

Getting Started with the Spectrum Scale REST API

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Contents

Overview	03
What is a REST API?	04
Four basic operations	05
Getting Started with the Spectrum Scale REST API	06
Architecture	07
Sample Calls	10
Endpoints	11
Demo	17

What is a REST API?

“REST API”

- “Representational State Transfer”
- Neither a protocol nor a standard → Every API is different
- Some loose conventions, for example:
 - Hierarchical URLs to identify entities, e.g.:
`/filesystems/gpfs0/filesets`

Stateless

- Client always sends all the data the server needs to fulfill a request
- Easy to use and implement since no state has to be managed
 - On the CLI: curl
 - Python, Java, ...

HTTP/HTTPS

- Well-known and widespread protocol
- HTTP security features can be leveraged, e.g. encryption, authentication, ...
- URLs are used to identify entities
- Four basic HTTP methods:
 - POST, PUT, GET, DELETE

JSON/XML

- Data is returned in machine readable format, for example JSON (JavaScript Object Notation) or XML (Extensible Markup Language)
- Easy to read and debug

Four basic operations

Create – POST

- Create new entities asynchronously
- Example: Create a new fileset or SMB share

Read – GET

- Retrieve information about all entities or a specific entity
- Returned entities can be filtered
- Example: List all unhealthy nodes

Update – PUT

- Change the configuration or state of an entity
- Example: Change an ACL or unmount a filesystem

Delete – DELETE

- Remove an entity
- Example: Delete a threshold or NFS export

Getting Started with the Spectrum Scale REST API

Architecture	07
Sample Calls	10
Endpoints	11

Architecture (1/3)

Requests are served over HTTPS

- Any client application can easily access the REST API (curl, Python, Java, ...)

Uses the same software stack as the GUI

- Multiple instances are supported for HA

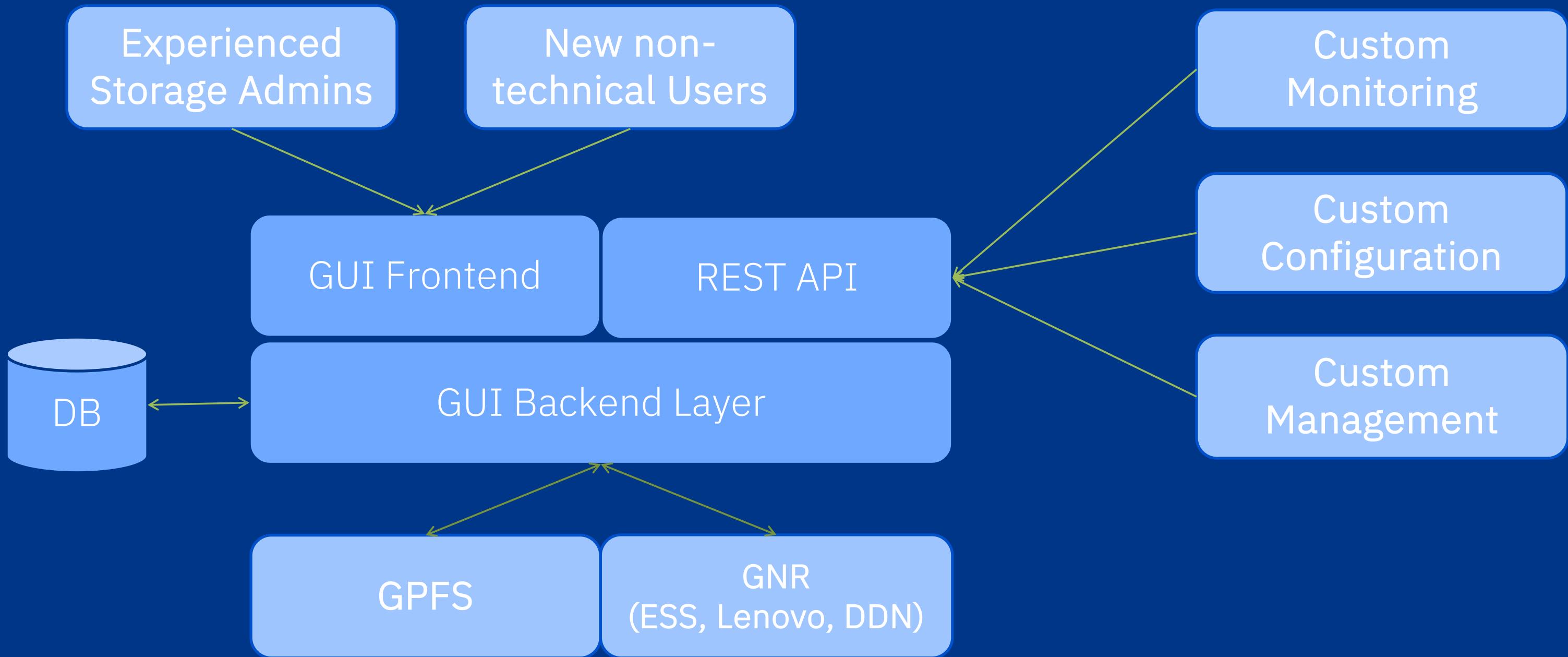
GUI user and role management is used

- Local users or users in an external AD/LDAP server are supported

Data is cached in a local database

- Cached data is updated via events coming from GPFS and on periodic intervals

Architecture (2/3)



Architecture (3/3)

Four basic operations:

- POST, PUT, GET, DELETE

GET requests are always served from the local database

- Returned entities can be filtered (e.g. all filesets starting with research*)
- Returned fields can be filtered

POST, PUT, DELETE requests are always asynchronous

- A jobId is returned which can be used to track the progress
- sysout, syserr, rc, .. of the mm-command can be retrieved

Sample Calls

List all endpoints:

```
curl -u 'admin:admin001' -X GET -k  
https://localhost:443/scalemgmt/v2/info
```

```
{  
  "info" : {  
    "name" : "Spectrum Scale REST Management",  
    "restApiVersion" : "2.2.0",  
    "serverVersion" : "5.0.3.0-developer build",  
    "paths" : {  
      "/access" : [ "POST", "GET" ],  
      "/access/status" : [ "GET" ],  
      "/ces/addresses" : [ "GET" ],  
      "/ces/addresses/{cesAddress}" : [ "GET" ],  
      "/ces/services" : [ "GET" ],  
      "/ces/services/{service}" : [ "GET" ],  
      "/cliauditlog" : [ "GET" ],  
      "/cluster" : [ "GET" ],  
      "/components/elements" : [ "GET" ],  
      "/components/elements/{componentId}" : [ "GET" ],  
      "/components/specifications" : [ "GET" ],  
      "/config" : [ "PUT", "GET" ],  
      "/filesystems" : [ "GET" ],  
      "/filesystems/{filesystemName}" : [ "GET" ],  
      "/filesystems/{filesystemName}/acl/{path}" : [ "GET", "PUT" ],  
      "/filesystems/{filesystemName}/afm/state" : [ "GET" ],  
      "/filesystems/{filesystemName}/audit" : [ "PUT" ],  
      "/filesystems/{filesystemName}/disks" : [ "GET" ],  
      "/filesystems/{filesystemName}/disks/{diskName}" : [ "GET" ],  
      "/filesystems/{filesystemName}/filesets" : [ "GET", "POST" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}" : [ "GET", "PUT", "DELETE" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/afmctl" : [ "POST" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/link" : [ "POST", "DELETE" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/psnaps" : [ "POST" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/psnaps/{snapshotName}" : [ "DELETE" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/quotadefaults" : [ "PUT", "POST", "GET" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/quotas" : [ "POST", "GET" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/snapshots" : [ "POST", "GET" ],  
      "/filesystems/{filesystemName}/filesets/{filesetName}/snapshots/{snapshotName}" : [ "DELETE", "GET" ],  
    }  
  }  
}
```

List all filesets in filesystem:

```
curl -u 'admin:admin001' -X GET -k  
https://localhost:443/scalemgmt/v2/filesystems/  
gpfs0/filesets?fields=:all:
```

```
{  
  "filesets" : [ {  
    "config" : {  
      "comment" : "root fileset",  
      "created" : "2019-01-31 14:35:17,000",  
      "iamMode" : "off",  
      "id" : 0,  
      "inodeSpace" : 0,  
      "inodeSpaceMask" : 0,  
      "isInodeSpaceOwner" : true,  
      "maxNumInodes" : 65792,  
      "oid" : 1,  
      "path" : "/mnt/gpfs0",  
      "permissionChangeMode" : "chmodAndSetacl",  
      "rootInode" : 3,  
      "snapId" : 0,  
      "status" : "Linked"  
    },  
    "filesetName" : "root",  
    "filesystemName" : "gpfs0",  
    "usage" : {  
      "allocatedInodes" : 65792,  
      "inodeSpaceFreeInodes" : 0,  
      "inodeSpaceUsedInodes" : 0,  
      "usedBytes" : 0,  
      "usedInodes" : 4038  
    }  
  } ],  
  "status" : {  
    "code" : 200,  
    "message" : "The request finished successfully."  
  }  
}
```

Documentation of all endpoints is available at:

<https://<yourguihost>/ibm/api/explorer>

Endpoints (CES, File Systems, ACLs, ...)

Spectrum Scale REST API v2 : APIs for managing a Spectrum Scale cluster		Show/Hide List Operations Expand Operations
GET	/scalemgmt/v2/access	Get details about your access token. If you are a security administrator a list of all access tokens is returned
POST	/scalemgmt/v2/access	Request access to this API
GET	/scalemgmt/v2/access/status	Get status about your access token.
GET	/scalemgmt/v2/ces/addresses	Get listing of CES Addresses
GET	/scalemgmt/v2/ces/addresses/{cesAddress}	Get detailed information about a CES Address
GET	/scalemgmt/v2/ces/services	Get listing of CES Services
GET	/scalemgmt/v2/ces/services/{service}	Get detailed information about a CES Service
GET	/scalemgmt/v2/cliauditlog	Retrieve a list of executed CLI commands
GET	/scalemgmt/v2/cluster	Get current configuration information
GET	/scalemgmt/v2/components/elements	Get listing of component elements
GET	/scalemgmt/v2/components/elements/{componentId}	Get detailed information about a element
GET	/scalemgmt/v2/components/specifications	Get listing of component specification
GET	/scalemgmt/v2/config	Get cluster config
PUT	/scalemgmt/v2/config	Change an attribute value of the GPFS config.
GET	/scalemgmt/v2/filesystems	List of filesystems in the cluster
GET	/scalemgmt/v2/filesystems/{filesystemName}	Get detailed information about a filesystem
GET	/scalemgmt/v2/filesystems/{filesystemName}/acl/{path}	Get access control list of file/directory
PUT	/scalemgmt/v2/filesystems/{filesystemName}/acl/{path}	Write access control list of file/directory
GET	/scalemgmt/v2/filesystems/{filesystemName}/afm/state	List afm state in a file system

Endpoints (Disks, File Sets, Quotas, ...)

PUT	/scalemgmt/v2/filesystems/{filesystemName}/audit	Enable/Disable/Update the file system auditing for a file system.
GET	/scalemgmt/v2/filesystems/{filesystemName}/disks	Get listing of disks
GET	/scalemgmt/v2/filesystems/{filesystemName}/disks/{diskName}	Get detailed information about a disk
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets	Get listing of filesets
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets	Create a new fileset
DELETE	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}	Delete a fileset
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}	Get detailed information about a fileset
PUT	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}	Change an existing fileset
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/afmctl	The AFM control functions
DELETE	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/link	Unlink an existing fileset
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/link	Link an existing fileset
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/psnaps	Create a new AFM peer snapshot
DELETE	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/psnaps/{snapshotName}	Delete an existing AFM peer snapshot
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/quotadefaults	List quota defaults in the cluster
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/quotadefaults	Set the quota defaults USR, GRP or FILESET for a file system
PUT	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/quotadefaults	Enable/Disable the quota defaults for a fileset.
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/quotas	List quotas in the cluster
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/quotas	Set quota limits / default quota limits / quota grace settings
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/snapshots	List snapshots for the specified fileset
POST	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/snapshots	Create a new snapshot

Endpoints (Policies, Snapshots, ...)

DELETE	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/snapshots/{snapshotName}	Delete a snapshot
GET	/scalemgmt/v2/filesystems/{filesystemName}/filesets/{filesetName}/snapshots/{snapshotName}	Read a snapshot for a fileset
PUT	/scalemgmt/v2/filesystems/{filesystemName}/mount	Mount a specific file system.
GET	/scalemgmt/v2/filesystems/{filesystemName}/owner/{path}	Get file/directory owner
PUT	/scalemgmt/v2/filesystems/{filesystemName}/owner/{path}	Set file/directory owner
GET	/scalemgmt/v2/filesystems/{filesystemName}/policies	List policies in the cluster
PUT	/scalemgmt/v2/filesystems/{filesystemName}/policies	Set a policy for a file system
GET	/scalemgmt/v2/filesystems/{filesystemName}/quotadefaults	List quota defaults in the cluster
POST	/scalemgmt/v2/filesystems/{filesystemName}/quotadefaults	Set the quota defaults USR, GRP or FILESET for a file system
PUT	/scalemgmt/v2/filesystems/{filesystemName}/quotadefaults	Enable/Disable the quota defaults for a file system.
GET	/scalemgmt/v2/filesystems/{filesystemName}/quotagracedefaults	List quota defaults in the cluster
POST	/scalemgmt/v2/filesystems/{filesystemName}/quotagracedefaults	Set the quota defaults USR, GRP or FILESET for a file system
PUT	/scalemgmt/v2/filesystems/{filesystemName}/quotamanagement	Enable/Disable the quota management for a file system.
GET	/scalemgmt/v2/filesystems/{filesystemName}/quotas	List quotas in the cluster
POST	/scalemgmt/v2/filesystems/{filesystemName}/quotas	Set quota limits / default quota limits / quota grace settings
GET	/scalemgmt/v2/filesystems/{filesystemName}/snapshots	List snapshots in a file system
POST	/scalemgmt/v2/filesystems/{filesystemName}/snapshots	Create a new snapshot
DELETE	/scalemgmt/v2/filesystems/{filesystemName}/snapshots/{snapshotName}	Delete a snapshot
GET	/scalemgmt/v2/filesystems/{filesystemName}/snapshots/{snapshotName}	Read a snapshot for a fileset
PUT	/scalemgmt/v2/filesystems/{filesystemName}/unmount	Unmount a specific file system.

Endpoints (RGs, NFS exports, Node Classes, ...)

GET	/scalemgmt/v2/gnr/recoverygroups	Get listing of recovery groups
GET	/scalemgmt/v2/gnr/recoverygroups/{recoveryGroupName}	Get detailed information about a recovery group
GET	/scalemgmt/v2/gnr/recoverygroups/{recoveryGroupName}/pdisks	Get listing of pdisks
GET	/scalemgmt/v2/gnr/recoverygroups/{recoveryGroupName}/pdisks/{pdiskName}	Get detailed information about a pdisk
GET	/scalemgmt/v2/gnr/recoverygroups/{recoveryGroupName}/vdisks	Get listing of vdisk
GET	/scalemgmt/v2/gnr/recoverygroups/{recoveryGroupName}/vdisks/{vdiskName}	Get detailed information about a vdisk
GET	/scalemgmt/v2/info	Get REST API info
GET	/scalemgmt/v2/jobs	Get list of asynchronous REST API jobs
DELETE	/scalemgmt/v2/jobs/{jobId}	Cancel a job
GET	/scalemgmt/v2/jobs/{jobId}	Get job details
GET	/scalemgmt/v2/nfs/exports	List of export in the cluster
POST	/scalemgmt/v2/nfs/exports	Create a new nfs export
DELETE	/scalemgmt/v2/nfs/exports/{exportPath}	Delete a NFS export
GET	/scalemgmt/v2/nfs/exports/{exportPath}	Get detailed information about a export
PUT	/scalemgmt/v2/nfs/exports/{exportPath}	Change an existing nfs export
GET	/scalemgmt/v2/nodeclasses	Get listing of Nodeclasses
POST	/scalemgmt/v2/nodeclasses	Create a new user-defined GPFS nodeclass
DELETE	/scalemgmt/v2/nodeclasses/{nodeclassName}	Delete an existing user-defined GPFS nodeclass
GET	/scalemgmt/v2/nodeclasses/{nodeclassName}	Get detailed information about a Nodeclass
PUT	/scalemgmt/v2/nodeclasses/{nodeclassName}	Change an existing user-defined GPFS nodeclass

Endpoints (Health Data, Performance Monitoring, ...)

GET	/scalemgmt/v2/nodes	Get listing of Nodes
POST	/scalemgmt/v2/nodes	Add one or more nodes to the GPFS cluster
DELETE	/scalemgmt/v2/nodes/{name}	Delete one or more existing nodes from the GPFS cluster
GET	/scalemgmt/v2/nodes/{name}	Get listing for a Node
GET	/scalemgmt/v2/nodes/{name}/health/events	Get System Health events
GET	/scalemgmt/v2/nodes/{name}/health/states	Get System Health states
GET	/scalemgmt/v2/nodes/{name}/services	Get status for all CES services on a node or nodeclass in the GPFS cluster
GET	/scalemgmt/v2/nodes/{name}/services/{serviceName}	Get status for a CES service on a node or nodeclass in the GPFS cluster
PUT	/scalemgmt/v2/nodes/{name}/services/{serviceName}	Start, Stop a service on a node or nodeclass in the GPFS cluster.
GET	/scalemgmt/v2/nsds	Get listing of nsds
GET	/scalemgmt/v2/nsds/{nsdName}	Get detailed information about a nsd
GET	/scalemgmt/v2/perfmon/data	Get performance data
GET	/scalemgmt/v2/perfmon/sensors	Get the sensor configuration
GET	/scalemgmt/v2/perfmon/sensors/{sensorName}	Get the sensor configuration
PUT	/scalemgmt/v2/perfmon/sensors/{sensorName}	Get the sensor configuration
GET	/scalemgmt/v2/perfmon/stats	Get performance data stat information
POST	/scalemgmt/v2/refreshTask/enqueue	Enqueue a background refresh task
GET	/scalemgmt/v2/smb/shares	List of smb shares in the cluster
POST	/scalemgmt/v2/smb/shares	Create a new smb share
DELETE	/scalemgmt/v2/smb/shares/{shareName}	Delete a SMB share

Endpoints (SMB Shares, ...)

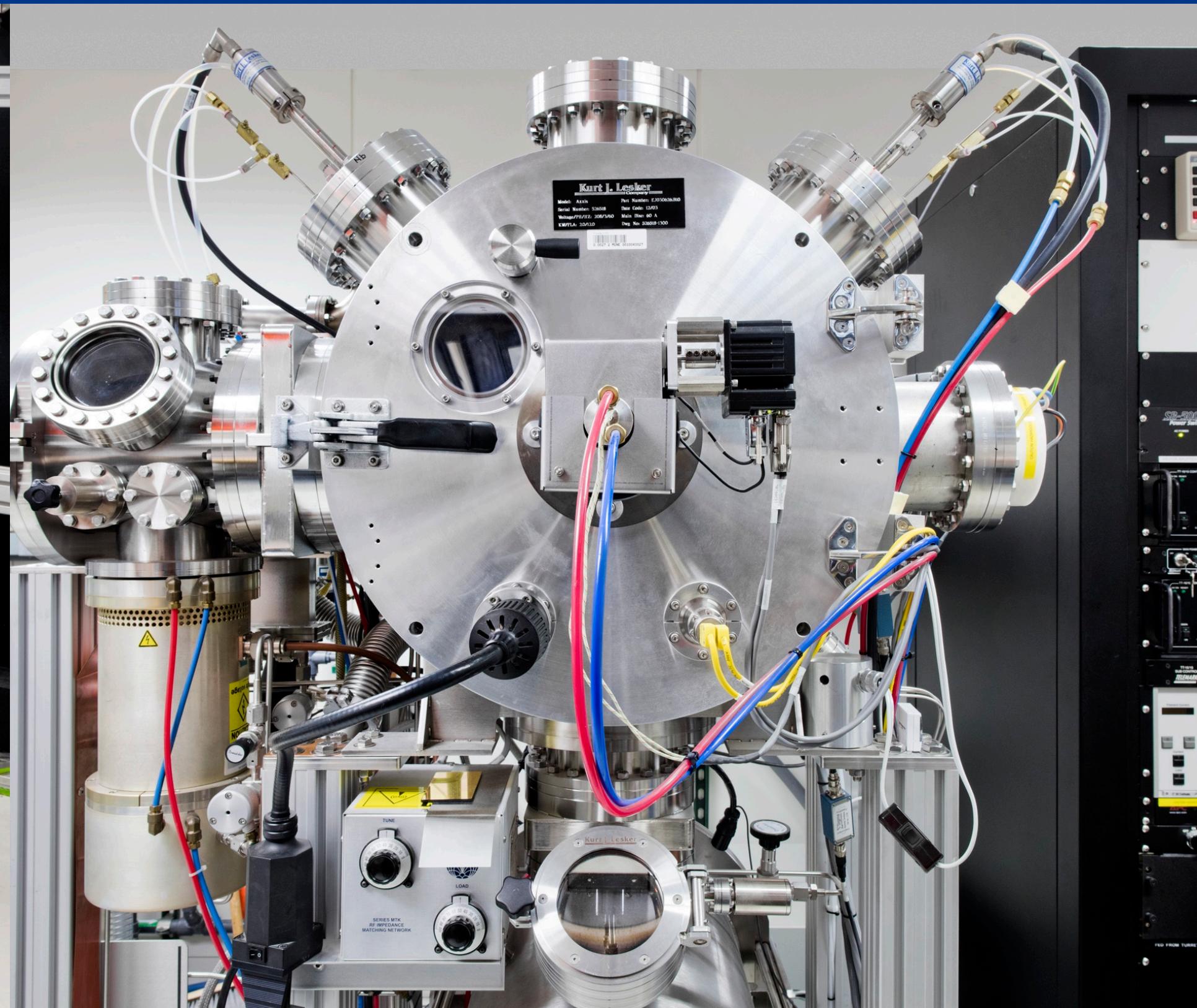
PUT	/scalemgmt/v2/smb/shares/{shareName}	Change an existing smb share
DELETE	/scalemgmt/v2/smb/shares/{shareName}/acl	Delete complete access control list of a SMB share
GET	/scalemgmt/v2/smb/shares/{shareName}/acl	Get access control list of share
DELETE	/scalemgmt/v2/smb/shares/{shareName}/acl/{name}	Delete an entry from the access control list of a SMB share
GET	/scalemgmt/v2/smb/shares/{shareName}/acl/{name}	Get access control list entry of a specific user/group/system of share
PUT	/scalemgmt/v2/smb/shares/{shareName}/acl/{name}	Adds an entry to the access control list of a SMB share

Hello Mr. Storage Admin, I need storage space for our new research project. Can you help me?

Sure!



Demo (GitHub: <https://github.com/andveloper/spectrumscale-guides>)



Thank you

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