

Journée des utilisateurs CIMENT



HPCDA@UGA - Benchmarks

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June 1, 2017





HPCDA@UGA - Benchmarks

- ※ Contexte
- ※ Benchmarks (supercalculateurs, résultats, ...)
- ※ Perspectives

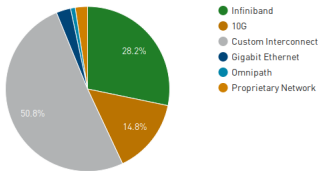
Projet HPCDA@UGA

- ▶ Challenges: Exp vs Prod, Cloud vs HPC
- ▶ Convergence de plateformes



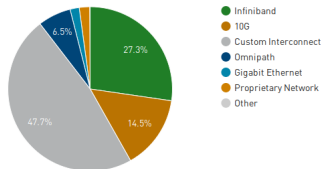
Intel Omni-Path (OPA) vs InfiniBand (IB) ?

Interconnect Family Performance Share



June 2016 ¹

Interconnect Family Performance Share

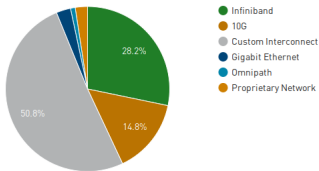


Nov. 2016 ¹

¹source Top500

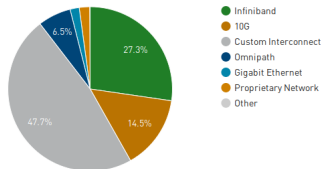
Intel Omni-Path (OPA) vs InfiniBand (IB) ?

Interconnect Family Performance Share



June 2016 ¹

Interconnect Family Performance Share



Nov. 2016 ¹

OPA

- ▶ Nouvelle génération d'interconnexion Intel
- ▶ Caractéristiques principales: 100GB/s
- ▶ En compétition avec l'InfiniBand EDR

¹source Top500

	Cluster 1	Cluster 2
Server	128 * PowerEdge R630 256 * PowerEdge C6320	84 * PowerEdge C6320
Type de noeud	Intel Xeon	
Processeur	E5-2697 v4	
Fréquence CPU	2.30 GHz	
# coeurs par socket	18	
# socket par noeuds	2	
# coeurs par noeuds	36	
Mémoire	128GB	
OS	Red Hat Enterprise Linux Server release 7.2 (Maipo)	
Fréquence mémoire	2400 MHz par noeuds	
Interconnexion	Intel OPA HFI	Mellanox InfiniBand

Table: Configurations

Différence entre les 2 configurations → interconnect

Compilateur Intel version 2017.2.174 et Intel MPI version 5.1.2.150

CP2K - DCM

Science de la matière condensée



- ▶ Fortran
- ▶ MPI, FFTW

VASP - SIMAP

Dynamique Moléculaire ab initio



- ▶ Fortran
- ▶ MPI, FFTW

SEM3D - ISTerre

Propagation d'onde



- ▶ Fortran
- ▶ MPI, MKL

Elmer/Ice - IGE

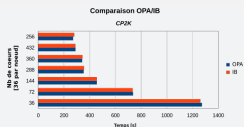
Ecoulement de la glace



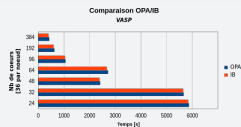
- ▶ Fortran, C, C++
- ▶ MPI, NetCDF, nn, csa

Merci à Romain B., Pierre G., Fabien G., Olivier L. & Alain P.

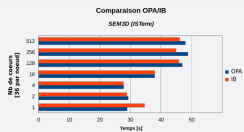
CP2K - DCM



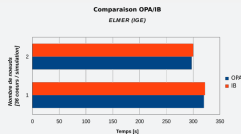
VASP - SIMAP



SEM3D - ISTerre



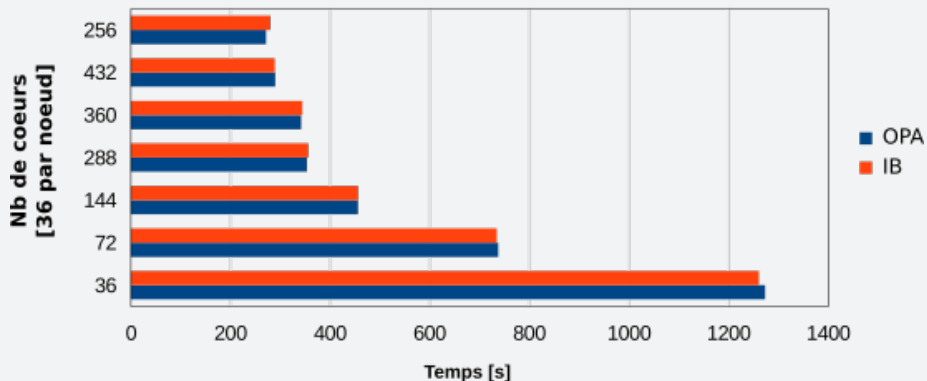
Elmer/Ice - IGE





Comparaison OPA/IB

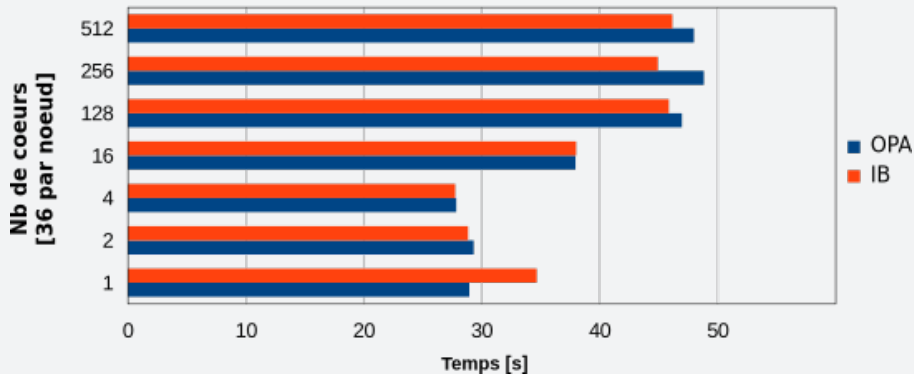
CP2K





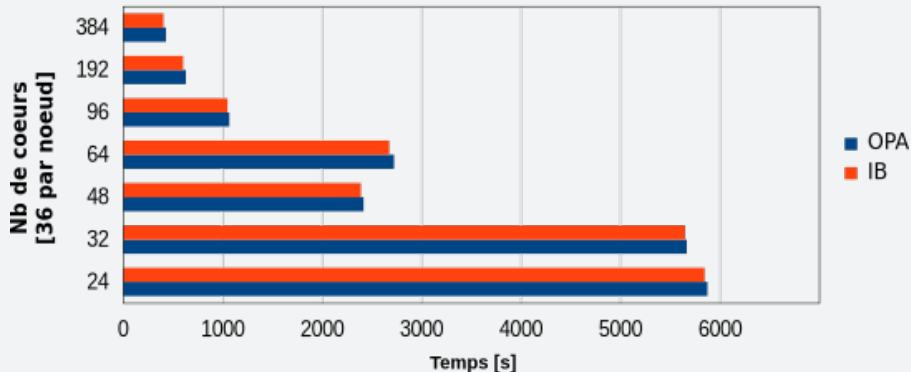
Comparaison OPA/IB

SEM3D (ISTerre)



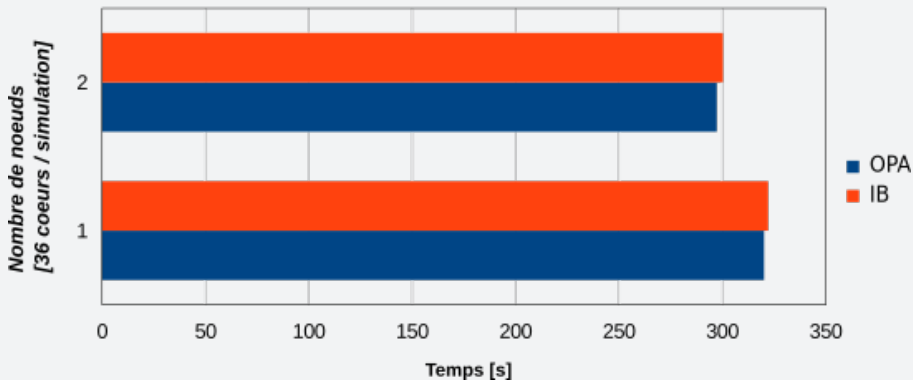


Comparaison OPA/IB VASP

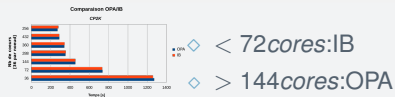


Comparaison OPA/IB

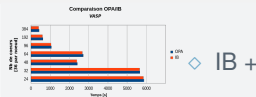
ELMER (IGE)



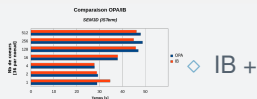
CP2K - DCM



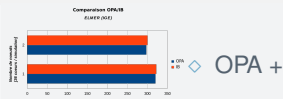
VASP - SIMAP



SEM3D - ISTERre

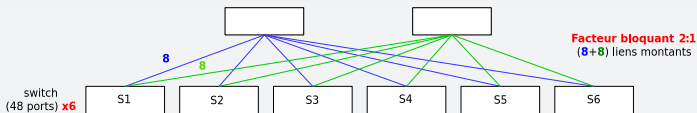


Elmer/Ice - IGE

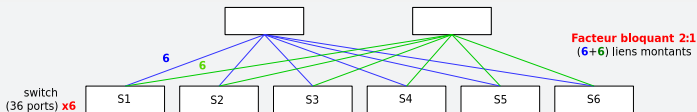


► Application dépendant,
cependant pas d'écart significatif entre OPA et IB

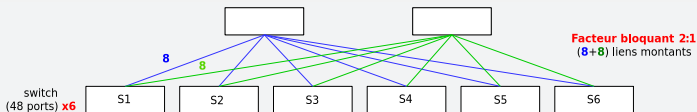
Configuration - OPA



Configuration - IB

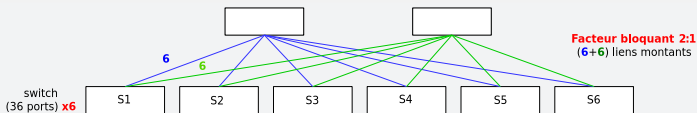


Configuration - OPA



$$\text{OPA} \rightarrow (48 - 16) \times 6 = 192 \text{ noeuds}$$

Configuration - IB



$$\text{IB} \rightarrow (36 - 12) \times 6 = 144 \text{ noeuds}$$



Merci !

N'hésitez pas à poser vos questions ...

