

ML380: IN-DEPTH ISCSI ANALYSIS



ML380 focuses on low-level debugging of iSCSI architecture. It is intended for individuals, such as Q/A Engineers and Development Engineers who already have a thorough understanding of the basics of iSCSI architecture and who wish to improve their understanding of protocol-level errors and iSCSI networking issues.

COURSE OBJECTIVE

Students develop the ability to differentiate between TCP and iSCSI protocol errors through lecture and protocol analyzer exercises. Students also learn iSCSI network optimization techniques based on the in-depth examination of the transport protocols.

COURSE OUTLINE

- Introduction to iSCSI troubleshooting
- TCP/IP and iSCSI protocols
- Troubleshooting Network Issues in iSCSI
- Troubleshooting Data issues in iSCSI
- iSCSI Performance Tuning

ANALYZER EXPERIENCE

Students analyze numerous iSCSI traces using the latest Finisar Xgig® Trace Viewer and Expert software.

PREREQUISITES

This is an advanced debugging course. Students are expected to have a working knowledge of iSCSI at a protocol level, such as presented in the Medusa Labs ML280 iSCSI Architecture and Instrumentation class.

COURSE LENGTH

2 days.

ML380

DETAILED COURSE DESCRIPTION

INTRODUCTION TO ISCSI TROUBLESHOOTING

This section provides a quick refresher on basic protocol-level iSCSI concepts, and prepares the students to move deeper into the protocol. Upon completion students are able to:

- Identify the parts of an iSCSI PDU
- Describe the effects of segmentation by TCP on the iSCSI PDU
- Locate iSCSI PDUs in an analyzer trace, including PDUs that are embedded in the TCP segment

ISCSI ARCHITECTURE & THE TCP/IP NETWORK

This section discusses the architectural design of iSCSI and the implications of transport through the TCP/IP network. iSCSI transmission inside of the TCP/IP stack is discussed and illustrated. Upon completion students are able to:

- Identify when a new TCP connection is created.
- Describe the process by which TCP acknowledges its data stream
- Describe the TCP sliding window and how it relates to flow control
- Describe the TCP slow start and congestion avoidance algorithms and how they relate to TCP flow control
- Identify the basic concepts defining IPv6 and the ramifications of converting from IPv4 to IPv6
- Describe how segmentation by TCP affects iSCSI transmission including locating & reassembling an iSCSI operation that has been broken up by TCP retransmissions

TROUBLESHOOTING NETWORK ISSUES IN ISCSI

This section details common network issues faced in production iSCSI environments using a mixture of live and pre-captured network traces. Upon completion students are able to:

- Describe the issues introduced by the use of firewalls and network address translation
- Describe and identify issues presented by long distance, high latency networks and possible solutions
- Describe Ethernet jumbo frames and the implications of their use

TROUBLESHOOTING DATA ISSUES IN ISCSI

This section details the various error recovery levels in iSCSI and data corruption issues that may arise in a production iSCSI environment using error injection and network traces. Upon completion students are able to:

- Describe the error recovery levels available in the iSCSI protocol.
- Identify data corruption and recovery from CRC errors.
- Identify data corruption and recovery from Digest errors
- Identify security issues from CHAP mismatching and failure.
- Identify common SCSI issues and how to troubleshoot them within iSCSI.

TROUBLESHOOTING PERFORMANCE ISSUES IN ISCSI

This section describes various methods of iSCSI performance tuning. Upon completion students are able to:

- Describe and identify possible performance tuning options provided by iSCSI and TCP/IP protocol options and parameters.
- Describe and identify possible real-world performance issues.