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Revised Swiss ATLAS Computing Strategy

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Global ATLAS Context

Global ATLAS has introduced new notion with nucleus and satellite sites with the goal to simplify and slim the distributed computing

- **Significantly less nucleus sites than today's T2, i.e. less storage end-points seen by the experiment**
- **Satellite sites can be storage less, i.e. with scratch space only and only minimal middleware (even none)**
- **Satellites can be very big, but not necessarily running all workflows**

Implications for Swiss ATLAS (5 yrs)

- **AEC-LHEP becomes Swiss nucleus for UNIBE and UNIGE with specific ATLAS services, competence and contact.
O(1k) cores and up O(1 PB) disk storage**
- **CSCS CRAY as flagship computing satellite without storage end point and specific ATLAS services and competence,
O(10k) cores. (Only) production workflows with moderate i/o.**
- **Other compute resources (UNIGE ?, UNIBE-ID, UNIBE-LHEP, SWITCHengines ...) are smaller satellites, O(1k) cores providing CPU to central ATLAS whenever free.
Below 1k cores it will not be worth the effort.**

Schematic

Global ATLAS production and data management system

UNIBE-ID

Smaller ATLAS compute

AEC-LHEP UNIBE/GE Nucleus

Storage endpoint, competences, services

CSCS CRAY

Swiss Flagship Compute
Scratch storage only

SWITCHengines

Smaller ATLAS compute

UNIGE

Smaller ATLAS compute

UNIBE LHEP

Smaller ATLAS compute

Expected benefits

- **Highly efficient compute at CSCS with additional huge opportunistic potential (backfill)**
- **Minimal ATLAS customer specific services and knowledge needed at CSCS. No storage element needed. Scratch only.**
- **Communication concerning ATLAS, EGI, WLCG etc via nucleus. CSCS and other satellites don't need to bother with these information networks.**

Timeline

- **Migration to revised ATLAS model goes with LHConCRAY project and T2 funding requests**
- **2016 T2 ATLAS storage request to nucleus only, no more storage at ATLAS CSCS (no need for dCache then)**
- **ATLAS runs only compute on CSCS CRAY from April 2016 ?**
- ...

Technical Considerations

Network considerations

ATLAS is implementing a model in which only needed data is moved to compute sites, not files with huge amount of not-needed data.

However, based on today's solution:

- ATLAS simulation: 1 events in 900s on one core with i/o ~ 2 MB. So a core needs ~ 0.00002 Gb/s.**
- 10k ATLAS cores needs ~ 1 Gb/s**

Reason to believe that the new scheme scales for simulation over the next 5 to 10 yrs

Reconstruction need ~2x i/o and is up to 70 faster, so this does not scale as good. However, may improve a lot due to slow down from significantly pile-up increase. Also Reco is 20% of WT (last year)