Lotus. Symposium 2003

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Lotus software | IBM Software Group

Domino a WebServices

D03

e business software

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Agenda

- Value of Domino applications
- Web services
- Web services and Domino applications

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Lotus Software

- Lotus Domino
  - Integrated messaging and Web application software platform
- Lotus Notes and iNotes
  - E-mail, calendaring, group scheduling, Web access and information management client
- Lotus Domino Designer
  - Rapid application development and deployment
- Lotus Domino Administrator
  - Administer Notes and Domino with the client or the Web administrator
- Knowledge Management
  - Lotus Discovery Server, Workflow, Domino.Doc, and Extended Search
- Sametime
  - Real-time collaboration with chat, whiteboarding and application sharing
- QuickPlace
  - Team collaboration for discussions, documents, tasks, etc. for projects and ad-hoc initiatives
- LearningSpace
  - Distance learning platform integrating live, asynchronous and self-paced content delivery

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Value of Domino Applications

- Multiple clients
  - Notes
  - Browser
  - Mobile (phone/pda)
  - Web Service Clients (R5)
- Off-line support
- Integrated Infrastructure
  - Database
  - Directory/Security
  - Application server
  - Multi-platform
  - Distributed environment
  - Web hosting
  - Mail/Calendar
  - Administration
- Rapid Application Development and Deployment (RADD)
  - Templets, Forms, Views, Pages, Agents, Actions, Items...
  - BASIC (LotusScript), HTML,Java, Javascript, COM, CORBA, XML...
  - Replication, Cross platform
  - Refresh/Replace Design

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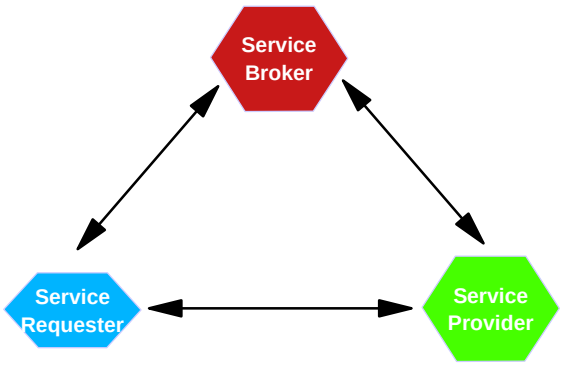
Web Services

- Web Services are applications that expose methods that can be called by other applications over the Internet
- Web services can be mixed and matched with other Web services to create innovative products, processes, and value chains
- Web services will transform the Internet into a universal software platform that contains a massive API formed by millions of Web methods written by companies all over the world



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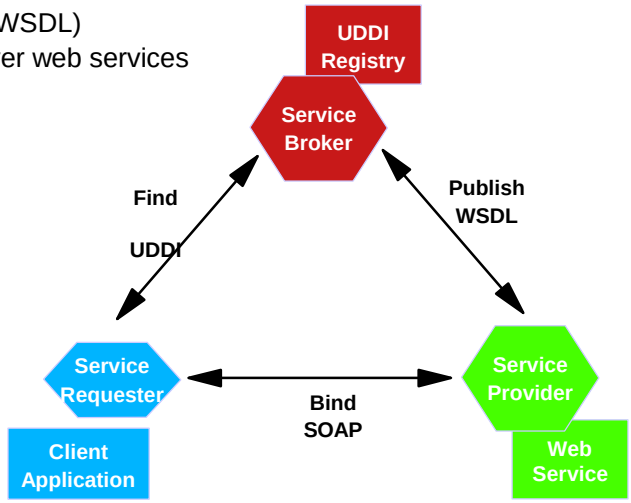
Web Services Framework

- Protocol to transport service requests and responses
  - Simple Object Access Protocol (SOAP)
- Common language to describe a web service
  - Web Services Description Language (WSDL)
- Global YellowPage to publicize and discover web services
  - Universal Description, Discovery & Integration (UDDI)



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Lotus Technology Strategy

IBM Lotus is engaged in a managed evolution of existing products, from freestanding infrastructure applications to mix and match capabilities that add collaborative power to J2EE/multi-tier applications

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Domino and Web Services

- WebSphere server/portal front-end for Domino Web service
- .NET front-end for Domino Web service
- Developing an architecture to get access to Domino business logic
- End-to-end integration
- Platform independence
- Easy programming model
- Choice of programming languages - Java or LotusScript
- Process-to-process communication over the net
- Open standards - Web service

e-business on demand

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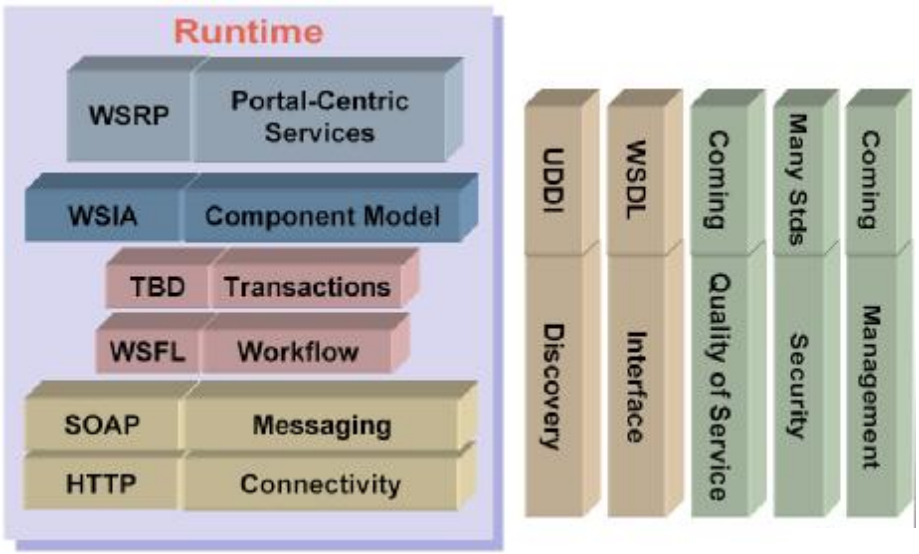
The Web Services Protocol Suite



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Some Real Web Services - United States

- Barnes and Noble Price Quote
  - returns price of a book at BN.com given an ISBN number
- eBay Price Watcher
  - checks current bid price of an eBay auction
- California Traffic Conditions
  - California highway conditions
- Weather Conditions
  - returns the weather for cast for a zip code
- Domino Calendar Lookup
  - returns calendar entries

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Some

- NTT Co
  - UDI
  - Lau

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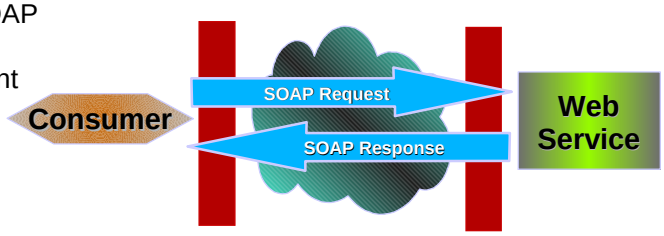
How Web Services Work

- The consuming application
  - Constructs a method call with parameters
  - Formats the call as XML/SOAP text
  - Sends it via HTTP POST
- Hosting application
  - Unwraps the SOAP request
  - Runs the requested Method
  - Wraps the result in a SOAP response
  - Sends the SOAP to Client
- The consuming application
  - Unwraps the SOAP response
  - Reads the result



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SOAP Protocol - Request

```
<SOAP-ENV:Envelope
   xmlns:SOAP-ENV=
      "http://schemas.xmlsoap.org/soap/envelope/"
   xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
   xmlns:xsd="http://www.w3.org/1999/XMLSchema">
<SOAP-ENV:Body>
   <ns1:getPrice
      xmlns:ns1="urn:xmethods-BNPriceCheck"
      SOAP-ENV:encodingStyle=
         "http://schemas.xmlsoap.org/soap/encoding/">
      <isbn xsi:type="xsd:string">0439139597</isbn>
   </ns1:getPrice>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```


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SOAP Protocol - Response

```
<SOAP-ENV:Envelope
   xmlns:SOAP-ENV=
      "http://schemas.xmlsoap.org/soap/envelope/"
   xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
   xmlns:xsd="http://www.w3.org/1999/XMLSchema">
<SOAP-ENV:Body>
   <ns1:getPriceResponse
     xmlns:ns1="urn:xmethods-BNPriceCheck"
     SOAP-ENV:encodingStyle=
        "http://schemas.xmlsoap.org/soap/encoding/">
     <return xsi:type="xsd:float">15.57</return>
   </ns1:getPriceResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```


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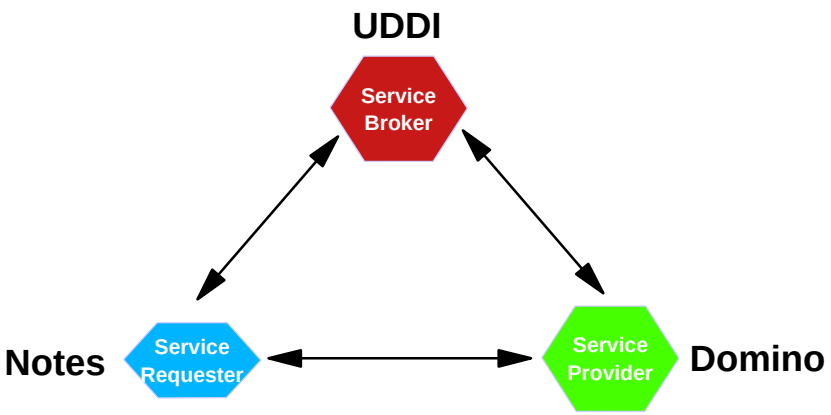
How Can Lotus Domino Work with Web Services?

- Consuming a Web services
- Hosting a Web services



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Consuming a Web services - Notes/Domino

- SOAPConnect
  - Free utility from Lotus
  - Hides Java from the developer
  - Step-by-step tutorial explains setup
- Java classes - (SOAP4J)
  - LotusScript calling Java (LS2J Domino 6)
  - Java Agents (Domino Rrelease 5 and 6)
- LotusScript calling Microsoft Objects (Windows Only)
  - MS SOAP Toolkit
  - .Net client objects

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J2EE and Domino and .NET

- All Host and Consume Web Services
- Domino can call a J2EE Web service application
- Domino can call a .NET Web service application
- J2EE can call a Domino Web service application
- Examples
  - Domino Calendar accessed from J2EE
  - Domino calling a J2EE transactional process via a web service
  - J2EE application calling a work flow application in Domino
  - Notes retrieving J2EE information to use off-line

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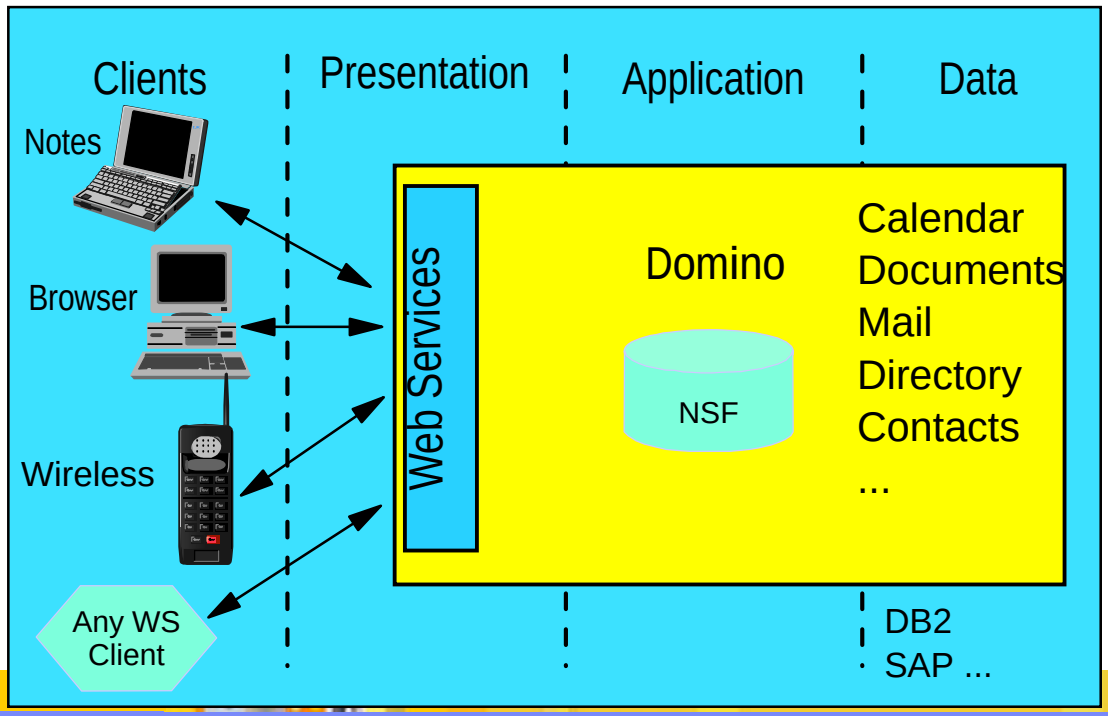
Lotus Centric Architecture



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Domino Web Service Database

```
Dim response As String
Dim incoming As String
Sub Initialize
Dim session As New NotesSession
Set doc = session.DocumentContext
'set the output content type to XML
Print "Content-Type: text/xml"
'get incoming SOAP message
incoming = doc.GetItemValue("Request_content")(0)
. . .
```


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Log Message for Debugging

```
. . .
'log incoming message
LogMessage(incoming)
'remove all whitespace from incoming SOAP message
incoming = RemoveWhitespace(Fulltrim(incoming))
. . .
```


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Parse SOAP Message

```
...
On Error Goto Errhandle
bodyPos= Instr(1,incoming,|<SOAP-ENV:Body>|)+15
'parse out method signature
methodSigPos= Instr(bodyPos,incoming,|<|)+1
methodSigEnd=Instr(bodyPos,incoming,| |)
methodSignature = Mid(incoming,methodSigPos,(methodSigEnd-methodSigPos))
'parse out method name
methodPos= Instr(bodyPos,incoming,|:|)+1
methodEnd=Instr(methodPos,incoming,| |)
methodName = Mid(incoming,methodPos,(methodEnd-methodPos))
'parse out namespace
nameSpacePos= Instr(methodEnd,incoming,|uri:|)+4
nameSpaceEnd=Instr(nameSpacePos,incoming,|"|)
nameSpace=Mid(incoming,nameSpacePos,(nameSpaceEnd-nameSpacePos))
...
```


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Namespace and Method

```
...
'Build a string containing the script library, function, and incoming soap message
'The nameSpace variable contains the script library to load
callString = |Use | & |"| & nameSpace & |"| & |
response = | & methodName & |(incoming)|
'execute the function
Execute callString
...
```


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Send Response back to SOAP Client

```
...
'create response
strTmp = |<?xml version="1.0" encoding="UTF-8" standalone="no"?>| & _
|<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" & _
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" & _
xmlns:xsd="http://www.w3.org/2001/XMLSchema">| & _
|<SOAP-ENV:Body>| & _
|<m:| & methodName & "Response" & | xmlns:m="uri:| & nameSpace & |"
SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">| & response & _
|</m:| & methodName & |Response>| & _
|</SOAP-ENV:Body>| & _
|</SOAP-ENV:Envelope>|
'send back SOAP response
Print strTmp
```


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Domino Script Library and Function

```
Dim domParser As NotesDOMParser
Function ISBNSearch(msg As String) As String
Dim session As New NotesSession
Dim rootElement As NotesDOMDocumentNode
Dim nodeList As NotesDOMNodeList
Dim node As NotesDOMNode
. . .
```


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Domino Script Library and Function

```
. . .
'create dom parser to process SOAP message
Set domParser = session.createDOMParser(msg)
domParser.process
Set rootElement = domParser.Document
Set nodeList = rootElement.GetElementsByTagName("*")
'locate ISBN
For i=1 To nodeList.NumberOfEntries
    Set node = nodeList.GetItem(i)
    If(node.NodeName="isbn")Then
        ISBN = node.FirstChild.NodeValue
        Exit For
    End If
Next
...
```


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Perform Business Logic

```
...
Dim db As NotesDatabase
Dim view As NotesView
Dim doc As NotesDocument
Set db = session.CurrentDatabase
Set view = db.getView("ByISBN")
'locate ISBN in database
Set doc = view.GetDocumentByKey(ISBN,True)
'create response
tmp =|<isbn xsi:type="xsd:string">| & doc.ISBNTX(0) &|</isbn>|&_
|<title xsi:type="xsd:string">| & doc.TitleTX(0) &|</title>|&_
|<price xsi:type="xsd:string">| & doc.ListPriceNU(0) &|</price>|&_
|<authors xsi:type="xsd:string">| & doc.AuthorsTX(0) &|</authors>|&_
|<publisher xsi:type="xsd:string">| & doc.PublisherTX(0)
&|</publisher>|&_
|<copies xsi:type="xsd:string">| & doc.CopiesTX(0) &|</copies>|
ISBNSearch = tmp
End Function
```


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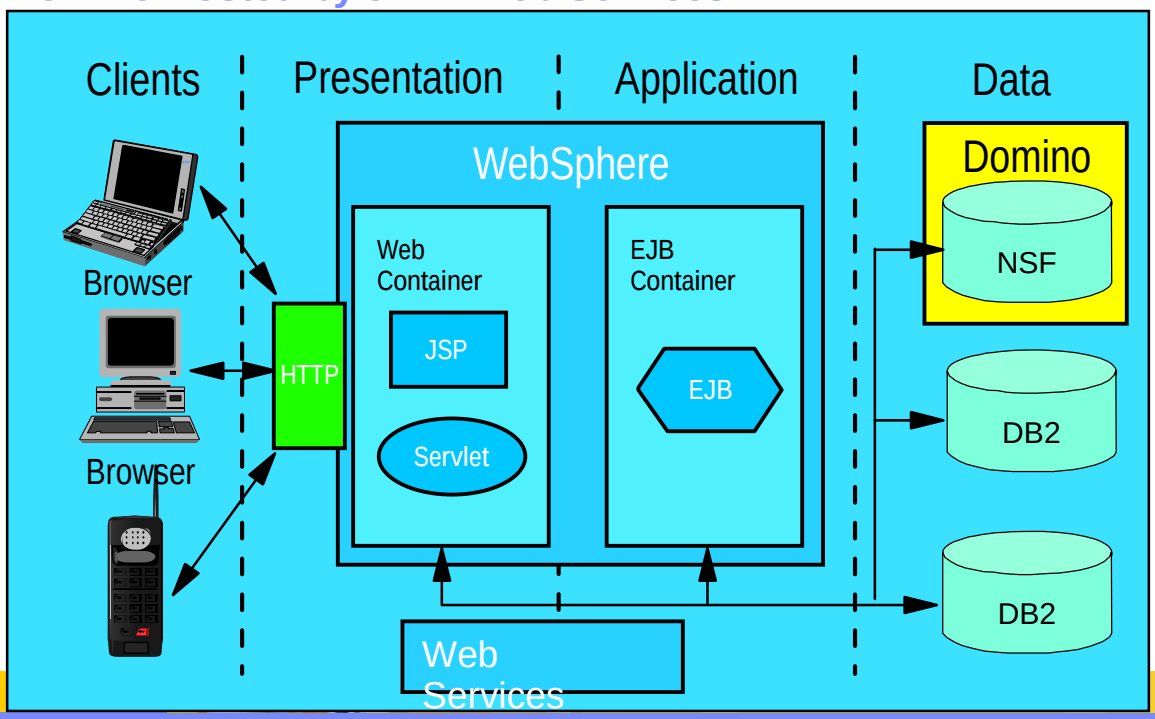
Domino Hosted by J2EE Web Services



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Summary

- XML/SOAP/Web Services are:
  - Platform/OS/language independent
- Lotus Domino/Notes can consume and provide web services! Today!
- It's easy to add a Web service interface to Domino applications- R5 and up
- Many tools for working with WS
- Domino Web Services can use Java (think Web Sphere), .Net (COM), or 100% Domino
- BASIC language Web Service that's cross platform (better than .Net)
- Java skills not required
- Web Services will be popular
- It's not hard

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Resources

- www.lotus.com/ldd
- www.alphaworks.ibm.com
- www.webservices.org
- www.uddi.org
- www.apache.org
- www.e-ProMag.com/garyspage
- www.advisormedia.com/Articles.nsf/aid/DEVEG02

- www.ibm.com/developerworks
- Tutorials
  - "Turn your Lotus applications into Web services"
  - "Hosting Web Services on Domino"

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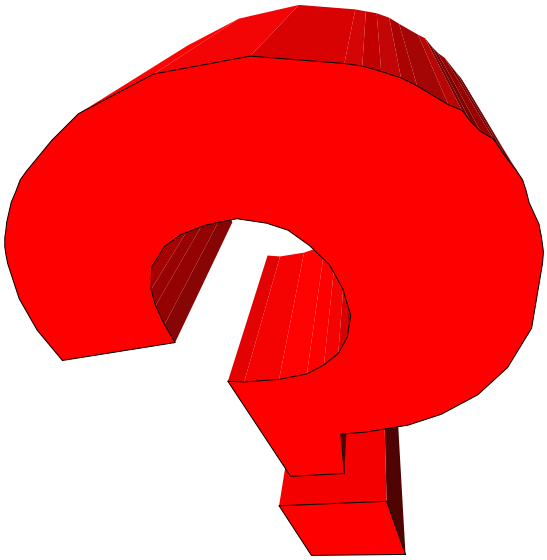

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Course Abstract

- Web services is the new way of connecting applications via HTTP. Come and see how to expose a Domino application as a Web service. 35 lines of LotusScript is all you need. See code demos that extend Domino applications to with WebSphere or .NET. It's very easy.

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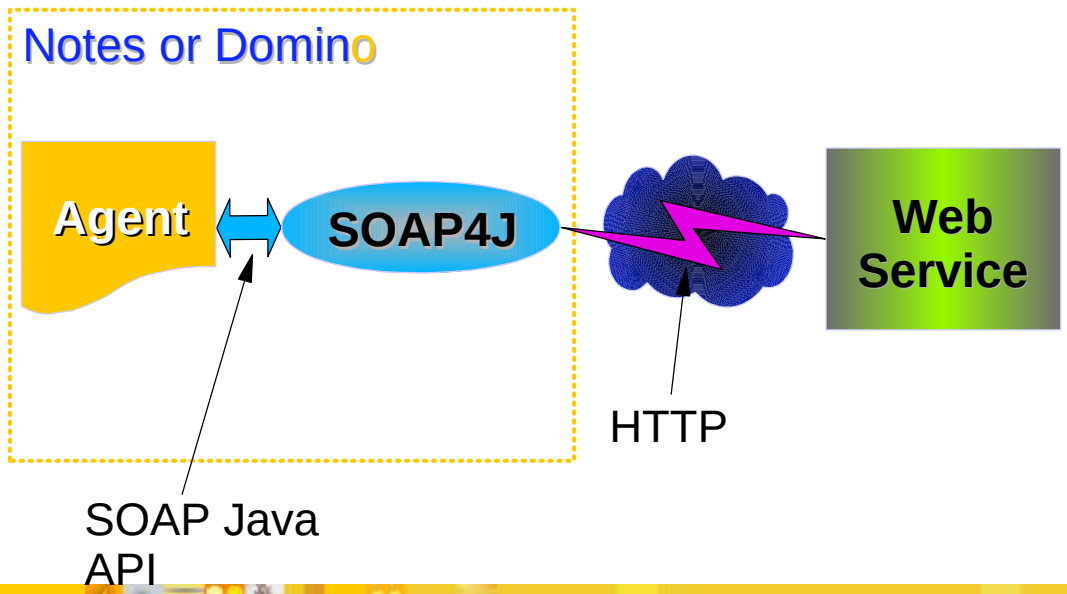
Consuming a WS with Java or LS2J



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How it works

- Form in Designer...
- Calls SOAP4J,MS Toolkit or SOAP Connect to build and send request...
- Response comes back...
- Extracted information from response...
- Updated Lotus Notes document...

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Web Service Description Language (WSDL)

- XML file
- Describes the service
  - Methods
  - parameters
  - data types
  - URL of the service
  - .....

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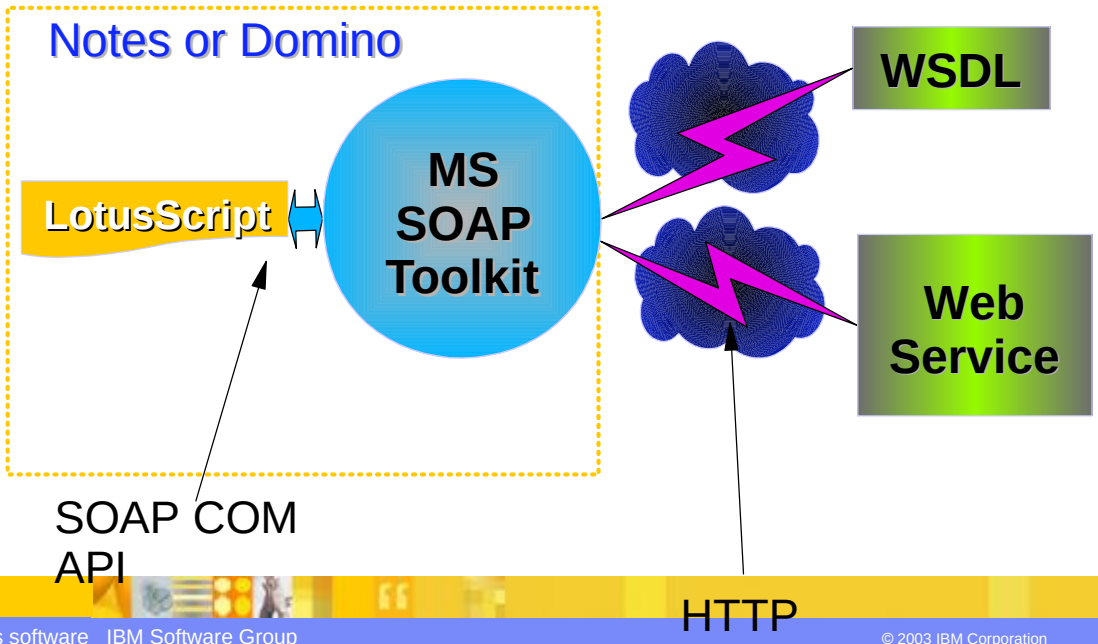
Consuming a WS with COM (Windows only)



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SOAPConnect for LotusScript

- Free utility
- LotusScript Library
- Java Agent
- R5 and release 6

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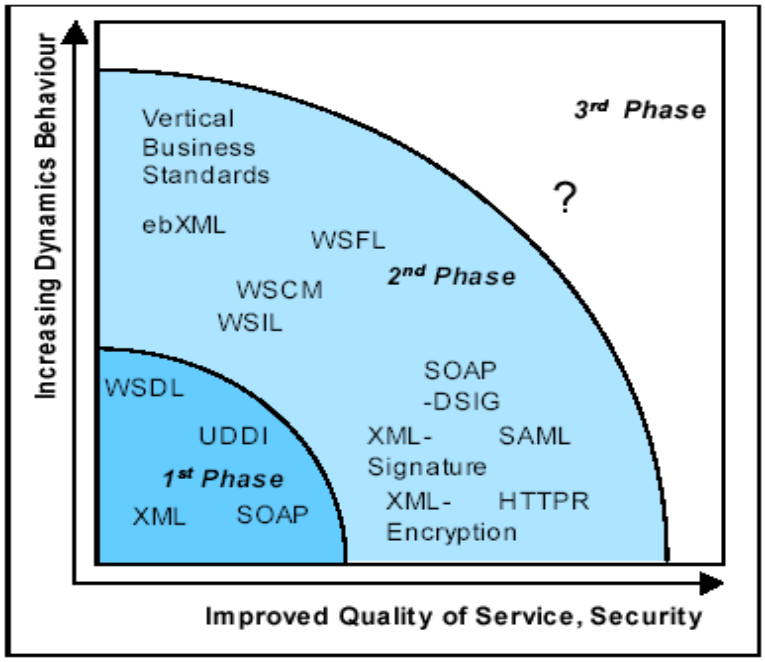
Evolving Standard for Web service



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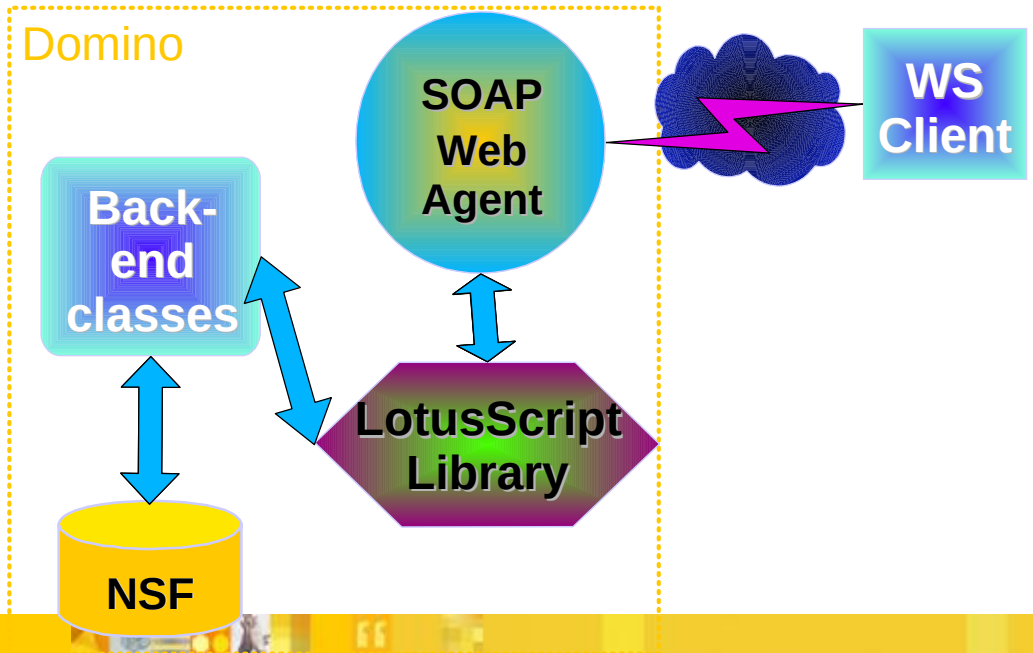
Providing a Lotus Domino WS - 100% Domino



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Web Services Agent

```
Sub Initialize
    Dim s As New notessession
    Dim doc As NotesDocument
    Set doc = s.DocumentContext
    SOAPin= doc.GetItemValue("Request_content")(0)
    Print "Content-Type: text/xml"
    On Error Resume Next
    bodyPos= Instr(1,SOAPin,|<SOAP-ENV:Body>|)+15
    methodPos= Instr(bodyPos,SOAPin,|:|)+1
    methodEnd=Instr(methodPos,SOAPin,| |)
    MethodName = Mid(SOAPin,methodPos,(methodEnd-methodPos))
    nameSpacePos= Instr(methodEnd,SOAPin,|uri:|)+4
    nameSpaceEnd=Instr(nameSpacePos,SOAPin,|"|)

NameSpace=Mid(SOAPin,nameSpacePos,(nameSpaceEnd-nameSpacePos))
    argPos=Instr(nameSpaceEnd,SOAPin,|/">|)+3
    argEnd=Instr(argPos,SOAPin,|<|)
    argValue= Mid(SOAPin,argPos,(argEnd-argPos))
```


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Web Services Agent *(cont.)*

```
    'The NameSpace will be the name of the Script Library to load
    'The MethodName will be the name of the function in the
Script
    'Library loaded by this agent (NameSpace)
    LSlib = NameSpace
    Parameter = argValue
    MyFunction = MethodName
    Library= |"| & LSlib & |"|
    Arg= |("| & Parameter & |")|
    ' load the right LotusScript Library and call the function
    CallString = |Use | & Library & |
    response =  | & MyFunction & Arg

    Execute CallString
```


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Web Services Agent *(cont.)*

```
        strTmp = |<?xml version="1.0" encoding="UTF-8" standalone="no"?>| &_
        |<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">|
& _
        |<SOAP-ENV:Body>| & _
        |<m:| & MethodName & "Response"  & | xmlns:m=" | & NameSpace & |">| & _
        |<Answer>| & response & |</Answer>| & _
        |</m:| & MethodName & |Response>| & _
        |</SOAP-ENV:Body>| & _
        |</SOAP-ENV:Envelope>|
        Print strTmp
End Sub
```


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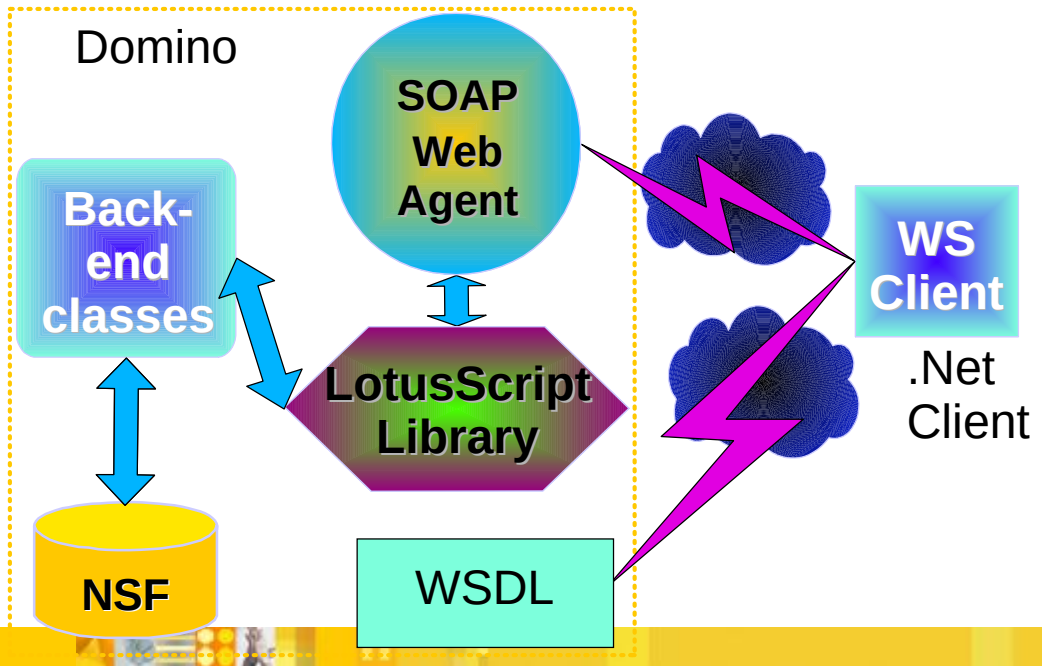
Providing a Lotus Domino WS - 100% Domino



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