**The Internal Revenue Service
Needs to Significantly Improve
the Inventory Used to Monitor
Its Year 2000 Conversion Efforts**

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DEPARTMENT OF THE TREASURY

WASHINGTON, D.C. 20220

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MEMORANDUM FOR COMMISSIONER ROSSOTTI

FROM: Pamela J. Gardiner
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SUBJECT: Final Audit Report - The Internal Revenue Service Needs to Significantly Improve the Inventory Used to Monitor Its Year 2000 Conversion Efforts

This report presents the results of our assessment of whether the Internal Revenue Service's (IRS) telecommunications equipment was inventoried completely and accurately and whether the preliminary risk assessment of this equipment was appropriately factored into the IRS' overall Year 2000 (Y2K) conversion plans. We also assessed whether the Y2K initiatives for inventorying tax processing commercial off-the-shelf (COTS) products are progressing as planned and goals are being completed effectively and timely. Network operating systems were also included in our telecommunications work because Information Systems management has classified network operating systems (NOS) as telecommunications items.

In summary, we found the IRS still has a significant amount of work remaining to sufficiently address the Y2K issues related to the inventories of telecommunications equipment, mid-range computer commercial software products, and NOS. Due to the time sensitivity of Y2K, these issues were reported to IRS officials throughout the review.

To minimize the Y2K-related risks associated with inaccurate or incomplete inventories, we recommended that the Chief Information Officer (CIO) develop and implement specific inventory processes and procedures to be followed by system managers and administrators at the field offices to ensure a comprehensive inventory. Also, the CIO

should conduct independent assessments of the inventory at critical IRS installations to ensure inventory accuracy and completeness for Y2K efforts. Over the longer term, we also recommended that the IRS evaluate and implement automated inventory and network management tools.

A draft copy of this report was sent to IRS management for comment on November 5, 1999. We received a draft copy of a management response from the Century Date Change Project Office. The text of this response is included in the body of this report. Management has indicated they will provide us with a final document describing their proposed corrective actions at a later date.

Copies of this report are also being sent to the IRS managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions, or your staff may call Scott Wilson, Associate Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

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Executive Summary

An accurate inventory of all hardware and software is critical to ensure the Internal Revenue Service (IRS) identifies and updates components affected by the Year 2000 (Y2K) date change. The IRS relies on its inventory system, the Integrated Network and Operations Management System (INOMS), as the primary tool to manage and report on the progress of its Y2K conversion efforts.

The objective of this review was to determine whether the IRS has completely and accurately inventoried its telecommunications equipment, network operating systems (NOS), and commercial-off-the-shelf products (COTS) as part of its Y2K conversion efforts. We obtained our results by conducting audits on-site at the IRS' 3 computing centers, 5 of its centers for processing tax returns, and 16 other locations. The majority of the audit work was conducted under contract by PricewaterhouseCoopers.

Results

The IRS still has a significant amount of work remaining to sufficiently address the Y2K issues related to the telecommunications equipment inventory, mid-range computer commercial software products inventory, and NOS inventory. Due to the importance of the inventory in the overall Y2K conversion effort, the IRS should take immediate action to correct the incompleteness and inaccuracies in its inventory database.

The Inventory Significantly Understates the Amount of Telecommunications Equipment in Use Throughout the Internal Revenue Service

When we compared samples of telecommunications equipment located at 24 IRS sites to the inventory information maintained on the INOMS database, only 45 percent of the items at the sites were included in the inventory. There was a substantial variation in the completeness of the inventory, depending on the type of IRS facility. The IRS' computing centers had the most complete inventories at approximately 74 percent, while local offices had the lowest completeness rate at 20 percent.

The significant understatement in the amount of telecommunications equipment used in IRS offices and operations poses a significant risk that some IRS offices may not be able to operate correctly on and after January 1, 2000. Since it is projected that the IRS will receive over 120 million telephone calls from taxpayers in Fiscal Year 2000, its telecommunications equipment and networks must be Y2K ready to assure there is no significant disruption in the telephone systems and access to taxpayer data.

A variety of factors have contributed to the incompleteness of the IRS' telecommunications inventory:

- Telecommunications equipment is often difficult to track because it is small, very portable, and easily purchased outside normal channels.

- The IRS lacks consistent policies and procedures pertaining to the telecommunications inventory process.

- There are weak communications between the IRS' procurement and inventory management processes/functions.

- Telecommunications program area owners have been reluctant to use the INOMS.

The Inventory of Mid-Range Computer Commercial Off-the-Shelf Software Products Has Significant Completeness and Accuracy Deficiencies

Our review of the mid-range computer (Tier II) COTS software products (such as Unix operation systems and Oracle database products) inventory identified significant disparities between the COTS installed on computers and the corresponding inventory records. At each site, we requested high-level documentation, independent of the INOMS, regarding each system's characteristics[1] for comparison to the INOMS. Only 51 percent of Tier II COTS products listed in the system documentation were entered on the INOMS database. Also, only 33 percent of Tier II COTS products on the INOMS database were found on the system documentation provided by the site personnel.

Without a complete inventory of Tier II COTS on the INOMS, the IRS may not identify and correct potentially serious Y2K problems. The inaccuracies may also lead to misguided renovation efforts, neglect of major issues, and inefficient use of resources.

The Inventory of Network Operating Systems Is Substantially Understated

Our review also identified a significant discrepancy on the number of NOS installed at IRS sites and the number of NOS listed on the INOMS inventory. A NOS, such as Microsoft's Windows NT, is used to control the access to stored data, the flow of input and output information, and the scheduling and execution of multiple concurrent tasks on a local area network (LAN). Of the 244 LAN servers we sampled, only 60 had an associated NOS on the INOMS database. There should be a one-to-one relationship between NOS and servers. A review of the entire INOMS database shows that there are

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[1] Hardware, operating system, COTS products, applications, and system administrators.

only 742 NOS records on the INOMS, while the IRS uses an estimated 2,500 to 3,000 LAN servers to conduct operations.

The complete and accurate inventory of all NOS is a critical aspect of the IRS' Y2K efforts. Since the IRS is dependent on its local area networks to perform a significant part of its tax administration work, the Century Date Change (CDC) Project Office and NOS Program Office must identify the existence and location of each NOS and conduct the necessary research and testing to assure that any NOS, unable to process past the year 2000 is updated or replaced before January 1, 2000. A NOS that does not process the century date correctly can cause disruption for all the workstations residing on a given LAN. If a large number of NOS remain non-compliant, there is a potential that workstations in several locations will be disrupted.

Summary of Recommendations

To minimize the Y2K-related risks associated with inaccurate or incomplete inventories, we recommended that the Chief Information Officer (CIO) develop and implement specific inventory processes and procedures to be followed by system managers and administrators at the field offices to ensure a comprehensive inventory. Also, the CIO should conduct independent assessments of the inventory at critical IRS installations to ensure INOMS accuracy and completeness for Y2K efforts. Over the longer term, we also recommend that the IRS evaluate and implement automated inventory and network management tools.

Management's Draft Response: As of the date of this report, a final management response had not been received due to the extensive efforts underway to prepare for Y2K. However, we summarized below a draft response from the CDC Project Office and incorporated a more detailed description of the response in the body of the report.

The CDC Project Office initiated a wall-to-wall inventory reconciliation process to be completed at critical IRS sites by December 31, 1999. The wall-to-wall inventory started August 2, 1999. The scope of the wall-to-wall inventory encompasses telecommunication hardware and COTS software. The inventory teams physically reconcile the INOMS database with inventory found or not found on the floor and update the INOMS to reflect the results of the physical inspection and software interrogation.

Information Systems (IS) is revamping the entire inventory process to sustain the wall-to-wall effort after Y2K through the Single Point Inventory Function (SPIF). As planned, the new SPIF will provide guidelines and procedures that establish accountability in receipt, distribution, excessing, and disposal of ADP hardware, software, and telecommunications inventory throughout the various IRS locations. IS will update the guidelines as required to incorporate the new procedures and update the

existing inventory and property management documents to reflect the newly developed
organizational structure and policies.

IS also established the Asset Management Modernization Project Office to modernize the
IRS Asset Management Program. The prime vendor responsible for the IRS
modernization initiative is addressing the concerns raised in our report and the inventory
management processes in its deliverables. IS expects incremental enhancement of the
INOMS including new scanner technology by September 2000. The delivery date for the
prototype of the modernized system, Information Technology Asset Management
System, is scheduled for March 2001.

Objective and Scope

The focus of this review was to evaluate the accuracy and completeness of the telecommunications, NOS, and COTS inventories.

This report presents the results of our work to assess whether the Internal Revenue Service's (IRS) telecommunications equipment has been inventoried completely and accurately, that the preliminary risk assessment of this equipment has been appropriately factored into the IRS' overall Year 2000 (Y2K) conversion plans, and that the Y2K initiatives for inventorying tax processing commercial off-the-shelf (COTS) and network operating systems (NOS) products are progressing as planned and are being completed effectively and timely.

Our work was conducted in accordance with *Government Auditing Standards.* We conducted our review from November 1998 to August 1999 in the National Office and on-site at sampled service centers and computing centers, as well as at other IRS offices. A complete list of these sites is included in Appendix IV. We provided our interim results to IRS management throughout the audit period due to the time sensitive nature of the Y2K issue. IRS management used our interim results to begin taking corrective action.

Details of our audit objective, scope, and methodology are presented in Appendix I. Major contributors to this report are listed in Appendix II.

As of the date of this report, a final management response had not been received due to the extensive efforts underway to prepare for Y2K. However, we incorporated the draft management response from the CDC Project Office in the body of the report. IRS management has indicated they will provide us with a final document describing their proposed corrective actions at a later date.

Background

The IRS is currently involved in an organization-wide initiative to address the potential issues that will arise as a result of the upcoming century rollover. As the year changes from 1999 to 2000, many computers and information systems will experience problems if they are not fixed due to their interpretation of two-digit years. The "Y2K problem" is a serious threat to the normal business operations of the IRS because the majority of tax processing functions use dates.

An initial step in addressing the Y2K problem is conducting a detailed inventory of all date-sensitive equipment throughout an organization. A comprehensive inventory is essential to understanding the scope and extent of effort required in a Y2K project. In its Y2K efforts, the IRS is using the Integrated Network and Operations Management System (INOMS) database as the central source of inventory data. This database is driving the Y2K assessment process for information systems throughout the IRS.

The technology infrastructure of the IRS is heavily reliant on the consistent operation of telecommunications equipment and NOS. This equipment includes, but is not limited to, automated call distributors, voice response units, telephone switches, routers, hubs, etc. The majority of voice and data traffic, both internal and external to the IRS, is dependent on telecommunications and NOS equipment. Many mission critical IRS systems rely on mid-range computer COTS products.

Results

Inaccurate inventories may lead to unexpected glitches on January 1, 2000.

The IRS still has a significant amount of work remaining to sufficiently address the Y2K issues related to the following areas:

- Telecommunications equipment inventory.

- Mid-range computer (Tier II) COTS products inventory.

- NOS inventory.

The CDC Project Office is using the INOMS database as the official inventory and the primary source of Y2K-readiness status. The deficiencies of the inventory database present a significant problem because the CDC Project Office uses the inventory to determine, manage and report on the progress of Y2K efforts. Due to the importance of the inventory in the overall IRS Y2K project, and the limited amount of time remaining, the IRS should take immediate action to correct the incompleteness and inaccuracies in its inventory database.

Our review did identify that the IRS has used an automated tool, the Bellcore Risk Assessment Tool, to assist in its efforts to perform a risk assessment of its telecommunications inventory. The results from this tool were used to identify the telecommunications equipment with the greatest risk for century date change problems.

To reduce the potential risk presented by non-compliant COTS and NOS products, the IRS hired a contractor to conduct a validation of all tax processing COTS and NOS products that are listed on the INOMS.

The Inventory Significantly Understates the Amount of Telecommunications Equipment in Use Throughout the Internal Revenue Service

The inventory of telecommunications equipment had completeness rates ranging from 20 to 74 percent at sampled IRS sites.

When telecommunications equipment located at the sampled 24 IRS sites was compared to the inventory information maintained on the INOMS database, we identified completeness rates ranging from 20 to 74 percent, with an average completeness rate of 45 percent (see Table 1). Our sample was selected to represent various aspects of IRS operations, including Computing Centers, Service Centers, and District Offices. For each site, we judgmentally selected the

items with the greatest potential for century date problems and excluded items with no known century date impact.

This significant understatement in the amount of telecommunications equipment used in IRS offices and operations poses a significant risk that all IRS offices may not be able to operate without significant interruption on and after January 1, 2000.

There was a substantial variation in the completeness of the inventory, depending on the type of IRS facility. Computing Center inventories were approximately 74 percent complete. The rate of completeness of the inventory for service centers was 49 percent while district offices had a completeness rate of 24 percent. Posts-of-duty had the lowest completeness rate of 20 percent (see Table 1). In general, the continued operation of the computing centers and service centers is required to assure timely tax processing. The district offices and posts-of-duty are essential to assure effective customer service and tax law enforcement.

	Items In Sample	Items Found on the INOMS	Percent of Sample Found on the INOMS
Computing Centers	444	330	74%
Service Centers	608	300	49%
District Offices	659	156	24%
Posts-Of-Duty	60	12	20%
TOTALS	1771	798	45%

Table 1: Telecommunications Equipment Found on the INOMS

A significant amount of equipment also lacked an inventory barcode,[1] although attaching a barcode is

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[1] A code consisting of a group of printed and variously patterned bars and spaces, and sometimes numerals, that is designed to be scanned and read into computer memory as identification for the object it labels.

supposed to be one of the first steps in inventorying equipment. During 1998, the IRS hired a contractor to conduct a 100 percent physical inventory of telecommunications equipment throughout IRS offices. Despite the recent 100 percent inventory efforts, approximately 18 percent of our audit sample did not appear to have a barcode label attached when we performed our visual inspection of the equipment in November 1998 through January 1999.

A variety of factors have caused the incompleteness of the telecommunications inventory:

A variety of factors have caused the incompleteness of the telecommunications inventory.

- The nature of telecommunications equipment.

- The lack of consistent policies and procedures pertaining to the telecommunications inventory process.

- The separation and weak communications between the procurement and inventory management processes/functions.

- The reluctance by the owners of telecommunications program areas to use the INOMS in managing Y2K progress.

The following pages contain a more detailed description of these factors:

The Nature of Telecommunications Equipment

Telecommunications inventory is often difficult to track due to its size and portability. Additionally, management at each IRS facility has the ability to purchase their own networking hardware and to move telecommunications equipment between locations. Further complicating inventory efforts, this equipment is usually installed or stored in an out-of-the-way location such as a telephone closet. Due to a combination of these factors, telecommunications equipment is often excluded or improperly recorded on the INOMS inventory.

Lack of Consistent Procedures

Telecommunications policies and procedures prior to Y2K activities were basically non-existent or inconsistent. During our field visits, we found that most field personnel were unable to provide copies of written

inventory procedures to the audit teams. Also, the property disposal procedures in place are not always followed. In our review of the INOMS database, we found a significant amount of "deadwood" equipment (i.e., existing INOMS records for equipment that had been disposed of).

Lack of Integration between Procurement and Inventory Management

Some of the deficiencies in the inventory database can be attributed to the separation and lack of integration between the procurement and inventory management processes. IRS policy dictates that all recently purchased automated data processing (ADP) equipment should be tagged with a barcode and entered onto the INOMS database within ten days. However, these steps are not being performed on a consistent basis in the field offices. Also, purchase order information is often absent when the equipment arrives at the receiving dock.

The Reluctance of Management to Use the INOMS in Managing Y2K Progress.

Many of the telecommunications program offices appear to be managing their Y2K efforts independent of the INOMS. During the review process, several telecommunications program office individuals expressed that they do not trust or use the INOMS in their Y2K activities. Instead, they track their progress on independent spreadsheets. These telecommunications program offices often ignore the INOMS and are not concerned about the completeness or accuracy of telecommunications inventory data on the INOMS.

There are significant deficiencies that could affect the ability of the IRS to identify and complete all Y2K remediation tasks related to telecommunications equipment.

The problems with the inventory expose the IRS to considerable risks. The senior management of the CDC Project Office and the IRS are dependent on the completeness and accuracy of the INOMS inventory database in the execution and reporting of their Y2K activities. This review indicated significant inventory deficiencies in the database that could affect the ability of the IRS to identify and complete all Y2K remediation tasks related to telecommunications equipment. Further, telecommunications equipment is heavily integrated in computer application systems (data) and telephone and message routing systems (voice). Failure to identify and correct all telecommunications equipment may lead to

system failures that could prevent critical customer service functions from operating, such as responding to taxpayer questions and accessing taxpayer data while the taxpayer is on the telephone. Since it is projected that the IRS will receive over 120 million telephone calls from taxpayers in Fiscal Year 2000, its telecommunications equipment and networks must be Y2K ready to assure there is no significant disruption in the telephone systems and access to taxpayer data.

We held preliminary discussions with IRS Information Systems management concerning the inventory issues. Management took corrective actions to improve the completeness of the inventory database, including uploading the results of the 100 percent inventory of telecommunications equipment that had not been entered onto the INOMS database. An inventory assessment (performed by the IRS on March 17, 1999) showed an overall completeness rate of approximately 63 percent at the sampled sites. This assessment confirmed that there are significant problems despite some improvement after we performed our inventory work. Management has also included telecommunications as part of its Tier II Independent Audit and Readiness Verification process. Part of this process includes site visits to validate the telecommunications inventory.

Recommendations

1. Due to the shortness of time remaining to complete corrective action prior to the Y2K deadline, the Chief Information Officer (CIO) should immediately develop and implement standard inventory processes and procedures to be followed by systems managers and administrators at the field offices to ensure a comprehensive inventory.

2. The Telecommunications Division should immediately develop a reporting format to be completed by telecommunications technicians at IRS sites that will facilitate reconciliation with the INOMS database. The Telecommunications

Division should work directly with local inventory specialists to ensure that data are entered onto the INOMS.

3. The CIO should conduct site visits at critical IRS installations to perform independent assessments of the inventory to ensure INOMS accuracy and completeness for Y2K readiness.

4. The CIO should analyze the current inventory data on the INOMS database and ensure that the inventory does not include discarded/removed equipment.

Management's Draft Response: In addressing recommendations 1 through 4, the CDC Project Office indicated that the following actions were taken to improve IRS' Y2K inventory:

- They have initiated a wall-to-wall inventory reconciliation process to be completed at critical IRS sites by December 31, 1999. The inventory teams will physically reconcile the INOMS database with inventory found or not found on the floor and update the INOMS to reflect the results of the physical inspection and software interrogation.

- The Commissioner signed a policy memorandum on November 12, 1999 designating the CIO as the responsible official for management and control of ADP property.

- Information Systems is revamping the entire inventory process to sustain the wall-to-wall inventory effort through the Single Point Inventory Function (SPIF). The new SPIF will provide guidelines and procedures that establish accountability in receipt, distribution, excessing, and disposal of ADP hardware, software, and telecommunications inventory throughout the various IRS locations.

Long-term Recommendations

5. The CIO should assure that the current ADP acquisition procedures are followed.

   ➢ Barcode labels should be applied as soon as the ADP property arrives on site.

   ➢ The equipment should be entered on the INOMS database within ten days, per IRS policy.

6. The CIO should develop, implement, and enforce detailed ADP inventory management procedures and guidelines that consider the following points:

   ➢ The INOMS database must be updated as ADP equipment is moved within and between offices.

   ➢ The INOMS database must be updated as ADP equipment is removed and/or discarded.

7. The CIO should determine a strategy for inventory management continuing past the year 2000. If the INOMS database remains the software tool, the following points should be considered. However, if the INOMS database is retired in favor of another tool, the following points should be considered during the tool selection, research, and evaluation process:

   ➢ Establishing cascading update/delete relationships between hardware and associated software records that could help prevent "orphaned" records and other data inaccuracies.

   ➢ Employing automated validation and error checking routines that could minimize the amount of illogical or out-of-range entries.

   ➢ Evaluating the feasibility of implementing automated inventory and network management tools (autodiscovery) to assist in the population and/or validation of the INOMS.

- ➢ Evaluating the feasibility of implementing an electronic interface between the procurement and inventory systems that would provide an effective and efficient means of entering new ADP property onto the INOMS database.

- ➢ Establishing a central control point for inventory purposes and the assignment of products to individuals for accountability purposes.

8. The CIO should re-evaluate the current annual inventory process and incorporate the following procedures:

- ➢ The annual inventory should include searching for unknown/unidentified equipment, as opposed to verifying the existing inventory.

- ➢ The annual inventory should include identification of obsolete or unused equipment and the appropriate means of removal.

9. The CIO should require topology map[2] documentation be created and maintained on a regular basis. These maps are necessary for several reasons including inventory change management, disaster recovery, and security.

Management's Draft Response: In addressing recommendations 5 through 9, the CDC Project Office indicated that the following actions will be implemented to improve the IRS' inventory controls over the long term:

- Information Systems will appoint an ADP Property Manager for each site with staff reporting to that manager.

- The new SPIF will include procedures for updating the INOMS whenever changes in ADP equipment location or inventory status occurs.

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[2] A detailed diagram or blueprint showing the layout and components of a local area network or other communications system.

- Information Systems established the Asset Management Modernization Project Office to modernize the IRS Asset Management Program. The prime vendor responsible for the IRS modernization initiative is addressing the inventory management processes in its deliverables.

- The new Single Point ADP Property Management Guidelines will transition the IRS to the new ADP property management process.

- The Director, Enterprise Operations Division, will review the recommendation regarding topology maps and advise the CIO as to how the IRS will proceed.

The Inventory of Mid-Range Computer Commercial Off-the-Shelf Software Products Has Significant Completeness and Accuracy Deficiencies

There are significant disparities between Tier II COTS software installed on computers and the corresponding inventory records.

Our review of the Tier II COTS software products inventory identified significant disparities between the COTS software installed on computers and the corresponding INOMS inventory records. At each site, we requested systems documentation, independent of the INOMS, regarding each system's characteristics (i.e., hardware manufacturer and model, operating system, COTS products used on the system, applications, and system administrators) to verify the accuracy of the INOMS data.

Where this type of information was available, we reconciled the Tier II COTS systems documentation to the Tier II COTS products found on the INOMS database. We found that only 51 percent of Tier II COTS products identified in system documentation were found on the INOMS database (see Table 2).

	Tier II COTS Products Identified By Site Documentation	Tier II COTS Products Identified by Documentation and Found on the INOMS	Percentage Found
Computing Centers	125	58	46%
Service Centers	592	307	52%
District Offices	8	7	88%
TOTALS	725	372	51%

Table 2: Tier II COTS Products Found on the INOMS

We also reconciled the INOMS database to the system documentation and found only 33 percent of Tier II COTS products on the INOMS database were identified in the system documentation provided (see Table 3).

	Tier II COTS Products on the INOMS	Tier II COTS Products on the INOMS and Found on Documentation	Percentage Found
Computing Centers	334	79	24%
Service Centers	804	309	38%
District Offices	68	7	10%
TOTALS	1206	395	33%

Table 3: Tier II COTS Products Found in Documentation

There were also significant discrepancies between the COTS products listings provided by the systems administrators and the "Model/Version" field on the INOMS database. Of the Tier II COTS products we found on the INOMS database and the system's

documentation, 59 percent had discrepancies between the "Model/Version" field on the INOMS and the documentation (see Table 4).

	Tier II COTS Products Identified by Documentation and Found on the INOMS	Tier II COTS Products Identified by Documentation and Found on the INOMS with Model/Version Discrepancies	Percentage with Discrepancies
Computing Centers	58	34	59%
Service Centers	307	181	59%
District Offices	7	6	86%
TOTALS	372	221	59%

Table 4: Tier II COTS Products with Model/Version Discrepancies

There is a lack of an effective reconciliation process between the Tier II COTS products and the INOMS database.

There are several factors contributing to the incompleteness of the Tier II COTS products inventory, including:

- The IRS lacks an effective process for periodically reconciling Tier II COTS products to the INOMS.

- There is no shared responsibility for the INOMS inventory data by the systems managers and administrators. INOMS issues have largely been delegated to inventory specialists. No corresponding responsibility for the database contents is placed with system owners.

- The INOMS inventory specialists have often not been provided with the training and guidance needed to conduct systems inventories of Tier II COTS products.

Without a complete inventory of Tier II COTS products on the INOMS, the IRS may not identify and remediate potentially serious Y2K problems.

Due to the IRS' reliance on the inventory information provided by the INOMS, these discrepancies present

critical risks to the IRS' efforts to address Y2K issues. Without a complete inventory of Tier II COTS products on the INOMS, the IRS may not identify and remediate potentially serious Y2K problems. Since, in many instances, application programs receive date information from COTS products, a date error might occur if the COTS product does not correctly interpret the century date. The inaccuracies may also lead to misguided renovation efforts and inefficient use of resources.

Recommendations

The following recommendations are specific to the Tier II COTS products inventory:

10. The CIO should develop documentation standards for capturing system information such as installed operating systems, COTS products, and applications. This information should be reviewed and reconciled with the INOMS.

11. The CIO should ensure personnel involved in the inventory process are trained to properly perform their respective functions.

12. Tier II systems managers and administrators should perform annual reviews to identify the COTS products associated with their systems, reconcile with the INOMS and confirm, in writing, the accuracy of the details (e.g., model/version, location, etc.).

    Management's Draft Response: In addressing recommendations 10 through 12, the CDC Project Office indicated that the following actions will be taken:

    - Documentation standards have been included in the Inventory Management Users Guide (July 1999) for COTS property and the Application Program Registry (July 1999) for in-house developed applications. Information Systems updates them as needed.

- In FY 1999, Information Systems trained over 500 INOMS end users. This class is still given on an as needed basis. Information Systems will develop and offer training classes to various personnel in the inventory process to correspond with the implementation of the SPIF.

- Information Systems will perform an annual review of the Tier II platforms to ensure the accuracy of the INOMS as it relates to the COTS products.

The Inventory of Network Operating Systems Is Substantially Understated

The current inventory of network operating systems in the inventory system is substantially understated.

Our review found a significant discrepancy in the number of sampled NOS and the INOMS database information. A NOS, such as Microsoft's Windows NT, is used to control the access to stored data, the flow of input and output information, and the scheduling and execution of multiple concurrent tasks on a local area network (LAN). Of the 244 LAN servers we sampled, only 60 had an associated NOS on the INOMS database. There should be a one-to-one relationship between NOS and servers on the inventory. A review of the entire INOMS database shows that there are only 742 entries for NOS records on the INOMS, while the IRS uses an estimated 2,500 to 3,000 LAN servers to conduct operations.

Many of the factors contributing to the incompleteness of the NOS inventory are the same as those discussed previously, including a lack of shared ownership for the INOMS data and a lack of training for inventory specialists. In addition, until Y2K efforts began, the capability for the consistent tracking of server hardware and the associated software was not viewed as being needed.

The IRS will be unable to complete implementation and testing activities without fully addressing every NOS on every server.

The complete and accurate inventory of all NOS is a critical aspect of the IRS' Y2K efforts. Since the IRS is dependent on its LANs to perform a significant part of its tax administration work, the CDC Project Office and NOS Program Office must know the existence and location of each NOS in order to conduct the necessary research, testing, and potential remediation efforts. Remediation efforts for NOS may include replacing or installing software patches. However, the IRS will be unable to complete implementation and testing activities without fully addressing every NOS on every server. A NOS that does not process the century date correctly can cause disruption for all the workstations residing on a given LAN. If a large number of NOS remain non-compliant, there is a potential that workstations in several locations will be disrupted.

Many of the previous recommendations, if implemented, would also improve the NOS inventory. In addition, we have included a specific recommendation to deal with NOS issues.

Recommendation

13. The CIO should analyze the INOMS data to find any server hardware that does not have a corresponding NOS record once the INOMS inventory has been updated with the results of the latest inventory efforts.

Management's Draft Response: The CDC Project Office states that Information Systems will continue analysis of the INOMS to determine the ratio of NOS records to corresponding servers. Information Systems will then determine if this issue needs to be included in the Y2K End-Game plan by December 15, 1999.

Conclusion

The IRS still has a significant amount of work remaining to sufficiently address the Y2K issues related to the

telecommunications equipment inventory, mid-range computer commercial software products inventory, and NOS inventory. The deficiencies of the inventory database present a significant problem because the CDC Project Office uses the inventory to determine, manage and report on the progress of Y2K efforts to internal and external entities. Due to the importance of the inventory in the overall IRS Y2K project and the limited amount of time remaining, the IRS should take immediate action to correct the incompleteness and inaccuracies on its inventory database.

Detailed Objective, Scope, and Methodology

The overall objective of this review was to assess whether the Internal Revenue Service's (IRS) telecommunications equipment was inventoried completely and accurately, that the preliminary risk assessment of this equipment was appropriately factored into the IRS' overall plans; and that the Year 2000 (Y2K) initiatives for inventorying tax processing commercial off-the-shelf (COTS) products are progressing as planned and goals are being completed effectively and timely. Network operating systems (NOS) were included in our telecommunications work because Information Systems management has classified NOS as telecommunications items.

The focus of this review was to evaluate the accuracy and completeness of the telecommunications and COTS inventories. The review also assessed how effectively the preliminary risk assessments of telecommunications equipment and COTS and NOS products have been factored into the IRS' overall plans. To accomplish this, we:

I.   Determined the overall status of the IRS' efforts to convert all telecommunications equipment and COTS products on major tax processing systems by:

    A.   Interviewing key staff to determine the current status and implementation plans and to identify issues.

    B.   Reviewing in detail, the Y2K Project Management Plan including organizational structure, staffing assignments, project plans and milestones.

    C.   Reviewing status reports.

    D.   Monitoring the Y2K project activities, deliverables, and milestones.

II.   Determined the completeness and accuracy of the inventory of telecommunications equipment by:

    A.   Evaluating the process used to assemble the telecommunications inventory for Y2K analysis and conversion and validating that the process is resulting in a comprehensive and accurate inventory of telecommunications items.

    B.   Conducting samplings of telecommunications equipment from 24 sites where the IRS has conducted extensive efforts to validate the inventory. We judgmentally selected items with the greatest potential for century date problems. These samples were compared to the Integrated Network and Operations Management System to determine their presence on the inventory.

  C. Documenting analysis of each site visited detailing the test methodology and test results, including conclusions and recommendations. The analysis assessed the effectiveness of the IRS' inventory efforts.

  D. Conducting surveys (in person) to assess Y2K activities in IRS offices that were not included in on-site efforts to validate the telecommunications inventory.

III. Determined the completeness and accuracy of the inventories of COTS products by:

  A. Analyzing system and COTS libraries on major tax processing systems to determine the completeness of the inventory of Tier I and Tier II COTS products.

  B. Reviewing inventory items for accuracy.

IV. Evaluated the IRS' planned usage of the results of the Bellcore Risk Assessment Tool by:

  A. Assessing whether the IRS has adequately identified the efforts needed to use the Bellcore tools.

  B. Evaluating whether the Service is using the results of the Bellcore tools appropriately to provide an effective assessment of the risks found in its telecommunications environment.

V. Determined the adequacy of the risk assessment of Tier I and Tier II COTS products by reviewing risk assessments on Tier I and Tier II COTS products to identify items that present the greatest risk to the IRS.

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The Internal Revenue Service Needs to Significantly Improve the Inventory Used to Monitor Its Year 2000 Conversion Efforts

Appendix III

Report Distribution List

Deputy Commissioner Modernization C:DM
Deputy Commissioner Operations C:DO
Chief Information Officer IS
Deputy Chief Information Officer (Systems) IS
Deputy Chief Information Officer (Operations) IS
Assistant Commissioner, National Operations IS:O
Assistant Commissioner, IS Field Operations IS:FO
Assistant Commissioner, Service Center Operations IS:SC
Assistant Commissioner, Program Evaluation and Risk Analysis M:OP
Century Date Change Program Director IS:CD
Office of the Chief Counsel CC
Office of Management Controls M:CFO:A:M
Office of Information Resources Management IS:IR
National Director for Legislative Affairs CL:LA
Audit Liaison, Office of Program Oversight IS:IR:O

List of Audit Sites

Detroit Computing Center
Martinsburg Computing Center
Tennessee Computing Center

Atlanta Service Center
Brookhaven Service Center
Memphis Service Center
Ogden Service Center
Philadelphia Service Center

Brooklyn District Office
Central California District Office
Georgia District Office
Illinois District Office
Indiana District Office
Michigan District Office
North Florida District Office
Northern California District Office
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