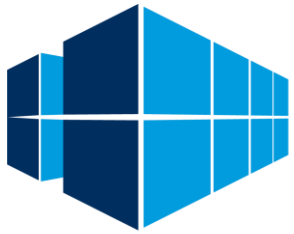
What Isambard has learned from the cloud

Dr Matt Williams

University of BRISTOL



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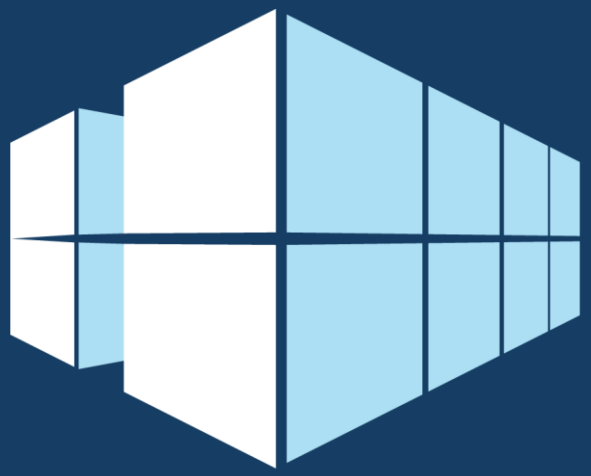

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Background:
The Isambards

Overview

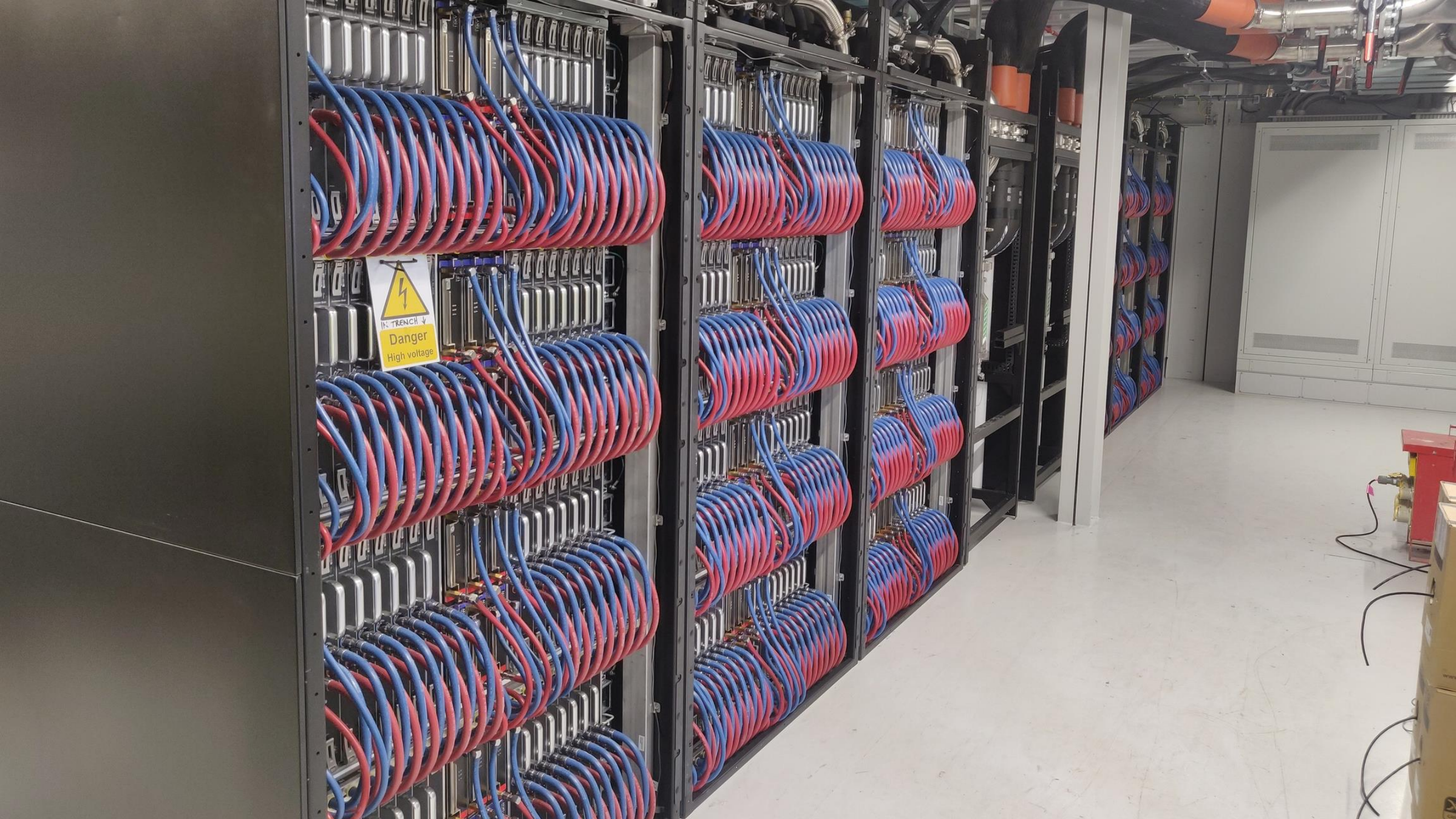
- There are two separate supercomputers:

  Isambard 3

  Isambard-AI

- Hosted in Northeast Bristol and run by the Bristol Centre for Supercomputing (BriCS), part of the University of Bristol.
- They are all physically hosted in Modular Data Centres
- They have different hardware, purposes and allocation models.


Department for Science, Innovation & Technology
UK Research and Innovation
Hewlett Packard Enterprise
NVIDIA
arm
BriCS
UNIVERSITY OF BRISTOL


IN TRENCH
Danger
High voltage

Isambard-AI

Rank	System	Cores	Rmax (PFlop/s)	Rpeak (PFlop/s)	Power (kW)
11	**Isambard-AI phase 2** - HPE Cray EX254n, NVIDIA Grace 72C 3.1GHz, NVIDIA GH200 Superchip, Slingshot-11, HPE Cray OS, HPE University of Bristol United Kingdom	1,028,160	216.50	278.58	

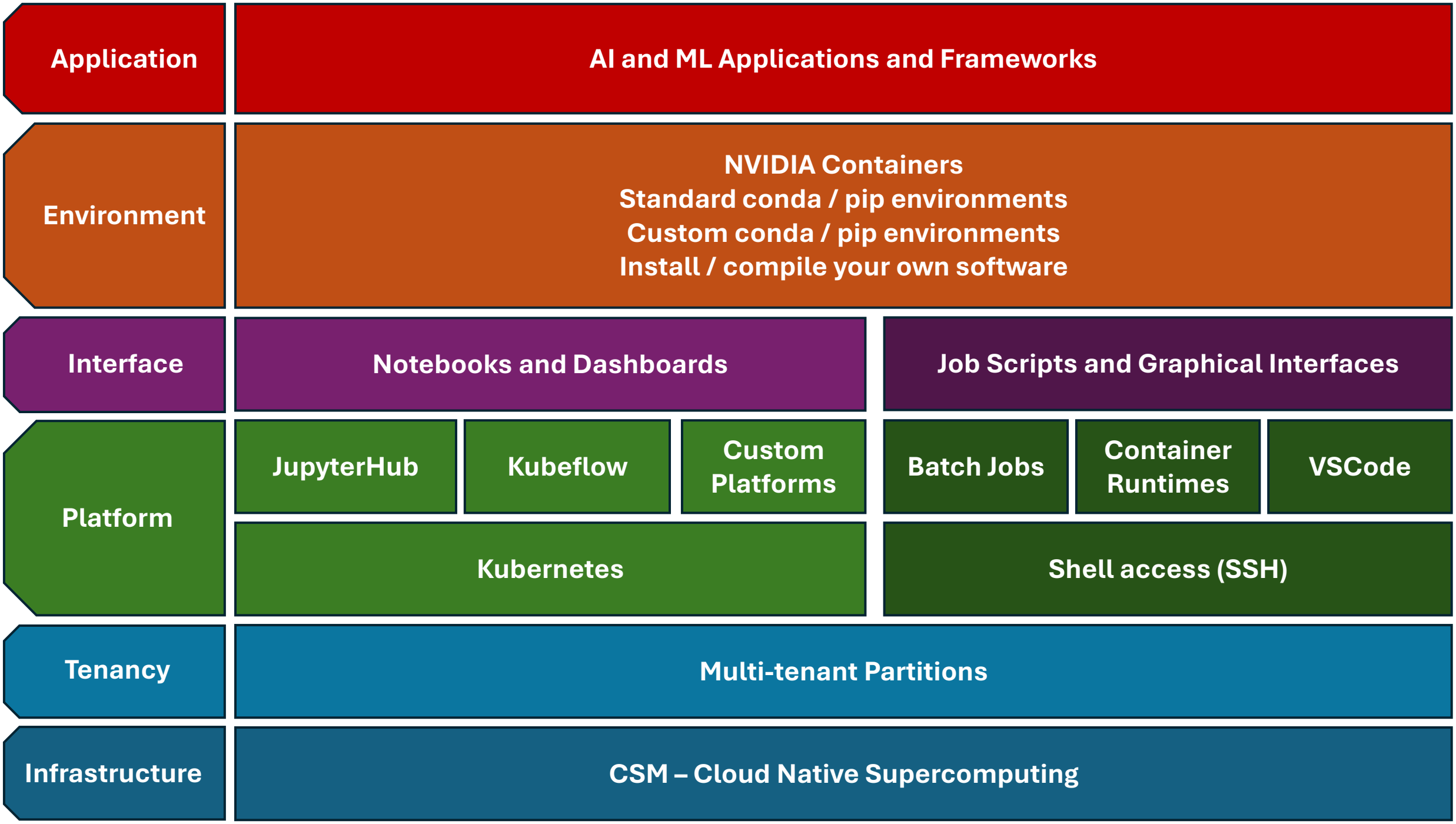
- Intended for AI/ML workloads
- 5,280 Grace Hopper superchips
- 25 PiByte all-flash storage
- ~5 MW
- Split into two parts: phase 1 and phase 2
  - Phase 1 is running for the last 10 months
  - Phase 2 is significantly larger and is coming online imminently


Isambard 03
GW4
UNIVERSITY OF BATH
University of BRISTOL
CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD
University of Exeter
UKRI
UK Research and Innovation

Isambard 3

- A more traditional HPC system
- 55,000 NVIDIA Grace-Grace ARM cores
- Slingshot 11
- 2 PiB storage
- 300 kW
- Funded by UKRI through GW4

Cloud-like services


Application
AI and ML Applications and Frameworks
Environment
NVIDIA Containers
Standard conda / pip environments
Custom conda / pip environments
Install / compile your own software
Interface
Notebooks and Dashboards
Job Scripts and Graphical Interfaces
Platform
JupyterHub
Kubeflow
Custom Platforms
Batch Jobs
Container Runtimes
VSCode
Kubernetes
Shell access (SSH)
Tenancy
Multi-tenant Partitions
Infrastructure
CSM – Cloud Native Supercomputing

View Edit

BriCS Technical Team

Bristol Centre for Supercomputing

Project dashboard Resources Team Audit logs

Project cost

NHR 15,436.11

↑ 64030.08% vs last month

Team size

19 members

AF EW IP JW +14

Aggregate usage and limits

15,436.106/5,000,000 NODE

Credits

NHR 1,000,000.00

- Total
- Estimate for the current month

View | Edit

BriCS Technical Team

Bristol Centre for Supercomputing

Project dashboard | Resources | Team | Audit logs

Resources

Search... | Export | Add

Name	Category	Offering	Created at	State	Actions
	Bristol Centre for Supercomputing		2025-06-26 04:12	OK	
Isambard-AI Phase 1 Notebook	Bristol Centre for Supercomputing	Isambard-AI Phase 1 Notebook	2025-02-28 05:18	OK	
Isambard 3 MACS	Bristol Centre for Supercomputing	Isambard 3 Multi Architecture System	2025-02-06 12:30	OK	
Isambard 3	Bristol Centre for Supercomputing	Isambard 3	2025-02-06 11:28	OK	
Isambard-AI Phase 1	Bristol Centre for Supercomputing	Isambard-AI Phase 1	2025-02-06 07:49	OK	

Server Options

Required settings

Choose a project: brics.brics: BriCS Technical Team

Select job duration: 4h

Select number of GH200s: 4

Optional settings

Leave empty to use default values

Enter partition:

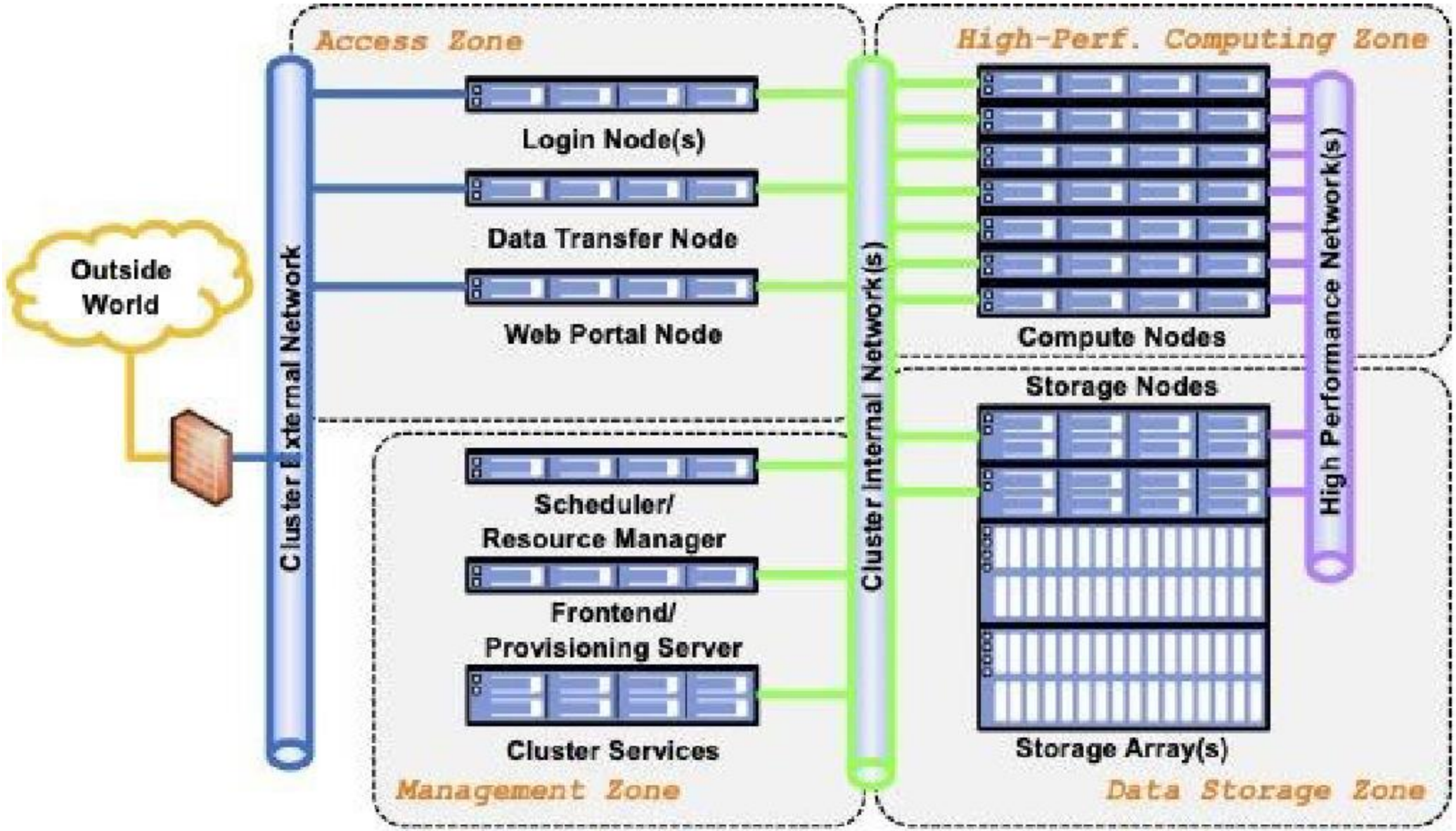
Enter reservation:

Start

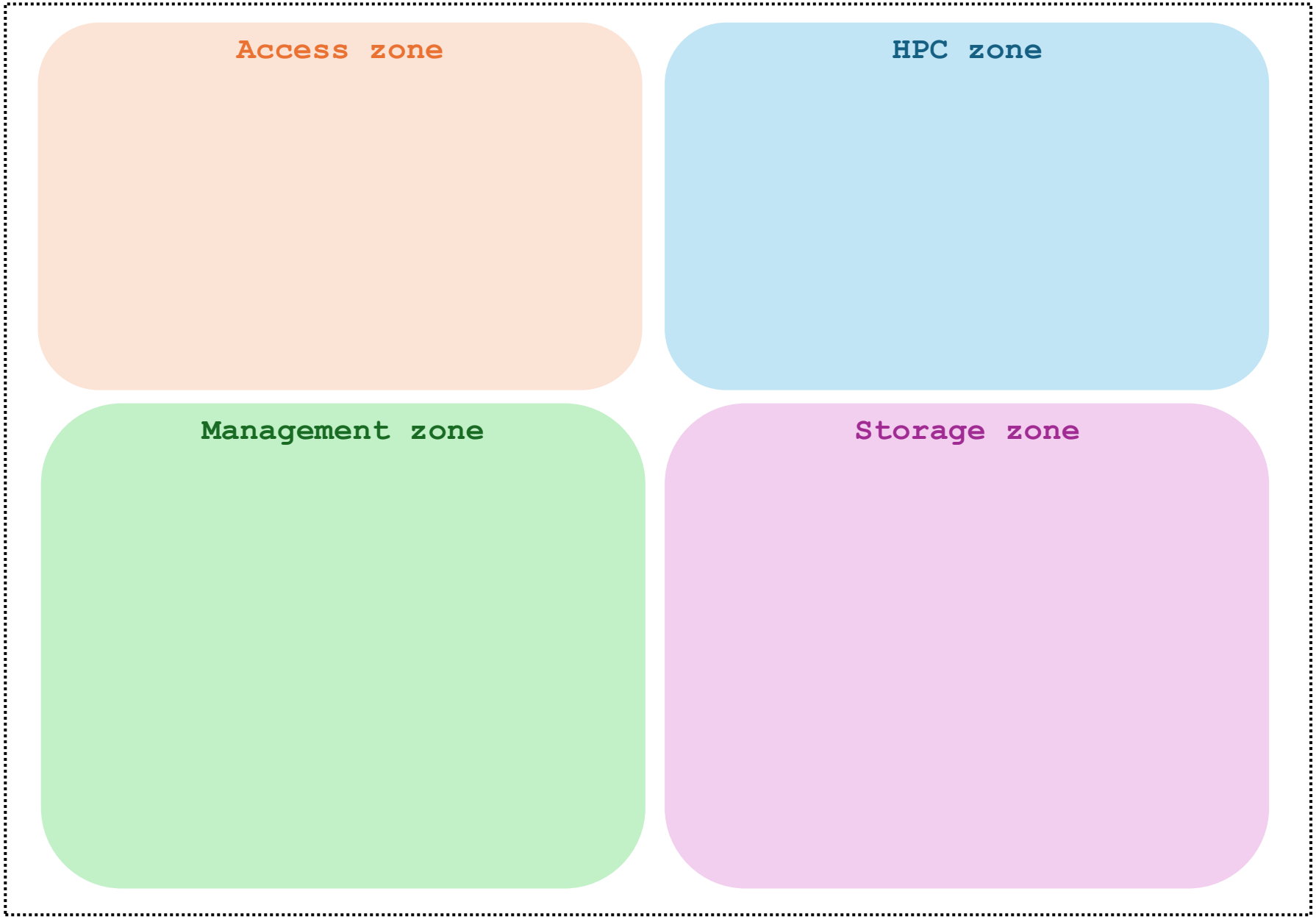
Cloud-like services

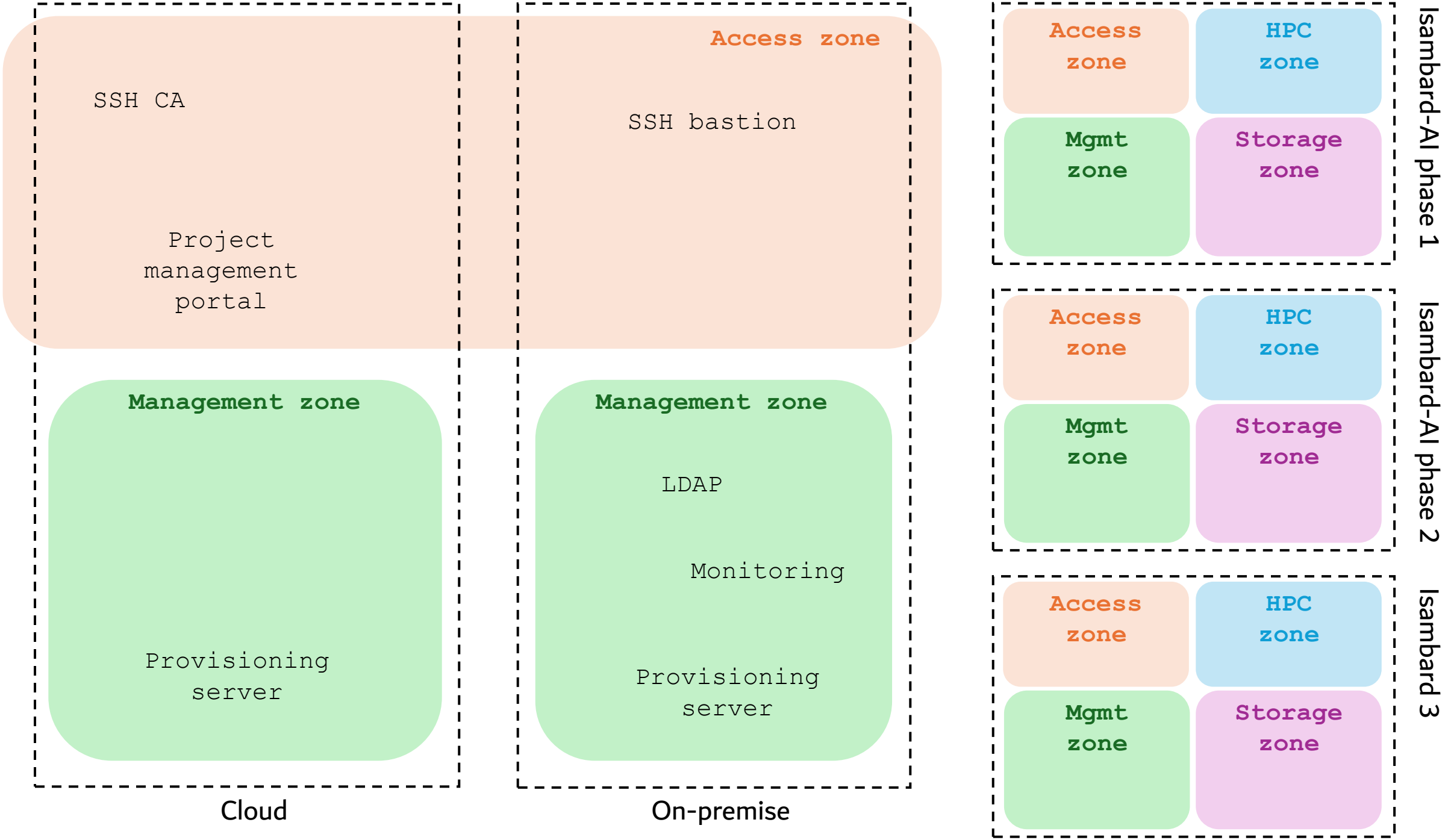
- Many users of our systems are coming from cloud environments
- Some are used to marketplace systems with managed applications
- Many use base VMs they manage themselves
- We will provide platforms and services where deep integration is needed
  - Self-service model elsewhere
- We are container-first and moving towards Kubernetes

Cloud for infrastructure


Access Zone
High-Perf. Computing Zone
Outside World
Cluster External Network
Login Node(s)
Data Transfer Node
Web Portal Node
Cluster Internal Network(s)
Compute Nodes
High Performance Network(s)
Storage Nodes
Scheduler/
Resource Manager
Frontend/
Provisioning Server
Cluster Services
Storage Array(s)
Management Zone
Data Storage Zone

Isambard-AI phase 1




Access zone
SSH CA
SSH bastion
Project management portal
Management zone
Management zone
LDAP
Monitoring
Provisioning server
Provisioning server
Cloud
On-premise
Access zone
HPC zone
Mgmt zone
Storage zone
Isambard-AI phase 1
Access zone
HPC zone
Mgmt zone
Storage zone
Isambard-AI phase 2
Access zone
HPC zone
Mgmt zone
Storage zone
Isambard 3

Cloud for infrastructure

- Using the cloud as a security boundary
- User authentication is done entirely off-site
  - Authorisation is done locally
- Management of cloud resources is siloed from on-site

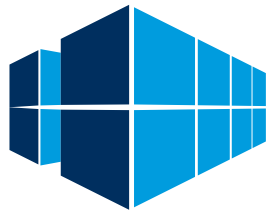
- Considering management failure modes from internet traffic
- Performance/latency of cloud-based management means we run things on-site

Thank you

Matt Williams
matt.williams@bristol.ac.uk

brics-enquiries@bristol.ac.uk

University of BRISTOL



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