



Medusa Labs Training

iSCSI Protocol (ML280_40G.2014.10)

Investigate the inner workings of the iSCSI protocol (including the latest, consolidated RFC), the LAN-based storage area networking (SAN) technology.

Get concrete, detailed answers to your questions:

- What network elements are required for iSCSI?
- How does iSCSI setup and manage connections?
- How do iSCSI devices login?
- How does iSCSI handle SCSI?
- What's new and different in the consolidated RFC?

You will learn all these things and more in Medusa Labs' comprehensive iSCSI Protocol training.

Based on the latest consolidated RFC standards documents and the latest real world test findings from Medusa Labs Testing Services, our iSCSI Protocol training covers the comprehensive iSCSI network architecture from power on through SCSI IO. And, each Medusa Labs' protocol class includes lab time.

Our classes are designed for engineering-minded individuals such as test engineers, design engineers, technical product/field support, and SAN administrators who address low-level protocol issues.

Medusa Labs Testing and Training

Viavi Solutions is a leading provider of testing and training services through its Medusa Labs offering that focuses on server, storage, and networking interfaces and protocols. Our engineers and trainers are experts in SAS, SCSI, RAID, iSCSI, SATA, SAS, and FCoE.

Our engineers helped develop some of the industry's key technologies and continue to have a vigorous passion for improving products and sharing their knowledge. This experience and enthusiasm translates into the highest quality testing and training services possible.

We further set ourselves apart by bringing the lab to the classroom through the use of Viavi Xgig® analyzers in every class.

3 Day Course Outline

- Fundamental Elements of iSCSI
- iSCSI Architecture and the Network
- iSCSI Communications Model
- iSCSI Discovery
- iSCSI Login
- iSCSI and SCSI IO
- iSCSI Error Recovery
- SCSI Fundamentals
- Fundamentals of Trace Analysis

What to Expect

- Never pay extra to view trace captures
- Includes insight into the standard based on our real-world testing experience
- Learn from experts with more than 20 years of experience in storage and networking

Fundamental Elements of iSCSI

This section identifies the basic features of and the premises upon which iSCSI technology has been designed. iSCSI is discussed in terms of the OSI model of computer networking. Upon completion, students are able to:

- Identify the basic features of iSCSI
- Describe iSCSI in terms of the OSI model of networking
- Describe common design approaches to iSCSI
- Define an iSCSI node



iSCSI Architecture and the TCP/IP Network

This section discusses the architectural design of iSCSI and the implications of transport through the TCP/IP network. iSCSI-specific objects and terminology are identified. iSCSI transmission inside of the TCP/IP stack is discussed and illustrated. Trace analysis is used to investigate the TCP connection creation process and the embedding of iSCSI PDUs. Upon completion, students are able to:

- Identify the roles of TCP and IP
- Identify when a new TCP connection is created
- Define iSCSI node, network entity, session, connection, and target portal group
- Describe an iSCSI target portal group and identify how it is used
- Describe how segmentation by other network layers affects iSCSI transmissions



iSCSI Communication Model — Protocol Data Units

This section introduces the iSCSI protocol data unit (PDU) format, usage, and management. Upon completion, students are able to:

- Describe the function of an iSCSI PDU
- Identify the headers in an iSCSI PDU and when each is used
- Describe the iSCSI-layer acknowledgement model
- Describe how iSCSI orders commands
- Identify the element with which iSCSI tracks PDUs related to a common IO or task

iSCSI Discovery

This section covers the discovery of iSCSI objects, including the use of iSNS (internet storage name server). iSCSI traces are used to illustrate the discovery process. Upon completion, students are able to:

- List the key information sought during discovery
- Describe how iSCSI uses the SendTargets method of discovery to find targets
- Describe how iSCSI nodes register with and query the iSNS server

Configuring Targets: the Login Process

This section discusses the normal login process in iSCSI. Trace analysis is used to investigate the login processes of a variety of iSCSI vendors. Upon completion, students are able to:

- Identify the two types of iSCSI login
- Explain how the iSCSI login relates to the TCP connection
- Describe the two stages of the login process
- List the parameters which may be negotiated during security negotiation
- Describe how iSCSI handles in-band authentication (CHAP) within the login process
- List multiple parameters which may be negotiated during operational negotiation



Mapping SCSI into iSCSI

This section covers the actual mapping of SCSI commands, data and status into iSCSI PDUs. Trace analysis covers various SCSI commands (read, write, inquiry) carried on the iSCSI transport layer. Upon completion, students are able to:

- Associate SCSI commands, data and status with the appropriate iSCSI PDU
- Chart the flow of an iSCSI transmission (IO)
- Explain under what circumstances the SCSI status phase may be collapsed into the data phase in iSCSI, including how this affects the layout of the PDU
- Explain how targets use R2T PDUs to flow control SCSI write operations
- Locate embedded iSCSI PDUs in GE frames on any protocol bit analyzer tool



iSCSI Error Recovery and Detection

This section discusses the error recovery hierarchy as outlined in iSCSI standards. Students explore issues ranging from failed login negotiations to SCSI check conditions. Upon completion, students are able to:

- Differentiate between the three main iSCSI error recovery levels, identifying the dependencies of each
- Identify how digest errors affect iSCSI transmission flow
- Identify how iSCSI recovers from errors that are within-command and within-connection
- Describe how iSCSI detects and recovers from connection failure
- Describe the effects of iSCSI session recovery

SCSI Fundamentals

This section explores basic SCSI concepts. Upon completion, students can:

- Define initiator and target roles
- Describe how SCSI exchanges are tracked
- Define read and write workflows
- Define relevant frames for each phase

Fundamentals of Trace Analysis

This section covers the basic concepts of trace analysis. Upon completion, students are able to:

- Know how an analyzer works
- Know what an analyzer captures and what files are created
- Understand how to search for information
- Describe effective strategies for maximizing analysis time

