

Distributed Data Management with PetaShare



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PetaShare is an NSF funded project which aims to solve the distributed data sharing and management problem. **Data-aware schedulers, data-aware storage systems, and cross-domain metadata scheme** are some of the key technologies being developed in order to prepare an underlying infrastructure for scientists to manage the low-level data handling issues.

Enabling Data Intensive Collaborative Science in Louisiana

□ The initial system which manages 250 Terabytes of disk storage and 400 Terabytes of tape storage will be deployed across the state utilizing the 40Gb/sec LONI connection at five campuses: Louisiana Tech., University of New Orleans, Tulane University, University of Louisiana at Lafayette, and Louisiana State University.

□ PetaShare enables collaboration between those institutions and helps multidisciplinary research in different application areas such as coastal and environmental modeling, geospatial analysis, bioinformatics, medical imaging, fluid dynamics, petroleum engineering, numerical relativity, and high energy physics.

□ PetaShare brings the idea of data-aware system model which includes data-aware scheduler (Stork), resource allocation and resource selections services, higher level planners, and workflow managers. PetaShare introduces the data management subsystem to be the I/O module in distributed computing systems.

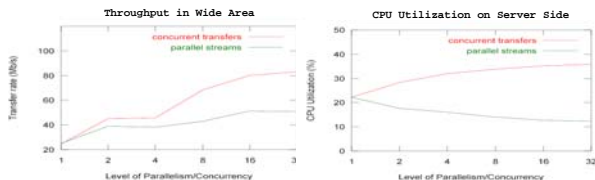


STORK :A Scheduler for Data Placement Activities as "first class citizens" in the Grid.

- Support for heterogeneously
- Protocol translation using Stork memory buffer/Disk Cache
- Flexible Job Representation and Multilevel Policy Support
- Run-time adaptation
- Dynamic protocol selection, Run-time Protocol Auto-tuning
- Failure Recovery and Efficient Resource Utilization
- Early Error Detection and Error Reporting

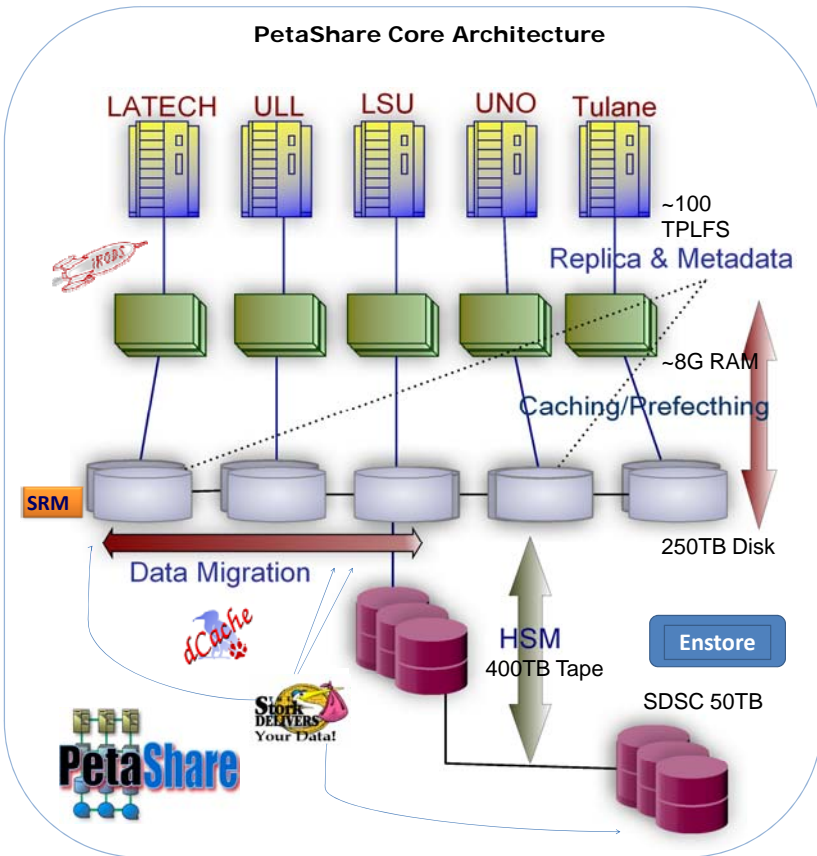
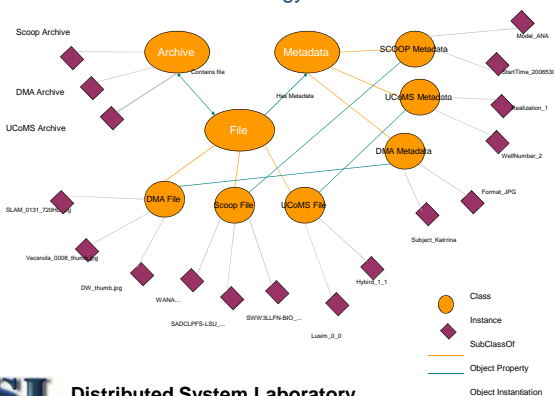
Two types of data movement:

- o First, data needs to be prefetched from low level storage layers to the higher levels such that management of data access has to be handled in an efficient manner.
- o Second, data should be migrated between those five contributing institutions; moreover, data should be scheduled and moved between distributed sites and the clients.



- **Concurrency:** transfer 1 file using n parallel streams
- **Parallelism:** transfer n files at the same time

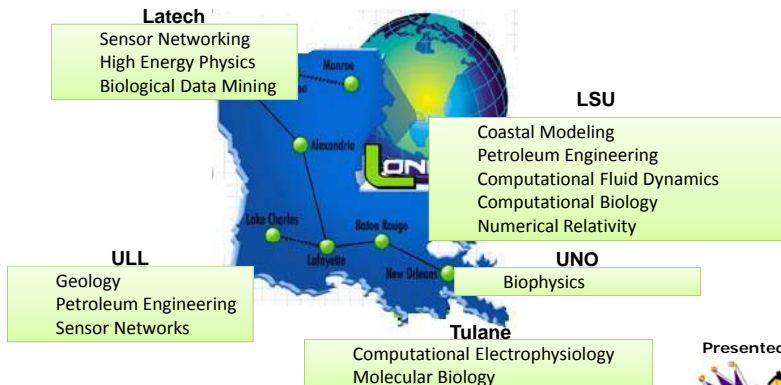
Cross Domain Ontology Definition



A Posix shell interface to PetaShare based on Parrot

Petashell

```
psh # cp /tmp/foo.dat /petashare/tulane/tmp/foo.dat
psh # vi /petashare/tulane/foo.log.txt
psh # exit
$
```



Presented at:

