Advanced Data Center Network Management and Automation Training Course



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4100 € (Per Person)

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Course Introduction / Overview:

The modern digital enterprise is built upon the data center, and its network is the central nervous system. This landscape is evolving at an unprecedented pace, moving away from rigid, manual configurations towards dynamic, automated, and software-defined infrastructures. This intensive training course is designed to equip participants with the advanced skills required to manage, automate, and secure next-generation data center networks. We will explore the paradigm shift from traditional three-tier architectures to modern spine-leaf designs, a concept thoroughly detailed in literature like "Network Programmability and Automation" by Jason Edelman, Scott S. Lowe, and Matt Oswalt. The curriculum delves deep into core technologies such as Software-Defined Networking (SDN), VXLAN-EVPN fabrics, and network function virtualization (NFV). At BIG BEN Training Center, we believe in practical application, guiding participants through the principles of Infrastructure as Code (IaC) and leveraging powerful automation tools. This program goes beyond theory, providing a comprehensive framework for building resilient, scalable, and highly efficient data center networks prepared for the challenges of cloud integration and the explosion of data traffic. Participants will gain the expertise to not only troubleshoot complex issues but also to proactively design and orchestrate network services, ensuring optimal performance and robust security in today's demanding IT environments.

Target Audience / This training course is suitable for:

- Network Engineers and Administrators.
- Data Center Architects and Designers.
- IT Infrastructure Managers.
- Network Operations Center (NOC) personnel.
- Systems Engineers involved in network infrastructure.
- Cloud Network Engineers.
- Cybersecurity professionals focused on network infrastructure.
- IT professionals seeking to upgrade their data center networking skills.

Target Sectors and Industries:

- Information Technology and Services.
- Telecommunications and Service Providers.
- Banking, Financial Services, and Insurance (BFSI).
- Healthcare and Pharmaceuticals.
- E-commerce and Retail.
- Government and Public Sector agencies.
- Media and Entertainment.
- Manufacturing and Industrial Automation.

Target Organizations Departments:

- Information Technology (IT) Infrastructure.
- Network Operations and Engineering.
- Data Center Management.
- Cybersecurity and Information Security.
- Cloud and Virtualization Services.
- Research and Development (R&D).
- Enterprise Architecture.
- Technical Support and Service Delivery.

Course Offerings:

By the end of this course, the participants will have able to:

- Design and implement modern spine-leaf data center network architectures.
- Master the concepts and application of Software-Defined Networking (SDN) and Network Function Virtualization (NFV).
- Configure and manage advanced network fabrics using VXLAN and EVPN.
- Automate routine network configuration and management tasks using industry-standard tools.
- Implement robust network security policies, including micro-segmentation and zero-trust principles.
- Monitor network performance and health using advanced telemetry and AIOps concepts.
- Develop strategies for data center interconnect (DCI) and hybrid cloud connectivity.
- Troubleshoot complex issues within a software-defined data center environment.
- Evaluate and integrate intent-based networking (IBN) solutions for enhanced operational efficiency.
- Create and execute network disaster recovery and business continuity plans.

Course Methodology:

This training course employs a blended learning methodology designed for maximum knowledge retention and practical skill development. The approach at BIG BEN Training Center is centered on active participation and real-world application. Each day combines expert-led instructional sessions with hands-on lab exercises that allow participants to build, configure, and troubleshoot virtual data center network environments. We utilize a combination of interactive presentations, detailed demonstrations, and collaborative group discussions to explore complex topics like network automation and SDN architecture. Case studies derived from real industry scenarios will be analyzed to understand the practical challenges and solutions in modern data center management. Participants will work in teams on projects that simulate the design and implementation of a next-generation network, fostering teamwork and problem-solving skills. Continuous feedback is provided by the instructor throughout the course, ensuring that participants can clarify doubts and solidify their understanding. The methodology is structured to bridge the gap between theoretical knowledge and the practical skills needed to excel in managing sophisticated data center networks.

Course Agenda (Course Units):

Unit One: Foundations of Modern Data Center Networking

- The evolution of the data center from legacy to software-defined.
- Comparing traditional three-tier architecture with spine-leaf architecture.
- Understanding east-west and north-south traffic patterns.
- Key components of a modern data center network infrastructure.
- Introduction to high-availability and fault tolerance concepts.
- Physical and virtual network elements and their roles.
- Fundamentals of network virtualization and overlay technologies.

Unit Two: Software-Defined Networking and VXLAN-EVPN Fabrics

- Deep dive into Software-Defined Networking (SDN) principles and controllers.
- Exploring the separation of control plane and data plane.
- Introduction to Network Function Virtualization (NFV) and its use cases.
- Understanding Virtual Extensible LAN (VXLAN) for network overlays.
- Implementing Ethernet VPN (EVPN) as the control plane for VXLAN.
- Configuring and verifying a VXLAN-EVPN fabric.
- Integrating physical and virtual workloads within the fabric.

Unit Three: Data Center Network Automation and Orchestration

- Introduction to network programmability and APIs.
- Principles of Infrastructure as Code (IaC) for network management.
- Automating network tasks using Ansible for networking.
- Leveraging Python scripts for network configuration and data collection.
- Introduction to network orchestration platforms and their benefits.
- Understanding data modeling with YANG and data encoding with JSON/XML.
- Implementing version control for network configurations with Git.

Unit Four: Network Security, Monitoring, and Performance

- Implementing zero-trust security models in the data center.
- Techniques for network micro-segmentation to isolate workloads.
- Deploying next-generation firewalls and intrusion prevention systems.
- Fundamentals of network telemetry and streaming data.
- Utilizing tools for real-time network visibility and performance monitoring.
- Introduction to AIOps for proactive network issue detection and resolution.
- Best practices for network traffic analysis and capacity planning.

Unit Five: Advanced Topics and Future Trends

- Designing and implementing Data Center Interconnect (DCI) solutions.
- Strategies for seamless hybrid and multi-cloud network integration.
- Exploring the concepts and benefits of Intent-Based Networking (IBN).
- Developing comprehensive network disaster recovery and continuity plans.
- Managing network services in containerized environments with Kubernetes.
- The role of machine learning in predictive network analytics.
- Preparing for the future of data center networking and emerging technologies.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As data centers become increasingly autonomous through AIOps and intent-based networking, what is the evolving role of the human network engineer?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering a holistic and forward-looking curriculum that bridges the critical gap between network architecture theory and hands-on automation practice. While many courses focus narrowly on a single vendor's technology or a specific protocol, this program provides a comprehensive, vendor-agnostic understanding of the principles that govern all modern data center networks. Its primary differentiator is the deep integration of automation and programmability throughout every module, treating it not as an afterthought but as a core competency for today's network professional. We move beyond basic scripting to instill an Infrastructure as Code (IaC) mindset, empowering participants to manage complex networks with efficiency and precision. Furthermore, the course places significant emphasis on integrating security and AIOps, reflecting the reality that a modern network engineer must be proficient in both securing the infrastructure and leveraging data for proactive management. By combining foundational architecture, advanced fabric technologies, practical automation, and future-facing topics like IBN and hybrid cloud, this course prepares participants not just for their current roles, but to become leaders and innovators in the future of data center networking.