Alvina Nishimoto
HP CSY
R&D Program Manager

Your HP e3000 E-Toolkit: Web-Enabling Your HP e3000 Environment
Agenda

- The definition of middleware
- Different types of middleware on the HP e3000
  - Desktop access
  - Data access
  - Remote procedure call
  - Message-oriented middleware
  - Extraction/Transformation/Transport
  - LDAP
  - XML
- Difference between middleware and application servers
- HP Web Wise
Typical Enterprise Server Environment

Web Server    HP e3000 Server    File Server    Other Database Servers

High-speed backbone

LAN   LAN   LAN
HP e3000 Environment

- HP e3000
- Business App
- Database
- Internet/Intranet
- Web Server
- WAN/LAN
- Visual Basic/Terminal Emulation/Other Interfaces
- Web
HP e3000 Web/Application Server

Web Server

- CGI
- Servlets
- DSO modules
- JDBC
- 3rd party software
- etc.

VPLUS/COBOL App

Database

Web Browser
Evolution in Software Development and the Internet/Intranet

**Application "Face Lift"**
- Application development tools will shift to support both Internet and Intranet business-strength applications via incorporation of WWW browsers, ORBs and Java-like O04GLs. (1996-1997)

**Application Migration**
- WWW browsers, ORBs and Java-like O04GLs will evolve to include full-fledged application frameworks and application management for internal collaborative applications and extra-enterprise transactions. (1997-1998)

**Application Re-architecting**
- The I-Way infrastructure (Internet, on-line services, media servers, content tools, billing services) will mature to accommodate business-critical applications, including electronic commerce. (1999-2001)

Source: META Group Inc., Feb/April 1996
Distributed Applications - Typical Transition Approach

- Establish new interface architecture
- Wrap existing applications
- Procure and/or build inventory of components
- Integrate and implement new components
- Replace wrapped components
Static Web Page

Web Client

Internet or Intranet
TCP/IP

Web Server

HTTPD

Static HTML Pages

Text

Graphics
Common Gateway Interface

Web Client

Web Server

CGI

Environment variables
input data

STD IN
STD OUT
CGI Program

HP 3000

Doc request + data

HTML doc

HTML doc

HP 3000
Web Protocol is Stateless

- A request is made to the server from the client, the information is provided and the connection is dropped.
- Web server itself has no way of "remembering" the request.
- CGI Web program must contain code to keep track of the following:
  - the user
  - all requests associated with that user
  - what information was sent to the user to create the illusion of a "state" environment.
Middleware Drivers

- Deployment of distributed applications
- Customers want choices in their deployment options. Options include:
  - OS
  - DBMS
  - Application packages

Middleware is key to building and integrating distributed application independent of underlying technologies.
Job of Middleware

“... make the complex world of distributed processing simpler by using middleware as the consistent intermediary rather than by building distributed programs that must natively communicate with nuts and bolts of all the unique requirements of each distributed resource”

IDC
Why HP e3000 Customers Need Middleware?

- Makes the development of distributed applications easier
- Addresses the IS labor shortage
- Exploits the power of the Internet
  - GUI frontend access
  - Easier access to backend computing resources
- Facilitate ability for distributed applications to scale up
- Allows HP e3000 to participate in this network computing environment
Middleware’s Position within the Distributed System
Communication Building Block Layers

OSI 7-Layer Reference Model

User Service

Transport Service

Middleware

<table>
<thead>
<tr>
<th>Layer</th>
<th>Function</th>
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<td>802.3, 802.5</td>
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<td>Data Link</td>
<td>NIC Driver</td>
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<td>Network</td>
<td>IPX, IP, DLC</td>
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<tr>
<td>Transport</td>
<td>SPX, TCP</td>
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<td>Session</td>
<td>Communication APIs (socket, APPC)</td>
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<td>Presentation</td>
<td>Application Program</td>
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<tr>
<td>Application</td>
<td>User Service</td>
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Types of Middleware

- Desktop Access
- Data Access
  - ODBC
  - JDBC
  - Gateways
- Remote Procedure Call
- Message-Oriented
- LDAP
Desktop Access Middleware

- Interoperability between client graphical user interfaces and existing applications
- Allows new user interface to be added to an existing application with little or no code changes
- First step into distributed systems
- Means to leverage backend applications with GUIs and internet front-ends
- Means to provide better customer service through improved access to backend data
HP e3000 Desktop Access
Middleware

Web/
Visual Basic/
Other Interfaces

Web Server/
Application server

Internet/
Intranet/LAN

Advances Network Systems
Bradmark
LegacyJ
Minisoft
Walldata
WRQ

VPLUS/
COBOL
Apps

Middleware

Database
Terminal Emulation in a Web Browser

- Millware ScreenJet
- Microsoft Javelin
- NetManage WallData
- WRQ Reflection
Vplus Conversion

- Advanced Network System's Vplus+ API
- Computer Associates Opal
- Bradmark VB-View
- LegacyJ Java Remote Client
- MiniSoft WebDimension (non Vplus also)
- USIN Visual Magic
System Management/File Access

- Bradmark MPE Command Center
- Middleware TheDash
- Omniso31utions GUI3000
- Samba
Development Environments

4GL
- AES Van Gogh
- Cognos PowerHouse
- Speedware Autobahn
- VisualSpeedware

3GL
- Robelle QED IT for Windows
- Whisper Technology Programmer Studio
Data Access Middleware

- Application to data source synchronous interoperability model
- Provides data-oriented API to make requests to read or update data from server-based data sources
- Uses either SQL syntax or proprietary database gateway API
- Need to build applications that are database independent
HP e3000 Data Access Middleware

Client/Application

HP e3000

Microsoft Excel
Lotus 1-2-3
Crystal Reports
Microsoft Interdev, etc.

Internet/Intranet/Lan

Middleware

Casahl, XML

ODBC
JDBC

Image/SQL

Business App

ODBC
JDBC
ODBC and JDBC Drivers

- HP’s ODBC and JDBC drivers
- Advanced Network Systems ADBC
- CSL Linkway ODBC
- DISC OMNIDEX for the Web
- MB Foster ODBC Link/SE
- Minisoft ODBC/32
Information Builders, Inc (IBI)
EDA /SQL

- Enterprise Data Access/SQL (EDA /SQL)
- Direct access to heterogeneous databases on heterogeneous platforms transparently
- Access TurboIMAGE, Allbase, Oracle, KSAM data on HP3000 from a multi-database and multi-platform environment
- Uses TCP/IP or NETIPC for network access
- FOCUS (window-based) is a decision support & analysis tool
Extraction/Transformation/TransportMiddleware

- Used for decision support systems (DSS) and integration
- Does reformatting, syntax conversion, and has prebuilt transformations
- Content-based, rules-based driven transformation
- Realtime or bulk load API
Data Warehousing for the HP3000
Made EASY by the Companies you trust!

Normalized

HP3000 IMAGE/SOL Operational Database

BRIDGEWARE Data Movement Tool

- Automatic Change Detection
- Full incremental warehouse loads
- Data Transformation & Scrubbing

Star/Snowflake

HP3000 IMAGE/SOL Data Warehouse

OMNIDEX™ Database Access

- Automatic ODBC Optimization
- Dynamic Aggregations
- Instant Multidimensional Analysis

Any Access Tool

BrioQuery

- Ease-of-Use
- Desktop OLAP
- Pivoting/Graphing

Taurus Software

HEWLETT PACKARD

QUEST SOFTWARE

Brio Technology

hp e3000 web enablement
June 28, 2001
Remote Procedure Call Middleware

- Application to application synchronous interoperability for procedural languages
- Applications ship a direct call for the execution of a procedure within a remote application
- Widely associated with DCE
- Trend to bundle RPC with OSs
- RPC included in Java as part of RMI
HP e3000 RPC Middleware

**Client/Application**

- Web/Visual Basic Interface

**Middleware**

- DCE

**HP 3000**

- Business App

- Image/SQL

**Internet/Intranet/Lan**

- Bradmark StarMail
- Ironside Technologies
- Fioravanti/Redwood
- Speedware Autobahn
- QuestNetBase Client
- Visual Speedware
RPC Middleware

FrontEnds for Manufacturing & Distribution
- Bradmark StarMan
- Ironside Technologies
- Fibravanti Redwood

Development Tools
- Speedware Autobahn
- VisualSpeedware
Message-Oriented Middleware

- Application to middleware synchronous or asynchronous interoperability
- Applications make requests by passing messages directly to the middleware
- Messages are records calling for action and supplying the input needed by that action
- Event-driven mode of processing, middleware waits for message to invoke the action
HP 3000 Message-Oriented Middleware (MOM)

Client/Application

Web/Visual Basic Interface

Queue of events or publish/subscribe events

MOM

HP 3000

Business App

WebMethods Enterprise
IBM’s MQ Series
Level 8’s Geneva MQ

Internet/Intranet/Lan
The Web Adapter

Mainframe Applications

Objects

HP

RDBMS

Internet

Java

COBOL

C/C++

Application Packages

Custom Applications

The Web Adapter
What does the Web Adapter do?

- **Auto crafts htm lpages for Events**
  - Developer may customize
- **Enables developer to interact with Broker from the Browser**
  - Receives WEB Get and POST request operations
  - Transforms operations into Active Events
  - Publishes the Event Request to a Broker
  - Receives corresponding Event Replies
  - Transforms Reply Events into htm lpages.
Using the Web Adapter

1. Online browser user references URL of the request form.
2. Request is transmitted to the WWW Adapter as an http request page.
3. Web Adapter publishes the request event to the broker.
4. Adapting application(s) publish replies.
5. Web Adapter, using html template(s) from the database, builds an html reply page.
6. Web Adapter transmits http reply to the browser.
Willow Technology and MQSeries

- Leading independent producer of fully compliant MQSeries client and server products.
- Developed under license from IBM
- Sales & support of IBM and Willow MQSeries products
- MQSeries systems integration, custom development, proof of concept, consulting
- More Information
  - web: www.willowtech.com; email: info@willowtech.com
  - phone: +1.408.377.7292; fax: +1.408.377.7293
MQSeries on MPE/ix

- MQSeries Client for MPE
  - V2 Client
    - Posix Client in Beta
  - V5.x Client
    - C, COBOL interfaces
    - TCP/IP interface
    - Requires MPE/ix 6.0 or later
    - Fully supported replacement for IBM Posix client
• Level8 personnel developed the original version of IBM MQ Series
• Worked with Microsoft on MS MQ and MS MQ interoperability products:
  • GenevaMQ Bridge for MQ Series
  • GenevaMQ Client
Microsoft Alliance

- Announced - October 1998
- Microsoft Licenses MSMQ - MQ Series Bridge
- NT Component of GenevaMQ to ship with Windows 2000
- Microsoft to provide 1st and 2nd level support for GenevaMQ Server
**Windows DNA**

The development model for Windows

**External Applications**

**Legacy Systems**

**Thin Client**

**Rich Client**

**Tools**

**Databases**

**Presentation**

**Business Logic**

**Data**

**System Services**
Windows DNA Business Logic

- Web
- Transaction
- Message Queuing
- Directory
- Security
- Build on each other
- Integrated together

Write business logic as COM components
MSMQ

- Key technology component of Windows DNA
- Microsoft’s implementation of the message queuing paradigm for the Windows NT operating system
- Windows only!!!!
Geneva MQ

- An enterprise platform for building cross-platform message queuing solutions based on MS MQ
- Available on MPE/iX, UNIX, MVS, AS/400, VMS, Unisys and over 12 other enterprise platforms
GenevaMQ

- GenevaMQ for HP e3000 MPE/iX (independent and dependent client)
- Provides fundamental Windows to MPE connectivity
- API implemented in both C and COBOL 85
Architecture

Dependent Client

Non-Windows

POSIX Application
GMQ API (Send)

GenevaMQ Client

Network

Windows

NT Application
MSMQ API (Receive)

MSMQ

Queue Manager

GenevaMQ Server

A
B
C
What can you do with LDAP?

- A directory web in much the same way that http & html are used to define implement the global hypertext web.
- Any LDAP client may peruse the global directory just as they can use a web browser to peruse the global Web.
- Provides one central source for searching, updating, and authenticating access to data.
LDAP - the Big Picture

LDAP Directory

- Resources
- Configuration
- Users & Groups
- Access Control
- Services
- Certificates
- Preferences

Administrators

- Other Users
- Clients

Devices

Servers
XML

- E-commerce has XML processing as part of the MACS application
- Different from HTML in that it separates content from presentation
- Allows data to be interpreted without knowing a specific form at beforehand
- Built in many application servers that use ODBC or JDBC to get to the data
- Lot of different types of XML, translators becoming prevalent
FOURSCOREANDSEVENYEARSAGOOURFOREFA
THERSBROUGHTFORTHONTHISCONTINENTAN
EWNATIONCONCEIVEDINLIBERTYANDDEDIC
ATEDTOTHEPROPOSITIONTHATALLMENAREC
REATEDEQUALNOWWEAREENGAGEDINAGREAT
CIVILWARTESTINGWHETHERTHATNATIONOR
ANYNATIONSOCONCEIVEDANDSODEDICATED
CANLONGENDURE

Four score and seven years ago, our
forefathers brought forth on this continent
a new nation, conceived in liberty and
dedicated to the proposition that all men
are created equal. Now we are engaged in a
great civil war, testing whether that nation
or any nation so conceived and so dedicated
can long endure.
RSA’s BSAFE SSL-C

- Core cryptographic services — Crypto-C and PKI service — Cert-C.
- Security simplified: one trusted vendor for both the secure protocol and the underlying cryptography
- Dramatic time to market benefits in the development of SSL-enabled applications
- SSLv2, v3 and TLS v1 specification support provides quick and interoperable functionality between SSL clients and servers
- Full-strength, supported product available in many countries
Middleware Types and Corresponding Products

<table>
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<tr>
<th>Synchronous RPC</th>
<th>SQL-Oriented Data Access</th>
<th>Object Request Broker</th>
<th>Message Oriented</th>
<th>Publish/Subscribe</th>
<th>Asynchronous RPC</th>
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</thead>
<tbody>
<tr>
<td>Microsoft MTS</td>
<td>JDBC</td>
<td>Visigenic VisBroker</td>
<td>Momentum XPC</td>
<td>ActiveMQ</td>
<td>HTTP</td>
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<td>NCR TOP END</td>
<td>Intersolv DataDirect</td>
<td>BEA</td>
<td>Microsoft M SMQ</td>
<td>ActiveMQ</td>
<td>NobleNet RPC</td>
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<td>IBM Encina</td>
<td>Oracle Connect</td>
<td>ObjectBroker</td>
<td>BEA MessageQ</td>
<td>TIBCO Rendezvous</td>
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<td>IBIEA/SQL</td>
<td>Iona Orbix</td>
<td>IBM M Q Series</td>
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<td>IBM CICS</td>
<td></td>
<td>TIBCO TIB/ObjectBus</td>
<td>NEON</td>
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<td></td>
</tr>
</tbody>
</table>

Source: DBMS
What Application Servers Do

- Integration with legacy systems and databases
- Web site support
- Web integrated system development
- Personal computer system development
- E-commerce
- Performance management

Source: Application Server Powering the Web-Based Enterprise by Jesse Feiler
Application Servers vs. Middleware

- Application servers mediate between databases and web servers
- Middleware mediate between system components that may be databases and Web servers or other components
- Middleware is more general

Source: Application Server: Powering the Web-Based Enterprise by Jesse Feiler
internet suite of key offerings
for business and
web-enabling your hp e3000

HP WebWise.
hp webwise secure webserver

based on the apache webserver

128-168 bit encryption and authentication

the most popular webserver package in the industry

cross-platform, open source solution
hp webwise mpe/iX secure web server based on open-source apache
orderable and shipping now from an hp reseller or sales rep.
on-line order, purchase, and download available today from www.software.hp.com
full hp support via the response center
affordable pricing based on system performance tier
new features and functionality are planned for fy 2001
Lutris Enhydra Application Server

Facilitates rapid development and deployment of Java and XML applications.

Uses for application servers:
- Connecting to legacy data
- Creating new solutions
- Deploying Internet solutions

100% Java means portable across all hardware platforms.
hp e3000 and lutris enhydra

based on open source enhydra application server

100% java
xml land wireless server

lutris technologies
 sponsor and developer of enhydra on the hp e3000
enhydra enables developers to develop and deploy java and xml applications for the e3000
hp e3000 and lutris

solution sell:
lutris = internet savvy
hp = hp e3000 savvy

based on open source enhydra
application server

100% java
xml and wireless server

lutris technologies

sponsor and developer of enhydra on
the hp e3000

enhydra enables developers to develop
and deploy java and xml applications
for the e3000
Java and interoperability for the HP e3000

Interoperability with other platforms:

- Java database connectivity (JDBC)
- MPe/IX SDK for Java 1.2
- Version 1.3 on the way
- MPe/IX Hotspot virtual machine for Java
  - 2x to 5x the performance of the classic Java VM
- Java servlets available in Lutris Enhydra 3.5 from Lutris

Current version of Samba for interoperability with NT (v 2.0.7 in 7.0 Express 1)

LDAP lightweight directory access protocol

ODBC connectivity from MB Foster Associates & others
open source enterprise software and services

enhydra - the leading open source java/xml application server

lutris-certified products

lutris services:
internet consulting,
support,
education

investors: chase capitalpartners, intel64 fund (includes hp), com paq, nec, db alex brown, chase h& q

form ore info:  www.lutris.com
open source

a development methodology
a licensing scheme

available to anybody
can be modified by anybody
open source

a development methodology
a licensing scheme

available to anybody
can be modified by anybody

Lutris does the core engineering on Enhydra

partners, consultants, ISVs can view and modify the source
open source

a development methodology
a licensing scheme

available to anybody
can be modified by anybody

Lutris does the core engineering
partners, consultants, ISVs can:

Java forms the basis for Enhydra
easily migrated to platforms like
application servers
development and deployment environment for dynamic web and wireless applications.
used for building dynamic, data driven applications.
Application servers

development and deployment environment for dynamic web and wireless applications. Used for building dynamic, data-driven applications able to draw upon data from many types of data sources: databases, legacy systems, erp systems, xml data stream, etc.
application servers

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application servers
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image/sql via JDBC

business logic

dynamic content

app servers (enhydra*)

static content

back-end connectivity

web servers

databases

legacy systems

e-commerce systems

back-end systems

browsers

wireless devices
**lutris and webwise**

The application server is one component of a complete solution stack. Secure Apache webserver provides security and the ability to serve static content. Application server used to create data-driven dynamic web (servlets) and wireless applications.
# References 1

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<thead>
<tr>
<th>Tool</th>
<th>Tool Type</th>
<th>Contact Info</th>
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<tbody>
<tr>
<td>SAMBA</td>
<td>NT file and print sharing</td>
<td><a href="http://www.hp.com/go/3000">www.hp.com/go/3000</a></td>
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<tr>
<td>Bradmark MPE Command Center</td>
<td>GUI front-end</td>
<td><a href="http://www.bradmark.com">www.bradmark.com</a></td>
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<td>Minisoft Frontman</td>
<td>GUI front-end</td>
<td><a href="http://www.minisoft.com">www.minisoft.com</a></td>
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<tr>
<td>OmniSolutions GUI 3000</td>
<td>GUI front-end</td>
<td><a href="http://www.omnisolutions.com">www.omnisolutions.com</a></td>
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<td>WRQ Reflection 1, version 6.0</td>
<td>Active document support</td>
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<tr>
<td>Advanced Network Systems</td>
<td>JDBC driver</td>
<td><a href="http://www.advnetsys.com">www.advnetsys.com</a></td>
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<td>CSL Linkway</td>
<td>ODBC driver</td>
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<td>MB Foster ODBCLink/SE</td>
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<td>Minisoft ODBC/32</td>
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<tr>
<td>Crystal Reports</td>
<td>ODBC spreadsheet</td>
<td><a href="http://www.img.seagate.com">www.img.seagate.com</a></td>
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<td>Microsoft Excel</td>
<td>ODBC spreadsheet</td>
<td><a href="http://www.microsoft.com">www.microsoft.com</a></td>
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<td>Casahl Replic-Action</td>
<td>ODBC tool (Lotus Notes and Microsoft Exchange)</td>
<td><a href="http://www.casahl.com">www.casahl.com</a></td>
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<td>Haht Hahtsite</td>
<td>ODBC tool</td>
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<td>Microsoft Access</td>
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# References 2

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<tr>
<th>Software/Middleware</th>
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<td>Information Builders EDA</td>
<td>Gateway</td>
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<td>Oracle Transparent Gateway for IMAGE/SQL</td>
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<td>Sybase Open Client/Open Server</td>
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<td>Premier Software OSCAR (Open Services Catalog &amp; Application Registry)</td>
<td>Middleware</td>
<td><a href="http://www.premiersoft.com">www.premiersoft.com</a></td>
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<td>Taurus Bridgeware</td>
<td>Middleware (database to database extraction)</td>
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<td><a href="http://www.level8.com">www.level8.com</a></td>
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<td>Willow Technology</td>
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<td>Lutris Enhydra</td>
<td>Application Server</td>
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Questions

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