The Enterprise Service Bus as part of an integration strategy

ESB FROM A TECHNICAL STANDPOINT: WHAT IS ITS FUNCTION AND WHERE DOES IT FIT?
SUSAN BRAMHALL
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What I’ll cover

- SOA
- ESB architecture
- The Yale SOA / ESB project
Crazy Quilt of Integration Complexity
It only gets worse

The Number of Connections Explodes with an Increasing Number of Systems
Integration Use Cases

Figure 1. Integration Patterns

Data Consistency

Multistep Process

Composite Application

Source: Gartner (July 2008)
Enterprise Integration Patterns

Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions
by
Gregor Hohpe,
Bobby Woolf,
Bobby Woolf

Integration Styles: File Transfer
Integration Styles: Shared Database
Integration Styles: Remote Procedure Call
Identity Sharing the New Way

- Data retrieved directly from HR and SIS
- Updates frequently
- Net ID, UPI and Directory updated immediately
The problem with tight coupling

Assumptions
- Platform technology—internal representations of numbers and objects
- Location—hardcoded machine addresses
- Time—all components have to be available at the same time
- Data format—the list of parameters and their types must match
What is SOA

- Service-Oriented Architecture is a software architecture pattern in which applications or systems are constructed from underlying (and usually distributed) software services that conform to a specific set of characteristics.
  - Loosely coupled
  - Abstract & Location transparent
  - Contract based
  - Reusable & Composable
  - Discoverable
  - Stateless
Integration Styles: Messaging
Consumers are minimally impacted by changes to that service
- Implementation can change
- Location can change
- New features may be added
What is an ESB?

• An Enterprise Service Bus is a runtime platform to help manage the operation of SOA services
• Must handle complex enterprise integration scenarios involving multiple (and often legacy) platforms, protocols and security models
What is Yale doing about SOA?

- **SOA**
  - Domain Model
  - Enterprise integration strategy
Domain Model

- An Example of a domain model that models student and courses
Basic Message-Based Integration
What is Yale doing with the ESB

- ESB - Fuse
  - Open source stack with huge adoption
  - Complex & mature
  - Many Camel EIP components – no java required
  - Development environment for custom components
  - Templates for Yale
The Open Source Fuse ESB
Added value - Security
Law Bench on the ESB

Law Application

Request for course data over http

OSGi service using Apache CXF

XML message object

JPA

Law course data

Law Application

Request for student data

Security policies

authN / authZ

OSGi service using Apache CXF

XML message object

JPA

Law student data
Added value - Filtering
Added value - enrichment
Simple Camel Example

JMS Q is watched by another route which perform content based routing
Custom Components when Necessary

A data change happened in the IAM Virtual Directory Server

Message with data issued

Data converted to Archer specific format

Custom Process Sends data using vendor provided API (SOAP)

Data available to other subscribers

Pushed data Is available on hosted application
We are basing our work on:

- An initial Reference architecture based on
- Recommendations from Jamie Goodyear, a founder and committer to the Apache projects that make up the Fuse suite.