MAVENIR™

MAVENIR'S ARTIFICIAL INTELLIGENCE (AI) AND ANALYTICS

Mavenir's Artificial Intelligence (AI) and Analytics Solutions Portfolio consists of products that are cloud-native, standards based with resource efficient architecture, and use advanced algorithms to address real-world problems faced by network operators. Across the network, Mavenir's suite of **Analytics** tools help operators collate and visualize network performance, faults, resource utilizations, incidents and other insights, as well as engage in predictive network planning and optimization in near real-time to enable network automation.

In the core network, Mavenir's **Network Data Analytics Function (NWDAF)** consolidates and presents insights into network events, and serves as a source of analytics information to allow all core network nodes and Operations, Administration and Management (OAM) to perform tasks more effectively. NWDAF enables other Network Functions (NFs) with analytics data that can be retrieved on-demand from NWDAF. Additionally, NWDAF enhances usual network procedures such as paging, Session Management Function (SMF) selection during Packet Data Network (PDN) establishment, and dynamic Quality of Service (QoS) policy updates.

In the Radio Access Network (RAN), Mavenir's **Non-Realtime** and **Near-Realtime RAN Intelligent Controllers (RICs)** follow the specifications of the O-RAN Alliance & 3GPP. The RIC makes radio network operations efficient by near real-time automation of network configuration, optimization, and enforcement of dynamic policies at per user and service level granularity. Though RIC is defined for OpenRAN, Mavenir's RIC algorithms have proven interworking and benefits in traditional and virtual RAN deployments, which allows Mavenir's RIC to be considered a next generation Self-Organizing/Optimizing Networks (SON) controller.

At the edge between RAN and core, Mavenir's **EdgeAI** applications can be deployed to perform real-time analytics of application streams, including Industrial Internet of Things (IIoT) sensor data, and provide advanced edge applications, such as Intelligent Video Analytics, for near real-time object detection.

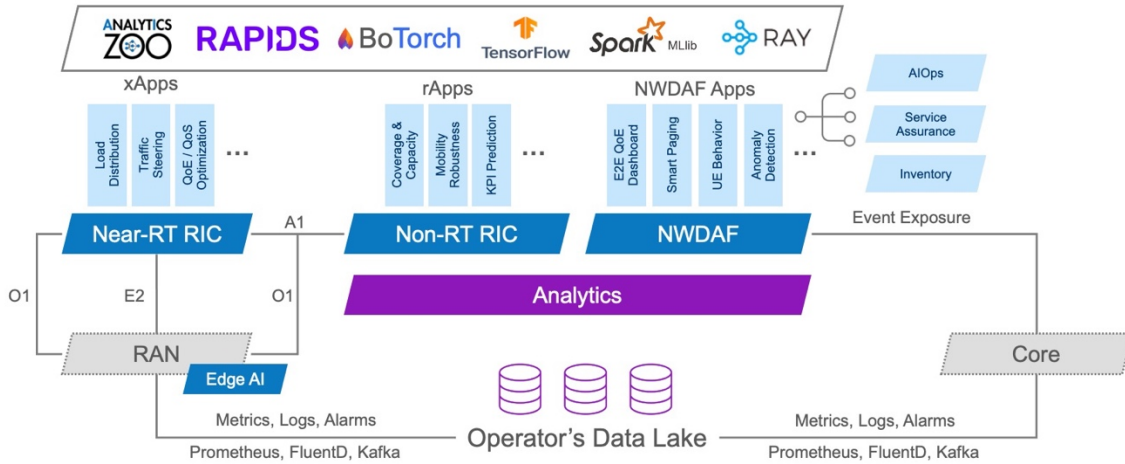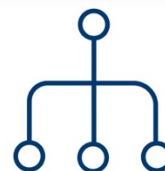**Unified AI & Analytics across RAN, Core, Applications, Platform, Transport, Devices & Edge**

Figure 1 – Mavenir AI and Analytics Solutions Portfolio Components

Why Mavenir for **AI and Analytics**

Open platform featuring standards-compliant interfaces and procedures	Vendor independent solution can work on any vendor's RAN and Core	Comprehensive coverage for all telco domains and network functions	Hyper converged Edge stack with fully integrated and tested hardware and software	AI and Analytics deployments across Tier 1 operators globally

Mavenir offers real-time and near-real-time insights for some of the world's largest **Tier 1 networks, processing billions of records per day.**

Mavenir solutions allow Tier 1 operators to:

Optimize Network Performance	Enable Faster Reporting and Response	Achieve Cost Savings

Key Functionalities of AI and Analytics Solutions

As a 3GPP defined network function, the **NWDAF** plays a key role in collecting events from network functions, correlating and analyzing them to provide historical statistics and predictions as Analytics services for different standards-defined use cases.

While the 3GPP standards are vague about how the NWDAF can collect and make use of RAN information, Mavenir's NWDAF is capable of ingesting and correlating data from across the network, including RAN, transport, and core. This enables the creation of end-to-end dashboards that allow the operator to visualize network performance down to the granularity of single user sessions, along with high accuracy predictive analytics services.

The **Non-Realtime RAN Intelligent Controller (Non-RT RIC)** is logically a part of the Service Management & Orchestrator (SMO). The Non-RT RIC applications take over where the legacy SON leave off, opening the door to a rich set of applications called rApps, such as Massive MIMO optimization using R1 interface open standard APIs. These apps tune network performance in a way that is more open and extensible than previous options with SON.

Mavenir's Non-RT RIC also features pre-built rApps, including radio coverage hole and capacity optimization, load balancing across radios, optimized beam alignment, and intelligent traffic steering, making extensive use of machine learning (ML)-tools such as Bayesian Optimization and Reinforcement Learning. These versatile tools enable operator-specified optimization objectives through tuning any available parameters in a completely data-driven manner, without the need to build expert knowledge in advance of how the RAN system behaves.

The **Near-Realtime RAN Intelligent Controller (Near-RT RIC)** complements the Non-RT RIC through implementation of policies derived and distributed by the Non-RT RIC. Mavenir's Near-RT RIC uses patented technology to identify user equipment (UE) uniquely for performance tracking and control along with standards based A1 and E2 interface procedures at per service/UE level granularity. It interacts with the RAN on the timescale of a few milliseconds and is capable of directly triggering actions such as handovers, carrier aggregation, and dual connectivity. The Near-RT RIC can adjust the scheduler parameters in the Distributed Unit (DU) to meet the QoS goals set forth by the Non-RT RIC.

Mavenir's **EdgeAI** applications focus on advanced consumer, enterprise, and industrial use cases, which combine the advantages of efficient service delivery over 5G through high bandwidth, high density, and low latency.

EdgeAI applications are designed to reduce load on the transport network by performing necessary data processing right at the edge of the network. The applications use the latest generation AI/ML engines to make inferences at the edge, render content for the end devices to reduce cost and complexity of these devices, and make time-critical decisions for industrial machinery and next generation consumer devices. The portfolio currently includes three board categories of applications: Intelligent Video Analytics, AR/VR/XR and IIoT.

AI and Analytics Solutions Built on Mavenir's Framework for Intelligent Operations

The AI and Analytics portfolio builds on top of Mavenir's **Framework for Intelligent Operations.** The framework supports:

> High-performance **Big Data Ingestion**
> Large volume **Data Storage**
> **High Availability** features through replication and redundancy
> Interactive data exploration with **Visualization and Monitoring**
> A library of **ML Algorithms**
> A hosting environment for **Pluggable Applications** that effect network changes through **Actuators**
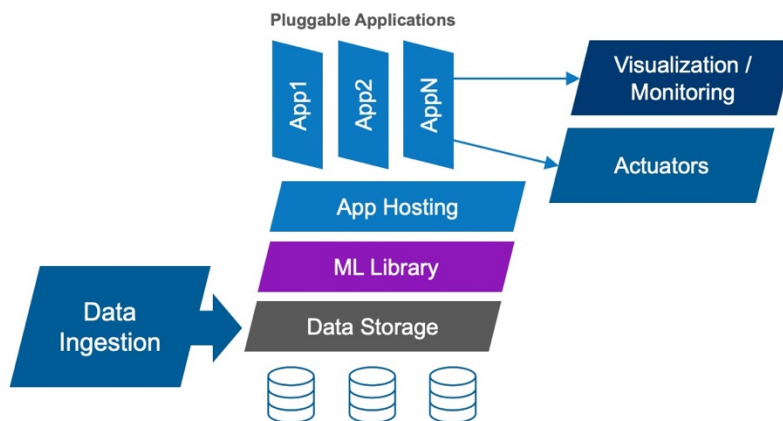

Figure 2: Mavenir's Framework for Intelligent Operations

All components of the solution portfolio are built from cloud-native technologies and run seamlessly inside Maveinr's Webscale Platform for Container Deployment or inside any standard Kubernetes cluster environment. Components can be deployed in a centralized or distributed fashion to minimize the bandwidth required for data movement on a per-use case basis.

A common Framework for Intelligent Operations provides key facilities such as a data lake, data ingestion pipelines, pluggable application lifecycle management, and visualization capabilities. Where required, the framework connects to existing operator data lakes for maximum deployment flexibility.

Learn More

For more information about Mavenir AI and Analytics solutions, visit mavenir.com.

About Mavenir

Mavenir is leveraging our DNA as a pioneer in advanced technology to focus on the vision of a single, software-based mobile network that can run on any cloud. We are reshaping the industry with our multi-generational, cloud-native, end-to-end software that is reducing complexity, de-risking digital transformation and rapidly modernizing networks. We are the trusted partner to customers around the globe, who are transforming the way the world connects — realizing the amazing new services and the promise of 5G and beyond.

For more on Mavenir Solutions please visit our website at www.mavenir.com