InfiniBand and Mellanox UFM® Fundamentals

**Part Number:** MTR-IB-UFM-OST-A  
**Duration:** 3 Days

What's in it for me?

Where do I start learning about InfiniBand?  
How can I gain the tools to manage this fabric?  
The answer is this conclusive UFM® and InfiniBand Foundations course.

With this course, you will be on your way to becoming an InfiniBand guru and a UFM® master at the same time. The more you understand InfiniBand, the simpler it is to manage, especially if you have a tool like UFM® in your toolbox. You will soon see your InfiniBand troubleshooting skills improving; MTTR will decrease, and you will be more confident supporting InfiniBand high performance computing environments.

This course is a combination of the InfiniBand Foundations and UFM® Administrator’s course. It is designed to provide an introduction to InfiniBand with additional fabric management via the UFM® product. This course is designed primarily for InfiniBand Level 1 and Level 2 System Administrators and Network Engineers.

It delivers a robust training curriculum, in which students will be introduced to InfiniBand elements, theory of operation, fabric installation, and fabric administration. This course focuses on the Mellanox InfiniBand switch family and host stack products. It is designed to meet the needs of administrators who are involved in installing, configuring, managing, troubleshooting, and monitoring InfiniBand fabrics, especially those who use the UFM® product.

Course Objectives:

Upon completion of this three-day course, students should be able to support level 1 & 2 fabric debug functions, maintain InfiniBand fabrics, and perform primary InfiniBand functions using Mellanox tools and best practices, as well as with Mellanox’s Unified Fabric Manager (UFM®).

Students should be confident performing the following tasks:

- Describe the InfiniBand (IB) protocol foundations
- List and describe InfiniBand main topologies
- Understand InfiniBand Subnet Manager main functions

[www.mellanox.com/academy](http://www.mellanox.com/academy)
Understand and configure InfiniBand partitions using the Subnet Manager
Describe InfiniBand cabling options
Operate basic activities of InfiniBand switch using its CLI
Set-up connections between hosts and IB switches
Perform fabric troubleshooting and best practice routines using host and switch CLI
Understand how to install and configure UFM®
Understand UFM’s dashboard and main features
Understand how UFM® implements discovers fabric elements
Understand and configure InfiniBand partitions using UFM®
Manage InfiniBand devices using UFM®
Design fabrics using UFM’s Logical Model concept
Trace fabric event notification down to a component
Describe UFM’s Subnet Manager main functions
Demonstrate how to use Fabric Health Monitoring
Monitor fabric activity using UFM® tools

Target Audience:

- Network & system administrators
- Network & system engineers
- InfiniBand pre-sales staff

Prerequisites:

Data communications and Linux knowledge

Course Topics

Day 1 Agenda:

- InfiniBand Architecture
  - InfiniBand Fabric Elements
  - HCA, Switches, SM, and Gateways
  - InfiniBand Link Speeds (SDR, DDR, QDR, FDR)
  - Device Addressing (GUIDs & LIDs)
  - Introducing the FDR 36-Port ASIC
  - Link Layer Flow Control Principles
  - Transport Layer Functions
  - Quality of Service Introduction (QoS)
  - Management Datagrams and VL15
  - Fabric Partitioning

- InfiniBand Supported Protocols
- Describe the Primary Upper Layer Protocols (ULP) for InfiniBand
- Which Protocols can Utilize the RDMA Capabilities? (Verbs)
- Who Uses What?

**Network Topologies**
- How to Scale from 36 Ports
- What is a CLOS Topology?
- Supported Topologies
- Explaining Cross Bisectional Bandwidth

**Cabling Best Practices**
- What to Do and What Not to Do
- Cable Management

**InfiniBand Subnet Manger**
- The Seven Steps for Fabric Bring-up (Initialization Process)
- SM High Availability (HA)
- Introducing the Primary SM Routing Algorithms

**InfiniBand Management**
- Management Datagrams
- Subnet Management Interface (SMI)
- General Service Interface (GSI)
- Performance Management Introduction
- Baseboard Management Introduction

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**Day 2 Agenda:**

**Mellanox OFED Introduction**
- Adapter Packages
- Introducing the OFED Stack
- OFED Components
- Adapter Packages
- OFED Installation
- Configuring OFED
- Host Based Utilities
- Cluster Based Utilities
- Performance Utilities

**Mellanox Switch Portfolio Introduction**
- QDR and FDR Platforms
- Switch FRUs
- Switch LED Indicators
- Configuring Your Switch for the First Time

**Mellanox Switch OS**
- Mellanox_OS Introduction
- Chassis Management Using CLI
- Chassis Management Using GUI
- Updating Chassis Firmware
- Viewing Switch Logs
- Internal Switch SM

- **Fabric Troubleshooting**
  - Using Host Utilities
  - Using Switch Utilities
  - Troubleshooting Congestion

- **Unified Fabric Manager Introduction**
  - UFM® Overview
  - Installing UFM® - Guidelines
  - Introducing the Logical Model
  - Monitoring the Fabric
  - Tracing Events

- **Lab Practice**
  - OFED Host Utilities
  - Mellanox_OS

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**Day 3 Agenda (UFM®)**

- **UFM® Overview**
  - UFM® Benefits
  - UFM® Software Components
  - UFM® Architecture

- **UFM® Dashboard Introduction**
  - How to Check Different Parameters Using UFM®
  - Monitoring BW Usage
  - Monitoring InfiniBand Traffic and Congestion
  - Monitoring Fabric Top Talkers
  - Monitoring the Top Congested Servers
  - Monitoring Event Notifications

- **Fabric Discovery and Views**
  - Using the View Tab
  - Selecting Info per Object
  - Viewing Fabrics Internal Structure and Properties
  - Topology View Icons
  - Assigning Servers to Racks
  - Modifying Polling Intervals
  - Modifying Topology Display Modes
  - Viewing Entire Fabric Using Table & Map Mode
  - Viewing Fabric Historical Events

- **Device Management**
  - Using the Device Tab
- Modifying Device Attributes
- Using the Device Management Agent
- Utilizing the Table Filter Feature
- Updating Firmware & Software Using UFM®
- Port Management
- Working with Device Alarms

- **Using UFM’s Logical Model**
  - Fabric Partitioning Using UFM®
  - Introducing the Logical Model
  - Physical Components
  - The Logical Network Object
  - UFM’s Management Network
  - Implementing QoS with UFM

- **UFM® Fabric Design**
  - Using the Design Window
  - UFM’s Design Concept Introduction
  - Creating an Environment
  - Creating a Network
  - Network Isolation and Security Using Partitioning
  - Creating a Logical Server Group

- **Fabric Monitoring with UFM®**
  - Using the Monitoring Tab
  - UFM’s Monitoring Features
  - How to Activate UFM® Monitoring
  - Using Monitoring Objects and Attributes
  - How to Configure a Monitor Window
  - Starting a Monitoring Session
  - Using Periodic Snapshots

- **Tracking Fabric Events**
  - How to Use the Event Table
  - Tracing Event Down to the Component
  - Using Common Port Tasks

- **UFM’s Configuration Window**
  - Configuring UFM’s Subnet Manager
  - Configuring Access Credentials
  - Using UFM’s Thresholds and Security Levels

- **UFM® Health Monitoring**
  - Display InfiniBand Fabric Health Reports
  - Display UFM® Server Health Report
  - Activate Topology Comparison, Current VS Planned for Fabric Optimal Setup Verification
  - Display UFM® Server Health Report
  - Display LOG Reports (SM, UFM®, Events)
  - Perform UFM® Configuration Backup
• Lab Exercises

• Q&A Wrap Up