EMC²

EMC® XtremIO Storage Array

XIOS Versions 4.0.2, 4.0.4, 4.0.10, 4.0.15, 4.0.25 and 4.0.26

XMS Versions 4.2.0, 4.2.1 and 4.2.2

RESTful API (Ver. 2.1) Guide

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This document provides information on using the RESTful API with the XtremIO Storage Array.

Topics include:

Introduction

XtremIO Product Description

XtremIO is an all-flash storage array that has been designed from the ground-up to unlock flash's full performance potential and deliver array-based capabilities that leverage the unique characteristics of SSDs, based on flash media.

XtremIO uses industry standard components and proprietary intelligent software to deliver unparalleled levels of performance. Achievable performance ranges from hundreds of thousands to millions of IOPS, and consistent low latency of under one millisecond.[*]

The system is also designed to provide minimal planning, with a user-friendly interface that makes provisioning and managing the array very easy.

XtremIO leverages flash to deliver value across the following main dimensions:

- **Performance** – Regardless of how busy the system is, and regardless of storage capacity utilization, latency and throughput remain consistently predictable and constant. Latency within the array for an I/O request is typically far less than one millisecond.[*]

- **Scalability** – The XtremIO storage system is based on a scale-out architecture. The system begins with a single building block, called an X-Brick. When additional performance and capacity are required, the system scales out by adding X-Bricks. Performance scales linearly, ensuring that two X-Bricks supply twice the IOPS, four X-Bricks supply four times the IOPS, six X-Bricks supply six times, and eight X-Bricks supply eight times the IOPS of the single X-Brick configuration. Latency remains consistently low as the system scales out.

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[*] As measured for small block sizes. Large block I/O by nature incurs higher latency on any storage system.

- **Efficiency** – The core engine implements content-based Inline Data Reduction. The XtremIO Storage Array automatically reduces (deduplicates and compresses) data on the fly, as it enters the system. This reduces the amount of data written to flash, improving longevity of the media and driving down cost. XtremIO arrays allocate capacity to volumes on-demand in granular data blocks. Volumes are always thin-provisioned without any loss of performance, over-provisioning of capacity, or fragmentation. Once content-based inline deduplication is implemented, the remaining data is compressed even further, reducing the amount of writes to the flash media. The data compression is carried out inline on the deduplicated (unique) data blocks.

  Benefits gained from avoiding a large percentage of writes include:

  - Better performance due to reduced data

  - Increased overall endurance of the flash array's SSDs

  - Less required physical capacity to store the data, increasing the storage array's efficiency and dramatically reducing the $/GB cost of storage

- **Data Protection** – XtremIO leverages a proprietary flash-optimized data protection algorithm (XtremIO Data Protection or XDP), which provides performance that is superior to any existing RAID algorithm. Optimizations in XDP also result in fewer writes to flash media for data protection purposes.

- **Functionality** – XtremIO supports high performance and space-efficient Snapshots, Inline Data Reduction (including inline deduplication and data compression), thin provisioning, and full VMware VAAI integration, as well as support for Fibre Channel and iSCSI protocols.

About this Guide

Scope

This guide contains a list of all RESTful API commands that you can use to manage and monitor the XtremIO Storage Array. The guide is intended for authorized users of the XtremIO Storage Array.

This guide also includes detailed descriptions of all supported fields, and describes RESTful API commands for XtremIO Storage Array Version 4.2.0, including enhanced features and backward compatibility.

Related Documents

Refer to the following documents for additional information:

- XtremIO Storage Array User Guide
- XtremIO Storage Array Security Configuration Guide
- XtremIO Storage Array Host Configuration Guide
- XtremIO Storage Array Release Notes

RESTful API Versioning

The current RESTful API versions are referred to as Version 2.0 and 2.1. The previous version is referred to as Version 1.0. In order to support backward compatibility, XtremIO now supports both Version 2.0/2.1 and Version 1.0.

With this RESTful API version, the API version is explicitly declared in the URL path, by using v2 in the notation syntax (e.g.: POST `api/json/v2/types/snapshots`). The same methodology will be employed in future XtremIO API versions.

As the previous version is supported, XtremIO Storage Array XMS Ver. 4.2.0 can be used with previously-written scripts or programs that employ previously-available versions of the API. However, new commands that are introduced in this software release are supported only by using API Version 2.0/2.1. The changed RESTful API supports a different call syntax and different response. The bulk of the RESTful API commands remain unchanged. The same call can be made in both versions 1.0 and 2.0/2.1, with the same, unchanged result.

Not declaring the API version in the URL for a given command executes the earliest API version in which this command was supported.

Table 1 shows examples of syntax to use for accessing objects according to versions. The example includes 'volume-folders', an object which was deprecated from XtremIO Versions 4.0 and 4.0.1 with the introduction of 'Tags' (as described in Tags (Folders Feature Replacement) on page 348).

Table 1: RESTful API Versions - URLs

RESTful API Version	Syntax	Access
1.0	/api/json/types/volumes/1	✔
2.0	/api/json/**v2**/types/volumes/1	✔
2.1	/api/json/**v2**/types/volumes/1	✔
1.0	/api/json/types/volume-folders	✔
2.0	/api/json/**v2**/types/volume-folders	✘
2.1	/api/json/**v2**/types/volume-folders	✘
2.0	/api/json/**v2**/types/tags	✔
2.1	/api/json/**v2**/types/tags	✔

Using the XtremIO RESTful API

Commands

The XtremIO RESTful API allows an HTTP-based interface for automation, orchestration, query and provisioning of a cluster or of multiple clusters. With this API, third party applications can be used to control and fully administer the array. Therefore, it allows flexible management solutions to be developed for the XtremIO array.

The RESTful API uses the following four HTTP commands to retrieve, create, update and delete configuration.

Command	Effect	Similar to
HTTP GET	Retrieves and lists existing configuration of an object or multiple objects.	XtremIO Management Server CLI 'show' commands
HTTP POST	Creates a new configuration of an object.	XtremIO Management Server CLI 'add' commands
HTTP PUT	Updates the existing configuration of an object.	XtremIO Management Server CLI 'modify' commands
HTTP DELETE	Deletes the existing configuration of an object.	XtremIO Management Server CLI 'remove' commands

JSON Format

The XtremIO's RESTful API uses JSON (JavaScript Object Notation), which is a lightweight data-interchange format.

With JSON, body parameters are formatted as follows:

```
{"parameter1":"value1", "parameter2":"value2", "name_f2or_integer_value":123}
```

Generating Output and Filtering

XtremIO RESTful API Version 2.0/2.1 enables displaying a list view of either all parameters in list response sets, or a partial list of parameters in list response sets (the response will always display the "index" and "name" parameters). This is an alternative option to the default view, which displays only the list of returned object URLs.

> **Note**: The commands and outputs in this section only apply to the GET command and assume working a single cluster.

Output List Definition

This section contains default GET command outputs.

- `/api/json/v2/types/volumes/`

  GETs a list of all the objects (volumes), with the name of the object, the objects' URLs/Href and cluster name owning the object.

  > **Note**: The cluster name in the output is referred to as sys-name.

- `/api/json/v2/types/volumes/4`

  GETs all the output parameters and their values of the selected object. In our example all the output parameters and values of the volume with an index number 4 are listed.

The user is able to change the default GET commands by using additional syntax, as in the following syntax:

- `/api/json/v2/types/volumes/28?cluster-index=1`**&prop=**index**&prop=**naa-name

  Using the `&prop` option enables you to list selected output parameters and their values of the defined object. Multiple parameter lists are supported. In our example, the system displays the output parameters `index` and `naa-name` for the volume with the index number 28.

- `/api/json/v2/types/volumes?`**full=1**

  `full=1` option displays parameters and their values in list view.

- `/api/json/v2/types/volumes?`**full=1&prop**=index&prop=naa-name

  In this example the `index` and `naa-name` output parameters and their values will be displayed for all volumes in a list view.

Filtering Logics

XtremIO RESTful API Version 2.0/2.1 supports the definition of filtering logics. This support enables you to retrieve concise and specific responses that potentially contain large amounts of unwanted rows. Any object property that can be exposed via RESTful API can be used as a filtering parameter.

The following filtering logics can be applied to filter out objects from a list.

Filter Type	Syntax
Equal to (Numeric/Integer or String properties)	`eq`
Not equal to (Numeric/Integer or String properties)	`ne`

Date and time properties	`to-date-time`
	`from-date-time`
	(Event monitoring only)

Greater than	`gt`
Greater than or equal to	`ge`
Less than	`lt`
Less than or equal to	`le`
Like	`like` Returns the defined term contained within the property.

When multiple properties are used for filtering, logical AND and logical OR can be used between all of the specified properties.

Logical AND Example

Logical AND is determined by the use of `&filter=` in the path. Use logical AND when filtering between different parameters.

`/api/json/v2/types/volumes?filter=vol-size:eq:10240`**`&filter=`**`name:eq:production`

This only returns a property of the size 10240KB <u>and</u> with the name of "production".

> **Note**: A filter can be used for any property that is relevant to the object.

Logical OR Example

Logical OR is determined by the use of "," in the path. Use logical OR when filtering between different values of a selected parameter.

```
/api/json/v2/types/volumes?filter=vol-size:eq:1G,vol-size:eq:10G,vol-size:eq:100G
```

This will return all volumes of the size 1G <u>or</u> 10G <u>or</u> 100G.

> **Note**: Logical OR can only be used for the same property.

Filtering syntax:

Filter=property1: OPERATOR: value & filter = property2: OPERATOR: value

Examples:

- To display all Volumes of a specified size (in this example it is 10240KB):
  ```
  /api/json/v2/types/volumes?filter=vol-size:eq:10240
  ```

- To view all Volumes not of the specified size (in this example it is 262144000KB):
  ```
  /api/json/v2/types/volumes?filter=vol-size:ne:262144000
  ```

- To view all LUN mapping with LUN greater than 200:
  ```
  /api/json/v2/types/lun-maps/?filter=lun:gt:200
  ```

- To view all LUN mapping with LUN less than or equal to 10:
  ```
  /api/json/v2/types/lun-maps/?filter= lun:le:10
  ```

- To view all volumes that contain the word "production":
  ```
  /api/json/v2/types/volumes/?filter=name:like:production
  ```

  This filter would return the following volumes: `current_production`, `previous_production`, `production_backup`

> **Note**: No cluster-id/name is required for managing a single cluster.

> **Note**: When making direct protocol calls, you must specifically encode all reserved characters. The examples in the guide use a client library that automatically encodes the reserved characters of the URL.

Object Naming Limitations

Volume names and Tag names, used as parameters in RESTful API commands, must comply with the following limitations:

- ◆ Character Lengths:
  - ◆ Volumes – up to 128 characters
  - ◆ All other objects – up to 64 characters
- ◆ Valid characters:
  - ◆ Alphanumeric characters
  - ◆ Space character
  - ◆ The following characters: ~! @ # $ % ^ * _ + { } | : ? . –
- ◆ Invalid characters: & / < > ( )

Multiple Clusters Managed by a Single XMS

> **Note**: Multiple cluster management is only relevant when an XMS manages more than one cluster.

XtremIO Versions 4.0 and above support the management of multiple clusters via a single XMS. Therefore, running PUT, POST or DELETE commands requires specifying a cluster index number or cluster name (when working with cluster objects). Specifying a cluster index number or cluster name for running GET commands is dependent if you want to view a single cluster's objects, or view the list of all clusters objects.

Specifying the cluster index number or cluster name for an XMS managing a single cluster remains optional (for cluster-related commands).

> **Note**: 'cluster-id' is shown as 'sys-id' output parameter in RESTful API responses.

Cluster Specification Syntax

Use one of the following parameters to specify a cluster in the header of a RESTful API command:

- cluster-index

  Example: /api/json/v2/types/[object type]?**cluster-index**=2

- cluster-name

  Example: /api/json/v2/types/[object type]?**cluster-name**=xbrickdrm220

To specify a cluster in the body of a RESTful API command, use the `cluster-id` parameter, as shown in the examples below:

- Cluster ID using cluster index

  Example: {"vol-name":"Vol123","vol-size":"1g","**cluster-id**":2}

- Cluster ID using cluster name

  Example: {"vol-name":"Vol123","vol-size":"1g","**cluster-id**":"xbrickdrm220"}

> **Note**: It is highly recommended to use the cluster-id name property (cluster-id="cluster name") when specifying a cluster, as a cluster's index number property may change when a cluster is removed and added from one XMS to another.

> **Note**: cluster-index and cluster-name are not required for XMS objects (e.g. Tags and User Accounts).

Multiple Cluster Management Summary

GET/POST/PUT/DELETE commands:

- Cluster name or cluster index number is required for cluster objects
- No cluster name or cluster index number is required for XMS objects

> **Note**: No cluster-id/name is required for managing a single cluster.

Accessing the RESTful API

Access to the RESTful API is achieved via HTTPS.

XtremIO Management Server (XMS) uses a self-signed certificate. To gain access to the RESTful API securely and receive certificate verification, you are first required to install the root certificate.

Installing the Root Certificate

To install the root certificate:

1. In Microsoft© Internet Explorer©*, enter the XMS IP address, supplied by your system administrator, to display the XtremIO splash screen, as shown in Figure 1.

Figure 1: XtremIO Splash Screen

2. Click the **root certificate** hyperlink.

3. When prompted, click **Save** and select the **Save as** option.

4. Browse to the cURL† directory and click **Save**.

5. Launch the cURL command as follows:

```
.\curl.exe -3 --cacert xms_root_ca.cer
https://<USERNAME>:<PASSWORD>@<XMS>/api/json/v2/types
```

Note:
The host CN in the key is the "easy install" cluster name, whereas most of the time it serves as the short name.
A browser "refresh" error may be experienced when using self-signed certificates. To remedy this error, should it occur, re-enter the URL in the browser's address field and press Enter. Installing a trusted certificate prevents a refresh error.

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* Microsoft and Windows Explorer are trademarks or registered trademarks of Microsoft Corporation.

† cURL version required: 7.30.0 or greater. When using a scripting tool other than cURL, save the root certificate to the respective scripting tool directory.

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User Roles

The XtremIO Storage Array User Accounts are defined for each user's authorized capabilities and roles, which are built into the cluster with predefined authorization capabilities, and cannot be removed, renamed or modified. Each user is issued a User ID (i.e. the User Account name) and password.

Three levels of users' roles are supported, as shown in the following table:

Role	RESTful API Capability
Admin	All commands
Configuration	All storage array configuration commands. Cannot manage users or set notification configurations.
Read-Only	HTTP GET commands only

Basic Cluster Management Flow

Basic cluster management involves assigning Initiators with access to the cluster's Volumes by LUN mapping.

To create a LUN mapping:

1. Add Volumes to the cluster (see Adding a New Volume, on page 320).

2. Create an Initiator Group (see Adding an Initiator Group, on page 155).

3. Add Initiators to the Initiator Group (see Adding an Initiator, on page 139).

4. Assign Volumes to the Initiators (see Creating a LUN Mapping on page 189).

REST HTTP Client

All commands and responses listed in this guide were run via Google Chrome© Postman©* extension tool.

For more information on this extension tool, refer to: https://www.getpostman.com

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* Google Chrome and Postman are trademarks or registered trademarks of Google.

RESTful Response Codes

Each command retrieves a specific HTTP response code.

Potential response codes include:

Response Code	Description
200 OK	The request is valid and points to an existing object.
201 CREATED	A valid request to add an object is confirmed.
400 BAD REQUEST	The request points to a non-existing object, a syntax problem, or a failed validation.
401 UNAUTHENTICATED USER	Indication that either the username or password is incorrect.

Supported Objects

Viewing the Supported Objects

GET /api/json/v2/types

This command (GET /api/json/v2/types) displays the list of all supported objects.

Example request

```
GET /api/json/v2/types/ HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "children": [
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions",
      "name": "alert-definitions"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/alerts",
      "name": "alerts"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/bbus",
      "name": "bbus"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/bricks",
      "name": "bricks"
    },
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/clusters",
      "name": "clusters"
    },
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/consistency-group-volumes",
      "name": "consistency-group-volumes"
    },
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/consistency-groups",
      "name": "consistency-groups"
```

```
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/dae-
controllers",
        "name": "dae-controllers"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/dae-
psus",
        "name": "dae-psus"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/daes",
        "name": "daes"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/data-
protection-groups",
        "name": "data-protection-groups"
      },
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/discover-initiators",
        "name": "discover-initiators"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/email-
notifier",
        "name": "email-notifier"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/events",
        "name": "events"
      },
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/infiniband-switches",
        "name": "infiniband-switches"
      },
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/initiator-groups",
        "name": "initiator-groups"
      },
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/initiators",
        "name": "initiators"
      },
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/initiators-connectivity",
        "name": "initiators-connectivity"
      },
      {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/iscsi-
portals",
        "name": "iscsi-portals"
      },
```

```
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/iscsi-
routes",
        "name": "iscsi-routes"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/ldap-
configs",
        "name": "ldap-configs"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/local-
disks",
        "name": "local-disks"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/lun-
maps",
        "name": "lun-maps"
    },
    {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/performance",
        "name": "performance"
    },

    {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snapshots",
        "name": "snapshots"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snmp-
notifier",
        "name": "snmp-notifier"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/ssds",
        "name": "ssds"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/storage-
controller-psus",
        "name": "storage-controller-psus"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/storage-
controllers",
        "name": "storage-controllers"
    },
    {
        "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/syslog-
notifier",
        "name": "syslog-notifier"
    },
    {
```

```
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/tags",
      "name": "tags"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/target-
groups",
      "name": "target-groups"
    },
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/targets",
      "name": "targets"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/user-
accounts",
      "name": "user-accounts"
    },
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/volumes",
      "name": "volumes"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/xenvs",
      "name": "xenvs"
    },
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/xms",
      "name": "xms"
    }
  ],
  "links": [
    {
      "href": "https://vxms-xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/",
      "rel": "self"
    }
  ]
}
```

Object Performance

Viewing Object Performance

GET /api/json/v2/types/performance?entity=[entity type]

This command (GET /api/json/v2/types/performance?entity=[entity type]) displays the performance of the defined entity type (object).

The available entity types are listed below:

- Cluster
- DataProtectionGroup
- Initiator
- InitiatorGroup
- SnapshotGroup
- SSD
- Tag
- Target
- TargetGroup
- Volume
- XEnv
- Xms

> **Note**: Ensure that the syntax of the entity is entered as shown in the list above. The first letter of the entity name is always in upper case.

Object Performance Input Parameters

The following table describes the parameters that can be used within the URL, to filter the performance query:

Input Parameter	Description	Mandatory
• cluster-name OR • cluster-index	Cluster's identification name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration

Input Parameter	Description	Mandatory

entity	A type of entity on which performance can be queried
	Values:
	
	• `Cluster`
	• `DataProtectionGroup`
	• `Initiator`
	• `InitiatorGroup`
	• `SnapshotGroup`
	• `SSD`
	• `Tag`
	• `Target`
	• `TargetGroup`
	• `Volume`
	• `XEnv`
	• `Xms`
	
	Note: Ensure that the syntax of the entity is entered as shown in the list above. The first letter of the entity name is always in upper case.
	Note: For the Tag performance call, the Tag name must also be entered in the request. For example:
	`/api/json/v2/types/performance?entity=`
	`Tag&entity-name=/Volume/Tag61`
	Where:
	- The Tag name must be listed after the `entity-`
	`name` or `entity-index`.
	- The Tag name must be prefixed with Tag type.
	In our example the Tag name is `Tag61` and the Tag type is `Volume`.
	Command example:
	`…/api/json/v2/types/performance?`**`entity`**
	`=Cluster``&granularity=one_day&export-`
	`to-file=test.txt`
		Yes

Input Parameter	Description	Mandatory
aggregation-type	Aggregation function of the request **Values:** • `avg` (default) • `max` • `min` **Note**: If `aggregation-type` is not included in the command line, the default value for the output is **avg**. The value applies to all historical numerical values in the query. **Command example:** `…/api/json/v2/types/performance?entity=Cluster&`**`aggregation-type=max`**	No
entity-index	The index of the entity **Note**: Multiple entities can be listed simultaneously by both `entity-index` and `entity-name`. **Command example:** `…/api/json/v2/types/performance?entity=Volume&`**`entity-index=3`**`&entity-name=Finance2`	No
entity-name	The name of the entity **Note**: Multiple entities can be listed simultaneously by both `entity-index` and `entity-name`. **Command example:** `…/api/json/v2/types/performance?entity=Volume&entity-index=3&`**`entity-name=Finance2`**	No
export-to-file	Option to export the performance response to a text file The file is located at: https://10.103.224.119/xtremapp/[name of file] The exported file type is CSV. **Command example:** `…/api/json/v2/types/performance?entity=Cluster&granularity=one_day&`**`export-to-file=[name of file].csv`** **Note**: The file name entered in the `export-to-file` parameter must contain a valid file name.	No

Input Parameter	Description	Mandatory
from-time	The defined commencement time of the report **Note**: If a `from-time` is not entered, then the report is defined from the earliest possible time. This is either, from the time the cluster started reporting performance data or up until the maximum time of the stored performance data (up to 2 years). Format: YYYY-MM-DD hh-mm-ss **Note**: When making direct protocol calls, the reserved characters used in the date format must be encoded. **Note**: Response date and time are in Epoch format. **Command example:** `…/api/json/v2/types/performance?entity=Cluster&`**`from-time=2015-12-01 00:00:00`**`&to-time=2015-12-02 14:00:00`	No
granularity	Time granularity of the output data **Values**: • `auto` • `one_day` • `one_hour` (default) • `one_minute` • `ten_minutes` • `raw` **Note**: If `granularity` is not included in the command line, the default value for the output is **`one_hour`**. **Command example:** `…/api/json/v2/types/performance?entity=Cluster&`**`granularity=one_day`**	No
limit	Number of row records to be returned The value must be a positive integer. **Command example**: `…/api/json/v2/types/performance?entity=Volume&entity-index=3&entity-name=Finance2&`**`limit=2`**	No

Input Parameter	Description	Mandatory
time-frame	Time frame of the request **Values**: • custom_time • last_day • last_hour • last_week • last_year • real_time **Command example:** `/api/json/v2/types/performance?entity=` `Cluster&`**`time-frame=last_day`**	No

to-time	The defined end time of the report
	Note: If a `to-time` is not defined, then the report is defined until the last reported performance data.
	Format: YYYY-MM-DD hh-mm-ss
	Note: When making direct protocol calls, the reserved characters used in the date format must be encoded.
	Note: Response date and time are in Epoch format.
	Command example:
	`…/api/json/v2/types/performance?entity`
	`=Cluster&from-time=2015-12-01`
	`00:00:00&`**`to-time=2015-12-02 14:00:00`**
		No

Example request

```
GET /api/json/v2/types/performance?entity=Target&prop=rd_iops&from-time=2016-
07-26 13:20:00&granularity=one_hour HTTP/1.1
Host: vxms-xbrick353
Authorization: Basic YWRtaW46WHRyZW0wxMA==
Cache-Control: no-cache
```

The above example is a request for data relating to average read-only IOPS taken as of 13:20, July 26 2016, on an hourly basis (granularity).

Filtering Performance Results

As shown in the Example request on page 27, using `&prop` in the syntax is a general capability that enables you to filter results and list selected output parameters and values of the defined object.

For performance related queries, of which the output can be very long, it is recommended to filter results by entering the specific properties you require.

For example: `GET /api/json/v2/types/performance?entity=InitiatorGroup&prop=`**`wr_bw`**`&prop=`**`small_iops`**

The following considerations should be made when using the `&prop` syntax:

◆ The query can only contain parameters that belong to the selected entity type.

◆ Only values from which historical data is collected, can be listed in the `&prop` output values list. These are:

 ◆ All bandwidth (`bw`) related parameters

 ◆ All IOPS (`iops`) related parameters

 ◆ All `latency` related parameters

 ◆ The parameters listed in Table 2 (the entity to which the parameter belongs to, is listed in parenthesis)

Table 2: Specific Parameters from which Historical Data is Collected

`compression_factor` (Cluster)	`free_logical_space_i n_base10` (Cluster)	`ssd_space_in_use` (SSD)
`cpu_usage` (Xenv)	`free_memory` (Xms)	`thin_provisioning_ra tio` (Cluster & SnapshotGroup)
`data_reduction_ratio` (Cluster)	`free_space` (Xms)	`thin_provisioning_sa vings` (Cluster)
`dedup_ratio` (Cluster)	`free_ud_ssd_space_in _base10` (Cluster)	`ud_ssd_space` (Cluster)
`fc_dumped_frames` (Target)	`logical_space_in_use` (Cluster, SnapshotGroup & Tag)	`ud_ssd_space_in_use` (DataProtectionGroup)
`fc_invalid_crc_count` (Target)	`logical_space_in_use _in_base10` (Cluster)	`ud_ssd_space_in_use_ in_base10` (Cluster)
`fc_link_failure_coun t` (Target)	`num_of_vols` (Cluster, SnapshotGroup & Xms)	`unaligned_io_ratio` (Tag)
`fc_loss_of_sync_coun t` (Target)	`percent_endurance_re maining` (SSD)	`useful_ssd_space` (DataProtectionGroup & SSD)
`fc_prim_seq_prot_err _count` (Target)	`shared_memory` (Cluster)	`vol_size_in_base10` (Cluster)
`free_disk_space_seco ndary` (Xms)	`shared_memory_in_use` (Cluster)	`fc_loss_of_signal_co unt` (Target)

For more information see, Object Performance Output on page 30.

For general details about request syntax, see Generating Output and Filtering on page 9.

Note: When making direct protocol calls, you must specifically encode all reserved characters. The examples shown in this guide were achieved using a client library that automatically encodes the reserved URL characters.

Object Performance Output

The object performance for each entity type contains two sets of output parameters. These output parameters (members) for each selected entity, are displayed at the end of the query. They can be divided into two sets:

- Universal output parameters — These are output parameters that apply to all performance entity types. The output parameters are: timestamp (Epoch time format), guid, name and index.

- Specific output parameter — These are output parameters unique to the specified performance entity type.

After running a query, the output displays all the values that apply to the selected entity. The values are presented without the parameter name headers. The parameter names are displayed once at the end of the output. The parameter values (members) are in the same order of the listed parameter names.

For example, the query:

```
GET /api/json/v2/types/performance?entity=InitiatorGroup
```

generates the following output:

```
{
  "counters": [
    [
      1467763200000,
      "69ad31ce258e4e1ab35362e644196092",
      "lgdrm1579",
      1,
      28,
      148,
      33,
      310,
      10.387777777777799,
      10,
      60,
      21.3787407407407,
      20903.357382716,
      162,
      10.990962962963,
      954.02279012345696,
      704.46782716049404,
      1658.4906172839501,
      15351.3436049383,
      5552.01377777778,
      9,
      19
```

```
    ],
    [
      1467763200000,
      "3b05405614c949028a64b87c4c38e951",
      "IG-iris",
      3,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null,
      null
    ],
    [
      1467763200000,
      "11b8db5979f44d2e9578b179a714a1be",
      "lgdrm1580",
      2,
      8,
      74,
      21,
      127,
      6.0710123456790104,
      6,
      29,
      18.002049382716098,
      20657.123234567902,
      54,
      11.931037037036999,
      1327.4712839506201,
      623.23044444444395,
      1950.7017283950599,
      11082.080814814801,
      9575.0424197530901,
      17,
      23
    ],
    [
      1467763200000,
      "e5fe3c24d40846a7b90664623d5ac0e5",
      "Server2",
      4,
      null,
      null,
```

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```
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null,
        null
    ],
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. . . . . . . . . .
"members": [
    "timestamp",
    "guid",
    "name",
    "index",
    "avg__unaligned_rd_iops",
    "avg__wr_iops",
    "avg__unaligned_wr_iops",
    "avg__iops",
    "avg__small_rd_bw",
    "avg__small_rd_iops",
    "avg__unaligned_iops",
    "avg__small_bw",
    "avg__bw",
    "avg__rd_iops",
    "avg__small_wr_bw",
    "avg__unaligned_wr_bw",
    "avg__unaligned_rd_bw",
    "avg__unaligned_bw",
    "avg__wr_bw",
    "avg__rd_bw",
    "avg__small_wr_iops",
    "avg__small_iops"
],
"links": [
    {
      "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/performance/",
      "rel": "self"
    }
],
"granularity": "one_day"
}
```

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Aggregation Type Suffix

One of the object performance input parameters used to filter the performance query is `aggregation-type`, which performs an aggregation function of the request. See Object Performance Input Parameters on page 23 for the table of parameters.

Possible values are: `min`, `max` or `avg`

Depending on the aggregation type defined in the request, each output metric is prefixed with either `avg__`, `min__` or `max__`.

Below are examples of output values:

- avg__rd_iops
- min__rd_iops
- max__rd_iops

Alerts

Viewing the List of Alerts

GET /api/json/v2/types/alerts

This command (GET /api/json/v2/types/alerts) displays the list of Alerts.

Example request

```
GET /api/json/v2/types/alerts HTTP/1.1
Host: vxms-xbrickdrm801.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "alerts": [
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/4",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/8",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/88",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/82",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/83",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/80",
            "name": ""
```

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```
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/81",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/86",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/87",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/84",
            "name": ""
        },

        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/75",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/79",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/78",
            "name": ""
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alerts/",
            "rel": "self"
        }
    ]
}
```

Example request

```
GET /api/json/v2/types/alerts/9 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "assoc-obj-name": "xbrickdrm788",
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "description": "The cluster state cannot be determined. The XMS is unable to
obtain the cluster state.",
    "class-name": "System",
    "sys-name": "xbrickdrm788",
    "threshold": "",
    "alert-code": "0200509",
    "guid": "3a69cca2b3c9487e8b4f7b2a15a02ec4",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "severity": "major",
    "index": 9,
    "name": "",
    "alert-type": "alert_def_sys_state_unknown",
    "alert-state": "clear_unacknowledged",
    "raise-time": "1443613686545",
    "assoc-obj-index": 2,
    "assoc-obj-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ]
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/alerts/9",
      "rel": "self"
    }
  ]
}
```

Alert Definitions

Viewing the List of Alert Definitions

GET /api/json/v2/types/alert-definitions

This command (GET /api/json/v2/types/alert-definitions) displays the list of Alert Definitions.

Example request

```
GET /api/json/v2/types/alert-definitions HTTP/1.1
Host: vxms-xbrickdrm801.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "alert-definitions": [
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_rebuild_20_to_40_done",
            "name": "alert_def_rebuild_20_to_40_done"
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_rebalance_60_to_80_done",
            "name": "alert_def_rebalance_60_to_80_done"
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_prepare_0_to_20_done",
            "name": "alert_def_prepare_0_to_20_done"
        },
        . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .      .
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
            . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
            . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_ibswitch_one_fan_failed",
            "name": "alert_def_ibswitch_one_fan_failed"
        },
        {
```

```
        "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_sys_vamd_no_free",
        "name": "alert_def_sys_vamd_no_free"
    },
    {
        "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_sys_encrypt_switch_incomplete",
        "name": "alert_def_sys_encrypt_switch_incomplete"
    },
    {
        "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_double_node_failure",
        "name": "alert_def_double_node_failure"
    }
],
"links": [
    {
        "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/alert-definitions/",
        "rel": "self"
    }
]
}
```

Output Parameter	Description
severity	The severity of the Alerts that are defined by this Alert Definition
threshold-value	Defines an Alert's threshold. **Note**: Only relevant for Alerts with a threshold default defined in the xml using the `<threshold_default_value>` element **Value range:** 1 -100
user-modified	Determines whether the Alert described by this Alert Definition is modified by the user or not. **Values**: • `true` • `false`
xms-id	The index number of the XMS object

Example request

```
GET /api/json/v2/types/alert-
definitions?name=alert_def_snapshotgroup_modify_pending HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "index": 345,
    "send-to-call-home": "yes",
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "name": "alert_def_snapshotgroup_modify_pending",
    "activity-mode": "enabled",
    "class-name": "SnapshotGroup",
    "threshold-type": "tech",
    "alert-type": "alert_def_snapshotgroup_modify_pending",
    "clearance-mode": "auto_clear",
    "user-modified": false,
    "alert-code": "1900103",
    "guid": "557cfd1020914c7991933a0b410a2101",
    "threshold-value": 90,
    "severity": "minor"
  },
  "links": [
    {
      "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/alert-
definitions/alert_def_snapshotgroup_modify_pending",
      "rel": "self"
    }
  ]
}
```

BBUs

Viewing the List of BBUs

GET /api/json/v2/types/bbus

This command (GET /api/json/v2/types/bbus) displays the list of BBUs.

Example request

```
GET /api/json/v2/types/bbus HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "bbus": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/bbus/1",
            "name": "X1-BBU"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/bbus/2",
            "name": "X2-BBU"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/bbus/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
fru-lifecycle-state	BBU's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` - Indicates a transient state in which the system performs initialization of a component.
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-version	Current firmware version of the BBU
fw-version-error	Reason for FRU diagnostic failure when a firmware problem exists
hw-revision	Hardware level of the power supply unit **Note**: The value is not always available.
identify-led	Indicates whether the identification LED is illuminated for this BBU. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	BBU's index number as defined by the XMS upon its creation (a unique positive number)
index-in-brick	The BBU's index within the X-Brick, either 1 or 2. Always 1 for multiple X-Brick clusters (for all X-Bricks), but two BBUs are available for a single X-Brick cluster.
input-frequency	Input frequency, measured in Hertz
is-bypass-active	Indicates if the BBU bypass is active.

Output Parameter	Description
is-low-battery-has-input	Indicates a low battery with power. Cluster undergoes an orderly shutdown when the power is under 70% (if insufficient additional BBUs exist) and will not boot.
is-low-battery-no-input	Indicates a low battery with no input. Cluster emergency shutdown and power-off occur when below 98% (if additional insufficient BBUs exist).
is-low-battery-runtime	Low battery runtime has been detected.
is-ups-overload	The BBU is overloaded.
model-name	Vendor-assigned BBU model name
monitoring-nodes-obj-id-list	The Storage Controller IDs that monitor the BBU. For a multiple X-Brick system this is a list of size 2 (for all X-Bricks). For a single X-Brick system this is a list of size 1.
name	BBU's name
obj-severity	BBU severity, based on severity level of current Alerts (Alerts still uncleared) for this BBU **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
outlet1-status	BBU Status (the status of the power output of BBU 1, read from the BBU)
outlet2-status	BBU Status (the status of the power output of BBU 2, read from the BBU)
output-current	Output current, measured in Amps
output-frequency	Output frequency, measured in Hertz
output-voltage	Output voltage
part-number	Part number. An EMC-assigned string identifying part (SKU). Independent of the actual vendor `model_name` used for this FRU.
power	Power, measured in Watts

Output Parameter	Description
power-feed	A and B PSU power feeds. Power into PSU typically has two feeds: A and B Typical configuration: • The first InfiniBand Switch PSU is connected to feed_A. • The second InfiniBand Switch PSU is connected to feed_B.
real-power	Real power, measured in Watts
serial-number	BBU's serial number
status-led	LED state indicating BBU object faults
sys-id	The index number of the cluster this BBU belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
ups-alarm	BBU alarm. Used to display specific BBU alarms. PM may use this information to calculate `fru_lifecycle_state`.
ups-battery-charge-in-percent	The percentage of BBU battery charge. If the BBU is unreachable or disabled, this parameter value is `null`
ups-conn-state	States of the control connection between the Storage Controller and the BBU. Each Storage Controller reports either `connected` or `disconnected`. Sym determines the values reported by Storage Controller 1 and Storage Controller 2 to determine if disconnected.
ups-id	BBU index number
ups-input	The BBU external power feed
ups-load-in-percent	The current BBU load given in percent
ups-load-percent-level	Event triggered for any change in this parameter
ups-need-battery-replacement	Indicates if the BBU battery needs to be replaced.
ups-status	Status information read from the BBU
ups-voltage	The input voltage of the BBU. Parameter value is `null` if BBU is unreachable or disabled.
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/bbus/2?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/bbus?name=X1-BBU&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "fru-lifecycle-state": "healthy",
        "fw-version-error": "no_error",
        "outlet2-status": "on",
        "is-low-battery-has-input": "false",
        "ups-voltage": 212,
        "ups-need-battery-replacement": "false",
        "power-feed": "PWR-B",
        "serial-number": "G299E01065",
        "enabled-state": "enabled",
        "ups-alarm": "not found",
        "fru-replace-failure-reason": "",
        "guid": "43a1c1946f724d84ba32411a64f4616b",
        "is-low-battery-runtime": "false",
        "ups-load-in-percent": 23,
        "index-in-brick": 1,
        "index": 2,
        "is-ups-overload": "false",
        "acc-daily-uptime": 1433,
        "sys-id": [
            "2bffd8cfecf24316b548323f04466cb0",
            "xbrickdrm353",
            1
        ],
        "battery-runtime": 1738,
        "obj-severity": "information",
        "identify-led": "na",
        "hw-revision": "",
        "outlet1-status": "on",
        "ups-input": "on",
        "xms-id": [
            "22b182cb5c0d459d962fe9d559057f2a",
            "xms",
            1
```

```
        ],
        "power": 276,
        "is-bypass-active": "false",
        "ups-conn-state": "connected",
        "output-voltage": 212.6000061035156,
        "tag-list": [],
        "fw-version": "02.08.0016",
        "real-power": 253,
        "part-number": "078-000-122",
        "monitoring-nodes-obj-id-list": [
            [
                "5fb7ead39487407bb4b51d5951881128",
                "X2-SC1",
                3
            ],
            [
                "7a7c09c87eef432a995dc8acb19cf828",
                "X2-SC2",
                4
            ]
        ],
        "output-frequency": 59.900001525878899,
        "battery-voltage": 0.0,
        "ups-status": "OL CHRG",
        "ups-battery-charge-in-percent": 100,
        "name": "X2-BBU",
        "ups-id": [
            "43a1c1946f724d84ba32411a64f4616b",
            "X2-BBU",
            2
        ],
        "brick-id": [
            "b8d5f3aa0082488aab6750996014d946",
            "X2",
            2
        ],
        "output-current": 1.299999952316284,
        "status-led": "na",
        "input-frequency": 59.900001525878899,
        "is-low-battery-no-input": "false",
        "model-name": "Eaton 5P 1550",
        "ups-load-percent-level": "ok"
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/bbus/2",
            "rel": "self"
        }
    ]
}
```

Clusters

Viewing the Details of the Managed Cluster

GET /api/json/v2/types/clusters

This command (GET /api/json/v2/types/clusters) displays the information of the cluster currently being managed.

Example request

```
GET /api/json/v2/types/clusters HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "clusters": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/clusters/1",
            "name": "xbrickdrm487"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/clusters/3",
            "name": "xbrickdrm577-578"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/clusters/2",
            "name": "xbrickdrm509"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/clusters/",
            "rel": "self"
        }
    ]
}
```

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Output Parameter	Description
avg-latency-32kb	Average latency time for 32KB blocks, measured in µs
avg-latency-4kb	Average latency time for 4KB blocks, measured in µs
avg-latency-512b	Average latency time for 512B blocks, measured in µs
avg-latency-512kb	Average latency time for 512KB blocks, measured in µs
avg-latency-64kb	Average latency time for 64KB blocks, measured in µs
avg-latency-8kb	Average latency time for 8KB blocks, measured in µs
avg-latency-gt1mb	Average latency time of the entire cluster, for block sizes greater than 1MB
brick-list	The cluster's list of X-Bricks
bw	Cluster's total real-time read and write bandwidth, measured in KB
bw-by-block	Cluster's current aggregated bandwidth
chap-authentication-mode	Describes the CHAP (Challenge-Handshake Authentication Protocol) mode for Initiator authentication (applicable for iSCSI only).
chap-discovery-mode	Describes the CHAP mode for Initiator discovery (applicable for iSCSI only).
cluster-expansion-in-progress	Indicates if cluster expansion is in progress. **Values**: • `false` - Cluster expansion is not underway. • `true` - Cluster expansion is underway.
compression-factor	Cluster-wide compression factor reflecting the overall space saving effects of compression
compression-factor-text	Compression factor text. Cluster-wide compression factor, reflecting the overall space-saving effects of compression, represented by a ratio of X:1. Presented with 1 decimal digit, append ':1' to the value. e.g: A value of 4.2 shows `4.2:1`.
compression-mode	Shows the compression mode (always `enabled`).
configurable-vol-type-capability	Denotes whether the cluster supports the capability to configure a Volume's vol-access. **Values**: • `supported` • `unsupported`
consistency-state	Indicates detection of data consistency error.
data-reduction-ratio	The ratio of actual used Volume capacity to used physical capacity in this cluster

Output Parameter	Description
data-reduction-ratio-text	An X:1 representation of the parameter (X= data-reduction-ratio)
debug-create-timeout	Determines whether the XMS uses long or normal timeout period for the create-debuginfo command. **Values**: • `normal` – Default XMS timeout • `long` – Long XMS timeout
dedup-ratio	Cluster's current ratio of deduplication space in use to total logical space in use
dedup-ratio-text	Cluster's total deduplication ratio
dedup-space-in-use	This parameter is no longer supported.
encryption-mode	Controls whether encryption (Data at Rest) is performed for all cluster SSDs, DAE SSDs and Local Disks.
encryption-supported	The capability parameter reflects whether Data at Rest encryption is possible for this cluster.
fc-port-speed	Fibre Channel port speed. The speed used by all Fibre Channel target ports. If all ports do not perform at the same speed, the value is `inconsistent`.
free-ud-ssd-space-in-percent	Monitors the percentage of the cluster's free UD SSD space.
free-ud-ssd-space-level	Monitors the free UD SSD space utilization levels
ib-switch-list	Number of InfiniBand Switches in the cluster and the list of their object IDs
index	Cluster's unique index number as defined by the XMS upon its creation
iops	Input/output per second (Cluster's total read and write real-time input/output operations per second)
iops-by-block	Input/output per second by block (current aggregated input/output per second, handled by all clusters managed by the XMS)

Output Parameter	Description
iscsi-port-speed	The negotiated speed of all iSCSI Target ports. The same value should be for all target ports. An Alert is issued, when inconsistent. **Values**: • `not_in_use` • `inconsistent` • `10mb` • `100mb` • `1gb` • `10gb`
last-upgrade-attempt-timestamp	Timestamp of the last attempted upgrade
last-upgrade-attempt-version	Software version of the last attempted upgrade
license-id	Cluster's license index number
logical-space-in-use	Total logical address space written to the cluster before deduplication, measured in KB
max-data-transfer-percent-done	The estimated time remaining for a cluster expansion procedure to complete, as a percentage
max-num-of-ssds-per-rg	The maximum number of SSDs a DPG can contain
memory-recovery-status	Reflects the current state of the `activate_cluster_memory recovery` command.
mode-switch-new-mode	Describes the most recent `encryption_mode` applied.
mode-switch-status	Current state of encryption mode being changed
naa-sys-id	A Volume's SCSI NAA name consistings of three elements
name	Cluster's name
num-of-bricks	Cluster's total number of X-Bricks
num-of-critical-alerts	The number of critical Alerts in the cluster
num-of-ib-switches	Cluster's total number of InfiniBand Switches
num-of-initiators	The number of Initiators belonging to this cluster

Output Parameter	Description
num-of-internal-vols	Number of internal Volumes. Internal Volumes are created by the cluster in order to support applications such as RecoverPoint and ODX. **Values**: • `tech` • `regular xms user` • `rp` • `odx`
num-of-jbods	Cluster's list of disk array enclosures (DAEs)
num-of-major-alerts	The number of major Alerts in the cluster
num-of-minor-alerts	The number of the XMS's minor Alerts
num-of-nodes	Total number of the cluster's Storage Controllers
num-of-rgs	Number of the cluster's Data Protection Groups (DPGs)
num-of-ssds	Total number of the cluster's SSDs
num-of-tars	Total number of the cluster's target ports
num-of-tgs	Total number of the cluster's Target Groups
num-of-upses	Total number of the cluster's BBUs
num-of-vols	Total number of the cluster's provisioned Volumes
num-of-xenvs	Total number of the cluster's XEnvs
obfuscate-debug	Determines whether debug information is created while obfuscating IP addresses. Default is disabled. Debug information is placed in the log bundle.
obj-severity	Cluster's severity, based on severity level of current Alerts (Alerts still uncleared) for this cluster and its contained objects **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.

Output Parameter	Description
os-upgrade-in-progress	Indicates if an operating system upgrade (for all Storage Controllers in the cluster) is currently in progress. **Values**: • `false` - OS upgrade is not underway. • `true` - OS upgrade is underway.
psnt-part-number	The PSNT, read from the Storage Controller
rd-bw	Cluster's total real-time read bandwidth in MB per second
rd-bw-128kb	Read bandwidth for 128KB size blocks
rd-bw-16kb	Read bandwidth for 16KB size blocks
rd-bw-1kb	Read bandwidth for 1KB size blocks
rd-bw-1mb	Read bandwidth for 1MB size blocks
rd-bw-256kb	Read bandwidth for 256KB size blocks
rd-bw-2kb	Read bandwidth for 2KB size blocks
rd-bw-32kb	Read bandwidth for 32KB size blocks
rd-bw-4kb	Read bandwidth for 4KB size blocks
rd-bw-512b	Read bandwidth for 512B size blocks
rd-bw-512kb	Read latency time for 512KB size blocks, measured in µs
rd-bw-64kb	Read bandwidth for 64KB size blocks
rd-bw-8kb	Read bandwidth for 8KB size blocks
rd-bw-by-block	Current aggregated bandwidth handled by all the clusters
rd-bw-gt1mb	Read time bandwidth of the entire cluster, for block sizes greater than 1MB
rd-iops	Cluster's total read real-time input/output operations per second
rd-iops-128kb	Current input/output per second for 128KB block size handled by the clusters
rd-iops-16kb	Current input/output per second for 16KB block size handled by the clusters
rd-iops-1kb	Current input/output per second for 1KB block size handled by clusters
rd-iops-1mb	Current input/output per second for 1MB block size handled by the clusters
rd-iops-256kb	Current input/output per second for 256KB block size handled by the clusters

Output Parameter	Description
rd-iops-2kb	Current input/output per second for 2KB block size handled by the clusters
rd-iops-32kb	Current input/output per second for 32KB block size handled by the clusters
rd-iops-4kb	Current input/output per second for 4KB block size, handled by the clusters
rd-iops-512b	Current input/output per second for 512B block size handled by the clusters
rd-iops-512kb	Current input/output per second for 512KB block size handled by the clusters
rd-iops-64kb	Current input/output per second for 64KB block size, handled by the clusters
rd-iops-8kb	Current input/output per second for 8KB block size handled by the clusters
rd-iops-by-block	Current aggregated input/output per second handled by all clusters managed by the XMS
rd-iops-gt1mb	Read time of the entire cluster, for block sizes greater than 1MB
rd-latency	Cluster's total real-time average latency of read operations, measured in µs
rd-latency-128kb	Read latency time for 128KB size blocks, measured in µs
rd-latency-16kb	Read latency time for 16KB size blocks, measured in µs
rd-latency-1kb	Read latency time for 1KB size blocks, measured in µs
rd-latency-1mb	Read latency time for 1MB size blocks, measured in µs
rd-latency-2kb	Read latency time for 2KB size blocks, measured in µs
rd-latency-256kb	Read latency time for 256KB size blocks, measured in µs
rd-latency-32kb	Read latency time for 32KB size blocks, measured in µs
rd-latency-4kb	Read latency time for 4KB size blocks, measured in µs
rd-latency-512b	Read latency time for 512B size blocks, measured in KB per second
rd-latency-512kb	Read latency time for 512KB size blocks, measured in µs
rd-latency-64kb	Read latency time for 64KB size blocks, measured in µs
rd-latency-8kb	Read latency time for 8KB size blocks, measured in µs
rd-latency-gt1mb	Latency read time of the entire cluster, for block sizes greater than 1MB
sc-fp-temperature-monitor-mode	Storage Controller front panel temperature monitor mode (the parameter used to disable the feature if the front panel sensor is faulty)

Output Parameter	Description
shared-memory-in-use-ratio-level	Used to monitor the shared memory utilization levels based on: `shared_memory_in_use_ratio`
shared-memory-in-use-recoverable-ratio-level	Used for low shared memory conditions, where a module's restart reclaims significant unused memory.
size-and-capacity	Cluster's total physical capacity, displayed: 1 x 10TB (number of X-Bricks multiplied by total physical X-Brick capacity)
small-bw	Current bandwidth of small input/output operations, addressed at the Volume
small-iops	Current small input/output operations per second
small-rd-bw	Current bandwidth of small input/output operations, addressed at the Volume
small-rd-iops	Current small read input/output operations per second
small-wr-bw	Current small write bandwidth
small-wr-iops	Current small write input/output operations per second
space-in-use	Cluster's total physical capacity used as user data (KB)
space-saving-ratio	Cluster's space saving ratio: `dedup_space_in_use` / `vol_size` **Note**: • Smaller numbers are the best for compression. • 0/0 = 0 (while cluster is without Volumes). • Changes when Snapshots are created. For example, if one Volume exists with blocks as non-zero and unique and 100 Snapshots are created, the parameter changes from 1 to 0.01 (a feature, not a bug). • Counter does not have a snapshot-group equivalent.
ssd-high-utilization-thld-crossing	Triggers a user threshold crossing Alert for high SSD utilization.
ssd-very-high-utilization-thld-crossing	Triggers a user threshold crossing Alert for very high SSD utilization.
ssh-firewall-mode	Determines whether a limitation on SSH connections is enforced. **Values**: • `locked` - SSH Firewall Mode is locked. • `unlocked` - SSH Firewall Mode is unlocked.
stopped-reason	The reason reported as to why `sys_state` is `stopped`

Output Parameter	Description
sys-activation-timestamp	Cluster's activation uptime timestamp as of 1.1.1970, measured in seconds
sys-health-state	Not in use. `sys-health-state` is a future output option. Do not use until further notification. **Note**: The correct method for gauging the cluster's health is by monitoring the cluster components' `fru-lifecycle-state` output parameter value, as follows: • When the `fru-lifecycle-state` value is `healthy`, the component's health state equals the value of the `obj-severity` output parameter. • When `fru-lifecycle-state` value is `not healthy`, the component's health state equals the value of the `fru-lifecycle-state` output parameter.
sys-id	Cluster's name or index number. May be omitted if only one cluster is defined.
sys-mgr-conn-error-reason	Reason for disconnection from the cluster manager
sys-mgr-conn-state	Current connection status between the XMS and the cluster's manager
sys-psnt-serial-number	Cluster's Product Serial Number tag (PSNT) serial number
sys-start-timestamp	Timestamp of the cluster's commencement. **Values**: measured in seconds since 1.1.1970
sys-state	Cluster's health state according to the XMS
sys-stop-type	Describes the nature of the current or last cluster stop.
sys-sw-version	XIOS version (the XtremAPP software version currently running on the Storage Controllers)
tag-list	List of Tags
thin-provisioning-ratio	The ratio of the total provisioned capacity to the logical space in use
total-memory-in-use	Represents the total amount of the memory pool currently in use by shared memory pools, in MB.
total-memory-in-use-in-percent	Represents the total amount (as a percent) of the memory pool currently in use by shared memory pools.
ud-ssd-space	Total user data space on the SSDs
ud-ssd-space-in-use	Specifies how much user data SSD space is in use, in Kbytes.
unaligned-bw	Current IOPS of unaligned bandwidth input/output operations
unaligned-iops	Unaligned input/output operations per second

Output Parameter	Description
unaligned-rd-bw	Current bandwidth of unaligned write input/output operations
unaligned-rd-iops	Current IOPS of unaligned read input/output operations
unaligned-wr-bw	Current bandwidth of unaligned write input/output operations
unaligned-wr-iops	Current IOPS of unaligned write input/output operations per second
under-maintenance	Indicates that the cluster is under maintenance.
upgrade-failure-reason	Shows permanent error of last upgrade attempts: Empty if previous attempt successful, if no previous upgrade command given, or upgrade currently in process
upgrade-state	The state of the last upgrade process for this Storage Controller
useful-ssd-space-per-ssd	User data space per SSD, measured in Kbytes
vaai-tp-limit-crossing	vStorage APIs for Array Integration (VAAI) thin provisioning limit crossing. Triggers notification to XMS user when thin provisioning limit is crossed.
vol-size	Total provisioned capacity. Volume size (in KB) as exposed to Initiators
wr-bw	Cluster's total real-time write bandwidth in MB per second
wr-bw-128kb	Write bandwidth for 128KB block size
wr-bw-16kb	Write bandwidth for 16KB block size
wr-bw-1kb	Write bandwidth for 1KB block size
wr-bw-1mb	Write bandwidth for 1MB block size
wr-bw-256kb	Write bandwidth for 256KB block size
wr-bw-2kb	Write bandwidth for 2KB block size
wr-bw-32kb	Write bandwidth for 32KB block size
wr-bw-4kb	Write bandwidth for 4KB block size
wr-bw-512b	Write bandwidth for 512B block size
wr-bw-512kb	Write bandwidth for 5122KB block size
wr-bw-64kb	Write bandwidth for 64KB block size
wr-bw-8kb	Write bandwidth for 8KB block size
wr-bw-by-block	Cluster's current bandwidth, used to get a Snapshot of the aggregated totals by block size
wr-bw-gt1mb	Write bandwidth of the entire cluster, for block sizes greater than 1MB
wr-iops	Total write real-time input/output operations per second

Output Parameter	Description
wr-iops-128kb	Current input/output per second for 128KB block size handled by all clusters
wr-iops-16kb	Current input/output per second for 16KB block size handled by all clusters
wr-iops-1kb	Current input/output per second for 1KB block size handled by all clusters
wr-iops-1mb	Current input/output per second for 1MB block size handled by all clusters
wr-iops-256kb	Current input/output per second for 256KB block size handled by all clusters
wr-iops-2kb	Current input/output per second for 2KB block size handled by all clusters
wr-iops-32kb	Current input/output per second for 32KB block size handled by all clusters
wr-iops-4kb	Current input/output per second for 4KB block size handled by all clusters
wr-iops-512b	Current input/output per second for 512B block size handled by all clusters
wr-iops-512kb	Current input/output per second for 512KB block size handled by all clusters
wr-iops-64kb	Current input/output per second for 64KB block size handled by all clusters
wr-iops-8kb	Current input/output per second for 8KB block size handled by all clusters
wr-iops-by-block	Current input/output per second, handled by the cluster. A parameter used to get a Snapshot of the aggregated totals by block size.
wr-iops-gt1mb	Write input/output per second of the entire cluster, for block sizes greater than 1MB
wr-latency	Cluster's total real-time average latency of write operations, measured in µs
wr-latency-128kb	Write latency time for 128KB size blocks, measured in µs
wr-latency-16kb	Write latency time for 16KB size blocks, measured in µs
wr-latency-1kb	Write latency time for 1KB size blocks, measured in µs
wr-latency-1mb	Write latency time for 1MB size blocks, measured in µs
wr-latency-256kb	Write latency time for 256KB size blocks, measured in µs
wr-latency-2kb	Write latency time for 2KB size blocks, measured in µs

Output Parameter	Description
wr-latency-32kb	Write latency time for 32KB size blocks, measured in µs
wr-latency-4kb	Write latency time for 4KB size blocks, measured in µs
wr-latency-512b	Write latency time for 512B size blocks, measured in µs
wr-latency-512kb	Write latency time for 512KB size blocks, measured in µs
wr-latency-64kb	Write latency time for 64KB size blocks, measured in µs
wr-latency-8kb	Write latency time for 8KB size blocks, measured in µs
wr-latency-gt1mb	Latency write time of the entire cluster, for block sizes greater than 1MB
xms-id	Object index number of the XMS

Example request by index

```
GET /api/json/v2/types/clusters/1 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/clusters?name=xbrickdrm487 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "compression-factor-text": "1.4:1",
        "os-upgrade-in-progress": "false",
        "ssh-firewall-mode": "unlocked",
        "rd-iops-32kb": "0",
        "rd-iops-64kb": "0",
        "obj-severity": "minor",
        "wr-iops-by-block": "15428",
        "num-of-rgs": 1,
        "total-memory-in-use-in-percent": 0,
        "iops": "46302",
        "last-upgrade-attempt-version": "",
        "avg-latency-512kb": "0",
        "psnt-part-number": "900-586-005",
        "wr-bw-32kb": "0",
        "rd-latency-256kb": "0",
        "num-of-nodes": 2,
        "wr-bw-by-block": "10086",
        "rd-latency-512b": "462",
        "rd-iops-1kb": "7728",
        "iscsi-port-speed": "10Gb",
        "memory-recovery-status": "inactive_failed",
        "debug-create-timeout": "normal",
        "num-of-minor-alerts": 5,
        "compression-factor": 1.445849490037596,
        "unaligned-rd-iops": "30847",
        "shared-memory-in-use-recoverable-ratio-level": "healthy",
        "wr-latency-2kb": "0",
        "wr-bw-16kb": "0",
        "rd-iops-8kb": "0",
        "num-of-tars": 8,
        "wr-latency-16kb": "0",
        "rd-bw": "22678",
        "avg-latency-1mb": "0",
        "avg-latency-256kb": "0",
        "wr-latency-512kb": "0",
        "tag-list": [],
        "rd-bw-128kb": "0",
        "wr-bw-4kb": "0",
        "wr-iops": "15428",
        "wr-latency-64kb": "0",
        "cluster-expansion-in-progress": "no",
        "wr-bw-gt1mb": "0",
        "name": "xbrickdrm487",
        "sys-start-timestamp": 1440412130,
        "num-of-ib-switches": 0,
        "acc-num-of-unaligned-wr": "691338067",
        "dedup-ratio-text": "2.7:1",
        "rd-iops-4kb": "0",
        "wr-iops-16kb": "0",
        "wr-latency-1mb": "0",
```

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```
        "acc-size-of-rd": "49996308734",
        "wr-latency-4kb": "0",
        "dedup-ratio": 2.70097856557676,
        "rd-latency-1mb": "0",
        "avg-latency-512b": "580",
        "sys-sw-version": "4.0.2-20",
        "rd-latency-16kb": "258",
        "rd-bw-512b": "11463",
        "max-data-transfer-percent-done": 0,
        "acc-num-of-wr": "1253785938",
        "avg-latency-2kb": "0",
        "wr-bw-128kb": "0",
        "mode-switch-new-mode": "self",
        "index": 1,
        "rd-iops-256kb": "0",
        "rd-latency-gt1mb": "0",
        "free-ud-ssd-space-in-percent": 29,
        "wr-latency-256kb": "0",
        "upgrade-failure-reason": "",
        "wr-bw-1kb": "4745",
        "wr-iops-gt1mb": "0",
        "acc-num-of-small-rd": "436513488",
        "rd-bw-4kb": "0",
        "num-of-xenvs": 4,
        "sys-stop-type": "none",
        "stopped-reason": "none",
        "wr-iops-32kb": "0",
        "configurable-vol-type-capability": "supported",
        "xms-id": [
            "486d7818922745b5912294620c41a9d5",
            "xms",
            1
        ],
        "rd-iops-gt1mb": "0",
        "wr-latency-gt1mb": "0",
        "small-wr-bw": "10086",
        "num-of-ssds": 13,
        "mode-switch-status": "none",
        "wr-bw-512b": "5339",
        "bw": "32764",
        "avg-latency-64kb": "0",
        "wr-bw-512kb": "0",
        "unaligned-wr-bw": "10086",
        "avg-latency": "580",
        "total-memory-in-use": 23158,
        "rd-iops-128kb": "0",
        "rd-latency-1kb": "443",
        "rd-bw-gt1mb": "0",
        "ud-ssd-space-in-use": "2480448728",
        "num-of-jbods": 1,
        "wr-bw-1mb": "0",
        "sys-health-state": "healthy",
        "avg-latency-8kb": "0",
```

```
"wr-iops-128kb": "0",
"unaligned-wr-iops": "15428",
"small-rd-iops": "30658",
"data-reduction-ratio-text": "3.9:1",
"wr-bw": "10086",
"rd-bw-1kb": "7728",
"wr-bw-64kb": "0",
"obfuscate-debug": "disabled",
"wr-latency": "828",
"rd-latency-8kb": "0",
"small-iops": "46086",
"wr-bw-2kb": "0",
"vol-size": "27917287424",
"unaligned-rd-bw": "22233",
"rd-bw-by-block": "22678",
"ud-ssd-space": "3503065616",
"wr-bw-8kb": "0",
"wr-iops-512b": "10680",
"rd-iops-512b": "22928",
"acc-num-of-small-wr": "356410852",
"guid": "6c54fc0b828543c99054c1ed6fcbad37",
"useful-ssd-space-per-ssd": "390625000",
"acc-num-of-rd": "1386532449",
"data-reduction-ratio": 3.905208481641639,
"license-id": "LIC123456789",
"ssd-very-high-utilization-thld-crossing": "healthy",
"rd-iops-16kb": "216",
"acc-size-of-wr": "48253935358",
"shared-memory-in-use-ratio-level": "healthy",
"num-of-internal-vols": 0,
"rd-bw-2kb": "0",
"rd-iops-by-block": "30874",
"under-maintenance": false,
"chap-authentication-mode": "disabled",
"bw-by-block": "32764",
"num-of-tgs": 1,
"ssd-high-utilization-thld-crossing": "exceeded",
"chap-discovery-mode": "disabled",
"wr-iops-1mb": "0",
"rd-latency-128kb": "0",
"rd-bw-16kb": "3483",
"acc-num-of-unaligned-rd": "798714228",
"unaligned-iops": "46275",
"wr-iops-2kb": "0",
"sc-fp-temperature-monitor-mode": "disabled",
"wr-iops-8kb": "0",
"rd-bw-512kb": "0",
"wr-latency-128kb": "0",
"rd-latency-512kb": "0",
"rd-bw-64kb": "0",
"sys-id": [
    "6c54fc0b828543c99054c1ed6fcbad37",
    "xbrickdrm487",
    1
],
```

```
"size-and-capacity": "1X10TB",
"rd-bw-1mb": "0",
"rd-latency-4kb": "172",
"avg-latency-4kb": "172",
"sys-activation-timestamp": 1440412130,
"wr-latency-512b": "834",
"wr-iops-256kb": "0",
"brick-list": [
    [
        "152cca38fd40402c822bf124ee59e436",
        "X1",
        1
    ]
],
"rd-latency-32kb": "0",
"rd-latency-64kb": "0",
"rd-bw-32kb": "0",
"wr-bw-256kb": "0",
"rd-latency-2kb": "0",
"fc-port-speed": "8GFC",
"space-saving-ratio": 0.1277782108921271,
"compression-mode": "enabled",
"vaai-tp-limit-crossing": "healthy",
"num-of-vols": 13,
"upgrade-state": "no_upgrade_done",
"wr-iops-512kb": "0",
"avg-latency-128kb": "0",
"space-in-use": 0,
"logical-space-in-use": "9685015352",
"wr-iops-64kb": "0",
"rd-iops-1mb": "0",
"ib-switch-list": [],
"sys-psnt-serial-number": "XIO000150201969",
"wr-iops-1kb": "4745",
"rd-iops-2kb": "0",
"encryption-mode": "self",
"rd-bw-8kb": "0",
"avg-latency-gt1mb": "0",
"last-upgrade-attempt-timestamp": "",
"thin-provisioning-ratio": 0.3469182089544259,
"sys-mgr-conn-error-reason": "none",
"avg-latency-32kb": "0",
"num-of-upses": 2,
"num-of-major-alerts": 0,
"num-of-initiators": 5,
"sys-mgr-conn-state": "connected",
"naa-sys-id": "44969418704",
"wr-iops-4kb": "0",
"unaligned-bw": "32319",
"encryption-supported": true,
"small-rd-bw": "19192",
"avg-latency-1kb": "585",
"rd-iops-512kb": "0",
```

```
        "small-wr-iops": "15428",
        "dedup-space-in-use": "3567221040",
        "num-of-bricks": 1,
        "rd-latency": "456",
        "free-ud-ssd-space-level": "healthy",
        "max-num-of-ssds-per-rg": 27,
        "wr-latency-32kb": "0",
        "iops-by-block": "46302",
        "rd-bw-256kb": "0",
        "wr-latency-8kb": "0",
        "sys-state": "active",
        "avg-latency-16kb": "258",
        "consistency-state": "healthy",
        "num-of-critical-alerts": 0,
        "wr-latency-1kb": "815",
        "rd-iops": "30874",
        "small-bw": "29278"
    },
    "links": [
        {
            "href": "https://vxms-xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/clusters/1",
            "rel": "self"
        }
    ]
}
```

Consistency Groups

Viewing the List of Consistency Groups

GET /api/json/v2/types/consistency-groups

This command (GET /api/json/v2/types/consistency-groups) displays the list of Consistency Groups.

Example request

```
GET /api/json/v2/types/consistency-groups HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "consistency-groups": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-
groups/1",
            "name": ""
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-
groups/3",
            "name": "Consistency Group"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-
groups/2",
            "name": "TestDevGroup"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-
groups/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	Consistency Group's severity, based on severity level of current Alerts (Alerts still uncleared) for this Consistency Group **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
sys-id	The index number of the cluster this Consistency Group belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
vol-list	The list of Volume object IDs this Consistency Group belongs to

Example request by index

```
GET /api/json/v2/types/consistency-groups/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/consistency-groups?name=CG_test1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "index": 1,
    "created-by-app": "xms",
    "name": "CG_test1",
    "obj-severity": "information",
    "certainty": "ok",
    "cg-short-id": 0,
    "tag-list": [],
    "num-of-vols": 2,
    "cg-id": [
      "f9cdfd216ec84d23a42a2e91cc52dc07",
      "CG_test1",
      1
    ],
    "guid": "f9cdfd216ec84d23a42a2e91cc52dc07",
    "vol-list": [
      [
        "33899af734ba432fadd2a96e119e8d39",
        "Vol_test1",
        8
      ],
      [
        "a97ea8e2d5e5437aa1e2b412a1a5be08",
        "vol_test2",
        13
      ]
    ],
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ]
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/consistency-groups/1",
      "rel": "self"
    }
  ]
}
```

Creating a Consistency Group

POST /api/json/v2/types/consistency-groups

This command (POST /api/json/v2/types/consistency-groups) enables you to create a Consistency Group.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
consistency-group-name	Consistency Group's name	Yes
tag-list	The list of Tags, including full name/path, to be included in the Consistency Group	No
vol-list	The list of object IDs (ID or name)	No

Example request

```
POST /api/json/v2/types/consistency-groups HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":1,"consistency-group-name":"Consis_1"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/consistency-groups/3",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
PUT /api/json/v2/types/consistency-groups/1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"new-name":"TEST"}
```

Example request by name

```
PUT /api/json/v2/types/consistency-groups/?name=TEST/ HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353",""new-name":"TEST"}
```

Response

```
200 OK
```

Consistency Group Volumes

Viewing the List of Consistency Group Volumes

GET /api/json/v2/types/consistency-group-volumes

This command (GET /api/json/v2/types/consistency-group-volumes) displays the list of Consistency Group Volumes.

> **Note:** Consistency Group Volume objects present the Volumes and Tags that are associated with a given Consistency Group. This object is also used to add or remove a Volume from a Consistency Group.

Example request

```
GET /api/json/v2/types/consistency-group-volumes HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "consistency-groups": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-group-
volumes/1",
            "name": "SQL-CG"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-group-
volumes/3",
            "name": ""
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/consistency-group-
volumes/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	Consistency Group Volume's severity, based on severity level of current Alerts (Alerts still uncleared) for this CG **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
sys-id	The index number of the cluster this Consistency Group Volume belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
vol-list	The list of Volume object IDs this Consistency Group Volume belongs to

Example request by index

```
GET /api/json/v2/types/consistency-group-volumes/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET //api/json/v2/types/consistency-group-volumes?name=CG1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```json
{
  "content": {
    "index": 1,
    "created-by-app": "xms",
    "name": "CG1",
    "obj-severity": "information",
    "certainty": "ok",
    "cg-short-id": 2,
    "tag-list": [],
    "num-of-vols": 4,
    "cg-id": [
      "0161e1bee6eb40f0bf098d8d67b09d7c",
      "CG1",
      1
    ],
    "guid": "0161e1bee6eb40f0bf098d8d67b09d7c",
    "vol-list": [
      [
        "d65270ffc544474098e2dbd0213a3cce",
        "BCS6",
        6
      ],
      [
        "0b691e06d6504ca9a90e1183a10fa0a3",
        "BCS7",
        7
      ],
      [
        "6c24c9690d124c38bd3cd6a27738b2e6",
        "BCS8",
        8
      ]
    ],
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ]
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/consistency-group-volumes/1",
      "rel": "self"
    }
  ]
}
```

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Adding a Volume to a Consistency Group

POST /api/json/v2/types/consistency-group-volumes

This command (POST /api/json/v2/types/consistency-group-volumes) enables you to add a Volume to a Consistency Group.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
cg-id	Consistency Group's name or index number	Yes
vol-id	Volume's name or index number	Yes

Example request

```
POST /api/json/v2/types/consistency-group-volumes HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm788","cg-id":"LAMACG2","vol-id":2}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/consistency-group-volumes/2",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
PUT /api/json/v2/types/consistency-group-volumes/1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"vol-access":"read_access"}
```

Example request by name

```
PUT /api/json/v2/types/consistency-group-volumes/cgvol1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","vol-access":"read_access"}
```

Response

```
200 OK
```

Example request by index

```
DELETE /api/json/v2/types/consistency-group-volumes/2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm788","cg-id":"LAMACG2","vol-id":2}
```

Example request by name

```
DELETE /api/json/v2/types/consistency-group-volumes?name=LAMACG2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"cg-id":"LAMACG2","vol-id":2}
```

Response

```
200 OK
```

DAEs

Viewing the List of DAEs

GET /api/json/v2/types/daes

This command (GET /api/json/v2/types/daes) displays the list of DAEs.

Example request

```
GET /api/json/v2/types/daes HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "daes": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/daes/1",
            "name": "X1-DAE"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/daes/",
            "rel": "self"
        }
    ]
}
```

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Output Parameter	Description
hw-revision	Hardware revision • Hardware level of the power supply unit. • The value is not always available. • GUI and CLI do not display the value when unavailable.
identify-led	Indicates whether the identification LED is illuminated for this DAE. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	DAE's index number as defined by the XMS upon its creation (a unique positive number)
jbod-id	The DAE object Identification number
model-name	Vendor-assigned DAE model name
name	DAE's name
num-of-jbod-controllers	The number of controller objects that belong to this DAE and a list of their object IDs
num-of-jbod-psus	The number of PSU objects that belong to this DAE and a list of their object IDs
obj-severity	DAE severity, based on severity level of current Alerts (Alerts still uncleared) for this DAE and its contained objects **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	Part number. EMC-assigned string identifying part (SKU). Independent of the actual vendor `model_name` used for this FRU

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Output Parameter	Description
serial-number	DAE's serial number
status-led	Status LED state, indicating DAE object faults
sys-id	The index number of the cluster this DAE belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/daes/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0QxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/daes?name=X1-DAE&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0QxMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "fru-lifecycle-state": "healthy",
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "obj-severity": "information",
    "num-of-jbod-psus": 2,
    "tag-list": [],
    "serial-number": "APM00140634619",
    "fw-version": "151 ",
    "part-number": "100-586-100-01",
    "fru-replace-failure-reason": "",
    "guid": "3fcdbcaf978e4b338fa5227b251fa698",
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ],
    "index": 1,
    "name": "X1-DAE",
    "brick-id": [
      "afdb132f2ff54cceafa7058f16b601a1",
      "X1",
      1
    ],
    "status-led": "off",
    "num-of-jbod-controllers": 2,
    "identify-led": "off",
    "model-name": "Derringer Encl ",
    "hw-revision": "17",
    "jbod-id": [
      "3fcdbcaf978e4b338fa5227b251fa698",
      "X1-DAE",
      1
    ]
  },
  "links": [
    {
      "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/daes/1",
      "rel": "self"
    }
  ]
}
```

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DAE Controllers

Viewing the List of DAE Controllers

GET /api/json/v2/types/dae-controllers

This command (GET /api/json/v2/types/dae-controllers) displays the list of DAE Controllers.

Example request

```
GET /api/json/v2/types/dae-controllers HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "dae-controllers": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-controllers/1",
            "name": "X1-DAE-LCC-A"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-controllers/2",
            "name": "X1-DAE-LCC-B"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-controllers/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
fru-lifecycle-state	DAE Controller's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` - Indicates a transient state in which the system performs initialization of a component.
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-version	Current firmware version of the DAE Controller
fw-version-error	Indicate if the firmware or OS upgrade has failed or is in the process of upgrading. This reflects the aggregate of all Storage Controller OS and firmware upgrades.
hw-revision	Hardware level of the power supply unit **Note**: The value is not always available. GUI and CLI do not display the value when unavailable.
identification	The panel label of the DAE Controller within its DAE
identify-led	Indicates whether the identification LED is illuminated for this DAE Controller. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	DAE Controller's index number as defined by the XMS upon its creation (a unique positive number)
jbod-controller-connectivity-state	Reflects the connectivity of the DAE Controller.

Output Parameter	Description
jbod-controller-id	The index number of the DAE Controller object
jbod-id	The DAE Controller objects Identification number
lcc-health-level	The DAE Controller's health
location	The location of the DAE Controller within its DAE
model-name	Vendor-assigned DAE Controller model name
name	DAE Controller's name
obj-severity	DAE Controller severity, based on severity level of current Alerts (Alerts still uncleared) for this DAE Controller **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	EMC-assigned string identifying part (SKU). Independent of the actual vendor `model_name` used for this FRU
sas1-brick-index	The index of X-Brick containing the Storage Controller that the SAS1 port is connected to. It should be 1 to 8 if connected and 0 if the port is disconnected. An error occurs if this X-Brick number differs from the X-Brick this Storage Controller belongs to.
sas1-node-index	Storage Controller's index within the X-Brick that the SAS1 port is connected to. It should be 1 to 2 if the port is connected or 0 if the port is disconnected.
sas1-port-in-node-index	The index of the port within the Storage Controller that the SAS1 port is connected to. It should be 1 to 2 if the port is connected or 0 if the port is not connected.
sas1-port-location	The location of the port within its DAE Controller
sas1-port-rate	Rate of the first serial attached SCSI (SAS) port used
sas1-port-state	State of the first serial attached SCSI (SAS) port used

Output Parameter	Description
sas2-brick-index	The index of the X-Brick containing the Storage Controller that the SAS2 port is connected to. It should be 1 to 8 if connected or 0 if the port is disconnected. An error occurs if this X-Brick number differs from the X-Brick this Storage Controller belongs to.
sas2-node-index	The index of the Storage Controller within the X-Brick that the SAS2 port is connected to. It should be 1 to 2 if the port is connected or 0 if the port is not connected.
sas2-port-in-node-index	The index of the port within the Storage Controller that the SAS1 port is connected to. It should be 1 to 2 if the port is connected or 0 if the port is not connected.
sas2-port-location	The location of the SAS2 port within its DAE Controller
sas2-port-rate	Rate of the second serial attached SCSI (SAS) port used **Values**: • `12gbps` • `6gbps` • `3gbps` • `unknown`
sas2-port-state	Status of the serial attached SCSI (SAS) port 2
sas-connectivity-state	Indicates if the port is physically connected and is at least partially working. The `sas_connectivity_state` of the DAE Controller port is reflected if the port is in `degraded` state.
serial-number	DAE Controller's serial number
status-led	LED state, indicating DAE Controller object faults
sys-id	The index number of the cluster this DAE Controller belongs to. May be omitted if only one cluster is defined.
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/dae-controllers/2?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/dae-controllers?name=X1-DAE-LCC-B&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "fru-lifecycle-state": "healthy",
    "sas1-port-location": "right",
    "jbod-controller-connectivity-state": "healthy",
    "failure-reason": "none",
    "sas2-node-index": 0,
    "obj-severity": "information",
    "sas1-port-in-node-index": 0,
    "serial-number": "JWXEL130501284",
    "sas2-port-state": "up",
    "fru-replace-failure-reason": "",
    "guid": "23d95f6d003e422aa8ef2ee6ae38e14b",
    "index": 2,
    "fw-version-error": "no_error",
    "sas1-port-rate": "6gbps",
    "sas-connectivity-state": "healthy",
    "identification": "lcc_b",
    "location": "top",
    "identify-led": "off",
    "hw-revision": "2864",
    "enabled-state": "enabled",
    "jbod-id": [
      "330758e8d5d844f295b49d55c8a28aa1",
      "X1-DAE",
      1
    ],
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "sas1-port-state": "up",
    "sas1-node-index": 0,
    "fw-version": "151 ",
    "part-number": "303-104-000E",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "sas1-brick-index": 0,
    "sas2-brick-index": 0,
    "name": "X1-DAE-LCC-B",
    "brick-id": [
      "f1cb26b27eb14e74b6a2d5b609449297",
      "X1",
      1
    ],
    "sas2-port-in-node-index": 0,
    "sas2-port-rate": "6gbps",
    "status-led": "off",
```

```
    "jbod-controller-id": [
      "23d95f6d003e422aa8ef2ee6ae38e14b",
      "X1-DAE-LCC-B",
      2
    ],
    "lcc-health-level": "level_1_clear",
    "model-name": "Derringer LCC  ",
    "sas2-port-location": "left"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/dae-controllers/2",
      "rel": "self"
    }
  ]
}
```

EMC® XtremIO Storage Array RESTful API (Ver. 2.1) Guide

DAE PSUs

Viewing the List of DAE PSUs

GET /api/json/v2/types/dae-psus

This command (GET /api/json/v2/types/dae-psus) displays the list of DAE PSUs.

Example request

```
GET /api/json/v2/types/dae-psus HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wxMA==
Cache-Control: no-cache
```

Response

```
{
    "dae-psus": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-psus/1",
            "name": "X1-DAE-PSU1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-psus/2",
            "name": "X1-DAE-PSU2"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/dae-psus/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-version	Current firmware version of the DAE PSU
fw-version-error	Indicates if the firmware or OS upgrade has failed or is in the process of upgrading. This reflects the aggregate of all Storage Controller OS and firmware upgrades.
hw-revision	Hardware level of the power supply unit **Note**: The value is not always available. GUI and CLI do not display the value when unavailable.
identification	The panel label of the DAE PSU within its DAE
identify-led	Indicates whether the identification LED is illuminated for this DAE PSU. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	DAE PSU's index number as defined by the XMS upon its creation (a unique positive number)
input	Confirms the existence of input power to the supply. The underlying sensors can be read in the Storage Controller's sensor arrays.
jbod-id	The DAE PSU objects' identification number
jbod-psu-id	The identity number of the DAE PSU object
location	The location of the DAE PSU within its DAE
model-name	Vendor-assigned DAE PSU model name
name	DAE PSU's name

Output Parameter	Description
obj-severity	DAE PSU severity, based on severity level of current Alerts (Alerts still uncleared) for this DAE PSU **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	EMC-assigned string identifying part (SKU), independent of the actual vendor `model_name` used for this FRU
power-failure	Shows details pertaining to the nature of a power failure, should one occur.
power-feed	Power into PSU typically has two feeds: A and B Typical configuration: • The first InfiniBand Switch PSU is connected to feed_A. • The second InfiniBand Switch PSU is connected to feed_B.
serial-number	DAE PSU's serial number
status-led	LED state indicating DAE PSU object faults
sys-id	The index number of the cluster this DAE PSU belongs to. May be omitted if only one cluster is defined.

Example request by index

```
GET /api/json/v2/types/dae-psus/1 ?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/dae-psus?name=X1-DAE-PSU1&cluster-name=xbrickdrm353
HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "fru-lifecycle-state": "healthy",
    "jbod-psu-id": [
      "79ef42e04e894efdb680a756aa161bfa",
      "X1-DAE-PSU1",
      1
    ],
    "obj-severity": "information",
    "power-feed": "PWR-A",
    "serial-number": "AC7B0130503764 ",
    "fw-version": "5.33",
    "part-number": "",
    "fru-replace-failure-reason": "",
    "guid": "79ef42e04e894efdb680a756aa161bfa",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "power-failure": "no_error",
    "index": 1,
    "name": "X1-DAE-PSU1",
    "brick-id": [
      "f1cb26b27eb14e74b6a2d5b609449297",
      "X1",
      1
    ],
    "fw-version-error": "no_error",
    "status-led": "na",
    "enabled-state": "enabled",
    "identification": "psu_a",
    "location": "right",
    "identify-led": "na",
    "input": "on",
    "model-name": "000B0019",
    "hw-revision": "2a10",
    "jbod-id": [
      "330758e8d5d844f295b49d55c8a28aa1",
      "X1-DAE",
      1
    ]
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/dae-psus/1",
      "rel": "self"
    }
  ]
}
```

Data Protection Groups

Listing the Data Protection Groups

GET /api/json/v2/types/data-protection-groups

This command (GET /api/json/v2/types/data-protection-groups) lists the XtremIO
Data Protection Groups (DPGs).

Example request

```
GET /api/json/v2/types/data-protection-groups HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "data-protection-groups": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/data-protection-groups/1",
            "name": "X1-DPG"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/data-protection-groups/1",
            "name": "X1-DPG"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/data-protection-groups/2",
            "name": "X2-DPG"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/data-protection-groups/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	DPG's severity, based on severity level of current Alerts (Alerts still uncleared) for this DPG **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
proactive-metadata-loading	This Boolean property reflects whether the cluster performs proactive loading of the metadata (property returns `true`). This may happen after the cluster is started or recovers from an extreme situation. At this stage, there may be performance degradation.
protection-state	DPG's protection state. If the DPG is currently under initial configuration, the parameter is initializing.
rd-bw	DPG's total read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rebalance-progress	Shows the progress of a DPG rebalance.
rebuild-in-progress	Indicates if the DPG currently performs a rebuild, and its progress, measured in percentage.
rebuild-prevention-reason	When an DPG enters a degraded state (either single or dual failure), a rebuild is generally initiated. However, conditions may prevent the rebuild. The parameter includes the reason for rebuild prevention.
rebuild-progress	The rebuid progress status
rg-id	DPG's object index number
rg-ud-ssd-percent-free-space	DPG's percentage of SSD free space for user data
rg-ud-ssd-space-levels	DPG user data SSD space levels. Events are triggered for any change in this parameter. **Note**: For XMS version 4.2.0, the only value listed is `obsolete`.
ssd-preparation-in-progress	Indicates if the DPG is currently performing an SSD preparation, and its progress, measured in percentage.

Output Parameter	Description
ssd-preparation-progress	The current state of the SSD preperation
ssd-size	DPG's overall size of unfailed SSDs
sys-id	The index number of the cluster this DPG belongs to. May be omitted if only one cluster is defined.
tag-list	DPG's list of Tags
ud-ssd-space	Total user data space on the SSDs
ud-ssd-space-in-use	Reports how much of user data space of the DPG is currently in use, measured in Kbytes.
useful-ssd-space	DPG's total amount of useful SSD space over all unfailed SSDs, for this DPG
wr-bw	DPG's total real-time write bandwidth, in MB per second
wr-iops	Total write real-time input/output operations per second
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/data-protection-groups/2?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/data-protection-groups?name=X1-DPG&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "ssd-size": "19535569200",
    "ssd-preparation-progress": 0,
    "obj-severity": "information",
    "rd-bw": "0",
    "ssd-preparation-in-progress": "done",
    "ud-ssd-space": "16368817184",
    "available-rebuilds": "5",
    "rebuild-prevention-reason": "none",
    "rg-id": [
      "ff6929f8b1d14119897bfa557063a33f",
      "X1-DPG",
      1
    ],
    "guid": "ff6929f8b1d14119897bfa557063a33f",
    "index": 1,
    "num-of-nodes": 2,
    "rg-ud-ssd-percent-free-space": 0,
    "sys-id": [
      "a9a4f600e6484da5a41a8a948a2d27ae",
      "xbrick281",
      1
    ],
    "integrating-slot-num": 255,
    "xms-id": [
      "208b6fbd8a594c4ea3b40155bbd0a431",
      "xms",
      1
    ],
    "rebuild-in-progress": "done",
    "num-of-ssds": 25,
    "tag-list": [],
    "rg-ud-ssd-space-levels": "healthy",
    "bw": "0",
    "wr-iops": "0",
    "protection-state": "normal",
    "rebuild-progress": 0,
    "name": "X1-DPG",
    "brick-id": [
      "893b700e95884decbebd35987b9b8338",
      "X1",
      1
    ],
    "ud-ssd-space-in-use": "0",
    "rebalance-progress": 0,
    "iops": "0",
    "useful-ssd-space": "19535569200",
    "rd-iops": "0",
```

```
    "wr-bw": "0",
    "proactive-metadata-loading": false
  },
  "links": [
    {
      "href": "https://vxms-xbrick281.xiolab.lab.emc.com/api/json/v2/types/data-
protection-groups/1",
      "rel": "self"
    }
  ]
}
```

Discover Initiators

Viewing the Discovered Initiators List

GET /api/json/v2/types/discover-initiators

This command (GET /api/json/v2/types/discover-initiators) displays a list of the Initiators that exist on the SCSI network, but are not yet added to the system.

Output Parameter	Description
num-of-conn-tars	The number of target ports that detect this Initiator
port-address	The following input format variations are accepted for Fibre Channel Initiators ("X" is a hexadecimal digit – upper case or lower case are allowed): • "XX:XX:XX:XX:XX:XX:XX" • "XXXXXXXXXXXXXXX" • "0xXXXXXXXXXXXXXXX" When the Initiator object port_address parameter is queried, the value is always returned in a single output format. IQN and EUI formats are allowed for iSCSI Initiators.
port-type	Port type (Fibre Channel or iSCSI)
sys-id	The cluster's identifier. Either the cluster's name or index number.
target-list	A list of all target ports (separated by a comma) that "discovered" this initiator.

Example request

```
GET /api/json/v2/types/discover-initiators HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
Postman-Token: c7dfc6d5-0c36-5dd7-c19b-18a69fb7f26e
```

Response

```
{
    "content": [
            {
            "port-address": "21:00:00:24:ff:54:8b:03",
            "target-list": [
                [
                    "b1b8aa91a27f428eb66cd764bc4f0b51",
                    "X1-SC1-fc1",
                    1
                ],
                [
                    "95a456f9447548639ad64ec4efed3273",
                    "X1-SC1-fc2",
                    2
                ],
                [
                    "f702ef5683014d79a17ea094cb32b106",
                    "X1-SC2-fc1",
                    5
                ],
                [
                    "a891e734f23142798746c464e99b4048",
                    "X1-SC2-fc2",
                    6
                ]
            ],
            "sys-id": [
                "18ac81e9036c4e4cbd836a26adefbc64",
                "xbrickdrm723",
                1
            ],
            "num-of-conn-tars": 4,
            "port-type": "fc"
        },
        {
            "port-address": "21:00:00:24:ff:54:8b:02",
            "target-list": [
                [
                    "b1b8aa91a27f428eb66cd764bc4f0b51",
                    "X1-SC1-fc1",
                    1
                ],
                [
                    "95a456f9447548639ad64ec4efed3273",
                    "X1-SC1-fc2",
                    2
                ],
                [
                    "f702ef5683014d79a17ea094cb32b106",
                    "X1-SC2-fc1",
                    5
                ],
```

```
                    [
                        "a891e734f23142798746c464e99b4048",
                        "X1-SC2-fc2",
                        6
                    ]
                ],
                "sys-id": [
                    "18ac81e9036c4e4cbd836a26adefbc64",
                    "xbrickdrm723",
                    1
                ],
                "num-of-conn-tars": 4,
                "port-type": "fc"
            }
        ],
        "links": [
            {
                "href": "https://localhost/api/json/v2/types/discover-initiators/",
                "rel": "self"
            }
        ]
}
```

Email Notifiers

Viewing the List of Email Notifiers

GET /api/json/v2/types/email-notifier

This command (GET /api/json/v2/types/email-notifier) displays the list of Email Notifiers.

Example request

```
GET /api/json/v2/types/email-notifier HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "email-notifier": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/email-notifier/1",
            "name": "email_notifier"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/email-notifier/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	Email Notifier severity, based on severity level of current Alerts (Alerts still uncleared) for this Email Notifier **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
proxy-address	The proxy server address
proxy-port	Proxy server port on a specific port number on the proxy server
proxy-user	Name of Email Notifier proxy user
recipients	Email Notifier recipients
recipients-str	Presents the list of email recipients.
sender	Email Notifier's sender
transport	The transport protocol, either SMTP or HTTP
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/email-notifier/1 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/email-notifier?name=email_notifier HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "xms-id": [
            "3fa6068630614c53b8f014c039fd03c3",
            "xms",
            1
        ],
        "recipients": [],
        "obj-severity": "information",
        "proxy-port": "",
        "mail-relay-address": "",
        "mail-user": "",
        "company-name": "",
        "recipients-str": "[]",
        "proxy-address": "",
        "guid": "38b2996ee49e45cf812a06e0655550f5",
        "transport": "http",
        "sender": "",
        "index": 1,
        "name": "email_notifier",
        "enabled": false,
        "frequency": 86400,
        "contact-details": "",
        "proxy-user": ""
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/email-notifier/1",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
PUT /api/json/v2/types/email-notifier/1 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache

{"recipient-list":["fred1@emc.com","fred2@emc.com"],"transport":"smtp","mail-
relay-address":"emailhub.emc.com","mail-user":"user","mail-
password":"123456","sender":"fred@emc.com"}
```

Example request by name

```
PUT /api/json/v2/types/email-notifier/?name=email_notifier HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache

{"recipient-list":["fred1@emc.com","fred2@emc.com"],"transport":"smtp","mail-
relay-address":"emailhub.emc.com","mail-user":"user","mail-
password":"123456","sender":"fred@emc.com"}
```

Response

```
200 OK
```

Events

Viewing all Events in the Cluster

GET /api/json/v2/types/events

This command (GET /api/json/v2/types/events) displays the list of Events in the cluster.

For this command, input parameters (as described in the following table), should be entered in the URL.

Input Parameter	Description	Mandatory
from-date-time	Date and time from which to filter Events: Format: "yyyy-mm-dd hh:mm:ss" Example: "2014-04-15 10:00:00"	No
to-date-time	Date and time until which to filter Events: Format: "yyyy-mm-dd hh:mm:ss" Example: "2014-04-15 10:00:00"	No

Output Parameter	Description
classification	Describes the category of the Event.
cluster	Cluster name to which the Event/Alert relates to
description	Event/Alert text
entity	The object to which the Event/Alert relates to
entity_details	Entity's name and index number
event_code	XtremIO code for this Event /Alert
id	Identification number
severity	The severity of the Event/Alert **Values:** • `Information` • `Minor` • `Major` • `Critical`
timestamp	Denotes when the Event/Alert was issued.

Example request

```
GET /api/json/v2/types/events HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```json
{
    "events": [
        {
            "entity_details": null,
            "severity": "information",
            "classification": "activity",
            "timestamp": "2015-02-11 16:09:05.625926",
            "entity": "XmsMonitor",
            "cluster": null,
            "event_code": "5000200",
            "id": 2237,
            "description": "Removed 577 old monitoring data records from
xms_history…"
        },
        {
            "entity_details": null,
            "severity": "information",
            "classification": "activity",
            "timestamp": "2015-02-11 16:09:04.925937",
            "entity": "TargetGroupMonitor",
            "cluster": null,
            "event_code": "5000200",
            "id": 2236,
            "description": "Removed 577 old monitoring data records from
target_group_history…"
        },
        {
            "entity_details": null,
            "severity": "information",
            "classification": "activity",
            "timestamp": "2015-02-11 16:09:04.450080",
            "entity": "TargetMonitor",
            "cluster": null,
            "event_code": "5000200",
            "id": 2235,
            "description": "Removed 4624 old monitoring data records from
target_history…"
        },
        {
            "entity_details": null,
            "severity": "information",
            "classification": "activity",
```

```
            "timestamp": "2015-02-11 16:09:03.582138",
            "entity": "NodeMonitor",
            "cluster": null,
            "event_code": "5000200",
            "id": 2234,
            "description": "Removed 59592 old monitoring data records from
node_history…"
        },
        {
            "entity_details": null,
            "severity": "information",
            "classification": "activity",
            "timestamp": "2015-02-11 16:09:02.830863",
            "entity": "RaidGroupMonitor",
            "cluster": null,
            "event_code": "5000200",
            "id": 2233,
            "description": "Removed 578 old monitoring data records from
raid_group_history…"
        },
```

InfiniBand Switches

Viewing the List of InfiniBand Switches

GET api/json/v2/types/infiniband-switches

This command (GET api/json/v2/types/infiniband-switches) displays the list of InfiniBand Switches.

Example request

```
GET /api/json/v2/types/infiniband-switches HTTP/1.1
Host: vxms-xbrickdrm801.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "infiniband-switches": [
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/infiniband-switches/1",
            "name": "IB-SW1"
        },
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/infiniband-switches/2",
            "name": "IB-SW2"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm801.xiodrm.lab.emc.com/api/json/v2/types/infiniband-switches/",
            "rel": "self"
        }
    ]
}
```

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Output Parameter	Description
fru-lifecycle-state	InfiniBand Switch's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` - Indicates a transient state in which the system performs initialization of a component.
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-psid	Internal ID of the firmware
fw-version	Current firmware version of the InfiniBand Switch
fw-version-error	Used to indicate if the firmware or OS upgrade has failed or is in the process of upgrading. This reflects the aggregate of all Storage Controller OS and firmware upgrades.
hw-revision	Hardware level of the InfiniBand Switch **Note**: The value is not always available. GUI and CLI do not display the value when unavailable.
ib-switch-id	The ID of the InfiniBand Switch object
ib-switch-index	The InfiniBand Switch index within the system (either 1 or 2). The correct installation ensures that the lower one is connected to port 1 of each Storage Controller. The XMS assumes that the InfiniBand Switch connected to port 1 is the lower one.

Output Parameter	Description
identify-led	Indicates whether the identification LED is illuminated for this InfiniBand Switch. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	InfiniBand Switch's index number as defined by the XMS upon its creation (a unique positive number)
inter-switch-ib1-port-state	The status of the first InfiniBand port used to connect to the other InfiniBand Switch
inter-switch-ib2-port-state	The status of the second InfiniBand port used to connect to the other InfiniBand Switch
is-available	InfiniBand Switch's availability status in relation to the system
model-name	Vendor-assigned InfiniBand Switch model name
name	InfiniBand Switch's name
num-of-temp-sensors	Total number of temperature sensors
num-of-voltage-sensors	Total number of voltage sensors
obj-severity	InfiniBand Switch's severity, based on severity level of current Alerts (Alerts still uncleared) for this InfiniBand Switch and its contained objects **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	EMC-assigned string identifying part (SKU), independent of the actual vendor `model_name` used for this FRU
ports	The InfiniBand Switch ports connecting to the Storage Controllers

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Output Parameter	Description
ports-num	Total number of ports in the InfiniBand Switch
serial-number	InfiniBand Switch's serial number
status-led	LED state indicating InfiniBand Switch's object faults
sys-id	The index number of the cluster this InfiniBand Switch belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
temp-sensors-array	An array containing information about the five temperature sensors of the InfiniBand Switch
voltage-sensors-array	An array containing information about the six voltage sensors of the InfiniBand Switch PSUs
wrong-sc-connection-detected	Denotes if at least one Storage Controller is not connected to the corresponding InfiniBand Switch port.
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/infiniband-switches/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/infiniband-switches?name=IB-SW1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

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Response

```
{
  "content": {
    "inter-switch-ib2-port-state": "active",
    "fru-lifecycle-state": "healthy",
    "voltage-sensors-array": [
      [
        "[ADM1024 (2.5Vin)] - 3.3V SX",
        2.11999988555908
      ],
      [
        "[ADM1024 (VCCP1)] - V-Core",
        0.8799999952316284
      ],
      [
        "[ADM1029 (VCC)] - 3.3V",
        3.259999990463257
      ],
      [
        "[ADM1024 (5v)] - 1.8V",
        1.769999980926513
      ],
      [
        "[ADM1024 (VCCP2)] - 1.2V",
        1.190000057220459
      ],
      [
        "[ADM1191] 12v Current sensor",
        11.75
      ]
    ],
    "fan-drawer-status": "healthy",
    "obj-severity": "information",
    "temp-sensors-array": [
      [
        "[SX Internal] SwitchX Silicon internal sensor",
        31
      ],
      [
        "[LM75] Close to QSFP cages (center)",
        26
      ],
      [
        "[LM75] Close to QSFP cages (right)",
        25
      ],
      [
        "[LM75] Close to QSFP cages (left)",
        26
      ],
      [
        "[ADM1024] Close to heat-sink",
        26
```

```
      ]
    ],
    "serial-number": "0xf452140300093cc0",
    "is-available": 1,
    "fru-replace-failure-reason": "",
    "guid": "59596ead54734d359000e0ab264c1b03",
    "ib-switch-id": [
      "59596ead54734d359000e0ab264c1b03",
      "IB-SW1",
      1
    ],
    "tag-list": [],
    "index": 1,
    "fan-1-rpm": 12600,
    "wrong-sc-connection-detected": "none",
    "ports-num": 18,
    "fw-version-error": "no_error",
    "fan-2-rpm": 12600,
    "identify-led": "na",
    "hw-revision": "0x00a2",
    "num-of-voltage-sensors": 6,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "fan-4-rpm": 12090,
    "num-of-temp-sensors": 5,
    "fw-psid": "EMC1260110029",
    "inter-switch-ib1-port-state": "active",
    "fw-version": "09.03.0000",
    "part-number": "*** SwitchX -  Mellanox Technologies",
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ],
    "name": "IB-SW1",
    "ib-switch-index": 1,
    "status-led": "na",
    "enabled-state": "enabled",
    "fan-3-rpm": 13170,
    "model-name": "SwitchX -  Mellanox Technologies",
    "ports": [
      [
        1,
        40,
        "up",
        [
          "f6cc6280edf044d18dedb89b4f4c58d6",
          "X1-SC1",
          1
        ],
```

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```
      "Storagecontroller",
      1,
      0,
      0,

      0,
      0,
      0,
      0
    ],
    [
      2,
      40,
      "up",
      [
        "69c039940aae47d2bfba6fd7bfe6056b",
        "X1-SC2",
        2
      ],


  ]
},
"links": [
  {
    "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/infiniband-switches/1",
    "rel": "self"
  }
]
}
```

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Initiators

Viewing the Initiators List

GET /api/json/v2/types/initiators

This command (GET /api/json/v2/types/initiators) displays the list of all Initiators and their defined parameters.

Example request

```
GET /api/json/v2/types/initiators HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Response

```
{
  "initiators": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiators/1",
      "name": "Init1"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiators/3",
      "name": "Init3"
    },
  ],
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiators/",
      "rel": "self"
    }
  ]
}
```

Output Parameter	Description
certainty	XMS certainty. Indicates confidence that the XMS and the cluster are synchronized. Value changes from `OK` if a request is sent while the XMS is unable to determine the success of the request.
chap-authentication-cluster-password	The credentials used by the cluster towards this specific Initiator. Both username and password are mandatory when `chap_authentication_mode` is not `disabled`. Always shown as `null`
chap-authentication-cluster-user-name	• Username by which the cluster identifies itself to any Initiator during the initial connection of the Initiator to the target. • Valid only if `chap-discovery-mode = initiator-and-target`. • Applicable for iSCSI only.
chap-authentication-initiator-password	The credentials used by this specific Initiator. Both username and password are mandatory when `chap_authentication_mode` is not `disabled`. Always shown as `null`
chap-authentication-initiator-user-name	• Username by which the Initiator is identified when connecting to the Target • Valid for iSCSI ports when `chap-authentication-mode` is not disabled
chap-discovery-cluster-password	Password by which the cluster identifies itself to any Initiator during the discovery phase. Always shown as `null`
chap-discovery-cluster-user-name	• Username by which the cluster identifies itself to any Initiator during discovery phase • Valid only if `chap_discovery_mode = initiator_and_target` • Applicable for iSCSI only
chap-discovery-initiator-password	Password by which any Initiator is identified during the discovery phase (at least 12 characters). Always shown as `null`
chap-discovery-initiator-user-name	• Username by which an Initiator is identified during the discovery phase • Valid for iSCSI ports only when `chap-discovery-mode` is not `disabled`
ig-id	The index number of the Initiator Group to which the Initiator object belongs
index	Initiator's index number as defined by the XMS upon its creation (a unique positive number)

Output Parameter	Description
initiator-conn-state	Indicates whether the Initiator is currently connected to the cluster via at least one target port.
initiator-id	Initiator object's index number
iops	Initiator's total read and write real-time input/output operations per second
name	Initiator's name as defined by the user when creating the Initiator
num-of-conn-tars	List containing the Target Object IDs via which the Initiator is currently connected to the cluster
obj-severity	Initiator's severity, based on severity level of current Alerts (Alerts still uncleared) for this Initiator **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
operating-system	Operating System (e.g. Linux, Windows, ESX, Solaris, AIX, HP-UX)
port-address	The following input format variations are accepted for Fibre Channel Initiators ("X" is a hexadecimal digit – upper case or lower case are allowed): • "XX:XX:XX:XX:XX:XX:XX" • "XXXXXXXXXXXXXXXX" • "0xXXXXXXXXXXXXXXXX" When the Initiator object `port_address` parameter is queried, the value is always returned in a single output format. IQN and EUI formats are allowed for iSCSI Initiators.
port-type	Port type (Fibre Channel or iSCSI)
rd-bw	Total read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rd-latency	Real-time average latency of read operations, measured in µs
small-bw	Current bandwidth of small input/output operations, addressed at the Initiator

Output Parameter	Description
small-iops	Current IOPS of small input/output operations, addressed at the Initiator
small-rd-bw	Current bandwidth of small input/output operations, addressed at the Initiator
small-rd-iops	Current IOPS of small read input/output operations, addressed at the Initiator
small-wr-bw	Current bandwidth of small write input/output operations, addressed at the Initiator
small-wr-iops	Current IOPS of small write input/output operations, addressed at the Initiator
sys-id	Cluster's name or index number. May be omitted if only one cluster is defined.
tag-list	List of Tags
unaligned-bw	Current bandwidth of unaligned input/output operations, addressed at the Initiator
unaligned-iops	Current IOPS of unaligned input/output operations, addressed at the Initiator
unaligned-rd-bw	Current bandwidth of unaligned read input/output operations, addressed at the Initiator
unaligned-rd-iops	Current IOPS of unaligned read input/output operations, addressed at the Initiator
unaligned-wr-bw	Current bandwidth of unaligned write input/output operations, addressed at the Initiator
unaligned-wr-iops	Current IOPS of unaligned write input/output operations, addressed at the Initiator
wr-bw	Total write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
wr-latency	Real-time average latency of write operations, measured in µs
xms-id	XtremIO Management Server's index number

Example request by index

```
GET //api/json/v2/types/initiators/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET //api/json/v2/types/initiators/?name=I0a&cluster-name=xbrickdrm487
HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "small-iops": "1772",
        "wr-latency": "796",
        "chap-discovery-initiator-password": "",
        "obj-severity": "information",
        "rd-bw": "40028",
        "unaligned-rd-bw": "38571",
        "acc-num-of-wr": "1390015103",
        "chap-discovery-cluster-user-name": "",
        "iops": "29525",
        "operating-system": "other",
        "num-of-conn-tars": 8,
        "port-type": "iscsi",
        "acc-num-of-small-wr": "431683712",
        "guid": "237a66b4f0614a53a78683598bfb880b",
        "chap-authentication-initiator-password": "",
        "acc-num-of-rd": "1523926160",
        "index": 1,
        "port-address": "iqn.1994-05.com.emc:lgdrm977",
        "small-rd-bw": "884",
        "chap-authentication-initiator-user-name": "",
        "ig-id": [
            "ee7c286b3a554b2b9f830b20511ed7e1",
            "IG1",
            1
        ],
        "acc-size-of-wr": "50300506890",
        "acc-num-of-small-rd": "556018779",
        "unaligned-rd-iops": "3919",
        "chap-discovery-cluster-password": "",
        "chap-authentication-cluster-password": "",
        "xms-id": [
            "3a3b3c72456f47e784854f669c1eba4c",
            "xms",
            1
```

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```
        ],
        "unaligned-wr-iops": "25603",
        "acc-num-of-unaligned-rd": "876191392",
        "small-wr-bw": "0",
        "tag-list": [],
        "unaligned-iops": "29522",
        "unaligned-bw": "140990",
        "bw": "142447",
        "wr-iops": "25603",
        "sys-id": [
            "5a4e2c488ded44aead94b23740554435",
            "xbrickdrm487",
            1
        ],
        "avg-latency": "738",
        "rd-latency": "360",
        "small-wr-iops": "0",
        "chap-authentication-cluster-user-name": "",
        "name": "977",
        "acc-num-of-unaligned-wr": "755461677",
        "certainty": "ok",
        "chap-discovery-initiator-user-name": "",
        "initiator-id": [
            "237a66b4f0614a53a78683598bfb880b",
            "977",
            1
        ],
        "acc-size-of-rd": "50988666607",
        "unaligned-wr-bw": "102419",
        "small-rd-iops": "1772",
        "initiator-conn-state": "connected",
        "rd-iops": "3922",
        "wr-bw": "102419",
        "small-bw": "884"
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/initiators/1",
            "rel": "self"
        }
    ]
}
```

Adding an Initiator

POST /api/json/v2/types/initiators

This command (POST /api/json/v2/types/initiators) enables you to add a new Initiator and associate it with an existing Initiator Group.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
ig-id	Initiator Group's name or index number	Yes

port-address	Initiator's port address
	The following rules apply:
	• For FC Initiators, any of the following formats are accepted ('X' is a hexadecimal digit – upper case and lower case are allowed):
	  • XX:XX:XX:XX:XX:XX:XX:XX
	  • XXXXXXXXXXXXXXXX
	  • 0xXXXXXXXXXXXXXXXX
	• For iSCSI Initiators, IQN and EUI formats are accepted.
	• Two Initiators cannot share the same port address.
	You cannot specify an FC address for an iSCSI Target and vice-versa.
		Yes

cluster-authentication-password	CHAP authentication cluster password	No
cluster-authentication-user-name	CHAP authentication cluster username	No
cluster-discovery-password	CHAP discovery cluster password	No

Input Parameter	Description	Mandatory
cluster-discovery-user-name	CHAP discovery cluster username	No
initiator-authentication-password	CHAP authentication password	No
initiator-authentication-user-name	CHAP authentication username	No
initiator-discovery-password	CHAP discovery password	No
initiator-discovery-user-name	CHAP discovery Initiator username	No
initiator-name	Initiator name	No
operating-system	Operating System (e.g. Linux, Windows, ESX, Solaris, AIX, HP-UX)	No

Example request

```
POST /api/json/v2/types/initiators/3?cluster-index=2 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"ig-id":2, "initiator-name":"lg0004-fc1", "port-
address":"50:01:43:80:24:21:df:ab"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms- xbrick238/api/json/v2/types/initiators/3",
            "rel": "self"
        }
    ]
}
```

Input Parameter	Description	Mandatory

port-address	Initiator's port address
	The following rules apply:
	• For FC Initiators, any of the following formats are accepted ('X' is a hexadecimal digit – upper case and lower case are allowed):
	   • XX:XX:XX:XX:XX:XX:XX:XX
	   • XXXXXXXXXXXXXXXX
	   • 0xXXXXXXXXXXXXXXXX
	• For iSCSI Initiators, IQN and EUI formats are accepted.
	• Two Initiators cannot share the same port address.
	You cannot specify an FC address for an iSCSI Target and vice-versa.
		Select one of the following:
		• port-address
		• remove-cluster-authentication-credentials
		• remove-cluster-discovery-credentials
		• remove-initiator-authentication-credentials
		• remove-initiator-discovery-credentials

remove-cluster-authentication-credentials	Removes CHAP cluster authentication credentials.	
remove-cluster-discovery-credentials	Removes CHAP cluster discovery credentials.	
remove-initiator-authentication-credentials	Removes CHAP Initiator authentication credentials.	
remove-initiator-discovery-credentials	Removes CHAP Initiator discovery credentials.	

Example request by index

```
PUT /api/json/v2/types/initiator-groups/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm238"}
```

Example request by name

```
PUT /api/json/v2/types/initiator-groups/?name=ig1&cluster-name=xbrickdrm238
HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache

{"cluster-id":2}
```

Response

```
200 OK
```

Initiators Connectivity

Viewing the Initiator Connectivity List

GET /api/json/v2/types/initiators-connectivity

This command (GET /api/json/v2/types/initiators-connectivity) displays a list of all initiators' connectivity.

Output Parameter	Description
index	Initiator's index number as defined by the XMS upon its creation (a unique positive number)
name	Initiator's name as defined by the user when creating the Initiator
num-of-conn-tars	The number of target ports that detects this Initiator
port-address	The following input format variations are accepted for Fibre Channel Initiators ("X" is a hexadecimal digit – upper case or lower case are allowed): • "XX:XX:XX:XX:XX:XX:XX" • "XXXXXXXXXXXXXXXX" • "0xXXXXXXXXXXXXXXXX" When the Initiator object port_address parameter is queried, the value is always returned in a single output format. IQN and EUI formats are allowed for iSCSI Initiators.
port-type	Port type (Fibre Channel or iSCSI)
sys-id	The cluster's identifier. Either the cluster's name or index number.
target-list	A list of all target ports (separated by a comma) that "discovered" this Initiator.

Example request

```
GET /api/json/v2/types/initiators-connectivity HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
Postman-Token: 4be7131a-2f92-4e15-e735-afe00ead8941
```

Response

```
{
  "content": [
    {
      "index": 5,
      "port-address": "10:00:00:90:fa:6d:b7:69",
      "name": "lgdrm1580-fc2",
      "target-list": [
        [
          "ff0d1c38a3c24f60ba04afd4892499d8",
          "X1-SC1-fc1",
          1
        ],
        [
          "05d2af1f107a4b6e962d94af0ab5781d",
          "X1-SC1-fc2",
          2
        ],
        [
          "78d32954e4144c2eb70339c8f1695560",
          "X1-SC2-fc1",
          5
        ],
        [
          "1db7b3b64dd442b8affed52e4d155bdb",
          "X1-SC2-fc2",
          6
        ]
      ],
      "num-of-conn-tars": 4,
      "sys-id": [
        "141d6520f41040b5941bb05828388b51",
        "xbrickdrm788",
        1
      ],
      "port-type": "fc"
    },
    {
      "index": 1,
      "port-address": "10:00:00:90:fa:55:09:30",
      "name": "IG-BI-fc-1",
      "target-list": [
        [
          "ff0d1c38a3c24f60ba04afd4892499d8",
          "X1-SC1-fc1",
          1
        ],
        [
          "05d2af1f107a4b6e962d94af0ab5781d",
          "X1-SC1-fc2",
          2
        ],
```

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```
      [
        "78d32954e4144c2eb70339c8f1695560",
        "X1-SC2-fc1",
        5
      ],
      [
        "1db7b3b64dd442b8affed52e4d155bdb",
        "X1-SC2-fc2",
        6
      ]
    ],
    "num-of-conn-tars": 4,
    "sys-id": [
      "141d6520f41040b5941bb05828388b51",
      "xbrickdrm788",
      1
    ],
    "port-type": "fc"
},

    "index": 6,
    "port-address": "iqn.1994-05.com.emc:lgdrm1580",
    "name": "lgdrm1580-iscsi",
    "target-list": [
      [
        "c490baa28a02455c842dee0bb8ca129d",
        "X1-SC1-iscsi1",
        3
      ],
      [
        "c490baa28a02455c842dee0bb8ca129d",
        "X1-SC1-iscsi1",
        3
      ],
      [
        "f7bd7484b9774776a8730a22979c7731",
        "X1-SC1-iscsi2",
        4
      ],
      [
        "f7bd7484b9774776a8730a22979c7731",
        "X1-SC1-iscsi2",
        4
      ],
      [
        "a4e8256c4c1e48bd9edf74bb95ca49a7",
        "X1-SC2-iscsi1",
        7
      ],
      [
        "a4e8256c4c1e48bd9edf74bb95ca49a7",
        "X1-SC2-iscsi1",
        7
      ],
      [
```

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```
            "a809243ef7114cc8b67b0e29c1186c08",
            "X1-SC2-iscsi2",
            8
          ],
          [
            "a809243ef7114cc8b67b0e29c1186c08",
            "X1-SC2-iscsi2",
            8
          ]
        ],
        "num-of-conn-tars": 8,
        "sys-id": [
          "141d6520f41040b5941bb05828388b51",
          "xbrickdrm788",
          1
        ],
        "port-type": "iscsi"
      },

      {
        "index": 8,
        "port-address": "10:10:10:10:10:10:10:11",
        "name": "IG_Test1-fc-2",
        "target-list": [],
        "num-of-conn-tars": 0,
        "sys-id": [
          "141d6520f41040b5941bb05828388b51",
          "xbrickdrm788",
          1
        ],
        "port-type": "fc"
      }
    ],
    "links": [
      {
        "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/initiators-connectivity/",
        "rel": "self"
      }
    ]
}
```

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Initiator Groups

Viewing the Initiator Groups List

GET /api/json/v2/types/initiator-groups

This command (GET /api/json/v2/types/initiator-groups) displays the list of all Initiator Groups.

Example request

```
GET /api/json/v2/types/initiator-groups HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "initiator-groups": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiator-groups/1",
      "name": "IG1"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiator-groups/2",
      "name": "IG2"
    }
  ],
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiator-groups/",
      "rel": "self"
    }
  ]
}
```

Output Parameter	Description
acc-size-of-wr	Accumulative capacity KB size of write operations having occurred during the Initiator Group's lifespan
bw	Total read and write bandwidth in MB per second
certainty	Indicates confidence that the XMS and the cluster are synchronized. Value changes from `OK` if a request is sent while the XMS is unable to determine the success of the request.
ig-id	The index number of the Initiator Group to which the Initiator object belongs
index	Initiator Group's index number as defined by the XMS upon its creation (a unique positive number)
iops	Initiator Group's total read and write real-time input/output operations per second
name	Initiator Group's name as defined by the user when creating the group
num-of-initiators	Number of Initiators belonging to this Initiator Group
num-of-vols	Number of Volumes in the Initiator Group
obj-severity	Initiator Group's severity, based on severity level of current Alerts (Alerts still uncleared) for this Initiator Group **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
rd-bw	Total real-time read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
small-bw	Current bandwidth of small input/output operations, addressed at the Initiator Group
small-iops	Current IOPS of small input/output operations, addressed at the Initiator Group
small-rd-bw	Current bandwidth of small input/output operations, addressed at the Initiator Group
small-rd-iops	Current IOPS of small read input/output operations, addressed at the Initiator Group

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Output Parameter	Description
small-wr-bw	Current bandwidth of small write input/output operations, addressed at the Initiator Group
small-wr-iops	Current IOPS of small write input/output operations, addressed at the Initiator Group
sys-id	The index number of the cluster this Initiator Group belongs to. May be omitted if only one cluster is defined.
tag-list	Initiator Group's list of Tags
unaligned-bw	Current bandwidth of unaligned input/output operations, addressed at the Initiator Group
unaligned-iops	Current IOPS of unaligned input/output operations, addressed at the Initiator Group
unaligned-rd-bw	Current bandwidth of unaligned input/output operations
unaligned-rd-iops	Current IOPS of unaligned read input/output operations, addressed at the Initiator Group
unaligned-wr-bw	Current bandwidth of unaligned write input/output operations, addressed at the Initiator Group
unaligned-wr-iops	Current IOPS of unaligned write input/output operations, addressed at the Initiator Group
wr-bw	Total write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/initiator-groups/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/types/initiator-groups?name=IG1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "small-iops": "0",
    "num-of-initiators": 2,
    "obj-severity": "information",
    "rd-bw": "0",
    "unaligned-rd-bw": "0",
    "iops": "0",
    "acc-num-of-small-wr": "0",
    "guid": "7b571f0cb53446ccb235353de374d71e",
    "acc-num-of-rd": "40039202052",
    "index": 1,
    "small-rd-bw": "0",
    "ig-id": [
      "7b571f0cb53446ccb235353de374d71e",
      "IG1",
      1
    ],
    "acc-size-of-wr": "100787768128",
    "acc-num-of-small-rd": "0",
    "unaligned-rd-iops": "0",
    "num-of-vols": 120,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "unaligned-wr-bw": "0",
    "acc-num-of-unaligned-rd": "45340962",
    "small-wr-bw": "0",
    "unaligned-iops": "0",
    "tag-list": [],
    "unaligned-bw": "0",
    "small-rd-iops": "0",
    "wr-iops": "0",
    "sys-id": [
```

```
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "small-wr-iops": "0",
    "rd-iops": "0",
    "name": "IG1",
    "acc-num-of-unaligned-wr": "45212583",
    "certainty": "ok",
    "acc-num-of-wr": "7437337979",
    "acc-size-of-rd": "545906128884",
    "unaligned-wr-iops": "0",
    "bw": "0",
    "small-bw": "0",
    "wr-bw": "0"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/initiator-groups/1",
      "rel": "self"
    }
  ]
}
```

Adding an Initiator Group

POST /api/json/v2/types/initiator-groups

This command (POST /api/json/v2/types/initiator-groups) enables you to add an Initiator Group and its Initiators to the XtremIO cluster.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
ig-name	Initiator Group's name	Yes
initiator-list	List of associated Initiators (name and port number)	No
tag-list	Tag ID list	No

Example request

```
POST /api/json/v2/types/initiator-groups/ HTTP/1.1
Host: vxms-xbrick353.xiolab.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache

{"ig-name":"PS_TG"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrick353.xiolab.lab.emc.com/api/json/v2/types/initiator-groups/4",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
PUT /api/json/v2/types/initiator-groups/4 HTTP/1.1
Host: vxms-xbrick353.xiolab.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","new-name":"IG-12"}
```

Example request by name

```
PUT /api/json/v2/types/initiator-groups/?name=PS_TG HTTP/1.1
Host: vxms-xbrick353.xiolab.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2"new-name":"TG_PS"}
```

Response

```
200 OK
```

Example request by index

```
DELETE /api/json/v2/types/initiator-groups/2?cluster-index=1 HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache
```

Example request by name

```
DELETE /api/json/v2/types/initiator-groups/?name=ig2&cluster-name=xbrickdrm238
HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache
```

Response

```
200 OK
```

iSCSI Portals and Routes

Viewing the List of iSCSI Portals

GET /api/json/v2/types/iscsi-portals

This command (GET /api/json/v2/types/iscsi-portals) displays the list of all iSCSI portals and their parameters.

Example request

```
GET /api/json/v2/types/HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "iscsi-portals": [
        {
            "href": " https://vxms-xbrick238/api/json/v2/types/iscsi-
portals/1",
            "name": "192.168.0.1/24"
        }
    ],
    "links": [
        {
            "href": " https://vxms-xbrick238/api/json/v2/types/iscsi-
portals/",
            "rel": "self"
        }
    ]
}
```

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Viewing the List of iSCSI Routes

GET /api/json/v2/types/iscsi-routes

This command (GET /api/json/v2/types/iscsi-routes) displays the list of iSCSI routes and their parameters.

Example request

```
GET /api/json/v2/types/iscsi-routes HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Response

```
{
    "iscsi-routes": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/iscsi-routes/1",
            "name": "R1"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/iscsi-routes/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	iSCSI portal's severity, based on severity level of current Alerts (Alerts still uncleared) for this iSCSI portal **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
port-address	The following input format variations are accepted for iSCSI portal Initiators ('x' is a hexadecimal digit – upper case or lower case are allowed): • "XX:XX:XX:XX:XX:XX:XX" • "XXXXXXXXXXXXXX" • "0xXXXXXXXXXXXXXX" When the Initiator object `port_address` parameter is queried, the value is always returned in a single output format. IQN and EUI formats are allowed for iSCSI Initiators.
sys-id	Cluster's name or index number. May be omitted if only one cluster is defined.
tar-id	Target's name or the index number
vlan	The portal information. If not in use, VLAN is 0.
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/iscsi-portals/1 ?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00MA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/iscsi-portals?name=10.10.30.40/16&cluster-
name=xbrickdrm788 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00MA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "index": 1,
    "port-address": "iqn.2008-05.com.xtremio:xio00150203249-514f0c50658f4c05",
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "name": "10.10.30.40/16",
    "obj-severity": "information",
    "certainty": "ok",
    "vlan": 0,
    "tar-id": [
      "2b04ba46b0274947bd1b0f70f170071d",
      "X1-SC2-iscsi2",
      8
    ],
    "ip-port": 3260,
    "ip-addr": "10.10.30.40/16",
    "guid": "1964671393d945da8b228edf0a3be10f",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ]
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/iscsi-portals/1",
      "rel": "self"
    }
  ]
}
```

Output Parameter	Description
sys-id	Cluster's name or index number. May be omitted if only one cluster is defined.
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/iscsi-routes/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/iscsi-routes?name=R1&cluster-name=xbrickdrm788 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "index": 1,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "name": "R1",
    "dest": "255.255.0.0/16",
    "obj-severity": "information",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "guid": "ba429a3115c6428ebd569efeed2313fc",
    "gateway": "10.10.254.254"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/iscsi-routes/1",
      "rel": "self"
    }
  ]
```

```
}
```

Adding an iSCSI Portal

POST /api/json/v2/types/iscsi-portals

This command (POST /api/json/v2/types/iscsi-portals) enables you to map a portal (which is a combination of an IP address and an IP port) to a Target.

This allows the target port to accept iSCSI traffic via the portal.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
ip-addr	IP address (cannot be used for another portal)	Yes
tar-id	Target's name or index number	Yes
vlan	VLAN index number	No

Example request

```
POST /api/json/v2/types/iscsi-portals/ HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2 "ip-addr":"152.62.109.59/24", "tar-id":6}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick267/api/json/v2/types/iscsi-portals/1",
            "rel": "self"
        }
    ]
}
```

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Adding an iSCSI Route

POST /api/json/v2/types/iscsi-routes

This command (POST /api/json/v2/types/iscsi-routes) enables you to create an iSCSI route.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
destination-network-and-mask	Destination network and mask	Yes
gateway	Gateway's IP address	Yes
iscsi-route-name	iSCSI's route name	No

Example request

```
POST /api/json/v2/types/iscsi-routes/ HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"destination-network-and-
mask":"255.255.0.0/17","gateway":"192.168.10.254"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick267/api/json/v2/types/iscsi-routes/2",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
DELETE /api/json/v2/types/iscsi-portals/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache
```

Example request by name

```
DELETE /api/json/v2/types/iscsi-portals/?name=portal1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrick238:42503
Authorization: Basic b3BlcmF0aW9uOm9wZXJhdGlvbg==
Cache-Control: no-cache
```

Response

```
200 OK
```

LDAP Configurations

Viewing the List of LDAP Configurations

GET /api/json/v2/types/ldap-configs

This command (GET /api/json/v2/types/ldap-configs) displays the list of LDAP Configurations.

Example request

```
GET /api/json/v2/types/ldap-configs HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "ldap-configs": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/ldap-configs/1",
            "name": ""
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/ldap-configs/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/ldap-configs/1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0oxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/ ldap-configs/?name=ldap-config1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0oxMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "server-urls": null,
    "user-to-dn-rule": "{username}@qa-mgmt-ad1.xiodrm.lab.emc.com",
    "cache-expire-hours": 24,
    "ca-cert-data": null,
    "search-filter": "(sAMAccountName={username})",
    "ca-cert-file": null,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "bind-pw": "xxxxxxx",
    "guid": "253499630e5d42a7bb5dc74876e4ce42",
    "sys-id": [],
    "index": 1,
    "server-url": [
      "ldap://10.103.224.41",
      "ldap://10.103.224.42"
    ],
    "name": "",
    "roles": [
      "admin:CN=group-auto-admin,OU=XIO-LDAP-AUTO,DC=qa-mgmt-
ad1,DC=xiodrm,DC=lab,DC=emc,DC=com",
      "configuration:CN=group-auto-config,OU=XIO-LDAP-AUTO,DC=qa-mgmt-
ad1,DC=xiodrm,DC=lab,DC=emc,DC=com",
      "read_only:CN=group-auto-read-only,OU=XIO-LDAP-AUTO,DC=qa-mgmt-
ad1,DC=xiodrm,DC=lab,DC=emc,DC=com"
    ],
    "bind-dn": "CN=qaldap,OU=XIO-LDAP-AUTO,DC=qa-mgmt-
```

```
ad1,DC=xiodrm,DC=lab,DC=emc,DC=com",
    "search-base": "OU=XIO-LDAP-AUTO,DC=qa-mgmt-
ad1,DC=xiodrm,DC=lab,DC=emc,DC=com",
    "timeout": 1500
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/ldap-configs/1",
      "rel": "self"
    }
  ]
}
```

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Example request by index

```
PUT /api/json/v2/types/ldap-configs/1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cache-expire-hours":"20"}
```

Example request by name

```
PUT /api/json/v2/types/ldap-configs/?name=ldap-config1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cache-expire-hours":"20"}
```

Response

```
200 OK
```

Local Disks

Viewing the List of Local Disks

GET /api/json/v2/types/local-disks

This command (GET /api/json/v2/types/local-disks) displays the list of Local Disks.

Example request

```
GET /api/json/v2/types/local-disks HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/",
            "rel": "self"
        }
    ],
    "local-disks": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/1",
            "name": "X1-SC1-LocalDisk1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/5",
            "name": "X1-SC2-LocalDisk1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/7",
            "name": "X1-SC2-LocalDisk5"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/6",
            "name": "X1-SC2-LocalDisk2"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/local-disks/8",
            "name": "X1-SC2-LocalDisk6"
        }
    ]
}
```

Output Parameter	Description
fru-lifecycle-state	Local Disk's FRU state, using generic FRU transition states **Values:** • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` – Indicates a transient state in which the system performs initialization of a component.
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-version	Current firmware version of the Local Disk
fw-version-error	Reason for FRU diagnostic failure when a firmware problem exists
hw-revision	Hardware level of the power supply unit **Note**: The value is not always available. GUI and CLI do not display the value when unavailable.
identify-led	Indicates whether the identification LED is illuminated for this Local Disk. The parameter value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU.
index	Local Disk index number as defined by the XMS upon its creation (a unique positive number)
local-disk-expected-type	The expected type of disk in this Slot. Similar to the Local Disk type, with an extra possible value of `empty`, meaning the Slot is expected to be empty.
local-disk-id	The index number of the Local Disk object
local-disk-purpose	The purpose of the Local Disk
local-disk-type	The type of Local Disk, SSD or spindle-HDD
local-disk-uid	A world-wide unique index number read from the disk firmware (same as the serial number)
model-name	Vendor-assigned SSD model name

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Output Parameter	Description
name	Local Disk's name
node-id	The Storage Controller's index number
num-bad-sectors	Number of bad sectors detected in the Local Disks
obj-severity	Local Disk's severity, based on severity level of current Alerts (Alerts still uncleared) for this Local Disk **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	An EMC-assigned string identifying the part
slot-num	The index number of the Local Disk object in this Slot. Should be empty for Slot state of `empty` and `error`.
status-led	LED state, indicating Local Disk object faults
sys-id	The index number of the cluster this Local Disk belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
xms-id	Object index number of the XMS

Example request by index

```
GET /api/json/v2/types/local-disks/5?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/local-disks?name=X1-SC2-LocalDisk1&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "fru-lifecycle-state": "healthy",
        "local-disk-uid": "wwn_[5000cca04d07aa1c]_serial_[0PV46NUA          ]",
        "num-bad-sectors": 0,
        "xms-id": [
            "22b182cb5c0d459d962fe9d559057f2a",
            "xms",
            1
        ],
        "obj-severity": "information",
        "tag-list": null,
        "encryption-status": "enc_supported_locked_cluster_pin",
        "fw-version": "C250",
        "local-disk-type": "ssd",
        "local-disk-expected-type": "ssd",
        "part-number": "118000047",
        "fru-replace-failure-reason": "",
        "guid": "f7facdceafc34700b336f8406357ad32",
        "sys-id": [
            "3d02428c151442d9a132fa6e10561da8",
            "xbrickdrm788",
            2
        ],
        "index": 5,
        "name": "X1-SC2-LocalDisk1",
        "brick-id": [
            "f1cb26b27eb14e74b6a2d5b609449297",
            "X1",
            1
        ],
        "local-disk-id": [
            "f7facdceafc34700b336f8406357ad32",
            "X1-SC2-LocalDisk1",
            5
        ],
        "disk-failure": "ok",
        "fw-version-error": "no_error",
        "status-led": "na",
        "enabled-state": "enabled",
        "slot-num": 0,
        "local-disk-purpose": "journal_and_boot_disk",
        "identify-led": "off",
        "model-name": "HITACHI  HUSMM112 CLAR200",
        "hw-revision": "na",
        "node-id": [
            "3067ff183922410fbb90a3f83c0926dd",
            "X1-SC2",
            2
        ]
    },
    "links": [
```

```
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/local-disks/5",
            "rel": "self"
        }
    ]
}
```

LUN Mapping

Viewing the LUN Mappings List

GET /api/json/v2/types/lun-maps

This command (GET /api/json/v2/types/lun-maps) displays the list of LUN mappings between Volumes and Initiator Groups.

Example request

```
GET /api/json/v2/types/lun-maps HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0lxMA==
Cache-Control: no-cach
```

Response

```
{
    "lun-maps": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/lun-maps/5",
            "name": "1_1_1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/lun-maps/7",
            "name": "23_2_1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/lun-maps/6",
            "name": "2_1_1"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/lun-maps/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	LUN map's severity, based on severity level of current Alerts (Alerts still uncleared) for this LUN map **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
sys-id	Cluster's name or index number. May be omitted if only one cluster is defined.
tg-index	Target's Group's index number
tg-name	Name of the LUN map Target Group
vol-index	Volume's index number
vol-name	Volume's name
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/lun-maps/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/lun-maps?name=55_1_1&cluster-name=xbrickdrm788 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "mapping-index": 1,
    "obj-severity": "information",
    "ig-name": "IG1",
    "guid": "8498f0fa6a844e39b51aaa0d91c7fc36",
    "vol-name": "BCS1",
    "index": 1,
    "tg-name": "Default",
    "ig-index": 1,
    "name": "1_1_1",
    "certainty": "ok",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "tg-index": 1,
    "mapping-id": [
      "8498f0fa6a844e39b51aaa0d91c7fc36",
      "1_1_1",
      1
    ],
    "vol-index": 1,
    "lun": 1
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/lun-maps/1",
      "rel": "self"
    }
  ]
}
```

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Creating a LUN Mapping

POST /api/json/v2/types/lun-maps

This command (POST /api/json/v2/types/lun-maps) enables you to create LUN mapping between Volumes and Initiator Groups.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
ig-id	Initiator Group's name or index number	Yes
vol-id	Volume's name or index number	Yes
tg-id	Target Group's name or index number	No
lun	Unique LUN identification, exposing the Volume to the host	No

Example request

```
POST /api/json/v2/types/lun-maps HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"vol-id":88,"ig-id":1}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/lun-maps/50",
            "rel": "self"
        }
    ]
}
```

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Removing a LUN Mapping

DELETE /api/json/v2/types/lun-maps/

This command (DELETE /api/json/v2/types/lun-maps/<parameter [lun-maps-id]>) enables you to remove a Volume's LUN mapping.

> **Note**: Removing a Volume's entire LUN mapping via RESTful API can only be achieved by removing one LUN mapping at a time.

For this command, input parameters (as described in the following table), should be entered in the URL.

Input Parameter	Description	Mandatory
cluster-name or cluster-index	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
luns-map-id	LUN maps index number	Yes

> **Note:** A cluster can also be defined as cluster-id in the body, however the cluster definition should only be entered in one location, either the URL or the body.

Example request by index

```
DELETE /api/json/v2/types/lun-maps/199?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW00xMA==
Cache-Control: no-cache
```

> **Note**: An "Example request by name" section is not listed here, as a name does not exist for this object type.

Response

```
200 OK
```

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Schedulers

Viewing the Schedulers List

GET /api/json/v2/types/schedulers

This command (GET /api/json/v2/types/schedulers) displays the list of all Schedulers and their defined parameters.

Example request

```
GET /api/json/v2/types/schedulers HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "schedulers": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/schedulers/1",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/schedulers/3",
            "name": ""
        },
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/schedulers/2",
            "name": ""
        },
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/schedulers/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
snapped-object-id	The object ID of the entity on which Snapshots are created
snapped-object-index	The index number of the Snapshotted object
snapped-object-name	The name of the Snapshotted object
snapped-object-type	The object type that was used to create this Snapshot
snapshots-to-keep-number	Defines the number of Snapshots to be saved.
snapshots-to-keep-time	The time period, in seconds, for which a Snapshot is retained. When the defined time has passed, the cluster automatically removes the Snapshot. • Minimum value is `60` (1 minute). • Maximum value is `15768000` (5 Years).
snapshot-type	The Snapshot is regular (default) or read-only.
suffix	A definable text adjoined to Scheduler's stem name
time	Periodic time intervals at which Snapshots are taken • For an interval schedule, a single triplet [hours-minutes-seconds] should be provided. • For an explicit schedule, a single triplet [day-of-week : hour : minute] should be provided.

Example request by index

```
GET /api/json/v2/types/schedulers/1?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/schedulers?name=Vol1Sched&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```json
{
  "content": {
    "suffix": "",
    "scheduler-type": "interval",
    "snapped-object-type": "Volume",
    "snapshots-to-keep-time": 157680000,
    "last-activation-status": "successful",
    "last-activation-time": "1444295850",
    "guid": "2b28d9f7d8104d73bc7043fe9cda0363",
    "snapshot-type": "readonly",
    "snapped-object-id": [
      "a584709b311d40ee8705280eaf9c65a5",
      "BCS1",
      1
    ],
    "index": 1,
    "snapped-object-index": 1,
    "name": "Vol1Sched",
    "snapped-object-name": "BCS1",
    "snapshots-to-keep-number": 1,
    "enabled-state": "enabled",
    "time": "0:0:15"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/schedulers/1",
      "rel": "self"
    }
  ]
}
```

Adding a New Scheduler

POST /api/json/v2/types/schedulers

This command (POST /api/json/v2/types/schedulers) enables you to create a new Scheduler.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
scheduler-name	Scheduler's name	Yes
scheduler-type	Type of Scheduler **Values**: • `interval` • `explicit`	Yes
snapshot-object-id	The ID of the Snapshotted object	Yes
snapshot-object-type	Type of the object used for `snapshot-object-id` **Values**: • `Volume` • `SnapSet` • `ConsistencyGroup`	Yes
time	Snapshot creation schedule **Values**: • If `scheduler-type` = `interval` use [h:m:s] • If `scheduler-type` = `explicit` use [d:h:m]	Yes
snapshots-to-keep-number	Number of Snapshots to be saved	Select one of the following:
snapshots-to-keep-time	The period of time for which a Snapshot should be retained. When the defined time has passed, the cluster automatically removes the Snapshot. • Minimum value is `60` (1 minute). • Maximum value is `15768000` (5 Years).	• snapshots-to-keep-number • snapshots-to-keep-time

Input Parameter	Description	Mandatory
enabled-state	Suspends or resumes Scheduler. **Values**: • `user_disabled` • `enabled`	No
snapshot-type	Defines the Snapshot type. **Values**: • `readonly` • `regular`	No
suffix	Text adjoined to the scheduler's stem name	No

Example request

```
POST /api/json/v2/types/schedulers HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"scheduler-type":"interval","snapshot-object-
id":344,"snapshot-object-type":"Volume","snapshots-to-keep-
number":2,"time":"10:20:15"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/schedulers/2",
            "rel": "self"
        }
    ]
}
```

Input Parameter	Description	Mandatory
state	Suspends or resumes Scheduler. **Values**: • `user_disabled` • `enabled`	No
suffix	Text adjoined to the Scheduler stem name	No
time	Snapshot creation schedule **Values**: • If `scheduler-type` = `interval` use [h:m:s] • If `scheduler-type` = `explicit` use [d:h:m]	No

> **Note:** A cluster can also be defined as `cluster-name` or `cluster-index` in the URL, however the cluster definition should only be entered in one location, either the URL or the body.

Example request by index

```
PUT /api/json/v2/types/schedulers/2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm788","suffix":"TEST"}
```

Example request by name

```
PUT /api/json/v2/types/schedulers/?name=Scheduler02 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache

{"cluster-id":2,"suffix":"TEST"}
```

Response

```
200 OK
```

Slots

Viewing the List of Slots

GET /api/json/v2/types/slots

This command (GET /api/json/v2/types/slots) displays the list of Slots.

Example request

```
GET /api/json/v2/types/slots HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Response

```
{
    "slots": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/24",
            "name": "1_23"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/25",
            "name": "1_24"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/20",
            "name": "1_19"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/21",
            "name": "1_20"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/22",
            "name": "1_21"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/23",
            "name": "1_22"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/1",
            "name": "1_0"
        },
```

```
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/3",
            "name": "1_2"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/2",
            "name": "1_1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/5",
            "name": "1_4"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/4",
            "name": "1_3"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/7",
            "name": "1_6"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/6",
            "name": "1_5"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/9",
            "name": "1_8"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/8",
            "name": "1_7"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/16",
            "name": "1_15"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/19",
            "name": "1_18"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/18",
            "name": "1_17"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/slots/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
slot-state	The Slot's current state/content **Values:** • `empty` – Slot is empty and is not expected to be used. • `unanticipated_disk` – Slot is expected to be empty but a disk is inserted. • `unsupported_disk` – Disk of an unsupported model is inserted into the slot. • `uninitialized_disk` – Disk has been inserted and is detected as working. A command from a technician is required to integrate the SSD into the system. • `error` – Error in detecting disk. • `ok` – Disk is OK and in use.
ssd-o-signature	The signature added to the SSD once it is added to the DPG
ssd-size	The overall size of the SSD
ssd-uid	• UID (unique identification) of the SSD that is inserted into the Slot. • Parameter contains a value only if the `slot state` is: `resident SSD`, `uninitialized SSD`, or `foreign XtremAPP SSD`. Otherwise it is `null`
sys-id	The index number of the cluster this SSD belongs to. May be omitted if only one cluster is defined.
xms-id	Object index number of the XMS

Example request by index

```
GET /api/json/v2/types/slots/24?cluster-index=2 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0oxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/slots?name=1_23&cluster-name=xbrickdrm788 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0oxMA==
Cache-Control: no-cache
```

Response

```json
{
  "content": {
    "ssd-size": "390625000",
    "index": 24,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "name": "1_23",
    "brick-id": [
      "f1cb26b27eb14e74b6a2d5b609449297",
      "X1",
      1
    ],
    "ssd-o-signature": "d19977bb4a474952b62a5710f10295e8",
    "product-model": "HITACHI  HUSMM114 CLAR400",
    "slot-error-reason": "none",
    "ssd-uid": "wwn-0x5000cca04e062678",
    "slot-state": "resident_ssd",
    "slot-num": 23,
    "guid": "6b120cba6914494aaf12f43cc25a753b",
    "sys-id": [
      "3d02428c151442d9a132fa6e10561da8",
      "xbrickdrm788",
      2
    ],
    "failure-reason": "none"
  },
  "links": [
    {
      "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/slots/24",
      "rel": "self"
    }
  ]
}
```

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Snapshots

Viewing the List of Snapshots

GET /api/json/v2/types/snapshots

This command (GET /api/json/v2/types/snapshots) displays the list of all Snapshots and their defined parameters.

Example request

```
GET /api/json/v2/types/snapshots HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "snapshots": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/20",
            "name": "ESX-2.snap.03112015-17:59:17"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/21",
            "name": "ESX-1.snap.03112015-17:59:17"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/5",
            "name": "ESX-2.snap.03112015-17:52:20"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/4",
            "name": "ESX-3.snap.03112015-17:52:20"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/6",
            "name": "ESX-1.snap.03112015-17:52:20"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/11",
            "name": "ESX-2.snap.03112015-17:55:34"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/10",
            "name": "ESX-3.snap.03112015-17:55:34"
        },
        {
```

```
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/13",
            "name": "ESX-3.snap.03112015-17:58:07"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/12",
            "name": "ESX-1.snap.03112015-17:55:34"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/15",
            "name": "ESX-1.snap.03112015-17:58:07"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/16",
            "name": "ESX-3.snap.03112015-17:58:54"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/18",
            "name": "ESX-1.snap.03112015-17:58:54"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshots/",
            "rel": "self"
        }
    ]
}
```

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Output Parameter	Description
ancestor-vol-id	Holds the Volume Snapshot source index number for the Snapshot. This parameter points to an object from which the Snapshot was created, providing that the "ancestor" object is not deleted, or that `create-snapshot-and-reassign` was not applied.
avg-latency	Total real-time average latency of read and write operations, measured in µs
bw	Total real-time read and write bandwidth in MB per second
certainty	Indicates confidence that the XMS and the cluster are synchronized. Value changes from `OK` if a request is sent while the XMS is unable to determine the success of the request.
created-from-volume	This parameter contains the `snapped_object` Volume name, as it was at the Snapshot's creation time, or `null` when the Volume was not created from a Snapshot. The string remains unchanged when the ancestor is renamed, deleted or reassigned.
creation-time	Snapshot's creation timestamp
dest-snap-list	Number of Volumes directly Snapshotted from the Snapshot, and the list of their object IDs (if any)
index	Snapshot's index number as defined by the XMS upon its creation (a unique positive number)
iops	Snapshot 's total read and write real-time input/output operations per second
lb-size	The "sector size" (LB size) of the Snapshot
logical-space-in-use	The total used Volume/ Snapshot capacity in all clusters managed by the XMS
lun-mapping-list	List of LUN mappings currently associated with the Snapshot, possibly empty, indicating that the Snapshot is currently unexposed.
naa-name	Snapshot's WWN/NAA name, globally unique and unique over time, set by the XMS (or by cluster) once a LUN is mapped to the Snapshot for the first time
name	Snapshot's name
num-of-dest-snaps	Number of Snapshots directly Snapshotted from this Snapshot
num-of-lun-mappings	Number of LUN mappings defined for this Snapshot

Output Parameter	Description
obj-severity	Snapshot's severity, based on severity level of current Alerts (Alerts still uncleared) for this Snapshot **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
rd-bw	Total real-time read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rd-latency	Total real-time average latency of read operations, measured in µs
related-consistency-groups	The Snapshot's related Consistency Group(s) ID(s), when relevant
small-bw	Current bandwidth of small input/output operations, addressed at the Snapshot
small-io-alerts	When Volume parameter of `small_io_alerts` is set to `disabled` (default), no Alerts are sent for a high number of small I/Os.
small-iops	Current IOPS of small input/output operations per second
small-io-ratio	The accumulated number of unaligned I/O divided by the total accumulated number of I/Os to the Snapshot, in percent
small-io-ratio-level	Event triggered whenever the `unaligned-io-ratio` level changes
small-rd-bw	Current bandwidth of small input/output operations, addressed at the Snapshot
small-rd-iops	Current IOPS of small read input/output operations per second
small-wr-bw	Snapshot's small write bandwidth
small-wr-iops	Current IOPS of small write input/output operations per second
snapgrp-id	The Volume Snapshot Group (VSG) Index
snapset-list	Lists names of the Snapshot Set containing the selected Snapshot. Value for a Volume is always `null`
snapshot-type	A Snapshot is regular (default) or read-only.
sys-id	The index number of the cluster this Snapshot belongs to. May be omitted if only one cluster is defined.

Output Parameter	Description
tag-list	Snapshot's list of Tags **Note**: This parameter only supports Snapshots and Volumes.
unaligned-bw	Current IOPS of unaligned bandwidth input/output operations
unaligned-io-alerts	When this Snapshot parameter is set to `disabled` (default), no Alerts are sent for high numbers of unaligned
unaligned-iops	Unaligned input/output operations per second
unaligned-io-ratio	Accumulated number of unaligned I/O divided by the total accumulated number of I/Os to the Snapshot, in percent
unaligned-io-ratio-level	Event triggered whenever the `unaligned-io-ratio` level changes
unaligned-rd-bw	Current bandwidth of unaligned read input/output operations
unaligned-rd-iops	Current IOPS of unaligned read input/output operations per second
unaligned-wr-bw	Current bandwidth of unaligned write input/output operations
unaligned-wr-iops	Current IOPS of unaligned write input/output operations per second
vaai-tp-alerts	The VAAI Soft Limit warning for this Volume is reported when monitoring is enabled. The threshold is a cluster–wide value as configured in the cluster `vaai_tp_limit`. The default is `disabled`.
vol-access	Denotes the host access configuration. **Values**: • `no_access` • `read_access` • `writes_access`
vol-id	Snapshot's index number as defined by the XMS upon its creation (a unique positive number)
vol-size	Total provisioned capacity. Snapshot KB size as exposed to Initiators
vol-type	Denotes the Volume type. **Values**: • `regular` • `readonly`
wr-bw	Total real-time write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
wr-latency	Total real-time average latency of write operations, measured in μs
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/snapshots/10?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/snapshots/?name=AAA2.111&cluster-name=xbrickdrm353
HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "small-io-alerts": "disabled",
    "small-iops": "0",
    "wr-latency": "0",
    "vol-id": [
      "9b90f3933a654316b8e84919c60612ef",
      "Vol_test1.1444291684418_DEV",
      10
    ],
    "obj-severity": "information",
    "unaligned-io-alerts": "disabled",
    "unaligned-rd-bw": "0",
    "num-of-dest-snaps": 0,
    "iops": "0",
    "acc-num-of-small-wr": "0",
    "small-io-ratio-level": "ok",
    "guid": "9b90f3933a654316b8e84919c60612ef",
    "snapshot-type": "regular",
    "logical-space-in-use": "0",
    "unaligned-io-ratio-level": "ok",
    "acc-num-of-rd": "0",
    "index": 10,
    "lb-size": 512,
    "naa-name": "",
    "snapset-list": [
      [
        "8caa844c23184c6299a177624f046279",
        "SnapshotSet.1444291684418_DEV",
        2
      ]
    ],
    "acc-size-of-wr": "0",
    "acc-num-of-small-rd": "0",
```

```
"unaligned-rd-iops": "0",
"snapgrp-id": [
  "e45d402c925244b6985efc9d4a25f8cb",
  "",
  8
],
"acc-size-of-rd": "0",
"created-from-volume": "Vol_test1",
"ancestor-vol-id": [
  "33899af734ba432fadd2a96e119e8d39",
  "Vol_test1",
  8
],
"vaai-tp-alerts": "disabled",
"creation-time": "2015-10-08 04:08:12",
"rd-bw": "0",
"xms-id": [
  "22b182cb5c0d459d962fe9d559057f2a",
  "xms",
  1
],
"unaligned-wr-iops": "0",
"acc-num-of-unaligned-rd": "0",
"small-wr-bw": "0",
"tag-list": [],
"unaligned-iops": "0",
"num-of-lun-mappings": 0,
"unaligned-bw": "0",
"small-rd-iops": "0",
"unaligned-io-ratio": "0",
"lun-mapping-list": [],
"vol-size": "10485760",
"wr-iops": "0",
"sys-id": [
  "2bffd8cfecf24316b548323f04466cb0",
  "xbrickdrm353",
  1
],
"avg-latency": "0",
"rd-latency": "0",
"small-wr-iops": "0",
"small-bw": "0",
"name": "Vol_test1.1444291684418_DEV",
"acc-num-of-unaligned-wr": "0",
"related-consistency-groups": [],
"certainty": "ok",
"vol-type": "regular",
"acc-num-of-wr": "0",
"small-io-ratio": "0",
"vol-access": "write_access",
"unaligned-wr-bw": "0",
"bw": "0",
"small-rd-bw": "0",
```

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```
    "alignment-offset": 0,
    "dest-snap-list": [],
    "rd-iops": "0",
    "wr-bw": "0"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/snapshots/10",
      "rel": "self"
    }
  ]
}
```

Creating a Snapshot

POST /api/json/v2/types/snapshots

This command (POST /api/json/v2/types/snapshots) enables you to run the following operations:

*   Create a Snapshot on a Volume, list of Volumes, Consistency Group, Snapshot Set or Tag List (see Table 3, on page 215).

*   Create a Snapshot and reassign on a Volume, Consistency Group or Snapshot Set (see Table 4, on page 216).

> **Note**: Refer to example use cases for taking Snapshots and reassigning on a Volume, Consistency Group or Snapshot Set, on page 351.

Parameters in Table 3 are exclusively for 'create Snapshots' commands.

For this command, input parameters (as described in the following table), should be entered in the body.

Table 3: Create Snapshot

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
consistency-group-id	Consistency Group's index number from which to create a new Snapshot	Select one of the following: • consistency-group-id • snapshot-set-id • tag-list • volume-list
snapshot-set-id	The index number of the Snapshot Set from which a new Snapshot will be created	
tag-list	List of Tag index numbers from which to create a new Snapshot **Note**: This parameter only supports Snapshots and Volumes.	
volume-list	List of Volumes index numbers from which to create a new Snapshot. List values are in rectangular brackets. Syntax example: `{"volume-list":["Finance1","Finance2"]}`	
snapshot-set-name	The name of the Snapshot Set	No
snap-suffix	A string added after a Snapshot stem name, limited to 64 characters	No
snapshot-type	The Snapshot is read/write (default) or read-only.	No

Parameters in Table 4 are exclusively for 'create Snapshots and reassign' commands.

For this command, input parameters (as described in the following table), should be entered in the body.

Table 4: Create Snapshot and Reassign

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
from-consistency-group-id	The name or index number of the Consistency Group from which a new Snapshot will be created	Select one of the following: • from-consistency-group-id • from-snapshot-set-id • from-volume-id • from- snapshot-set-tag-id
from-snapshot-set-id	Snapshot Set's name or index number from which to create a new Snapshot	
from-snapshot-set-tag-id	Snapshot Set's tag name or index number from which to create a new Snapshot	
from-volume-id	Volume name or index number from which to create a new Snapshot	
to-consistency-group-id	Consistency Group's name or index number to which to assign a new Snapshot	Select one of the following: • to-consistency-group-id • to-snapshot-set-id • to-volume-id • to-snapshot-set-tag-id
to-snapshot-set-id	The name or index number of the Snapshot Set to which a new Snapshot will be assigned	
to-snapshot-set-tag-id	Snapshot Set's Tag name or index number to which to assign a new Snapshot	
to-volume-id	Volume name or index number to which to assign a new Snapshot	
backup-snapshot-type	The back-up Snapshot type is regular (default) or read-only.	No
backup-snap-suffix	Snapshot name suffix	No
no-backup	This parameter serves as a flag. If the flag is set, the source is removed. The no-backup flag must have a value set. The value can be of any text string. For example, `"no-backup":"true"`	No

Input Parameter	Description	Mandatory
snapshot-set-name	The name of the backup Snapshot Set	No

Example request for Create Snapshot

```
POST /api/json/v2/types/snapshots HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"snapshot-set-id":1,"snap-suffix":"TGSNAP"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snapshots/51",
            "rel": "self"
        },
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snapshots/54",
            "rel": "self"
        }
    ]
}
```

Example request for Create Snapshot and Reassign

```
POST /api/json/v2/types/snapshots HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":1,"from-consistency-group-id":"IrisCG","to-snapshot-set-
id":"IrisSnapSet.SnapshotSet_1433089451","backup-snap-
suffix":"TGsnap","backup-snapshot-type":"regular"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snapshots/50",
            "rel": "self"
        },
        {
            "href": "https://vxms-
xbrickdrm788.xiodrm.lab.emc.com/api/json/v2/types/snapshots/51",
            "rel": "self"
        }
    ]
}
```

Input Parameter	Description	Mandatory
vol-size	- The Volume's disk space size in: K (KB) / M (MB) / G (GB) / T (TB) / P (PB), limited to 2PB - The minimum Volume size is 1 MB. - Volume size must be in multiples of 8 KB. - Reflects the Volume size available to Initiators. - Does not indicate the actual SSD space consumed by the Volume. - Must be an integer greater than 0.	

Note: A cluster can also be defined as `cluster-name` or `cluster-index` in the URL, however the cluster definition should only be entered in one location, either the URL or the body.

Example request by index

```
PUT /api/json/v2/types/snapshots/53 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache

{"cluster-id":1,"small-io-alerts":"enabled"}
```

Example request by name

```
PUT /api/json/v2/types/snapshots/?name=maxtest1 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","small-io-alerts":"enabled"}
```

Response

```
200 OK
```

Snapshot Sets

Viewing the List of Snapshot Sets

GET /api/json/v2/types/snapshot-sets

This command (GET /api/json/v2/types/snapshot-sets) displays the list of all Snapshot Sets.

Example request

```
GET /api/json/v2/types/snapshot-sets HTTP/1.1
Host: vxms-xbrickdrm801.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshot-sets/",
            "rel": "self"
        }
    ],
    "snapshot-sets": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshot-sets/1",
            "name": ""
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshot-sets/3",
            "name": ""
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snapshot-sets/2",
            "name": ""
        }
    ]
}
```

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Output Parameter	Description
obj-severity	Snapshot Set's severity, based on severity level of current Alerts (Alerts still uncleared) for this Snapshot Set **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
snapset-id	Index number of the Snapshot Set object
snapset-short-id	Short ID, created by SYM, not used by the XMS. Used by external interfaces such as RecoverPoint.
sys-id	The index number of the cluster this Snapshot Set belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
vol-list	The list of Volume object IDs belonging to this Snapshot Set

Example request by index

```
GET /api/json/v2/types/snapshot-sets/3?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET //api/json/v2/types/snapshot-
sets?name=SnapshotSet.1444291790785_TEST1&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```json
{
  "content": {
    "index": 3,
    "num-of-vols": 1,
    "name": "SnapshotSet.1444291790785_TEST1",
    "obj-severity": "information",
    "tag-list": [],
    "snapset-short-id": 3,
    "snapset-id": [
      "17c750753bbb4e8ea0d69fd5e718a9a9",
      "SnapshotSet.1444291790785_TEST1",
      3
    ],
    "cg-id": 1,
    "cg-oid": [
      "f9cdfd216ec84d23a42a2e91cc52dc07",
      "CG_test1",
      1
    ],
    "creation-time-long": "1444291809000",
    "guid": "17c750753bbb4e8ea0d69fd5e718a9a9",
    "vol-list": [
      [
        "5cf16887c96044e292d11de5db3c69c2",
        "Vol_test1.1444291790785",
        11
      ]
    ],
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ],
    "cg-name": "CG_test1"
  },
  "links": [
    {
      "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/snapshot-sets/3",
      "rel": "self"
    }
  ]
}
```

Example request by index

```
PUT /api/json/v2/types/snapshot-sets/53 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":1,"snapshot-set-id":1,"new-name":"SNAP-SET1"}
```

Example request by name

```
PUT /api/json/v2/types/snapshot-sets/?name=maxtest1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","snapshot-set-id":SnapDefault,"new-name":"SNAP-
SET1"}
```

Response

```
200 OK
```

SNMP Notifier

Viewing the SNMP Notifier

GET /api/json/v2/types/snmp-notifier

This command (GET /api/json/v2/types/snmp-notifier) displays the SNMP Notifier.

Example request

```
GET /api/json/v2/types/snmp-notifier/ HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wxMA==
Cache-Control: no-cache
```

Response

```
{
    "snmp-notifier": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snmp-notifier/1",
            "name": "snmp_notifier"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/snmp-notifier/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	SNMP Notifier severity, based on severity level of current Alerts (Alerts still uncleared) for this SNMP Notifier **Values**: `clear` - No Alerts exist for this entity. `information` - The highest severity for this entity and all contained objects is information. `minor` - The highest severity for this entity and all contained objects is minor. `major` - The highest severity for this entity and all contained objects is major. `critical` - The highest severity for this entity and all contained objects is critical.
port	The SNMP Notifier's port ID
priv-key	SNMPv3 privacy key. This parameter behaves as a password (hashed when shown), with a minimum of eight characters.
priv-protocol	SNMPv3 privacy protocol
recipients	SNMP Notifier recipients
username	Name of the SNMP Notifier User
version	SNMP Notifier version number
xms-id	The index number of the XMS object

Example request by index

```
GET /api/json/v2/types/snmp-notifier/1 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/snmp-notifier?name=snmp_notifier HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "username": "admin",
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "heartbeat-frequency": 300,
    "recipients": [],
    "obj-severity": "information",
    "community": "public",
    "engine-id": "22b182cb5c0d459d962fe9d559057f2a",
    "priv-key": "xxxxxxx",
    "guid": "745589cb1fd34b6b8baff117d32841df",
    "port": 162,
    "index": 1,
    "name": "snmp_notifier",
    "auth-key": "xxxxxxx",
    "enabled": false,
    "version": "v2c",
    "auth-protocol": "md5",
    "priv-protocol": "des"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/snmp-notifier/1",
      "rel": "self"
    }
  ]
}
```

Example request by index

```
PUT /api/json/v2/types/snmp-notifier/1 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"recipient-list":["lgdrm100","lgdrm101"]}
```

Example request by name

```
PUT /api/json/v2/types/snmp-notifier/?name=snmp_notifier HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"recipient-list":["lgdrm100","lgdrm101"]}
```

Response

```
200 OK
```

Storage Controllers

Viewing the Storage Controllers

GET /api/json/v2/types/storage-controllers

This command (GET /api/json/v2/types/storage-controllers) displays the list of Storage Controllers.

Example request

```
GET /api/json/v2/types/storage-controllers HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "storage-controllers": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/1",
            "name": "X1-SC1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/2",
            "name": "X1-SC2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/1",
            "name": "X1-SC1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/3",
            "name": "X2-SC1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/2",
            "name": "X1-SC2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/4",
            "name": "X2-SC2"
```

```
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/1",
            "name": "X1-SC1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/2",
            "name": "X1-SC2"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
current-health-state	Storage Controller's health state **Values**: • `level_1_clear` – Healthy, sensor in valid range. • `level_2_unknown` - The sensor cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe detected problem. Used for a single component failure. • `level_6_critical` - Most severe detected problem.
dedicated-ipmi-link-conn-state	Represents the state of the link between the dedicated IPMI port (eth3) and the other Storage Controller (rmm4 port). **Values**: • `ok` - No connection problems were detected in the intra X-Brick (e.g. between the eth3 port and the rmm4 port). Also used when the active_ipmi_port value is not `eth3`. • `invalid_wiring` - The port connection wiring is not valid (e.g. eth3 port is connected to the rmm4 port of the same Storage Controller). • `disconnected` - There is no connection.
dedicated-ipmi-port-speed	Negotiated speed of the dedicated IPMI port **Values**: • `10mb` • `100mb` • `1gb` • `10gb` • `unknown`
dedicated-ipmi-port-state	State of the dedicated Ethernet port (e.g. eth3) used for IPMI access instead of IPMI using the main Ethernet managment port. Indicates the physical connection only. Does not relate to IP addressing and routing issues. **Values**: • `up` - Port is physically connected. • `down` - Port is physically disconnected. • `unknown` - Port state cannot be determined. This is also used when the active_ ipmi_port value is `not dedicated`.

Output Parameter	Description
dimm-correctable-errors	Count of a DIMM error-correcting code (ECC) correctable errors
dimm-health-state	Reflects the health state of the DIMM. **Values**: • `level_1_clear` - Healthy - Sensor is in valid range. • `level_2_unknown` - The sensor cannot be read or the value cannot be determined for any other reason. • `level_5_major` - DIMM errors are excessive.
enabled-state	Indicates whether the Storage Controller is currently enabled or disabled, either by user or the cluster. **Values**: • `enabled` - The object is currently enabled. If the health_state is `healthy`, this object is active. • `user_disabled` - The user disabled this object. Disabled and requires manual user activation. • `system_disabled` - The cluster deactivated this object. Disabled and requires manual user activation when conditions causing deactivation no longer exist.
fan-health-state	Indicates the health state of the least healthy fan `sensor_types`, based on both analog and discrete sensors.
fc-hba-fw-version	Fibre Channel host bus adaptors firmware version
fc-hba-hw-revision	Detected Fibre Channel host bus adaptors hardware revision
fc-hba-model	Fibre Channel host bus adaptors hardware model
fru-lifecycle-state	Storage Controller's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` - Indicates a transient state in which the system performs initialization of a component.

Output Parameter	Description
fw-version-error	This parameter is used to indicate if the firmware or OS upgrade has failed or is in the process of upgrading. This reflects the aggregate of all Storage Controller OS and firmware upgrades.
ib1-link-downed	Number of times this InfiniBand port was declared as down
ib1-link-downed-per-long-period	Number of times this InfiniBand port was declared as down, over the last five minute period
ib1-link-downed-per-minute	Number of times this InfiniBand port was declared as down, during the last minute
ib1-link-error-recoveries	Number of times this InfiniBand port successfully completed a link error recovery procedure
ib1-link-error-recoveries-per-long-period	Number of times this InfiniBand port successfully completed a link error recovery procedure, over the last five minute period
ib1-link-error-recoveries-per-minute	Number of times this InfiniBand port successfully completed a link error recovery procedure, during the last minute
ib1-link-health-level	Denotes the most severe problem detected over this InfiniBand link.
ib1-link-rate-in-gbps	InfiniBand1 link rate
ib1-local-link-integrity-errors	Number of times this InfiniBand port had logical link integrity errors
ib1-local-link-integrity-errors-per-long-period	Number of times this InfiniBand port had logical link integrity errors, over the last five minute period
ib1-local-link-integrity-errors-per-minute	Number of times this InfiniBand port had logical link integrity errors, during the last minute
ib1-peer-oid ib2-peer-oid	The object index number of the specific peer object connected to this Storage Controller
ib1-port-in-peer-index	Index of the port within the Storage Controller this port is connected to (0 if the port is unconnected). The value is meaningful only when `port_peer_type` is not `none`.

Output Parameter	Description
ib1-port-misconnection	Indicates if a problem exists in port 1 of the Storage Controller's InfiniBand port connections. **Values**: • `healthy` - Connection of the Storage Controller's InfiniBand ports is OK. • `not_node` - Storage Controller's InfiniBand port is connected to something other than a Storage Controller (for single X-Bricks). • `wrong_port` - Storage Controller's InfiniBand port is connected to incorrect Storage Controller InfiniBand port in the peer Storage Controller.
ib1-port-peer-type	Defines whether port 1 is connected to a Storage Controller, another switch, or is disconnected.
ib1-port-rcv-errors	Number of packets received on this InfiniBand port with errors
ib1-port-rcv-errors-per-long-period	Number of packets received with errors on this InfiniBand port, over the last five minute period
ib1-port-rcv-errors-per-minute	Number of packets received on this InfiniBand port with errors, during the last minute
ib1-port-rcv-remote-physical-errors	Number of remote physical errors this InfiniBand port encountered
ib1-port-rcv-remote-physical-errors-per-long-period	Number of remote physical errors this InfiniBand port encountered, over the last five minute period
ib1-port-rcv-remote-physical-errors-per-minute	Number of remote physical errors this InfiniBand port encountered, during the last minute
ib1-port-state	Storage Controller's InfiniBand port 1 state **Values**: • `up` - Port is connected and can run traffic. • `down` - Port is disconnected. • `unknown` - Port state is unknown.
ib1-symbol-errors	Total number of symbol errors on this InfiniBand port
ib1-symbol-errors-per-long-period	Total number of symbol errors on this InfiniBand port, over the last five minute period
ib1-symbol-errors-per-minute	Total number of symbol errors on this InfiniBand port, during the last minute
ib2-link-downed	Number of times this InfiniBand port was declared as down
ib2-link-downed-per-long-period	Number of times this InfiniBand port was declared as down, over the last five minute period

Output Parameter	Description
ib2-link-downed-per-minute	Number of times this InfiniBand link was declared as down, during the last minute
ib2-link-error-recoveries	Number of times this InfiniBand port successfully completed a link error recovery procedure
ib2-link-error-recoveries-per-long-period	Number of times this InfiniBand port successfully completed a link error recovery procedure, over the last five minute period
ib2-link-error-recoveries-per-minute	Number of times this InfiniBand port successfully completed a link error recovery procedure, during the last minute
ib2-link-health-level	Denotes the most severe problem detected over this InfiniBand link.
ib2-link-rate-in-gbps	Storage Controller InfiniBand link rate for port 2 **Values**: • unknown • `sdr` - single data rate, 2.5Gb/s • `ddr` - double data rate, 5 Gb/s • `qdr` - quad data rate, 10 Gb/s • `fdr` - fourteen data rate, 14.0625 Gb/s • `fdr10` - ~10.31 Gb/s
ib2-local-link-integrity-errors	Number of times this InfiniBand port had logical link integrity errors
ib2-local-link-integrity-errors-per-long-period	Number of times this InfiniBand port had logical link integrity errors, over the last five minute period
ib2-local-link-integrity-errors-per-minute	Number of times this InfiniBand port had logical link integrity errors, during the last minute
ib2-port-in-peer-index	Port index within the Storage Controller this port is connected to (should be 0 if the port is unconnected). The value is meaningful only when `port_peer_type` is not none.

Output Parameter	Description
ib2-port-misconnection	Indicates whether a connection problem exists between Storage Controllers in InfiniBand port 2. **Values**: • `healthy` - Connection of the Storage Controller's InfiniBand ports is OK. • `not_node` - Storage Controller's InfiniBand port is connected to something other than a Storage Controller (for single X-Bricks). • `wrong_port` - Storage Controller's InfiniBand port is connected to incorrect Storage Controller InfiniBand port in the peer Storage Controller.
ib2-port-peer-type	Defines whether port 2 is connected to a Storage Controller, another switch, or to nothing.
ib2-port-rcv-errors	Number of packets received on this InfiniBand port with errors
ib2-port-rcv-errors-per-long-period	Number of packets received on this InfiniBand port with errors, over the last five minute period
ib2-port-rcv-errors-per-minute	Number of packets received on this InfiniBand port with errors, during the last minute
ib2-port-rcv-remote-physical-errors	Number of remote physical errors this InfiniBand port encountered
ib2-port-rcv-remote-physical-errors-per-long-period	Number of remote physical errors this InfiniBand port encountered, over the last five minute period
ib2-port-rcv-remote-physical-errors-per-minute	Number of remote physical errors this InfiniBand port encountered, during the last minute
ib2-port-state	Storage Controller's InfiniBand port 2 state **Values**: • `up` - Port is connected and can run traffic. • `down` - Port is disconnected. • `unknown` - Port state is unknown.
ib2-symbol-errors	Total number of symbol errors on this InfiniBand port
ib2-symbol-errors-per-long-period	Total number of symbol errors on this InfiniBand port, over the last five minute period
ib2-symbol-errors-per-minute	Total number of symbol errors on this InfiniBand port, during the last minute
ib-addr1	Storage Controller's internal backend InfiniBand addresses for port 1
ib-addr2	Storage Controller's internal backend InfiniBand addresses for port 2

Output Parameter	Description
ib-switches-dn	Cluster has detected new InfiniBand Switches.
ib-switch-psu-dn	Cluster has detected a new InfiniBand power supply unit.
identify-led	Indicates whether the identification LED is illuminated for this Storage Controller. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	Storage Controller's index number as defined by the XMS upon its creation (a unique positive number)
index-in-brick	The BBU's index within the X-Brick, either 1 or 2. Always 1 for multiple X-Brick clusters (for all X-Bricks), but two BBUs are available for a single X-Brick cluster.
internal-sensor-health-state	Reflects health state of the least healthy of all `temperature/voltage/fan/current/internal sensor_types`. Value is based on both the analog and discrete sensors of each type. **Values**: • `level_1_clear` - Healthy - Sensor is in valid range. • `level_2_unknown` - Sensor cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe detected problem. Used for a single component failure. • `level_6_critical` - Most severe detected problem.
ipmi-addr	IPMI address and subnet for this Storage Controller
ipmi-addr-subnet	The IPMI's address subnet
ipmi-bmc-fw-version	Array element of the accepted firmware version
ipmi-bmc-hw-revision	IPMI hardware revision
ipmi-bmc-model	IPMI's hardware model (BMC)

Output Parameter	Description
ipmi-conn-error-reason	Reason reported for the disconnection from the Storage Controller's intelligent platform management interface (IPMI) **Values**: • `no_route_to_host` - There is no routing or destination is not reachable. • `connection_reset_by_peer` - TCP connection reset by the IPMI. • `connection_refused` - TCP connection refused by the IPMI.
ipmi-gw-ip	The IPMI default gateway's IP address
iscsi-daemon-state	Indicates the current iSCSI daemon state. **Values**: • `healthy` - iSCSI daemon reported no error. • `failed` - iSCSI daemon failed.
is-sym-node	Indicates if this Storage Controller is the Storage Controller running the SYM. For all X-Bricks other than the first X-Brick, the value is always `no`.
jbod-dn	DAE discovery needed. Cluster has detected a new DAE.
jbod-lcc-discovery-needed	Cluster has detected a new DAE Controller (LCC).
jbod-psu-dn	DAE power supply unit discovery needed. Cluster has detected a new DAE power supply unit.
journal-state	Defines Storage Controller's journal health state regarding failover and failback.
local-disk-controller-fw-version	Storage Controller's current firmware version
local-disk-controller-hw-revision	Revision for the Local Disk Storage Storage Controller hardware
local-disk-controller-model	Local Disk controller model's name
local-disk-dn	Cluster has detected a new Local Disk Storage.
local-disk-list	Storage Controller's number of Local Disk Storage
low-ram-level	Storage Controller's 'RAM Level Low' indicator (represented by the `true` value)
mgmt-gw-ip	The IPMI default gateway's IP management
mgmt-link-health-level	Storage Controller's management port health state
mgmt-port-autoneg	Indicates if auto-negotiation is enabled (default) or disabled

Output Parameter	Description
mgmt-port-duplex	Ethernet port duplex. The current port configuration applies if the port is full duplex or half duplex. **Values**: • `full` • `half`
mgmt-port-speed	The Management port's port speed **Values**: • `10mb` • `100mb` • `1gb` • `10gb`
mgmt-port-state	Storage Controller's management port state **Values**: • `up` - Port is physically connected. • `down` - Port is physically disconnected. • `unknown` - Port state cannot be determined.
monitored-ups-list	BBU monitored by this Storage Controller
name	Storage Controller's unique name, as defined by the XMS upon its creation
node-csid	Internal Storage Controller naming index number
node-fp-temperature-state	Indicates the temperature sensor reading for above normal temperatures. Failover is triggered at high threshold. **Values**: • `normal` - Whenever the temperature level is below sc_fp_temperature_high_warning_threshold • `warning` - Whenever the temperature level is between sc_fp_temperature_high_warning_threshold AND sc_fp_temperature_high_critical_threshold • `high` - Whenever the temperature level is above sc_fp_temperature_high_critical_threshold • `invalid` - Whenever PM fails to read the sensor for five consecutive attempts (reading every 30 seconds), or five consecutive readings are out of the expected temperature range
node-guid	GUID (Globally Unique Identifier) hardwired in the physical Storage Controller. Once it is installed, it never changes.

Output Parameter	Description

node-health-state	Reflects the overall health state of the Storage Controller and its contained components.
	Values:
	
	• `healthy`
	  1. The Storage Controller and its contained FRUs (all local_disk and node_psu) are all ok: fru_lifecycle_state is `healthy` enabled_state is `enabled`
	    and
	    All XEnv's xenv_state are `active`
	    and
	    All module's mdl_state are `active`.
	  2. Also the Storage Controller node_journaling_health_state is `healthy`.
	
	• `partial_fault` – Not performance affecting, but some fault exists, calculated as:
	  1. The Storage Controller, XEnv and module conditions are the same as for `healthy` state.
	  2. One of the following:
	    • Storage Controller state of node_journaling_health_state is not `healthy`.
	    or
	    • At least one local_disk.fru_lifecycle_state is not `healthy` or local_disk.enabled_state is not `enabled`.
	    or
	    • At least one node_psu.fru_lifecycle_state is not `healthy` or node_psu.enabled_state is not `enabled`.
	
	• `degraded` – Condition(s) exist(s) that affect(s) performance calculated as:
	  1. Some of the contained components are not OK, calculated as follows:
	    • At least one XEnv xenv_state not `active`.
	    or
	    • At least one module mdl_state is not `active`.
	  2. All other conditions are the same as for `healthy` or `partially_degraded`.
	
	• `failed` – Storage Controller's fru_lifecycle_state is not `healthy` or Storage Controller's enabled_state is not `enabled`.

node-id	The Storage Controller's object index number
node-index	Storage Controller's physical index within the X-Brick (lower-most one is number 1)

Output Parameter	Description
node-journaling-health-state	Defines the health state of the journaling component, where in any state other than `healthy` **Values**: • `healthy` - Journal function is healthy and in use. • `ready` - Journal function is not in use, yet is potentially analyzed as working, due to a technician decision not to use the journal. • `fault` - Journal function has a fault on this Storage Controller, as there is a chance of losing the journal upon a power loss. • `dumping` - Journal is in the process of dumping itself.
node-mgr-addr	IP addresses used to access the Storage Controller manager
node-mgr-addr-subnet	Storage Controller's subnet mask management IP
node-mgr-conn-error-reason	Reason for the last disconnection between the XMS and the Storage Controller
node-mgr-conn-state	Connection state between XMS and Storage Controller manager (clustering agent) **Values**: • `disconnected` - XMS is disconnected from the Storage Controller manager. The Storage Controller manager connection error reason parameter describes the reason for the disconnection. • `connected` - XMS is connected to the Storage Controller manager. • `unknown` - Used by the XMS when one poll fails, until three consecutive polls fail. • `controlled_disconnect` - XMS is disconnected from the Storage Controller manager in an expected manner. The Storage Controller manager connection error reason parameter describes the reason for the disconnection. This is the state while the Storage Controller state is `shutdown` or `booting`.
node-psu-dn	Storage Controller power supply unit discovery needed. Cluster has detected a new Storage Controller power supply unit.
node-psu-list	Storage Controller's number of Storage Controller PSU (power supply unit) objects and list of their object IDs. There are two PSUs per Storage Controller.
node-stop-reason	Reason reported for Storage Controller stoppage

Output Parameter	Description
node-stop-type	Describes the nature of the current/last Storage Controller stop. **Values**: • `none` - The Storage Controller is not stopped or stopping. Set when the Storage Controller re-enters the `active` state. • `dae_stopped` - The Storage Controller was orderly stopped as part of an orderly cluster stop. • `stopped` - The Storage Controller was stopped unorderly. • `failed_stop` - An unorderly stop failed in an unrecoverable way. • `dae_stopping` - The Storage Controller is in the process of an orderly stop. **Note**: If an orderly stop transforms into an unorderly stop, the value of this parameter changes accordingly. • `stopping` - The Storage Controller is in the process of an unorderly stop. **Note**: If an orderly stop transforms into an unorderly one, the value of this parameter is changed accordingly. • `replaced` - The Storage Controller is in the stopped state due to Storage Controller replacement process being performed.
num-of-local-disks	Storage Controller's total number of Local Disks
num-of-monitored-upses	Number of BBUs that are connected to the Storage Controller
num-of-node-psus	Storage Controller's number of Storage Controller PSU objects and the list of their object IDs. There should be two PSUs per Storage Controller.
num-of-ssds	Total number of SSDs in this Storage Controller's X-Brick
obj-severity	Storage Controller's severity, based on severity level of current Alerts (Alerts still uncleared) for this Storage Controller and its contained objects **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
os-upgrade-current-step	The current step number reached during an operating system upgrade

Output Parameter	Description
os-upgrade-current-step-info	Displays a text representation of the `os_upgrade` for a defined Storage Controller. A value of "`None`" means that no `os_upgrade` is taking place.
os-version	Storage Controller operating system version, equivalent to the firmware for other components
part-number	EMC-assigned string identifying part (SKU), independent of the actual vendor `model_name` used for this FRU
pci-10ge-hba-fw-version	iSCSI host bus adaptors firmware version
pci-10ge-hba-hw-revision	iSCSI bus adaptors hardware hardware revision
pci-10ge-hba-model	iSCSI host bus adaptors model name
pci-disk-controller-fw-version	DAE Controller's (LCC) firmware version
pci-disk-controller-hw-revision	DAE Controller (LCC) hardware revision
pci-ib-hba-fw-version	InfiniBand host bus adaptors freeware revision
pci-ib-hba-hw-revision	InfiniBand host bus adaptors hardware revision
pci-ib-hba-model	Infiniband host bus adaptors hardware model
remote-journal-health-state	Defines the health state of the remote journal.
rg-id	The index number of DPG associated with this Storage Controller
sas1-hba-port-health-level	Storage Controller's SAS port number 1 health level **Values**: • `level_1_clear` - Healthy – SAS port is healthy. • `level_2_unknown` - The port health cannot be read or their values cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe detected problem. • `level_6_critical` - Most severe detected problem.
sas1-port-rate	Rate of the first serial attached SCSI (SAS) port used
sas1-port-state	State of the first serial attached SCSI (SAS) port used

Output Parameter	Description
sas2-hba-port-health-level	Storage Controller's SAS port number 2 health level **Values**: • `level_1_clear` - Healthy – SAS port is healthy. • `level_2_unknown` - The port health cannot be read or their values cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe detected problem. • `level_6_critical` - Most severe detected problem.
sas2-port-rate	Rate of the second serial attached SCSI (SAS) port used **Values**: • `12gbps` • `6gbps` • `3gbps` • `unknown`
sas2-port-state	Status of the serial attached SCSI (SAS) port 2
sc-start-timestamp	The last time this Storage Controller was started
sc-start-timestamp-display	Storage Controller's start-time
serial-number	Storage Controller's serial number
ssd-dn	Cluster has detected a new SSD.
status-led	LED state indicating Storage Controller object faults
sw-version	Storage Controller software version. This should be identical to the cluster's software version, unless it is undergoing special process (e.g. upgrade).
sys-id	The index number of the cluster this Storage Controller belongs to. May be omitted if only one cluster is defined.
tag-list	The list of Storage Controller Tags
targets-dn	The cluster has detected new Target(s).
temperature-health-state	Reflects health state of the least healthy temperature `sensor_types`, based on both the analog and discrete sensors.

Output Parameter	Description
upgrade-failure-reason	Shows the permanent error of the last upgrade attempts. It is blank when the last attempt has been successful, or if no pervious upgrade command was given, or if an upgrade is currently in progress. **Values**: • All failure options of test validity • Failed to prepare system • Failed to stop service • Upgrade was rolled back • Emergency: system is down
upgrade-state	The state of the last upgrade process for this Storage Controller
ups-discovery-needed	Sets BBU discovery.
voltage-health-state	Reflects the aggregated health state of the voltage sensors. **Values**: • `level_1_clear` - Healthy - Diagnostic is in valid range. • `level_2_unknown` - The sensor cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe detected problem. Used for a single component failure. • `level_6_critical` - Most severe detected problem.
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/storage-controllers/2?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/storage-controllers?name=X1-SC2&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "ib2-link-error-recoveries": 0,
        "fru-lifecycle-state": "healthy",
        "ib1-port-rcv-remote-physical-errors-per-minute": 0,
        "node-guid": "001e6785cdc30000000000000000000000",
        "obj-severity": "information",
        "dimm-health-state": "level_1_clear",
        "local-disk-controller-fw-version": "",
        "ib2-port-rcv-errors-per-minute": 0,
        "num-of-monitored-upses": 1,
        "rg-id": [
            "6230c38bdca345ec9f087649bd1a7e8c",
            "X1-DPG",
            1
        ],
        "jbod-dn": "false",
        "pci-ib-hba-model": "",
        "ib1-port-in-peer-index": 1,
        "bios-fw-version": "SE5C600.86B.01.06.0002.110120121539",
        "ib2-link-rate-in-gbps": "qdr",
        "ib2-symbol-errors": 0,
        "mgmt-port-duplex": "full",
        "sas1-port-rate": "6gbps",
        "ib2-port-rcv-remote-physical-errors-per-minute": 0,
        "fc-hba-model": "",
        "ib2-port-state": "up",
        "node-csid": 9,
        "ib2-local-link-integrity-errors-per-minute": 0,
        "os-upgrade-current-step-info": null,
        "ipmi-addr-subnet": null,
        "node-fp-temperature-state": "normal",
        "tag-list": [],
        "pci-disk-controller-hw-revision": "",
        "node-stop-type": "none",
        "ib2-port-rcv-errors": 0,
        "ib2-symbol-errors-per-minute": 0,
        "ib2-port-in-peer-index": 2,
        "node-health-state": "healthy",
        "node-mgr-conn-state": "connected",
        "ib2-link-downed-per-minute": 0,
        "ib-switches-dn": "false",
        "name": "X1-SC2",
        "local-disk-controller-hw-revision": "",
        "ib2-port-rcv-remote-physical-errors-per-long-period": 0,
        "enabled-state": "enabled",
        "ib2-port-misconnection": "healthy",
        "is-sym-node": false,
        "sas2-hba-port-health-level": "level_1_clear",
        "fc-hba-hw-revision": "v8.02.01-k4-tgt",
        "ups-discovery-needed": false,
        "mgmt-port-speed": "1gb",
        "sas1-hba-port-health-level": "level_1_clear",
```

```
"ib1-port-state": "up",
"ipmi-conn-error-reason": null,
"ib1-link-error-recoveries": 0,
"ib2-local-link-integrity-errors-per-long-period": 0,
"xms-id": [
    "486d7818922745b5912294620c41a9d5",
    "xms",
    1
],
"sc-start-timestamp": 1440411310,
"sc-start-timestamp-display": "Mon Aug 24 13:15:10 2015",
"index": 2,
"ib2-symbol-errors-per-long-period": 0,
"current-health-state": "level_1_clear",
"upgrade-failure-reason": "",
"internal-sensor-health-state": "level_1_clear",
"ib1-symbol-errors": 0,
"ib1-link-downed-per-long-period": 0,
"journal-state": "healthy",
"temperature-health-state": "level_1_clear",
"ipmi-bmc-fw-version": "1.19",
"node-psu-dn": "false",
"ib2-link-health-level": "level_1_clear",
"ib1-port-rcv-remote-physical-errors": 0,
"num-of-ssds": 13,
"ssd-dn": 1,
"ib2-port-rcv-errors-per-long-period": 0,
"node-stop-reason": "none",
"ib1-peer-oid": "7c2d52656e656e2048616c6c616b2d7c",
"ib1-link-downed": 0,
"ib1-symbol-errors-per-minute": 0,
"ib1-link-error-recoveries-per-minute": 0,
"ib2-peer-oid": "7c2d52656e656e2048616c6c616b2d7c",
"upgrade-state": "no_upgrade_done",
"pci-10ge-hba-hw-revision": "3.22.3",
"os-upgrade-current-step": 0,
"mgmt-gw-ip": "10.102.32.1",
"ib1-port-rcv-remote-physical-errors-per-long-period": 0,
"node-mgr-addr": "10.102.38.233",
"low-ram-level": "ok",
"sas2-port-state": "up",
"backend-storage-controller-state": "normal",
"ib2-local-link-integrity-errors": 0,
"node-mgr-addr-subnet": "10.102.38.233/20",
"active-ipmi-port": "dedicated",
"remote-journal-health-state": "healthy",
"ipmi-bmc-hw-revision": "",
"ib1-local-link-integrity-errors-per-minute": 0,
"mgmt-port-autoneg": "enable",
"serial-number": "FC6XI141000003",
"ib1-symbol-errors-per-long-period": 0,
"guid": "900c099de0b54aed865942966abb9db8",
"status-led": "na",
```

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```
"fc-hba-fw-version": "v5.08.02",
"fw-version-error": "no_error",
"dimm-correctable-errors": 0,
"ib1-link-rate-in-gbps": "qdr",
"os-version": "Xtremio OS release 4.0.2-19.1",
"identify-led": "off",
"sas1-port-state": "up",
"pci-10ge-hba-fw-version": "0x8000047d",
"pci-10ge-hba-model": "",
"ib1-link-health-level": "level_1_clear",
"monitored-ups-list": [
    [
        "d5ee33084525424993c003cafbd44fd1",
        "X2-BBU",
        2
    ]
],
"node-mgr-conn-error-reason": "none",
"fan-health-state": "level_1_clear",
"num-of-local-disks": 4,
"ib2-link-downed-per-long-period": 0,
"node-psu-list": [
    [
        "20017c62dc45443296e8c416ee6828a7",
        "X1-SC2-PSU-L",
        3
    ],
    [
        "326a4f4c7e494663b30228cff58518ce",
        "X1-SC2-PSU-R",
        4
    ]
],
"part-number": "100-586-017-00",
"sys-id": [
    "6c54fc0b828543c99054c1ed6fcbad37",
    "xbrickdrm487",
    1
],
"ib1-port-misconnection": "healthy",
"ib2-port-peer-type": "node",
"brick-id": [
    "152cca38fd40402c822bf124ee59e436",
    "X1",
    1
],
"dedicated-ipmi-port-speed": "1Gb",
"sas2-port-rate": "6gbps",
"ib2-link-error-recoveries-per-long-period": 0,
"ib1-local-link-integrity-errors-per-long-period": 0,
"pci-disk-controller-fw-version": "13.00.6",
"ib2-link-downed": 0,
"ipmi-gw-ip": null,
"mgmt-port-state": "up",
"voltage-health-state": "level_1_clear",
```

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```
"targets-dn": 0,
"ib1-link-downed-per-minute": 0,
"pci-ib-hba-hw-revision": "0",
"jbod-lcc-discovery-needed": false,
"ib1-port-rcv-errors-per-minute": 0,
"ib1-port-rcv-errors-per-long-period": 0,
"ib2-port-rcv-remote-physical-errors": 0,
"ib-switch-psu-dn": 0,
"dedicated-ipmi-port-state": "up",
"ib1-local-link-integrity-errors": 0,
"ipmi-bmc-model": "",
"index-in-brick": 2,
"local-disk-controller-model": "",
"sw-version": "4.0.2",
"iscsi-daemon-state": "healthy",
"ib1-port-peer-type": "node",
"ipmi-addr": null,
"ib-addr1": "169.254.0.17",
"ib-addr2": "169.254.0.18",
"local-disk-dn": "false",
"local-disk-list": [
    [
        "b3ec713fbf934659b6d4c96ff65bb593",
        "X1-SC2-LocalDisk1",
        5
    ],
    [
        "43ec94c48a3043de89388afc33b277cb",
        "X1-SC2-LocalDisk2",
        6
    ],
    [
        "c4d88f969c2f4a70a31d34af8235b735",
        "X1-SC2-LocalDisk5",
        7
    ],
    [
        "2e3b9ae12a6a48328c8c253c3e4609d5",
        "X1-SC2-LocalDisk6",
        8
    ]
],
"num-of-node-psus": 2,
"node-journaling-health-state": "healthy",
"ib1-link-error-recoveries-per-long-period": 0,
"ib2-link-error-recoveries-per-minute": 0,
"node-index": 2,
"jbod-psu-dn": "false",
"dedicated-ipmi-link-conn-state": "ok",
"ib1-port-rcv-errors": 0,
"mgmt-link-health-level": "level_1_clear",
"pci-ib-hba-fw-version": "2.33.5000",
"node-id": [
```

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```
            "900c099de0b54aed865942966abb9db8",
            "X1-SC2",
            2
        ],
        "brick-index": 1
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/storage-controllers/2",
            "rel": "self"
        }
    ]
}
```

Storage Controller PSUs

Viewing the List of Storage Controller PSUs

GET /api/json/v2/types/storage-controller-psus

This command (GET /api/json/v2/types/storage-controller-psus) displays the list of Storage Controller PSUs.

Example request

```
GET /api/json/v2/types/storage-controller-psus HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "storage-controller-psus": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/1",
            "name": "X1-SC1-PSU-L"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/3",
            "name": "X1-SC2-PSU-L"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/2",
            "name": "X1-SC1-PSU-R"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/4",
            "name": "X1-SC2-PSU-R"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/1",
            "name": "X1-SC1-PSU-L"
        },
        {
            "href": "https://vxms-
```

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```
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/3",
            "name": "X1-SC2-PSU-L"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/2",
            "name": "X1-SC1-PSU-R"
        },
            {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/7",
            "name": "X2-SC2-PSU-L"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/6",
            "name": "X2-SC1-PSU-R"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/8",
            "name": "X2-SC2-PSU-R"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
fru-lifecycle-state	Storage Controller PSU's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` – Indicates that an FRU that has not been initialized passes through this state before initialization. • `initializing` – Indicates a transient state in which the system performs initialization of a component.
fru-replace-failure-reason	Reason why the FRU replacement has failed. `null` means that the last FRU replacement was either not performed for this object or the replacement was successful.
fw-version-error	Firmware version error. Parameter used to indicate if the firmware or OS upgrade has failed or is in the process of upgrading.
hw-revision	Hardware level of the power supply unit
index	Storage Controller PSU's index number as defined by the XMS upon its creation (a unique positive number)
input	The existence of input power to the supply
location	The location of the Storage Controller PSU within its Storage Controller
model-name	Vendor-assigned Storage Controller PSU's model name
name	Storage Controller PSU's name
node-id	Storage Controller's index number
node-psu-id	Storage Controller PSU's object index number

Output Parameter	Description
obj-severity	Storage Controller PSU severity, based on severity level of current Alerts (Alerts still uncleared) for this Storage Controller PSU **Values**: `clear` - No Alerts exist for this entity. `information` - The highest severity for this entity and all contained objects is information. `minor` - The highest severity for this entity and all contained objects is minor. `major` - The highest severity for this entity and all contained objects is major. `critical` - The highest severity for this entity and all contained objects is critical.
part-number	EMC-assigned string identifying part (SKU), iIndependent of the actual vendor `model_name` used for this FRU
power-failure	Shows severity pertaining to the nature of a power failure, should one occur
power-feed	Power into PSU typically has two feeds: A and B Typical configuration: - The first InfiniBand Switch PSU is connected to feed_A. - The second InfiniBand Switch PSU is connected to feed_B.
serial-number	Storage Controller PSU's serial number
status-led	LED state, indicating Storage Controller PSU's object faults
sys-id	The index number of the cluster this Storage Controller PSU belongs to. May be omitted if only one cluster is defined.

Example request by index

```
GET /api/json/v2/types/storage-controller-psus/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET //api/json/v2/types/storage-controller-psus?name=X1-SC1-PSU-L&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "fru-lifecycle-state": "healthy",
        "obj-severity": "information",
        "power-feed": "PWR-B",
        "serial-number": "E98791D1341146259",
        "part-number": "*** DPS-750XB A",
        "fru-replace-failure-reason": "",
        "guid": "90c1657d9ce14303b47f6f20d2844d95",
        "sys-id": [
            "2bffd8cfecf24316b548323f04466cb0",
            "xbrickdrm353",
            1
        ],
        "power-failure": "clear",
        "index": 1,
        "name": "X1-SC1-PSU-L",
        "brick-id": [
            "afdb132f2ff54cceafa7058f16b601a1",
            "X1",
            1
        ],
        "node-psu-id": [
            "90c1657d9ce14303b47f6f20d2844d95",
            "X1-SC1-PSU-L",
            1
        ],
        "fw-version-error": "no_error",
        "status-led": "on",
        "enabled-state": "enabled",
        "location": "left",
        "input": "on",
        "model-name": "DPS-750XB A",
        "hw-revision": "04  ",
        "node-id": [
            "f6cc6280edf044d18dedb89b4f4c58d6",
            "X1-SC1",
            1
        ]
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/storage-controller-psus/1",
            "rel": "self"
        }
    ]
}
```

SSDs

Viewing the List of SSDs

GET /api/json/v2/types/ssds

This command (GET /api/json/v2/types/ssds) displays the list of SSDs.

Example request

```
GET /api/json/v2/types/ssds HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "ssds": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/24",
            "name": "wwn-0x5000cca0131228b4"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/25",
            "name": "wwn-0x5000cca013124b24"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/20",
            "name": "wwn-0x5000cca013118e5c"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/21",
            "name": "wwn-0x5000cca0131185f8"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/22",
            "name": "wwn-0x5000cca013125bdc"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/23",
            "name": "wwn-0x5000cca013121770"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/ssds/1",
            "name": "wwn-0x5000cca013100ee8"
        },
```

```
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/3",
        "name": "wwn-0x5000cca013118260"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/2",
        "name": "wwn-0x5000cca0131009a8"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/5",
        "name": "wwn-0x5000cca01311839c"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/10",
        "name": "wwn-0x5000cca0131181cc"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/13",
        "name": "wwn-0x5000cca013118df8"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/12",
        "name": "wwn-0x5000cca013118950"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/15",
        "name": "wwn-0x5000cca013100898"
    },
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/18",
        "name": "wwn-0x5000cca013118990"
    }
],
"links": [
    {
        "href": "https://vxms-xbrick238/api/json/v2/types/ssds/",
        "rel": "self"
    }
]
}
```

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Output Parameter	Description
diagnostic-health-state	Reflects the health of the SSD device itself. **Values**: • `level_1_clear` - In valid range. • `level_2_unknown` - Cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe problem detected. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe problem detected. Used for a single component failure. • `level_6_critical` - Most severe problem detected.
enabled-state	Indicates whether the SSD is currently enabled or disabled, either by the user or the cluster. **Values:** • `enabled` - The object is currently enabled. If the `health-state` is healthy, this object is active. • `user_disabled` - The user has disabled this object. It is disabled and requires manually activation by the user. • `system_disabled` - The system has deactivated this object. It is disabled and must be reactivated by the user when conditions causing the deactivation no longer exist.
encryption-status	SSD's encryption (Data at Rest) status **Values**: • `enc_disk_status_not_supported` - Used for SSDs that do not support Data at Rest encryption and for HDD. • `enc_disk_status_unlocked` - The SSD supports encryption. However, the SSD is currently not locked. • `enc_disk_status_locked` - The SSD supports encryption, but the PIN is unknown. • `enc_disk_status_locked_cluster_pin` - The SSD supports encryption and is locked with the system's PIN. • `enc_disk_status_unknown_pin_erasable` - The SSD supports encryption and is locked with an unknown, erasable PIN. • `enc_disk_status_unknown_pin_non_erasable` - The SSD supports encryption and is locked with an unknown, non-erasable PIN.

Output Parameter	Description
fru-lifecycle-state	SSD's FRU state, using the generic FRU transition states **Values**: • `healthy` - The FRU is functional (although may not be fully functional) and diagnosed as healthy. • `failed` - The FRU is diagnosed as failed by the system. This includes a failure during the initial system preparation and configuration. • `disconnected` - As far as the system can tell, no FRU is physically present. This includes the detection of a newly-plugged component with a serial number which is different from that of the previous component in the same location. • `uninitialized` - An FRU that has not been initialized passes through this state before initialization. • `initializing` – Indicates a transient state in which the system performs initialization of a component.
fw-version	Current firmware version of the SSD
fw-version-error	Reason for FRU diagnostic failure when a firmware problem exists **Values**: • `invalid_fw_version` - The firmware version is invalid and cannot be used. • `mismatch_fw_version` - The firmware version does not match the target firmware version. It is not optimal, but is usable. • `no_error` - The firmware version used and the target firmware are the same. • `upgrading` - The firmware version is in the process of being upgraded. • `unknown_model` - This FRU model is not supported in this version.
health-state	The SSD's state of health **Values**: • `level_1_clear` - Counter is in valid range. • `level_2_unknown` - The counter cannot be determined. • `level_3_warning` - Least severe problem detected • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe problem detected. • `level_6_critical` - Most severe problem detected.

Output Parameter	Description
hw-revision	Hardware level of the power supply unit **Note**: The value is not always available. GUI and CLI do not display the value when unavailable.
identify-led	Indicates whether the identification LED is illuminated for this SSD. The property value is reflected in the GUI LED icon. **Note**: There is no identification LED in the current PSU. **Values**: • `off` - Identification LED is turned off. • `blinking` - Identification LED is blinking. • `on` - Identification LED is turned on. • `na` - This LED or reading of its value is not supported in the hardware.
index	SSD's index number as defined by the XMS upon its creation (a unique positive number)
io-error-asc	The ASC code of the most recent I/O error (two hex digits)
io-error-ascq	The ASCQ code of the most recent I/O error (two hex digits)
io-error-sense-code	The sense code of an I/O error
io-error-vendor-specific	Vendor-specific information string of the most recent I/O error
iops	SSD's total read and write real-time input/output operations per second
last-io-error-timestamp	Timestamp of last recorded I/O error
last-io-error-type	Defines the last I/O error type. **Values**: • `none` – SSD is not in replace status. • `ssd_error` – SSD returned error on I/O. • `timeout` – I/O timeout, triggered a test for I/O errors.
model-name	Vendor-assigned SSD model name
name	SSD's name
num-bad-sectors	Number of bad sectors, detected in the SSD

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Output Parameter	Description
obj-severity	SSD's severity, based on severity level of current Alerts (Alerts still uncleared) for this SSD **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information . • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
part-number	A string assigned by EMC identifying the part
percent-endurance-remaining	Percentage of SSD endurance remaining
percent-endurance-remaining-level	Event triggerered for any change in this parameter
rd-bw	Total read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rg-id	The index number of DPG associated with this Storage Controller
serial-number	SSD's serial number
slot-num	Slot index in which SSD currently resides, or Slot index into which the currently-disconnected SSD was previously inserted
smart-error-asc	The ASC code of the most recent SMART error (two hex digits)
smart-error-ascq	The ASCQ code of the most recent SMART error (two hex digits)

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Output Parameter	Description
ssd-failure-reason	Reasons for SSD failure **Values**: • `none` - The SSD's fru_lifecycle_state is healthy. • `disconnected` - The reason for the SSD failure was its removal from its physical Slot. **Note**: The value is not cleared when the SSD is re-inserted into its Slot. Value clearance occurs once the SSD health state becomes `healthy`. • `ssd_size_mismatch` - The size of the SSD is different from the SSD's ssd, size parameter. • `wrong_brick` - The SSD is inserted to an X-Brick other than the RG's X-Brick. • `ssd_failed_diagnostics` - The SSD has failed the diagnostic testing (the value for diagnostic_health_state is level_5_major or level_6_critical errors). • ssd_links_failed - Both SSD ports failed (ssd_link1_error_health_state and ssd_link2_error_health_state have level_5_major or level_6_critical errors).
ssd-id	SSD object's identification
ssd-link1-health-state	• Reflects the SSD health state. • Relates to the ports and connected link of the SSD. • Relates to the first port, which should be connected to Storage Controller-1. **Values:** • `level_1_clear` - Healthy - Diagnostic is in valid range. • `level_2_unknown` - The sensor cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe detected problem. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe problem detected. Used for a single component failure. • `level_6_critical` - Most severe problem detected.

Output Parameter	Description
ssd-link2-health-state	• Reflects the SSD health state. • Relates to the ports and connected link of the SSD. • Relates to the second port, which should be connected to SC-2. **Values**: • `level_1_clear` - Healthy - Diagnostic is in valid range. • `level_2_unknown` - The sensor cannot be read or the value cannot be determined for any other reason. • `level_3_warning` - Least severe problem detected. • `level_4_minor` - Detected problem. At least some functionality is possible. • `level_5_major` - Severe problem detected. Used for a single component failure. • `level_6_critical` - Most severe problem detected.
ssd-rg-state	Displays the state of the SSD related to the DPG to which it belongs.
ssd-size	The overall size of the SSD
ssd-size-in-kb	SSD size in KB
ssd-space-in-use	SSD space in use, in KB
ssd-uid	• UID (unique identification) of the SSD that is inserted into the Slot. • Parameter contains a value only if the `slot state` is: `resident_SSD`, `uninitialized_SSD`, or `foreign_XtremAPP_SSD`. Otherwise it is `null`
status-led	LED state, indicating SSD object faults
swap-led	Defines whether a replacement procedure is to be activated when a new SSD is inserted into the DAE. **Values**: • `off` - SSD is not in replace status. • `blinking` - SSD is in replace status.
sys-id	The index number of the cluster this SSD belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
useful-ssd-space	The useful size of this specific SSD
wr-bw	Total write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
xms-id	Object index number of the XMS

Example request by index

```
GET /api/json/v2/types/ssds/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/ssds?name=wwn-0x5000cca0131228b4&cluster-
name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "ssd-size": "390625000",
    "fru-lifecycle-state": "healthy",
    "smart-error-ascq": 0,
    "ssd-failure-reason": "none",
    "percent-endurance-remaining": 99,
    "obj-severity": "information",
    "rd-bw": "0",
    "ssd-link1-health-state": "level_1_clear",
    "serial-number": "0x5000cca02b0555dc",
    "rg-id": [
      "2e8f08c16ee54040a17e8e4f1d121cb4",
      "X1-DPG",
      1
    ],
    "health-state": null,
    "guid": "27032042984b4e279bc4616fc724206b",
    "index": 1,
    "ssd-id": [
      "27032042984b4e279bc4616fc724206b",
      "wwn-0x5000cca02b0555dc",
      1
    ],
    "fw-version": "C260",
    "fw-version-error": "no_error",
    "ssd-space-in-use": "0",
    "last-io-error-timestamp": 0,
    "slot-num": 0,
    "identify-led": "off",
    "io-error-ascq": 0,
    "hw-revision": "",
    "ssd-link2-health-state": "level_1_clear",
    "num-bad-sectors": 0,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
```

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```
      "xms",
      1
    ],
    "ssd-rg-state": "in_rg",
    "io-error-asc": 0,
    "percent-endurance-remaining-level": "ok",
    "io-error-vendor-specific": 0,
    "tag-list": [],
    "io-error-sense-code": 0,
    "bw": "0",
    "ssd-uid": "wwn-0x5000cca02b0555dc",
    "part-number": "118033287",
    "swap-led": "off",
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ],
    "last-io-error-type": "none",
    "diagnostic-health-state": "level_1_clear",
    "name": "wwn-0x5000cca02b0555dc",
    "brick-id": [
      "afdb132f2ff54cceafa7058f16b601a1",
      "X1",
      1
    ],
    "wr-iops": "0",
    "ssd-size-in-kb": 390625000,
    "certainty": "ok",
    "status-led": "off",
    "enabled-state": "enabled",
    "iops": "0",
    "encryption-status": "enc_supported_locked_cluster_pin",
    "smart-error-asc": 0,
    "model-name": "HITACHI  HUSMM814 CLAR400",
    "wr-bw": "0",
    "useful-ssd-space": "390625000",
    "rd-iops": "0"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/ssds/1",
      "rel": "self"
    }
  ]
}
```

SYSLOG Notifier

Viewing the SYSLOG Notifier

GET /api/json/v2/types/syslog-notifier

This command (GET /api/json/v2/types/syslog-notifier) displays the SYSLOG Notifier.

Example request

```
GET /api/json/v2/types/syslog-notifier HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "syslog-notifier": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/syslog-notifier/1",
            "name": "syslog_notifier"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/syslog-notifier/",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
GET /api/json/v2/types/syslog-notifier/1 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/syslog-notifier?name=syslog_notifier HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "index": 1,
        "xms-id": [
            "22b182cb5c0d459d962fe9d559057f2a",
            "xms",
            1
        ],
        "name": "syslog_notifier",
        "obj-severity": "information",
        "guid": "7ad85438ba9949a4afeb0c8917a3220c",
        "enabled": false,
        "targets": []
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/syslog-notifier/1",
            "rel": "self"
        }
    ]
}
```

Tags

Viewing the List of Tags

GET /api/json/v2/types/tags

This command (GET /api/json/v2/types/tags) displays the list of Tags.

Example request

```
GET /api/json/v2/types/tags HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/",
      "rel": "self"
    }
  ],
  "tags": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/1",
      "name": "/Volume"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/3",
      "name": "/SnapshotSet"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/2",
      "name": "/InitiatorGroup"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/5",
      "name": "/Volume/tag2"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/4",
      "name": "/SnapshotSet/MyTag"
```

```
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/7",
      "name": "/Scheduler"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/6",
      "name": "/SnapshotSet/tag3"
    },
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/8",
      "name": "/Scheduler/stag"
    }
  ]
}
```

Example request by index

```
GET /api/json/v2/types/tags/3 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/tags?name=/SnapshotSet HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "index": 3,
        "xms-id": [
            "22b182cb5c0d459d962fe9d559057f2a",
            "xms",
            1
        ],
        "child-list": [
            [
                "9b74680cd9934dcf993f3394c2d98d1d",
                "/SnapshotSet/MyTag",
                4
            ],
            [
                "413dce890c32460a8b6c50dbca6bca17",
                "/SnapshotSet/tag3",
                6
            ]
        ],
        "parent-id": [],
        "color": "#c8c8c8",
        "num-of-direct-objs": 2,
        "object-type": "SnapSet",
        "name": "/SnapshotSet",
        "obj-list": [],
        "caption": "SnapshotSet",
        "num-of-items": 0,
        "creation-time-long": "1443615424000",
        "num-of-children": 2,
        "guid": "da2d42124be84783a0bfb84cea8fc670",
        "direct-list": [
            [
                "9b74680cd9934dcf993f3394c2d98d1d",
                "/SnapshotSet/MyTag",
```

```
                4
        ],
        [
            "413dce890c32460a8b6c50dbca6bca17",
            "/SnapshotSet/tag3",
            6
        ]
    ]
},
"links": [
    {
        "href": "https://vxms-xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/tags/3",
        "rel": "self"
    }
]
}
```

Creating a Tag

POST /api/json/v2/types/tags

This command (POST /api/json/v2/types/tags) enables you to create a Tag.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
entity	The entity type associated (InfinibandSwitch, DAE, Initiator, BatteryBackupUnit, Scheduler, StorageController, DataProtectionGroup, X-Brick, Volume, Cluster, InitiatorGroup, SSD, SnapshotSet, ConsistencyGroup, Target)	Yes
tag-name	Full path Tag name	Yes

Example

```
POST /api/json/v2/types/tags HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"entity":"ConsistencyGroup","tag-name":"TG_Volumes"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/tags/17",
            "rel": "self"
        }
    ]
}
```

Example request by index

```
PUT /api/json/v2/types/tags/1 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"entity-details":"Rev1","entity":"Volume"}
```

Example request by name

```
PUT /api/json/v2/types/tags/?name=/Volume/BI_MAX HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","entity-details":"test","entity":"Volume"}
```

Response

```
200 OK
```

Example request by index

```
DELETE /api/json/v2/types/tags/69 HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"entity-details":"test","entity":"Volume"}
```

Example request by name

```
DELETE /api/json/v2/types/tags?name=/Volume/BI_MAX HTTP/1.1
Host: vxms-xbrickdrm788.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm353","entity-details":"test","entity":"Volume"}
```

Response

```
200 OK
```

Targets

Viewing the Targets List

GET /api/json/v2/types/targets

This command (GET /api/json/v2/types/targets) displays the list of all Targets and their parameters.

Example request

```
GET /api/json/v2/types/targets HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "targets": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/1",
            "name": "X1-SC1-fc1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/3",
            "name": "X1-SC1-iscsi1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/2",
            "name": "X1-SC1-fc2"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/5",
            "name": "X1-SC2-fc1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/4",
            "name": "X1-SC1-iscsi2"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/7",
            "name": "X1-SC2-iscsi1"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/6",
            "name": "X1-SC2-fc2"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/8",
```

```
            "name": "X1-SC2-iscsi2"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/targets/",
            "rel": "self"
        }
```

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Output Parameter	Description
bw	Total read and write bandwidth in MB per second
certainty	Indicates confidence that the XMS and the cluster are synchronized. Value changes from `OK` if a request is sent but the XMS is unable to determine the success of the request.
driver-version	Driver version of the Target object
eth-kbytes-rx	The total Kbytes received. Relevant for iSCSI only.
eth-kbytes-tx	The total number of Kbytes transmitted. Relevant for iSCSI only.
eth-pkt-rx	The number of Ethernet packets received. Relevant for iSCSI only.
eth-pkt-rx-crc-error	The number of Ethernet frames received with CRC error (and thus dropped). Relevant for iSCSI only.
eth-pkt-rx-no-buffer-error	The number of Ethernet packets that failed to be received due to lack of buffer space. Relevant for iSCSI only.
eth-pkt-tx	The number of Ethernet packets transmitted. Relevant for iSCSI only.
eth-pkt-tx-error	The number of packets that failed to be transmitted due to error. Relevant for iSCSI only.
fc-dumped-frames	The Fibre Channel ports' diagnostic counter for dumped frames. Impacts the `port_health_level`.
fc-invalid-crc-count	The Fibre Channel ports' diagnostic counter for invalid CRC count. Impacts the `port_health_level`.
fc-link-failure-count	The Fibre Channel ports' diagnostic counter for failure count. Impacts the `port_health_level`.
fc-loss-of-signal-count	The Fibre Channel ports' diagnostic counter for loss of signal count. Impacts the `port_health_level`.
fc-loss-of-sync-count	The Fibre Channel ports' diagnostic counter for loss of syncronized count . Impacts the `port_health_level`.
fc-prim-seq-prot-err-count	The Fibre Channel ports' diagnostic counter for primary sequential protocol error count. Impacts the `port-health-level`.
fc-seq-retx-req-count	The Fibre Channel ports' diagnostic counter for sequential retransmission request count. Values impact the `port_health_level`.
fw-version	Current firmware version of the Target
index	Target's index number as defined by the XMS upon its creation (a unique positive number)

Output Parameter	Description
iops	Target's total read and write real-time input/output operations per second
jumbo-enabled	Determines whether jumbo frames are supported for this Target. The default value is `false`.
mtu	Maximum valid values for maximum transmission unit sizes are 1500 when non-jumbo frames are enabled and 9216 when jumbo frames are enabled for iSCSI Targets. Applicable for iSCSI only.
name	Target's name as defined by the XMS when creating the Target
node-id	The Storage Controller's index number
obj-severity	Target's severity, based on severity level of current Alerts (Alerts still uncleared) for this Target **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
port-address	The following input format variations are accepted for Fibre Channel Initiators ("X" is a hexadecimal digit – upper case or lower case are allowed): • "XX:XX:XX:XX:XX:XX:XX" • "XXXXXXXXXXXXXXXX" • "0xXXXXXXXXXXXXXXXX" When the Initiator object `port_address` parameter is queried, the value is always returned in a single output format. IQN and EUI formats are allowed for iSCSI Initiators.

Output Parameter	Description
portal-list	• List of all portals (VLAN, IP and Port) associated with the Target. • Relevant only for iSCSI ports. • List is `null` for Fibre Channel ports. • For iSCSI ports, when empty, the port does not accept iSCSI traffic. • When the cluster is initialized, the list shows no Targets (there are no non-empty default values to eliminate IP conflict risks). • Implementation forces a limit upon the maximum number of Target portals. • XMS and managed clusters enforce the uniqueness of all the exposed IP addresses.
port-health-level	Target health level • When any of the port's diagnostic properties show an unexpected value (i.e. a counter is non-0 or if the port is removed from the system) • The highest severity for all properties that contribute to port health level **Note**: Since any non-zero value is an error, no mechanism is used to indicate the threshold, or which counter is out of range.
port-index	• The port number for both Fibre Channel and iSCSI. • Value is either 1 or 2. • Assigned by discovery.
port-mac-addr	MAC address of this target port (relevant for iSCSI Targets only)
port-speed	The negotiated speed of the port (some applicable for Ethernet and some for Fibre Channel)
port-state	State of the Target port (Fibre Channel or iSCSI)
port-type	Port type (Fibre Channel or iSCSI) and port's address
rd-bw	Total read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rd-latency	Real-time average latency of read operations, measured in µs
relative-target-port	Indicates the relative Target port.
small-bw	Current bandwidth of small input/output operations, addressed at the Target
small-iops	Current IOPS of small input/output operations per second, addressed at the Initiator Group
small-rd-bw	Current bandwidth of small input/output operations, addressed at the Target

Output Parameter	Description
small-rd-iops	Current IOPS of small read input/output operations per second, addressed at the Target
small-wr-bw	Current bandwidth of small write input/output operations, addressed at the Target
small-wr-iops	Current IOPS of small write input/output operations per second, addressed at the Target
sys-id	The index number of the cluster this Target belongs to. May be omitted if only one cluster is defined.
tag-list	List of Tags
tar-error-reason	Failure type causing the Target's `target_health_state` not to be `clear`
tar-id	Target's name or the index number
tg-id	The index number of the Target Group this Target object belongs to, if any (and `null` otherwise)
unaligned-bw	Current bandwidth of unaligned input/output operations, addressed at the Target
unaligned-iops	Current IOPS of unaligned input/output operations per second, addressed at the Target
unaligned-rd-bw	Current bandwidth of unaligned input/output operations, addressed at the Target
unaligned-rd-iops	Current IOPS of unaligned read input/output operations per second, addressed at the Target
unaligned-wr-bw	Current bandwidth of unaligned write input/output operation, addressed at the Target
unaligned-wr-iops	Current IOPS of unaligned write input/output operations per second, addressed at the Target
wr-bw	Total write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
wr-latency	Real-time average latency of write operations, measured in µs
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/targets/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrick353
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/targets?name=X1-SC1-fc2&cluster-name=xbrickdrm353
HTTP/1.1
Host: vxms-xbrick353
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "small-iops": "0",
    "port-mac-addr": "",
    "obj-severity": "information",
    "rd-bw": "0",
    "unaligned-rd-bw": "0",
    "driver-version": "v8.02.01-k4-tgt",
    "fc-dumped-frames": "0",
    "iops": "0",
    "port-type": "fc",
    "acc-num-of-small-wr": "0",
    "guid": "9f5589998c1c4b39948b27a33b23d2e3",
    "fc-loss-of-signal-count": "0",
    "acc-num-of-rd": "0",
    "tar-error-reason": "none",
    "port-address": "51:4f:0c:50:2c:8f:4c:01",
    "port-health-level": "level_1_clear",
    "eth-pkt-rx-crc-error": 0,
    "eth-pkt-tx": 0,
    "acc-size-of-wr": "0",
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ],
    "unaligned-rd-iops": "0",
    "eth-kbytes-tx": 0,
    "relative-target-port": 2,
    "wr-latency": "0",
    "eth-pkt-rx-no-buffer-error": 0,
    "acc-num-of-unaligned-rd": "0",
    "unaligned-iops": "0",
    "wr-iops": "0",
```

```
"port-speed": "8GFC",
"fc-prim-seq-prot-err-count": "0",
"name": "X1-SC1-fc2",
"brick-id": [
  "afdb132f2ff54cceafa7058f16b601a1",
  "X1",
  1
],
"acc-num-of-unaligned-wr": "0",
"acc-num-of-wr": "0",
"mtu": 1500,
"acc-size-of-rd": "0",
"unaligned-wr-bw": "0",
"fc-link-failure-count": "1",
"port-state": "up",
"eth-pkt-rx": 0,
"portal-list": [],
"fc-invalid-crc-count": "0",
"index": 2,
"small-rd-bw": "0",
"acc-num-of-small-rd": "0",
"eth-kbytes-rx": 0,
"xms-id": [
  "22b182cb5c0d459d962fe9d559057f2a",
  "xms",
  1
],
"small-wr-bw": "0",
"eth-pkt-tx-error": 0,
"tag-list": [],
"unaligned-bw": "0",
"small-rd-iops": "0",
"fw-version": "v5.08.02",
"tg-id": [
  "6ee7474465534263acbe325d97aa70e6",
  "Default",
  1
],
"tar-id": [
  "9f5589998c1c4b39948b27a33b23d2e3",
  "X1-SC1-fc2",
  2
],
"avg-latency": "0",
"small-wr-iops": "0",
"fc-seq-retx-req-count": 0,
"rd-latency": "0",
"certainty": "ok",
"node-id": [
  "f6cc6280edf044d18dedb89b4f4c58d6",
  "X1-SC1",
  1
],
"unaligned-wr-iops": "0",
"bw": "0",
```

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```
    "port-index": 2,
    "jumbo-enabled": false,
    "rd-iops": "0",
    "wr-bw": "0",
    "fc-loss-of-sync-count": "0",
    "small-bw": "0"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/targets/2",
      "rel": "self"
    }
  ]
}
```

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Response

```
200 OK
```

Target Groups

Viewing the List of Target Groups

GET /api/json/v2/types/target-groups

This command (GET /api/json/v2/types/target-groups) displays the list of Target Groups.

Example request

```
GET /api/json/v2/types/target-groups HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "target-groups": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/target-groups/1",
            "name": "Default"
        },
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/target-groups/1",
            "name": "Default"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/target-groups/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
tag-list	List of Tags
tg-id	The index number of the Target Group this Target object belongs to, if any (and `null` otherwise)
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/target-groups/1?cluster-index=11 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/target-groups?name=Default&cluster-
name=xbrickdrm353Default HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "index": 1,
    "xms-id": [
      "22b182cb5c0d459d962fe9d559057f2a",
      "xms",
      1
    ],
    "name": "Default",
    "obj-severity": "information",
    "tag-list": null,
    "tg-id": [
      "6ee7474465534263acbe325d97aa70e6",
      "Default",
      1
    ],
    "guid": "6ee7474465534263acbe325d97aa70e6",
    "sys-id": [
      "2bffd8cfecf24316b548323f04466cb0",
      "xbrickdrm353",
      1
    ]
  },
  "links": [
```

```
  {
     "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/target-groups/1",
     "rel": "self"
  }
  ]
}
```

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User Accounts

Viewing the List of User Accounts

GET /api/json/v2/types/user-accounts

This command (GET /api/json/v2/types/user-accounts) displays the list of User Accounts.

Example request

```
GET /api/json/v2/types/user-accounts HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "user-accounts": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/user-accounts/2",
            "name": "admin"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/user-accounts/5",
            "name": "admin-487"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/user-accounts/6",
            "name": "TRO"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/user-accounts/",
            "rel": "self"
        }
    ]
}
```

Example request by name

```
GET /api/json/v2/types/user-accounts/?name=admin-487 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "index": 5,
        "password": "xxxxxxx",
        "xms-id": [
            "486d7818922745b5912294620c41a9d5",
            "xms",
            1
        ],
        "name": "admin-487",
        "obj-severity": "information",
        "role": "admin",
        "external-user": false,
        "user-id": [
            "803e3abb5a044ea9ba0457f3ada95b84",
            "admin-487",
            5
        ],
        "guid": "803e3abb5a044ea9ba0457f3ada95b84",
        "inactivity-timeout": 333
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/user-accounts/5",
            "rel": "self"
        }
    ]
}
```

Adding a User Account

POST /api/json/v2/types/user-accounts

This command (POST /api/json/v2/types/user-accounts) enables you to create a new User Account.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
role	User role ('read_only', 'admin', 'configuration', 'technician')	Yes
usr-name	Username	Yes
password	User password	Select one of the following:
public-key	User public key	• password • public-key
inactivity-timeout	Inactivity timeout in minutes	No

Example request

```
POST /api/json/v2/types/user-accounts HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"password":"abracadabra","role":"read_only","usr-name":"bob"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/user-accounts/6",
            "rel": "self"
        }
    ]
}
```

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Volumes

Viewing the Volumes List

GET /api/json/v2/types/volumes

This command (GET /api/json/v2/types/volumes) displays the list of all Volumes and their defined parameters.

Example request

```
GET /api/json/v2/types/volumes HTTP/1.1
Host: vxms-xbrick238.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "volumes": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/volumes/1",
            "name": "DB01-Data"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/volumes/3",
            "name": "DB01-MSDTC"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/volumes/4",
            "name": "DB01-Log.snap.03102015-13:59:07"
        },
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/volumes/6",
            "name": "DB01-Data.snap.03102015-13:59:07"
        }
    ],
    "links": [
        {
            "href": "https://vxms-xbrick238/api/json/v2/types/volumes/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
ancestor-vol-id	Holds the Volume's Snapshot source index number. This parameter points to an object from which the snapshot was created, providing that the "ancestor" object is not deleted, or that `create-snapshot-and-reassign` was not applied.
avg-latency	Total real-time average latency of read and write operations, measured in μs
bw	Total real-time read and write bandwidth in MB per second
certainty	Indicates confidence that the XMS and the cluster are synchronized. The value changes from `OK` if a request is sent while the XMS is unable to determine the success of the request.
created-from-volume	This parameter contains the `snapped_object` Volume name, as it was at the Snapshot's creation time, or `null` when the Volume was not created from a Snapshot. The string remains unchanged when the ancestor is renamed, deleted or reassigned.
creation-time	Volume's creation timestamp
dest-snap-list	Number of Volumes directly Snapshotted from the Volume, and list of their object IDs (if any)
index	Volume's index number as defined by the XMS upon its creation (a unique positive number)
iops	Volume's total read and write real-time input/output operations per second
lb-size	The "sector size" (LB size) of the Volume
logical-space-in-use	The total used Volume capacity in all clusters managed by the XMS
lun-mapping-list	List of LUN mappings currently associated with the Volume, possibly empty, indicating that the Volume is currently unexposed
naa-name	Volume's WWN/NAA name, globally unique and unique over time, set by the XMS (or by cluster) once a LUN is mapped to the Volume for the first time
name	Volume's name
num-of-dest-snaps	Number of Volumes directly Snapshotted from this Volume
num-of-lun-mappings	Number of LUN mappings defined for this Volume

Output Parameter	Description
obj-severity	Volume's severity, based on severity level of current Alerts (Alerts still uncleared) for this Volume **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
rd-bw	Total real-time read bandwidth in MB per second
rd-iops	Total read real-time input/output operations per second
rd-latency	Total real-time average latency of read operations, measured in μs
related-consistency-groups	The Volume's related Consistency Group(s) ID(s), when relevant
small-bw	Current bandwidth of small input/output operations, addressed at the Volume
small-io-alerts	When Volume parameters of `small_io_alerts` is set to `disabled` (default), no Alerts are sent for a high number of small I/Os.
small-iops	Current IOPS of small input/output operations per second
small-io-ratio	The accumulated number of unaligned I/O divided by the total accumulated number of I/Os to the Volume, in percent
small-io-ratio-level	Event triggered whenever the `unaligned-io-ratio` level changes
small-rd-bw	Current bandwidth of small read input/output operations, addressed at the Volume
small-rd-iops	Current IOPS of small read input/output operations
small-wr-bw	Volume's small write bandwidth
small-wr-iops	Current IOPS of small write input/output operations
snapgrp-id	The Volume Snapshot Group (VSG) Index
snapset-list	Lists names of the Snapshot Set containing the selected Snapshot. Value for a Volume is always `null`
snapshot-type	The Snapshot is regular (default) or read-only.

Output Parameter	Description
sys-id	The index number of the cluster this Volume belongs to. May be omitted if only one cluster is defined.
tag-list	Volume's list of Tags
unaligned-bw	Current IOPS of unaligned bandwidth input/output operations
unaligned-io-alerts	When this Volume parameter is set to `disabled` (default), no Alerts are sent for a high number of unaligned I/Os.
unaligned-iops	Unaligned input/output operations per second
unaligned-io-ratio	Accumulated number of unaligned I/O divided by the total accumulated number of I/Os to the Volume, in percent
unaligned-io-ratio-level	Event triggered whenever the `unaligned-io-ratio` level changes
unaligned-rd-bw	Current bandwidth of unaligned read input/output operations
unaligned-rd-iops	Current IOPS of unaligned read input/output operations per second
unaligned-wr-bw	Current bandwidth of unaligned write input/output operations
unaligned-wr-iops	Current IOPS of unaligned write input/output operations per second
vaai-tp-alerts	The VAAI Soft Limit warning for this Volume is reported when monitoring is enabled. The threshold is a cluster–wide value as configured in the cluster `vaai_tp_limit`. The default is `disabled`.
vol-access	Denotes the type of volume and its accesibility.
vol-id	Volume's index number as defined by the XMS upon its creation (a unique positive number)
vol-size	Total provisioned capacity. Volume KB size as exposed to Initiators
vol-type	Denotes the Volume type. **Values**: • `regular` • `readonly`
wr-bw	Total real-time write bandwidth in MB per second
wr-iops	Total write real-time input/output operations per second
wr-latency	Total real-time average latency of write operations, measured in μs
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/volumes/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/volumes?name=tg_vol1&cluster-name=xbrickdrm353 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "small-io-alerts": "disabled",
        "small-iops": "0",
        "wr-latency": "0",
        "vol-id": [
            "1b4e7d6e76c643ee9d7bac4d91d4ed70",
            "tg_vol1",
            1
        ],
        "obj-severity": "information",
        "unaligned-io-alerts": "disabled",
        "unaligned-rd-bw": "0",
        "num-of-dest-snaps": 0,
        "iops": "0",
        "acc-num-of-small-wr": "0",
        "small-io-ratio-level": "ok",
        "guid": "1b4e7d6e76c643ee9d7bac4d91d4ed70",
        "snapshot-type": "regular",
        "logical-space-in-use": "0",
        "unaligned-io-ratio-level": "ok",
        "acc-num-of-rd": "0",
        "index": 1,
        "lb-size": 512,
        "naa-name": "",
        "snapset-list": [],
        "acc-size-of-wr": "0",
        "acc-num-of-small-rd": "0",
        "unaligned-rd-iops": "0",
        "snapgrp-id": [
            "ce145cc99b774fd6b5f4d87384fa810d",
            "",
            1
        ],
        "acc-size-of-rd": "0",
        "created-from-volume": "",
        "ancestor-vol-id": [],
```

```
        "vaai-tp-alerts": "disabled",
        "creation-time": "2015-10-08 03:04:20",
        "rd-bw": "0",
        "xms-id": [
            "22b182cb5c0d459d962fe9d559057f2a",
            "xms",
            1
        ],
        "unaligned-wr-iops": "0",
        "acc-num-of-unaligned-rd": "0",
        "small-wr-bw": "0",
        "tag-list": [],
        "unaligned-iops": "0",
        "num-of-lun-mappings": 0,
        "unaligned-bw": "0",
        "small-rd-iops": "0",
        "unaligned-io-ratio": "0",
        "lun-mapping-list": [],
        "vol-size": "8",
        "wr-iops": "0",
        "sys-id": [
            "2bffd8cfecf24316b548323f04466cb0",
            "xbrickdrm353",
            1
        ],
        "avg-latency": "0",
        "rd-latency": "0",
        "small-wr-iops": "0",
        "small-bw": "0",
        "name": "tg_vol1",
        "acc-num-of-unaligned-wr": "0",
        "related-consistency-groups": [],
        "certainty": "ok",
        "vol-type": "regular",
        "acc-num-of-wr": "0",
        "small-io-ratio": "0",
        "vol-access": "write_access",
        "unaligned-wr-bw": "0",
        "bw": "0",
        "small-rd-bw": "0",
        "alignment-offset": 0,
        "dest-snap-list": [],
        "rd-iops": "0",
        "wr-bw": "0"
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/volumes/1",
            "rel": "self"
        }
    ]
}
```

Adding a New Volume

POST /api/json/v2/types/volumes

This command (POST /api/json/v2/types/volumes) enables you to create a new Volume.

For this command, input parameters (as described in the following table), should be entered in the body.

Input Parameter	Description	Mandatory
cluster-id	Cluster's name or index number	• No – for a single cluster configuration • Yes – for a multiple cluster configuration
vol-name	Volume's name	Yes
vol-size	• The Volume's disk space size in: K (KB) / M (MB) / G (GB) / T (TB) / P (PB), limited to 1 PB • The minimum Volume size is 1 MB. • Volume size must be in multiples of 8 KB. • Does not indicate the actual SSD space consumed by Volume. • Must be an integer greater than 0.	Yes
alignment-offset	The alignment offset for Volumes of 512 LB size is between 0 and 7. If omitted, the offset value is 0. Volumes of logical block size 4096 must not be defined with an offset.	No
lb-size	Logical block size in bytes. Can either be 512 or 4096 bytes.	No
small-io-alerts	Enable or disable small input/output Alerts.	No
unaligned-io-alerts	Enable or disable unaligned I/O Alerts.	No
vaai-tp-alerts	Enable or disable VAAI TP Alerts.	No

Example request

```
POST /api/json/v2/types/volumes HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache

{"cluster-id":1,"vol-name":"TGvol","vol-size":"8m"}
```

Response

```
{
    "links": [
        {
            "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/volumes/47",
            "rel": "self"
        }
    ]
}
```

Inout Parameter	Description	Mandatory
vol-size	• The Volume's disk space size in: K (KB) / M (MB) / G (GB) / T (TB) / P (PB), limited to 2 PB • The minimum Volume size is 1 MB. • Volume size must be in multiples of 8 KB. • Reflects the Volume size available to Initiators. • Does not indicate the actual SSD space consumed by Volume. • Must be an integer greater than 0.	

Note: A cluster can also be defined as `cluster-name` or `cluster-index` in the URL, however the cluster definition should only be entered in one location, either the URL or the body.

Example request by index

```
PUT /api/json/v2/types/volumes/78 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":2,"small-io-alerts":"enabled"}
```

Example request by name

```
PUT /api/json/v2/types/volumes/?name=DB10 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache

{"cluster-id":"xbrickdrm788","small-io-alerts":"disabled"}
```

Response

```
200 OK
```

X-Bricks

Viewing the X-Bricks

GET /api/json/v2/types/bricks

This command (GET /api/json/v2/types/bricks) displays the list of all X-Bricks.

Example request

```
GET /api/json/v2/types/bricks HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "bricks": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/bricks/1",
            "name": "X1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/bricks/1",
            "name": "X1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/bricks/2",
            "name": "X2"
        },
        {
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/bricks/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	X-Brick severity, based on severity level of current Alerts (Alerts still uncleared) for this X-Brick **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
rg-id	The index number of DPG associated with this X-Brick
ssd-slot-array	Information on whether the X-Brick's Slots are empty, what SSDs are detected, etc. Information is updated both for SSDs with an SSD object and for SSDs without one. Information may be slightly inaccurate (reflects state as it was 10-20 seconds earlier).
sys-id	The index number of the cluster this X-Brick belongs to. Maybe omitted if only one cluster is defined.
tag-list	List of Tags
ups-list	List of BBUs attached to the X-Brick. List is of size 1 for multiple X-Brick clusters and of size 2 for a single X-Brick cluster.
xms-id	XtremIO Management Server's index number

Example request by index

```
GET //api/json/v2/types/bricks/1?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/bricks?name=X1&cluster-name=xbrickdrm353HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0OxMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "node-list": [
            [
                "6f18835f9d304826bc492c17d5012da3",
                "X1-SC1",
                1
            ],
            [
                "900c099de0b54aed865942966abb9db8",
                "X1-SC2",
                2
            ]
        ],
        "xms-id": [
            "486d7818922745b5912294620c41a9d5",
            "xms",
            1
        ],
        "brick-guid": "075461b882fe4ec889c671acb3fd29c9",
        "sys-id": [
            "6c54fc0b828543c99054c1ed6fcbad37",
            "xbrickdrm487",
            1
        ],
        "obj-severity": "information",
        "brick-state": "in_sys",
        "tag-list": [],
        "num-of-ssds": 13,
        "rg-id": [
            "6230c38bdca345ec9f087649bd1a7e8c",
            "X1-DPG",
            1
        ],
        "guid": "152cca38fd40402c822bf124ee59e436",
        "index-in-system": 1,
        "index": 1,
        "num-of-nodes": 2,
        "name": "X1",
        "brick-id": [
            "152cca38fd40402c822bf124ee59e436",
            "X1",
            1
        ],
        "jbod-list": [
            [
                "6db00aae674148b4a632b0a9e0791a16",
                "X1-DAE",
                1
            ]
        ],
```

```
        "ssd-slot-array": [
            [
                0,
                "resident_ssd",
                "none",
                [
                    "7820dd9f6df042369acab3ccaef6f586",
                    "wwn-0x5000cca02b062af4",
                    1
```

```
            [
                24,
                "empty",
                "none",
                [],
                "7c2d52656e656e2048616c6c616b2d7c",
                "none",
                "0",
                "0",
                "none"
            ]
        ],
        "ups-list": [
            [
                "83fe9fd5f680498c9bf6cad1e664be1e",
                "X1-BBU",
                1
            ],
            [
                "d5ee33084525424993c003cafbd44fd1",
                "X2-BBU",
                2
            ]
        ]
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/bricks/1",
            "rel": "self"
        }
    ]
}
```

XEnvs

Viewing XEnvs

GET /api/json/v2/types/xenvs

This command (GET /api/json/v2/types/xenvs) displays the list of XEnvs.

Example request

```
GET /api/json/v2/types/xenvs HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "xenvs": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/1",
            "name": "X1-SC1-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/3",
            "name": "X1-SC2-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/2",
            "name": "X1-SC1-E2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/4",
            "name": "X1-SC2-E2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/1",
            "name": "X1-SC1-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/3",
```

```
            "name": "X1-SC2-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/2",
            "name": "X1-SC1-E2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/5",
            "name": "X2-SC1-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/4",
            "name": "X1-SC2-E2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/1",
            "name": "X1-SC1-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/3",
            "name": "X1-SC2-E1"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/2",
            "name": "X1-SC1-E2"
        },
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/4",
            "name": "X1-SC2-E2"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
obj-severity	XEnv's severity, based on severity level of current Alerts (Alerts still uncleared) for this XEnv **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
sys-id	The index number of the cluster this XEnv belongs to. May be omitted if only one cluster is defined
tag-list	List of Tags
xenv-id	XEnv's index number
xenv-state	Health state of the XEnv
xms-id	XtremIO Management Server's index number

Example request by index

```
GET /api/json/v2/types/xenvs/3?cluster-index=1 HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/xenvs/?name=X1-SC2-E1&cluster-name=xbrickdrm353
HTTP/1.1
Host: vxms-xbrickdrm353.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "content": {
        "num-of-mdls": 3,
        "index": 3,
        "guid": "fa5c83f93988456698298bc76fcaa5cc",
        "xms-id": [
            "486d7818922745b5912294620c41a9d5",
            "xms",
            1
        ],
        "name": "X1-SC2-E1",
        "xenv-id": [
            "fa5c83f93988456698298bc76fcaa5cc",
            "X1-SC2-E1",
            3
        ],
        "brick-id": [
            "152cca38fd40402c822bf124ee59e436",
            "X1",
            1
        ],
        "obj-severity": "information",
        "tag-list": null,
        "sys-id": [
            "6c54fc0b828543c99054c1ed6fcbad37",
            "xbrickdrm487",
            1
        ],
        "cpu-usage": 18,
        "csid": 12,
        "xenv-state": "active",
        "node-id": [
            "900c099de0b54aed865942966abb9db8",
            "X1-SC2",
            2
        ]
    },
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xenvs/3",
            "rel": "self"
        }
    ]
}
```

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XMS

Viewing the XMS

GET /api/json/v2/types/xms

This command (GET /api/json/v2/types/xms) displays a list of the XMSs.

Example request

```
GET /api/json/v2/types/xms HTTP/1.1
Host: vxms-xbrickdrm487.xiodrm.lab.emc.com
Authorization: Basic YWRtaW46WHRyZW0xMA==
Cache-Control: no-cache
```

Response

```
{
    "xmss": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xms/1",
            "name": "xms"
        }
    ],
    "links": [
        {
            "href": "https://vxms-
xbrickdrm487.xiodrm.lab.emc.com/api/json/v2/types/xms/",
            "rel": "self"
        }
    ]
}
```

Output Parameter	Description
iops	The aggregated value of total read and write real-time input/output operations per second from all clusters managed by the XMS
iops-by-block	Input/output per second by block (current aggregated input/output per second, handled by all clusters managed by the XMS)
ip-version	The IP version used by the XMS for both southbound (towards clusters) and northbound
logs-size	The aggregated log size of all clusters managed by the XMS, measured in Kbytes
max-recs-in-event-log	The aggregated value of maximum records in the Event Logs of all clusters managed by the XMS
memory-utilization-level	Monitors the aggregated free memory on all clusters managed by the XMS
mgmt-interface	The physical network interface used by the XMS to communicate with the clusters
mode	Determines whether NTP is automatically or manually configured.
name	Name of the XMS
ntp-servers	List of NTP servers
num-of-igs	The aggregated value of Initator Groups that currently exist in all clusters managed by the XMS
num-of-iscsi-routes	The aggregated amount of iSCSI routes for all clusters managed by the XMS
num-of-systems	The number of clusters managed by the XMS
obj-severity	The XMS's severity, based on severity level of current Alerts (Alerts still uncleared) for this XMS **Values**: • `clear` - No Alerts exist for this entity. • `information` - The highest severity for this entity and all contained objects is information. • `minor` - The highest severity for this entity and all contained objects is minor. • `major` - The highest severity for this entity and all contained objects is major. • `critical` - The highest severity for this entity and all contained objects is critical.
overall-efficiency-ratio	The aggregated value of the ratio of provisioned Volume capacity to the cluster's actual used physical capacity
ram-total	Total available RAM for all clusters managed by the XMS

Output Parameter	Description
ram-usage	RAM usage for all clusters managed by the XMS
rd-bw	The aggregated value of real-time read bandwidth from all clusters managed by the XMS
rd-bw-by-block	The aggregated value of bandwidth handled by all clusters managed by the XMS
rd-iops	IOPS of small input/output operations per second
rd-iops-by-block	The aggregated value of aggregated input/output per second handled by all clusters managed by the XMS
rd-latency	XMS's total real-time average latency of read operations, measured in µs
recs-in-event-log	The aggregated value of records that are currently in the log for all clusters managed by the XMS
restapi-protocol-version	Exposes the supported RESTful API version
server-name	The fully qualified name of the XMS server
sw-version	XMS software version. This version should be identical to the cluster's software version, unless it is undergoing a special process (e.g. upgrade).
thin-provisioning-savings	The aggregated value of percentage of Volume capacity not in use
uptime	The aggregated number of seconds passed since the XMS was last rebooted
version	The installed XtremIO XMS version
wr-bw	The aggregated value of total real-time write bandwidth of all clusters managed by the XMS, in MB per second
wr-bw-by-block	The aggregated value of current bandwidth for all clusters managed by the XMS, used to get a Snapshot of the aggregated totals by block size
wr-iops	The aggregated value of total write real-time input/output operations per second from all clusters managed by the XMS
wr-iops-by-block	The aggregated value of input/output per second handled by all clusters managed by the XMS
wr-latency	Cluster's aggregated value of total real-time average latency of write operations, measured in µs
wrong-cn-in-csr	Triggers an Alert if the default CSR (Certificate Signing Request) contains CN which is not the XMS's FQDN.

Output Parameter	Description
xms-gw	XMS's default gateway IP address
xms-id	The index number of the XMS object
xms-ip	IP address of the XMS
xms-ip-sn	XMS IP address and subnetmask. The XMS IP address is optional. It is not required if this command is only used to update the Storage Controller's IP or IPMI addresses.

Example request by index

```
GET /api/json/v2/types/xms/1 HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Example request by name

```
GET /api/json/v2/types/xms?name=xms HTTP/1.1
Host: vxms-xbrick238
Authorization: Basic YWRtaW46WHRyZW0wMA==
Cache-Control: no-cache
```

Response

```
{
  "content": {
    "wr-latency": "11300",
    "max-recs-in-event-log": 2000000,
    "top-n-igs-by-iops": [
      [
        [
          "7b571f0cb53446ccb235353de374d71e",
          "IG1",
          1
        ],
        "1308552",
        "1283726",
        "20266",
        "18352",
        "2592278",
        "38618",
        "xbrickdrm788",
        2
      ],
      [
        [
          "cb6c85975f8e418da52f59bdfec706d4",
          "LG707",
```

```
        2
    ],
    "27909",
    "19184",
    "14263",
    "17115",
    "47093",
    "31378",
    "xbrickdrm353",
    1
],
[
    [
        "2f0700d543964133909d4b80de1998ed",
        "LG708",
        3
    ],
    "1019221",
    "616962",
    "5373",
    "3871",
    "1636183",
    "9244",
    "xbrickdrm353",
    1
],
[
    [
        "c895fa6bd68043159f6521453accb1f6",
        "LG705",
        4
    ],
    "3525",
    "84717",
    "7062",
    "957",
    "88242",
    "8019",
    "xbrickdrm353",
    1
],
[
    [
        "5c04aec42c2e4930b018c23de6c43dec",
        "IG2",
        2
    ],
    "27820",
    "158763",
    "1590",
    "3446",
    "186583",
    "5036",
```

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```
        "xbrickdrm788",
        2
      ],
      [
        [
          "da1993535e714f3c9729ec4823caaf33",
          "LG706",
          1
        ],
        "0",
        "0",
        "0",
        "0",
        "0",
        "0",
        "xbrickdrm353",
        1
      ]
    ],
    "wr-iops-by-block": "48583",
    "ram-total": "3924680",
    "datetime": "2015-10-19 11:13:31 EDT",
    "rd-bw-by-block": "2163417",
    "iops": "92348",
    "logs-size": "68417081",
    "guid": "22b182cb5c0d459d962fe9d559057f2a",
    "index": 1,
    "uptime": "60 days, 3:19:53.040000",
    "wr-bw-by-block": "2387115",
    "db-version": "4.0.2",
    "server-name": null,
    "num-of-iscsi-routes": 1,
    "sw-version": "4.0.2-31",
    "rd-iops-by-block": "43765",
    "top-n-volumes-by-latency": [
      [
        [
          "c94b22eae8d942cebac692274f334bb0",
          "HR_Vol3",
          83
        ],
        "1179",
        "569",
        "594",
        "618",
        "15047",
        "15665",
        "xbrickdrm353",
        1
      ],
      [
        [
          "ce8da457f6504b18b5290486ffb50b46",
          "HR_Vol5",
          85
```

```
          ],
          "1430",
          "835",
          "1352",
          "13645",
          "2067",
          "15712",
          "xbrickdrm353",
          1
        ],
        [
          [
            "56ae01bab3b749ae865419f15a776fbf",
            "HR_Vol1",
            80
          ],
          "897",
          "897",
          "897",
          "1936",
          "2721",
          "4657",
          "xbrickdrm353",
          1
        ],
        [
          [
            "9612a3cc767c42448b9596277e3f05a9",
            "HR_Vol2",
            82
          ],
          "2933",
          "2001",
          "2614",
          "1708",
          "887",
          "2595",
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            "HR_Vol7",
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          "2914",
          "7067",
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```

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```
           1
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        "1214",
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    "version": "4.0.2",
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    "obj-severity": "information",
    "overall-efficiency-ratio": "3.80832952128",
    "bw-by-block": "4550532",
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        "1283726",
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        "18352",
        "2592278",
        "38618",
        "xbrickdrm788",
        2
      ],
```

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```
[
  [
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    3
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  "5373",
  "3871",
  "1636183",
  "9244",
  "xbrickdrm353",
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],
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    "IG2",
    2
  ],
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  "1590",
  "3446",
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  "8019",
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],
[
  [
    "cb6c85975f8e418da52f59bdfec706d4",
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  ],
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  "19184",
```

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```
      "14263",
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],
"num-of-igs": 6,
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   "xms",
   1
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"allow-empty-password": false,
"disk-space-secondary-utilization-level": "healthy",
"num-of-systems": 2,
"recs-in-event-log": 18683,
"bw": "4550532",
"disk-space-utilization-level": "healthy",
"default-user-inactivity-timeout": 10,
"wr-iops": "48583",
"build": "31",
"thin-provisioning-savings": "12",
"memory-utilization-level": "healthy",
"xms-ip-sn": "255.255.240.0",
"avg-latency": "10353",
"rd-latency": "9213",
"xms-ip": "10.103.224.119",
"num-of-user-accounts": 4,
"name": "xms",
"days-in-num-event": 19,
"wrong-cn-in-csr": false,
"mgmt-interface": "eth0",
"iops-by-block": "92348",
"ram-usage": "781240",
"restapi-protocol-version": "2.0",
"mode": "automatic",
"ntp-servers": [
```

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```
      "10.254.140.21"
    ],
    "rd-iops": "43765",
    "wr-bw": "2387115",
    "cpu": "10.06"
  },
  "links": [
    {
      "href": "https://vxms-
xbrickdrm353.xiodrm.lab.emc.com/api/json/v2/types/xms/1",
      "rel": "self"
    }
  ]
}
```

Appendix A – RESTful API Versions

RESTful API Version 2.0 enhancements include:

- Backward Compatibility
- Tags (Folders Feature Replacement)
- Enhanced Snapshots Management
- New Snapshot Operations
- New REST Object Support

RESTful API Version 2.1 enhancements include:

- Filtering Logic Enhancements
- New Objects

RESTful API Version 2.0 Enhancements

Backward Compatibility

Compatibility Policy

RESTful API resources and any related representations are maintained in a backward compatible manner, wherever possible.

The following guidelines define the XtremIO RESTful API backward compatibility policy:

- Command names are maintained.
- Command authorizations are maintained. The number of users can be increased (but not reduced).
- No parameters are removed.
- Parameters names and types are maintained.
- New parameters may be added.
- The order of parameters in a response may vary.
- Object values (such as `name`) may change for any object type other than `enum`, for which new values may be added, but existing values are maintained.
- Any bugs in the RESTful API are fixed.
- RESTful API Version 1.0 commands are transparently translated to support new Snapshot command syntax (snapshot-object-type = Volume).

Tags (Folders Feature Replacement)

XtremIO Storage Array Versions 4.0 and 4.0.1 introduced 'Tag' objects. Tags are used for assigning named (GUI) identifiers to any object type within the cluster, bringing enhanced object filtering and isolation capabilities for improved management and monitoring of the XtremIO clusters.

Tags are created and managed per object type. Therefore, to tag both Volumes and Initiator Groups with a specific Tag name (e.g. Production), you should create a Tag with the same name for both Volumes and Initiator Groups.

The RESTful API Tags are fully backward compatible with the deprecated Folders feature. Folders management calls are supported in RESTful API Version 1.0. Folders-related API calls are translated internally to a Tag-realated management call. Therefore, for example, if you create a Volume Folder using RESTful API Version 1.0, this call will be translated to creating a Tag of object type Volume.

The naming convention of a Tag is different than that of a Folder. Because Tags are generic and supported across all cluster object types, when creating an object of a certain type, the Tag is assigned a prefix with the object-type. For example, if you create a Volume Tag named "Production", the official name of the Tag will be "/volume/Production". However, in order to maintain backward compatibility, the object-type prefix is hidden and not required for all RESTful API Version 1.0 folder commands.

Taggable Objects

The following objects can be tagged:

- Battery Backup Units
- Clusters
- Consistency Groups
- DAEs
- Data Protection Groups
- InfiniBand Switches
- Initiator Groups
- Initiators
- Local Disks
- Schedulers
- Snapshot Sets
- SSDs
- Storage Controllers
- Targets
- Volumes
- X-Bricks

Enhanced Snapshots Management

XtremIO offers the following tools for managing Snapshots and optimizing their usability:

- Consistency Groups
- Snapshot Sets
- Read-Only Snapshots
- Scheduler

Consistency Groups

Consistency Groups (CG) are used to create a consistent image of a set of Volumes, usually used by a single application, such as a database. With XtremIO CGs, you can create a Snapshot of all Volumes in a group, using a single command. This ensures that all Volumes are created at the same time. Many operations that are applied on a single Volume can also be applied on a CG.

Snapshot Sets

A Snapshot Set is a point-in-time group of Snapshots that have been taken from a single Snapshot operation on a Volume, group of Volumes, Consistency Group, or on another Snapshot Set.

Snapshot Sets are not manageable. However, you can take a Snapshot on a Snapshot Set, and Volumes can be mapped to other host applications.

Read-Only Snapshots

XtremIO Snapshots can be created either as writable (default) or as read-only, in order to provision for local backup and immutable copies. A Read-Only Snapshot can be mapped to an external host, such as a backup application. However, it is not possible to write to it. Once created as read-only, a Snapshot cannot be modified to be writeable.

Scheduler

The Scheduler can be used for local protection use cases. It can be applied to a Volume, a CG or a Snapshot Set. Each Scheduler can be defined to run at an interval of seconds, minutes or hours. Alternatively, a Scheduler can be set to run at a specific time of a specific day or days of a week. Each Scheduler has a retention policy, based on the number of copies the customer would like to hold or based on the age of the oldest Snapshot.

New Snapshot Operations

XtremIO has introduced the following new Snapshot operations:

* Snapshots can be taken on multiple object types (Volumes, Consistency Groups and Snapshot Sets).
* Snapshots can be used to restore data when the source of the Snapshot has been compromised.
* Snapshots (local backup copies) can be used to restore a Volume, in case of logical data corruption.
* Development and Test, DWH and Real-Time Analytics environments management (Refresh).
* Snapshots can be used to create copies, and then to refresh the copies with more current data.

Refresh

XtremIO enables taking Snapshots on an existing Volume, Volume list, Consistency Group or Snapshot Set. It also enables refreshing the Snapshot data to that of a source Volume's current state and at a later stage, without the need to explicitly perform LUN mapping to provide access for the newly refreshed Snapshot data. Initial mapping of the 'to-be-refreshed' Snapshot needs to be performed.

The following examples are use cases, supported by Refresh:

◆ Backup of production environment/DWH/Real-Time Analytics: A Snapshot Set, taken of a Consistency Group with production Volumes, is mapped to a different host at a certain point in time. It is then refreshed periodically with data from the source Consistency Group (with production Volumes).

◆ Refresh 'Development and Test' environments from a 'master copy' made from the production environment: The 'master copy' is a Snapshot Set taken at a certain point in time from the Consistency Group with production Volumes. The Development and Test environment is a Snapshot Set that was initially taken from the production Consistency Group or the initial 'master copy', and is mapped to a different host. The Development and Test environment is refreshed periodically from a new master copy that was created from the production environment.

Restore

The Restore feature enables you to restore a Volume for an immutable local Snapshot copy. This is required if a logical corruption is encountered on the production server. The production server can then be restored with an uncorrupted local.

New REST Object Support

XtremIO RESTful API Version 2.0 introduces newly-supported objects which were previously only supported via the CLI.

The newly-supported objects in RESTful API Version 2.0 are:

- Alerts
- Alert Definitions
- BBUs
- Consistency Groups
- Consistency Group Volumes
- DAEs
- DAE Controllers
- DAE PSUs
- Email Notifiers
- InfiniBand Switches
- LDAP Configurations
- Local Disks
- Object Performance
- Schedulers
- Slots
- Snapshot Sets
- SNMP Notifier
- Storage Controller PSUs
- SYSLOG Notifier
- Tags
- User Accounts
- XMS

RESTful API Version 2.1 Enhancements

Filtering Logic Enhancements

- Added OR Logic to support OR logics between a selected parameters.
- Added filters:
    - Great than (gt)
    - Greater or equal to (ge)
    - Less than (lt)
    - Less than or equal to (le)
    - Like

New Objects

- Discover Initiators

    ```
    GET /api/json/v2/types/discover-initiators
    ```

- Initiators Connectivity

    ```
    GET /api/json/v2/types/initiators-connectivity
    ```

Appendix B – RESTful API Changes

Changes from Ver. 3.0.X to Ver. 4.0

The following tables list the XtremIO Storage Array RESTful API parameters that have changed from version 3.0.1 to version 4.0.

Table 5: Clusters

Parameter	Added	Removed	Changed
brick-id	No	Yes	N/A
cluster-expansion-in-progress	Yes	No	N/A
compression-factor-last-sample	No	Yes	N/A
debug-create-timeout	Yes	No	N/A
num-of-critical-alerts	Yes	No	N/A
num-of-igs	Yes	No	N/A
num-of-internal-vols	Yes	No	N/A
num-of-major-alerts	Yes	No	N/A
num-of-minor-alerts	Yes	No	N/A
obfuscate-debug	Yes	No	N/A
odx-mode	Yes	No	N/A
os-upgrade-in-progress	Yes	No	N/A
psnt-part-number	Yes	No	N/A
rd-bw-32kb	Yes	No	N/A
rd-latency-1mb	Yes	No	N/A
rg-max-ud-allowed	No	Yes	N/A
rg-min-ud-guaranteed	No	Yes	N/A
rg-min-ud-guaranteed-in-ssd-units	No	Yes	N/A
ssh-firewall-mode	Yes	No	N/A
sys-psnt-part-number	No	Yes	N/A
tag-list	Yes	No	N/A
under-maintenance	Yes	No	N/A
unequal-raid-groups-level	No	Yes	N/A
vaai-tp-limit	No	Yes	N/A

Table 5: Clusters

Parameter	Added	Removed	Changed
wr-iops-4kb	Yes	No	N/A

Table 6: X-Bricks

Parameter	Added	Removed	Changed
index	Yes	No	N/A
index-in-system	Yes	No	N/A
name	Yes	No	N/A
ups-list	Yes	No	N/A

Table 7: XEnvs

Parameter	Added	Removed	Changed
csid	Yes	No	N/A
num-of-mdls	Yes	No	N/A

Table 8: Storage Controllers

Parameter	Added	Removed	Changed
avg-node-temperature	Yes	No	N/A
free-disk-space	Yes	No	N/A
ib1-link-downed	Yes	No	N/A
ib1-link-downed-per-long-period	Yes	No	N/A
ib1-link-downed-per-minute	Yes	No	N/A
ib1-link-error-recoveries	Yes	No	N/A
ib1-link-error-recoveries-per-long-period	Yes	No	N/A
ib1-link-error-recoveries-per-minute	Yes	No	N/A
ib1-local-link-integrity-errors	Yes	No	N/A
ib1-local-link-integrity-errors-per-long-period	Yes	No	N/A

Table 8: Storage Controllers

Parameter	Added	Removed	Changed
ib1-local-link-integrity-errors-per-minute	Yes	No	N/A
ib1-port-rcv-errors	Yes	No	N/A
ib1-port-rcv-errors-per-long-period	Yes	No	N/A
ib1-port-rcv-errors-per-minute	Yes	No	N/A
ib1-port-rcv-remote-physical-errors	Yes	No	N/A
ib1-port-rcv-remote-physical-errors-per-long-period	Yes	No	N/A
ib1-port-rcv-remote-physical-errors-per-minute	Yes	No	N/A
ib1-symbol-errors	Yes	No	N/A
ib1-symbol-errors-per-long-period	Yes	No	N/A
ib1-symbol-errors-per-minute	Yes	No	N/A
ib2-link-downed	Yes	No	N/A
ib2-link-downed-per-long-period	Yes	No	N/A
ib2-link-downed-per-minute	Yes	No	N/A
ib2-link-error-recoveries	Yes	No	N/A
ib2-link-error-recoveries-per-long-period	Yes	No	N/A
ib2-link-error-recoveries-per-minute	Yes	No	N/A
ib2-local-link-integrity-errors	Yes	No	N/A
ib2-local-link-integrity-errors-per-long-period	Yes	No	N/A
ib2-local-link-integrity-errors-per-minute	Yes	No	N/A
ib2-port-rcv-errors	Yes	No	N/A
ib2-port-rcv-errors-per-long-period	Yes	No	N/A
ib2-port-rcv-errors-per-minute	Yes	No	N/A
ib2-port-rcv-remote-physical-errors	Yes	No	N/A
ib2-port-rcv-remote-physical-errors-per-long-period	Yes	No	N/A
ib2-port-rcv-remote-physical-errors-per-minute	Yes	No	N/A
ib2-symbol-errors	Yes	No	N/A

Table 8: Storage Controllers

Parameter	Added	Removed	Changed
ib2-symbol-errors-per-long-period	Yes	No	N/A
ib2-symbol-errors-per-minute	Yes	No	N/A
index	Yes	No	N/A
ipmi-addr-subnet	Yes	No	N/A
ipmi-gw-ip	Yes	No	N/A
jbod-lcc-discovery-needed	Yes	No	N/A
mgmt-gw-ip	Yes	No	N/A
mgmt-port-duplex	Yes	No	N/A
node-high-file-descriptors	Yes	No	N/A
node-low-ram	Yes	No	N/A
node-mgr-addr-subnet	Yes	No	N/A
os_upgrade_current_step	Yes	No	N/A
remote-journal-health-state	Yes	No	N/A
sas1-port-misconfiguration	Yes	No	N/A
sas2-port-misconfiguration	Yes	No	N/A
sc_start_timestamp	Yes	No	N/A
sc-power-buttons	Yes	No	N/A
sc-start-timestamp-display	Yes	No	N/A
ups-prev-day-uptime	Yes	No	N/A
ups-uptime	Yes	No	N/A

Table 9: Data Protection Groups

Parameter	Added	Removed	Changed
name	Yes	No	N/A
rebalance-in-progress	Yes	No	N/A
rebalance-progress	Yes	No	N/A
rebuild-progress	Yes	No	N/A
ssd-preparation-progress	Yes	No	N/A
tag-list	Yes	No	N/A

Table 10: Volumes

Parameter	Added	Removed	Changed
acc-num-of-unaligned-wr	Yes	No	N/A
acc-num-of-wr	Yes	No	N/A
acc-size-of-rd	Yes	No	N/A
certainty	Yes	No	N/A
name	Yes	No	N/A
owner	Yes	No	N/A
permissions	Yes	No	N/A
permissions-text	Yes	No	N/A
small-bw	Yes	No	N/A
small-io-ratio	Yes	No	N/A
small-rd-iops	Yes	No	N/A
small-wr-iops	Yes	No	N/A
snapsets	Yes	No	N/A
tag-list	Yes	No	N/A
unaligned-io-ratio	Yes	No	N/A
unaligned-wr-bw	Yes	No	N/A
unaligned-wr-iops	Yes	No	N/A

Table 11: Snapshots

Parameter	Added	Removed	Changed
certainty	Yes	No	N/A
owner	Yes	No	N/A
permissions	Yes	No	N/A
permissions-text	Yes	No	N/A

Table 12: Initiators

Parameter	Added	Removed	Changed
authentication-chap-initiators-missing-credentials	Yes	No	N/A
certainty	Yes	No	N/A
discovery-chap-initiators-missing-credentials	Yes	No	N/A

Table 13: Initiator Groups

Parameter	Added	Removed	Changed
certainty	Yes	No	N/A

Table 14: Targets

Parameter	Added	Removed	Changed
certainty	Yes	No	N/A
eth-kbytes-rx	Yes	No	N/A
eth-kbytes-tx	Yes	No	N/A
eth-pkt-rx	Yes	No	N/A
eth-pkt-rx-crc-error	Yes	No	N/A
eth-pkt-rx-no-buffer-error	Yes	No	N/A
eth-pkt-tx	Yes	No	N/A
eth-pkt-tx-error	Yes	No	N/A
fc-seq-retx-req-count	Yes	No	N/A
port-mac-addr	Yes	No	N/A
relative-target-port	Yes	No	N/A
unaligned-wr-iops	Yes	No	N/A

Table 15: iSCSI Portals

Parameter	Added	Removed	Changed
certainty	No	Yes	N/A

Table 16: LUN Mapping

Parameter	Added	Removed	Changed
certainty	Yes	No	N/A
index	Yes	No	N/A
name	Yes	No	N/A

Table 17: SSDs

Parameter	Added	Removed	Changed
certainty	Yes	No	N/A

Changes from Ver. 4.0 to Ver. 4.0.2

The following tables list the XtremIO Storage Array RESTful API parameters that have changed from version 4.0 to version 4.0.2.

Table 18: Data Protection Groups

Parameter	Added	Removed	Changed
proactive-metadata-loading	Yes	No	N/A

Table 19: Alerts

Parameter	Added	Removed	Changed
oid	No	Yes	N/A

Table 20: Alert Definitions

Parameter	Added	Removed	Changed
oid	No	Yes	N/A

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Changes from Ver. 4.0.2 to Ver. 4.2.0

The following tables list the XtremIO Storage Array RESTful API parameters that have changed from version 4.0.2 to version 4.2.0.

Table 21: Alerts

Parameter	Added	Removed	Changed
command	No	No	Yes

Table 22: Consistency Group Volumes

Parameter	Added	Removed	Changed
vol-access	No	No	Yes

Table 23: Clusters

Parameter	Added	Removed	Changed
debug-createtimeout	No	Yes	N/A
iscsi-tcp-port	No	Yes	N/A
obfuscate-debug	No	Yes	N/A
odx-mode	No	Yes	N/A

Table 24: Targets

Parameter	Added	Removed	Changed
ip-address	Yes	No	N/A
port-type	Yes	No	N/A

Troubleshooting and Getting Help

EMC support, product, and licensing information can be obtained as follows:

Product information

For documentation, release notes, software updates or information about EMC products, licensing and service; go to EMC Online Support (registration required) at: http://Support.EMC.com.

Troubleshooting

Go to EMC Online Support. After logging in, locate the appropriate Support by Product page.

Technical support

For technical support and service requests, go to EMC Online Support. After logging in, locate the appropriate Support by Product page and choose either Live Chat or Create a service request. To open a service request through EMC Online Support, you must have a valid support agreement. Contact your EMC Sales Representative for details about obtaining a valid support agreement or to answer any questions about your account.