Data Affinity CDMI Extension

Version 2.0

ABSTRACT: This CDMI Extension is intended for developers who are considering a standardized way to add functionality to CDMI. When multiple compatible implementations are demonstrated and approved by the Technical Working Group, this extension will be incorporated into the CDMI standard.

This document has been released and approved by the SNIA. The SNIA believes that the ideas, methodologies, and technologies described in this document accurately represent the SNIA goals and are appropriate for widespread distribution. Suggestion for revision should be directed to http://www.snia.org/feedback/.

SNIA Working Draft

May 18, 2020

USAGE

Copyright © 2020 SNIA. All rights reserved. All other trademarks or registered trademarks are the property of their respective owners.

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:

1. Any text, diagram, chart, table or definition reproduced shall be reproduced in its entirety with no alteration, and,

2. 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 emailing tcmd@snia.org. Please include the identity of the requesting individual or company and a brief description of the purpose, nature, and scope of the requested use.

All code fragments, scripts, data tables, and sample code in this SNIA document are made available under the following license:

BSD 3-Clause Software License

Copyright (c) 2020, The Storage Networking Industry Association.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

* Neither the name of The Storage Networking Industry Association (SNIA) nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS ”AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

DISCLAIMER

The information contained in this publication is subject to change without notice. The SNIA makes no warranty of any kind with regard to this specification, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The SNIA shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this specification.

Suggestions for revisions should be directed to https://www.snia.org/feedback/.

Copyright © 2020 SNIA. All rights reserved. All other trademarks or registered trademarks are the property of their respective owners.

Contents

Clause 1: Location Affinity CDMI Extension **1**
1.1 Overview 1
1.2 Instructions to the Editor 1

Clause 1

Location Affinity CDMI Extension

1.1 Overview

Cloud storage systems may be distributed over more than a single location. Clients of the system need to explicitly specify that an object exists in a particular location due to proximity to other resources (compute resources, people, etc.). This extension proposes a new capability that allows metadata on an object that dictates the locations where the object should exist.

Affinity is similar to the `cdmi_geographic_placement` capability in that it suggests to the system where an object can or cannot be located. However, affinity is a much stronger attribute, as it directs an object or copies of an object to exist in specific locations that may be more finely grained than geopolitical borders (data center, physical building location, etc.).

The affinity of an object may have implications to the `cdmi_data_redundancy_provided` data systems metadata value of an object. If more than one location is specified in the value for `cdmi_data_affinity`, additional copies of the object may be implied by the system, which would adjust the `cdmi_data_redundancy_provided` value.

1.2 Instructions to the Editor

To merge this extension into the CDMI 2.0.0 specification, make the following changes:

1. Add an entry to the end of the table starting on line 451 of cdmi_capability_object.txt, as follows:

Table 1: Capabilities for data system metadata

Capability name	Type	Definition
`cdmi_data_affinity`	JSON array of JSON strings	When the cloud storage system supports the cdmi_data_affinity data system metadata as defined in 16.3 Support for data system metadata, the `cdmi_data_affinity` capability shall be present and shall list the data locations available to objects using the capabilities set. If absent, the system shall determine the data location. The JSON array items used as identifiers for locations shall be arbitrary JSON strings.

2. Add an entry to the end of the table starting on line 216 of cdmi_metadata.txt, as follows:

Table 2: Data system metadata

Metadata name	Type	Description	Requirement
`cdmi_data_affinity`	JSON array of JSON strings	If this data system metadata item is present and not an empty array, it indicates that the client is requesting that an object be stored in a specific location. Each string in the array shall contain a unique user-specified location identifier. When this data system metadata item is absent or is present and is an empty JSON array, the system shall determine the data location. The list of location identifiers available to the object is specified by the `cdmi_data_affinity` capability (as described in 12.2.9 Data system metadata capabilities).	Optional

78 3. Add an entry to the end of the table starting on line 533 of cdmi_metadata.txt, as follows:

Table 3: Provided values of data system metadata

Metadata name	Type	Description	Requirement
`cdmi_data_affinity_provided`	JSON array of JSON strings	Contains one or more identifiers that corresponds to locations where the object is stored.	Optional