ePIC Streaming Computing Model

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Marco Battaglieri[1], Wouter Deconinck[2], Markus Diefenthaler[3], Jin Huang[4], Sylvester Joosten[5], Jefferey Landgraf[4], David Lawrence[3] and Torre Wenaus[4]
for the ePIC Collaboration

[1]Istituto Nazionale di Fisica Nucleare - Sezione di Genova, Genova, Liguria, Italy.
[2]University of Manitoba, Winnipeg, Manitoba, Canada.
[3]Jefferson Lab, Newport News, VA, USA.
[4]Brookhaven National Laboratory, Upton, NY, USA.
[5]Argonne National Laboratory, Lemont, IL, USA.

Abstract

This document provides a current view of the ePIC Streaming Computing Model. With datataking a decade in the future, the majority of the content should be seen largely as a proposed plan. The primary drivers for the document at this time are to establish a common understanding within the ePIC Collaboration on the streaming computing model, to provide input to the October 2023 ePIC Software & Computing review, and to the December 2023 EIC Resource Review Board meeting. The material should be regarded as a snapshot of an evolving document.

Report: Initial version of a plan set to develop over the next decade.
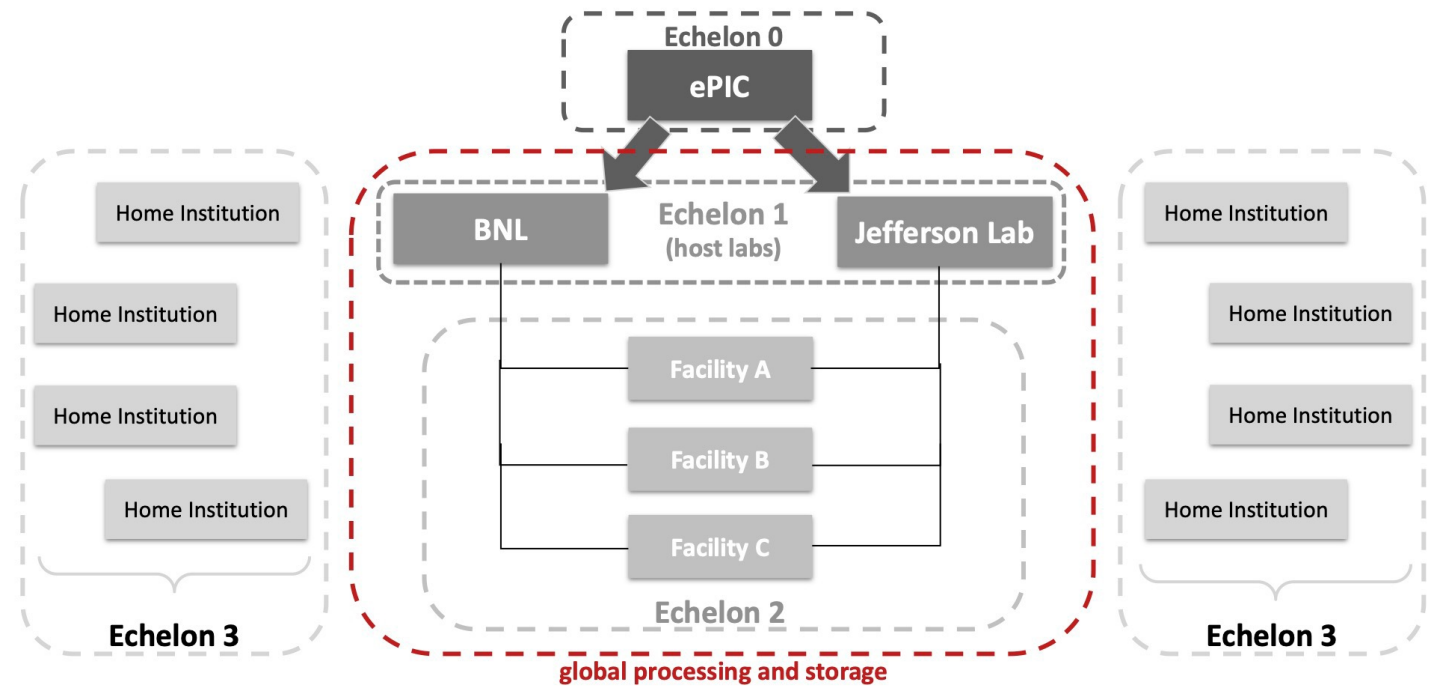
Echelon 0: ePIC experiment.

**Echelon 1**: Crucial and innovative partnership between host labs.

Echelon 2: Essential global contributions.

Echelon 3: Full support of the analysis community.

Echelon 2: Global ePIC Computing

ePIC is an international collaboration and so is its computing:

- **Echelon 2** includes **global resources contributed by collaborating institutions**.

- Achieving scientific goals relies on effectively using Echelon 2 resources.

- Design of computing model aims for **effective integration and management**.

- EIC RRB will oversee the compute resources for the EIC.

- Representatives from ePIC and international partners will manage the **EIC International Computing Organization** (EICO) under the leadership of the EIC Computing and Software Joint Institute (ECSJI).
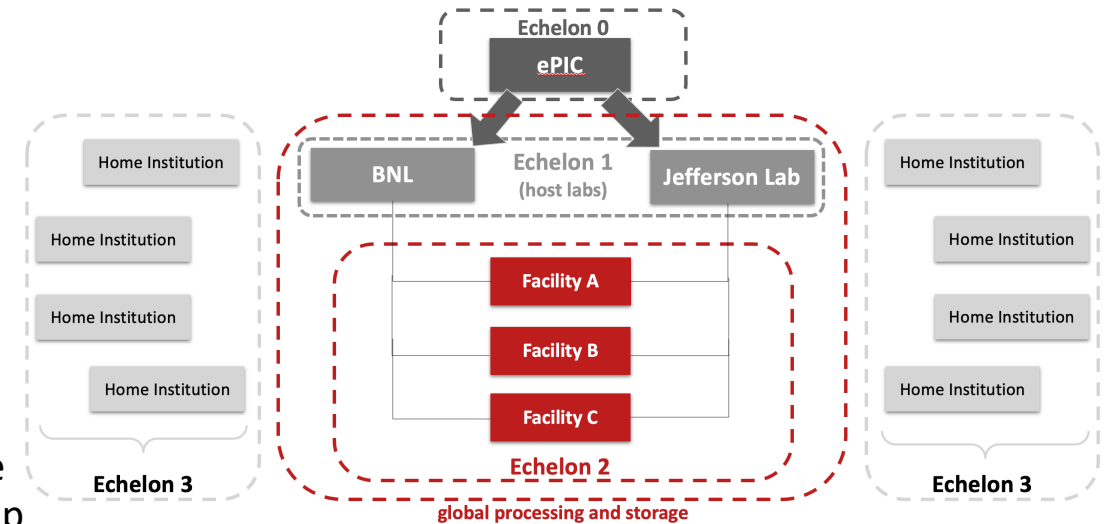
In-kind computing infrastructure contributions:

- **From the review**: *"There are clearly very significant opportunities in in-kind computing infrastructure contributions."*

- Canada, Italy, and United Kingdom engaged as a proof of concept in this context:
  - Integration of resources from international partners into simulation campaigns.

Echelon 3: Home Institute Computing

- **Echelon 3**: Component in the computing model where collaborators directly interact with the computing system:
  - Users can access ePIC Computing through various platforms like institutional clusters, work desktops, and personal laptops.
  - The role of Echelon 3 is to serve these diverse use cases.

- **Echelon 3 Resources**:
  - Both global and local to the user, similar to Echelon 2.
  - Numerous, diverse, volatile, and often have restrictions on their use.
  - Not intended to be managed as collaboration resources.

- The collaboration will provide tools, interfaces, connection points, data access mechanisms, and support to make Echelon 3 resources effective for ePIC analysis.