UNITE 2003
Technology Conference

Web Services
as part of your
IT Infrastructure

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Session MTP4062

9:15am – 10:15am

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Who is MGS, Inc.

- Software Engineering, Product Development & Professional Services firm founded in 1986
- We provide products and services to solve business problems:
  - **Software Engineering Services**
  - **Professional Services**
    - **Management Support Services**
    - **Consulting and Technical Services**
    - **Application Development Services**
    - **Training Services**
  - **Product Development**

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Why Listen to MGS, Inc.

- Over 30 years experience in computer solutions
- Experts in making computer solutions both reliable and efficient
- Experienced in a variety of hardware/software technologies
- Experts in operating system design and management
- Experts in data communications
- Experienced in solutions requiring multiple, diverse platforms

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Web Services

- In this presentation you will learn about …
  - The “Vision”
  - The “Reality”
  - What it can do “Today”
  - The “Business Case”
  - The “Technology”
  - The “Future”

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Web Services – The Vision

- Major players
  - Microsoft
  - HP
  - IBM
  - Sun
- Goal
  - Make Internet program-to-program exchanges as easy as browsing the Web

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Web Services – The Vision

- Internet based
- Universal directory
  (like TCP/IP host name services)
- “Loose Coupling” between service provider and service consumer
  - Anonymous client
  - Service discovery
  - Flexible data content
  - asynchronous
- Charge per service
- Create a world-wide fabric of computing services (and commerce)

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Web Services – The Vision

- The Web Services Provider …
  - Service provider publishes a service
    - Deploys on an Internet connect computer
    - Publishes service in a global Internet directory
  - Provider establishes a way for customer to purchase the service

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Web Services – The Vision

- The Web Services Client …
  - Client shops the global Internet directory for the desired services
  - Software Interactive Development Environments (IDE) natively support browsing the directory and incorporation of service “objects”
  - Client purchases services necessary for the application
  - Develop/deploy application
  - Client applications use the Web Service(s) to provide business solutions

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Web Services – The Reality

- Mission critical applications cannot depend on:
  - the Internet
  - “vended” services
  - the hope that someone is vending needed services
  - the hope that “vended” services operate exactly as the business requires
- Business interfaces do not benefit from:
  - Dynamic service discovery
  - Data flexibility

Web Services – The Reality

- Similar to the problem of truly “open” systems
  - The “vision” never quite comes to fruition. No one vendor can/will take responsibility for the whole thing.
  - Difficult to make reliable
  - Problems in developing an integrated solutions (the parts never quite fit together)
  - Difficult to manage and maintain
- Don’t buy into the Web Services “hype”

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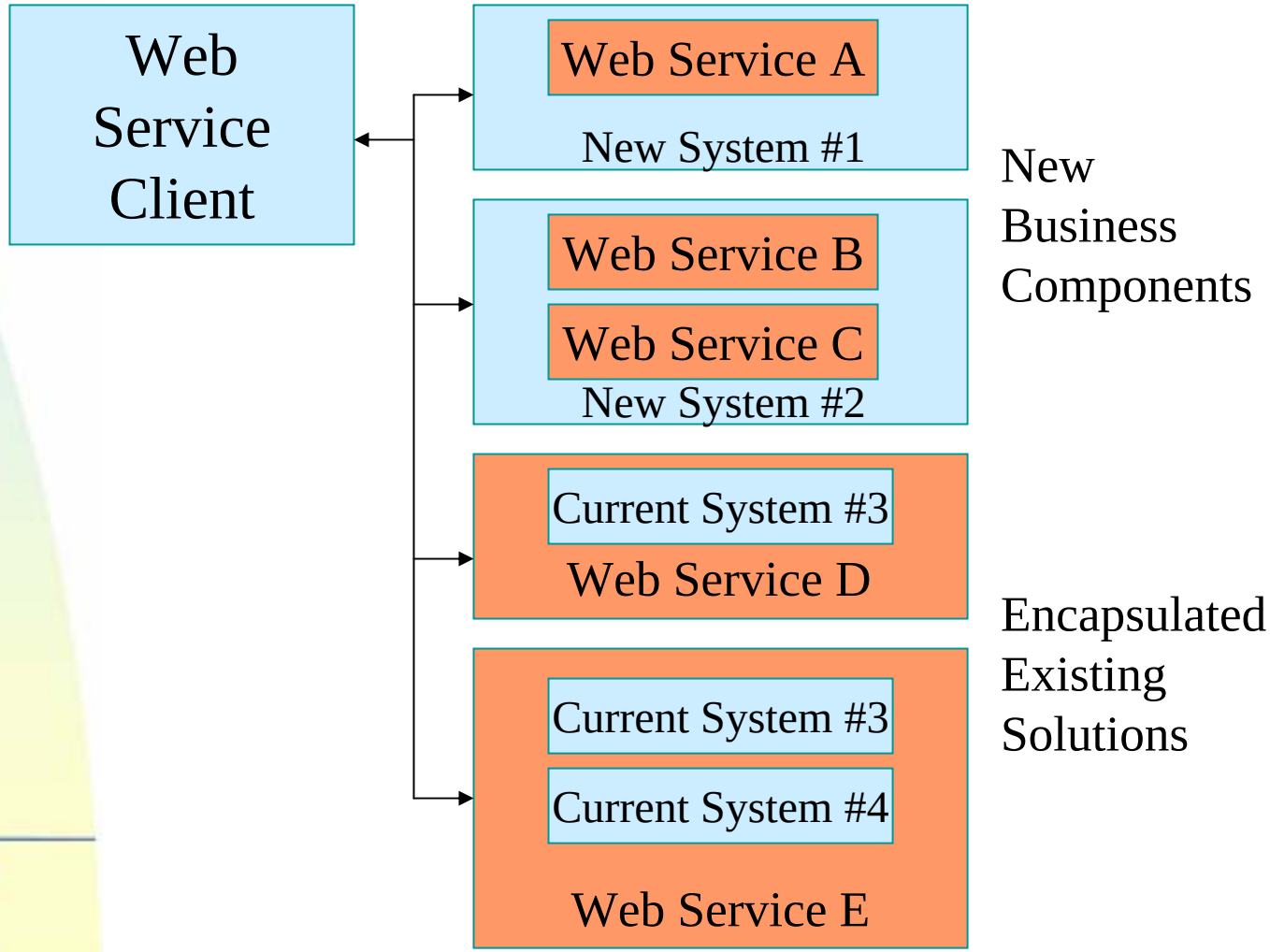
Web Services – Today

- The Web Services concept contains extremely powerful elements:
  - Simple, well-defined, standards-based interface
  - Technology independent implementation
  - Each set of services has a description file
  - Integrated directory of service descriptions and documentation
  - Provides the ability to:
    - Componentize new Enterprise business functions
    - Encapsulate existing business functions for easier access

Web Services – Today



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Web Services- Business Case

- Simpler and more flexible then "open" transaction protocols
  - **EDI – Electronic Data Interchange**
  - **DTP – Distributed Transaction Processing (OLTP)**
- Not technology dependent
  - **RPC – Remote Procedure Calls**
  - **DCOM – Distributed Component Object Model**
  - **RMI – Remote Method Invocation**
  - **CORBA – Common Object Request Broker Architecture**

Web Services- Business Case

- Built on proven Internet communications standards
  - **HTTP – HyperText Transfer Protocol**
  - **SOAP – Simple Object Access Protocol**
  - **XML – eXtensible Markup Language**
- Includes service description and service directory
  - **WSDL – Web Services Description Language**
  - **UDDI – Universal Description, Discovery and Integration**

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Web Services- Business Case

- Supported by software IDEs
  - Discovery of service
  - Automatic creation of Web Services client objects
  - Web Services Server object support
    - WSDL generation
    - UDDI update
    - Server program
  - Included as part of the application framework
    - Microsoft .NET
    - Sun Microsystems J2EE

Web Services- Business Case

- Abstracts business functionality
  - Creates machine (technology) independent functionality
  - Indirect reference to service
  - Trivial to re-locate the business function or functions
  - Improved scalability
  - Improved ability to re-host

Web Services- Business Case

Programs Worldwide in 2001 (in millions)

	Custom Applications	Application Packages
Total	87.2	5.6
Windows	5.9	0.4
UNIX	15.7	1.0
Other	65.5	4.2

Aberdeen Group, February 2002

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Web Services- Business Case

- Leverage existing business functionality
  - Rewrites are expensive
  - Redesigns are even more expensive
  - Placing a Web Services envelope around existing functionality is relatively inexpensive
  - Preserves investment in known, reliable business solutions

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Web Services- Business Case

- Use proven Web Services elements to solve business problems
  - Organize IS services
    - **Description of each service**
    - **Directory of services**
  - Implement functionality shared between dissimilar systems
  - Provide well defined interfaces between business units
  - Leverage existing functionality
  - Not dependent on proprietary technology
  - Ease of use (IDE support)
- Standard warning …. don't implement technology for technology's sake

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Web Services - Technology

Definition:

A Web service is a software application identified by a URI, whose interfaces and bindings are capable of being defined, described, and discovered as XML artifacts. A Web service supports direct interactions with other software agents using XML based messages exchanged via internet-based protocols.

WC3 Web Services Architecture Requirements Working Draft 11 October 2002

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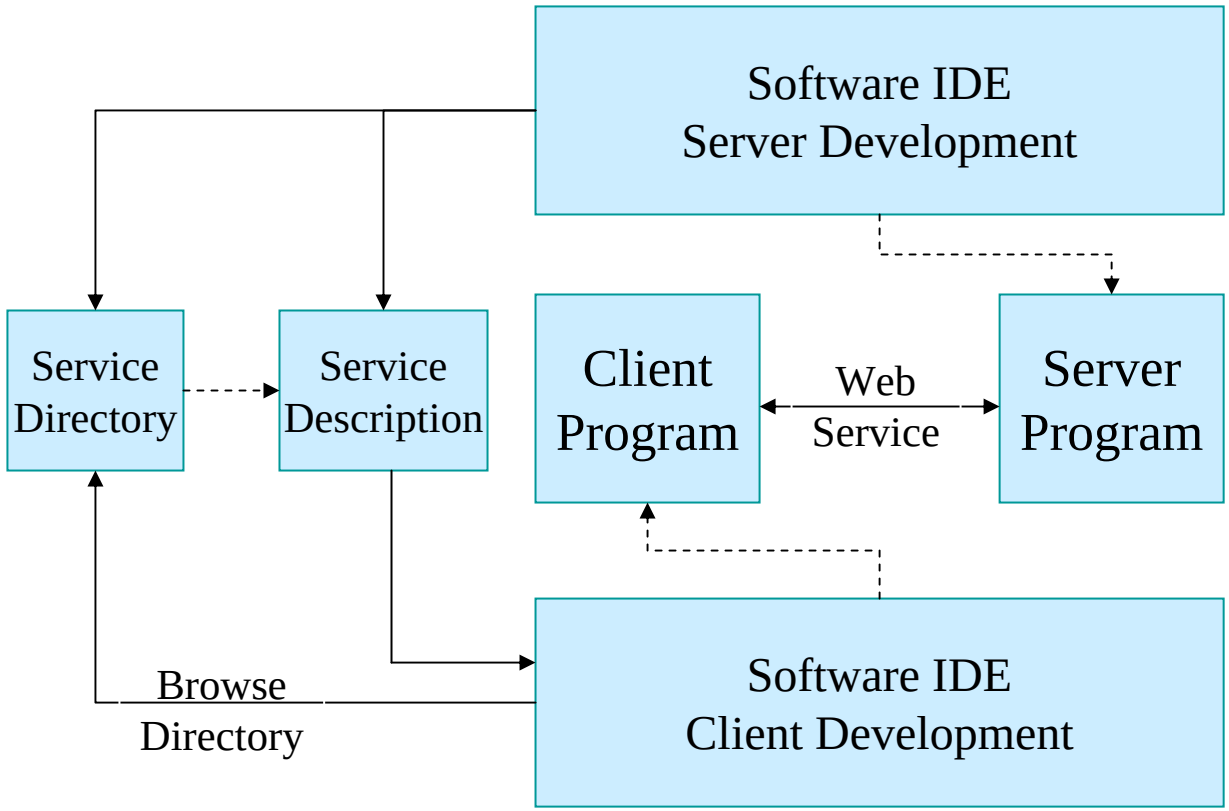
Web Services - Technology

- Development components:
  - Business function (application)
  - Web Service definition (WSDL)
  - Web Service directory (UDDI)
  - Web Service enabled IDE
    - UDDI browser
    - Create client objects from WSDL
    - Create Web Services servers
- Runtime components
  - Client application program
  - HTTP or HTTPS protocol
  - SOAP protocol
  - XML data request/response
  - Server application program

Web Services- Technology

- Directory contains Web Service description and documentation
  - **UDDI** – Universal Description, Discovery and Integration
  - **WSDL** – Web Services Description Language
- UDDI specifys WSDL location with a URI
  - For use with HTTP
  - Includes web server host name
  - Includes WSDL file name

Web Services- Technology



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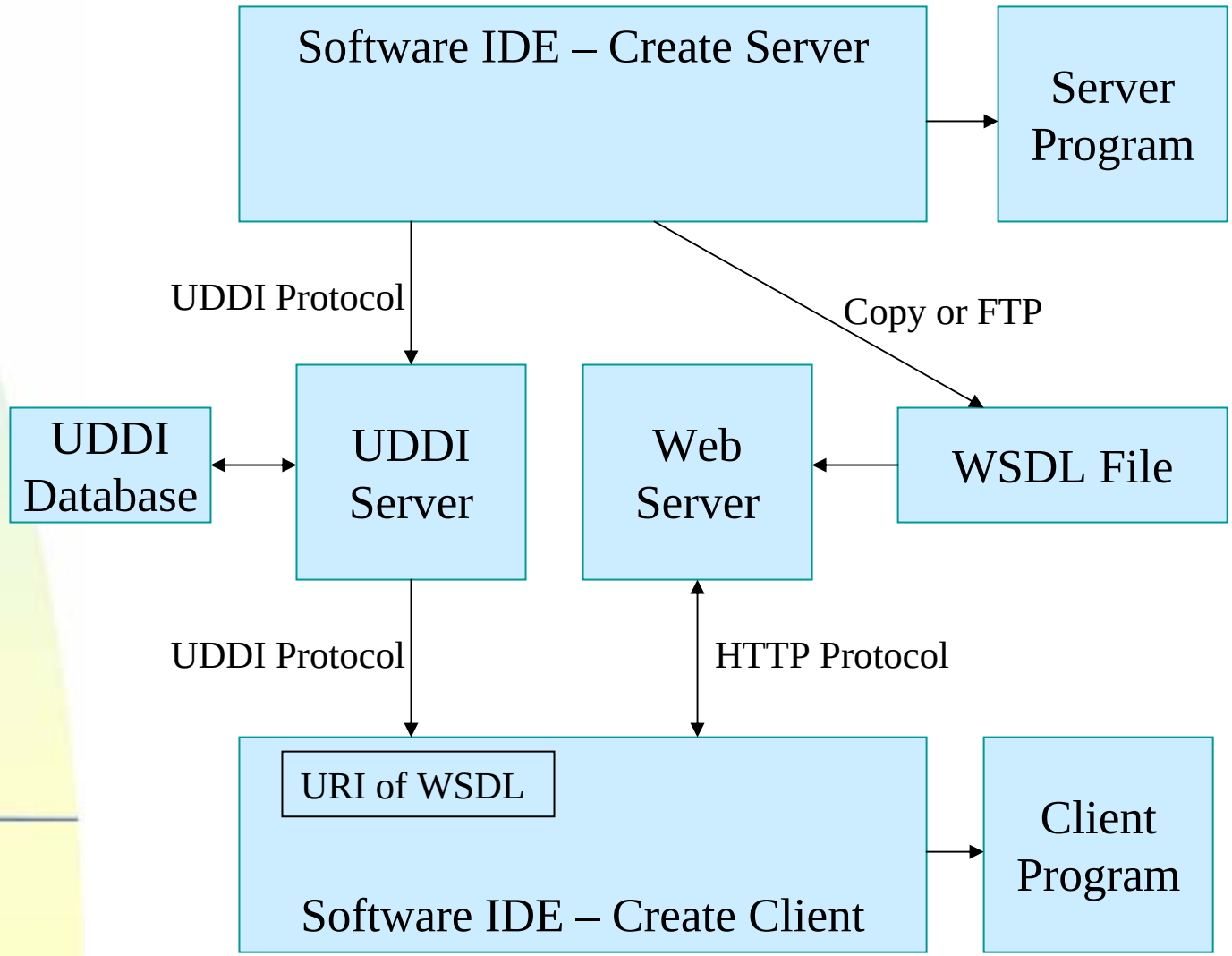
Web Services- Technology



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Web Services- Technology

WSDL File Excerpt:

```
<message name="WSTEST_SCRN01">
  <part name="Trancode" type="xsd:string" />
  <part name="Input_data" type="xsd:string" />
</message>
<message name="WSTEST_SCRN01Response">
  <part name="Trancode" type="xsd:string" />
  <part name="Input_data" type="xsd:string" />
  <part name="statusLine" type="xsd:string" />
</message>

<service name="COMSWebServices">
  <documentation>Access COMS applications via Web Services
  </documentation>
    <port name="WSTEST" binding="wsdl:WSTESTHttpBinding">
    <soap:address location="http://laptop1mcp/COMSWebServices/" />
    </port>
</service>
```

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Web Services – Technology

- Web Services is built on Internet communications standards
  - **HTTP –** HyperText Transfer Protocol
  - **SOAP –** Simple Object Access Protocol
  - **XML –** eXtensible Markup Language
- Web service is addressed with the server's URI obtained from the WSDL

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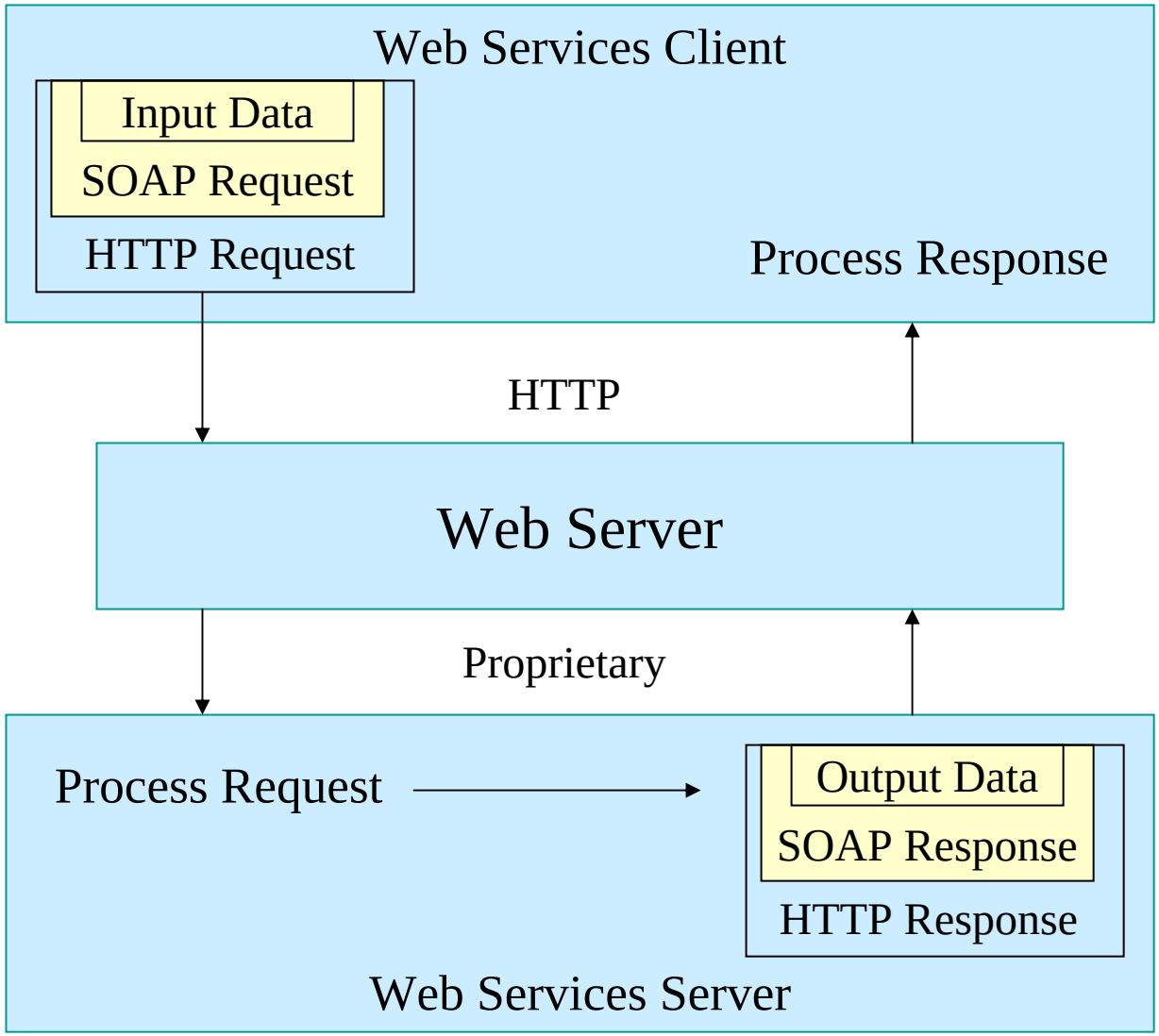
Web Services – Technology

Indicates XML Encoding



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Web Services – Technology

SOAP Request:

```
<soap:Envelope>
  <soap:Body>
    <tns:WSTEST_SCRN01>
      <Trancode>SCRN01</Trancode>
      <InputData>lower case letters</InputData>
    </tns:WSTEST_SCRN01>
  </soap:Body>
 </soap:Envelope>
```

SOAP Response:

```
<soap:Envelope>
  <soap:Body>
    <tns:WSTEST_SCRN01Response>
      <Trancode>SCRN01</Trancode>
      <InputData>LOWER CASE LETTERS</InputData>
      <statusLine />
    </tns:WSTEST_SCRN01Response>
  </soap:Body>
 </soap:Envelope>
```

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Web Services

- Security Considerations
  - Can use HTTPS (SSL) for authentication and encryption
  - SOAP security
    - assumes transaction is from a trusted source
    - leaves transaction security to the application
    - possible use of future XML security standards
  - Application Security
    - part of each transaction
    - part of a multi transaction dialog

Web Services - Future

- Languages for defining business processes based on sequences of individual Web Services
  - **Microsoft/IBM – BPELAWS (Business Processing Execution Language for Web Services)**
  - **Sun – WSCI (Web Services Choreography Interface)**
- Web Services will become a requirement for systems to ***participate*** in the Enterprise just as TCP/IP has become a requirement for systems to ***communicate*** within the Enterprise

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Web Services - Future

“[by using Web Services] developers must consider how to build more modular components, how to share data across otherwise disparate sources , and ultimately, how to create applications out of these components and data sources.”

- Infoworld June 10, 2002

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Additional Questions?

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This presentation is available on our WEB site

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Reference Material

- **WC3 Web Services Architecture Requirements**
  http://www.w3.org/TR/2002/WD-wsa-reqs-20021011
- **WC3 Web Services Description Requirements**
  http://www.w3.org/TR/ws-desc-reqs/
- **Web-Enablement: Setting the Foundation for Web Services, eCommunity Presentation October 10, 2002**
  Wayne Kernochan, Aberdeen Group
- **Understanding XML Web Services, The Web Services Idea.**
  Tim Ewald, Microsoft Corporation
  http://msdn.microsoft.com/webservices/understanding/readme/default.aspx

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