

NTT Communications

Cloudⁿ

Object Storage API Manual

Ver.1.0

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Version	Edited date	Description of modification
Ver.1.0	February 20, 2013	A new version (separated from the Cloud ⁿ Storage User Guide)

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1-1) Use the Object Storage API

This service provides the API in order to save or obtain data to Object Storage.

API can be used to operate the resource directly from the customer's program without cloud console. Also this API is the AmazonWebService S3-compatible API (2006-03-01 Version) but only the REST API is available. SOAP API is not provided. The API Server is shown below.

API server : str.cloudn-service.com

1

[API request format]

The API request has the following format. An example of command "GET Object" to download the Object stored in Japan DC is shown below.

```
GET /sample/object.jpg HTTP/1.1
Date: Thu, 18 Oct 2012 03:14:30 +0000
Authorization: AWS SaMp1eAcceSkey:d9OGZcQHI7I8iVwP7IeRLRu9sNk=
```



The above request shows downloading the "object.jpg" file stored in "sample" bucket.

2

[Create the API request]

This section describes how to generate a request to Object Storage API using the example of request in ①.

The request of Object Storage API is below similar to general HTTP requests:

```
"HTTP request method" "Target PATH" "HTTP version"
"HTTP header"
...
"HTTP header"
```

However because the request must be certified, the "certified information" must be provided. Object Storage API uses the "Authorization Header" defined in HTTP for request certification.

The Authorization Header format is shown below.

```
Authorization: AWS AccessKey:Signature
```

"AccessKey" is an "access key". "Signature" is a sign created with a "secret key". For method to confirm the access key and secret key, refer to the Chapter 3 "Confirm the access key and secret key".

1-1) Use the Object Storage API

In order to create Authorization Header, several steps are necessary. This section a sample to create Authorization Header (¥n is the Unicode code point U+000A, usually called as new line).

```
Authorization = "AWS" + " " + Access key + ":" + Signature;
```

```
Signature = Base64( HMAC-SHA1( UTF-8-Encoding (secret key, character strings of sign) ) );
```

```
Character strings of sign = Request method + "¥n" +  
    Content-MD5 + "¥n" +  
    Content-Type + "¥n" +  
    Date + "¥n" +  
    Extension header element for service +  
    Resource element of normalized resource;
```

```
Resource element of normalized resource = [ "/" + Bucket name] +  
    Path of URL encoded + Sub-resource character string  
[When the sub-resource is provided: The sub-resource is "?acl", etc.];
```

```
Extension header element for service = Described later
```

②

This section describes the process to create Authentication Header in the example of obtaining "object.jpg" in "sample" in ①.

```
GET /sample/object.jpg HTTP/1.1  
Date: Thu, 18 Oct 2012 03:14:30 +0000
```

③

The base HTTP Request (hereinafter referred to as base request) is shown in ③.

First, create "signature base string". As shown in ②, the signature base string starts with "HTTP request method + ¥n". In ③, the HTTP request method is "GET". Here the signature base string in the example in ③ is below:

```
Signature base string = GET¥n
```

Next proceed with `Content-MD5 + "¥n"` and `Content-Type + "¥n"` in the sample in ②. Handling Content-MD5 and Content-Type varies depending on whether the base request header includes "Content-MD5" and "Content-Type" header or not.

This section describes when the base header does not include "Content-MD5" and "Content-Type" Header in ③.

1-1) Use the Object Storage API

If the base request includes "Content-MD5" Header like ③, Content-MD5 is ignored and only the following "¥n" is added to the signature base string. The signature base string when `Content-MD5 + "¥n"` is evaluated in ② is:

```
Signature base string = GET¥n¥n
```

For `Content-Type + "¥n"`, the same process as Content-MD5 is applied. The signature base string when Content-MD5 + "¥n" is evaluated in ② is:

```
Signature base string = GET¥n¥n¥n
```

Unlike the example of ③ HTTP Request, when the base request includes Content-MD5 and Content-Type Header, add the value following header name to the signature base string. For example, if "Content-Type: image/jpeg" header is included in the HTTP Request, "image/jpeg" is substituted in Content-Type of ② `Content-Type + "¥n"`.

The signature base string immediately after evaluating `Content-Type + "¥n" in ② will be "Signature base string =GET¥n¥nimage/jpeg¥n".

Proceed with "Date+¥n" in the sample in ②.

In Object Storage API, the request has an expiration date configured in order to prevent replay attacks. Therefore HTTP Request must include Date Header. "Date+¥n" in ② will be "Date Header value" + "¥n". "Signature base string" at this time is :

```
Signature base string = GET¥n¥n¥nThu, 18 Oct 2012 03:14:30 +0000¥n
```

Proceed with description of "Extension header element for service" in the sample in ②. The header consisting of "extension header element for service" starts with "x-amz-" (hereinafter referred to as extension header).

Because the extension header is not included in the base request in ③, no processing is performed for the base request in ③. If the extension header element for service is included, follow the rule below:

1. When the extension header name (such as x-amz-acl) includes the upper case, convert the Header name to the lower case. For example, if the header name is "X-Amz-Acl", it is converted to "x-amz-acl".
2. If multiple extension headers are specified, use the extension headers in lower case in Section 1 to sort them alphabetically in ascending order. For example, if "x-amz-server-side-encryption" and "x-amz-delete-marker" are specified in "GET Object", sorting is as shown below:

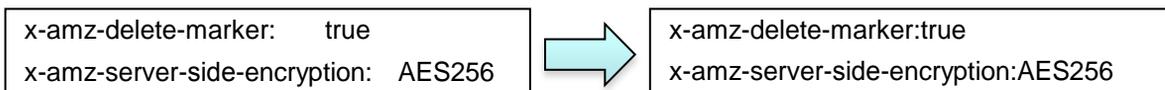
```
x-amz-server-side-encryption: AES256
x-amz-delete-marker: true
```



```
x-amz-delete-marker: true
x-amz-server-side-encryption: AES256
```

1-1) Use the Object Storage API

3. If another extension header with the same name is specified (multiple extension headers with the same name exist), arrange them into a single "Extension header name: List of comma-delimited value". Blanks among values are deleted. For example, when two extension headers "x-amz-meta-username: Alice" and "x-amz-meta-username: Bob" are combined into one header, it will be "x-amz-meta-username:Alice,Bob".
4. When the extension header is across multiple lines,
5. replace the white-spaces included in that extension header (including newlines) with "one" white-space to make multiple lines to be a single line.
6. Exclude the white spaces between the extension header and value to connect. The example of "x-amz-server-side-encryption" and "x-amz-delete-marker" is shown below:



6. Add a newline "¥n" (U+000A) to the extension header with works in Step 1 - 5 performed. Combine all headers in this list into a single string to be the extension header element for service.

Because the extension element for service is not necessary, the signature base string in ③ has no change at this time and remains below:

Signature base string = GET¥n¥n¥n¥nThu, 18 Oct 2012 03:14:30 +0000¥n

Proceed with "resource element of normalized resource" processing in sample in ②. Create the resource element of normalized resource according to the procedure below:

1. Prepare the empty string ("") as a box.
2. Use the HTTP Host Header to attach "/" before the bucket name for request with the bucket name specified, and add it to the empty string in Section 1. For "Host: sample.str.cloudn-service.com", it will be "/sample". For the request in path format
3. (like example in ③, if Host Header is not specified or Host Header value is equal to API server (str.cloudn-service.com)) and the request not to process the bucket, no action is performed.
4. Add the HTTP request URI path to the box where the processes in Sections 1 - 2 have been finished. In the example in ③, it corresponds to the path format. Therefore the box content at this time is "/sample/object.jpg". For request to process the sub resource string such as ?versioning, ?location and ?acl, add "question mark", "sub resource name" and "sub resource value (if present)" to the box. If there are multiple sub resources, sort them alphabetically in ascending order. and separate them with "&". Example) ?acl&versionId=value. The sub resource is acl, location, policy, uploadId, uploads, versionId, versioning and versions.

1-1) Use the Object Storage API

In the example of base request in ③, "sub resource string" does not exist. Therefore the "resource element of normalized resource" processed in Section 1, 2 and 3 will be "/sample/object.jpg".

Add the "the resource element of normalized resource" to the signature base string.

```
Signature base string = GET¥n¥n¥nThu, 18 Oct 2012 03:14:30 +0000¥n/sample/object.jpg
```

Here creating the signature base string is finished. Output of signature base string to terminal is shown below.

```
GET
```

```
Thu, 18 Oct 2012 03:14:30 +0000  
/sample/object.jpg
```

(Caution: No newline is included after /sample/object.jpg.)

According to sample in ②, obtain the output of HMAC-SHA1 including the UTF-8 encoded signature base string with "secret key" (message digest). Base64 encode the output to generate "Signature".

Combine the above "Signature" and "access key" to generate Authorization Header.

```
Authorization: □AWS□Access key:Signature
```

④

(Caution: □ shows a white-space.)

Add Authorization Header created in ④ to ③ base request to generate the request in ①.

```
GET /sample/object.jpg HTTP/1.1  
Date: Thu, 18 Oct 2012 03:14:30 +0000  
Authorization: AWS SaMp1eAcceSkey:d9OGZcQHI7I8iVwP7IeRLRu9sNk=
```

1-1) Use the Object Storage API

3

[Example of request and signature base string]

As shown in "Create the API request", follow these steps in order to create the signature base string. Here the relationship between request and signature base string is shown for reference.

Get Object (If the HTTP Host Header is used to specify the bucket)	
GET /object.txt HTTP1/1 Date: Thu, 18 Oct 2012 03:14:30 +0000 Host: sample.str.cloudn-service.com User-Agent: Ruby Accept: /* Authorization: AWS \${Access key}:\${Signature}	GET·n ·n ·n Thu, 18 Oct 2012 03:14:30 +0000·n /sample/object.txt
Get Service (If the HTTP Host Header is used but it corresponds to API server)	
GET / HTTP1/1 Date: Thu, 18 Oct 2012 03:14:30 +0000 Host: str.cloudn-service.com Authorization: AWS \${Access key}:\${Signature}	GET·n ·n ·n Thu, 18 Oct 2012 03:14:30 +0000·n /
PUT Bucket (For path format)	
PUT /sample2 HTTP1/1 Date: Thu, 18 Oct 2012 03:14:30 +0000 Content-Type: application/octet-stream User-Agent: Ruby Accept: /* Authorization: AWS \${Access key}:\${Signature}	PUT·n ·n application/octet-stream·n Thu, 18 Oct 2012 03:14:30 +0000·n /sample2
PUT Object (For path format)	
PUT /sample/rfc2460.txt HTTP1/1 Date: Thu, 18 Oct 2012 03:14:30 +0000 Content-MD5: 68f4c9a5670828247c1a56693f71f309 Content-Type: text/plain Content-length: 85890 User-Agent: Ruby Accept: /* x-amz-acl: public-read Authorization: AWS \${Access key}:\${Signature}	PUT·n 68f4c9a5670828247c1a56693f71f309·n text/plain·n Thu, 18 Oct 2012 03:14:30 +0000·n x-amz-acl:public-read·n /sample/rfc2460.txt

1-2) Object Storage API List

This service provides the following APIs.

Bucket	Command	Option
	GET Service	Lists of all buckets owned by the authenticated sender
	PUT Bucket	Creates a new bucket
	DELETE Bucket	Deletes the bucket named in the URI
	GET Bucket	Returns the objects in a bucket
	List Objects	Returns the objects in a bucket
	GET Bucket ACL	Returns the access control list (ACL) of a bucket
	GET Bucket Location	Returns a bucket's Region.
	GET Bucket logging	Returns the logging status of a bucket
	GET Bucket Object versions	Lists metadata about all of the versions of objects
	GET Bucket versioning	Returns the versioning state of a bucket.
	List Multipart Uploads	Lists in-progress multipart uploads
	PUT Bucket ACL*	Sets the permissions on an existing bucket using ACL.
	PUT Bucket versioning	Sets the versioning state of an existing bucket.
	HEAD Bucket	Checks if a bucket exists and you have permission to access it



The following APIs are not supported in this service.

- DELETE Bucket lifecycle
- DELETE Bucket website
- GET Bucket lifecycle
- GET Bucket notification
- GET Bucket requestPayment
- GET Bucket website
- PUT Bucket lifecycle
- PUT Bucket notification
- PUT Bucket requestPayment
- PUT Bucket website

1-2) Object Storage API List

This service provides the following APIs

Object	Command	Option
	DELETE Object	Removes an object
	PUT Object	Adds an object to a bucket
	Initiate Multipart Upload	Initiates a multipart upload and returns an upload ID
	Upload Part	Uploads a part in a multipart upload
	Complete Multipart Upload	Completes a multipart upload
	Abort Multipart Upload	Aborts a multipart upload
	List Parts	Lists the parts that have been uploaded for a specific multipart upload
	GET Object	Retrieves objects from Cloud ⁿ Storage
	GET Object ACL*	Returns the access control list (ACL) of an object
	HEAD Object	Retrieves metadata from an object
	PUT Object ACL*	Sets the access control list (ACL) permissions
	PUT Object Copy	Creates a copy of an object



The following APIs are not supported in this service.

- GET Object torrent
- POST Object
- Upload Part - Copy
- Delete Multiple Objects

2-1) Object Storage API Common Information

API Server (End Point) for this service is as follows,

str.cloudn-service.com

The following table describes headers that can be used by various types of Cloudⁿ Storage REST API Request.

Common Request Header	
Header Name	Description
Authentication	The information required for request authentication.
Content-Length	Length of the message (without the headers). This header is required for PUTs and operations that load XML.
Content-MD5	The base64 encoded 128-bit MD5 digest of the message (without the headers). This header can be used as a message integrity check to verify that the data is the same data that was originally sent.
Date	The current date and time according to the requester.
Expect	When your application uses 100-continue, it does not send the request body until it receives an acknowledgment. If the message is rejected based on the headers, the body of the message is not sent. This header can be used only if you are sending a body. Valid Values: 100-continue
Host	For path-style requests, the value is str.cloudn-service.com. For virtual-style requests, the value is \${BucketName}.str.cloudn-service.com.

Common Response Header	
Header Name	Description
Content-Length	The length in bytes of the body in the response. Default: None
Connection	specifies whether the connection to the server is open or closed. Valid Values : open close Default : None
Date	The date and time responded. Default: None
ETag	The entity tag is a hash of the object. The ETag only reflects changes to the contents of an object, not its metadata. The ETag is determined when an object is created. For objects created by the PUT Object operation and the POST Object operation, the ETag is a quoted, 32-digit hexadecimal string representing the MD5 digest of the object data. For other objects, the ETag may or may not be an MD5 digest of the object data. If the ETag is not an MD5 digest of the object data, it will contain one or more non-hexadecimal characters and/or will consist of less than 32 or more than 32 hexadecimal digits.
Server	The name of the server that created the response.
x-amz-delete-marker	Specifies whether the object returned was (true) or was not (false) a Delete Marker Valid Values : true false Default : false
x-amz-request-id	A value created by Cloud ⁿ storage that uniquely identifies the request. In the unlikely event that you have problems with Cloud ⁿ storage .
x-amz-version-id	The version of the object. When you enable versioning, Cloud ⁿ storage generates a random number for objects added to a bucket. The value is UTF-8 encoded and URL ready. When you PUT an object in a bucket where versioning has been suspended, the version ID is always null. Valid Values : null any URL-ready, UTF-8 encoded string Default : null

2-2) Object Storage API bucket operation

GET Service

Description

Returns a list of all buckets owned by the authenticated sender of the request.

Request

Request Method	GET
Path,Parameters, etc	Set "/" as Request Path (all request needs to go to str.cloudn-service.com, instead of Hostname with Host Headerwith bucket name.)
Header	None
Body	None

Response

Response Header	None			
Response (Body)	format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>ListAllMyBucketsResult</i>	Container for response.	Owner, Buckets (None)
		<i>Owner</i>	Container for bucket owner information.	ID, DisplayName (<i>ListAllMyBucketsResult</i>)
		<i>ID</i>	Bucket owner's user ID.	None (<i>ListAllMyBucketsResult.Owner</i>)
		<i>DisplayName</i>	Bucket owner's display name.	None (<i>ListAllMyBucketsResult.Owner</i>)
		<i>Buckets</i>	Container for one or more buckets.	Bucket (<i>ListAllMyBucketsResult</i>)
		<i>Bucket</i>	Container for bucket information.	Name, (<i>ListAllMyBucketsResult.Buckets</i>)
		<i>Name</i>	Bucket's name.	None (<i>ListAllMyBucketsResult.Buckets.Bucket</i>)
<i>CreationDate</i>	Date the bucket was created.	None (<i>ListAllMyBucketsResult.Buckets.Bucket</i>)		

2-2) Object Storage API bucket operation

PUT Bucket

Description	Creates a new bucket.
--------------------	-----------------------

Request

Request Method	PUT			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
	Extension header	Description	Required	
	<i>x-amz-acl</i>	Allow ACL to apply to the bucket. Type : String Valid Values: private public-read public-read-write authenticated-read bucket-owner-read bucket-owner-full-control		
	<i>x-amz-grant-read (*2)</i>	Allows grantee to list the objects in the bucket. Type : String Constraints : None Default : None		
	<i>x-amz-grant-write (*2)</i>	Allows grantee to create, overwrite, and delete any object in the bucket. Type : String Constraints : None Default : None		
	<i>x-amz-grant-read-acp (*2)</i>	Allows grantee to read the bucket. Type : String Constraints : None Default : None		
	<i>x-amz-grant-write-acp (*2)</i>	Allows grantee to write the ACL for the applicable bucket. Type : String Constraints : None Default : None		
	<i>x-amz-grant-full-control (*2)</i>	Allows grantee full control on the bucket. Type : String Constraints : None Default : None		
	Body(任意)	Format	XML	
XML Data		Node Name	Description	
		<i>CreateBucket Configuration</i>	Container for bucket configuration settings.	LocationConstraint (None)
		<i>LocationConstraint</i>	Specifies the region where the bucket will be created.	None (<i>CreateBucketConfiguration</i>)

(*1) In case using Virtual-Host style, Host Header is required and Request Path should always be "/".

(*2) Special Attribute Value Pair needed. Attribute should be "id" and "emailAddress", and they should be the e-mail address and id which were registered in Cloudⁿ Storage. (e.g.: `x-amz-grant-read: id="daikuwa"`)

Response

Response Header	Common Response Header is used.
Response (Body)	None

2-2) Object Storage API bucket operation

DELETE Bucket

Description	Deletes the bucket named in the URI. All objects (including all object versions and Delete Markers) in the bucket must be deleted before the bucket itself can be deleted.
-------------	--

Request

Request Method	DELETE
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path. (*)
Header	Host For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com.</code> (*)
Body	None

(*) In case using path style, Host Header is not required and if you want to specify it, it should be `str.cloudn-service.com`.

Response

Response Header	Common Response Header is used.
Response (Body)	None

2-2) Object Storage API bucket operation

GET Bucket (LIST Object)

Description	Returns some or all of the objects in a bucket
-------------	--

Request				
Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Other Parameters	Parameter	Description	Required
		<i>delimiter</i> *	All keys that contain the same string between the prefix, if specified, and the first occurrence of the delimiter after the prefix are grouped under a single result element. Type : String Default : None	
		<i>marker</i> *	Specifies the key to start with when listing objects in a bucket. Type : String Default : None	
		<i>max-keys</i> *	Sets the maximum number of keys returned in the response body. The response might contain fewer keys but will never contain more. Type : String Default : 1000	
	<i>Prefix</i> *	Limits the response to keys that begin with the specified prefix. Type : String Default : None		
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com</code> .		
Body	None			

* Will not added in Signature strings.

Response				
Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (<i>Parent Node</i>)
		<i>ListBucketResult</i>	Container of Response	Name, Prefix, Marker, MaxKeys, IsTruncated, Contents (<i>None</i>)
		<i>Name</i>	Bucket Name	None (<i>ListBucketResult</i>)
		<i>Prefix</i>	Prefix when requested.	None (<i>ListBucketResult</i>)
		<i>Marker</i>	Marker when requested.	None (<i>ListBucketResult</i>)
		<i>MaxKeys</i>	Max-Keys when requested. Default: 1000	None (<i>ListBucketResult</i>)
		<i>IsTruncated</i>	A flag that indicates whether (true) or not (false) Cloud ⁿ storage returned all of the results that satisfied the search criteria. True for exceeded MaxKeys value.	None (<i>ListBucketResult</i>)
		<i>Contents</i>	Container at where metadata of Object stores	Key, LastModified, StorageClass, Size, Etag, Owner (<i>ListBucketResult</i>)

2-2) Object Storage API bucket operation

Response (continued from previous page)

Response (Body)	XML Data	Node	Description	Child Node (Parent Node)
		<i>Key</i>	The object's key.	None (<i>ListBucketResult.Contents</i>)
		<i>LastModified</i>	Date and time the object was last modified.	None (<i>ListBucketResult.Contents</i>)
		<i>StorageClass</i>	Always STANDARD.	None (<i>ListBucketResult.Contents</i>)
		<i>Size</i>	Size in bytes of the object.	None (<i>ListBucketResult.Contents</i>)
		<i>ETag</i>	The entity tag is an MD5 hash of the object. The ETag only reflects changes to the contents of an object, not its metadata.	None (<i>ListBucketResult.Contents</i>)
		<i>Owner</i>	Bucket owner.	ID, DisplayName (<i>ListBucketResult.Contents</i>)
		<i>ID</i>	Object owner's ID.	None (<i>ListBucketResult.Contents.Owner</i>)
		<i>DisplayName</i>	Object owner's name.	None (<i>ListBucketResult.Contents.Owner</i>)
		<i>CommonPrefixes</i>	If you specify a delimiter in the request, then the result returns each distinct key prefix containing the delimiter in a <i>CommonPrefixes</i> element.	Prefix (<i>ListBucketResult</i>)
		<i>Prefix</i>	Prefix found in Common Prefix	None (<i>ListBucketResult.CommonPrefixes</i>)

2-2) Object Storage API bucket operation

GET Bucket ACL

Description	Returns the access control list (ACL) of a bucket
-------------	---

Request

Request Method	GET		
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.		
	Sub Resource	Parameter	Description
		<i>acl</i>	Request parameter which means Access List. This needs to be reviewed as signature strings.
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .	
Body	None		

Response

Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>AccessControlPolicy</i>	Container for the response.	Owner, <i>AccessControlList</i> (None)
		<i>Owner</i>	Container for bucket owner information.	ID, <i>DisplayName</i> (<i>AccessControlPolicy</i>)
		<i>ID</i>	Bucket owner's ID.	None (<i>AccessControlPolicy.Owner</i>)
		<i>DisplayName</i>	Bucket owner's display name.	None (<i>AccessControlPolicy.Owner</i>)
		<i>AccessControlList</i>	Container for ACL information.	Grant (<i>AccessControlPolicy</i>)
		<i>Grant</i>	Container for <i>Grantee</i> and <i>Permission</i> .	Grantee (<i>AccessControlPolicy.AccessControlList</i>)
		<i>Grantee</i>	Container for <i>DisplayName</i> and <i>ID</i> of the person being granted permissions.	ID, <i>DisplayName</i> (<i>AccessControlPolicy.AccessControlList.Grant</i>)
<i>Permission</i>	Permission given to the <i>Grantee</i> for bucket.	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)		

2-2) Object Storage API bucket operation

GET Bucket Location

Description	Returns a bucket's Region.
-------------	----------------------------

Request

Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>location</i>	Flag which shows location and needs to include signature strings.	YES
Header	Host	For virtual-Host style requests, the value is \${BucketName}. str.cloudn-service.com.		
Body	None			

Response

Response Header	Common Response Header is used.			
Response (Body)	For mat	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>LocationConstraint</i>	Container for the result.	None (None)

2-2) Object Storage API bucket operation

GET Bucket Object Versions

Description	Lists metadata about all of the versions of objects in a bucket.			
Request				
Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>versions</i>	Request parameter which means Access List. This needs to be reviewed as signature strings.	YES
	Other Parameters	Parameter	Description	Required
		<i>delimiter</i> *	All keys that contain the same string between the prefix, if specified, and the first occurrence of the delimiter after the prefix are grouped under a single result element. Type : String Default : None	
		<i>marker</i> *	Specifies the key to start with when listing objects in a bucket. Type : String Default : None	
		<i>max-keys</i> *	Sets the maximum number of keys returned in the response body. The response might contain fewer keys but will never contain more. Type : String Default : 1000	
	<i>Prefix</i> *	Limits the response to keys that begin with the specified prefix. Type : String Default : None		
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com</code> .		
Body	None			

* Will not added in Signature strings

Response				
Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>ListVersionsResult</i>	Container for the result.	Name, Prefix, KeyMarker, MaxKeys, VersionIdMarker, IsTruncated, Version (None)
		<i>Name</i>	Bucket owner's name.	None (<i>ListVersionsResult</i>)
		<i>Prefix</i>	Selects objects that start with the value supplied by this parameter.	None (<i>ListVersionsResult</i>)
		<i>KeyMarker</i>	Marks the last Key returned in a truncated response.	None (<i>ListVersionsResult</i>)
		<i>VersionIdMarker</i>	Marks the last version of the Key returned in a truncated response.	None (<i>ListVersionsResult</i>)
		<i>MaxKeys</i>	Specifies the maximum number of objects to return.	None (<i>ListVersionsResult</i>)
		<i>IsTruncated</i>	A flag that indicates whether (true) or not (false) Cloud ⁿ storage returned all of the results that satisfied the search criteria. True for exceeded MaxKeys value.	None (<i>ListVersionsResult</i>)

2-2) Object Storage API bucket operation

Response (continued from previous page)

Response (Body)	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>NextKeyMarker</i>	When the number of responses exceeds the value of MaxKeys, NextKeyMarker specifies the first key not returned that satisfies the search criteria. Use this value for the key-marker request parameter in a subsequent request.	None (<i>ListVersionsResult</i>)
		<i>NextVersionIdMarker</i>	When the number of responses exceeds the value of MaxKeys, NextVersionIdMarker specifies the first object version not returned that satisfies the search criteria. Use this value for the version-id-marker request parameter in a subsequent request.	None (<i>ListVersionsResult</i>)
		<i>Version</i>	Container for version information.	Key, VersionId, IsLatest, LastModified, StorageClass, Size, ETag, Owner, (<i>ListVersionsResult</i>)
		<i>Key</i>	Object Key	None (<i>ListVersionsResult.Version</i>)
		<i>VersionID</i>	Version ID of an object	None (<i>ListVersionsResult.Version</i>)
		<i>IsLatest</i>	Specifies whether the object is (true) or is not (false) the latest version of an object.	None (<i>ListVersionsResult.Version</i>)
		<i>LastModified</i>	Date and time the object was last modified.	None (<i>ListVersionsResult.Version</i>)
		<i>StorageClass</i>	Always STANDARD.	None (<i>ListVersionsResult.Version</i>)
		<i>Size</i>	Size in bytes of the object.	None (<i>ListVersionsResult.Version</i>)
		<i>Etag</i>	The entity tag is an MD5 hash of the object. The ETag only reflects changes to the contents of an object, not its metadata.	None (<i>ListVersionsResult.Version</i>)
		<i>Owner</i>	Bucket owner.	ID, DisplayName (<i>ListVersionsResult.Version</i>)
		<i>ID</i>	Object owner's ID.	None (<i>ListVersionsResult.Version.Owner</i>)
		<i>DisplayName</i>	Object owner's name.	None (<i>ListVersionsResult.Version.Owner</i>)

2-2) Object Storage API bucket operation

GET Bucket Versioning

Description	Uses the versioning subresource to return the versioning state of a bucket. This implementation also returns the MFA Delete status of the versioning state.
-------------	---

Request

Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Request Parameters	Parameter	Description	Required
		<i>versioning</i>	Request parameter which means Versioning. This needs to be reviewed as signature strings.	YES
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
Body	None			

Response

Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>VersioningConfiguration</i>	Container for the Status response element.	Status, MfaDelete (<i>None</i>)
		Status	The versioning state of the bucket. (Suspended Enabled)	None (<i>VersioningConfiguration</i>)
	<i>MfaDelete</i>	Specifies whether MFA delete is enabled in the bucket versioning configuration. This element is only returned if the bucket has been configured with MfaDelete. If the bucket has never been so configured, this element is not returned.	None (<i>VersioningConfiguration</i>)	

2-2) Object Storage API bucket operation

List Multipart Upload

Description	Lists in-progress multipart uploads.			
Request				
Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>uploads</i>	Request parameters to obtain version in progress and evaluated as signature	YES
	Other Parameters	Parameter	Description	Required
		<i>delimiter</i> *	All keys that contain the same string between the prefix, if specified, and the first occurrence of the delimiter after the prefix are grouped under a single result element. Type : String Default : None	
		<i>key-marker</i> *	This parameter specifies the multipart upload after which listing should begin. Type : String Default : None	
		<i>max-uploads</i> *	Sets the maximum number of multipart uploads to return in the response body. Type : String Default : 1000	
		<i>upload-id-marker</i> *	Together with key-marker, specifies the multipart upload after which listing should begin. If key-marker is not specified, the upload-id-marker parameter is ignored.	
	<i>prefix</i> *	Lists in-progress uploads only for those keys that begin with the specified prefix. Type : String Default : None		
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com.</code>		
Body	None			

* Will not added in Signature strings

Response

Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>ListMultipartUploadsResult</i>	Container for the response.	Bucket, prefix, KeyMarker, UploadIdMarker, MaxUpload, IsTruncated, NextKeyMarker, NextUploadIdMarker, upload (None)
		<i>Bucket</i>	Bucket Name	None (<i>ListMultipartUploadsResult</i>)
		<i>Prefix</i>	Prefix when requested.	None (<i>ListMultipartUploadsResult</i>)
		<i>KeyMarker</i>	key-marker when requested.	None (<i>ListMultipartUploadsResult</i>)
		<i>UploadIdMarker</i>	upload-id-marker when requested.	None (<i>ListMultipartUploadsResult</i>)
		<i>MaxUploads</i>	max-uploads when requested.	None (<i>ListMultipartUploadsResult</i>)

2-2) Object Storage API bucket operation

Response (continued from previous page)

Response (Body)	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>IsTruncated</i>	A flag that indicates whether (true) or not (false) Cloud ⁿ storage returned all of the results that satisfied the search criteria. True for exceeded MaxKeys value.	None (<i>ListMultipartUploadsResult</i>)
		<i>NextKeyMarker</i>	When the number of responses exceeds the value of MaxKeys, NextKeyMarker specifies the first key not returned that satisfies the search criteria. Use this value for the key-marker request parameter in a subsequent request.	None (<i>ListMultipartUploadsResult</i>)
		<i>NextUploadIdMarker</i>	When a list is truncated, this element specifies the value that should be used for the upload-id-marker request parameter in a subsequent request.	None (<i>ListMultipartUploadsResult</i>)
		<i>Delimiter</i>	Delimiter when requested	None (<i>ListMultipartUploadsResult</i>)
		<i>CommonPrefixes</i>	If you specify a delimiter in the request, then the result returns each distinct key prefix containing the delimiter in a CommonPrefixes element.	Prefix (<i>ListMultipartUploadsResult</i>)
		<i>(CommonPrefix,)Prefix</i>	Prefix got as CommonPrefix	None (<i>ListMultipartUploadsResult.CommonPrefix</i>)
		<i>Upload</i>	Container for elements related to a particular multipart upload.	<i>Key, Initiator, Owner, StorageClass, initiated</i> (<i>ListMultipartUploadsResult</i>)
		<i>Key</i>	Object Key	None (<i>ListVersionsResult.Version.Upload</i>)
		<i>Initiator</i>	Container element that identifies who initiated the multipart upload.	ID, DisplayName (<i>ListVersionsResult.Version.Upload</i>)
		<i>(Initiator.)ID</i>	Account's ID when starting upload	None (<i>ListVersionsResult.Version.Upload.Initiator</i>)
		<i>(Initiator.)DisplayName</i>	Principal's name.	None (<i>ListVersionsResult.Version.Upload.Initiator</i>)
		<i>Owner</i>	Container element that identifies the object owner, after the object is created	ID, DisplayName (<i>ListVersionsResult.Version.Upload</i>)
		<i>(Owner.)ID</i>	Owner ID of the object after creation	None (<i>ListVersionsResult.Version.Upload.Initiator</i>)
		<i>(Owner.)DisplayName</i>	MD5 value of the Object, and only reflects changes to the contents of an object, not its metadata.	None (<i>ListVersionsResult.Version.Upload.Initiator</i>)
		<i>StorageClass</i>	Always STANDARD	None (<i>ListVersionsResult.Version.Upload</i>)
		<i>Initiated</i>	Date and time at which the multipart upload was initiated.	None (<i>ListVersionsResult.Version.Upload</i>)

2-2) Object Storage API bucket operation

PUT Bucket ACL

Description	Sets the permissions on an existing bucket using ACL.
-------------	---

Request

Request Method	PUT			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>acl</i>	Flag which shows ACLs and needs to include signature strings.	YES
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
	Extension header (*1)	Description	Required	
	x-amz-acl	Sets the ACL of the bucket using the specified canned ACL. Type : String Valid Values: private public-read public-read-write ¥ authenticated-read bucket-owner-read bucket-owner-full-control Default : private		(YES) (*2)
	x-amz-grant-read	Allows grantee to list the objects in the bucket. Type : String Default : None Constraints : None		
	x-amz-grant-write	Allows the specified grantee(s) to create, overwrite, and delete any object in the bucket. Type : String Default : None Constraints : None		
	x-amz-grant-read-acp	Allows the specified grantee(s) to read the bucket ACL. Type : String Default : None Constraints : None		
	x-amz-grant-write-acp	Allows the specified grantee(s) to write the ACL for the applicable bucket. Type : String Default : None Constraints : None		
	x-amz-grant-full-control	Allows the specified grantee(s) the READ, WRITE, READ_ACP, and WRITE_ACP permissions on the bucket. Type : String Default : None Constraints : None		
Body	XML Data (*1)			
	Node Name	Description	Child Node(Parent Node)	Required
	<i>AccessControlPolicy</i>	Contains the elements that set the ACL permissions for an object per grantee.	Owner, AccessControlList (None)	YES
	<i>Owner</i>	Container for the bucket owner's display name and ID.	ID, DisplayName (<i>AccessControlPolicy</i>)	YES
	<i>(Owner).ID</i>	ID of the bucket owner,	None (<i>AccessControlPolicy.Owner</i>)	YES
	<i>(Owner).DisplayName</i>	Screen name of the bucket owner.	None (<i>AccessControlPolicy.Owner</i>)	YES

2-2) Object Storage API bucket operation

Request (continued from previous page)

Body	XML Data(*1)			
	Node Name	Description	Child Node(Parent Node)	Required
	<i>AccessControlList</i>	Container for ACL information.	Grant (<i>AccessControlPolicy</i>)	YES
	<i>Grant</i>	Container for Grantee and Permission.	Grantee, Permission (<i>AccessControlPolicy.AccessControlList</i>)	YES
	<i>Grantee</i>	The subject whose permissions are being set. You first need to declare below as attributes for node, xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" You can specify the person(grantee) to whom you're assigning access rights,as follows, xsi:type="CanonicalUser" xsi:type="AmazonCustomerByEmail" xsi:type="Group"	ID, DisplayName, EmailAddress, URI (<i>AccessControlPolicy.AccessControlList.Grant</i>)	YES
	<i>(Grantee).ID</i>	The ID of the grantee when declared xsi:type="CanonicalUser"	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>(Grantee).DisplayName</i>	The DisplayName of the grantee when declared xsi:type="CanonicalUser"	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	
	<i>(Grantee).EmailAddress</i>	The e-mail address of the grantee when declared xsi:type="AmazonCustomerByEmail"	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>(Grantee).URI</i>	Can be used when declared xsi:type="Group"	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>Permission</i>	Specifies the permission given to the grantee. Valid Values: FULL_CONTROL WRITE WRITE_ACP READ READ_ACP	None (<i>AccessControlPolicy.AccessControlList.Grant</i>)	YES

(*1) ACL setting by Header and Body are exclusively available, which means in case of ACL setting by header, no body needed and in case of ACL setting by Body, no header needed.

(*2) In case of request by header, this is required.

Response

Response Header	x-amz-version-id	The version of the object. Type : String Default : None
Response (Body)	None	

2-2) Object Storage API bucket operation

PUT Bucket Versioning

Description	Sets the versioning state of an existing bucket.
-------------	--

Request

Request Method	PUT			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		versioning	Flag which shows Versioning and needs to include signature strings.	YES
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}. str.cloudn-service.com.</code>		
	Extension header (*1)	Description		Required
	x-amz-mfa	The value is the concatenation of the authentication device's serial number, a space, and the value displayed on your authentication device.		(YES)
Body	XML Data			
	Node Name	Description	Child Node(Parent Node)	Required
	<i>VersioningConfiguration</i>	Container for setting the versioning state.	Status, MfaDelete (None)	YES
	<i>Status</i>	Sets the versioning state of the bucket. Valid Values : Suspended Enabled * Enable : Enable Versioning * Suspended: Disable Versioning Version value is "null" in case of disable.	None (VersioningConfiguration)	
	<i>MfaDelete</i>	Specifies whether MFA Delete is enabled in the bucket versioning configuration. When enabled, the bucket owner must include the x-amz-mfa request header in requests to change the versioning state of a bucket and to permanently delete a versioned object. Valid Values: Disabled Enabled	None (VersioningConfiguration)	

Response

Response Header	None
Response (Body)	None

2-2) Object Storage API bucket operation

HEAD Bucket

Description	This operation is useful to determine if a bucket exists and you have permission to access it. The operation returns a 200 OK if the bucket exists and you have permission to access it. Otherwise, the operation might return responses such as 404 Not Found and 403 Forbidden.
-------------	---

Request

Request Method	HEAD
Path,Parameters, etc	For path-style requests, fill bucket name in Request Path.
Header	None
Body	None

Response

Response Header	None
Response (Body)	None

2-3) Object Storage API object operation

DELTE Object

Description	Removes the null version (if there is one) of an object and inserts a delete marker.
-------------	--

Request

Request Method	DELETE			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>versionId</i>	Need to specify in case of getting specified Version object, and also evaluate as signature strings. Type : String Default : None	
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
Body	None			

Response

Response Header	x-amz-delete-marker	Specifies whether the versioned object that was permanently deleted was (true) or was not (false) a delete marker.
	x-amz-version-id	Returns the version ID of the delete marker created as a result of the DELETE operation.
Response (Body)	None	

2-3) Object Storage API object operation

PUT Object

Description	Adds an object to a bucket.
-------------	-----------------------------

Request

Request Method	PUT		
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.		
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}. str.cloudn-service.com.</code>	
	Header	Description	Required
	Cache-Control	Can be used to specify caching behavior along the request/reply chain. Type : String Default : None Constraints: None	
	Content-Disposition	Specifies presentational information for the object. Type : String Default : None Constraints: None	
	Content-Encoding	Specifies what content encodings have been applied to the object and thus what decoding mechanisms must be applied to obtain the media-type referenced by the Content-Type header field. Type : String Default : None Constraints: None	
	Content-Length	The size of the object, in bytes. Type : String Default : None Constraints: None	YES
	Content-MD5	The base64-encoded 128-bit MD5 digest of the message (without the headers) according to RFC 1864. This header can be used as a message integrity check to verify that the data is the same data that was originally sent. Type : String Default : None Constraints: None	
	Content-Type	A standard MIME type describing the format of the contents. Type : String Default : binary/octet-stream Valid Values: MIME types Constraints : None	
	Expect	When your application uses 100-continue, it does not send the request body until it receives an acknowledgment. If the message is rejected based on the headers, the body of the message is not sent. Type : String Default : binary/octet-stream Valid Values: MIME types Constraints : None	
	Expires	The date and time at which the object is no longer cacheable. Type : Int Default : None Constraints: None	
	Extension Header	Description	Required
x-amz-meta-*	Any header starting with this prefix is considered user metadata. It will be stored with the object and returned when you retrieve the object. The PUT request header is limited to 8 KB in size. Within the PUT request header, the user-defined metadata is limited to 2 KB in size. Type : String Default : None Constraints: None		

2-3) Object Storage API object operation

Request (continued from previous page)			
Header	Extension Header	Description	Required
	x-amz-server-side-encryption	Specifies a server-side encryption algorithm to use when Cloudn Storage creates an object Type : String Valid Value: AES256	
	x-amz-storage-class	The type of storage to use for the object that is created after successful multipart upload.	
	x-amz-acl	The canned ACL to apply to the object. Type : String Default : private Valid Values: private public-read public-read-write authenticated-read ¥ bucket-owner-read bucket-owner-full-control Constraints: None	
	x-amz-grant-read (※1, ※2)	Allows grantee to read the object data and its metadata. Type : String Default : None Constraints: None	
	x-amz-grant-read-acp (※1)	Allows grantee to read the object ACL. Type : String Default : None Constraints: None	
	x-amz-grant-write-acp (※1)	Allows grantee to write the ACL for the applicable object. Type : String Default : None Constraints: None	
	x-amz-grant-full-controll (※1)	Allows grantee the READ, READ_ACP, and WRITE_ACP permissions on the object. Type : String Default : None Constraints: None	
Body	upload data		

(*1) Special Attribute Value Pair needed. Attribute should be "id" and "emailAddress", and they should be the e-mail address and id which were registered in Cloudⁿ Storage. (e.g.: x-amz-grant-read: id="daikuwa")

(*2) x-amz-grant-write is used for bucket and is not used for Object.

Response			
Response Header	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used.	
	x-amz-version-id	Version of the object.	
Response (Body)	None		

2-3) Object Storage API object operation

Initiate Multipart Upload

Description Initiates a multipart upload and returns an upload ID.

Request

Request Method	POST		
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.		
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com</code> .	
	Header	Description	Required
	Cache-Control	Can be used to specify caching behavior along the request/reply chain. Type : String Default : None Constraints: None	
	Content-Disposition	Specifies presentational information for the object. Type : String Default : None Constraints: None	
	Content-Encoding	Specifies what content encodings have been applied to the object and thus what decoding mechanisms must be applied to obtain the media-type referenced by the Content-Type header field. Type : String Default : None Constraints: None	
	Content-Length	The size of the object, in bytes. Type : String Default : None Constraints: None	YES
	Content-MD5	The base64 encoded 128-bit MD5 digest of the message (without the headers). This header can be used as a message integrity check to verify that the data is the same data that was originally sent. Type : String Default : None Constraints: None	
	Content-Type	A standard MIME type describing the format of the contents. Type : String Default : binary/octet-stream Valid Values: MIME types Constraints : None	
	Expect	When your application uses 100-continue, it does not send the request body until it receives an acknowledgment. If the message is rejected based on the headers, the body of the message is not sent. Type : String Default : binary/octet-stream Valid Values: MIME types Constraints : None	
	Expires	The date and time at which the object is no longer cacheable. Type : Int Default : None Constraints: None	
	Extension Header	Description	Required
x-amz-meta-*	Any header starting with this prefix is considered user metadata. It will be stored with the object and returned when you retrieve the object. The PUT request header is limited to 8 KB in size. Within the PUT request header, the user-defined metadata is limited to 2 KB in size. Type : String Default : None Constraints: None		

2-3) Object Storage API object operation

Request (continued from previous page)			
Header	Extension Header	Description	Required
	x-amz-server-side-encryption	Specifies a server-side encryption algorithm to use when Cloudn Storage creates an object Type : String Valid Value: AES256	
	x-amz-storage-class	The type of storage to use for the object that is created after successful multipart upload. Type : String Valid Values: STANDARD REDUCED_REDUNDANCY Default : STANDARD	
	x-amz-acl	Sets the ACL of the bucket using the specified canned ACL. Type : String Default : private Valid Values: private public-read public-read-write authenticated-read ¥ bucket-owner-read bucket-owner-full-control Constraints: None	
	x-amz-grant-read (*1, *2)	Allows grantee to read the object data and its metadata. Type : String Default : None Constraints: None	
	x-amz-grant-read-acp (*1)	Allows grantee to read the object ACL. Type : String Default : None Constraints: None	
	x-amz-grant-write-acp (*1)	Allows grantee to write the ACL for the applicable object. Type : String Default : None Constraints: None	
	x-amz-grant-full-controll (*1)	Allows grantee the READ, READ_ACP, and WRITE_ACP permissions on the object. Type : String Default : None Constraints: None	
Body	None		

(*1) Special Attribute Value Pair needed. Attribute should be "id" and "emailAddress", and they should be the e-mail address and id which were registered in Cloudn Storage. (e.g.: x-amz-grant-read: id= "daikuwa")

(*2) x-amz-grant-write is used for bucket and is not used for Object.

Response				
Response Header	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used.		
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>InitiateMultipartUploadResult</i>	Container for response.	Bucket, Key, UploadId (None)
		<i>Bucket</i>	Name of the bucket to which the multipart upload was initiated.	None (InitiateMultipartUploadResult)
		<i>Key</i>	Object Key	None (InitiateMultipartUploadResult)
	<i>UploadId</i>	ID for the initiated multipart upload.	None (InitiateMultipartUploadResult)	

2-3) Object Storage API object operation

Upload Part

Description	Uploads a part in a multipart upload.
-------------	---------------------------------------

Request				
Request Method	PUT			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		partNumber	Part number that identifies the part.	YES
	uploadId	Upload ID identifying the multipart upload whose parts are being listed.	YES	
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}. str.cloudn-service.com.</code>		
	Header	Description	Required	
	Content-Length	The size of the object, in bytes. Type : String Default : None Constraints: None	YES	
	Content-MD5	The base64 encoded 128-bit MD5 digest of the message (without the headers). This header can be used as a message integrity check to verify that the data is the same data that was originally sent. Type : String Default : None Constraints: None		
	Expect	When your application uses 100-continue, it does not send the request body until it receives an acknowledgment. If the message is rejected based on the headers, the body of the message is not sent. Type : String Default : binary/octet-stream Valid Values: MIME types Constraints : None		
Body	upload data			

Response		
Response Header	ETag (*)	The entity tag is an MD5 hash of the object. The ETag only reflects changes to the contents of an object, not its metadata.
	x-amz-server-side-encryption	If you specify server-side encryption in your request, the response includes this header. It confirms the encryption algorithm that will be used for the object that is created after successful multipart upload.
Response (Body)	None	

(*) Common Response Header used but need to run of "Complete Multipart Upload."

2-3) Object Storage API object operation

Complete Multipart Upload

Description	Completes a multipart upload by assembling previously uploaded parts.
-------------	---

Request					
Request Method	POST				
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.				
	Sub Resource	Parameter	Description	Required	
		uploadId	To specify uploadId which were brought as a result of Initiate Multipart Upload, and also evaluate as signature strings.	YES	
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .			
Body	XML Data				
		Node Name	Description	Child Node(Parent Node)	Required
		<i>CompleteMultipartUpload</i>	Container for the request.	Part, (None)	YES
		<i>Part</i>	Container for elements related to a particular previously uploaded part.	PartNumber, ETag (<i>CompleteMultipartUpload</i>)	YES
		<i>PartNumber</i>	Part number that identifies the part.	None (<i>CompleteMultipartUpload.Part</i>)	YES
		<i>ETag</i>	The entity tag is an MD5 hash of the object.	None (<i>CompleteMultipartUpload.Part</i>)	YES

Response				
Response Header	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used.		
	x-amz-version-id	Version ID of the newly created object, in case the bucket has versioning turned on.		
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>CompleteMultipartUploadResult</i>	Container for the response.	Bucket, Key, UploadId (None)
		<i>Location</i>	The URI that identifies the newly created object.	None (<i>CompleteMultipartUploadResult</i>)
		<i>Bucket</i>	Bucket Name	None (<i>CompleteMultipartUploadResult</i>)
		<i>Key</i>	The object key of the newly created object.	None (<i>CompleteMultipartUploadResult</i>)
<i>ETag</i>	The entity tag is an MD5 hash of the object. The ETag only reflects changes to the contents of an object, not its metadata.	None (<i>CompleteMultipartUploadResult</i>)		

2-3) Object Storage API object operation

Abort Multipart Upload

Description	Aborts a multipart upload.
-------------	----------------------------

Request

Request Method	DELETE			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		uploadId	To specify uploadId which were brought as a result of Initiate Multipart Upload, and also evaluate as signature strings.	YES
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}. str.cloudn-service.com</code> .		
Body	None			

Response

Response Header	Common Response Header is used.
Response (Body)	None

2-3) Object Storage API object operation

List Part

Description	Lists the parts that have been uploaded for a specific multipart upload.
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Request

Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		uploadId	To specify uploadId which were brought as a result of Initiate Multipart Upload, and also evaluate as signature strings.	YES
	Other Parameters	Parameter	Description	Required
max-parts		Sets the maximum number of parts to return in the response body. Type : String Default: 1,000		
	part-number-marker	Specifies the part after which listing should begin. Only parts with higher No part numbers will be listed. Type : String Default: None		
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
Body	None			

Response

Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>ListPartsResult</i>	Container for the response.	Bucket, Key, UploadId, Initiator, Owner, StorageClass, PartNumberMarker, NextPartNumberMarker, MaxParts, IsTruncated, Part (<i>None</i>)
		<i>Bucket</i>	Bucket Name	None (<i>ListPartsResult</i>)
		<i>Key</i>	Object key for which the multipart upload was initiated.	None (<i>ListPartsResult</i>)
		<i>UploadId</i>	Upload ID identifying the multipart upload whose parts are being listed	None (<i>ListPartsResult</i>)
		<i>Initiator</i>	Container element that identifies who initiated the multipart upload.	ID, DisplayName (<i>ListPartsResult</i>)
		<i>(initiator).ID</i>	Canonical User ID or a user ARN value	None (<i>ListPartsResult.Initiator</i>)
		<i>(initiator).DisplayName</i>	Principal's name.	None (<i>ListPartsResult.Initiator</i>)
		<i>Owner</i>	Container element that identifies the object owner.	ID, DisplayName (<i>ListPartsResult</i>)
		<i>(Owner).ID</i>	Canonical User ID or a user ARN value	None (<i>ListPartsResult.Owner</i>)
		<i>(Owner).DisplayName</i>	Principal's name.	None (<i>ListPartsResult.Owner</i>)

2-3) Object Storage API object operation

Response (continued from previous page)

Response (Body)	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>StorageClass</i>	Class of storage (STANDARD or REDUCED_REDUNDANCY) used to store the uploaded object.	None (<i>ListPartsResult</i>)
		<i>PartNumberMarker</i>	Part number after which listing begins.	None (<i>ListPartsResult</i>)
		<i>MaxParts</i>	Maximum number of parts that were allowed in the response.	None (<i>ListPartsResult</i>)
		<i>IsTruncated</i>	Indicates whether the returned list of parts is truncated. A true value indicates that the list was truncated. A list can be truncated if the number of parts exceeds the limit returned in the MaxParts element.	None (<i>ListPartsResult</i>)
		<i>NextPartNumberMarker</i>	When a list is truncated, this element specifies the last part in the list, as well as the value to use for the part-number-marker request parameter in a subsequent request.	None (<i>ListPartsResult</i>)
		<i>Part</i>	Container for elements related to a particular part. A response can contain zero or more Part elements.	PartNumber, LastModified, ETag, Size (<i>ListPartsResult</i>)
		<i>PartNumber</i>	Part number identifying the part.	None (<i>ListPartsResult.Part</i>)
		<i>LastModified</i>	Date and time at which the part was uploaded.	None (<i>ListPartsResult.Part</i>)
		<i>ETag</i>	Entity tag returned when the part was uploaded.	None (<i>ListPartsResult.Part</i>)
		<i>Size</i>	Size of the uploaded part data.	None (<i>ListPartsResult.Part</i>)

2-3) Object Storage API object operation

GET Object

Description	Retrieves objects from Cloud ⁿ Strage. If you grant READ access to the anonymous user, you can return the object without using an authorization header.
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Request

Request Method	GET			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
Sub Resource	Parameter	Description	Required	
	<i>versionId</i>	Need to specify in case of getting specified Version object, and also evaluate as signature strings.		
	Other Parameters	Parameter	Description	Required
		response-content-type	Sets the Content-Type header of the response. Type : String Default: None	
		response-content-language	Sets the Content-Language header of the response. Type : String Default: None	
		response-expires	Sets the Expires header of the response. Type : String Default: None	
		response-cache-control	Sets the Cache-Control header of the response. Type : String Default: None	
		response-content-disposition	Sets the Content-Disposition header of the response. Type : String Default: None	
response-content-encoding		Sets the Content-Encoding header of the response. Type : String Default: None		
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
	Header	Description	Required	
	Range	Downloads the specified range bytes of an object. Type : String Default : None		
	If-Modified-Since	Return the object only if it has been modified since the specified time. Type : String Default : None		
	If-Unmodified-Since	Return the object only if it has not been modified since the specified time, Type : String Default : None		
	If-Match	Return the object only if its entity tag (ETag) is the same as the one Specified Type : String Default : None		
	If-None-Match	Return the object only if its entity tag (ETag) is different from the one specified, Type : String Default : None		
Body	None			

2-3) Object Storage API object operation

Response		
Response Header	x-amz-delete-marker	Specifies whether the object retrieved was (true) or was not (false) a Delete Marker. Type : Boolean Valid Values: true false Default : false
	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used. Type : String Valid Values: AES256
	x-amz-version-id	Returns the version ID of the retrieved object if it has a unique version ID. Type : String Default : None
Response (Body)	Object data	

2-3) Object Storage API object operation

GET Object ACL

Description	Returns the access control list (ACL) of an object
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Request

Request Method	GET		
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.		
	Sub Resource	Parameter	Description
		acl	Flag which shows ACLs and needs to include signature strings.
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com.</code>	
Body	None		

Response

Response Header	Common Response Header is used.			
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>AccessControlPolicy</i>	Container for Grant, Grantee, and Permission	Owner, AccessControlList (<i>None</i>)
		<i>Owner</i>	Container for the bucket owner's display name and ID.	ID, DisplayName (<i>AccessControlPolicy</i>)
		<i>(Owner).ID</i>	ID of the bucket owner	None (<i>AccessControlPolicy.Owner</i>)
		<i>(Owner).DisplayName</i>	Screen name of the bucket owner	None (<i>AccessControlPolicyOwner</i>)
		<i>AccessControlList</i>	Container for Grant, Grantee, and Permission	Grant (<i>AccessControlPolicy</i>)
		<i>Grant</i>	Container for the grantee and his or her permissions.	Grantee, Permission (<i>AccessControlPolicy.AccessControlList</i>)
		<i>Grantee</i>	The subject whose permissions are being set.	ID, DisplayName (<i>AccessControlPolicy.AccessControlList.Grant</i>)
		<i>(Grantee).ID</i>	ID of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)
		<i>(Grantee).DisplayName</i>	Screen name of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)
<i>Permission</i>	Specifies the permission (FULL_CONTROL, WRITE, READ_ACP) given to the grantee.	None (<i>ListPartsResult.Owner</i>)		

2-3) Object Storage API object operation

HEAD Object

Description	Retrieves metadata from an object without returning the object itself.
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Request				
Request Method	HEAD			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>versionId</i>	Need to specify in case of getting specified Version object, and also evaluate as signature strings.	
	Other Parameters	Parameter	Description	Required
		response-content-type	Sets the Content-Type header of the response. Type : String Default: None	
		response-content-language	Sets the Content-Language header of the response. Type : String Default: None	
		response-expires	Sets the Expires header of the response. Type : String Default: None	
		response-cache-control	Sets the Cache-Control header of the response. Type : String Default: None	
		response-content-disposition	Sets the Content-Disposition header of the response. Type : String Default: None	
	response-content-encoding	Sets the Content-Encoding header of the response. Type : String Default: None		
Header	Host	For virtual-Host style requests, the value is <code>\${BucketName}.str.cloudn-service.com</code> .		
	Header	Description	Required	
	Range	Downloads the specified range bytes of an object. Type : String Default : None		
	If-Modified-Since	Return the object only if it has been modified since the specified time. Type : String Default : None		
	If-Unmodified-Since	Return the object only if it has not been modified since the specified time. Type : String Default : None		
	If-Match	Return the object only if its entity tag (ETag) is the same as the one specified. Type : String Default : None		
	If-None-Match	Return the object only if its entity tag (ETag) is different from the one specified. Type : String Default : None		
Body	None			

2-3) Object Storage API object operation

Response		
Response Header	x-amz-meta-*	If you supplied user metadata in a PUT object operation, that metadata is returned in one or more response headers prefixed with x-amz-meta- and with the suffix name that you provided on storage.
	x-amz-missing-meta	This header is set to the number of metadata entries that were not returned in x-amz-meta headers.
	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used. Type : String Valid Values: AES256
	x-amz-version-id	The version ID of the object returned. Type : String Default : None
Response (Body)	None	

2-3) Object Storage API object operation

PUT Object ACL

Description	Sets the access control list (ACL) permissions for an object that already exists in a bucket.			
Request				
Request Method	PUT			
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.			
	Sub Resource	Parameter	Description	Required
		<i>acl</i>	Flag which shows ACLs and needs to include signature strings.	YES
		<i>versionId</i>	Need to specify in case of getting specified Version object, and also evaluate as signature strings.	
Header	Host	For virtual-Host style requests, the value is <code>#{BucketName}.str.cloudn-service.com</code> .		
	Extension header (*1)	Description	Required	
	<i>x-amz-acl</i>	Sets the ACL of the bucket using the specified canned ACL. Type : String Valid Values: private public-read public-read-write authenticated-read ¥ bucket-owner-read bucket-owner-full-control Default : private	(YES) (*2)	
	<i>x-amz-grant-read</i>	Allows grantee to list the objects in the bucket. Type : String Default : None Constraints : None		
	<i>x-amz-grant-write</i>	Not available.		
	<i>x-amz-grant-read-acp</i>	Allows grantee to read the bucket. Type : String Default : None Constraints : None		
	<i>x-amz-grant-write-acp</i>	Allows grantee to write the ACL for the applicable bucket. Type : String Default : None Constraints : None		
	<i>x-amz-grant-full-control</i>	Allows grantee full control on the bucket. Type : String Default : None Constraints : None		
Body	XML Data(*1)			
	Node Name	Description	Child Node(Parent Node)	Required
	<i>AccessControlPolicy</i>	Container for the request.	Owner, AccessControlList (None)	YES
	<i>Owner</i>	Container for the bucket owner's display name and ID.	ID, DisplayName (<i>AccessControlPolicy</i>)	YES
	<i>(Owner).ID</i>	ID of the bucket owner	None (<i>AccessControlPolicy.Owner</i>)	YES
	<i>(Owner).DisplayName</i>	Screen name of the bucket owner	None (<i>AccessControlPolicy.Owner</i>)	YES

2-3) Object Storage API object operation

Request (continued from previous page)

Body	XML Data (*1)			
	Node Name	Description	Child Node(Parent Node)	Required
	<i>AccessControlList</i>	Container for Grant, Grantee, and Permission	Grant (<i>AccessControlPolicy</i>)	YES
	<i>Grant</i>	Container for the grantee and his or her permissions.	Grantee, Permission (<i>AccessControlPolicy.AccessControlList</i>)	YES
	<i>Grantee</i>	The subject whose permissions are being set. You first need to declare below as attributes for node, xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" You can specify the person(grantee) to whom you're assigning access rights,as follows, xsi:type="CanonicalUser" xsi:type="AmazonCustomerByEmail" xsi:type="Group"	ID, DisplayName, EmailAddress, URI (<i>AccessControlPolicy.AccessControlList.Grant</i>)	YES
	<i>(Grantee).ID</i>	ID of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>(Grantee).DisplayName</i>	Screen name of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	
	<i>(Grantee).EmailAddress</i>	e-mail address of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>(Grantee).URI</i>	URI of the bucket grantee	None (<i>AccessControlPolicy.AccessControlList.Grant.Grantee</i>)	(YES)
	<i>Permission</i>	Logging permissions given to the Grantee for the bucket. Valid Values: FULL_CONTROL WRITE ¥ WRITE_ACP READ READ_ACP	None (<i>AccessControlPolicy.AccessControlList.Grant</i>)	YES

(*1) ACL setting by Header and Body are exclusively available, which means in case of ACL setting by header, no body needed and in case of ACL setting by Body, no header needed.

(*2) In case of request by header, this is required.

Response

Response Header	x-amz-version-id	Version of the copied object in the destination bucket. Type : String Default : None
Response (Body)	None	

2-3) Object Storage API object operation

PUT Object Copy

Description	Creates a copy of an object.
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Request

Request Method	PUT		
Path, Parameters, etc	For path-style requests, fill bucket name in Request Path.		
	Sub Resource	Parameter	Description
		versionId	Need to specify in case of getting specified Version object, and also evaluate as signature strings.
Header	Host	For virtual-Host style requests, the value is <code>/\${BucketName}.str.cloudn-service.com</code> .	
	Extension header (*1)	Description	Required
	x-amz-copy-source	The name of the source bucket and key name of the source object, separated by a slash (/). (e.g. /bucket/key) This string must be URL-encoded. Additionally, the source bucket must be valid and you must have READ access to the valid source object.	
	x-amz-metadata-directive	Specifies whether the metadata is copied from the source object or replaced with metadata provided in the request. Type : String Default : COPY Valid values: COPY REPLACE You cannot copy an object to itself unless the MetadataDirective header is specified and its value set to REPLACE	
	x-amz-copy-source-if-match	Copies the object if its entity tag (ETag) matches the specified tag. x-amz-copy-source-if-unmodified-since, but cannot be used with other conditional copy headers.	
	x-amz-copy-source-if-none-match	Copies the object if its entity tag (ETag) is different than the specified ETag. x-amz-copy-source-if-modified-since, but cannot be used with other conditional copy headers.	
	x-amz-copy-source-if-unmodified-since	Copies the object if it hasn't been modified since the specified time. This header can be used with x-amz-copy-source-if-match, but cannot be used with other conditional copy headers.	
	x-amz-copy-source-if-modified-since	Copies the object if it has been modified since the specified time. This header can be used with x-amz-copy-source-if-none-match, but cannot be used with other conditional copy headers.	
	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used. Type : String Valid Value: AES256	
	x-amz-storage-class	The type of storage to use for the object that is created after successful multipart upload. Type : String Valid Values: STANDARD REDUCED_REDUNDANCY Default : STANDARD	
	x-amz-acl	Sets the ACL of the bucket using the specified canned ACL. Type : String Valid Values: private public-read public-read-write authenticated-read bucket-owner-read bucket-owner-full-control Default : private	
	x-amz-grant-read (*)	Allows grantee to list the objects in the bucket. Type : String Default : None Constraints : None	

2-3) Object Storage API object operation

Request (continued from previous page)			
Header	x-amz-grant-write(*)	Not available	
	x-amz-grant-read-acp (*)	Allows grantee to read the bucket. Type : String Constraints : None Default : None	
	x-amz-grant-write-acp (*)	Allows grantee to write the ACL for the applicable bucket. Type : String Constraints : None Default : None	
	x-amz-grant-full-control (*)	Allows grantee full control on the bucket. Type : String Constraints : None Default : None	
Body	None		

(*) Special Attribute Value Pair needed. Attribute should be "id", and it should be the user id for Cloudⁿ Storage. (e.g.: x-amz-grant-read: id= "cloudnuser1")

Response				
Response Header	x-amz-copy-source-version-id	Version of the source object that was copied.		
	x-amz-server-side-encryption	If you request server-side encryption when adding an object, the response includes this header confirming the encryption algorithm used.		
	x-amz-version-id	Version of the copied object in the destination bucket.		
Response (Body)	Format	XML		
	XML Data	Node Name	Description	Child Node (Parent Node)
		<i>CopyObjectResult</i>	Container for the response.	ETag, LastModified (None)
		<i>ETag</i>	The entity tag is an MD5 hash of the object. The ETag only reflects changes to the contents of an object, not its metadata.	None (<i>CopyObjectResult</i>)
<i>LastModified</i>	Bucket Name	None (<i>CopyObjectResult</i>)		