Indian Institute of Technology, Kanpur

Department of Computer Science and Engineering

Proposal for a new course

Title	: Storage Computing Architectures
Course No.	: CS698Y
Units	: 3-0-0-4
Instructors	: Dr. Rajat Moona
Semester	: Any semester in the PG Program.
Department	: Computer Science and Engineering

Course Content : **Introduction to Disk Technology:** Disk Geometry - actuator, platter, head, sector, track, spindle, motor, arm, actuator. Disk Performance - capacity, RPM, environmental effects. Disk Speed - why don't disk speed scale up? Techniques to improve speed, Reliability, Cache, interface with OSes, Storage Abstraction (Volume Manager, VFS), Implementation Issues (Buffer Cache, Page Cache, Swap).

Historical Perspective of storage computing: Mainframe, personal computers, shared computing, shared personalized computing; Administration issues (e.g. backup), data availability; Data quality, type, storage needs, evolution; Information Lifecycle Management (ILM); DAS, SAN, NAS and CAS overview; Storage categorization primary, secondary, tertiary, off-line

Fault Tolerance and Data Availability at Disk level: Hot plugging, Hot Swap, Hot Spare Disk

Storage interface protocols: SCSI and related concepts such as arbitration, logical unit etc.

Network Storage: Network attached storage (NAS) such as NFS, RPC NLM, NIS, CIFS, SMB, ADS, PDC, DNS. Network protocols for storage, OS interface, interoperability, Mounting, dismounting, auto-mounting. Storage Area Network (SAN) such as Fiber channel; issues such as Distance, speed, connectivity, scalability, security. Storage network topologies (point-to-point, arbitrated loop, switched fabric)

Upcoming storage technologies: IP-SAN such as iSCSI, iSNS, FCIP, iFCP, IP Security, threats, protection mechanisms.

Backup and Recovery: incremental backup, differential backup, self-backup, tape virtualization, snapshots, copy mirrors, data replication

Object Based Storage Devices: Background, SCSI OSD model, Object caching, store and access mechanism.

Node Clustering: Concept of storage clusters, namespaces, Intra-cluster communication, Cluster based file systems, Caching Model in Distributed environment, Cache coherency

References : No specific text book. Material will be covered from various sources including research papers, on-line documentation and reference books.

Deptt. to which the proposed course will be of interest	: CSE, EE
Pre-requisites	: Instructor's Consent
Estimated student enrollment	: 20
Any other remarks	: None
Signature of the proposer	:

The course is approved/not approved.

Convenor, DPGC
Deptt. of CSE

Chairman, SPGC