E32

SOA and z/VSE:

Implementing SOA using Web Services and Tools

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San Antonio, TX

Innovation that Matters in Todays IT

Top Innovation Priorities:

- **Extend the ability to collaborate inside & outside**
- **Innovate business models & processes**
- **Leverage information for business optimization**

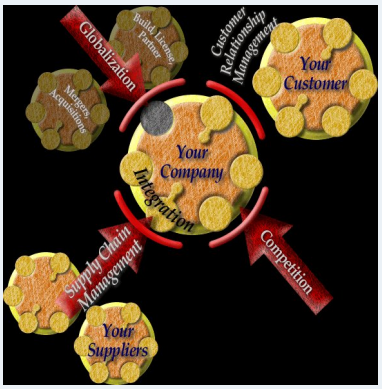
*87% of CEOs believe fundamental **change** is required in next two-years to drive innovation*

Source: 2006 IBM Global CEO Survey

Innovation is all about change.
SOA makes it easier to change.

Dynamic e-business

The Networked economy is driving the evolution of electronic business and integration is the key



- Business-to-business
- Across towers
- With 3rd party software and services
- Across tiers

Customers & Analysts Agree:

SOA Enables Rapid & Incremental Change Leading to Innovation

Innovation That Matters *

*"The IBM and GenXus SOA-based solution has made our product **more innovative, expanded our market** and made us **more competitive** It will let us grow our business significantly in the years to come."*

MADDENCO INC

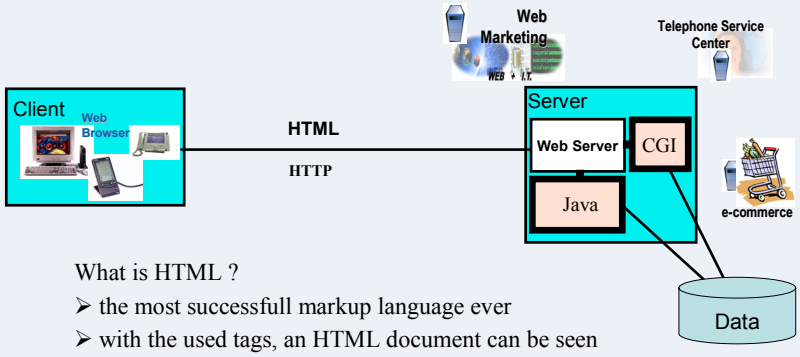
*"SOA is the **heart of the next wave of innovation**. The leaders that do this well are able to **rapidly change** …"*

AMR

"SOA is critical for … executing the on-demand vision and in preparing … for the** incremental changes **… over time. Companies … make better decisions."

IDC

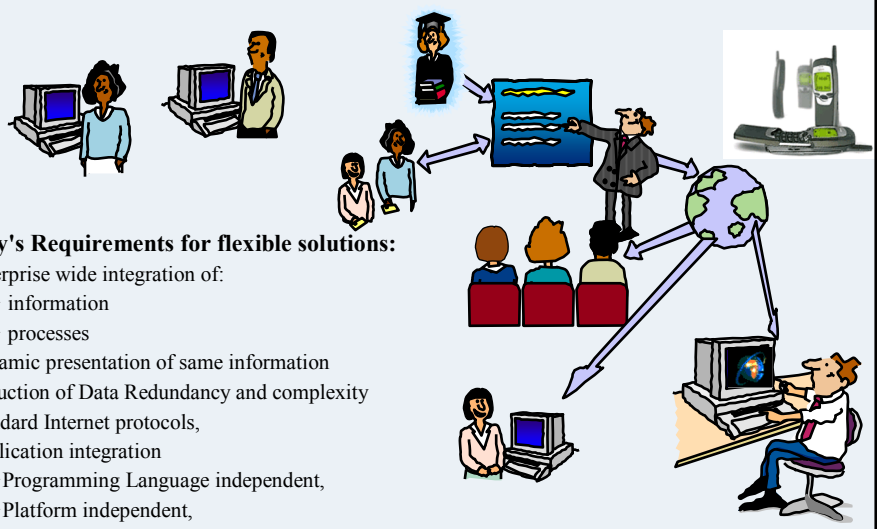
HTML - Traditional Internet Technology



What is HTML ?

- the most successfull markup language ever
- with the used tags, an HTML document can be seen on all platforms from Palmtops to mainframe
- extension interfaces like CGI (Common Gateway Interface) and Java (applets, servlets, EJB) allow access to backend systems
- **HTML was designed with humans in mind**

HTML - wasn't designed for today's requirements



Today's Requirements for flexible solutions:

- Enterprise wide integration of:
  - information
  - processes
- Dynamic presentation of same information
- Reduction of Data Redundancy and complexity
- Standard Internet protocols,
- Application integration
  - Programming Language independent,
  - Platform independent,
  - Architecture independent,

XML - eXtendet Markup Language
the plattform independent data representations

- HTML - contains tags to tell a browser how to display information
  - but not WHAT that information is
- **XML was designed with applications in mind** (distributed application)
- XML has information about structure and content of information
- XML supports attributes that hold additional information about a tag
- HTML can be written within XML

An address in HTML

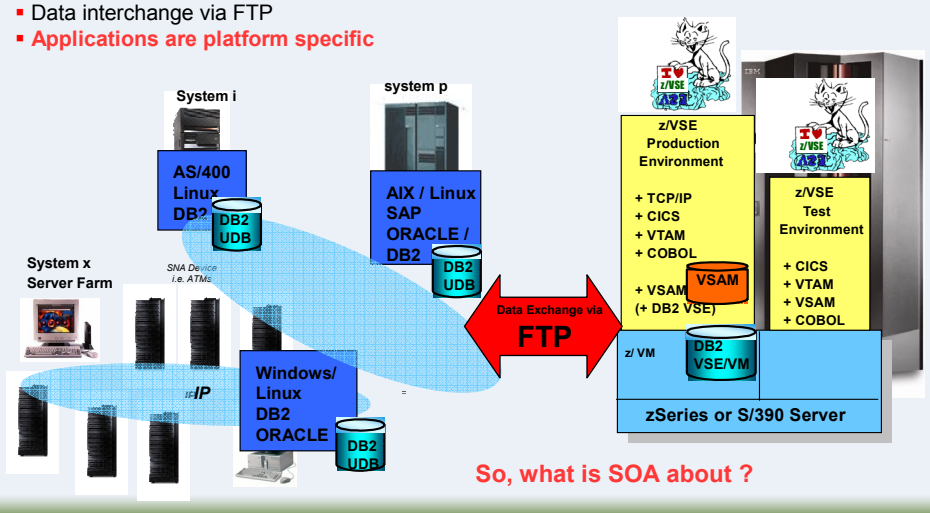
```
<p>
<b>Mrs. Mary Brown</b>
<br>
1401 MainStreet
<br>
Winston Salem, WN 34123
</p>
```

An address in XML

```
<address>
   <title>Mrs.</title>
   <firstname>Mary</firstname>
   <lastname>Brown</lastname>
   <street>1401 MainStreet</street>
   <city state="WN">Winston Salem</city>
   <postalcode type="int">34123</postalcode>
</address>
```


Typical VSE Customer Environment Data interchange

- VSAM data on VSE (some DB2 environments)
- Relational databases on distributed platforms (DB2, Oracle)
- Data interchange via FTP
- Applications are platform specific



So, what is SOA about ?

(1) SOA is a Concept for IT Business Management

What is Service Oriented Architecture (SOA) ?

A Service-Oriented Architecture (SOA) is focused on developing technology to accomplish your business tasks.

- **eliminate technological constraints that dictate the activities (i.e op. system and data organization constraints)**
- **it is organized around actual activities, or business services, rather than the different individual silos of information maintained by departments of the company to enable:**
  - **a greater alignment of business and IT**
  - **A network-based infrastructure, enabling geographically and technologically diverse resources to work together**
  - **On-demand, built-on-the-fly-applications**
  - **Greater code reuse**
  - **Better process standardization throughout the enterprise**
  - **Easier centralization of corporate control**

" While deploying technology is certainly key to a successful SOA integration, it is the maximizing of the people, process and information elements that are truly core to the SOA process."

Judith Hurwitz
President, Hurwitz & Assoc.

SOA is more than just about technology, but technology's integration with business insight and thought leadership.

What is Service Oriented Architecture (SOA) ?

(2) SOA is an new IT Architectural Concept

- **SOA is represented in "loosely coupled" application components:**
  - **not tied to a particular database,**
  - **not tied to a particular infrastructure.**
  - **self-contained**
  - **with well-defined interfaces**
- **Services enable the combination of themselves:**
  - **to extend existing business logic**
  - **to create new applications.**

- **Services can be accessed over a network.**
  - **the network may exist within your corporate, or it may be geographically and technologically diverse**
  - **the access is as though they were all installed on your local desktop.**
- **It enables much greater code reuse,**
- **cutting your workload at the same time that it increases your capabilities.**
- **enables your business to adapt to changing conditions and requirements**

SOA is more than just doing the same thing a different way.

Why Reuse for Service Oriented Architectures?

- Existing applications **are among the most valuable assets a company owns**
- **It is** 5X less expensive **to reuse existing applications than to write new applications from scratch***
- **Reusing proven, time-tested applications results in significantly** lower risks **and faster time to market**
- Maintenance **overhead** shrinks **with greater use of proven and tested code for common functions**
- Best practices **provide key framework for business policies and reuse as a design point for SOA**

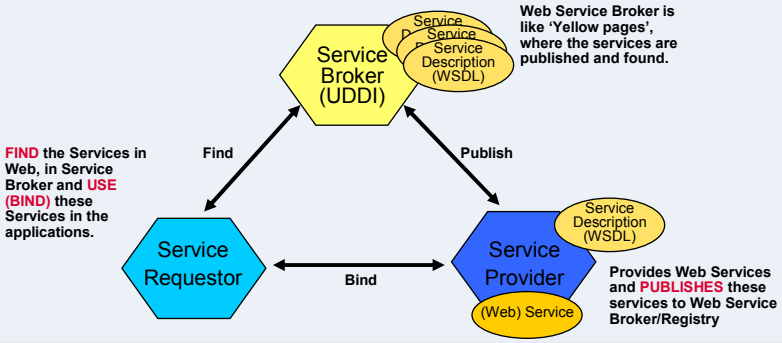
The SOA Architecture - Standards

- Web Services
  - **defined Services**
- XML **(eXtended Markup Language)**
  - **platform independent data representation**
- SOAP **(Simple Object Access Protokol)**
  - **protocol for Web Services**
- UDDI **(Universal Description Discovery Integration)**
  - **catalog to register and find Web Services**
- WSDL **(Web Services Description Language)**
  - **language in which the Web Services describes**
- Enterprise Service Bus
  - **The Plug for the Services**

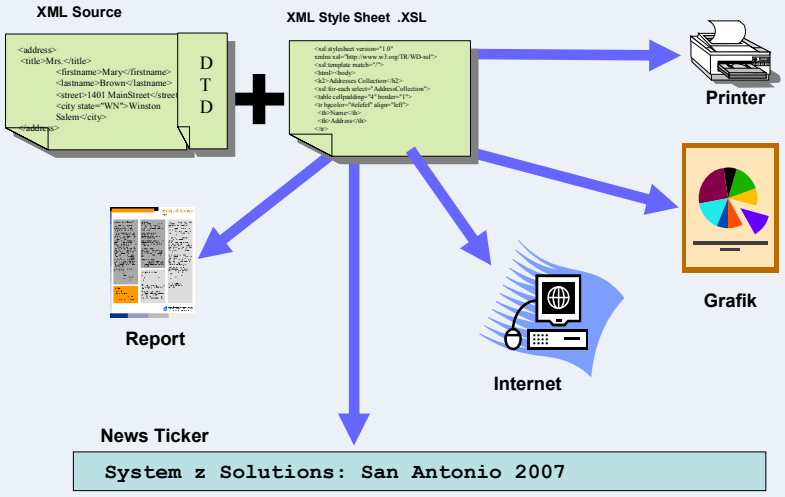
What are Web Services ?

„WebServices are self-contained, modular applications that can be described, published, located, and invoked over a network, generally, the World Wide Web." **IBM**

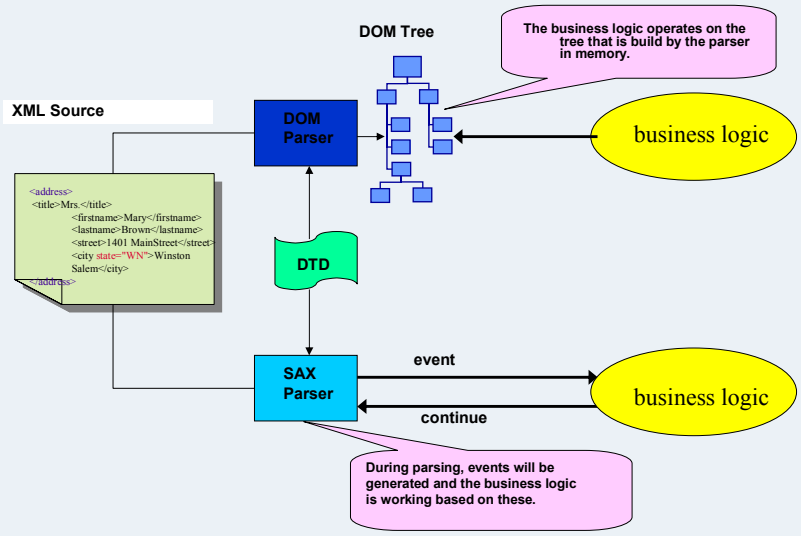
"A WebService is programmable application logic, accessible using standard Internet protocols" **Microsoft**



What is XML ?



XML parser Technology (DOM,SAX)



What is SOAP?

- Simple Object Access Protocol
- SOAP is an XML based protocol for communication between two remote applications:
  - is based on RPC messaging
  - is language independent (de-couples interface from implementation)
  - represents remote procedure calls and responses
- A SOAP message consists of:
  - envelope
    - wraps the message itself
    - defines rules for decoding the message
  - message
    - request
      - method to invoke on a remote object and parameters
    - response
      - result of running the method and exceptions

What is UDDI?

- Universal Description, Discovery and Integration
- UDDI is a specification for publishing and discovery of businesses and the services they provide
- UDDI specifications define how to construct UDDI Business Registries
- UDDI specifications are based on XML and SOAP:
  - API to communicate with a UDDI Registry are SOAP based
    - UDDI4J (UDDI for Java) - Open Source implementation in Java
    - JAXR (Java API for XML Registries) - Sun
  - data structures that define Web Service in UDDI Registry are XML based

What is WSDL?

- Web Services Description Language
- WSDL is an XML based vocabulary for defining a Web Ser
  - interfaces
    - operation types (i.e. one-way, request-response, notification)
    - messages defining a Web Service interface
    - definition of data types (XML Schema)
  - access protocol (i.e. SOAP over HTTP)
  - contact endpoints (i.e. Web Service URL and URNs[1])

(1URNs are location independent pointers to a file, or to different repre... same content. In most ways they can be used like URLs)

- A Web Service URL returning WSDL makes Web Services self-describing
- Similar in purpose to IDL (Interface Definition Language)
  - From a WSDL file, wizards can generate:
  - proxy classes for calling Web Service
    - skeleton classes to implement a Web Service

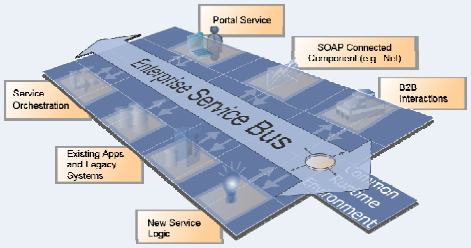
What is an Enterprise Service Bus?

An Enterprise Service Bus (ESB) is a flexible Infrastructure for services and application integration

An ESB reduces the number, size and complexity of your interfaces in a SOA solution.

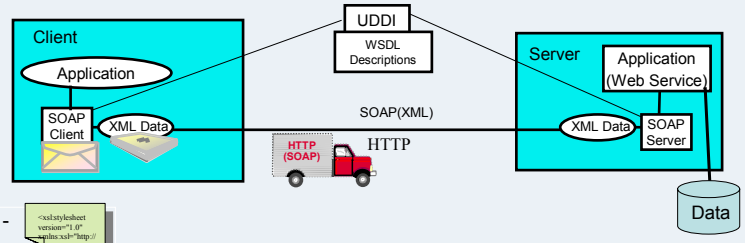
An ESB realizes following tasks between requestor und service

- **ROUTING of messages between Services**
- **CONVERTING the transport protocol between requestor and service**
- **TRANSFORMING message formats between requestor and service**
- **HANDLING of business events between different types of services**



Web Services in action

XML Document + SOAP Protocol = Web Services



XML -

SOAP -

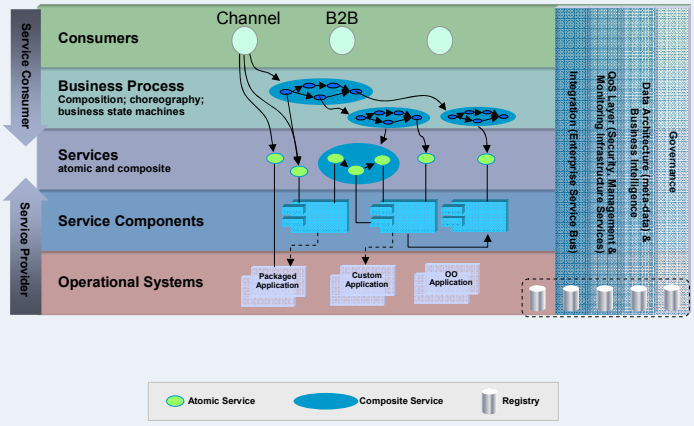
HTTP - **Carrier**

TCP/IP - **Street**

A ***web service***

- implements a bussiness, application or system functionality
- is intended for application communication
- is useable in internet, intranet, extranet
- is useable for browser-based solutions up to the B2B integration between companies
- uses only standard internet technologies

SOA Solution Layers



Service Consumers
- Portal, B2B, Standalone, .Net

Business Process Layer
- BPEL Processes

Service Definition Layer
- WSDL, XML Schema, WS-Policy

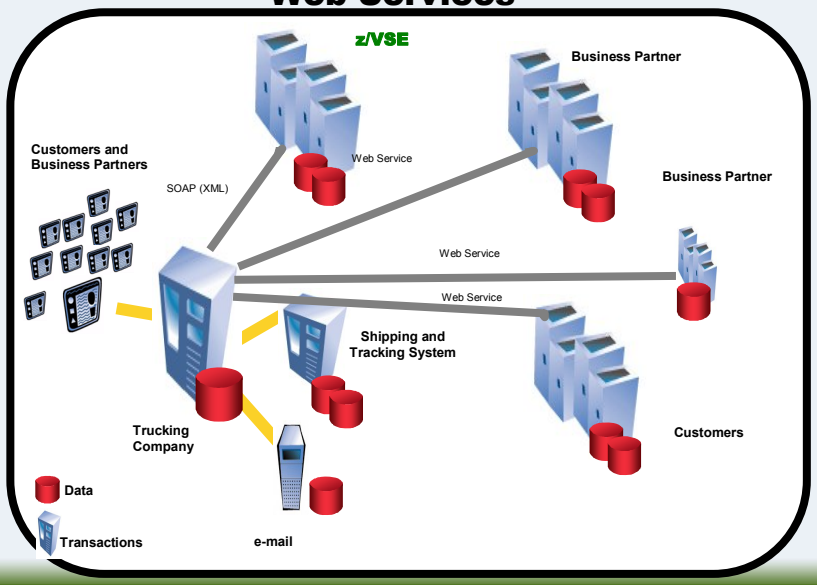
Service Facade Layer
- Service Platform based service facades: J2EE, .Net, SCA etc.

Operational Systems Layer
- ISVs, Middleware, Custom Apps, Platforms, Network

Why should VSE customers consider SOA?

- SOA is modern (hype) and strategic
  - **It is mentioned in all IT journals and newspapers**
- Easy integration of existing VSE programs and processes
  - **Reducing the interface complexity**
  - **Reuse of existing application logic as services**
  - **Use of standard protocols (XML, SOAP, HTTP)**
- integration is platform independent
  - **independent of application programming language**
  - **independent of the data involved**
- Integration of VSE into a Microsoft .Net environment
  - **without the use of Java**
  - **the most incompatible environments can be integrated**
- SOA enables the extension of VSE applications
  - **to other platforms and architectures**
  - **to partners and open world**

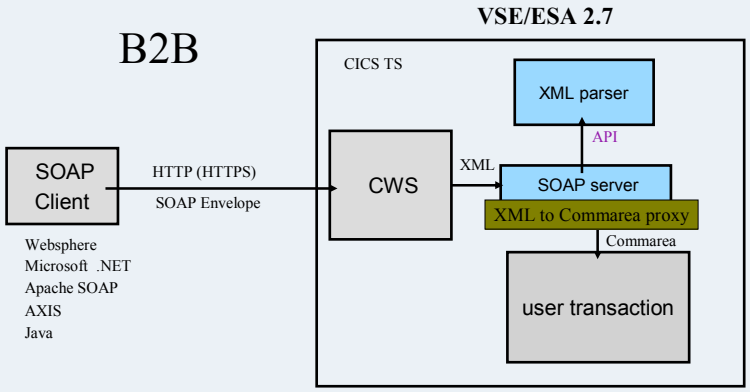
Service Oriented Architecture(SOA) Web Services



VSE as SOAP server

Web Services (SOAP)

SOAP - Simple Object Access Protocol
(platform independent remote procedure call)



VSE as SOAP client

Web Services (SOAP)

SOAP - Simple Object Access Protocol
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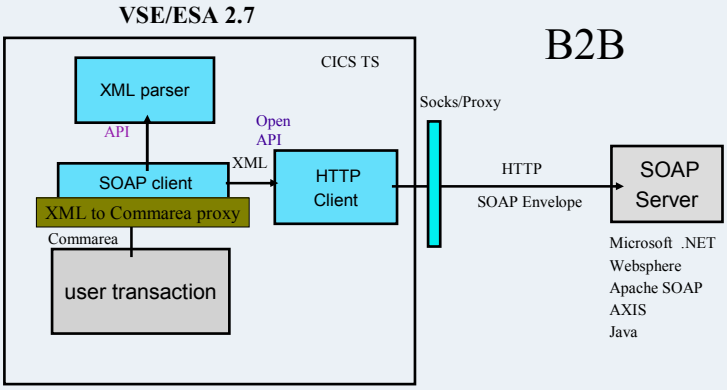
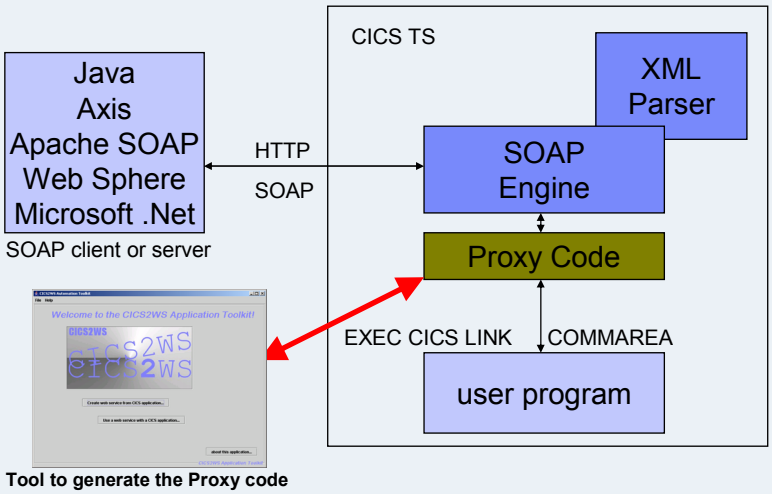
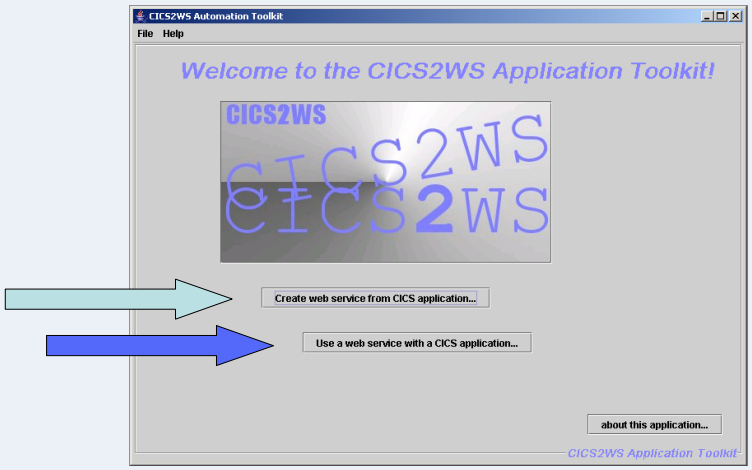


Web Services in and with VSE



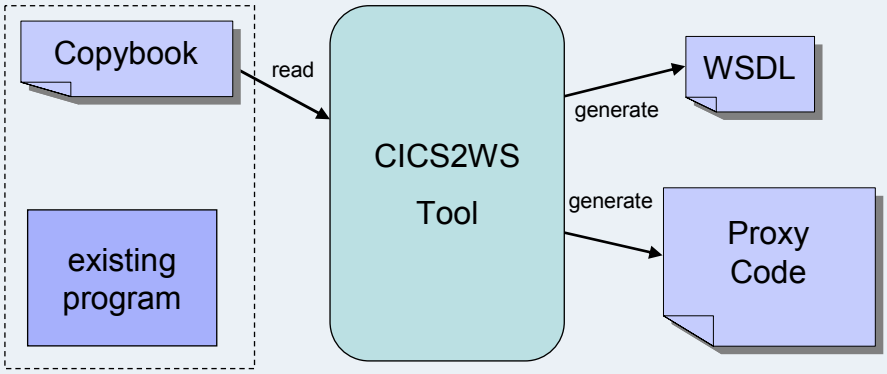
Tool to generate the Proxy code

CICS to Web Services Tool

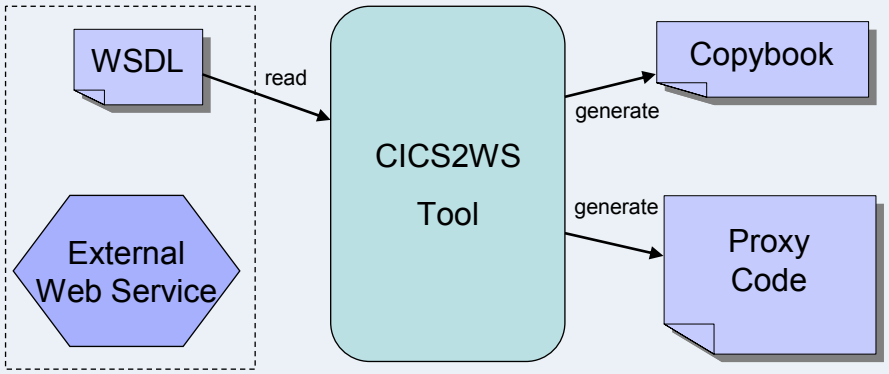


http://www.ibm.com/servers/eserver/zseries/zvse/downloads/

VSE as a SOAP server (service provider)

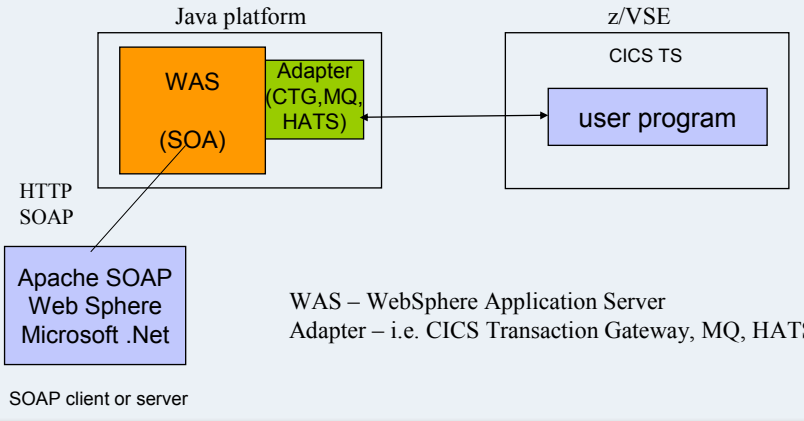


VSE as a SOAP client (service requestor)



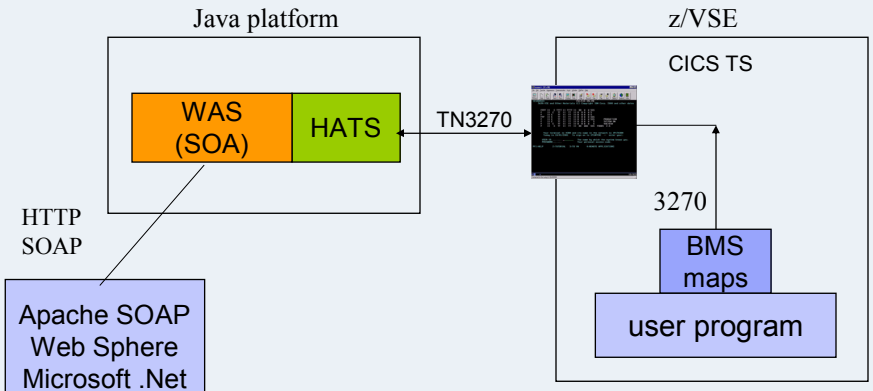
Web Services with Middle tier and z/VSE

The Web Service is implemented on the middle tier – WebSphere Connector technology is used to access VSE logic



WAS – WebSphere Application Server
Adapter – i.e. CICS Transaction Gateway, MQ, HATS

Web Services with 3270 applications



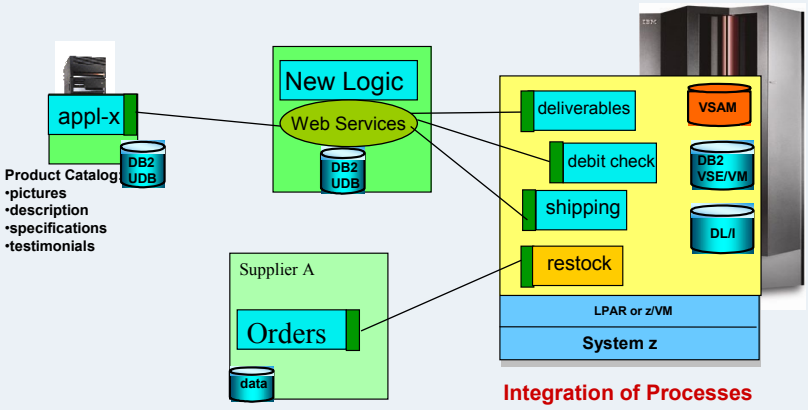
SOAP client or server

WAS – WebSphere Application Server
HATS – Host Access Transformation Server

SOA – the way to New applications and processes

- Applications look the same for all users
- Core applications can be enhanced (independent of their language, COBOL, ASM, PL/I)
- New business logic is built

Increased success for the Company



Integration of Processes

Solutions where SOA is not the best architecture

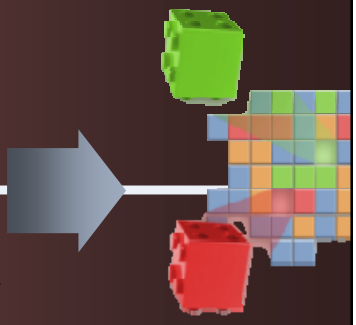
- **For high performance requirements**
  - **Communications using SOAP/XML are time consuming**
- **For the transfer of large amounts of data**
  - **XML data can get huge**
- **If transaction security is required**
  - **No 2 phase commit yet**
- **For real time direct access to data**
  - **SOAP is program to program communication**

Creating & Reusing Services - Greater Value through SOA

Create Flexible, Service-based Business Applications

Value

- Flexibility and elimination of duplication for reduced cycle times
- Expanded access to core applications
- Consultant studies have found it 5X less expensive to re-use existing applications than to write new applications*



Start with

- What services are needed to run your business?
- Identify high-value existing IT assets and service-enable them for reuse
- Fill in gaps by creating new services for today's business needs and future reuse
- Registry/repository to facilitate centralized access and control of reusable services

" With reuse, solving the next business problem can be done more quickly and efficiently."

- Amy Wohl

** Software Productivity Research (SPR)*

Reusing Services

Business Challenge: Leverage existing assets to improve business agility

Sysdat & Gautzsch

Reused existing RPG service based function to integrate with Amazon.de sales portal

Online in 3 weeks. ***ROI in < 3 months.***

WebSphere Business Integration Express, Partner Gateway

Acesita

Integrates mySAP and existing backend applications with **reusable service data**

Real-time views of critical cost and profit information for **better decisions**

IBM BCS, WebSphere MQ and Message Broker

Mainsoft and Comtec

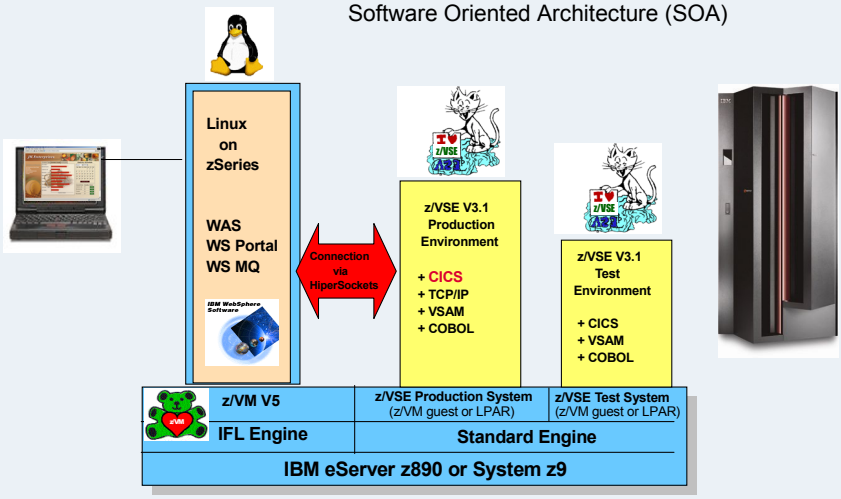
Reuse .NET applications in open standards-based SOA with IBM Business Partner Mainsoft Solutions

5x faster than rewriting the code from scratch

Mainsoft Visual MainWin, WebSphere Application Server

WebSphere Application Server for VSE Customers

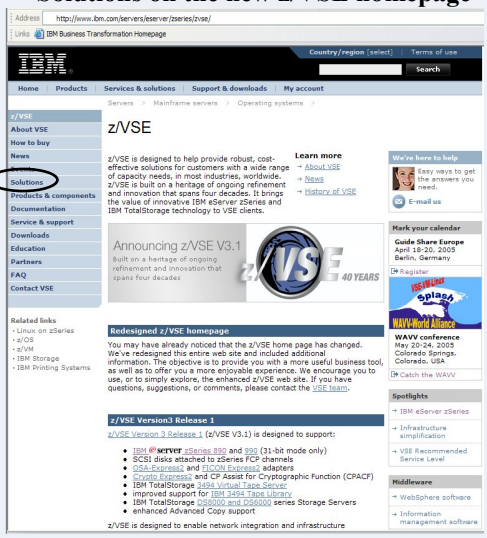
The possibility of application integration and Software Oriented Architecture (SOA)



Transactional processing with CICS TS

Solution	Connector to use
Webify	▪CWS – CICS Web Support ▪HATS – Host Access Transformation server ▪HOD – Host on Demand server
CICS application access from remote	▪CTG – CICS Transaction Gateway ▪HATS – Host Access Transformation Server ▪MQ Series (Client or Server)
SOA - Flexible, platform independent, CICS application integration, the most advance Application-to-application communication Method	▪Web Services – using XML data and SOAP protocol

Solutions on the new z/VSE homepage



http://www.ibm.com/servers/eserver/zseries/zvse/

Documentation

- **What is SOA?**
  - http://www.ibm.com/developerworks/webservices/newto/
  - http://webservices.xml.com/pub/a/ws/2003/09/30/soa.html
- **Web Services**
  - http://www.ibm.com/servers/eserver/zseries/zvse/documentation/ebusiness.html#soap
- ***z/VSE e-business Connectors, User's Guide (SC33-8231)***
  - http://www-03.ibm.com/servers/eserver/zseries/zvse/
- **Web Services in VSE (zJournal Article from Rich Smrcina)**
  - http://www.zjournal.com/index.cfm?section=article&aid=281
  - http://www.zjournal.com/index.cfm?section=article&aid=320
  - Includes COBOL sample code