



Practical Experience of WSRF Core Programming (GT3.9.1)

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OGSA-TESTBED MEETING

9 July, 2004, Westminster

- WSRF Core Architecture
- WSRF Practice
- Bugs

- Service + Resource
- Operation Providers
- JNDI Directory
- Resource State Management
- Resource Properties
- Notification
- Security
- Client side support

- The service is just a plain web service
- Resource is managed/discovered via a ResourceHome with resourceKey.
- Available ResourceHome currently are:
 - SimpleResourceHome
 - SoftResourceHome
 - ServiceResourceHome
 - PersistentResourceHome

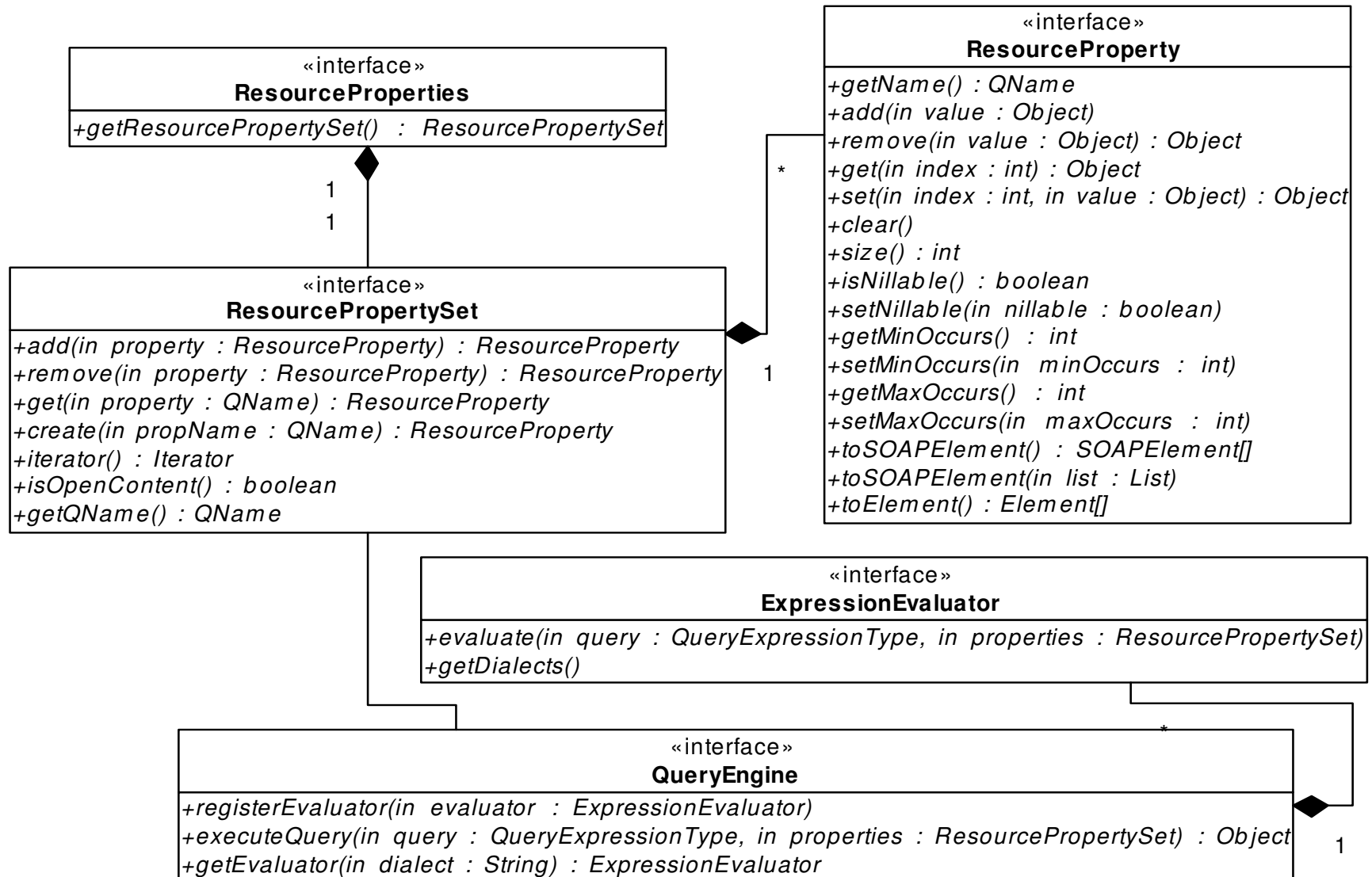
Any service can be an operation provider.

- Destroy
- Set Termination Time
- Get Current Message
- Notification Consumer
- Pause/Resume Subscription
- Subscribe
- Get/Set Resource Properties
- Query Resource Properties

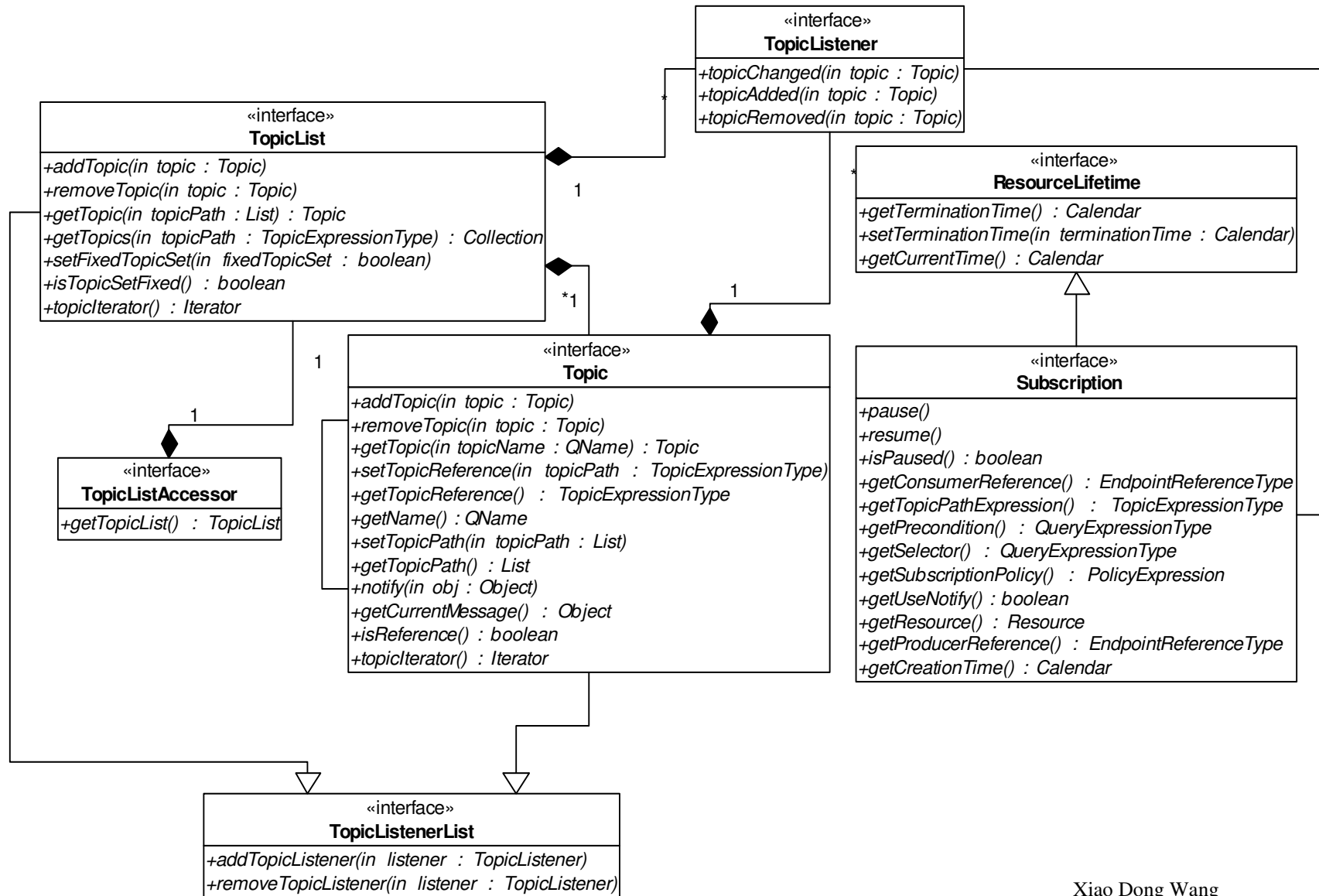


- JNDI Directory
 - <http://jakarta.apache.org/tomcat/tomcat-5.0-doc/jndi-resource-howto.html>
- Resource State Management
 - soft references
 - persistent resources
- Security
 - WS-Security
 - XML Encryption
 - XML Signature

Resource Properties



Notification



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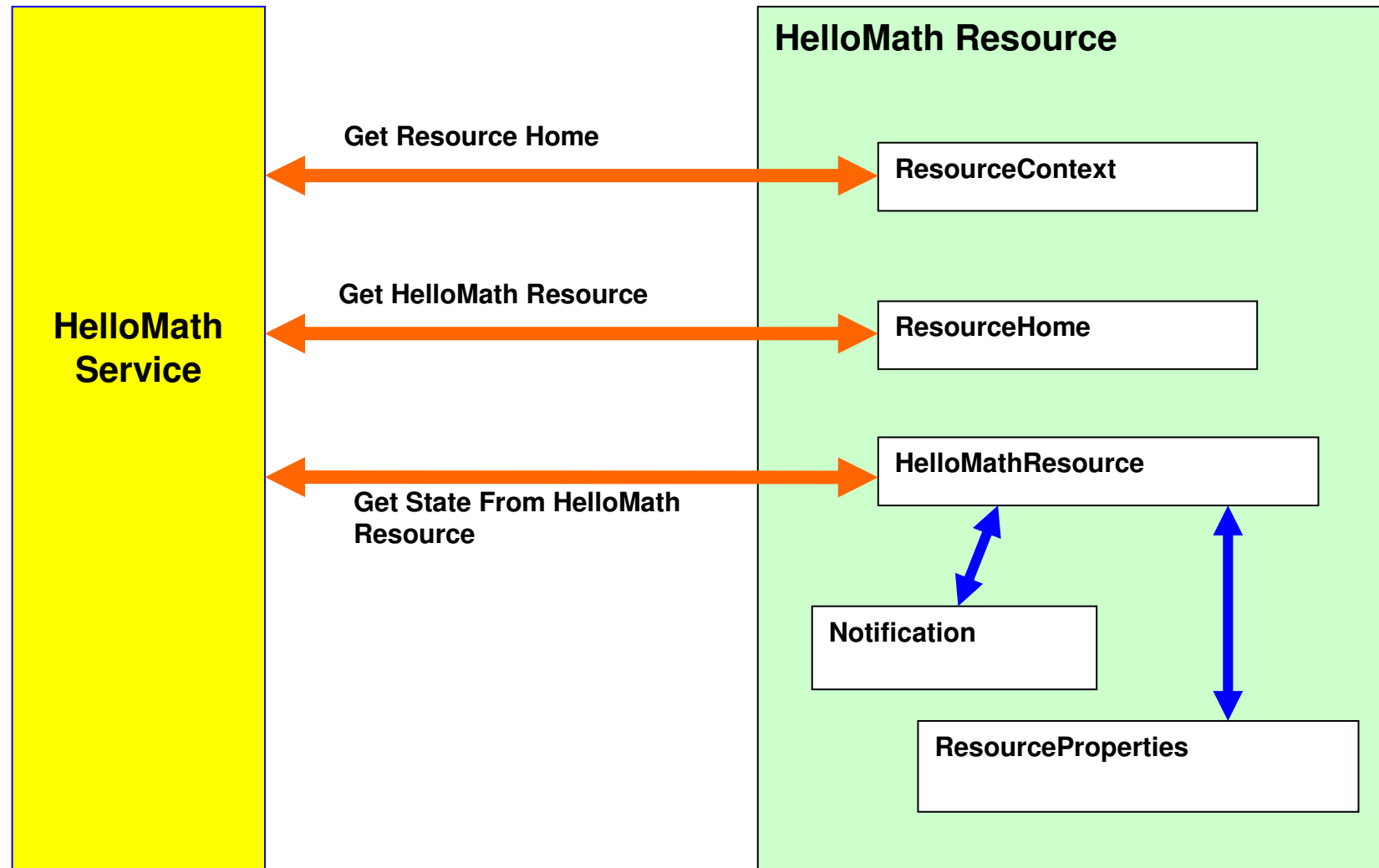


- Scenario:
 - Web service: HelloMath
 - Function:
 - add(float)
 - subtract(float)
 - multiply(float)
 - divide(float)
 - With notification
 - No security
 - Client support



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HelloMath Service Structure (1)



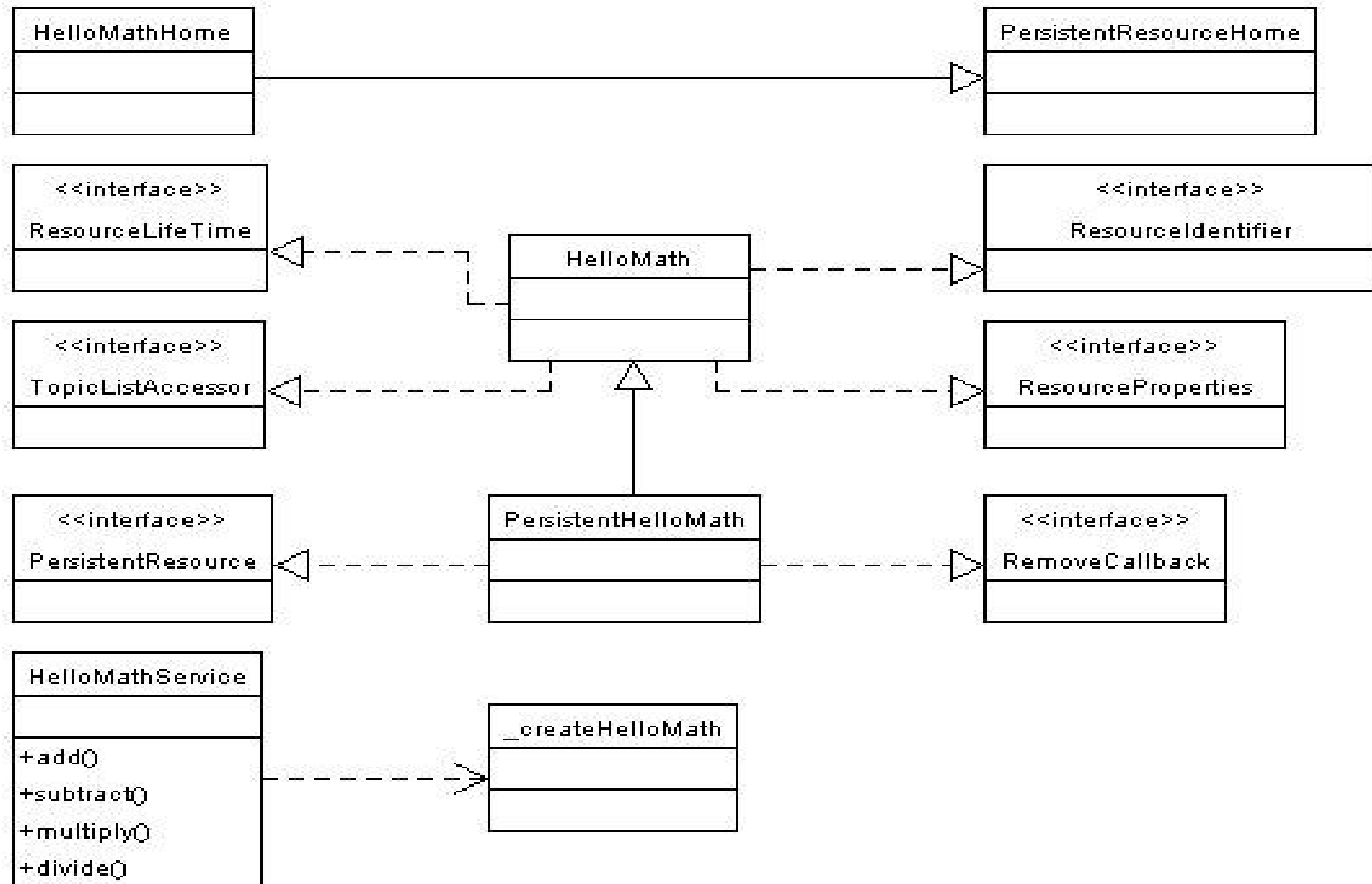
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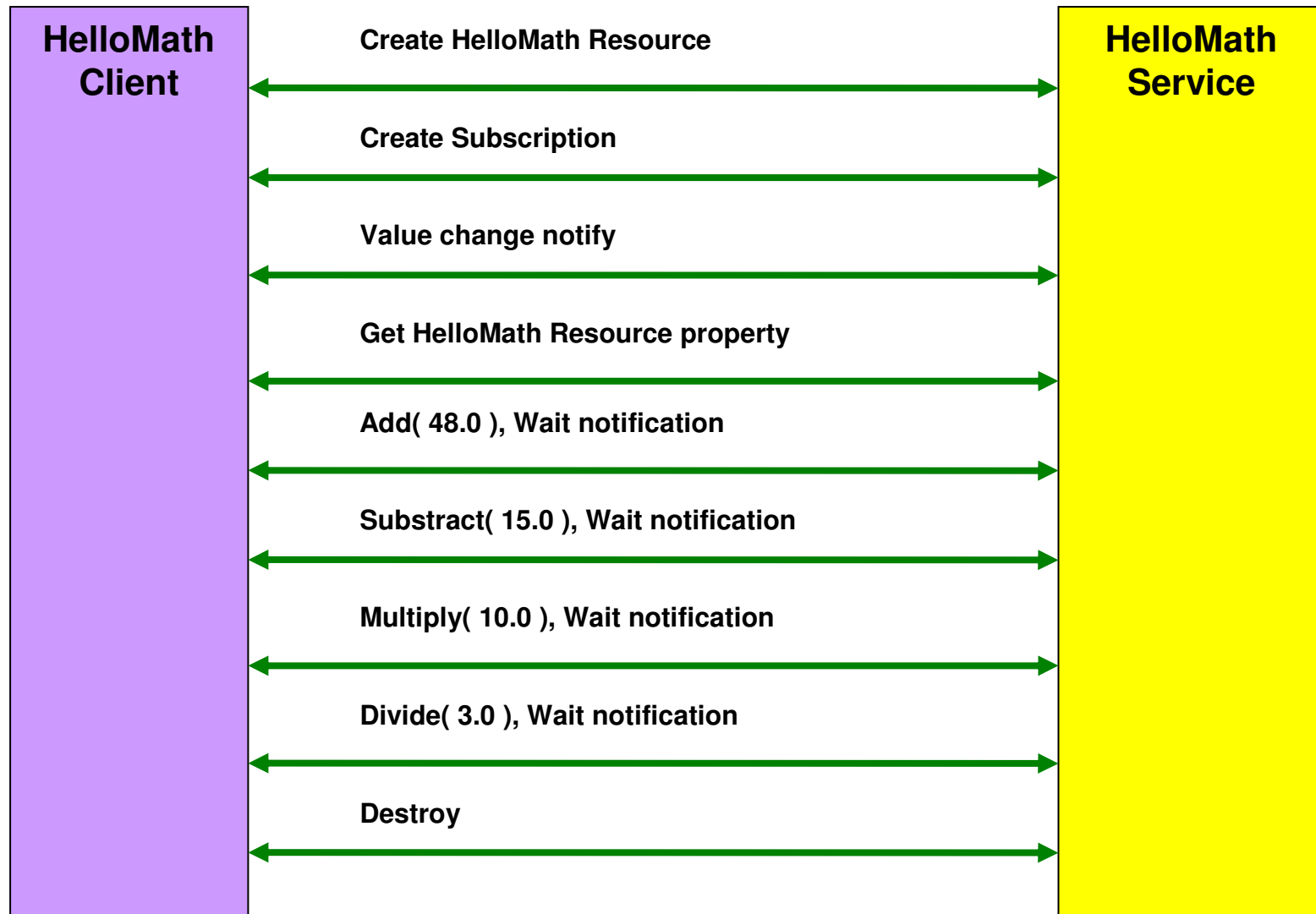
HelloMath Service Structure (2)



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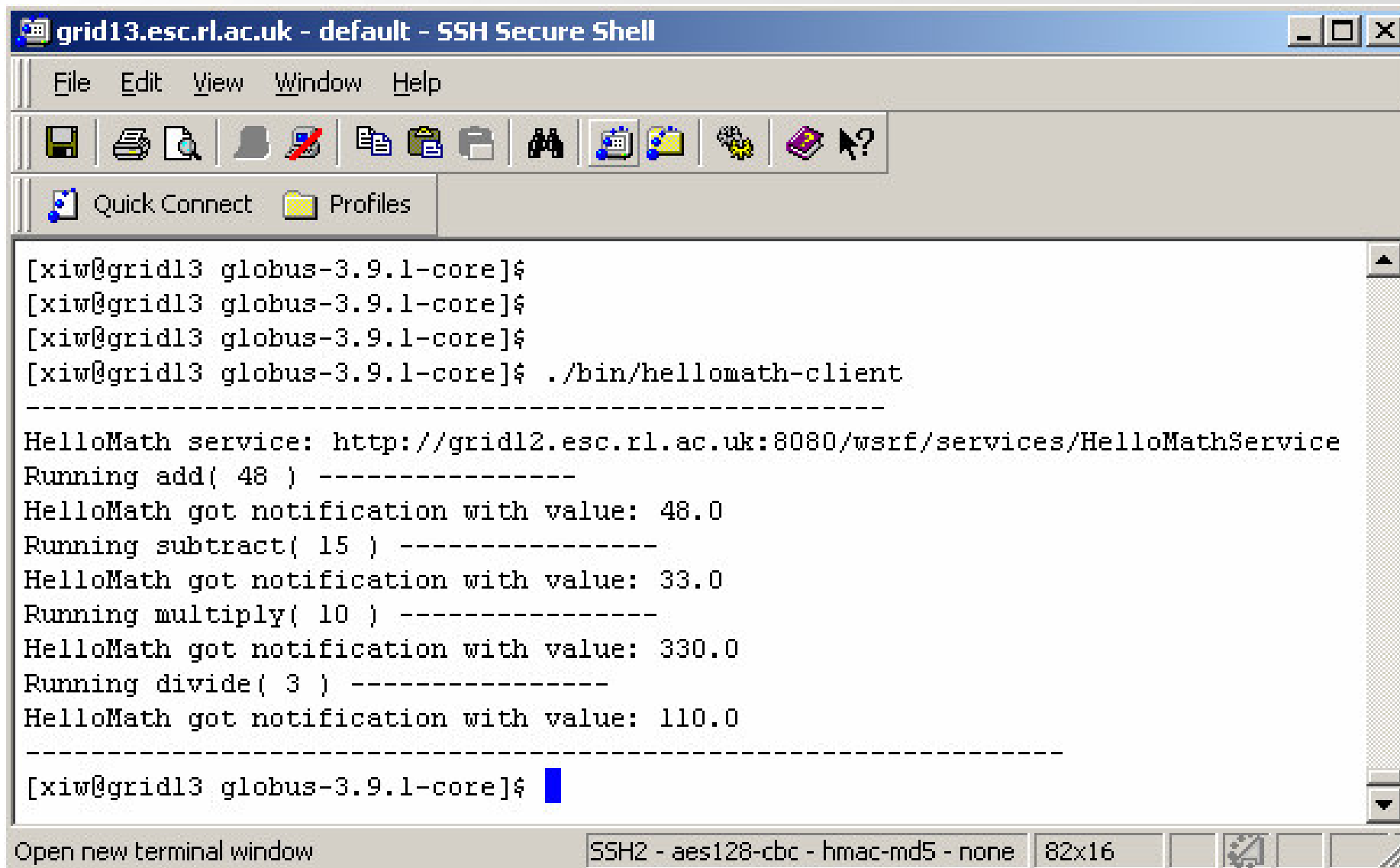
HelloMath Service Interaction



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Screenshot



```
[xiw@grid13 globus-3.9.1-core]$
[xiw@grid13 globus-3.9.1-core]$
[xiw@grid13 globus-3.9.1-core]$
[xiw@grid13 globus-3.9.1-core]$ ./bin/hellomath-client
-----
HelloMath service: http://grid12.esc.rl.ac.uk:8080/wsrf/services/HelloMathService
Running add( 48 ) -----
HelloMath got notification with value: 48.0
Running subtract( 15 ) -----
HelloMath got notification with value: 33.0
Running multiply( 10 ) -----
HelloMath got notification with value: 330.0
Running divide( 3 ) -----
HelloMath got notification with value: 110.0
-----
[xiw@grid13 globus-3.9.1-core]$
```

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HelloMath Service Code

```
• public _createHelloMathResponse createHelloMath(_createHelloMath request) throws RemoteException
• {
•     ResourceContext ctx = null;
•     HelloMathHome home = null;
•     ResourceKey key = null;
•     try
•     {
•         ctx = ResourceContext.getResourceContext();
•         home = (HelloMathHome) ctx.getResourceHome();
•         key = home.create();
•     }
•     catch(RemoteException e)
•     {
•         throw e;
•     }
•     catch(Exception e)
•     {
•         throw new RemoteException("", e);
•     }
•     EndpointReferenceType epr = null;
•     try
•     {
•         epr = AddressingUtils.createEndpointReference(ctx, key);
•     }
•     catch(Exception e)
•     {
•         throw new RemoteException("", e);
•     }
•     _createHelloMathResponse response = new _createHelloMathResponse();
•     response.setEndpointReference(epr);
•     return response;
• }
```



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subtract function of HelloMath service Code

```
• public float subtract(float arg0) throws RemoteException
• {
•     Object resource = null;
•     try
•     {
•         resource = ResourceContext.getResourceContext().getResource();
•     }
•     catch(RemoteException e)
•     {
•         throw e;
•     }
•     catch(Exception e)
•     {
•         throw new RemoteException("", e);
•     }
•     HelloMath helloMath = (HelloMath) resource;
•     float result = helloMath.getValue();
•     result -= arg0;
•     helloMath.setValue(result);
•     return result;
• }
```



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HelloMath PersistentResource Code

```
• public class PersistentHelloMath extends HelloMath implements RemoveCallback,
  PersistentResource {
•     /** Set up value as resourcekey */
•     public void setValue(float value) {
•         .....
•     }
•     /** Set up lifetime */
•     public void setTerminationTime(Calendar time) {
•         .....
•     }
•     /** User-defined function. After new resource created, the key returned */
•     public Object create() throws Exception {
•         .....
•     }
•     /** Called when activating a HelloMath resource by PersistentResourceHome */
•     public void load(ResourceKey key) throws ResourceException {
•         .....
•     }
•     /** Called when activating a HelloMath resource by PersistentResourceHome */
•     public void store() throws ResourceException {
•         .....
•     }
•     /** Remove this service thread */
•     public void remove() throws ResourceException {
•         .....
•     }
• }
```

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JNDI config document

```
• <?xml version="1.0" encoding="UTF-8"?>
• <jndiConfig xmlns="http://wsrf.globus.org/jndi/config">
•   <service name="HelloMathService">
•     <resource
•       name="home"
•       type="org.globus.wsrf.samples.hellomath.HelloMathHome">
•       <resourceParams>
•         <parameter>
•           <name>factory</name>
•           <value>org.globus.wsrf.tools.jndi.BeanFactory</value>
•         </parameter>
•         <parameter>
•           <name>resourceClass</name>
•           <value>org.globus.wsrf.samples.hellomath.PersistentHelloMath</value>
•         </parameter>
•         <parameter>
•           <name>resourceKeyName</name>
•           <value>{http://hellomath.com}HelloMathKey</value>
•         </parameter>
•         <parameter>
•           <name>resourceKeyType</name>
•           <value>java.lang.Float</value>
•         </parameter>
•       </resourceParams>
•     </resource>
•   </service>
• </jndiConfig>
```



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server config document

- `<?xml version="1.0" encoding="UTF-8"?>`
- `<deployment name="defaultServerConfig"`
- `xmlns="http://xml.apache.org/axis/wsdd/"`
- `xmlns:java="http://xml.apache.org/axis/wsdd/providers/java"`
- `xmlns:xsd="http://www.w3.org/2001/XMLSchema">`
- `<service name="HelloMathService" provider="Handler"`
- `use="literal" style="document">`
- `<parameter name="allowedMethodsClass"`
- `value="com.hellomath.HelloMathPortType"/>`
- `<parameter name="handlerClass"`
- `value="org.globus.axis.providers.RPCProvider"/>`
- `<parameter name="className"`
- `value="org.globus.wsrf.samples.hellomath.HelloMathService"/>`
- `<wsdlFile>share/schema/core/samples/hellomath/hellomath_service.wsdl</wsdlFile>`
- `<parameter name="scope" value="Application"/>`
- `<parameter name="providers" value="`
- `DestroyProvider SetTerminationTimeProvider GetRPPProvider`
- `SubscribeProvider GetCurrentMessageProvider"/>`
- `</service>`
- `</deployment>`



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HelloMath PortType WSDL Document

```
• <definitions name="HelloMath" .....>
•   <wsdl:import namespace=...../>
•   <types>
•     <xsd:schema targetNamespace="http://hellomath.com" xmlns:tns="http://hellomath.com"
•       xmlns:xsd="http://www.w3.org/2001/XMLSchema">
•       <xsd:import namespace="http://schemas.xmlsoap.org/ws/2003/03/addressing"
•         schemaLocation="../../../ws/addressing/WS-Addressing.xsd" />
•       <xsd:element name="createHelloMath"><xsd:complexType/></xsd:element>
•       <xsd:element name="createHelloMathResponse"><xsd:complexType>
•         <xsd:sequence><xsd:element ref="wsa:EndpointReference"/></xsd:sequence>
•       </xsd:complexType>
•     </xsd:element>
•     <xsd:element name="add" type="xsd:float"/>
•     <xsd:element name="addResponse" type="xsd:float"/>
•     <xsd:element name="subtract" type="xsd:float"/>
•     <xsd:element name="subtractResponse" type="xsd:float"/>
•     <xsd:element name="multiply" type="xsd:float"/>
•     <xsd:element name="multiplyResponse" type="xsd:float"/>
•     <xsd:element name="divide" type="xsd:float"/>
•     <xsd:element name="divideResponse" type="xsd:float"/>
•     <xsd:element name="Value" type="xsd:float"/>
•     <xsd:element name="myHellomathRP">
•       <xsd:complexType>
•         <xsd:sequence>
•           <xsd:element ref="tns:Value"
•             minOccurs="1" maxOccurs="1"/>
•         </xsd:sequence>
•       </xsd:complexType>
•     </xsd:element>
•   </xsd:schema>
• </types>
```

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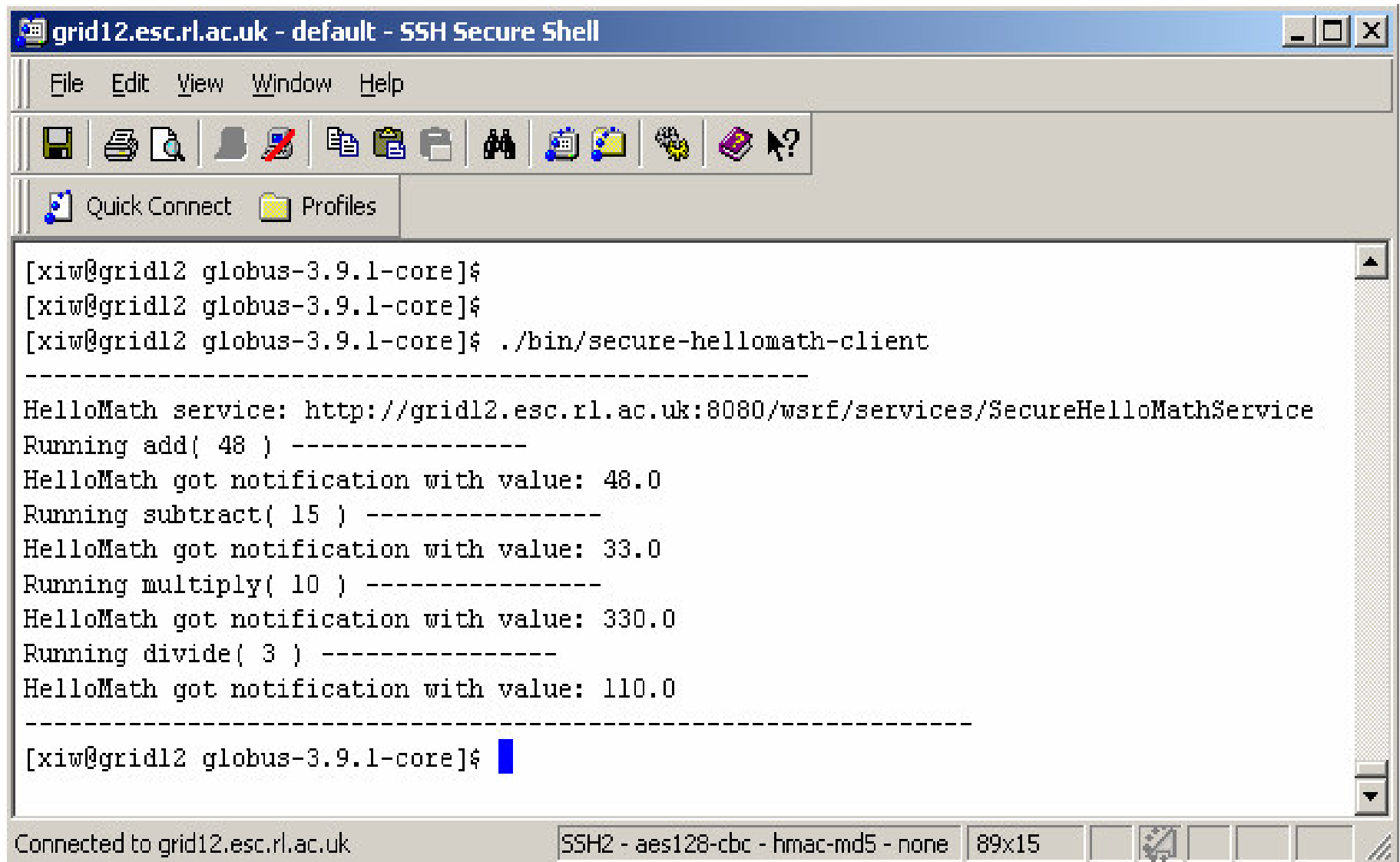
CCLRC HelloMath PortType WSDL Document (continued)

```
• <message name="CreateHellomathRequest"><part name="request" element="tns:createHelloMath"/></message>
• <message name="CreateHellomathResponse"><part name="response" element="tns:createHelloMathResponse"/></message>
• <message name="AddInputMessage"><part name="parameters" element="tns:add"/></message>
• <message name="AddOutputMessage"><part name="parameters" element="tns:addResponse"/></message>
• <message name="SubtractInputMessage"><part name="parameters" element="tns:subtract"/></message>
• <message name="SubtractOutputMessage"><part name="parameters" element="tns:subtractResponse"/></message>
• <message name="MultiplyInputMessage"><part name="parameters" element="tns:multiply"/></message>
• <message name="MultiplyOutputMessage"><part name="parameters" element="tns:multiplyResponse"/></message>
• <message name="DivideInputMessage"><part name="parameters" element="tns:divide"/></message>
• <message name="DivideOutputMessage"><part name="parameters" element="tns:divideResponse"/></message>
• <portType name="HelloMathPortType" gtwsdl:implements="wsnt:NotificationProducer
•                                     wsrl:ImmediateResourceTermination
•                                     wsrl:ScheduledResourceTermination"
•                                     wsrp:ResourceProperties ="tns:myHellomathRP">
•   <operation name="createHelloMath">
•     <input message="tns:CreateHellomathRequest"/>
•     <output message="tns:CreateHellomathResponse"/>
•   </operation>
•   <operation name="add">
•     <input message="tns:AddInputMessage"/>
•     <output message="tns:AddOutputMessage"/>
•   </operation>
•   <operation name="subtract">
•     <input message="tns:SubtractInputMessage"/>
•     <output message="tns:SubtractOutputMessage"/>
•   </operation>
•   <operation name="multiply">
•     <input message="tns:MultiplyInputMessage"/>
•     <output message="tns:MultiplyOutputMessage"/>
•   </operation>
•   <operation name="divide">
•     <input message="tns:DivideInputMessage"/>
•     <output message="tns:DivideOutputMessage"/>
•   </operation>
• </portType>
• </definitions>
```

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- http://bugzilla.globus.org/bugzilla/show_bug.cgi?id=1800
- http://bugzilla.globus.org/bugzilla/show_bug.cgi?id=1801
- http://bugzilla.globus.org/bugzilla/show_bug.cgi?id=1806
- http://bugzilla.globus.org/bugzilla/show_bug.cgi?id=1811



```
grid12.esc.rl.ac.uk - default - SSH Secure Shell
File Edit View Window Help
[Icons: Save, Print, Find, Copy, Paste, Undo, Redo, Cut, Paste, Run, Stop, Break, Help, etc.]
Quick Connect Profiles

[xiw@grid12 globus-3.9.1-core]$
[xiw@grid12 globus-3.9.1-core]$
[xiw@grid12 globus-3.9.1-core]$ ./bin/secure-hellomath-client
-----
HelloMath service: http://grid12.esc.rl.ac.uk:8080/wsrf/services/SecureHelloMathService
Running add( 48 ) -----
HelloMath got notification with value: 48.0
Running subtract( 15 ) -----
HelloMath got notification with value: 33.0
Running multiply( 10 ) -----
HelloMath got notification with value: 330.0
Running divide( 3 ) -----
HelloMath got notification with value: 110.0
-----
[xiw@grid12 globus-3.9.1-core]$
```

Connected to grid12.esc.rl.ac.uk SSH2 - aes128-cbc - hmac-md5 - none 89x15