



IBM Smart Business

Development & Test on the IBM Cloud

REST API Reference

API version: 20090403

API designation: provisional

Document version: v1.3



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1 Overview

IBM Smart Business Development and Test on the IBM Cloud offers dynamic provisioning, scalable runtime environment that supports the end-to-end lifecycle for development and test activities. Integration within developer tooling is enabled through several application programming interfaces. SOAP and REST endpoints have been designed to be simple and flexible enabling extension and integration. This document reviews the current REST API. The SOAP based endpoint will be documented in a future release. Both the REST and SOAP endpoints should be considered provisional in form and function and may change without notice.

Who should read this guide

Developers and architects interested in understanding or working programmatically with the IBM Smart Business Development and Test on the IBM Cloud will find the necessary details on the current REST API.

This guide presumes knowledge of XML, web services, REST and a programming language. Developers should review the IBM Smart Business Development and Test on the IBM Cloud User Guide (www.ibm.com/cloud/developer/static/userguide.html). Much of the capabilities exposed through the web experience are available through the API. Developers should explore the web experience to gain a better understanding of the overall solution.

API Designation

The current application programming interface is officially released as provisional and will change. This document will be updated and published to coincide with changes to the API. The goal is to ensure this programming interface evolves to meet the needs of the development community.

API Versioning

Changes to the REST API are versioned with the date (e.g. 20091101) and is clearly seen as part of the URL.

Improving the API

The current API is provisional in nature, explicitly noting that it will change. Help influence the evolution by providing feedback through the online forums or through email.

Feedback specific to this user guide should be sent to: devcloud@us.ibm.com

Recent changes

- URLs use to point at www-949.ibm.com. They are now written as www-180.ibm.com.



- Additional content was added to this document to describe the additional requirement that HTTP client code needs to follow redirects.

Upcoming changes

The earliest versions of the API were not intended for public consumption and as such do not follow the conventions of the provisional designation. In upcoming releases two things will be apparent:

1. The REST API URLs will contain the word provisional.
2. The XML namespace will include the word provisional.

The private endpoints will be formally deprecated and eventually removed. This document will track their availability.

2 Security

Currently, the REST-API is a secured web resource which uses Basic Authentication and SSL. In order to use the API services a user must be registered with the DeveloperCloud and be able to provide their credentials with each request. All requests to the API are required to go over SSL to ensure transport level encryption. No message level signing or encryption is done at this time.

3 Request Structure

The Developer Cloud API follows the REST access pattern applying the HTTP semantics to its application domain. All DeveloperCloud objects can be accessed and manipulated via unique URIs that can be built from the base URL using the standard set of HTTP Methods.

Note: The URLs in this document will redirect to other hosts and as such require your HTTP client code to follow redirects.

Base URL: <https://www-180.ibm.com/cloud/developer/api/rest/20090403/>

Valid Resource Endpoints:

images	<Base URL>/images/
instances	<Base URL>/instances/
storage	<Base URL>/storage/
addresses	<Base URL>/addresses/
requests	<Base URL>/requests/
keys	<Base URL>/keys/

Requests use the typical HTTP name/value pair approach for passing parameters. Message bodies use the typical HTTP body encoding. Specific and valid message bodies and parameters are used throughout the rest of this guide.

4 Response Format

The DeveloperCloud API is built to support a variety of different response encodings. The default encoding of responses is XML. The 20090403 version of the API supports both XML JSON (JavaScript Object Notation) response encodings. Use the `AcceptHTTP` header to define the desired response encoding. The table below defines the supported response encodings and the associated `Accept` header MIME Type value:

Response Encoding	MIME Type
XML	text/xml
JSON	application/json

HTTP Request:

```
GET /cloud/developer/api/rest/20090403/images HTTP/1.1
Host: www-949.ibm.com
User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.1.1)
Gecko/20090715 Firefox/3.5.1
Accept: application/json
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
Cookie: ...
Cache-Control: max-age=0
```

HTTP Response:

```
HTTP/1.x 200 OK
Date: Fri, 31 Jul 2009 11:45:54 GMT
Server: IBM_HTTP_Server
Cache-Control: max-age=3600
Expires: Fri, 31 Jul 2009 12:48:40 GMT
Vary: Accept-Encoding,User-Agent
Content-Encoding: gzip
Content-Type: application/json
Content-Language: en-US
Transfer-Encoding: chunked
```

The DeveloperCloud API also has full support for the GZIP Content-Encoding. In order to have responses compressed using GZIP set the Accept-Encoding header in the HTTP Request to gzip.

5 API Command Reference

5.1 Image Management

5.1.1 GET /images

Description: Returns the list of Images available to be provisioned on the IBM DeveloperCloud.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeImagesResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <Image>
    <ID>3</ID>
    <ProductCodes>
      <ProductCode>84e900960c3d4b648fa6d4670aed2cd1</Product-
        Code>
    </ProductCodes>
    <Name>SUSE 10 SP2</Name>
    <Location>
      https://...
    </Location>
    <State>1</State>
    <Owner>SYSTEM</Owner>
    <Visibility>PUBLIC</Visibility>
    <Platform>SUSE Linux Enterprise/10 SP2</Platform>
    <Description>SuSE v10.2 Base OS Image</Description>
    <Manifest>
      https://.../parameters.xml
    </Manifest>
    <Documentation>
      https://.../GettingStarted.html
    </Documentation>
    <SupportedInstanceTypes>
      <InstanceType>MEDIUM</InstanceType>
      <InstanceType>SMALL</InstanceType>
      <InstanceType>LARGE</InstanceType>
    </SupportedInstanceTypes>
```

```

        <CreatedTime>2009-04-25T00:00:00.000-04:00</CreatedTime>
    </Image>

```

```

    ...
</ns2:DescribeImagesResponse>

```

JSON Response:

```

{
  "images": [
    {
      "name":
        "SUSE 10SP2",
      "manifest": "https://.../parameters.xml",
      "state": 1,
      "visibility": "PUBLIC",
      "owner": "SYSTEM",
      "platform": "SUSE Linux Enterprise/10 SP2",
      "createdTime": 1240632000000,
      "location": "http://...",
      "supportedInstanceTypes": [
        "MEDIUM",
        "SMALL",
        "LARGE"
      ],
      "productCodes": [
        "84e900960c3d4b648fa6d4670aed2cd1"
      ],
      "documentation": "https://.../GettingStarted.html",
      "id": "3",
      "description": "SuSE v10.2 Base OS Image"
    },
    ...
  ]
}

```

Error Codes: None

5.1.2 GET /images/\$IMAGE_ID

Description: Returns the available Image identified by the supplied Image ID

Message Body: None

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeImageResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

```

```

<Image>
  <ID>3</ID>
  <ProductCodes>
    <ProductCode>84e900960c3d4b648fa6d4670aed2cd1</Product-
      Code>
  </ProductCodes>
  <Name>SUSE 10 SP2</Name>
  <Location>
    https://...
  </Location>
  <State>1</State>
  <Owner>SYSTEM</Owner>
  <Visibility>PUBLIC</Visibility>
  <Platform>SUSE Linux Enterprise/10 SP2</Platform>
  <Description>SuSE v10.2 Base OS Image</Description>
  <Manifest>
    https://.../parameters.xml
  </Manifest>
  <Documentation>
    https://.../GettingStarted.html
  </Documentation>
  <SupportedInstanceTypes>
    <InstanceType>MEDIUM</InstanceType>
    <InstanceType>SMALL</InstanceType>
    <InstanceType>LARGE</InstanceType>
  </SupportedInstanceTypes>
  <CreatedTime>2009-04-25T00:00:00.000-04:00</CreatedTime>
</Image>
</ns2:DescribeImageResponse>

```

JSON Response:

```

{
  "name":
  "SUSE 10SP2",
  "manifest": "https://.../parameters.xml",
  "state": 1,
  "visibility": "PUBLIC",
  "owner": "SYSTEM",
  "platform": "SUSE Linux Enterprise/10 SP2",
  "createdTime": 1240632000000,
  "location": "http://...",
  "supportedInstanceTypes": [
    "MEDIUM",
    "SMALL",
    "LARGE"
  ],
  "productCodes": [

```




```
      "84e900960c3d4b648fa6d4670aed2cd1"
    ],
    "documentation": "https://.../GettingStarted.html",
    "id": "3",
    "description": "SuSE v10.2 Base OS Image"
  }
}
```

Error Codes:

404: The image specified by the supplied \$IMAGE_ID is not found

5.1.3 DELETE /images/\$IMAGE_ID

Description: Deletes Image identified by the supplied Image ID.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DeleteImageResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:DeleteImageResponse>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

401: The user is not authorized to delete this image

404: The image specified by the supplied \$IMAGE_ID is not found

412: The image is in an invalid state to perform this operation

500: An unknown error occurred deleting this image

5.1.4 PUT /images/\$IMAGE_ID**5.1.4.1 PUT visibility**

Description: Makes the Image identified by the supplied Image ID publically available for all users to create Instances of.

Message Body:

visibility: The new visibility state of the image, currently only PUBLIC is supported.

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:PromoteImageResponse
```

```

xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
<Image>
  <ID>3</ID>
  <ProductCodes>
    <ProductCode>84e900960c3d4b648fa6d4670aed2cd1</Pro-
      ductCode>
  </ProductCodes>
  <Name>SUSE 10 SP2</Name>
  <Location>
    https://...
  </Location>
  <State>1</State>
  <Owner>SYSTEM</Owner>
  <Visibility>PUBLIC</Visibility>
  <Platform>SUSE Linux Enterprise/10 SP2</Platform>
  <Description>SuSE v10.2 Base OS Image</Description>
  <Manifest>
    https://.../parameters.xml
  </Manifest>
  <Documentation>
    https://.../GettingStarted.html
  </Documentation>
  <SupportedInstanceTypes>
    <InstanceType>MEDIUM</InstanceType>
    <InstanceType>SMALL</InstanceType>
    <InstanceType>LARGE</InstanceType>
  </SupportedInstanceTypes>
  <CreatedTime>2009-04-25T00:00:00.000-04:00</CreatedTime>
</Image>
</ns2:PromoteImageResponse>

```

JSON Response:

```

{
  "name":
    "SUSE 10SP2",
  "manifest":"https://.../parameters.xml",
  "state":1,
  "visibility":"PUBLIC",
  "owner":"SYSTEM",
  "platform":"SUSE Linux Enterprise/10 SP2",
  "createdTime":1240632000000,
  "location":"http://...",
  "supportedInstanceTypes":[
    "MEDIUM",
    "SMALL",
    "LARGE"
  ]
}

```

```

    ],
    "productCodes": [
        "84e900960c3d4b648fa6d4670aed2cd1"
    ],
    "documentation": "https://.../GettingStarted.html",
    "id": "3",
    "description": "SuSE v10.2 Base OS Image"
}

```

Error Codes:

401: The user is not authorized to change the visibility of this image
 404: The image specified by the supplied \$IMAGE_ID is not found
 412: The image is in an invalid state to perform this operation
 500: An unknown error occurred deleting this image

5.2 Instance Management**5.2.1 GET /instances**

Description: Returns the list of Instances that the authenticated user manages.

Message Body: None

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeInstancesResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Instance>
    <ID>7430</ID>
    <Name>ABC</Name>
    <RequestID name="ABC">7430</RequestID>
    <Owner>aadelucc@us.ibm.com</Owner>
    <Hostname>vm723.developer.ihost.com</Hostname>
    <IP>129.33.197.78</IP>
    <ImageID>3</ImageID>
    <InstanceType>MEDIUM</InstanceType>
    <Status>5</Status>
    <KeyName>DEFAULT</KeyName>
    <LaunchTime>2009-12-10T14:10:31.726-05:00</LaunchTime>
    <ExpirationTime>2010-01-09T14:10:40.837-05:00</ExpirationTime>
    <ProductCodes/>
    <Software>
      <Application>
        <Name>SUSE Linux Enterprise</Name>
        <Version>10 SP2</Version>
        <Type>OS</Type>
      </Application>
    </Software>
  </Instance>
</ns2:DescribeInstancesResponse>

```

```
        </Software>
    </Instance>
    ...
</ns2:DescribeInstancesResponse>
```

JSON Response:

```
{
  "instances":[
    {
      "launchTime":1260472231726,
      "software":[
        {
          "version":"10 SP2",
          "type":"OS",
          "name":"SUSE Linux Enterprise"
        }
      ],
      "ip":"129.33.197.78",
      "requestId":"7430",
      "keyName":"DEFAULT",
      "name":"ABC",
      "instanceType":"MEDIUM",
      "status":5,
      "owner":"aadelucc@us.ibm.com",
      "hostname":"vm723.developer.ihost.com",
      "imageId":"3",
      "productCodes":[ ],
      "requestName":"ABC",
      "id":"7430",
      "expirationTime":1263064240837
    },
    ...
  ]
}
```

Error Codes:

401: The currently authenticated user is not authorized to view this information

500: An unexpected error occurred getting the list of instances for the authenticated user

5.2.2 GET /instances/\$INSTANCE_ID

Description: Returns the Instance that the authenticated user manages with the specified \$INSTANCE_ID.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeInstanceResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Instance>
    <ID>7430</ID>
    <Name>ABC</Name>
    <RequestID name="ABC">7430</RequestID>
    <Owner>aadelucc@us.ibm.com</Owner>
    <Hostname>vm723.developer.ihost.com</Hostname>
    <IP>129.33.197.78</IP>
    <ImageID>3</ImageID>
    <InstanceType>MEDIUM</InstanceType>
    <Status>5</Status>
    <KeyName>DEFAULT</KeyName>
    <LaunchTime>2009-12-10T14:10:31.726-05:00</LaunchTime>
    <ExpirationTime>2010-01-09T14:10:40.837-05:00</ExpirationTime>
    <ProductCodes/>
    <Software>
      <Application>
        <Name>SUSE Linux Enterprise</Name>
        <Version>10 SP2</Version>
        <Type>OS</Type>
      </Application>
    </Software>
  </Instance>
</ns2:DescribeInstanceResponse>
```

JSON Response:

```
{
  "launchTime":1260472231726,
  "software":[
    {
      "version":"10 SP2",
      "type":"OS",
      "name":"SUSE Linux Enterprise"
    }
  ],
  "ip":"129.33.197.78",
```

```

    "requestId": "7430",
    "keyName": "DEFAULT",
    "name": "ABC",
    "instanceType": "MEDIUM",
    "status": 5,
    "owner": "aadelucc@us.ibm.com",
    "hostname": "vm723.developer.ihost.com",
    "imageId": "3",
    "productCodes": [],
    "requestName": "ABC",
    "id": "7430",
    "expirationTime": 1263064240837
  }

```

Error Codes:

401: The currently authenticated user is not authorized to view this instance

404: The instance specified by the supplied \$INSTANCE_ID is not found

500: An unexpected error occurred getting the list of instances for the authenticated user

5.2.3 POST /instances

Description: Requests a new Instance to be created.

Message Body:

name:	The alias to use to reference this instance
imageID:	The ID of the image to create this instance from
instanceType:	The instance type to use for this instance {SMALL, MEDIUM, LARGE}
publicKey:	The public key to use for accessing the created instance
ip (optional):	The ID of a static IP address to associate with this instance
volumeID (optional):	The ID of a storage volume to associate with this instance
Configuration Data:	Arbitrary name/value pairs defined by the image being created

NOTE: If a volumeID is specified the following configuration property MUST be defined:

oss.storage.id.0.mnt: The mount point in which to mount the attached storage volume

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:CreateInstanceResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Instance>

```

```

<ID>XXXX</ID>
<Name>$name</Name>
<RequestID name="$name">XXXX</RequestID>
<Owner>aadelucc@us.ibm.com</Owner>
<Hostname></Hostname>
<IP>$ip</IP>
<ImageID>$imageId</ImageID>
<InstanceType>$instanceSize</InstanceType>
<Status>0</Status>
<KeyName>$publicKey</KeyName>
<LaunchTime>2009-12-10T14:10:31.726-05:00</LaunchTime>
<ExpirationTime>2010-01-09T14:10:40.837-05:00</ExpirationTime>
<ProductCodes/>
<Software>
  <Application>
    <Name>SUSE Linux Enterprise</Name>
    <Version>10 SP2</Version>
    <Type>OS</Type>
  </Application>
</Software>
</Instance>
</ns2:CreateInstanceResponse>

```

JSON Response:

```

{
  "launchTime":1260472231726,
  "software":[
    {
      "version":"10 SP2",
      "type":"OS",
      "name":"SUSE Linux Enterprise"
    }
  ],
  "ip":null,
  "requestId":XXX,
  "keyName":$publicKey,
  "name":$name,
  "instanceType":$instanceType,
  "status":0,
  "owner":"aadelucc@us.ibm.com",
  "hostname":NULL,
  "imageId":$imageID,
  "productCodes":[ ],
  "requestName":$name,
  "id":XXX,
  "expirationTime":1263064240837
}

```

Error Codes:

401: The authenticated user is not authorized to create instances
402: Payment is required before more instances may be created
409: There are not enough resources in the cloud to fulfill this request
412: One or more of the supplied parameters are invalid for this instance
500: An unexpected error occurred creating this instance

5.2.4 DELETE /instances/\$INSTANCE_ID

Description: Deletes the Instance that the authenticated user manages with the specified \$INSTANCE_ID.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DeleteInstanceResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:DeleteInstanceResponse>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

401: The user is not authorized to delete this instance
404: The instance specified by \$INSTANCE_ID was not found
412: The instance is in an invalid state to perform this operation
500: An unknown error occurred deleting this instance

5.2.5 PUT /instances/\$INSTANCE_ID**5.2.5.1 PUT** expirationTime

Description: Sets the expiration time of the instance to the value specified in the message body

Message Body:

expirationTime: The new expiration time for this instance in milliseconds (epoch)

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:ExtendReservationResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <NewEndDate>2009-08-10T00:00:00.000-04:00</NewEndDate>
</ns2:ExtendReservationResponse>
```


**JSON Response:**

```
{ "expirationTime":1249876800000 }
```

Error Codes:

401: The user is not authorized to extend the expiration time of this instance

402: Payment is required before more instances may be created

404: The instance specified by \$INSTANCE_ID was not found

406: The provided expiration date is not valid

409: There are not enough resources in the cloud to fulfill this request

412: The instance is in an invalid state to perform this operation

500: An unknown error occurred deleting this instance

5.2.5.2 PUT state

Description: Sets the state of the instance to the value specified in the message body

Message Body:

state: The new state of the instance, valid values are restart, save

When state = restart the additional parameter is optional:

keyName: The name of the SSH Public Key to add to the instance during restart.

When state = save the additional parameters are required:

name: The name to associate with the captured image.

description: The description to associate with the capture image.

XML Response:

When a restart request is made:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:RestartInstanceResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:RestartInstanceResponse>
```

When a save request is made:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:SaveInstanceResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Image>
    <ID>XXXX</ID>
    <ProductCodes>
      <ProductCode>XXXX</ProductCode>
    </ProductCodes>
    <Name>$name</Name>
    <Location>
```

```

        http://ihs201.devcloud.ibm.com/cloud/rest/images/
        XXXX
    </Location>
    <State>0</State>
    <Owner>aadelucc@us.ibm.com</Owner>
    <Visibility>PRIVATE</Visibility>
    <Platform>SuSE v10.2</Platform>
    <Description>$description</Description>
    <Manifest>
        https://c101.devcloud.ibm.com/cloud/developer/ram.
        ws/RAMSecure/
        artifact/XXX/1.0/parameters.xml
    </Manifest>
    <Documentation>
        https://c101.devcloud.ibm.com/cloud/developer/ram.
        ws/RAMSecure/
        artifact/XXX/1.0/GettingStarted.html
    </Documentation>
    <SupportedInstanceTypes>
        <InstanceType>MEDIUM</InstanceType>
        <InstanceType>SMALL</InstanceType>
        <InstanceType>LARGE</InstanceType>
    </SupportedInstanceTypes>
    <CreatedTime>2009-11-09T17:01:28.000-05:00</CreatedTime>
</Image>
</ns2:SaveInstanceResponse>

```

JSON Response:

```

{
    "name":$name,
    "manifest":"https://.../parameters.xml",
    "state":0,
    "visibility":"PRIVATE",
    "owner":"aadelucc@us.ibm.com",
    "platform":"SUSE Linux Enterprise/10 SP2",
    "createdTime":1240632000000,
    "location":"http://...",
    "supportedInstanceTypes":[
        "MEDIUM",
        "SMALL",
        "LARGE"
    ],
    "productCodes":[
        XXXX
    ],
}

```

```

    "documentation": "https://.../GettingStarted.html",
    "id": "XXXX",
    "description": $description
  }

```

Error Codes:

401: The user is not authorized to perform this action
 402: Payment is required before more instances may be created
 404: The instance specified by \$INSTANCE_ID was not found
 409: There are not enough resources in the cloud to fulfill this request
 412: The instance is in an invalid state to perform this operation
 500: An unknown error occurred deleting this instance

5.2.6 GET /requests/\$REQUEST_ID

Description: Returns the list of Instances that the authenticated user manages that were created as part of the request specified by \$REQUEST_ID.

Message Body: None

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeRequestResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Instance>
    <ID>3608:180889</ID>
    <RequestID name="Testing">3608</RequestID>
    <Hostname>vm064.developer.ihost.com</Hostname>
    <IP>129.33.194.74</IP>
    <ImageID>3</ImageID>
    <Status>5</Status>
    <LaunchTime>2009-07-27T00:00:00.000-04:00</LaunchTime>
    <ExpirationTime>2009-08-10T00:00:00.000-04:00</ExpirationTime>
    <ProductCodes/>
    <Software>
      <Application>
        <Name>SLES</Name>
        <Version>10 SP2</Version>
        <Type>OS</Type>
      </Application>
    </Software>
  </Instance>
  ...
</ns2:DescribeRequestResponse>

```

JSON Response:

```
{
  "instances":[
    {
      "launchTime":1248667200000,
      "status":5,
      "hostname":"vm064.developer.ihost.com",
      "owner":"aadelucc@us.ibm.com",
      "imageId":"3",
      "software":[
        {
          "version":"10 SP2",
          "type":"OS",
          "name":"SLES"
        }
      ],
      "productCodes":[ ],
      "ip":"129.33.194.74",
      "requestName":"Testing",
      "requestId":"3608",
      "id":"3608:180889",
      "expirationTime":1249876800000
    },
    ...
  ]
}
```

Error Codes:

401: The currently authenticated user is not authorized to view this request

404: The request specified by the supplied \$REQUEST_ID is not found

500: An unexpected error occurred getting the list of instances in this request for the authenticated user

5.3 Storage Management**5.3.1 GET /storage**

Description: Used to retrieve the set of storage volumes for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeVolumesResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
```

```

<Volume>
  <ID>67</ID>
  <InstanceID>${INSTANCE_ID}</InstanceID>
  <Owner>aadelucc@us.ibm.com</Owner>
  <Name>New Storage</Name>
  <Format>ext3</Format>
  <Size>50</Size>
  <State>5</State>
  <ProductCodes/>
  <CreatedTime>2009-12-10T13:17:55.119-05:00</CreatedTime>
</Volume>
...
</ns2:DescribeVolumesResponse>

```

JSON Response:

```

{"volumes": [
  {
    "instanceId": "${INSTANCE_ID}",
    "state": 5,
    "size": "50",
    "owner": "aadelucc@us.ibm.com",
    "createdTime": 1260469075119,
    "productCodes": [],
    "format": "ext3",
    "name": "New Storage",
    "id": "67"
  },
  ...
]}

```

Error Codes:

401: The currently authenticated user is not authorized to view this information

500: An unexpected error occurred getting the list of storage volumes for the authenticated user

5.3.2 GET /storage/\${STORAGE_ID}

Description: Used to retrieve the specified storage volume for the authenticated user.

Message Body: None

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeVolumeResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

```

```

<Volume>
  <ID>67</ID>
  <InstanceID>$INSTANCE_ID</InstanceID>
  <Owner>aadelucc@us.ibm.com</Owner>
  <Name>New Storage</Name>
  <Format>ext3</Format>
  <Size>50</Size>
  <State>5</State>
  <ProductCodes/>
  <CreatedTime>2009-12-10T13:17:55.119-05:00</CreatedTime>
</Volume>
</ns2:DescribeVolumeResponse>

```

JSON Response:

```

{
  "instanceId": "$INSTANCE_ID",
  "state": 5,
  "size": "50",
  "owner": "aadelucc@us.ibm.com",
  "createdTime": 1260469075119,
  "productCodes": [],
  "format": "ext3",
  "name": "New Storage",
  "id": "67"
}

```

Error Codes:

401: The currently authenticated user is not authorized to view this storage volume
 404: The storage volume specified by the supplied \$STORAGE_ID is not found
 500: An unexpected error occurred getting the specified storage volume for the authenticated user

5.3.3 POST /storage

Description: Creates a new storage volume for the authenticated user.

Message Body:

name: The desired name of the newly created storage volume

format: The filesystem format for the new storage volume. Valid format is: EXT3

size: The size of the new storage volume. Valid values may include SMALL, MEDIUM, and LARGE. Actual values may depend on the location used and may be discovered via the location service.

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:CreateVolumeResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <Volume>
    <ID>XXX</ID>
    <InstanceID>$INSTANCE_ID</InstanceID>
    <Owner>aadelucc@us.ibm.com</Owner>
    <Name>$name</Name>
    <Format>$format</Format>
    <Size>$size</Size>
    <State>0</State>
    <ProductCodes/>
    <CreateTime>2009-12-10T13:17:55.119-05:00</CreateTime>
  </Volume>

</ns2:CreateVolumeResponse>
```

JSON Response:

```
{
  "instanceId":null,
  "state":0,
  "size":"$size",
  "owner":"aadelucc@us.ibm.com",
  "createTime":1260469075119,
  "productCodes":[ ],
  "format":"$format",
  "name":"$size",
  "id":"XXXX"
}
```

Error Codes:

401: The currently authenticated user is not authorized to remove this storage volume
402: Payment is required before more storage volumes may be created
409: There are not enough resources in the cloud to fulfill this request
412: One or more of the supplied parameters are invalid for this request
500: An unexpected error occurred creating the specified storage volume for the authenticated user

5.3.4 DELETE /storage/\$STORAGE_ID

Description: Remove the specified storage volume for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DeleteVolumeResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:DeleteVolumeResponse>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

401: The currently authenticated user is not authorized to remove this storage volume
 404: The storage volume specified by the supplied \$STORAGE_ID is not found
 412: The storage volume is not in the correct state to be deleted
 500: An unexpected error occurred getting the specified storage volume for the authenticated user

5.4 IP Address Management

5.4.1 GET /addresses

Description: Used to retrieve the set of static IP addresses for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeAddressesResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <Address>
    <ID>1217</ID>
    <IP>129.33.196.243</IP>
    <State>2</State>
    <InstanceID>$INSTANCE_ID</InstanceID>
  </Address>
  ...
</ns2:DescribeAddressesResponse>
```

JSON Response:

```
{ "addresses": [
  {
    "state": 2,
    "ip":
    "129.33.196.243",
    "id": "1217",
    "instanceId": "$INSTANCE_ID"
  }
]}
```


Error Codes:

401: The currently authenticated user is not authorized to view this information

500: An unexpected error occurred getting the list of IP addresses for the authenticated user

5.4.2 POST /addresses

Description: Allocates a new static IP addresses for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:AllocateAddressResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <Address>
    <ID>1217</ID>
    <IP>XXX</IP>
    <State>0</State>
    <InstanceID></InstanceID>
  </Address>
</ns2:AllocateAddressResponse >
```

JSON Response:

```
{
  "state":0,
  "ip":null,
  "id":"1217",
  "instanceId":null
}
```

Error Codes:

401: The currently authenticated user is not authorized to remove this IP address

402: Payment is required before more addresses may be allocated

409: There are not enough resources in the cloud to fulfill this request

500: An unexpected error occurred allocating a new IP address for the authenticated user

5.4.3 DELETE /addresses/\$ADDRESS_ID

Description: Used to release the specified static IP addresses for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:ReleaseAddressResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:ReleaseAddressResponse>
```

JSON Response:

```
{"success": true }
```

Error Codes:

401: The user is not authorized to release this address
 404: The address specified by \$ADDRESS_ID was not found
 412: The address is in an invalid state to perform this operation
 500: An unknown error occurred releasing this address

5.5 Key Management**5.5.1 GET /keys**

Description: Used to retrieve the set of Public Keys stored for the authenticated user.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeKeysResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <PublicKey>
    <KeyName>DEFAULT</KeyName>
    <KeyMaterial>
      AAAB3NzaC1yc2EAAAADAQABAAQACqBw7a+...
    </KeyMaterial>
    <Default>true</Default>
    <LastModifiedTime>2009-12-10T02:01:47.510-05:00</LastModified-
      Time>
    <Instances>
      <InstanceID>$INSTANCE_ID</InstanceID>
    </Instances>
  </PublicKey>
</ns2:DescribeKeysResponse>
```

JSON Response:

```
{"keys": [
  {
    "default": true,
    "instanceIds": [ "$INSTANCE_ID " ],
```

```

        "keyMaterial": "AAAB3NzaC1yc2EAAAADAQABAAQACqBw7a+...",
        "keyName": "DEFAULT",
        "lastModifiedTime": 1260428507510
    }
  ]}

```

Error Codes: None

5.5.2 GET /keys/\$KEY_NAME

Description: Used to retrieve the key with the specified key name from the set of Public Keys stored for the authenticated user.

Message Body: None

XML Response:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:DescribeKeyResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">

  <PublicKey>
    <KeyName>$KEY_NAME</KeyName>
    <KeyMaterial>
      AAAB3NzaC1yc2EAAAADAQABAAQACqBw7a+...
    </KeyMaterial>
    <Default>true</Default>
    <LastModifiedTime>2009-12-10T02:01:47.510-05:00</LastModified-
Time>
    <Instances>
      <InstanceID>$INSTANCE_ID</InstanceID>
    </Instances>
  </PublicKey>
</ns2:DescribeKeyResponse>

```

JSON Response:

```

{
  "default": true,
  "instanceIds": [ "$INSTANCE_ID" ],
  "keyMaterial": "AAAB3NzaC1yc2EAAAADAQABAAQACqBw7a+...",
  "keyName": "DEFAULT",
  "lastModifiedTime": 1260428507510
}

```

Error Codes:

404: The key specified by \$KEY_NAME was not found

5.5.3 POST /keys

5.5.3.1 POST name

Description: Used to generate a new SSH Key Pair for the authenticated user.

Message Body:

name: The name to used to identify this key pair.

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:GenerateKeyPairResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <PrivateKey>
    <KeyName>$name</KeyName>
    <KeyMaterial>
      -----BEGIN RSA PRIVATE KEY-----
      MIIEowIBAAKCAQEAs5ZBc+dWakadPaW6JbTZmWzCPx/PMsA-
J7A2nLFy108P9b
      NWKCFefRZy0y0KAWoVpWgdx0+QQ2yVIvaEgjJ0KGiBELLc9Hnd0
jpMFhFDs
      ...
      -----END RSA PRIVATE KEY-----
    </KeyMaterial>
    <Default>true</Default>
    <LastModifiedTime>2009-12-10T02:01:47.510-05:00</LastModi-
fiedTime>
  </PrivateKey>
</ns2:GenerateKeyPairResponse >
```

JSON Response:

```
{
  "default":false,
  "keyMaterial":
    "-----BEGIN RSA PRIVATE KEY-----
    MIIEowIBAAKCAQEAs5ZBc+dWakadPaW6JbTZmWzCPx/PMsAJ7A2nL-
Fy108P9bNWK
    CFefRZy0y0KAWoVpWgdx0+QQ2yVIvaEgjJ0KGiBELLc9Hnd0jpMFhFDbI
    SsqmWbf
    ...
    -----END RSA PRIVATE KEY-----",
  "keyName":"$name",
  "lastModifiedTime":1260428507510
}
```

Error Codes:

409: A key with the specified \$KEY_NAME already exists

500: An unexpected error occurred generating the new key pair

5.5.3.2 POST name & publicKey

Description: Used to add a new SSH Key Pair for the authenticated user.

Message Body:

name: The name to used to identify this key pair.

publicKey: The RSA SSH Key to add

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:AddKeyResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:AddKeyResponse >
```

JSON Response:

```
{ "success":true }
```

Error Codes:

409: A key with the specified \$KEY_NAME already exists

412: The supplied public key is invalid

500: An unexpected error occurred generating the new key pair

5.5.4 PUT /\$KEY_NAME

5.5.4.1 PUT public key

Description: Used to update the Public Key specified by the supplied key name stored for the authenticated user.

Message Body:

publicKey: The public key to store

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:UpdateKeyResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:UpdateKeyResponse>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

404: The key specified by \$KEY_NAME was not found

412: The supplied public key is invalid

500: An unexpected error occurred generating the new key pair

5.5.4.2 PUT default

Description: Used to set the Public Key specified by the supplied key name as the default key.

Message Body:

default: A boolean representing the default state of this key

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:SetDefaultKeyResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
</ns2:SetDefaultKeyResponse>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

404: The key specified by \$KEY_NAME was not found

500: An unexpected error occurred updating the key

5.5.5 DELETE /keys/\$KEY_NAME

Description: Deletes Key identified by the supplied key name.

Message Body: None

XML Response:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?><ns2:RemoveKeyResponse xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03"/>
```

JSON Response:

```
{ "success":true }
```

Error Codes:

401: The user is not authorized to perform this action

404: The key specified by the supplied \$KEY_NAME is not found

500: An unknown error occurred deleting this image

5.6 Location Management

5.6.1 GET /locations

Description: Returns the list of Locations (Data Centers) that the user is entitled to and their capabilities

Message Body: None

XML Response:

```
<ns2:DescribeLocationsResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Location>
    <ID>1</ID>
    <Name>US North East: Poughkeepsie, NY</Name>
    <Description></Description>
    <Location>POK</Location>
    <Capabilities>
      <Capability id="oss.storage.capacity">
        <Entry key="SMALL">
          <Value>50</Value>
        </Entry>
        <Entry key="MEDIUM">
          <Value>100</Value>
        </Entry>
        <Entry key="LARGE">
          <Value>200</Value>
        </Entry>
      </Capability>
      <Capability id="oss.storage.format">
        <Entry key="EXT3">
          <Value>
            ext3</Value>
          </Entry>
        </Capability>
      <Capability id="oss.instance.spec.i386">
        <Entry key="SMALL">
          <Value>
            SMALL</Value>
          </Entry>
        <Entry key="MEDIUM">
```

```

        <Value>
            MEDIUM</Value>
        </Entry>
        <Entry key="LARGE">
            <Value>
                LARGE</Value>
            </Entry>
        </Capability>
        <Capability id="oss.instance.spec.x86_64" />
    </Capabilities>
</Location>
...
</ns2:DescribeLocationsResponse>

```

JSON Response: Not currently supported

Error Codes: None

5.6.2 GET /locations/\$LOCATION_ID

Description: Returns the Location identified by the supplied Location ID

Message Body: None

XML Response:

```

<ns2:DescribeLocationResponse
  xmlns:ns2="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03">
  <Location>
    <ID>1</ID>
    <Name>US North East: Poughkeepsie, NY</Name>
    <Description></Description>
    <Location>POK</Location>
    <Capabilities>
      <Capability id="oss.storage.capacity">
        <Entry key="SMALL">
          <Value>50</Value>
        </Entry>
        <Entry key="MEDIUM">
          <Value>100</Value>
        </Entry>
        <Entry key="LARGE">
          <Value>200</Value>
        </Entry>
      </Capability>
    </Capabilities>
  </Location>
</ns2:DescribeLocationResponse>

```



```
</Capability>
<Capability id="oss.storage.format">
  <Entry key="EXT3">
    <Value>ext3</Value>
  </Entry>
</Capability>
<Capability id="oss.instance.spec.i386">
  <Entry key="SMALL">
    <Value>SMALL</Value>
  </Entry>
  <Entry key="MEDIUM">
    <Value>MEDIUM</Value>
  </Entry>
  <Entry key="LARGE">
    <Value>LARGE</Value>
  </Entry>
</Capability>
<Capability id="oss.instance.spec.x86_64" />
</Capabilities>
</Location>
</ns2:DescribeLocationResponse>
```

JSON Response: Not supported at this time

Error Codes:

401: The user is not authorized

404: The image specified by the supplied \$LOCATION_ID is not found

6 Additional resources

Official cloud portal: www.ibm.com/cloud

IBM Smart Business Development & Test on the IBM Cloud:

www.ibm.com/cloud/developer

User Guide - IBM Smart Business Development & Test on the IBM Cloud:

www.ibm.com/cloud/developer/static/userguide.html

7 Appendix A: XSD

```
<xsd:schema targetNamespace="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03"
  xmlns:tns="http://www.ibm.com/xmlns/b2b/cloud/api/2009-04-03"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:ref="http://ws-i.org/profiles/basic/1.1/xsd">

  <xsd:import namespace="http://ws-i.org/profiles/basic/1.1/xsd" schema-
    Location="./WS-ISwA.xsd"/>

  <xsd:element name="DescribeConfiguration" type="tns:DescribeConfiguratio
    nType" />
  <xsd:complexType name="DescribeConfigurationType">
    <xsd:sequence>
    </xsd:sequence>
  </xsd:complexType>

  <xsd:element name="DescribeConfigurationResponse" type="tns:DescribeConf
    igationResponseType" />
  <xsd:complexType name="DescribeConfigurationResponseType">
    <xsd:sequence>
      <xsd:element name="Configuration" type="tns:Configuration"/>
    </xsd:sequence>
  </xsd:complexType>

  <xsd:element name="DescribeInstances" type="tns:DescribeInstancesType"
    nillable="false" />
  <xsd:complexType name="DescribeInstancesType">
    <xsd:sequence>
    </xsd:sequence>
  </xsd:complexType>

  <xsd:element name="DescribeInstancesResponse" type="tns:DescribeInstan
    cesResponseType"
    nillable="false" />
  <xsd:complexType name="DescribeInstancesResponseType">
    <xsd:sequence>
      <xsd:element name="Instance" type="tns:Instance"
        minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
  </xsd:complexType>

  <xsd:element name="DescribeInstance" type="tns:DescribeInstanceType"
    nillable="false" />
  <xsd:complexType name="DescribeInstanceType">
```

```
<xsd:sequence>
  <xsd:element name="ID" type="xsd:string" minOccurs="1"
    maxOccurs="1" nillable="false" />
</xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeInstanceResponse" type="tns:DescribeInstanc
eResponseType"
  nillable="false" />
<xsd:complexType name="DescribeInstanceResponseType">
  <xsd:sequence>
    <xsd:element name="Instance" type="tns:Instance" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeRequest" type="tns:DescribeRequestType"
  nillable="false" />
<xsd:complexType name="DescribeRequestType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1"
      maxOccurs="1" nillable="false" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeRequestResponse" type="tns:DescribeRequestR
esponseType"
  nillable="false" />
<xsd:complexType name="DescribeRequestResponseType">
  <xsd:sequence>
    <xsd:element name="Instance" type="tns:Instance" minOccurs="0"
      maxOccurs="unbounded" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="CreateInstance" type="tns:CreateInstanceType"
  nillable="false" />
<xsd:complexType name="CreateInstanceType">
  <xsd:sequence>
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="ImageID" type="xsd:string" />
    <xsd:element name="InstanceType" type="xsd:string" />
    <xsd:element name="KeyName" type="xsd:string" />
    <xsd:element name="IP" type="xsd:string" />
    <xsd:element name="VolumeID" type="xsd:string" />
    <xsd:element name="Configuration" type="tns:Configuration" />
    <xsd:element name="Files" type="tns:Files" />
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="Files">
  <xsd:sequence>
    <xsd:element name="File" minOccurs="0" maxOccurs="unbounded"
      type="ref:swaRef" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="CreateInstanceResponse" type="tns:CreateInstanceRes
ponseType"
  nillable="false" />
<xsd:complexType name="CreateInstanceResponseType">
  <xsd:sequence>
    <xsd:element name="Instance" type="tns:Instance"
      maxOccurs="unbounded" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteInstance" type="tns:DeleteInstanceType"
  nillable="false" />
<xsd:complexType name="DeleteInstanceType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1"
      maxOccurs="1" nillable="false" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteInstanceResponse" type="tns:DeleteInstanceRes
ponseType"
  nillable="false" />
<xsd:complexType name="DeleteInstanceResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="SaveInstance" type="tns:SaveInstanceType"
  nillable="false" />
<xsd:complexType name="SaveInstanceType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" />
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="Description" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="SaveInstanceResponse" type="tns:SaveInstanceRespons
eType" nillable="false" />
```

```
<xsd:complexType name="SaveInstanceResponseType">
  <xsd:sequence>
    <xsd:element name="Image" type="tns:Image" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="StartInstance" type="tns:StartInstanceType"
  nillable="false" />
<xsd:complexType name="StartInstanceType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1"
      maxOccurs="1" nillable="false" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="StartInstanceResponse" type="tns:StartInstanceRespo
nseType"
  nillable="false" />
<xsd:complexType name="StartInstanceResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="StopInstance" type="tns:StopInstanceType"
  nillable="false" />
<xsd:complexType name="StopInstanceType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1"
      maxOccurs="1" nillable="false" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="StopInstanceResponse" type="tns:StopInstanceRespons
eType"
  nillable="false" />
<xsd:complexType name="StopInstanceResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="RestartInstance" type="tns:RestartInstanceType"
  nillable="false" />
<xsd:complexType name="RestartInstanceType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1"
      maxOccurs="1" nillable="false" />
    <xsd:element name="KeyName" type="xsd:string" minOccurs="0" />
  </xsd:sequence>
</xsd:complexType>
```

```
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="RestartInstanceResponse" type="tns:RestartInstanceR
        esponseType"
        nillable="false" />
    <xsd:complexType name="RestartInstanceResponseType">
        <xsd:sequence>
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="ExtendReservation" type="tns:ExtendReservationType"
        nillable="false" />
    <xsd:complexType name="ExtendReservationType">
        <xsd:sequence>
            <xsd:element name="ID" type="xsd:string" />
            <xsd:element name="EndDate" type="xsd:dateTime" />
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="ExtendReservationResponse" type="tns:ExtendReservat
        ionResponseType" nillable="false" />
    <xsd:complexType name="ExtendReservationResponseType">
        <xsd:sequence>
            <xsd:element name="NewEndDate" type="xsd:dateTime" />
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="DescribeAddresses" type="tns:DescribeAddressesType"
        nillable="false" />
    <xsd:complexType name="DescribeAddressesType">
        <xsd:sequence>
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="DescribeAddressesResponse" type="tns:DescribeAddres
        sesResponseType" nillable="false" />
    <xsd:complexType name="DescribeAddressesResponseType">
        <xsd:sequence>
            <xsd:element name="Address" type="tns:Address" minOccurs="0"
                maxOccurs="unbounded" />
        </xsd:sequence>
    </xsd:complexType>

    <xsd:element name="AllocateAddress" type="tns:AllocateAddressType"
        nillable="false" />
    <xsd:complexType name="AllocateAddressType">
```

```
<xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="AllocateAddressResponse" type="tns:AllocateAddressR
  esponseType" nillable="false" />
<xsd:complexType name="AllocateAddressResponseType">
  <xsd:sequence>
    <xsd:element name="Address" type="tns:Address" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="ReleaseAddress" type="tns:ReleaseAddressType"
  nillable="false" />
<xsd:complexType name="ReleaseAddressType">
  <xsd:sequence>
    <xsd:element name="IP" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="ReleaseAddressResponse" type="tns:ReleaseAddressRes
  ponseType" nillable="false" />
<xsd:complexType name="ReleaseAddressResponseType">
  <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeImages" type="tns:DescribeImagesType" />
<xsd:complexType name="DescribeImagesType">
  <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeImagesResponse" type="tns:DescribeImagesRes
  ponseType" />
<xsd:complexType name="DescribeImagesResponseType">
  <xsd:sequence>
    <xsd:element name="Image" type="tns:Image" minOccurs="0"
      maxOccurs="unbounded" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeImage" type="tns:DescribeImageType" />
<xsd:complexType name="DescribeImageType">
  <xsd:sequence>
    <xsd:element name="ImageID" type="xsd:string" />
  </xsd:sequence>
```

```
</xsd:complexType>

<xsd:element name="DescribeImageResponse" type="tns:DescribeImageResponseTy
eType" />
<xsd:complexType name="DescribeImageResponseType">
  <xsd:sequence>
    <xsd:element name="Image" type="tns:Image" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteImage" type="tns:DeleteImageType" />
<xsd:complexType name="DeleteImageType">
  <xsd:sequence>
    <xsd:element name="ImageID" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteImageResponse" type="tns:DeleteImageResponseType"
pe" />
<xsd:complexType name="DeleteImageResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="PromoteImage" type="tns:PromoteImageType" />
<xsd:complexType name="PromoteImageType">
  <xsd:sequence>
    <xsd:element name="ImageID" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="PromoteImageResponse" type="tns:PromoteImageResponseT
ype" />
<xsd:complexType name="PromoteImageResponseType">
  <xsd:sequence>
    <xsd:element name="Image" type="tns:Image" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeVolumes" type="tns:DescribeVolumesType"
nillable="false" />
<xsd:complexType name="DescribeVolumesType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeVolumesResponse" type="tns:DescribeVolumesRes
```



```

ponseType" nillable="false" />
  <xsd:complexType name="DescribeVolumesResponseType">
    <xsd:sequence>
      <xsd:element name="Volume" type="tns:Volume" minOccurs="0"
maxOccurs="unbounded" nillable="false" />
    </xsd:sequence>
  </xsd:complexType>

<xsd:element name="DescribeVolume" type="tns:DescribeVolumeType"
  nillable="false" />
<xsd:complexType name="DescribeVolumeType">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" minOccurs="1" maxOc-
      curs="1" nillable="false" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeVolumeResponse" type="tns:DescribeVolumeRespo
nseType" nillable="false" />
<xsd:complexType name="DescribeVolumeResponseType">
  <xsd:sequence>
    <xsd:element name="Volume" type="tns:Volume" nillable="false"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="CreateVolume" type="tns:CreateVolumeType"
  nillable="false" />
<xsd:complexType name="CreateVolumeType">
  <xsd:sequence>
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="Format" type="xsd:string" />
    <xsd:element name="Size" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="CreateVolumeResponse" type="tns:CreateVolumeResponseT
ype" nillable="false" />
<xsd:complexType name="CreateVolumeResponseType">
  <xsd:sequence>
    <xsd:element name="Volume" type="tns:Volume" nillable="false" />

  </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteVolume" type="tns:DeleteVolumeType"
  nillable="false" />
<xsd:complexType name="DeleteVolumeType">
  <xsd:sequence>

```

```
        <xsd:element name="ID" type="xsd:string" minOccurs="1" maxOccurs="1" nillable="false" />
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DeleteVolumeResponse" type="tns:DeleteVolumeResponseType" nillable="false" />
<xsd:complexType name="DeleteVolumeResponseType">
    <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeKey" type="tns:DescribeKeyType" />
<xsd:complexType name="DescribeKeyType">
    <xsd:sequence>
        <xsd:element name="KeyName" type="xsd:string" />
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeKeyResponse" type="tns:DescribeKeyResponseType" />
<xsd:complexType name="DescribeKeyResponseType">
    <xsd:sequence>
        <xsd:element name="PublicKey" type="tns:Key"/>
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeKeys" type="tns:DescribeKeysType" />
<xsd:complexType name="DescribeKeysType">
    <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="DescribeKeysResponse" type="tns:DescribeKeysResponseType" />
<xsd:complexType name="DescribeKeysResponseType">
    <xsd:sequence>
        <xsd:element name="PublicKey" type="tns:Key" minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="AddKey" type="tns:AddKeyType" />
<xsd:complexType name="AddKeyType">
    <xsd:sequence>
        <xsd:element name="KeyName" type="xsd:string" />
        <xsd:element name="KeyMaterial" type="xsd:string" />
    </xsd:sequence>
</xsd:complexType>
```

```
</xsd:complexType>

<xsd:element name="AddKeyResponse" type="tns:AddKeyResponseType" />
<xsd:complexType name="AddKeyResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="RemoveKey" type="tns:RemoveKeyType" />
<xsd:complexType name="RemoveKeyType">
  <xsd:sequence>
    <xsd:element name="KeyName" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="RemoveKeyResponse" type="tns:RemoveKeyResponseType" />
<xsd:complexType name="RemoveKeyResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="UpdateKey" type="tns:UpdateKeyType" />
<xsd:complexType name="UpdateKeyType">
  <xsd:sequence>
    <xsd:element name="KeyName" type="xsd:string" />
    <xsd:element name="KeyMaterial" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="UpdateKeyResponse" type="tns:UpdateKeyResponseType" />
<xsd:complexType name="UpdateKeyResponseType">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="GenerateKeyPair" type="tns:GenerateKeyPairType" />
<xsd:complexType name="GenerateKeyPairType">
  <xsd:sequence>
    <xsd:element name="KeyName" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="GenerateKeyPairResponse" type="tns:GenerateKeyPairResponseType" />
<xsd:complexType name="GenerateKeyPairResponseType">
  <xsd:sequence>
```

```

        <xsd:element name="PrivateKey" type="tns:Key" />
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="SetDefaultKey" type="tns:SetDefaultKeyType" />
<xsd:complexType name="SetDefaultKeyType">
    <xsd:sequence>
        <xsd:element name="KeyName" type="xsd:string" />
    </xsd:sequence>
</xsd:complexType>

<xsd:element name="SetDefaultKeyResponse" type="tns:SetDefaultKeyResponse" />
<xsd:complexType name="SetDefaultKeyResponseType">
    <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Key">
    <xsd:sequence>
        <xsd:element name="KeyName" type="xsd:string" />
        <xsd:element name="KeyMaterial" type="xsd:string" />
        <xsd:element name="Default" type="xsd:boolean" />
        <xsd:element name="LastModifiedTime" type="xsd:dateTime" />
        <xsd:element name="Instances" minOccurs="0">
            <xsd:complexType>
                <xsd:sequence>
                    <xsd:element name="InstanceID" type="xsd:string" minOccurs="0" maxOccurs="unbounded" />
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Image">
    <xsd:sequence>
        <xsd:element name="ID" type="xsd:string" />
        <xsd:element name="ProductCodes" type="tns:ProductCodes" />
        <xsd:element name="Name" type="xsd:string" />
        <xsd:element name="Location" type="xsd:string" />
        <xsd:element name="State" type="xsd:integer" />
        <xsd:element name="Owner" type="xsd:string" />
        <xsd:element name="Visibility" type="tns:VisibilityType" />
        <xsd:element name="Architecture" type="xsd:string" />
        <xsd:element name="Platform" type="xsd:string" />
        <xsd:element name="Description" type="xsd:string" />
    </xsd:sequence>
</xsd:complexType>

```

```
<xsd:element name="Manifest" type="xsd:string" />
<xsd:element name="Documentation" type="xsd:string" />
<xsd:element name="SupportedInstanceTypes" type="tns:SupportedIn
  stanceTypes" />
<xsd:element name="CreatedTime" type="xsd:dateTime" />
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="SupportedInstanceTypes">
  <xsd:sequence>
    <xsd:element name="InstanceType" type="xsd:string"
      maxOccurs="unbounded" />
  </xsd:sequence>
</xsd:complexType>

<xsd:simpleType name="VisibilityType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="PUBLIC" />
    <xsd:enumeration value="SHARED" />
    <xsd:enumeration value="PRIVATE" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="Instance">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" />
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="RequestID" type="tns:Request" />
    <xsd:element name="Owner" type="xsd:string" />
    <xsd:element name="Hostname" type="xsd:string" />
    <xsd:element name="IP" type="xsd:string" />
    <xsd:element name="ImageID" type="xsd:string" />
    <xsd:element name="InstanceType" type="xsd:string" />
    <xsd:element name="Status" type="xsd:integer" />
    <xsd:element name="KeyName" type="xsd:string" />
    <xsd:element name="LaunchTime" type="xsd:dateTime" />
    <xsd:element name="ExpirationTime" type="xsd:dateTime" />
    <xsd:element name="ProductCodes" type="tns:ProductCodes" />
    <xsd:element name="Software">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="Application"
            type="tns:Application" minOccurs="0"
            maxOccurs="unbounded" />
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="Request">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="name" type="xsd:string" use="optional"
        />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:complexType name="Address">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" />
    <xsd:element name="IP" type="xsd:string" />
    <xsd:element name="State" type="xsd:integer" />
    <xsd:element name="InstanceID" type="xsd:string" minOccurs="0"
      />
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Volume">
  <xsd:sequence>
    <xsd:element name="ID" type="xsd:string" />
    <xsd:element name="InstanceID" type="xsd:string" minOccurs="0"/>
    <xsd:element name="Owner" type="xsd:string" />
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="Format" type="xsd:string" />
    <xsd:element name="Size" type="xsd:string" />
    <xsd:element name="State" type="xsd:integer" />
    <xsd:element name="ProductCodes" type="tns:ProductCodes" />
    <xsd:element name="CreatedTime" type="xsd:dateTime" />
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="ProductCodes">
  <xsd:sequence>
    <xsd:element name="ProductCode" type="xsd:string"
      maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Application">
  <xsd:sequence>
    <xsd:element name="Name" type="xsd:string"/>
    <xsd:element name="Version" type="xsd:string"/>
    <xsd:element name="Type" type="xsd:string"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="Configuration">
  <xsd:sequence>
    <xsd:element name="Property" type="tns:NameValuePair"
      minOccurs="0" maxOccurs="unbounded" />
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="NameValuePair">
  <xsd:sequence>
    <xsd:element name="Name" type="xsd:string" />
    <xsd:element name="Value" type="xsd:string" />
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="Fault">
  <xsd:sequence>
    <xsd:element name="Timestamp" type="xsd:dateTime" />
    <xsd:element name="Description" type="xsd:string" />
    <xsd:element name="Cause" type="xsd:string" />
    <xsd:element name="Code" type="xsd:integer" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="KeyExistsFault" type="tns:Fault" />
<xsd:element name="KeyUpdateFailedFault" type="tns:Fault" />
<xsd:element name="UnknownKeyFault" type="tns:Fault" />
<xsd:element name="InvalidKeyFault" type="tns:Fault" />
<xsd:element name="KeyGenerationFailedFault" type="tns:Fault" />
<xsd:element name="UnknownInstanceFault" type="tns:Fault" />
<xsd:element name="UnknownImageFault" type="tns:Fault" />
<xsd:element name="UnknownRequestFault" type="tns:Fault" />
<xsd:element name="UnauthorizedUserFault" type="tns:Fault" />
<xsd:element name="InsufficientResourcesFault" type="tns:Fault" />
<xsd:element name="InvalidConfigurationFault" type="tns:Fault" />
<xsd:element name="InvalidReservationDateFault" type="tns:Fault" />
<xsd:element name="PaymentRequiredFault" type="tns:Fault" />
<xsd:element name="InvalidStateFault" type="tns:Fault" />
<xsd:element name="UnknownAddressFault" type="tns:Fault" />
<xsd:element name="UnknownVolumeFault" type="tns:Fault" />
<xsd:element
```



8 Appendix B: Instance Status

Value	Name
0	NEW
1	PROVISIONING
2	FAILED
3	REMOVED
4	REJECTED
5	ACTIVE
6	UNKNOWN
7	DEPROVISIONING
8	RESTARTING
9	STARTING
10	STOPPING
11	STOPPED

9 Appendix C: Image States

Value	Name
0	NEW
1	AVAILABLE
2	UNAVAILABLE
3	DELETED
4	CAPTURING

10 Appendix D: IP Address States

Value	Name
0	NEW
1	ALLOCATING
2	FREE
3	ATTACHED
4	RELEASING
5	RELEASED
6	FAILED

11 Appendix E: Storage States

Value	Name
0	NEW
1	CREATING
2	DELETING
3	DELETED
4	UNMOUNTED
5	MOUNTED
6	FAILED



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