Unit 8 Web Services with Resources

Unit Outcomes. Here you will learn

- About the latest standards for describing WS with stateful resources.
- To develop and deploy WS with resources using the Globus Toolkit.
- How WS resources integrate with other WS features, namely notification.

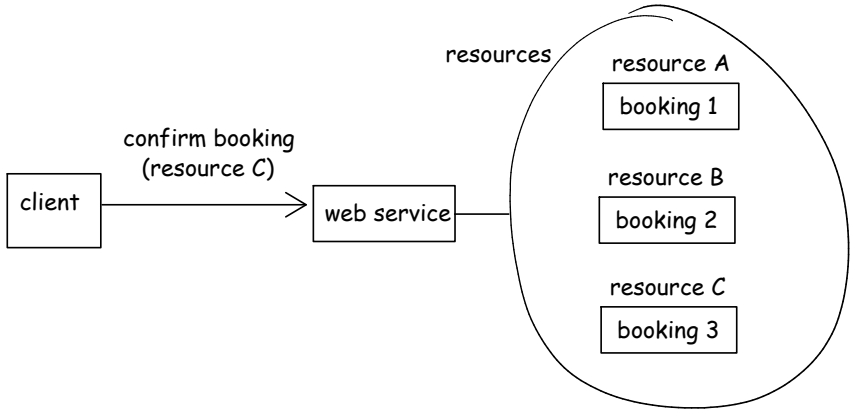
Further Reading: Globus Toolkit 4 online tutorial 1.3, 3--8

Contents

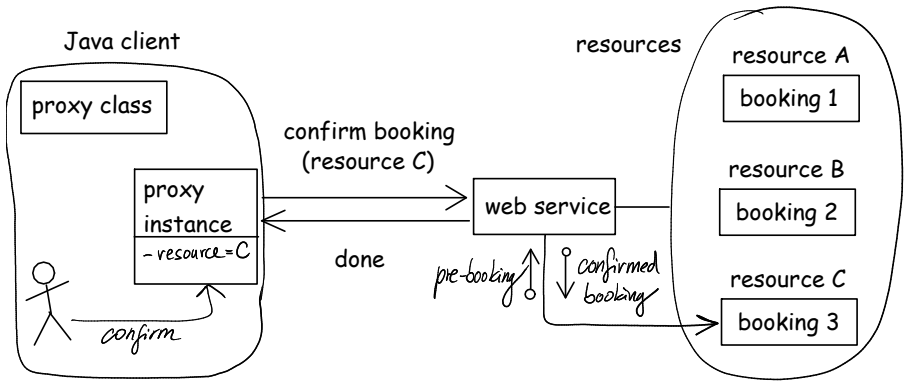
Systematic Stateful WS
Stateless vs stateful WS

- SOA definition:
  "services accessed in a *stateless* request-response manner"
  - eg service for adding many numbers:
    - stateless: all numbers passed at once
    - stateful: can add one number at a time and then request sum
- stateless services good for maintainability, scalability

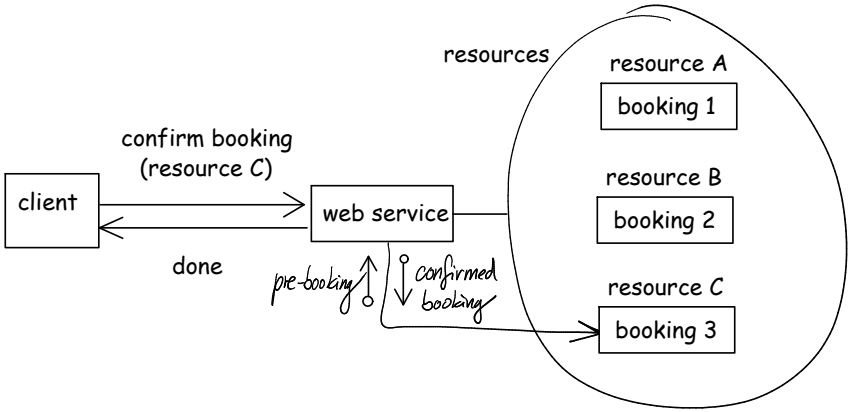
WS resources



WS resources and Java classes



Managing WS resources



GDT annotated class

```
@GridService
    (name = "Math",
     namespace = "http://localhost:8080/wsrf/services/MathService",
     ...)
public class Math
{
    @GridAttribute
    private int[] numbers = new int[MAX_NUMS];

    @GridAttribute
    private int numbersLength = 0;

    @GridMethod
    public void addNumber(int n)
    {
        if(numbersLength < MAX_NUMS)
        {
            numbers[numbersLength] = n;
            numbersLength ++;
            System.out.printf("Math: Added number %d.%n", n);
        }
```


Generated WSDLs

MathPortType		
addNumber		
input	parameters	addNumber
output	parameters	addNumberResponse
getSum		
input	parameters	getSum
output	parameters	getSumResponse
GetResourceProperty		
input	GetResourcePropertyRequest	GetResourceProperty
output	GetResourcePropertyResponse	GetResourcePropertyResponse
InvalidResourcePropertyQNameFault	InvalidResourcePropertyQNameFault	InvalidResourcePropertyQNameFault
ResourceUnknownFault	ResourceUnknownFault	ResourceUnknownFault

MathFactoryPortType		
createResource		
input	parameter	createResource
output	parameter	createResourceResponse

(createResourceResponseType)	
EndpointReference	EndpointReferenceType

WS-Addressing

- Endpoint Reference (EPR) = XML remote reference to a WS
- standard SOAP headers, eg `<wsa:To>`, `<wsa:From>`
- used to identify WS-Resources, eg:

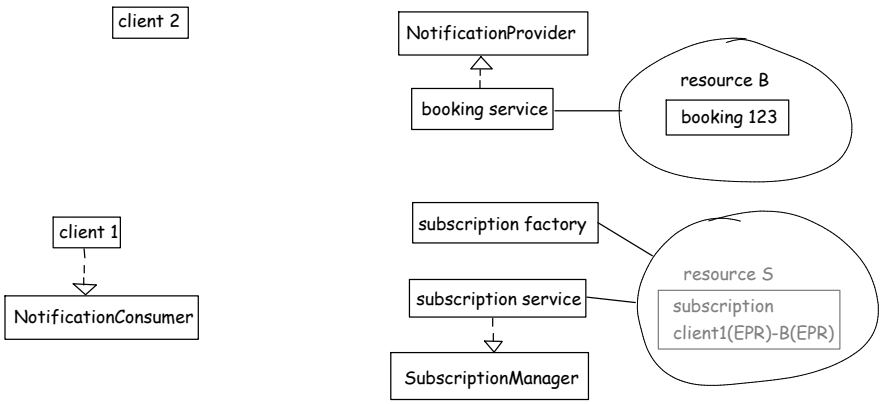
```
<soap:Envelope ...>
   <soap:Header>
        <wsa:To>
          http://a.com/services/Math?res=C
        </wsa:To>
        ...
   </soap:Header>
   <soap:Body>
        ...
   </soap:Body>
</soap:Envelope>
```

- also used as return value by factory service

WS-ResourceProperties

- four standard port types (with 1 operation each):
  - `GetResourceProperty` (in above WSDL)
  - `GetMultipleResourceProperties`
  - `SetResourceProperties`
  - `QueryResourceProperties`

WS-Notification



Learning Outcomes

Learning Outcomes. You should now be able to

- Describe the concept of WS-Resource using suitable examples and diagrams.
- Explain how WS-Addressing, WS-ResourceProperties and WS-Notification standards relate to WSRF, illustrating the ideas with examples.
- Name three standard port types used in basic notification according to WS-Notification and draw a collaboration diagram illustrating their use.