

Introduction to SOI-Toolkit

Simplify development of open source based integrations and services

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Background

- Increasing interest for open source based integrations and services
 - Specifically based on Mule ESB
 - For details on Mule ESB see:
 - [CADEC 2009: SOA and Open Source](#)
 - [CADEC 2010: Replacing a commercial integration platform with an open source ESB](#)
- Experience from many projects indicates need for an initial establishment phase
 - Very much in common for most projects



Things to consider...

Before or during development (of in worst case afterwards...)

- Code structures and component model
- Dependency management
- Testing (unit and integration tests)
- Property files for environment specific configuration
- Logging, what to log, when and how
- Software configuration, build, release and deploy management
- Various OSS needs to be glued together
- Catalog of standard high level patterns

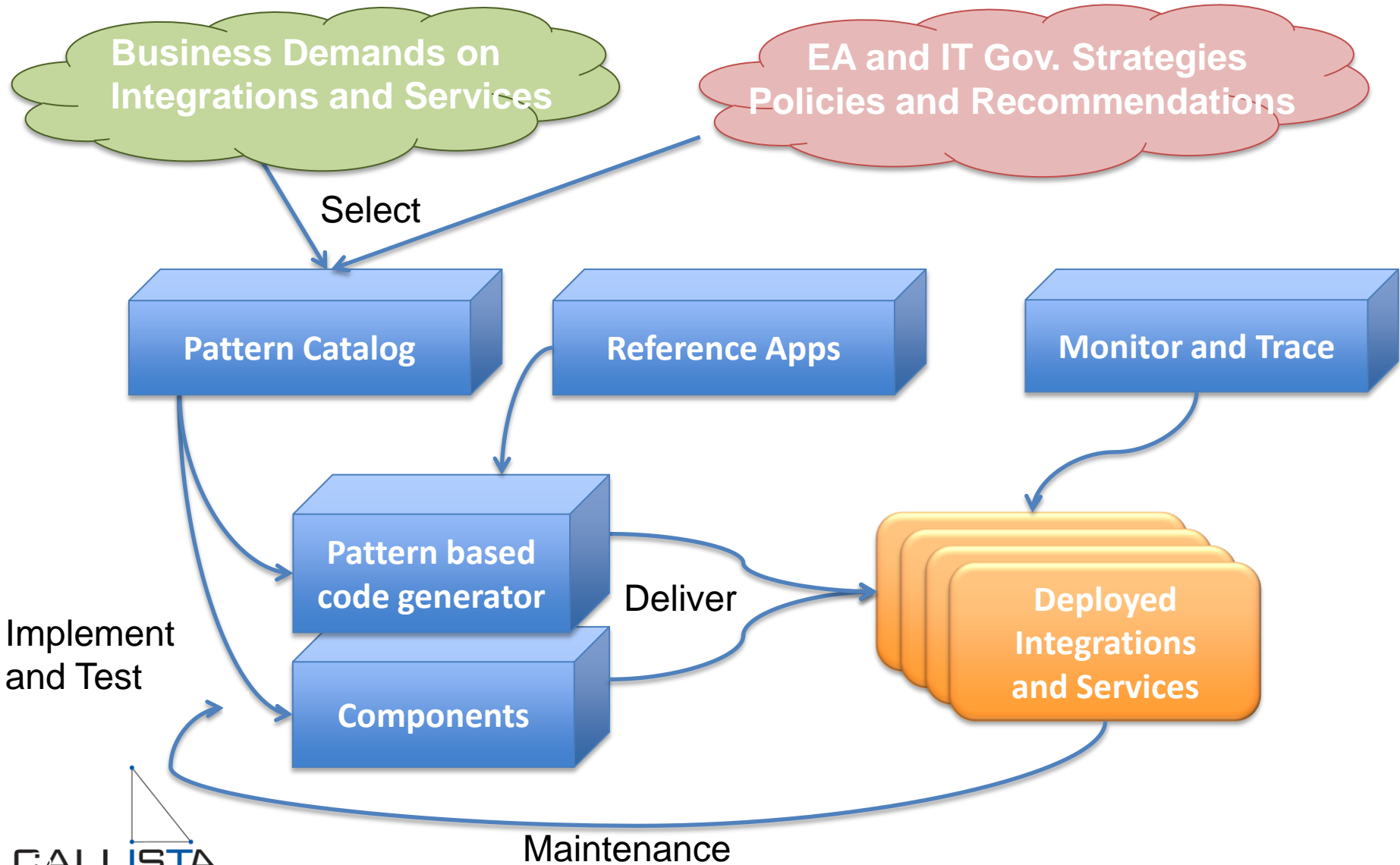
→ Common problems should be given a common solution!

Result

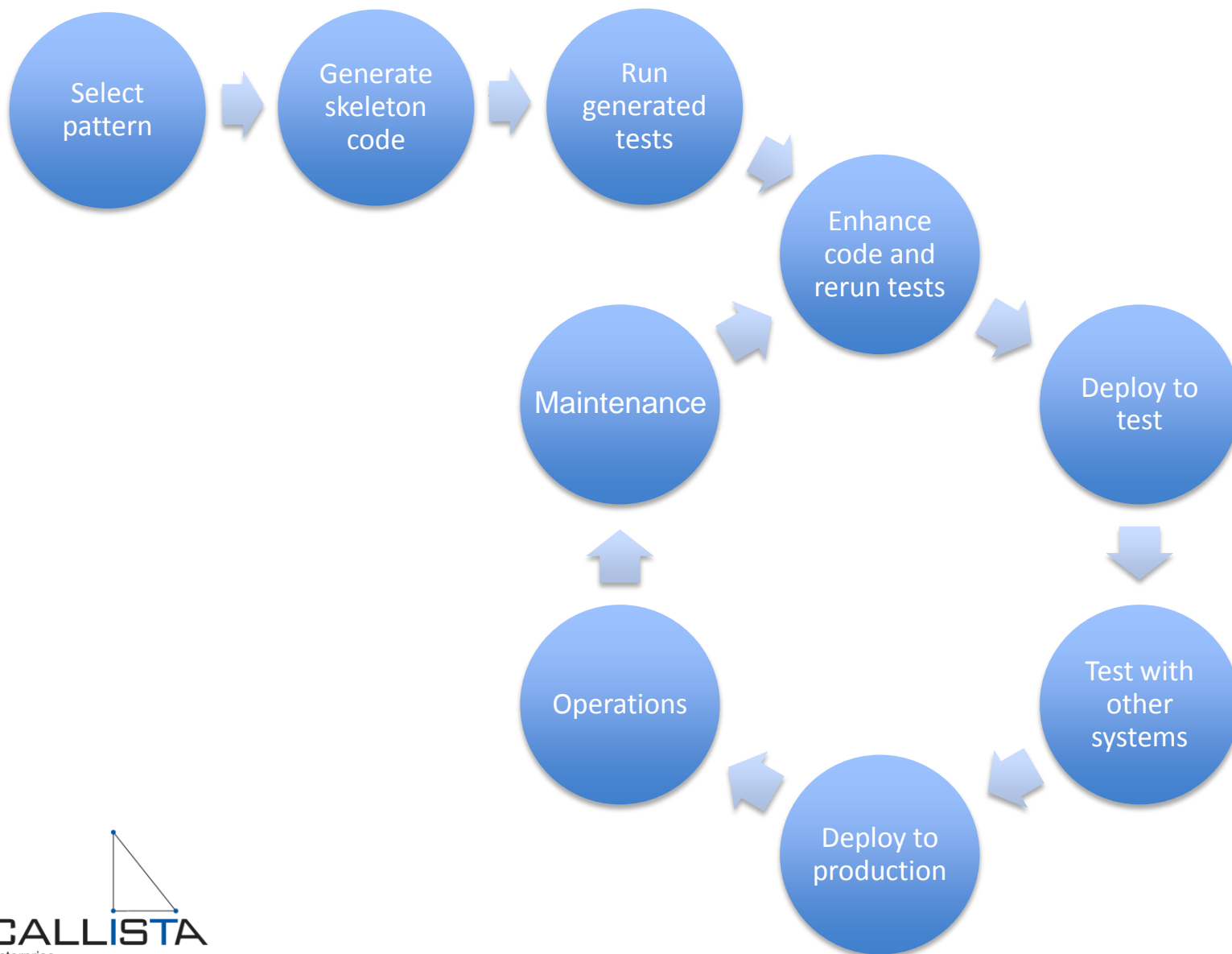
- SOI-Toolkit was born...
 - A toolkit for Service Oriented Integration
 - Codebase from Volvofinans Bank AB
 - Initiated in September and first release during October 2010
 - Apache 2.0 license (business friendly)
 - <http://soi-toolkit.org>
- Vision
 - Simplify development of open source based integrations and services
 - Support all software lifecycle phases of an integration or service
 - Initial development, test, operations and maintenance



SOI-Toolkit - Building Blocks



Supporting all lifecycle phases of a service



Sample high-level Patterns

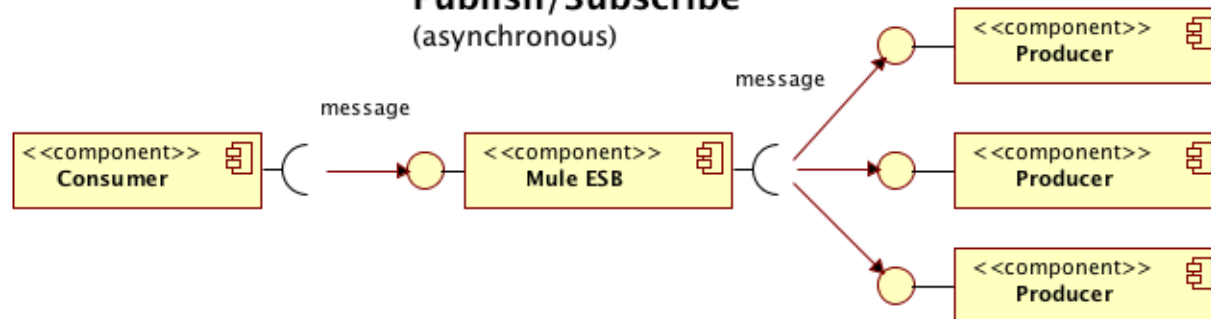
Request/Response (synchronous)



Store & Forward (asynchronous)

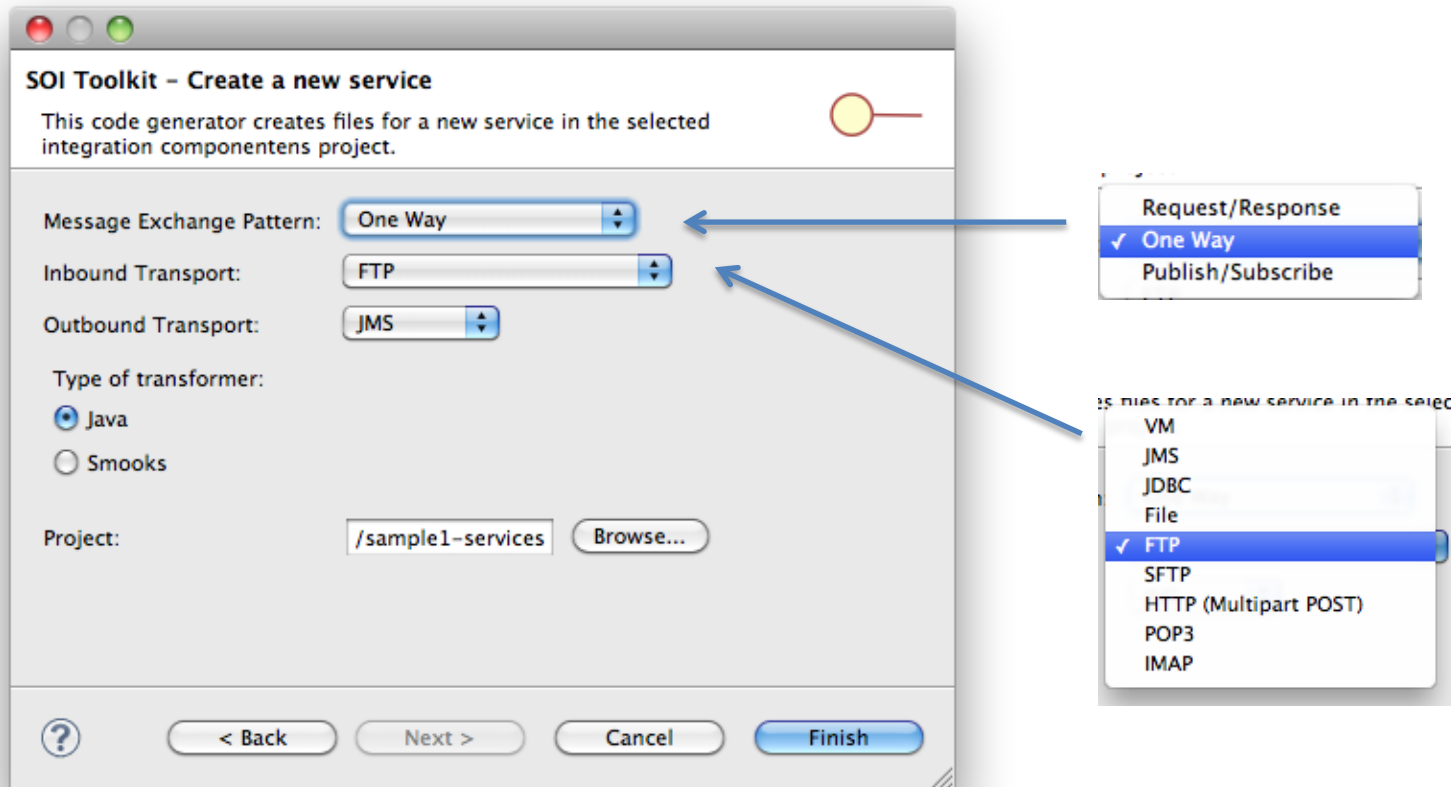


Publish/Subscribe (asynchronous)



Pattern based Code Generator

Eclipse plugin

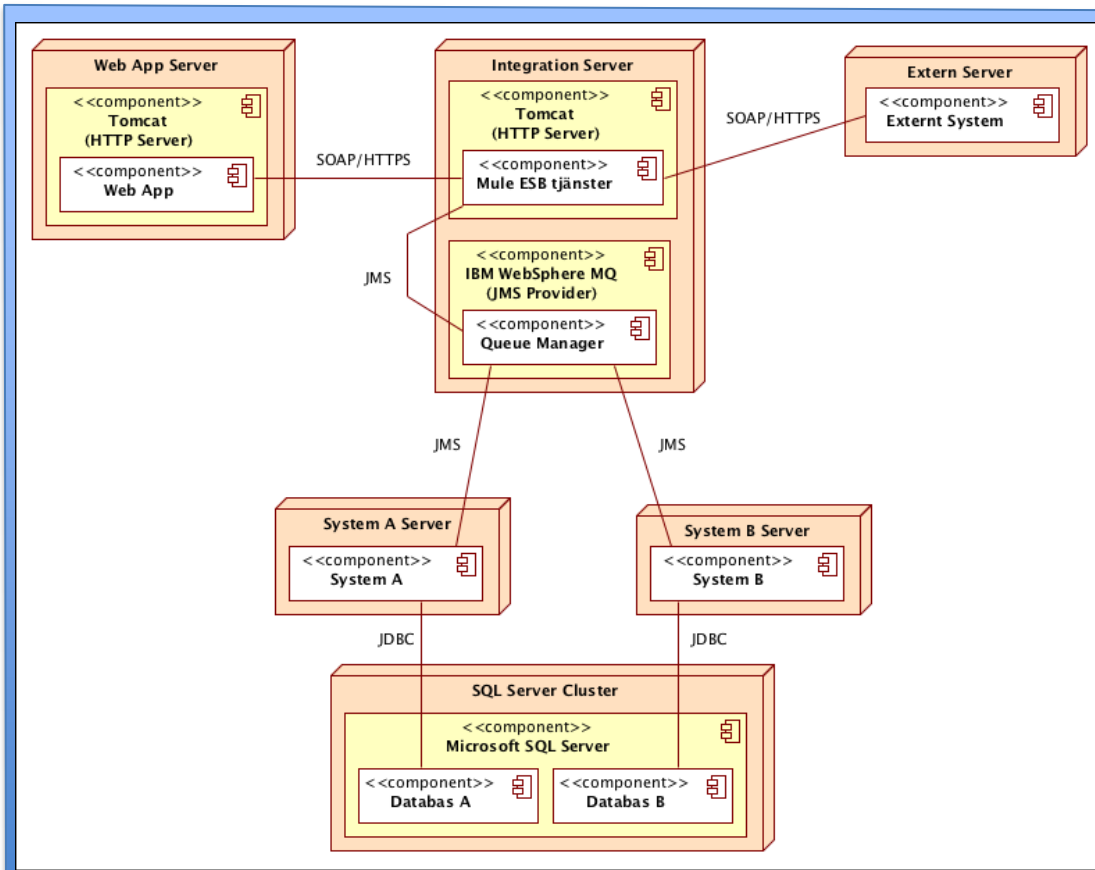


Pattern based Code Generator

- Generates
 - Code structures
 - Maven build files
 - Services
 - Tests
 - Test consumers and test producers
 - Logging
 - Property files
 - Deployable files
- Developer can focus on developing integrations and services using standard Mule functionality!

Testing

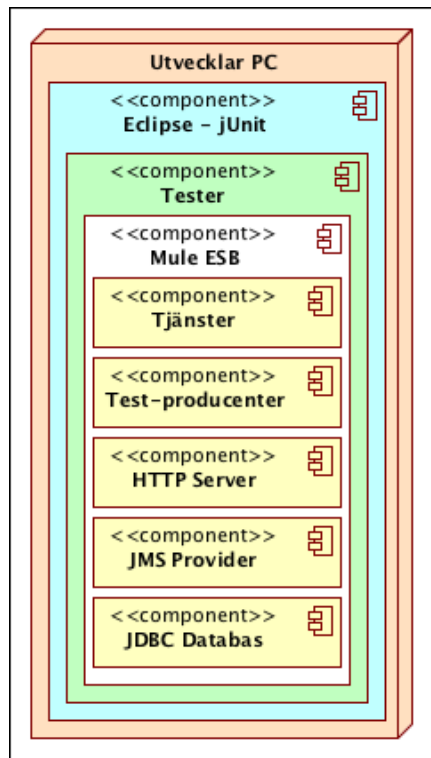
How to test large and complex integrations and services?



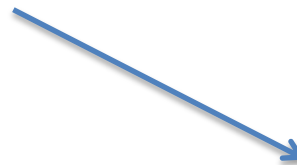
Testing

Mule ESB uses Spring, Maven, Eclipse and jUnit to support local automated unit testing of integrations and services!

Infrastruktur-komponenter exekverar inbäddat i testerna

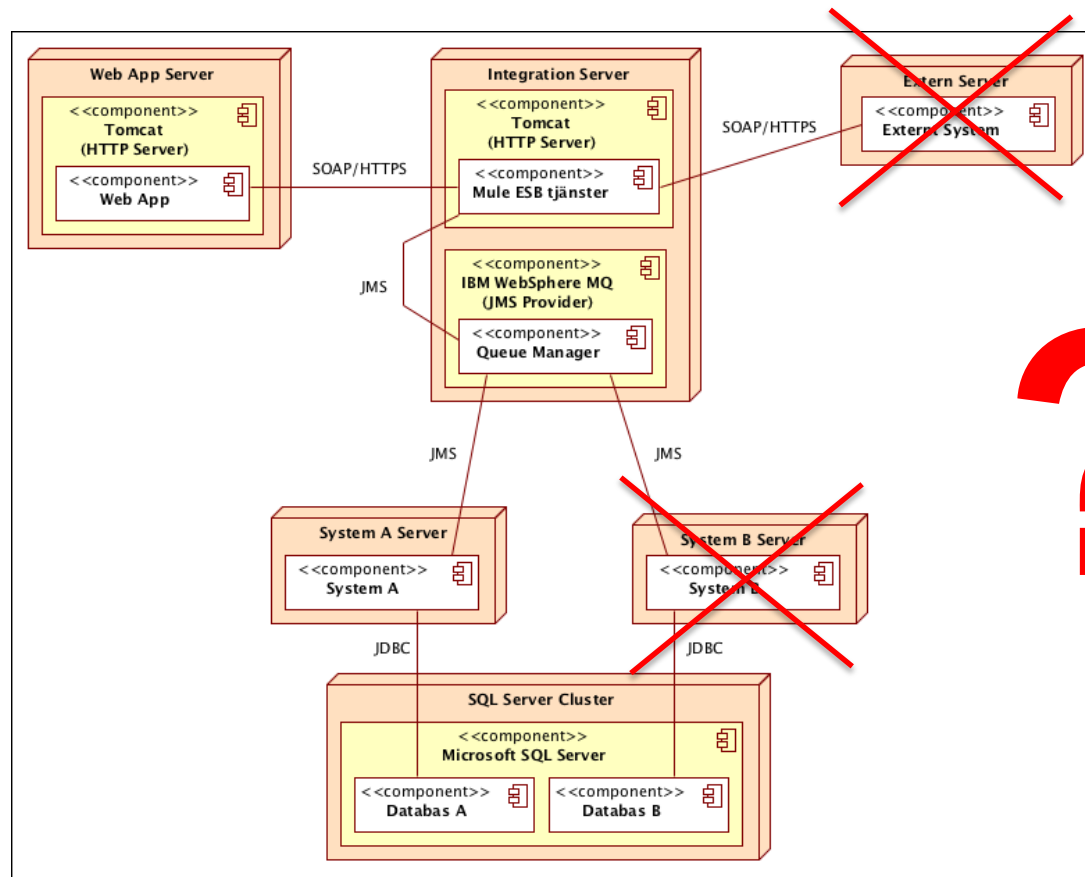


- Ingen infrastruktur att installera
 - Allt som behövs laddas ner av Maven (med undantag för ftp och sftp server...)
- Ingen deploy-fil att skapa...
 - Alla tester kör direkt inne i Eclipse
- Ingen deploy behöver göras...
 - All infrastruktur är inbäddad i Eclipse



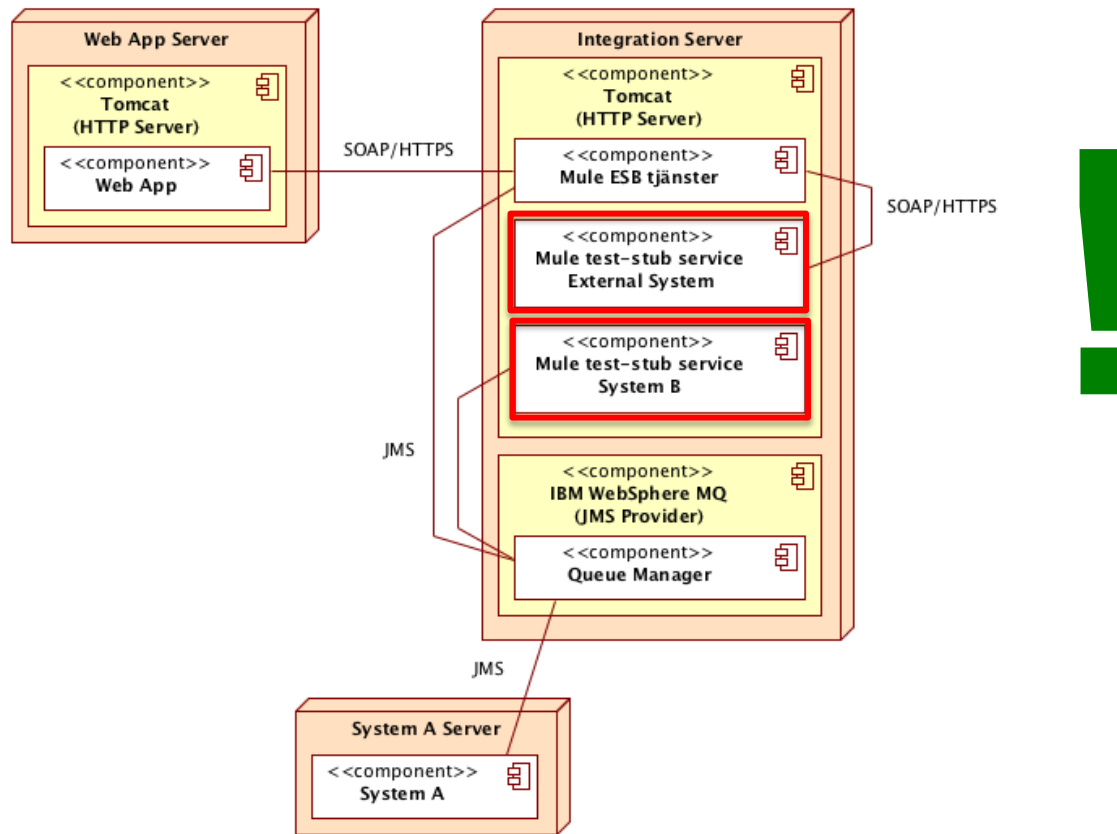
Testing

- Integration tests
 - **PROBLEM:** Very often all systems are not ready for test...



Testing

- **SOLUTION:** Deploy test-producers (test-stubs) for affected systems in Mule ESB
 - Deploy as separate war-file



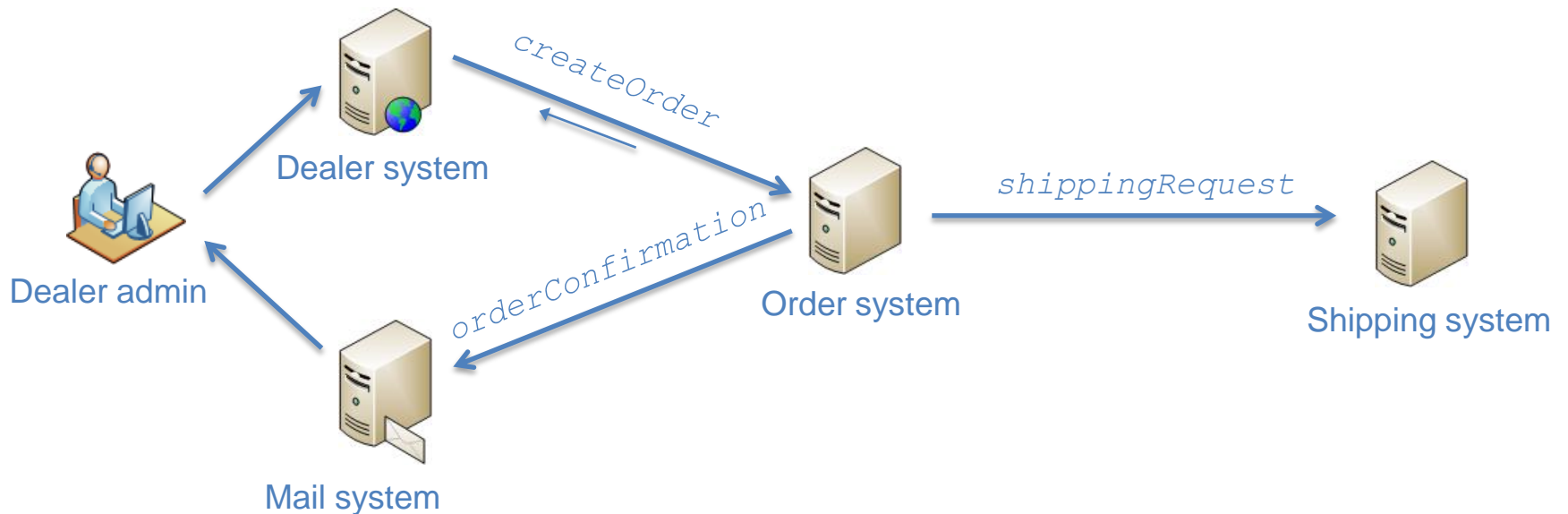
Tutorial overview

-

Demo time!

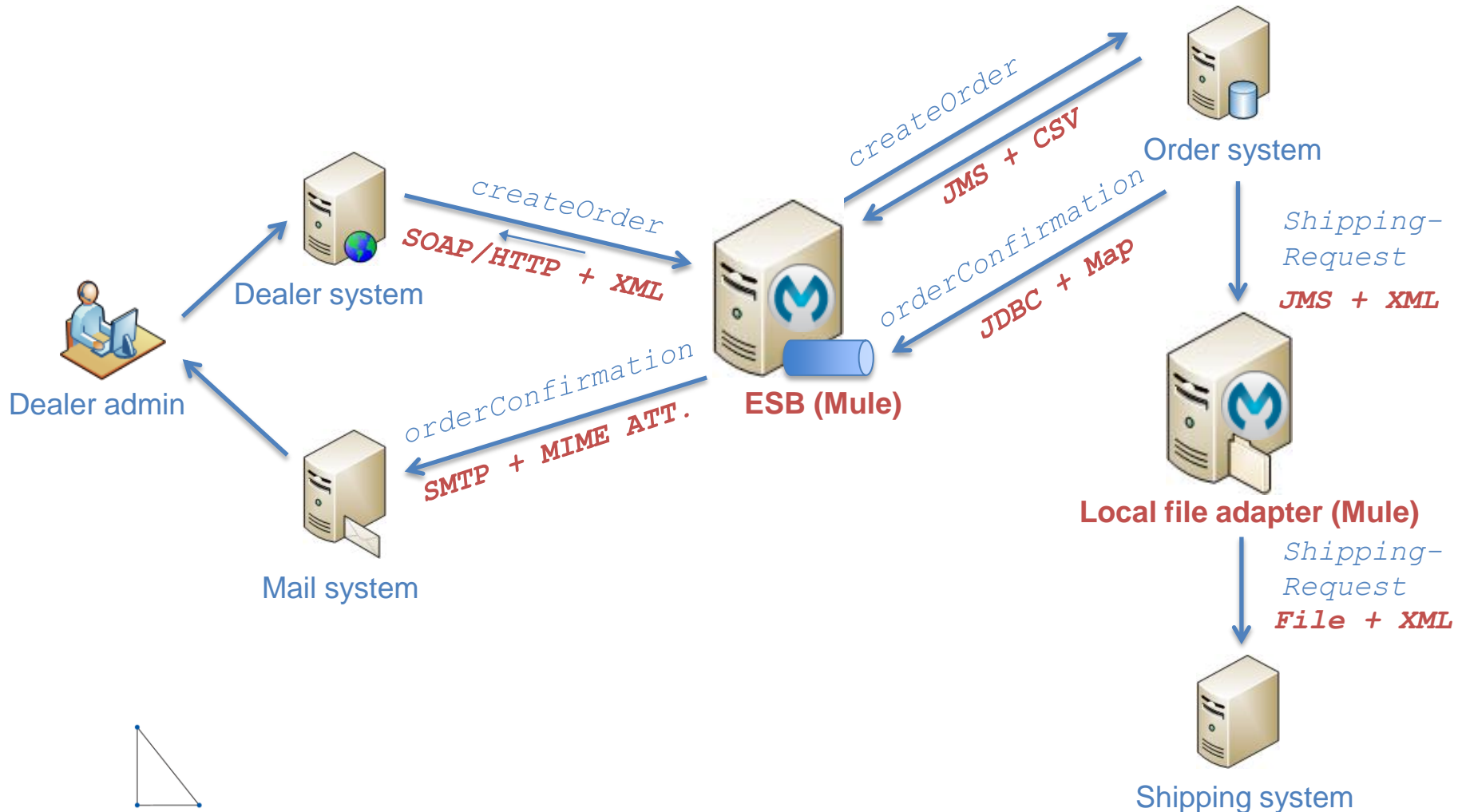
Tutorial/Demo – SOI Toolkit Ref App

Logical view



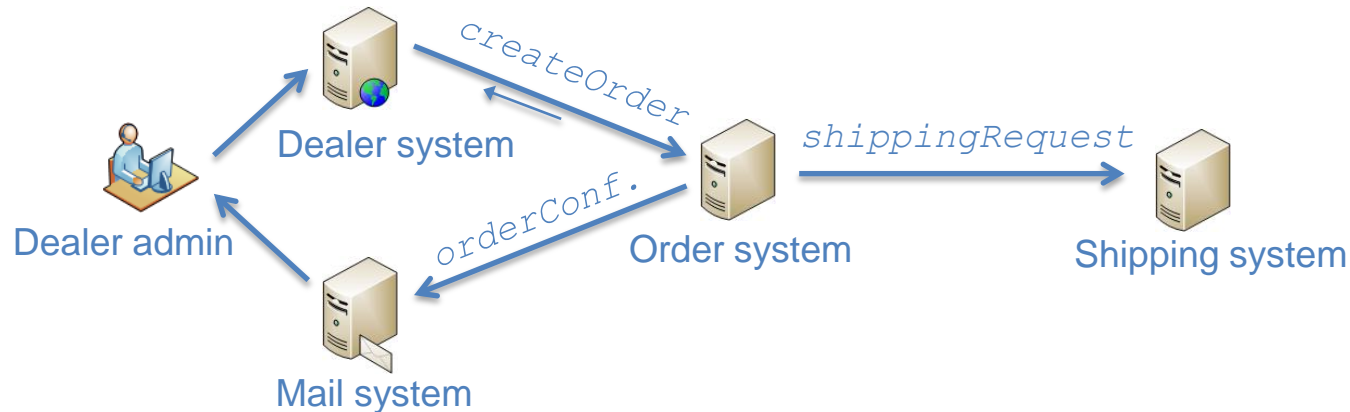
Tutorial/Demo – SOI Toolkit Ref App

Physical view



Tutorial/Demo – SOI Toolkit Ref App

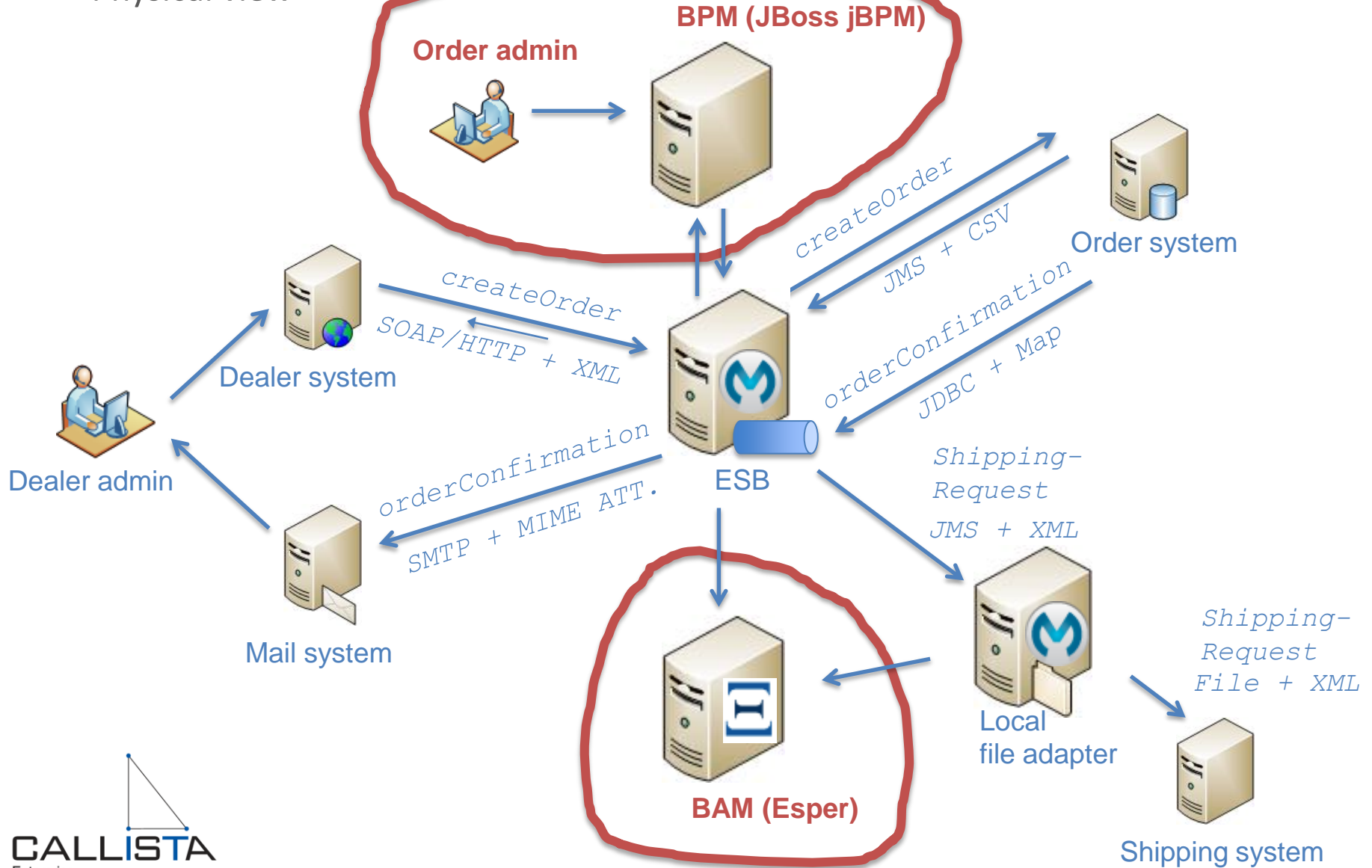
Technical overview



Name	Transports	Transformation	Quality of Service
CreateOrder (Dealer → Order)	Sync SOAP ↔ Asynch JMS	XML ↔ CSV	<ul style="list-style-type: none"> Idempotent Receiver, eliminating duplicate requests.
ShippingRequest (Order → Shipping)	JMS → File	None (XML)	<ul style="list-style-type: none"> JMS Retry + max retries → DLQ. Self healing connection. Mule acts as a local file-adapter.
OrderConfirmation (Order → Dealer)	JDBC → SMTP	DB → Mime with attachment	<ul style="list-style-type: none"> Resend of mail. Self healing connection.

Extended Demo - SOI Toolkit Ref App

Physical view



Extended Demo – SOI Toolkit Ref App

soapUI instead of a Dealer web-app...

The screenshot displays the soapUI 3.5.1 application window. The interface is divided into several sections:

- Left Panel:** A tree view showing a project named 'CreateOrderService' with sub-items 'createOrderBinding' and 'createOrder'. 'Request 1' is selected under 'createOrder'. Below this is the 'Request Properties' table.
- Request Properties Table:**

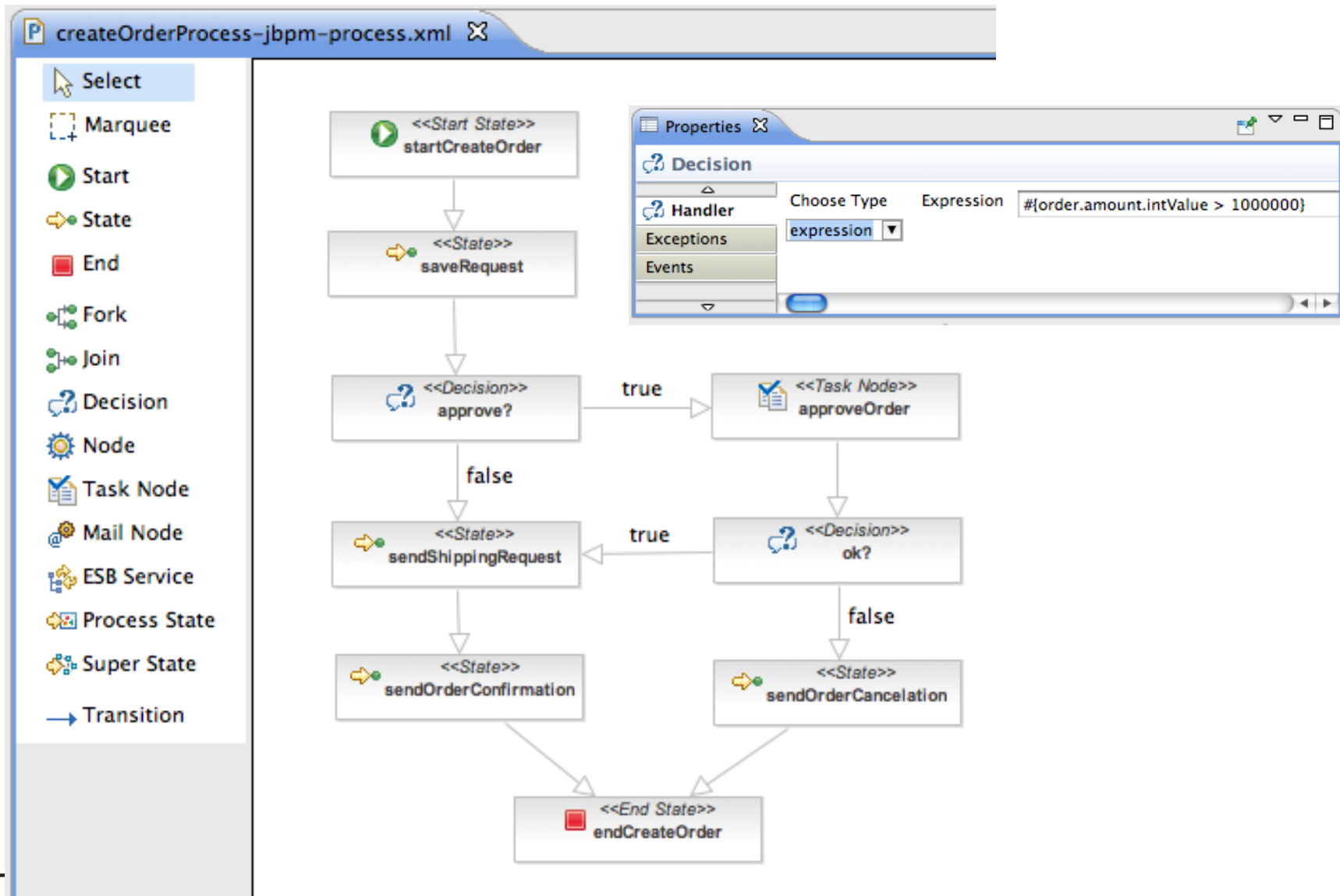
Property	Value
Name	Request 1
Description	
Message Size	834
Encoding	UTF-8
Endpoint	http://localhost:...
Timeout	
Bind Address	
Follow Redirects	false
Username	
Password	
Domain	
WSS-Password T...	
- Request Editor:** Shows the SOAP request XML for 'Request 1' at the endpoint 'http://localhost:8080/ordermgm/services/createorder/v1'. The XML is:

```
<?xml version='1.0' encoding='UTF-8'>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <soapenv:Header/>
  <soapenv:Body>
    <urn:createOrder>
      <urn:customerId>123456</urn:customerId>
      <urn:uniqueCustomerReferenceId>abc123</urn:uniqueCustomerReferenceId>
      <urn:orderDate>2011-01-19T15:00:00</urn:orderDate>
      <urn:orderLines>
        <urn:productId>111</urn:productId>
        <urn:quantity>20</urn:quantity>
        <urn:price>
          <urn:currency>SEK</urn:currency>
          <urn:amount>100000</urn:amount>
        </urn:price>
      </urn:orderLines>
    </urn:createOrder>
  </soapenv:Body>
</soapenv:Envelope>
```
- Response Editor:** Shows the SOAP response XML. The XML is:

```
<?xml version='1.0' encoding='UTF-8'>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <createOrderResponse xmlns="urn:org.soitoolkit">
      <customerId>123456</customerId>
      <uniqueCustomerReferenceId>abc123</uniqueCustomerReferenceId>
      <orderId>10002</orderId>
    </createOrderResponse>
  </soap:Body>
</soap:Envelope>
```
- Status Bar:** Shows 'response time: 84ms (414 bytes)'. Below it are links for logs: 'soapUI log', 'http log', 'jetty log', 'error log', 'wsrm log', and 'memory log'.

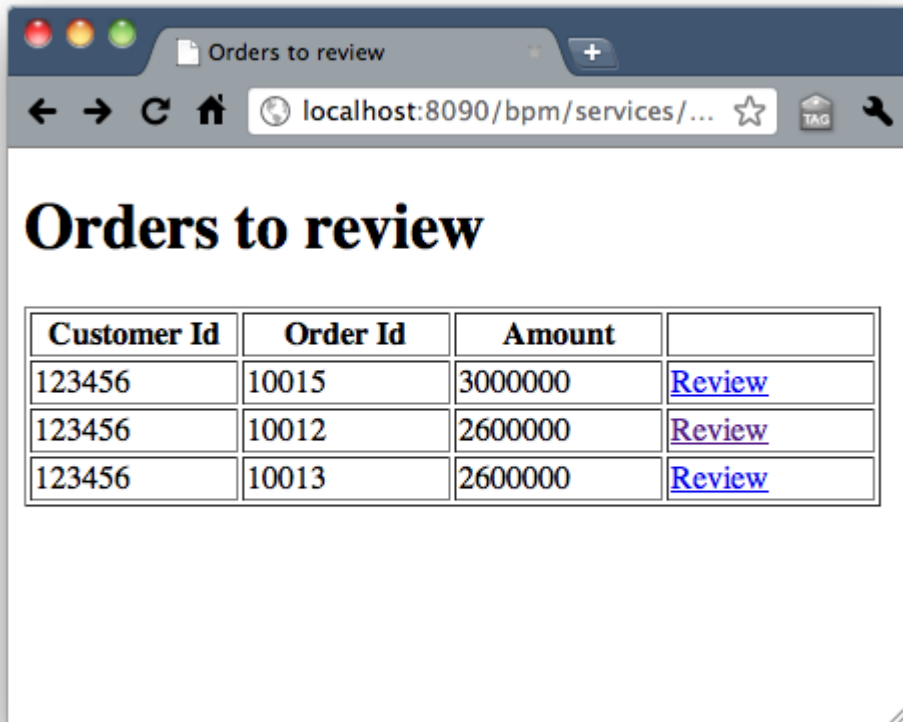
Extended Demo – SOI Toolkit Ref App

BPM – Process Orchestration with Mule ESB + JBoss jBPM



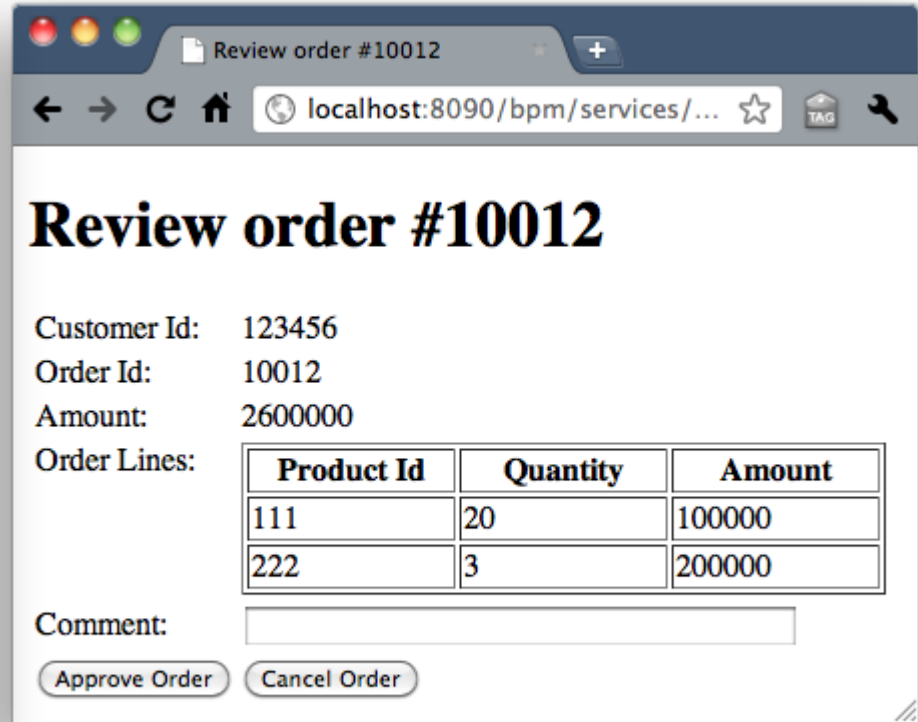
Extended Demo – SOI Toolkit Ref App

BPM – Process decides that Order Admin needs to review an Order



Orders to review

Customer Id	Order Id	Amount	
123456	10015	3000000	Review
123456	10012	2600000	Review
123456	10013	2600000	Review



Review order #10012

Customer Id: 123456
Order Id: 10012
Amount: 2600000

Order Lines:

Product Id	Quantity	Amount
111	20	100000
222	3	200000

Comment:

Extended Demo – SOI Toolkit Ref App

Mail as Order Confirmation

The screenshot shows a Gmail interface in a browser window. The address bar displays the URL <https://mail.google.com/mail/u/2/#inbox/12d8f825f3679c42>. The Gmail header includes navigation links for Kalender, Dokument, Reader, Webben, and mer, along with the user's email address soitoolkit1@gmail.com and links for Inställningar, Hjälp, and Logga ut. The Gmail logo is visible on the left. The left sidebar shows the 'E-post' menu with options like Kontakter and Aktiviteter, and the 'Inkorgen (6)' section with items like Buzz, Stjärnmärkt, and Skickade mail. The main content area displays an email from 'soitoolkit' with the subject 'Order confirmed: 10009'. The email body contains the text: 'Your order 10009 has been confirmed. Estimated delivery is 2011-01-16 16:47:08.323.' Below the text is an attachment named 'orderconfirmation-10009.csv' (1kB) with links for 'Visa' and 'Hämta'. The email is dated '16:47 (1 timme sedan)'. The right sidebar shows 'Nytt fönster' and 'Skriv ut alla' options, and a section for 'Annonser' with links for 'Ultrasound AFE Module', 'Free 2011 Horoscope', and 'Mer om...'. The bottom of the page shows the 'Enterprise' logo.

Extended Demo – SOI Toolkit Ref App

BAM – Business Activity Monitoring with Esper + Grails

The screenshot shows a web browser window displaying the Grails application. The browser address bar shows `localhost:8100/tracer/interaction/show/2`. The Grails logo is visible in the top left. A yellow box highlights the text "No Order Admin involved...". Below the logo, there are navigation links for "Home" and "Interaction List". The main content area is titled "Show Interaction" and displays the following details:

- Id: 2
- Integration Scenario: create-order
- Correlation Id: orderId=10009
- First Timestamp: 2011-01-16 16:47:08 CET
- Last Timestamp: 2011-01-16 16:47:09 CET
- Log LogLevel: INFO
- Extra Properties: {}

Below the interaction details is a "Log Events" section with a table of log entries:

Id	Timestamp	Host	Service	Endpoint	Log Level	Log Message
7	2011-01-16 16:47:08.396	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	msg-out
12	2011-01-16 16:47:08.506	10.0.1.4 (10.0.1.4) -	sendShippingRequest-sender-service	jms://SHIPPING.SHIPPINGREQUEST.IN.QUEUE	INFO	msg-out
14	2011-01-16 16:47:08.532	10.0.1.4 (10.0.1.4) -	shippingRequest-sender-service	jms://SHIPPING.SHIPPINGREQUEST.IN.QUEUE	INFO	msg-in
15	2011-01-16 16:47:08.541	10.0.1.4 (10.0.1.4) -	shippingRequest-sender-service	file:///Users/magnuslarsson/soitoolkit/file-transport/shippingrequest/outbound	INFO	msg-out
17	2011-01-16 16:47:08.574	10.0.1.4 (10.0.1.4) -	sendOrderConfirmation-sender-service	jdbc://sendorderconfirmation-import-query	INFO	msg-out
18	2011-01-16 16:47:09.261	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	jdbc://orderconfirmation-export-query	INFO	msg-in
19	2011-01-16 16:47:09.267	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	smtp://b442604:****@smtp.bredband.net:25	INFO	msg-out

Extended Demo – SOI Toolkit Ref App

BAM – Business Activity Monitoring with Esper + Grails

The screenshot displays a web browser window with the URL `localhost:8100/tracer/interaction/show/3`. The page features the Grails logo and a navigation bar with 'Home' and 'Interaction List' links. A prominent yellow box at the top right contains the text 'Order Admin Approves the Order'. Below this, the 'Show Interaction' section provides details for interaction ID 3, including the integration scenario 'create-order', correlation ID 'orderId=10010', and timestamps from 2011-01-16 16:48:24 CET to 16:48:55 CET. The 'Log Events' section contains a table with 9 rows of event data, including timestamps, host addresses, service names, endpoints, log levels, and messages. Several cells in the table are highlighted with red boxes.

Show Interaction

Id	3
Integration Scenario	create-order
Correlation Id	orderId=10010
First Timestamp	2011-01-16 16:48:24 CET
Last Timestamp	2011-01-16 16:48:55 CET
Log LogLevel	INFO
Extra Properties	{}

Log Events

Id	Timestamp	Host	Service	Endpoint	Log Level	Log Message
24	2011-01-16 16:48:24.756	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	msg-out
26	2011-01-16 16:48:24.791	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	Assigned: OrderAdmin for order id: 10010
41	2011-01-16 16:48:54.408	10.0.1.4 (10.0.1.4) -	approve-or-cancel-order-service	http://localhost:8090/services/approveOrCancelOrder?tid=4210688&orderId=10010&comment=Ok&approve=Approve+Order	INFO	msg-in
45	2011-01-16 16:48:54.454	10.0.1.4 (10.0.1.4) -	sendShippingRequest-sender-service	jms://SHIPPING.SHIPPINGREQUEST.IN.QUEUE	INFO	msg-out
47	2011-01-16 16:48:54.462	10.0.1.4 (10.0.1.4) -	shippingRequest-sender-service	jms://SHIPPING.SHIPPINGREQUEST.IN.QUEUE	INFO	msg-in
48	2011-01-16 16:48:54.471	10.0.1.4 (10.0.1.4) -	shippingRequest-sender-service	file://Users/magnuslarsson/soitoolkit/file-transport/shippingrequest/outbound	INFO	msg-out
51	2011-01-16 16:48:54.504	10.0.1.4 (10.0.1.4) -	sendOrderConfirmation-sender-service	jdbc://sendorderconfirmation-import-query	INFO	msg-out
52	2011-01-16 16:48:55.149	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	jdbc://orderconfirmation-export-query	INFO	msg-in
53	2011-01-16 16:48:55.155	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	smtp://b442604:****@smtp.bredband.net:25	INFO	msg-out

Extended Demo – SOI Toolkit Ref App

BAM – Business Activity Monitoring with Esper + Grails

GRAILS

Order Admin Cancel the Order

Home Interaction List

Show Interaction

Id	4
Integration Scenario	create-order
Correlation Id	orderId=10011
First Timestamp	2011-01-16 16:48:25 CET
Last Timestamp	2011-01-16 16:49:03 CET
Log LogLevel	INFO
Extra Properties	{}

Log Events

Id	Timestamp	Host	Service	Endpoint	Log Level	Log Message
31	2011-01-16 16:48:25.653	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	msg-out
33	2011-01-16 16:48:25.690	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	Assigned: OrderAdmin for order id: 10011
54	2011-01-16 16:49:02.148	10.0.1.4 (10.0.1.4) -	approve-or-cancel-order-service	http://localhost:8090/services/approveOrCancelOrder?tid=42106886&orderId=10011&comment=No&cancel=Cancel+Order	INFO	msg-in
58	2011-01-16 16:49:02.194	10.0.1.4 (10.0.1.4) -	sendOrderConfirmation-sender-service	jdbc://sendorderconfirmation-import-query	INFO	msg-out
59	2011-01-16 16:49:03.280	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	jdbc://orderconfirmation-export-query	INFO	msg-in
60	2011-01-16 16:49:03.286	10.0.1.4 (10.0.1.4) -	orderConfirmation-sender-service	smtp://b442604:****@smtp.bredband.net:25	INFO	msg-out

Extended Demo – SOI Toolkit Ref App

BAM – Business Activity Monitoring with Esper + Grails

GRAILS

Order Admin is away...

Home Interaction List

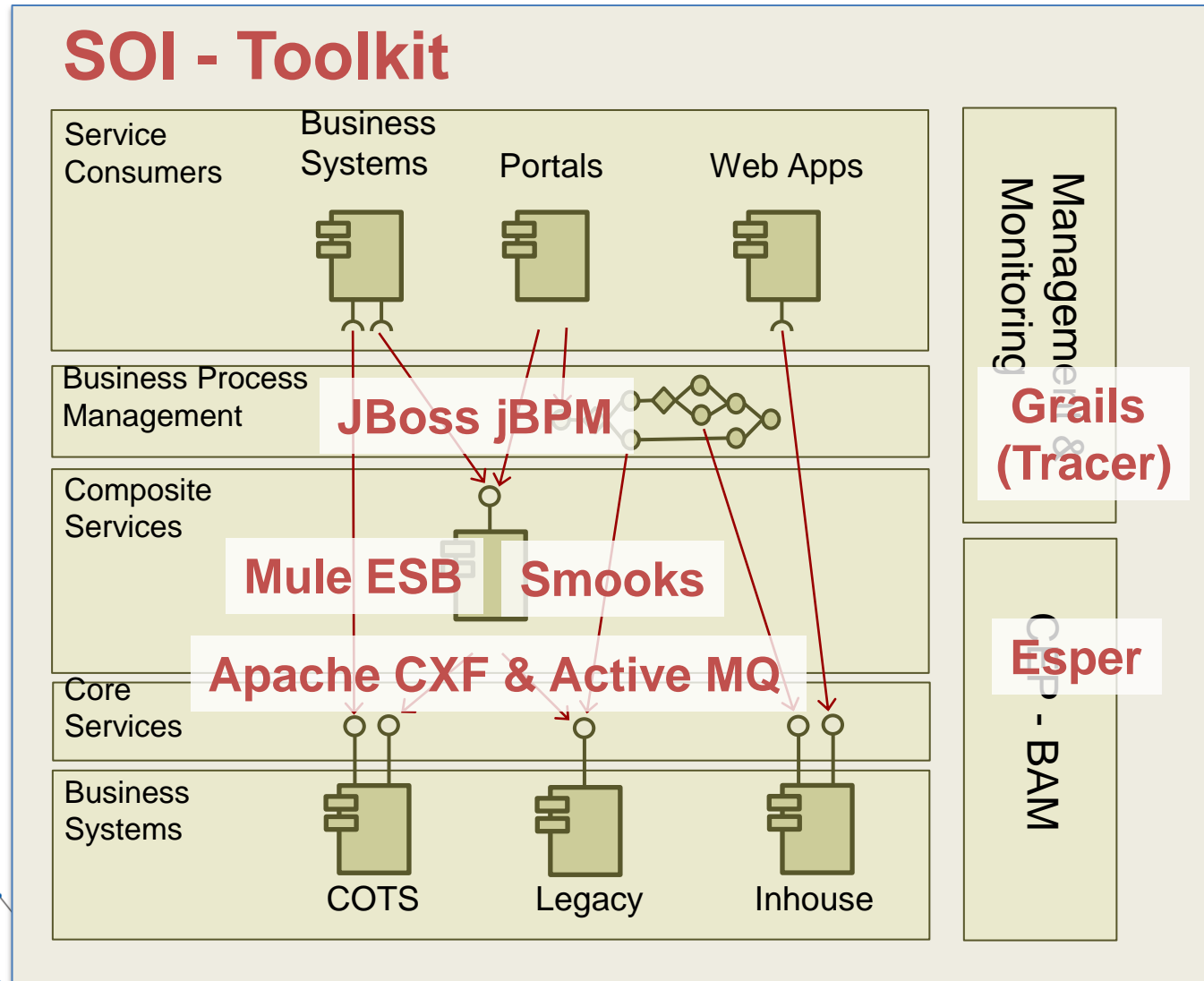
Show Interaction

Id	2
Integration Scenario	create-order
Correlation Id	orderId=10013
First Timestamp	2011-01-16 18:20:05 CET
Last Timestamp	2011-01-16 18:20:10 CET
Log LogLevel	ERROR
Extra Properties	{}

Log Events

Id	Timestamp	Host	Service	Endpoint	Log Level	Log Message
7	2011-01-16 18:20:05.746	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	msg-out
8	2011-01-16 18:20:05.779	10.0.1.4 (10.0.1.4) -	createOrderProcess-to-bpm-service	bpm://create-order-process	INFO	Assigned: OrderAdmin for order id: 10013
9	2011-01-16 18:20:10.916	() -			ERROR	CEP-Statement triggered: MissingOrderDeliveryConfirmation

You have seen the following in action...



Want to know more?

Visit <http://soi-toolkit.org>!

The screenshot shows a web browser window displaying the project page for 'soi-toolkit' on code.google.com. The browser's address bar shows 'code.google.com/p/soi-toolkit/'. The page header includes the user 'magnus.larsson.ml@gmail.com' and navigation links for 'My favorites', 'Profile', and 'Sign out'. The project logo is a blue house with a white '{P}' inside, followed by the text 'soi-toolkit'. A search bar is present with the text 'Search projects'. Below the header is a navigation menu with 'Project Home', 'Wiki', 'Issues', 'Source', and 'Administrator'. The main content area is titled 'Kickstart Service Oriented Integration with Mule ESB'. It features a 'Content' section with a list of links: 'Kickstart Service Oriented Integration with Mule ESB', 'What is soi-toolkit?', 'News!', 'Documentation', 'Collaboration', 'Downloads', and 'For developers of soi-toolkit'. A 'What is soi-toolkit?' section follows, explaining that the tool helps with getting started with Mule ESB and provides a source code generator. A 'News!' section at the bottom mentions a release on Jan 12 2011. The left sidebar contains 'Project Information' (Starred project, Activity, Code license: Apache License 2.0, Content license: Creative Commons 3.0 BY, Feeds) and 'Owners' (magnus.larsson.ml, Peter.Merikan). The right sidebar has 'Links' and 'Groups' (soi-toolkit-user, soi-toolkit-dev, soi-toolkit-scm).

Project Home | Wiki | Issues | Source | Administrator

Summary | Updates | People

Tip: Discuss and then document [each teammate's project duties](#).

Kickstart Service Oriented Integration with Mule ESB

Content

- [Kickstart Service Oriented Integration with Mule ESB](#)
 - [What is soi-toolkit?](#)
 - [News!](#)
 - [Documentation](#)
 - [Collaboration](#)
 - [Downloads](#)
 - [For developers of soi-toolkit](#)

What is soi-toolkit?

Soi-toolkit helps you getting started with Mule ESB in no time using plain Eclipse and Maven.

Soi-toolkit provides a source code generator (as a Eclipse plugin) that can generate:

- Skeleton projects for you with a structure and content that supports an efficient development process based on Maven.
- Skeleton source code for services and integrations by selecting a basic integration pattern (request/response, one-way or publish/subscribe) and then selecting protocols for inbound and outbound messages. Test code is also generated to help you unit-testing the services according to [Test Driven Development](#).

The generator also generates proper setups for handling logging, configuration through property files, creation of skeleton WSDL and XML Schemas that complies to [WS-I Basic Profile](#) with automatic creation of Java code, automatic creation of deployable war files and more...

Soi-toolkit also provides you with some runtime components, reference applications and documentation to further help you to get started quickly.

News!

Jan 12 2011: soi-toolkit v0.3.0 is released, read more in the [Release Notes!](#)

Project Information

- ★ Starred project
- Activity ■ High
- Code license**
[Apache License 2.0](#)
- Content license**
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- Feeds**
[Project feeds](#)

Owners

- [magnus.larsson.ml](#)
- [Peter.Merikan](#)

Committers
[1 committers](#)

Contributors
[0 contributors](#)

[People details »](#)

Links

Groups

- [soi-toolkit-user](#)
- [soi-toolkit-dev](#)
- [soi-toolkit-scm](#)