About Mellanox On-Site courses
Mellanox Academy offers on-site customized courses for maximum content flexibility to make the learning process as efficient and as effective as possible.

Content flexibility
Our customers and partners may choose to be trained and/or certified on any of the certifications below, or to create their own unique professional training program by mixing topics from different certifications.

Training delivery
We offer a variety of training delivery methods; on-site, online and remote, to answer challenges such as global geographical spread, diverse knowledge level of the target audience, new hires training solutions and budget constraints.

How others choose to customize their training?
Each customer may choose to mix-and-match the desired topic with the desired delivery method. Below are the best customized training mix-and-match combinations our customers had chosen and confirmed its successfulness:

1) **A blend of online learning with on-site training**
   Many of our customers include online training as prerequisite to the on-site training to align the level of knowledge among the target audience and create solid baseline for the desired training.
   Another good example is customers who choose to learn most of the theory part online and make the on-site training hands-on oriented. Some customers choose the online solution as their advanced learning solutions after acquiring the necessary knowledge on-site.

2) **Virtual Private Training**
   Customers with global geographical spread choose the virtual instructor-led training to overcome the distance and the time zone differences.

3) **A blend of online with Virtual Training for New Hires**
   Some customers need an immediate solution for new hires and an annual advanced training.
   We usually offer our online academy as the immediate solution. Later on, we hold a remote training to bridge the required knowledge gaps or for advanced training.

   No matter how challenging it may be, our training specialists will customize with you the most efficient and effective training solution.
IB Professional Training Program
Mellanox InfiniBand certified professional training and certification is the entry level to InfiniBand world. It is aimed for network professionals and IT experts.

Target Audience
Network engineers, Network administrators
Serves administrator, IT technicians and IT managers.

Certification Terms and Conditions
In order to get the “IB Professional” certification, the student has to pass the online certification exam.

InfiniBand Professional Topics
Duration: 3 days on-site, 9-13 hours online, 5 virtual sessions (each session lasts 3 hours)

This training provides the fundamentals of InfiniBand while emphasizing mechanisms, topologies, routing engines and tools that are suitable for HPC environments. During the course, students will learn about management concepts and architectural layers, as well as various utilities for managing and monitoring InfiniBand fabrics, and even troubleshooting techniques to handle basic issues. It is designed to meet the needs of anyone who installs, configures, manages, troubleshoots or monitors InfiniBand fabrics.

Topics:
InfiniBand Introduction
- InfiniBand Trade Association
- What is InfiniBand?
- InfiniBand key features - InfiniBand fabric components
- Topologies

InfiniBand Architecture
- The physical layer
  - Overview
  - Mechanisms
- The data link layer
  - Overview
  - Mechanisms & services
- The network layer
Overview
- Mechanisms

The transport layer
- Overview
- Mechanisms & Services

The upper layers
- Structure – verbs & protocols
- Mechanisms & services
- Protocols overview

Fabric Management
- Introduction to subnet management concepts
- Subnet Manager
- Fabric addressing
- Node’s identifiers
- Fabric Initialization stages
- Basic Routing Algorithms

InfiniBand Drivers and Tools
- Mellanox OFED for Linux/win overview
- Upgrading OFED version
- Burning firmware
- OFED utilities overview
- Cluster based utilities
- Node based utilities
- Route based utilities
- Diagnostic utilities

UFM
- UFM installation modes
- UFM Dashboard Functionality
- How to Monitor the Fabric
- How to Analyze Congestion
- How to Manage Devices
- Fabric Discovery and Views
- How to Monitor Fabric Health
- How to Manage Events on the Fabric
- UFM’s Logical Model
- How to Configure UFM
IB Expert and IB Engineer Training Programs

If you had already taken our **IB Professional** training (formally known as InfiniBand Fundamentals) or have an equivalent field experience, it’s time to consider your next educational step and enroll to **IB Expert and/or IB Engineer** training programs and certifications.

**Target Audience**

These customized advanced trainings are intended for server and network administrators who had taken “IB Professional” training or have equivalent knowledge in IB.

**The Offer**

Mellanox Academy offers 2 levels of advanced InfiniBand training & certification:

1. Mellanox Certified InfiniBand Expert
2. Mellanox Certified InfiniBand Engineer

**Training Programs Overview**

The **IB Expert** training and certification covers 5 topics. Each topic can be also delivered as a standalone training.

- InfiniBand Fabric Bring-up Expert
- InfiniBand Monitoring Expert
- InfiniBand Performance Expert
- InfiniBand Management and Configuration Expert
- InfiniBand Server-side Administration Expert

The **IB Engineer** training and certification has one additional and complementary topic:

- InfiniBand Diagnostic & Troubleshooting Expert

**Certification Terms and Conditions**

In order to get the “**IB Expert**” certification, the student has to pass at least 3 out of 5 certification exams.

In order to receive the “**IB Engineer**” certification, the student has to complete and successfully pass the 2 remaining expert certifications from the “IB Expert” training program, as well as to pass the “Diagnostics &Troubleshooting” certification exam.

*We at the Mellanox Academy allow you to select any training topic you wish.*
*We also offer the option to combine remote training with on-site training in order to align the level of knowledge before the on-site training, or to complete the learning process after the on-site training.*

Below is the complete outline of the **IB Expert** and the **IB Engineer** training certification programs.
InfiniBand Expert Topics

1. Fabric Bring-Up Expert
   Duration: 1 day on-site, 6-9 hours online, 3 virtual sessions (each session last 3 hours)

   The student will learn how to bring up a fabric and perform initial configuration, verify and upgrade adapter cards and switches software, and perform fabric health check to ensure a smooth operation of the fabric.

   a. Introduction to InfiniBand
   b. Fabric Bring Up – Introduction
   c. OFED Utilities
   d. Introduction to Mellanox Operating System
   e. Switch Verification
   f. HCA Software Installation and Verification
   g. Switch Upgrade
   h. Switch Hardware Health Check
   i. Fabric Health Check
   j. InfiniBand Topology Validation

2. Monitoring Expert
   Duration: 1 day on-site, 6-9 hours online, 3 virtual sessions (each session last 3 hours)

   The student will learn how to set different monitoring methods on a fabric, as well as scheduling tasks, quick error detection verification, and logging and troubleshooting enabling.

   a. Introduction to InfiniBand
   b. SNMP Configuration
   c. Email Notifications Configuration
   d. Remote Logging Configuration
   e. OpenSM Logs
   f. Fabric Inspector
   g. Scheduled Fabric Scan Task
   h. Topology Validation Scheduled Task
   i. Automatic Switch Backup Configuration
   j. Automatic Switch Dump Scheduled Task

3. Performance Expert
   Duration: 1 day on-site, 6-9 hours online, 3 virtual sessions (each session last 3 hours)

   The student will learn what affects the performance of fabric, use different benchmarking and measurement tools, how to tune the fabric for best performance, and how to troubleshoot performance issues.

   a. Introduction to InfiniBand
   b. Performance Overview
   c. IB Benchmarking Tools
   d. Performance Tuning
4. Management Expert

Duration: 1-1.5 days on-site, 9-13 hours online, 4 virtual sessions (each session last 3 hours)

The student will learn about the Subnet Manager and its capabilities (one of the main concepts in InfiniBand fabrics), routing considerations, congestion control, health monitoring, QoS and multicast. The student will also learn how to recognize main troubleshooting scenarios that are related to the fabric management.

   a. Introduction to InfiniBand Architecture and Management
   b. Subnet Manager – Introduction
   c. InfiniBand Fabric Topologies
   d. Routing Algorithms
   e. Routing Chains
   f. Adaptive Routing
   g. Congestion Control
   h. Health Monitoring
   i. Quality of Service
   j. InfiniBand Multicast
   k. Troubleshooting

5. Server Side Administration Expert

Duration: 1-1.5 days on-site, 9-13 hours online, 4 virtual sessions (each session last 3 hours)

The student will learn about the interaction between the InfiniBand technology and the upper layer protocols – such as IPoIB, MPI, storage solutions and VMware. The student will also learn about important configurations of upper layer protocols via Mellanox InfiniBand products.

   a. Introduction to InfiniBand
   b. IPoIB
      i. IPoIB
   c. MPI
      i. 1 - MPI Introduction
      ii. 2 - Open MPI
      iii. 3 - Mellanox HPC-X
      iv. 4 - Open MPI Troubleshooting
   d. RoCE
      i. 1 – Introduction to RoCE
      ii. 2 – RoCE Configuration
   e. Storage
InfiniBand Engineer Topics

The InfiniBand Engineer work requires advanced diagnostics and troubleshooting capabilities for most of the fabric issues. In addition to InfiniBand knowledge, the engineer has to know how to optimize the cluster performance and maintain its stability.

6. Diagnostics & Troubleshooting Expert

Duration: 1-1.5 days on-site, 9-13 hours online, 4 virtual sessions (each session last 3 hours)

The student will learn how to troubleshoot the fabric, starting from the physical layer up to the upper layer protocols. This unit is accompanied with several hands-on best practice activities, delivered via the Mellanox Academy Fabric Simulator.

   a. Fabric Diagnostics
   b. HCA
      i. HCA LED Indications
      ii. Case #1 – The HCA is Not Recognized by the Server
      iii. Case #2 – The Physical Link is Down
      iv. Case #3 – The Logical Link is Down
      v. Case #4 – InfiniBand Commands are Not Executing
   c. Switch
      i. Case #1 – The Switch LEDs are indicating on a Malfunction
      ii. Case #2 – The Director Switch is Not Functioning Properly
   d. Performance
      i. Troubleshooting – Performance