RFP #2

THE LANGE GROUP

RESPONSE TO RFP ICS-FY-99-52
for

SERVICES TO DEVELOP AND IMPLEMENT A REPLACEMENT LAND COURT AND REGULAR AUTOMATED TRACKING SYSTEM

Prepared for

DEPARTMENT OF LAND AND NATURAL RESOURCES
BUREAU OF CONVEYANCES
STATE OF HAWAII

May 28, 1999 POSPONED

Prepared by

The Lange Group

500357

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The Lange Group

Software Systems Analysis & Telecommunications Consulting

May 28, 1999

Carl Watanabe, Deputy Registrar
Bureau of Conveyances
Department of Land and Natural Resources
1151 Punchbowl Street, Room 122
Honolulu, HI 96813

Dear Mr. Watanabe:

This is The Lange Group's sole and complete response to the State of Hawaii Request for Proposal; No. ICS-FY-99-052 FOR SERVICES TO DEVELOP AND IMPLEMENT A REPLACEMENT LAND COURT AND REGULAR AUTOMATED TRACKING SYSTEM FOR THE STATE OF HAWAII.

The Lange Group has solicited from various other sub-contracting vendors proposals in response to portions of the Bureau of Conveyance's requirements. The Lange Group will be responsible for the management of the project team and the performance of obligations incurred pursuant to its response to the Bureau of Conveyances' request for proposal.

The solution being proposed is very complex, not only because of our need to have a detailed understanding of your business, but because of our need to integrate a variety of products and technologies into a comprehensive solution for the BOC. The Lange Group team is uniquely qualified to do this, with their 19 years of application development and system integration experience and 10 years of collaboration with the BOC, we feel we have a solid understanding of the technologies and your business.

Thank you very much for the opportunity to submit a proposal for your Bureau of Conveyances' Integrated System. If you have any questions regarding this proposal, please call Nani Lindsey at 545-1822.

Thank you for considering The Lange Group. We look forward to being of service to the Bureau of Conveyances in the near future.

Sincerely,

Nani Lindsey
Manager

500359

1100 Ward Avenue, Suite 1050 Honolulu, Hawaii 96814 Fax (808) 599-5264 Phone (808) 545-1822

1.2 Transmittal Letters

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The Lange Group

Software Systems Analysis & Telecommunications Consulting

May 28, 1999

Carl Watanabe, Deputy Registrar
Bureau of Conveyances
Department of Land and Natural Resources
1151 Punchbowl Street, Room 122
Honolulu, HI 96813

Dear Mr. Watanabe:

The undersigned has carefully read and understands the Request for Proposal No. ICS-FY-99-052 FOR SERVICES TO DEVELOP AND IMPLEMENT A REPLACEMENT LAND COURT AND REGULAR AUTOMATED TRACKING SYSTEM FOR THE STATE OF HAWAII. If selected, we will furnish and deliver all items stated in this proposal. Our exceptions and/or clarifications to the RFP terms and conditions, which we are willing to negotiate, may be found in Appendix H, Terms and Conditions, of this proposal. This proposal represents The Lange Group's sole and complete response to your RFP.

Any questions that the State may have regarding this proposal should be directed to:

Name:	Nani Lindsey
Title:	Manager
Company:	The Lange Group
Address:	1100 Ward Avenue, Suite 1050
City:	Honolulu, HI 96814
Telephone No.:	(808) 545-1822
Facsimile No.:	(808) 599-5264

The undersigned understands and agrees that:

1. The undersigned has received all three (3) addenda to this RFP.

2. The undersigned is a corporation that was established in Honolulu, Hawaii on February 24, 1981 and is incorporated in the State of Hawaii. We have been registered with the Business Registration Division of the State of Hawaii Department of Commerce and Consumer Affairs to do business in the State of Hawaii since then. Our State of Hawaii General Excise Tax License ID is 1019-3806.

3. The Lange Group, Lange, intends to utilize the following sub-contractors on this RFP:

   - International Business Machines corporation, IBM
   - Boss Electric, Inc.

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4. It is understood that the State of Hawaii reserves the right to reject any and all Proposals and to waive any defects, when in the State's opinion, such rejection and waiver may be made in the best interest of the State.

5. By submitting this proposal, the undersigned is declaring that the proposal is not in violation of Section 84-15, Hawaii Revised Statutes, concerning prohibited State contracts and that the undersigned is certifying that this proposal was arrived at independently, without consultation, communication, or agreement with any other Offeror or competitor. No attempt was made or will be made by the undersigned to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

6. This proposal shall remain in effect until July 31, 1999; and that the prices listed in the proposal are firm and shall remain so throughout performance of the work.

7. If awarded the Contract, any services performed must be performed in accordance with Section 103D, Hawaii Revised Statutes.

8. This proposal contains assumptions and constraints which have not been approved in advance by the State of Hawaii.

9. The undersigned acknowledges that the entire RFP has been read and understood and agrees to be bound by its terms and conditions, as modified by our proposal.

We would like to request that the following five (5) pages be marked "Confidential". This is due to the fact that we do not want potential exposure of employee loss due to the shortness of Programmers in the market at this time. Thank You for your efforts in this matter.

4.0 - Organization and Staffing (page 1 – The Lange Group Organization Chart)
A1 - Staff Resumes (page 3, 4)
B1 – Staff References (page 2, 3)

Respectfully submitted,

Unique Computer Systems, Inc. dba
THE LANGE GROUP

Yolanda H. Lindsey
President

(SEAL)

Date: May 28, 1999
Address: 1100 Ward Avenue, Suite 1050
Honolulu, Hawaii 96814

Hawaii General
Excise Tax License No: 10193806
Type of Organization: CORPORATION
Federal I.D. Number: 99-0206123
State of Incorporation: HAWAII

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The Lange Group

Software Systems Analysis & Telecommunications Consulting

CERTIFICATION

I, Yolanda H. Lindsey, Secretary of Unique Computer Systems, Inc., a Hawaii corporation, do hereby certify that the following is a full, true and correct copy of a resolution duly adopted by the Board of Directors of said Corporation, at its meeting held on the twenty first day of January, 1999 at it's offices at 1100 Ward Avenue, Suite 1050, Honolulu, Hawaii 96814, at which a quorum was present, and that said resolution has not been modified, amended or rescinded and continues in full force and effect:

> "RESOLVED that any individual at the time of holding the position of President is hereby authorized to execute on behalf of the Corporation, any bid, proposal, or contract for software and consulting services to be performed by the Corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of Unique Computer Systems, Inc. dba The Lange Group, on this twenty seventh day of May, 1999.

Secretary

SEAL

500363

/ minutes certify

1100 Ward Avenue, Suite 1050 Honolulu, Hawaii 96814 Fax (808) 599-5264 Phone (808) 545-1822

International Business Machines Corporation
1240 Ala Moana Blvd.
Honolulu, HI 96814

May 28, 1999

Mr. Carl Watanabe, Deputy Registrar
Bureau of Conveyances
Department of Land & Natural Resources
1151 Punchbowl Street, Rm. 122
Honolulu, Hawaii 96813

Dear Mr. Watanabe:

The undersigned has carefully read and understands the Request for Proposal No. ICS-FY-99-052 for Services to Develop and Implement a Replacement Land Court and Regular Automated Tracking System for the State of Hawaii.

The Undersigned understands and agrees that:

IBM, International Business Machines Corporation, is a corporation that was established in Endicott, New York on June 14, 1911 and is incorporated in the State of New York. We have been registered with the Business Registration Division of the State of Hawaii, Department of Commerce and Consumer Affairs, to do business in the State of Hawaii since January 31, 1950. Our State of Hawaii General Excise Tax License ID is 1000-2555. Our tax clearance has been included with this letter.

The general scope of work to be performed by IBM, as a subcontractor to The Lange Group, is as specified in **Phase 1 of Part 1, Tasks 1 - 6 and Phase 2 of Part 1, Tasks 7 – 9** Statement of Work; to the State of Hawaii-Department of Land and Natural Resources-Bureau of Conveyances RFP No. ICS-FY-99-052.

IBM is willing to perform the work as a subcontractor to The Lange Group as indicated above within the designated time as specified in **Phase 1 of Part 1, Tasks 1 - 6 and Phase 2 of Part 1, Tasks 7 – 9.**

Respectfully submitted,

Steven M. Mizokawa
Business Unit Executive
International Business Machines Corporation

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INTERNATIONAL BUSINESS MACHINES CORPORATION

I, Robert F. Salvia, IBM Americas, do hereby certify that said General Counsel, in accordance with the resolutions of the Board of Directors of International Business Machines Corporation ("IBM"), at a meeting duly held and called on April 25, 1994, at which a quorum was present and acting throughout, has been duly authorized to execute and deliver on behalf of IBM any contract or other instrument necessary or appropriate in the ordinary course of IBM's business, including but not limited to bid documents for the sale of IBM products and services to federal, state and local governments and agencies, purchase orders and sales agreements, and the like, and to delegate this authorization within the IBM Americas organization, which includes IBM Puerto Rico, as may be permitted by law; and that said authorization has not been modified, amended or rescinded and continues in full force and effect. So authorized, I hereby delegate said authority to execute and deliver on behalf of IBM any such contract or other instrument to the following persons holding the below listed positions in IBM Americas:

General Manager
President
Treasurer
Vice President
Area General Manager
General Counsel
Assistant General Counsel
Corporate Counsel
Area Counsel
Senior Area Counsel
Senior Counsel
Site Counsel
Staff Counsel
Senior Attorney
Staff Attorney
Attorney
Director
Business Development Executive
Managing Principal
Solutions Executive
Principal
Solutions Executive/Manager
Business Area Manager
Regional Manager (Area CSO)
Area Business Planning Manager
Manager of Finance
Segment Manager/Executive
Manager of Services Center
Manager, Availability Center, IBM Global Services
Availability Services Manager
Professional Development Manager
Manager, Parts Sales and Infrastructure Services, IBM Global Services
Program Director, GSA Schedule Programs
Manager, Federal Contract Relations

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Contract Relations Advisor
Location Manager/Executive
Marketing Manager
National Account Manager
Manager, Contracts and Procurement
Account Executive
Business Unit Executive
Unit Manager
Industry Executive
Sales Manager/Regional Sales Manager
Manager of Consulting Services
Customer Operations Manager
Client Executive
Customer Service Executive, IBM Global Services
Enterprise Service Executive, IBM Global Services
Client Manager
Practice Leader
Customer Engineer, IBM Global Services
Business Measurement Analyst
Customer Contract Representative
Systems Integration Manager, IBM Global Services
Customer Service Operations Center Manager, IBM Global Services
Field Manager, IBM Global Services
Client Representative
Marketing Specialist
Sales Specialist
Services Specialist
Marketing Representative
Customer Support Representative
Customer Relationship Representative
Project Leader
Certified Marketing Specialist
Project Manager/Executive
Opportunity Manager/Executive
Consultant
Senior Consultant
Executive Consultant
Area Bankruptcy Coordinator
Program Manager
Account Support Representative
Business Offering Advocate
Field Marketing Practices

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of said International Business Machines Corporation on this 24th day of February 1999.

500366

General Counsel, IBM Americas

BOSS ELECTRIC
Licensed Electrical Contractors
Lic. No. C-14828

46-178 Kahuhipa Street
Kaneohe, Hawaii 96744
Phone: (808) 247-1411
Fax: (808) 235-3625

May 19, 1999

Mr. Carl Watanabe
Deputy Registrar
Bureau of Conveyances
Department of Land & Natural Resources
1151 Punchbowl St. Rm. 122
Honolulu, Hawaii 96813

Dear Mr. Watanabe,

The undersigned has carefully read and understands the Request for Proposal, No. ICS-FY-99-052 FOR SERVICES TO DEVELOP AND IMPLEMENT A REPLACEMENT LAND COURT AND REGULAR AUTOMATED TRACKING SYSTEM FOR THE STATE OF HAWAII.

The undersigned understands and agrees that:

The undersigned is a corporation registered with the Business Registration Division of the State of Hawaii, Department of Commerce and Consumer Affairs to do business in the State of Hawaii. Our Electrical Contractor license number is 14828. Our State of Hawaii General Excise Tax ID number is 10344476 and is not delinquent nor do we owe any State tax. Boss Communication Technologies was incorporated in the State of Hawaii in August 1987.

The general scope of work to be performed by Boss Communication Technologies Inc. as a subcontractor to IBM is as specified in part 1, phase 1, task 1, to the State of Hawaii Department of Land and Natural Resources-Bureau of Conveyances RFP No. ICS-FY-99-052.

Boss Communication Technologies Inc. is willing to perform the work indicated above within the designated time as specified in part 1, phase 1, task 1 to the State of Hawaii Department of Land and Natural Resources-Bureau of Conveyances RFP No. ICS-FY-99-052.

Respectfully submitted,

Boss Communication Technologies, Inc.
Exact legal name of offeror

Glenn Boss, Vice President

Glenn Boss

General excise tax I.D. No. 10344476

*If the corporate seal is not available at the local office where the proposal is prepared, as a letter signed by an authorized corporate officer indicating location of the seal may be attached to the proposal as an acceptable substitute.

**Please attach to this proposal evidence of authority of this officer to submit on behalf of the company.

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BOSS ELECTRIC
Licensed Electrical Contractors
Lic. No. C-14828

46-178 Kahuhipa Street
Kaneohe, Hawaii 96744
Phone: (808) 247-1411
Fax: (808) 235-3625

Boss Communication Technologies, Inc.

I, Glenn Boss, Secretary of Boss Communication Technologies, Incorporated, a Hawaii corporation, do hereby certify that the following is a full, true, and correct copy of a resolution duly adopted by the Board of Directors of said Corporation, at its meeting duly called and held at the offices of the Corporation, 46-178 Kahuhipa Street, Kaneohe Hawaii 96744, on the seventh day of November 1991, at which a quorum was present and acting throughout, and that said resolution has not been modified, amended or rescinded and continues in full force and effect:

> "RESOLVED that any individual at the time holding the position of President or Vice President, be, and each of them hereby is, authorized to execute on behalf of the Corporation any bid, proposal, or contract for the sale or rental of the products of the Corporation or for services to be performed by the Corporation, and to execute any bond required by any such bid, proposal, or contract with the United States Government or the State of Hawaii or the City and County of Honolulu, or any County or Municipal Government of said State, or any department or subdivision of any of them."

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of Boss Communication Technologies, Incorporated on this nineteenth day of May 1999.

Glenn Boss

Secretary

President and Treasurer:	John E. Boss 1223 Manulani St. Kailua, Hawaii 96734
Vice President and Secretary:	Glenn Boss 1030 Aoloa Pl. #304A Kailua, Hawaii 96734

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2.0 Executive Summary

Understanding the Bureau of Conveyances' Vision

The Lange Group (Lange), is honored to offer the Bureau of Conveyances-State of Hawaii (BOC) a total solution to meet the requirements of RFP ICS-FY-99-052; Request for Proposal for Services to Develop and Implement a Replacement Land Court and Regular Automated Tracking System for the State of Hawaii.

The staffing of a systems design, development, conversion and implementation project may be the single most important determinant of project success. Our project approach is team based. The members of the TEAM have the depth of industry and technical knowledge, and a complete and workable solution that meets BOC's business requirements.

The formulation of our "TEAM" was based on the following:

- The Lange Group offers unparalleled knowledge of BOC's current application, Year 2000 remediation skills, WANG VS to IBM's RISC System/6000 migration expertise, and in depth knowledge of BOC's user community and application enhancement requirements.
- IBM's unparalleled expertise in technologies required to implement this proposal, which include networking, imaging, Web enablement, and hardware and software solutions.

The Lange Group has outlined distinct roles and responsibilities in implementation of the BOC solution, our previous working relationship as a team allows us to confidently fashion and deliver a successful project.

The Bureau of Conveyances (BOC) has a unique opportunity to modernize its current processes with IBM's VisualInfo Document Management System. Many government organizations that have embarked on re-engineering or migrating their current systems have had mixed results. The solutions provided by "high-tech" answers to today's problems are sometimes more difficult to use than the problems they try to solve. We believe that BOC can avoid many of the problems that befall other organizations by utilizing IBM's VisualInfo products. IBM's VisualInfo Client Application for scanning, indexing and document management will provide BOC with proven state-of-the-art technology to drive modernization of your current processes. As BOC has discovered, the use of information technology to support government services and operations is no longer a "nice to have", it is critical to the success of BOC today.

The Lange Group recognize that the migration to a new technology platform and infrastructure will require detailed planning to minimize disruption to the BOC's operations and allows you to maintain service to the public. We are committed to the successful implementation of the Bureau of Conveyances' technology architecture. We have therefore, assigned qualified and experienced resources to provide an integrated solution that embraces our vision of delivering technology through its appropriate application in support of the Bureau of Conveyances' mission, goals and objectives.

Meeting these goals is only possible if the right team is assembled to perform the work.

Why our Core Team is the Right Team

The Bureau of Conveyances' RFP requirements drove the selection of our team.

- Familiarity with and understanding of the existing Bureau of Conveyances' application programs.
- Experience with migration of Wang VS minicomputer applications to the RISC System/6000.
- Experience with the technologies required to satisfy the Bureau of Conveyances' goals.
- Experience with statewide telecommunications network, LANs, and intelligent workstations.
- Experience with IBM RISC Systems/6000 and NT servers with intelligent workstation clients.
- Experience with large-scale image enablement projects in many different industries and environments.
- Experience with WEB enablement to provide Internet/Intranet services.
- Industry leadership with image conversion services committed to meeting each client's specific needs with high-quality results.

The Core Team was selected to provide these critical ingredients. The principal members of the Team is composed of:

- **The Lange Group (Primary Contractor)** – Offers unparalleled knowledge of the Bureau of Conveyances application programs on the Wang VS and prior conversion experience with Wang VS, SPEED II and IBM RISC Systems/6000. The Lange Group will be responsible for assisting the Bureau of Conveyances in a detailed study and analysis before undertaking enhancements, migration and conversion of applications from the existing Wang platform. The Lange Group is a local, IBM Business Partner, who has been servicing the Bureau of Conveyances since 1987 when SPEED II was first installed on their Wang VS. The Lange Group has unparalleled knowledge of existing BOC applications on the Wang VS. This knowledge is critical in successfully migrating and converting applications from the existing Wang VS in the shortest and most cost effective manner.

  The Lange Group is a Hawaii-based computer software development and consulting firm that has provided cost-effective business solutions for over 18 years to more than 50 clients in both government and private sectors throughout the state of Hawaii. Our software has been installed on over 100 computer systems. It is a trade name of Unique Computer Systems, Inc., a Hawaii corporation founded in 1980.

  Our staff has many years of practical experience in the analysis, evaluation, design, development and implementation of mission critical mid range to large scale integrated computer solutions. All members of The Lange Group have at least a Bachelors degree in Computer Science from a major university. Together, we make up a tight-knit group of Applications Developers and System Integrators who can focus on the solution business issues.

The Lange Group has had a long 19-year history of technical consulting and services to various aspects of the BOC customer base, especially the Legal and Real Estate industry within the state of Hawaii. They have provided automated applications in the Real Estate Brokerage, Real Estate Management, Title & Escrow and have been involved with the Honolulu Board of Realtors technical review committee. The Lange Group is very familiar with the BOC's customers needs and capabilities. This knowledge will be engaged further to insure the BCIS has the highest degree of functionality so that the BOC can provide.

IBM and IBM Global Services (Subcontractor) – In IBM today, there are two fundamental missions:

- Strive to lead in the creation, development and manufacture of the most advanced information technologies.
- Translate advanced technologies into value for our customers with the world's largest information services company, IBM Global Services.

IBM offers extensive experience in project management; unparalleled knowledge of the proposed Bureau of Conveyances' hardware, system software and telecommunications environment; training skills; and extensive experience with the proposed imaging, Internet services, and networking solutions.

IBM's ability to successfully execute and expedite complex system projects is accelerated by the use of a worldwide Application Development/Systems Integration (AD/SI) methodology. IBM's Worldwide Integrated Solution Design and Delivery Methodology (WSDDM) is a comprehensive methodology incorporating robust tools and methods for project management, application development and system integration. WSDDM provides a consistent methodology for all IBM services practitioners around the world. It formalizes the essential components of every project, from planning and design to delivery and maintenance. It is our experience that this approach mitigates the complexity and risk associated with these technologies and generates a functionally stable solution at the conclusion of the project.

The Right Approach for Implementing the Bureau of Conveyances' Goals and Objectives

The Bureau of Conveyances faces a formidable challenge in attempting to implement a new technology architecture. The team, which implements the new architecture, must accommodate an existing Bureau of Conveyances' system, integrate multiple technologies, migrate applications, and educate users. The Core Team is committed to assist the Bureau of Conveyances in meeting this challenge with an approach to implementation that controls risk.

Upon careful evaluation of your requirements, coupled with our experience in complex systems integration projects, the Core Team has developed a phased implementation approach to ensure success. Our objective in this proposal is to combine the products and services, which best meet your needs using the proposed phased approach. The highlights of this strategy include the following:

The Lange Group's Proposal

The RFP is broken down into two parts. Part 1 which comprises two phases and eleven tasks, and Part 2 which makes up one task, task 12. This proposal is in response to Part 1, Phase 1 and 2 which is comprised of Task 1 through 11. The Lange Group has declined to offer a response to Part 2, task 12. Instead we will work with the Vendor of the BOC's choice in the integration of deliverables of task 12 into the new BCIS. The activities involved here is described in our task 7 "b".

Migration/Enhancements to Land Court and Regular System

The Lange Group will migrate all of the applications currently residing on the WANG VS to the proposed BCIS running on the RISC System/6000, and replace the standalone UNISYS by providing a new fully functional Regular System Tracking application. The new BCIS system will be made Year 2000 ready and enhanced to meet BOC's requirements. The end product will be a fully functional integrated BCIS with one point of entry that minimizes duplication of work, and enhanced to provide greater accessibility and efficiency of the BOC. The steps involved in implementing this robust, integrated, enhanced BCIS were formulated with the intention of providing the greatest realized benefits, while minimizing disruptions to the daily BOC operations. Any disruptions would be offset by features and functionality superior to the existing process.

The migration approach of the mission-critical existing applications was chosen to capitalize on the years of customization invested in this unique Land Court and Regular System. Migration in general minimizes the risk factor of time and resources that accompany new development efforts. More directly, it minimizes the training and learning curve of the BOC staff, allowing them to spend the time improving and enhancing their existing skills in new and advanced technology.

Migration would involve the conversion of the existing SPEED II applications including all associated data of (K03) LCATS and (K06) Receiving/Accounting, to the APPX environment, a SPEED II equivalent on the UNIX platform. Enhancements to the migrated applications will be made after successful migration. The "infant" BCIS would also provide for the Hawaii FYI links to the LCATS subscribers.

The new Regular System Tracking application will have enhanced tracking and management information functions, and would allow the BOC to search and access the General Index information by anyone in the BOC. These enhancements would include a tighter coupling of both recording systems to Accounting and Management Reporting. Both Land Court and Regular System will contain the modules, and be ready for "image enabling" where the actual document images will reside on the new BCIS.

Digital Imaging and storing of the BOC recorded documents

The BOC, like many government entities worldwide, is driven by paper. Much of government output is in the form of paper documents that are mailed, filed, and stored, often for very long periods.

The Lange Group is proposing the implementation of IBM's ImagePlus VisualInfo product integrated with Kofax's Ascent Capture product as the solution platform for BOC's BCIS system. VisualInfo will provide an industrial strength system and with enterprise wide capabilities. In combination with IBM's business partner, Kofax Ascent Capture, VisualInfo will deliver key

critical business and technical functions that will allow BOC to enhance its ability to provide quality service.

ImagePlus VisualInfo is the latest member in IBM's ImagePlus family. VisualInfo can manage business documents that include information of many types including image, graphics, audio, video, spreadsheets, and word-processing text. VisualInfo is a key component of our EDMSuite family, which encompasses a variety of disciplines, including imaging, workflow and COLD technology.

IBM's VisualInfo will be combined with Kofax's Ascent Capture software to facilitate the image and data capture portion of the solution. This modular solution contains the following components: Scan, OCR, Index, Rescan/QA and Release which makes the index data available to your business application. In addition, the Release module interfaces to the VisualInfo long-term storage software for archive and retrieval purposes of the image and index data. As a part of this proposal, implementation of an image enable BCIS system will provide a seamless integration between the Regular and Land Court Systems.

Implementing BOC's Network infrastructure and UNIX and NT platforms

This proposal provides migration from the current BOC Land Court and Regular Systems to the proposed RISC System/6000. The implementation of an I/O redundant migration platform and a reliable, high performance network infrastructure framework is pivotal to our solution of providing timely and accurate information to all projected end users. A uniform goal throughout the project will be to get end users up and running as quickly as possible, balanced with quality and low risk.

This proposal provides for many new features and functionality for the BOC. The following major components form the infrastructure and foundation for the BCIS solution deployed:

- A UNIX "IBM's AIX" based RISC System/6000 H50 Enterprise server that has been designed for high performance and I/O redundancy. There is also an optional CPU configured which can be utilized in the event of primary server shutdown

- ADSTAR Distributed Storage Manager (ADSM) software, on the IBM RISC System/6000 for enterprise-wide storage management solution. This software provides unattended backup and archive, Hierarchical Storage Management (HSM), and disaster Recovery Manager designed to support business continuance while implementing disaster recovery operations

- IBM's DB2/6000 Universal Database (UDB), an Open Systems Relational Database (RDBMS). The database is crucial in forming the foundation of BOC's business activities

- An NT based file and print server to enhance the BOC's capabilities in these areas. This server will also function as the base for the image capture server for the daily document scanning and indexing. This NT server will facilitate sharing of both software and physical resources such as printers.

- A BOC LAN made up of a Fast Ethernet based network with a centralized switch to increase total performance and availability. The BOC will be linked to the RISC System/6000 H50

Enterprise Server and the NT server over high performance fiber optics, running 100 Mbps/second to every desktop.

- Connection to the FYI users will always be maintained through out the implementation process to ensure no loss of functionality and capability for the existing remote users
- All workstations will be high performance PC's for all BOC users, workstations capable of supporting the future both image applications and future growth.

Implementing remote access both from Neighbor Islands and the Internet

The Lange Group will provide additional components for remote access to the BCIS solution for two classes of users, neighbor island BOC locations and Internet public access. Both image and data access will be enabled for both sets of remote users.

Neighbor Island BOC Users

The Neighbor Island users will utilize the BCIS applications and image and will connect via a cost/performance effective solution like frame relay or ISDN.

These remote BOC users will access the BCIS applications and images through the LAN or WAN that will connect these users to the BCIS RISC System/6000 H50 Enterprise Server.

Public Access Users (Internet)

The proposed Internet public access solution is divided into two areas: data retrieval and image retrieval. For the data retrieval component, public users will access a partial BCIS application through the Internet. This will be referred to as the Web-based BCIS for clarification purpose. This Web-based BCIS will have a limited set of functionality to let users search and browse for information, but this will not be a full replication of BCIS on the Web. The process will consist of initial user access to the BCIS application via a customized Java applets

For the image retrieval component, the user will have the option of entering the imaging system from the BCIS Java application to retrieve the specific document. For this Web-based image retrieval function, the IBM ContentConnect client makes a request for an image that is passed through the Web Server which in turn communicates with the VisualInfo Library and Object Server. The IBM ContentConnect product allows access to VisualInfo to be performed on any client operating system using a standard WEB browser.

SUMMARY

It is clearly stated throughout the RFP that the vendor's solution must provide the BOC with technology which enables the BOC to provide quality service through efficient use of resources that enhances the operations within the BOC, and which provides a higher level of products and services to their customers. Our objective in this proposal is to combine the products and services that best meet the needs of the BOC using a phased approach.

The new BCIS will reside on a framework that can easily accommodate growth, and is flexible enough to utilize new technological advances, as they become available. The BCIS engages advance technology products and methods to increase BOC's operational efficiency, launching them ahead at the start. This translates to greater productivity of the BOC operations, and therefore capable of accommodating and providing proactive services to their Customers and to the Public in general.

3.0 Project Approach, Work Plan and Schedule

3.1 Project Approach

3.1.0 Overall Proposed Solution Description

The Lange Group proposes to provide the Bureau of Conveyance of the State of Hawaii with a new, enhanced, comprehensive system for receiving, storing, converting and disseminating information. This new BCIS system will replace the current Regular and Land Court Systems and will offer the State of Hawaii an consistent method of capturing electronic documents and maps by scanning an storing them into a database. The State of Hawaii BOC is pursuing the implementation of a document imaging system to take advantage of the technological opportunities associated with automated storage and retrieval. BOC users will be able to retrieve these documents online, view them at different magnifications, and print them. The system will have backup and recovery capabilities so BOC will not lose valuable documents and will have security to prevent unauthorized use and abuse. The system will have redundant hardware and employ mirroring techniques to ensure around the clock access from a usage perspective. BOC users on neighbor islands will have remote access to BCIS and the public will be able to access a limited set of BCIS capabilities from the Internet.

Although The Lange Group has declined to provide services for Part 2 Load Back Microfilm Images, we have included services to work with the appropriate vendor of choice in planning, and implementation of their images import. Theses services are further described in Task 7, Enable Remote Access to Image Data.

Task 1 – Implement BOC Network

Task 1 will involve the implementation of a high speed data network for the BOC, high performance desktop workstations and printers, and an NT based file and print server.

The data network will be a switched Fast Ethernet 100 Mb based LAN, which is more than capable of providing high performance image applications and growing into the future. Workstations will be cost effective, yet high performance 450 MHz Processors, with adequate memory and disk. IBM's Microsoft certified and network professionals will perform the implementation work, as well as connecting with the Windows NT Server.

Task 2 – BOC Requirements Verification

This task requires the verification of the proposed BCIS with the operational requirements of the BOC. This task will consist of performing a structured walk through of specific tasks identified by the BOC, performing a functional comparison of the BCIS with the existing

LCATS and General Index systems, and performing a data flow analysis of BCIS that will confirm that all data paths are addressed.

Task 3 – Replacement of the Regular and Land Court Systems

This task will consist of migration of the WANG VS applications to the new BCIS, as well as creation and integration of a new Regular System Tracking Application. The Lange Group will be using the SPEED II to APPX migration tools provided by APPX Software, for whom The Lange Group is the local distributor. The conversion of all WANG DMS data to the DB2 relational database management system will also be done with 100% conversion effectiveness. Two RISC System/6000 model H50 will be installed, configured and tested with the required software including backup, and Database support, by IBM technicians. Remote support will be added to accommodate the existing Title Company access.

Migration Ease, at a Fixed Cost

Migrating SPEED II to APPX allows the BOC to retain thousands of hours and dollars of development resources (application design, user training, data, etc.) into the new system. The migration process is managed and controlled, since all applications being migrated have been developed by The Lange Group. It allows for seamless migration, quickly and correctly while maintaining consistency and stability throughout the business system. All data as well as 100 percent of the applications are moved materially unchanged. This move takes full advantage of continuous, incremental improvements inherent in the new software and hardware platforms.

Fixed fee migration eliminates the risk and exposure of long term, hourly based consulting. The Lange Group understands the basis of the application software and will incorporate features to take advantage of the increased functionality provided by APPX and the new BCIS hardware platform, windows based workstations and web access. All software is Y2K compliant. Of paramount importance, understanding of the BOC environment minimizes migration time and cost, which can be spent in further enhancements.

APPX is a complete, comprehensive rapid application build and change tool for industrial strength applications. It currently runs on many hardware and software platforms, and provides integration with a wide variety of database products including Oracle and DB2. We have chosen DB2 as the relational database to reside on from a "price performance" objective. IBM is known for it's excellent support here in Hawaii, and has proposed a DB2 solution for the State of Hawaii that is very cost effective.

Regular System Tracking - "Piece of Cake"

Task 3 also includes the design, development and implementation of a new Regular System Tracking application using APPX. At least from an implementation standpoint, The Lange Group having already developed a comprehensive Land Court Tracking system for the BOC, the Regular System Tracking will be incrementally easier. This new system will contain the same level of edit checks and ease of data entry, providing access by any BOC authorized user. This new application will incorporate what is currently captured by the UNISYS, eliminating the need for microfiche conversion. This new system will be integrated into the Receiving and Management Reporting modules, further facilitating Double System

Recordations. A quicker electronic download of the General Indexes can be made to the companies currently receiving magnetic tapes or a CD-ROM can be written, relieving the ICSD from these clerical data transfer functions, and speeding up turn-around time to these companies. In general, this new Regular System Tracking application will provide the BOC with more timely access to recorded information which can now be offered to BOC's customers and the General Public.

Task 4 – Implementing Imaging Capability on the BOC Network

Task 4 imaging will consist of image and data capture, long term storage and image retrieval. To develop the overall solution for this task, the project team will use Kofax's Ascent Capture Software, for the front-end data and image capture along with IBM's ImagePlus VisualInfo for long term storage and retrieval. This phase will also include writing the images out to the Kodak 4800 image writer as part of long term storage to meet legal and archival requirements.

Kofax Ascent Capture

The key to Ascent Capture is its powerful batch manager and administration. With Ascent, system administrators use a simple menu-driven user interface to define processing procedures and rules for each type of document. This ensures that every document is scanned and indexed the same way and reduces operator-training requirements, ensures consistent quality, and simplifies system management.

This modular solution contains the following components: Scan, OCR, Index, Rescan/QA and Release which makes the index data available customer's business application. In addition, the Release module interfaces to the VisualInfo long-term storage software for archive and retrieval purposes of the image and index data.

In Brief Ascent Capture

- Provides a scaleable client/server platform suitable for low to high volume processing
- Supports both single- and dual-sided scanning via high-end video and SCSI interface models from BancTec/TDC, Bell+Howell, Fujitsu, Kodak, Panasonic, Photomatrix, and Ricoh
- Automatic document separation, in the form of bar codes and patch codes, helps to speed the processing of scanned documents.
- Includes the industry's best image processing, bar code reading, and optical character recognition (OCR).
- Provides a Visual Basic compatible macro language allowing very powerful access to system resources outside of Ascent Capture, including the ability to open an external database and validate entered values against a database or document manager.

The Ascent Capture software will be used for the image and data capture portion of the design.

ImagePlus VisualInfo

ImagePlus VisualInfo is a member of IBM's EDMSuite family. VisualInfo can manage business documents that include information of many types including image, graphics, audio, video, spreadsheets, and word-processing text. VisualInfo is a key component of our EDMSuite family, which encompasses a variety of disciplines, including imaging, workflow and COLD technology. This is a strategic product area focus for the IBM Corporation.

In a traditional library system, the library contains a card catalog, the actual books or objects, and the readers or clients of the library. In VisualInfo, the same concepts are used. Business documents will be cataloged (indexed) in the NT Library Server and images will be stored the VisualInfo NT Object Server. The servers will be accessed by a functionally-rich Windows/95 or NT client which provides access to all library services including document organization, management and on demand delivery of information.

In Brief VisualInfo

- Provides a scaleable client/server platform suitable for small workgroups through large enterprise solutions.
- Allows easy-to-use, advanced document management supporting a range of object types including image, spreadsheets, word-processing text, audio, and video clips.
- Provides basic work management capabilities to support business process re-engineering.
- Provides hierarchical storage management for automatically moving images between storage devices such as magnetic hard drives, optical, and tape.
- Provides robust system services to bring industrial strength solutions to the LAN environment.
- Includes industry specific and cross-industry offerings from business partners and IBM Service organizations.
- Provides Windows 3.1, Windows 95, Windows NT, OS/2 and Internet/Intranet clients
- Provides unconstrained distributed document storage to access information rapidly and efficiently.
- Includes an OPEN design enabling integration of line-of-business applications and complementary offerings to provide functional extensions.

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The VisualInfo product will be used for long-term image storage and retrieval for the design of BOC's Image system.

Task 5 – Implementing Imaging Capability to BCIS

In this task, the integration of images captured into the VisualInfo DB2 database will be integrated into the application, network and the operation of the BOC. This shall include the capabilities and requirements identified in Section 3.6 IMAGING REQUIREMENTS of the RFP. In addition, update functions will be created which will check that the links between the Text data and the Images are synchronized.

At this point, the BOC users will be able to pull up a record in either Regular or Land Court and be able to "hot key" up the associated document in another window on their PC. All the functionality provided on a standalone basis in task 4, will now be available to any BOC user with the appropriate access level.

Task 6 – Enabling Remote Access to Text Data

In this task, we will provide additional components for remote access to the BCIS text data for neighbor island BOC locations. This will allow any BOC user in the five remote locations, via a high speed data line, to perform the same functions as if they were in the Honolulu office, accessing text data only, based on their logon security.
The neighbor island users will connect via a cost/performance effective solution like Frame Relay or ISDN.

- This task includes setup of the five remote locations to each be outfitted with a DELL PC 450MHz with 64MB SDRAM, 6.4GB of disk, and a 17" color monitor. Also, a Lexmark 12PPM Laser Printer will be attached so that remote printing would be possible at these neighbor island locations. The same equipment at the remote locations are also proposed for the Honolulu BOC, so that users will be familiar with the hardware operations. These same hardware components already exist in the State Parks Division. Connecting this hardware to the BCIS will be additional network components consisting of Cisco Routers to support frame relay access.

Task 7 – Enable Remote Access to Image Data

This task provides additional access to the BCIS image data for Neighbor Island BOC locations. This will allow any BOC user in the five remote locations, via a high speed data line, to perform the same functions as if they were in the Honolulu office, accesing both text and image data, based on their logon security.

The Neighbor island users will now be able to utilize the image applications developed in task 4 and made available to the local BOC users during task 5. The neighbor island users will connect via a cost/performance effective solution like frame relay or ISDN previously setup in task 6.

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Task 7 b – Backfile Microfilm Integration

The microfilm back-file conversion will play a crucial role in the successful implementation of the imaging system. The benefits expected from the document imaging system will be fully realized when the system contains a full complement of active document images, which will enhance the dept of information that the BOC can easily offer.

We intend to perform the integration of the images and data provided by the subcontractors chosen by the BOC to complete Part 2, Task 12 Load Back Microfilm Images at this step. We feel that addressing this task after the BOC has implemented it's image entry component, will give the BOC a chance to revise procedures and understand the processes including stabilizing it's own image and data entry and retrieval processes. We will provide this chosen vendor with needed specifications in order to correctly integrate their images into the BCIS. We will also design procedures and provide a customized import program that can be used by the BOC to update the BCIS with the images and data from the vendor, in a controlled, systematic environment.

Task 8 – Enable Public Access to Text Data

In this task, we will provide additional components for Internet access to the BCIS text data for the General Public utilizing a PC containing a common web browser (like Microsoft Internet Explorer or Netscape Navigator). During this task two additional servers, the Public Access web server and a separate firewall, will be added to the rack installed in task 1 containing the BOC network server. The firewall will provide secure only access to the BCIS for the public. We will interface the Web Server and the Firewall to the Internet using Cisco Routers.

A Public Access Web Server, accessing the back end BCIS applications via DB2 Queries, and IBM ContentConnect's Web based image retrieval system, will contain the web enabled java application which will drive the end user search and retrieval of text data. We will provide the Java based application which the BOC web page will link to.

Task 9 – Enable Public Access to Image Data

This task is like task 8, but provides for additional access to the BCIS image data over the internet for Public Access. Anyone accessing the BCIS over the internet with a PC containing a common web browser (like Microsoft Internet Explorer or Netscape Navigator) will be able to access both text and image data from the BCIS. All hardware and software components will be in place. There are no additional hardware or software components that are needed from this point.

Task 10 – Data Remediation

Back file conversion of General Index data contained on the ICSD mainframe since 1976 will be converted and imported into the new BCIS, and therefore be available to authorized users and the new General Index search module. We will work with ICSD in obtaining magnetic tape or other compatible electronic media to accomplish this. The records provided will be scanned for missing fields and an exception report of these records will be

provided. Alternatively, if the Part II, Task 12 vendor provides this information as part of their submittals along with the 10 years of microfilm to image conversion, we will provide the import program to read their information and update the BCIS accordingly.

Task 11 – GIS Requirements Study

This task involves the formulation of a proposal based upon the needs of the DLNR to store or access GIS map data (plat maps). This involves presentation and submission of a written report that is clearly understood to DLNR. Basically this entails conducting a study toward later implementation. This does not involve submitting an actual plan or cost estimates for a functional GIS system, but rather to define "System Requirements" and present "System Design Alternatives" (physical design which indicates task for each alternative that should be considered).

Task 12 – Load Back Microfilm Images

The Lange Group has declined to provide services for Part 2, Task 12 Load Back Microfilm Images, but we have included services to work with the appropriate vendor of choice in planning, and implementation of their images import. Theses services are further described in Task 7, Enable Remote Access to Image Data.

3.1.1 Task 1 Proposed Solution

Task 1 – Implement a Basic BOC Network

Overview

The first requirement is the implementation of a basic network to tie together the local PC workstations at the BOC. A Windows NT file and print server will be installed in this task. This server would enable sharing of LAN printers for non-BOC application usage, such as word processing and spreadsheets. This server also would provide a place for some other shared applications, such as central storage of Microsoft Office applications. Optimally we have proposed a dual CPU Server which has two 450 MHz Processors, 256 MB RAM, and six 9.1 GB RAID enabled hard drives. This server would be located within a rack that will also house the future Internet Web and Firewall Server planned for Task 8, and will be attached to the network through one of the 100 Mb Ethernet hubs. This server will also serve as the image capture server in Task 4. Services to install this server are included in our price.

The basic components required for this phase include:

- A Fast Ethernet network to span the RISC System/6000 Enterprise Server at ICSD, and the BOC offices on the first floor
- Thirty three additional DELL P3 450MHz PC's with twenty eight 17" monitors and five 21" monitors to act as workstations for BOC personnel which will replace their WANG workstations

- Printers both HP LaserJet 24ppm printers and Lexmark 12ppm printers
- Cabling to support the Ethernet Network

The solution is as depicted in the drawing entitled "Task 1 Schematic."

The PC's themselves will be image capable. That is, they will have enough memory, CPU, and disk to support the image application when loaded. To this end, we recommend DELL P3 450 MHz CPU's, with 64 M RAM memory, and 6.4 GB disk. There will be a mixture of 17" and 21" monitors for regular and image intensive users. While smaller machines would be adequate initially, the price difference is not great enough to offer a significant advantage. For the future it is best to get a sizable machine today. PC's will require Windows 95/98 with software to support TCP/IP access to the RISC System/6000s. In this initial phase, the PC's will emulate VT100's to the RISC System/6000, utilizing telnet. Essentially, the PC's will strictly act as terminals accessing BOC applications on the RISC System/6000.

Cabling in support of this Ethernet network will be a combination of Category 5 Twisted Pair copper cabling, and 62.5 micron Fiber Optic cabling. The Category 5 cabling will be used to connect the PC's to the hubs, and is certified for 100 Mbps operation. The Fiber cabling is to connect the ICSD Ethernet Switch to the First Floor hubs.

Recommended Components

- 1 24 port 10/100 Ethernet Switch with redundant power supplies
- 2 24 port 100 Mb hubs, with fiber uplink
- 2 24 port 10/100 Mb hub with fiber uplink
- 4 100 Mb copper to fiber converters
- Two 10/100 Ethernet Adapters in each RISC System/6000
- PC's with 450 MHz CPU's, 64 M RAM, 6.4 GB Hard Drives, 10/100 Ethernet cards, and both 17 " and 21" monitors
- Laser Printers with 10/100 Ethernet cards, or external Print Servers
- Category 5 cabling to each desktop
- 12 strands of 62.5 Micron Fiber cable between ICSD and First Floor (six strands to each office)
- TCP/IP Telnet software for PC's
- Windows NT Server (450 MHz Processor, 256 Mb RAM, seven 9.1 GB RAID Hard Drives, 10/100 Ethernet card)
- Windows NT Server Software

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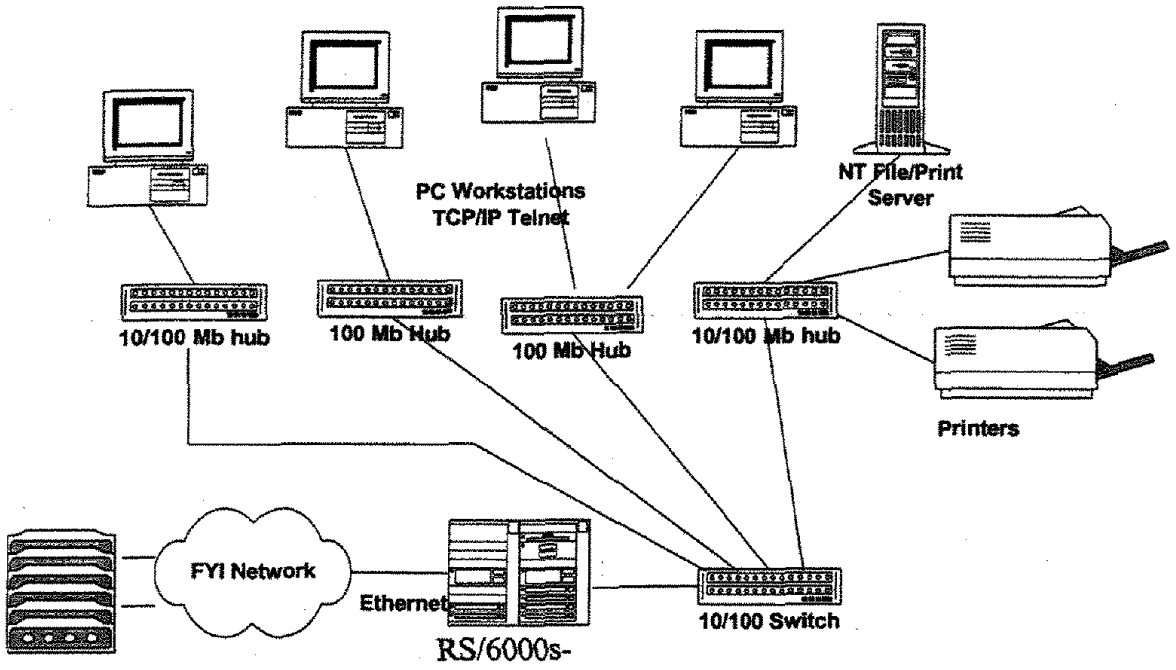
Task 1 Schematic



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3.1.2 Task 2 Proposed Solution

Task 2 – BCIS Requirements Verification

This task will consist of performing a walk through of the current operational environment at the BOC in order to obtain greater understanding of the current work flow of the BOC and to review alternatives with the BOC in the way work could be better accomplished. The information gathered will be used to provide detailed design specifications to be used in subsequent phases, as well as serve as discussion points to work with BOC staff in ascertaining expectations, and how they envision their new BCIS.

With the advent of new equipment both on the desktops, and throughout the network, it will be critical to re-analyze the impact to the operation of the new changes at every step of the way. Also, the most important ingredient to any successful computerized implementation is the close involvement of the end users of the system. Here we will gather information from the BOC staff and insure that input, provided to all phases, is user driven.

Given the proposed contemplated approach in each phase, we will be involved in "reality checks" as it relates to the mission-critical applications and the BOC. It must be *their* system, with our help to insure that the overall implementation will net the greatest degree of enhancement to the BOC operation as a whole. The enhancement process to provide greater functionality may negate other concerns previously encountered. Therefore, we must keep an open mind from the beginning, and begin to fashion and evolve the new BCIS into a tool for optimal operational efficiency, from the BOC's perspective.

We will conduct analysis and requirements evaluation, to review the enhancements prior to design the and re-design of the existing LCATS, Receiving – Labels and Cashiering applications, and before the new Regular System Automated Tracking application is written. This is to insure that the BOC will be involved in the detailed design aspect prior to changes and new development takes place.

3.1.3 Task 3 Proposed Solution

Task 3 - Replacement of the Regular and Land Court Systems

Overview

The Lange Group is the original developers of the complete Land Court Automated Title System for the BOC, and since 1987, has been providing annual support and enhancements to LCATS through this day. Included as an enhancement to the LCATS system, in 1990, was the development of the Hawaii FYI module for public access. Since then, The Lange Group has worked closely with the BOC to further develop the Receiving and Accounting Modules which facilitate the Receiving process of both Land Court and Regular System in the Document Time & Numbering, as well as Cashiering, Accounting, and Management Reporting. BOC electronic backlog during The Lange Group's eairly involvement was measured in years. Today, it is measured in months. Technological and application enhancements are needed now to take the next step towards a more efficient BOC.

Migration of the BOC's tailored application from the WANG to the BCIS residing on a framework of enhanced technology from IBM, made the most sense. This move would take full advantage of the continuous, incremental improvements that have evolved over the last 10 years and minimize the risks associated with new implementations. All data and 100% of the programs will be migrated, providing a seamless move to the new BCIS. The BCIS would continue to provide for the Hawaii FYI links to the LCATS subscribers.

A new Regular System Automated Tracking module and General Index will be designed, developed and implemented during this phase. It would contain a smaller subset of information with functionality similarly found in LCATS. It will fully replace the functions currently performed on the UNYSIS. This information along with what we already capture in LCATS, including enhancements, would provide a new front end General Index search module, which can replace the microfiche hardware and processes from this day forward.

Enhancements to the migrated applications will be made after successful Year 2000 remediation and migration. These enhancements will provide for greater efficiency of the BOC, a higher level of data integrity and facilitate a more timely response of information to the BOC customers. The Lange Group will perform evaluation and analysis of the existing system early on, and suggest ways to re-engineer the BOC workflow so that information will be captured at the most optimal time, by the appropriate or elevated skilled person, geared to minimize task overlaps. The re-engineering will take place gradually as the project life cycle moves from Phase 1 to other phases, such as Image scanning and image-enabling of the Land Court and Regular System tracking modules. Once all of the BOC's internal operational software is in place, further additional tailoring of the BOC software will be done to provide for neighbor island and Internet access of BOC information. These software enhancements are only possible, and will take full advantage of the new BCIS technological capabilities.

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We will conduct on-going evaluation and analysis at the beginning of phase one (migration/enhancements), phase three (imaging) and phase four (remote access), to provide alternatives to the BOC, as this and other future phases are implemented.

Detailed Description

Migration of Wang VS Applications

Our first step will be the migration from the Wang VS to the IBM RISC Systems/6000, the new BCIS. Migration would involve the conversion of the existing SPEED II applications, including all associated data, to the APPX environment, a SPEED II equivalent on UNIX platforms. During the migration, all dates will be made year 2000 ready. The familiar applications (K03) LCATS and (K06) Receiving/Accounting will be moved 100% to the new BCIS.

The data will be prepared using SPEED II utilities, into export flat files on the WANG to be transferred to a PC or multiple PC's. These PC's with WLOC or serial connections to the WANG must also be attached to the BCIS, and have adequate disk storage. Benchmark timings will be performed to estimate the download times as well as byte and record counts will be verified during the migration. WANG transfer utilities, already in place at ICSD (such as Lightspeed gateways or Wang PC/LIS-PC/VS transfer utilities) will be utilized to download the export files to PC's. FTP will be used to transfer these flat files from the PC to the BCIS. On the BCIS there will be an APPX import utility that will update the DB2 database. DB2 would already have been setup during the BCIS installation at ICSD. The import would be a two step process. There will be a front-end update that will expand the dates creating the Y2K remediated data files, then the actual import of the files into DB2 will be done. This Y2K database reorganization step was planned on the BCIS to utilize its much faster processor and large disk capacity, minimizing reorganization time of the BOC's large data files. There are two data conversions planned for this phase. The first will entail conversion of all master tables such as the (K03) Glossaries, Assistant Registrar Tables, Document Class, etc., and the (K06) Client Companies, Source Codes, Parameters etc. to facilitate BOC parallel testing. The second will be the final cutover where all data files will be converted.

The migration of the application and data files will be 100% consistent, so the new BCIS will be operationally seamless to the BOC end-user and will be year 2000 ready prior to testing.

During the initial testing of the migrated applications, all master tables will be available and all other database tables will be initialized to simulate "Day 1" on the BCIS. The BOC will begin to parallel the daily data entry routines to validate that the migration has been completed successfully and to familiarize themselves with the new BCIS environment. This testing phase is scheduled to run for a maximum of three months.

The Hawaii FYI connection will be checked during this test period as well as all other network and peripheral connections, such as printers. The BOC's Data Processing personnel should be included to aid in the installation of the Microsoft and terminal emulation software residing on the individual PC's. RS/6000 system utilities such as the ADSM backup and processor/volume group takeover will be tested. Other administrative functions such as physical file level security and definition of user logons will be completed

with help from ICSD. Any issues requiring work or problems reported by the BOC during the testing phase will be handled in an expeditious manner.

The Hawaii FYI subscribers would be provided with new instructions regarding configurations and suggested software that is needed to logon to the BCIS, along with a cut-over date when determined by the BOC. Software required will be easy to obtain, "off-the-shelf" type, but at minimum will be capable of VT100 terminal emulation and print file transfers which will occur simultaneously over the same dial-up line.

The existing Wang printers will be replaced by various low volume Laser printers, located throughout the office, and a few high volume printers centrally located as is currently done. In addition, a new label printer will be recommended for purchase, which would be capable of printing bar codes as well as other additional printed information. We will aid the BOC in redesigning the labels and acquisition of the new label printer thereafter.

Because it is outside the scope of this Proposal to address Wang Office, the statewide e-mail system, BOC users of this application should continue to have an icon on their desktop to access the Wang VS. Also, the BOC would continue to use stand-alone Word Processing capabilities at the desktop level.

Replacement of Regular System and General Indexes

A new Regular System Automated Tracking application will be designed, developed and implemented. The new system contemplated would replace the existing UNYSIS and all microfiche related processes and equipment from this point forward. There will be an input screen which, like LCATS will already contain the recording and cashiering information for each document. The indexing clerk will call up the document number and, as before, will enter Grantor/Grantee information and other new fields determined in the Enhancement phase. All fields previously entered during the Recording and Cashiering step will be readily available. The following fields will be entered: grantors names; names and addresses of grantees/others; martial status and description of secured interest. Other data entry techniques such as the use of the LCATS glossaries will be provided for faster error-free data entry, such as frequently used names. Redundant, or double key entry will be considered here to insure data integrity. This screen will also serve to facilitate manual entry of prior year's history.

A quicker electronic download of the General Index information containing both Regular System and Land Court, can be made to the companies currently receiving magnetic tapes daily, relieving the ICSD from these clerical data transfer functions, and speeding up turn-around time to these companies. A CD-ROM can be written periodically, such as annually, and offered at a fee, to other entities that wish this media form.

There are several different alternatives that the BOC can explore regarding historical incorporation of data collected on microfiche or other media forms, back to 1976. The Lange Group will conduct on-going evaluation and analysis at the beginning of this phase to provide alternatives to the BOC, as this and other future phases are planned and implemented. The fundamental premise underlying information that will be collected and stored by the BCIS is that it can be relied on.

Enhancements to Land Court & Regular System

Fields currently being captured or produced at the Labels Time & Numbering or Cashiering process would be saved within each document record for both Land Court and Regular System. These fields include the Conveyance Tax purchased, HRF fees, noted on TCT's, new TCT issuance, LCO, Decree, date and time of recording, document class and island code. Other worthwhile fields of tracking value to Searchers are, description of secured interest, date of document, grantor/grantee information and Tax Map Key (TMK). There are techniques to utilize these field so that "chain of title" can be accurately tracked if available. The receiving/indexer will be relied upon to identify these fields on the document, which are determined to be of tracking value. Any cross-reference document information such as original Mortgage document that the Release lifts, or the Assignment of Mortgage reference will be acquired for other search. Unit/Interval number for timeshares should also be considered to aid in timeshare tracking. The search modules will be capable of searching by:

- Grantor / Grantee (where partial names can be searched)
- Land Court Document
- Regular System Document
- Condo Map / Apt
- File Plan / Lot
- Certificate of Title
- Tax Map Key
- Application / Lot
- Miscellaneous (Cross Referenced)
- Mortgages
- Tax Liens / Releases
- Declarations
- Financing Statements (affecting a UCC1)

Fields should be captured as early as possible, given the staff and skill sets. Re-engineering the workflow means consideration would be given to re-establish job descriptions and titles. Data integrity will be of utmost importance so a redundant double key entry technique is recommended. The database will contain multiple paths so that we can optimize the Search times for more complex inquiries. The Lange Group will work with the BOC and their customers, title companies and others, to further determine reasonable fields and search paths required, so that the database can be optimized to minimize the time spent searching at the BOC.

With this, the BOC may be in a better position to trade-off, Title Searchers time, for more information submitted in electronic form. One option would be that they provide machine-

readable information requested on a "fly" or cover sheet for each document being recorded. For bulk-recordings of projects, timeshares etc., this information can be provided to the BOC on diskette or other electronic means.

The Recording "Time & Number" process will be enhanced to allow each clerk the ability to print to any label machine or share label machines. These new label machines will replace the existing Wang printers, and will generate a bar code label that will contain the official record number. OR#'s can be Document number, LCO or Decree that will be read in by the scan step during the document Image Scanner. The document number on the bar code will "tie" the image to the actual document information record for retrieval purposes later. Other important numbers which can fit on the bar coded will be added such as Island code, and document class. To facilitate double system recordation's, the recording screen will be changed to allow Land Court, Regular or Double system Time & Numbering to be done in one step, and the generation of one or two labels for Double system will be done automatically.

The Cashiering and Recording function could be combined into a single step as opposed to two separate steps as is currently done. All workstations will be PC based so the two windows can be displayed such that, one window will be in Labels, the other in Cashiering. Thereafter it would be easy to flip between windows. Alternatively, a new "combo" Receiving input screen can be developed which would combine the Recording and Cashiering functions in one step, generating both the bar coded label as well as a receipt. The BOC would be involved in the tailoring of the combined screen. For ease of imaging and handling, the receipt could be printed on a laser printer or continue to be printed on the existing receipt printers. The actual format of the label will be re-designed to contain fees collected in an effort to eliminate the need for the attached copy behind the document.

Company names would be checked against a "bad checks list" and the system will guard against it at both the Cashiering and Recording levels. A glossary key will be provided in the Labels screen to catch this early on. The Labels File Maintenance of Land Court and Regular System will be consolidated into one screen and allow retrieval and on-line listings by document number, LCO or decree. The reprint of LC and RS labels will also be consolidated.

To facilitate Land Court, if a new TCT is issued, the system will automatically create (add) the TCT along with captured fields during receiving, to create a "TCT starter". There will be a new function to perform "bulk" TCT updates of a stand-alone type document for the "as listed herein"s. New TCT can be signed automatically with a laser-printed signature.

This step will streamline processing at the BOC which will increase productivity, capture more comprehensive data reliably, and facilitate timely availability of all BOC records.

Selected reports and search results, based on user sort-selection criteria, will contain new output formats which can be written to CD-ROM, and therefore be distributed to the General Public. Two additional output formats are contemplated here. One will be in a format which can be viewed using any text editor such as WORDPAD, on a compatible PC. Another will be a "comma delimited" format which can be used to import to other compatible PC applications such as spreadsheets and databases. Eg. EXCEL, FoxPro, ACCESS.

Search criteria will also include the cross-reference document, if requested by the user in the selection criteria, which will also display all "sister" documents to those found. Eg. If a mortgage is found, any other document pertaining to that mortgage will also be displayed, such as the Release, Assignment, Assumption, etc.

In the Legal Description of the property, generic verbiage can be displayed automatically in the text area which will be formulated from the information input in the already captured fields such as Apartment No, Lot No, etc., somewhat like a dynamic glossary. The user will be allowed to change the generic text.

Additional changes to LCATS and Receiving – Labels and Cashiering will be further defined by BOC in the Analysis, Requirements and Recommendation steps before any changes are made.

All files will be contained on the BCIS in a better than production class DBMS as called for by the RFP. An industrial strength, robust "relational" database, "RDBMS" from IBM called DB2 will be utilized to store all data. An authorized DB2 database administrator "dba" can define field level attributes and can perform data dictionary and tables changes. The application software provides for multiple level locking (file, record, field) two-phase commit and rollback at the transaction level (within the code), should a transaction fail. Automatic error detection and recovery within the code is build-in to the application software. Large scale file update processes can provide for dynamic file rollback after process failure, where scheduling of these jobs can be controlled. The IBM provided backup software and manager "ADSM" can be configured to automatically archive to Optical and tape based on an aging scheme set in the manager. Complete mirroring of data on disk (duplicate data) will be done so the data is contained on two separate disk at any one time. Major recovery processes, procedures and support will be available by to the BOC and to ICSD in the event restore of backup files need to be accomplished.

System Information

Current Estimated Wang Disk Use and profiles of the largest files:

DISK USE:		#recs	used blks	alloc blks
K06	CONVEY	427,106	29,181	
	CONVEYR	934,541	47,575	
	Etc...			
	Total		77,599 (159Mb)	86,144 (177Mb)
K03	DAILYLOG	379,353	82,211	96,537
	ENCUMBR	2,102,060	217,123	221,926
	LANDESC	330,818	66,073	66,159
	MISCREF	11,208	491	496
	OWNERXR	345,873	48,296	48,779
	TCTMS	188,314	234,036	301,911
	TRUSTEE	19,877	3,462	3610
	Etc...			
	Total		667,517 (1,367Mb)	759,943 (1,556Mb)

10 Year Estimates: 16Gb x 1.5 rdbms factor x 2 ten year = 48Gb

Estimated Disk requirement for Regular System and Grantor/Grantee:

REGULAR SYSTEM and GRANTOR/EE INDEXES (10 year estimated at 10Gb)
10 Year Estimates: 10 Gb prior year + 10Gb future ten year = 20Gb

Task 3 Environment Description

- The IBM RISC System/6000 H50 Enterprise Server
- An optional 2nd IBM RISC System/6000 H50 CPU
- IBM DB2 UDB Enterprise Relational Database
- ADSM Backup Software
- APPX Software, Inc. 50 user license, 1designer
- IBM DB2/6000 relational database, ~~50~~ seat license, ~~1~~ Developer Edition
- New Bar Code Label Printers which will replace the existing register printers

- CD-ROM Writers
- Hookup to the Fast Ethernet network to span the RISC System/6000 Enterprise Server at ICSD, and the BOC offices on the first floor. This network would have already been installed in task 1.

The solution is as depicted in the drawing entitled "BOC RSC/6000 Configuration"

Remote access for Title Companies needs to be provided through modems to match their existing capabilities. Existing connections are made through Hawaii FYI. Continuing the use of FYI appears to be the most economical and easiest to support, so we are proposing carrying this forward, if at all possible. Today, the FYI connection to the Wang is made through the State's packet (X.25) network. Carrying forward with X.25 is not feasible, so we are recommending the use of a TCP/IP Ethernet connection from FYI. This requires Ethernet ports and a Category 5 Copper-cabling run from the FYI UNIX host to the RISC System/6000. The Title Company PC's then would be capable of dialing FYI as VT100 terminals and connecting to the BOC RISC System/6000. Should this not be feasible, other alternatives must be explored, such as providing modems and direct dial lines into the BOC server.

Proposed UNIX ENTERPRISE Server

The UNIX Server being provided to the BOC is an IBM RS/6000 Model H50 Enterprise Server, which is a series of new high performance servers, based upon the enhanced PowerPC 604e processor family. The speed of the processor is 332MHz and is packaged for an SMP (symmetrical multiprocessor). The H50 allows for up to 4 of these processors and provides for 3GB of memory. The memory used in this system is called SDRAM (synchronous dynamic random access memory) and runs at a speed of 10ms unlike your standard PC's which use memory that runs at 60 to 80ms. This is one of reasons why IBM was able to keep the cost down on these high performance servers. Level 2 cache, which is important in commercial applications, is quite expensive. Therefore, providing higher speed memory like that used in the H50, can alleviate putting in a lot of Level 2 cache memory. The H50 uses industry standard PCI based adapters and mounts in a standard 6-foot EIA rack. The H50 is packaged such that 4 of these units can fit into one rack. Dial In facilities to handle the existing Title Company remote access users will also be attached.

The BOC Primary RISC System/6000 Model H50 for Application , Database, Archive and Retrieval, and Enterprise Backup

There will be two H50 CPU's configured for this proposal. The first is the BCIS application and database server, while the second is an optional stand-by CPU. The H50 was chosen based upon the load requirement as well as for it's ability to handle multiple high performance adapters, key to good performance. This server called BOC primary will be equipped with 4 processors and 2 GB of RAM. There will be two (2) internal 9.1GB UltraSCSI disk drives, two (2) 10/100 autosensing full duplex Ethernet adapters, two (2) high performance serial storage architecture adapters, and redundant AC power supplies. The intention here is to duplicate things like disk drives as well as adapters, which are the components in a computer system most likely to fail. The RS/6000 system and AIX the operating system provides the facilities to easily mirror the operating system as well as

application and data files. So in the event of a hard drive failure, the other drive will take over. The disk drives are all hot swappable so that the machine will never have to come down. The application code as well as the database and data will be attached externally to a high performance disk array called SSA (serial storage architecture). This architecture was selected over the traditional SCSI or RAID arrays because of its performance and recoverability characteristics unique to this industry. The SSA technology allows for drives to be hooked up via a loop versus the traditional SCSI, which used a bus. As a result, each disk drive has two (2) paths to the adapters, so if one adapter failed, the drive would simply use the existing path. Each path in the SSA architecture is full duplex, meaning that we can read and write simultaneously on each path. Another advantage of using an architecture like SSA is that it does not arbitrate the bus, meaning that when a particular disk drive is performing an operation in the SCSI world, all other drives must wait until it has finished what it has been doing before the next drive can execute it's task. SSA is non-arbitrated, meaning that all disk drives would be able to simultaneously read and write at the same time. This is why SSA will outperform FC-AL (fiber channel arbitrated loop). Although FC-AL has a higher speed loop (100MB/sec), it still has that problem of arbitration, which slows down its overall throughput. The SSA disks will use AIX striping over multiple disks for performance and AIX mirroring for protection. AIX LVM striping and mirroring is part of the operating system and are provided at no charge.

Besides the DB2 database and applications, this server will run the enterprise-wide backup and restore software called ADSM. ADSM will provide two functions: first provide industry strenght backup and restore functions automatically to the proposed automated tape library, the IBM 3575-L24. Secondly ADSM will perform the control of the optical library, the IBM 3995-C66 for archiving of images.

The BOC ADSM RISC System/6000 Model H50 for Backup, Recovery, and Image Archiving

The BOC RISC System/6000 Model H50 for Hot Standby

The second of the two servers being proposed is also an IBM RS/6000 Model H50, which will act primarily as a hot standby in the unlikely event that we suffer a processor failure on the primary BOC node. While acting as a hotstandby, the BOC can opt to use this as a development/education node, since it's only function will be to standby in normal operation. This node will be equipped with 2-332MHz POWERPC 604e processors and 1.0GB of RAM. The disk drives used for the system will be duplexed like the primary node and the adapters will be duplicated like the primary. All of the SSA high performance disk drives will be twintailed to both machines, so in the event of an unlikely failure, applications and database can be quickly imported into this node for continued usage.

Both CPU units, as well as the disk drive drawers, will be housed in an IBM standard rack. This rack has been configured to have two power distribution units as well as an UPS (uninterruptible power supply). This UPS has the intelligence to shutdown the machines gracefully after a certain time threshold has been exceeded. Graceful shutdown is important to ensure files do not get corrupted, which could mean hours upon hours of restore time.

These machines have been configured to be available stand-alones, which mean that precautions have been taken to alleviate problem areas like disk drives, network adapters,

and power supplies. Processor failures are rare. If they do happen, it is caught early on in the implementation while the service personnel are "shaking" the machine down. In our experience, only disk drive failures have occurred, after RISC System /6000 have been put into production.

Benefit Summary of the IBM RS/6000 H50

High performance CPU unit to handle the workload of today and sized for the future

Industry standard PCI bus, key to new technologies

RS/6000 H50 is the start of a line of UNIX servers that will grow into newer high performance processors (giga processors) exploiting new technologies like copper interconnect and silicon-on-insulator (turbocharging transistors). This is not old technology; it is proven technology that will allow you to exploit possibilities in the near future

Upgrade to the RS/6000 H50 to the new H70 enterprise server the basis toward the gigaprocessor. All future processors will be based on the H70 and it is a mere processor swap from the H50 to the H70 with a direct serial number transfer.

There are several H50's installed here in Hawaii, so the Bureau would not be the first.

High Performance I/O system in regards to SSA (serial storage architecture), if you have a "hungry" processor you need to make sure you can "feed" it appropriately. SSA is the key to this; no more "waiting on I/O" which is a big performance inhibitor.

Mirror protection, part of the robust AIX operating system

Disk striping for performance, part of the robust AIX operating system.

Redundant adapters for protection against unplanned outages.

First step to full automatic redundancy if/when the Bureau chooses to do so.

ADSM ADSTAR Distributed Storage Manager for Backup and Restore

Introduction:

To provide automatic backup and recovery of the BOC's entire SP complex as well as the control workstations and NT servers, a product from IBM's Storage Division is being proposed called ADSM. Relied on by major corporations around the world, IBM's award-winning ADSTAR Distributed Storage Manager (ADSM) software is an enterprise-side storage management solution. It includes unattended network backup and archive, Hierarchical Storage Management (HSM), and a Disaster Recovery Manager designed to support business continuance while implementing disaster recovery operations.

No more "finger pointing" and ease of mind that backups are being performed

ADSM's native intelligence automates a full range of storage management functions. You can tailor data backups and archives via ADSM's policies to specify what data gets backup up or archived, where it is stored and how long the data is kept. Its powerful scheduling feature eliminates the need for manual backup and tracking. You can schedule storage operations to complement ordinary workflow or during off-peak hours to optimize network resources and performance. ADSM's relational database tracks every version of every file. Identifies tape volumes and even manages retention policies. This frees employees for more productive work and help control costs.

ADSM provides backup and archive services for more than 30 different client platforms like Windows NT, AIX, HP-UX, SUN Solaris, Windows 95/98, and a whole bunch more. It backs up and restores distributed data, applications and databases, including DB2, Oracle, Sybase, Informix, Microsoft SQL Server, Lotus Notes and SAP/R3

Since so many corporations run 7x24 operations, they increasingly need to backup data quickly and consistently within a shrinking or non-existent backup window, ADSM includes a wide range of features to speed both backup and restore performance. ADSM supports both full backup and an exclusive approach called "incremental forever." With "incremental forever" backups. The initial backup contains a full copy of all data files, while subsequent ones store only new or changed files. This reduces backup time, network traffic and storage media. But the backup function is only part of the story. Even more important, you can restore data in the event of a failure or disaster quickly and reliably. With ADSM's unique "tape collocation" and "tape reclamation" technologies, incremental backups from one client are placed on the same tape or group of tapes night after night. That way, ADSM can perform a full recovery with minimal tape mounts. This is a fast and reliable way to restore data.

Designed to simplify the job of storing and managing data across today's client/server enterprise networks, ADSM features a graphical user interface (GUI) for end users. It lets users easily manage basic backup and restore functions; supports advanced tasks such as point-in-time restore, progress indicators, enhanced search features, and collapsible directory trees. A powerful Web-enabled administrator interface allows administrators to seamlessly traverse and operate on all ASM servers on the network from anywhere in the enterprise.

ADSM's centralized control features help companies leverage resources and enhance overall control. Centralized logging of operational data allows administrators to quickly assess the status of storage management operations. Centralized monitoring helps ensure the integrity of ADSM servers by sending alerts and "heart beat" calls to Simple Network Management Protocol (SNMP) managers such as, Tivolii, HP Openview, CA Unicenter and Netview, via industry-standard SNMP traps and Management Information Blocks (Mibs). You can set and store most ADSM client options at the server level. This lets administrators control option settings and group those options among multiple clients to avoid replication. An SQL interface enables access and reporting on ADSM database and real-time ADSM server information. An ODBC driver, available with the Windows 32-bit client, lets you use products like Microsoft Excel and Access, or Lotus 1-2-3 and Lotus Approach to import data, build queries and generate reports.

ADSM offers a complete, scalable storage management solution for today - with the performance, control and usability features to grow with your needs well into the future.

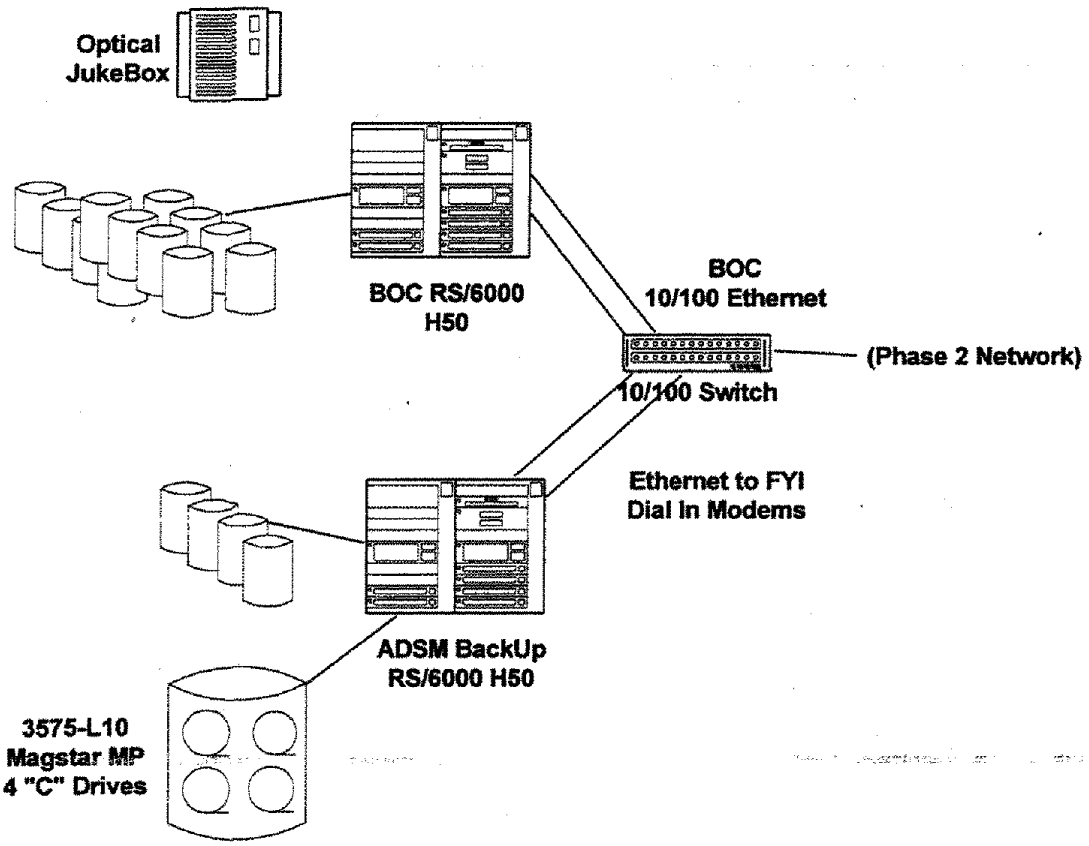
The RS/6000 family is a scalable, compatible line of RISC UNIX workstations, servers, and supercomputers that are reshaping the way companies operate. This economical family of systems fulfills the computing requirements of many small businesses, workgroups, and large enterprises. Powered by IBM's award winning AIX, RS/6000 has the advanced technology and architecture needed to grow and adapt to the Bureau's ever changing workloads.

The AIX operating system provides significant functions for high availability. Logical volume (disk) mirroring (LVM) disk controller duplexing and Journaled File System (JFS) to maintain file system consistency and prevent data loss all contribute to highly reliable system environment.

The RISC System/6000 BOC server will be located in the machine room at ICSD. Supporting the RISC System/6000 will be a 10/100 Ethernet Switch. To provide the needed bandwidth for the future image applications, the RISC System/6000 will be outfitted with Ethernet cards capable of both 10 and 100 Mbps speed. There will be two connections from each of the two RISC System/6000s to the switch. To provide some level of network hardware redundancy, this switch will have redundant power supplies. Should more redundancy be required, a second switch can be added.

This 10/100 Ethernet Switch will be connected via Fiber Optic cabling to 100 Mb and 10/100 hubs on the First Floor. There will initially be four 24 port hubs to support up to 96 workstations and printers (48 in each office). Each of the hubs will have a separate fiber attachment to the central switch. This will ensure that failure of one hub or fiber cannot cause more than 24 workstations to fail. PC workstations and printers will attach to these hubs, once again utilizing 10/100 Ethernet Cards, operating at 100 Mb.

BOC RISC/6000 Configurations



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3.1.4 Task 4 Proposed Solution

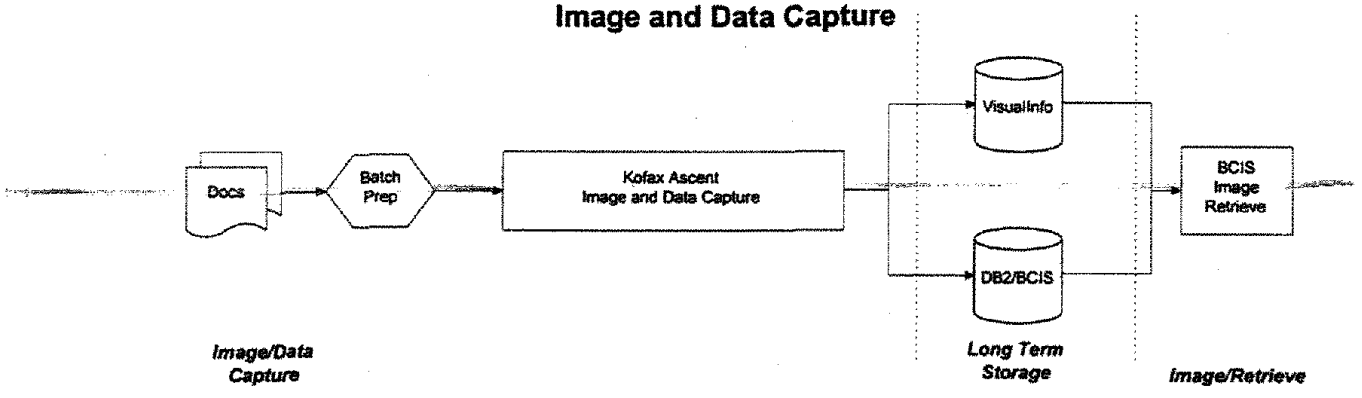
Task 4 – Implementing Imaging Capability on the BOC Network

Overview

The following figure represents the imaging workflow diagram for the BCIS Image-enabled functionality. The proposed workflow is divided into three major areas: Scan and Index Capture, Long-Term Storage/Microfilm Output and Retrieval. The products to be used for the three different areas are as follows:

- Image and Data Capture – *Kofax Ascent Software*
- Long-Term Storage – *IBM's VisualInfo*
- Image Retrieval – *IBM's VisualInfo*

Kofax Ascent Capture Software provides the modules to import the index and image data into the system. The release module in Kofax Ascent posts the data to the existing DB2 BCIS database and the index and images to VisualInfo for long-term storage and will also write the documents out to microfilm for legal purposes. The Lange Group feels that the combination of these two software components will allow for an efficient and timely processing of the incoming documents which will allow the documents to be available for retrieval as quickly as possible. The image-enabling of the application will done by retrieving the image via the document number as the user presses a hot-key within the BCIS application. The following workflow diagram depicts the overview of the image component of the BCIS system:



As shown in the workflow diagram above, the documents will go through a batch preparation process that will separate the documents into document type (i.e., Recorded Documents, maps and all other types of documents). The documents will be scanned using a scanner that will create images that will be able to be viewed with the BCIS application. As the documents are scanned, the bar code will be read for index information. This index information will be passed along with the image to the Index module. This module will allow

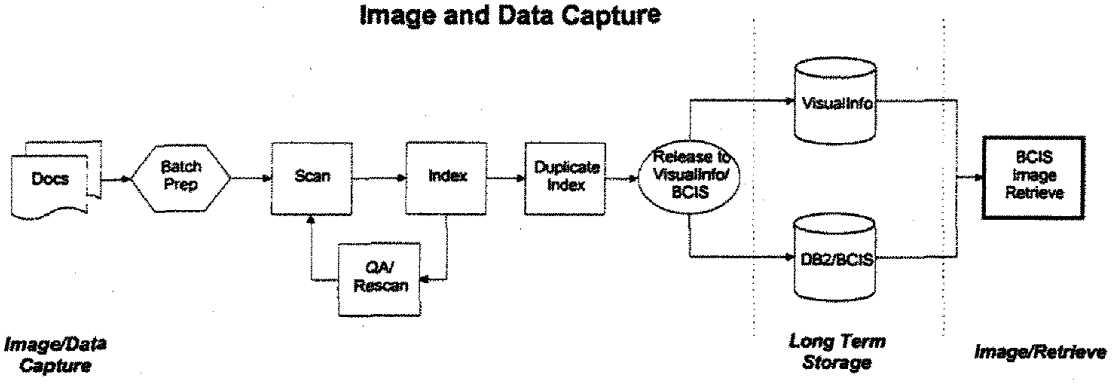
the user to correct invalid bar code data and enter in the remaining data required for the BCIS system. During this step, the user is presented with the image and the index fields simultaneously to allow for "heads-down" data entry. At this time, the user also has the option to route the document back for rescan if the document has been excessively skewed or is unreadable. After the data entry has been completed, the documents and data are routed to the Release module. The Release module formats the data for storage to the BCIS DB2 database and the images and index data for long-term storage to VisualInfo. During the Release module, images will also be placed in a directory to be imported for microfilm. The images will be written to microfilm using the Kodak Document (microfilm) writer.

At this point, the images are available to be viewed from the BCIS application. The user will press a hot key or accelerator key to retrieve the image that pertains to the document they are working on in the BCIS application.

Detailed Description

The following figure represents the detailed workflow and is followed by a description of each step. In the diagrams, the circled processes represent background processes that do not require user intervention, while the rectangles represent end-user functions.

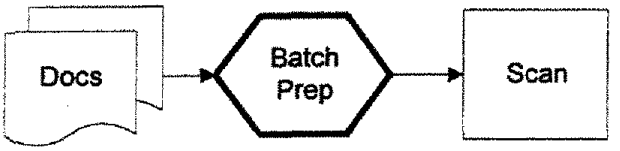
Image and Data Capture



The new imaging process will start with Batch Preparation.

Batch Preparation

For the Batch Preparation step, the diagram shows a simple preparation process that separates documents by document type:



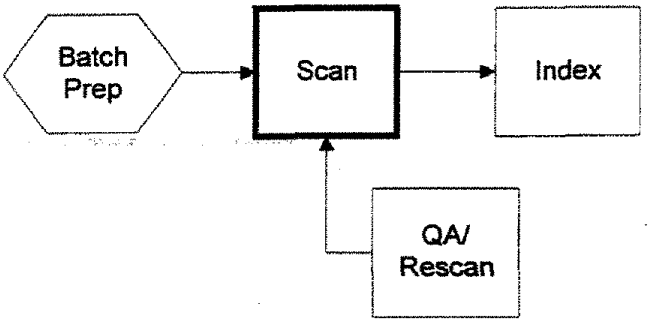
Document preparation is also expected during this step to include:

- Checking documents for damage
- Removing staples and/or paper clips
- Repair damaged documents or copy any torn or ripped documents
- Documents, at a high level, are to be grouped as follows:
- Map sized documents
- All other documents

Maps will be separated from the Recorded Documents into specific batches due to the size of the maps requiring a different scanner. All other documents may be grouped together as the scanner will be able to detect various page sizes within the batch.

Scan

The Scan process is the next step to get the documents into the system.



A scan operator will feed a batch of documents of the same type into a scanner. It is assumed that the batches will be grouped together as follows:

- Recorded Documents

- Map sized documents
- All other documents

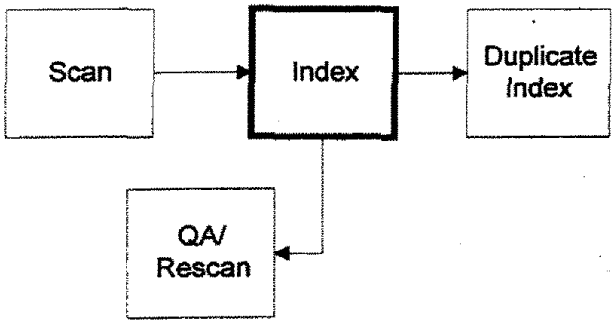
This sorting allows the process to select the most efficient scanner for the type of incoming document.

The Scan process supports automatic document separation, in the form of bar codes and patch codes, which helps to speed the processing of scanned documents.

At Scan time, the software will read the bar code on the document and route the image and bar code values to the Index process.

Index

Ascent Capture has a manual key entry process designed for fast "heads-down" index data entry.



The Index module displays the scanned image, and presents the data entry operator with an elegant, simple data entry screen. The operator never has to touch a mouse – a proven time-waster during data entry. The System Administrator sets up validation of field length and data types through menu-driven choices. During this step, the user can enter the information that was not captured via the incoming bar code.

The index step will include four validations using valid values developed during the Requirements Validation for this task. The validation will occur for the document number, marital status, island code and the document type. This will allow quality control to occur during the index process and eliminate major data changes down the road. During the index step, the index user will be responsible for entering the general index information, which will allow BOC to take advantage of the skill level already in place for the indexing function. Sample index fields include the following:

- Document No
- Number of Pages for this Document

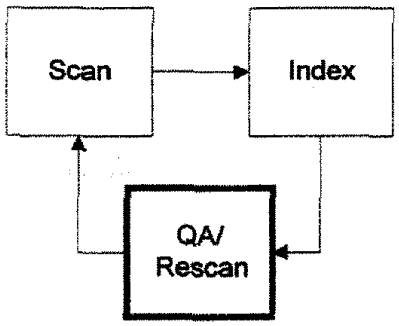
- Date/time of Scan (automatic system time)
- User ID who Scanned (automatic via user logon)
- Grantor name (3 fields, multiple occurrences)
- Grantee name (")
- Marital Status
- Grantee Address
- Description of Property
- Type of Document
- *Island Code*

After the Index step is complete, the batch is routed to the Duplicate Index module to allow for maximum quality assurance before storing the data to the BCIS system.

For exceptions, if the user detects an unusable image that has been excessively skewed during the scan process or is unreadable, they can route the document to the QA/Rescan module.

QA/Rescan

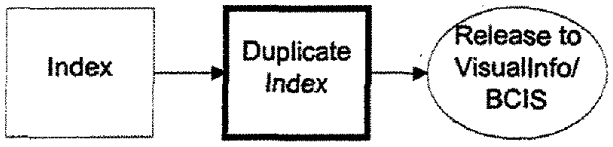
In the situation where the Index operator finds that the image is unreadable, the operator will route the document to the QA/Rescan module.



During this process, the QA/Rescan specialist can then edit the batch, rescan and replace a page or document, or delete the entire batch and rescan it. The software determines which documents will require indexing and present these documents for the index operator. The process control between these steps is fully automatic – the index operator does not worry about where the batch is going because the automated batch manager takes care of everything.

Duplicate Index

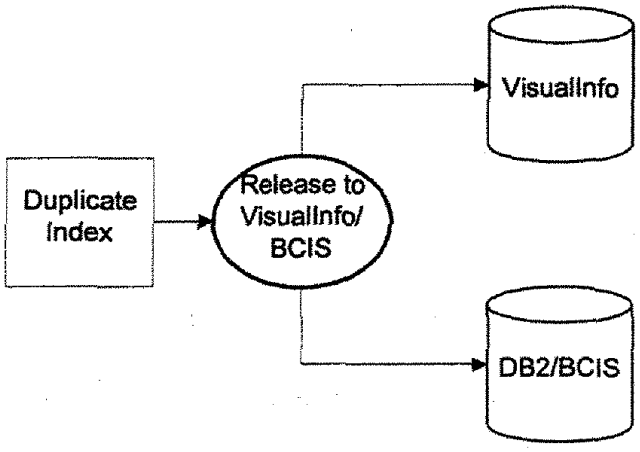
The Duplicate Index step will allow a user different from the original index user to enter index information for the document.



This module can be configured for the user to enter all the index fields that were entered in the Index step, or only a subset of the original information. At this time, the original field values will be compared with the new field values and any discrepancies displayed to the user. Once the batch has been validated, it is then routed to the Release module.

Release Module

The final step for the Kofax Ascent Capture software is to post the data to the DB2 database and the images and index data to VisualInfo.



This Release module is a background process, which will be customized to post the data to the backend DB2 BCIS database. In addition, Kofax includes an interface to IBM's VisualInfo software to store the images and index data for long-term storage. After this module has completed processing, the data is available for the BCIS application and the images are available for retrieval on VisualInfo.

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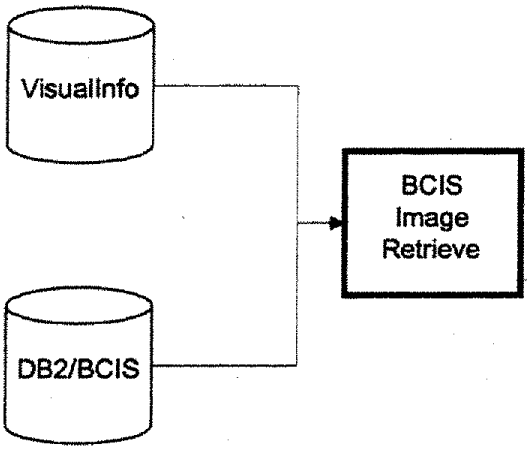
At this time, a copy of the images will be written to a file directory to be imported into microfilm. The Kofax Document (microfilm) Writer will be used to write the documents to microfilm.

BCIS Image Retrieve

For Task 4, the imaging retrieval will be via the standard VisualInfo Client Application software. Within the VisualInfo Client Application, the user can select to perform a search by any one or more of the index fields to retrieve the appropriate document.



Once the image has been displayed, the user has access to several imaging functions such as print or fax. Additional imaging services include:

- document zoom
- rotation
- paging through documents
- reverse image display
- scale page to size of window

Several annotations can also be used which are stored as an overlay to the image, to keep the image in its original form. The types of annotations available are:

- "post-it" notes
- highlights
- arrows
- free-form lines

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- circles or ovals
- text boxes
- squares
- stamps (similar to rubberstamps)

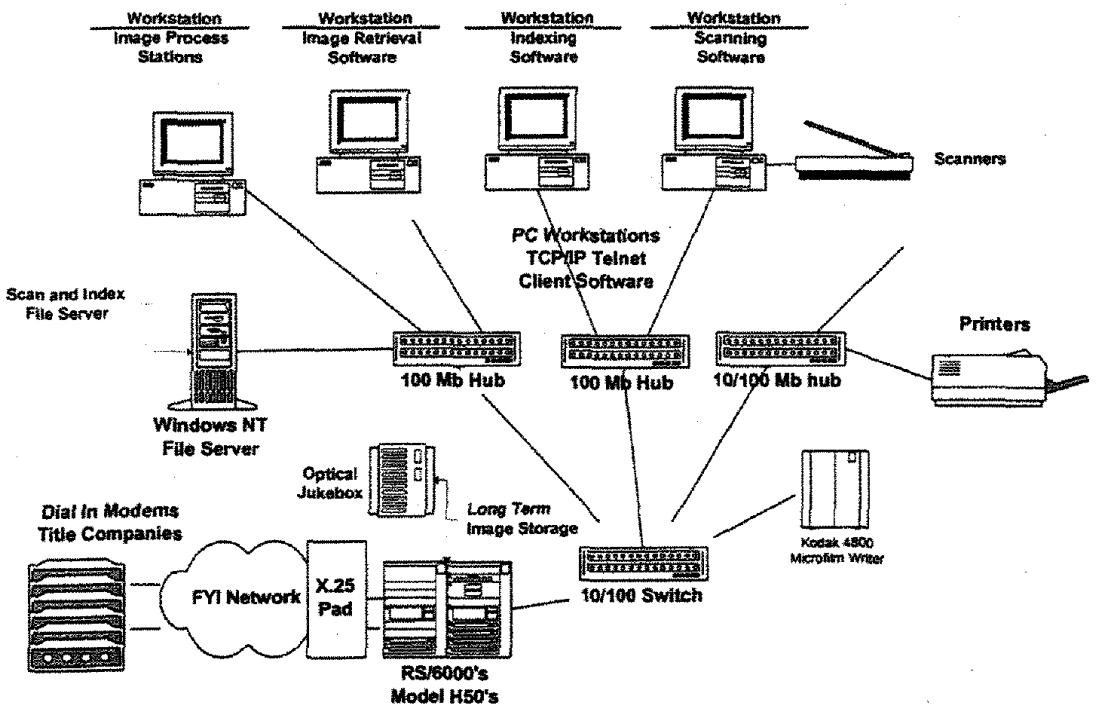
Thumbnail views can also be used to view the pages of the documents. These views are good for determining if the correct document has been chosen and can also be used to move quickly between pages.

Task 4 Environment Description

Overview

The system diagram depicted below shows the production Task 4 VisualInfo (imaging) environment to support the image-enabled BCIS application(s). Task 4 will consist of image and data capture, image storage/retrieval and microfilm output. The primary objective of the Task 4 technical environment is to provide the most cost-effective imaging infrastructure to support the BCIS application(s). A key design point of Task 4 is to leverage the preceding phases to minimize costs while still providing high availability and performance. The proposed task 4 design will use the existing Windows 98 end user workstations communicating to the backend imaging servers running on the AIX RS/6000 machines. This conformity to the planned environments of earlier tasks will also leverage skills and knowledge from those phases for ongoing support. The imaging solution as shown below will also support remote access to images from a WEB-based browser as part of Task 4.

Task 4 Schematic



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As mentioned earlier, the Task 4 imaging functions will be provide by the following products:

Imaging Function	Product
Scan and Index Capture	Kofax's Ascent Software (IBM Business Partner)
Long-Term Storage	IBM's VisualInfo
Image Retrieval	IBM's VisualInfo

Detail Description

Below are the sizing assumptions used to calculate the CPU and disk requirements for the RS/6000's model H50's.

System Information:

Daily Hours of Operation:	
Scanning	8 Hours
Indexing Documents	8 Hours
Processing Documents	8 Hours
Migrating to Optical	8 Hours
Business Days per Year:	260

Client Workstations and Server Proposed:

Windows 98 based:	50
Server Type:	AIX
Years Documents are Retained:	10
Document Definitions	
Items Per Day	1,500
Pages Per Document	10
Size Per Page	70 KB
Days on DASD	30 days
Microfilm Conversion Items	3,000,000 documents (7-10 pages/document)
Daily Ad-hoc Searches:	3,000
Length of all the Key Fields	60

Estimated CPU Requirements

Machine Type / RAM	Function	CPU%
RS/6000 , 2 Gig	BCISDB2 and Appl. Requirements	15%
RS/6000 , 2 Gig	Imaging Requirements	19%

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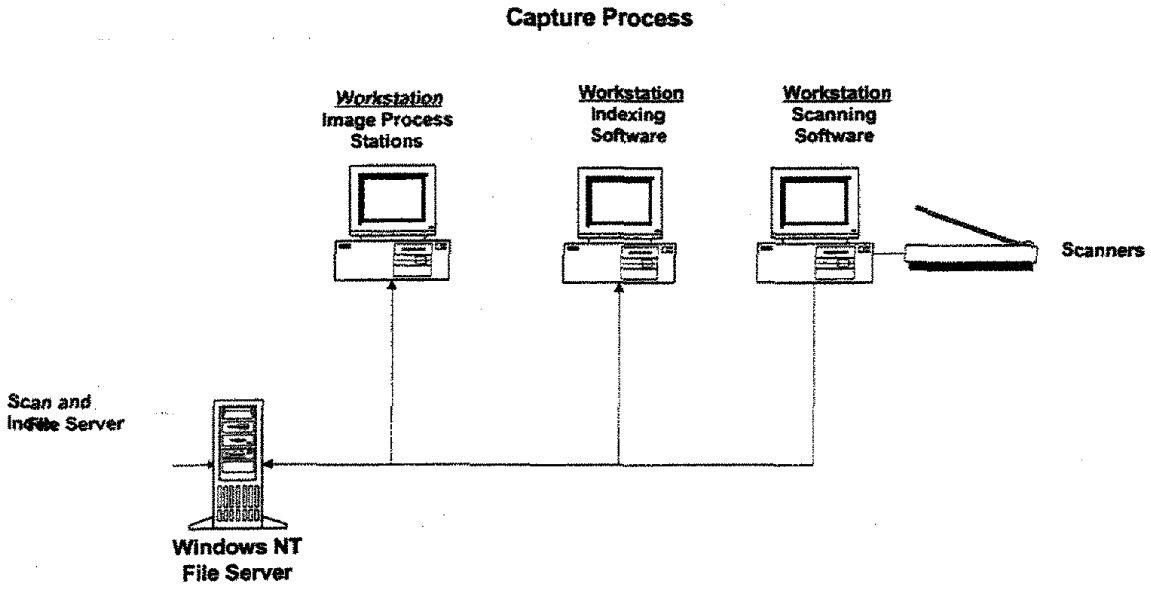
Estimated Storage Requirements

Function / Appl.	Volume Group	First Year[1]	@10 Years
AIX and LPPs	rootvg	std internal disk	n/a
Database			
1) Library Server	vi-database	4GB per year	10GB
2) Object Server	vi-database	2.5GB per year	08GB
3) ADSM Server	adsm-database	3.5GB per year	10GB
4) BCISdatabase	boc-database	20GB ~~per year~~	40GB
Database Logs	database-logs	4GB	10GB
30 Days of Images	vi-images	30GB	30GB
ADSM Disk Pool	adsm-disk	5GB	05GB
Database(s) work area	db-workarea	2GB 7168	05GB
Total Disk Requirements			**118GB**
Optical Requirements[3]	n/a	140GB	1.4TB

[1] First year of new (scanned) documents
[3] Sized for 10 years of new documents, does not include optical storage for converted microfilm documents

Scan and Index Capture - Scanning software will be added to existing Windows 98 client workstations as well as appropriate scanners designed to handle the different paper requirements. The scanning application as part of Kofax's Ascent Capture is designed to support both simplex and duplex scanners at their full rated speed and comes standard with support for high-speed video scanners via Kofax accelerator boards as well as mid-range SCSI scanners via ISIS drivers. The scan application will run from a client workstation with the scan device attached directly to the workstation. This workstation can also be used to perform other imaging functions, and does not have to be dedicated to the scan function. User friendly Windows panels will prompt the user through the scan options and process. The scanner will be able to run at rated speeds as images are quickly staged to the Windows NT File Server as shown below:



Once scanned, documents will be available to be indexed with users retrieving images from the file server to their local workstation. Indexing information will then be entered and stored back to the file server ready for the next step in the capture process. Other steps in the capture process may include OCR, Quality Assurance and Re-scan.

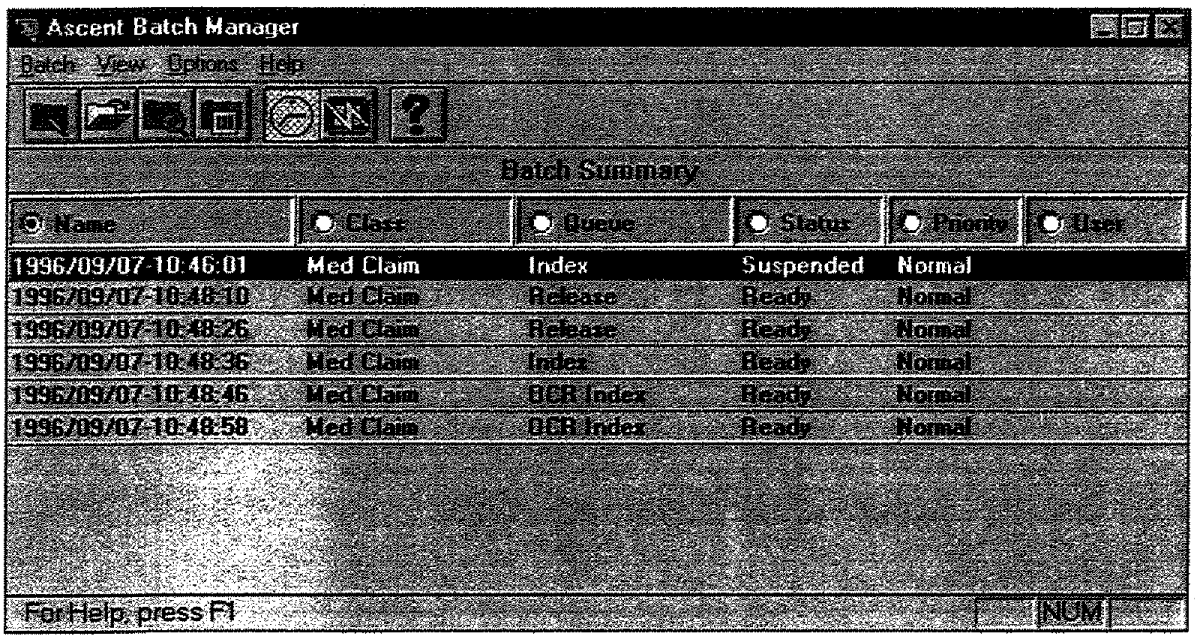
The Scan and Index NT File Server will be configured with a RAID-5 high availability disk subsystem to retain images through the "Scan and Index Capture" process. At the completion of the capture process the images will be permanently released (stored) to the RISC System/6000 server cluster for long term storage and image retrieval.

While documents are in the capture process a Batch Manager module is used to check the status or control the flow of batches through capture system. The system administrator can use the Batch Manager to create, delete, or open batches. In addition, the administrator can route a batch to a processing module or change the current status of a batch.

The Batch Manager can be used to:

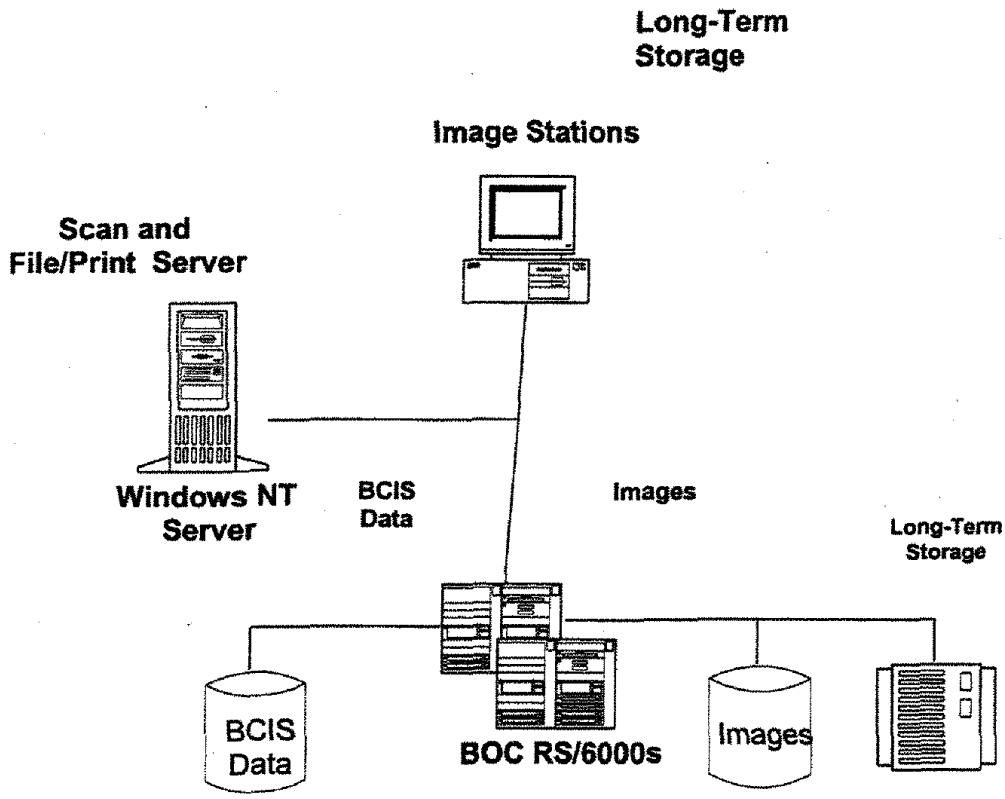
- Display a summary table showing the current status of all active batches in the Ascent Capture system.
- Create new batches.
- Delete existing batches.
- Edit batch properties such as the priority, status, and processing module.
- Invoke a batch's associated Ascent Capture processing module.
- Display a status history of each active batch in the system.

A sample screen of the Kofax Ascent Batch Manager is shown below:



Long-Term Storage

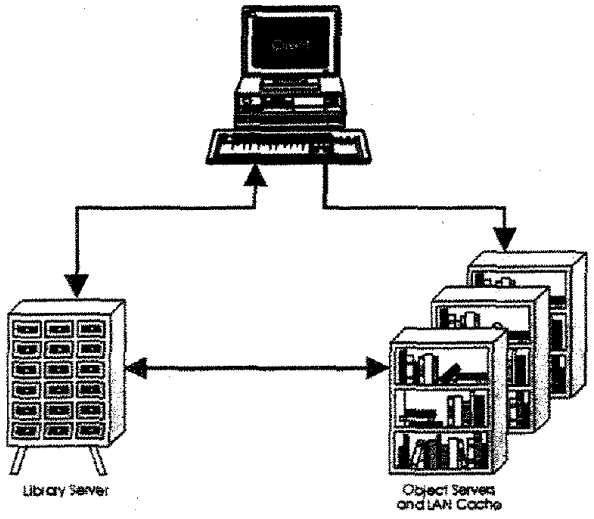
The final step for the capture process is to store the data to the DB2 BCIS database and the images and index data to VisualInfo for long-term storage and write the documents to microfilm. The release module is a background process running on a Windows 95/98 client workstation. After this module has completed processing, the data is available for the BCIS application and the images are available for retrieval from VisualInfo.


Long-Term
Storage
Image Stations
Scan and
File/Print Server
Windows NT
Server
BCIS
Data
Images
Long-Term
Storage
BCIS
Data
BOC RS/6000s
Images

The Task 4 long-term storage solution will leverage the RISC System/6000s installed as part of the Task 3 hardware implementation. Added to the RS/6000 would be an optical jukebox, VisualInfo imaging server software and the Kodak 4800 microfilm writer as shown in the above diagram. The VisualInfo imaging server software is composed of the following components.

- AIX VisualInfo Library Server
- AIX VisualInfo Object Server

The VisualInfo imaging environment is similar to a traditional card catalog library system. The BOC business documents are cataloged (indexed) in the Library Server component while the Object Server manages the physical images themselves. The figure below shows this client/server relationship.



VisualInfo Library Server

This Server will contain a master copy of all of the information relating to BOC image objects. The Library Server will direct requests from the BOC imaging users to the appropriate Object Server(s) to store, retrieve, and update objects within the VisualInfo environment. The Library Server is built on IBM's DB2/6000 relational database technology to provide highly reliable transaction processing with forward and backward recovery. The DB2/6000 database tables that make up the VisualInfo Library Server provides the following functions:

- Indices of all objects stored
- Class information about objects

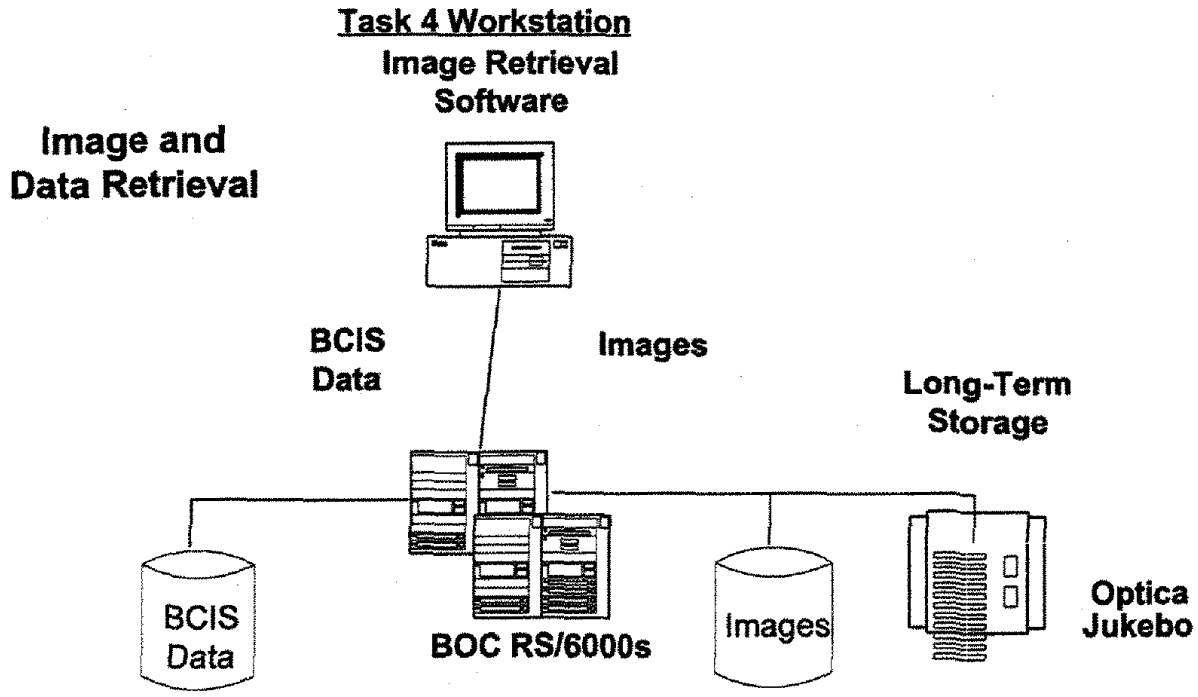
- Workflow of all objects
- Access control of all objects
- National Language support for all objects
- Administrative information
- Internal operational information

VisualInfo Object Server

The VisualInfo Object Server maintains the stored objects themselves. The Object Server will provide System Managed Storage (SMS) for all objects within the VisualInfo environment. Meaning, the Object Server will initially store images on high availability RS/6000 mirrored disks. This will allow for the most recently scanned document to have the faster access times, compared to older archived documents that reside on optical or tape storage. User defined retention periods, as part of SMS will allow for the automatic migration of objects off the RS/6000 disks to longer-term optical storage and / or tape.

Image Retrieval

From the client workstation, image services are provided through the VisualInfo Client Application running on existing Windows 98 stations. The protocol for all VisualInfo imaging components will be TCP/IP to be consistent with the previous phases and communications standards.

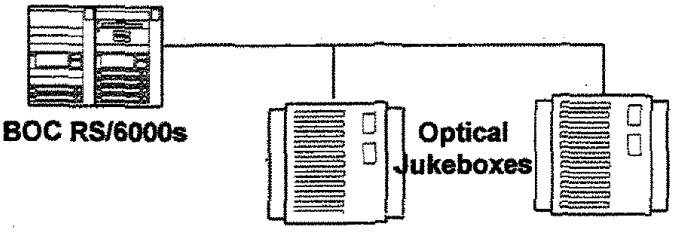


500415

Optical Jukebox

The proposed Task 4 design includes one IBM 3995 Optical Library (jukebox) model C66 with IBM's new 5.2 GB Extended Multifunction Optical Drives. One for conversion and one for newly scanned documents. It utilize the IBM 5.2 GB optical cartridges, providing 811 GB of MO rewritable, Permanent WORM, or CCW (non-permanent WORM) optical storage for use by the VisualInfo RS/6000 system. The 3995 model C66 includes four 5.2 GB Extended Multifunction optical drives and storage cells for 156 optical cartridges. The 3995 will be SCSI attached the RS/6000 as shown in the diagram below.

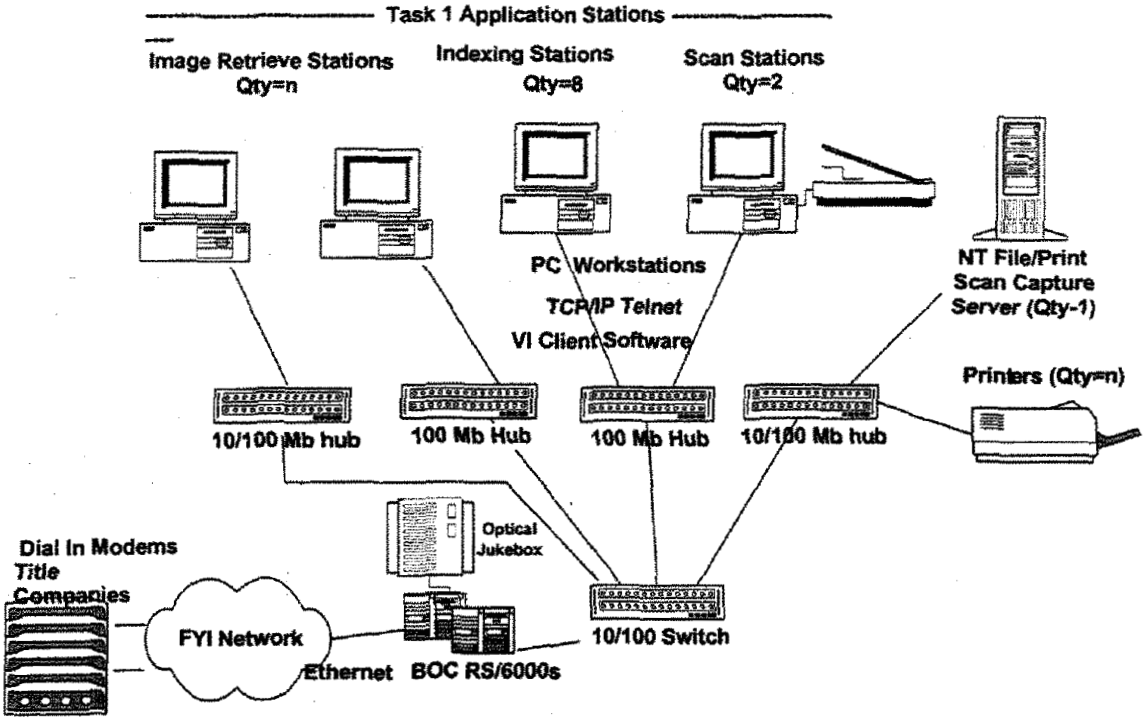
IBM 3995 Optical Library
(jukeboxes)



The VisualInfo Object Server in conjunction with ADSM will manage movement of images to and from the optical platters as needed by end users. The location of the actual image(s) will be transparent to the end users as its location is controlled by the VisualInfo Object Server.

The 3995 optical library has an autochanger that moves the optical cartridges among the optical drives, the storage cells, and the entry/exit slot. The model is also equipped with a dual-gripper picker on the autochanger for enhanced performance during the exchange of optical cartridges.

Task 4 Schematic



3.1.5 Task 5 Proposed Solution

Task 5 – Implementing Imaging Capability to BCIS

In this task, the integration of images captured into the VisualInfo DB2 database will be integrated into the application, network and the operation of the BOC. This shall include the capabilities and requirements identified in Section 3.6 IMAGING REQUIREMENTS of the RFP. In addition, update functions will be created which will check that the links between the Text data and the Images are synchronized.

At this point, the BOC users will be able to pull up a record in either Regular or Land Court and be able to "hot key" up the associated document in another window on their PC. All the functionality provided on a standalone basis in task 4, will now be available to any BOC user. We will work with the BOC to determine how, and where this functionality is needed, both for local BOC users as well as the Neighbor Island BOC offices.

One example of data to image application linking is in the LCATS Encumbrance screen. While reviewing an encumbrance for a certain CT#, and with the cursor on the encumbrance record of interest, pressing a "hot key", say PF 17, will automatically retrieve the document associated with that encumbrance, and display it in another window on the users PC. The user will only have to click within the image window, to make it the active window, and use all the image navigation tools available under VisualInfo.

3.1.6 Task 6 Proposed Solution

Task 6 – Enabling Remote Access to Text Data

Overview

In this task, we will provide additional components for remote access to the BCIS text data for neighbor island BOC locations. This will allow any BOC user in the five remote locations, via a high speed data line to perform the same functions as if they were in the Honolulu office to text data, based on their logon security. The neighbor island users will connect via a cost/performance effective solution like Frame Relay or ISDN, with Frame Relay being preferred due to its scalability of speeds above 128Kb.

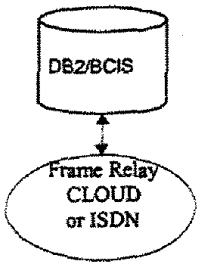
This task includes setup of the five remote locations to each be outfitted with a DELL PC 450MHz with 64MB SDRAM, 6.4GB of disk, and a 17" color monitor. Also, a Lexmark 12PPM Laser Printer will be attached so that remote printing would be possible at these neighbor island locations. The same equipment at the remote locations are also proposed for the Honolulu BOC, so that users will be familiar with the hardware operations. These same hardware components already exist in the State Parks Division. Connecting this hardware to the BCIS, will be additional network components consisting of Cisco Routers to support Frame Relay access.

Neighbor Island Users
The Neighbor island users will utilize the BCIS application developed during task 3. The neighbor island users will connect via a cost/performance effective solution like Frame Relay or ISDN. Frame Relay is preferred due to it's scalability in increasing line speeds over an initial 128Kb. The remote BOC will access the BCIS applications through the LAN or WAN that will connect these users to the RISC System/6000.

Access to retrieve the image component is planed for the next task. Here neighbor island users will access a partial BCIS application through the remote network. This remote access BCIS will have a sub-set of functionality to let users search and browse for information similar in function to the FYI users, including the ability to print a limited set of reports, such as CT's and other forms.

When approved and in place, there could be an optional capture screen that will gather the users credit card information to optionally charge for printed hard copies. There will be links in the FYI modules to allow for this when the BOC is ready to implement it. This would entail signing up with a clearing house vendor who will provide credit card authorization and validation electronically. This implementation is not planned for at this time, and not included in the proposal.

Task 6 - Remote Access – Text Data



Task 6 Environment Description

Overview

The Task 6 Networking pieces will build on those already provided in Task 1, and entails adding additional remote access for BOC personnel on the Neighbor Islands. The same base local high speed Ethernet remains intact.

Full remote BOC support for such locations as the Neighbor islands can be provided through public Frame Relay or ISDN access, the state's Hawaiian network, or through the Internet using Extranet (VPN) technology. Given the requirement to support up to two PC's in each location, a frame relay based router solution is being proposed. This would allow for 128K circuits to each remote location, with the ability to add speed as needed. The cost of a full T1 Frame Relay connection is about $600/month, while 128K is $200. For planning purposes, approximate image delay over a T1 is less than one second.

Configurations to support the frame relay alternative at ICSD would be an additional Router with an Ethernet connection to the BOC Switch. The remote sites will have PC's with Printers. The RISC System/6000 will provide disk features that are necessary for the Databases.

Components

- Cisco 4500 Router for Outer Island access
- DSU's to connect remote connections to router
- Cisco 2505 Routers/hubs in each of the five remote locations
- One PC and a printer in each of the five remote locations

3.1.7 Task 7 Proposed Solution

Task 7 – Enable Remote Access to Image Data

Overview

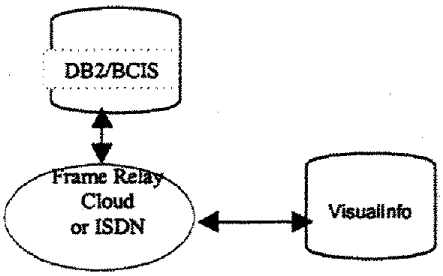
This task provides additional access to the BCIS image data for Neighbor Island BOC locations. This will allow any BOC user in the five remote locations, via a high speed data line, to perform the same functions as if they were in the Honolulu office for both text data and now, images, based on their logon security.

PC software will have already been installed during Task 6 at the five remote locations which will enable them to access the BCIS. Along with the software, 12ppm laser printers will already be available for both data and image printing.

The Neighbor island users will now be able to utilize the images developed in task 4 and made available to the local BOC users during task 5. The remote users will be able to retrieve document side-by-side from the Regular or LCATS text data or by using a standalone image query screen to pull up just a document, by document number. Optionally, a charge module using a credit cards scheme can be implemented so that the BOC can provide, and automatically collect fees for remote printing.

The same base local high speed Ethernet remains intact, along with all other components.

Task 7 - Remote Access to Images



3.1.7 Task 7 b Proposed Solution

Task 7 b – Backfile Microfilm Integration

We intend to perform the integration of the images and data provided by the vendor chosen by the BOC to complete Part 2, Task 12 Load Back Microfilm Images at this step. We feel that this will give the BOC some time to implement procedures and understand the processes including stabilizing it's own image and data entry retrieval processes, before undertaking bulk loading of images. We will provide the chosen vendor with needed specifications in order to correctly integrate their images into the BCIS. We will also design procedures and provide a customized import program that can be used by the BOC in timely controlled updates to the BCIS with the images and data from the vendor.

The proposed conversion process / solution is comprised of two steps as described below:

(1) Media transfer of Microfilm Conversion images and data onto the BCIS
(2) Store (Import) to VisualInfo

(1) Media transfer of converted images and data

The purpose of this step will be to load the magnetic media of converted microfilm images and data to a secure disk in the VisualInfo environment. We will work with the Part II vendor to provide specfications for image and data storage and will setup and help the BOC with procedures to accomplish loading of the raw data. This process will be a batch process, and operate independently of the BOC imaging system, soas to not interfere with the implementation and daily operation of the imaging system.

(2) Store (Import) to VisualInfo

The purpose of this step will be to take the images and indexing from the conversion process described above and import (store) the documents into VisualInfo. The documents will be automatically indexed using the data provided along with the image from the vendor. Once the images are stored into VisualInfo they will available for retrieval side-by-side newly scanned documents. This will allow users to retrieve these bulk loaded images, just as if they were newly scanned documents, as they come into the system.

Orphan Image Update of BCIS Application

We will develop an Update function that will check that links from Land Court and Regular System DB2 VisualInfo database to synchronize the data and images environments. This is to verify that the DB2 links to the images exists, for all images that are scanned, to facilitate timely image retrieval.

3.1.8 Task 8 Proposed Solution

Task 8 – Enable Public Access to Text Data

Overview

For Task 8, we will provide additional components for internet public access. First off, will be access to BCIS Text Data utilizing a web enabled java application to meet their requirements while maintaining adequate security.

In this task, we will provide additional components for Internet access to the BCIS text data for the General Public utilizing a PC containing a common web browser (like Microsoft Internet Explorer or Netscape Navigator). During this task two additional servers, the Public Access web server and a separate firewall, will be added to the rack installed already installed in task 1. The firewall will provide secure only access to the BCIS for the public. We will also interfacing the Web Server and the Firewall to the Internet using a Cisco Router connected to ICSD's Internet connection connected to ICSD's Internet connection

A Public Access Web Server, accessing the back end BCIS applications via DB2 Queries, and IBM ContentConnect's Web based image retrieval system, will contain the web enabled java application which will drive the end user search and retrieval of text data. We will provide the java based application which the BOC web page will link to.

The proposed Internet public access solution is divided into two areas: (1) data retrieval and (2) image retrieval. This task will enable data retrieval while task 9 will provide image retrieval for Public Access.

For the data retrieval component, public users will access a partial BCIS application through the Internet. This will be referred to as the Web-based BCIS for clarification purpose. This Web-based BCIS will have a limited set of functionality to let users search and browse for information but this will not be a full replication of BCIS on the Web. The process will consist of initial user access to the BCIS application, via a customized Java applet. The web-based Hawaii FYI Java application will provide increased functionality over the current Land Court FYI and be enhanced to provide better search and print capabilities. This new module will also provide access to the Regular System. We will perform analysis of the existing Hawaii FYI system to determine the enhancements required prior to developing the final product. It will also include an analysis of an accounting module to enable the BOC to charge for printing by the page of image documents or as is currently handled, unlimited printing for subscription users.

The IBM ContentConnect product allows access to VisualInfo to be performed on any client operating system using a standard WEB browser with Java runtime.

Task 8 Environment Description

The Task 9 Networking pieces will build on those already provided in Task 1. Internet Public Access will be provided through a Windows NT based Web Server connected to a public Ethernet. This public access Ethernet will be isolated from the remainder of the BOC network by a Firewall. The application on this node will be web/java enabled, and will gain

access to pertinent data on the BOC nodes through SQL queries, which will be restricted on the Firewall. This will provide sufficient security to protect the production data.

The Firewall will be an NT based machine, with Firewall software. The machine will have three Ethernet adapters. One adapter will connect to the BOC NT LAN Ethernet, one to the Internet, and one to a "demilitarized zone" (DMZ). The Public Access node will connect to this DMZ Ethernet. Connection to the Internet will be made through a Router connected to ICSD's Internet service. Connection can be via a direct Ethernet connection, or a simulated T1 to the Basement. The Router connects to the third Ethernet card on the Firewall. The public will connect via this router to the firewall, which will redirect traffic only to the public access node. Web enabled applications on the Public Access Node will provide information to the public, and will request data from the BOC nodes via SQL requests. Only these SQL requests will be allowed through the Firewall into the production BOC nodes.

Windows NT is recommended for both the Firewall and the Web Server. The BOC Data Base will remain on the RISC System/6000, but these front-end NT servers will effectively isolate the BCIS database.

Components

- 450 MHz PC for Firewall, with 128 Mb RAM, 4.5 GB Hard Drive, 3 Ethernet cards, and Windows NT
- Firewall software
- Cisco 2500 Router for Internet access
- DSU for Internet access

3.1.9 Task 9 Proposed Solution

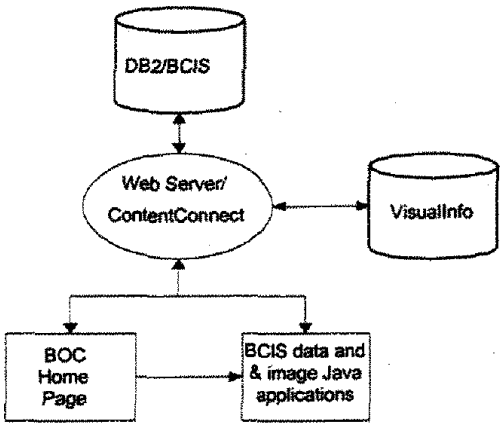
Task 9 – Enable Public Access to Image Data

Overview

This task utilizes the same components installed in task 8 and in addition provides for additional access to the BCIS image data over the internet for Public Access. Anyone accessing the BCIS over the internet with a PC containing a common web browser (like Microsoft Internet Explorer or Netscape Navigator) will be able to access both text and image data from the BCIS. There are no additional hardware or software components that are needed here.

For the image retrieval component, the user will have the option of entering the imaging system from the BCIS Java application to retrieve the specific document. For this web-based image retrieve function, the IBM ContentConnect java client will make a request for an image that is passed through the Web Server which in turn communicates with the VisualInfo Library and Object Server. For the public access information flow, please refer to the following diagram:

Task 9 - Remote Access



The IBM ContentConnect product allows access to VisualInfo to be performed on any client operating system using a standard WEB browser with Java runtime.

3.1.10 Task 10 Proposed Solution

Task 10 – Data Remediation

Back file conversion of General Index data contained on the ICSD mainframe since 1976 will be converted and imported into the new BCIS, and therefore be available to authorized users and the new General Index search module. We will work with ICSD in obtaining magnetic tape or other compatible electronic media to accomplish this. The records provided will scanned for missing fields and an exception report of these records will be provided. Alternatively, if the Part II, Task 12 vendor provides this information as part of their submittals along with the 10 years of microfilm to image conversion, we will provide the import program to read their information and update the BCIS accordingly.

Depending on the condition of the data being stored on the mainframe as well as it's completeness, we will attempt to correct known abnormalities in order to import as many records as can be done, without compromising the data integrity of the new BCIS database. If the Task 12 vendor provides more correct and complete data, then we will use this data for the period provided.

System Information:

Magnetic information can be provided both by magnetic tape and electronic downloads from the mainframe. Data from earlier years are not complete, and may be missing for a few periods. Data is contained on both disk and archive file storage (ie. not on-line). ICSD will be depended upon to provide information on suitable media or help with electronic transfers, which ever allows for feasible faster throughput to the BCIS. Upon review of mainframe data contained, the BOC can decide whether or not to include the data in the new BCIS. Estimates of General Index information on disk from 1976 contained on the mainframe are:

Go Forward Disk Estimates:	Average records/year	1998 Est records
Master File (Regular System)	700,000	600,000
Master File (Land Court)	350,000	250,000
Based on 1998 record counts		850,000
Total disk space required per year		300 MB per year

Back Data File Current Storage needs:

History – from 1990 forward are contained on disk (on-line)
Archive – from 1976 – 1989 are contained on the shelf (off-line)

1973 – 1988	15 years (est.)	3,750 MB
1989 – 1993	10 years (est.)	1,250 MB
1994 – current	6 years (est.)	1,250 MB
		6,500 MB Total on mainframe

3.1.11 Task 11 Proposed Solution

Task 11 – GIS Requirements Study

This task involves the formulation of a proposal based upon the needs of the BOC to store or access GIS map data (plat maps). This involves presentation and submission of a written report that is clearly understood to the BOC. Basically this entails conducting a study toward later implementation. This does not involve submitting an actual plan or cost estimates for a functional GIS system, but rather to define "System Requirements" and present "System Design Alternatives" (physical design which indicates task for each alternative that should be considered).

Here, with the help of a GIS Analyst, we will conduct a needs assessment for the development of an automated mapping program for the BOC. The approach for conducting this study will involve the potential managers and end users of the recommended solution. Once the current system is understood, a Needs Assessment report will be prepared which will define the requirements of the system. Using this report, an Implementation Plan will be prepared that will provide the most cost effective and functional solution to the BOC.

We have obtained five general Work Plans and Pricing from GIS specialist here in Hawaii who were each provided with an overall idea of what this task involved. Each consultant has the necessary skills to provide a study, Request for Quotation, and implement a suitable GIS system. Our findings concluded that the overall price for the initial study would generally be the same, but each consultant had a different approach and work plan. Therefore, we would like to approach this task with an overall needs assessment with the BOC first, and based on these requirements, select the appropriate consultant who can perform a feasible study with deliverables within our cost estimates. These consultants are:

Shannon McElvaney
Geo InSight International, Inc.
Located in Manoa

Allan Cadieux
Carter & Burgess
Located in Downtown Honolulu

Sherry Amundson
Maptech, Inc.
Located in Hilo

Dave Bramwell
Integrated Information Solutions
Located in Kailua, Oahu

Royce Jones
GDSI Hawaii
Located in Manoa

3.1.12 Task 12 Proposed Solution

Task 12 – Load Back Microfilm Images

The Lange Group has declined to provide services for Part 2, Task 12 Load Back Microfilm Images, but has included services to work with the appropriate vendor of choice in planning,

and implementation of their images import. Theses services are further described in Task 7, *Enable Remote Access to Image Data.*

3.2 Work Plan

This section defines the scope of work to be accomplished by The Lange Group under the *terms and conditions of the Contract between the State of Hawaii and The Lange Group* (Agreement). The task to be performed are listed and an estimated schedule is provided. In addition the responsibilities of the BOC are listed.

Changes to this Statement of Work will be processed in accordance with the procedure described in section 3.5 Project Change Control Procedure. The investigation and the implementation of changes may result in modifications to the Estimated Schedule, Charges, and/or other terms of the Agreement.

Section 6.0 Pricing is incorporated in and made a part of this Statement of Work.

3.2.1 Project Scope

The purpose of this project is to implement Bureau of Conveyance Integrated System (BCIS) which consists of services to migrate the existing WANG applications, design and develop enhancements, design and develop a new Regular System Automated Tracking, conversion of WANG data to the new BCIS, Image enablement, and provide Neighbor Island and Internet access to both recording systems

The Bureau of Conveyances has organized the BCIS project into two parts and twelve tasks of which this Statement of Work covers eleven of the twelve tasks, known as Part 1. The Lange Group has declined to include services for task 12, known as Part 2.

PART 1

Phase 1

- Task 1 - Implement a Basic BOC Network
- Task 2 - BCIS Requirements Verification
- Task 3 – Replacement of the Regular and Land Court Systems
- Task 4 – Implementing Imaging Capability on the BOC Network
- Task 5 – Implementing Imaging Capability to BCIS
- Task 6 – Enabling Remote Access to Text Data

Phase 2

- Task 7 – Enable emote Access to Image Data
- Task 7 b – Backfile Microfilm Integration
- Task 8 – Enable Public Access to Text Data
- Task 9 – Enable Public Aces to Image Data
- Task 10 – Data Remediation
- Task 11 – GIS Requirements Study

The Lange Group proposes consulting and implementation services for the migration of the (K06) LCATS and (K03) Receiving/Accounting applications to the BCIS, IBM RS/6000 environment, including conversion of existing data to the DB2 relational database. Also, our services will include the design, development, implementation and training of a new Regular System Automated Tracking module. The Lange Group will provide the BOC a fully functional Imaging system of recorded documents, which will capture General Indexing information, and link these document images to the BCIS text data. There will be two forms of remote access to the BCIS. Neighbor Island access will be provided via Frame Relay or ISDN. For General Public access, we will provide a new Hawaii FYI module which can be accessed across the Internet via a browser. Lastly, we will provide GIS analysis and conduct a study of map data information handling at the BOC.

This Statement of Work (SOW) consists of the following major tasks and activities:

- Project Management
- Replacement of Regular System and General Indexes
- Conversion of General Index files from mainframe
- Enhancement to Land Court and Regular System
- Image Enablement of Land Court and Regular System
- Neighbor Island and Internet Access

The scope of The Lange Group's participation in each of these tasks are as follows:

Task 1 - Implement a Basic BOC Network

We will provide consulting, implementation and training services to provide a working BOC network "LAN" at Kalanimoku. This includes:

- An NT based file and print server that will eventually serve as the Image capture server
- 33 each - Pentium III PC's with Windows 95/98 and software to access the BCIS, including six laser printers
- A fast ethernet based LAN
- Fiber and Category 5 copper cabling in support of this LAN

Task 2 - BCIS Requirements Verification

We will provide consulting services to assess the current environment, identify the system requirements, define objectives, and verify that the proposed BCIS meets the operational requirements of the BOC. It will include a structured walk through of specific tasks identified by the BOC, perform a functional comparison of the BCIS with the existing LCATS and

General Index systems, and perform a data flow analysis of the BCIS to insure that all data paths are addressed.

Task 3 – Replacement of the Regular and Land Court Systems

We will provide consulting, design, implementation and training services to provide the BOC with the new BCIS. This includes the migration from the Wang platform to the RS/6000 environment, and the conversion of 100% of the data contained on the Wang to a relational database, IBM's DB2. The BCIS will also include:

- 2 each - IBM RISC System/6000 H50 processors
- Connectivity to existing remote FYI (Title Company) users
- ADSM as a backup strategy

Task 4 – Implementing Imaging Capability on the BOC Network

We will provide consulting and implementation services for the implementation of a VisualInfo and Kofax solution. The services will include installation of the VisualInfo system hardware and software, tailoring of the VisualInfo software parameters, installation of Kofax software and hardware, customization of both Kofax and VisualInfo and user and system administrator training.

Task 5 – Implementing Imaging Capability to BCIS

In this task we will image enable the BCIS with the imaged documents scanned in during task 4. This would include a hot key in LCATS and Regular System to link and automatically pull up the actual document that the text data is displaying, but in another window.

Task 6 – Enabling Remote Access to Text Data

We will provide consulting and implementation services for the extension of the BCIS to BOC's Neighbor Island locations, for retrieving text data.

Task 7 – Enable Remote Access to Image Data

We will provide consulting and implementation services for the implementation of solution for retrieving images from the BCIS system by Neighbor Islands.

Task 7 b – Backfile Microfilm Integration

We will provide an automated utility and documentation to bulk import converted microfilm images into the VisualInfo imaging environment. The converted images will then be available for retrieval by BCIS users just as newly scanned documents.

Task 8 – Enable Public Access to Text Data

We will provide consulting and implementation services for the implementation of a web-based solution for retrieving text data from the BCIS system via the Internet. The services will include installation of the web-server hardware and software, installation and customization of IBM's ContentConnect Java based client application for VisualInfo and consulting services for developing a Java based application to access the DB2 BCIS database.

Task 9 – Enable Public Aces to Image Data

We will provide consulting and implementation services for the implementation of a web-based solution for retrieving document images from the BCIS system via the Internet.

Task 10 – Data Remediation

We will help in the conversion and integration of historical and archival data from 1976 currently stored on the mainframe at ICSD, into the BCIS.

Task 11 – GIS Requirements Study

We will conduct a study to analyze and recommend alternatives to the BOC that will address its GIS requirements.

3.2.2 Key Assumptions

This Statement of Work is predicated on the following assumptions and dependencies. These are based on our understanding of the requirements and design that have been developed jointly by BOC and The Lange Group. Any impact resulting from deviations to these assumptions will be assessed using the Project Change Control Procedure (section 3.5).

General

1. Development work under this Statement of Work will be performed at the BOC location in Honolulu, Hawaii, The Lange Group location in Honolulu, Hawaii, IBM in Honolulu, Hawaii and IBM Global Services location in Sacramento, California.

2. All deliverables will be provided on paper and electronically using MS Office products, and Visio software.

3. BOC will have five (5) business days to review each deliverable document for which BOC has approval responsibility. Rejections must be for cause and in writing within the five (5) day period.

4. The Lange Group may use subcontractors to perform a portion of the proposed work.

5. In order to help reduce the potential for cost and schedule overruns, The Lange Group and BOC agree to minimize time spent in meetings.

6. All hardware, software and network components necessary to perform each task, will have been procured and installed prior to the commencement of each task, including workstations and printers.

7. We are not providing any Year 2000 services under this Statement of Work, but all software derived by The Lange Group specify the Year 2000 readiness. We do not make any representations regarding the Year 2000 readiness of any other vendors product.

8. The Lange Group and BOC agree not to directly or indirectly induce or solicit for employment any employee of the other who directly performs work on this project, from the execution date of this Agreement, to one year after the completion, termination or expiration date of this Agreement, whichever comes first. For purposes of this document, The Lange Group includes any successor organization and BOC means BOC and any *successor organization.*

9. The development of a training plan and the provision of in-depth product training, which will include, but is not limited to ADSM, DB2, RS/6000, AIX, TCP/IP, VisualInfo, ImagePlus VisualInfo and Kofax, to the appropriate BOC staff or their subcontractors is the responsibility of BOC.

10. We have sized and will configure the DB2/6000 environment to support the volumes documented in the "System Information" section of the Statement of Work within this RFP response. Such sizing was estimated based on current volumes known within the current BOC Wang environment.

11. BOC will provide use of a WANG VS to contain migration data and use of already in place Wang data transfer environments to facilitate Wang to PC data conversion step. This may include the use of Wang to PC gateways (Lightspeed) or and WANG PC/LIS software

12. BOC will authorize ICSD to provide on magnetic media, the General Index files currently contained on the mainframe in a suitable format to be converted to the BCIS database

13. BOC will identify one Operations Support person, and one Technical Support person to assist in the implementation and testing, and will receive knowledge of the system *through skills transfer training. This person is expected to assist The Lange Group in all* tasks and to be knowledgeable in all aspects of the project

14. BOC will identify one key person who will be responsible in making final decisions when necessary, known as the "responsible person". This person is expected to assist The Lange Group in all tasks and to be knowledgeable in all aspects of the project

15. During this project, the testing environment located at the BOC location will become the development environment. Therefore, one environment will be used for testing and development

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16. The users of the VisualInfo solution will be familiar with personal computer and Windows functions.

17. One BOC operations person, and one BOC Technical Support person will assist in the implementation and testing of the VisualInfo hardware and software and will receive knowledge of the system through skills transfer training.

18. Converted microfilm images and indices will be provided by the BOC in an agreed upon

19. This SOW does not address the capturing of image retrieval statistics to bill public users.

3.2.3 The Lange Group Responsibilities

The tasks to be performed by The Lange Group are listed below and will be performed by The Lange Group or personnel subcontracted by The Lange Group.

3.2.3.1 Project Management

Description: The objective of this activity is to provide technical direction and control of all members of this project and to provide a framework for project, communications, reporting, and procedural and contractual activity. The tasks are as follows:

- Prepare a high-level Project Plan for performance of this Statement of Work that defines the tasks and schedule responsibilities.
- Maintain project communications through the BOC Project Manager.
- Assist the BOC Project Manager in establishing documentation and procedural standards for the project.
- Assist the BOC Project Manager in maintaining a Project Plan, which defines the detailed tasks, completion schedule, and task responsibilities.
- Provide weekly status reports when The Lange Group resources are actively engaged.
- Review and administer, as appropriate, the Project Change Control Procedure (3.5) with the BOC Project Manager.
- Coordinate and manage the technical activities of the project personnel.

Completion Criteria:

Upon completion of all Phases of this project

Deliverables:

- Periodic Status Reports
- Initial Project Plan

Task 1 - Implement a Basic BOC Network

3.2.3.2 Network Design Validation

Description: The objective of this activity is to validate the network requirements and develop a detailed design. The following tasks will be performed in this activity:

- Perform up to four interviews to refine and validate the network design.
- Research current available technology to develop the detailed design.
- Develop the Network Design Document.
- Identify any new hardware and software required.
- Develop the IP addressing scheme for the BOC.

Completion Criteria: This activity will be considered complete when the Network Design Document has been delivered to BOC Project Manager.

Deliverables:

- Network Design Document.

3.2.3.3 Installation of Network Components

Description: The objective of this activity is to create a working network in support of the BCIS and imaging applications. Network components will include Ethernet switches and hubs, PC's, and a Windows NT Server.

- Physically install and configure the network components recommended in the Network Design Document. These include:
  - 1 - 24 port 10/100 Ethernet switch, with redundant power supply
  - 2 - 24 port 100 Ethernet hubs with management modules
  - 2 - 24 port 10/100 Ethernet hubs with management modules.
- Physically install and configure other network components provided by BOC. These include:
  - all PC's, with Windows 95/98, Telnet software
  - network attached printers
  - 1 - Windows NT 4.0 File and Print Server
- Test connectivity between the PC workstations and the NT File Server.
- Document the configuration of the switches, the PC's, and the NT File Server.
- Provide up to one day of training for up to 10 BOC personnel in the operation of the new PC workstations.
- Provide up to one day of training for two BOC personnel on the operation of the Windows NT server and the switches/hubs.

Completion Criteria: This activity will be considered complete when all components have been installed and configured, documentation has been provided, and training completed.

Deliverables: None

3.2.3.4 Installation of Cabling

Description: The objective of this activity is to install the fiber optic and copper cabling to support the BCIS Network Connectivity.

- Install FutureFlex Air Blown Fiber tube cable between the ICSD computer room and each of two (2) BOC's first floor cabinet locations. A six-strand multimode fiber optic cable will be installed in each tube cable.
- Install two (2) 36-inch lockable equipment cabinets with fans in the BOC to function as IDFs, and a 19" x 84" equipment rack to function as the MDF.
- Terminate all fibers in three (3) fiber termination panels, OTDR and insertion loss test at 850/1300 nanometers, and provide written and graphical test results.
- Install eighty (80) single Category-5 cable outlets in rooms 121, 122 and 123; and one (1) cable outlet in the ICSD computer room. Test all outlets for Category-5 compliance at 100 MHz.

Completion Criteria: This activity will be considered complete when the cabling has been installed and tested.

Deliverables: None

Task 2 - BCIS Requirements Verification

Task Description: The objective of this activity is to assist the BOC in evaluating the existing environment, work with BOC staff in needs assessment and provide comparisons. Facilitate meetings with the BOC to validate that the design of the BCIS will meet their needs. Perform a structured walk through of specific tasks identified by the BOC. Perform a functional comparison of the BCIS with the existing LCATS and General Index systems. Perform a data flow analysis of BCIS that will confirm that all data paths are addressed.

Completion Criteria

This task is complete when the Requirements Document has been submitted to BOC.

Deliverables

- Requirements Document

Task 3 – Replacement of the Regular and Land Court Systems

3.2.3.5 RISC System/6000 Planning

Description: The objective of this activity is to review and plan the installation of the RS/6000 model H50 and the associated software. The following tasks will be performed in this activity:

- Prepare and conduct one planning meeting
- Document hardware layout and physical disk configurations
- Review and document RS/6000 Installation plan
- Review and document software configurations, including IP addressing.

Completion Criteria: This activity will be considered complete when the planning meeting has been conducted, and the RS/6000 Installation plan has been delivered.

Deliverables:

- RS/6000 Installation plan

3.2.3.6 Installation of RISC System/6000s and Associated Software

Description: The purpose of this activity is to install the RS/6000 model H50, capable of operating on the network, supporting the BCIS Application, and ready for the Image application to be added. The following tasks are included in this activity:

- Perform physical planning for the RS/6000 to verify space availability, and electrical requirements.
- Provide physical requirements to BOC personnel for ordering.
- Schedule CE to install the RS/6000
- Prepare the basic software, including:
  - Install the AIX Operating System
  - Install appropriate Y2K and Operating System Patches
  - Set up private IP address
  - Install appropriate device/kernel drivers Start carving the hard disks
- Load ADSM LPP and client code
- Customize ADSM using default management classes
- Customize and setup disk, tape, and copy pools
- Set up mirror protection for ADSM data base
- Set up the 3575 Magstar MP
- Install and setup DB2/6000
- Provide one half day training on the RS/6000 and associated software operation for two BOC personnel.
- Provide documented control book showing the RS/6000 and software configurations.

Completion Criteria: This activity will be complete when the RS/6000 and associated software are installed and operational, and the Control Book has been delivered

Deliverables:

- RS/6000 Control Book.

3.2.3.7 Perform Migration to the BCIS from the WANG environment

Task Description: *The objective of this activity is to convert all programs and data* that currently reside on the WANG VS computer system in the applications known as K03 and K06, to the BCIS. This task is dependent on required hardware, software and networking components being in place.

- Review with client work plan associated with this task including estimated schedules and obtain client approval
- Obtain current SPEED II application software K03, K06 from BOC
- Obtain current WANG Master data files for K03, K06 from the BOC

All work from this point is done in the WANG development region

- Setup, and populate the application and data files from BOC
- Create the export K03 & K06 application
- Create the export K03 & K06 data
- Determine the PC transferring workstations and insure proper hookups to the WANG and the BCIS
- Create migration check point sheets, used in tracking and establishing benchmarks
- Transfer (download, upload) the application export files from the WANG to the PC then to the BCIS
- Transfer (download, upload) the data export files in the same manner

All work from this point down is done on the BCIS

- Perform validation checks of the import files
- Setup the APPX development region for the K03 & K06 application and data
- Import the application files into APPX development region
- Import the data files into APPX development region
- Perform conformity verification and corrections on all menus, jobs and functions in the application software to match the WANG, including data verification
- Setup and populate the test regions for application and data
- Create the DB2 Update program that will read the test data and write the DB2 test database

Initial Testing of K03, K06 application in Prototype Region

- Prepare training materials

- Develop Initial Test Cases
- Train BOC staff
- Assist BOC with initial testing period

DB2 setup and interface

- Verify that DB2 is working properly
- *Define authority privileges and test assignments for dba, developers and users*
- Setup the DB2 test data environment same as the migration test environment
- Run the DB2 Update program to populate the DB2 test database
- Perform verification checks on the data and verify the application links to it correctly
- Verify that the application and DB2 test environment performs correctly
- Setup the DB2 production environment
- Develop Acceptance Test Cases

Testing Period to run from 1 – 3 months

- Migrate the full WANG data to DB2, using this for benchmark throughput times
- Assist and test ADSM backup and recovery procedures
- *Assist with test of Hawaii FYI connections*
- Create Hawaii FYI User Instructions
- Identify and prepare migration environment on the BOC WANG VS2
- Perform parallel acceptance testing by BOC

Cutover from the WANG to the BCIS

- Review with BOC and ICSD testing status and plan cutover dates, plan for follow-up activities such as advisory notices to Hawaii FYI subscribers
- Perform final migration of the full WANG data to DB2

Completion Criteria:

This task will be completed when all milestones have been completed. The following milestones are defined in this task:

Milestone 1: After satisfactory completion of Initial Testing in the Prototype Region
Milestone 2: After satisfactory completion of Acceptance Testing by BOC
Milestone 3: Ten business days after final migration and cutover to the BCIS

Deliverables:

- Migrated APPX application (K03) LCATS/FYI and (K06) Receiving/Accounting
- Converted Data from WANG DMS to IBM DB2
- Acceptance Test Cases
- Hawaii FYI User Instructions
- APPX Design and User Manuals

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3.2.3.8 Create new Regular System Automated Tracking and General Index

Task Description: The objective of this activity is to design, develop and implement a Regular System Automated Tracking and General Index replacement system. This task will overlap with 3.2.3.7 Perform Migration to the BCIS. This task is dependent on required hardware, software and networking components being in place.

- Facilitate up to two four-hour workflow sessions
- Facilitate up to two two-hour meetings with Companies who receive magnetic tapes
- Develop the Detail Design
- Facilitate up to two four-hour design reviews
- Develop the Prototype
- Facilitate up to two four-hour Prototype reviews
- Develop the Software
- Develop Acceptance Test cases
- Create Download Company Instructions
- Develop Training materials

Initial Testing
- Train BOC staff
- Assist BOC with initial testing period
- Assist with download testing

Implementation and Solution Validation
- Initialize Production environment
- Assist with Acceptance Test

Completion Criteria: This task will be complete after the first ten business days of production.

Deliverables:

- New (Kxx) Regular System Automated Tracking and General Indexes
- Design Document
- Acceptance Test Cases
- Training Materials

3.2.3.9 Enhance the Land Court and Regular System

Task Description: The objective of this activity is to re-engineer the workflow and enhance the Land Court and Regular Systems. Bar coded labels will be introduced. This task will overlap with task 3.2.3.7 Perform Migration to the BCIS. This task is dependent on required hardware, software and networking components being in place.

- Facilitate up to two four-hour design sessions
- Make software changes in test region

- Facilitate one four-hour prototype review session

Implementation and Solution Validation

- *Move software into production environment*

Completion Criteria: *This task will be complete after the first ten business days* after production.

Deliverables:

- Modified K03, K06, Kxx software
- Modifications Made Document

Task 4 – Implementing Imaging Capability on the BOC Network

3.2.3.10 Solution Definition

Description: The objective of the Solution Definition activity is to determine and *solidify the requirements for the BCIS imaging implementation. The following tasks* will be performed in this activity:

- Facilitate up to two, four-hour image workflow sessions which include the *following tasks:*
  - *Define rules and edits required during the index process; and*
  - Define document types and exception processing.

These sessions will lead to the customization of the Kofax and VisualInfo software.

- Facilitate up to two, four-hour configuration definition and infrastructure validation sessions.
- Confirm the infrastructure requirements for the production environment. Confirm hardware and software sizing and configurations. Specific topics will include performance, availability, backup/recovery and leveraging of existing infrastructure (i.e. DNS, tape backup).
- Develop the System Requirements Specification document.

Completion Criteria: This activity will be considered complete when the System Requirements Specification has been delivered

Deliverables:

- System Requirements Specification

3.2.3.11 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan

Assistance on the following tasks will be provided:

- BOC will assist in the development of the Acceptance Test Plan

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered

Deliverable Materials:

- Acceptance Test Plan

3.2.3.12 Solution Generation

Description: The purpose of this activity is to install and configure necessary hardware and software components for the imaging solution. Also included will be the customization tasks necessary for the imaging solution. Installation and configuration will consist of:

- Configure Kofax Sub System Server (1)
- Configure Kofax Index workstations (2)
- Configure Scan workstations (2)
- Configure Kofax Ascent Capture software
- Configure IBM 3995 Optical Library (1)
- Install VisualInfo Library Server (1)
- Configure VisualInfo Library Server software and prerequisite software, including DB2 and ADSM
- Install VisualInfo Object Server (1)
- Configure VisualInfo Object Server software and prerequisite software, including DB2 and ADSM
- Configure VisualInfo Client workstations
- Install Microfilm Generator

For the customization portion of this activity, the following tasks will be performed:

- Customization of the Kofax Index software
- Customization of the Microfilm Generator

Finally, integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be complete when all Kofax and VisualInfo components are installed and configured.

Deliverable Materials: None.

3.2.3.13 Solution Validation

Description: During this activity, The Lange Group will perform the System Test and will provide up to 40 hours of assistance to BOC with the Acceptance Test.

- Perform System Test
- Assist with Acceptance Test

The BOC will be responsible for:

- Perform Acceptance Test

Completion Criteria: This activity will be complete when the Acceptance Test executes as outlined in the Acceptance Test Plan.

Deliverable Materials: None

3.2.3.14 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Develop training materials
- Conduct Training on VisualInfo Security / System Administration for up to 2 users
- Conduct Training on Kofax Scan Subsystem for up to 5 users
- Conduct Train the Trainer session for the Retrieval Users for up to 5 users

Completion Criteria:

This task will be complete when The Lange Group has conducted the half-day Security training, the half-day System Administration training, the half-day Scan Subsystem training and the half-day Train the Trainer session for Retrieve.

Deliverable Materials: Training Materials

Task 5 – Implementing Imaging Capability to BCIS

The objective of this activity is to image enable the Land Court and Regular System with the images scanned in during task 4.

3.2.3.15 Solution Definition

Description: The objective of the Solution Definition activity is to determine and solidify the requirements for the imaging implementation to interface to BCIS. The following tasks will be performed in this activity:

- Facilitate one four-hour image session which includes the following tasks:
  - Define interface requirements to DB2 BCIS database
  - Define annotation requirements
  - Define retrieval requirements from BCIS application
  - Prepare the BCIS Interface Specification

Completion Criteria: This activity will be considered complete when the BCIS Interface Specification has been delivered

Deliverables:

- BCIS Interface Specification
- Modified K03, Kxx software

3.2.3.16 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan

Assistance on the following tasks will be provided:

- BOC will assist in the development of the Acceptance Test Plan

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered to BOC Project Manager.

Deliverable Materials: Acceptance Test Plan

3.2.3.17 Solution Generation

Description: The purpose of this activity is customize the imaging software to integrate to the BCIS application. Customization will consist of:

- Customization of the Kofax Release module to integrate with the DB2 BCIS application
- Customization to include annotations for the image for page numbers
- Customized retrieve module for the BCIS application.

Finally, integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be complete when the above components have been customized according to the BCIS Interface Specification.

Deliverable Materials: None.

3.2.3.18 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Develop training materials
- Conduct System Administration training for up to 2 users
- Conduct Train the Trainer session for the Retrieval Users for up to 5 users

Completion Criteria:

This task will be complete when The Lange Group has conducted the 1 hour System Administration training and the 2 hour train the trainer session.

Deliverable Materials: Training Materials

Task 6 – Enabling Remote Access to Text Data

3.2.3.19 Design/Install Remote Access

Description: The objective of this task is to deploy a remote access solution for BOC locations on the neighbor islands. The following tasks will be performed as part of this activity:

- Define the remote access requirements and validate the existing design
- Install and configure hardware necessary for this support to include:
  - One Cisco 4500 Router at ICSD for remote frame relay connections
  - Five Cisco 2500 Routers on the neighbor islands
  - Five PC's for access to the BCIS system
  - Test connectivity from the remote PC's to the BCIS text data
  - Document configurations of routers in the Router Configuration Document
  - Update the Network Design document with the new configuration

Completion Criteria: This activity will be complete when the neighbor island PC's can connect to the BCIS data and the configuration documents have been delivered.

Deliverables:

- Updated Network Design Document
- Router Configuration document

3.2.3.20 Solution Definition

Description: The objective of the Solution Definition activity is to determine and solidify the requirements for the remote access to the BCIS text data

- Facilitate up to one, four-hour configuration definition and infrastructure validation session.
- Confirm the infrastructure requirements for the remote environments. Confirm hardware and software sizing and configurations.
- Update the System Requirements Specification document.

Completion Criteria: This activity will be considered complete when the System Requirements Specification has been updated and delivered

Deliverables: Updated System Requirements Specification

3.2.3.21 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan
-

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered

Deliverable Materials: Acceptance Test Plan

3.2.3.22 Solution Generation

Description: The purpose of this activity is to install and configure necessary hardware and software components for the remote access to the imaging solution. Installation and configuration will consist of:

- Install and configure 5 remote locations

Finally, integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be complete when 5 remote access components are installed and configured.

Deliverable Materials: None.

3.2.3.23 Solution Validation

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Description: During this activity, The Lange Group will perform the System Test and will provide up to 40 hours of assistance to the BOC with the Acceptance Test.

- Perform System Test
- Assist with Acceptance Test

BOC will be responsible for:

- Perform Acceptance Test

Completion Criteria: This activity will be complete when the Acceptance Test executes as outlined in the Acceptance Test Plan.

Deliverable Materials: None

3.2.3.24 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Conduct Train the Trainer session for the Retrieval Users

Completion Criteria: This task will be complete when The Lange Group has completed the train the trainer sessions

Deliverable Materials: none

Task 7 – Enable Remote Access to Image Data

3.2.3.25 Solution Definition

Description: The objective of the Solution Definition activity is to determine and solidify the requirements for the remote access to the BCIS imaging implementation. The following tasks will be performed in this activity:

- Facilitate up to one, four-hour configuration definition and infrastructure validation session.
- Confirm the infrastructure requirements for the remote environments. Confirm hardware and software sizing and configurations.
- Update the System Requirements Specification document.

Completion Criteria: This activity will be considered complete when the System Requirements Specification has been updated and delivered

Deliverables: Updated System Requirements Specification

3.2.3.26 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan
-

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered

Deliverable Materials: Acceptance Test Plan

3.2.3.27 Solution Generation

Description: The purpose of this activity is to install and configure necessary hardware and software components for the remote access to the imaging solution. Installation and configuration will consist of:

- Install and configure 5 remote locations for VisualInfo access

Finally, integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be complete when 5 VisualInfo remote access components are installed and configured.

Deliverable Materials: None.

3.2.3.28 Solution Validation

Description: During this activity, The Lange Group will perform the System Test and will provide up to 40 hours of assistance to the BOC with the Acceptance Test.

- Perform System Test
- Assist with Acceptance Test

BOC will be responsible for:

- Perform Acceptance Test

Completion Criteria: This activity will be complete when the Acceptance Test executes as outlined in the Acceptance Test Plan.

Deliverable Materials: None

3.2.3.29 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Conduct Train the Trainer session for the Retrieval Users

Completion Criteria: This task will be complete when The Lange Group has completed the train the trainer sessions

Deliverable Materials: none

Task 7 b – Backfile Microfilm Integration

3.2.3.30 Conversion Requirements Validation

Task Description: Integration of the images and data provided by the Vendors chosen by the BOC to complete Part 2, Task 12 Load Back Microfilm.

- Facilitate requirements session with BOC.
- Define internal specifications
- Define procedures and programs used to import the convert microfilm images
- Implement Import program to be used
- Train two BOC users on import procedures to VisualInfo

Completion Criteria: This task will be completed when the BOC has received it's training.

Deliverables

- Requirements Definition
- Training Materials

Task 8 – Enable Public Access to Text Data

3.2.3.31 Internet Access Design Validation

Description: The objective of this activity is to validate the Internet access requirements and develop a detailed design. The following tasks will be performed in this activity:

- Research current available technology to develop the detailed design.
- Develop the Internet Access Design Document.
- Identify any new hardware and software required.
- Develop the IP addressing for Internet access.

Completion Criteria: This activity will be considered complete when the Internet Access Design Document has been delivered

Deliverables:

- Internet Access Design Document.

3.2.3.32 Installation of Network Components for Internet Access

Description: The objective of this activity is to create working Internet access in support of the BCIS application. Tasks will include installation and customization of the following components:

- Installation and configuration of a web server
- Installation and customization of a firewall
- Installation and customization of a router for internet connection

Integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be considered complete when all components have been installed and configured.

Deliverables: None

3.2.3.33 Solution Definition

Description: The objective of this activity is to determine the requirements for the BCIS text data implementation over the Internet. The specifications created will serve as a basis for the creation of a web based application which could be called from the DLNR Home page.

Facilitate up to two, four hour specifications sessions which will include the following:

- Define query and report formats
- Define security
- Define chargeable items
- Confirm infrastructure requirements for the production environment

These sessions will lead to the customization of a Java based application.

Assistance on the following tasks will be provided:

- BOC webmaster will develop a BOC home page and links

Completion Criteria: This activity will be considered complete when the System Requirements Specification has been delivered

Deliverables: System Requirements Specification

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3.2.3.34 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan
-

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered

Deliverable Materials: Acceptance Test Plan

3.2.3.35 Solution Generation

Description: The purpose of this activity is to develop and install the Java based application which will be used by the General Public.

Completion Criteria: This activity will be complete when the Java based application is installed.

Deliverable Materials: None.

3.2.3.36 Solution Validation

Description: During this activity, The Lange Group will perform the System Test and will provide up to 40 hours of assistance to the BOC with the Acceptance Test.

- Perform System Test
- Assist with Acceptance Test

BOC will be responsible for:

- Perform Acceptance Test

Completion Criteria: This activity will be complete when the Acceptance Test executes as outlined in the Acceptance Test Plan.

Deliverable Materials: None

3.2.3.37 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Conduct Train the Trainer session for the BOC

Completion Criteria: This task will be complete when The Lange Group has completed the train the trainer sessions

Deliverable Materials: none

Task 9 – Enable Public Acess to Image Data

3.2.3.38 Solution Definition

Description: The objective of the Solution Definition activity is to determine and document the requirements for the web-based access to the image system. The following tasks will be performed in this activity:

- Facilitate up to one, four-hour session to determine Web-based image requirements.
- Confirm the infrastructure requirements for the new web-based production environment. Confirm hardware and software sizing and configurations. Specific topics will include performance, availability, backup/recovery and leveraging of existing infrastructure (i.e., DNS, tape backup).
- Identify the customization necessary for the Internet imaging solution.
- Develop the Internet Requirement Specification Document.

Completion Criteria: This activity will be considered complete when the Internet Requirement Specification Document has been delivered

Deliverables: Internet Requirement Specification Document

3.2.3.39 Develop Test Plans

Description: The development of the System Test Cases and Acceptance Test Plan will occur during this activity. The following tasks are included in this activity:

- Develop System Test Cases
- Develop Acceptance Test Plan

Completion Criteria: This activity will be complete when the Acceptance Test Plan has been delivered

Deliverable Materials: Acceptance Test Plan

3.2.3.40 Solution Generation

Description: The purpose of this activity is to install and configure necessary hardware and software components for the remote BCIS access solution. Also included will be the customization tasks necessary for the remote access through the Internet. Installation and configuration will consist of:

- Installation/Configuration of IBM's ContentConnect server software
- Customization of web component for image viewing charges

Finally, integration tests will be performed to ensure all components are working together.

Completion Criteria: This activity will be complete when all the listed components are installed and configured.

Deliverable Materials: none

3.2.3.41 Solution Validation

Description: During this activity, The Lange Group will perform the System Test and will provide assistance to BOC with the Acceptance Test.

- Perform System Test
- Assist with Acceptance Test

The BOC will be responsible for:

- Perform Acceptance Test

Completion Criteria: This activity will be complete when the Acceptance Test executes as outlined in the Acceptance Test Plan.

Deliverable Materials: None

3.2.3.42 Procedures and Training

Description: The purpose of this activity is to plan and conduct the training for the BCIS imaging system. The following tasks will be performed:

- Develop training materials
- Conduct Training on web daily operations.
- Conduct Train the Trainer session for the Retrieval Users for up to 5 users.
- Conduct training on the new network infrastructure devices

Completion Criteria: This task will be complete when The Lange Group has conducted the one day Operations training, and the half-day Train the Trainer, and network infrastructure training sessions.

Deliverable Materials: Training Materials

Task 10 – Data Remediation

3.2.3.43 Conversion of the General Index files from mainframe

Task Description: The objective of this activity is to convert the General Index Master files for both Regular System and Land Court currently residing on the mainframe, from 1976.

- Facilitate requirements session with BOC and ICSD
- Define technical specifications
- Define procedures and programs used to import the data
- Design and develop import programs
- Transfer and import the mainframe data files to the BCIS
- Perform verification checks on the imported data

Assistance on the following tasks will be provided:

- ICSD will provide mainframe data on suitable "common" media and provide file layouts, listings or other information such as record counts etc. to verify records contained therein
- BOC will aid in spot check verification of validity of data

Completion Criteria: This task will be completed when selected data contained on the mainframe (1976 through current) is converted and accessible on the BCIS

Deliverables: Converted Master Indexes (1976 through current)

Task 11 – GIS Requirements Study

3.2.3.44 Study Requirements

Task Description: The objective of this activity is to validate the requirements and perform a needs assessment of a GIS solution for the BOC. This shall include the formulation of a proposal based upon these needs

Completion Criteria: This task will be completed upon presentation of the results of the study and formulation of a proposal

Deliverables: Study Results & Proposal

3.2.4 The Bureau of Conveyances Responsibilities

The responsibilities listed in this section are in addition to those responsibilities specified in the *Agreement* and the items listed in Assumptions and are to be provided at no charge to The Lange Group. The Lange Group's performance is predicated upon the following responsibilities being fulfilled by BOC.

3.2.4.1 BOC Project Manager

Prior to the start of this Statement of Work, BOC will designate, in writing, a person, called the BOC Project Manager, to whom all The Lange Group communications will be addressed and who has the authority to act for BOC in all aspects of the contract. This Project Manager will also insure that appropriate BOC resources and personnel are available to provide the necessary information for this project. The responsibilities of BOC Project Manager include:

- Serve as the interface between the The Lange Group project team and all BOC personnel participating in this project.
- With the The Lange Group Project Manager, administer Project Change Control.
- Attend project status meetings.
- Obtain and provide information, data, decisions and approvals, within three working days of The Lange Group's request, unless BOC and The Lange Group agree to an extended response time.
- Resolve deviations from project plans that may be caused by BOC.
- *Help resolve project issues and escalate issues within BOC organization, as* necessary.

- Monitor and report project status on a regular basis to BOC as appropriate.
- Provide and coordinate BOC technical resources as necessary.
- Signoff on all deliverables or provide feedback within three (3) days of receipt.

3.2.4.2 Other BOC Personnel Responsibilities

- Participate in meetings and interviews as necessary.
- Provide any additional information as is necessary for the project, as mutually agreed upon by The Lange Group and BOC.
- Help schedule interview sessions and/or meetings with identified personnel and arrange conference rooms/meeting rooms for such interviews, as appropriate.
- Review and provide input or changes to the documentation of the interview findings.
- Conduct post-interview meetings with the management team to quantify identified tangible and strategic benefits and finalize input.
- Provide subject matter experts who are knowledgeable in business processes and system architecture, including internal interfaces and API's, if required.
- Provide (through current inventory or procurement) all hardware, operating system, software, development tools and networking per an agreed-to schedule for both development and production systems.

3.2.4.3 Additional BOC Responsibilities

1. Provide suitable office space, office supplies, furniture, telephone, parking, and other facilities equivalent to those provided to BOC project team members for the The Lange Group team (up to 2 physical work areas) while working on BOC premises.
2. Provide all necessary clerical and reproduction services required to support The Lange Group team while working on BOC premises.
3. Provide all necessary machine time, related services, and supplies required to support project planning, tracking, documentation, and reporting activities.

3.2.4.4 Security

BOC is responsible for the actual content of any data file, selection and implementation of controls on its access and use, and security of the stored data.

3.2.4.5 Laws, Regulations and Statutes

BOC is responsible for the identification and interpretation of any applicable laws, regulations, and statutes that affect BOC application systems or programs which The Lange Group will have access to during this project. It is the responsibility of BOC to assure that the resulting systems and programs meet the requirement of those laws.

3.2.4.6 Required Consents and Indemnity

You will promptly obtain and provide to us all Required Consents necessary for us to provide the Services described in this Statement of Work. A required Consent means any consents or approvals required to give us and our subcontractors the right or license to access, use and/or modify (including creating derivative works) to the hardware, software, firmware and other products that you use, without infringing the ownership or license rights (including patent and copyright) of the providers or owners of such products.

You will indemnify, defend and hold us, our affiliates, and subcontractors, harmless from and against any and all claims, losses, liabilities and damages (including reasonable attorneys' fees and costs) arising from or in connection with any claims (including patent and copyright infringement) made against us, alleged to have occurred as a result of your failure to provide any Required Consents.

We will be relieved of the performance of any obligations that may be affected by your failure to promptly obtain and provide any Required Consents to us.

Phase 1 (Task 1 – Task 6), and Phase 2 (Task 7 – Task 11)

- Provide BOC and/or ICSD personnel for training and skills transfers, so as to be capable of operating the network and systems upon completion of this Statement of Work.
- Ensure that the hardware necessary for each task is acquired before the start of the implementation of the task
- Assist in the installation and configuration activities. This assistance will consist of the database administrator actively participating in the installation of the DB2 database as well as a System Administrator involved in all installation activities and configuration of software components.
- Assist in Testing – both the System Test and Acceptance Test will take place on the installed machines before the environment becomes the Production Environment. The BOC Project Manager will ensure that users will be available to assist in the testing effort. The BOC will assist The Lange Group in the development of the Acceptance Test Cases. BOC users will be responsible for executing the User Acceptance test cases.

- Assist in Training - the BOC Project Manager will ensure that the trainees are notified of, scheduled for, and attend the training session. Attendees should have experience using a personal computer and Windows. BOC will provide a suitable area with the installed workstations for the hands-on usage session.

- Define Backup and Recovery Procedures – The Lange Group will assist BOC in defining and documenting the backup and recovery. As part of this activity, BOC will be responsible for validating that the backup and recovery procedures are executed on a regular and timely basis.

3.2.5 Deliverable Materials

All original authored material provided by The Lange Group during the performance of this Statement of Work are the property of The Lange Group or a product or property of others who The Lange Group has a right to use and/or distribute to you. The APPX Software, Inc. license contract will be made a part of the *Agreement.*

Initial Project Plan

- Project Schedule using Microsoft PROJECT (2 –5 pages)
- Status Reports (1-2 pages)

Task 1 – Implement a Basic BOC Network

- Network Design Document
- Component List
- PC Workstations, server and switch/hub configurations
- Cabling test results

Task 2 – BCIS Requirements Verification

- System Requirements Specification Document

Task 3 – Replacement of the Regular and Land Court Systems

- RISC System/6000 installation plan
- RISC System/6000 Control Book
- Acceptance Test Plan

Task 4 – Implementing Imaging Capability on the BOC Network

- System Requirements Specification

- Acceptance Test Plan
- Training Materials

Task 5 – Implementing Imaging Capability to BCIS

- BCIS Interface Specification
- Acceptance Test Plan
- Training Materials

Task 6 – Enabling Remote Access to Text Data

- Unpdated Network Design Document
- Router Configuration Document

Task 7 – Enable Remote Access to Image Data

- Updated System Requirements Specification
- Acceptance Test Plan

Task 7 b – Backfile Microfilm Integration

- System Requirements Specification

Task 8 – Enable Public Access to Text Data

- Internet Requirements Specification Document
- Internet Access Design Document
- Acceptance Test Plan
- Training Materials

Task 9 – Enable Public Access to Image Data

- Acceptance Test Plan
- Updated Training Materials

Task 10 – Data Remediation

none

Task 11 – GIS Requirements Study

- Needs Assessment
- Study and Presentation Materials

3.2.6 Post Implementation Support

Description: The purpose of this activity is to cutover to the Production Environment task as defined in the Statement of Work. During this activity, The Lange Group will provide the production system support as follows:

- Take problem calls and collect information about the problem. Help with determination of who to call or where the problem lies, and help with the expeditious solution of the problem.
- Assist with the collection of data to assist in the diagnosis of the problem if the solution lies with another vendor
- Advise the BOC who the appropriate vendor to contact, or help contact the appropriate vendor to open a problem report

The Lange Group will provide product support contracts for all the vendor products associated with this project. The Lange Group will have access and authorization to use the vendor support telephone numbers in the performance of it's work.

Completion Criteria:

This task will be completed at the end of the Maintenance Contract period.

Deliverable Materials: None

3.3 Estimated Schedule

The estimated schedule for the overall BCIS project is twelve calendar months, as depicted at a high level in the following chart with estimated start date of August 2, 1999:

Overall Schedule						Months						
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Task 1												
Task 2												
Task 3												
Task 4												
Task 5												
Task 6												
Task 7												
Task 7b												
Task 8												
Task 9												
Task 10.												
Task 11												

Task 1 – Implement a Basic BOC Network

Estimated start date: August 2, 1999
Estimated end date: September 30, 1999

	Weeks							
Task 1	1	2	3	4	5	6	7	8
Network Design Validation								
Conduct Interviews								
Research								
Develop Network Design Document								
Identify hardware / software								
Develop IP addressing scheme								
Network Design Document				X				
Installation of Network Components								
Install Network Components								
Install DELL PC's w/software								
Install Printers								
Install NT Server								
Test connectivity								
Train the Trainer on PC usage								
Training on NT, switches / hugs								
All PC Hardware Installed								X
Installation of Cabling								
Cabling Complete								X

Task 2 – BCIS Requirements Verification

Estimated start date: August 2, 1999
Estimated end date: August 31, 1999

Weeks

Task 2	1	2	3	4
Requirements Verification				
Conduct Requirements Sessions	■	■	■	
Perform Structured Walk Through	■	■	■	
Create Requirements Document				■
Requirements Document				X

Task 3 – Replacement of the Regular and Land Court System

Estimated start date: August 2, 1999
Estimated end date: May 31, 2000

Months

Task 3	1	2	3	4	5	6	7	8	9	10
Task 1 Kickoff	■									
Initial Project Plan	X									
Installation of the RS/6000										
Planning	■									
Installation of Hardware		■	■							
Installation of Software			■							
Installation Plan/Control Book			X							
Migration of K03, K06										
Migrate	■	■	■							
DB2 Setup			■	■						
Initial Test					■					
Initial Testing Compl.					X					
Convert Wang Full Data						■				
Test 1-3 months							■	■	■	
Acceptance Test Compl.										X
Convert Final Data										■
Cutover to BCIS										■
Cutover to BCIS										X
Regular System & GI's										
Requirements	■									
Design		■								
Development			■	■	■					
Initial Test						■				
Test 1-3 months							■	■	■	
Production										■
Cutover to BCIS										X
Enhancements										
Development			■	■	■	■				
Test 1-3 months							■	■	■	
Production										■
Wang Migration Complete										X

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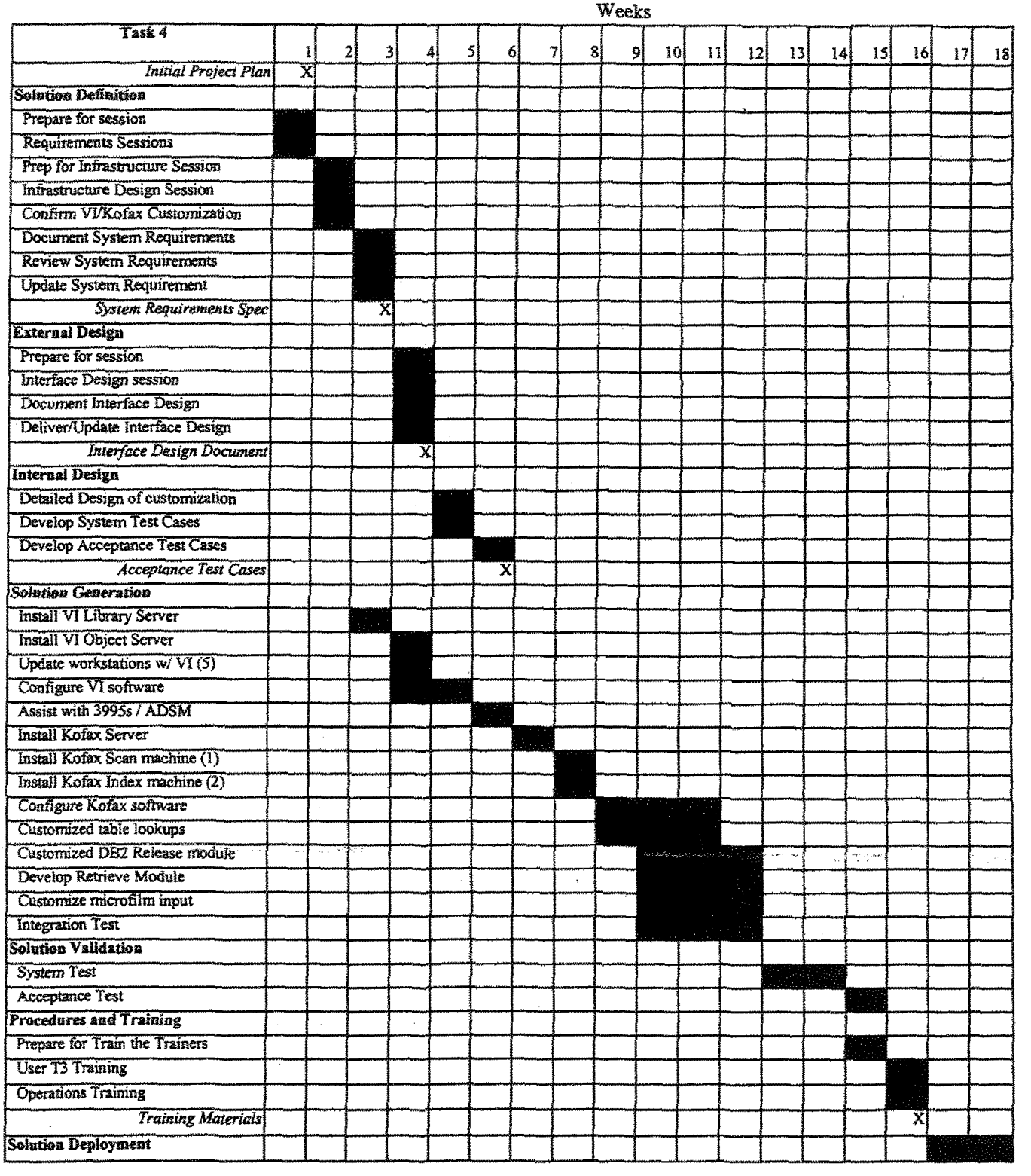
Task 4 – Implementing Imaging Capability on the BOC Network

Estimated start date: October 1, 1999
Estimated end date: December 31, 1999



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Task 5 – Implementing Imaging Capability on BCIS

Estimated start date: January 1, 2000
Estimated end date: January 31, 1999

Weeks

Task 5	1	2	3	4
Solution Definition	■			
Interface Specifications	■			
Develop Test Plans		■		
Acceptance Test Plan		■		
Solution Generation		■	■	
Procedures and Training				■
Training Materials				■

Task 6 – Enabling Remote Access to Text Data

Estimated start date: February 1, 2000
Estimated end date: February 29, 2000

Weeks

Task 6	1	2	3	4
Design/Install Remote Access	■			
Solution Definition	■			
Interface Specifications	X			
Develop Test Plans		■		
Acceptance Test Plan			X	
Solution Generation		■	■	
Procedures & Training				■
Training Material				X

Task 7 – Enable Remote Access to Image Data

Estimated start date: March 1, 2000
Estimated end date: March 31, 2000

Weeks

Task 7				
Solution Definition	■			
System Requirements Specification		X		
Develop Test Plans		■		
Acceptance Test Plan			X	
Solution Generation		■	■	
Solution Validation				■
Procedures and Training				■
Training Materials				X

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Task 7 b – Backfile Microfilm Integration

Estimated start date: March 1, 2000
Estimated end date: March 31, 2000

Weeks

Task 7 b	1	2	3	4
Requirements Validation				
Confirm technical environment	■			
Review import specifications	■			
Develop system/accept test cases	■			
Develop Migration Solution				
Application Design	■			
Code/Unit Test		■	■	
System Test				■
Deliver Migration Solution				
Demonstrate/Acceptance Test				■
Acceptance Test Cases				X

Task 8 – Enable Public Access to Text Data

Estimated start date: April 1, 2000
Estimated end date: June 31, 2000

Weeks

Task 8	1	2	3	4	5	6	7	8	9	10	11	12
Internet Access Design Validation	■	■										
Internet Access Design Document			X									
Installation of Network Components			■	■								
Solution Definition	■	■										
System Requirements Specification			X									
Develop Test Plans			■	■								
Acceptance Test Plan					X							
Solution Generation				■	■	■	■	■	■			
Solution Validation										■	■	
Procedures & Training												■
Training Materials												X

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Task 9 – Enable Public Access to Image Data

Estimated start date: May 1, 2000
Estimated end date: June 30, 2000

	Weeks							
Task 9	1	2	3	4	5	6	7	8
Solution Definition	■	■						
Internet Requirement Specifications			X					
Develop Test Plans			■					
Acceptance Test Plan				X				
Solution Generation			■	■	■			
Solution Validation						■	■	
Procedures and Training								■
Training Materials								X

Task 10 – Data Remediation

Estimated start date: July 1, 2000
Estimated end date: July 31, 2000

Task 10	1	2	3	4
Solution Definition	■			
Develop Test Plans		■		
Solution Generation		■	■	
Solution Validation				■
Procedures and Training				■
Training Materials				X

Task 11 – GIS Requirements Study

Estimated start date: July 1, 2000
Estimated end date: July 31, 2000

Task 11	1	2	3	4
Requirements Verification	■			
Perform GIS Study		■	■	■
Solution Generation		■	■	
Results of Study				X

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3.4 Completion Criteria

The Lange Group shall have fulfilled its obligations under this Statement of Work when any one of the following first occurs:

- The Lange Group accomplishes the The Lange Group tasks described, including delivery to BOC of the Deliverable Materials.
- A specific task will be construed to have been fulfilled if the BOC uses the deliverables including hardware and software in a production mode for greater than three months after the completion of that specific task.
- The Lange Group or BOC terminates the Project in accordance with the provisions of the *Agreement*.

3.5 Project Change Control Procedure

The following provides a detailed process to follow if a change to this Statement of Work (SOW) is required.

4. A Project Change Request (PCR) will be the vehicle for communicating change. The PCR must describe the change, the rationale for the change and the effect the change will have on the project.
5. The designated Project Manager of the requesting party will review the proposed change and determine whether to submit the request to the other party.
6. Both, the The Lange Group and BOC Project Managers will review the proposed change and approve it for further investigation or reject it. The Lange Group will specify any charges for such investigation. If the investigation is authorized, the Project Managers will sign the PCR, which will constitute approval for the investigation charges. IBM will invoice BOC for any such charges. The investigation will determine the effect that the implementation of the PCR will have on price, schedule and other terms and conditions of the *Agreement.*
7. A written Change Authorization and/or Project Change Request (PCR) must be signed by both parties to authorize implementation of the investigated changes.

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CONFIDENTIAL

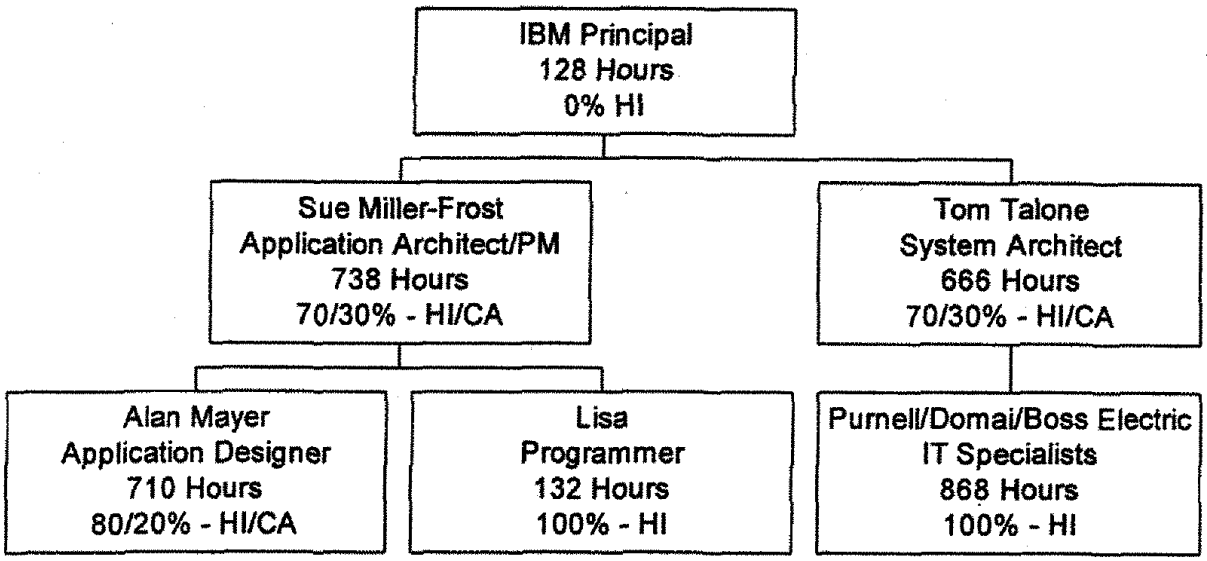
PLEASE REFER TO PROPOSAL TRANSMITTAL LETTER DATED

MAY 28, 1999 TO CARL WATANABE, DEPUTY REGISTRAR

4.2 IBM Organization and Staffing

4.2.1 Organization Project Team

IBM's proposed organizational structure for the BOC Project is shown below. The members of the proposed team are representative skill/experience levels and may be substituted with comparable skills/experience at the appropriate time in the project life cycle.



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4.2.2 IBM Project Manager

Description: The IBM Project Manager (PM) is responsible for the day-to-day direction of the project team, resource scheduling, guidance/direction and problem solving. This individual will provide direction by establishing and managing a detailed project plan with defined deliverables, achievable activities, and sufficient checkpoints to ensure project success.

4.2.3 IBM Application Architect

Description: The IBM Application Architect provides software solutions for clients business problems. The Application Architect is also tasked with provided technical leadership.

4.2.4 IBM System Architect

Description: The IBM System Architect provides I/T solutions for clients business problems. The System Architect is also tasked with providing technical leadership.

4.2.5 IBM Application Designer

Description: The IBM Application Designer constructs the actual software solution for a clients business problem.

4.2.6 IBM Programmer

Description: The IBM Programmer helps the Application Designer code the actual software solution for a clients business problem.

4.2.7 IBM I/T Specialist

Description: The IBM I/T Specialist provides solution construction, implementation, and systems integration in a technical business specialty.

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5.0 Offeror Background and Experience

5.1 Background and Experience

The Lange Group Background and Experience

The Lange Group consists of a professional group of people who together, provide software product and services to both the government and private sectors throughout the state of Hawaii. It is a trade name of Unique Computer Systems, Inc., a Hawaii Corporation, founded in 1980. Our business is to provide Consulting, services and Application software System to business and government in the state of Hawaii. A major part of our mission statement is to "aid the business process in becoming more efficient although the use of automation and optimized workflow". We have made this our underlying goal in every one of our engagements throughout our 18 years in business. The basis for our many successful installations if the understanding of our clients needs and the customizing of software to meet the individual and changing needs of each client.

The Lange Group is the original developers of the complete Land Court Automated Title System for the BOC, and since 1987, has been providing annual support and enhancements to LCATS through this day. Included as an enhancement to the LCATS system, in 1990, was the development of the Hawaii FYI module for public access. Since then, The Lange Group has worked closely with the BOC to further develop the Receiving and Accounting Modules which facilitate the Receiving process of both Land Court and Regular System in the Document Time & Numbering, as well as Cashiering, Accounting, and Management Reporting.

5.2 IBM Background and Experience

The staffing of a systems design, development, and implementation project may be the single most important determinant of project success. IBM's project and systems integration approach is team based. Altogether, the IBM team that will deliver the State of Hawaii solution has the unique combination of local support, local awareness, depth of industry and technical knowledge to provide a complete, workable solution t the State of Hawaii's business requirements.

IBM was established to do business in Endicott, New York on June 14, 1911 and is incorporated in the State of New York. IBM has been in business for almost eighty-six years and is publicly owned. Our stock is traded on the New York Stock Exchange under the trading symbol IBM.

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International Business Machines Corporation (IBM) is a worldwide organization with corporate headquarters located at:

One Old Orchard Road
Armonk, New York 10504

IBM is a computer and software manufacturer and provides computer-related services. We are a large, multinational corporation with significant activities in almost every aspect of the information technology business in almost every free country in the world.

IBM is in the business of helping customers solve problems through the use of advanced information technologies. The company operates primarily in the single industry segment that creates value by offering services, software, systems, products, and technologies.

As of December 31, 1998, IBM "full-time" employees numbered 291,067.

Financial Information

IBM has total assets of $86.100 Billion against liabilities of $66.667 Billion and total shareholders equity of $19.433 Billion.

IBM's total revenue over the last five years totals $372 Billion. The annual figures in millions of dollars are:

Year	Revenue in Dollars (1,000,000s)
1998	$81,667
1997	$78,508
1996	$75,947
1995	$71,940
1994	$64,052

The latest IBM annual report is enclosed. If the State requires further financial information, IBM will be pleased to provide it.

IBM liability insurance is with National Union Fire Insurance Company and Liberty Mutual Insurance Group under policy #RMGL148552.

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Corporate Officer

Louis V. Gerstner, Jr. is Chairman of the Board and Chief Executive Officer.

IBM's Qualifications

IBM provides service information technology in the design, development, and delivery of a full range of hardware, software, services and maintenance offerings. We are a manufacturer of state-of-the-art, compatible, and reliable hardware and software operating in the industry segment that creates value by offering services, software, systems, products, and technologies.

Relevant Company and staff experience

Systems Integration

IBM is recognized as a world leader in the systems integration business particularly in information technology and its integration into business processes. IBM has over 30 years experience in systems integration projects of varying complexities. IBM has developed extensive know how and experience in the areas of:

- Development and enhancement of complex information systems
- Application of the latest technologies and methodologies
- Project management and control
- Assisting users in managing the transition to new computing environments
- Developing long-term customer partnerships

IBM's Global Services is the most comprehensive and complete information technology services provider in the world. The depth of skills and experience in IBM Global Services, backed by the IBM company's global resources, makes us one of the most creative forces in the information industry today. We can shape the way information is created and shared, changing the way people live, work, and communicate. We're defining new ways for businesses and industries to operate, and the ways governments and institutions deliver services.

Our aim is to help customers achieve their objectives. We can help design, build, and install whatever business solution a customer needs, and we'll help run and upgrade it as the customer's business grows. We'll do all or part of those things, depending on how our clients want to partner with us.

This way a customer can avoid investing in designing and installing their own information systems, and developing the skills necessary to support them. Their business problems are solved faster, risk is reduced and so are the costs. If customers want, we'll help them make their crucial information technology decisions.

While customers today understand the importance of information technology, they need to focus on their core businesses. They want the best vendor to handle the technology. Many are turning to us, and in 1996 they made IBM Global Services the largest services provider

in the industry, and with the highest levels of customer satisfaction. We in turn are working with Business Partners to jointly develop, sell and deliver services solutions to our customers worldwide.

With more than 120,000 professionals in 159 countries, our worldwide presence is formidable. We're a leader in all key services capabilities, from consulting, system integration, around-the-clock technical support, and managed operations, to application development and cutting-edge technologies, such as network computing and object-oriented programming.

We specialize in business transformation, change management and information technology planning. Our consultants are working with customers to define and reengineer their key processes, helping to cut costs, shorten cycle times, and strengthen competitive advantage.

Our system integration specialists are writing, customizing and installing software applications to a customer's individual needs, making different hardware and software technologies, and network technologies work together.

We're helping customers explore the network computing revolution that's changing everything from the way products and services are developed and marketed, to how supply chains are managed and information shared. We're migrating customers to the network environment – the Internet and Intranets – integrating new technology into their applications, *providing scaleable performance, systems management, and end-to-end security. Our* leadership in network services is strengthened by the network services, one of the world's largest data network and Internet access providers.

Through our strategic outsourcing competency, we're working with many clients to manage all or part of their technology operations, tackling challenges ranging from a supply chain distribution process or back office activity, to large-scale systems management, running a customer's computer center, help desk, and supporting their end-users.

Our product and systems services professionals will keep a customer's system up and running, whether it's IBM or non-IBM hardware and software.

And because our clients need to know how to use the latest technologies, we offer extensive education and training, from tutorials and long-distance learning techniques to extensive instruction for organizations and enterprises. In addition, we provide certification and testing consulting services to assist companies in skills assessment and certification of their employees, partners and resellers.

Underpinning our capabilities is IBM's research, development and engineering capital with a budget exceeding $4.8 billion a year. It means that when customers do business with IBM Global Services they have access to the very latest technology and know-how. We have the ability to reach directly into any of our plants and laboratories around the world and take out scientists, researchers and developers to fill key skills gaps when building customer solutions.

Our capabilities, whether applied separately or together in various combinations depending on what's needed or preferred, are offered with one objective in mind – to help our clients grow and succeed.

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6.0 PRICE Part 1

PART 1

PRICES

THE LANGE GROUP
September 28, 1999

PROPOSAL

RFP ICS-FY-99-52

500476

KFP-2
9-28-99
FILE

6.0 PRICES – PART 1

These are the cost of items provided by The Lange Group and represents prices for services and actual cost. Please refer to Attachment H – Recommended Hardware, Software and Post Implementation Support by Task. Task to be performed are described in the section 3.0 – Project Approach Work Plan and Schedule.

HOURS BY TASK INCLUDING HOURLY RATES:

Task	Description	Lange Lead	Lange Pgmr	IBM Princ	IBM Arch	IBM Sys	IBM Desig	IBM Pgmr	IBM IT Spe
1	Implement a basic BOC network	65		6	24				234
2	BCIS Requirements Verification	120	130		20	30	30		
3	Replacement of Regular & Land Court	235	1052	12					150
4	Implementing Imaging Capability on the BOC	120	120	50	278	300	200		32
5	Implementing Imaging Capability to BCIS	160	180	16	84	72	244		
6	Enabling Remote Access to Text Data	20	40						45
7	Enabling Remote Access to Image Data	80	160	8	32	68			120
8	Enable Public Access to Text Data	150	480	8	48	34	16		140
9	Enable Public Access to Image Data	80	160	40	230	132	200	132	
10	Data Remediation	40	160						
11	GIS Requirements Study	20							
	Total Hours	1090	2482	128	728	636	690	132	72
	Hourly Rate	120.00	100.00	237.00	237.00	237.00	237.00	237.00	237.00

SERVICES COST SUMMARY BY COMPANY:

Company Name	Total Hrs	Labor $	2% Admin Fee	State GET	Subtotal	T&L Cost Est.	TOTAL
The Lange Group	3572	379,000		15,789.14	394,790		394,789
IBM	3035	719,295	14,3856	29,965.83	763,645	90,000	853,647
Boss Electric							31,106
GIS Specialist		30,000		1,249.80	31,2450		31,250
Project Total Services							1,310,792

6.0 PRICES – PART 1
CONTINUED

The following table shows by task the payment milestones for work performed. Payment is based on identifiable deliverables, with the final payment being made after contract completion. It provides for payment of "actual cost" items such as hardware and software, and a percentage of the labor cost, depending on the deliverable.

PAYMENT MILESTONES:

Task	*Amount*
Task 1 – Implement a basic BOC Network	
Upon installation of all hardware	Cost of Components as per Attachment H
Upon completion of Task 1	100% of task 1 services and actual cost incurred
Task 2 – BCIS Requirements Verification	
Upon completion of Task 2	100% of task 2 services and actual cost
Task 3 – Replacement of the Regular & Land Court	
Upon installation of RS/6000	Cost of Components as per Attachment H
Upon Completion of Initial Testing in Prototype Region	33% of task 3 services and actual cost incurred
Upon Completion of Acceptance Testing by BOC	33% of task 3 services and actual cost incurred
Upon completion of Task 3	33% of task 3 services and actual cost incurred
Task 4 – Implementing Imaging Capability on BOC	
Upon installation of all Hardware	Cost of Components as per Attachment H
Upon Receipt and approval of System Specification	25% of task 4 services and actual cost incurred
Upon Installation of all Kofax and VisualInfo components	25% of task 4 services and actual cost incurred
Upon completion of Training	25% of task 4 services and actual cost incurred
Upon completion of task 4	25% of task 4 services and actual cost incurred
Task 5 – Implement Imaging Capability on BCIS	
Upon completion of Acceptance Test	33% of task 5 services and actual cost incurred
Upon completion of Training	33% of task 5 services and actual cost incurred
Upon completion of task 5	33% of task 5 services and actual cost incurred
Task 6 – Enable Remote Access to Text Data	
Upon installation of Hardware	Cost of Components as per Attachment H
Upon completion of task 6	100% of task 6 services and actual cost incurred
Task 7 – Enable Remote Access to Images	
Upon Receipt and approval of System Specifications	33% of task 7 services and actual cost incurred
Upon completion of Acceptance Test	33% of task 7 services and actual cost incurred
Upon completion of task 7	33% of task 7 services and actual cost incurred
Task 8 – Enable Public Access to Text Data	
Upon Receipt and approval of System Specifications	50% of task 8 services and actual cost incurred
Upon completion of task 8	50% of task 8 services and actual cost incurred
Task 9 – Enable Public Access to Images	
Upon Receipt and approval of System Specifications	25% of task 9 services and actual cost incurred
Upon completion of Acceptance Test	25% of task 9 services and actual cost incurred
Upon completion of Training	25% of task 9 services and actual cost incurred
Upon completion of Task 9	25% of task 9 services and actual cost incurred
Task 10 – Data Remediation	
Upon completion of task 10	100% of task 10 services and actual cost incurred
Task 11 – GIS Requirements Study	
Upon completion of task 11	100% of task 10 services and actual cost incurred

6.0 PRICES – PART 1
CONTINUED

Payment is due upon receipt of the invoice. Section 103-10 HRS, provides that the State shall have thirty (30) calendar days from receipt of invoice or satisfactory delivery of goods or performances of services to make payment. Upon delinquency, interest will be due in accordance with statute.

POST IMPLEMENTATION SUPPORT:

The Lange Group Total Support Service annual maintenance of Lange authored programs includes error correction changes, consulting etc., at the reduced SOH hourly rate, fixed for the first year, with the option to renew one additional year. Also listed is the annual Appx Software Subscription Service which provides for software updates.

The Lange Group Annual Support Service (annual)	$15,000
Appx Software Subscription Service (annual)	$ 7,680 (optional)

All software developed by The Lange Group under this proposal is included in the annual maintenance. Support is offered during normal business hours, 8:00 am to 4:30 pm Monday through Friday, except holidays. The following is the average response times that you will normally experience. Our usual response time is well within it.

1. There is a two hour response time for severe problems
2. There is a four hour response time for degraded level problems
3. There is a 24 hour response time for less severe problems

Please add State General Excise Tax at the rate of 4.166%

6.0 PRICES – PART 1
CONTINUED

This is the Summary of total cost for items provided by The Lange Group, and represents prices for Services, Actual cost, Recommended Hardware, Software by Task, and Post Implementation Support by Year. Tasks to be performed are described in the section 3.0 – Project Approach Work Plan and Schedule. Prices include Hawaii State Tax 4.166%.

TOTAL COST SUMMARY:

Task	Description	Labor Services Lange & IBM	Other Services	Travel & Living Estimate	Subtotal Services	Required H/W & S/W	Optional H/W & S/W	Grand Total	Cumulative Total
1	Implement a Basic BOC Network	74,550.89	31,106.00	3,000.00	108,656.89	133,966.90		242,623.79	242,623.79
2	BCIS Requirements Verification	48,670.56		5,000.00	53,670.56			53,670.56	296,294.35
3	Replacement of RS and LCATS	179,718.82		10,000.00	189,718.82	281,155.68	38,463.92	509,338.42	805,632.77
4	Implementing Imaging Capability at BOC	243,887.36		40,000.00	283,887.36	215,947.19		499,834.55	1,305,467.32
5	Implement Imaging Capability on BCIS	143,420.93		10,000.00	153,420.93			153,420.93	1,458,888.25
6	Enable Remote Access to Text Data	17,989.23		2,000.00	19,989.23	55,377.47		75,366.70	1,534,254.95
7	Enable Remote Access to Images	84,034.36		5,000.00	89,034.36			89,034.36	1,623,289.31
8	Enable Public Access to Text Data	130,646.46		5,000.00	135,646.46	31,894.18		167,540.64	1,790,829.95
9	Enable Public Access to Images	211,350.75		10,000.00	221,350.75			221,350.75	2,012,180.70
10	Data Remediation	21,666.53			21,666.53			21,666.53	2,033,847.23
11	GIS Requirements Study	2,499.98	31,250.00		33,749.98			33,749.98	2,067,597.21
Year	***Total Acquisition Cost***	**1,158,435.87**	**62,356.00**	**90,000.00**	**1,310,791.87**	**718,341.42**	**38,463.92**	**2,067,597.21**	
1	Post Implementation Support 1st Year	15,624.90			15,624.90	48,927.45	7,999.95	72,552.30	2,140,149.51
2	Post Implementation Support 2nd Year	15,624.90			15,624.90	58,553.78	11,889.99	86,068.67	2,226,218.18
3	Post Implementation Support 3rd Year	15,624.90			15,624.90	81,558.45	11,889.99	109,073.34	2,335,291.52
	Grand Total Acquisition & Post Implementation Support by the end of 3 Years	**1,205,310.57**	**62,356.00**	**90,000.00**	**1,357,666.57**	**907,381.10**	**70,243.85**	**2,335,291.52**	

6.2 PRICE Part 2

PART 2

Offeror is not proposing a price for this part

7.0 CERTIFICATION

7.1 The Lange Group Certification

The Lange Group certifies that:

a. The prices and cost data were arrived at independently, without consultation, communication, or agreement with any other Offeror or competitor.

b. Unless otherwise required by law, the prices and cost data that were submitted have not been knowingly disclosed by the Offeror, directly or indirectly, to any other Offeror or competitor prior to the award of the contract.

c. No attempt was made or will be made by each Offeror to induce any other person or firm to submit or not to submit a price for the purpose of restricting competition.

500482

CONFIDENTIAL

PLEASE REFER TO PROPOSAL TRANSMITTAL LETTER DATED

MAY 28, 1999 TO CARL WATANABE, DEPUTY REGISTRAR

500483

CONFIDENTIAL

PLEASE REFER TO PROPOSAL TRANSMITTAL LETTER DATED

MAY 28, 1999 TO CARL WATANABE, DEPUTY REGISTRAR

500488

Attachment C: Offeror's Financials

C.1 The Lange Group Financials

The Lange Group humbly requests a waiver of the Audited Company Financial Statements for the three prior years as requested in the RFP.

We are a Hawaii Corporation and have been doing business in the state of Hawaii since 1980. We have been in our same office location at 1100 Ward Avenue, Suite 1050, Honolulu, Hawaii for 15 years. We have provided reliable service and support to the State of Hawaii, continuously, for over 14 years, and we hope our track record would stand up for us. We hope that it speaks for itself.

There are no outstanding debts or liens and no pending or anticipated litigation to the best of our knowledge.

Audited Financial Statement would take some time and expense to generate and believe that this is not the intent of the request. We feel that our Financial Statement would not provide the State of Hawaii with any further insight into our ability to perform or to our credibility and reliability.

C.2 IBM Financials

IBM financial statements for the previous three years may be obtained through the website at WWW.ibm.com/annual reports and are also included as hard copies in the ORIGINAL proposal only as IBM Annual Reports for 1998, 1997.

500492

Attachment D: Offeror's References

D.1 The Lange Group References

Office of the Prosecuting Attorney
County of Hawaii
34 Rainbow Drive
Hilo, Hawaii 96720
Contact: Jay T. Kimura
Prosecuting Attorney
Phone: (808) 961-0466

Our involvement was to provide system analysis, design, development, implementation, testing, and training for the on-line FACTS system which tracks Case information, as well as provides for Victim Notification and Subpoena Generation. Time period of project: FACTS April '87 through present

Employees Retirement System
201 Merchant Street, Suite 1400
Honolulu, Hawaii 96813
Contact: David Shimabukuro
Administrator
Phone: (808) 586-1700

Our involvement is to provide the development software, including annual support for Member tracking and General Ledger, as well as, provide consulting services to the Data Processing programming staff in technical advise and problem. Time period of project: beginning April '89 through present

Animal Quarantine Branch
Department of Agriculture
1428 S King Street
Honolulu, Hawaii 96814
Contact: Helene Okamoto
DPSA
Phone (808) 973-9490

Our engagement included systems analysis, design, development, implementation, testing, and training of an on-line animal and owner tracking system along with cash register system and accounts receivables. Time period of project: January '93 through present.

Attachment E: Subcontractor Resumes & References

E.1 Subcontractor Resumes

E.1.1 IBM Staff Resumes

IBM will be employed as a subcontractor to The Lange Group is as specified in **Phase 1 of Part 1, Tasks 1 - 6 and Phase 2 of Part 1, Tasks 7 – 9** Statement of Work; to the State of Hawaii-Department of Land and Natural Resources-Bureau of Conveyances RFP No. ICS-FY-99-052.

The IBM resumes listed below consist of representative skills and experience levels, and do *not necessarily reflect the specific team members that will be assigned to the BOC project.*

Raymond P. Bailey
I/TAP SSR – ACCOUNT
2777 S. Kihei Road, H-101
Kihei, HI 96753

Professional Profile

Twenty-nine years experience in the Industry Systems, Mid-Range, and Large Systems arena. Fifteen years as a Support Specialist supporting Area 11 as a Teleprocessing and ATM (Automatic Teller Machine) Specialist. Extensive skills and experience in providing technical assistance to service, marketing and customer management. Team Leader of multiple complex SP2 system upgrades at the Maui High Performance Computing Center on Maui. Resourceful in providing solutions to insure optimum customer satisfaction.

Professional Experience

- Project/Team Leader for multiple installations at Maui High Performance Computing Center on Maui. Primary responsibility as Account SSR for their large SP installation. Performed planning and coordinated tasks between customer and IBM and was a key member of the install team. Assisted in the install of SP at Sprint USA AND Hawaii State DOT. I have attended SP Topgun workshops in Poughkeepsie where Engineering people have presented the latest information on SP hardware. Worked as a Support Specialist in Los Angeles for Area 11. This effort involved me in assisting many IBM offices in complex problem determination problems. Worked as an instructor for local customer classes on various machine types. Jointly gave seminars on multiple products in Area 11 for Customer Engineers. This increased the effectiveness of our local CEs and helped promote good customer satisfaction. Worked at the Support Room for the 1984 Summer Olympics in Los Angeles. My present assignment is Account SSR at the Maui High Performance Computing Center for the past 4 ½ years. Responsible for total service management of 603 SP-nodes and multi-I/O environment.

Education and Personal History

IBM Staff training. Recipient of six IBM Means Service Awards, All-Star Award at an IBM Means Service Conference, and Area 11 Division Award.

Michael M. Domai
Senior Sales Specialist
1240 Ala Moana Boulevard
Honolulu, HI 96814

Professional Profile

Twelve years in the computer industry working as a UNIX/AIX Systems Engineer, with primary specialty for the past ten years as product specialist on all aspects of IBM's midrange UNIX offerings, following five years in product development designing computer peripherals. Experience with a wide range of customers in a number of industries, including retail, travel, distribution, telecommunications, public sector, engineering and scientific. UNIX/AIX specialties include: networking and communications skills in TCP/IP environments, heterogeneous connectivity in both commercial and engineering/scientific environments. Capable in systems and network management as well as designing highly available environments and LAN Consolidation projects.

Professional Experience

- Designed and implemented for a large food distributor a complex TCP/IP network which included a non-IBM processor and a PC network, which minimized the impact of cutover to a new application and a new system. Telecommunications was also implemented to tie together remote sites to improve upon up-to-date sales information, which was lacking before.

- Worked on a team that helped design, implement, and test an EDI network that tied 70 convenience stores to an RISC System/6000 host. Up-to-date information regarding sales analysis and pricing and centralized control were the benefits reaped by this customer. Marketing personnel could then take advantage through the use of X-Windows on a personal computer, token ring, TCP/IP, and Oracle RDBMS to analyze their database for marketing trends.

- Led a team that helped design, benchmark, and implement the largest IBM RISC System installation in Hawaii for a major telecommunications company. The RS/6000 was to replace some Prime Computer equipment and had to run both PI/OPEN and Sybase in a highly available environment. Customer is currently running eight RS/6000 servers, four of which are very high-end servers utilizing over 100GB of disk. Currently leading a team to move the customer into a SP environment.

- Key member in running rollout/announcement of the IBM RS/6000 to all Southern California customers.

- Marketed, Architected, and Implemented first commercial SP LAN Consolidation Project for a Public Sector Account here in Hawaii. Involved doing cost justification, project management for the implementation, and skills transfer to users.

- Marketed, Architected, and Implemented second commercial SP LAN Consolidation Project for a Telecommunications account here in Hawaii. Involved doing cost justification, project management for the implementation, and skills transfer to users.

- Created, developed, and conducted over 30 sessions on RS/6000 UNIX/AIX Basics and TCP/IP-NFS communications to over 50 companies, generating over $10,000 in revenue. The rating of these sessions averaged between excellent and above average.

- Key technical member in responding to complex customer's requests for proposals/information. Assist customers and IBM marketing representatives in network design in a TCP/IP environment for client server computing, or other less complex networking, migration/conversion efforts, and testing/implementation.

Education and Personal History

Account Systems Engineer with IBM Marketing at Costa Mesa, California (1986-1990) Account Systems Engineer with IBM Marketing at Honolulu, Hawaii (1991-1993) Advisory Product Specialist with IBM Pacific Trading Area at Honolulu, Hawaii (1993-present) Senior Associate Engineer with Tape Development at IBM General Products Division in Tucson, Arizona (1982-1986) Bachelors in Biology at University of Hawaii at Manoa (1978). Forty-four credits in Mechanical Engineering Courses from University of Arizona at Tucson, Arizona and from California State University at Long Beach (equivalent to BSME). In excess of 1,500 hours of technical and professional courses, including RS/6000 and AS/400 technical education and professional development at IBM.

John H. Hewitt
I/TAP SSR – BASE
1240 Ala Moana Boulevard
Honolulu, HI 96814

Professional Profile

Seventeen years in the computer industry as a Services Support Representative (SSR) working in the Large System and Medium System environment.

Large Systems expertise includes 43xx, 308x, 309x, 9672 and SP product line and the associated I/O.

Medium System expertise includes AS/400, RISC and Series/1 processors and associated I/O.

Proficient with check sorters (3890, 3892) and teleprocessing equipment.

Hold a Top Secret and SCI security clearance.

Professional Experience

- Led a team to relocate an entire computer room from one site to a newly constructed computer room for a large Federal Government account. Acted as a consultant for the client for some of the technical specification for their new facility.

- Managed several large system installations for "water cooled" machines and the ES/9000 line of processors. Responsibilities included installing and configuring all the I/O, configure and install IOCDS, assist client with the environmentals i.e., A/C, chilled water, power requirements and space utilization. Met all client expectations as well as beat deadlines.

- Assist other SSRs with installs, discontinuances and relocations as well as diagnosing, repairing, upgrading and maintaining all assigned equipment.

Education and Personal History

Two years at Honolulu Community College in Electronic Tech Program IBM: System I/O class, CEs of the 90's and Seeking Excellence classes. Thousands of hours of formal IBM education on machines from terminals to mainframes.

Ted Kanemori
1240 Ala Moana Boulevard
Honolulu, HI 96814

Professional Profile

Thirty-one years in the computer industry servicing hardware and software in the small and intermediate systems range. Hardware support trained on numerous systems including 9370, AS/400, Sys/38, Sys/36, Series/1, RISC/6000, PC-base and communications. Technical leader in a hardware/software role within the Pacific region for 13 years. Then worked for eight years, until 1990, as a Hardware Support Specialist for "all" small to intermediate IBM systems and associated peripherals. Presently in the position of Senior I/T Specialist – Software Support with eight years of extensive software training and experience in UNIX, AIX, and RISC/6000 installation, operation, education, and systems administration.

Professional Experience

- Managed and coordinated all necessary resources (IPRs, engineers, architects, air conditioning specialists, electricians, customer management, IBM management and hardware CEs) in the installation of numerous small and intermediate complex systems hardware.

- Instrumental in the creation of several awareness type projects for the local service organization. "GRASSROOTS" (a parts usage, branch office expense, support center, customer sensitivity AWARENESS program) was adopted by the area and is being used in the Atlanta Education Center.

- Chosen by management to go to Guam, Australia, and American Samoa to resolve hardware technical problems in the Sys/3, Sys/38, AS/400, Series/1 and 3174 Communications area. Timely communications and hardware fixes resulted in increased system availability and a very satisfied customer set.

- Chosen by management for temporary assignments in Los Angeles, Rochester, Dallas and Austin to assist branch offices and the support centers in support of the Sys/3, Series/1, AS/400, 933X and RISC/6000 product groups. My responsibility was to provide direct on-site assistance and provide support center phone assistance to all parts of the United States, Canada and Europe.

- Designed, developed and instructed numerous hardware classes for the branch office. Trainees were introduced to our newer products; thus giving them a headstart on more advanced formal training at the IBM Education Center. Customer Engineers were periodically re-introduced to systems that they had not worked on for awhile thus enabling them to better serve the needs of our customers.

- Perform multiple AIX installs/upgrades for RISC/6000 and SP systems. This would include installation of operating systems, licensed program products, and fixes. Trained

on RS/6000, SP-PSSP, ADSM, HACMP, Netview, and RS/6000 Problem Determination/Problem Source identification.

- Installed RISC/6000 software, and taught RISC/6000 customer, "System Administration" classes. My hardware skills and software training together, allowed me to show a fuller more robust presentation of the course material, lending to more productivity and satisfied graduates.

- Team Leader for "RISC/6000 Software Support" unit, that has primary responsibility for resolving all customer satisfaction issues, and hard to fix software problems in the U.S. western geography. This includes nine western states including Hawaii, and the territory of Guam.

Education and Personal History

- University of Hawaii – Two years

- Electronics Institute of Hawaii – Graduated with honors

- Over 7,000 hours, hardware training. Over 2,800 hours software installation/administration training. Over 800 hours interpersonal skills. Over 100 hours management skills training.

- Privately funded interpersonal skills classes (Tri-Core)

- Interpersonal skills training at Windward Community College

Alan C. Mayer
2710 Gateway Oaks Drive
Sacramento, CA 95833

Professional Profile

Mr. Mayer has over 11 years of experience in software development. Mr. Mayer has worked on requirements, design, coding, and testing. In the last five years he has performed as software architect or as lead programmer on several complex client/server document imaging projects.

Experience and Accomplishments

Document Imaging (Claims Processing) - Application Architect
Image architect for a government agency that processes workers compensation claims. Gathered requirements, performed high level design, held design reviews with workflow vendor and customer, and created detailed software design specifications for scan, index, image import, and workflow integration. Performed coding using VisualBasic and the VisualInfo OLE programming interface.

Document Imaging (Banking) - Application Architect
Software architect for a complex client/server loan application imaging system. Developed requirements, high level design, and detailed software design. Led a group of six software developers through project life cycle of prototyping, demonstration, and development of custom functionality using IBM Visual Info imaging APIs and VisualAge C++. This integrated image application supports both scan and fax input, automatic forms recognition, OCR, specialized fax processing, data entry, storage of data to a Microsoft SQL server database, and storage of images to IBM VisualInfo. Successful implementation of this imaging application has enabled the client to double the capacity of the loan processing center.

Document Imaging (Healthcare) - Application Architect
Responsible for the design, development, and implementation of a health claims processing system for a major California HMO. Successfully led a team of programmers through project life cycle of requirements definition, design, coding, test, and final acceptance. Responsible for all aspects of system administration and took the lead role in developing and conducting end-user training courses.

Document Imaging (Government) - Developer / Team Lead
Development team lead for a forms processing application for a California State government agency. Responsible for the successful implementation of the data entry and data validation applications. Project combined image technology with expert systems to increase the efficiency of business functions.

Classified Advertising - Software Developer
Customized complex classified advertising software for customers that required enhanced functionality not available in the base product. Worked from defined customer requirements to create program specifications, code, test, install at the customer site, and obtain customer

acceptance. These projects ranged from four months to almost a year in duration, working in teams of from two to five people. Responsible for test, installation, and acceptance phases which resulted in extensive on-site work with the customer. Delivered documentation for end users and system administrators and designed formal training for end users.

Education and Background

- Bachelor of Science in Computer Science, Minors in Business and Math, California State University at Chico

Areas of Expertise

- Document imaging systems
- Application Design
- Client/Server Software Development
- Forms processing including OCR, automated Forms Recognition, fax processing.
- OS/2 and Windows programming using C, C++, VisualBasic
- VisualInfo programming (working set, display services, library, OLE)
- DB2/2, Microsoft SQL server
- Lotus Notes, VisualAge C++, PVCS
- Microsoft Word, Excel, PowerPoint

Susan Miller-Frost
2710S Gateway Oaks Drive, Suite 200
Sacramento, CA 95833

Professional Profile

Ms. Miller-Frost has over ten years of experience in information systems design, development and implementation with organizations in the public sector, insurance and finance industries. Experience includes application development, team leadership, application architect and database administration.

Experience and Accomplishments

Led design, development, testing, training and installation client/server imaging system in the government industry. Project included a migration from a legacy system into a new system designed, developed and installed as a part of this project. Migration included data as well as applications from an OS/2 and mainframe environment to a Windows NT client platform with OS/2 servers. Acted as Project Manager on this project as well as lead Application Architect.

Led design, development, testing, training and installation of a client/server imaging system for a major U.S. Bank. Worked directly with the customer as the application architect in designing the system functionality. Responsibilities included defining high-level designs for the development team, planning and leading the execution of integration and system test, installing the code in the production environment, and training the end users as well as system support staff on the application. Supported the application in production and worked with the client in defining enhancements to the system.

Performed Image and Workflow requirements definition and design for a major U.S. bank to image-enable and automate their indirect lending processes.

Led development team for an imaging project in the insurance industry. Performed as the application architect for the project, working as the customer liaison to facilitate the definition of the system requirements and as the central point of contact for the customer for issues or questions concerning the system. Led joint application design sessions, interfaced with the development team to define the specifications of the system, and acted as a member of the development team performing the database design task. Tracked and evaluated progress of the development team on the project.

Led database development team for an implementation of a client/server IBM imaging system in the government industry. Performed analysis on the required functionality of the applications and defined the proper database architecture needed to support the functionality. Completed the definition of database elements, defined all logical relationships and created the logical database model using the Bachman CASE tool.

Assisted with the programming for the expert system rules-based function to ensure integrity on the incoming data. Provided technical on-site training to the client's system analysts and application training to the end users of the system.

Led development team in the design and implementation for a large client/server government welfare solution. Managed three teams that were comprised of functional analysts, technical analysts, programmers and system testers. Responsible for scheduling and performing all design walk-throughs and client sign-off. Performed the role of contract administrator, managing with the client management and supporting the change control process.

Education and Background

- B.S. in Mechanical Engineering, California Polytechnic State University, San Luis Obispo
- M.B.A., University of California, Davis
- Technical Education: over 1,400 hours
- Certified I/T Architect, IBM
- Member of I/T Architect Board, IBM

Lisa Nicholas
IT Specialist
IBM Corporation
2710 South Gateway Oaks Drive
Sacramento, CA 95832

Professional Profile

Ms. Nicholas is an IT Specialist with IBM Global Services. Responsibilities include assisting in Joint Application Design (JAD) sessions, requirements gathering and documentation, developing and documenting business process flow diagrams, developing and documenting user instructions, designing and developing applications and providing overall project assistance.

Experience and Accomplishments

Ms. Nicholas worked with customers to establish the requirements and design of Wizard applications to interface with the IBM Global Services Child Welfare Services Case Management System (CWS/CMS). The purpose of the Wizard is to automate the navigation of the CWS/CMS application when the user is completing specific tasks. Ms. Nicholas wrote one of the Wizard applications. Each Wizard was developed using Visual Basic and Windows 95 API functions.

Ms. Nicholas was part of the Arizona Department of Economic Securities programming team. She wrote REXX programs to convert the existing IRM images to VisualInfo. As part of this process, a DB2 database was updated specifying the status of the images in this process. Ms. Nicholas also wrote an Index application in Visual Basic that interfaced with the VisualInfo client. It retrieved images from VisualInfo, allowing the users to specify the identifying information about the image, and moved the document to appropriate VisualInfo folder and to the Quality Assurance folder for review.

Ms. Nicholas worked with the CWS/CMS project on refining the design of Case Conversion Tool (CCT). This program was used to convert manual counties to the statewide CWS/CMS application. Using her knowledge of CWS/CMS, Ms. Nicholas worked with the programmers, testers and customers to revise the CCT to help ensure the successful conversion of the manual counties. Ms. Nicholas used Paradox and Delphi to aid in the programming of the application. In addition, she revised the specifications of the CCT and documented these changes for the customers. Ms. Nicholas was involved in testing the CCT, data converted from Foster Care Information System to CCT and data converted from CCT into CWS/CMS. She also was involved in analyzing and testing solutions to data integrity problems in the CWS/CMS database.

After these conversions were completed, Ms. Nicholas designed the conversion of Foster Care Information System data into the SOC 158 portion of the CWS/CMS application. She analyzed the differences in the data structures and worked with the programmers to make the changes to the existing conversion programs in the fewest places possible.

Ms. Nicholas has worked in five of the largest counties in California assisting in the implementation of CWS/CMS. Efforts included documenting current processes, designing and documenting new processes and the implementation of these new processes throughout the Departments of Family and Children's Services.

Ms. Nicholas worked as a Business Analyst on the State of California Child Welfare Services Case Management System implementation team. The team developed a specialized workbook and workshop based on IBM Global Service's Workflow Management Methodology. The workbook provided a step-by-step approach for the counties of California to analyze their current Child Protective Services operating procedures. The workbook was delivered to 58 counties in a hands-on workshop environment.

She supervised and participated in the implementation of an update to the California Department of Corrections database system. This database system provided a user-friendly interface that ensured the integrity of the data. In addition, she performed conversion and verification of the existing data.

Education and Background

Bachelor of Arts in Economics and Minor in Mathematics, University of California, Davis.

Jock Purnell
Network Specialist/Consultant
IBM Corporation
1240 Ala Moana Blvd.
Honolulu, HI 96814

Professional Profile

Mr. Purnell has over twenty years experience in the Information Systems Industry as a Systems Engineer and Network Specialist, with the last ten years spent specializing in Networking. Mr. Purnell's networking expertise is in the area of enterprise networking, with capabilities in designing, planning, performance monitoring and troubleshooting multivendor networks. Mr. Purnell has in-depth expertise in Token Ring, Ethernet, Fast and Gigabit Ethernet, ATM, Novell IPX, TCP/IP, SNMP, Banyan Vines, Windows NT, SNA, NetBios, Bridges and Routers, Multiplexors, Hubs, T1's, Frame Relay and other high speed networking alternatives, Network Management, and fiber optic and copper cabling. Strengths include of many protocols, capabilities in problem isolation and performance evaluation of complex networks, and ability to create broad logical network designs that reflect overall application requirements as well as network hardware and software.

Professional Experience

Provided technical support for the design and implementation of a T1/56K/LAN bridge network for a large utility, enabling them to realize a 75% reduction in response time.

Designed and implemented a fiber optic, time division multiplexed network for a major museum. This network supports a UNIX host, connection to the Internet, and many ASCII terminals, PC's, and Macintosh computers.

Designed and implemented a fiber optic and 56K DDS router and hub network for a major hospital to support Novell IPX, TCP/IP, and SNA traffic to any location in the hospital, and provide seamless integration of a multivendor network.

Designed a fiber optic LAN and data portion of a private microwave system for a major electric utility. SNA, Windows NT, and Banyan Vines are the protocols supported over these networks. Result is lowered response time, as well as LAN integration of the entire company.

Designed and implemented network integration solutions including hubs, routers, and T1 Multiplexors for two major banks, a large insurance carrier, and a large public utility. Protocols include SNA, NetBios, Novell IPX, TCP/IP, Vines, Windows NT, and AppleTalk.

Acted as IBM project leader and technical support for two large national retailers and an international oil company in their development of distribute processing applications on IBM 8100 systems. Applications included ticketing, purchase order processing, and catalog mail order processing.

Designed and implemented three major ATM backbone projects for a large hospital and two schools. These ATM networks are providing high-speed communications for Windows NT, Novell IPX, and TCP/IP, and AppleTalk connections.

Designed, implemented, or advised on firewall projects for major hospitals, banks, schools, State and County government in Hawaii. These firewalls protect and allow 1000's of workstations to access the Internet securely

Education and Personal History

Brown University, Bachelor of Arts in Political Science, University of Southern California, Masters in Business Administration, IBM Corporation: Many hours of technical training, including IBM's Systems Research Institute, providing the equivalent of a Masters in Computer Science.

Dieter Rauscher
1240 Ala Moana Boulevard
Honolulu, HI 96814

Professional Profile

Twenty-five years in the computer industry as Information Technology Specialist, Operational Support Specialist, Systems Engineer, Systems Programmer, Development Programmer, Applications Programmer, Data Processing Supervisor and Computer Operator. Four years experience managing and supervising data processing departments in health care and wholesale industry. Successfully led and participated in tests of pre-released IBM hardware and software at IBM Poughkeepsie laboratory. Five years hands on experience tuning, configuring and performing capacity planning for a large IBM internal system. Participated in implementing problem and change management at several IBM locations. Experienced in implementation of RACF security at several installations. Three years experience installing and maintaining AIX, RS/6000 and SP systems.

Professional Experience

- Perform multiple AIX services, such as Smoothstarts and AIX upgrades for clients in Hawaii. These consisted of physical installation of hardware, installing of AIX and licensed programmed products, application of software fixes, customization of system, performance tuning, writing shell scripts and performing problem determination/problem source identification. Performed RS/6000 SP work at client, which included upgrading AIX level on nodes, adding devices, installing products, system administration activities and education of client.

- Lead capacity planning, performance and tuning efforts for an IBM development system that supported over 1,000 personnel and maintained subsecond response time for an average of 250 "active" users on an MVS/TSO and database system for five years. Performance monitoring and tuning was learned from experts at IBM Poughkeepsie. Successfully configured hardware for highest availability for those five years, with an average availability of over 98%. Trained four people in MVS performance monitoring and tuning skills.

- Systems Engineer responsible for assisting customer implement problem and change management an IBM manufacturing data center. This data center consisting of an eight processor complex. The implementation resulted in improved problem and change systems which was the major contributor of increased availability from 95% to 98% as measured at the host.

- Key participants for IBM customers in Hawaii and the Pacific by providing software support and services across IBM platforms. Responsibilities include customer satisfaction with IBM software support, presenting software support structure to all 390 customers, problem determination, problem source identification and problem analysis, proactive preventive maintenance strategies. Currently leading effort to implement availability support for customers desiring high Availability Systems in S/390 area.

Education and Personal History

- Bachelor of Arts in Computer Science from the State University of New York at Potsdam.
- Technical systems training by IBM – over 1,550 hours including MVS and internals, RACF, performance and tuning, SMP/E, capacity planning, assembler programming, JES 2, data communications, project management, OS/2, AIX and RS/6000 installation and administration.

Thomas A. Talone
2700 Gateway Oaks Drive
Sacramento, CA 95833

Professional Profile

Eleven years of data processing experience with IBM as an Information Systems Specialist and Information Systems Architect. Specializing in large scale client/server enterprise systems, imaging technology, desktop and server computing, and Local and Wide Area Networks. Extensive experience in technical strategic planning, implementation, on-site project management, and marketing support.

Experience and Accomplishments

Lead IBM Systems Architect for several large-scale image and workflow client/server-based projects. Customer set includes large West Coast financial bank, State of Arizona utility company, California State University, multiple State of California government agencies, and West Coast health insurance provider. Responsibilities include: Lead Systems Architect, Technical Marketing Support, Technical Proposal Manager, On-site Implementation Project Manager, and Level 3 Production Support Engineer. Accountable for overall technical solution, detail capacity and performance planning, hardware and software configurations, and benchmark validation. Also performed technical liaison responsibilities for IBM interfacing with senior level customer executives.

IBM Systems Engineer specializing in networking and PC desktop/server platforms. Worked on several marketing and implementation projects. Responsibilities included: LAN and enterprise-wide communications engineer, imaging software specialist, workstation, and server technical support. Other duties included systems management specialist and Level 2 on-site technical support. Completed tasks to configure workstations, servers, and networking requirements. Performed numerous installation activities accountable for problem determination and resolution, and conducted several tailored customer education classes.

Managed the design and implementation of a LAN-based office system for over 400 users for a large State of California user department. This replaced an aging, competitively installed system that no longer could handle the expanding user base. The new system not only provided needed capacity but provided sub second response time to an IBM S/390 mainframe for business critical applications.

Participated in a joint IBM/State of California R&D image project to automate bankruptcy claims processing for large State department. Responsible for workstation implementation and problem determination, LAN design, LAN education and technical support/problem resolution.

Managed assigned customer accounts as IBM marketing specialist. Responsible for marketing and supporting complete line of IBM desktop and server related products. Managed and grew customer base to meet and exceed annual sales quota.

Education and Background

- MBA - Finance, California State University - Sacramento, Sacramento California.
- B.S., Management Information Systems (M.I.S), California State University - Sacramento, Sacramento, California.

Roy K. Tamaru
I/TAP SSR – BASE
1240 Ala Moana Boulevard
Honolulu, HI 96814

Professional Profile

Twenty-three years service with IBM. The first 17 in the copier/printer office products industry and the last six in the large/intermediate systems arena, focusing on servicing multiple accounts in the areas of technical problems, account management, which includes non technical problem solving and IPR skills. Technically trained on various CPUs including 4381, 9121, 9221, 9021, 9672, SP and I/O products in the 370 environment. With more than five years of 9121 experience. Taking the lead role of role in servicing and installing high end cut sheet laser printers. A team member of numerous CPU (9121, 3090) installations and upgrades and data center relocations.

Professional Experience

- A team leader in charge of technical support and territory operations in the Copier/Printer group. Trained on all of the copier products and 3820, 3812, 6670 Laser Printers.
- Primary responsibility was the installation and maintenance of cutsheet laser printers (3825, 3827) in major accounts and maintaining a high level of customer satisfaction.
- A team leader of the successful planning and installation of the first two 9121 CPUs in the branch office, located at First Hawaiian Bank and Kaiser Medical Center.
- A team leader in the major relocation of the First Hawaii Bank data center, which consisted of installation planning (new site preparation) scheduling of disconnecting and packing, then reinstalling, debugging and verifying proper system operation for turnover to the customer.
- A team leader in the installation of the first commercial SP processor in the state. Currently maintaining the account of State of Hawaii Department of Transportation.
- A team leader in the installation of IBM's latest storage systems, Ramac and getting the customer, First Hawaiian Bank, to the Parallel Sysplex environment. Including the 9672 Rn4 processor, 9037 sysplex timer and 9674 coupling facility machines.

Education and Personal History

Associate degree in electronics, Electronics Institute of Hawaii. IBM education consisting in excess of 1,500 hours of personal development and technical training.

E.1.2 Boss Electric Staff Resumes

Boss Electric, Inc. will be employed as a subcontractor to IBM for the Installation of Fiber and Category 5 Data cables in **Phase 1 of Part 1, Tasks 1.** Attached is Boss Electric, Inc. supplied company references. Also attached is a list of Boss Electric project team members and summaries of their individual experience.

Boss Electric Team

Project Manager – Glenn Boss

- Siecor fiber optic certified designer
- Sumitomo air blown fiber system certified designer
- Siemon Cabling System certified designer
- Supervising Electrician
- 25 years experience with Boss Electric

Project Supervisor – Chris Sukumaran

- Siecor fiber optic certified installer
- Sumitomo air blown fiber system installer
- Siemon Cabling System certified installer
- 9 years experience with Boss Electric

Lead Installer – Dennis Scanlon

- Siecor product fiber optic trained installer
- Sumitomo air blown fiber system installer
- 3M Volition Fiber Optic certified installer
- 7 years experience with Boss Electric

Lead Installer – Martin Sittle

- Siecor product fiber optic trained installer
- Sumitomo air blown fiber system installer
- Siemon Cabling System certified installer
- 3M Volition Fiber Optic certified installer
- 5 years experience with Boss Electric

Another 4-5 installers would be assigned to this project. With the exception of 1 new hire, all have had Siecor product fiber optic training, which includes hands-on testing and terminating procedures and all are presently undergoing BICSI Cabling Installation Training.

E.2.1 IBM Staff References

Attached is the Staff Reference Information corresponding to the IBM Staff Resumes.

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Ray Bailey**	4. Position **Systems Services Representative**	7. Phone Number **(800) 426-7378**

REFERENCE #1 INFORMATION	
6. Reference Name **Steve Karwoski**	7. Phone Number **(808) 879-5077 x228**
8. Title **Director of Systems and Operations**	
9. Organization Name **Maui High Performance Computing Center**	
10. Organization Address **550 Lipoa Parkway, Kihei, HI 96753**	

REFERENCE #2 INFORMATION	
6. Reference Name **Ty Fukuhara**	7. Phone Number **(808) 847-9790**
8. Title **Systems Manager**	
9. Organization Name **Sprint – Hawaii**	
10. Organization Address **925 Dillingham Blvd., Honolulu, HI 96817**	

REFERENCE #3 INFORMATION	
6. Reference Name **Larry Okimoto**	7. Phone Number **(808) 587-2369**
8. Title **Chief Information Officer**	
9. Organization Name **State of Hawaii Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI 96813**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Lisa Nicholas**	4. Position **IT Specialist**	7. Phone Number **(916) 641-4162**

REFERENCE #1 INFORMATION	
6. Reference Name **Ann Piasecki**	7. Phone Number **(626) 302-4687**
8. Title **DP Manager**	
9. Organization Name **Southern California Edison**	
10. Organization Address **2255 Walnut Grove Avenue, Rosemead, CA 91770**	

REFERENCE #2 INFORMATION	
6. Reference Name **Richard Yung**	7. Phone Number **(310) 771-5162**
8. Title **Systems Administrator**	
9. Organization Name **Nissan Motors**	
10. Organization Address	

REFERENCE #3 INFORMATION	
6. Reference Name **Mark Smith**	7. Phone Number **(805) 681-2924**
8. Title **Systems Administrator**	
9. Organization Name **Applied Magnetics, Inc.**	
10. Organization Address	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Michael Domai**	4. Position **RS/6000**	7. Phone Number

REFERENCE #1 INFORMATION	
6. Reference Name **Ty Fukuhara**	7. Phone Number **(808) 847-9790**
8. Title **Systems Manager**	
9. Organization Name **Sprint – Hawaii**	
10. Organization Address **925 Dillingham Blvd., Honolulu, HI 96817**	

REFERENCE #2 INFORMATION	
6. Reference Name **Larry Okimoto**	7. Phone Number **(808) 587-2369**
8. Title **Chief Information Officer**	
9. Organization Name **State of Hawaii Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI 96813**	

REFERENCE #3 INFORMATION	
6. Reference Name **Carolyn Ramesar**	7. Phone Number **(808) 627-8530**
8. Title **I/T Architect Manager**	
9. Organization Name **Honolulu Cellular**	
10. Organization Address **500 Kahelu Avenue, Mililani, HI 96789**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **John Hewitt**	4. Position **Systems Service Representative**	7. Phone Number **(800) 426-7378**

REFERENCE #1 INFORMATION	
6. Reference Name **Larry Okimoto**	7. Phone Number **(808) 587-2369**
8. Title ***Chief Information Officer***	
9. Organization Name **State of Hawaii Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI 96813**	

REFERENCE #2 INFORMATION	
6. Reference Name **Dennis Yara**	7. Phone Number **(808) 474-4615**
8. Title **Systems Administrator**	
9. Organization Name **Fleet and Industrial Supply Center**	
10. Organization Address **1942 Gaffney Street, Suite 100 Code 95, Pearl Harbor, HI 96860**	

REFERENCE #3 INFORMATION	
6. Reference Name **Walt Lieberman**	7. Phone Number **(808) 837-3538**
8. Title **IS Manager**	
9. Organization Name **Duty Free Shoppers**	
10. Organization Address **3375 Koapaka Street, Honolulu, HI 96819**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Ted Kanemori**	4. Position **IT Specialist**	7. Phone Number **(808) 597-9441**

REFERENCE #1 INFORMATION	
6. Reference Name **Larry Okimoto**	7. Phone Number **(808) 587-2369**
8. Title **Chief Information Officer**	
9. Organization Name **State of Hawaii Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI 96813**	

REFERENCE #2 INFORMATION	
6. Reference Name **Ty Fukuhara**	7. Phone Number **(808) 847-9790**
8. Title **DP Manager**	
9. Organization Name **Sprint – Hawaii**	
10. Organization Address **925 Dillingham Boulevard, Honolulu, HI 96817-4506**	

REFERENCE #3 INFORMATION	
6. Reference Name **Carolyn Ramesar**	7. Phone Number **(808) 627-8530**
8. Title **IT Architect Manager**	
9. Organization Name **Honolulu Cellular**	
10. Organization Address **500 Kahelu Avenue, Mililani, HI 96789**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Alan Mayer**	4. Position **IT Specialist**	7. Phone Number **(800) 637-1270**

REFERENCE #1 INFORMATION	
6. Reference Name **Scott Muravnik**	7. Phone Number **(702) 341-4231**
8. Title **Project Manager**	
9. Organization Name **Bank of America – National Dealer Lending Division**	
10. Organization Address **Las Vegas, NV**	

REFERENCE #2 INFORMATION	
6. Reference Name **John D. Francois**	7. Phone Number **(704) 554-5012**
8. Title **Certified Project Executive**	
9. Organization Name **IBM Global Services**	
10. Organization Address **8501 IBM Drive, MG79/101, Charlotte, NC 28262**	

REFERENCE #3 INFORMATION	
6. Reference Name **Diane LeFavre**	7. Phone Number **(336) 333-7227**
8. Title **Image & Workflow Management Practice – Carolinas/Tennessee**	
9. Organization Name **IBM Global Services**	
10. Organization Address **706 Green Valley Road, PO Box 21607, Greensboro, NC 27420**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Sue Miller-Frost**	4. Position **IT Architect**	7. Phone Number **(800) 429-6687**

REFERENCE #1 INFORMATION	
6. Reference Name **Tedi Wells**	7. Phone Number **(916) 567-2941**
8. Title **Deputy Director, Government**	
9. Organization Name **IBM Global Services**	
10. Organization Address **2710S Gateway Oaks, Suite 200, Sacramento, CA 95833**	

REFERENCE #2 INFORMATION	
6. Reference Name **Christine Dicken**	7. Phone Number **(602) 274-5359 x1248**
8. Title **Project Manager**	
9. Organization Name **State of Arizona, Department of Economic Security**	
10. Organization Address **3443 N. Central Avenue, Phoenix, AZ 85012**	

REFERENCE #3 INFORMATION	
6. Reference Name **Marsha Huckabay**	7. Phone Number **(916) 684-5200 x3263**
8. Title **Quality Manager**	
9. Organization Name **ALLDATA**	
10. Organization Address **9412 Big Horn Boulevard, Elk Grove, CA 95758**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Jock Purnell**	4. Position **Network Specialist**	7. Phone Number **(808) 597-9240**

REFERENCE #1 INFORMATION	
6. Reference Name **Bill Arrington**	7. Phone Number **(808) 535-7085**
8. Title **Network Supervisor**	
9. Organization Name ***Kapiolani Medical Center***	
10. Organization Address **1964 Young Street, Suite 100, Honolulu, HI 96826**	

REFERENCE #2 INFORMATION	
6. Reference Name ***David Chang***	7. Phone Number
8. Title **Chief Information Officer**	
9. Organization Name **Central Pacific Bank**	
10. Organization Address ***222 N. School Street, Honolulu, HI 96817***	

REFERENCE #3 INFORMATION	
6. Reference Name **Zeke Crater**	7. Phone Number **(808) 537-4953**
8. Title **Network Manager**	
9. Organization Name **Queen's Medical Center**	
10. Organization Address **1301 Punchbowl Street, Honolulu, HI 96813**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Dieter Rauscher**	4. Position **I/T Specialist**	7. Phone Number **(808) 597-9449**

REFERENCE #1 INFORMATION	
6. Reference Name **Mr. Larry Okimoto**	7. Phone Number **(800) 597-2369**
8. Title **CIO**	
9. Organization Name **Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI**	

REFERENCE #2 INFORMATION	
6. Reference Name **Mr. James Iwanaga**	7. Phone Number **(808) 837-8682**
8. Title **Assistant Vice President – MIS**	
9. Organization Name **Servco Pacific, Inc.**	
10. Organization Address **2841 Pukoloa Street, Honolulu, HI**	

REFERENCE #3 INFORMATION	
6. Reference Name **Mr. Patrick Saka**	7. Phone Number **(808) 244-3981**
8. Title **General Manager**	
9. Organization Name **The Maui News**	
10. Organization Address **100 Mahalani Street, Wailuku, Maui, HI**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Thomas Talone**	4. Position **System Architect**	7. Phone Number **(800) 689-3185**

REFERENCE #1 INFORMATION	
6. Reference Name **Jeff Haas**	7. Phone Number **(562) 985-2294**
8. Title	
9. Organization Name **California State University, Long Beach**	
10. Organization Address **2200 Bellflower Boulevard, Long Beach, CA 94621**	

REFERENCE #2 INFORMATION	
6. Reference Name **Bob Woods**	7. Phone Number **(602) 236-2820**
8. Title	
9. Organization Name **Salt River Project**	
10. Organization Address **2521 Priest Drive, Tempe, AZ 81521**	

REFERENCE #3 INFORMATION	
6. Reference Name **Robin Henderson**	7. Phone Number **(602) 248-9354, x1514**
8. Title	
9. Organization Name **State of Arizona, Department of Economic Security**	
10. Organization Address **3225 N. Central Avenue, Phoenix, AZ**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Roy Tamaru**	4. Position **System Services Representative**	7. Phone Number **(800) 426-7378**

REFERENCE #1 INFORMATION	
6. Reference Name **Ty Fukuhara**	7. Phone Number **(808) 847-9790**
8. Title **Systems Manager**	
9. Organization Name **Sprint – Hawaii**	
10. Organization Address **925 Dillingham Blvd., Honolulu, HI 96817**	

REFERENCE #2 INFORMATION	
6. Reference Name **Larry Okimoto**	7. Phone Number **(808) 587-2369**
8. Title **Chief Information Officer**	
9. Organization Name **State of Hawaii Department of Transportation**	
10. Organization Address **869 Punchbowl Street, Honolulu, HI 96813**	

REFERENCE #3 INFORMATION	
6. Reference Name **Ralph Johnson**	7. Phone Number
8. Title **DP Manager**	
9. Organization Name **Kaiser Permanente – Hawaii**	
10. Organization Address **3288 Moanalua Road, Honolulu, HI 96819**	

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

SUBCONTRACTOR INFORMATION		
3. Proposed Staff Name on Resume **Lisa Nicholas**	4. Position **IT Specialist**	7. Phone Number **(800) 429-8200**

REFERENCE #1 INFORMATION	
6. Reference Name **Ms. Kate Aitchison**	7. Phone Number **(510)268-4257**
8. Title **Implementation Manager**	
9. Organization Name **Alameida County Child Welfare Project**	
10. Organization Address	

REFERENCE #2 INFORMATION	
6. Reference Name **Mr. Dennis Griess**	7. Phone Number **(303)924-1464**
8. Title **Sr. Consultant**	
9. Organization Name **International Business Machines Corporation**	
10. Organization Address **6300 Diagonal Hwy. Boulder, CO. 80301**	

REFERENCE #3 INFORMATION	
6. Reference Name **Ms. Terry Elwood**	7. Phone Number **(916)567-2949**
8. Title **Child Welfare Training Leader**	
9. Organization Name **International Business Machines Corporation**	
10. Organization Address **3775 North Freeway Blvd. Sacramento, CA 95834**	

E.2.2 Boss Electric Staff References

OFFEROR INFORMATION	
1. Name of Offeror **International Business Machines Corporation**	2. RFP Reference Number **ICS-FY-99-052**

STAFF INFORMATION		
3. Proposed Staff Name on Resume **Boss Electric**	4. Position **Cable Installers**	7. Phone Number **247-9256**

REFERENCE #1 INFORMATION	
6. Reference Name **Barbara Kahana**	7. Phone Number **547-9256**
8. Title **Director of Information Systems**	
9. Organization Name **Kuakini Medical Center**	
10. Organization Address **347 N. Kuakini Street, Honolulu, HI 96817**	

REFERENCE #2 INFORMATION	
6. Reference Name **Alan Ito**	7. Phone Number **(808) 547-6899**
8. Title **System Information Officer, Information Systems**	
9. Organization Name **St. Francis Hospital**	
10. Organization Address **2226 Liliha Street, Honolulu, HI 96817**	

REFERENCE #3 INFORMATION	
6. Reference Name **Michael Hiramoto**	7. Phone Number **(808) 874-2337**
8. Title **Sr. MIS Manager**	
9. Organization Name **Grand Wailea Resort, Hotel & Spa**	
10. Organization Address **3850 Wailea Alanui Drive, Wailea, Maui, HI 96753**	

Attachment F: Technical Point Response Worksheet

Attachment F-2: Response to Technical Points

3.5.0 The specification is addressed in section 3.0 Project Approach, Work Pland and Schedule

3.5.1 Yes, 3.1.0

3.5.2 Yes, 3.1.1

3.5.3 Yes, 3.1.1

3.5.4 Yes, 3.1.1

3.5.5 Yes, 3.2

3.5.6 Yes, 3.1.1, 3.1.3

3.5.7 Yes, 3.1.8

3.5.8 Yes, 3.1.6, 3.1.8

3.5.9 Yes, 3.1.6, 3.1.8

3.5.10 Yes, 3.1.1

3.5.11 Yes, 3.1.2, 3.1.3

3.5.12 Yes, 3.1.3

3.5.13 Yes, 3.1.1

3.5.14 Yes, 3.2.3

3.5.15 Yes, 3.1.3

3.5.16 Yes, 3.1.1, 3.1.3

3.5.17 Yes, 3.1.0, 3.1.3

3.6.1 Yes 3.1.4

3.6.1.1 Yes 3.1.4, 3.1.6

3.6.1.2 Yes, 3.1.7b

3.6.1.3 Yes, 3.1.8

3.6.1.4 Yes, 3.1.0, 3.1.4

3.6.1.5 Yes, 3.1.0, 3.1.1

3.6.1.6 Yes, 3.1.4

3.6.1.7 Yes, 3.1.4

3.6.1.8 Yes, 3.1.4

3.6.1.9 Yes, 3.1.4, 3.1.11

3.6.1.10 Yes, 3.1.3

3.6.1.11 Yes, 3.1.4

3.6.1.12 See 3.1.4, as described, this will be governed by the line speeds from remote locations.

3.6.1.13 See 3.1.4, see previous 3.6.1.12

3.6.1.14 Yes, 3.1.4

3.6.1.15 Yes, 3.1.4

3.6.1.16 Yes, 3.1.4

3.6.1.17 Yes, 3.1.4, 3.1.5

3.6.1.18 Yes, 3.1.4, 3.1.5

3.6.1.19 Yes, 3.1.4, 3.1.5

3.6.1.20 Yes, 3.1.4

3.6.1.21 Yes, 3.1.4

3.6.1.22 Yes, 3.1.4

3.6.1.23 Yes, 3.1.4, 3.1.5

3.6.1.24 Yes, 3.1.4

3.6.1.25 Yes, 3.1.4, 3.1.5

3.6.1.26 Yes, 3.1.4, 3.1.5

3.6.1.27 Yes, 3.1.4

3.6.1.28 Yes, 3.1.4

3.6.1.29 Yes, 3.1.4

3.6.1.30 Yes, 3.1.4

3.6.1.31 See 3.1.4, more information is required on what spreadsheet format(s) are needed

3.6.2.1 See 3.1.4, 3.1.5, more information is required on when and where this customized feature should be implemented

3.6.3.1 Yes, 3.1.3

3.6.3.2 Yes, 3.1.3

3.6.3.3 Yes, 3.1.3

3.6.3.4 Yes, 3.1.3

3.6.3.5 Yes, 3.1.3

3.6.3.6 Yes, 3.1.3

3.6.3.7 Yes, 3.1.3

3.6.3.8 Yes, 3.1.3

3.6.3.9 Yes, 3.1.3

3.6.3.10 Yes, 3.1.3

3.6.3.11 Yes, 3.1.3

3.6.3.12 Yes, 3.1.3

3.6.3.13 Yes, 3.1.3

3.6.3.14 Yes, 3.1.3

3.6.3.15 Yes, 3.1.3

3.6.3.16 Yes, 3.1.3

3.6.3.17 Partially, more information is required. Sort selections allow for flexibility but not format.

3.6.3.18 Yes, 3.1.3, 3.1.4

3.6.3.19 Partially, more information is needed to determine the extend of training needed on-line.

3.6.3.20 Yes, 3.1.3, 3.1.4

3.6.3.21 Yes, 3.1.3

3.6.3.22 Yes, 3.1.3, 3.1.4

3.6.3.23 Yes, 3.1.4

3.6.3.24 Yes, 3.1.4

3.6.3.25 Partially, more information is needed

3.6.3.26 Yes, 3.1.5

3.6.4.1 Partially, more information is needed

3.6.4.2 Yes, 3.1.4

3.6.4.3 Yes, 3.1.4

3.6.4.4 Yes, 3.1.4

3.6.4.5 Yes, 3.1.4

3.6.4.6 Yes, 3.1.4

3.6.4.7 Yes, 3.1.1, 3.1.3

3.6.4.8 Yes, 3.1.4

3.6.4.9 Yes, 3.1.4

3.7.1 Yes, 3.1.6

3.7.2 Yes, 3.1.1

3.7.3 Yes, 3.1.1, 3.1.3

3.8 Yes, 3.1.3

3.9 Yes, 3.1.6

3.9.1 Yes, 3.1.3

3.9.2 Yes, 3.1.3, 3.1.6, 3.1.8

3.9.3 Yes, 3.1.3, 3.1.5, 3.1.6

3.9.4 Yes, 3.1.6

3.10.1 Yes, 3.1.1

3.10.2 Yes, 3.1.2

3.10.3 Yes, 3.1.3

3.10.4 Yes, 3.1.4

3.10.5 Yes, 3.1.5

3.10.6 Yes, 3.1.6

3.10.7 Yes, 3.1.7

3.10.8 Yes, 3.1.8

3.10.9 Yes, 3.1.9

3.10.10 Yes, 3.1.10

3.10.11 Yes, 3.1.11

3.10.12 NO, Offeror has declined to submit a proposal for this task

3.11.1 Yes, 3.2.3.1

3.11.2 Yes, 3.2.3.2

3.11.3 Yes, 3.2.3.3

3.11.4 Yes, 3.2.3.4

3.11.5 Yes, 3.2.3.5

3.11.6 Yes, 3.2.3.6

3.11.7 Yes, 3.2.3.7

3.11.8 Yes, 3.2.3.8

3.11.9 Yes, 3.2.3.9

3.11.10 Yes, 3.2.3.10

3.11.11 Yes, 3.2.3.11

3.11.12 NO, Offeror has declined to submit a proposal for this task

3.12 Yes, 3.2.3.0

3.13 Yes, Attachment A

3.13.1 Yes, Attachment B

3.13.2 Yes, Attachment E

3.14.1 Floor Space Requirements

We have provided these requirements in Attachment I, Facilities and Operational Requirements.

3.14.2 Weight Requirements

We have provided these weight requirements in Attachment I, Facilities and Operational Requirements.

3.14.3 Power Requirements

We have provided the electrical source requirements in Attachment I, Facilities and Operational Requirements, "Power Profile."

3.14.4 Operational Environment

Documentation is provided for operational environment. See Attachment I, Facilities and Operational Requirements.

3.14.5 Additional Configuration Features

We are not providing any Year 2000 services. Product Specifications specify the Year 2000 readiness of the proposed Products. We don not make any representations regarding the Year 2000 readiness of these Products.

Under the terms of our Statement of Work, we are not responsible for 1) your products, 2) a third party's products (including products you license from our subcontractors) or 3) IBM's (previously installed Products ("Other Products") to correctly process or properly exchange accurate date data with Products or deliverables we provide. The Lange Group will be relieved of our obligations under our Statement of Work due to the inability of such Other Products to correctly process or properly exchange accurate date data with the Products or deliverables we provide to you. BOC acknowledges that it is BOC's responsibility to assess their current systems and take appropriate action to migrate to Year 2000 ready systems.

Notwithstanding the preceding Year 2000 provision and exclusions, all Materials and Services provided and/or delivered by The Lange Group pursuant to this Statement of Work shall be Year 2000 ready. Year 2000 Ready shall mean that the Materials

provided and/or delivered shall be capable, when used in accordance with its applicable documentation, or correctly and accurately processing, providing and receiving date data within and between the twentieth and twenty-first centuries, including the extra day occurring in any leap year, provided that all products (for example, hardware, software and firmware) used with the Product do not improperly or inaccurately provide date data to or receive date data from such Product. The Lange Group Services provided pursuant to this Statement of Work should not cause any product, which was previously Year 2000 Ready to become non-Year 2000 Ready.

3.14.6 Quality of Equipment

We comply with the requirements in this section.

3.14.7 Delivery

We comply with the requirements in this section.

3.14.8 Installation

Please delete the sentence, "Late installation will subject the Contractor to the assessment of Liquidated Damages". We comply with all other requirements in this section.

3.15 Service and Support Personnel Requirement

IBM has full-time staff of on-duty support personnel based on the Island of Oahu. Our 24x7 service telephone number is 1-800-426-7378. Resumes have been included in Attachment A. Other vendors may or may not provide on-site service.

3.16 Hardware Maintenance Requirements

Maintenance services for proposed equipment have been included in Attachment H.

3.16.1 Diagnostic Tools and Test Equipment

IBM complies with the responsibility for providing all special diagnostic tools and test equipment necessary to detect, isolate, and correct machine malfunctions.

Diagnostics
Diagnostics are a detailed set of instructions which guide the service representative through the repair process. IBM diagnostics may be a set of menu-driven instructions which reside within the machine, or they may be a set of diagrams or written instructions. These instructions must be strictly adhered to in order to obtain valid and accurate results.

IBM continuously tries to improve both its equipment reliability and diagnostic instructions. As enhancements are made, corresponding diagnostics are updated for your systems equipment. Diagnostic procedures are used to verify correct machine operation when maintenance parts are replaced or adjusted and when engineering changes are installed or features are added/removed.

Your IBM processors today typically monitor their own performance and provide information to the operator. This information is recorded and used by you and IBM to defer maintenance to a more convenient and scheduled time. On selected IBM processors, diagnostic information can be transmitted to IBM support centers, which assists them in promptly determining appropriate actions to be taken. IBM also uses the knowledge base concept in its support locations. These expert systems are computer-based programs which are developed using the data gathered from the manufacturing lines. The data is applied to specific symptoms in order to provide consistent diagnostic approaches to problems. They are also continually refined via field experiences to provide the most up-to-date maintenance diagnostic information available.

Tools

Maintenance Device: The IBM Maintenance Device (MD) is a portable tool used on certain IBM products and consists of a microprocessor, diskette drive, keyboard, display and standard interfaces.

When attached to an IBM product, the MD assists the IBM Customer Engineer in loading diagnostics and in executing maintenance analysis procedures. The device provides the IBM Customer Engineer with maintenance procedures which can be controlled via the hand-held keyboard. For certain IBM products, these maintenance procedures are stored on diskettes and shipped with the product. In addition, the MD can be used in conjunction with the remote support facility by IBM Customer Engineers for the purpose of running remote diagnostics and transferring product logs and trace data to obtain expert assistance. This process can prevent an outage or reduce the length of an outage.

The Stand Alone Terminal Exerciser (SATE) is a series of programs for the MD that provides a fast means for isolating link, loop, or terminal problems. Typically, a Customer Engineer responding to a network terminal problem would use SATE to determine whether the terminal or network is at fault. The MD with the appropriate SATE program is connected to the terminal and acts as an alternate host. The terminal responds to signals as if it were still connected to the network. As a result, the SATE saves time for both you and IBM.

SATE on the MD is an example of the sophisticated IBM electronic tools that greatly improve problem diagnosis and reduce service time.

PT-2: The PT-2 is another important teleprocessing tool that has been developed by IBM. With its adapters and sophisticated software, it can capture pertinent error data transmitted over system channels and TP networks.

The PT-2 can capture data in unattended mode, then auto dial and transmit failure data to a remote support site for evaluation. Once the failure data is captured, it can be displayed locally and remotely in a form that helps IBM Customer Engineers and IBM specialists diagnose the problem.

IBM telecommunication specialists can use the PT-2 and other IBM network tools to isolate failures even hundreds of miles away.

TP Line Monitor: The Teleprocessing (TP) Line Monitor is a hardware adapter which can attach to the service interface of the PT-2. The adapter is then connected by means of cables to an external integrated adapter (EIA) interface or by means of probes to an integrated modem or other signal converter interface.

The TP Line Monitor is a data-capture tool which can be used for problem determination assistance within a teleprocessing network. With your authorization, transmitted and received data of a communication network, along with line control changes, can be monitored and recorded on tape under control of the PT-2 application programs. The TP Line Monitor supports start/stop, BSC and SDLC line controls. The recorded tape can be replayed and analyzed by the on-site IBM Customer Engineer or, in some cases, it can be transmitted to the remote IBM site for further analysis. This allows IBM to diagnose your difficult problems expeditiously and perform quality repair in a timely manner.

Other Tools and Test Equipment: Specialized tools and test equipment will be available for use by IBM Customer Engineers and specialists as required. In addition to the conventional tools and test equipment such as oscilloscopes, meters, tape and disk testers, IBM Customer Engineers and specialists use a number of sophisticated devices which assist in the effective maintenance of IBM equipment and which are readily available when needed. Some of these devices include:

- Humidity Recorders
- Line Voltage Recorders
- Noise Analyzers
- Communication Line Error Detectors
- Logic Monitoring and Recording Devices
- Interface Monitors/Testers
- RF/Microwave Monitors
- Port Tester

IBM has a continuing service research program to develop tools, test equipment, and ways to assist the CE in effectively performing maintenance responsibilities. The organization has produced numerous innovative tools and service methods which have greatly improved IBM's ability to provide you with responsive and quality service.

IBM has an ongoing program of service research, to develop tools and test equipment to assist the SSR in performing maintenance responsibilities effectively.

3.16.2 Periods of Maintenance Service

IBM service is committed to providing the high level technical resources and management support necessary to solve even the most complicated service request. Branch product trained specialists, area designated specialists, and remotely located hardware, and software and network support specialists are available to your customer engineer 24 hours a day, seven days a week. Customer satisfaction is assured with IBM service management systems, including call response monitoring, performance tracking and a finely-tuned alert system that makes all of IBM's resources available to you, even product engineers at the plant of origin.

You demand from your maintenance vendor fast response, quality repair, and a professional support team. IBM's maintenance services features were designed to meet these needs and include:

- Twenty-four hour, 365-days-a-year coverage as well as a lower cost nine-hour, five-days-a-week coverage, and depot repair service for mobile products.
- Assigned IBM Customer Engineer and Account Managers: trained, experienced and familiar with your installation and service needs.
- Computer Assisted Dispatch
- Multiple dispatch centers which back each other up
- Around-the-clock support
- Direct digital radio link to customer engineers
- Customer Problem Determination Assistance Groups
- Around-the-clock support
- Problem diagnosis assistance begins while the Customer Engineer is enroute
- Remote specialist available
- Access to IBM Parts Inventory System 24 hours a day
- Complete product line coverage
- Access to extensive on-line service data base
- Efficient and quick problem diagnosis
- Around-the-clock support
- Experience of IBM Customer Engineers from around the world
- Engineering changes managed by IBM
- Technical support structure when additional product knowledge is required

- Local Specialists
- System Management Specialists
- System Support Centers
- Plant Development Engineers
- Competitive costs/flexible options
- Service planned and managed by IBM
-

IBM maintenance services is the best decision for the long-range performance of your information systems.

Fast Response:
An important criterion for selecting a service organization is how quickly the vendor responds to service requests. Fast response is accomplished by blending all elements of the total service delivery process. In particular, the accuracy and timeliness of the IBM communications system that is used to notify the service force, the close proximity to you of that service force, and how quickly they can get parts to your location affect response time. IBM's service organization excels in these areas of service delivery.

Our goal is to respond to the initial trouble call within two hours and to be on site in ???? hours. 75% of the time the IBM Customer Engineer will respond to the initial trouble call within 20 minutes, and is on site within two hours when required. We cannot guarantee this response without a significant increase in cost to the State of Hawaii.

3.16.3 Preventive Maintenance

Convenient Scheduling
IBM's service approach is designed to maximize your system availability. Your IBM Customer Engineer's goal is to provide you with the best service in the industry. This goals is supported by predictive and preventive maintenance routines developed specifically for individual equipment and systems. You IBM Customer Engineer will work with you to schedule service activities at times which minimize impact to your operations.

Preventive Maintenance
This maintenance approach is designed to keep equipment in good working order based upon the specific needs of individual machines, as determined by IBM. Preventive maintenance (PM) can include lubrication, adjustments, and replacement of maintenance parts as deemed necessary.

In addition to any lubrication and adjustments required, your Customer Engineer may also run diagnostic programs. These diagnostics are tailored for your IBM equipment and help your Customer Engineer to predict maintenance requirements and schedule the corrective action at a time which minimizes impact to your operation, yet resolves the problem before a failure occurs. For our customers, IBM will carefully plan and

manage PM based not only on equipment configuration but also on your usage of the equipment as well.

3.16.4 Remedial Maintenance

Quality repair means fixing it right the first time. A quality repair starts with the training of your IBM Customer Engineer. IBM has trained individuals who service a broad spectrum of your installed IBM products. To meet IBM's high quality standards, Customer Engineers are initially trained and continually updated with the latest in technology, diagnostics, and information to provide you with the best service. This extensive training keeps your Customer Engineers up to date on new products and developments. Customer Engineers also have a variety of tools and procedures to help them provide quality maintenance and are prepared to handle even the toughest problem quickly and effectively.

In order to comply with the State's requirement for and exchange of a machine which cannot be repaired within forty-eight (48) hours from time of on-site arrival or from the time ordered parts are received, we are including a spare node in our proposal.

3.16.5 Predictive Maintenance

Predictive Maintenance is a term applied to a number of procedures and programs which are utilized by IBM Customer Engineers. These procedures and programs track, predict, and correct potential malfunctions on machines under IBM maintenance services to avoid adversely impacting your operation. When transient error recordings exceed established thresholds, maintenance can be scheduled and performed to enhance your system and equipment availability. Predictive maintenance can include:

- Analysis of "trend report" generated by IBM programs from Error Recording Editing Program (EREP) data.
- System and component status monitoring, logging and analysis procedures.
- Use of system diagnostics or IBM tools to exercise equipment.
- Analysis of I/O error statistical reports.

IBM Predictive Maintenance often calls for an entire sequence of maintenance parts to be replaced to prevent an outage. Installing the appropriate level and complement of these parts is important in maintaining a high level of reliability.

3.16.6 Replacement Parts

IBM complies with all requirements in this section.

3.16.7 Safety Devices

IBM will install safety modifications including any safety devices provided by formal IBM Engineering Changes (ref 2.15.10) as deemed necessary by IBM or the State.

3.16.8 Parts Availability

We comply for the major components of the BCIS, ie. servers, PC workstations, printers etc. Readily available maintenance parts are a key element in service delivery. IBM's computerized parts logistic system helps reduce downtime by relaying information regarding nearest available parts to Customer Engineers via the MoST. The IBM parts distribution network provides 24-hour parts availability to the IBM Customer Engineer. We strive to provide the right maintenance part at the right place at the right time.

IBM can provide an inventory parts listing upon the State's request. This list does include descriptions and quantities that will normally be stocked on the Island of Oahu. However, because of the complexity of the IBM Parts Inventory Management System (PIMS) the listing will vary based on national and local usage trends as well as engineering changes that normally occurs. Therefore, any point-in-time, listings will likely change due to IBM's dynamic real-time parts management system.

IBM's maintenance parts inventory levels are maintained primarily to support products that are under an IBM maintenance services contract. This inventory is based not only by machine type but also by model. Under an IBM maintenance services contract, parts replacement is performed regardless of the cost of the part or the quantity. These decisions are based on machine diagnostics, Customer Engineer, and/or support center recommendations. All IBM parts are new or equivalent to new, and manufactured by IBM or to IBM's specifications. Utilizing their MoST, the Customer Engineer can check locations for parts, order parts and request specific shipping instructions, all within a matter of minutes.

Customer Engineers may have the needed parts in their individual parts supplies. If a Customer Engineer does not have the necessary part, access to it is available through additional levels of distribution:

Outside Locations - Customer Engineer, card caddies, mobile, remote, branch and customer account locations are included in the Customer Engineer's part network in which maintenance parts may be stocked. We also stock parts on Kauai, Maui and the Big Island.
Emergency Parts Support Centers (EPSC) - Approximately 90 EPSCs are located throughout the U.S.; they supply Customer Engineers with parts needed to repair machines in a local geographic area. Hawaii is an EPSC. The mix and quantity of parts is determined by the type and number of machines installed in that area. The branch office parts room stocks the recommended supply of the parts necessary to support each product line.
Regional Distribution Centers - There are five Regional Distribution Centers strategically located throughout the U.S. (Paramus, New Jersey; Chicago, Illinois; Dallas, Texas; Atlanta, Georgia; Hayward, California) to provide parts not stocked at outside locations or emergency parts support centers.

Central Distribution Locations - The Central Distribution Location located in Mechanicsburg, Pennsylvania, provides emergency delivery of parts not stocked at the regional distribution centers.

Manufacturing Plants - To insure complete parts coverage, parts can be obtained from the plant of manufacture if they are not available elsewhere.

IBM has the ability to meet ICSD's part stocking level requirements and will work with State's personnel to ensure parts objectives are met.

In the event that a part is not available from the local parts inventory, IBM will comply with the twenty-four (24) parts requirement for all shipment and delivery of items within IBM's control. This includes obtaining parts off the IBM's manufacturing assembly line, if necessary.

IBM invites ICSD to review our parts inventory and management systems at anytime upon request.

In the event that an item of equipment is inoperative for more than twenty-four (24) hours due to equipment failure, IBM can provide one or more of the following actions at no additional cost to the State:

- Provide backup equipment
- Provide on-site personnel for thorough analysis of the problem
- Provide replacement for the failing equipment

When specified by ICSD personnel, IBM will comply with having required parts on-site within twenty-four (24) hours. IBM will use the most cost-effective manner including priority air shipment if required at IBM's expense.

3.16.9 Engineering Changes

The performance of IBM products is continually being evaluated in order to improve their reliability and availability. An IBM service call results in a incident report which is analyzed at the manufacturing plant and by IBM service planning. Data from this analysis is used in the development of engineering changes to improve the product's reliability and serviceability.

As a maintenance services customer, IBM ships all appropriate engineering changes automatically. The IBM Customer Engineers will coordinate the engineering change installation with your schedule to limit disruption of your operations.

3.16.10 Equipment Modifications

IBM complies with all requirements in this section.

3.16.11 Hierarchy of Support

When an IBM system, system component, or IBM supported software serviced by IBM personnel is inoperative or fails intermittently, it may be placed on alert. An alert may be escalated from the branch office to the IBM area office to invoke additional resources. Area offices escalate to headquarters to insure every appropriate IBM resource is involved in a timely basis.

The alert procedure informs IBM marketing and service management of situations that adversely affect your product and system availability and/or your satisfaction. This procedure helps IBM management take appropriate actions on a timely basis.

As higher levels of management are notified, that level reviews the proposed actions to insure that appropriate resources are utilized to resolve the problem. During off-shift hours, IBM's situation managers monitor and respond to alert situations as appropriate.

IBM recognizes that complex maintenance problems may occur which require service resources beyond that available at the local level. We will make available to The BOC and ICSD hierarchies of support to quickly elevate difficult problems and resolve these complex equipment malfunctions. Resumes have been included with our proposal.

IBM will comply with the requirements of response times and support levels as stipulated in this RFP as follows:

Level One Support – Oahu (Roy Tamaru & John Hewitt)

Each account has an assigned System Services Representative (SSR) who is the Local Branch Office person responsible for preventive and remedial maintenance and equipment installation activities. SSRs are carefully selected, well trained and highly skilled. The SSR's goal is to help the IBM customers obtain a high degree of reliability and availability from their IBM products. SSR's are assigned responsibilities for specific customer accounts, which increases their familiarity with the account installations, personnel and applications. This enhances the System Services Representatives ability to resolve equipment problems quickly and efficiently, by eliminating the need to gather fundamental information at the time of each service call.

Assigned backup System Services Representatives are designated to respond to the assigned SSR's customers in the event the assigned SSR is unavailable. This provides a normal response when and if an alternative is needed. The backup SSR has similar skills and training as the assigned SSR; therefore, there is minimal degradation on response or service.

When a service call is placed to IBM, the SSR is expected to contact the customer by phone within one hour. If an on-site visit is necessary, he/she is expected to arrive within two hours. IBM's escalation procedures allow for quicker response based on the State's urgency and requirement. The IBM service number is 1-800-426-7378.

Level Two Support – Oahu (Ray Bailey)

If the assigned System Services Representative (SSR) is experiencing difficulty in resolving the problem, Ray Bailey, our Local Branch Office RISC Systems/6000-SP specialist who specializes in providing diagnostic assistance and/or repair expertise will be dispatched according to your response time requirements.

Level Three Support – Remote Plant Locations

In the event the local SSR resources are still experiencing problems in resolving the issue, they will call plant engineers located in San Jose, California. Austin, Texas, Rochester, Minnesota, and Poughkeepsie, New York. Located in the IBM laboratory and plant locations, they make significant contributions to the maintainability and serviceability of IBM products.

3.16.12 Maintenance Reports

IBM maintains an extensive on-line database that records all items (a. to i.) in this section of the RFP. IBM will furnish the information specified in this section to the Central Computing Site by filling out the Information & Communications Services Division 'OPERATIONS TROUBLE LOG' form (ref Operations Trouble Log sheet) which is provided by ICSD operations.

3.17 Software Maintenance Requirements

3.17.1 Error Correction

When ICSD Support personnel determines that a potential IBM software error has occurred, a call will be placed to the IBM AIX Supportline in Dallas a 1-800-2255-249 (1-800-CALL-AIX). Supportline will assist the State with software errors that can be reproduced or in determining what additional data is necessary to resolve problem for those that can not be reproduced.

In the event that additional assistance is required for problem resolution, an escalation procedure exists. A Supportline technical specialist will escalate to the next level of support, if they have exhausted all resources or if progress is not being made on the situation. Higher levels of support include technical team leaders, programmers and engineers. If local IBM support is required, a local Assistance Request (LAR) will be generated. IBM will respond within 4 hours and work with the State and AIX SupportLine until the problem is resolved. If progress is still not being made, the local IBM office has the ability to open a complaint on behalf of the State to engage the appropriate resources within IBM to resolve the situation.

If the State feels that their call is not being escalated in a timely manner, the State should ask to speak with a Duty Manager. A Duty Manager is available 24 hours a day, 7 days a week. Their role is to act as the States advocate and assure appropriate focus/responsiveness is placed on the call.

IBM RISC System/6000 System Alert is available to inform the State about potential software problems. IBM specialists review fixes that apply to your software releases and will inform you on a regular basis, of any software fixes (PTF's) that may be critical to your system. This includes HIPER fixes and PE PTF's. ALERT is priced at $30/month.

3.17.2 Updates

IBM's policy for updating monthly license charge (MLC) software is not to charge for release and modification updates. IBM's current policy for one time charge (OTC) software, such as AIX and other licensed program products is to provide modifications at no charge and to charge a minimal fee for subsequent release upgrades. Modifications will be ordered by calling AIX SupportLine.

3.17.3 Hotline Service

IBM will provide the State with phone consultation for "how to" operational questions and defect support on a 24x7 basis with IBM AIX SupportLine or (2) pre-approved designated callers. With AIX SupportLine, the State has direct access to a team of technical specialists. These specialists are available 24 hours a day, 7 days a week to answer your questions about the operation of your IBM system and current releases of eligible programs. IBM's trained specialists have years of experience with the AIX product line. They are up to date on technical functions, problem resolution, have access to programmers and engineers who developed the system and use the latest in tools and databases to respond quickly and accurately to your questions and software defect problems. To invoke AIX SupportLine, the State will place a call to 1-800-CALL-AIX. Response time for less severe problems is 4 hours during prime shift hours, based upon customer's time zone.

AIX SupportLine 24x7 with support for ADSM, HACMP, C/C++ & DB2 UDB.

3.17.4 Withdrawn Software

IBM will provide up to 12 months notice before withdrawing support for software. In the event that support is withdrawn, IBM shall provide software support on a best effort basis for the remainder of the SupportLine contract term. Once the SupportLine contract has expired, IBM can provide best effort support for a separate fee, to be determined at that time.

3.17.5 Response Times

For calls placed to the Hotline, acknowledgement is immediate. There is always a person available to take information pertaining to a problem, assign a problem number and based on the urgency, assign a technical specialist to assist with your call in a timely manner. It is not necessary to leave a voice mail message with this Hotline service. Usually, a caller will be transferred live to a technical specialist or receive a callback from a technical specialist
within one hour. IBM's SupportLine response objectives are two hours for prime shift and four hours for offshift. IBM's normal escalation procedure allow for quicker response depending on urgency. Severity 1 calls are given priority.

IBM also has a mission critical support offering which is structured for one-hour response objective during prime shift and two hours for offshift.

The IBM Business Critical offering can be enhanced to provide 1 hour guaranteed response time 24 hours per day, 7 days a week. This option can be offered as a supplement to normal AIX SupportLine. It would require IBM to allocate additional resources for all shifts. This option would cost an additional $6,000 per month.

3.18 Software Terms and Conditions

Please refer to our IBM Customer Agreement (ICA) in Appendix G.

3.18.1 Grant of License

Please refer to our IBM Customer Agreement (ICA) in Appendix G.

3.18.2 Use and Protection of Software

Please refer to our IBM Customer Agreement (ICA) in Appendix G.

3.18.3 Other Software Requirements

Please refer to our IBM Customer Agreement (ICA) in Appendix G.

3.18.4 Warranty

IBM will provide assistance to the State at no additional charge with AIX SupportLine AND Designated caller ID. This will include assistance with usage support and IBM software defect support.

3.19 Time Of Performance

These requirements have been included in our Statement of Work (SOW).

3.20 Acceptance Procedure

These requirements have been included in our Statement of Work (SOW).

3.20.1 thru 3.20.13

These requirements have been included in our Statement of Work (SOW).

3.21 Training

These requirements have been included in our Statement of Work (SOW).

3.22 Deliverable Products and Services

These requirements have been included in our Statement of Work (SOW).

3.22.1 Description of Deliverables

These requirements have been included in our Statement of Work (SOW).

3.23 Post Implementation Support

IBM will provide the State with both hardware and software maintenance support on a 24x7 basis. A hardware maintenance and AIX SupportLine agreement will cover this.

Optional local system administrative software support is available on an hourly basis during the hours of 8AM to 4PM.

We propose a block of 100 hours for the first year to help with AIX System administration tasks, ADSM, and HACMP administration tasks.

3.24 Maintenance of Offices

The Lange Groups local office is located at 1100 Ward Avenue. IBM's local Honolulu office is located at 1240 Ala Moana Boulevard.

FORM A-6
(REV. 3/1998)

STATE OF HAWAII — DEPARTMENT OF TAXATION

TAX CLEARANCE APPLICATION

PLEASE TYPE OR PRINT CLEARLY

FOR OFFICE USE ONLY

BUSINESS START DATE IN HAWAII IF APPLICABLE
02124181

HAWAII RETURNS FILED IF APPLICABLE
19____ 19____ 19____

STATE APPROVAL STAMP
State of Hawaii
APPROVED
MAY 03 1999
per L Dennis
Department of Taxation

*IRS APPROVAL STAMP
INTERNAL REVENUE SERVICE
APPROVED
MAY 3 1999
per Chisholm
Pacific-Northwest District

CERTIFIED COPY STAMP
Pacific-Northwest District
This copy is acceptable as a substitute for the original tax clearance certificate issued.
Internal Revenue Service

1. APPLICANT INFORMATION: (PLEASE PRINT CLEARLY)

Applicant: UNIQUE COMPUTER SYSTEMS, INC.

Address: 1100 Ward Avenue, Suite 1050

City/State/Zip Code: Honolulu, Hawaii 96814

DBA/Trade Name: THE LANGE GROUP

2. TAX IDENTIFICATION NUMBER(S):

HAWAII GENERAL EXCISE ID # 1 0 1 9 3 8 0 6

FEDERAL EMPLOYER ID # 9 9 - 0 2 0 6 1 2 3

SOCIAL SECURITY # ___ ___ ___ - ___ ___ - ___ ___ ___ ___

3. APPLICANT IS A/AN: (CHECK ONLY ONE BOX)

- ☐ CORPORATION
- ☒ S CORPORATION
- ☐ TAX EXEMPT ORGANIZATION
- ☐ INDIVIDUAL
- ☐ PARTNERSHIP
- ☐ ESTATE
- ☐ TRUST
- ☐ LIMITED LIABILITY COMPANY
- ☐ LIMITED LIABILITY PARTNERSHIP

4. THE TAX CLEARANCE IS REQUIRED FOR:

- ☒ CITY, COUNTY, OR STATE GOVERNMENT CONTRACT IN HAWAII *
- ☐ LIQUOR LICENSE *
- ☐ REAL ESTATE LICENSE
- ☐ CONTRACTOR LICENSE
- ☐ BULK SALES
- ☐ FINANCIAL CLOSING
- ☐ PROGRESS PAYMENT
- ☐ PERSONAL
- ☐ HAWAII STATE RESIDENCY
- ☐ FEDERAL CONTRACT
- ☐ LOAN
- ☐ SUBCONTRACT
- ☐ OTHER _____

*IRS APPROVAL STAMP IS FOR PURPOSES INDICATED BY ASTERISK.

5. NO. OF CERTIFIED COPIES REQUESTED: 1

6. SIGNATURE:

Yolanda H. Lindsey — PRINT NAME

President — PRINT SPECIFIC TITLE: Corporate Officer, General Partner, Individual (Sole Proprietor)

SIGNATURE

5-3-99 — DATE

(808) 545 - 1822 — TELEPHONE

(808) 599 - 5264 — FAX

POWER OF ATTORNEY. If submitted by someone other than a Corporate Officer, General Partner, or Individual (Sole Proprietor), a power of attorney (State of Hawaii Department of Taxation Form N848) must be submitted with this application. If a Tax Clearance is required from the Internal Revenue Service, IRS Form 8821, or IRS Form 2848 is also required. Applications submitted without proper authorization will be sent to the address of record with the taxing authority. UNSIGNED APPLICATIONS WILL NOT BE PROCESSED.

PLEASE TYPE OR PRINT CLEARLY — THE FRONT PAGE OF THIS APPLICATION BECOMES THE CERTIFICATE UPON APPROVAL.

SEE PAGE 2 ON REVERSE & INSTRUCTIONS. Failure to provide required information on page 2 of this application or as required in the separate instructions to this application will result in a denial of the Tax Clearance request.

50650

FORM A-6
(REV. 3/1998)

STATE OF HAWAII — DEPARTMENT OF TAXATION

TAX CLEARANCE APPLICATION

PLEASE TYPE OR PRINT CLEARLY

APPLICANT INFORMATION: (PLEASE PRINT CLEARLY)

Applicant: IBM Corporation

Address: 1240 Ala Moana Blvd.

City/State/Zip Code: Honolulu HI 96814

DBA/Trade Name:

2. TAX IDENTIFICATION NUMBER(S):

HAWAII GENERAL EXCISE ID # 1 0 0 0 2 5 5 5

FEDERAL EMPLOYER ID # 1 3 - 0 8 7 1 9 8 5

SOCIAL SECURITY #

3. APPLICANT IS A/AN: (CHECK ONLY ONE BOX)

- [X] CORPORATION
- [ ] S CORPORATION
- [ ] TAX EXEMPT ORGANIZATION
- [ ] INDIVIDUAL
- [ ] PARTNERSHIP
- [ ] ESTATE
- [ ] TRUST
- [ ] LIMITED LIABILITY COMPANY
- [ ] LIMITED LIABILITY PARTNERSHIP

THE TAX CLEARANCE IS REQUIRED FOR:

- [X] CITY, COUNTY, OR STATE GOVERNMENT CONTRACT IN HAWAII *
- [ ] LIQUOR LICENSE *
- [ ] REAL ESTATE LICENSE
- [ ] CONTRACTOR LICENSE
- [ ] BULK SALES
- [ ] FINANCIAL CLOSING
- [ ] PROGRESS PAYMENT
- [ ] PERSONAL
- [ ] HAWAII STATE RESIDENCY
- [ ] FEDERAL CONTRACT
- [ ] LOAN
- [ ] SUBCONTRACT
- [ ] OTHER

** IRS APPROVAL STAMP IS FOR PURPOSES INDICATED BY ASTERISK.*

5. NO. OF CERTIFIED COPIES REQUESTED: 20

6. SIGNATURE:

Shirley S. Shinsato
PRINT NAME

Shirley S. Shinsato
SIGNATURE

Authorized Agent POA
PRINT SPECIFIC TITLE: Corporate Officer, General Partner, Individual (Sole Proprietor)

DATE

(808) 597 - 9343
TELEPHONE

(808) 597 - 9568
FAX

POWER OF ATTORNEY. If submitted by someone other than a Corporate Officer, General Partner, or Individual (Sole Proprietor), a power of attorney (State of Hawaii Department of Taxation Form N848) must be submitted with this application. If a Tax Clearance is required from the Internal Revenue Service, IRS Form 8821, or IRS Form 2848 is also required. Applications submitted without proper authorization will be sent to the address of record with the taxing authority. UNSIGNED APPLICATIONS WILL NOT BE PROCESSED.

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500551

FOR OFFICE USE ONLY

BUSINESS START DATE IN HAWAII IF APPLICABLE
01/30/50

HAWAII RETURNS FILED IF APPLICABLE
19____ 19____ 19____

STATE APPROVAL STAMP
State of Hawaii
APPROVED
MAR 12 1999
per
Department of Taxation

IRS APPROVAL STAMP
INTERNAL REVENUE SERVICE
APPROVED
MAR 12 1999
per CX 99-00444
Pacific-Northwest District

CERTIFIED COPY STAMP

Note: ATTACHMENT H for original PROPOSAL
dated September 28, 1999 could not be found at this time.

We apologies for any inconvenience this may cause you and hope one of the copies obtained from either the DLNR or ICSD still contains the original Attachment H.

OptiPlex Desktops

Choosing the Right OptiPlex
- OptiPlex GX1p
- OptiPlex GX1
- OptiPlex G1
- OptiPlex Model Comparison
- OptiPlex Buyers Guide

About OptiPlex
- What Is Managed PC?
- Managed PC Features
- Service Plans
- Awards & Reviews
- Obtaining Documentation
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- I/O Connections
- Keyboards & Mice
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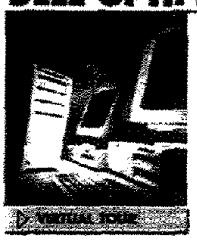
Buy Online or Call: 1-800-WWW-DELL

DELL OPTIPLEX GX1



Superior System Performance Today. Headroom for the Future

- **Superior system peformance and network manageability today, while helping to protect your technology investment tomorrow.**
- **Built with state-of-the-art and proven technology**
- **Delivers the industry-standard Systems Management for complex network needs**

▷Specifications
▷Manageability Features

400MHz Pentium II Systems with monitor and 3 yr onsite service.
Starting from **$1,478**

SELECT & PRICE

Features	Functions	Benefits
• New-generation Intel® processor technology: Pentium® III -500MHz -450MHz Pentium® II -450MHz -400MHz -350MHz	• The GX1 is optimized for maximum life-cycles: 2X AGP provides full support for future applications and operating systems	• By combining the state-of-the-art performance of the latest Intel chipset and manageability features with industry-standard technology, the GX1 can give you the investment protection and flexibility designed to help lower your company's total cost of ownership
• 440BX chipset with 100MHz Front Side Bus Pentium processor and 100MHz SDRAM memory support	• 440BX AGP chipset and 100MHz SDRAM to help ensure optimum performance for future applications	• GX1's maximized manageability features allow for software and firmware updates at any time, hardware maximization and software configuration control—all while helping to minimize unplanned downtime
• Integrated 2X AGP graphics controller with 4/8MB SGRAM and integrated audio	• Hard-disk drive with S.M.A.R.T. II predictive failure alert maximizes high-speed responsiveness to applications while reducing unplanned downtime	
• S.M.A.R.T. II Ultra DMA/33 6.4, 8.4, 10GB[1] hard-disk drives	• Integrated audio for today's (and tomorrow's) media-rich environments	
• SCSI-S.M.A.R.T. II, UltraWide SCSI 7200RPM 4.5 or 9.1GB[1] drives		
• Integrated security, fault management, data integrity, and configuration monitoring manageability features		

Programs and Deals

▷**Federal Government**
▷**Small Business** (up to 400 people)
Large Business

OptiPlex News
- Dell receives an "A" in customer satisfaction for Reliability and Service from PC Magazine
- Pentium III
- Windows 2000
- Dell Year 2000
- Total Cost of Ownership
- Vectors White Pages
- Direct Effect Program
- Dell Guard

500553

OptiPlex Desktops

OptiPlex GX1 Virtual Tour

- Overview
- Processor
- Chassis & Expansion
- Memory
- Hard Drive
- Monitors
- Video/Graphics
- Audio
- Speakers
- CD-ROM
- Tape Backup
- Zip
- Networking
- I/O Connections
- Keyboards & Mice
- Operating System

OptiPlex GX1

- OptiPlex GX1
- Configure, Price, & Buy

Buy Online or Call: 1-800-WWW-DELL

OPTIPLEX GX1 VIRTUAL TOUR

Monitors

Dell is the #1 US color desktop PC monitor supplier! *

Dell monitors offer excellent image quality for all uses at great prices. They offer enhanced viewing with high resolution and refresh rates, sharp images and bright, vibrant colors. Check out all the reasons for purchasing a Dell branded monitor:

- **Exceptional reliability** - Dell works extensively with top tier monitor suppliers during all phases of Dell monitor development to help ensure reliability.
- **Exceptional compatibility** - Dell monitors undergo exhaustive testing on Dell systems and peripherals to help ensure compatibility
- ***Single point of contact for support*** - purchasing a Dell branded monitor means that you only have one company to contact if you need assistance
- **Monitors arrive with the systems**, potentially eliminating the costs associated with waiting for all components to arrive before beginning system installation
- **Single invoice** for monitor and system can reduce complexity
- **Includes a 3 year limited warranty** when purchased with a Dell system
- **Monitor and system have matching plastic color** for professional appearance

OptiPlex Buyers Guide

- Reference
- Recommendation

SELECT & PRICE

* Source: Stanford Resources: Monitrak Q2 1998, Based on Q2 shipments to U.S. market (www.stanfordresources.com).

▷ **Performance Series Dell Branded Monitors**
▷ **Mainstream Series Dell Branded Monitors**
▷ **Speciality Monitors**

Performance Series:

Dell branded Trinitron® and flat panel displays for high quality graphics; excellent for multi-tasking, large data set analysis, and advanced graphics applications

UltraScan 1600HS

- 21" Trinitron®
- 19.8" Viewable Image Size
- .26mm~.28mm aperture grille pitch
- Displays over 65% more information than our 17" (16.0"VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity

SPECS

Dell 1500FP

- 15.0" Active matrix (TFT)
- 15.0" Viewable Image Size
- .297mm pixel pitch
- Require 60% less space than comparable CRT; consume less power

SPECS

500554

UltraScan 1000HS

- 17" Trinitron®
- 16.0" Viewable Image Size
- .25mm aperture grille pitch
- Displays over 60% more information than our 15" (13.8" VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity
- Shorter depth 17"- Only 1" deeper than 15" (13.8" VIS) 800F model

SPECS

UltraScan P990

- 19" Trinitron®
- 18.0" Viewable Image Size
- .25mm~.27mm aperture grille pitch
- Displays over 65% more information than our 17" (16.0" VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity

SPECS

Mainstream Series:

Dell branded monitors for general business applications and multi tasking, for users with lower graphics requirements.

Dell 1200HS

- 19" High Contrast Flat Square Tube
- 17.9" Viewable Image Size
- .28mm dot pitch
- Supports up to 1600x1200 for ultra-high resolution operation
- Displays over 65% more information than our 17"(15.9" VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity

SPECS

Dell M1110

- 21" Flat Square Tube
- 20.0" Viewable Image Size
- .28mm dot pitch
- Supports up to 1600x1200 for ultra-high resolution operation
- Displays over 65% more information than our 17"(15.9" VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity

SPECS

Dell 800F

- 15" Flat Square Tube
- 13.8" Viewable Image

Dell M770

- 17" Flat Square Tube
- 16.0" Viewable Image

500555

Size

- .28mm dot pitch
- Cost effective solution for entry level system requirements

SPECS

Size

- .27mm dot pitch
- Displays over 60% more information than our 15" (13.8" VIS) display when using optimal resolution, allowing you to have more and larger windows open, allowing for increased productivity

SPECS

Speciality Monitors

800M
Multimedia

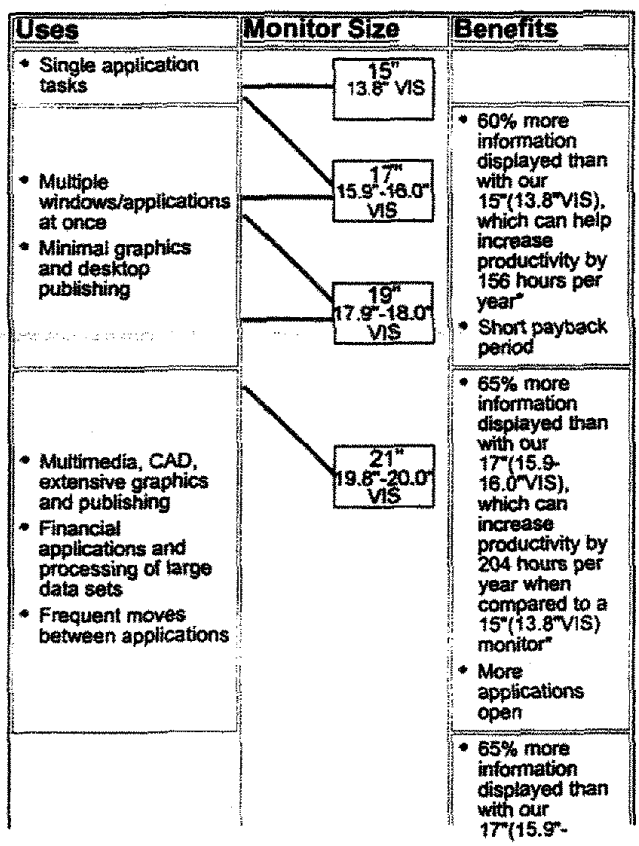
- 15" Flat Square Tube
- 13.8" Viewable Image

Size

- .28mm dot pitch
- Integrated Stereo Speakers & microphone, volume control & headphone jack

SPECS

Display size recommendations
Because a display can impact the system's overall usability and a user's productivity, Dell recommends purchasing the largest display a buyer can afford.



500556

		17"(15.9"-16.0"VIS), which can help increase productivity by 204 hours per year when compared to a 15"(13.8"VIS) monitor* • Supports 1600x1200 for ultra high resolution operation • More applications open

* Source: *PC Computing, May 1998*

Why buy Dell Trinitron® displays?

- Increased contrast due to darker glass
- High-phosphor surface for brighter images
- Aperture grill less heat sensitive for greater color purity
- Cylindrical shape versus spherical shape lessens reflections

Why buy flat panel displays?

- Less bulk, depth, and weight; require up to 60% less space than comparable CRT
- Clear, sharp image even at maximum brightness; no flicker
- Lower power consumption; very little heat generation
- Image distortion is eliminated; reduced glare and reflection = reduced eye strain
- Not subject to distortion in areas of high electromagnetic interference; no emissions

HOMEPAGE | WORLDWIDE SITES | PRODUCTS | STORE | SUPPORT | SITE MAP | SEARCH | CONTACT

Source: Stanford Resources: Monitrak Q2 1998, based on Q2 shipments to U.S. market(www.stanford.resources.com)
*Prices are subject to change without notice. Visit the Dell online store or call 1-800-WWW-Dell for the latest pricing
Dell, UltraScan and OptiPlex are registered trademarks of Dell Computer Corporation.
TRINITRON is a registered trademark of Soney Corporation.
Dell disclaims any proprietary interest in the marks and names of others.

±For a copy of Dell's Limited Warranties and Guarantees, write to Dell USA L.P. One Dell Way, RR1, Box 12, Round Rock, TX. 78628. Specifications valid in the U.S. only and subject to change without notice.

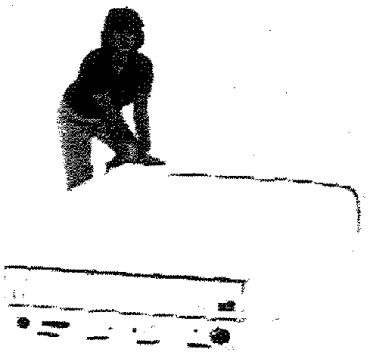
500557

HEWLETT PACKARD
Expanding Possibilities

HP CD-Writer Plus 7500e Series — Flexible, Portable, and Easy to Install!

Easy to Use, Easy to Install

Congratulations on your decision to purchase an HP CD-Writer Plus. Take this page with you when you shop for your HP CD-Writer Plus 7500e series drive.



HP CD-Writer 7500e
HP CD-Writer 7510e

Fun and Flexible!

Back up projects on home and office PCs, transport files to various work locations, and more:

- Take it with you! Plugs into any PC parallel port, anywhere — including laptop computers.
- Save large presentations, reports, and CAD files to CD, then reclaim precious hard drive space.
- Back up your hard drive, e-mail messages, or critical projects for added security.
- Great for home and school projects! Back up your home PC, create and save large multimedia projects, and record your own music to share with friends and family.

Speeds

2x Write, 2x Rewrite, 24x Read

Minimum System Requirements

IBM or compatible with Pentium processor (133 MHz or above), 32 MB RAM, 15-110 MB free hard drive space for installing software, 10 MB free space for each minute of recorded music; Microsoft Windows 95 and 98 or Windows NT 4.0 with SP3. (Note: Windows NT server not supported.) Sound card required for 7510e for certain applications.

HP CD-Writer Plus — The Storage Technology of Choice

- Save 650 megabytes of data on a single CD
- Write and rewrite large files
- Create your own CDs
- Easy as using a floppy disk
- Share files with anyone, anywhere when saving on CD-R media
- It's from HP, the leader in storage technology

CD Media is Affordable, Portable, and Durable

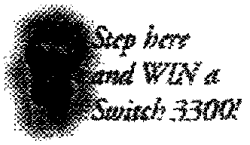
Approximate Cost of various Media	Approximate Cost per 650 Megabytes
650-megabyte CD-R disc $1.00 each	$1.00
650-megabyte CD-RW disc $6.00 each	$6.00
1.44-megabyte floppy diskette $.50 each	$225.00
100-megabyte removable cartridge $15.00 each	$97.00
2-gigabyte removable cartridge $125.00 each	$40.00

Visit the web site!

Visit the HP CD-Writer site at www.hpcdwriter.com. Be sure to sign up for the CD-Writer newsletter on the web site! Learn tips and techniques and read about the latest technology.

500558

SuperStack II Switches for All Your Technology Needs



Today, your desktop population probably requires a mix of 10 Mbps and 100 Mbps service to meet the individual demands of your users. As you deliver higher speeds to the desktop, server connections may become strained, so you need options to scale to Fast Ethernet, Gigabit Ethernet, or ATM for high-speed desktop and server connections as well as in the backbone. With the SuperStack II family of switches, you can support all of your bandwidth requirements with the appropriate technology and the appropriate level of control.

Ethernet
Today, Ethernet is the most popular topology for implementing local area networks. Ethernet provides bandwidth that can be either shared across a number of users using hubs, or dedicated to workstations using switched technology. The availability of low-cost Ethernet switches has also made it possible to deliver dedicated 10 Mbps full-duplex links to the desktop, for affordable high-performance, high functionality, and highly manageable networks.

Fast Ethernet
Fast Ethernet, based on the Ethernet standard, is a high-speed technology that runs over your existing infrastructure, works with your existing management systems, and requires no retraining by your IT staff. Fast Ethernet is one of the most popular high-speed technologies because it's cost effective, stable, and compatible with existing Ethernet LAN environments. Fast Ethernet runs over 100BASE-FX fiber and 100BASE-TX copper. For greater performance, full-duplex is also supported.

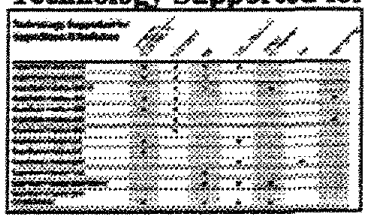
10/100 Mbps Ethernet/Fast Ethernet
10/100 Ethernet/Fast Ethernet with auto-sensing capability is one of the most economical and flexible ways to add bandwidth immediately—while maintaining migration options to higher bandwidth in the future. 10/100 technology combines conventional 10BASE-T and high-speed 100BASE-TX support in one device, delivering higher bandwidth to the desktop, aggregating 10/100 hubs, and maintaining the status quo for those who are efficiently served by 10 Mbps Ethernet. With 10/100 autosensing functionality, there is no need to configure individual switched ports. The switch automatically senses the speed of the connected end device (either 10 Mbps or 100 Mbps) and channels the data through at the appropriate speed.

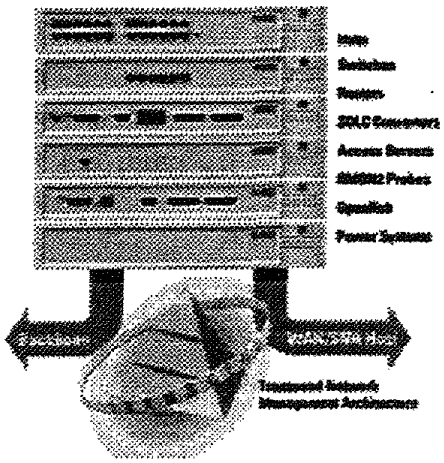
Gigabit Ethernet
Gigabit Ethernet retains the traditional simplicity and manageability of Ethernet and Fast Ethernet making it easy to integrate with existing LAN equipment. It allows a tenfold increase in backbone bandwidth over Fast Ethernet with minimal impact on support staff. The extra bandwidth helps you deal with unplanned changes and additions to the network, and frees you from constantly tuning the network. Gigabit Ethernet is a powerful backbone/server solution because it delivers phenomenal bandwidth cost effectively, preserves the Ethernet frame format, and works with your existing traffic management systems.

ATM
ATM is an established LAN backbone technology that offers significant benefits to larger organizations by providing tight integration between LAN and WAN environments and offering high levels of resilience and redundancy. In the LAN environment, OC-3c (155 Mbps) and OC-12c (622 Mbps) connections are used to communicate across the network. While these connections do not provide the raw bandwidth of Gigabit Ethernet, ATM provides alternative methods for delivering effective backbone solutions, such as Quality of Service (QoS), which guarantees bandwidth to applications. The control offered by ATM enables the deterministic delivery of applications and services in complex network environments.

Layer 3 Switching
Intranets and extranets, while proving indispensable for companies of all sizes, are also causing new traffic management problems. Hypertext links between servers and e-mails create any-to-any traffic that are overwhelming legacy LAN routers. As a result, companies are experiencing more bottlenecks between subnetworks. Layer 3 switching solves these intranet bottleneck problems by embedding classical routing in the switch hardware that routes traffic at high speeds while intelligently isolating faults, containing broadcast traffic, and providing seamless subnet/VLAN connections.

Technology Supported for SuperStack II Switches





SuperStack® II Systems
The 3Com SuperStack® II system gives you a flexible, cost-effective connectivity solution for local, wide area, and SNA networks. You can combine diverse technologies and network services in one stacked system, strengthen it with uninterruptible and redundant power systems, and manage it all with Transcend® network management and control solutions.

As an important part of the 3Com Transcend Networking framework, SuperStack II systems will meet your evolving network needs—future proofing your network investment.

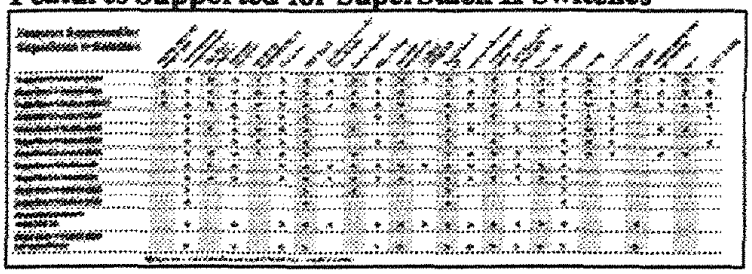
A single SuperStack II system provides connections for a range of network environments and protocols: Ethernet, Fast Ethernet, Layer 3 switching, Gigabit Ethernet, Token Ring, FDDI, ISDN, X.25, Frame Relay, and ATM. Depending on your needs, you can build SuperStack II systems for virtually any network environment. Capabilities include:

- Hubs for flexible workgroup connectivity that feature SNMP, RMON, and Web-based management
- Industry-leading physical layer support for Token Ring networks, including Token Ring switching
- Full SNMP, RMON, and Web-based management for Ethernet, Fast Ethernet, Gigabit Ethernet switches, as well as a dedicated RMON-1/RMON-2 probe
- Full range of switches to increase performance in high-speed client/server LANs
- Full, multiprotocol network access for telecommuters or users at other off-site

- Full, multiprotocol network access for telecommuters or users at other off-site locations
- Routing between central site and branch offices using innovative Boundary Routing® architecture or conventional routing software for multiple WAN choices, including ISDN
- SNA-to-LAN conversion linking local and remote offices to an SNA host system
- Choice of power systems to ensure uninterrupted network operation

For smaller offices of fewer than 20 users, our OfficeConnect® products can be used to complement SuperStack II systems.

Features Supported for SuperStack II Switches



Features

Stackability

Four SuperStack II Switch 1100 or Switch 3300 units can be interconnected to form a stack that offers unrivaled performance and management features.

Each unit has a built-in connector at the rear of the unit called the matrix port. Two units can be connected back-to-back with a SuperStack II Switch matrix cable. To connect more than two units, a SuperStack II matrix module can be inserted into the high-speed module slot of one of the units in the stack, and a matrix cable can be used to connect to each switch in the stack.

Stacking provides the user with a plethora of benefits. These include the ability to manage in excess of 100 ports as a single logical entity. Configuration is therefore faster and simpler. Stacking also provides the user with the optional resilient IP addresses across the stack. Thus if a failure should occur, the resilient IP address can be used for management stacking using the SuperStack II Switch matrix module and cable, keeping front panel ports free and increasing the number of matrix ports in an aggregated system.

Management

Transcend network management

All SuperStack II switches are managed by 3Com's Transcend network management and control solutions. Transcend solutions give you end-to-end visibility and control over all devices in your network with two levels of management: 1) technologies, such as embedded SmartAgent® software and RMON, within 3Com devices throughout the network, and 2) centralized highly automated applications at the network center for monitoring, configuring, and troubleshooting all devices in the network.

Web-based management

Manage your switches with any Web browser, either through direct or dial-up connection or across the LAN. This delivers ease of use and accessibility to network management personnel and reduces in-service costs, but still with full security.

Security—Disconnect Unauthorized Device (DUD)

LAN security architecture with DUD automatically disconnects unauthorized devices from the LAN.

Roving Analysis Port (RAP)
RAP allows a network analyzer attached to any unit in a stack to monitor any of the switch ports or virtual LANs (VLANs) in the stack. It also minimizes the time required for problem determination and resolution and maximizes switch uptime, thereby lowering your cost of ownership.

RMON support
Transcend software's powerful combination of RMON (Remote Monitoring, a superset of SNMP MIB II) and embedded SmartAgent software reduces the processing burden on your management station, minimizes network traffic, and saves time by automatically monitoring and analyzing your network. RMON tells you at a glance how the network is performing and who is using it the most. And Transcend software gives you the added benefit of RMON features in your network without the processing and memory costs usually associated with RMON. See the At-a-Glance RMON Support table for details on RMON groups supported by SuperStack II switches.

Class of Service (CoS)
CoS can be defined simply as a method for prioritizing various traffic types. 3Com switches can support two methods of enabling CoS on Ethernet networks. The first method is IEEE 802.1D (incorporating 802.1p), which enables eight levels of prioritization; and the second method is 3Com's innovative PACE® technology, which allows the user to specify certain applications as high priority. A hardware feature, dual queues, is used to exploit these traffic prioritization schemes; the dual queues function—required for CoS—will automatically enable a second port buffer for high-priority traffic thereby allowing the traffic to bypass lower priority data for faster processing within the switch.

Traffic Management
Flow Control
Flow control is an essential switch feature that eliminates dropped packets on congested ports. To provide switch application flexibility, 3Com switches support flow control schemes suited to both full- and half-duplex environments. **Intelligent Flow Management** (IFM) is a solution designed to work in half duplex, for example, a hub aggregation application. A solution using **IEEE 802.3x** is also supported and designed for full-duplex connections, such as desktop switching; this method of flow control is set automatically using the auto-sensing features of SuperStack II switches.

Broadcast traffic control
Traditional Ethernet switches suffer from the threat of broadcast storms that can potentially bring networks to a halt. However, all SuperStack II switches can be configured with broadcast storm protection to limit the number of broadcast packets allowed to be forwarded by each port. This allows the SuperStack II switches to offer the security of broadcast storm protection normally associated with a router while also providing the protocol independence of a switch.

Network Availability
Backup power supplies
3Com gives you all the choices you need to ensure constant power to your stackable switches. Both the ARPS and the UPS work with any SuperStack II switch. The ARPS is ideally suited as a backup for individual power supplies in the SuperStack II units. The UPS fully protects your SuperStack II system from the effects of brownouts or spikes that occur in outside power lines.

Resilient links
3Com's simple and flexible resilient links technology ensures fault tolerance via redundant connections to other network devices.

Spanning tree
Support for the industry-standard IEEE 802.1D (incorporating 802.1p) spanning tree protocol is provided as an alternative to resilient links. This protects against network loops and can be used to provide redundant network paths.

Port trunking
Port trunking establishes backbone links by treating multiple parallel links as a single network pipe. Trunking also provides link redundancy; traffic on any failed link comprising a network trunk automatically switches over to the other links in the trunk.

VLANs
VLANs allow PCs, workstations, and other resources, including printers and file servers, to be organized into logical, broadcast domains so that only devices within the same domain can communicate with each other. 3Com switches allow users to implement VLANs on their network using one of two schemes: IEEE 802.1Q, including GVRP, which enables the auto-learning of VLANs, or 3Com's VLT. Both methods allow for the configuration of VLANs based on ports and/or MAC addresses for maximum flexibility and security. For 802.1Q VLANs, a port on a switch can be assigned to a VLAN; all other switches learn about that VLAN when the switches automatically communicate that knowledge via the GVRP protocol.

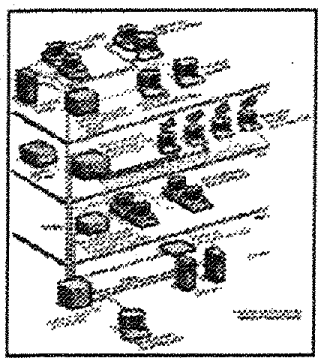
Switches supporting both VLAN schemes can be used to provide seamless migration from VLT to IEEE 802.1Q environments that preserve investment in current LAN developments and equipment.

Layer 3 Support
Multicast filtering using IGMP snooping
Multicast filtering enables the automatic configuration of filters for IP multicast traffic, such as video and audio broadcasts, allowing advanced multimedia applications to be delivered easily to the workgroup.

Fast IP
Fast IP is 3Com's standards-based cut-through routing solution for all types of legacy routing network backbones. This reduces traffic flow through router bottlenecks and maximizes performance by utilizing the switched infrastructure.

Layer 3 Switching
Layer 3 switching is the implementation of routing protocols in leading-edge ASIC technology. Routing performance is dramatically and cost effectively boosted to enable the widespread deployment of intranets (IP-based networking).

Product Configurations (Diagrams)



Fast Ethernet LAN and WAN connectivity
A medium-sized corporation supporting a mixture of switched and shared workgroups has a central Fast Ethernet backbone.

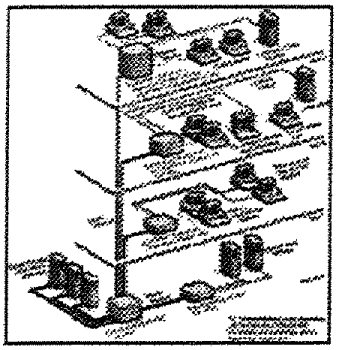
In the basement, a stack of SuperStack II Switch 3300s provides Fast Ethernet 10/100 Mbps links to the floors and 10/100 connections for local servers, and it also provides the ability to scale to Gigabit Ethernet when needed. The entire network is managed at the Transcend network management console or via Web-based management at any browser. Intranet traffic is managed simply and cost effectively when a SuperStack II Switch Layer 3 module is plugged into a

SuperStack II Switch 3300.

On the first floor, a stack of SuperStack II Switch 1100s connects to a 10 Mbps PS Hub 40 and provides each segment with 10 Mbps bandwidth.

On the second floor, the SuperStack II Dual Speed Hub 500 with a mixture of 100 Mbps and 10 Mbps users is connected to a switched 100 Mbps backbone via the data center SuperStack II Switch 3300 stack.

On the third floor, a SuperStack II Switch 1100 and 3300 stack provides dedicated switched 10 Mbps and 10/100 Mbps to power users for transferring large files and multimedia traffic.



Gigabit Ethernet LAN and WAN connectivity
An organization supporting a mixture of 10/100 Mbps switched and shared desktop connections has migrated to a Gigabit Ethernet backbone.

3Com has taken an early lead in the Gigabit Ethernet market by providing the ability to utilize this new high-speed technology while protecting your existing network infrastructure investment.

In this configuration, the SuperStack II system in the basement comprises a Switch 9300, a Switch 3900, and an Advanced Redundant Power System for added resilience. The Switch 9300 provides the Gigabit Ethernet switching backbone and links to Gigabit Ethernet servers while the Switch 3900 provides unconstrained access to a large Fast Ethernet server farm. This configuration provides the fastest backbone solution and fastest server access for all floors.

On the first floor, the Switch 3900 provides line-rate services to power users directly connected to switched Fast Ethernet ports. The network is managed at the Transcend network management console.

On the second floor, the Switch 3300 and Switch 1100 provide network connectivity to switched 10 Mbps and 100 Mbps users, and the use of an optional SuperStack II Switch 1000BASE-SX module provides Gigabit Ethernet support.

On the third floor, the Switch 3300 provides line-rate services to power users on switched Fast Ethernet as well as switched 10 Mbps services to less demanding users, and connects shared 10 Mbps and 10/100 hubs to the Gigabit Ethernet backbone.

If you're looking for advanced switching solutions with the unsurpassed combination of price

and performance for supporting 10 Mbps and 10/100 Mbps traffic, the new SuperStack II Switch 1100 and SuperStack II Switch 3300 are the right solutions for you.

The SuperStack II Switch 1100 and SuperStack II Switch 3300 represent the latest generation of 3Com stackable switching technology. Now you can scale performance seamlessly with interswitch communication that enables a stack of SuperStack II Switch 1100 switches or SuperStack II Switch 3300 switches (or a mix of both in the same stack) to perform and be managed as a single entity. Multiple switches can even share a single IP address.*

The advanced stackability of the new SuperStack II Switch 1100 and SuperStack II Switch 3300 eliminates the need to communicate through network ports.

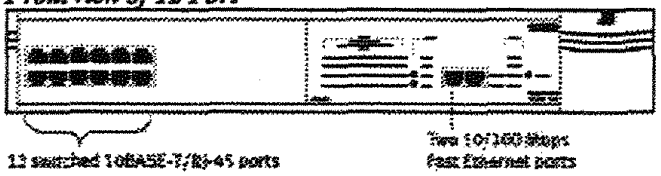
Each switch has a built-in connector at the rear of the unit called the matrix port. Two units can be connected back-to-back with a SuperStack II Switch matrix cable (3C16965). To connect more than two units, a SuperStack II Switch matrix module (3C16960) can be inserted into the high-speed module slot of one of the units in the stack, and a SuperStack II Switch matrix cable can be used to connect to each switch in the stack. This enables you to scale up to one larger virtual switch of up to 110 switched ports. Interswitch links are created through the high-performance SuperStack II switch module that connects the switches to deliver 4 x 1 Gbps links between switches; this ensures high-speed communication with no bottlenecks between switches. Plus, it does not consume valuable Fast Ethernet or Gigabit Ethernet ports.

The new SuperStack II Switch 1100 and SuperStack II Switch 3300 provide support for a range of backbone connections options, including Fast Ethernet, Fast Ethernet over fiber, Gigabit Ethernet, Layer 3 switching, and ATM via an optional high-speed module.

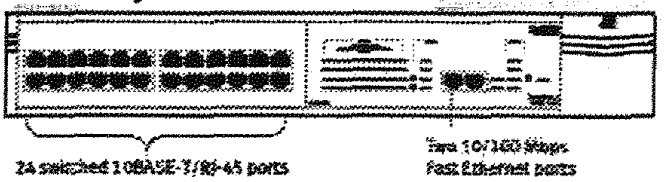
**Multiple IP addresses can be supported to provide resilient stack management.*

SuperStack II Switch 1100

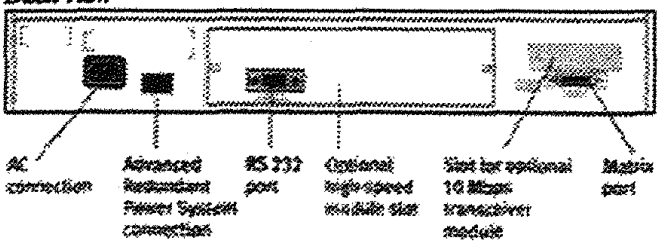
Front view of 12 Port



Front view of 24 Port

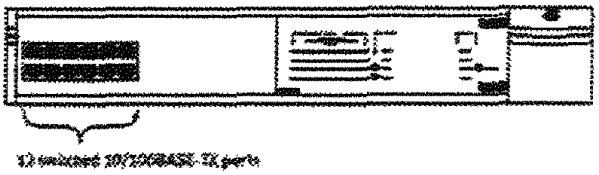


Back view

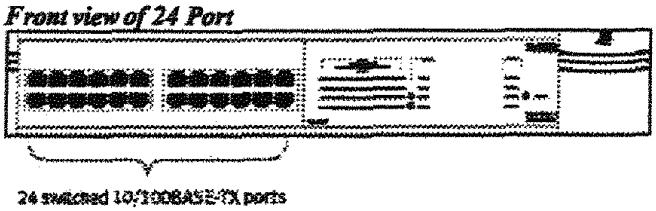


SuperStack II Switch 3300

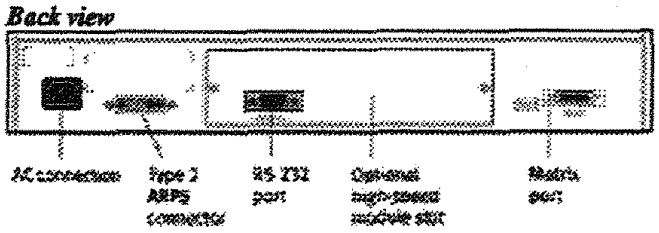
Front view of 12 Port

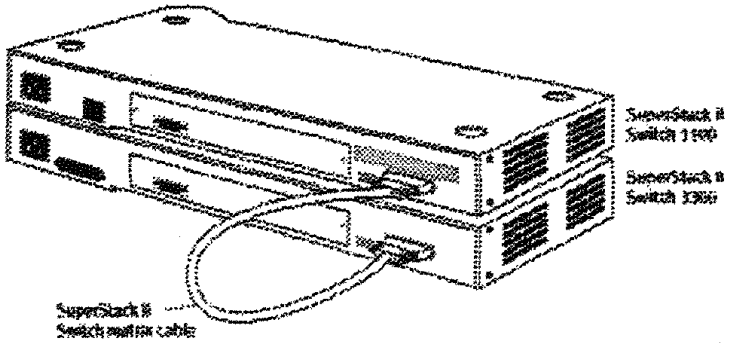


Front view of 24 Port



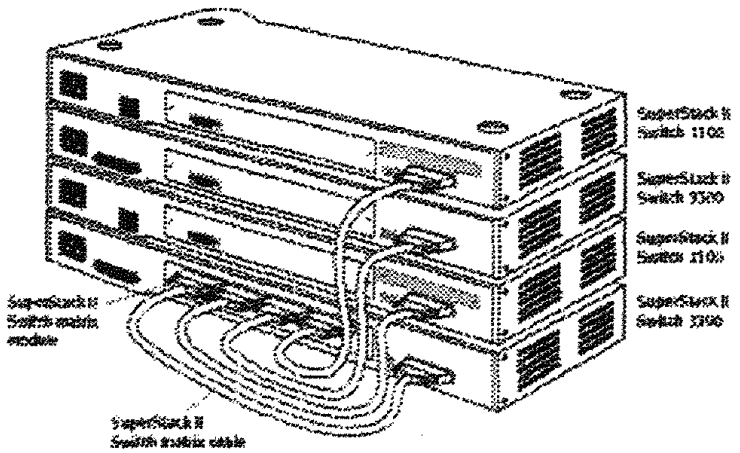
Back view





The SuperStack II Switch 1100 and Switch 3300 can be stacked up to two units high with just the SuperStack II Switch matrix cable.

- *With a low-cost cable, users can double the port density with a 1 Gbps link between switches.*
- *Mix and match SuperStack II Switch 1100 and Switch 3300 to meet customer needs.*
- *Stack up to two units high—supporting up to 56 switched ports.*



The SuperStack II Switch 1100 and Switch 3300 can be stacked up to four units high by using

500566

the SuperStack II Switch matrix module and SuperStack II Switch matrix cables.

- *Mix and match Switch 1100 and Switch 3300 within the stack to meet customer needs.*
- *Stack up to four units high—supporting up to 110 switched ports.*
- *SuperStack II Switch matrix module supports 4 x 1 Gbps links between switches to create high-density switches without wasting Fast Ethernet or Gigabit Ethernet ports.*

About the Switches

The SuperStack II Switch 1100 is perfect for desktop connectivity, and its ability to scale to larger configurations makes it equally suited for handling hub aggregation. A single device can support up to 6,000 MAC addresses. Likewise, the SuperStack II Switch 3300 is suitable for handling desktop, hub, and switch aggregation in large networks. A single device can support up to 12,000 MAC addresses.

The SuperStack II Switch 1100 is available in 12- and 24-port versions and features two built-in auto-sensing 10/100 Fast Ethernet ports; the SuperStack II Switch 3300 is available in 12- and 24-port versions. All models have matrix port on the rear of the unit that enables high-speed connection to other SuperStack II Switch 1100 and Switch 3300 units. This eliminates the bottlenecks caused by interconnecting switches with Fast Ethernet ports. What's more, the stacked switches can be managed as a single entity and share a single IP address.

As with other SuperStack II switches, the new SuperStack II Switch 1100 and Switch 3300 feature autosensing 10/100 ports that adjust for 10BASE-T and 100BASE-TX attached devices. Both switches automatically provide full-duplex/half-duplex capability on all ports to boost bandwidth for servers and power users. Plus, they both help you implement advanced policy-based management across the network with features such as support for Fast IP, RMON, IGMP snooping, IEEE 802.1D (incorporating 802.1p prioritization), and IEEE 802.1Q standards-based and VLT VLANs.

Key new features in the SuperStack II Switch 1100 and Switch 3300 include the following:

- Matrix port for high-speed connections between switches
- Ability to mix and match switches in a single stack
- Management of a switch stack as an entity; single IP address per stack
- Layer 3 capabilities, including Fast IP and IGMP snooping
- Web browser interface to locate management and configuration functions
- Full support for resilient links and spanning tree
- Optional SuperStack II redundant power supplies
- Dual queues to facilitate traffic prioritization
- Multicast filtering using IGMP snooping/GMRP
- Elastic port buffering enables on-the-fly allocation of memory for port buffers for automatic performance optimization based on network traffic
- Flow control improves performance and minimizes packet loss under heavy network loading
- VLT VLAN tagging protects investment infrastructure
- 802.1Q standard-based VLANs with GVRP support to facilitate dynamic VLAN membership

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SuperStack II Switch 1100 and SuperStack II Switch 3300 Optional High-Speed Accessories

500567

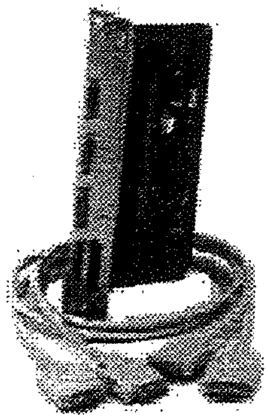
SuperStack II Switch Matrix Module and Matrix Cable

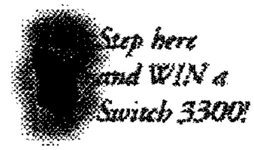
The SuperStack II Switch matrix module and matrix cable let you mix and match SuperStack II Switch 1100s and 3300s to improve throughput, share downlinks, and ease management. Use the matrix cable to connect two Switch 1100s or Switch 3300s and the matrix module to connect

up to four switches* while conserving Fast Ethernet ports. The matrix module's 4 x 1 Gbps backplane provides a 1 Gbps link between switches. Ultralow latency (maximum 300 ns) and hardware flow control ensure top performance at low cost. The entire stack can be managed as a single entity.

- Any switch port can be configured to support roving analysis across the stack for greater visibility into traffic flows and RMON data; the module supports IEEE 802.1D and 802.1Q standards for VLANs and Ethernet Class of Service (CoS).

**Each unit in a stack requires a matrix cable, including the unit that holds the matrix module.*





SuperStack II Switch matrix module and SuperStack II Switch matrix cable

SuperStack II Switch 100BASE-FX Modules
The SuperStack II Switch 100BASE-FX module adds a fiber Fast Ethernet backbone link to your switched workgroup The easy-to-install dual module is an excellent choice for resilient connections in mission-critical networks or when multiple fiber backbone connections are needed to and from the stack. A single high-speed backbone link can be shared by multiple units in a stack.

- Full-duplex Fast Ethernet provides 200 Mbps throughput and 2 kilometers distance on fiber.

SuperStack II Switch 1000BASE-SX Module
The SuperStack II Switch 1000BASE-SX module supports high-performance, fault-tolerant interworkgroup and workgroup-to-backbone connection. The easy-to-install module provides a full-duplex 1000BASE-SX multimode fiber interface to another Fast Ethernet or Gigabit Ethernet switch over distances up to 275 meters.

- Full-duplex Gigabit Ethernet provides up to 2 Gbps throughput, eliminating network bottlenecks.
- The module supports both 802.1D spanning tree and resilient links.

SuperStack II Switch Layer 3 Module
The SuperStack II Switch Layer 3 module lets you cost effectively add routing capabilities to your switched 10/100/1000 Mbps workgroups to boost intranet performance and off-load legacy routers of LAN traffic. SuperStack II Switch 1100, 3300, and 3300 FX switches with the easy-to-install Layer 3 module seamlessly route IP traffic between subnets in addition to switching IPX, AppleTalk, and other legacy protocols. One SuperStack II Layer 3 module can manage routing for the entire stack.

- Extensive standards-based routing protocol support (including RIP and OSPF) enables the switches to operate in any networking environment.
- Distance Vector Multicast Routing Protocol (DVMRP) optimizes multimedia traffic delivery.

500568

Optional High-Speed Modules for Your Existing SuperStack II Switches

SuperStack II Desktop Switch, SuperStack II Switch 1000, and SuperStack II Switch 3000 Family

SuperStack II Switch Gigabit Ethernet SX Module

These modules provide a cost-effective seamless migration to higher speed networking. By adding the SuperStack II Switch Gigabit Ethernet SX module to your existing SuperStack II Switch 3000, Switch 1000, or Desktop Switch, you can integrate existing SuperStack II switches with high-speed backbones. Supporting high-bandwidth, high-performance interworkgroup, and workgroup-to-backbone Gigabit Ethernet connectivity, you can interconnect multiple switches without creating traffic bottlenecks. Plus, you get 2 Gbps (full-duplex) bandwidth—10 times the bandwidth of Fast Ethernet—without changing your existing switching platforms. The SuperStack II Switch Gigabit Ethernet SX module complements the 3Com SuperStack II Switch 9000 so you can implement an end-to-end Gigabit Ethernet network solution—from the desktop to the backbone.

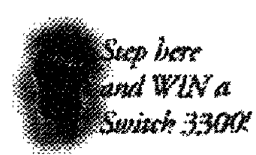
SuperStack II Switch ATM OC-3c Module

The ATM OC-3c module provides support for the ATM Forum standards for LAN Emulation (LANE 1.0) allowing existing Fast Ethernet and Ethernet LAN users to communicate transparently over a high-speed ATM backbone. Full-duplex operation gives wire speeds of 310 Mbps, virtually eliminating network bottlenecks. Low latency of 68 microseconds from Ethernet to ATM provides increased network performance. The ATM OC-3c module absorbs traffic peaks to prevent packet loss due to the deep 40,000 cells (2 MB) buffer.

Support for the ATM Forum LANE standard allows existing LAN users to communicate over the high-speed ATM network and provides investment protection for existing Ethernet NICs, hubs, switches, and routers.

SuperStack II Switch 3300 FX

Expanding the award-winning SuperStack II 1100/3300 switch platform, the SuperStack II Switch 3300 FX meets the needs of government and financial institutions that require the security and redundancy of fiber cabling support. The switch features eight multimode fiber switched Fast Ethernet ports and two autosensing 10/100BASE-TX Fast Ethernet ports. A truly stackable solution, up to four SuperStack II Switch 3300 FX units or a mixture of SuperStack II Switch 3300 FX and SuperStack Switch 1100 or 3300 units can be stacked together using the SuperStack II matrix module and matrix cable to create a single, manageable, high-density fiber aggregation or desktop solution. Managing the entire stack as one system alleviates network management complexity and reduces overhead administrative costs. Built-in fault tolerant features for mission-critical environments include resilient links, spanning tree support, and the SuperStack II advanced redundant and uninterruptible power systems; while support for up to 12,000 MAC addresses makes this an ideal switch for large, demanding LAN environments. 50569

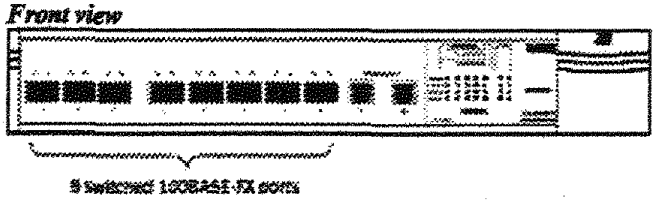


- Matrix module delivers 4 x 1 Gbps bandwidth within the switch stack, eliminating traffic bottlenecks; the entire stack can be managed as a single entity, and downlink resources can be easily shared
- Support for IEEE 802.1Q standards-based VLANs and 802.1D (incorporating 802.1p prioritization) brings enhanced multimedia support and improved data throughput
- Fast IP and IGMP snooping provide Layer 3 capabilities, increasing performance of routed networks and improving delivery of multimedia applications
- Intelligent Flow Management (IFM) and 802.3x congestion control features help avoid

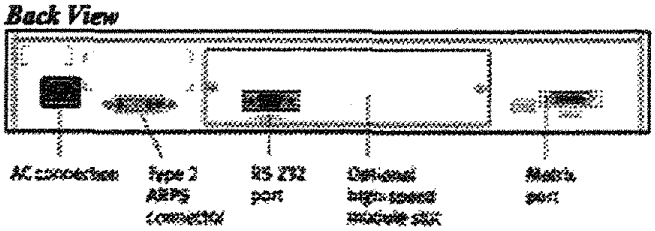
packet loss and performance under heavy load conditions
- Web-based management provides access to management and configuration functions from anywhere on the network simplifying management tasks and reducing in-service costs

SuperStack II Switch 3300 FX

Front view



Back View



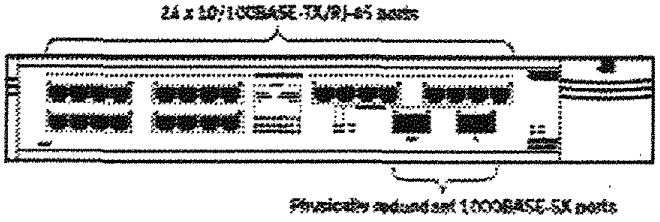
SuperStack II Switch 3800
10/100/1000 Mbps Ethernet Layer 3 Switching

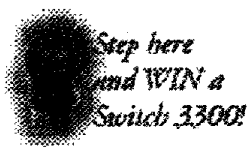
The SuperStack II Switch 3800 offers affordable leading-edge Layer 3 switching technology for 10 times the performance of intranets. Wire-speed Layer 3 switching (IP routing) and Layer 2 switching are embedded in ASICs to forward at nonblocking speed any-to-any intranet traffic while broadcast/multicast traffic and fault propagation are kept under control in appropriate subnetworks.

The SuperStack II Switch 3800 not only aggregates the traffic from Ethernet and Fast Ethernet workgroups to a server farm or a corporate backbone through an optional Gigabit Ethernet high-speed link, but it removes router bottlenecks that occur in corporate networks when high-speed any-to-any intranet traffic chokes software-based legacy routers.

SuperStack II Switch 3800

Front view

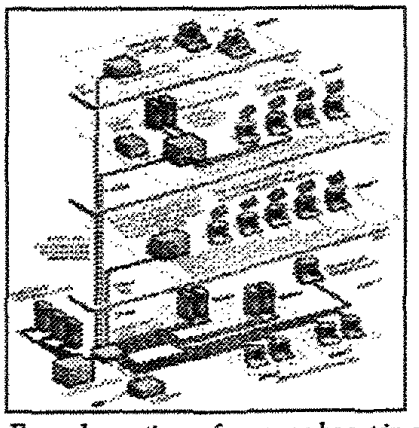




Key features include:

- 24 10/100 Mbps Ethernet/Fast Ethernet autosensing ports
- One Gigabit port (1000BASE-SX or 1000BASE-LX) enabled by an optional SuperStack II Switch 3800 GBIC (Gigabit Interface Connection). A second GBIC can be plugged in to provide additional physical resilience.
- Full line-rate nonblocking routing performance on all ports (over 5 million IP packets per

second and 8.7 Gbps throughput)
- Support for standards-based routing protocols: RIP/RIP v2
- Support for up to 12,000 MAC addresses for handling networks of virtually any size
- Elastic port buffering to enable on-the-fly allocation of memory for automatic performance optimization based on network traffic
- IEEE 802.3x flow control on all full-duplex ports to improve performance and minimize packet losses
- Full VLANs implementation:
  - Port and tagged VLANs (802.1Q)
  - Protocol-based VLANs to allocate bandwidth and enforce management policies among different protocols (e.g., IP, IPX, NetBIOS, DECnet)
- User-definable packet filters to control traffic flows
- Support for spanning tree per VLAN
- Class of Service embedded in ASIC—PACE technology, 802.1D (incorporating 802.1p)
- RMON support for four groups
- Simplicity and scalability of 10/100/1000 Ethernet in the industry-leading SuperStack II system architecture



For a dramatic performance boost in corporate routed networks, the SuperStack II Switch 3800 delivers wire-speed IP routing embedded in ASIC technology in addition to 10/100/1000 Mbps Layer 3 switching.

It offloads the routing of intranet traffic from slow legacy routers while keeping under control broadcast/multicast traffic and fault propagation in appropriate subnetworks.

SuperStack II Switch 3900 and SuperStack II Switch 9300 10/100 Mbps to 1000 Mbps Gigabit Ethernet Switching

The SuperStack II Switch 3900 and the SuperStack II Switch 9300 (Gigabit Ethernet switch) constitute an industry-leading solution for high-density 10/100 Ethernet to Gigabit Ethernet switching.

SuperStack II Switch 3900

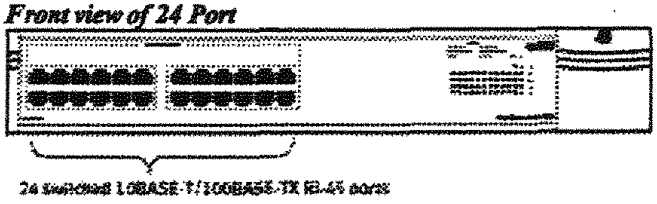
The SuperStack II Switch 3900 delivers full line-rate performance (over 9.8 million pps of switching performance) for up to 36 10/100 Mbps ports and from one to three 1000 Mbps ports. Multiple Gigabit Ethernet uplinks can be trunked together to deliver an uplink with 3 Gbps of bandwidth.

The SuperStack II Switch 3900 is available in two versions: a 24-and 36-port 10/100 Ethernet/Fast Ethernet switch. Both have one integral 1000BASE-SX port and two Gigabit Ethernet expansion slots. The rear-mounted expansion slots accept optional Gigabit Ethernet modules available for either 1000BASE-SX or 1000BASE-LX both via SC connectors. The

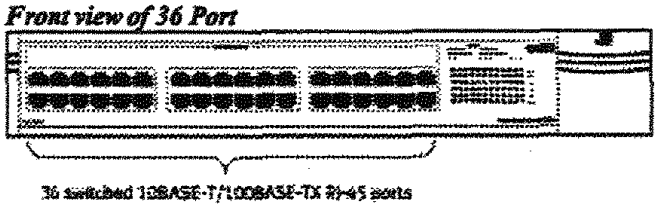
1000BASE-SX option supports multimode fiber links, while the 1000BASE-LX option supports single-mode fiber. The 1000BASE-LX option supports multimode fiber when used in conjunction with a conditioned launch cable.

SuperStack II Switch 3900

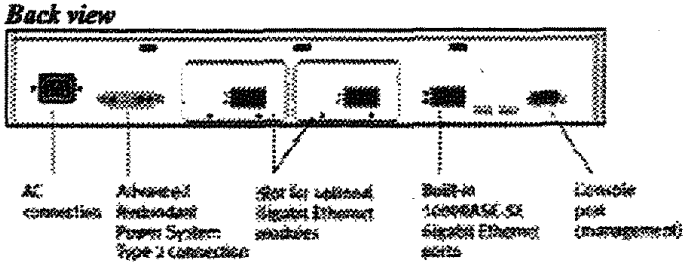
Front view of 24 Port



Front view of 36 Port



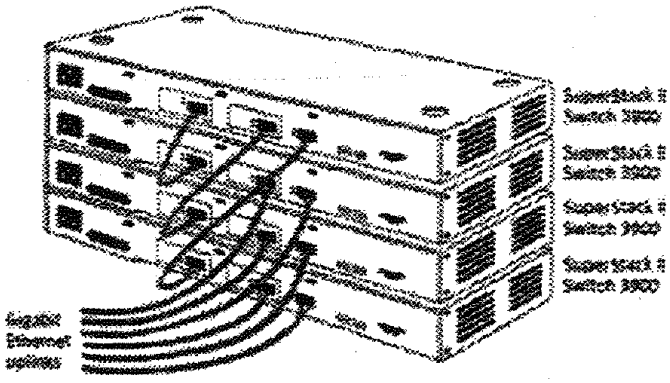
Back view



Key features in the SuperStack II Switch 3900 include the following:

- Supports up to 16,000 MAC addresses
- Multicast filtering using IGMP snooping*
- Multicast throttling limits broadcasts and multicasts on a per-port basis
- Support for IEEE 802.3x flow control on all full-duplex ports
- Roving Analysis Port (RAP) for copying data from any port to another port with a network analyzer attached
- RMON support for four groups
- Fully standards-based 802.1Q VLANs, including GVRP* support for automatic VLAN configuration distribution
- IEEE 802.1D (incorporating 802.1p)* Class of Service support and dual priority queuing
- Web browser interface for management and configuration functions
- Full line-rate nonblocking switching performance (6.6 Gbps throughput and over 9.8 million pps frame processing)
- Support for multiple Gigabit Ethernet uplinks
- Support for trunking (multiple parallel active links) on both Fast Ethernet and Gigabit Ethernet ports (up to six ports per trunk group and four trunks per unit)
- Resilient links
- Full-duplex support on all Gigabit and Fast Ethernet ports
- All Fast Ethernet ports support 10/100 and full-/half-duplex operation with autonegotiation (IEEE 802.3x)

**Free software upgrade available Q3CY99.*



Four SuperStack II Switch 3900s equipped with additional Gigabit Ethernet expansion modules can be grouped yielding a configuration of 144 10/100 Ethernet ports with six Gigabit Ethernet uplinks.

- *Interconnect four units with dedicated Gigabit Ethernet links.*
- *Two additional Gigabit Ethernet option slots per switch yield six additional Gigabit Ethernet ports for uplinks or additional bandwidth.*

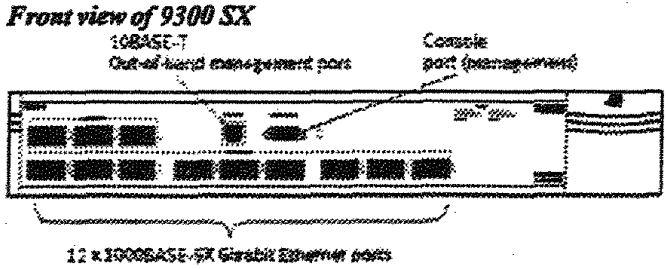
SuperStack II Switch 9300

The SuperStack II Switch 9300 enables practical, cost-effective, and high-performance deployment of Gigabit Ethernet as an effective interswitch, switch-to-server, and general purpose backbone technology. As the highest density Gigabit Ethernet (1000/1000 Mbps) switch available in a SuperStack II package, the SuperStack II Switch 9300 delivers full line-rate switching between its 12 Gigabit Ethernet ports to support 17.85 million pps forwarding rate and 12 Gbps full-duplex throughput. Multiple Gigabit Ethernet ports can be trunked together to deliver up to 6 Gbps interswitch link. Full line-rate Gigabit Ethernet switching is supported on all ports via 25.6 Gbps switching fabric.

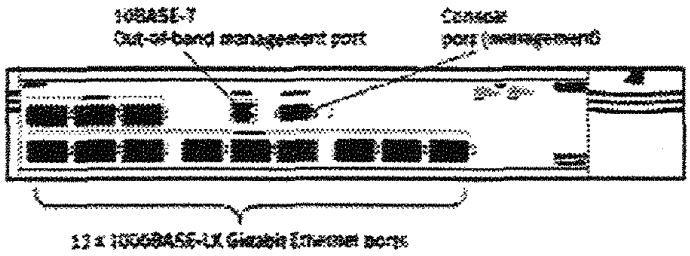
The SuperStack II Switch 9300 is available in three versions: a fixed 12-port fiber optic (12 x 1000BASE-SX) Gigabit Ethernet switch; a fixed 12-port fiber optic (10 x 1000BASE-SX and 2 x 1000BASE-LX) Gigabit Ethernet switch; and a fixed 12-port fiber optic (12 x 1000BASE-LX) Gigabit Ethernet switch. With the SuperStack II Switch 9300, you can interconnect high densities of Fast Ethernet switches that are attached to either dedicated desktops or shared segments and high-bandwidth network resources, such as servers.

SuperStack II Switch 9300

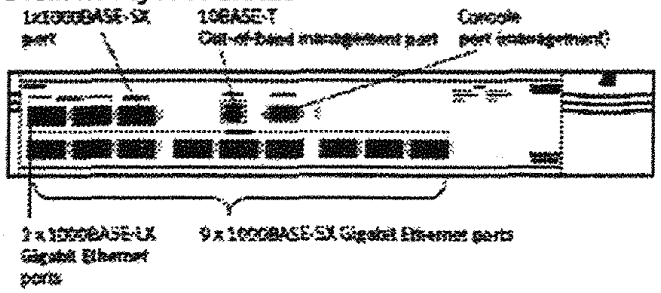
Front view of 9300 SX



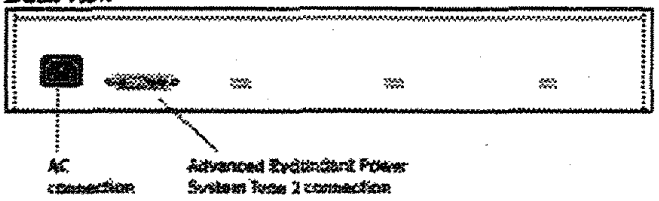
Front view of 9300 LX



Front view of 9300 SX/LX



Back view



Free! 'Try Before You Fly' Evaluation Promotion

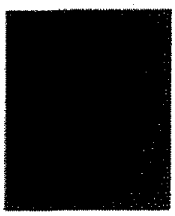
Key features in the SuperStack II Switch 9300 include the following:

- Supports up to 16,000 MAC addresses
- Multicast filtering using IGMP snooping*
- Multicast throttling limits broadcasts and multicasts on a per-port basis
- Support for IEEE 802.3x flow control on all full-duplex ports
- Roving Analysis Port (RAP) for copying data from any port to another port with a network analyzer attached
- RMON support for four groups
- Fully standards-based 802.1Q VLANs, including GVRP* support for automatic VLAN configuration distribution
- IEEE 802.1D (incorporating 802.1p)* Class of Service support and dual priority queuing
- Web browser interface for management and configuration functions
- Resilient links
- Full line-rate nonblocking switching performance (12 Gbps throughput and over 17.8 million pps frame processing)
- Support for trunking (multiple parallel active links) on Gigabit Ethernet ports (up to six ports per trunk group and four trunks per box)
- Full-duplex support on all Gigabit Ethernet ports

**Free software upgrade available Q3CY99.*

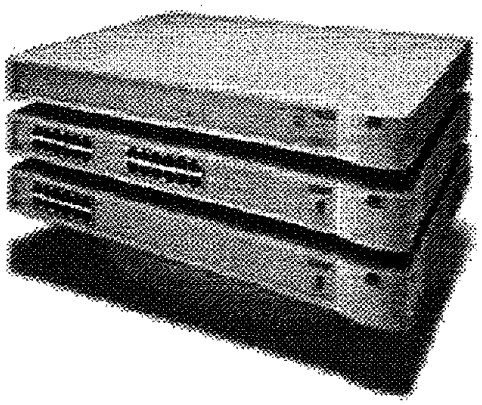
500574

Previous Page | Next Page



SuperStack® II Hub 100
Stackable Fast Ethernet Hub

A flexible, easy-to-configure 100BASE-T hub for economical, high-speed connections in departmental LANs



SuperStack II Hub 100 combines the economy and convenience of a stackable hub with 100 Mbps Fast Ethernet performance. You can use SuperStack II Hub 100 hubs along with other 3Com SuperStack or SuperStack II devices to provide a variety of connectivity options in departmental and remote site LANs.

SuperStack® II Hub 100 hubs combine the performance advantages of 100 Mbps Fast Ethernet technology with the manageability, flexibility, and economy of a stackable hub platform.

SuperStack II Hub 100 is stackable, allowing you to keep your initial Fast Ethernet investment low while enabling you to increase port density, enhance system reliability, and add SNMP management. Because they are part of 3Com's SuperStack system architecture, SuperStack II Hub 100 hubs can be integrated with a full range of other network devices, technologies, and services in one managed stack. All types of Fast Ethernet (TX, T4, FX) can be supported in one stackable system.

3Com offers a full line of Fast Ethernet network devices—hubs, switches, NICs, and routers—for building flexible, cost-effective high-speed networks.

Contents:

Key Benefits

Enhanced performance. Full 100 Mbps connectivitysignificantlyboosts network performance. Stackabilityprovides high port densityat low cost.

SNMP-based RMON management. The optional SuperStack II Hub 100 Management Unit delivers full SNMP managementusing Remote Monitoring (RMON) to reduce network traffic and enhance network analysis. 3Com's Transcend® application lets you administer hub ports and network interface cards (NICs) together as one system.

Flexible backbone connections. A 100BASE-TX transceiver module with an RJ-45 connector for Category 5 UTP wiring, or a 100BASE-FX transceiver module with a 62.5/125µ SC fiber connectorpermits a wider range of backbone/downlinkconnections.

Support for Class II. Hub 100 TX hubs support extended network distances, greater port densityper segment, and more flexible connectivityoptions for Fast Ethernet hubs.

SuperStack systems. 3Com's SuperStack systems let you combine hubs, switches, routers, and a redundant power system in one robust, easily managed stack.

500577

3153-BG3 ASCII ENH KBD-ENGLISH

back to hitlist

IBM Monitors

InfoWindow II 3153-BG3 ASCII ENH KBD-ENGLISH

The 3153 ASCII/Async Terminal is a low-cost data entry text-based transaction workstation used in RS/6000 with AIX or PC Server with SCO UNIX environments.

At a glance...

texttext Key characteristics: **InfoWindow II 3153-BG3 ASCII ENH KBD-ENGLISH**
BP STD7

- Feature Benefit information not available on this product

exttext BP STD

500578

Part number	Description
42H0772	**3153-BG3 ASCII ENH KBD-ENGLISH**
Product category:	**Monitors**
Product family:	**IBM Options**
Product series:	**Monitors**
Group:	**Terminals**
Sub-group:	**ASCII Async (RS/6000)**
Class:	
Model name:	**InfoWindow II 3153-BG3 ASCII ENH KBD-ENGLISH**
Worldwide part number:	**42H0772**
Type / Model:	**3153-BG3**
Standard pack quantity:	**1**
Announce status:	**Announced**
Announce date:	**03-25-98**
General availability date:	**01-01-98**
IBM announcement number:	
Announcement of withdrawal date:	
Withdrawal date:	
Withdrawal announcement number:	
Final returns date:	
Final returns request date:	
Returns announcement number:	
Alternative models:	--
Most recent change date:	**03-25-98**
Reason for change:	**Announcement**
Countries of origin:	--
Ship group:	**Video element** **Keyboard** **Power cord** **User's Guide**

texttext Limited Warranty period and type3: **Three year Customer Carry-in Exchange**

(as known at time of announcement)

500579

texttext Restrictions:	--
Supported software:	--
Hardware prerequisites	texttext
IBM systems:	--
Non-IBM systems:	--
Operating system requirements:	--
Adapters:	--
Mounting kit etc.:	--
Product Approvals	texttext
Product approvals/certifications4:	**CE MARK (Europe), CISPR-22 Class B, CSA C22.2 No. 950 (Canada), DHHS, EN 60950, Energy Star compliant, FCC Class A - Part 15, GS Mark (Germany), UL-1950 First Edition, VCCI, ZH 1/618 (Germany)**
Energy Star Compliant:	**Yes**
Support	texttext

Display case colour:	**Pearl white**
Terminal type:	**Green Monochrome (RS-232 main port)**
Tube type:	**CRT**
Nominal screen size:	**14inches (356mm)**
Viewable image size:	**11inches (279mm)**
Maximum viewable width:	--
Maximum viewable height:	--
Pixel pitch/type:	--
Anti-glare:	--
Anti-static:	--
Touch screen:	**No**
Tilt/swivel stand:	**Yes**
Screen surface treatment:	--
Multimedia features:	--
Multiscanning:	--
Number of factory presets:	
Number of user presets:	
Preset modes:	--
Microprocessor control:	--
Syncing:	--
Top flicker free VESA mode:	--
Maximum addressibility:	--
Onscreen programming:	--
Self-diagnostics:	--
Plug and play support:	--
Ergonomics:	EPA Energy Star compliant (US), ISO 9241 Part 3

500580

Ergonomics:	**EPA Energy Star compliant (US), ISO 9241 Part 3**
Emissions:	**MPR-II, SWEDAC**
Acoustics:	**Declared acoustical noise emissions LWAD = 4.5 Bels or less**
Apple/workstation compatible:	**--**
Vertical refresh rate (low; high) (Hz):	
Maximum Horizontal frequency (low; high) (kHz):	
Power management features4:	**EPA Energy Star compliant** **Num Lock indicator** **Screen saver**
Power consumption:	**41Watts**
Video inputs (connectors):	**--**
User display controls:	**--**

500581

Other Information
Product Information:
-Keyboard Layout: ASCII-style
-Keyboard Language: English
-F1-F12 keys are programmable to four levels and all other keys are programmable to two levels
-When configured for dual sessions, each session can have its own unique redefinition of keys.
-Total of 542 bytes is available per session
-Physical Keyboard Information: Weight- 0.9Kg, H 38mm x W 451mm x D 158mm

-ASCII/ANSI/PC Emulations: IBM 3151, WYSE 50/50+, WYSE 60, DEC VT320, DEC VT220, DEC VT100, TeleVideo 925, ADDS Viewpoint, SCO Console, AT386, PC Term
-Support display modes: 800x338/82Hz, 100Hz; 800x390/71Hz; 800x396/71Hz; 800x450/60Hz; 800x468/60Hz; 1188x338/82Hz, 100Hz; 1188x390/71Hz; 1188x396/71Hz; 1188x450/60Hz; 1188x468/60Hz
-Supports up to ten pages of memory
-Parallel port: supports Centronics parallel interface; unidirectional (output only); female 25-pin D-shell (DB25) connector
-Two serial communication ports for host system attachment (direct or via modem) or for serial printer attachment:
1. Main RS232: birdirectional communication up to 134.4Kbps; configured as DTE (Data Terminal Equipment); female 25-pin D-shell (DB25) connector
2. Auxiliary RS232: bidirectional communications up to 38.4Kbps; configured as DCE (Data Communications Equipment); female 25-pin D-shell (DB25) connector
-Can simultaneously receive data using the main and auxiliary serial communication ports that is attachedto the same host system or two different host systems.
-User can select between dual sessions:
1. Full screen: Allows the user to view one session at a time in a full screen format.
2. Split screen: Allows the user to view two sessions in a top-bottom format. The top and bottom sessions are separated by horizontal line.
-Desk Assessories: Clock, Calendar, Calculator (3153 does not support calculation import capability), ASCII Chart, Diagnostic Menu
-Can copy and paste between sessions
-7-bit ASCII Chart in cloumn format includes: Decimal, Octal, Hexadecimal, and Binary values
-Can view a single page of a single/multipage document prior to printing it when using WordPerfect for UNIX. Requires WYSE 60 emulation and 8-bit mode, Terminal Environment for WordPerfect,

and Display Setup within Word Perfect
-Can create a 30-character banner message at power-on
-Setup menu is the control panel to allow the user to configure the communications, display, printer, and keyboard operations. Setup menu can be printed on a local attached printer.
-Supports 7-bit character sets
-Tilt/Swivel stand characteristics: +15 degrees to -3 degrees of tilt; +/- degrees of swivel

Note**6**

text Weight:	**16.9lbs**
Height:	**13inches**
Width:	**12.5inches**
Depth:	**13.4inches**
Operating Temperature (C) (low; high):	**10; 40**
Relative Humidity (%) (low; high):	**30; 80**
Wet Bulb (C):	
Ship Information	text
Box 1	texttext
Weight:	**28lbs**
Height:	**21.3inches**
Width:	**16inches**
Depth:	**21.5inches**
Box 2	texttext
Weight:	--
Height:	--
Width:	--
Depth:	--
Special ship information:	

top

BOCH53

Date : 11 May 1999
Time : 16:57:20
Currency : DOLLARS
Hardware Price File : RS6PRC HWUS 04 MAY 1999
Software Price File : RS6PRC SWUS 04 MAY 1999

PCRS6000 Version : 05.08.03
Last Build : 04 May 1999

The IBM Portable Configurator (tm) is classified for proposal usage only. Commitments on prices and products should not be made without complete verification with the sales manuals. Prices are for your information only and are subject to change. Applicable taxes are not shown.

********** HARDWARE **********

Product	Description	Qty	Purchase	Maint
7026-H50	RS/6000 Enterprise Server Model H50	1	22000	229
	CD-ROM Drive	1	N/C	
	1.44 MB 3.5-inch Diskette Drive	1	N/C	
	Base SCSI 6-Pack	1	N/C	
	Integrated SCSI-2 Fast/Wide Adapter 1	1	N/C	
	Integrated SCSI-2 Fast/Wide Adapter 2	1	N/C	
	Integrated Ethernet Adapter	1	N/C	
	Base AC Power Supply	1	N/C	
2913	9.1 GB 1" Ultra SCSI Hot Swap Disk	3	5250	
2919	9.1 GB 1" Ultra SCSI Disk Drive Select	1	350	
2934	Async Terminal/Printer Cable (EIA-232)	1	45	
2968	10/100 Mbps Ethernet PCI Adapter	2	550	
4106	Select 256 MB (2x128MB) SDRAM DIMMs	1	1280	
4110	256 MB (2x128MB) SDRAM DIMMs	7	17920	
4320	2-Way 604e 332MHz Processor Card, 2x256KB L2 Cache	1	10000	120
4338	2-Way 604e 332MHz Processor Card, 2x256KB L2 Cache	1	3000	40
5005	Preinstall	1	N/C	
5520	Complete System Order	1	N/C	
6159	12GB/24GB 4mm Tape Drive	1	3200	
6207	Ultra SCSI Differential PCI-Bus Adapter	2	1300	
6225	Advanced SerialRAID Adapter (PCI)	2	6000	
6235	32 MB Fast-Write Cache Option	2	1150	

500583

	Card			
9300	Language - English (US)	1	N/C	
			=========	======
	7026-H50 Price		72045	
	Monthly Maintenance			389
3153-BG3	InfoWindow II ASCII Display Station (Green/RS232)	1	577	
9131	Keyboard - US English, PC Style	1	N/C	
			=========	
	3153-BG3 Price		577	
3575-L24	Tape Library Dataserver (240-Cartridge)	1	49500	250
1400	Plant Install Multi-Path with 2 Magstar "C" Drives	1	25800	320
5212	12m SCSI Cable	2	450	
8757	120 Magstar MP Data Cartridges, "C" Format	2	11520	
9200	Open System Device Drivers	1	N/C	
9600	RS/6000 Attachment	1	N/C	
9907	110/117/120 V, 50/60 Hz Power Cord	1	N/C	
			=========	======
	3575-L24 Price		87270	
	Monthly Maintenance			570
3995-C66	Optical Library Dataserver (4 Drives)	1	49000	395
7201	Differential	1	599	
7218	12m SCSI-2 Differential F/W PCI Adapter Cable	1	100	
8109	WORM Optical Disk Media, 5.2GB, 52 pack	1	7410	
9008	5.2 GB Extended Multifunction Library	1	N/C	
9907	110/117/120 V, 50/60 Hz Power Cord	1	N/C	
			=========	======
	3995-C66 Price		57109	
	Monthly Maintenance			395
7014-S00	System Rack - Stealth Black	1	3500	35
0126	Content : 7026-H50 (8 EIA)	1	N/C	
0156	Content : 7133-D40 (4 EIA)	2	N/C	
6171	Additional Power Distribution Unit, Side-Mounted, 1-Phase	1	1000	
9171	Power Distribution Unit, Side-Mounted, 1-Phase	1	N/C	
9300	Language - English (US)	1	N/C	
9801	Rack Power Cord - Watertight	1	N/C	
			=========	======
	7014-S00 Price		4500	
	Monthly Maintenance			35
7133-D40	Advanced SSA Disk Subsystem (Rack-Mounted)	2	25500	400

0550	Hungary Manufacturing Ship Direct to Customer	2	N/C	
8022	50/60Hz AC, 300 VDC Power Supplies	2	4000	
8031	Raven Black Drawer Cover	2	500	
8209	One 9.1GB Advanced Disk Drive Module	32	88320	
8805	5m Advanced SSA Cable	16	1200	
9300	Language - English (US)	2	N/C	
			=========	======
	7133-D40 Price		119520	
	Monthly Maintenance			400
9910-U33	Prestige EXT 3000VA, Rack Mount, 208-240V, 50/60Hz	1	3822	
9001	Onlinet Network for AIX, RS-232 Cable	1	N/C	
9851	Power Cord (L6-30)	1	N/C	
			=========	
	9910-U33 Price		3822	

********** SOFTWARE **********

Product	Description	Qty	License
5765-C34	AIX Version 4	1	N/C
4061	AIX 4.3 for 1-2 Users	1	N/C
4062	InfoExplorer for AIX 4.3 - First Time Order	1	50
4065	Designated Sys Users (1-78) for AIX 4.3	6	750
5005	Preinstall	1	N/C
9001	Asset Registration	1	N/C
			=========
	5765-C34 OTC		800
5765-C64	IBM C for AIX V4.4	1	N/C
0001	BOTC	1	799
3483	Preinstall - Single Pallet Delivery	1	N/C
5996	CD-ROM	1	N/C
9001	Asset Registration	1	N/C
			=========
	5765-C64 OTC		799
5801-AAR	Program Packages	1	N/C
1948	ADSM for AIX V3.1 Program Pkg CD-ROM (1948)	1	1595
9001	Asset Registration	1	N/C
			=========
	5801-AAR OTC		1595
5807-AAR	Use Based Features	1	N/C
0788	ADSM for AIX V3.1 Network Ed Enabler (0788)	1	8400

5245	ADSM for AIX V3.1 Extended Device Spt	1	14995
8297	ADSM for AIX V3.1 1 User Reg (8297)	2	200
			=========
	5807-AAR OTC		23595
5692-AIX	System Software	1	N/C
0598	AIX Welcome Center	1	N/C
0838	AIX 4.3 Update CD	1	N/C
0857	AIX 4.3 Server 1-2	1	N/C
0859	Preinstall AIX 4.3 Server Bundle	1	N/C
0860	AIX 4.3 Bonus Pack - Non Export.	1	N/C
0863	AIX 4.3 InfoExplorer	1	N/C
1004	CD-ROM Process Charge	1	50
2924	English	1	N/C
3410	CD-ROM	1	N/C
5005	Preinstall	1	N/C
5924	AIX 4.3 PII - English	1	N/C
9001	Asset Registration	1	N/C
			=========
	5692-AIX OTC		50

********** GRAND TOTALS **********

Hardware Price	344843	
Software OTC	26839	
	=========	
Grand Total	371682	
Monthly Maintenance		1789

N/C - No Charge
W/D - Withdrawn
T&M - Time and Material
N/O - Not Offered
N/A - Price Not Available
*** - Price Not Available

bocsecond

Date : 24 May 1999
Time : 17:01:35
CFREPORT : bocoptical
Currency : DOLLARS
Hardware Price File : RS6PRC HWUS 18 MAY 1999
Software Price File : RS6PRC SWUS 18 MAY 1999

PCRS6000 Version : 05.08.05
Last Build : 19 May 1999

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********** HARDWARE **********

Product	Description	Qty	Purchase	Maint
7026-H50	RS/6000 Enterprise Server Model H50	1	22000	229
	CD-ROM Drive	1	N/C	
	1.44 MB 3.5-inch Diskette Drive	1	N/C	
	Base SCSI 6-Pack	1	N/C	
	Integrated SCSI-2 Fast/Wide Adapter 1	1	N/C	
	Integrated SCSI-2 Fast/Wide Adapter 2	1	N/C	
	Integrated Ethernet Adapter	1	N/C	
	Base AC Power Supply	1	N/C	
2913	9.1 GB 1" Ultra SCSI Hot Swap Disk	1	1750	
2919	9.1 GB 1" Ultra SCSI Disk Drive Select	1	350	
2934	Async Terminal/Printer Cable (EIA-232)	1	45	
2968	10/100 Mbps Ethernet PCI Adapter	2	550	
4106	Select 256 MB (2x128MB) SDRAM DIMMs	1	1280	
4110	256 MB (2x128MB) SDRAM DIMMs	3	7680	
4338	2-Way 604e 332MHz Processor Card, 2x256KB L2 Cache	1	3000	40
5005	Preinstall	1	N/C	
5520	Complete System Order	1	N/C	
6159	12GB/24GB 4mm Tape Drive	1	3200	
6207	Ultra SCSI Differential PCI-Bus Adapter	2	1300	
6225	Advanced SerialRAID Adapter (PCI)	2	6000	
6235	32 MB Fast-Write Cache Option Card	2	1150	

500587

9300	Language - English (US)	1	N/C	
			=========	======
	7026-H50 Price		48305	
	Monthly Maintenance			269
3153-BG3	InfoWindow II ASCII Display Station (Green/RS232)	1	577	
9131	Keyboard - US English, PC Style	1	N/C	
			=========	
	3153-BG3 Price		577	

********** SOFTWARE **********

Product	Description	Qty	License
5765-C34	AIX Version 4	1	N/C
4061	AIX 4.3 for 1-2 Users	1	N/C
5005	Preinstall	1	N/C
9001	Asset Registration	1	N/C
			=========
	5765-C34 OTC		0

5692-AIX	System Software	1	N/C
0598	AIX Welcome Center	1	N/C
0838	AIX 4.3 Update CD	1	N/C
0857	AIX 4.3 Server 1-2	1	N/C
0859	Preinstall AIX 4.3 Server Bundle	1	N/C
0860	AIX 4.3 Bonus Pack - Non Export.	1	N/C
1004	CD-ROM Process Charge	1	50
2924	English	1	N/C
3410	CD-ROM	1	N/C
5005	Preinstall	1	N/C
5924	AIX 4.3 PII - English	1	N/C
9001	Asset Registration	1	N/C
			=========
	5692-AIX OTC		50

********** GRAND TOTALS **********

Hardware Price	48882	
Software OTC	50	
	=========	
Grand Total	48932	
Monthly Maintenance		269

N/C - No Charge
W/D - Withdrawn

500588

T&M - Time and Material
N/O - Not Offered
N/A - Price Not Available
*** - Price Not Available

Unprecedented server price/performance

RS/6000 Enterprise Server Model H50

Highlights

Powerful one- to four-way symmetric multiprocessor (SMP) rack-drawer server with superior price/performance

Industry-leading decision support performance

Affordable upgrades, including additional processors, memory and storage

Outstanding reliability with ECC memory and ECC Level 2 cache, plus a standard service processor, redundant hot-swappable cooling fans and an available redundant hot-swappable power supply

Hot-swappable disk bays for improved system availability, smooth growth and data portability

Exceptional AIX® operating system with reliability, availability and systems management features

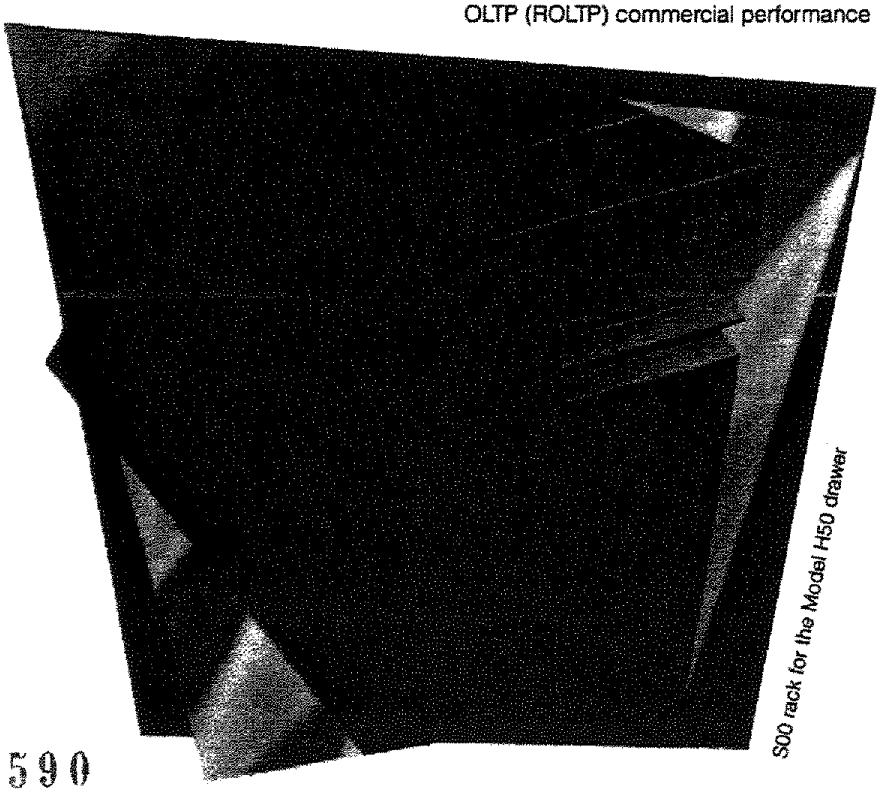
e-business server with balanced price/performance

Product description

The RS/6000® Enterprise Server Model H50 is a one- to four-way SMP designed to deliver the performance and reliability for your critical applications, and the flexibility to add the features important to your business. This system excels as a multiuser application, database and Internet server. It has the connectivity that allows it to participate in many currently installed UNIX® and PC networks.

The Model H50 system is an eight EIA-high rack drawer for mounting in a 19-inch rack enclosure, such as IBM S00 rack (separately purchased). Clustering an H50 with additional H50 drawers, and shared disk subsystems provides outstanding shared data availability and flexibility.

The Model H50 has achieved excellent performance benchmark results. Along with its sister product, the deskside Model F50/332, the H50 is among industry leaders in decision support performance (TPC-D at 100GB as of 1/26/98)* for four-way servers. Relative OLTP (ROLTP) commercial performance



S00 rack for the Model H50 drawer

e-business

500590

Feature	*Benefits*
One- to four-way PowerPC 604e™ with X5 cache system	• Delivers exceptional price/performance needed for commercial applications at 332MHz • Offers processor scalability and performance
Up to 3GB of SDRAM memory	• Provides very fast performance to reduce disk paging and accommodate application requirements
ECC L2 cache, eight-way set assoc.	• Provides reliable performance with few cache misses for increased throughput
Hot-swappable disk bays	• Enable swapping or adding of disks without powering down the system • Provide outstanding reliability, availability and serviceability
Three individual PCI I/O buses	• Enhance I/O throughput and reduce many typical application I/O bottlenecks
Internal RAID storage	• Helps protect data without purchasing external disk subsystems
Ultra SCSI disk support	• Doubles data transfer rate over SCSI-2 up to an impressive 40MB/second for data-intensive applications • Helps improve multiple disk access performance
SSA RAID disk support	• Increases disk performance up to 80MB/second for transaction-intensive applications • Provides higher disk capacity than traditional SCSI • Helps improve data availability
Built-in service processor	• Designed to continuously monitor system operations and take corrective action to promote problem resolution and high system availability • Enables remote diagnostics and maintenance
Ample expansion slots and bays	• Provide flexibility options and a rich networking configurability
AIX operating system	• Provides a wealth of multiuser communications and systems management technologies • Complies with major industry standards[1] • Provides an AIX binary compatible environment where most AIX 4.2 and Version 4.3 applications already running on other RS/6000 systems can run unmodified

[1] *AIX 4.3 is UNIX 95 and UNIX 98 branded by the Open Group, and complies with IEEE POSIX 1003.1-1996 and 1003.2-1992 specifications.*

is excellent at a value of 32.8, the highest 4-processor configured server in the RS/6000 line-up (equivalent to the Model F50/332MHz). SPECint95 is also outstanding. SPECweb96 results place the Model H50 among the industry leaders. All in all, no matter what type of application performance your requirements demand, the H50 is an outstanding choice for workgroup or enterprise computing.

The Model H50 features advanced PowerPC 604e system processors with the X5 Level 2 (L2) cache system. The 256KB L2 cache on each processor, with eight-way set associative implementation, helps to deliver far fewer cache misses when the processors are searching L2 for data.

For demanding application performance requirements, the SDRAM memory provides a peak memory bandwidth of 1.3GB/second.

Three individual PCI buses connect to the nine PCI slots for an outstanding 400MB/second aggregate data throughput that can help reduce typical I/O bottlenecks and enhance performance.

IBM's advanced disk technologies, SCSI-2, Ultra SCSI and Serial Storage Architecture (SSA), are cost-effective internal options. Providing increasingly faster database access, these performance features combine with the exceptional system architecture to allow the Model H50 to compete with far more costly systems.

But no system is worth its price if it is not reliable and available to run all day, every day in your environment – and the Model H50's design helps to answer this requirement. The ECC memory and ECC L2 cache provide single-bit and double-bit error detection with single-bit error correction to minimize potential impact on running applications.

The twelve hot-swappable disk bays can house SCSI-2, Ultra SCSI or SSA disk drives. These disks are removable and replaceable while the system is running to avoid costly downtime from disk malfunction or data portability requirements. Internal RAID 0, 1 and 5 support helps provide the disk redundancy necessary to keep key applications going.

RS/6000 Enterprise Server Model H50 at a glance

Standard configuration

Microprocessor:	332MHz PowerPC 604e with X5 cache	**Internal disk drive:**	4.5GB SCSI Fast/Wide
Level 1 (L1) cache:	32KB data/32KB instruction	**Disk/media bays:**	Thirteen (one used)/three (two used)
Level 2 (L2) cache:	256KB ECC	**I/O expansion slots:**	Nine (seven PCI, two PCI/ISA)
RAM (memory):	128MB ECC Synchronous DRAM	**PCI bus widths:**	Two 32-bit and one 64-bit
Memory bus width:	128-bit	**Memory slots:**	Two
Ports:	Three serial and one parallel		

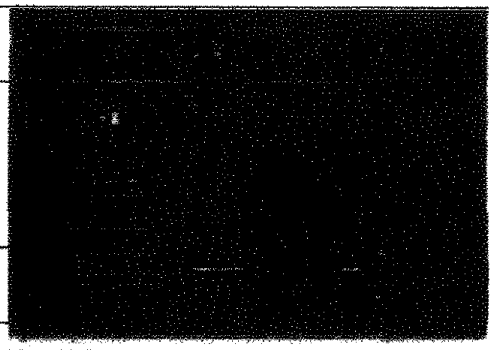
Standard features:	20X (Max) CD-ROM drive	Ethernet® 10Base5/T controller	Service processor
	1.44MB 3.5-inch diskette drive	Dual integrated SCSI-2 Fast/Wide controllers	

AIX operating system†:	Version 4.2.1 or Version 4.3 (One- to two-user license is standard††)

System expansion

SMP configurations:	To 2, 3 or 4 processors
RAM:	Up to 3GB
Internal disk storage:	Up to 118.2GB
External disk storage:	Up to 4.8TB SCSI-2; up to 3.5TB SSA

System dimensions:	13.8" H x 17.5" W x 33.2" D (350 mm x 443 mm x 844 mm); 120 lbs (55 kg)§
Warranty:	24 x 7, on-site for one year (limited) at no additional cost



Model H50 drawer

† *Can be optionally preinstalled* †† *Additional user licenses available*

§ *Base machine with minimum disk, adapters and devices; weight will vary when additional disks, adapters and other peripherals are installed.*

The Model H50 also has online concurrent diagnostics that help enable service technicians to correct many potential system malfunctions without interrupting your operations. An auto restart option is designed to automatically reboot the system following an unrecoverable software error, hardware failure or environmentally induced stoppage (like power interruption).

But perhaps the most advanced availability feature of this server is its standard service processor—an additional microprocessor that is designed to operate when the main system is down. The service processor has advanced integrated system environmental monitoring/alerting functions (such as AC/DC voltage, fan speed and temperature sensing), to provide early power-off warnings, and has facilities for error log analysis and alerts.

If potential component failures are detected, the service processor can auto dial-out to a service center without operator initiation to take preventive maintenance measures, in an effort to avoid a costly system outage. Remote maintenance and diagnostics functions, including console mirroring from a remote site, enable dial-in by a service technician, who can reboot and restore your system as soon as possible after a failure, or correct a potential malfunction before it occurs.

For extra reliability, the Model H50 includes hot-swappable redundant cooling fans as a standard feature, and offers an optional second back-up power supply (also hot-swappable).

The computing power of the Model H50 is strengthened by its operating system, AIX Version 4.2.1 or Version 4.3. Adding real value over other UNIX operating systems in terms of reliability, availability and systems management, AIX also offers exceptional scalability with the multitasking, multiuser functionality for distributed environments.

With HACMP (High Availability Cluster Multi-Processing) software, a Model H50 cluster provides enhanced failover support and helps to enable mission critical applications like e-business to operate reliably on a 24 x 7 basis.

Supported features and devices

The Model H50 supports a wide range of optional features and devices, such as:

- Communications adapters for 25/155 Mbps ATM, ISDN, Token-Ring, 10/100 Mbps Ethernet, FDDI, X.25 and asynchronous environments
- Color displays of various sizes and resolutions
- ASCII terminals, X terminals and the IBM Network Station
- IBM and non-IBM printers, plotters and modems

Year 2000 readiness

When used in accordance with its associated documentation, the Model H50 is capable of correctly processing date data between the 20th and 21st centuries, provided all other products used with it properly exchange date data.

Service and support

The Model H50 is backed by IBM's worldwide service and support. IBM's commitment is behind every system sold, in order to provide the highest possible customer satisfaction.

IBM customer financing provides an additional incentive. An array of attractive and flexible financing programs eases the acquisition of new technology and helps protect you from the risk of obsolescence. Financing may be available to credit-qualified customers. Rates are based on credit rating, financing terms and other options. Other restrictions may apply.

More information

- Contact your IBM marketing representative or IBM Business Partner.
- For a list of optional features and devices supported by the Model H50, visit RS/6000 on the Web at *www.rs6000.ibm.com* and select the Hardware option to view the Facts and Features brochure.
- Access *www.tpc.org* and *www.specbench.org* on the Internet for detailed TPC-D Executive Summaries and SPEC performance information.
- For Relative OLTP (ROLTP) performance notes, access *www.rs6000.ibm.com/hardware/perf_notes.html*

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IBM.

IBM Corporation
Marketing Communications, Servers
Route 100
Somers, New York 10589

Printed in the United States of America
10-98

*For more product data and performance information, access *www.rs6000.ibm.com/hardware/#eservers*

G221-7051-01

Worldwide telephone numbers

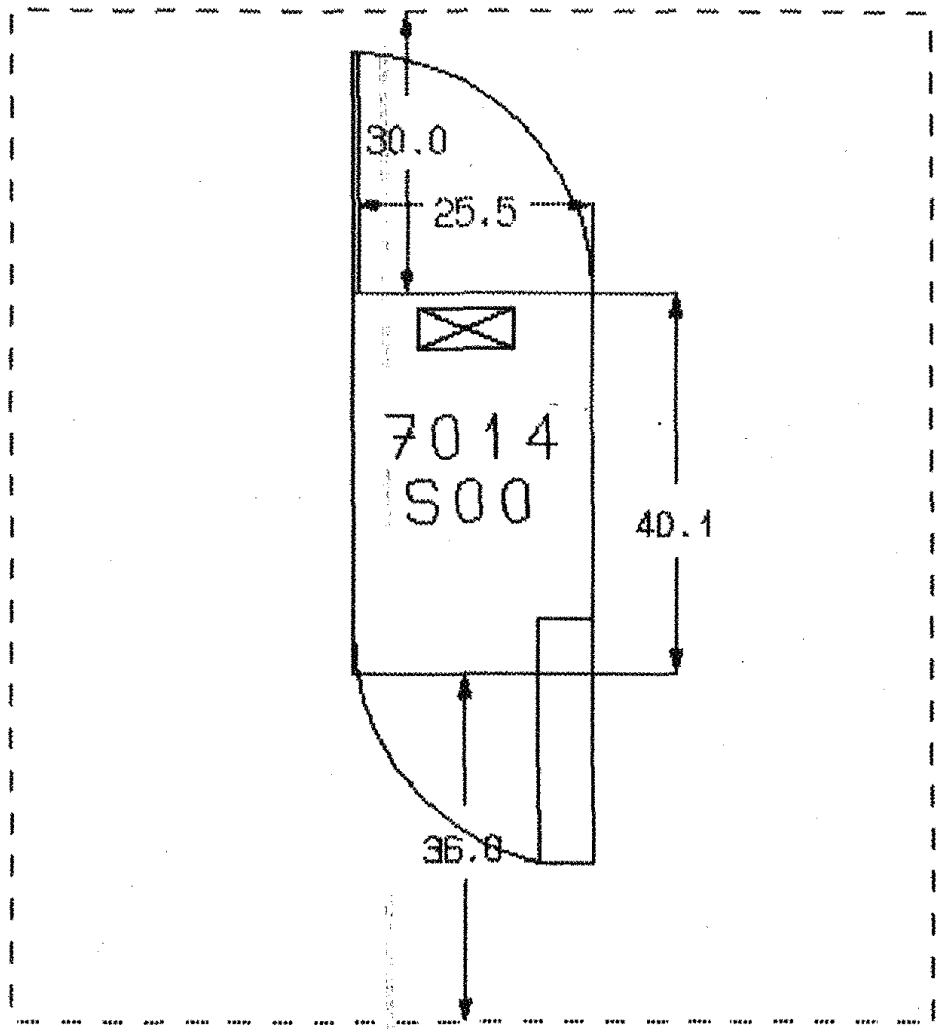
IBM Asia Pacific		
Australia		132-426x RS/INFO
Bangladesh		880-2-869-783
China:	Beijing	10-437-6677 x CRC
	Guangzhou	20-778-7268 x CRC
	Shanghai	21-6280-1070 x CRC
Hong Kong		852-2825-7878
India (TATA)		080-526-9050
Indonesia		21-251-2922
Japan		0120-00-6025
Korea		02-781-7114
Malaysia		03-717-7788
New Zealand		0800-801-800
Philippines		02-819-2426
Singapore		1-800-320-1234
Sri Lanka		01-440810
Taiwan		080-011011
Thailand		02-273-4444
Vietnam:	Hanoi	84-4-426316
	Ho Chi Minh	84-8-241474

IBM Europe, Middle East, or Africa	
Abu-dhabi	971-2-345165
Albania	35-542-32025
Austria	43-1-21145-2500
Bahrain	973-533995
Belgium	32-2-225-3600
Bosnia	38-771-219388
Bulgaria	3592-731076
Croatia	3851-6124500
Czech Republic	420-2-67106111
Denmark	4545-8031-6000
Dubai	971-4-313155
Egypt	202-3492533
Finland	358-9800-42680
France	33-(02)-3855-7777
FYR of Macedonia	38991-113144
Germany	49-180-55090
Greece	30-1-688-1476
Hungary	361-1654422
Ireland	353-18-5020-5205
Israel	972-177-022-3888
Italy	39-167-016338
Kuwait	965-2439900

(*IBM Europe, Middle East, or Africa, cont.*)	
Netherlands	31-20-513-5151
Norway	47-669999-9090
Oman	968-791360
Poland	48-22-8786-777
Portugal	351-1-7915880
Qatar	974-435395
Romania	401-6158267
Russia	7-095-2586400
Saudi Arabia	966-02-600007
Slovak Republic	421-7-7806111
Slovenia	38661-1252154
South Africa	27-800-128-128
Spain	34-901-100-400
Sweden	46-20-220203
Switzerland	41-155-1225
Turkey	90-212-2800900
UK	01705-492149
Ukraine	38044-2270225
Yemen	967-1-213745

IBM Latin America	
Argentina	319-6666
Bolivia	591-2-361-555
Brazil	0800-11-1426 x317
Chile	800-216-216, or 56-2-200-60-64
Colombia	9800-17555
Costa Rica	506-223-6222
Dominican Republic	809-566-5161
Ecuador	593-432-1444 x5808
El Salvador	503-298-5011
Guatemala	502-331-5859
Honduras	504-322-309
Mexico	(5) 627-2444 x3333
Nicaragua	505-266-4141
Panama	507-263-9977
Paraguay	595-21-444-094 x210
Peru	511-349-0050
Uruguay	902-3617
Venezuela	800-33-426

IBM North America	
Canada & U.S.	1-800-IBM-CALL (1-800-426-2255)



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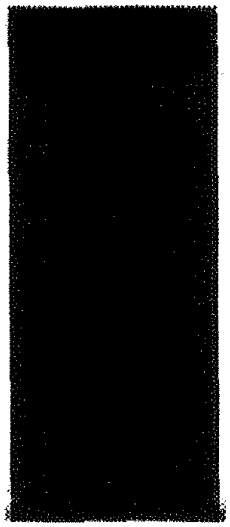

H50

208V, 30Amp, 1-Phase, w/3-wire

Qty (1 or 2) per 7014, NEMA L6-30R

F/C 9171 = Base PDU 14' Pwrcord
F/C 6171 = Addn PDU 14' Pwrcord
F/C 9801 = RS-3933 Watertight
note: 7133-D40 need dual PDU

Max 7014 = 4.0KVA, 3.6KW, 12.28KBtu
Max 7026-H50 = .6KVA, .43KW, 1.98KBtu, 195lbs.
Max 7133-020 Dwr = .657KVA, .61KW, 2.07KBtu, 110lbs.
Max 7133-D40 Dwr = .483KVA, .4KW, 1.365KBtu, 118lbs.
Max 3570-B12 Tape = .13KVA, .13KW, .444KBtu, 63.9lbs.

Base w/Shipping Pallet = 46" x 32.5", 349lbs.

High-performance IBM 7133 Serial Disk System for UNIX and Windows NT servers

IBM 7133 Serial Disk System Advanced Models D40 and T40

Highlights

Provides outstanding disk storage performance with advanced SSA bandwidth of 160 MB/sec

Features high-performance 36.4 GB, 18.2 GB, 9.1 GB, and 4.5 GB IBM disk drives (7,200 and 10,020 RPM)

Provides high capacity—up to 582 GB per tower or drawer and 3.5 TB per host adapter

Enables disk sharing through simultaneous attachment of multiple UNIX** and Windows NT** hosts to the IBM 7133 Serial Disk System

Provides high availability with redundant data paths, redundant cooling units, and two power supplies

Facilitates remote mirroring—up to 10 km connection distances—with the Advanced SSA Optical Extender

Simplifies storage management when used with the IBM StorWatch* Serial Storage Expert

IBM 7133 Serial Disk System Advanced Models D40 and T40

The IBM 7133 Serial Disk System Advanced Models D40 and T40 provide highly available storage for UNIX and Windows NT servers. By implementing a powerful industry-standard serial technology, the 7133 Advanced Models D40 and T40 provide outstanding performance, availability, and attachability.

The rack-mountable 7133 Advanced Model D40 drawer is designed for integration into a supported 19-inch rack. The 7133 Advanced Model T40 is a free-standing deskside tower unit.

Both 7133 Advanced Models can be populated with 36.4 GB, 18.2 GB, 9.1 GB, and 4.5 GB IBM Ultrastar* disk drives. Drive capacities can be intermixed, providing the flexibility to build storage capacity from gigabytes to terabytes. The 7133 Advanced Models can be intermixed in the same loop with other models of the 7133 (Models 010, 020, 500, 600) as well as with the 7131-405.

SSA multi-host attachment

Capable of connecting and sharing storage with multiple UNIX and Windows NT hosts, the 7133 Serial Disk System is ideally suited for clustered server environments. Servers can benefit from IBM Serial Storage Architecture (SSA) technology via appropriate SSA adapters or attachments.

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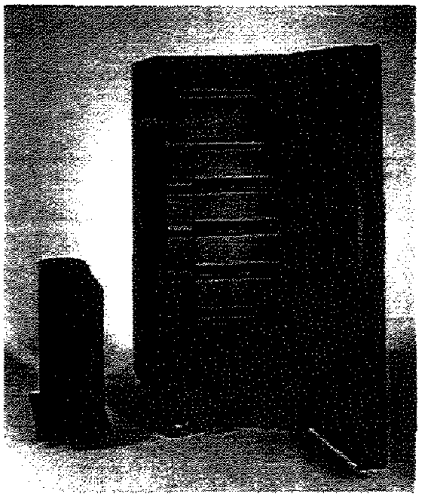
High performance

The 7133 Advanced Models provide outstanding performance for multiple, concurrent, full-duplex I/O operations. Unlike SCSI bus configurations, SSA devices such as the 7133 Serial Disk System are configured in loops and allow multiple concurrent operations to occur in separate sections of these loops. This results in high overall throughput and superior utilization of the 160 MB/sec bandwidth of the 7133 Advanced Models. This SSA capability is referred to as spatial reuse.

High availability

IBM SSA technology features significant availability advantages over SCSI-based technology. If a cable failure occurs on the loop, the SSA adapter automatically continues accessing disks



IBM 7133 Serial Disk System Advanced Models D40 and T40

through an alternate path. If a disk failure occurs, the hot-swappable drives can be removed and replaced without disrupting the communication between the adapter and other disks on the loop.

To further increase availability, the 7133 Advanced Models monitor and provide detailed information on the status of power, cooling, and disk drives.

With the Advanced SSA Optical Extender, distances up to 10 km are supported between 7133 Advanced Models and advanced SSA 160 MB/sec adapters. In addition, this optical extender supports distances up to 2.4 km between other 7133 models and SSA adapters[2].

Investment protection
The 7133 Serial Disk System helps protect investments in existing equipment while providing a clear path for growth. Existing SCSI-based applications should migrate easily, because SSA is compatible with the SCSI command set. The 7133 Serial Disk System is a key building block in the IBM Seascape* architecture, a blueprint for innovative storage solutions.

To facilitate server consolidation, IBM supports the relocation of existing 7133 Advanced Model D40s into the IBM Versatile Storage Server*.

For more information
For more information, contact your IBM representative or IBM Business Partner. Or visit www.ibm.com/storage/disk.

IBM 7133 Serial Disk System Advanced Models D40 and T40 at a glance

Models	***Rack-mountable D40/Deskside T40***
4.5 GB disks (7,200 RPM)	18.0 to 72.0 GB
9.1 GB disks (10,020 and 7,200 RPM)	36.4 to 145.6 GB
18.2 GB disks (10,020 and 7,200 RPM)	72.8 to 291.2 GB
36.4 GB disks (7,200 RPM)	145.6 to 582.4 GB
Capacity (per adapter)	Up to 96 drives (48/loop)
Physical specifications	
Dimensions (H, W, D)	D40: 171 mm x 444 mm x 737 mm
	T40: 610 mm x 210 mm x 861 mm
Weight (maximum configuration)	D40: 118.0 lb (53.5 kg)
	T40: 168.0 lb (76.2 kg)
Operating environment	
Temperature	50° to 104° F (10° to 40° C)
Relative humidity	8 to 80%
Maximum wet bulb	80.6° F (27.0° C)
Power requirements	20 to 400 watts
Warranty	One year limited
Supported systems[1]	
Selected UNIX and Intel**-based servers	

[1] For a current listing of supported product models, visit www.ibm.com/storage/7133attach, or contact your IBM representative or IBM Business Partner.

www.ibm.com/storage

IBM Storage Systems Division
5600 Cottle Road
San Jose, CA 95193

Produced in the United States
5-99

[2] The IBM 7131-405 does not support the use of IBM optical extenders.

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G225-6798-02

A Magstar storage solution that provides ultrafast, reliable access to data and unattended backup and restore operations in midrange environments

Magstar MP (Multi-Purpose) 3575 Tape Library Dataserver

Highlights

- *Offers five models for the SCSI systems environment*
- *Includes Magstar™ MP tape drives that provide fast data access for current and emerging applications such as save/restore, network storage management, data warehousing, and digital libraries*
- *Increases the amount of data that can be accessed with near-online performance for up to 4.8 TB of storage capacity (with 3:1 compression)*
- *Delivers an aggregate sustained data rate of 50 to 300 GB/hour with maximum compression on Model C tape drives*
- *Provides rich multi-host attachment for library sharing: up to six AS/400® hosts or any three heterogeneous hosts*
- *Supports industry-leading storage management offerings to provide enterprise-wide backup/restore and archive/retrieval*

Magstar MP 3575 Tape Library Dataserver Models

Overview

The IBM Magstar MP 3575 Tape Library Dataserver is a family of automated tape storage solutions designed for the growing unattended storage requirements of today's midrange systems and network servers. These compact, integrated tape storage libraries expand the capability of tape processing by optimizing both read- and write-intensive operations. A dual-gripper picker can provide fast cartridge exchange times between the library slots and the Magstar MP tape drives in the library. The Magstar MP 3575 tape library attaches to AS/400, RS/6000™, HP, Windows NT, Sun, and other SCSI-attached open systems in single- or multi-host configurations.

The patented new multi-path architecture enables multiple homogeneous or heterogeneous hosts to share library resources. You can configure up to three user-defined logical libraries to optimize host library sharing.

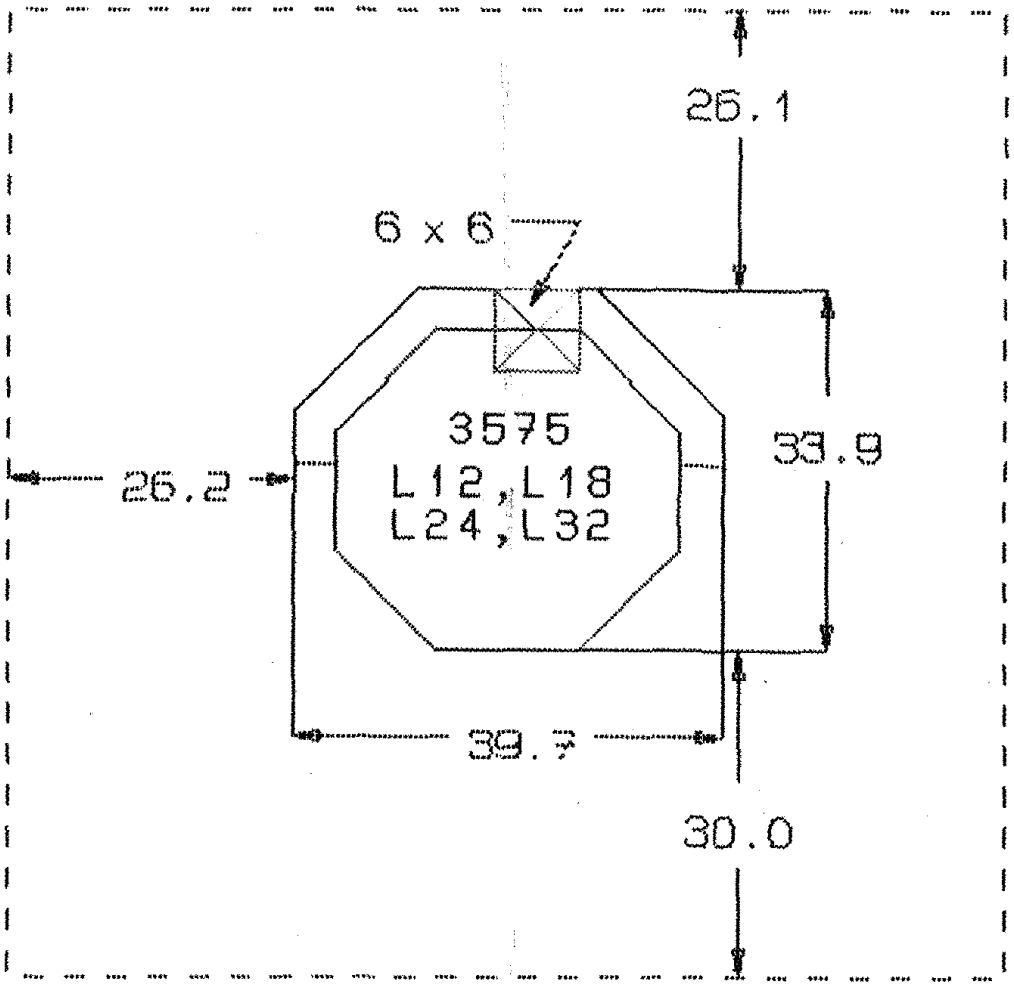
Unattended tape operations and higher storage capacity

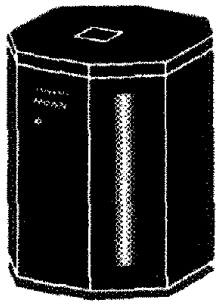
There are five models of the Magstar MP 3575 tape library, ranging in size from 300 GB to 4.8 TB of compressed online storage capacity and from one to six tape drives. This spectrum of choices provides the high granularity required for a wide range of enterprise solutions. In addition, two of the models are expandable. With these capacities, the Magstar MP 3575 tape library can provide unattended tape handling for tape save/restore and can evolve into an advanced storage management solution to enable a more efficient and cost-effective combined use of disk and tape.

Applications that previously required disk or optical technology can now benefit from the high capacities and fast data access characteristics of the Magstar MP 3575 tape library. These applications include:

- Automated save/restore
- Automated migrate/recall
- Backup/archive
- Large sequential files
- Records management
- Multimedia applications

Industry-leading software solutions for Magstar MP 3575 Tape Libraries are available from IBM, IBM Business Partners, and third-party solution providers. This broad range of applications enables you to select the solution that best meets your storage needs.





Magstar MP
3575 Library

120V or 208V, 15Amp, 1-Phase, 3-Wire

Qty (1) of either:
STD (1) NEMA 5-15R (120V)
F/C 9908 = NEMA 6-15R (208V)
F/C 9909 = R&S 3913U-2 (Inline Connector @208V)
or R&S 3943U-2 (Receptacle @208V)

Max = .45KVA, .35KW, 1.2KBtu
Max Wt. = 446 lbs.

cbr03/10/99

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IBM optical solutions providing low cost, high capacity, direct access storage – enhanced with IBM 5.2GB (8X) Extended Multifunction Optical Drives. The evolution continues . . .

Enhanced 3995 Optical Library C-Series for the RS/6000

Highlights

- *Features IBM's first-in-the-industry extended multifunction drives that include support for Permanent WORM, Magneto-Optical (MO) Rewritable and CCW WORM optical cartridges*
- *Enhanced with 5.25 inch industry standard 5.2GB (8X) internal optical drives doubling the capacity of previous 3995 C-Series Optical Libraries*
- *Provides five models for RISC System/6000 SCSI-2 attachment to meet your individual storage capacity requirements*
- *Delivers from 104GB to 1341GB (1.341TB) of low cost, online optical storage capacity*
- *Allows configuration flexibility by providing for additional internal optical drives without loss of storage capacity*
- *Investment protection through continued access to information on optical media created on any previous generation 3995 Optical Library*
- *Combines capacity, performance, flexibility, and technology to deliver the best optical storage solution available*

World class flexibility

The enhanced IBM Optical Library C-Series models provide low cost, high capacity, direct access storage to enable innovative, new business applications for your RISC System/6000 environment. Featuring IBM's 5.2GB industry-standard 5.25 inch optical drives, these enhanced 3995 Optical Library C-Series models deliver new levels of capacity at a reduced cost per megabyte.

With these optical library models, IBM has continued to enhance its innovative, first-in-the-industry extended multifunction optical drives. This technology provides support for Permanent Write-Once, Read-Many (WORM), Magneto-Optical (MO) rewritable, and Continuous Composite Write-Once (CCW) WORM using industry-standard 5.25 inch optical cartridges. All three technologies can be used within a single library, offering the most flexibility in meeting specific business requirements.

Low cost, high capacity

Five models are available, ranging from 104GB to 1341GB (1.341TB) of online storage capacity, providing the granularity required for a wide range of business solutions. Plus, the 540GB capacity model is expandable to 811GB.

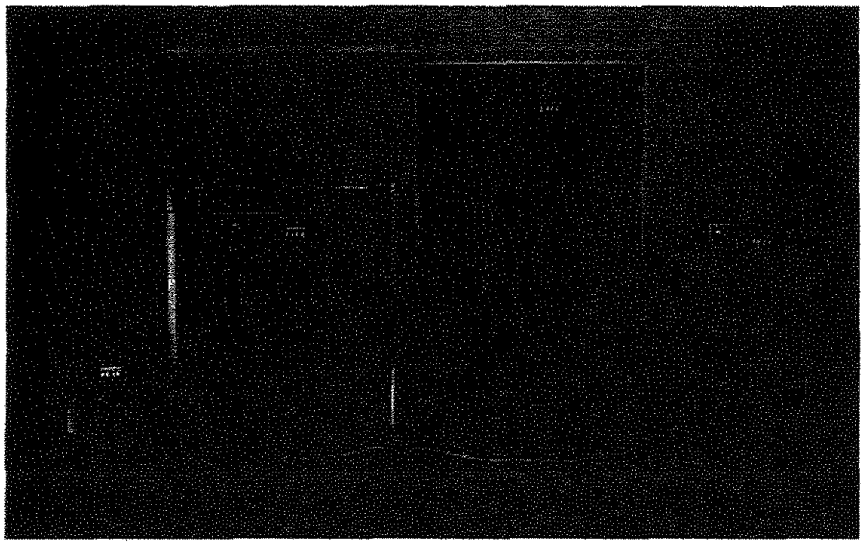
With a doubling of capacity over the previous generation of optical technology the enhanced IBM 3995 SCSI models offer optical storage solutions at a significantly lower cost per megabyte.

Enhanced performance

The 3995 C-Series Optical Library family has previously delivered improved optical drive data rates and faster cartridge exchange times. Most models offer a dual-gripper picker on the auto-changer and optional additional internal drives for faster performance.

Broad range of solutions

The enhanced 3995 is ideal for RS/6000 applications requiring centralized online storage with moderate performance. IBM's extended multifunction support is designed to satisfy auditing and/or legal



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requirements for unalterable, permanent retention of data. The 3995 also provides the flexibility of rewritable and CCW WORM optical storage.

Industry-leading software solutions for the 3995 are available from IBM, IBM Business Partners, and independent solution providers. This broad range of applications allows you to select the solution which best meets your business needs.

Software solutions need to provide the drivers and library manager for these new IBM optical libraries. Software requirements for SCSI direct-attached host systems may vary depending upon host system. Refer to your host system and application documentation for requirements.

IBM applications for the 3995 include IBM VisualInfo for AIX and OnDemand for AIX, both of which are members of IBM's Electronic Document Management Suite of solutions (EDMSuite), ADSTAR Distributed Storage Manager (ADSM) for AIX, and IBM Digital Library.

Industry-Standard 5.25 inch Optical Media Cartridges with 5.2GB capacity

Optical Disk Cartridges

The following types of 5.25 inch optical disk cartridges are supported in the Enhanced 3995 C-Series RISC System/6000 attached optical libraries. Please note that the application software used with the 3995 may have media-type support restrictions.

Capacity[1]	Magneto-Optical (MO) Rewritable	Permanent WORM	CCW WORM
5.2GB (2048 Bytes/Sector)	Read/Write	Read/Write	Read/Write
4.8GB (1024 Bytes/Sector)	Read/Write	N/A	Read/Write
4.1GB (512 Bytes/Sector)	Read/Write	N/A	Read/Write
2.6GB (1024 Bytes/Sector)	Read/Write	Read/Write	Read/Write
2.3GB (512 Bytes/Sector)	Read/Write	N/A	Read/Write
1.3GB (1024 Bytes/Sector)	Read	Read	N/A
1.19GB (512 Bytes/Sector)	Read	N/A	N/A
650MB (1024 Bytes/Sector)	Read	Read	N/A
595MB (512 Bytes/Sector)	Read	N/A	N/A

Designed for the RS/6000, POWERparallel SP and PC environments

The 3995 SCSI models are designed for attachment to servers, workstations, and personal computers which support a SCSI-2 interface, including the IBM RS/6000, POWERparallel SP, and personal computer (PC) systems.

Industry standards

The enhanced 3995 supports 5.25 inch optical cartridges which are compatible with the industry standards listed below:

- ISO/IEC DIS 15286 information technology – 130mm optical disk cartridges – capacity: 5.2GB per cartridge – for information interchange
- ISO/IEC 15486: 1998 data interchange on 130mm optical disk cartridges of type WORM (Write-Once, Read-Many) using irreversible effects – capacity: 2.6GB per cartridge
- ISO/IEC 14517: 1996 130mm optical disk cartridges for information interchange – capacity: 1.3GB per cartridge
- ISO/IEC 13549: 1993 data interchange on 130mm optical disk cartridges – capacity: 1.3GB per cartridge
- ISO/IEC 11560:1992 information interchange on 130mm optical disk cartridges using the magneto-optical effect, for write once, read multiple functionality
- ISO/IEC 10089: 1991 130mm rewritable optical disk cartridge for information interchange.

Installation

These 3995 Optical Libraries are physically installed by IBM personnel and installation is estimated to take from 2 to 4 hours.

IBM warranty

The enhanced 3995 C-Series models are warranted with IBM's limited one year warranty. This warranty service is on-site customer service, 24 hours a day, 7 days a week.

Media

IBM optical media can be ordered via feature codes, from IBM Media or Supplies Distribution, or from authorized dealers. To order IBM media and supplies in the United States, call toll-free 1-888-IBM-MEDIA (1-888-426-6334) today.

Let us tell you more

For further information on the IBM Enhanced 3995 Optical Library C-Series models, contact your IBM representative or IBM Business Partner. In the U.S. or Canada you can also call IBM Direct: 1-800-IBM-CALL (1-800-426-2255). Internet: www.ibm.com/storage

500600

[1] Unformatted capacity

IBM Enhanced 3995 Optical Library C-Series at a glance

Model	C60	C62	C64	C66	C68
Maximum Storage Capacity (unformatted)	104GB	270GB	540GB	811GB	1341GB (1.341TB)
Maximum Cartridge Slots	20	52	104	156	258
Internal Drives	1 or 2	2	2 or 4	4 or 6	4 or 6
Performance					
Average Cartridge Move Time	2.8 seconds	2.6 seconds	2.8 seconds	2.8 seconds	3.1 seconds
Picker Type on Autochanger	Single-Gripper	Dual-Gripper	Dual-Gripper	Dual-Gripper	Dual-Gripper
Reliability					
Mean Swaps Between Failure	1,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Mean Time to Repair	30 minutes	30 minutes	30 minutes	30 minutes	30 minutes
Dimensions					
Height-mm (in)	457 (18 in.)	991 (39 in.)	1029 (40.5 in.)	1029 (40.5 in.)	1480 (58.25 in.)
Width-mm (in)[2]	216 (8.5 in.)	355 (14 in.)	813 (32 in.)	813 (32 in.)	813 (32 in.)
Depth-mm (in)	737 (29 in.)	737 (29 in.)	762 (30 in.)	762 (30 in.)	762 (30 in.)
Weight-kg (lbs) (without media)[3]	28 (61 lb.)	69 (152 lb.)	120 (265 lb.)	125 (275 lb.)	193 (425 lb.)
Nominal Power Consumption (watts)					
Assumes Maximum Drive Configuration	80 watts (275 BTU/Hr)	90 watts (310 BTU/Hr)	140 watts (475 BTU/Hr)	180 watts (614 BTU/Hr)	180 watts (614 BTU/Hr)
Electrical	**All Models**				
Line Voltage (V ac)	100-127 Nominal or 200-240 Nominal				
Line Frequency (Hz)	50-60				
Environmental Specifications (operating)	**All Models**				
Temperature	10°c to 38°c (50°F to 100.4°F)				
Relative Humidity	8 to 80%				
Maximum Wet Bulb Temperature	25.6°c (78.4°F)				
Hardware Interface[4]					
Single-Ended SCSI Interface:	SCSI-2 High-performance External Controller (#2410 or #2831) or SCSI-2 Fast/Wide Adapter/A (#2408, #2412, #2413, #2416, #6207, or #6209)				
Differential SCSI Interface:	SCSI-2 Differential High-performance External Controller (#2420) or SCSI-2 Differential Fast/Wide Adapter/A (#2409, #2414, #2413, #2416, #6207, or #6209)				
HACMP SCSI Connection	A quantity of two (2) each of FC 7217 or FC 7218 are required for HACMP implementation				
Software[5]	An application that provides optical library management functions and drivers for the C6X Libraries is required and needs to be acquired separately. The selected application may have it's own prerequisites and/or dependencies.				
Year 2000	Year 2000 Ready[6]				
Warranty	IBM limited one year warranty				
Upgrade Options					
3995 C-Series Models to Enhanced 3995 C-Series models w/5.2GB	Yes				
Model C64 to Model C66 field upgrades available	Yes				

Optical Drive Performance	
Rotation Speed	3000 RPM
Average Seek – MO Rewritable or CCW	25 ms
Average Seek – Permanent WORM	120 ms
Average Latency	10 ms
Average Load Time (including spin-up to ready)	5.5 sec
Average Unload Time (including spin-down)	3 sec
Data Transfer Rate	
Sustained	2.3 to 4.6MB/sec
Burst (synchronous)	10MB/sec
Burst (asynchronous)	6MB/sec
Buffer Memory Capacity	2MB
Reliability	
Mean Loads Between Failure (MLBF)	1,000,000
Mean Time Between Failure (MTBF)	100,000 hours

[2] The width at the base, with stabilizers is 464mm (18.25 in.) for Model C62.

[3] The actual weight of the optical library will vary depending on the number of internal optical drives.

[4] These models, with a single-ended SCSI-2 interface, are not supported on the 900-sereis POWERserver. A SCSI-2 differential interface is required. Some of the RS/6000 SCSI features may no longer be available.

[5] RISC System/6000 or application software may require an AIX/6000 selective enhancement installation. These 3995 Models do not include device drivers or Optical Library Management Software. These need to be obtained separately. See you IBM Representative for a list of IBM and non-IBM software that support these enhanced 3995 C-Series Optical Libraries.

[6] When used in accordance with its associated documentation, it is capable of correctly processing, providing, and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange accurate date data with it.

IBM Storage Systems Division
Department AYX
9000 S. Rita Road
Tucson AZ 85744

Printed in the United States of America
09-98

Performance data herein was obtained, and failure rate data was projected based upon a specified process, in a controlled test environment. Actual results obtained may vary significantly.

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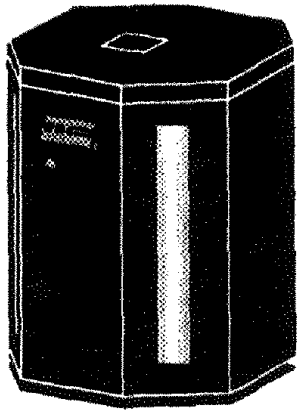
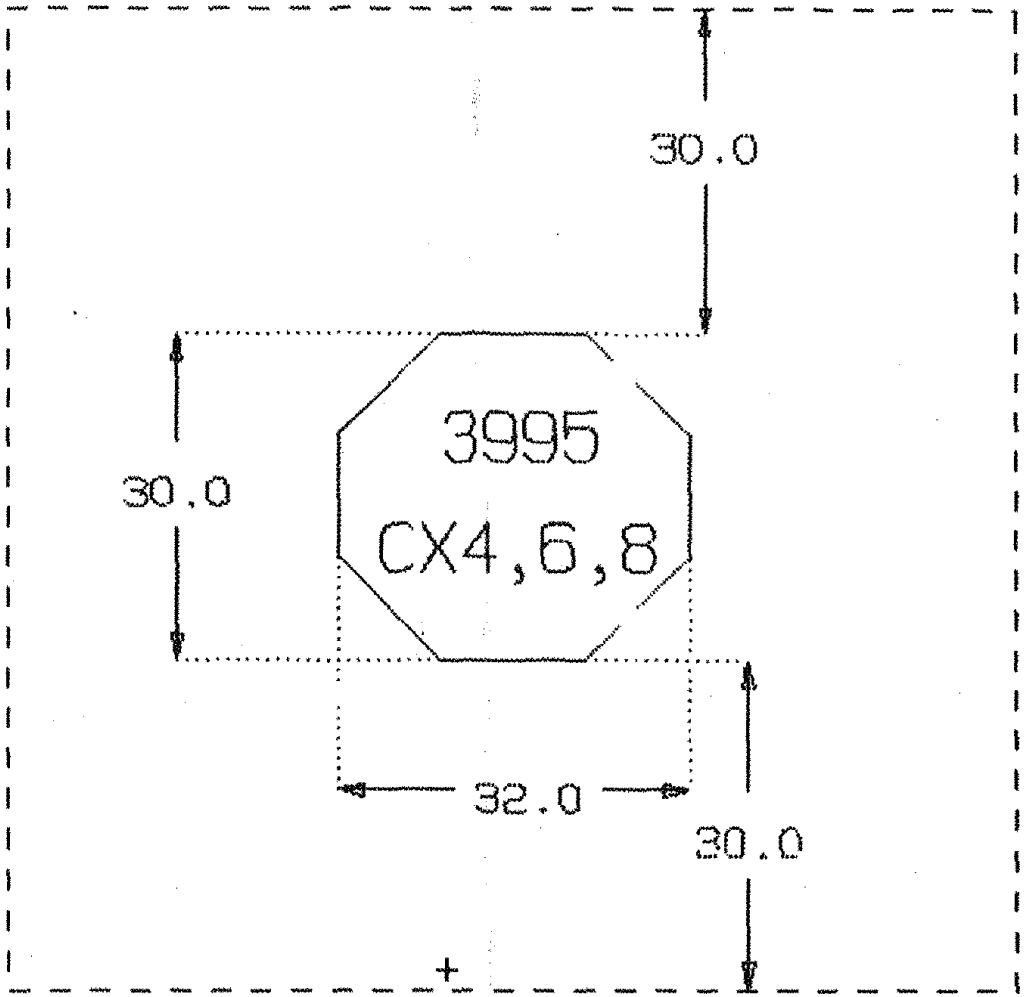
IBM hardware products are manufactured from new parts, or new and used parts. In some cases, the hardware product may not be new and may have been previously installed. Regardless, our warranty terms apply.

G225-6809-00

500602



3995 Optical Disk



cbr03/10/99

120V or 208V, 15Amp, 1-Phase, 3-Wir

Qty (1) of either:

STD (1) NEMA 5-15R (120V)
F/C 9908 = NEMA 6-15R (208V)
F/C 9909 = R&S 3913U-2 (Inline Connector @208V)
or R&S 3943U-2 (Receptacle @208V)

Max = .45KVA, .35KW, 1.2KBtu
Max Wt. = 446 lbs.

Library Controller:
Max = .28KVA, .17KW, .58KBtu
Max Wt. = 45lb.
6' Powercord to 3995

+ SYSTEM POWER PROFILE

BOC 7026-H50 SYSTEM

5/17/99 18:38

60 HERTZ SYSTEM

EQUIPMENT LIST

ROW	C	QTY	UNIT-MOD	REMARKS		
1	6	1	7026-H50	KVA-.63	KW-.60	CON-RACK
2	6	1	7026-H50	KVA-.63	KW-.60	CON-RACK
3	6	1	9910-U33	KVA-.287	KW-.287	CON-C
4	6	1	7014-S00	KVA-.01	KW-.01	CON-C
5	6	2	7133-D40	KVA-.483	KW-.483	CON-RACK
6	5	2	3153-BG3	KVA-.07	KW-.07	CON-H
7	5	1	3575-L24	KVA-.45	KW-.35	CON-H
8	5	1	3995-C68	KVA-.30	KW-.18	CON-H

:

:--1,2,3)IBM 3PH,1PHLN,1PHLL 4,5,6)OEM 3PH,1PHLN,1PHLL

SYSTEM DATA

60 HZ DATA	3 PHASE	1 PH L-N	1 PH L-L	TOTAL (3PH)
SYSTEM VOLTAGE.....=	208.00	120.00	208.00	208.00 VOLTS
STDY STATE RMS I/LINE=	.00	7.08	11.98	9.05 AMPS
STDY STATE PEAK I/LINE=	.00	10.01	16.95	12.80 AMPS
NEUTRAL I 3PH BAL SYS =	.00	.00	.00	.00 AMPS
POWER FACTOR.....=	.00	.79	.99	.96
REAL POWER.....=	.00	.67	2.46	3.13 KW
REACT.PWR (LEAD+ LAG-)=	.00	-.52	-.38	-.91 KVARS
APPARENT POWER.....=	.00	.85	2.49	3.26 KVA
AIR HEAT DISSIPATION..=	.00	2.29	8.41	10.69 KBTU/HR
WATER HEAT DISSIPATION=	.00	.00	.00	.00 KBTU/HR

SYSTEM NOTES

1) PROFILE VALUES SHOWN ARE POWER REQMT AT LAST CUSTOMER CKT BREAKER PANEL(S) CONNECTING EDP/MG TO PWR SOURCE. LOSSES IN CABLE(S) TO XFRMR/UPS AND IN XFRMR/UPS ARE NOT INCLUDED.
2) PROFILE ASSUMES WORST CASE USAGE,IE ALL DISK DRIVES RUNNING AND ALL TAPES MOUNTED.

INRUSH DATA

THE INRUSH CURRENTS (PEAK) ARE:

ROW	UNIT MDL	AMPS	NOTE	ROW	UNIT MDL	AMPS	NOTE

INRUSH NOTES

1) INRUSH VALUE GIVEN IS WORST CASE PEAK VALUE FOR 1 UNIT OF THE TYPE SHOWN.
2) INRUSH CURRENTS FOR VARIOUS UNITS DO NOT OCCUR SIMULTANEOUSLY SINCE UNITS ARE NORMALLY SEQUENCED ON.
3) ALL INRUSH CURRENTS (UNLESS OTHERWISE STATED) ARE FOR A HALF CYCLE OR LESS.

UNIT DATA

BOC 7026-H50 SYSTEM

5/17/1999 18:38

60 HZ. SYSTEM

C UNIT-MDL	QTY:	KVA	PLUG TYPE	BTU WATER	BTU AIR	POUNDS WGT/UNIT:	SYSTEM NOTES
6*7026-H50	1:	.630:	RACK		2048		
6*7026-H50	1:	.630:	RACK		2048		
6*9910-U33	1:	.287:	C		980		
6*7014-S00	1:	.010:	C		34		
6*7133-D40	2:	.966:	RACK		3297		
5*3153-BG3	2:	.140:	H		478		
5*3575-L24	1:	.450:	H		1195		
5*3995-C68	1:	.300:	H		614		
TOTAL (3PH)		3.262			10693		

* SYSTEM NEUTRAL CURRENT MAY BE HIGHER, CURRENT HARMONIC ANALYSIS DIFFERENT AND TYPICAL CURRENT WAVESHAPES DIFFERENT THAN LISTED SINCE THE ACTUAL CURRENT WAVESHAPE FOR THIS TYPE/MODEL IS NOT ON FILE.

PLUG NOTES

REF CODE : PP/BU	REF	PROVIDED WITH MACHINE POWER CORD PLUG CAP	DESCRIPTION	PROVIDED BY CUSTOMER RATING VOLTS:	AMP	PHASE	WIRES	INLINE CON'CTR OR REC'TCLE	
C	40	RS 3750	WATERPROOF	250	30	1	3	3933	3753
H	4	NEMA 5-15P	NONLOCKING	125	15	1	3	5-15R	5-15R

HH - HARVEY HUBBELL OR IEC 309 EQUIVALENT
RS - RUSSELL STOLL
NEMA- NATL ELECT MFR ASSOC CONFIG NO
BU - FIGURE NUMBER IBM BULLETIN C-B-2-4700-009
PP - INTERNAL REFERENCE USED IN POWER PROFILE AND IN MANY INSTALLATION PLANNING MANUALS

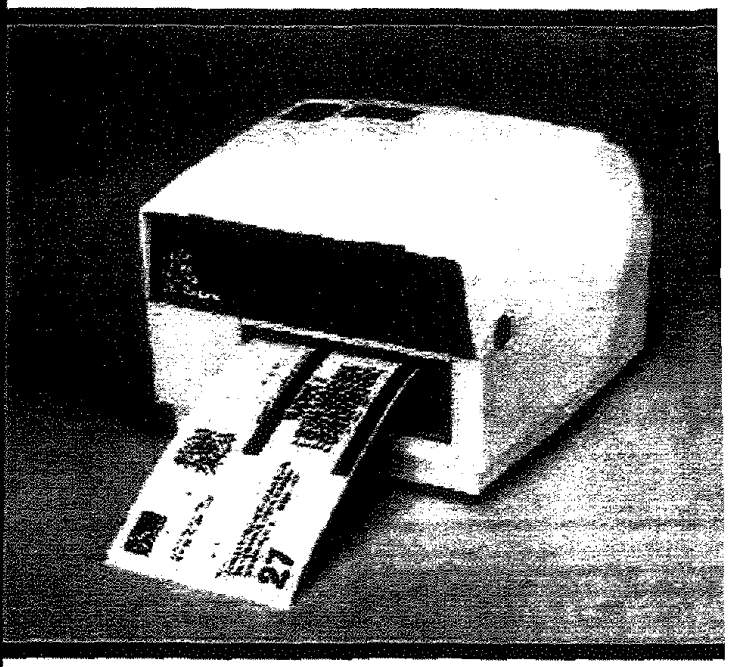
WHEN RUSSELLSTOLL INLINE CONNECTOR IS USED WITH FLEXIBLE METAL CONDUIT OR LIQUID-TIGHT FLEXIBLE CONDUIT, A RUSSELLSTOLL FSA OR JPA ADAPTER IS REQUIRED.

GENERAL NOTES

1) KVA TOTALS ARE A VECTOR SUM,NOT ARITHMETIC SUM
2) TOTAL HEAT VALUES ARE DERIVED FROM TOTAL SYSTEM POWER,NOT UNIT HEAT SUM
3) IF THE CPU USES A MG,KVA AND A/C DATA FOR ATTACHED UNITS IS IN THE CPU DATA
4) THE VALUES SHOWN ABOVE ARE FOR DATA PROCESSING EQUIPMENT ONLY. ADDITIONAL POWER AND A/C LOADS SHOULD BE ADDED TO COMPENSATE FOR NON-DATA PROCESSING EQPT. AND ROOM LOSSES. CONSULT YOUR POWER AND A/C CONTRACTORS OR CONSULTANTS TO DETERMINE IF THE TOTAL CAPACITY INSTALLED OR PLANNED IS ADEQUATE
5) AN EMERGENCY POWER OFF BUTTON SHOULD BE INSTALLED IN ALL COMPUTER ROOMS AS STATED IN THE NATL. ELECTRIC CODE ARTICLE 645
6) THE USE OF NEW POWER CONVERSION TECHNOLOGIES IN THE DATA PROCESSING INDUSTRY HAS CREATED UNANTICIPATED HARMONIC CURRENTS. THIS OCCURS WHEN LARGE NUMBERS OF SINGLE PHASE PRODUCTS ARE POWERED FROM THREE PHASE SYSTEMS. CONSEQUENCES ARE A NEUTRAL CURRENT UP TO 1.73 TIMES THE PHASE CURRENT FOR THESE PRODUCTS, WITH POSSIBLE OVERLOADING OF TRANSFORMERS AND BUILDING WIRING. CBEMA INFORMATION LETTER 'THREE PHASE POWER SOURCE OVERLOADING CAUSED BY SMALL COMPUTERS AND ELECTRONIC OFFICE EQUIPMENT' DISCUSSES DERATING TRANSFORMERS AND OTHER PRACTICES FOR DEALING WITH THIS SITUATION. TO OBTAIN THIS PAPER CALL 1-202-737-8888. USE TRUE RMS AMMETERS TO MEASURE CURRENTS SINCE SIMPLE CLAMP-ON AMMETERS READ VERY LOW WHEN HARMONIC CURRENTS ARE PRESENT
7) FUTURE GROWTH OF THIS DATA PROCESSING SYSTEM MAY REQUIRE GREATER POWER AND COOLING REQUIREMENTS THAN SHOWN IN THIS POWER PROFILE REPORT. THIS CAN BE DUE TO ACTIONS SUCH AS; MODEL UPGRADES , THE ADDITION OF MORE DEVICES OR ADDING FEATURES THAT REQUIRE MORE POWER. IT IS GOOD PRACTICE TO RUN ANOTHER PROFILE BASED ON AN ESTIMATE OF FUTURE GROWTH AND CONSIDER THAT PROFILE ALSO WHEN SPECIFYING THE POWER AND COOLING SYSTEMS FACILITIES.

Zebra® T300

THERMAL TRANSFER DEMAND PRINTER



Introducing the T300

The T300™ is an affordable, compact and simple-to-use bar code printer that's perfect for first-time users. With its thermal transfer printing capability, the T300 produces long lasting labels that retain their original sharp appearance, even after exposure to outdoor elements and harsh chemicals. As a result, it's ideal for applications such as compliance shipping, labeling parts bins, archiving document files or tagging company assets.

Affordable
The T300 is an affordable, reliable point-of-use labeling solution for low-volume printing applications. It includes many standard features, such as the peel-off feature, that are often options on other brands.

Simple-to-use
The T300 is easy to set up, operate and maintain. The printer's unique "clam shell" design makes access so easy, no special operator training is required to install and reload media. User-friendly, Windows™-based WYSIWYG BAR-ONE® software comes as a standard feature, so even computer novices will find it easy to design and print labels.

Compact
Smaller than a shoe box and weighing just over 7 pounds (3.15kg), the T300 is perfect for busy environments or small spaces.

Network-ready
The T300 can be connected to your network via Ethernet through the use of ZebraNet™, Zebra's micro print server. This enables multiple users working on a variety of platforms to connect to the same printer. As up to 40 print jobs can be queued from multiple hosts, the T300 provides distributed, on-demand printing capabilities at an affordable price.

For more information

For additional details on all Zebra® printers, supplies, software and accessories, call your Zebra representative or visit our website at: http://www.zebra.com.

- **Satisfy all of your low-volume, on-demand requirements for high-quality, durable labels using any computer system**
- **Start using your new printer immediately with the supplied BAR-ONE software, and Zebra media and ribbon**
- **Zebra's ZPL II® programming language allows easy integration into existing systems that run Zebra printers—without the need for additional software**

Industry/application overview

- **Manufacturing/product identification**
- **Distribution**
- **Professional offices**
- **Health care**
- **Transport**
- **Automotive**

500607

Zebra

When it's on the line.™

T300 Specifications*

STANDARD FEATURES

PRINT SPECIFICATIONS

- **Print Method/s** Thermal transfer
- **Print Width** 1.0" (25mm) to 4.125" (104mm)
- **Print Length** 0.5" (13mm) to 18.0" (457mm)
- **Resolution** 203dpi (8 dots/mm)
- **Speed/s** 2.0"/sec. (50mm/sec.) and 1.5"/sec. (38mm/sec.)

PHYSICAL CHARACTERISTICS

- **Length** 10.1" (257mm)
- **Width** 8.8" (224mm)
- **Height** 6.2" (157mm)
- **Construction** ABS/Polycarbonate plastic
- **Weight** 7 lbs. (3.18kg)
- **Shipping Wt.** 10 lbs. (4.54kg)

PRODUCT FEATURES

- Transmissive and reflective media sensors
- Peel-off and tear-bar features
- 32-bit processor
- 512K DRAM

SOFTWARE

- **ZPL II® Programming Language**
  Universal language for Zebra printers. Makes label creation and formatting simple.
- **BAR-ONE® Software**
  Zebra's Windows™-based WYSIWYG label design and printing software.

OPERATING CHARACTERISTICS

ENVIRONMENT

- **Operating Temp.** 40°F (4°C) to 100°F (38°C)
- **Storage Temp.** -4°F (-20°C) to 140°F (60°C)
- **Operating Humidity** 10-90% non-condensing
- **Storage Humidity** 10-90% non-condensing

ELECTRICAL

- External 120VAC or 230VAC power supply at 47-63Hz (additional country line cords available)

COMMUNICATION / INTERFACE CAPABILITIES

- 36-pin Centronics®-compatible parallel port
- RS-232 serial port (9-pin)

AGENCY APPROVALS

- UL 544 (Part 42.5); CSA 22.2 (No. 950); carries CE mark of compliance; IEC 950/EN 60950; FCC (Part 15 Subpart B/Level A); AAME 4.3.2; UL 1950; SOR/88-475; EN 50082-1; CISPR 22 (Class B)

MEDIA CHARACTERISTICS

MEDIA SPECIFICATIONS

For optimum print quality and printer performance, use genuine Zebra supplies.

- **Width** 1.0" (25mm) to 4.65" (118mm)
- **Max. Roll Capacity** 4.0" (102mm) O.D.
- **Core Size** 1.0" (25mm) I.D.
- **Interlabel Gap** 0.08" (2mm) to 0.16" (4mm)
- **Length** 0.5" (13mm) to 18.0" (457mm) Tear-off
  1.0" (25mm) to
  18.0" (457mm) Peel-off and cutter
- **Thickness** 0.003" (0.076mm) to 0.01" (0.25mm)

RIBBON SPECIFICATIONS

Ribbon is recommended to be at least as wide as media.

- **Max. Length/Roll** 360ft (110m)
- **Max. Width/Roll** 1.0" (25mm) to 4.25" (108mm)
- **Core Size** 0.5" (13mm) I.D.
- **Roll Capacity** 1.5" (38mm) O.D.

FONTS / GRAPHICS / SYMBOLOGIES

CHARACTER FONTS/SETS

- **CHR Fonts** Standard: 7 bitmapped (A, B, D, E (OCR-B), F, G, H (OCR-A)) and 1 smooth (CG Triumvirate™ Bold Condensed): 6, 8, 10, 12, 14, 18 pt.
- **CHR Sets** IBM® Code Page 850 (international characters, graphic symbols)

GRAPHIC FEATURES

- Supports user-defined fonts and graphics—including custom logos

BAR CODE SYMBOLOGIES

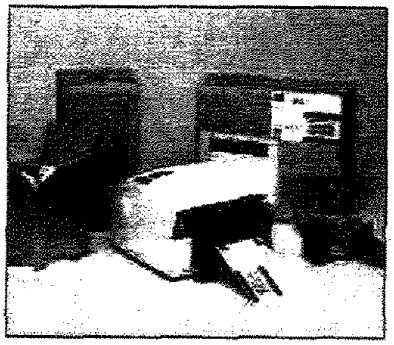
- **One-Dimensional**
  Code 39, Code 11, Code 93, Code 128, CODABAR, Plessey, LOGMARS, Interleaved 2 of 5, EAN-8, EAN-13, Industrial 2 of 5, UPC-A, UPC-E, Standard 2 of 5, Postnet, MSI, UCC/EAN 128, UPC/EAN with 2 and 5 digit supplements
- **Two-Dimensional**
  MaxiCode, PDF-417

OPTIONAL FEATURES

OPTIONS/ACCESSORIES

- **ZebraNet™ micro print server** (provides Ethernet network capability)
- **PC-470™ print controller** (for stand-alone applications; in place of a computer)
- **Rotary media cutter**

Compliance Shipping



Bar code label customer shipments with the 7300 printer.

Zebra Technologies Corporation
International Headquarters Office
333 Corporate Woods Parkway
Vernon Hills, IL60061-3109 U.S.A.
Phone: +1 (847) 634-6700 or (800) 423-0422
Fax: +1 (847) 913-8766

Zebra Technologies Europe Limited
European Headquarters Office
Zebra House
The Valley Centre, Gordon Road
High Wycombe
Buckinghamshire HP13 6EQ, UK
Phone: +44 (0) 1494 472872
Fax: +44 (0) 1494 450103

Zebra Technologies Europe GmbH
Regional Sales Office—Germany
Birkenwaldstr. 38
63179 Obertshausen
Germany
Phone: +49 (0) 6104 959135
Fax: +44 (0) 6104 959111

Zebra Technologies Corporation
Regional Sales Office—Asia/Pacific
301 Geyland Road #04-05
Geyland Centre, Singapore 389344
Phone: +65-842-0322
Fax: +65-842-0366

Zebra Technologies Corporation
Regional Sales Office—Latin America
4300 N. University Dr., Suite C-200
Ft. Lauderdale, FL33351 U.S.A.
Phone: +1 (954) 747-5090
Fax: +1 (954) 747-3655

***Specifications listed are for base model printers with standard features only unless otherwise noted. Ask your Zebra representative for detailed specs for the printer recommended for your application.**

www.zebra.com

500609

I.D. Number: 023ALL Cisco 4500

- **More Information on Cisco 4500-M Modular Router**

Introduction

Cisco's 4000 router familyis growing again, with a new platform (the Cisco 4500), two new ISDN Network Processor Modules (NPMs), along with new IOS software features. The new 4500 joins the modular 4000 familyand the fixed-configuration 2500 and 3000 familiesto create the industry's broadest spectrum of access router platforms. When combined with Cisco's Internetwork Operating System (IOS) features, these platform familiesform the most flexibleand diverse access router product line available. Now, more then ever before, Access Without Compromise means greater IOS functionality and features on an even more diverse platform family.

The Cisco 4500 is a new midrange platform with two key defining characteristics:

- A high-performance RISC processor, which makes it particularly well suited, along with the new NPMs and software features, to solving current and future wide-area network (WAN) problems.
- Compatibilitywith existing Cisco 4000 NPMs and with the Cisco IOS, thus providing protection to customers' existing investments in Cisco equipment and assuring the proven broad and deep protocol support of Cisco's software.

The Cisco 4500 will be deployed in several different applications in each of the four market sectors: Access, Core, Workgroup, and IBM networking. Its performance shines in processor-intensive WAN applications. It offers benefits for IP network providers, multiprotocol network users, and legacy network integration and migration.

This announcement provides details regarding the Cisco 4500 and related new products and features. These include:

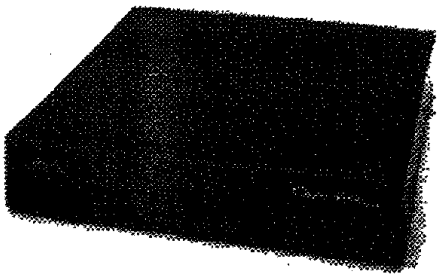
- Cisco 4500—Cisco's new midrange router platform that features the high performance of the 64-bit IDT Orion RISC processor (a MIPS R4400 derivative), compatibilitywith Cisco's existing NPMs, and the proven features of Cisco's IOS.
- ISDN BRI NPMs—Two new multiport ISDN BRI NPMs for internetworking over cost-effective Basic Rate Interfaces. A four-port version and an eight- port version are supported by new ISDN features in the IOS.

- Protocol Translation—Long available on Cisco's communication servers, protocol translation is now available on the 4000 and 4500. Terminal sessions can be translated between Telnet, LAT, and X.25, allowing interaction in nonhomogenous environments.

- Data Compression—Payload compression for X.25 links reduces usage costs by compressing the payload of X.25 frames before they are sent out to the public network. Link compression increases volume over point to point links by compressing the entire data stream.

- ATM—Cisco is announcing its intention to deliver an ATM NPM for the Cisco 4500 platform. This commitment allows Cisco customers to plan ahead for simple upgrades when ATM services are generally available. The delivery of the ATM NPM will further protect their investments in the Cisco platforms.

Figure 1.:



500610

Cisco 4500

Overview

Cisco 4500

Throughout the world, networks are growing at a tremendous rate. As network size, complexity, and bandwidth increase, so do the demands on the network infrastructure. Router configurations become more complex, new features and protocols add to system software size, and faster networks stress equipment. The processing power and operating memory that seemed plentiful a year ago might suddenly become inadequate for emerging networking requirements. Anticipating this evolution, Cisco has created the Cisco 4500, a new internetworking platform that will accommodate such growth.

The Cisco 4500's high performance comes from its 100-MHz, 64-bit IDT Orion RISC processor. It delivers impressive results in processor-intensive router operations. The fast clock speed and the RISC architecture enable the router to speed through tasks such as encapsulation, policy/security screening, and protocol conversion. This makes the Cisco 4500 an ideal platform for internetworks supporting SNA, for security and policy partitioning in campus internetworks, and for WAN internetwork gateways. It will also prove its worth in the ongoing internetwork migration as Cisco continues to develop new IOS features, higher-speed interfaces, and higher-density NPMs to make use of the available performance.

Along with the new processor, Cisco has made some -significant memory enhancements. The 4500 comes standard with 8 MB of main DRAM, 4 MB of system Flash, 4 MB of Boot Flash, and 4 MB of shared DRAM.

Main memory stores the IOS running configuration and routing tables. With 8 MB as the standard configuration, the 4500 is ready to run IOS version 10.1. (For details of memory configurations see the table on page 10.) The Cisco 4500's main DRAM can be upgraded to 32 MB for large networks with large configurations or for future IOS versions with additional features.

Shared memory is used for packet buffering by all of the router's network interfaces. The 4-MB standard configuration is suitable for Cisco 4500s with up to 24 physical or virtual network interfaces. To increase throughput for greater numbers of interfaces (for example, config-urations including Frame Relay interfaces with many DLCIs), the shared memory can be upgraded to 16 MB of DRAM.

System Flash stores the compressed system software image. The boot helper image, stored in EPROM in previous Cisco 4000 routers, is stored in the Boot Flash on the Cisco 4500. Upgrading the Boot image is greatly simplifiedwith this configuration.

Even with the changes in processor and memory architecture, the Cisco 4500 retains compatibilitywith the Cisco IOS and with existing network interface modules. Delivery of the entire Cisco IOS feature set on this new platform at first release is key to users who want to deploy the Cisco 4500 into existing enterprise networks. Similarly, compatibilitywith existing NPMs is important to preserve the value of customers' investments in Cisco products. All recent revision NPMs, with the single exception of the NP-1E single-port Ethernet module, are compatible with both the Cisco 4000 and the Cisco 4500. (For details see the NPM compatibilityrequirements in the table on page 9.)

ISDN BRI NPMs and IOS ISDN Features

Two new NPMs provide the Cisco 4000 and Cisco 4500 platforms with ISDN Basic Rate Interface (BRI) support. One NPM has four separate physical ISDN BRIs; the other offers even greater density with eight separate BRIs. Since each physical BRI supports two 64-kbps ISDN B channels, the four- and eight-BRI NPMs provide 8 and 16 B channels, respectively.

The two new multiple BRI NPMs provide cost-effective remote office data gathering for organizations that want to take advantage of less costly ISDN tariffs. ISDN BRI services are especially cost effective for internetworking connections where the 64-kbps channels can be saturated and when access is required for only a portion of the working day. This is because tariffs are based upon the length of time that the call is established, not on the amount of data forwarded.

The Cisco IOS has an extensive set of features that make ISDN an even more effective internetworking technology. These features include dial backup and dial on demand for IP and other protocols. More information on Cisco's ISDN offering and the ISDN BRI NPMs is included in the ISDN Product Announcement that accompanies this announcement.

Protocol Translation 500611

Protocol translation has been offered on Cisco's communication servers and on some router platforms for several years. Now the Cisco 4000 and Cisco 4500 also support this unique feature. Protocol translators convert between virtual terminal protocols to allow devices running dissimilarprotocols to communicate. This feature provides improved applications availabilitythrough increased connectivity as well as cost savings by protecting investments in legacy terminal and/or computer networks. Standalone devices can provide this feature but at extra cost. By including this capability on the router, Cisco can further reduce

our customers' network costs.

Cisco's protocol translation software supports Telnet, TN3270, Local Area Transport (LAT), and X.25. Descriptions of these protocols follow.

- Telnet—Telnet is the TCP/IP remote terminal protocol. TCP/IP is the most widely implemented protocol suite on networks of all media types. Cisco's protocol translation capabilities allow sessions between Telnet devices and X.25 or LAT devices.

- TN3270—TN3270 is the Telnet 3270 terminal emulator. TN3270 devices communicate with IBM hosts or front-end processors that support TCP/IP. The Cisco Protocol Translator can be used by X.25, Telnet, or LAT devices to emulate TN3270 devices for connection to IBM hosts.

- Local Area Transport (LAT)—LAT is Digital Equipment Corporation's proprietary terminal connection protocol used with Digital minicomputers. Cisco's routers support bridging of the LAT protocol. The addition of protocol translation allows LAT packets to be converted for communication with X.25 and Telnet devices.

- X.25 PAD—Cisco protocol translators support the X.25 protocol and X.3/X.28/X.29 specifications for virtual terminal support. This capability allows the conversion from X.25 to LAT and Telnet.

Both the 4000 and the 4500 are capable protocol trans-lation platforms. Either unit can support up to 180 sessions. The 4500 will, of course, have significant processing power to spare for routing functions, even with a large number of protocol translation sessions running.

Data Compression

500612

The demand for data to travel across the WAN is continuously increasing, driving the development of faster link services and more efficient transfer methods. The key elements that are driving the growth in need for additional WAN bandwidth are the many different applications that are being used in the networks and the growth in the size of the networks themselves. Of course, bandwidth does not come without a price, so optimizing use of the available bandwidth is critical.

Cisco's commitment to develop and market products that can provide a lower total cost of ownership is documented in the white paper published as Product Bulletin #231 earlier this year. This commitment has resulted in a broad spectrum of hardware platforms and a comprehensive set of IOS features to optimize usage of WAN links. These include features such as Compression, Priority Output Queuing, Custom Queuing, Access Lists, Novell Static SAPs, and Novell IPX SAP filters. WAN optimization involves processor-intensive functions that make the Cisco 4500 an excellent candidate for these applications.

Two new data compression features have been added to the IOS recently. Link compression and X.25 Packet Payload compression augment the existing TCP/IP header compression and DEC LAT compression features. Link compression, which compresses all of the data on a serial interface, was introduced in IOS 10.0(4). It provides complete data-stream compression on a point-to-point synchronous serial link. Payload compression, which compresses only the data payload portion of the data packet while leaving the header intact, is the required method of compression for operation across virtual network WAN services such as X.25. Because the header information is left unchanged, the packet still can be switched through the WAN packet network. Cisco's X.25 payload compression feature

is included in IOS version 10.2.

ATM

Several years ago Cisco released a Statement of Direction with a three-phase plan for ATM implementation on our internetworking platforms. Since that time, Cisco has delivered each of the phases as promised. Today, a native ATM interface is available on the Cisco 7000 series.

Now, Cisco is announcing that the Cisco 4500 will also support a native ATM interface. In mid-1995 Cisco will release and ship a new ATM NPM. It will be available with T1/E1, T3/E3, and SONET/SDH direct interfaces to ATM switches and services at rates up to 155 Mbps.

This commitment will allow our customers a long-term upgrade path for the Cisco 4500. For workgroup/campus networks, customers can operate with an FDDI backbone now and upgrade to ATM when the technology is more mature. This migration path requires only swapping the FDDI hub for an ATM switch and FDDI NPMs for ATM NPMs. Customers' investments in infrastructure cabling, router chassis, and LAN NPM cards are protected. For wide-area applications, customers will be able to replace current serial NPM interfaces with ATM NPMs when services are deployed to support them. Again, the value of the investment made in chassis and other NPMs will be maintained.

For early ATM technology adopters, Cisco has a product available today. The Cisco 7000 ATM Interface Processor (AIP) has been available since June. It provides the best-in-class performance and functionality expected from a high-end core Cisco product. AIP-equipped Cisco 7000s along with Cisco's HyperSwitch are creating the ATM router-cluster backbone networks.

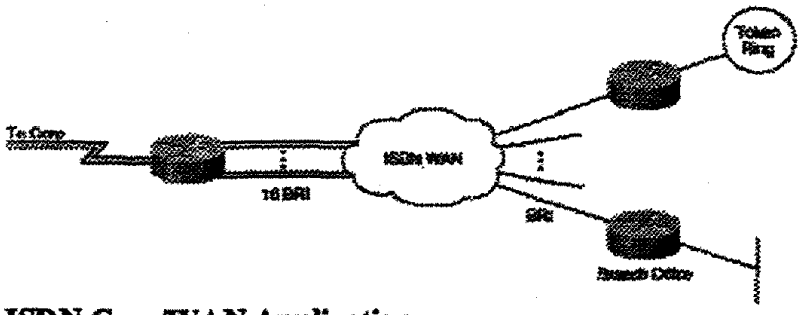
The Cisco 4500 ATM NPM will be targeted to the increasing number of users who will need only backbone connectivity. This access, possibly duplicated many times over from remote sites over evolving ATM public services, will demand a lower-cost solution. In these user environments, a low-cost ATM LAN/WAN configuration based on the Cisco 4500, such as one ATM interface with four Ethernets or one ATM with four Token Ring interfaces, will be the ideal solution.

4500 Applications in Cisco's Key Segments

The Cisco 4500 offers the same modularity as the Cisco 4000. This flexibility allows custom configurations that can apply to many applications in all four of Cisco's defined market segments: Access, Core, Workgroup, and IBM networks.

The Cisco 4000 remains the most cost-effective modular router in our product line. The Cisco 4500's improved performance is very well suited for applications that are more processor-intensive. In particular, and in combination with the new NPMs and software features, the Cisco 4500 will be used extensively in WAN applications for higher density, policy/security, and protocol conversion and translation. The examples that follow are some common applications in which the Cisco 4500 will be used.

Figure 2.:



ISDN Core/WAN Application

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Core/WAN

The Cisco 4500 will be used in many different Core/ WAN applications. Its size, modularity, and performance make it the router most appropriate for the distribution ring in large networks and even for the core or backbone in some smaller internetworks. This section contains descriptions of some Core/WAN applications that could use the extra power of the Cisco 4500.

In the first example, shown in Figure 2, the 4500 is used as a distribution ring router. High-speed interfaces connect to core routers, and 16 BRIs are available for access from remote sites. This configuration could accept 32 simultaneous B-channel calls. This type of data concentration function usually calls for security/policy filtering to control access. That processor-intensive function, along with the throughput possible due to the density allowed, make the 4500 the ideal choice for this type of application.

Similar arguments can be made for the 4500 when the WAN is an X.25 or Frame Relay network. By using the quad serial port NPMs, a multiport WAN router can be built. With high-speed interfaces upstream to the core, and medium-speed X.25 lines into the PDN, the Cisco 4500 could cost-effectively concentrate data from many remote routers. X.25 payload compression and protocol translation further improve the economics of this application They also further tax the processing power of the router, making the Cisco 4500 an ideal platform for these applications. With Frame Relay interfaces, even higher data rates and more virtual circuits can be supported.

The next example, depicted in Figure 3, shows a common protocol translation application. Similar to the preceding case, the Cisco 4500 is used to concentrate data from multiple sites, this time from over an X.25 PDN. In this case, however, the router is performing an additional function. Remote users are making calls to the router through X.25 Packet Assembler/Disassemblers(PADs). The router accepts the calls, translates the terminal sessions from X.25 to Telnet, and forwards the new data on through the IP network. When the IP host responds, the router translates Telnet back to X.25 for delivery back to the terminal over the PDN.

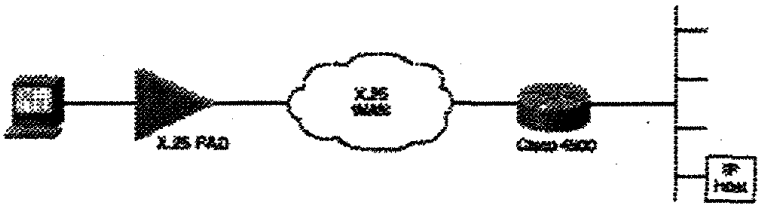
The reverse application is also useful. That is the case where Cisco routers form an IP WAN and the Cisco Protocol Translation feature is used to connect to X.25 hosts.

Providing these functions on our Cisco 4000 and 4500 router platforms can save our customers from purchasing extra dedicated devices and services for translation. The protocol translator allows network administrators to deliver services to diverse users on legacy networks simply and cost effectively.

The final Core/WAN application discussed here involves the use of Cisco's Generic Route Encapsulation (GRE). GRE is used, among other reasons, to provide multiprotocol connectivity across a single protocol

backbone. GRE is a processor-intensive function and is therefore a prime candidate for application on the Cisco 4500. IP service providers can use this feature to offer their customers multiprotocol service as well as to provide virtual private networks. Enterprise internetwork users could use this feature to tunnel low usage protocols over a common backbone.

Figure 3.:



Protocol Translation Application

IBM

The Cisco 4500 is particularly well suited to SNA applications. The RISC processor provides the high performance required to effectively handle large SNA networks. Encapsulation, local acknowledgments, protocol conversion, and custom queuing are all key parts of an SNA/router solution, and all require significant processing power.

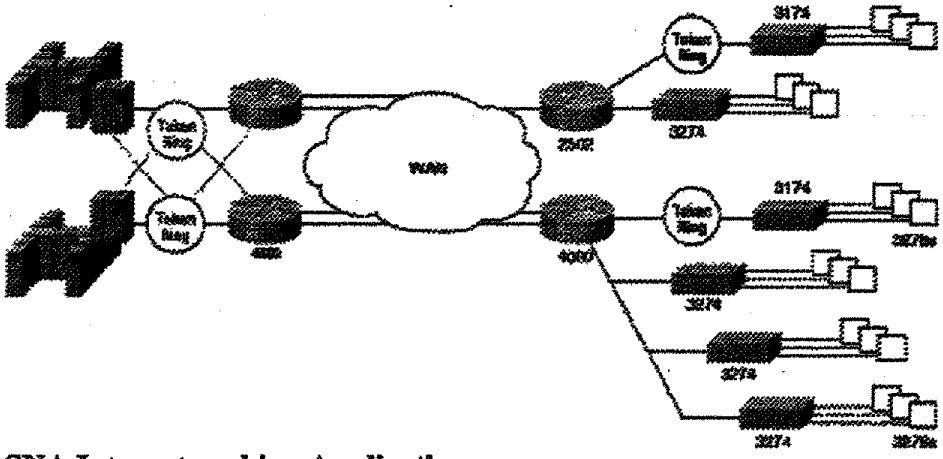
Figure 4 shows some typical SNA network applications. The two computer-room Cisco 4500s provide connectivity to the central site hosts. The interface is either via Token Ring or over serial SDLC lines. The Cisco 4500's modular capability allows configurations with a high density of serial lines and several Token Ring network interfaces. At the central site this can be used to dual-home the routers and provide extra WAN paths for higher availability.

The routers shown at the remote sites provide connection to the local cluster controllers and terminals. Again, connection can be via Token Ring or serial lines. Depending on the local environment and usage requirements, the remote sites could be serviced by Cisco 2500, Cisco 4000, or Cisco 4500 routers.

Cisco's IOS supports SDLC transport, SDLLC, and RSRB on the Cisco 4500. SDLC transport is used when both the cluster controllers and the front-end processors are connected to the internetwork over serial SDLC lines. If the host site has migrated to Token Ring LAN connections, the SDLC-to-LLC2 conversion (SDLLC) is used. Finally, if both ends of the WAN internetwork are Token Ring LANs, RSRB is used.

In all three cases the SNA data is encapsulated and then transported over the multiprotocol internetwork. Encapsulation is a processor-intensive function and thus is ideally suited for the Cisco 4500. All three scenarios also provide some form of local acknowledgment to maintain the state of the connection to the device without using valuable WAN bandwidth. This spoofing function is also processor intensive.

Figure 4.:



SNA Internetworking Application

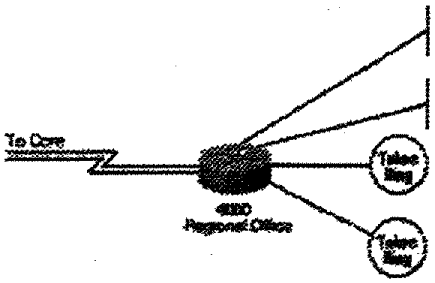
Access

The modular architecture and variety of NPMs available for the Cisco 4000 and the Cisco 4500 provide customers with the flexibilityto configure access routers for multi-LAN sites where fixed configuration routers do not meet their needs. As the lowest-cost modular router in the Cisco product line, the Cisco 4000 is ideally suited for access applications. Figure 5 shows a simple multi-LAN branch office. The router must support Ethernet for one group of users and Token Ring networks for IBM users. Two upstream synchronous lines provide connectivity to the backbone network.

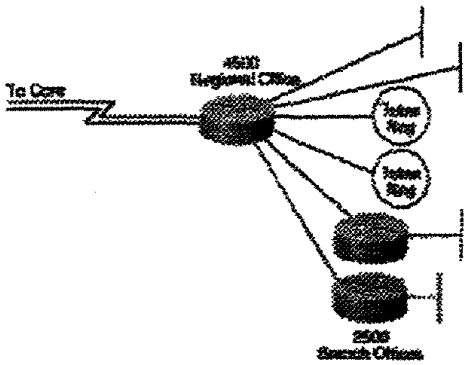
The Cisco 4500, with the same great flexibilityand even greater performance, can function as a regional site access router, especiallywhere some data concentration from branch offices is required. Figure 6 shows an example of this configuration. The Cisco 4500 provides access to the core network for the local LAN users, just as the Cisco 4000 did in the previous example. In this case, however, it must also support the data gathering function for the branch office sites that are connected via a WAN.

In this application, the extra performance of the Cisco 4500 enables the higher throughput required when forwarding data from multiple sites. In the case where the WAN is an X.25 network, more use can be made of the Cisco 4500's RISC processor bandwidth. The new Payload Compression feature can further reduce the cost of data concentration by compressing the X.25 packet contents while leaving the header to ensure transport across the packet-switched WAN. The smaller packets result in lower costs or recovered bandwidth for more applications.

Figure 5.:



Cisco 4000 Access Application
Figure 6.:



4500 Access Application

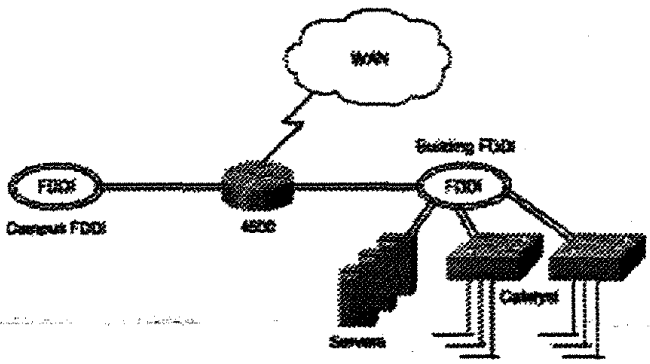
Workgroup/Campus

All of the specific applications for the Cisco 4500 described in the previous sections involve WAN environments; however, there are applications in workgroup and campus environments as well.

In Figure 7, two FDDI NPMs and one serial NPM are used on a single Cisco 4500 to provide policy/security filtering between a campus FDDI backbone, a departmental FDDI server network, and a WAN internetwork.

The Cisco 4500 can deliver the performance required for FDDI internetworking and for the extra load demanded of the administrative policy/security functions.

Figure 7.:



Campus Application

Cisco 4500 Configuration Guidelines

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Memory Requirements

The Cisco 4500 is a three-slot chassis very similar to the Cisco 4000. Both routers can hold up to three of the various NPMs. Following is a brief description of each NPM, the number of ports available, and the types of media each supports.

- Ethernet—Two versions are available: a single port and a dual port for a maximum density of six Ethernets per chassis. Both units provide both an AUI and a 10BaseT connector for each port. Note that the Cisco 4500 does not support the 1E NPM. The 1E is the oldest of the NPMs and

will not pass EMI tests with the new, higher-speed Cisco 4500. Given the position of the Cisco 4500 with respect to the Cisco 4000, we expect that most will be used in higher-density applications. The 1E will continue to be sold and supported in the Cisco 4000 chassis.

- Token Ring—NPMs are available with one or two Token Ring ports for a maximum of six Token Ring interfaces. On both single- and dual-port NPMs, DB-9 ports provide a direct connection to a media access unit (MAU).
- FDDI—Each NPM supports one FDDI network interface. Versions are available for either dual- or single-attached multimode or dual-attached single-mode fiber. The Cisco 4500 supports up to two FDDI NPMs; the Cisco 4000 supports one.
- Serial—NPMs are available with two or four serial ports for a maximum of 12 synchronous serial interfaces. Universal interfaces are provided where the cable attached to each port determines the interface type and mode.
- BRI—NPMs are available with four or eight basic rate interface ports. Each port is an RJ45.

The following table shows the combinations of NPMs that are supported by both chassis types.

NPM Configuration Limits

500618

NPM Type	Number of NPMs		
	4000	4500	Earliest version supported on 4500
Single Ethernet	1, 2, or 3	Not supported	Not supported
Dual Ethernet	1, 2, or 3	1, 2, or 3	TBD
Single Token Ring (NP-1R)	1, 2, or 3	1, 2, or 3	—
Single Token Ring (NP-1RV2)	1, 2, or 3	1, 2, or 3	Rev. 4
Dual Token Ring	1, 2, or 3	1, 2, or 3	Rev. 4
Multimode, dual-attached FDDI	1	1 or 2	Rev. 5
Multimode, single-attached FDDI	1	1 or 2	Rev. 5
Single-mode, dual-attached FDDI	1	1 or 2	Rev. 5
Dual-port serial	1, 2, or 3	1, 2, or 3	—
Four-port serial	1, 2, or 3	1, 2, or 3	—
Four-port MBRI	1, 2, or 3	1, 2, or 3	—
Eight-port MBRI	1, 2, or 3	1, 2, or 3	—

The standard memory configuration for the Cisco 4500 includes 8 MB of main DRAM, 4 MB of System Flash, 4 MB of Boot Flash, and 4 MB of shared DRAM. Main memory can be upgraded to 32 MB for large networks with large configurations or for future IOS revisions with additional features. System Flash memory can be upgraded to 8 MB for additional room for stored images. Shared memory can be upgraded to 16 MB for applications where more then 24 physical or virtual interfaces are configured. The Cisco 4500 also uses Flash memory to store the Boot image. This change allows

simplifiedBoot image upgrades.

The table below lists the standard and optional memory configurations for the Cisco 4500. Configurations for the older Cisco 4000 and the Cisco 4000-M are included for comparison. It also shows the minimummemory requirements for the Cisco 4500 and Cisco 4000 in order to support several IOS releases. See the table footnotes for recommended configurations for specific applications.

Memory Requirements and Options

		Boot	System Flash	Main DRAM[1]	Shared DRAM[2]
Memory Options Supported &&Center&& &&Center&& &&Center&&					
	Cisco 4000	1, 2 EPROM	2, 4	4, 16	1, 4
	Cisco 4000-M	1, 2 EPROM	4, 8	4, 8, 16, 32	4, 16
	Cisco 4500	4, 8 Flash	4, 8	8, 32	4, 16
Minimum Memory Requirements by Image &&Center&& &&Center&& &&Center&&					
Cisco 4000		EPROM &&Center&& &&Center&& &&Center&&			
	IOS 9.14(6)	1	2	4	1[3]
	IOS 9.21	2	4	16	4
	IOS 10.0	2	4	16	4
Cisco 4000-M		EPROM &&Center&& &&Center&& &&Center&&			
	IOS 9.14(6)	1	4	4	4

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	IOS 9.21	2	4	8	4
	IOS 10.0	2	4	8	4
Cisco 4500		Flash &&Center&& &&Center&& &&Center&&			
	IOS 10.1	4	4	8	4

[1]Use more memory for large configurations. This is independent of network size and protocol.

[2]Shared Memory: 4 MB is sufficient for applications with up to 24 physical or virtual interfaces. For greater then 24 physical or -virtual interfaces use more shared DRAM.

[3]On the original Cisco 4000, the standard configuration was 1 MB, which was sufficient for applications with up to 5 virtual -interfaces. For networks with 6 or more physical or virtual interfaces, use 4 MB shared DRAM.

Due to the evolution of memory devices and speed requirement differences between the Cisco 4500 and the Cisco 4000-M, the components used to provide the memory in each chassis are different. The table below shows the part numbers and descriptions for the various memory components.

Memory Component Part Numbers

Part Number	Platform	Description
MEM-NP4F=	4000	Additional 2 MB of Flash EPROM (total 4 MB)
MEM-NP16M=	4000	Additional 12 MB of Main Memory (total 16 MB)
MEM-NP4S=	4000	Additional 3 MB of Shared Memory (total 4 MB)
MEM-NP8F-M (=)	4000-M	Additional 4 MB of Flash EPROM (total 8 MB)
MEM-NP8M-M (=)	4000-M	8 MB Upgrade, replaces 4 MB Main Memory (total 8 MB)
MEM-NP16M-M (=)	4000-M	16 MB Upgrade, replaces 4 MB Main Memory (total 16 MB)
MEM-NP32M-M (=)	4000-M	32 MB Upgrade, replaces 4 MB Main Memory (total 32 MB)
MEM-NP8F-P (=)	4500	Additional 4 MB of Flash EPROM (total 8 MB)
MEM-NP32M-P (=)	4500	32 MB Upgrade, replaces 8 MB Main Memory (total 32 MB)
MEM-NP16S-P (=)	4500	16 MB Upgrade, replaces 4 MB Shared Memory (total 16 MB)

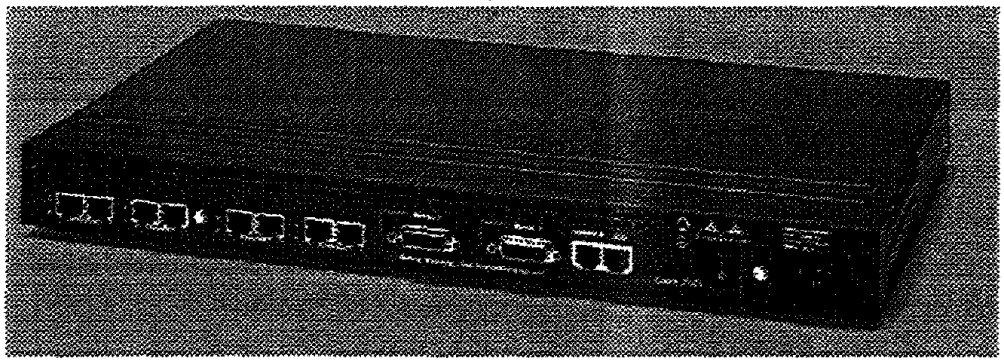
Cisco 4500, Features, Pricing, and Availability

Availabilityinformation for the Cisco 4500, the new NPMs, and the related software features is shown in the table below. Pricing information is included in the Ordering Information Addendum.

Product and Feature Availability

Feature/Module/Chassis	IOS Release	Orderable	FCS
4500 Chassis	10.1	08/08/94	08/22/94
4 MBRI NPM	10.2	08/08/94	10/01/94
8 MBRI NPM	10.2	08/08/94	10/01/94
Protocol Translation (4000)	10.0(4)	now	now
Protocol Translation (4500)	10.2	08/08/94	10/01/94
X.25 Packet Compression	10.2	08/08/94	10/01/94

Posted: Thu Mar 4 22:24:45 PST 1999



Cisco 2505 and 2507 Router/Hubs

Cisco 2505 Router/Hub

- **Products Catalog: Cisco 2505/2507 Router/Hubs**
- **Cisco Simplifies Remote Access with Integrated Router/Hub Units**

Introduction

Cisco Systems is introducing two new **Cisco 2500** models that combine in a single unit the proven functionality and reliability of the Cisco 2500 router with a fully integrated managed workgroup wiring hub. Targeted at small branch office environments, the new Cisco 2505 and 2507 models integrate the basic local-area network (LAN) connectivity and routing requirements of typical branch offices. The Cisco 2500 router offers flexible LAN and wide-area network (WAN) feature support. The integrated hub provides built-in LAN connectivity for simplified, cost-effective installation. Cisco's total solution also provides integrated configuration and management tools. Large companies can extend their internetworks to sites with no previous connectivity, and smaller businesses can now install and centrally manage complete LAN/WAN internetworks.

Features at a Glance

- Two fixed-configuration Ethernet hardware models: models 2505 and 2507 Eight or sixteen repeated hub ports
- Three **Internetwork Operating System**[tm] (IOS) feature sets
- Hub ports and router interfaces configurable via Telnet commands, AutoInstall, or Cisco Configuration Builder

500622

- **SNMP**-managed hub ports

- Integrated router/hub SNMP agent
- Supported by CiscoWorks[tm] management applications
- Two synchronous serial interfaces operating at up to 4 megabits per second (Mbps)
- One asynchronous serial interface for low-speed WAN access for primary dial-on-demand routing or dial backup connections

Benefits Summary

- Flexible LAN connectivity, with support for 8 or 16 Ethernet hub ports.
- Integrated hub ports providing:
    - Simplified installation and improved serviceability and reliability with fewer cables and devices
    - Space savings through one compact platform
    - Simplified, integrated router and hub configuration through Cisco's Configuration Builder
    - Centralized, simplified, and integrated router and hub management through Cisco's CiscoWorks management applications
- Flexible WAN connectivity, with one asynchronous and two synchronous serial interfaces for link redundancy, line speed migration, and WAN cost optimization
- Flexible IOS[tm] feature sets, from the industry's lowest-cost, full-featured IP routing to the full suite of protocols and features found in Cisco's IOS Enterprise feature set
- Proven reliability of the industry-leading Cisco 2500 router platform
- Single-vendor supply and support through Cisco's direct and indirect field sales and support organization and partnerships

Packet-Switched and Circuit-Switched Services

Both the Cisco 2505 and 2507 models come standard with Frame Relay, X.25, X.25 DDN, and SMDS software, providing cost-effective access to packet-switched networks at remote sites. All models also come standard with V.25bis and Integrated Services Digital Network (ISDN) signaling software for cost-effective access to circuit-switched networks.

SDLC Consolidation

When ordered with the IOS Enterprise feature set (see the **"Product Information"** section that follows), the Cisco 2505 and 2507 routers can be configured to connect a local SDLC device and a LAN to a corporate internetwork using either synchronous serial port. This configuration allows an organization to maintain its SDLC investments while gaining performance improvements and greater management control.

Protocol Translation

Also available with the IOS Enterprise feature set, Cisco's protocol translation feature provides improved applications availability through increased connectivity, as well as cost savings by protecting investments in legacy terminal networks. This feature extends the life of those terminal-to-host environments while allowing migration to LAN-based applications. Cisco's protocol translation software supports Telnet, Local Area Transport (LAT), X.25 PAD, TN3270, and rlogin.

Data Compression

Cisco announced a **comprehensive support strategy for data compression** earlier this year. In addition to TCP/IP header and DEC LAT compression, all Cisco 2505 and 2507 models currently support link compression for up to 128 kilobits per second (kbps) with LAPB encapsulation and Frame Relay header compression. In IOS Release 10.2, X.25 payload compression will be supported. These compression techniques ensure a wide range of support for optimizing wide-area internetworking costs.

Product Information

The integrated router/hub models are available in two fixed hardware configurations:

MODEL	INTERFACE CONFIGURATION
CISCO2505	One Ethernet interface with eight repeated hub ports, one slow-speed asynchronous serial, and two synchronous serial interfaces.
CISCO2507	One Ethernet interface with sixteen repeated hub ports, one slow-speed asynchronous serial, and two synchronous serial interfaces.

Both hardware models come with 8 or 16 RJ-45 connectors on the back of the unit. The Ethernet interface is internal to the chassis, with the 8 or 16 connectors representing repeated hub ports. A separate Ethernet AUI connector is not included. These models are targeted at small access environments with basic LAN connectivity requirements. By integrating the wiring hub repeater, there is no need for

external router-to-hub cables, separate hub installation, or additional physical space for two units.

Each of the two hardware models can be ordered with any of three IOS feature sets. They range from a low cost, IP-specific feature set (IP), to a Desktop (DT) feature set containing IP, IPX, AppleTalk, and DECnet, to an Enterprise (EN) feature set containing Cisco's full IOS protocol suite. Each set includes Cisco's unique AutoInstall capability, the "plug-and- play" router feature that allows for rapid, economical router installation with minimal expertise at remote sites. The specific protocols and features supported in each feature set are summarized in the following table.

		IOS FEATURE SET		
CATEGORY	PROTOCOL/FEATURE	IP	DT	EN
LAN	IP, Bridging, LAN extension host	*	*	*
	IPX, AppleTalk 1 & 2, DECnet IV		*	*
	DECnet V, OSI, XNS, Banyan VINES, Apollo Domain			*
WAN	Dual Synchronous Serial, Compression	*	*	*
	HDLC, PPP, X.25, Frame Relay, SMDS#, ISDN	*	*	*
IP Routing	RIP, IGRP, OSPF, BGP, EGP	*	*	*
	ES-IS, IS-IS			*
IBM	RSRB, Proxy Explorer, SNA Local LU Address Prioritization, Local Acknowledgment, Administrative Filtering, NetBIOS Name Caching, Access Control Filtering	*	*	*
	Serial Tunneling or SDLC Transport, SDLC Link-Level Support, SDLLC			*
Management	AutoInstall, SNMP, Integrated Hub Management, MIBs	*	*	*
Protocol Translation	Telnet, LAT, rlogin, TN3270, X.25 PAD			*

SMDS is only in the EN feature set as of Release 10.0. SMDS will be in all three feature sets as of 10.2(2).

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Each model comes standard with 4 megabytes (MB) of Flash EPROM memory and either 2, 4, or 6 MB of DRAM memory, depending on which IOS feature set is ordered. Flash memory can be expanded in two ways. One option provides a "dual-banking" capability for uninterrupted router availability during IOS upgrades. The second option provides an additional 4 MB of Flash memory for expanded code space for future IOS releases. DRAM memory, which provides for a combination of shared packet memory and system memory, can be increased to a maximum of 18 MB total. This combination of standard and optional memory provides users with cost-effective, expandable memory configurations, ensuring that the Cisco 2505 and 2507 models can support any access environment, both today and into the future. The memory configurations are summarized in the following tables.

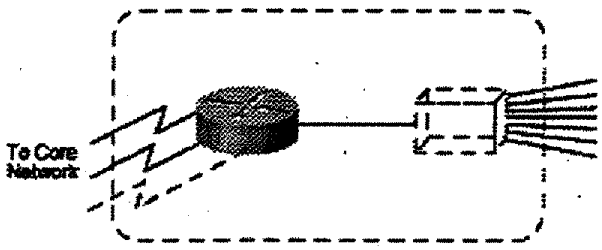
Flash Memory

	IOS RELEASE 10.0 (all) IOS RELEASE 10.2 (IP & Desktop feature sets)	IOS RELEASE 10.2 (Enterprise feature set)
Single-bank capability	One 4-MB SIMM (standard)	Two 4-MB SIMMs (optional)

management information and functionality for both router and hub components. Instead of managing the router and the hub separately, CiscoWorks' CiscoView application covers both with the same user interface and workstation or PC. CiscoView includes the following tools:

- **Port Configuration** -- Enables simplified configuration of the hub's ports.
- **Physical View** -- Graphically depicts the router and hub physical configuration, including interface and port descriptions.
- **Show Status** -- Depicts the status of interfaces and ports for easy identification of problems at a glance. Data provided includes whether the ports are operationally up/down and administratively up/down.
- **Troubleshooting** -- Allows for simplified troubleshooting of routine problems, including resetting a port or interface and gathering traffic statistics.

- **Cisco Configuration Builder** -- In addition to being able to configure the routing features in the Cisco 2505 and 2507, Cisco Configuration Builder provides a simplified means of configuring the integrated hub ports. Configuration Builder automatically "learns" the model and hardware configuration and provides a hub port configuration window. This allows the user to configure both the router and hub with the same easy to use graphical user interface (GUI) application and PC.



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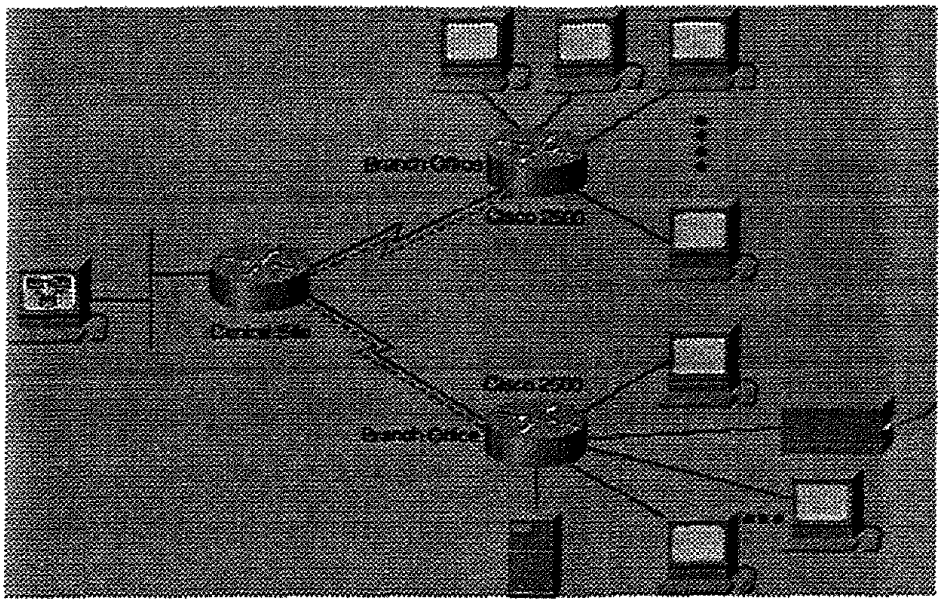
With CiscoWorks and the new Cisco 2505 and 2507 integrated hub models, users gain a cost-effective, easy-to-install, centrally managed LAN/WAN solution.

Dial-on-Demand Routing (DDR)

Dial-on-demand routing facilitates using WAN links only when necessary. For remote locations that only require occasional access to network services, the Cisco 2505 and 2507 models' dial-on-demand feature reduces the cost of wide-area access by making use of ISDN or serial dial-up lines as alternatives to costly leased lines. Cisco's IOS currently supports DDR for IP, IPX, and AppleTalk protocols.

Dial Backup

The dial backup feature provides a more economical solution than a second leased line when users require a backup link for disaster recovery. If access over the primary WAN link fails, the second dial-up line is automatically brought on line. This feature also allows for a second line to be activated to load-share traffic if the primary link experiences a user-selected threshold.



The new Cisco 2505 and 2507 models integrate a fully managed wiring hub into the industry-leading Cisco 2500 series router.

Applications

500627

Integrated Hub Functionality

The Cisco 2505 and 2507 models offer an ideal combination of connectivity and management for small remote access or branch office environments.

- **LAN Wiring Concentration** -- These models use low-cost, unshielded twisted pair (UTP) cable wired in a star configuration for easy installation. If needed, changes and additions can be made easily by using a modular patch cord. Because the hub is integrated into the Cisco 2500 chassis, there is no need for separate power cords or hub- to-router cabling; everything is neatly contained in one compact desktop-, rack-, or wall-mountable chassis.

- **WAN Connectivity** -- As with all Cisco 2500 models, the Cisco 2505 and 2507 models come with one asynchronous and two synchronous serial interfaces allowing for easy connection to the WAN. The Cisco 2500 family offers flexible WAN access and migration from lower-cost asynchronous technologies to higher speed synchronous connections.

- **Network Management** -- The Cisco 2505 and 2507 models allow for complete in-band network management from any SNMP-based network management station. This feature allows the Cisco 2505 and 2507 models to be remotely managed from a central site, eliminating the need for network management expertise at the remote location. The Cisco 2505 and 2507 models comply with the applicable standards in RFC 1515 (Definition of Managed Objects for IEEE 802.3 Medium Attachment Units) and RFC 1516 (Definition of Managed Objects for IEEE 802.3 Repeater Devices). In addition to standard SNMP management capability, Cisco offers the following other installation and management capabilities:

    - **CiscoWorks Integrated Router/Hub Management** -- This feature provides detailed

Dual-bank capability	Two 4-MB SIMMs (optional)	Two 8-MB SIMMs (optional)

DRAM Memory

IOS FEATURE SET	TOTAL DRAM Standard	Options
Enterprise	6 MB	18 MB
Desktop	4 MB	6 MB, 18 MB
IP	2 MB	4 MB, 6 MB, 18 MB

Cisco 2505 and 2507 Connectivity

Ethernet

The Cisco 2505 and 2507 models provide 8 or 16 10BaseT RJ-45 unshielded connectors compatible with the Ethernet Version 2 and IEEE 802.3 interface protocols.

Synchronous Serial

The Cisco 2505 and 2507 serial ports provide up to two dedicated serial port interfaces operating in DCE or DTE mode compatible with leased line, circuit-switched, and packet-switched services at speeds up to 4 Mbps. The serial port connectors use flexible serial transition cables, a universal design common to the **Cisco 7000** FSIP interface card, the **Cisco 4000** 4T network processor module (NPM), and other models within the Cisco 2500 family. This feature enables easy transition to any of the common physical interfaces, including V.35, EIA/TIA-232, EIA/TIA-449, EIA/TIA-530, and X.21, as well as common spares across Cisco's entire product line.

Asynchronous Serial (Auxiliary Port)

In addition to the two dedicated synchronous serial lines, the Cisco 2505 and 2507 model's auxiliary interfaces are configurable to provide an additional dial-up line for asynchronous routing. Asynchronous routing of IP, IPX, and AppleTalk protocols at speeds up to 38.4 kbps is supported over these interfaces.

SDLC

When ordered with the IOS Enterprise feature set, the Cisco 2505 and 2507 synchronous ports can be configured to connect SDLC devices to a corporate internetwork. Cisco STUN and SDLLC features provide SDLC control of the serial link. The serial ports support NRZ/NRZI and full- or half-duplex functionality.

Product Compliance

The Cisco 2505 and 2507 router/hubs meet or exceed the following product safety requirements:

- UL 1950
- CSA 22.2 through 950
- EN 60950
- EN 41003

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- BABT
- AUSTEL (AS3260, AST00)

In addition, the router/hubs meet or exceed the following specifications for electromagnetic compatibility (EMC) and are certified to meet the European EMC Directive:

- FCC Class A
- VDE 0878 Part 3 and 30, Class B
- CISPR 22 Class B
- VCCI Class 2 (Japan)
- NFC 98020 (France)
- CE Mark (Europe)
- IEC 801-2, 3, 4, 5, 6

Complete telecom network certification information, including country-by- country status, is available online on CCO **for registered users only** under "Product Approval Status by Country." Please review this data for the most recent updates regarding country availability,including certification/ registration numbers. If there are any questions regarding product approvals, please send them to pm-approvals@cisco.com.

Planned Orderability and Availability

The Cisco 2505 and 2507 models will be available for shipment at IOS release 10.0(6) on October 28, 1994. Availabilityon a country-by-country basis will depend on compliance testing status, and can be found online as described above. All memory options will be available with the initial shipments. Orders for all products will be accepted beginning September 12, 1994.

Posted: Wed Dec 3 09:05:21 PST 1997