



JOURNÉE DE RENCONTRE DES UTILISATEURS DU PÔLE DE CALCUL INTENSIF POUR LA MER

PIERRE COTTY



Le programme de la journée

- 9 h 40 - 12 h 10 DATARMOR: nouveau périmètre, nouvelles perspectives
- *Pause déjeuner : buffet*
- 14 h 00 - 16 h 30 DATARMOR: nouveaux champs d'applications scientifiques
- Poster et Discussions autour d'un pot

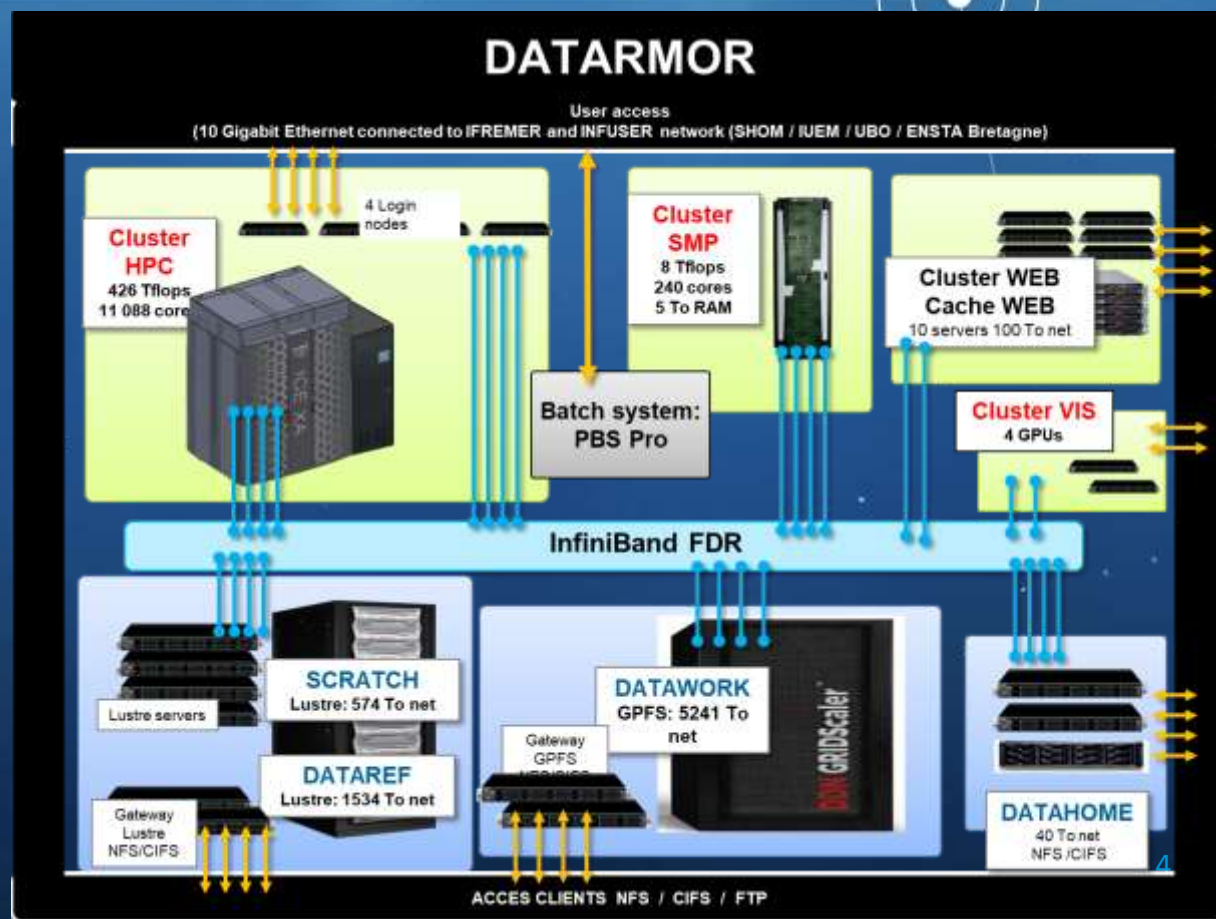


DATARMOR AND NEW TOOLS

Tina ODAKA



DATARMOR



ACCES CLIENTS

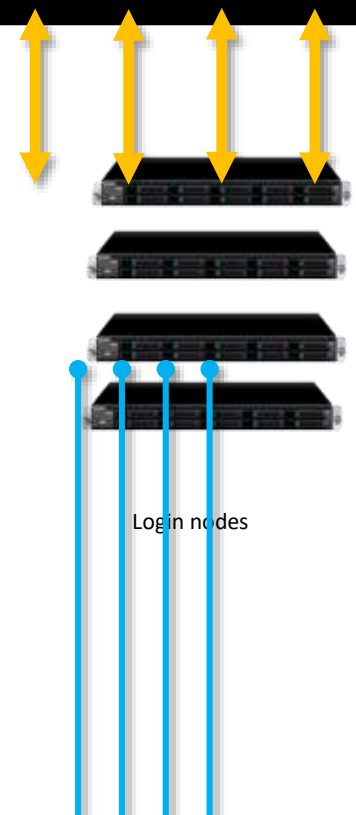
(10 Gigabit Ethernet connected to IFREMER and INFUSER network (SHOM / IUEM / ENSTA Bretagne)

Cluster HPC



426 Tflops
11 088 cores
396 Nodes

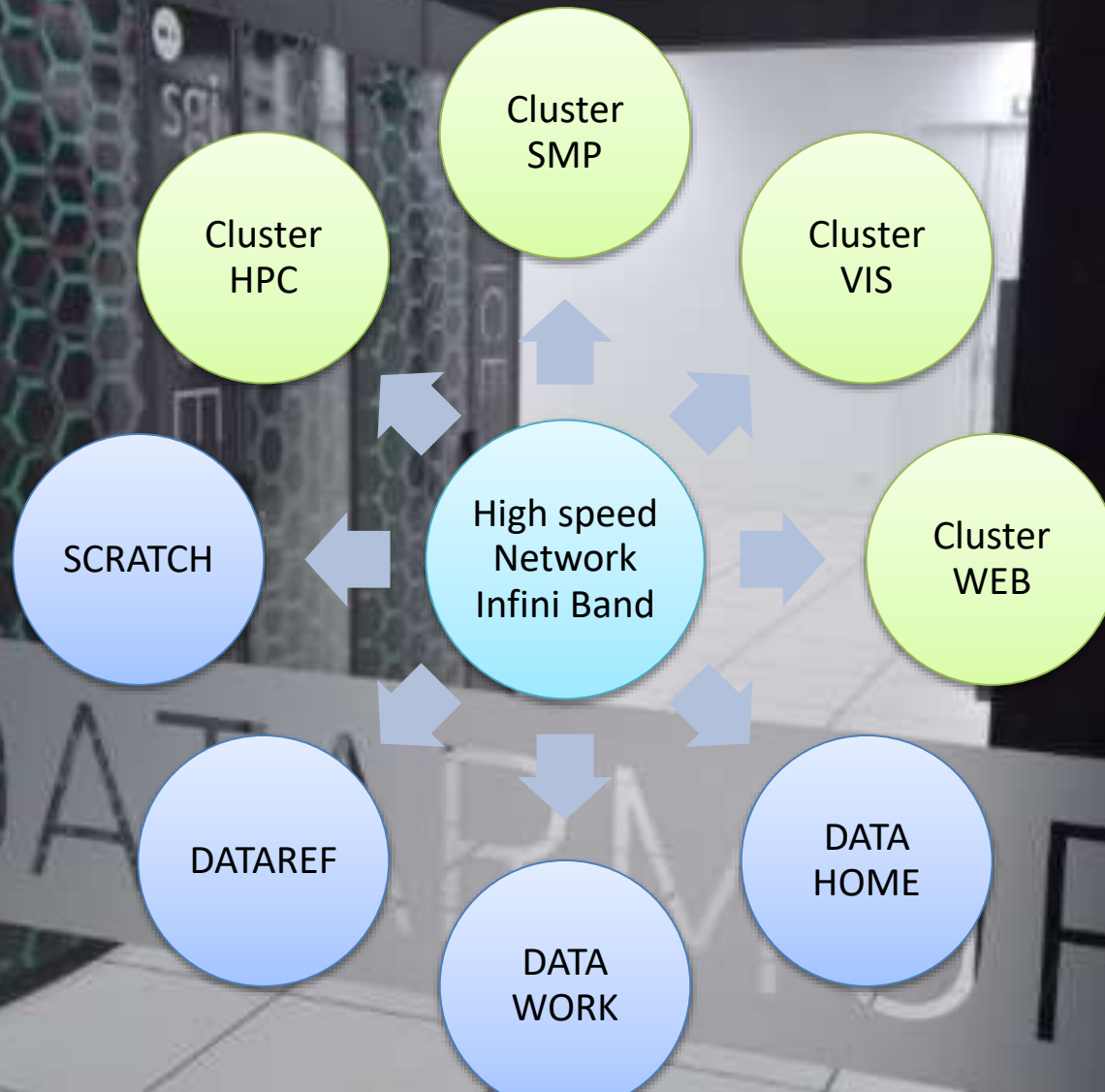
PBS Pro; sharing computing resources



RANKING

List	Rank	System	Vendor	Cores	Rmax (TFlops)	Rpeak (TFlops)	Power (kW)
11/2016	446	SGI ICE XA, Xeon E5-2680v4 14C 2.4GHz, Infiniband FDR	HPE/SGI	10,976	388.7	421.5	

DATARMOR: not only HPC



DISK

- **DATAREF (LUSTRE, 1.5PB = 1395TiB)**
 - Reference data (next presentation)
- **DATAWORK (GPFS, 5PB = 4500TiB)**
 - Work data
 - User space and project space
- **SCRATCH (LUSTRE)**
 - Scratch file for
 - 15 days max
- **DATAHOME (GPFS)**
 - Source codes
 - with backup

PB ? TiB??

comparisons with International System of Units (SI) prefixes

one kibibit 1 Kibit = 2^{10} bit = 1024 bit

one kilobit 1 kbit = 10^3 bit = 1000 bit

one mebibyte 1 MiB = $(2^{10})^2$ B = 1 048 576 B

one megabyte 1 MB = $(10^3)^2$ B = 1 000 000 B

one gibibyte 1 GiB = $(2^{10})^3$ B = 1 073 741 824 B

one gigabyte 1 GB = $(10^3)^3$ B = 1 000 000 000 B

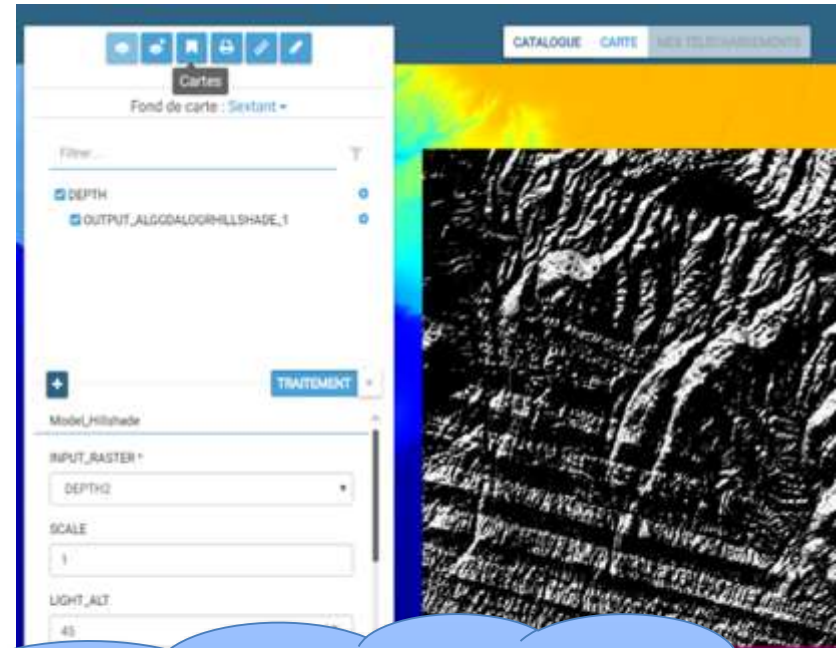
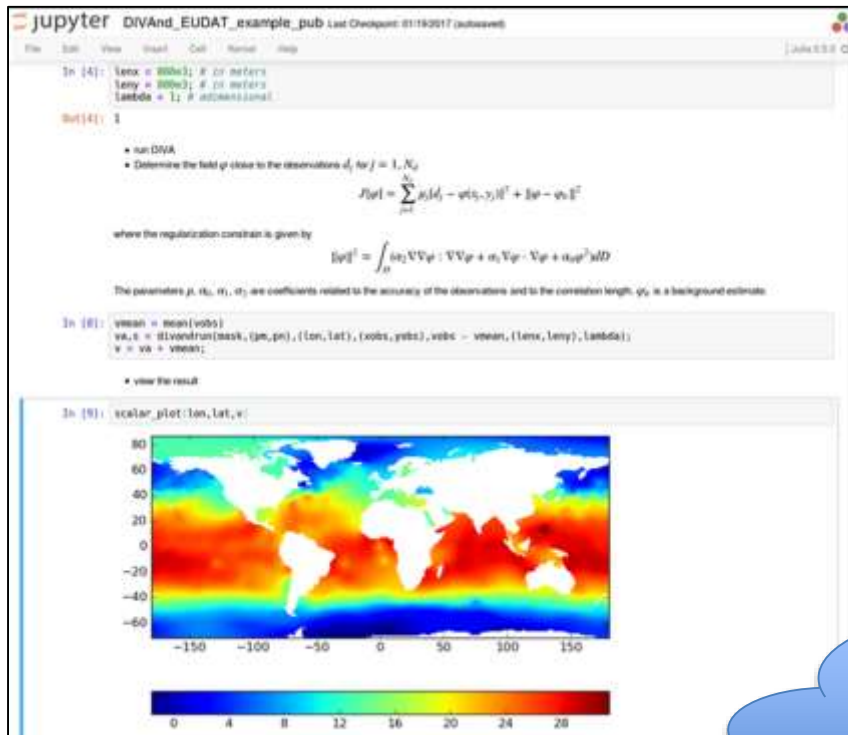
byte = octet(French) TiB (**tebibyte**) = Tio (French **tébioctet**)

Clustre WEB, SMP, VIS

- **Cluster SMP**
 - 1 node with 240 cores, 5 TB RAM
 - PBS Pro
 - Jobs only for huge memory, or many CPU cores.
- **Cluster VIS**
 - 2 nodes each with:
 - 2 GPU (NVIDIA Quadro K6000: 2880 cuda cores, 12GB memory)
 - 2 Intel Cpu 2.2 Ghz each with 10 cores
 - PBS Pro
 - Visualisation.
- **Cluster WEB**
 - 10 servers
 - Based on vmware virtual machine, and soon in docker/kubernetes
 - Hosting web services for datarmor, like VRE

New tools on DATARMOR

VRE: virtual research environment Complex system but simple access



SeaDatacloud, Emodnet ...

Traditional access

'ssh' : terminal, command line,,,
Must have basic linux knowledge.

Challenge DATARMOR

more flexible (web, click, ,,) access

Less of : vi, ssh, fortran, mpi

Flexible, and easy access should speed up the learning/development/analysis time for users.

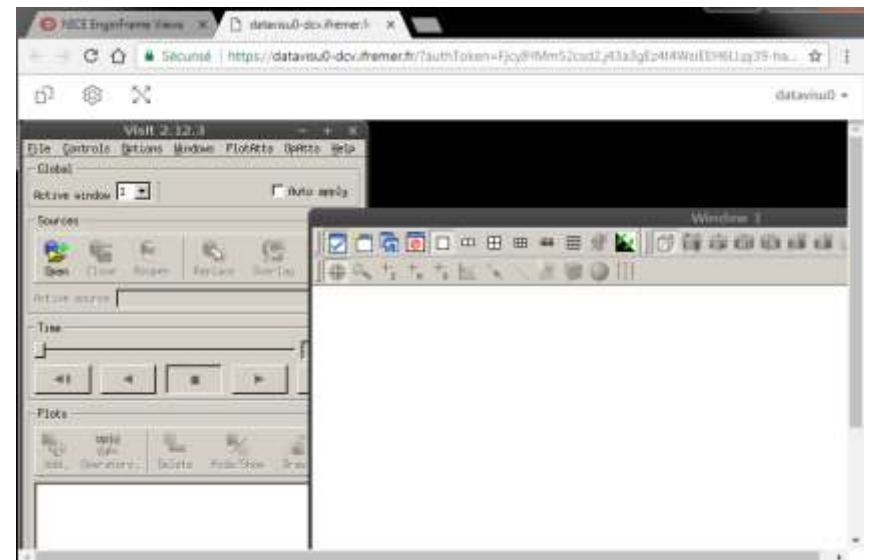
It can lower the barrier for 'new users' non traditional users.

It might slowdown computing time, but if it globally wins the time from development through having 'result' in a graph to be putted in a paper, whats the harm of slowing down a bit of computing time?

How to co-habite traditional HPC users and new users?

<https://datarmor-vis.ifremer.fr>

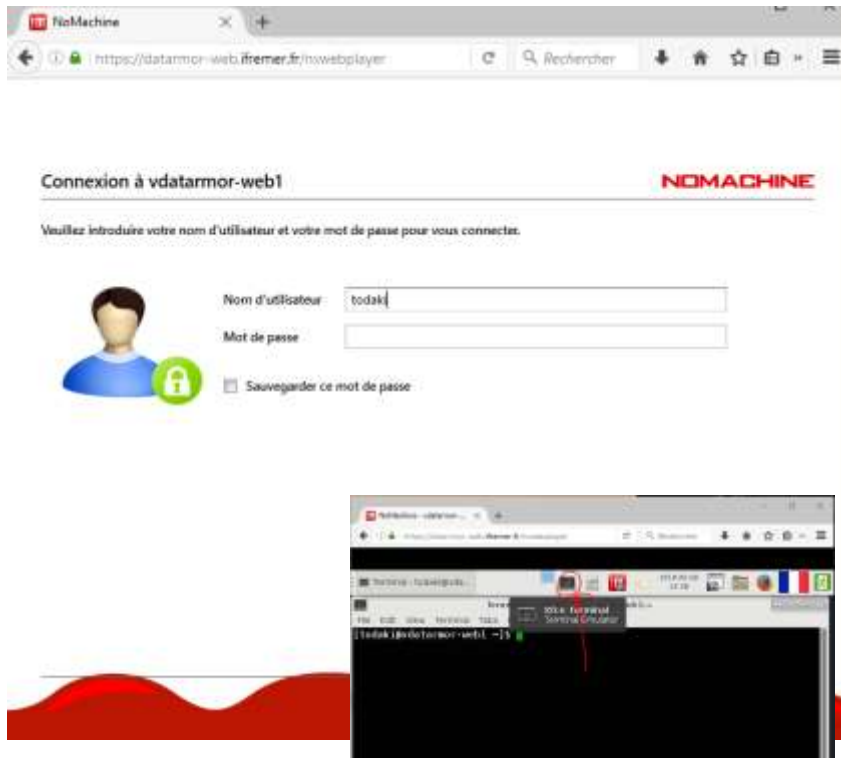
first step for VRE: example Visit



PBS Pro controls the access. Cohabitation with traditional usage

Remote access to GPU
Co-working possibilities

https://datarmor-web.Ifremer.fr



- **Jupyter notebook:** interactive usage of computing power through **PBS Pro**
- Netcdf related graphical tools (python)
- Julia <https://julialang.org>
- **high performance, alternative of python??**
- **DIVA (fortran-mpi to Julia)**
- Pyspark
 - **session spark end of this morning!**
- Machine learning tools through conda
- Or other GUI tools...



Compression of image: interface by 'nomachine' software.

Virtual environment: integration with PBSPRO



Benefits:

- Light weight
- Can share environment between different architectures.
- Keep same environments as your PC/datarmor

Implementations @datarmor

- conda
- IFREMER developed Docker integration to PBS pro.

GARAXY @ DATARMOR
Bioinformatics web-tools

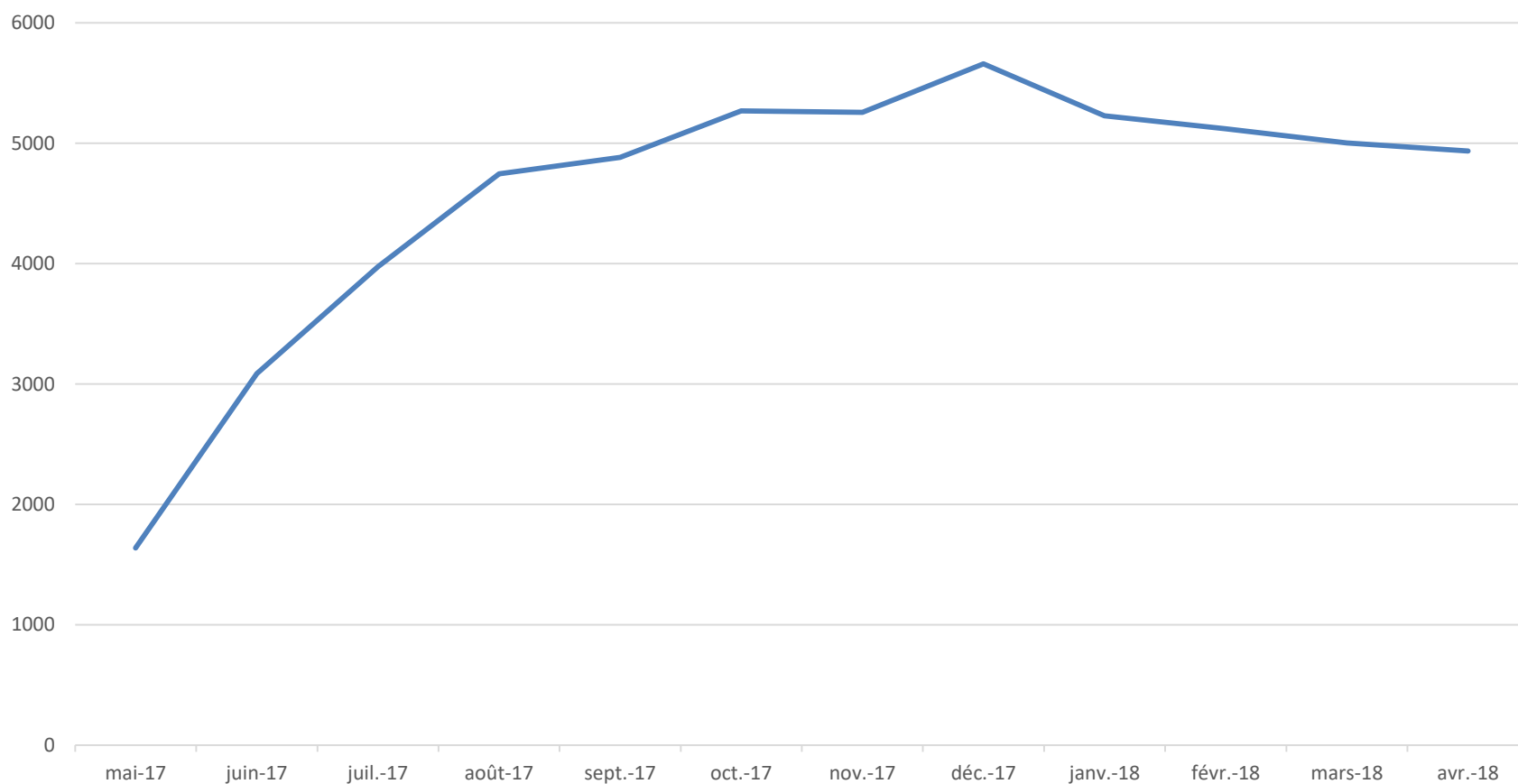


PBS Pro controls the access. Cohabitation with traditional usage

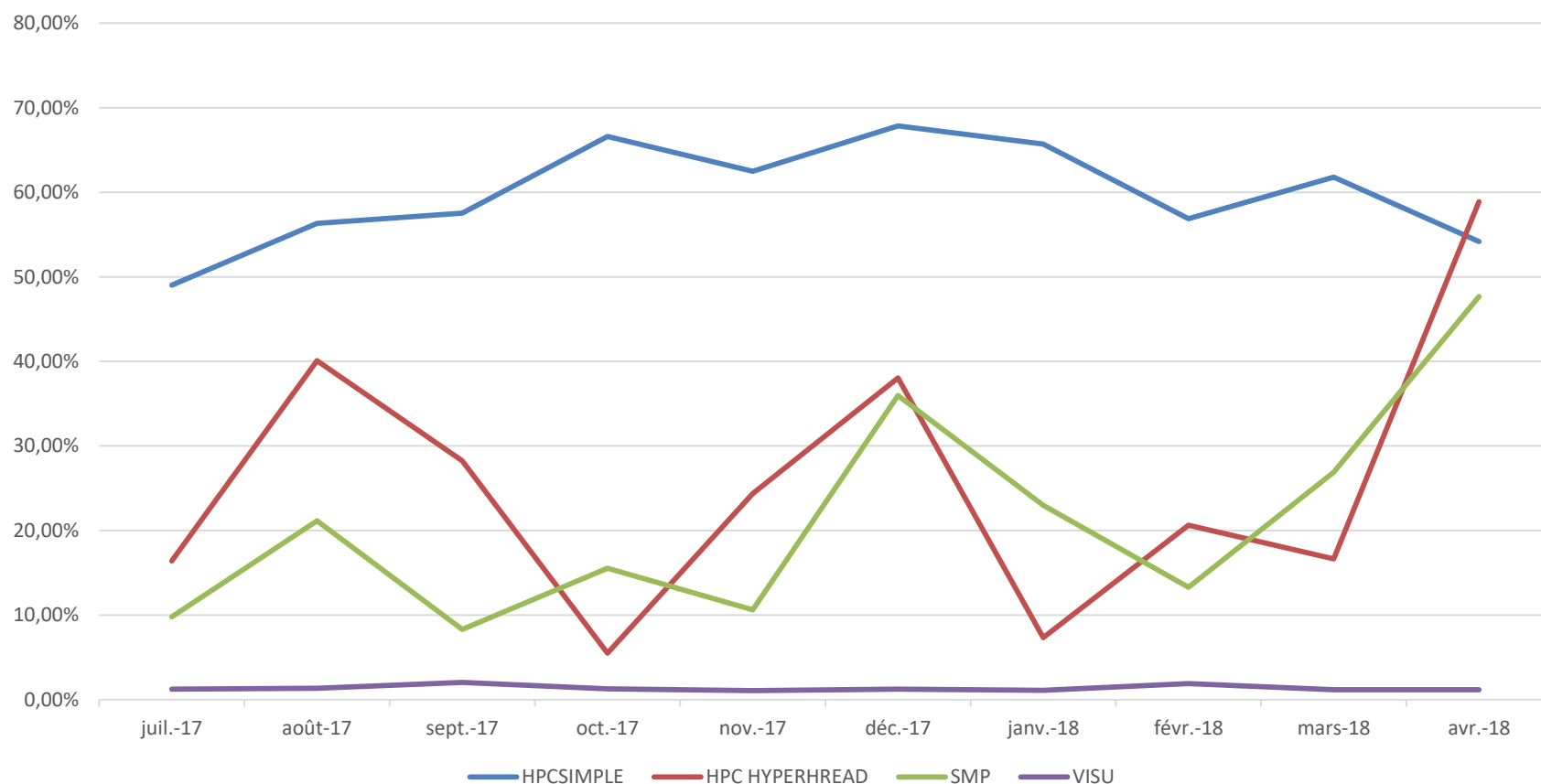
DATARMOR: status of use



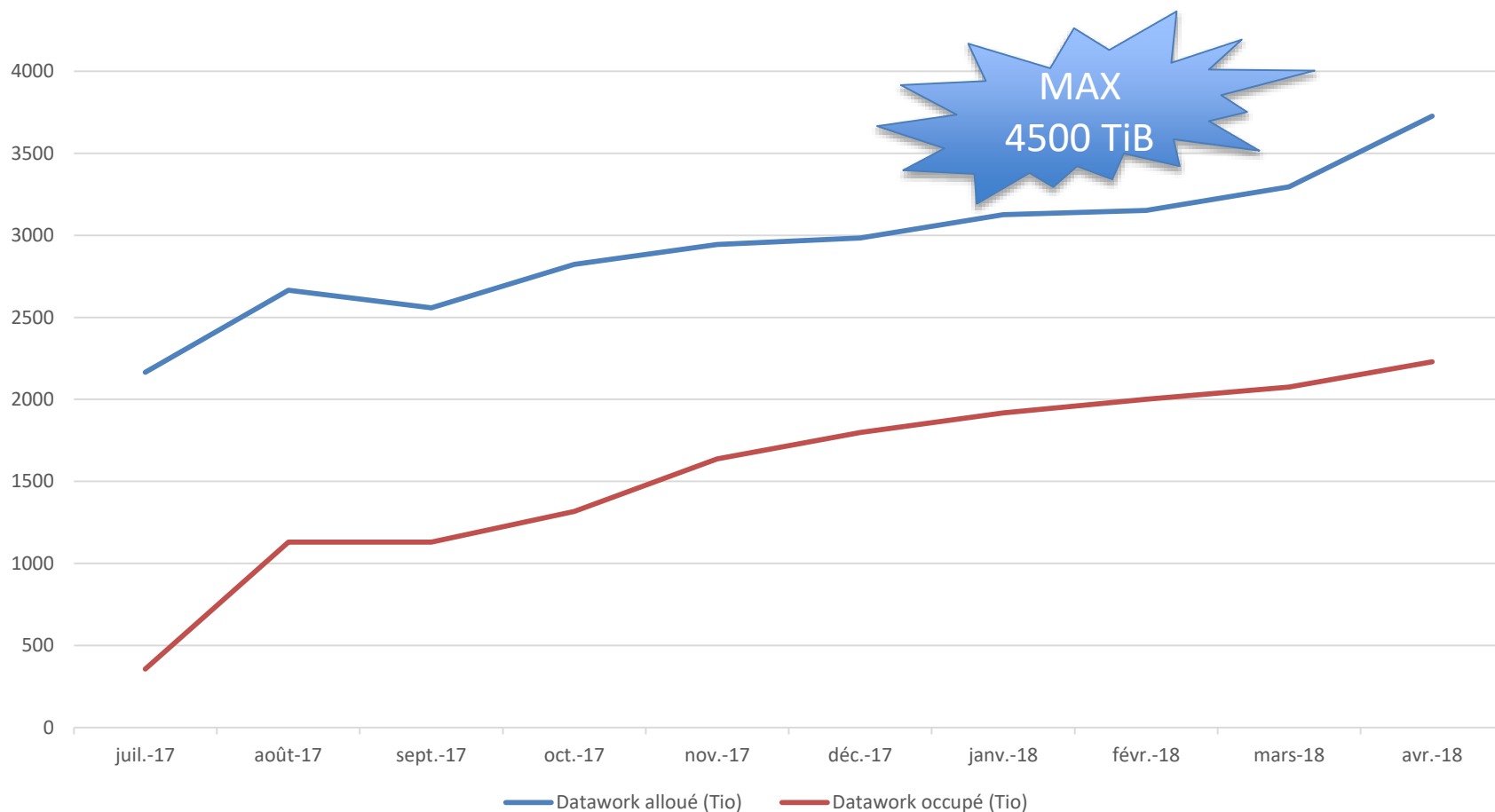
Reserved resources en K hours/month



Reserved CPU cores resources (%)



Use of DATAWORK (TiB)



Upgrade 2018

- Increase the capacity of datawork
1.5PB =1364TiB
- cluster-web
- Summer 2018

DATARMOR is not only HPC
DATARMOR and (Virtual) research environment
Upgrade 2018 coming SOON

THANK YOU

