JSON Transfer Encoding Extension

Version 1.0e

"Publication of this Working Draft for review and comment has been approved by the Cloud Storage Technical Working Group. This draft represents a "best effort" attempt by the Cloud Storage Technical Working Group to reach preliminary consensus, and it may be updated, replaced, or made obsolete at any time. This document should not be used as reference material or cited as other than a 'work in progress.' Suggestion for revision should be directed to http://snia.org/feedback."

Working Draft
Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>By</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-11-07</td>
<td>1.0a</td>
<td>David Slik, NetApp Inc.</td>
<td>Initial version of document</td>
</tr>
<tr>
<td>2012-11-14</td>
<td>1.0b</td>
<td>David Slik, NetApp Inc.</td>
<td>Updates to reflect TWG feedback</td>
</tr>
<tr>
<td>2013-01-30</td>
<td>1.0c</td>
<td>David Slik, NetApp Inc.</td>
<td>TWG edits from the Winter Symposium face-to-face meeting.</td>
</tr>
<tr>
<td>2013-01-31</td>
<td>1.0d</td>
<td>David Slik, NetApp Inc.</td>
<td>Additional TWG edits from Winter Symposium face-to-face meeting.</td>
</tr>
<tr>
<td>2013-03-20</td>
<td>1.0e</td>
<td>SNIA TWG</td>
<td>Edits at Austin face-to-face meeting.</td>
</tr>
</tbody>
</table>

The SNIA hereby grants permission for individuals to use this document for personal use only, and for corporations and other business entities to use this document for internal use only (including internal copying, distribution, and display) provided that:

- Any text, diagram, chart, table, or definition reproduced shall be reproduced in its entirety with no alteration, and,
- Any document, printed or electronic, in which material from this document (or any portion hereof) is reproduced shall acknowledge the SNIA copyright on that material, and shall credit the SNIA for granting permission for its reuse.

Other than as explicitly provided above, you may not make any commercial use of this document, sell any excerpt or this entire document, or distribute this document to third parties. All rights not explicitly granted are expressly reserved to SNIA.

Permission to use this document for purposes other than those enumerated above may be requested by e-mailing tcmd@snia.org. Please include the identity of the requesting individual and/or company and a brief description of the purpose, nature, and scope of the requested use.

Copyright © 2012 Storage Networking Industry Association.
JSON Transfer Encoding Extension

Overview

CDMI 1.0.2 supports two transfer encodings, UTF-8 and Base64. UTF-8 works well for text, but requires all JSON special characters (such as quotes " ) to be escaped. Base64 works well for binary data, and does not require any special escaping, but is not human readable.

Many use cases for CDMI, such as for Web 2.0 applications, are based around the storage of JSON data. Currently, this requires either the escaping of JSON data when stored as UTF-8 or the Base64 encoding of the JSON data. This represents an additional overhead, an additional processing pass, and makes stored data less human readable.

This extension proposes a third transfer encoding, a "JSON" transfer encoding, that allows stored JSON data in values to be directly specified and accessed as JSON.

For example, assuming that the following JSON is to be stored in a data object:

```json
{
    "test" : "value"
}
```

Accessing this with UTF-8 transfer encoding look like:

```json
{
    "valuetransferencoding" : "utf-8",
    "value" : "{    "test" : "value"}
}
```

Accessing this with Base64 transfer encoding looks like:

```json
{
    "valuetransferencoding" : "base64",
    "value" : "ew0KCSJ0ZXN0IiA6ICJ2YWx1ZSI=
}
```

This extension proposes a third transfer encoding, that would look like:

```json
{
    "valuetransferencoding" : "json",
    "value" : { "test" : "value" }
}
```

With this transfer encoding, the value will be a JSON object instead of a string, and the server will be responsible for validating the specified JSON.

Modifications to the CDMI 1.0.2 spec:

1) Insert new paragraph at end of "5.15.1 Value Transfer Encoding"

CDMI version 1.1 introduces a new "json" value transfer encoding. Data objects with a value transfer encoding of json shall be accessible to CDMI 1.0.x clients with a valuetransferencoding of UTF-8.
2) Insert new bullet at end of valuetransferencoding bullet list in "8.1 Overview"

• If the value transfer encoding of the object is set to "json", the data stored in the value of the
  data object shall contain a valid JSON object, and it shall be transported as JSON data in the
  value field. The JSON stored and returned shall be semantically equivalent, but may not be
  syntactically identical. For example, whitespace outside of JSON quoted strings may be removed
  or added by either client libraries or by the server. This means that the number of bytes sent
  may not be the same as the number of bytes stored.

3) Insert new bullet at end of "valuetransferencoding" description entry in table "Table 8 -
  Request Message Body - Create a Data Object using CDMI Content Type"

• "json" indicates that the data object contains a valid JSON object, and the value field shall be a
  JSON object containing this JSON data. Setting the contents of the data object value field to
  any value other than a valid JSON object shall result in error 400 Bad Request being returned to
  the client.

4) Insert new example at end of clause "8.2.9 Examples"

EXAMPLE 3  PUT to the container URI the data object name and JSON contents:

```plaintext
PUT /MyContainer/MyDataObject.txt HTTP/1.1
Host: cloud.example.com
Accept: application/cdmi-object
Content-Type: application/cdmi-object
X-CDMI-Specification-Version: 1.0.2

{
  "mimetype" : "text/plain",
  "metadata" : { },
  "valuetransferencoding" : "json",
  "value" : {
    "test" : "value"
  }
}
```

The following shows the response.

```plaintext
HTTP/1.1 201 Created
Content-Type: application/cdmi-object
X-CDMI-Specification-Version: 1.0.2

{
  "objectType": "application/cdmi-object",
  "objectID": "0000706D0010374085EF1A5C7018D774",
  "objectName": "MyDataObject.txt",
  "parentURI": "/MyContainer/",
  "parentID": "00007ED90010067404EDED32860C086A",
  "domainURI": "/cdmi_domains/MyDomain/",
  "capabilitiesURI": "/cdmi_capabilities/dataobject/",
  "completionStatus": "Complete",
  "mimetype": "text/plain",
  "metadata": {
    "cdmi_size": "21"
  }
}
```
5) Replace the contents of the "Content-Type" description entry in table "Table 12 - Request Headers - Create a CDMI Data Object using a Non-CDMI Content Type"

The content type of the data to be stored as a data object. The value specified here shall be used as the mimetype field of the CDMI data object. If the content type includes the charset parameter as defined in RFC 2046 of "utf-8" (e.g., ";charset=utf-8"), the valuetransferencoding field of the CDMI data object shall be set to "utf-8". If the content type is "application/json", the valuetransferencoding field of the CDMI object shall be set to "json". Otherwise, the valuetransferencoding field of the CDMI data object shall be set to "base64".

6) Insert new bullet at end of "valuetransferencoding" description entry in table "Table 16 - Response Message Body - Read a Data Object using CDMI Content Type"

• "json" indicates that the data object contains a valid JSON object, and the value field shall be a JSON object containing this JSON data.

7) Insert new bullet after the second bullet in the "value" description entry in table "Table 16 - Response Message Body - Read a Data Object using CDMI Content Type"

• If the value transfer encoding field indicates json encoding, the value field shall contain a valid JSON object.

8) Insert new example at end of clause "8.4.8 Examples"

EXAMPLE 5  GET to the data object URI to read the value and valuetransferencoding fields of a data object storing JSON data:

GET /cdmi_objectid/0000706D0010374085EF1A5C7018D774?valuetransferencoding;value
HTTP/1.1  
Host: cloud.example.com  
Accept: application/cdmi-object  
X-CDMI-Specification-Version: 1.0.2

The following shows the response.

HTTP/1.1 200 OK  
Content-Type: application/cdmi-object  
X-CDMI-Specification-Version: 1.0.2

{   "valuetransferencoding" : "json"   "value" : { "test" : "value" } }

9) Insert new bullet at end of "valuetransferencoding" description in table "Table 22 - Request Message Body - Update a CDMI Data Object using CDMI Content Type"

The value transfer encoding used for the data object value. Three value transfer encodings are defined:

• "utf-8" indicates that the data object contains a valid UTF-8 string, and shall be transported as a UTF-8 string in the value field. Setting or updating the contents of the data object value field to any value other than a valid UTF-8 string shall result in a 400 Bad Request being returned to the client.
• "base64" indicates that the data object contains arbitrary binary sequences, and shall be transported as a base 64 encoded string in the value field. Setting the contents of the data object value field to any value other than a valid base 64 string shall result in error 400 Bad Request being returned to the client.

• "json" indicates that the data object contains a valid JSON object, and shall be transported as a JSON object in the value field. Setting or updating the contents of the data object value field to any value other than a valid JSON object shall result in a 400 Bad Request being returned to the client.

This field shall only be included when updating a data object by value, and shall be stored as part of the object. If not specified, the existing value of the valuetransferencoding field shall be used.

When updating or appending to an object with a valuetransferencoding of "json" or "utf-8", the client shall use a valuetransferencoding of "base64".

This field shall be stored as part of the object.

10) Insert new bullet after the second bullet in the "value" description entry in table "Table 22 - Request Message Body - Update a CDMI Data Object using CDMI Content Type"

• If the value transfer encoding field indicates json encoding, the value field shall contain a valid JSON object.

11) Insert new text at end of "Content-Range" description entry in table "Table 25 - Request Headers - Update a CDMI Data Object using a Non-CDMI Content Type"

When updating by range or appending to an object with a valuetransferencoding of "json" or "utf-8", the valuetransferencoding of the object shall be set to "base64".

12) Insert new bullet at end of "valuetransferencoding" description entry in table "Table 50 - Request Message Body - Create a New Data Object using CDMI Content Type"

• "json" indicates that the data object contains a valid JSON object, and the value field shall be a JSON object containing this JSON data. Setting or updating the contents of the data object value field to any value other than a valid JSON object shall result in a 400 Bad Request being returned to the client.

13) Replace the contents of the "Content-Type" description entry in table "Table 54 - Request Header - Create a New Data Object using a Non-CDMI Content Type"

The content type of the data to be stored as a data object. The value specified here shall be used as the mimetype field of the CDMI data object. If the content type includes the charset parameter as defined in RFC 2046 of "utf-8" (e.g., ";charset=utf-8"), the valuetransferencoding field of the CDMI data object shall be set to "utf-8". If the content type is "application/json", the valuetransferencoding field of the CDMI object shall be set to "json". Otherwise, the valuetransferencoding field of the CDMI data object shall be set to "base64".
14) Insert new bullet at end of valuetransferencoding bullet list in "11.1 Overview"

- If the value transfer encoding of the object is set to "json", the data stored in the value of the queue object can contain valid JSON object, and it shall be transported as JSON data in the value field.

15) Insert new bullet at end of "valuetransferencoding" description entry in table "Table 88 - Response Message Body - Read a Queue Object using CDMI Content Type"

- "json" indicates that the queue object value contains a valid JSON object, and it shall be transported as a JSON object in the value field.

16) Insert new bullet after the third bullet in the "value" description entry in table "Table 88 - Response Message Body - Read a Queue Object using CDMI Content Type"

- If the valuetransferencoding field indicates json encoding, the corresponding value field shall contain a valid JSON object.

17) Insert new bullet at end of "valuetransferencoding" description entry in table "Table 97 - Request Message Body - Enqueue a New Queue Value using CDMI Content Type"

- "json" indicates that the queue object value contains a valid JSON object, and shall be transported as a JSON object containing this JSON data. Setting the contents of the queue object value field to any value other than a valid JSON object shall result in error 400 Bad Request being returned to the client.

18) Update Example 5 in clause "11.6.8 Examples"

```json
"mimetype": [  
  "text/plain",
  "text/plain",
  "application/json"
],
"valuetransferencoding": [  
  "utf-8",
  "base64",
  "json"
],
"value": [  
  "First",
  "U2Vjb25k",
  {
    "value": "test"
  }
]
```

19) Insert at end of table "Table 101 - System-Wide Capabilities"

<table>
<thead>
<tr>
<th>Capability Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cdmI_valuetransferencoding_json</td>
<td>String</td>
<td>If present and &quot;true&quot;, this capability indicates that the cloud storage system supports json valuetransferencoding.</td>
</tr>
</tbody>
</table>