

Python 202- Network Automation

- 5 Day Course
- Lecture and Lab

Course Overview

Managing networks can be repetitive and error-prone, but Python can make incredible changes to how you automate with all major (and most minor) network vendors. This course is driven by lessons and labs designed to utilize Python libraries designed to interact with and configure your network devices. At the conclusion of this course, you'll be empowered with the tools and skills necessary to take your network to the next level. This class is a combination of live demonstrations and hands-on labs with virtual network devices and endpoints as targets for your configuration.

Review this course online at <https://www.alta3.com/courses/pyna>

Who Should Attend

This course was written for networking professionals looking to expand their capabilities by automating their workload with Python. This includes: Network Engineers, Network Architects, System Admins, DevOps Engineers, Cisco Certified Professionals (CCNA, CCNP, CCIE), and developers interested in network programmability with Python.

What You'll Learn

- Sending HTTP Requests to APIs with builtin and 3rd party libraries
- Opening Telnet Sessions with builtin libraries
- Automating SSH commands with Paramiko
- Performing ICMP Pings
- Transforming Data between JSON, YAML, and Python
- Retrieve and Push network device configuration via Netmiko and Napalm
- Use Pandas to manipulate data in a variety of formats (CSV, Excel, JSON)
- Database manipulation
- Capturing and Parsing Network Traffic
- AI LLM prompt engineering for Python snippets and jumpstarting solutions

Outline



Certification

-  Lecture + Lab: Python for Network Automation - Certification Project


AI LLM Toolkit

-  Lecture + Lab: Large Language Model toolkit for AI Solution Assistance







Software Control Management

-  Lecture + Lab: SCM Option #1 - GitHub
-  Lecture + Lab: SCM Option #2 - GitLab





Python

-  Lecture + Lab: Installing Python



Data and File Manipulation

-  Lecture + Lab: Read from Files
-  Lecture + Lab: Python Data to JSON
-  Lecture + Lab: Python Data to YAML
-  Lecture + Lab: Pandas dataframes with Excel, csv, json, HTML and beyond
-  Lecture + Lab: CSV data - Standard Library and pandas dataframes
-  Lecture + Lab: List and Dict Modeling

APIs and HTTP

-  Lecture + Lab: Interacting with APIs
-  Lecture + Lab: APIs, pip, and requests
-  Lecture + Lab: Restful Open APIS with Standard Library
-  Lecture + Lab: Restful Open APIS with requests



Troubleshooting

-  Lecture + Lab: Python for Network Captures and Wireshark
-  Lecture + Lab: Examining Network Capture pcaps Files with termshark


ICMP (ping)

-  Lecture + Lab: Performing ICMP Checks




Automating Email

-  Lecture + Lab: Automating SMTP
-  Lecture + Lab: Exploring Network Interfaces


Front End Web Calls

-  Lecture + Lab: Web Scraping Data with Beautiful Soup
-  Lecture: Automating Front-End Web Forms



Connecting with Python

-  Lecture + Lab: Python Telnet Client
-  Lecture: Introducing Paramiko
-  Lecture + Lab: Paramiko and SFTP
-  Lecture + Lab: Automating Commands Across SSH



Python and Network Devices

-  Lecture: Python to Cisco NX-OS
-  Lecture + Lab: Netmiko for Router and Switch Automation
-  Lecture + Lab: Lightweight Database Interactions





NAPALM

-  Lecture + Lab: Getting Switch Configuration with NAPALM
-  Lecture + Lab: Switch Validation and NAPALM

Building APIs

-  Lecture + Lab: Building APIs with Python Flask
-  Lecture + Lab: Intro to Building Django Apps




CI/CD Automation

-  Lecture: Introduction to CI CD with GitLab
-  Lecture + Lab: Running Python in a Container
-  Lecture: CI CD with Python, Webhooks, and GitLab Runner
-  Lecture + Lab: Lifecycling a Python App with GitLab

Testing

-  Lecture + Lab: Testing Code with PyTest



Optimizing Code for Automation

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

Concurrency

-  Lecture + Lab: Automating HTTP Requests
-  Lecture + Lab: Automating HTTP Requests with Async IO

Enterprise Applications

-  Lecture + Lab: VMWare NSX Automation
-  Lecture + Lab: scapy - Network Traffic as Code

Prerequisites

Recommended Prerequisite:

- Python 101 - Python Basics (5 days)