

# Methodology:

- Aspects: cost models, modelling of system, understanding of behaviour & performance, technology evolution, prototyping



- Develop prototypes that help evolve the running system; understand the relative costs, understand the performance, gradually learn where the next bottlenecks, issues are, prototype solutions
  - Iterate towards the HL-LHC computing model, with feedback from real measurements and experience, develop the costs as we progress

# Prototyping

- ❑ Overarching goal: Prototype of “data-lake” style model
  - understand the relative costs of different workflows
  - Federated storage with different latencies - look at impact
- ❑ Specific aspects: →

# Potential R&D/prototyping

- ❑ Resource Provisioning
  - Common infrastructure for provisioning traditional, cloud, HPC and specialized hardware.
  - Demonstrate capability of scheduling for peak loads in clouds
  - Use of specialized or exotic hardware/facilities
  - Specification & execution of workflows rather than jobs
  - Common workload management system, integrated with data management, to manage the execution of workflows on diverse resources, with high level of automation and AI
- ❑ Data Management and Access
  - Integration of data placement and data delivery by combining data management and data federation solutions
  - Smart caching
  - Integration of networking information and testing of advanced networking infrastructure
- ❑ Data Reduction
  - Common workflow management system, to manage the complex workflows of the future which may involve hybrid resource usage, integration with framework, and deep integration with metadata
  - Define common selection criteria.
  - Demonstrate the ability to support hundreds of users reducing multi-petabyte samples to multi-terabyte samples and export them.
- ❑ Data Transformation
  - Demonstrate the broad applicability of the event server model to all LHC experiments
  - Demonstrate breaking the event loop into series of discrete data transformations

# White paper

## □ Agreed:

- 5-10 page white paper contribution for the CWP, high level messages, accessible - main ideas;
- 50 page document with the details – needs clean up of existing document

# 5-page document

- Introduction
  - Explain the HL-LHC problem, requirements, etc.
  - Cost, metrics, model development
- High-level view of potential computing models
  - Various aspects and ideas
- Infrastructure & technology
  - How this may evolve, constraints, concerns
- Facilities
  - What they may look like
- Common data management and data access layer
- Networking
  - Considerations, how to manage traffic
- Common resource provisioning layer
  - Including all types of resources; common pilot factory etc
- Common workload management layer
  - Different workflows, granularity
- Roadmap & prototyping work