

GreenITCube

Status and Monitoring

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GSI Darmstadt

HEPiX Fall 2016

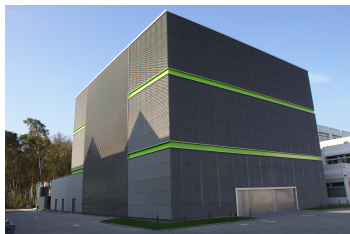


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Reminder



- 27*30 meters, height 22 meters - nearly a cube :-)
- 6 floors with 128 racks each (12 MW)
- only level 5+6 in use now (4 MW)
- Two independent power supplies
- Racks with passive rear-door heat-exchanger
- Costs 11.5 million euro
- Construction started 12/2014, First clusters running 03/2016



Cooling and electricity

Cooling

- It's working!!
- No leakage
- No general problem found
- small issues solved (e.g. damaged cooling tower)

Electricity

- It's working!!
- power of second source sometimes at upper tolerance
- power supplies (<900W) needs reset (only 10 servers)

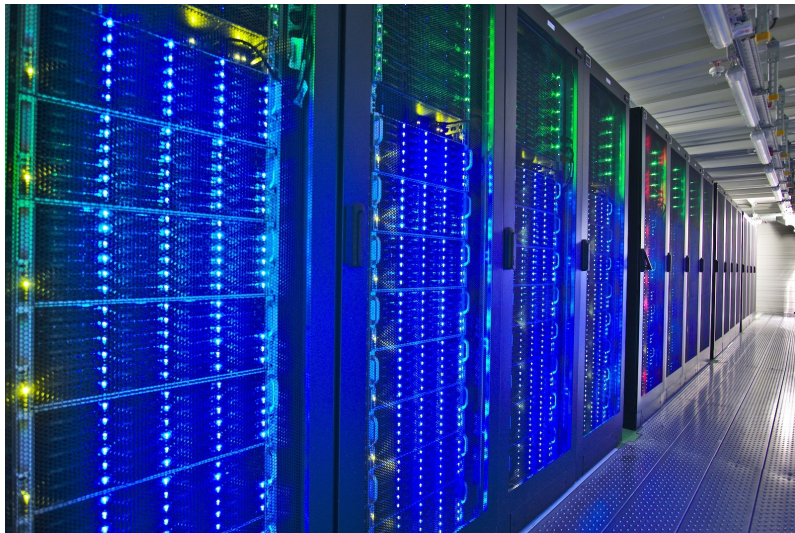


Racks and PDUs

- Hardware must be chosen carefully (e.g. depth of systems)
- Supermicro Hardware works good concerning air flow, depth, ...
- PDUs:
 - only few defects (sensors, management interfaces)
 - 2 PDUs in racks with redundant power -> PDU Array
 - SNMP problems -> solved by Emerson with new firmware



Hardware



Computing

- Starting with 4000 cores
- 2 tenders (August: 3920 cores and October: 2016 cores)
- tender from October (last week) not yet in operation
- BUT: Not really an extension - compensation of older systems in other data center
- In addition: L-CSC GPU based system (no update)



Storage

- Lustre system started with 7 PB
- 1 tender arrived in September (5 PB)
- already fully in operation
- BUT: Not really an extension - compensation of older systems in other data center



Near future

- From now on real extensions!
- More compute nodes: 3360 cores begin of December (just ordered)
- More Lustre storage:
 - + 2 PB begin of November (newest servers of decommissioned HERA FS)
 - + 6 PB begin of December (just ordered)
- Total Lustre Storage end of 2016: 20 PB
- Total Cores end of 2016: 13296
- 50 Racks in use end of 2016
- Ongoing movement/replacement of Linux Infrastructure
- January 2017 first other IT group besides HPC in GreenITCube



Monitoring



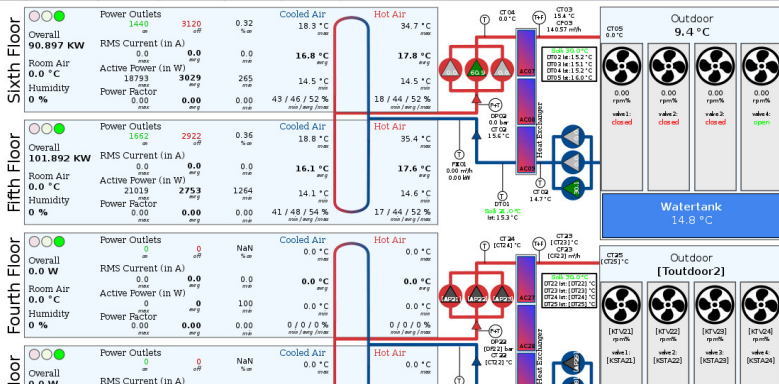
What is monitored?

- racks (temperature and humidity)
- infrastructure (cooling and energy)
- data of infrastructure directly collected from different system controls
- Problems solved: wrong units

Live-Monitoring old

 auto-refreshing auto-refresh

GSI Greencube Monitoring - beta v0.1



Live-Monitoring old

auto-refreshing auto-refresh
GSI Greencube
Help

Overview	First Floor	Second Floor	Third Floor	Fourth Floor	Fifth Floor	Sixth Floor	G6A-19																																																																																																																															
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Live-Monitoring getting redesigned

- Goals:
- Reduce overview page to main values
- remove/add values
- so far just planing phase

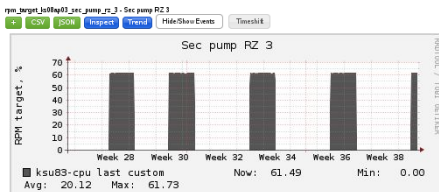
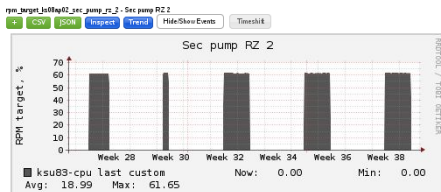
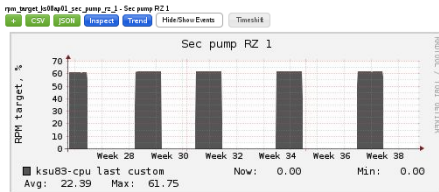
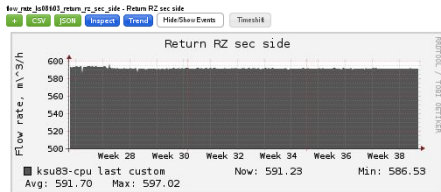


Is long term monitoring important?

- YES!!
- Why?
 - In case of an incident - Find the reason
 - Better understand your system
 - Check the system
 - Verify changes

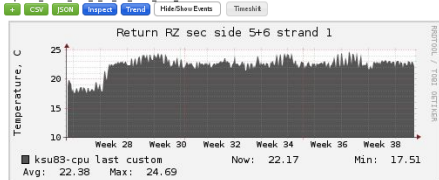


Check the system

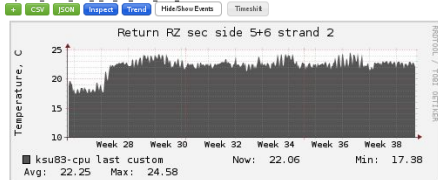


Verify changes

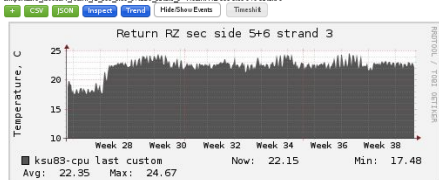
temperature_ksu8842_return_rz_sec_side_5%2B6_strand_1 - Return RZ sec side 5+6 strand 1



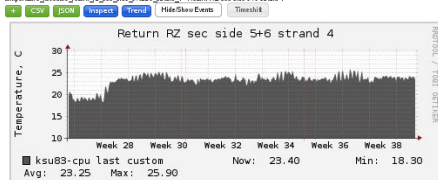
temperature_ksu8843_return_rz_sec_side_5%2B6_strand_2 - Return RZ sec side 5+6 strand 2



temperature_ksu8844_return_rz_sec_side_5%2B6_strand_3 - Return RZ sec side 5+6 strand 3



temperature_ksu8845_return_rz_sec_side_5%2B6_strand_4 - Return RZ sec side 5+6 strand 4



What could be improved?

- Still every check has to be done manually
- -> Implement reporting
- The way we use Ganglia is not comfortable
- -> Find a better solution bringing data together

Help needed

- DataCenter team will grow
- two positions open
- Main tasks:
 - Improving monitoring and optimising the system
 - Planning new systems and extensions
 - Handling InfiniBand network



Timelapse: <https://youtu.be/j93R0kORA9c>

Questions?

