# Reducing MTTR for Complex HPC Systems

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diverse universe
PERTH AUSTRALIA

# Topics

Introduction

System Diagnostic Utility (SDU)

Choices: 3-Levels of Opt-In

Q&A

# Introduction

— HPE Services - HPC Global Support, Telemetry

— We have been doing "call home" at HPE/Cray for a long time – over 10 years

— System Snapshot Analyzer (SSA)
  — Over 2.8 million "snapshots" processed

— We've learned much and we are moving to our next generation solution
  — **System Diagnostic Utility** (**SDU**) – client
  — **Metis** – Back-end pipeline
  — Modernized the architecture
    — SDU is containerized
    — Metis is a cloud-based data lake
    — Industry leading secure data transport with HPE Remote Device Access (RDA)
  — More capability on the client
  — New value for air-gapped sites

**Metis** was the Titan goddess and the architect of cunning strategies.  More than simply <u>possessing knowledge</u>, she embodied <u>the art of using that knowledge to achieve a desired outcome</u>.  Her foresight and strategic planning were legendary, making her a counselor of unmatched wit and ingenuity.

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# HPC Call Home Support Platforms

| SOLUTION | CLIENT SUPPORTED PLATFORMS | NOTES |
|---|---|---|
| System Snapshot Analyzer (**SSA**)<br>Client: **Shepherd** (aka **SSA**) | • Cray XE/XC<br>• Sonexion/ClusterStor/E1000 (NEO 6.x and prior)<br>• CS Series | • In production since 2015<br>• Free of charge<br>• Must intentionally register, download, setup<br>• **Back-end will migrate to Metis 7/2024** |
| **Metis**<br>Client: System Diagnostic Utility (**SDU**) | • HPE Cray EX with CSM 1.4+ (includes Slingshot)<br>• HPE Cray EX/Apollo/XD/Gen11 with HPCM 1.9+ (includes Slingshot with 1.10 patch+)<br>• E1000 NEO 7+ (in progress) | • Next generation Call Home<br>• Free of charge<br>• **Built into HPE solutions (must simply be installed/enabled)**<br>• Local raw data has human view capability<br>• HPE RDA fully integrated |

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# System Diagnostic Utility (SDU)

# Goals of System Diagnostic Utility (SDU)

— **Reduce MTTR + Improve CSAT**

— **Improve case velocity**

  — Automatic daily collections provide high-level information ("Asset Facts") to the service team immediately with zero effort

  — Ensures the right service person is assigned to the case

  — Especially important when multiple engineers are working the case in disparate time zone interactions

— **Consistent capture and workflow**

  — Standard interface across supported platforms

  — One command to gather data, upload, and associate with a case (Case management system/CAST)

  — Remove the mundane steps of the support process

— **Improves customer support experience**

  — Easy and free: one-time setup (< 10 minutes), zero-downtime, zero-cost

  — All support data is viewable by customer locally in a single location (history here is important)

  — HPE engineers have the exact same view and tools

  — Enabling daily collections will allow HPE to be more proactive when bugs and CVEs are identified

— **Broad HPC platform support**

# Choice: 3 Levels of Opt-in

## Local Only

———

Auto/manual capture

Single location

Historical data

Local tools
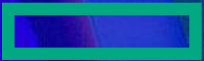
## Local + Secure Upload

———

Local + Secure upload via RDA

Fastest and most secure method to share case data

## Local + Secure Upload + Secure Remote Access

———

When you need an expert available immediately, virtually and securely

# Opt-in 1: Local Collection

# Opt-in 1: Local Collection

— **Local collection** only (no upload)

  — Using this model, there is no data leaving the datacenter, it all stays local

    — POSIX view of the data

  — Capability to automatically and/or manually run collections to capture key configurations / state

  — Historical collections

    — Retain count is up to the you

    — Compare points in time

  — Value to air-gapped sites

  — Tools developed and used by HPE engineers may be provided to run on that locally captured data

# Local Only
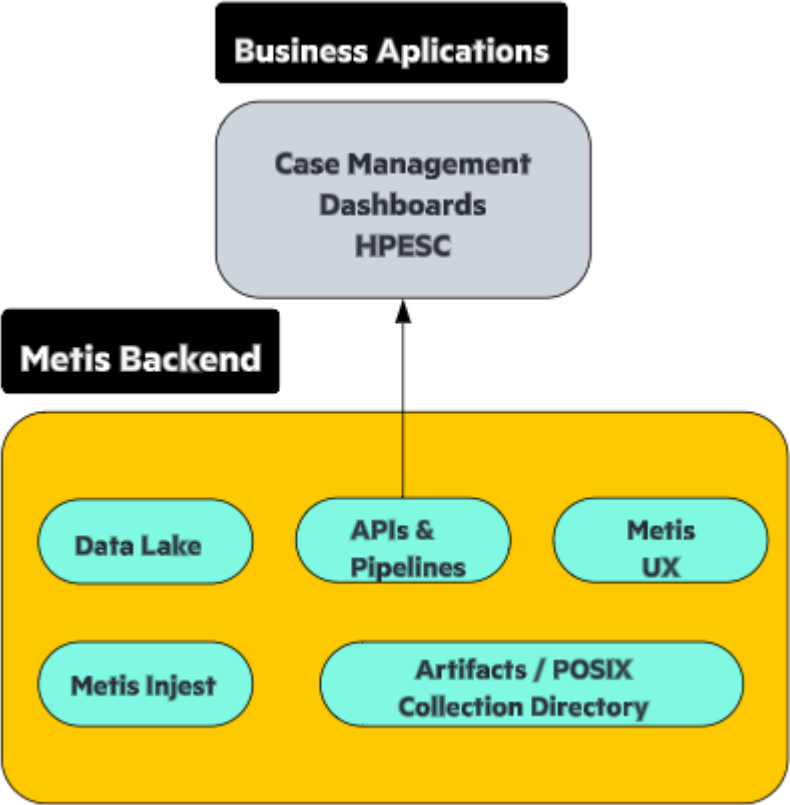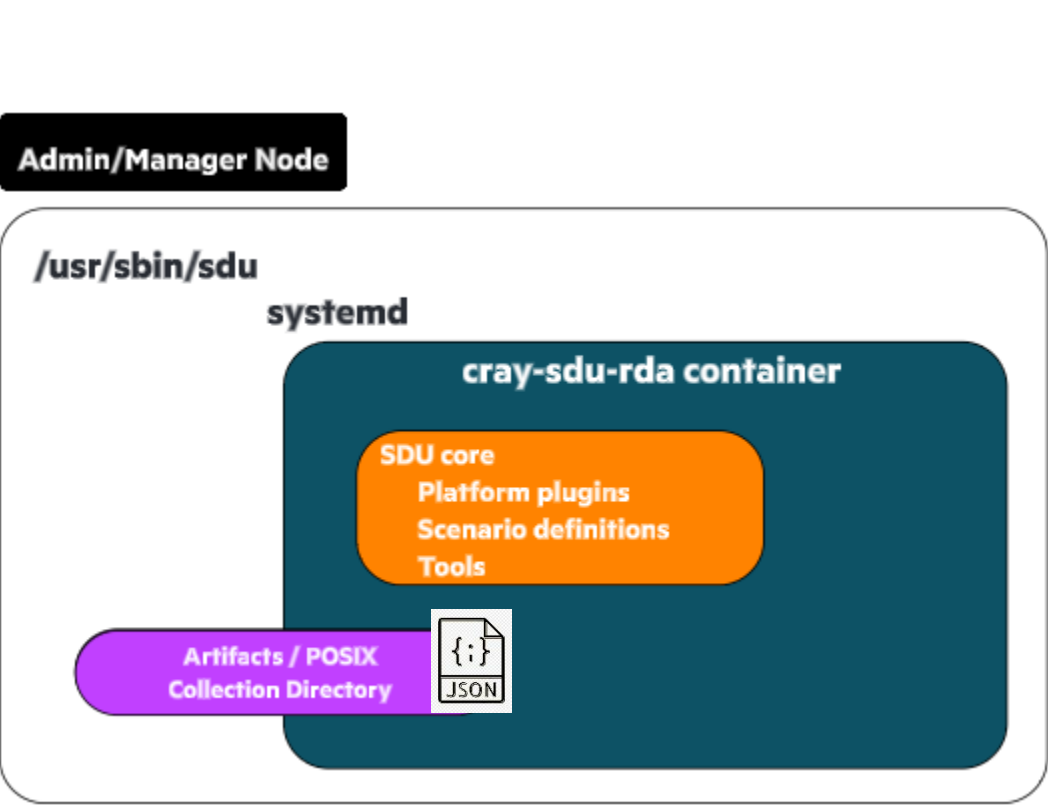
# Asset Facts

— Local use of this data

— This provides our team a valuable surface knowledge of the state of the system without digging through many objects

— Geared to be sent on a daily cadence

— In disconnected sites, there is a way to just send up

Asset Facts

— JSON file can be reviewed before transport

— Manual redact if necessary

— Getting Asset Facts is helpful on any cadence (daily/monthly/quarterly)

# DLVR Asset Facts

75 items • Sorted by Key • Updated a few seconds ago

| | Key ↑ | Type | Friendly N... | Value | Created Date |
|---|---|---|---|---|---|
| 32 | ☐ fabric.slingshot.versions.pki_engine | | | 1.3.0 | 5/6/2024 8:02 PM |
| 33 | ☐ fabric.slingshot.versions.rosetta_devel_library | | | 6.19.0 | 5/6/2024 8:02 PM |
| 34 | ☐ fabric.slingshot.versions.switch_firmware | | | not installed | 5/6/2024 8:02 PM |
| 35 | ☐ fabric.slingshot.versions.tools | | | 2.0.2 | 5/6/2024 8:02 PM |
| 36 | ☐ fabric.slingshot.versions.ui | | | 2.0.2 | 5/6/2024 8:02 PM |
| 37 | ☐ fabric.slingshot.versions.web_server | | | not installed | 5/6/2024 8:02 PM |
| 38 | ☐ sat.showrev.host_os.Kernel | | | 5.14.21-150400.24.38.1.254... | 5/6/2024 8:02 PM |
| 39 | ☐ sat.showrev.host_os.SLES | | | SLE_HPC 15-SP4 | 5/6/2024 8:02 PM |
| 40 | ☐ sat.showrev.product_revision.cos | | | 2.5.120 | 5/6/2024 8:02 PM |
| 41 | ☐ sat.showrev.product_revision.cpe | | | 23.5.9 | 5/6/2024 8:02 PM |
| 42 | ☐ sat.showrev.product_revision.cray-sdu-rda | | | 2.3.2 | 5/6/2024 8:02 PM |
| 43 | ☐ sat.showrev.product_revision.csm | | | 1.4.1 | 5/6/2024 8:02 PM |
| 44 | ☐ sat.showrev.product_revision.csm-diags | | | 1.4.31 | 5/6/2024 8:02 PM |
| 45 | ☐ sat.showrev.product_revision.hfp | | | 23.5.1 | 5/6/2024 8:02 PM |
| 46 | ☐ sat.showrev.product_revision.HFP-firmware | | | 23.5.1 | 5/6/2024 8:02 PM |
| 47 | ☐ sat.showrev.product_revision.hpc-csm-software-recipe | | | 23.7.0 | 5/6/2024 8:02 PM |
| 48 | ☐ sat.showrev.product_revision.pbs | | | 1.2.11 | 5/6/2024 8:02 PM |
| 49 | ☐ sat.showrev.product_revision.sat | | | 2.5.17 | 5/6/2024 8:02 PM |
| 50 | ☐ sat.showrev.product_revision.sle-os-backports-sle-15-sp3-x86_64 | | | 23.5.22-20220805 | 5/6/2024 8:02 PM |

# Summary Report

– A human-readable overview of what was run and captured

```
==============================================================================
SDU Report for session 1714521601 on 2024-04-01T00:00:43Z
==============================================================================
+--------------------------------------------------------------+
|                          Collection                          |
+------------------+-------------------------------------------+
| component        | data                                      |
+------------------+-------------------------------------------+
| system_name      | Brook                                     |
| description      | HPE CSM A/C Training System "Brook"       |
| id               | 10011582-r6g08a                           |
| product_id       | r6g08a                                    |
| serial           | 10011582                                  |
| user_agent       | sdu/4.2.3 (linux; platform:csm; rv:4.2.3) |
| session_id       | 1714521601                                |
| start_time       | 2024-04-01T00:00:01.860660Z               |
| end_time         | 2024-04-01T00:00:42.380008Z               |
| Qualifiers       |                                           |
|  - channel       | default                                   |
|  - case_references |                                         |
|  - reason        | Cron-Daily                                |
|  - start_time    | None                                      |
|  - end_time      | None                                      |
+------------------+-------------------------------------------+

+------------------------------------------------------------------------------------------------+
|                                          Commands                                              |
+----------+-------------------------------------------------------------------------------------+
| node     | command                                                                           |
+----------+-------------------------------------------------------------------------------------+
| fmn      | fmctl get /fabric/available-agents -r                                             |
| fmn      | fmn-show-status --details                                                         |
| fmn      | fmn-show-version                                                                  |
| ncn-m001 | /usr/bin/sat --token-file /root/.config/sat/tmpztsc_q58.json showrev --all --format pretty |
| ncn-m001 | /usr/bin/sat --token-file /root/.config/sat/tmpztsc_q58.json showrev --all --format json   |
| ncn-m001 | /usr/bin/sat --token-file /root/.config/sat/tmpztsc_q58.json status --format pretty        |
| ncn-m001 | /usr/bin/sat --token-file /root/.config/sat/tmpztsc_q58.json status --format json          |
+----------+-------------------------------------------------------------------------------------+
```

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# Summary Report

– A human-readable overview of what was run and captured

– Asset Facts JSON file: `SfdcFactsXfer1_CsmFacts0.json`

```
+------------------------------------------------------------------+
|                              Files                               |
+------------------------------------------------------------------+
| Posix View Relative Path                                         |
+------------------------------------------------------------------+
| localhost/files/etcd_checks/etcd_checks.log                      |
| localhost/files/pyml/validated/CsmFacts0.yaml                    |
| localhost/files/pyml/validated/CsmFacts0.json                    |
| localhost/files/pyml/sfdc/validated/SfdcFactsXfer1-CsmFacts0.json |
+------------------------------------------------------------------+
+---------------------------------------+
|                Plugins                |
+---------------------------+-----------+
| name_space                | exit_code |
+---------------------------+-----------+
| etcd.checks               | 0         |
| obtain.api.gateway        | 0         |
| fmn.gather.info           | 0         |
| fmn.gather.availableagents | 0        |
| fmn.gather.status         | 0         |
| fmn.gather.version        | 0         |
| sat.showrev.output        | 0         |
| sat.status.output         | 0         |
+---------------------------+-----------+
==================================================================
End of Report
==================================================================
```

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# Opt-in 2: Local Collection + Secure Upload
# RDA Asynchronous File Transport (AFT)
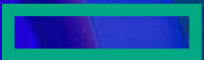
# Opt-in 2: Local Collect + Secure Upload

– **Local collection + RDA (upload to HPE)**

  – Same benefits as Local collections

  – Additional benefit: HPE engineers have the exact same POSIX view of the data

    – NOTE: This was a big learning from our SSA implementation

  – Leverages HPE world-class secure transport HPE Remote Device Access (RDA) Asynchronous File Transport (AFT)

    – Security Technical Paper

    – Heavy oversight with HPE Cybersecurity

    – This requires only a single OUTBOUND TCP 443 to https://midway.ext.hpe.com from within the SDU container

    – Proxy support

    – Geo-limiting configurations

  – Can be a global setting or ala cart secure upload

  – Enabled the ability to associate "Asset Facts" to a serial number in the HPE Case Management System

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# Local and Secure Upload
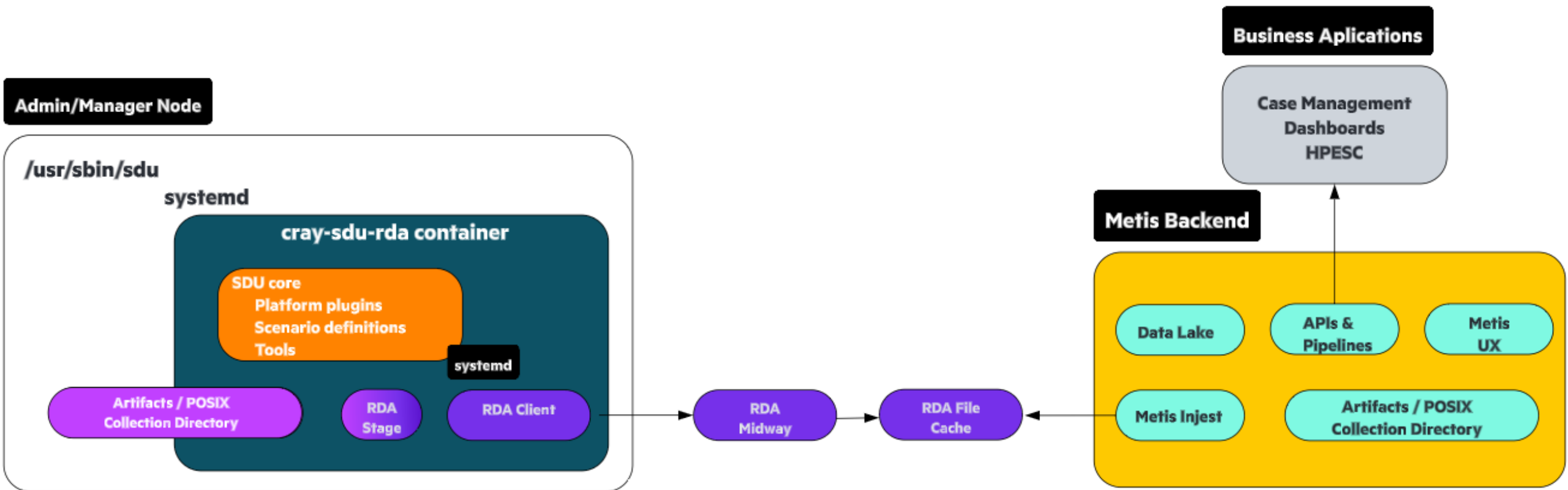
# Opt-in 3: Secure Remote Access
# RDA Interactive Device Access (IDA)
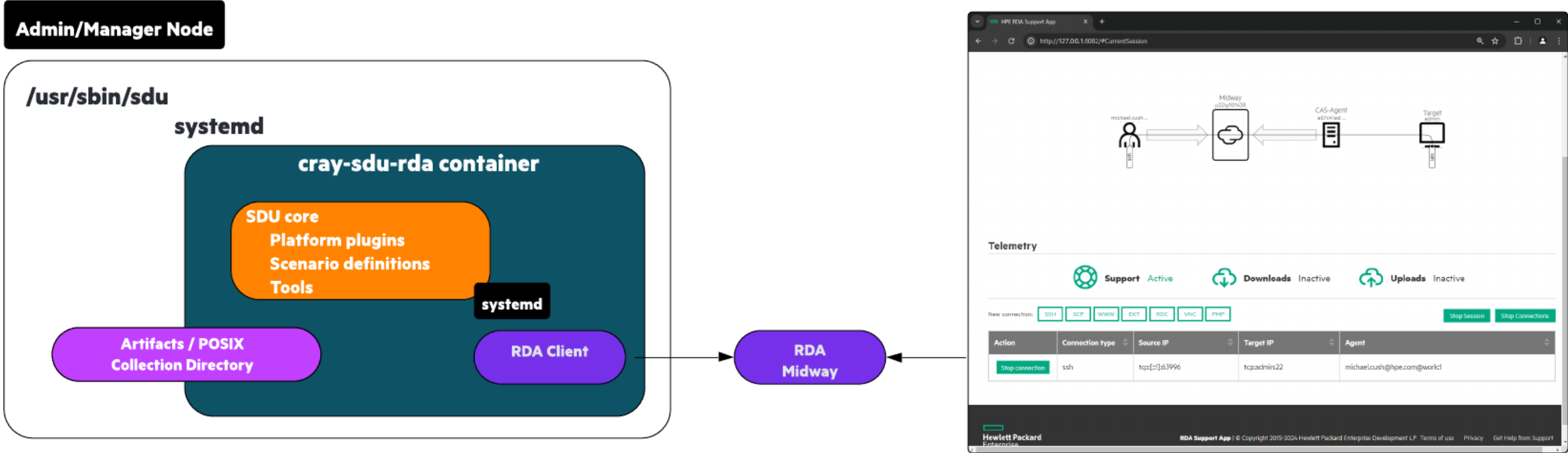
# Opt-in 3: Secure Remote Access

— **Secure Remote Access**

  – Leverages the HPE RDA feature: Interactive Device Access (IDA)

  – When you need an expert available immediately, virtually and securely

  – TCP/IP tunnel – this only requires OUTBOUND TCP 443 to https://midway.ext.hpe.com from within the SDU container

  – Proxy Support

  – There are NO inbound connections (tunnel)

  – 100% control of WHO, WHAT, WHEN this can be used

  – We use this in our own datacenters to provide access to employees who are offsite and are unable to use the VPN
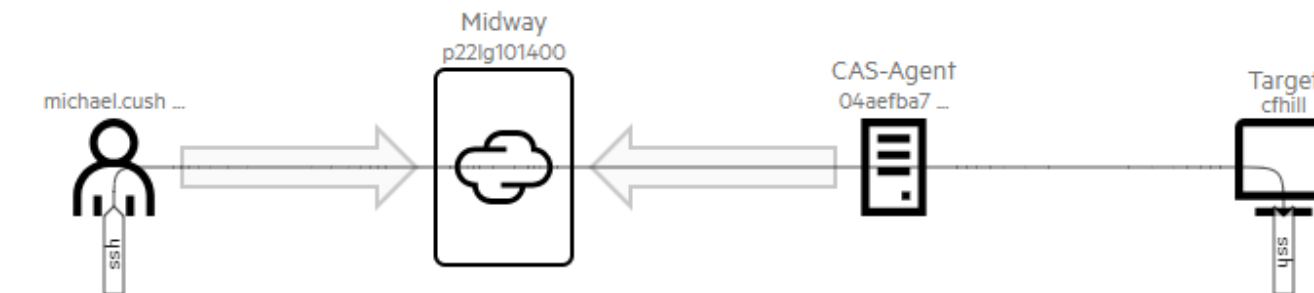


In order for HPE employee to establish this connection, they must be authenticated using their hardware token (YubiKey) and PIN.

# Secure Remote Access

# Why use IDA versus other remote access solutions

— **Secure Remote Access**

  — Customer has 100% control

  — No need to manage YubiKey / users

    — **WHEN** an HPE badged employee can connect (start/stop functionality on-demand)

    — **WHO** can connect via Access Control List (ACL)

      — Badged HPE employees and they must be members of the IDA group

        — This leverages two-factor authentication: X.509 hardware token and password (i.e. YubiKey) to connect to the midway

      — Named users

      — Groups of users

      — Layered service local auth (i.e. sshd)

    — If they leave HPE, their digital badges are immediately revoked (no user management required)

  — **WHAT** sort of connection (for instance, SSH to node x)

  — **WHAT** specifically a user can do

    — System tools can further restrict access to the system (for instance, sudo if you choose to give user accounts)

  — **VISIBILITY**

    — Connection start/end and failed connections are logged in /var/log/messages locally and in the RDA backend infrastructure

    — All activities can be logged using native Linux tools if individual user accounts are used

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# Is it safe?

- SDU
  - Pluggable architecture written in Python – you can inspect the code
  - Plugins and scenarios are "recipes" for troubleshooting
  - Delivered as a Podman OCI container and controlled via systemd to isolate it from other processes running on the system
  - Guardrails on load, plugin run-time, and storage used (live byte counter)
  - Support telemetry is *as needed information only* to support the system/resolve issues
  - 3 distinct levels of opt-in that the you have 100% control over
  - Our teams uses RDA/IDA to securely connect to our test and support systems inside of HPE – deep trust in the security
  - It is our policy to never capture PII
    - Local POSIX view allows you to view exactly what is being sent to HPE
  - It is our policy to never capture any data that is proprietary to our customers

# Questions? Need Help?

— chp-help@hpe.com

— Open HPE Support Center (HPESC) case requesting help or more information.

  — Direct your case to the HPC Call Home team by putting 'SDU Call Home' in the subject and/or description.

— This is a partnership, please open a case against your system and let us know if you have any RFEs, bugs or comments, e.g.:

  — Would it be possible to have SDU open the DCE case?

  — Can you create a scenario for DIMMs failures?

  — I need help configuring the ACL for remote access.

# Questions

# Thank you