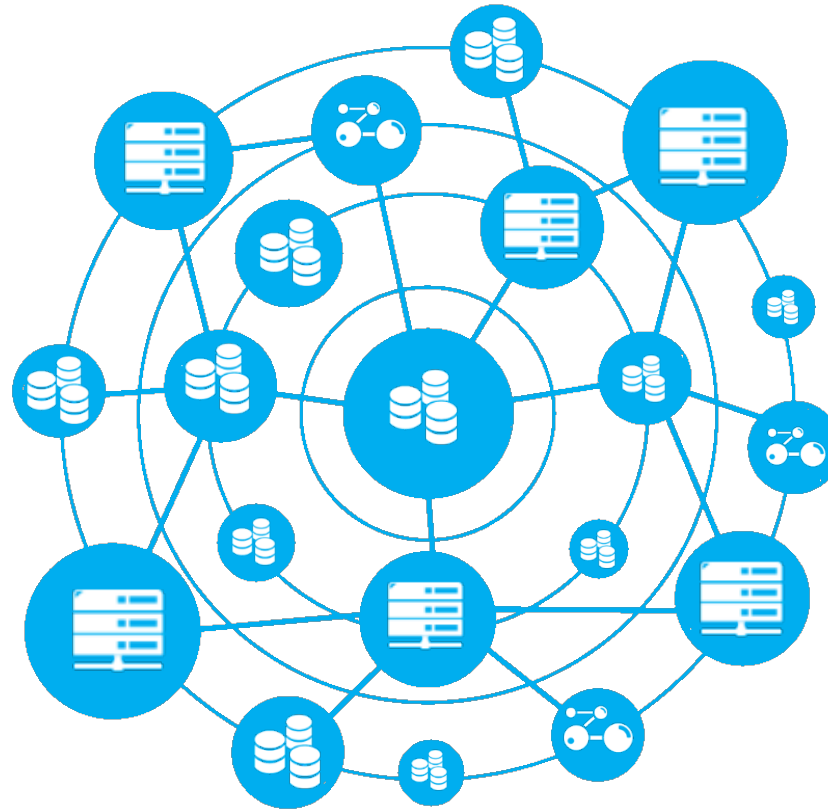


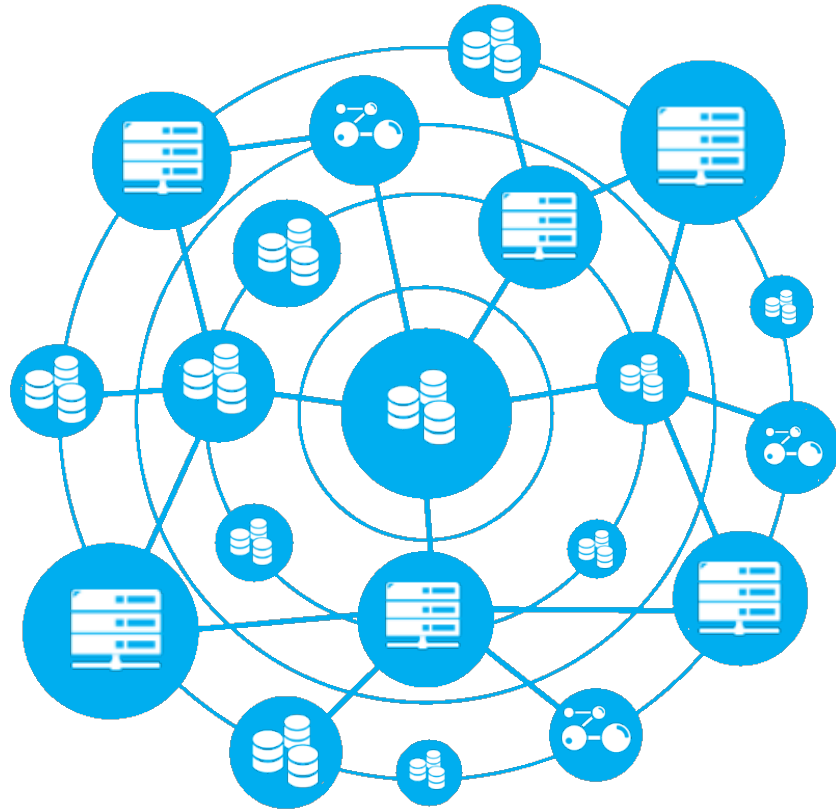
MESONET

le mésocentre des mésocentres



MESONET

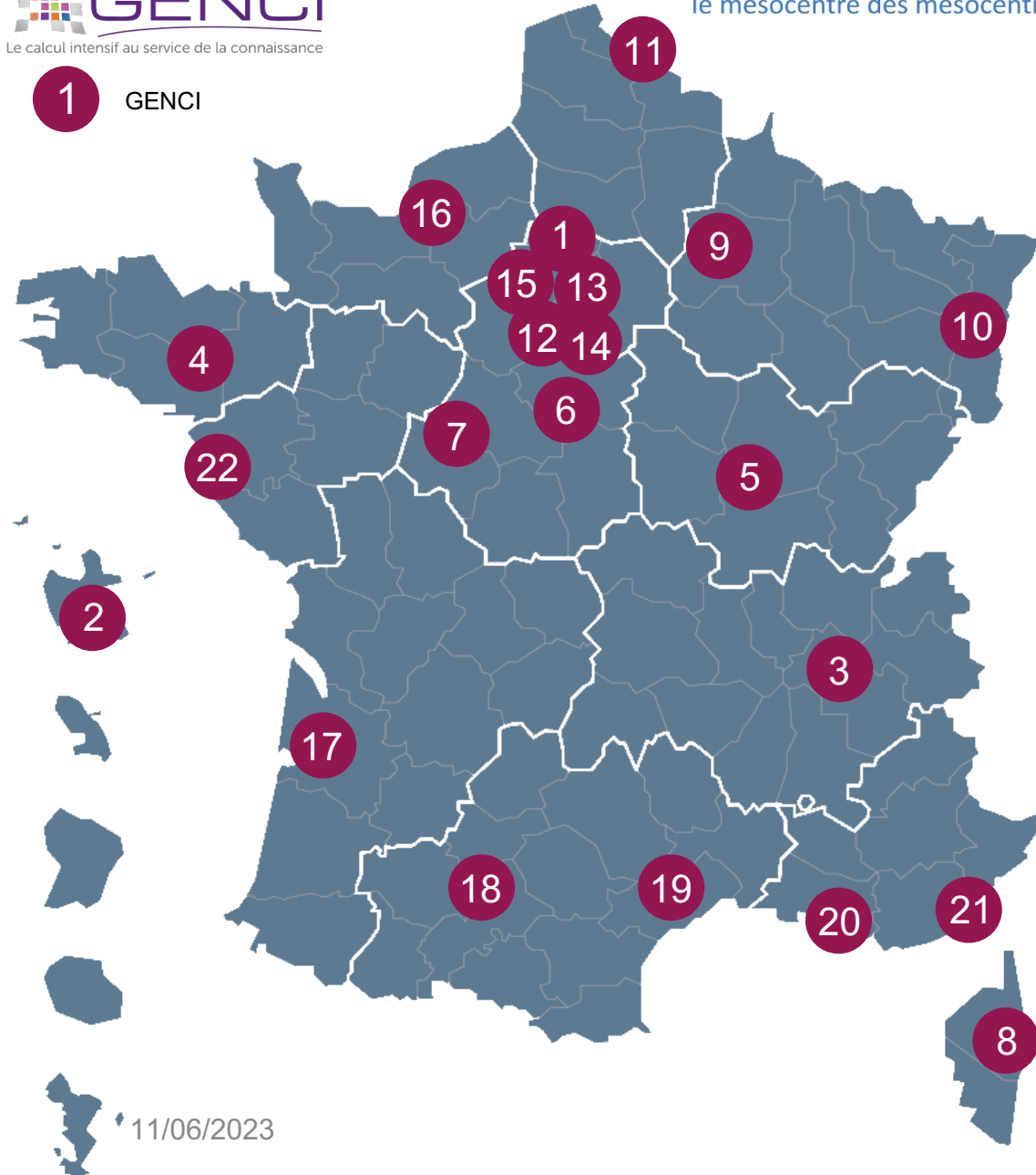
le mésocentre des mésocentres



Anne LAURENT

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A regional HPC centre
on a national scale



2 University of the West Indies



3 CINAURA (Grenoble Alpes University, FLMSN)



4 GIP numérique de Bretagne



5 University of Burgundy Franche Comté (UBFC)



6 University of Orléans CaSciModOT Federation



7 University of Tours CaSciModOT Federation



8 University of Corsica Pascal Paoli



9 University of Reims Champagne-Ardenne



10 University of Strasbourg



11 University of Lille



12 Paris Saclay University



13 Supelec power station



14 ENS Paris Saclay



15 Paris sciences et lettres (including Observatoire de Paris)



16 CRIANN (Rouen)



17 University of Bordeaux



18 University of Toulouse (Calmip)



19 University of Montpellier (ISDM-Meso)



20 Aix-Marseille University



21 Côte d'Azur University



22 Centrale Nantes

MesoNET's objectives

1 - Set up a distributed national *mesocentre* infrastructure

- Strengthen the structure of the regional offering
- Propose HPC / AI infrastructures at the highest technological level
- Integrate new communities
- Encourage Third-Party1-Third-Party2 exchanges (national and regional centres)
- Providing an agile infrastructure for code development
- Strong action on training
- Integrate into the national and European vision

*14.2 M funded
total budget €30.4 M
started 01/10/2021
duration of 6 years*

MesoNET's objectives

- Set up a distributed national *mesocentre* infrastructure
- Creating a Research Infrastructure (IR)

Politique d'infrastructure de recherche



La stratégie nationale des infrastructures de recherche

Plus que jamais auparavant, les enjeux scientifiques posent le défi de construire des outils de recherche à la pointe des connaissances scientifiques et technologiques. Les frontières de la connaissance ont reculé jusqu'à des extrêmes que seules des...



PORTAL

OPEN SCIENCE / OPEN DATA

Visible part
SI Research / project
Allocations
Open science / Open data

Interaction with experts

Actions



PORTAL

SHARED SUPPORT



OPEN SCIENCE / OPEN DATA

7 permanent recruitments
Shared support (AI, HPC, etc.)

Local resources for keeping equipment operational

The actions



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OPEN SCIENCE / OPEN DATA

SHARED SUPPORT

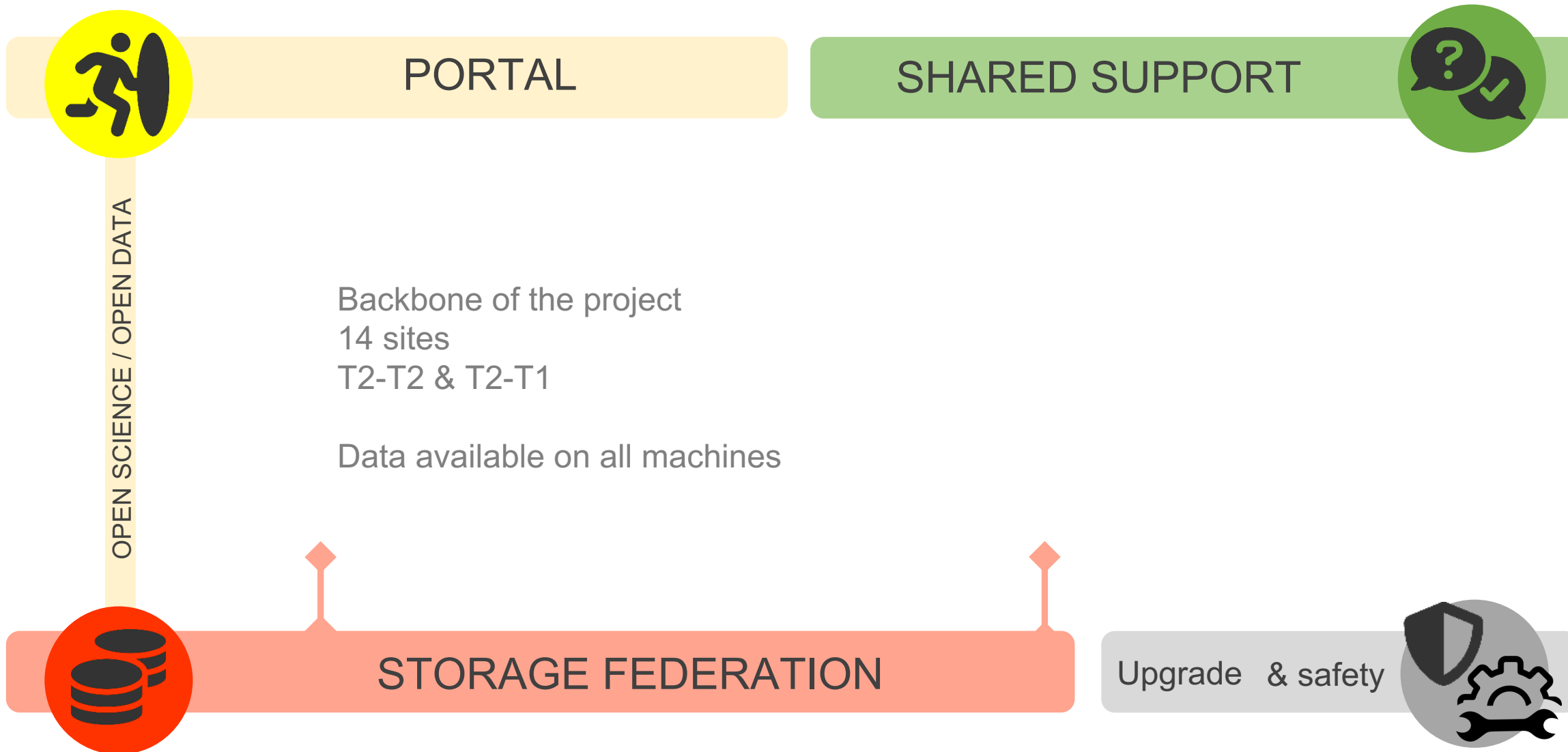


Audit of 13 partners
Upgrades (network, other)

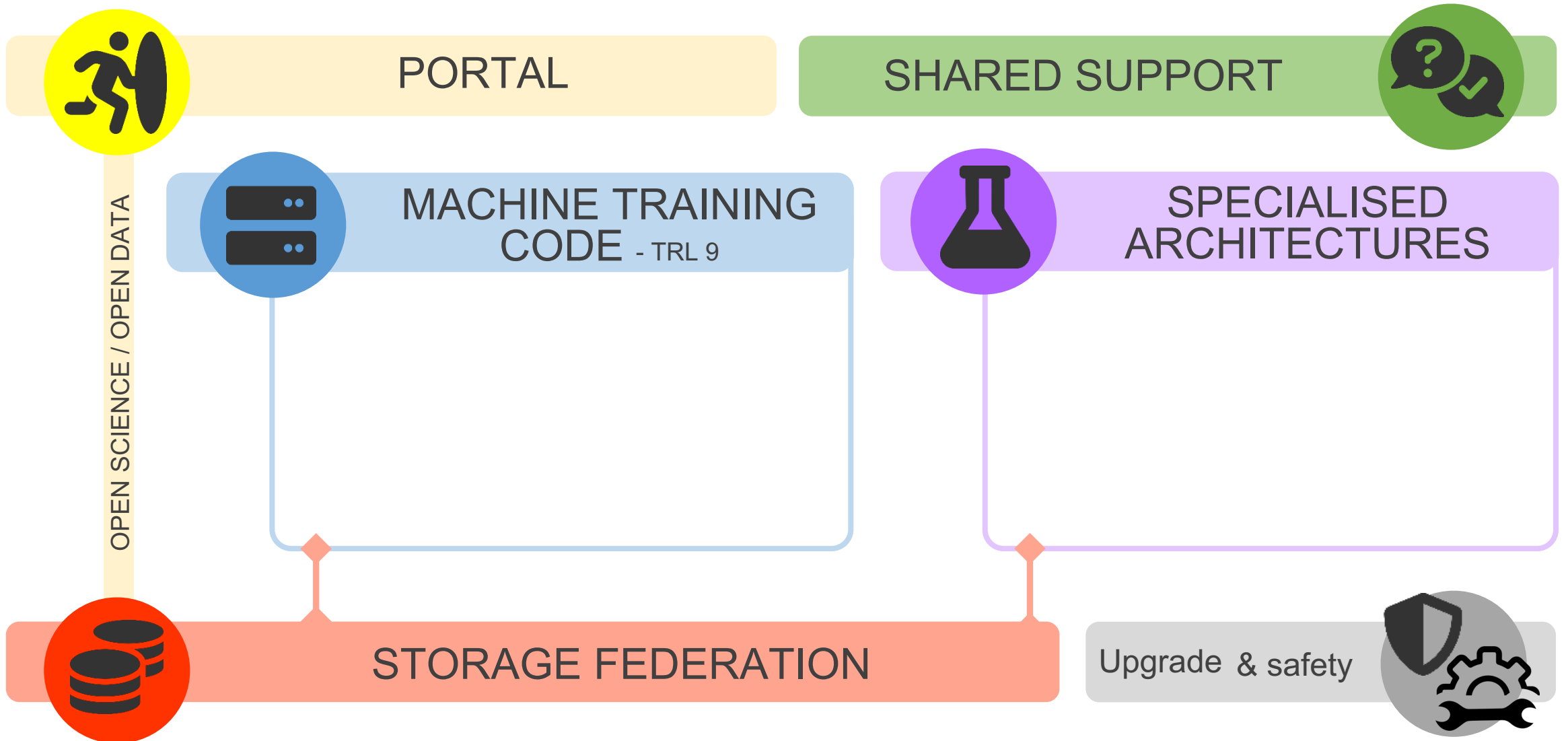
Upgrade & safety



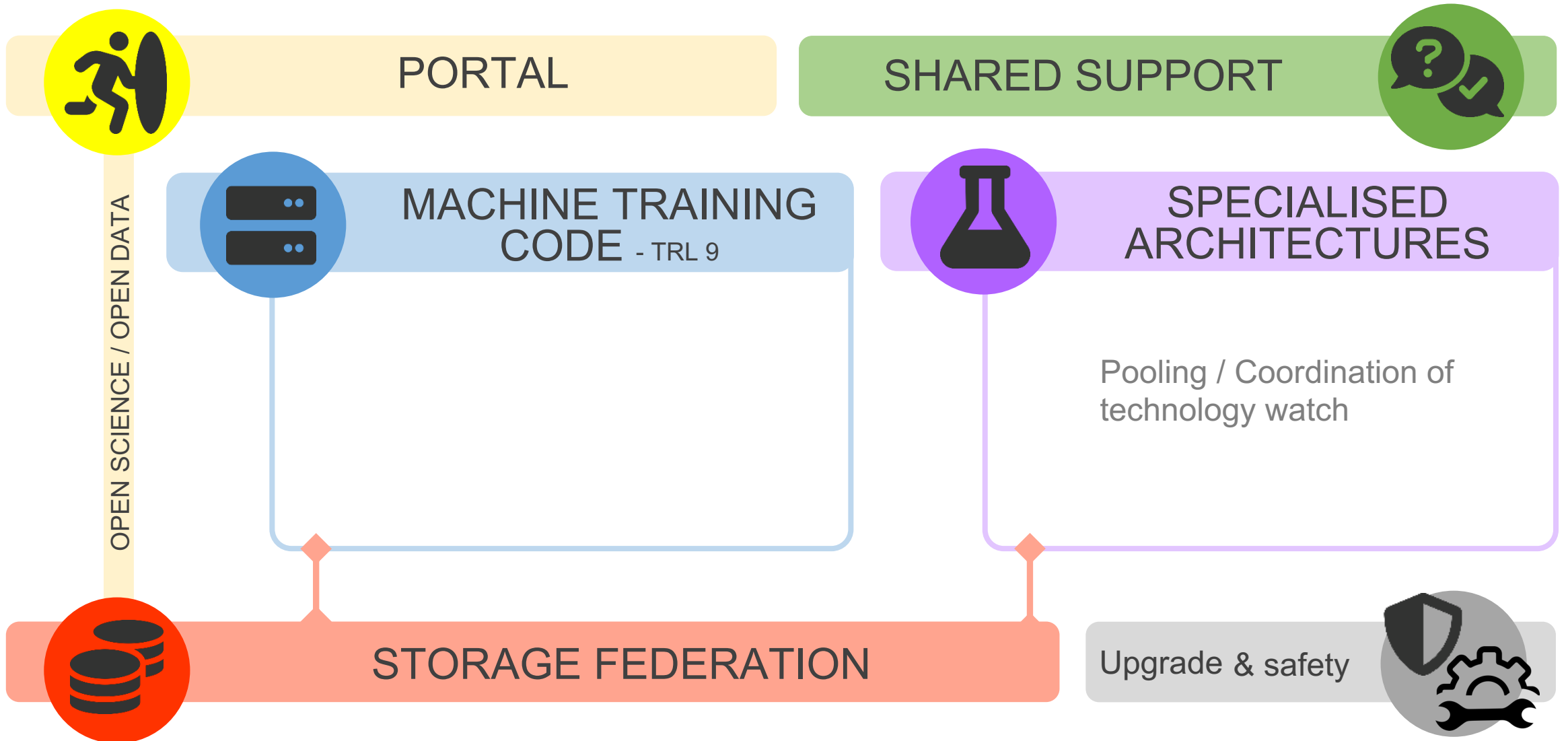
The actions



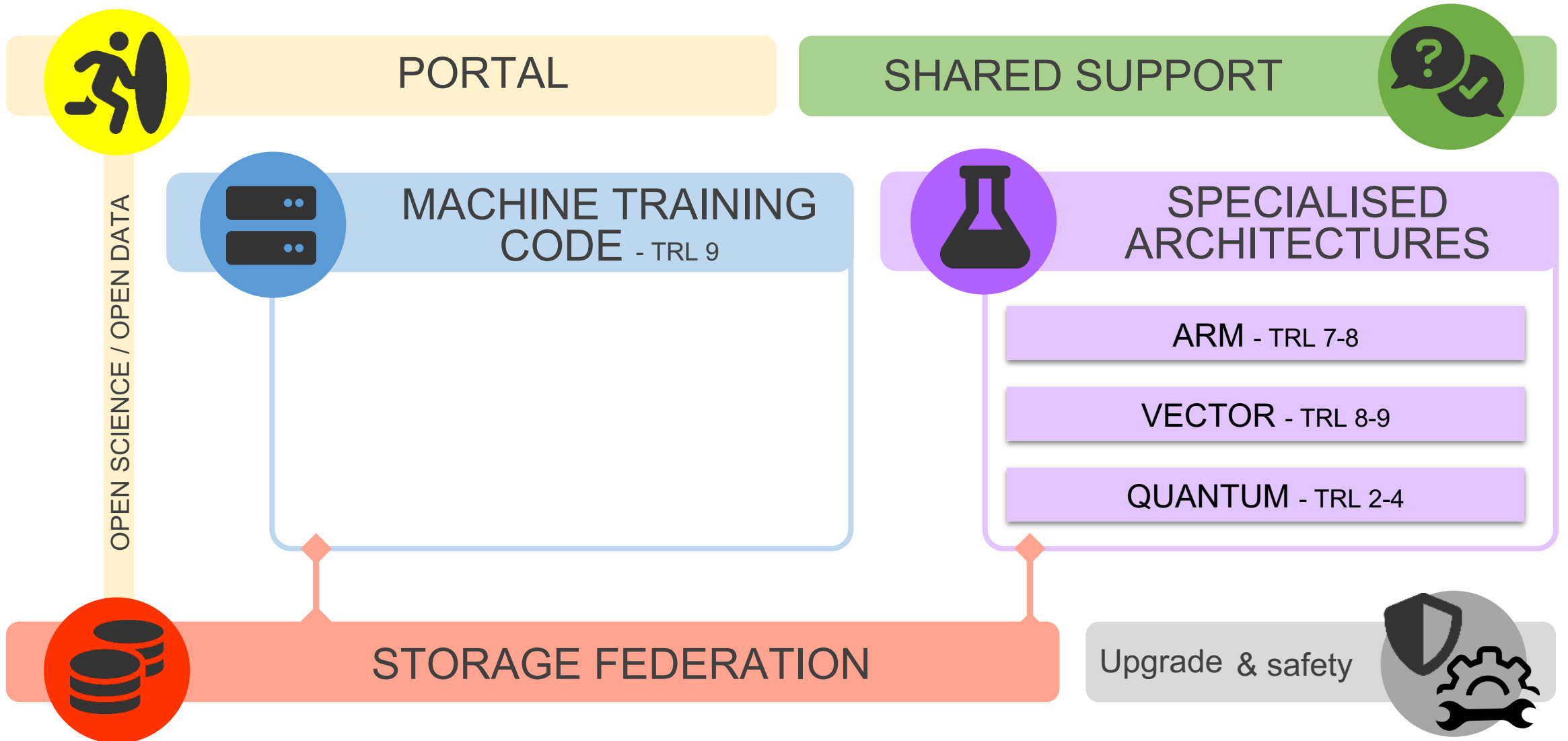
The actions



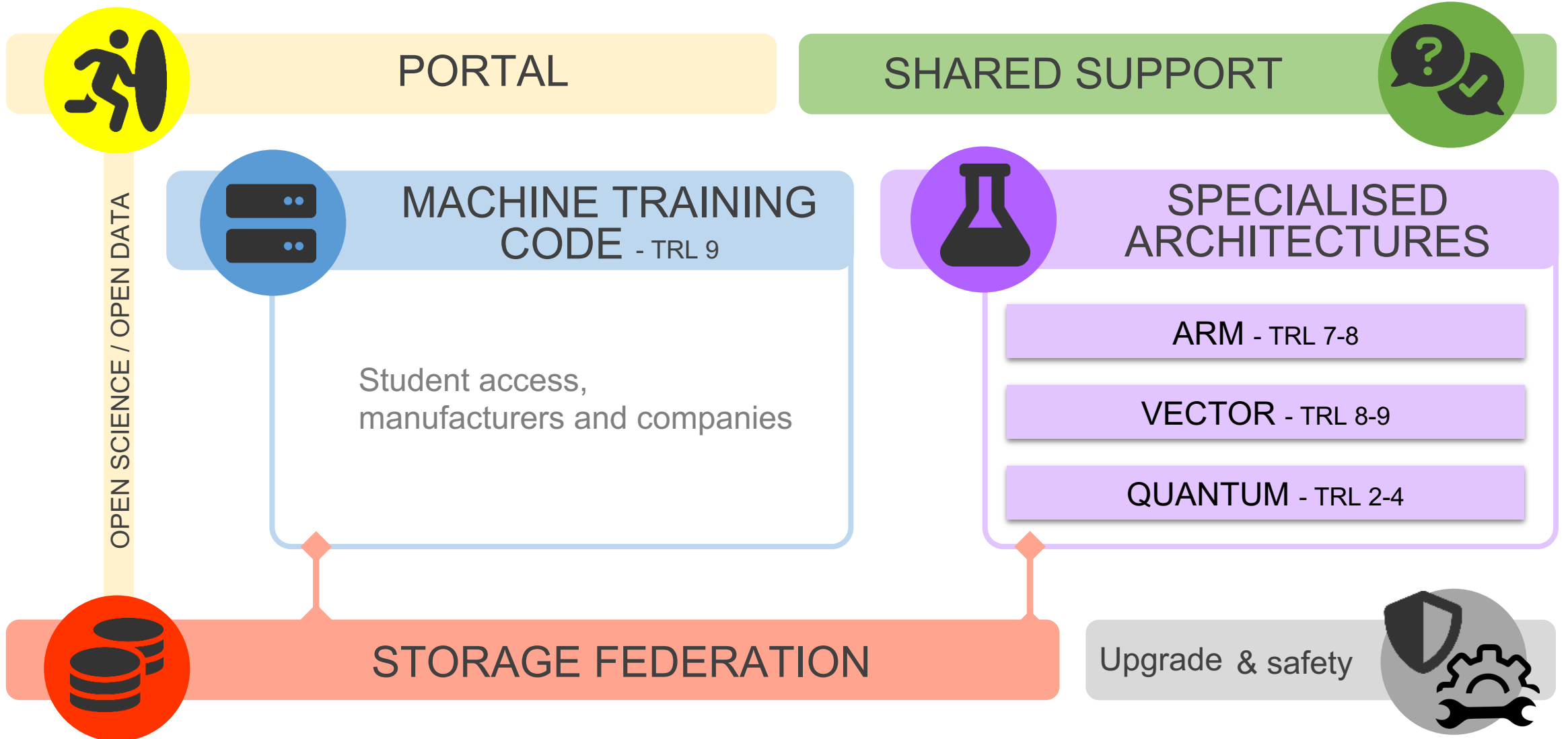
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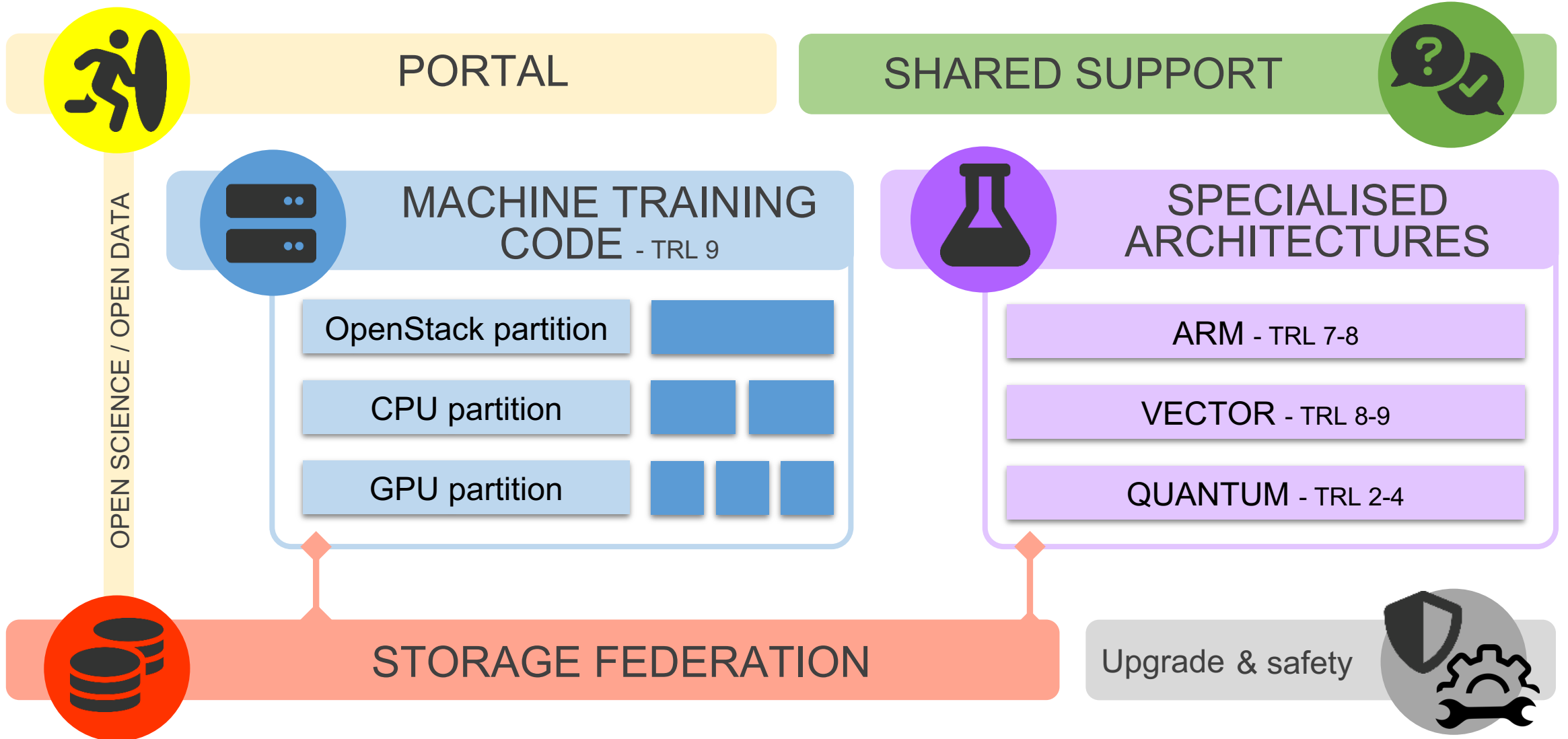
The actions



The actions



The actions



Actions



Company



PORTAL

SHARED SUPPORT



OPEN SCIENCE / OPEN DATA



MACHINE TRAINING CODE - TRL 9

- OpenStack partition
- CPU partition
- GPU partition



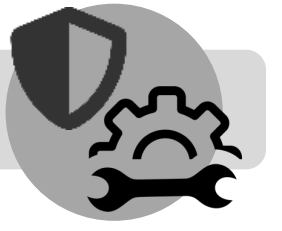
SPECIALISED ARCHITECTURES

- ARM - TRL 7-8
- VECTOR - TRL 8-9
- QUANTUM - TRL 2-4



STORAGE FEDERATION

Upgrade & safety



Services for users

Teachers, students, industry, researchers



Researchers :

- Easy access (uniform) and free (allocation process)
- State-of-the-art machines, specialised architectures, training, support, software tools
- Data availability between MesoNET centres and national centres



Teachers, Students :

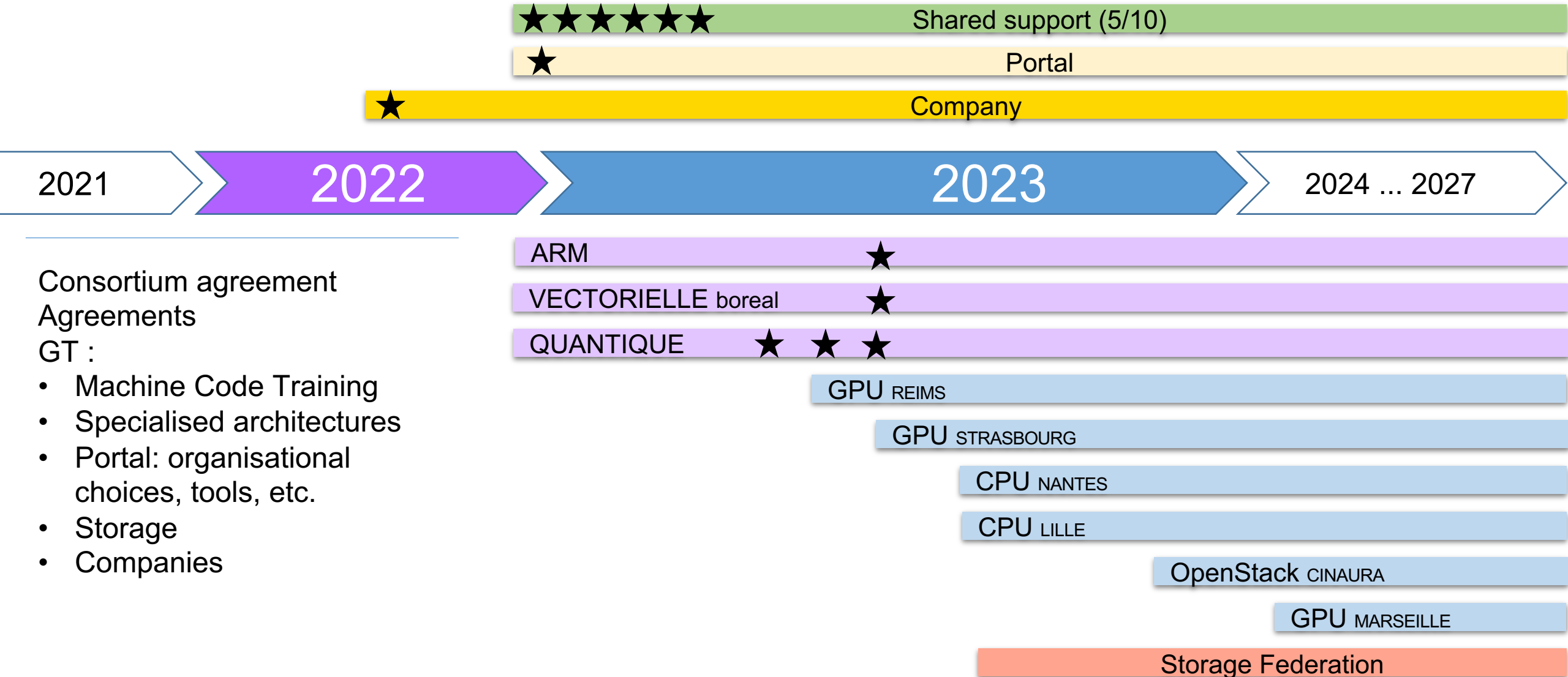
- Machines outside ZRR (Restricted Access Zone) & Cloud
- Access to and creation of educational content
- Restricted access in class mode and free access in project mode



Manufacturers :

- Pay access
- Services offered in conjunction with the French *Competence Centre* (EuroHPC)

The schedule



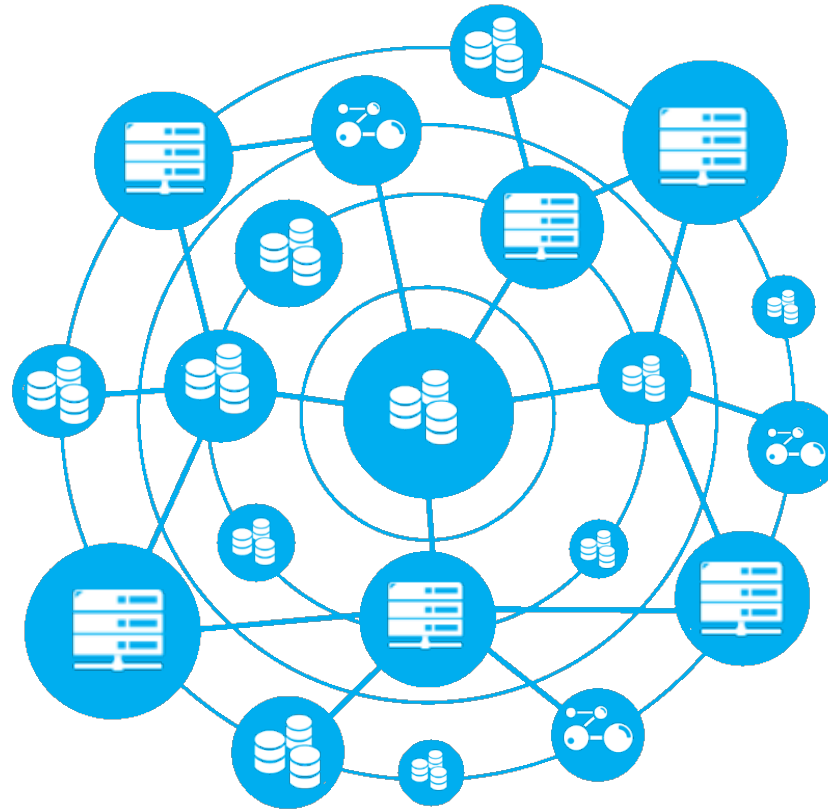
Consortium agreement
Agreements

GT :

- Machine Code Training
- Specialised architectures
- Portal: organisational choices, tools, etc.
- Storage
- Companies

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<https://mesonet.fr>

contact@mesonet.fr

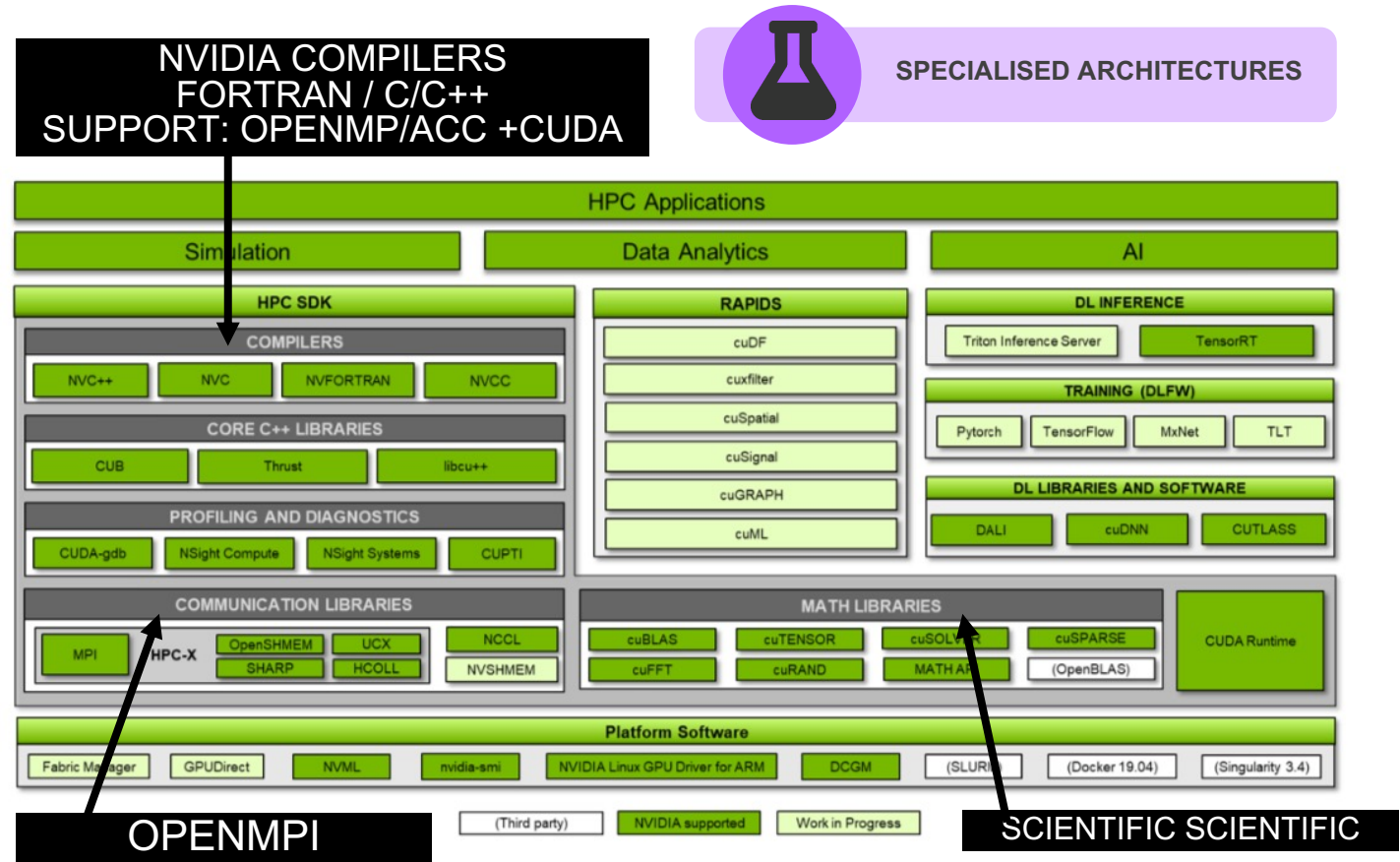
Specialised architectures



TURPAN ARM Prototyping Machine

Toulouse computing centre CALMIP

- 15 ARM Nvidia nodes interconnected in Infiniband
 - 1 * ARM 80-core 2.8 Ghz, v8 processor
 - 2 * Nvidia A100-80 GPU (80 GB HBM2)
 - 512 GB RAM (8*64 GB @ DDR4 3200 GT/s)
 - 2 HDR infiniband cards
- 350 TB storage
 - Hot' storage (scratch+project)
 - SSD cache (I/O acceleration)
 - NFS
- 2 * Connection frontals
 - ARM
- 2 * Pre- and post-processing servers
 - 2 * Milan 7313 16c
 - 512 GB
 - 2 * A49 48 GB
 - VirtuaGL + TurboVNC
- Nvidia HPC SDK, ARM & GNU



Pre-prod: Q1 2023

Quantum QLM training and support

Supported by the University of Reims / ROMEQ Mesocentre



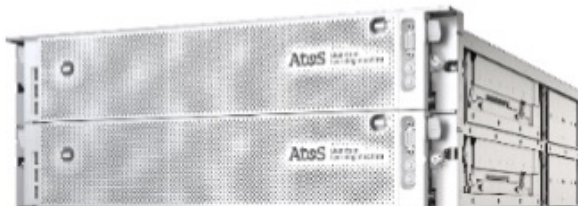
SPECIALISED ARCHITECTURES

Plenary Conference
"State of the Art in Quantum Computing"

Quantum Education

- 36 days of training
- Courses & Practical work
- Sessions of 5 to 10 users.
- on site, video or hybrid

Events & Activities



Introduction (1 day)

Notions : Bool algebra, Sets, Geometry, Linear algebra, Probabilities, States, Qubits, quantum gates, superposition, entanglement, Quantum circuit design

Practical work: EPR Pair, Qubit Teleportation, Measurement

Start date: June 2023

Advanced (3 days)

Starting with the myQLM : documentation, tutorials, pyAQASM, gates, QLib, ...

Quantum circuits: writing, exploring, execution, noiseless simulation options

Discovery of classical algorithms: EPR pair, Qubit **teleportation**

Advanced features of myQLM : Circuits, parametrized gates, plugins, topology

Discovery of advanced quantum algorithms: Amplitude amplification, phase estimation, adiabatic computing

Connection to QLM for advanced features: Advanced Simulators, Optimization, Noise model

Themes (1 day each)

Algorithms: Grover, Shor, QAOA-type variational algorithm

Applications: CFD, EQA Chemistry, Combinatorial Analysis

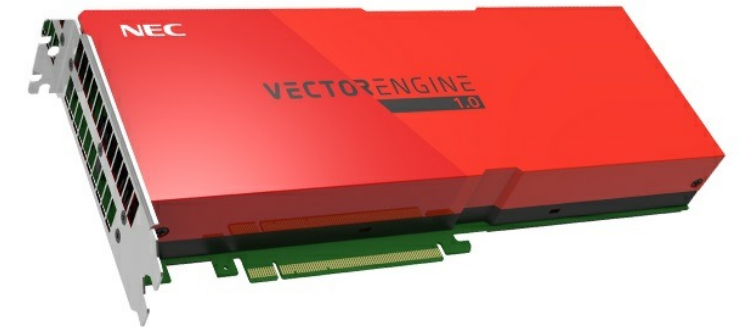
Large Bore Vector Machine

Normandy Computing Centre CRIANN

- Supply awarded to NEC in April 2022
- 1st stage (end of 2022)
 - (9 compute nodes) x (8 Vector Engines)
 - InfiniBand interconnect (HDR, 2x200 Gbit/s per node)
 - Spectrum Scale (500 TB, 3.5 GB/s)
 - Vector Engine: SX-Aurora TSUBASA 20B
 - 8 cores 1.6 GHz
 - 64 registers of 256 double precision elements (16384 bits) per core
 - 48 GB HBM2 (High Bandwidth Memory)
 - 1.53 TB/s memory bandwidth
- 2nd stage (2024) will double the capacity



SPECIALISED ARCHITECTURES



Avail: Q1 2023