

# IT8001

## Information Storage and Management

Professional Elective

Topic

Introduction to  
SCSI



**Varun C.M.**

Assistant Professor, Department of Information Technology,  
St. Xavier's Catholic College of Engineering

## Expected Outcome

CO2

Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.

# Introduction to SCSI

Small Computer System Interface (SCSI) has emerged as a preferred connectivity protocol in high-end computers. This protocol supports parallel transmission and offers improved performance, scalability, and compatibility compared to ATA. However, the high cost associated with SCSI limits its popularity among home or personal desktop users. Over the years, SCSI has been enhanced and now includes a wide variety of related technologies and standards.

SCSI supports up to 16 devices on a single bus and provides data transfer rates up to 640 MB/s (for the Ultra-640 version).

Serial attached SCSI (SAS) is a point-to-point serial protocol that provides an alternative to parallel SCSI. A newer version of serial SCSI (SAS 2.0) supports a data transfer rate up to 6 Gb/s.

SCSI was developed to provide a device-independent mechanism for attaching to and accessing host computers. SCSI also provided an efficient peer-to-peer I/O bus that supported multiple devices.

Today, SCSI is commonly used as a hard disk interface. However, SCSI can be used for connecting devices, such as tape drives, printers, and optical media drives, to the host computer without modifying the system hardware or software.

## SCSI Standards Family



## SCSI Standards Family

### SCSI Architecture Model

#### Device-Type Specific Command Sets

#### Primary Command Set

Defines the SCSI systems model, the functional partitioning of the SCSI standard set, and the requirements applicable to all SCSI implementations and implementation standards

#### Interconnects

## SCSI Standards Family

SCSI Architecture Model

### Device-Type Specific Command Sets

### Primary Command Set

Implementation standards that define specific device types including a device model for each device type.

These standards specify the required commands and behaviors specific to a given device type and prescribe the requirements to be followed by a SCSI initiator device when sending commands to a SCSI target device having the specific device type.

The commands and behaviors for a specific device type may include reference commands and behaviors shared by all SCSI devices.

## SCSI Standards Family

### SCSI Architecture Model

#### Device-Type Specific Command Sets

#### Primary Command Set

An implementation standard that defines a model for all SCSI device types.

This standard specifies the required commands and behavior common to all SCSI devices, regardless of the device type, and prescribes the requirements to be followed by a SCSI initiator device when sending commands to any SCSI target device.

## SCSI Standards Family



## SCSI Standards Family

### SCSI Architecture Model

Implementation standards that define the communication mechanism employed by the SCSI transport protocols. These standards may describe the electrical and signaling requirements essential for SCSI devices to interoperate over a given interconnect.

### Interconnects

## SCSI Client-Server Model

In a SCSI client-server model, a particular SCSI device acts as a SCSI target device, a SCSI initiator device, or a SCSI target/initiator device. Each device performs the following functions

**SCSI initiator device:** Issues a command to the SCSI target device to perform a task. A SCSI host adapter is an example of an initiator.

**SCSI target device:** Executes commands to perform the task received from a SCSI initiator. Typically, a SCSI peripheral device acts as a target device; however, in certain implementations, the host adapter can also be a target device.

## SCSI Client-Server Model

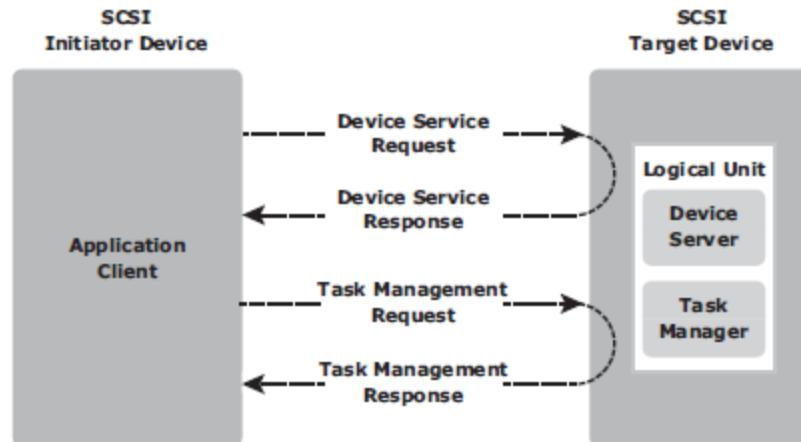


Image courtesy EMC Corporation, "Information Storage and Management"

## SCSI Client-Server Model

A SCSI target device contains one or more ***logical units***. A logical unit is an object that implements one of the device functional models as described in the SCSI command standards. The logical unit processes the commands sent by a SCSI initiator. A logical unit has two components, a device server and a task manager. The device server addresses client requests, and the task manager performs management functions.

## SCSI Client-Server Model

The **SCSI initiator device** composed of an application client and task management function initiates device service and task management requests. Each device service request contains a **Command Descriptor Block** (CDB), which defines the command to be executed and lists command-specific inputs and other parameters specifying how to process the command.

## SCSI Client-Server Model

The application client also creates tasks, objects within the logical unit, representing the work associated with a command or a series of linked commands.

A task persists until either the Task Complete Response is sent or the task management function or exception condition ends it.

## Parallel SCSI

In the parallel SCSI initiator-target communication, an **initiator ID** uniquely identifies the initiator and is used as an originating address. This ID is in the range of 0 through 15, with the range 0 through 7 being the most common.

A **target ID** uniquely identifies a target and is used as the address for exchanging commands and status information with initiators. The target ID is in the range of 0 through 15.

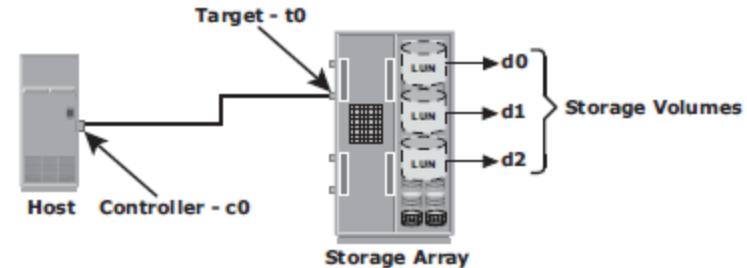
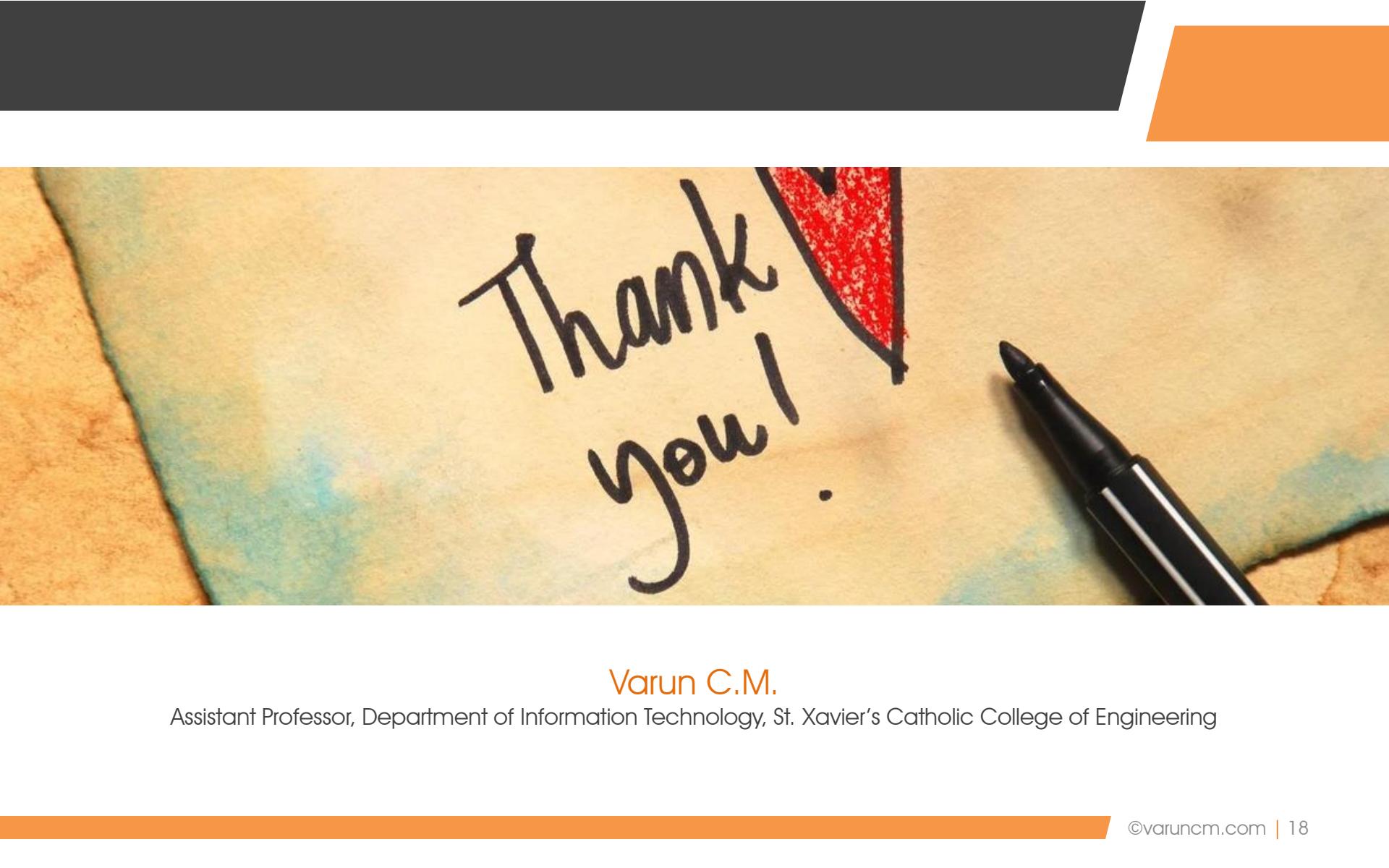


Image courtesy EMC Corporation, "Information Storage and Management"



## References

- EMC Corporation, "Information Storage and Management" , Wiley, India.  
Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.



Thank  
you!

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