

COURSE OUTLINE

1.0 IP Networking

- 1.1 Describe the difference between enterprise environments and industrial environments
- 1.2 Describe the components for making the data flow highly available and predictable in an industrial environment (QoS, IP addressing, protocol, and hardware resiliency)
- 1.3 Interpret and diagnose problems that are related to QoS
- 1.4 Describe the differences between redundancy and resiliency requirements / approaches between the enterprise and the plant floor
- 1.5 Differentiate the capabilities of switch types
- 1.6 Describe the life cycle of a multicast group
- 1.7 Describe and configure the operation and use cases for NAT
- 1.8 Describe and configure the operation and use cases for static routing
- 1.9 Describe and configure VLAN trunking to a virtual switch
- 1.10 Describe and configure Layer 2 resiliency protocols (Spanning Tree, REP, Flex Links, and Ether channels)
- 1.11 Configure switch ports (macros, threshold alarms)

2.0 Common Industrial Protocol (CIP) Knowledge and Configuration

- 2.1 Explain the CIP connection establishment process
- 2.2 Explain producer/consumer models and implicit/explicit message models
- 2.3 Recognize communication abilities and capacities in different hardware/hardware generations (revisions)
- 2.4 Identify and describe the technologies that enable CIP Motion and CIP Safety
- 2.5 Identify the applicability, limitations, and components of a DLR implementation
- 2.6 Implement multicast features for CIP within a LAN
- 2.7 Optimize RPI on a CIP connection given a set of parameters
- 2.8 Enable and configure IEEE 1588 PTP at the system level
- 2.9 Configure the Stratix using the Add On Profile (AOP) in Studio 5000

3.0 ProfiNET Knowledge and Configuration

- 3.1 Describe the differences in ProfiNET support between Cisco catalyst and Cisco Industrial Ethernet (IE) switches
- 3.2 Describe the operation and purpose of ProfiSAFE
- 3.3 Describe the three basic ProfiNET devices and conformance classes
- 3.4 Describe the ProfiNET application classes and communication channels
- 3.5 Describe DCP and how it can be used for IP addressing of devices and configuration pushes
- 3.6 Describe ring network requirements for ProfiNET
- 3.7 Enable ProfiNET on the switch
- 3.8 Enable Layer 2 QoS to ensure ProfiNET is prioritized
- 3.9 Integrate the Cisco IE Switch in SIMATIC STEP 7 3.10 Configure and monitor ProfiNET alarm profiles on IE switches

4.0 Security

- 4.1 Describe the defense in-depth approach to securing the industrial zone
- 4.2 Identify how a security component (hardware/software) applies to a network device to meet the network security definition of defense in depth
- 4.3 Describe network device hardening
- 4.4 Describe the concept and mechanisms of implementing logical segmentation
- 4.5 Identify possible options to control traffic between zones (ACLs, firewalls, VLANs)

5.0 Wireless

- 5.1 Describe the differences between 802.11a/b/g/n/ac
- 5.2 Describe the components that you need to build multiple wireless networks on a single access point
- 5.3 Describe the difference between autonomous and controller-based access points and wireless workgroup bridges
- 5.4 Demonstrate a typical switch port configuration for autonomous and controller-based access points 5.5 Describe the limitations of using a workgroup bridge with a

control communication

6.0 Troubleshooting

- 6.1 Troubleshoot advanced Layer 1 problems such as mechanical deterioration, electromagnetic noise issues, and infrastructure mismatches
- 6.2 Troubleshoot VLAN trunking
- 6.3 Troubleshoot an error disabled port
- 6.4 Troubleshoot basic spanning tree port state and root priority problems
- 6.5 Troubleshoot Layer 3 problems by inspecting route tables and NAT tables
- 6.6 Troubleshoot Layer 3 problems in a VRF-lite enabled environment
- 6.7 Demonstrate the ability to find the location of a device within a multi-switch network given an IP address
- 6.8 Identify methods for troubleshooting a communication problem in a CIP environment
- 6.9 Troubleshoot CIP using an Ethernet/IP browse tool, command line, and a web browser
- 6.10 Troubleshoot device communications performance
- 6.11 Identify the source of cable and device faults in a DLR
- 6.12 Identify methods for troubleshooting a communication problem in a ProfiNET environment
- 6.13 Troubleshoot ProfiNET using SIMATIC STEP 7 to view network topology, use the switch command line