Examon Web

Visualization Framework For Live And Collected Power, Energy, Performance And Operational Data In Supercomputers

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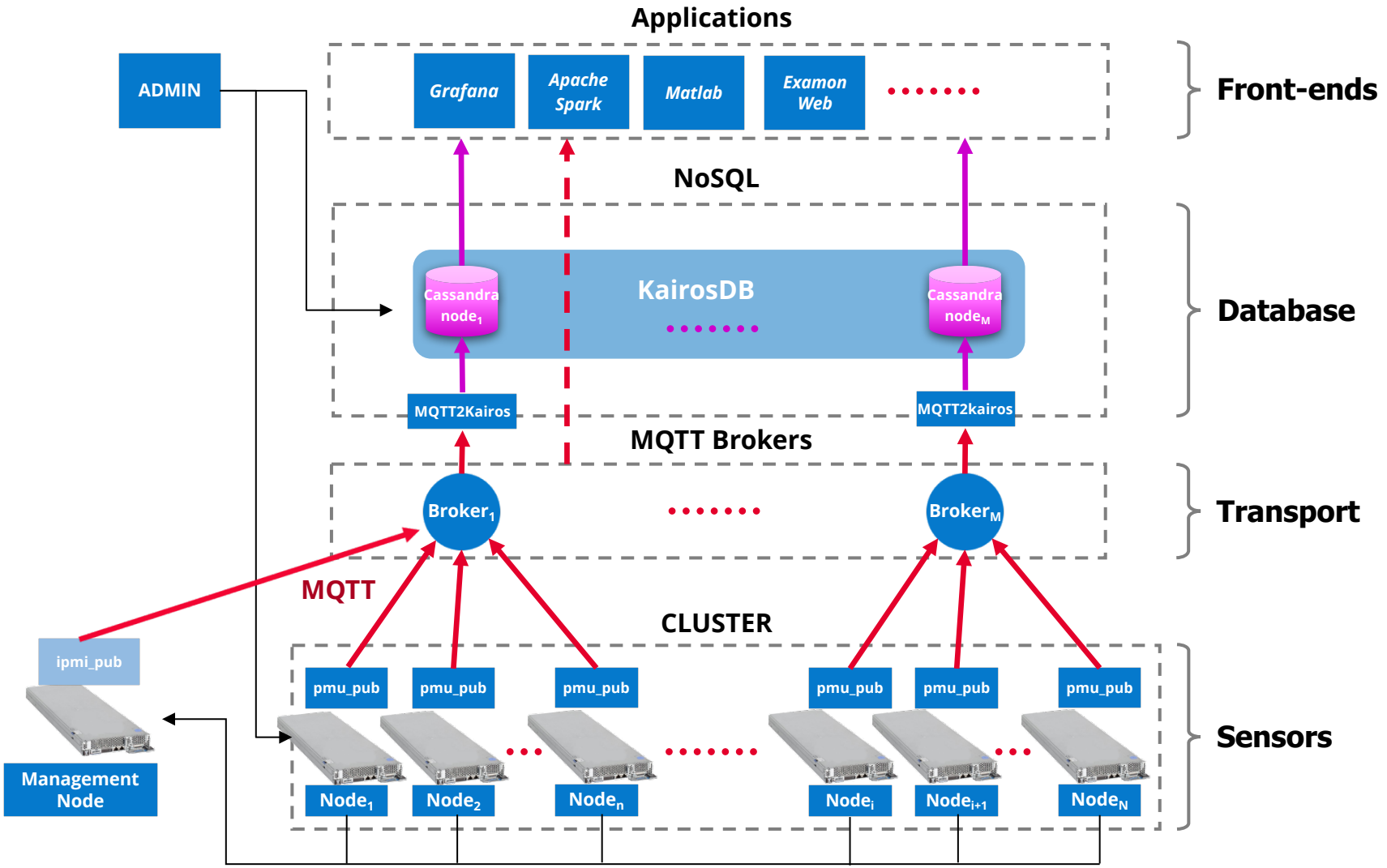
OUTLINE

- What is Examon
- Examon Architecture
- What is Examon Web
- Examon Web Architecture
- What Examon Web can do
- Further work

“Scalable framework for performance and energy monitoring of HPC facilities”

- performance counters (pmu_pub)
- “package” metrics
- IPMI
- MQTT transport
- “big data” database cluster storage
- PBS job hooks

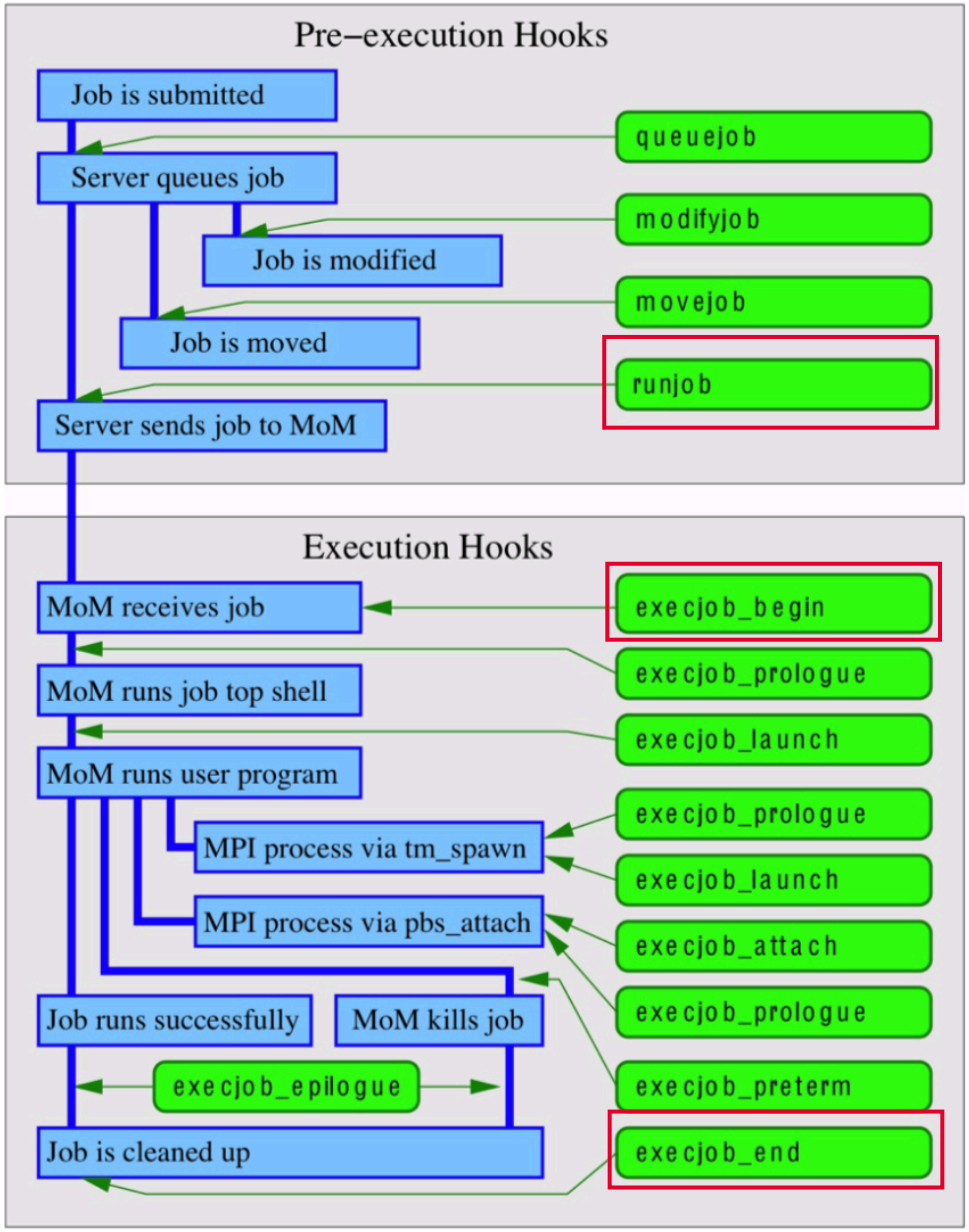
EXAMON ARCHITECTURE



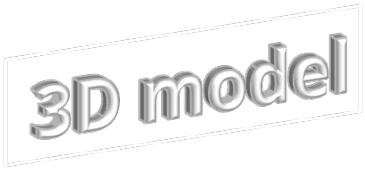
- **Message Queue Telemetry Transport**
- **Lightweight** message queueing and transport protocol
- Well suited for **low resource demanding** scenarios like **IoT** applications
- Basic features:
  - **Publisher-Subscriber** model
  - Async communication protocol (**messages**)
  - **Low overhead** packet (2 bytes header)
  - **QoS** (3 levels)

PBS Hooks

- Available hooks
  - runjob
  - execjob_begin
  - execjob_end
- Sent via MQTT
- Stored to Cassandra
- Info about the job, user & used resources

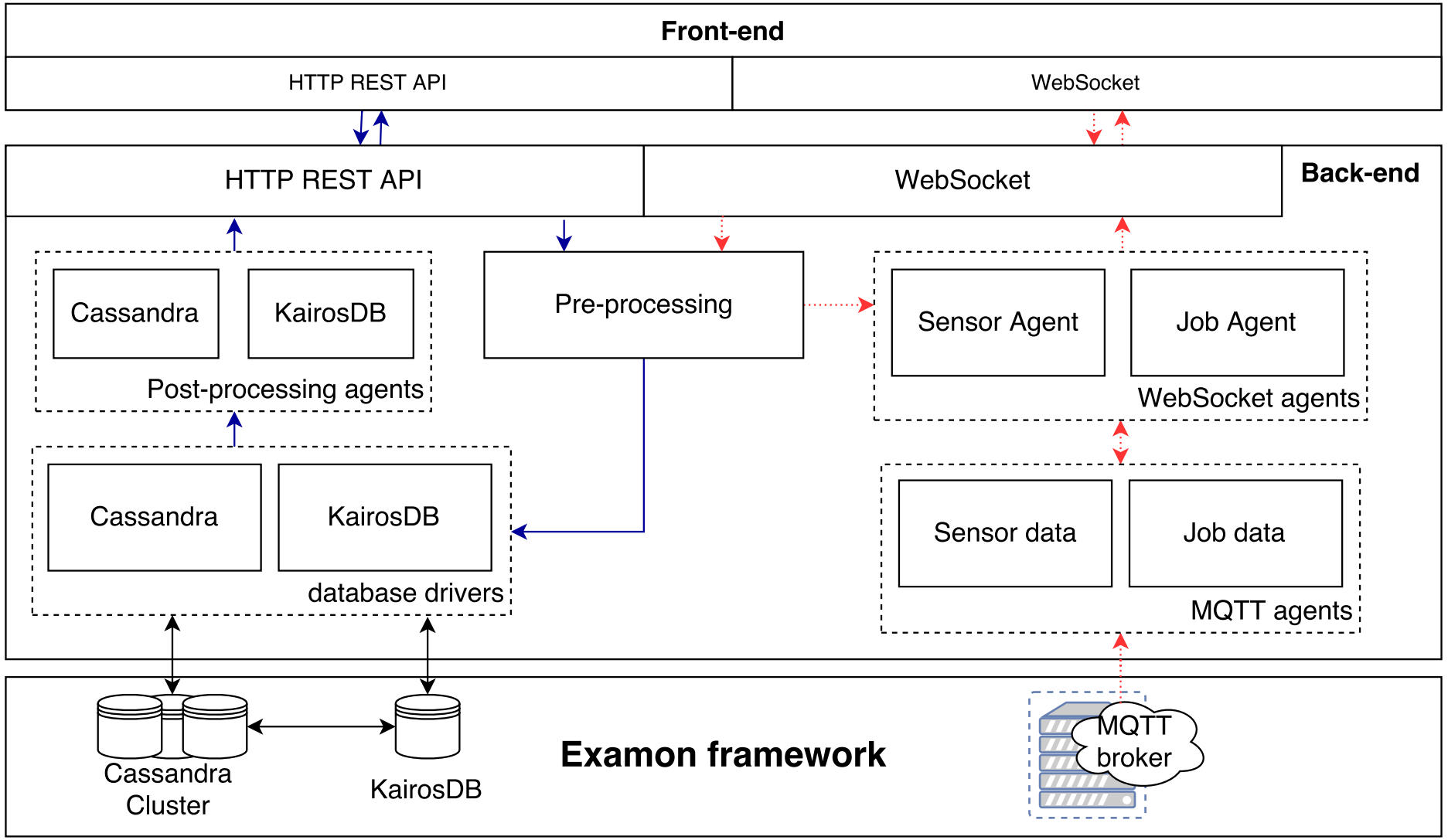


"Visualization of performance, power and energy statistics of HPC applications and cluster status."

- Utilize data gathered from Examon & PBS
- Provide insights on user's jobs
- System administrator overview
- 

of a cluster
- Combine metric and job data

EXAMON WEB ARCHITECTURE



EXAMON WEB: JOB OVERVIEW

EXA:MON Home Public

2935289.io01 Search

Job Info | Performance | Energy

Job ID: 2935289.io01 | User ID: tgastald | Account name: smr_prod | Project: _pbs_project_default | Job Name: 006_201702040900_5

Times

Duration: 9 mins 59 secs

Queue time: 11:07:55 21/08/17

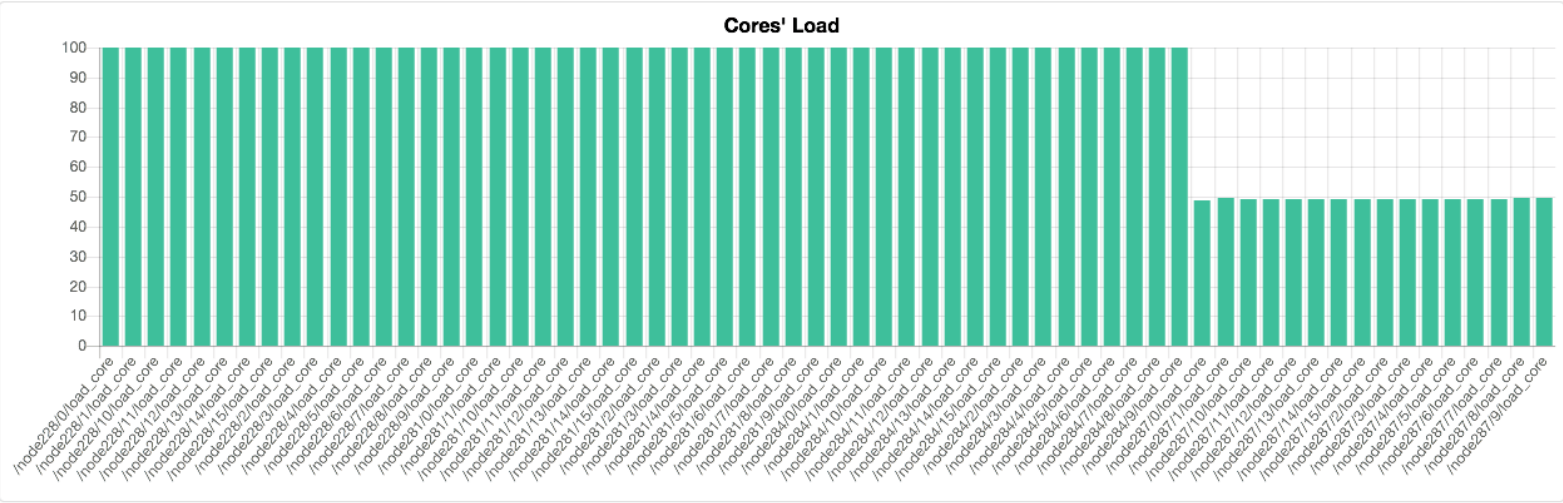
Start time: 11:07:55 21/08/17

End time: 11:17:54 21/08/17

Memory	Time	GPUs	MICs
491,520 MB	16,200 s	0	0

Nodes →	Cores →	Variables →	MPI Processes
4	64	22	16

Status	Average Power	Sys Utilization	CPUs Utilization	Average Temperature
Finished	684.4 W	77.4 %	92.34 %	46.24 °C



EXAMON WEB: JOB ENERGY DASHBOARD

EXAMON MONITORED METRICS

PMU

- Temp
- Instr
- clk_curr
- clk_ref
- C3
- C6
- cpi
- C3res
- ips
- freq_ref
- freq
- dT_core
- C6res
- load_core

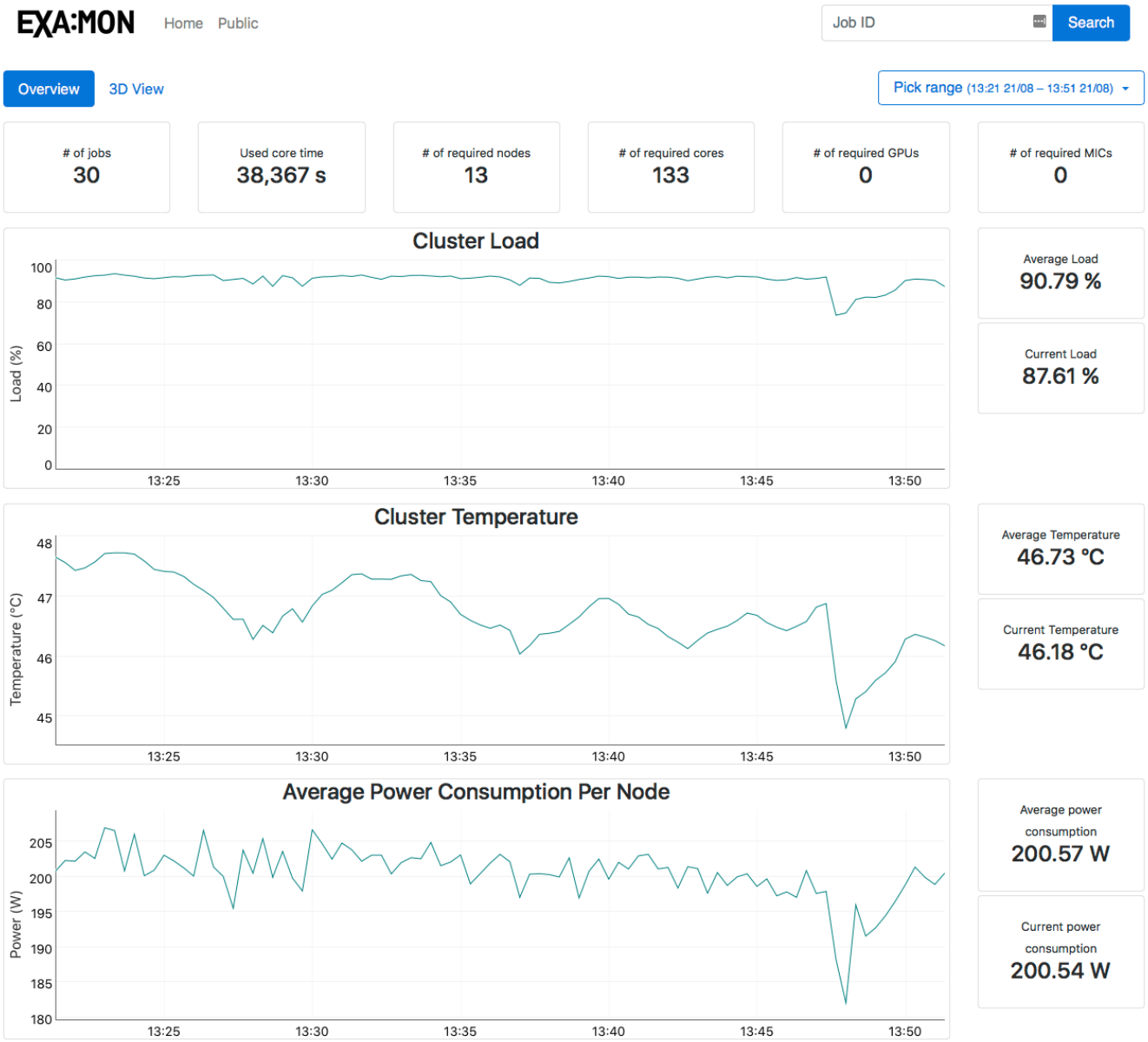
IPMI

- pow_dram
- pow_pkg
- temp_pkg
- erg_pkg
- erg_dram
- erg_units
- freq_ref
- C2
- C3
- C6
- Uclk
- Avg_Power
- Sys_Utilization
- CPU_Utilization
- Mem_Utilization
- IO_Utilization
- PCH_Temp
- Ambient_Temp
- HDD_Inlet_Temp
- PCI_Riser_1_Temp
- PCI_Riser_2_Temp
- GPU_Outlet_Temp
- CPU1_Temp
- CPU2_Temp

TMAM

- back_end_bound
- core_bound
- L1L2_bound
- front_end_bound
- retiring
- bad_speculation
- L3_bound
- issue_loss_idle

EXAMON WEB: SYSTEM ADMIN OVERVIEW



EXAMON WEB: 3D MODEL

FURTHER WORK

- Anomaly detection in running jobs
- Job performance analysis and classification
- Adjustable dashboards
- “Smart dashboard”
- ”Job management”
- Users
- Cluster visualisation

SUMMARY

- web interface for Examon framework
- connection between two different data sources
- integration of 3D model
- large user base to affect
- Advanced analysis and classification of jobs
- Job overview
- Available on GitHub: https://github.com/petrstehlik/examon-web

Thank you for your attention & visit me during the poster session

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