Network Automation with Python

- 5 Days
- Lecture and Hands-on Labs

Course Overview

This course provides a practical and hands-on approach to network automation using Python, empowering participants to automate, manage, and analyze network operations efficiently. Starting with foundational Python programming, the course progresses to cover essential skills like interacting with networking APIs, analyzing traffic captures, and automating diagnostics. Participants will explore powerful libraries such as Paramiko, Netmiko, and NAPALM to configure and validate network devices across multi-vendor environments. The course also delves into advanced topics like SSH automation, database integration for tracking network data, and using Python for traffic analysis with Wireshark and Pyshark. By the end, attendees will be equipped with the tools and knowledge needed to streamline network operations and adopt automation in their workflows.

Review this course online at https://www.alta3.com/courses/py202

Who Should Attend

- Network Engineers looking to automate repetitive tasks and streamline network operations.
- System Administrators managing networked environments and seeking to enhance efficiency with Python scripting.
- DevOps Professionals aiming to integrate network automation into CI/CD pipelines.
- IT Professionals transitioning into roles that require network automation and programmability skills.
- Network Architects designing scalable, automated networks for complex environments.
- Security Engineers interested in analyzing network traffic and performing automated diagnostics.
- Python Developers expanding their expertise into network automation and device management.
- Telecom and ISP Technicians managing large-scale networks and multi-vendor environments.
- Students and Enthusiasts eager to explore network automation as a career path.
- Anyone Working with Network Devices who wants to simplify and automate configurations using Python.

What You'll Learn

- Master Python Fundamentals: Build a strong foundation in Python programming, including functions, data structures, and control flow, to support network automation.
- Understand APIs for Networking: Learn to interact with networking APIs using Python libraries like `requests` for efficient data retrieval and management.
- Analyze Network Traffic: Use Python to capture and analyze network data with tools like Wireshark, Pyshark, and termshark.
- Perform Network Diagnostics: Implement Python scripts for tasks like ICMP checks and troubleshooting network issues.
- Automate Remote Network Tasks with Paramiko: Use Paramiko to establish SSH connections and automate file transfers and commands across network devices.

- Streamline Device Management with Netmiko: Simplify router and switch configurations using the Netmiko library for efficient automation.
- Leverage NAPALM for Network Configuration: Use NAPALM to retrieve, validate, and apply configurations on network devices.
- Utilize Python and Regex for Network Data Parsing: Apply regular expressions to extract and process meaningful data from network configurations and logs.
- Integrate Python with Lightweight Databases: Use sqlite3 to store and manage network data for reporting and analysis.
- Automate Multi-Vendor Network Environments: Develop Python scripts to manage configurations across diverse network devices and platforms.

Outline

Day 1- Foundational Python

- Lecture + Lab: Built-in Functions
- Lecture + Lab: Custom Functions
- Lecture + Lab: Objects and Methods
- Lecture: Python Lists
- Lecture + Lab: Python Lists
- Lecture: Python Dictionaries
- Lecture + Lab: Python Dictionaries
- Lecture: Conditionals
- Lecture + Lab: If, Elif, and Else Conditions
- Lecture + Lab: While Loops

Day 2- Foundational Python (Continued)

- Lecture + Lab: For Loops
- Lecture: Reading and Writing to Files
- Lecture + Lab: Reading Files
- Lecture + Lab: Using Modules
- Lecture + Lab: PIP and Third Party Libraries
- Lecture + Lab: Try and Except
- Lecture + Lab: Python Classes & Inheritance

Day 3- APIs, Network Diagnostics and Analysis

- Lecture: APIs and Networking
- Lecture + Lab: Accessing APIs with requests
- Lecture + Lab: Networking APIs with requests
- Lecture + Lab: Python for Network Captures and Wireshark
- Lecture + Lab: Examining Network Capture pcaps Files with termshark
- Lecture + Lab: Performing ICMP Checks
- Lecture + Lab: Python and Regular Expression for Searching

Days 4 & 5- Remote Network Configuration

- Lecture: Introducing Paramiko
- Lecture + Lab: Paramiko and SFTP
- Lecture + Lab: Automating Commands Across SSH
- Lecture: Python to Cisco NX-OS
- Lecture + Lab: Netmiko for Router and Switch Automation
- Lecture + Lab: Lightweight Database Interactions
- Lecture + Lab: Getting Switch Configuration with NAPALM
- Lecture + Lab: Switch Validation and NAPALM

Additional Labs and Tools

- Lecture + Lab: Using Argparse
- Lecture + Lab: Controlling run time with Environmental Variables
- Lecture + Lab: Python and Regular Expression for Searching

- Lecture + Lab: Controlling run time with Environmental Variables
- Lecture + Lab: Exploring Network Interfaces
- Lecture + Lab: Python Telnet Client
- Lecture + Lab: Testing Code with PyTest
- Lecture + Lab: Automating HTTP Requests
- Lecture + Lab: Automating HTTP Requests with Async IO

Optional- PCEP Certification Guide

- Lecture: Introduction to the PCEP Exam
- Lecture + Lab: Advanced Numbers and Operators
- Lecture + Lab: Pythonic Loops and Iteration
- Lecture + Lab: Advanced Lists and Tuples
- Lecture + Lab: Advanced Functionality and Error Handling

Prerequisites

- Basic Keyboard Proficiency: Ability to efficiently navigate and use a keyboard, including typing, copy-pasting, and basic text editing in terminal and/or text editors.