

WLCG DOMA kick-off Introduction

Maria Girone, Simone Campana
CERN

From Napoli: DOMA Q&A

- **Data Management and Provisioning Systems**
 - Pursue commonality in experiment data management systems. Rucio being a very promising candidate as common solution between ATLAS and CMS
 - Implement common functionalities in a common middleware layer (see FTS for example)
- **Geographically distributed storage services: evolve existing technologies (dCache, EOS, ..) to “advanced data federations”**
 - Performance, impact of latency/bandwidth, QoS, notification mechanism, deployment model, operation model
- **Content Delivery and Caching technologies**
 - Protocols, granularity, methodology
- **Data Federation Protocols**
 - From short/medium term gridFTP replacement to longer term token based system

From Napoli: Trends from Workload Management session



Thoughts on Storage Budget



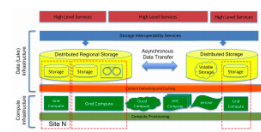
- The tape budget is something we can not shrink significantly
 - “virtual data” makes no sense given the high CPU cost of reconstruction.
 - Disk is ~x5 more expensive than tape.
- => The best bet for reducing storage budget is to rely more on tape and less on disk.**

Data lakes and workload management

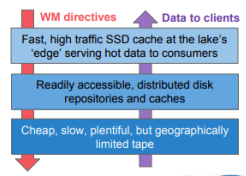


- Our sites are linked with (ever higher) high-bandwidth networking
 - We can expect **~100x bandwidth growth** by HL-LHC
- **Data lakes:** integrated consolidation of distributed storage (and compute) facilities, leveraging high-bandwidth networks
- Data lake encompasses facilities with several levels of storage
 - **Tape**, at a relatively limited number of sites
 - **Standard disk**, at large storage repositories and smaller caches
 - Fast SSD **'edge cache'** for the hottest data
 - Should be able to **place data optimally** based on (dynamic) need
- Workload management knows the hot popular data in use
 - Use that knowledge to drive preparing data in the lake, asynchronously to the processing, e.g.
 - tape staging in a **carousel workflow**
 - placing hot data in SSD cache **'close'** to available CPU
 - **transforming/marshaling data** optimally for client delivery
 - Requires APIs supporting WM directives
- **Instead of 1.8 replicas on disk today, WM + data lake manages dynamic availability of actively used data with replica count <<1**

Data lake schematic



Data lake interactions



T. Wenaus 2018-03-27



End to End content delivery
Hot/Warm/Cold storage



From Napoli: Next steps

- Create a Data Organization Management Access evolution project:
 - keep track of developments and advancements in all DOMA areas
 - provide a forum to discuss ideas
 - foster interoperability of solutions
 - an umbrella for stakeholders, national initiatives, EU projects, already existing working groups
- Stakeholders: experiments, middleware developers and storage providers, facilities

News from the LHCC

- The LHCC will start a review process of the WLCG strategy for HL-LHC
- The timescale for the review is early next year. This is the starting point for a several years process
- There will be regular checkpoints of the progress after that
- DOMA is a key aspect of the strategy and therefore will be a key area of the review process
- The progress we make in the next six months will be extremely valuable as input to the review
- We should be prepared to report regularly our progress

In this kick-off meeting

- We discussed DOMA technologies in Napoli
- For the kick-off we thought focusing on:
 - Use cases from experiments
 - Experience from facilities
 - Plans and ongoing activities at the level of WLCG, in the experiments and at different sites/regions/funding agencies
- Planning for regular monthly meetings, possibly in conjunction with pre-GDB slots
- Logistics: for coffee breaks we will go to Restaurant-2 (here in front). Please be back in time.