Hitachi Ops Center Administrator

Log Analysis Guide

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-Preface-

This material was created for the purpose of grasping the contents of the trouble and the division of the trouble factor from the information (such as log files and configuration files) taken when the person in charge or the support person in the case of a failure occurred in response to the failure of the Hitachi Ops Center Administrator. In case of failure correspondence, it is possible to promptly respond and measure by using it in conjunction with a separate "disaster countermeasure procedure".

For HPE OEM version, see Appendix A-1 in the Hitachi Ops Center Administrator Troubleshooting Guide.

-History-

| No | Version | Updates | Date |
| --- | --- | --- | --- |
| 1 | 10.2.0 | Newly created | April 7th, 2020 |
| 2 | 10.3.1 | None | July 1st,2020 |
| 3 | 10.5.0 | None | Sep 10th,2020 |
| 4 | 10.5.1 | None | Nov 25th,2020 |
| 5 | 10.6.0 | None | Jan 18th,2021 |
| 6 | 10.6.1 | None | Apr 14th,2021 |
| 7 | 10.7.0 | None | July 9th,2021 |
| 8 | 10.8.0 | Add Podman support | Aug. 4th, 2021 |
| 9 | 10.8.1 | None | Jan 25th, 2021 |
| 10 | 10.8.2 | None | Apr. 18th,2022 |
| 11 | 10.9.0 | None | Sep. 29th,2022 |
| 12 | 10.9.1 | Chapter 2: Added the description that old log files are saved with gz format on Administrator version 10.9.1 or later versions  Chapter 2: Added the description about the rainier-service-ui | Jan. 23th, 2023 |
| 13 | 10.9.2 | None | Apr. 18th, 2023 |
| 14 | 10.9.3 | None | Jul. 7th, 2023 |
| 15 | 11.0.0 | None | Dec. 20th, 2023 |
| 16 | 11.0.1 | Added a note that file containers have been deprecated in 1.3. | Mar. 25th, 2024 |
| 17 | 11.0.2 | None | May. 27th, 2024 |
| 18 | 11.0.3 | None | Oct. 4th, 2024 |
| 19 | 11.0.4 | None | Feb. 28th, 2025 |

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# Overview

This document describes the output format, component configuration, and example of log analysis required to analyze the various logs output from Hitachi Ops Center Administrator.

## Target departments

3SC(CTSC/ESC/APSC), Hitachi Vantara

## Abbreviations

Abbreviations used on this document are shown below.

|  |  |
| --- | --- |
| Abbreviation | Stand for the abbreviation |
| API | Application Program Interface |
| ALUA | Asymmetric Logical Unit Access |
| CCI | Console Command Interface |
| CLI | Command Line Interface |
| FC | Fibre Channel |
| GAD | Global-active Device |
| GMT | Greenwich Mean Time |
| GUI | Graphical User Interface |
| GUM | Gateway for Unified Management |
| HA | High Availability |
| HBA | Host Bus Adapter |
| HDID | Hitachi Data Instance Director |
| HNAS | Hitachi Network Attached Storage |
| HTTP | Hyper Text Transfer Protocol |
| I/F | Interface |
| IP | Internet Protocol |
| iSCSI | Internet Small Computer System Interface |
| JSON | JavaScript Object Notation |
| LDEV | Logical Device |
| NDC | Nested Diagnostic Context |
| OS | Operating System |
| P-VOL | Primary Volume |
| RAID | Redundant Arrays of Inexpensive Disks |
| REST | Representational state transfer |
| RMI | Remote Method Invocation |
| SAN | Storage Area Network |
| SNMP | Simple Network Management Protocol |
| SSB | SenSe Byte |
| S-VOL | Secondary volumes |
| SVP | Service Processor |
| TBD | To Be Determined |
| URL | Uniform Resource Locator |
| VAM | Hitachi Virtual Appliance Manager |
| VSM | Virtual Storage Machine |
| VSP | Virtual Storage Platform |
| WWN | World Wide Name |

## Required knowledges

* Hitachi Ops Center Administrator
* OS(Linux)
* Web browser
* SAN(Storage Area Network)
* Storage systems

Note: From version 11.0.1, the file container has been deprecated, and the GUI and API for file storage management are no longer supported.

## Related documents

The following resources are required for the Hitachi Ops Center Administrator (the latest Version notation is listed below). Check the latest version of each manual for failure analysis.

For information about storage systems, see the Maintenance manual for the corresponding storage system.

Table 1 Related documents

|  |  |  |
| --- | --- | --- |
| Category | Product | Document name |
| Public | Ops Center Administrator | * Hitachi Ops Center Administrator 10.0.0 Getting Started Guide * Hitachi Ops Center Administrator 10.0.0 REST API Reference Guide * Hitachi Ops Center Administrator 10.0.0 User Guide |
| Ops Center Protector | * Hitachi Ops Center Protector Quick Start Guide * Hitachi Ops Center Protector User Guide |
| Limited | Ops Center Administrator | * Hitachi Ops Center Administrator Trouble Shooting GUide |

## Target version

This document is targeting Hitachi Ops Center Administrator 10.0.0 or later, however some sample logs on earlier than 10.0.0 are included.

# Logging system

Functionalities of Hitachi Ops Center Administrator server are provided by internal microservices. Each microservice is running as a Docker container or a Podman container, and it print log information to standard output or standard error. Output logs are collected by logspout (a log router for Docker or Podman) and stored into log files. These files are exported by executing rainier-getlogs command and are archived into /logs/application-logs in rainier-logs.tar.gz file.

Note: On Ops Center Administrator version 10.9.1 or later versions, old log files are saved with gz format. When searching log files with some keywords, use the zgrep command as well as the grep command, or unzip the gz files and run the grep command.

**infra microservices**

app-manager

hid-elasticsearch

hid-grizzly

si

infra-application-manager-ui

mariadb

**rainier microservices**

rainier-proxy

file

cinder-blocade

rainier-ui

cinder-cisco

rainier

rainier-service-ui

cli

cli\_<*storage-id*>





rainier-getlogs

**Docker/Podman (containers)**

[rainier-logs.tar.gz]

+- logs

+- application-files

+- **application-logs**

+- host-logs

**Other**

logspout

/bin/logspout

Log files

stdout, stderr

/opt/rainier/bin/  
rainier-getlogs

whistler

Figure 1 Logging system

## Log files for microservices

Logs output by microservices of Administrator server are stored into /logs/application-logs directory of rainier-logs.tar.gz file.

Table 2 Logs output by infra microservices

|  |  |  |  |
| --- | --- | --- | --- |
| # | Microservice | Stored directory (\*1) | Role of the microservice and contents of log |
| 1 | app-manager | infra-app-manager | * Manage microservices of Administrator * Contains initialization processes of microservices while starting of Administrator server |
| 2 | hid-elasticsearch | infra-hid-elasticsearch | * Provides store of dynamic configuration information (cache) that is updated on refresh of storage system * Contains update processes of cache |
| 3 | hid-grizzly | infra-hid-grizzly | * Provides job reporting * Contains startup process of the service (transactios of each job is not contained) |
| 4 | infra-application-manager-ui | infra-infra-application-manager-ui | * Provides GUI of VAM * Contains startup process of the service |
| 5 | mariadb | infra-mariadb | * Provides store of static configuration information that is not updated on refresh of storage system * Contains startup process of the service |
| 6 | si | infra-si | * Provides user authentication service * Contains user authentication transactions |

\*1 .\logs\application-logs directory under rainier-logs.tar.gz file

Table 3 logs output by rainier microservices

|  |  |  |  |
| --- | --- | --- | --- |
| # | Microservice | Stored directory (\*1) | Role of the microservice and contents of log |
| 1 | cinder-brocade | rainier-cinder-brocade | * Adapter for fabric switches provided by Brocade * Contains accesses for fabric switch |
| 2 | cinder-cisco | rainier-cinder-cisco | * Adapter for fabric switches provided by Cisco * Contains accesses for fabric switch |
| 3 | cli\_<*storage\_id*> | rainier-cli\_<*storage\_id*> | * Adapter for RAID Manager for each storage system * This microservice is created on onboarding a storage system (for the storage system) * Contains executions of RAID Manager command |
| 4 | file | rainier-file | * Adapter for file storage system * Contains accesses for file storage systems |
| 5 | rainier | rainier-elastic-store | * The rainier provides core functions of Administrator server, for example job execution and refresh of storage system * The rainier-elastic-store contains referencing and updating processes for cache |
| 6 | rainier-rainier | * The rainier-rainier contains processes of job execution and automatic storage system refresh |
| 7 | rainier-proxy | rainier-rainier-proxy | * Provdes an end point for accessing rainier services from outside * Contains requests and responses of RESTfull API provided by Administrator |
| 8 | rainier-service-ui | rainier-rainier-service-ui | * Provides new UI front end of Rainier * Contains requests and responces to the front end |
| 9 | rainier-ui | rainier-rainier-ui | * Provides Administrator's GUI * Contains startup process of the microservice (actions after the startup process is not contained) |
| 10 | whistler | rainier-whistler | * Adapter for fabric switches. This service uses the cinder-brocade and the cinder-cisco. * Contains accesses for fabric switch |

\*1 .\logs\application-logs directory under rainier-logs.tar.gz file

## Log levels

Log output level of Administrator server can be customized with Hitachi Virtual Appliance Manager(VAM).

* Open the VAM with web browser and select "LOGS"-"Application Log Settings" menu, then select log level and click Submit button. Reboot Administrator server.
* Candidates of log levels are INFO, DEBUG and TRACE. Default value is INFO.

Table 4 Log levels for log output level settings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Log level on log | | Log output level for log level setting on VAM | | |
| Level | Meaning of the level | INFO | DEBUG | TRACE |
| ERROR | * Indicates critical failure * When an accident was occurred, and process was terminated | X | X | X |
| WARN | * Indicates potential failure * When an accident was occurred, but process was continued | X | X | X |
| INFO | * Indicates information * When no action required, but notification is required as reference information | X | X | X |
| DEBUG | * Indicates detailed action * Used for route cause on trouble shooting | - | X | X |
| TRACE | * Indicates more detailed action than DEBUG * Used for route cause on trouble shooting | - | - | X |

## Message formats

This section describes the message formats of infra-si, rainier-proxy and rainier-rainier, which are relatively frequently referenced in the log files described in the section 2.1 .

### message format of infra-si

The output format of the log file created under logs/application-logs/infra-si is shown below.

2020-01-28 17:25:41.698 INFO 33 --- [ scheduling-1] c.h.hsa.si.springsecurity.SecurityCore : cleanupExpiredTokens started

Date and time

Log level

Process ID

Thread ID

Class name in Java

Main sentence

Figure 2 Message format of infra-si

2020-01-28 18:00:24.933 INFO 34 --- [nio-8081-exec-2] AuditLogger :  
 <38>1 2020-01-28T18:00:24.933+00:00 10.145.24.245 si http-nio-8081-exec-2 AUTH [data from="10.145.24.228" user="sysadmin" operation="POST /v1/tokens" statusCode="200" status="SUCCEEDED"]

Date and time

Log level

Process ID

Thread ID

Main sentence

user name

HTTP request (login)

HTTP status code

Date and time

IP address of receiver

Severity

IP address of sender

HTTP status

Class name in Java

Thread ID

Figure 3 Message format of infra-si - Audit

Table 5 Message items of infra-si

|  |  |  |  |
| --- | --- | --- | --- |
| # | Item | | Contents |
| 1 | Date and time | | Log output date and time   * Based on clock of a host running Administrator server * Since the timezone is GMT, there is difference between date and time on Administrator GUI |
| 2 | Log level | | Log level (see the section 2.2 ) |
| 3 | Process ID | | Process ID in the host (a Docker container or a Podman container) |
| 4 | Thread D | | ID of the thread that output the log |
| 5 | Class name in Java | | Java class name that output the log |
| 6 | Main sentence | - | Main sentence of the log |
| 7 | Severity | Value based on the severity |
| 8 | Date and time | Date and time when the request was issued |
| 9 | IP address of receiver | IP address of receiver of the request (IP address of Administrator server) |
| 10 | Thread ID | ID of the thread that output audit log |
| 11 | IP address of sender | IP address of sender of the request (IP address of Administrator client) |
| 12 | User name | User name that send the request |
| 13 | HTTP request | URL of request |
| 14 | HTTP status code | Status code of result |
| 15 | HTTP status | Status of the result |

### Message format of rainier-proxy

The output format of the log file created under logs/application-logs/rainier-proxy is shown below.

2019/11/13 00:00:16 [info] 37#37: \*370 client 10.145.24.228 closed keepalive connection

Dateand time

Log level

Main sentence

Process ID

Figure 4 Message format of rainier-proxy type 1

Table 6 Message items of rainier-proxy type 1

|  |  |  |
| --- | --- | --- |
| # | Item | Contents |
| 1 | Date and time | Log output date and time   * Based on clock of a host running Administrator server * Since the timezone is GMT, there is difference between date and time on Administrator GUI |
| 2 | Log level | Log level of Web service (emerg, alert, crit, error, warn, notice, info, debug) |
| 3 | Process ID | Process ID in the host (a Docker container or a Podman container) |
| 4 | Main sentence | Main sentence of the log |

10.196.193.7 - - [13/Nov/2019:00:04:06 +0000]  
 "GET /scripts/scripts.034a8c11.js HTTP/1.1" 200 1078540 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

Date and time

User agent

Remote address

URL

HTTP status

Referer

Bytes sent

Figure 5 Message format of rainier-proxy type 2

Table 7 Message items of rainier-proxy type 2

|  |  |  |
| --- | --- | --- |
| # | Item | Contents |
| 1 | Remote address | IP address of sender of the request (IP address of Administrator client) |
| 2 | Date and time | Log output date and time   * Based on clock of a host running Administrator server * Since the timezone is GMT, there is difference between date and time on Administrator GUI |
| 3 | URL | URL of the request |
| 4 | HTTP status | HTTP status code |
| 5 | bytes sent | Bytes of the response |
| 6 | Referer | Referer of the request |
| 7 | User agent | Program name that sent the request |

### Message format of rainier-rainier

The output format of the log file created under logs/application-logs/rainier-rainier is shown below.

App | 2019-10-20T21:33:55,548 INFO [REST\_API:puFR7Y][ForkJoinPool-2-worker-43] c.h.b.s.c.c.r.RestUtil ---   
POST request to http://localhost:8082/block/provider/api/storage-system-info payload OnBoardStorageSystemProperties{ipAddress=10.196.191.23, portNumber=null, username=hsa, password=[FILTERED], storageSystemId=null, isTrySvpOnly=false, cciImage=null}

Date and time

Log level

Service

NDC ID

Class name in Java

Main sentence

Thread ID

Figure 6 Message format of rainier-rainier

Table 8 Message items of rainier-rainier

|  |  |  |
| --- | --- | --- |
| # | Item | Contents |
| 1 | Service | Service name that output the log   * App: a service that provide RESTfull API * Block: a service that executes block storage system operation * Deploy: a service that executes startup process * Monitoring: a service that handle alerts (SNMP trap) |
| 2 | Date and time | Log output date and time   * Based on clock of a host running Administrator server * Since the timezone is GMT, there is difference between date and time on Administrator GUI |
| 3 | Log level | Log level (see the section 2.2 ) |
| 4 | NDC ID | NDC (Nested diagnostic cotext) ID that output the log |
| 5 | Thread ID | ID of thead that output the log |
| 6 | Class name in Java | Java class name that output the log |
| 7 | Main sentence | Main sentence of the log |

# Log analysis procedure

## Escalation procedure

Is there the same issue?

Find the same from past issues

Acquire necessary information

Understand the condition

(Customer's site)

Answer based on the past issue

(3SC)

(IT pro)

Ask IT pro to analyze (Escalation)

Yes

No

See Table 9 for details

Compile the acquired information

Figure 1 Escalation procedure

## Information should be acquired from customer's environment

The information obtained in the environment where the failure had occurred is shown on Table 9.

Table 9 Necessary information for trouble shooting

|  |  |  |
| --- | --- | --- |
| # | Item | Description |
| 1 | Operation information | Acquire information about the operations performed on the Administrator server in the customer environment (or reproduction environment), and the operations performed on the SVP or other storage system management software. |
| 2 | Date and time | Obtain information on the date and time when the failure occurred in the customer environment (or reproduction environment). Time zone information for the storage systems is also required when matching DUMP information and Administrator server log. |
| 3 | Log files of Administrator server | Collect Administrator serer logs using rainier-getlogs command. See "Download maintenance information" section on *Hitachi Ops Center Administrator User Guide* for details. |
| 4 | Host information | Collect host information of Administrator server. See chapter 5 for details. |

# Logs details

Logs for microsevices are descrbied in the section 2.1 . Of these, infra-si, rainier-proxy and rainier-rainier are often analyzed during troubleshooting. The details are descrbied below.

## infra-si

### Starting the microservice

1. Create template(s) for confd

/etc/confd/conf.d/logconfig.toml not found. Creating a new one.

[template]

src = "logconfig.conf.tmpl"

dest = "/opt/config/log4j2.xml"

keys = [

"/hid-instances/d53ea8b1-c143-4825-926f-60c54cead1ad/app-settings/logLevel",

"/hid-instances/d53ea8b1-c143-4825-926f-60c54cead1ad/app-settings/auditLogLevel",

"/hid-instances/d53ea8b1-c143-4825-926f-60c54cead1ad/app-settings/auditLogRetentionDays"

]

:

1. Spawn internal processes

Spawn internal processes, si and confd, that support the microservice.

2019-11-12 17:19:04,969 CRIT Supervisor running as root (no user in config file)

2019-11-12 17:19:05,002 INFO RPC interface 'supervisor' initialized

2019-11-12 17:19:05,002 CRIT Server 'unix\_http\_server' running without any HTTP authentication checking

2019-11-12 17:19:05,002 INFO supervisord started with pid 30

2019-11-12 17:19:06,006 INFO **spawned: 'si'** with pid 33

2019-11-12 17:19:06,008 INFO **spawned: 'confd'** with pid 34

Picked up JAVA\_TOOL\_OPTIONS: -XX:+UseG1GC -XX:+UseStringDeduplication -XX:SurvivorRatio=8 -XX:NewSize=64m -XX:MaxNewSize=64m -Xms128m -Xmx128m

2019-11-12T17:19:06Z dece991aa3b7 confd[34]: INFO Backend set to etcd

2019-11-12T17:19:06Z dece991aa3b7 confd[34]: INFO Starting confd

2019-11-12T17:19:06Z dece991aa3b7 confd[34]: INFO Backend nodes set to http://etcd:4001

2019-11-12T17:19:06Z dece991aa3b7 confd[34]: INFO Target config /opt/config/log4j2.xml out of sync

2019-11-12T17:19:06Z dece991aa3b7 confd[34]: INFO Target config /opt/config/log4j2.xml has been updated

2019-11-12 17:19:07,322 INFO success: **si entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

2019-11-12 17:19:07,323 INFO success: **confd entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

1. Start internal services

*Main*, an internal service, service is started.

17:19:07.367 [main] INFO com.hitachivantara.hsa.si.rest.Main - Starting for brand default

:

2019-11-12 17:19:09.125 INFO 33 --- [ main] com.hitachivantara.hsa.si.rest.Main : **Starting Main** on dece991aa3b7 with PID 33 (/opt/si/lib/WEB-INF/classes started by root in /opt)

:

2019-11-12 17:19:45.982 INFO 33 --- [ main] AuditLogger : <14>1 2019-11-12T17:19:45.966+00:00 - **si main STARTUP** [data user="-" **status="SUCCEEDED"**]

2019-11-12 17:22:03.100 INFO 33 --- [nio-8081-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherServlet'

2019-11-12 17:22:03.100 INFO 33 --- [nio-8081-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'

2019-11-12 17:22:03.119 INFO 33 --- [nio-8081-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 19 ms

2019-11-12 17:22:04.548 INFO 33 --- [nio-8081-exec-1] AuditLogger : <38>1 2019-11-12T17:22:04.548+00:00 si si http-nio-8081-exec-1 AUTH [data from="172.17.0.11" user="tuna" operation="POST /v1/tokens" statusCode="200" status="SUCCEEDED"]

### Login from a client of Administrator GUI

The infra-si outputs a log for each login from client of Administrator GUI client. The operation is "POST /v1/tokens" for the login.

2019-11-12 18:00:17.277 INFO 33 --- [nio-8081-exec-3] AuditLogger : <38>1 2019-11-12T18:00:17.277+00:00 10.196.193.141 si http-nio-8081-exec-3 AUTH [data from="10.145.24.228" user="sysadmin" operation="**POST /v1/tokens**" statusCode="200" status="SUCCEEDED"]

## rainier-proxy

### Starting the microservice

1. Create template(s) for confd

/etc/confd/conf.d/server.crt.toml not found. Creating a new one.

/etc/confd/templates/server.crt.conf.tmpl not found. Creating a new one.

/etc/confd/conf.d/server.key.toml not found. Creating a new one.

/etc/confd/templates/server.key.conf.tmpl not found. Creating a new one.

1. Spawn internal processes

Spawn internal processes, nginx and confd, that support the microservice.

2019-12-16 17:30:14,007 CRIT Supervisor running as root (no user in config file)

2019-12-16 17:30:14,015 INFO RPC interface 'supervisor' initialized

2019-12-16 17:30:14,015 CRIT Server 'unix\_http\_server' running without any HTTP authentication checking

2019-12-16 17:30:14,015 INFO supervisord started with pid 19

2019-12-16 17:30:15,017 INFO **spawned: 'nginx'** with pid 22

2019-12-16 17:30:15,018 INFO **spawned: 'confd'** with pid 23

2019-12-16T17:30:15Z 746bbb90bfde confd[23]: INFO Backend set to etcd

2019-12-16T17:30:15Z 746bbb90bfde confd[23]: INFO Starting confd

2019-12-16T17:30:15Z 746bbb90bfde confd[23]: INFO Backend nodes set to http://etcd:4001

2019-12-16T17:30:15Z 746bbb90bfde confd[23]: INFO /etc/nginx/certificates/server.crt has md5sum d5b5c73d2f8d05613ce2592ebcbb9b57 should be 12702ef01dab1b5194912c297e9967b3

2019-12-16T17:30:15Z 746bbb90bfde confd[23]: INFO Target config /etc/nginx/certificates/server.crt out of sync

:

2019-12-16 17:30:15,709 INFO waiting for nginx to stop

2019-12-16 17:30:15,709 INFO stopped: nginx (terminated by SIGTERM)

2019-12-16 17:30:15,714 INFO spawned: 'nginx' with pid 31

nginx: [emerg] host not found in upstream "rainier.rainier.hid.local:8080" in /etc/nginx/conf.d/infra\_proxy.conf:5

2019-12-16 17:30:16,168 INFO success: **confd entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

2019-12-16 17:30:16,168 INFO exited: nginx (exit status 1; not expected)

:

2019-12-16 17:30:36,626 INFO spawned: 'nginx' with pid 38

nginx: [warn] the "ssl" directive is deprecated, use the "listen ... ssl" directive instead in /etc/nginx/conf.d/infra\_proxy.conf:61

2019-12-16 17:30:37,636 INFO success: **nginx entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

1. Wait for rainier-ui to start

The microservice waits until rainier-ui is ready.

2019/12/16 17:30:38 [error] 39#39: \*1 connect() failed (111: Connection refused) while connecting to upstream, client: 172.17.0.1, server: , request: "GET / HTTP/1.1", upstream: "http://172.17.0.15:8080/", host: "localhost"

172.17.0.1 - - [16/Dec/2019:17:30:38 +0000] **"GET / HTTP/1.1" 502** 157 "-" "curl/7.47.0"

:

2019/12/16 17:34:20 [error] 39#39: \*397 connect() failed (111: Connection refused) while connecting to upstream, client: 172.17.0.1, server: , request: "GET / HTTP/1.1", upstream: "http://172.17.0.15:8080/", host: "localhost"

172.17.0.1 - - [16/Dec/2019:17:34:20 +0000] "GET / HTTP/1.1" 502 157 "-" "curl/7.47.0"

2019/12/16 17:34:20 [info] 39#39: \*397 client 172.17.0.1 closed keepalive connection

172.17.0.1 - - [16/Dec/2019:17:34:21 +0000] **"GET / HTTP/1.1" 200** 1113 "-" "curl/7.47.0"

### Access from client

1. Open **Login** page

2019/11/13 00:04:02 [info] 37#37: \*372 SSL\_do\_handshake() failed (SSL: error:14094416:SSL routines:ssl3\_read\_bytes:sslv3 alert certificate unknown:SSL alert number 46) while SSL handshaking, client: 10.196.193.7, server: 0.0.0.0:443

:

10.196.193.7 - - [13/Nov/2019:00:04:05 +0000] **"GET / HTTP/1.1"** 200 1113 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

10.196.193.7 - - [13/Nov/2019:00:04:05 +0000] "GET /styles/vendor.23c8625b.css HTTP/1.1" 200 5666 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

:

2019/11/13 00:04:05 [warn] 37#37: \*376 an upstream response is buffered to a temporary file /var/cache/nginx/proxy\_temp/1/00/0000000001 while reading upstream, client: 10.196.193.7, server: , request: "GET /scripts/scripts.034a8c11.js HTTP/1.1", upstream: "http://172.17.0.14:8080/scripts/scripts.034a8c11.js", host: "10.196.193.141", referrer: "https://10.196.193.141/"

:

10.196.193.7 - - [13/Nov/2019:00:04:06 +0000] "GET /scripts/scripts.034a8c11.js HTTP/1.1" 200 1078540 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

:

10.196.193.7 - - [13/Nov/2019:00:04:06 +0000] "GET /bower\_components/bel-ui/app/fonts/OpenSans-Bold-webfont.woff HTTP/1.1" 200 22432 "https://10.196.193.141/styles/main.b362bd11.css" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

1. Execute login

10.196.193.7 - sysadmin [13/Nov/2019:00:04:20 +0000] **"POST /v1/security/tokens HTTP/1.1" 200** 399 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

10.196.193.7 - - [13/Nov/2019:00:04:20 +0000] "GET /v1/security/tokens HTTP/1.1" 200 399 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

:

2019/11/13 00:04:20 [info] 37#37: \*389 SSL\_do\_handshake() failed (SSL: error:14094416:SSL routines:ssl3\_read\_bytes:sslv3 alert certificate unknown:SSL alert number 46) while SSL handshaking, client: 10.196.193.7, server: 0.0.0.0:443

:

10.196.193.7 - - [13/Nov/2019:00:04:20 +0000] "GET /views/templates/nav-bar-header.html HTTP/1.1" 200 269 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

:

10.196.193.7 - - [13/Nov/2019:00:04:21 +0000] "GET /v1/storage-systems HTTP/1.1" 200 54 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

:

10.196.193.7 - - [13/Nov/2019:00:04:26 +0000] "GET /v1/dp-manager HTTP/1.1" 200 0 "https://10.196.193.141/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3904.97 Safari/537.36"

## rainier-rainier

### Starting the microservice

1. Check status of etcd:2378

checking service status at etcd:2379.

service at etcd:2379 ready.

1. Create templates for confd

/etc/confd/conf.d/hostIpconfig.toml not found. Creating a new one.

[template]

src = "hostIpconfig.conf.tmpl"

dest = "/opt/config/snmpIp"

keys = [

"/hid-instances/795075e4-c6d1-4e05-9f3a-3e6bde59f4e1/app-settings/snmpIp"

]

reload\_cmd = "echo updated hostIp file"

/etc/confd/templates/hostIpconfig.conf.tmpl not found. Creating a new one.

{{with get "/hid-instances/795075e4-c6d1-4e05-9f3a-3e6bde59f4e1/app-settings/snmpIp"}}{{base .Key}}={{.Value}}{{end}}

:

1. Spawn internal processes

Spawn internal processes, nginx and confd, that support the microservice.

2019-12-16 17:32:31,387 CRIT Supervisor running as root (no user in config file)

2019-12-16 17:32:31,481 INFO RPC interface 'supervisor' initialized

2019-12-16 17:32:31,481 CRIT Server 'unix\_http\_server' running without any HTTP authentication checking

2019-12-16 17:32:31,497 INFO supervisord started with pid 111

2019-12-16 17:32:32,502 INFO **spawned: 'rainier\_app'** with pid 114

2019-12-16 17:32:32,505 INFO **spawned: 'rainier\_monitoring'** with pid 115

2019-12-16 17:32:32,506 INFO **spawned: 'rainier\_block'** with pid 116

2019-12-16 17:32:32,507 INFO **spawned: 'confd'** with pid 117

2019-12-16T17:32:32Z 8a1da1594e99 confd[117]: INFO Backend set to etcd

2019-12-16T17:32:32Z 8a1da1594e99 confd[117]: INFO Starting confd

2019-12-16T17:32:32Z 8a1da1594e99 confd[117]: INFO Backend nodes set to http://etcd:4001

:

2019-12-16 17:32:33,782 INFO success: **rainier\_app entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

2019-12-16 17:32:33,782 INFO success: **rainier\_monitoring entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

2019-12-16 17:32:33,782 INFO success: **rainier\_block entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

2019-12-16 17:32:33,782 INFO success: **confd entered RUNNING state**, process has stayed up for > than 1 seconds (startsecs)

1. Start internal services

Internal services, App, Block and Monitoring, are started.

Monitoring | 2019-12-16T17:32:41,303 INFO [MON\_INIT][main] c.h.b.s.r.m.i.RestMonitoringProviderApplication --- **Starting RestMonitoringProviderApplication** on 8a1da1594e99 with PID 115 (/opt/hid/monitoring.jar started by root in /)

:

Block | 2019-12-16T17:32:41,944 INFO [BACKEND\_INIT][main] c.h.b.s.r.b.i.RestBlockProviderApplication --- **Starting RestBlockProviderApplication** on 8a1da1594e99 with PID 116 (/opt/hid/block.jar started by root in /)

:

App | 2019-12-16T17:32:45,610 INFO [REST\_INIT][main] c.h.b.s.r.a.RestApplication --- **Starting RestApplication** on 8a1da1594e99 with PID 114 (/opt/hid/app.jar started by root in /)

:

Block | 2019-12-16T17:33:20,294 INFO [BACKEND\_INIT][main] c.h.b.s.r.b.i.RestBlockProviderApplication --- **Started RestBlockProviderApplication** in 41.28 seconds (JVM running for 47.633)

:

Monitoring | 2019-12-16T17:33:28,907 INFO [MON\_INIT][main] c.h.b.s.r.m.i.RestMonitoringProviderApplication --- **Started RestMonitoringProviderApplication** in 50.015 seconds (JVM running for 56.244)

:

App | 2019-12-16T17:34:11,946 INFO [REST\_INIT][main] c.h.b.s.r.a.RestApplication --- **Started RestApplication** in 92.401 seconds (JVM running for 99.282)

### Add a storage system

The following steps are executed on adding a storage system.

Step 1: Starting the process

Step 2: Connect to the storage system

Step 3: Get basic storage system information

Step 4: Create and start a container for CLI

Step 5: Load resource information

Step 6: Regiter SNMP trap destination

Step 7: Finish of the process

Processes in the steps depends on model of the storage system.

enterprise storage system

mid-range storage system with SVP

mid-range storage system without SVP

#### Add an enterprise storage system

1. Starting the process

A request "POST ~/v1/storage-systems" is submitted, then a create a job titled "Create storage system".

App | 2019-11-18T02:33:49,243 INFO [REST\_API:JCbar8][http-nio-8080-exec-9] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/storage-systems**] body=[{"ipAddress":"10.196.191.10","username":"hsa","password":\*\*\*\*\*}]

App | 2019-11-18T02:33:49,414 INFO [REST\_API:JCbar8][http-nio-8080-exec-9] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 8accd741-5637-4efc-95f9-c39e6141b011, **Title: Create storage system**

1. Connect to a storage system

Try to connect to the storage system with RMI-APIs.

App | 2019-11-18T02:33:49,596 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-supervisors?ipAddress=10.196.191.10&portNumber&isTrySvpOnly=false

:

Block | 2019-11-18T02:38:04,125 INFO [REST\_API:JCbar8:dU0Lh8][http-nio-8082-exec-9] c.h.b.s.d.b.s.r.R800RemoteInterfaceDesc --- **Succeeded to create RMI Registry** (details: ipAddress=10.196.191.10, portNumber=1099, userName=hsa).

Block | 2019-11-18T02:38:04,126 INFO [REST\_API:JCbar8:dU0Lh8][pool-166-thread-1] c.h.b.s.d.b.s.r.RmiDriverFactoryImpl --- **Starting createRmiDriver**()

:

Block | 2019-11-18T02:38:06,127 INFO [REST\_API:JCbar8:dU0Lh8][pool-166-thread-1] c.h.b.s.d.b.s.r.RmiDriverFactoryImpl --- **Completed createRmiDriver**() Took: 2.001 s

1. Get basic information

If the connection to the storage system is successful, get basic information from the storage system. The basic information includes model, serial number, vendor, firmware version. RMI-APIs (\*1) are used to get the nformation on enterprise storage systems.

\*1 Java class name: c.h.b.s.d.b.s.r.RemoteCallHandler

Block | 2019-11-18T02:38:06,054 INFO [REST\_API:JCbar8:dU0Lh8][pool-166-thread-1] **c.h.b.s.d.b.s.r.RemoteCallHandler** --- [51305] **Running RMI-API: method: getSubsystemInfoEx**, attempt #0

Block | 2019-11-18T02:38:06,084 INFO [REST\_API:JCbar8:dU0Lh8][pool-166-thread-1] c.h.b.s.d.b.s.r.RemoteCallHandler --- [51305] Finished RMI-API: method: getSubsystemInfoEx, Total time taken in ms: 30

1. Create and start a container for CLI

Administrator uses a container to running RAID Manager. The container is created and started on adding a storage system. An instance of the RAID Manager is invoked on the container starting process.

Block | 2019-11-18T02:38:06,299 INFO [REST\_API:JCbar8:dU0Lh8][http-nio-8082-exec-9] c.h.b.s.d.b.s.d.i.DockerConnectorImpl --- **New container will be created** because it's not found. image: rdocker:6000/cli:kiwi\_default\_82bae1d71b981860fa838e508a092067bfd35e5c, name: cli\_51305, env: START\_CCI\_ARGS=-i 10.196.191.10,10.196.191.10 -b HV

Block | 2019-11-18T02:38:06,737 INFO [REST\_API:JCbar8:dU0Lh8][http-nio-8082-exec-9] c.s.d.c.DefaultDockerClient --- **Starting container** with Id: e75202f5f7ebde8860a182c87a818ad2bd4751e6bfffba0305cc84ec7d59bb75

1. Load resource information

Collect resource information from storage systems, and store them to caches in Administrator server. RMI-APIs, RAID Manager commands and HDID APIs are used to collect the information for enterprise storage systems.

[RMI API]

Java class name: c.h.b.s.d.b.s.r.RemoteCallHandler

App | 2019-11-18T02:40:51,019 INFO [REST\_API:JCbar8, REST\_API:JCbar8][ForkJoinPool-1-worker-29] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/51305/settings/licenses

:

Block | 2019-10-16T01:44:45,985 INFO [REST\_API:JGgzcc:M2TJiP][http-nio-8082-exec-2768] **c.h.b.s.d.b.s.r.RemoteCallHandler** --- [430002] **Running RMI-API: method: getKeyLicenseStatus**, attempt #0

:

Block | 2019-10-16T01:45:03,934 INFO [REST\_API:JGgzcc:M2TJiP][http-nio-8082-exec-2768] c.h.b.s.d.b.s.r.RemoteCallHandler --- [430002] Finished RMI-API: method: getKeyLicenseStatus, Total time taken in ms: 17948

[RAID Manager]

Java class name: c.h.b.s.d.b.s.c.c.CciCommandBase

App | 2019-11-18T02:40:49,887 INFO [REST\_API:JCbar8][pool-3-thread-2] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/51305/resource-groups

:

Block | 2019-11-18T02:40:49,908 INFO [REST\_API:JCbar8:psQJ3U][http-nio-8082-exec-7] **c.h.b.s.d.b.s.c.c.CciCommandBase** --- [51305] **Running Command**: echo | read-lock **raidcom get resource** -IM0, attempt #0

Block | 2019-11-18T02:40:50,990 INFO [REST\_API:JCbar8:psQJ3U][http-nio-8082-exec-7] c.h.b.s.d.b.s.c.c.CciCommandBase --- [51305] Finished Command: echo | read-lock raidcom get resource -IM0, Total time taken in ms: 1082

[HDID API]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

App | 2019-11-18T02:40:51,003 INFO [REST\_API:JCbar8, REST\_API:JCbar8][ForkJoinPool-1-worker-58] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/51305/hdid-replications

:

Block | 2019-11-18T02:40:51,295 INFO [REST\_API:JCbar8:04l2Py][http-nio-8082-exec-19] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [NodeManagerApi#  
masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] ---> **GET https://10.145.24.219:443/HDID/master/NodeManager/objects/Nodes/?query=%28type+IN+%28%22HitachiVirtualStoragePlatform%22%29%29&order-by=name+ASC** HTTP/1.1

:

Block | 2019-11-18T02:40:51,354 INFO [REST\_API:JCbar8:04l2Py][http-nio-8082-exec-19] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [NodeManagerApi#masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] <--- END HTTP (6635-byte body)

1. Register SNMP trap destination

Register IP address of the Administrator server to the storage system as a SNMP trap destination. RMI-APIs are used to set the destination for enterprise storage systems.

App | 2019-11-18T03:25:19,741 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/51305/settings/add-snmp-trap-destinations payload StorageSystemSnmpSettings{storageSystemModel=VSP G1500, trapDestinations=[SnmpTrapDestination{username=HIDSNMPMGR, ipAddress=10.196.193.141, authProtocol=SHA, privacyProtocol=DES}]}

:

Block | 2019-11-18T03:25:20,044 INFO [REST\_API:JCbar8:DwfIAU][http-nio-8082-exec-23] c.h.b.s.d.b.s.r.R800RmiDriver --- **Registering HID as a SNMP V3 manager** on the arraySnmpTrapDestination{username=HIDSNMPMGR, ipAddress=10.196.193.141, authProtocol=SHA, privacyProtocol=DES}

:

Block | 2019-11-18T03:25:20,091 INFO [REST\_API:JCbar8:DwfIAU][http-nio-8082-exec-23] **c.h.b.s.d.b.s.r.RemoteCallHandler** --- [51305] **Running RMI-API**: method: invoke, params: com.hitachi.sanproject.data.SanData@f5122fc1..., attempt #0

Block | 2019-11-18T03:25:40,289 INFO [REST\_API:JCbar8:DwfIAU][http-nio-8082-exec-23] c.h.b.s.d.b.s.r.RemoteCallHandler --- [51305] Finished RMI-API: method: invoke, Total time taken in ms: 20197

Block | 2019-11-18T03:25:40,290 INFO [REST\_API:JCbar8:DwfIAU][http-nio-8082-exec-23] c.h.b.s.d.b.s.r.R800RmiDriver --- Finished registering HID as a manager on the array

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-11-18T03:25:52,262 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobStepReporter --- JOB\_ID: 8accd741-5637-4efc-95f9-c39e6141b011, SEVERITY: Information, MESSAGE: Successfully created storage system 51305.

App | 2019-11-18T03:25:52,263 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 8accd741-5637-4efc-95f9-c39e6141b011, add REPORT: CreateStorageSystemPostStepReport, SEVERITY: Information, MESSAGE: Successfully created storage system 51305.

App | 2019-11-18T03:25:52,677 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: 8accd741-5637-4efc-95f9-c39e6141b011

App | 2019-11-18T03:25:52,772 INFO [REST\_API:JCbar8][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 8accd741-5637-4efc-95f9-c39e6141b011, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Add a mid-range storage system with SVP

1. Starting the process

A request "POST ~/v1/storage-systems" is submitted, then create a job titled "Create storage system".

App | 2019-10-16T01:37:16,900 INFO [REST\_API:JGgzcc][http-nio-8080-exec-10] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/storage-systems**] body=[{"ipAddress":"10.196.191.20","username":"hsa","password":\*\*\*\*\*}]

App | 2019-10-16T01:37:18,527 INFO [REST\_API:JGgzcc][http-nio-8080-exec-10] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: dce9f4a3-6bf8-4a37-9d11-4f62f1702e81, **Title: Create storage system**

1. Connect to a storage system

Try to connect to the storage system with RMI-APIs.

App | 2019-10-16T01:37:19,952 INFO [REST\_API:JGgzcc][ForkJoinPool-2-worker-44] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-supervisors?ipAddress=10.196.191.20&portNumber&isTrySvpOnly=false

:

Block | 2019-10-16T01:37:20,261 INFO [REST\_API:JGgzcc:bfA8wa][http-nio-8082-exec-2668] c.h.b.s.d.b.s.r.HM800RemoteInterfaceDesc --- **Succeeded to create RMI Registry** (details: ipAddress=10.196.191.20, portNumber=1099, userName=).

Block | 2019-10-16T01:37:21,651 INFO [REST\_API:JGgzcc:dIQpPJ][pool-23403-thread-1] c.h.b.s.d.b.s.r.RmiDriverFactoryImpl --- **Starting createRmiDriver**()

:

Block | 2019-10-16T01:37:31,002 INFO [REST\_API:JGgzcc:dIQpPJ][pool-23403-thread-1] c.h.b.s.d.b.s.r.RmiDriverFactoryImpl --- **Completed createRmiDriver**() Took: 9.351 s

1. Get basic information

If the connection to the storage system is successful, get basic information from the storage system. The basic information includes model, serial number, vendor, firmware version. RMI-APIs are used to get the nformation on enterprise storage systems.

Block | 2019-10-16T01:37:30,006 INFO [REST\_API:JGgzcc:dIQpPJ][pool-23403-thread-1] c.h.b.s.d.b.s.r.RemoteCallHandler --- [null] **Running RMI-API: method: getSubsystemInfoEx**, attempt #0

Block | 2019-10-16T01:37:30,497 INFO [REST\_API:JGgzcc:dIQpPJ][pool-23403-thread-1] c.h.b.s.d.b.s.r.RemoteCallHandler --- [null] Finished RMI-API: method: getSubsystemInfoEx, Total time taken in ms: 490

1. Create and start a container for CLI

Administrator uses a container to running RAID Manager. The container is created and started on adding a storage system. An instance of the RAID Manager is invoked on the container starting process.

Block | 2019-10-16T01:37:32,232 INFO [REST\_API:JGgzcc:dIQpPJ][http-nio-8082-exec-2735] c.h.b.s.d.b.s.d.i.DockerConnectorImpl --- **New container will be created** because it's not found. image: rdocker:6000/cli:jaguar\_default\_16e8f7811365783d0d3039c9046d73fcb45a69a8, name: cli\_430002, env: START\_CCI\_ARGS=-i 10.196.191.21,10.196.191.22 -b HV

Block | 2019-10-16T01:37:38,604 INFO [REST\_API:JGgzcc:dIQpPJ][http-nio-8082-exec-2735] c.s.d.c.DefaultDockerClient --- **Starting container** with Id: eea0de773c71f25c204da130b8832a83d8ff8c76254c9da64c4e9b7407aaac80

1. Load resource information

Collect resource information from storage systems, and store the information to caches in Administrator server. RMI-APIs, RAID Manager commands and HDID APIs are used to collect the information on mid-range storage system with SVP.

[RMI API]

Java class name: c.h.b.s.d.b.s.r.RemoteCallHandler

App | 2019-10-16T01:44:03,722 INFO [REST\_API:JGgzcc, REST\_API:JGgzcc][ForkJoinPool-1-worker-18] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/430002/settings/licenses

:

Block | 2019-10-16T01:44:45,985 INFO [REST\_API:JGgzcc:M2TJiP][http-nio-8082-exec-2768] **c.h.b.s.d.b.s.r.RemoteCallHandler** --- [430002] **Running RMI-API: method: getKeyLicenseStatus**, attempt #0

:

Block | 2019-10-16T01:45:03,934 INFO [REST\_API:JGgzcc:M2TJiP][http-nio-8082-exec-2768] c.h.b.s.d.b.s.r.RemoteCallHandler --- [430002] Finished RMI-API: method: getKeyLicenseStatus, Total time taken in ms: 17948

[RAID Manager]

Java class name: c.h.b.s.d.b.s.c.c.CciCommandBase

App | 2019-10-16T01:44:03,161 INFO [REST\_API:JGgzcc][pool-3-thread-1] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/430002/resource-groups

**:**

Block | 2019-10-16T01:44:03,193 INFO [REST\_API:JGgzcc:tDyXgn][http-nio-8082-exec-2746] **c.h.b.s.d.b.s.c.c.CciCommandBase** --- [430002] **Running Command**: echo | read-lock **raidcom get resource** -IM0, attempt #0

Block | 2019-10-16T01:44:03,683 INFO [REST\_API:JGgzcc:tDyXgn][http-nio-8082-exec-2746] c.h.b.s.d.b.s.c.c.CciCommandBase --- [430002] Finished Command: echo | read-lock raidcom get resource -IM0, Total time taken in ms: 490

[HDID API]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

App | 2019-10-16T01:44:03,693 INFO [REST\_API:JGgzcc, REST\_API:JGgzcc][ForkJoinPool-1-worker-63] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/430002/hdid-replications

:

Block | 2019-10-16T01:44:04,923 INFO [REST\_API:JGgzcc:edIaet][http-nio-8082-exec-2761] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [NodeManagerApi#masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] ---> **GET https://10.197.221.22:443/HDID/master/NodeManager/objects/Nodes/?query=%28type+IN+%28%22HitachiVirtualStoragePlatform%22%29%29&order-by=name+ASC** HTTP/1.1

Block | 2019-10-16T01:44:04,923 INFO [REST\_API:JGgzcc:edIaet][http-nio-8082-exec-2761] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [NodeManagerApi#masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] ---> END HTTP (0-byte body)

1. Register SNMP trap destination

Register IP address of the Administrator server to the storage system as SNMP trap destination. GUM JSON APIs (\*1) are used to set the destination for mid-range storage systems.

\*1 Java class name: c.h.b.c.g.GumRestLogger

App | 2019-10-16T01:48:32,214 INFO [REST\_API:JGgzcc][ForkJoinPool-2-worker-44] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/430002/settings/add-snmp-trap-destinations payload StorageSystemSnmpSettings{storageSystemModel=VSP G200, trapDestinations=[SnmpTrapDestination{username=HIDSNMPMGR, ipAddress=10.196.193.141, authProtocol=SHA, privacyProtocol=DES}]}

:

Block | 2019-10-16T01:48:41,433 INFO [REST\_API:JGgzcc:gEgHtC][http-nio-8082-exec-2777] **c.h.b.c.g.GumRestLogger** --- [GumRestClient#setSnmpInformation] ---> **POST https://10.196.191.21/cgi-bin/easygui.cgi** HTTP/1.1

Block | 2019-10-16T01:50:12,012 INFO [REST\_API:JGgzcc:gEgHtC][http-nio-8082-exec-2777] c.h.b.c.g.GumRestLogger --- [GumRestClient#setSnmpInformation] <--- HTTP/1.1 200 OK (90579ms)

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-10-16T01:53:43,728 INFO [REST\_API:JGgzcc][ForkJoinPool-2-worker-44] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: dce9f4a3-6bf8-4a37-9d11-4f62f1702e81, add REPORT: CreateStorageSystemPostStepReport, SEVERITY: Information, MESSAGE: Successfully created storage system 430002.

App | 2019-10-16T01:53:44,751 INFO [REST\_API:JGgzcc][ForkJoinPool-2-worker-44] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: dce9f4a3-6bf8-4a37-9d11-4f62f1702e81

App | 2019-10-16T01:53:45,052 INFO [REST\_API:JGgzcc][ForkJoinPool-2-worker-44] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: dce9f4a3-6bf8-4a37-9d11-4f62f1702e81, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Add a mid-range storage system without SVP

1. Starting the process

A request "POST ~/v1/storage-systems" is submitted, then create a job titled "Create storage system".

App | 2019-11-18T04:17:56,105 INFO [REST\_API:leJiuq][http-nio-8080-exec-8] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/storage-systems**] body=[{"ipAddress":"10.196.191.36","username":"hsa","password":\*\*\*\*\*}]  
:

App | 2019-11-18T04:17:56,274 INFO [REST\_API:leJiuq][http-nio-8080-exec-8] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 892cedcd-8e00-4daa-8328-927265ea6500, **Title: Create storage system**

1. Connect to a storage system

Attempt to connect to the storage system with RMI-APIs, but the connection fails because the RMI-APIs cannot be used without SVP. Then attempt to connect with PF REST APIs(\*1).

\*1 Java class name: c.h.b.s.d.b.s.b.c.l.BlockRestLogger

Block | 2019-11-18T04:17:56,437 WARN [REST\_API:leJiuq:dZcjFN][http-nio-8082-exec-62] c.h.b.s.d.b.s.r.RmiDriverDiscoveryImpl --- **Attempt to create RMI driver** for RmiConfig{ipAddress=10.196.191.36, portNumber=[DEFAULT], username=, password=[FILTERED]} have failed with error Remote service on 10.196.191.36 does not have binding for RMIControl, try another one

Block | 2019-11-18T04:17:56,437 ERROR [REST\_API:leJiuq:dZcjFN][http-nio-8082-exec-62] c.h.b.s.d.b.s.r.RmiDriverDiscoveryImpl --- None of the known drivers([com.hitachi.sanproject.rmi.supervisor.rmiserver, RMIControl, RMIControl]) can be used to communicate with RmiConfig{ipAddress=10.196.191.36, portNumber=[DEFAULT], username=, password=[FILTERED]}

Block | 2019-11-18T04:17:56,437 INFO [REST\_API:leJiuq:dZcjFN][http-nio-8082-exec-62] c.h.b.s.d.b.s.d.StorageSystemOnBoardDriverImpl --- **Cannot communicate to a storage system via RMI API.** Try to communicate via REST API. IP Address: 10.196.191.36

Block | 2019-11-18T04:17:56,893 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] **c.h.b.s.d.b.s.b.c.l.BlockRestLogger** --- [ObjectsApi#v1ObjectsStoragesGet] ---> **GET https://10.196.191.36/ConfigurationManager/v1/objects/storages** HTTP/1.1

:

Block | 2019-11-18T04:17:57,312 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.h.b.s.d.b.s.b.c.l.BlockRestLogger --- [ObjectsApi#v1ObjectsStoragesGet] <--- END HTTP (182-byte body)

1. Get basic information

If the connection to the storage system is successful, get basic information from the storage system. The basic information includes model, serial number, vendor, firmware version. GUM JSON APIs(\*1) are used to get the nformation on mid-range storage systems without SVP.

\*1 Java class name: c.h.b.c.g.GumRestLogger

Block | 2019-11-18T04:18:04,993 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] **c.h.b.c.g.GumRestLogger** --- [GumRestClient#getStorageSystemInformation] ---> **POST https://10.196.191.36/cgi-bin/easygui.cgi** HTTP/1.1

Block | 2019-11-18T04:18:06,376 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.h.b.c.g.GumRestLogger --- [GumRestClient#getStorageSystemInformation] <--- HTTP/1.1 200 OK (1382ms)

Block | 2019-11-18T04:18:06,387 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.h.b.c.g.GumRestLogger --- [GumRestClient#getFirmwareVersion] ---> POST https://10.196.191.36/cgi-bin/easygui.cgi HTTP/1.1

Block | 2019-11-18T04:18:07,419 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.h.b.c.g.GumRestLogger --- [GumRestClient#getFirmwareVersion] <--- HTTP/1.1 200 OK (1031ms)

1. Create and start a container for CLI

Administrator uses a container to running RAID Manager. The container is created and started on adding a storage system. An instance of the RAID Manager is invoked on the container starting process.

Block | 2019-11-18T04:18:08,507 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.h.b.s.d.b.s.d.i.DockerConnectorImpl --- **New container will be created** because it's not found. image: rdocker:6000/cli:kiwi\_default\_82bae1d71b981860fa838e508a092067bfd35e5c, name: cli\_415249, env: START\_CCI\_ARGS=-i 10.196.191.36,10.196.191.37 -b HV

Block | 2019-11-18T04:18:08,764 INFO [REST\_API:leJiuq:dM37TA][http-nio-8082-exec-36] c.s.d.c.DefaultDockerClient --- **Starting container** with Id: 5de6be2971e4a0a67ac584df6bc3717a7dbfdfc23dd1d9de171c4b2e39960895

1. Load resource information

Collect resource information from storage systems, and store the information to caches in Administrator server. RAID Manager comamnds, GUM JSON APIs, PF REST APIs, and HDID APIs are used to collect the information on mid-range storage system with SVP.

[RAID Manager]

Java class name: c.h.b.s.d.b.s.c.c.CciCommandBase

App | 2019-11-18T04:19:03,646 INFO [REST\_API:leJiuq][pool-3-thread-3] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/415249/resource-groups

:

Block | 2019-11-18T04:19:03,688 INFO [REST\_API:leJiuq:aHZSD3][http-nio-8082-exec-47] **c.h.b.s.d.b.s.c.c.CciCommandBase** --- [415249] **Running Command**: echo | read-lock **raidcom get resource** -IM0, attempt #0

Block | 2019-11-18T04:19:04,078 INFO [REST\_API:leJiuq:aHZSD3][http-nio-8082-exec-47] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415249] Finished Command: echo | read-lock raidcom get resource -IM0, Total time taken in ms: 390

[GUM JSON API]

Java class name: c.h.b.c.g.GumRestLogger

App | 2019-11-18T04:19:04,093 INFO [REST\_API:leJiuq, REST\_API:leJiuq][ForkJoinPool-1-worker-32] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/415249/settings/licenses

:

Block | 2019-11-18T04:19:05,769 INFO [REST\_API:leJiuq:yOEm6f][http-nio-8082-exec-77] **c.h.b.c.g.GumRestLogger** --- [GumRestClient#getLicense] ---> **POST https://10.196.191.36/cgi-bin/easygui.cgi** HTTP/1.1

:

Block | 2019-11-18T04:19:07,052 INFO [REST\_API:leJiuq:yOEm6f][http-nio-8082-exec-77] c.h.b.c.g.GumRestLogger --- [GumRestClient#getLicense] <--- HTTP/1.1 200 OK (1282ms)

[PF REST API]

Java class name: c.h.b.s.d.b.s.b.c.l.BlockRestLogger

App | 2019-11-18T04:19:04,088 INFO [REST\_API:leJiuq, REST\_API:leJiuq][ForkJoinPool-1-worker-29] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/415249/ports

:

Block | 2019-11-18T04:19:04,785 INFO [REST\_API:leJiuq:rO0ERn][http-nio-8082-exec-47] **c.h.b.s.d.b.s.b.c.l.BlockRestLogger** --- [ObjectsApi#v1ObjectsStoragesStorageDeviceIDPortsGet] ---> **GET https://10.196.191.36/ConfigurationManager/v1/objects/storages/886000415249/ports** HTTP/1.1

:

Block | 2019-11-18T04:19:07,067 INFO [REST\_API:leJiuq:rO0ERn][http-nio-8082-exec-47] c.h.b.s.d.b.s.b.c.l.BlockRestLogger --- [ObjectsApi#v1ObjectsStoragesStorageDeviceIDPortsGet] <--- END HTTP (4481-byte body)

[HDID API]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

App | 2019-11-18T04:19:04,088 INFO [REST\_API:leJiuq, REST\_API:leJiuq][ForkJoinPool-1-worker-61] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/415249/hdid-replications

:

Block | 2019-11-18T04:19:04,289 INFO [REST\_API:leJiuq:Xo8m05][http-nio-8082-exec-86] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [NodeManagerApi#  
masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] ---> **GET https://10.145.24.219:443/HDID/master/NodeManager/objects/Nodes/?query=%28type+IN+%28%22HitachiVirtualStoragePlatform%22%29%29&order-by=name+ASC** HTTP/1.1

:

Block | 2019-11-18T04:19:04,351 INFO [REST\_API:leJiuq:Xo8m05][http-nio-8082-exec-86] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [NodeManagerApi#  
masterNodeManagerObjectsNodesqueryTypeIN22HitachiVirtualStoragePlatform22orderBynameASCGet] <--- END HTTP (6635-byte body)

1. Register SNMP trap destination

Register IP address of the Administrator server to the storage system as SNMP trap destination. GUM JSON APIs (\*1) are used to set the destination for mid-range storage systems.

\*1 Java class name: c.h.b.c.g.GumRestLogger

App | 2019-11-18T05:04:44,167 INFO [REST\_API:leJiuq][ForkJoinPool-2-worker-1] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415249/settings/add-snmp-trap-destinations payload StorageSystemSnmpSettings{storageSystemModel=VSP G900, trapDestinations=  
[SnmpTrapDestination{username=HIDSNMPMGR, ipAddress=10.196.193.141, authProtocol=SHA, privacyProtocol=DES}]}

:

Block | 2019-11-18T05:04:48,942 INFO [REST\_API:leJiuq:4qDS41][http-nio-8082-exec-129] **c.h.b.c.g.GumRestLogger** --- [GumRestClient#setSnmpInformation] ---> **POST https://10.196.191.36/cgi-bin/easygui.cgi** HTTP/1.1

Block | 2019-11-18T05:04:49,511 INFO [REST\_API:leJiuq:4qDS41][http-nio-8082-exec-129] c.h.b.c.g.GumRestLogger --- [GumRestClient#setSnmpInformation] <--- HTTP/1.1 200 OK (568ms)

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-11-18T05:05:06,682 INFO [REST\_API:leJiuq][ForkJoinPool-2-worker-1] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: 892cedcd-8e00-4daa-8328-927265ea6500

App | 2019-11-18T05:05:06,736 INFO [REST\_API:leJiuq][ForkJoinPool-2-worker-1] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 892cedcd-8e00-4daa-8328-927265ea6500, STATUS: SUCCESS\_WITH\_ERRORS, **MESSAGE: Set the job status**

### Refresh storage system

#### Refresh a storage system refresh automatically

Administrator periodically checks for configuration changes on a storage system and refresh cache information of the storage system if any. The following steps are executed on the refresh.

Step 1: Starting the process

Step 2: Check configuration changes on a storage system

Step 3: Reload resource information (Optional)

Step 4: Finish of the process

1. Starting the process

A message "Start refresh:[<*storage-id*>]" is appeared at the beginning of refresh.

App | 2019-11-13T00:44:46,583 INFO [REFRESH:pmonTV][RefreshCacheService RUNNING] c.h.b.s.b.p.c.StorageResourceCacheImpl --- **Start refresh:[410438]**

App | 2019-11-13T00:44:46,583 INFO [REFRESH:pmonTV][RefreshCacheService RUNNING] c.h.b.s.b.p.c.PoolForRefreshCache --- Submitted new refresh task. Current queue length: 0.

App | 2019-11-13T00:44:46,584 INFO [][pool-3-thread-2] c.h.b.s.b.p.c.PoolForRefreshCache --- Started new refresh task. Current queue length: 0.

1. Check configuration changes on a storage system

Collect information related to configuration changes using RMI-APIs or PF REST APIs.

[RMI-API]

Java class name: c.h.b.s.d.b.s.r.RemoteCallHandler

App | 2019-11-08T07:07:28,687 INFO [REFRESH:rJS2jS][RefreshCacheService RUNNING] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/410438/revision

:

Block | 2019-11-08T07:07:32,818 INFO [REFRESH:rJS2jS:VKKU2j][http-nio-8082-exec-1104] c.h.b.s.d.b.s.r.RemoteCallHandler --- [410438] Running RMI-API: method: refreshUx, params: 0..., attempt #0

Block | 2019-11-08T07:08:42,312 INFO [REFRESH:rJS2jS:VKKU2j][http-nio-8082-exec-1104] c.h.b.s.d.b.s.r.RemoteCallHandler --- [410438] Finished RMI-API: method: refreshUx, Total time taken in ms: 69494

:

Block | 2019-11-08T07:08:52,226 INFO [REFRESH:rJS2jS:fperVT][http-nio-8082-exec-1055] **c.h.b.s.d.b.s.r.RemoteCallHandler** --- [410438] **Running RMI-API: method: getConfVerSummary**, attempt #0

Block | 2019-11-08T07:08:52,382 INFO [REFRESH:rJS2jS:VKKU2j][http-nio-8082-exec-1104] c.h.b.s.d.b.s.r.RemoteCallHandler --- [410438] Finished RMI-API: method: getConfVerSummary, Total time taken in ms: 10069

[PF REST API]

Java class name: c.h.b.s.d.b.s.r.RemoteCallHandler

App | 2019-11-13T01:08:48,237 INFO [REFRESH:fq56dr][RefreshCacheService RUNNING] c.h.b.s.c.c.r.RestUtil --- GET request to http://localhost:8082/block/provider/api/storage-systems/415249/revision

:

Block | 2019-11-13T01:08:53,032 INFO [REFRESH:fq56dr:ptTEZF][http-nio-8082-exec-43] **c.h.b.s.d.b.s.b.c.l.BlockRestLogger** --- [PfRestConfigurationInformationApi#getConfigurationInformation] ---> **GET https://10.196.191.36/ConfigurationManager/v1/objects/storages/886000415249/configuration-informations/instance** HTTP/1.1

:

Block | 2019-11-13T01:08:53,820 INFO [REFRESH:fq56dr:ptTEZF][http-nio-8082-exec-43] c.h.b.s.d.b.s.b.c.l.BlockRestLogger --- [PfRestConfigurationInformationApi#  
getConfigurationInformation] <--- END HTTP (29-byte body)

1. Reload resource information

If any configuration changes are detected, reload resource information from the storage system and update cache information. This step is almost the same as step 5 described in the section 4.3.2 .

1. Finish of the process

"Complete refresh: [storage-id]" is output when the process terminates.

App | 2019-11-13T00:49:59,702 INFO [REFRESH:pmonTV][pool-3-thread-2] c.h.b.s.b.p.c.StorageResourceCacheImpl --- Complete loadCache:[410438]: StopWatch 'loadCache': running time (millis) = 287104; [] took 287104 = 100%

App | 2019-11-13T00:49:59,703 INFO [REFRESH:pmonTV][RefreshCacheService RUNNING] c.h.b.s.b.p.c.StorageResourceCacheImpl --- **Complete refresh:[410438]**

#### Refresh a storage system manually

The following steps are executed when an user submit "Refresh storage system" request for a storage system.

Step 1: Starting the process

Step 2: Reload resource information (Optional)

Step 3: Finish of the process

1. Starting the process

A request "POST ~/v1/storage-systems/refrsh" is submitted, then create a job titled "Refresh storage system".

App | 2019-11-13T00:31:04,783 INFO [REST\_API:XvmkzT][http-nio-8080-exec-1] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/storage-systems/refresh**] body=[{"storageSystemIds":["410438"]}]

:

App | 2019-11-13T00:31:04,973 INFO [REST\_API:XvmkzT][http-nio-8080-exec-1] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: b36c5915-8dd6-4075-84dd-e38f65c3e532, Title: **Refresh storage system 410438**

App | 2019-11-13T00:31:04,976 INFO [REST\_API:XvmkzT][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobStepReporter --- JOB\_ID: b36c5915-8dd6-4075-84dd-e38f65c3e532, SEVERITY: Information, MESSAGE: Refreshing storage system 410438.

:

App | 2019-11-13T00:31:05,564 INFO [REST\_API:XvmkzT, M\_REFRESH:gRxCXa][ForkJoinPool-2-worker-86] c.h.b.s.b.p.c.StorageResourceCacheImpl --- Start refresh:[410438]

1. Reload resource information

Reload resource information from the storage system and update cache information. This step is almost the same as step 5 described in the section4.3.2 .

1. Finish of the process

"Complete refresh: [storage-id]" and "Set the job status" are output when the process terminates.

App | 2019-11-13T00:34:47,519 INFO [REST\_API:XvmkzT, M\_REFRESH:gRxCXa][pool-3-thread-4] c.h.b.s.b.p.c.StorageResourceCacheImpl --- Complete loadCache:[410438]: StopWatch 'loadCache': running time (millis) = 173473; [] took 173473 = 100%

App | 2019-11-13T00:34:47,519 INFO [REST\_API:XvmkzT, M\_REFRESH:gRxCXa][ForkJoinPool-2-worker-86] c.h.b.s.b.p.c.StorageResourceCacheImpl --- **Complete refresh:[410438]**

:

App | 2019-11-13T00:35:27,370 INFO [REST\_API:XvmkzT][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: b36c5915-8dd6-4075-84dd-e38f65c3e532, add REPORT: RefreshStorageSystemPostStepReport, SEVERITY: Information, MESSAGE: Successfully refreshed storage system 410438.

App | 2019-11-13T00:35:27,510 INFO [REST\_API:XvmkzT][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: b36c5915-8dd6-4075-84dd-e38f65c3e532

App | 2019-11-13T00:35:27,634 INFO [REST\_API:XvmkzT][ForkJoinPool-2-worker-29] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: b36c5915-8dd6-4075-84dd-e38f65c3e532, STATUS: SUCCESS, MESSAGE: **Set the job status**

### Attach volumes

#### Attach volumes for fibre network

The following steps are executed on attaching volumes for fibre network.

Step 1: Starting the process

Step 2: Set virtual IDs (optional)

Step 3: Create host groups (optional)

Step 4: Add WWNs to host groups (optional)

Step 5: Set host mode (optional)

Step 6: Add LUN paths

Step 7: Finish of the job

1. Starting the process

A request "POST ~/v1/volume-manager/attach" is submitted, then create a job titled "Attach volumes to servers.".

App | 2019-11-06T06:43:52,541 INFO [REST\_API:Kri7F8][http-nio-8080-exec-8] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/volume-manager/attach**]body=[{"storageSystemId":"410438","hostModeOptions":null,"volumes":[{"volumeId":1620,"lun":null,"virtualIdRange":null}],"enableZoning":false,"enableLunUnification":false,"ports":[{"serverId":1,"serverWwns":["123456789ABCDEFA"],"portIds":["CL1-E"]}]}]

:

App | 2019-11-06T06:43:53,905 INFO [REST\_API:Kri7F8][http-nio-8080-exec-8] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: d06fc43b-46e2-43d6-9765-ff04e81345c7, **Title: Attach volumes to servers.**

1. Ser virtual IDs

If target volume is not set a virtual ID, a job titled "Map virtual volume ids to volumes" is created. "raidcom map resource -ldev\_id" is used for setting a virtual ID.

App | 2019-11-06T06:43:55,389 INFO [REST\_API:Kri7F8][ForkJoinPool-2-worker-44] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 55878499-fef8-4309-a607-4d1657d017e1, **Title: Map virtual volume ids to volumes**

:

App | 2019-11-06T06:43:56,130 INFO [REST\_API:Kri7F8][ForkJoinPool-2-worker-101] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/volumes/1620/map-virtual-volume-id payload MapVVolIdProperties{virtualVolumeId=1620}

:

Block | 2019-11-06T06:43:56,744 INFO [REST\_API:Kri7F8:6YaWeE][http-nio-8082-exec-383] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock raidcom map resource -ldev\_id 1620 -virtual\_ldev\_id 1620 -IM0, attempt #0

Block | 2019-11-06T06:43:56,933 INFO [REST\_API:Kri7F8:6YaWeE][http-nio-8082-exec-383] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Finished Command: echo | read-lock raidcom map resource -ldev\_id 1620 -virtual\_ldev\_id 1620 -IM0, Total time taken in ms: 188

1. Create host groups

If there is no appropriate host group in a port, a host group is created with "raidcom add host\_grp" command.

App | 2019-11-06T06:44:11,044 INFO [REST\_API:Kri7F8][ForkJoinPool-2-worker-101] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/ports/CL1-E/host-groups payload CreateFibreHostGroupProperties{hostGroupName=test-fc-1, hostMode=LINUX, hostModeOptions=HostModeOptions{hostModeOptions=[]}, luns=[], protocol=FIBRE, hbaWwns=[123456789ABCDEFA], iscsiNames=null, chapUser=null, forceOverwriteChapSecret=false, resourceGroupName=null, hostGroupId=108}

:

Block | 2019-11-06T06:44:11,525 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom add host\_grp** -port CL1-E-108 -host\_grp\_name test-fc-1 -IM0, attempt #0

Block | 2019-11-06T06:44:11,933 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Finished Command: echo | read-lock raidcom add host\_grp -port CL1-E-108 -host\_grp\_name test-fc-1 -IM0, Total time taken in ms: 407

1. Add WWNs to host groups

Add WWNs of a server to the host group if the WWNs are not defined. "raidcom add hba\_wwn" is used for adding an WWN to a host group.

Block | 2019-11-06T06:44:14,363 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom add hba\_wwn** -port CL1-E-108 -hba\_wwn 123456789ABCDEFA -IM0, attempt #0

Block | 2019-11-06T06:44:14,728 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Finished Command: echo | read-lock raidcom add hba\_wwn -port CL1-E-108 -hba\_wwn 123456789ABCDEFA -IM0, Total time taken in ms: 365

1. Set host mode

If a host group is created on step 3, host mode is set with "raidcom modify host\_grp -host\_mode" command.

Block | 2019-11-06T06:44:15,107 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom modify host\_grp** -port CL1-E-108 **-host\_mode** LINUX -reset\_host\_mode\_opt -IM0, attempt #0

Block | 2019-11-06T06:44:15,401 INFO [REST\_API:Kri7F8:mjSS9B][http-nio-8082-exec-380] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Finished Command: echo | read-lock raidcom modify host\_grp -port CL1-E-108 -host\_mode LINUX -reset\_host\_mode\_opt -IM0, Total time taken in ms: 294

1. Add LUN paths

Add LUN paths to host groups. A LUN path is added with "raidcom add lun" command.

App | 2019-11-06T06:44:21,739 INFO [REST\_API:Kri7F8][ForkJoinPool-2-worker-101] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/ports/CL1-E/host-groups/108/add-to payload UpdateHostGroupProperties{luns=[Lun{volumeId=1620, lun=1}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-11-06T06:44:22,170 INFO [REST\_API:Kri7F8:eAvEks][http-nio-8082-exec-379] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom add lun** -port CL1-E-108 -lun\_id 1 -ldev\_id 1620 -IM0, attempt #0

Block | 2019-11-06T06:44:22,867 INFO [REST\_API:Kri7F8:eAvEks][http-nio-8082-exec-379] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Finished Command: echo | read-lock raidcom add lun -port CL1-E-108 -lun\_id 1 -ldev\_id 1620 -IM0, Total time taken in ms: 696

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-11-06T06:44:35,198 INFO [REST\_API:Kri7F8][ForkJoinPool-2-worker-44] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: d06fc43b-46e2-43d6-9765-ff04e81345c7, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Attach volumes for iSCSI network

The following steps are executed on attaching volumes for iSCSI network.

Step 1: Starting the process

Step 2: Set virtual IDs (optional)

Step 3: Create iSCSI targets (optional)

Step 4: Add iSCSI names to iSCSI targets (optional)

Step 5: Set host mode and CHAP authentication mode (optional)

Step 6: Set CHAP users (optional)

Step 7: Add LUN paths

Step 8: Finish of the job

1. Starting the process

A request "POST ~/v1/volume-manager/attach" is submitted, then create a job titled "Attach volumes to servers.".

App | 2019-11-07T03:18:22,186 INFO [REST\_API:CrmPGr][http-nio-8080-exec-2] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/volume-manager/attach**] body=[{"storageSystemId":"415248","hostModeOptions":null,"volumes":[{"volumeId":8024,"lun":null,"virtualIdRange":null}],"enableLunUnification":false,"ports":[{"serverId":7,"iscsiInitiatorNames":["iqn.test.iscsi.1"],"portIds":["CL3-C"]}]}]

:

App | 2019-11-07T03:18:28,184 INFO [REST\_API:CrmPGr][http-nio-8080-exec-2] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: b6919b8d-e4bd-4cd2-935b-89a45934c459, **Title: Attach volumes to servers.**

1. Set virtual ID

If target volume is not set a virtual ID, a job titled "Map virtual volume ids to volumes" is created. "raidcom map resource -ldev\_id" is used for setting a virtual ID.

App | 2019-11-07T03:18:31,938 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 02c13546-bb20-43a2-ae4e-4eaeb32b2b26, **Title: Map virtual volume ids to volumes**

:

App | 2019-11-07T03:18:39,101 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-115] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415248/volumes/8024/map-virtual-volume-id payload MapVVolIdProperties{virtualVolumeId=8024}

:

Block | 2019-11-07T03:18:40,306 INFO [REST\_API:CrmPGr:sNfoE5][http-nio-8082-exec-825] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom map resource -ldev\_id** 8024 -virtual\_ldev\_id 8024 -IM0, attempt #0

Block | 2019-11-07T03:18:40,705 INFO [REST\_API:CrmPGr:sNfoE5][http-nio-8082-exec-825] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom map resource -ldev\_id 8024 -virtual\_ldev\_id 8024 -IM0, Total time taken in ms: 398

1. Create iSCSI targets

If there is no appropriate iSCSI target in a port, an iSCSI target is created with "raidcom add host\_grp" command.

App | 2019-11-07T03:19:03,610 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-115] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415248/ports/CL3-C/host-groups payload CreateIscsiHostGroupWithChapProperties{hostGroupName=test-iscsi-1, hostMode=LINUX, hostModeOptions=HostModeOptions{hostModeOptions=[]}, luns=[], protocol=ISCSI, hbaWwns=null, iscsiNames=[iqn.test.iscsi.1], chapUser=ChapUser{userName=test-chap-user-1}, forceOverwriteChapSecret=false, resourceGroupName=null, hostGroupId=1}

:

Block | 2019-11-07T03:19:04,487 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom add host\_grp** -port CL3-C-1 -host\_grp\_name test-iscsi-1 -IM0, attempt #0

Block | 2019-11-07T03:19:04,904 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom add host\_grp -port CL3-C-1 -host\_grp\_name test-iscsi-1 -IM0, Total time taken in ms: 417

1. Add iSCSI names to iSCSI targets

Add iSCSI names of a server to the host group if the iSCS names are not defined. "raidcom add hba\_iscsi" command.

Block | 2019-11-07T03:19:08,677 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom add hba\_iscsi** -port CL3-C-1 -hba\_iscsi\_name iqn.test.iscsi.1 -IM0, attempt #0

Block | 2019-11-07T03:19:08,932 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom add hba\_iscsi -port CL3-C-1 -hba\_iscsi\_name iqn.test.iscsi.1 -IM0, Total time taken in ms: 255

1. Set host mode and CHAP authentication mode

If an iSCSI target is created on step 3, host mode and CHAP authentication mode are set with "raidcom modify host\_grp -host\_mode".

Block | 2019-11-07T03:19:09,324 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom modify host\_grp** -port CL3-C-1 **-host\_mode** LINUX -reset\_host\_mode\_opt -authmethod CHAP -mutual disable -IM0, attempt #0

Block | 2019-11-07T03:19:09,631 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom modify host\_grp -port CL3-C-1 -host\_mode LINUX -reset\_host\_mode\_opt -authmethod CHAP -mutual disable -IM0, Total time taken in ms: 306

1. Set CHAP users (optional)

If an iSCSI target is created on step 3 and CHAP user settings are necessary, set them with "raidcom add chap\_user" and "raidcom set chap\_user".

Block | 2019-11-07T03:19:10,002 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom add chap\_user** -port CL3-C-1 -initiator\_chap\_user "test-chap-user-1" -IM0, attempt #0

Block | 2019-11-07T03:19:10,259 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom add chap\_user -port CL3-C-1 -initiator\_chap\_user "test-chap-user-1" -IM0, Total time taken in ms: 256

:

Block | 2019-11-07T03:19:10,647 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo [FILTERED] | read-lock **raidcom set chap\_user** -port CL3-C-1 -initiator\_chap\_user "test-chap-user-1" -secret -IM0, attempt #0

Block | 2019-11-07T03:19:10,684 INFO [REST\_API:CrmPGr:8kWX83][http-nio-8082-exec-753] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo [FILTERED] | read-lock raidcom set chap\_user -port CL3-C-1 -initiator\_chap\_user "test-chap-user-1" -secret -IM0, Total time taken in ms: 36

1. Add LUN paths

Add LUN paths to iSCSI targets. A LUN path is added with "raidcom add lun" command.

App | 2019-11-07T03:19:25,503 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-115] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415248/ports/CL3-C/host-groups/1/add-to payload UpdateHostGroupProperties{luns=[Lun{volumeId=8024, lun=1}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-11-07T03:19:26,306 INFO [REST\_API:CrmPGr:BJt4yk][http-nio-8082-exec-814] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom add lun** -port CL3-C-1 -lun\_id 1 -ldev\_id 8024 -IM0, attempt #0

Block | 2019-11-07T03:19:26,707 INFO [REST\_API:CrmPGr:BJt4yk][http-nio-8082-exec-814] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom add lun -port CL3-C-1 -lun\_id 1 -ldev\_id 8024 -IM0, Total time taken in ms: 401

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-11-07T03:19:35,735 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: b6919b8d-e4bd-4cd2-935b-89a45934c459, add REPORT: AttachVolumesToServersPostStepReport, SEVERITY: Information, MESSAGE: Storage System 415248. Completed attaching volumes with IDs: [8024] to servers with IDs: [7].

App | 2019-11-07T03:19:36,097 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: b6919b8d-e4bd-4cd2-935b-89a45934c459

App | 2019-11-07T03:19:38,729 INFO [REST\_API:CrmPGr][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: b6919b8d-e4bd-4cd2-935b-89a45934c459, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Detach a volume

The following steps are executed on detaching a volume.

Step 1: Starting the process

Step 2: Delete a LUN path

Step 3: Delete a host group or an iSCSI target (optional)

Step 4: Finish of the job

1. Starting the process

A request "POST ~/v1/volume-manager/detach" is submitted, then create a job titled "Detach volume from server.".

App | 2019-11-07T07:36:53,063 INFO [REST\_API:R4kQub][http-nio-8080-exec-8] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/volume-manager/detach**] body=[{"storageSystemId":"410438","volumeId":"1620","serverId":8}]

:

App | 2019-11-07T07:36:54,972 INFO [REST\_API:R4kQub][http-nio-8080-exec-8] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 9270d37a-3e37-445c-9350-ef0fa3215465, Title: **Detach volume from server.**

1. Delete a LUN path

Delete a LUN path from a host group with "raidcom delete lun" command.

App | 2019-11-07T07:44:16,612 INFO [REST\_API:2ML6gl][ForkJoinPool-2-worker-16] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415248/ports/CL3-C/host-groups/1/remove-from payload UpdateHostGroupProperties{luns=[Lun{volumeId=8024, lun=1}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-11-07T07:44:17,064 INFO [REST\_API:2ML6gl:jsJDMO][http-nio-8082-exec-1388] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom delete lun** -port CL3-C-1 -ldev\_id 8024 -IM0, attempt #0

Block | 2019-11-07T07:44:18,581 INFO [REST\_API:2ML6gl:jsJDMO][http-nio-8082-exec-1388] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom delete lun -port CL3-C-1 -ldev\_id 8024 -IM0, Total time taken in ms: 1516

1. Delete a host group or an iSCSI target

If there is no LUN path in a host group or an iSCSI target after step2, delete them with "raidcom delete host\_grp" command.

App | 2019-11-07T07:44:46,271 INFO [REST\_API:2ML6gl][ForkJoinPool-2-worker-16] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/415248/ports/CL3-C/host-groups/1/delete payload DeleteHostGroupProperties{safeDelete=true}

:

Block | 2019-11-07T07:45:10,872 INFO [REST\_API:2ML6gl:JPj2dz][http-nio-8082-exec-1386] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Running Command: echo | read-lock **raidcom delete host\_grp** -port CL3-C-1 -IM0, attempt #0

Block | 2019-11-07T07:45:11,910 INFO [REST\_API:2ML6gl:JPj2dz][http-nio-8082-exec-1386] c.h.b.s.d.b.s.c.c.CciCommandBase --- [415248] Finished Command: echo | read-lock raidcom delete host\_grp -port CL3-C-1 -IM0, Total time taken in ms: 1038

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-11-07T07:45:13,690 INFO [REST\_API:2ML6gl][ForkJoinPool-2-worker-16] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 713dfe94-ec6e-41d8-93fe-9f059ba6c180, add REPORT: DetachVolumeFromServerPostStepReport, SEVERITY: Information, MESSAGE: Storage System 415248. Finished detaching volume with IDs: 8024 from server test-iscsi-1 (ID:7).

App | 2019-11-07T07:45:14,404 INFO [REST\_API:2ML6gl][ForkJoinPool-2-worker-16] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: 713dfe94-ec6e-41d8-93fe-9f059ba6c180

App | 2019-11-07T07:45:14,536 INFO [REST\_API:2ML6gl][ForkJoinPool-2-worker-16] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 713dfe94-ec6e-41d8-93fe-9f059ba6c180, STATUS: SUCCESS, **MESSAGE: Set the job status**

### Setting High Availability Pairs

#### Create, attach and protect volumes with HA

The following steps are executed on creating, attaching and protecting volumes with High Availability.

Step 1: Starting the process

Step 2: Create primary volume

Step 3: Set ALUA mode

Step 4: Attach primary volumes

Step 5: Create secondary volumes and HA pairs

Step 6: Attach secondary volumes

Step 7: Finish of the process

1. Starting the process

A request "POST ~/v1/volume-manager/create-attach-protect" is submitted, then create a job titled "Create volumes, attach to servers and set up data protection".

App | 2019-10-16T06:43:55,848 INFO [REST\_API:AcLWIr][http-nio-8080-exec-4] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/volume-manager/create-attach-protect**] body=[{"storageSystemId":"410438","virtualStorageMachineId":"410438-VSPF400-F600andVSPG400-G600","aluaEnabled":true,"intendedImageType":null,"hostModeOptions":null, ...{"replicationType":"HA","replicationGroupName":"hsa-kihara-1016","secondaryStorageSystemId":"430002","secondaryPoolId":4,"quorumId":0,"secondaryPorts":[{"serverId":13,"serverWwns":["123456789ABCDEF0"],"portIds":["CL2-A"],"preferredPath":null}],"shareHgByAllServers":false}, ..

:

App | 2019-10-16T06:43:56,888 INFO [REST\_API:AcLWIr][http-nio-8080-exec-4] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 477df262-89d0-4b85-a57b-c16dd026b183, **Title: Create volumes, attach to servers and set up data protection**

1. Create primary volumes

A job titled "Create volumes from template" is created, then "raidcom add ldev" command is used to create a volume.

App | 2019-10-16T06:43:57,278 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 6ec5bad2-7711-44ed-9eaa-9de1c2b5aa53, **Title: Create volumes from template**

:

App | 2019-10-16T06:43:59,581 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-74] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/volumes payload CreateVolumeProperties  
:

Block | 2019-10-16T06:43:59,895 INFO [REST\_API:AcLWIr:WVVcCa][http-nio-8082-exec-3454] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom add ldev** -ldev\_id 1620 -capacity 2097152 -pool 3 -IM0, attempt #0

:

App | 2019-10-16T06:44:10,413 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-60] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 6ec5bad2-7711-44ed-9eaa-9de1c2b5aa53, STATUS: SUCCESS, MESSAGE: Set the job status

1. Set ALUA mode

A job titled "Update ALUA mode for volumes" is created, then "raidcom modeify ldev -alua enable" command is used to set a volume ALUA enabled.

App | 2019-10-16T06:44:10,734 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 95bf7e9f-8311-4cb1-8526-640d4ec6397c, **Title: Update ALUA mode for volumes**

:

App | 2019-10-16T06:44:12,868 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-74] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/volumes/1620/update payload UpdateVolumeProperties{volume=VolumeIdentifier{volumeId=1620, storageSystemId=410438}, label=null, capacity=null, dataSavingType=null, aluaEnabled=true, tieringPolicyId=null}

:

Block | 2019-10-16T06:44:13,555 INFO [REST\_API:AcLWIr:b8qOTD][http-nio-8082-exec-3484] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom modify ldev** -ldev\_id 1620 **-alua enable** -IM0, attempt #0

:

App | 2019-10-16T06:50:38,157 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-74] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 6b1b5753-3a66-49eb-863b-cec1e11ff054, STATUS: SUCCESS, MESSAGE: Set the job status

1. Attach primary volumes

A job titled "Attach volumes to servers." is created, then "raidcom add lun" command is executed for each LUN path to be added.

App | 2019-10-16T05:46:16,563 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-32] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: f9dfff07-ec77-42d0-ae9e-16c75f7dd06f, **Title: Attach volumes to servers.**

:

App | 2019-10-16T05:46:18,219 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-117] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/430002/ports/CL2-A/host-groups/38/add-to payload UpdateHostGroupProperties{luns=[Lun{volumeId=465, lun=6}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-10-16T05:46:18,397 INFO [REST\_API:WIwVr4:uxusdL][http-nio-8082-exec-3342] c.h.b.s.d.b.s.c.c.CciCommandBase --- [430002] Running Command: echo | read-lock **raidcom add lun** -port CL2-A-38 -lun\_id 6 -ldev\_id 465 -IM0, attempt #0

:

App | 2019-10-16T05:46:30,625 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-75] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: f9dfff07-ec77-42d0-ae9e-16c75f7dd06f, STATUS: SUCCESS, MESSAGE: Set the job status

1. Create secondary volumes and HA pairs - new replication group

The process of creating High Availability pairs depends on whether the replication group is new or existing. If the replication group is new, a job titled "Create replication group .." is created, then HDID functions shown on Table 10 are executed.

App | 2019-10-16T06:50:54,487 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 332f3357-c8af-4ede-b4c4-595bd81cca21, **Title: Create replication group** hsa-kihara-1016 with HA on storage system 410438.

:

App | 2019-10-16T06:50:54,653 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-60] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/hdid-replications payload <CreateHdidReplicationProperties{storageSystemIdentifier=410438, replicationGroupName=hsa-kihara-1016, secondaryStorageSystemId=430002, secondaryPoolId=4, secondaryPoolName=PMDLG\_DP\_FREE\_OTHER, quorumId=0, quorumName=hsa-uehara-quorum-R800#1, secondaryPorts=[CreateHdidReplicationSecondaryPortProperties{serverId=13, serverWwns=[123456789ABCDEF0], iscsiInitiatorNames=null, portIds=[CL2-A], preferredPath=null}]},{}>

Table 10 HDID functions executed on HA pair creation - new replication group

|  |  |  |
| --- | --- | --- |
| # | Function | Action and used HDID APIs |
| 1 | Create a Hitachi block host node | Create a Hitachi block host node that defines primary volume IDs   * POST ~/HDID/master/HardwareNodeHandler/objects/HardwareNodes |
| 2 | Create a policy | Create a policy that defines replication schedule   * POST ~/HDID/master/PolicyHandler/objects/Policies |
| 3 | Create a data flow | Create a data flow that defines replication configuration   * POST ~/HDID/master/DataFlowHandler/objects/DataFlows |
| 4 | Activate a data flow | Activate a data flow. The function creates or deletes replication configuration. Secondary volumes and High Availability pairs are created on this context.   * PUT ~/HDID/master/RulesManager/services/Rules/actions/compile/invoke * PUT ~/HDID/master/RulesManager/services/Rules/actions/distribute/invoke |

[Sample HDID API call]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

Block | 2019-10-16T06:50:54,914 INFO [REST\_API:AcLWIr:8g5odl][http-nio-8082-exec-3491] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [HardwareNodeHandlerApi#createHardwareNode]---> **POST https://10.145.24.219:443/HDID/master/HardwareNodeHandler/objects/HardwareNodes** HTTP/1.1

:

Block | 2019-10-16T06:50:55,096 INFO [REST\_API:AcLWIr:8g5odl][http-nio-8082-exec-3491] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [HardwareNodeHandlerApi#createHardwareNode] <--- END HTTP (342-byte body)

Block | 2019-10-16T06:50:55,097 INFO [REST\_API:AcLWIr:8g5odl][http-nio-8082-exec-3491] c.h.b.s.d.b.s.h.d.p.CreateHdidBlockHostProcessor --- Succeeded to create a Block Host Node hsa-kihara-1016@00-028B66-D5DC8F-4F3EA6-BFC6F8[0-1-26].

1. Create secondary volumes and HA pairs - existing replication group

If the replication group is existing, a job titled "Add volumes to replication group .." is created, then HDID functions shown on Table 11 are executed.

App | 2019-10-16T05:40:46,826 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-32] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 3d456149-36a0-434b-9290-90a1e9758d03, **Title: Add volumes to replication group** hsa-kihara-1016 on storage system 410438.

:

App | 2019-10-16T05:40:47,752 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-75] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/hdid-replications/f446038f-f7ba-4c4d-b229-c432e4b2636b/add-pairs payload <AddPairsToHdidReplicationProperties{storageSystemIdentifier=410438, replicationGroupName=hsa-kihara-1016, secondaryStorageSystemId=430002, secondaryPorts=[CreateHdidReplicationSecondaryPortProperties{serverId=13, serverWwns=[123456789ABCDEF0], iscsiInitiatorNames=null, portIds=[CL2-A], preferredPath=null}], dataFlowId=f446038f-f7ba-4c4d-b229-c432e4b2636b, sourceNodeLocalId=1, destinationNodeLocalId=2, policyId=1eeba8f5ebcb4907851bee9fd4f757d5, operationLocalId=1, acceptDeactivatedDataFlow=false},{}>

Table 11 HDID functions executed on HA pair creation - existing replication group

|  |  |  |
| --- | --- | --- |
| # | Function | Action and used HDID APIs |
| 1 | Update a Hitachi block host node | Update a Hitachi block host node. Primary volume IDs are added on this context.   * PUT ~/HDID/master/HardwareNodeHandler/objects/HardwareNodes/<*node\_id*> |
| 2 | Activate a data flow | Activate a data flow. Secondary volumes and High Availability pairs are created on this context.   * PUT ~/HDID/master/RulesManager/services/Rules/actions/compile/invoke * PUT ~/HDID/master/RulesManager/services/Rules/actions/distribute/invoke |

[Sample HDID API call]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

Block | 2019-10-16T05:40:54,937 INFO [REST\_API:WIwVr4:NnO1ov][http-nio-8082-exec**-**3330] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [HardwareNodeHandlerApi#updateHardwareNode] ---> **PUT https://10.145.24.219:443/HDID/master/HardwareNodeHandler/objects/HardwareNodes/hsa-kihara-1016%4000-FAC026-CD6901-4C308F-903AE4%5B0-1-25%5D** HTTP/1.1

:

Block | 2019-10-16T05:40:55,039 INFO [REST\_API:WIwVr4:NnO1ov][http-nio-8082-exec-3330] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [HardwareNodeHandlerApi#updateHardwareNode] <--- END HTTP (390-byte body)

Block | 2019-10-16T05:40:55,039 INFO [REST\_API:WIwVr4:NnO1ov][http-nio-8082-exec-3330] c.h.b.s.d.b.s.h.d.p.AddVolumeIdsToHdidBlockHostProcessor --- Succeeded to add volume IDs to a Block Host Node hsa-kihara-1016@00-FAC026-CD6901-4C308F-903AE4[0-1-25].

1. Attach secondary volumrs

A job titled "Attach volumes to servers." is created, then "raidcom add lun" command is executed for each LUN path to be added.

App | 2019-10-16T05:46:16,563 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-32] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: f9dfff07-ec77-42d0-ae9e-16c75f7dd06f, **Title: Attach volumes to servers.**

:

App | 2019-10-16T05:46:18,219 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-117] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/430002/ports/CL2-A/host-groups/38/add-to payload UpdateHostGroupProperties{luns=[Lun{volumeId=465, lun=6}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-10-16T05:46:18,397 INFO [REST\_API:WIwVr4:uxusdL][http-nio-8082-exec-3342] c.h.b.s.d.b.s.c.c.CciCommandBase --- [430002] Running Command: echo | read-lock **raidcom add lun** -port CL2-A-38 -lun\_id 6 -ldev\_id 465 -IM0, attempt #0

:

App | 2019-10-16T05:46:30,625 INFO [REST\_API:WIwVr4][ForkJoinPool-2-worker-75] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: f9dfff07-ec77-42d0-ae9e-16c75f7dd06f, STATUS: SUCCESS, MESSAGE: Set the job status

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-10-16T06:57:16,975 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 477df262-89d0-4b85-a57b-c16dd026b183, add REPORT: AttachSecondaryVolumesToServersPostStepReport, SEVERITY: Information, MESSAGE: Storage System 430002: Completed attaching secondary volumes (ID: 466) to servers (ID: 13).

App | 2019-10-16T06:57:17,166 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: 477df262-89d0-4b85-a57b-c16dd026b183

App | 2019-10-16T06:57:17,239 INFO [REST\_API:AcLWIr][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 477df262-89d0-4b85-a57b-c16dd026b183, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Protect volumes with HA

The following steps are executed on protecting volumes with High Availability. From step 2 to 5 are the same as section 4.3.5.1.

Step 1: Starting the process

Step 2: Set ALUA mode

Step 3: Attach primary volumes

Step 4: Create secondary volumes and HA pairs

Step 5: Attach secondary volumes

Step 6: Finish of the process

1. Starting the process

A request "POST ~/v1/volume-manager/attach-protect" is submitted, then create a job titled "Attach volumes to servers and set up data protection".

App | 2019-10-21T03:03:52,167 INFO [REST\_API:K8i8pS][http-nio-8080-exec-2] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/volume-manager/attach-protect**] body=[{"storageSystemId":"410438","aluaEnabled":false,"intendedImageType":null,"hostModeOptions":[],"enableZoning":false,"enableLunUnification":false,"ports":[{"serverId":7,"serverWwns":["123456789ABCDEF0"],"portIds":["CL1-E"],"preferredPath":null}],"replicationGroup":{"replicationType":"HA","replicationGroupName":"hsa-kihara-1021","secondaryStorageSystemId":"430002","secondaryPoolId":4,"quorumId":0,"secondaryPorts":[{"serverId":7,"serverWwns":["123456789ABCDEF0"],"portIds":["CL1-A"],"preferredPath":null}],"shareHgByAllServers":false},"volumeIds":[1626]}]

:

App | 2019-10-21T03:03:58,054 INFO [REST\_API:K8i8pS][http-nio-8080-exec-2] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: c344d742-bea3-41e9-8a7a-fcfadd96a186, Title: **Attach volumes to servers and set up data protection**

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-10-21T03:14:59,720 INFO [REST\_API:K8i8pS][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: c344d742-bea3-41e9-8a7a-fcfadd96a186, add REPORT: AttachSecondaryVolumesToServersPostStepReport, SEVERITY: Information, MESSAGE: Storage System 430002: Completed attaching secondary volumes (ID: 948) to servers (ID: 7).

App | 2019-10-16T06:34:13,117 INFO [REST\_API:B3dIyq][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c

App | 2019-10-16T06:34:13,439 INFO [REST\_API:B3dIyq][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Unprotect a volume

The following steps are executed on unprotecting a volume and deleting secondary volume. If target volume is last volume in the replication group, "Delete a replication group" is executed instead of "Unprotect a volume".

Step 1: Starting the process

Step 2: Remove a HA pair and secondary volume

Step 3: Finish of the process

1. Starting the process

A request " POST ~/v1/storage-systems/<storage\_id>/replication-groups/<replication\_group\_id>/remove-volumes" is submitted, then create a job titled "Unprotecting volumes..".

App | 2019-10-16T06:15:50,324 INFO [REST\_API:B3dIyq][http-nio-8080-exec-3] c.h.b.s.r.c.a.RestAppRequestBodyAdviceAdapter --- REQUEST method=[**POST**] path=[**/v1/storage-systems/410438/replication-groups/1/remove-volumes**] body=[{"primaryVolumeIds":[1618],"deleteSecondaryVolume":true,"removeConnection":false}]

:

App | 2019-10-16T06:15:51,957 INFO [REST\_API:B3dIyq][http-nio-8080-exec-3] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c, Title: **Unprotecting volumes** [1618] from replication group hsa-kihara-1016 on Storage System 410438.

1. Remove a HA pair and secondary volume

A job titled "Unprotecting volumes.." is created, then HDID functions shown on Table 12 are executed.

App | 2019-10-16T06:15:51,957 INFO [REST\_API:B3dIyq][http-nio-8080-exec-3] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c, Title: **Unprotecting volumes [1618] from replication group** hsa-kihara-1016 on Storage System 410438.

:

App | 2019-10-16T06:15:52,357 INFO [REST\_API:B3dIyq][ForkJoinPool-2-worker-103] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/hdid-replications/f446038f-f7ba-4c4d-b229-c432e4b2636b/remove-pairs payload <RemovePairsFromHdidReplicationProperties{storageSystemIdentifier=410438, replicationGroupName=hsa-kihara-1016, secondaryStorageSystemId=430002, dataFlowId=f446038f-f7ba-4c4d-b229-c432e4b2636b, sourceNodeLocalId=1, destinationNodeLocalId=2, policyId=1eeba8f5ebcb4907851bee9fd4f757d5, operationLocalId=1, primaryVolumeIdsToBeRemoved=[1618], acceptDeactivatedDataFlow=false},{}>

Table 12 HDID functions executed on removing a pair

|  |  |  |
| --- | --- | --- |
| # | Function | Action and used HDID APIs |
| 1 | Update a Hitachi block host node | Update a Hitachi block host node. A primary volume Id is removed from the node on this context.   * PUT ~/HDID/master/HardwareNodeHandler/objects/HardwareNodes/<*node\_id*> |
| 2 | Activate a data flow | Activate a dataflow. Remove a HA pairs and secondary volume on this context.   * PUT ~/HDID/master/RulesManager/services/Rules/actions/compile/invoke * PUT ~/HDID/master/RulesManager/services/Rules/actions/distribute/invoke |

[Sample HDID API call]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

Block | 2019-10-16T06:15:53,935 INFO [REST\_API:B3dIyq:Kh64de][http-nio-8082-exec-3392] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [RulesManagerApi#masterRulesManagerServicesRulesActionsDistributeInvokePut] ---> **PUT https://10.145.24.219:443/HDID/master/RulesManager/services/Rules/actions/distribute/invoke** HTTP/1.1

:

Block | 2019-10-16T06:15:54,008 INFO [REST\_API:B3dIyq:Kh64de][http-nio-8082-exec-3392] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [RulesManagerApi#masterRulesManagerServicesRulesActionsDistributeInvokePut] <--- END HTTP (4-byte body)

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-10-16T06:34:13,117 INFO [REST\_API:B3dIyq][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c

App | 2019-10-16T06:34:13,439 INFO [REST\_API:B3dIyq][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: efd7fb20-eef2-413c-abc7-b1f01c91f91c, STATUS: SUCCESS, **MESSAGE: Set the job status**

#### Deleting a replication group of HA

The following steps are exected on deleting a replication group. If there is no pair in the replication group, the replication group is deleted without deleting pair.

Step 1: Starting the process

Step 2: Delete a replication group and pairs

Step 3: Finish of the process

1. Starting the process

A job titled "Delete replication group.." is created.

App | 2019-10-16T06:35:53,526 INFO [REST\_API:4922C4][http-nio-8080-exec-9] c.h.b.s.c.j.e.JobRunnerBase --- **Created job** JOB\_ID: 646c963c-0ad5-4b9f-9da5-5767cadbcd0a, **Title: Delete replication group** hsa-kihara-1016 on storage system 410438.

:

App | 2019-10-16T06:35:54,767 INFO [REST\_API:4922C4][ForkJoinPool-2-worker-103] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/hdid-replications/f446038f-f7ba-4c4d-b229-c432e4b2636b/delete payload <DeleteHdidReplicationProperties{storageSystemIdentifier=410438, replicationGroupName=hsa-kihara-1016, secondaryStorageSystemId=430002, dataFlowId=f446038f-f7ba-4c4d-b229-c432e4b2636b, sourceNodeLocalId=1, destinationNodeLocalId=2, policyId=1eeba8f5ebcb4907851bee9fd4f757d5, operationLocalId=1, primaryVolumeIdsToBeRemoved=[1619], acceptDeactivatedDataFlow=true},{}>

1. Delete a replication group and pairs

HDID functions shown on Table 13 are executed.

Table 13 HDID functions executed on deleting a replication group

|  |  |  |
| --- | --- | --- |
| # | Funciton | Action and used HDID APIs |
| 1 | Deactivate a data flow | Deactivate a data flow. Replications related to the data flow can be torn down.   * PUT ~/HDID/master/RulesManager/services/Rules/actions/deactivate/invoke |
| 2 | Teardown a replication | Tear down a replication. Pairs in the replication are deleted.   * PUT ~/ HDID/<*hitachi\_vsp\_node\_id*>/VirtualStoragePlatformHandler/objects/ Replications/<*replication\_id*>/actions/Teardown/invoke |
| 3 | Delete a replication | Delete a replication. The replication and secondary volumes are deleted.   * DELETE ~/HDID/<*hitachi\_vsp\_node\_id*>/VirtualStoragePlatformHandler/objects/ Replications/<*replication\_id*> |
| 4 | Delete a data flow | Delete a data flow.   * DELETE ~/HDID/master/DataFlowHandler/objects/DataFlows/<*data\_flow\_id*> |
| 5 | Delete a policy | Delete a policy.   * DELETE ~/HDID/master/PolicyHandler/objects/Policies/<*policy\_id*> |
| 6 | Delete a Hitachi block host node | Delete a Hitachi block host node.   * DELETE ~/HDID/master/HardwareNodeHandler/objects/HardwareNodes/ <*node\_id*> |

[Sample HDID API call]

Java class name: c.h.b.s.d.b.s.h.c.l.HdidClientLogger

Block | 2019-10-16T06:35:56,633 INFO [REST\_API:4922C4:2hSCSd][http-nio-8082-exec-3475] **c.h.b.s.d.b.s.h.c.l.HdidClientLogger** --- [RulesManagerApi#masterRulesManagerServicesRulesActionsDeactivateInvokePut] ---> **PUT https://10.145.24.219:443/HDID/master/RulesManager/services/Rules/actions/deactivate/invoke** HTTP/1.1

:

Block | 2019-10-16T06:35:56,705 INFO [REST\_API:4922C4:2hSCSd][http-nio-8082-exec-3475] c.h.b.s.d.b.s.h.d.p.DeactivateDataFlowProcessor --- Succeeded to deactivate a data flow f446038f-f7ba-4c4d-b229-c432e4b2636b.

1. Finish of the process

"Set the job status" is output when the process terminates.

App | 2019-10-16T06:41:41,217 INFO [REST\_API:4922C4][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 646c963c-0ad5-4b9f-9da5-5767cadbcd0a, add REPORT: DeleteReplicationGroupPostStepReport, SEVERITY: Information, MESSAGE: Storage System 410438: Successfully deleted the replication group (name: hsa-kihara-1016).

App | 2019-10-16T06:41:41,527 INFO [REST\_API:4922C4][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobRunnerBase --- Marking success for job JOB\_ID: 646c963c-0ad5-4b9f-9da5-5767cadbcd0a

App | 2019-10-16T06:41:41,620 INFO [REST\_API:4922C4][ForkJoinPool-2-worker-103] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 646c963c-0ad5-4b9f-9da5-5767cadbcd0a, STATUS: SUCCESS, **MESSAGE: Set the job status**

# Effective data for troubleshooting analysis

In trouble case, application information(files under /logs/application-files directory) and host information(files under /logs/host-logs directory) are effective for troubleshooting analysis.

Table 5-1 rainier-logs

|  |  |  |  |
| --- | --- | --- | --- |
| # | Parent directory (Under /logs) | Sub directory | Outline |
| 1 | application-files | infra-hid-elasticsearch | This directory includes information of Elasticsearch that has storage configuration information.  This data can be used for configuration to reproduce customer environment. See xxx for detail. |
| 2 | rainier-cli\_<storage system ID> | This directory includes log of RAID manager that is used for access to storage from Administrator. This directory is created for each storage system ID. |
| 3 | application-logs | - | See 2.1 |
| 4 | host-logs | ./ | This directory includes information about the Docker service and OS. |
| 5 | ./etc | This dicrectory includes files that are placed under etc directory of host. |
| 6 | ./etc/systemd | This directory includes output of ls for /usr/lib/systemd/system and /etc/systemd/system. |

# Analysis examples

## Log analysis flow

As desribed in 2.1, Administrator output multiple logs. So, first step of log analysis is selecting target log for investigation. This log depends on the problem.

1. For user authentication problem investigation.

Analyze infra-si. Especially problem of Active Directory, this log has some data.

1. For UI related problem investigation.

Analyze rainier-proxy and rainier-rainier. rainier-proxy has information about request from client to Administrator. rainier-rainier has information about process of server for request(mainly configuration request) from client.

1. For job and refresh problem investigation.

Analyze rainier-rainie. In case HNAS related problem, analyze rainier-file. In case FC switch related problem, analyze rainier-whistler, rainier-cinder-brocade and rainier-cinder-cisco.

1. Other cases.

If problem does not match with above (1) to (3), like Administrator is unstabl, analyze rainier-rainierand infra micro servic(see table 2-1). Analyze other logs depends on necessity.

Authentication problem?

Start log analysis

No

Yes

6.1.2 rainier-proxy log analysis

6.1.1 infra-si log analysis

UI related problem?

No

Yes

6.1.3 rainier-rainier log analysis

Job or refresh related problem？

No

Yes

Analyze all of logs

Fig 8 Log analysis flow

### infra-si log analysis

No

6.1.1.3 Find cause and action

Job error?

Yes

6.1.1.2 Search Exception/Error

6.1.1.1 How to check API

Start infra-si log analysis

No

Login error?

Yes

6.1.1.1 How to check API

6.1.1.2 Search Exception/Error

Fig 9 infra-si log analysis flow

#### How to check API

When you investigate error of user operation, find failed API that corresponds to operation, and check log to find part that API is used.

Table 6-1 REST API that is output in infra-si

|  |  |  |  |
| --- | --- | --- | --- |
| # | Category | API name: Request URI | Notes |
| 1 | Token management | Getting a token: GET /v1/security/tokens | - |
| 2 | Creating a token: POST /v1/security/tokens | Used for login. |
| 3 | Deleting a token: DELETE /v1/security/tokens | Used for logout. |
| 4 | Account domain | Listing account domains: GET /v1/security/account-domains | - |
| 5 | Getting an account domain: GET /v1/security/account-domains/{domain-id} | - |
| 6 | Adding an account domain: POST /v1/security/account-domains | Used for addition of account domain |
| 7 | Adding an account domain: POST /v1/security/account-domains/{domain-id} | Used of modification of account domain. |
| 8 | Deleting an account domain: DELETE /v1/security/account-domains/{domain-id} | Used for deletion ofaccount domain. |
| 9 | Authencation provider | Listing authentication providers: GET /v1/authenticationproviders | - |
| 10 | Getting an authentication provider: GET /v1/authenticationproviders/{authentication-provider-id} | - |
| 11 | Adding an authentication provider: POST /v1/authenticationproviders | Used for registration of Active Directory server |
| 12 | Updating an authentication provider: POST /v1/authenticationproviders{authencation-provider-id} | Used for modification of Active Directory server. |
| 13 | Deleting an authentication provider: DELETE /v1/authenticationproviders{authencation-provider-id} | Used for deletion of Active Directory server. |
| 14 | User management | Listing user groups: GET /v1/security/account-domains/domainId/groups?filter=r | - |
| 15 | Listing group mappings: GET /v1/security/account-domains/domainId/group-mappings | - |
| 16 | Getting a group mappings: GET /v1/security/account-domains/domainId/group-mappings/  mappingId | - |
| 17 | Creating role mappings: POST /v1/security/account-domains/domainId/group-mappings | Used for assignment of user role. |
| 18 | Deleting group mappings: DELETE /v1/security/account-domains/domainId/groupmappings/mappingId | Used for deletion of user role. |
| 19 | Listing users: GET /v1/security/account-domains/domainId/users | - |
| 20 | Getting users: GET /v1/security/account-domains/domainId/users/userId | - |
| 21 | Creating a user: POST /v1/security/account-domains/domainId/users/ | Used for creation ofuser. |
| 22 | Deleting a user: DELETE /v1/security/account-domains/domainId/users/userId | Used for deletion ofuser. |
| 23 | Updating users: POST /v1/security/account-domains/domainId/users/userId | Used for changing password of user. |

#### Search Exception/Error

After you find error occurred time and API, seach the parts that are ERROR or WARN of log level and Java exception.

#### How to find cause and action

Find cause based on information that is checked in 6.1.1.1, 6.1.2.1 steps, then consider action.

### rainier-proxy log analysis

rainier-proxy receives request from Administrator client. A part of request(especially request to rainier-rainier) is output in this log. So, if there is a problem in GUI, this rainier-proxy log may help to investigate cause. For example, when rainier micro service is high load, server cannot respond to client request, then "Failed to get data from API. Try agein." Message shows in GUI, in this case request is not output in this log even though that should be output.

#### How to find problem part

Use date, client IP address and API to find problem part in rainier-proxy.

No

6.1.2.3 How to find cause and action

API error or missing?

Yes

6.1.2.2 rainier-rainier log analysis

6.1.2.1How to find problem part

Start infra-si log analysis

Fig 10 rainier-rainier log analysis flow

#### rainier-rainier log analysis

If you find API(except user authentication) error or cannot find API request, analyze log of rainier-rainer.

#### How to find cause and action

Find cauase from information that is got from 6.1.2.1 and 6.1.2.2, then consider action.

### rainier-rainier log analysis

No

No

6.1.3.6 How to find cause and action

6.1.3.5 Related software investigation

6.1.3.3 Check log that does not have NDC

6.1.3.2 How to find specific part of problem

6.1.3.1 How to find problem part by NDC

NDC is insufficient?

Yes

Need to investigate

related software?

Yes

Start rainier-rainier log analysis

No

6.1.3.4 Related log investigation

Need to investigate

related log?

Yes

Fig 11 rainier-rainier log analysis flow

#### How to find problem part by NDC

In the rainier-rainier log, log of multiple processes are output. For example, volume attachment for storage1 and onboard of storage are executed at same time, both of logs are output in rainier-rainier log. So, it is hard to distinguish for investigation. To find easily the log target process, you can use key information NDC ID(see 2.3.1). By using this, you can find log for the process like storage onboard, refresh and volume attach, etc.

1. How to find NDC ID

To find NDC ID, use Job creation part, job ID, error message or date. For example, if you know the error message and time of error, grep by error message, then you can focus by time of error. And also if you know the job ID, you can grep by the job ID.

1. How to find process log by NDC ID

Use NDC ID as a key and grep log file, then you can get log of target process.

#### How to find specific part of problem

If investigation target is function that is described in 4.3, you can find specific part of problem by comparing with the information that is described in 4.3.

If investigation target is not function that is described in 4.3, find ERROR log level or message that includes exception. Most of the case, you can find problem part by searching this key word.

#### Check log that does not have NDC

In some cases NDC ID is not output and also misses to grep exception due to new line of message. So, refer original log file and check around the time when error occurred.

#### Related log investigation

Some fuction of rainier micro services uses other micro services. So, sometimes it is necessary to check other micro services log.

1. File storage related function

Access to file storage uses file micro service. So, when you need information about access to file storage, check rainier-file log files.

1. FC switch related function

Access to FC switch uses whistler micro service. And this service uses cinder-brocade micro service or cinder-cisco micro service depends on the vendor of switch. So, when you need information about access to FC switch, check rainier-whistler, rainier-cinder-brocade and rainier-cinder-cisco log files.

1. CLI related function

CLI(RAID Manager) is executed in cli micro service. So, when CLI execution error, check rainier-cli\_<storage system ID> lo files. (Information is almost same as rainier-rainier log)

#### Related software investigation

Administor cooperates with Hitachi Data Instance Director(HDID) and Storage Navigator.

1. HDID

When HDID is registered in Administrator server, rainier micro service accesses HDID server, then gets configuration information and changes configuration. When problem occurs during access to HDID, refer jobs and logs of HDID GUI. These information is not included in log of Administrator, you need to ask customer to collect screen shot of jobs and logs or export of logs.

1. Storage Navigator

Administrator has function to launch Storage Navigator. When problem occurs after launch collect screen shot and export of jobs.

#### How to find cause and action

Find cause from information that is got from 6.1.3.1 and 6.1.3.5 and consider action. If necessary create environment for reproduce, then test.

## Log analysis examples

### Failed to add storage system

[Symptom]

The following error message is displayed on adding a storage system. Model of the storage system is VSP G370, and SVP is used.

Cannot connect to storage system 452101.

1. Selecting target log

Since the addition of a storage system is handled by the rainier microservice, log files under */logs/application/logs/rainier-rainier* directory should be analized.

1. Fitlering related process by NDC

Extract files from rainier-logs.tar.gz, then change current directory to "./logs/application-logs/rainier-rainier". Grep the error message, and identify the NDC(\*1). Then, grep with NDC and save the output to a file.

\*1 On the example below, the NDC is "REST\_API:zb140t".

~/work$ tar -zxvf rainier-logs.tar.gz

~/work$ cd ./logs/rainier-rainier

~/work/logs/rainier-rainier$ grep "Cannot connect to storage system 452101." \*.log

rainier-2019-09-17T18-14-08.831.log:java.util.concurrent.ExecutionException: com.hds.bel.storage.core.contract.report.UserException: Cannot connect to storage system 452101.

rainier-2019-09-17T18-14-08.831.log:Caused by: com.hds.bel.storage.core.contract.report.UserException: Cannot connect to storage system 452101.

rainier-2019-09-17T18-14-08.831.log:com.hds.bel.storage.core.contract.report.UserException: Cannot connect to storage system 452101.

rainier-2019-09-17T18-14-08.831.log:App | 2019-09-17T15:09:26,603 WARN [**REST\_API:zb140t**][ForkJoinPool-2-worker-36] c.h.b.s.c.j.e.TaskExceptions --- Received error executing task. Error com.hds.bel.storage.core.contract.report.UserException: Cannot connect to storage system 452101., stack trace: com.hds.bel.storage.core.contract.report.UserException: Cannot connect to storage system 452101.

:

~/work/logs/rainier-rainier$ grep "REST\_API:zb140t" \*.log >zb140t.txt

1. Identify a point of the failure

Identify a point of failure by comparing result of the grep with the normal process described in the section 4.3.2.2. In this case, "remove storage system" is executed after starting a container for CLI. It is the point.

rainier-2019-09-17T18-14-08.831.log:Block | 2019-09-17T15:04:22,782 INFO [REST\_API:zb140t:iN4hnj][http-nio-8082-exec-9] c.s.d.c.DefaultDockerClient --- **Starting container** with Id: 1099e193694976ad0210e2ba54eb1f7ef2efc5de459b06667b25073c40ded44e

:

rainier-2019-09-17T18-14-08.831.log:Block | 2019-09-17T15:09:23,189 INFO [REST\_API:zb140t:iN4hnj][http-nio-8082-exec-9] c.h.b.s.d.b.s.d.i.DockerStorageManagerImpl --- **Attempting to remove storage system** with serial 452429

1. Check logs without NDC

Since some logs are not set NDC, original log files should be checked. In this case, a message "RestShellCommandTask.call failed" was being output repeatedly for several minutes.

Block | 2019-09-17T15:04:23,192 ERROR [][pool-66-thread-1] c.h.b.s.c.s.s.RestShellCommandTask --- **RestShellCommandTask.call failed** - command: [echo]

java.net.ConnectException: Failed to connect to /192.168.0.17:8080

:

Block | 2019-09-17T15:09:13,267 ERROR [][pool-95-thread-1] c.h.b.s.c.s.s.RestShellCommandTask --- **RestShellCommandTask.call failed** - command: [echo]

java.net.ConnectException: Failed to connect to /192.168.0.17:8080

1. Estimate the cause and actions

As mentioned in the section 4.3.2.2, a RAID Manager instance is invoked on the container starting process. The invocation may have failed. The possible causes are:

Could not connect to command devices on the storage system

Command devices on the storage system didn't work

Took long time (more than 5 minutes) to invoke RAID Manager instance

The following checks are required to identify the cause.

Check firewall settings: Allowed connection from Administrator server (any/udp) to command device port (31001/udp) on the storage system

Check status of storage system: Controllers are working properly

Check time required for RAID Manager instance startup: Invoke a RAID Manager on another host and confirm that the invocation is completed within 5 minutes.

In this case, we found that there is a problem in the firewall settings.

### Failed to refresh storage system

[Symptoms]

Since automatic storage system refresh is executed internally, user may not, user may not notice immediately when a failure occur. It may be noticed indirectly, and this case will focus on such case.

Failed to create High Availability pairs with the following error message:

Creating a replication group in Data Instance Director succeeded but failed to refresh resources in Ops Center Administrator. Wait for a while, and then manually attach secondary volumes to servers.

1. Selecting target log

Since the High Availability pair creation is handled by the rainier microservice, log files under */logs/application/logs/rainier-rainier* directory should be analized.

1. Fitlering related process by NDC

Extract files from rainier-logs.tar.gz, then change current directory to "./logs/application-logs/rainier-rainier". Grep the error message, and identify the NDC(\*1). Then, grep with NDC and save the output to a file.

\*1 On the example below, the NDC is "REST\_API:dg9Dsf ".

~/work$ tar -zxvf rainier-logs.tar.gz

~/work$ cd ./logs/rainier-rainier

~/work/logs/rainier-rainier$ grep "Creating a replication group in Data Instance Director succeeded, but failed to refresh" \*.log

:

rainier.log:App | 2019-09-12T02:22:48,067 ERROR [**REST\_API:dg9Dsf**][ForkJoinPool-2-worker-51] c.h.b.s.c.j.e.JobStepReporter --- JOB\_ID: 8a58f287-365a-42c2-b0c5-544ed4b7e26c, SEVERITY: Error, MESSAGE: Creating a replication group in Data Instance Director succeeded, but failed to refresh resources in Ops Center Administrator. Wait for a while, and then manually attach secondary volumes to servers.

rainier.log:App | 2019-09-12T02:22:48,067 INFO [REST\_API:dg9Dsf][ForkJoinPool-2-worker-51] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 8a58f287-365a-42c2-b0c5-544ed4b7e26c, add REPORT: RefreshFailedAfterCreatingReplicationGroupInHdidErrorReport, SEVERITY: Error, MESSAGE: Creating a replication group in Data Instance Director succeeded, but failed to refresh resources in Ops Center Administrator. Wait for a while, and then manually attach secondary volumes to servers.

~/work/logs/rainier-rainier$ grep "REST\_API:dg9Dsf" rainier.log >dg9Dsf.txt

1. Identify a point of the failure

Identify a point of failure by comparing result of the grep with the normal process described in the section 4.3.5.1. In this case, detect unavailable of a resource cache (GadDevice) after distribution of a dataflow. The log indicates that a communication error occurred with SVP.

Block | 2019-09-12T02:03:04,023 INFO [REST\_API:dg9Dsf:HTXP9g][http-nio-8082-exec-196] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [NodeManagerApi#masterNodeManagerObjectsProductInformationGet] ---> GET https://10.145.26.158:443/HDID/master/NodeManager/objects/ProductInformation HTTP/1.1

:

Block | 2019-09-12T02:03:04,165 INFO [REST\_API:dg9Dsf:HTXP9g][http-nio-8082-exec-196] c.h.b.s.d.b.s.h.d.p.DistributeDataFlowProcessor --- **Succeeded to distribute a Data Flow** f99854a6-9e11-4155-a6ed-3d1eed42774b.

:

App | 2019-09-12T02:22:48,249 WARN [REST\_API:dg9Dsf][ForkJoinPool-2-worker-58] c.h.b.s.c.j.e.Tasks --- Received error executing getResult of task. Error java.util.concurrent.ExecutionException: com.hds.bel.cache.contract.exceptions.ResourceCacheUnavailableException: Resource 410438:GadDevice is not available. Retry the operation later or contact System Administrator if required. Failure details: Storage System 410438. An unexpected error occurred during communication with storage system. SVP IP address: 10.196.191.23. Contact your administrator if this condition persists. [{code=6205, data=8000}]: A time-out error occurred. \\nVerify that all of the settings have been applied. Retry the setting on the items \\nthat are not applied if there is any. If this problem persists, contact the Hitachi \\nData Systems Support Center., stack trace: java.util.concurrent.ExecutionException: com.hds.bel.cache.contract.exceptions.ResourceCacheUnavailableException: **Resource 410438:GadDevice is not available**. Retry the operation later or contact System Administrator if required. Failure details: Storage System 410438. **An unexpected error occurred during communication with storage system. SVP IP address: 10.196.191.23.** Contact your administrator if this condition persists. [{code=6205, data=8000}]: A time-out error occurred. \\nVerify that all of the settings have been applied. Retry the setting on the items \\nthat are not applied if there is any. If this problem persists, contact the Hitachi \\nData Systems Support Center.

1. Check cache refresh process

Since unavailability of caches occurs mainly during storage system refreshing process, check refresh processes. The investigation revealed that the cache is set unavailable by communication error with SVP.

App | **2019-09-12T02:12:10,228** INFO [REFRESH:L3nxPg][RefreshCacheService RUNNING] c.h.b.s.b.p.c.StorageResourceCacheImpl --- **Start refresh**:[410438]

:

Block | **2019-09-12T02:13:22,656** ERROR [REFRESH:L3nxPg:GMG9EJ][http-nio-8082-exec-233] c.h.b.s.r.c.RestExceptionMapper --- REST controller exception: mapToRestUserException

com.hds.bel.storage.core.contract.report.UserException: **Storage System 410438. An unexpected error occurred during communication with storage system. SVP IP address: 10.196.191.23.** Contact your administrator if this condition persists. [6205-8000]: A time-out error occurred. \\nVerify that all of the settings have been applied. Retry the setting on the items \\nthat are not applied if there is any. If this problem persists, contact the Hitachi \\nData Systems Support Center.

:

App | 2019-09-12T02:13:22,908 WARN [REFRESH:L3nxPg, REFRESH:L3nxPg][ForkJoinPool-1-worker-22] c.h.b.c.c.ResourceCache --- **setUnavailable: 410438:GadDevice**

com.hds.bel.storage.core.contract.report.UserException: Storage System 410438. An unexpected error occurred during communication with storage system. SVP IP address: 10.196.191.23. Contact your administrator if this condition persists. [{code=6205, data=8000}]: A time-out error occurred. \\nVerify that all of the settings have been applied. Retry the setting on the items \\nthat are not applied if there is any. If this problem persists, contact the Hitachi \\nData Systems Support Center.

1. Estimate the cause and actions

The failure on High Availability pair creation was caused by a communication failure that occurred during storage refreshing process.

The following actions are required for this case.

Check availability of network and SVP, and recover if any problem is found

Execute manual storage system refresh

### Failed to attach volumes

[Symptoms]

Failed to attach volumes to a server having fibre port with the following error message.

Failed to attach volume with ID: 2042 on port CL1-G on Storage System 410438. An error occurred while executing CLI command or API: An order to the control/command device was rejected It was rejected due to SKEY=0x05, ASC=0x26, ASCQ=0x00, SSB=0xB958,0x01F2 on Serial#(410438) CAUSE : The LU path is not included one Virtual Machine. [SSB code: B958-01F2] Refer to 'Command Control Interface User and Reference Guide' for the details. If the problem persists, contact customer support.

1. Selecting target log

Since the volume attachment is handled by the rainier microservice, log files under */logs/application/logs/rainier-rainier* directory should be analized.

1. Fitlering related process by NDC

Extract files from rainier-logs.tar.gz, then change current directory to "./logs/application-logs/rainier-rainier". Grep the error message, and identify the NDC(\*1). Then, grep with NDC and save the output to a file.

\*1 On the example below, the NDC is "REST\_API:pCgRL4".

~/work$ tar -zxvf rainier-logs.tar.gz

~/work$ cd ./logs/rainier-rainier

~/work/logs/rainier-rainier$ grep "Failed to attach volume with ID: 2042 on port CL1-G on Storage System 410438" \*.log

com.hds.bel.storage.core.contract.report.UserException: Failed to attach volume with ID: 2042 on port CL1-G on Storage System 410438. …

:

App | 2019-11-08T07:33:56,912 INFO [**REST\_API:pCgRL4**][ForkJoinPool-2-worker-2] c.h.b.s.c.j.e.JobReporterImpl --- JOB\_ID: 6be469d2-6b5d-45a9-a321-e1c4919fa931, add REPORT: AttachVolumesFailedReport, SEVERITY: Error, MESSAGE: Failed to attach volume with ID: 2042 on port CL1-G on Storage System 410438. An error occurred while executing CLI command or API: An order to the control/command device was rejected It was rejected due to SKEY=0x05, ASC=0x26, ASCQ=0x00, SSB=0xB958,0x01F2 on Serial#(410438) CAUSE : The LU path is not included one Virtual Machine. [SSB code: B958-01F2] Refer to 'Command Control Interface User and Reference Guide' for the details. If the problem persists, contact customer support.

:

~/work/logs/rainier-rainier$ grep "REST\_API:pCgRL4" \*.log >pCgRL4.txt

1. Identify a point of the failure

Identify a point of failure by comparing result of the grep with the normal process described in the section 4.3.4.1. In this case, detect an error during execution of "raidcom add lun" command. The SSB code (0xB958,0x01F2) found in the log indicates details of the error.

App | 2019-11-08T07:33:51,835 INFO [REST\_API:pCgRL4][ForkJoinPool-2-worker-2] c.h.b.s.c.c.r.RestUtil --- POST request to http://localhost:8082/block/provider/api/storage-systems/410438/ports/CL1-G/host-groups/72/add-to payload UpdateHostGroupProperties{luns=[Lun{volumeId=2042, lun=5}], additionalPorts=null, updateHostModeOptionsProperties=null}

:

Block | 2019-11-08T07:33:51,989 INFO [REST\_API:pCgRL4:R0m3MV][http-nio-8082-exec-1113] c.h.b.s.d.b.s.c.c.CciCommandBase --- [410438] Running Command: echo | read-lock **raidcom add lun** -port CL1-G-72 -lun\_id 5 -ldev\_id 2042 -IM0, attempt #0

Block | 2019-11-08T07:33:56,751 ERROR [REST\_API:pCgRL4:R0m3MV][pool-9759-thread-1] c.h.b.s.c.s.s.ShellCommandTask --- ERROR Stream: [0]:'raidcom: [EX\_CMDRJE] An order to the control/command device was rejected’

Block | 2019-11-08T07:33:56,751 ERROR [REST\_API:pCgRL4:R0m3MV][pool-9759-thread-1] c.h.b.s.c.s.s.ShellCommandTask --- ERROR Stream: [0]:'raidcom: [EX\_CMDRJE] An order to the control/command device was rejected'

Block | 2019-11-08T07:33:56,751 ERROR [REST\_API:pCgRL4:R0m3MV][pool-9759-thread-1] c.h.b.s.c.s.s.ShellCommandTask --- ERROR Stream: [1]:'It was rejected due to SKEY=0x05, ASC=0x26, ASCQ=0x00, **SSB=0xB958,0x01F2** on Serial#(410438)'

Block | 2019-11-08T07:33:56,751 ERROR [REST\_API:pCgRL4:R0m3MV][pool-9759-thread-1] c.h.b.s.c.s.s.ShellCommandTask --- ERROR Stream: [2]:'CAUSE : The LU path is not included one Virtual Machine.'

Block | 2019-11-08T07:33:56,752 ERROR [REST\_API:pCgRL4:R0m3MV][pool-9759-thread-1] c.h.b.s.c.s.s.ShellCommandTask --- ERROR Stream: [3]:''

1. Find meaning of the SSB code

Definition of SSB codes are described in some documents. The SSB code (0xB958,0x1F2) is found in "SSB codes" section of *Command Control Interface User and Reference Guide*[[1]](#footnote-1), and the code means that host group and LDEV(volume) is not belong to the same virtual storage machine.



1. Estimate the cause and actions

Administrator don't create two or more host group under one port for a server, and one host group cannot belong to multiple virtual machines. From these facts, there are one or more volumes that are attached to the specified port and belonging to the another virtual storage machine.

One of the following actions is required for this case.

Specify another port for attaching

Change virtual storage machine of the volume

Specify another volume

Specify another server

### Failed to create a HA pair

[Symptoms]

Failed to protect a volume with the following error message.

Storage System 410438: An error occurred during distributing data flow in Data Instance Director. …

Failed to create a replication pair from replication group hsa-test-1028 for Storage System 410438 by Data Instance Director.

1. Selecting target log

Since the High Availability pair creation is handled by the rainier microservice, log files under */logs/application/logs/rainier-rainier* directory should be analized.

1. Fitlering related process by NDC

Extract files from rainier-logs.tar.gz, then change current directory to "./logs/application-logs/rainier-rainier". Grep the error message, and identify the NDC(\*1). Then, grep with NDC and save the output to a file.

\*1 On the example below, the NDC is "REST\_API:ywJ8AA".

~/work$ tar -zxvf rainier-logs.tar.gz

~/work$ cd ./logs/rainier-rainier

~/work/logs/rainier-rainier$ grep "Failed to create a replication pair from replication group hsa-test-1028" \*.log

App | 2019-10-28T07:48:22,301 ERROR [][ForkJoinPool-2-worker-59] c.h.b.s.c.j.e.JobRunnerBase --- Task(Job Id= 4908034c-7513-4da5-8cef-8686552e3722) failed with error : com.hds.bel.storage.core.contract.report.UserException: Failed to create a replication pair from replication group hsa-test-1028 for Storage System 410438 by Data Instance Director., stack trace:

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App | 2019-10-28T07:48:22,430 WARN [**REST\_API:ywJ8AA**][ForkJoinPool-2-worker-2] c.h.b.s.c.j.e.Tasks --- Received error executing getResult of task. Error java.util.concurrent.ExecutionException: com.hds.bel.storage.core.contract.report.UserException: Failed to create a replication pair from replication group hsa-test-1028 for Storage System 410438 by Data Instance Director., stack trace: java.util.concurrent.ExecutionException: com.hds.bel.storage.core.contract.report.UserException: Failed to create a replication pair from replication group hsa-test-1028 for Storage System 410438 by :

~/work/logs/rainier-rainier$ grep "REST\_API:ywJ8AA" \*.log >ywJ8AA.txt

1. Identify a point of the failure

Identify a point of failure by comparing result of the grep with the normal process described in the section 4.3.5.2 and 4.3.5.1. In this case, failed to get job information from HDID server after data flow distribution.

Block | 2019-10-28T07:38:14,593 INFO [REST\_API:ywJ8AA:chNrZ5][http-nio-8082-exec-1792] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [RulesManagerApi#masterRulesManagerServicesRulesActionsDistributeInvokePut] ---> PUT https://10.145.24.219:443/HDID/master/RulesManager/services/Rules/actions/distribute/invoke HTTP/1.1

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Block | 2019-10-28T07:38:14,659 INFO [REST\_API:ywJ8AA:chNrZ5][http-nio-8082-exec-1792] c.h.b.s.d.b.s.h.c.l.HdidClientLogger --- [RulesManagerApi#masterRulesManagerServicesRulesActionsDistributeInvokePut] <--- END HTTP (4-byte body)

Block | 2019-10-28T07:38:14,659 INFO [REST\_API:ywJ8AA:chNrZ5][http-nio-8082-exec-1792] c.h.b.s.d.b.s.h.d.p.DistributeDataFlowProcessor --- Succeeded to distribute a Data Flow 0993dd1e-3968-4f24-9137-9255f4f80feb.

Block | 2019-10-28T07:48:21,764 ERROR [REST\_API:ywJ8AA:chNrZ5][http-nio-8082-exec-1792] c.h.b.s.d.b.s.h.d.p.PollHdidJobProcessor --- **An error occurred while getting job information from Data Instance Director for Storage System 410438.**

1. Check logs without NDC

Since some logs are not set NDC, original log files should be checked. In this case, status and description of the job was found.

Block | 2019-10-28T07:48:21,764 ERROR [REST\_API:ywJ8AA:chNrZ5][http-nio-8082-exec-1792] c.h.b.s.d.b.s.h.d.p.PollHdidJobProcessor --- An error occurred while getting job information from Data Instance Director for Storage System 410438.

com.hds.bel.storage.core.contract.report.UserException: A job in Data Instance Director failed. (jobID: 3ufc04shgvknk{5f66288c-8583-43d4-ba78-823bebc9fe62}, type: eJOBTYPE\_BACKUP, **status: eJOB\_FAILED**, nodeID: HM800M6@00-C53118-60C2A6-458AB8-492724[1-1-2], operation: Initialize Replication, subsystem: Block, **description: 'hsa-test-1028' backup for hsa-test-1028**, started: 2019-10-28T07:38:50Z, completed: 2019-10-28T07:48:16Z, destination: HM850H3@00-A7FB99-6CC20F-4BD882-8F4483[1-1-4], dataFlowName: hsa-test-1028)

1. Check details of the HDID job

Detailed information of a HDID job can be acquired on HDID GUI. Open **Jobs** page, click **Job Type** column of the target job(\*1), then **Job Details** page is open. Then click **Export** button at upper right corner of the page, and select "Plain Text with Attachment".

\*1 A job can be identified with the description that found on the previous step.

スクリーンショット, 抽象, モニター が含まれている画像

自動的に生成された説明

Figure 12 Jobs page

スクリーンショットの画面

自動的に生成された説明

**Export**

Figure 13 Jobs Details page

1. Check detailed HDID job information

Check detailed HDID job information that is exported on the previous step. In this case, a failure of paircreate command with SSB code:0xD004,0xFA16 found in the information.

Sequence... Log Message |

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127152... | Handler 'HitachiVirtualStoragePlatform' call failed: Could not begin replica |

... | tion - check state of existing replications from source logical devices.|

... | paircreate -ITC2503 -g HDIDdg0 -svol -c 7 -jq 0x1c -fg never |

127151... | startReplication (Intelligent Storage Manager) \*\*\* Attachment count: 2 \*\*\* |

:

---Attachment 1---

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PROCESS NAME: /HORCM/usr/bin/paircreate

START TIME: 28-Oct-2019, 07:48:13.480

END TIME: 28-Oct-2019, 07:48:16.145

DURATION: 2665ms

WORKING DIRECTORY: /HORCM/usr/bin

ARGUMENT LIST: -ITC2503 -g HDIDdg0 -svol -c 7 -jq 0x1c -fg never

ENVIRONMENT SETTINGS:

RESULT:

exit code: 221, output: **paircreate: [EX\_CMDRJE] An order to the control/command device was  
 rejected**

Refer to the command log(/HORCM/log2503/horcc\_hdid.log) for details.

It was rejected due to SKEY=0x05, ASC=0x20, ASCQ=0x00, **SSB=0xD004,0xFA16** on Serial#(410438)

(Abnormal exit)

1. Find meaning of the SSB code

Definition of SSB codes are described in some documents. The documents are not only *Command Control Interface User and Reference Guide*[[2]](#footnote-2) but also product documentations. The SSB code: 0xD004,0xFA16 is described in " Troubleshooting for CCI" section in *Troubleshooting under Global-active device*[[3]](#footnote-3), and the code means that the specified volume is secondary volume of ShadowImage. Since secondary volume of High Availability pair is created on demand, the secondary volume is not secondary volume of ShadowImage. Therefore, it is assume that primary volume of High Availability pair is secondary volume of ShadowImage.



1. Check requirements

Requirements for High Availability are described in a product documentation "System requirements" under "Global-active device"[[4]](#footnote-4). In this case, failed to use secondary volume of ShadowImage as primary volume of High Availability (GAD). The restriction is described in "Interoperatbility requirements" section.



1. Estimate the cause and actions

The failure is due to specifying volume that is secondary volume of ShadowImage.

The following actions are required for this case.

Select another volume

Delete ShadowImage pair with the speicified volume as a secondary volume

1. https://knowledge.hitachivantara.com/Documents/Management\_Software/Command\_Control\_Interface [↑](#footnote-ref-1)
2. https://knowledge.hitachivantara.com/Documents/Management\_Software/Command\_Control\_Interface [↑](#footnote-ref-2)
3. https://knowledge.hitachivantara.com/Documents/Management\_Software/SVOS/8.1/Global-Active\_Device/Troubleshooting [↑](#footnote-ref-3)
4. https://knowledge.hitachivantara.com/Documents/Management\_Software/SVOS/8.1/Global-Active\_Device/System\_requirements [↑](#footnote-ref-4)