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Automation Meets Observability:
The Foundation of Cloud-Native Core Networks

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As telecommunications operators transition to cloud-native architectures, a new foundation is forming, where automation and observability are no longer optional tools but essential pillars. In the era of 5G and beyond, these twin capabilities are not just operational enablers; they are business imperatives.

Automation by Itself Isn't Enough

Cloud-native core networks introduce inherently dynamic and distributed architecture. Cloud-native network functions (CNFs) can spin up or scale down on demand, leading to rapid changes in system behavior. Cloud infrastructure capacity and availability may change, for example, during the in-service upgrade. While automation streamlines these changes, reducing manual tasks and minimizing human error requires precise execution. Without accurate, real-time insights, automation can exacerbate issues instead of resolving them. This is where observability enters the equation.

Observability in Cloud-Native Environments

Observability is more than monitoring. It's about gaining deep, contextual understanding of what's happening across your network, from packet flows and service performance to the health of Kubernetes clusters running mission-critical workloads. It encompasses metrics, logs, and traces, meshed with contextual metadata that helps identify not just what failed, but why and where, out of the box, not pieced together after the fact by operational staff.

In cloud-native telecom environments, observability enables:

- **Proactive Problem Detection:** By recognizing patterns and anomalies in real time, observability systems can notify operations staff and/or even trigger automated workflows before issues impact subscribers.
- **Network Wide Root Cause Analysis:** With distributed CNFs living across multiple nodes and data centers, pinpointing the source of a degradation or failure requires tracing requests across the entire core network.
- **Optimization of Resource Utilization:** Insights into performance and behavior allow operators to allocate compute, storage, and bandwidth where it's needed most, optimizing costs and improving quality of service.

Automation + Observability = Autonomous Networks

When automation and observability are tightly integrated, they form the foundation of intent-based networking, where the network can understand high-level goals and act on them autonomously.

Consider a scenario in a 5G Standalone core where subscriber data throughput experience is underperforming due to a misbehaving CNF. Observability tools detect abnormal latency and packet loss, trace it to a specific container instance, and feed this insight to a performance assurance automation engine. The engine then restarts the container or spins up a healthy instance elsewhere, all without human intervention.

Challenges and Considerations

To make this a reality, network architecture and an operational mindset for automation and observability must be a key upfront consideration:

- **Information Silos:** Legacy monitoring and OSS tools often operate in silos, unable to provide an end-to-end visibility across distributed horizontal and vertical environments. A unified observability solution is critical.
- **Information Overload:** Cloud-native networks generate vast amounts of telemetry data. Intelligent selection and correlation of data based on telecom data models and learning are fundamental to proper observability.
- **Automation Capabilities:** Core networks should be deployed out of the gate using automation for deployment lifecycle management, day two configuration management for infrastructure, network functions, and communication fabrics as these are basic building blocks.
- **APIs:** Open and easily adaptable APIs facilitate rapid construction of data-driven automation use-cases.
- **Traditional Modes of Operation:** Legacy organizational structures and modes of operation may not translate well with the rapid automation adaptation. An automation-first mindset must permeate all aspects of the organization and network design.

The Path Forward for Cloud Native Core Operators

Telco operators must adopt platforms that unify observability data and embed automation across operations. AI models tailored to telecom can enhance insight and actionability. Just as critical is fostering an automation culture and reorganizing teams to embrace continuous improvement and platform thinking.

Conclusion

Automation and observability are not optional, they're the foundation of modern core networks. Operators that embrace them holistically will gain agility, resilience, cost efficiency, and a competitive edge in the 5G era and beyond. cca

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