International PostExascale

Workshop Series

InPEx 2025 workshop – April 14-17, Japan

InPEx working groups results and achievements since the Sitges (Spain) InPEx 2024 workshop

Digital continuum and data management

Session Co-leads: Gabriel Antoniu (Inria), Manish Parashar (U Utah), Kentaro Sano (RIKEN)

InPEx - Digital Continuum and Data Management (summary of the sessions in Sitges)

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Context:

- Postexascale HPC within the digital continuum

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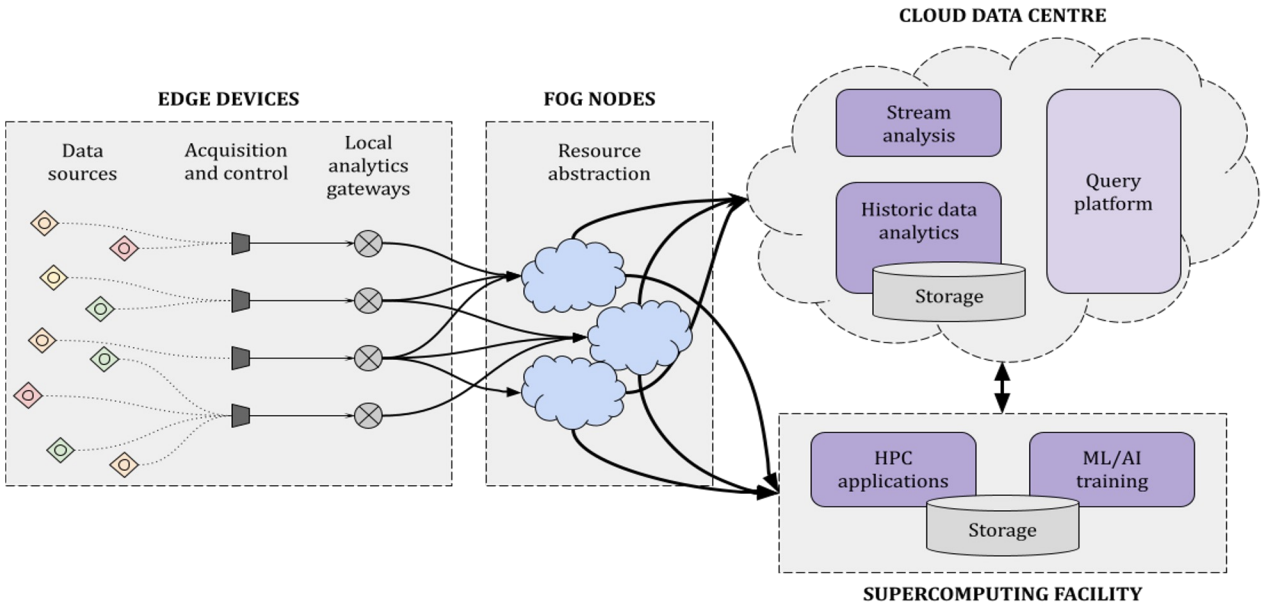

Digital Continuum and Data Management Challenges (as identified at the latest workshop in Sitges)

- Interoperability
- Hardware Heterogeneity
- Cybersecurity and Privacy
- Multiscale System-of-systems Integration
- Sustainability
- Energy Efficiency
- Data management
- Scheduling/resource allocation across the continuum
- Programming models
- Edge Application Requirements
- Reliability issues
- Tradeoff management
- Scale

InPEx - Digital Continuum and Data Management – Use Cases

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Presentation of the results and achievements of the working group

- Two online meetings : 28 January 2025, 27 February 2025
- Decided to focus the discussions on the requirements of concrete use cases

- Identified 4 representative Use Cases
  - [ESiWACE] A Workflow for HPCW - The High-Performance Climate & Weather Benchmark
    - *Mario Acosta et al. – BSC*
  - [HEP] High-Energy Physics use cases for HPC
    - *Maria Girone et al. – CERN*
  - [SKA] Direction-Dependent Facet (DDF) calibration Use-Case (astronomy/radioinferometry-based imaging)
    - *Mathis Certenais (U Rennes), Damien Gratadour (Obs Paris) et al (Inria)*
  - [Urgent computing] Facilitating trade-off management on the Continuum for Urgent Science
    - *Manish Parashar (U Utah), Daniel Balouek (Inria)*

InPEx - Digital Continuum and Data Management – Next Steps

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Plan for this workshop

- TODO: Use case characterization, identification of shared challenges and potential solutions
- Criteria:
    1. Access to HPC resources (as a community)
    2. Interface to a federation of resources (e.g. EuroHPC)
    3. Co-design for the post-exascale systems
    4. Portability of the benchmarks and codes
    5. Deployement issues of the workflows and applications
    6. Metrics for different deployement scenarios
    7. Semantics and quality of data
    8. Resources provisionning
    9. End-to-end workflow control
    10. Multitenancy
    11. Data logistics

- Session1: Wed, April 16, 9am-11am – Use case presentation

- Session2: Wed: April 16, 4:30pm-6pm – Discussion on shared challenges and solutions