WHY PRIVATE UDDI

The Universal Description, Discovery and Integration (UDDI) standard brings the much-anticipated missing piece of the collaborative commerce (c-commerce) puzzle. UDDI essentially provides for three links that have been missing in existing approaches to developing c-commerce applications and services:

- A standardized, transparent mechanism for describing services
- A simple mechanism for invoking services
- An accessible central registry of services

UDDI allows the conversion of the WorldWide Web (Web) from a mainly document-based distributed system to a component-based distributed services. To provide sophisticated services such as online shopping, conventional Web applications consisted of CGI scripts and HTML pages are not enough. More and more of these conventional applications are being transformed to intelligent components that supply complex data and behavior. The UDDI allows for these types of services to be registered, categorized and invoked in a coherent and consistent fashion.

- Business name
- Contact information
- Human-readable description
- Identifiers (DUNS, tax, ID, etc.)
- Services and products index
- Industry codes
- Geographic index
- E-business rules
- Service description
- Application invocation
- Data binding

Information provided in a UDDI business registration consists of three components: “White Pages” of company contact information; “Yellow Pages” that categorize business by standard taxonomies; and “Green Pages” that document the technical information about services that are exposed. It is anticipated that within the next few years the UDDI registry will contain tens and possibly hundreds of thousands of Web Services. This will revolutionize the way business is conducted and will make the c-commerce a reality.

In addition to the one and only public UDDI registry that contains all the business registries on the Web, private UDDI registry hosted and operated by companies could add huge value to the c-
commerce initiatives. The values of private UDDI registries are established due to different factors.

**The Public UDDI Is Not Secure**

Businesses are reluctant to publish information or services that may compromise their competitive edge. They may be willing to publish these information and services for a smaller group of consumers, suppliers or partners not for the entire Web community. The existing UDDI direction does not have any provision to tailor access privileges by companies or businesses. This is a big impeding factor for these types of companies to be able to participate in e-commerce using a public UDDI registry.

**The Public UDDI Is Not Reliable**

Currently 48% of the production UDDI registry (tModels tested only) has links that are unusable. These pointers contain missing, broken or inaccurate information. The following analysis from SalCentral is another example of why public UDDI may not be a realistic alternative for business at this time.

<table>
<thead>
<tr>
<th>Analysis for Suffix = WSDL</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://uddi.microsoft.com/inquire">https://uddi.microsoft.com/inquire</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Records</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed: Connect Failure</td>
<td>93  41%</td>
</tr>
<tr>
<td>Failed: Name Resolution Failure</td>
<td>63  28%</td>
</tr>
<tr>
<td>OK: Correct format and confirmed to be available</td>
<td>36  16%</td>
</tr>
<tr>
<td>Failed: Protocol Error such as 401 Access Denied</td>
<td>34  15%</td>
</tr>
<tr>
<td>Invalid URI: The hostname could not be parsed.</td>
<td>1   &lt;1%</td>
</tr>
<tr>
<td>The URI prefix is not recognized.</td>
<td>1   &lt;1%</td>
</tr>
</tbody>
</table>

Most likely a significant number of these inaccuracies will be remedied by the time e-commerce is near its full swing, however, as its momentum picks up, the demand for more and more accurate and reliable service will likely increase creating a constant gap between what the state of the public registry is versus the demands of companies doing business on the Web.
The Public UDDI Is Not Feature-Rich

The public UDDI is often compared with a huge warehouse full of products. It is rarely that a consumer is interested in everything in a warehouse. Instead, consumers are interested in areas that are specialized and tailored to particular needs. Some analysts refer to the public UDDI as a dumb registry forming the basis of the data storage of millions of pieces of information. In this view, to make this information useful someone needs to give the customer and Web Service provider an element of control. They believe that there must be a layer between the consumer and the public UDDI that acts as an intermediary. This layer is referred to as Value Added Service Supplier (VASS) layer.

The Value Proposed By Private UDDI Registries

Private UDDI registries will bring to the picture the much-needed element of control. This control would allow enhancements that remedy the shortcomings of the public UDDI explained above.

At the center of these enhancements is the ability to store the information in private UDDI registries. These registries are owned and controlled by companies or VASS’s. From one end they provide the same interface to the consumers or registrars to inquire and publish information. From the other end this information is validated and then could optionally pushed to (or pulled from depending on the action) the public UDDI registry. At the same time many value added features could be added. These values are substantial to carry out meaningful e-commerce transactions.

The private UDDI registry is the main technology enabler for VASS companies. These companies could act as Business Service Providers (BSP) whose services are tailored for each industry vertical. These tailored services could provide highly sophisticated and highly secure network of data and services for companies that require specialized transaction with each other. Private UDDI registries provide the main technology piece for that supports this business model.

ACUMEN UDDI SOLUTIONS

Acumen Advanced Technologies Inc. (Acumen) is a provider of private UDDI registries. Acumen has two UDDI solutions:
- Private UDDI Registry Standard Edition
- Private UDDI Registry Enterprise Edition

Acumen’s implementations have the following unique features:
- It is the only known commercially available private UDDI that has a full implementation of the 2.0 specifications.
- It is the only known commercially available private UDDI that has integration to multiple backend repositories. Acumen’s implementation supports all leading DBMS brands (Oracle, Sybase, MS-SQLServer, DB/2). It also supports Directory products that support LDAP and are compatible with iPlanet directory server and IBM SecureWay Directory.

**UDDI STANDARD EDITION**

The Acumen’ UDDI registry Standard Edition (AUDDI™-SE) supplies a fully functional private UDDI registry that could be used either as a standalone product or hosted in an application server environment such as BEA WebLogic Server, IBM WebSphere or IONA Orbix E2A. As a standalone product, it comes with an executable that runs an HTTP/HTTPS listener. In a hosted environment, it could be used as a Java class library linked with the rest of the application server environment.

The AUDDI™-SE provides an implementation for the UDDI 2.0 specification. This edition of software follows a layered architecture. The higher layers are dependent on the lower layers. The layers are as follows:

**HTTP Listener**

This layer is comprised of a lightweight Web server that supports HTTP and HTTPS connections. Its job is to provide HTTP/HTTPS connection to the clients of the software. Additionally it hosts the SOAP Listener Servlet. This Servlet is responsible to response to the SOAP messages that are coming through HTTP/HTTPS messages. It also performs protocol level validation for incoming request.

This insures that the incoming HTTP message is sent via the HTTP POST method and also Publish APIs are sent via the HTTPS connection. The UDDI SOAP Servlet follows the J2EE Servlet standard. As the result it could be easily hosted in any Web container that supports the Servlet technology.

**SOAP Parser**

This layer performs all the XML parsing and validation as well as providing coarse grain classes and data types that have a one-one correspondence with UDDI SOAP specification. This layer also translates the SOAP XML requests to pure Java API calls.
UDDI Core

This layer is comprised of a set of classes that correspond to the UDDI entity model and support the granular functionality required to save and retrieve entity relations and contents. All these classes are pure Java. This layer is responsible to write the information to the backend repositories. It is also responsible to perform authentication and authorization.

Persistence

This layer is responsible to save and retrieve information to and from the repository back-ends. This edition supports multiple repository back-ends. It supports repository back-ends that are capable of being connected via JDBC connections. It also supports repository back-ends that are compatible with JNDI LDAP. In addition it is possible to hook virtual directory proxies that support either LDAP or JDBC at the API level and are capable of talking to different backend repositories such as DBMS, LDAP Directories, Texts and File Systems.

Security

The UDDI standard specifies that while inquiry APIs could be performed in an anonymous fashion, the publish APIs have to be performed by authenticated users. For this reason, before performing any publish APIs; the user has to be authenticated. The authentication in UDDI world amounts to acquiring an authentication token from the registry. In subsequent calls the user incorporates this authentication token in SOAP messages sent to the registry. To acquire an authentication token, the user has to specify a user ID and a credential.

This edition of the product provides a security module that creates authentication tokens. These tokens, based on the specification, are opaque to the users. Hence any security backend could be consulted that performs authentication and builds a token (credential). This version of software is capable of using JAAS APIs to talk to security providers. It also contains a custom security module that performs authentication against a user registry in LDAP. The latter is the default security engine of the product.

UDDI ENTERPRISE EDITION

Acumen’s UDDI registry Enterprise Edition (AUDDI™-EE) is the technology enabler for VASS business model. Acumen sees VASS vendors to act as BSPs for various sectors of industries that require highly accurate and highly secure environment for their business transactions performed via Web Services. AUDDI™-EE is built on top the standard edition. Hence it inherits all of its features such as the core UDDI features as well as persistence and security functionality.

Support for Application Server Environment

AUDDI™-EE runs within an enterprise application server environment such as BEA WebLogic Server, IBM WebSphere or IONA Orbix E2A. It utilizes many features of these environments such as their support for Web Services and J2EE. Since many of the AUDDI™-EE features are dependant on J2EE specified functionality such as JNDI, JMS, JCA, JMX, a rich J2EE environment is a fundamental requirement for this version of the product. AUDDI™-EE also provides access channels other than SOAP. It is perceived that many conventional and soon to become legacy applications, such as applications written in Java (standalone or Java/CORBA) would also require to conduct business using UDDI. This ability is performed through Access Channel Adapters developed for each type of client (Java/CORBA).
Enhanced Relationship Manager

One of the important features supported in this version of product is its capability of maintaining a persistence store of a graph of relationship among business entities stored in the UDDI registry. Currently the semantics of the business relationship among UDDI entities are limited to perform one-way relations. The relations are binary relations where two businesses have agreed on before this relation (the specification calls it an assertion) could be saved. The specification lacks in the area of n-ary relations and role definition. As an example it is not possible to say in a UDDI assertion which node in the relationship is playing what role. To provide a more sophisticated relation management AUDDI™-EE takes advantage of Acumen’s Java Relation Service (JRS). JRS is a pure Java implementation of CORBA Relationship Service specification. Using this AUDDI™-EE can maintain a separate relationship graph that provides enhanced relationship information.

Notification and Quality of Service

Businesses could get notified about certain business events via different media such as newsletters, emails messages, SNMP messages. The business events are topics that are defined by AUDDI™-EE and businesses are registered to receive notification against these topics. This version also provides logging and auditing capabilities. This would allow the VASS keep track of data that SLAs are sensitive to.

Support for Multiple Object Binding

This edition of the software is intended to replace dispersed naming/location services solution that currently exist in an enterprise. Enterprises with multiple programming environments such as CORBA, J2EE and Web Services can all register their software components within AUDDI™-EE. As indicated before AUDDI™-EE provides programming APIs for these programming environments to access the data stored in its repositories. At the same time AUDDI™-EE information model is enhanced to accommodate references to CORBA IOR, Java RMI, EJB Remote Sessions, and JMS objects, in addition to the URIs corresponding to Web Services access points. This feature would allow one central registry/repository for all the corporate information.
Enterprises over years have become to rely on multiple registries/repositories for their corporate information. Over years multiple standards for registries emerged. Some of these standards are tied to a larger application framework, such as JNDI or CDS and some of them are registry standards that have gained widespread use due to its power and explicabilities such as X.500 directories. However, none of these standards, especially the ones tied to an application framework became a ubiquitous standard for corporate registries.

As the corporate data grew in these registries enterprises are faced with data fragmentation issue. This issue is contributing to high operation cost of the data maintenance as well as the capital expenditure (hardware and software) to maintain multiple unrelated technologies. From the other hand, not having a global view of the corporate resources contribute to loss of opportunity for new businesses. As the result it has become exceedingly important to large enterprises who maintain large amount of cataloged information to centralize this information and provide one single access layer for all customers, applications or users of this data.

By providing a single view of the entire corporate data AUDDL™-EE solves the corporate data fragmentation issue. It allows for a single point of registry and retrieval of cataloged information.

**Reporting**

This group of features facilitates such as:
- Monitoring of entries within the UDDI registry and notifying the subscribers of any change to the entry.
- Rating of UDDI registries based on various determined factors such as accuracy of data and availability of service.
• Validating UDDI entries on an ongoing basis to ensure and report the quality of the entries in the registry.
• Populating the VASS registry in a proactive way. This allows the VASS vendor to operate as the Yahoo of the Web Services world.

The target release date for AUDDI™-EE software is second quarter 2003.

AUDDI™-SE the BEA choice for embedded UDDI engine.
SUPPORTED PRODUCTS AND PLATFORMS

LDAP Directories
All JNDI LDAP Compatible Directories
- IPnet
- IBM SecureWay Directory
- Simens DirX
- Octetstring VDE

Databases
All JDBC Compatible Databases
- Oracle
- DB2
- MS-SQL
- Sybase

Application Servers
All Application Servers Supporting J2EE Servlet Standard
- BEA WebLogic
- IBM Websphere
- Pramati Server
- Apache Tomcat
- IONA Orbix E2A

Operating Systems
All OS's with JRE 1.3.x
- Windows NT 4.0 SP3
- Windows 2000
- Sun Solaris 2.6, 7, 8
- Linux

SUMMARY OF SUPPORTED STANDARDS

Support for UDDI Specification
- Programmer's API Version 2.0
- Data Structures Version 2.0

Support for Java Standards
- JAXP
- JAXM, SAAJ
- JAXR
- JMX
- JDK 1.4

SUMMARY OF PRODUCT FEATURES

Multiple Data Store
- LDAP Data Stores
- JDBC Data Stores
- Minimal Access to Data Store
- Efficient Data Model

Security
- Plug-able
- JAAS
- Policy Based
- SSL
- Authentication and Authorization
- ACL Based

Multiple Client Support
- SOAP Client
- HTTP Client
- Java Client

Multiple Deployment
- Sand-alone
- Embedded (Application Servers)
- Linked (Java Class Library)

Extensive Input Validation
- XML Validation
- Schema Validation
- Data Validation

Management Features
- Support for Java Management Extensions
- Management Consol

Clustering Features
- Support for Application Server Clustering
- Support for LDAP Clustering
ABOUT ACUMEN

Acumen Advanced Technologies Inc. is a Web Services solution provider. Acumen is the only provider of private UDDI registries with multiple DBMS and LDAP repository back-ends and third party security plug-ins, with extensive input validation. Acumen private UDDI registry Standard Edition (AUDDI™-SE) is a pure Java solution that could be deployed either as a standalone solution or as a class library linked with J2EE application server platforms such as BEA WebLogic Server.

For more information, visit the Acumen's Web site at www.AcumenTechnologies.com or contact the company directly at 1-866-491-1419.

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i See http://www.salcentral.com

ii See http://www.webservicesarchitect.com/content/articles/clark05.asp