SOAP-over-UDP

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SOAP-over-UDP

- User Datagram Protocol (UDP)
- SOAP-over-UDP binding
- One-way and request-response examples
- Message encoding and retransmissions
- URI scheme
- Security considerations
- Some suggested changes
• Unreliable transport
• Supports unicast message transmission
  – Best effort delivery
• Supports multicast message transmission
  – Uses IP multicast group address. Example: 239.255.255.250
  – Multicast range limited by TTL (IPv4) or hop limit (IPv6) setting
• UDP packet size limitation (64k)
UDP packet

<table>
<thead>
<tr>
<th>+</th>
<th>Bits 0-15</th>
<th>Bits 16-31</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 31</td>
<td>Source Port</td>
<td>Destination Port</td>
</tr>
<tr>
<td>32 – 63</td>
<td>Length</td>
<td>Checksum</td>
</tr>
<tr>
<td>64 - 65635(max)</td>
<td></td>
<td>Data</td>
</tr>
</tbody>
</table>
SOAP-over-UDP binding

• Describes how to transmit a SOAP message inside a UDP packet.
• Supports both SOAP 1.1 and SOAP 1.2
• Supports the following MEPs
  – Unicast one-way
  – Multicast one-way
  – Unicast request-response
  – Multicast request, unicast response
One-way message

- <!-- SOAP-over-UDP message sent unicast from 192.168.0.200:65938 to 192.168.0.300:65939 -->

- <?xml version="1.0" encoding="utf-8"?>
  <s:Envelope
    xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:c="http://schemas.xmlsoap.org/ws/2004/08/mime"
    xmlns="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:r="http://schemas.xmlsoap.org/ws/2004/08/addressing/role"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <s:Header>
      <a:MessageID>urn:uuid:xy8923ee-6813-498c-8c1b-6272a22353f7</a:MessageID>
      <a:To>http://fabrikam.com/Server</a:To>
    </s:Header>
    <s:Body>
      ....
    </s:Body>
  </s:Envelope>
Request message

- <!-- SOAP-over-UDP message sent unicast from 192.168.0.200:65938 to 192.168.0.300:65939 -->
- <?xml version="1.0" encoding="utf-8"?>
- <s:Envelope
  xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:m="http://schemas.xmlsoap.org/soap/encoding">
  <s:Header>
    <a:MessageID>urn:uuid:xy8923ee-6813-498c-8c1b-6272a22353f7</a:MessageID>
    <a:To>http://fabrikam.com/Server</a:To>
    <a:ReplyTo>
      http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous
    </a:ReplyTo>
  </s:Header>
  <s:Body>
    ...... 
  </s:Body>
</s:Envelope>
Response message

• <!-- SOAP-over-UDP message sent unicast from 192.168.0.300:65939 to 192.168.0.200:65938 -->
• <?xml version="1.0" encoding="utf-8"?>
• <s:Envelope
  xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:s="">
  <s:Header>
    <a:MessageID>urn:uuid:xy8923ee-6813-498c-8c1b-6272a22353f7</a:MessageID>
    <a:To>
      http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous
    </a:To>
  </s:Header>
  <s:Body>
    ....
  </s:Body>
• </s:Envelope>
Message encoding

• Use of algorithm defined XML 1.0 (Appendix F) to detect if message is encoded as XML.

• XML 1.0 specification describes
  – how to auto detect encoding of XML messages when no external encoding information is present.
  – How to use external encoding information, if present.
  – Use of UTF-8, UTF-16, UCS-4 and other encoding styles along with byte order information.
Message retransmissions

• Retransmitted messages
  – MUST use [message id]
  – MUST contain the same [message id]

• To avoid packet collisions
  – Implementations should use exponential back-off techniques
URI scheme

- soap.udp: // <host> [ : <port> ] [/ <rel_path>] [ ? <query> ]

- The syntax and semantics of <host>, <port>, <rel_path> and <query> are as defined in RFC 2396.
Security considerations

• Use of WS-Security recommended for message integrity, confidentiality, authenticity and establishing trust.

• Due to UDP packet size limitation
  – Pass security tokens by reference using Key Identifier mechanisms described in WS-Security is recommended.
Some suggested changes

• Use of default port
  – UDP is a transport level protocol and hence must NOT be limited to a specific port.

• False duplicates
  – Messages transmitted by two different sources containing the same content and NO [message id] may be interpreted as duplicates.
    – Specification should discuss this case.

• Add message examples that show use of addressable URI in the [reply endpoint] addressing property.
Some suggested changes

• Add message examples that show use of soap.udp URI scheme in the [destination endpoint] and [reply endpoint] addressing properties.

• Change the occurrence of ‘messageId’ to ‘messageID’.

• Use urn:uuid scheme for messageID values (per RFC 4122).
Q & A