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Enterprise

HPE Cray EX with CSM System Diagnostic Utility (SDU) Administration Guide (2.0.0) (S-8035)

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HPE Cray EX with CSM System Diagnostic Utility (SDU) Administration Guide

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2 Introduction

2.1 Overview

The System Diagnostic Utility (SDU) is a tool for collecting important system data, such as logs, core files, register dumps, and more. This guide is intended for use with the HPE Cray EX system with Cray System Management (CSM) software installed.

The HPE Remote Device Access (RDA) transport is the preferred method for uploading triage or inventory data collected from SDU for further analysis by customer support. There is also added support for upload to CrayPort if the HPE RDA transport is not available.

Refer to the following for more information on the key components of SDU:

- ***System Diagnostic Utility (SDU)*** - Is responsible for gathering all necessary information needed to debug a significant majority of problems. “Gathering” can be extended to imply:
  - Collection of multiple data sources across either a stand-alone or distributed system in a scalable manner, with the ability to tailor collection targets and time bounds.
  - Step-wide analysis of collected data to make assertions about a running product or platform, such as indicating that specific hardware is suspect.
  - Presentation of system collection data for operator or programmatic analysis, such as triage tools and customer support summary tools.
  - Capable of both exporting a portable collection to a POSIX file system and uploading a collection from a customer system into the Metis call-home data lake via RDA.
  - Per revision SDU documentation is found here. Cray credentials required.
- ***Remote Device Access (RDA)*** - HPE RDA provides integrated remote connectivity for support automation, device telemetry and remote service delivery. RDA is integrated with the SDU product stream.
  - HPE RDA Documentation: https://midway.ext.hpe.com/home

2.2 Installation

Please refer to the associated installation guide published with this administration guide. See the publication section.

2.3 Publication

This installation guide is intended to be published along with an administration guide on a per revision basis. These guides are published to the following locations. This is not necessarily a complete list of publication sites.

- Online via the HPE Customer Support Center.
- The root directory of an SDU distribution tar file in PDF form.
- This HPE internal site. Cray credentials are required for login.

3 Collection

3.1 Run an Inventory Collection with SDU

Use the System Diagnostic Utility (SDU) to collect the software, firmware, and hardware inventory data for collection upload to customer support. The inventory data collected and uploaded will enable customer support to provide a high level of service for the system.

System inventory data is collected that will be used to provide support for the system.

3.1.1 Prerequisites

- The System Admin Toolkit (SAT) is properly configured on the non-compute node (NCN) manager node that SDU is running on.
- The system is installed and running.
- This procedure requires administrator privileges.
- This procedure should be performed after the system software, firmware, or hardware has been updated.

3.1.2 Procedure

1. Run an SDU collection with the inventory scenario.

   ```
   ncn-m001# sdu --scenario inventory
   ```

2. Change to the inventory collection data view.

   Running an inventory collection job produces a system dump that is stored in a custom raw collection format. A file-system representation of a collection, called a collection view, is created by SDU to make navigation of the data easier and more portable.

   The SDU collection output log will report the location of the collection view. For example:

   ```
   [...]

   [stdout] INFO dir created in view /var/opt/cray/sdu/collection/inventory/view/
   2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27

   [...]
   ```

   Change to the returned directory with the cd command. Replace the directory in the command below with the value returned in the output log on the system being used.

   ```
   ncn-m001# cd /var/opt/cray/sdu/collection/inventory/view/
   2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27
   ```

3. Review the inventory collection.

   The collection manifest JSON document is stored in the root of the view directory. Dump contents are organized first by host, and then by content type (files and cmds).

4. Prepare to upload the inventory collection.

   Create a compressed tar file of the collection view. Ensure that symbolic link de-referencing is enabled with the h option in the tar command. Replace the ***SYSTEM_NAME***, ***VIEW_DIRECTORY***, and ***SDU_DUMP_DIRECTORY*** values before running the command.

   ```
   ncn-m001# tar cvfzh SYSTEM_NAME-VIEW_DIRECTORY.tgz SDU_DUMP_DIRECTORY
   ```

   For example, if the system name is test_system, and the view directory is `/var/opt/cray/sdu/collection/inventory/view/2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27`, the following command would be used:

   ```
   ncn-m001# cd /var/opt/cray/sdu/collection/inventory/view
   ncn-m001# tar cvfzh \
             test-system-2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27.tgz \
             2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27
   ```

3.2 Run a Triage Collection with SDU

Use the System Diagnostic Utility (SDU) to collect logs, core files, register dumps, and more. Package the output with tar to share any useful system triage information with system administrators and product support.

Gather important system information that is required to diagnose and debug a majority of system problems.

3.2.1 Prerequisites

- The System Admin Toolkit (SAT) is properly configured on the non-compute node (NCN) manager node that SDU is running on.
- The system is installed and running.
- This procedure requires administrator privileges.
- This procedure should be performed after the system software, firmware, or hardware has been updated.

3.2.2 Procedure

1. Run the triage collection with SDU.

   The following is only an example. Use the `--reason` option to specify a reason for running the triage collection. Take note of the directory in the output line beginning with [stdout] INFO dir, which will be needed for the proceeding steps.

   ```
   ncn-m001# sdu --scenario triage --reason "Problem with install"
   ```

   Output similar to the following is expected:

   ```
   [stdout] INFO Configuration file "/etc/opt/cray/sdu/sdu.conf" and CLI Options Valid.
   [stdout] INFO UI master_control status is (enabled) [no control file created]
   [stdout] INFO MASTER CONTROLS -> (M:True, U:False)
   [stdout] INFO UI CONTROLS -> (C:True, U:True)
   [stdout] INFO Exclusive run: Lock file created
   @ /var/opt/cray/sdu/lock/sdu.lock_channel-triage_system-devkit
   [stdout] INFO COLLECT stage start

   [...]

   [stdout] INFO dir created in view /var/opt/cray/sdu/collection/triage/view/
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2
   [stdout] INFO starting purge
   [stdout] INFO work directory removed from '/var/opt/cray/sdu/collection/triage/.work'
   [stdout] INFO keeping 10 snapshot(s) max
   [stdout] INFO Found 2 snapshot(s) to keep, 0 to purge
   [stdout] INFO exiting purge, nothing to do
   [stdout] INFO 1813098605.0 raw bytes collected.
   [stdout] INFO SDU session stop successfully
   [stdout] INFO run took 2431.83 seconds
   ncn-m001#
   ```

   The `--start_time` and `--end_time` options can be used to specify a custom time frame. These options support the minus syntax for minutes, days, weeks, and months. If no option is provided for `--end_time`, it defaults to the current time.

   The default time frame is two days if nothing is supplied. The minimum collection window should be supplied by the user at this time to reduce the collection time and improve the chance of collection success. This is particularly important for the smf.gather.logs plugin.

   For example:

   ```
   ncn-m001# sdu --scenario triage --start_time '-2 days' --reason "Problem with install"
   ```

2. Change to the dump view directory.

   Use the directory path provided in the output above to access the human-readable snapshot of the system. The snapshot JSON document is stored at the root of the view directory.

   WARNING: Do not edit a dump view. Editing the contents of a view may corrupt the data.

   For example:

   ```
   ncn-m001# cd /var/opt/cray/sdu/collection/triage/view/
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2
   ```

3. Locate the desired dump content by changing to the directory of a specific host/system management component and content type.

   Dump contents are organized first by host or system management component, and then by content type (files and cmds).

   The following is an example of the directory path:

   ```
   ncn-m001# ls -l
   ```

   The returned output is expected to look similar to the following:

   ```
   total 3576
   drwxr-x--- 4 root root      31 Feb 15 03:51 ceph
   ```

```
drwxr-x--- 3 root root      18 Feb 15 03:51 k8s
drwxr-x--- 3 root root      19 Feb 15 03:51 localhost
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-m002
drwxr-x--- 4 root root      31 Feb 15 03:51 ncn-m003
drwxr-x--- 4 root root      31 Feb 15 03:51 ncn-m003-sdu
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-s001
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-s002
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-s003
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-w001
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-w002
drwxr-x--- 3 root root      19 Feb 15 03:51 ncn-w003
-rw-r--r-- 1 root root 3659206 Feb 15 03:51
session-1613358653-3c7c6d3040cef5b59b15f15f29c9eda2.json
```

Additional subdirectories exist that contain the logs, core files, register dumps, and more.

4. View the resulting collection data.

   The following examples show the data located in the Ceph subdirectory.

   - The ceph/cmds/ directory:

     ```
     ncn-m001# ls -l ceph/cmds/
     ```

     The returned output is expected to look similar to the following:

     ```
     total 0
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_df_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/67/
     bef2d34767a083815c1f171c411acc515f2b737cb10e99e9039279
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_pool_ls_detail_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/0b/
     4a7f196368880bbee39f35629b8012311d37a9a5d4773bd8d9c233
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_pool_stats_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/5a/
     6c6d3d3021a6ccb913f06b9043d2030a24b0cc579ac119b9445ca9
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_status_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/8e/
     32abc332681187cea60e52a1074079e7e75358ef4f4b50414c635a
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_tree_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/a4/
     afe3a6a667cc15162a14d326b41ddf306bb40641a59dd85aa5ebb2
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_osd_utilization_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/19/
     21ec6bfc7243de4aecd6e3f7c054553fbecf6cdefbb80512e0e906
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_pg_stat_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/f0/
     402a5c0053bd3b20fff48138a4a6a67add88e7f32150e575e496e7
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_status_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/42/
     83efbe4a361646f721fbca26a2ec51173da8bdca1f1b040ca70878
     lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001_usr_bin_ceph_version_std.out
     -> /var/opt/cray/sdu/collection/triage/objects/f9/
     582cd618911ce1e567bef488949642ba673e0a5380b899e1c9478c
     ```

   - The ceph/files/ directory:

     ```
     ncn-m001# ls -lR ceph/files/
     ```

     The returned output is expected to look similar to the following:

     ```
     ceph/files/:
     total 0
     ```

```
drwxr-x--- 2 root root 36 Feb 15 03:51 ncn-s001
drwxr-x--- 2 root root 36 Feb 15 03:51 ncn-s002
drwxr-x--- 2 root root 36 Feb 15 03:51 ncn-s003

ceph/files/ncn-s001:
total 0
lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s001-ceph-logs.tgz
-> /var/opt/cray/sdu/collection/triage/objects/
41/b73dafe5745369674a315a395055e9b07a4d8d383f5186e21d6010

ceph/files/ncn-s002:
total 0
lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s002-ceph-logs.tgz
-> /var/opt/cray/sdu/collection/triage/objects/ff/
922f33411829617e0ed8e04b6c30c8f43dbc92ee2e420718fb8a5e

ceph/files/ncn-s003:
total 0
lrwxrwxrwx 1 root root 101 Feb 15 03:51 ncn-s003-ceph-logs.tgz
-> /var/opt/cray/sdu/collection/triage/objects/72/
c60fd140282236a2ccb224f3da2e4d2830b91772257e4902f1c43e
```

5. Package the output of the SDU collection.

   Important system information can be packaged with tar to share with system administrators and product support. The output needs to be packaged and relocated before editing the contents of a view.

   WARNING: It is critical that tar is called with the symbolic link dereferencing option (the h option) when tarring up a view. To avoid corruption, do not edit the contents of a view.

   ```
   ncn-m001# tar cvfhz \
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2.tgz \
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2
   ```

   Output is expected to look similar to the following:

   ```
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   session-1613358653-3c7c6d3040cef5b59b15f15f29c9eda2.json
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/ceph/
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/ceph/cmds/
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_version_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_status_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_osd_status_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_osd_df_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_osd_utilization_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_osd_pool_stats_std.out
   2021-02-15T03-10-53_UTC-3c7c6d3040cef5b59b15f15f29c9eda2/
   ceph/cmds/ncn-s001_usr_bin_ceph_osd_pool_ls_detail_std.out

   [...]
   ```

4 Upload

4.1 Upload a Triage or Inventory Collection

Upload the triage or inventory data collected from the System Diagnostic Utility (SDU) for further analysis by customer support.

4.1.1 Prerequisites

A triage or inventory collection has be retrieved with SDU.

4.1.2 Procedure

Select either of the options below. Option 1 is the preferred method.

4.1.2.1 Option 1

Use the built-in HPE Remote Device Access (RDA) transport, which requires HTTPS outbound. This is the preferred method.

HPE RDA provides integrated remote connectivity for support automation, device telemetry, and remote service delivery.

- RDA Documentation: https://midway.ext.hpe.com/home
- Security white paper: https://support.hpe.com/hpesc/public/docDisplay?docId=a00006791en_us

Use the following steps for HPE RDA:

1. Enter the SDU container.

   ```
   ncn-m001# sdu bash
   ```

2. Change to the appropriate view directory.

   For triages:

   ```
   ncn-m001-sdu# cd /var/opt/cray/sdu/collection/triage/view
   ```

   For inventories:

   ```
   ncn-m001-sdu# cd /var/opt/cray/sdu/collection/inventory/view/
   ```

3. Display the current collections.

   ```
   ncn-m001-sdu# ls
   ```

   Output similar to the following is expected:

   ```
   2021-02-24T23-18-26_UTC-034e936fbbef3b01625a485bfb82df77
   2021-02-25T20-05-53_UTC-00f76fd853d02339fe52a918505da4e9
   2021-02-25T20-07-57_UTC-97166640064c88636abc5d670411f2c2
   ```

4. Upload the appropriate collection using the `sdu-stage-to-rda` command.

   ```
   ncn-m001-sdu# sdu-stage-to-rda 2021-02-25T20-09-52_UTC-f6cade95450824711405aa52dade8092
   ```

   Output similar to the following is expected:

   ```
   Staging files for RDA transport
   Moving files from /var/tmp/RDA_STAGE.7gL3 to RDA outbox /var/tmp/rda/outbox
   Done.
   ```

5. Monitor the progress of the upload by inspecting the contents of the RDA outbox upload directory.

   ```
   ncn-m001-sdu# ls -l /var/tmp/rda/outbox
   ```

   Output similar to the following is expected:

   ```
   total 420
   -rw-r--r-- 1 root root   2094 Mar  1 12:13 01f8a53c5aebcb992914c30ebcefc0734798fcc816ac8a2263e4528d
   -rw-r--r-- 1 root root 259228 Mar  1 12:13 44a9d0cc9f231b6222979a84ff338df0958abca08f6c5651298b031f
   ```

```
-rw-r--r-- 1 root root     98 Mar  1 12:13 8d8eed41009402e672740711f0a179e17d0e1dd9b45ac334d6f77397
-rw-r--r-- 1 root root     68 Mar  1 12:13 a58db5e8688d24dcec266e5e67037e5daf4db7f18bd702fb23437563
-rw-r--r-- 1 root root      0 Mar  1 12:13 d14a028c2a3a2bc9476102bb288234c415a2b01f828ea62ac5b3e42f
-rw-r--r-- 1 root root 102658 Mar  1 12:13 ddceb621cdee3914422d5a192526659dbb21d5406bb451f9120e18f3
-rw-r--r-- 1 root root   1998 Mar  1 12:13 eec76be3c577ce1e9d77ed22a98096784f45a6e0c859b717851eb9cb
-rw-r--r-- 1 root root   1940 Mar  1 12:13 f47fc92d6a815541721a05c0ef5e24696587dc7a84512797b33df264
-rw-r--r-- 1 root root  38109 Mar  1 12:13 session-1614308992-f6cade95450824711405aa52dade8092.json
```

6. Verify the RDA outbox is empty.

   It will take a bit for the outbox to empty as content is uploaded.

   `ncn-m001-sdu# ls -l /var/tmp/rda/outbox`

   `total 0` will be returned when the RDA outbox is empty.

4.1.2.2 Option 2

Upload the compressed tar file of the collection view ***SYSTEM_NAME-VIEW_DIRECTORY***.tgz to customer support by creating a CrayPort support ticket and attaching it there.

Package the output of the triage or inventory collection. Important triage and inventory collections can be packaged with tar to share with system administrators and product support. The output needs to be packaged and relocated before editing the contents of a view.

WARNING: It is critical that the tar command is called with the symbolic link de-referencing option (the h option) when packaging up a view. To avoid corruption, do not edit the contents of a view.

Create a compressed tar file of the collection view. Ensure that symbolic link de-referencing is enabled with the h option in the tar command. Replace the ***SYSTEM_NAME***, ***VIEW_DIRECTORY***, and ***SDU_DUMP_DIRECTORY*** values before running the command.

```
ncn-m001# tar cvfzh SYSTEM_NAME-VIEW_DIRECTORY.tgz SDU_DUMP_DIRECTORY
```

For example, if the system name is test_system, and the view directory is `/var/opt/cray/sdu/collection/inventory/view/2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27`, the following command would be used:

```
ncn-m001# cd /var/opt/cray/sdu/collection/inventory/view
ncn-m001# tar cvfzh test-system-2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27.tgz \
2020-10-01T00-35-20_UTC-c410d30f1d5656ae006f657aa09d4d27
```

5 Configure

5.1 SDU

Configure SDU for use on the system. This procedure will populate `/etc/opt/cray/sdu/sdu.conf` with the required information provided.

There are a few ways to configure SDU, they are detailed in this section.

5.1.1 Prerequisites

The following information is needed to properly identify the system:

- Top-level system serial number. An HPE service team member can help to obtain this.
- System product number. Here is a (non-exhaustive) list of possibilities:
  - Shasta air-cooled: R6G08A
  - Shasta liquid-cooled: R4K98A

Additionally, the `sdu setup` command will ask for information, such as system name, system type, system description, company name, company site, and country code. See `sdu setup --help` for an exhaustive list of what will be requested.

5.1.2 Interactively

1. Start an interactive SDU configuration session with the following command:

   ```
   ncn-m001# sdu setup
   ```

2. Follow the on-screen prompts, answering each question posed.

5.1.3 Directly

The SDU configuration is saved to `/etc/opt/cray/sdu/sdu.conf`. This file may be edited directly as long as SDU is not currently executing.

5.1.4 Programmatically

A non-blocking `sdu setup` command is provided by passing the `--batch` parameter to the command. Each sdu.conf section and field can then be set using the following form:

```
ncn-m001# sdu setup --batch --[<section>][<field key>] <value>
```

where

<section> is the sdu.conf section of interest <field key> is the field within the sdu.conf section of interest <value> is the value to set the field to

5.2 RDA

Enable and configure the HPE Remote Device Access (RDA), which provides integrated remote connectivity for support automation, device telemetry, and remote service delivery. HPE RDA requires HTTPS outbound. This is a one-time setup that only needs to be run once on the NCN manager node running SDU.

Configuring and enabling RDA is optional. This is only required if network connectivity to HPE is required for either of the following:

1. Transport of SDU collections over the network to HPE
2. Interactive Device Access Refer to the resources below for more information on RDA:

- RDA Documentation: https://midway.ext.hpe.com/home
- Security white paper: https://support.hpe.com/hpesc/public/docDisplay?docId=a00006791en_us

5.2.1 Prerequisites

SDU must be installed. See “Install System Diagnostic Utility (SDU) Product Stream” in the ***HPE Cray EX System with CSM Diagnostic Utility (SDU) Installation Guide*** for more information.

Typically, RDA is configured at SDU installation time, but this is not strictly required.

5.2.2 Procedure

1. Enter the SDU container.

   ```
   ncn-m001# sdu bash
   ```

2. Run `cray-rda-setup enable` to configure and enable RDA.

   ```
   ncn-m001-sdu# cray-rda-setup enable
   ```

   When prompted, use the serial number and product number specified during `sdu setup`. The serial number is a system serial number. Contact an HPE representative to obtain the system serial number and product number.

   For example:

   ```
   Enter serial number (required) []: 77340000
   Enter product number (required) []: R4K98A
   ```

   Output similar to the following is expected:

```
=== RDA Setup Utility ===
Loading current configuration...
Checking known environments...
Current environment is pro

Environment not changed

Applying changes for product-mode: CAS-Agent

Create run-time directories... Done

Configure services
Done
Protecting config... Done
Updating configuration... Done
Adding midway-selector to cron... Done
Checking device certificate...
Certificate issued
Certificate created OK
Using device ID f1aa025b-a810-4625-b4eb-6d84ff699147
Adding cas-getcert to cron... Done
Checking web certificate.... Done
[Re]Apply file ownership and permissions... Done
Starting rda-cas service... Done
Starting rda-cas-jobs service... Done
Adding watchdog to cron... Done
Done!
```

3. Verify RDA operation.

   There will be an active tunnel listed if RDA is configured and enabled properly.

   NOTE: There is a delay from the completion of setup to tunnel readiness. Allow up to one minute for the following command to display properly configured tunnels.

   ```
   ncn-m001-sdu# rda-control show tunnel -v
   ```

   Output similar to the following is expected:

   ```
   Operating Values
   ----------------
           Command: show tunnel
      Station Role: cas
          Use WAPI: https://127.0.0.1:8082
           Midways: midway.ext.hpe.com:443
        Start Time          Tunnel       Remote Endpoint
   ====================  ==============  ===============
   2021-03-01T21:29:16Z  g4t9667g        tcp:15.241.136.220:443
   ```

6 Support

6.1 Known Issues

6.1.1 Piping SDU Command Output

Piping SDU command output to the less or more commands causes formatting problems. This is a known issue when using podman exec with the `--tty` option. Refreshing the less or more will work around this issue. Less and more have the following commands to refresh the screen using `CTRL-r`, `CTRL-l`, or `r`.

6.2 Troubleshoot SDU

6.2.1 Troubleshoot SDU Failing to Run on Systems with Extreme Load Metrics

There is a safety mechanism built into SDU that prevents it from running when the five-minute load average exceeds a configurable setting in sdu.conf. This check is made prior to plugin execution.

This safety mechanism can be bypassed with the following command line parameter:

```
-x, --allow_unsafe
```

Alternatively, the load limit in sdu.conf can be tuned by reading on.

6.2.1.1 Background Information

The python os.getloadavg function is used to gather the system load data.

The following is an example of the load limit being reached:

```
ncn-m001# sdu --scenario triage --reason "system ncn-w001 slow at noon"
[stdout] UI master_control status is (enabled)
[stdout] MASTER CONTROLS -> (M:True, C:True, U:False)
[stdout] UI CONTROLS -> (C:True, U:True)
[stdout] Exclusive run: Lock file created @ /var/opt/cray/sdu/lock/
sdu.lock_channel-triage_system-unknown
2020-04-07 12:04:11.657 STDERR pid-1397828:sdu:main:409 root - System load is not OK, aborting
```

6.2.1.2 Prerequisites

This procedure requires administrative privileges.

6.2.1.3 Procedure

Edit the [sysconf][system_load_limit] setting found in the following file:

```
/opt/etc/cray/sdu/sdu.conf
```

6.2.2 Troubleshoot Out of Space

There is a safety mechanism that will prevent SDU from running if an insufficent amount of host file system space is available. This check is made prior to plugin execution.

Out of space may be indicated with an error similar to the following:

```
ERROR:root:Not enough free space on collection file system for 2 * maximum collection size!
```

There are three procedures to that can be used to resolve this issue. They be used in conjunction or individually.

- Procedure 1 - Free Host File System Space
- Procedure 2 - Configure sdu.conf
- Procedure 3 - Reduce collection request

6.2.2.1 Prerequisites

This procedure requires administrative privileges.

6.2.2.2 Procedure 1

To delete all locally stored collections:

```
rm -rf /var/opt/cray/sdu/collection/*
```

To delete collections staged for upload to HPE:

```
rm -rf /var/opt/cray/sdu/outbox/*
```

6.2.2.3 Procedure 2

There are two settings of relevance when working with SDU file system space:

1. [collection][max_collection_size]
2. [collection][collect_retain_per_channel]

The configuration file is found at the following location:

`/etc/opt/cray/sdu/sdu.conf`

The maximum collection size is the maximum number of bytes to collect per SDU execution. The collect retain per channel field is the number of collections to store on the host file system per channel (also known as scenario).

The maximum value for the [collection][max_collection_size] setting over any number of SDU executions is as follows:

```
[collection][max_collection_size] = disc_free
                                  / 2
                                  / ([collection][collect_retain_per_channel]
                                     * number_of_channels)

    where
        [collection][max_collection_size] is a setting in sdu.conf

        [collection][collect_retain_per_channel] is a setting in sdu.conf

        disc_free is a sample of the free bytes on the host file system. Excluding the
        /var/opt/cray/sdu/collection directory.

        number_of_channels is the number different types of "scenarios" or "channels" that
        will be executed.
```

The total file system size utilized by SDU will not exceed:

```
    [collection][max_collection_size] * [collection][collect_retain_per_channel] * num_channels

    where
        [collection][max_collection_size] is a setting in sdu.conf

        [collection][collect_retain_per_channel] is a setting in sdu.conf

        num_channels is the number different types of "scenarios" or "channels" that
        will be executed.
```

6.2.2.4 Procedure 3

The number of bytes collected per collection can be reduced by utilizing the command line parameters:

- `--plugin`
- `--start_time`
- `--end_time`

More information can be obtained about these parameters from the manual. This can be viewed by issuing `ncn-m001-sdu: ~# man sdu` externally to the cray-sdu-rda container. Otherwise, `ncn-m001: ~# man sdu` can be issued internally.

Additionally, `sdu --help` has more information on command line parameters and is accessible internally and externally to the cray-sdu-rda container.

6.2.3 Troubleshoot Plugin Timeouts

There are two sets of timeouts associated with each plugin.

1. The following setting in sdu.conf (units of seconds)
    1. [process][child_sigint_timeout]
    2. [process][child_sigterm_timeout]

3. [process][child_sigkill_timeout]
4. [process][child_orphan_timeout]

2. The per plugin timeouts (units of seconds) specified in the associated .json file
    1. ['runtime']['timeouts']['int']
    2. ['runtime']['timeouts']['term']
    3. ['runtime']['timeouts']['kill']
    4. ['runtime']['timeouts']['orphan']

The sdu.conf timeouts apply to the following: - command execution - file query - file collection

The plugin .json timeouts apply to the following: - command collection

The sdu.conf file is found at this location:

```
/etc/opt/cray/sdu/sdu.conf
```

The per plugin .json configuration files are found at the following path. Note that the path is only accessible from the context of the cray-sdu-rda container.

```
ncn-m002-sdu:/ # cd /opt/cray/sdu/default/plugins/plugin.d/
```

The following will happen with each of these timeouts if exceeded by plugin executions, respectively:

- send operating system signal
    - SIGINT
    - SIGTERM
    - SIGKILL
- orphan the plugin subprocess

6.2.4 Troubleshoot SDU Failures

Log inspection can provide insight into problems encountered with the System Diagnostic Utility (SDU). Additionally, executing commands of interest with debugging enabled can also help resolve problems.

This procedure is intended to help debug issues with SDU itself. For issues using the `sdu` command, use the `--help` command line option for more information.

6.2.4.1 Prerequisites

SDU is installed on a system and is exhibiting a problem.

6.2.4.2 Procedure

1. Review the SDU log at the following location:

   ```
   /var/opt/cray/sdu/log/sdu.log
   ```

2. Review the manifest for a collection of interest. Replace the placeholder values in the directory path below before searching for the manifest.

   ```
   /var/opt/cray/sdu/collection/<scenario>/view/<date>_UTC-<hash>/session-<epoch>-<hash>.json
   ```

   In particular, look for non-zero exit codes. This may provide insight into which plugin(s) may be failing.

3. Look for standard error logs. Replace the placeholder values before running the following command.

   ```
   cd /var/opt/cray/sdu/collection/<scenario>/view/<date>_UTC-<hash>/
   find . -name *.err
   ```

   Additionally, reviewing the standard out information in conjunction with the standard error data can be helpful as well.

   ```
   find . -name *.out
   ```

4. Executing commands of interest in conjunction with the `-d` or `--debug` parameter will provide more detailed information to `STDOUT` and `STDERR`. Review this additional output to gather insights into what might be going wrong.

   NOTE: The extra debugging information that is output to `STDOUT` and `STDERR` when `-d` or `--debug` is given on the command line, is always saved to the SDU log. It is logged independently of the debug command line parameter.