Architecting Web Service Applications for the Enterprise

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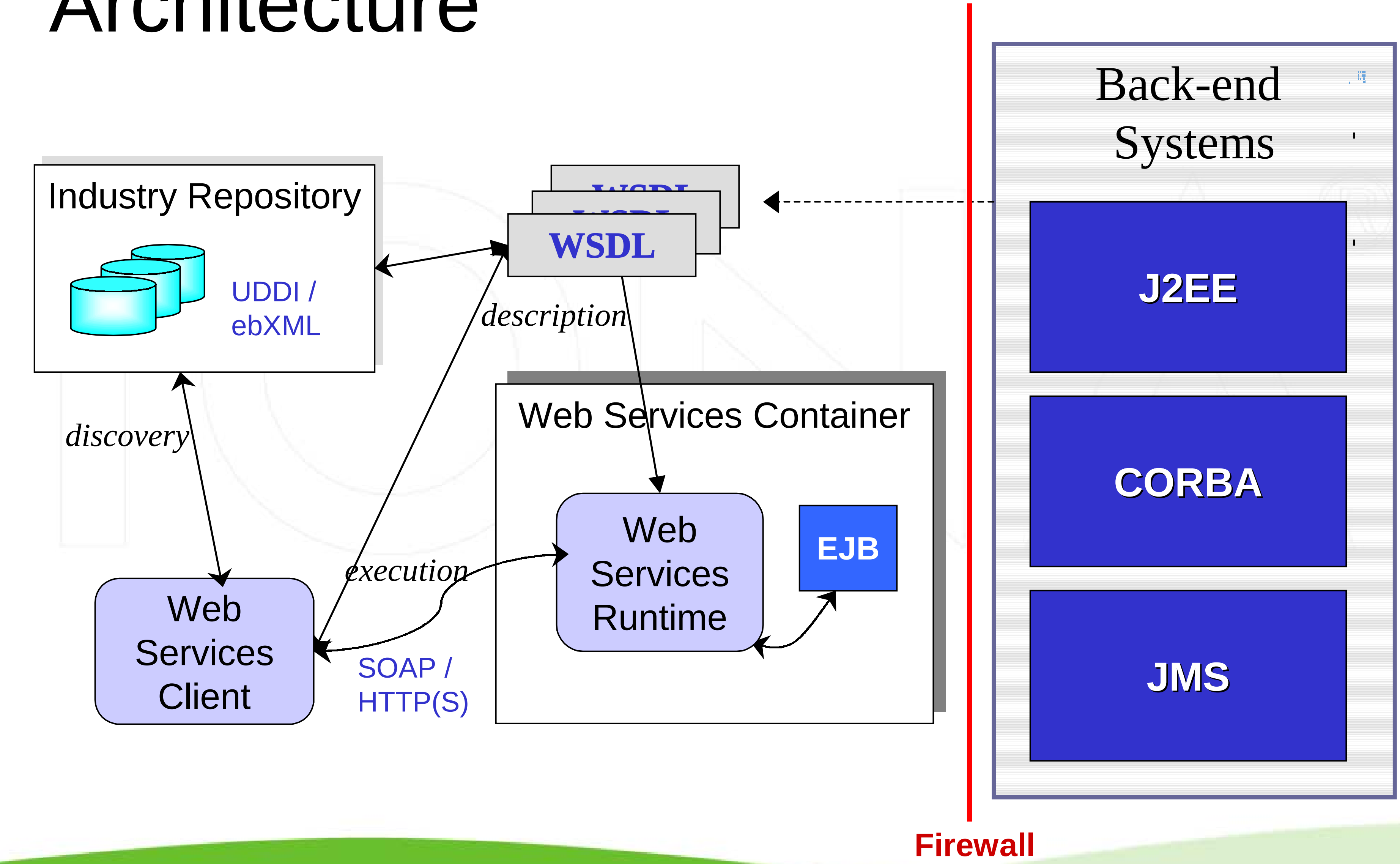
Basic Web Service Architecture



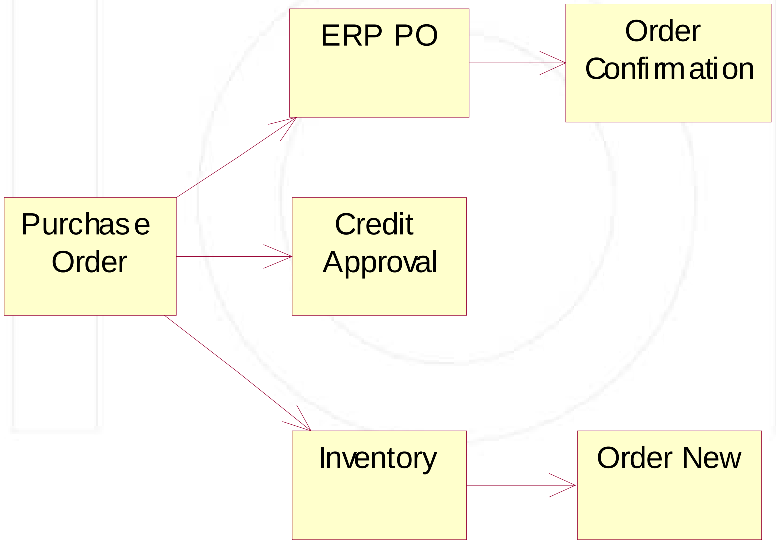
Granularity and Networking Overhead

- The facts of life…Designing Web services is different than either local or distributed objects.
- Distributed Internet requests are 10^3 to 10^6 X more expensive
- Create higher level Web services
  - Increase request granularity
  - Use service-oriented interfaces
  - Expose valuable business functions

Creating Higher-Level Business Services

- Higher-level services are created by combining fundamental (or primitive) internal business functionality into…
- Business Compositions
  - Expose external business value
  - Exchange all data in a single message
- Many different compositions can be created from differing combinations of the same primitive functions

Sample Business Composition



Purchase Order

ERP PO

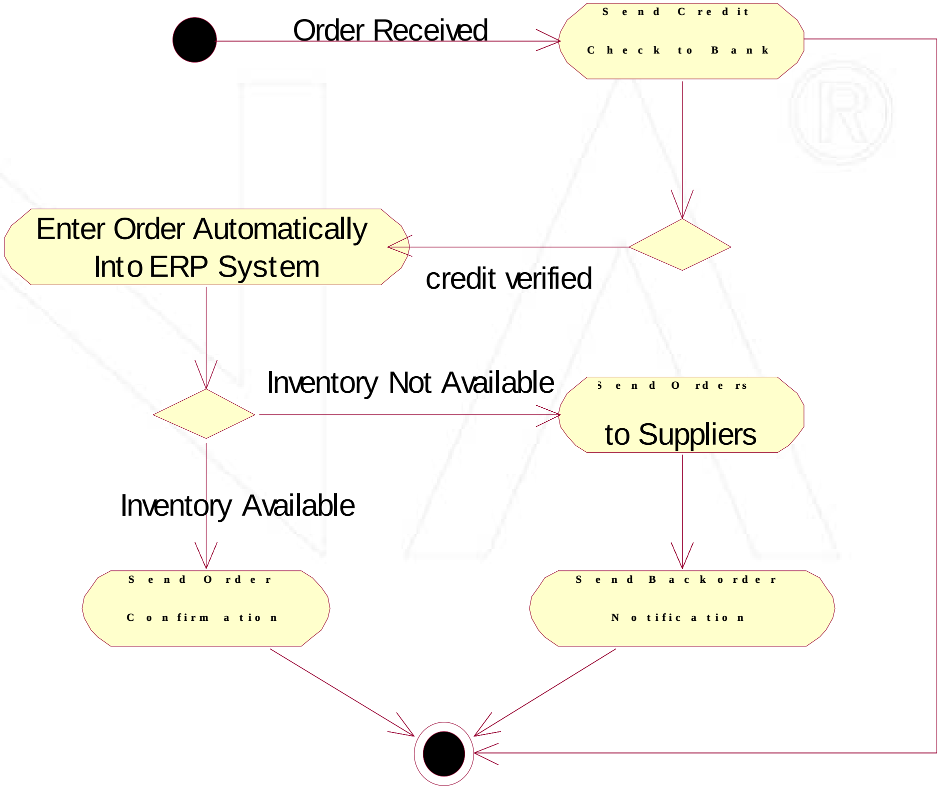
Order Confirmation

Credit Approval

Inventory

Order New

Process Diagram



Order Received

Send Credit Check to Bank

Enter Order Automatically Into ERP System

credit verified

Inventory Not Available

Send Orders to Suppliers

Inventory Available

Send Order Confirmation

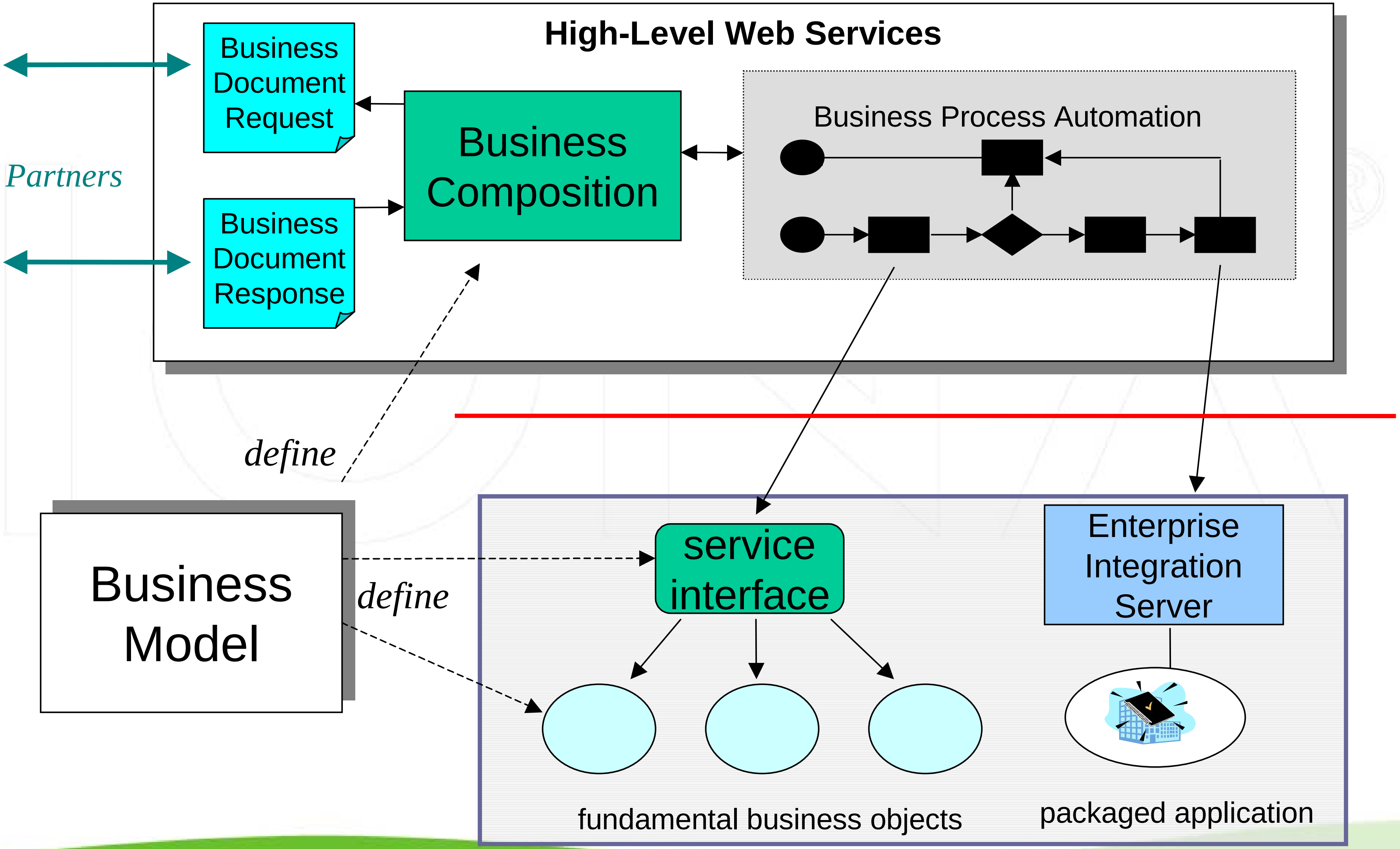
Send Backorder Notification

Process Activity

Document-Based Processing

- Higher-level services pass larger amounts of data back and forth
- This data can be organized and transmitted in an XML document
- Document processing can be complex
- Business Process Model (BPM) automation techniques (workflow) are ideal for processing XML documents and implementing business compositions

Document-Based Web Services


High-Level Web Services
Partners
Business Document Request
Business Document Response
Business Composition
Business Process Automation
define
Business Model
define
service interface
Enterprise Integration Server
fundamental business objects
packaged application

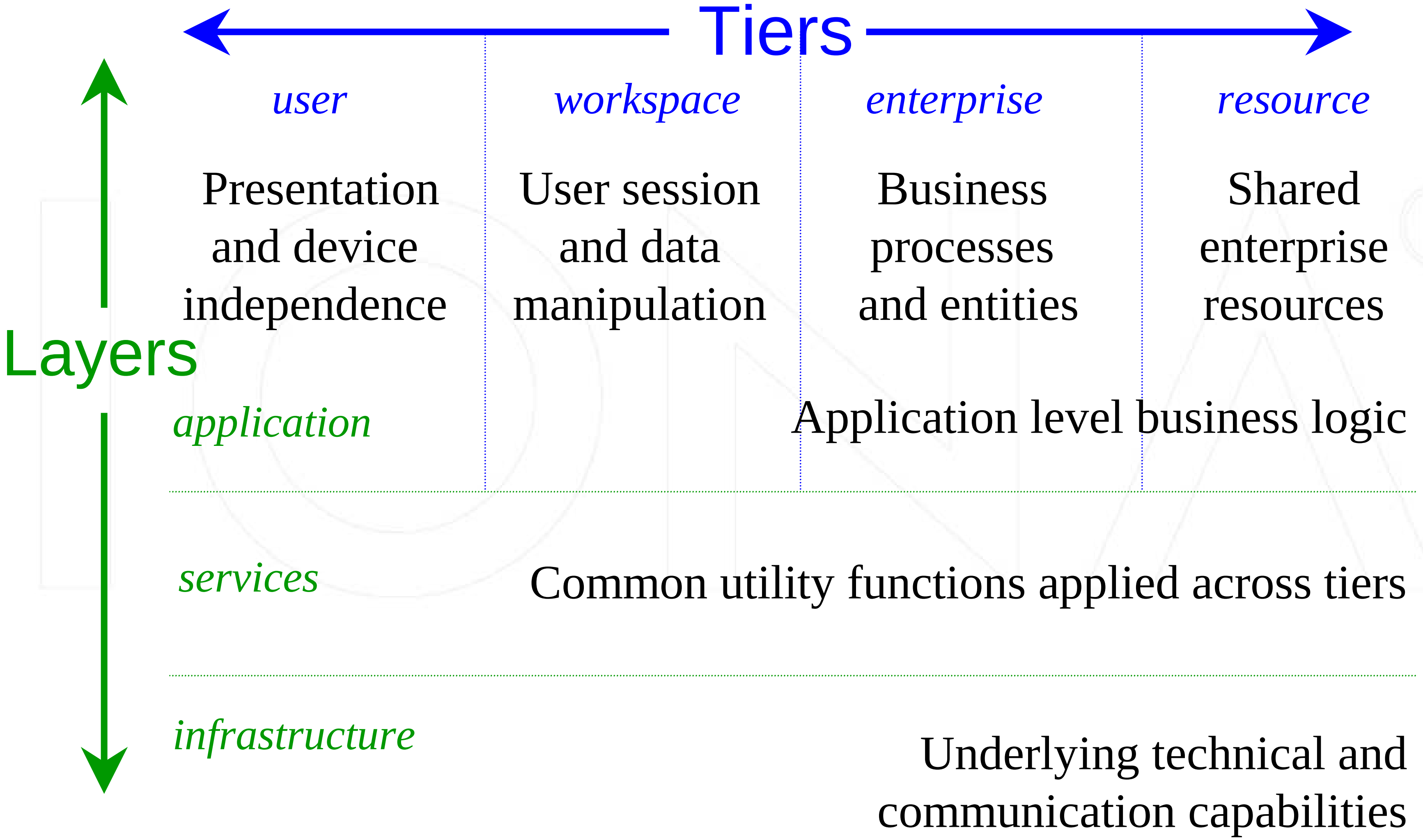
Additional WS Requirements

- Service execution will be subject to Service Level Agreements (SLAs)
- Collaborations between partners (especially multiple partners) will require a shared context to be passed with the business documents
- Collaborative business processes may take days to execute, requiring a new mechanism for extending transactional atomicity to B2Bi

Architecture Fundamentals

- Tiers – Logical distribution of functionality
  - Each tier has roles and responsibility
  - Physical distribution
  - Scalability
  - Reuse
- Layers – Logical separation of logic
  - Spans tiers
  - Separates business logic from services from infrastructure

Architectural Foundations



Tiers

user

Presentation and device independence

workspace

User session and data manipulation

enterprise

Business processes and entities

resource

Shared enterprise resources

Layers

application

Application level business logic

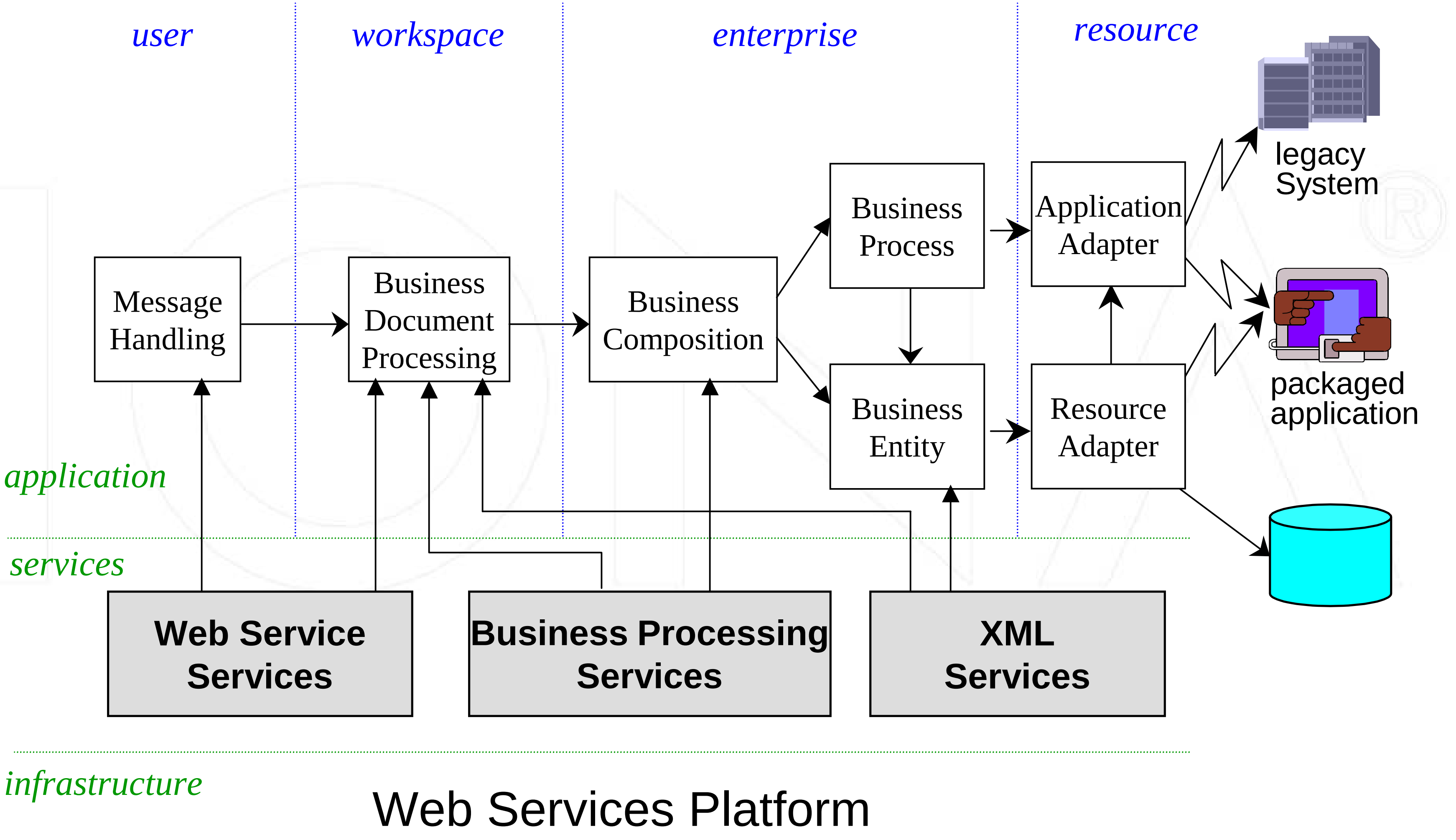
services

Common utility functions applied across tiers

infrastructure

Underlying technical and communication capabilities

Web Services Architecture



Architectural Elements

- The architectural elements are defined to provide for:
  - Distribution
  - Scalability
  - Technology Independence
  - Device Independence
  - Application Integration
  - Future Enhancements and migrations
- Not all applications will have all elements
- Elements map to different implementation types depending on the technology
- Not all elements map to distributed components

Services Layer

- Web Service Services
  - Identity
  - Service Level Agreements
  - Security
  - Business Transactions
- Business Process Services
  - Process Automation
  - Auditing
- XML Services
  - Parsing
  - Transformation
  - Persistence

User Tier

- Performs security authentication and authorization
- Establishes Identity
- Enforces Service Level Agreements
- Theme: Initial Message Processing

Workspace Tier

- Maintains session state
- Requests services from Enterprise Tier
- Parses XML Document
- Associates document with BPM
- Performs XML transformations and persists data
- Theme: Document Processing

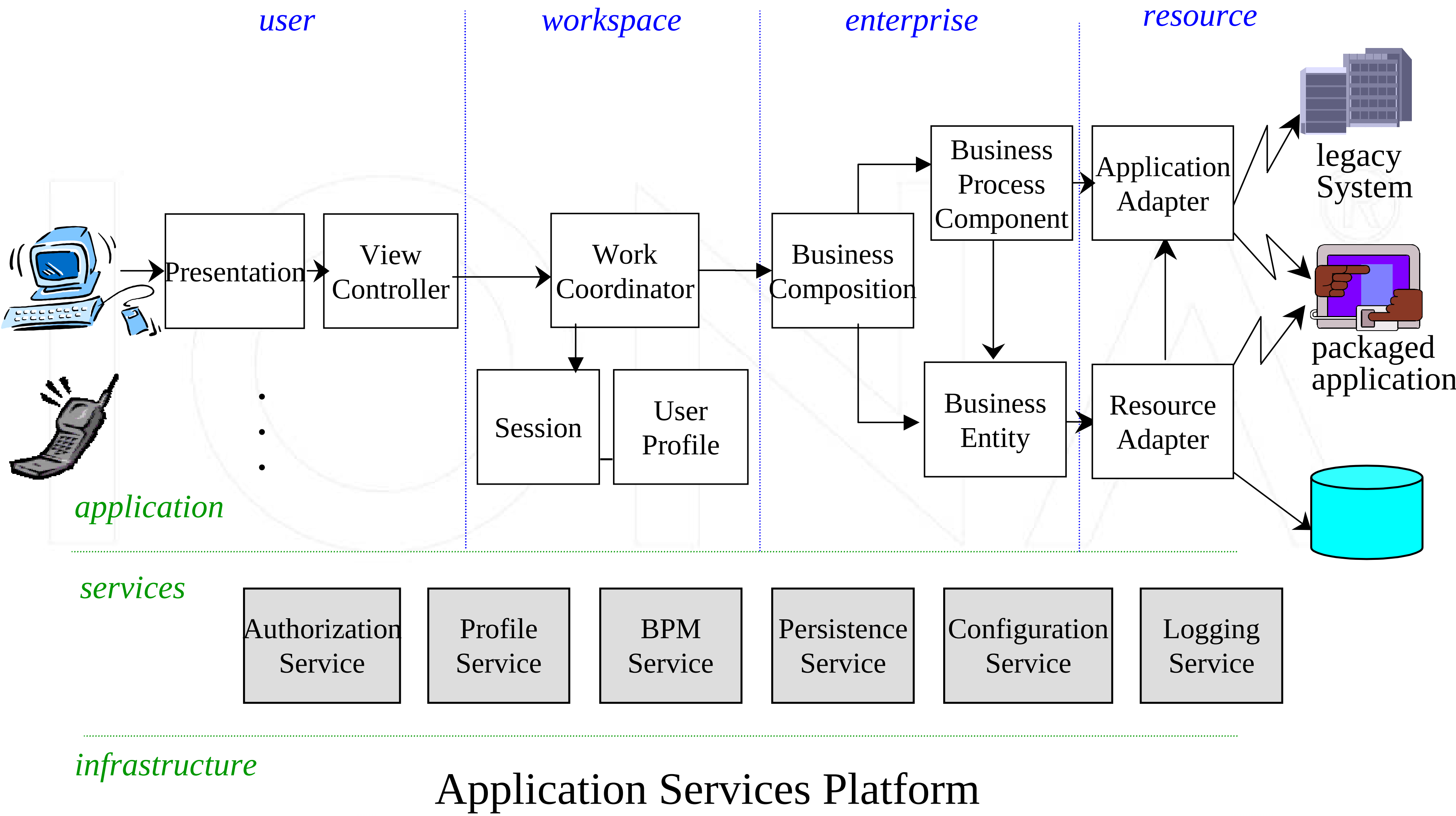
Enterprise Tier

- Provides reusable business collaborations and business processes to all enterprise users (according to business model)
- Manages integrity of enterprise resources
- Scopes 2PC Transactions
- Enforces system level business rules
- Interacts with Resource Tier
- Theme: Business Functionality

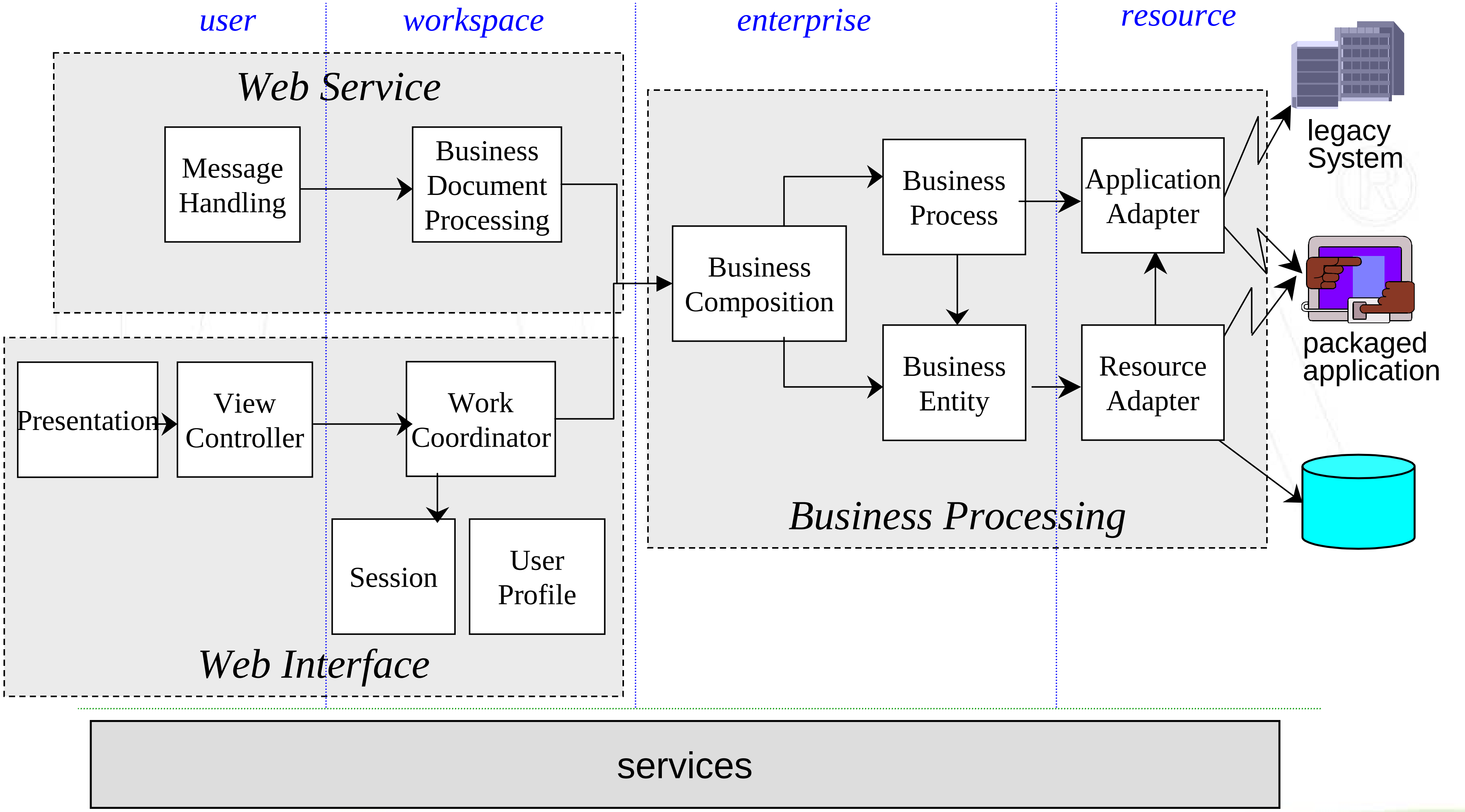
Resource Tier

- Provides access to shared resources and applications of the systems
- Performs transformation and data manipulation between systems and business-model-defined processes and entities
- Complex processing can be accomplished by process automation/data transformation services
- Presents packaged applications and legacy systems to enterprise tier in canonical format
- Theme: Making enterprise resources available

Web Interface Architecture



Enterprise Architecture


user
workspace
enterprise
resource
Web Service
Message Handling
Business Document Processing
Business Composition
Business Process
Application Adapter
legacy System
Business Entity
Resource Adapter
packaged application
Business Processing
Presentation
View Controller
Work Coordinator
Session
User Profile
Web Interface
services