Cloud-Native 5G Architecture and Edge Computing Integration Training Course



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Sharm El-Sheikh

4100 € (Per Person)

Ref: #TEL5074_285197

Course Introduction / Overview:

This course provides a comprehensive exploration of the paradigm shift in telecommunications, focusing on the convergence of 5G networks with cloud-native principles and edge computing. As the industry moves away from traditional, monolithic architectures, this program delves into the agile, scalable, and resilient frameworks that define modern network infrastructure. Participants will gain a deep understanding of how technologies like microservices, containerization, and continuous integration/continuous delivery (CI/CD) are revolutionizing 5G network functions. The curriculum is designed to bridge the gap between theoretical knowledge and practical application, drawing on concepts discussed by leading experts like Stephen Terrill in his work "5G Core Networks: Powering Digitalization". BIG BEN Training Center has structured this course to empower professionals to design, deploy, and manage next-generation networks capable of supporting high-bandwidth, low-latency applications. We will dissect the 5G Service-Based Architecture (SBA), explore the critical role of Multi-access Edge Computing (MEC), and analyze real-world use cases that are driving innovation. This training is essential for anyone looking to master the technologies that underpin the future of connected services and the Internet of Things (IoT).

Target Audience / This training course is suitable for:

- Network Architects and Engineers.
- Telecommunications Professionals.
- Cloud Engineers and Administrators.
- Solution Architects.
- IT Managers and Directors.
- Software Developers working on network applications.
- Systems Integrators.
- DevOps Engineers in the telecom sector.
- Technical Project Managers.

Target Sectors and Industries:

- Telecommunications Service Providers.
- Information Technology and Services.
- Automotive and Autonomous Vehicle Development.
- Healthcare and Telemedicine.
- Smart Manufacturing and Industrial IoT (IIoT).
- Logistics and Supply Chain Management.
- Media and Entertainment.
- Government, Public Safety, and Defense Agencies.
- Energy and Utilities.

Target Organizations Departments:

- Network Operations and Engineering.
- Research and Development (R&D).
- IT Infrastructure and Cloud Services.
- Product Development and Management.
- Corporate Strategy and Innovation.
- Cybersecurity and Network Security.
- Digital Transformation Teams.

Course Offerings:

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

- Analyze the fundamental principles of cloud-native architecture and their application to 5G networks.
- Deconstruct the 5G Service-Based Architecture (SBA) and the roles of its key network functions.
- Implement containerization and orchestration strategies for telecom workloads using Docker and Kubernetes.
- Design and manage network slicing to deliver customized services for diverse use cases.
- Evaluate the architecture and benefits of Multi-access Edge Computing (MEC) for low-latency applications.
- Integrate edge computing solutions with a 5G core network to optimize performance.
- Develop security strategies to address the unique challenges of distributed, cloud-native 5G and edge environments.
- Assess the impact of Open RAN (O-RAN) on the 5G ecosystem.
- Formulate deployment and migration plans for transitioning from legacy networks to a cloud-native infrastructure.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, interactive, and highly practical. We believe that mastering complex topics like cloud-native 5G and edge computing requires more than just theoretical lectures. Our approach combines expert-led instruction with collaborative learning to ensure a deep and lasting understanding. The course incorporates detailed case studies of real-world 5G and edge deployments, allowing participants to analyze successes and challenges from leading global organizations. Interactive sessions, group discussions, and problem-solving workshops are central to the learning experience, encouraging participants to share insights and tackle complex architectural problems together. We utilize a blend of presentations, whiteboarding sessions, and guided practical scenarios to reinforce key concepts. This dynamic environment ensures that participants not only learn the "what" and "why" but also the "how" of implementing these advanced technologies. Our expert instructors facilitate a continuous feedback loop, providing personalized guidance and ensuring that all participants can confidently apply their new skills in their professional roles.

Course Agenda (Course Units):

Unit One: Foundations of 5G and Cloud-Native Principles

- Introduction to 5G evolution from 4G LTE.
- Key drivers and performance goals of 5G (eMBB, URLLC, mMTC).
- Understanding the 3GPP standards for 5G architecture.
- Core concepts of cloud-native computing.
- The twelve-factor app methodology in a telecom context.
- Contrasting monolithic, virtualized (NFV), and cloud-native network functions.
- Benefits of a cloud-native approach for network agility and scalability.

Unit Two: Core Cloud-Native Technologies for Telecom

- Introduction to microservices architecture for network functions.
- Containerization fundamentals with Docker.
- Container orchestration with Kubernetes in a telco environment.
- Understanding Kubernetes components: Pods, Services, Deployments.
- Service mesh technologies like Istio for managing microservices communication.
- Implementing CI/CD pipelines for network function development and deployment.
- Stateless vs. stateful applications in the 5G core.

Unit Three: Deep Dive into the 5G Core (5GC) Architecture

- Overview of the 5G Service-Based Architecture (SBA).
- Roles and interactions of key network functions (AMF, SMF, UPF, AUSF, NRF).
- Control and User Plane Separation (CUPS) in 5G.
- Network slicing principles and implementation.
- Creating and managing end-to-end network slices for different services.
- User plane function (UPF) selection and routing policies.
- Procedures for registration, session management, and mobility.

Unit Four: Exploring the Edge Computing Paradigm

- Defining edge computing and Multi-access Edge Computing (MEC).
- Edge computing architecture and deployment models.
- The role of edge computing in reducing latency and backhaul traffic.
- Key use cases for MEC: AR/VR, V2X communication, and industrial automation.
- Relationship between the 5G core and the edge cloud.
- ETSI MEC framework and reference architecture.
- Data processing and analytics at the network edge.

Unit Five: Integration, Security, and Future Trends

- Strategies for integrating MEC platforms with the 5G UPF.
- Traffic steering and session breakout to the edge.
- Security challenges in a distributed cloud-native 5G and edge environment.
- Implementing security measures for containers and APIs.
- Introduction to Open RAN (O-RAN) and its impact on the ecosystem.
- The role of AI and machine learning in network automation and optimization at the edge.
- Final project: Designing an integrated 5G and edge solution for a specific use case.

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 intelligence and data processing move from the centralized core to the distributed edge, what are the fundamental shifts in security paradigms and data governance models that organizations must anticipate?

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

This course distinguishes itself by providing a holistic, integrated perspective that bridges the critical gap between traditional telecommunications engineering and modern cloud computing practices. While many programs focus on either 5G architecture or cloud-native technologies in isolation, our curriculum is uniquely designed to explore their powerful synergy. We move beyond theoretical overviews to concentrate on the practical challenges and strategies of integrating Multi-access Edge Computing (MEC) with a 5G Service-Based Architecture. The content is structured to build knowledge logically, from foundational principles to complex, real-world deployment scenarios. Participants will not just learn about individual components like Kubernetes or the 5G UPF; they will master how these elements interact to deliver low-latency, high-bandwidth services. Furthermore, the course emphasizes strategic thinking, encouraging participants to analyze use cases and design end-to-end solutions. By focusing on the "how" of integration and security, rather than just the "what," this training equips professionals with the actionable skills needed to lead next-generation network transformation projects and drive tangible business innovation.