Optimizing Enterprise LAN and WAN Infrastructure Training Course



23 - 27 Nov 2026

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4100 € (Per Person)

Ref: #NO7383_279053

Course Introduction / Overview:

In today's digitally driven business environment, the performance of enterprise networks is not just a technical concern but a critical determinant of organizational success. This course provides a comprehensive exploration of the strategies and technologies for optimizing both Local Area Networks (LANs) and Wide Area Networks (WANs). As organizations increasingly rely on cloud services, distributed workforces, and data-intensive applications, the challenges of managing network latency, bandwidth, and reliability have grown exponentially. This program, offered by BIG BEN Training Center, delves into the core principles of network performance management, moving from foundational concepts to advanced optimization techniques. Drawing on seminal works in the field, such as "Computer Networks" by Andrew S. Tanenbaum, the course contextualizes theoretical knowledge with practical, real-world applications. Participants will learn to diagnose bottlenecks, implement robust Quality of Service (QoS) policies, leverage the power of SD-WAN, and secure their network infrastructure against emerging threats. This training is designed to empower IT professionals with the skills needed to build, maintain, and enhance resilient, high-performing enterprise networks that directly support strategic business objectives and drive competitive advantage in a complex technological landscape.

Target Audience / This training course is suitable for:

- Network Engineers and Administrators.
- IT Managers and Team Leaders.
- Network Architects and Designers.
- Systems Engineers.
- Infrastructure Managers.
- IT professionals involved in network performance and troubleshooting.
- Solutions Architects.
- Telecommunications Specialists.

Target Sectors and Industries:

- Information Technology and Services.
- Financial Services and Banking.
- Healthcare and Pharmaceuticals.
- Telecommunications Providers.
- Retail and E-commerce.
- Manufacturing and Logistics.
- Governmental and Public Sector Agencies.
- Education and Research Institutions.

Target Organizations Departments:

- Information Technology (IT) Department.
- Network Operations Center (NOC).
- Infrastructure and Operations.
- Cybersecurity and Information Security.
- Cloud Services and Engineering.
- Research and Development (R&D).
- Technical Support and Help Desk.

Course Offerings:

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

- Analyze and benchmark LAN and WAN performance using key metrics.
- Identify and troubleshoot common network performance bottlenecks.
- Design and implement effective Quality of Service (QoS) policies.
- Evaluate and deploy SD-WAN solutions to enhance WAN performance and reduce costs.
- Apply traffic shaping and bandwidth management techniques.
- Optimize network protocols such as TCP for better efficiency.
- Secure network traffic without compromising performance.
- Develop a strategic approach to network capacity planning.
- Improve application performance across the enterprise network.
- Monitor network health and performance proactively.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, engaging, and practical, ensuring that participants can immediately apply their learning in their professional roles. This course moves beyond traditional lectures by integrating a blended learning approach. Mornings will often focus on foundational concepts and theoretical frameworks, presented by our expert instructors who bring years of industry experience. These sessions are followed by interactive discussions, group-based problem-solving exercises, and in-depth analysis of real-world case studies from various industries. Afternoons are dedicated to hands-on labs and simulated scenarios where participants will configure, manage, and troubleshoot network environments. This practical application reinforces theoretical knowledge and builds tangible skills. Collaborative workshops encourage participants to share their own organizational challenges, fostering a rich learning environment where diverse perspectives are explored. Continuous feedback is provided throughout the course, and a capstone project allows participants to design a comprehensive network optimization strategy for a model enterprise, solidifying their mastery of the course objectives.

Course Agenda (Course Units):

Unit One: Foundations of Network Performance

- Introduction to LAN and WAN Architectures.
- Understanding Network Performance Metrics (Latency, Jitter, Packet Loss, Throughput).
- Common Causes of Network Congestion and Bottlenecks.
- Network Performance Baselining and Auditing.
- Introduction to Network Monitoring and Analysis Tools.
- The OSI and TCP/IP Models in the Context of Performance.
- Fundamentals of Packet Analysis with Wireshark.

Unit Two: Local Area Network (LAN) Optimization

- Advanced Ethernet Switching Concepts.
- Implementing and Managing Virtual LANs (VLANs).
- Spanning Tree Protocol (STP) Optimization and Enhancements.
- Link Aggregation (EtherChannel) for Increased Bandwidth and Redundancy.
- Implementing LAN Quality of Service (QoS).
- Optimizing Wireless LAN (WLAN) Performance and Security.
- Troubleshooting Common LAN Performance Issues.

Unit Three: Wide Area Network (WAN) Optimization

- Traditional WAN Technologies (MPLS, Leased Lines) and Their Limitations.
- Introduction to Software-Defined WAN (SD-WAN) Architecture and Benefits.
- Implementing SD-WAN Policies for Application-Aware Routing.
- WAN Acceleration and Application Performance Management (APM).
- Techniques for Traffic Shaping and Policing.
- Optimizing Voice and Video Traffic over the WAN.
- Cloud Connectivity and Hybrid WAN Design.

Unit Four: Protocol Optimization and Network Security

- Deep Dive into TCP Optimization Techniques (Window Scaling, Congestion Control).
- Optimizing DNS, DHCP, and other Core Network Services.
- The Role of Caching and Content Delivery Networks (CDNs).
- Integrating Security into Network Optimization.
- Understanding Secure Access Service Edge (SASE).
- Performance Implications of Firewalls, VPNs, and Intrusion Prevention Systems (IPS).
- Balancing Security Policies with Network Performance Requirements.

Unit Five: Advanced Strategies and Future Trends

- Network Capacity Planning and Forecasting.
- Leveraging Network Automation for Performance Management.
- AI and Machine Learning in Network Optimization (AIOps).
- Optimizing for Hybrid and Multi-Cloud Environments.
- Preparing for IPv6 and its Impact on Performance.
- Developing a Holistic Network Optimization Strategy.
- Final Project: Designing an Optimized Enterprise Network Solution.

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 network automation and AI-driven optimization become more prevalent, what is the evolving role of the human network engineer in managing enterprise infrastructures?

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

This course distinguishes itself by adopting a holistic, strategy-first approach to network optimization rather than focusing narrowly on specific vendor tools or technologies. While many programs teach the "how" of configuration, this training emphasizes the "why" behind strategic decisions, empowering participants to design and implement solutions that are perfectly aligned with their organization's unique business objectives. We focus on vendor-agnostic principles, ensuring the skills learned are transferable across any hardware or software environment. The curriculum is uniquely structured to bridge the gap between LAN and WAN optimization, treating the enterprise network as a single, cohesive ecosystem. Furthermore, the course content is forward-looking, integrating critical modern concepts like SD-WAN, SASE, and AIOps, preparing professionals not just for today's challenges but for the future of networking. The extensive use of real-world case studies and a capstone project that simulates a complete optimization lifecycle provides a level of practical, applicable experience that is difficult to find elsewhere, transforming participants from network administrators into strategic network architects.