

Web Services with PHP on IBM i

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The PHP Company

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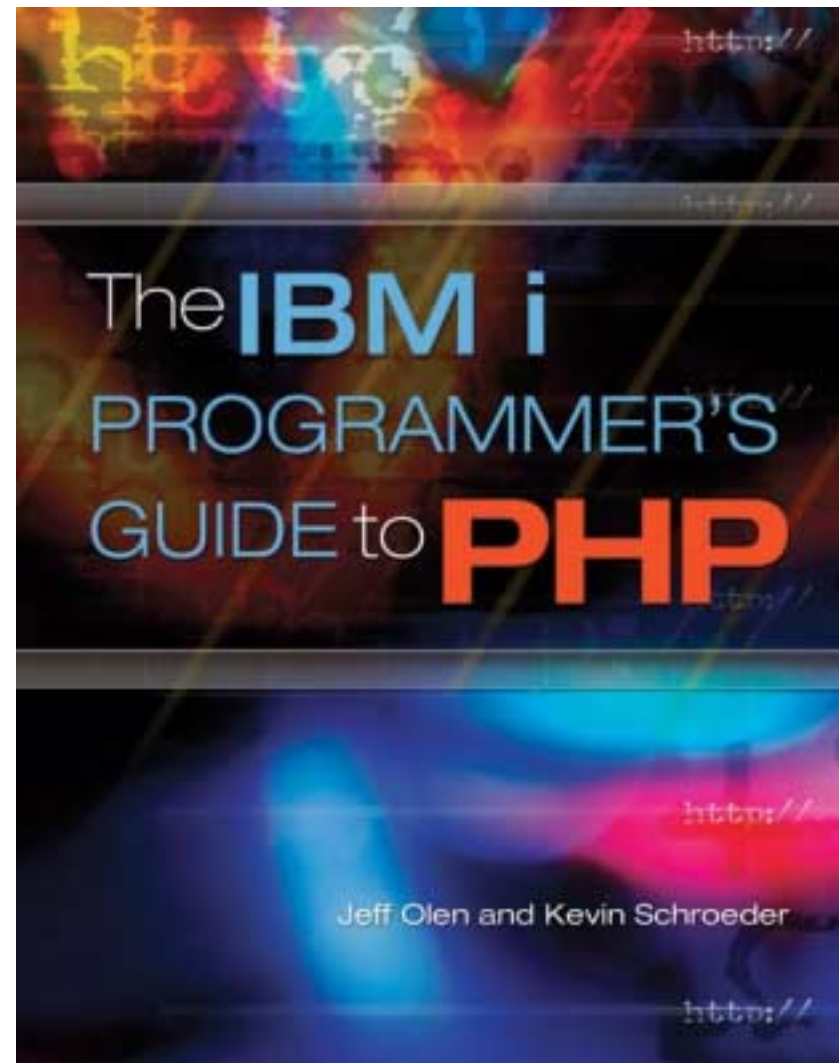
Come see us at PHP|tek in Chicago!

- **Zenders will be presenting several sessions!**
- **Over 45 sessions on various aspects of PHP & web!**
- **Lots of good networking opportunities**
- **Still time to register at <http://tek.mtacon.com/>**



New PHP book!

- mcpressonline has a brand new PHP book!
- Available now!
- Co-authored by **Jeff Olen** (i5, PHP and RPG) and Zend's own **Kevin Schroeder** (Professional Services, PHP, Java, etc.)
- <http://www.mc-store.com/5096.html>



Agenda

- **Discuss the old ways of passing data**
- **Define Web Services**
- **Explore a Sample Web Service that**
 - Uses two different i5's
 - In two different states
 - To do two different things
- **Wrap up and Q/A**

Special Thank You to Dr. Franken!



The screenshot shows a web browser window displaying the website <http://www.franken.com/>. The page features a large "Frankeni" logo with a lightning bolt graphic. Below the logo is a red banner with the text "We select your configuration rules and substitute our own...". The main content area is titled "Franken NEWS" and contains two news items. The first item, dated May 1, 2009, is titled "COMMON Visit a rousing success!" and describes Frankie III's activities at the COMMON annual conference. The second item, dated April 26, 2009, is titled "FRANKIE III Found!!" and describes his presence at the COMMON Expo. To the right of the news items is a cartoon mascot named "FrankenBob" and a "Friends of Frankie" section featuring a "TRIPP-LITE" logo and a thank-you message for donating UPS battery backups. A sidebar on the left contains navigation links and a weather widget.

See the Frankie III Build!

- About Frankie
- Meet the Team
- Hear the Team Speak
- Contact Us
- Franken System Gallery
- FrankenFAQ
- Ask Dr. Franken
- The Dr's Blog
- The Friends of Frankie
- Links and Downloads

0.00 in.
8:25:19 AM
FrankenWeather

FUELLY 55.0 avg MPG

Powered by

Franken NEWS

Updated: May 1, 2009 via FrankenNews Service

COMMON Visit a rousing success!

Frankie III spent a great week at the [COMMON annual conference](#). He hung out in the Passport to Prizes booth greeting all many admirers during Expo. On Wednesday he was featured in [Pimp my i-Extreme system i engineering](#). He spend the remainder of the day hanging out in that session room puzzling attendees of other sessions.

But on Thursday it got more interesting! IBM's Ian Jarman, manager of IBM Power Systems Software invited him to the IBM Rochester facility. So he's hitched a ride on the IBM truck from Reno to Rochester. DrFranken expects to join him on site on May 18th and early the 19th before a visit to [The CMNI users group](#) in Chicago that evening.

Updated: April 26, 2009 via FrankenNews Service

FRANKIE III Found!!

Frankie III is at COMMON! When Expo opened a bit earlier this afternoon there he was standing in the Passport to prizes booth! He's fully assembled and running all four i partitions, Linux, and twin Windows servers.

FrankenBob
The Official Mascot

Friends of Frankie

TRIPP-LITE

Thank You - to [Tripp Lite](#) for donating UPS battery backups to the cause.

Where we are and where we're going

- **Tightly coupled**
 - Mine, mine, mine...I own it all! mwa-ha-ha-ha-ha
 - API program calls
 - Stored procedures and ODBC
- **Loosely coupled**
 - We don't own all of our business logic
 - Web Services
 - Mash-ups

Usher in the new age of computing!

- **Books that are the basis for my position**
 - The Cathedral & the Bazaar by Eric Raymond
 - Open Source is OK!
 - Dynamic is in, Monolithic is out
 - But there is room for both...for a while
 - Small Pieces Loosely Joined by David Weinberger
 - Modular is better!
 - Many small pieces around the Internet
 - Scattered amongst the cloud!

What is a Web Service?

- **W3C says...**
 - A software system designed to support interoperable machine to machine interaction over a network.
- **Key words**
 - Software system
 - Interoperable
 - Machine to machine
 - Network
- **It's really just another way to call programs!**



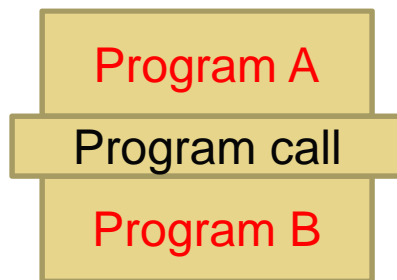
Who uses Web Services?

- **Web presence today**
 - Google → Maps, Spell checkers, etc.
 - Amazon.com → Product availability, Order processing
 - Salesforce.com → Application Integration
 - TerraServer → Cloud based applications
 - Many, many more
- **API layer replacement tomorrow**
 - Inter-program communication
 - Inter-system communication

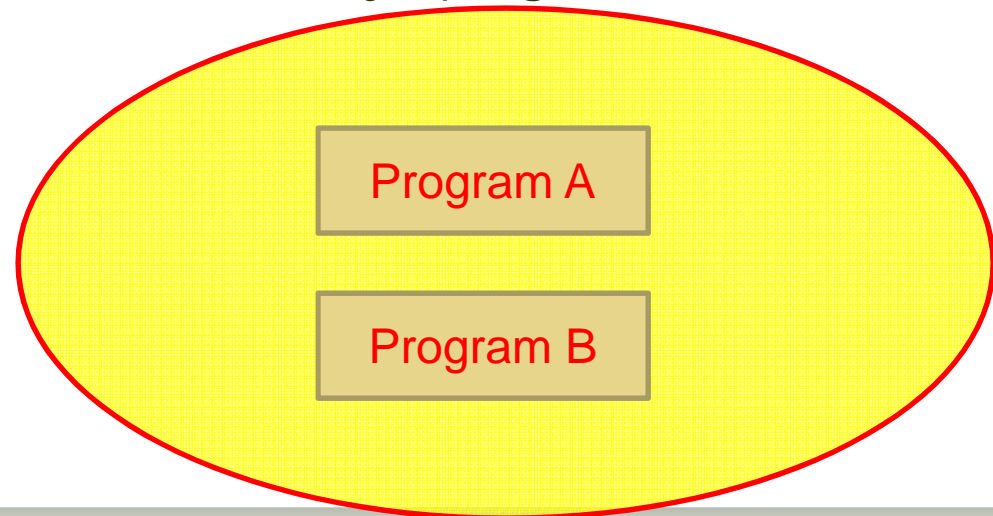
Why use Web Services?

- **SOA Layer**
 - Fancy term for modern program calls!
 - Parts are self defining and self documenting
 - Code is modular from the start
 - Facilitate the upgrade process

Yesterday's program call



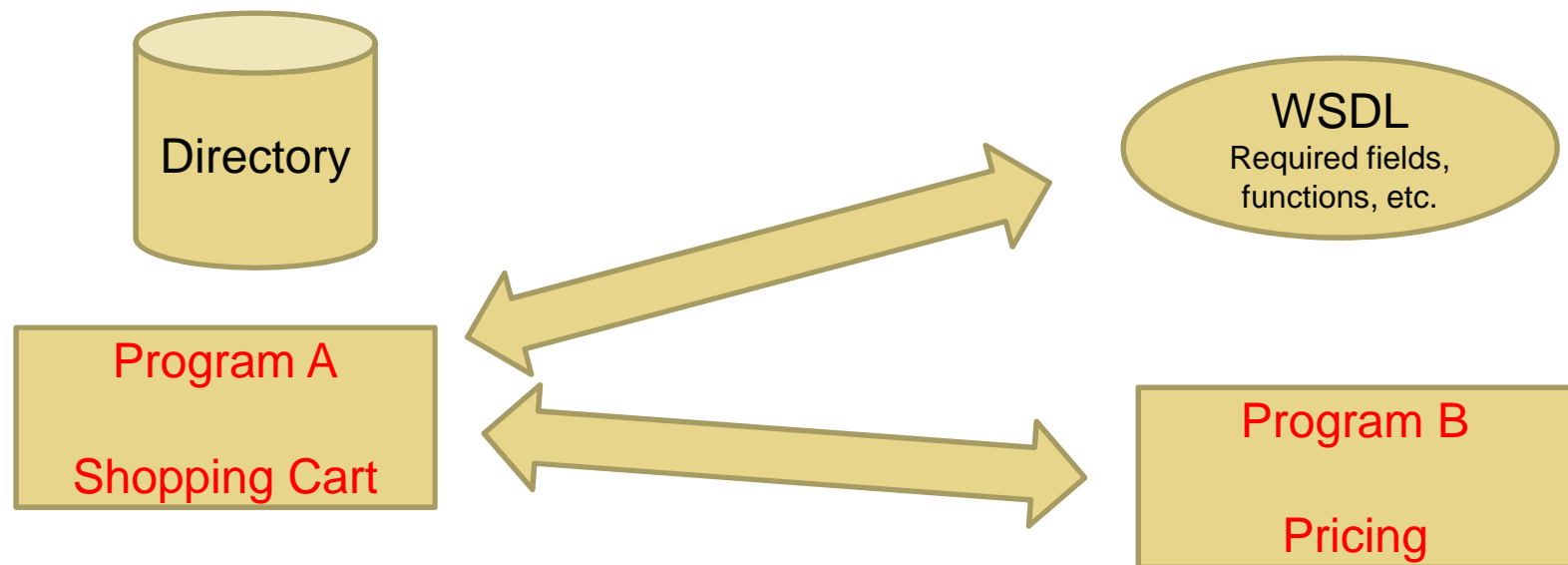
Today's program call



What are the components of Web Services?

- **Web Services Architecture**

- Server – Executes a function (Provision)
- Client – Requests a function (Consume)
- Directory – Lists the functions
- WSDL – Describes the function (XML)



Web services Setup

- **Got networking?**
 - Client i5 does not need public IP
 - Server i5 will need public IP, if using Internet as transport
 - Programmers, start to get to know your network admin!
 - DNS Rocks!
 - Check PHPinfo and Zend Core setup...

Web services Setup PHP info...

soap

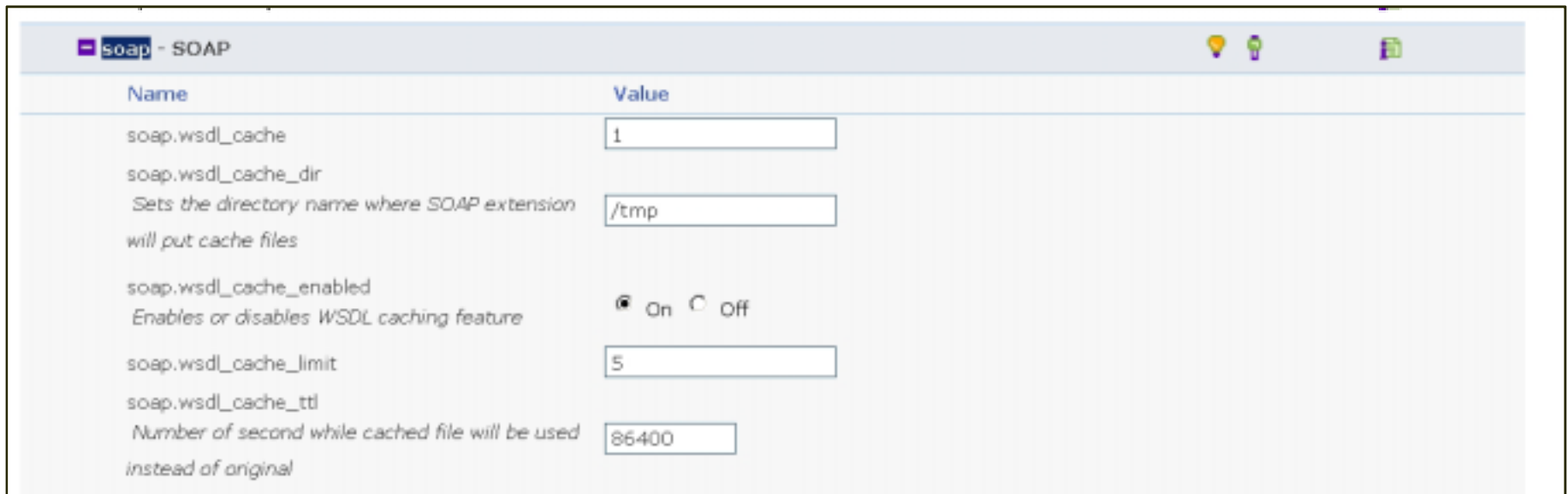
Soap Client	enabled
Soap Server	enabled

Directive	Local Value	Master Value
soap.wsdl_cache	1	1
soap.wsdl_cache_dir	/tmp	/tmp
soap.wsdl_cache_enabled	1	1
soap.wsdl_cache_limit	5	5
soap.wsdl_cache_ttl	86400	86400

Web services Setup Zend Core...

- **SOAP WSDL Cache**

- WSDL can be rather verbose
- Cached WSDL runs better
- Cache default is 1 day $((86400 / 60) / 60) = 24$ hours
- You can change default, turn on and off, control files location



The screenshot shows a configuration window titled "soap - SOAP". It contains a table with two columns: "Name" and "Value".

Name	Value
soap.wsd_cache	<input type="text" value="1"/>
soap.wsd_cache_dir <i>Sets the directory name where SOAP extension will put cache files</i>	<input type="text" value="/tmp"/>
soap.wsd_cache_enabled <i>Enables or disables WSDL caching feature</i>	<input checked="" type="radio"/> On <input type="radio"/> Off
soap.wsd_cache_limit	<input type="text" value="5"/>
soap.wsd_cache_ttl <i>Number of second while cached file will be used instead of original</i>	<input type="text" value="86400"/>

Sample PHP web service on IBM i



Objective...Complete web service

- **Browser in Chicago**
- **Client on i5 in California**
- **Server on i5 in Michigan**
- **WSDL automatically generated**
- **Generate basic information**

Flow of Web Service Application



First page

- **HTML only...**



The screenshot shows a web browser window with the following content:

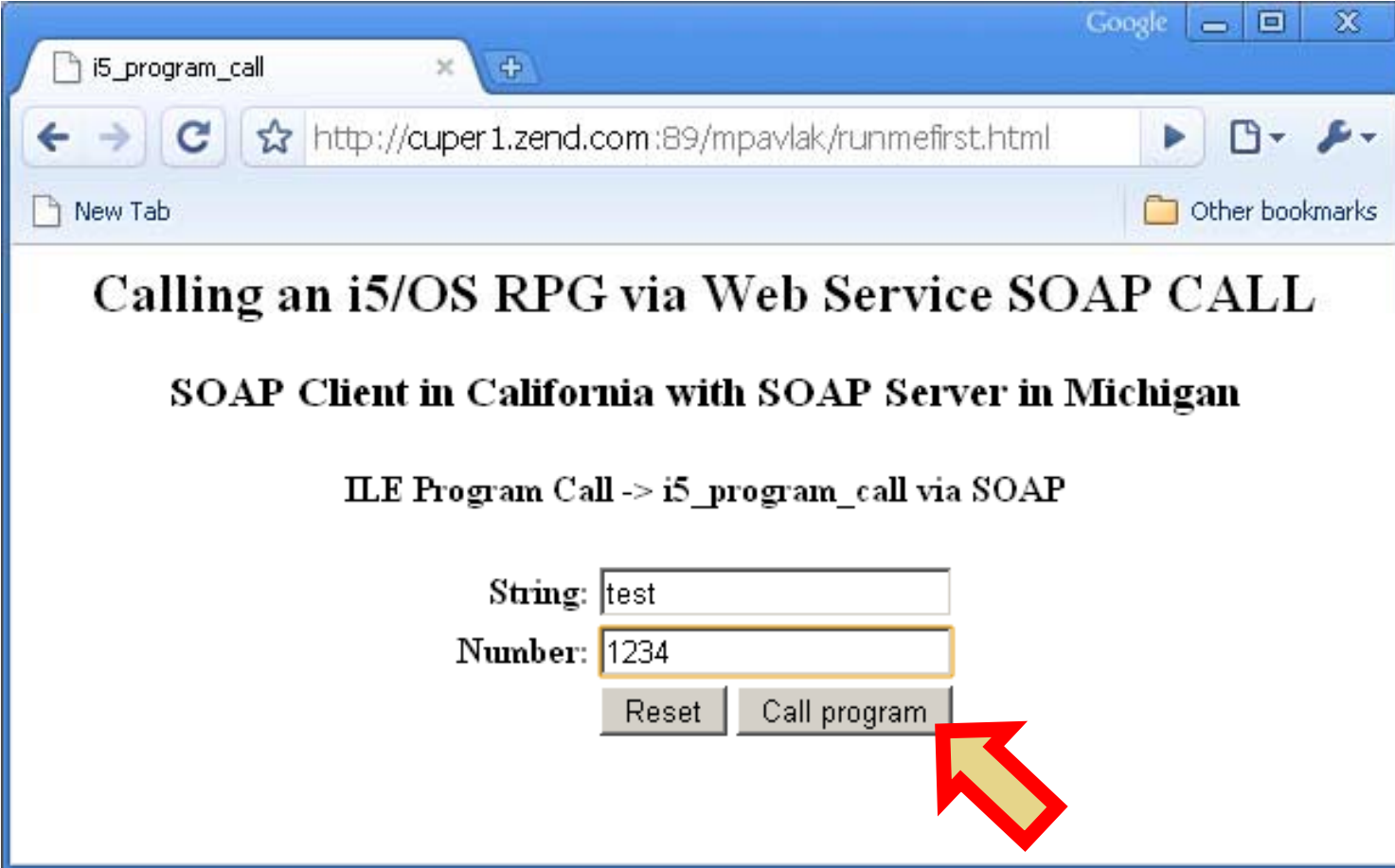
- Browser title: i5_program_call
- Address bar: http://cuper1.zend.com:89/mpavlak/runmefirst.html
- Page title: **Calling an i5/OS RPG via Web Service SOAP CALL**
- Subtitle: **SOAP Client in California with SOAP Server in Michigan**
- Text: **ILE Program Call -> i5_program_call via SOAP**
- Form fields:
 - String:
 - Number:
- Buttons:

HTML Code

```
<html><head><title>i5_program_call</title>
<link rel="stylesheet" type="text/css" href="php.css"></head>
<body><center><h2>Calling an i5/OS RPG via Web Service SOAP CALL</h2>
<h3>SOAP Client in California with SOAP Server in Michigan</h3>
<h4>ILE Program Call -> i5_program_call via SOAP</h4>
<form method="post" action="clientSOAPsimple.php">
<table border="0">
<tr>
<th align="right">String: </th>
<td><input type="text" name="MYstring"></td>
</tr>
<tr>
<th align="right">Number: </th>
<td><input type="text" name="MYnumber"></td>
</tr>
<tr>
<td colspan="2" align="right">
<input type="reset">
<input type="submit" value="Call program">
</td>
</tr></table></form></center></body></html>
```

First page

- **HTML only...**



The screenshot shows a web browser window with the following content:

- Browser title: i5_program_call
- Address bar: http://cuper1.zend.com:89/mpavlak/runmefirst.html
- Page title: **Calling an i5/OS RPG via Web Service SOAP CALL**
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- Text: **ILE Program Call -> i5_program_call via SOAP**
- Form fields:
 - String:
 - Number:
- Buttons:

A red arrow with a yellow center points to the "Call program" button.

Client SOAP of Web Services?

- **Three lines of code**
 - Runs on local machine in California
 - Invoked by HTML form
 - Object \$client WSDL (on remote machine...)
 - Result of method from object
 - Print it out!

Think DNS!

```
<?php
$client = new SoapClient("http://[redacted].com:89/nikey/newer.wsdl");
$res = $client->Joiner($_POST["MYstring"], $_POST["MYnumber"]);
print "\n\n\n\n" . $res;
?>
```

WSDL supports 5 elements

- **<binding>**
 - Supported protocols
- **<message>**
 - Request, response
- **<portType>**
 - Methods
- **<service>**
 - URI of Service (server)
- **<types>**
 - Data Types

WSDL: Web Services Descriptor Language

Part 1 of 2

```
<?xml version='1.0' encoding='UTF-8'?>

<!-- WSDL file generated by Zend Studio. -->

<definitions name="newer" targetNamespace="urn:newer" xmlns:typens="urn:newer"
  <message name="Joiner">
    <part name="a" type="xsd:string"/>
    <part name="b" type="xsd:string"/>
  </message>
  <message name="JoinerResponse">
    <part name="JoinerReturn" type="xsd:string"/>
  </message>
  <portType name="serverSOAPPortType">
    <operation name="Joiner">
      <documentation>
        This JOINER FUNC example joins CITY and SHORT ZIP
      </documentation>
      <input message="typens:Joiner"/>
      <output message="typens:JoinerResponse"/>
    </operation>
  </portType>
```

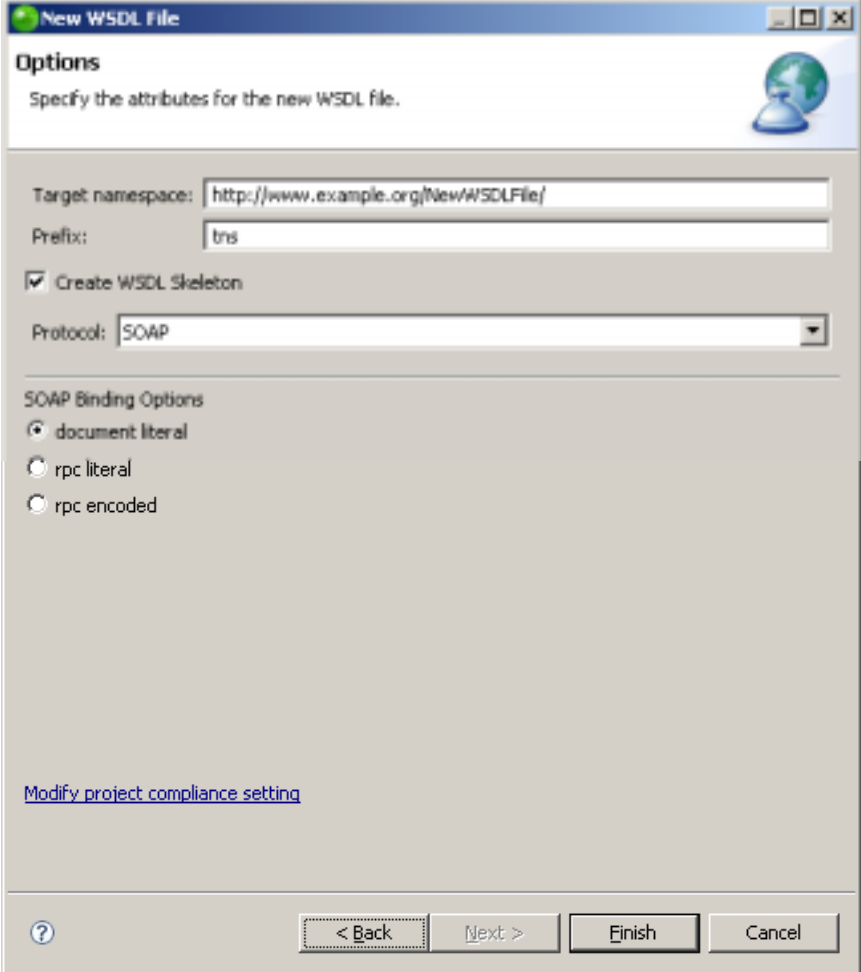
WSDL: Web Services Descriptor Language

Part 2 of 2

```
<binding name="serverSOAPBinding" type="typens:serverSOAPPortType">
  <soap:binding style="rpc" transport="http://schemas.xmlsoap.org/soap/http"/>
  <operation name="Joiner">
    <soap:operation soapAction="urn:serverSOAPAction"/>
    <input>
      <soap:body namespace="urn:newer" use="encoded" encodingStyle="http://schemas.xmlsoap
    </input>
    <output>
      <soap:body namespace="urn:newer" use="encoded" encodingStyle="http://schemas.xmlsoap
    </output>
  </operation>
</binding>
<service name="newerService">
  <port name="serverSOAPPort" binding="typens:serverSOAPBinding">
    <soap:address location="http://192.168.16.235:89/serverSOAP.php"/>
  </port>
</service>
</definitions>
```

WSDL: Let ZSEi5 do the heavy lifting!

- **Wizard in ZSEi5**
 - File → New → other
 - Web Service → WSDL
 - Select type of Service
 - Skeleton is built!
 - Helps if you understand web services
 - Like SDA to DDS...



The screenshot shows a dialog box titled "New WSDL File" with a sub-header "Options". The instructions say "Specify the attributes for the new WSDL file." The fields are filled with "http://www.example.org/NewWSDLFile/" for Target namespace and "tns" for Prefix. The "Create WSDL Skeleton" checkbox is checked, and the Protocol is set to "SOAP". Under "SOAP Binding Options", "document literal" is selected. At the bottom, there are buttons for "< Back", "Next >", "Finish", and "Cancel". A link "Modify project compliance setting" is also visible.

SOAP Server

```
<?php

/**
 * This JOINER FUNC example joins CITY and SHORT ZIP
 *
 * @param string $a
 * @param string $b
 * @return string
 */
function Joiner($a, $b) {

    // Connect
    $conn = i5_connect("localhost", "phpuser", "*****", array(I5_OPTIONS_INITLIBL => "PHPUSER"));
    if (!$conn)
        die("<br>Connection failed. Error number = " . i5_errno() . " msg = " . i5_errormsg());

    $description = array(
        array("name" => "SOMESTRING", "IO" => I5_INOUT, "Type" => I5_TYPE_CHAR, "Length" => "200"),
        array("name" => "SOMENUM", "IO" => I5_INOUT, "Type" => I5_TYPE_PACKED, "Length" => "15.5")
    );

    $pgm = i5_program_prepare("PHPUSER/A_CALL_RPG", $description);
    if (!$pgm)
        die("<br>Program prepare error. Error number = " . i5_errno() . " msg = " . i5_errormsg());

    $parmln = array("SOMESTRING" => $a, "SOMENUM" => (int)$b);

    $parmOut = array("SOMESTRING" => "SOMESTRING", "SOMENUM" => "SOMENUM");
}
```

RPG Program

```
F**-----FTP-MSG-----**
FPF FTPMSG O   E           K DISK
C* Main program
C*-----**
C   *ENTRY           PLIST
C                   PARM           Message           200
C                   PARM           Number1           15 5
C*
C                   MOVEL          *blanks           MSG           200
C*
C                   EVAL           FTPMSG = %trim(Message)
C                   WRITE          RFTPMSG
C                   EVAL           MSG = 'Record added to DB:'
C                   ADD            1           Number1
C                   DIV            2           Number1
C*
C                   Z-ADD          1           X           2 0
C                   EVAL           Message = %trim(MSG) + ' ' +
C                                   %SUBST(Message:X:4)
C*
C                   EVAL           *INLR = *ON
```

SOAP Server

```
$ret = i5_program_call($pgm, $parmln, $parmOut);

if (!$ret) {
    die("<br>Program call errno=".i5_errno()." msg=".i5_errormsg());
}

// Close program call
i5_program_close($pgm);

// Close connection
i5_close($conn);

    return "<b>RPG added the first four characters of the message to DB2:</b> $SOMESTRING <br/>"
        . " Sent two params in web service message it was = <b>" . $a . " " . $b . "</b>"
        . "<br><b>RPG calculation, incremented by 1 and div by 2:</b> $SOMENUM";
}

$server = new SoapServer("http://192.168.16.235:89/newer.wsdl");
$server->addFunction("Joiner");
$server->handle();

?>
```

Output of the Web Service



Proof it worked!

- **File Output on Server**
 - Server program
 - Each run write message
 - User different on target machine

```
.....1.....2.....3.....4.....5.....6
USER          FTPMSG
MIKEY        HelloWorld
MIKEY        Mikeywashere
MIKEY        anyone
MIKEY        jerry
MIKEY        Jerry
MIKEY        Bob
MIKEY        Bob
MIKEY        Bob
MIKEY        Bob
MIKEY        test
MIKEY        test
MIKEY        test
***** End of data *****
```

Resources...Don't skimp on education!

- **Books!**

- PHP 5 Unleashed (Coggeshall)
- Zend Studio for Eclipse User Guide
- Zend Core for i5/OS User Guide

- **Training**

- Zend Studio Training at Zend.com
 - Next class June 8, 2009

- **Internet**

- <http://www.php.net/manual/en/book.soap.php>
- <http://www.w3schools.com/soap/default.asp>

Thank you – mike.p@zend.com

Q&A

