HCLSoftware

HCL Augmented **Network Automation**

Proactive Network Automation for 5G Network Optimization

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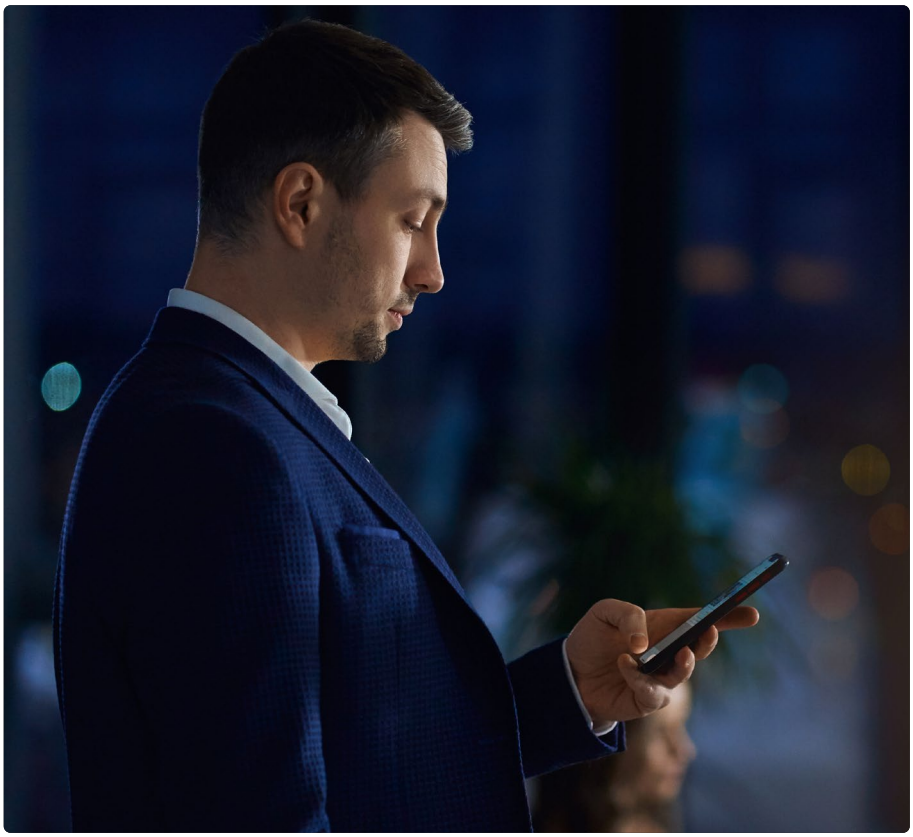
Proactive Network Automation for 5G Network Optimization

Mobile Network Operators (MNOs) worldwide have reached new levels of complexity in their network operations. This is driven by multiple technology stacks and various RAN generations (i.e., 3G, 4G, 5G and future 6G) within networks, the widespread adoption of small cell-based private and public networks, the advent of ORAN and more frequency bands. While this is all positive, it is increasing network operation costs.

In addition, as many new services are created and deployed, MNOs need more agility in their networks to shorten the time to market, maintain the optimal customer experience and adhere to the service level agreements. MNOs must also keep their networks profitable.

Classic Self-Organizing Networks (SON) assist MNOs with routine Radio Access Network (RAN) management activities that automate RAN planning, deployment, and operational troubleshooting. HCL's Augmented Network Automation (ANA) Platform evolves from SON with an open architecture that allows MNOs to build custom applications aligned to each network strategy without depending on other application vendors or the SON vendor platform. The Radio Intelligent Controller (C-RIC) becomes the next generation SON for all mobile network technologies (i.e., 3G, 4G, 5G, 6G and beyond).



MNO Business Challenges

1. Network Complexity

Manage the network and multiple technologies in terms of layer management, mobility management, interference management.

2. Cost cutting

Constant pressure to reduce OPEX while maintaining a good customer experience.

3. Performance

Balance performance and return on the investment of optimal customer experience

4. Power Savings

manage this costly resource as consumption continues to increase

5. Traffic Management

Understand where customers need capacity and who to deliver it in the most efficient way

6. Backhaul integrity

Ensure that transport networks are fully capable of adapting to any issues

7. Mobility

Managing all the services to deliver fast moving mobile experiences in a multi-technology and multi-layer environment

HCL ANA Platform Highlights

HCL ANA Platform incorporates additional essential elements for MNO success, including:

1. Simplified service management and orchestration platform enables MNOs to optimize network performance, enable operational efficiency and deliver enhanced customer experience.
2. Analytic services leverage Machine Learning (ML) and Artificial Intelligence (AI) to support faster and more robust solutions.
3. End-to-end network automation that goes beyond the RAN to incorporate cross-domain automation of transport, core and application layers.
4. Subscriber-centric Quality of Experience (QoE) management ensures MNOs support subscriber-level requirements, such as increased bandwidth for streaming applications.
5. 5G network slice optimization and automation that improves subscriber QoE with support for end-to-end network slicing.
6. Near real-time automation platform that enables ORAN support for faster use cases—from seconds to sub-seconds for closed-loop applications.
7. Optimization of cellular network performance that automatically predicts, configures and optimizes cellular network with improved network management leveraging AI, self-healing and reinforced learning techniques to enable flexible deployments (i.e., on-premises, hybrid and public cloud).
8. Open platform for innovation that supports ORAN and enables service providers and partners to develop and quickly deploy applications to cellular networks.

MNO

Applications

O-RAN rApps & xApps enable ML models and data-driven decision making.

User friendly

Management console and analytics (ML/AL)

5G Network Slicing

5G Network slicing to optimize subscriber QoE

Closed Loop

24/7 automation with minimal human interventions

Energy Savings

Optimize network energy consumption and reduces costs while maintaining network performance

Network Efficiency

Reduce operational costs with orchestrated automation across network domains driven by ML/AI

Unified management & orchestration

The apps including conflict management

Open & flexible

Deployable on-premise/ private/public/hybrid cloud

Network Environments

Today's network environments are complex, with many MNOs deploying 4G and 5G technologies in their networks. Increased subscriber QoE demands, such as video streaming applications, require flexibility, scalability and automation to meet the diverse demands of subscribers. The need for additional functions, such as geolocation, crowdsourcing, big data analytics and the Internet of Things (IoT), further increases network complexity.

HCL Augmented Network Automation (ANA) Platform helps MNOs solve network complexity and go beyond the RAN domain to cover transport, core and application server layers. It provides comprehensive end-to-end network automation that predicts, corrects and updates to ensure enhanced subscriber QoE.

Simplified Network Operation

New 5G uses cases requiring higher resolution data, contributing to a rise in overall network complexity and demand for additional capabilities. The multilayered architecture of HCL Augmented Network Automation (ANA) Platform simplifies and automates complex network operation practices, helping to reduce both support time and operational errors.

HCL ANA Platform's capabilities include remote configuration of new base station equipment, new services enablement (e.g., connected cars and remote healthcare) and parameter audits with automated predicting, configuring and optimizing networks. HCL ANA Platform takes RAN automation a step further by employing an open architecture that allows MNOs to build custom applications aligned to each MNO network strategy without having to depend on SON vendor product roadmaps.

Automation

Automation of network tasks, ZTP etc. simplifies management & operations

Architecture

O-RAN architecture incorporates intelligent framework for machine learning (i.e. Near-RT & Non-RT RIC)

Application

O-RAN rApps & xApps enable ML Models and data-driven decision making

AI/ ML

O-RAN facilities for ML-based models can be trained for predictive network edge

HCL ANA Platform has a unified management console that provides data visibility and the ability to control, change and configure applications across multiple domains and networks. This optimizes setup and maintenance without needing a different tool for each network layer. With the HCL ANA Platform's augmented automation and the unified management console, day-to-day operations are more automated and simplified, leading to productivity improvements.

HCL ANA Platform at a Glance

The most deployed and most mature centralized RAN optimization automation solution currently available, HCL ANA Platform has been used by multiple Tier 1 and Tier 2 operators across the globe over the last decade. HCL ANA Platform manages more than three million cells from all major RAN equipment manufacturers worldwide, with more than two million cells in North America.

1. Closed loop, 24/7 principal automation with minimal human touch
2. On-premises, cloud and hybrid deployments
3. Multi-vendor support using OSSii, multi-technology support
4. 5G and ORAN ready

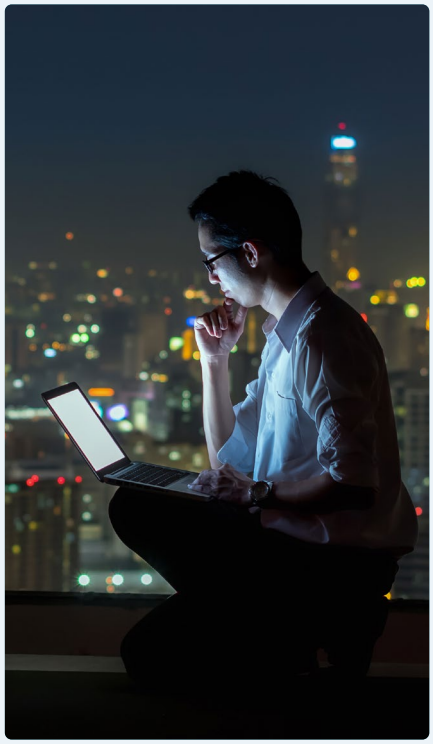
Closed Loop, Dynamic Configuration

HCL Augmented Network Automation (ANA) Platform operates in a closed loop that includes monitoring, analyzing, adjusting execution and re-monitoring across the network. In addition, it brings the advantage of supporting multi-technology, multi-vendor cellular network deployments. By taking advantage of these functions and the platform's flexibility, service quality and system capacity can be further improved across the network.

HCL ANA Platform minimizes the impact of rapid changes in the network, ensuring no network performance degradation and the preferred user experience is maintained. This is accomplished by proactively identifying root causes that adversely affect the network and acting to prevent them before they occur. To detect the behavior patterns hidden in the mass of measurements at the network level, HCL ANA Platform uses the clusterization of similar network nodes.

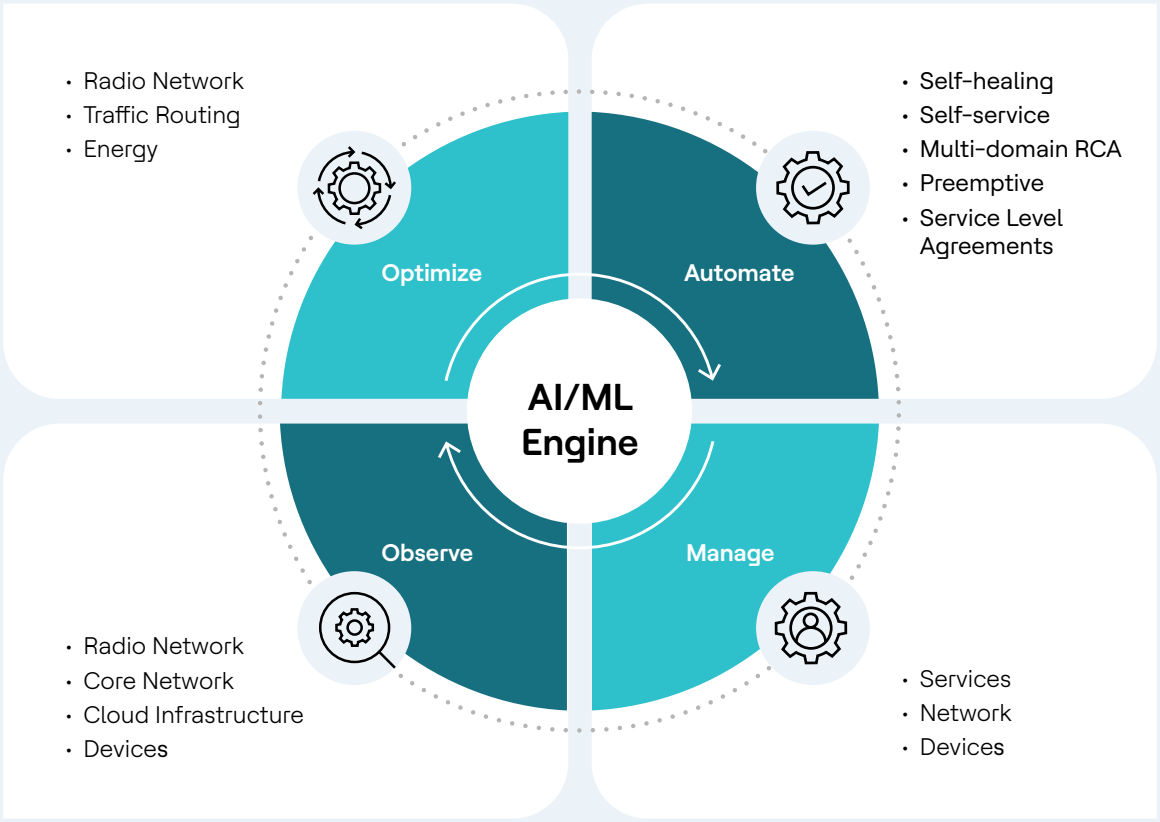
HCL ANA identifies cells with suboptimal performance and analyzes the root causes of these cells to optimize performance. The predictive capabilities select the optimal actions to maximize network performance. Employing these advanced predictive algorithms reduces uncertainty about how the changes would affect the radio network and minimizes the need for multiple corrective action steps.

HCL ANA Platform ensures performance improvements, reduces human intervention, minimizes errors and maximizes network operational efficiency. With zero-touch activation, orchestration and management, HCL ANA increases network savings, improves the user experience and enables fast and simple deployment of new services.



Single Pane of Glass for Radio, Core Network and Infrastructure Powered by AI/ML and Analytics

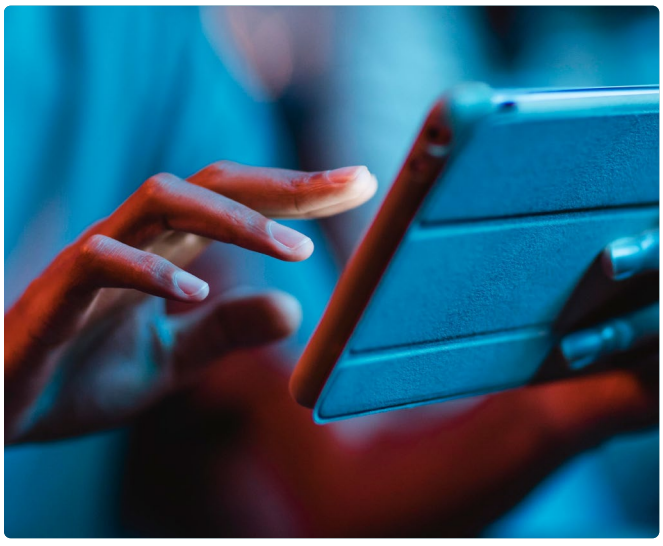
Multi-domain root cause analysis

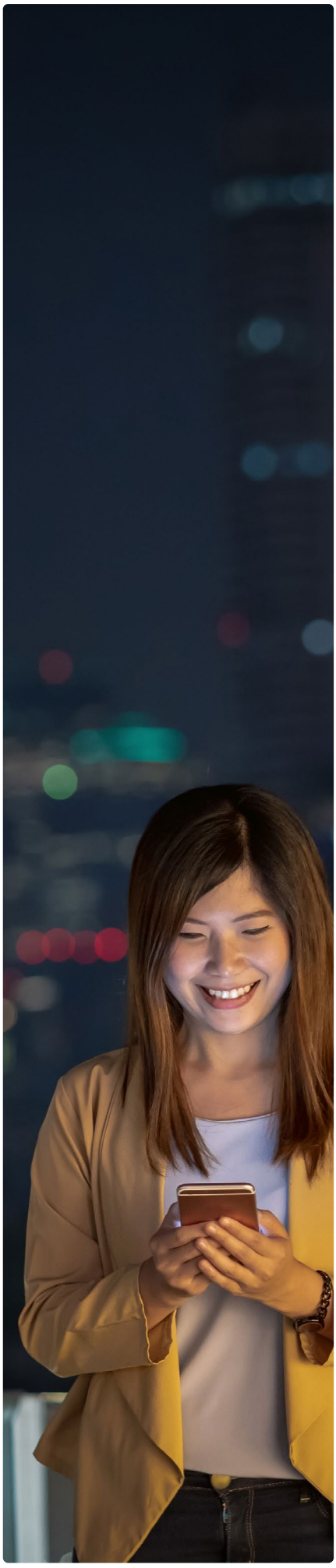


Predictive Network Optimization

HCL ANA Platform continuously monitors network-wide state performance and health. When anomalies or inefficiencies are detected, HCL ANA Platform automatically takes corrective actions, including:

1. Reconfiguring network elements
2. Updating assignments or relations between network resources
3. Balancing loads across locations and resources
4. Updating networks' logical topology





Containerized, Modular and ORAN Ready

Containerized and modular, the HCL Augmented Network Automation (ANA) Platform leverages ML and analytics across multiple layers to optimize networks, reduce CAPEX/OPEX and support future technologies. HCL ANA is a future-proofed microservices platform that uses containers to reduce hardware resources, supply faster startup times, require less maintenance and provide portability. HCL ANA is built to support the evolution from SON to cRIC and from SON to the future Service Management Orchestration (ORAN SMO).

Support for rApps

HCL Augmented Network Automation (ANA) Platform supports multiple use cases that can easily be onboarded to the future HCL SMO Platform as new use cases develop. HCL ANA has a containerized and hosted platform that supports R1 services to onboard rApps. HCL ANA now offers several in-house-built rApps, including iDES. Currently, HCL ANA platform supports the cRIC and Management Data Analytics Function (MDAF) elements of the SMO. In addition, multiple existing HCL Augmented Network Automation (ANA) platform applications can easily be onboarded as rApps.

HCL Network Automation (ANA) Platform includes:

An open API framework for developers to create customer network applications for access, load management, coverage, capacity, mobility management and Voice Over LTE (VoLTE) solutions.

The ability for Mobile Network Operators (MNOs) to create customized use case-based applications that are user experience-aware and addresses Key User Quality Indicators (KQIs). User-centric HCL ANA enables new applications for enterprise, private LTE/5G and high mobility.

Capability for MNOs to simplify network management complexity with a closed-loop network automation environment that supports multi-vendor, multi-technology deployments.

The collection and processes of vast amounts of data in real-time from most network domains (i.e. radio in transport to core to automatically predict, configure and optimizemulti-domain networks with self-healing techniques.

rApps

The Open RAN (ORAN) architecture introduces new types of automation applications called rApps. An rApp is designed to run on the non-real-time RIC to realize different RAN automation and management use cases, with control loops on a time scale of one second and longer. In HCL ANA, rAPPs, such as iDES, focus on predicting and optimizing radio access power usage in mobile networks. It is a proven and tested solution that has been shown to provide additional energy savings beyond the standard RAN vendor's energy savings feature.

The unique value that HCL cRIC generates is the capability to work side-by-side with legacy RAN architectures. ORAN nodes will be sharing spectrum with legacy nodes and this can be managed with HCL Multi-Vendor cRIC, which is HCL ANA ready and R1 compliant. An rApp SDK and skeletal rApp are available with HCL ANA Platform to enable the development of solid rApps, more quickly. Hosting is available to support rApps developed by HCL, MNOs, or third-party application vendors.

Flexibility with Improved TCO

HCL Augmented Network Automation (ANA) Platform is scalable and supports flexible deployments on-premises and in public, private, or hybrid clouds. It provides MNOs with a single management console to view and control network services and subscribers across multiple network domains.

HCL ANA Platform offers a unified console to manage the different layers, technologies, vendors and architecture, such as ORAN and classic Element Management System (EMS) networks. This results in efficient network scalability and improved productivity to reduce Total Cost of Ownership (TCO). This network flexibility reduces operational risk as MNOs no longer require vendor lock-in for network solutions.

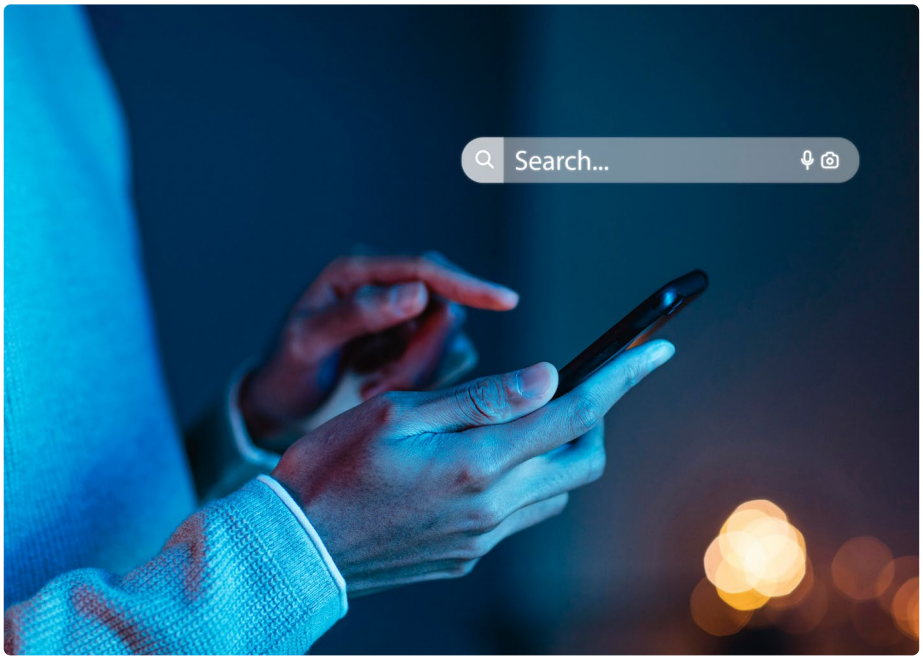
Optimizing and reducing RAN energy consumption with HCL Dynamic Energy Savings Application

The HCL Dynamic Energy Savings application dynamically optimizes RAN energy consumption and reduces costs while maintaining network performance. This is possible by powering down capacity layers when not in use. The application is offered as a service where the only cost will be a percentage of the realized savings. and even more value is gained with support of both 4G and 5G networks.

HCL's deep engineering experience and end-to-end offerings fuel MNO growth , extracting tangible value and driving innovation at scale for MNOs all while reducing energy consumption.

More Choice,
Less Risk with Open Platform

HCL Augmented Network Automation (ANA) Platform reduces network management complexity by allowing the freedom to customize and configure networks according to individual network operator requirements and plans. Leveraging an open API framework allows for the easy creation and deployment of custom network applications. This future ready solution also improves a customer's TCO with an optional subscription based hosted cloud offer available on AWS Cloud and Google Cloud. HCL ANA platform is currently deployed by many Tier 1/2 Service-Providers worldwide to automate their operations and maximize their network utilization and end-user experience.



Learn More:

HCL Augmented Network Automation (ANA) Platform harnesses closed-loop automation across

network layers to deliver predictive optimization and 24/7 hands-free network configuration that automatically corrects any anomalies—driving faster time to market of new services across 5G networks.

To find out more,
visit: *https://bit.ly/2Sn0ipM*

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About HCLSoftware

HCLSoftware, the software business division of HCLTech, fuels the Digital+ economy by developing, marketing, selling and supporting solutions in four key areas: digital transformation; data and analytics; AI and intelligent automation and enterprise security. HCLSoftware drives customer success through relentless product innovation for more than 20,000 organizations, including a majority of the Fortune 100 and almost half of the Fortune 500.