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# Mastering Outbound SOAP Web Services

John Andersen
Sr. Solutions Architect
ServiceNow

Chris Maloy
Expert Services Genius
ServiceNow

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# Objectives

Learn how to use the GUI-based SOAP Message utility within ServiceNow

Be able to create scripts that leverage SOAP communication

Understand how to handle asynchronous outbound SOAP Requests

Learn how to leverage ECC Queue Retry Policies

Understand how to use WS-Security with SOAP calls

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# What is SOAP?

- Simple Object Access Protocol
- Communication between two systems
- Communication over the Internet
- Platform & Language independent
- XML based protocol

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# SOAP Transport

- Endpoint
- Action
- Headers/Attributes
- Envelope




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# SOAP Envelope

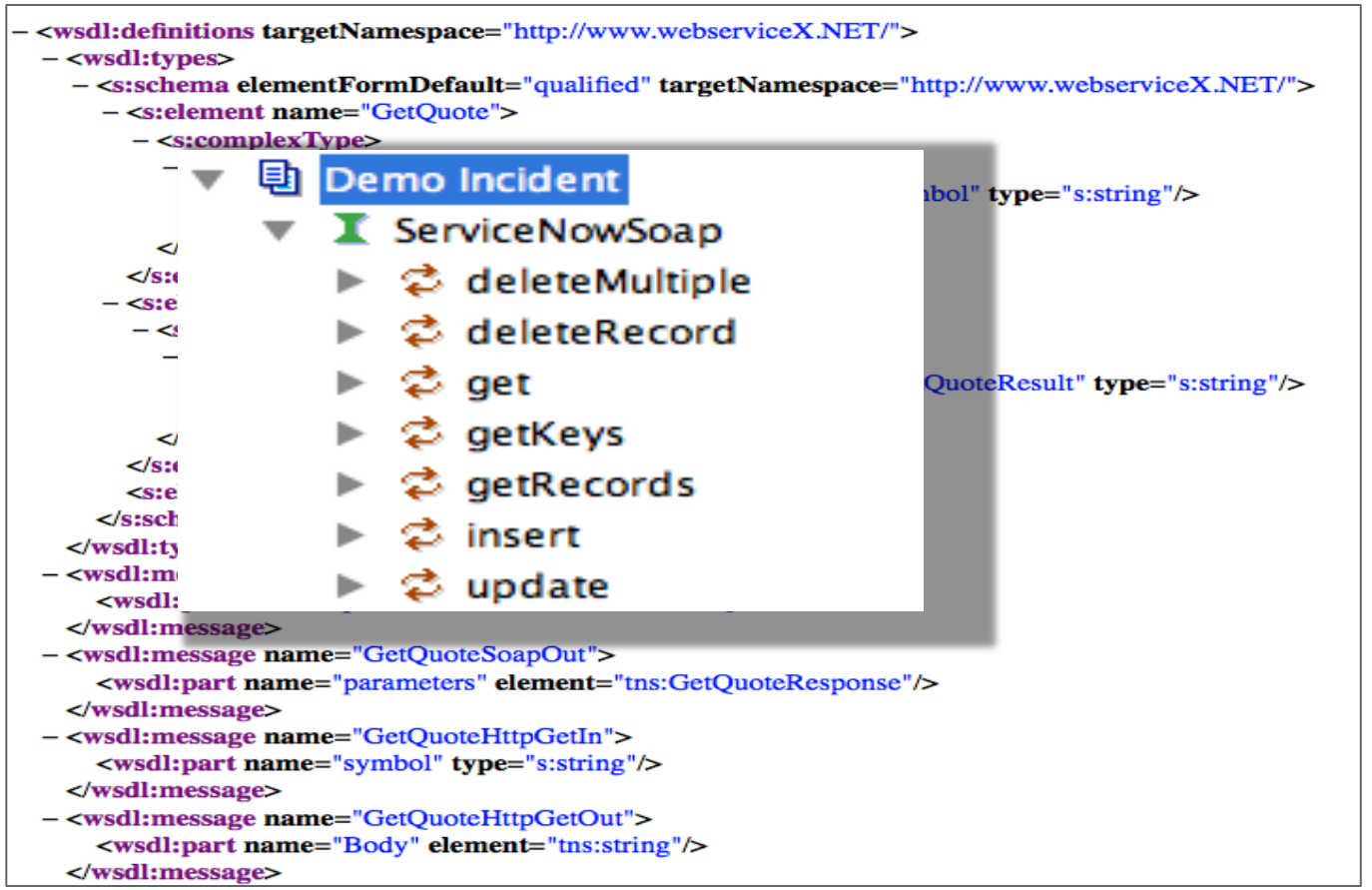
- Main Document
- Header (optional)
  - containing processing instructions for the envelope
- Body
  - contains the actual message to be delivered
- Fault element (optional)
  - providers error information




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# SOAP WSDL

- WSDL
  - Catalog of available functions
  - Templates of requests




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# SOAP Communication Flow

```
<soapenv:Envelope xmlns:soapenv="http://schemas
   <soapenv:Header/>
   <soapenv:Body>
      <web:GetQuote>
         <web:symbol>IBM</web:symbol>
      </web:GetQuote>
   </soapenv:Body>
</soapenv:Envelope>
```

1) Client sends SOAP Request





2) Server processes the SOAP Request

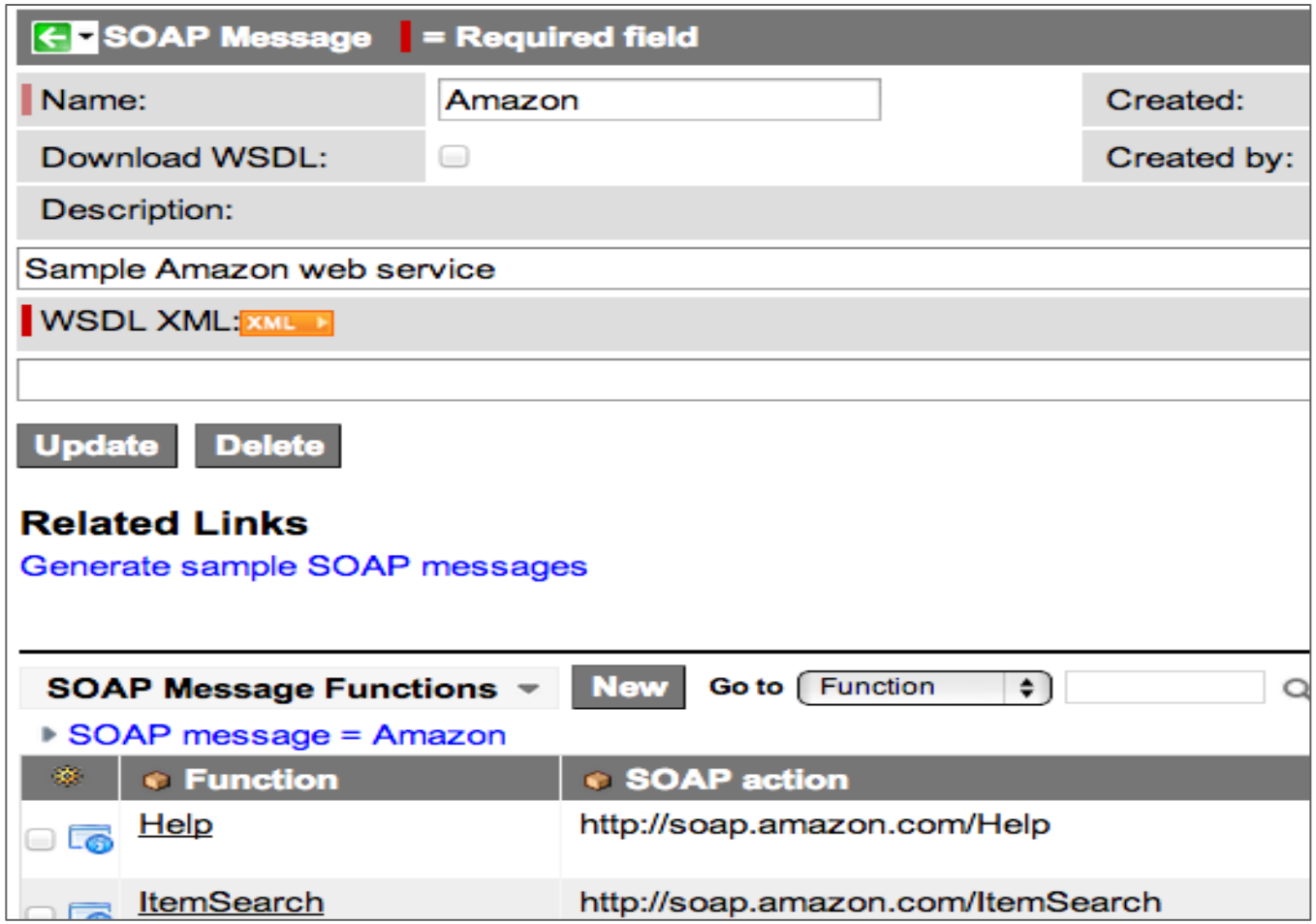
3) Server sends a SOAP Response

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org
   <soap:Body>
      <GetQuoteResponse xmlns="http://www.webservicex
         <GetQuoteResult><![CDATA[<StockQuotes><Stock
      </GetQuoteResponse>
   </soap:Body>
</soap:Envelope>
```

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# Demo: SOAP Message UI

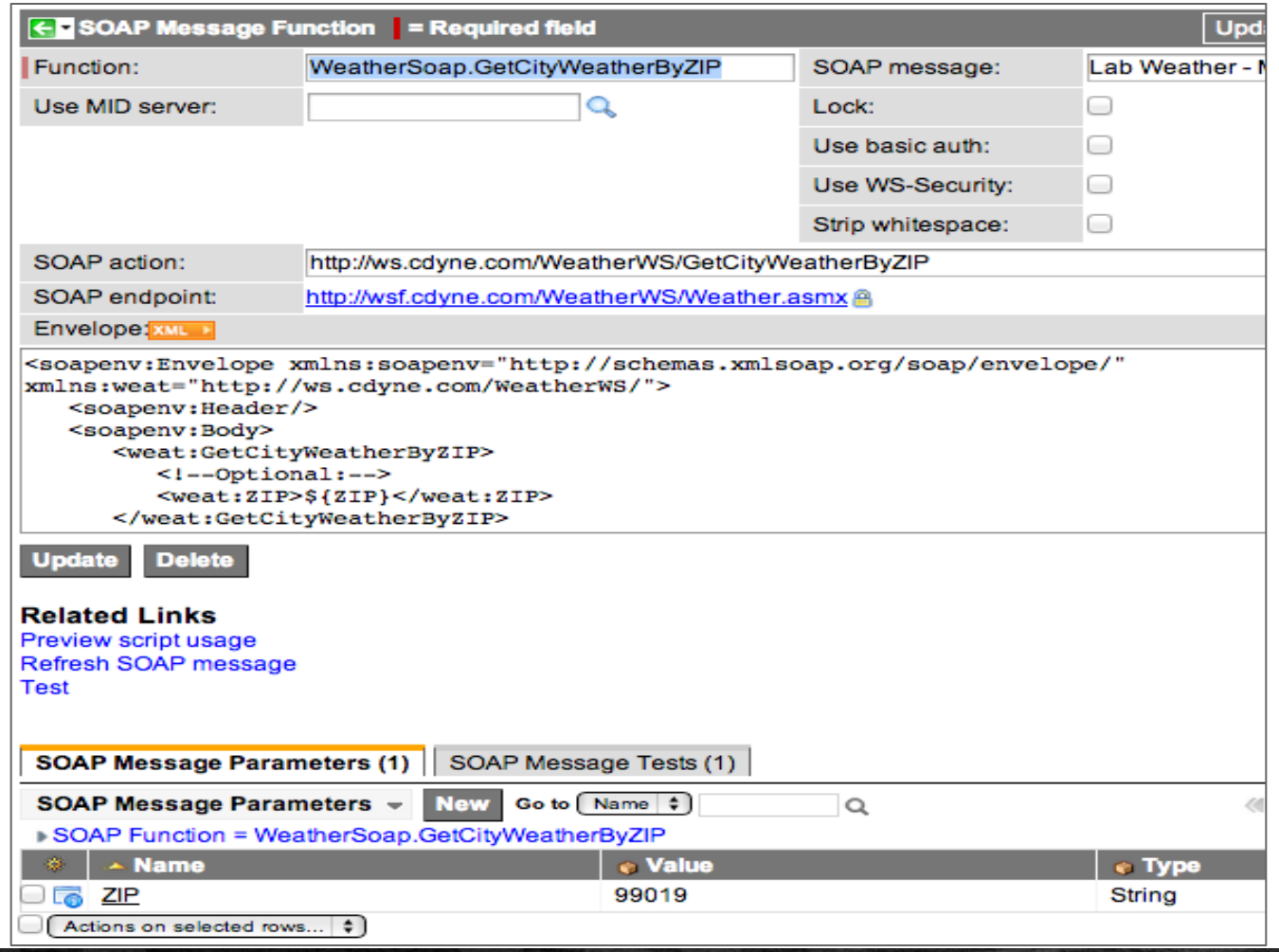
- WSDL
  - Download
  - Paste
- Generate




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# Demo: SOAP Message Function UI

- Lock
- Security
- SOAP
  - Action
  - Endpoint
- Envelope
- Variables
- Test




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# Perform exercise 1

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# Scripting with SOAP Message

- Make SOAP Requests in scripts
  - Business Rules
  - Script Includes
  - Workflows
  - Background Scripts
- SOAP Libraries
  - SOAPMessage
  - SOAPEnvelope
  - SOAPRequest




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# Interpreting XML Responses

- XPATH

  / : Level Separator

  /Envelope/Body/GetCityWeatherByZIPResponse/GetCityWeatherByZIPResult/Success

  // : Relative path Separator

  //GetCityWeatherByZIPResult/Success

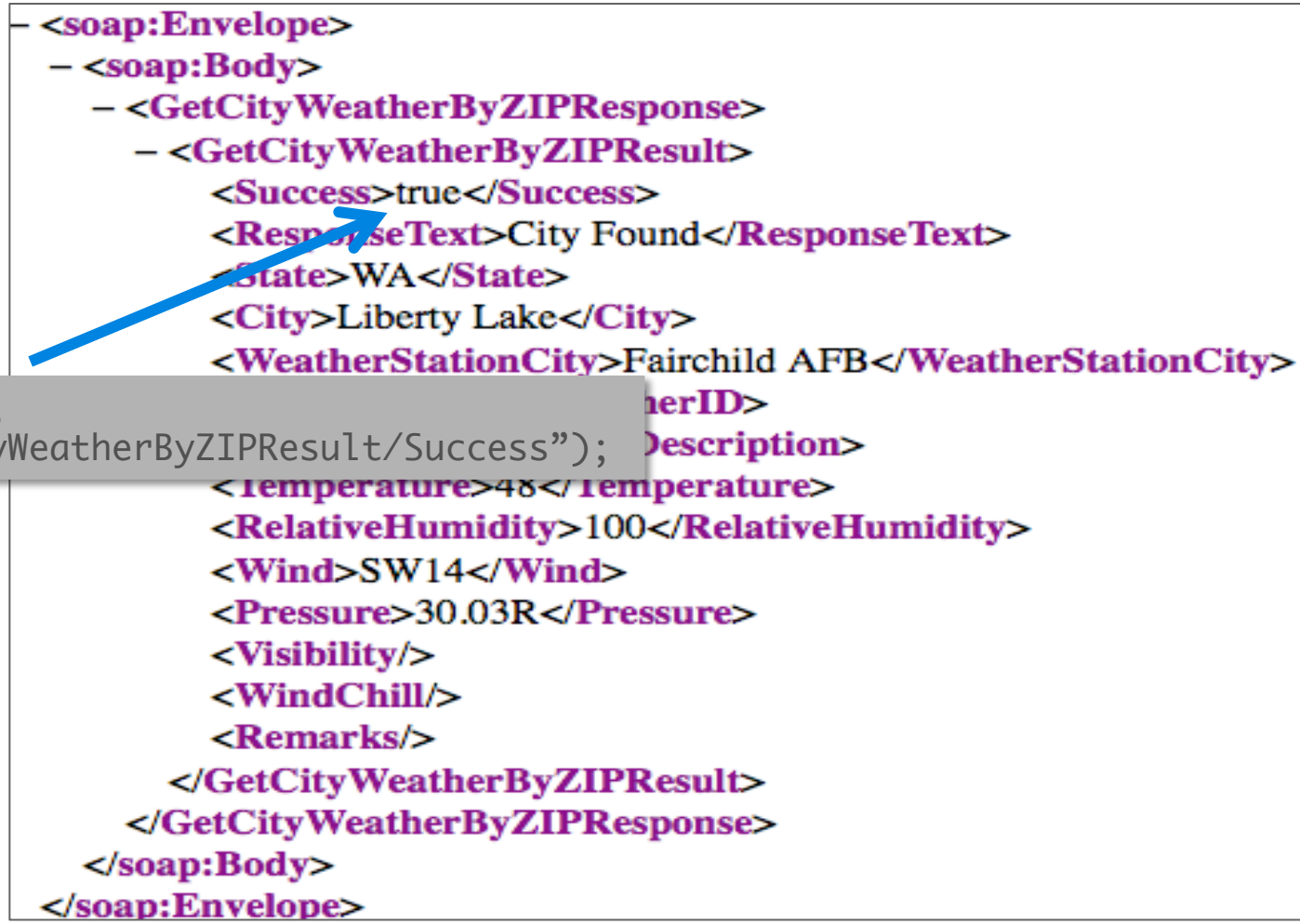
```
- <soap:Envelope>
  - <soap:Body>
    - <GetCityWeatherByZIPResponse>
      - <GetCityWeatherByZIPResult>
          <Success>true</Success>
          <ResponseText>City Found</ResponseText>
          <State>WA</State>
          <City>Liberty Lake</City>
          <WeatherStationCity>Fairchild AFB</WeatherStationCity>
          <WeatherID>14</WeatherID>
          <Description>Cloudy</Description>
          <Temperature>48</Temperature>
          <RelativeHumidity>100</RelativeHumidity>
          <Wind>SW14</Wind>
          <Pressure>30.03R</Pressure>
          <Visibility/>
          <WindChill/>
          <Remarks/>
        </GetCityWeatherByZIPResult>
      </GetCityWeatherByZIPResponse>
    </soap:Body>
  </soap:Envelope>
```

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# Getting XML Values via XPATH

- XMLDocument

```
var xmldoc = new XMLDocument(response);
success = xmldoc.getNodeText("//GetCityWeatherByZIPResult/Success");
```




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# XMLHelper

- Utility function
- Convert XML to JavaScript object

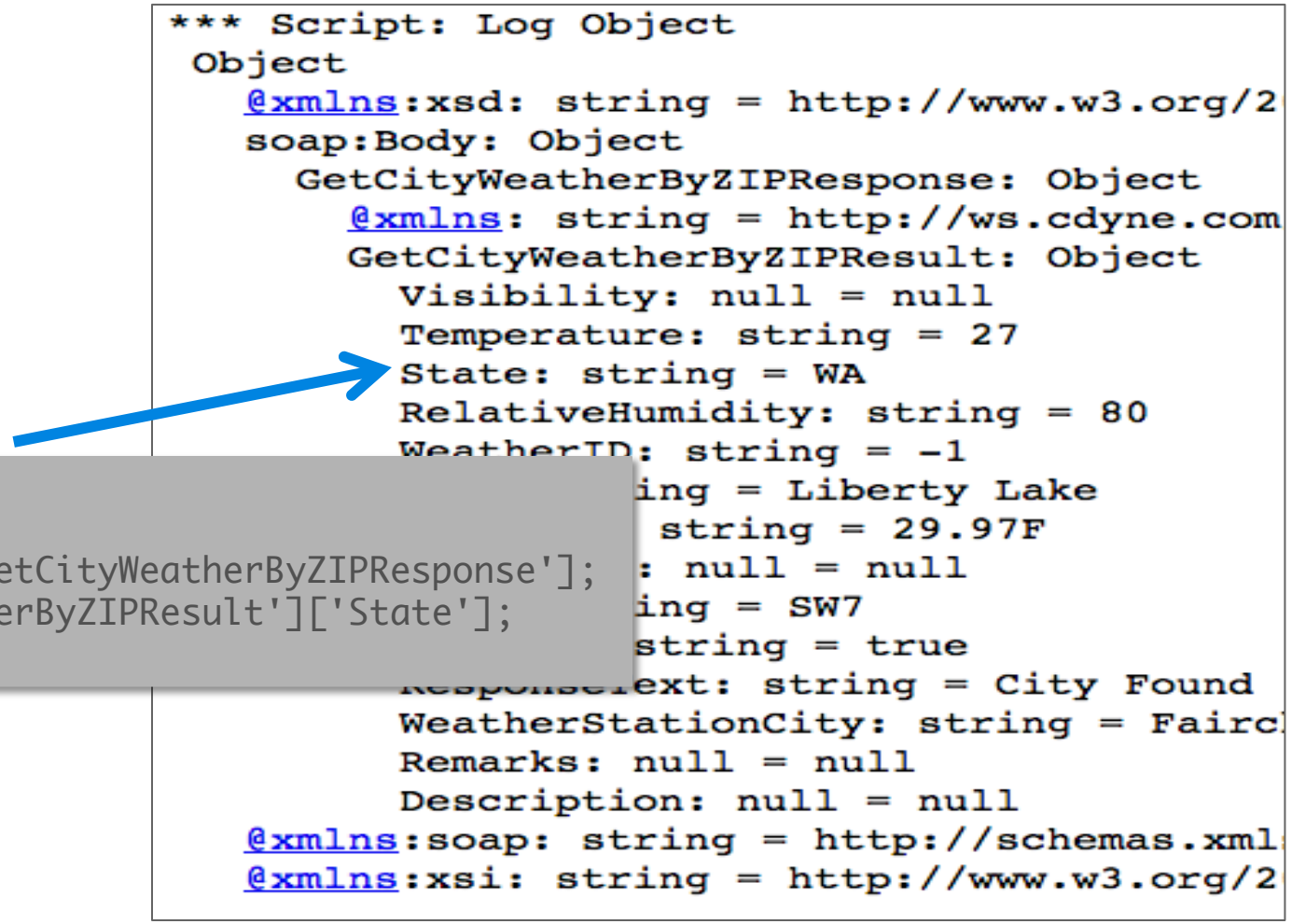
```
var helper = new XMLHelper(response);
var obj = helper.toObject();
JSUtil.logObject(obj);
```

```
*** Script: Log Object
 Object
   @xmlns:xsd: string = http://www.w3.org/2
   soap:Body: Object
     GetCityWeatherByZIPResponse: Object
       @xmlns: string = http://ws.cdyne.com
       GetCityWeatherByZIPResult: Object
         Visibility: null = null
         Temperature: string = 27
         State: string = WA
         RelativeHumidity: string = 80
         WeatherID: string = -1
         City: string = Liberty Lake
         Pressure: string = 29.97F
         WindChill: null = null
         Wind: string = SW7
         Success: string = true
         ResponseText: string = City Found
         WeatherStationCity: string = Fairc
         Remarks: null = null
         Description: null = null
   @xmlns:soap: string = http://schemas.xml
   @xmlns:xsi: string = http://www.w3.org/2
```

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# Using XMLHelper to get Element Value

```
var helper = new XMLHelper(response);
var obj = helper.toObject();
var weatherResponse = obj['soap:Body']['GetCityWeatherByZIPResponse'];
var state = weatherResponse['GetCityWeatherByZIPResult']['State'];
gs.log(state);
```




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# Perform exercise 2

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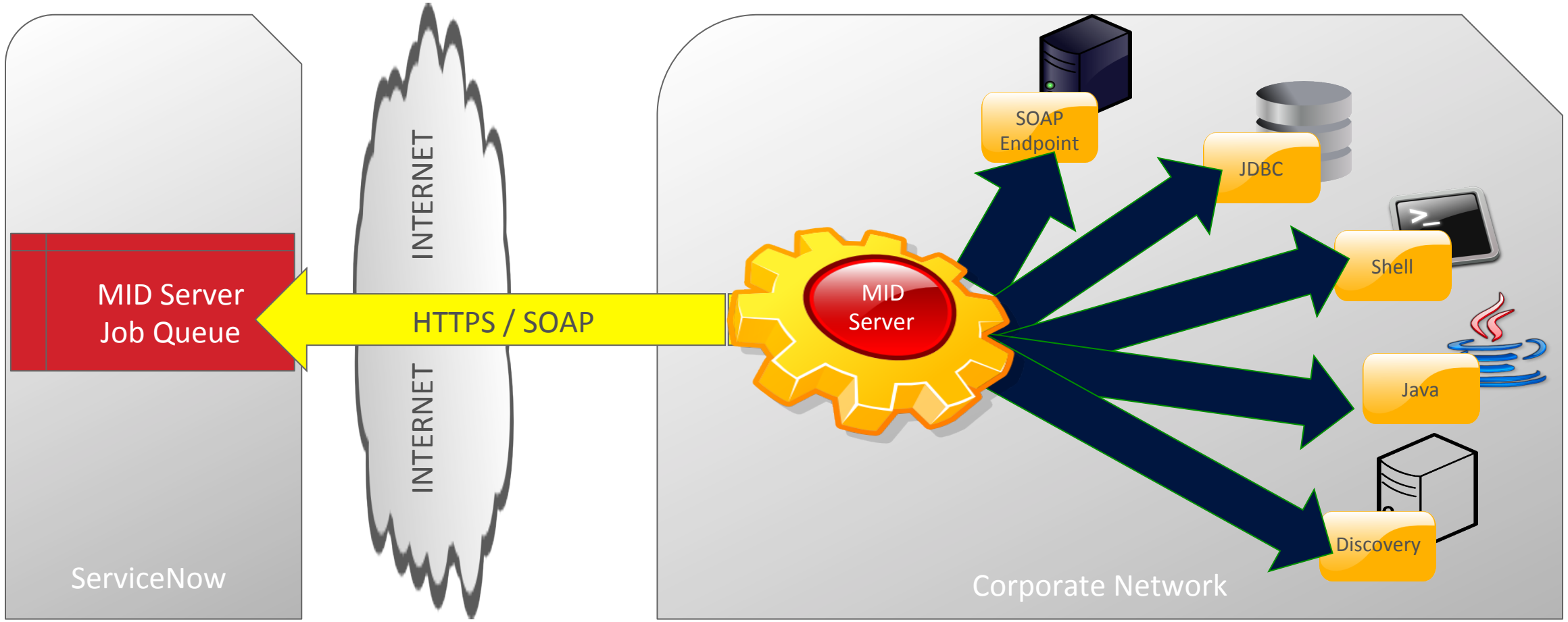
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# SOAP through the MID Server

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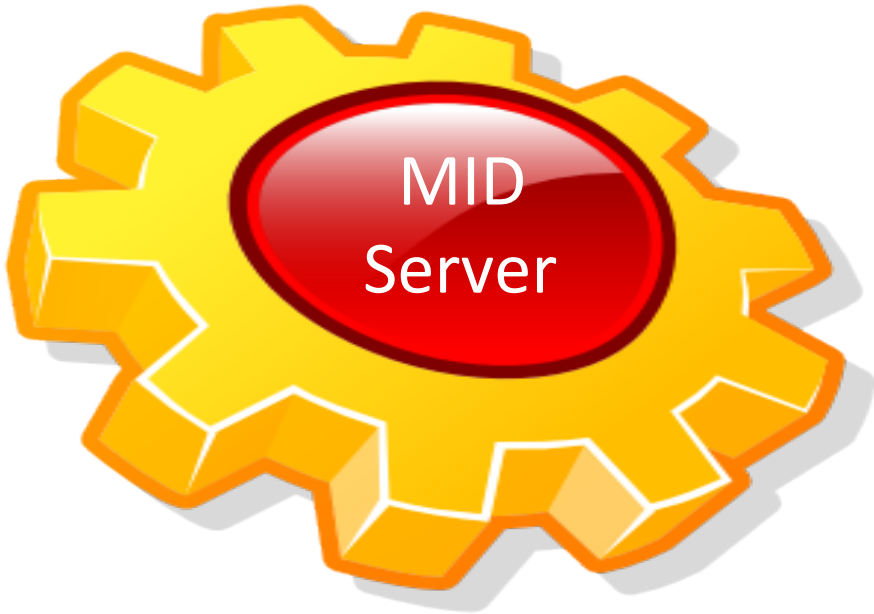
# MID Server – Working behind the firewall




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# Soap through the MID Server

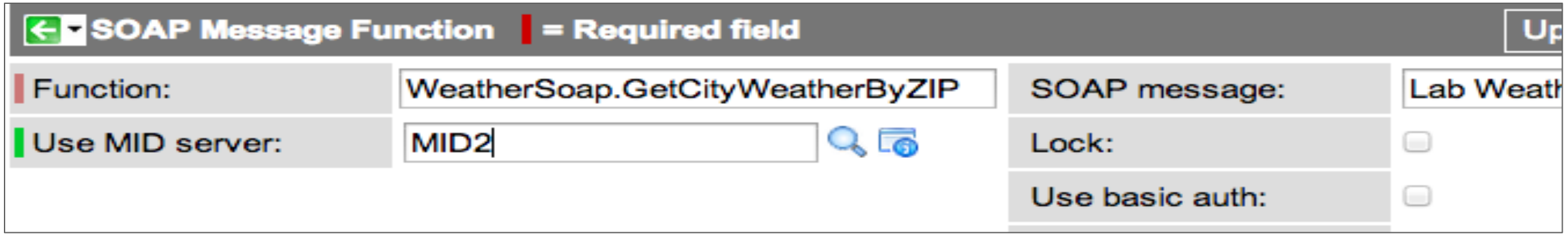
- When would you want to do this?
- Process
  - Message is placed on ECC Queue
  - MID Server takes queue record and processes
  - Places XML response back on ECC Queue
- Limitations
  - Custom HTTP Headers




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# How to Send SOAP through MID Server

- Through the UI
  - SOAP Message Function: MID Server Field




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# How to Send SOAP through MID Server

- Setting it through Scripting
  - setMIDServer() function

```
var s = new SOAPMessage('WeatherForecast', 'GetWeatherByZipCode');
s.setParameter('zipcode', '83274');
s.setMIDServer("MID2");
s.post();
```

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# Getting the response

- MID Server calls are Asynchronous
- post() function returns “null”
- getResponse() function

```
s.post();

var k = 1;
var r = s.getResponse();
while(r == null) {
  gs.log("waiting ... " + k + " seconds");
  r = s.getResponse(1000);
  k++;
  if (k > 30) {
    break; // service did not respond after 30 tries
  }
}
gs.log(r);
```

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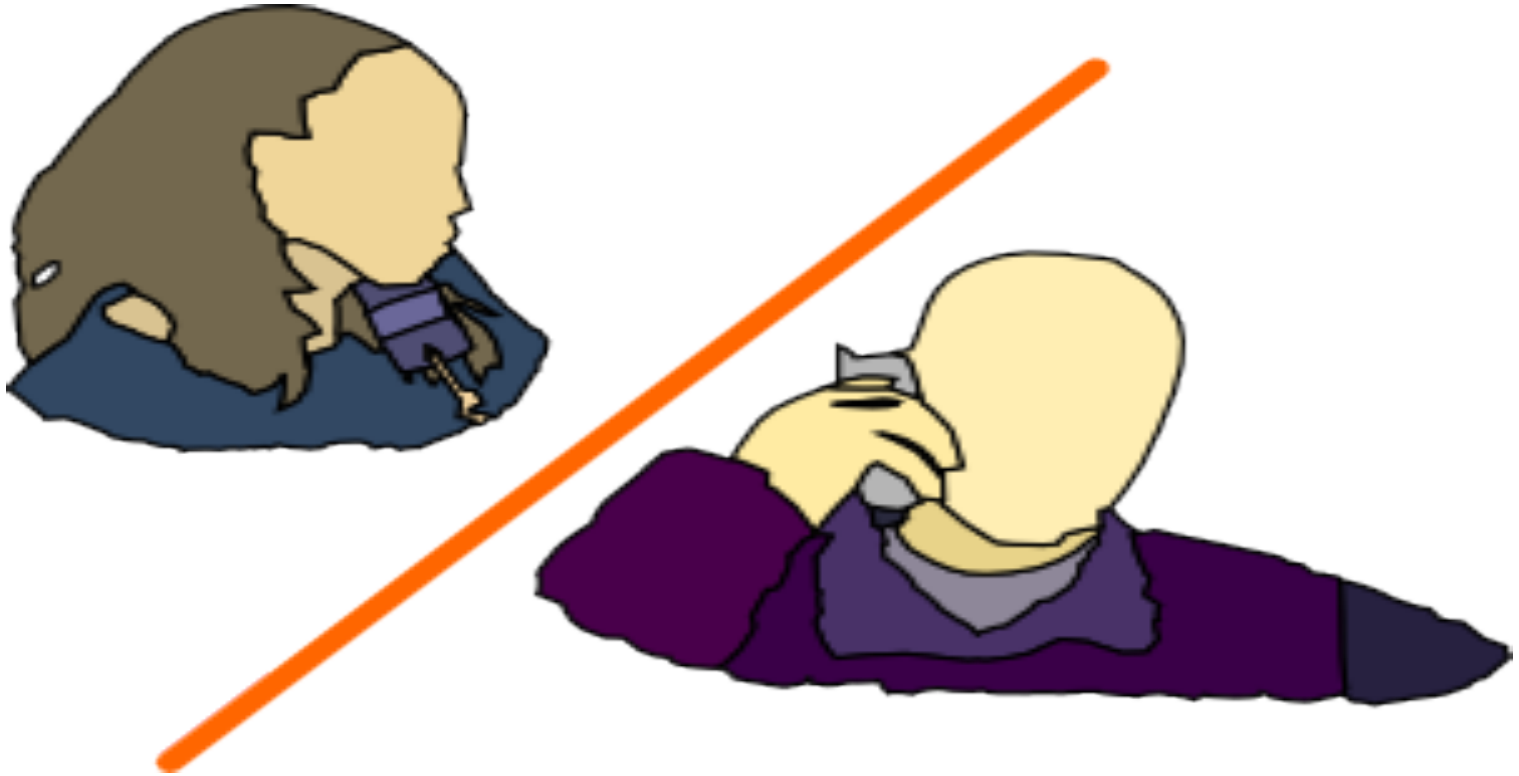
# Asynchronous SOAP calls

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# Synchronous vs. Asynchronous calls

- Synchronous: Talking on the phone



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# Synchronous vs. Asynchronous calls

- Asynchronous: Voicemail





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# Asynchronous Scenarios

- SOAP via MID Server
- JavaScript



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# Scripting the call to be asynchronous

- Pass ‘true’ to the POST method

```
var s = new SOAPMessage(‘Weather', ’GetCityWeatherByZIP');
s.setParameter('ZIP', '99019');
s.post(true);
```

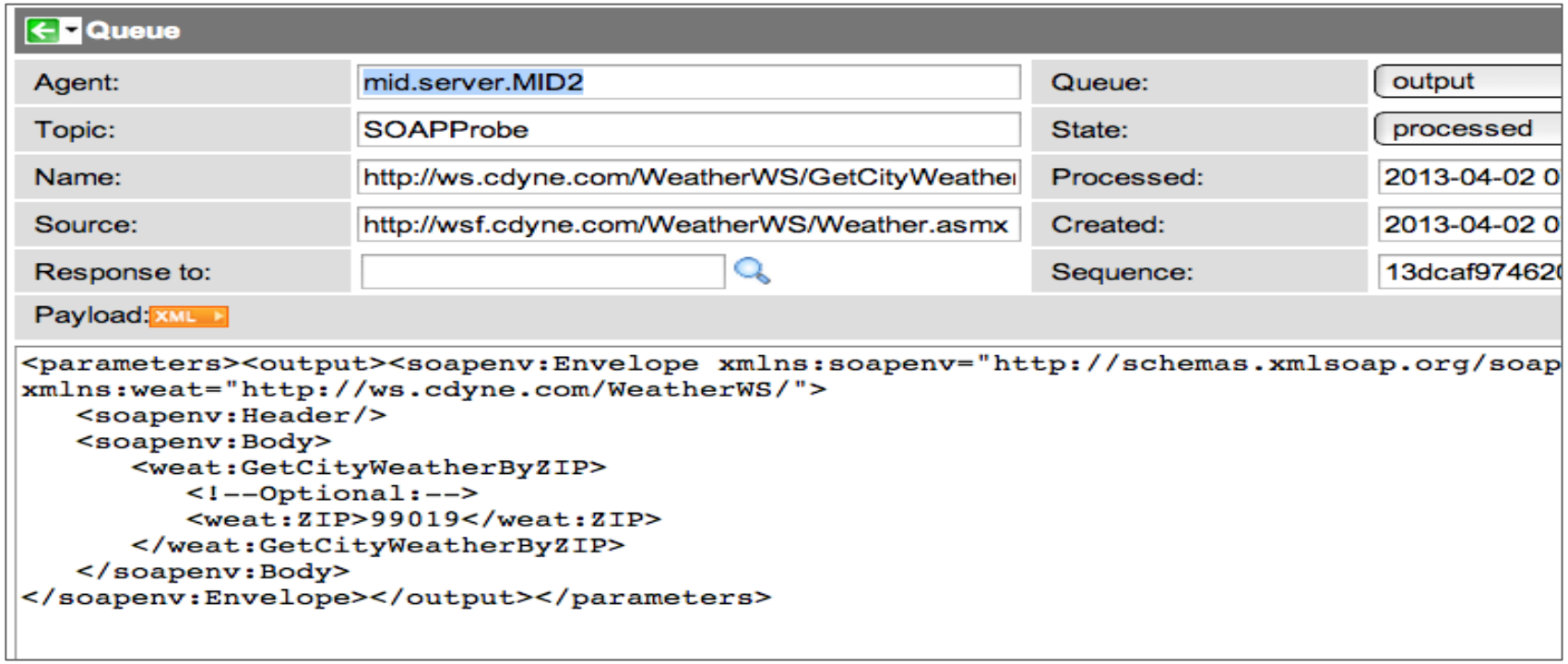
- Use getResponse() method

```
var k = 1;
var r = s.getResponse();
while(r == null) {
   r = s.getResponse(1000);
   k++;
   if (k > 30) break; // no response after 30 tries
}
```

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# Messages on the ECC Queue

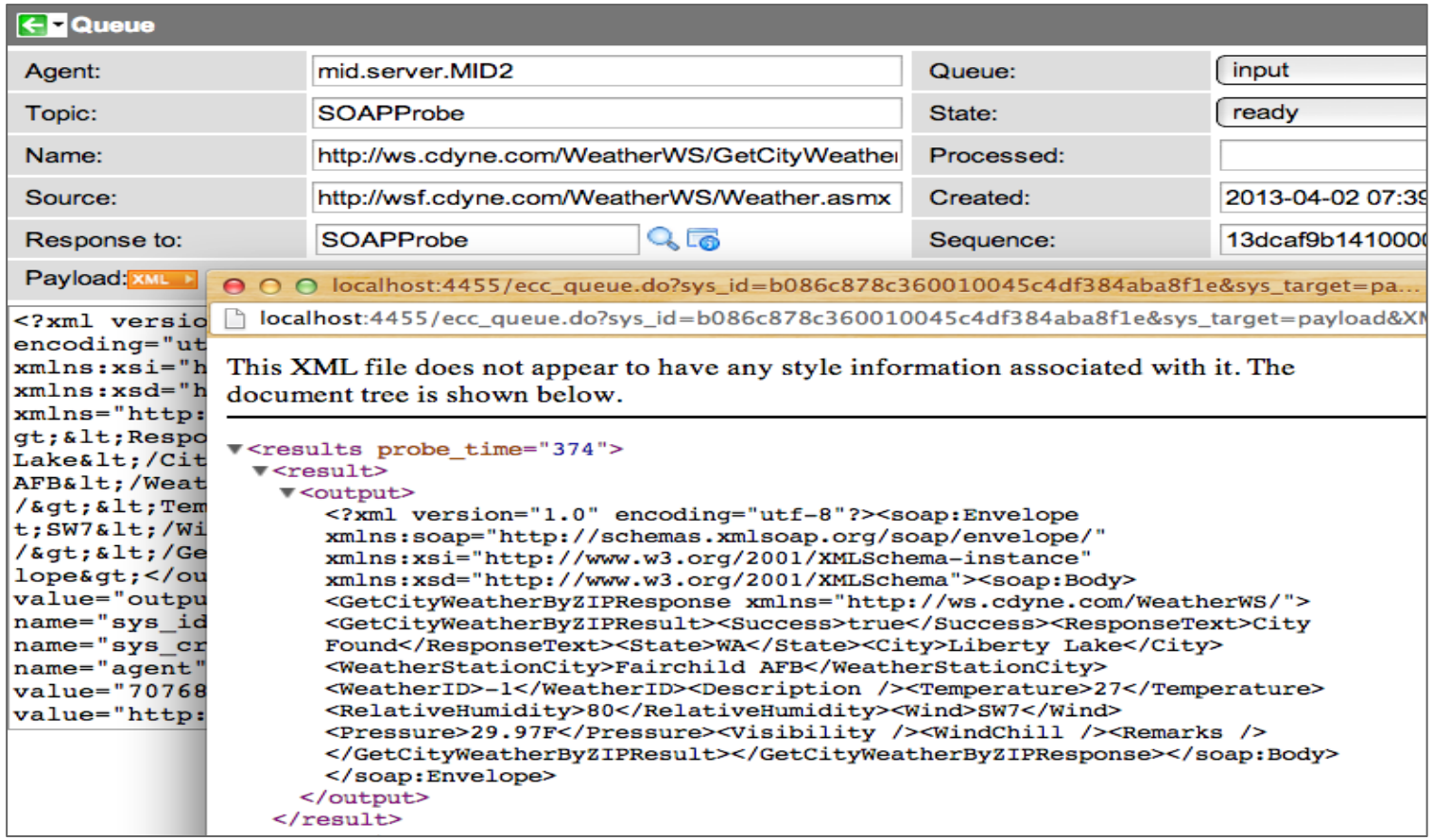
- Asynchronous SOAP Messages go to the ECC Queue




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# Messages on the ECC Queue

- Responses come in as Input records




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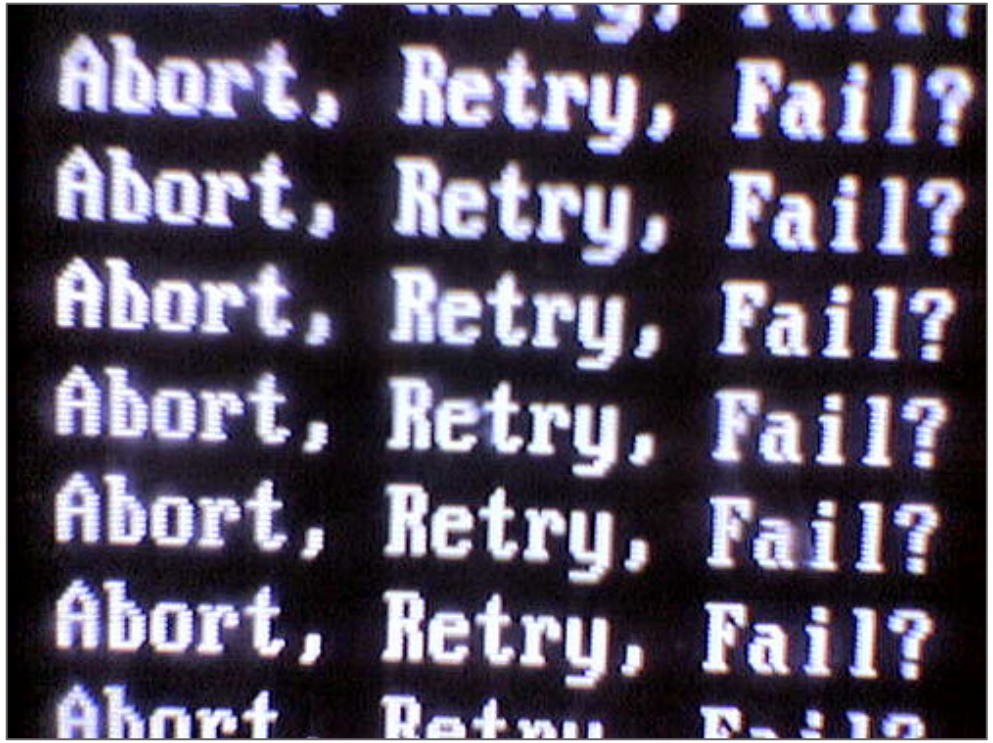
# ECC Queue Retry Policies

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# ECC Queue Retry Policy

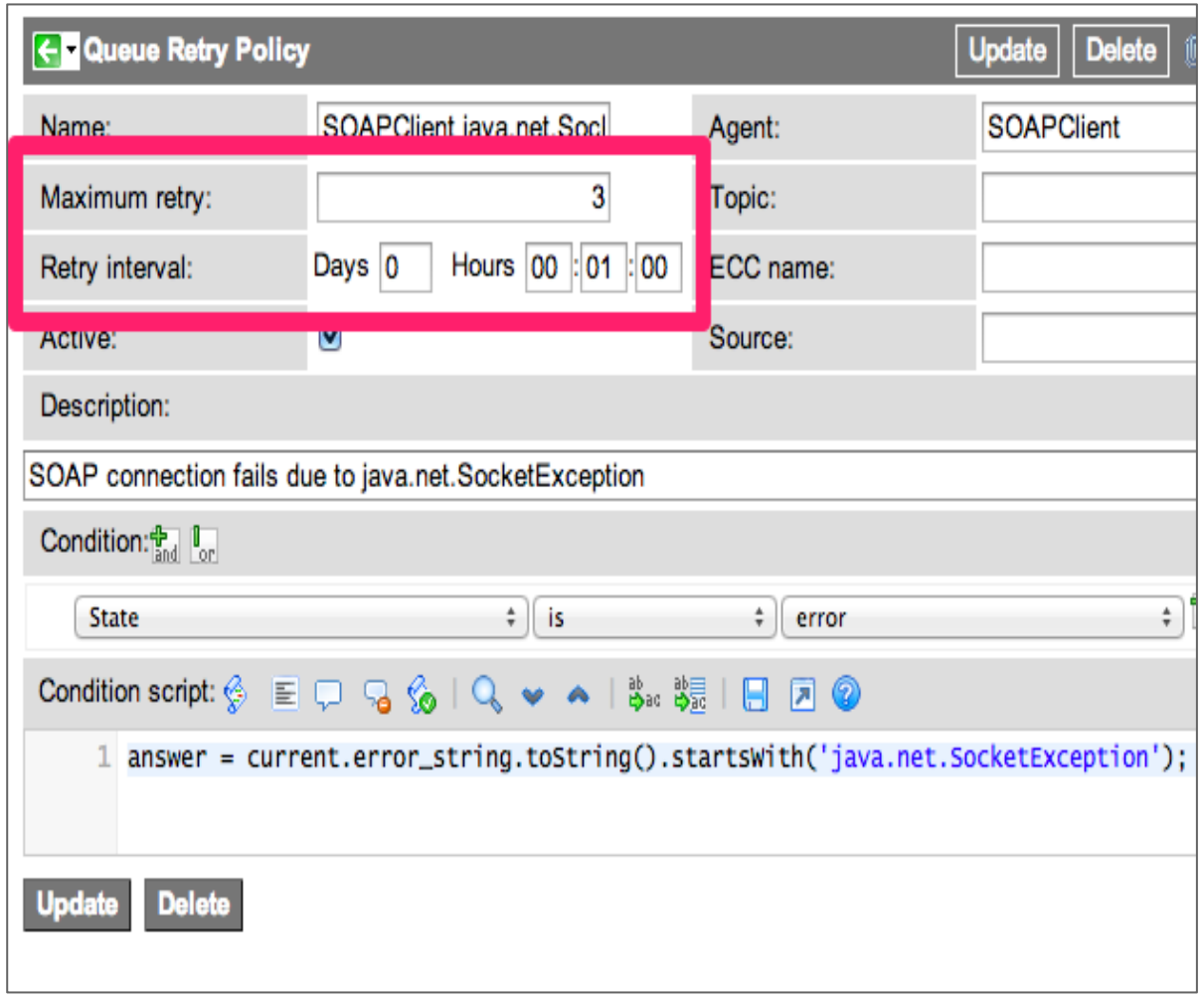
- Requires “ECC Queue Retry Policy” Plugin
- Applies to OUTBOUND web services
- Only works with Asynchronous SOAP Requests
  - SOAP through the MID Server
  - Asynchronous, Direct SOAP Calls
- Not limited to SOAP




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# Policy Retry Options

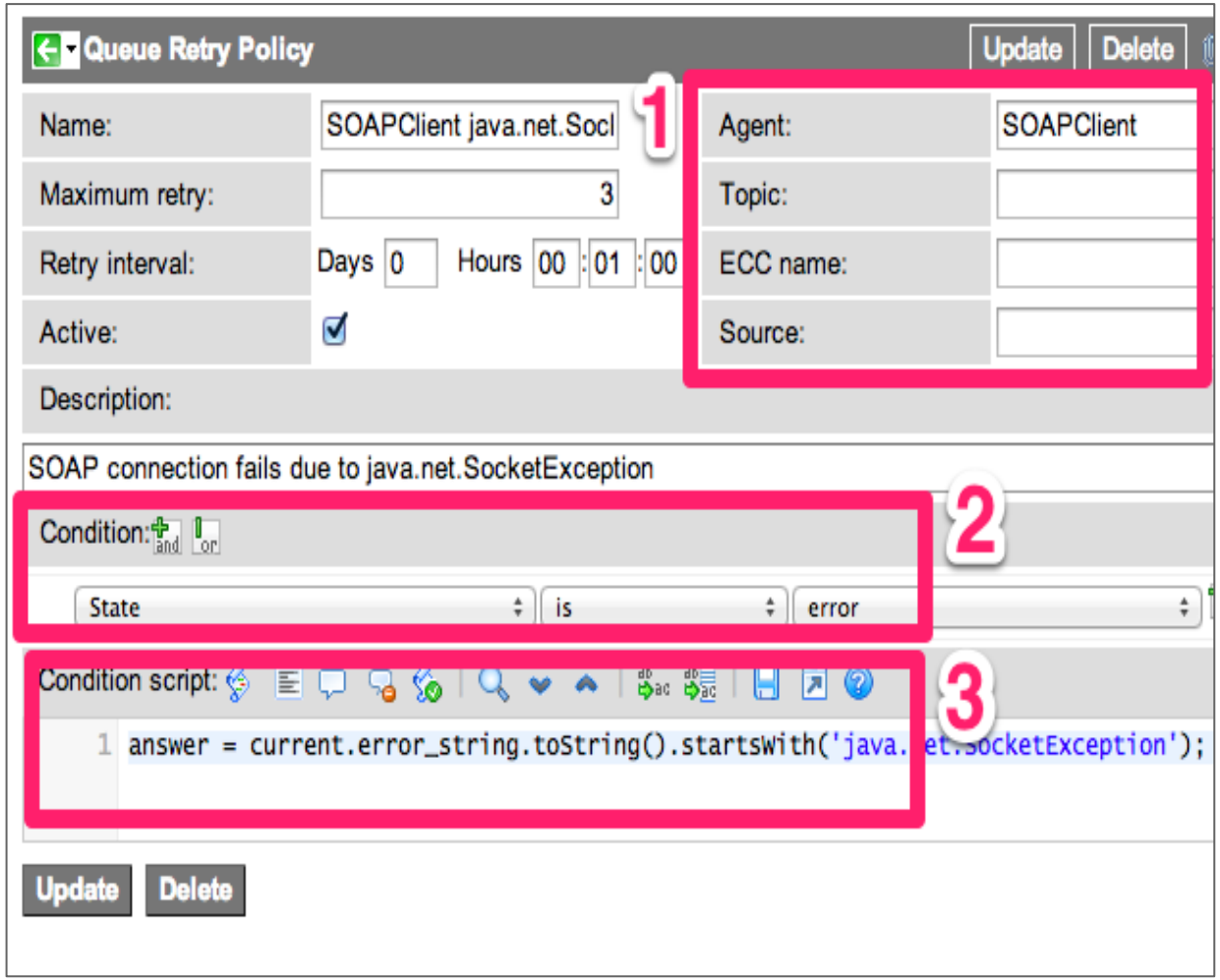
1. Maximum retries
2. Interval between retries




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# Policy Condition Options

1. ECC Queue Field – Exact Matches
2. Dropdown AND/OR Filtering
3. Server side JavaScript logic




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# Exercise 3: Asynchronous SOAP and Retry Policies

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# WS-Security

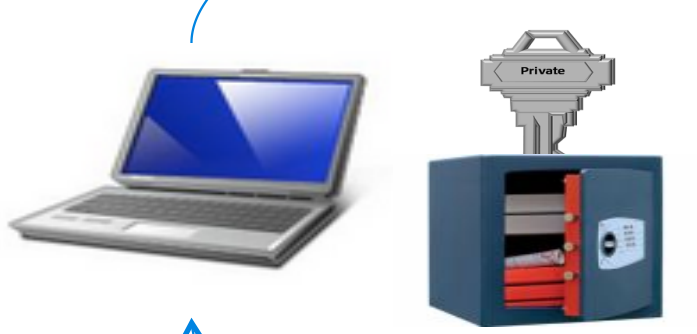
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1) Client prepares SOAP Request and Signs it with the Private Key from the keystore

2) The Server validates the Signature with the Public key it stores from the trusted client

3) If the Signature checks out, then the server sends its response











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# Exercise 4: Signing SOAP Requests

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# Top Takeaways

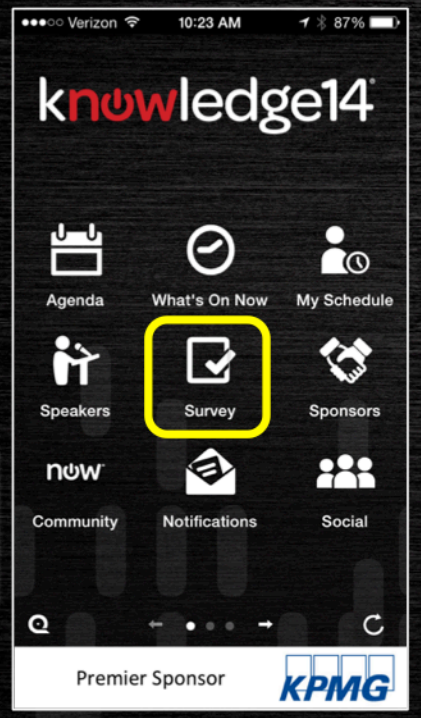
1. The GUI-based SOAP Message utility helps you set up outbound SOAP Web Service Calls

2. SOAP Message records can be called using server-side scripts

3. Asynchronous SOAP requests can be monitored for failure conditions and retried as needed

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**John Andersen**

*Sr. Solutions Architect*

ServiceNow

**Chris Maloy**

*Expert Services Guru*

ServiceNow

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