CMS Tier-2 presentation

Outline:
- **T2 in the CMS computing model**
  - data management at T2's
  - analysis at T2's
- **Commissioning T2's**
- **Communication with T2's**

Matthias Kasemann

Tier-2's in the CMS Computing model

- **Centrally coordinated MC simulation**
  - Full Geant4 and Fast Simulation including RECO step,
    - up to now: RECO step often performed at T1's
  - Output is stored on T1 centers
- **Group analysis, coordinated by CMS physics[-objects] and commissioning groups**
  - Topics (and data) assigned and distributed to Tier-2 centers
  - Input: local data (RAW/RECO and AOD) or pulled from T1
  - Output: local data, managed by respective group
- **Individual users analysis (of associated users)**
  - Input: local data (RAW/RECO and AOD) or pulled from T1
  - Output: local data, managed by individual user
  - Users have a Tier-2 "home" for their output data

Data management is the biggest issue:
- Management performed by user-groups and local users
- Each Tier-2 has a CMS data manager, each group has (to have) a data manager
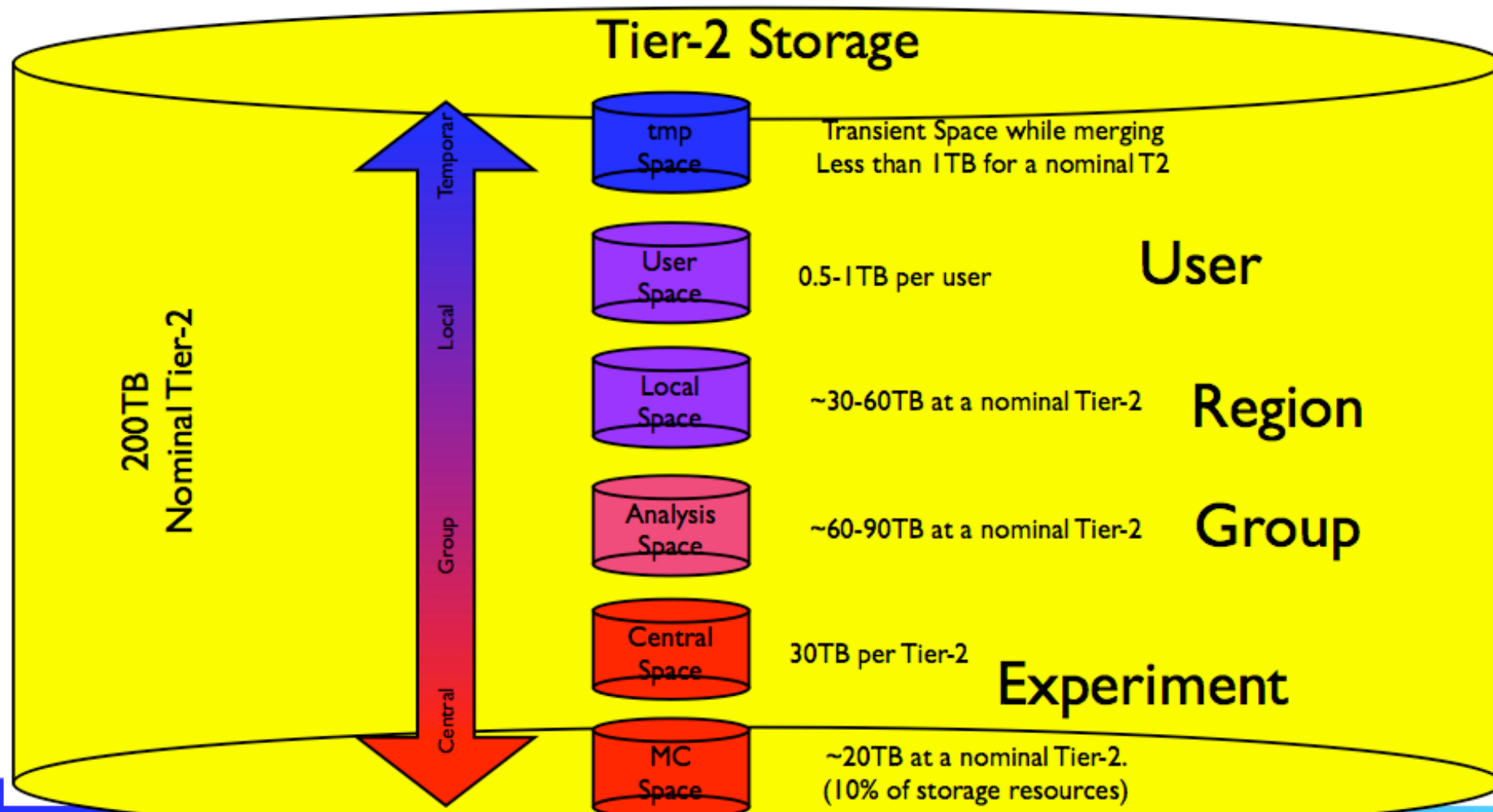- Tools are being build currently: based on Phedex and DBS

In CMS Jobs go to Data

How is the Storage managed?

Storage at Tier-2 centers is broken into 6 pieces

➡ Transient and unmanaged to more persistent and centrally managed

Tier-2 Storage

200TB Nominal Tier-2

Temporar

Local

Group

Central

tmp Space — Transient Space while merging Less than 1TB for a nominal T2

User Space — 0.5-1TB per user — **User**

Local Space — ~30-60TB at a nominal Tier-2 — **Region**

Analysis Space — ~60-90TB at a nominal Tier-2 — **Group**

Central Space — 30TB per Tier-2 — **Experiment**

MC Space — ~20TB at a nominal Tier-2. (10% of storage resources)

Who Controls the Storage?

All numbers are for a nominal Tier-2

Central Space 30TB

➡ Intended for RECO samples of Primary Datasets.

- In 2008 we had expected to be able to store 2 copies of MC and data sample using the identified T2 space

Physics Group Space 60-90TB

➡ Assigned to 1-3 physics groups. Space allocated by physics data manager. The site data manager still approves the request, but only to ensure the group is below quota

Local Storage Space 30TB-60TB

➡ Controlled by the local storage manager. Intended to benefit the geographically associated community

User Space 0.5-1TB per person in the geographically associated community

➡ controlled by individuals

Motivations for User Space at Tier-2s

We need to give users a predictable space to write and Grid accessible storage

➡ People need places to write to that are not Castor at CERN

- CERN Castor writes to tape

  - This uses tape resources, which we need for real data
  - User Files are often small, which is lowering the average file size on tape and the efficiency of the tape system impacts the ability to access data
  - Need to support users on disk resources at Tier-2s

The concept of keeping it on the local Tier-2 was to divide the problem

➡ At a nominal Tier-2 40 users are supported

➡ User Space is assigned at the Tier-2 geographically associated with the institution

➡ Keeping it by institution and local users provides us with better chance for efficient support and management.

CRAB will have the ability to stage data to /store/user and stage from it

Tier-2 Analysis Workflow

Ideal Tier-2 Workflow
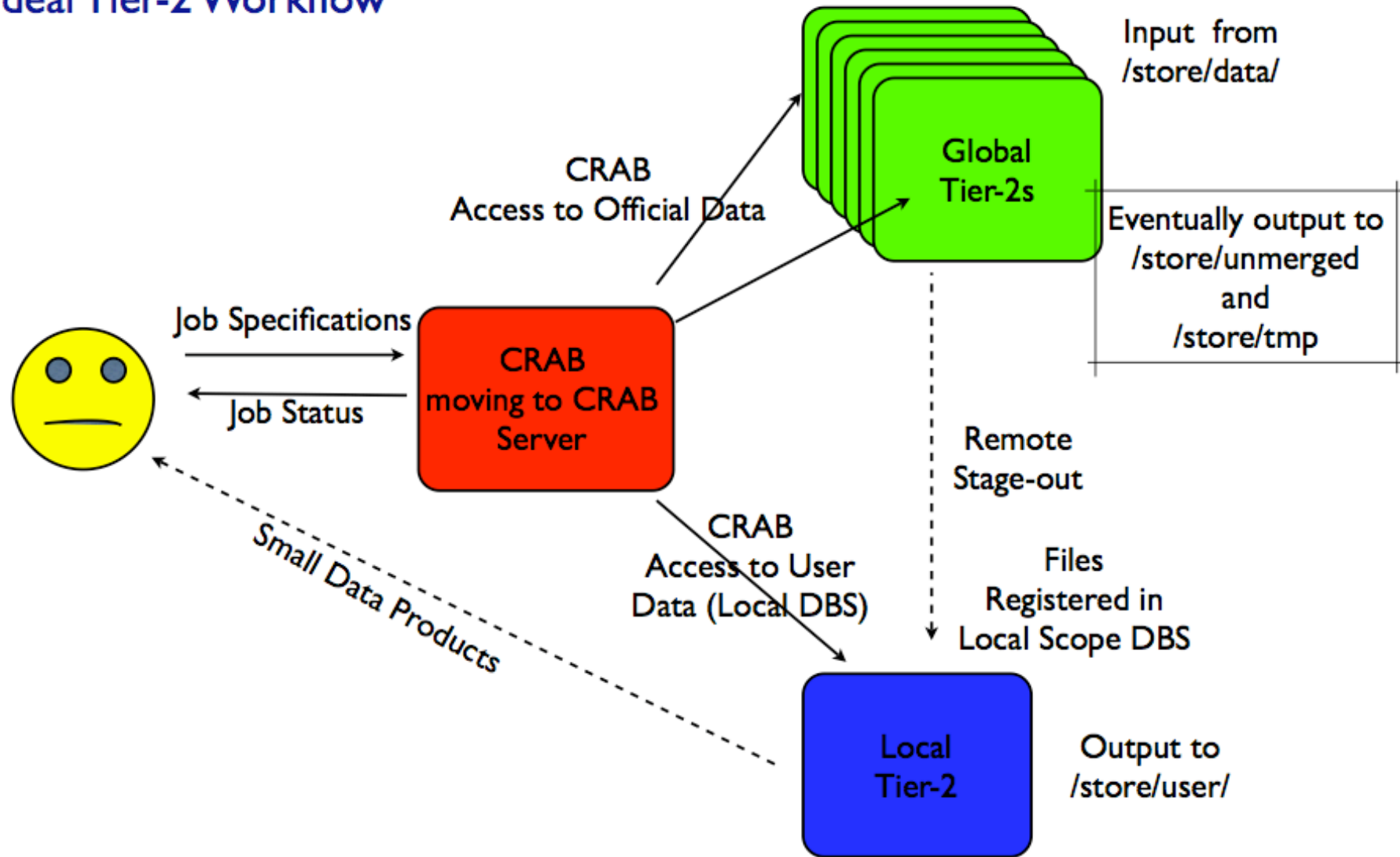
Site Commissioning PADA Task

- The CMS **site commissioning (SC)** is one of the activities of **PADA** (Processing and Data Access) Task Force.

- Aimed **objectives** of the task:

  → *Guarantee that data processing workflows at T1 and T2 sites can be performed efficiently and reliably.*

  → *Verify that CMS sites are complying with their resource pledges and are able to sustain both Data analysis and MC production activities.*

- The site commissioning makes use of several sources of **information** to assess the readiness of a site to run CMS workflows:

  → *The average site availability according to the CMS **SAM tests***
  → *The success rate of analysis-like jobs submitted by the **Job Robot***
  → *The number of **commissioned transfer links** with other sites*

  https://twiki.cern.ch/twiki/bin/view/CMS/PADASiteCommissioning

Commissioning criteria: Daily rules + Site Status

- The evaluation of the global site status relies on **daily rules** to be satisfied for the T1 and T2 sites:

Daily Rules for Tier-1 sites
daily SAM availability ≥ 90%
daily JR-MM efficiency ≥ 95% ➝ **90% (debug)**
having commissioned the downlink with the Tier-0
having ≥ 10 commissioned downlinks to Tier-2 sites
having ≥ 4 commissioned downlinks/uplinks to other Tier-1 sites

Daily Rules for Tier-2 sites
daily SAM availability ≥ 80%
daily JR-MM efficiency ≥ 90% ➝ **80% (debug)**
having a commissioned uplink with at least 1 Tier-1
having a commissioned downlink with ≥ 2 Tier-1 sites

(for Tier-2s: failing metrics on weekends do not count)

- The **global SC status** is determined as follows:

  - **COMMISSIONED:** *daily rules are satisfied during the last 2 days, or during the last day and at least 5 days in the last 7*
  - **WARNING:** *daily rules are not satisfied in the last day but satisfied during at least 5 days in the last 7*
  - **UNCOMMISSIONED:** *daily rules satisfied for less than 5 days in the last 7*

- The Site Commissioning **tool is almost in place**, and we hope to have it commissioned and in production soon.

Communication…

- **Two Tier-2 coordinators assure communication to/from Tier-2 centers:**
  Giuseppe Bagliesi/INFN and Ken Bloom/Nebraska
  - **Attend all operations meetings**
  - **Feed Tier-2 issues back to operations**
  - **write T2-relevant minutes**
  - **Organize Tier-2 workshops during Computing weeks**

- **On errors observed operation shifts raise Savannah/GGUS tickets**
  - **If appropriate assigned to Tier-2 centers by central operations**