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Next Generation Grid Enabled SOA: Not Your MOM's Bus

Dave Chappell
VP & Chief Technologist, SOA

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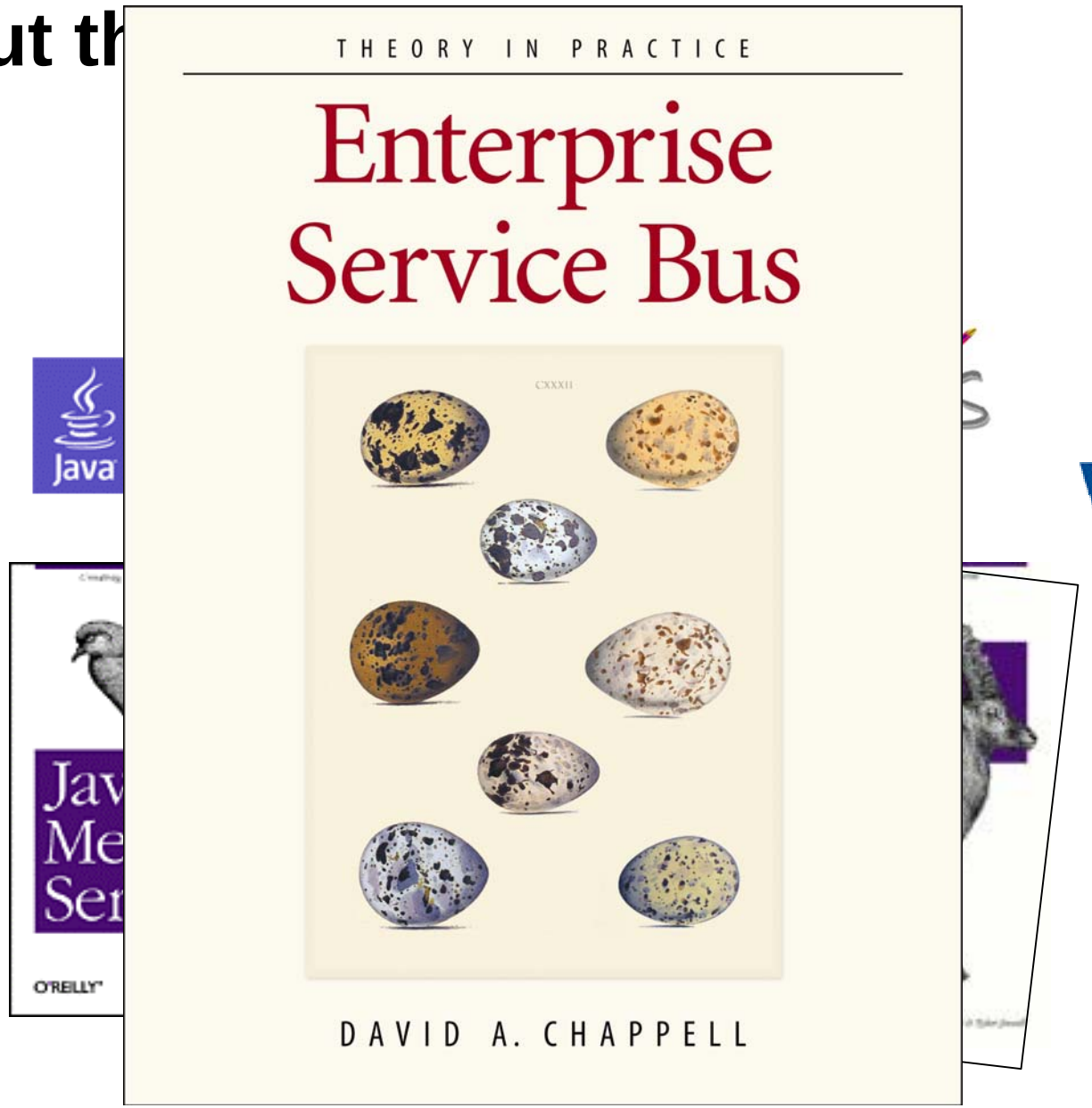
About th


THEORY IN PRACTICE
Enterprise Service Bus
DAVID A. CHAPPELL
Java
W3C
O'REILLY

Agenda/Outline

- SOA Today: Drivers for Change
- SOA Tomorrow: SOA Grid
  - State Management in the SOA Grid
  - Stateful Load Balancing and HA
- QoS and Distributed SOA Processing
  - Not Your MOM's Bus
- Use Cases – BPEL and ESB Mediation
  - Claim Check Pattern
  - Relocatable Stateful Orchestrations (BPEL)
- New Model for Scaling SOA
- Summary

SOA Today: Level Setting
What were we suppose to get from SOA?

- **IT Management Paradigm Shift**
  - Reduce Cost and Complexity
    - Service Enablement of IT Assets
    - Leverage investment, reuse
- **Business Agility**
  - Better align with the Business Needs
  - Automate Business Function
    - Business Process Orchestration
    - Composite Applications
- **Flexibility**
  - Loose Coupling, Modularity
  - Easily integrated, upgraded, replaced
- **Re-Focus on Innovation, New Business Services**

Large XML Payloads

Tearing Down / De-coupling Silos

Unexpected Usage Demands

Meeting SLA Expectations

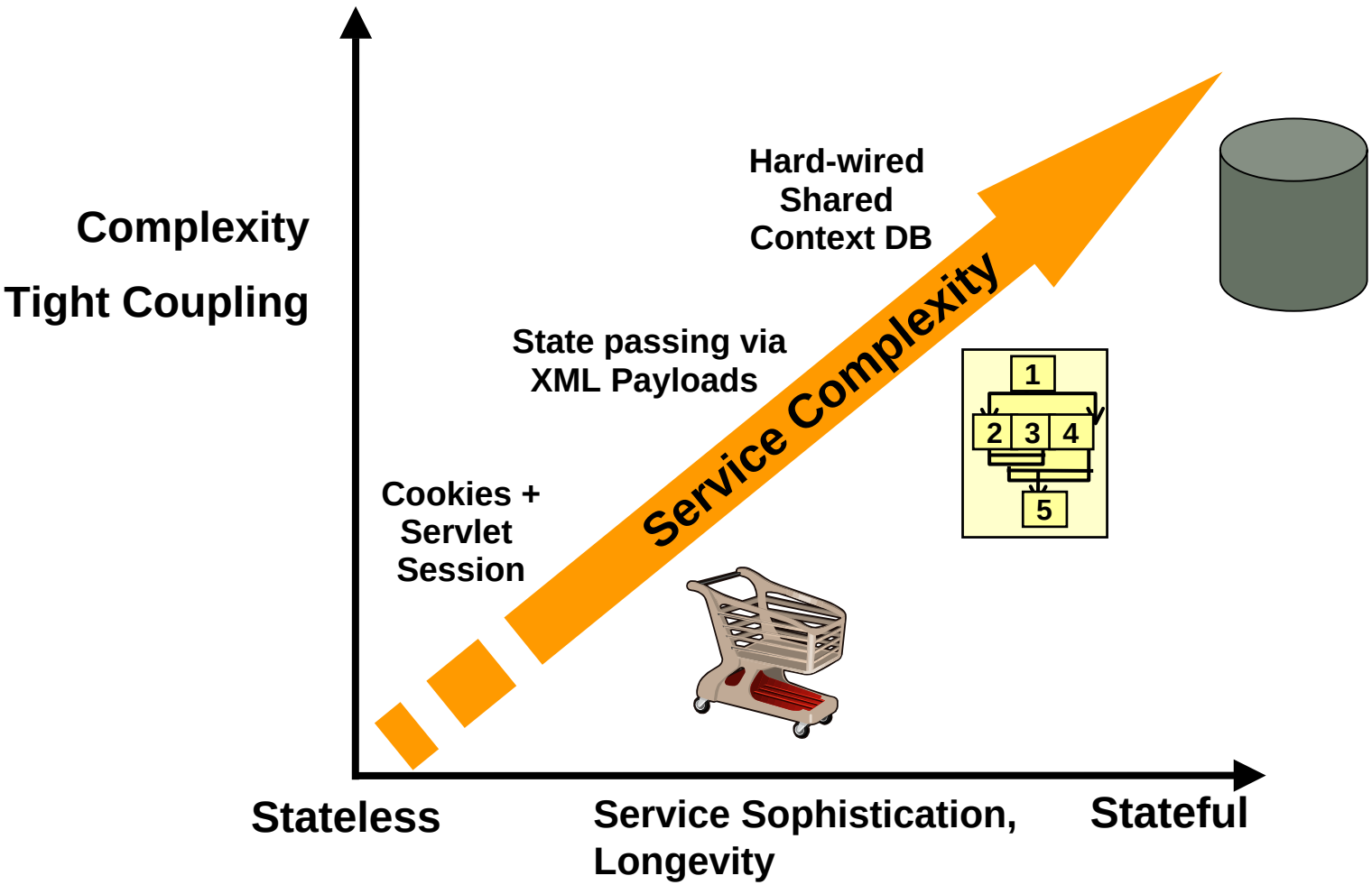
Sharing Information Across Multiple Services

Drivers for Change: The Evolving Problem Set 50,000 foot view

- **SOA Architect: Tearing Down Silos**
  - Reuse of Shared Services
  - New Flexible Business Processes
- **IT Operations: Deployment Complexity**
  - How many configurations of servers?
  - When and how to add more flavors?
- **Cost and Efficiency**
  - Datacenter resource utilization
    - Usage typically 13% – 17%
    - Virtualization only solves part of the problem

Tight Coupling & Contention Between SOA Architect & IT Operations

State Management Techniques in SOA Applications



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The SOA Grid

- State-aware continuous availability for service infrastructure, application data, and processing logic
- Predictable scalability for XTP
  - Scales out linearly, whether 2 or 2,000 servers
  - Heterogeneous Environment
  - High-end / low-cost commodity hardware
- Data Grid and Compute Grid
  - Linearly scalable shared memory and logic
  - Intelligent co-location and affinity between processing logic and Grid storage
- Dramatic overall increase in performance and throughput
  - Reduced/Eliminate dependency on disk persistence
  - Without sacrificing HA

Oracle Coherence Customers

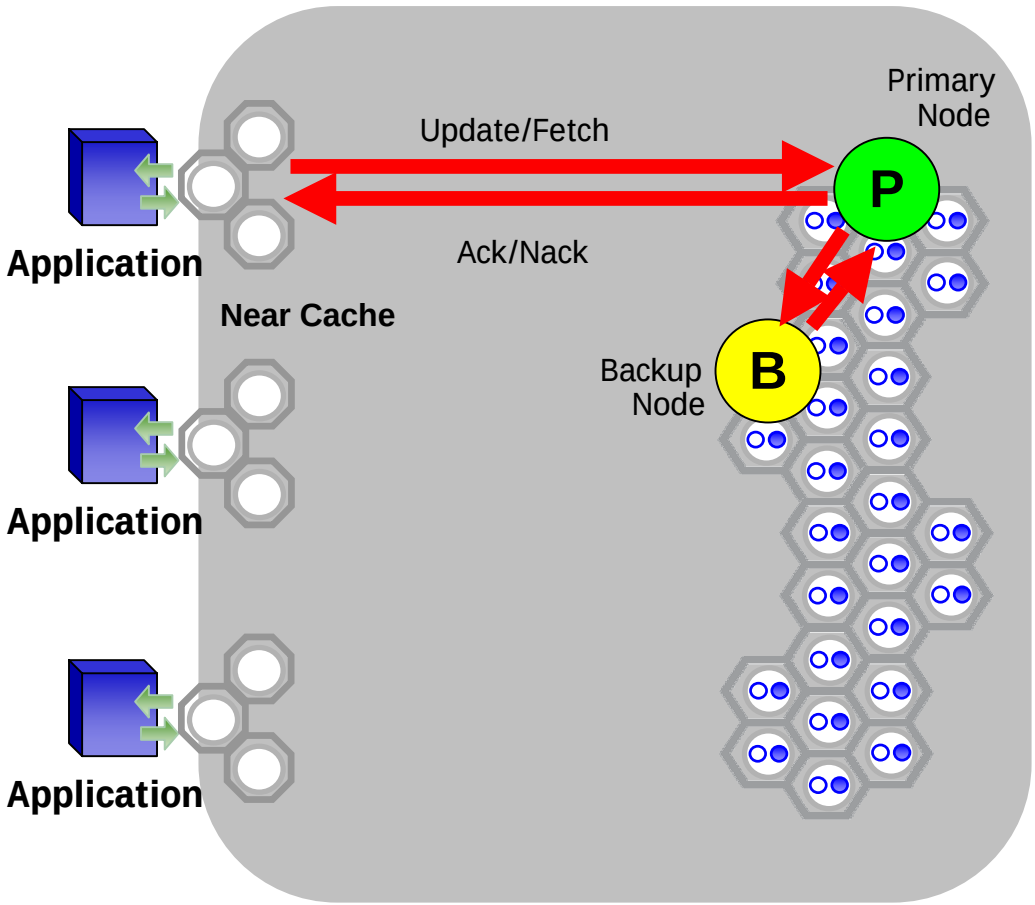
Sampling of Customers

100 Direct Customers and 1,500+ production installations

SOA Grid - Primary/Backup synchronization

Non-storage-aware
Datagrid clients

Storage-aware
Datagrid servers



Available Today with Oracle Coherence

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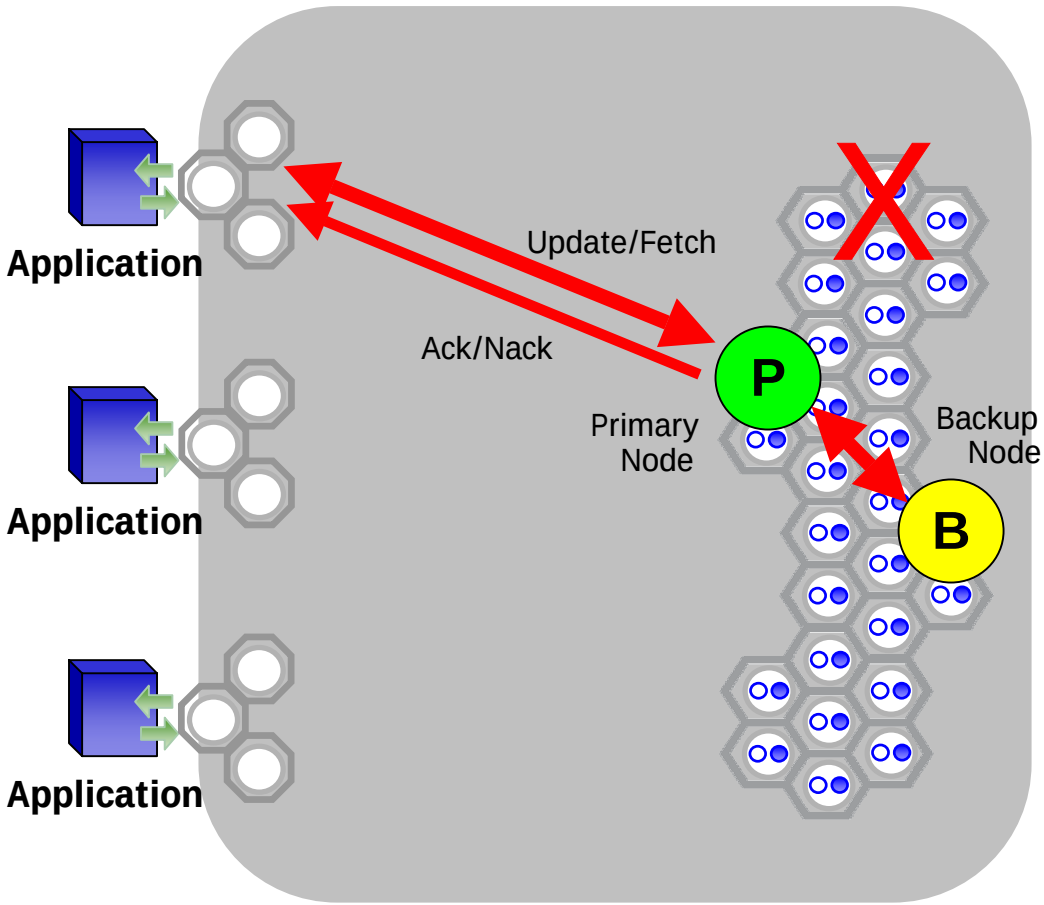

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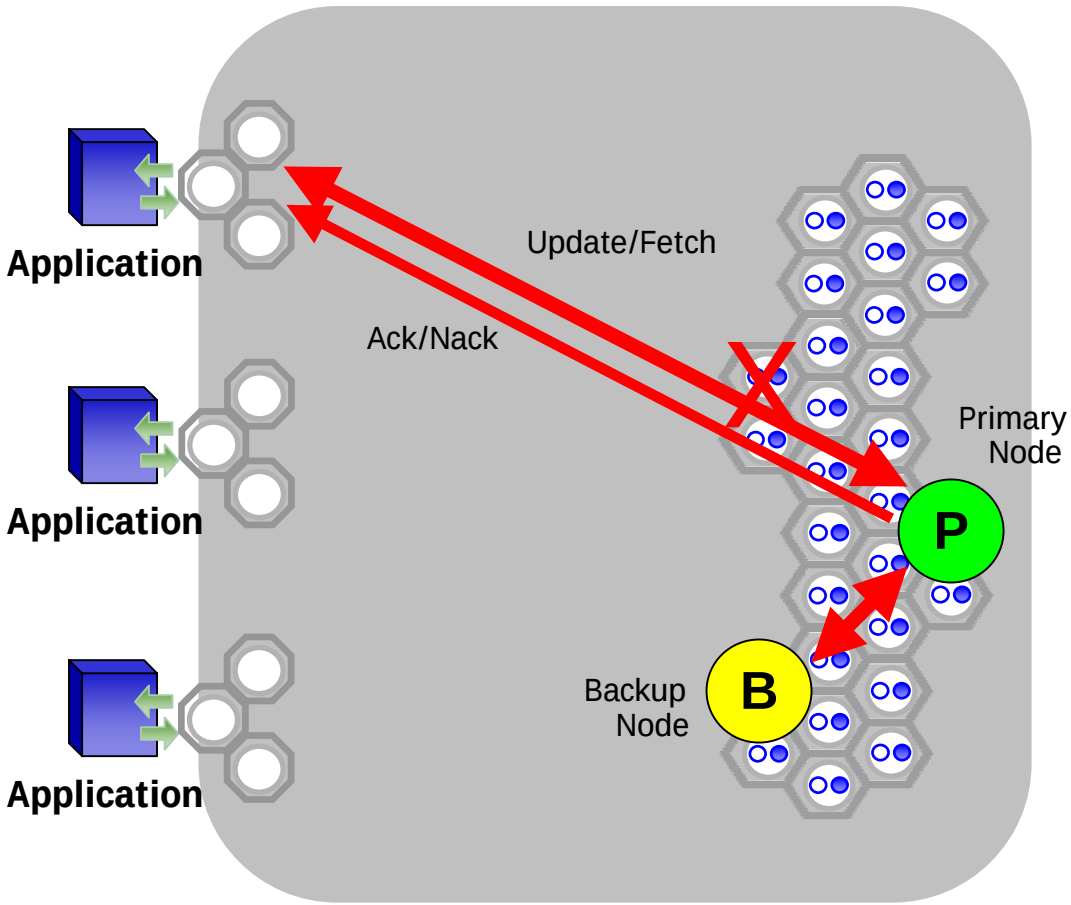
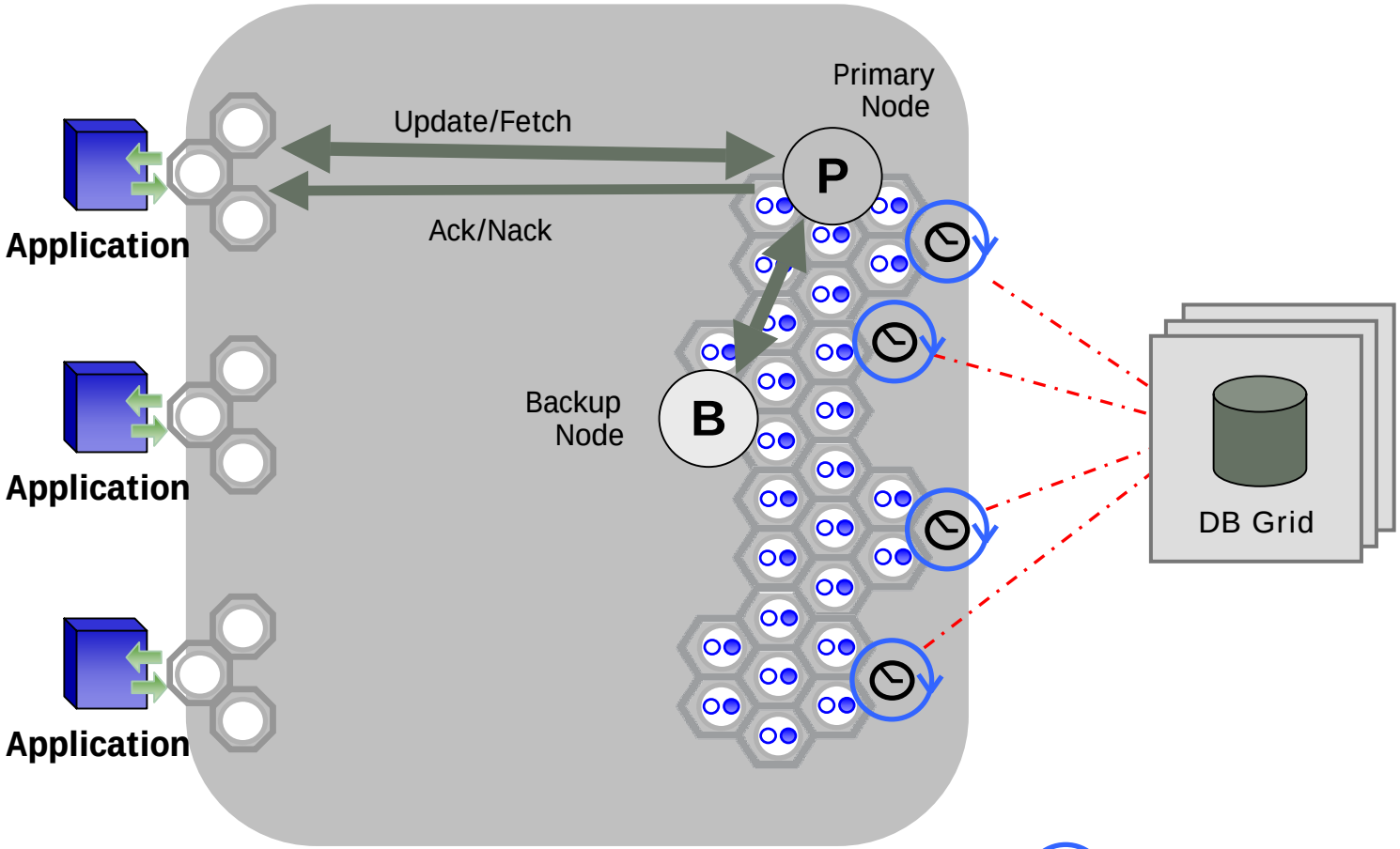


Available Today with Oracle Coherence

Asynchronous DB Updates

Non-storage-aware
Datagrid clients

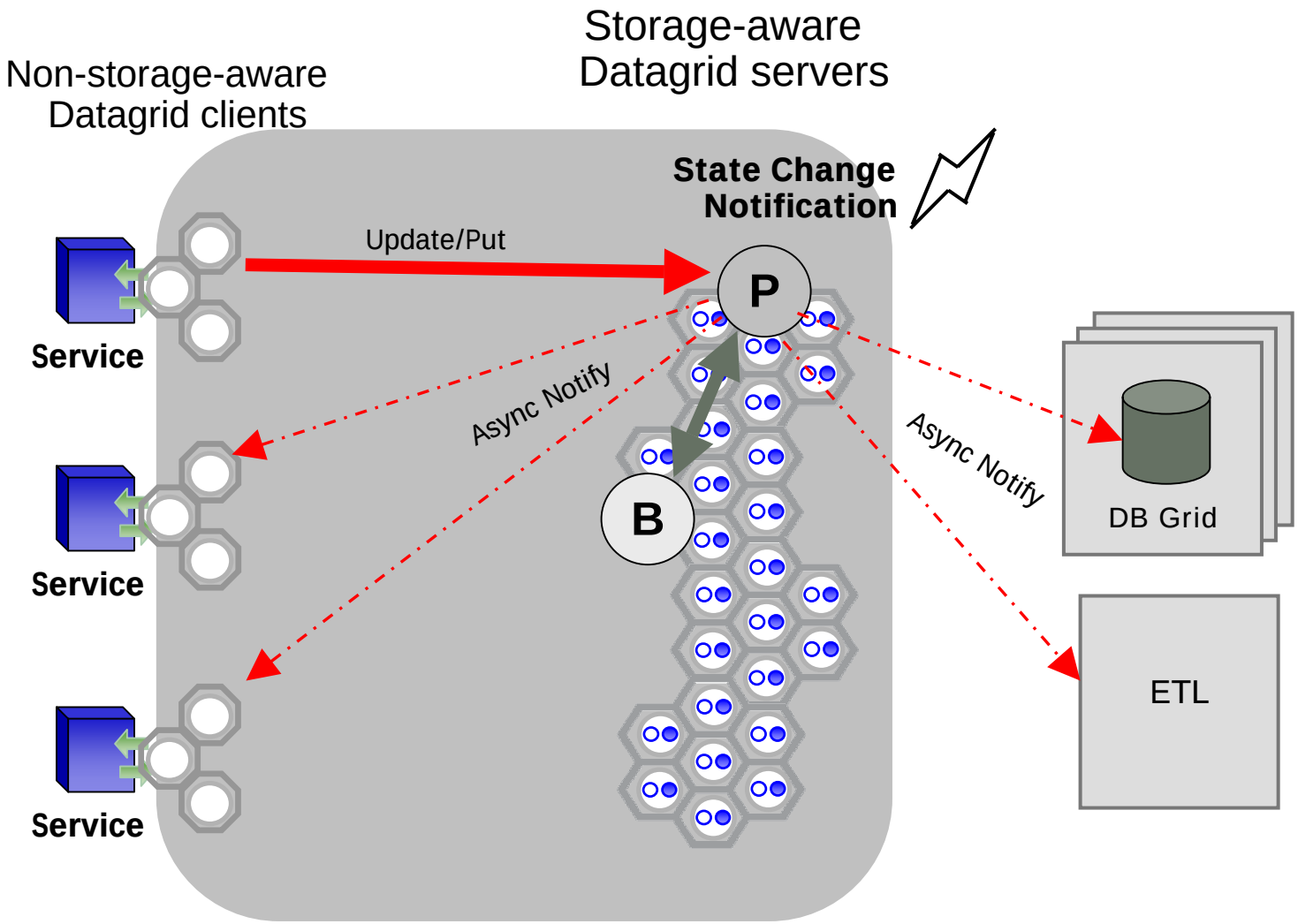
Storage-aware
Datagrid servers



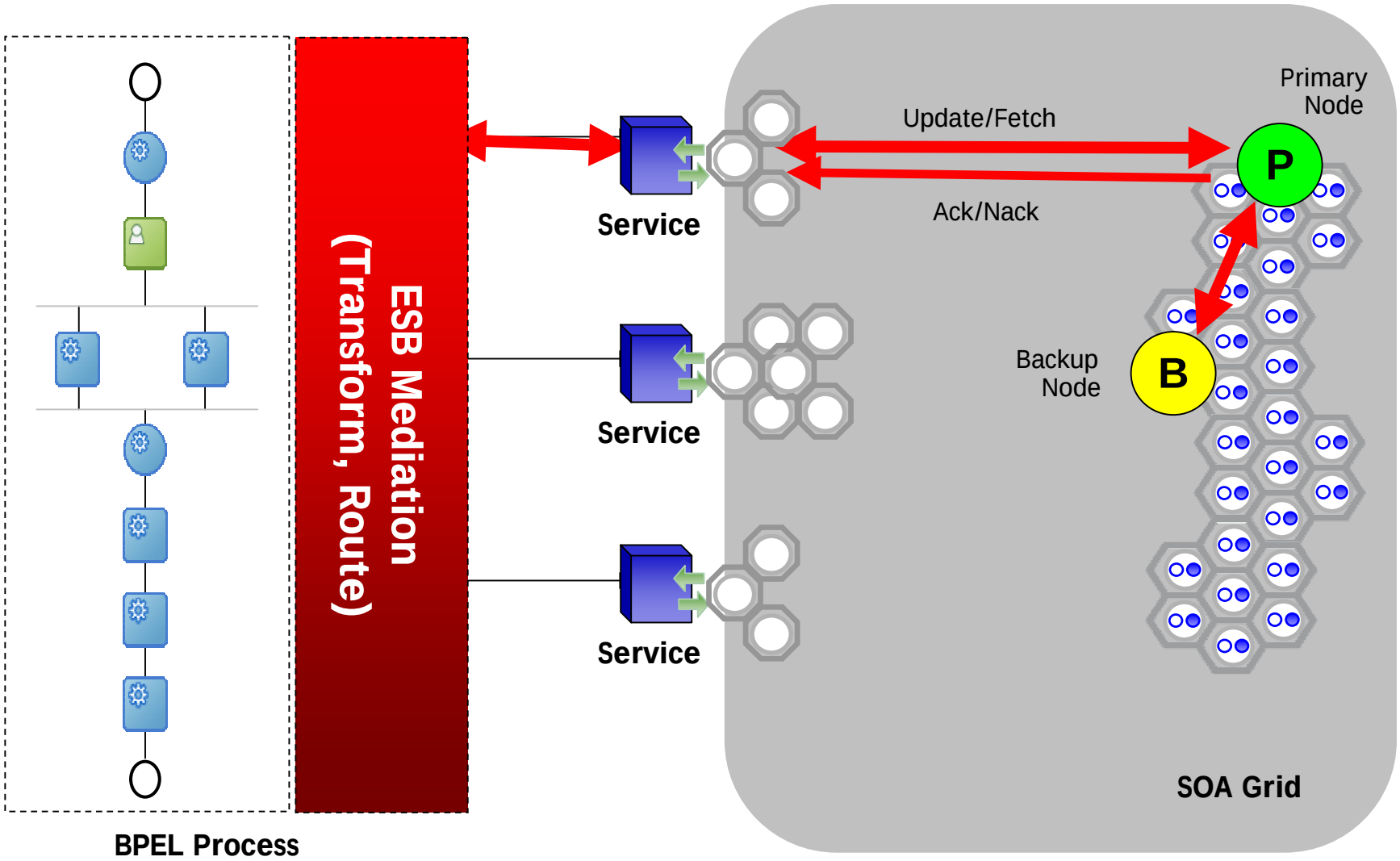
Available Today with Oracle Coherence

= Write Behind Queue

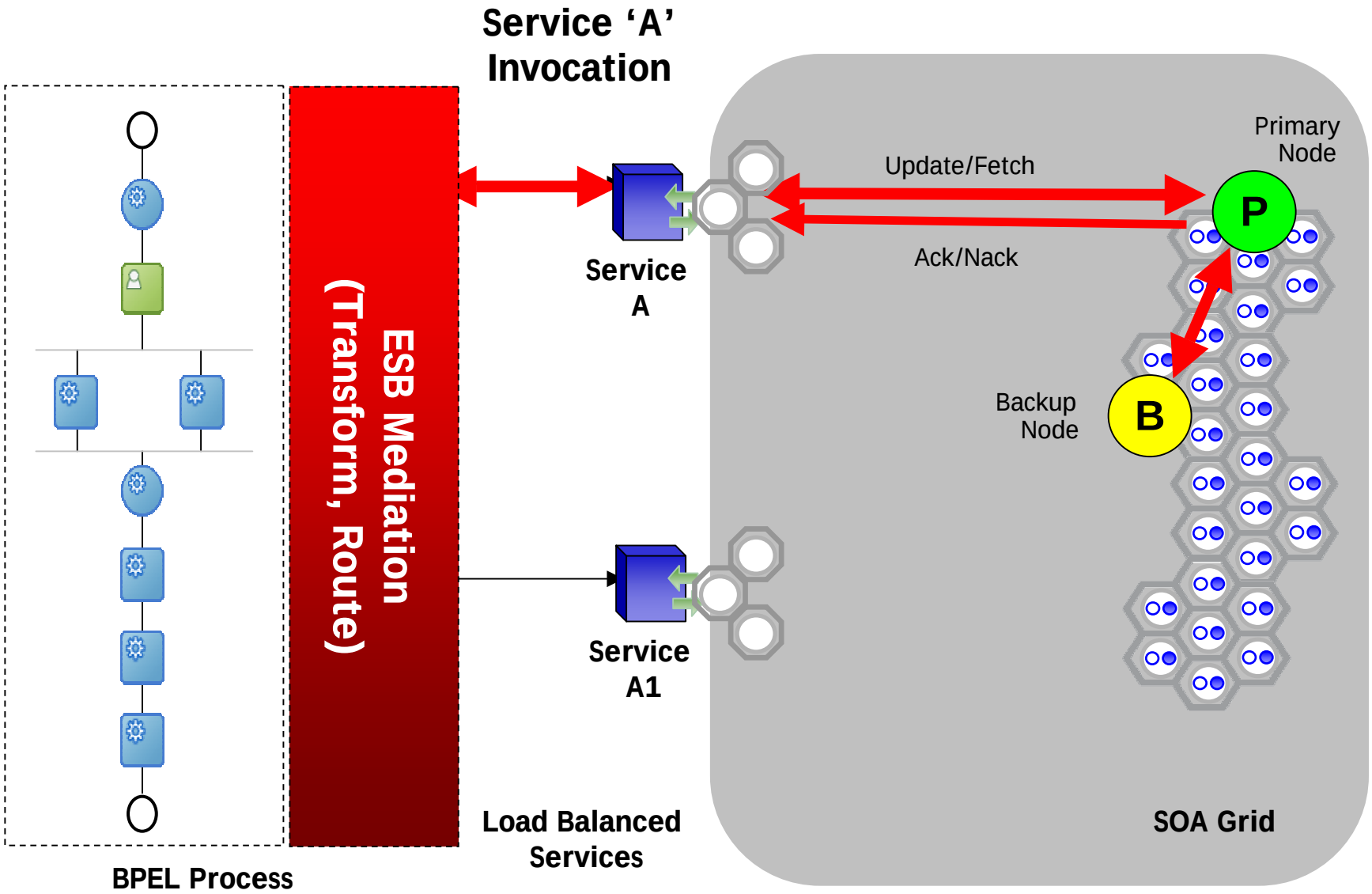
State-Based Notifications



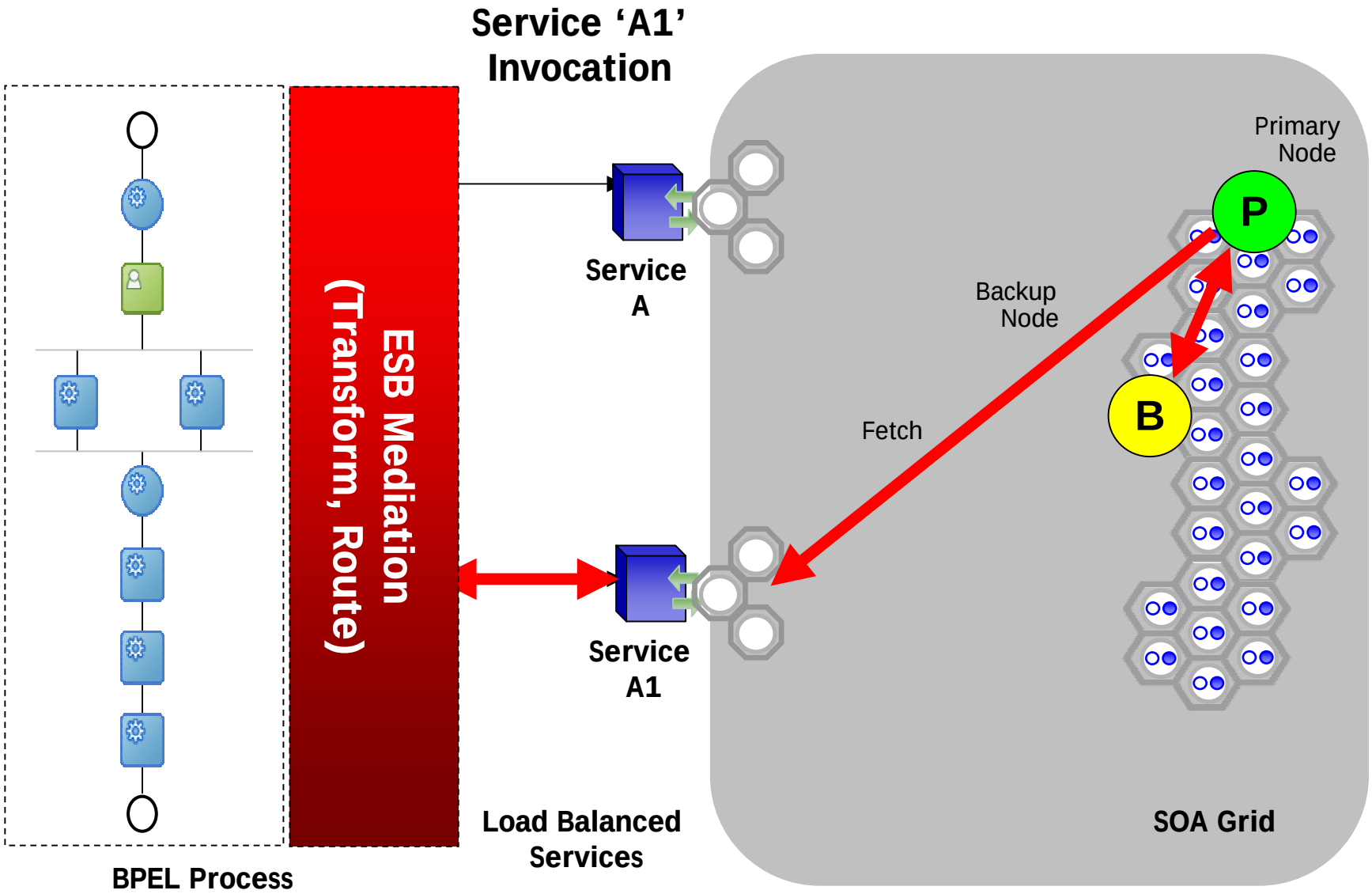
SOA Grid


BPEL Process
ESB Mediation
(Transform, Route)
Service
Service
Service
Update/Fetch
Ack/Nack
Primary
Node
P
Backup
Node
B
SOA Grid

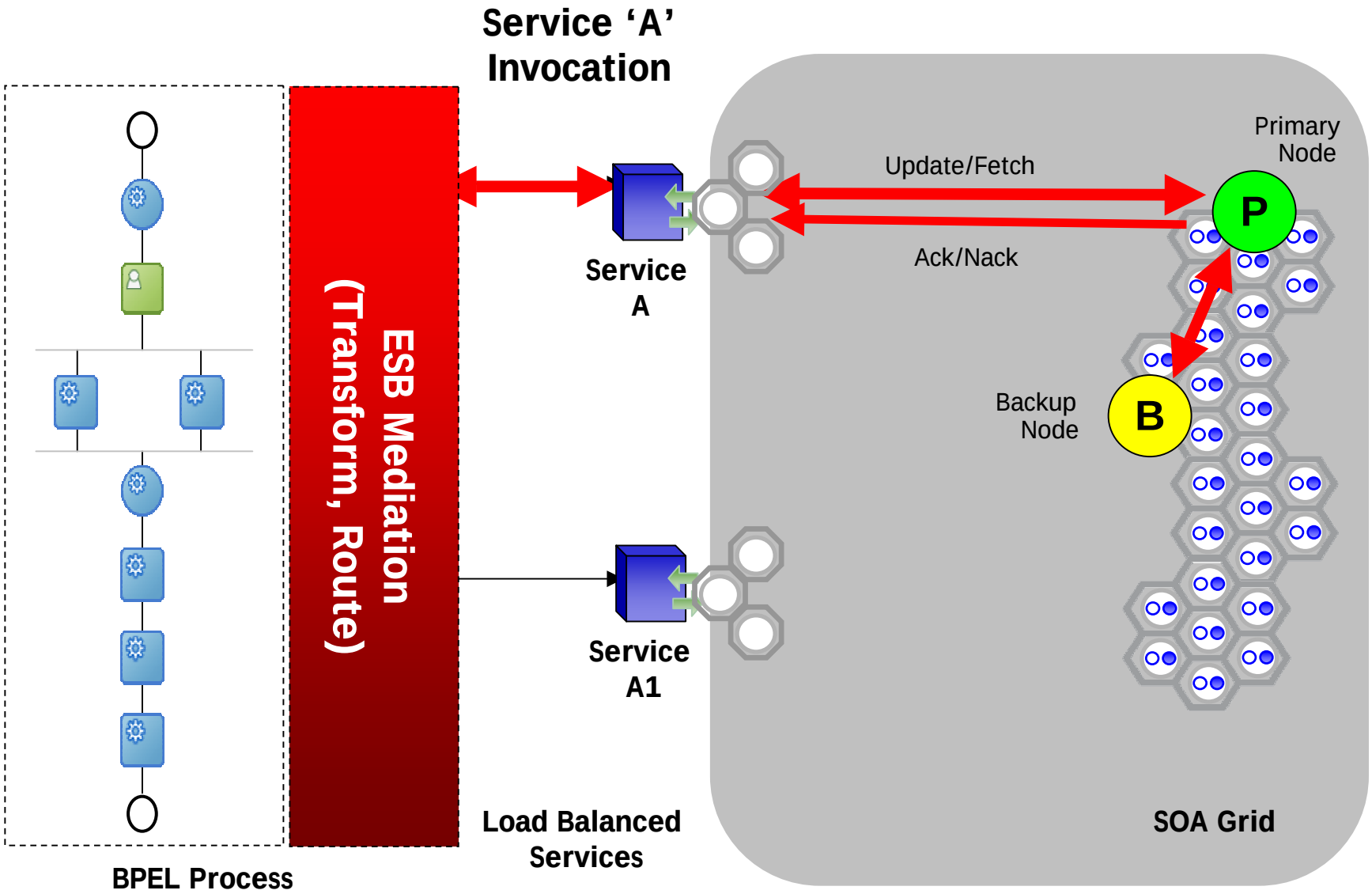
Stateful Service load balancing



Stateful Service load balancing



Stateful Service availability/failover



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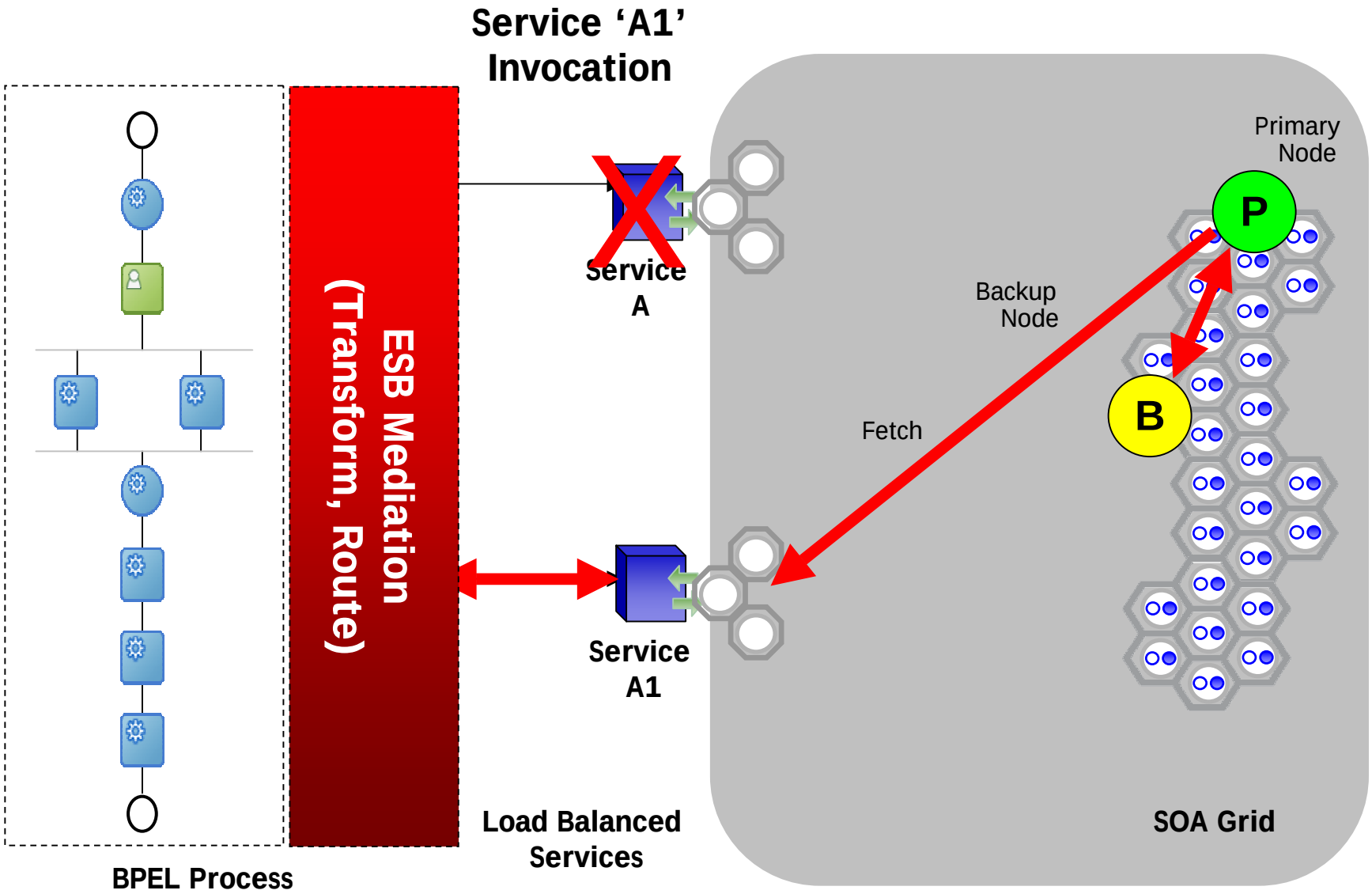

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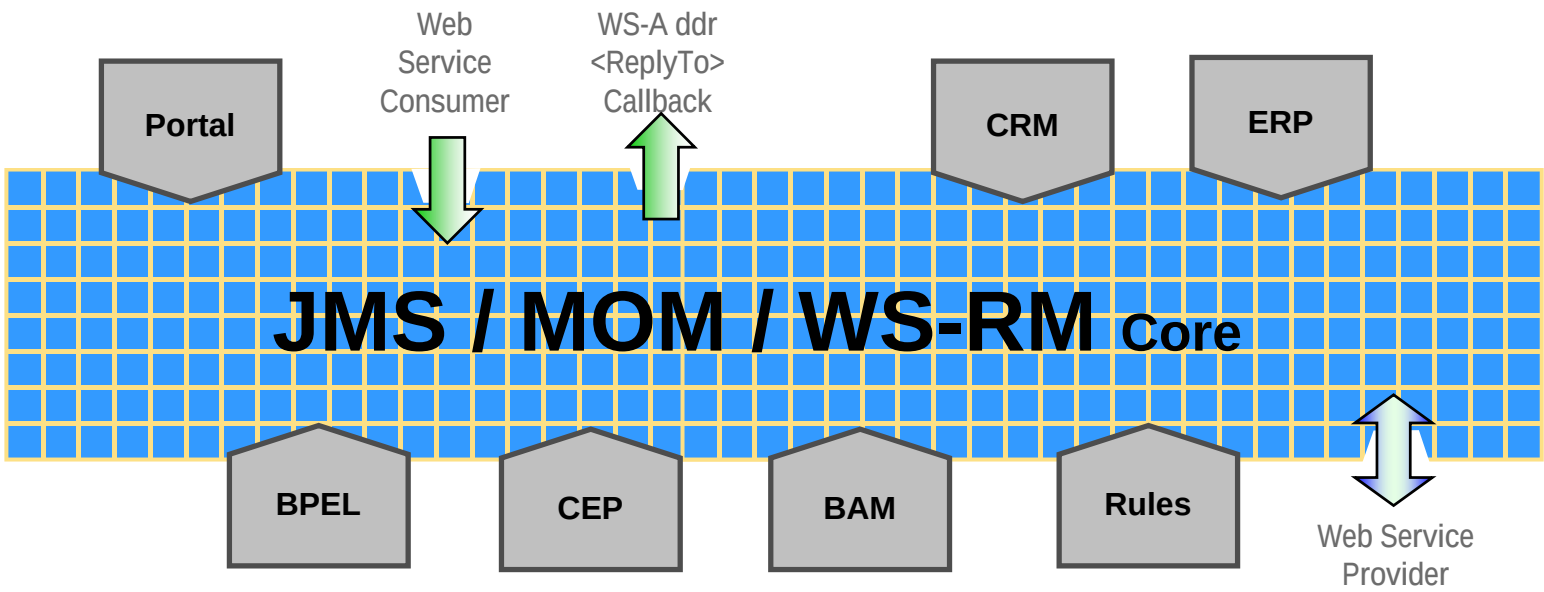
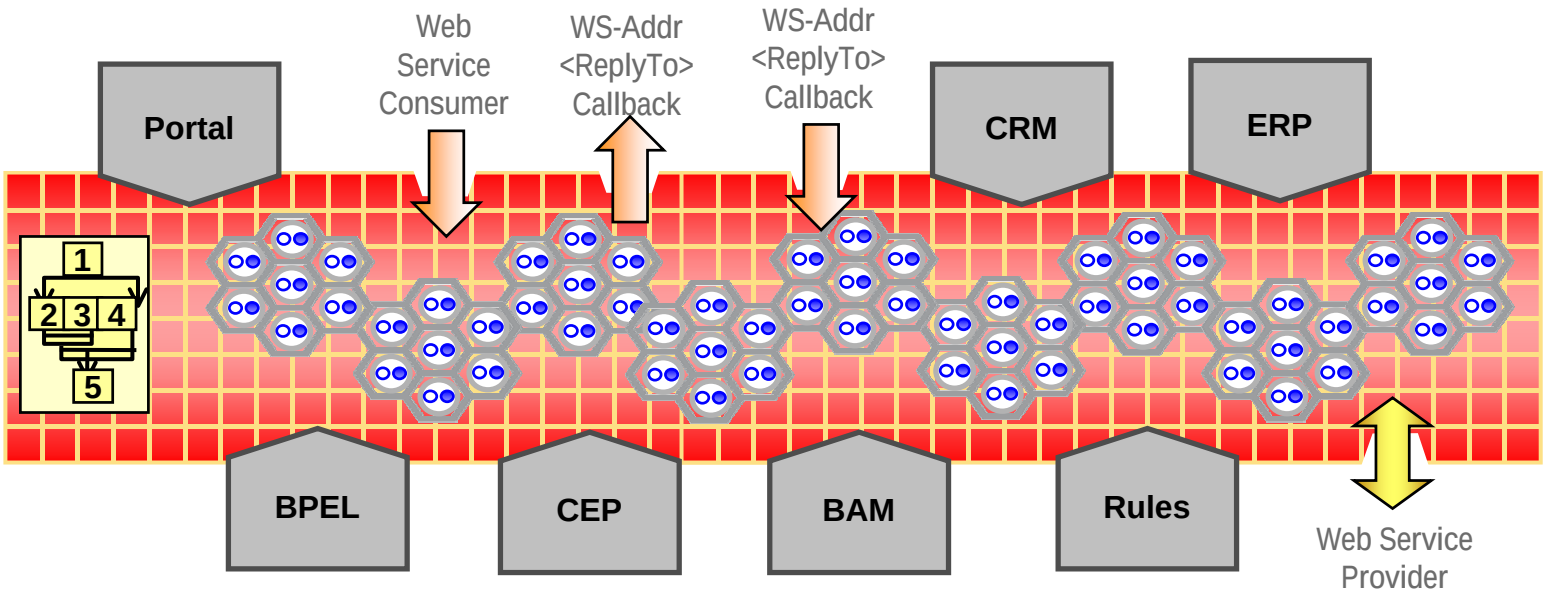
SOA Grid – Not Your MOM's Bus

Conventional Messaging for QoS



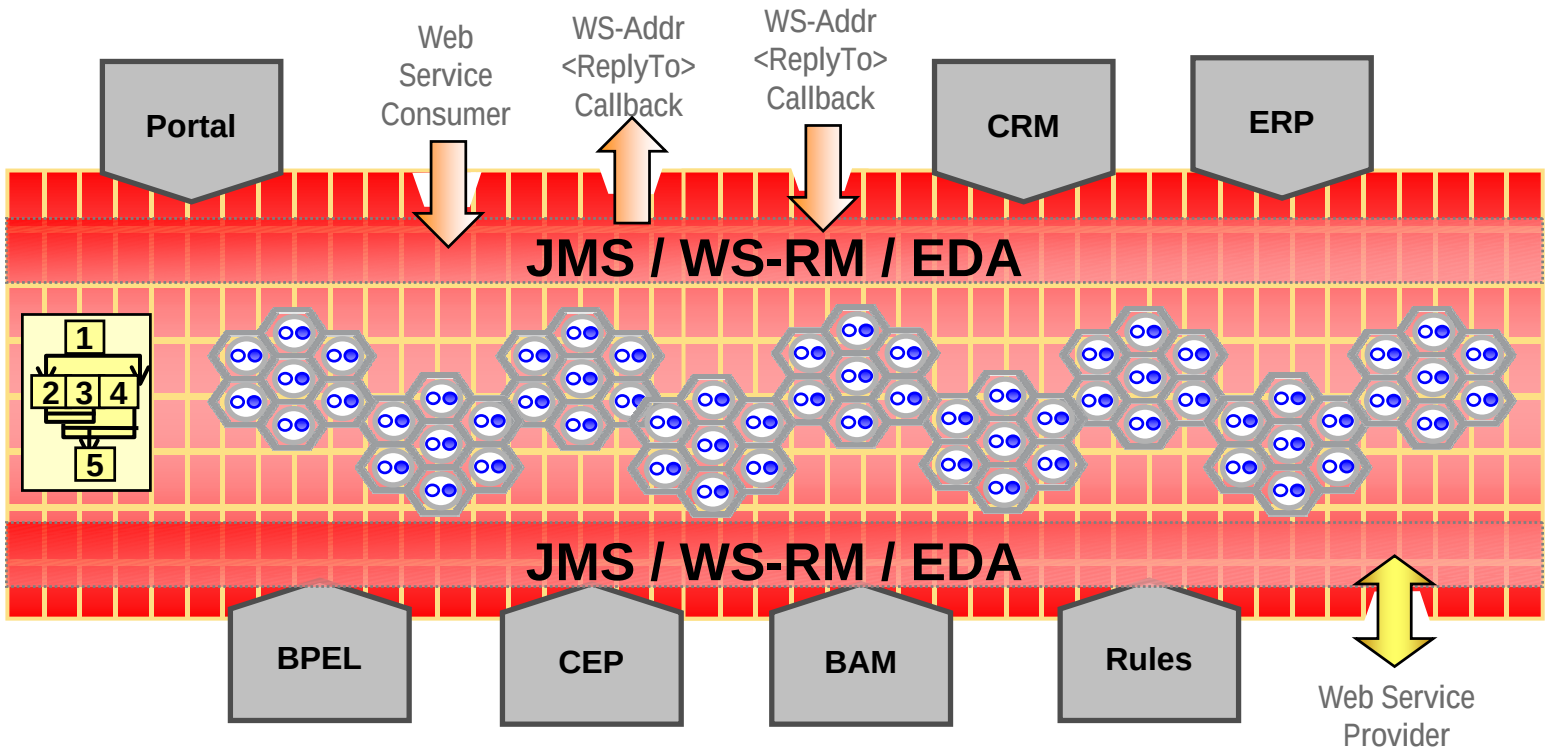
SOA Grid – Not Your MOM's Bus

Why send it when its already there?



That Being Said…

Still Plenty of Use Cases for Conventional Messaging



Rule of Thumb

- Still need MOM for –
  - Familiar client API / usage model
  - Ordering
  - Pub/Sub
- Avoid putting state in Queues where it doesn't belong
- Avoid "sending" stuff when it doesn't really have to travel anywhere
- "Subscribe" to state changes in the grid using observer pattern

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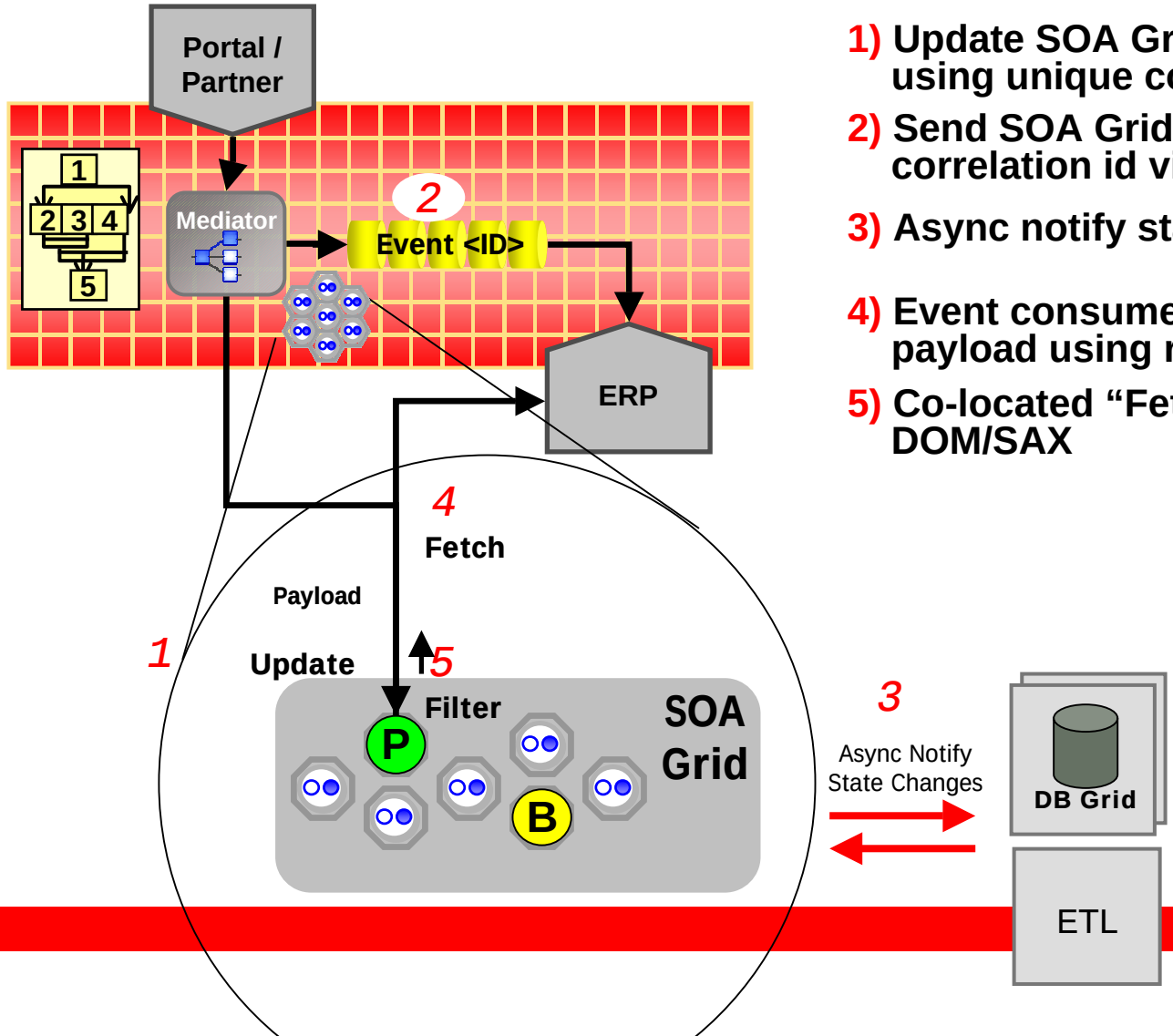
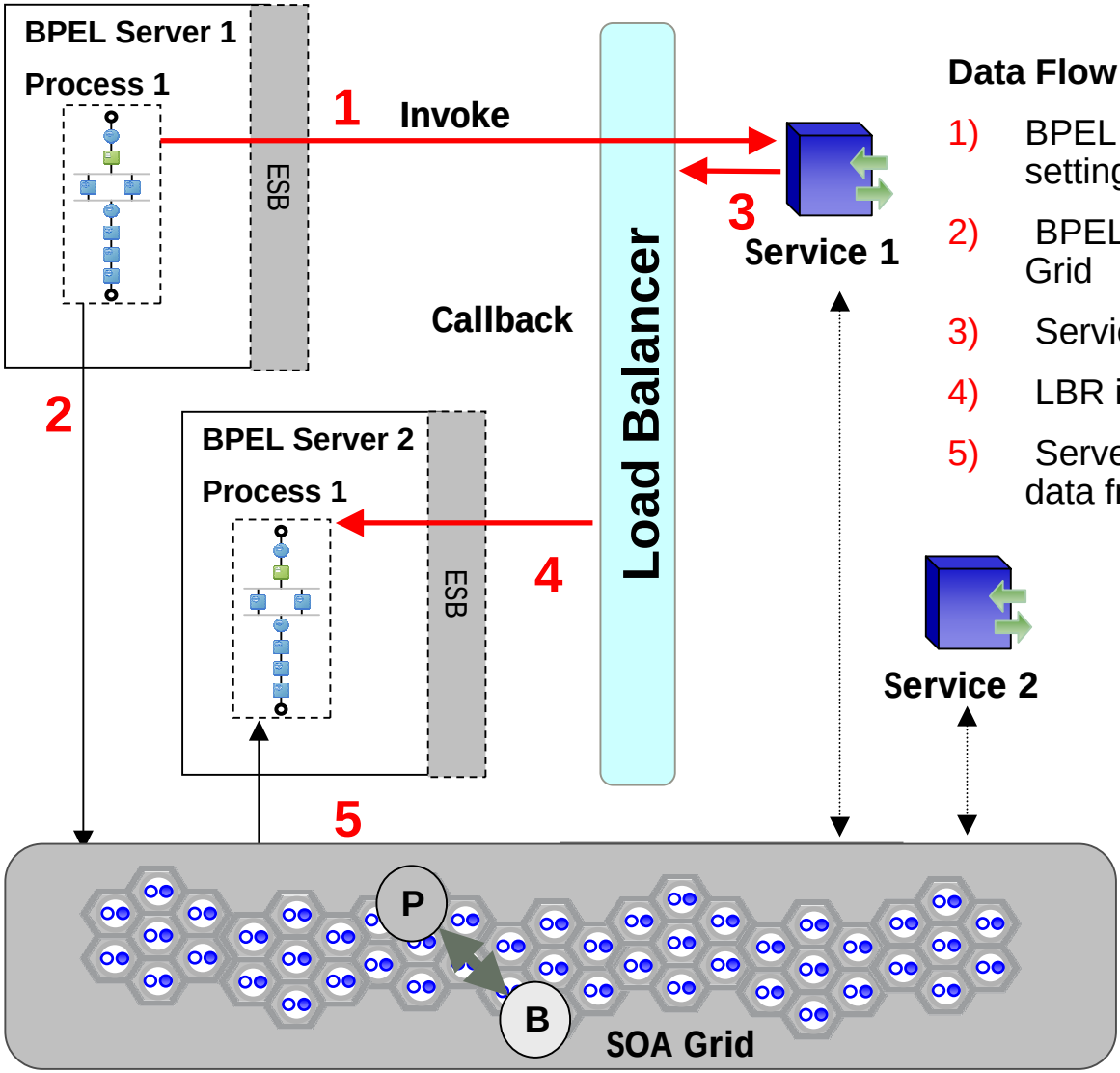
SOA Grid Mediation Use Case

Claim Check / Pass-by-ref Pattern



1) Update SOA Grid with payload object using unique correlation Id
2) Send SOA Grid payload reference as correlation id via Event
3) Async notify state change to DB/ETL
4) Event consumer / subscriber fetches payload using reference id
5) Co-located "Fetch Filter" returns partial DOM/SAX

BPEL Dehydration Example

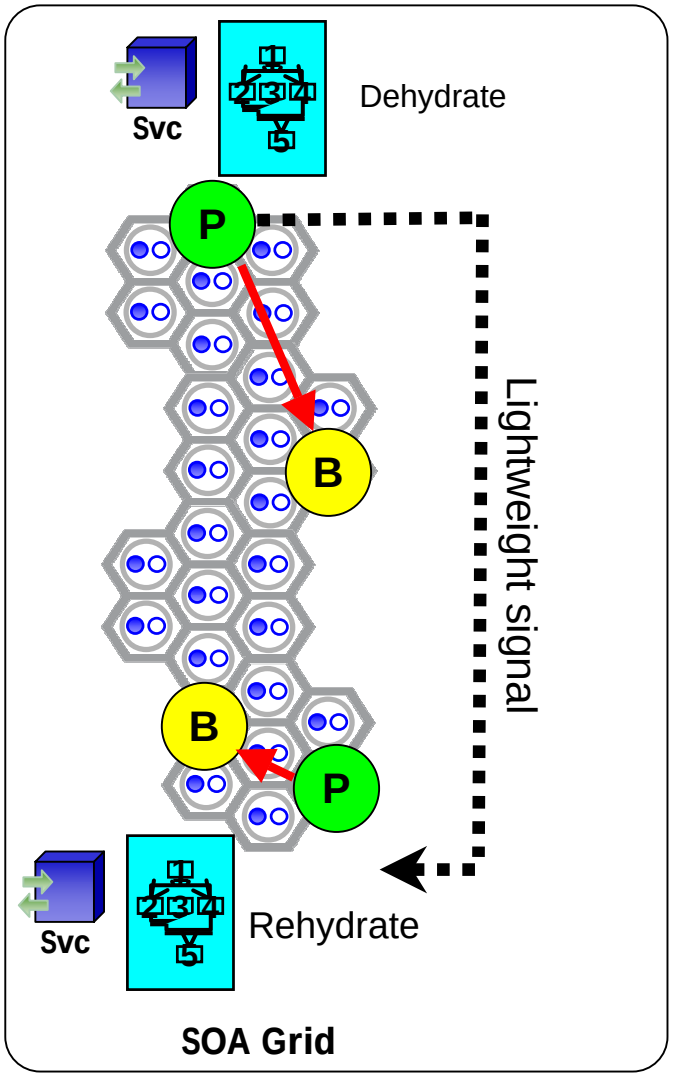


Data Flow

1) BPEL Server 1 Process 1 invokes Service 1 setting callback URL to LBR
2) BPEL Server 1 Process 1 dehydrates to Grid
3) Service 1 Invokes LBR
4) LBR invokes BPEL Server 2 Process
5) Server 2 Process 1 rehydrates process data from grid and continues

Service 1 and 2 can store their own data in the SOA Grid but they do not require access to the BPEL dehydration store in this example.

Relocatable BPEL processes



- Activate/Rehydrate BPEL process where the next service resides
- Efficient co-location of Process/Service Logic/Data
- Reduces Hub-and-spoke traffic

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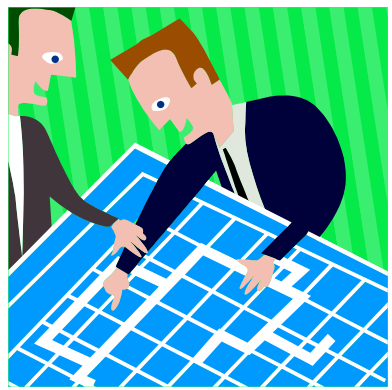
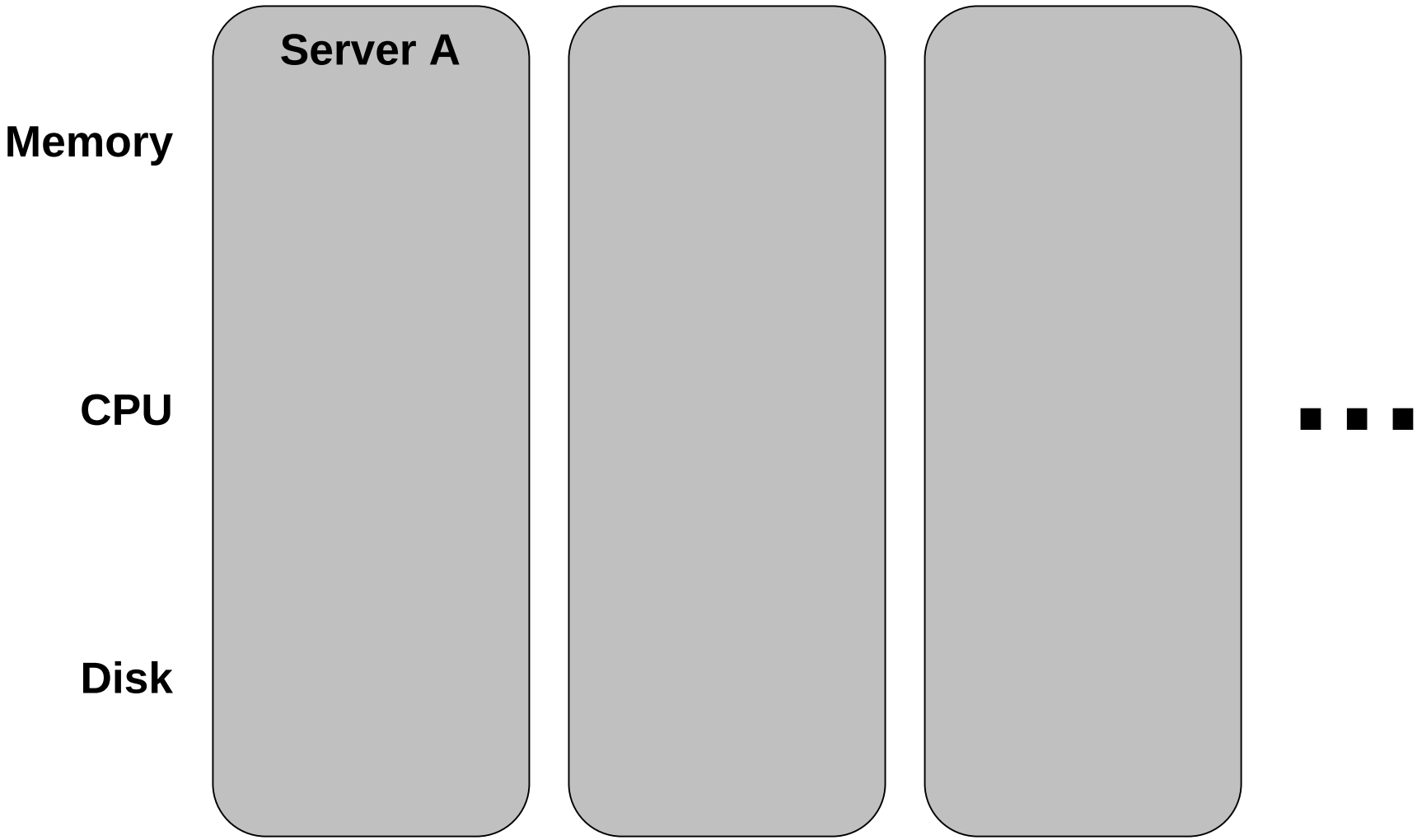


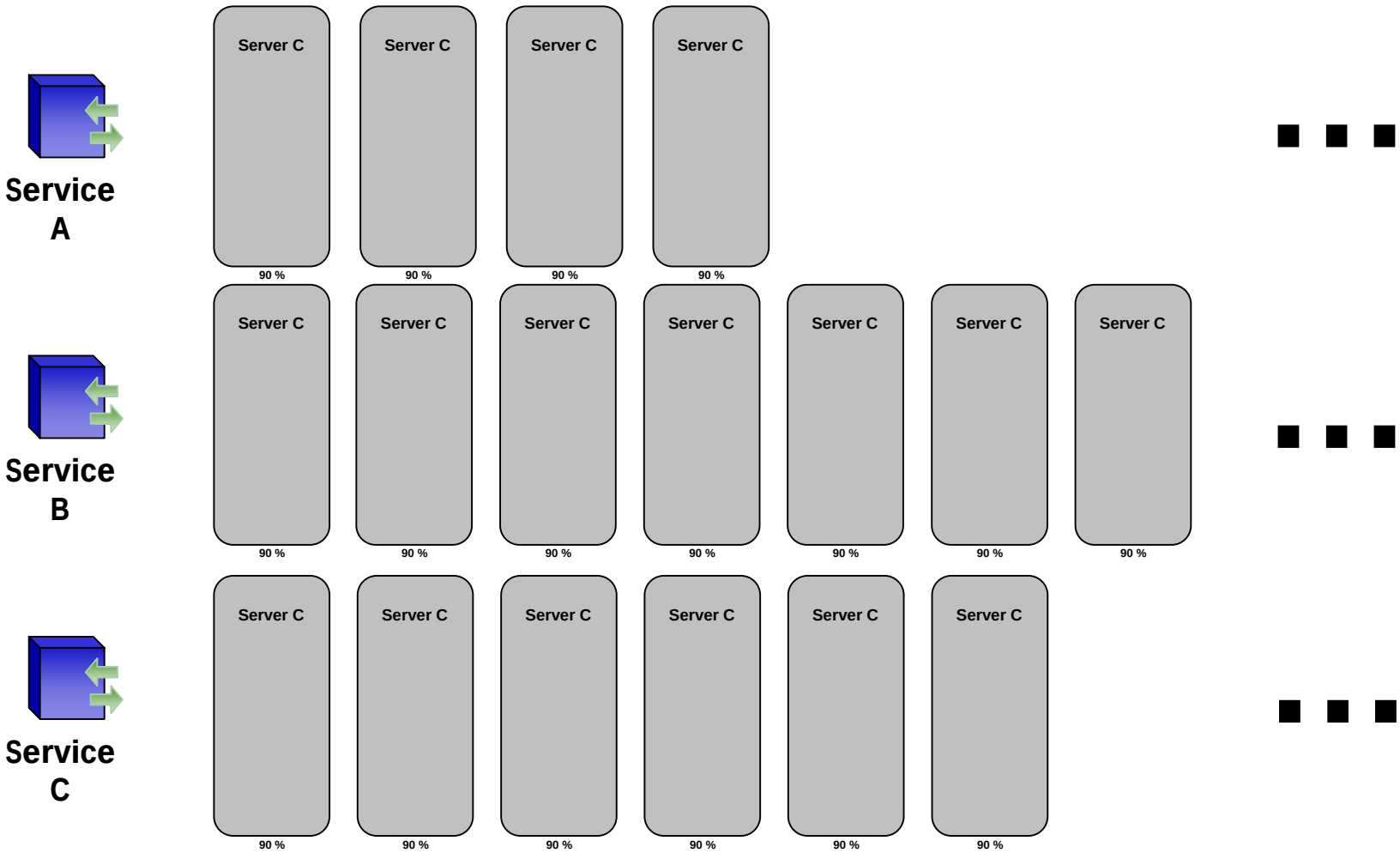
Server Utilization

Typical Virtualization Scenario



Server Utilization

Typical SOA Scalability Scenario



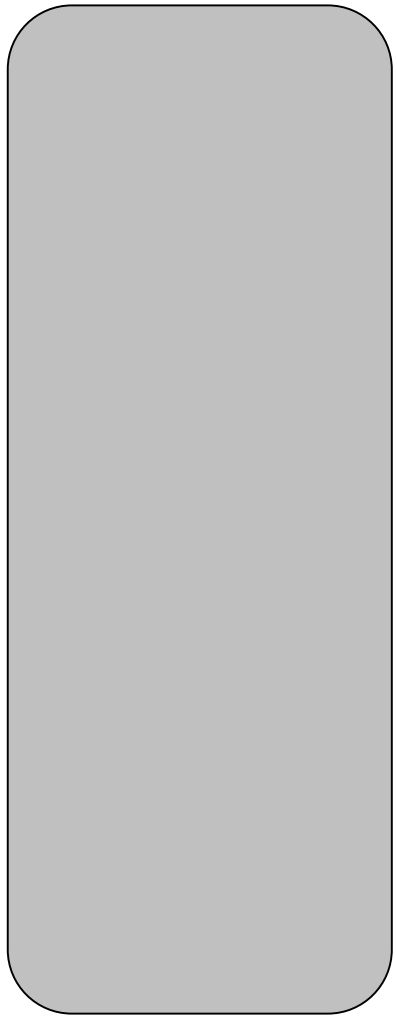
Server Utilization

SOA Grid

Memory

CPU

Disk



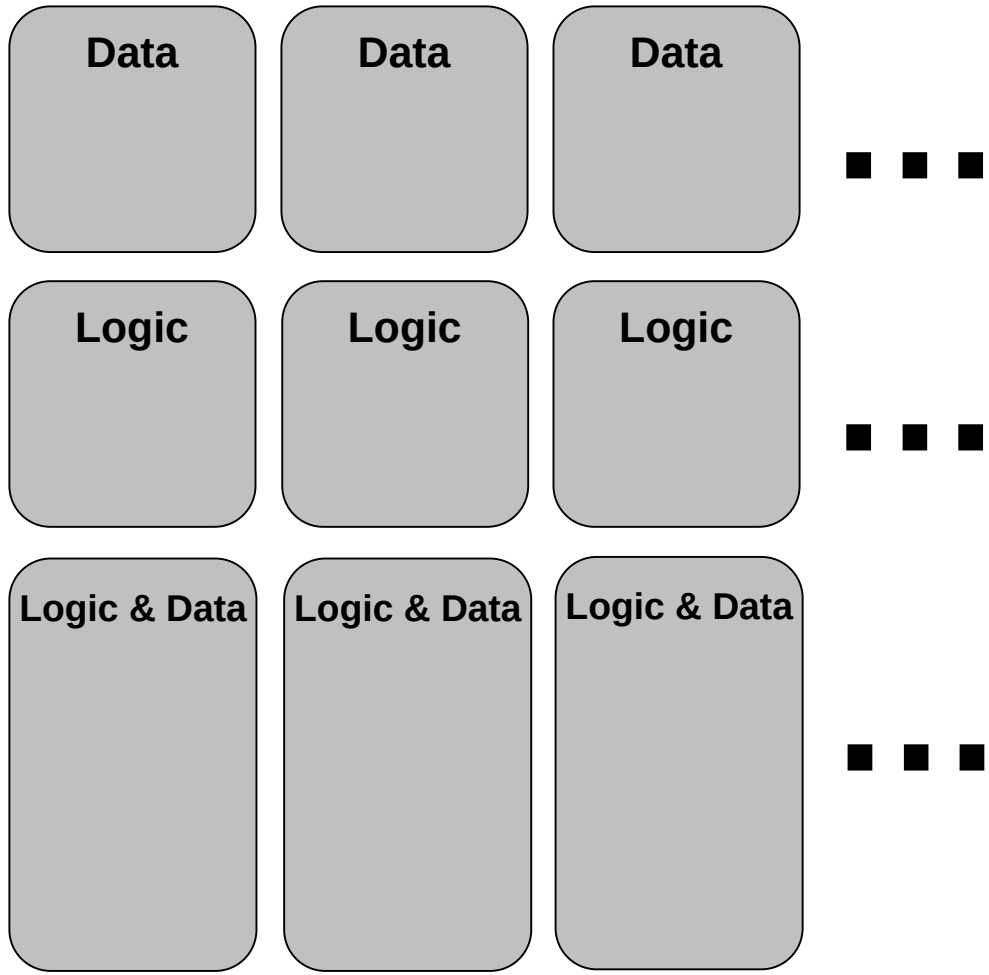
Server Utilization

SOA Grid

Memory Utilization (Storage Enabled)

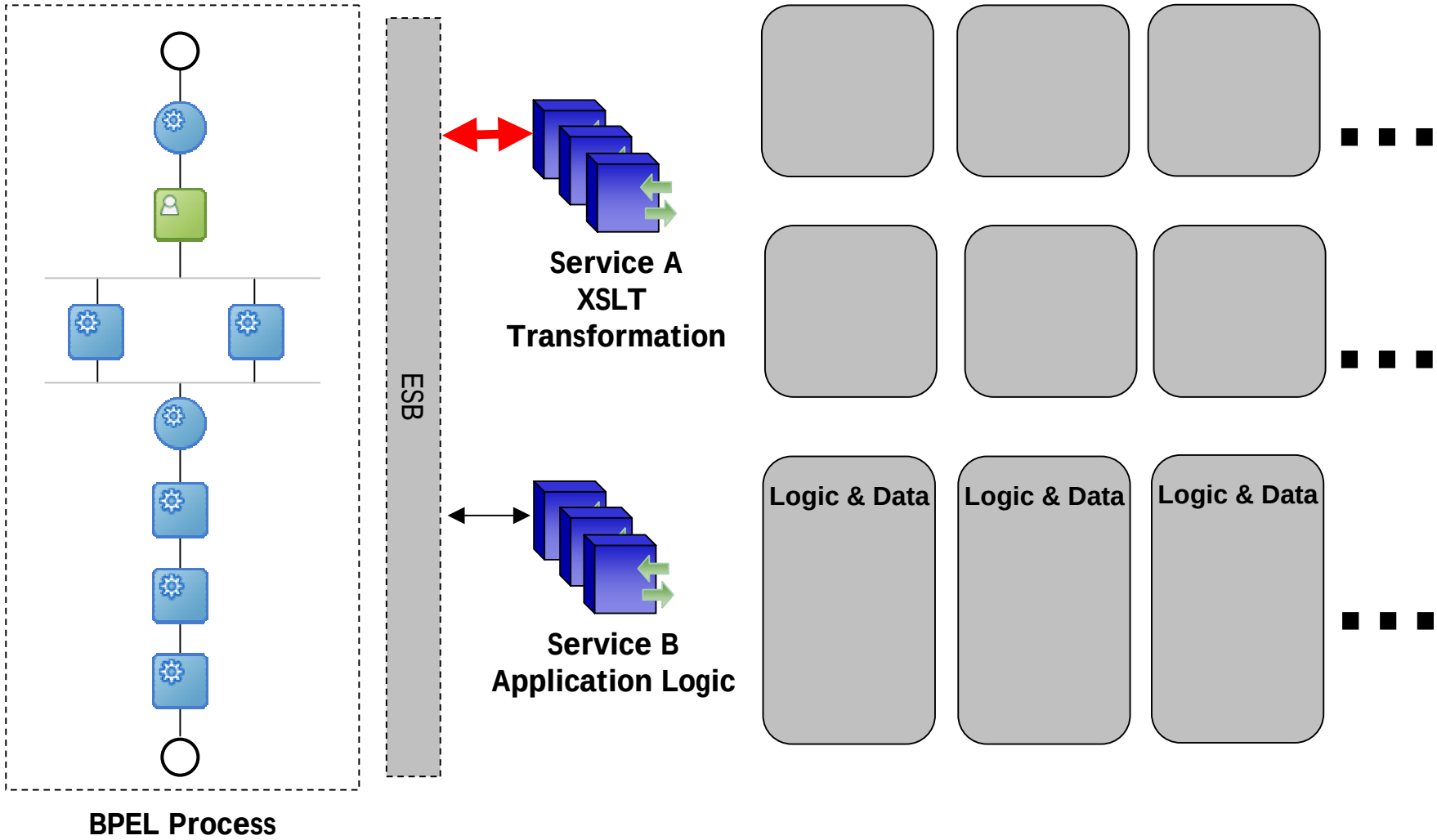
CPU Utilization (StorageDisabled)

Both



Scaling SOA

A new model for efficient resource utilization



The SOA Grid

- State-aware continuous availability
- Predictable scalability
- Data Grid and Compute Grid
- Dramatic overall increase in performance and throughput
  - In memory data access speeds

For More Information

- **Dave Chappell Blog –**
  - **http://blogs.oracle.com/davidchappell**
- **SOA Magazine – SOA – Ready for Primetime: The Next Generation, Grid Enabled SOA**
  - http://www.soamag.com/I10/0907-1.asp
- **XTPP – Gartner Research ID # G00151768 – Massimo Pezzini**
- **Data Grid –**
  - http://www.oracle.com/products/middleware/coherence/index.html
- **General SOA Information –** http://www.oracle.com/technologies/soa/index.html

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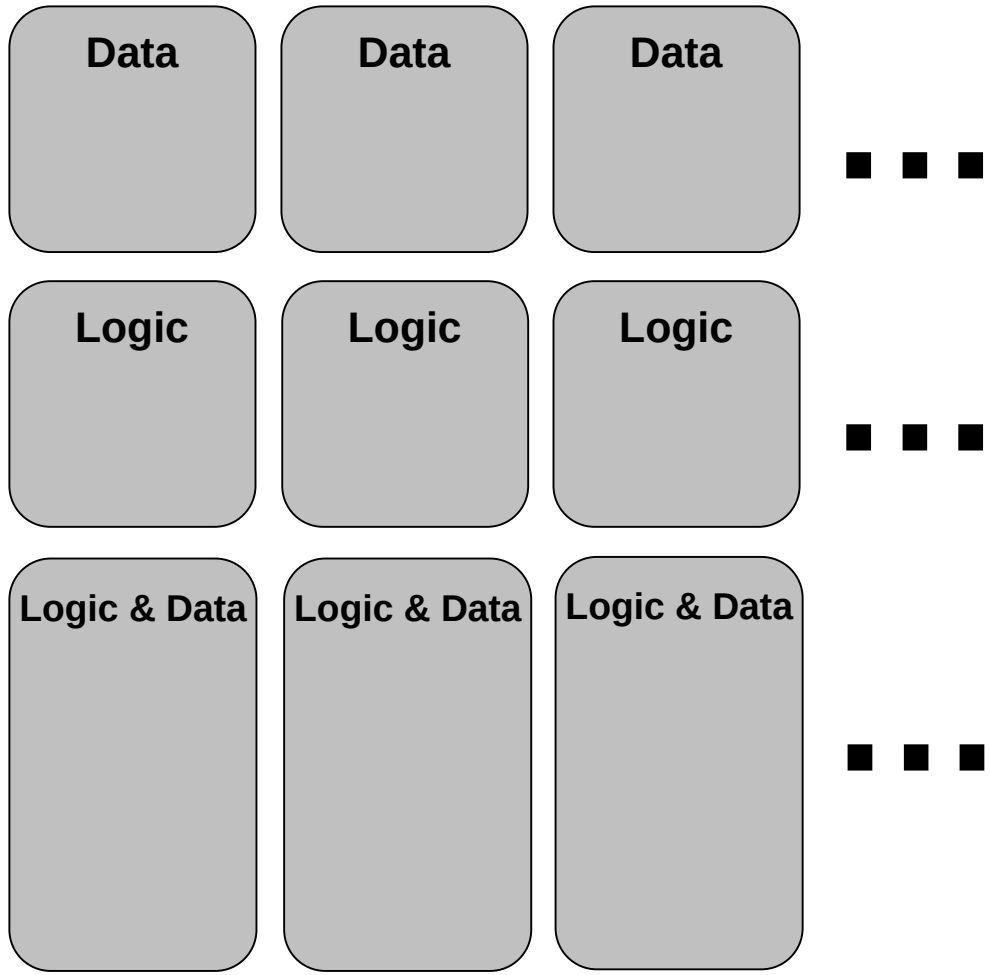
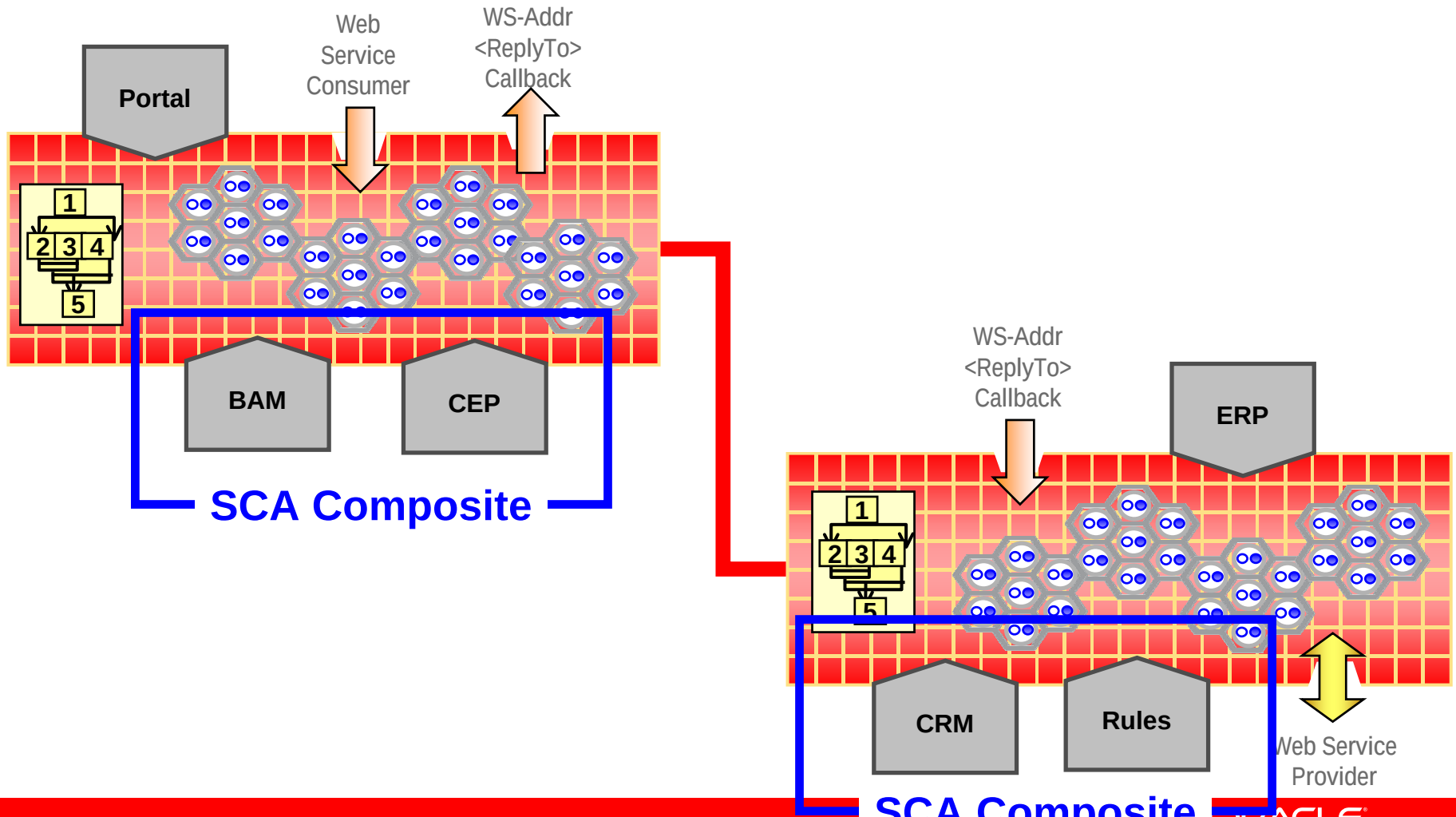


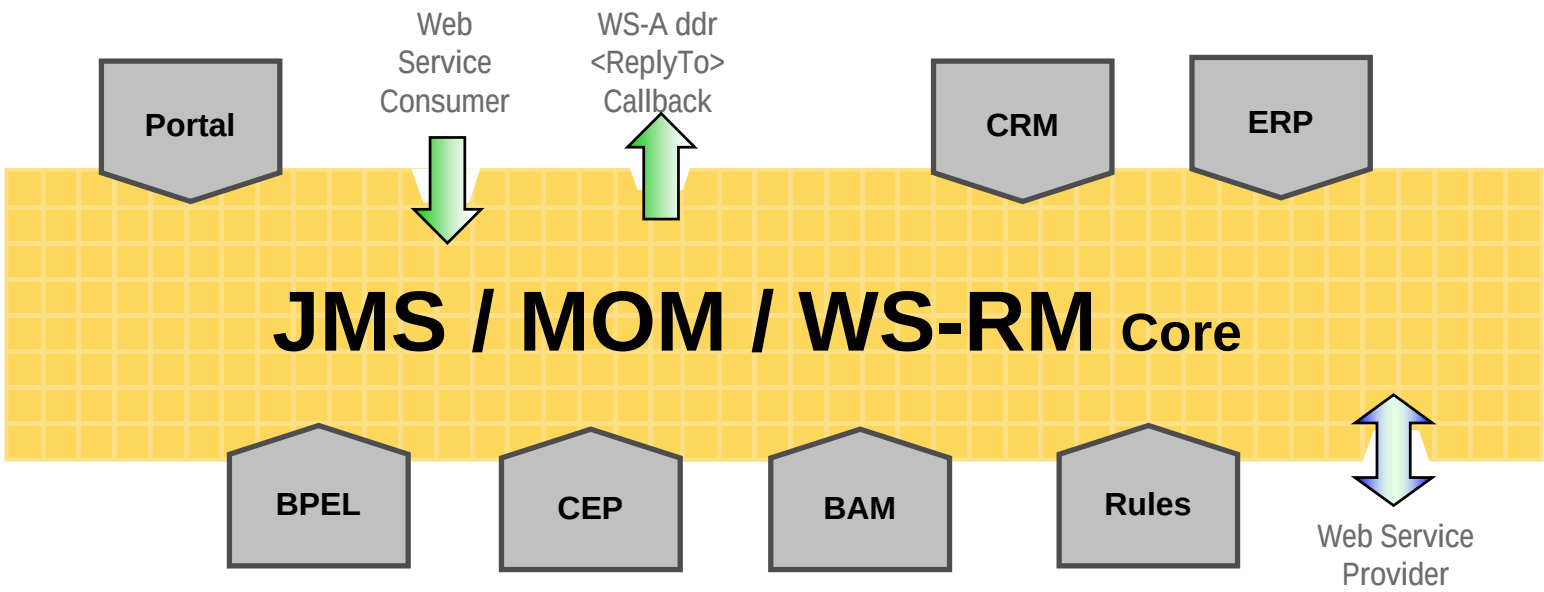
Service Component Architecture (SCA)

Combine BPEL, BAM, Rules, Custom Logic…



SOA Grid – Not Your MOM's Bus

Conventional Messaging for QoS



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Conventional Messaging for QoS