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Microsoft
微软（中国）有限公司

Web Services Interoperability Between .NET and J2EE

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MSDN Webcasts

Agenda

- Web Services Support in Java and .NET
- Basic Interoperability
- Security - WS-Security
- Large Data – MTOM
- Reliable Messaging – WS-RM
- Resources

Web Services Support in Java

- ***Today***
  - Java API for XML-based RPC (JAX-RPC) 1.1: Support for SOAP/HTTP(S), WS-I BP 1.0 compliance
  - Java Architecture for XML Binding (JAXB) 1.0: Data binding support
  - SOAP with Attachments API for Java (SAAJ) 1.2: Low level access to SOAP messages
  - Java 2 Platform, Enterprise Edition (J2EE™) 1.4: endpoints, full packaging and deployment model

Web Services Support in Java

- ***Soon***
  - JAX-WS 2.0 (formerly JAX-RPC 2.0) (JSR-224): Data binding by JAXB, Protocol and Transport Independence
  - JAXB 2.0 (JSR-222): 100% schema support
  - Java SE 6.0:
    - Metadata support for web services (JSR 181)
    - Mustang (6.0) will include JAX-RPC 2.0 and a lightweight http server
  - J2EE 5.0 platform: Well integrated web services support

Other Java Toolkits

- IBM
  - Rational Application Developer (RAD) 6.0
  - ETTK 2.3 (AlphaWorks)
- BEA
  - BEA WebLogic Workshop 8.1.4
- ISV
  - Systinet Server 5.0
- Open Source
  - Apache Axis 1.2
  - Apache SOAP
  - GSoap

Web Services Support in .NET

- ***Today***
  - .NET Framework 1.1
    - SOAP/HTTP(S) and WS-I BP
    - IDE support through Visual Studio
  - WSE (Web Services Enhancements)
    - Enhances the current Web Services stack
    - WS-Security, WS-SecureConversation, WS-Trust, WS-Policy, MTOM
    - WSE 3.0 Community Technology Preview

Web Services Support in .NET

- ***Soon -*** “Indigo”
  - Combines four areas of distributing computing:
    - ASMX Web Services
    - WS-* (WSE)
    - .NET Remoting (Customization and Extension)
    - Enterprise Services (Transactions)
  - Security, Reliable Messaging and Transaction
  - Beta 1 now released
  - Integrates with Visual Studio 2005

…and Even More Toolkits!

- C++
  - Apache Axis 1.2
  - Roguewave LEIF 1.2
  - Systinet Server 5.0
- Perl
  - Soap::Lite
- Mainframe and midrange integration
  - Microsoft Host Integration Server 2004
  - Microsoft BizTalk Server 2004
  - ClientSoft Service Builder 3.5
  - NetManage OnWeb 7.0
  - ASNA Datagate

WS-I Compliance

- WS-I: Web Services Interoperability Org.
  - http://www.ws-i.org
  - 170+ ISVs, SIs and Enterprise Customers
  - Broad vendor support and working groups
- Profiles, testing tools and sample applications
  - Profiles
    - WS-I Basic Profile
    - WS-I Basic Security Profile in Draft
  - Testing tools
    - Monitor and Analyzer for both Java and C#
    - Vendor integration with other SOAP trace tools

The WS-I Basic Profile 1.0

Stack of layers	Web Services Standards
Location	UDDI v2
Description	WSDL 1.1
Message	SOAP 1.1
Schema	XSD 1.0
Expression	XML 1.0
Transport	HTTP(S)

Recommendations and Strategies

- WS-I basic profile
  - Sets the “bar of entry” for vendors
  - Does this stop developers from creating non-compliant Web Services?
  - Set of recommendations and strategies
  - IDE compliance

Recommendation

- Control your environment
  - Latest “compatible” version of Web services toolkits
    - Things change with point releases
  - Debugging, tracing and logging
    - Use tools to their full extent
  - Thinking about exceptions
    - Use SOAP Fault to describe error

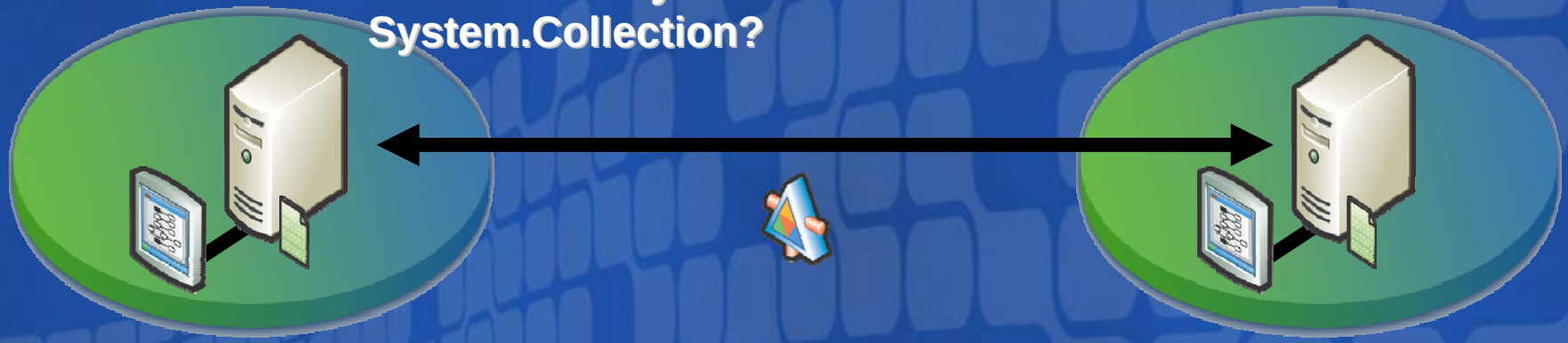
Recommendation

- Use XSD first approach
  - Instead of thinking about code, think about data
  - Model the data first using XSD
  - Use tools to then create platform specific types on each platform

XSD First Approach

?

Will the Java technology Client understand my System.Collection?



Microsoft .NET

Sun Java WSDP

XSD First Approach

Will the .NET Client understand my java.util.Vector?

Microsoft .NET

Sun Java WSDP

XSD First Approach

We need a *lingua franca* between the two platforms…

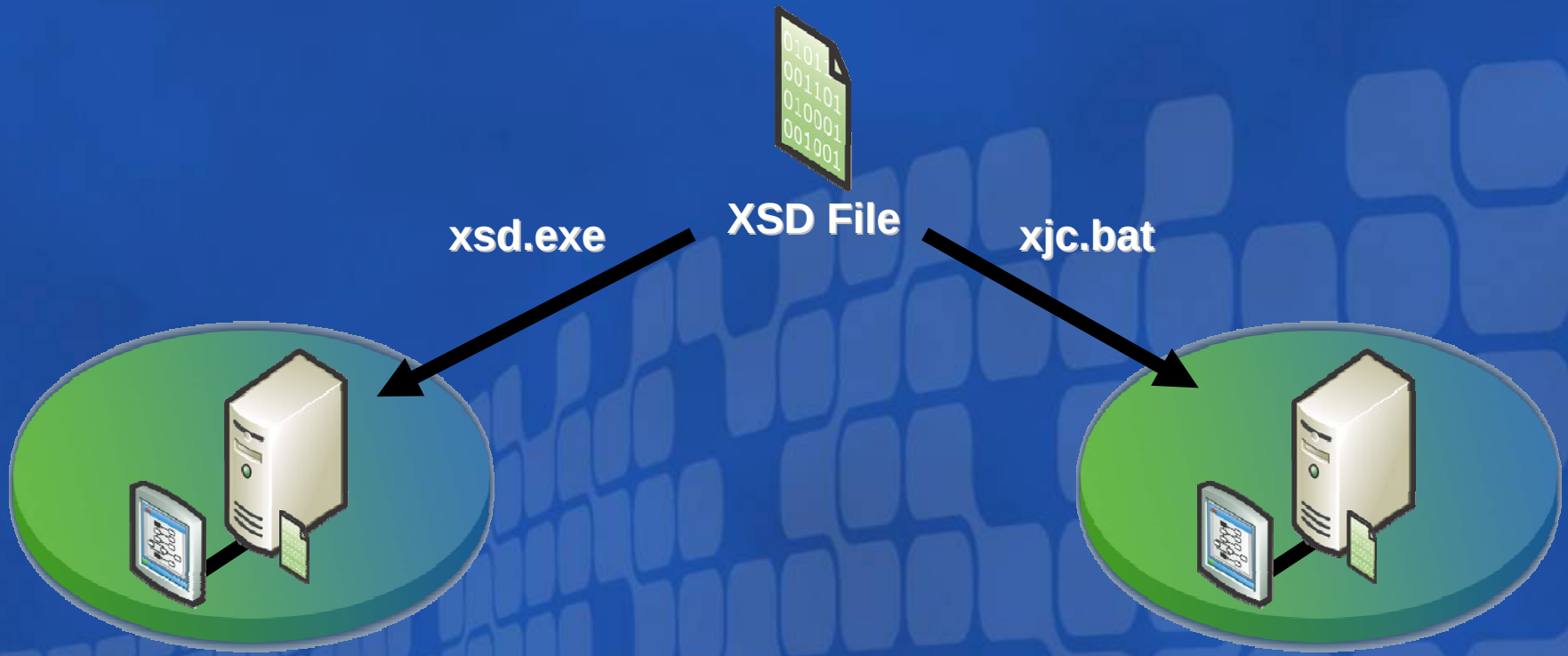
XSD File

Microsoft .NET

Sun Java WSDP

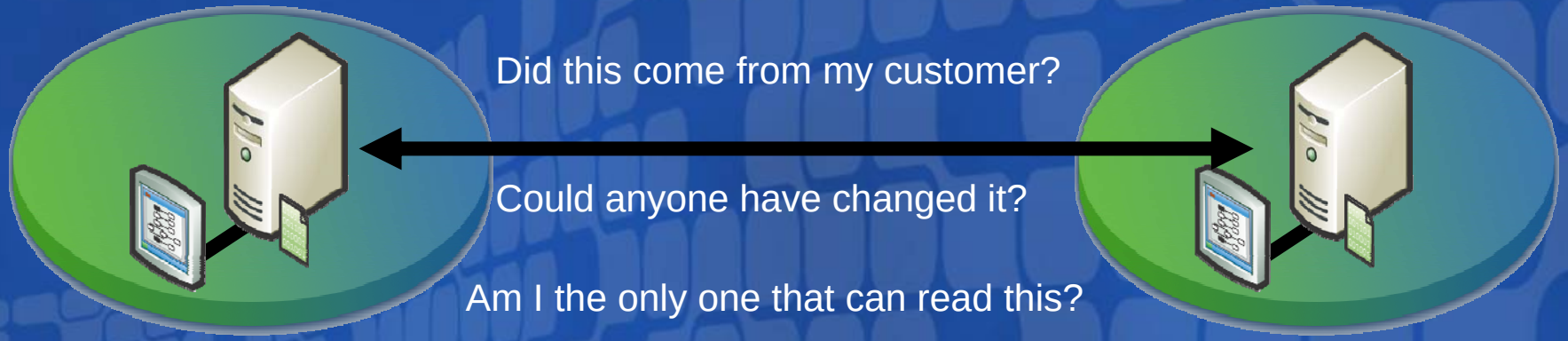
XSD First Approach

We need a *lingua franca* between the two platforms…



What about Security?

- You build a Web service…
  - You want to secure it, providing:
    - Integrity (This message has come from x, and hasn't been tampered with)
    - Confidentiality (The data in this message can only be read by the intended recipient)



What about Security?

- Can’t we use SSL?
  - Limitations with Web services:
    - Point to point communication
    - No way of applying security to just part of the message
    - Security is removed after the transport layer
    - Really only good for TCP communication

What about Security?

- Introducing WS-Security
  - Message level security
    - SOAP Headers provide integrity and confidentiality
    - OASIS Specification (WS-Security 1.0)—April 2004
    - Transport agnostic

SSL vs WS-Security

Transport Level

- Uses SSL
- Point-to-Point: Protects the “pipe”
- Does not work with Intermediaries
- Based on well tested standards
- Well known key management

Message Level

- Does not use SSL
- Data chunks are protected
- Intended to work with Intermediaries
- Based on newer standards
- More complex key management

Plain Text

```
<soap:Header>
        …
</soap:Header>
<soap:Body>
        …
</soap:Body>
```

Signed Request


```
<soap:Header>
 <wsse:Security>
  <wsse:BinarySecurityToken ValueType="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3"
EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
wss-soap-message-security-1.0#Base64Binary“><--Binary Token Here ->
</wsse:BinarySecurityToken>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
   <SignedInfo>
    <CanonicalizationMethod
Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
     <SignatureMethod
Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
     <-- Digests here -->
   </SignedInfo>
   <SignatureValue><-- Signature here --></SignatureValue>
  </Signature>
 </wsse:Security>
</soap:Header>
```

Unencrypted Request


```
<soap:Header>
        …
</soap:Header>
<soap:Body>
 <submitOrder xmlns="http://www.openuri.org/">
  <payment>
   <CreditCardNo xmlns="http://my.org/c.xsd">
       1234-1234-1234-1234</CreditCardNo>
   <ExpiryMonth xmlns="http://my.org/c.xsd">7</ExpiryMonth>
   <ExpiryYear xmlns="http://my.org/c.xsd">2007</ExpiryYear>
   <Amount xmlns="http://my.org/c.xsd">0</Amount>
   </payment>
  </submitOrder>
</soap:Body>
```

Encrypted Request 1/2


```
<soap:Header>
 <xenc:EncryptedKey
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">
  <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5" />
  <KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
   <wsse:SecurityTokenReference>
    <wsse:KeyIdentifier ValueType="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-
1.0#X509SubjectKeyIdentifier">LNvOmdlQG1H4kbknOQKS+Kxr1kw=</w
sse:KeyIdentifier>
   </wsse:SecurityTokenReference>
  </KeyInfo>
 </xenc:EncryptedKey>
</soap:Header>
```

Encrypted Request 2/2


```
<soap:Body>
 <xenc:EncryptedData Id="EncryptedContent-f4697366-d180-4970-
a661-aabcbfa97ffd"
Type="http://www.w3.org/2001/04/xmlenc#Content"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#">
  <xenc:EncryptionMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#aes128-cbc" />
   <xenc:CipherData>
       <xenc:CipherValue>MwyNQUuiVYxwfamGr
       bKayqcVmtYPTcmuaqufPZMe1BPtRZto0shMrWmK8Q9HEy5
       uGnNjMFNpYC51mnzFBd</xenc:CipherValue>
  </xenc:CipherData>
 </xenc:EncryptedData>
</soap:Body>
```

Implement WS-Security Using Java

- Web Services Developer Pack (Java WSDP) 1.5
  - SOAP Message Security V1.0, UserName Token Profile V1.0, X.509 Token Profile V1.0
  - `wscompile -security` generates security code
  - Uses XWS-Security configuration files
  - Command line tools—PKCS12Import, KeyExport
  - Samples available under <JWSDP_HOME>/xws-security/samples

Implement WS-Security Using .NET

- WSE (Web Services Enhancements) 2.0
- Support via code or WS-Policy file
- Token support includes UsernamePassword, X.509, Kerberos and SAML
- Add-in Wizard support for Visual Studio

DEMO

WS-Security Interoperability Using Sun Java WSDP 1.5 and Microsoft WSE 2.0

WS-Security Support

- Nice… but who's supporting it?
  - Sun Microsystems Java WSDP 1.5
  - Microsoft (Web Services Enhancements) WSE 2.0
  - BEA WebLogic 8.1.4
  - IBM WebSphere 5.1.2 (OASIS compliant in 6.0)
  - Systinet Server 5.0
  - Oracle (through acquisition of Phaos)
  - webMethods Glue 5.0.2
  - Apache Projects (WS-FX and Axis-WSSE)
  - RSA BSAFE
  - Verisign TSIK Toolkit (xmldsig and xmlenc)
  - Entrust Authority Security Toolkit (xmldsig and xmlenc)
- Yeah, but are they really…

DEMO

WS-Security Interoperability Support

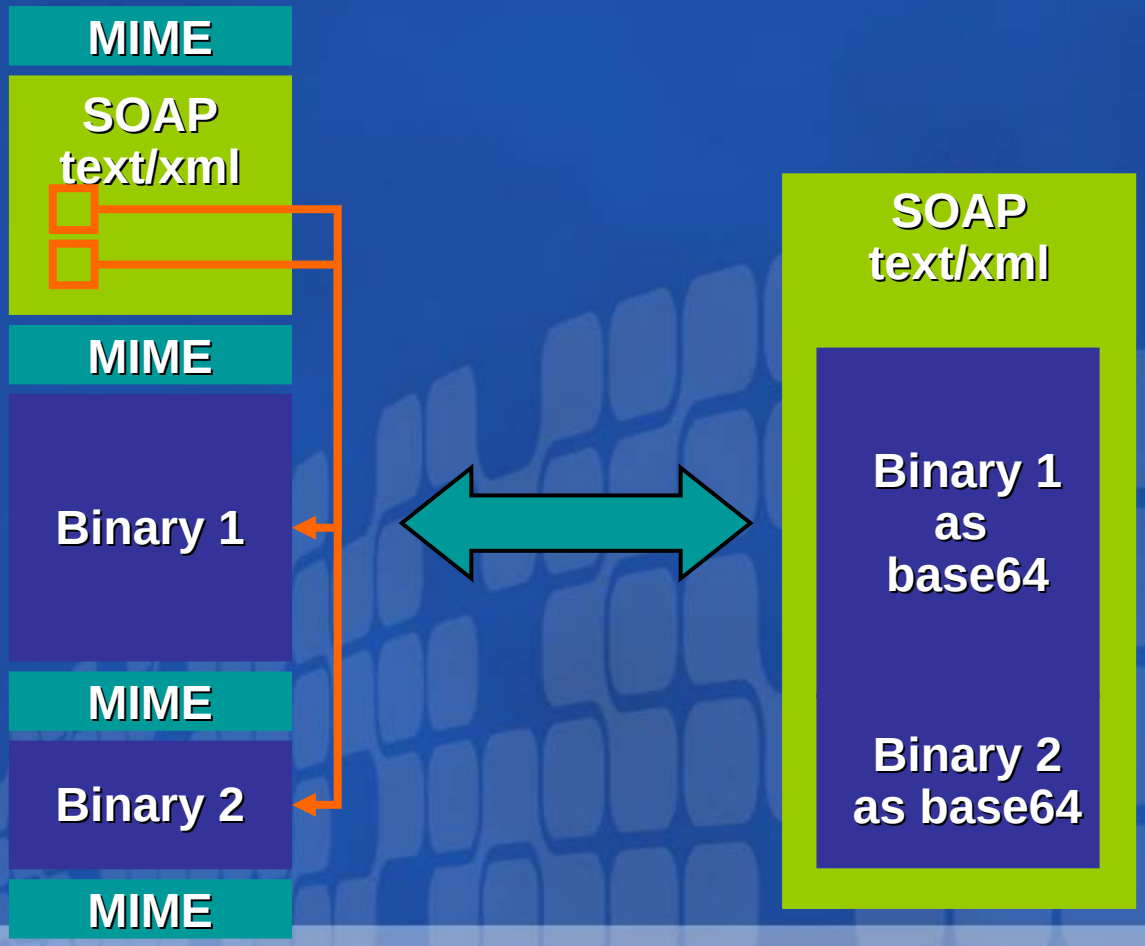
Attachments

- A little history
  - MIME (Multipurpose Internet Mail Extension)
  - SwA (SOAP with Attachments)
  - DIME (Direct Internet Message Encapsulation)
- Some problems
  - Outside SOAP body
  - Transport dependant

Attachments Using MTOM

- MTOM
  - Message Transmission Optimization Mechanism
    - http://www.w3.org/TR/soap12-mtom/
  - Benefits of SOAP envelope
  - Efficient serialization of binary data with XML
- How MTOM works
  - First MIME part is a SOAP envelope (i.e., text/xml)
  - Subsequent MIME parts are binary (e.g., type/jpeg)
  - Binary MIME parts are referenced into SOAP envelope

Attachments Using MTOM



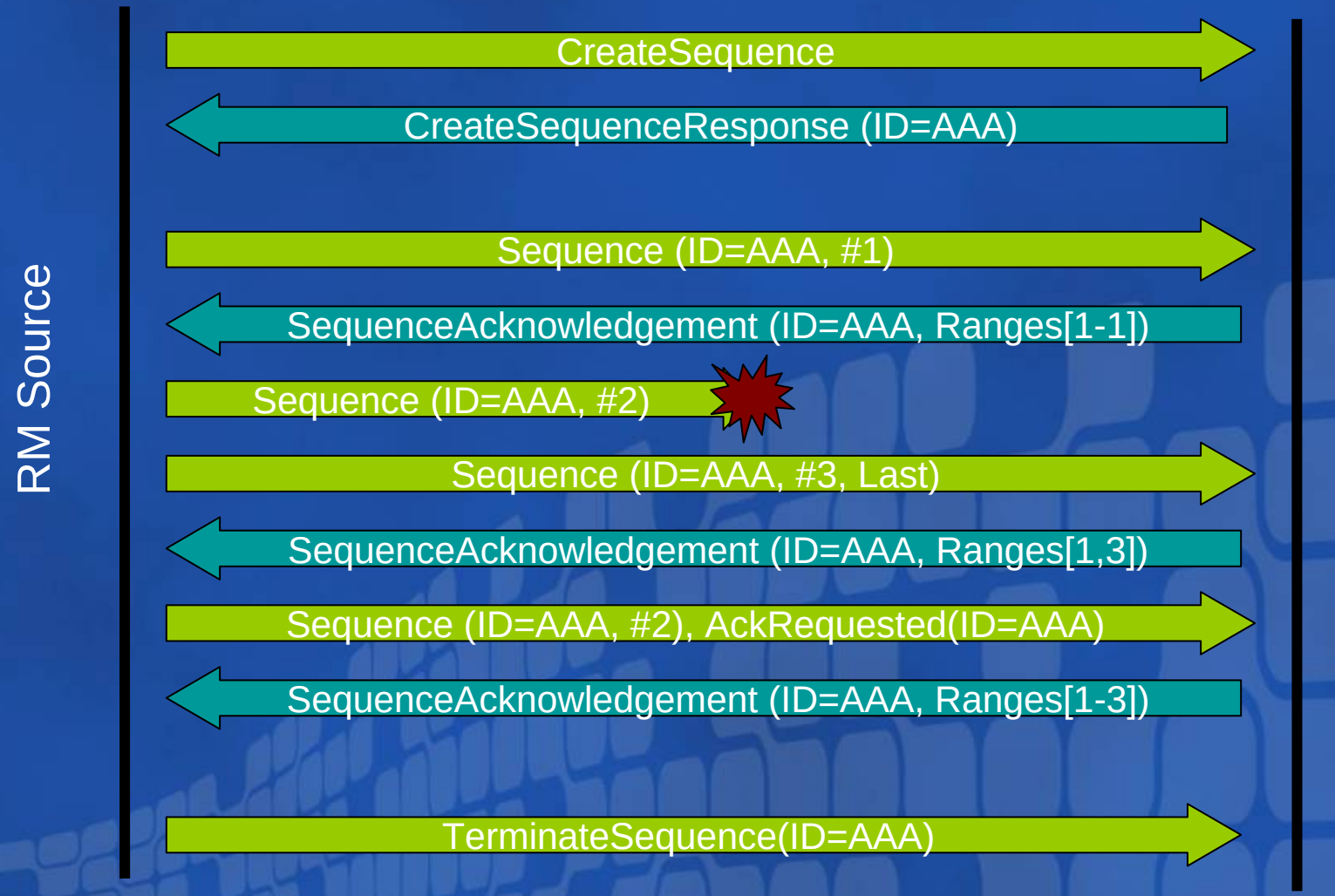
DEMO

Using MTOM to Send Attachments

Reliable Messaging

- “How do we make web services reliable?”
- Core capabilities
  - Reliable transfer of message between two nodes
  - Assurances: At least once. At most once. Ordered.
  - Basic Web services Message Exchange Patterns (MEPs)
- Composable with
  - WS-Addressing
  - WS-Security
  - WS-SecureConversation

Reliable Messaging



Reliable Messaging


```
<Soap:Header>
    <wsa:MessageID>
      http://Business456.com/guid/71e0654e-5ce8-477b-bb9d-
34f05cfcbc9e
    </wsa:MessageID>
    <wsa:To>
      http://fabrikam123.com/serviceB/123
    </wsa:To>
    <wsa:From>
      <wsa:Address>http://Business456.com/serviceA/789</wsa:Address>
    </wsa:From>
    <wsa:Action>
      http://fabrikam123.com/serviceB/123/request
    </wsa:Action>
    <wsrm:Sequence>
      <wsrm:Identifier>http://my.org/RM/ABC</wsrm:Identifier>
      <wsrm:MessageNumber>1</wsrm:MessageNumber>
    </wsrm:Sequence>
  </Soap:Header>
```

DEMO

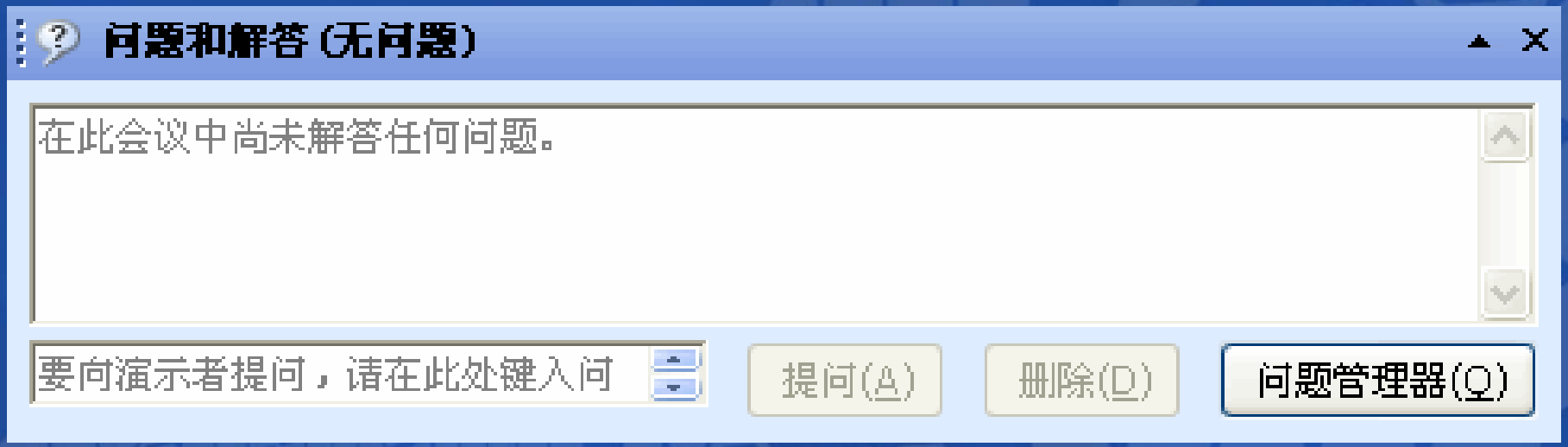
Reliable Web Services

Resources

- Web Services Interoperability Home Page
  - http://msdn.microsoft.com/webservices/building/interop
- Interop Month
  - http://www.interopmonth.com
- Java Interoperability Home Page
  - http://msdn.microsoft.com/vstudio/java/interop
- Java and Web Services
  - http://java.sun.com/webservices
  - http://{ }.dev.java.net for JWSDP, JAX-RPC and JAXB

Question & Answer

如需提出问题，请单击“提问”按钮并在随后显示的浮动面板中输入问题内容。一旦完成问题输入后，请单击“提问”按钮。



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