Service-Oriented Architecture: One Size fits Nobody

Christoph Bussler

Keynote, ICEIS Conference
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bea
Think liquid.™

Agenda

- The Promise of SOA and One SOA Approach
- Common Architecture Patterns
- Abstractions
- SOA vs. SOI
- Conclusions

The Promise of Service-oriented Architecture (SOA)

- Flexibility
  - Adjust to business need of the day
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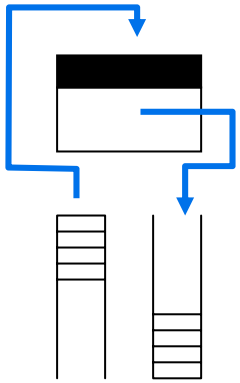
- Dynamic and automatic discovery
  - Finding existing services (automatically) inside and outside organizations
  - E. g., list all web services that check if a given address is a real address

One SOA Approach

One SOA Approach

- Put all functionality on a queue
  - IN queue for requesting service
  - OUT queue for providing service results



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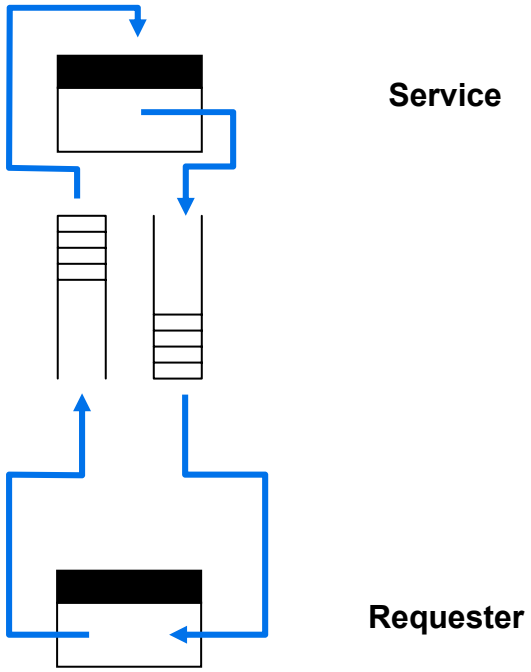

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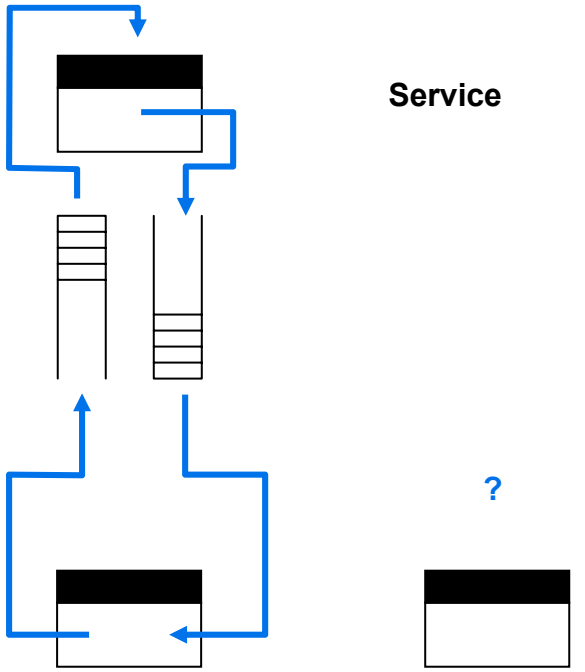

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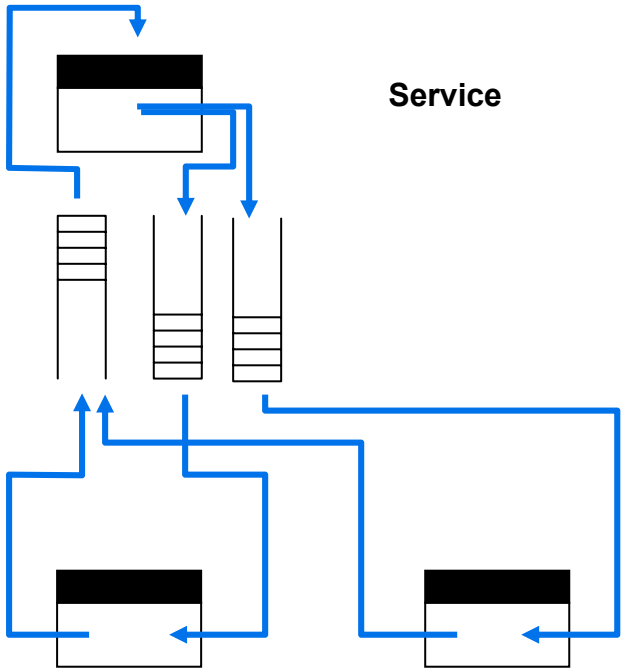

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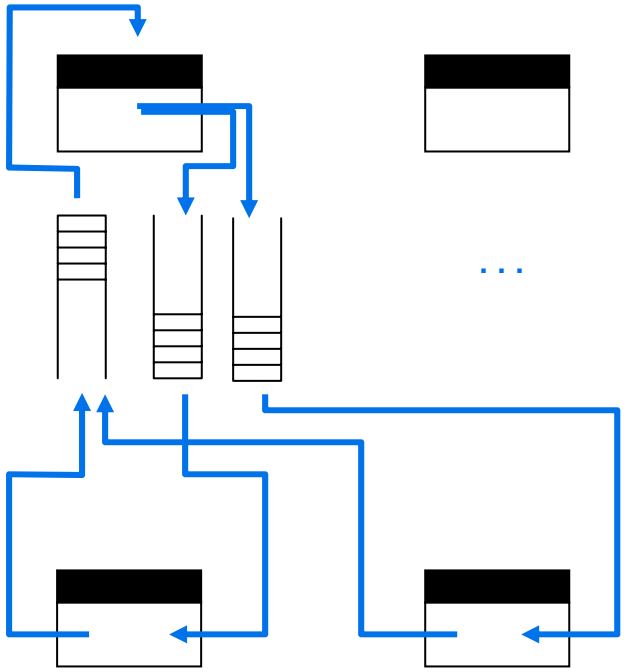

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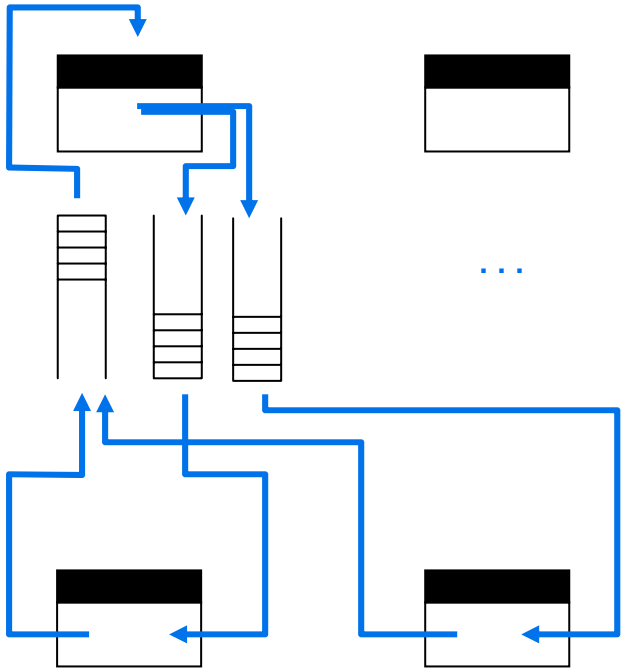
- “Message-based” approach
  - All interactions between service requester and service provider take place over messages



One SOA Approach

- Wait a minute …

One SOA Approach

- Heterogeneity?
  - Data type system mismatches?

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  - Data type system mismatches?
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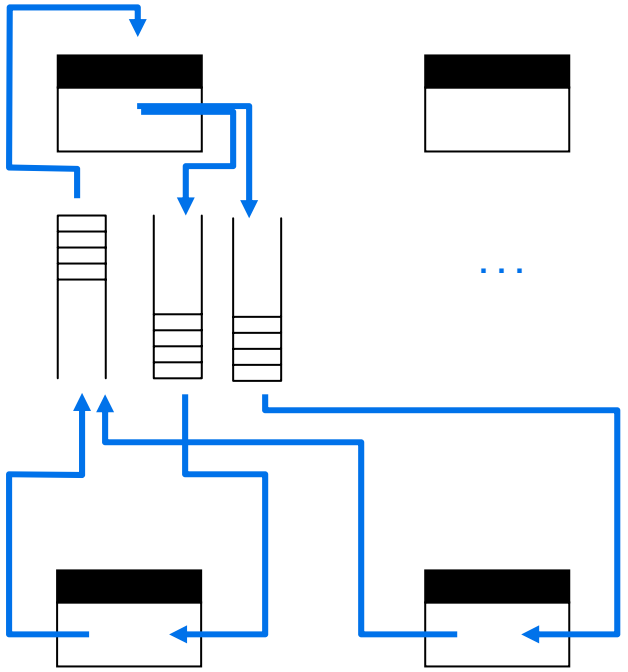
  - Data semantics mismatches?
  - Let's add transformation to the approach

One SOA Approach

- Transformation
  - Syntax
  - Semantics
    - Vocabulary



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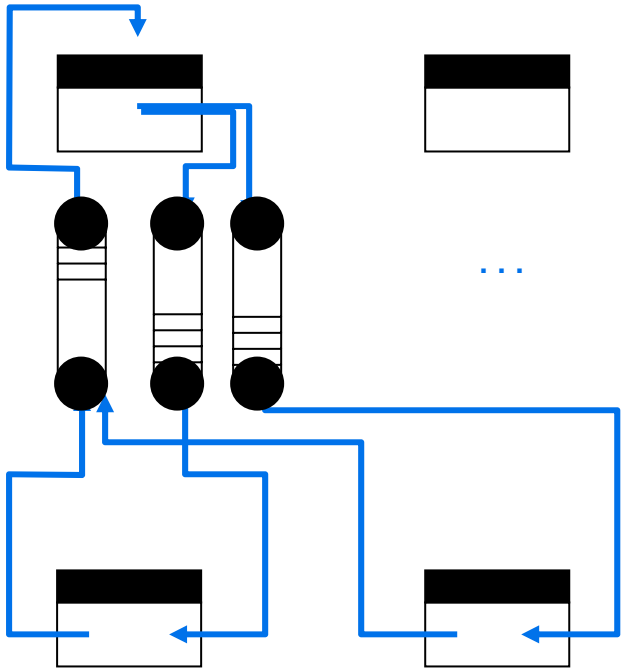


Example of Service Composition

- A service
  - That calls another service
  - That in turn composes two other services
  - Using the SOA approach based on queues

Example of Service Composition

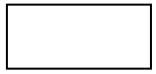
- Preface: Symbols

Example of Service Composition

- Interface

Example of Service Composition

- Implementation

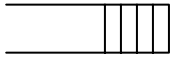


Example of Service Composition

- Service

Example of Service Composition

- Queue (ESB)



Example of Service Composition

- Transformation

Example of Service Composition

- State

Example: Story

- Story: Once upon a time …

Example: Story

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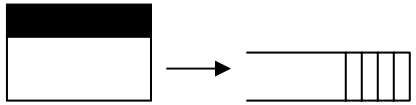

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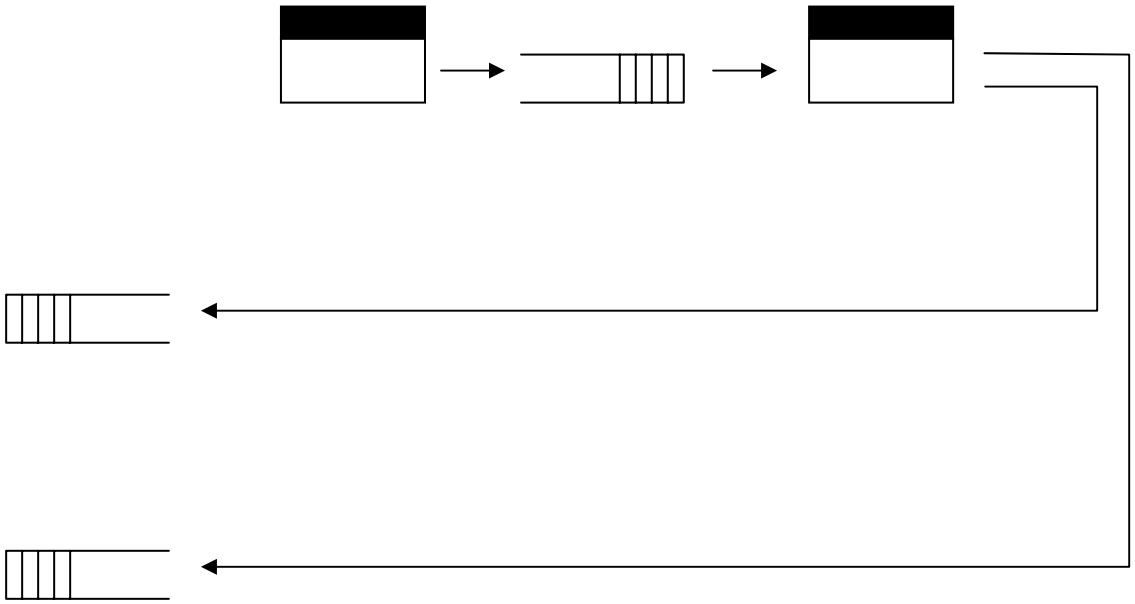

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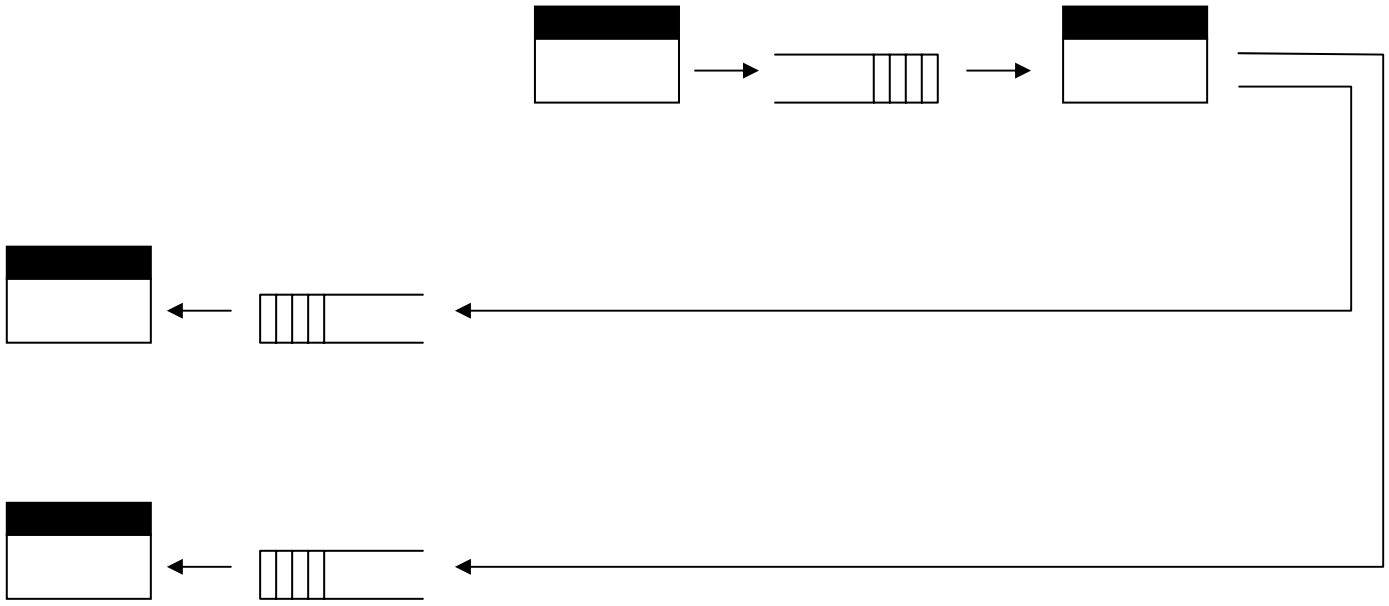

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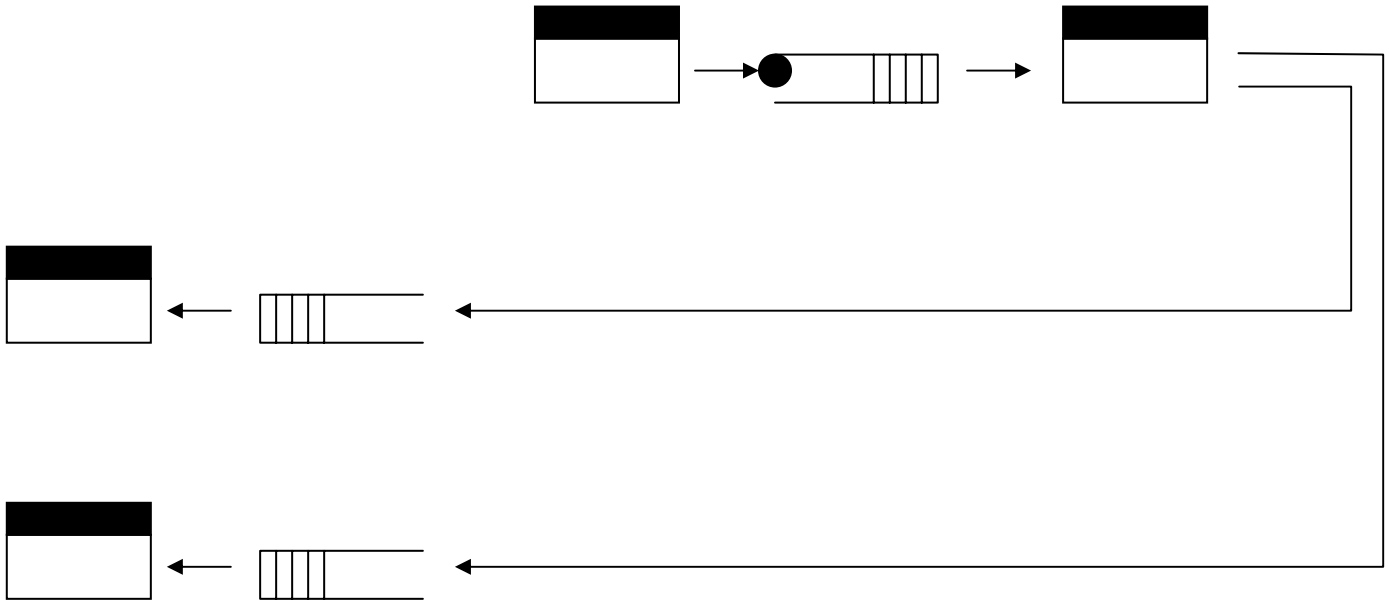

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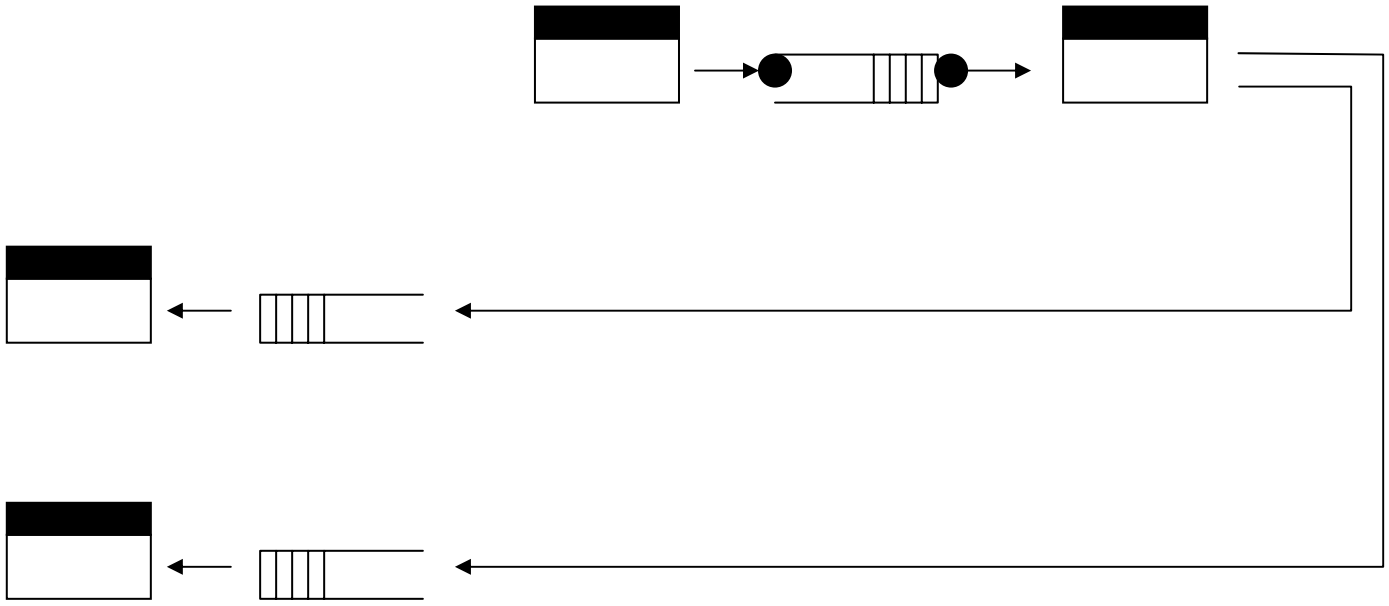

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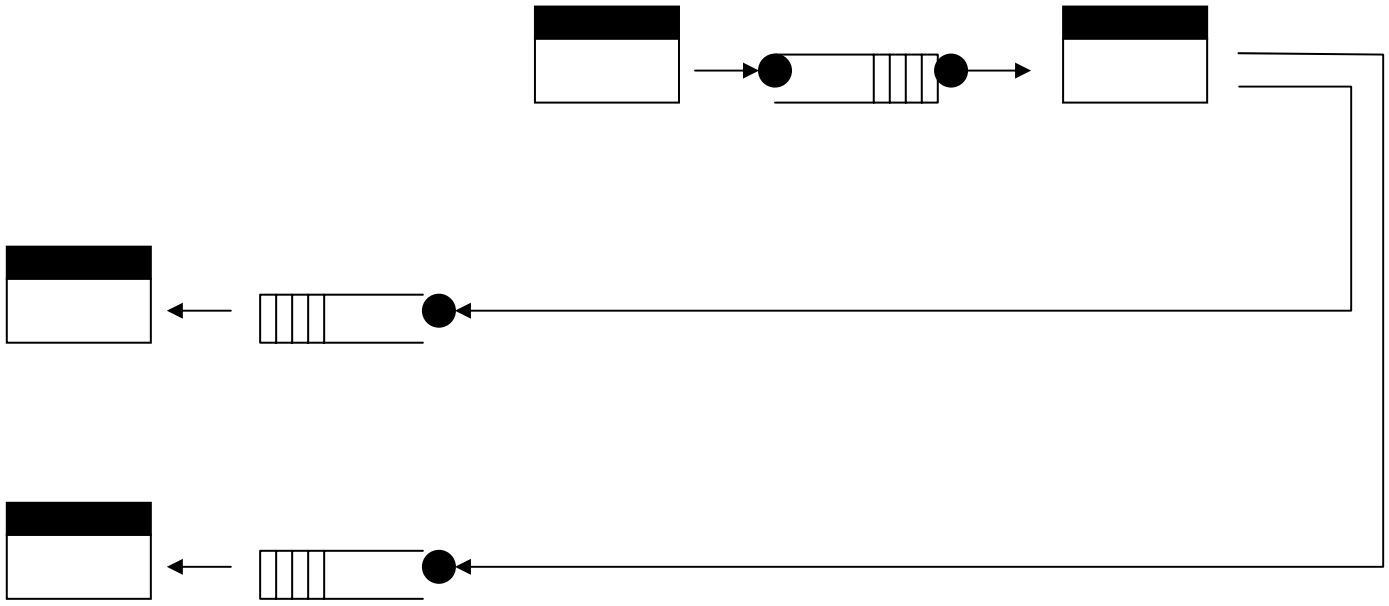

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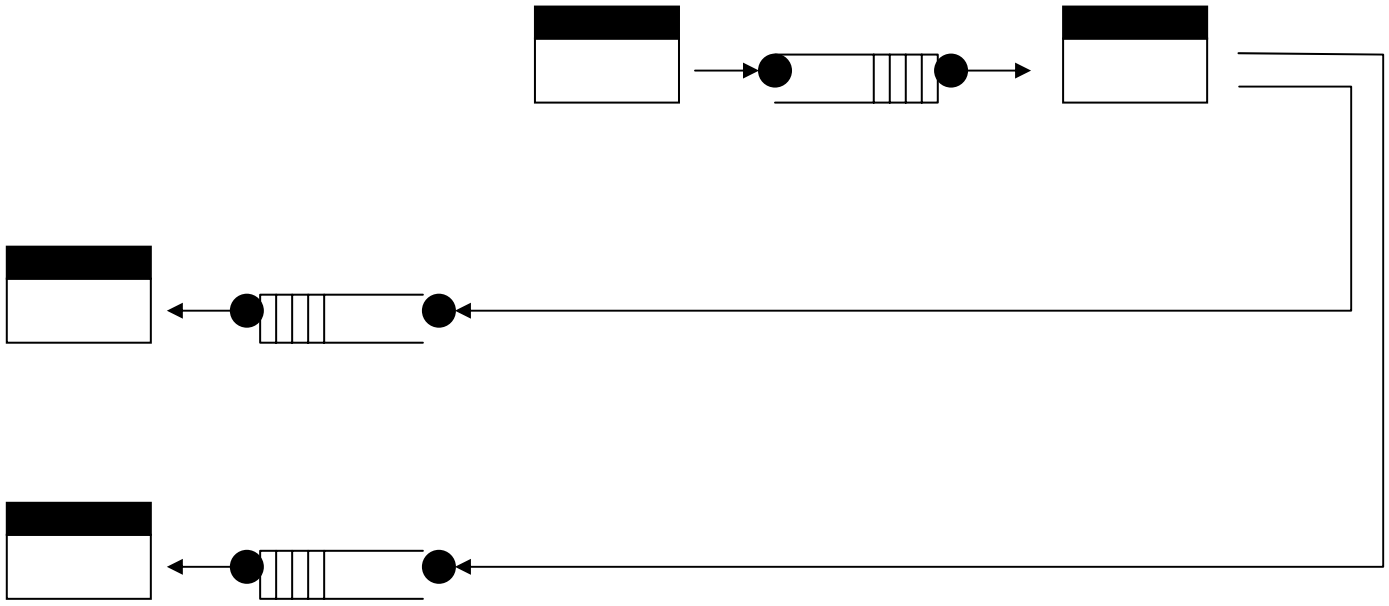

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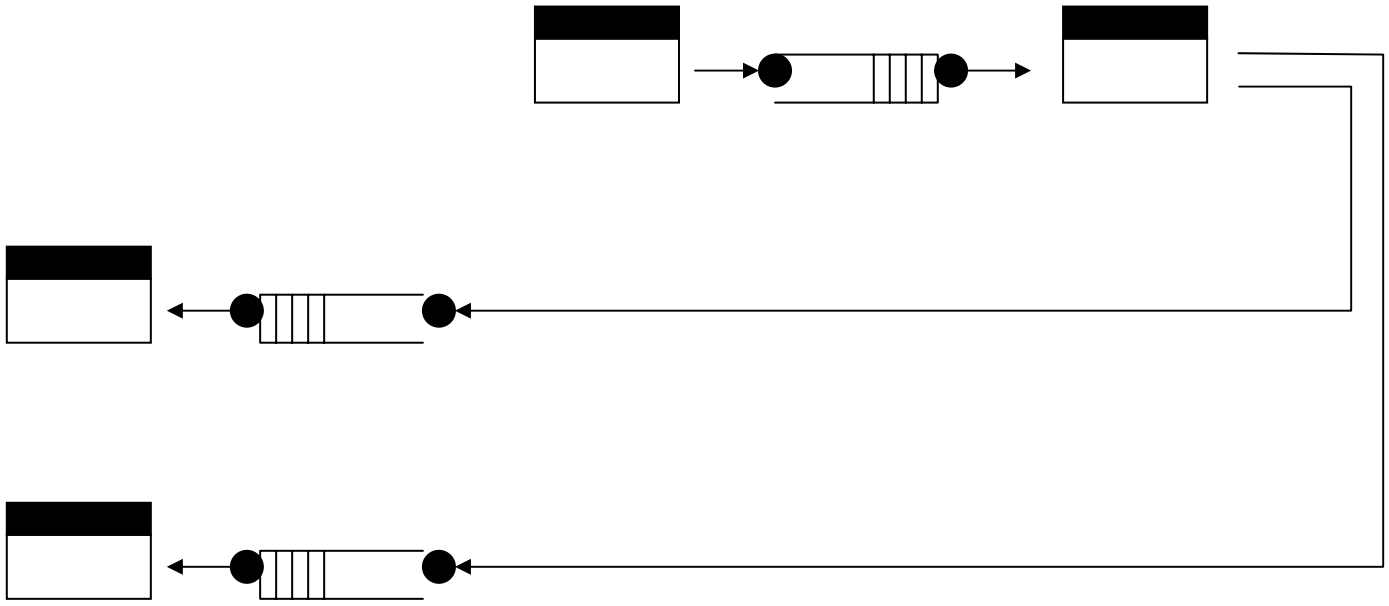

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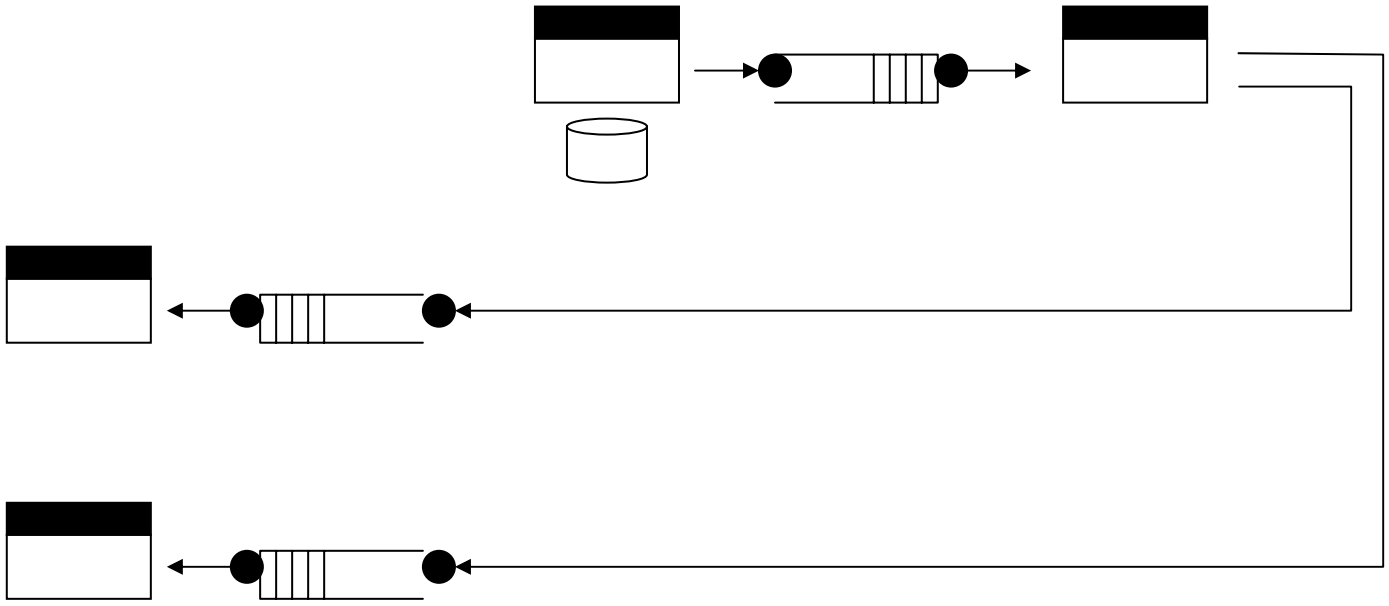

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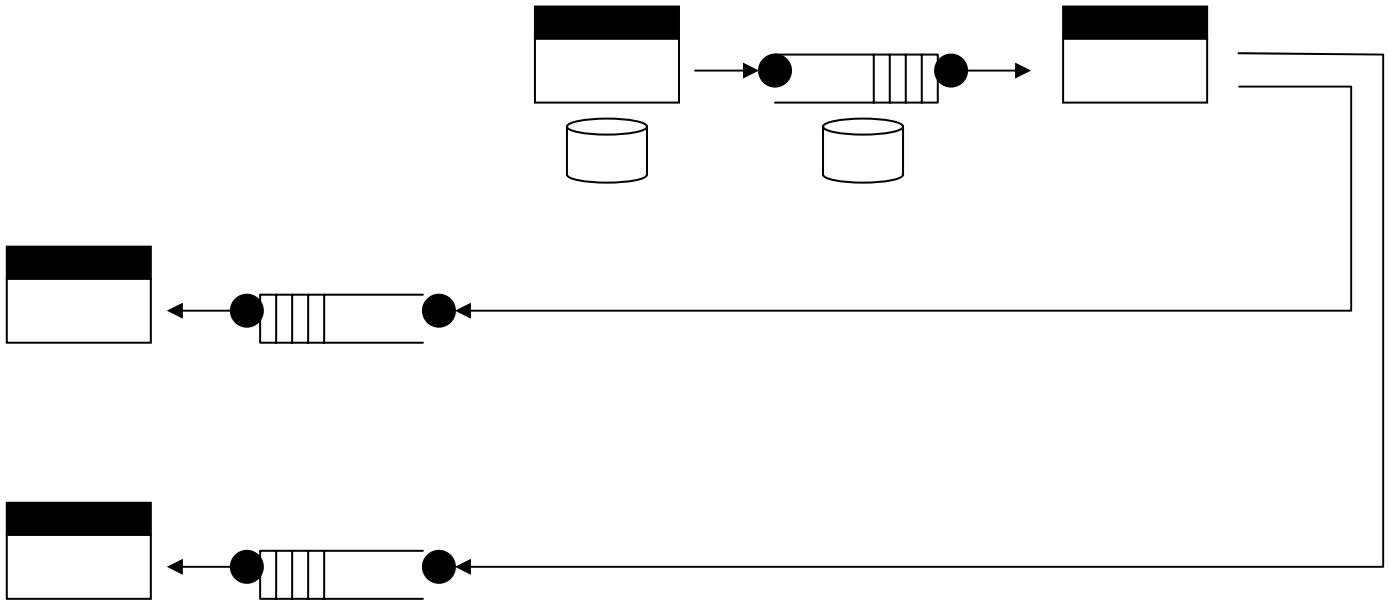

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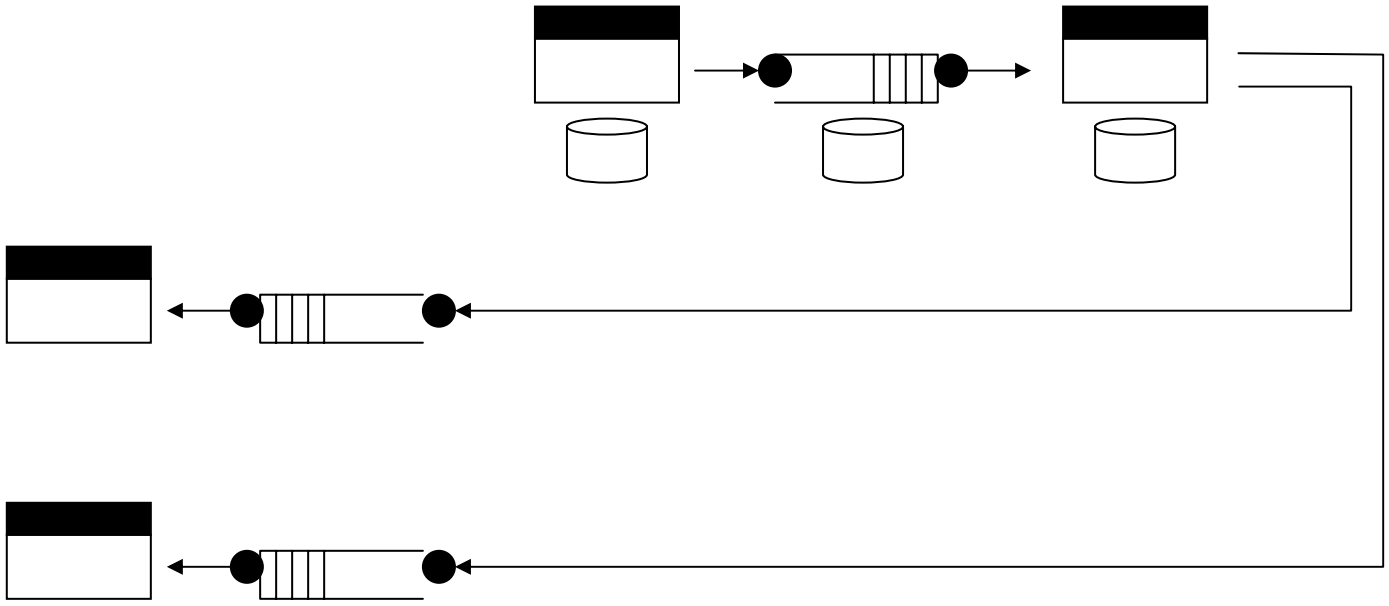

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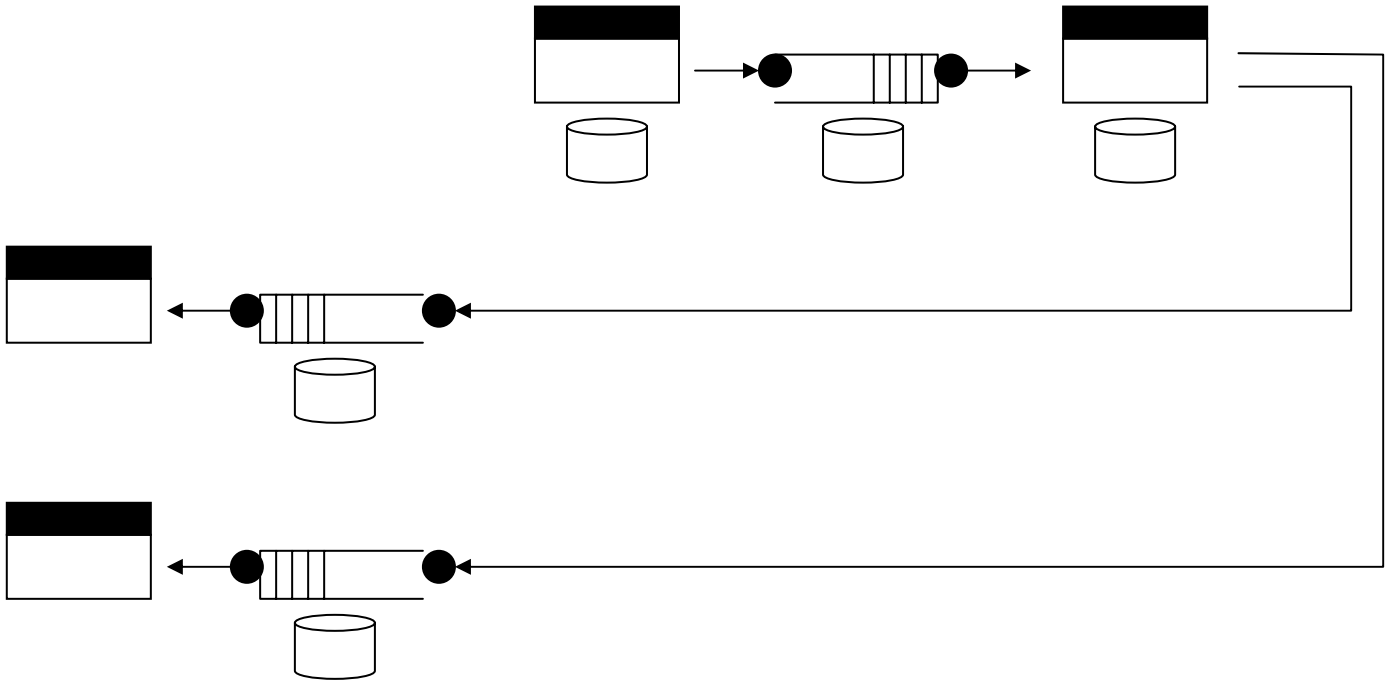

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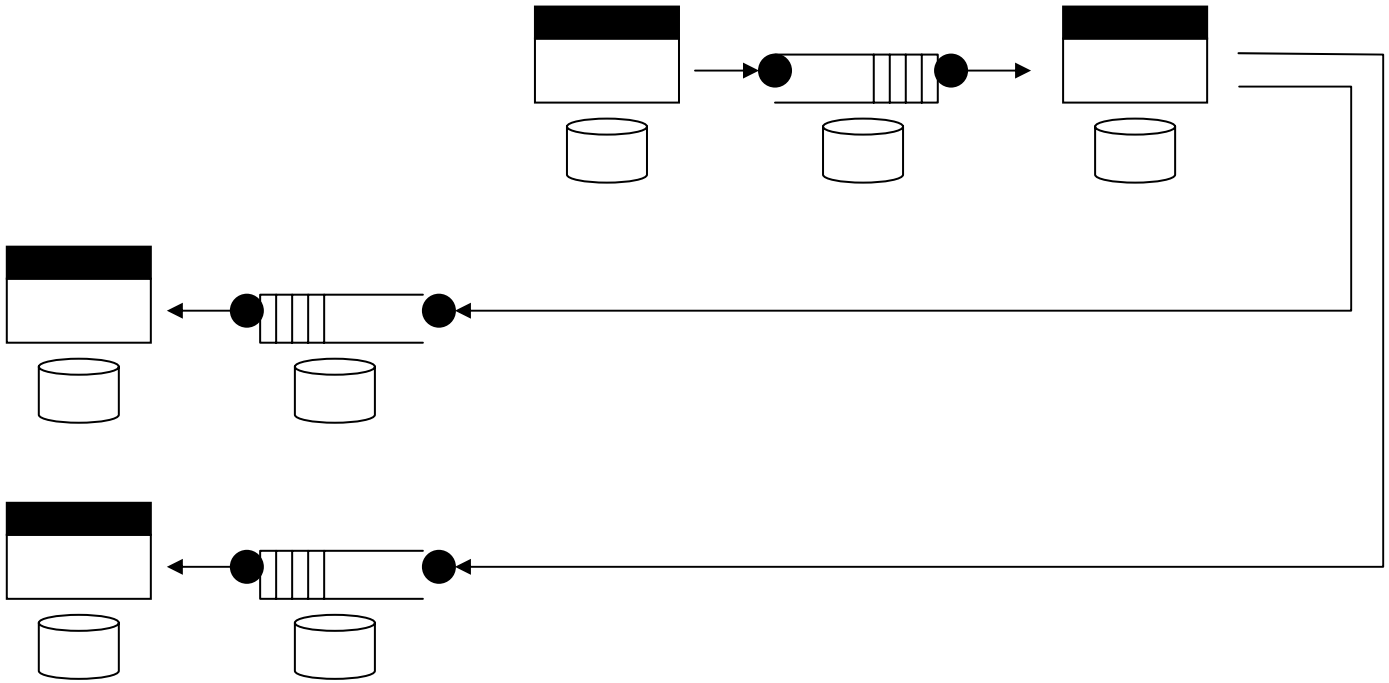

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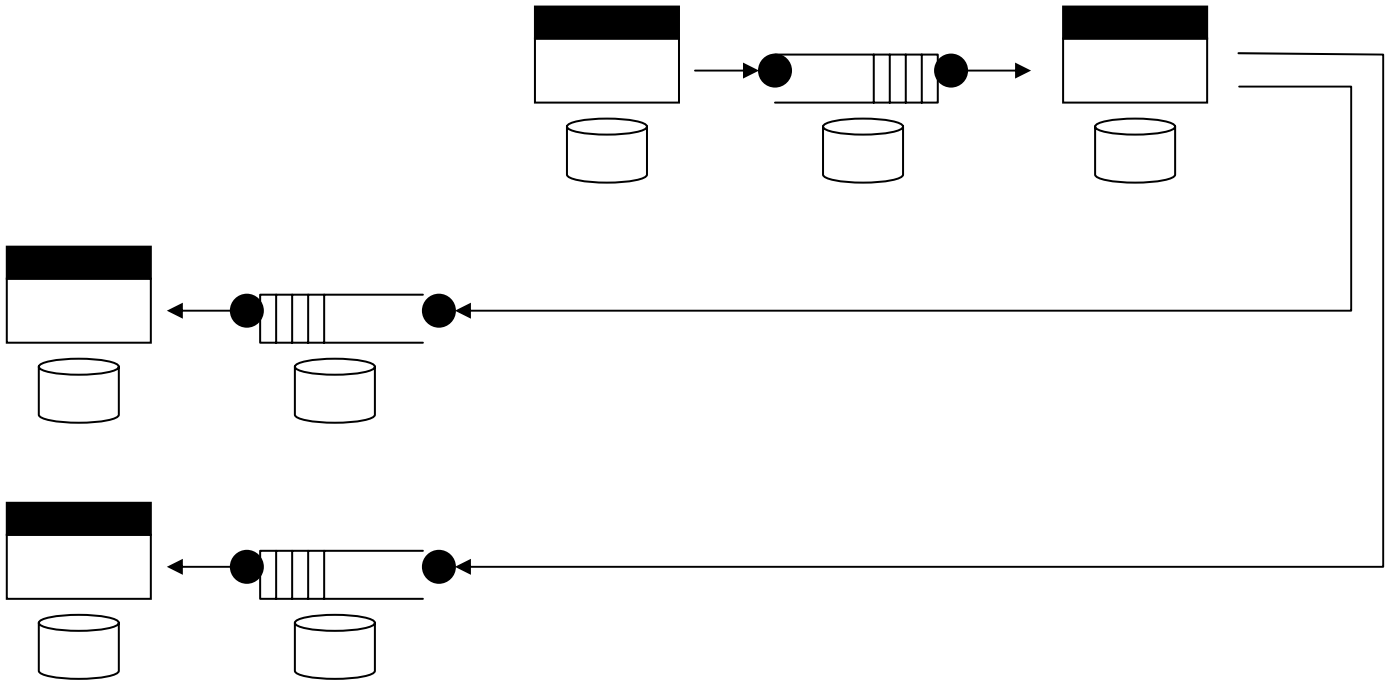

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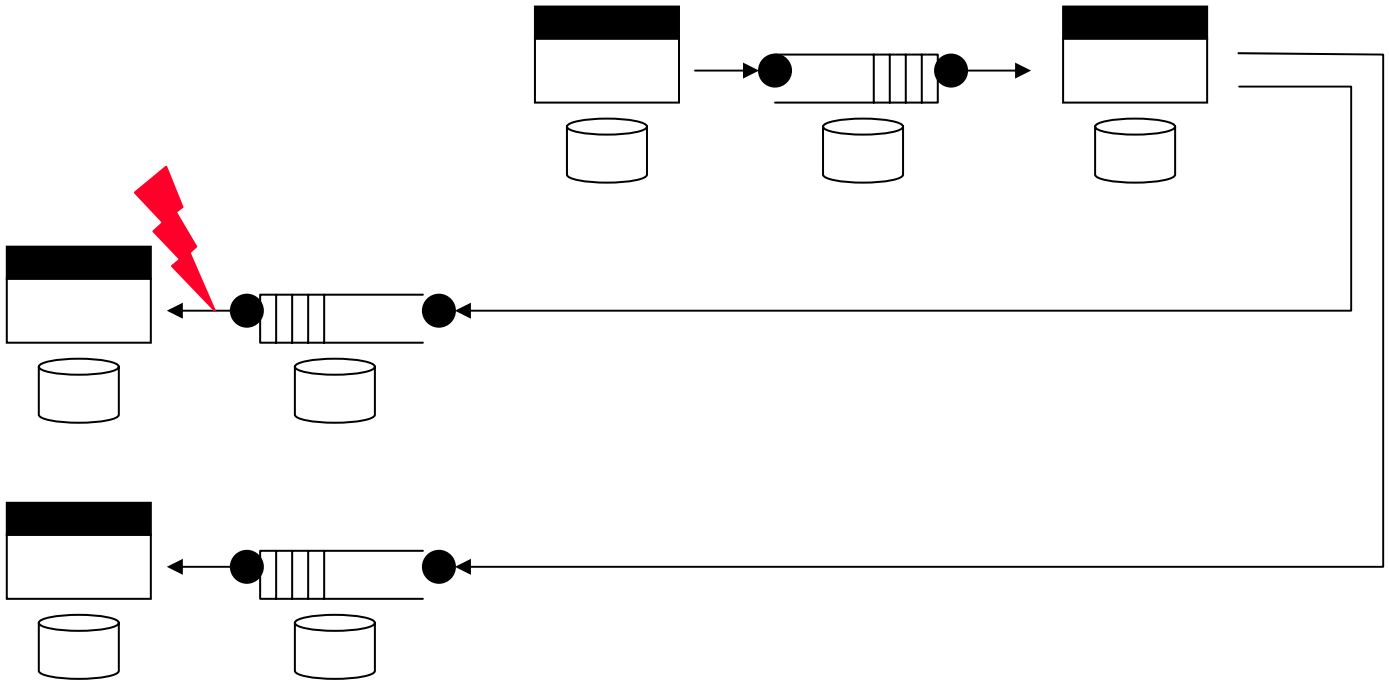

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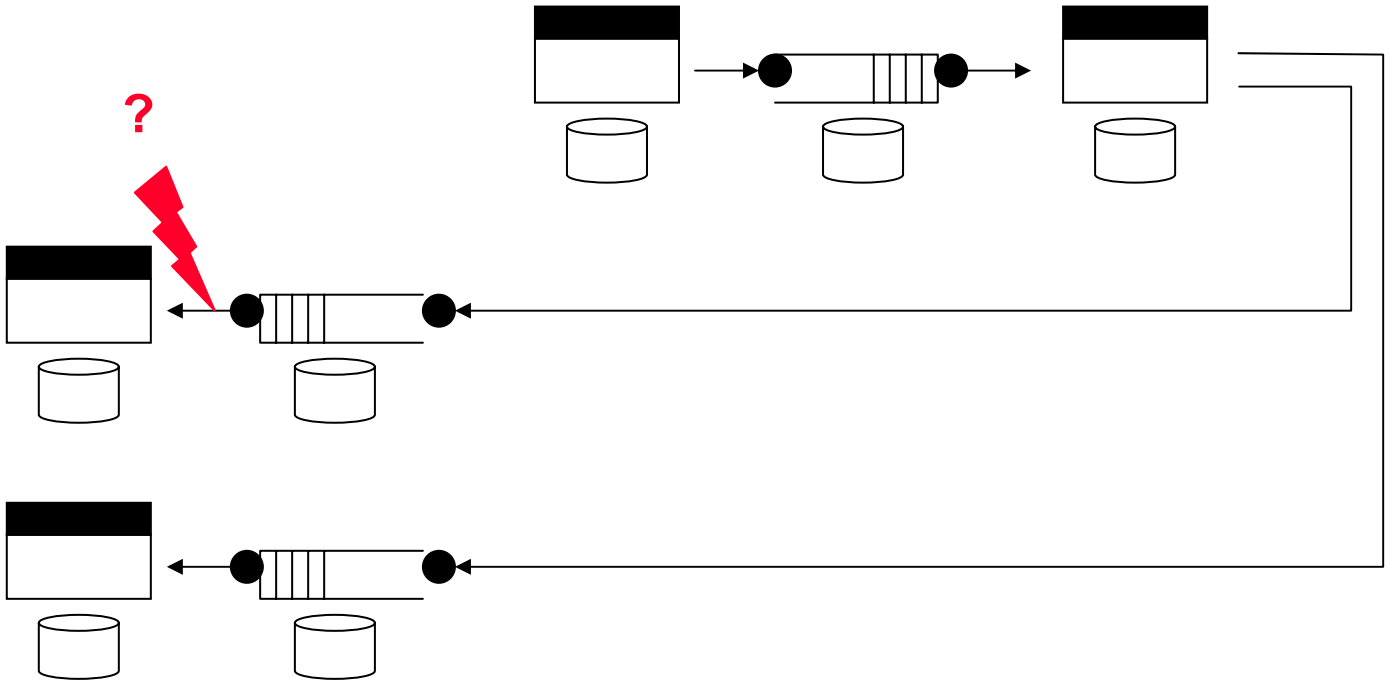

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  - …

Switch Perspective

- From
  - SOA view
  - = Computer science

Switch Perspective

- From
  - SOA view
  - = Computer science
- to
  - IT view
  - = Information technology (i.e., implementation of business functionality)

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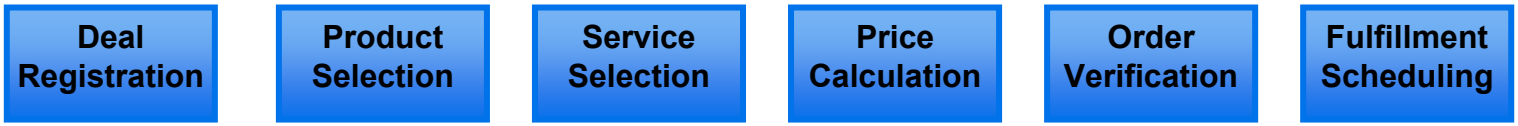
- Good news: does not make difference to following discussion
- Implementation!
  - Implicit by
    - Data attribute states
    - Messages in specific queues
    - Knowledge of people
    - ‘Process’ in packaged application systems

(Simplified) Business Process Example



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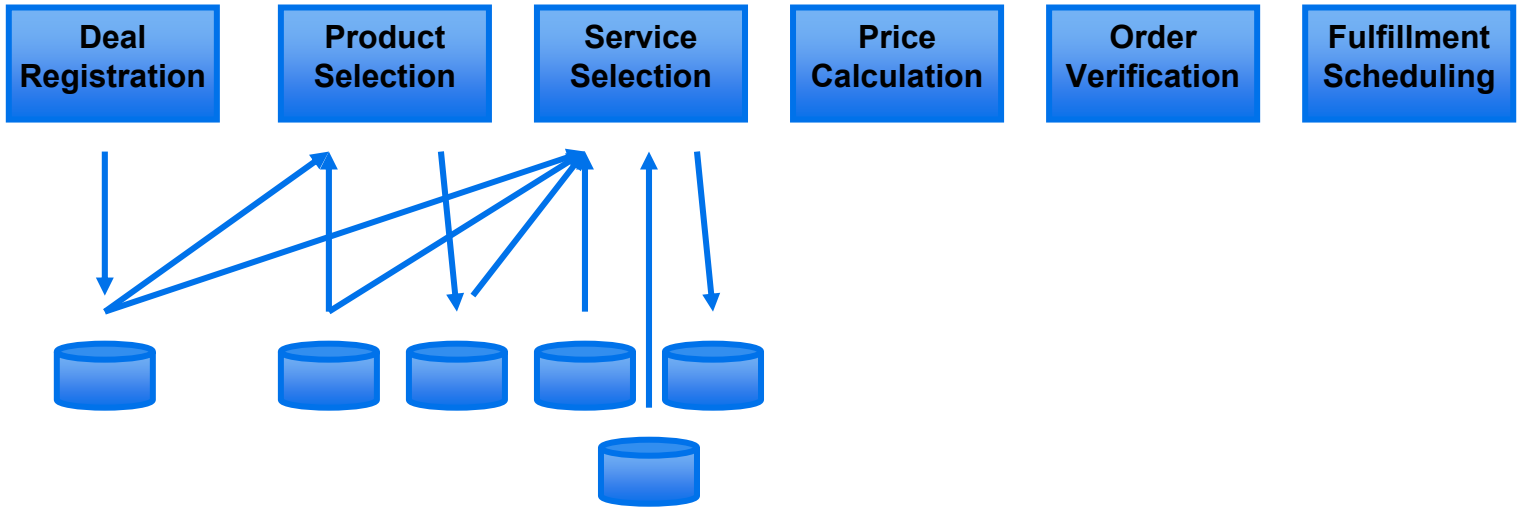

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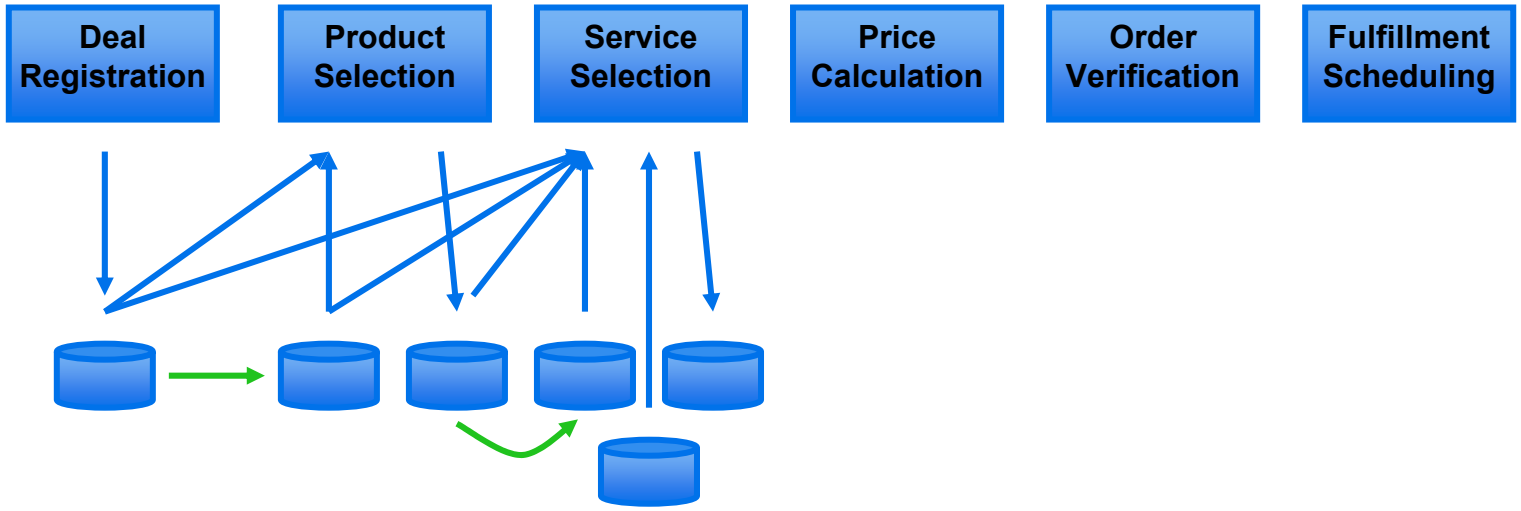

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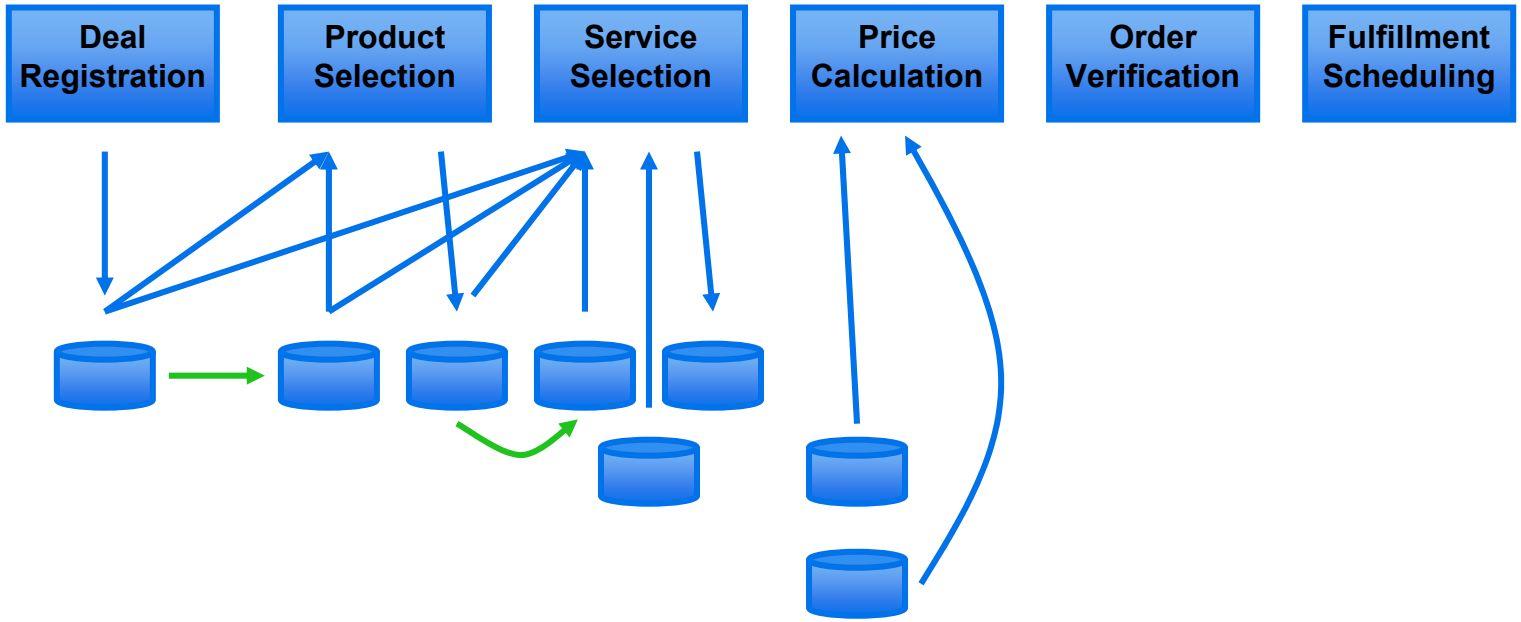

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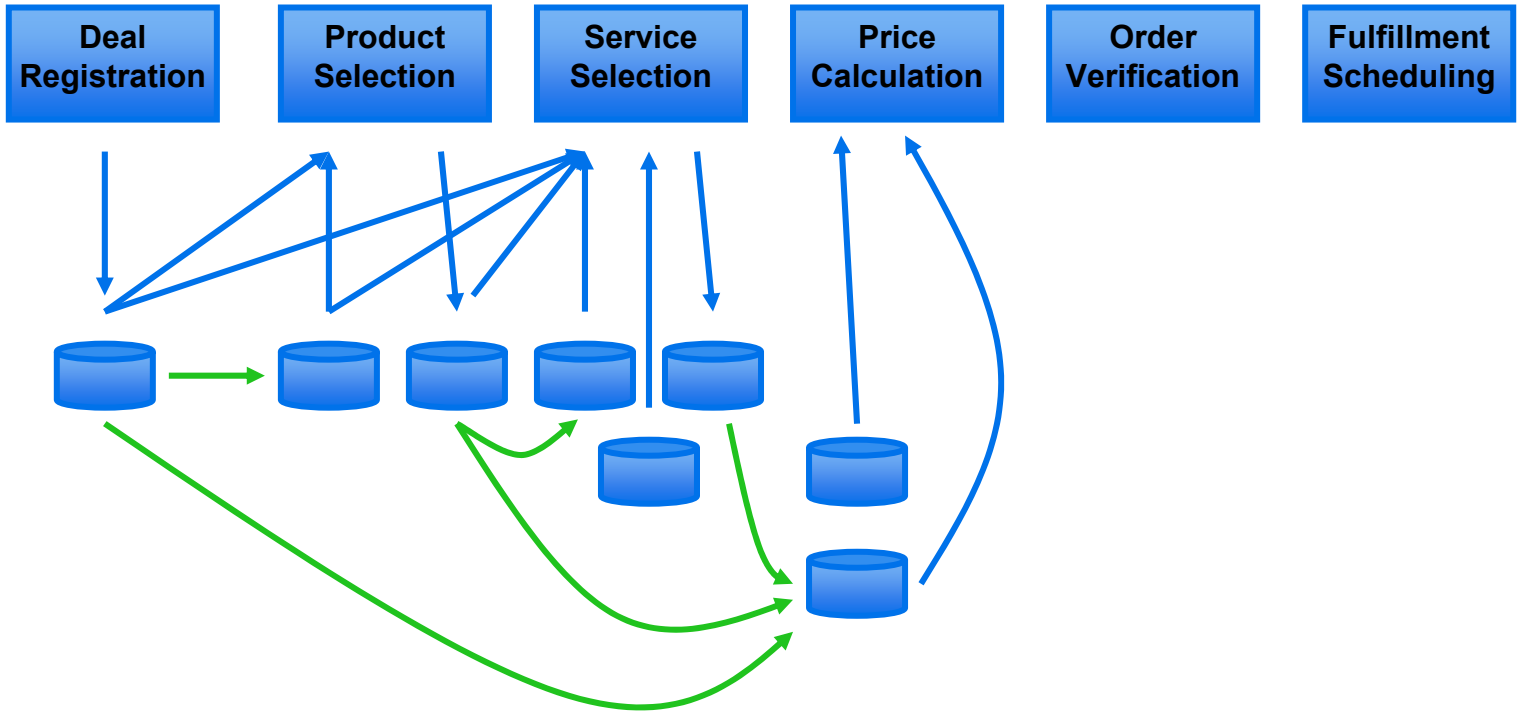

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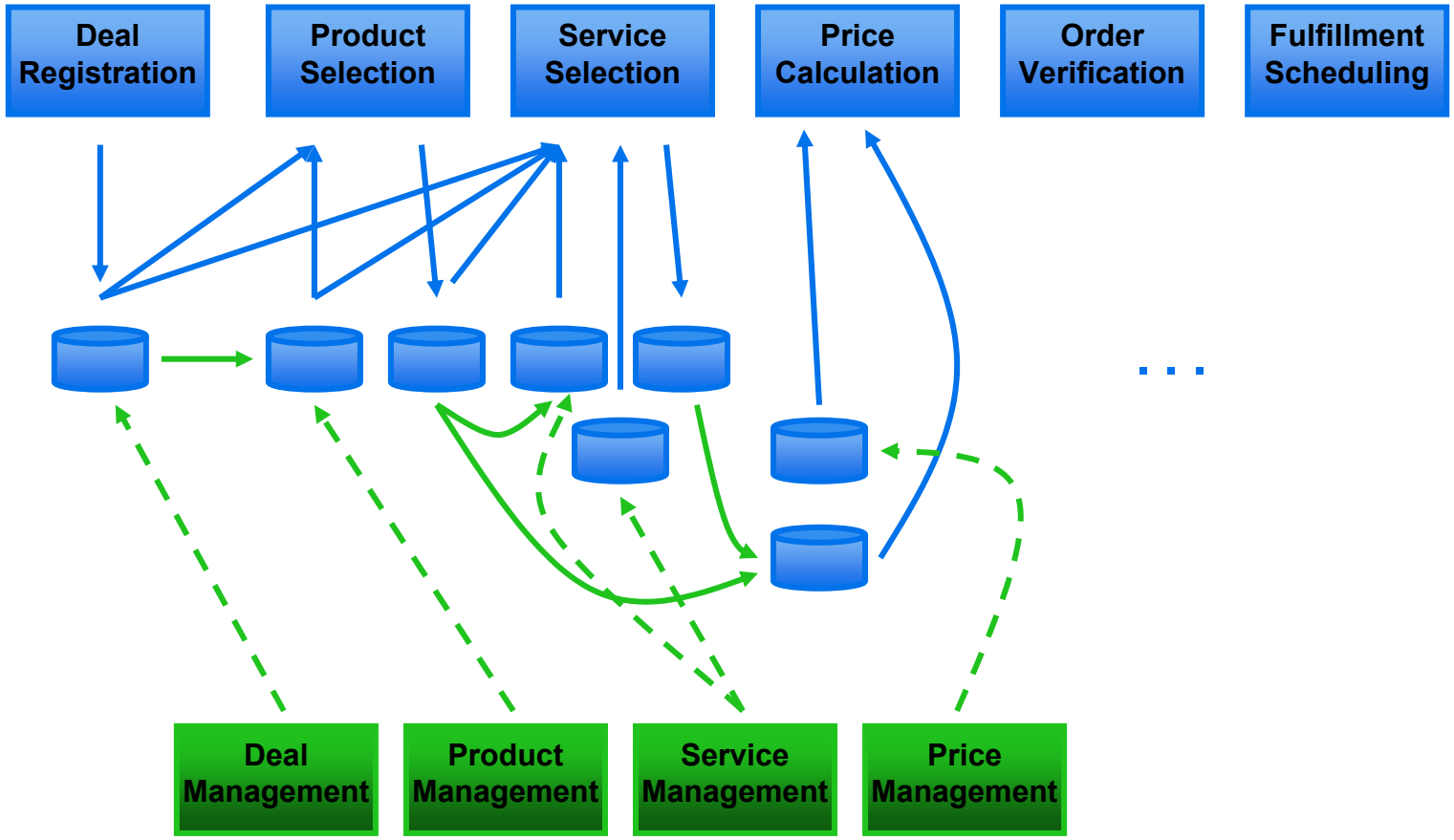

Big Question

- How to implement business functionality with a SOA?

Switch Perspective

- From
  - IT view
  - = Information technology (i.e., implementation of business functionality)

Switch Perspective

- From
  - IT view
  - = Information technology (i.e., implementation of business functionality)
- to
  - Architecture view
  - = System Architecture (i.e., complex system abstractions)

Common Architecture Patterns

- UI read
  - Data in heterogeneous sources

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- UI read
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- UI write
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- Packaged application system access
  - Remote access
  - Data flow/replication/master-slave within application systems

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- Concurrent data management
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- Concurrent processes
  - Creation, update, deletion of sets of complex data objects
- Dependencies
  - E. g., do not allow process until data is in a specific state

One SOA Approach Revisited

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- UI write
- Automated read / write
- Task and data (by value) flow
- Task and data (by reference) flow
- Data flow
- Data replication
- Data master-slave
- Packaged application system access
- Concurrent data management
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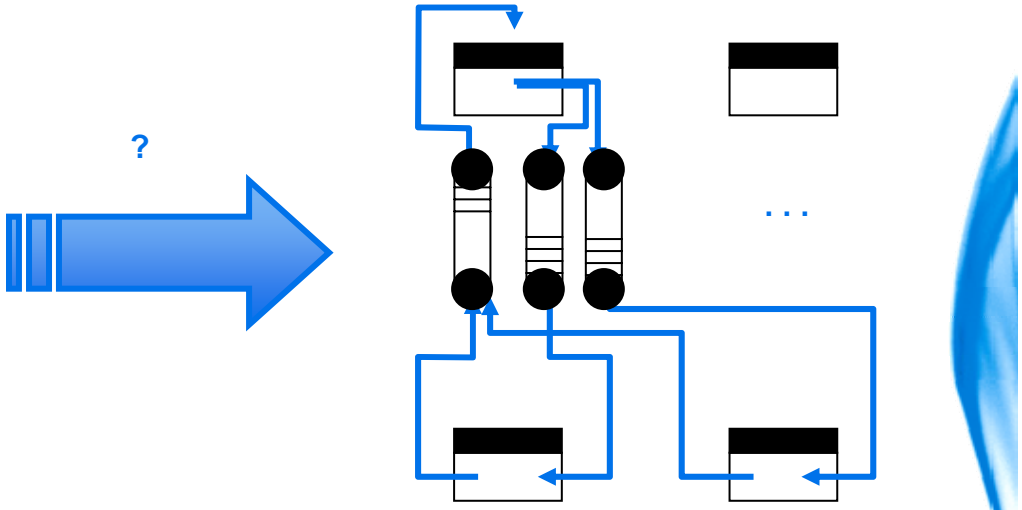

bea
Think liquid.

What's Wrong?

Horizontal Abstraction

- Computer science view
  - Layered architecture
  - Abstraction of invocation infrastructure and functionality

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  - Layered architecture
  - Abstraction of invocation infrastructure and functionality
- The message-based approach to SOA tries to provide a single abstraction to all architecture patterns
  - SX, S, M, L, XL, XXL

Horizontal Abstraction

- Computer science view
  - Layered architecture
  - Abstraction of invocation infrastructure and functionality
- The message-based approach to SOA tries to provide a single abstraction to all architecture patterns
  - SX, S, M, L, XL, XXL
  - Uniformity
    - (Comfortable and convenient)

Functionality Abstraction

- Needed:

Functionality Abstraction

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- Building blocks that implement higher-level functionality supporting architecture patterns

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Functionality Abstraction

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- Building blocks that implement higher-level functionality supporting architecture patterns
- Building blocks that implement appropriate (horizontal) layering for the architecture pattern they implement
- Building blocks that have (vertical) layering so that they can combined for business process implementation

Functionality Abstraction

Functionality Abstraction

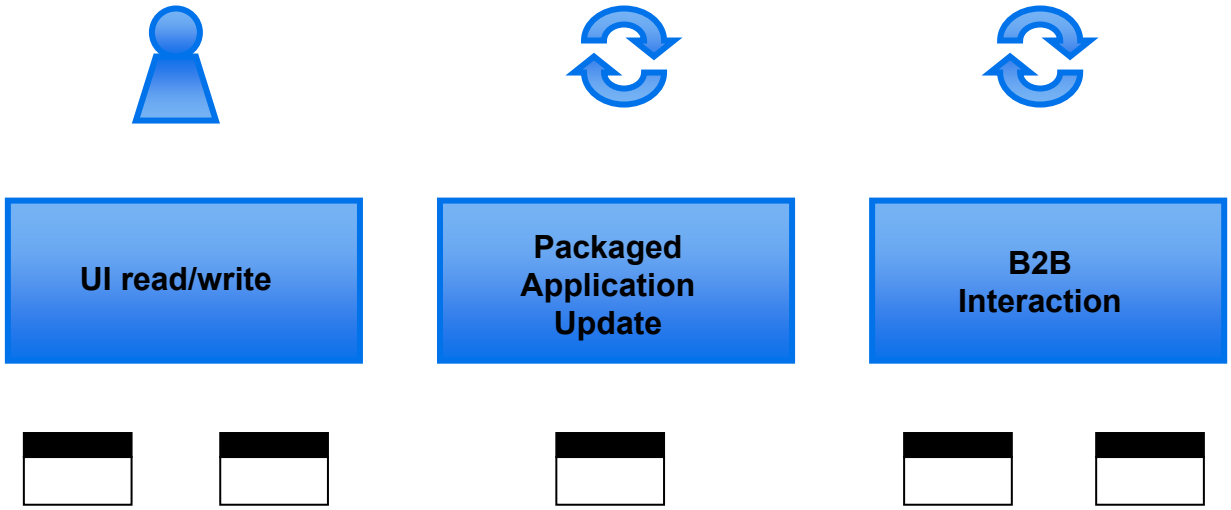
UI read/write

Packaged Application Update

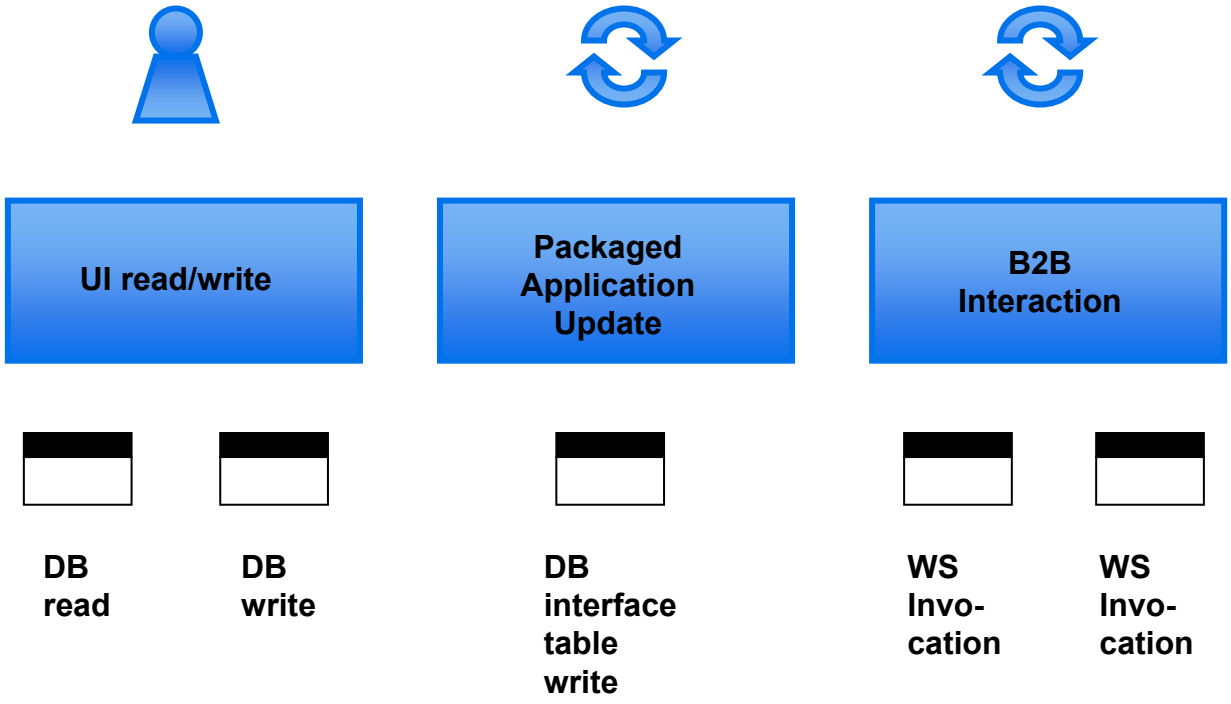
B2B Interaction

bea Think liquid.

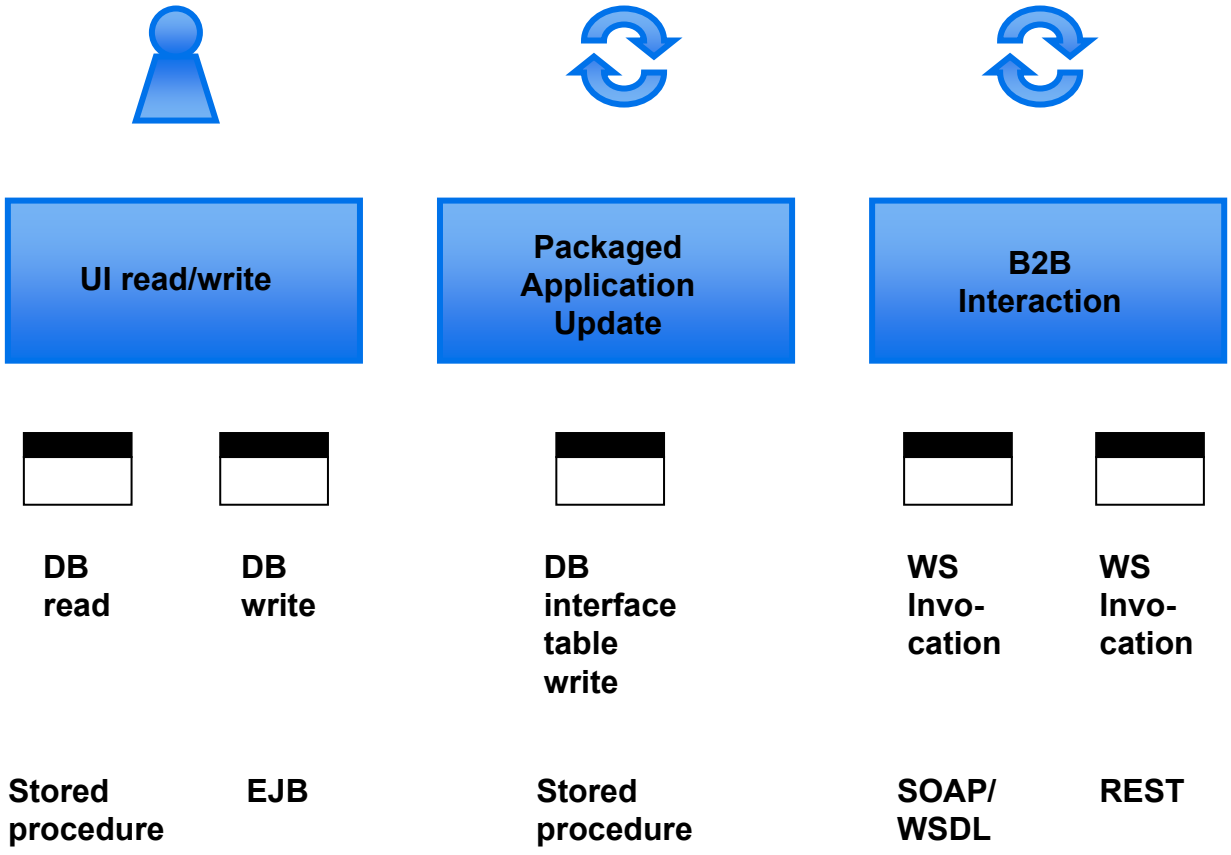
Functionality Abstraction



Functionality Abstraction



Functionality Abstraction

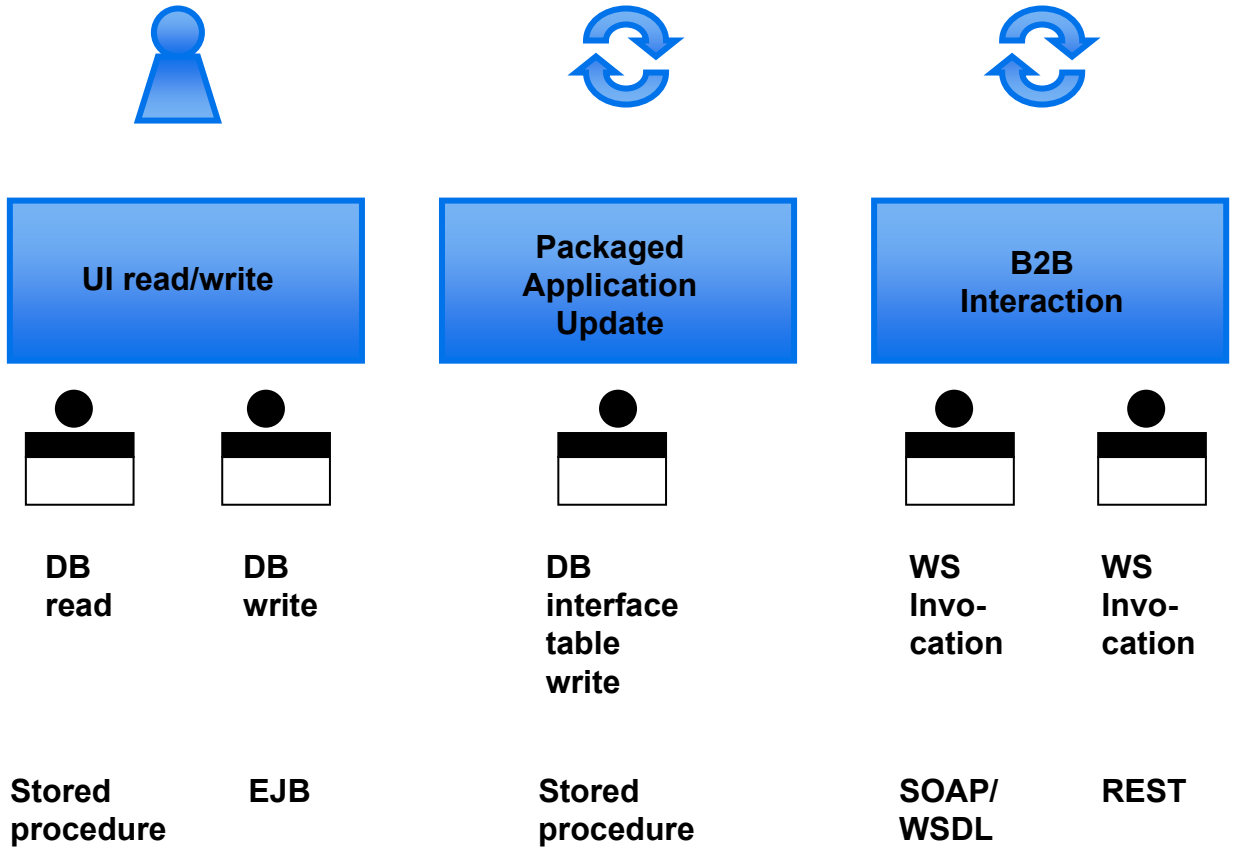


Functionality Abstraction

Definition						
	DB read	DB write	DB interface table write	WS Invo-cation	WS Invo-cation	
Implementa-tion	Stored procedure	EJB	Stored procedure	SOAP/ WSDL	REST	

bea Think liquid.™

Functionality Abstraction



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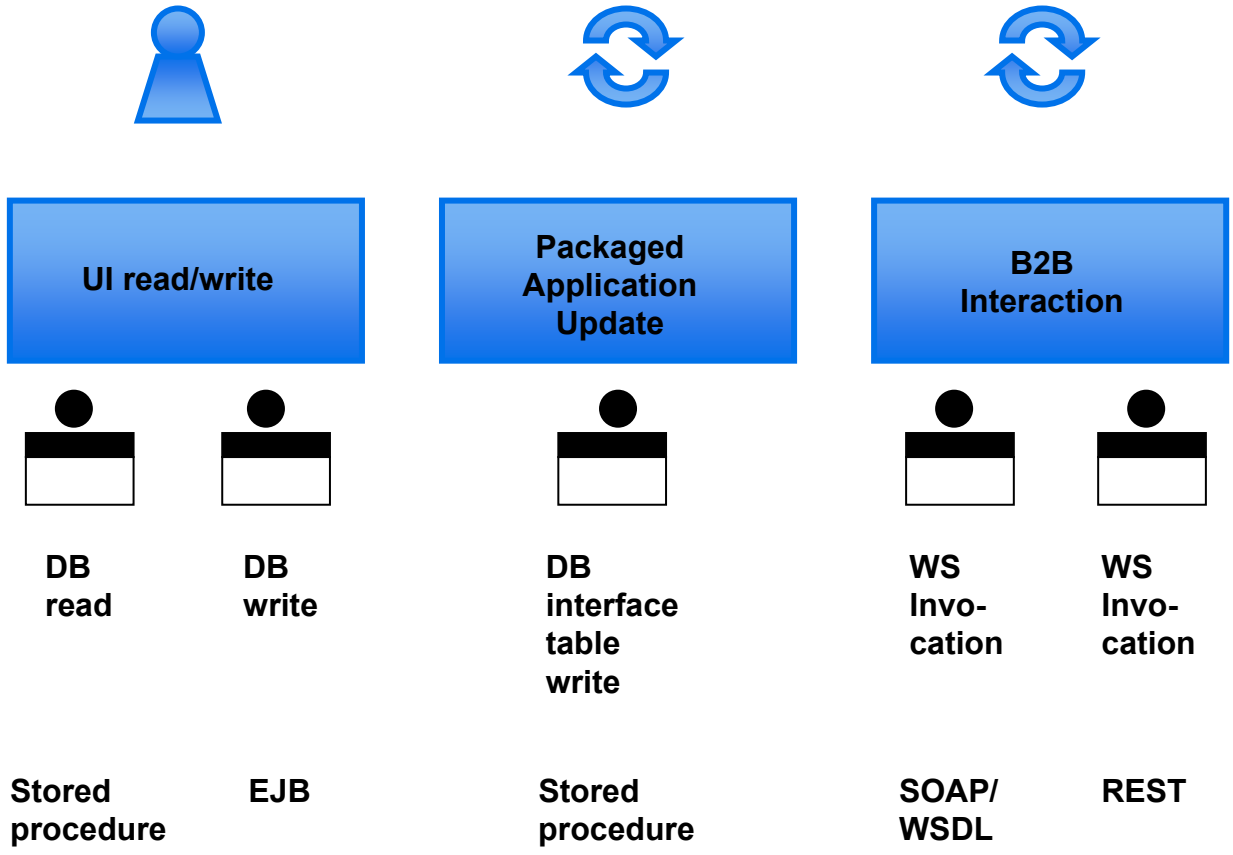
Functionality Abstraction



bea Think liquid.

Functionality Abstraction

	UI read/write		Packaged Application Update	B2B Interaction	
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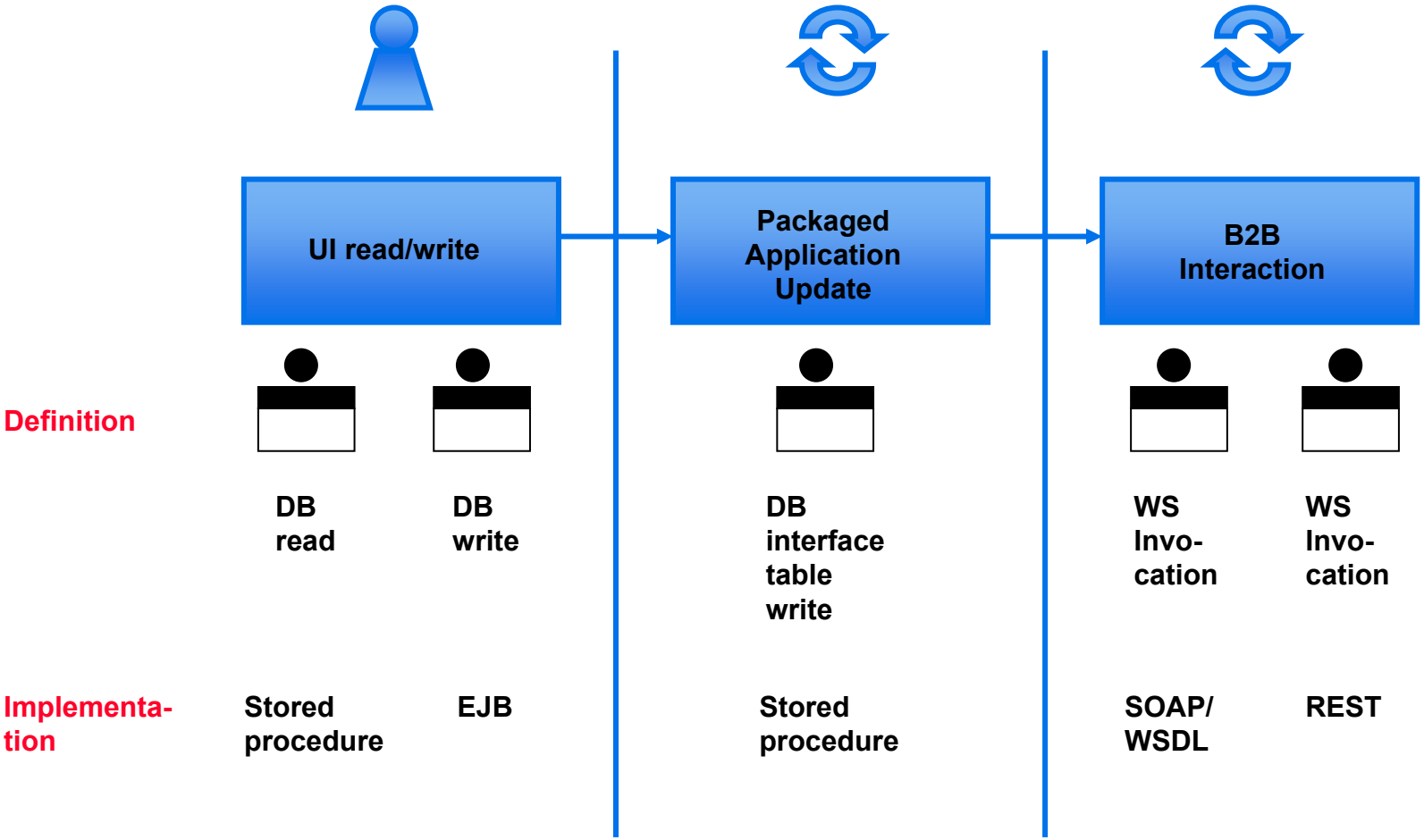
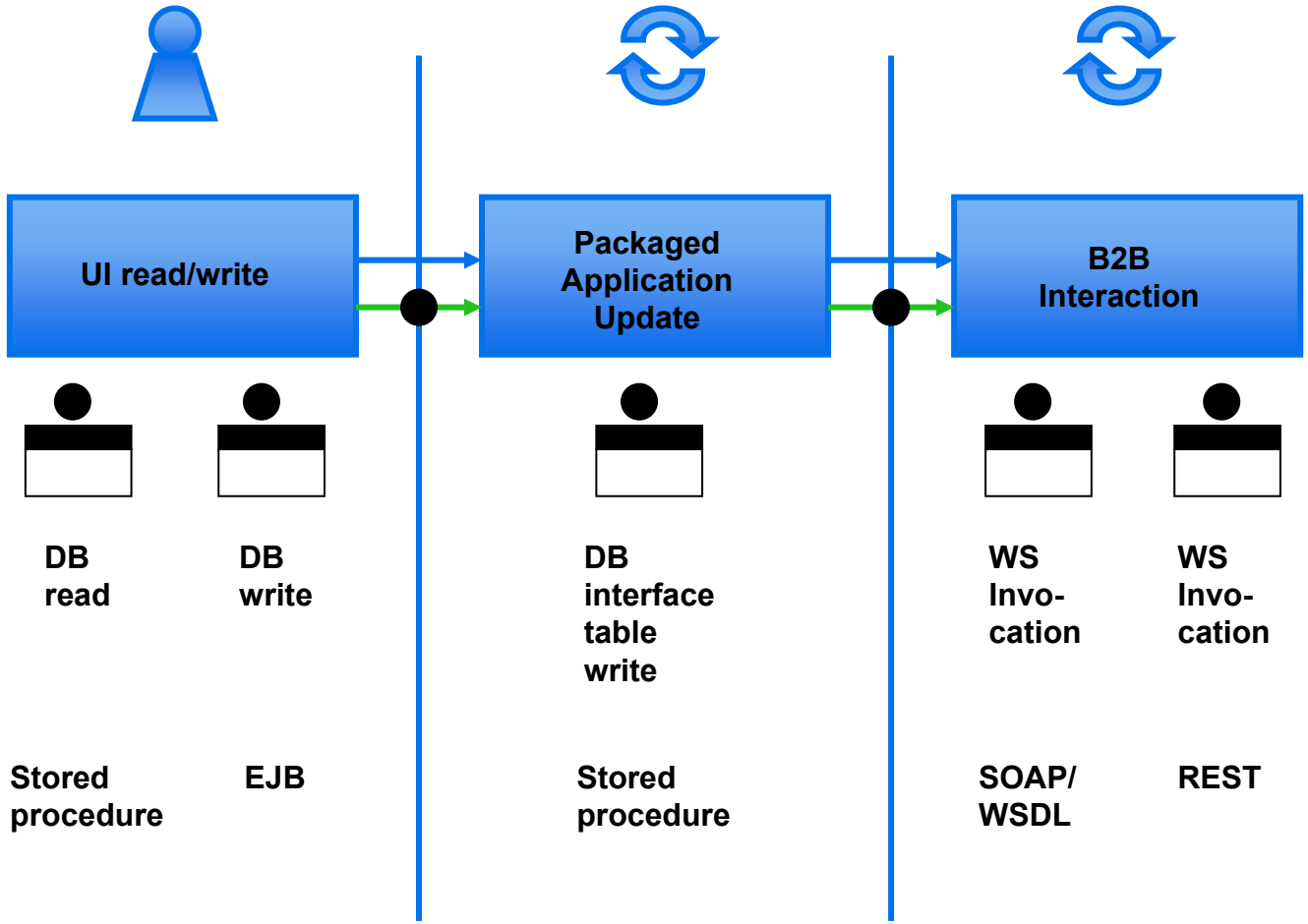
Functionality Abstraction



Functionality Abstraction



SOA vs. SOI

- “A” Architecture
- Architecture
  - Building blocks to satisfy architecture patterns
  - Independent of implementation (OASIS SOA RM)

SOA vs. SOI

- “A” Architecture, “I” Implementation
- Architecture
  - Building blocks to satisfy architecture patterns
  - Independent of implementation (OASIS SOA RM)
- Implementation
  - Building blocks to address architecture patterns and computer science abstractions
  - Building blocks have two interfaces
    - Horizontal one into infrastructure
    - Vertical one to each other

Conclusions

- SOA
  - One size fits nobody
  - Single horizontal abstraction too simplified

Conclusions

- SOA
  - One size fits nobody
  - Single horizontal abstraction too simplified
- SOA with functionality abstraction
  - Many sizes fit 80%
  - Specific building blocks target specific functionality