



SEANERGY
ENERGY EFFICIENT EXASCALE

SEANERGY – Status and Outlook

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Presentation at the EuroHPC JU Booth at ISC 2026

CONNECTING THE DOTS



ISC

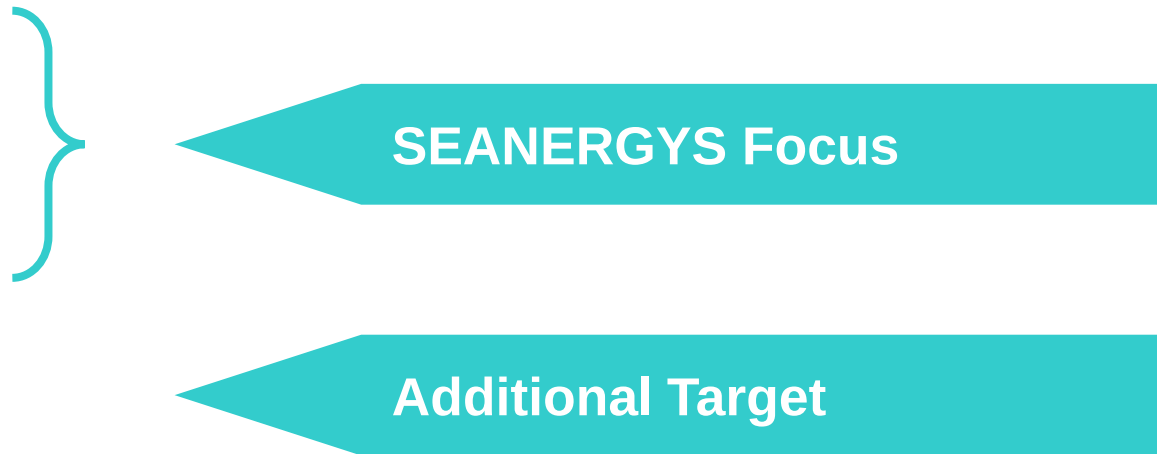
High Performance

Energy Efficiency in HPC/AI – Vectors



- Infrastructure and cooling
 - Direct (warm) liquid cooling
 - Re-use waste heat
- Selection of efficient hardware
 - Heterogeneous architectures with accelerators
- Software for efficient system operation
 - Coordinate across nodes and jobs
 - Adapt to workload behavior
 - Long-term monitoring and prediction
 - Deliver actionable feedback to users
- Application optimization/adaptation
 - Performance engineering
 - Effective end-user support

All vectors have to be addressed



SEANERGYS Focus

Additional Target

Approach



Target: deployment on large scale production systems in 2029

Monitoring (Pillar A)

- Scalable sensor-data capture
- Combination with non-structured data
- Establishment of a system data plane

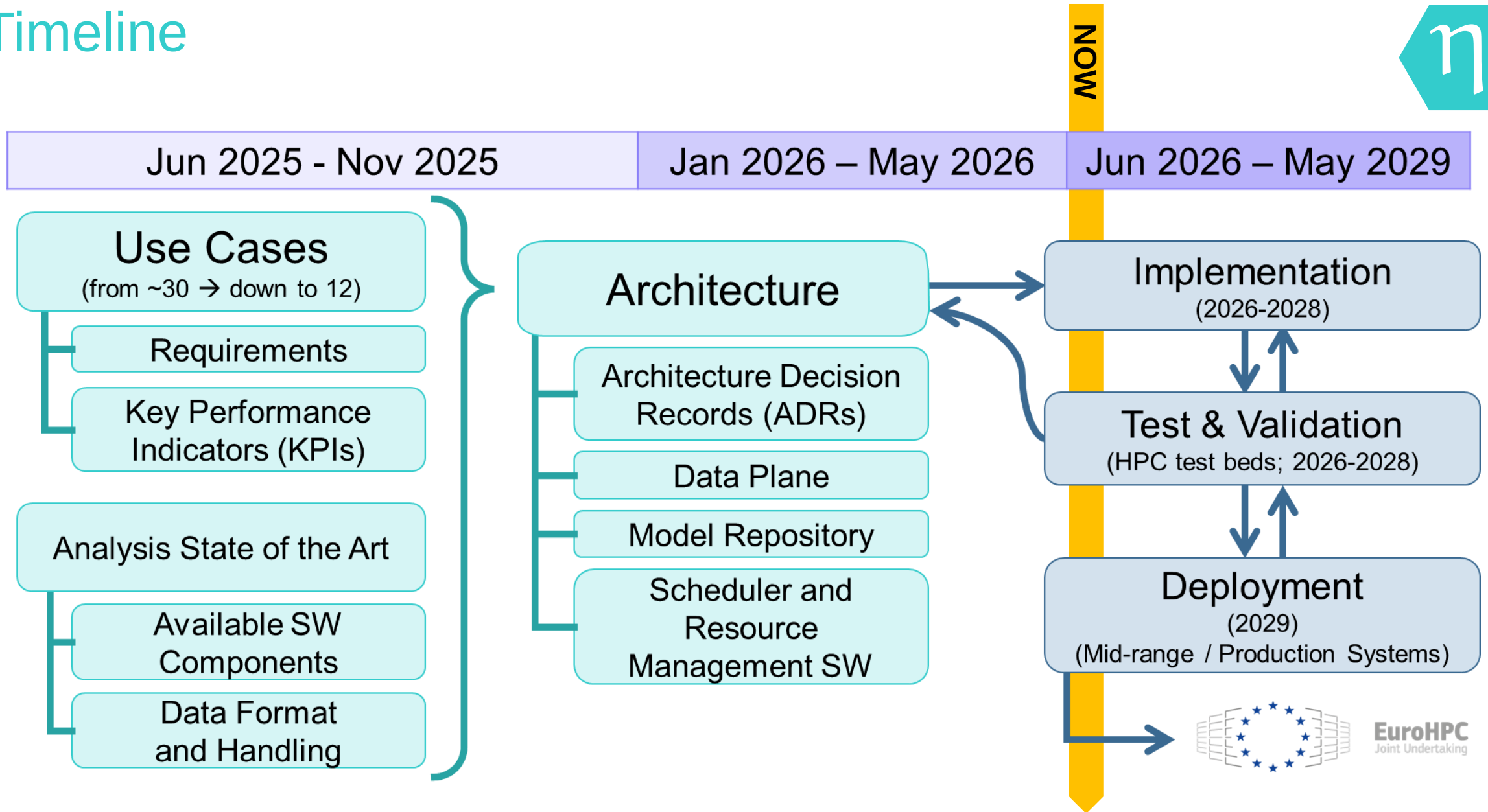
AI Data Analytics (Pillar B)

- Interactive System-/Workload-state visualizations
- Automatic decision making using expert knowledge
- Use of AI and ML to improve management decisions

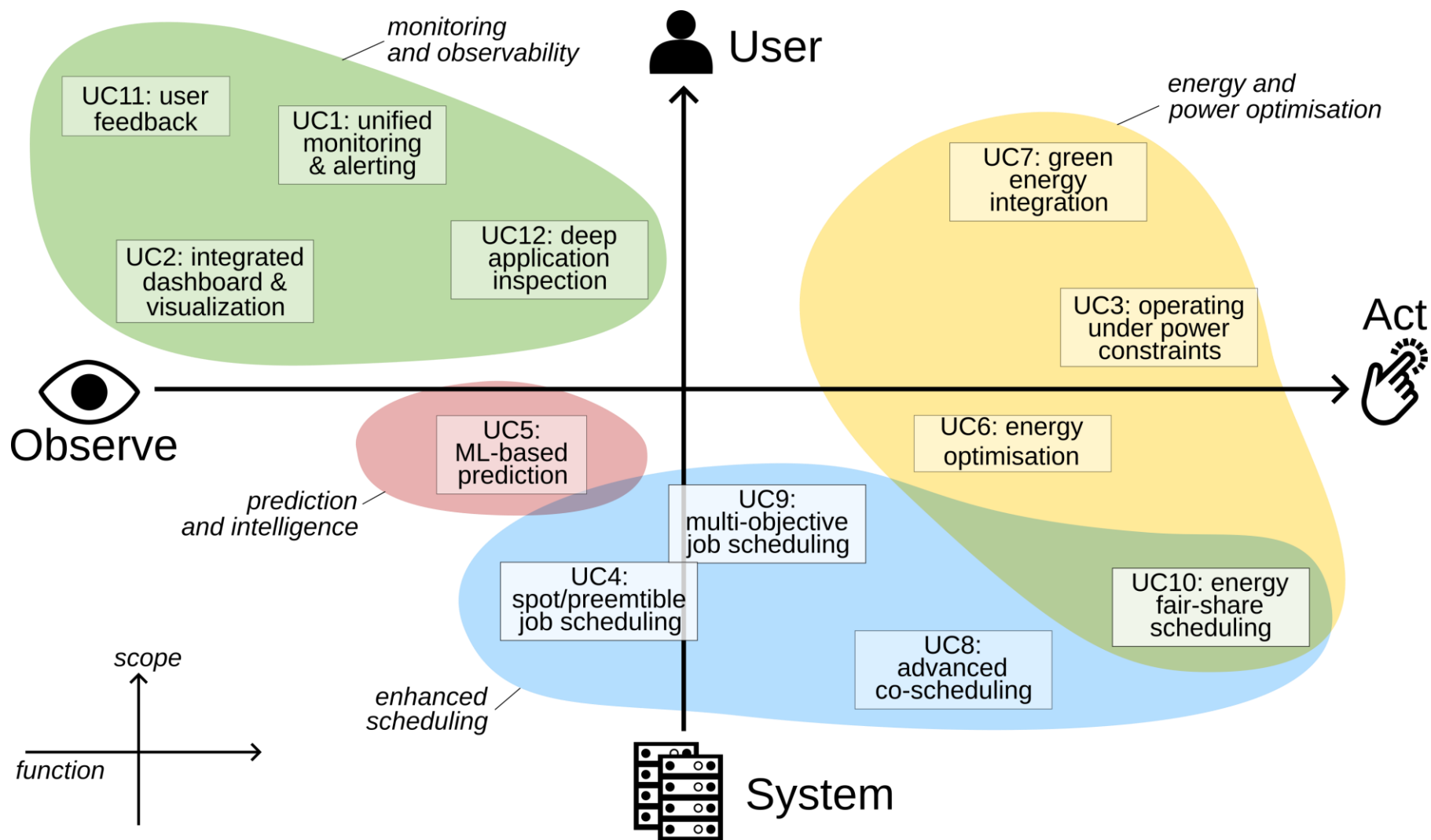
Scheduling and Resource Management (Pillar C)

- Dynamic control knobs to optimize system
- Cooperative full stack approach
- Modern energy-/power-/carbon-aware schedulers

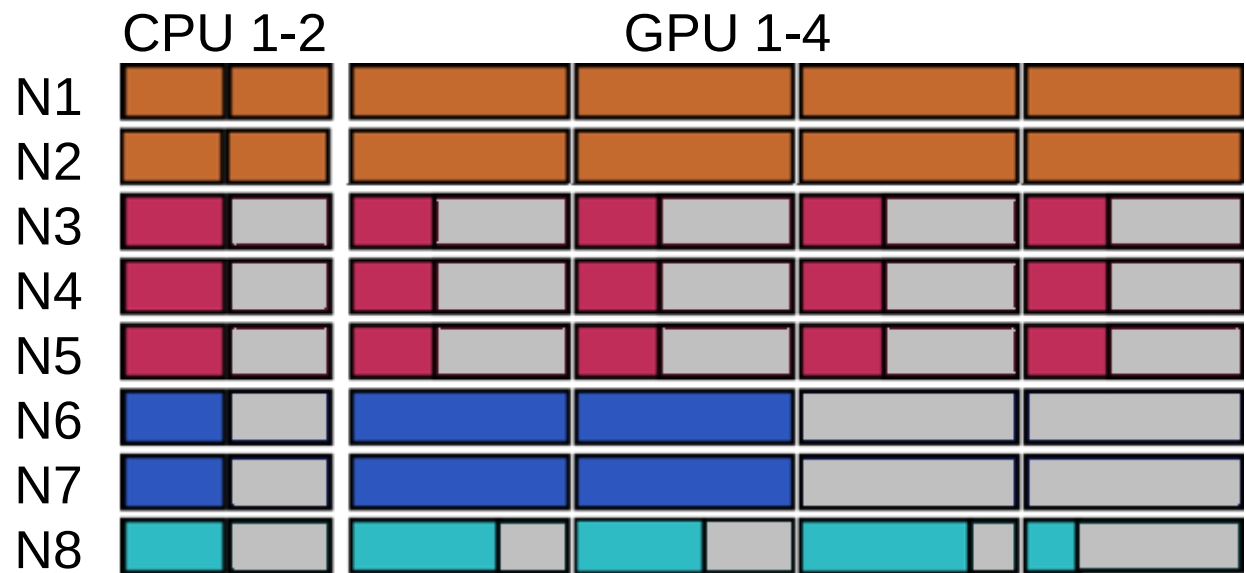
Timeline



Use Cases



Scheduling/Resource Management Optimisation – Example



Workloads	
Orange	Memory bound, uses all node resources
Blue	Uses 50% of the node resources
Pink & Cyan	Use varying parts of node resources
Green	Uses most node resources



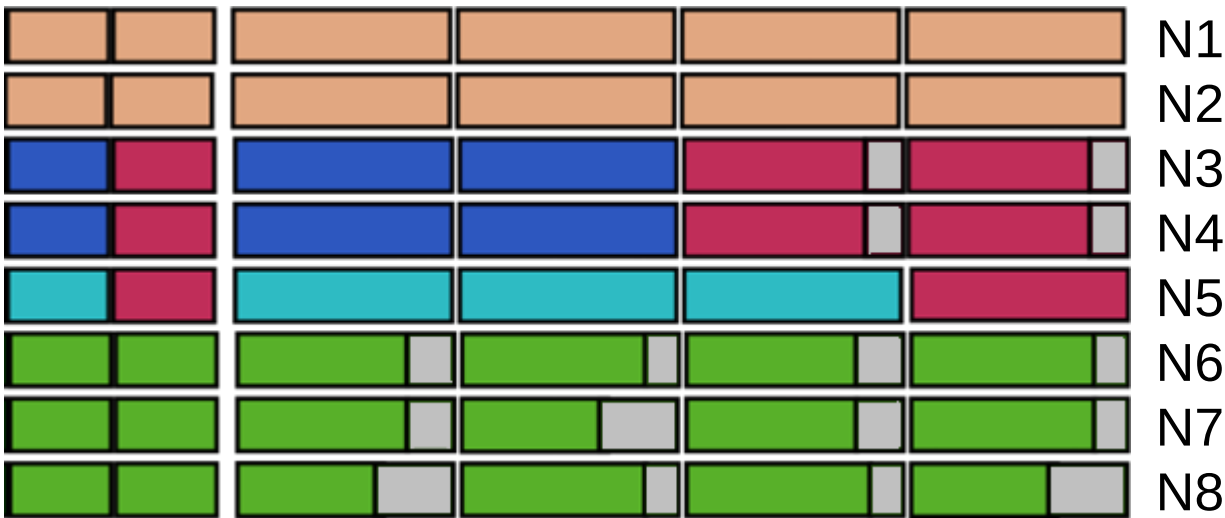
Clock down & save energy



Co-schedule three WLS



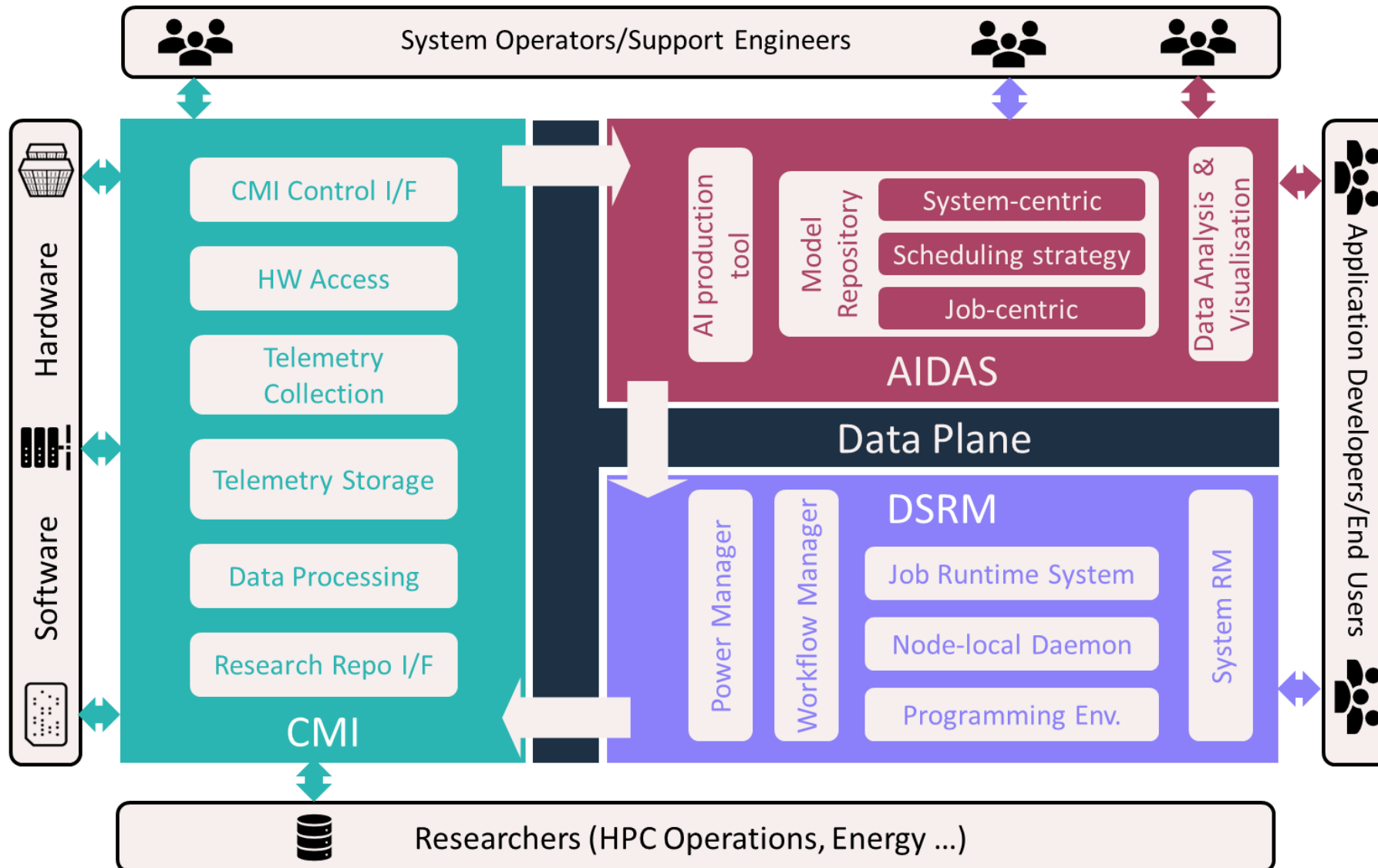
Run additional workloads



CPU 1-2

GPU 1-4

Software Architecture



Software Development Status and Next Steps

- SW Architecture defined and “starting” SW components identified
 - SEANERGYS is based on many well-established, solid SW packages
- Flux to serve the basis of the SEANERGYS system-scheduler/resource manager
 - Will leverage and extend compatibility-interfaces to ease transition from Slurm
- Early data plane implementation available
 - Serves as main integration layer
- Work on AI models progressing using pre-existing “zero-day” monitoring datasets
- Excellent collaboration with Flux team established
 - Work on integrating SEANERGYS job/node level daemons and workflow system
- First release of the SEANERGYS SW suite planned for end of 2026
 - Access to be provided via the SEANERGYS Website at <https://seanergys.eu/>



*: only a selection of SW packages shown

Consortium



Light blue background denotes HPC/AI centres

SEANERGYS carries on the torch from the DEEP-SEA and REGALE projects

DEEP-SEA



Thank you and Acknowledgements



Look at our Website: seanergys.eu

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EuroHPC
Joint Undertaking



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