

MULTI-SERVICE GATEWAY FOR IP CORE NETWORK



**Accelerate
Network transformation
To Virtualization**

Internet traffic keeps on growing due to device proliferation and new subscribers usage: it urges telecom operators, whether they provide mobile, fixed or Wifi connectivity, to adapt and build new IP networks that meet ever evolving requests in terms of cost and flexibility to launch profitable services.

Accelerate software transformation in telecom networks

Vedicis Software Service Gateway (SSG) helps telecom operators to reap today the benefits of software and virtualization with better agility and ROI. It is a software multi-services platform to analyze, control and monetize IP access, broadband bandwidth and subscriber's usage from the core network.

As a **software telco grade platform** with standard interface (3GPP and web based APIs), it efficiently addresses network team requirements for manageability and high availability. The SSG is either deployed as a Virtual Network Function (VNF), on Linux OS, and or in a cloud.

Combining Vedicis expertise and field experience with the flexibility of new virtualization standards, the SSG is the perfect blend of openness and resources optimization.

Multi-service platform

Depending on interfaces and feature set optimization, Vedicis SSG can be deployed as a PGW, a DPI-PCEF, or a WAG.

PGW

Packet Data Network -Gateway

- For cloud based MVNO/MVNE
- For IOT/M2M service provider

Providing data connectivity to mobile devices, Vedicis PGW is an efficient and high performance gateway which simplifies core network deployments.

Hosting a natively integrated Dpi engine and the PCEF, it fits very well to cost conscious MVNO/ MVNE.

DPI- PCEF

Policy & Charging Enforcement

- For MNO/MVNO
- For ISP

Deployed in the core network, the Deep Packet Inspection & Policy control Enforcement Function is a telecom solution that delivers data traffic analysis, policy control enforcement and metering for charging. It provides integration facilities to policy servers and charging/billing systems.

WAG

Wireless Access Gateway

- For MNO/MVNO
- For Wifi service provider

Designed to control Wifi Access Network from a central point, this solution enables telecom operators to control and monetize Wifi services, and/or offload their standard 3G/4G network with Wifi access.



Software based - Efficient - Field proven

Pure Software solution

Cloud deployments and Network Function Virtualization (NFV) represent massive trends in today's telecom infrastructure with the end of hardware centric systems and the adoption of powerful software platforms.

Vedicis Software Service Gateway enables Communication Service Providers to **choose the right steps to leverage software transformation**. It can be deployed in a private or public Cloud, as a Virtual machine on KVM or VMware, or as a software on Linux OS and Intel servers.

Already deployed in AWS (Amazon cloud), Vedicis solutions can be quickly activated and scale depending on use cases, throughput and interface requirements. **This completely redefines network costs and profitability.**

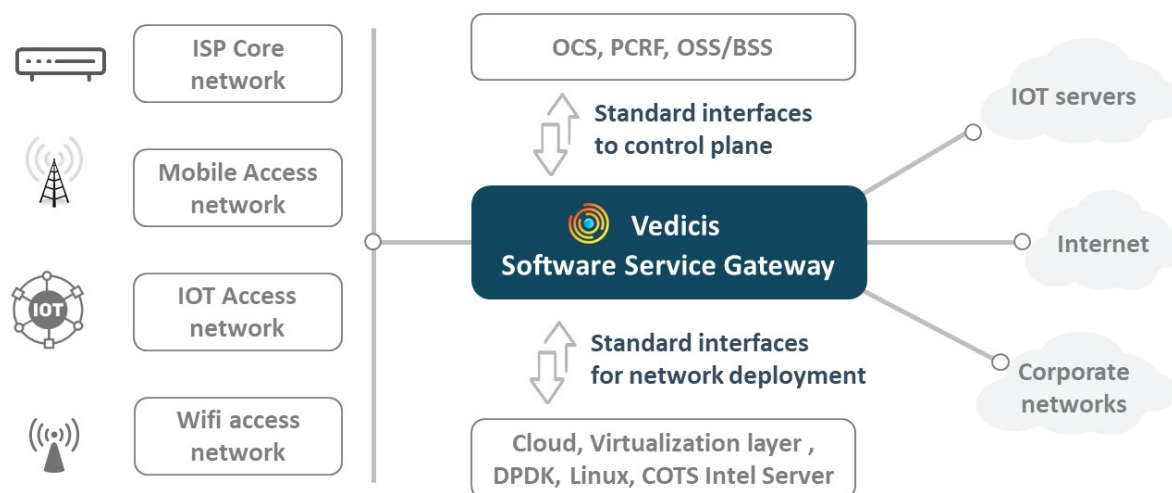
Benefits for the new IP network

Build new interworking solution: The SSG delivers access management and network connectivity on Wifi and 3G/LTE with WAG and PGW capabilities, and support the latest standard for IOT management with NB-IOT and LTE-M networks.

Get traffic visibility: Deep Packet Inspection gives the subscriber, application, device and location awareness for data traffic analysis, statistics & service based charging.

Control network and subscribers traffic: policy enforcement provides the shaping, blocking, marking, URL filtering, and traffic steering requested for control.

Monetize usage: Quota metering for charging empowers telecom operators to fully leverage their Online Charging System and launch new advanced data services.



SSG deployment in Mobile, fixed and Wifi networks

Fast integration

The SSG is optimized for a fast integration in the carrier's ecosystem.

- Diameter interfaces such as Gx (with PCRF) and Gy (with OCS) follow 3GPP specifications and enable out of the box integration. Customization on specific call flows is performed in matters of days.
- Radius can be used for subscriber awareness, access control and charging enforcement.
- Webservices can be proposed to externalize service configuration.
- Data records are provided in csv files or real time interfaces.

Network configurations

PGW	S5/S8, Gn/Gp interfaces
DPI-PCEF	Gi and sGi interface for mobile networks Besides BRAS/BNG in core fixed networks
WAG	Between Wifi Access point and the router to Internet.

VNF and virtualization

Deployed on Linux and leveraging DPDK openness, Vedicis SSG can be virtualized either on KVM or on VMware. The VNF is managed by standard life cycle APIs and can be integrated to MANO & OpenStack.

As a standard software or as a VNF packaged, the SSG benefits from a low hardware footprint and simple integration: it is an ideal platform to support network and cloud based deployment.

Software platform features

Access management	Traffic processing	IP and GTP (V1 and V2) GRE, VLANs, IPSec
	PDN-GW functions	GTP to IP (PDN-GW) APN Management Multi-bearer support
	Carrier Wifi functions	WAG configuration for trusted access Mobile data offloading GTP routing to PDN-GW Local breakout
	ePDG for untrusted wifi access	Secured tunneling Wifi calling : VoWifi
	IP address allocation	Internal DHCP Radius client for specific corporate services
Traffic management	QoS management	Routing, blocking, filtering, shaping QCI management, DSCP marking
	Service awareness	TFT (Traffic Flow Templates), DPI, VoLTE Aggregated traffic shaping per network criteria such as APN, HNO...
Subscriber policy enforcement	Policy management	Controlled by PCRF (Gx interface) or by onboarded rule engine – Subscriber policy enforcement – Real time bandwidth Shaping per service (application, protocol) / direction (uplink, downlink) Fairness, fair usage
	Service control	Service prioritization: QCI management, traffic marking (DSCP, 802.1p), multi-criteria traffic class assessment. Http redirect to captive portal URL filtering
Traffic metering for charging	Real time charging enforcement	Diameter Gy interface : Time and volume based. Multiple rating groups, per service and per direction (uplink/downlink)
	Offline charging enablement	Data records per subscriber with service and direction awareness.
Traffic analysis	Subscriber and connection awareness	Binding IP address and User ID (i.e IMSI or MSISDN) RAT, APN, IMEI, Charging ID Others, depending on ecosystem (mobile, fixed, wifi).
	DPI and usage awareness	3200 applications and protocols available in DPI library DPI configuration module for custom classification based on IP addresses, ports, autonomous systems, domain names (http and https classification) and URLs (http).
	Volumes & QoS metrics	Response time: Access and Internet Round Trip Time Packet loss tracking: TCP retry rate Subscriber inactivity time, Subscriber QoE
	Traffic statistics real time monitoring	Traffic statistics per service, category of applications, traffic classes, subscriber enforcement profiles. Real time traffic monitoring with application awareness.
Data records	Session, subscriber, aggregated data records	Session data record per user session (PDP context, bearer) IP data record: per IP session (TCP, UDP) User data record: per subscriber and period of time Custom aggregated records: for instance per cell ID, RAT, HNO
	Real time events	Configurable volume threshold, per subscriber and specific service.
Legal services	Compliance	URL filtering Data records
	Interception	Subscriber traffic interception
IOT Specific features	Fleet management	Fleet policy and charging Aggregated traffic shaping (for devices belonging to the same fleet) Webservice API for fleet and profile provisioning Fleet Data records
	Security	Walled garden approach to prevent DDOS occurrences Traffic pattern alerts

Telco grade software

Vedicis Software Service Gateway is designed and deployed from the ground up to meet the most demanding telecom operator requirements:

• **High Performance**

Leveraging Intel architecture, designed with powerful multi-core CPU, and powerful memory access, Vedicis SSG achieves high switching performance on Intel standard servers.

• **High availability & redundancy**

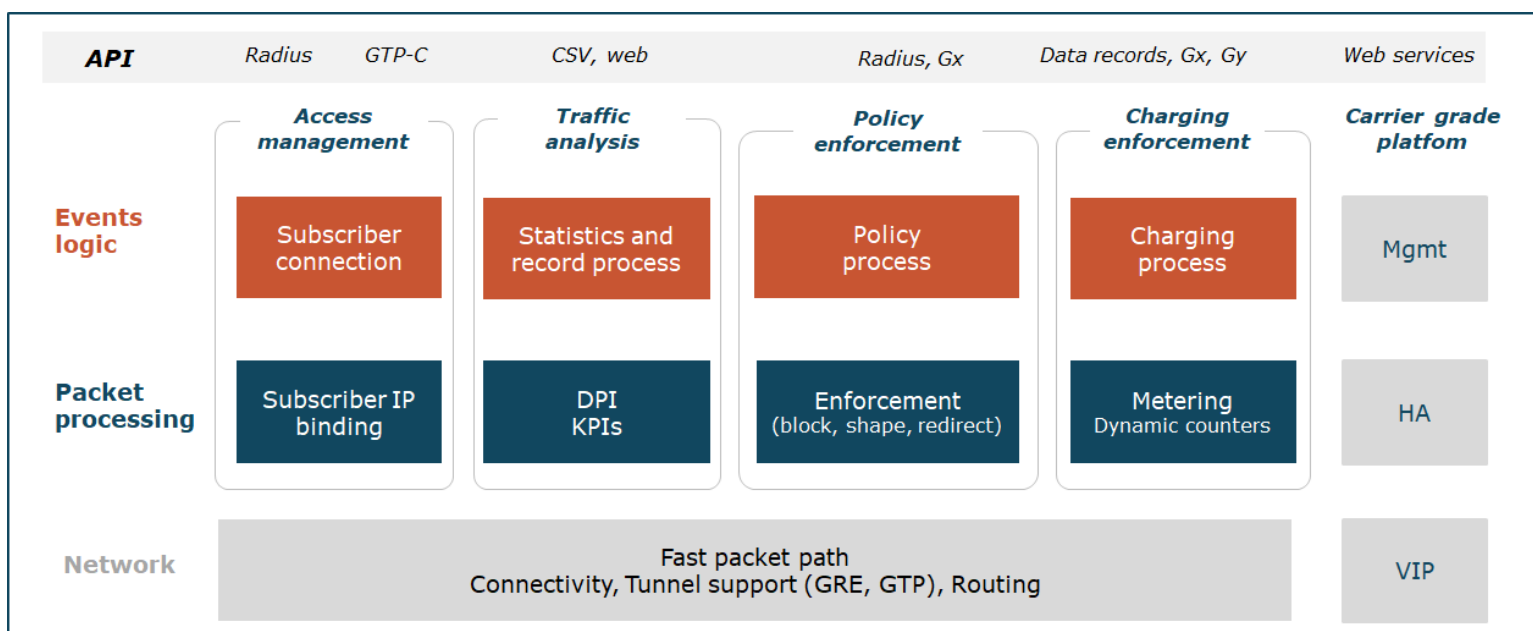
Clustering in active/cold stand-by, active/hot stand-by and n+1 configuration are used to provide stateless or stateful redundancy and service high availability.

• **Scalability**

The software architecture is optimized to scale with performance from a few Mbps to 80 Gbps on a single 2U Intel server. The solution scales out with n+1 clustering.

• **Manageability**

Graphical User Interface and APIs (SNMP, Web services) are delivered for rapid and smooth integration within carrier's OSS.



Intel server / Virtualization layer

Software architecture

Software Service Gateway Performance	Subscribers	10M concurrent users per system, expandable
Example with • HPE 2U 2CPU (HP Proliant DL 380) & comparable Cisco UCS server • Other configuration available with 1U/4U & Blades	Throughput	Up to 80 Gbps with 8x 10GE ports
	Latency	< 20 micro-seconds
	Concurrent sessions	200 000 000 sessions, 500 000 new sessions/s
	DR creation	100 000 IPDR/s per 10 Gbps link

About Vedicis

Vedicis provides advanced IP broadband packet management software platform to fixed and mobile Communication Service Providers. With Vedicis PGW, DPI-PCEF and Wireless Access Gateway solutions, CSPs take informed actions for better traffic connectivity, control and monetization. Vedicis' leading cloud ready platform uniquely enables the technology migration to Software Defined Networks and to reap the benefits of more flexibility, faster integration and better ROI.

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