

Introducing Automation for Cisco Solutions (CSAU)

Course Summary

Description

The Introducing Automation for Cisco Solutions (CSAU) v1.1 course gives you a broad overview of network automation skills. Through a combination of lectures and hands-on labs, you will learn the fundamentals of automation such as working on model-driven programmability solutions with Representational State Transfer Configuration Protocol (RESTCONF) and Network Configuration Protocol (NETCONF) protocols. The course also covers data formats and types, including Extensible Markup Language (XML), JavaScript Object Notation (JSON), Yaml Ain't Markup Language (YAML), and Yet Another Next Generation (YANG), and their value in network automation, along with DevOps tools such as Ansible and Git.

Objectives

At the end of this course, students will be able to:

- Articulate the role network automation and programmability play in the context of end-to-end network management and operations
- Define and differentiate between waterfall and agile software development methodologies
- Interpret and troubleshoot Python scripts with fundamental programming constructs built for network automation use cases
- Describe how DevOps principles, tools, and pipelines can be applied to network operations
- Understand the role of network automation development environments and associated technologies such as Python virtual environments, Vagrant, and Docker
- Understand and construct HTTP-based API calls to network devices
- Articulate the differences among and common use cases for XML, JSON, YAML, and protobuf
- Construct and interpret Python scripts using the Python requests module to automate devices that have HTTP-based APIs
- Understand the role YANG plays in network automation
- Understand that a number of tools exist to simplify working with YANG models
- Describe the functionality of RESTCONF and NETCONF and the differences between them
- Construct Ansible playbooks to configure network devices and retrieve operational state data from them
- Build Jinja2 templates

Topics

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| • Examining Network Management and Operations | • Using Python Requests to Automate HTTP-Based APIs |
| • Exploring Software Development Methodologies | • Exploring YANG |
| • Using Python for Network Automation | • Using YANG Tools |
| • Describing NetDevOps: DevOps for Networking | • Automating Model-Driven APIs with Python |
| • Managing Automation Development Environments | • Introducing Ansible for Network Automation |
| • Introducing HTTP Network APIs | • Templating Configurations with Jinja2 |
| • Reviewing Data Formats and Data Encoding | |

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Course Summary (cont'd)

Audience

This course is designed primarily for customer engineers and systems engineers in the following job roles:

- Automation architect
- Automation engineer
- Consulting systems engineer
- DevOps engineer
- Network administrator
- Network architect
- Network consulting engineer
- Network design engineer
- Network engineer
- Network operator
- Network reliability engineer
- Sales engineer
- Site reliability engineer
- Systems engineer
- Technical solutions architect

This course would also be useful for network manager job roles such as:

- Application developer
- Collaboration developer
- Collaboration solutions architect
- IT director
- Mobile developer
- Network Operations Center (NOC) manager
- Software architect
- Web developer

Prerequisites

Before taking this course, you should have the following knowledge and skills:

- Routing and switching including Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), and basic configuration features such as interfaces, Simple Network Management Protocol (SNMP), and static routes
- Fundamentals of Python data structures and programming constructs such as loops, conditionals, and classes, or the equivalent of 3-6 months of experience writing Python scripts
- Basic Linux commands for navigating the file system and executing scripts
- Knowledge of working with text editors

Duration

Three days

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Course Outline

- Examining Network Management and Operations
- Exploring Software Development Methodologies
- Using Python for Network Automation
- Describing NetDevOps: DevOps for Networking
- Managing Automation Development Environments
- Introducing HTTP Network APIs
- Reviewing Data Formats and Data Encoding
- Using Python Requests to Automate HTTP-Based APIs
- Exploring YANG
- Using YANG Tools
- Automating Model-Driven APIs with Python
- Introducing Ansible for Network Automation
- Templating Configurations with Jinja2

Lab outline

- Use Network Automation Scripts
- Enforce Python Fundamentals on the Interactive Interpreter
- Automate Networks with Netmiko
- Use the Git Version-Control System and Collaborate on an Internal Project
- Build Reproduceable Automation Environments
- Use HTTP-Based APIs with Postman
- Explore YAML and JSON Data
- Consume HTTP-Based APIs with Python Requests
- Explore YANG Tools
- Explore RESTCONF with Python
- Explore NETCONF with Python
- Configure Network Devices with Ansible
- Collect Network Data with Ansible
- Build and Deploy Configurations with Ansible