RADCOM

RADCOM ACE

An automated, containerized 5G assurance platform with AI-driven insights for standalone 5G network operations

INTRODUCTION

RADCOM is the leading provider of cloud-native, containerized, and automated service assurance solutions with AI-driven insights and complete network visibility.

RADCOM ACE is an automated 5G assurance platform that seamlessly integrates with Kubernetes to provide a closed-loop approach to assurance for Standalone (SA) and Non-standalone (NSA) 5G. Being Service Based Architecture (SBA) ready, the solution supports advanced 5G assurance capabilities such as complex Control and User Plane Separation (CUPS) correlation, new CUPS protocol decoding, and the Packet Forwarding Control Protocol. **RADCOM ACE** uses streaming analytics to deliver automated real-time network intelligence given to the operators' orchestration to detect, analyze, and resolve issues automatically. **RADCOM ACE** also provides end-to-end network troubleshooting from the KPI level down to the session/packet level, critical when rolling out new network architectures.

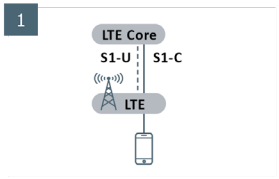
Correlating various data sources (network events, event detail records (EDRs), and packets) from the RAN to the core, **RADCOM ACE** delivers Artificial Intelligence (AI) driven insights and automated root cause analysis for 5G. Proactively ensuring the customer experience and service quality with a range of telecom specific AI-driven use cases. Reducing noise and bringing into focus the critical issues enabling engineers to work smarter and focus on core business objectives for 5G. Built with microservices-based components enables the solution to be distributed, cloud-efficient, and dynamic. The solution continuously adapts using a full CICD implementation that is critical as 5G and cloud infrastructures evolve.

With over 30 years of deep network understanding, RADCOM has extensive experience working with leading telecom operators globally. RADCOM offers the most advanced 5G portfolio for large scale networks, providing operators with a smart, efficient, and on-demand approach to network monitoring that meets the challenges of assuring the customer experience in the 5G era.

INTRODUCTION: 5G MIGRATION OPTIONS

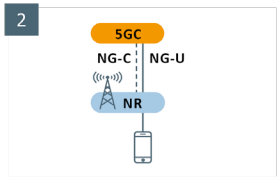
SA

1



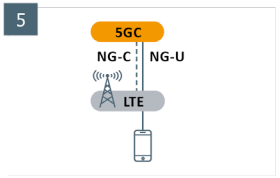
SA LTE connected to EPC

2



SA NR connected to 5GC

5



SA LTE connected to 5GC

Legend

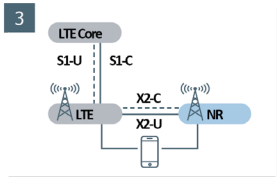
User plane

Control plane

NSA

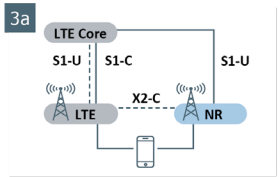
NSA LTE and NR connected to EPC

3



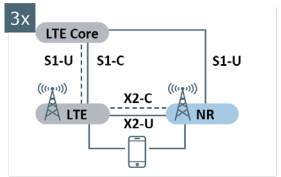
There is no connection between the NR and the 4G network. All 5G user plane traffic is routed through the 4G RAN.

3a



Provides for dynamic switching of the 5G user plane traffic between the LTE RAN and NR.

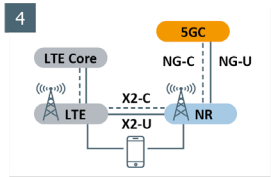
3x



A combination of option 3 and 3a with both the S1-U and X2 interfaces being available from the NR.

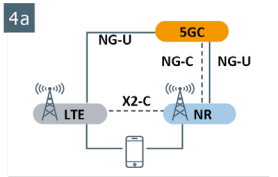
NSA NR and LTE connected to 5GC

4



There is no Xn interface between the LTE RAN and NR. The LTE RAN is connected to the 5GC via the NG-U interface.

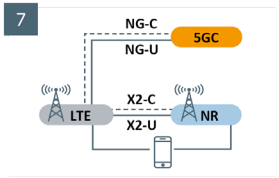
4a



There is no direct connectivity between the LTE RAN and the 5GC. All information flows via the Xn interface.

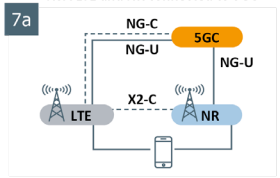
NSA LTE and NR connected to 5GC

7



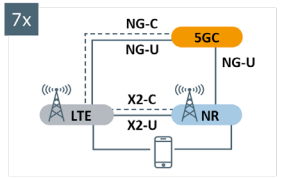
There is no interface between the NR and the 5GC. Information flows via the Xn.

7a



There is no Xn interface and the NR is connected to the 5GC via the NG-U interface.

7x



A combination of option 7 & 7A.

For a more detailed information on 5G migration and network architecture download our poster

RADCOM ACE

- Assures both Standalone (SA) and Non-Standalone (NSA) services
- Stateless and lightweight architecture
- Fully containerized end-to-end solution for assurance from the RAN to the core
- Built using a microservices architecture to scale efficiently and dynamic seamlessly integrate with Kubernetes
- Full support for CI/CD software development to automate testing and achieve rapid product deployment with no system downtime
- Ingests multiple data types (events, EDRs and packets)
- AI-driven insights for real-time analysis and deciphering of encrypted Service-based Interfaces (SBI)

Automated

RADCOM ACE is a fully automated 5G assurance platform that consists of RADCOM Service Assurance, and RADCOM Network Insights, driven by AI. The entire platform is truly cloud-native, meaning that it can be deployed on cloud infrastructure, bare metal, or both. This cloud-native design enables RADCOM to deliver containerized, stateless, and cloud-agnostic solutions for dynamic automated assurance.

Containerized

Built using a microservices architecture allows for efficient scaling and updating. The Lego-like structure allows for the addition and removal of microservices and components as needed, keeping it lightweight and agile. Additionally, a microservices architecture enables smooth orchestration and interoperability. RADCOM ACE seamlessly integrates with Kubernetes (K8), which controls the containerized functions, essential to enabling automation in the network. The use of K8 allows RADCOM ACE to be resilient, meaning in the event of a component failure, it can be scaled down and replaced automatically and on-demand, meaning network failures are invisible to the end-user.

End-to-end

RADCOM ACE ingests multiple data types (events, EDRs and packets) and delivers Service Based Architecture (SBA) readiness for both SBI and non-SBI interfaces, correlating multiple data sources from the 5G NR to the 5G core, RADCOM ACE provides smart insights to ensure a superior customer experience for Standalone (SA) and Non-standalone (NSA) 5G.

RADCOM ACE is a smart containerized solution for automated assurance in NSA and SA 5G.

SOLUTION ARCHITECTURE

RADCOM NETWORK INSIGHTS

NETWORK TROUBLESHOOTING APPPLICATIONS

- Packet Analysis
- Session Analysis
- Network Analytics

CUSTOMER & SERVICE INSIGHT APPLICATIONS

- Video Streaming
- Customer Groups
- Device Insights
- Roaming Insights
- VoLTE Insights
- Customer Care
- Fixed Broadband
- RAN Analysis

External Outputs
Kafka Streaming | NFVO | BSS | OSS | CSV | API |

RADCOM SERVICE ASSURANCE

- Applications Backend
- Machine Learning
- Heuristic Modelling
- Anomalies Detection
- Big Data Analytics
- Trace Rules

EVENT BUS
(Data Processing, Streaming Analytics and Internal Communication)

FOR 5G NETWORKS:
Network Events, Event Detail Records & Packets

DATA ACQUISITION

- I.C.O.N
- cProbe
- vProbe

FOR 3G/4G NETWORKS:
Network Packets

External Inputs
PM | Events | Alarms | CRM | Legacy Probes

RADCOM NETWORK VISIBILITY

- Smart Sampling
- Session-aware
- Traffic Distribution
- Smart load balancing
- Management at Scale

- 5G
- 4G
- 3G
- IMS
- VoIP
- VoLTE

RADCOM SERVICE ASSURANCE

RADCOM Service Assurance forms a crucial part of the RADCOM ACE solution. Delivering smart end-to-end network visibility, RADCOM Service Assurance efficiently collects data from multiple sources and smartly correlates into RADCOM Network Insights driven by AI.

For full network visibility, RADCOM Service Assurance captures both packet-based data and network events via two methodologies:

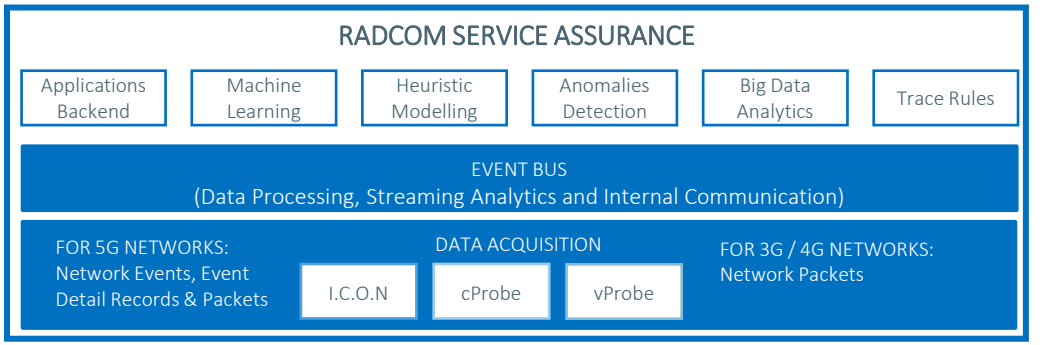
- RADCOM Containerized Probes (cProbe Adapters) provide a solution for packet monitoring in 5G networks

- RADCOM I.C.O.N for monitoring network events
    - Smart, containerized, and stateless functions
    - Monitors, correlates, processes, and analyzes multiple types of network events on one lightweight node

Both RADCOM cProbe and RADCOM I.C.O.N allow for an extremely high throughput that can handle the correlation of an unlimited amount of data, which will be crucial for monitoring in 5G.

As part of RADCOM ACE, RADCOM Service Assurance is containerized and fully automated. Built with a microservices architecture, it seamlessly integrates with Kubernetes, so operators can transition to a closed-loop approach for managing the customer experience. Additionally, RADCOM Service Assurance implements a full pipeline for Continuous Integration/Continuous Deployment (CICD), which enables the operator to achieve rapid deployments of change requests and product customizations, including automatic testing and verification cycles. Operators need to have the ability to react to changes and customizations on-demand and, therefore, must deploy the use of a full CI/CD strategy.

RADCOM Service Assurance is a smart, containerized, and lightweight solution for 5G NSA and SA.



RADCOM I.C.O.N.

RADCOM I.C.O.N. is a single containerized, stateless component that combines front-end probe functionality with complex-back end processing into one standalone monitoring cluster delivering full network visibility in 5G from the RAN to the network core.

Due to its stateless architecture, I.C.O.N has a low footprint and consumes minimal data while still boasting high performance. Its on-demand functionality makes it ideal for the 5G network as it can react in real-time to changes in the network, launching services as required keeping it lightweight and agile.

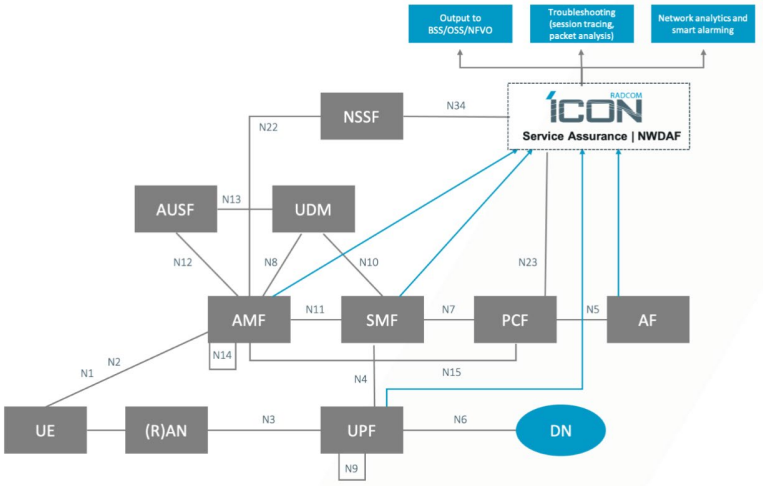
RADCOM I.C.O.N

RADCOM'S NWDAF SOLUTION

As part of the new 5G core architecture, one of the network functions will be called the Network Data Analytics Function (NWDAF), which provides a centralized function for data collection and analytics, enabling closed-loop optimization. RADCOM I.C.O.N is at the heart of RADCOM's NWDAF solution. It is designed for the collection and analytics of the network data, from across the entire 5G network, acquiring data close to the source, and seamlessly integrating with an operator's cloud environment.

RADCOM I.C.O.N as part of RADCOM Service Assurance delivers an enhanced NWDAF offering to the operator with end-to-end troubleshooting as well as complete service and customer visibility, providing a comprehensive NWDAF and an end-to-end service assurance solution.

For more detailed information on RADCOM's NWDAF solution, download the solution brief here



RADCOM I.C.O.N. provides the NWDAF as well as end-to-end assurance with call tracing and packet analysis

RADCOM NETWORK INSIGHTS

Ensuring a high-quality customer experience will require an independent auditor to correlate all the data, extract smart insights, pinpoint where there are customer-affecting service degradations, and troubleshoot the network performance. Operators need next-generation, container-based solutions that provide them with low-level tools such as call tracing and packet analysis to perform network troubleshooting for the new underlying network architectures. Also, operators need to understand the overall customer experience and end-to-end service performance with the ability to drill down to the lower level to perform root cause analysis.

The 5G network core is designed with an SBI where encryption using TLS 1.3 is the default, which poses an issue to operators as passive probing is no longer effective. Operators, therefore, need to collect data through event-based feeds using RADCOM I.C.O.N.

As part of RADCOM ACE, RADCOM Network Insights takes the data which has been collected and analyzed by RADCOM Service Assurance and applies cutting edge AI and Machine Learning (ML) techniques to derive real-time insights for network troubleshooting.

RADCOM Network Insights uses both Network Analytics tools as well as Customer and Service Insights to deliver a complete picture of a customers' Quality of Experience (QoE).

RADCOM NETWORK INSIGHTS

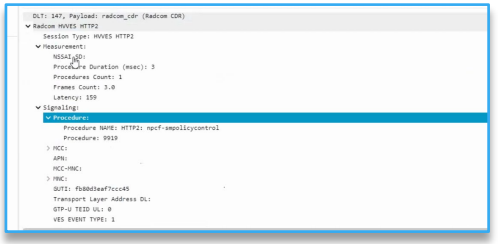
TROUBLESHOOTING AND NETWORK ANALYTICS

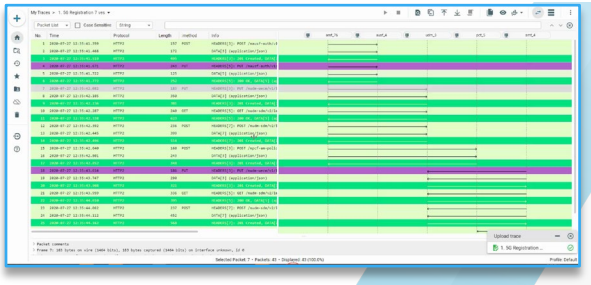
RADCOM's network troubleshooting portfolio includes both front-end network analytics and troubleshooting platforms; RADCOM Packet Analyzer, RADCOM Session Analyzer, and RADCOM Network Analytics.

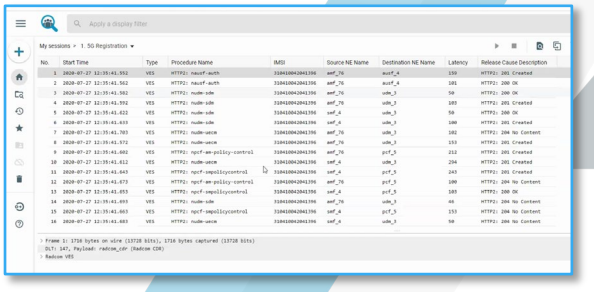
RADCOM Packet Analyzer is a packet and protocol analyzer used to view any packet flowing through the network for any selected subscriber or time. It enables the operator to capture and analyze packets for network troubleshooting by Network Interfaces, 3rd Legacy Probes, and Network Element Logs via APIs, and NFVI Monitoring.

RADCOM Session Analyzer is a session-based, call tracing application used for detailed network analysis. With any combination of flexible filters, RADCOM Session Analyzer provides an end-to-end correlated view of the subscriber or network session for root cause analysis and quick resolution of issues.

RADCOM Network Analytics application enables operators to monitor KPI trends smartly and drill down for network troubleshooting. Supporting multi-technologies (2G, 3G, 4G, LTE, and 5G) and multi-network environments, the application offers a series of network KPIs that reflect performance across all domains.







RADCOM NETWORK INSIGHTS

CUSTOMER AND SERVICE INSIGHTS

RADCOM Network Insights, as part of RADCOM ACE, provides detailed Service Operation and Customer Experience intelligence for mobile and fixed-line broadband networks by monitoring Key Quality Indicators (KQIs) and Key Performance Indicators (KPIs).

These are calculated based on numerous collected OSS/BSS data sources such as user and control plan probe data, network fault and performance data, call trace, CRM data, etc. As part of the end-to-end solution, RADCOM Network Insights enables a number of essential use cases including, but not limited to:

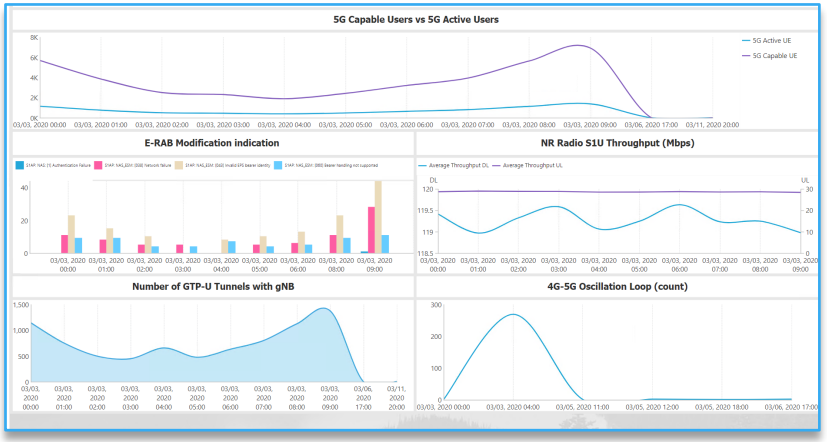
- Tier 1 Customer care for efficient and effective resolutions to network issues.
- Proactive Care for VIPs ensuring the operators most valuable customers experience fewer network issues.
- IoT service assurance supporting significant numbers of devices which are required to communicate with one another.
- RAN Analytics monitoring the RAN functionality where approximately 70% of network issues occur and optimizing the network using AI and ML.
- Maximizing Roaming Analysis identifying revenue opportunities and supporting customers who are roaming outside of the operators' network.
- Video analytics using AI and heuristic modelling to provide an understanding of the perceived QoE where the majority of traffic is encrypted.
- VoLTE analysis assuring high-quality voice calls in all IP-networks.

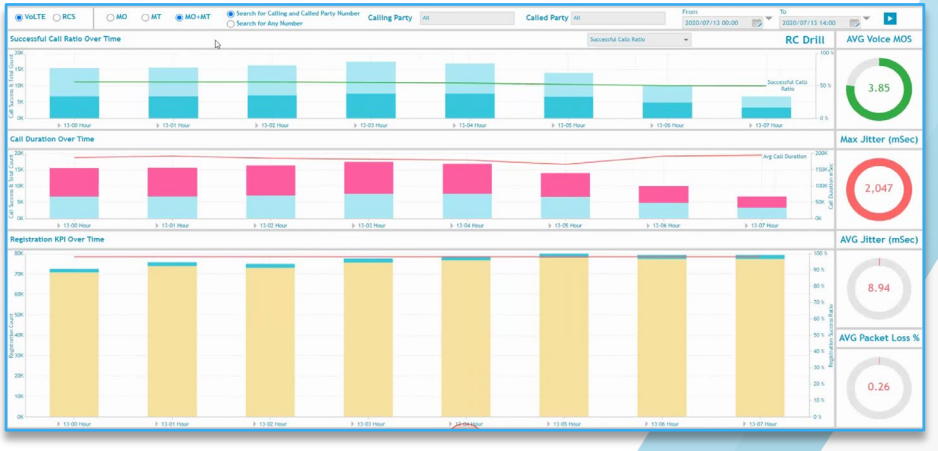
RADCOM NETWORK INSIGHTS

CUSTOMER AND SERVICE INSIGHTS

RADCOM Network Insights uses advanced technologies in AI and ML and applies these techniques to the data, which immediately highlights and alerts any service or customer experience degrading trends and delivers underlying root cause with suggested next best action. Network performance degradation or a network fault are visually linked to the impacted services and customers, while historical trouble tickets info is used to classify temporary or chronic problems.

RADCOM's customer and service insights are driven by AI and ML for automated root cause analysis and drill-down troubleshooting from the session level down to an individual packet or event.



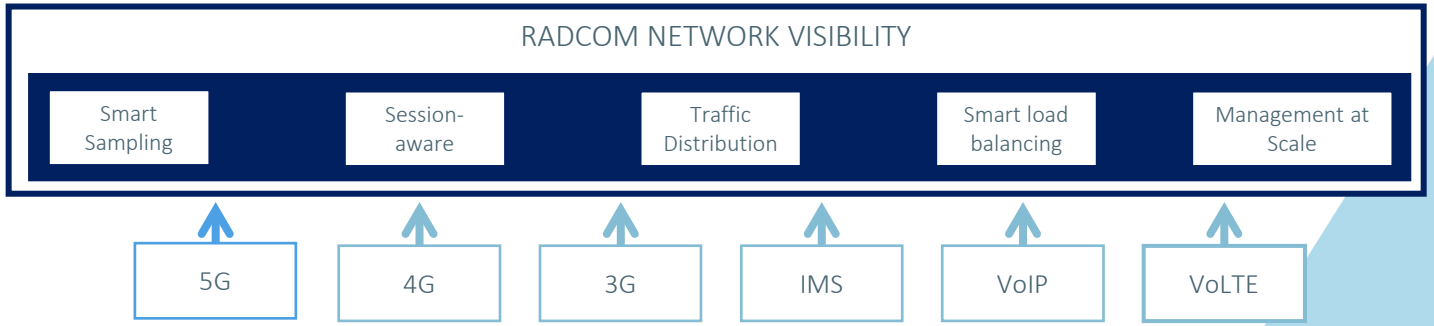


RADCOM NETWORK VISIBILITY

RADCOM Network Visibility can be delivered together with RADCOM ACE or as a standalone solution for an integrated cloud-native solution. With advanced packet broker capabilities that ensure intelligent traffic distribution, smart load balancing, and intelligent sampling for full end-to-end visibility across the network. RADCOM provides automating orchestrating and on-demand cloud-native Network Visibility (with ingress load balancing). RADCOM Network Visibility helps to distribute network traffic from multiple cloud environments to service assurance probes, security tools, and other systems.

RADCOM Network Visibility can be instantiated in minutes and managed centrally, scaled via integration with NFV MANO and Orchestration, to provide visibility from the edge to the network core. This means that as network changes occur, they are reflected in the visibility layer. Larger scale operators with multiple cloud environments can deploy Management at Scale, which enables the simultaneous management of high volumes of traffic (in a central GUI, via NETCONF/YANG or a CLI) using multiple virtual filters.

Management at Scale allows operators to configure rules once and apply them on-demand to tens of thousands of virtual network packet brokers (vNPBs) instantly. Operators are, therefore, able to gain an end-to-end view of the entire network and achieve full network visibility.



A SMART APPROACH TO MONITORING IN 5G

The nature of the 5G network requires the capture data from multiple sources, followed by smart correlation, processing, indexing, and analysis.

RADCOM ACE delivers this with its intelligent automated, containerized, and on-demand functionality. In RADCOM Service Assurance, the powerful combination of cProbes with RADCOM I.C.O.N means the collection of data from both packets and events delivers the all-important network visibility and AI-driven insights.

RADCOM offers a disruptive technology-based subscription pricing model. This is risk-free for the operators, with a forecastable fee over multiple years irrespective of capacity or subscriber growth. RADCOM's cloud-native pricing model delivers CAPEX and OPEX savings from day one.

RADCOM ACE is **Automated, Containerized** and delivers complete **End-to-end** visibility for your 5G network.

Visit our website at: www.radcom.com