



MAVENIR DIGITAL ENABLEMENT CONVERGED CHARGING SOLUTION

SOLUTION BRIEF



One of the most critical requirements for communications service providers (CSPs) looking to move to 5G is to ensure that revenue management operates smoothly and evolves to the new 5G converged charging model.

THE EVOLVING ROLE FOR CHARGING SYSTEMS IN A NETWORK

A converged charging system (CCS) was traditionally referred to as a charging system or an online charging system. Previously, 3GPP specifications defined an offline charging model (near real-time charging), then an online charging model (real-time charging) was added. Today, the infinite number of use cases available with a 5G network encouraged 3GPP to introduce the converged charging model. Converged charging handles both online and offline charging and is the only node that generates the call data records (CDRs) in the 5G core.

Worldwide 5G deployments are increasing, and unlike any other network generation, 5G presents an infinite number of yet-to-be-imagined use cases, paving the way for a cross-industry ecosystem. Hence, the most solid investment will be in a platform engineered for architectural flexibility rather than one that focuses on traditional use cases. CCS is designed to take a central role in the 5G network for service monetization with:

- ✓ Charging for traditional connectivity bundles – voice, data, and SMS services
- ✓ Support for 5G service charging over 3GPP defined charging function (CHF) for a service-based interface (SBI) together (Nchf) or any other HTTP-based interface
- ✓ Support for session and event-based charging of network usage – via SMF
- ✓ Support for usage monitoring and notification events – via policy control function (PCF)
- ✓ Support for network slice charging using various event triggers from managed network systems (MNS) and network data analytics function (NWDAF) for slice operations and analytics related events – CEF NF
- ✓ Support for CDR generation on behalf of SMF, AMF, and the rest of 5GC NFs – CGF
- ✓ Support for massive IoT (MlIoT), MEC, and private networks charging and monetization

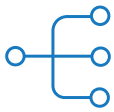
The need for a platform framework that is modern, agile, open, and can adapt to any 5G use case is also validated by 3GPP specifications and the architectural shift to a service-based architecture (SBA) for the 5G core.

USE A MODERN CHARGING SYSTEM BASED ON CLOUD-NATIVE ARCHITECTURE

Mavenir's modern charging system allows CSPs to adapt to any type of charging event triggered by the network. To facilitate new business opportunities and charge any usage type on the CSP's network, Mavenir's CCS uses a cloud-native design that supports traditional 3G, 4G, and 5G (voice, SMS, data charging) and can be deployed alongside the existing charging solution. This highly flexible core data model is supplemented by a very intuitive no-code user interface to build complex charging rules.

With Mavenir's CCS, distributed deployment, where the CHF node can be deployed both at the edge network and centrally in the primary data center, enables different charging and monetization possibilities for MEC, private networks, IoT, and network slices.

A key feature of the new CCS is the built-in multi-tenancy which enables:



**Tenants for enterprise
and network slicing**



**Tenants for
MVNOs and sub-brands**



**Tenants for technology
& service-oriented
charging**

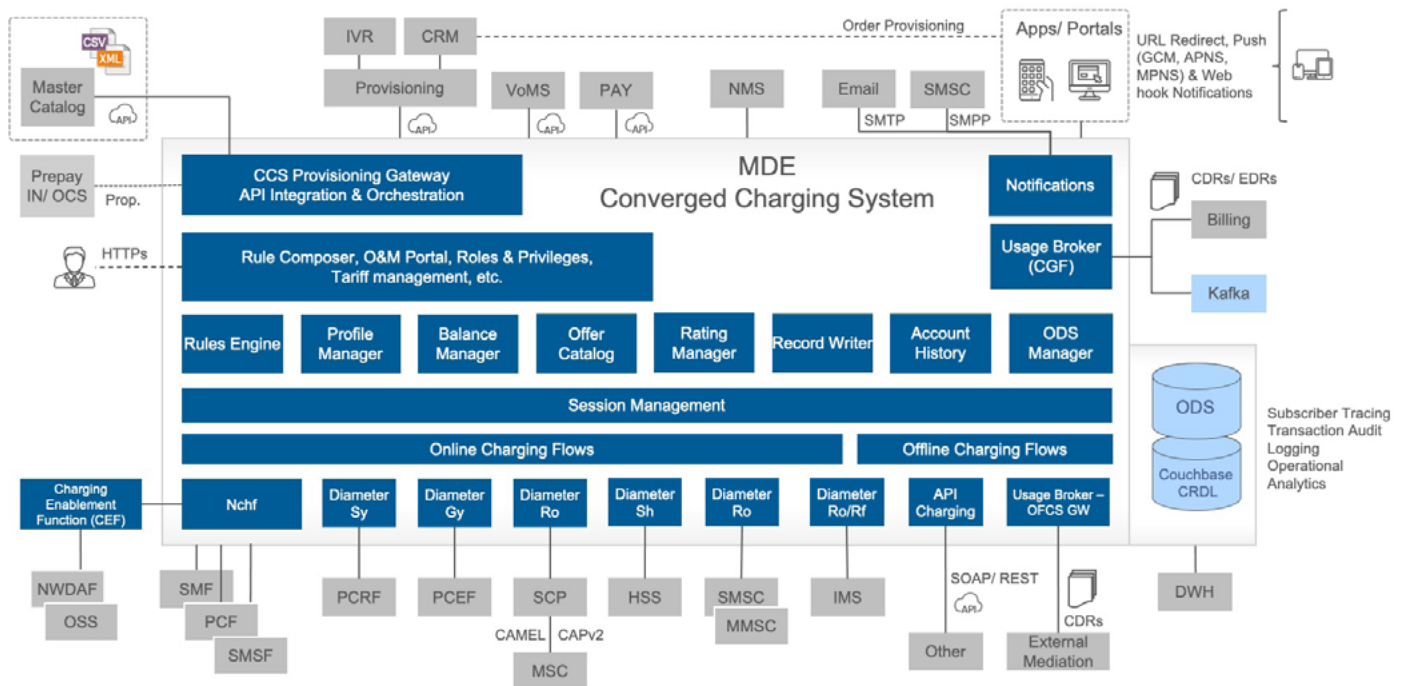




MAVENIR'S CCS SOLUTION

As the entire core and the charging solution moves to an SBA, Mavenir's CCS complies with the latest 3GPP specifications, focusing on the services and openness that require a redesign of the traditional charging solution. Mavenir's CCS is completely cloud-native and microservices-based and exposes interfaces over REST and SBI. This high-level diagram reflects how Mavenir's CCS fits into any network ecosystem to lay the foundations for convergence.

MAVENIR'S CONVERGED CHARGING SYSTEM



MAVENIR'S CCS HIGHLIGHTS

Mavenir's Converged Charging System (CCS) is a modern telecom charging system and can be deployed alongside the existing charging solution. The microservices-based, API-first, cloud-native, and headless (MACH) architecture supports the next-generation rating and charging requirements, including 5G, mIoT, MEC, and beyond. Mavenir's CCS supports complete convergence of charging models, multi-tenant capability, and is service or network agnostic for charging offer and rule definitions.

Compliant with all 3GPP Release 15 and 16 defined charging models

- Supports traditional offline-only charging model
- Supports traditional online-only charging model
- Supports the new 5G converged charging model

Technology support

- Supports charging for 4G, 5G, as well as combo nodes on a common rating function

Support for Diameter + SBI interfaces

- Natively supports the evolved packet core-based Diameter charging interfaces and the 5GC-based SBI Nchf interface, with a common RF and ABMF engine

Support for the charging enablement function (CEF)

- Charging for network slices based on events and triggers from analytics (NWDAF) and MNS is supported per the 3GPP defined function

100% microservices

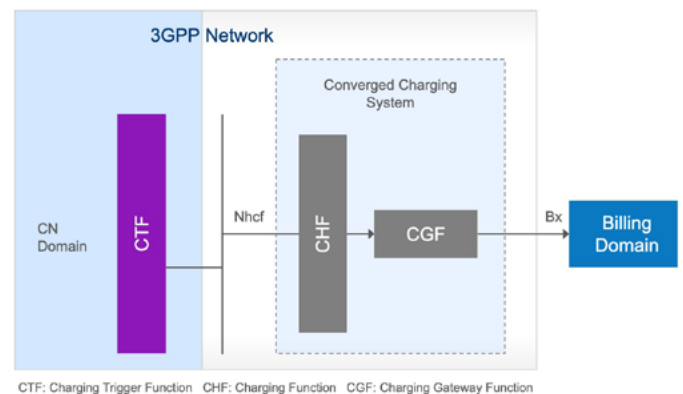
- Composed of granular and stateless microservices for realizing full benefits of cloud-native capability
- Microservices with a minimal footprint (less than 50 MB) enable new pod creation in less than 5 seconds for dynamic scaling

High performance

- High-performance NoSQL document database for infinite scalability and distributed architecture
- Support for 1800+ TPS with a single core pod, and this performance continues to increase so that CSPs can expect even higher benchmarks in the future

Lightweight deployment option for 5G CDR generation only function

- 3GPP defined CCS as the only designated node for CDR generation in 5G
- Deploy only specific microservices to enable an Nchf interface + CDR generation services in an FWA 5G network
- Best suited for initial deployments looking only for the CDR generation capability from the new 5G CHF and integrate with a legacy charging system for actual rating and billing





MAVENIR'S CCS HIGHLIGHTS CONTINUED

Flexible deployment options

- Stateless microservices allow CSPs to deploy with a small footprint in edge data centers or on-premises within a private network
- Deploy as a centralized and multi-tenant CCS hosted in the primary data center
- Active-Active and Active-Standby deployment across one or more sites

Observability and monitoring for cloud-native environments

- Granular observability and monitoring using Mavenir's telco cloud integration layer for log, performance, fault, configuration, and scalability management
- Kubernetes-managed pod auto-healing and redundancy across application clusters



UI-driven products, policies, and rating tree configurations

- A modern UI to achieve a no-code approach for building complex charging products, policies, discounts, and rating trees

Public cloud-ready

- Available for deploying on Amazon Web Services, Google Cloud Platform, and Azure

Multi-tenancy support

- Built-in separation of packages, subscriber data, interfaces, and observability and monitoring allow handling multiple tenants under a common platform
- Multi-tenancy across product, subscription, configuration, deployment

Provisioning flexibility

- Seamless provisioning whether the rating product catalog is outside of CCS (centralized) or within CCS (de-centralized)
- Extensive set of REST-based OpenAPIs for seamless provisioning and integration into IT network

Notification engine

- Extensive support for event triggers based on various charging call flows, with the ability to send subscriber notifications (threshold limits, renewal reminders, advice to charge)
- Out-of-box integration for SMS, email, and omnichannel notifications using APIs



MAVENIR'S CCS HIGHLIGHTS CONTINUED

Extensive charging features

- Flexible data models to support separate hierarchy and lifecycle states for package, subscribers, and subscriptions
- Extensive support for group accounts and subscriptions with shared account group, CUG, and friends and family accounts
- Retail subscriber-centric features such as data rollover with dynamic entitlement policies, separate charging for hotspots, renewal and reset at package and allowance levels, extensive discounts, and promotional capabilities
- Comprehensive support for traditional and new rating features:
 - Flat rating and re-rating
 - Tiered tariffs
 - Peak and off-peak charging
 - Tariff time control (TTC)
 - Telescopic rates
 - Zone and location-based charging
 - Special number charging
 - Source and destination-based charging

In the new, use-case-driven future, the importance of an agile and robust charging and monetization platform becomes paramount. The final destination for all CSPs is to move from the old charging architecture to the new SBA. This transition, which may seem very complex, is greatly simplified by Mavenir's composable architecture. Mavenir allows CSPs to deploy this CCS alongside the existing charging solution starting with a minimal set of microservices and gradually migrating from the old charging architecture to the new.

Mavenir's CCS has significantly helped customers capture new revenue streams by adding capabilities that support new use cases and services to capitalize on the evolving 5G world. Backed by Mavenir's years of experience in the telecommunications industry and more than 250 tier 1 customer deployments, our business support systems continue to be bold and disruptive, challenging the norm with innovative solutions to keep our promise of **"One Network. Any Cloud. All Software."**



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