SESSION	**Building e-Business Applications with WebSphere**
NUMBER	*E419311*
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Objectives

- Define Phases of an e-Business application
    - Checklist of items to be considered
        - Varies widely depending on customer and project type
    - Focus on Internet applications, not Intranet
- Detailed Focus on Architecture Phase
    - RAS
    - Security
    - Data
    - Application

Web Development Phases

Strategy	Requirements	Architecture	Implementation
•Business Strategy	•Functional Analysis	•Physical	(Iterative)
•Web Strategy	•Technical Analysis	•Security	•Programming
•Competitive Analysis		•Data	•Testing
•Project Planning		•Application	•Migration/Rollout
		•Tools	
		•Systems Mgmt	
		•Information	
		•Creative	

Strategy Phase

- Clearly Define Business Strategy
- Develop Web Strategy in support of Business Strategy
    - Determine Marketing and Branding plans
    - Determine Personalization strategy
    - Determine Revenue Sharing and Advertising strategy
    - Determine Content Needs
    - Determine Customer Service needs
- Perform Competitive Analysis
    - What are best-of-breed doing ?
    - Perform Gap Analysis vs. Best Practices

Requirements Phase

- Functional Analysis
  - Use Cases
  - Business Rules
- Technical Analysis
  - Technical Audit for existing systems
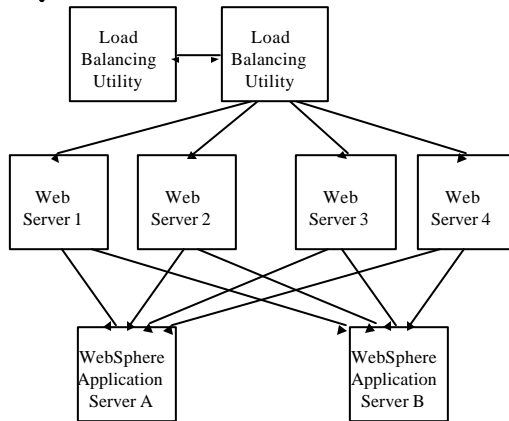 - Constraints and Mandates
  - Data Sources

Architecture Phase

- Physical Architecture
  - Determine Hosting Location
  - Design Network Infrastructure
  - Design/Size Hardware Environment
  - Design Test Environments
  - Design High Availability Solution

WebSphere Topology Option 1

Load Balancing Utility

Load Balancing Utility

Web Server 1

Web Server 2

Web Server 3

Web Server 4

WebSphere Application Server A

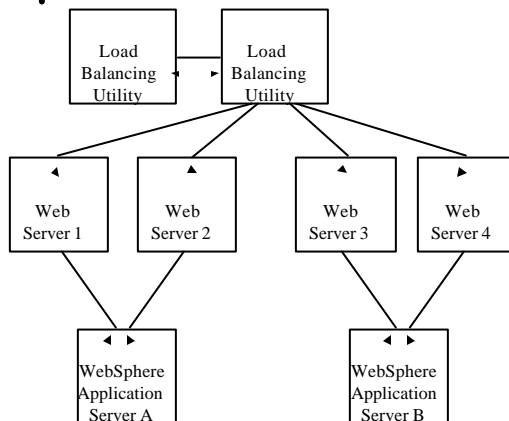WebSphere Application Server B

Pros and Cons:
- Maximum Fault Tolerance
- Simplest Configuration
- Less Flexible for Versioning

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WebSphere Topology Option 2

Load Balancing Utility

Load Balancing Utility

Web Server 1

Web Server 2

Web Server 3

Web Server 4

WebSphere Application Server A

WebSphere Application Server B

Pros and Cons:
- Simpler Version Control
- More Configuration Effort
- App Server Failure requires Load Balancing re-configuration

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Architecture Phase

- Security Architecture
  - Design Authentication Scheme
  - Design Authorization Scheme
  - Design Privacy Solution
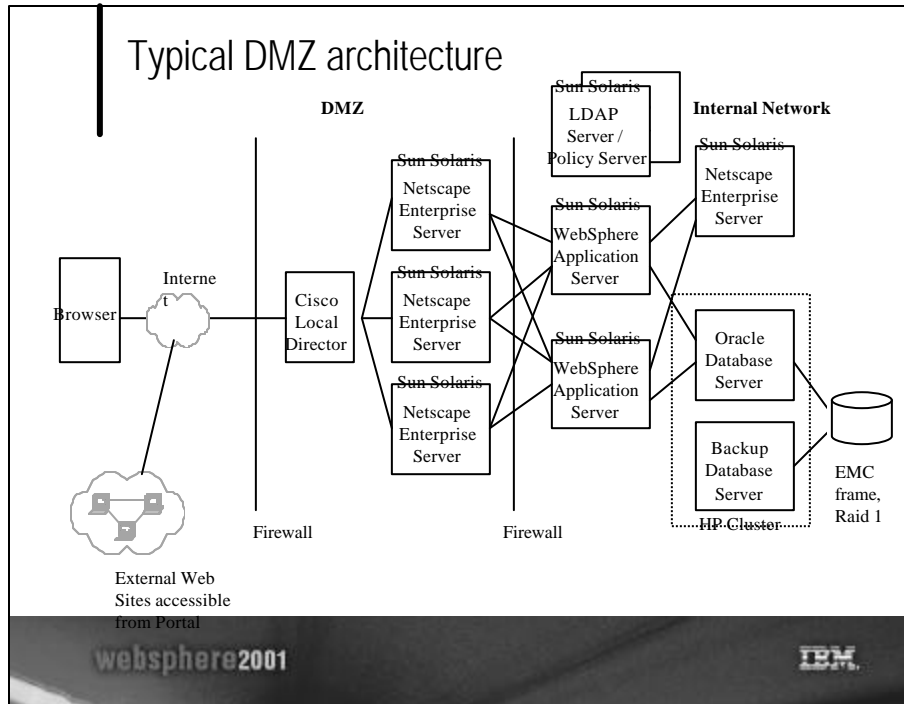 - Design Firewall Configuration
  - Design Single Signon Solution

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WebSphere Issues

- Is WebSphere Security sufficient ?
  - Single Signon - single domain vs. Portal Security
  - Authorization Levels - need for data authorization
    - Row Level
    - Column Level
  - Dynamic Screen configuration based on role

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Typical DMZ architecture

DMZ

Sun Solaris
LDAP Server / Policy Server

Internal Network

Sun Solaris
Netscape Enterprise Server

Sun Solaris
Netscape Enterprise Server

Sun Solaris
WebSphere Application Server

Browser

Interne t

Cisco Local Director

Sun Solaris
Netscape Enterprise Server

Sun Solaris
WebSphere Application Server

Oracle Database Server

Sun Solaris
Netscape Enterprise Server

Backup Database Server

EMC frame, Raid 1

Firewall

Firewall

HP Cluster

External Web Sites accessible from Portal

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DMZ Options for WebSphere connectivity

- Remote OSE
    - No WebSphere components in DMZ
    - Relatively Firewall Friendly - no NAT issues
    - No SSL on connection
- Servlet Redirector
    - Secure Connection
    - Not Firewall Friendly - RMI/IIOP
- Proxy Server
    - Firewall Friendly
    - No WebSphere Components in DMZ
    - HTTP(S) through inner Firewall

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Architecture Phase, cont.

- Data Architecture
  - Design Logical Model
  - Design Physical Model
  - Design Initial Data Loads
  - Design Ongoing Data Feeds
  - Design High Availability Scheme
  - Design Audit, Backup and Recovery Schemes
  - Design Data Warehouse / DataMart

WebSphere Databases

- Session Database
  - High Volume of Reads and Updates
  - High Availability Requirements
  - Minimal Recovery Requirements
- Admin Database
  - Low volume, mainly reads
  - High Availability, High Recoverability
- Application Database
  - Application specific requirements
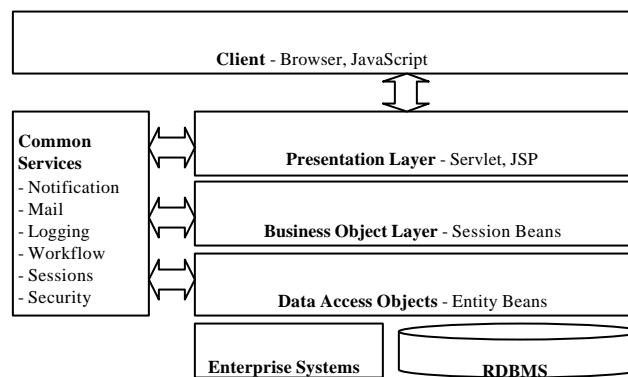
Architecture Phase, cont.

- Application Architecture
    - Design Object Model
        - Class and Sequence Diagrams
    - Design Web Components
        - Servlets and JSPs, EJB access
    - Design Business Components
        - Java Beans or EJBs; Session vs. Entity Beans
    - Design Data Access Components
        - Entity Bean usage, Searching, Caching
    - Design/Select Framework Components
        - Logging, Messaging, Error Handling

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Typical Application Architecture - MVC

Client - Browser, JavaScript

Common Services - Notification - Mail - Logging - Workflow - Sessions - Security	Presentation Layer - Servlet, JSP
	Business Object Layer - Session Beans
	Data Access Objects - Entity Beans

| Enterprise Systems | RDBMS |

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Application Architecture - Components

```
          WEB TIER              EJB TIER

                        ┌──────┐      RMI  ┌──────┐
┌────────┐   HTTP  ┌────┐│ JSP  │─────────→│Entity│ JDBC   ╭────────╮
│Browser │────────→└────┘ │     │⊕         │ Bean │───────→│Database│
│        │              │     │  ┌──────┐  └──────┘        │        │
│        │              └─────┘  │ HTTP │ ┌────────┐       │ ╭──╮╭──╮│
│        │                       │Session│ │Session │       │ ╰──╯╰──╯│
│        │              ⊕        └──────┘ │ Bean   │        │  ╭──╮   │
│        │   HTTP     ┌──────┐   RMI      │ Facade │        │  ╰──╯   │
│        │  GET, POST │Servlet│──────────→│        │  ┌──────┐       │
└────────┘            └──────┘            └────────┘  │Entity│───────→╰────────╯
                                                      │ Bean │
                                                      └──────┘
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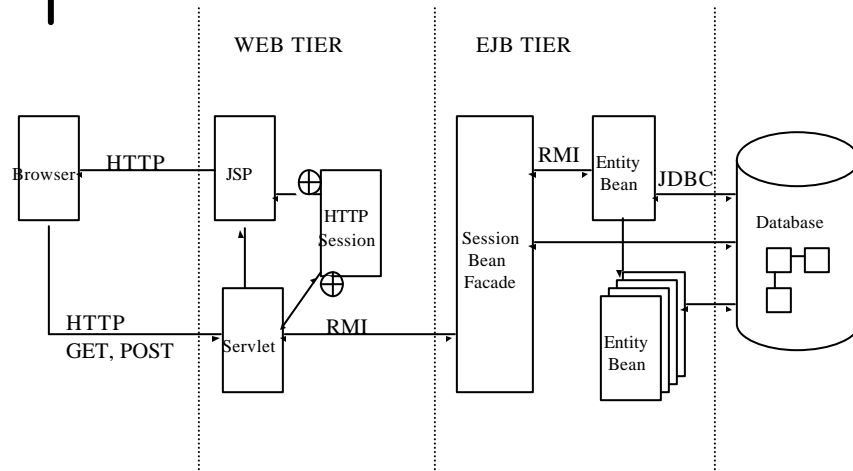
Application Design Issues

- Mapping "Post" variables to Bean variables
  - hard coded, or some key/value scheme
- Mapping Bean variable to EJBs
  - using copies of EJBs in web tier ?
- Web Tier to EJB Tier "transport layer"
  - Flat (e.g. XML) vs.. Structured (serialized beans)
- Where to cache data
  - HTTP Session, Stateful Beans, Entity Beans, Database

Passing Data - Web Tier to EJB

- XML
  - Simple, Consistent Interface with Flat Data Structures
  - Independent of both Database and Presentation
- Value/Detail Objects
  - Copies of Entity Beans
  - Type Checking
  - Client Side Cache
- Page Specific Beans
  - Independent of Data Layer
  - View specific logic in EJB layer - requires stateful beans

Searching and Data Caching

- Cache in HTTP Session
  - Managing Pagination
  - Persistent Sessions
  - Session cleanup
- Cache in Stateful Session Beans
  - Issues with lack of clustering
- Cache in Entity Beans
  - WebSphere Entity Beans - no option "B" cache
- Cache in Database (no explicit cache)
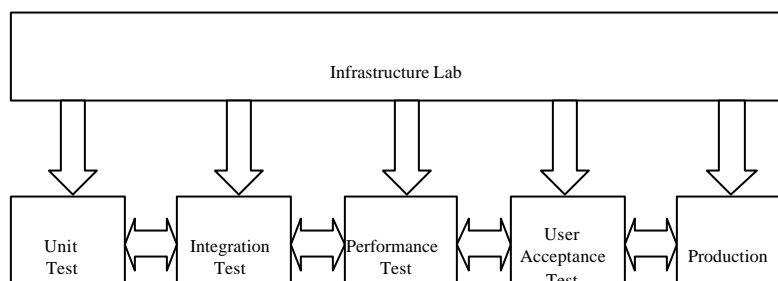 - Performance Issues

Architecture Phase, cont.

- Tools
  - Select Development Tools
  - Select Modeling Tools
  - Select Testing Tools
  - Select Code Management Tools
  - Install and Configure Tools
- Testing
  - Setup Test Environments
  - Develop Test Plans
  - Develop Test Scripts

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Typical Environments Needed

Infrastructure Lab

Unit Test	Integration Test	Performance Test	User Acceptance Test	Production

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Architecture Phase, cont.

- Systems Management
    - Integration with Systems/Network Management
    - Performance Monitoring
- Analytics
    - Site Analysis
        - Clickstream Analysis
        - Link Validity
    - Warehouse Analysis - Data Mining

Architecture Phase, cont.

- Information Architecture
    - Develop Site Map
    - Develop Page Layout and Navigation
- Graphic Design
    - Develop Creative Concepts
    - Select Creative Approach
- Help/Training
    - Develop Online Help
    - Develop Education and Training Materials

Architecture Phase, cont.

- Customer Service
    - Determine Channels - Web, IVR, Email etc.
    - Determine Content Requirements - Help, FAQ etc.
- Content Management
    - Develop Content Management Solution
    - Develop Personalization Solution
- Advertising & Marketing
    - Banner Ad Management
    - Click-through Revenue Sharing
    - Customer Tracking (e.g. Doubleclick)

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Implementation Phase

- Programming
    - Develop Framework Components
    - Develop Web Tier - HTML, JSP, Servlets
    - Develop EJBs
    - Develop Batch/Messaging Components
- Database
    - Create Physical Model
    - Develop Stored Procedures
    - Build and Load Test Databases
    - Implement Backup and Recovery Scheme

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Implementation Phase, cont.

- Customer Service
  - Develop Customer Service Facility
  - Implement CRM/CSR solution
- Content Management
  - Implement Content Management Solution
  - Develop Content Approval Workflow rules
  - Develop Promotion, Rollback and Backup scripts
- Help/Training
  - Refine Online Help
  - Refine Education and Training Materials

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Implementation Phase, cont.

- Testing
  - Perform Unit Tests
  - Perform Integration Test
  - Perform Load Test
  - Perform User Acceptance Test
- Implementation
  - Build Production Environment
  - Migrate Code and Content to Production
  - Build and Load Production Databases
  - Implement System Management Scripts

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