UDDI: The Web Services Registry Standard

OASIS UDDI Specification Technical Committee

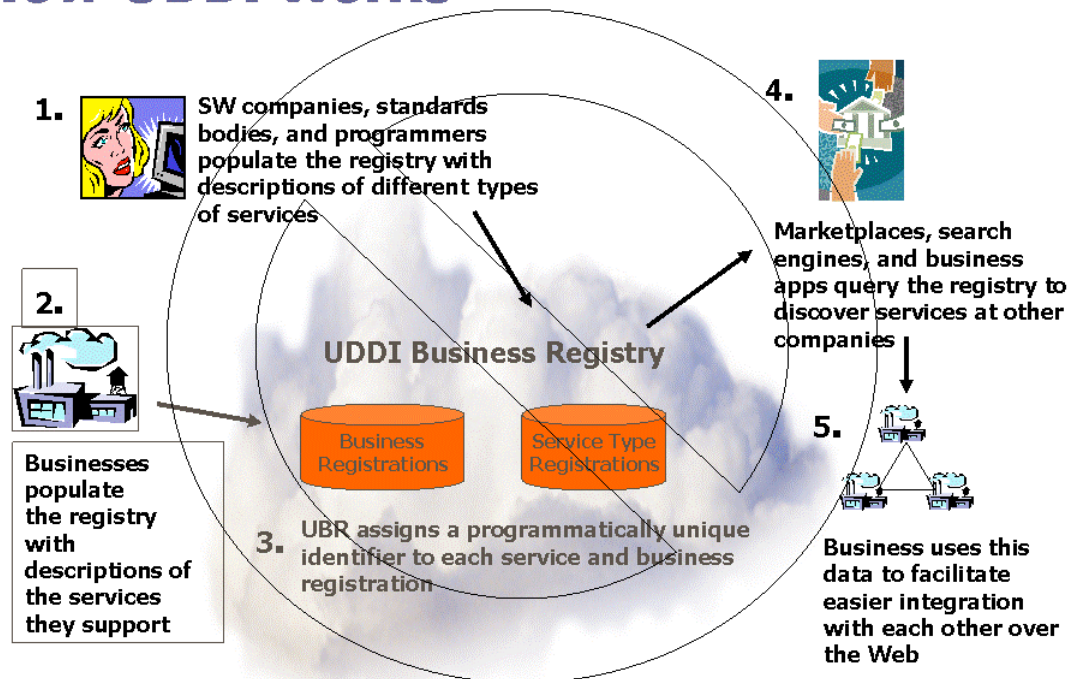### Gartner Application Integration and Web Services Summit

Orlando, 17 November 2004

Agenda

- UDDI Update - Luc Clément, Systinet, Co-chair OASIS UDDI Spec TC
- Case Studies
    - "UDDI at The Hartford"– Ben Moreland, Director - Application Infrastructure Delivery, The Hartford
    - "Schwab UDDI Experiences"– Dylan Lewis, Technical Director, Charles Schwab
    - Q&A
- Interoperability Demo: BookWorld Inc.
    - Rick Allen, IBM Software Group
    - Luc Clement, Systinet
    - Daniel Feygin, UnitSpace
    - Claus von Riegen, SAP AG
    - Zhe Wu, Oracle
- Q&A

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How UDDI Works

1. SW companies, standards bodies, and programmers populate the registry with descriptions of different types of services

2. Businesses populate the registry with descriptions of the services they support

UDDI Business Registry

Business Registrations

Service Type Registrations

3. UBR assigns a programmatically unique identifier to each service and business registration

4. Marketplaces, search engines, and business apps query the registry to discover services at other companies

5. Business uses this data to facilitate easier integration with each other over the Web

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Web Services Registry Protocol

- **Universal Description, Discovery and Integration**
- **UDDI protocol**
  - Inquiry, Publish, and Subscription APIs
  - A data model with built-in extensibility using metadata
- **Design-time**
  - Facilitates visibility and reuse
- **Runtime – protocol for an adaptive enterprise**
  - Dynamic location
  - Dynamic binding
  - Dynamic discovery

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UDDI Specification Evolution

- UDDI v1 Specifications - 2000
  - UDDI Programmer's API 1.0
  - UDDI Data Structure Reference V1.0
- Transition made from:

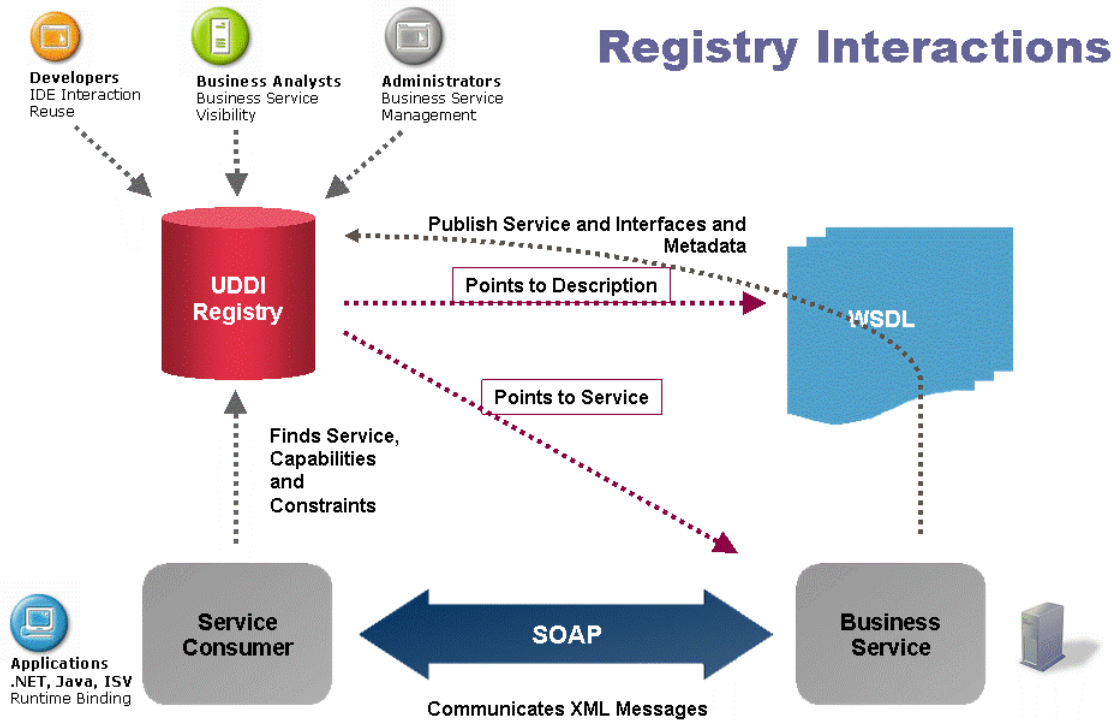| The Web services Standard Registry (i.e. UBR)	→	The Web services Registry Standard
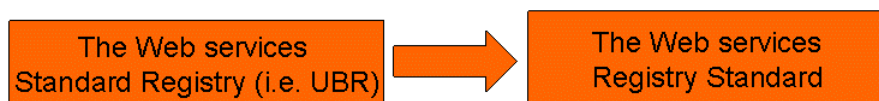
- UDDI v2 specifications – OASIS Standard – Sep 2002
  - UDDI Version 2 API Specification
  - UDDI Version 2 Data Structure
  - UDDI Version 2 Replication Specification

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UDDI v3

- Key focus: enterprise readiness
- Key features
  - Information Model Improvements
  - Extended Discovery Features
  - Support for digital signatures
  - Publisher Assigned Keys
    - Support for Multi-Registry Environment
    - Human-friendly, URI-based keys
  - Subscription API
- Submitted to OASIS and formation of the OASIS UDDI Spec TC – July 2002
- UDDI v3 specifications – OASIS Standard by Jan 05
  - UDDI Version 3.0.1 and 3.0.2
  - Extensive vendor and community feedback and interoperability tested version of the spec

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Registry Interactions

Developers
IDE Interaction
Reuse

Business Analysts
Business Service
Visibility

Administrators
Business Service
Management

UDDI
Registry

Publish Service and Interfaces and
Metadata

Points to Description

WSDL

Points to Service

Finds Service,
Capabilities
and
Constraints

Applications
.NET, Java, ISV
Runtime Binding

Service
Consumer

SOAP

Business
Service

Communicates XML Messages

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Registry: Foundation for SOA

- ## Frank Kenney, Gartner Research Analyst
  - "There's tremendous power for SOA governance if you store process, policy, SLA's, and related information about services in a registry. Gartner believes that registries will be essential to minimally discover and document services and preferably to enable the governance function."

- ## Registry: SOA's system of record
  - Categorized index of services, interfaces and their metadata

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Modeling your enterprise

- Definition of taxonomies to model business services
  - Semantic information that enables reuse of services
  - Lifecycle
    - Lifecycle stages: Design, develop, test, deploy, configure, provision, discover, operate, manage, and maintain services
  - Availability and performance characteristics of the service - QoS
- Essence: Taxonomies key to a semantic rich registry

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Why do you need a standard

- Standardization:
  - Interoperability
  - Broad platform support
  - Broad vendor support:
    - Acumen Technology
    - Apache.org
    - BEA
    - Bindingpoint
    - Cape Clear Software
    - Fujitsu
    - IBM
    - IONA
    - Microsoft
    - Novell
    - Oracle
    - SAP AG
    - Select Business Solutions
    - Sun Microsystems, Inc
    - Systinet
    - webMethods
  - UDDI is the core and open registry standard for Web services and enterprise SOA

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Standards Convergence on UDDI

- Web services specifications are now converging to UDDI
- Several domain specific standards
  - **Policy** - mapping of WS-policy onto UDDI
  - **Orchestration** - publication and discovery of BPEL4WS abstract processes
  - **Management -** publication and discovery of metrics and manageability provider information - WSDM
  - **Portal Integration -** publication and discovery of WSRP Producer and Portlet services

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Next on the agenda

- Case Studies
  - "UDDI at The Hartford"– Ben Moreland, Director - Application Infrastructure Delivery, The Hartford
  - "Schwab UDDI Experiences"– Dylan Lewis, Technical Director, Charles Schwab
  - Q&A
- Interoperability Demo: BookWorld Inc.
- Material: Complete your evaluation forms

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UDDI at The Hartford

November 17, 2004

Benjamin Moreland
Director, Application Infrastructure Delivery

The Hartford

- Founded in 1810
- One of the largest investment and insurance companies in the United States.
- 30,000 employees
- Two Operations:
  - Hartford P&C
  - Hartford Life

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Outline

- P&C SOA Reference Arch. History
- SEMCI
- UDDI Solution
- Summary

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P&C SOA Reference Arch. History

- Implementing SOA since 1999
- Local registries
- 2002-2003 – Development of P&C Reference Architecture (SOA based)
- 2003 – Began enterprise SOA approach. Purchased SOM and UDDI tools
- 2004 – SOM & UDDI tools in production

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P&C SEMCI

- ACORD (1970) sets standards
  - www.acord.com
- Single Entry Multiple Carrier Interface
  - www.semci.org
- A leader since 1997 in the commercial SEMCI space – first app in use
- Real-time request/response XML application (quote, schedule & add)

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P&C SEMCI (cont)

- SEMCI request/reply process
  - Accept ACORD XML message
  - Authenticate
  - Validate (rule-based edits)
  - Translate to main frame (AL3)
  - Quote from main frame
  - Translate to XML
  - Echo
  - Respond with ACORD XML message

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1 Minute SOA

Find, Bind & Execute
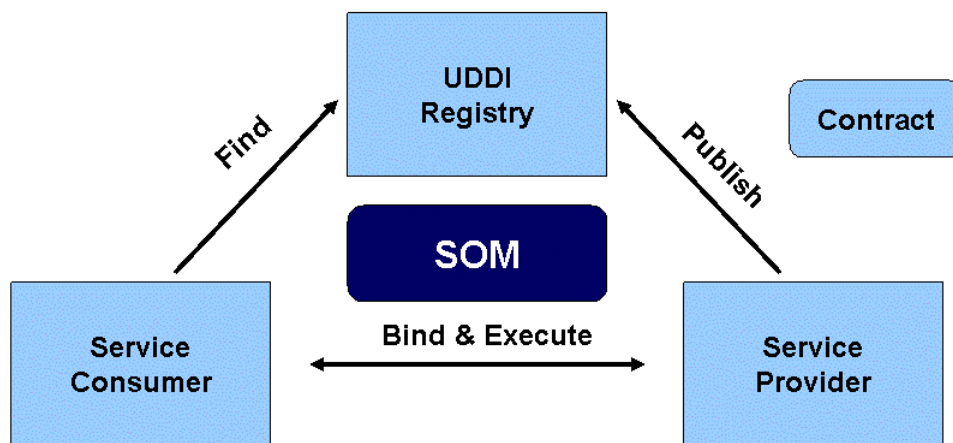
SOA SEMCI issues

- Multiple versions of ACORD specs
  - AL3, CR 2, 1.0, 1.1, 1.3, 2.0
- Multiple Business Messages
  - Auto, W/C, BOP, Property, GL
  - Add, Quote, Inquiry, Schedule
- Multiple Business Segments (MM, SC)
- Multiple versions of app/service releases
- Multiple environments (Dev, QA, Prod)
- Scalability
- Reduced maintenance

SOA SEMCI Application

DMZ

SEMCI Orch

SOAP

ACORD XML →

← ACORD XML

Network Appl

SOAP ←→ **SOM** ←→ SOAP

Edit

XML->AL3

Quoting Engine

AL3->XML

Echo

Auth
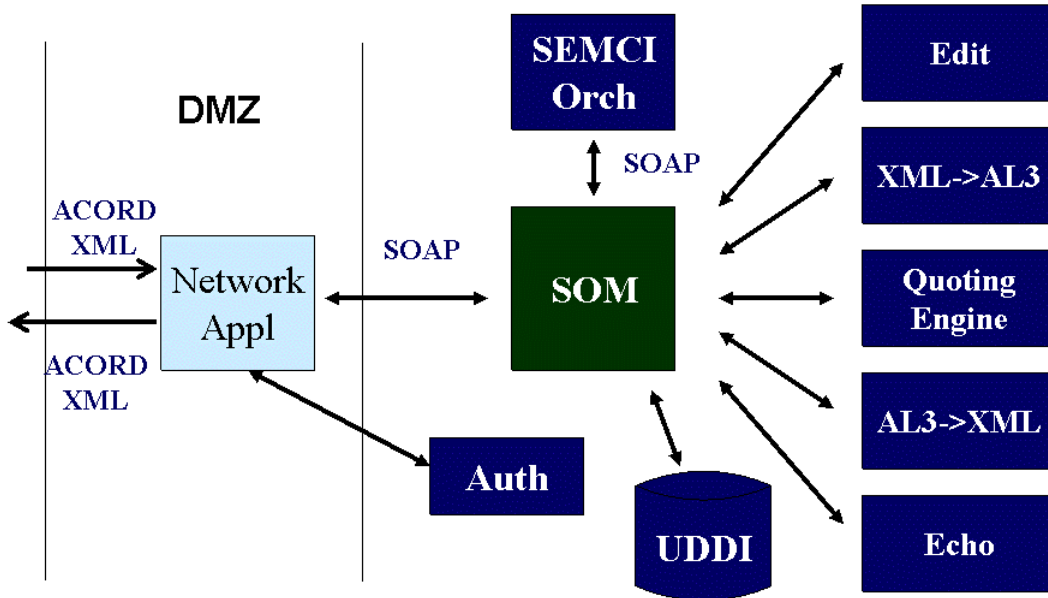
UDDI

9

The Hartford UDDI Solution (Design Time)

Architect, Developer

UI

UDDI

Service request →

← TModel(s)

TModel →

← Service(s)

Service/TModel →

← Binding Template[WSDL location]
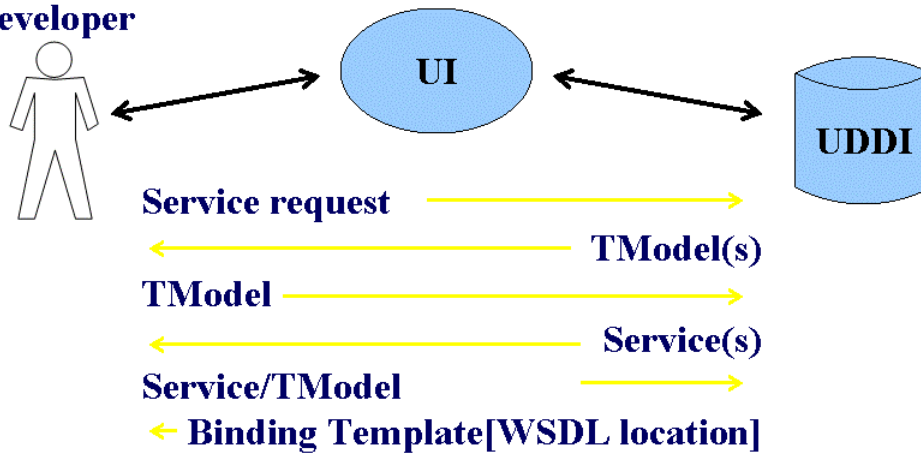
10

The Hartford UDDI Solution (Runtime)

ACORD
XML

SEMCI
Orch

ACORD
XML

Service
Request

WSDL loc

WSDL,Data

SOAP
response

UDDI

WSDL/Data

Proxy

Service

Data
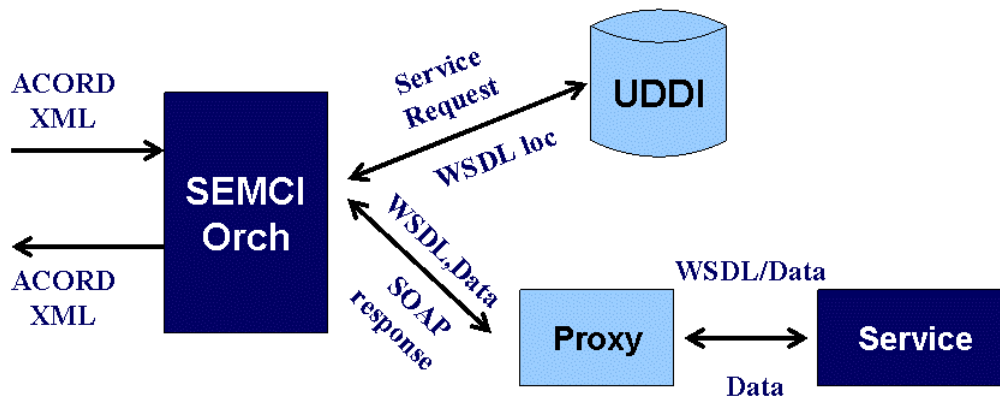
11

Successful SOA

- ## Technology
  - – Reference Architecture, Roadmaps
- ## Operations
  - – Def'n of a service, UDDI, SLAs, Testing, Support
- ## Organization
  - – Support of first two, SOA incentives

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UDDI Summary

- UDDI
  - Provides versioning capabilities
  - Simplifies design
  - Provides greater flexibility
  - Design time & runtime benefits (reuse, modifiable, manageable, buildable)
  - Reduces maintenance
- Final Question
  - What should be in UDDI?

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Thank you

Benjamin Moreland

The Hartford Financial Services Group

Director, *Application Infrastructure Delivery*

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Schwab UDDI Experiences

Dylan Lewis
Nov 2004

Introduction

- ## Project Overview
- ## UDDI Function
- ## UDDI Implementation
  - – Physical Manifestation
  - – Best Practices 2 and UDDI Version 3
  - – Endpoints
  - – Policies
  - – Directory Client
- ## Conclusions

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Request Reply Bus

- Reusable Infrastructure to enable any service requester to invoke a service, in any environment, using industry standard mechanisms
- Implementation concentrated on Mainframe and Java providers, .NET and Java requestors using SOAP/HTTP.

Request Reply Bus Architecture
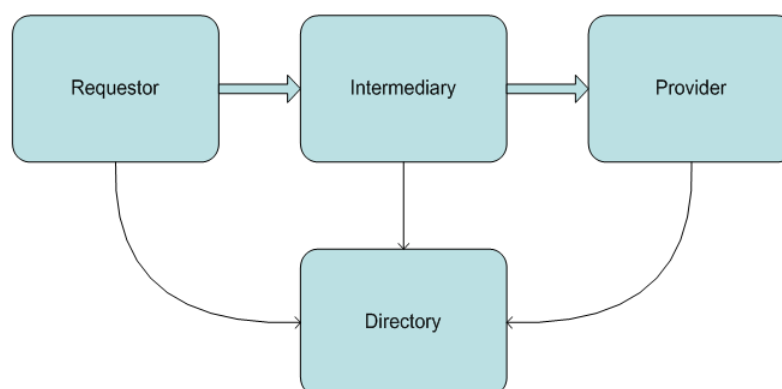
+ Tools and Processes

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UDDI Function

- Both runtime and development time usage.
- Development time is 'traditional' service information and WSDL reference
- Runtime usage allows the rest of the infrastructure to make decisions based almost entirely on directory contents.

UDDI Implementation
Physical Manifestation
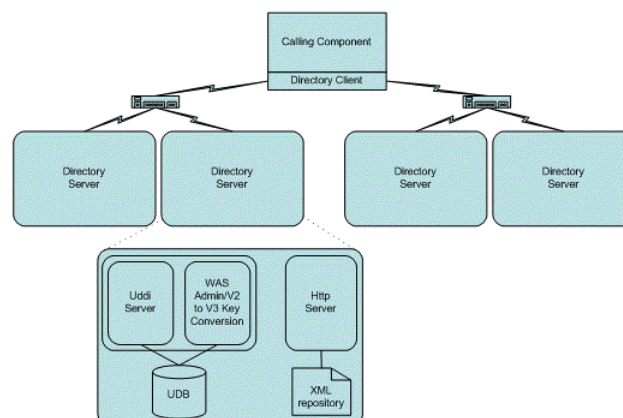
WSDL in UDDI Best Practices 'Version 2'.

- Uses more 'complete' mapping.
- Positions for the future w.r.t. to tools e.t.c. and precluded need for migration project.
- Needed to load custom schema and develop custom tools.
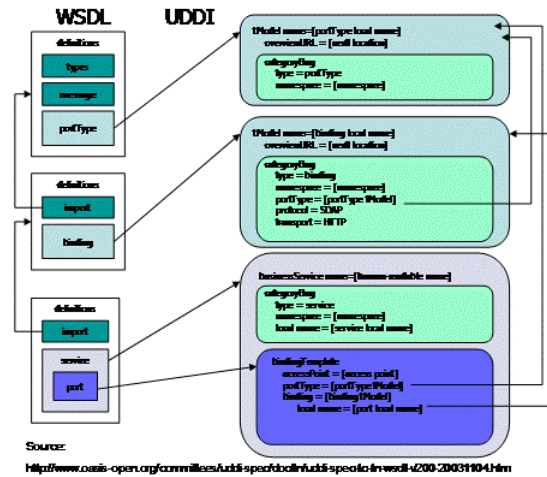
UDDI Version 3 Key

- UDDI Version 2 keys are UUIDs
- Version 3 keys are human readable.
- We implemented a mapping web service to allow Applications to use V3 keys.
- Directory Client performs key mapping.
- This will prevent future application changes.

V3_KEY	V2_KEY
uddi:schwab.com:service:PerformTrade	621ED516-CE9D-3392-AD45-0478E840D0E2

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Endpoints

- WSDL contains http://null as the endpoint.
- Directory Contains 'Public' and 'Private' Endpoints
- Client looks up Public Endpoint at runtime.
- Intermediary looks up multiple 'private' endpoints and selects one of the URLs

Polices

- Majority of runtime behavior is based on 'policies'
- E.g. logging policy, various routing policies, security policy e.t.c.
- Policies are attached to 'service' or 'port' only.
- Most policies are represented by XML referenced by OverviewURLs in UDDI.
- Implemented prior to WS-PolicyAttachment (et al)

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Directory Client and Caching

- Components using the UDDI directory, particularly at runtime, use a Schwab built directory client API.
  - Implements a caching scheme
  - Abstracts whether JAX-R, UDDI4J, JAX-RPC, e.t.c. are used to access UDDI
  - Simplifies directory usage for calling components e.g. specialized APIs to return policies.

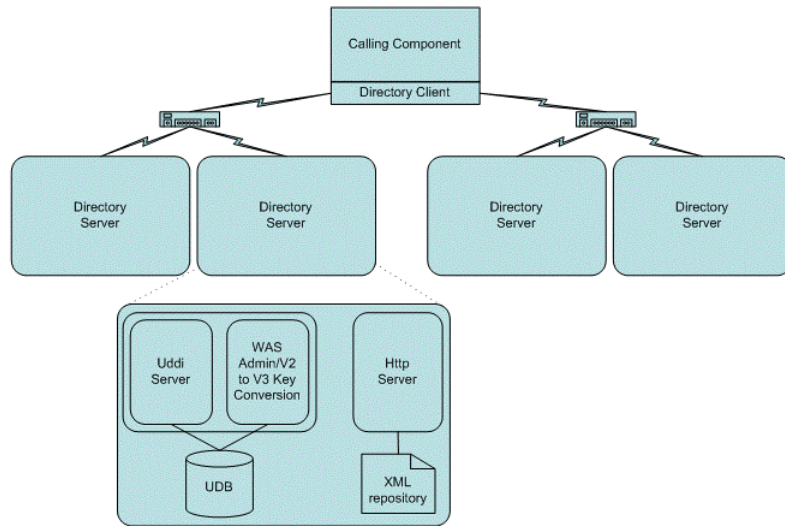Nov 2004   © 2004 Charles Schwab & Co., Inc. All rights reserved. Member SIPC.   11

Data Model
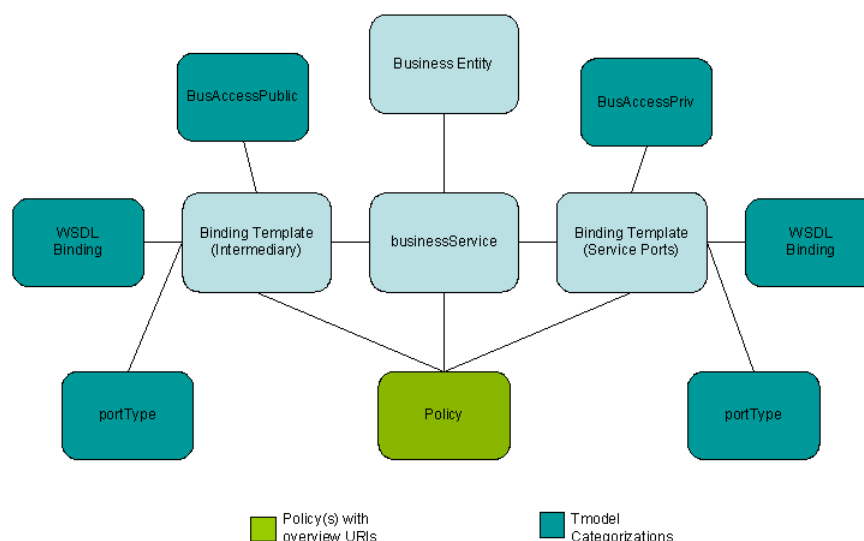
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Review

Calling Component

Directory Client

Directory Server

Directory Server

Directory Server

Directory Server

Uddi Server

WAS Admin/V2 to V3 Key Conversion

Http Server

UDB

XML repository

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Review 2

Requestor

Intermediary

Provider
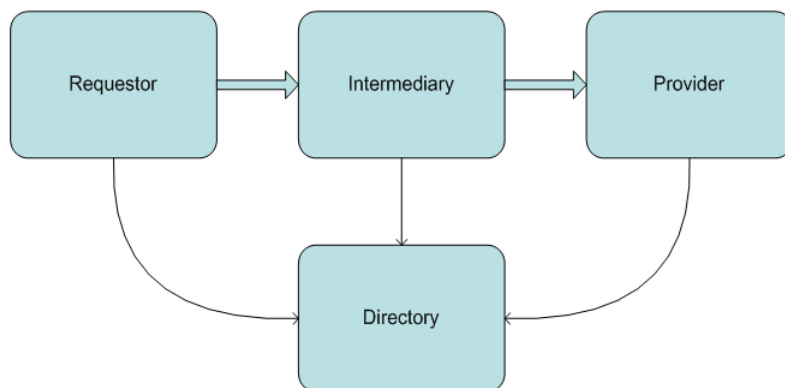
Directory

+ Tools and Processes

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Summary/Conclusions

- Remember WSDL/XML is not stored in directory
- Many UDDI APIs to choose from – very confusing picture in recent past.
- Nearly everything is a Tmodel which is simple and complex at the same time.
- Expecting more tooling such as built in policy support.

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Interoperability Demo: BookWorld Inc.

OASIS UDDI Specification Technical Committee

Gartner Application Integration and Web Services Summit

Orlando, 17 November 2004

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Agenda

- **Interoperability Demo: BookWorld Inc.**

  - Rick Allen, IBM Software Group

  - Luc Clément, Systinet

  - Daniel Feygin, UnitSpace

  - Claus von Riegen, SAP AG

  - Zhe Wu, Oracle

- **Q&A**

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Setting the stage

- **The Corporate Purchaser for BookWorld Inc.**
  - monitors inventory level
  - buys books on behalf of the entirety of the chain
- **Store locations**
  - Centralized Outlet Inventory Level Service
  - Flagship store
- **Inventory Consolidation and Procurement Service**
  - Invokes store inventory level services
  - Invoke BookWorld suppliers' Supplier Availability and Order Services

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Our Goal

- **Demonstrate the advantages of registry as a foundation of SOA**
  - Transparency
  - Built in flexibility/easy adaptation to meet dynamic business needs
  - Reduce costs of inevitable change/evolution
- **UDDI as a standard and implementation is reality:**
  - 5 vendors involved in the demo
  - different UDDI registry implementations
  - different UDDI client implementations

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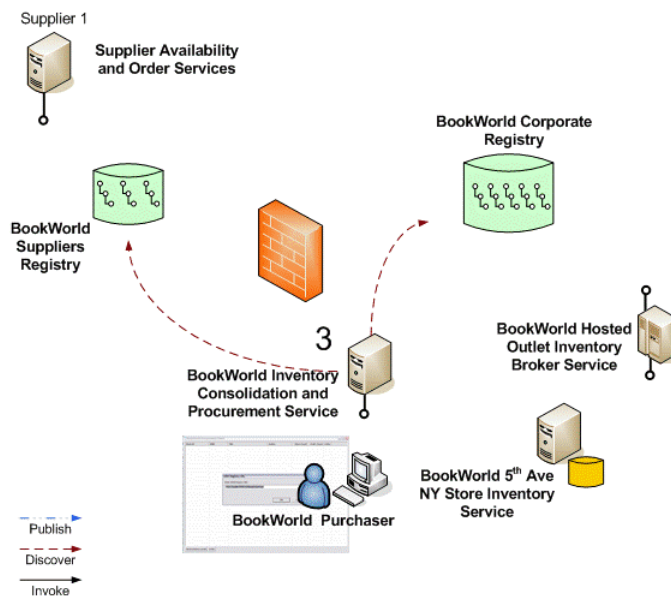# Setting the Stage – UDDI Registries and Clients

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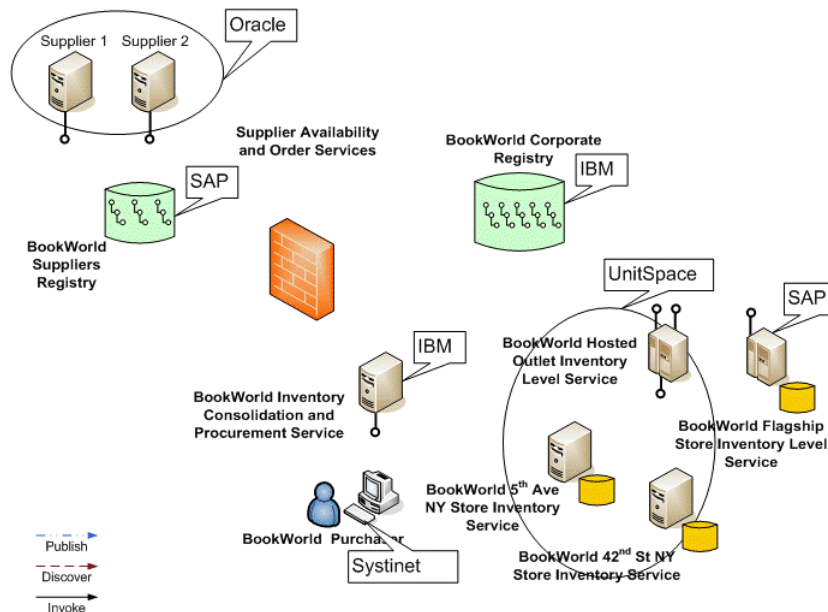
Made easier with test registries

Initial State

The BookWorld Procurement Client

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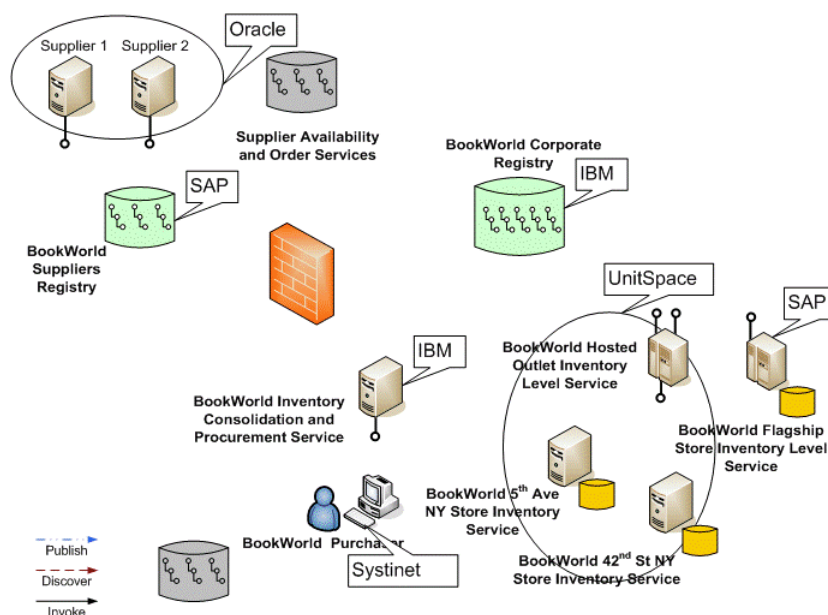
Start the client and invoke inventory check

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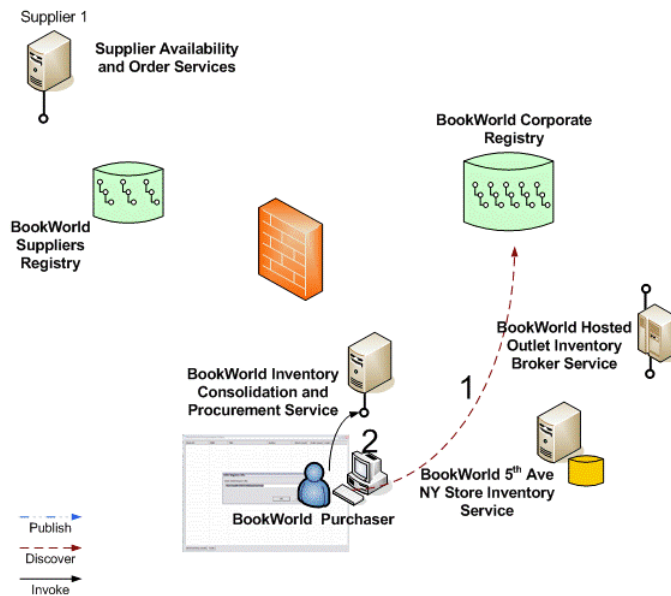
Inv & Consolidation Svc Discovers Stores and Suppliers

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Store inventory check performed and book orders placed

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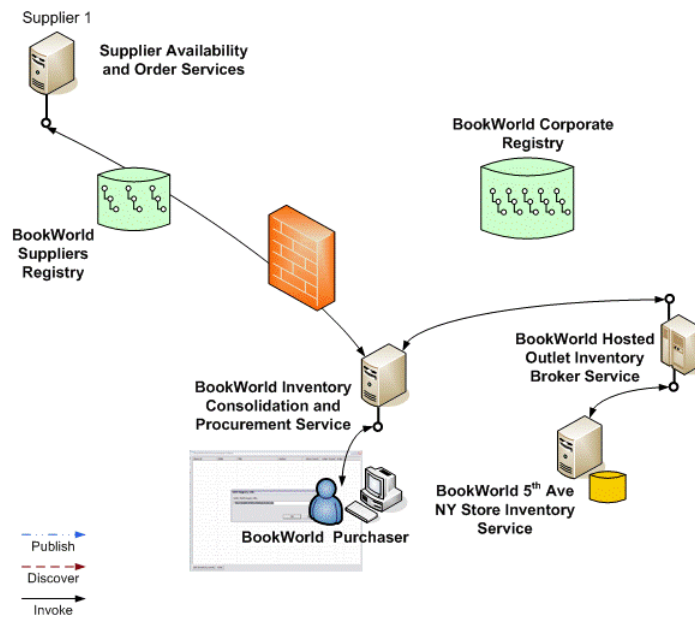
Flagship Store Inventory Level Service Added

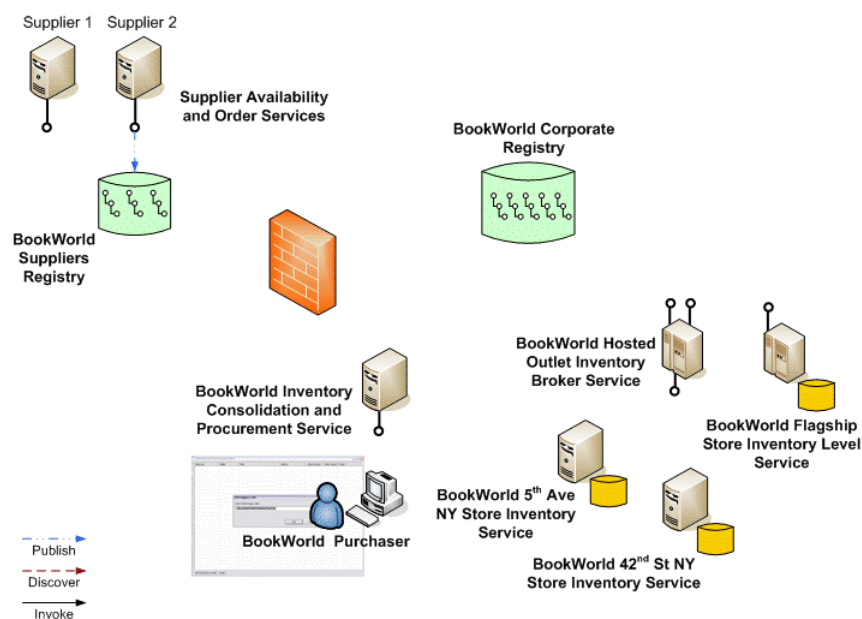http://www.oasis-open.org
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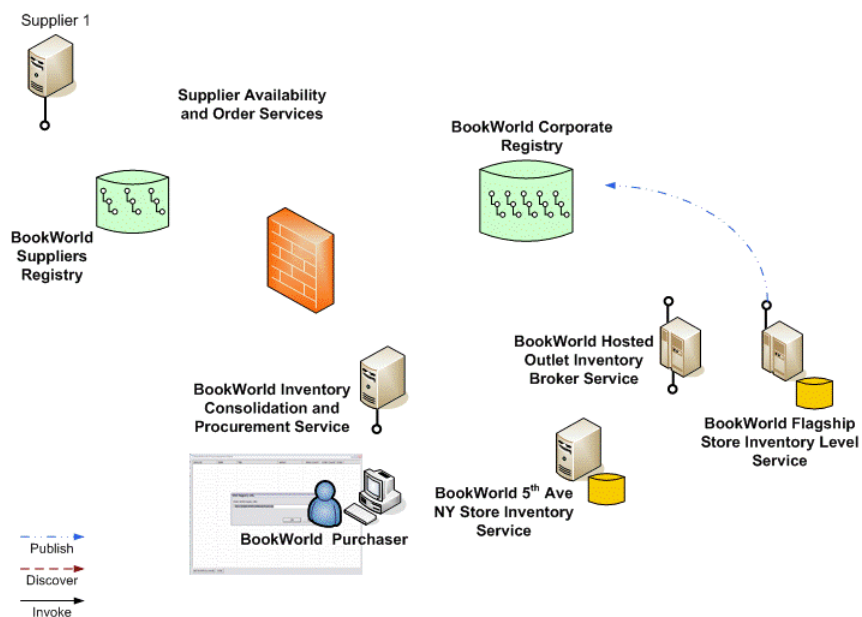
Hosted Outlet Store Inventory Broker Service Added
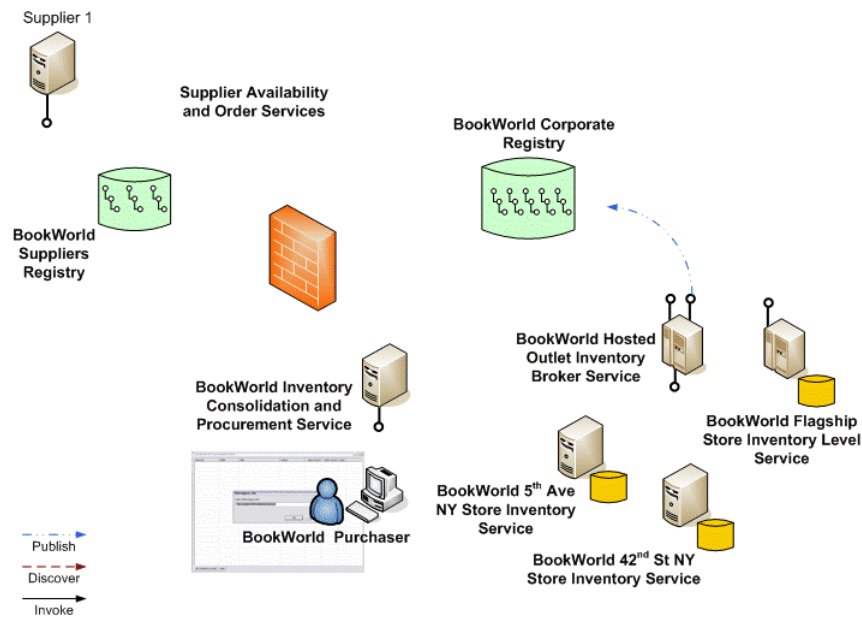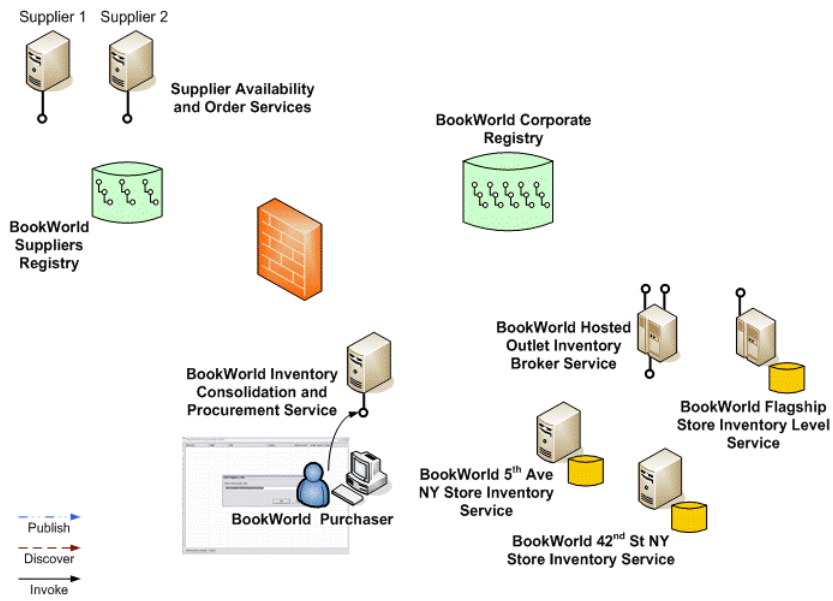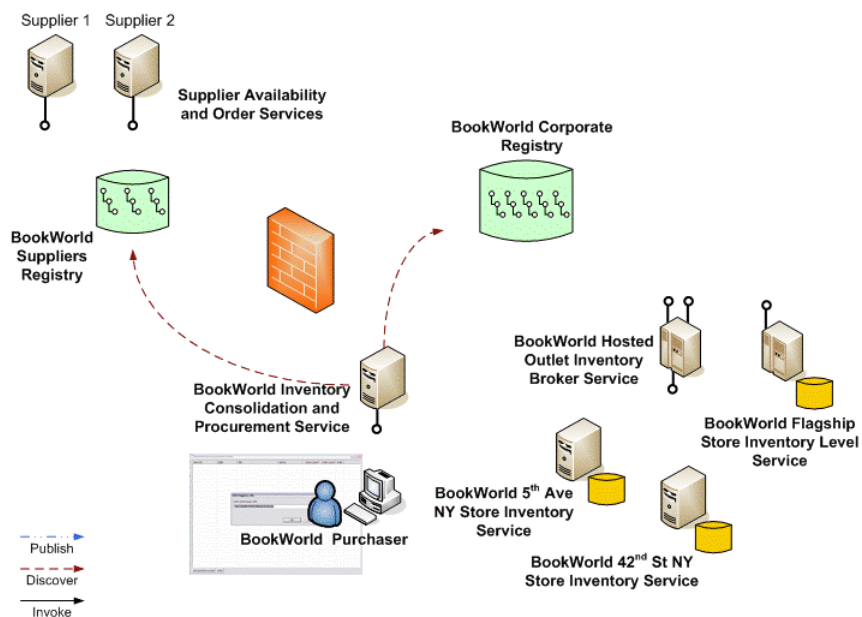

New Supplier Added

Inventory Check Performed

New stores and suppliers discovered

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New store inventories checked and new source of suppliers available

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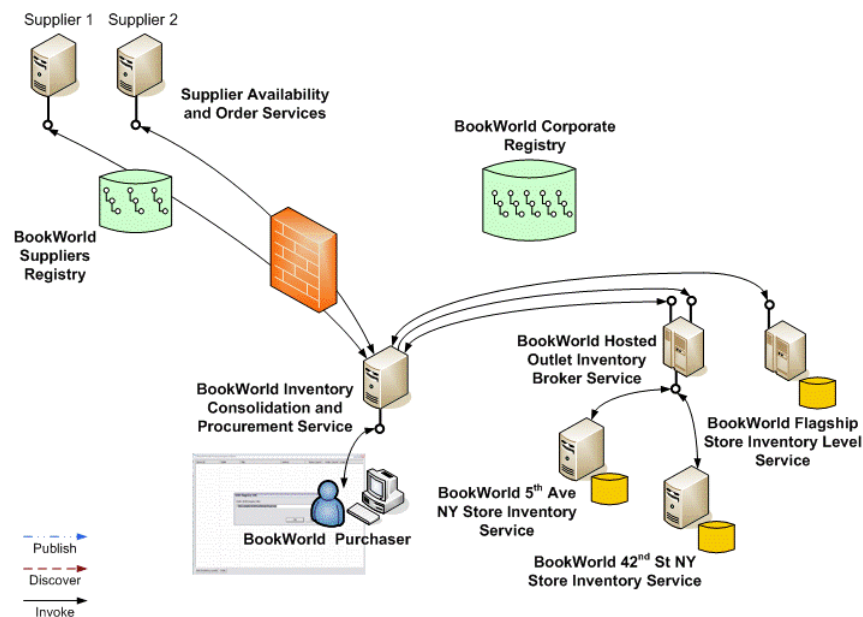
Recap

- **Registry as a foundation of SOA**
  - Transparency
  - Built in flexibility/easy adaptation to meet dynamic business needs
  - Reduce costs of inevitable change/evolution
- **Design-time**
  - Facilitates visibility and reuse
- **Same infrastructure for runtime and design-time**
- **Taxonomies - key to a semantic rich registry**
- **UDDI standard and implementations are realities:**
  - UDDI is a mature spec with
    - Proven interoperability
    - broad vendor support for registries and clients
    - Broad platform support

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Contact and information

- Presenters:
  - Dylan Lewis, Technical Director, Charles Schwab
  - Ben Moreland, Manager - Application Infrastructure Delivery, The Hartford
  - Rick Allen, IBM Software Group
  - Luc Clément, Systinet
  - Daniel Feygin, UnitSpace
  - Claus von Riegen, SAP AG
  - Zhe Wu, Oracle
- Additional information:
  - Resource Guide
  - White Papers: Executive and Technical WP
- Material: Complete your evaluation forms

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