

# Serial Attached SCSI in the Enterprise Data Center

IDF Storage Community  
Martin Czekalski, Maxtor





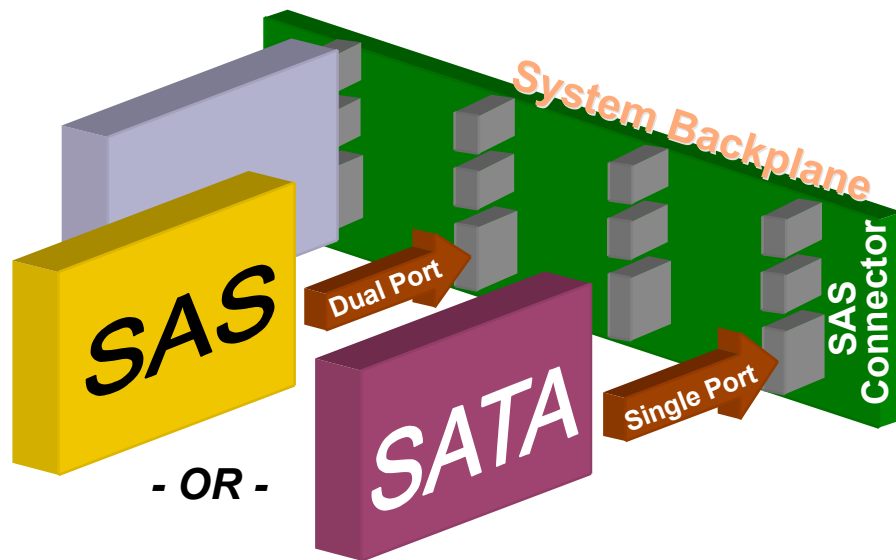
# SAS Products Are Entering the Market Now

- Three years of development and three plugfests; SAS is market-ready
- Market entry 2nd half, 2004
- OEMs are starting to adopt SAS
- SAS products anticipated in indirect channels during 1st quarter
- SFF enterprise-class drive availability will stimulate market demand

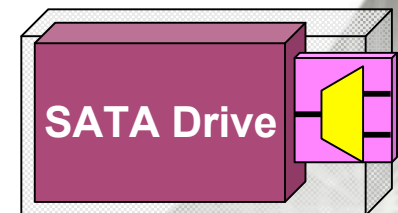


# Serial Attached SCSI (SAS) Advantages

- Increased customer choice; lower TCO
- SAS infrastructure supports Serial ATA (SATA) drives

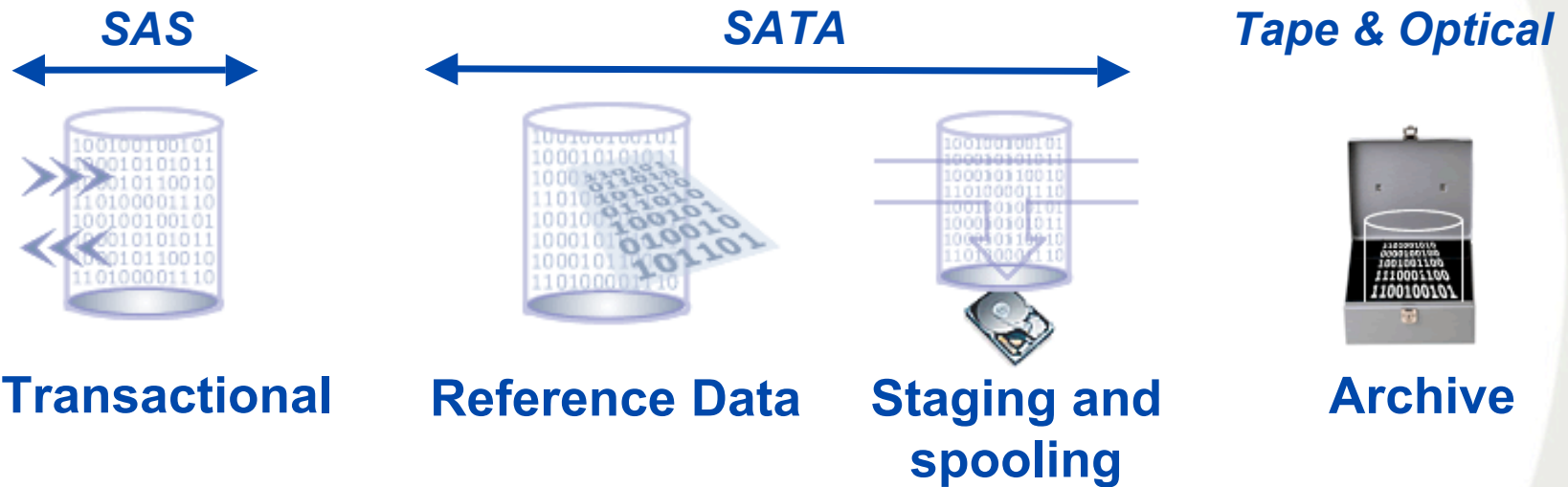


OR





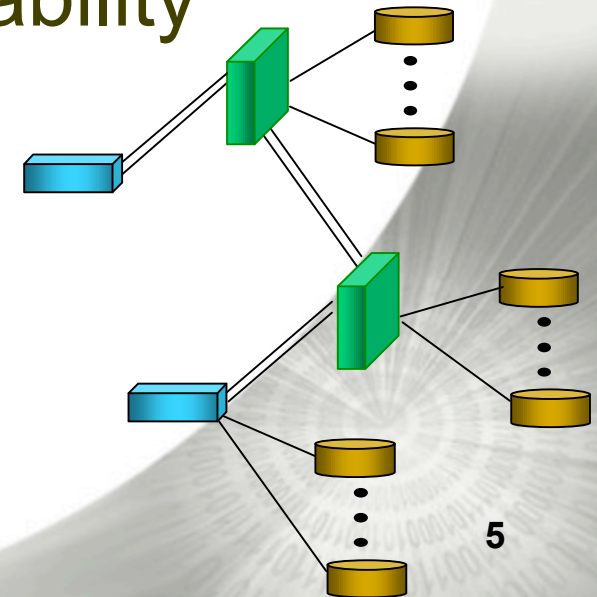
# Serial Attached SCSI (SAS) Advantages



- Flexible SAS deployment based on:
  - Enterprise online requirements
  - Long-term storage needs
  - Tiered storage
  - SMB usage

# SAS System Features

- Serial technology--fast, redundant paths
- SAS system is scalable to more than 16K devices with expanders
- Combine multiple links for bandwidth aggregation
- Dual-port drives for high availability
- Worldwide name addressing
- Utilizes SCSI middleware



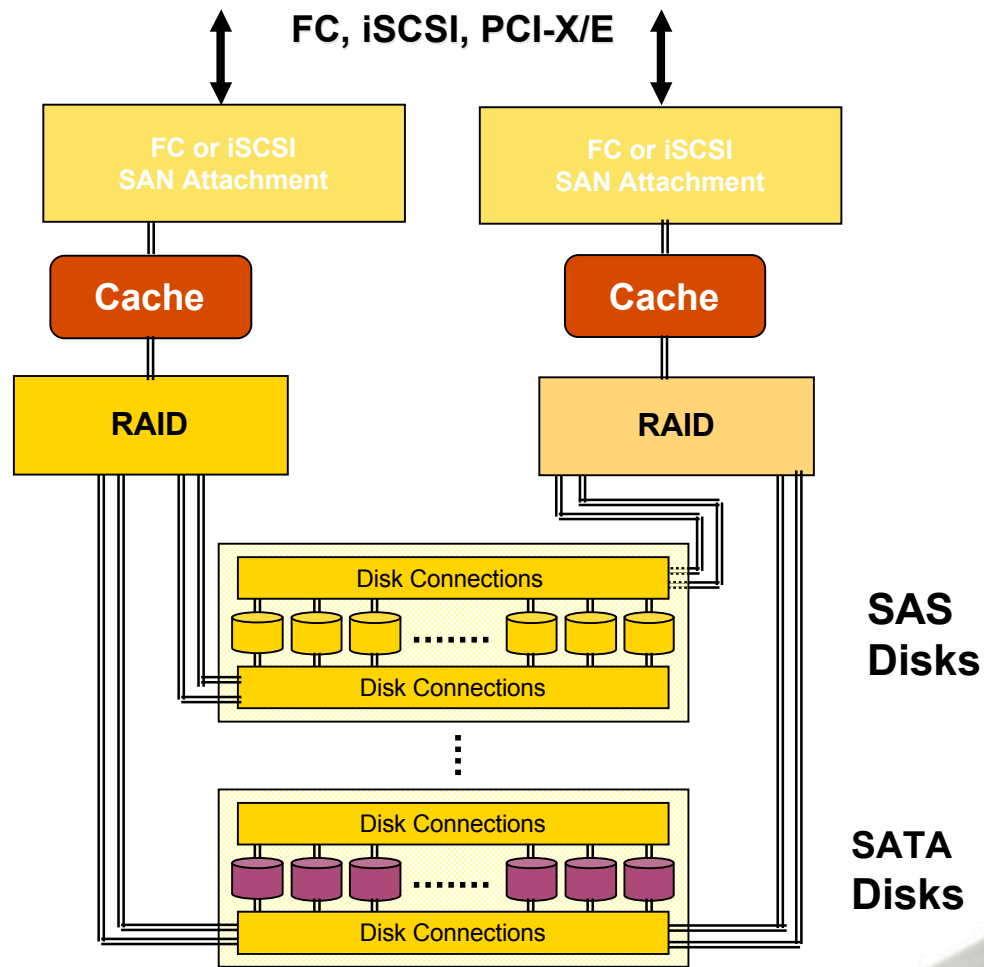


# SAS Protocol is the Key to System Communication

- SAS system is universal controller
- Serial SCSI Protocol (SSP) transfers SCSI commands
- SCSI Management Protocol (SMP) sends information to expanders
- SATA Tunneled Protocol (STP) enables direct SATA commands

# Typical SAS High Availability System

## SAN or Host Attachment





# IDF SAS Performance Demonstration

- 1st-ever demo to span a single RAID array across multiple SAS controllers
- RAID-on-Chip SAS controller has eight SAS/SATA ports and PCI-X / PCI Express interfaces
- 12-15K RPM drives, each sustaining >93 MB/s to total 1GB/s throughput



# IDF SAS Scalability and Flexibility Demonstration

- PCI-X to 8-port SAS HBA
- SAS 12-port and 36-port expanders
- 15K RPM-147GB SAS enterprise drives
- 7200 RPM SATA drives
- System operates at 3Gb/s