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# Intermediate Python for Network Engineers (IPYNE)

***WHERE GREAT TRAINING  
HAPPENS EVERYDAY!***



## Intermediate Python for Network Engineers (IPYNE)

### Course Duration

5 Days

### Course Price

\$4,395.00

44 CLCs

### Methods of Delivery

In-Person ILT

Virtual ILT

Onsite ILT

### About this Class

The Intermediate Python for Network Engineers (IPYNE) training is tailored for network professionals seeking to expand their skills in network programmability and automation using Python. Ideal for those looking to deepen their knowledge, this training emphasizes practical applications that enhance network efficiency and reduce repetitive tasks through automation. Participants will gain hands-on experience with real-world use cases, such as automating device configurations, managing network inventories, and integrating with Cisco products such as IOS XE, Meraki, and ThousandEyes using REST APIs. The training introduces intermediate programming concepts such as creating modular and reusable code with object-oriented programming, building simple web interfaces with Flask, and leveraging large language models for intelligent automation workflows. Upon completion, you will be able to design and implement Python-based automation solutions that interact with network infrastructure and streamline operational tasks. This training also earns you 29 Continuing Education (CE) credits toward recertification.

## Intermediate Python for Network Engineers (IPYNE)

### How you will benefit

This class will help you:

- Gain hands-on experience using Python to automate, configure, and monitor network devices, increasing efficiency and reducing manual errors
- Develop practical skills in leveraging modern tools and libraries—such as Netmiko, PyATS, and REST APIs—for scalable and reliable network automation
- Learn to build and deploy reusable automation solutions, including scripts, web interfaces, and API wrappers, to streamline network operations
- Acquire foundational knowledge in integrating advanced technologies like CI/CD, telemetry, and large language models (LLMs) to enhance and future-proof network management
- Earn 29 CE credits toward recertification

### Why Attend with Current Technologies CLC

- Our Instructors are the top 10% rated by Cisco
- Our Lab has a dedicated 1 Gig Fiber Connection for our Labs
- Our Labs run up to Date Code for all our courses

### Who Should Attend

- Network Engineers with little or no programming or Python experience
- Network Administrators
- Network Managers
- Systems Engineers

### Prerequisites

The knowledge and skills you are expected to have before attending this course are:

- Familiarity and basic understanding of core networking concepts
- Familiarity with Cisco IOS-XE software or other Cisco network device configuration and operation skills
- Cisco CCNA certification or equivalent knowledge

## Intermediate Python for Network Engineers (IPYNE)

### Objectives

- Describe Python's versatility and suitability for network programmability and automation
- Explain why network programmability is needed and how it enables modern network automation
- Describe programmatic interaction with network devices and the benefits of network automation for scaling from traditional to programmable networks
- Identify practical examples and existing Python tools for network automation
- Write and run basic Python scripts, demonstrating foundational syntax, elements (variables, data types, operators), and logic (decisions and loops)
- Introduce standard and third-party libraries, the import statement, and using the Python interpreter
- Demonstrate hands-on interaction with Python, including accepting input and performing basic network tasks (e.g., connectivity checks)
- Emphasize code styles, readability, and development environment setup, including Python installation, VS Code, virtual environments, Docker, and Git
- Implement Python tools for automating device inventory, including data storage with variables, grouping devices with lists and dictionaries, iterating and filtering device data, and file operations (load/save)
- Organize code with functions and develop scripts for inventory management
- Use external libraries (e.g., Netmiko) for SSH connections and scaling network configurations with Python and templates
- Parse and analyze device output, handle exceptions, and build CLI applications for device management

## Intermediate Python for Network Engineers (IPYNE)

### Cont. Objectives

- Implement tools for testing and validating device state using PyATS and Genie, including retrieving and verifying configuration data
- Demonstrate Python context managers, parsing outputs, performing compliance validation, and running scripts on Cisco IOS-XE devices (Guest Shell)
- Create tools for backing up device configs, automating backup storage with Git, comparing configs, and periodic backups with logging
- Use PyATS for configuration comparison and automate backup processes
- Describe HTTP REST API fundamentals, interactive documentation, and creating API requests in Python
- Parse JSON data, automate interactions with APIs (e.g., Cisco Meraki Dashboard, ThousandEyes), and manage authentication securely
- Demonstrate creating, configuring, and analyzing network tests and monitoring data with API scripts
- Explain the importance of debugging, logging, unit testing, and integrating scripts with CI/CD pipelines
- Handle API errors, implement rate limiting/retries, and introduce telemetry collection with OpenTelemetry

## Intermediate Python for Network Engineers (IPYNE)

### Course Outline

Module 1: Python Programming for Network Engineers

Module 2: Write Your First Python Scripts

Module 3: Python Development Environment Setup

Module 4: Device Inventory Automation

Module 5: Scale Configuration of Network Devices

Module 6: Network Monitoring and Validation

Module 7: Device Configuration Backup Automation

Module 8: HTTP API Fundamentals

Module 9: Cisco ThousandEyes Network Insights with HTTP API Automation

Module 10: Network Automation Debugging and Testing

Module 11: HTTP API Automation Wrapper

Module 12: Build a Web Interface for Network Automation

Module 13: Large Language Models for Network Automation

## Intermediate Python for Network Engineers (IPYNE)

### Lab Outline

- Lab 1: Interact with Python Using the Interpreter
- Lab 2: Run Your First Script
- Lab 3: Install Python and Setup Developer Environment
- Lab 4: Create a Device Inventory Tool
- Lab 5: Create a Network Device Configuration Tool
- Lab 6: Monitor and Validate Device Configurations
- Lab 7: Create a Backup Tool for Network Configurations
- Lab 8: Retrieve Data from Cisco Meraki Dashboard API
- Lab 9: Create and Monitor ThousandEyes Network Tests
- Lab 10: Write Unit Tests for Network Automation Scripts
- Lab 11: Harden Automation Scripts with Logging and Error Handling
- Lab 12: Build a Reusable Cisco ThousandEyes API Automation Wrapper
- Lab 13: Build a Web Interface for Network Device Management
- Lab 14: Build a Web Interface for Network Automation
- Lab 15: Build a Network Automation Tool with Ollama