DataGrid Support for EO Application Data processing

DataGrid WP1-2-5-9 Session

5th Project Conference – 2-5 September, Budapest

EO Data Storage Requirements (1)

- Large amounts of EO Data stored in archives (non-Grid)
  - Not just large volumes of data
    - millions of small (15k) files
  - Interface needed between archive systems and the SE
    - is GDMP_STAGE_TO/FROM MSS enough?
- Need to register on the RC and retrieve in a short time from the RC the corresponding information
- EO Data is normally stored in EO archives and located using the conventional metadata catalog (non-Grid)
  - Large number of datasets
  - Large datasets (multi-temporal, global coverage)
  - Not all datasets will be stored on the Grid
  - Not all of the dataset will be stored on the grid
  - Data will be transfered to the Grid when it needs to be processed

EO Data Storage Requirements (2)

- The results of Grid processing (EO products) are placed on the Grid SE and registered with the RC
  - How / when will products be transfered to the archive system ?
- When space is needed on the SE selected files need to be moved to the MSS
  - The files to be staged out need to be selected on some basis
    - automatically by the SE middleware, i.e. on a least-recently-used basis (LRU)
    - by applying some user-defined rules
  - Requirement is probably for both ways
  - However some minimum support framework is needed
- How much of the required functionality will be provided by DataGrid middleware ?
- What additional functionality needs to be provided by the application Grid interface ?

EO Data Storage Requirements (3)

- Data to be processed is either already on the SE or needs to be transfered to the SE
  - Need method to determine if the data is already on the SE ?
- Large dataset may need to be distributed over several storage elements
- Distribution of the dataset allows optimisation (spread the load)
    - exploitation of many storage elements (in principle, more storage is available)
    - jobs may be sent to different CEs (simultaneous parallel execution)
    - back-up, redundancy
- However there is the need for job-scheduling / partitioning based on location of file replicas:
  - user submits a job to process a selected portion of the dataset
  - job needs to be partitioned into several sub-jobs (SPMD concept)
  - each sub-job needs to process a selected part of the dataset
  - sub-jobs need to be directed to the appropriate CE/closeSE pair where the target datafiles are held

EO Data Storage Requirements (4)

- Before any Grid processing can be done the input dataset needs to be copied to the Grid storage element(s)
- This may be an automatic, even overnight process, as it will take some time
- The algorithm needs to
  1. Select and identify the list of files on the user machine (or archive storage) which need to be transfered to the Grid for processing (input dataset)
  2. Search the grid for CEs which have the required capability
     - EO processing environment software (C, Fortran, IDL)
     - Close SE with capacity for storing large numbers of input files as well as results
  3. After selecting the target CE/SE it must reserve space and begin the data transfer
  4. Once complete the data processing can begin

Replica catalogue (RC) capabilities

- Large amount of EO data files stored on the SE
    - Around 20 millions of files
- Need to register on the RC and retrieve in a short time from the RC the corresponding information