




MAVENIR DIGITAL ENABLEMENT CHARGING GATEWAY FUNCTION

SOLUTION BRIEF



5G networks are bringing many new 5G-fueled innovations to consumers. In turn, 5G use cases increase the need for data, data feeds, and reports. New use cases also bring new partners and vendors to the ecosystem with new revenue opportunities. All this change makes it even more critical for basic functions such as ensuring the charging information is correctly transferred to the billing system operate just like they do today.

THE EVOLVING ROLE OF A CGF

The Charging Gateway Function (CGF) is commonly referred to as Mediation. The core purpose is to carry out offline network usage charging for individual subscribers as well as wholesale charging for enterprises and partners. CGF plays the vital role of orchestrating data workflows – collection, transformation, and distribution – traditionally for offline rating and charging requirements only. With data now the focal point of many operations and a driving factor for 5G business decisions, CGF's role is no longer limited to merely offline charging requirements.

A vital component for all CSPs, this telecom node is placed between network data generators and the business support systems (BSS) or IT systems that can process the generated data. The CGF collects data from nodes and intelligently applies configurable rules to filter out corrupt or irrelevant data. Specific data or event records are then aggregated and transformed into the format demanded by the target systems (enrich, process, transform). The data is generated by IP, VoIP, mobile wireless, and wireline networks over multiple formats such as Diameter, CSV, Binary, ASCII, TAP/RAP/NRTRDE, and transferred over different protocols such as FTP, sFTP, TCP/IP, and Kafka streams.



USE MAVENIR'S CGF IN THE NEW WORLD

Data has become the center point of operations and a driving factor for business decisions. Connectors are now available for reporting systems, data warehouses, and big data systems that provide critical usage insights to business and marketing teams. Revenue assurance is also one of the most important areas of focus. Hence assurance systems need a data feed to spot revenue loss trends. However, with the advent of 5G and a plethora of new use cases, the number of information consumers is likely to grow, in line with the ever-increasing volume of charging data records (CDRs) and event data record (EDRs). These new systems will drive the CGF to be much more open, flexible, and dynamic to fulfill the data requirements. The role of the CGF is ever-evolving:

An integral part of CCS in 5GC

The 3GPP 5GC specifications (Release 15 onwards) define CGF as an integral part of the new, centralized 5G Converged Charging System (CCS). CCS is expected to converge online and offline charging models and is identified as the only node in the 5GC expected to generate CDRs. As seen in Figure 1, all network usage events come to the CHF over the service-based interface (SBI) charging function (Nchf) and are passed on to the CGF. If needed, Mavenir's CGF can even help CSPs retain their legacy OCS that doesn't support the new SBI. Mavenir's CGF provides an adaptor for protocol translation, assisting customers with a gradual transition to 5G.

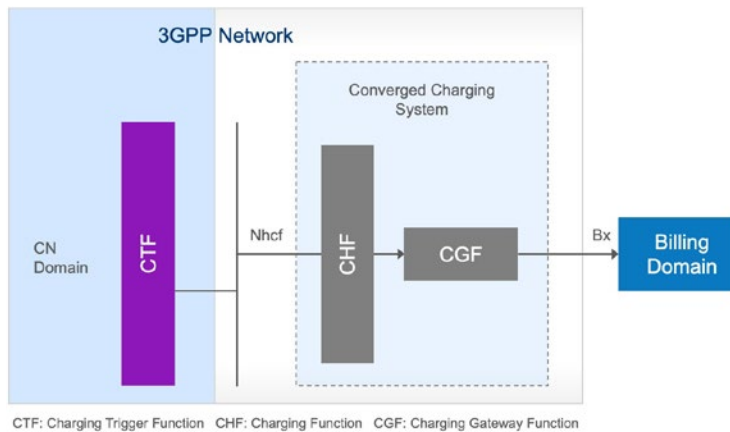


Figure 1

Network slice-related events (Operations and Analytics)

CSPs are using a 5G architecture to assign slices of their network for specific customer use cases. Multiple slices increase the data generated by the network. If a CSP needs to monitor usage in real-time for a cloud-gaming slice where quality of service and latency are critical to a consumer, event brokering becomes vital for several operational and business functions. To meet these non-traditional event charging requirements, the Mavenir's CGF addresses the event capture, processing, and transformation functions before the consumption of charging or billing nodes.



USE A MODERN CGF BASED ON CLOUD-NATIVE ARCHITECTURE

The modern CGF within the Mavenir Digital Enablement (MDE) portfolio is based on cloud-native architecture. The library of adapters is designed for different data sources and event file formats. The library is built with microservices that automatically carry out correlations, aggregation, and filtration in a true cloud-native web-scale fashion. The library uses a universal internal data movement bus to provide a common pub-sub model for the data transformation layer. As seen in Figure 2, it publishes events in real-time that are received by different applications that subscribed to them as they are being processed through the bus. MDE fully leverages the public cloud resources and services by adopting the Microservices, API-first, Cloud-native, Headless (MACH) architecture to the core.

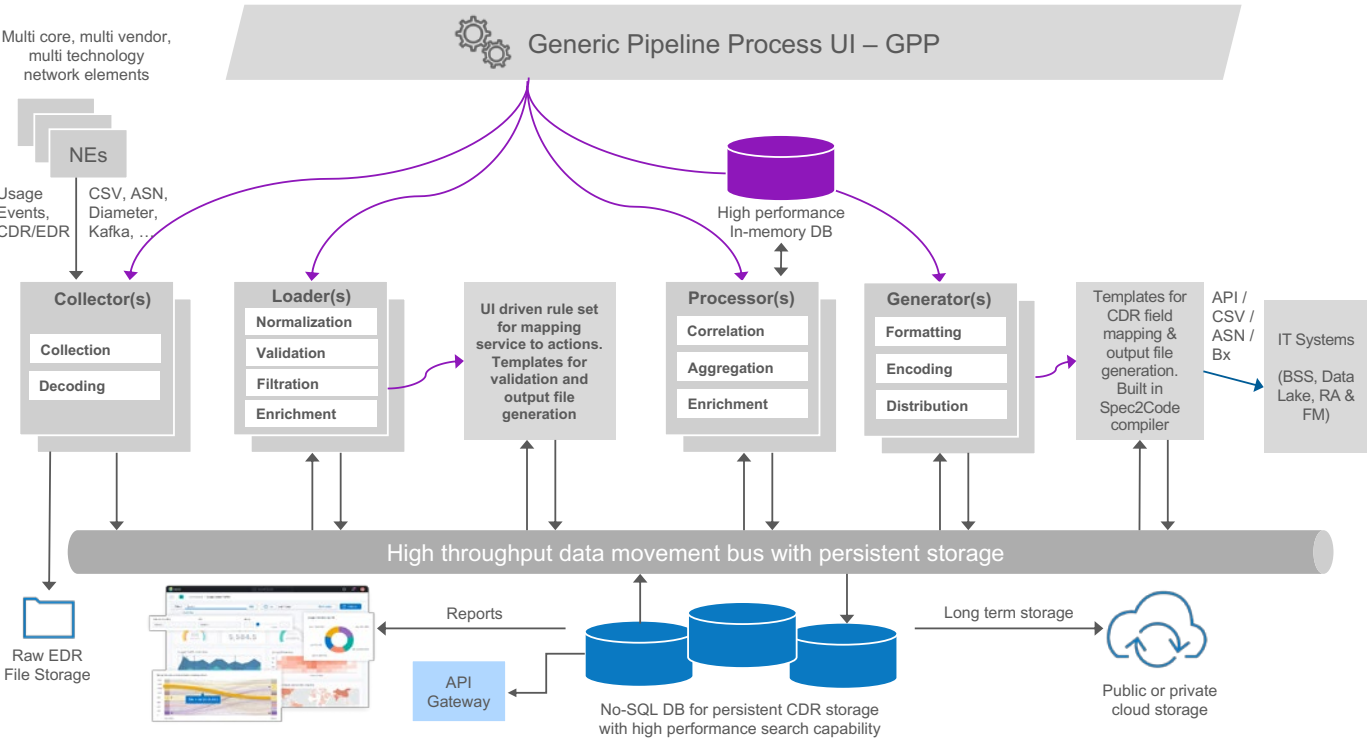


Figure 2



Mavenir's CGF inherently supports multi-tenancy so that CSPs can use the same platform for various lines of business and different purposes. The ability to rely on a common framework and in-house personnel overcomes one of the typical challenges with CGFs. No longer do multiple CGF and mediation nodes from numerous vendors force CSPs into a spaghetti mediation solution with little support. Mavenir's cloud-native, multi-tenant design empowers a CSP to use the same CGF platform for:

- Serving as a network and billing mediation solution using a common source of all CDRs from all network elements and specific downstream billing applications
- Onboarding one or more MVNOs as tenants and providing a unique stream of CDRs from network to billing nodes
- Launching sub-brand(s) with complete separation of CDRs and usage reporting
- Onboarding enterprise customers to provide IoT, private networks, and other MEC services
- Obtaining an independent, self-sufficient, and centralized CGF for various network slices carved from the same 5GC
- Collecting and correlating events from multiple sources to enable building various IT applications such as a 360° customer view or campaign management

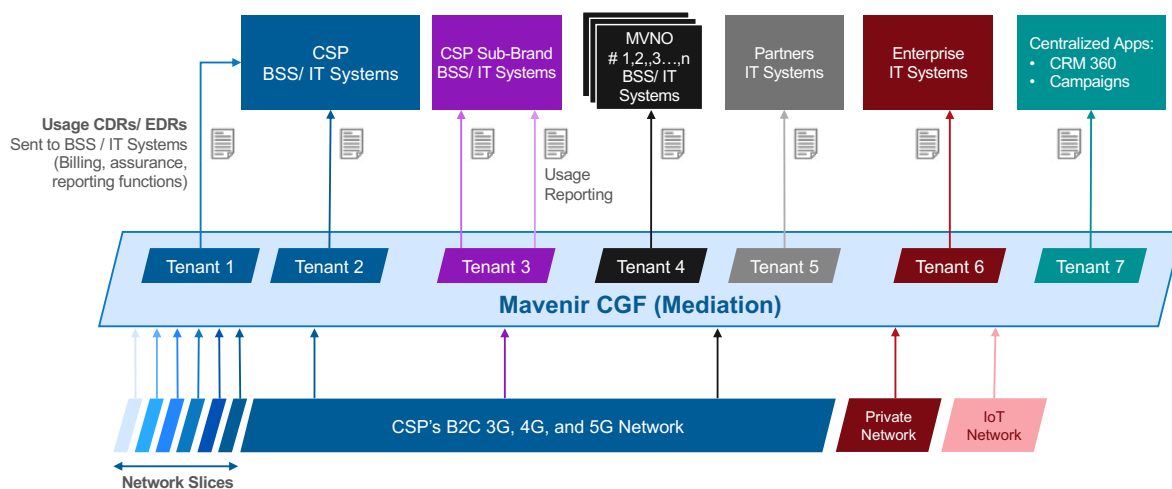


Figure 3

Figure 3 shows how Mavenir's mediation service, the charging gateway function (CGF), connects to any network, private or public, network slices, handles data capture, enrichment, and transformation into the required usage records for the respective IT or BSS systems to consume.



MAVENIR'S CGF HIGHLIGHTS

Mavenir's CGF is a microservices-based mediation engine which filters, validates, enriches, aggregates, and correlates usage data received in CDR files from the CCS. Creating mediation engine rules is very intuitive with a UI-driven approach that makes it possible to seamlessly realize new pricing and charging models. Mavenir's CGF enables CSPs to make that critical generational jump to 5G with flexible deployment options that reduce complexity and help connect a variety of data sources.

Stateless and microservices-driven

- 100% stateless, cloud-native microservices to avoid performance bottlenecks and scale specific microservice as needed
- Selective microservice creation to create only the microservice pods needed, leaving other service pods untouched

Deployment models

- Centralized or distributed deployment models
- Flexible deployment options for 5G use cases where event and CDR processing may be required on-premises (for a private network), at the edge data center (for MEC), and at the central data center (for regular and network slice charging requirements)

Active-Active architecture

- True Active-Active deployment with two-way replication using high-performance no-SQL DBs and distributed architecture

Rules engine-driven logic

- A rules engine to parallel evaluation and high performance

UI-driven processing pipeline configuration

- A modern UI to achieve a no-code approach for building complex service-control trees and CDR processing rules

Real-time alerts and notifications

- Notification and event creation to detect any anomalies identified during CDR generation



MAVENIR'S CGF HIGHLIGHTS CONTINUED

Addition of new data sources dynamically

- Dynamically add new data sources in the collection or distribution pipeline without having to restart or refresh the cache

Duplication detection

- Collected data is automatically checked for duplication using key parameters to ensure processing is done only once

Dynamic update of CDR specifications

- Built-in compilers generate encoders and decoders dynamically using only the CDR specifications as input, reducing integration timeframes from months to hours

Dynamic update of configuration changes

- Truly cloud-native capabilities that allow configuration changes to be synchronized across clusters in local as well as remote sites

Multiple database support for different use cases

- Selective use of different databases is determined by varying performance and functionality needs, such as using a high-performance, no-SQL database with in-memory processing for CDR aggregation and correlation while using a high-performance document database for persistent storage, analytics, searching, and API exposure

High performance

- Built-in resiliency and redundancy to remove performance bottlenecks at every level
- A single pod with one core can process 3750+ CDRs/second

Multiple format and protocol support

- Support for all key 3GPP protocols such as Ga, Rf, SBI, Bx, and others (FTP, sFTP, GTP, TCP/IP, Kafka)

Support for all 3GPP charging models

- Support for traditional offline charging models for legacy networks
- Support for newer converged charging models in 5GC networks

Observability and monitoring, reporting, and programmable interim billing

- 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

Public cloud-ready

- Deployment on Amazon Web Services, Google Cloud Platform, and Microsoft Azure

To summarize, Mavenir's CGF is a robust mediation layer built on modern technologies to enable 5G and futuristic use cases while still supporting traditional mediation functions both on and offline. It addresses several key concerns, such as processing siloed data collected through various networks in real-time. CGF simplifies convergence by enriching and correlating data from networks to the respective OSS/BSS. It eliminates concerns of data volume that arise with the multitude of systems from which mediation collects data. Moreover, the intuitive, UI-driven rules platform for configuring rules and creating adaptors makes handling any new use case easy.





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