

HIBALL

HELMHOLTZ International BigBrain
Analytics & Learning Laboratory

Application Co-Design of a Modular Computing Architecture
for cellular BigBrain connecting the Canadian CBRAIN and
German Supercomputing Infrastructures

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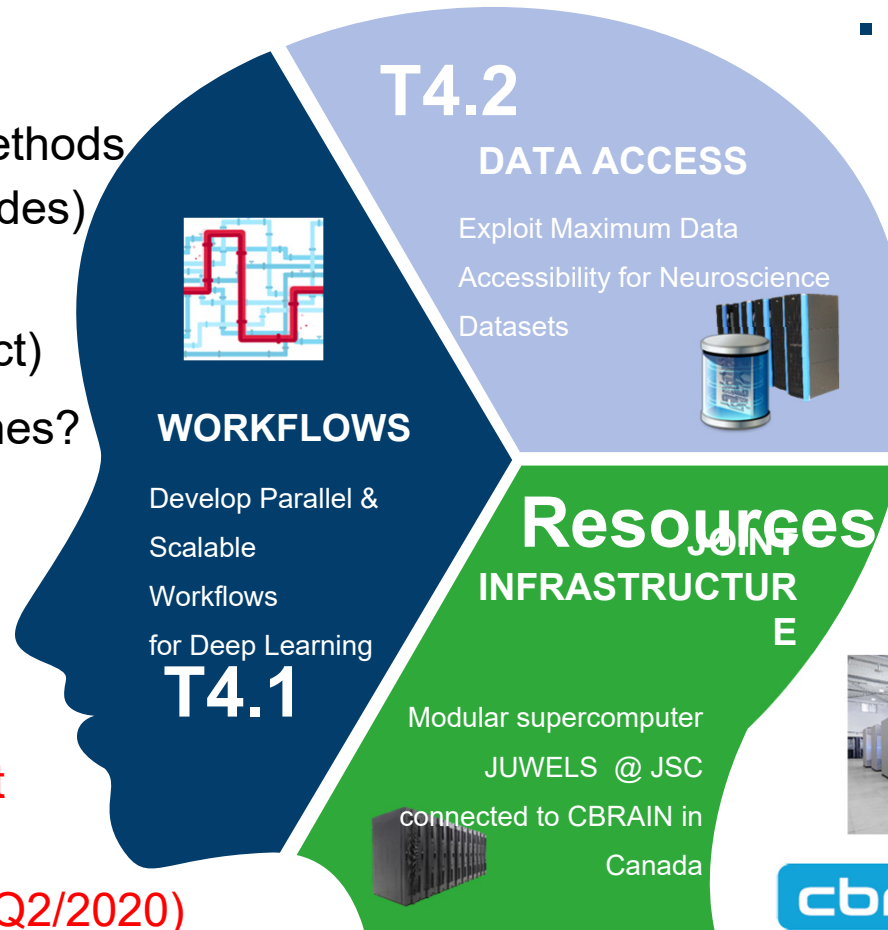
Modular computing architecture for cellular BigBrain

Step 1: 'Workflows'

- Scale Deep Learning Methods (e.g. Horovod across nodes)
- Use innovative GPU interconnects (GPUDirect)
- How to exchange pipelines? (e.g. explore 'Boutiques' system to exchange containerized pipelines)

Initial Work:

- Draft architecture of joint infrastructure between JSC & CBRAIN (end of Q2/2020)



Step 2: 'Data Access'

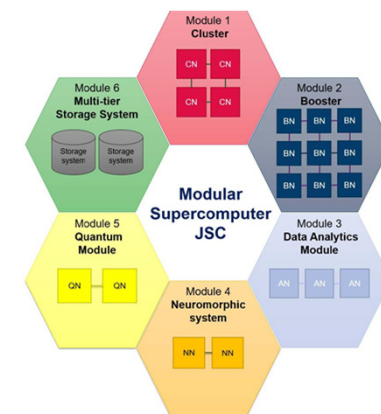
- Exploit hierarchical memory architecture for datasets
- How to exchange/sync data between infrastructures? (e.g. I/O optimization methods)



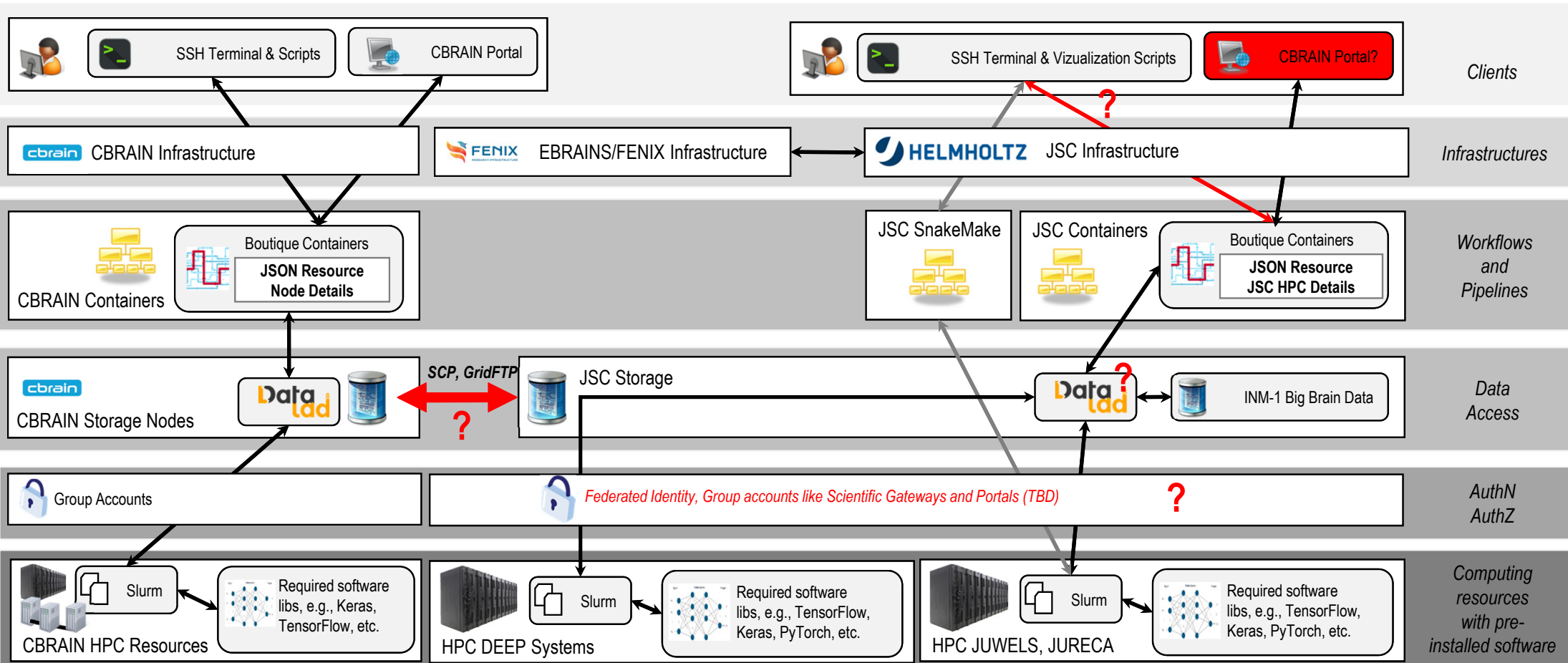
JÜLICH SUPERCOMPUTING CENTRE



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Draft Architecture of Joint Infrastructure



Involved Technology Research & Next Steps



- SnakeMake
 - Workflow management system for scalable data analysis.
- DataLad
 - Versioning system built on Git and integrates into python.
- Boutiques
 - Cross-platform tool for automatic publishing, integration, and execution of command-line applications
- Next Steps
 - Refine the draft architecture with details on protocols and data access (~Q3/2020)

