

SBW, Perl and CORBA

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Perl SBW Client library

- **A Perl extension that provides an SBW API**
- **Object-Oriented**
- **Equivalent to Java SBW API**
 - Same Class and Method names as Java
 - Similar to C++ API
 - Creates Perl proxy objects for services
- **Currently limited to querying SBW system and exercising modules**
 - Can't provide services from Perl

Perl – SBW type mapping

SBW Signature	Perl	Java
string	<i>String</i>	String
int	<i>Integer</i>	int
double	<i>Double</i>	double
boolean	<i>Integer</i>	boolean
byte	<i>Integer</i>	byte
<i>Array</i>	<i>Array</i>	<i>Array</i>
<i>List</i>	<i>Hash</i>	java.util.List

Example: calling a known module

```
use lib 'SBW_HOME/lib';  
use SBW;  
  
$module = SBW::getModuleInstance(  
    "edu.caltech.trigonometry");  
$service = $module->findServiceByName("Trig");  
$trig = $service->getServiceObject();  
$trig->sin(x);
```

Example: complex types

Consider a method with the signature:

```
{string name, double x}[] loadSBMLModel(string sbml)
```

Code to call it:

```
$parameters = $simulator->loadSBMLModel($sbml);  
...  
foreach $parameter (@$parameters)  
{  
    $name = $parameter->{name};  
    $value = $parameter->{x};  
  
    // Do something with parameter data here...  
}
```

Exception handling

- **Perl Client library supports standard Perl exception mechanism**
 - Library calls `croak` when errors are encountered

Exception Handling: Example

```
eval
{
    print "getModuleDescriptor(\"foo\")\n";
    $descriptor = SBW::getModuleDescriptor("foo");
};

if ($?)
{
    print
        (SBW::SBWException::
            getDetailedMessage(), "\n");
}
```

CORBA – SBW Gateway

- **Bidirectional**
 - Single process implements all functionality
 - Exposes CORBA objects as SBW services
 - Exposes SBW service as CORBA objects
- **Provides a mapping between SBW and CORBA datatypes**
- **Developed with the OpenORB Java ORB and client library**
 - See <http://openorb.sourceforge.net/>
 - IIOP compatible
 - Open source

CORBA – SBW type mapping

SBW Signature	CORBA	Java
string	string	String
int	long	int
double	double	double
boolean	boolean	boolean
byte	octet	byte
<i>Array</i>	sequence	<i>Array</i>
<i>Defined List</i>	struct	java.util.List
<i>Undefined List</i>	SBWAnyList	java.util.List

CORBA view of SBW

- Each service has a CORBA proxy object
- SBW accessible via name server
- CORBA IDL generator
 - Queries SBW system
 - Generates IDL for a given service

SBW CORBA Name server heirarchy

- **SBW**
 - Services
 - *Details not shown*
 - Modules
 - *Module1*
 - ModuleDescription
 - ServiceFactoryS1
 - ServiceFactoryS2
 - SystemServiceFactory
 - ModuleInstances
 - *Module1*
 - 1
 - » S1
 - » S2
 - » SYSTEM

SBW view of CORBA

- **Single module**
 - edu.caltech.CORBAGateway
 - Management type unique
 - Single executable handles all requests
- **Proxy Service for each CORBA object**
 - Only CORBA objects which use entirely SBW compatible types are exposed to SBW