

**Network Programming and Administration using Python**

**Course Number:** PYTH-210  
**Duration:** 3 days

**Overview**

This Network Programming and Administration using Python training course teaches attendees how to create TCP/IP client and server programs using multi-tasking and multi-threading in Python. Students learn how to use Paramiko, Netmiko, and NAPALM (Network Automation and Programmability Abstraction Layer with Multivendor support) libraries and functions to obtain network device and configuration information, automate SSH tasks to communicate with network devices, and automate network device configurations changes.

**Prerequisites**

Participants must be working systems and/or network administrators/engineers/technicians with some experience with fundamental Linux utilities and commands. Python programming experience and working knowledge of a vendor-specific network device (CLI) are useful but not essential.

**Materials**

All Python programming training students receive comprehensive courseware covering all topics in the course.

**Software Needed on Each Student PC**

Attendees will not need to install any software on their computer for this class. The class will be conducted in a remote environment that Accelebrate will provide; students will only need a local computer with a web browser and a stable Internet connection. Any recent version of Microsoft Edge, Mozilla Firefox, or Google Chrome will be fine.

**Objectives**

* Learn sufficient Python programming skills to write programs that manage and configure network devices
* Write robust code for multi-tasking and multi-threaded operations
* Install and use Paramiko, Netmiko, and NAPALM capabilities for managing and configuring network devices
* Acquire network device information
* Automate changes to network device configurations

**Outline**

* Introduction to Python Data Types and Operations [depth as needed]
  + Python program layout
  + Executing a Python program
  + Scalar variables and operations
  + Tuple and list array variables and operations
  + Dictionary variables and operations
  + Function creation and calling
* Multi-tasking and Multi-threading TCP/IP Client/Server Python Programs
  + Python multi-tasking server
  + Avoiding zombie processes from a multi-tasking server
  + Python network client
  + Python multi-threading server
  + Avoiding zombie threads from a multi-threading server
  + Creating a daemon (server) process in Python
  + Implement a daemon-based multi-tasking or multi-threading server
* Required Setup for Accessing Network Devices
  + Resource requirements for an accessible network device
  + Overview of EVE-NG setup for network device emulation
* Obtaining Network Information and Configuring Network Devices (Paramiko)
  + Overview of ParamikoSSH capabilities
  + Obtaining and installing the Paramiko SSH library
  + Initial connection to a network device via the SSH connect method
  + Sending and receiving network device information via Paramiko SSH methods
* Obtaining Network Information and Configuring Network Devices (Netmiko)
  + Overview of the Netmiko library capabilities (wrapper around Paramiko SSH)
  + Obtaining and installing the Netmiko library
  + Successfully establishing a connection to network device
  + Basic informational extraction commands
  + Execution of configuration commands with possible commit actions
  + Platform auto-detection from SSH
* Obtaining Network Information and Configuring Network Devices
  + Overview of NAPALM (Network Automation and Programmability Abstraction Layer)
  + Obtaining and installing the NAPALM library on Linux
  + NAPALM common API interface to establish a connection to a network device
  + Basic retrieval of state data from a network device
  + Loading, replacing, merging, and committing configuration changes
  + Rolling back committed changes
  + Ansible modules to drive NAPALM actions
* Conclusion