



PRODUCT BRIEF

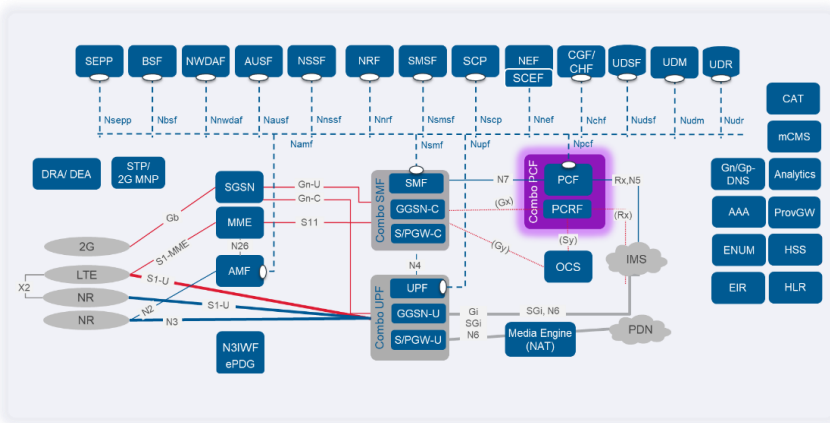
Mavenir's Combo Packet Core Function



Mavenir combines the functionalities of the Packet Control Function (PCF) and Policy and Charging Rules Function (PCRF) into a single, integrated platform called Combo PCF. It enables Communication Service Providers (CSPs) to easily allocate bandwidth to users, enforce usage policies, and manage network resources for enhanced Quality of Service (QoS), based on factors such as subscription plans, service-level agreements (SLAs), network conditions, and user preferences.

Mavenir's Combo PCF can be integrated with 5G Core Session Management Function (SMF) Nodes for 5G subscribers and Legacy PGW/GGSNs for 2G/3G/4G subscribers. The solution can also be deployed as a standalone PCF or PCRF.

Delivering the lowest total cost of ownership, Mavenir's Combo PCF ensures that all the benefits of running a cloud-native network function can be passed directly on to operators and their customers, generating a clear impact on business growth.



Highlight features & benefits

- **3GPP Release 16-** based standard interfaces
- **Scalable architecture** significantly reduces infrastructure deployment costs
- **Cloud-native microservices design** optimizes resource usage and increases business agility
- **UDR integration** for 5G and legacy subscribers
- **VoLTE/VoNR support** with Gx/N7-Rx session binding
- **CCS/CHF integration** for quota control and spending limits management
- **Versatile policy composer** provides elegant graphical interface for building plans based on range of policy control use cases
- **Pre-defined and dynamic policy rules** application enables enhanced Quality of Experience
- **Extensive framework to build PCC rules** drawn from an array of parameters, including APN/DNN, RAT Type, Location Device and IMSI/ISDN
- **Overload control management** eliminates bottlenecks to meet SLAs
- **Carrier-grade** high availability on cost-effective commercial-off-the-shelf hardware delivers rapid value
- **Geo-redundant** deployment configuration reduces risk and improves user experience



Mavenir Combo PCF Overview

As a key component of the Mavenir Converged Packet Core (5GC and EPC) and IP Multimedia Subsystem (IMS) solution suite, Mavenir Combo PCF allows CSPs to effectively manage network resource control through policy enforcement, gating, and service flow detection. Mavenir Combo PCF offers the flexibility to support real-time policy rules, service data flow detection, usage-based monitoring control and flow-based charging.

With the ability to access subscriber information from the Unified Data Repository (UDR), Mavenir Combo PCF provides support for Policy Charging Control (PCC) decision-making. The solution harnesses Unstructured Data Storage Function (UDSF) for storing session context information and Network Repository Function (NRF) as a NF service consumer for registration and service discovery. When deployed as a standalone PCRF, the Combo PCF leverages the UDR to serve as a Subscription Profile Repository (SPR) for 4G and legacy subscribers utilizing the service-based N36 interface.

Innovative Architecture

Mavenir empowers Communication Service Providers to monetize Any-G use case networks using a 5G Standalone (SA)-ready cloud-native architecture – offering network agility, performance, and reliability across all network generations. When deployed on a 5G SA-ready architecture that supports all network generations, including 4G, the benefits of this integration exponentially increase.

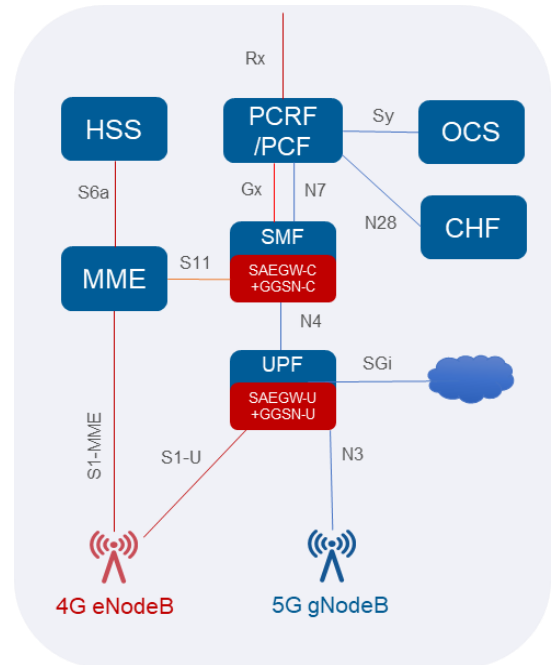
All the principal advantages of Mavenir's Cloud Native Converged Packet Core architecture are leveraged to deliver a solution for CSPs that optimizes network resources, delivers differentiated services, and monetizes their offerings more effectively than ever before. This architecture supports the rapid deployment and scaling of services, ensuring that CSPs can quickly respond to market demands and technological advancements. By utilizing a microservices-based approach, Mavenir's solution offers enhanced scalability and interoperability, allowing CSPs to integrate seamlessly with third-party systems and applications.



Mavenir Combo PCF Deployment Options

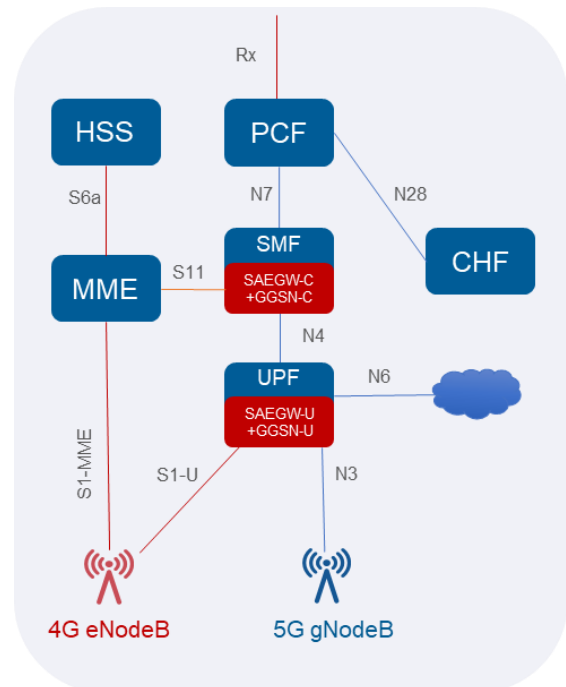
N7/N40 SBI for 5G SA, Gx/Sy for 4G and Legacy Subscribers

With this deployment option, customers have the option to seamlessly replace their PCRF with Mavenir’s Combo PCF without requiring any additional modifications to the existing 4G architecture. This solution leverages Gx/Sy interfaces and is particularly advantageous for businesses intending to maintain the usage of their P-GW in the foreseeable future. Additionally, this option enables a faster go-to-market strategy for PCRF Swap initiatives, while extending the lifecycle of legacy architecture.



SBI Interface Towards 5G Packet Core for 5G and Legacy Subscribers

This option capitalizes on 3GPP Release 16 and 17 features to implement a PCF that can cater to legacy architectures and standalone PCF 5G SA setups. It eliminates the need for Gx/Sy Diameter-based interfaces and enables users to immediately harness the benefits of Service Based Interfaces (SBI) architecture. Additionally, it provides a single policy solution for both 5G and legacy subscribers. In this model, it should be noted that the CHF (Charging Function) and SMF (Session Management Function) need to be deployed with the equivalent feature alongside the PCF in the network. This option is ideal for All-G greenfield deployments.





Policy Composer GUI

The Policy Composer provides an intuitive web-based Graphical User Interface (GUI) that supports creating, testing, and installing policies before they are applied on the Combo PCF. Operators can use the Policy Composer GUI to create custom plans based on their specific use cases. A rich set of pre-defined templates are also available to support new premium and personalized services – including family data plans, priority first-responder services and bandwidth-on-demand.

Streamlined Management and Orchestration

Mavenir's Digital Cloud Automation (MDCA) platform enables fully automated cloud deployment of all 5G packet core network functions, including the Combo PCF. This means that operators can rapidly deploy and scale their networks with minimal manual intervention, reducing time-to-market for new services and ensuring rapid response to changing network demands.

Moreover, the common observability framework provides operators with real-time insights into network performance and health. By centralizing monitoring and troubleshooting capabilities, CSPs can proactively identify and address issues, leading to improved reliability and minimal downtime. This enhanced observability also enables operators to optimize network resources more effectively, ensuring efficient utilization and enhancing overall network agility.

Maximum Reliability

Each component of Mavenir Combo PCF is designed for high availability and has no single point of failure. A well-distributed deployment of multiple instances of N-way active Combo PCF microservice pods allows for rapid failure detection and re-routing of subsequent requests to other available pods. Mavenir Combo PCF can also support multi-site geo-redundancy with service continuity, safeguarding the flow of real-time traffic through disaster events which may bring down an entire data center, or cause network failures in the interim.

Low Footprint Solution

The scale-in capabilities of the Mavenir Combo PCF allow the same software used in larger networks to be miniaturized and used for small form-factor applications such as in Non-Public Networks (NPN).



Key Features

Key Features	
PCRF+PCF	<ul style="list-style-type: none"> ▪ Support for wide range of policy control use cases <ul style="list-style-type: none"> > Dynamic and pre-defined policy rules > Rules based on APN/DNN, RAT-type, location, devices type, identity etc. > FUP and speed boosters > Time of day plans > Roaming plans > Application detection-based plans (e.g. detection, heuristics-based identification on GW/UPF) ▪ Unified Management <ul style="list-style-type: none"> > Netconf for config management > Performance counters on Kafka > Subscriber tracing > TRLs (Transaction Logs) ▪ Elegant Policy Composer with intuitive policy design UI ▪ Policy programming using auto-generated LUA scripting ▪ Geo-redundancy with session or service continuity ▪ IMS Emergency Services support ▪ PRA and Geo-fencing for Fixed Wireless Access (FWA) use case ▪ P-CSCF restoration ▪ Integration with UDR based subscriber profile repository <ul style="list-style-type: none"> > Utilizes NoSQL high performance and highly scalable database > Standard NUDR interface support > REST-based Provisioning API
PCF	<ul style="list-style-type: none"> ▪ AM and UE policies support (URSP and ANDSP rules application) ▪ Reflective QoS ▪ Nchf interface for SLC management for 5G and legacy subscribers ▪ VoNR support with Rx interface support
PCRF	<ul style="list-style-type: none"> ▪ 5G NSA support ▪ Sy interface for OCS integration ▪ VoLTE only deployment without UDR/SPR

Combo PCF Standards References	
3GPP References	<ul style="list-style-type: none"> ▪ 3GPP TS 23.501 v16.6.0: System Architecture for the 5G System ▪ 3GPP TS 23.502 v16.6.0: Procedures for the 5G System ▪ 3GPP TS 23.503 v16.12.0: Policy and Charging Control framework for the 5G System ▪ 3GPP TS 23.380 IMS Restoration Procedures ▪ 3GPP TS 29.503 v16.4.0: 5G System; Unified Data Management Services



	<ul style="list-style-type: none"> ▪ 3GPP TS 29.500 v16.6.0: 5G System; Technical Realization of Service Based Architecture ▪ 3GPP TS 29.507 Access and Mobility Policy Control Service ▪ 3GPP TS 29.508 v16.6.0: 5G System; Session Management Event Exposure Service ▪ 3GPP TS 29.510 v16.6.0: 5G System; Network function repository services ▪ 3GPP TS 29.512 v16.5.0: 5G System; Session Management Policy Control Service ▪ 3GPP TS 29.513: Policy and Charging Control signaling flows ▪ 3GPP TS 29.514 v16.6.0: 5G System; Policy Authorization Service ▪ 3GPP TS 29.518 v16.6.0: 5G System; Access and Mobility Management Services ▪ 3GPP TS 29.519 v16.4.0: 5G System; Usage of the Unified Data Repository Service for Policy Data, Application Data and Structured Data for Exposure ▪ 3GPP TS 29.525: UE Policy Control Service ▪ 3GPP TS 23.401 v14.5.0: Architecture for E-UTRAN ▪ 3GPP TS 23.402 v14.5.0: Architecture for non-3GPP access ▪ 3GPP TS 23.203 v14.5.0: PCC Architecture ▪ 3GPP TS 23.527 V16.3.0: Restoration Procedures ▪ 3GPP TS 29.212 v14.5.0: Gx reference point ▪ 3GPP TS 29.213 v14.5.0: Signaling flows and parameter mapping ▪ 3GPP TS 29.214 v14.5.0: Rx reference point ▪ 3GPP TS 29.219 v14.5.0: Sy reference point
IETF References	<ul style="list-style-type: none"> ▪ IETF RFC 6733: Diameter Base Protocol ▪ IETF RFC 8506: Diameter Credit-Control Application

About Mavenir

Mavenir is building the future of networks today with cloud-native, AI-enabled solutions which are green by design, empowering operators to realize the benefits of 5G and achieve intelligent, automated, programmable networks. As the pioneer of Open RAN and a proven industry disruptor, Mavenir’s award-winning solutions are delivering automation and monetization across mobile networks globally, accelerating software network transformation for 300+ Communications Service Providers in over 120 countries, which serve more than 50% of the world’s subscribers.

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

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