High Performance Computing Cluster

HPCC Hardware

20 Compute nodes, 560 cores with room to expand

– All Nodes:
  - Xeon Broadwell CPUs (2.6 GHz)
  - 28 cores per node
  - Infiniband EDR
    – (Infinite Bandwidth) (Enhanced Data Rate) (100 Gb/s)

– Login Node: 1
  - 64 GB DDR4 2400 MHz RAM
    – (DDR = Double Data Rate)
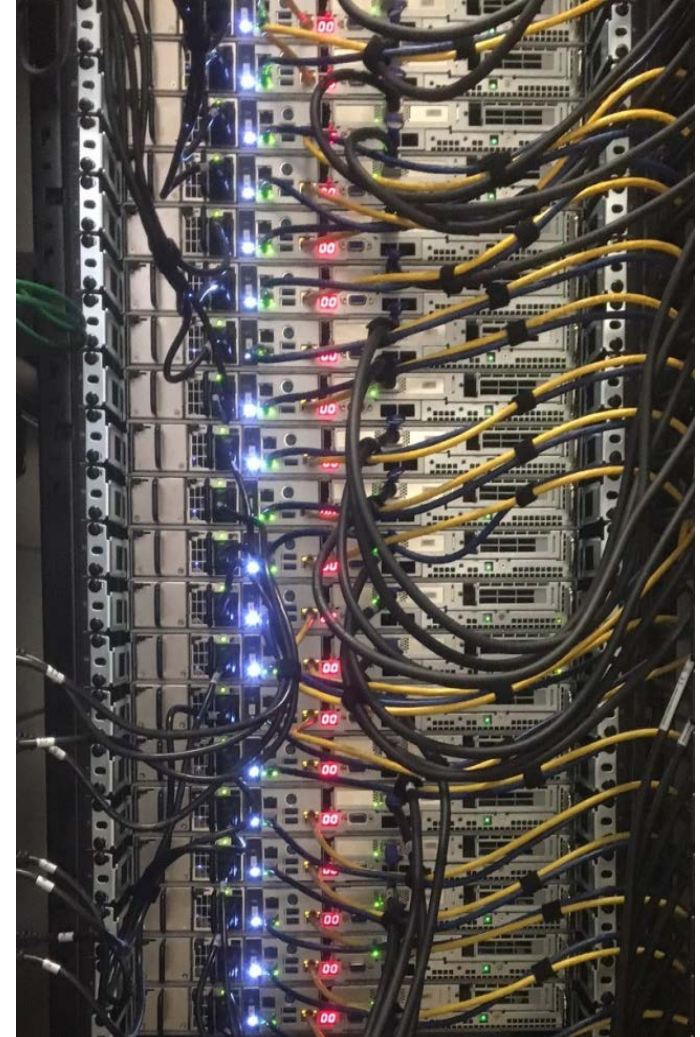 - 4TB local hard drive array

– Compute Nodes: 17
  - 96 GB DDR4 2400 MHz RAM
  - 120 GB SATAII SSD (Solid State Drive)

– Application Compute Nodes: 3
  - 96 GB DDR4 2400 MHz RAM
  - 4 TB local hard drive + SSD as above

– File Server:
  - 128GB DDR4 2400MHz RAM
  - 6TB drive array for OS
  - 55 TB data drive array (accessible to all nodes)
  - Infiniband EDR

HPCC Software

- OS:
  - Linux RedHat v7

- Compilers:
  - GNU Compiler
    - Program compilers and libraries
  - Intel Parallel Studio XE 2016
    - Latest Intel toolkit for high performance applications

- NetCDF, HDF5
  - Network Common Data Form
    - Programming interface to scientific data files
  - HDF5
    - Hierarchical Data Format – used to store image data

- WRF-ARW v3.8.1
  - Weather model (Atmospheric simulation system)

- Scheduler:
  - TORQUE – Adaptive Computing
    - Provides control over batch jobs and distributed computing resources

- Utopus Applications to be installed
  - R2 Renewable Generation Forecast Models
  - Energy Demand Forecast Model
  - Weather Insights for Environment (WISE)
  - Transactive Energy Management

VELCO

HPCC Analytics

- Vermont Weather Analytics Center
  - Weather Visualization
  - WISE (Weather InSights Environment)
  - Demand Forecasting
  - Renewable Forecasting
- OSIsoft Plant Information (PI)
  - Integrate asset data with maintenance applications
  - Predictive analysis on Telecom systems
- Utilize idle processing time for other opportunities

Utopus Transition Plan: VELCO

➤ Infrastructure Transition	VELCO Operational Infrastructure: Deep Thunder + Demand Forecasting + Renewable Forecasting + file updates to VELCO server	• **Server Cleanup (no planned impact to Operational Runs):** Feb 24th – March 10th: Remove any source from DT server, test / validate DT and downstream models. Prepare for move • **Server Shutdown:** **13th March**: Bring down Deep Thunder server after 0z run; • **Server Move:** 13th March • **VELCO server bring up at the new data center:** 14th March - 19th March: n/w setup; firewall setup; IP address setup; Reconfigure the servers • **First Run of DT:** **20th March***
	Yellow Zone Infrastructure: Opus Infrastructure + Opus Applications (SEDA + PLM)	• **Server Rebuild:** **1st March** – 8th March: New Licenses needed for all s/w. Opus platform rebuild • **Yellow Zone Build:** 12th March – **20thth March**: n/w setup; firewall setup; IP address setup
➤ Weekly Track Meeting Transition	Weekly track meetings; discussions and R&D	• **2 Week Transition – No track meetings:** **27th Feb** – 13th March: Move to temporary space; Setup n/w, datacenter access. Setup phones and conference lines; Setup email ids and laptops. Complete UI joining formalities • **Post Transition:** **14th March**: Weekly track meetings on schedule • **Weekly PM Meeting:** As planned; Tarun to join the team to help manage the Utopus tasks and support Lloyd.
➤ Track s/w Delivery	S/W development plans for each of the four tracks	• **Impact on S/W development and delivery:** **6st March** - **10th April**: Align and segment all IP and s/w per UI standard (removing IBM headers, managing licensed s/w, setting up access to s/w). Setup new dev-ops environment with new operating system, new s/w, UI headers etc. All s/w development plans will move by 5 weeks.
➤ VELCO Infrastructure buildout	Setting up VELCO h/w for Deep Thunder + downstream analytics	• Start effort from **21th March**. See details on the Track 4 timeline

*Utopus and IBM Deep Thunder team will make every effort to complete the task sooner