Enabling SwaggerSocket in CXF and Olingo Services

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Agenda

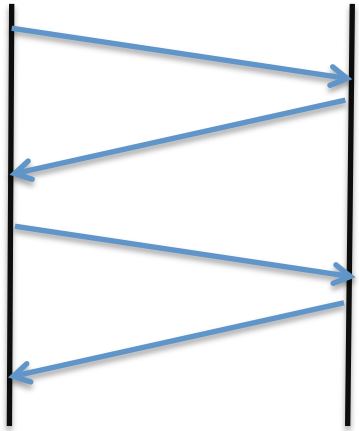
- Apache CXF's WebSocket Support
- What is SwaggerSocket
- Using with Apache CXF and Apache Olingo
- Demos


Apache CXF’s WebSocket Support

Advantages of WebSocket (1)

non-duplex channel
(normal HTTP)

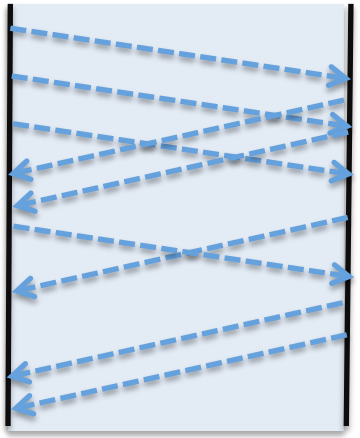
Client Server



Data is transferred
over multiple socket connections
or a single connection (keep-alive)
in either direction at time

duplex channel
(websocket)

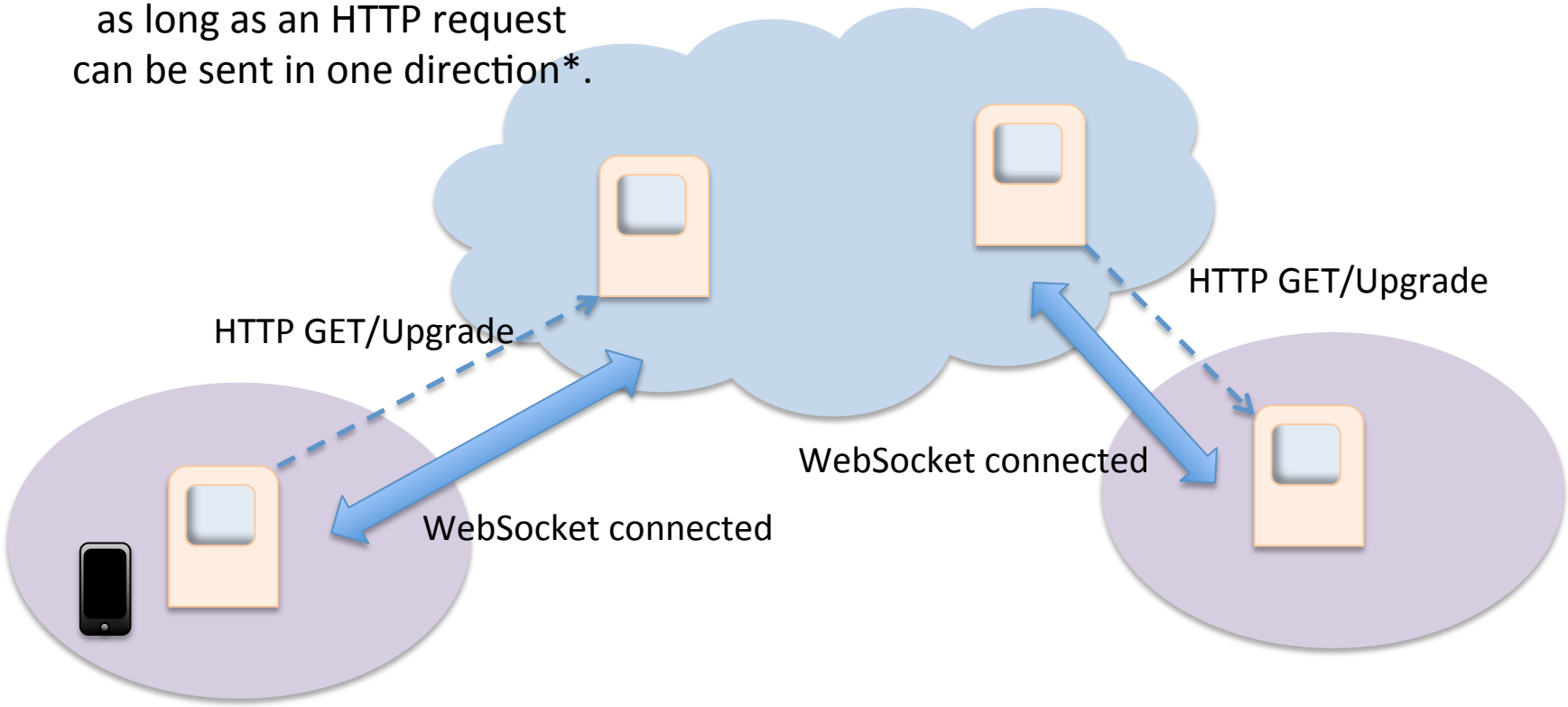
Client Server



Data can be transferred
over a single socket connection
in both directions

Advantages of WebSocket (2)

A WebSocket connection can be established across the network boundaries as long as an HTTP request can be sent in one direction*.



* Unless explicitly blocked or not supported

Apache CXF Overview

Apache CXF is an open source services framework supporting jaxws and jaxrs frontends, various WS-* standards and security features, and transports.

http://cxf.apache.org

CXF with WebSocket

- WebSocket transport added in CXF 3.0.0
  - enabled JAXWS and JAXRS services to be invoked over a WebSocket
  - used Jetty or Atmosphere (with a supported Servlet container) and runs in the standalone or the servlet-container mode
  - used one specific protocol binding (CXF's default WebSocket protocol)

CXF WebSocket Transport in server-side in Embedded mode or Servlet-Container mode

In Jetty-Embedded Mode, use the ws[s] instead of http[s] in the address attribute

```
<jaxrs:server id="bookservice" address="ws://localhost:8080/
services/rest">
    <jaxrs:serviceBeans>
        <ref bean="bookServiceBean" />
    </jaxrs:serviceBeans>
    ...
</jaxrs:server>
```

In Servlet-Container-Mode, set the transportId

```
<jaxrs:server id="bookservice" address="/services/rest"
  transportId="http://cxf.apache.org/transports/websocket">
    <jaxrs:serviceBeans>
        <ref bean="bookServiceBean" />
    </jaxrs:serviceBeans>
    ...
</jaxrs:server>
```

Protocol Binding: Request and Response with CXF's default WebSocket binding

Once a socket is opened, a request message can be sent over the socket.
Each request and response message looks like an HTTP message.

```
Request = Method SP Request-URI CRLF
          *(( header ) CRLF)
          CRLF
          [ body ]
```

```
Response = [Status-Code CRLF ]
           *(( header ) CRLF)
           CRLF
           [ body ]
```

A GET request with optional requestId for message correlation

```
GET /services/rest/getBook/184...
requestId: 77a5114a-3b78-4581...
```

A POST request

```
POST /services/rest/addBook
Content-Type: text/xml

<?xml ...
```

A successful response

```
200
Content-Type: text/json

...
```

An error response

```
405
responseId: 77a5114a-3b78-3b78...
```

New WebSocket Features in CXF 3.0.5

- WebSocket protocol binding is implemented as an Atmosphere interceptor
- Allowing the protocol binding to be easily switched or extended by replacing or adding the Atmosphere interceptors
- Jetty Embedded mode can now use Atmosphere to take advantage of Atmosphere's features and this protocol binding support
- Jetty-Only mode is supported with no new features


What is Apache Olingo

Apache Olingo Overview

- Apache Olingo is an open source project implementing the OData (Open Data Protocol) standard, a data query and manipulation protocol based on REST principle

- http://olingo.apache.org

OData REST messages

```
GET /OData.svc/Category(1)/Products?$top=2&orderby=name
```

```
GET /OData.svc/Category(1)/Products(2)
```

```
GET /OData.svc/Category(1)/Products(2)/Price
```

```
POST /OData.svc/Category(2)/Products(3) HTTP/1.1
Content-Type: application/json

...
```

```
PUT /OData.svc/Category(2)/Products(3)/Accessary
Content-Type: application/json

...
```


What is SwaggerSocket

What is SwaggerSocket

- REST service calls over WebSocket
  - A series of service invocations can be performed on a single birectional, duplex channel.
  - Asynchronous handling directly supported
  - Similar to CXF's WebSocket protocol binding but uses JSON to package the messages

- Originally introduced by Wordnik in 2012 using Atmosphere Framework
  - Apache Licensed Open Source Project hosted at

  https://github.com/swagger-api/swagger-socket

  - Atmosphere Framework is a scalable asynchronous application framework supporting various transports such as WebSocket, Server-Side-Events, …

SwaggerSocket Status

- SwaggerSocket 2.0.1
- Server
  - Atmosphere based, implemented as an Atmosphere protocol interceptor
  - OSGi enabled (available as Karaf-Feature)
- Client
  - Javascript: works in Browsers or Node.js (installable from npm)
  - Scala

SwaggerSocket: Javascript Client API (1)

```
// using jQuery variant
var ss = new jQuery.swaggersocket.SwaggerSocketListener();
var swaggerSocket = new jQuery.swaggersocket.SwaggerSocket();

// listeners methods called at open, close, error, response,..
ss.onOpen = function(response) {};
ss.onClose = function(Response) {};
ss.onError = function(Response) {};
ss.onResponse = function(Response) {};
ss.onResponses = function (Response) {};
```

```
// opening a connection
var request = new jQuery.swaggersocket.Request()
          .path(path)
          .listener(ss);
swaggerSocket.open(request);
```

SwaggerSocket Protocol (1)

after WebSocket is open, a handshake request is sent

```
{"handshake":{"protocolVersion":"1.0",
              "protocolName":"SwaggerSocket",
              "uuid":"0",
              "path":"ws://localhost:8080/swaggersocket"
             }
}
```

a handshake response with the identity key

```
{"status":{"statusCode":200,"reasonPhrase":"OK"},
 "identity":"a5b9363c-ba21-4916-8ca8-b61e66529cbd"
}
```

SwaggerSocket: Javascript Client API (2)

```
// sending a request
var request = new jQuery.swaggersocket.Request()
              .path("path")
              .method(”GET")
              .listener(ss);
swaggerSocket.send(request);
```

```
// sending multiple requests at once
var requests = new Array();
requests[0] = new jQuery.swaggersocket.Request()
              .path("path1")
              .method("POST")
              .data("Hello World")
              .dataFormat("text/plain”)
              .listener(ss);
requests[1] = new jQuery.swaggersocket.Request()
              .path("/path2")
              .method(”GET”)
              .listener(ss);
swaggerSocket.send(requests);
```

SwaggerSocket Protocol (2)

a request message can be sent as

```
{"identity":"a5b9363c-ba21-4916-8ca8-b61e66529cbd",
 "requests":[{"uuid":"5e4dbf1f-2117-f024-3d59-a1e71060d13e",
              "method":"POST",
              "path":"/echo",
              "dataFormat":"text/plain",
              "messageBody":"Hello World"}]
}
```

a response message can be received as

```
{"identity":"a5b9363c-ba21-4916-8ca8-b61e66529cbd",
 "responses":[{"headers":[{"name":"Content-Type",..."}],
               "path":"/echo",
               "uuid":"5e4dbf1f-2117-f024-3d59-a1e71060d13e",
               "messageBody":"Hello World",
               "last":true,
               "reasonPhrase":"OK","statusCode":200}]
}
```

SwaggerSocket Protocol (3)

additional request attributes can be supplied as required by the application

```
{"identity":"a5b9363c-ba21-4916-8ca8-b61e66529cbd",
 "requests":[{"uuid":"5e4dbf1f-2117-f024-3d59-a1e71060d13e",
              "method":"POST",
              "path":"/echo",
              "dataFormat":"application/json",
              "headers”:[{"name":"name1","value":"value1"},
                         {"name":"name2","value":"value2"}, ...],
              "queryStrings":[{"name":"name1","value":"value1"},
                         {"name":"name2","value":"value2"}, ...],
              "messageBody":"..."}]
}
```

Enabling SwaggerSocket for REST services

- Option 1
  - When publishing JAXRS resources, simply use SwaggerSocketServlet to host the services
- Option 2
  - For existing servlet based applications, SwaggerSocketServlet can be added to process the original requests and route internally over the application's own servlet
- Option 3
  - When using CXF, which is Atmosphere-enabled, simply register the SwaggerSocket protocol interceptor in its Atmosphere transport's interceptors list.


Demos
- CXF with SwaggerSocket on Karaf
- Olingo with SwaggerSocket

Links

- SwaggerSocket Project
  - https://github.com/swagger-api/swagger-socket
  - https://github.com/swagger-api/swagger-socket/tree/master/samples
  - Googlegroup: swagger-swaggersocket
- Other SwaggerSocket samples (Demo) at
  - https://github.com/elakito/swaggersocket-samples
- Atmosphere Framework
  - https://github.com/Atmosphere/atmosphere
- Apache CXF
  - http://cxf.apache.org
- Apache Olingo
  - http://olingo.apache.org

- Contact

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