Storage Area Networks and the High Performance Storage System

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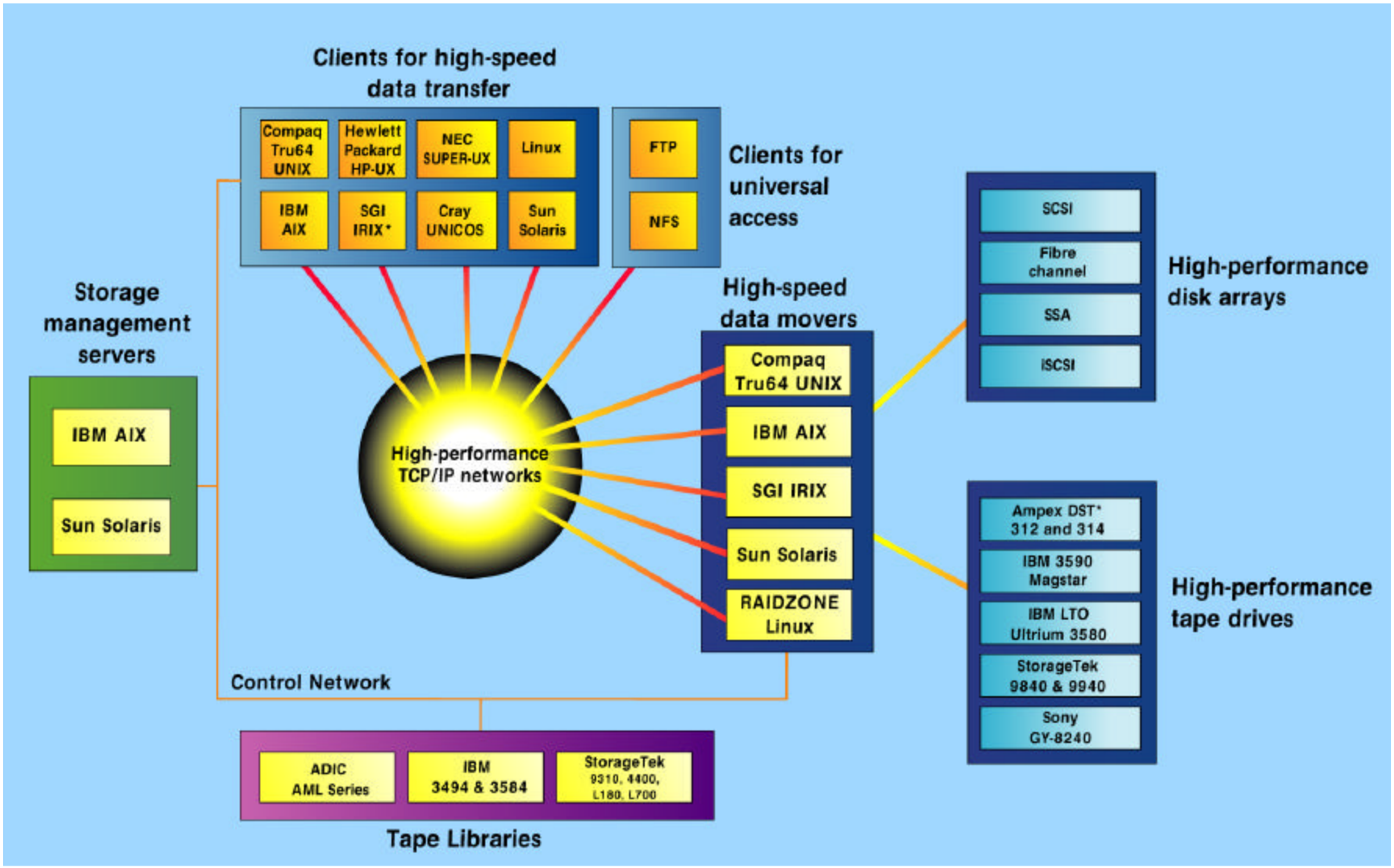
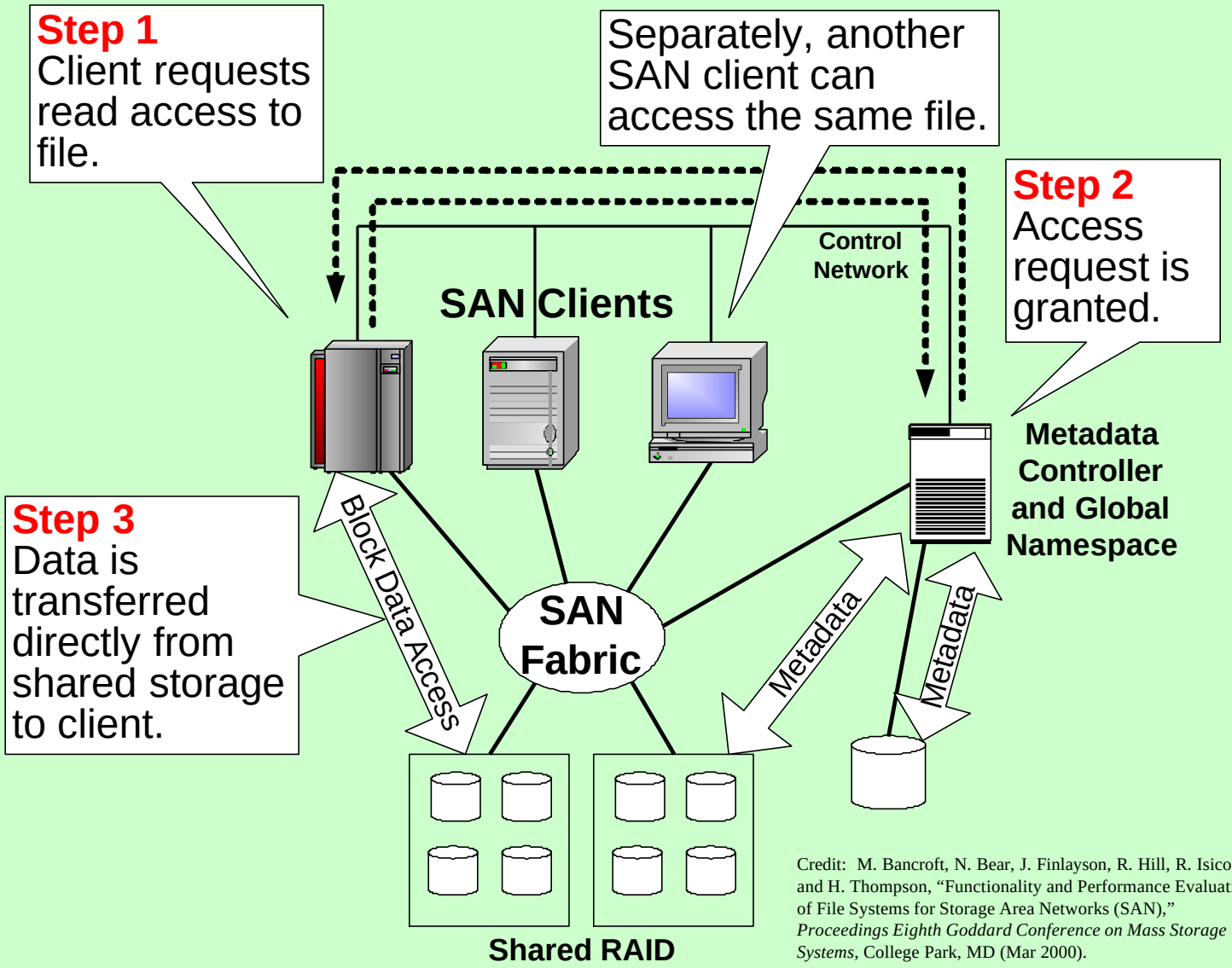
Network-centered HPSS Architecture

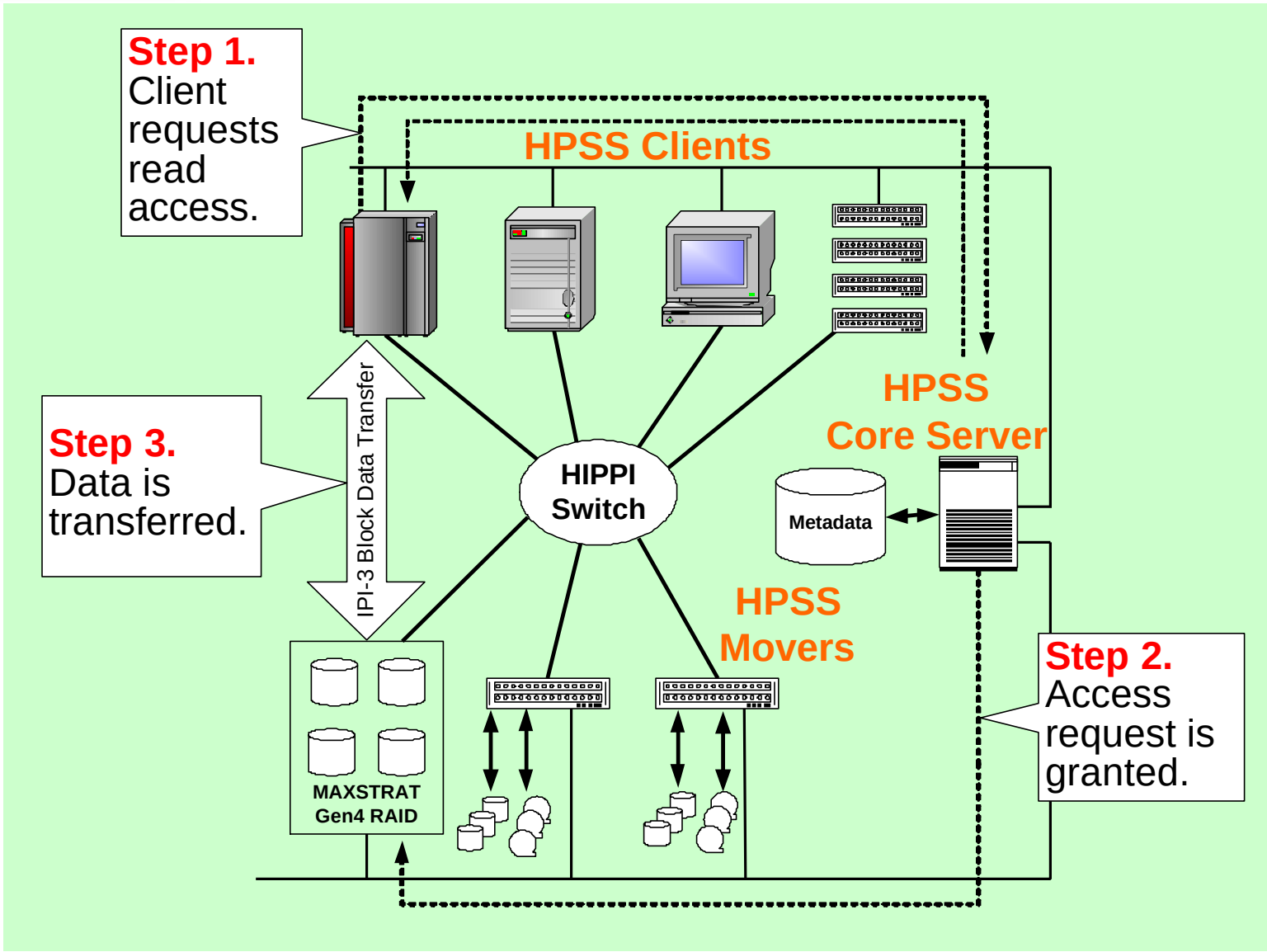


Conceptual SAN File System

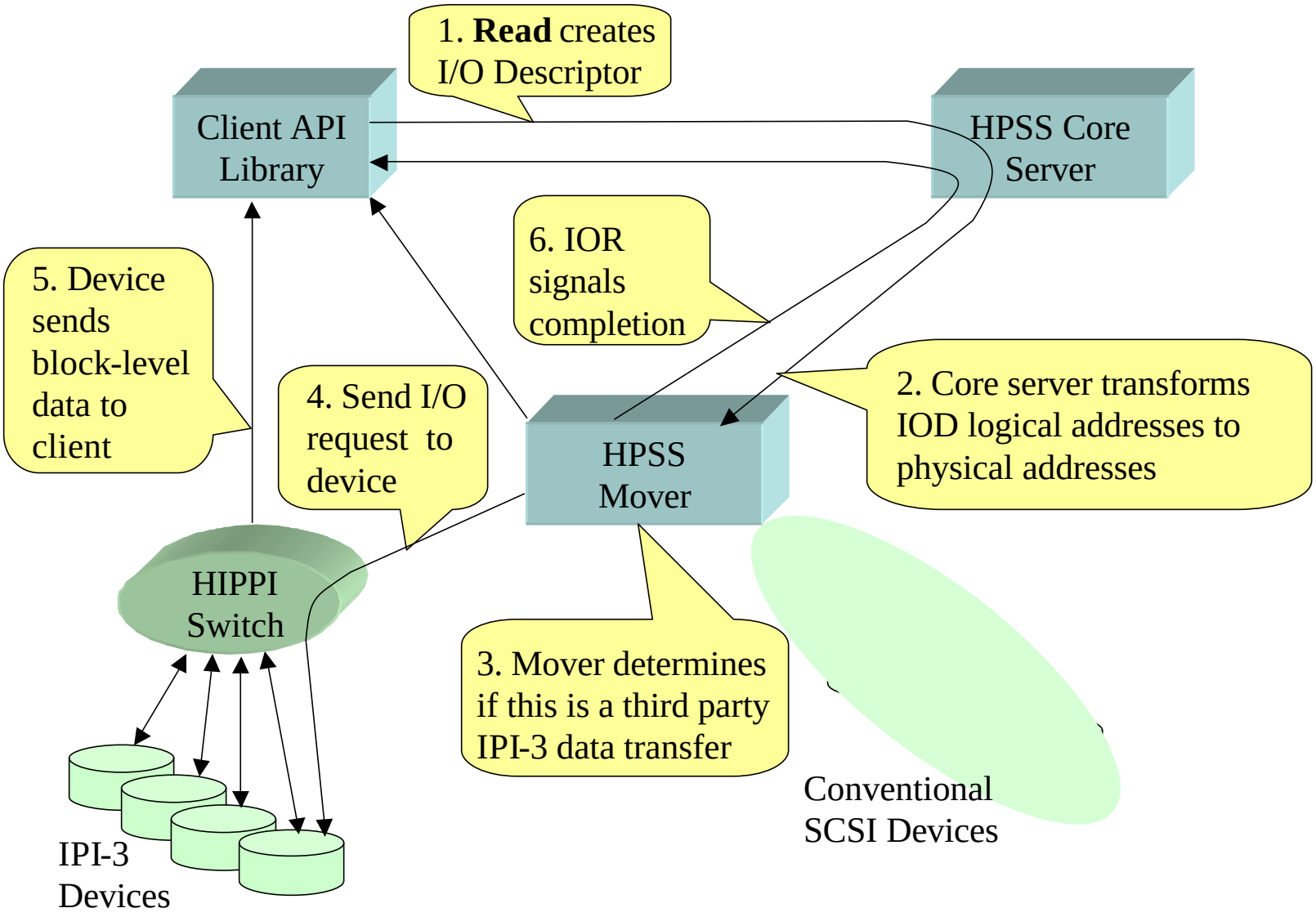


Credit: M. Bancroft, N. Bear, J. Finlayson, R. Hill, R. Isicoff, and H. Thompson, "Functionality and Performance Evaluation of File Systems for Storage Area Networks (SAN)," *Proceedings Eighth Goddard Conference on Mass Storage Systems*, College Park, MD (Mar 2000).

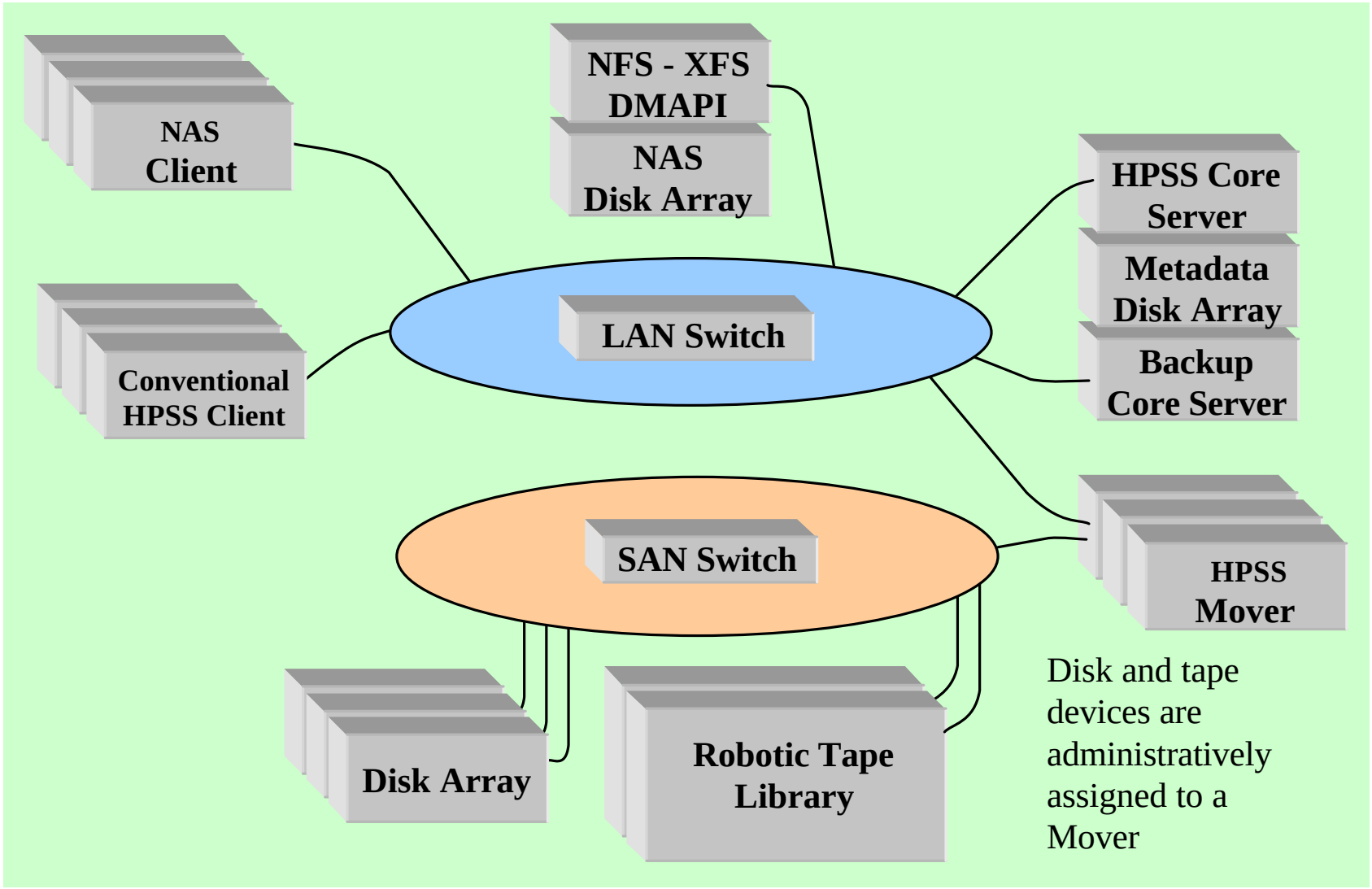
IPI-3 Data Flow



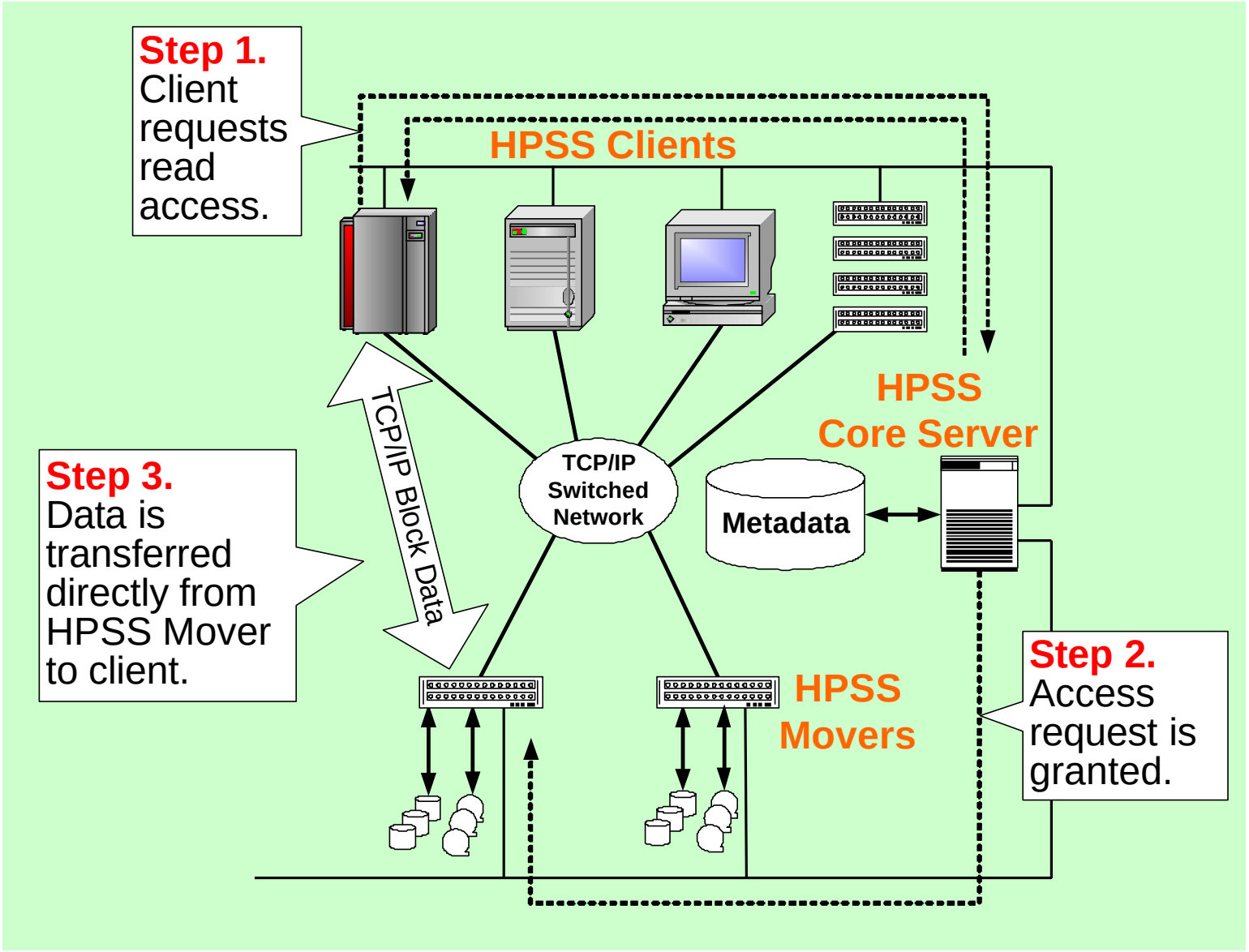
IPI-3 Disk Data Flow Detail



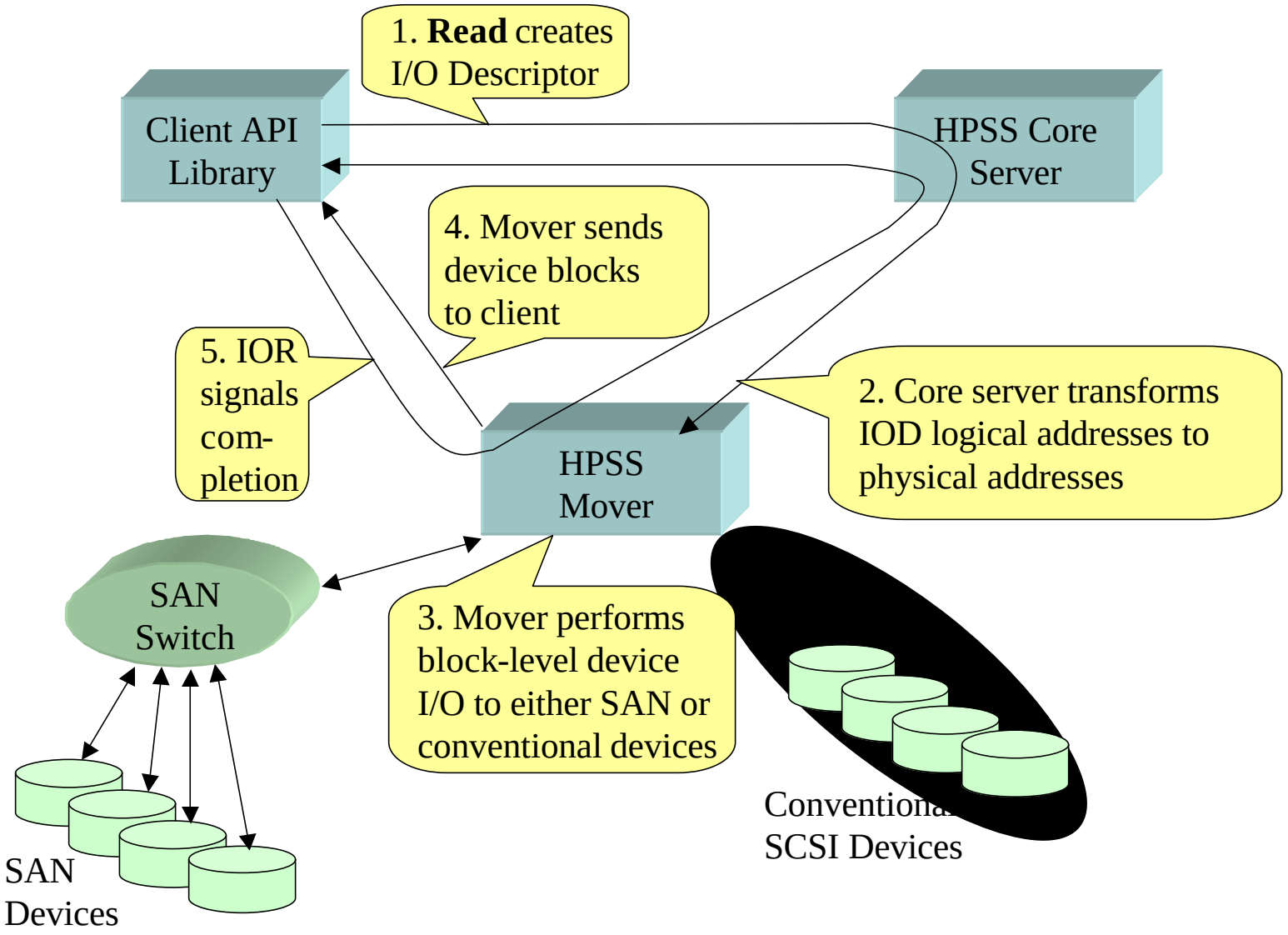
How SANs are used today in HPSS



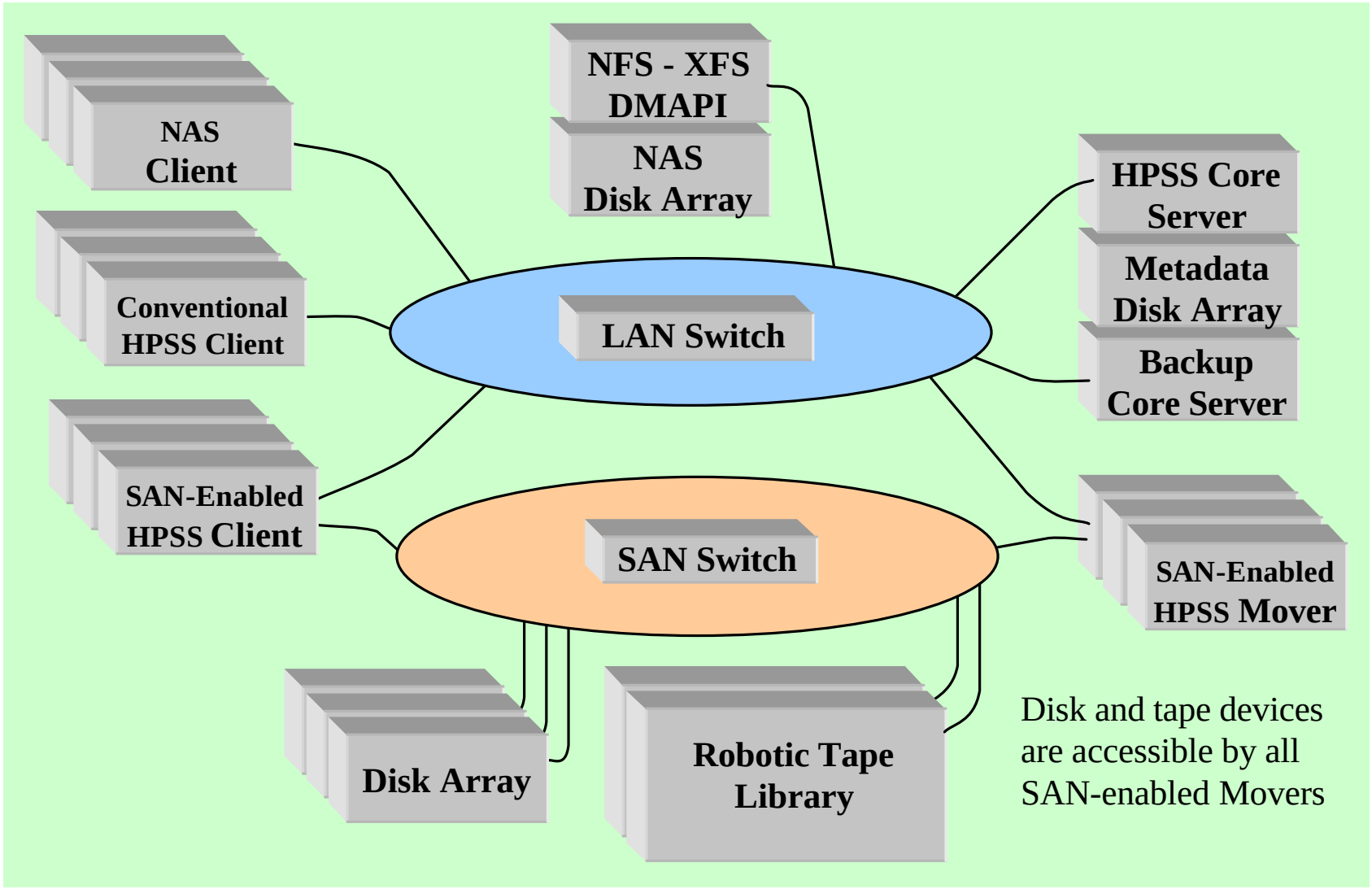
Today's HPSS Data Flow



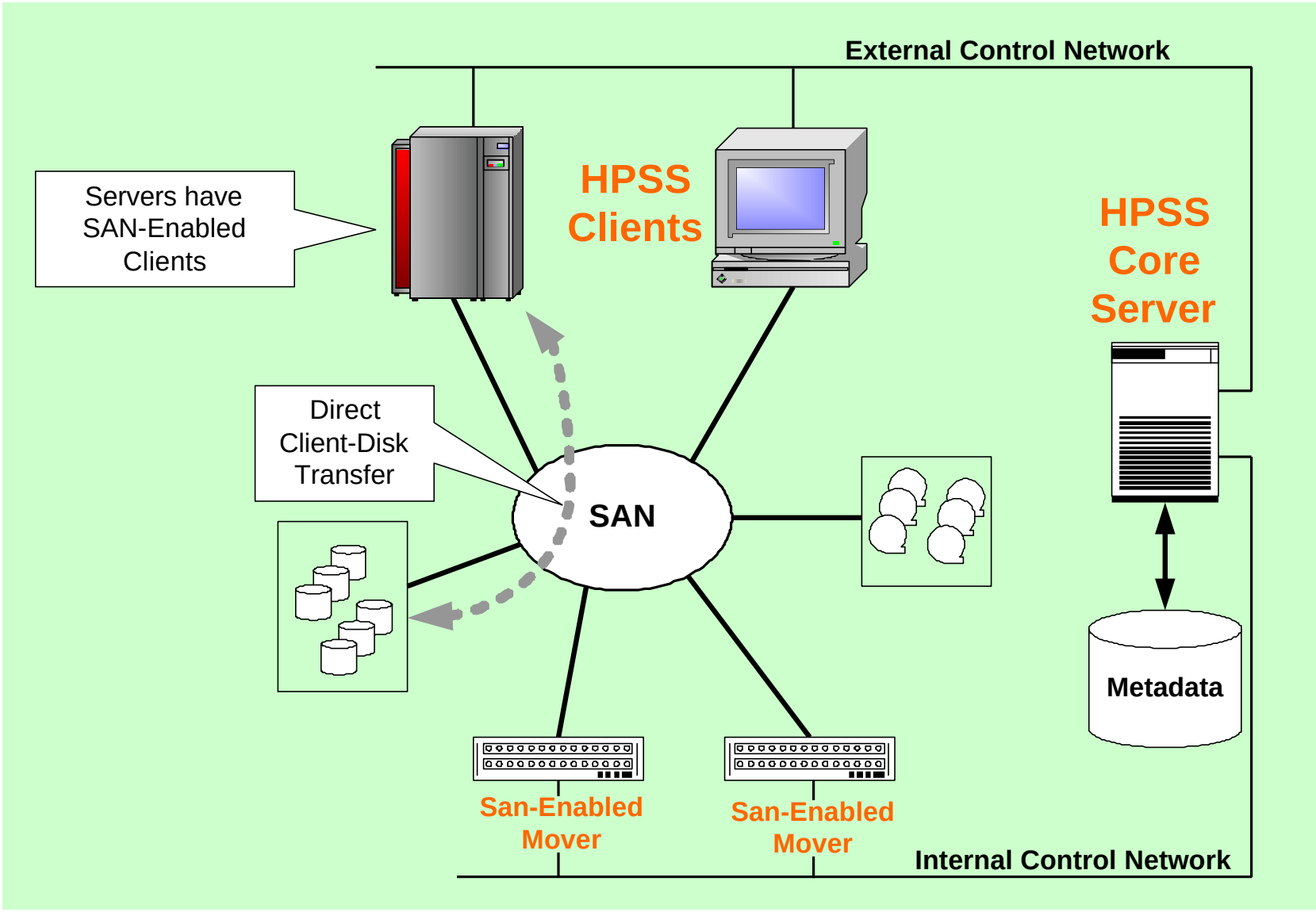
Today's Disk Data Flow Detail



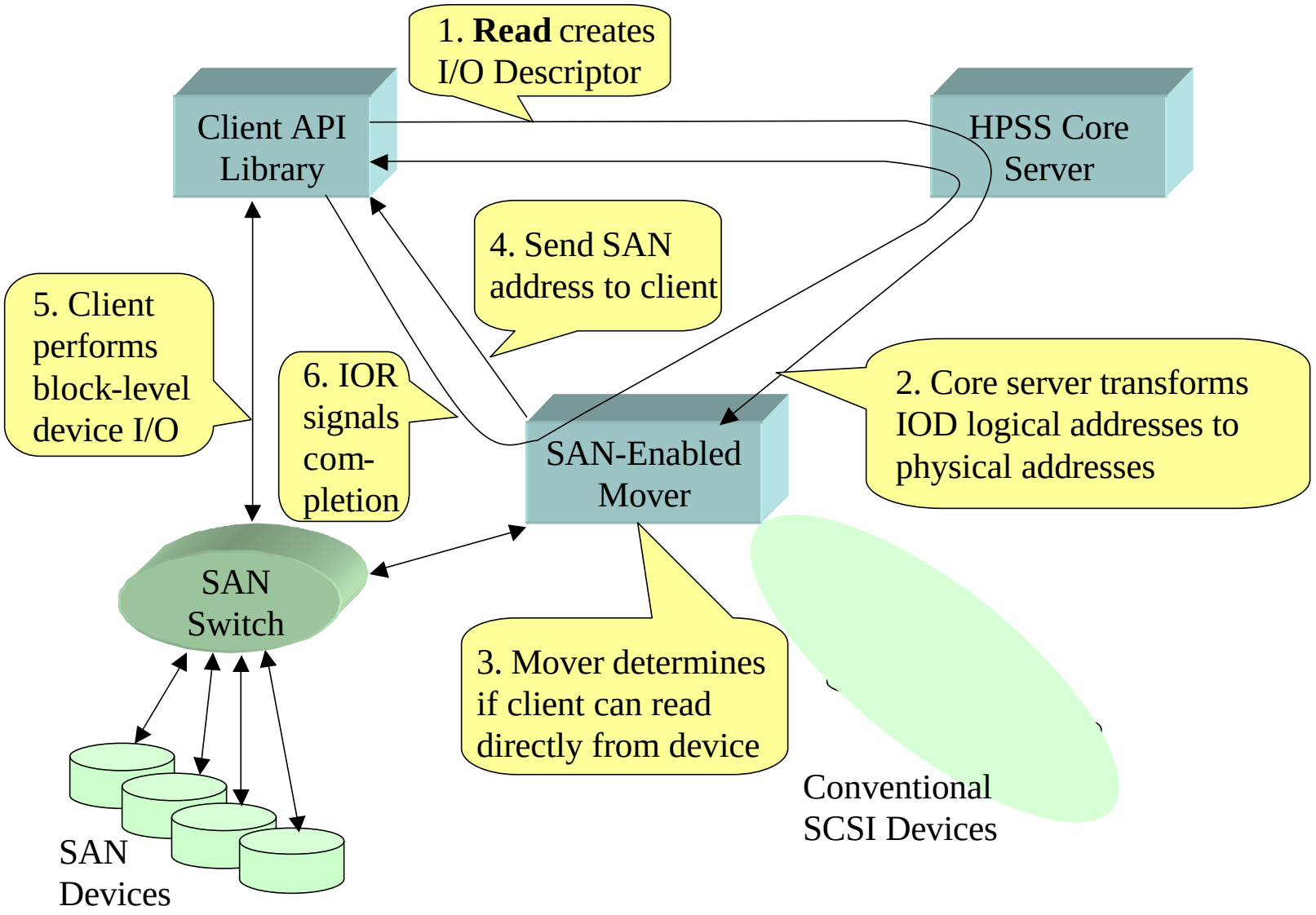
How SANs will be used in 2003



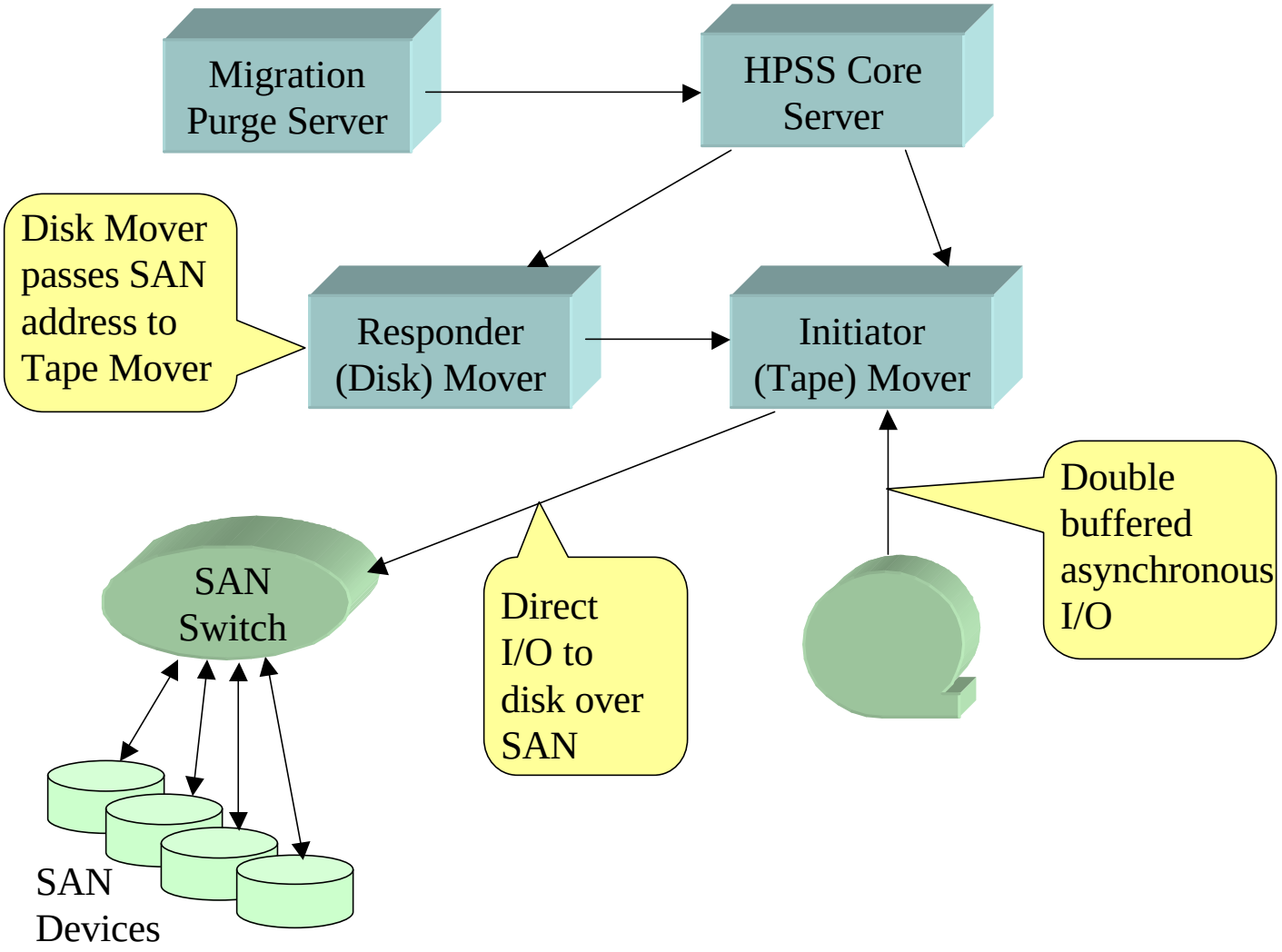
Planned SAN Data Flow



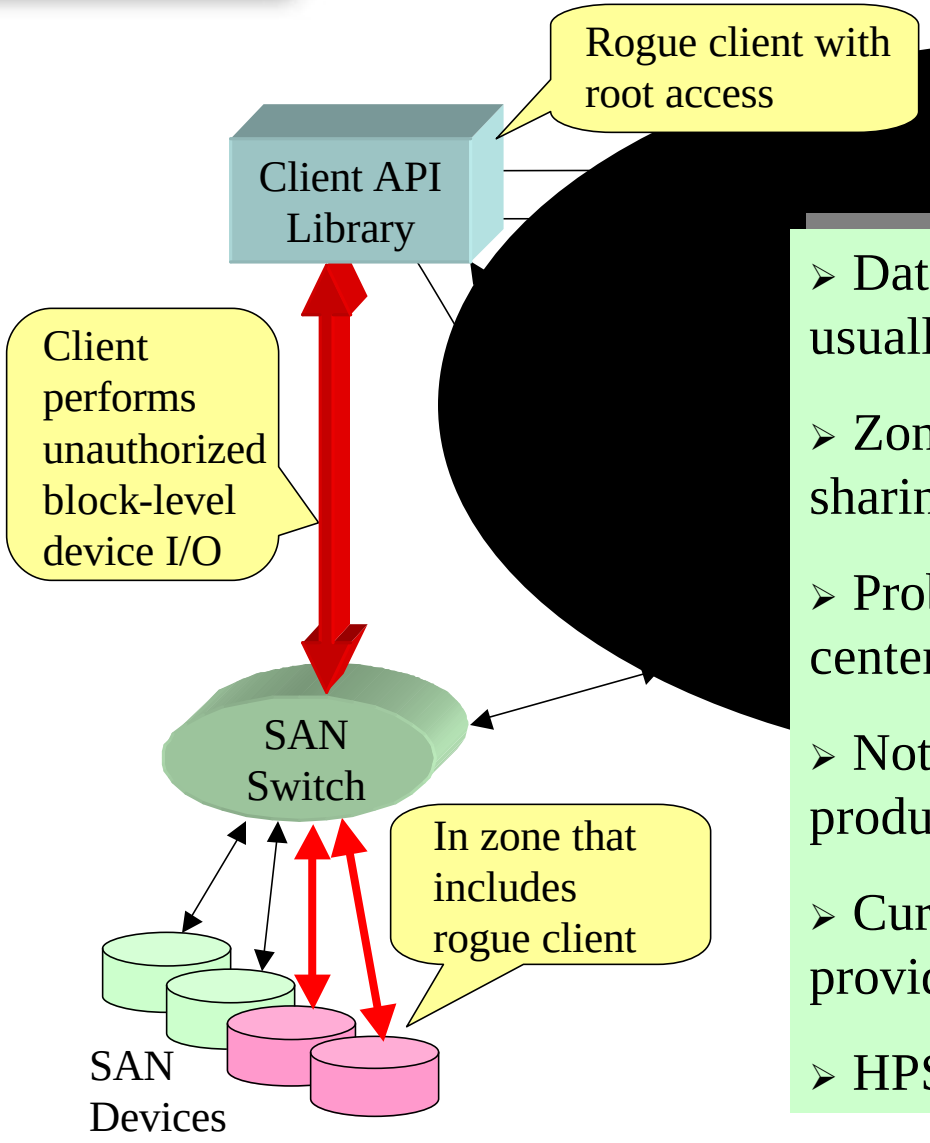
Planned SAN Disk Data Flow Detail



Planned SAN Staging Data Flow

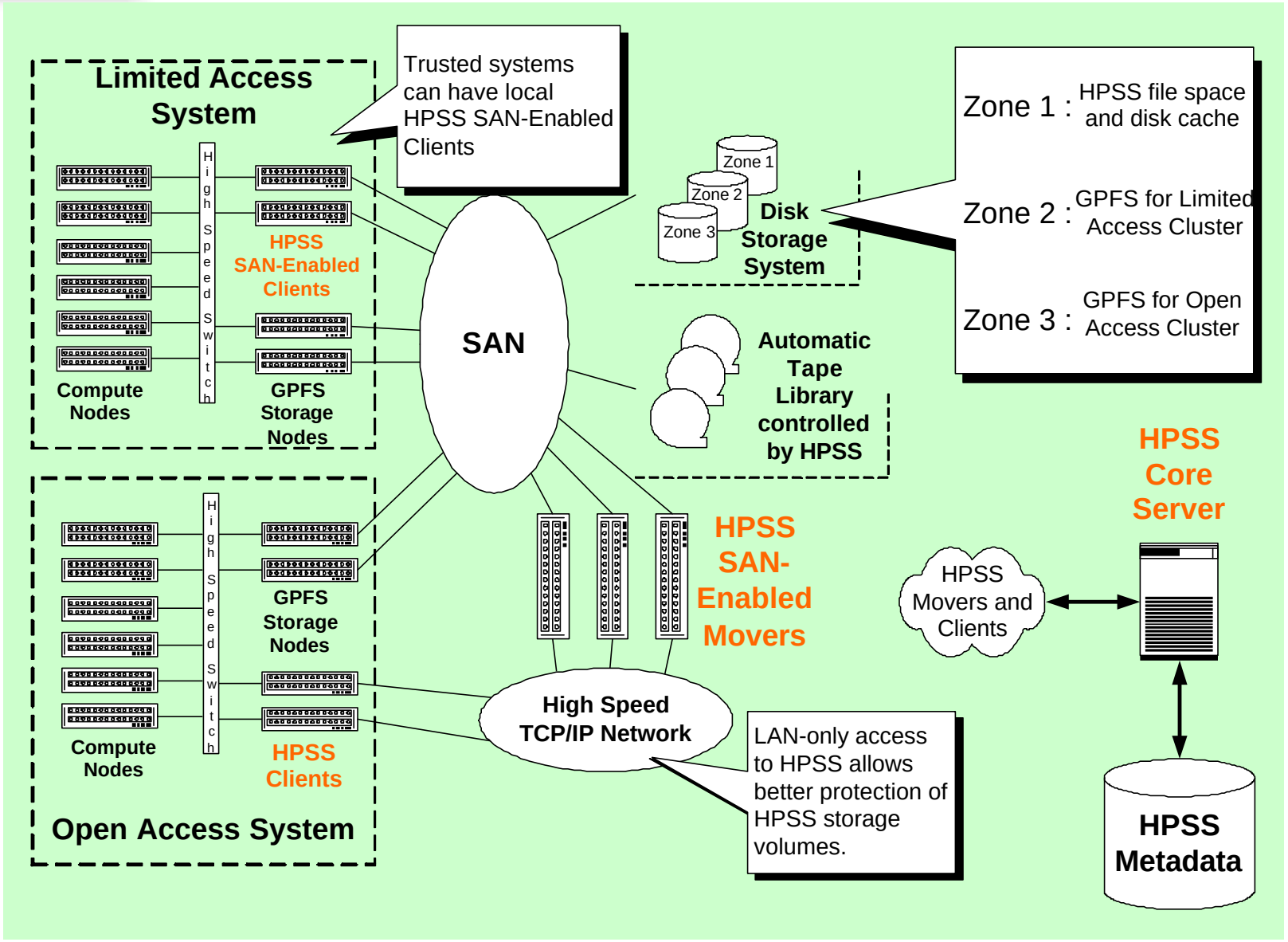


Classic SAN File System Vulnerability



- Data security in SAN environment is usually addressed with zoning
- Zoning is incompatible with data sharing and SAN file systems
- Problem for open supercomputer centers
- Not a problem for dedicated production centers
- Current HPSS mover architecture provides required security
- HPSS sites will have a choice

Classes of Service for Open and Limited Access



Findings

- High data rates and scalability are supported by a network-centered architecture, but not tied to either LAN or SAN.
- HPSS Mover is a useful tool for scalability and facilitates simple evolution toward full support for SAN file system concepts.
- LAN-based and SAN-based technologies are complementary and can be mixed.
- Data rates are limited by the hardware configuration and not by HPSS software.
- Due to the lack of an adequate SAN security mechanism, shared access to data is best managed in a server-based environment for vulnerable situations.
- Manageability and high availability are enhanced by SAN capabilities.
- Separation of data network paths from control network paths enhances security.