

Web, Database, and Application Server Bricks v1.0

Status of this Memo

This memo proposes brick standards for enterprise web, database, and applications servers pursuant to the standards sub-series of NRFCs. After a reasonable review period has elapsed and pending acceptance by the ARB, these standards will become part of the NIH Enterprise Architecture. Distribution of this memo is unlimited.

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1 Introduction

The purpose of this NRFC is to establish four 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

The products designated for use are intended for applications running on server class machines. Smaller, locally used applications designed to support no more than 10 users are not covered by these specifications.

2 Web, Database, and Application Servers

Web servers are software that serve as engines which run websites. Through a Web listener, they accept HTTP (non-encrypted) and HTTPS (encrypted) connections from Web browsers. The Web server may return HTML based Web pages and other files directly to the browser, or may invoke additional software that performs processes such as database interaction and generates the returned HTML or files.

The **Online Transaction Processing (OLTP)** database market is defined by products that are suitable for a broad range of enterprise-level real time applications, including purchased business applications such as enterprise resource planning, customer relationship management, and customized transactional systems.

Data Warehouse (DW) database functional requirements are different than OLTP DBMS in that they support large databases, complex multi-table join processing and schema support, and have specialized index technology, workload management, and data partitioning capabilities. Most importantly, they support parallel capabilities (e.g., I/O, query and operations), and parallel utilities (e.g., backup/recovery and reorganization). DW databases are generally not updated real time, but are frequently updated via over night, batch oriented processes.

An **application server** is a modern form of platform middleware. It is system software that resides between the operating system on one side, and the external resources — such as DBMS, communications and Internet services — on another side, and the users' applications on a third side. At runtime, the application server is to act as host (or container) for the user's business logic while facilitating access and performance of the business application. The application server must perform despite the variable and competing traffic of client requests, hardware and software failures, the distributed nature of the larger-scale applications, and potential

heterogeneity of the data and processing resources required to fulfill the business requirements of the applications.

2.1 Web Server

This brick provides baseline information and the future direction for deploying web servers at NIH.

Table 1. Web Server Brick

Baseline Environment (Today)	Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)
<ul style="list-style-type: none"> ■ Apache ■ Microsoft Internet Information Server ■ Neon Shadow ■ Netscape Enterprise Server ■ Other 	<ul style="list-style-type: none"> ■ Apache ■ Microsoft Internet Information Server 	<ul style="list-style-type: none"> ■ Apache ■ Microsoft Internet Information Server
Retirement Targets (Technology to eliminate)	Containment (No new deployments)	Emerging (Technology to track)
<ul style="list-style-type: none"> ■ None 	<ul style="list-style-type: none"> ■ Neon Shadow ■ Netscape Enterprise Server ■ Other 	<ul style="list-style-type: none"> ■ Evolving open source products
Comments		
<ul style="list-style-type: none"> ■ 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 as 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 low as the selected Tactical and Strategic products. ■ Evolving open source products are Emerging because open source developers have done a better job of modularizing their software, making it move feasible to combine components in order to produce a desired solution. ■ Apache and MS Internet Information Server are Tactical/Strategic only when running on any of the operating systems/platforms designated as Tactical or Strategic in the Server Platform Brick. 		

2.2 OLTP and DataWarehouse Database Servers

The following bricks provide baseline information and the future direction for deploying OLTP and data warehouse database servers at NIH.

Table 2. OLTP Database Server Brick

Baseline Environment (Today)	Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)
<ul style="list-style-type: none"> ■ DB2 ■ IMS ■ Microsoft Access ■ Microsoft SQL Server ■ MySQL ■ Oracle ■ Other ■ Sybase 	<ul style="list-style-type: none"> ■ DB2 ■ Microsoft SQL Server ■ MySQL ■ Oracle 	<ul style="list-style-type: none"> ■ DB2 ■ Microsoft SQL Server ■ Oracle
Retirement Targets (Technology to eliminate)	Containment (No new deployments)	Emerging (Technology to track)
<ul style="list-style-type: none"> ■ None 	<ul style="list-style-type: none"> ■ IMS ■ Microsoft Access ■ Other ■ Sybase 	<ul style="list-style-type: none"> ■ Evolving open source products
Comments		

- 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 as 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 low as the selected Tactical and Strategic products.
- Evolving open source products are Emerging because open source developers have done a better job of modularizing their software, making it more feasible to combine components in order to produce a desired solution.
- Oracle and Microsoft SQL Server are Tactical/Strategic for the current and previous releases and only when running on any of the operating systems/platforms designated as Tactical or Strategic in the Server Platform Brick.
- DB2 is Tactical/Strategic when run on IBM-OS/390-zOS or AIX.
- MySQL is designated as Tactical because, although it is not as functional and scalable as the databases listed as Tactical and Strategic, it is open source and quickly gaining in usage.
- Microsoft Access is designated Containment because is not as functional and scalable as the databases listed as Tactical and Strategic.

Table 3. Data Warehouse Database Server Brick

Baseline Environment (Today)	Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)
<ul style="list-style-type: none"> ■ DB2 ■ Microsoft Access ■ Microsoft SQL Server ■ MySQL ■ Oracle 	<ul style="list-style-type: none"> ■ DB2 ■ Microsoft SQL Server ■ MySQL ■ Oracle 	<ul style="list-style-type: none"> ■ DB2 ■ Microsoft SQL Server ■ Oracle
Retirement Targets (Technology to eliminate)	Containment (No new deployments)	Emerging (Technology to track)
<ul style="list-style-type: none"> ■ None 	<ul style="list-style-type: none"> ■ Microsoft Access 	<ul style="list-style-type: none"> ■ Evolving open source products
Comments		
<ul style="list-style-type: none"> ■ 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 as 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 low as the selected Tactical and Strategic products. ■ Evolving open source products are Emerging because open source developers have done a better job of modularizing their software, making it more feasible to combine components in order to produce a desired solution. ■ Oracle and Microsoft SQL Server are Tactical/Strategic for the current and previous releases and only when running on any of the operating systems/platforms designated as Tactical or Strategic in Server Platform Brick. ■ DB2 is Tactical/Strategic when run on IBM-OS/390-zOS or AIX. ■ MySQL is designated as Tactical because, although it is not as functional and scalable as the databases listed as Tactical and Strategic, it is open source and quickly gaining in usage. ■ Microsoft Access is designated Containment because is not as functional and scalable as the databases listed as Tactical and Strategic. 		

2.3 *Application Server*

This brick provides baseline information and the future direction for deploying application servers at NIH. The following classifications apply to standalone applications servers, not application servers that are included with a multi-tier COTS product.

Table 4. Application Server Brick

Baseline Environment (Today)	Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)
<ul style="list-style-type: none"> ■ Apache Tomcat ■ BEA WebLogic ■ Caucho Resin ■ JBoss ■ Macromedia Cold Fusion ■ Microsoft .NET Server ■ Neon Shadow ■ Oracle 9ias ■ Other ■ WiTango Application Server 	<ul style="list-style-type: none"> ■ Apache Tomcat ■ JBoss ■ Macromedia Cold Fusion ■ Microsoft .NET Server ■ Oracle 9ias 	<ul style="list-style-type: none"> ■ Apache Tomcat ■ JBoss ■ Macromedia Cold Fusion ■ Microsoft .NET Server ■ Oracle 9ias
Retirement Targets (Technology to eliminate)	Containment (No new deployments)	Emerging (Technology to track)
<ul style="list-style-type: none"> ■ None 	<ul style="list-style-type: none"> ■ Neon Shadow ■ Other ■ WiTango Application Server 	<ul style="list-style-type: none"> ■ BEA WebLogic ■ Caucho Resin ■ Evolving open source products
<ul style="list-style-type: none"> ■ 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 as 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 low as the selected Tactical and Strategic products. ■ Apache Tomcat, Macromedia Cold Fusion, Oracle 9ias, Microsoft .NET Server, and JBoss are considered Tactical/Strategic only when running on any of the operating systems/platforms designated as Tactical or Strategic in the Server Platform Brick. ■ BEA WebLogic has been designated emerging due to its industry popularity. BEA is characterized by dominating market share, massive installed bases and marketing momentum, and according to Gartner is widely supported by ISVs and system integrators, and is well-known and recognized. ■ Evolving open source products are Emerging because open source developers have done a better job of modularizing their software, making it move feasible to combine components in order to produce a desired solution. ■ Apache Tomcat is somewhat limited – serves Java servlet and jsp files, does not support J2EE/EJB objects. ■ Neon Shadow is considered a leader in the Gartner Programmatic Integration Server Magic Quadrant, but has been designated containment due to its history of providing mainframe-class integration capabilities (mainframe technology is also considered containment). ■ WiTango Application Server is considered Containment because it is not widely used at NIH and doesn't offer advantages over the products selected as Tactical/Strategic. ■ Caucho Resin is an example of an open development environment, and is a fast servlet and JSP engine supporting load balancing for increased reliability. Open development environments in middleware and infrastructure like Caucho's Resin encourages the use of Linux as a freely available OS foundation for the application software stack. Consider Caucho when looking for a low cost streamlined J2EE application server to be used by well-skilled technical engineering teams. As a result, Caucho Resin is designated emerging. 		

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

To contact the NRFC Editor, send an email message to EnterpriseArchitecture@mail.nih.gov.
 To contact the authors, send an email message to wkj@mail.nih.gov or jay.shah@gartner.com

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
0.1	Original Template		Bill Jones and Jay Shah
0.2	Made changes in response to comments from the first distribution. Include adding a scope and changing the way open source products are handled.		Bill Jones
1.0	Approved by ARB 5/25/2005.	ARB	Steve Thornton, NRFC Editor

7 Author's Address

William K. Jones
National Institutes of Health
10401 Fernwood Road
Mail Stop 5628
Bethesda, Maryland 20817
Phone: 301-402-1241
Email: wkj@mail.nih.gov

Jay Shah
Contractor for National Institutes of Health
Gartner Consulting
8405 Greensboro Drive
6th Floor
McLean, VA 22012
Phone: 703-226-4849
Email: jay.shah@gartner.com