Use of SAM-SRM Interface for Movement of MC Data

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The CDF [1] experiment has generated more than 2 fb^{-1} of raw data. As much as same amount of Monte Carlo(MC) data are needed for detector understanding and physics analysis. It is not feasible to produce these MC data on-site due to limitation on computing resources and CDF remote sites or Grid Tier1 and Tier2 may be utilized for producing MC data. From our past experience, we learnt that one of the most important limitation in the heavy usage of off site resources it is that the Worker Nodes(WN) were sitting idle just because another WN was transferring data to destination site at Fermilab. This situation leads to inefficient uses of computing resources and sometimes to the loss of the output. Hence, a framework is needed for transportation of MC data from remotes sites to Fermilab.

Figure 1 shows a prototype model for movement of MC data from worker nodes to the space on destination Storage Resource Manager (SRM) [2]. The destination SRM in our case will be at Fermilab. Following are the components of the prototype model

- A Sequential Access via Meta-data (SAM) [3] station (not shown in the figure) and temporary space of around few Tera Bytes(TB) on SRM which are closer to each grid access sites.
- A SAM station and space on SRM near to the destination site. The destination site is at Fermilab.

This prototype model relies on integration of SAM with Storage Resource Manager(SRM). We used SAM because it is the default data handling framework of the CDF. The reasons for using SRM are to avoid unncessary complications which may arise from different Storage Elements (SE) at different remote sites.

The user jobs will run on the Worker Nodes(WN) and output data from these jobs will be transferred to SRM of grid access site. A process at grid access site will check the arrival of new file and its metadata in the SRM. The metadata is a file of the order of few bytes which contains all the information related to the MC output data.

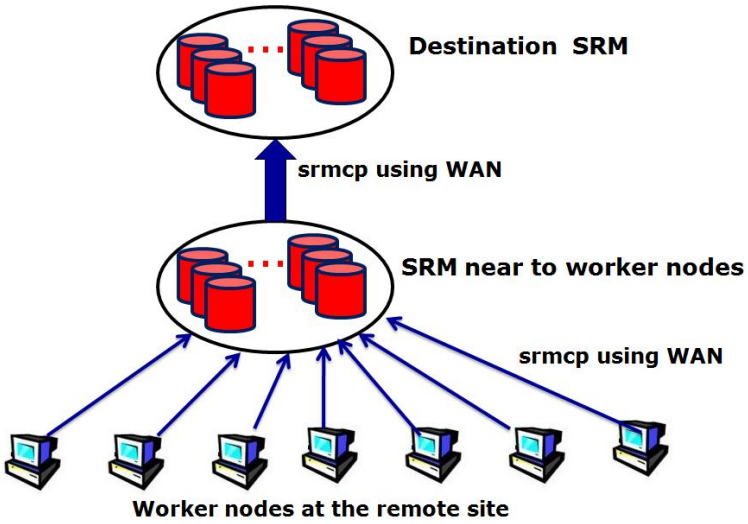

Figure 1: A prototype model for transfer of MC data from worker nodes to destination SRM.

Using information from metadata, the same process will register these files into the SAM station of the grid sites. The process at destination site communicates with the SAM station of the grid access site for its arrival of new file. The new file and its metadata will get transferred to the destination SRM through SAM station to station copy. Once the new files and its metadata arrives at destination SRM, its counterpart from the SRM at grid access site will be erased. In this way, the used space in the SRM of grid access site will be created again. The validation team will validate these new files and correct files will be moved to tape for storage. In the end, the process at the destination SRM will update the SAM database entries for arrival of new files in tape.

The robustness of the model depend on performance of data transfer between WN and SRM (closer to the WN) and then to destination SRM. Using this model, data generated of the order of few Tera Bytes per day at WN can be easily transfered to the storage element closer to the users end. There are also some other spin off from this study. One can use this model for transporting raw data from productions site to the WN at remote site for further processing of raw data.

References

[1] **http://www-cdf.fnal.gov**

[2] **http://sdm.lbl.gov/srm-wg/**

[3] **http://d0ora1.fnal.gov/sam/**