DevNet Associate (DEVASC) 1.0 Scope and Sequence

Introduction

The networking industry is undergoing a transformation to using a software-oriented approach with APIs and automation. This change is driven by the ever-increasing complexity and size of networks due to new connections such as the IoT, as well as a need to deliver more agile networking services. This change requires a new software-oriented skillset that complements existing networking skills. The DevNet Associate course teaches students the best practices of modern software development practices and DevOps, to understand and learn how to securely use APIs, and how to automate network operations using those APIs.

Target Audience

The Cisco Networking Academy® DevNet Associate (DEVASC) course is designed for college and university students, vocational training center students, and participants of coding bootcamps who want to understand and manipulate networks using software. The DEVASC certificate is the associate-level certification in the software-focused Cisco DevNet track. The DEVASC certification validates foundational knowledge and skills in areas like Software Development and Design, Understanding and Using APIs, Cisco Platforms and Development, Application Deployment and Security, Infrastructure and Automation, and Network Fundamentals. These software-focused areas complement networking skills from CCNA and CyberOps Associate. Together, they create a bridge between the worlds of Software Developers, Networking Engineers and, Cybersecurity Professionals.

Prerequisites

Learners are expected to have the following skills:

- Basic coding skills in any object-oriented programming language (loops, if/else, objects, etc.)

- Basic understanding of computer networks (CCNA ITN level)

- Basic PC operating system navigation skills

- Basic internet usage skills

- Familiarity with Cisco Packet Tracer

Target Certifications

This course aligns with the Cisco Certified DevNet Associate (DEVASC) certification. Candidates need to pass the 200-901 DEVASC exam to achieve the Cisco Certified DevNet Associate certification.

Course Description

In the DEVASC course curriculum, Cisco Networking Academy™ participants develop workforce readiness skills and build a foundation for success in automation-related careers and degree programs. With the support of video and rich media, participants learn, apply, and practice programming and infrastructure automation knowledge and skills through a series of in-depth hands-on experiences that reinforce their learning. Upon completion of the DEVASC course, learners will be prepared to take the Cisco DEVASC certification exam.

DEVASC includes the following features:

- The course is comprised of eight modules. Each module is comprised of topics.

- Modules emphasize critical thinking, problem solving, collaboration, and the practical application of skills.
- Each module contains some way to practice and assess understanding, such as a lab or a Packet Tracer activity. These module-level activities provide feedback and are designed to indicate learner's mastery of the skills needed for the course. Learners can ensure their level of understanding well before taking a graded quiz or exam.
- Students learn the basics of software development, APIs, fundamentals of networking, application deployment, infrastructure and automation, as well as Cisco platforms.
- The language used to describe these concepts is designed to be easily understood by learners at the college level.
- Assessments and practice activities are focused on specific competencies to increase retention and provide flexibility in the learning path.
- Multimedia learning tools, including videos, and quizzes, address a variety of learning styles and help stimulate learning and promote increased knowledge retention.
- Labs and Cisco® Packet Tracer simulation-based learning activities help students develop critical thinking and complex problem-solving skills.
- Cisco Packet Tracer activities are designed for use with a newer version of Packet Tracer designed specifically for this course, Packet Tracer for Network Automation (PTNA). PTNA is included in the virtual machines created for this course.

Course Objectives

The DEVASC course is designed for people who want to learn the knowledge and skills they need to work in network programming and automation. These course materials will assist you in developing the skills necessary to do the following:

- Use basic Python programming and Linux skills.
- Implement a development environment using DevNet resources.
- Use software development and design best practices.
- Create REST API requests over HTTPS to securely integrate services.
- Explain the processes and devices that support network connectivity.
- Use current technologies to deploy and secure applications and data in a cloud environment.
- Compare software testing and deployment methods in automation and simulation environments.
- Compare Cisco platforms used for collaboration, infrastructure management, and automation.

Lab Equipment Requirements

This course requires no physical equipment other than the student's lab PC. It uses several Virtual Machines (VMs) to create the lab experience.

Baseline Equipment Bundle:

- PCs - minimum system requirements
  - CPU: Intel Pentium 4, 2.53 GHz or equivalent with virtualization support
  - Operating Systems, such as Microsoft Windows, Linux, and Mac OS
  - 64-bit processor
  - RAM: 8 GB
  - Storage: 10 GB of free disk space
  - Display resolution: 1024 x 768
  - Language fonts supporting Unicode encoding (if viewing in languages other than English)
  - Latest video card drivers and operating system updates
- Internet connection for lab and student PCs

Student PC Software:

- Oracle VM VirtualBox Manager (version 6.1 or later)
- DEVASC VM (Downloadable from the Course)

- CSR1000V VM (Instructor download and distribution)
- Packet Tracer Network Automation Edition (pre-installed on the DEVASC VM)

DevNet Associate Outline

Listed below are the current set of modules and their associated competencies outlined for this course. Each module is an integrated unit of learning that consists of content, activities and assessments that target a specific set of competencies. The size of the module will depend on the depth of knowledge and skill needed to master the competency. Some modules are considered foundational, in that the artifacts presented, while not assessed, enable learning of concepts that are covered on the DEVASC certification exam.

DevNet Associate

Module Title/ Topic Title	Objective
Module 1. Course Introduction	Use basic Python programming and Linux skills.
1.1 Your Lab Environment	Install a virtual lab environment.
1.2 Linux	Manage the Linux file system and permissions.
1.3 Python	Use basic Python programming.
Module 2. The DevNet Developer Environment	Implement a development environment using DevNet resources.
2.1 DevNet Overview	Explain how DevNet encourages communities of network programmers.
2.2 Exploring DevNet Online Resources	Investigate DevNet online resources.
Module 3. Software Development and Design	Use software development and design best practices.
3.1 Software Development	Compare software development methodologies.
3.2 Software Design Patterns	Describe the benefits of various software design patterns.
3.3 Version Control	Implement software version control using GIT.
3.4 Coding Basics	Explain coding best practices.
3.5 Code Review and Testing	Use Python Unit Test to evaluate code.
3.6 Understanding Data Formats	Use Python to parse different messaging and data formats.
Module 4. Understanding and Using APIs	Create REST API requests over HTTPS to securely integrate services.
4.1 Introducing APIs	Explain the use of APIs.
4.2 API Design Styles	Compare synchronous and asynchronous API design styles.
4.3 API Architecture Styles	Describe common API architecture styles.
4.4 Introduction to REST APIs	Explain the functions of REST APIs.
4.5 Authenticating to a REST API	Create REST API requests over HTTPS to securely integrate services.

Module Title/ Topic Title	Objective
4.6 API Rate Limits	Explain the purpose of API rate limits.
4.7 Working with Webhooks	Explain the use of webhooks.
4.8 Troubleshooting API Calls	Explain how to troubleshoot REST APIs.
Module 5. Network Fundamentals	Apply the processes and devices that support network connectivity.
5.1 Introduction to Network Fundamentals	Explain basic network terms and processes.
5.2 Network Interface Layer	Explain the features and functions of the OSI network layer.
5.3 Internetwork Layer	Explain the features and functions of the OSI internetwork layer.
5.4 Network Devices	Explain the features and functions of common network devices.
5.5 Networking Protocols	Explain common networking protocols.
5.6 Troubleshooting Application Connectivity Issues	Troubleshoot basic network connectivity.
Module 6. Application Deployment and Security	Use current technologies to deploy and secure applications and data in a cloud environment.
6.1 Understanding Deployment Choices with Different Models	Explain common cloud deployment models.
6.2 Creating and Deploying a Sample Application	Use container technology to deploy a simple application.
6.3 Continuous Integration/Continuous Deployment (CI/CD)	Explain the use of Continuous Integration/Continuous Deployment (CI/CD) in application deployment.
6.4 Networks for Application Development and Security	Explain the network technology required for application development in a cloud environment.
6.5 Securing Applications	Use common application security techniques to secure data.
Module 7. Infrastructure and Automation	Compare software testing and deployment methods in automation and simulation environments.
7.1 Automating Infrastructure with Cisco	Describe deployment environments that benefit from automation.
7.2 DevOps and SRE	Explain the principles of DevOps.
7.3 Basic Automation Scripting	Describe the use of scripting in automation.
7.4 Automation Tools	Explain automation tools that speed the development and deployment of code.
7.5 Infrastructure as Code	Explain the benefits of storing infrastructure as code.
7.6 Automating Testing	Explain how automation tools are used in the testing of application deployments.
7.7 Network Simulation	Describe the use of the Cisco VIRL network simulation test environment.

Module Title/ Topic Title	Objective
Module 8. Cisco Platforms and Development	Compare Cisco platforms used for collaboration, infrastructure management, and automation.
8.1 Introduction to Cisco Platforms	Describe the Cisco API platform.
8.2 Cisco SDKs	Explain how Cisco SDKs assist in the development of applications.
8.3 Understanding Network Programmability and Device Models	Compare network programmability models.
8.4 Cisco Network Management	Compare Cisco network management platforms.
8.5 Cisco Compute Management	Describe Cisco compute management solutions.
8.6 Cisco Collaboration Platforms	Describe Cisco collaboration platforms.
8.7 Cisco Security Platforms	Describe Cisco security platforms.