ATLAS Concerns for the future

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Manpower (Brainpower!)

- Expertise coming from T1s and T2s!
  - a large overlap between site operations and experiment support
  - we cannot afford to lose it
- Guarantee the stability of resources in spite of shrinking funding for manpower at sites - how to address?
- Clouds, today at 15%, more in the future
  - even grid clusters are difficult to maintain
  - how well will the clouds be supported and how much the experiments need to micromanage?
- Career possibilities are limited for experts in computing and software
  - especially for the physicists
  - difficult to motivate people to contribute on long and more permanent basis
Sites deployment and evolution

- Till recently: uniform service provisioning for Tier-2
- But even now: what should new sites deploy? ...not very clear!
  - which CE? how to configure it?
  - DPM? dCache? ... what makes sense long term?
  - new technologies: ObjectStores? http federations?
  - deployment models: OSG, EGI ...

- Possible future:
  - compute intensive sites, cached storage -- lower operational cost
  - data intensive sites: providing permanent storage with good connectivity - higher operational cost

- How to adjust the deployment model?
Storage persistency

- Compute resources are “easy”:
  - volatile: if a site goes down, there is no permanent damage
  - migration to new technologies (OS, services) is “transparent”/short term operational activity

- Storage resources are much more difficult:
  - site instabilities cause partial unavailability of permanent data
  - deployment of new storage technology is a long term operational activity

- Decommissioning of storage resources is expensive:
  - long migration of unique data - months, years
  - potential loss of unique data -- happened to ATLAS on few sites in the past

- How to ensure a stable storage?
  - MoU - required?, enough?
  - long term commitment? level of support? planned funding?
Upgrade studies considerations for Run-3/4

- Memory consumption:
  - 4 to 8GB of RSS

- Reconstruction time:
  - x15 as compared to MC15 at mu=25

- Need for dedicated resources:
  - most of the sites are not able to run them out of the box
  - often competing with other heavy requests (HLT reprocessing, Heavy-Ion reprocessing)
  - we need to find a way to run the upgrade jobs on part of ATLAS resources without disruption of regular activities
Job resource requirements

- RSS (PSS) instead of VMEM implemented in WMS
  - some sites not ready yet (LRMS with cgroups needed)

- Various activities:
  - high-memory vs usual 2GB/core jobs
  - high-I/O vs low I/O jobs
  - multi-core (and MPI) jobs vs single-core jobs
  - EventService (single event processing) vs fixed no-of-events jobs

- Those workloads can vary a lot (campaigns)
  - sites with static partitioning not effective - eg. we cannot use all resources for mcore (not more than 60%)
  - should the sites be pushed to be more dynamic, or should general-purpose vs limited-functionality sites be introduced?
Networking

- Need for efficient network performance and connectivity monitoring
  - ESNet provides central and full monitoring overview - in discussion to extend it to Geant
- Packet loss is critical for high RTT
  - needs to be propagated to the network operators
  - Crucial in view of concentration of the storage and remote access
- How to ensure sufficient network quality?
  - measurement
  - procedures and propagation to NRENs
- Some countries have much better networking infrastructure than the others
  - are the less performant networks sufficient for the new paradigm?
Common Software

- Common software is, as ever, essential and difficult
- Open source community points the way: practical, bottom-up, community driven
- ATLAS supports and participates in the community initiative following this model, the HEP Software Foundation
  - HSF startup team leadership & membership
  - Contributed [HEP Software & Computing Knowledge Base](#), [websites & newsletter](#), EC2 platform for HSF websites, ...
  - Investigating common project possibilities
  - Starting to leverage expertise via HSF, notably on git migration
- But HSF participation is (persistently) very low and consequently progress on building the HSF into what the optimists imagined 18 months ago is very slow
- How to address? How to build up the effort?
- Institutions capable of making/supporting contributions should do so
- Individuals should be encouraged and supported to participate
- cf. Benedikt’s talk on Wed for more on HSF