IoT Assurance

Anritsu
Advancing beyond

Executive Summary

> “Whether... smart cities, cars, lockers, meters, or something else; IoT Assurance has you covered.”

Cellular IoT

Cellular IoT (CIoT) is a set of technologies enabling communication between devices and data networks using cellular networks. It provides a way for devices like sensors and actuators to connect to other networks and share data without the need for traditional wired connections. Cellular IoT technologies are designed to be energy-efficient, cost-effective, and suitable for a wide range of IoT applications.

The main technologies falling under the umbrella of Cellular IoT are:

- **NB-IoT (Narrowband IoT)**: This is a low-power, wide-area network (LPWAN) technology that allows for efficient communication between devices over long distances. It is well-suited for applications that require sporadic transmission of small amounts of data, such as smart meters or agricultural sensors.

- **LTE-M (LTE for Machines)**: LTE-M is another cellular technology designed for IoT devices. It provides a balance between data rate, coverage, and power consumption. LTE-M is suitable for applications that require moderate data rates and improved mobility, making it a good fit for applications like asset tracking and wearables.

Both NB-IoT and LTE-M are part of the LTE (Long-Term Evolution) standard, and they share the same underlying infrastructure.

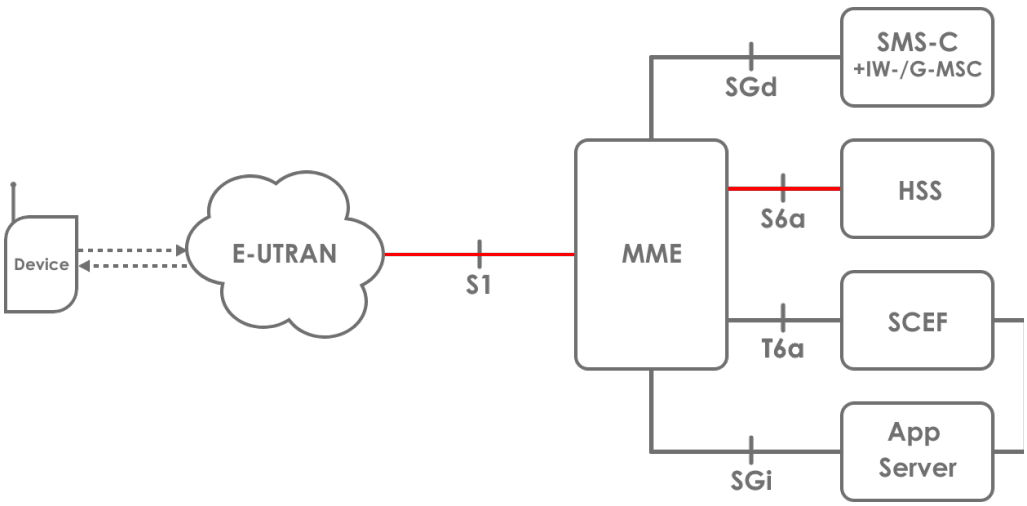
IoT Assurance is a must-have for Mobile Network Operators (MNOs) who will need trusted analysis to support data-driven decisions on network services and resource configuration, deployment, and usage.

Anritsu provides performance management, analytics and anomaly detection on CIoT for the deepest insights into the experience of devices on the network.

IoT Assurance dives deep into S1 and S6a procedures for NB-IoT and LTE-M traffic to provide unparalleled insights on:

- Failure Analysis
- Performance Analysis
- Marketing Analysis
- Network Function Monitoring
- Service Monitoring
- Optimisation
- Planning

IoT Assurance is designed to meet the detailed and demanding requirements of today’s MNOs who choose to offer the best in cellular IoT services to their business customers. Whether it is smart cities, cars, lockers, meters, or something else; IoT Assurance has you covered.



IoT Assurance dives deep into S1 and S6a procedures for NB-IoT and LTE-M traffic

Solution Overview

> Improve overall experience by ensuring consistent connectivity and performance for business-critical applications.

Use Cases

Network Operations Assurance for IoT

- Continuous, real-time monitoring of network performance
- Deep-dive troubleshooting of issues

Detect and resolve connectivity issues faster using anomaly detection and continuous monitoring of real-time data and alerts.

Roaming Assurance for IoT Devices

- Ensuring seamless connectivity as devices roam between visited networks

Analyse and optimise roaming performance ensure SLAs are met and enhance end-user experience.

Experience Assurance for IoT Devices

- Ensuring the highest quality of service for devices and their end-users
- Easily view Top N and Worst N for multiple dimensions

Monitor and improve IoT subscriber experience with detailed analytics and dozens of IoT-specific KPIs.

IoT Application Performance

- Detailed analytics for specific application performance

Improve overall experience by ensuring consistent connectivity and performance for business-critical applications.

Target Users

Network Operations Managers

Responsibilities:
Oversee network performance, manage operations, and troubleshoot issues.

Needs:
Real-time monitoring, quick troubleshooting, and efficient network management.

Benefits:
Streamlined network operations and improved efficiency.

Roaming Managers

Responsibilities:
Manage roaming performance and ensure seamless connectivity.

Needs:
Accurate roaming analytics, configurable scoring models, and detailed performance insights.

Benefits:
Increased precision and applicability of roaming analytics.

Customer Experience Managers

Responsibilities:
Monitor and enhance subscriber experience.

Needs:
Single source of truth, optimised data modelling, and advanced user plane scoring.

Benefits:
Ensured high-quality user experience.

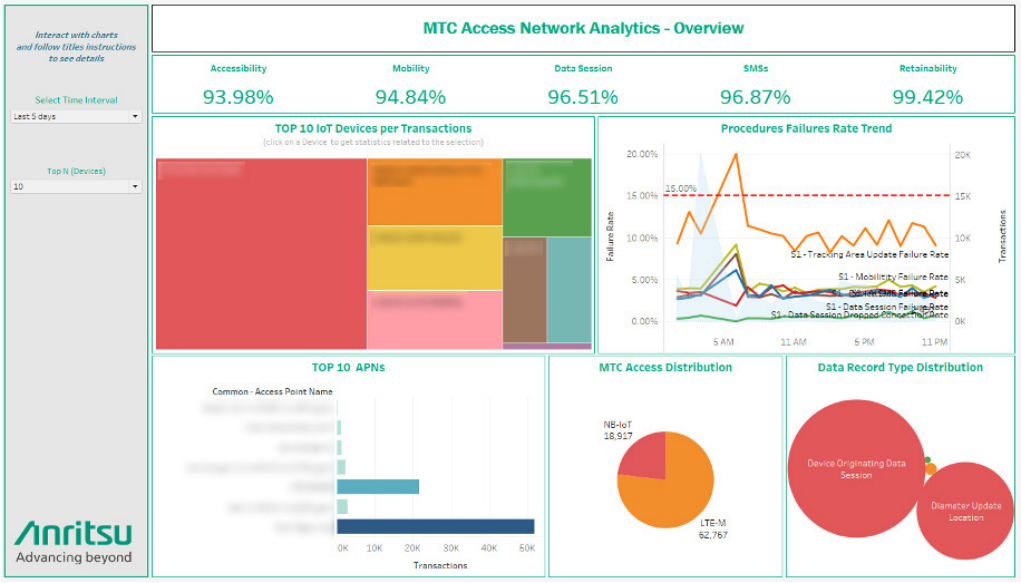
Application Performance Analysts

Responsibilities:
Ensure consistent performance for critical applications.

Needs:
Detailed analytics, consistent connectivity.

Benefits:
Improved customer experience through consistent application performance.

Technical Overview



Advanced Analytics

IoT Assurance provides the following Advanced Analytics Dashboards out of the box:

Access Network Analytics

This dashboard aims to discover issues in the functioning of the access network for the CIoT devices and traffic and access technology network elements. Operations and Quality departments will benefits greatly from these insights.

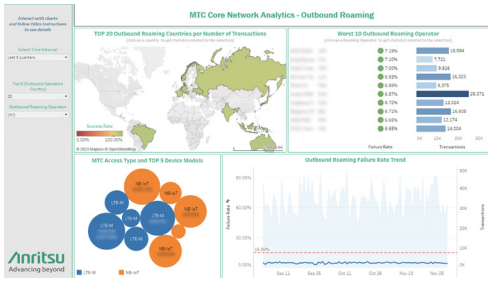
Guided drill-downs from an overview to the root cause reduce the mean-time-to-resolution for Operations teams.

Network and Service Scoring highlight problem areas, devices, network elements or transaction types (Accessibility, Mobility, and Retainability).

Core Network Analytics for Outbound Roaming

This dashboard allows users to view a summary of IoT Outbound Roaming on the Diameter S6a interface.

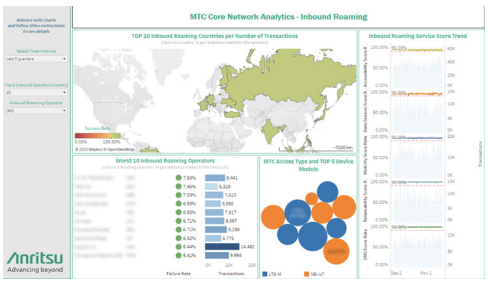
Users can slice and dice by time, visited countries and visited operators.



Core Network Analytics for Inbound Roaming

This dashboard allows users to view a summary of IoT Inbound Roaming on the S1-MME interface.

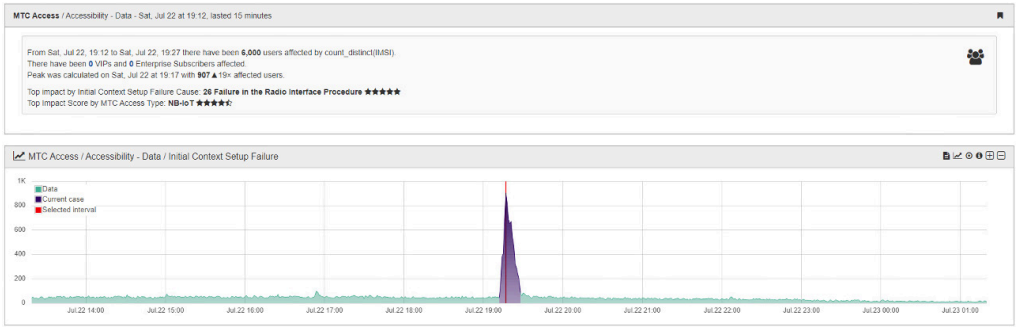
Users can slice and dice by time, visiting countries and visiting operators.



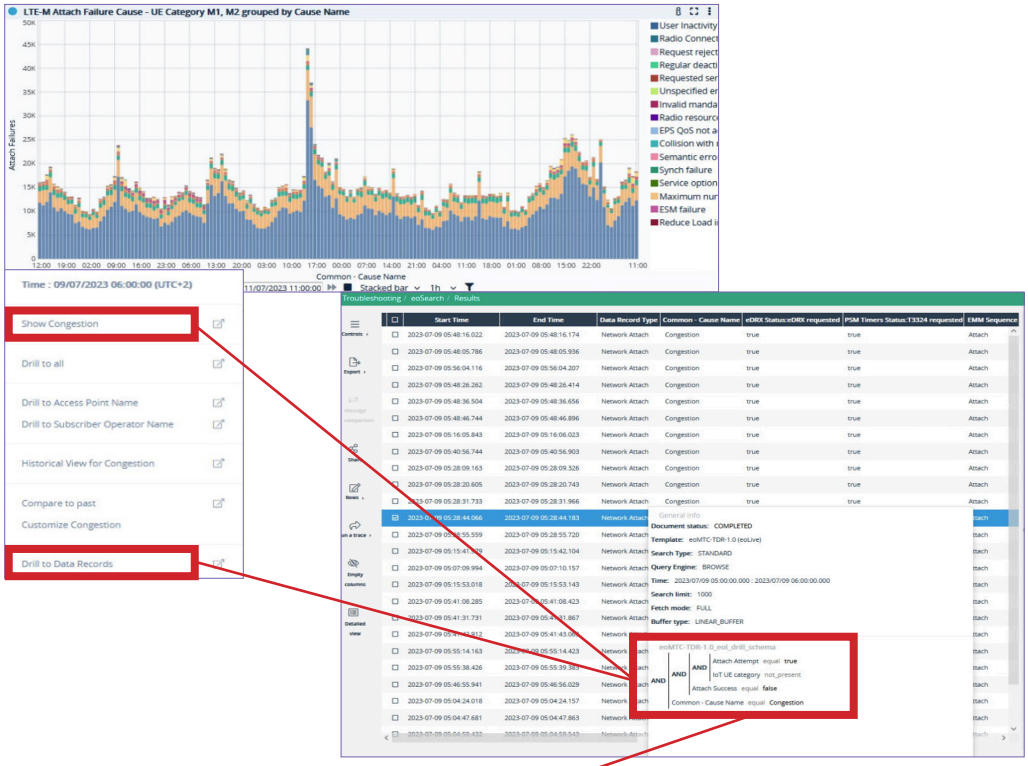
> “Guided drill-downs from an overview to the root cause reduce the mean-time-to-resolution for Operations teams.”

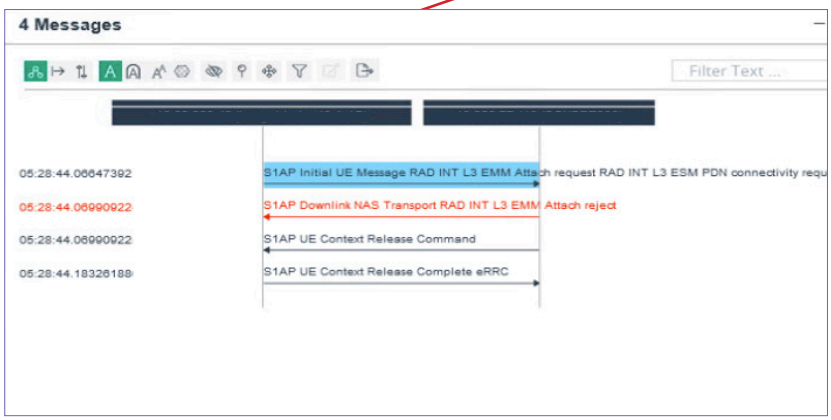
Screenshots

IoT Assurance Anomaly Detection



IoT Assurance Performance to Packet Drill-down





Metrics & Analyses Overview

Network Performance Monitoring

IoT Assurance includes the following example IoT-specific KPIs out of the box:

- S1 - Attach Failure Rate
- S1 - Authentication Failure Rate
- S1 - Default EPS Bearer Context Activation Failure Rate
- S1 - Detach Failure Rate
- S1 - Control Plane Service Request Failure Rate
- S1 - Initial Context Setup Failure Rate
- S1 - Device Originating SMS Failure Rate
- S1 - Device Terminating SMS Failure Rate
- S1 - PDN Connectivity Failure Rate
- S1 - Service Request Failure Rate
- S1 - Tracking Area Update Failure Rate
- S1 - Device Data Session Drop Rate
- S1 - Data Session Distribution
- S1 - Data Session Initiation Failure Rate
- S1 - UE Context Modification Failure Rate
- S1 - AVG time of Device Accepted T3324 Timer (seconds)
- S1 - AVG time of Device Accepted T3412 Timer (seconds)
- S1 - Incoming Handover Failure Rate
- S1 - Path Switch Failure Rate
- Diameter - Roaming Inbound Location Update Failure Rate
- Diameter - Roaming Outbound Location Update Failure Rate

In addition, there are multiple pre-defined dashboards providing:

- Overview
- CIoT Services Analysis
- IoT Data Service Analysis
- IoT Roaming Analysis

Anomaly Detection

IoT Assurance includes the following example anomaly detection analysis-types out of the box:

Error-based Analyses:
Accessibility – Diameter Update Location Failure – Result Code
Accessibility – Diameter Update Location Failure – Experimental Result Code
Accessibility – Diameter Update Location Failure – Inbound Roaming – Result Code
Accessibility – Diameter Update Location Failure – Inbound Roaming – Experimental Result Code
Accessibility – Diameter Update Location Failure – Outbound Roaming – Result Code
Accessibility – Diameter Update Location Failure – Outbound Roaming – Experimental Result Code

Time-based Analyses:
Response Time Analysis – MTC Diameter Transactions
Response Time Analysis – MTC Diameter Transactions - Inbound Roaming
Response Time Analysis – MTC Diameter Transactions - Outbound Roaming

Volume-based Analyses:
Signalling Storm – MTC Diameter Update Location
Roaming Analysis – MTC Diameter Inbound Roaming Update Location
Roaming Analysis – MTC Diameter Outbound Roaming Update Location

All analyses are fully configurable and new analyses can be easily created to accommodate new use cases.

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