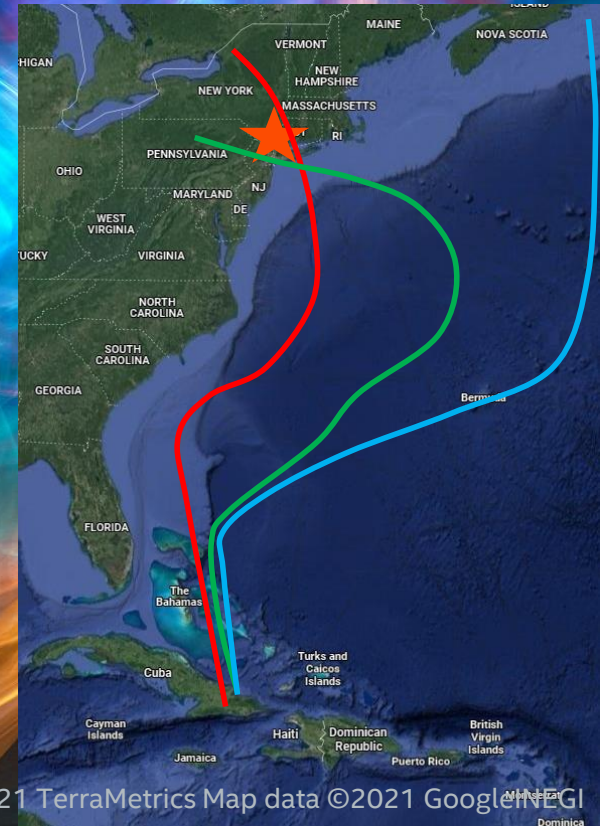




# Intel HPC Update:

## Converging AI, Mod/SIM, Big data Leveraging Heterogeneity

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CTO and Chief Architect HPC, Intel  
Aurora Technical Lead and PI





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# Three Pillars of the Exascale Era

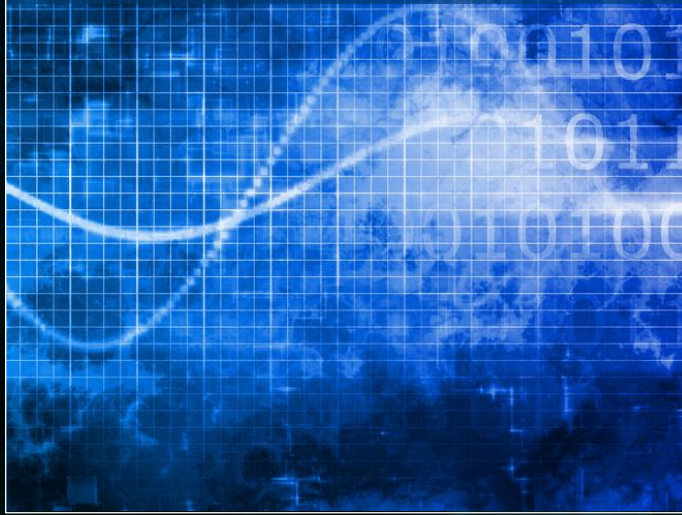
## HPC SIMULATION

Model Drives Data



## DATA ANALYTICS

Data Drives Insight



## ARTIFICIAL INTELLIGENCE

Model Inferred from Data



**Data Store  
Visualization**



# Two Key HPC Trends

- Combining AI, Mod/Sim, Big Data
- Increasing heterogeneity



# Addressing Challenges Raised by Trends

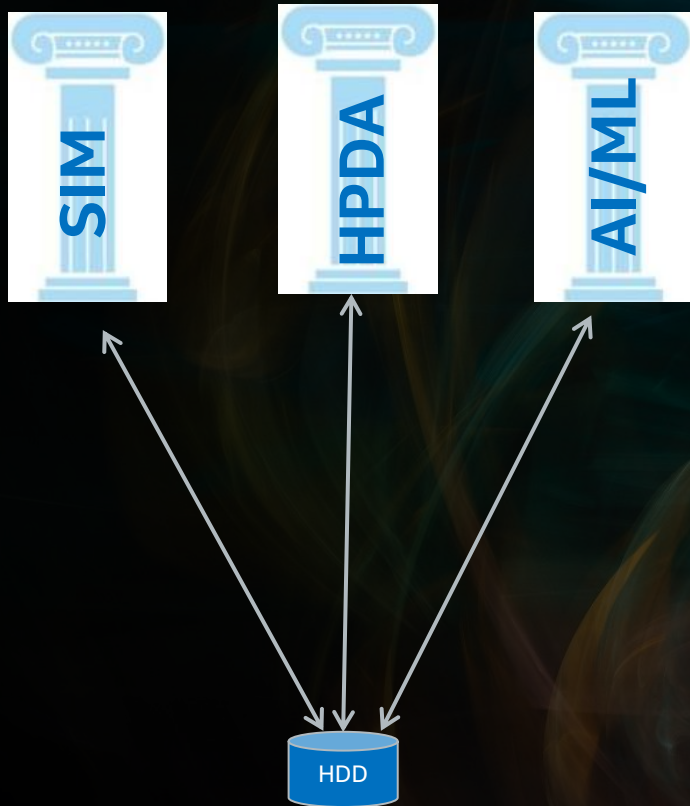
- Facilitate platforms for converged HPC, AI, and Big Data computing
- System design methodology needed
- Provide a programming model encompassing heterogeneous elements
- Provide scalable software that supports new data models
- Integrate heterogeneous components at the right level



# Converged workloads benefit from a tightly-coupled “Data Centric” architecture

## Today

(communication through thin linearized pipe to filesystem)



DAOS, NVM,  
New Architecture

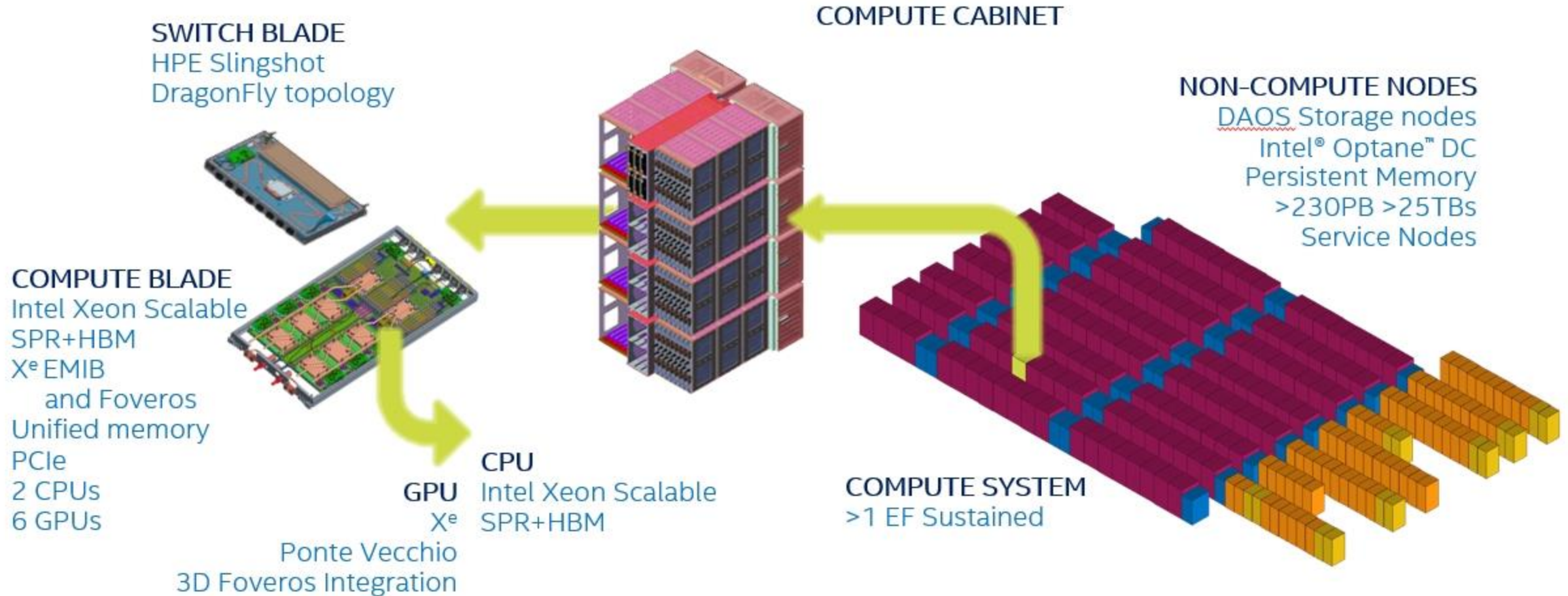
## Tomorrow

(interactive workflows via tightly-coupled, high-bandwidth, active sharing of program data objects)

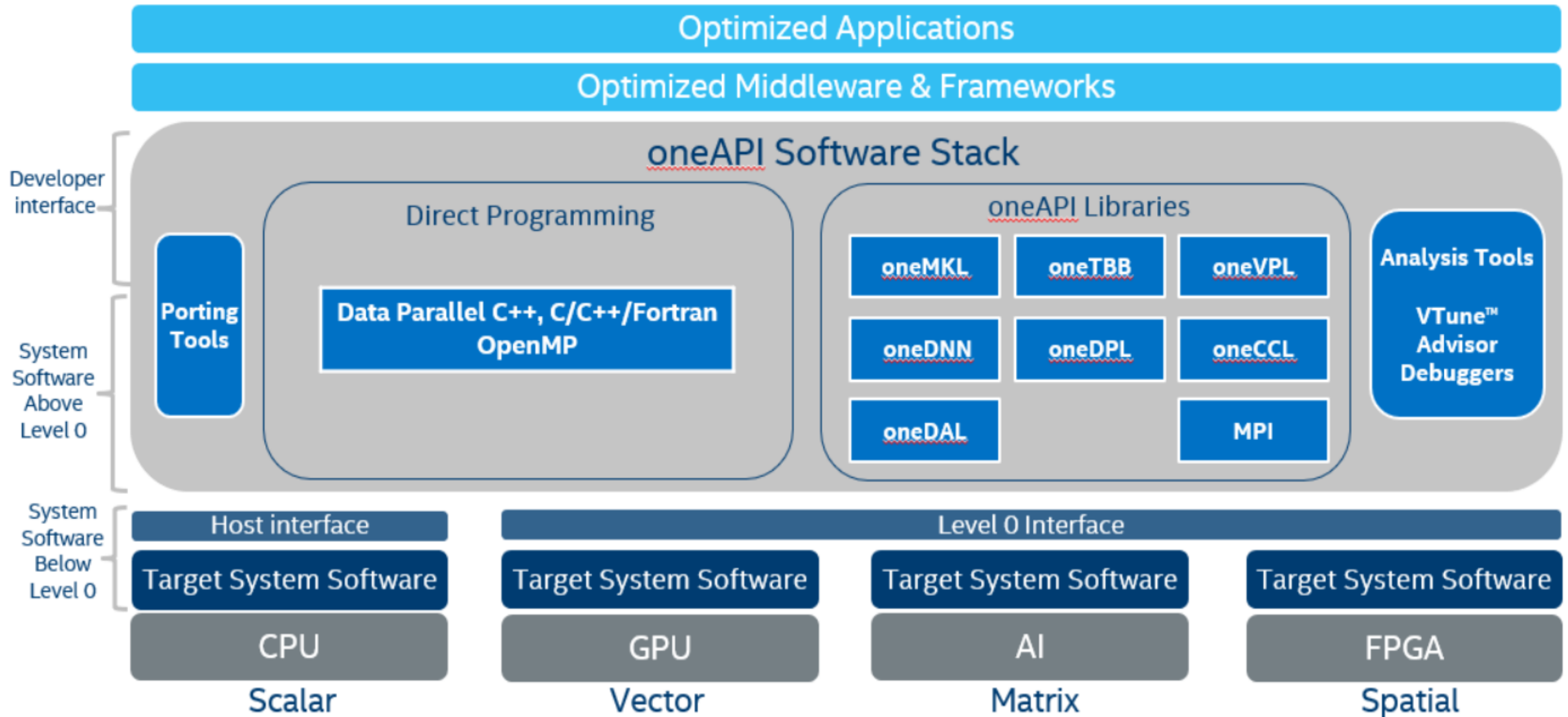




# Aurora System Architecture



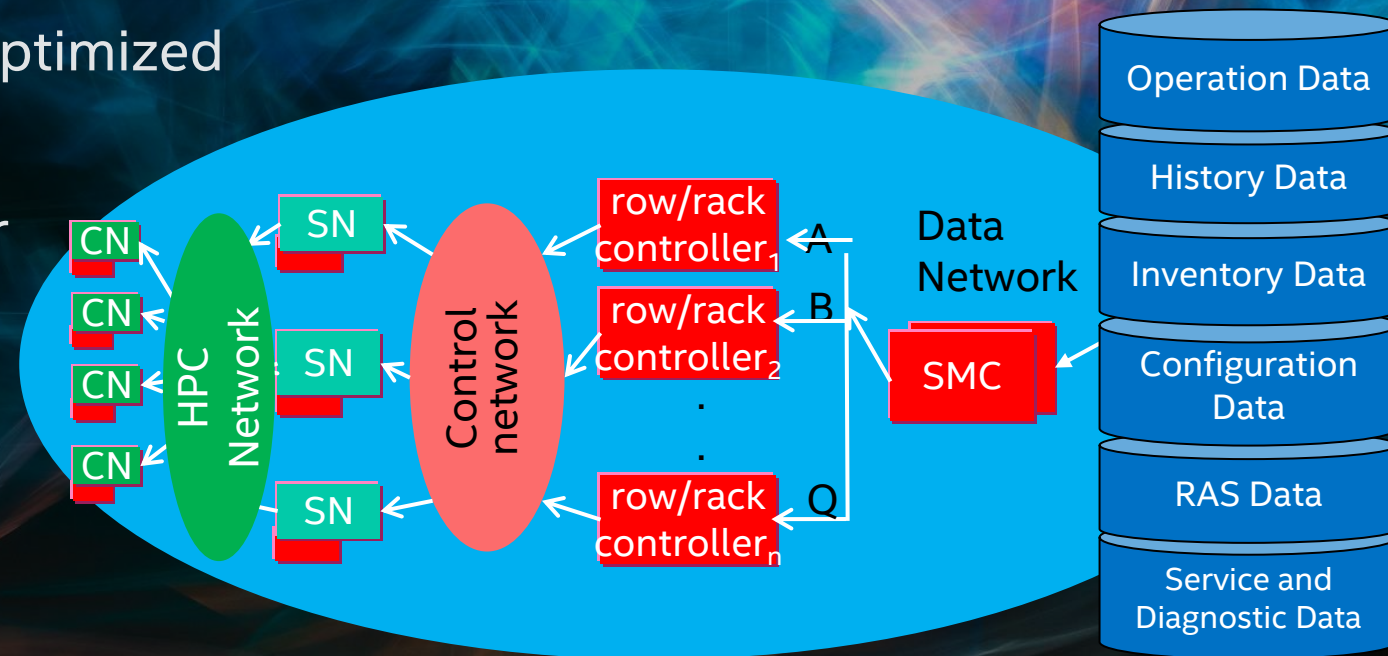
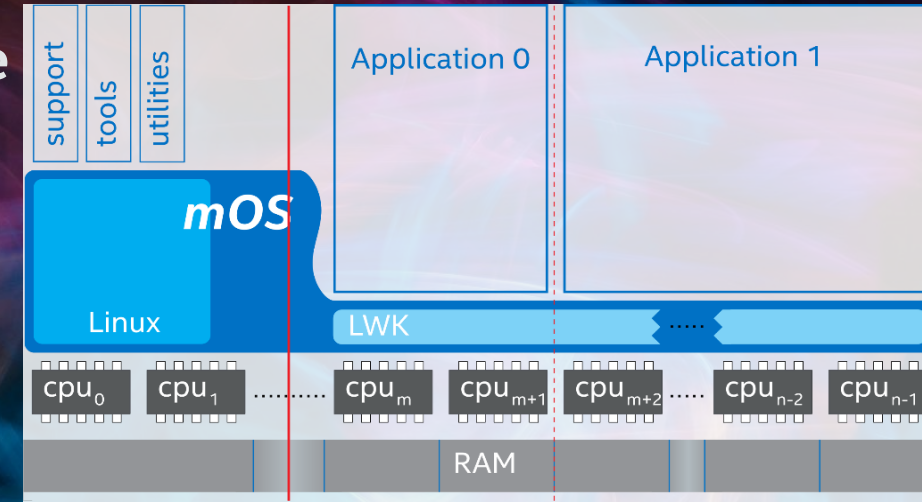
# oneAPI Software Stack for HPC and AI Applications





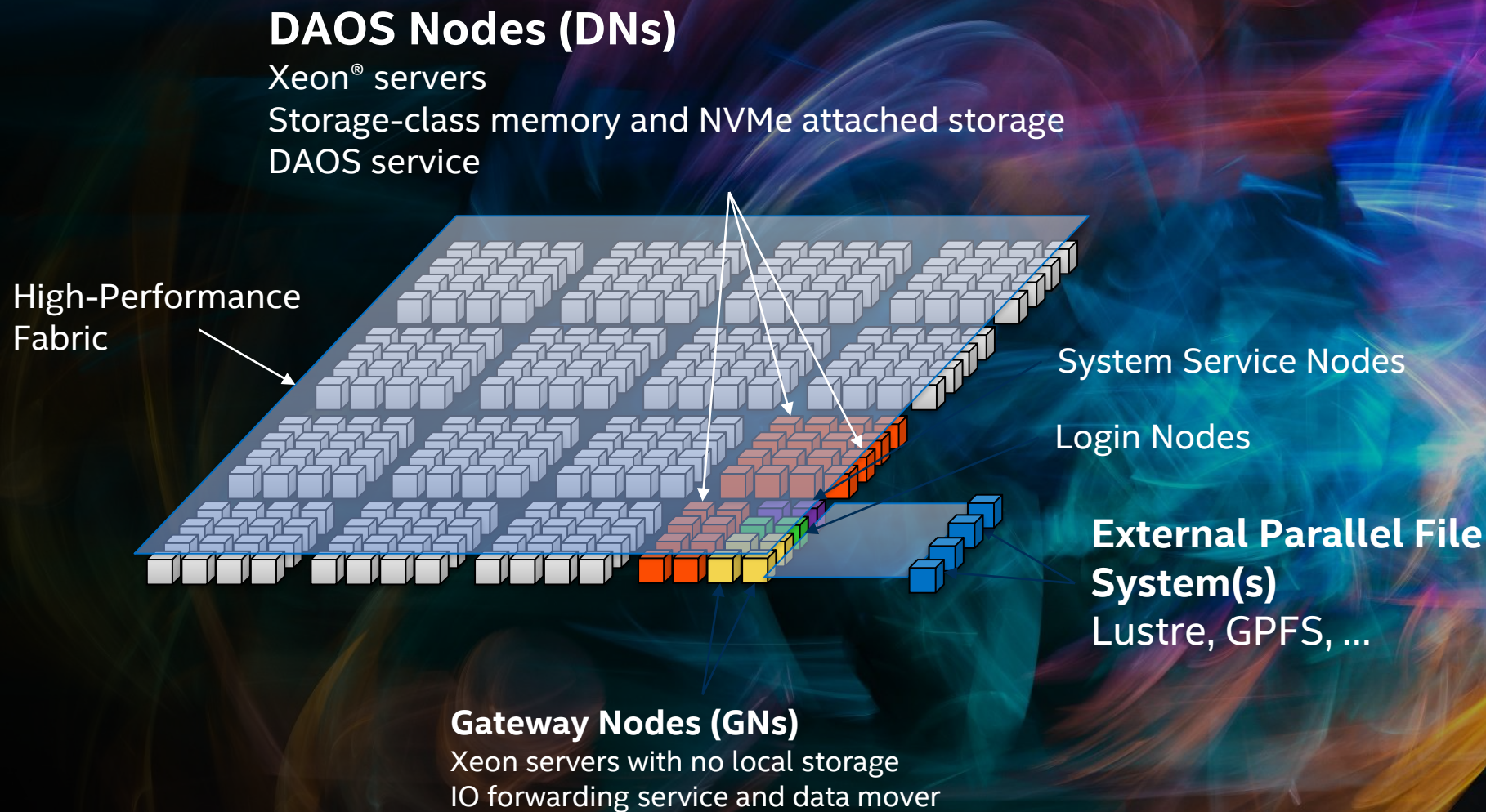
# Core Software HPC Components

- **oneAPI**
  - Developer environment program once run everywhere
- **mOS**
  - Scalable operating system
- **Unified Control System**
  - Unified, Productive (single pane of glass), Reliable
- **MPI**
  - Scalable, high performance, topology optimized
- **GEOPM**
  - Global Extensible Open Power Manager
- **PMIx**
  - Process management with “Instant On”
- **DAOS**
  - Distributed Asynchronous Object Store





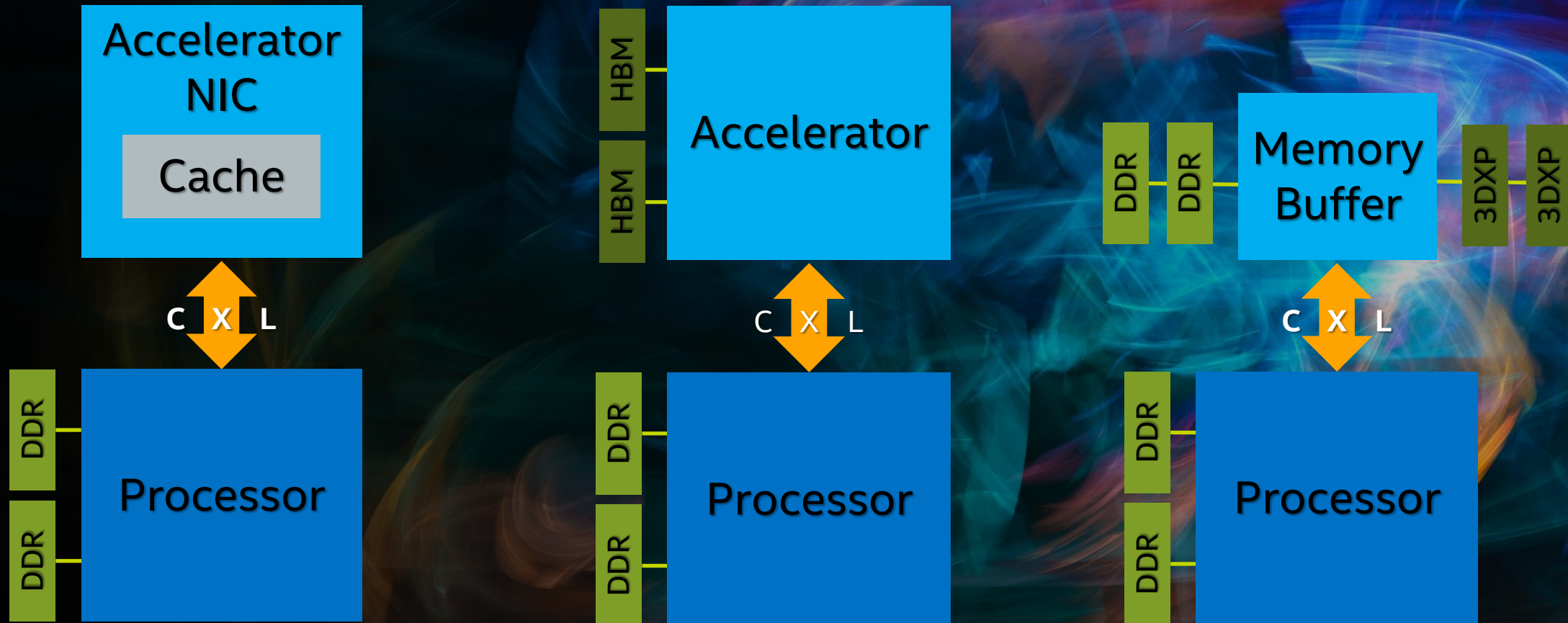
# Disaggregated High-Performance Storage Using DAOS





# Tight Coupled Components

- Using EMIB and Foveros allows tighter coupling of components
- CXL technology allows for a productive shared memory software environment





# Thank You

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