

Certified Switching Engineer (MTC SWE)



OUTCOMES

By the end of this training session, the student will be familiar with RouterOS Layer 2 forwarding software and RouterBOARD hardware switch chip features and bridge features. The student will be able to configure and control Layer 2 forwarding using MikroTik networking solutions.

TARGET AUDIENCE

Network engineers and technicians wanting to deploy and support Layer 2 based networks.

DURATION

3 days

COURSE PREREQUISITES

MTCNA certificate

SUGGESTED READING:

Search for 'Layer 2 networking', 'Bridging', 'Switching', 'VLAN'

CURRICULAR CONTENT



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Module 1 Introduction

- Layer 2 forwarding concepts
 - Unicast, multicast and broadcast traffic
 - MAC learning in bridges and switches
 - Interface settings
- RouterOS bridge overview
- RouterBOARD switch chip overview
 - RouterBOARDS with basic switch chips
 - Cloud Router Switch (CRS) series devices with advanced switch chips
- SwitchOS (SwOS) brief overview
- Module 1 laboratory

Module 2 MTU

- MTU
- RouterOS bridge overview
- L2MTU
- Jumbo frames
- Potential MTU issues
- Module 2 laboratory

Module 3 VLAN

- 802.1Q and 802.1ad VLAN overview and tagging concepts
- RouterOS VLAN interfaces
 - Port based VLAN (VLAN bridging)
 - Inter-VLAN routing ('router on a stick')
- VLANs in basic switch chips
 - Port based VLAN
- VLANs in bridge interfaces
 - Port based VLAN
 - MAC based VLAN
 - Protocol based VLAN
- QinQ (802.1ad)
 - QinQ implementation with bridge VLAN filtering
 - QinQ implementation with VLAN interfaces
- Module 3 laboratory

Module 4 Spanning Tree Protocol

- Spanning tree protocol (STP) concepts
 - STP bridge priority
 - STP port path cost
 - STP and RSTP comparison
- Multiple Spanning tree (MSTP) concepts
 - MSTP definition
 - MSTP regions
 - CST/CIST
- Bridge protocol data unit (BPDU)
- Spanning tree security
- Module 4 laboratory

CURRICULAR CONTENT

Module 5 Link Aggregation

- RouterOS bonding
 - Bonding modes
 - Compatibility with other static link aggregation
- Module 5 laboratory

Module 6 Port Isolation

- RouterOS bridge horizon
- Switch port isolation
- Module 6 laboratory

Module 7 QoS

- Layer 2 QoS (802.1p)
 - RouterOS bridge filter priority
 - CRS priority configuration
- Traffic shaping
 - Bandwidth limiting in bridge with queues
 - Bandwidth limiting in switch chip
- Module 7 laboratory

Module 8 Layer 2 Security

- IGMP snooping
- DHCP snooping • Loop protect
- Traffic storm control
- Layer 2 firewall
 - RouterOS bridge filter features
 - Switch access control list
- BPDU guard
- ARP modes
- Port security
- 802.1X
- Switch security
- Module 8 laboratory

Module 9 PoE

- RouterOS PoE modes and compatibility
- RouterOS PoE priority settings
- RouterOS PoE monitoring
- Module 9 laboratory

Module 10 Tools

- Layer2 diagnostic tools
- Port mirroring
- Module 10 laboratory

Module 11 SwOS

- Introduction to SwOS
- RouterBOARD dual-boot compatibility
- Installing SwOS
- Managing SwOS
- Configuration of Layer 2 Features with SwOS
 - VLANs
 - (R)STP
 - Port trunking
 - QoS
 - Layer 2 security
- Module 11 laboratory