

# Cisco Certified DevNet Professional

## Introduction

Cisco Certified DevNet Professional certification gives you that breadth and depth. The certification covers core skills and knowledge, plus a concentration area of your choice. And completing any professional-level certification exam earns you a Cisco Specialist certification, so you get recognized for your accomplishments along the way. Whether you're a software developer, a networking professional, or some of both, Cisco Certified DevNet Professional training and certification prepares you for professional-level job roles in designing and writing applications that use Cisco platforms as a base.

## Required exam

### 350-901 DEVCOR: Developing Applications Using Cisco Core Platforms and APIs

The Developing Applications using Cisco Core Platforms and APIs (DEVCOR) v1.0 course helps you prepare for Cisco DevNet Professional certification and for professional-level network automation engineer roles. You will learn how to implement network applications using Cisco® platforms as a base, from initial software design to diverse system integration, as well as testing and deployment automation. The course gives you hands-on experience solving real-world problems using Cisco Application Programming Interfaces (APIs) and modern development tools.

## Duration

5 Days

## Course Objectives

After taking this course, you should be able to:

- Describe the architectural traits and patterns that improve application maintainability
- Describe the architectural traits and patterns that improve application serviceability
- Identify steps to design and build a ChatOps application
- Implement robust Representational State Transfer (REST) API integrations with network error handling, pagination, and error flow control
- Describe the necessary steps for securing user and system data in applications
- Describe the necessary steps for securing applications
- Identify common tasks in the automated application release process
- Describe best practices for application deployment
- Describe methodologies for designing distributed systems
- Describe the concepts of infrastructure configuration management and device automation
- Utilize Yet Another Next Generation (YANG) data models to describe network configurations and telemetry
- Compare various relational and nonrelational database types and how to select the appropriate type based on requirements
- Describe a typical incident response plan and the functions of a typical Computer Security Incident

- Response Team (CSIRT).
- Explain the use of Vocabulary for Event Recording and Incident Sharing (VERIS) to document security incidents in a standard format.

## Prerequisites

There are no formal prerequisites for Cisco Certified DevNet Associate certification, but you should make sure to have a good understanding of the exam topics before taking the exam as well as knowledge in the following areas:

- Knowledge of program design and coding with a focus on Python
- Familiarity with Ethernet, TCP/IP, and Internet-related networking
- Understand the utilization of APIs
- Understanding of software development and design methodologies
- Hands-on experience with a programming language (specifically Python)

## Target Audience

This course is designed for anyone who performs or seeks to perform a developer role and has one or more years of hands-on experience developing and maintaining applications that are built on top of Cisco platforms.

This course covers specialized material about designing, developing, and debugging applications using Cisco APIs and platforms, and managing and deploying applications on Cisco infrastructure. To fully benefit from this course, you should have three to five years of experience designing and implementing applications that are built on top of Cisco platforms.

The course is appropriate for:

- Network engineers expanding their skill-base to include software and automation
- Developers expanding expertise in automation and DevOps
- Solution architects moving to the Cisco ecosystem
- Infrastructure developers designing hardened production environments

The job roles best suited to the material in this course are:

- Senior network automation engineer
- Senior software developer
- Senior system integration programmer

Additional job roles that could find this course useful are:

- Senior infrastructure architect
- Senior network designer
- Senior test development engineer

Students preparing for Cisco Certified DevNet Professional and Cisco Certified DevNet Specialist – Core certification will also find this material useful.

## Course Outline

Section title	Learning mode
Designing for Maintainability	Self-study
Designing for Serviceability	Self-study

Implementing ChatOps Application	Lecture
Describing Advanced REST API Integration	Lecture
Securing Application Data	Self-study
Securing Web and Mobile Applications	Self-study
Automating Application-Release	Lecture
Deploying Applications	Lecture
Understanding Distributed Systems	Lecture
Orchestrating Network and Infrastructure	Lecture
Modeling Data with YANG	Lecture
Using Relational and Non-Relational Databases	Self-study
Lab Code Reference	Self-study

## Lab Outline

- Construct Sequence Diagram
- Construct Web Sequence Diagram
- Use Cisco Webex Teams™ API to Enable ChatOps
- Integrate Cisco Meraki™ API to List Service Set Identifiers (SSIDs) and Retrieve Location Data
- Use Paginated REST API Endpoint
- Utilize REST API Error Control Flow Techniques
- Evaluate Application for Common Open Web Application Security Project (OWASP) Vulnerabilities
- Resolve Merge Conflicts with Git
- Diagnose Continuous Integration and Continuous Delivery (CI/CD) Pipeline Failures
- Containerize Application Using Docker
- Integrate Application into Existing CI/CD Environment
- Diagnose Problems Using Application Logs
- Configure Network Parameters Using Puppet
- Configure Network Parameters Using Ansible
- Synchronize Firepower Device Configuration
- Utilize RESTCONF for Network Configuration
- Query Relational Database
- Query Document Store
- Query Time Series Database
- Query Graph Database

## Concentration Exams (Choose One)

### 1. 300-435 ENAUTO: Automating and Programming Cisco Enterprise Solutions

Implementing Automation for Cisco Enterprise Solutions (ENAU1) v.1.2 teaches you how to implement Cisco Enterprise automated solutions, including programming concepts, orchestration, telemetry, and automation tools.

This course highlights the tools and the benefits of leveraging programmability and automation in the Cisco-powered Enterprise Campus and WAN. You will also examine platforms including IOS XE software for device-centric automation, Cisco DNA Center for the intent-based enterprise network, Cisco Software-Defined

WAN, and Cisco Meraki. Their current ecosystem of APIs, software development toolkits, and relevant workflows are studied in detail together with open industry standards, tools, and APIs, such as Python, Ansible, Git, JSON/YAML, NETCONF/RESTCONF, and YANG.

## Duration

3 Days

## Course Objectives

This course is designed primarily for network and software engineers who are interested in learning about automation and programmability and hold the following job roles:

- Network engineer
- Systems engineer
- Wireless engineer
- Consulting systems engineer
- Technical solutions architect
- Network administrator
- Wireless design engineer
- Network manager
- Sales engineer
- Account manager

## Prerequisites

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

- Basic programming language concepts
- Basic understanding of virtualization
- Ability to use Linux and CLI tools, such as Secure Shell (SSH) and bash
- CCNP level core networking knowledge
- A foundational understanding of Cisco DNA, Meraki, and Cisco SD-WAN

## Target Audience

This course is designed primarily for network and software engineers who are interested in learning about automation and programmability and hold the following job roles:

- Network engineer
- Systems engineer
- Wireless engineer
- Consulting systems engineer
- Technical solutions architect
- Network administrator
- Wireless design engineer
- Network manager
- Sales engineer
- Account manager

## Course Outline

- Network Programmability Foundation
- Automating APIs and Protocols
- Managing Configuration with Python and Ansible
- Implementing On-Box Programmability and Automation with Cisco IOS XE Software
- Implementing Model-Driven Telemetry
- Day 0 Provisioning with Cisco IOS-XE Software
- Implementing Automation in Enterprise Networks
- Building Cisco DNA Center Automation with Python
- Automating Operations using Cisco DNA Center
- Introducing Cisco SD-WAN Programmability
- Building Cisco SD-WAN Automation with Python
- Building Cisco SD-WAN Automation with Ansible
- Automating Cisco Meraki
- Implementing Meraki Integration APIs

## Lab Outline

- Automate Networks with Netmiko
- Use Postman for REST API Consumption
- Use Ansible to Configure and Verify Device Configuration
- Implement On-Box Programmability and Automation with Cisco IOS XE Software
- Use Python on Cisco IOS XE Software
- Implement Streaming Telemetry with Cisco IOS XE
- Explore Cisco DNA Center APIs
- Build Python Scripts to Interact with Cisco DNA Center Intent APIs
- Build Python Scripts with Cisco DNA Center Assurance APIs
- Troubleshoot End-to-End Connectivity and Health-Check the Network via the Cisco DNA Center API
- Perform Administrative Tasks Using the Cisco SD-WAN API
- Build, Manage, and Operate Cisco SD-WAN Programmatically
- Consume SD-WAN APIs Using the Uniform Resource Identifier (URI) Module
- Manage Policies with Ansible
- Build Reports Using Ansible-Cisco SD\_WAN Role
- Implement Cisco Meraki API Automation
- Explore Cisco Meraki Integration APIs
- Explore Cisco Meraki Webhook Alerts

## 2. 300-835 CLAUTO: Automating Cisco Collaboration Solutions

The Implementing Automation for Cisco Collaboration Solutions (CLAUI) v1.0 course teaches you how to implement Cisco® Collaboration automated, programmable solutions for voice, video, collaboration, and conferencing on-premises or in the cloud. Through a combination of lessons and hands-on labs, you will combine tools and processes to tackle communication challenges using key platforms including Cisco Unified Communications Manager, Cisco IP Phone Services, Cisco Unity® Connection, Cisco Finesse®, Cisco Collaboration Endpoints, Cisco Webex Teams™, and Cisco Webex® Meetings. You will also learn how to use Application Programming Interfaces (APIs) interfaces such as Representational State Transfer (REST) and Simple Object Access Protocol (SOAP), parsing data in Extensible Markup Language (XML) and JavaScript Object Notation (JSON) formats, and leverage frameworks such as Python.

## Duration

3 Days

## Course Objectives

After taking this course, you should be able to:

- Examine API and automation capabilities and concepts for Cisco Unified Communication Manager
- Examine API and automation capabilities and concepts for Cisco Unity Connection
- Examine API and automation capabilities and concepts for Cisco Finesse
- Examine Experience API (xAPI) and automation capabilities and concepts for Cisco Collaboration endpoints
- Examine API and automation capabilities and concepts for Cisco Webex Teams
- Examine API and automation capabilities and concepts for Cisco Webex Meetings

## Prerequisites

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

- Basic knowledge of Simple Object Access Protocol (SOAP) and REST APIs
- Basic programming and scripting skills in Python
- Intermediate knowledge in managing and configuring three or more of the following Cisco Collaboration offerings:
  - Cisco Unified Communications Manager
  - Cisco IP Phones
  - Cisco Finesse
  - Cisco Webex Devices (Collaboration and Video Endpoints)
  - Cisco Webex Teams

## Target Audience

This course is designed for network and software engineers interested in Cisco Collaboration and Webex automation and who hold job roles such as:

- Collaboration Sales Engineer
- Collaboration Software Developer
- Collaboration Solutions Architect
- Consulting Systems Engineer
- Network Administrator
- Network Engineer
- Network Manager
- Software Architect
- Software Developer
- Systems Engineer
- Technical Solutions Architect
- Wireless Design Engineer
- Wireless Engineer

## Course Outline

- Automating Cisco Unified Communications Manager
- Automating Cisco Unity Connection
- Automating Cisco Finesse
- Examining Cisco Collaboration Endpoint Automation
- Examining Cisco Cloud Collaboration Automation
- Examining Cisco Conferencing Automation

## Lab Outline

- Configure the Initial Collaboration Lab Environment
- Verify Phone Details
- Configure Phone Line Label
- Configure User Pin
- Configure System Forward No Answer Timer
- Configure Route Plan Report
- Deploy Basic SQL Query
- Deploy Advanced SQL Query
- Configure an Alternate Extension in Cisco Unity Connection
- Configure Voicemail Pin
- Verify Cisco Finesse Agent Settings and Observe XMPP Messages
- Deploy Cisco Finesse Gadget
- Deploy Modify Call Via Video Codec Programmatically
- Configure System Name and Branding
- Deploy and Monitor Video Call
- Configure Custom Control Panel Using the In-Room Control Editor
- Deploy Macro Using the In-Room Control Editor
- Verify Cisco Webex Organization and License Information
- Configure New Cisco Webex Teams Room
- Deploy Cisco Webex Teams Interactive Bot
- Deploy Cisco Webex Teams Widget
- Configure Cisco Webex Meetings User
- Configure and Record Cisco Webex Meeting
- Verify Cisco Meeting Server System Status
- Configure Host Access on Cisco Meeting Server Spaces

## 3. 300-635 DCAUTO: Automating and Programming Cisco Data Center Solutions

The Implementing Automation for Cisco Data Center Solutions (DCAUI) v1.0 course teaches you how to implement Cisco®'s Data Center automated solutions including programming concepts, orchestration, and automation tools. Through a combination of lessons and hands-on practice, you will manage the tools and learn the benefits of programmability and automation in the Cisco-powered Data Center. You will examine Cisco Application Centric Infrastructure (Cisco ACI®), Software-Defined Networking (SDN) for data center and cloud networks, Cisco Nexus® (Cisco NX-OS) platforms for device-centric automation, and Cisco Unified Computing System (Cisco UCS®) for Data Center compute. You will study their current ecosystem of Application Programming Interfaces (APIs), software development toolkits, and relevant workflows along with open industry standards, tools, and APIs, such as Python, Ansible, Git, JavaScript Object Notation (JSON), Yaml Ain't Markup Language (YAML), Network Configuration Protocol (NETCONF), Representational State Transfer Configuration Protocol (RESTCONF), and Yet Another Generation (YANG). This course prepares you for the 300-635 Automating Cisco Data Center Solutions (DCAUTO) certification exam. Introducing Automation for Cisco Solutions (CSAU) is required prior to enrolling in Implementing Automation for Cisco Data Center Solutions (DCAUI) because it provides crucial foundational knowledge essential to success.

## Duration

3 Days

## Course Objectives

After taking this course, you should be able to:

- Leverage the tools and APIs to automate Cisco ACI-powered data centers.
- Demonstrate workflows (configuration, verification, health checking, monitoring) using Python, Ansible, and Postman.
- Leverage the various models and APIs of the Cisco Nexus OS platform to perform day 0 operations, improve troubleshooting methodologies with custom tools, augment the CLI using scripts, and integrate various workflows using Ansible and Python.
- Describe the paradigm shift of Model-Driven Telemetry and understand the building blocks of a working solution.
- Describe the Cisco Data Center compute solutions that can be managed and automated using API-centric tooling, by using the Python SDK, PowerTool, and Ansible modules to implement various workflows on Cisco UCS, Cisco IMC, Cisco UCS Manager, Cisco UCS Director, and Cisco Intersight.

## Prerequisites

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

- Basic programming language concepts
- Basic understanding of virtualization and VMware
- Ability to use Linux and Command Line Interface (CLI) tools, such as Secure Shell (SSH) and bash
- CCNP level data center knowledge
- A foundational understanding of Cisco ACI

## Target Audience

This course is designed for network and software engineers who hold the following job roles:

- Network engineer
- Systems engineer
- Wireless engineer
- Consulting systems engineer
- Technical solutions architect
- Network administrator
- Wireless design engineer
- Network manager
- Site reliability engineer
- Deployment engineer
- Sales engineer
- Account manager

## Course Outline

- Describing the Cisco ACI Policy Model
- Describing the Cisco APIC REST API
- Using Python to Interact with the ACI REST API
- Using Ansible to Automate Cisco ACI
- Describing Cisco ACI Apps Center and Kubernetes Integration
- Introducing Cisco NX-OS Programmability
- Describing Day-Zero Provisioning with Cisco NX-OS
- Implementing On-Box Programmability and Automation with Cisco NX-OS
- Implementing Off-Box Programmability and Automation with Cisco NX-OS
- Understanding Model-Driven Telemetry
- Automating Cisco UCS Using Developer Tools
- Implementing Workflows Using Cisco UCS Director



- Describing Cisco DCNM
- Describing Cisco Intersight

## Lab Outline

- Use Cisco APIC Web GUI
- Discover the Cisco APIC REST API
- Use Postman with the APIC REST API
- Use Python with the Cisco APIC REST API
- Configure and Verify Cisco ACI Using Acitoolkit
- Use Cobra and Arya to Recreate a Tenant
- Manage Configuration Using Ansible
- Set Up a New Tenant the NetDevOps Way
- Create an Infrastructure Health Report
- Install an Application from the App Center on the Cisco APIC
- Power on Auto Provisioning on the Cisco Nexus 9000
- Use Bash and Guest-Shell on Cisco NX-OS
- Use Python to Enhance CLI Commands
- Trigger a Python Script Using Cisco Embedded Event Manager (EEM)
- Docker Containers on NX-OS
- Configure and Verify Using NX-API and Python
- Configure and Verify Using NETCONF/YANG
- Use Ansible with NX-OS
- Streaming Telemetry
- Connect, Query, and Modify Cisco UCS Manager Objects Using Cisco UCS PowerTool
- Discovery 21: Connect, Query, and Modify Cisco UCS Integrated Management Controller (IMC) Objects Using Cisco IMC PowerTool
- Utilize Cisco UCS Python Software Development Kit (SDK)
- Utilize Cisco IMC Python SDK
- Implement Ansible Playbooks to Modify and Verify the Configuration of Cisco UCS Manager

## 4. 300-535 SPAUTO: Automating and Programming Cisco Service Provider Solutions

The Implementing Automation for Cisco Service Provider Solutions (SPAUI) v1.0 course prepares you to implement and support automation solutions in a Service Provider network infrastructure, using network programmability principles, protocols, tools, and mechanisms. Through a combination of lessons and hands-on labs, you will learn to deploy, configure, monitor, and operate Service Provider network environments using modern data models. These models allow you to represent operational data and new network management protocols in order to administer hundreds or thousands of devices in a single operation, replacing traditional, time-consuming, error-prone, device-by-device Command Line Interface (CLI) management. The course also introduces powerful automation solutions that can streamline network operations.

This course covers Yet Another Next Generation (YANG) data models and validation tools, Representational State Transfer Configuration Protocol RESTCONF and Network Configuration Protocol (NETCONF) management protocols, model-driven telemetry with Google Remote Procedure Call (gRPC) and Google Network Management Interface (gNMI), traffic automation with XR Transport Control (XTC), Secure Shell (SSH)-based automation tools like NetMiko and Ansible, orchestration provided by Network Services Orchestration (NSO), Network Function Virtualization (NFV) lifecycle management with Elastic Services Controller (ESC), and network operations automation with WAN Automation Engine (WAE). This course prepares you for the 300-535 Automating and Programming Cisco® Service Provider Solutions (SPAUTO) exam.

## Duration

3 Days

## Course Objectives

After taking this course, you should be able to:

- Use NETCONF and RESTCONF programmability protocols on Cisco devices
- Describe and use tools to validate YANG data models on Cisco devices
- Describe and configure model-driven telemetry on Cisco devices
- Describe and configure network traffic automation with Cisco XTC
- Describe and use network automation tools that utilize SSH
- Automate service provider network configuration with Cisco NSO
- Describe how to automate virtualized resources with Cisco ESC
- Describe how to automate service provider WAN with Cisco WAE

## Prerequisites

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

- CCNP equivalent level of knowledge for Routing and Switching (R and S)
- Cisco Internetworking Operating System (IOS XE) and Cisco IOS XR working experience
- SP Operations experience with routing, Multi-Protocol Label Switching (MPLS), and Virtual Private Network (VPN) Solutions
- Network Programmability Basics (Network Programming Foundations, APIs and Protocols, Network Model-Driven APIs and Protocols, Configuration Management with Ansible, Service Provider Network Automation workflows)

## Target Audience

This course is designed for Service Provider networking professionals in job roles such as:

- Network administrators
- Network architects
- Network designers
- Network engineers
- Network managers
- Network Operations Center (NOC) personnel
- Network supervisors

## Course Outline

- **Implementing Network Device Programmability Interfaces with NETCONF and RESTCONF**
  - Implement NETCONF Protocol
  - Implement RESTCONF Protocol
- **Implementing Model-Driven Programmability with YANG**
  - YANG Data Models
  - YANG Tools
  - YANG Development Kit
- **Implementing Model-Driven Telemetry**
  - Implementing Model-Driven Telemetry with gRPC
  - Implementing Model-Driven Telemetry with gNMI

- **Automating Service Provider Network Traffic with Cisco XTC**
  - Cisco XTC Fundamentals
  - Configure Cisco XTC
- **Automating Networks with Tools That Utilize SSH**
  - Implement Device Configurations with Python Netmiko Library
  - Implement Device Configurations with Ansible Playbooks
- **Orchestrating Network Services with Cisco NSO**
  - Cisco NSO Fundamentals
  - Cisco NSO Device Manager
  - Cisco NSO Services
  - Implement Device Configurations with Python
- **Automating Virtualized Resources with Cisco Elastic Services Controller**
  - Cisco ESC Architecture
  - Cisco ESC Resource Management
- **Automating the WAN with Cisco WAE**
  - Describe the Cisco WAE Components

## Lab Outline

- Explore NETCONF Protocol in Cisco Devices
- Configure Cisco IOS XE Devices with RESTCONF
- Explore Cisco and OpenConfig YANG Data Models with YANG Tools
- Use client and Python to Configure Cisco Devices
- Use YANG Development Kit (YDK) to Configure Cisco Devices
- Configure Model-Driven Telemetry with gRPC
- Configure Model-Driven Telemetry with gNMI
- Configure Path Disjointness with Cisco XTC
- Use Python Netmiko Library to Configure Cisco Devices
- Use Ansible to Configure Cisco Devices
- Use Cisco NSO Device Manager
- Create a Loopback Service Template
- Use Cisco NSO REST API with Postman
- Explore and Use Cisco WAE Features

## 5. 300-735 SAUTO: Automating and Programming Cisco Security Solutions

The Implementing Automation for Cisco Security Solutions (SAUI) v1.0 course teaches you how to design advanced automated security solutions for your network. Through a combination of lessons and hands-on labs, you will master the use of modern programming concepts, RESTful Application Program Interfaces (APIs), data models, protocols, firewalls, web, Domain Name System (DNS), cloud, email security, and Cisco® Identity Services Engine (ISE) to strengthen cybersecurity for your web services, network, and devices. You will learn to work within the following platforms: Cisco Firepower® Management Center, Cisco Firepower Threat Defense, Cisco ISE, Cisco pxGrid, Cisco Stealthwatch® Enterprise, Cisco Stealthwatch Cloud, Cisco Umbrella®, Cisco Advanced Malware Protection (AMP), Cisco Threat Grid, and Cisco Security Management Appliances. This course will teach you when to use the API for each Cisco security solution to drive network efficiency and reduce complexity.

## Duration

3 Days

## Course Objectives

- Describe the overall architecture of the Cisco security solutions and how APIs help enable security
- Know how to use Cisco Firepower APIs
- Explain how pxGrid APIs function and their benefits
- Demonstrate what capabilities the Cisco Stealthwatch APIs offer and construct API requests to them for configuration changes and auditing purposes
- Describe the features and benefits of using Cisco Stealthwatch Cloud APIs
- Learn how to use the Cisco Umbrella Investigate API
- Explain the functionality provided by Cisco AMP and its APIs
- Describe how to use Cisco Threat Grid APIs to analyze, search, and dispose of threats

## Prerequisites

Before taking this course, you should have:

- Basic programming language concepts
- Basic understanding of virtualization
- Ability to use Linux and Command Line Interface (CLI) tools, such as Secure Shell (SSH) and bash
- CCNP level core networking knowledge
- CCNP level security networking knowledge

## Target Audience

This course is designed primarily for professionals in job roles such as:

- Network engineer
- Systems engineer
- Wireless engineer
- Consulting systems engineer
- Technical solutions architect
- Network administrator
- Wireless design engineer
- Network manager
- Sales engineer
- Account manager

## Course Outline

- Introducing Cisco Security APIs
- Consuming Cisco Advanced Malware Protection APIs
- Using Cisco ISE
- Using Cisco pxGrid APIs
- Using Cisco Threat Grid APIs
- Investigating Cisco Umbrella Security Data Programmatically
- Exploring Cisco Umbrella Reporting and Enforcement APIs
- Automating Security with Cisco Firepower APIs
- Operationalizing Cisco Stealthwatch and the API Capabilities
- Using Cisco Stealthwatch Cloud APIs
- Describing Cisco Security Management Appliance APIs

## Lab Outline

- Query Cisco AMP Endpoint APIs for Verifying Compliance
- Use the REST API and Cisco pxGrid with Cisco Identity Services Engine
- Construct a Python Script Using the Cisco Threat Grid API
- Generate Reports Using the Cisco Umbrella Reporting API
- Explore the Cisco Firepower Management Center API
- Use Ansible to Automate Cisco Firepower Threat Defense Configuration
- Automate Firewall Policies Using the Cisco Firepower Device Manager API
- Automate Alarm Policies and Create Reports Using the Cisco Stealthwatch APIs
- Construct Reports Using Cisco Security Management Appliance (SMA) APIs

## 6. 300-910 DEVOPS: Implementing DevOps Solutions and Practices using Cisco Platforms

The Implementing DevOps Solutions and Practices using Cisco Platforms (DEVOPS) v1.0 course teaches you how to automate application deployment, enable automated configuration, enhance management, and improve the scalability of cloud microservices and infrastructure processes on Cisco® platforms. You will also learn how to integrate Docker and Kubernetes to create advanced capabilities and flexibility in application deployment. This course prepares you for the 300-910 Implementing DevOps Solutions and Practices using Cisco Platforms (DEVOPS) certification exam.

## Duration

5 Days

## Course Objectives

After taking this course, you should be able to:

- Describe the DevOps philosophy and practices, and how they apply to real-life challenges
- Explain container-based architectures and available tooling provided by Docker
- Describe application packaging into containers and start building secure container images
- Utilize container networking and deploy a three-tier network application
- Explain the concepts of Configuration Item (CI) pipelines and what tooling is available
- Implement a basic pipeline with Gitlab CI that builds and deploys applications
- Implement automated build testing and validation
- Describe DevOps principles applied to infrastructure
- Implement on-demand test environments and explain how to integrate them with an existing pipeline
- Implement tooling for metric and log collection, analysis, and alerting
- Describe the benefits of application health monitoring, telemetry, and chaos engineering in the context of improving the stability and reliability of the ecosystem
- Describe how to implement secure DevOps workflows by safely handling sensitive data and validating applications
- Explain the design and operational concepts related to using a mix of public and private cloud deployments
- Describe modern application design and microservices architectures
- Describe the building blocks of Kubernetes and how to use its APIs to deploy an application
- Explain advanced Kubernetes deployment patterns and implement an automated pipeline
- Explain how monitoring, logging, and visibility concepts apply to Kubernetes

## Prerequisites

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

- Basic programming language concepts and familiarity with Python
- Basic understanding of compute virtualization
- Ability to use Linux, text-driven interfaces, and CLI tools, such as Secure Shell (SSH), bash, grep, ip, vim/nano, curl, ping, traceroute, and telnet
- A foundational understanding of Linux-based OS architecture and system utilities
- CCNA® level core networking knowledge
- A foundational understanding of DevOps concepts
- Awareness and familiarity with continuous integration, continuous deployment, and continuous delivery (CI/CD) concepts
- Hands-on experience with Git

## Target Audience

This course is designed for network and software engineers interested in automation and programmability and who hold job roles such as:

- Account manager
- Consulting systems engineer
- Network administrator
- Network engineer
- Network manager
- Sales engineer
- Systems engineer
- Technical solutions architect
- Wireless design engineer
- Wireless engineer

## Course Outline

- Introducing the DevOps Model
- Introducing Containers
- Packaging an Application Using Docker
- Deploying a Multitier Application
- Introducing CI/CD
- Building the DevOps Flow
- Validating the Application Build Process
- Building an Improved Deployment Flow
- Extending DevOps Practices to the Entire Infrastructure
- Implementing On-Demand Test Environments at the Infrastructure Level
- Monitoring in NetDevOps
- Engineering for Visibility and Stability
- Securing DevOps Workflows
- Exploring Multicloud Strategies
- Examining Application and Deployment Architectures
- Describing Kubernetes
- Integrating Multiple Data Center Deployments with Kubernetes
- Monitoring and Logging in Kubernetes

## Lab Outline

- Interact with GitLab Continuous Integration (CI)
- Explore Docker Command-Line Tools
- Package and Run a WebApp Container
- Build and Deploy Multiple Containers to Create a Three-Tier Application
- Explore Docker Networking
- Build and Deploy an Application Using Docker Compose
- Implement a Pipeline in Gitlab CI
- Automate the Deployment of an Application
- Validate the Application Build Process
- Validate the Deployment and Fix the Infrastructure
- Build a Yaml Ain't Markup Language (YAML) Infrastructure as Code (IaC) Specification for the Test Environment
- Manage On-Demand Test Environments with Terraform
- Build Ansible Playbooks to Manage Infrastructure
- Integrate the Testing Environment in the CI/CD Pipeline
- Implement Pre-deployment Health Checks
- Set Up Logging for the Application Servers and Visualize with Kibana
- Create System Dashboard Focused on Metrics
- Use Alerts Through Kibana
- Instrument Application Monitoring
- Use Alerts and Thresholds to Notify Webhook Listener and Cisco Webex® Teams™ Rooms
- Secure Infrastructure in the CI/CD Pipeline
- Explore Kubernetes Setup and Deploy an Application
- Explore and Modify a Kubernetes CI/CD Pipeline
- Kubernetes Monitoring and Metrics—Elasticsearch, Logstash, and Kibana (ELK)

## 7. 300-915 DEVIOT: Developing Solutions using Cisco IoT and Edge Platforms

The Developing Solutions Using Cisco IoT and Edge Platforms (DEVIOT) v1.0 course prepares you to develop Internet of Things (IoT) applications for Cisco® IoT edge compute and network architecture. Through a combination of lessons and hands-on experience, you will learn to implement and deploy Cisco IOx applications using Cisco Field Network Director and Cisco Kinetic. This course covers designing, deploying, and troubleshooting edge applications, and understanding the use of management tools, so you can control your industrial network and connected devices at scale. This course will prepare you for the 300-915 Developing Solutions Using Cisco IoT and Edge Platforms (DEVIOT) exam.

### Duration

5 Days

### Course Objectives

After taking this course, you should be able to:

- Explain the fundamentals of Cisco IoT and list common devices involved
- List the common protocols, standards, and data flows of IoT
- Explain the Cisco IoT, common needs, and the corresponding solutions
- Explain how programmability can be used to automate and make operations, deployment, and support of Cisco IoT more effective
- Describe common Cisco IoT applications and how they apply to Cisco IoT use cases
- Explain the functions and use cases for Cisco security applications and Cisco IoT

## Prerequisites

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

- General software development or coding skills
- Basic functional and object-oriented programming skills
- Basic understanding of where applications live and how they are deployed in real-world scenarios
- Basic understanding of how networking works
- Basic Linux OS skills: installing code language dependencies, installing code libraries, and general scripting
- Understanding of how to store code using git or another Version-Control System (VCS)

## Target Audience

This course is designed primarily for network and software engineers who are interested in learning about automation and programmability and hold the following job roles:

- Consulting systems engineer
- IoT Designer
- Network administrator
- Network engineer
- Network manager
- Sales engineer
- Systems engineer
- Technical solutions architect

## Course Outline

- Defining Cisco IoT
- IoT Networking and Other Devices
- Examining IoT Protocols
- Examining IoT Standards
- Recognizing Cisco IoT Needs and Solutions
- Using Programmability with Cisco IoT
- Describing Cisco IoT Applications: Cisco IOx
- Describing Cisco IoT Applications: Cisco Kinetic and Cisco Field Network Director
- Defining Cisco Security Applications

## Lab Outline

- Use an MQTT Consumer to Subscribe to Sensor Data
- Use Cisco IOx Applications to Receive and Process Sensor Data
- Troubleshoot a Sensor Connection
- Use and Interpret Freeboard Data
- Use and Interpret Grafana Data
- Use and Interpret Kibana Data
- Cisco IOx Familiarity Lab
- Develop and Deploy a Cisco IOx Application
- Troubleshoot Cisco IOx
- Navigate Cisco Field Network Director
- Explore Cisco Field Network Director API



## 8. 300-920 DEVWBX: Developing Applications for Cisco Webex and Webex Devices

The Developing Applications for Cisco Webex and Webex Devices (DEVWBX) v1.1 course prepares you to use the programmability features of Webex, the Cisco enterprise solution for video conferencing, online meetings, online training, webinars, web conferencing, cloud calling, and collaboration. Through a combination of lessons and hands-on labs, you will learn about Webex Application Programming Interface (API) Foundation, meetings, devices, teams, messaging, embedding Cisco Webex, administration, and compliance. You will learn how to leverage Webex APIs to extend the functionalities of teams, meetings, and devices, and explore how these APIs can help automate, administer, and enforce compliance.

### Duration

5 Days

### Course Objectives

After taking this course, you should be able to:

- Describe and use Webex APIs, authentication, and documentation
- Manage meetings using the Webex Meetings Representational State Transfer (REST) API and Extensible Markup Language (XML) API
- Manage and extend Cisco Collaboration Devices with Experience API (xAPI), macros, and user interface customizations
- Program with WebEx teams REST API, cards, webhooks, and bots
- Embed Webex collaboration features into web and mobile applications using the Webex teams JavaScript SDK, widgets, and Mobile Software Development Kits (SDKs)
- Manage Webex administration and compliance using JavaScript

### Prerequisites

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

- Basic programming knowledge
- JavaScript, Node.js, JavaScript Object Notation (JSON), REST syntax and uses, and Visual Studio Code Integrated Development Environment (IDE) familiarity
- Knowledge of Webex products usage and administration: teams, meetings, and devices

### Target Audience

This course is designed for professionals in job roles such as:

- Communication engineers
- Project managers
- Network engineers
- Software engineers
- System architects

## Course Outline

- **Introducing Webex APIs Foundations**
  - Webex as an Extensible Platform
- **Building Cisco Webex Teams Applications**
  - Introduction to Webex Messaging
- **Developing with Webex Meetings XML API**
  - Describe the capabilities of Cisco Webex meeting APIs
- **Automating and Extending Cisco Collaboration Devices with xAPI**
  - Overview, Capabilities and Transport Methods for Cisco Endpoint Device Programmability
- **Embedding Cisco Webex**
  - Benefits of Embedding Cisco Webex into Other Applications
- **Managing Administration and Compliance with Cisco Webex APIs**
  - Administer a Cisco Webex Organization

## Lab Outline

- Experience the Webex APIs Documentation and Use the Webex Teams API
- Configure Authentication and Invoke the Webex Teams API
- Create and Retrieve Messages with JavaScript
- Create a Webex Card
- Building a Webex Bot Using Botkit
- Configure a Webex Integration
- Manage Users, Schedule and Edit a Meeting, and Download a Recording
- Using xAPI for Cisco Collaboration Endpoint Devices
- Add Cisco Webex Teams Widget to a Web Page
- Call, Share Screen, and Send Messages with the Browser SDK
- Create a User and View License Usage
- Retrieve Created Messages to Take a Compliance Action