JavaOne℠

Sun's 2004 Worldwide Java Developer Conference℠

Architecting RouteOne CAS Using Java™ 2 Platform, Enterprise Edition (J2EE™), WS, EAI and SSO Technologies

Real-World Experience

java.sun.com/javaone/sf

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RouteOne LLC. + Sun Microsystems, Inc.
www.routeone.com

Sun microsystems

RouteOne℠ speed. access. simplicity.

Goal of This Talk

What you will learn

Lessons learnt from “real-world” experience in integrating enterprises with Patterns and Web Services

Agenda

Introduction

- Business Background, Architecture Overview

Security Architecture

J2EE™ Architecture

Web Services Architecture

EAI Architecture

Summary

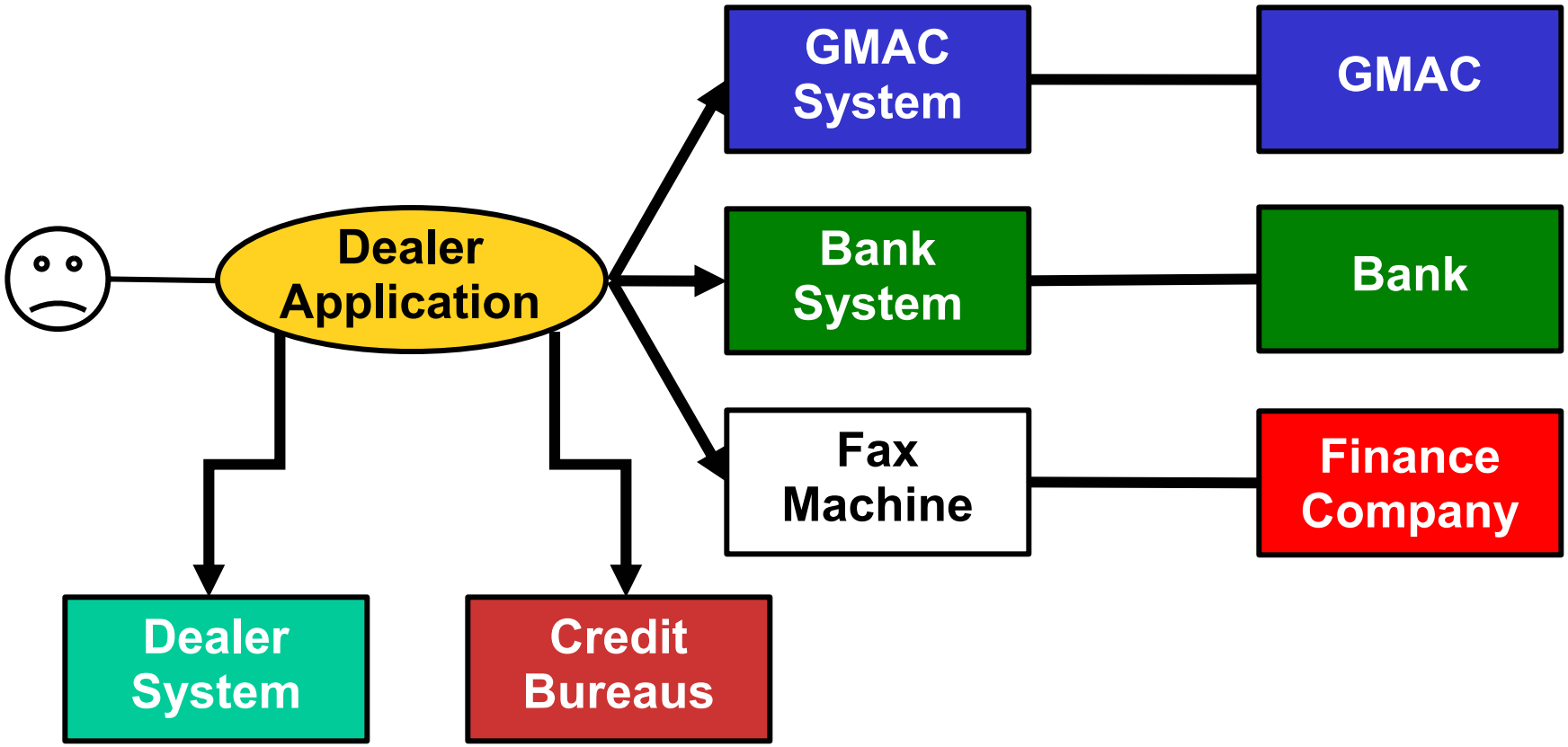
Introduction

Business Background

- RouteOne LLC
  - Automotive Credit Aggregation System
- Jointly owned by financial arms of:
  - DaimlerChrysler, Ford, General Motors, Toyota
  - “Captives”
- End users
  - Dealers, Finance & Insurance Managers (F&I)
- Business partners
  - Credit Bureaus, Finance Sources
- Technical partners
  - Sun, Cap Gemini, Covansys, IBM

Introduction

Replace this…



Introduction

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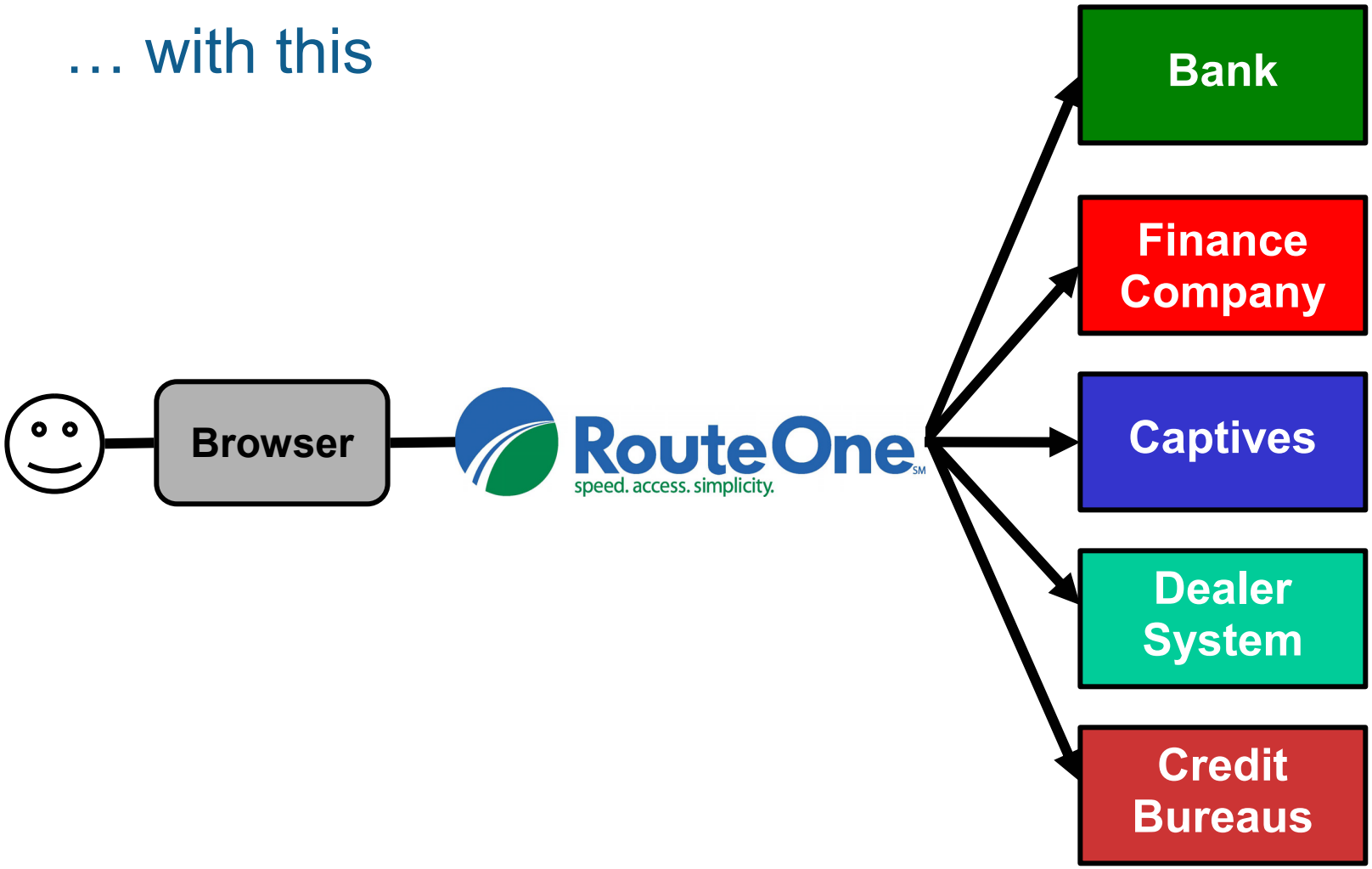


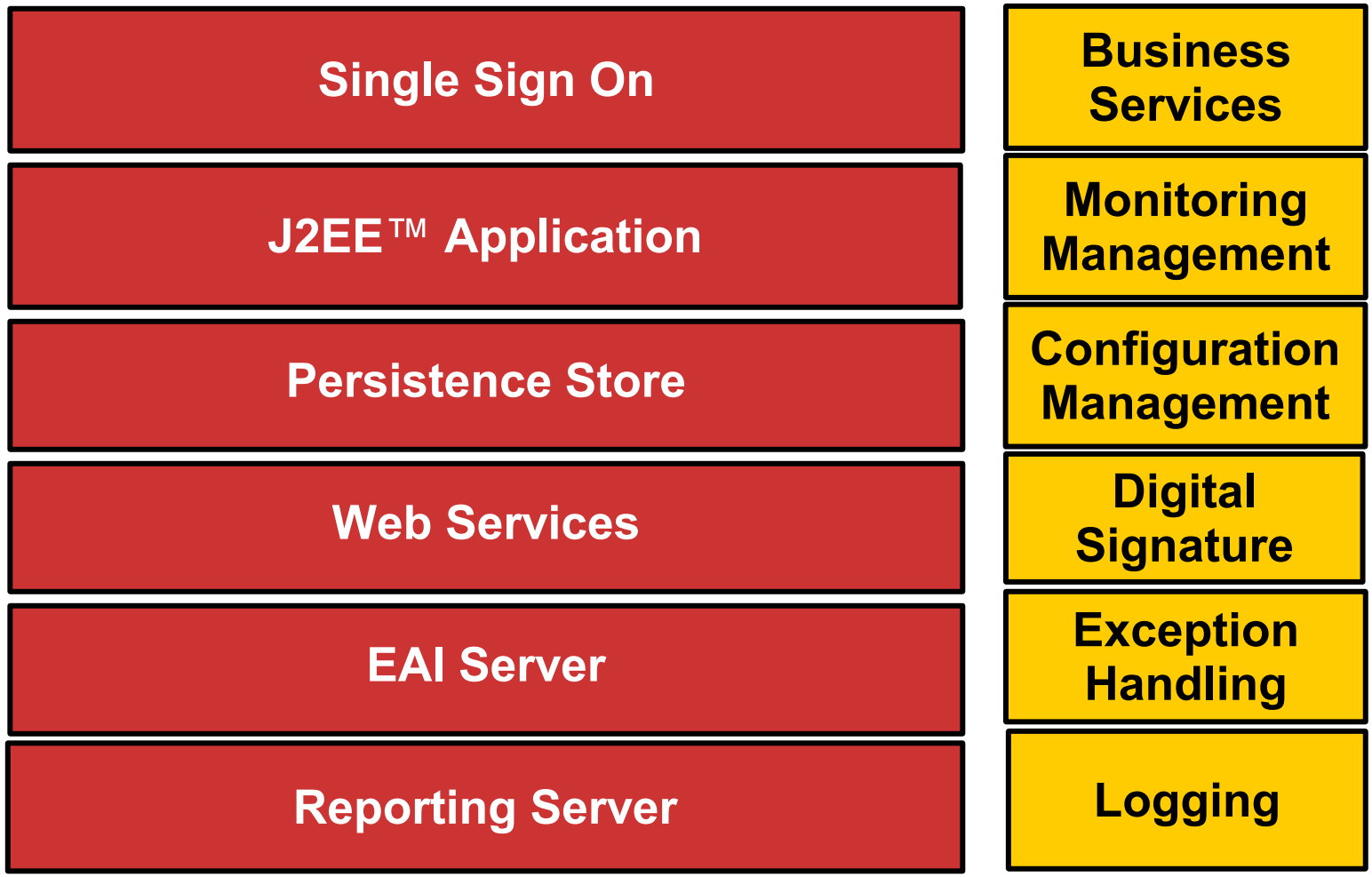
Introduction

Architecture: Forces

- Requires many services
  - Credit bureaus, vehicle information, account numbers
  - Web Services with SOA
- Integrate securely with different business processes
  - Single Sign On with SAML
  - Asynchronous Messaging with Web Services stack
  - XML-DSIG
- Integrate with different platforms
  - Open standards and open architecture

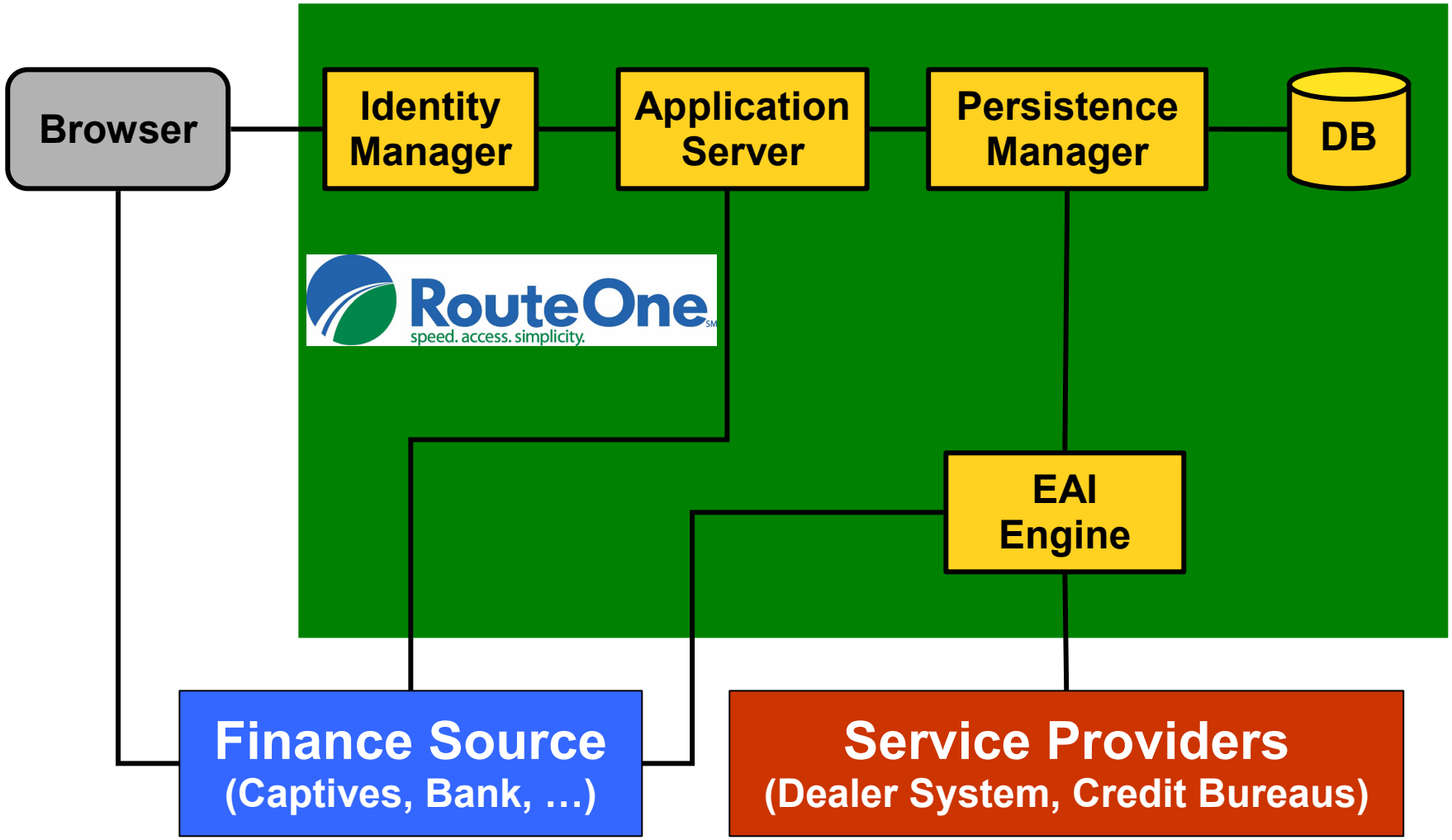
Introduction

Components and Services



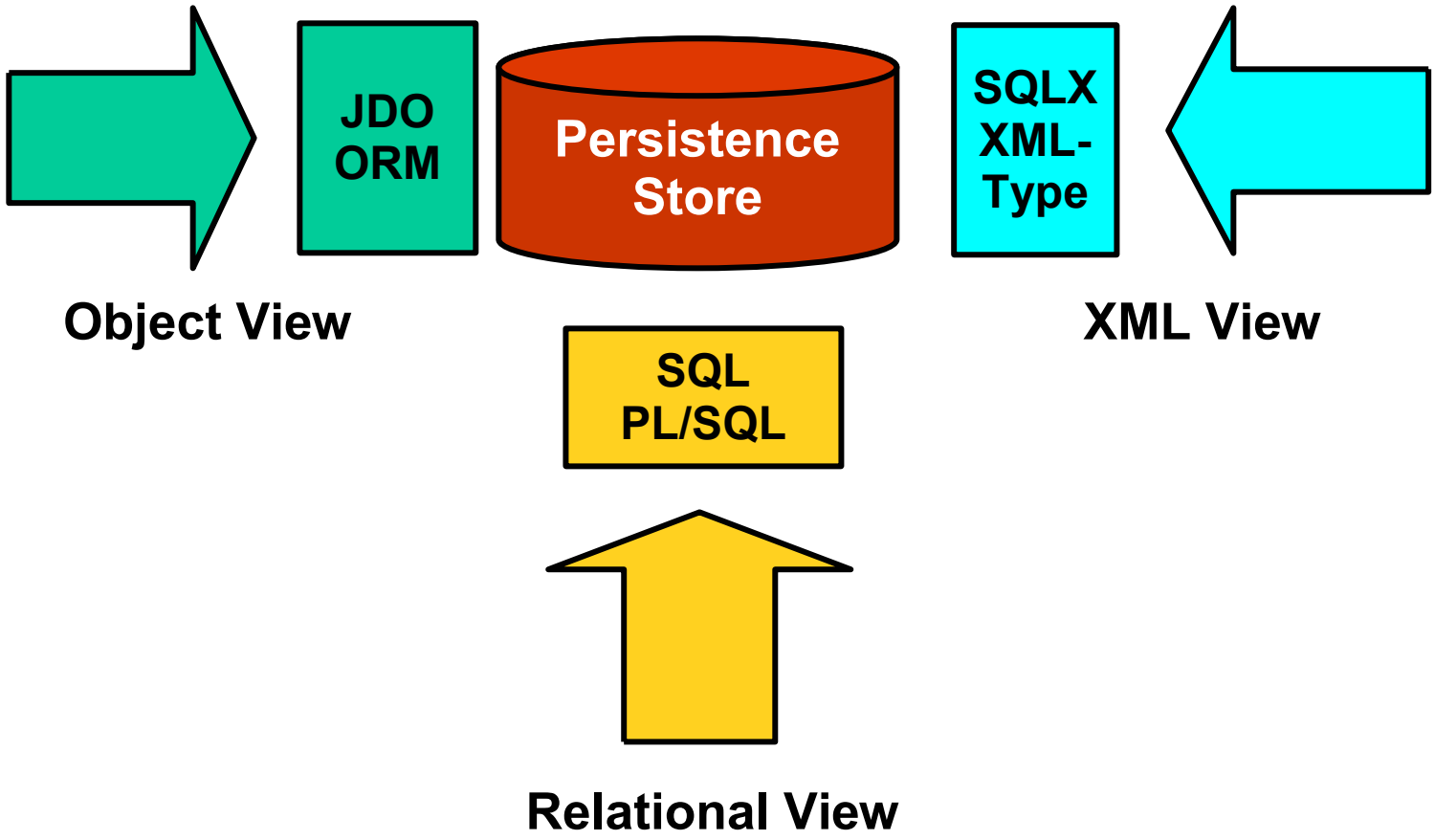
Introduction

Application Flow



Introduction

Persistence Views



Agenda

Introduction

Security Architecture

- SAML, Single Sign On, Digital Signature

J2EE Architecture

Web Services Architecture

EAI Architecture

Summary

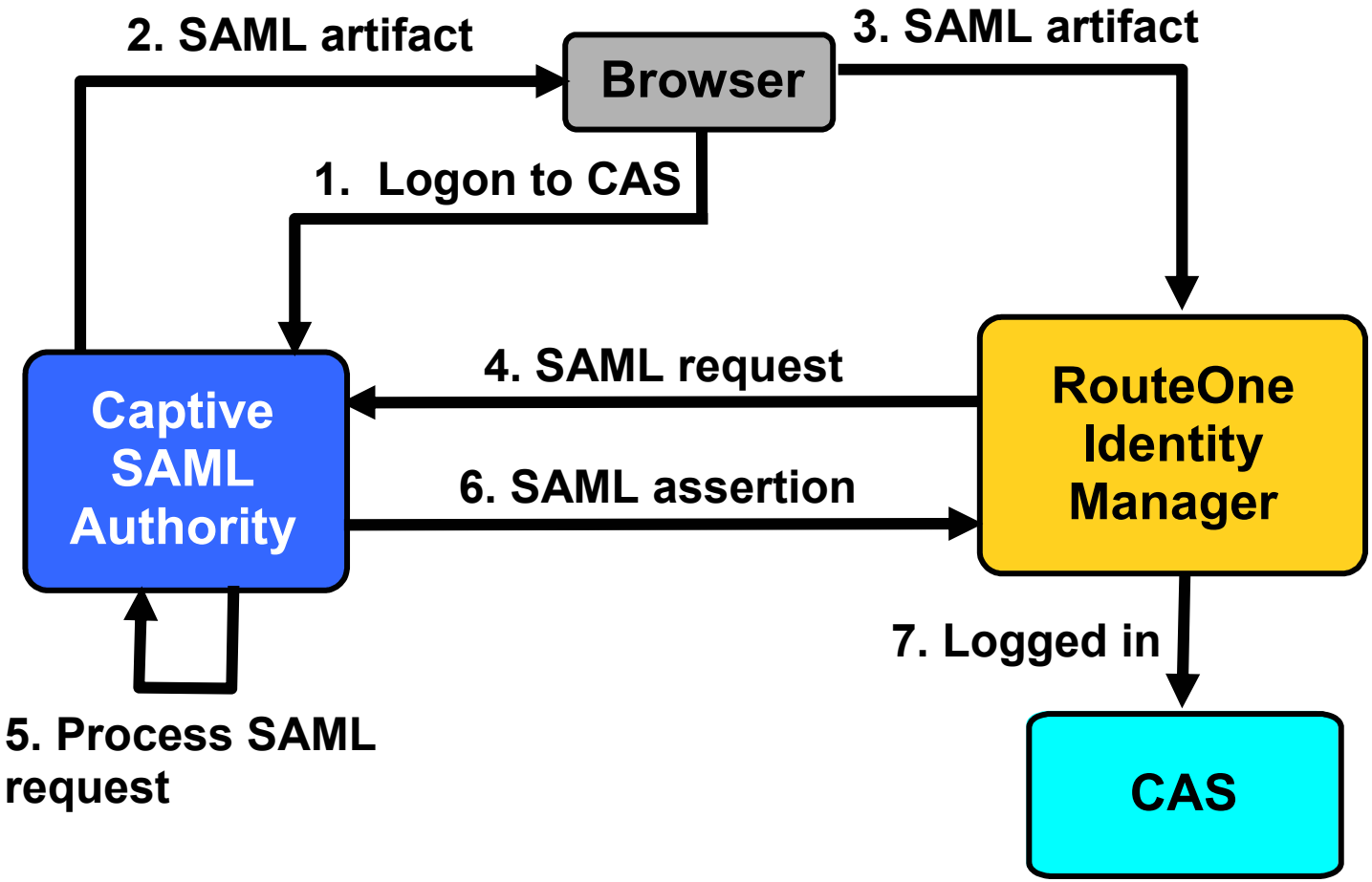
Security Architecture

SAML Primer

- Security Assertion Markup Language
- OASIS standard
- XML framework for exchanging User Credentials
- Basis for the Liberty Alliance Project
- Supported by many vendors and products
- Standard SSO Profiles and Bindings
  - Browser Artifact Profile, Browser POST Profile

Security Architecture

Single Sign On



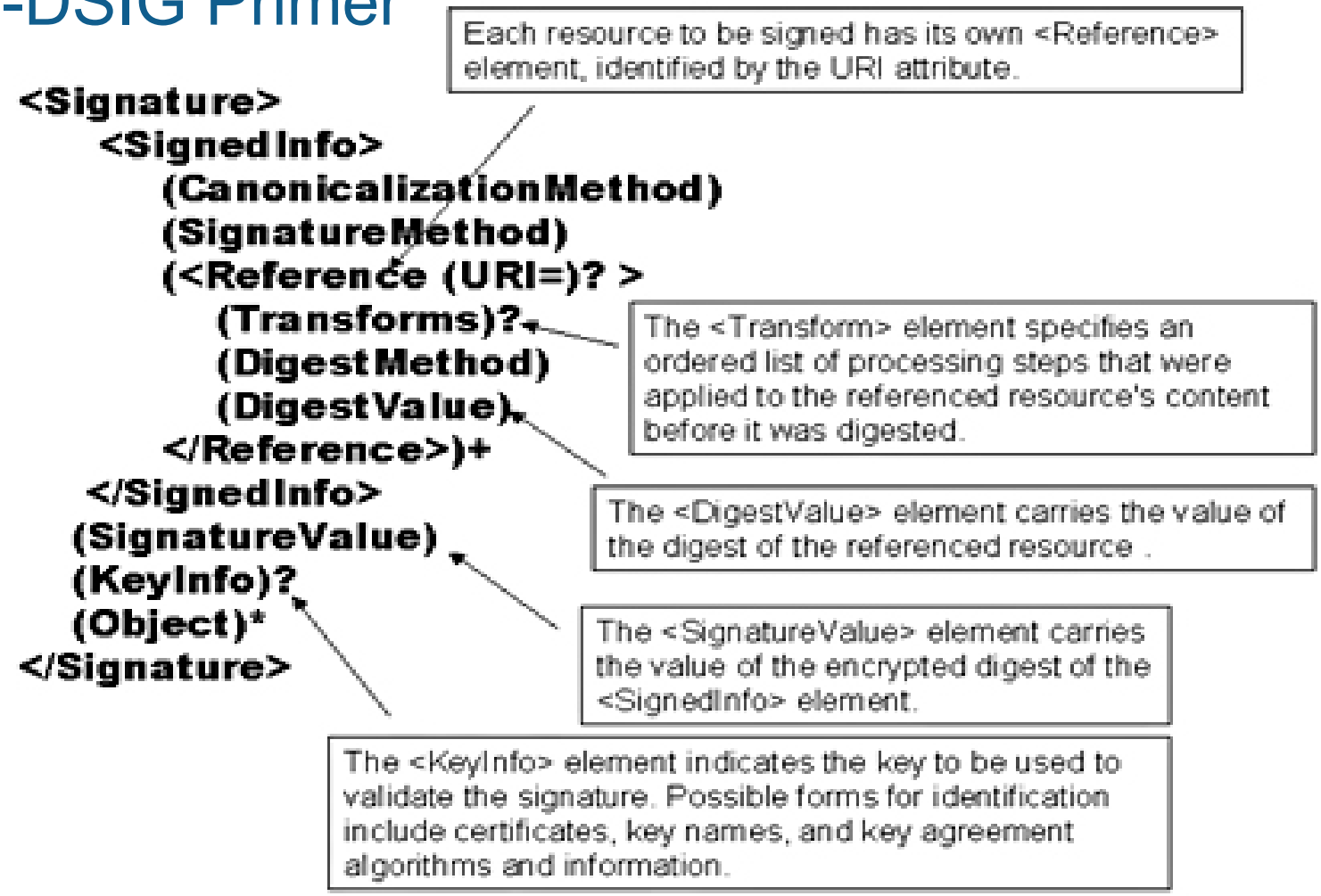
Security Architecture

Business Context and XML-Dsig

- XML signature (XML-Dsig)
  - Digital signatures for XML documents
  - W3C standard
- Provides
  - Message Authenticity *(Who sent this message?)*
  - Message Integrity (*Is this what was sent?*)
  - Non-Repudiation *(Can the sender deny sending this message?)*
- Supported by many vendors

Security Architecture

XML-DSIG Primer



Security Architecture

Lessons Learned

- Resource Intensive
- Canonicalization style
  - Inclusive or Exclusive
  - .Net and WS-Security require Exclusive!
- DSig does not define the trust process
  - KeyInfo provides the hints
- Over SSL provides client-side authentication

Agenda

Introduction

Security Architecture

J2EE Architecture

- Patterns, Tiers, Struts Challenges, Aspects

Web Services Architecture

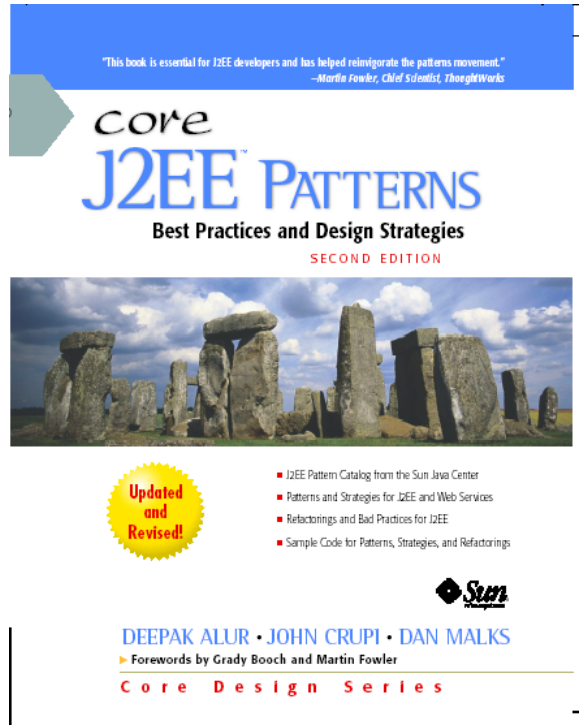
EAI Architecture

Summary

J2EE Architecture

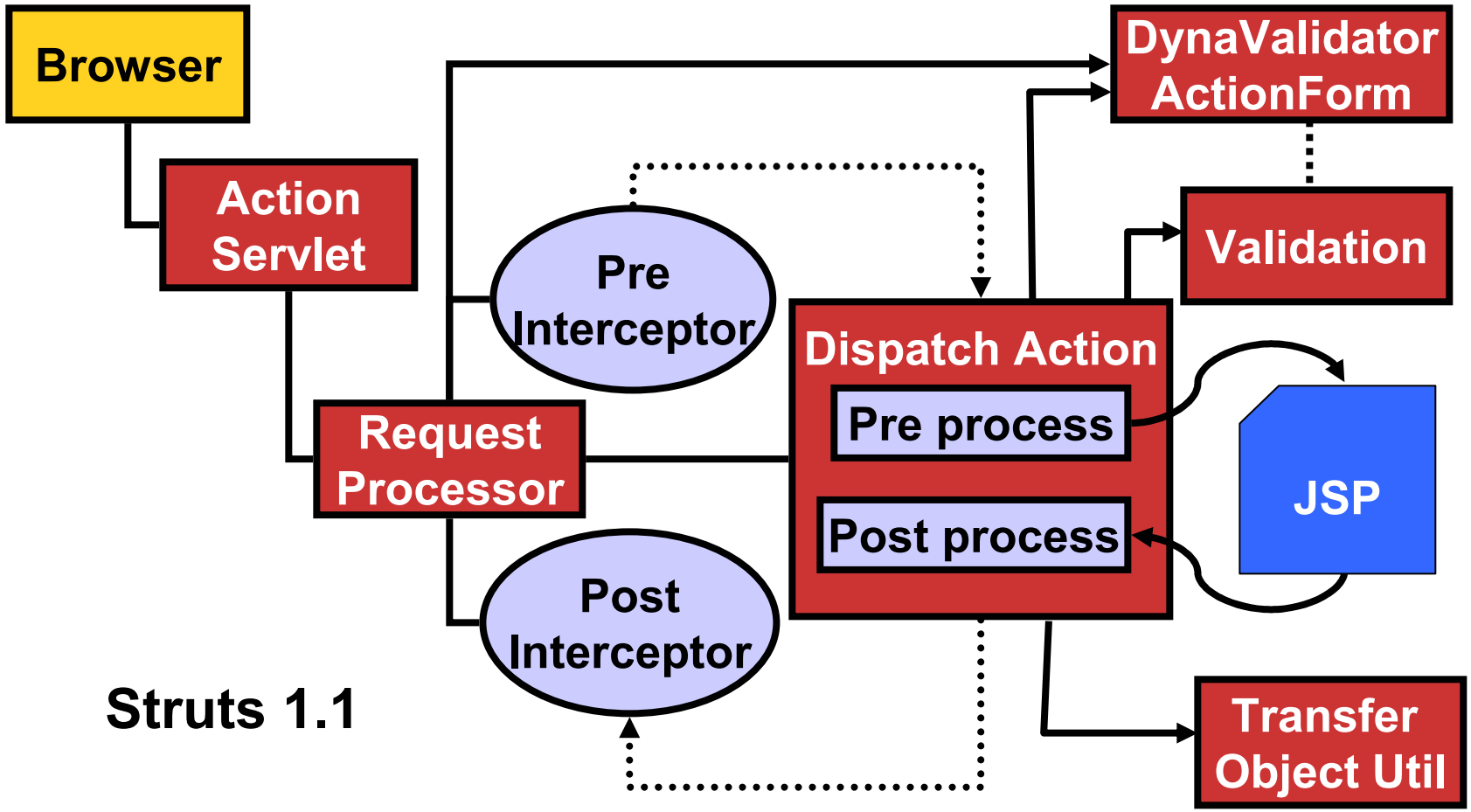
Core J2EE Patterns

- Front Controller
- Transfer Object
- Business Delegate
- Session Façade
- Data Access Object
- View Helper



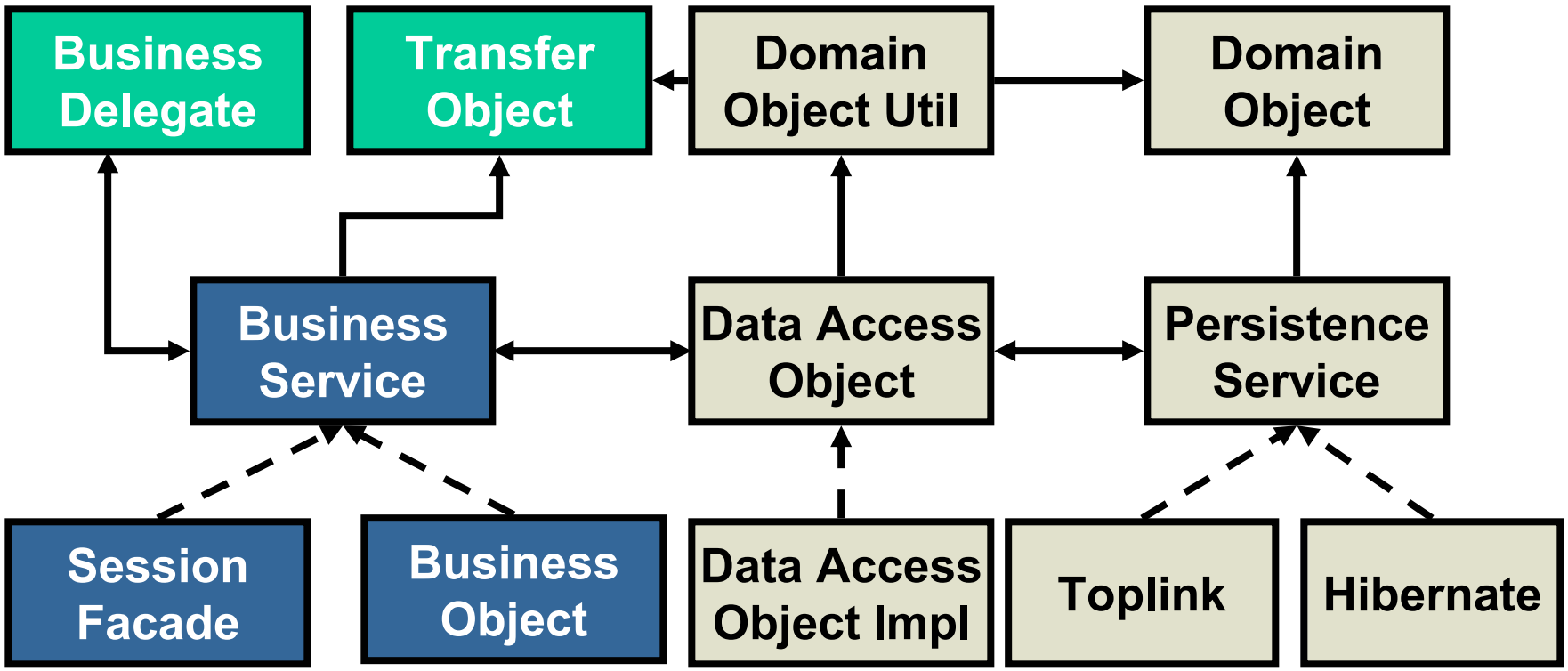
J2EE Architecture

Presentation Tier Components



J2EE Architecture

Business and Integration Tier Components

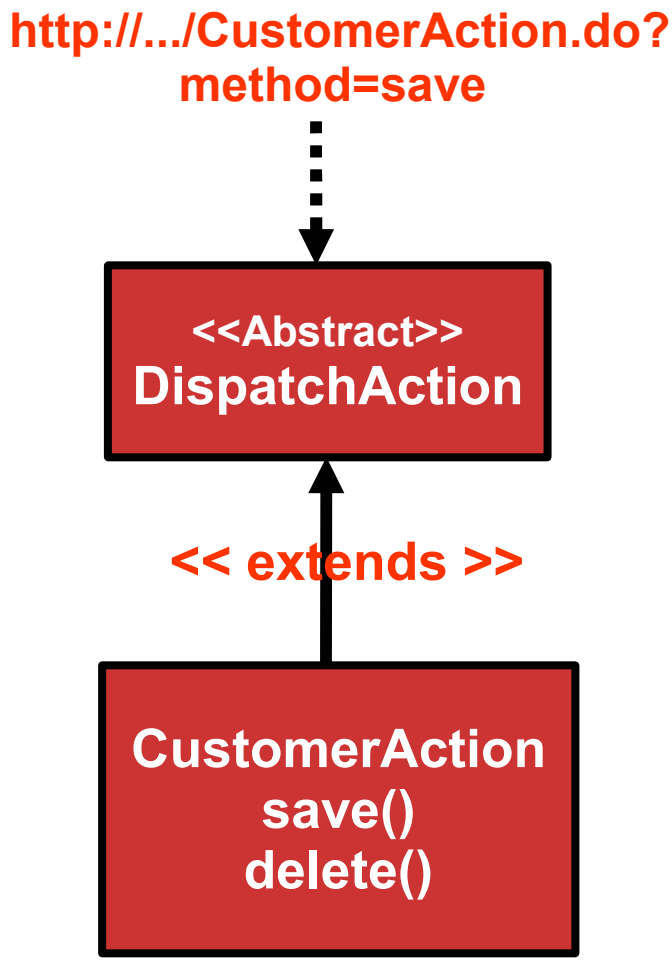


J2EE Architecture

Struts–Dispatch Action

- Reduce action classes
- Combine related actions
- Just one Action mapping!

```
<action path="/CustomerAction"
        type="CustomerAction"
        name="myActionForm"
        scope="request“
        …
        parameter="method"
/>
```



J2EE Architecture

Struts–Mapping Dispatch Action

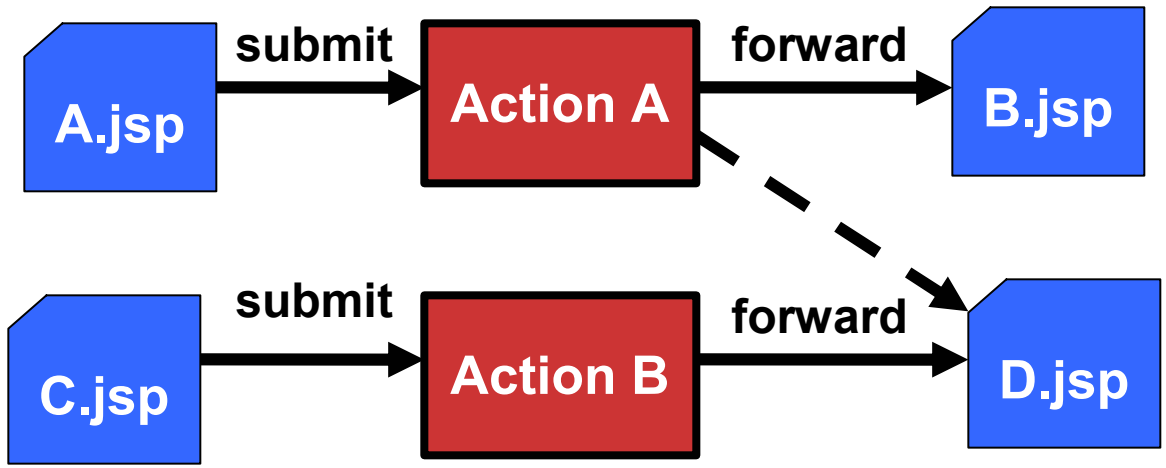
- Extends DispatchAction
- One URL per method
- Different ActionMappings by method

```
<action path="/DeleteCustomerAction"
        type="org.example.CustomerAction"
        parameter="delete" …> …..
</action>
<action path="/SaveCustomerAction"
        type="org.example.CustomerAction"
        parameter="save"
        validate="true" …> …….
</action>
```

J2EE Architecture

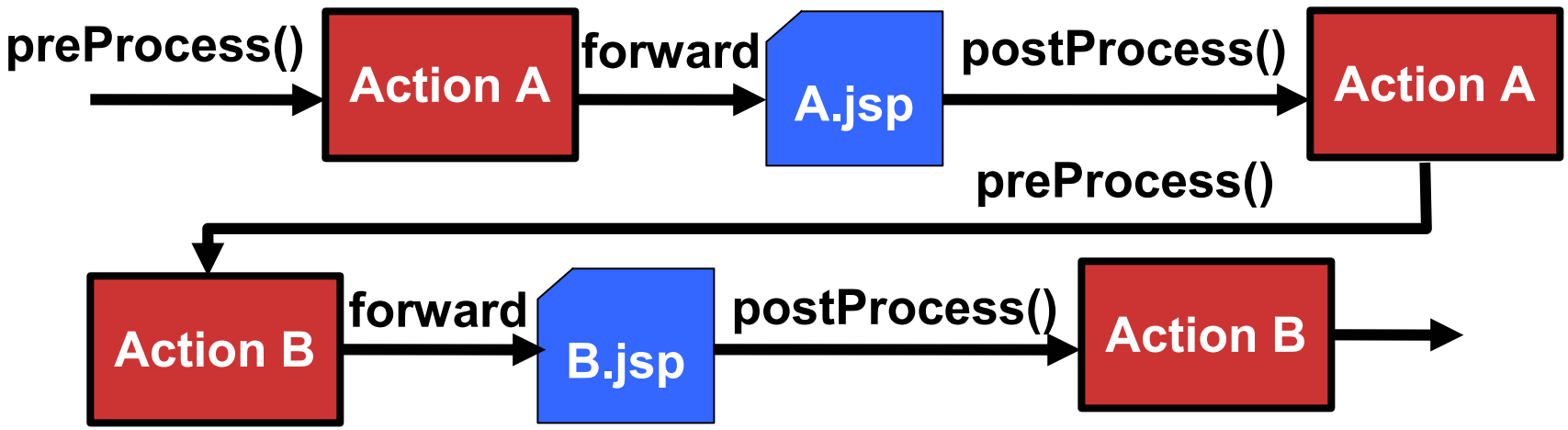
Struts–Coupling Action

- Using an Action to Post-Process and Pre-Process
- Creates tight coupling to the navigation



J2EE Architecture

Action with PreProcess and PostProcess methods



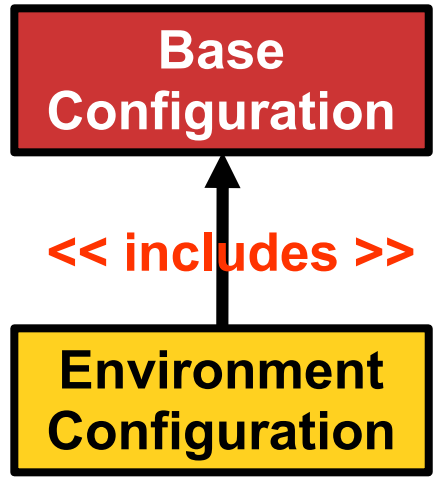
Distributed Application Management

Configuration Management–Drivers

- Using open source JFig Framework
- Drivers
  - Different Components
  - Environment
    - Development, Integration, Production…
  - Remote vs. Local Deployment
  - Container vs. Standalone
  - Clustering

Distributed Application Management

JFig Config File

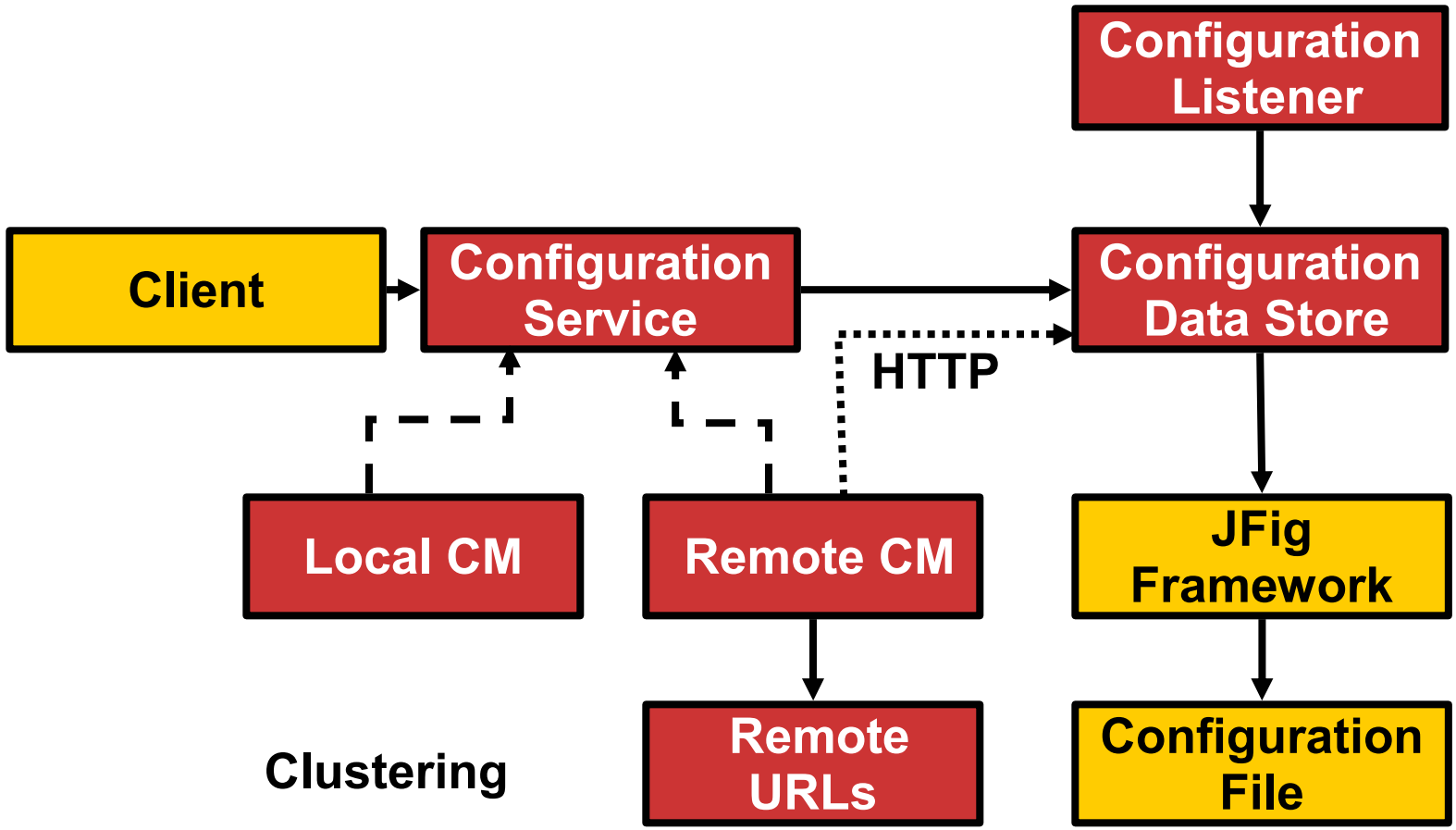



```
<configuration>
    <include name="base.config.xml"/>
    <section name="locs">
        <entry key="instance" value="development" />
    </section>
    <section name="paths">
        <entry key="config_dir" value="d:/[locs]{instance}/config/" />
    </section>
</configuration>
```

```
ConfigurationManager.getProperties(sectionName, key)
    delegate ↳ JFig.getInstance().getValue(sectionName, key)
```

Distributed Application Management

Configuration Management–Implementation



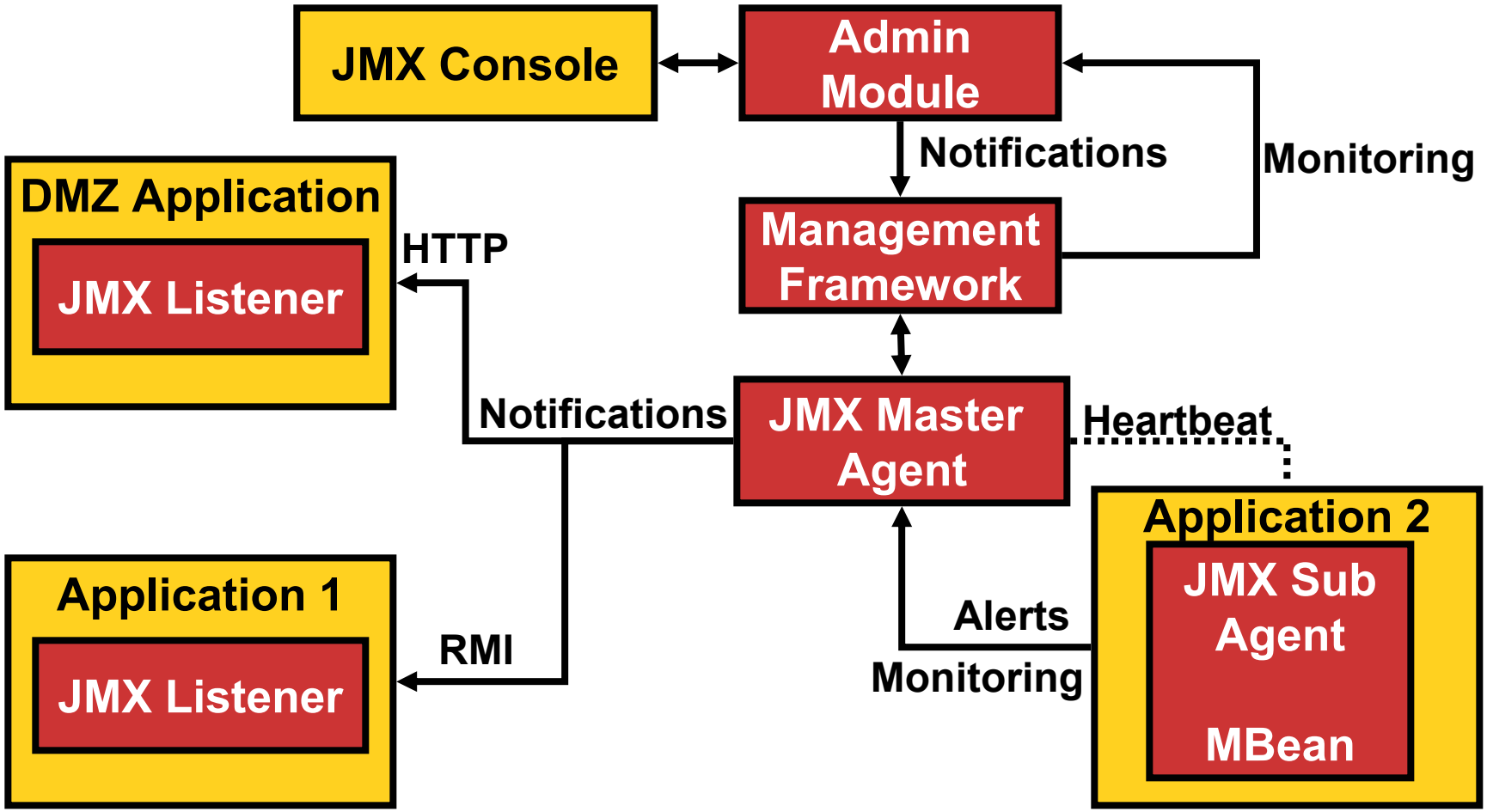
Distributed Application Management

Monitoring and Notification–Drivers

- Opportunity Cost
  - Availability of external system
- Dynamic Application Configuration
  - Profiles
  - End points
- Dynamic Application Monitoring
  - Credit applications/messages in a queue
  - Number of error/fault messages

Distributed Application Management

Monitoring and Notification–Implementation



Agenda

Introduction

Security Architecture

J2EE Architecture

Web Services Architecture

- Document Literal, Interceptors

EAI Architecture

Summary

Web Services Architecture

RPC Web Services

- Synchronous and Asynchronous
- SOAP based and WSDL described
- Extensible through Web Services Stack
  - Security
  - Reliability
- Payload is an automotive standard
  - STAR

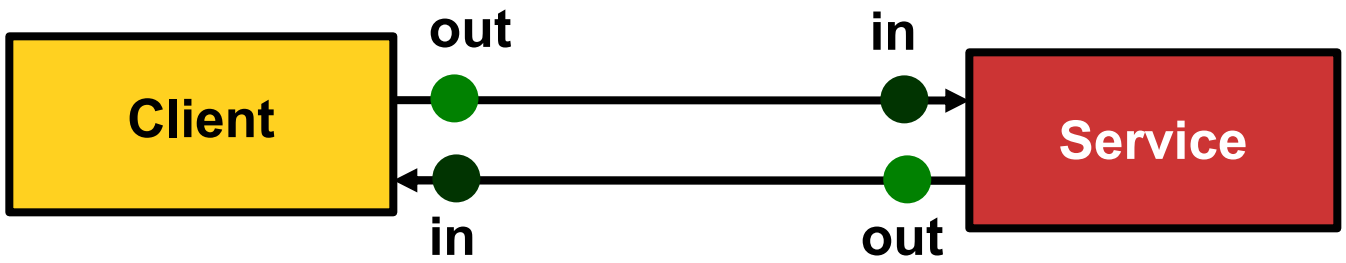
Web Services Architecture

Challenges with exchange of Document/Literal

- Pros
  - Industry standards are schemas
  - Coarse grained data exchange
- Cons
  - Not as widely supported as RPC/Encoded
  - Tool support to generate the WSDL?
- Solution
  - Define the interface with return type String
  - Serialize the DOM as Base64
  - Out of band agreement on the schema

Web Services Architecture

Interceptors and Handlers



- Interceptors use Handlers to perform
  - Validations
  - Digital signing
  - Auditing
  - Logging

Agenda

Introduction

Security Architecture

J2EE Architecture

Web Services Architecture

EAI Architecture

- Messages, Patterns, SQLX, Shredding XML

Summary

EAI Architecture

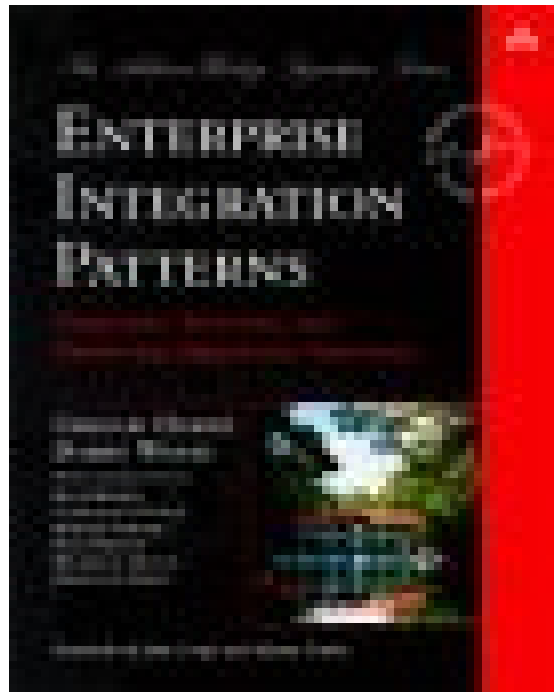
Messages

- Asynchronous Document/Literal Messages
  - Credit Application, Credit Decision, Text Messages, Credit Bureau Reports
- HTTPs or MQ Series
- SOAP 1.1 Envelope and Faults
- Internally a series of JMS Queues and Listeners
- Messages are digitally signed (XML-DSig)

EAI Architecture

Patterns

- Claim Check
- Content-Based Router
- Normalizer
- Content Enricher
- Envelope Wrapper
- Message History
- Messaging Mapper
- Dead Letter Channel



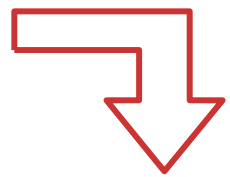
From 2 Gurus
(Hohpe & Woolf)

EAI Architecture

SQLX

- SQLX group
- Members include most RDBMS vendors
- SQL Functions to output XML

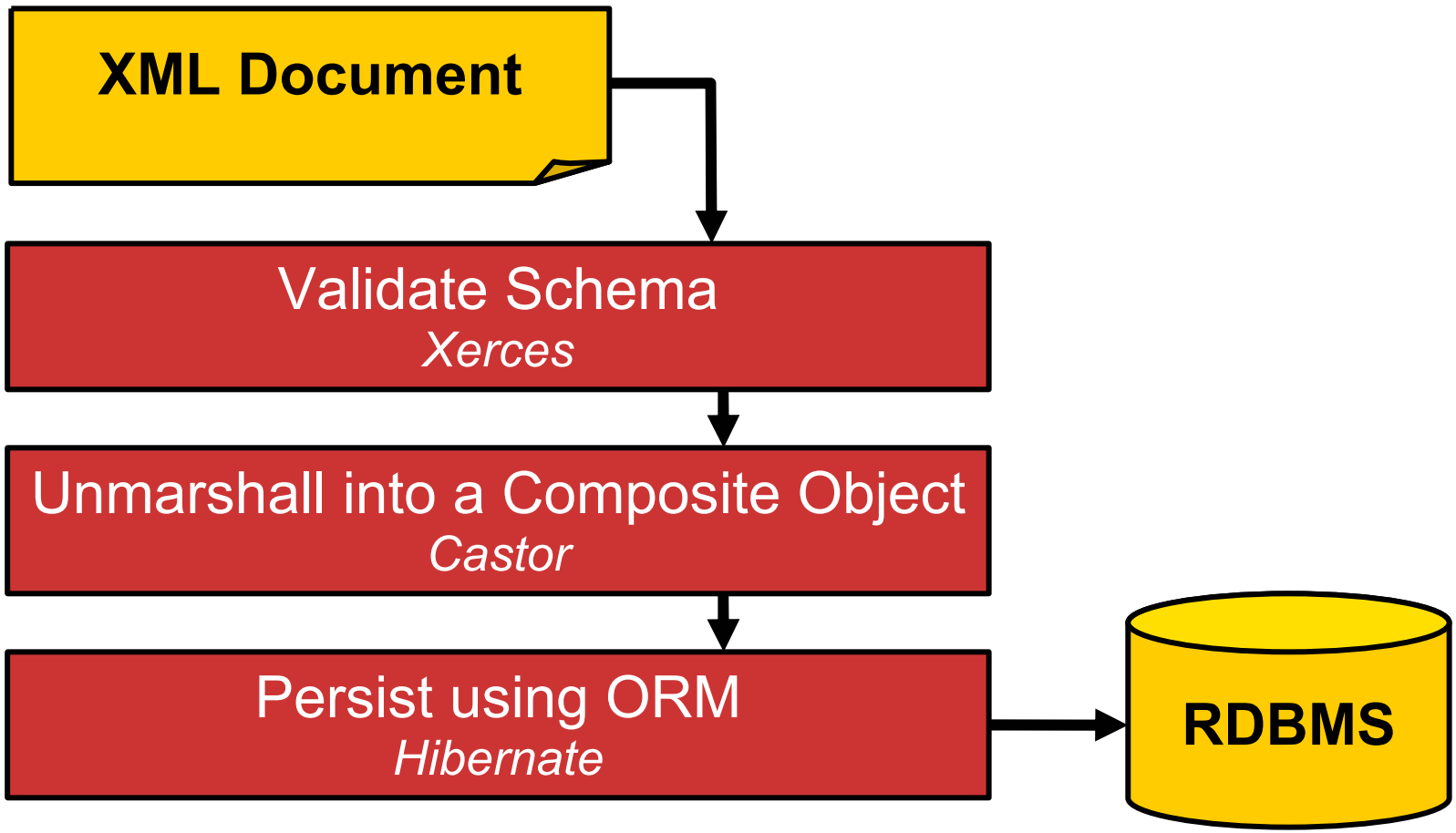
```
SELECT XMLELEMENT ("person",
      XMLATTRIBUTES (sex AS sex),    XMLFOREST (
      firstname || ',' || lastname AS "name",
      contact    AS "email") )
FROM ...
```



```
<person sex="M">
 <name>GKrisna</name>
 <email>gk@routeone.com</email>
</person>
```

EAI Architecture

Shredding XML into a RDBMS



Agenda

Introduction

Security Architecture

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Summary

Summary

We learned how to integrate Enterprises with…

- Standards-based SSO, XML-DSig
- Struts and J2EE patterns
- Document/Literal SOAP-RPC
- EAI Patterns
- Services for common Aspects of J2EE and EAI systems

Conclusion

Lessons learnt from “real-world” experience in integrating enterprises with Patterns and Web Services

For More Information

Further references…

- URLs
  - http://www.corej2eepatterns.com (Core J2EE Patterns)
  - http://www.eaipatterns.com (EAI Patterns)
  - http://iso-relax.sourceforge.net/JARV (JARV)
  - http://www.sqlx.org (SQLX)
  - http://jfig.sourceforge.net (JFig)
  - http://www.oasis-open.org (OASIS)
  - http://www.w3.org/TR/xmldsig-core (XML-DSig)

Acknowledgements

A cast of thousands

- Architect Consultants
  - Deepak Alur (Principal Engineer @ Sun and co-author of *Core J2EE Patterns*)
  - Paul Jatkowski (Senior Architect @ Sun)
  - Bill Beshilas (Cap Gemini)
- Architects
  - J2EE Application Architects (Kuna Rao, Ashok Mollin)
  - Data Architect (Rekha Khandhadia)
  - Web Services Architects (Siva Papineni, Kartik Ganeshan)
  - Messaging Architects (Dongfan Chen)
  - Application Architect (Rani Vallurupalli)
  - Security Architects (Yanchou Han)
- Other architects from Sun and Cap Gemini

Q&A

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