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# Programming and Automating Cisco Networks

## A Guide to Network Programmability and Automation in the Data Center, Campus, and WAN

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Ryan Tischer, CCIE No. 11459
Jason Gooley, CCIE No. 38759

# [Programming And Automating Cisco Networks A To Network Programmability And Automation In The Data Center Campus And Wan Networking Technology](#)

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**Programming And Automating Cisco Networks A To Network Programmability And Automation In The Data Center Campus And Wan Networking Technology:**

Programming and Automating Cisco Networks Ryan Tischer,Jason Gooley,2016-09-08 Today the best way to stay in control of your network is to address devices programmatically and automate network interactions In this book Cisco experts Ryan Tischer and Jason Gooley show you how to do just that You ll learn how to use programmability and automation to solve business problems reduce costs promote agility and innovation handle accelerating complexity and add value in any data center campus LAN or WAN        **Network Architect's Handbook** Alim H. Ali,2024-01-31 Follow a step by step roadmap to developing essential competencies in network architecture design relationship management systems and services coupled with certification guidance and expert tips Key Features Grasp the big picture of information technology infrastructure to become a successful network architect Overcome challenges to improve network performance and configuration management Advance your career by improving your skills using real life examples and practical advice from an industry expert Purchase of the print or Kindle book includes a free PDF eBook Book DescriptionBecoming a network architect is challenging it demands hands on engineering skills collaboration with internal teams and C Suite stakeholders as well as adeptly managing external entities like vendors and service providers The author taps into his extensive background in IT and security to help you gain a detailed understanding of the network architect s role and guide you in evolving into an effective network architect within an organization fostering seamless communication with leadership teams and other stakeholders Starting with a clear definition of the network architect s role this book lays out a roadmap and discusses the attributes and mindset for success You ll explore network architect design physical infrastructure routing and switching and network services such as DNS MLAG and service insertion You ll also gain insights into the necessary skills and typical daily challenges faced by network architects And to thoroughly prepare you to advance in your career this handbook covers certifications and associated training for maintaining relevance in an organization along with common interview questions for a network architect s position By the end of this book you ll be armed with essential concepts techniques and newfound skills to pursue a career as a network architect What you will learn Examine the role of a network architect Understand the key design makers in an organization Choose the best strategies to meet stakeholder needs Be well versed with networking concepts Prepare for a network architect position interview Distinguish the different IT architects in an organization Identify relevant certification for network architects Understand the various de facto network fabric architect models used today Who this book is for This book is for network engineers and technicians aspiring to transition into the role of a network architect Whether you are at the beginning of your journey or seeking guidance along the path this book will support you with its deep coverage of key aspects such as design concepts architectural requirements relevant experience certifications and advanced education with a special emphasis on cloud best practices A practical understanding of IT networking is necessary to get the

most out of this book     **Sdn And Nfv: A New Dimension To Virtualization** Brij B Gupta,Amrita Dahiya,Elhadj Benkhelifa,2024-01-08 Software defined network SDN and network function virtualization NFV are two technology trends that have revolutionized network management particularly in highly distributed networks that are used in public private or hybrid cloud services SDN and NFV technologies when combined simplify the deployment of network resources lower capital and operating expenses and offer greater network flexibility The increasing usage of NFV is one of the primary factors that make SDN adoption attractive The integration of these two technologies SDN and NFV offer a complementary service with NFV delivering many of the real services controlled in an SDN While SDN is focused on the control plane NFV optimizes the actual network services that manage the data flows Devices such as routers firewalls and VPN terminators are replaced with virtual devices that run on commodity hardware in NFV physical networking This resembles the as a service typical model of cloud services in many aspects These virtual devices can be accessed on demand by communication network or data center providers This book illustrates the fundamentals and evolution of SDN and NFV and highlights how these two technologies can be integrated to solve traditional networking problems In addition it will focus on the utilization of SDN and NFV to enhance network security which will open ways to integrate them with current technologies such as IoT edge computing and blockchain SDN based network programmability and current network orchestration technologies The basics of SDN and NFV and associated issues challenges technological advancements along with advantages and risks of shifting networking paradigm towards SDN are also discussed Detailed exercises within the book and corresponding solutions are available online as accompanying supplementary material     Network Programmability and Automation Fundamentals Khaled Abuelenain,Jeff Doyle,Anton Karneliuk,Vinit Jain,2021-05-06 Modernize and optimize network management with APIs and automation Legacy network management approaches don t scale adequately and can t be automated well This guide will help meet tomorrow s challenges by adopting network programmability based on Application Programming Interfaces APIs Using these techniques you can improve efficiency reliability and flexibility simplify implementation of high value technologies automate routine administrative and security tasks and deploy services far more rapidly Four expert authors help you transition from a legacy mindset to one based on solving problems with software They explore today s emerging network programmability and automation ecosystem introduce each leading programmable interface and review the protocols tools techniques and technologies that underlie network programmability You ll master key concepts through hands on examples you can run using Linux Python Cisco DevNet sandboxes and other easily accessible tools This guide is for all network architects engineers operations and software professionals who want to integrate programmability into their networks It offers valuable background for Cisco DevNet certification and skills you can use with any platform whether you have software development experience or not Master core concepts and explore the network programmability stack Manage network software and run automation scripts in Linux environments Solve real problems with Python and its Napalm and

Nornir automation frameworks Make the most of the HTTP protocol REST architectural framework and SSH Encode your data with XML JSON or YAML Understand and build data models using YANG that offer a foundation for model based network programming Leverage modern network management protocols from gRPC and gNMI to NETCONF and RESTCONF Meet stringent service provider KPIs in large scale fast changing networks Program Cisco devices running IOS XE IOS XR and NX OS as well as Meraki DNA Center and Webex platforms Program non Cisco platforms such as Cumulus Linux and Arista EOS Go from zero to hero with Ansible network automation Plan your next steps with more advanced tools and technologies **Programming and Automating Cisco Networks** Ryan Tischer. Jason Gooley,2016 *Network Programmability and Automation* Matt Oswalt,Christian Adell,Scott S. Lowe,Jason Edelman,2022-06-23 Network engineers are finding it harder than ever to rely solely on manual processes to get their jobs done New protocols technologies delivery models and the need for businesses to become more agile and flexible have made network automation essential The updated second edition of this practical guide shows network engineers how to use a range of technologies and tools including Linux Python APIs and Git to automate systems through code This edition also includes brand new topics such as network development environments cloud programming with Go and a reference network automation architecture Network Programmability and Automation will help you automate tasks involved in configuring managing and operating network equipment topologies services and connectivity Through the course of the book you ll learn the basic skills and tools you need to make this critical transition You ll learn Programming skills with Python and Go data types conditionals loops functions and more New Linux based networking technologies and cloud native environments and how to use them to bootstrap development environments for your network projects Data formats and models JSON XML YAML Protobuf and YANG Jinja templating for creating network device configurations A holistic approach to architecting network automation services The role of application programming interfaces APIs in network automation Source control with Git to manage code changes during the automation process Cloud native technologies like Docker and Kubernetes How to automate network devices and services using Ansible Nornir and Terraform Tools and technologies for developing and continuously integrating network automation **Study Guide 300-435 ENAUTO: Automating and Programming Cisco Enterprise Solutions Certification Exam** Anand Vemula, The Automating and Programming Cisco Enterprise Solutions 300 435 ENAUTO study guide offers a comprehensive approach to mastering network automation with Cisco solutions Covering key topics from basic network programmability to advanced automation techniques this guide equips readers with the skills needed to manage configure and automate network devices and services efficiently It begins with an overview of network programmability and automation contrasting traditional networking methods with software defined networking SDN and introduces essential tools like APIs and model driven programmability The guide then delves into Python programming emphasizing its application for network automation with practical scripts and usage of popular networking modules like Netmiko Paramiko and Requests

Chapters focused on Cisco s tools such as Cisco DNA Center SD WAN vManage and Meraki explore their automation capabilities Practical exercises are included to demonstrate how to use these APIs for automating tasks such as policy configurations and troubleshooting The guide also covers telemetry NETCONF and RESTCONF providing readers with in depth knowledge of model driven telemetry and device configuration automation It concludes with a focus on troubleshooting automation workflows integration with CI CD tools like Jenkins and GitLab and version control using Git and GitHub Through detailed explanations and real world use cases the guide prepares readers for success in automating Cisco enterprise networks equipping them with the practical knowledge required to excel in the 300 435 ENAUTO exam and beyond

*Network Programmability with YANG* Benoit Claise,Joe Clarke,Jan Lindblad,2019-01-18 The entire networking industry is being pressured to automate to scale and move faster In modern networks you just can t manage everything by hand anymore You need to automate relentlessly and the most practical way to do so is with YANG and NETCONF But existing documentation on these technologies has been poor jargon filled or non existent so most implementers have been forced to learn by trial and error Now Network Programmability with YANG gives them comprehensive and reliable guidance for unlocking the power of network automation using model driven APIs and protocols Written by three leaders of the YANG development effort this plain spoken book guides networking professionals in successfully applying software practices based on YANG data models The authors focus on the network operations layer emphasizing model driven APIs and underlying transports Using their information and insights network professionals can transform the way they manage large networks

*Study Guide on Automating and Programming Cisco Data Center Solutions (300-635 DCAUTO) Exam* Anand Vemula, The Cisco 300 635 DCAUTO certification focuses on automation and programmability within Cisco Data Center technologies particularly Cisco ACI NX OS and UCS environments The exam covers fundamental knowledge of Cisco s Unified Data Center Architecture and dives deep into key components such as the Application Policy Infrastructure Controller APIC Leaf and Spine switches in ACI and the role of Cisco UCS with its management platforms including Cisco Intersight Central to the certification is understanding the ACI policy model which uses tenants bridge domains and endpoint groups EPGs to logically segment and control network traffic Mastery of the ACI object model and REST API is essential enabling candidates to programmatically manage and automate network policies The exam also emphasizes practical skills in NX OS programmability contrasting traditional CLI with modern NX API REST and CLI methods and highlights the importance of Python scripting alongside NETCONF and RESTCONF protocols Cisco UCS programmability is explored through UCS Manager s XML APIs Cisco Intersight s cloud based device management and the use of Python SDKs and PowerTool for automation Candidates learn how to automate workflows using DevOps and Infrastructure as Code IaC tools like Ansible and Terraform integrating these with CI CD pipelines and Git for streamlined operations Advanced scripting techniques cover data extraction reporting and building automation scripts across Cisco UCS ACI and NX OS platforms Monitoring and

logging with telemetry SNMP and syslog integration into tools like Splunk and Grafana complete the skill set Overall the certification equips network professionals to automate and manage modern data center infrastructures efficiently

Network Programmability and Automation Scott Lowe S.. Matt Oswalt. Jason Edelman,2018 Cisco Software-Defined Access Srilatha Vemula,Jason Gooley,Roddie Hasan,2020-08-11 The definitive Cisco SD Access resource from the architects who train Cisco s own engineers and partners This comprehensive book guides you through all aspects of planning implementing and operating Cisco Software Defined Access SD Access Through practical use cases you ll learn how to use intent based networking Cisco ISE and Cisco DNA Center to improve any campus network s security and simplify its management Drawing on their unsurpassed experience architecting solutions and training technical professionals inside and outside Cisco the authors explain when and where to leverage Cisco SD Access instead of a traditional legacy design They illuminate the fundamental building blocks of a modern campus fabric architecture show how to design a software defined campus that delivers the most value in your environment and introduce best practices for administration support and troubleshooting Case studies show how to use Cisco SD Access to address secure segmentation plug and play software image management SWIM host mobility and more The authors also present full chapters on advanced Cisco SD Access and Cisco DNA Center topics plus detailed coverage of Cisco DNA monitoring and analytics Learn how Cisco SD Access addresses key drivers for network change including automation and security Explore how Cisco DNA Center improves network planning deployment evolution and agility Master Cisco SD Access essentials design components best practices and fabric construction Integrate Cisco DNA Center and Cisco ISE and smoothly onboard diverse endpoints Efficiently operate Cisco SD Access and troubleshoot common fabric problems step by step Master advanced topics including multicast flows Layer 2 flooding and the integration of IoT devices Extend campus network policies to WANs and data center networks Choose the right deployment options for Cisco DNA Center in your environment Master Cisco DNA Assurance analytics and tests for optimizing the health of clients network devices and applications *Cisco Networks* Chris Carthern,William Wilson,Noel Rivera,2021-05-23 For beginning and experienced network engineers tasked with building LAN WAN and data center connections this book lays out clear directions for installing configuring and troubleshooting networks with Cisco devices Cisco Networks 2nd Edition is a practical guide and desk reference for Cisco engineers This new edition will discuss tools that can be used to automate and troubleshoot networks A new chapter on quality of service has been added to teach managing network resources by prioritizing specific types of network traffic The new edition has an updated wireless section which focuses on an updated controller and integration with Cisco Identity Services Engine ISE and Cisco Prime Infrastructure This practical desk companion doubles as a comprehensive overview of the basic knowledge and skills needed by CCNA and CCNP exam takers Prior familiarity with Cisco routing and switching is desirable but not necessary as Chris Carthern Dr Will Wilson and Noel Rivera start their book with a review of network basics Further they explain practical

considerations and troubleshooting when establishing a physical medium for network communications Later they explain the concept of network layers intermediate LAN switching and routing Next they introduce you to the tools and automation used with Cisco networks Moving forward they explain management planes data planes and control planes Next they describe advanced security trouble shooting and network management They conclude the book with a section which focuses on using network automation to automate Cisco IOS networks What You Will Learn Configure Cisco switches routers and data center devices in typical corporate network architectures Use black hat tools to conduct penetration testing on the security of your network Configure and secure virtual private networks VPNs Enable identity management in your network with the Cisco Identity Services Engine ISE to Who This Book Is For Network designers engineers programmers managers and students

**Transforming Campus Networks to Intent-Based Networking** Pieter-Jan Nefkens,2019-12-05 Migrate to Intent Based Networking and improve network manageability cost agility security and simplicity With Intent Based Networking IBN you can create networks that capture and automatically activate business intent assure that your network responds properly proactively detect and contain security threats and remedy network issues before users even notice Intent Based Networking makes networks far more valuable but few organizations have the luxury of building them from the ground up In this book leading expert Pieter Jans Nefkens presents a unique four phase approach to preparing and transforming campus network infrastructures architectures and organization helping you gain maximum value from IBN with minimum disruption and cost The author reviews the problems IBN is intended to solve and illuminates its technical business and cultural implications Drawing on his pioneering experience he makes specific recommendations identifies pitfalls and shows how to overcome them You ll learn how to implement IBN with the Cisco Digital Network Architecture and DNA Center and walk through real world use cases In a practical appendix Nefkens even offers detailed technical configurations to jumpstart your own transformation Review classic campus network deployments and understand why they need to change Learn how Cisco Digital Network Architecture DNA provides a solid foundation for state of the art next generation network infrastructures Understand intent and how it can be applied to network infrastructure Explore tools for enabling automating and assuring Intent Based Networking within campus networks Transform to Intent Based Networking using a four phased approach Identify challenges Prepare for Intent Design and Deploy and Enable Intent Anticipate how Intent Based Networking will change your enterprise architecture IT operations and business *Cisco pyATS — Network Test and Automation Solution* John Capobianco,Dan Wade,2024-07-23 Unlock the power of automated network testing with the Cisco pyATS framework Written by industry experts John Capobianco and Dan Wade Cisco pyATS Network Test and Automation Solution is a comprehensive guide to theCisco pyATS framework a Python based environment for network testing device configuration parsing APIs and parallel programming Capobianco and Wade offer in depth insights into the extensive capabilities of pyATS and the pyATS library Genie You ll learn how to leverage pyATS for network testing including software version testing

interface testing neighbor testing and reachability testing You ll discover how to generate intent based configurations create mock devices and integrate pyATS into larger workflows using CI CD pipelines and artificial intelligence You ll explore the pyATS Blitz feature which introduces a low code no code approach to network testing by allowing you to configure devices and write test cases using YAML much like Ansible And you ll learn how to reset devices during or after testing with the pyATS Clean feature build a pyATS image from scratch for containerized application deployment and much more Whether you re a network professional software developer or preparing for the Cisco DevNet Expert Lab exam this book is a must have resource Understand the foundations of NetDevOps and the modern network engineer s toolkit Install upgrade and work with the pyATS framework and library Define test cases control the flow of test execution and review test results with built in reporting features Generate automated network documentation with Jinja2 templates and Genie Conf objects Apply CI CD practices in network automation with GitLab Ansible and pyATS Leverage artificial intelligence in pyATS for enhanced network automation **Network Programmability with YANG** Benoit Claise,Joe Clarke,Jan Lindblad,2019 *Cisco Data Center Fundamentals* Somit Maloo,Iskren Nikolov,2022-09-29 Get ready to configure and operate modern data centers and move up to high value CCNP Data Center DC certification Cisco Data Center Fundamentals is the complete guide for network engineers and other professionals who need a solid understanding of modern data center technologies Especially useful for those preparing for the Cisco DCCOR exam and Cisco Certified Network Professional CCNP Data Center certification it fully addresses the essentials of networking storage compute and automation in today s data center environments Authored by two long time experts in operating Cisco data centers and developing official Learning Cisco training for them this guide explains each concept step by step balancing depth and breadth and maximizing clarity throughout The authors go far beyond introducing relevant products protocols and features They illuminate underlying technologies identify key interdependencies walk through configuring working solutions and truly help prepare you to set up and operate a modern data center Gain a holistic unified understanding of the data center and its core components Walk through installation and deployment of key data center technologies Explore potential applications to see what s possible in your environment Learn how Cisco switches and software implement data center networking and virtualization Discover and apply data center network design and security best practices Review Cisco data center storage technologies and concepts including Fibre Channel VSANs storage virtualization and FCoE Explore the building blocks of the Cisco UCS data center compute solution and how UCS uses hardware abstraction and server virtualization Use automation and APIs to improve data center productivity and agility Create and customize scripts for rapid troubleshooting Understand cloud computing for the data center services deployment models and the Cisco Intersight hybrid cloud operations platform High-Speed Cisco Networks John R. Vacca,2001-12-21 High Speed Cisco Networks Planning Design and Implementation covers LAN WAN technology and its benefits The book lays out Cisco s complete line of products and describes their features and best applications It provides

critical details on routers and servers switches and hubs security products network management tools ATM products other services and programs and Internetwork Operating Systems IOS Cisco s routers hubs and switches are the core of the Internet and today s high speed networks Armed with this independent evaluation the reader can design high speed networks that meet current needs and scale to future requirements with confidence **Network Automation Made Easy** Ivo Pinto,2021 Left hand column Explore modern use cases for network automation and compare today s most widely used automation tools Capture essential data for use in network automation using standard formats such as JSON XML and YAML Get more value from the data your network can capture Install Ansible and master its building blocks including plays tasks modules variables conditionals loops and roles Perform common networking tasks with Ansible playbooks manage files devices VMs cloud constructs APIs and more See how Ansible can be used to automate even the largest global network architectures Discover how NetDevOps can transform your approach to automation and create a new NetDevOps pipeline step by step Build a network automation strategy from the ground up reflecting lessons from the world s largest enterprises This book is part of the Networking Technology Series from Cisco Press which offers networking professionals valuable information for constructing efficient networks understanding new technologies and building successful careers Right hand column Practical strategies and techniques for automating network infrastructure As networks grow ever more complex network professionals are seeking to automate processes for configuration management testing deployment and operation Using automation they aim to lower expenses improve productivity reduce human error shorten time to market and improve agility In this guide expert practitioner Ivo Pinto presents all the concepts and techniques you ll need to move your entire physical and virtual infrastructure towards greater automation and maximize the value it delivers Writing for experienced professionals Ivo Pinto reviews today s leading use cases for automation compares leading tools and presents a deep dive into using the open source Ansible engine to automate common tasks You ll find everything you need from practical code snippets to real world case studies to a complete methodology for planning strategy This guide is for everyone seeking to improve network operations and productivity including system network storage and virtualization administrators network and security engineers and many other technical professionals and managers You can apply its vendor neutral concepts throughout your entire environment from servers to the cloud switches to security *Cisco Digital Network Architecture* Tim Szigeti,David Zacks,Matthias Falkner,Simone Arena,2018-12-27 The complete guide to transforming enterprise networks with Cisco DNA As networks become more complex and dynamic organizations need better ways to manage and secure them With the Cisco Digital Network Architecture network operators can run entire network fabrics as a single programmable system by defining rules that span their devices and move with their users Using Cisco intent based networking you spend less time programming devices managing configurations and troubleshooting problems so you have more time for driving value from your network your applications and most of all your users This guide systematically introduces Cisco DNA

highlighting its business value propositions design philosophy tenets blueprints components and solutions Combining insider information with content previously scattered through multiple technical documents it provides a single source for evaluation planning implementation and operation The authors bring together authoritative insights for multiple business and technical audiences Senior executives will learn how DNA can help them drive digital transformation for competitive advantage Technical decision makers will discover powerful emerging solutions for their specific needs Architects will find essential recommendations interdependencies and caveats for planning deployments Finally network operators will learn how to use DNA Center s modern interface to streamline automate and improve virtually any network management task Accelerate the digital transformation of your business by adopting an intent based network architecture that is open extensible and programmable Integrate virtualization automation analytics and cloud services to streamline operations and create new business opportunities Dive deep into hardware software and protocol innovations that lay the programmable infrastructure foundation for DNA Virtualize advanced network functions for fast easy and flexible deployments Translate business intent into device configurations and simplify scale and automate network operations using controllers Use analytics to tune performance plan capacity prevent threats and simplify troubleshooting Learn how Software Defined Access improves network flexibility security mobility visibility and performance Use DNA Assurance to track the health of clients network devices and applications to reveal hundreds of actionable insights See how DNA Application Policy supports granular application recognition and end to end treatment for even encrypted applications Identify malware ransomware and other threats in encrypted traffic   **Designing for Cisco Internetwork Solutions (DESGN) (Authorized CCDA Self-Study Guide) (Exam 640-863)** Diane Teare,2007-10-12 Authorized Self Study Guide Designing for Cisco Internetwork Solutions DESGN Second Edition Foundation learning for CCDA exam 640 863 Designing for Cisco Internetwork Solutions DESGN Second Edition is a Cisco authorized self paced learning tool for CCDA foundation learning This book provides you with the knowledge needed to design enterprise networks By reading this book you will gain a thorough understanding of designing routed and switched network infrastructures and services within a modular architecture In Designing for Cisco Internetwork Solutions DESGN Second Edition you will study a broad range of network design principles and guidelines You will learn about network design in the context of the Cisco Service Oriented Network Architecture SONA framework and the Cisco Enterprise Architecture Specific topics include campus and data center infrastructure remote connectivity IP addressing design routing protocol selection voice network design wireless network design and including security in your designs An ongoing case study plus chapter ending review questions illustrate and help solidify the concepts presented in the book Whether you are preparing for CCDA certification or simply want to gain a better understanding of network design principles you will benefit from the foundation information presented in this book Designing for Cisco Internetwork Solutions DESGN Second Edition is part of a recommended learning path from Cisco that includes simulation and hands on training from

authorized Cisco Learning Partners and self study products from Cisco Press To find out more about instructor led training e learning and hands on instruction offered by authorized Cisco Learning Partners worldwide please visit www cisco com go authorizedtraining Diane Teare is a professional in the networking training and e learning fields She has more than 20 years of experience in designing implementing and troubleshooting network hardware and software and has also been involved in teaching course design and project management She has extensive knowledge of network design and routing technologies and is an instructor with one of the largest authorized Cisco Learning Partners Understand the Cisco vision of intelligent networks and the SONA framework Learn how to structure and modularize network designs within the Cisco Enterprise Architecture Design basic campus and data center networks Build designs for remote connectivity with WAN technologies Create IPv4 addressing schemes Understand IPv6 design Select the appropriate routing protocol for various modules in the Cisco Enterprise Architecture Design basic VoIP and IP telephony networks Understand wireless design principles Build security into your network designs This volume is in the Certification Self Study Series offered by Cisco Press Books in this series provide officially developed self study solutions to help networking professionals understand technology implementations and prepare for the Cisco Career Certifications examinations Category Cisco Press Network Design Covers CCDA Exam 640 863

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