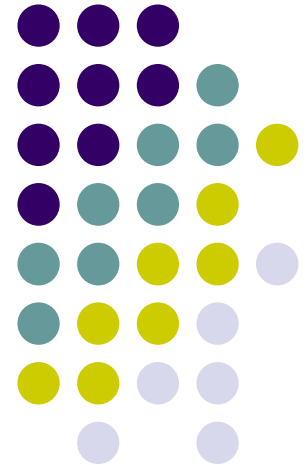
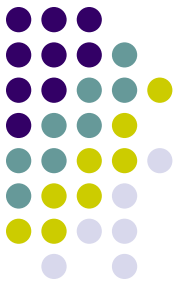


Texas Library Directory Web Services Application: The Potential for Web Services to Enhance Information Access to Legacy Data

Fatih Oguz
Valdosta State University

William E. Moen
University of North Texas





Introduction

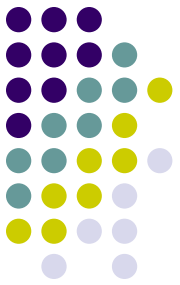
- An exploratory research project to identify, describe, and investigate the applicability of the Web services (WS) approach to access legacy data.
- Developed and implemented a prototype WS application to show how a legacy system can be accessed and its data can be searched and retrieved.



Legacy Data

- Data that need to be converted to a different format when another medium will be utilized to process the data or the non-XML data.

Library of Texas (LOT)



- A statewide service-based virtual library that uses current and emerging computer and Internet technologies to expand the reach and range of all Texans to the state's libraries and their resources.

Z component of the LOT (ZLOT)



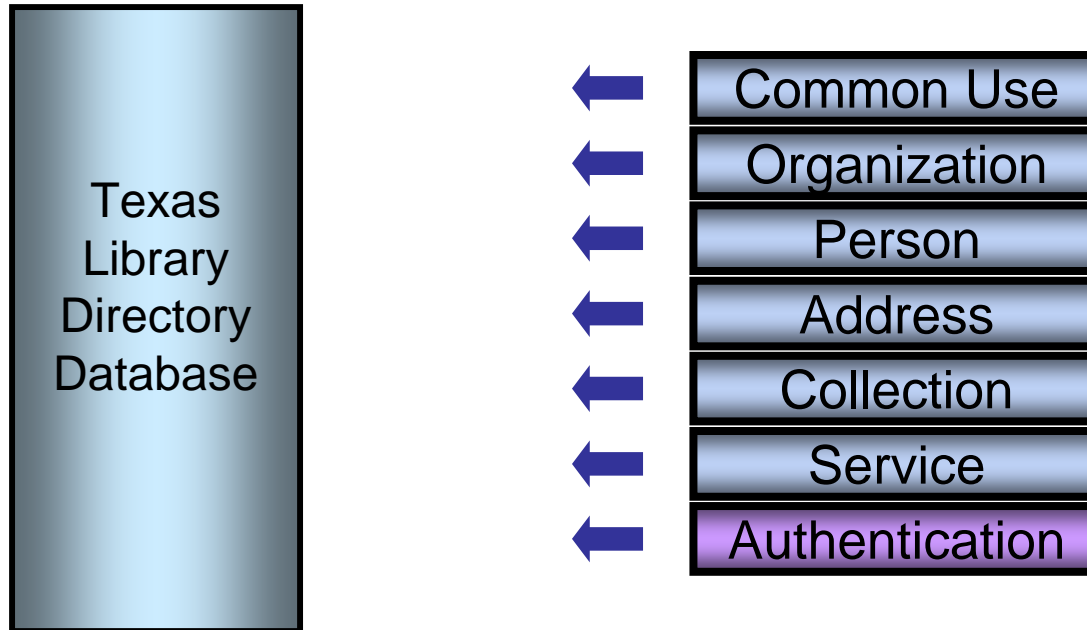
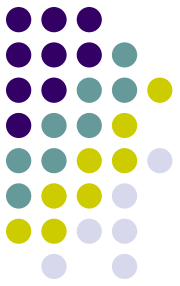
- University of North Texas team
- Support implementation of the Resource Discovery Service (RDS)
- The RDS is a metasearch application
- 2 year project
 - 7 months of Texas Library Directory Database development

Texas Library Directory Database (TLDD)

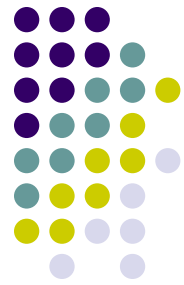


- Enables local library presence
- Enables various groupings of the information resources for search and retrieval
- Provides information about participating libraries
- Provides a mechanism for maintaining the library directory database

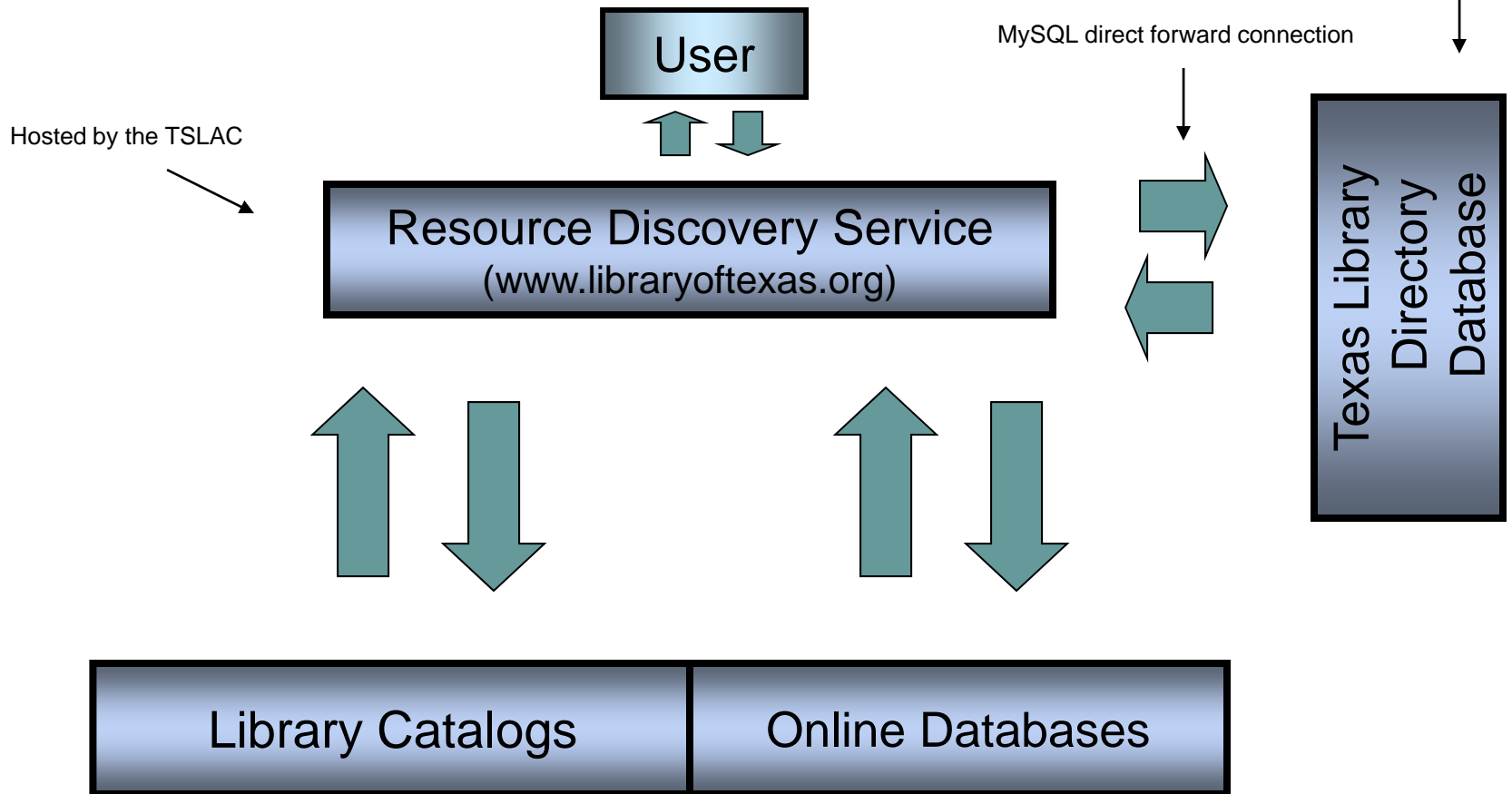
TLDD Information Categories



Resource Discovery Service (RDS)



Hosted by the TSLAC





Subject Areas

- [▶ Business Information](#)
- [▶ **General Information**](#)
- [▶ History & Genealogy](#)
- [▶ Homework & Education](#)
- [▶ Librarian Tools](#)
- [▶ Literature & Criticism](#)
- [▶ Medicine & Health](#)
- [▶ Newspapers & Magazines](#)
- [▶ Science & Technology](#)
- [▶ Spanish Materials](#)

Subject Types

Personal settings

- [▶ Build a group of favorites](#)
- [▶ See your search history](#)

Search - General Information

Welcome to the Library of Texas! You can:
 * **Enter** words in the box to search the resources that are checked below
 * **Choose** a subject on the left to see a different group of resources
 * **Build** and save your own favorite groups of resources
 See the help page for more instructions.

Search

- [▶ Advanced search](#)

- [▶ Un-check all resources](#)
- [▶ Hide resources](#)

Public Libraries

- [Carrollton Public Library](#)
- [Denton Public Library](#)
- [Farmers Branch - Manske Library](#)
- [Grapevine Public Library](#)
- [Southlake Public Library](#)

Academic Libraries

- [Southern Methodist University](#)
- [Texas Wesleyan University](#)
- [Texas Woman's University](#)
- [The University of Texas at Arlington](#)
- [University of North Texas](#)
- [University of North Texas Health Science Center](#)

Online Resources:

- [Academic Search \(EBSCO\)](#)
- [ArticleFirst \(OCLC\)](#)
- [Funk & Wagnalls Encyclopedia \(EBSCO\)](#)
- [MasterFile Premier \(EBSCO\)](#)
- [MASUltra \(EBSCO\)](#)
- [Middle Search Plus \(EBSCO\)](#)
- [Student Resource Center GOLD \(Gale\)](#)
- [Texas Almanac \(Gale\)](#)
- [Topic Search \(EBSCO\)](#)
- [TRAIL](#)
- [WorldCat \(OCLC\)](#)

Other:

- [Library of Congress](#)

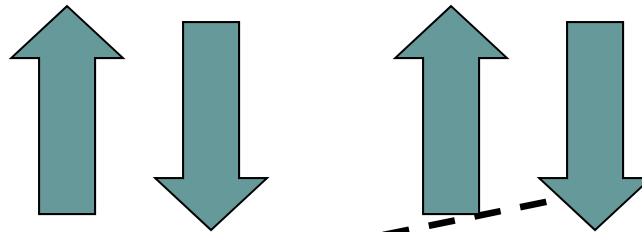
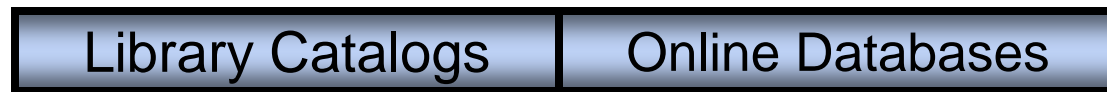
Library Catalogs

Online Databases

RDS as a local application



Hosted by the
TSLAC



SRW 1.1

SRW 1.1

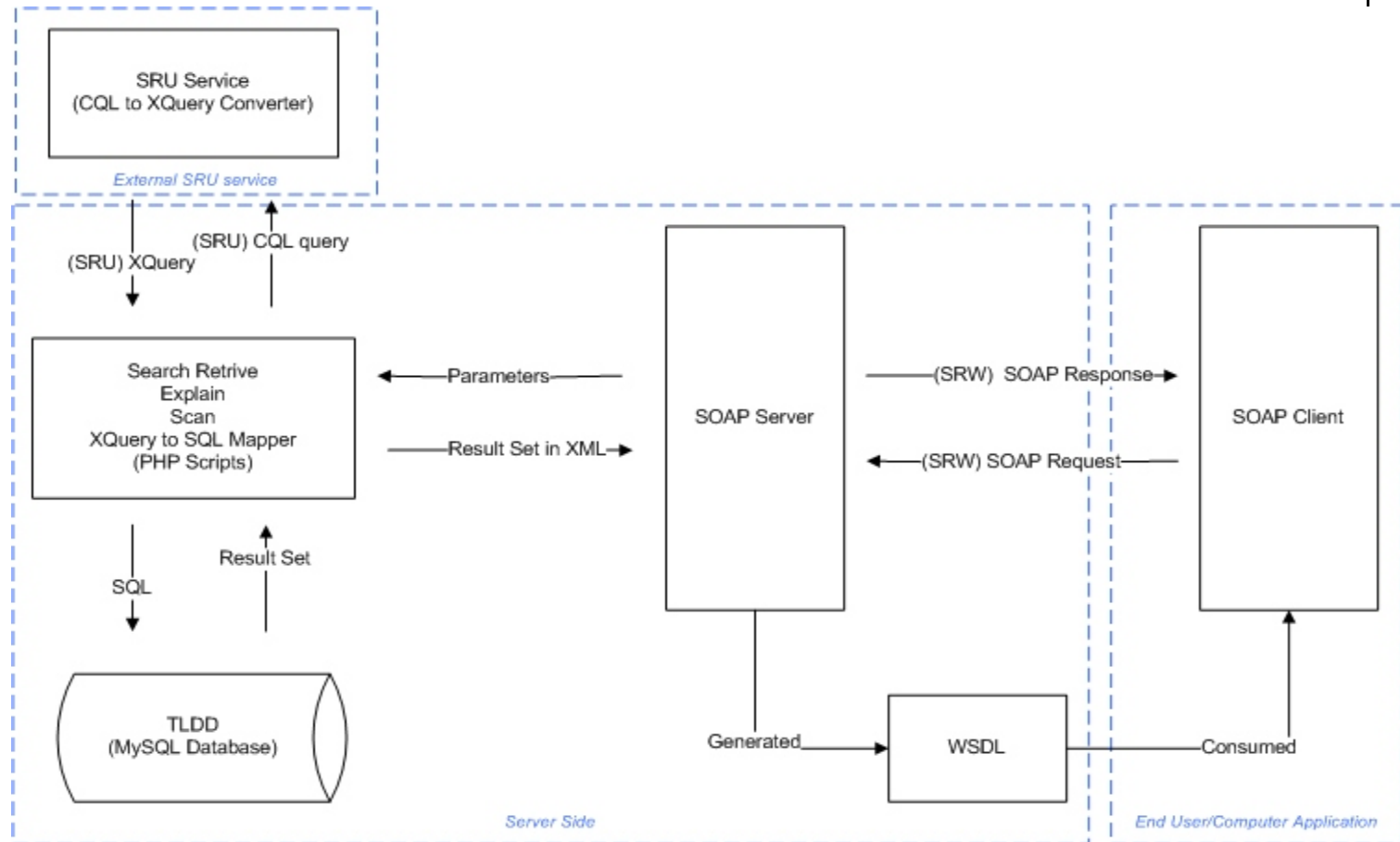


Running on local library intranet





TLDD Web services

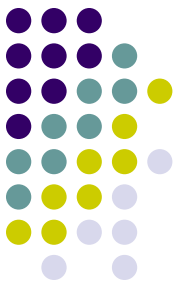




Web services with SRW 1.1

SRW 1.1 Web services standard is composed of there main operations as listed below:

- SearchRetrieve
- Scan
- Explain



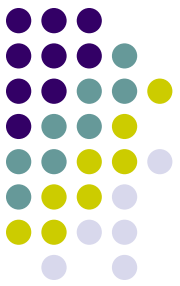
Web services with SRW 1.1

- Pilot application incorporated with an external WS, VB CQL Parser, to parse Common Query Language (CQL) queries and convert into XQuery.
- VB CQL Parser service is a Search and Retrieve URL (SRU) service, a companion to SRW, which passes parameters via URL instead of SOAP and the response is returned as in XML (XQuery).
- XQuery has been translated to SQL statements for querying the MySQL database.
- The pilot WS application supports simple term and simple Boolean searches.

SOAP SearchRetrieve Request



```
<SOAP-ENV:Envelope xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <SOAP-ENV:Body>
    <m:searchRetrieve xmlns:m="http://web2.unt.edu/tsa/WS/SRW/:SRW"
SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
      <version xsi:type="xsd:string">1.1</version>
      <query xsi:type="xsd:string">ds.city=denton not
ds.organization=public</query>
      <maximumRecords
xsi:type="xsd:integer">10</maximumRecords>
    </m:searchRetrieve>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```



CQL to XQuery

- CQL: **ds.city=denton not ds.organization=public**

- XQuery:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- ds.city=denton not ds.organization=public -->
<?prox_1_0 True ?>
<?search_term_1_2 True ?>
- <xQuery xmlns="http://www.loc.gov/zing/srw/">
- <triple xmlns="http://www.loc.gov/zing/cql/xcql/">
- <leftOperand>
- <searchClause>
  <index>ds.city</index>
- <relation>
  <value>=</value>
  </relation>
  <term>denton</term>
</searchClause>
</leftOperand>
- <boolean>
  <value>not</value>
</boolean>
- <rightOperand>
- <searchClause>
  <index>ds.organization</index>
- <relation>
  <value>=</value>
  </relation>
  <term>public</term>
</searchClause>
</rightOperand>
</triple>
</xQuery>
```

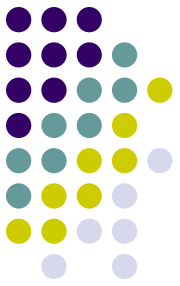


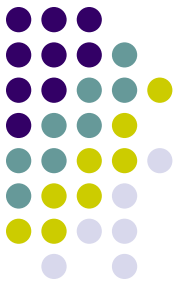
SOAP SearchRetrieve Response

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SOAP-ENC="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:si="http://soapinterop.org/xsd" xmlns:ds="http://web2.unt.edu/tsa/WS/SRW/" xmlns:tns="http://web2.unt.edu/tsa/WS/SRW/">
  <SOAP-ENV:Body>
    <ns1:searchRetrieveResponse xmlns:ns1="http://web2.unt.edu/tsa/WS/SRW/SRW">
      <version xsi:type="xsd:string">1.1</version>
      <numberOfRecords xsi:type="xsd:integer">2</numberOfRecords>
      <records xsi:type="SOAP-ENC:Array" SOAP-ENC:arrayType="tns:records[2]">
        <item xsi:type="tns:records">
          <recordPacking xsi:type="xsd:string">XML</recordPacking>
          <recordSchema xsi:type="xsd:string">http://web2.unt.edu/tsa/WS/SRW/DS.xsd</recordSchema>
          <recordData xsi:type="tns:dsData">
            <orgID xsi:type="xsd:integer">359</orgID>
            <orgName xsi:type="xsd:string">Texas Woman&apos;s University - Blagg-Huey Library</orgName>
            <orgType xsi:type="xsd:string">Academic Library</orgType>
            <orgAddress xsi:type="xsd:string">P. O. Box 425528</orgAddress>
            <orgCity xsi:type="xsd:string">Denton</orgCity>
            <orgZip xsi:type="xsd:string">76204</orgZip>
            <orgPopulationServed xsi:type="xsd:string">7887</orgPopulationServed>
          </recordData>
          <recordPosition xsi:type="xsd:integer">1</recordPosition>
        </item>
        <item xsi:type="tns:records">
          <recordPacking xsi:type="xsd:string">XML</recordPacking>
          <recordSchema xsi:type="xsd:string">http://web2.unt.edu/tsa/WS/SRW/DS.xsd</recordSchema>
          <recordData xsi:type="tns:dsData">
            <orgID xsi:type="xsd:integer">390</orgID>
            <orgName xsi:type="xsd:string">UNT Libraries</orgName>
            <orgType xsi:type="xsd:string">Academic Library</orgType>
            <orgAddress xsi:type="xsd:string">P.O. Box 305190</orgAddress>
            <orgCity xsi:type="xsd:string">Denton</orgCity>
            <orgZip xsi:type="xsd:string">76203</orgZip>
            <orgPopulationServed xsi:type="xsd:string">27858</orgPopulationServed>
          </recordData>
          <recordPosition xsi:type="xsd:integer">2</recordPosition>
        </item>
      </records>
      <diagnostics xsi:nil="true"/>
    </ns1:searchRetrieveResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```


Operating Environment

- Operating System: Linux
- Language: PHP
- SOAP Toolkit: NuSOAP 0.6.9





Shortcomings

- Security
 - NuSOAP 0.6.9 implementation does not conform to the WS-Security profile
- Messaging
 - NuSOAP 0.6.9 only supports SOAP 1.1 specification as opposed to SOAP 1.2.
- Reliability
- Interoperability
 - Issues with .NET SOAP clients
- Performance

Project Evaluation



- The application itself is not robust and provides limited functionality (e.g., CQL), however, this was not due to WS architecture but rather programming limitations.
- developing such services does not require allocation of vast resources and proprietary toolkits.
- NuSOAP is simple and flexible but other mature SOAP toolkits (e.g., Apache Axis) should be considered.
- Local libraries do not have to allocate additional resources while adopting the RDS application for their searchable library catalogs.