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WebSphere DataPower SOA Appliance: The XML Management Interface

- Appliance Management Protocol (AMP) configuration examples
- SOAP Configuration Management (SOMA) examples
- Debugging tips and common errors

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Redpaper

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Contents

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Preface

The XML Management Interface is the third way to configure and administer the WebSphere® DataPower® SOA Appliance. The other two are the WebGUI and the CLI.

The DataPower device® can be completely configured and managed through the XML Management Interface. If enabled, this interface allows administrators to send status and configuration requests to the DataPower appliance through a standard SOAP interface, using SOAP messages. The Appliance Management Protocol (AMP) is a series of commands developed after SOAP. AMP is simple to use and is independent of any firmware version, thereby providing a generalized way of managing the appliance.

This interface requires the HTTPS protocol for all communication. By default, the interface acts as a Secure Sockets Layer (SSL) server, using the default system keys that come with the device. These keys are the same keys that are used for the WebGUI and Secure Shell (SSH) interface (such as a Command Line Interface (CLI)). If desired, administrators can employ their own keys.

Chapter 1 explains the different flavors of the XML Management Interface (AMP, SOAP Configuration Management, SOAP Configuration Management v2004, WSM, WSDM, UDDI, SLM). The chapter also describes how to enable and configure the XML Management Interface by using the WebGUI, how to activate it using the CLI, and how to send the SOAP-Requests to the device.

Chapter 2 shows the most common requests that can be sent to the XML Management Interface of the DataPower device, focusing on the Appliance Management Protocol (AMP) service.

Chapter 3 shows the most common requests that can be sent to the XML Management Interface of the DataPower device, focusing on the SOAP Configuration Management service.

Chapter 4 explains ways to debug your requests and shows the most common mistakes that are made.

IBM® WebSphere DataPower SOA Appliances represent an important element in the IBM approach to Service Oriented Architecture (SOA). IBM SOA appliances are purpose-built, easy-to-deploy network devices that simplify, help secure, and accelerate your XML and Web services deployments while extending your SOA infrastructure. This Redpaper assumes familiarity with the general use of DataPower. For more information, see “Related publications” on page 39 or visit the following Web page:

http://www.ibm.com/software/integration/datapower/index.html

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1

The Basics

The XML Management Interface of the DataPower appliance can be set up for different endpoints:

- Appliance Management Protocol (AMP)
- SOAP Configuration Management (SOMA), and SOAP Configuration Management v2004, an established version of the current SOAP Configuration Management
- Web Service Management (WS-Management or WSM)
- Web Services Distributed Management (WSDM)
- Service level monitoring (SLM)
- Universal Description Discovery and Integration (UDDI)

This paper focuses on the AMP and SOAP Configuration Management endpoints.

1.1 Overview of the XML Management Interface

Although this paper focuses on AMP and SOAP (SOMA), this section also describes WSM, WSDM, SLM, UDDI, and their URIs.

1.1.1 Appliance Management Protocol (AMP)

When setting up the Appliance Management Protocol (AMP) endpoint on the XML Management Interface, a multi-box management for automated administration processes can be implemented. The URI for the AMP endpoint is:

```
/service/mgmt/amp/1.0
```

1.1.2 SOAP Configuration Management (SOMA)

By using the implemented SOAP Management, the device can be administered using SOAP XML requests and responses. As mentioned previously, the device offers a legacy version of the SOAP Interface, SOAP v2004. This version is no longer updated and should only be used for earlier applications. The URI for the current version is:

```
/service/mgmt/current
```

The URI for SOAP v2004 is:

```
/service/mgmt/2004
```

Note: The examples shown in this Redpaper use SOAP Configuration Management, not SOAP Configuration Management (v2004). SOAP Configuration Management (v2004) has stricter rules, and therefore some of the examples shown in this paper will not work.

For more information, refer to the SOAP Interface in the WebGUI Guide, located at:

http://www-1.ibm.com/support/docview.wss?rs=2362&uid=swg24014405

1.1.3 WebService-Management (WSM)

Configuring WebService-Management (WSM) on the XML Management Interface exposes management status data using WS-Management semantics. The URI for the WSM service is:

```
/service/ws-management
```

1.1.4 Web Services Distributed Management (WSDM)

Enabling the Web Services Distributed Management (WSDM) endpoint handler displays management status data using WSDM semantics. It also supports collection and reporting of WSDM statistics for Web Service Proxy (WS Proxy) hosted Web services. The URI for the WSDM service is:

```
/service/wsdm-10
```

For more information about this service, refer to the WSDM Interface in the WebGUI Guide.

1.1.5 Service Level Monitoring (SLM)

Another multi-box management option that comes with the DataPower XML Management Interface is Service Level Monitoring. SLM is a proprietary protocol for exchanging real time transaction monitoring and statistics. The URI for addressing the SLM endpoint is:

```
/service/slm/datashare/1.0
```

The SLM protocol is used to communicate SLM data between appliances and is not a public Web service.

1.1.6 Universal Description Discovery and Integration (UDDI)

If the Universal Description Discovery and Integration (UDDI) subscription is enabled on the XML Management Interface, the device displays a UDDI subscription listener Web service. This service endpoint must be configured in the UDDI registry as the subscription's service endpoint. Any number of subscriptions may use this endpoint. This endpoint processes subscription updates for all domains. The URI for the UDDI subscription endpoint is:

```
/service/uddi-subscription
```

1.2 XML Management Interface endpoints

The endpoints in the XML Management Interface, their URIs, and how they are used are listed in Table 1-1.

Table 1-1 XML Management Interface endpoints

Endpoint	URI	Usage
SOAP Configuration Management	/service/mgmt/current	Precede AMP and could be affected by differences in subsequent firmware versions. Despite of this it allows easy manipulation of custom configuration and provides simple yet flexible automation means. It has a much finer granularity than AMP.
SOMA v2004	/service/mgmt/2004	Legacy version of SOMA. Not longer updated. Supported for backward compatibility.
WSM	/service/ws-management	WS-Management provides the possibility to access and exchange management information.
WSDM	/service/wsdm-10	WSDM is a standard to monitor the status of other services.
AMP	/service/mgmt/amp/1.0	AMP was developed to address several shortcomings of the existing SOMA interface. It is firmware version independent and thereby provides a generalized way of managing the appliance.
SLM	/service/slm/datashare/1.0	SLM offers the possibility to define, monitor and improve services.
UDDI	/service/uddi-subscription	UDDI is a platform-independent registry to publish service listings and define how services interact with each other.

1.3 Setting up using the WebGUI

To enable the XML Management Interface of your DataPower device:

1. Using an administrator account, log in to the default domain on your DataPower device.

2. From the navigation bar, choose **Network** → **Management** → **XML Management Interface**. A configuration window opens, as shown in Figure 1-1.

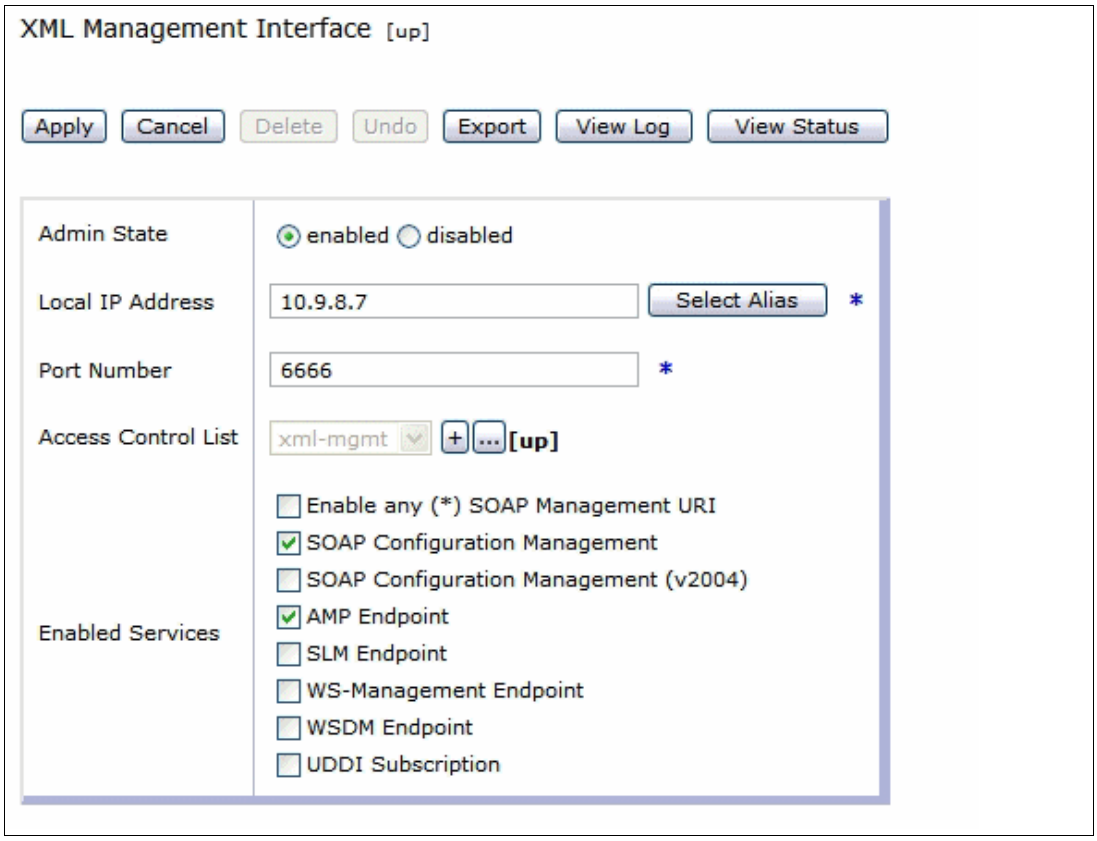

Figure 1-1 XML Management Interface configuration window

3. Set the **Local IP Address** or use an alias instead.
4. Set the **Port Number** on which you want the XML Management Interface to run.
5. Set up an **Access Control List** (ACL) to prevent unauthorized access to your DataPower XML Management Interface.

   To define an ACL:

   a. Click the **+** (plus sign) button.

      The Access Control List configuration window opens to the **Main** panel, as shown in Figure 1-2 on page 5.

Figure 1-2 Access Control List configuration window

b. Enter an ACL name in the **Name** field. For example, enter `MyACL`.

c. Set the **Admin State** to `enabled`.

d. Click **Entry** in the navigation bar at the top.

e. Set up your ACL to allow or deny specific **IP-Address-Ranges**.

   The IP address format must be in slash notation, for example `1.2.3.4/24` if your subnet mask is 255.255.255.0 or `/32` for a single client.

   By allowing one IP address or subnet, all other subnets and IP addresses will be denied.

6. Click Save.

   The entry now appears in the Entries-List.

7. Repeat the steps until the ACL is completed.

   The **Enabled Services** section allows controlling of the various services running on the XML Management Interface. This Redpaper focuses on the SOAP Configuration Management and the Appliance Management Protocol (AMP) endpoint.

   Important: Never activate the check box **Enable any (*) SOAP Management URI**. Activating it could lead to problems using SOAP Management (SOMA), because any URI is accepted by the device. What can happen is that the device uses the SOAP v2004 specifications instead of the current SOAP Management implementation, which might cause trouble with the requests sent to the box. For example, they could be rejected although they are valid.

8. Activate the check boxes for SOAP Configuration Management and AMP endpoint.
9. Apply your changes.
10. Save your configuration.

1.4 Setting up by using the Command Line Interface

To enable the XML Management Interface of your DataPower device, use the following CLI commands:

```
Xi50# configure terminal
Xi50(config) # xml-mgmt
```

```
Xi50(config xml-mgmt) # local-address X.X.X.X
Xi50(config xml-mgmt) # port XXXX
Xi50(config xml-mgmt) # mode amp+soma
Xi50(config xml-mgmt) # admin-state enabled
Xi50(config xml-mgmt) # exit
Xi50(config) # write memory
Overwrite previously saved configuration [y/n] yes
```

Figure 1-3 shows an example of using the CLI commands.

```
Welcome to DataPower XI50 console configuration.
(C) 1999-2008 by DataPower Technology, Inc.

Version: XI50.3.6.0.33 build 159353 on 2008/07/28 10:30:01
Serial number: 00406 20899

xi50# configure terminal
Global configuration mode
xi50(config)# xml-mgmt
Modify XML Management Interface configuration
xi50(config xml-mgmt)# local-address 10.9.8.7
xi50(config xml-mgmt)# port 6666
xi50(config xml-mgmt)# mode amp+soma
xi50(config xml-mgmt)# admin-state enabled
xi50(config xml-mgmt)# exit
xi50(config)# write memory
Overwrite previously saved configuration [y/n]? yes
```

Figure 1-3 Setting up the XML Management Interface by using the CLI

To enable the other services on the XML Management Interface, add any of the following abbreviations to the **mode** command by prefacing each with a **+** (plus sign):

`any`	Configures the XML Management Interface to listen on any URI
`slm`	Configures the XML Management Interface for Service Level Monitoring
`uddi`	Enables the UDDI-Subscription on the XML Management Interface
`v2004`	Configures the XML Management Interface using the earlier version of SOMA
`wsdm`	Enables Web Service Distributed Management
`wsm`	Enables WebService Management

For example, to enable all services use the following CLI command:

```
Mode amp+soma+any+slm+uddi-subscription+v2004+wsdm+wsm
```

1.5 How to send requests to the XML Management Interface

After the XML Management Interface is configured and is up and running, you can send your request by using the command line tool, **`curl`**.

In Windows®, you can use Cygwin, which is a freeware Linux®-like environment for Windows. You can download it from the official Web site:

`http://cygwin.com/setup.exe`

A production system would likely use another XML or SOAP client. However, **`curl`** also has a native Win32® version.

In this Redpaper, the **curl** command is used to address the management endpoint of the XML Management Interface.

The following example shows a request **curl** command with options:

```
curl –k –u user:password –d @myRequestFile.xml
https://DataPowerIP:Port/EndpointURI
```

Options for the **curl** command are:

k Allows connections to SSL sites without cert.

u Specifies the user and password.

d Indicates HTTP post data

@ Specifies the file that is sent to the XML Management Interface followed by the address of the DataPower device, the port the XML Management is running on and the Endpoint URI, explained in section 1.1, “Overview of the XML Management Interface” on page 2.

Note: Note that the XML Management must be called using HTTPS (not HTTP). Make sure the final *S* is on HTTPS.

Figure 1-4 shows an example of entering the command.

```
Rolf@CL3KMY00 ~
$ curl -k -u user:password -d @myRequestFile.xml https://DataPowerIP:Port/EndPo
intURI
```

Figure 1-4 Sending a curl request

2

Appliance Management Protocol (AMP)

This chapter describes the Appliance Management Protocol (AMP) and provides examples of commands to administer your DataPower appliance.

2.1 What is AMP?

The Appliance Management Protocol (AMP) is a series of commands that were developed to address several shortcomings of the existing SOMA interface. The structure is simple and should be easy to understand. It is independent of a firmware version and thereby provides a generalized way of managing the appliance.

The Web Service Definition Language (WSDL) and schema files, with all operations and actions that can be performed with AMP, are stored on the device. Although this Redpaper provides several examples, to view additional file examples, select:

Control Panel → File Management → Store

In that location, the example files to look at are:

- store:///app-mgmt-protocol.wsdl
- store:///app-mgmt-protocol.xsd

2.2 Configuration examples

Send AMP requests to a specific address, such as:

`https://DataPowerIP:Port/service/mgmt/amp/1.0`

The examples in this section show how easy the structure is and how simple the AMP requests are. The AMP request is embedded in a SOAP message, which is sent to the DataPower device by the **`curl`** command. Each example shows the source code of the SOAP message, the **`curl`** command to send to the DataPower device, and the response from DataPower.

The structure of each example is:

- Request
- Curl command
- Response

All samples shown in this Redpaper can also be found in either of the following locations:

- The IBM Redbooks Web server. Point your Web browser at:

  `ftp://www.redbooks.ibm.com/redbooks/SG244446`

- The IBM Redbooks Web site for this paper at:

  `http://www.redbooks.ibm.com/redpieces/abstracts/redp4446.html/`

  Select **Additional Material** to open the directory that corresponds to the Redpaper. Download XMLsamps.zip file.

2.2.1 Get the domain list of the device

The response to the request is a list of all application domains on your device.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
```

```
   <dp:GetDomainListRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0"/>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_getdomainlist.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:GetDomainListResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Domain>Domain1</amp:Domain>
         <amp:Domain>Domain2</amp:Domain>
         <amp:Domain>default</amp:Domain>
         <amp:Domain>Domain3</amp:Domain>
         <amp:Domain>Domain4</amp:Domain>
      </amp:GetDomainListResponse>
   </env:Body>
</env:Envelope>
```

2.2.2 Get device information

The response to the request shows the device name, the serial number, the device ID (9003), the device type (XA35, XS40, XI50), the firmware version, any failures, and the license set of your DataPower device.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:GetDeviceInfoRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0"/>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_getdeviceinfo.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:GetDeviceInfoResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:DeviceName>DataPower XI50</amp:DeviceName>
         <amp:DeviceSerialNo>XXXXXXX</amp:DeviceSerialNo>
         <amp:DeviceID>9003-XI50-03</amp:DeviceID>
         <amp:DeviceType>XI50</amp:DeviceType>
```

```
            <amp:FirmwareVersion>XI50.3.6.0.25</amp:FirmwareVersion>
            <amp:FailureDetected>false</amp:FailureDetected>
            <amp:ManagementInterface type="web-mgmt">9090</amp:ManagementInterface>
            <amp:DeviceFeature>MQ</amp:DeviceFeature>
            <amp:DeviceFeature>TAM</amp:DeviceFeature>
            <amp:DeviceFeature>DataGlue</amp:DeviceFeature>
            <amp:DeviceFeature>JAXP-API</amp:DeviceFeature>
            <amp:DeviceFeature>PKCS7-SMIME</amp:DeviceFeature>
            <amp:DeviceFeature>SQL-ODBC</amp:DeviceFeature>
            <amp:DeviceFeature>Tibco-EMS</amp:DeviceFeature>
            <amp:DeviceFeature>WebSphere-JMS</amp:DeviceFeature>
         </amp:GetDeviceInfoResponse>
      </env:Body>
   </env:Envelope>
```

2.2.3 Enable (start) an application domain

This request sets the admin state of the application domain `myDomain` to *enabled*. The amp:Status OK in the response indicates, that the request was performed successfully and your domain is now enabled.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:StartDomainRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Domain>myDomain</dp:Domain>
   </dp:StartDomainRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_startdomain.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:StartDomainResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:StartDomainResponse>
   </env:Body>
</env:Envelope>
```

2.2.4 Disable an application domain

The application domain `myDomain` is set to `disabled`.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:StopDomainRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Domain>myDomain</dp:Domain>
   </dp:StopDomainRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_stopdomain.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:StopDomainResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:StopDomainResponse>
   </env:Body>
</env:Envelope>
```

2.2.5 Restart an application domain

The application domain `myDomain` is restarted.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:RestartDomainRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Domain>myDomain</dp:Domain>
   </dp:RestartDomainRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_restartdomain.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:RestartDomainResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
```

```
      </amp:RestartDomainResponse>
   </env:Body>
</env:Envelope>
```

2.2.6 Delete an application domain

The application domain `myDomain` is deleted.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:DeleteDomainRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Domain>myDomain</dp:Domain>
   </dp:DeleteDomainRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_deletedomain.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:DeleteDomainResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:DeleteDomainResponse>
   </env:Body>
</env:Envelope>
```

2.2.7 Reboot the device

The DataPower device reboots, which might take several moments.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:RebootRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Mode>reboot</dp:Mode>
   </dp:RebootRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_reboot.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:RebootResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:RebootResponse>
   </env:Body>
</env:Envelope>
```

2.2.8 Reload the firmware

The firmware is reloaded.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:RebootRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Mode>reload</dp:Mode>
   </dp:RebootRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_reload.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:RebootResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:RebootResponse>
   </env:Body>
</env:Envelope>
```

2.2.9 Upgrade the firmware

The Base64_Encoded_Firmware_Image must be replaced by the base64 encoded file content. Because this can be more than 700.000 lines of code, we decided to replace it. Processing this request might take several seconds. The device rebooted after the image was installed.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
```

```
   <dp:SetFirmwareRequest
xmlns:dp="http://www.datapower.com/schemas/appliance/management/1.0">
      <dp:Firmware>Base64_Encoded_Firmware_Image</dp:Firmware>
   </dp:SetFirmwareRequest>
</soapenv:Body>
</soapenv:Envelope>
```

Curl command

```
curl –k –u user:password –d @AMP_setfirmware.xml
https://DataPowerIP:Port/service/mgmt/amp/1.0
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <amp:SetFirmwareResponse
xmlns:amp="http://www.datapower.com/schemas/appliance/management/1.0">
         <amp:Status>ok</amp:Status>
      </amp:SetFirmwareResponse>
   </env:Body>
</env:Envelope>
```

3

SOAP Configuration Management (SOMA)

SOMA is the abbreviation for SOAP Configuration Management. It provides commands to administer the DataPower appliance. SOMA was written before AMP and can be affected by differences in subsequent firmware versions. However, SOMA provides easy manipulation of custom configurations and simple, flexible automation.

3.1 What is SOMA?

SOMA has a much finer granularity than AMP. The WSDL and schema files, with all operations and actions that can be performed with SOMA, are stored on the device.

To find those files, select:

Control Panel → File Management → Store

In the store:/// directory of the DataPower Appliance, the files are:

- store:///xml-mgmt-base.xsd
- store:///xml-mgmt-ops.xsd
- store:///xml-mgmt.wsdl
- store:///xml-mgmt.xsd

3.2 Configuration examples

Send SOMA requests to a certain address, such as:

https://DataPowerIP:Port/service/mgmt/current

The examples in this section show how to run automated processes. The SOMA request is embedded in a SOAP message that is sent to the DataPower device by using the **curl** command. Each example shows the source code of the SOAP message, the **curl** command to send to the DataPower device, and the response from DataPower.

The structure of each example is:

- Request
- Curl command
- Response

Every SOAP message consists of a request that has an operation (do-action, do-import, for example) and the actual action to execute. If an operation has optional attributes, they are also described in this section.

3.2.1 Flush the document cache

The <dp:result> element in the response shows that the operation was performed successfully and the cache was flushed.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="someBank-Sample"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <FlushDocumentCache>
                             <XMLManager>someBankXML</XMLManager>
                        </FlushDocumentCache>
                    </dp:do-action>
```

```
            </dp:request>
        </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_flushdocumentcache.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-12T16:31:05+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.2 Flush the stylesheet cache

The stylesheet cache is flushed.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <FlushStylesheetCache>
                             <XMLManager>default</XMLManager>
                        </FlushStylesheetCache>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_flushstylesheetcache.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-12T16:41:58+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.3 Flush AAA cache

The <FlushAAACache> element requires the AAA <PolicyName> as the child element. AAA_Auth is the name we chose for the AAA Policy, specified in an XML firewall in the default domain.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <FlushAAACache>
                            <PolicyName>AAA_Auth</PolicyName>
                        </FlushAAACache>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_flushaaacache.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-12T16:43:30+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.4 Flush RBM cache

This flushes role based management (RBM) configuration mode cache.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <FlushRBMCache/>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_flushrbmcache.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-12T16:48:56+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.5 Flush ARP cache

This flushes Address Resolution Protocol (ARP) cache. With ARP you can get a host's hardware address when you only know the IP address.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <FlushArpCache/>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_flusharpcache.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-12T16:52:56+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.6 Set the log level in the default or the application domain

This is request to change the log level of the default domain or the application domain. To set the log level in the default domain, leave the request as it is. If you want to change the log

level in an application domain, add the `domain=myDomain` attribute to the `<dp:request>` element.

In the request, the `<LogLevel>` element can be set to one of the following values:

emerg	emergency log level
alert	alert log level
critic	critical log level
error	error log level
warn	warning log level
notice	notice log level
info	information log level
debug	debug log level

Request to change the log level of the default domain

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <SetLogLevel>
                           <LogLevel>emerg</LogLevel>
                        </SetLogLevel>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Request to change the log level of the myDomain application domain

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain=?myDomain?
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <SetLogLevel>
                           <LogLevel>emerg</LogLevel>
                        </SetLogLevel>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl commands

```
curl -k -u user:password -d @soma_loglevеldefault.xml
https://DataPowerIP:Port/service/mgmt/current

curl -k -u user:password -d @soma_loglevelapplicationdomain.xml
https://DataPowerIP:Port/service/mgmt/current
```

Responses

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T10:40:16+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>

<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T10:42:21+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.7 Create a backup of the device and the application domains

To perform a backup of the entire system, use `<dp:domain name="all-domains"/>`. Refer to Table 3-1 for a list of `do-backup` attributes.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:request xmlns:dp="http://www.datapower.com/schemas/management">
      <dp:do-backup format="ZIP">
         <dp:domain name="default"/><!-- enter all the application domains you
want to be included in your domain backup, here only the default domain will be
included in the backup, for a entire system backup use <dp:domain
name=”all-domains”/>-->
      </dp:do-backup>
   </dp:request>
</soapenv:Body>
</soapenv:Envelope>
```

Table 3-1 Attributes of the do-backup function

do-backup operation	Value	Description
format	ZIP XML	Specifies the export format of the backup file, either ZIP or XML.
persisted	true false	If set to true, only the domains with saved configurations will be included in the backup.

Curl command

```
curl -k -u user:password -d @soma_createbackup.xml
https://DataPowerIP:Port/service/mgmt/current > backup.xml
```

Response

The response is shown in the backup file created.

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T12:35:20+01:00</dp:timestamp>
         <dp:file>base64 encoded file content</dp:file>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.8 Restore backup

The following do-restore operation shows a Base64_Encoded_File placeholder value. This means that the complete file must be encoded in base64 and included in the <dp:input-file> element. Because this file can be several thousand lines, it was simply replaced by this placeholder. Refer to Table 3-2 for a list of do-restore attributes.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:request xmlns:dp="http://www.datapower.com/schemas/management">
      <dp:do-restore source-type="ZIP">
         <dp:input-file>Base64_Encoded_File</dp:input-file>
         <dp:domain name="default"/><!-- enter all the domains you want to be
restored -->

      </dp:do-restore>
      <dp:do-action>
            <SaveConfig/>
      </dp:do-action>
   </dp:request>
</soapenv:Body>
</soapenv:Envelope>
```

Table 3-2 Attributes of the do-restore function

do-restore operation	Value	Description
source-type	ZIP XML	Specifies the source type of the export to be imported.
dry-run	true false	If set to true, the device performs a dry run of the command.
overwrite-files	true false	If set to true, existing files are overwritten.
overwrite-objects	true false	If set to true, existing objects are overwritten.

Curl command

```
curl -k -u user:password -d @soma_restorebackup.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T15:08:59+01:00</dp:timestamp>
         <dp:import>
            <import-results domain="default">
               <export-details>
[...]
               </export-details>
            </import-results>
         </dp:import
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.9 Copy a file to the device

Refer to Table 3-3 for a list of `set-file` attributes.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:request xmlns:dp="http://www.datapower.com/schemas/management">
      <dp:set-file name="local:///Testfile">
         Base64_encoded_File
      </dp:set-file>
   </dp:request>
</soapenv:Body>
</soapenv:Envelope>
```

Table 3-3 Attribute of the set-file function

set-file operation	Value	Description
name	Image:/// AnyString Local:///AnyString Temporary:///AnyString	Specifies the location of where to upload the file on the DataPower filesystem and how to name it.

Curl command

```
curl -k -u user:password -d @soma_copyfile.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
```

```
        <dp:timestamp>2008-03-13T15:13:07+01:00</dp:timestamp>
        <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.10 Delete a file from the device

Use this request to delete a file from the device.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <DeleteFile>
           <File>local:///Testfile</File>
                        </DeleteFile>
                    </dp:do-action>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_deletefile.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T15:15:34+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.11 Create a directory on the device

Use this request to create a directory on the device.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <CreateDir>
```

```
            <Dir>local:///testdirectory</Dir>
                        </CreateDir>
                    </dp:do-action>
                </dp:request>
             </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_createdirectory.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T16:17:23+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.12 Remove a directory from the device

Use this request to remove a directory from the device.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:do-action>
                        <RemoveDir>
            <Dir>local:///testdirectory</Dir>
                        </RemoveDir>
                    </dp:do-action>
                </dp:request>
             </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_removedirectory.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-13T16:19:42+01:00</dp:timestamp>
         <dp:result>OK</dp:result>
```

```
      </dp:response>
   </env:Body>
</env:Envelope>
```

3.2.13 Export an object

Table 3-4 lists the `do-export` attributes. Table 3-5 lists the `object` attributes.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:request xmlns:dp="http://www.datapower.com/schemas/management"
domain="myDomain">
      <dp:do-export format="ZIP" all-files="true">
         <dp:object name="SomeObject" class="XMLFirewallService"
ref-objects="true" ref-files="true"/>
      </dp:do-export>
   </dp:request>
</soapenv:Body>
</soapenv:Envelope>
```

Table 3-4 Attributes of the do-export function

do-export operation	Value	Description
`format`	`ZIP` `XML`	Specifies the export format of the backup file, either ZIP or XML.
`all-files`	`true` `false`	If set to true, all files of the specified domain are exported.
`persisted`	`true` `false`	If set to true, only the domains with saved configurations are included in the backup.

Table 3-5 Attributes of the object element

object element	Description
`name`	Specifies the name of particular object to export.
`class`	Specifies the class of the object.

To export all objects of all classes, set the following attributes in the `<dp:object>` element:

@name = “all-objects” Indicates all objects of the specified class.

@class = “all-classes” Specifies all classes.

Curl command

```
curl -k -u user:password -d @soma_objectbasedexport.xml
https://DataPowerIP:Port/service/mgmt/current > export .txt
```

Response

The export.txt file contains the contents of the base 64-encoded file (in the <dp:file> element, immediately after the timestamp).

```
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  425k    0  425k    0     0   219k      0 --:--:--  0:00:01 --:--:--  491k
```

3.2.14 Import an object

This imports the object from the example shown in section 3.2.13, “Export an object” on page 28. Refer to the do-import attributes in Table 3-6.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
<soapenv:Body>
   <dp:request xmlns:dp="http://www.datapower.com/schemas/management"
domain="myDomain">
      <dp:do-import source-type="ZIP" overwrite-objects="true"
overwrite-files="true">
            <dp:input-file>Base_64_encoded_Export</dp:input-file>
            <dp:object name="SomeObject" class="XMLFirewallService"
overwrite="true"/>
      </dp:do-import>

   </dp:request>
</soapenv:Body>
</soapenv:Envelope>
```

Table 3-6 Attributes of the do-import function

do-import operation	Value	Description
source-type	ZIP XML	Specifies the source type of the export to be imported.
dry-run	true false	If set to true, the device performs a dry run of the command.
overwrite-files	true false	If set to true, existing files are overwritten.
overwrite-objects	true false	If set to true, existing objects are overwritten.

Curl command

```
curl -k -u user:password -d @soma_objectbasedimort.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-18T17:48:22+01:00</dp:timestamp>
```

```
            <dp:import>
               <import-results domain="myDomain">
                  <export-details>
                     <description>Exported Configuration </description>
                     <user>admin</user>
                     <domain>myDomain</domain>
                     <comment/>
                     <product-id>9003-XI50-03</product-id>
                     <product>XI50</product>
                     <model>DataPower XI50</model>
                     [?]
                     <cfg-result class="XMLFirewallService" name="SomeObject"
status="SUCCESS"/>
                  </export-details>
               </import-results>
            </dp:import>
         </dp:response>
      </env:Body>
</env:Envelope>
```

3.2.15 Get status by monitoring the device

By changing the `class` attribute of the `<dp:get-status>` element, you can monitor different values of the DataPower device. This example shows the `CPUUsage` value. For a list of other values, see “Values of the class attribute” on page 31.

Request

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
            <env:Body>
                <dp:request domain="default"
xmlns:dp="http://www.datapower.com/schemas/management">
                    <dp:get-status class="CPUUsage"/>
                </dp:request>
            </env:Body>
</env:Envelope>
```

Curl command

```
curl -k -u user:password -d @soma_getstatus.xml
https://DataPowerIP:Port/service/mgmt/current
```

Response

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:timestamp>2008-03-19T17:32:17+01:00</dp:timestamp>
         <dp:status>
            <CPUUsage xmlns:env="http://www.w3.org/2003/05/soap-envelope">
               <tenSeconds>5</tenSeconds>
               <oneMinute>3</oneMinute>
               <tenMinutes>6</tenMinutes>
               <oneHour>6</oneHour>
               <oneDay>6</oneDay>
```

```
            </CPUUsage>
          </dp:status>
        </dp:response>
    </env:Body>
</env:Envelope>
```

Values of the class attribute

By changing the `class` attribute, you can monitor the following values or status of the DataPower device:

A ActiveUsers, ARPStatus

C ConnectionsAccepted, CPUUsage, CryptoEngineStatus

D DateTimeStatus, DNSCacheHostStatus, DNSNameServerStatus, DNSSearchDomainStatus, DNSStaticHostStatus, DocumentCachingSummary, DocumentStatus, DocumentStatusSimpleIndex, DomainStatus, DynamicQueueManager

E EnvironmentalFanSensors, EnvironmentalSensors, EthernetInterfaceStatus

F FilePollerStatus, FilesystemStatus, FirmwareStatus, FirmwareVersion

H HSMKeyStatus, HTTPConnections, HTTPConnectionsCreated, HTTPConnectionsDestroyed, HTTPConnectionsOffered, HTTPConnectionsRequested, HTTPConnectionsReturned, HTTPConnectionsReused, HTTPMeanTransactionTime, HTTPTransactions

L LibraryVersion, LicenseStatus, LoadBalancerStatus, LogTargetStatus

M MemoryStatus, MessageCountFilters, MessageCounts, MessageDurationFilters, MessageDurations, MessageSources, MQQMstatus, MQStatus

N NFSMountStatus, NTPRefreshStatus

O ObjectStatus

P PortStatus

R ReceiveKbpsThroughput, ReceivePacketThroughput, RoutingStatus

S ServicesStatus, SLMPeeringStatus, SLMSummaryStatus, SNMPStatus, SSHTrustedHostStatus, StandbyStatus, StylesheetCachingSummary, StylesheetExecutions, StylesheetExecutionsSimpleIndex, StylesheetMeanExecutionTime, StylesheetMeanExecutionTimeSimpleIndex, StylesheetProfiles, StylesheetProfilesSimpleIndex, StylesheetStatus, StylesheetStatusSimpleIndex, SystemUsage

T TCPSummary, TCPTable, TibcoEMSStatus, TransmitKbpsThroughput, TransmitPacketThroughput

U UDDISubscriptionKeyStatusSimpleIndex, UDDISubscriptionServiceStatusSimpleIndex, UDDISubscriptionStatusSimpleIndex

V Version

W WebAppFwAccepted, WebAppFwRejected, WebSphereJMSStatus, WSMAgentSpoolers, WSMAgentStatus, WSOperationMetrics, WSOperationsStatus, WSRRSubscriptionServiceStatus, WSRRSubscriptionStatus, WSWSDLStatus, WSWSDLStatusSimpleIndex

Some of the values show the output only if statistics are enabled on your DataPower device. To enable statistics from the WebGUI, select:

Objects → System → Statistic settings

4

Debugging

If a request is not valid, the DataPower device does not provide detailed information in the response. This is by design because showing details to any client sending a request to the XML Management Interface would be a security exposure. This is why in most cases the response indicates simply `Internal Error`. The only way to debug failing requests is to enable internal logging on the device.

This chapter shows how to enable internal logging and how to debug problems. It provides solutions to common mistakes during the use of the XML Management Interface.

4.1 Enabling internal logging by using the WebGUI

To enable internal logging:

1. Using an administrator ID, log in into the default domain of your DataPower device.
2. From the Control Panel, click the **Troubleshooting** Icon..
3. In the **Logging** section, shown in Figure 4-1:
   a. Set the **Log Level** to **debug**.
   b. Set **Enable Internal Logging** to **on**.
   c. Click the **Set Log Level** button.
4. Save your configuration.

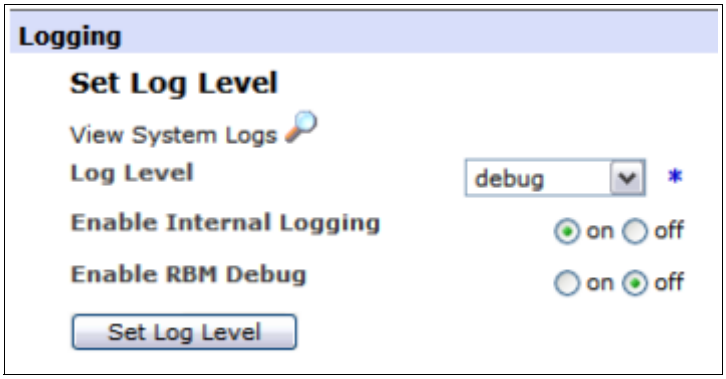

Figure 4-1 Setting the log level

4.2 Debugging an invalid request

At the beginning of the chapter we mentioned that, for security reasons, the DataPower device provides little information. Most of the time, the response indicates `Internal Error`:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <env:Fault>
         <faultcode>env:Client</faultcode>
         <faultstring>Internal Error (from client)</faultstring>
      </env:Fault>
   </env:Body>
</env:Envelope>
```

If you receive a response like this to your request, check the default log for more detailed information. The default log only shows entries of the XML Management Interface when internal logging is enabled. Steps for enabling internal logging are listed in section 4.1, “Enabling internal logging by using the WebGUI” on page 34. The log shows errors of the WebGUI category, with messages from an XML firewall called xml-mgmt. The errors look similar to the error shown in Figure 4-2 on page 35.

The message clearly states where the error is, which is in the element `<FlushAAACache>` in the `do-action` of the request. It also states what was expected. By comparing the list of expected elements to the element used in the request, you can determine that a typographical error exists in the `<FlushAAACache>` element of the request.

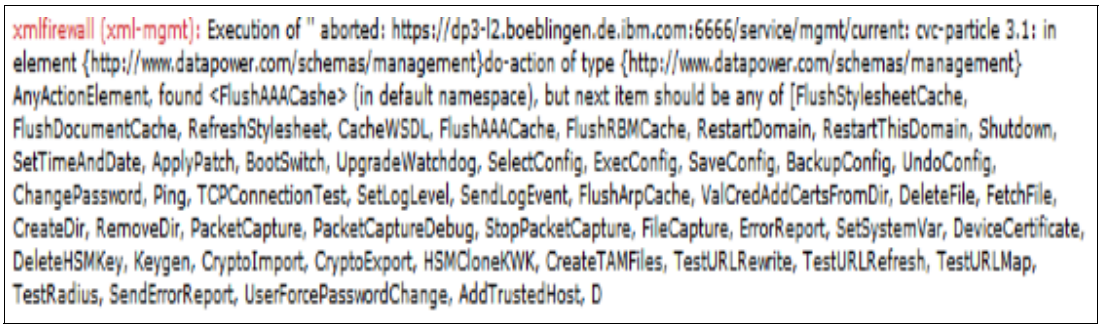

Figure 4-2 XML firewall message

When you debug, check the following items:

- ☐ Check your **curl** command.
- ☐ Check your request XML file.
- ☐ Check the default log for any entries of the XML Management Interface.

4.3 Common errors

As you can imagine, there are probably as many errors as grains of sand at the beach. To highlight the most common mistakes, this section provides examples of errors we encountered.

4.3.1 Malformed content

The following error response indicates malformed content, which means the request was not well-formed:

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <env:Fault>
         <faultcode>env:Client</faultcode>
         <faultstring>Malformed content (from client)</faultstring>
      </env:Fault>
   </env:Body>
</env:Envelope>
```

The log lists a message similar to the following message:

```
xmlfirewall (xml-mgmt): mismatched tag, expected dp:do-action at line 1
```

Check the syntax of the request file. It could be missing an angle bracket (< or >) or a closing tag.

4.3.2 curl: (52) Empty reply from server

When sending a curl request to the DataPower device using HTTP instead of HTTPS, the following error is in the response:

```
curl: (52) Empty reply from server
```

The log lists the following error message:

```
xmlfirewall (xml-mgmt): SSL error - could not
establish SSL for incoming connection. Connection
Refused.
```

Check the syntax of your **curl** request. The XML Management Interface uses HTTPS for communication, not HTTP.

4.3.3 Authentication failure

You might receive the following authentication failure response from your DataPower device:

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <dp:response xmlns:dp="http://www.datapower.com/schemas/management">
         <dp:result>Authentication failure</dp:result>
      </dp:response>
   </env:Body>
</env:Envelope>
```

The log lists the following error message:

```
xmlfirewall (map): RBM: Authetication failed - Access Denied
```

This states that the RBM Authentication failed with the user credentials that were sent to the device.

Check the username and password you specified in the **curl** request.

4.3.4 Access denied (from client)

DataPower might send the following response to a **curl** command:

```
<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <env:Fault>
         <faultcode>env:Client</faultcode>
         <faultstring>Access Denied (from client)</faultstring>
      </env:Fault>
   </env:Body>
</env:Envelope>
```

The log shows the following error message:

```
xmlfirewall (xml-mgmt): Unknown xml-mgmt service URI ‘/services/mgmt/current
```

This indicates an incorrect URI. The correct URI is `/service/mgmt/current`, (no *s* on the word service) rather than `services/mgmt/current` as shown.

Check the URI used in your **curl** command.

4.3.5 curl: (7) couldn't connect to host

The response might indicate the following message:

```
curl: (7) couldn't connect to host
```

The log lists the following this error message:

```
TCP connection attempt refused from
                to '                port 6667
```

Check the port number you sent the request to. Addressing the request to the correct XML Management Interface port can solve this issue.

4.3.6 Internal error

The following response shows an internal error:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <env:Fault>
         <faultcode>env:Client</faultcode>
         <faultstring>Internal Error (from client)</faultstring>
      </env:Fault>
   </env:Body>
</env:Envelope>
```

Because it can be caused by several situations, the only way to debug is to check the log for details about the error.

Error from an invalid element

This internal error was caused by an invalid element in the request. As shown in Figure 4-3, the log message indicates where the error is (in the element `<FlushAAACashe>` in the `do-action` of the request), and what was expected.

```
xmlfirewall (xml-mgmt): Execution of '' aborted: https://dp3-l2.boeblingen.de.ibm.com:6666/service/mgmt/current: cvc-particle 3.1: in
element {http://www.datapower.com/schemas/management}do-action of type {http://www.datapower.com/schemas/management}
AnyActionElement, found <FlushAAACashe> (in default namespace), but next item should be any of [FlushStylesheetCache,
FlushDocumentCache, RefreshStylesheet, CacheWSDL, FlushAAACache, FlushRBMCache, RestartDomain, RestartThisDomain, Shutdown,
SetTimeAndDate, ApplyPatch, BootSwitch, UpgradeWatchdog, SelectConfig, ExecConfig, SaveConfig, BackupConfig, UndoConfig,
ChangePassword, Ping, TCPConnectionTest, SetLogLevel, SendLogEvent, FlushArpCache, ValCredAddCertsFromDir, DeleteFile, FetchFile,
CreateDir, RemoveDir, PacketCapture, PacketCaptureDebug, StopPacketCapture, FileCapture, ErrorReport, SetSystemVar, DeviceCertificate,
DeleteHSMKey, Keygen, CryptoImport, CryptoExport, HSMCloneKWK, CreateTAMFiles, TestURLRewrite, TestURLRefresh, TestURLMap,
TestRadius, SendErrorReport, UserForcePasswordChange, AddTrustedHost, D
```

Figure 4-3 Error message from invalid element

By comparing the list of expected elements to the element used in the request, you can determine that a typographical error occurred in the `<FlushAAACache>` element in the request.

Error in the namespaces in the request file

The internal error is also listed in the log if problems exist with namespaces in the request file. The example in Figure 4-4 on page 38 shows a request, where the namespace of the do-action was not specified. By adding ‘dp:’ to the do-action this issue can be solved.

Figure 4-4 Error from the namespace

4.4 Additional help

For additional help with debugging and creating requests, you can always use the schemas and stylesheets that come with the device. All functions, attributes, and elements are specified in those files. You can find them in the store:/// directory of the DataPower device.

For AMP, refer to:

- store:///app-mgmt-protocol.wsdl
- store:///app-mgmt-protocol.xsd

For SOMA, refer to:

- store:///xml-mgmt-base.xsd
- store:///xml-mgmt-ops.xsd
- store:///xml-mgmt.wsdl
- store:///xml-mgmt.xsd

See also “Related publications” on page 39 for additional resources.

We hope this document helps you as you are creating and debugging your SOMA and AMP requests to administer your DataPower device.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this paper.

IBM Redbooks

For information about ordering these publications, see “How to get Redbooks” on page 40. Note that some of the documents referenced here might be available in softcopy only.

- *IBM WebSphere DataPower SOA Appliances Part I: Overview and Getting Started,* REDP-4327
- *IBM WebSphere DataPower SOA Appliances Part II: Authentication and Authorization,* REDP-4364
- *IBM WebSphere DataPower SOA Appliances Part III: XML Security Guide,* REDP-4365
- *IBM WebSphere DataPower SOA Appliances Part IV: Management and Governance,* REDP-4366

Online resources

These publications are also relevant as further information sources:

- WebSphere DataPower Integration Appliance firmware, documentation download Web site:

  `http://www.ibm.com/support/docview.wss?rs=2362&uid=swg24014405`

  The following guides are available on the Web site:

  - *DataPower XI 3.7.1 WebGUI Guide*
  - *DataPower XI 3.7.1 Reference Guide*

  You will have to register for an IBM support or developerWorks user ID and password, and also sign up to receive DataPower product information. Both registrations are free.
- WebSphere DataPower SOA Appliances product support Web site:

  `http://www.ibm.com/software/integration/datapower/support/`
- Managing services dynamically using WebSphere DataPower SOA Appliances with WebSphere Service Registry and Repository:

  `http://www.ibm.com/developerworks/websphere/library/techarticles/0802_rohmann/0802_rohmann.html`

Locating the code samples on the Web

Code samples associated with this paper are available in softcopy on the Internet from either:

- The IBM Redbooks Web server. Point your Web browser at:

  `ftp://www.redbooks.ibm.com/redbooks/SG244446`

- The IBM Redbooks Web site for this paper at:

  http://www.redbooks.ibm.com/redpieces/abstracts/redp4446.html/

  Select **Additional Material** to open the directory that corresponds to the Redpaper. Download XMLsamps.zip file.

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WebSphere DataPower SOA Appliance: The XML Management Interface

Appliance Management Protocol (AMP) configuration examples

SOAP Configuration Management (SOMA) examples

Debugging tips and common errors

The XML Management Interface is the third way to configure and administer the WebSphere DataPower SOA Appliance. The other two are the WebGUI and the CLI.

The DataPower device can be completely configured and managed through the XML Management Interface. If enabled, this interface allows administrators to send status and configuration requests to the DataPower appliance through a standard SOAP interface, using SOAP messages. The Appliance Management Protocol (AMP) is a series of commands developed after SOAP. AMP is simple to use and is independent of any firmware version, thereby providing a generalized way of managing the appliance.

This interface requires the HTTPS protocol for all communication. By default, the interface acts as a Secure Sockets Layer (SSL) server, using the default system keys that come with the device. These keys are the same keys that are used for the WebGUI and Secure Shell (SSH) interface (such as a Command Line Interface (CLI)). If desired, administrators can employ their own keys.

REDP-4446-00

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