

# 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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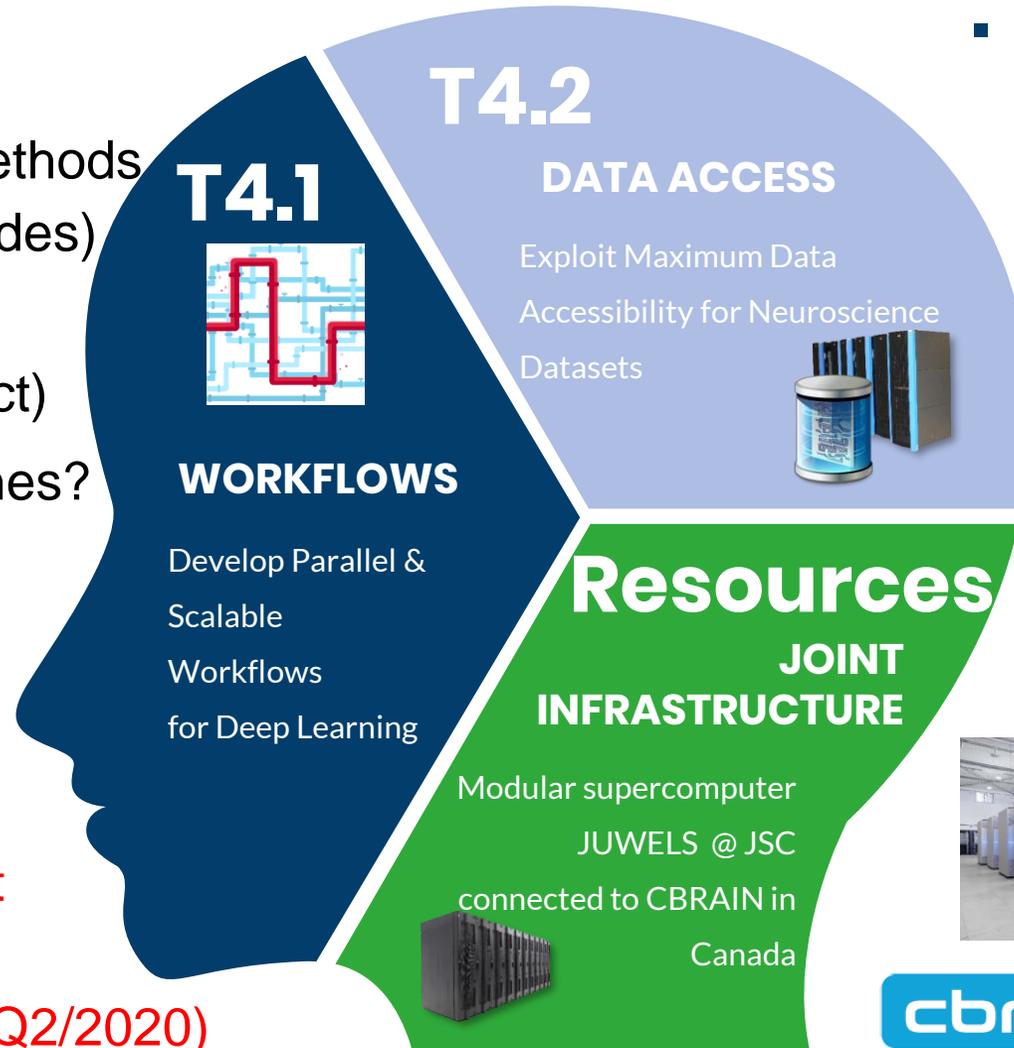
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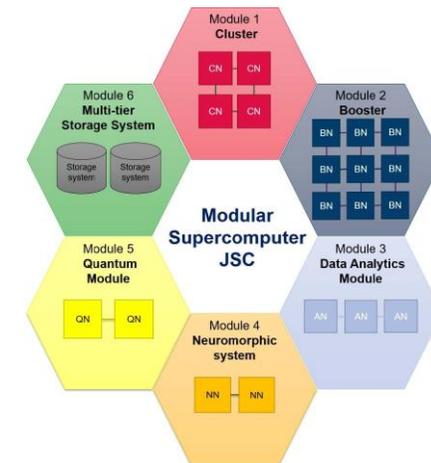
# Modular computing architecture for cellular BigBrain

- 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)

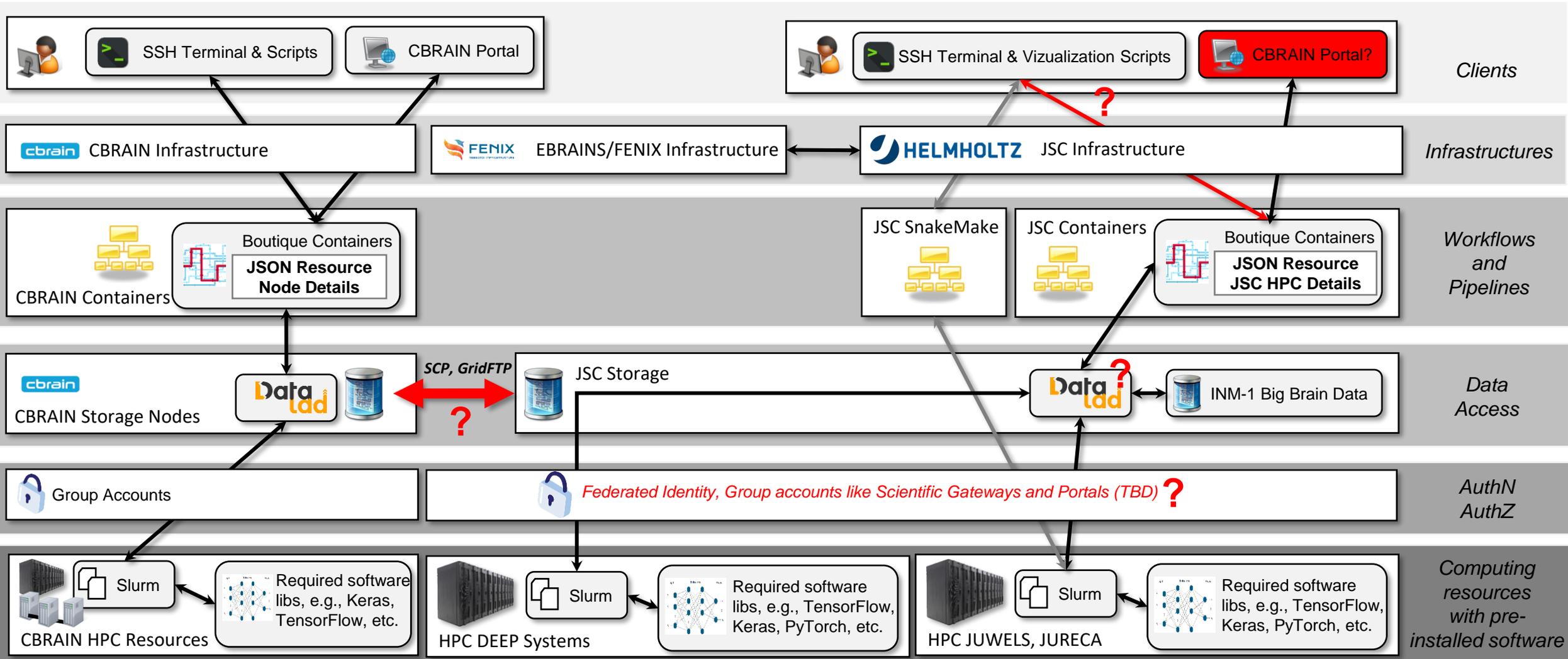
- Initial Work:
  - Draft architecture of joint infrastructure between JSC & CBRAIN (end of Q2/2020)**



- Step 2: 'Data Access'
  - Exploit hierarchical memory architecture for datasets
  - How to exchange/sync data between infrastructures? (e.g. I/O optimization methods)



# 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)

