



**Hewlett Packard**  
Enterprise

# **HTT – Hardware Triage Tool**

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## HTT – Hardware Triage Tool Overview

- Incorporates lessons learned from deployments across the world
- The hardware triage tool:
  - Checks for different failure signatures
  - Provides hardware actions and RMA codes (If applicable)
  - Builds a detailed support bundle even if it can't provide a diagnosis
- Current State
  - Can diagnose problems on several hardware programs
    - EX235a, EX255a, EX254n, EX4252, EX425, and the EX235n blades
  - Being utilized in EMEA, the Americas, and APAC
  - Product level solution
  - Tests for new hardware programs are being developed early in the product lifecycle



## Hardware Triage Tool – What's in a name?

- What it is and it is not
- Administrators can run HTT to diagnose failures, for example if a compute node:

Fails to power on

Powers on but fails  
to boot (stuck at  
UEFI shell)

Boots but fails  
health checks

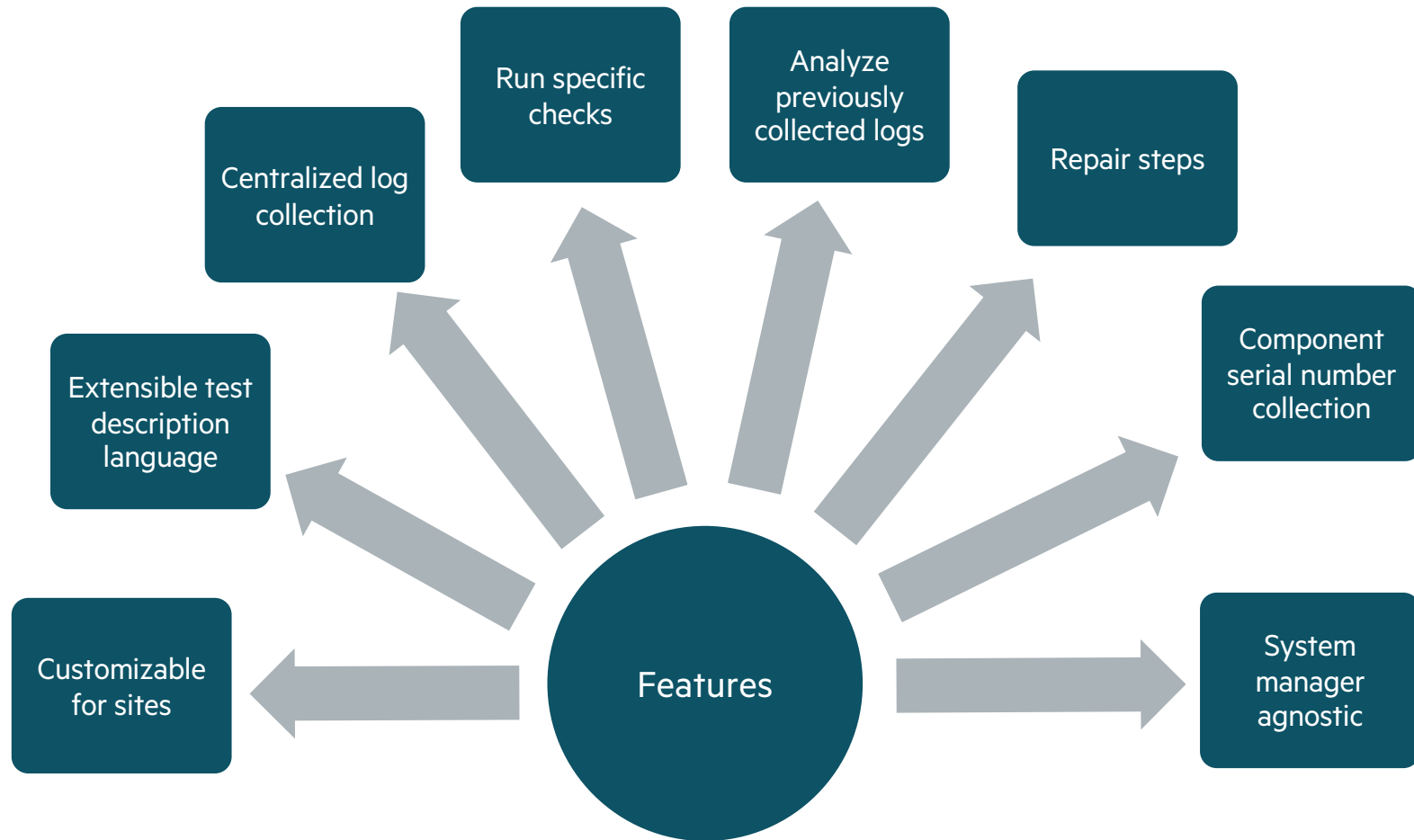
Unexpectedly  
reboots

Unexpectedly  
powers down  
(Emergency Power  
Down)

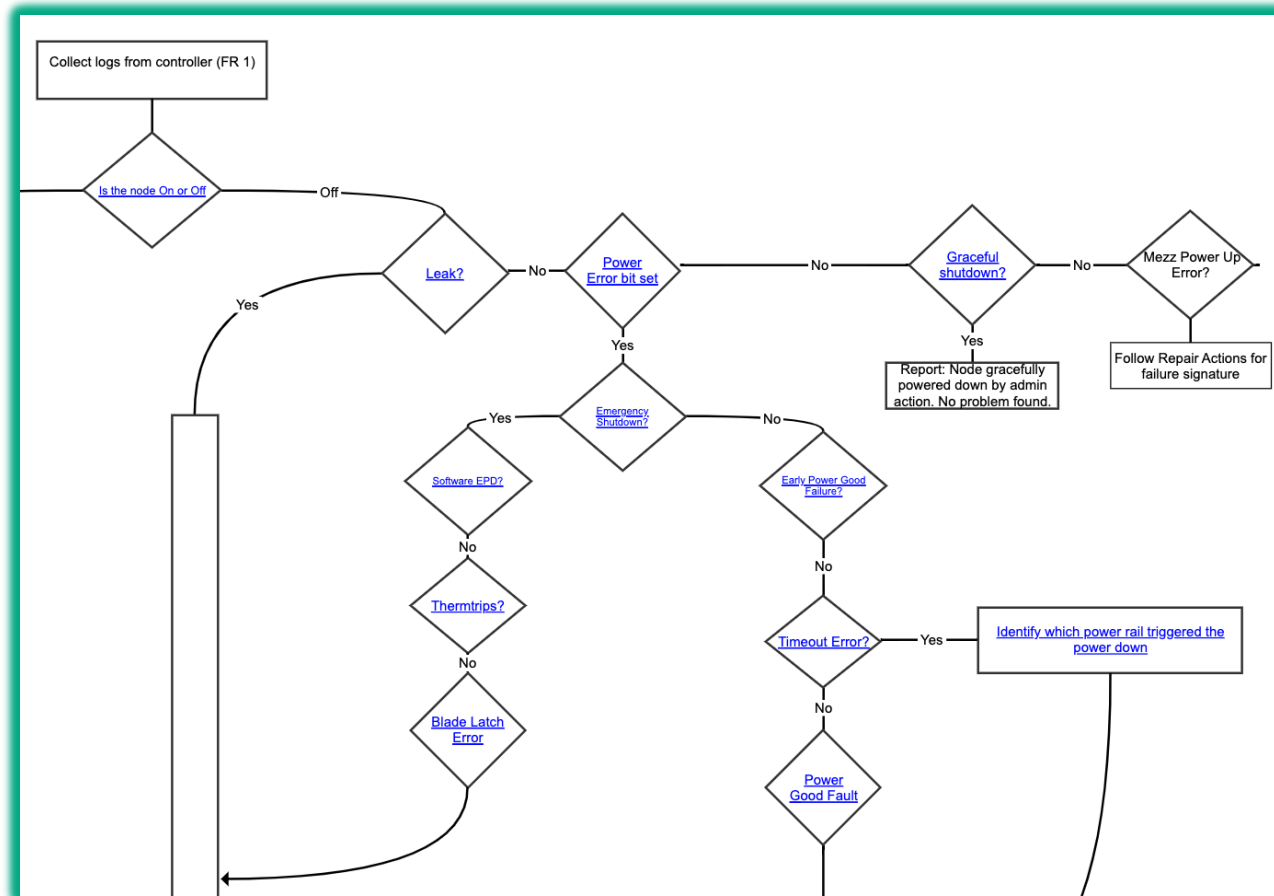
Becomes  
unresponsive during  
a job but didn't  
power off



## Hardware Triage Tool Features



# Defining Test Workflows



MezzError:

```
custom_script: check_mezz_error.py
custom_script_value_yes: "0"
custom_script_args: log_path
yes_condition:
  action: |
    - swap NMC0-NMC1
    - swap risers to see if it follows the mezz
no_condition:
  action: None
go_to: Dracut_shell
```

## A Closer Look at the Test Description Language

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Graceful Power Down:

```
exec_statement: 'cat $logpath/power_down_req '
exec_statement_value_yes: "1"
yes_condition:
  action: Graceful shutdown happened
no_condition:
  go_to: MezzError
```

Power CAP Check:

```
input_json: powerfault_epd.Node$n.nfpga.json
key1:
  input: '["Registers","R_NFPGA_GPNC_N$n_PWR_CSR_CAP","Val"] '
  value:
    value_no: "0x0"
yes_condition:
  go_to: PowerError
no_condition:
  go_to: Emergency Shutdown
```

## Defining Test Workflows

```
Power CAP Check:
input_json: powerfault_epd.Node$n.nfpga.json
key1:
  input: '["Registers","R_NFPGA_GPNC_N$n_PWR_CSR_CAP","Val"]'
  value:
    value_no: "0x0"
yes_condition:
  go_to: PowerError
no_condition:
  go_to: Emergency Shutdown
```

```
Emergency Shutdown:
input_json: powerfault_epd.Node$n.nfpga.json
key1:
  input: '["Registers","R_NFPGA_GPNC_N$n_PWR_CSR_CAP","Bits","emergency_shutdown"],["Registers","R_NFPGA_GPNC_N$n_PWR_CSR","Bits","emergency_shutdown"]'
  value:
    value_yes: "0x1"
yes_condition:
  go_to: SoftwareEPD
no_condition:
  go_to: EarlyPowerGoodFailure
```

# Hardware Triage Tool – Command Line Arguments

- `/opt/clmgr/hardware-triage-tool/hwtriage -h`

```
-h, --help          show this help message and exit
-r, --revision      Show the revision and exit.
-n NODE_NAME, --node-name NODE_NAME
                    Enter the node name to perform the checks
-u USERNAME, --username USERNAME
                    Username to access node controller and the redfish
                    calls
-p PASSWORD, --password PASSWORD
                    Password to access node controller and redfish calls
-l LOGPATH, --logpath LOGPATH
                    Provide the full log path to perform the checks
-ns {On,Off}, --node-state {On,Off}
                    Provide the node power state
-hw {ex235a,ex255a,ex254n,ex4252,ex425,ex235n}, --hardware {ex235a,ex255a,ex254n,ex4252,ex425,ex235n}
                    Provide the node hardware type
-ls, --list-stages  To list stages in a yaml file
-bs BEGIN_STAGE, --begin-stage BEGIN_STAGE
                    Enter the stage name from where the check will start
-rs RUN_STAGE, --run-stage RUN_STAGE
                    To run only one stage from yaml file
-f INPUT_YAML, --input-yaml INPUT_YAML
                    To pass an input config yaml file as input
-hy HARDWARE_YAML, --hardware-yaml HARDWARE_YAML
                    To pass a hardware config yaml file as input
-sn, --show-serial-number
                    To display the serial number info with the triage
                    result
-sno, --serial-number-only
                    Collect the serial numbers into a file without
                    triaging
-k SSH_KEY, --ssh-key SSH_KEY
                    Ssh key to enable passwordless ssh
-t TIMEOUT, --timeout TIMEOUT
                    Timeout duration for collecting logs in seconds,
                    default=120
-v, --verbose       To have a verbose output
-cpath CUSTOM_LOG_PATH, --custom-log-path CUSTOM_LOG_PATH
                    Provide the custom log path to store the triage logs
                    in the case to override the default log path
```



## Defining Hardware Configuration

- The hardware.yml file defines all supported hardware platforms
- Located at `/opt/clmgr/hardware-triage-tool/hardware.yml`

```
hardware_family:
- name: "ex235a"
  attributes:
    hardware:
      workflow_on: "workflows/workflow_EX235a_on.yml"
      workflow_off: "workflows/workflow_EX235a_off.yml"
      number_of_nics: "4"
      firmware_version: "1.5.41-ESM"
      nic_speed: "BS_200G"
      pci_speed: "16.0 GT/s PCIe"
      pci_width: "16"
      link_speed: "16.0 GT/s PCIe"
      link_width: "16"
      esm_link_speed: "25.0 GT/s"
      BIOSVER: "1.6.2"
      BIOSREV: "5.21"
      CPUONLINE: "0-127"
      mem_manufacture: "1"
      DIMM_sizes: "1"
      DIMM_speed: "1"
      DIMM_count: "8"
```

## Hardware Triage Tool Usage

- Installation on the admin node (HPCM) or ncn-m001 (CSM)
- HTT is invoked via the `hwtrriage` command
  - `hwtrriage -u root -p [REDACTED] -n x9000c3s5b0n1`

Log collection completed

logging path : /opt/clmgr/hardware-triage-  
tool/logs/x9000c3s5b0n1.2023.09.19.13.23/x9000c3s5b0

EX4252 Hardware is supported!

Triaging :x9000c3s5b0n1 ⋮

Node is in Off state

Analysis file : /opt/clmgr/hardware-triage-  
tool/logs/x9000c3s5b0n1.2023.09.19.13.23/x9000c3s5b0/triage\_output.json

Serial Numbers information : /opt/clmgr/hardware-triage-  
tool/logs/x9000c3s5b0n1.2023.09.19.13.23/x9000c3s5b0/serial\_numbers.txt

Triaging :x9000c3s5b0n1 ⋮ Stage analysis : PowerError Detected!

Stage analysis : Emergency Shutdown Detected!

Stage analysis : BladeLatch Detected!

Recommended action : First check to make sure latch is closed, if it isn't then close the latch, if  
problem resurfaces over time, replace the latch

Triage completed!

# Demo



# Questions



# Thank you!



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