Implementing NetDevOps (NDO-302)

COURSE OVERVIEW

Imagine managing a network with tens of thousands of devices. The mere thought of centralizing this data might seem overwhelming. You know that if you did have a single source of truth and a testing network that was identical to your production network, then these things become possible:

- Test changes on a network that is configured identically to your production network.
- Test rollbacks on a network that is configured identically to your production network.
- Rollback changes in seconds.
- Know the configuration of all your systems in REAL TIME.
- Convert, upgrade, or change configuration in seconds.
- Testing is conducted thoroughly and with complete peace of mind using Cisco Modeling Labs, not on your production network.
- Yet, the cost of not doing so is far greater than you might expect.

Managing a large network, with its hundreds or even tens of thousands of devices, is daunting. The prospect of loading all that data into a single source of truth may seem too great a challenge, and you might be tempted to avoid it. However, the benefits of managing your network with a single source of truth and a testing lab that is identical to the appropriate portion of your production network are undeniable. This course will teach you how you can accomplish it.

WHO WILL BENEFIT FROM THIS COURSE?

- Students interested in the "Dev" portion of NetDevOps
- Core Team
- Network Engineers
- Network Administrators
- NetDevOps Ansible Developers
- NetDevOps Python Developers
- Administrators interested in Automation
- Individuals interested in expanding traditional DevOps to include NetDevOps skills

PREREQUISITES

CCNA or similar experience

COURSE OBJECTIVES

- NetDevOps Framework and Single Source of Truth
- Proficiency in Essential NetDevOps Tools
- Source of Truth Implementation
- Network Automation Techniques

- Network Security and Secrets Management
- Virtual Network Simulation
- CI/CD Integration for Network Management
- Data Verification and Management
- Configuration Management with Templates
- Real-World Network Management Application

COURSE OUTLINE

Fundamentals

- LECTURE: What is NetDevOps?
- LECTURE: What is Source of Truth?
- LECTURE: Cisco NetDevOps Big Picture
- DEMO: Data Collection to Verification
- DEMO: Cisco NetDevOps CI/CD Pipeline
- Lecture + Lab:Setting up Git
- Lecture + Lab: Ansible installation
- Lecture: LECTURE: What is YAML?

Ansible Basics

- Lecture: Introduction to Ansible
- Lecture + Lab: Ansible.cfg files
- Lecture: Ansible Inventories
- Lecture + Lab: Ansible Host Inventory
- Lecture: Ansible Cisco Collections

Netbox

- Lecture + Lab: Introduction to Netbox
- Lecture + Lab: Setting up your Organization
- Lecture + Lab: The Netbox API
- Lecture + Lab: IP Address Management
- Lecture + Lab: Making Connections
- Lecture + Lab: Setting Up WIFI

CML

- LECTURE: Cisco Modeling Labs (CML)
- Lecture + Lab: CML Manual Topography
- Lecture + Lab: CML Dynamic Inventory
- Lecture + Lab: Building CML Lab with Ansible
- Lecture + Lab: Converting Netbox Config to CML Topology
- LECTURE: cml_lab_facts Data Structure

Essential Ansible Tools

- LECTURE: SSH to CML Nodes
- Lecture + Lab: SSH to CML Nodes
- Lecture + Lab: Cisco Ansible Networking Modules
- Lecture + Lab: Ansible Agnostic Modules

- Lecture + Lab: Specific Network Modules- Banner
- Lecture + Lab: Ansible Vault

Jinja2

- Lecture: LECTURE: Introduction to Jinja2
- Lecture + Lab: Writing Basic Jinja2 Templates
- Lecture + Lab: NetBox Cisco Config Templates

Introduction to CI/CD

- Lecture: Introduction to CI/CD with GitLab
- Lecture: Introduction to Git
- Lecture + Lab: Git Branching
- Lecture + Lab: GitLab Webhooks
- Lecture + Lab: Creating gitlab-ci.yml

Access Security

- Lecture: AAA plus NetDevOps Secrets Mangement
- Lecture: Vaultwarden Password Management
- Lecture: TACACS+ Server

Data Collection to Verification

- Lecture + Lab: Prepare GitLab Repository for Cisco Data Collection
- Lecture + Lab: Convert Cisco Network Topology Spreadsheets to Ansible Inventory
- Lecture + Lab: Gathering Cisco Network Device Information with Ansible
- Lecture + Lab: Loading Gathered Cisco Data into Netbox
- Lecture + Lab: Verify Ingested Data in CML

CI/CD Pipeline to Implement Change

- Lecture + Lab: Netbox-Jinja2 Device Config with Ansible
- Lecture + Lab: Rolling Back Network Changes

Validation

- Lecture + Lab: Detecting Manual Interference Outside the Source of Truth
- Lecture: LECTURE: Managing the Hot Fix
- Lecture + Lab: Managing Config Drift

Additional Resources

- Lecture + Lab: Final Project
- Lecture: LECTURE: how to install Netbox

Under Development

- Lecture + Lab: Rollback a Change
- Lecture + Lab: Change CI/CD Pipeline
- Lecture + Lab: Gathering Physical Connection Data

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