

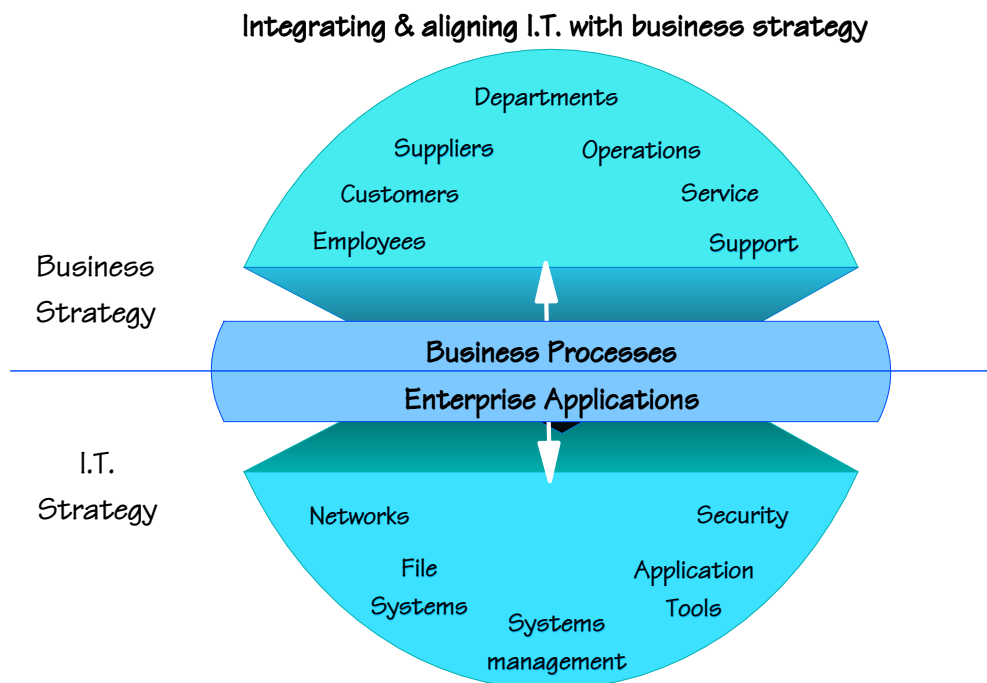
Web Services for Business Application Integration

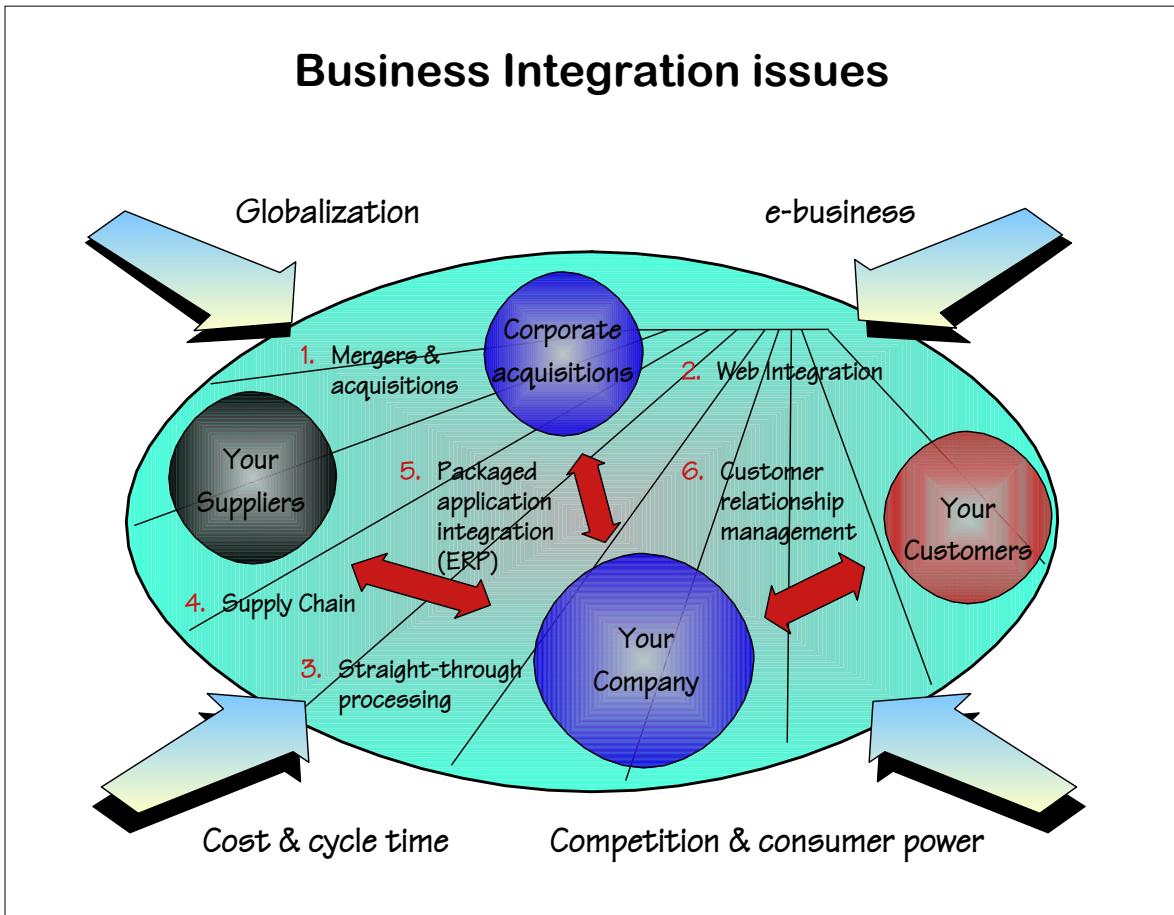


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Transaction Processing Consultant
IBM Certified System Designer
tonysk@lightyr.com



What is Business Integration all about?





- ### Value of Business Integration
- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Mergers & acquisitions <ul style="list-style-type: none"> ▪ Ensure the merger is a success ▪ Bring diverse businesses together -- faster 2. Web integration <ul style="list-style-type: none"> ▪ Tie the Web into your core business systems for competitive advantage 3. Straight-through processing <ul style="list-style-type: none"> ▪ Reduce business risk ▪ Achieve 'zero latency' trading | <ol style="list-style-type: none"> 4. Supply chain integration <ul style="list-style-type: none"> ▪ Make the supply chain more effective 5. Packaged application integration <ul style="list-style-type: none"> ▪ Implement ERP systems faster and less expensively ▪ Make ERP systems more responsive and flexible to business change 6. CRM integration <ul style="list-style-type: none"> ▪ Get a single customer view ▪ Gain the ability to cross sell |
|---|---|

Ensure the I.T. infrastructure is flexible

"The objectives of a business organization are only partially known at any given time, and are *always* subject to change."

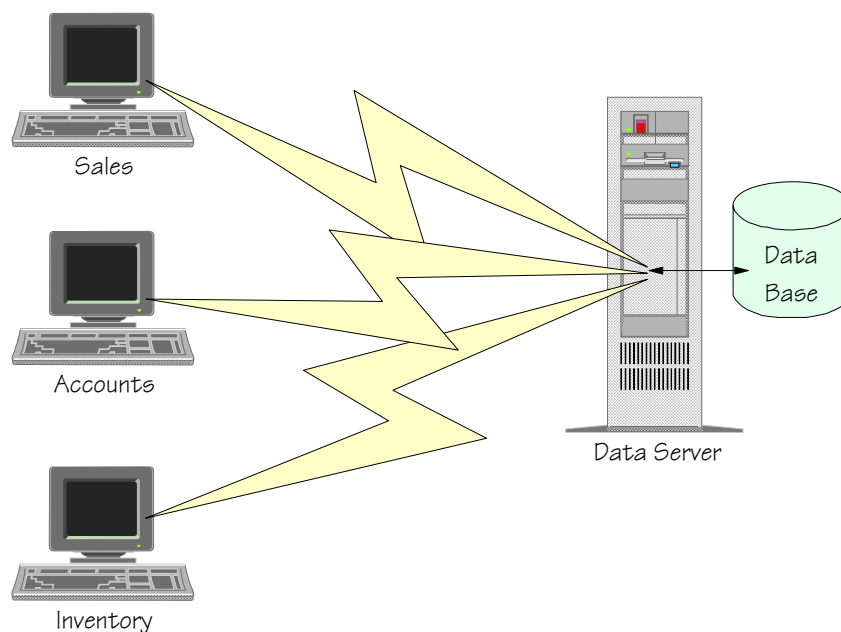
Source: 'Enterprise Application Integration & Information Flow',
by John Mann, The Yankee Group

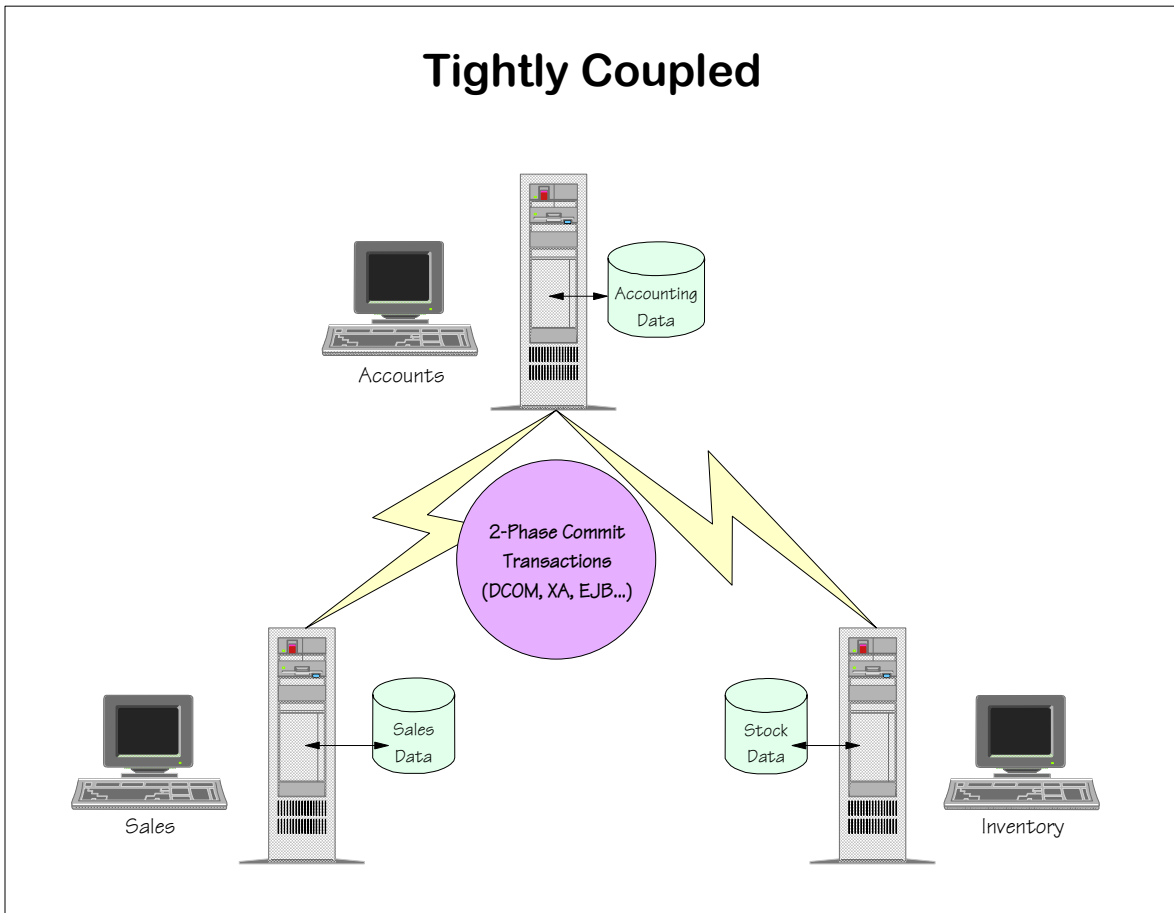
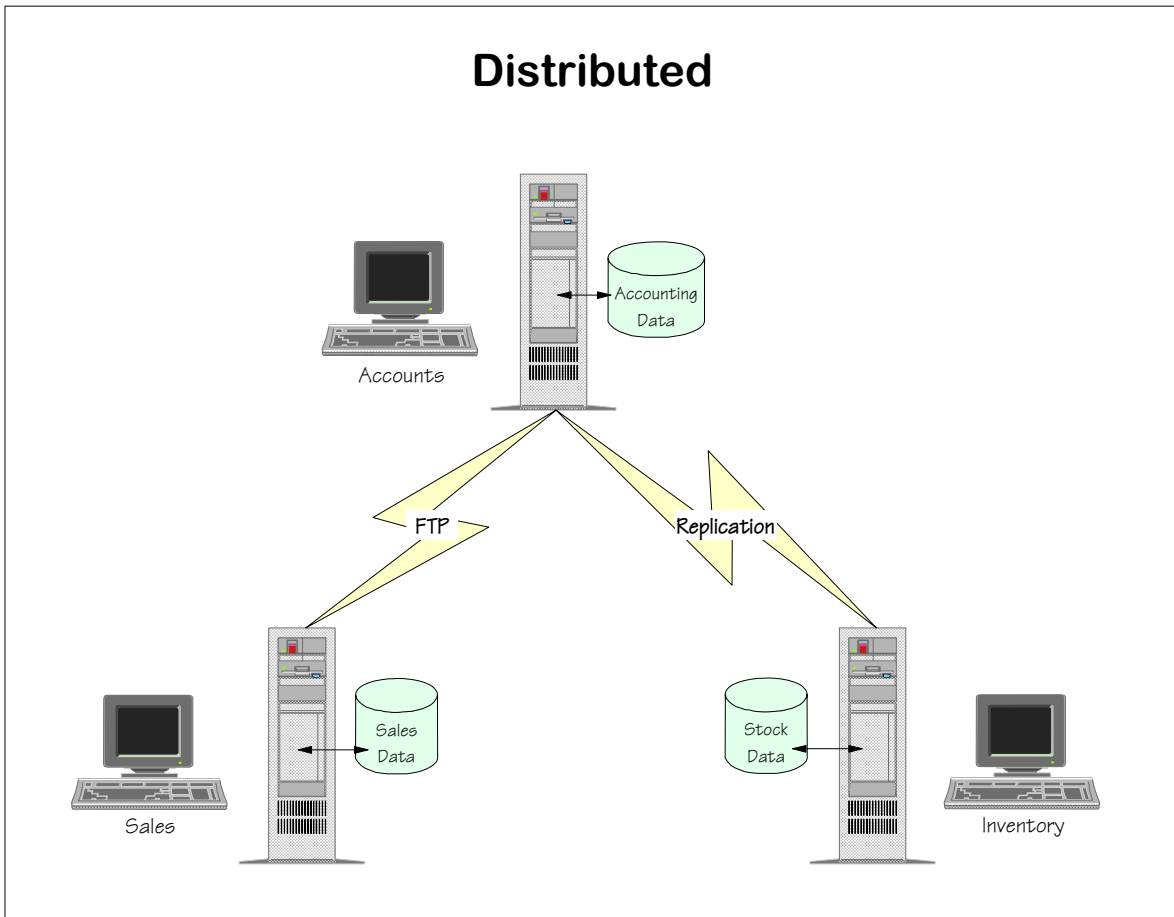
This constantly changing and often unpredictable environment creates a major challenge for those seeking to justify long-term investment, particularly in I.T...

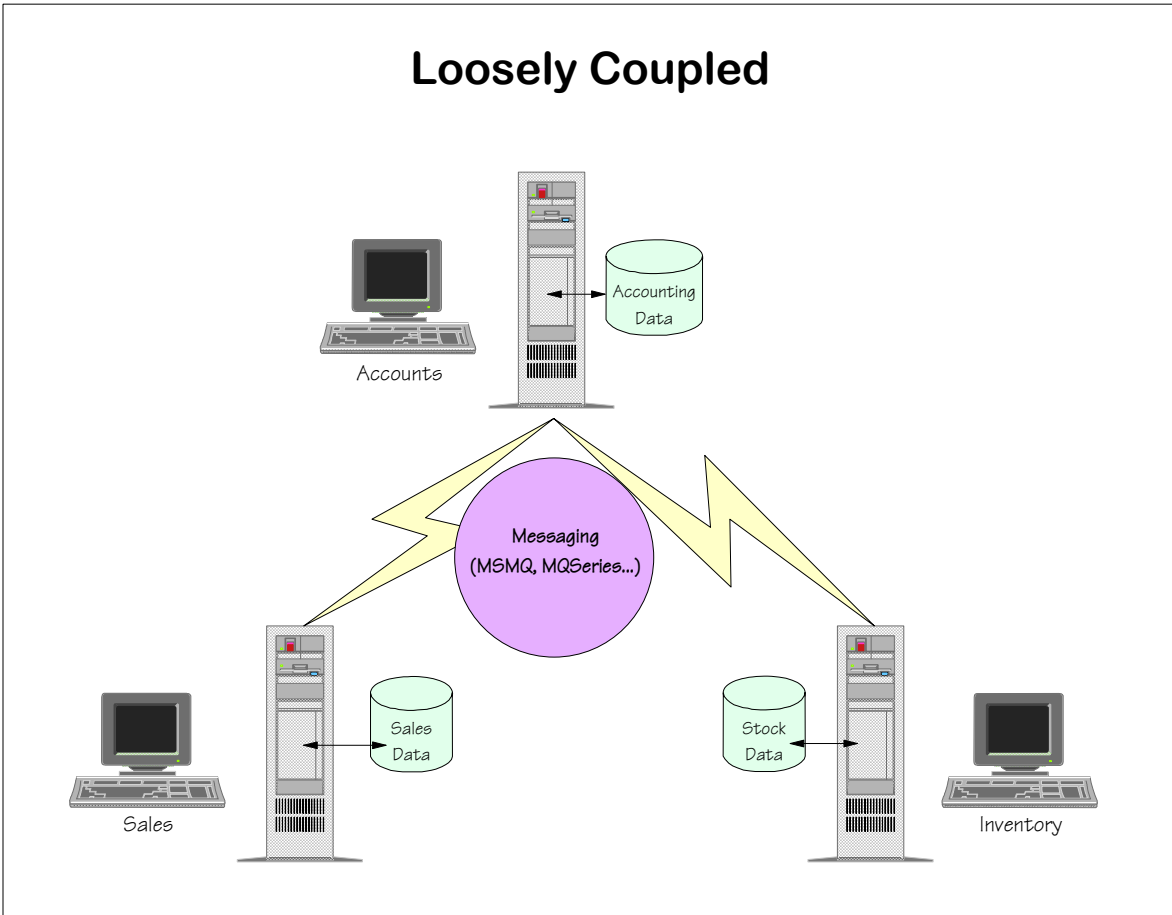
...A more realistic approach is to build flexibility into I.T. systems to ensure that they can be configured, augmented or replaced when change inevitably occurs."

Source: 'Information Integration',
by Spike Cavell & Co.

Centralized







Distributed Architectures

Architecture	Tightly Coupled	Loosely Coupled
Application Development	✓	
Response Time	=	=
Re-use	<i>software components</i>	<i>data</i>
Business to Business		✓
Cross-Platform		✓
Availability		✓
Scale-ability		✓

XML

- Extensible Markup Language
- **Self-defining** data structure protocol
- **Text-only** -- ideal for cross-platform data

for example:

```
<?xml version=' 1.0' >
<CustomerBalance>
  <CustomerNumber>123456</CustomerNumber>
  <AccountBalance>$5,000</AccountBalance>
</CustomerBalance>
```

- ▶ DTD: defines the data model for an XML document
- ▶ **Schema**: similar to DTD, with some advantages, e.g.
 - **data type** of each element and attribute
 - has a name, aka 'schema **name space**'

www.w3c.org/XML

Web Services

Conceptually, **Web Services** represent a model in which discrete tasks within e-business processes are distributed widely throughout a value net.

Specifically, **Web Services** are a stack of emerging standards that describe a service-oriented, component-based application architecture.

Gartner define **Web Services** as software components that employ one or more of **SOAP**, **WSDL**, or **UDDI** to perform distributed computing.

Using these technologies constitutes a Web service; using **all** of them is **not** required.

SOAP Specification

- (originally *Simple Object Access Protocol*, now only a name)
- *Message Format*:
 - defines what is in a message
- *Message Elements*:
 - how to parse the message
- *Encoding rules*:
 - serialization mechanisms for encoding applicationdefined data types
- *Representation*:
 - how to represent remote procedure calls and responses

www.w3.org/TR/SOAP

SOAP Message Types

- *Request*
 - Contains invoked service, service operations and input parameters
- *Response*
 - Returns output parameters returned from a service invocation
- *Fault*
 - Used to communicate errors

SOAP Message Structure

- Envelope
 - Root element of SOAP message

- Header
 - Used to include additional information
 - Must be immediate child of envelope
 - Must occur before the body element

- Body
 - Contains the method call, and the call arguments

- Fault
 - Status information contained within the SOAP body
 - <faultcode>: Specify error codes
 - <faultstring>: Textual description of fault
 - <faultactor>: The entity that generated the fault
 - <detail>: Application specific data about the fault

Example message

```

<SOAP: Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope"
  SOAP:encodingStyle="http://schemas.xmlsoap.org/soap/encoding">

  <SOAP: Header>
    <MyHeader xmlns="http://www.acme.com">
      <Username>MyUsername</Username>
    </MyHeader>
  </SOAP: Header>

  <SOAP: Body>
    <ns1: DoSomething xmlns:ns1="urn:MyService">
      <i n0 xsi:type="xsd:int">300</i n0>
      <i n1 xsi:type="xsd:boolean">false</i n1>
    </ns1: DoSomething>
  </SOAP: Body>

</SOAP: Envelope>

```

Namespaces

```

<SOAP: Envelope
  xml ns: soap="http://schemas.xmlsoap.org/soap/envelope"
  SOAP: encodingStyle="http://schemas.xmlsoap.org/soap/encoding">

  <SOAP: Header>
    <MyHeader xml ns="http://www.acme.com">
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</SOAP: Envelope>

```

Encoding

```

<SOAP: Envelope
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  <SOAP: Header>
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```

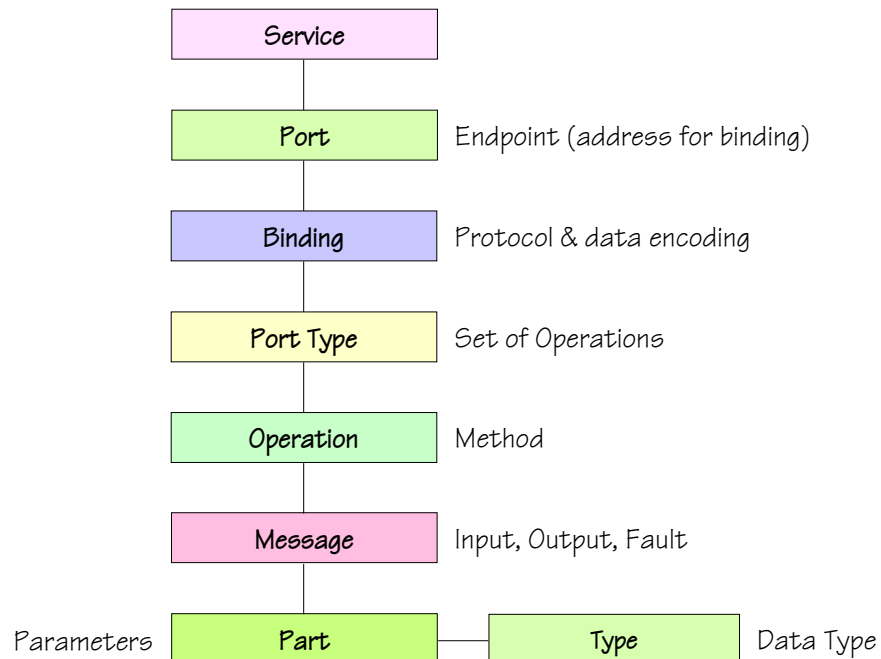
WSDL

- **Web Services Description Language**
 - An XML language for describing Web services
- **Describes:**
 - What the Web service does
 - How to invoke it
 - Where it is located

...an IDL for Web services

www.w3.org/TR/wsdl

WSDL elements



UDDI

■ Universal Description, Discovery, and Integration

▶ Registry for:

- Service types
- Businesses Information
Service details

▶ Description:

Host common definitions for service interfaces (promote standardization and interoperability)

▶ Discovery:

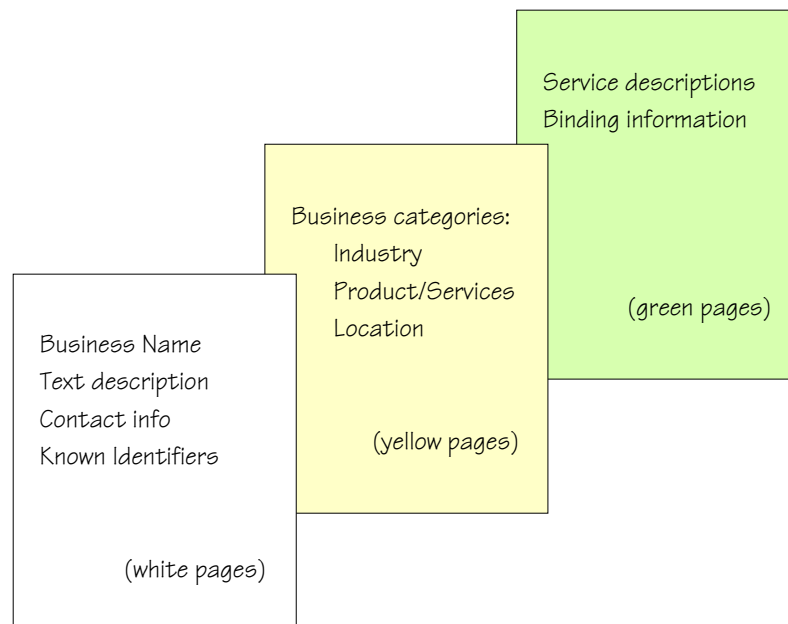
Find service implementations, and the businesses that provide them

▶ Integration:

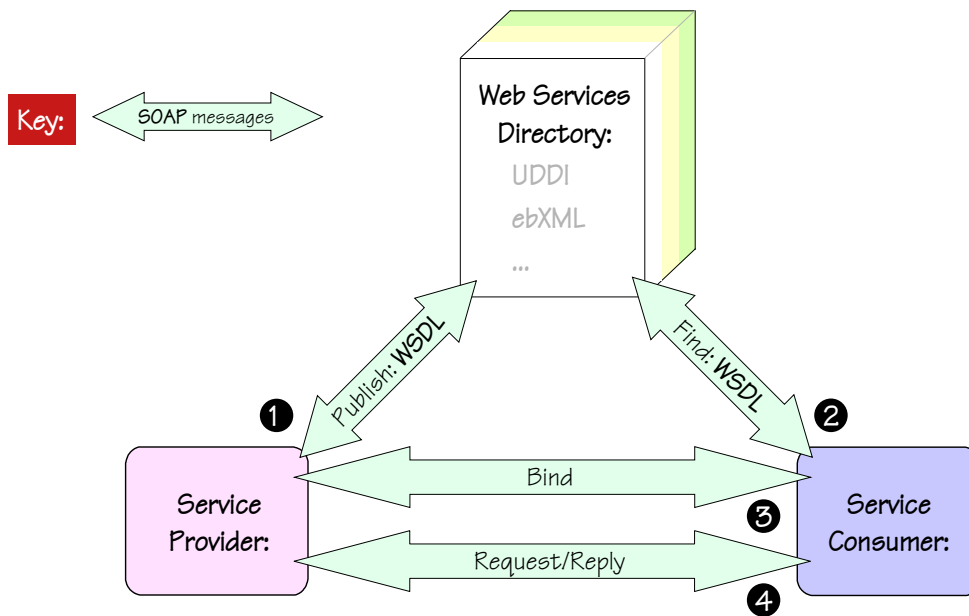
Facilitate aggregation of services in business workflows (promotes B2B integration)

www.uddi.org

UDDI Registry



Putting it all together...



Example Applications

- **Private**
 - ▶ 'open' alternative to existing interfaces, such as:
 - client/server
 - RPC
 - ...
- **Business to Business**
 - ▶ 'open' versions of proprietary interfaces
 - for example, alternatives to SAP's IDOC, PeopleSoft's and J. D. Edwards APIs...
- **Public**
 - ▶ hundreds of examples already available...

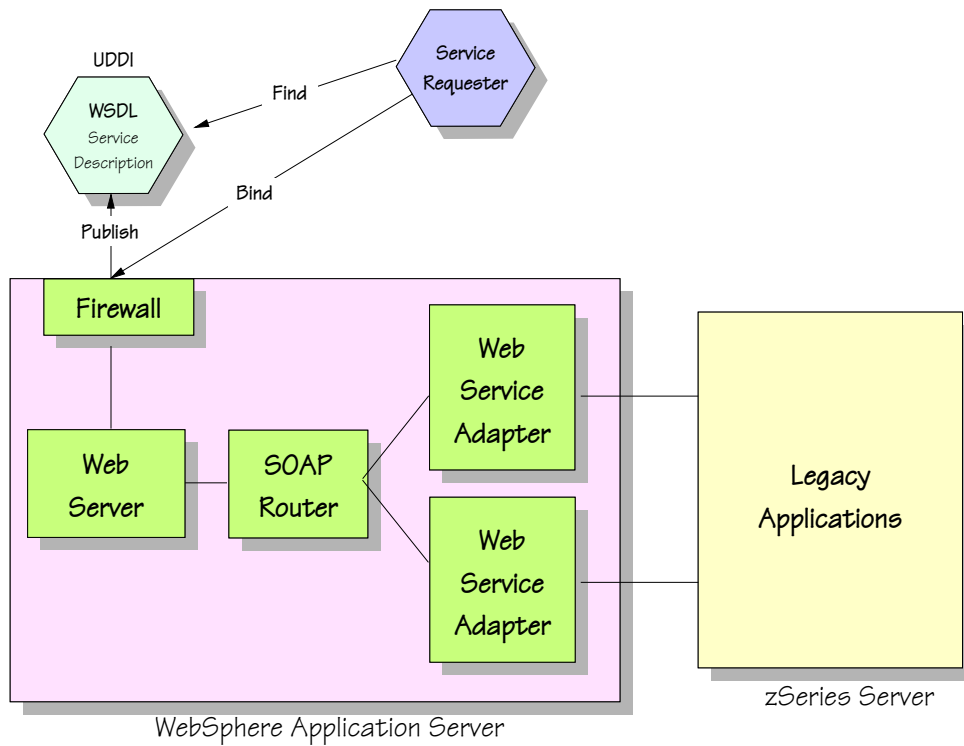
Real Web Services

- Query web documents directly from other computer applications:
google.com/apis
- Locate entertainment, restaurants, and lodging in a given area:
zagat.com
- Find ATM locations in a given zip code:
serviceobjects.com/products/dots_atm_demo.asp
- Track the current location and status of a FedEx package:
fedex.com/us/tracking
- Translate text between two languages:
babelfish.altavista.com

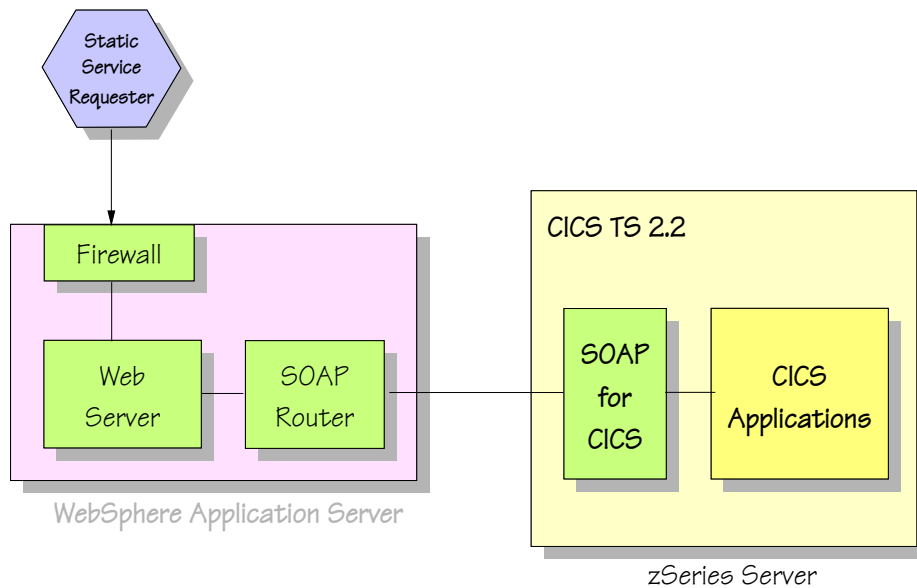
Building Web Services

Provider	Tools	SOAP	WSDL	UDDI
IBM	WebSphere Studio ETTK (was WSTK)	✓	✓	✓
BEA	WebLogic Workshop	✓	✓	✓
Oracle	Portal Development Kit	✓	✓	✓
Microsoft	Visual Studio .net .net SDK	✓	✓	✓
Sun	Forte for Java WSDP	✓	✓	✓
HP	e-Speak Tools	✓	✓	✓

What about Legacy applications?

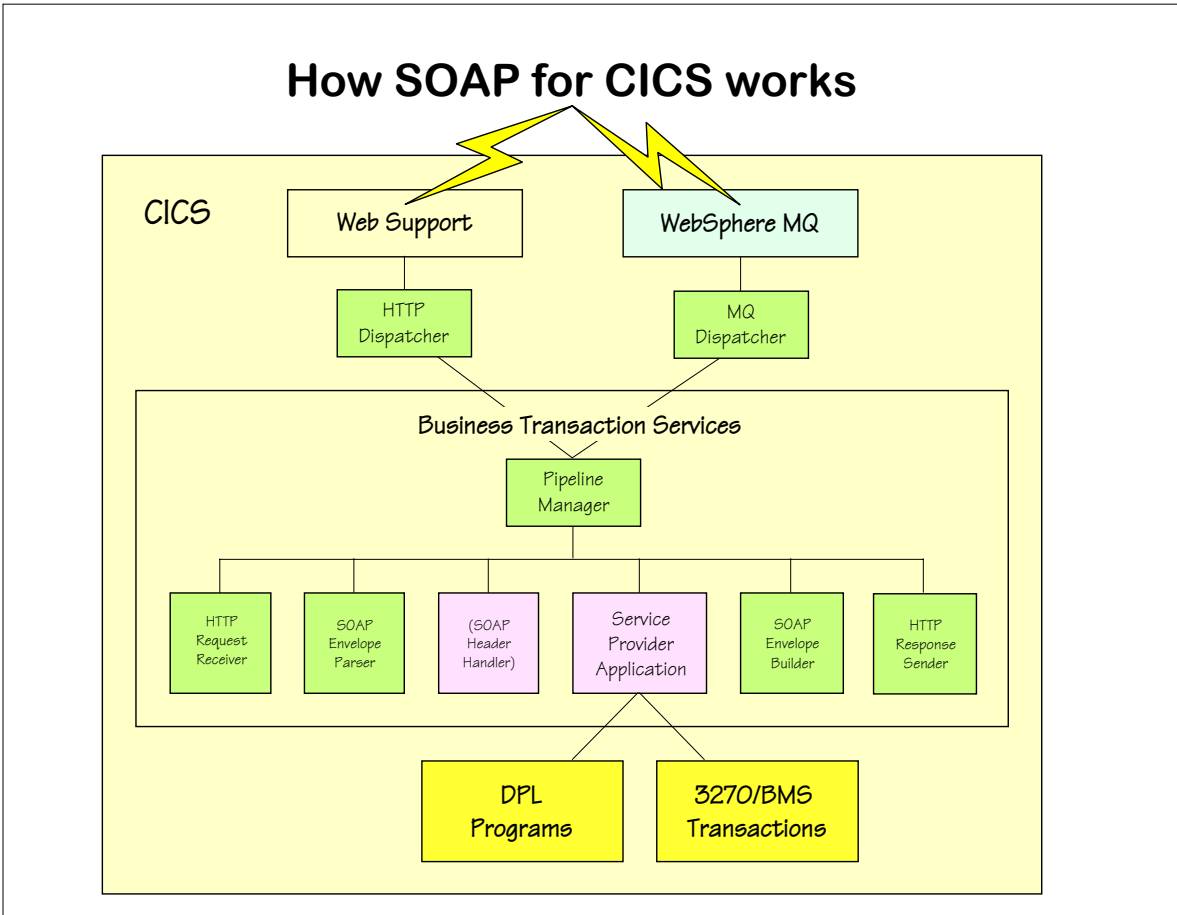


SOAP for CICS - TS 2.2 feature

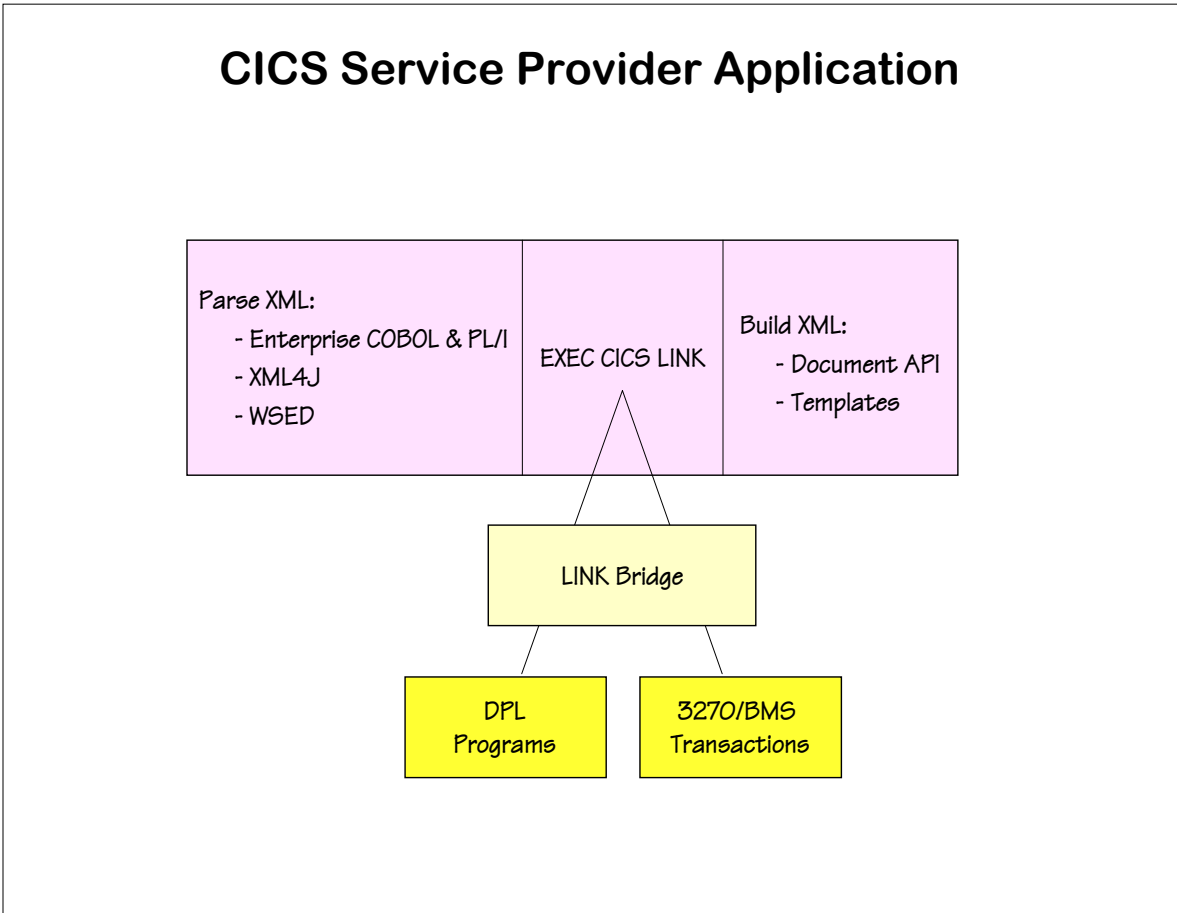


for an example showing how to generate WSDL for a dynamic requester, see http://www7b.software.ibm.com/wsdd/library/techarticles/0307_griffith/griffith1.html

How SOAP for CICS works



CICS Service Provider Application



SupportPac CA1M

- *SOAP for CICS Technology Preview*

- Still available for download

<http://www-3.ibm.com/software/htp/cics/soap/supportpac/>

- Supports inbound SOAP messages CICS TS 1.3

- Supports inbound & outbound SOAP on CICS TS 2.2

Web Services

- **Open standards-based**

- ▶ multi-platform
- ▶ vendor neutral

- **Flexible**

- ▶ dynamic
- ▶ tightly or loosely coupled

- **Modular**

- ▶ Easy & cheap web-based implementation
- ▶ Incremental development
- ▶ low cost EAI & B2B

Lightyear Consulting Ltd.

Palo Alto - Austin - Scottsdale - Laguna Beach - Calgary
www.lightyr.com



Next steps towards Web Services...

1. Tutorial:
<http://www.oreillynet.com/lpt/a/web services/2002/02/12/webservicefaqs.html>
2. Tools & code examples:
<http://www.alphaworks.ibm.com/tech/webservices toolkit>
3. Ask Lightyear:
 - On-site technical seminars & education classes
 - Consulting services
 - Java Development
 - ...





"...on the road again..."

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- Features & Functions of DB2 V8
- What's New in DB2 Tools?
- DB2 and Web Services**
- DB2 V8 Security Update
- A Detailed Look at DB2 Performance Management Tools



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