

PAN01

IBM Data Cognitive Systems Strategy and Directions – Innovations for HPC, HPDA and Machine & Deep Learning Merging, in Oil and Gas

P. Vezolle* (IBM)

Summary

High Performance Computing technologies and challenges continue to evolve. The explosion and the power of Cognitive and Artificial Intelligence open new ways to design the next generation of oil and gas applications and infrastructures. The wide range of applications and the common growing needs in computing power must be addressed by future hybrid and heterogeneous system solutions, as well as disruptive technologies like Quantum and Neurosynaptic computing. In



High Performance Computing technologies and challenges continue to evolve. The explosion and the power of Cognitive and Artificial Intelligence open new ways to design the next generation of oil and gas applications and infrastructures. The wide range of applications and the common growing needs in computing power must be addressed by future hybrid and heterogeneous system solutions, as well as disruptive technologies like Quantum and Neurosynaptic computing. In this presentation, we will outline IBM directions to tackle HPC challenges with both technology and cognitive approaches. We will give an overview of IBM next generation Cognitive and Data Centric systems based open and hybrid architecture allowing to integrate any third-party hardware accelerated technologies, in a cache coherent manner. We will present the impact and advantages through a HPC seismic imaging application. We will give some concrete examples where cognitive and machine learning change both HPC and oil&gas paradigms.

Main aspects:

Some references:

- Cognitive and machine learning innovations and challenges for oil and gas simulations and production frameworks.
- The challenges towards Exaflops systems and the next generations of IBM computing systems, including heterogeneous architectures and disruptive technologie like Quantum processor, and their impacts on the oil and gas HPC application design.

Heterogeneous and hybrid architecture

- OpenPOWER foundation: https://openpowerfoundation.org/
- OpenCAPI : http://www.anandtech.com/show/10759/opencapi-unveiled-amd-ibm-googlemore

Cognitive Systems

 Multiple IBM articles – just for exemple: https://www.ibm.com/blogs/watson/2016/10/cognitive-iot-technologies-help-drive-betterdecisions-oil-gas/

IBM Quantum computing

- IBM Announces the Next Step in its Plans to Develop a Quantum Computing Ecosystem
- http://www.hpcuserforum.com/downloads/techassessment1.pdf IBM Synaptics computing
 - http://www.research.ibm.com/articles/brain-chip.shtml