Application Server

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

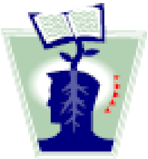
6 Related Lifecycle and Adoption Processes

7 Conclusion

Icons / Metaphors

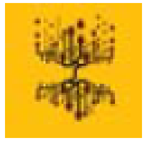
Information

Common Realization

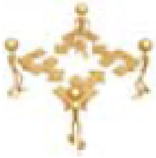


Knowledge/Competency Pattern

Governance



Alignment



Solution Approach

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

6 Related Lifecycle and Adoption Processes

7 Conclusion

Understanding Application Servers

- Wikipedia Definition:
  - “An **application server**, in an n-tier software architecture, serves an API to expose business logic and business processes for use by third-party applications”
  - However, not all application servers expose APIs today?!
- Application Server vs. Legacy Servers
  - Database server and transaction processing monitors are degenerated application servers
  - However database servers and transaction processing monitors pre-date application server technology
    - Why?
- Role of Application Servers
  - Manage non-functional requirements so that developers can focus on functional requirements

Application Servers Evolution

- Traditional client-server technology
- CGI frameworks
- Page-based extended HTML environments
- Distributed object computing platforms
- Java-Based
- Object Management Architectures (OMAs)
- Component-based computing environments
- Web Services platforms
- Next generation application servers (reflective, multimedia- and agent-enabled, MDA-compliant, etc.)

Application Servers Generics

- Modern Application Server Properties
  - Rich/portable software
  - Middleware between pervasive devices and back-office systems (OMA-compliant)
  - Platform independent programming interface
  - Support legacy applications integration (EAI/B2Bi)
  - XML-enabled
  - Web-services-enabled
  - SOA-compliant
  - etc.

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

6 Related Lifecycle and Adoption Processes

7 Conclusion

Pattern Categories and Framework

- Model View
  - Reference Architectural Style and Element(s)
  - Architectural Style
  - Architectural Pattern
  - Design Patterns
- Implementation View
  - Reference Implementation Style and Element(s)
  - Implementation Style
  - Implementation Pattern
  - Idiom

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

6 Related Lifecycle and Adoption Processes

7 Conclusion

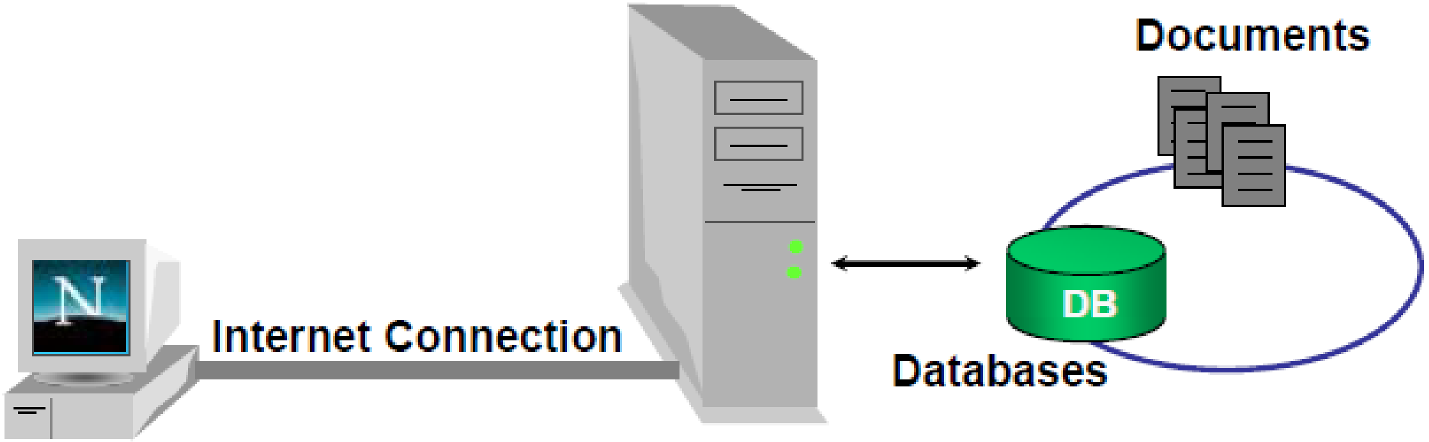
Underlying Facilities

- (Network) Communication Protocols
  - e.g., TCP/IP, HTTP, RPC, GIOP/IIOP, RMI, XML, XML-RPC, SOAP/DIME/ROPE, UDDI/DISCO, WSDL
- Client-Server Technology
- Distributed Object Computing
- Component Models and Frameworks
- Secure Messaging Infrastructures
- etc.

Web 1.0 Business Evolution

- **First it was Online Publishing**
  - The World Wide Web - a Global Information Network Emerged (The Information Superhighway)
  - The Web Browser Provided Platform-Independent Access to Information
  - People Could View the Same Content Anywhere in the World
  - There was Explosive Growth in the Number of Business Web sites
- **Then it became Online Services and Web Applications**
  - Businesses are Building Relationships with Web-based Customers
  - Value-Based Services are Ensuring a Steady Flow of Web-based Traffic
  - Overhead is Reduced with Automated Online Services
  - A New Global Marketplace is Emerging -
Web Applications/services are Available from Anywhere in the World 24x7
  - Web Application Updates Occur Instantly and Universally
  - Doing Business is now Cheaper, Faster, and Easier

Basic Web Applications



Documents

Internet Connection

DB

Databases

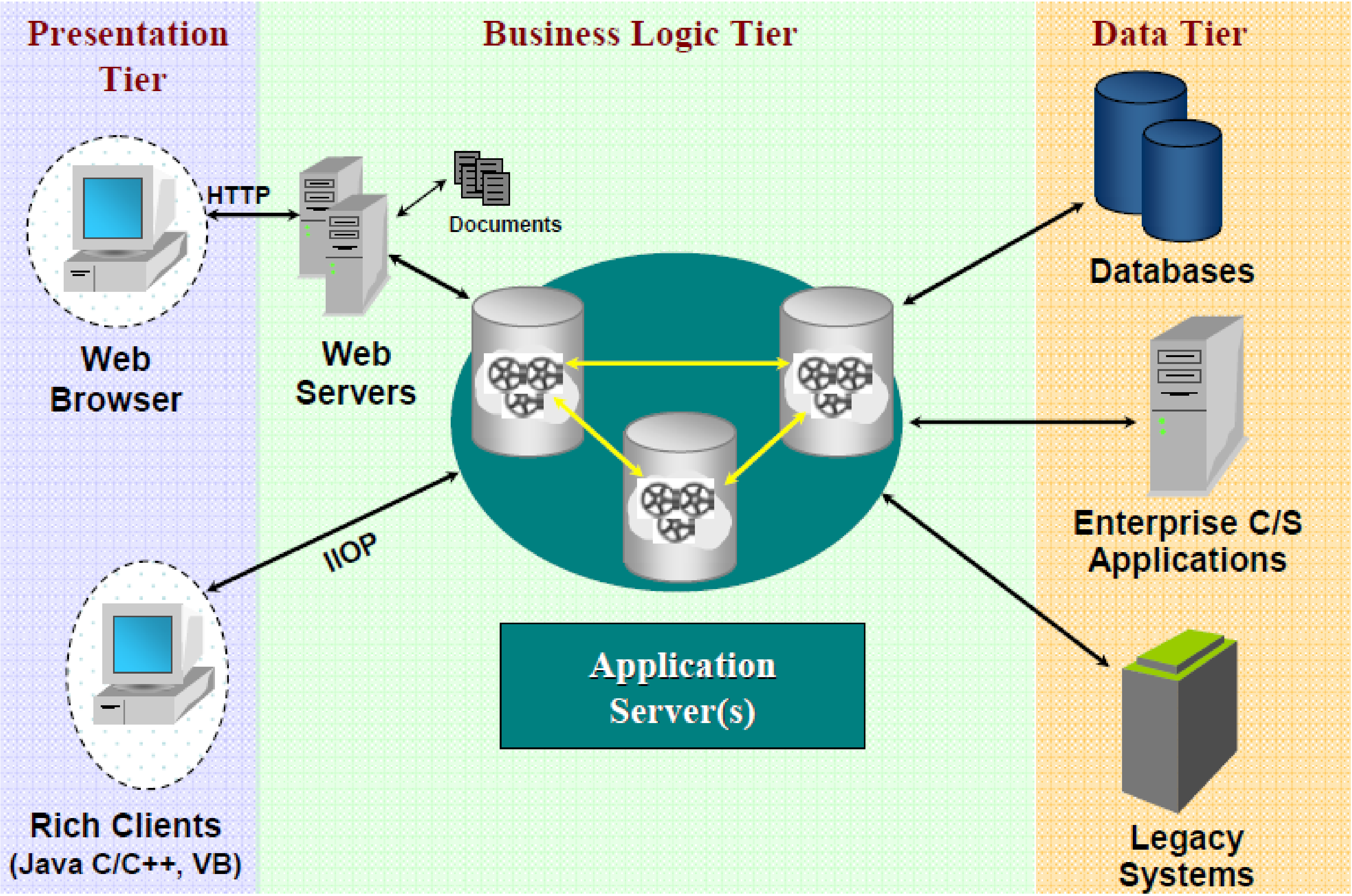
Client Browser

Web Server

Enterprise Data

CGI, SSJS, NSAPI,
ISAPI, WAI, Etc.

Robust Web Applications



Mission Critical Requirements

- **High Performance and Scalability**
  - Benchmarks demonstrate 6000+ concurrent users, 12,000 TPM on a 4-CPU Sparc
- **High Availability & Reliability**
  - Customers like E*Trade & ISN demand 24x7 reliability with software & hardware fault tolerance
  - eBay on WebSphere
    - 30+ billion transactions per day
    - Over 8,000 tps!
  - Countrywide Insurance on WebSphere
    - Over 20,000 tps!

Mission Critical Application Requirements (continued)

- **Rapid Development through Pre-built Application & System Services**
  - Proven that large-scale enterprise applications can be built in half the time with equivalent resources
- **Enterprise Integration**
  - Need for high-performance integration to databases, legacy systems, client/server applications and ERP applications
- **Open & Extensible**
  - Need for standards-based, cross-platform supporting Windows/UNIX, JAVA/C++, CORBA/IIOP, RMI/IIOP, and .Net/COM+

Application Server Selection Criteria

- Usability
- Scalability
  - Concurrency
  - Extensibility
- Security
- Manageability
  - Fault tolerance, auto-deployment, communications, development environment, monitoring tools
- Reusability
- Support
- Skills

Application Server Categories

- Legacy technology
- Page-based extended HTML environments
- OMA-based
- Web Services platforms
- MDA-based
- Next generation
- Sample Classification:
  - » http://en.wikipedia.org/wiki/Comparison_of_application_servers

Application Servers Examples

- CGI-Perl custom environments
- ColdFusion 8, PHP 5, ASP .Net, JEE JSP
- WebSphere Application Server V7
- Oracle WebLogic 11g
- Red Hat JBoss Enterprise Application Platform
- etc.

Application Server Packages
(e.g., SAP Software Solutions, Oracle/PeopleSoft, Infor’s Baan)

- ERP, and B2Bi Suites
- Human Resources
- Sales Automation
- Financial/Accounting
- Retail/Point of Purchase
- Manufacturing/Inventory
- Supply Chain Management
- etc.

Sample Features

- **High performance & scalability**
  Create applications that deliver data quickly and scale to hundreds and thousands of concurrent users.
- **Maximum availability (24x7)**
  Create applications that are available 24 hours a day, 7 days a week, even when while being updated!
- **Client Independence**

  Access applications using web browsers or rich Java/C++ clients.
- **Rapid application development (RAD)**
  Develop applications quickly and easily with pre-built system and application services, application builder, extension builder, and a variety of third-party tools.
- **Enterprise Application Integration**
  Connect to backend databases, existing client/server applications, and existing legacy systems.

Value Proposition

What Customers are Building with it...

Customer Self-Service

- on-line credit card
- customer care & billing
- portfolio management
- benefits administration

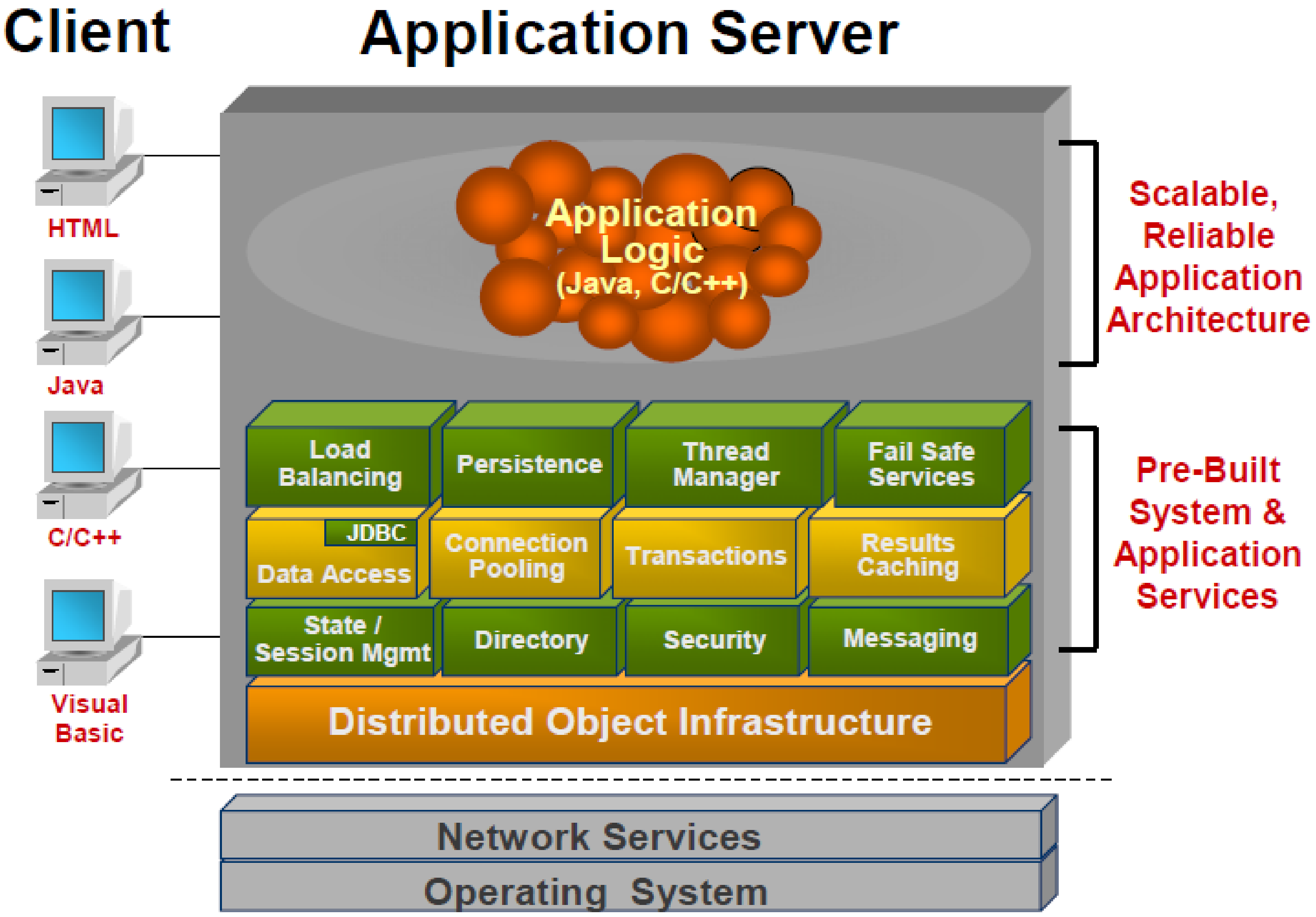
Business-to-Business Efficiencies

- package tracking
- claims processing
- supply chain management
- sales automation

Revenue Expansion

- on-line retailing, on-line trading
- loyalty programs
- travel and entertainment

Internal Architecture



Services

- **Key Application Services**
  - Java, C/C++ Client Support
  - Rich client Support

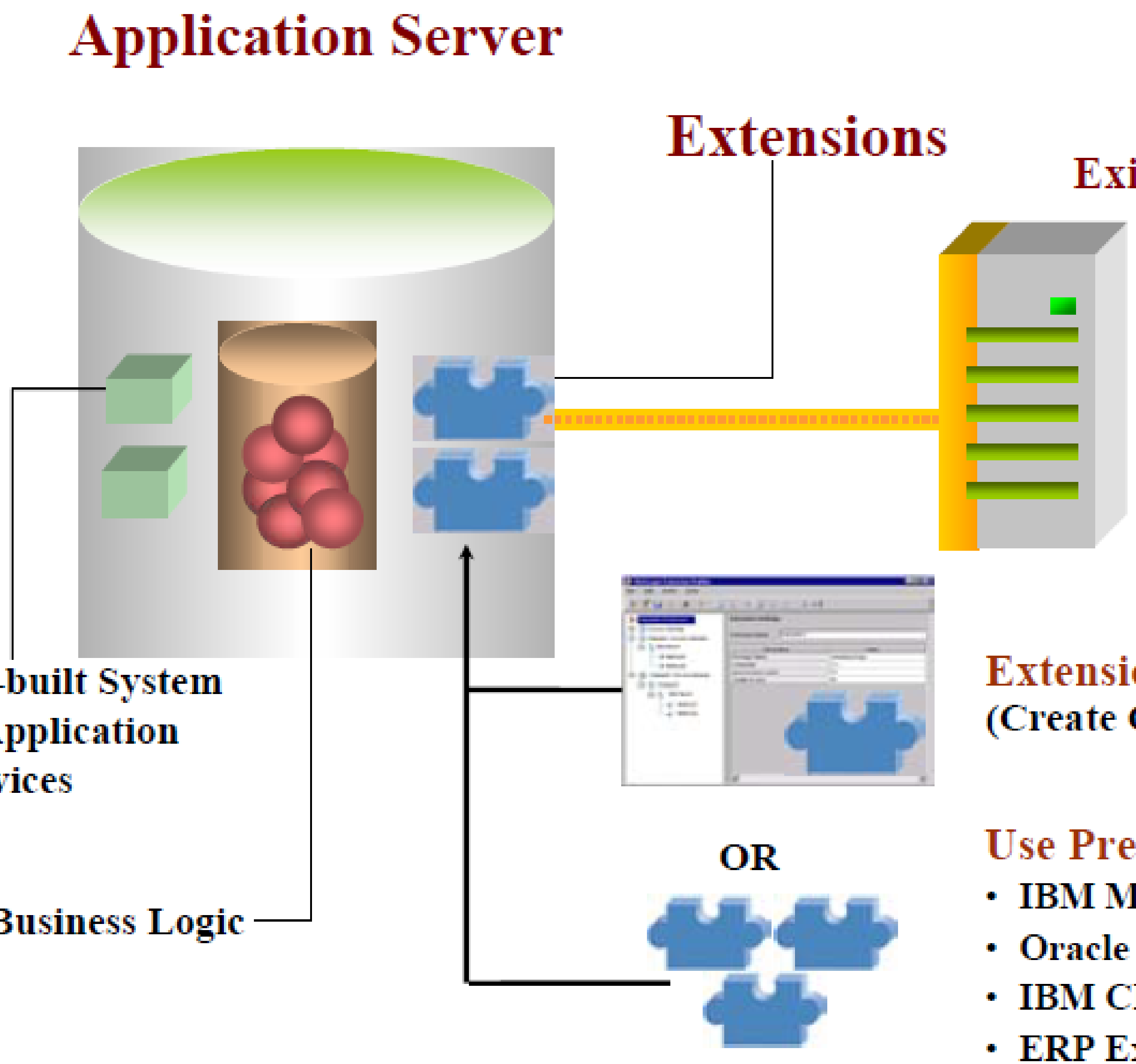
    e.g., Adobe Flash/Flesh/Air, Microsoft Silverlight
  - State/ Session Management
  - Database Request Management
  - Transaction Management
  - Connection Cache
  - Results Cache
  - Dynamic Content Generation
  - Streaming
  - Security

Services (continued)

- **Key System Services**
  - Multi-process, Multi-threaded
  - Dynamic Load Balancing
  - Application Partitioning
  - Asynchronous Processing
  - Event Logging & Tracking
  - Kernel Services
  - Directory Services
  - E-mail Messaging
- **Key Administration Services**
  - Application Management
  - Server Management

Extension Builder

Extending Application Servers Functionality



Application Server

Extensions

Existing Applications and Systems

- Client/server applications
- Enterprise Systems
- Legacy Applications
- Third-party Web solutions

Pre-built System & Application Services

Business Logic

Extension Builder
(Create Custom Extensions)

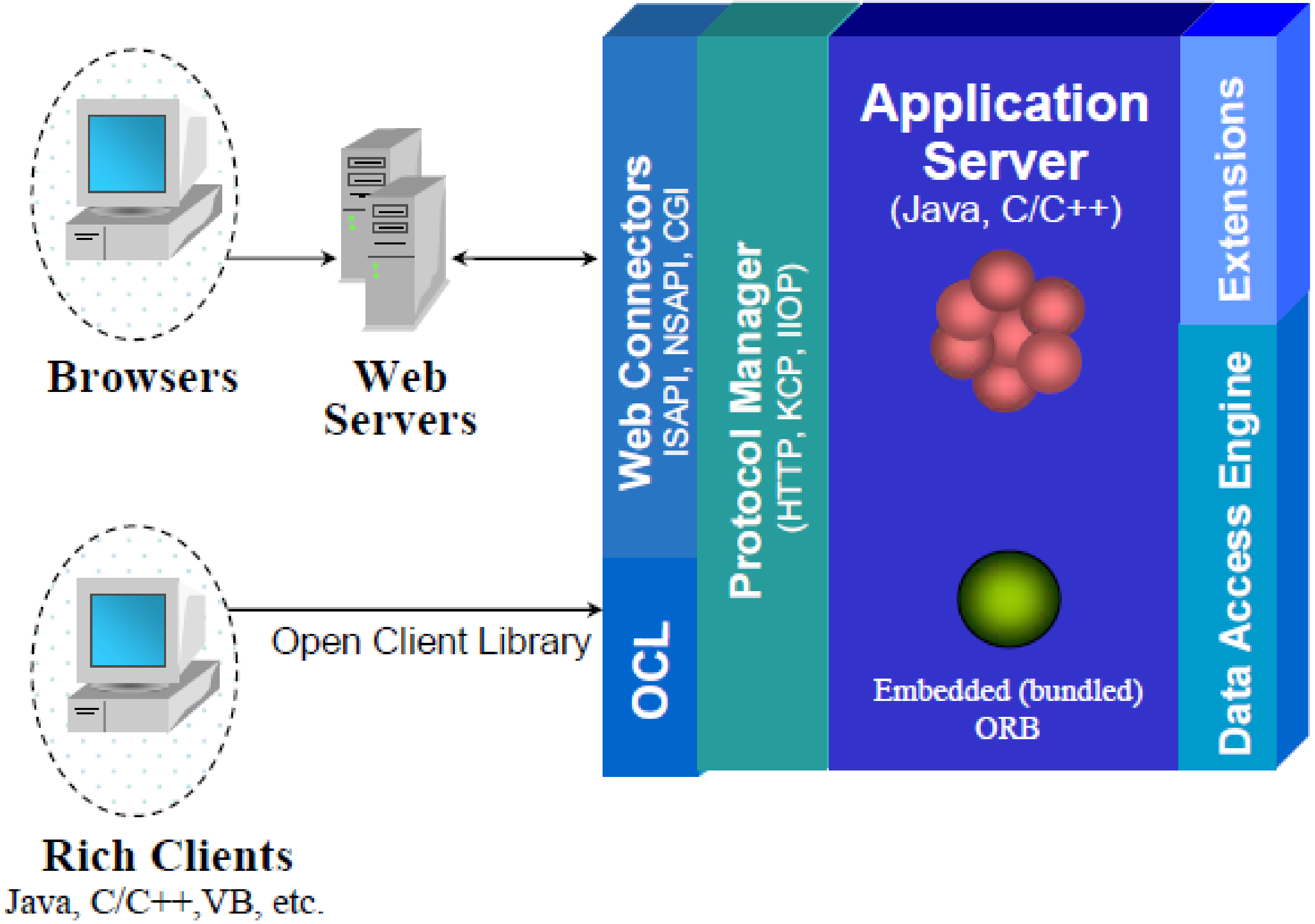
OR

Use Pre-built Extensions

- IBM MQ Series
- Oracle Tuxedo
- IBM CICS, IMS
- ERP Extensions

Technical Architecture

Open and Extensible



Extensions

- TP Monitors
- Legacy
- Client/server

Data Sources

- RDBMS
  - Oracle
  - Sybase
  - IBM Informix
  - IBM DB2
  - SQL Server
- OODBMS
  - ODI
- ODBC & JDBC

Platforms

- Oracle Solaris
- HP-UX
- SGI Irix
- Windows XP and Server 2008

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

6 Related Lifecycle and Adoption Processes

7 Conclusion

Sample Application Server Development Methodology Support

Develop, Deploy & Manage Business-Critical Applications

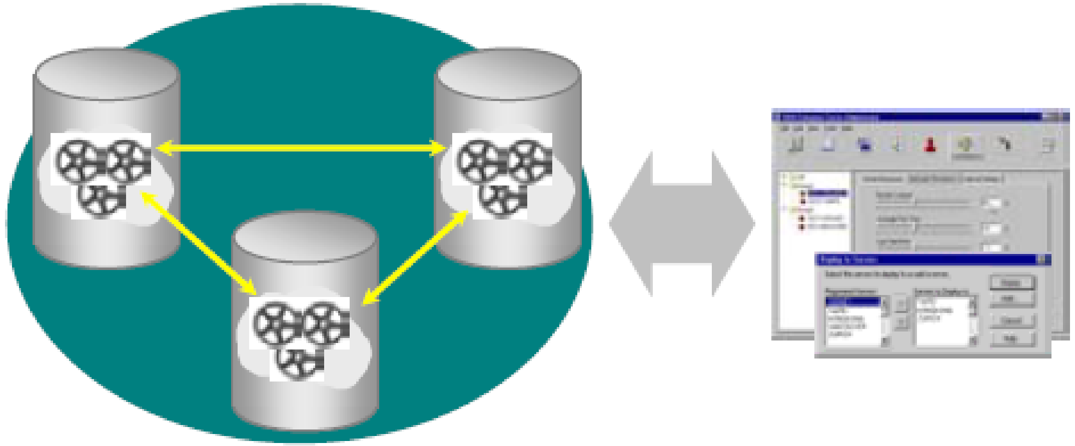
Develop | **Deploy** | **Manage**

Application Builder

Develop & deploy business applications in Java/C++

Extension Builder

Develop & deploy 'Extensions' in Java/C++ for enterprise application integration



Application Servers

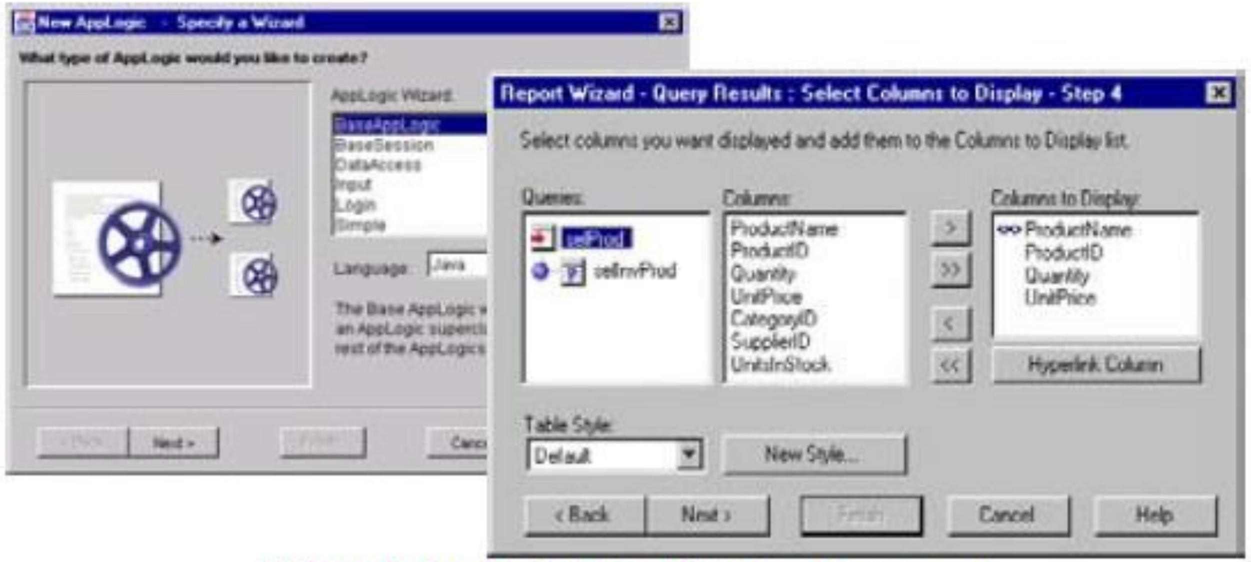
- High Performance & Scalability
- High Availability
- Client-Independence
- Rapid Development of Business Applications
- Enterprise Integration

Administrator

- Application Administration & Management
- Server & Cluster Management

Application Builder

- **Rapid Development of Business Applications**
  - Wizards for Point-&-click Development
  - Pre-built Application Services and Class Libraries (Java, C/C++)
  - Reusable Application Components
  - Distributed Deployment of Application Components
  - Distributed Development Using Three-Tier Programming Model



New AppLogic - Specify a Wizard

What type of AppLogic would you like to create?

AppLogic Wizard:
BaseAppLogic
BaseSession
DataAccess
Input
Login
Simple

Language: Java

The Base AppLogic w
an AppLogic supercl
rest of the AppLogics

Report Wizard - Query Results : Select Columns to Display - Step 4

Select columns you want displayed and add them to the Columns to Display list.

Queries:
selProd
selInvProd

Columns:
ProductName
ProductID
Quantity
UnitPrice
CategoryID
SupplierID
UnitsInStock

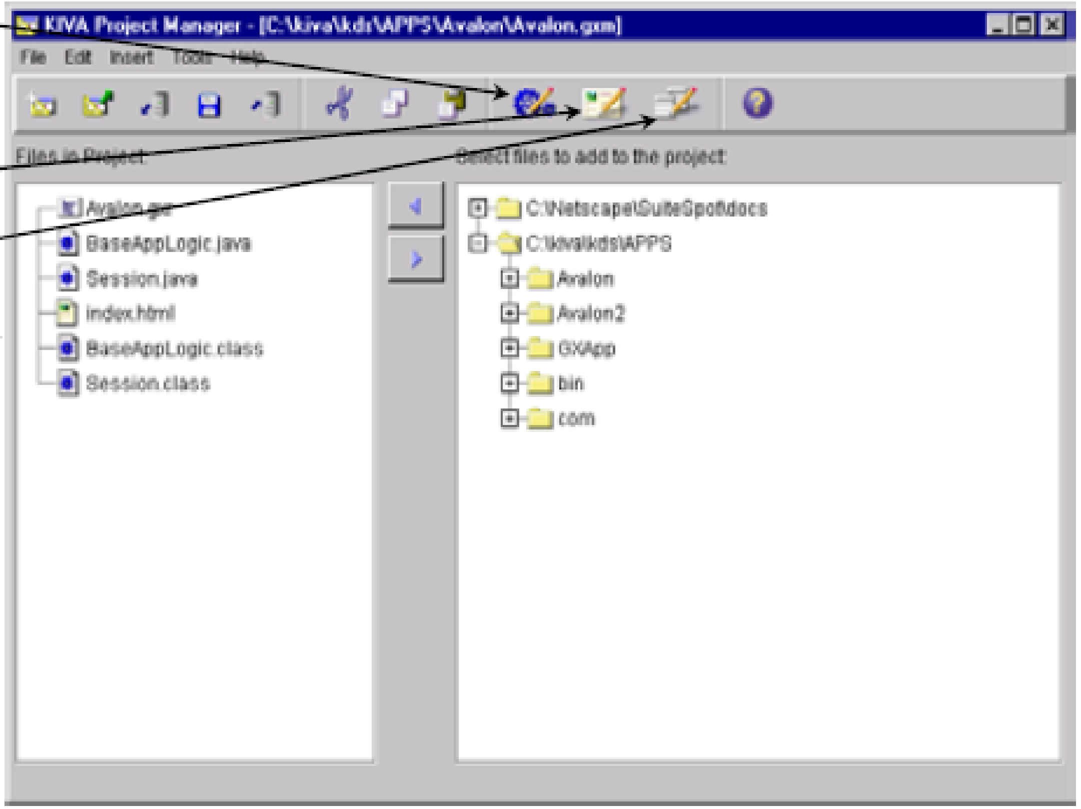
Columns to Display:
ProductName
ProductID
Quantity
UnitPrice

Table Style: Default

Wizards for Point-&-click Development

Application Builder (continued)

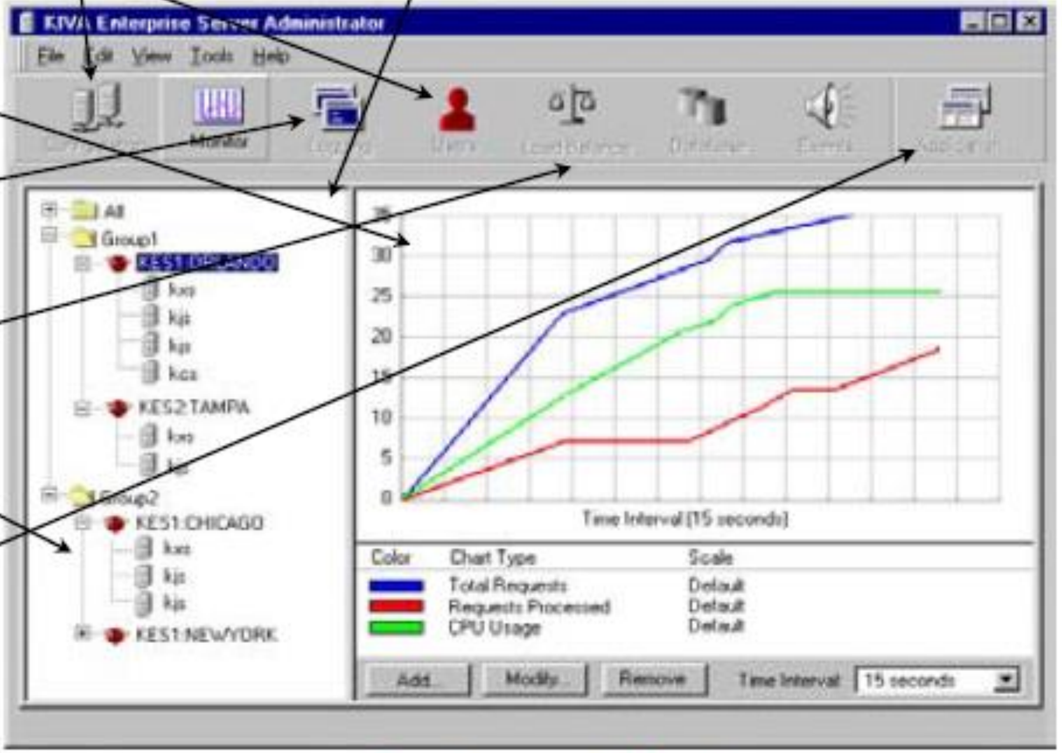
- **Robust Application Development Tools**
  - Application Logic Designer
  - HTML Designer
  - Query Designer
  - Project Manager
  - Third-party Tool Support


KIVA Project Manager - [C:\kiva\kds\APPS\Avalon\Avalon.gxm]
File Edit Insert Tools Help
Files in Project:
Select files to add to the project:
Avalon.gxm
BaseAppLogic.java
Session.java
index.html
BaseAppLogic.class
Session.class
C:\Netscape\SuiteSpot\docs
C:\kiva\kds\APPS
Avalon
Avalon2
GXApp
bin
com

Project Manager

Server Administration

- Advanced cluster management
- Enterprise-wide views of all servers and processes
- Event monitoring & alerts
- Multi-view graphical performance monitoring
- ACL, User & Group Management
- Load balancing customization
- Application administration
- Application partitioning
- Integrated deployment



Color	Chart Type	Scale
🟦	Total Requests	Default
🟥	Requests Processed	Default
🟩	CPU Usage	Default

Performance Monitor

Agenda

1 Introduction

2 Application Servers Key Concepts

3 Patterns and Application Servers

4 Application Server Supporting Technology

5 Expected Application Server Features

6 Related Lifecycle and Adoption Processes

➡ 7 Conclusion

Summary – Key Application Server Objectives

- Enable Rapid Development of Business Applications
- Provide Industry Leading Performance & Scalability
- Provide High Availability & Reliability
- Enable Enterprise Application Integration
- Allow Client-Independence
  (HTML, Java, C++, VB, etc.)
- Provide Open & Extensible Architecture