API Programming Guide

vCenter Chargeback Manager 2.0.0

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About This Book

The *API Programming Guide* provides information on how to use vCenter Chargeback Manager APIs.

Intended Audience

This book is intended for anyone who develop applications to work with vCenter Chargeback Manager.

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- Installation and Upgrade Guide
- User's Guide
- API Programming Guide
- API Reference
- SDK for Java Developer's Guide

To access the complete vCenter Chargeback Manager documentation, go to http://www.vmware.com/support/pubs/vcbm_pubs.html.

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vCenter Chargeback Manager APIs 1

This chapter includes the following topics:

What Is vCenter Chargeback Manager?

vCenter Chargeback Manager is a cost reporting solution for environments virtualized using vSphere. This Web-based application interacts with the vCenter Server, vCloud Director, and vShield Manager to retrieve resource usage information and other configuration details, calculates the cost by using the chargeback formulas defined in the application, and generates reports.

vCenter Chargeback Manager runs on an Apache Tomcat server instance. The user interacts with the vCenter Chargeback Manager through a load balancer (Apache HTTP Server). vCenter Chargeback Manager connects to a database that stores application-related information, such as the defined hierarchies, cost model, users, roles, and so on. The application also interacts with the vCenter Server and vCenter Server Database through a Data Collector. The Data Collector uses VIM APIs to communicate with the vCenter Server and JDBC to communicate with the vCenter Server Database.

vCenter Chargeback Manager can be integrated with a vCloud Director setup using the Cloud Director Data Collector. This data collector interacts with the vCloud Director Database and fetches the Org data required for importing the hierarchies and the relevant data in to vCenter Chargeback Manager. You can also install the vShield Manager Data Collector which helps you fetch the external network related information for each Org in the vCloud Director setup and replicate the same in the vCenter Chargeback Manager database.

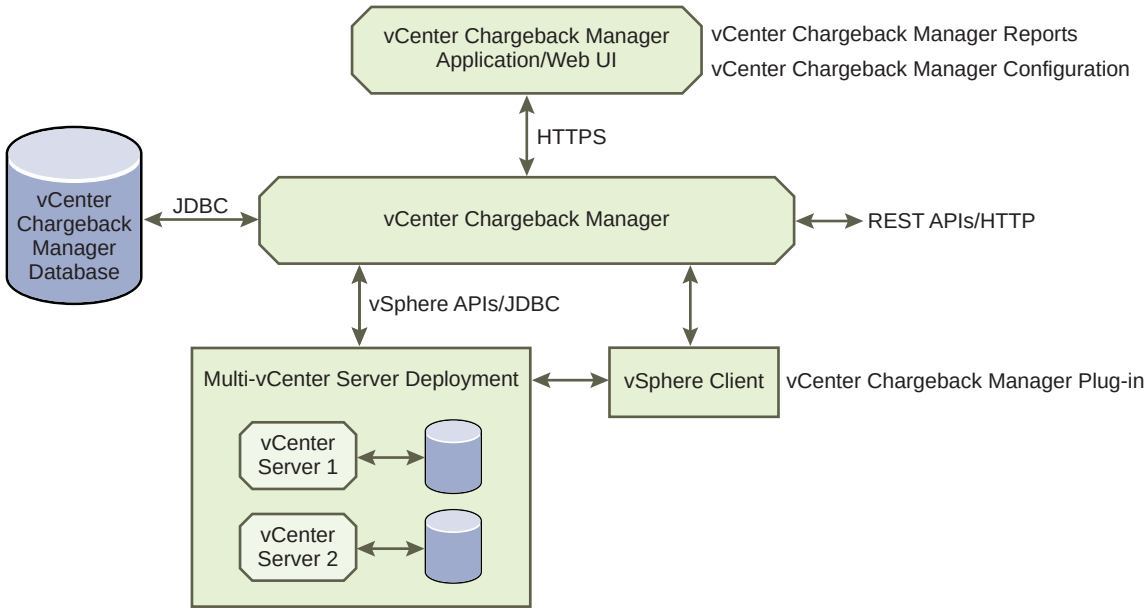
vCenter Chargeback Manager APIs provide an interface for application developers to programmatically use the functionality of vCenter Chargeback Manager.

For more information about the vCenter Chargeback Manager and its capabilities, see the *vCenter Chargeback Manager User's Guide*.

REST Architecture

vCenter Chargeback Manager APIs implement the Representational State Transfer (REST) architecture. REST-based APIs help you send HTTP requests for resources over the network and receive responses.

Figure 1-1. REST Architecture in vCenter Chargeback Manager



Requests

An HTTP request sent by a vCenter Chargeback Manager API can be of the following type: PUT, POST, GET, or DELETE. Table 1-1 shows how each of these request types maps to a standard CRUD operation.

Table 1-1. Request Type Mapping

Request Type	CRUD Operation
POST	CREATE
GET	READ
PUT	UPDATE/CREATE
DELETE	DELETE

Along with the HTTP requests, you can pass request parameters by using XMLs. An example request XML for the Login API is provided here.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Request xmlns="http://www.vmware.com/vcenter/chargeback/2.0">
    <Users>
        <User>
            <Name>admin</Name>
            <Password>P@ssw0rd</Password>
            <Type>local</Type>
        </User>
    </Users>
</Request>
```

Responses

When an API task is successful, the value of the `status` parameter in the response XML is set to `success` as shown in the following example.

```
<?xml version="1.0" encoding="UTF-8"?>
<Response status="success" isValidLicense="true"
                xmlns="http://www.vmware.com/vcenter/chargeback/2.0"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <Hierarchies>
        <Hierarchy id="1">
            ...
```

```
        </Hierarchy>
    </Hierarchies>
</Response>
```

If an API task is unsuccessful, the `status` parameter is set to `failure` and the `Error` element captures all the details.

```
<?xml version="1.0" encoding="UTF-8"?>
<Response status="failure" isValidLicense="true"
               xmlns="http://www.vmware.com/vcenter/chargeback/2.0"
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<Error majorErrorCode="500" minorErrorCode="2014"
message="Hierarchy with id '1' does not exist." />
</Response>
```

Table 1-2 explains the components of the `Error` element.

Table 1-2. Components of Error Element

Element	Description
`majorErrorCode`	The class of the error. It represents the HTTP Status codes.
`minorErrorCode`	The API error code. For example, it can indicate that hierarchy creation failed.
`vendorSpecificErrorCode` (Optional)	A vendor or implementation-specific error code that points to specific modules or parts of the code, and can make problem diagnostics easier. For example, it can indicate if a code snippet is a vCenter Chargeback Manager error code or a database error code.
`message`	A one-line, human-readable message that describes the error that occurred.
`ErrorStackTrace`	This element is present when the log level in vCenter Chargeback Manager is set to `debug`.

Common Elements in the Request and Response XMLs

Table 1-3 presents the common XML elements used by the request and response XMLs.

Table 1-3. Common Elements

Element	Description
Request	An API request starts with this element.
Response	An API response starts with this element.
status	Denotes whether API is successfully executed.
IsValidLicense	Indicates the status of the license. Value can be true or false.

For an example request XML, see "Requests." For an example response XML, see "Responses."

vCenter Chargeback Manager API Syntax

Each vCenter Chargeback Manager API has the following syntax:

`<HTTP_request_method> <Base_Url>/<API_signature>`

For example, `GET https://123.123.123.123/vCenter-CB/api/hierarchies`

Table 1-4 describes the components of vCenter Chargeback Manager API syntax.

Table 1-4. API Syntax Components

Syntax Component	Description
HTTP_request_method	PUT, POST, GET, or DELETE
Base_Url	The URL of the vCenter Chargeback Manager. The base URL for vCenter Chargeback Manager APIs is: `https://<vCenter Chargeback Manager IP>/vCenter-CB/api` For example, `https://123.123.123.123/vCenter-CB/api`

Table 1-4. API Syntax Components

Syntax Component	Description
API_signature	The URL path for a vCenter Chargeback Manager API. For example, `/hierarchies` retrieves the hierarchies added to the vCenter Chargeback Manager running on 123.123.123.123.
version	(Optional) API version. If you want to use vCenter Chargeback Manager 1.5 API, then specify the version as 1.5.0. If you do not specify the version, the current API version, which is 2.0, is considered. For example, `GET https://12.123.12.123/vCenter-CB/api/hierarchies?version=2.0`

If you want to use an earlier version of the vCenter Chargeback Manager API, you must perform the following tasks:

- In the API URL, specify version=<version_number>.

  For example, `<HTTP_request_method> <Base_Url>/<API_signature>?version=1.5.0`

- In the request XML, update the request element with the following tag:

  `<Request xmlns="http://www.vmware.com/vcenter/chargeback/1.5.0">`

NOTE Ensure that you specify the version in both the API URL and the request XML.

API Versioning

Every vCenter Chargeback Manager API request and response includes target namespace to denote the API version. For example, the following request XML sends the version with which it is working.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request xmlns="http://www.vmware.com/vcenter/chargeback/2.0">
    <Hierarchies>
        <Hierarchy>
            <Name>Test_Hierarchy</Name>
            <Description>Test Hierarchy</Description>
        </Hierarchy>
    </Hierarchies>
</Request>
```

The request states that vCenter Chargeback Manager API version 2.0 is being called. If the request is for vCenter Chargeback Manager version 1.5, the call fails. If the request is for vCenter Chargeback Manager 2.0, the call succeeds and gets a response similar to the following:

```
<?xml version="1.0" encoding="UTF-8"?>
<Response  xmlns="http://www.vmware.com/vcenter/chargeback/2.0"
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" status="success"
               isValidLicense="true">
    <Hierarchies>
        <Hierarchy id="1174">
            <Name>Test_Hierarchy</Name>
            <Description>Test Hierarchy</Description>
            <CreatedOn>1275033342320</CreatedOn>
            <InSync>true</InSync>
            <LastUpdatedTime>1275033342350</LastUpdatedTime>
            <LastUpdatedUser>local\superuser</LastUpdatedUser>
            <Entities>
                <Entity id="1175">
                    <Name>Test_Hierarchy</Name>
                    <Description>Root</Description>
                    <Type>100</Type>
                    <Shares>
                        <Share>
                            <Percentage>100</Percentage>
                            <Parent id="-1" />
                            <StartTime>0</StartTime>
                        </Share>
```

```
                    </Shares>
                </Entity>
            </Entities>
        </Hierarchy>
    </Hierarchies>
</Response>
```

If you specify the API version, be sure to specify it with both the request XML (wherever applicable) and the URL. If it is specified only in the request XML or the URL and not both, then the API results in an error. If the API version is absent in both the URL and the request XML (wherever applicable), then the API returns the output corresponding to the latest version.

Understanding the Workflow 2

This chapter explains how to perform some of the basic vCenter Chargeback Manager tasks using the APIs. You can create a hierarchy and add entities, add fixed cost and generate a report on resource utilization.

The chapter includes the following topics:

Requirements for Code Examples

This chapter provides code examples to explain how you can call the APIs. To run these code examples, you require the following JAR and helper class files.

JAR Files

The code examples need the following JAR files.

- `commons-httpclient-3.1.jar`
- `commons-logging-1.1.1.jar`
- `jdom.jar`

You must place these JAR files in the classpath.

CommonUtil Class

The code examples use the following CommonUtil class.

```
public final class CommonUtil {
    /**
    * This method writes out a formatted XML document to the Writer out.
    *
    * @param doc
    * @param out
    * @throws IOException
    */
    public static void printXML(Document doc, Writer out) throws IOException {
        XMLOutputter o = new XMLOutputter();
        Format newFormat = o.getFormat();
        newFormat.setIndent("  ");
        o.setFormat(newFormat);
        o.output(doc, out);
    }
    /**
        * This method returns the XML document as a string object
        *
        * @param doc JDOM document representation of the XML
        * @return String representation of the XML document
        * @throws IOException
        */
    public static String xmlAsString(Document doc) throws IOException {
        Writer w = new StringWriter();
        printXML(doc, w);
        return w.toString();
    }
    /**
        * This method reads the XML from a file and returns its representation as a
        * JDOM document
        *
        * @param filePath path to the XML file
        * @return JDOM document representation of the XML
        * @throws IOException
        * @throws JDOMException
        */
    public static Document getXMLDocument(String filePath) throws IOException, JDOMException {
        FileInputStream fis = null;
        try {
            fis = new FileInputStream(filePath);
            return getXMLDocument(fis);
        } finally {
            if (fis != null) {
            fis.close();
        }
    }
}

/**
    * This method reads an XML document from the input Stream and returns its
    * JDOM document representation
    *
    * @param is input stream that has the XML content
    * @return jDOM document representation for the XML
    * @throws IOException
    * @throws JDOMException
    */
    private static Document getXMLDocument(InputStream is) throws IOException, JDOMException {
        Document xml = null;
        SAXBuilder builder = new SAXBuilder();
        xml = builder.build(is);
        return xml;
    }
}
```

FakeSSLCertificateSocketFactory Class

The code examples use the following class to access resources over the HTTPS protocol.

```
/**
    * Helper class to accept self-signed certificate.
    */
    public class FakeSSLCertificateSocketFactory implements SecureProtocolSocketFactory {
    private SSLContext sslContext;
    public FakeSSLCertificateSocketFactory() throws NoSuchAlgorithmException,
                    KeyManagementException {
        sslContext = SSLContext.getInstance("SSL");
        sslContext.init(null, new TrustManager[] {new X509TrustManager() {

            @Override
            public void checkClientTrusted(X509Certificate[] ax509certificate, String s) throws
                            CertificateException {
            // Allow.

            }

            @Override
            public void checkServerTrusted(X509Certificate[] ax509certificate, String s) throws
                            CertificateException {
            // Allow.
            }

            @Override
            public X509Certificate[] getAcceptedIssuers() {
            return new X509Certificate[0];
            }
        }}, null);
    }
    @Override
    public Socket createSocket(String s, int i) throws IOException, UnknownHostException {
        return sslContext.getSocketFactory().createSocket(s, i);
    }

    @Override
    public Socket createSocket(String s, int i, InetAddress inetaddress, int j) throws
                    IOException, UnknownHostException {
        return sslContext.getSocketFactory().createSocket(s, i, inetaddress, j);
    }

    @Override
    public Socket createSocket(String s, int i, InetAddress inetaddress, int j,
                    HttpConnectionParams httpconnectionparams) throws IOException,
        UnknownHostException, ConnectTimeoutException {
        return sslContext.getSocketFactory().createSocket(s, i, inetaddress, j);
    }

    @Override
    public Socket createSocket(Socket socket, String s, int i, boolean flag) throws IOException,
                    UnknownHostException {
    return sslContext.getSocketFactory().createSocket(socket, s, i, flag);
    }

    }
```

Log In to vCenter Chargeback Manager

To start using vCenter Chargeback Manager APIs, you must log in to vCenter Chargeback Manager.

To log in to vCenter Chargeback Manager

1 Call the Login API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/login
```

For example, you can define a call as follows:

```
POST https://123.123.123.123/vCenter-CB/api/login?version=2.0
```

2 (Optional) Use the URL parameter version to specify the API version that you want to call.

3 In the request XML for this API, you can specify the following login details.

- User type
- User name
- Password
- LDAP server ID or LDAP server name

The following is an example request XML file.

```
<?xml version="1.0" encoding="UTF-8"?>
    <Request xmlns="http://www.vmware.com/vcenter/chargeback/2.0">
        <Users>
            <User>
                <Type>userType</Type>
                <Name>administrator</Name>
                <Password>vmware</Password>
                <!-- For LDap User you can either provide LdapServer id or ldap server name
                                -->
                <LdapServer id="1"/>
            </User>
        </Users>
        <!-- For Ldap Users -->
        <LdapServers>
            <LdapServer>
                <LdapServerName>vmw</LdapServerName>
            </LdapServer>
        </LdapServers>
</Request>
```

If the login succeeds, the API returns a response XML that indicates whether the user is authenticated.

The following is an example program that calls the API.

```
/**
     * This method is for Login to vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @param version
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleLoginMethod(String requestFilePath, String baseURL, String
                version) throws IOException, JDOMException,
            NoSuchAlgorithmException, KeyManagementException, HttpException {
        PostMethod post = null;
        NameValuePair[] parameters = {new NameValuePair("version", version)};
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
```

```
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/login?version=2.0";
        System.out.println(uri);
        try {
            post = new PostMethod(uri);
            post.setQueryString(parameters);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Add vCenter Server Information

You can add the vCenter Server instances in your virtualized environment to vCenter Chargeback Manager. This helps determine the computing resource utilization for the virtual machines and calculate the total costs.

To add vCenter Server information

1 Call the API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/vCenterServer
```

For example, you can define a call as follows:

```
POST https://123.123.123.123/vCenter-CB/api/vCenterServer?vesrion=2.0
```

2 In the request XML, specify the following information:

- vCenter Server URL
- vCenter Server Name
- vCenter Server Description
- vCenter Server Username
- vCenter Server Password
- PluginRegistered
- StatsSync
- Datasource URL
- Data Source Name
- Data Source User Name
- Data Source Password
- Data Source Type
- DataSourceAuthType

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request xmlns="http://www.vmware.com/vcenter/chargeback/2.0">
    <VCenterServers>
        <VCenterServer>
            <Url>101.102.107.21:443</Url>
            <Name>vc1</Name>
            <Description>vc1</Description>
            <UserName>administrator</UserName>
            <Password>xxxx</Password>
            <PluginRegistered>true</PluginRegistered>
            <StatsSync>true</StatsSync>
            <DataSourceUrl>
                10.112.107.21\sqlexp_vim
```

```
            </DataSourceUrl>
            <DataSourceName>vim_vcdb</DataSourceName>
            <DataSourceUserName>sa</DataSourceUserName>
            <DataSourcePassword>xxxx</DataSourcePassword>
            <DataSourceType id="1" />
            <DataSourceAuthType id="1" />
            <ForceUpdate>false</ForceUpdate>
        </VCenterServer>
    </VCenterServers>
</Request>
```

If the vCenter Server is successfully added, the API returns an XML response that provides the vCenter Server ID.

The following is an example program that calls the API.

```
/**
     * This method is to add the vCenter-Server in vCenter-Chargeback application
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddVCenterServerMethod(String requestFilePath, String baseURL)
               throws IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/vCenterServer?version=2.0";
        System.out.println(uri);
        System.out.println(bodyString);
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Add a Custom Chargeback Hierarchy

Use the Add a Chargeback Hierarchy API to create a hierarchy with the given name and description.

To add a custom Chargeback hierarchy

1 Call the API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/hierarchy
```

For example, you can define a call like this:

```
POST https://123.123.123.123/vCenter-CB/api/hierarchy
```

2 In the request XML, specify a name and a description for the hierarchy.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <Hierarchies>
        <Hierarchy>
            <Name>Test_Hierarchy</Name>
            <Description>Test Hierarchy</Description>
        </Hierarchy>
    </Hierarchies>
</Request>
```

If successful, the API returns details of the new hierarchy.

The following is an example program that calls the API.

```
/**
     * This method is to add a vCenter-ChargeBack hierarchy in
     * vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddHierarchyMethod(String requestFilePath, String baseURL)
                throws IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        HttpClient client = new HttpClient();
        String uri = "https://" + baseURL + "/vCenter-CB/api/hierarchy";
        System.out.println(uri);
        System.out.println(bodyString);
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Add a vCenter Server Entity to the Chargeback Hierarchy

This task helps you add a vCenter Server entity under a specified parent entity in a Chargeback hierarchy.

To add a vCenter Server entity to the Chargeback hierarchy

1 Call the API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/hierarchy/{hierarchyId}/entity/{parentEntityId}
```

For example, you can define a call like this:

```
POST https://123.123.123.123/vCenter-CB/api/hierarchy/11/entity/101
```

2 In the request XML, specify the hierarchy ID, entity name, and description for the hierarchy.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <VCenterServers>
        <VCenterServer id="502">
            <VCenterServerView id = "2"/>
                <Entities>
                    <Entity id="1062"/>
                </Entities>
        </VCenterServer>
    </VCenterServers>
</Request>
```

If successful, the API returns an XML file that indicates the status.

The ID of the vCenter Server and the vCenter Server entities can be obtained by fetching the list of the vCenter Servers and the vCenter Server entities available in vCenter Chargeback Manager by using the following APIs:

- `GET <Base_URL>/vCenterServers`
- `GET <Base_URL>/vcHierarchy/{vCenterServerId}`

The following is an example program that calls the Add Entity API.

```
/**
     * This method is for adding a new vCenter-Server entity under
     * vCenter-Chargeback Hierarchy entity
     *
     * @param requestFilePath
     * @param baseURL
     * @param hierachyId
     * @param CBEntityId
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddNewVCenterServerEntity(String requestFilePath, String
               baseURL, int hierachyId, int CBEntityId, long startTime)
            throws IOException, JDOMException, NoSuchAlgorithmException,
               KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        NameValuePair[] parameters = {new NameValuePair("startTime",
               String.valueOf(startTime))};
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/hierarchy/" + hierachyId +
               "/entity/" + CBEntityId;
        HttpClient client = new HttpClient();
        System.out.println(uri);
        System.out.println(bodyString);
        try {
            post = new PostMethod(uri);
            post.setQueryString(parameters);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Add a Fixed Cost

A fixed cost is a definite cost that can be charged on an entity. Using the Add Fixed Cost API, you can create fixed costs for entities.

To add a fixed cost

1 Call the API using the following syntax.

```
<HTTP_request_method> <Base_URL>/fixedCost
```

For example, you can define a call like this:

```
POST https://123.123.123.123/vCenter-CB/api/fixedCost
```

2 In the request XML, specify a name and a description for the fixed cost.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <FixedCosts>
        <FixedCost>
            <Name>Fixed Cost 1</Name>
            <Description>Fixed Cost 1 description</Description>
            <Currency id="1"/>
        </FixedCost>
    </FixedCosts>
</Request>
```

If the task is successful, the API returns an XML file that provides details of the new fixed cost.

The following is an example program that calls the API.

```
/**
     * This method is to add a fixed cost in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddFixedCost(String requestFilePath, String baseURL) throws
               IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/fixedCost";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Modify a Fixed Cost Value

Using the Modify Fixed Cost API, you can update the ID, value, and duration for a fixed cost.

To modify a fixed cost value

1 Call the API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/fixedCost/{fixedCostId}/values
```

For example, you can define a call like this:

```
PUT https://123.123.123.123/vCenter-CB/api/fixedCost/{fixedCostId}/values
```

2 In the request XML, specify a name and a description for the fixed cost. The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <FixedCosts>
        <FixedCost id="1">
            <Values>
                <Value>
                    <Cost>3.1415</Cost>
                    <Duration id="1"/>
                </Value>
            </Values>
        </FixedCost>
    </FixedCosts>
</Request>
```

The response XML indicates whether the fixed cost value was successfully modified.

The following is an example program that calls the API.

```
/**
     * This method is to modify the values of an existing fixedCost
     *
     * @param requestFilePath
     * @param baseURL
     * @param startTime
     * @param endTime
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleModifyFixedCostValues(String requestFilePath, String baseURL,
                int fixedCostId, long startTime, long endTime) throws IOException,
            JDOMException, NoSuchAlgorithmException, KeyManagementException, HttpException {
        PutMethod put = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        HttpClient client = new HttpClient();
        String uri = "https://" + baseURL + "/vCenter-CB/api/fixedCost/" + fixedCostId +
                "/values";
        System.out.println(uri);
        NameValuePair[] parameters = {new NameValuePair("startTime",
                String.valueOf(startTime)), new NameValuePair("endTime",
                String.valueOf(endTime))};
        try {
            put = new PutMethod(uri);
            put.setRequestBody(bodyString);
            put.setQueryString(parameters);
            client.executeMethod(put);
            System.out.println(put.getResponseBodyAsString());
```

```
        } finally {
            if (put != null) {
                put.releaseConnection();
            }
        }
    }
```

Generate a Report

Use the Generate Report API to send a request to create a report.

To generate a report

1 Call the API by using the following syntax.

```
<HTTP_request_method> <Base_URL>/report
```

For example, you can define a call like this:

```
POST https://123.123.123.123/vCenter-CB/api/report
```

2 In the request XML, specify the following details about the hierarchy, entity, resource counters, and the cost model.

- Name of the report.
- Description of the report.
- Type of the report that you want to generate. You can generate a cost report, cost comparison report, or a usage report.
- Start and end times of the period for which the report is to be generated.
- IDs of the hierarchy, entity, cost model, and computing resource for which you want to generate the report.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
   <Reports>
      <Report>
         <MetaData>
            <Name>SampleReport</Name>
            <Description></Description>
            <ReportType>COST_REPORT</ReportType>
            <OwnedByName></OwnedByName>
            <ReportPeriod>
               <From>1320085800000</From>
               <To>1322418599999</To>
            </ReportPeriod>
            <Hierarchies>
               <Hierarchy id="1023">
                  <Entities>
                     <Entity id="1024" costModelId="30" />
                  </Entities>
               </Hierarchy>
            </Hierarchies>
            <ComputingResources>
               <ComputingResource id="1" />
               <ComputingResource id="2" />
               <ComputingResource id="5" />
               <ComputingResource id="6" />
               <ComputingResource id="9" />
               <ComputingResource id="10" />
            </ComputingResources>
         </MetaData>
         <Configuration>
            <Computation>
               <Settings type="costVariance">
```

```
                <Property name="enabled" value="true" />
                <Property name="granularity" value="DAILY" />
              </Settings>
            </Computation>
          </Configuration>
        </Report>
    </Reports>
</Request>
```

vCenter Chargeback Manager queues this report request as a task and returns an XML that indicates the status of the task. You can use the Get Queued Task Status API to track the progress of the task. For more information on the Get Queued Task Status API, see the *vCenter Chargeback Manager API Reference*.

The following is an example program that calls the API.

```
/**
     * This method is to generate report for a vCenter-ChargeBack hierarchy
     * entity in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleGenerateReportMethod(String requestFilePath, String baseURL)
                throws IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/report";
        HttpClient client = new HttpClient();
        System.out.println(uri);
        System.out.println(bodyString);
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Using vCenter Chargeback Manager with a Billing System 3

This chapter explains some of the tasks that you can perform by using vCenter Chargeback Manager APIs in an environment where vCenter Chargeback Manager is integrated with a third party billing system. You can use vCenter Chargeback Manager to perform cost measurement and generate resource utilization reports, which are provided to the billing system to charge customers.

The chapter includes the following topics:

Requirements for Code Examples

This chapter provides code examples to explain how you can call the APIs. To run these code examples, you require the following JAR and helper class files.

JAR Files

The code examples need the following JAR files.

- `commons-httpclient-3.1.jar`
- `commons-logging-1.1.1.jar`
- `jdom.jar`

You must place these JAR files in the classpath.

CommonUtil Class

The code examples use the following CommonUtil class.

```
public final class CommonUtil {
    /**
    * This method writes out a formatted XML document to the Writer out.
    *
    * @param doc
    * @param out
    * @throws IOException
    */
    public static void printXML(Document doc, Writer out) throws IOException {
        XMLOutputter o = new XMLOutputter();
        Format newFormat = o.getFormat();
        newFormat.setIndent("  ");
        o.setFormat(newFormat);
        o.output(doc, out);
    }
    /**
        * This method returns the XML document as a string object
        *
        * @param doc JDOM document representation of the XML
        * @return String representation of the XML document
        * @throws IOException
        */
    public static String xmlAsString(Document doc) throws IOException {
        Writer w = new StringWriter();
        printXML(doc, w);
        return w.toString();
    }
    /**
        * This method reads the XML from a file and returns its representation as a
        * JDOM document
        *
        * @param filePath path to the XML file
        * @return JDOM document representation of the XML
        * @throws IOException
        * @throws JDOMException
        */
    public static Document getXMLDocument(String filePath) throws IOException, JDOMException {
        FileInputStream fis = null;
        try {
            fis = new FileInputStream(filePath);
            return getXMLDocument(fis);
        } finally {
            if (fis != null) {
            fis.close();
        }
    }
}

/**
    * This method reads an XML document from the input Stream and returns its
    * JDOM document representation
    *
    * @param is input stream that has the XML content
    * @return jDOM document representation for the XML
    * @throws IOException
    * @throws JDOMException
    */
    private static Document getXMLDocument(InputStream is) throws IOException, JDOMException {
        Document xml = null;
        SAXBuilder builder = new SAXBuilder();
        xml = builder.build(is);
        return xml;
    }
}
```

FakeSSLCertificateSocketFactory Class

The code examples use the following class to access resources over the HTTPS protocol.

```
/**
    * Helper class to accept self-signed certificate.
    */
    public class FakeSSLCertificateSocketFactory implements SecureProtocolSocketFactory {
    private SSLContext sslContext;
    public FakeSSLCertificateSocketFactory() throws NoSuchAlgorithmException,
                    KeyManagementException {
        sslContext = SSLContext.getInstance("SSL");
        sslContext.init(null, new TrustManager[] {new X509TrustManager() {

            @Override
            public void checkClientTrusted(X509Certificate[] ax509certificate, String s) throws
                            CertificateException {
            // Allow.

            }

            @Override
            public void checkServerTrusted(X509Certificate[] ax509certificate, String s) throws
                            CertificateException {
            // Allow.
            }

            @Override
            public X509Certificate[] getAcceptedIssuers() {
            return new X509Certificate[0];
            }
        }}, null);
    }
    @Override
    public Socket createSocket(String s, int i) throws IOException, UnknownHostException {
        return sslContext.getSocketFactory().createSocket(s, i);
    }

    @Override
    public Socket createSocket(String s, int i, InetAddress inetaddress, int j) throws
                    IOException, UnknownHostException {
        return sslContext.getSocketFactory().createSocket(s, i, inetaddress, j);
    }

    @Override
    public Socket createSocket(String s, int i, InetAddress inetaddress, int j,
                    HttpConnectionParams httpconnectionparams) throws IOException,
        UnknownHostException, ConnectTimeoutException {
        return sslContext.getSocketFactory().createSocket(s, i, inetaddress, j);
    }

    @Override
    public Socket createSocket(Socket socket, String s, int i, boolean flag) throws IOException,
                    UnknownHostException {
    return sslContext.getSocketFactory().createSocket(socket, s, i, flag);
    }

    }
```

Add Cost Models

You can add multiple cost models in vCenter Chargeback Manager. Defining multiple cost models enables you to charge different sets of entities or hierarchies differently. It also enables you to compare the costs calculated using different cost models for a hierarchy or a set of entities.

To add a cost model

1 Call the Add Cost Model API by specifying the following URL in your program.

```
POST https://<ipaddress>/vCenter-CB/api/costModel
```

2 In the request XML, specify the following information.

- Name: Specify Networking as the name of the cost model.
- Description: Provide a brief description for the Networking cost model.
- Currency ID: (Optional) Specify the ID of the currency to be set for this cost model. If not specified, the currency ID will automatically be set to US Dollars (USD) or the global currency ID that was set during vCenter Chargeback Manager upgrade. For a list of currencies supported by vCenter Chargeback Manager, see the Appendix of the *vCenter Chargeback Manager API Reference*.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
    <Request>
        <CostModels>
            <CostModel>
                <Name>Networking</Name>
                <Description>Networking Cost Model</Description>
                <Currency id="1"/>
            </CostModel>
        </CostModels>
    </Request>
```

3 Add the following cost models.

- Allocation Pool
- Reservation Pool
- Pay as you go

The following is an example program that calls the Add Cost Models API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method is to add a cost model in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddCostModel(String requestFilePath, String baseURL) throws
               IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/costModel";
```

```
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Add a Billing Policy

You can define custom billing policies as per your requirements. A billing policy defines an expression that is used for identifying the computing resources units to be considered for calculating the costs.

To add a billing policy

1 Call the Add Billing Policy API by specifying the following URL in your program:

`POST https://<ipaddress>/vCenter-CB/api/billingPolicy`

2 In the request XML, provide the following details:

- Name: Name of the billing policy.
- Description: A brief description of the billing policy.
- Expression: The expression defines attribute values that identify the computing resource units to be considered for cost calculation. For a list of computing resources and their associated attribute values, see the Appendix of the *vCenter Chargeback Manager API Reference*. For a computing resource the expression can be the maximum of available attributes. It can also account for the fixed costs, linked clones and the state of the virtual machine.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
    <Request>
        <BillingPolicy>
            <Name>New Billing Policy </Name>
            <Description>New Flexible Billing Policy Expression</Description>
            <Expression>cpu=max(usage, reservation);memory=max(usage,reservation);rest=usage;
                        </Expression>
         </BillingPolicy>
        </Request>
```

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**

     * This method is to add a billing policy in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws JDOMException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws HttpException
     */
    public static void sampleAddBillingPolicy(String requestFilePath, String baseURL) throws
               IOException, JDOMException, NoSuchAlgorithmException,
            KeyManagementException, HttpException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
```

```
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/billingPolicy";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Retrieve List of Hierarchies

Typically, you create new hierarchies in vCenter Chargeback Manager whenever new customer accounts are created and schedule reports to track resource usage for these accounts. To retrieve a list of hierarchies based on their names or on the time of their creation, you can use the Search API.

To retrieve a list of hierarchies

1 Call the Search API by using the following URL in your program.

```
POST <API base URL>/search
```

2 In the request XML, use the following search criteria to get the hierarchy by name.

```
<Criteria type="AND">
    <Filter name="hierarchyName" type="EQUAL" value="TestHierarchy" />
</Criteria>
```

For more information on all the available search filters, refer *vCenter Chargeback Manager API Reference*.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <SearchQueries>
        <SearchQuery id="hierarchy">
            <Criteria type="AND">
                <Filter name="name" type="LIKE" value="%hierarchy1%" />
                <Filter name="desc" type="LIKE" value="%hierarchyDesc1%" />
                <Filter name="createdOn" type="BETWEEN" from="1230748200000"
                                to="1295548200000"/>
            </Criteria>
            <SortBy>
                <Params>
                    <Param index="1" order="DESC">createdOn</Param>
                </Params>
                </SortBy>
                <Pagination>
                    <FirstResultCount>0</FirstResultCount>
                    <MaxResultCount>100</MaxResultCount>
            </Pagination>
        </SearchQuery>
    </SearchQueries>
</Request>
```

If the operation is successful, the response XML provides details of the retrieved hierarchies.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method get list of hierarchies from vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleGetHierarchies(String requestFilePath, String baseURL) throws
               HttpException, IOException, KeyManagementException,
            NoSuchAlgorithmException, JDOMException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/search";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Get Details of a Hierarchy

After the Search API retrieves the new hierarchies, you can get more details about a specific hierarchy by calling the Get Hierarchy API.

To get details of a hierarchy

1 Call the Get Hierarchy API by using the following URL in your program.

```
GET <API base URL>/hierarchy/{hierarchyId}
```

If the operation is successful, the response XML contains details of the hierarchy.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method get hierarchy from vCenter-ChargeBack
     *
     * @param hierarchyId
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleGetHierarchy(int hierarchyId, String baseURL) throws
               HttpException, IOException, KeyManagementException, NoSuchAlgorithmException,
            JDOMException {
        GetMethod get = null;
        HttpClient client = new HttpClient();
```

```
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/hierarchy/" + hierarchyId;
        try {
            get = new GetMethod(uri);
            client.executeMethod(get);
            System.out.println(get.getResponseBodyAsString());
        } finally {
            if (get != null) {
                get.releaseConnection();
            }
        }
    }
```

Add Report Schedule for Hierarchy

You can schedule reports to be generated at regular intervals. Add a report schedule for the hierarchy by using the Report Schedule API.

To add a report schedule for a hierarchy

1 Call the Report Schedule API by using the following URL in your program.

```
POST <API base URL>/reportSchedule
```

For example,

```
POST https://123.123.123.123/vCenter-CB/api/reportSchedule
```

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
   <ReportSchedules>
      <ReportSchedule>
         <MetaData>
            <Name>SampleReportSchedule</Name>
            <Description></Description>
            <ReportType>COST_REPORT</ReportType>
            <OwnedByName></OwnedByName>
            <ReportPeriodType>WEEKLY</ReportPeriodType>
            <ReportPeriod>
               <Weekly>
                  <StartDayOfWeek>1</StartDayOfWeek>
               </Weekly>
            </ReportPeriod>
            <Hierarchies>
               <Hierarchy id="1023">
                  <Entities>
                     <Entity id="1024" costModelId="30">
                        <Attributes operator="OR">
                           <Attribute id="10" criteria="EQUALS">
                              <Value>TestValue</Value>
                           </Attribute>
                        </Attributes>
                     </Entity>
                  </Entities>
               </Hierarchy>
            </Hierarchies>
            <ComputingResources>
               <ComputingResource id="1" />
               <ComputingResource id="2" />
               <ComputingResource id="5" />
               <ComputingResource id="6" />
               <ComputingResource id="9" />
               <ComputingResource id="10" />
            </ComputingResources>
         </MetaData>
         <Configuration>
```

```
            <Computation>
               <Settings type="costVariance">
                  <Property name="enabled" value="true" />
                  <Property name="granularity" value="DAILY" />
               </Settings>
            </Computation>
         </Configuration>
         <ScheduleDetail>
            <FireTime>
               <Hour>13</Hour>
               <Minute>59</Minute>
            </FireTime>
            <Recurrence type="WEEKLY">
               <DayOfWeek>2</DayOfWeek>
            </Recurrence>
            <Range>
               <StartDate>1321295400000</StartDate>
               <Count>-1</Count>
            </Range>
         </ScheduleDetail>
      </ReportSchedule>
   </ReportSchedules>
</Request>
```

If the operation is successful, the response XML provides details of the report schedule.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method schedules report in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleScheduleReport(String requestFilePath, String baseURL) throws
                HttpException, IOException, KeyManagementException,
            NoSuchAlgorithmException, JDOMException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/reportSchedule";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Get Report Schedule by Hierarchy Name

Depending on how you charge each customer, you might have mapped entities in the hierarchy to appropriate cost models. You can call the Search API to get the report schedule for the hierarchy and verify the entity to cost model mappings.

To get schedule by hierarchy name

1 Call the Search API by using the following URL in your program.

```
POST <API base URL>/search
```

2 In the request XML, specify the following parameters to search schedules. You can use any of these parameters alone or in combination with the others.

- name
- desc
- hierarchyName
- costModelName

3 You can use search operators such as `EQUAL, NOT_EQUAL, BETWEEN, GT, LT, GT_EQUAL, LT_EQUAL, NULL, NOT_NULL, LIKE, NOT_LIKE` to filter your search.

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
   <SearchQueries>
       <SearchQuery id="reportSchedule">
           <Criteria type="AND">
               <Filter name="name" type="LIKE" value="%reportSchedule1%" />
               <Filter name="desc" type="LIKE" value="%reportScheduleDesc1%" />
               <Filter name="costModelName" type="EQUAL" value="costModel1"/>
           </Criteria>
           <SortBy>
               <Params>
                   <Param index="1" order="DESC">name</Param>
               </Params>
           </SortBy>
           <Pagination>
               <FirstResultCount>0</FirstResultCount>
               <MaxResultCount>100</MaxResultCount>
           </Pagination>
       </SearchQuery>
    </SearchQueries>
</Request>
```

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method get schedule by hierarchy name from vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleGetScheduleByHierarchyName(String requestFilePath, String
               baseURL) throws HttpException, IOException, KeyManagementException,
            NoSuchAlgorithmException, JDOMException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/search";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
```

```
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Reschedule a Report

You can update a report schedule using the Reschedule Report API. The Reschedule Report API updates the schedule information. If you want to update the entity to cost model mapping, you must delete the schedule and create a new schedule.

To reschedule a report

1 Call the Reschedule Report API by using the following URL in your program.

```
PUT <API base URL>/reportSchedule/{scheduleId}
```

For example,

```
PUT https://123.123.123.123/vCenter-CB/api/reportSchedule/5
```

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request xmlns="http://www.vmware.com/vcenter/chargeback/2.0">
    <ReportSchedules>
        <ReportSchedule>
            <MetaData>
                <ReportPeriodType>DAILY</ReportPeriodType>
                <ReportPeriod>
                    <Daily>
                        <DaysBefore>1</DaysBefore>
                    </Daily></ReportPeriod>
            </MetaData>
            <ScheduleDetail>
                <FireTime>
                    <Hour>13</Hour>
                    <Minute>59</Minute>
                </FireTime>
                <Recurrence type="DAILY">
                    <RepeatInterval>1</RepeatInterval>
                </Recurrence>
                <Range>
                    <StartDate>1321295400000</StartDate>
                    <Count>-1</Count>
                </Range>
            </ScheduleDetail>
        </ReportSchedule>
    </ReportSchedules>
</Request>
```

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method Re-schedule report in vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @param scheduleId
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
```

```
public static void sampleRescheduleReport(String requestFilePath, String baseURL, int
          scheduleId) throws HttpException, IOException,
        KeyManagementException, NoSuchAlgorithmException, JDOMException {
    PutMethod put = null;
    Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
    String bodyString = CommonUtil.xmlAsString(requestDocument);
    HttpClient client = new HttpClient();
    Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
           FakeSSLCertificateSocketFactory(), 443));
    String uri = "https://" + baseURL + "/vCenter-CB/api/reportSchedule/" + scheduleId;
    try {
        put = new PutMethod(uri);
        put.setRequestBody(bodyString);
        client.executeMethod(put);
        System.out.println(put.getResponseBodyAsString());
    } finally {
        if (put != null) {
            put.releaseConnection();
        }
    }
}
```

Delete Report Schedule

Currently, the Reschedule Report API updates only the schedule information and not the entity to cost model mapping. So, you need to delete the report schedule and create a new one if you want to add, modify, or delete any entity to cost model mappings if any new customer is getting added.

To delete a report schedule

1 Call the Delete Schedule API by using the following URL in your program.

```
DELETE <API base URL>/reportSchedule/{scheduleId}
```

For example,

```
DELETE https://123.123.123.123/vCenter-CB/api/reportSchedule/5
```

The response XML indicates that the delete operation is successful.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method is to delete report schedule in vCenter-ChargeBack
     *
     * @param baseURL
     * @param scheduleId
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleDeleteReportSchedule(String baseURL, int scheduleId) throws
              HttpException, IOException, KeyManagementException,
            NoSuchAlgorithmException, JDOMException {
        DeleteMethod delete = null;
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
               FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/reportSchedule/" + scheduleId;
        try {
            delete = new DeleteMethod(uri);
            client.executeMethod(delete);
            System.out.println(delete.getResponseBodyAsString());
        } finally {
            if (delete != null) {
                delete.releaseConnection();
```

```
            }
        }
    }
```

Get List of Archived Reports for a Hierarchy

For a specific hierarchy, you can get a list of archived reports that were generated after a specific time. To do this, you can use the Search API.

To get list of archived reports for a hierarchy

1 Call the Search API by using the following URL in your program.

```
POST <API base URL>/search
```

2 In the request XML, use the following section to search for reports with the specific hierarchy name and created after or equal to a time passed in milliseconds since January 1, 1970.

```
<Criteria type="AND">
    <Filter name="hierarchyName" type="EQUAL" value="TestHierarchy" />
    <Filter name="createdOn" type="GT_EQUAL" value="1272639780140" />
</Criteria>
```

The following is an example request XML.

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
    <SearchQueries>
        <SearchQuery id="report">
            <Criteria type="AND">
                <Filter name="name" type="LIKE" value="%report1%" />
                <Filter name="desc" type="LIKE" value="%reportDesc1%" />
                <Filter name="costModelName" type="EQUAL" value="costModel1"/>
            </Criteria>
            <SortBy>
                <Params>
                    <Param index="1" order="DESC">totalCost</Param>
                </Params>
            </SortBy>
            <Pagination>
                <FirstResultCount>0</FirstResultCount>
                <MaxResultCount>100</MaxResultCount>
            </Pagination>
        </SearchQuery>
    </SearchQueries>
</Request>
```

The response XML contains a list of reports that match the search criteria.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method gets archived reports from vCenter-ChargeBack
     *
     * @param requestFilePath
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleGetArchivedReports(String requestFilePath, String baseURL)
                throws HttpException, IOException, KeyManagementException,
            NoSuchAlgorithmException, JDOMException {
        PostMethod post = null;
        Document requestDocument = CommonUtil.getXMLDocument(requestFilePath);
        String bodyString = CommonUtil.xmlAsString(requestDocument);
```

```
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/search";
        try {
            post = new PostMethod(uri);
            post.setRequestBody(bodyString);
            client.executeMethod(post);
            System.out.println(post.getResponseBodyAsString());
        } finally {
            if (post != null) {
                post.releaseConnection();
            }
        }
    }
```

Get a Report as XML

Get a report in the XML format using the Export Report API.

1 Use the following syntax to call the Export Report API.

```
GET <API base URL>/report/{reportId}/export?exportFormat=XML
```

For example,

```
GET https://123.123.123.123/vCenter-CB/api/report/10/export?exportFormat=XML
```

The API queues the export report request as a task and returns the status of the queued task. You can check the status of the queued task using the Get Queued Task Status API. After the exported report is ready, the Export Report API returns the report in XML format.

2 In the response XML, check the ComputeData section for the cost details.

For a detailed description of all the elements in the response XML, see the vCenter Chargeback Manager API Reference Guide.

The following is an example program that calls the API. This program assumes that the request XML is populated with the required information.

```
/**
     * This method get report as XML vCenter-ChargeBack
     *
     * @param reportId
     * @param baseURL
     * @throws IOException
     * @throws HttpException
     * @throws NoSuchAlgorithmException
     * @throws KeyManagementException
     * @throws JDOMException
     */
    public static void sampleGetReportAsXml(int reportId, String baseURL) throws
                HttpException, IOException, KeyManagementException, NoSuchAlgorithmException,
            JDOMException {
        GetMethod get = null;
        HttpClient client = new HttpClient();
        Protocol.registerProtocol("https", new Protocol("https", (ProtocolSocketFactory) new
                FakeSSLCertificateSocketFactory(), 443));
        String uri = "https://" + baseURL + "/vCenter-CB/api/report/" + reportId + "/export";
        NameValuePair[] parameters = {new NameValuePair("exportFormat", "XML")};
        try {
            get = new GetMethod(uri);
            get.setQueryString(parameters);
            client.executeMethod(get);
            System.out.println(get.getResponseBodyAsString());
        } finally {
            if (get != null) {
                get.releaseConnection();
            } } }
```

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