ClusterCockpit Monitoring Service
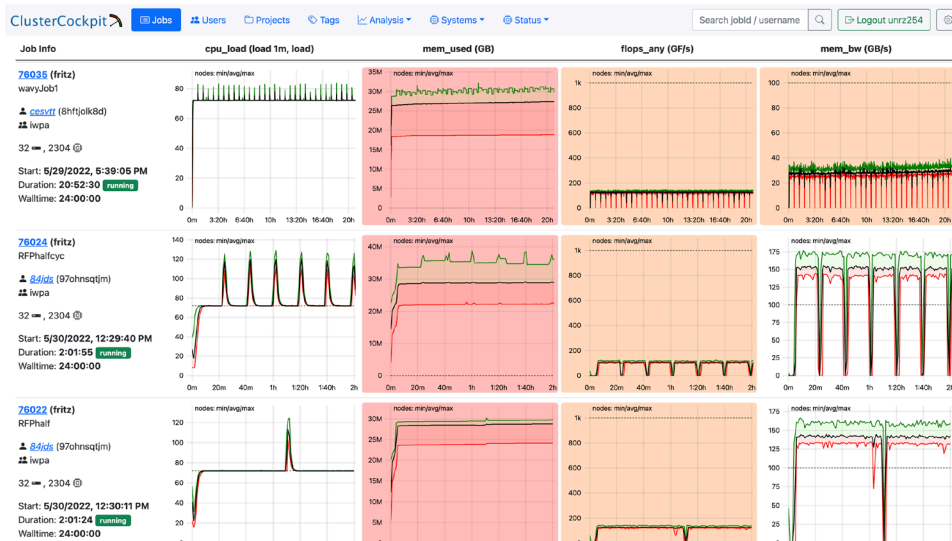
Jan Eitzinger, 12.07.2022

ClusterCockpit

Overview

- Web-based job-specific performance monitoring

- Rudimentary job accounting and access to job performance metric data

- User Authentication with IDM HPC accounts

- **HPC-Portal** accounts cannot login yet

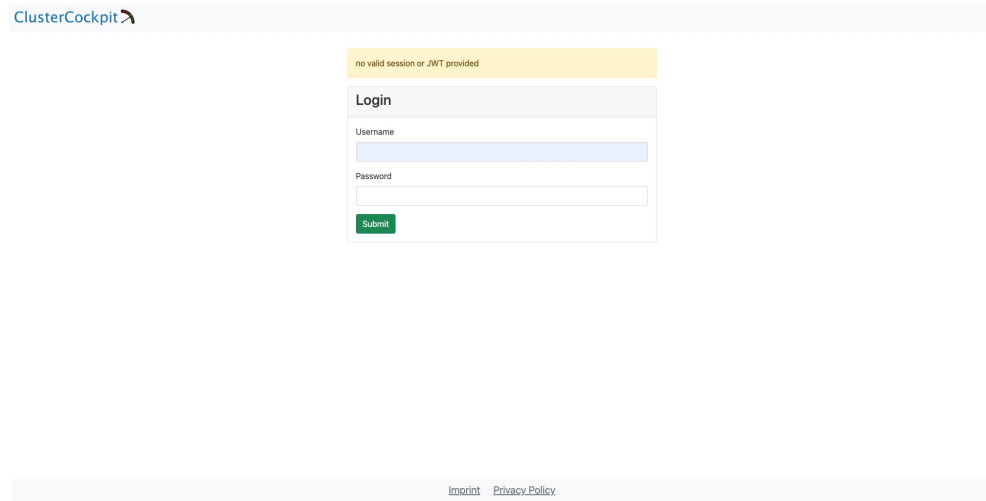- ClusterCockpit Framework developed at NHR@FAU

`https://github.com/ClusterCockpit/`

Service still in BETA!

Access to ClusterCockpit

URL: https://monitoring.nhr.fau.de/

- Login with **IDM HPC account**
- **HPC Portal users cannot login (yet)**

- You can see **your running** and **completed jobs**
- Future: Project managers can see jobs from all users in a project

Purpose and use cases

- **Access to job performance metrics**

  - **Feedback** about job performance

  - Identify **pathological jobs** early on

  - **Monitor** and **classify** your job performance

- **Simple job monitoring and accounting**

  - **Overview** about running and completed jobs

  - **Histograms** about walltime and node count

  - Powerful **filter** and **search** features

  - **Tag jobs** to group and organize your jobs
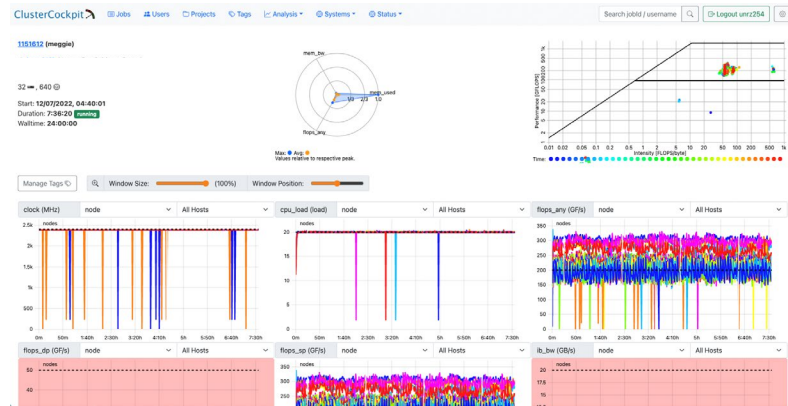
Empirical roofline plot
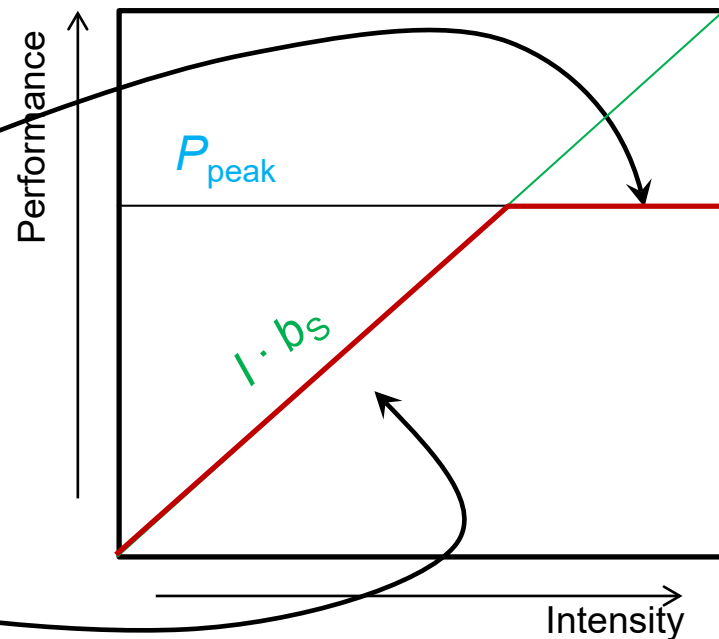
How fast can tasks be processed? P [flop/s]

The bottleneck is either

- The execution of work: P_{peak} [flop/s]

- The data path: $I \cdot b_S$ [flop/byte x byte/s]
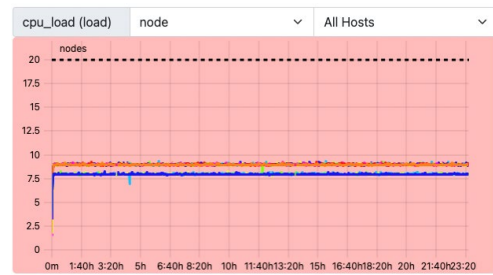
This is the "Naïve Roofline Model"

- High intensity: P limited by execution

- Low intensity: P limited by data transfer

- "Knee" at $P_{max} = I \cdot b_S$:
  Best use of resources
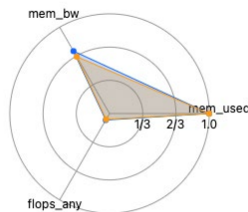
Measured using hardware performance counter data
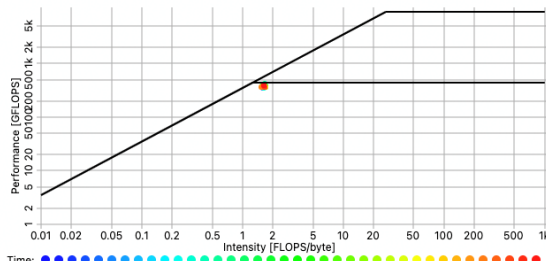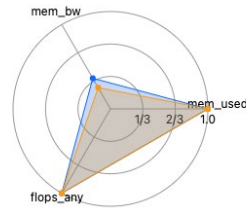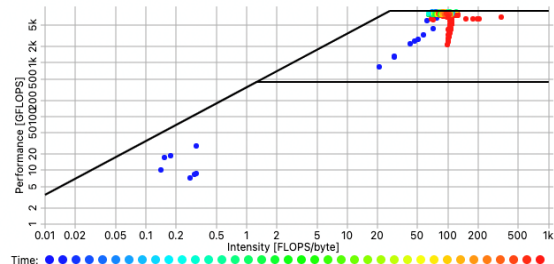
How to detect bad jobs

- Load metric indicates allocation or placement issues

- Basic resource utilization (arithmetic and memory bandwidth) can be seen in the roofline and polar plots

Node statistic table to detect performance imbalance

Metrics	flops_any	node		mem_bw	node		cpu_load	node	

Node	min △	avg ▲	max △	min △	avg △	max △	min △	avg △	max △
m0445	0	28.9	34.6	0	41.8	55.3	2	20	22.1
m0709	0	26.5	32	0	35.3	46	2	20	21.3
m0705	0	26.4	32.6	0	35.4	45.8	2	20	21.3
m0706	0	26.4	32.5	0	36.3	47.4	2	20	21.4
m0710	0	26.2	32.5	0	33.3	45.6	2	20	21.6
m0711	0	26.2	32.4	0.1	35	47.9	20	20.1	21.2
m0668	0	26.1	32.5	0	37.9	47.8	2	20	21.2
m0661	0	25.8	32.4	0	37.8	49.6	20	20.1	21.3
m0269	0	17.3	27.3	0	29.1	42.4	2	20	21.7
m1160	0	17.2	26.3	0	30.8	42.7	2	20	20.8
m1133	0	16.9	27.3	0.1	32.5	43.5	20	20.1	21.4
m1135	0	16.9	25.3	0	33.7	45.5	2	20	21.5
m1131	0	16.8	25.8	0	33.3	45.3	2	20	20.8
m1158	0	16.6	25.9	0	31.7	44.3	2	20.1	21.3
m1141	0	16.5	24.2	0	34.6	46.4	20	20.1	20.5
m1137	0	16.4	24.1	0	33.5	44.1	2	20	20.3
m1139	0	16.4	25.3	0	32.2	42.7	2	20	20.9
m1138	0	16.3	24	0	32.7	43.8	2	20	20.6

Outlook

- **Ongoing work on**:
    - Login support for HPC Portal users
    - Support all Clusters
    - Intuitive Job performance visualization
    - Automatic Job classification
    - Automatic application tagging

- **Please open a ticket if you encounter a problem!**

Any remarks or questions?   **DEMO**