



# Best Practices in Event-Driven Service-Oriented Architecture

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## Agenda

- ✓ What are Service-Oriented Architecture (SOA) and Event-Driven Architecture (EDA)?
- ✓ Are SOA & EDA really different, or two sides of same coin?
- ✓ A discussion of coupling: loose, tight, and decoupled
- ✓ Invocation mechanisms in SOA
- ✓ Lightweight Events in SOA

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## What are Events?

- *Ordinary event* – something that happens in the real world
- *Ordinary business event* – a meaningful change in the state of the enterprise or of something relevant to the enterprise
  - Customer order, the arrival of a shipment, etc.
- *Software event* – a record of an ordinary event in software.
  - Data that describe the ordinary event, typically in the form of a message

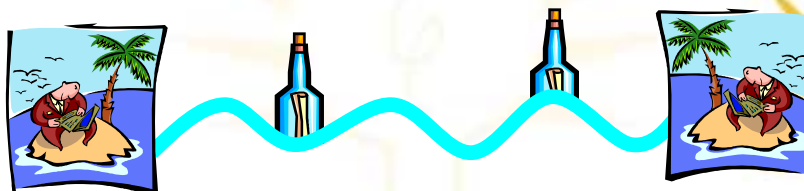


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## What is Event-Driven Architecture?

- EDA is an approach to distributed computing where events trigger asynchronous messages that are then sent between independent software components that need not have any information about each other.



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## What are Services?

- Interfaces to software functionality that communicate via messages
- Web Services are *Standards-based* interfaces to software functionality



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## What is Service-Oriented Architecture?

- Access software via discoverable, *loosely coupled* Services
- Users can compose Services into business processes that are also Services

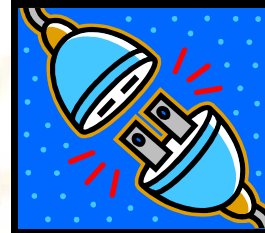


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## What about Coupling?

- *Coupling* – the level of common knowledge necessary in a distributed computing exchange
- *Tight coupling* – one participant must have detailed knowledge about the other participant
- *Full decoupling* – the two participants need have no knowledge about each other in order to interact
- *Loose coupling* – the two participants may have specific, limited knowledge about each other



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## Service Contracts & Loose Coupling

- *Service contract* – a document external to each participant that provides the information each participant needs to interact with the other
- *Web Services Description Language (WSDL)* – standard Service contract language



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## EDA & SOA: Really Different?

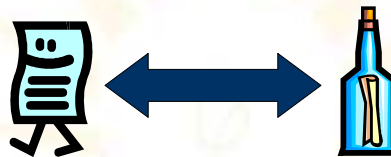
- Is EDA truly decoupled?
  - ✓ Key question: just what is loose coupling, anyway?
- Is SOA really client/server?
  - ✓ Key question: what invocation mechanisms are appropriate in SOA?

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## Loose Coupling: How Loose is Loose Enough?

- Loose coupling key to agility benefit of SOA
- Full decoupling actually a misnomer – there is always some information about events



- Events are “more loosely coupled than contracted Services”
- Metadata about events largely *ad hoc*

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## Events & Full Decoupling

- Publishers of events sort them into *topics*
  - Form of metadata
- Other metadata about event often available – size, format, protocol, etc.

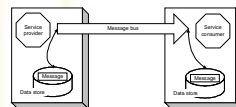
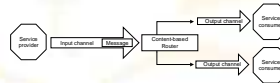
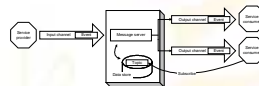
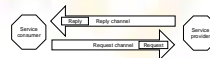


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## Invocation Mechanisms in SOA

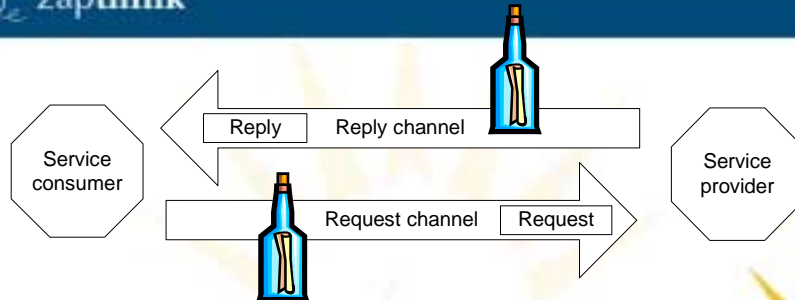
- SOA is more flexible than client/server – supports multiple invocation mechanisms
  - Request/Reply
  - Publish/Subscribe
  - Routed Events
  - Reliable Messaging



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## Request/Reply

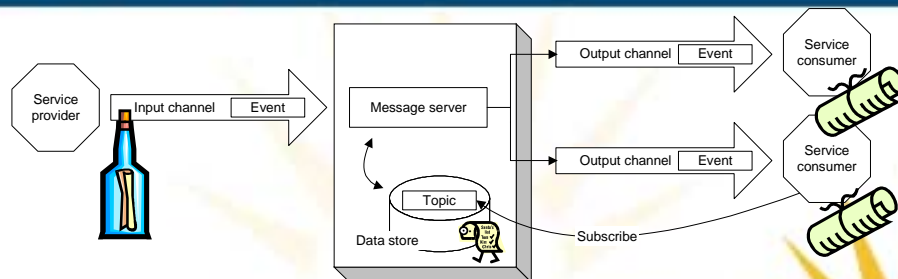


- Synchronous interaction made up of two asynchronous interactions

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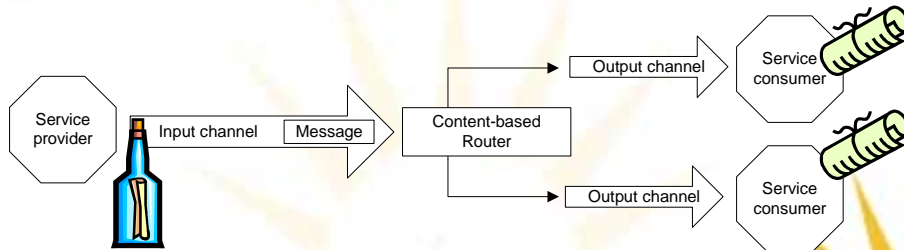
## Publish/Subscribe



- Consumers subscribe to topic
- Provider creates event
- Message server duplicates and routes events depending on subscription info

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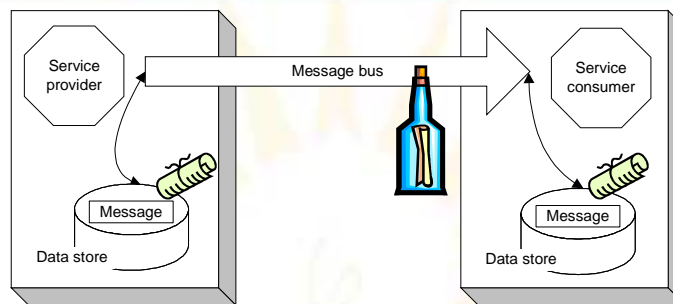
## Routed Events



- Role of integration broker – transforms, routes messages
- Looks inside message
- ESBs offer this functionality

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## Reliable Messaging



- Guarantees message delivery
- Can also guarantee messages sent only once, delivered in correct order

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## Lightweight Events in SOA

- When WSDL is overkill
  - Only binding information must be contracted
  - Ad hoc contract may be sufficient
  - Situations where some tight coupling is OK
- When HTTP and SSL are sufficient
  - Most Web Services over HTTP today
  - SSL provides confidentiality but not content-based security



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## Best Practice: Lightweight Tools for Lightweight Jobs

- Most SOAs today are not enterprise-wide
  - Pilots
  - Departmental scope
  - Midsize businesses
- Best practice: "the right tool for the job"



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## In Summary

- ✓ Coupling is a spectrum
- ✓ SOA requires loose coupling
- ✓ Events are typically loosely coupled
- ✓ SOA should be event-driven
- ✓ Lightweight SOA often sufficient

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