



Web Services in Rhapsody

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Outline

- What are Web Services?
- IHE Profiles
- Web Services in Rhapsody
 - Host-based Web Services in Rhapsody
 - Utilizing the Rhapsody Web Service Client to connect to a Web service
- Communication Points, Operations and Parameters in Rhapsody
- IHE Toolkit
- Monitoring Web Services
- Web Services Demo

What are web services ?

- A method of communication that allows disparate systems to communicate
 - For example Windows and Unix
- Web services can be created regardless of the programming language
- Provides query/response or update services
- Rules for communication are defined in a WSDL
 - Encoded in XML
- Web Services have two uses
 - Reusable application-components
 - Connect existing software

Web Services Description Language (WSDL)

- Written in XML
- Used to describe and locate web services
- `http://localhost:8880/services/GetPatientID?wsdl`
- 5 major elements (can contain other elements)
 - `<types>`
 - `<message>`
 - `<portType>`
 - `<binding>`
 - `<Service>`

Operations

- Defined in the <port type> element
- 4 Types of Operations
 - One-way
 - Request-response
 - Solicit-response
 - Notification

WSDL Example Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions targetNamespace="http://localhost:8880/services/GetPatientID"
    xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy" xmlns:wsaw="http://www.w3.org/2006/05/addressing/wsdl"
    xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
    xmlns:ns0="http://localhost:8880/services/GetPatientID" xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
    xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/">
    <wsdl:documentation>Get Patient ID</wsdl:documentation>
    <types>
        <message>
            <portType>
                <binding>
                    <Service>
<wsp:Policy wsu:Id="servicePolicy" xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy" xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"><wsp:ExactlyOne><wsp:All><wsam:Addressing wsp:Optional="true" xmlns:wsam="http://www.w3.org/2007/05/addressing/metadata"><wsp:Policy><wsam:AnonymousResponses/></wsp:Policy></wsam:Addressing></wsp:All></wsp:ExactlyOne></wsp:Policy>
</wsdl:definitions>
```

WSDL Example <Type> Portion

```
<wsdl:types>
  <xsschema attributeFormDefault="unqualified" elementFormDefault="qualified" targetNamespace="http://localhost:8880/services/GetPatientID">
    <xselement name="GetpatientID">
      <xsccomplexType>
        <xsssequence>
          <xselement minOccurs="0" name="FirstName" type="xs:string"/>
          <xselement minOccurs="0" name="LastName" type="xs:string"/>
        </xsssequence>
      </xsccomplexType>
    </xselement>
    <xselement name="GetpatientIDResponse">
      <xsccomplexType>
        <xsssequence>
          <xselement minOccurs="0" name="PatientID" type="xs:string"/>
        </xsssequence>
      </xsccomplexType>
    </xselement>
    <xselement name="GetpatientIDFault">
      <xsccomplexType>
        <xsssequence>
          <xselement name="payload" type="xs:string"/>
        </xsssequence>
      </xsccomplexType>
    </xselement>
  </xsschema>
</wsdl:types>
```

WSDL Example <Message> Portion

```
<wsdl:message name="GetpatientIDRequest">
  <wsdl:part name="parameters" element="ns0:GetpatientID">
    </wsdl:part>
  </wsdl:message>
<wsdl:message name="GetpatientIDFault">
  <wsdl:part name="parameters" element="ns0:GetpatientIDFault">
    </wsdl:part>
  </wsdl:message>
<wsdl:message name="GetpatientIDResponse">
  <wsdl:part name="parameters" element="ns0:GetpatientIDResponse">
    </wsdl:part>
  </wsdl:message>
```

WSDL Example <PortType> Portion

```
<wsdl:portType name="GetPatientIDPortType" wsp:PolicyURIs="#servicePolicy">
    <wsdl:operation name="GetpatientID">
        <wsdl:documentation>GetpatientID</wsdl:documentation>
        <wsdl:input message="ns0:GetpatientIDRequest" wsaw:Action="urn:GetPatientID">
            </wsdl:input>
        <wsdl:output message="ns0:GetpatientIDResponse"
            wsaw:Action="http://localhost:8880/services/GetPatientID/GetPatientIDPortType/GetpatientIDR
            esponse">
            </wsdl:output>
        <wsdl:fault name="GetpatientIDFault" message="ns0:GetpatientIDFault"
            wsaw:Action="http://localhost:8880/services/GetPatientID/GetPatientIDPortType/GetpatientIDF
            ault">
            </wsdl:fault>
        </wsdl:operation>
    </wsdl:portType>
```

WSDL Example <Binding> Portion

```
<wsdl:binding name="GetPatientIDSoap12Binding" type="ns0:GetPatientIDPortType">
  <soap12:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
  <wsaw:UsingAddressing wsdl:required="false"/>
  <wsdl:operation name="GetpatientID">
    <soap12:operation soapAction="urn:GetPatientID" style="document"/>
    <wsdl:input>
      <soap12:body use="literal"/>
    </wsdl:input>
    <wsdl:output>
      <soap12:body use="literal"/>
    </wsdl:output>
    <wsdl:fault name="GetpatientIDFault">
      <soap12:fault name="GetpatientIDFault" use="literal"/>
    </wsdl:fault>
  </wsdl:operation>
</wsdl:binding>
```

WSDL Example <Service> Portion

```
<wsdl:service name="GetPatientID">
  <wsdl:port name="GetPatientIDHttpSoap12Endpoint"
binding="ns0:GetPatientIDSoap12Binding">
    <soap12:address
location="http://titakj2.galenhealthcare.com:8880/services/GetPatientID.GetPatientIDHttps
oap12Endpoint"/>
  </wsdl:port>
</wsdl:service>
```

Simple Object Access Protocol (SOAP)

- Provides xml based structure for managing communications
- Contains the following elements which are declared in the namespace
 - Envelope
 - Header
 - Body
 - Fault

Anatomy of a SOAP Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:pat="http://www.galenhealthcare.com/LookupPatientID">
  <soap:Header xmlns:wsa="http://www.w3.org/2005/08/addressing">
    <wsa:Action>urn:LookupPatientID</wsa:Action>
    <wsa:MessageID>messageid</wsa:MessageID>
  </soap:Header>
  <soap:Body>
    <pat:lookupPatientID>
      <pat:FirstName>Jamie</pat:FirstName>
      <pat:LastName>Titak</pat:LastName>
    </pat:LookupPatientID>
  </soap:Body>
</soap:Envelope>
```

Anatomy of a SOAP Response

```
<soapenv:Envelope xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope">
  <soapenv:Header xmlns:wsa="http://www.w3.org/2005/08/addressing">
    <wsa:RelatesTo>messageID<wsa:RelatesTo>
  </soapenv:Header>
  <soapenv:Body>
    <pat:LookupPatientID xmlns:pat="http://www.galenhealthcare.com/LookupPatientID">
      <pat:PatientId>1243534</pat:PatientId>
    </pat:LookupPatientID>
  </soapenv:Body>
</soapenv:Envelope>
```

Integrating the Healthcare Enterprise (IHE)

- Non-profit solving the problem on how to cost effectively implement regional integration between healthcare systems
- Promotes the coordinated use of established standards such as DICOM and HL7
- Domains
 - Anatomic Pathology, Cardiology, Dental, Eye Care, IT Infrastructure, Laboratory, Patient Care Coordination, Patient Care Devices, Pharmacy, Quality, Research and Public Health, Radiation Oncology, Radiology
- Integration Profiles
 - Describe specific solutions to integration problems and can be used as an implementation guide
- Example Profile: Patient Demographic Query (PDQ)
 - Allows applications to query a central patient information server and retrieve a patient's demographic and visit information
- Resources
 - <http://www.ihe.net>
 - <http://wiki.ihe.net>

Web Services in Rhapsody

- Rhapsody provides an easy-to-use interface for harnessing Web services, Independent of
 - Whether the Web service is hosted by Rhapsody
 - Whether Rhapsody uses an external Web service.
- Vendors can exploit Rhapsody's secure Web services for application integration
- Supports SOAP/WSDL as a host and client
- Provides a limited set of REST-based operations

Web services in Rhapsody Continued

- Web Services are created and managed utilizing the Web Services Management dialog in the IDE environment
- Activity and state of web services may be monitored utilizing the Monitoring / Web Services item in the Web Management Console.
- IHE toolkit to implement IHE profiles
- Web Service Host hosts web services whereas the Web Service Client connects to web services



Web Service
Client



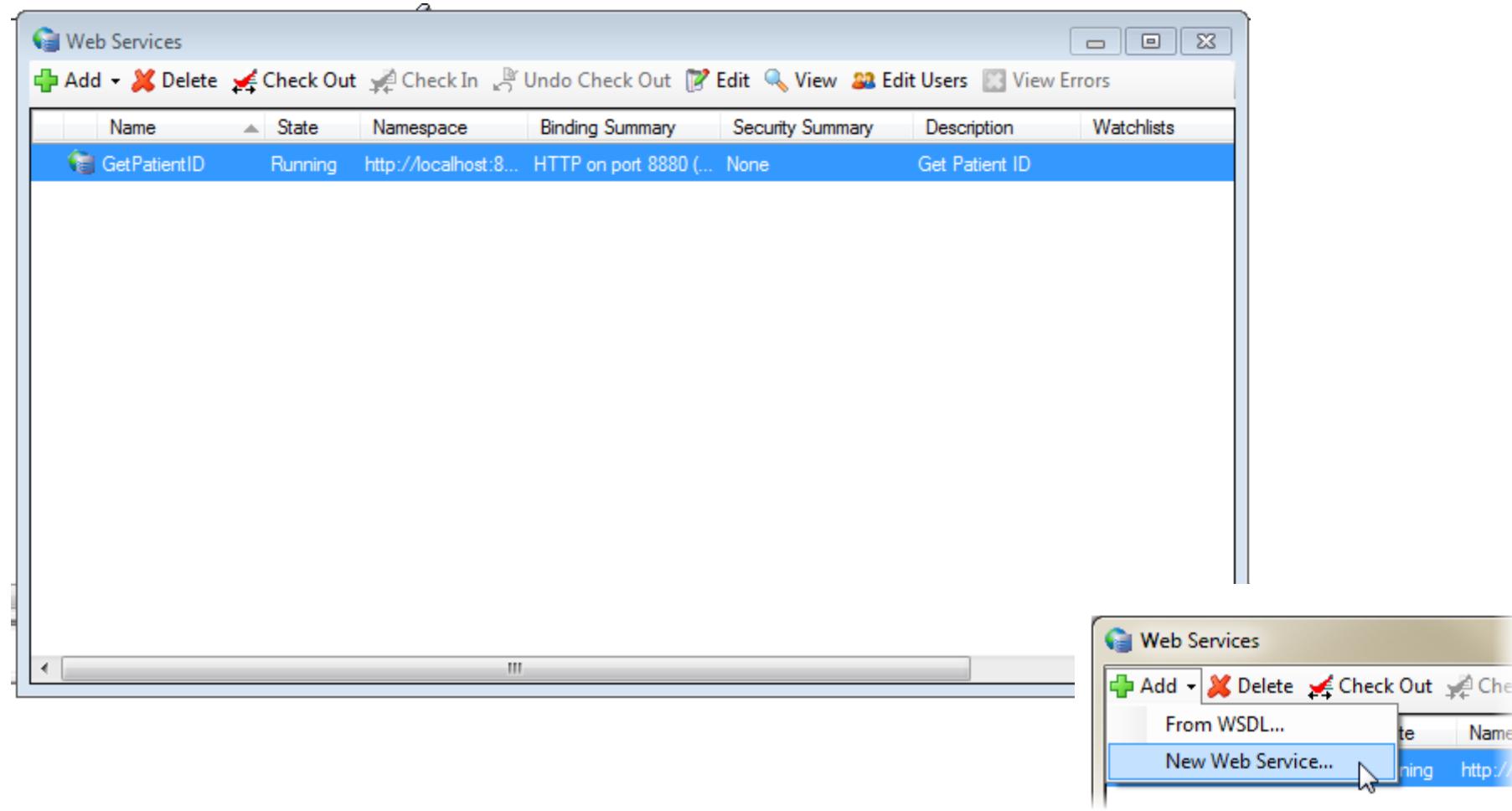
Web Service
Hosting

vitalcenter



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Hosted Web Services



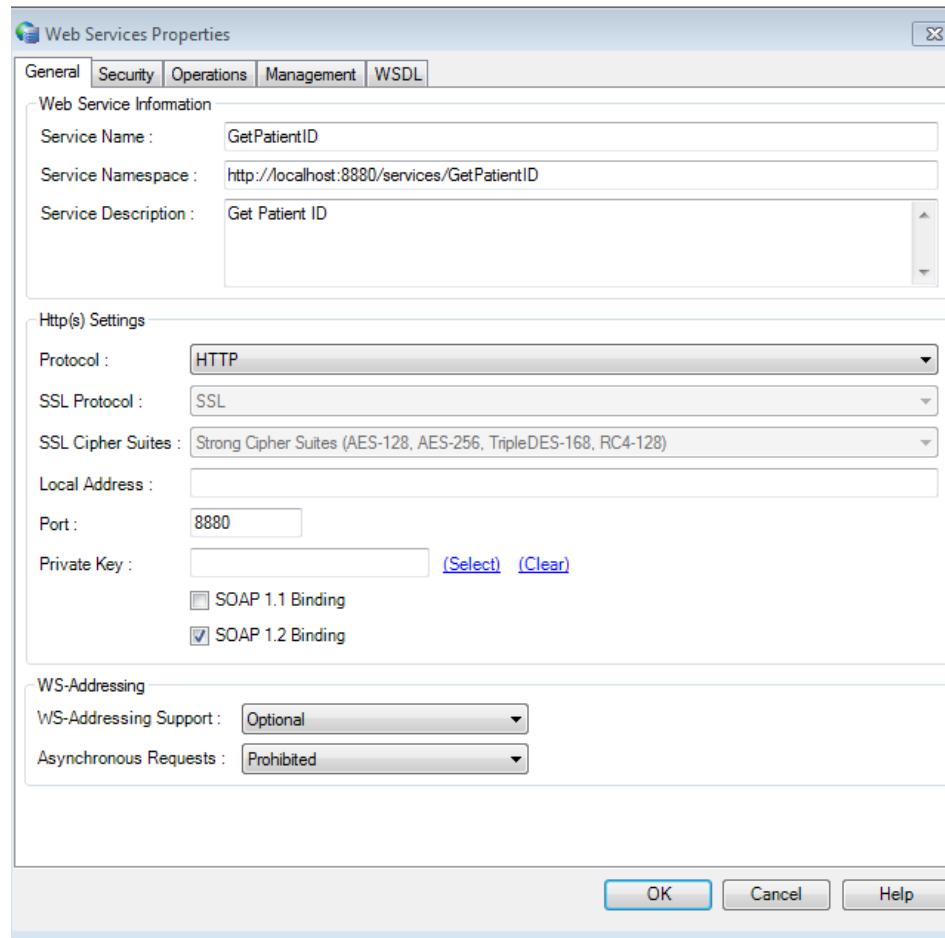
The screenshot shows a Windows application window titled "Web Services". The main menu bar includes "File", "Edit", "View", "Tools", "Help", and "About". Below the menu is a toolbar with icons for "Add", "Delete", "Check Out", "Check In", "Undo Check Out", "Edit", "View", "Edit Users", and "View Errors". A table lists the details of a single service:

Name	State	Namespace	Binding Summary	Security Summary	Description	Watchlists
GetPatientID	Running	http://localhost:8...	HTTP on port 8880 (...)	None	Get Patient ID	

At the bottom of the application window, there is a status bar with the text "III".

A secondary window titled "Web Services" is visible at the bottom right, showing a dropdown menu for "Add" with the option "New Web Service..." highlighted.

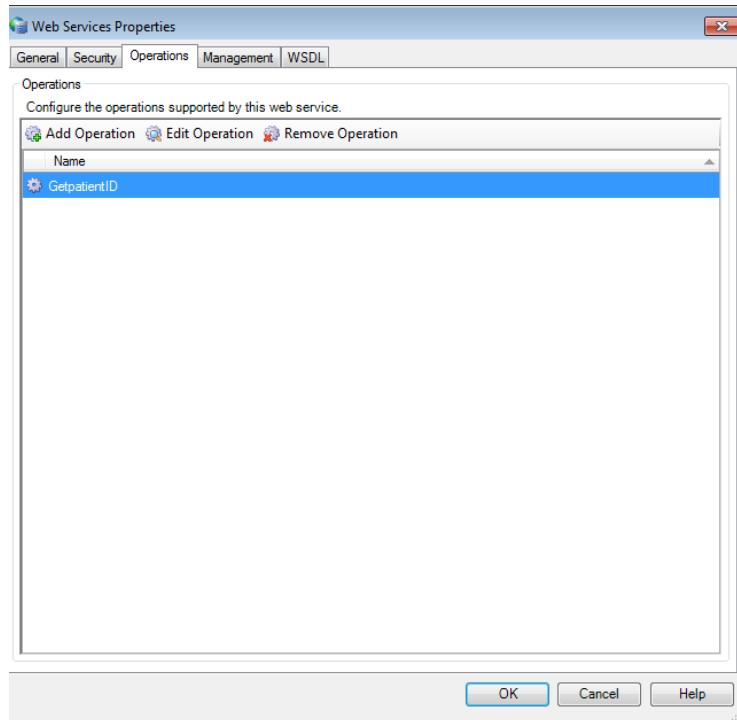
Rhapsody Web Services Properties for Web Service Hosting



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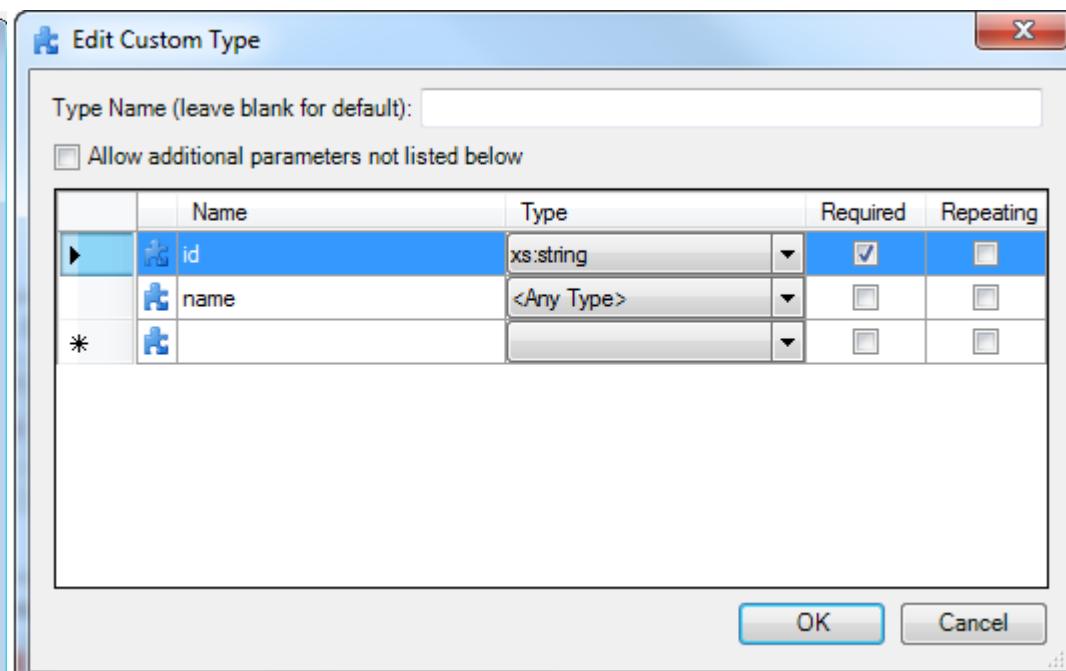
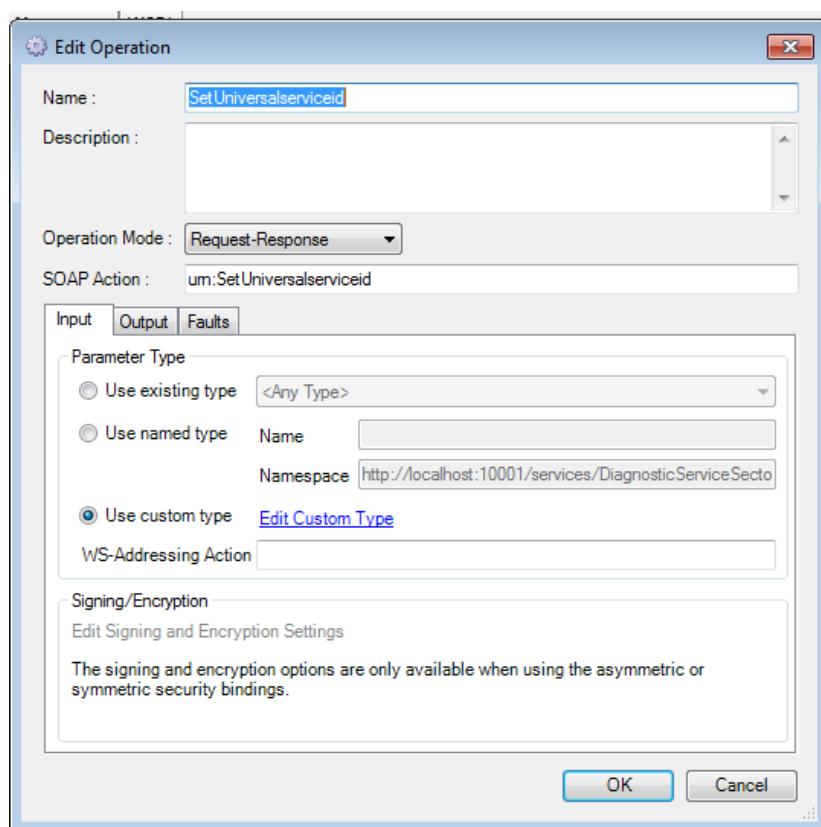
Edit Operations for Web Service Hosting



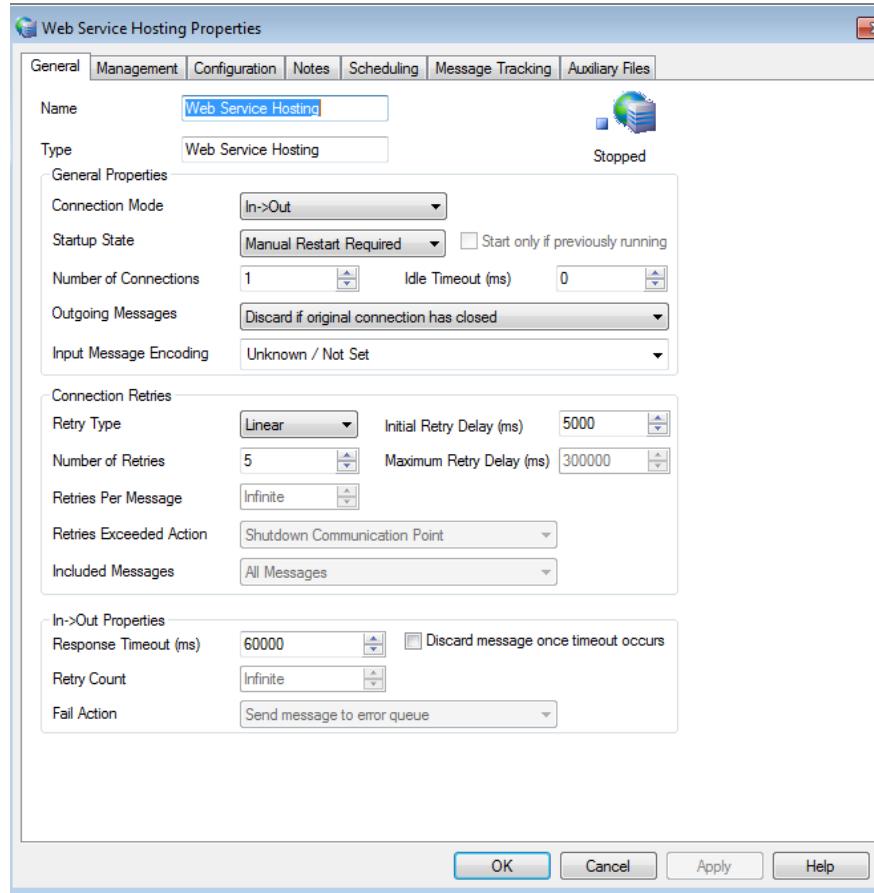
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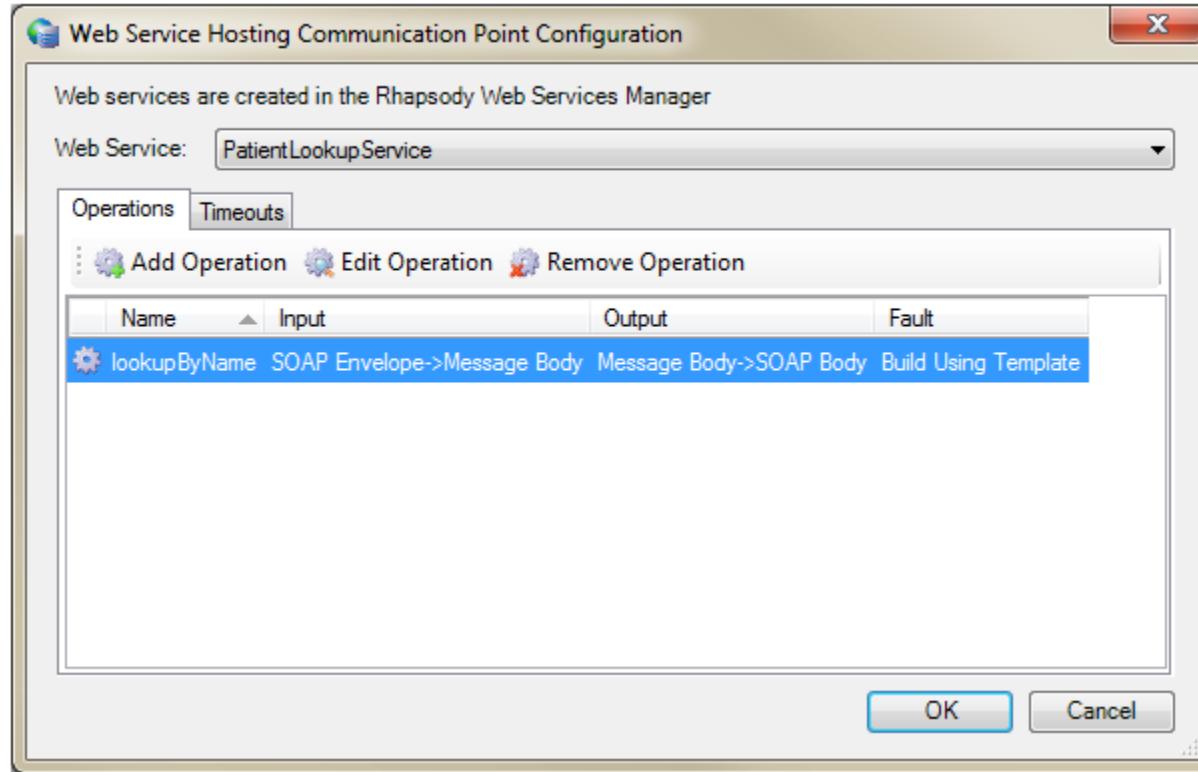
Edit Parameters for Web Service Hosting



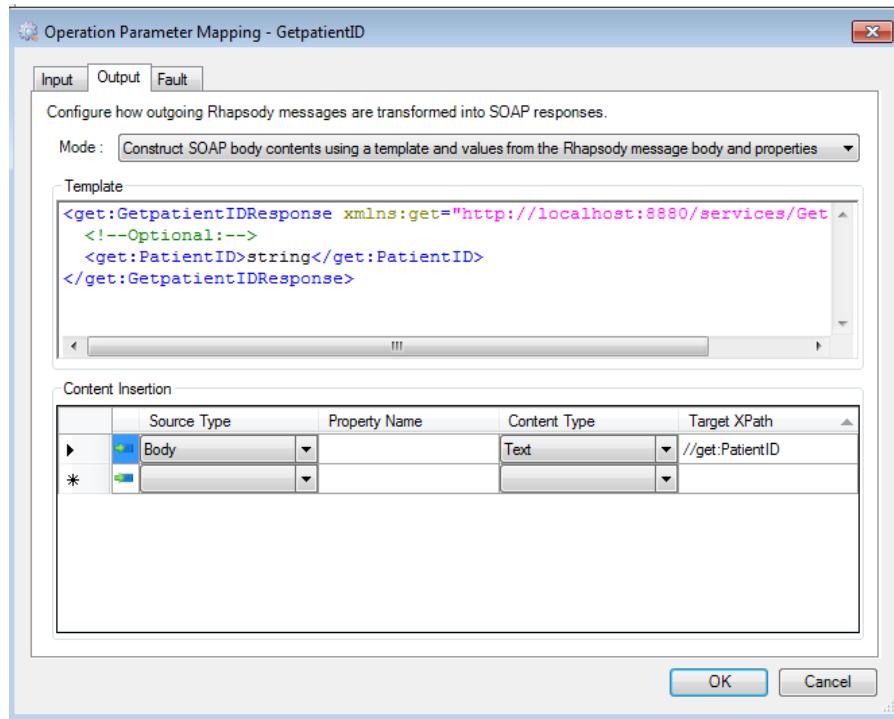
Communicating with Web Services (Host Web Service communication point)



Edit Operation for Web Service Hosting Communication Point



Edit Parameters for Web Service Hosting Communication Point



Communicating with Web Services (Web Service Client)

Top-down approach

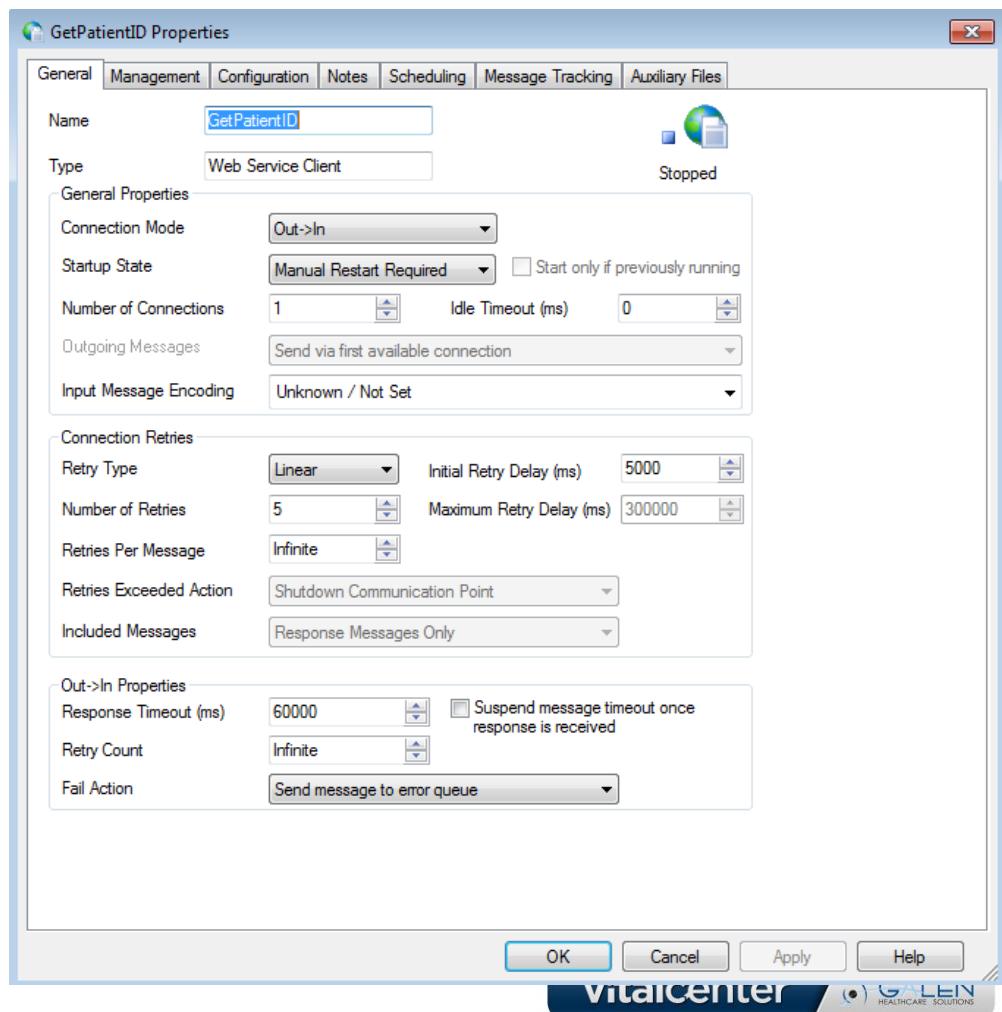
- Uses an existing Web Services Description Language (WSDL).
- The WSDL is imported and is used to generate the Web service configuration.
You can then modify the configuration, and your changes will be reflected in the WSDL that is hosted by Rhapsody.

Bottom-Up approach

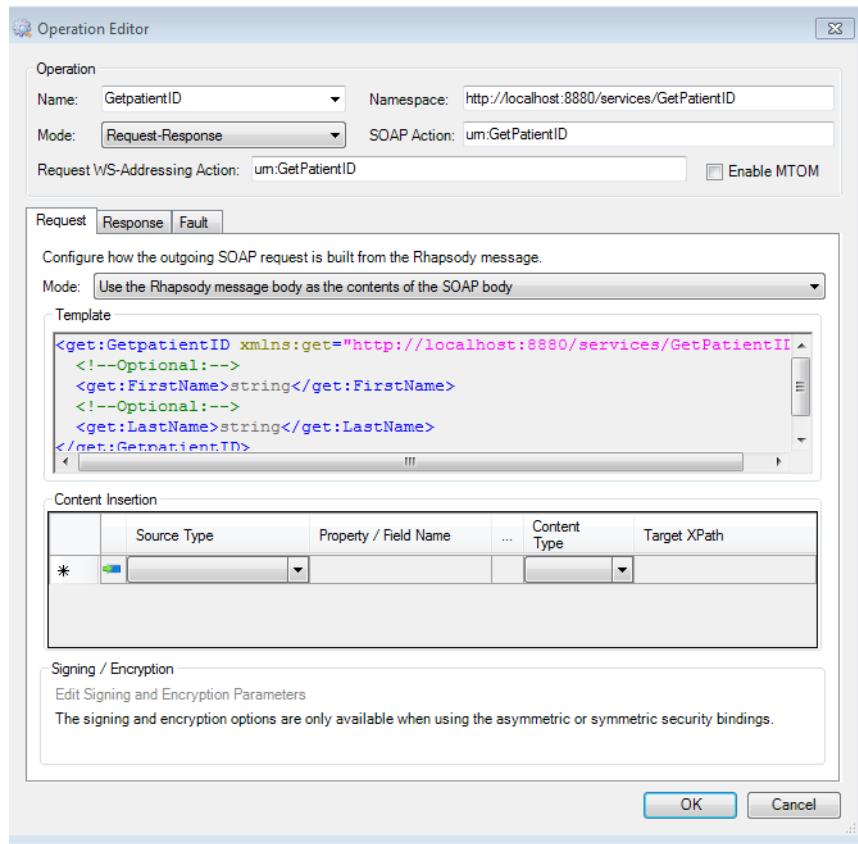
- The bottom-up approach does not require a WSDL.
- Instead you create a new Web service, and configure all the settings manually.
- We recommend this approach when exposing an existing Rhapsody route as a Web service.

Web Services Client Configuration

- Connects to Web Services hosting by WSDL or by manually configuring the settings
 - General Settings
 - Operations
 - In-Only
 - Request-Response
 - Endpoint



Edit Operations for Web Services Client



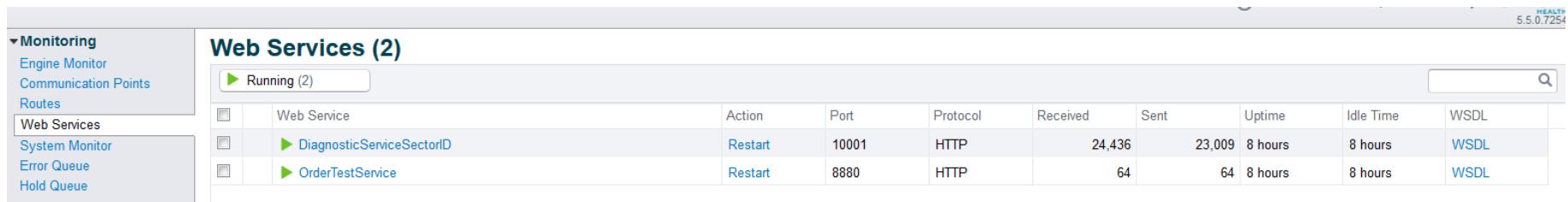
IHE Toolkit

- Optional add-on to Rhapsody 5, which simplifies the understanding and implementation of IHE-based regional integration efforts
- The IHE Toolkit includes:
 - Five new filters and one new communication point
 - Sample configurations showing the usage of typical IHE scenarios
 - Documentation explaining IHE
- Allows users to rapidly IHE enable your products or network without costly development or needing to understand the complexity of IHE specifications
- Keep up to date with the latest healthcare standards with new versions of the IHE Toolkit

IHE - XDR Recipient
IHE - XDS Consumer
IHE - XDS On Demand Document ...
IHE - XDS Repository
IHE - XDS/XDR Source

Monitoring Web Services in Rhapsody

- Monitor web services in web management console
- Access to WSDL
- Start/Stop Webserver
- Messages Sent and Received
- How long the Web service has been idle



The screenshot shows the Rhapsody web management console interface. On the left, there's a navigation sidebar with sections like 'Monitoring', 'Engine Monitor', 'Communication Points', 'Routes', 'Web Services' (which is currently selected), 'System Monitor', 'Error Queue', and 'Hold Queue'. The main content area is titled 'Web Services (2)' and shows a table with two rows of data. The columns are: Action, Port, Protocol, Received, Sent, Uptime, Idle Time, and WSDL. The first row shows 'Restart' at port 10001 with HTTP protocol, 24,436 received, 23,009 sent, 8 hours uptime, and 8 hours idle time, with a 'WSDL' link. The second row shows 'Restart' at port 8880 with HTTP protocol, 64 received, 64 sent, 8 hours uptime, and 8 hours idle time, also with a 'WSDL' link. A search bar is located at the top right of the main table area.

Action	Port	Protocol	Received	Sent	Uptime	Idle Time	WSDL
Restart	10001	HTTP	24,436	23,009	8 hours	8 hours	WSDL
Restart	8880	HTTP	64	64	8 hours	8 hours	WSDL

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DEMO

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Embrace the new world of healthcare



For the Galen take on industry news, EHR developments, interesting solutions we have developed, and new Galen products check out our blog...

A screenshot of the Galen Healthcare Solutions blog homepage. At the top, there's a navigation bar with the Galen logo, the slogan "embrace the new world of healthcare", and a "blog" link. To the right of the blog link are links for "Wiki", "VitalCenter", "Galen Healthcare Solutions", and a search bar. The main content area features a post titled "The Three Types of Organizations that Need New EHRs" by Christopher.Libby. The post includes a summary, a pie chart showing the distribution of Medicare Registrants (43%) and Unregistered Professionals (38%), and a sidebar with a "Sign up" form, a search bar, and a "Tags" section.

The Three Types of Organizations that Need New EHRs

Posted by Christopher.Libby on February 18, 2013 under Business Intelligence, Data Conversion, Electronic Health Record, General, Healthcare IT, Implementations, Industry News, Meaningful Use, Uncategorized Edit

The era of electronic health records has arrived and opportunities for innovative uses of data are plentiful for providers and vendors alike. Fueled by financial incentives from the government as well as meaningful use requirements, organizations that best position their data to help providers deliver patient centered care will flourish. Physician organizations are also becoming larger through growth, acquisitions, and mergers. These growth milestones provide organizations opportunities to reflect on the capabilities of their current medical record system in order to decide if their current system will keep them competitive in the future. These are the three types of organizations that will be purchasing a new Electronic Health Record (EHR) system in 2013.

The New EHR Adopter

A pie chart divided into two segments. The left segment is light blue and labeled "Unregistered Professionals 38%". The right segment is dark blue and labeled "Medicare Registrants 43%".

Buying a new EHR is not cheap which may explain why many smaller physician practices have held out on the investment as long as they could. Only around 20% of providers are attesting to Meaningful Use in the US. However, government mandates and incentives are forcing providers to overcome their resistance to EHRs. While larger practices initially lead the charge into the digital

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Thank you for joining us today, for additional assistance....

You can contact us through our **NEW** website at
www.galenhealthcare.com

A screenshot of the galenhealthcare.com website. The page features a header with the GALEN logo, navigation links for Blog, Wiki, Webcasts, Forum, and a search bar. A main banner image shows two healthcare professionals in profile. On the left, a sidebar contains sections for VitalCenter™ (with a brief description), BLOG (listing "Creating and Applying Custom Hold For Reasons"), WIKI (listing "eCalcs – Integrated Health Calculators"), EVENTS / WEBCASTS (listing "February 20, 2013 2:00 pm - 3:30 pm Rhapsody – Introduction to the Rhapsody Integration Engine"), and DEVELOPER FORUM. The right side of the page has a "Welcome to the NEW galenhealthcare" message and a "Contact Us" form. The "Contact Us" form is highlighted with a red border and a red oval around the "Contact Us" button. The form fields include First Name*, Last Name*, Company*, Phone*, Email*, City*, State/Province*, Product/Service Interest (with options for Technical Services, Project Management, Implementations, VitalCenter™, and Other), and a Details text area. At the bottom, there is a "vitalcenter" badge and the GALEN logo.