

# DATARMOR: Comment s'y préparer ?

Tina Odaka  
30.09.2016



# PLAN

- DATARMOR: Detailed explanation on hard ware
- What can you do today to be ready for DATARMOR



# DATARMOR :

## convention de nommage

ClusterHPC

REF

SCRATCH

HOME

ClusterSMP

ClusterWEB  
+  
CacheWEB

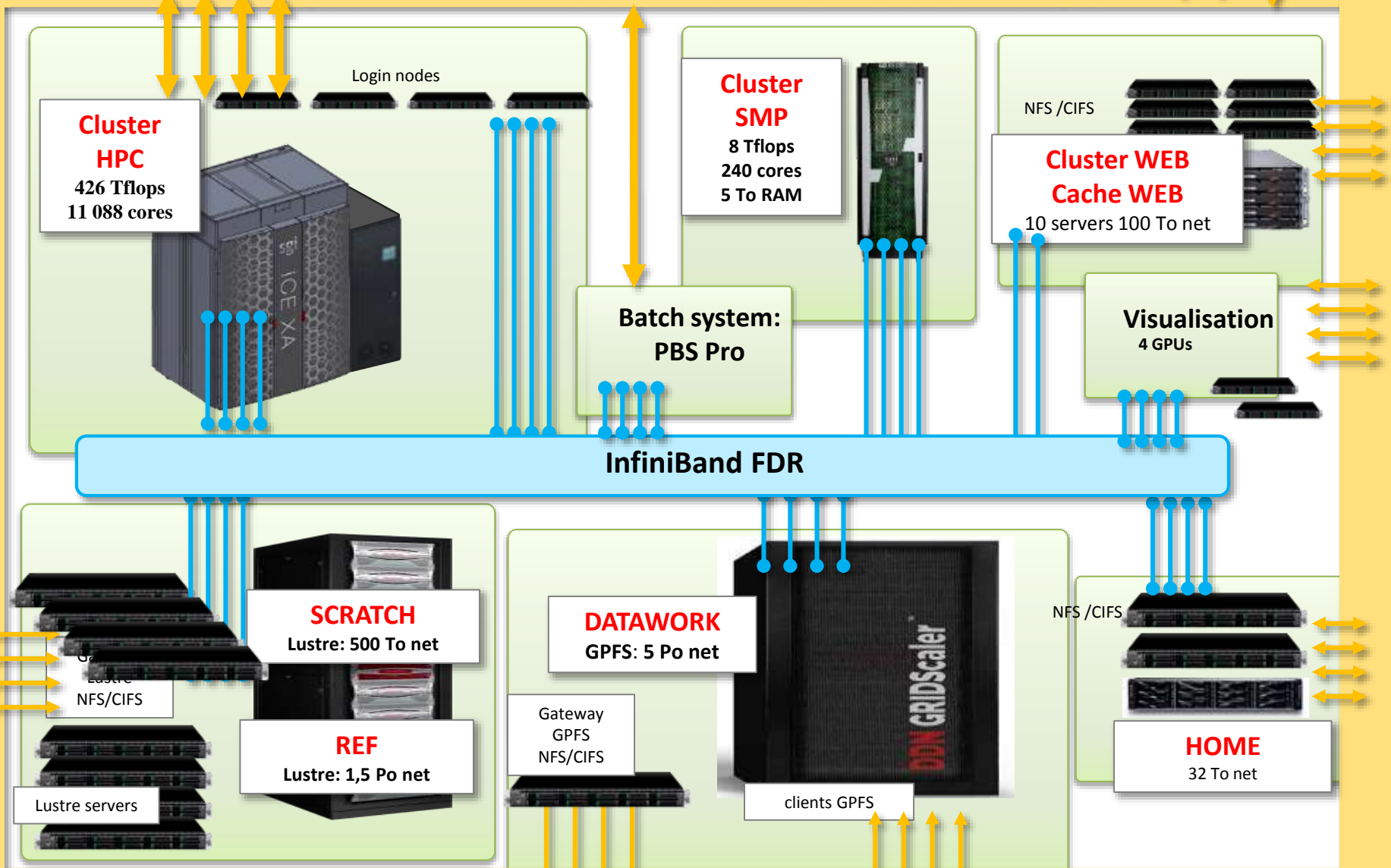
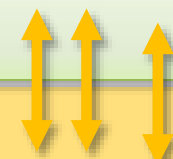
DATAWORK



# Configuration Global: Datarmor

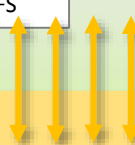
ACCES CLIENTS

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



ACCES CLIENTS

NFS / CIFS / FTP



# Cluster HPC

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



**Cluster HPC**  
**426 Tflops**  
**11 088 cores**  
**396 Nodes**  
**99 Lams**  
**3 Racks**

Batch system: PBS Pro

InfiniBand FDR

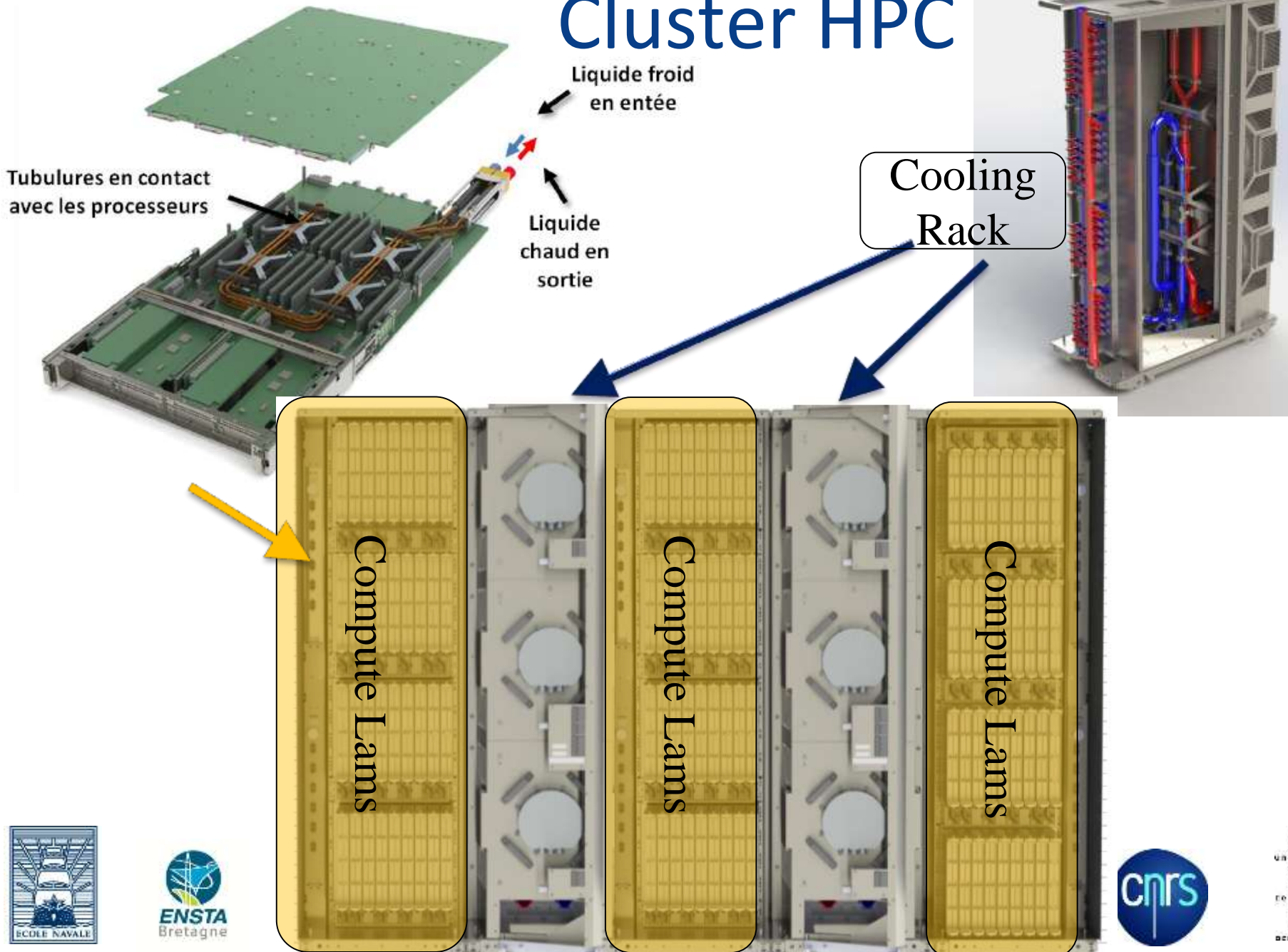
# Cluster HPC

## ■ Compute nodes

- CPU Intel E5-2680 v4 : 14 cores, 2.4 Ghz
- 1 node: 2CPUS => 28 cores / nodes
- 1 lam => 4 nodes
- 1 IRU => 9 lam => 36 nodes
- 1E rack = 4 IRU = 144 nodes = 4032 cores !!DENSE!!
- 1E cell = 2 E rack.
- DATARMOR have 1 E cell and  $\frac{3}{4}$  E rack.



# Cluster HPC



# Cluster HPC

- ICE XA connected to Cooling Distribution Unit
- CDU connected to Dry cooler (free cooling)
- Dry cooler works outside temperature max 25 degree. Back up is done by Cold water system in IFREMER.





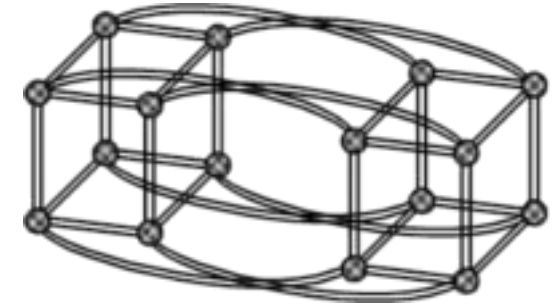
# Infra: more in detail...

## *poster*

- ***DATARMOR aujourd'hui, Les Photos: (IMA et RIC IFREMER)***



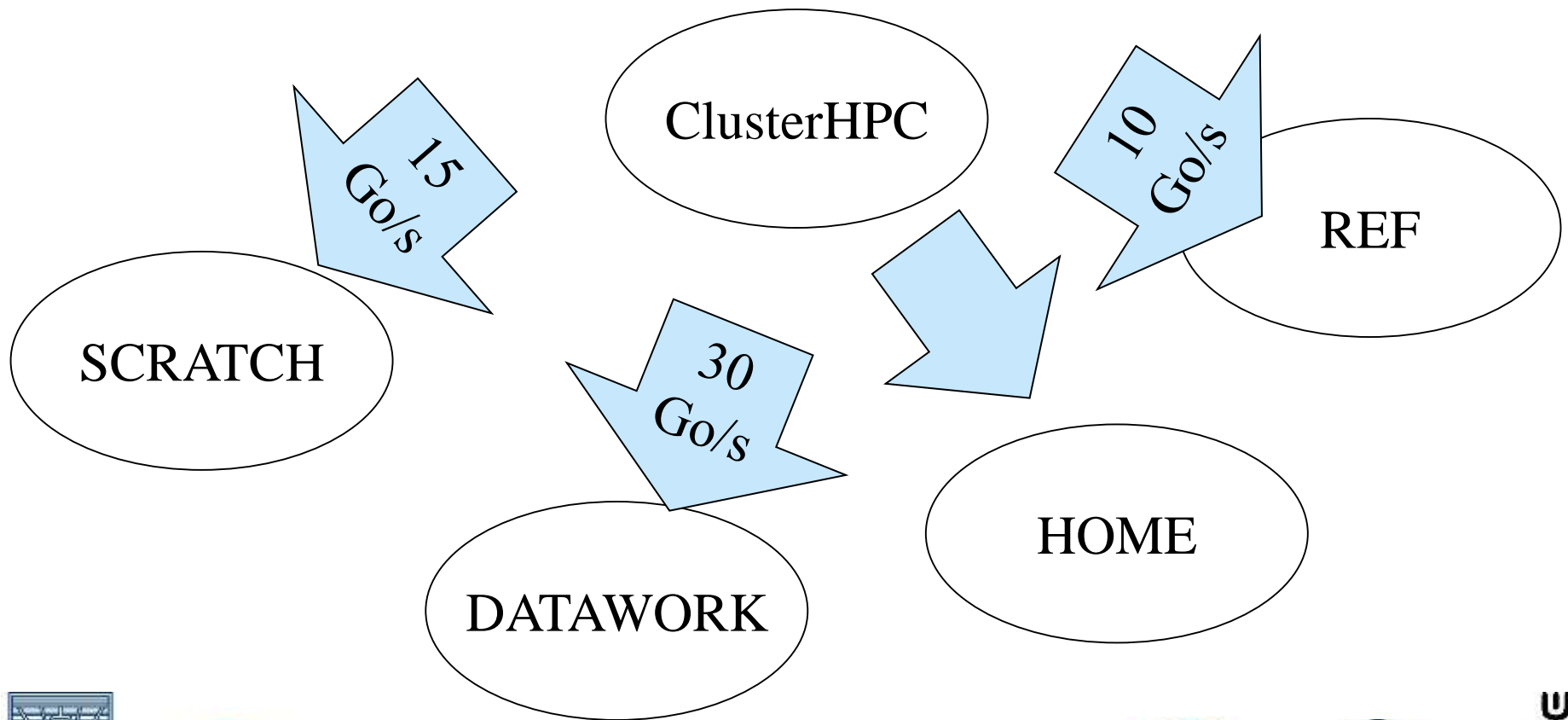
# Cluster HPC



- Memory
  - 128Go/node, 50To Total.
- Network
  - Dual InfiniBand 4x FDR
  - topologie Enhanced Hypercube.
- Login nodes and available services
  - Intel Parallel Studio XE , Vtune, DDT(256 cores), SGI MPI
  - Submitting jobs : PBS PRO (qsub)



# Cluster HPC: access to data



# Cluster SMP

ACCES CLIENTS

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

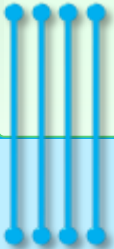
**Cluster SMP**

**240Tflops cores**

**5 To RAM**



Batch system:  
PBS Pro



InfiniBand FDR



NFS / CIFS / FTP

# Cluster SMP

- UV3000
- CPU Intel Xeon E5-4650v3 12 cores @ 2.1 Ghz30 MB L3 cache105
- 1 node: 2CPUS => 24 cores / nodes
- Total 10 node, => 240 Cores/ machine.
- Memory: 160 x 32 GB DDR4 2133 hz = 5.1 To / machine.
- SMP => 10 node but can boot as 1 big node.
- Use pbs as Cluster HPC (same login nodes)



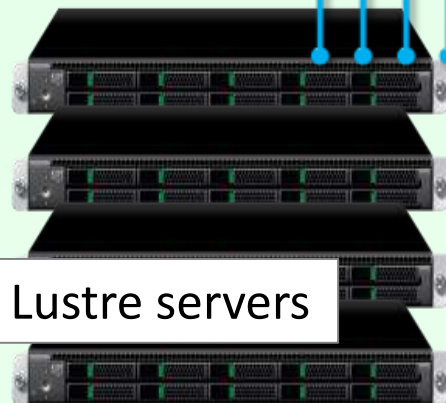
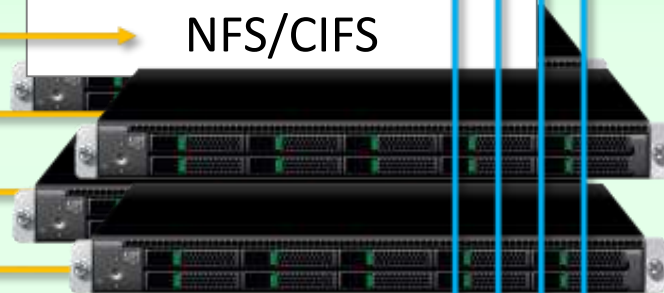
# REF and SCRATCH: Lustre

ACCES CLIENTS

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

InfiniBand FDR

Gateway Lustre  
NFS/CIFS



Lustre servers



**Temporally  
HPC DATA**

**Lustre: 500 To  
net**

**Reference  
DATA**

**Lustre:  
1,5 Po net**

ACCES CLIENTS  
NFS / CIFS / FTP

# REF and SCRATCH: Lustre

- Lustre => parallel file system (/temp and /work on caparmor)
- Separated meta data and object data in physical servers
- REF and SCRATCH are hosted in Lustre
- 'material ' is same, but will be configured so that there will be Difference in performance.
- Gateway-lustre will assure the NFS (linux) CIFS (windows) access



Ifremer



# DATAWORK: GPFS

ACCES CLIENTS

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

InfiniBand FDR

**Work DATA**  
**GPFS: 5 Po**  
**net**

Gateway GPFS  
NFS/CIFS

clients GPFS

ACCES CLIENTS  
NFS / CIFS / FTP





# DATAWORK: GPFS

- GPFS=> parallel file system (IBM)
- Separated meta data and object data but can be in mixed in physical servers
- New to PCIM but GPFS is a stable and well know product.
- DATAWORK is hosted in GPFS
- Gateway-GPFS will assure the NFS (linux) CIFS (windows) access

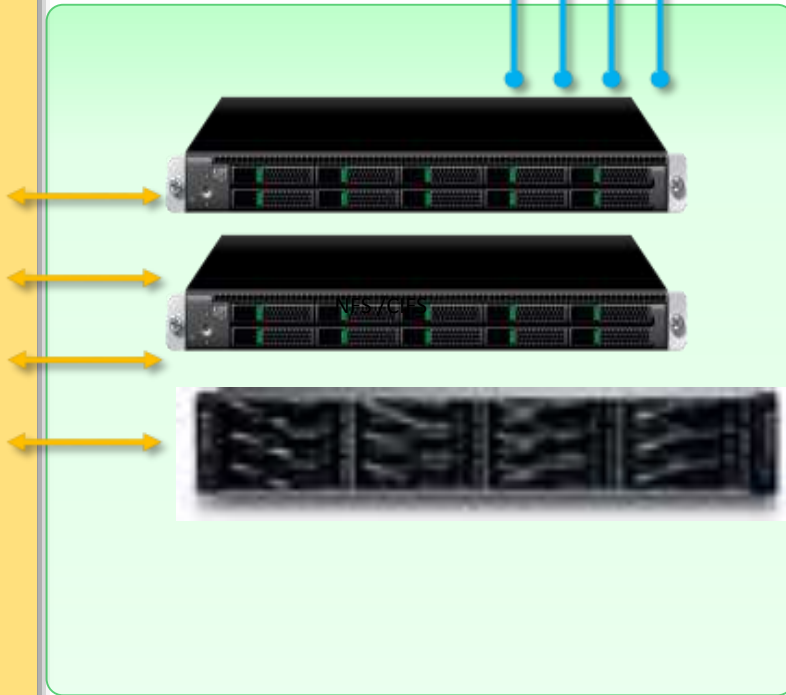


# HOME

ACCES CLIENTS

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

InfiniBand FDR



**HOME**  
32 To net



# HOME

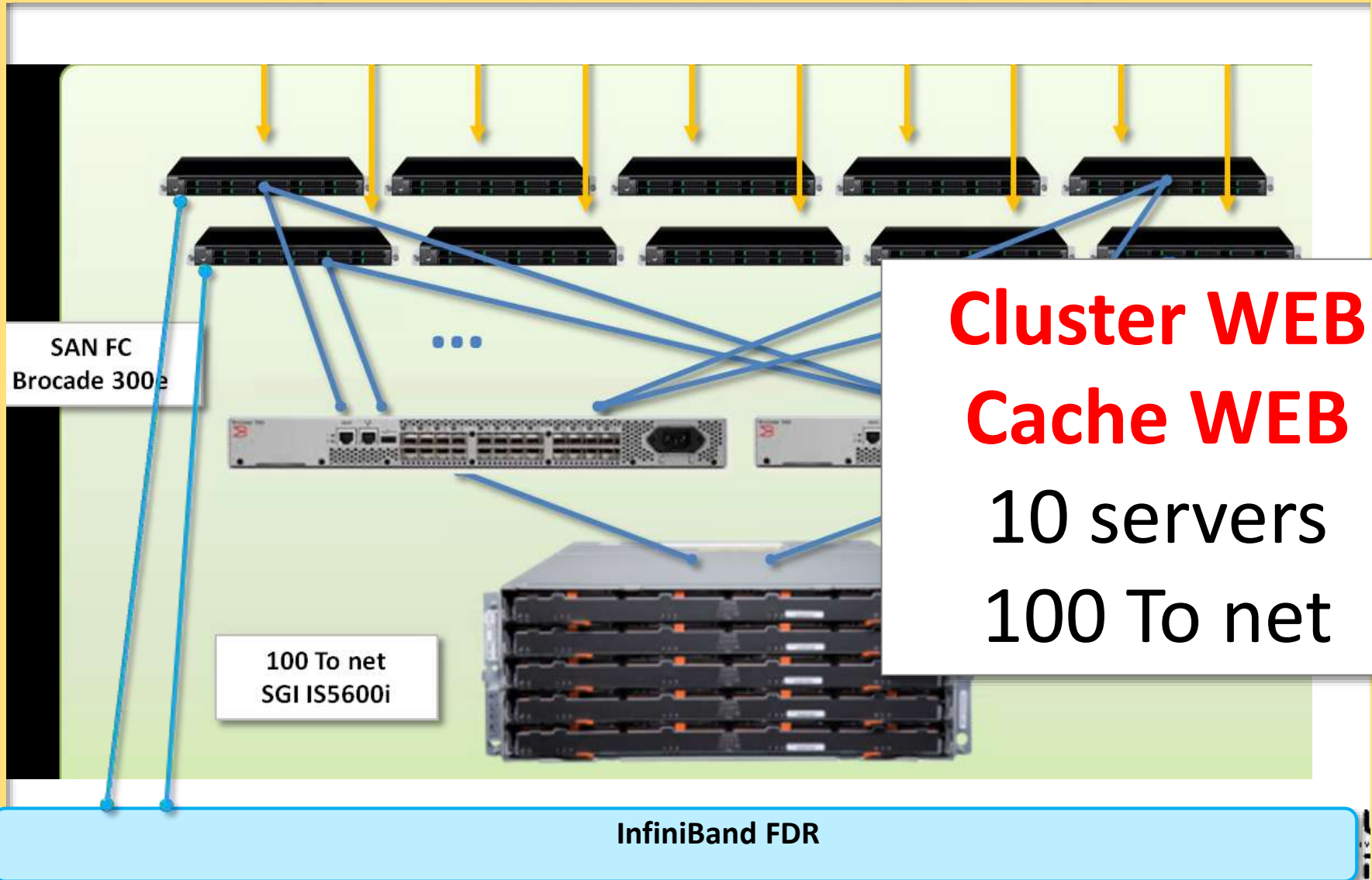
- User quota as CAPARMOR
- Two re-dundant NFS server
- Same space as caparmor's HOME.
- NFS, as caparmor.
- Possible to mount from windows



# Cluster WEB and Cache WEB

ACCES CLIENTS

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



ACCES CLIENTS  
NFS / CIFS / FTP

# Cluster WEB and Cache WEB

- To host web server it can
  - Fast access to small files
  - Redundant with FC disk
  - Can host virtual machines.
  - Half of the nodes have direct connection to IB network.



# Visualization

- 2 Machine for
  - 128 GB memory (16x 16GB)
  - 2 NVIDIA Quadro 6000
  - 2x processors E5-2630 v4 : 10 cores 2.2Ghz
  - IB FDR 10Gb dual-port
- Enhanced possibility for users to visualize pre-post calcul



# Visualization

- NVIDIA Quadro 6000
  - 448 cuda cores
  - 1 T flops (single precision)
  - 0.5T flops (double precision)
  - Memory 6GB GDDR5
  - Memory bandwidth 114 GB/s



# Planning

- A partir de Debut 2017 : ouverture aux utilisateurs (DATARMOR challenge inclus)
- Fin Mars 2017 : Arrêt Caparmor
- => VERY SHORT transission like nymphhea=>caparmor
  - nymphhea: Alpha >caparmor: intel -> DATARMOR : intel
    - ✓ BUT Should be easier than last transition





# What you can prepare today: for CAPARMOR users

- Check with your code with new compiler
  - Intel comp ver 15
  - Test aggressive compiler optimization to see if you get wrong result or not

	CAPARMOR	DATARMOR
CPU	Nehalem	Broadway
Speed	2.8 Ghz	2.4 Ghz
Flops/clock (each core)	4	16

# What you can prepare today: for CAPARMOR users

- HPC: parallel (Multi thread.)
  - Be ready for 28 thread OpenMP with MPI. (hybrid)

	CAPARMOR	DATARMOR
Cores/node	8	28
Memory/node	24 Go	128 Go
Memory/core	3 Go	4,5Go



# What you can prepare today

- RAPPEL: think your data now!!
  - How you need to organize your data for datarmor?
  - Separating
    - ✓ scratch
    - ✓ home
    - ✓ workdata
    - ✓ ref ...
  - Think time line of your data (which data are worse kept for years, which data must have back up, ..)



# What you can do today: new users

- New users:
  - Non Fortran (or C) users
    - ✓ Do you use 'docker'? If so contact us and we can try with UV2000 we have today to test submit your job.
  - Visualisation?
    - ✓ We will have test environment in autome. Plz contact us so that we can make test
      - do not forget to tell us which software you use.
      - Whats the size of data you use
      - What is the graphic card you use today



# Merci

- Poster
- ***DATARMOR aujourd'hui, Les Photos: (IMA et RIC IFREMER)***

