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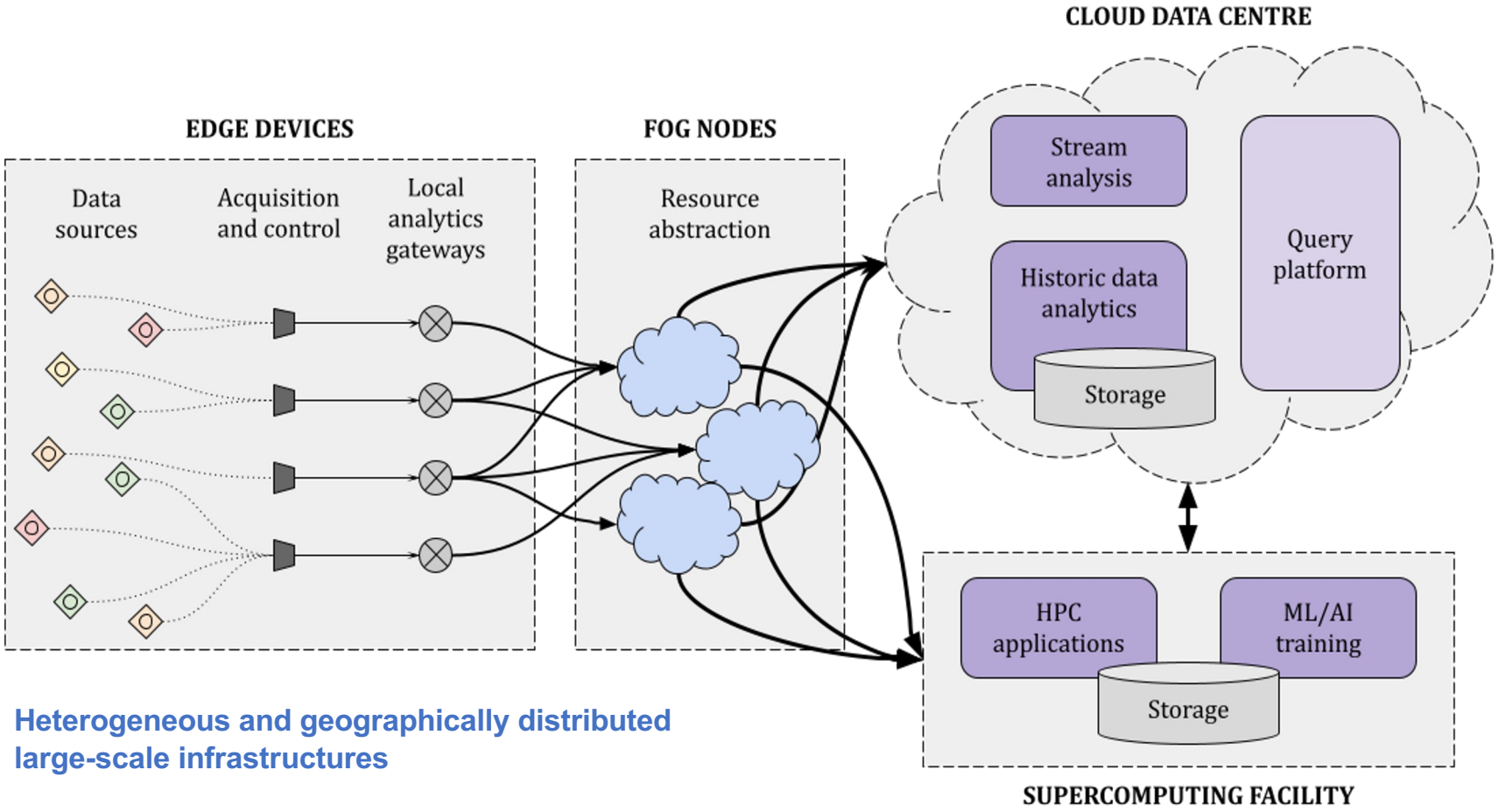
TRANS NUMERIQUES

PROGRAMME DE RECHERCHE
NUMÉRIQUE POUR L'EXASCALE

NumPEx Sessions on the Computing Continuum

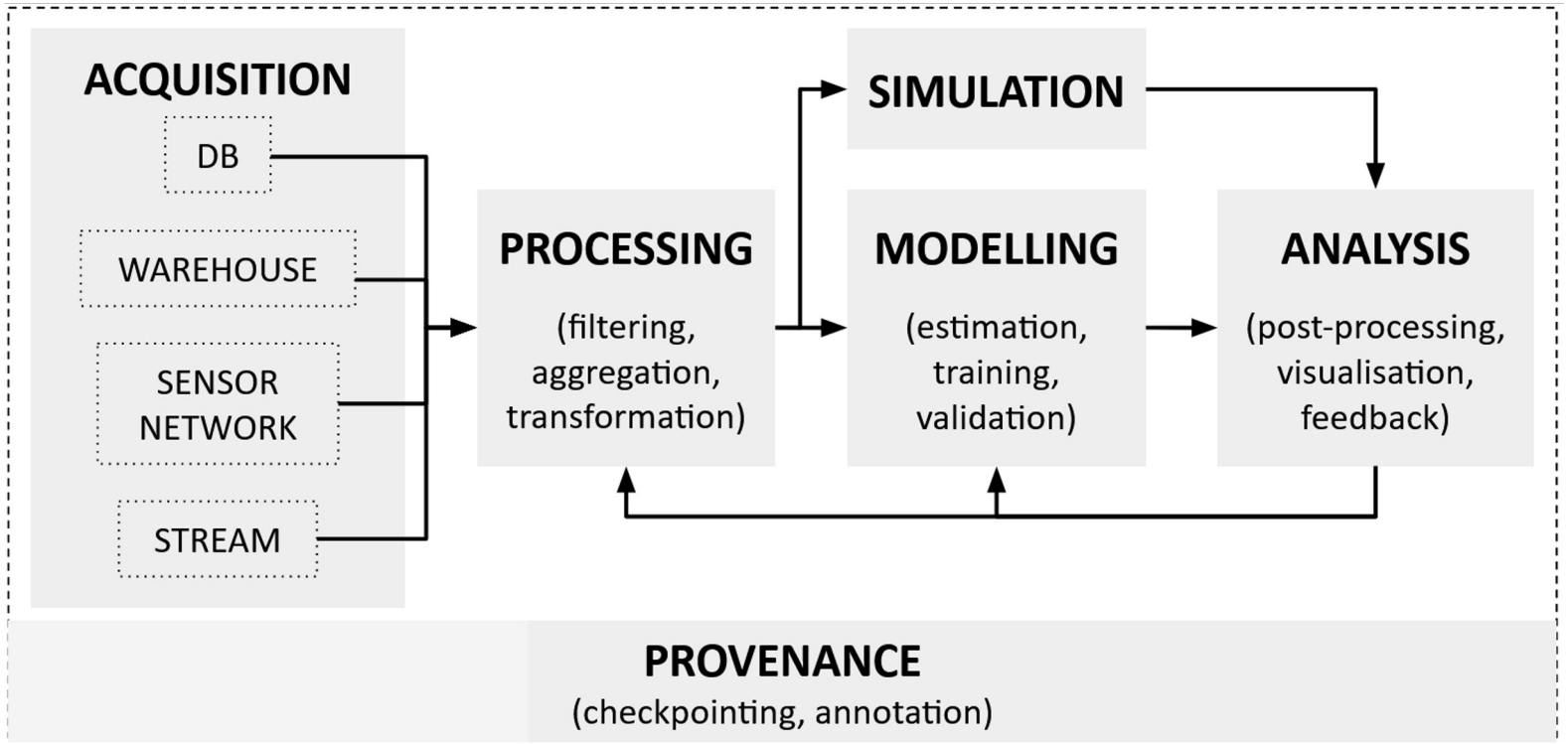
Co-animators: Gabriel Antoniu (Inria), François Bodin (Univ Rennes)

The Computing Continuum

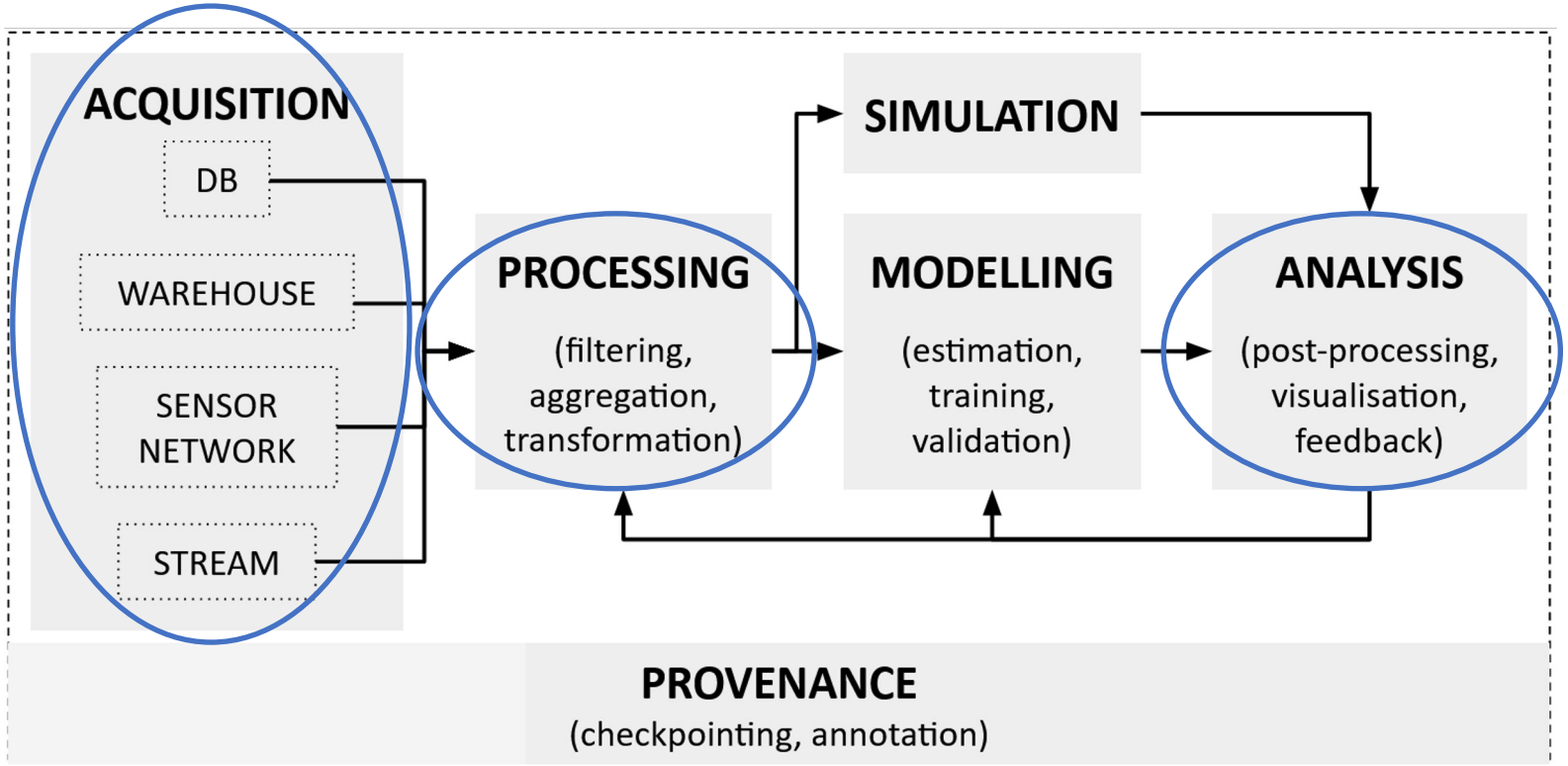


Heterogeneous and geographically distributed large-scale infrastructures

Application Workflows across the Continuum

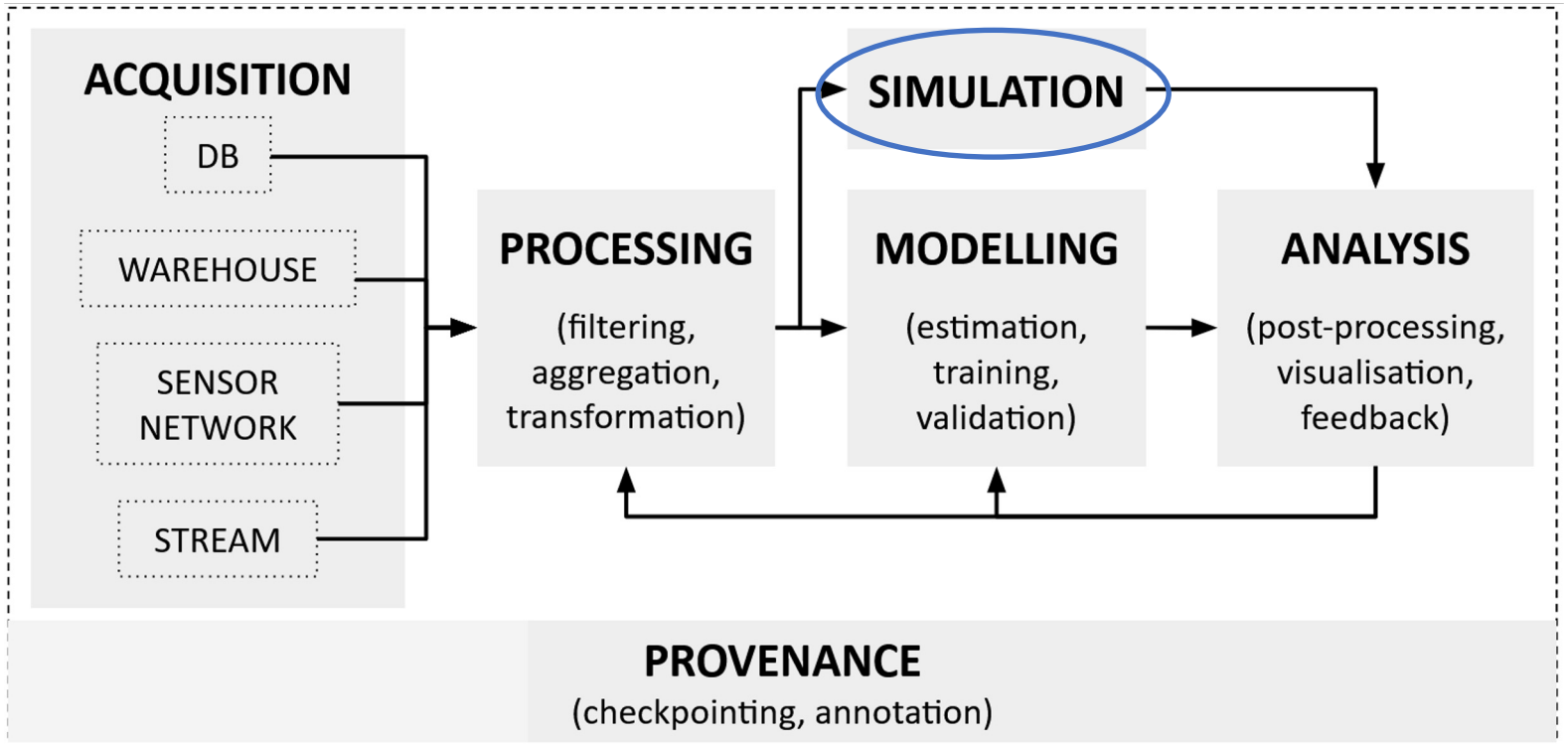


Application Workflows across the Continuum



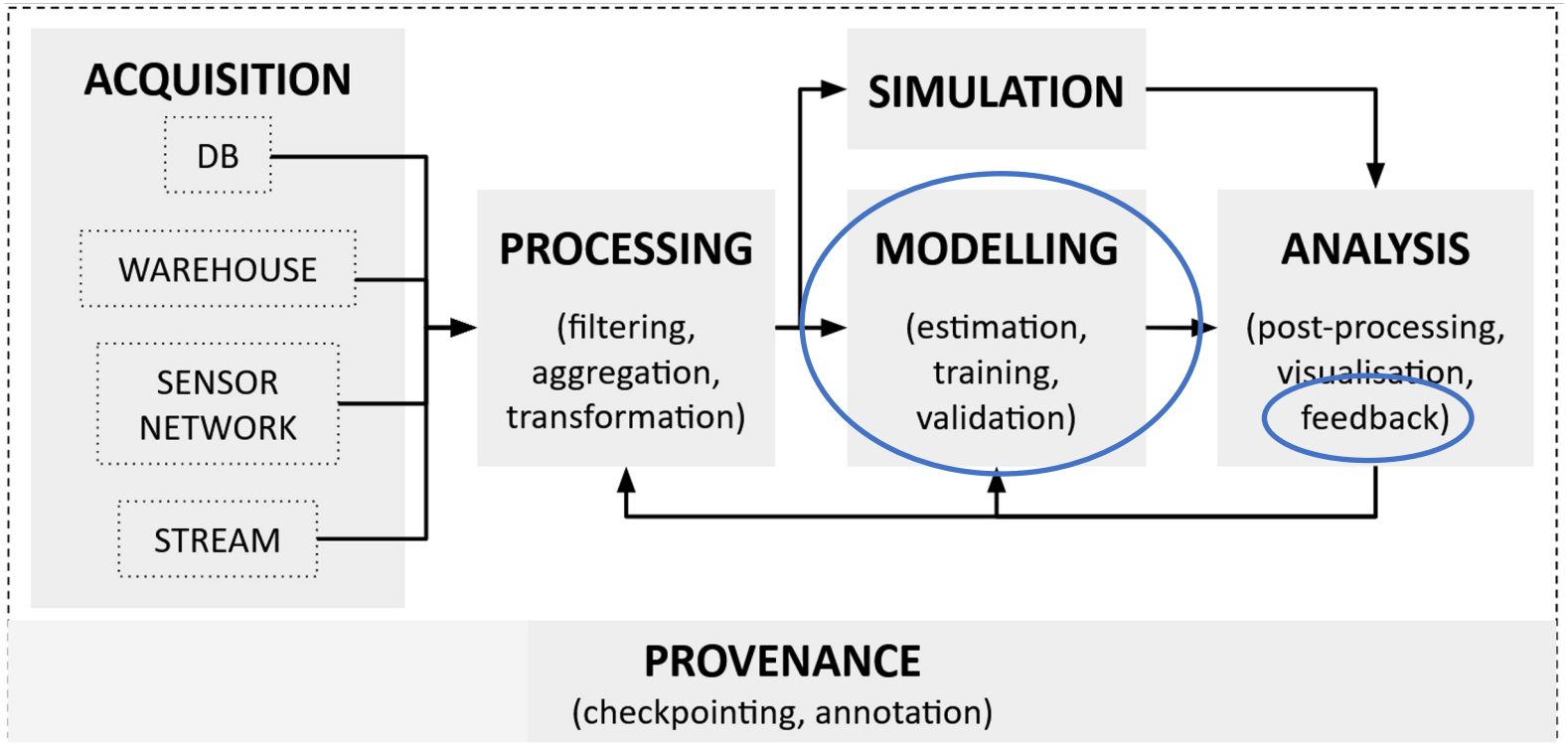
Mixed requirements: Big Data

Application Workflows across the Continuum



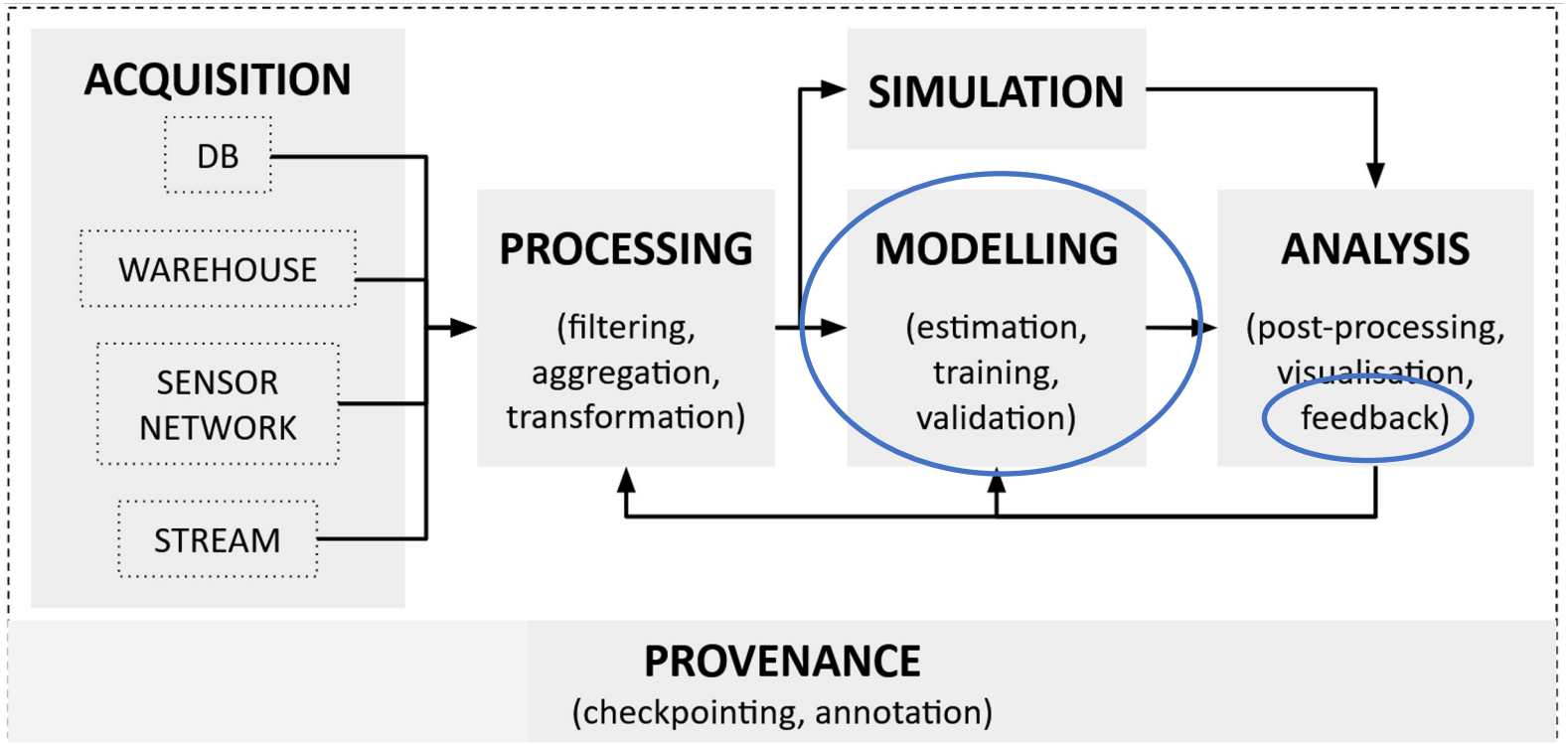
Mixed requirements: High-performance computing (HPC)

Application Workflows across the Continuum



Mixed requirements: AI/ML

A Post-Exascale Workflow: Square Kilometer Array Observatory

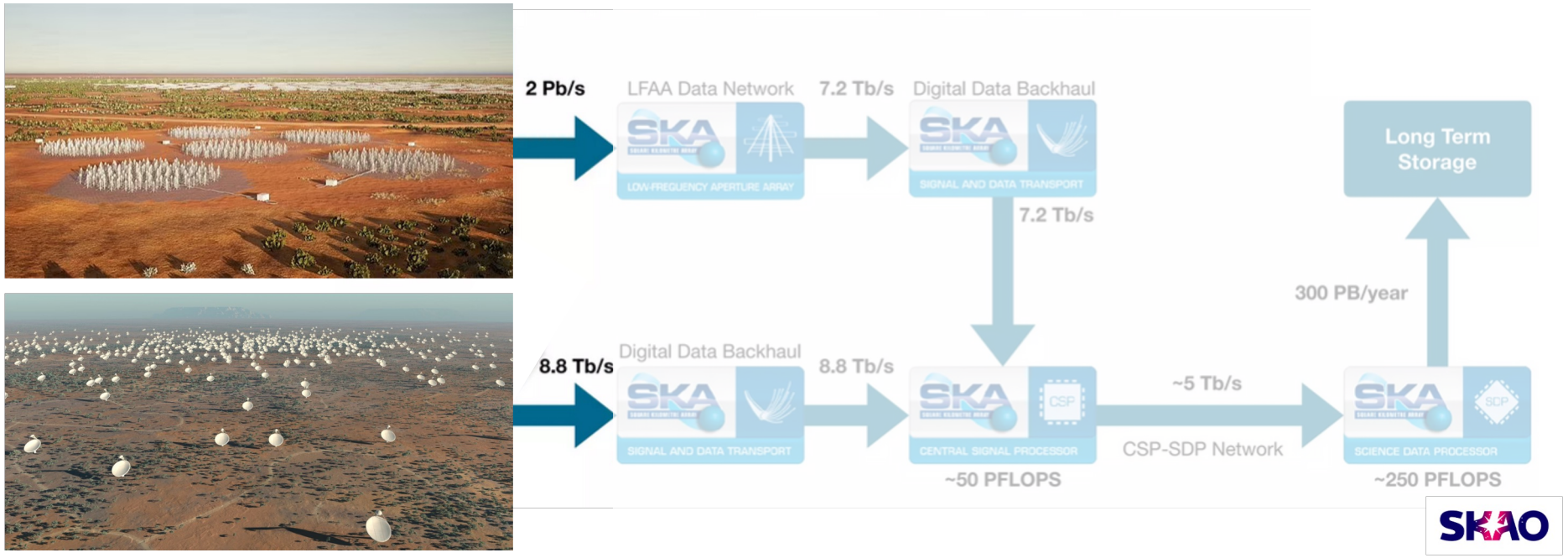


Mixed requirements: AI/ML

A Post-Exascale Workflow: Square Kilometer Array Observatory

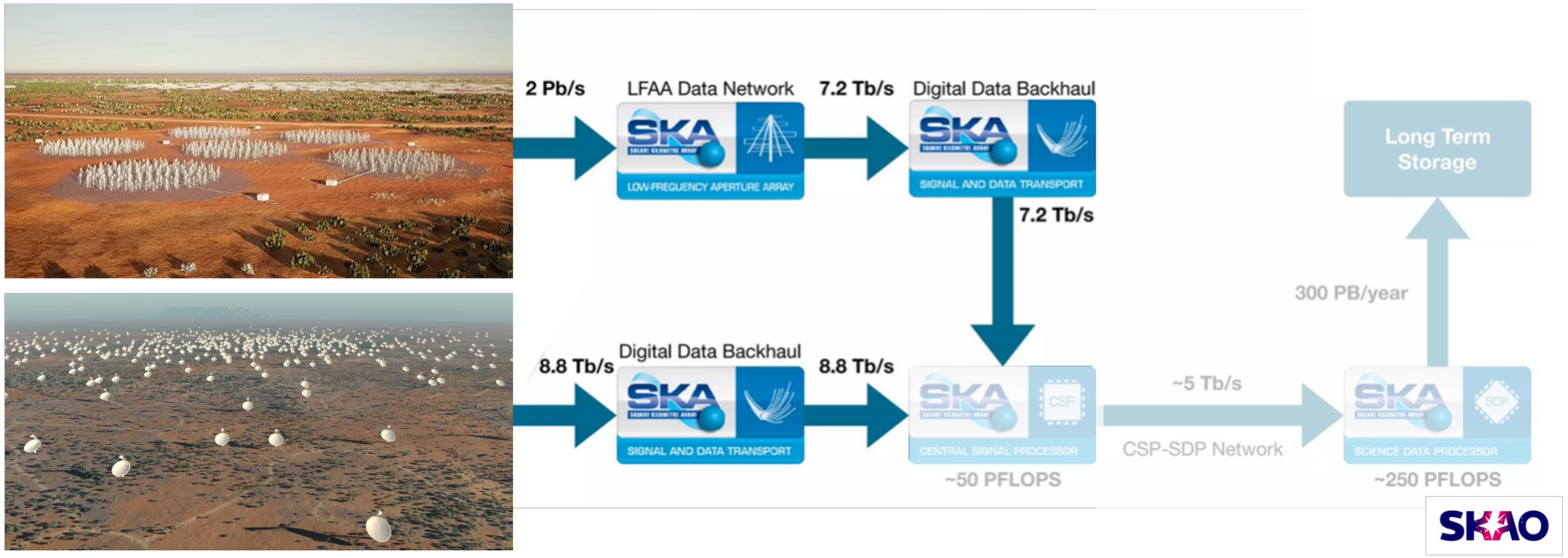
Edge sensors create PB/s of data

Data acquisition



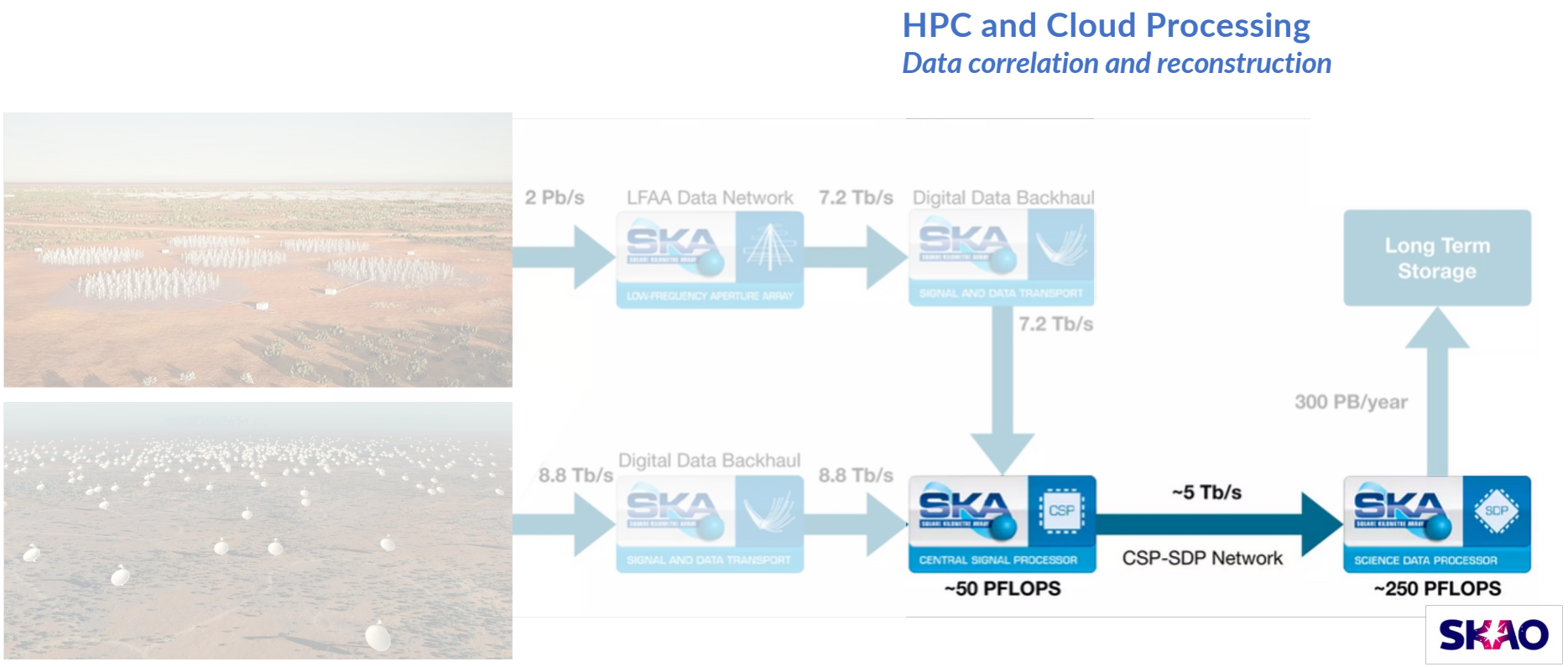
Credit: Square Kilometer Array Observatory (SKAO) / Damien Gratadour

A Post-Exascale Workflow: Square Kilometer Array Observatory



Credit: Square Kilometer Array Observatory (SKAO) / Damien Gratadour

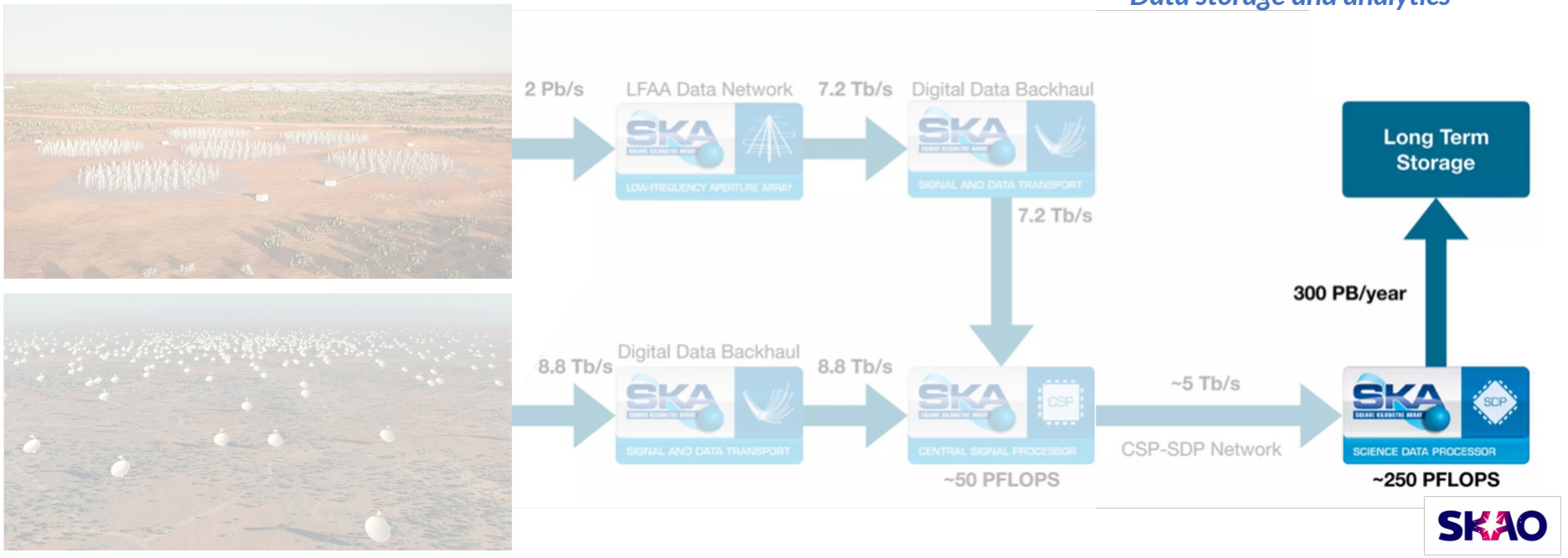
A Post-Exascale Workflow: Square Kilometer Array Observatory



Credit: Square Kilometer Array Observatory (SKAO) / Damien Gratadour

A Post-Exascale Workflow: Square Kilometer Array Observatory

Cloud Data Services for the Global Research Community
Data storage and analytics



Credit: Square Kilometer Array Observatory (SKAO) / Damien Gratadour

The Computing Continuum in European Strategic Documents: BDVA, ETP4HPC Strategic Agendas, TCI

Some Challenges

Application/workflow level

- Programming models and API for worksflows across the continuum
- HPC as a service
- Portability of the benchmarks and codes

Middleware level

- Deployment of the workflows and applications across the continuum
- End-to-end workflow control and management
- Transparent Edge-Cloud-HPC integration

Resource management

- Interface to federation of resources (e.g. multiple EuroHPC centers)
- Resources provisioning across the continuum

Data

- Data logistics across the continuum
- Data accessibility for the long term
- Frugal storage solutions, e/g., computational storage
- Semantics and quality of data

Security

- Trust models, authentication
- Enable confidential computing across the continuum
- HPC cybersecurity operational constraints (e.g. ZRR)

Other

- Application/software/hardware co-design for the post-exascale syste
- Multi-tenancy

Goal of the sessions and proposed organization

Days 1 and 2: Discussion of the challenges

- Discuss initial challenges (list to be enriched)
- **Ongoing R&D efforts** to address these challenges?
- What important **strategic actions** do you see to address these challenges?
- What are the **technical milestones** whose achievement would help to address these challenges?
- What are the g**overnance requirements**?

Goal of the sessions and proposed organization

- How to abstract the continuum?
- AAI and other federation issue?
- How to monitor the continuum?
- How to implement data logistic?
- How and where AI could/should help?
- How to implement provenance at the continuum level?
- Ontologies for the continuum?
- Containers strategies/support continuum wide (e.g. cybersecurity issues)?

Day 3: synthesis and feedback to the plenary session

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Thank you!

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