SAP’s Exchange Infrastructure

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1. History and Motivation
2. SAP’s Exchange Infrastructure
3. Key Challenges
4. Standards Stack for Business Applications
5. Summary
The Customers Integration Landscape

ERP legacy:
~25 systems

ERP non-SAP:
~35 systems, different versions

Technical Systems

SAP R/3:
~30 systems, versions 3.1I – 4.6B

e-Procurement:
in 10 units

SAPMarkets
Enterprise Buyer
(Professional Edition)

e-Sales

Collaborative Engineering

Trading
Historical Development

Enterprise Resource Planning

Database Integration
Integration by single centralized data model

Inter-/Intra-Enterprise Co-operation

Direct Connections
Integration nightmare
Exponentially growing complexity

Collaborative Business

Integration Engine & Bus Infrastructure
Shared central knowledge,
Small number of peer-to-peer connections
The Networked Economy

- Customer
- Distributor
- Manufacturer
- OEM
- Parts Provider
- Subcontractor
- Raw Material
- E-Mail
- MS Excel
- Internet
- Oracle
- SAP
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Open E-Business Integration

Portal Infrastructure
User-centric Integration

SAP Web Application Server
Web services provision
J2EE

Exchange Infrastructure
Process-centric integration

SCM
CRM
Legacy / 3rd Party

Unification, Roles, ...

Shared Collaboration Knowledge/Business Semantics

Web services

Business scenarios, Interfaces, ...

Web Application Server – The Integration Infrastructure

Portal Infrastructure

- SAP Web AS
  - Portal Development Kit for J2EE
  - Portal Development Kit for .Net
  - Presentation Layer
    - J2EE/ABAP
    - Business Layer
      - SAP Web Application Server
        - Java Connector
          - Third Party J2EE Application Server e.g. IBM WebSphere
        - Microsoft .Net Connector

Exchange Infrastructure

- SAP Web AS
Exchange Infrastructure – Overview

Shared Integration Knowledge in SAP Integration Repository and Integration Directory
Integration of SAP, Partner and Third Party components

* based on SAP Web Application Server 6.20+
Providing Integration Contents on different Levels

Integration Repository
- Product to be used at design/development time
- At SAP, partner, and customer site
- Shipped along with content

Integration Directory
- Product to be used at configuration time
- At customer site
- Content partially derivable from Integration Repository by configuration tools

Integration Engine
- Product to be used at runtime
- At customer site
- Relies on content of Integration Directory
Integration Repository

Integration Content provided at Design Time

Already contains Integration knowledge for mySAP.com e-Business platform

Open for Partner and 3rd Party components

Content can be filled from different sources using open standard descriptions (e.g. WSDL, xCBL, etc.)

XML and Java based tools
Integration Repository - Interfaces

Central place to define and catalog global and component-specific interfaces
- Interfaces assigned to components
- Tracks different interface versions
- Descriptions of all existing BAPI, IDOCs and RFCs

Includes message types and data types for high reusability

Based on WSDL (Web Service Description Language, W3C)
- Outbound and inbound interfaces
- Synchronous and asynchronous interfaces
- XML Schema to describe data types

Basis for Proxy generation

Global interfaces and types (xCBL, RosettaNet, etc.)

Application developer designs a new interface
Integration Directory

Integration Content provided at Configuration Time

Contains productive integration knowledge at customer site
  - Can be derived from Integration Repository

Open for Partner and 3rd party components

XML and Java based tools
Message Flow in the Integration Server

1. SAP 3.x to SAP Adapter
2. SAP Adapter to Logical Routing
3. Logical Routing to Mapping Framework
4. Mapping Framework to Third Party System

Integration Directory
- Routing
- Mapping
- Services

SAP 3.x
SAP 4.x
SAP Adapter
Third Party System
3rd Party Adapter
mySAP.com Solution*
Marketplace
Business Partner
Business Partner
Business Partner
Firewall
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Challenge – Non-Stop Business

Highly-scalable Integration Server
- „Exactly once“ delivery of messages and execution of services
- Error handling and Monitoring

Availability
- Critical for real time services, where instant responses are needed
- Can be managed more easily for asynchronous, message-based interactions

Lose coupling via XML-Messaging
- Asynchronous communication as far as possible
- Synchronous communication where required

Evolution
- Allow easy and non-disruptive addition of new services and processes
- Integration of existing SAP components
- Integration of existing customer and 3rd party components
Challenge – Shared Business Semantics

Shared process descriptions
- For a common understanding how collaborative work
  - how responsibilities are divided across participants / systems
  - which messages are exchanged under which conditions and events

Shared business rules
- conditions for acceptance of documents, pricing, delivery, payment ...

Shared Integration Repository and Directory
- Of business, services, interfaces, message types
- For distributed execution in multiple businesses, multiple locations and multiple software components

Shared classification and discovery of business and services (UDDI)
- For discovery of businesses which provide certain types of services
- For discovery of services which adhere to certain interfaces and protocols
- Based on common taxonomies like location, industry code
Challenge - Web Services Choreography

WSCI (Web Service Choreography Interface)

- New interface standard proposed by SAP, Sun, BEA and Intalio to drive the adoption of collaborative business applications
- Fill gap between Web service definition languages (e.g. WSDL) and process languages that describe executable processes (e.g. BPML)
- Describe how Web Services interact in choreographed, stateful fashion with other Web services
- Providing a global view of a complex process involving multiple Web services
- Foundation for automated, application-application collaboration

Unstructured Web Services

Collaborative Bidding Process

Download
http://ifr.sap.com/wsci/
Design, definition and description of integration scenarios

- Choreography of interfaces and respective components
- Documentation, owner, customizing activities, ...
- Will drive SAP software development process with effect to documentation, test and implementation
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XML Standards Stack for Business Applications

**Business Related**

- Application level messages and protocols
- Trading partner (ebXML CPPA)
- Discovery, Classification (UDDI)

**Technology Focused**

- Messaging Services (incl. Reliability, Routing, ...)
  - SOAP
- Related Java / J2EE standards
- WSCI / BPML / XLANG / WSFL
- Transactions (BTP..)
- Description (WSDL)

Other items:

- Data Representation and Transformation (XML, Schema, XSLT etc.)
- Transport Protocol (HTTP, SMTP etc.)

Security:

- XML Encryption, XML Signature, DSIG, SAML etc.
mySAP.com is an E-business infrastructure

Integration is the key driver for interoperability
- Collaborative e-business applications
- E-business infrastructure technology
- Non-trivial business applications are requiring to be integrated efficiently

Business applications are still a challenge
- Non-stop business
- Knowledge about business semantics
- Web Services choreography for collaborative apps

Business infrastructure
- Based on open Internet standards
- Integration of XML-based applications with legacy / 3rd party applications
- Direct and guide the future development in interoperability
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