Network Automation with Python Fast Track

Days: 3

Prerequisites: Although not required, students with some experience programming will most appreciate this hands-on course.

Audience: Network Engineers, Network Architects, DevOps/SRE (Site Reliability Engineers), Network Operations Center (NOC) Technicians/Analysts, or IT Infrastructure Managers.

Description: This course provides a practical and hands-on approach to network automation using Python. It's designed to empower network engineers to move beyond manual, time-consuming command-line interfaces. Participants will learn to leverage a full-featured programming language for advanced data manipulation, multi-vendor automation, and seamless integration with the broader IT ecosystem. The hands-on labs focus on automating real-world network devices from major vendors like Cisco, Arista, and others..

Course Objectives: In this course, you will learn how to:

- **Apply Python to Network Tasks:** Use Python fundamentals to programmatically interact with network devices.
- **Master Multi-Vendor Automation:** Confidently manage and configure devices from different vendors via both CLI and APIs.
- **Automate with Data:** Parse and manipulate structured and semi-structured data formats like JSON and CLI output.
- **Build Reliable Solutions:** Securely manage credentials and version control network configurations to ensure reliability.

OUTLINE:

PYTHON FUNDAMENTALS FOR NETWORKING

• Lecture + Lab: List and Dict Modeling
• Lecture + Lab: Python Data to JSON
• Lecture + Lab: Python Data to YAML
• Lecture + Lab: Read from Files
• Lecture + Lab: CSV Data - Standard Library and pandas DataFrames
• Lecture: Functions and Control Flow
• Lecture + Lab: Modules, Libraries, and Exception Handling

CLI AUTOMATION

• Lecture: Introducing Paramiko
• Lecture + Lab: Automating Commands Across SSH
• Lecture + Lab: Paramiko and SFTP
• Lecture + Lab: Python Telnet Client
• Lecture + Lab: Performing ICMP Checks

MULTI-VENDOR AUTOMATION

• Lecture + Lab: Netmiko for Router and Switch Automation
• Lecture: Python to Cisco NX-OS
• Lecture + Lab: Getting Switch Configuration with NAPALM
• Lecture + Lab: Switch Validation and NAPALM
• Lecture + Lab: Exploring Network Interfaces

PARSING AND DATA HANDLING

• Lecture + Lab: Python and Regular Expressions for Searching
• Lecture + Lab: Parsing Semi-Structured Data with Regex
• Lecture + Lab: Python for Network Captures and Wireshark
• Lecture + Lab: Examining Network Capture PCAP Files with termshark

API-DRIVEN AUTOMATION

• Lecture + Lab: APIs, pip, and requests
• Lecture + Lab: RESTful Open APIs with requests
• Lecture + Lab: Interacting with APIs
• Lecture + Lab: RESTful Open APIs with Standard Library
• Lecture + Lab: API-Driven Network Automation with requests

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DATA LOGGING AND RELIABILITY

- Lecture + Lab: Lightweight Database Interactions
- Lecture + Lab: Data Logging and State Tracking
- Lecture + Lab: Controlling Runtime with Environmental Variables
- Lecture + Lab: Using argparse

ADVANCED AND OPTIONAL TOPICS

- Lecture + Lab: Automating HTTP Requests
- Lecture + Lab: Automating HTTP Requests with Async IO
- Lecture + Lab: Introduction to FastAPI
- Lecture + Lab: Web Scraping Data with Beautiful Soup