



VO Boxes for CMS?

- ◆ VO boxes are but one aspect to the issue of providing the required services to each experiment a site is catering to
 - ◆ VO box a tool for a site to implement the experiment services in a secure way
 - ◆ framework for the **external provisioning** of these services at a given site
 - ◆ particularly relevant for the case where there is no local effort to provide that service
- ◆ CMS computing model includes running CMS application services as part of the Grid — as a site responsibility to CMS
 - ◆ as outlined in the CM paper, the C-TDR and has been agreed to by the CMS-CCC
 - ◆ for many services CMS is using there are middleware solutions
 - ◆ examples are data storage management, file movement, job scheduling etc
 - ◆ there are and will be application specific distributed services that are required to handle application specific concepts that don't map to current Grid-supported concepts
 - ◆ examples: databases (handled by LCG-3D), CMS datasets (handled by PhEDEx), probably others
- ◆ Concept of VO boxes is useful, however not the main CMS' issue
 - ◆ “care taking” of CMS services through local community effort
 - ◆ clear statement from collaboration about availability of CMS effort at each of the CMS T1 centers, and T2 have CMS community, too



CMS DM system requires site involvement

- ◆ **A suite of responsibilities at the site**
 - ◆ including custodial responsibility for data, data quality assurance, user support etc
 - ◆ expect to require a suit of tools to ensure data integrity on the level of CMS datasets
- ◆ **PhEDEx implements the data placement and transfer layer for CMS on top of baseline Grid services such as FTS, SRM, etc.**
 - ◆ PhEDEx services allow us to handle such practical concepts as management of entire datasets (not just files) between sites according to experiment-managed priorities, resource usage policies, defining and carrying out custodial data placement assignments, and so on.
 - ◆ it does not require a separate box
- ◆ **CMS Tier-1 and Tier-2 centers need to continue providing the means to install local PhEDEx services.**
 - ◆ generally need to verify the integrity of file transfers using local tools to check file existence, checksums, stage and migration status
 - ◆ experience problems communicating with file catalogues behind firewalls.
 - ◆ Ideally much of this functionality could be devolved to lower-level services, and PhEDEx has established excellent links with tool (FTS, srmcp) and technology providers (dCache, Castor, DPM) with this in mind.
 - ◆ We expect that we will need to incorporate less of this functionality as tools mature.



How about non-CMS Sites?

- ◆ PhEDEx does not require to be administered by a site-local admin
 - ◆ in a number of cases the PhEDEx service is installed locally but operated by someone remotely from another computing centre.
 - ◆ CMS has demonstrated that it can host data and run production activities at sites that do not have CMS people or services (such as PhEDEx) running; thus we are able to use all resources that can be made available to us, but analysis activities profit greatly from the additional functionalities incorporated in PhEDEx.
- ◆ managing these services remotely currently is not an operationally reliable solution for CMS sites, but helps with opportunistic use
 - ◆ we have found this to be practically attractive only in specific rare situations.
- ◆ CMS Sites, including the CMS Tier-1 centers have been very successfully providing the required support
 - ◆ high visibility of the Tier-1 centers in the CMS community
 - ◆ the provision of this service at sites to date has not been a problem
- ◆ PhEDEx has been in production operation for over a year, handling a large fraction of all CMS production data transfers, with positive experience and substantial tested capacity to scale