CMS Data Grid, Open Science Grid, and Condor-C

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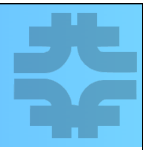
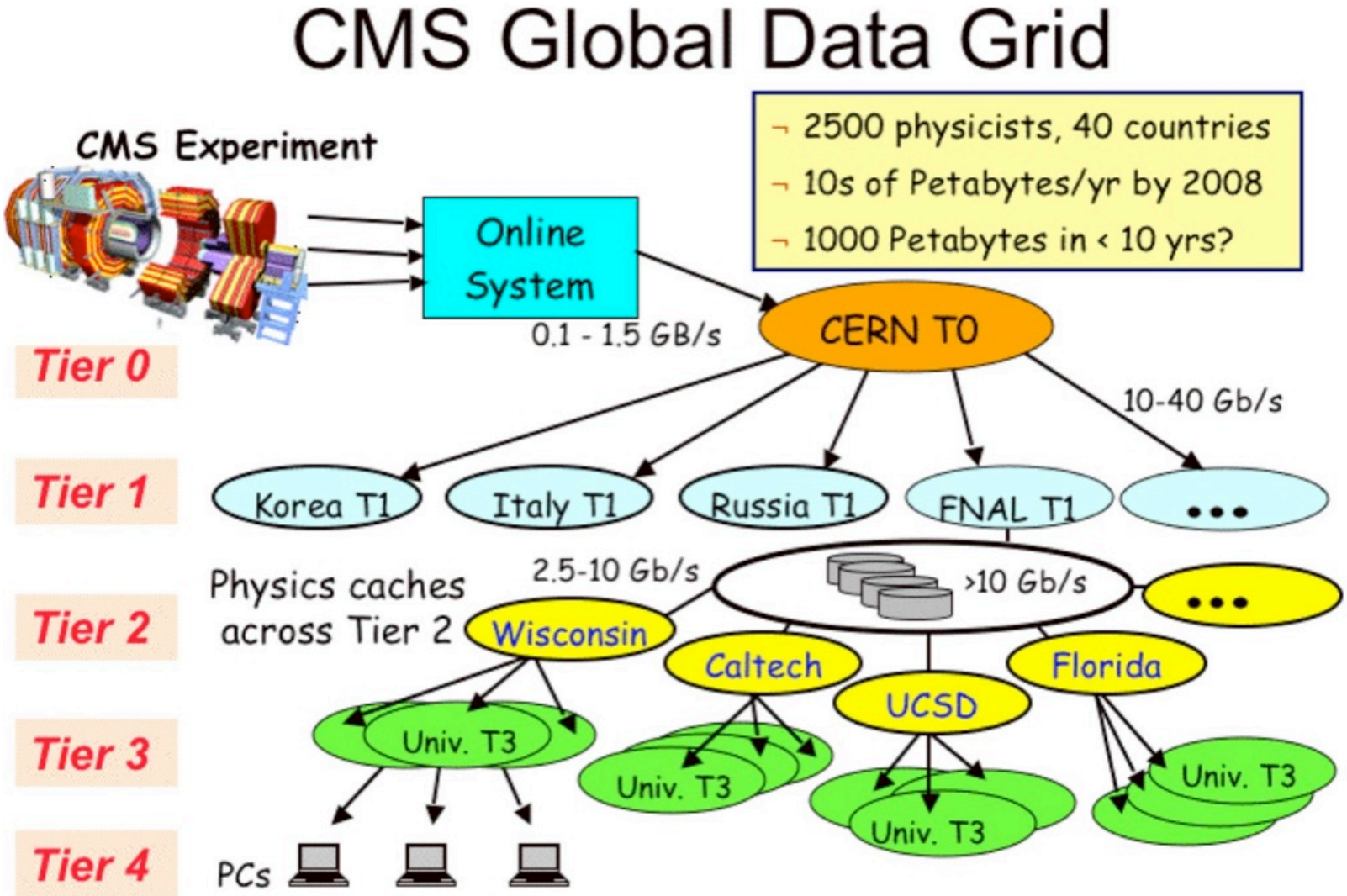
Formation of the CMS Data Grid



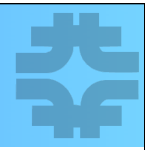
The 4 experiments being constructed for the Large Hadron Collider at CERN are proposing new scales of scientific computing

- Computing is widely distributed from the beginning
  - There are significant resources for selection and reconstruction at the detector, but a relatively small fraction of the total computing
  - 6 Tier-1 computing facilities distributed worldwide with a total capacity of 10pB of disk storage and 12M SpecInt2k (About 10,000 modern CPUs)
  - 50 Tier-2 computing facilities distributed worldwide with approximately the same integrated computing capacity
- Wide Area networking is critical to success
  - Facilities will make use of 10Gb wide area network links
- We expect to make extensive use of grid interfaces
  - Data Transfer, Site configuration and status exchange, and execution of requests.

CMS Computing Model



Open Science Grid



The Open Science Grid (OSG) Consortium was formed in 2004 by teams from U.S. universities and national laboratories

- Build and support a production quality peta-scale Grid infrastructure for large scale science.
- Ensure that the U.S. plays a leading role in defining and operating the global grid infrastructure needed for large-scale collaborative and international scientific research.

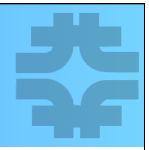
Self-organized contributions to a heterogeneous infrastructure

- Policy, Storage, Integration, Authorization, Operations

Infrastructure heavily based on VDT for Grid Services

- Migration from Grid2003 infrastructure

Building the Environment



OSG will provide the US computing centers

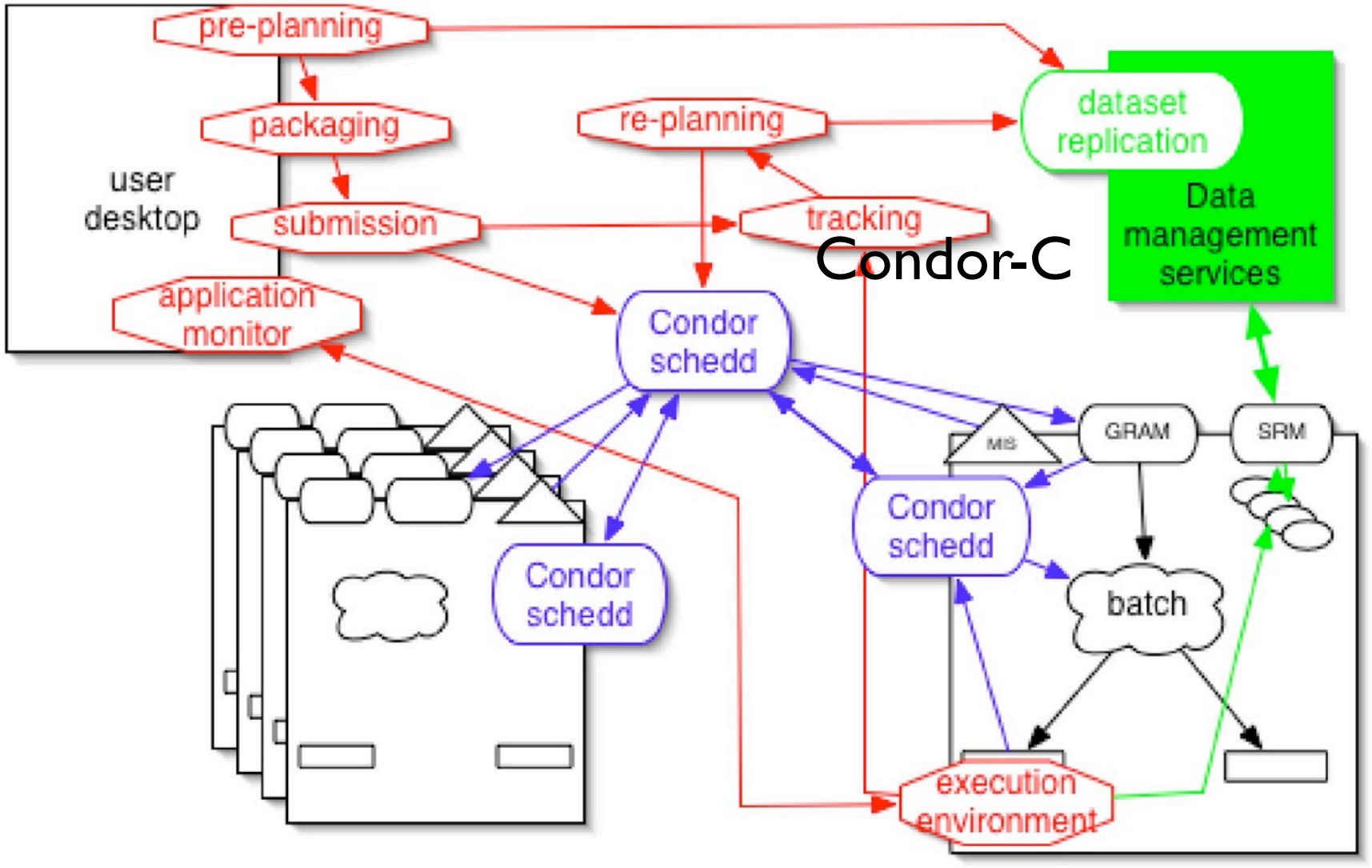
- The interfaces to enable users to remotely interact with facilities
- The interfaces for data management and data transfer
- The infrastructure to perform predictable and repetitive computing

OSG is providing improved services for

- Upgraded version of VDT
- Fine Grained authorization
  - Ability to use extended proxy certificates
- Core Monitoring Improvements
  - Reports to several protocols, places limits on load from polling
- Discovery Service
  - Web service based discovery to identify local and remote grid services
- SRM enabled storage elements
  - SRM/dCache at Tier-1 and Tier-2 sites and SRM/DRM LBNL file system

Analysis Execution Environment

Anticipating an early deployment of Condor-C



Role of Condor-C

Expect Condor-C for processing plus Globus GRAM for authentication and setup to scale better than the current installations

- Beginning to see scaling limitations in our current implementation

CMS has a Tiered data management model which maps onto the Tiered computing model

- Data is partitioned between centers
- Data Management system resolves more information with increasing locality
  - Global system Resolves location of datasets globally
  - Local site data management system resolves physical filenames

We hope to use two levels of schedd in Condor-C to direct processing requests to the appropriate site and then use the local schedd to control requests until data is available.