

A faded, light blue background image of a person in a graduation gown holding a globe. The person is standing in front of a building with a large archway. The text is overlaid on this image.

# **Adaptive Data Dissemination and Caching for Edge Service Architectures built with the J2EE**

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## Outline

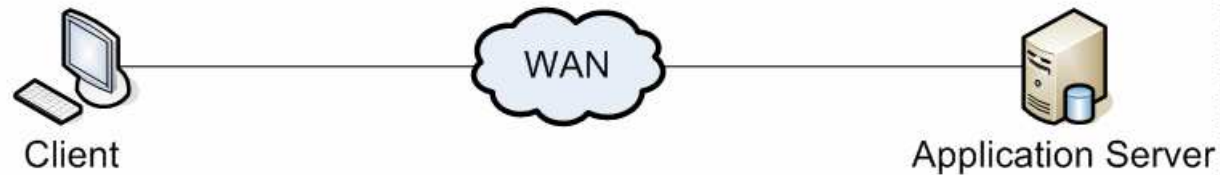
- Multitiered Enterprise Applications**
- Edge Server Architecture**
- Valorized Edge Servers**
- Application Model**
- Data Service Layer**
- Design and Implementation**
- Digital Library**

## Multitiered Enterprise Applications

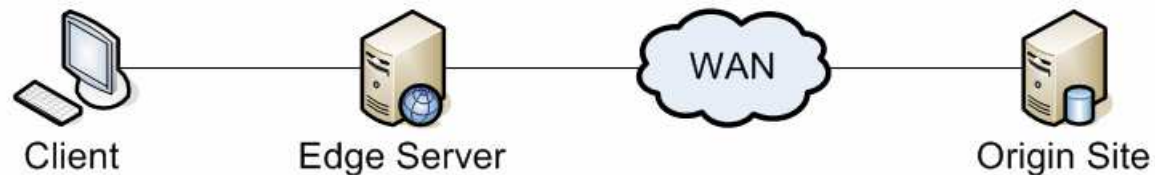
- Evolved from Client / Server Architecture**
  - Client Tier / Web Tier / Business Tier / Backend Tier
- Internet Bottlenecks**
  - First Mile / Peering Points / Backbone / Last Mile
- Insufficient Performance and Scalability**
  - Geographically Dispersed Clients
  - Dynamic and Personalized Content
  - Service Centric Interactions
  - Pure Caching Inadequate

## Edge Server Architecture 1/2

Conventional Multitiered Enterprise Application



Edge Server Architecture



## Edge Server Architecture 2/2

### **Distributed Edge Servers**

- Reduce Expensive Round Trips Across WANs
- Akamai EdgeComputing Platform

### **Splittier Approach**

- Web Tier at Edge Servers
- Business Tier at Origin Site

### **Caching of Content Fragments**

- Web Interface / Content Delivery Centric
- Dynamic Assembly

## Valorized Edge Servers 1/2

- Valorization of Edge Servers**
  - Dynamic Content Creation
  - Business Processing
  - Multiple Client Interfaces
  - Caching and Replication Inadequate
- Adaptive Data Dissemination and Caching**
  - Complete and Partial Replication
  - Application Specific Strategies
  - Related Research / Integration Issues

## Valorized Edge Servers 2/2

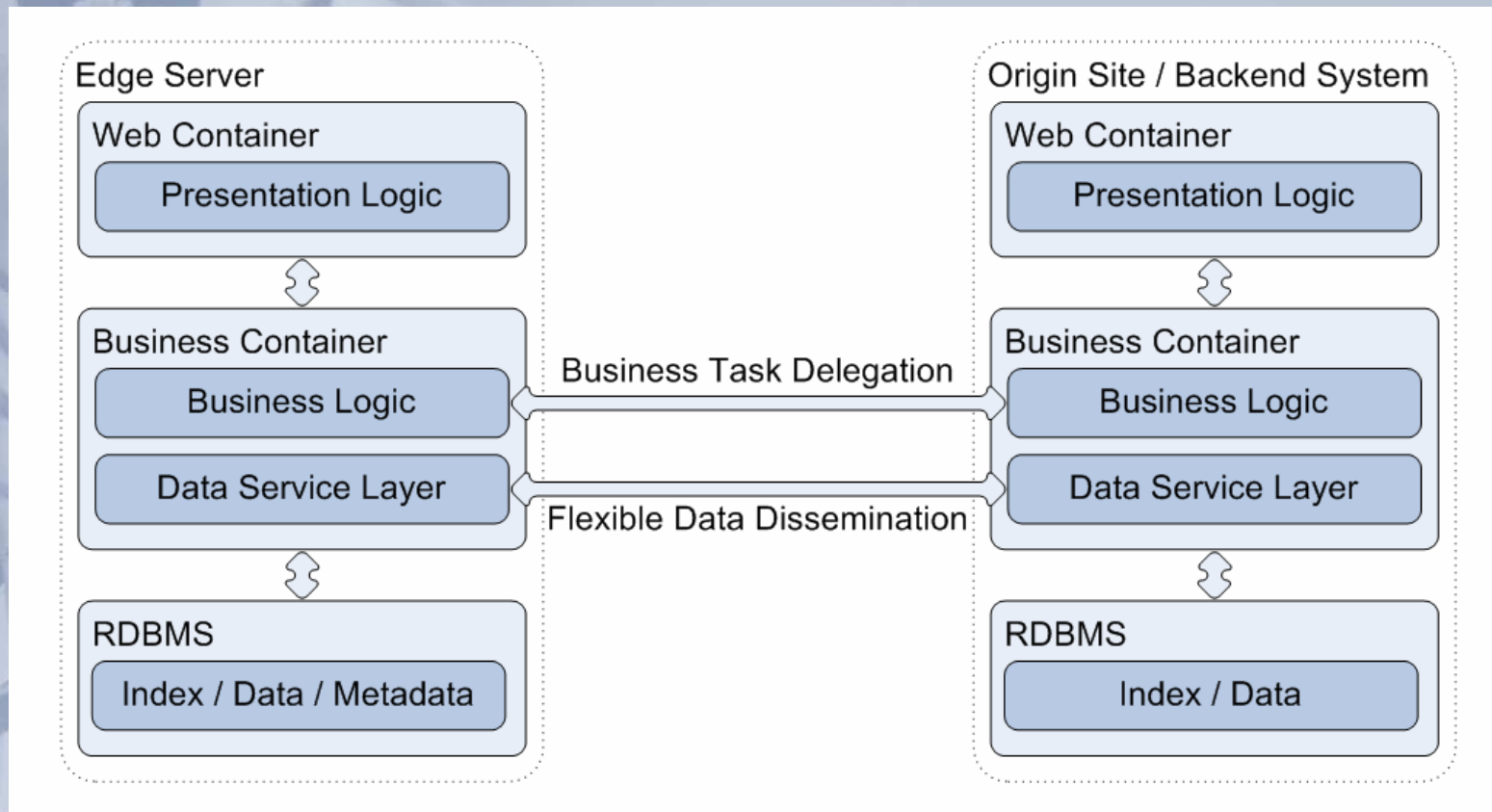
### **Strategies and Guidelines**

- Decomposition of Multitiered Enterprise Applications
- Integration of Flexible Dissemination Infrastructure
- Streamline Definition of Application Specific Algorithm

### **Design Considerations**

- Minimize Impact on Business and Presentation Logic
- Preserve Value Added Services
- Feedback Mechanism

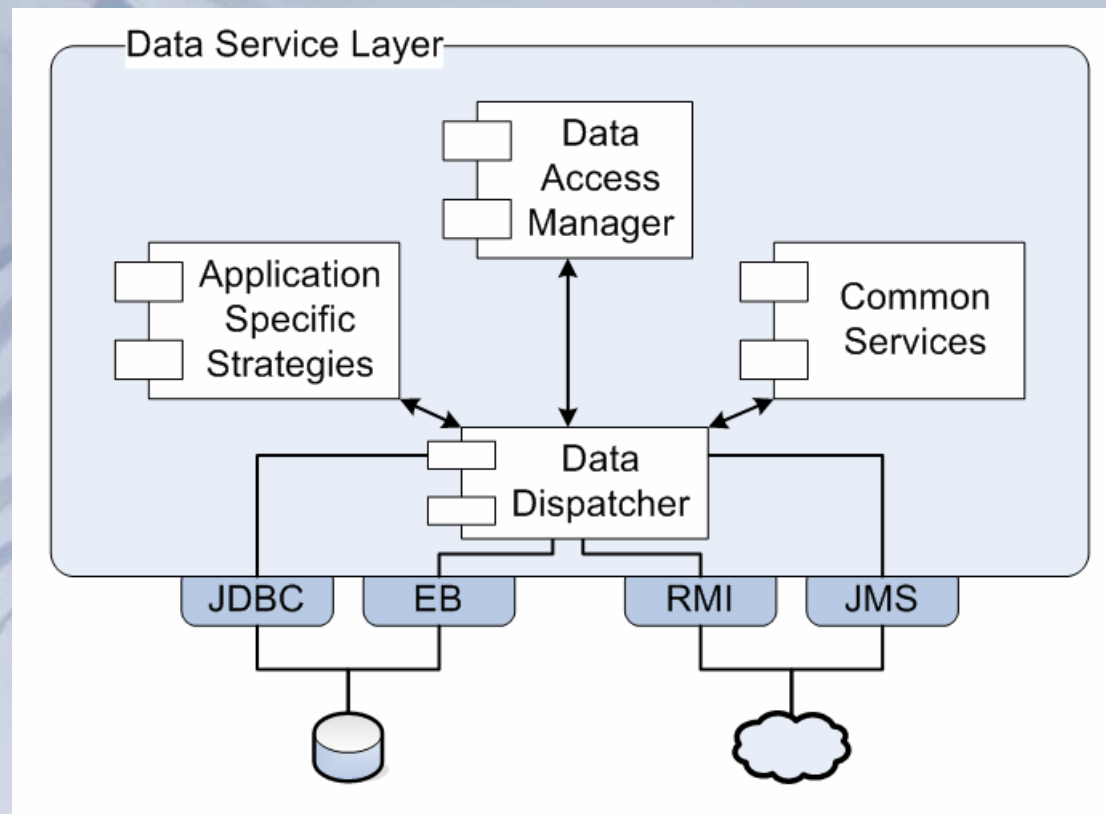
## Application Model 1/2



## Application Model 2/2

- Several Communication Patterns**
- Distributed Decision Logic**
  - Caching
  - Dissemination
  - Expiration
- Feedback Mechanism**
  - Metadata
  - Exceptions

# Data Service Layer 1/2



## Data Service Layer 2/2

### Notification Group

- Value Objects
- Operation

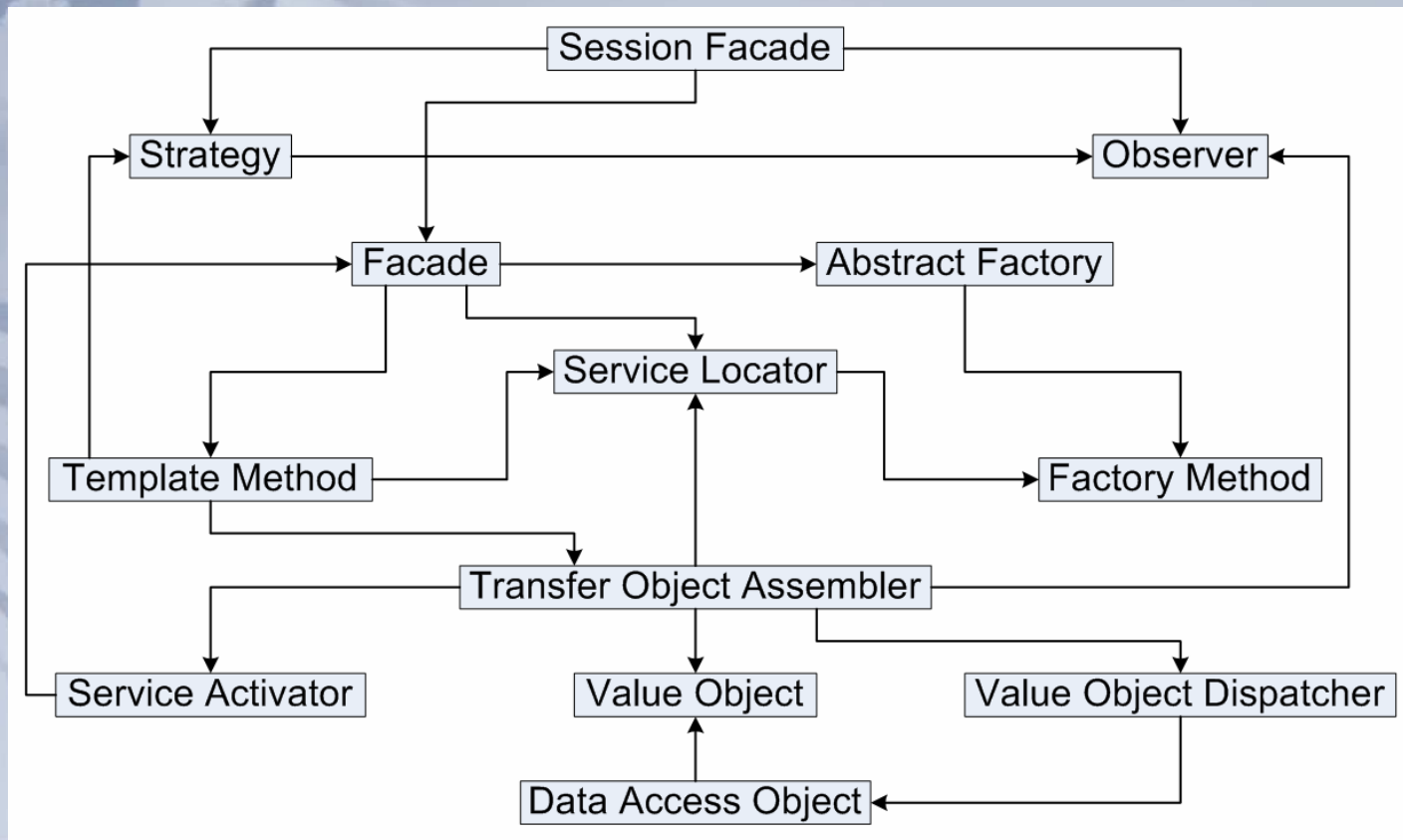
### Data Types

- Completely Replicated
- Partially Replicated

### Utilization

- Assign Replication Scheme
- Devise Application Specific Algorithms

# Design and Implementation 1/2



## Design and Implementation 2/2

- Advocates Best Practices**
- Separation of Concerns**
  - Data Independent / Dependent Code
  - Application Specific Algorithms
- Flexible Infrastructure**
  - Integration of Partial Replication
  - Development / Comparison of Algorithm

## Digital Library

- Completely Replicated Index**
  - Author / Article / Category
- Partially Replicated Items**
  - Accounts / Documents
- Valorized Edge Servers**
  - Authentication / Authorization
  - Query Request
  - Document Request

## Conclusion

- Bridging the Gap**
  - Application Specific Dissemination and Caching
  - Multitiered Enterprise Applications
- Increase Performance and Scalability**
  - Service Centric Interactions
  - B2B
- Dependent on Application Scenario**
  - Assignment of Replication Scheme
  - Distribution of Operations

# Questions or Comments