Open Source SCA –
The Apache Tuscany Project

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Agenda

- Tuscany, SCA, SDO and DAS
  - Tuscany in the Apache Incubator
  - Tuscany / Java
  - Tuscany / C++
  - Looking Forward
  - A simple Calculator Example
  - Developing the BigBank Example
  - Questions?
Goals of the Tuscany Project

- Implement an SOA programming model and runtime support based on the Open SOA specifications (SCA, SDO and DAS)
- Not just a reference implementation
- Build a developer and user community around this programming model and help socialize SCA, SDO, and DAS
- Gain early experience and help refine the specifications based on that experience
- Broaden the application of SOA to encompass multiple languages and a variety of component types
Tuscany, SCA, SDO and DAS

Hosting Platform

SOA Based Application

DAS
SDO
SCA

RDB
XML
Service Network
Service Component Architecture

- A programming model for developing services using component assembly
- Multiple languages, multiple container technologies, and multiple service access methods
- Declarative policies for infrastructure services
  - Security, transactions, reliable messaging
- Business-level model for implementing services
  - Service components with service interfaces
  - No technical APIs like JDBC, JCA, JMS, ...
Service Component Architecture

- Binding model for multiple access methods
  - WSDL, SOAP over HTTP, messaging, RMI-IIOP, ...

- Multiple interface definition languages
  - Java interfaces
  - WSDL portTypes
  - C++ classes

- Flexible data bindings
  - SDO (Service Data Objects)
  - Axiom, E4X, etc.
SCA Composites and Systems

- Model for assembling tightly coupled code (Composites)
- Model for assembling loosely coupled services (Systems)

Diagram:
- System
- Composite
  - Connections
- External Web Service
**SCA Composites**

- **Service**
  - Java interface
  - WSDL PortType

- **Composite A**
  - Component A
  - Wire
  - Property setting

- **Component A**
  - Service
  - Binding
    - Web Service
    - SCA
    - JCA
    - JMS
    - SLSB

- **Component B**
  - Service
  - Property setting

- **Reference**
  - Java interface
  - WSDL PortType

- **Binding**
  - Web Service
  - SCA
  - JCA
  - JMS
  - SLSB

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Service Data Objects

- Object/Java API that spans types of data to provide
  - Object(value)-based read-modify-write
  - Complex data structures (not just rows)
  - Disconnected access pattern
  - Optimistic concurrency control model
  - Tools for data binding

- Industry Support
  - Joint specification: BEA, IBM, Oracle, SAP, Sybase and Xcalia
  - Open source implementations (Apache, Eclipse)
  - Products
SDO and Data Access Service

![Diagram showing data access service and related technologies]

- Client
- Data Access Service
- Data Graph
- Data Object
- Change Summary
- RDB
- XML DB
- JDBC
- XPath / XQuery
- Local
- XML/HTTP
- CCI / Proprietary
- EJB: Customer
- Web service
- JCA
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Tuscany in the Apache Incubator

- Project created in Dec 2005 with an initial code contribution from IBM and BEA
- Implementation of SCA, SDO and DAS in Java and C++
- Companion PHP project at PECL.net
- First stable tag in Feb 2006
- M1 releases for Java and C++ in June and August
- M2 releases... now...
- The Tuscany Community is growing
Tuscany and other Open Source projects

- Axis2/Java and Axis2/C for Web Services
- Celtix for Web Services and JMS
- Service-Mix binding
- Apache Stdcxx (Standard C++ Library)
Tuscany – Getting Involved

- Home page: http://incubator.apache.org/tuscany
- Code: http://svn.apache.org/repos/asf/incubator/tuscany
- svn co http://svn.apache.org/repos/asf/incubator/tuscany/java
- svn co http://svn.apache.org/repos/asf/incubator/tuscany/cpp
- Dev mailing list: tuscany-dev@ws.apache.org
- User mailing list: tuscany-user@ws.apache.org
- Commit mailing list: tuscany-commits@ws.apache.org
- JIRA issues: http://issues.apache.org/jira/browse/TUSCANY
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Tuscany SCA / Java

- Open source implementation of the SCA specification
  - Running on J2SE, Tomcat, Jetty, others
  - IOC container for POJO components
  - Support for Web Services
  - Support for SDO and other Data bindings
- Extensible platform
  - Ability to add more component implementation types and binding types
Tuscany SCA / Java

- Samples and scenarios
  - Samples to demonstrate the technology and programming model
  - Bigger scenarios / applications incl. the BigBank scenario from the SCA spec

- Command line tools
  - WSDL to Java, Java to WSDL
  - Deployment tools
  - Maven plugins
Tuscany SDO / Java

- Open source implementation of the SDO specification
  - Dynamic data object support
  - Static code generation
  - Helper classes (XMLHelper, XSDHelper, DataFactory, CopyHelper, EqualityHelper)
  - ChangeSummary support
- Integration with Axiom and other Data bindings
- Metadata handling / scoping
- Command line tools
  - Java and XSD generators
  - Maven plugins
Tuscany DAS / Java

- Provides relational access in terms of SDO DataObjects
  - Optimistic Concurrency control
  - Database-generated IDs
  - Stored procedures
  - DB2/Derby/MySQL
  - Partial updates
  - Static and Dynamic SDOs
Tuscany/Java M1 release

- June 06
  - Implements a subset of SCA 0.9
  - SDO 2.0.1
  - DAS / RDB
  - Runtime integrated with Tomcat
  - Support for Java and WSDL interface types
  - Java and JavaScript components
  - Groovy and Ruby prototypes
  - Web Service binding / Axis2 and Celtix
  - JSON-RPC binding
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Tuscany SCA / C++

- Open source implementation of the SCA specification
  - Windows and Linux distributions
  - Support for C++ components
  - Support for Web Services
  - Support for SDO
  - Support for scripting languages (PHP, Ruby, Python etc.)

- Extensible platform
  - Ability to add more component implementation types and binding types
Tuscany SDO / C++

- Open source implementation of the SDO specification
  - High Performance
  - Integration with scripting languages (PHP etc.)
  - No code generation for now
  - Integration with Standard C++ Library
Tuscany/C++ M1 release

- August 06
  - Subset of SCA 0.9
  - SDO 2.0.1 (using Libxml2 for XML parsing)
  - Windows and Linux distributions
  - MS Visual Studio and GNU Automake builds
  - Support for C++ and WSDL interface types
  - C++ components
  - Web Service binding / Axis2C
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Latest news

- Project voted to publish SCA and SDO C++ M2 release, now going through Incubator PMC vote
- Project voted to publish SDO Java M2 release, now going through Incubator PMC vote
- Community working on finalizing SCA Java M2 release
- New JMS binding
- Community discussion just starting with Apache ODE
Looking Forward

- SCA spec revisions coming up
  - Spec APIs being developed in Tuscany
  - Proposals for new functionality
- Early SDO 2.1 features
- More...
  - Support for SOA policies e.g. security
  - Support additional languages and protocols
  - Interop and integration between Java and C++ runtimes
  - SDO added value (metadata handling, codegen)
Really Looking Forward

- Tuscany is a framework for supporting SOA applications
  - A real SOA programming model
  - Multi-language, multi-protocol, multi-platform
- Allows developers to write applications their way
  - Integrates with programming models most suited to the application (Java, C++, scripting etc.)
  - Simplifies the handling of data with SDO
- Provides the glue needed to connect the service together
  - Making assembly / wiring easy with SCDL
  - Mediations to fix impedance mismatch between services
  - Policies to support infrastructure requirements
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Calculator Example / Java

Demo
Calculator Example / Ruby

Demo
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Developing BigBank - 1
Developing BigBank - 2
Developing BigBank - Demo
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