Plasma controller API Specification

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Contents

Revision History

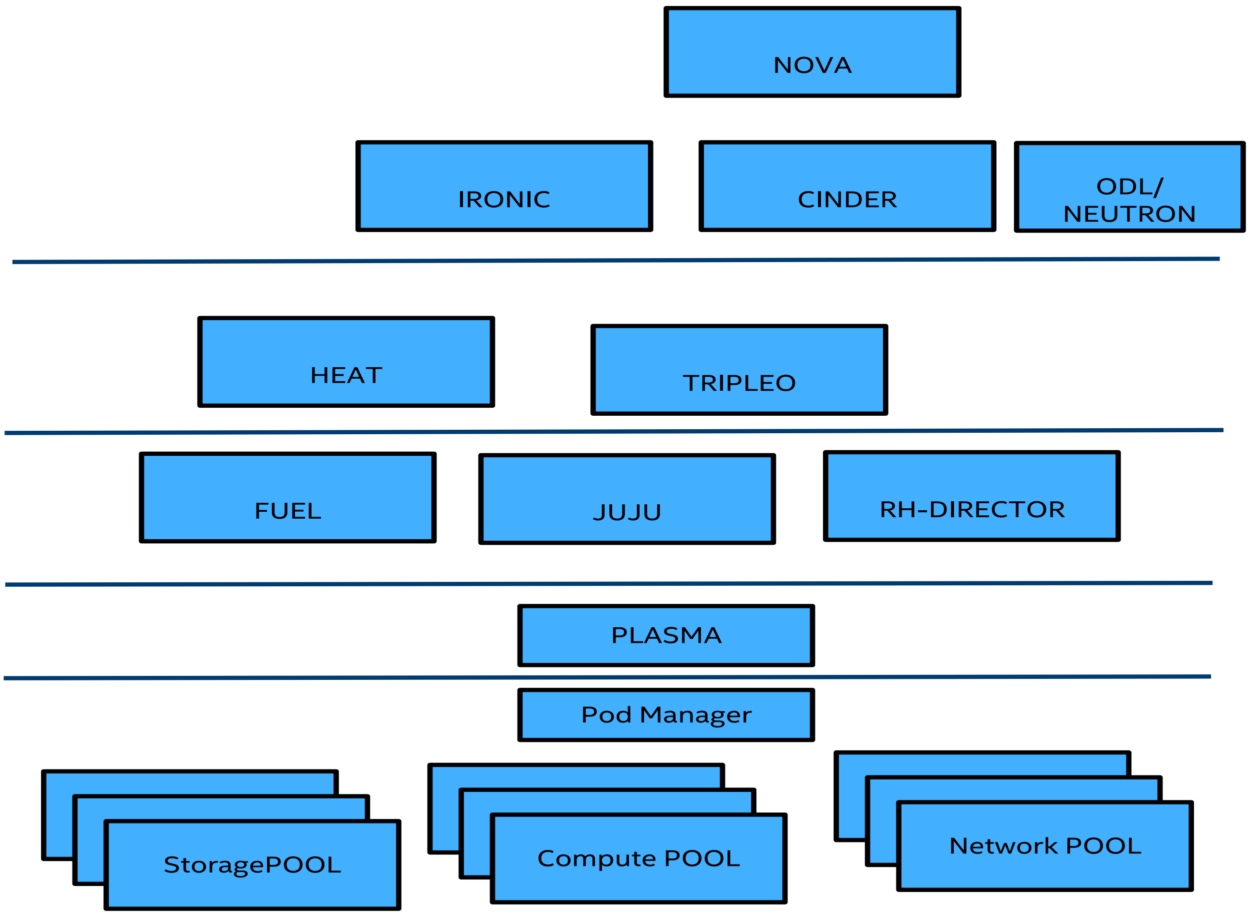
0.1	First draft	6.17. 2016	Chester Kuo
0.2	Added APIs for storage management, Flavor creation. Added Introduction paragraph, update storage management for attachment/de-attachment	6.22.2016	Ananth Narayan S, Chester Kuo
0.3	Revised mockup API data	7.26.2016	Chester Kuo
0.4	Updated details of flavor creator	8.7.2016	Ananth Narayan S

Introduction

Plasma is a controller for Pooled and composable resources which adhere to DMTF Redfish with hardware management requests. That includes provisioning and management of RSD components and underlay features.

Plasma and OpenStack

Current OpenStack components such as Nova, Neutron, Cinder, Ironic need to be modified to call Plasma APIs to provide the requested RSD feature. For example if a particular flavor system is requested which maps to a RSD system, such a call should go to Ironic which subsequently Plasma to provide that node. So Plasma will get subsumed under Ironic in the future.



Scope

This document contains information about the Restful API of Plasma controller including networking, storage configuration and compute nodes composition and flavor creation..etc.

Terminology

Term	Definition
BMC	Baseboard Management Controller
CIMI	Cloud Infrastructure Management Interface
HTTP	Hypertext Transfer Protocol
JSON	JavaScript Object Notation
NIC	Network Interface Card
OCCI	Open Cloud Computing Interface
OData	Open Data Protocol
OVF	Open Virtualization Format
POD	A physical collection of multiple racks
PODM	POD Manager
PSME	Pooled System Management Engine
REST	Representational state transfer
SDV	Software Development Vehicle
URI	Uniform resource identifier
UUID	Universally Unique Identifier
XML	eXtensible Markup Language

References

Document name		

API

Notes:

1. During the discovery phase, plasma queries the rack to obtain a list of entities and caches the data.
2. The plugin selects a refresh interval to update its cache. This is not exposed in the API.

Service Root

Name	List API verion	In	Type	Description
URI	/			
	versions	Body	Array	A list of version objects that describe API version available
	min_version	Body	String	If this version of the API supports microversions, the minimum microversion that is supported. This will be the empty string if microversions are not supported.
	version	Body	String	Versioning of this API response
	id	Body	String	A Major API version
	links	Body	Array	A List of relative links. This allows a client to easily obtain rather than construct resource URIs. The following types of link relations are associated with resources. • A self link contains a versioned link to the resource. Use these links when the link is followed immediately. • A bookmark link provides a permanent link to a resource that is appropriate for long term storage.
	status	Body	String	The status of this API version, this can be one of : CURRENT : this is the preferred version of the API to use. SUPPORTED : this is an older , but still supported version of the API DEPRECATED : a deprecated version of the API that be removed.

Operations

GET

```
GET /
```

Response

Normal Response codes: 200

```
{
  "name" : "OpenStack Plasma API",
  "description" : "Plasma is an OpenStack project which aims to provide node composition based on
redfish API.",
  "default_version" : {
    "status" : "CURRENT",
    "version" : "1.1",
    "links" : [
      {
        "rel" : "self",
        "href" : "http://openstack.example.com:8881/v1/"
      }
    ],
    "id" : "v1",
    "min_version" : "1.0"
  },
  "versions" : [
    {
      "status" : "CURRENT",
      "links" : [
        {
          "href" : "http://openstack.example.com:8881/v1/",
          "rel" : "self"
        }
      ],
      "id" : "v1",
      "version" : "1.1",
      "min_version" : "1.0"
    }
  ]
}
```

API version, get details of a specific API

Name	Showing v1 API	In	Type	Description
URI	/v1			
Property				
	id	Body	String	Major API version
	links	Body	Array	Links to the resources.

Normal Response codes: 200

Operations

GET

```
GET /v1
```

Response

```
{
  "id" : "v1",
  "links" : [
    {
      "href" : "http://openstack.example.com:8881/v1/",
      "rel" : "self"
    },
    {
      "rel" : "describedby",
      "type" : "text/html",
      "href" : "http://docs.openstack.org/developer/plasma/dev/api-spec-v1.html"
    }
  ],
  "nodes" : [
    {
      "rel" : "self",
      "href" : "http://openstack.example.com:8881/v1/nodes/"
    },
    {
      "rel" : "bookmark",
      "href" : "http://openstack.example.com:8881/nodes/"
    }
  ],
  "storages" : [
    {
      "href" : "http://openstack.example.com:8881/v1/storages/",
      "rel" : "self"
    },
    {
      "rel" : "bookmark",
      "href" : "http://openstack.example.com:8881/storages/"
    }
  ],
  "flavors" : [
    {
      "href" : "http://openstack.example.com:8881/v1/flavors/",
      "rel" : "self"
    },
    {
      "rel" : "bookmark",
      "href" : "http://openstack.example.com:8881/flavors/"
    }
  ],
  "media_types" : [
    {
      "type" : "application/vnd.openstack.plasma.v1+json",
      "base" : "application/json"
    }
  ]
}
```

All API calls through the rest of this document require authentication with the OpenStack Identity service. They also required a base service url that is extracted from the Identity token of type plasma. This will be the root url that every call below will be added to build a full path.

[http://developer.openstack.org/api-guide/quick-start/api-quick-start.html]

Composed Nodes collections

Name	Node Collection	In	Type	Description
URI	/nodes			
	nodestate (optional)	Query	String	Filter the list of return nodes , and only return those with the specificed "nodestate"
	field (optional)	Query	String	one or more fields to be returned in the response
	links	Body	String	A list of relative links
	id	Body	String	UUID of nodes
	nodestate	Body	String	The current composed node state of this node. Allocating, Allocated, Assembling, PoweredOn, PoweredOff, Failed

Return a list of nodes with some information about each node, some filtering is possible by passing in with request.

Operations

Normal response codes: 200

Error response codes: 400, 401, 403

GET

```
GET /nodes
```

Response

```
{
  "nodes" : [
   {
      "id" : "ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0",
      "name" : "Server 1" ,
      "nodestate" : "PoweredOn" ,
      "links": [
        {
          "rel" : "self",
                  "href" : "https://openstack.example.com/v1/nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0"
        },
        {
          "href" : "https://openstack.example.com/nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0",
          "rel" : "bookmark"
        }
      ]
   },
   {
      "id" : "4d8c3732-a248-40ed-bebc-539a6ffd25c0" ,
      "name" : "Server 2",
      "nodestate" : "PoweredOff" ,
      "links" : [
               {
                  "ref" : "self",
                   "href" : "https://openstack.example.com/v1/nodes/4d8c3732-a248-40ed-bebc-539a6ffd25c0"
               },
        {
           "ref" : "bookmark",
           "href" : "https://openstack.example.com/nodes/4d8c3732-a248-40ed-bebc-539a6ffd25c0"
        }
       ]
    }
  ]
}
```

Filtering nodes

Filter criterion are provided as part of the HTTP GET URI. The number of search criteria that can be provided is limited to the length of the HTTP GET request. Only exact match filters are supported and filtering can be based on any (non nested) key of

URI	/v1/nodes?name1=value1&name2=value2	
Example	/v1/nodes?ram=10	Filter in hosts that have 10GB RAM only.
	/v1/nodes?ram=10&nodestate=PoweredOn	Filter in hosts that have 10GB Ram and whose nodestate is 'PoweredON'

GET /nodes?nodestate=PoweredOn

Response

```
{
        "nodes": [{
                 "id": "eeeecccc-dddd-ffff-aaaa-uuuukkkk",
                 "nodestate": "PoweredOn",
                 "Links": [{
                        "rel": "self",
                        "href": "https://openstack.example.com/v1/nodes/eeeecccc-dddd-ffff-aaaa-
uuuukkkk"
                 }, {
                        "href": "https://openstack.example.com/v1/nodes/eeeecccc-dddd-ffff-aaaa-
uuuukkkk",
                        "rel": "bookmark"
                 }],
                 "name": "Server 1"
        }]
}
```

POST

Create a new composed node with specific resource or empty request.
When you create a server, the response shows only the server ID, its links. You can get additional attributes through subsequent GET requests on the servers id.

Normal response codes: 200

Error response codes: 401, 403, 404

```
POST /nodes
Content-Type: application/json
{
}
```

Response

```
{
  "node" :
    {
        "id" : "eeeecccc-dddd-ffff-aaaa-uuuukkkk",
        "Links" : [
          {
            "rel" : "self",
                    "href" : "https://openstack.example.com/v1/odes/eeeecccc-dddd-ffff-aaaa-uuuukkkk"
          },
          {
            "href" : "https://openstack.example.com/v1/nodes/eeeecccc-dddd-ffff-aaaa-uuuukkkk",
            "rel" : "bookmark"
          }
        ]
    }
}
```

Composed Node details

Return details of single node

Name	Node details	In	Type	Description
URI	/nodes/{node_ident}			
	field (optional)	Query	String	Fields to be returned in the response. The following request return only the uuid and power_state fields for each composed node. Ex: GET /v1/nodes?field=id,name
	id	Body	String	UUID of the resources
	nodestate	Body	String	Current Composed node state,
	boot_source	Body	String	Current booting source target, None, Pxe, Localdisk
	pending_boot_source	Body	String	Pending booting source target
	pooling_group_id	Body	String	Pooling resource group id
	health_status	Body	String	Health status, OK, Warning, Critical
	name	Body	String	Human-readable identifier for compose node
	metadata	Body	String	Compute node Metadata , Host NIC MAC address, BMC MAC address, RackID, compute node ID, Serial No. This is used for metadata server of deployment.
	node_property	Body	String	CPU, memory , and storage asset info
	links	Body	String	
	created_at updated_at	Body	String	TimeStamp for compose node creation.
	provision_state	Body	String	Node Provision state set by deployment tool, like Puppet, Ansible…etc

Operations

GET

Normal response codes: 200

Error response codes: 401, 403, 404

```
GET /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0
```

Response

```
{
   "node" : {
      "id" : "ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0",
      "nodestate" : "Off",
      "boot_source" : "Localdisk",
      "pending_boot_source" : "PXE",
      "pooling_group_id" : "11z23344-0099-7766-5544-33225511",
      "health_status" : "OK",
      "name" : null,
      "metadata" : {
         "nic" : [
                     {"mac" : "f1:12:44:55:66:77"},
            {"mac" : "f2:44:44:44:44:88"}
         ],
                  "mgmt_mac" : "00:AA:BB:CC:DD:EE",
         "podid" : "POD1",
         "rackid" : "Rack2",
                  "slotid" : "3",
         "board_serialno" : "2M220100SL"
      },
      "node_properties" : {
         "cpu_arch" : "x86_64",
                  "cpu_count" : "2",
                  "memory_size_gb" : "32",
         "network" : [
            {
               "type" : "ethernet",
               "speed" : "40000000"
            }
         ],
         "memory_type" : "DDR4",
               "storage" : [
            {
               "type" : "SSD",
               "volume_gb" : "40"
            }
         ]
      },
      "created_at" : "2016-04-20T15:40:00+00:00",
      "updated_at" : "2016-04-20T15:40:00+00:00",
      "links": [
        {
           "rel" : "self",
                "href" : "https://openstack.example.com/v1/nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0"
        },
        {
            "rel" : "boomark",
            "href" : "https://openstack.example.com/nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0"
        }
      ]
   }
}
```

DELETE

Release a composed node

Normal response codes: 204

Error response codes: 401,403, 404 ,409

```
DELETE /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0
```

Response

This is no body content for the response of a successful DELETE query

PUT

Update the attributes of composed node.

Normal response codes: 200

Error response codes: 400, 401, 403 ,404

```
PUT /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0
{
  "node": {

      "name" : "new-server-name"
   }
}
```

Storage volume management for node

The following API is used to manage storage volume attached to a node.

Name		In	Type	Description
URI	/nodes/{node_id}/storages			
id	Input parameter	URL	String	UUID of the node
storagevolumeAttachments		Body	Array	List of the storage volume attachments
device		Body	String	Name of the device such as , /dev/sdd
id		Body	String	The UUID of the attachment
serverId		Body	String	The UUID of the server
volumeId		Body	String	The UUID of the attached storage volume

Operations

GET

List storage devices attached to the specified node.

Normal response codes: 200

Error response codes: 401, 403 ,404

```
GET /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0/storages
```

Response

```
{

   "storagevolumeAttachments": [
      {
         "device": "/dev/sdd",
         "id": "a26887c6-c47b-4654-abb5-dfadf7d3f803",
         "serverId": "ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0",
         "volumeId": "a26887c6-c47b-4654-abb5-dfadf7d3f803"
      },
      {
         "device": "/dev/sdc",
         "id": "a26887c6-c47b-4654-abb5-dfadf7d3f804",
         "serverId": "ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0",
         "volumeId": "a26887c6-c47b-4654-abb5-dfadf7d3f804"
      }
   ]
}
```

POST

Attach a storage volume to the node.

Name		In	Type	Description
Request				
storagevolumeAttachments		Body	String	A Dictionary representation of a storage volume attachment.
volumeId		Body	String	The UUID of the volume to attach.
deviceId		Body	String	The UUID of storage device, this mapping to Drive.xml schema
id		Body	String	The UUID of the attachment

Normal response codes: 200

Error response codes: 400, 401, 403,404, 409

```
POST  /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0/storages
Content-Type: application/json
{
   "storagevolumeAttachment": {
      "deviceId": "a26887c6-c47b-4654-abb5-dfadf7d3f803"
   }
}
```

Response

```
{
   "storagevolumeAttachment": {
      "id": "116887c6-c47b-4654-abb5-dfadf7d44444",
      "volumeId": "1226887c-c47b-5446-abb5-33adf7d3f803",
      "deviceId": "a26887c6-c47b-4654-abb5-dfadf7d3f803"
   }
}
```

Error Response

```
{
            "status": 400,
            "error": {
                        "message": "Error message"
            }
}
```

DELETE

Detach an attached storage volume from the node.

Request : attachment id

Normal response codes: 202

Error response codes: 400,401, 403, 404, 409

```
DELETE  /nodes/ee1ecc3c-d3dd-f4ff-a6aa-uu7uk9k0/storages/116887c6-c47b-4654-abb5-dfadf7d44444
```

Success Response

```
This is no body content for the response of a successful DELETE query
```

Error Response

```
{
		"status": 404,
		"error": {
				"message": "Error message"
		}
}
```

Storage

This section lists Plasma API to support management of pooling storage such as NVMe or SSD drive. OpenStack managed storage is out of scope of this document – it is handled by OpenStack components(Cinder)/Ceph etc.

Storage Device Collection

This call lists the enumerated storage devices.

Name		In	Type	Description
URI	/storages			
	filter (optional)	Query	String	Using filter to return node based on criteria
	deviceId	Body	String	The UUID of storage device, this mapping to Drive.xml schema
	pooling_groud_id	Body	String	Identifier of Switch (switch cluster) devices
	allocate_status	Body	String	Status of storage device, Status : Allocated, Available, Erasing

Operations

GET

List all storage devices

Normal response codes: 200

Error response codes: 401, 403, 404

```
GET /storages
```

Response

```
{
   "storges" : [
     {
         "deviceId" : "bbfddf09-4d7e-40d5-88a9-8acfb2f88c21",
              "pooling_group_id" : "11z23344-0099-7766-5544-33225511",
              "allocate_status" : "allocated",
         "links" : [
           {
             "ref" : "self",
             "href" : "https://openstack.example.com/v1/storages/bbfddf09-4d7e-40d5-88a9-8acfb2f88c21"
           },
           {
             "ref" : "bookmark",
             "href" : "https://openstack.example.com/storages/bbfddf09-4d7e-40d5-88a9-8acfb2f88c21"
           }
         ]
     },
     {
         "deviceId" : "4c16a45b-b029-49c4-af84-1abcf458a062",
        "pooling_group_id" : "22zz3344-0099-7766-5544-33225512",
             "allocate_status" : "available",
        "links" : [
         {
           "ref" : "self",
           "href" : "https://openstack.example.com/v1/storages/4c16a45b-b029-49c4-af84-1abcf458a062"
         },
         {
           "ref" : "bookmark",
           "href" : "https://openstack.example.com/storages/4c16a45b-b029-49c4-af84-1abcf458a062"
         }
        ]
     }
   ]
}
```

Storage Device

This call provides the properties of the specified storage device.

Name		In	Type	Description
URI	/storages/{device_id}			
	id	Query	String	Identifier of the storage device
	capacity_mb	Body	String	Size of storage devices
	pooling_group_id	Body	String	Identifier of Switch (switch cluster) devices
	health_status	Body	String	Health status of device

Operations

GET

Query storage device properties

```
GET /storages/4c16a45b-b029-49c4-af84-1abcf458a062
Content-Type: application/json
```

Response

```
{
   "storage_device" :
     {
        "deviceId" : "4c16a45b-b029-49c4-af84-1abcf458a062",
        "pooling_group_id" : "11z23344-0099-7766-5544-33225511",
        "health_status" : "critical",
        "capacity_mb" : "1000",
        "property_foo1" : "value_bar1",
        "property_foo2" : "value_bar2"
     }
}
```

PUT

Set device properties such as QoS

Normal response codes: 200

Error response codes: 400,401, 403, 404

```
PUT /storages/ffffcccc-dddd-ffff-aaaa-uuuukkkk
Content-Type: application/json
{
    “property_foo1” : “test1”
}
```

Response

```
{
  “storage_device” : [
    {
        “deviceId” : “ffffcccc-dddd-ffff-aaaa-uuuukkkk”,
        “capacity_mb” : “1000”,
        “pooling_group_id” : “11z23344-0099-7766-5544-33225511”,
        “health_status” : “Critical”,
        “property_foo1” : “test1” ,
        “property_foo2” : “value_bar2”
    }
  ]
}
```

Error response

```
{
            "status": 404,
            "error": {
                        "message": "Error message"
            }
}
```

OpenStack Flavors

Flavor creator is a Plasma component that can generate Intel® RSD optimized flavors which can then be inserted into OpenStack installations.

Flavor Creator

Name		In	Type	Description
URI	/flavors			

Operations

GET

No operation on /GET

```
GET /flavors
```

Response

```
{

}
```

Flavor creator - Generate flavors

This API call generates OpenStack flavors based on the specified criterion. If the criterion provided is not supported an error message that the operation is not supported shall be returned.

Name		In	Type	Description
URI	/flavors			
criteria	Input	Request Body	String	Criterion to be used to generate the flavors. Supported criterion determined from output of /criteria

POST

Normal response codes: 200

Error response codes: 400, 401, 403, 404, 409

```
POST /flavors
Content-Type: application/json

{
        "criteria": “criterion1, criterion2..”

}
```

Response

```
{
 [
  [
   "[{\"flavor\": {\"disk\": 17519, \"vcpus\": 4, \"ram\": 16, \"name\": \"S_irsd-Systems:Rack1-Block1-Sled1-Node1_Sled:Rack1-Block1-Sled1_Enclosure:Rack1-Block1_Rack:Rack1_\", \"id\": \"1e3fda00-f3cc-46f7-9fd2-7e384ab81770\"}}, {\"extra_specs\": {\"Rack\": \"Rack1\", \"Systems\": \"Rack1-Block1-Sled1-Node1\", \"Sled\": \"Rack1-Block1-Sled1\", \"Enclosure\": \"Rack1-Block1\"}}]",
   "[{\"flavor\": {\"disk\": 70076, \"vcpus\": 16, \"ram\": 64, \"name\": \"L_irsd-Systems:Rack1-Block1-Sled1-Node1_Sled:Rack1-Block1-Sled1_Enclosure:Rack1-Block1_Rack:Rack1_\", \"id\": \"a4ccdf1b-7df1-4499-85c0-39aa503716e8\"}}, {\"extra_specs\": {\"Rack\": \"Rack1\", \"Systems\": \"Rack1-Block1-Sled1-Node1\", \"Sled\": \"Rack1-Block1-Sled1\", \"Enclosure\": \"Rack1-Block1\"}}]",
   "[{\"flavor\": {\"disk\": 35038, \"vcpus\": 8, \"ram\": 32, \"name\": \"M_irsd-Systems:Rack1-Block1-Sled1-Node1_Sled:Rack1-Block1-Sled1_Enclosure:Rack1-Block1_Rack:Rack1_\", \"id\": \"c40f7fa8-7699-450c-abe2-3194c6aaa76c\"}}, {\"extra_specs\": {\"Rack\": \"Rack1\", \"Systems\": \"Rack1-Block1-Sled1-Node1\", \"Sled\": \"Rack1-Block1-Sled1\", \"Enclosure\": \"Rack1-Block1\"}}]"
  ],
}
```

Error reponse

```
{
        "status": 404,
        "error": {
                "message": "Error message"
        }
}
```

Flavor Creator – Supported criteria

Provide a list of criteria which are supported by the flavor creator. One or more criteria are used to create the flavors; example of such criteria include:

- CPU model/features
- Location hierarchy
- Platform features

No input parameters are necessary for this call.

Name		In	Type	Description
URI	/flavor/criteria			

Operations

GET

List all supported flavor generation criteria along with their descriptions.

Normal response codes: 200

Error response codes: 401, 403

```
GET /flavor/criteria
```

Response

```
{
{
  "critera": [
    {
      "name": "default",
      "description: "This generates 3 flavors S,M,L based on node asset tag"
    },
    {
      "name": "example",
      "description": "This is a dummy criteria for demo purpose"
    }
  ]
}
}
```

DELETE

Delete a critiera

Not applicable. Supported criteria are determined based on installed plugins.