Implementation of a Global ESB
Schenker AG
Agenda

- Introduction
- Development and Governance Process
- Service Design Guidelines
- Common Integration Patterns
- Technical Architecture
- Questions & Answers
Introduction
Company and Speaker

DB Schenker
CEO: Jochen Thewes

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (Million EUR)</td>
<td>15,451</td>
<td>14,943</td>
</tr>
<tr>
<td>EBIT (Million EUR)</td>
<td>395</td>
<td>332</td>
</tr>
<tr>
<td>Employees (.000)</td>
<td>66.3</td>
<td>64.8</td>
</tr>
</tbody>
</table>

Source: Annual statement DB AG, March 2016

Name: Dr. Alexander Königs
Position: Head of scintilla* ESB/MSG
Chief Integration Architect ESB
E-Mail: alexander.koenigs@dbschenker.com
Web: http://www.dbschenker.com/
Introduction
Starting point back in 2010

- IT landscape of Schenker comprises around 2,000 mostly country-specific applications
- Schenker try to reduce the number of applications to about 500
- B2B and A2A integrations either by direct coupling or by using an EDI platform in a point-to-point manner
- Result: Very intricate and hard to maintain IT landscape
- Additionally: EDI platform offers poor support of XML messages and no support of synchronous integrations

Aim
Implementation of a new integration platform with:
- Allow for reuse of integrations in a service-minded manner
- Native support of XML messages
- Native support of synchronous integrations
Introduction
New Integration Platform: scintilla*

- Product: Oracle Service Bus 11g
- Upgrade to version 12 planned for Q1/2017
- In production since mid of 2011
- Rated as company critical application with highest available SLA
- 2 active/active clusters each with 4 cluster nodes with 16 GB RAM on 2 machines; located in 2 separate data centers
- More than 200 OSB projects (services + adapters) in production
Applications are responsible for implementation of their integrations

- Are trained, guided, and consulted by Integration Architects
- Are provided with documentation (solution architecture, cookbook, etc.)
- Are provided with templates (e.g., for specification, test documentation)
- Need to pass quality gates to enter next phase
Development and Governance Process

Definition Phase

- Phase for requesting new services or changing existing (web-based request form)
- Collection of contact details of requestor, technical responsible, and capacity management
- Description of intended integration scenario and estimated timeline
- Integration Architects perform reviews and clarify open questions
- Integration Architects decide whether a new service is required or whether an existing service should be changed
Phase for specification of services and adapters (functional, non-functional, technical)

Applications are provided with documentation template

Integration Architects assist project in creating the specification and perform reviews

Specification used by developers for implementation and maintenance

Specification used for resolution of support cases

Specification used for capacity management
Development and Governance Process
Coding Phase

- Definition
- Specification & Construction
- Coding
- Testing
- Operation

- Developers are provided with a ready-to-use virtual machine for local development
- Developers are provided with a development cookbook that defines standards for logging, error-handling, and business monitoring
- Developers are provided with automatic code inspection tool
- Developers are required for implementing development test suites
- Integration Architects perform automatic and manual code inspection
Development and Governance Process
Testing Phase

Integration Testing
- Scope: Testing of technical fitness of an integration
- Testing of
  - Erroneous messages
    - Invalid XML messages
    - Non-XML messages
  - Empty messages
  - Temporary unavailability of backend systems
- Error-Handling, Logging, and Business Monitoring

Functional and Non-functional Testing
- Scope: Functional and non-functional fitness of an integration
- Testing of
  - Typical and exceptional business use cases
  - Performance
  - Load behavior
Development and Governance Process

Operation Phase

- Definition
- Specification & Construction
- Coding
- Testing
- Operation

- Monitoring of platform (i.e., Hardware, OS, Weblogic Server, Oracle Service Bus)
- Technical monitoring of integrations
- Business monitoring
  - Aggregated statistics
  - Tracking of single messages
Currently, manually maintained Excel list of assets (OSB projects, JMS queues, canonical message formats, etc.) and their relationship with each other
Asset Management
Outlook: Enterprise Repository
Bottom-Up (past)

- Technical IT requestors try to explain business case for their integration need to the Integration Architects
- Integration Architects try to map business case to existing or new services and to existing or new canonical message formats
- New canonical messages are designed with input from technical IT requestors based on concrete backend interfaces

Top-Down (future)

- IT business analysts model Schenker core business processes and identify necessary business services
- IT information architects model required business information and identify necessary business objects
- Services rely on business service model
- Canonical message formats rely on business objects

Technical focus

Business focus
Common Implementation Patterns

Buffer pattern

![Diagram showing a buffer pattern between System A and System B]

- Proxy service (1)
- Proxy service (2)
- Business service
- JMS
- Persistence store

System A to System B flow diagram with intermediate steps including a buffer pattern.
Common Implementation Patterns

Retry pattern
Common Implementation Patterns
Multicast pattern

*with QoS of Exactly Once
Technical Architecture
Production Stage Overview

Load Balancer

Datacenter 1
- Cluster 1
  - Node 1
  - Node 2
  - Cluster 2
  - Node 3
  - Node 4

Datacenter 2
- Cluster 2
  - Node 5
  - Node 6
  - Cluster 3
  - Node 7
  - Node 8

Machine 1
Machine 2
Machine 3
Machine 4
Thank you for your attention!
Any questions?

Dr. Alexander Königs
Head of scintilla* ESB/MSG / Integration Services
Customer & Business Intelligence CBI (F.LCC)
Schenker AG
E-Mail: alexander.koenigs@dbschenker.com
www.dbschenker.com