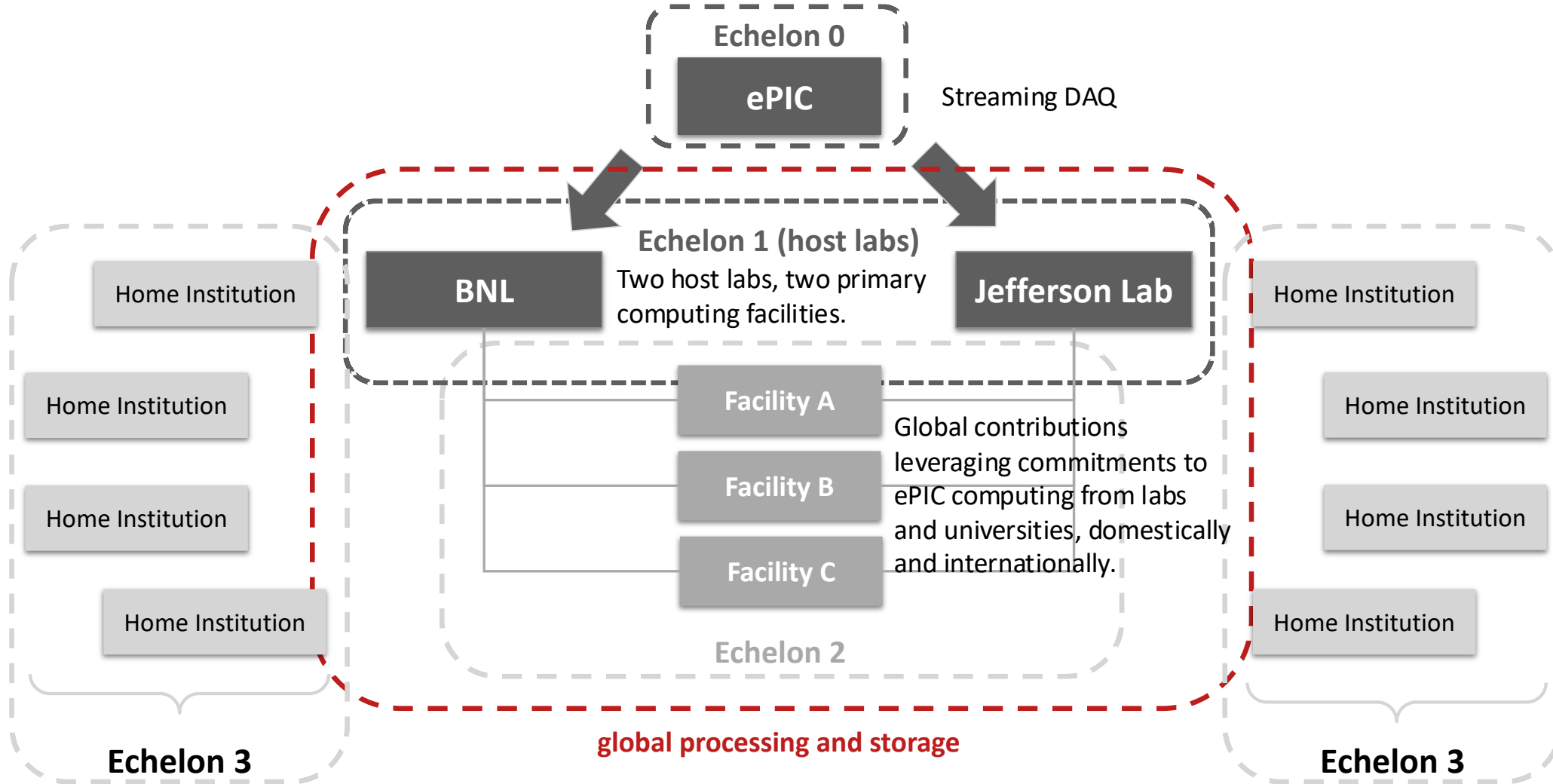


The ePIC Streaming Computing Model



Supporting the analysis community *where they are* at their home institutes, primarily via services hosted at Echelon 1 and 2.

Computing Use Cases and Their Echelon Distribution

Use Case	Echelon 0	Echelon 1	Echelon 2	Echelon 3
Streaming Data Storage and Monitoring	✓	✓		
Alignment and Calibration		✓	✓	
Prompt Reconstruction		✓		
First Full Reconstruction		✓	✓	
Reprocessing		✓	✓	
Simulation		✓	✓	
Physics Analysis		✓	✓	✓
AI Modeling and Digital Twin		✓	✓	

Substantial role for Echelon 2 in preliminary resource requirements model

Assumed Fraction of Use Case Done Outside Echelon 1	
Alignment and Calibration	50%
First Full Reconstruction	40%
Reprocessing	60%
Simulation	75%

- **Echelon 1** sites uniquely perform the **low-latency streaming workflows** consuming the data stream from Echelon 0:
 - Archiving and monitoring of the streaming data, prompt reconstruction and rapid diagnostics.
- Apart from low-latency, **Echelon 2** sites fully participate in use cases and **accelerate** them:
 - Tentative resource requirements model assumes a **substantial role for Echelon 2**.
 - **Priority**: Capabilities and resource requirements for Echelon 2 resources developed jointly with the community.
 - **Priority**: Establishing EIC International Computing Organization (EICO):



Timeline

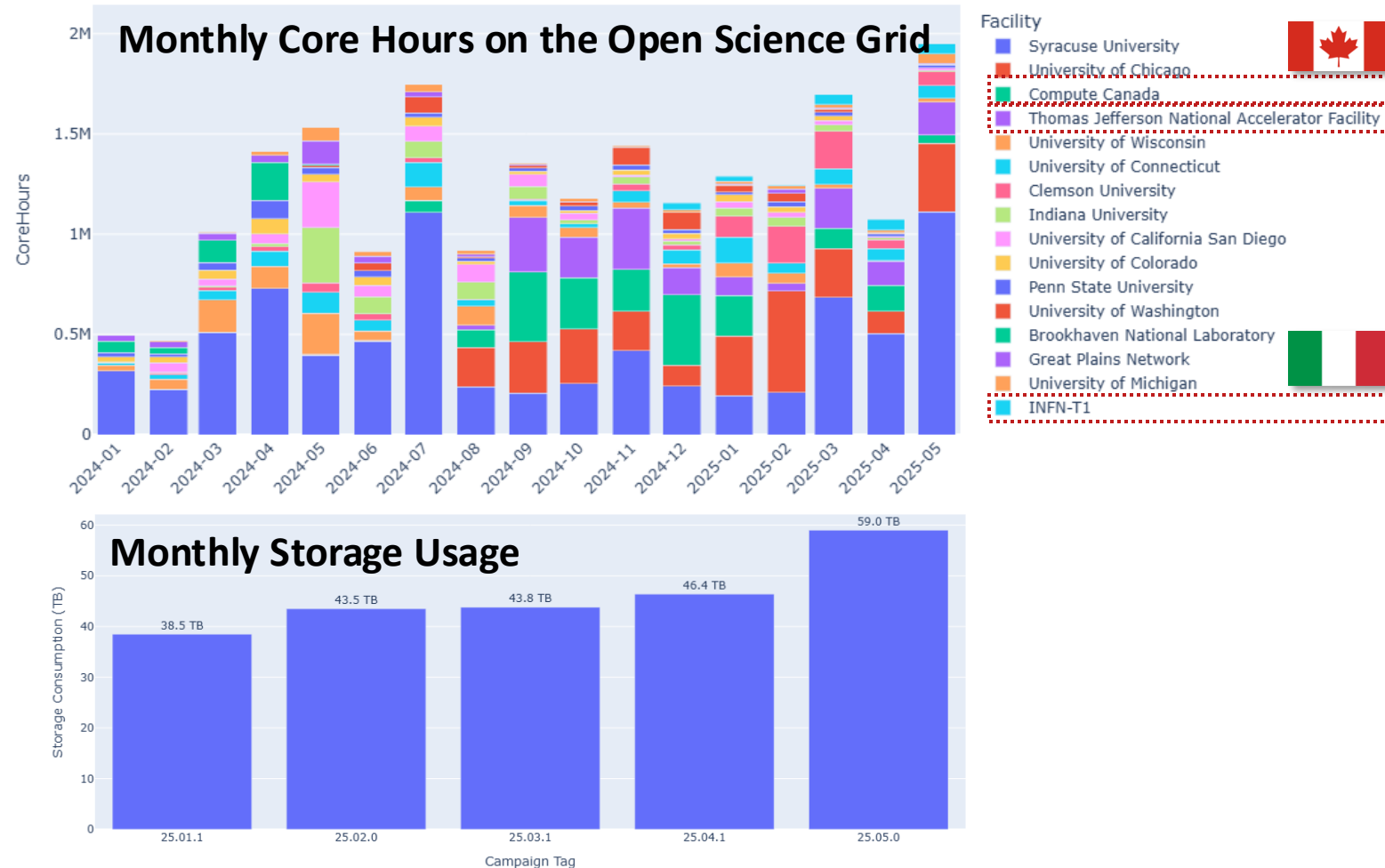
FY25	FY26	FY27	FY28	FY29	FY30	FY31	
PicoDAQ	MicroDAQ	MiniDAQ	Full DAQ-v-1	Production DAQ			DAQ
Streaming Orchestration			Streaming Challenges				
AI-Empowered Streaming Data Processing			Analysis Challenges				Computing
				Distributed Data Challenges			
AI-Driven Autonomous Alignment and Calibration			Self-Driven ePIC Experiment				AI

- **Compute-Detector Integration:**

- Joint deliverables between **DAQ** and **computing** to develop integrated systems for detector readout, data processing, and ultimately physics analysis.
- **Key role of AI:** Empowering data processing and enabling autonomous experimentation and control.

International Contributions to Compute and Storage for ePIC Simulations

- Over the past year, monthly simulation campaigns consumed approximately 15 million core hours on the OSG, generating over 500 TB of simulation data.
- These simulations serve as the standard for detector and physics studies for the preTDR and also the Early Science Program.
- These included compute resources from international partners.



Supporting the monthly simulation campaigns with compute and storage resources is an effective way to help build the ePIC computing infrastructure and facilitate early data and analysis challenges.

Agenda

11:00 AM → 12:10 PM Echelon 2: Status and Plans		
11:00 AM	ePIC Computing Model: Updates Speaker: Dr Markus Diefenthaler (Jefferson Lab)	5m
11:05 AM	Discussion	5m
11:10 AM	Echelon 2 in Canada: Status and Plans Speaker: Dr Wouter Deconinck (University of Manitoba) Google Slides	10m
11:20 AM	Discussion	5m
11:25 AM	Echelon 2 in France: Status and Plans Speaker: Carlos Munoz Camacho (IJCLab, CNRS/IN2P3)	10m
11:35 AM	Discussion	5m
11:40 AM	Echelon 2 in Japan: Status and Plans Speaker: Taku Gunji (Center for Nuclear Study, the University of Tokyo)	10m
11:50 AM	Discussion	5m
11:55 AM	Echelon 2 in Taiwan: Status and Plans Speaker: Eric Yen (Academia Sinica Grid Computing Centre)	10m
12:05 PM	Discussion	5m

- I am grateful to the representatives of all **EICO member countries** who have contributed material for today's meeting in preparation for the **ePIC Software & Computing Review**.
- In addition to today's presentation, I have received input regarding the **Echelon 2 status and plans in Italy and the United Kingdom**.
- Due to conflicts with other meetings, this that material cannot be presented during today's session.
- The received material will still be included in the **documentation for the Software & Computing Review**.

