

trinityX
by ClusterVision



ClusterVision in a nutshell



Turn-key AI, HPC, Big
Data & Cloud solution
provider

20 YRS

Leading SME
specialist for HPC



PacificTeck
HPC and AI Experts

Partnership with
PacificTeck for the
Japanese market

800+

Projects
successfully
completed



Developer of TrinityX,
The open source
cluster manager

20+

Top500 HPC
Installations
historically

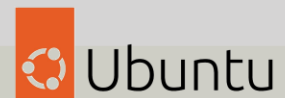




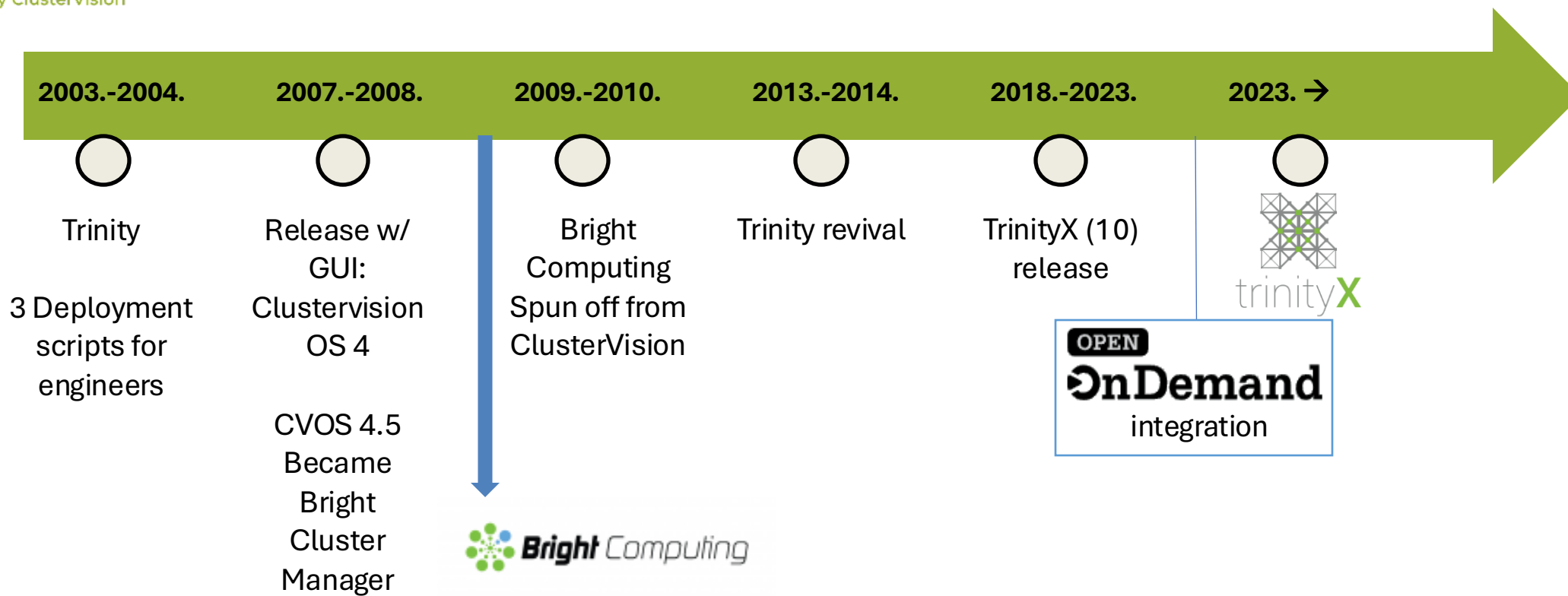
Open Source HPC & AI Cluster Manager designed to make your cluster **agile, reliable, and responsive to your organizational needs**

- Designed ground up to provide all services required in a modern HPC system
- Allows full customization of your cluster installation
- Dramatically speeds up installation time and reduces administrative efforts
- Allows for unified management of HPC, A/I and cloud bounced clusters
- Follows the tool-box approach
- Very modular

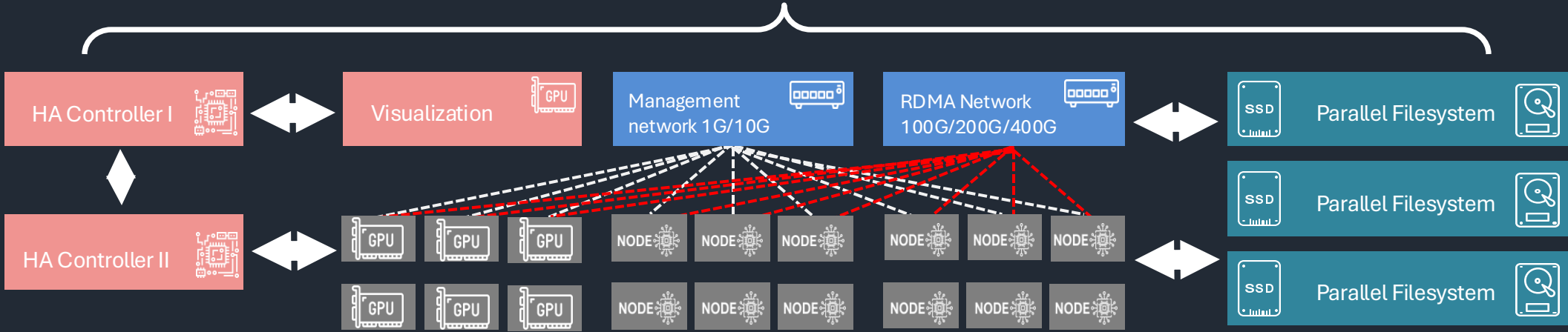
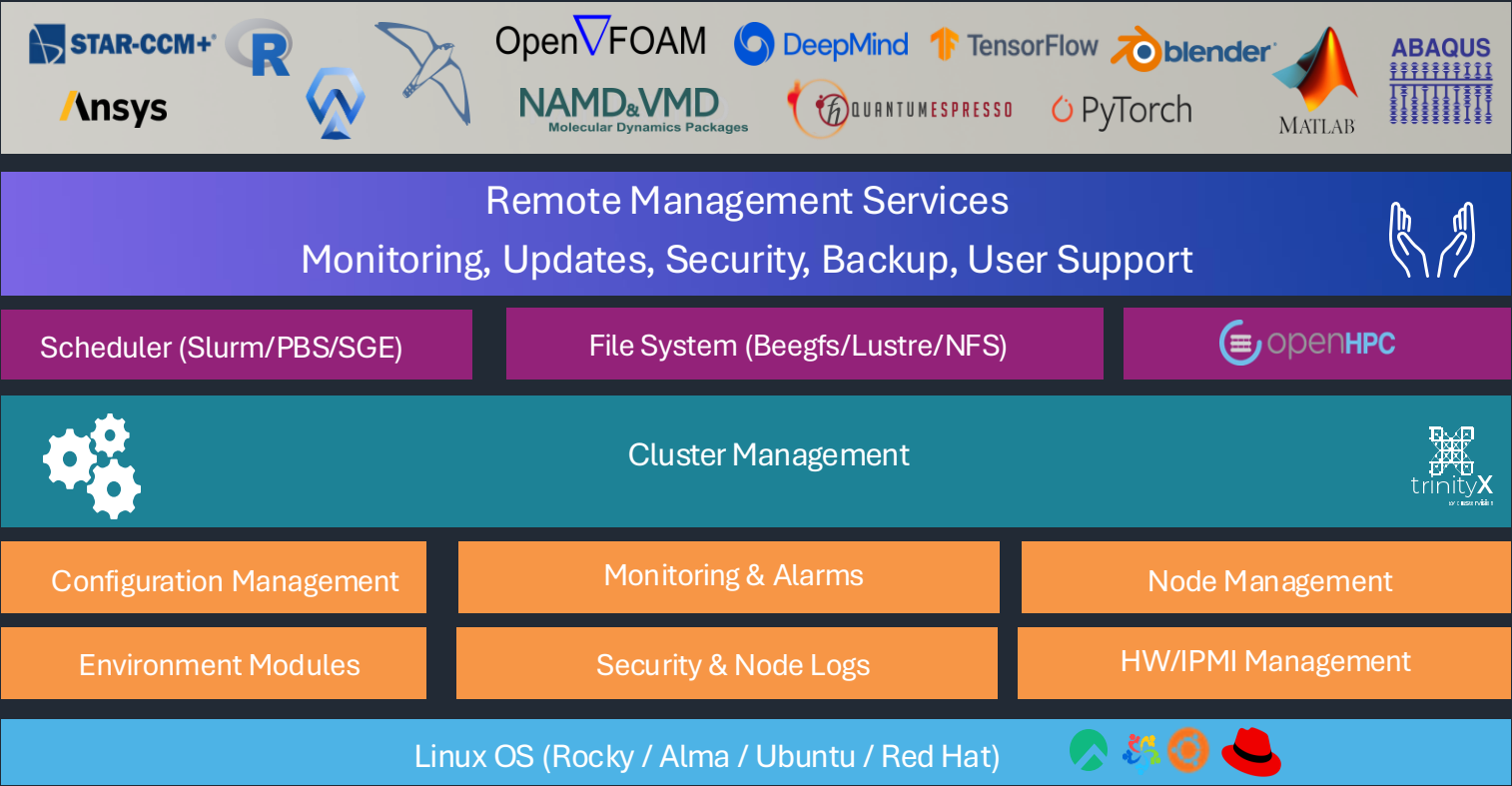
<https://github.com/clustervision/trinityX>



Brief history of TrinityX

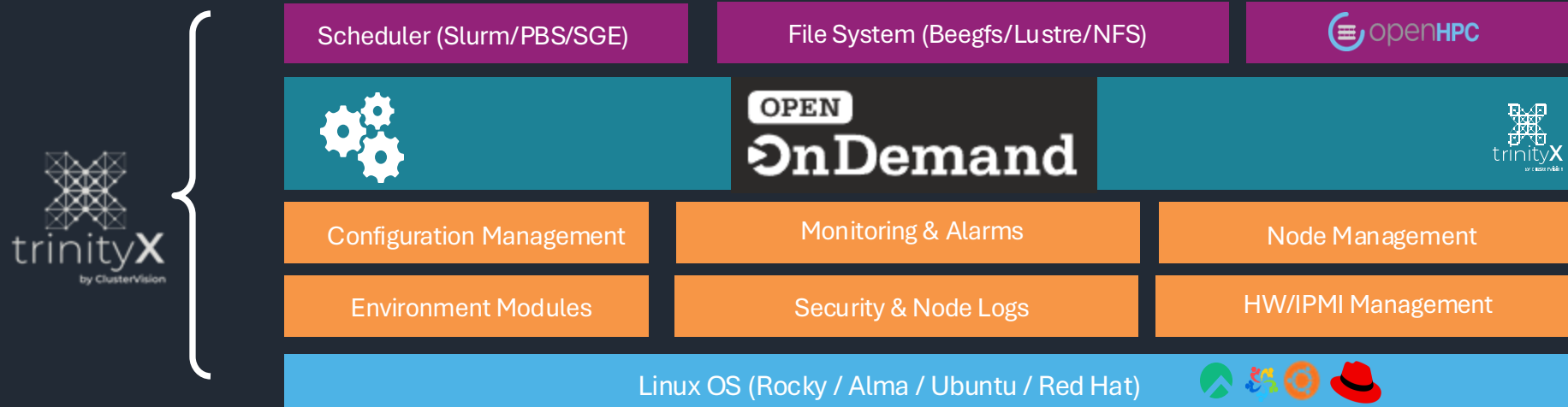


What does a cluster manager do?



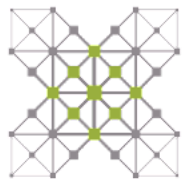
What does a cluster manager do?

It's the glue between the many components and manages the flow of an AI/HPC cluster



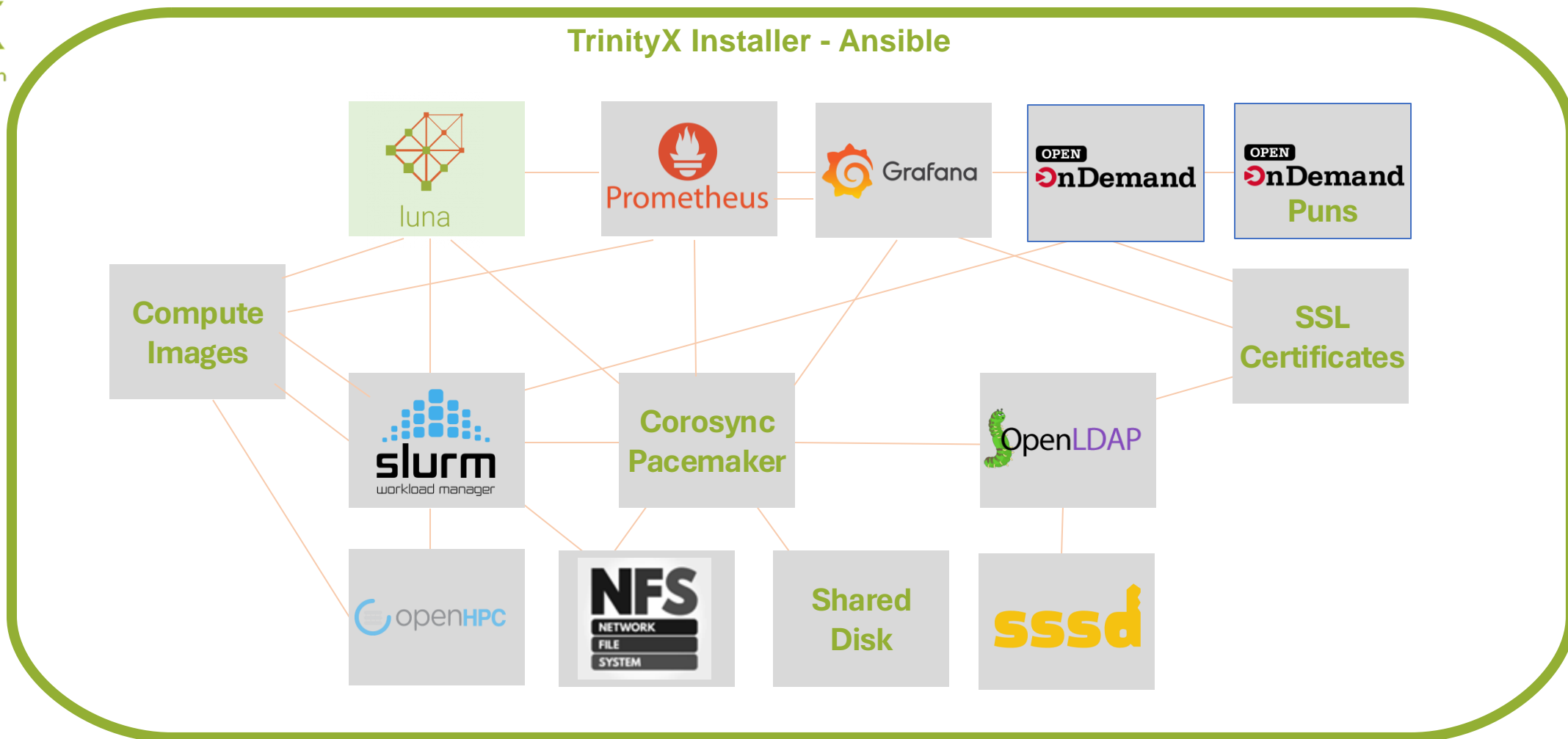
Most commonly, a cluster manager is command line driven, however OpenOnDemand integration provided a sturdy graphical framework for our in-house developed applications.

This, of course besides off-the-shelf third party applications for administrators but also users! The latter is not so standard.



trinityX
by ClusterVision

Main components of TrinityX in tin-foil hat formation



Demo Time!!

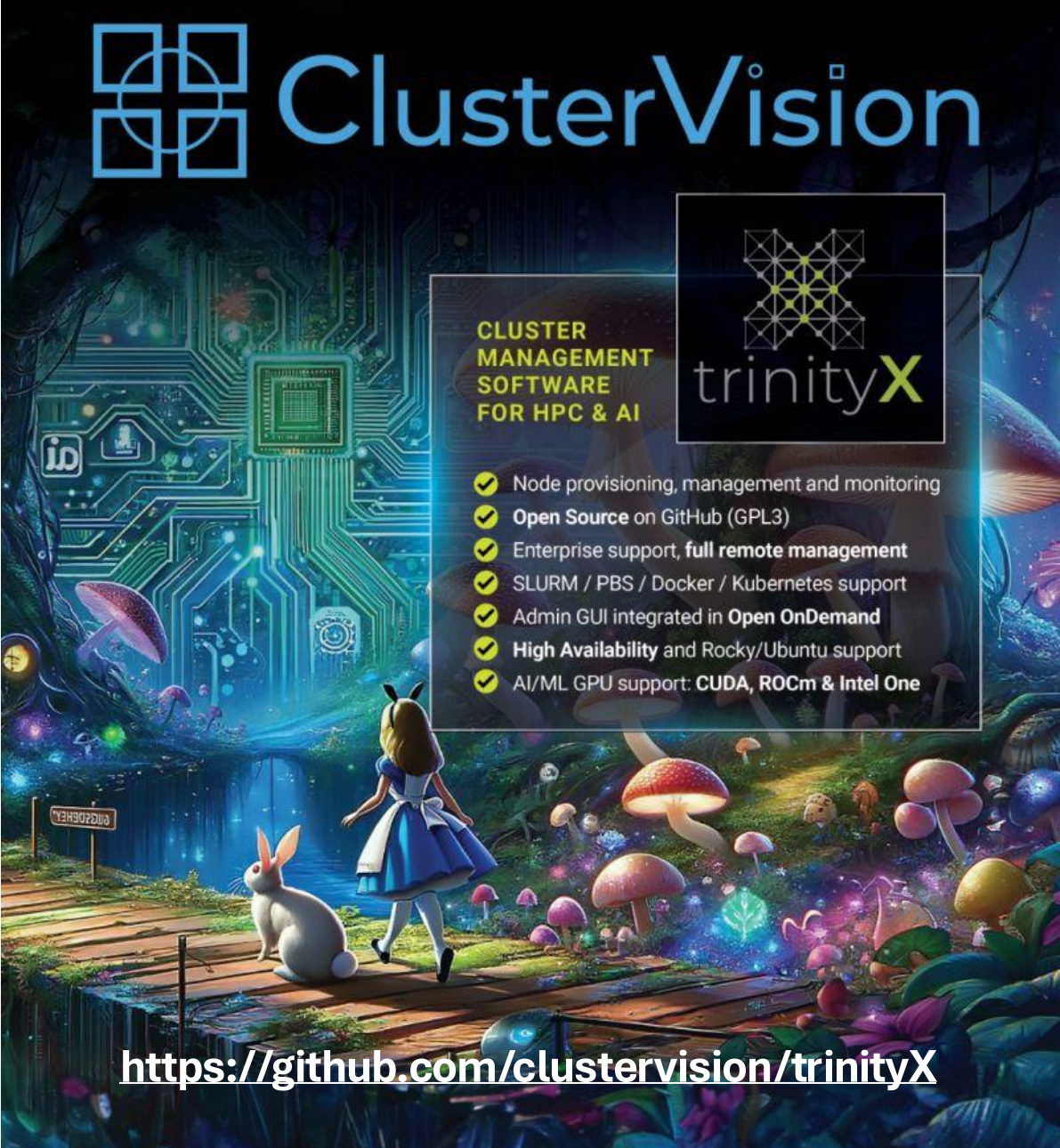


THANK YOU!

Feel free to contact our partner:

PacificTeck
HPC and Machine Learning Experts

www.pacificteck.com
E-mail: sales@pacificteck.com



ClusterVision

CLUSTER MANAGEMENT SOFTWARE FOR HPC & AI

trinityX

- ✓ Node provisioning, management and monitoring
- ✓ **Open Source** on GitHub (GPL3)
- ✓ Enterprise support, **full remote management**
- ✓ SLURM / PBS / Docker / Kubernetes support
- ✓ Admin GUI integrated in **Open OnDemand**
- ✓ **High Availability** and Rocky/Ubuntu support
- ✓ AI/ML GPU support: **CUDA, ROCm & Intel One**

<https://github.com/clustervision/trinityX>

Starting a stateful remote desktop

Session was successfully created.

Home / My Interactive Sessions

Interactive Apps

Desktops

Remote Desktop

Servers

Code Server

Jupyter Notebook

Remote Desktop (672)

1 node

Host: node001.cluster

Created at: 2024-10-02 18:26:06 CEST

Time Remaining: 2 hours and 59 minutes

Session ID: a5a9bcdd-5a79-4514-b34b-27dd3fe8430c

Compression

0 (low) to 9 (high)

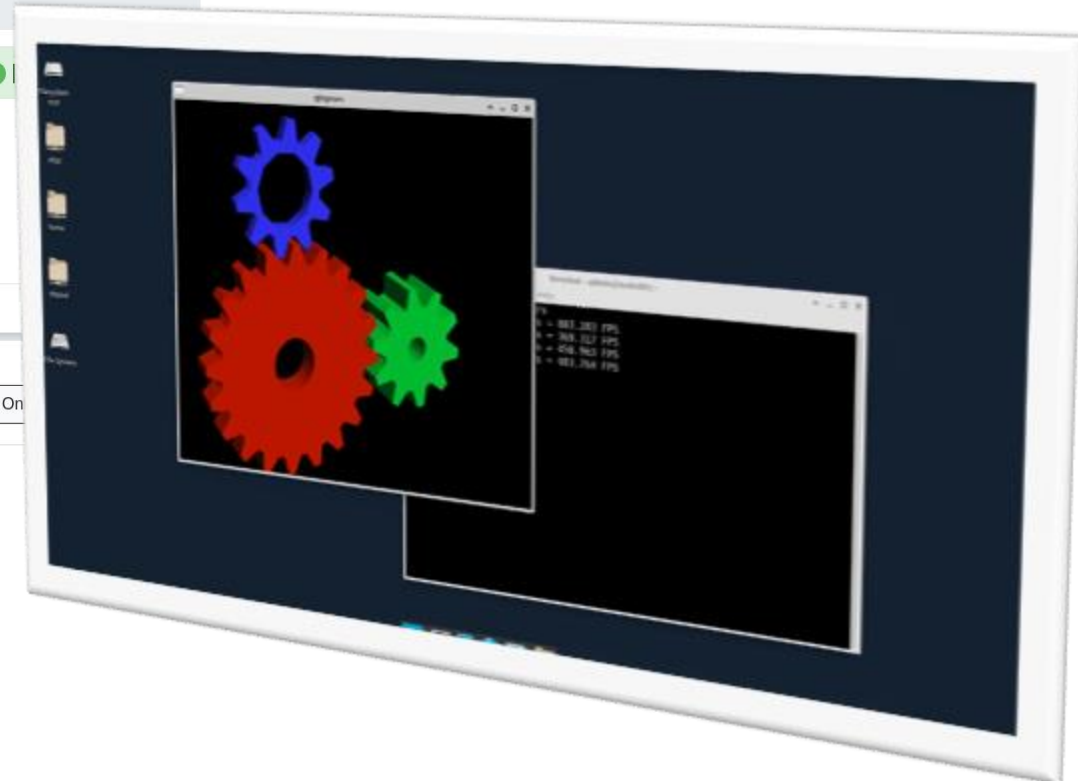
Image Quality

0 (low) to 9 (high)

Launch Remote Desktop

View On

OOD applications





Submit a job based on template or custom script

Jobs

+ New Job

☆ Create Template

Edit Files

Job Options

Open Terminal

Submit

Stop

Loading

Delete

Show 25 entries

Search:

Created	Name	ID	Cluster	Status
December 6, 2023 2:34pm	(default) Simple Sequential Job	667	TrinityX	Completed
December 6, 2023 2:34pm	(default) Simple Sequential Job	21	TrinityX	Completed
October 31, 2023 2:59pm	(default) Simple Sequential Job	20	TrinityX	Completed

Showing 1 to 3 of 3 entries

Previous 1 Next

Job Details

667

Job Name:

(default) Simple Sequential Job

Submit to:

TrinityX

Account:

Not specified

Script location:

/trinity/home/admin/ondemand/data/sys/myjobs/projects/default/3

Script name:

main_job.sh

Folder Contents:

main_job.sh

slurm-15.out

slurm-17.out

slurm-19.out

slurm-20.out



Luna - node, group and osimage management

trinityX

Home / Node

Node List

Add New Node

Show 10 entries

Search:

S. NO.	NAME	GROUP	OSIMAGE	OSIMAGETAG	SETUPBMC	BMCSETUP	STATUS	TPM_UUID	ACTIONS
1	node001	compute	compute	NONE	TRUE	compute	Luna installer: success	False	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
2	node002	compute	compute	NONE	TRUE	compute	Luna installer: success	False	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
3	node003								
4	node004								
5	node005								
6	node006								
7	node007								
8	node008								
9	node009								
10	node010								

Showing 1 to 10 of 10 entries

trinityX

Home / Group

Group List

Add New Group

Show 10 entries

Search:

S. NO.	NAME	BMCSETUPNAME	OSIMAGE	OSIMAGETAG	ROLES	INTERFACES	ACTIONS
1	compute	compute	compute	NONE	NONE	interface = BOOTIF network = cluster interface = BMC network = ipmi	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
2	ubuntu	compute	ubuntu	NONE	NONE	interface = BOOTIF network = cluster interface = BMC network = ipmi interface = ext1 network = external	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
3	login	compute	compute	NONE	NONE	interface = BOOTIF	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
4	my_compute	compute					

Showing 1 to 4 of 4 entries

trinityX

Home / OS Image

OS Image List

Add New OS Image

Show 10 entries

Search:

S. NO.	NAME	KERNELVERSION	ACTIONS
1	compute	5.14.0-427.35.1.el9_4.x86_64	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>

Showing 1 to 1 of 1 entries

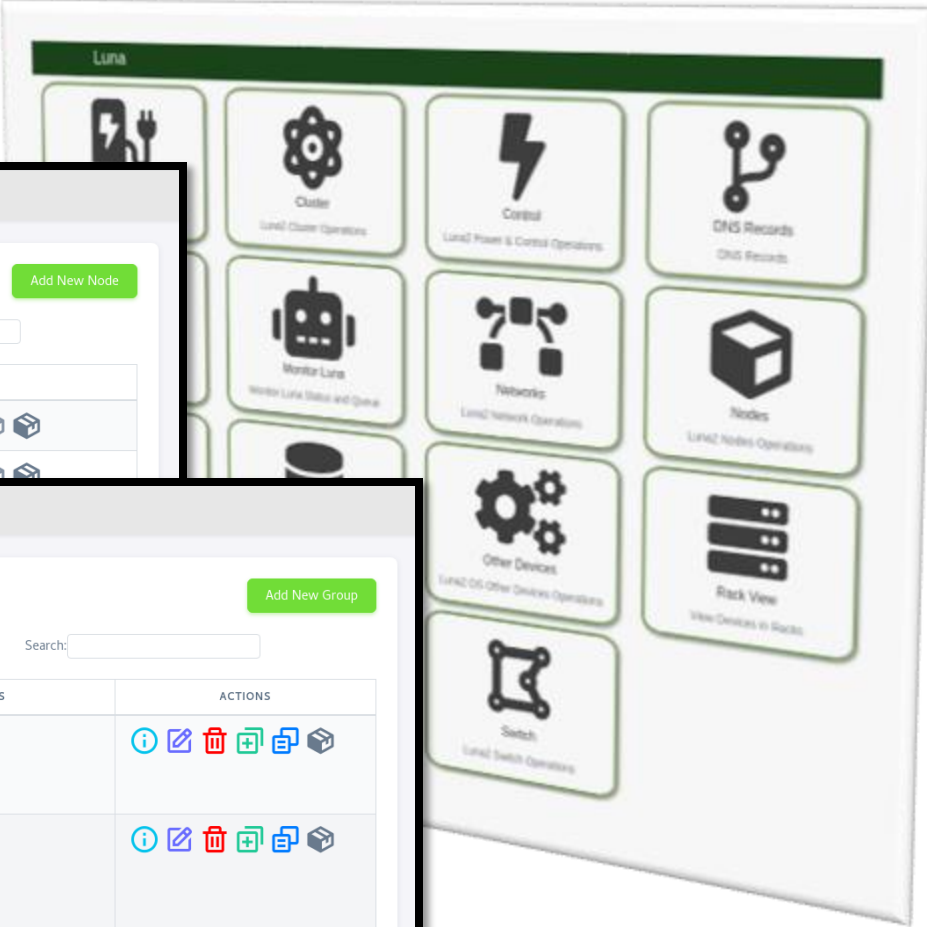
Packing OS Image >> compute...

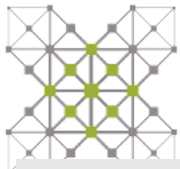
osimage pack for compute queued

2024-09-27 12:30:19 :: queued pack osimage compute with id 35

2024-09-27 12:30:19 :: assembling kernel and ramdisk for osimage compute

Close





Slurm configurator and user management

trinityX Home / Slurm

Added new empty hardware preset

Configuration Menu

[View Configuration](#) [Test Configuration](#)

[Hardware](#) [Nodes](#) [Partition](#)

[+ Add Node](#) [Import From Luna](#) [Delete](#)

<input type="checkbox"/>	Name ▲	Luna Group ▲	HWP
<input type="checkbox"/>	node001	ubuntu	GPU
<input type="checkbox"/>	node002	compute	GPU
<input type="checkbox"/>	node003	compute	GPU
<input type="checkbox"/>	node004	compute	GPU
<input type="checkbox"/>	node005	compute	
<input type="checkbox"/>	node006	compute	
<input type="checkbox"/>	node007	compute	
<input type="checkbox"/>	node008	compute	
<input type="checkbox"/>	node009	compute	

trinityX Home / users

[Users](#) [Groups](#)

[Add new user](#)

Name	UID	Actions
admin	1051	Edit Delete
anybody	1069	Edit Delete
GID 159 Home /trinity/home/anybody Shell /bin/bash Groups anybody Password {SSHA}tUIF9wQfKHag+eCUR4ColnF70wTsDm1D Common Name anybody Given Name Surname anybody Email Phone Expire -1 Last Change 19816		
demo	1050	Edit Delete
mytest	1073	Edit Delete
phd_1	1054	Edit Delete
phd_2	1055	Edit Delete
phd_3	1056	Edit Delete



Infiniband Diagnostics – identifies bad links easily

trinity
by ClusterV



[Home](#) / [infiniband](#)

Switches 6

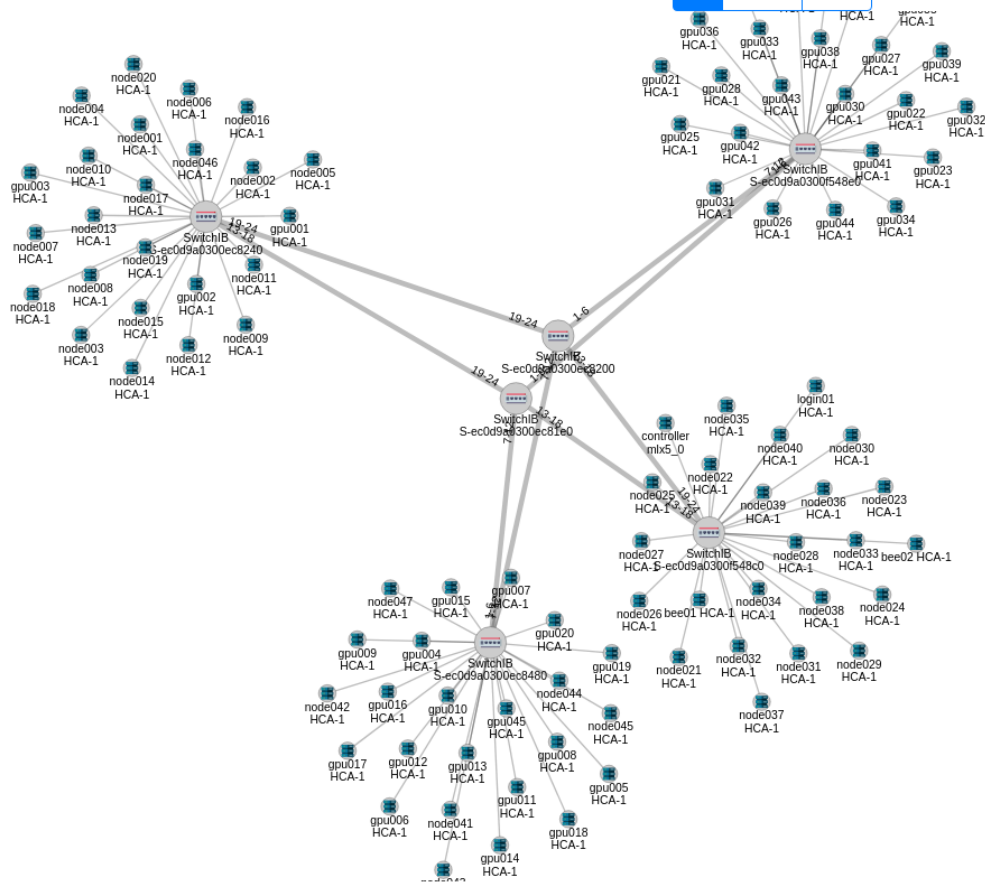
Nodes 96

Links 104

Simulation All

All Nodes Links

Save



Name	UID	Port	Target
SwitchIB Mellanox Technologies	S-ec0d9a0300ec8240		
SwitchIB Mellanox Technologies	S-ec0d9a0300ec8480		
SwitchIB Mellanox Technologies	S-ec0d9a0300f548e0		
SwitchIB Mellanox Technologies	S-ec0d9a0300ec8200		
SwitchIB Mellanox Technologies	S-ec0d9a0300ec81e0		
SwitchIB Mellanox Technologies	S-ec0d9a0300f548c0		
node019 HCA-1	H-506b4b03003fa98a		
node017 HCA-1	H-506b4b03003fa9a2		
node015 HCA-1	H-506b4b030043f9b2		
node013 HCA-1	H-506b4b030043f9aa		
node011 HCA-1	H-506b4b030043fa72		
node009 HCA-1	H-506b4b03003fa952		
node007 HCA-1	H-506b4b030041d02a		
node005 HCA-1	H-506b4b03003fa9a6		
node003 HCA-1	H-506b4b030043fa6e		
node001 HCA-1	H-506b4b03003fa962		
gpu002 HCA-1	H-506b4b030043fa3e		
gpu003 HCA-1	H-506b4b030043fa86		
node046 HCA-1	H-08c0eb0300ddc0f6		
gpu001 HCA-1	H-506b4b030043f9f6		
node004 HCA-1	H-506b4b030043f9de		
node002 HCA-1	H-506b4b030043f9c6		

RackView with metric overlay – typical hot-spot detector

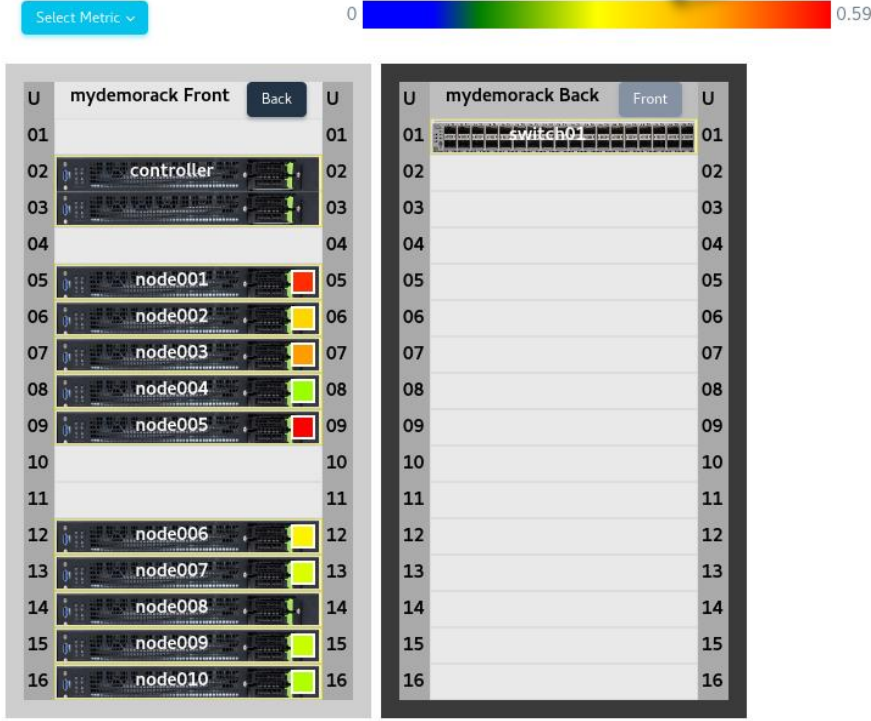
trinityX Home / Rack

Rack Representation

Manage Rack Frames

Manage Inventory

Device Pool **EMPTY**



Select Metric ▾

No Scale

Temperature

System Load

Power Consumption

node005

node006

node007

node008

node009

node010





Grafana 'home' dashboard – The admin coffee time panel

trinity

by Clust

Search or jump to...

ctrl+k

Home > Dashboards > TrinityX > Home

Last 1 hour

30s

Sign in

Filter Filesystem Host

All

Filter Filesystem Type

All

TrinityX Dashboards

System status

Welcome!

HA Re...

Ok

% Nodes Up

100%

Nodes

4

Nodes Up

4

Cores

232

GPUs

1

Memory

386 GiB

Controller Filesystems

hostname	mountpoint	device	size	used_perc
real-controller1.cl...	/	/dev/nvme0n1p1	200 GiB	
real-controller2.c...	/	/dev/nvme0n1p1	200 GiB	
real-contr	/trinity/ohpc	trinityx/_trinity_ohpc	96.4 GiB	
real-controller1.cl...	/trinity/ha	trinityx/_trinity_ha	96.3 GiB	
real-controller1.cl...	/var/lib/nfs	trinityx/_trinity_ha	96.3 GiB	
real-controller1.cl...	/trinity/shared	trinityx/_trinity_sh...	96.3 GiB	
real-controller1.cl...	/trinity/home	trinityx/_trinity_ho...	96.3 GiB	

Current Alerts

PowerSupplyFaultDetected

Firing for 2h 56m 4s

> 2 instances

View alert rule

Available nodes

hostname	luna_group	cpus	gpus	load5	mem_tot	mem_use	swap_tot	swap_use	temp	failed_proc
node001.cluster	compute	96	0	0.0%	125.8 GiB	0.9%	0.0 B	N/A	52.0 °C	1
node002.cluster	gpu	16	1	7.4%	125.8 GiB	0.8%	0.0 B	N/A	25.0 °C	1
node003.cluster	compute	96	0	0.2%	62.8 GiB	1.7%	0.0 B	N/A	43.0 °C	1
node004.cluster	compute	8	0	0.0%	62.5 GiB	9.3%	0.0 B	N/A	47.0 °C	1
real-controller1.cluster	controller	8	0	1.9%	30.8 GiB	29.7%	0.0 B	N/A	41.0 °C	0
real-controller2.cluster	controller	8	0	0.8%	30.8 GiB	28.5%	0.0 B	N/A	38.0 °C	1



Search or jump to...

ctrl+k



Sign in

Host All GPU All

Home TrinityX Dashboards

GPU [node002.cluster] [1c222a41-e1aa-b1f5-cbf7-1f35c2a8f2e3]

Name ⓘ
NVIDIA RTX A6000

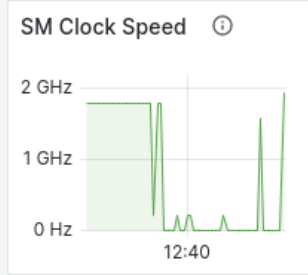
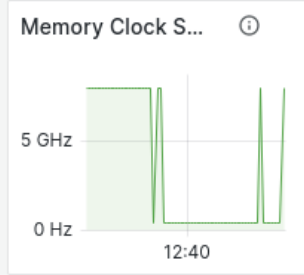
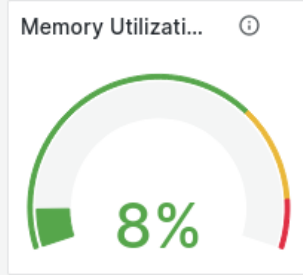
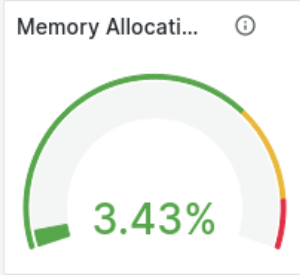
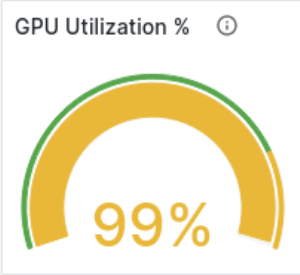
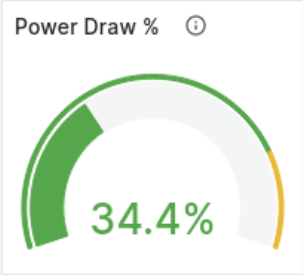
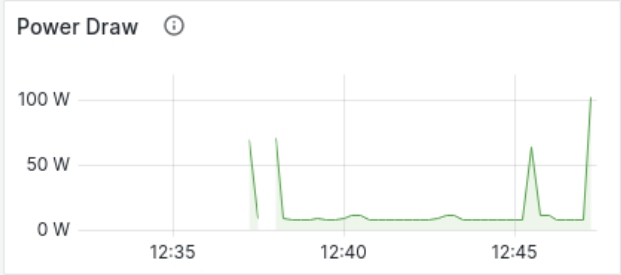
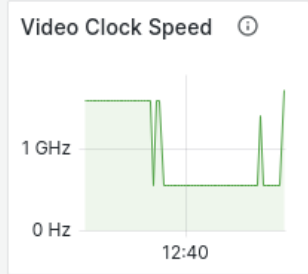
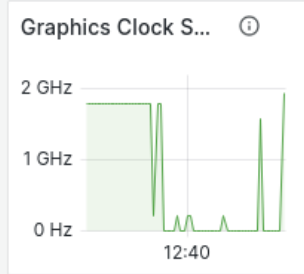
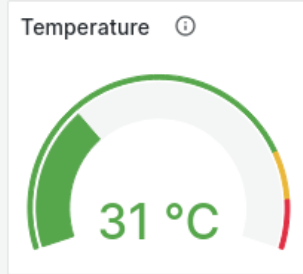
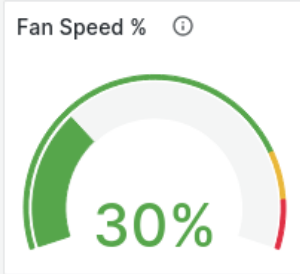
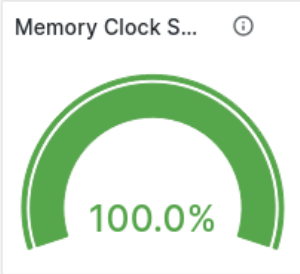
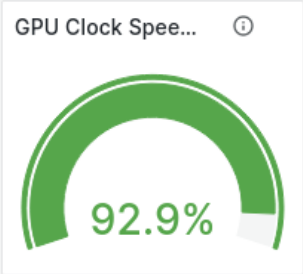
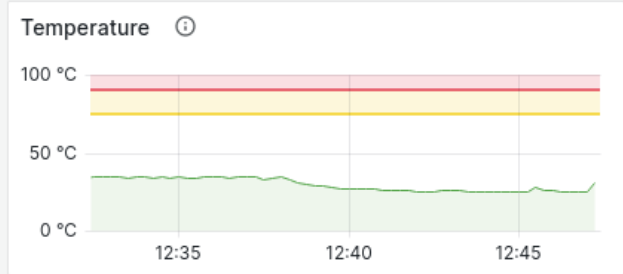
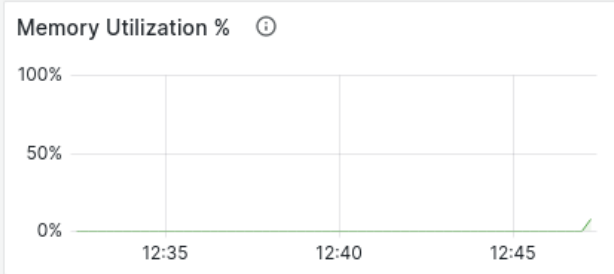
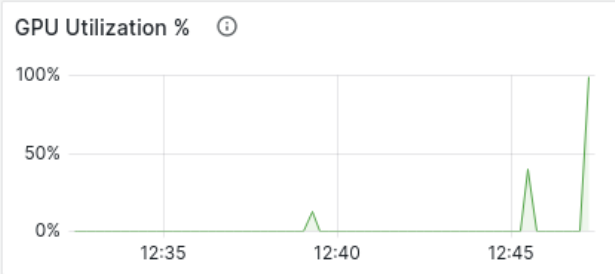
P-State ⓘ
P0

Driver Version ⓘ
550.78

Vbios Version ⓘ
94.02.5C.00.02

Throttle Reasons ⓘ

No data





Search or jump to...

ctrl+k



Grafana Detailed System overview

node003.cluster

Home

TrinityX Dashboards

Power Status

Powered On

Available Sensors

bmc
Yes

chassis
Yes

dcmi
Yes

ipmi
Yes

Machine Info

manufacturer_id	firmware_revision
GIGA-BYTE TECHNOLOGY CO., LTD (15370)	12.61

IPMI Sensors State

name	type	state
Watchdog	Watchdog 2	Ok
SEL	Event Logging Disabled	Ok
PS2_Status	Power Supply	Critical
PS1_Status	Power Supply	Ok
CPU1_Status	Processor	Ok
CPU0_Status	Processor	Ok

> Power (3 panels)

Temperatures

IPMI Temperatures

name	temperature	state
CPU0_TEMP	47 °C	Ok
CPU1_TEMP	50 °C	Ok
DIMMG0_TEMP	36 °C	Ok
DIMMG1_TEMP	35 °C	Ok
DIMMG2_TEMP	36 °C	Ok
DIMMG3_TEMP	35 °C	Ok
HDD_TEMP_0	27 °C	Ok
HDD_TEMP_1	28 °C	Ok
INLET_AIR_TEMP	27 °C	Ok
MB_TEMP1	44 °C	Ok
MB_TEMP2	42 °C	Ok
VR_DIMMG0_TEMP	40 °C	Ok
VR_DIMMG1_TEMP	45 °C	Ok

IPMI Fan Speeds

name	speed	state
BPB_FAN_1A	6450 rpm	Ok
BPB_FAN_1B	5250 rpm	Ok
BPB_FAN_2A	6600 rpm	Ok
BPB_FAN_2B	5250 rpm	Ok
BPB_FAN_3A	6600 rpm	Ok
BPB_FAN_3B	5250 rpm	Ok
BPB_FAN_4A	6450 rpm	Ok
BPB_FAN_4B	5250 rpm	Ok
BPB_FAN_5A	6600 rpm	Ok
BPB_FAN_5B	5250 rpm	Ok
BPB_FAN_6A	6600 rpm	Ok
BPB_FAN_6B	5250 rpm	Ok
BPB_FAN_7A	6600 rpm	Ok

IPMI Voltages

name	voltage	state
P_12V	12.1 V	Ok
P_1V0_AUX_LAN	990 mV	Ok
P_3V3	3.25 V	Ok
P_5V	4.96 V	Ok
P_5V_STBY	4.93 V	Ok
P_VBAT	3.05 V	Ok
P0_VDD_18	1.82 V	Ok
P0_VDDCR_CPU	730 mV	Ok
P0_VDDCR_SOC	680 mV	Ok
P1_VDD_18	1.82 V	Ok
P1_VDDCR_CPU	730 mV	Ok
P1_VDDCR_SOC	680 mV	Ok
VR_DIMMG0_VOUT	1.25 V	Ok



THANK YOU!

<https://github.com/clustervision/trinityX>



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