

## Server Bricks v1.2

### Status of this Memo

This document specifies an NIH architectural standards track protocol for the NIH community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "National Institutes of Health Enterprise Architecture Standards Process" (NRFC0001/BCP0001) for the standardization state and status of this protocol. Distribution of this memo is intended for the NIH community.

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## 1 Introduction

The purpose of this NRFC is to establish two new server bricks as part of the NIH Enterprise Architecture. These proposed bricks were developed based on baseline information provided by a survey for IC technologists that was distributed to all Institutes and Centers. Tactical and Strategic recommendations are based on analysis of those technologies coupled with research from Gartner analysts.

By establishing and following these standards, NIH can evolve towards a more homogenous server environment which can provide the following benefits:

- Allows technologists to develop deeper skills in fewer technologies
- Simplifies systems management because fewer operating environments need to be managed
- Positions NIH for better volume purchase discounts

## 2 Enterprise and Mid-Range Server Bricks

Enterprise servers consist of the platform hardware and the operating system that together support the operating environment to support application and database servers that serve the entire NIH organization. Enterprise servers typically serve hundreds, if not thousands of concurrent users and utilize high availability and redundant configurations to minimize downtime. Mid-range servers consist of the platform hardware and operating system that together support the operating environment for applications and databases that serve a smaller group of users. Because the distinctions between enterprise and mid-range servers depend on subjective estimates of workload magnitude, these bricks address both enterprise and mid-range servers. These standards are meant to provide guidance when selecting a server for a new application or when upgrading the server environment for an existing application. This NRFC cannot replace the capacity planning and operational support analysis needed to ensure the new server environment, including storage subsystems and peripherals – which are not addressed here – is capable of meeting the size, maintainability, performance and availability requirements of the business.

### ***2.1 Enterprise and Mid-Range Server Platform Processor***

This brick provides baseline information and the future direction for deploying enterprise and mid-range servers at NIH in terms of the preferred hardware platform.

**Table 1. Enterprise and Mid-Range Server Platform Processor Architecture Brick**

<b>Baseline Environment (Today)</b>	<b>Tactical Deployment (0-2 years)</b>	<b>Strategic Deployment (2-5 years)</b>
<p>General Purpose:</p> <ul style="list-style-type: none"> <li>■ AMD Athlon</li> <li>■ Apple Macintosh, including G4, PowerPC and Xserve G5</li> <li>■ Hewlett Packard Alpha</li> <li>■ Hewlett Packard PA-RISC</li> <li>■ IBM POWER</li> <li>■ IBM eServer zSeries</li> <li>■ Intel Itanium 2</li> <li>■ Pentium</li> <li>■ Proprietary Appliance Servers</li> <li>■ Sun SPARC</li> </ul> <p>Scientific:</p> <ul style="list-style-type: none"> <li>■ Apple Macintosh, including G4, PowerPC and Xserve G5</li> <li>■ SGI MIPS Technologies</li> </ul>	<p>General Purpose:</p> <ul style="list-style-type: none"> <li>■ AMD Athlon</li> <li>■ AMD Opteron</li> <li>■ Apple Macintosh, including G4, PowerPC and Xserve G5</li> <li>■ IBM eServer zSeries</li> <li>■ IBM POWER</li> <li>■ Intel Itanium 2</li> <li>■ Intel Xeon</li> <li>■ Sun SPARC</li> </ul>	<p>General Purpose:</p> <ul style="list-style-type: none"> <li>■ AMD Athlon</li> <li>■ AMD Opteron</li> <li>■ IBM eServer zSeries</li> <li>■ IBM POWER</li> <li>■ Intel Itanium 2</li> <li>■ Intel Xeon</li> <li>■ Sun SPARC</li> </ul>
<b>Retirement Targets (Technology to eliminate)</b>	<b>Containment (No new deployments)</b>	<b>Emerging (Technology to track)</b>
<ul style="list-style-type: none"> <li>■ None</li> </ul>	<p>General Purpose:</p> <ul style="list-style-type: none"> <li>■ HP Alpha</li> <li>■ HP PA-RISC</li> <li>■ Pentium</li> <li>■ Proprietary Appliance Servers</li> </ul>	<ul style="list-style-type: none"> <li>■ Blade</li> <li>■ Virtualization</li> </ul>
<b>Comments</b>		

- IBM eServer zSeries is considered tactical and strategic because there is greater potential for new business for the zSeries than for any other mainframe technology. It is also being considered as a Linux server platform and for ongoing DB2 support.
- SGI MIPS Technologies are currently used in a CIT special purpose scientific environment and are therefore classified as containment.
- HP Alpha and HP PA-RISC product lines are classified as containment because, according to Gartner research and HP's own published position, HP's strategy for the Alpha product line is to support the install base of their existing customers and to enable transition of those customers to newer technologies.
- AMD Opteron processor will address enterprise server requirements, while AMD Athlon will address mid-range server requirements.
- Proprietary appliance servers are considered containment due to their specialized purpose.
- NIH will seek opportunities to pilot Blade server technologies at the enterprise level, leveraging lessons learned from smaller implementations.
- NIH should evaluate virtualization technologies and vendor strategies based on cost reduction (hardware, software and staffing — now and in the future) and agility improvements (flexibility to handle changing workload requirements without difficulty or significant expense). For the next several years, vendors will provide new virtualization solutions, which should be considered for deployment at NIH if they can deliver a shorter return on investment and ease future technology transitions.
- Tactical and Strategic products were selected to leverage NIH's investment in products that are a proven fit for NIH's known future needs. Leveraging baseline products in the future will minimize the operations, maintenance, support and training costs for new products.
- Some baseline products have been designated Retirement and Containment. These products are either not as widely or successfully deployed at NIH, or they do not provide as much functionality, value, or Total Cost of Ownership as the selected Tactical and Strategic products.

## ***2.2 Enterprise and Mid-Range Operating System***

This brick provides baseline information and the future direction for deploying enterprise and mid-range servers at NIH in terms of the preferred operating systems.

**Table 2. Enterprise and Mid-Range Operating System Server Brick**

<b>Baseline Environment (Today)</b>	<b>Tactical Deployment (0-2 years)</b>	<b>Strategic Deployment (2-5 years)</b>
<p><u>General Purpose:</u></p> <ul style="list-style-type: none"> <li>■ Apple Mac OS X Server</li> <li>■ Custom-built Linux</li> <li>■ Hewlett-Packard HP-UX</li> <li>■ Hewlett-Packard (HP) OpenVMS</li> <li>■ Hewlett-Packard (HP) Tru64 UNIX</li> <li>■ IBM AIX</li> <li>■ IBM z/OS</li> <li>■ Microsoft Windows 2000</li> <li>■ Microsoft Windows NT Server</li> <li>■ Microsoft Windows Server 2003</li> <li>■ Novell SUSE Linux</li> <li>■ Redhat Linux</li> <li>■ Sun Solaris</li> <li>■ UNIX from other vendors</li> </ul> <p><u>Scientific:</u></p> <ul style="list-style-type: none"> <li>■ Apple Mac OS X Server</li> <li>■ SGI IRIX</li> </ul>	<p><u>General Purpose:</u></p> <ul style="list-style-type: none"> <li>■ Apple Mac OS X Server</li> <li>■ Hewlett-Packard HP-UX</li> <li>■ IBM AIX</li> <li>■ IBM z/OS</li> <li>■ Microsoft Windows Server 2003</li> <li>■ Novell SUSE Linux</li> <li>■ Redhat Linux</li> <li>■ Sun Solaris</li> </ul>	<p><u>General Purpose:</u></p> <ul style="list-style-type: none"> <li>■ Hewlett-Packard HP-UX</li> <li>■ IBM AIX</li> <li>■ Microsoft Windows Server, latest and previous version</li> <li>■ Novell SUSE Linux</li> <li>■ Redhat Linux</li> <li>■ Sun Solaris</li> </ul>
<b>Retirement Targets (Technology to eliminate)</b>	<b>Containment (No new deployments)</b>	<b>Emerging (Technology to track)</b>
<p><u>General Purpose:</u></p> <ul style="list-style-type: none"> <li>■ Microsoft Windows NT Server</li> </ul>	<p><u>General Purpose:</u></p> <ul style="list-style-type: none"> <li>■ Custom-built Linux</li> <li>■ Hewlett-Packard (HP) OpenVMS</li> <li>■ Hewlett-Packard (HP) Tru64 UNIX</li> <li>■ Microsoft Windows 2000</li> <li>■ UNIX from other vendors</li> </ul>	<ul style="list-style-type: none"> <li>■ Linux at the enterprise server level</li> </ul>

**Comments**

- SGI IRIX is currently used in a CIT special purpose scientific environment and is therefore classified as Containment for general purposes.
- Latest version of Windows will be considered Strategic, as well as its immediate predecessor (i.e. latest two versions will be tactical and strategic).
- Windows NT is classified as retirement because Microsoft is going to discontinue support in the next few years. NIH should migrate to Microsoft Windows Server 2003.
- HP Tru64 is classified as containment as HP will not enhance this operating system beyond 2006 or support the code beyond 2011.
- IBM's z/OS is classified as Tactical for the ADB and DB2-based applications.
- Linux on zSeries will be deployed on z/VM.
- Windows 2000 is classified as containment because Windows XP and Windows Server 2003 are to be used for tactical and strategic deployment.
- Other flavors of UNIX are classified as containment because HP-UX, IBM AIX, Sun Solaris, Redhat Linux and Novell SUSE Linux are to be used for tactical and strategic deployment.
- NIH currently runs a custom-built source version of Linux (presently running the 2.4 kernel with glibc 2.2.5) which is considered containment as RedHat and Novell SUSE are to be used for tactical and strategic deployment.
- While Linux is considered strategic for mid-range applications, there are still too few implementations at the enterprise level to make it tactical or strategic within the NIH enterprise. NIH will seek opportunities to pilot Linux implementations at the enterprise level, leveraging lessons learned from mid-range implementations.
- Tactical and Strategic products were selected to leverage NIH's investment in products that are a proven fit for known future needs. Leveraging baseline products in the future minimizes operations, maintenance, and support costs of new products.
- Some baseline products have been designated Retirement and Containment. These products are either not as widely or successfully deployed at NIH, or they do not provide as much functionality, value, or Total Cost of Ownership as the selected Tactical and Strategic products.

### 3 References

For additional information about the NRFC process and/or the NIH Enterprise Architecture, please refer to:

National Institutes of Health. Enterprise Architecture.

<<http://enterprisearchitecture.nih.gov>>

For additional information about complying with security regulations and guidelines at NIH, please refer to:

National Institutes of Health. NIH Security.

< <http://www.cit.nih.gov/security.html> >.

## 4 Contact

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## 5 Security Considerations

All server implementations must include adequate security measures to ensure application and data integrity through enforcement of authentication and authorization, adequate physical security of hardware, network connectivity that complies with security regulations and guidelines, and ongoing cooperation and communication with the vendor to apply fixes to any security vulnerabilities that may become exposed in time.

## 6 Changes

Version	Change	Authority	Author of Change
1.0	Original Draft		Bill Jones and Jay Shah
1.1	Updated version addresses concerns and recommendations from comment period. <ul style="list-style-type: none"> <li>Removed “Provisional” from title</li> <li>Added the scientific classification to describe scientific baseline information while only specifying standards for general purpose</li> <li>Updated standards designation for IBM z/OS and revised comments for other standards</li> </ul>	Author	Bill Jones and Jay Shah
1.2	<ul style="list-style-type: none"> <li>Moved the following technologies from containment to tactical: (1) Apple Macintosh, including G4, PowerPC and Xserve G5 and (2) Apple Mac OS X</li> </ul>	Architecture Review Board (3/9/2005)	Steve Thornton

	Server. ■ Minor grammatical changes and reordered lists.		
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