







A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP-messages, typically conveyed using HTTP with an XML serialization in conjunction with other Webrelated standards. W3C **Copyright © 2005 Bluster Systems International, LLC **WAVY20054** **WAVY2005

Some kind of function you can use across some kind of network Usually involve short interactions (connect, access code, disconnect) Discoverable, maybe ... Described with XML A Web Service is the exposure of a business process over a network

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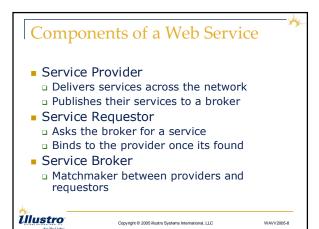
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Who Defines Web Services? • Open System Standards Organizations • World Wide Web Consortium (W3C) www.w3c.org • Web Services Interoperability Organization (WS-I) www.ws-i.org



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Who Defines Web Services? Software Vendors IBM Corp. www.ibm.com/developerworks/webservices Microsoft Corp. www.microsoft.com/webservices Hewlett-Packard Company devresource.hp.com/drc/topics/web_services.jsp







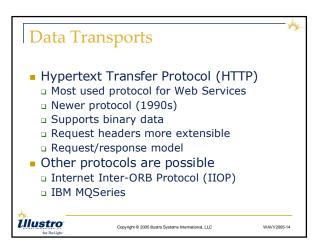
Ewerything is in XML Everything is in XML SOAP Simple Object Access Protocol Protocol to make requests and receive result WSDL Web Service Description Language Describes the available services, inputs and outputs Copyright © 2005 illustro Systems International, LLC WANY2005-10



Web Service protocols do not define the physical (wire) or logical (application layer) protocol used to transmit requests and results Typically the TCP/IP protocols used are SMTP HTTP

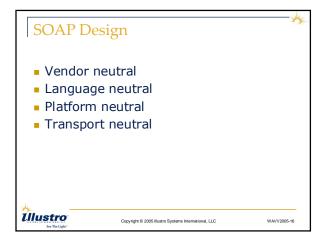


■ Simple Mail Transfer Protocol (SMTP) □ Early TCP/IP protocol □ Multipurpose Internet Mail Extensions (MIME) support allows non-textual data ■ Problems with SMTP □ Non-textual data must be encrypted □ Security problems □ Data size limitations

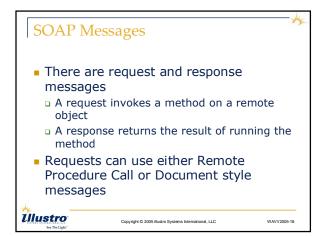


eXtensible Markup Language XML Platform independent way to share data Markup language similar to SGML Tags describe the meaning and purpose of the data Data only, no presentation attributes Used for all documents, requests and responses in Web Services architecture Details at www.w3c.org





Usually a Web Service lives behind a SOAP Server or Web Server that understands SOAP requests Handles the transport protocol (HTTP) Processes the SOAP request document Calls processing program passing input data Creates and returns result message



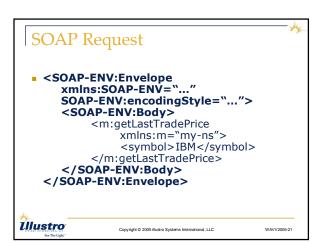


Most Web Services use RPC style messages SOAP specification defines how calls and returns are serialized in messages Document style messages can transport any XML document as long as the SOAP Server knows what to do with it

SOAP Envelopes A SOAP envelope contains the message itself The message is in an application specific vocabulary; namespaces distinguish the parts The envelope can contain a header, and MUST contain a body

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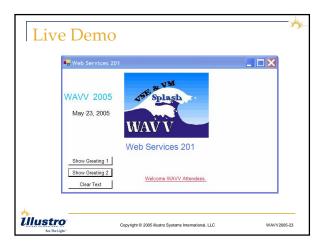
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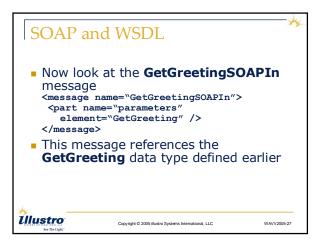


Web Services Description Language If we're going to find and use web services automatically, we have to have a way to describe them WSDL is used to describe a web service when it is published When a service is located, WSDL is used to invoke it



■ The WSDL file contains everything needed to make a SOAP request □ The address of the machine that hosts the service □ The name of the service □ The name of the method □ The name and types of the arguments to the method

SOAP and WSDL To make a SOAP request we have to know the arguments Start out looking in the WSDL <portType> <portType name="GreetingWSOAP"> <operation name="GetGreeting"> <input message="s0:GetGreetingSOAPIn" /> This says use GetGreetingSOAPIn message as the input to the method





SOAP and WSDL In reality, we will write our client code to a known programming interface We will know the method name and number and type of arguments ahead of time But, this information in the WSDL will be used by our tools to automatically generate proxy classes for us

Universal Description, Discovery and Integration Web Service discovery Defines standards for distributed registry of Web Services White pages company information Yellow pages categories of services Green pages business rules



IBM. Microsoft, SAP, NTT and others provide registries of Web Services See www.uddi.org/find.html for access See www.ibm.com/services/uddi for information on IBM's registry You can register for no charge and publish your own Web Services

UDDI Registries

- Registration basic process
 - Split your WSDL file
 - Register the interface portion as a TModel
 - Describe your business with a BusinessEntity
 - Add a BusinessServices record to describe your service. Refers to BusinessEntity and TModel
 - □ Install the WSDL file on your web server



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UDDI Process

- The UDDI discovery process
 - Client queries the UDDI registry for a service and receives the result
 - Client uses the results to request the WSDL file from the service provider's web server
 - Client invokes the service using the information from the WSDL file and receives the result from the service



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IBM has released UDDI4J, a free, open source implementation of the client side of UDDI. Simplifies the task of interacting with a UDDI registry JAVA Class Library See www 124.ibm.com/developerworks/projects/uddi4j

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Recommendations When starting to use Web Services Start with a pilot project to prove the value up front Start small, grow fast Do something representative of your larger goal Goals can be achieved by a small team in 2-3 months Define goals, expectations and measures of success before starting





Other Considerations J2EE and .NET support direct XML handling XML parser APIs (DOM and SAX) Stream readers and writers (XMLTextReader/XMLTextWriter) They also support sockets and even HTTP XML documents can be sent/received and processed without SOAP overhead Copyright © 2005 (Butto Systems International, LLC WAAV/2005-37)







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