Large Scale B2B Integration with Oracle Fusion Middleware

Anne Knapp, VP of Technology, SPS Commerce
Sean Carey, Lead / Software Architect, SPS Commerce

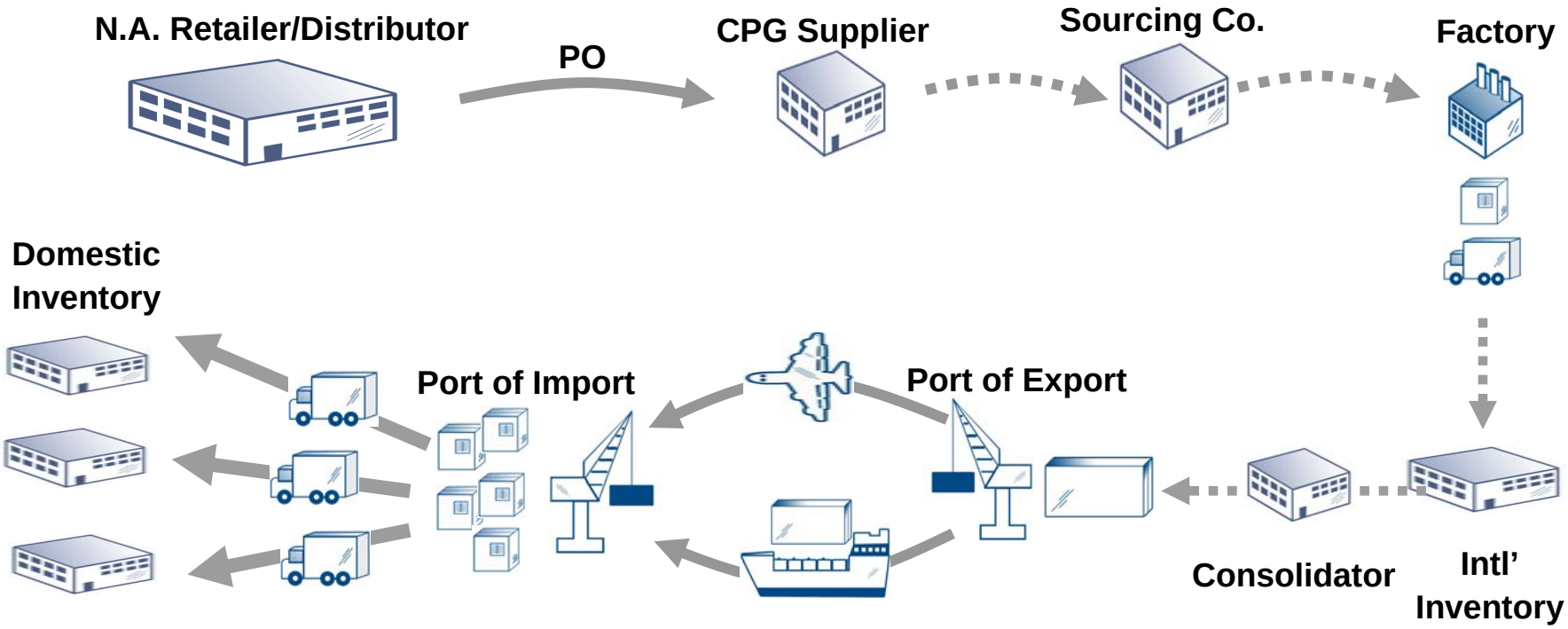
Topics

- SPS Commerce Overview
- Today's Market
- Business Challenges and System Requirements
- Solutions using Oracle's Fusion Middleware
  - Architecture
  - Lessons Learned
  - Technical Challenges and Solutions
- Questions

SPS Commerce Overview

- Leader in B2B integration delivered using a SaaS / multi-tenant model
  - 20,000+ suppliers
  - 1,300+ buying organizations
  - 79,000 connections
- Founded in 1996
- Headquartered in Minneapolis
  - Additional offices in Beijing, LA, Houston, and NJ
- 270+ Employees

Multi Party Supply Chain

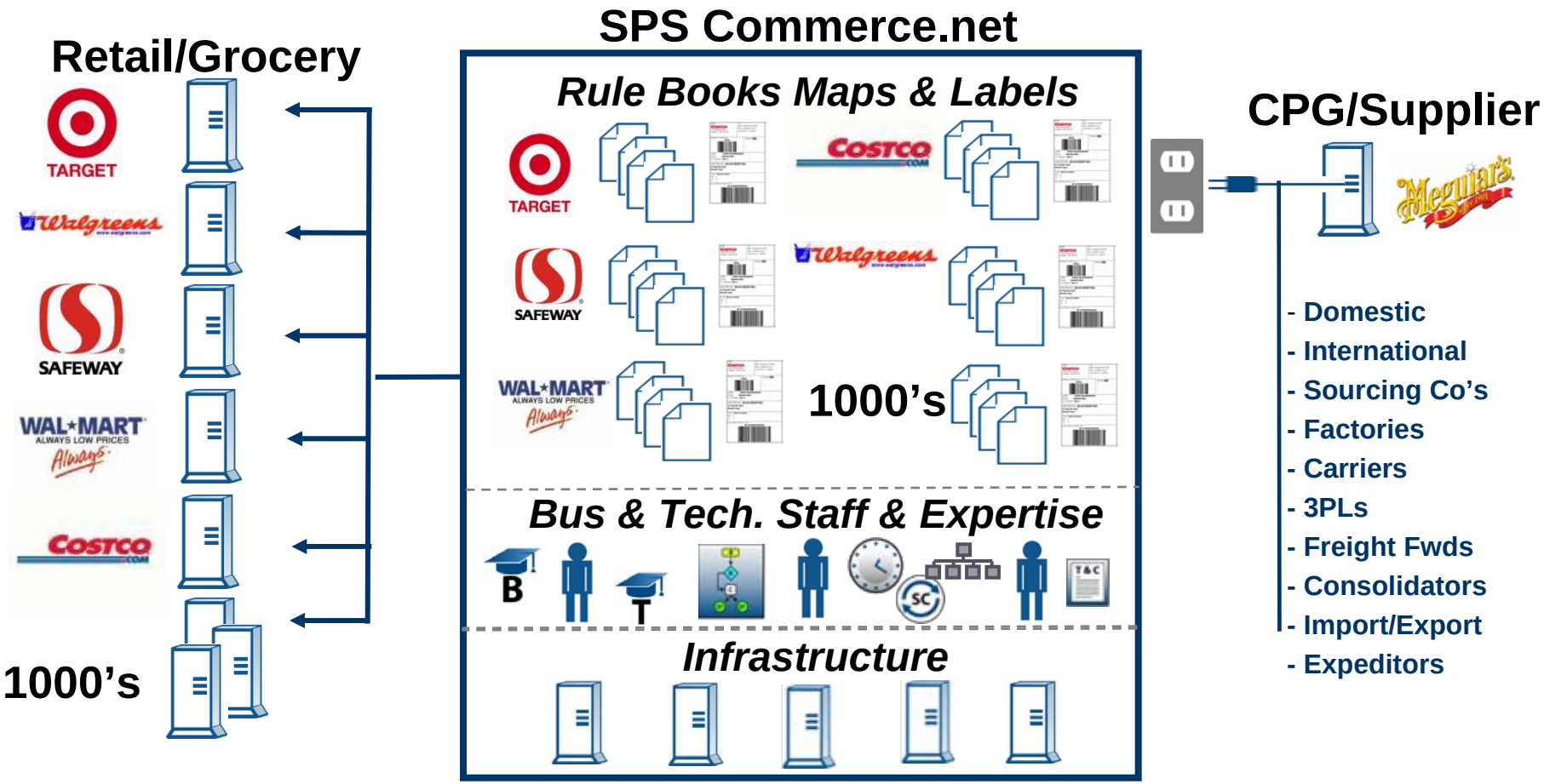


The outsourcing of fulfillment tasks creates challenges:

- Who needs P.O. information?
- Who needs to send ASNs (or "ASN-like") documents?
- Who needs to produce labels?
- How are transactions and content managed?

How do fulfillment partners satisfy their CPG customer's B2B integration requirements?

SPS Commerce Solutions



- Solves Problems Software Never Could/Can
  - Global Geography, Multiple Partners, New Markets (Logistics, Inventory Management, Import/Export, Sourcing Service Providers)

Business Challenges and Solution Requirements

- Availability
  - Demand for better system uptime, data processing times
  - Easy “performance tuning” - Add computing / processing capacity with minimal effort
- Serviceability
  - Provide better tools, information for internal users and customers
    - Easily track a document through all processing points
    - Single interface for managing trading relationships, document status and error resolution
    - More up to date information for overall document processing performance
    - Enhanced user experience for SPS services
    - Ease of customer implementation
- Reliability
  - Support for diverse trading relationships – retailer to vendor, vendor to vendor, 3PL, international, etc.
  - Optimized shared processes

Business Challenges and Solution Requirements

- Innovation
  - Business Process Modeling
    - Applications that support requirements of all areas of the Supply Chain
      - Retailer
      - Vendor
      - Logistics
      - Manufacturing
  - Flexibility and adaptability
    - Move away from EDI as de facto data format
    - Easily plug in “adapters” for new products and services
    - Extend integration beyond SPS firewall

Selecting a Solution

- Legacy system issues
  - Lack of clustering/scalability
  - Batch cycles limit throughput
  - Bottlenecks create data backlogs
  - EDI-centric design
  - Inadequate reporting/audit capabilities
- High level requirements
  - Highly scalable
  - Event-driven, parallel processing
  - Move away from dependency on EDI
  - Provide greater visibility

Oracle SOA Suite

- SOA principles align well with SaaS requirements
  - Agility
  - Reuse
  - Standards-based integration
- Full suite of tools
  - JDeveloper & ADF
  - BPEL
  - B2B
  - Grid Control
  - BAM & BI
- Supports a move from EDI to XML as standard data format

From design to production

- Up-front design is critical for SOA
  - Analyze business processes
  - Break out reusable service components
  - Message design and data structures
- What this means for SPS
  - Support transformation and routing of data between thousands of trading partners
  - Hundreds of different document and data formats
  - Hundreds of different business processes and connection models
  - System must be easy to extend and maintain without development overhead

The SPS Commerce Data Center

- Multi-layered, configuration-driven approach
- Manage connections between thousands of retailers and suppliers
- Handle both EDI and non-EDI documents through the same system
- Comprised of three main functional layers
  - Communications and presentation services
  - Data transformation
  - Document routing

Communications and Presentation Services

- Handles data delivery between SPS and its external customers
- Is comprised of both visual/interactive services and data communications
- Specialized BPEL services orchestrate the interaction between external systems and the data center using those systems' native protocols

Data Transformation

- Internal data store is canonical xml format
- Transformation services utilize custom java-based technology for which thousands of maps have already been developed
- Integration through JMS provided a simple bridge from legacy to SOA with little coding involved
- Canonical data allows for greater reporting/visibility as well as flexibility to route independent of customer, format and service

Document Routing

- Consumes and transmits only canonical data
- Performs tracking and analysis of data
- Runs customer-specific business rules
- Process is reversed for delivery to recipient (route, transform, communications)

Key Features

- End-to-end processes are not described at the bpel level
- Configuration drives the process flow from stage to stage using dynamic linkage
- Extensions and new features are added through configuration rather than code
- Other essential services include Error Hospital, partner setup, service configuration and data/process monitoring

Lessons Learned

- Performance tuning
  - Infrastructure level
  - Application/service level
- Infrastructure tuning
  - Memory allocation
  - Connection pooling (adapters, db)
  - Process concurrency
  - Dehydration store
- Application tuning
  - Synchronous vs. Asynchronous process design
  - Resource consumption vs. dehydration activity

Technical Challenges and Solutions

- Document size
  - Problems
    - EDI has a legacy of large documents
    - SOA messages typically processed in memory as objects
    - Arbitrarily large objects impact performance and stability
  - Solutions
    - Work with partners to manage document size
    - Break up large data sets with many repeatable groups

Technical Challenges and Solutions

- Message bursts
  - Problems
    - Batch cycles and job lists produce bursts of message activity
    - SOA assumes message independence
    - Messages processed in parallel, creates high-load conditions
  - Solutions
    - Work with partners to increase frequency, decrease batch size
    - Use traffic shaping to serialize processing activity and spread messages out over time

Project Results

- Increased capacity
  - 3 million transactions per month
- Improve service reliability and performance
  - Reduced processing time by 80%
  - Improved error handling, notification
- Increase the use of automated processes to reduce manual labor
- Minimize technical support workload
  - Easily identify and resolve problems

Questions?