

LINUX CLUSTER MONITOR

- Two Years' Progress Review -

HPC & AI Team

June 2nd 2022

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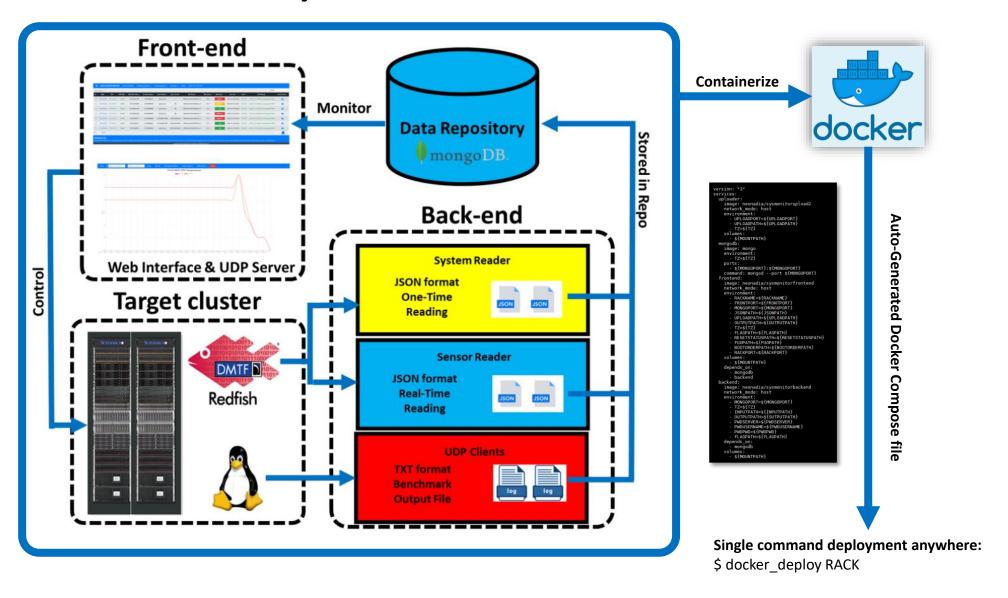
Outline



- ☐ System architecture
- ☐ Latest updates overview
- ☐ Advanced features
- ☐ Sensor reading features
- ☐ Cluster report generator
- ☐ Quick deployment steps

System Architecture





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Latest Updates Overview



Front-end:

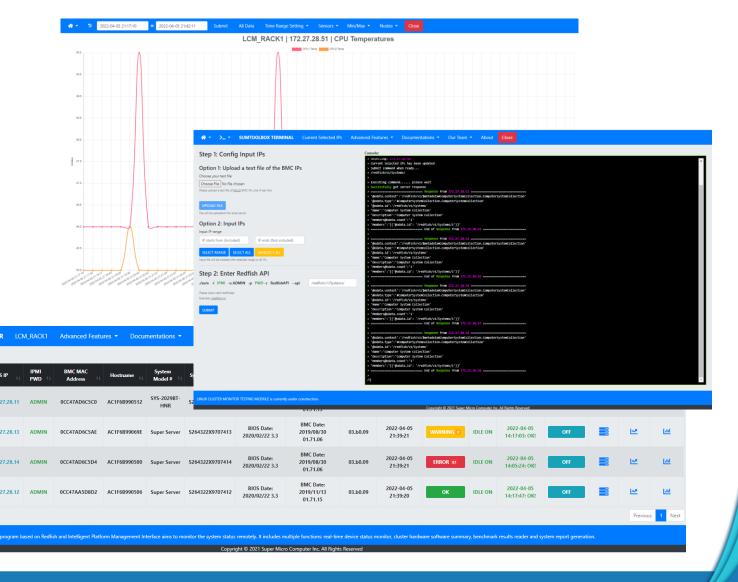
- 1. Asynchronous web page.
- 2. Real-time rack level administration tools.
- 3. More advanced features.
- 4. New cluster report.
- 5. User friendly UI design.

Back-end:

- 1. Multiple APIs: Redfish, IPMI and SUM.
- 2. Performance optimization.
- 3. Better benchmark support.
- 4. Archive module.

Deployment:

- 1. Automatic deployment.
- 2. Input file auto generating.
- 3. Health check and autoheal.



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Home Page: Rack View



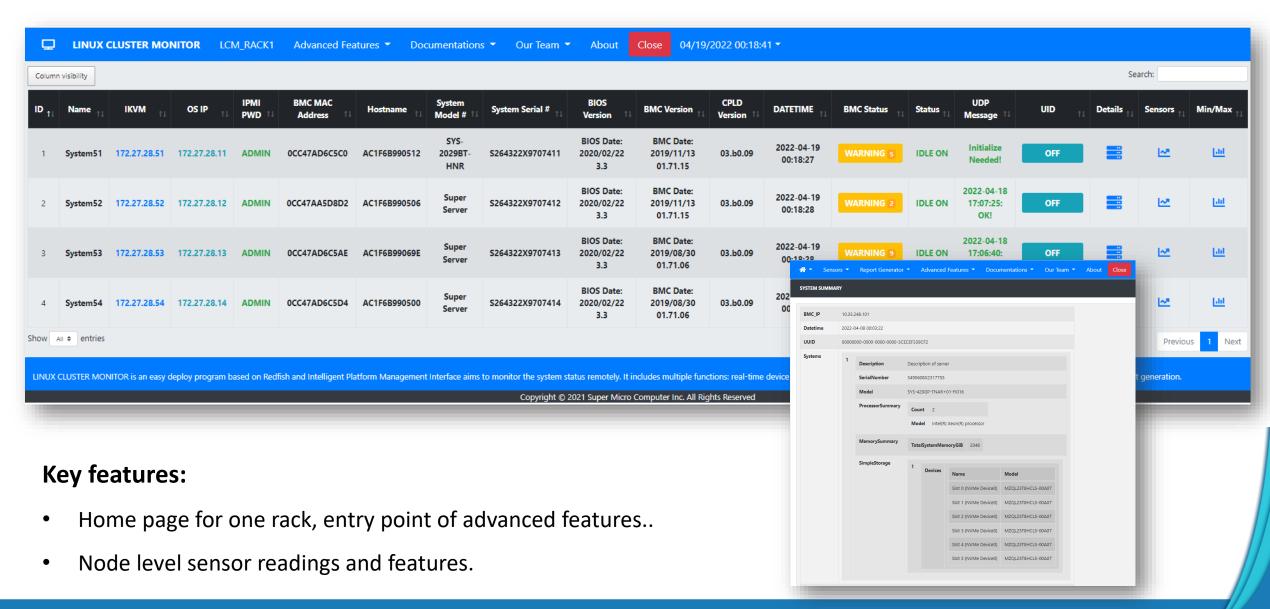
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CK) 11	RACK NAME	NODES †1	START DATE	LAST DATE	TIME ELAPSED 11	IPMI RANGE	BMC EVENTS	POWER †↓	TEMP †	FAN †↓	MIN/MAX $_{\uparrow\downarrow}$	IPMI AUTH [†]	REPORT 1	SUM †1	IPMITOOL 11	SENSOR COUNT	UDP †1	DETAIL
1	N1-rack1-mapping_SSG-6029P- E1CR24L	11	2021-08-27 11:56:52	2021-08-30 10:09:03	2 days, 22:12:11	192.168.8.237 - 192.168.13.30	ок	⋈	₩.	₩.	<u>[ad</u>	(SV	ß	<u>&</u>	&	¥≣	&	
2	N2-rack1-mapping_SYS-1029P- WTRT	5	2021-08-27 11:57:03	2021-08-30 10:08:25	2 days, 22:11:22	192.168.8.205 - 192.168.13.22	ок	<u>~</u>	₩.	<u>~</u>	<u>[ad</u>	csv	ß	&	&	扫	&	====
3	N3-rack1-mapping_SYS-1019P- WTR	5	2021-08-27 11:56:57	2021-08-30 10:08:50	2 days, 22:11:53	192.168.9.2 - 192.168.14.9	ок	<u>~</u>	₩.	<u>~</u>	<u>[ad</u>	csv	ß	&	a	Æ	A	11
4	N4-rack1-mapping_SYS-6029U- E1CRT	2	2021-08-27 11:57:08	2021-08-30 10:08:56	2 days, 22:11:48	192.168.9.59 - 192.168.9.253	ОК	<u>~</u>	<u>~</u>	<u>~</u>	<u>Lad</u>	csv	ß	&	&	≆	&	10
5	N5-rack10-mapping-new_SYS- 2029BT-HNC0R	36	2021-08-26 16:22:13	2021-09-01 09:28:02	5 days, 17:05:49	192.168.0.24 - 192.168.15.248	2 Errors 34 Warnings	<u>~</u>	<u>₩</u>	<u>~</u>	<u>Lad</u>	csv	ß	&	&	≆	&	11
6	N6-rack10-mapping-new_SYS- 4029GP-TRT	2	2021-08-26 16:21:56	2021-09-01 09:28:36	5 days, 17:06:40	192.168.0.163 - 192.168.14.149	2 Warnings	₩.	<u>₩</u>	₩.	[aid	CSV CSV	ß	盎	&	¥≡	&	11
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- Home page for everything, each row represent a single rack.
- Rack level sensor readings and features.



Home Page: Node View





Outline



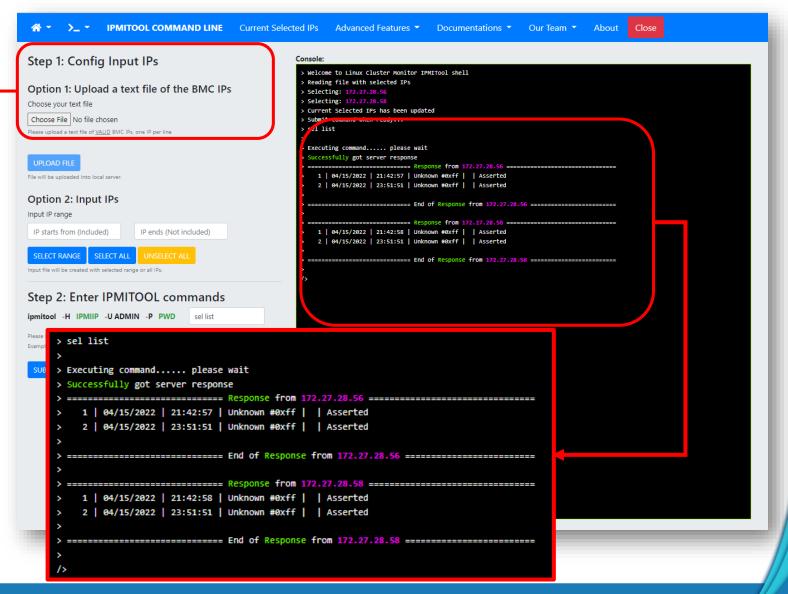
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IPMI COMMAND LINE



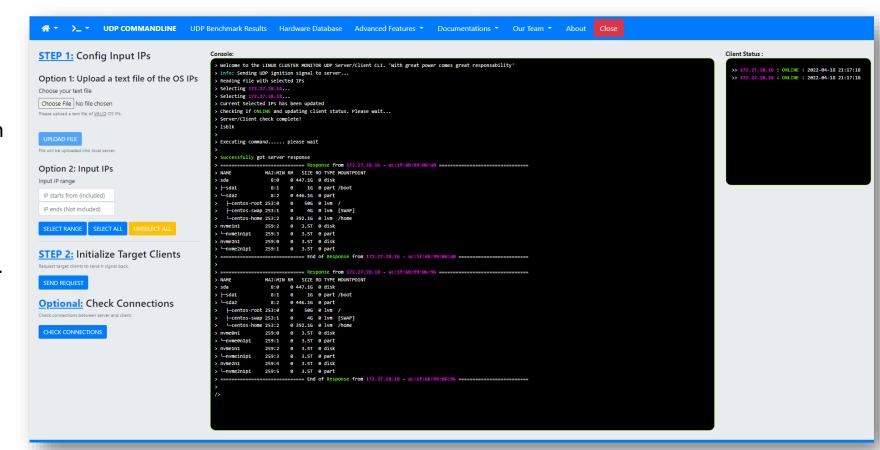
- Ease to execute ipmi commands
- A top down message is generated with the results from your nodes.
- Select your nodes with a text file, manually input range.
- User and Password must be correct on deployment of Linux Cluster Monitor.

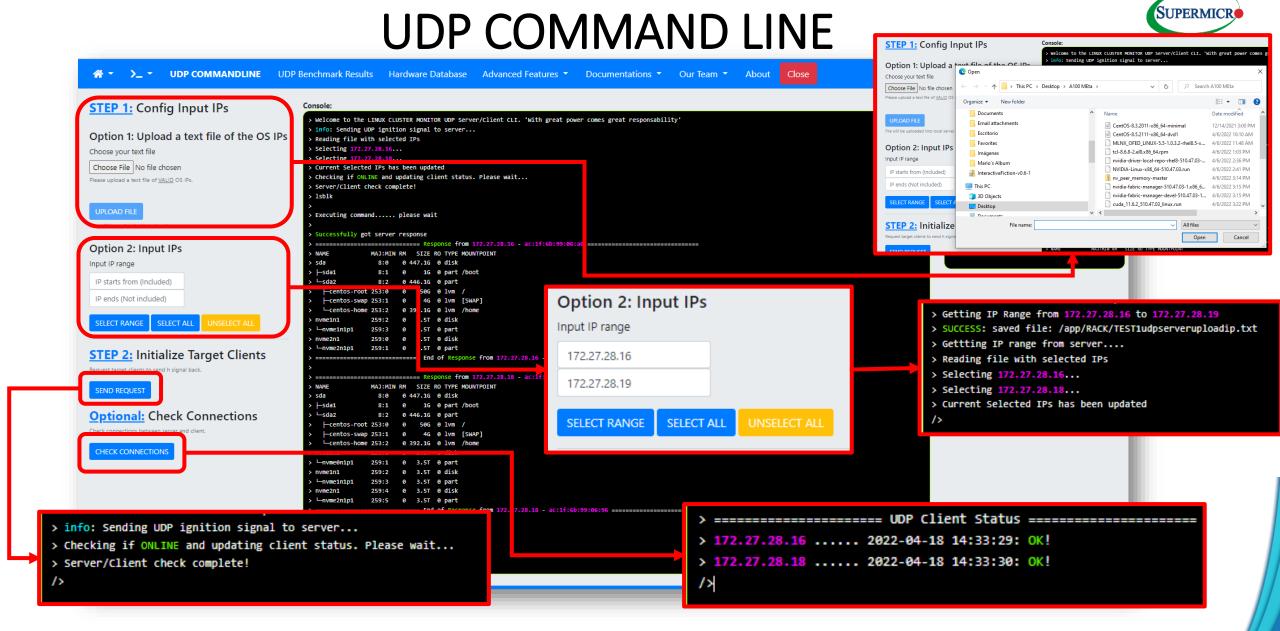




UDP COMMAND LINE

- Run bash commands through UDP.
- UDP server will initialize the clients in your cluster on page request.
- UDP clients must be installed and initialized on your cluster by the user.
- CLI gives constant feedback.
- Connection check between client/server.

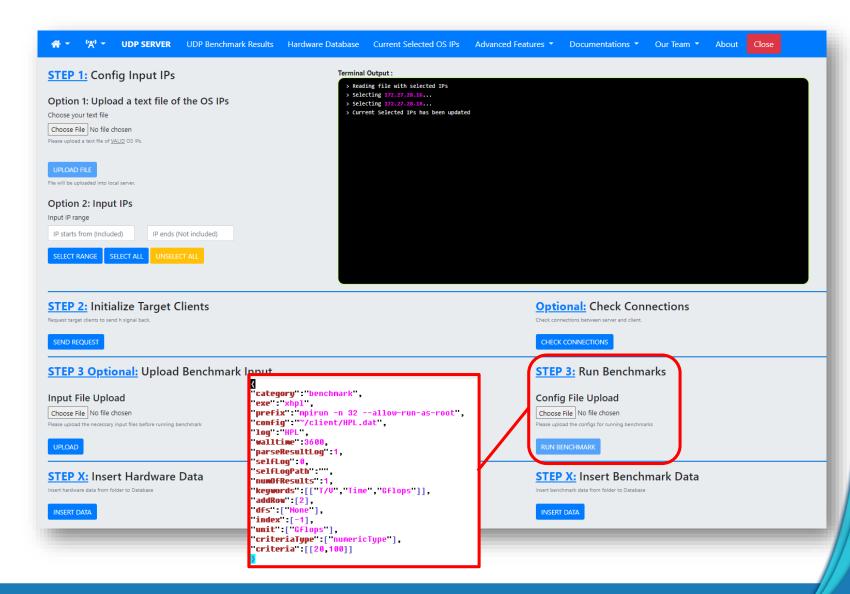






UDP SERVER CONTROLLER

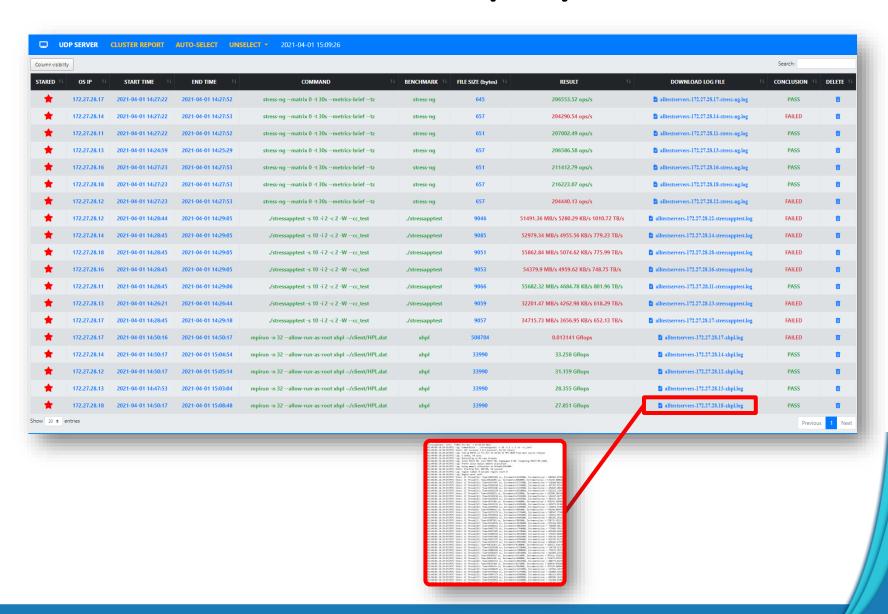
- All benchmarks supported.
- Config file needed for each benchmark.
- Benchmark results will be saved to database once done.
- Allows user to load hardware data from your cluster
- Allows user to load benchmark data into the database for parsing.
- Real-time terminal output to show the running status.



UDP Benchmark Results Display

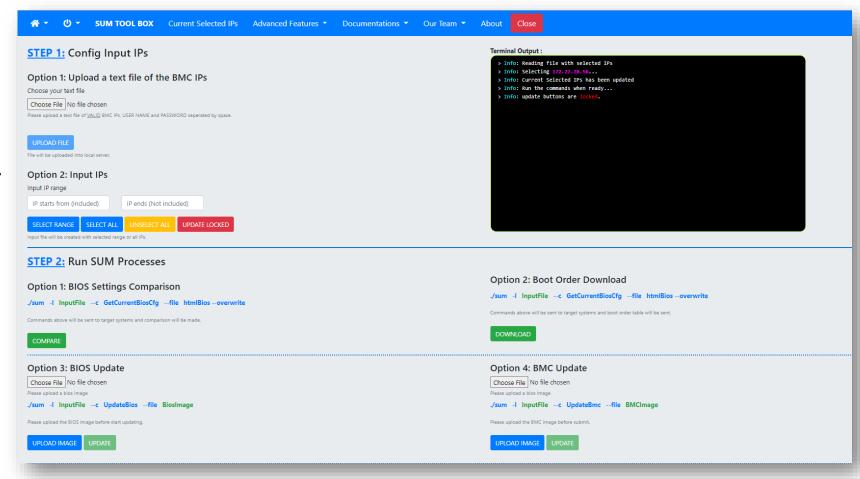


- Benchmark results are stored in database.
- Automatically fetch key results from output file.
- Automatically verify the performance.
- Start and end time of the benchmark.
- Benchmark type and runtime command.
- Cluster report generator.



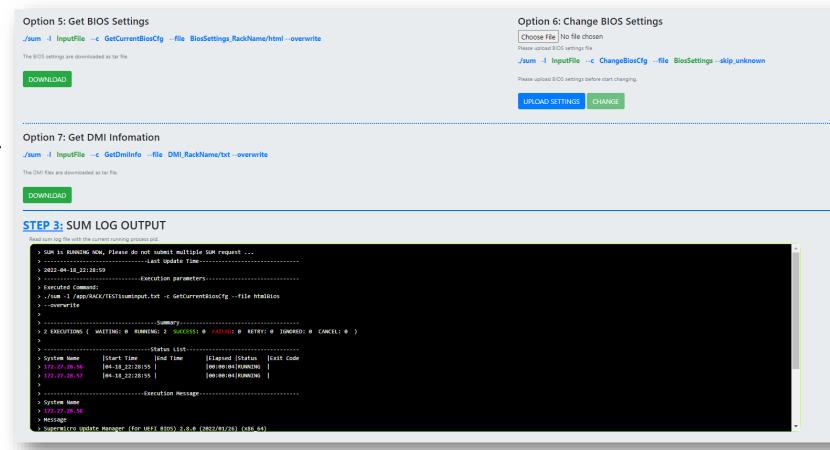


- Update BIOS.
- Update BMC firmware.
- Get BIOS settings for all nodes.
- Compare BIOS settings.
- Change BIOS settings
- Download boot order.
- Get DMI information.
- Show SUM running status.

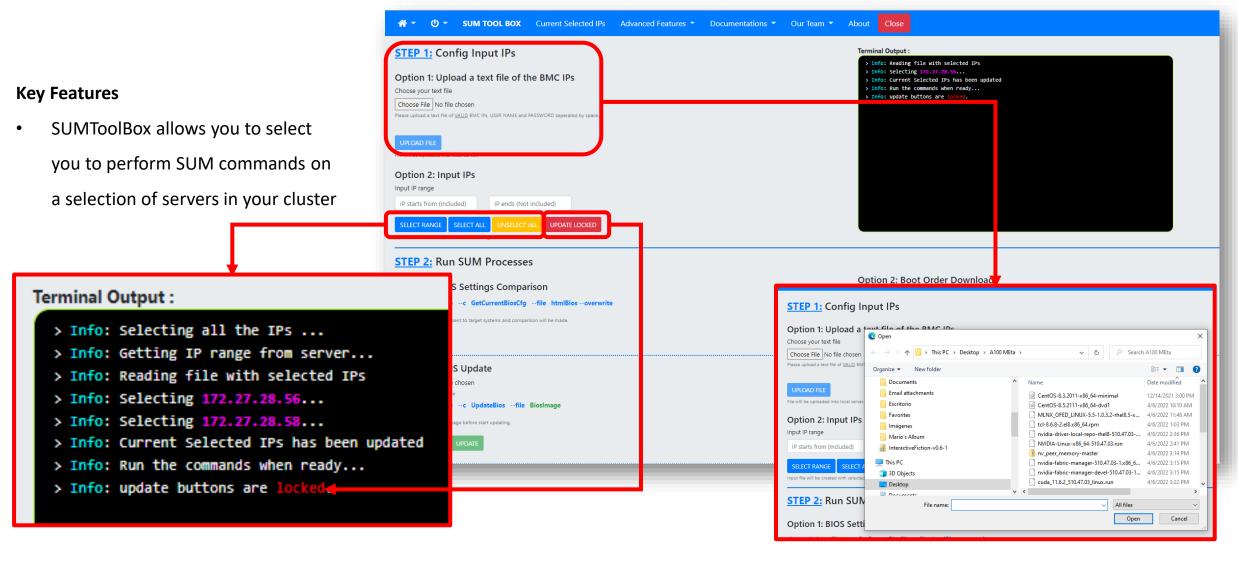




- Update BIOS.
- Update BMC firmware.
- Get BIOS settings for all nodes.
- Compare BIOS settings.
- Change BIOS settings
- Download boot order.
- Get DMI information.
- Show SUM LOG OUTPUT



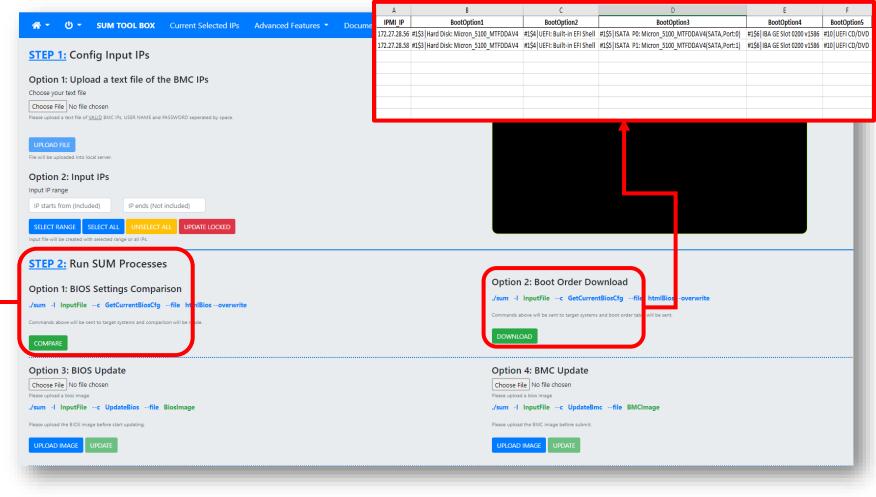






- BIOS Settings Comparison
- Boot Order Download

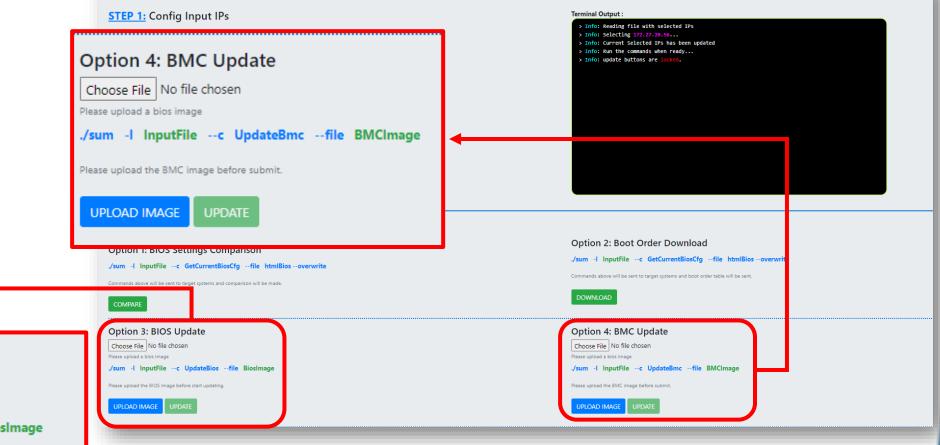




** U * SUM TOOL BOX Current Selected IPs Advanced Features * Documentations * Our Team * About Close



- BIOS update for multiple nodes
- BMC (IPMI firmware) update for multiple nodes
- Terminal to track the updating process.





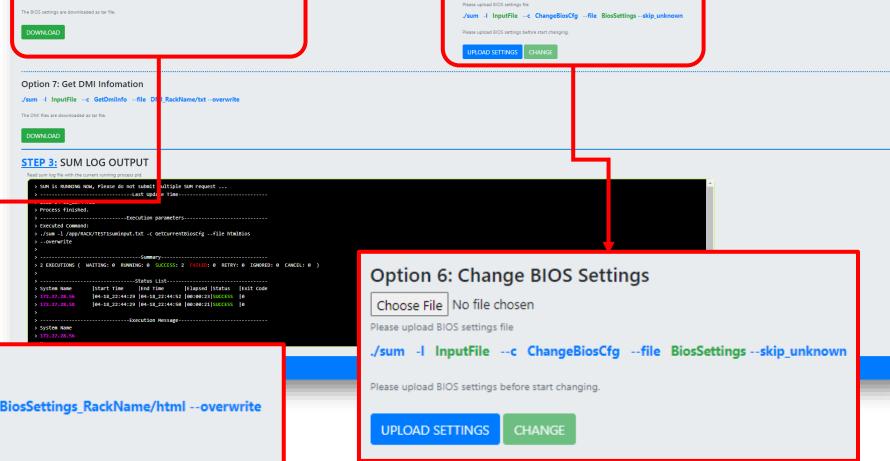
Option 5: Get BIOS Settings

/sum -I InputFile --c GetCurrentBiosCfg --file BiosSettings_RackName/html --overwrite



Key Features

- Get BIOS Settings and dump to html file.
- Change BIOS Settings by using html file.
- Terminal output to track.



Option 6: Change BIOS Settings

Choose File No file chosen

Option 5: Get BIOS Settings

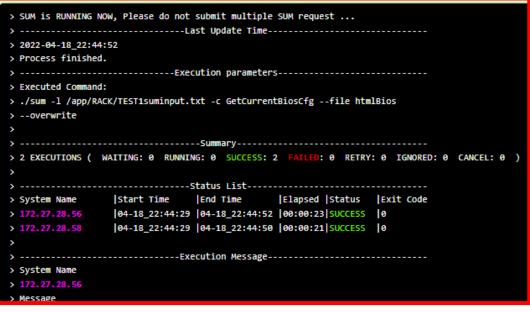
./sum -I InputFile --c GetCurrentBiosCfg --file BiosSettings_RackName/html --overwrite

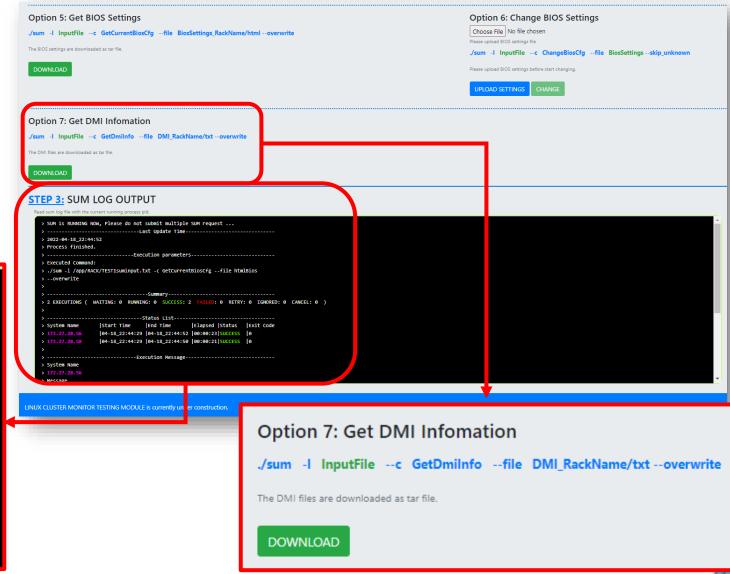
The BIOS settings are downloaded as tar file.

DOWNLOAD



- Get DMI Information
- SUM LOG OUTPUT







Key Features

/redfish/v1/Chassis

Executing command..... please wait

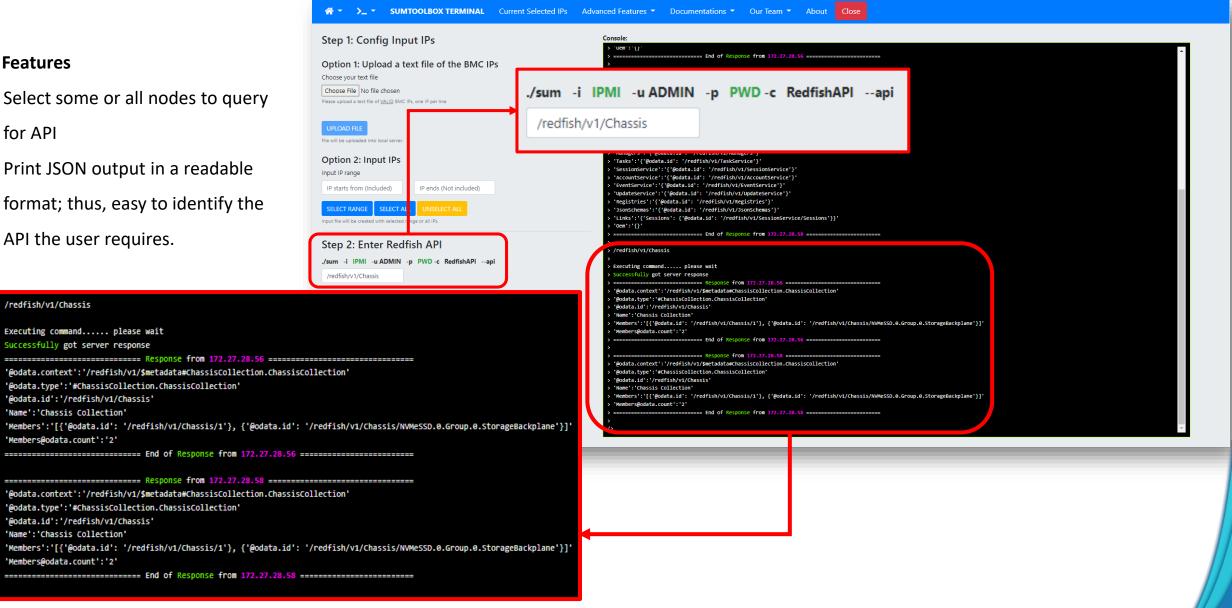
Successfully got server response

'@odata.id':'/redfish/v1/Chassis' 'Name':'Chassis Collection'

'Members@odata.count':'2'

'Members@odata.count':'2'

- Select some or all nodes to query for API
- Print JSON output in a readable format; thus, easy to identify the API the user requires.

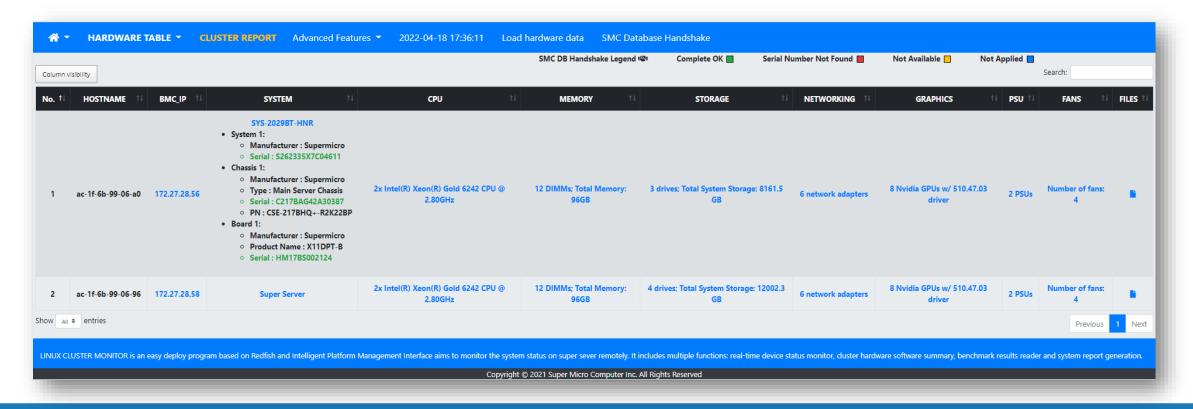


'@odata.id':'/redfish/v1/Chassis' 'Name':'Chassis Collection'

Rack Hardware viewer



- Parse through your hardware log for you cluster
- Create detailed table to show all the components and serial numbers.
- Handshake your MongoDB serial numbers w/ those from the SMC DB. SMC DB is provided as a .txt file corresponding to each system.
- Add your hardware data to an auto generated PDF Report.



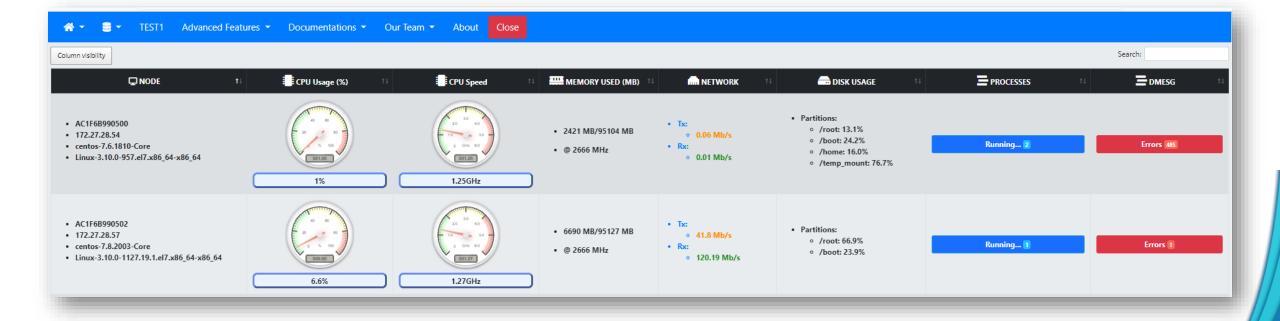
Cluster Telemetry



View server real-time metrics

- CPU Usage and Speed
- Partition usage
- Processes
- DMESG error capture
- Memory Usage

- Node kernel and Operating System
- Server Network Rx and Tx, with individualized NIC traffic mapped.



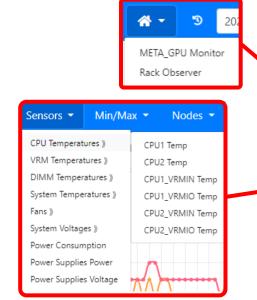
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Real-Time Sensor Readings





Key features:

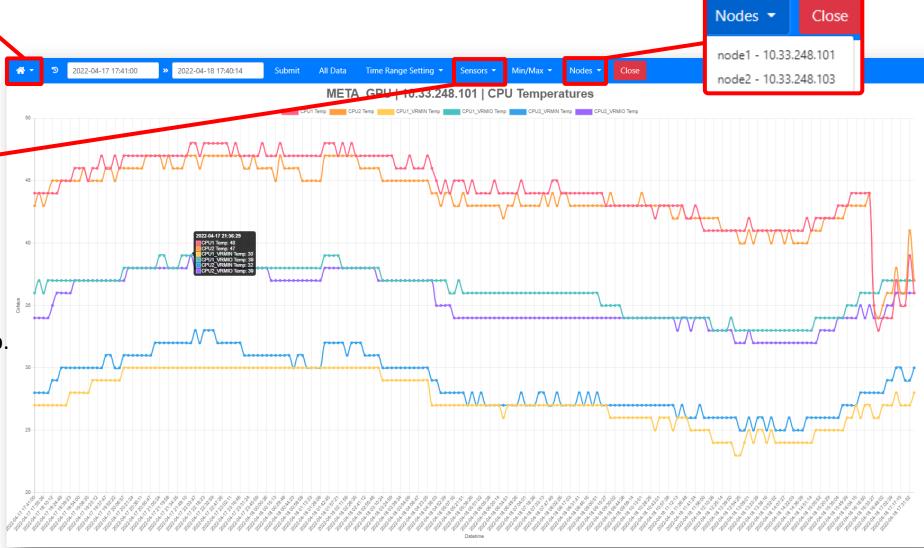
Line plots with timestamp.

Node selection.

Sensor selection.

New navigation button.

• Datetime backtracking.

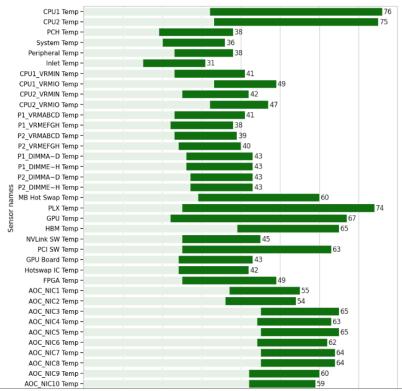


Supports power, temperature, voltage and fan speed.

Minimum/Maximum Sensor Readings







SENSOR NAME	MIN READING	MIN DATETIME	MAX READING	MAX DATETIME	AVG READING	NUM COUNT	NA COUNT
CPU1 Temp	32	2022-04-12 17:54:28	76	2022-04-11 22:22:39	46.2115	14653	164
CPU2 Temp	33	2022-04-13 16:33:13	75	2022-04-11 22:24:44	47.0535	14653	164
PCH Temp	19	2022-04-18 12:37:45	38	2022-04-08 00:27:23	25.716	14653	164
System Temp	20	2022-04-12 11:22:09	36	2022-04-08 00:08:38	25.569	14653	164
Peripheral Temp	23	2022-04-18 12:39:50	38	2022-04-08 00:07:35	29.2717	14653	164
Inlet Temp	15	2022-04-12 14:29:59	31	2022-04-08 00:05:29	20.8381	14653	164
CPU1_VRMIN Temp	23	2022-04-18 12:45:03	41	2022-04-11 19:43:04	30.3646	14653	164
CPU1_VRMIO Temp	33	2022-04-17 13:46:19	49	2022-04-08 00:03:24	38.9616	14653	164
CPU2_VRMIN Temp	25	2022-04-18 12:44:00	42	2022-04-11 21:27:21	31.7611	14653	164
CPU2_VRMIO Temp	32	2022-04-18 12:40:53	47	2022-04-08 00:07:35	37.9329	14653	164
P1_VRMABCD Temp	23	2022-04-18 12:41:55	41	2022-04-08 00:09:40	29.9841	14653	164
P1_VRMEFGH Temp	22	2022-04-18 12:41:55	38	2022-04-08 00:03:24	28.8001	14653	164
P2_VRMABCD Temp	23	2022-04-18 12:44:00	39	2022-04-08 00:03:24	29.8514	14653	164
P2_VRMEFGH Temp	24	2022-04-18 12:44:00	40	2022-04-08 00:24:15	30.0016	14653	164
P1_DIMMA~D Temp	26	2022-04-18 12:08:33	43	2022-04-08 00:06:33	32.5856	14653	164
P1_DIMME~H Temp	26	2022-04-18 12:50:15	43	2022-04-08 00:07:35	33.251	14653	164
P2_DIMMA~D Temp	27	2022-04-18 12:57:33	43	2022-04-08 00:03:24	34.0354	14653	164
P2_DIMME~H Temp	27	2022-04-13 14:22:51	43	2022-04-08 00:16:58	32.8862	14653	164
MB Hot Swap Temp	29	2022-04-18 12:49:12	60	2022-04-11 22:12:13	37.4129	14653	164
PLX Temp	25	2022-04-12 19:14:29	74	2022-04-12 17:51:20	57.1058	14653	164

- Bar plots with maximum and minimum readings.
- Table with numerical data and timestamp.
- Quick jump to the Real-Time sensor page with peak reading time period.
- Supports power, temperature, voltage and fan speed.
- LCM elapsed time and number recorded readings.

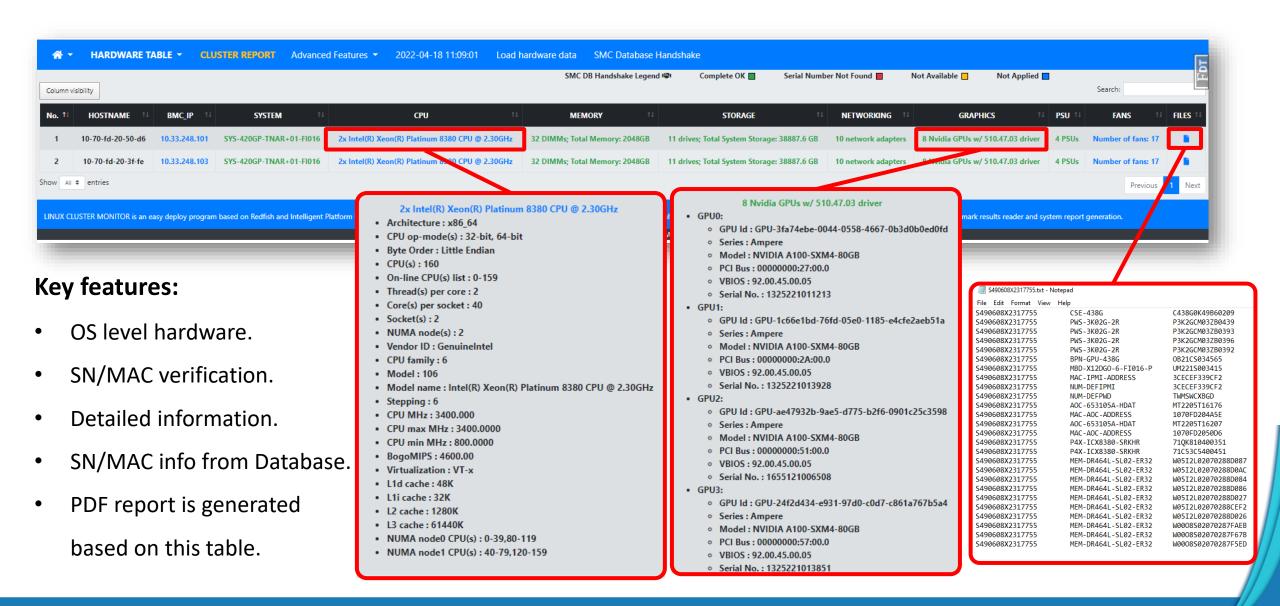
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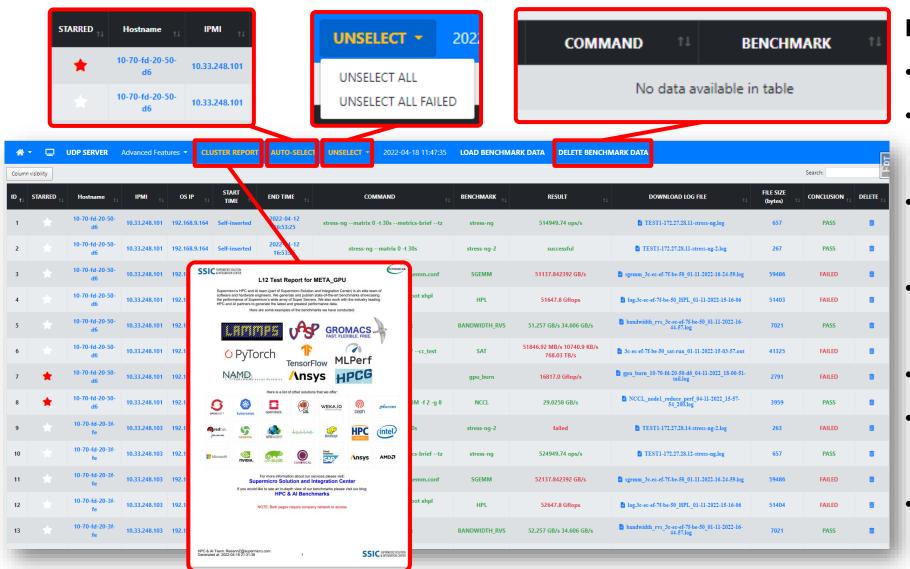
OS Level Hardware Information





Benchmark Results Table





- Datetime of benchmark result.
- Benchmark conclusion: Pass or Failed.
- Benchmark running commands.
- Hostname and IPMI IP of benchmark node.
- Download log files.
- Select proper results for the report.
- Results management.

Auto-Generated L12 Testing Report



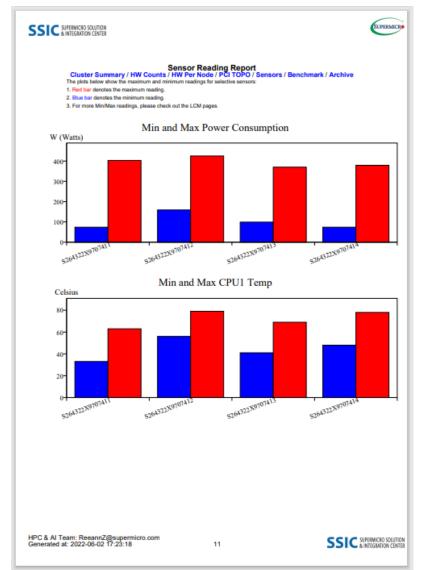


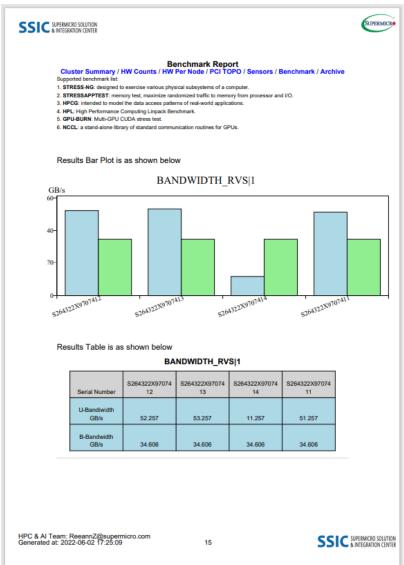


- Hardware information per node.
- Model name and quantity.
- Serial numbers and MAC addresses.
- A list of benchmarks we supported.
- Title page with introduction.
- Links to team's website.

Auto-Generated L12 Testing Report



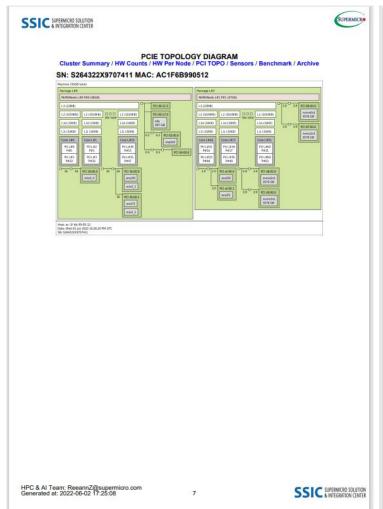




- Selected Min/Max sensor readings.
- Selected benchmark results.
- Each node is identified by serial number.
- Benchmark results have both table and charts.
- Currently support 6 kinds of benchmarks.
- Scalable for future benchmarks.

Auto-Generated L12 Testing Report







- Topology of all PCIE buses.
- Each table represent one node.
- Serial number and Model name for every component.
- Mac address for some of the components.
- FW for GPU, NIC and DISK.
- All the information is obtained from OS level or SMCIPMITool.

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Quick Deployment Steps



1. Install Docker, Docker-compose and ncat:

I. Docker: https://docs.docker.com/engine/install/centos/

II. Docker-compose: https://docs.docker.com/compose/install/

III. Ncat: \$ yum install nmap-ncat.x86_64

IV. Build necessary images, for the source code please visit our git server:

http://172.27.21.102:3000/ChenyangL/LinuxClusterMonitor

2. Bash shell script for deployment:

Following the link below and download the latest starting script: "docker deploy.sh"

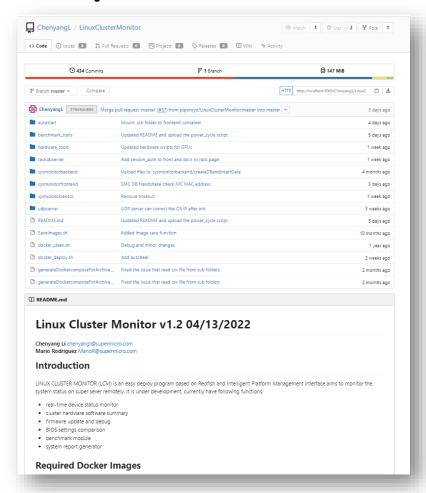
http://172.27.21.102:3000/ChenyangL/LinuxClusterMonitor

3. Create input files and start deployment:

- I. Create a folder for input files.
- II. Copy ".csv" files into folders.
- III. Create an "auto.env" file, visit our git server for more details.
- IV. Run: \$./docker_deploy.sh FOLDERNAME

4. Healthcheck and auto-heal:

- I. Healthcheck functions has been implemented to frontend pages and sensor reading module to monitoring the healthy status.
- II. If container is not healthy, it will be restarted. (auto-heal).
- III. To disable the auto-heal, simply stop the 'autoheal' container.





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