

**MULTI-SERVICE GATEWAY FOR IP CORE NETWORK**



**Control Access & Data Traffic  
To Monetize Internet Usage**

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 the most relevant 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 APIs (3GPP) or custom interfaces, it addresses efficiently network team requirements for manageability and high availability to manage broadband traffic. The SSG is either deployed on Linux OS or as a virtual machine providing standard MANO and Open Stack interfaces: the SSG enables telecom operators **NFV & cloud deployment**, with high performance VNF.

**Unique platform, multiple solutions**

The SSG comes in different solution packages based on integration points and use case optimization:

**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, integrating in policy server and charging/billing system.

**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 operator to provide offload local break out capabilities to their standard 3G/4G network with Wifi networks, with policy control and charging enforcement features.

**PGW**

Packet Data Network -Gateway

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

As the anchor point for all IP traffic from subscriber's devices, the PGW is the interworking gateway between the mobile network and Internet. With a combined DPI and charging enforcement engine, it fits very well to cost conscious MVNO/MVNE.

**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 advanced new data services.

### IP packet management software

Vedicis Smart Software Gateway (SSG) is built upon a proven and packaged software technology to manage IP packets in broadband networks.

#### Software for standard Intel servers

Vedicis SSG achieves high switching performance on Intel standard servers, either 1U/2U or Blade systems:

- up to 80 Gbps of throughput are supported on a 2U HPE or Cisco UCS servers without proprietary hardware.

Vedicis leverages Intel architecture designed with powerful multi-core CPU, large cache, and large RAM size. This eliminates performance bottlenecks observed with Network Processor Units from network appliances.

SSG is available as a bare metal software on Linux OS or Virtual Network Function (VNF) for infrastructure transformation with Network Function Virtualization.

#### Fast integration

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

- Standard 3GPP interfaces: Diameter interfaces such as Gx (with PCRF), Gy (with OCS) enable out of the box integration, and customization on specific call flows is done in matters of days.
  - Radius, webservice...
- Radius can be used for subscriber awareness, and third party subscriber data base can be integrated through webservice.

### Telco grade software

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

- 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 further service high availability.

- Scalability The software architecture is optimized to grow and scale with performance to manage from a few Mbps to 80 Gbps on a single 2U HPE or Cisco Intel server.

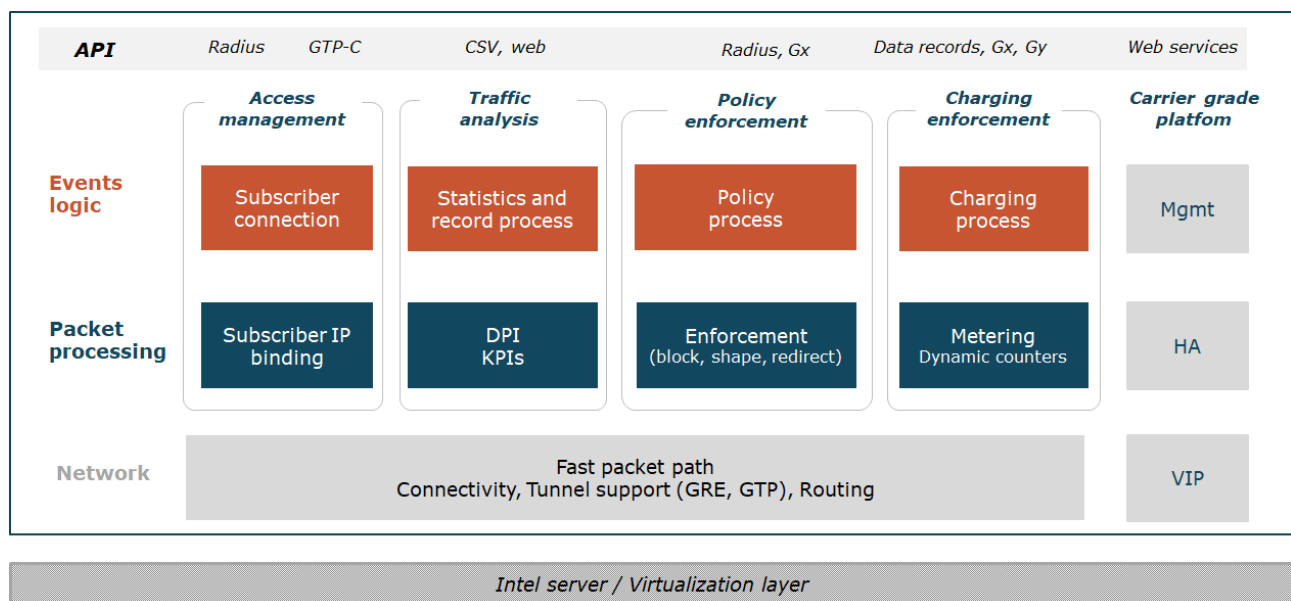
The solution scales out smoothly with n+1 clustering.

- Manageability Centralized management & operations are delivered thanks to the system graphical user interface or the command line interface. SNMP can be leveraged for rapid and smooth integration within carrier's OSS.

### VNF and virtualization

Deployed on a Linux Host, the 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.



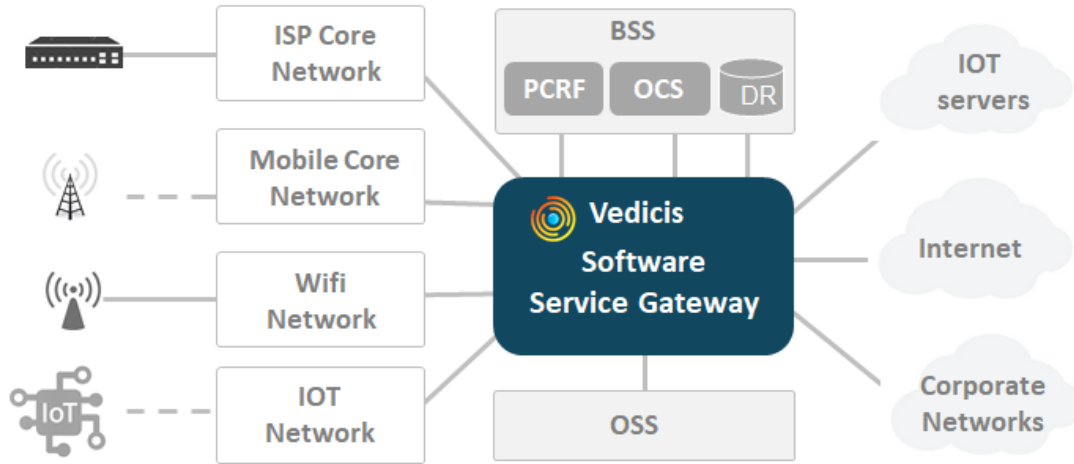
### Software architecture

**Software platform features**

<b>Access management</b>	Traffic processing	IP and GTP (V1 and V2) GRE, VLANs
	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
<b>Traffic management</b>	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...
<b>Subscriber policy enforcement</b>	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
<b>Traffic metering for charging</b>	Real time charging enforcement	Diameter Gy interface : Time and volume based. Multiple rating groups, per service and per direction
	Offline charging enablement	Data records per subscriber with service and direction awareness.
<b>Traffic analysis</b>	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	3000 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.
<b>Data records</b>	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.
<b>Legal services</b>	Compliance	URL filtering Data records
	Interception	Subscriber traffic interception
<b>IOT Specific features</b>	Fleet management	Fleet policy and charging with local logic Support for web service lookup and local cache avoiding provisioning and diameter bottlenecks Per device and per fleet limits and charging management
	Security	Walled garden approach to prevent DDOS occurrences with weak devices Rogue/buggy devices activity detection and blocking

**Deployment & Integration**

Deployment principles and examples



- DPI-PCEF: MNO deployment on Gi, SGi interface
- DPI-PCEF for ISP deployment beside the BRAS or Peering/Transit points.
- WAG: deployment between Wifi access points and Internet
- PGW: S5/S8 interfaces

<p><b>Software Service Gateway Performance</b></p> <p><i>Example with</i></p> <ul style="list-style-type: none"> <li>• HPE 2U 2CPU (HP Proliant DL 380) &amp; comparable Cisco UCS server</li> <li>• Other configuration available with 1U/4U &amp; Blades</li> </ul>	Subscribers support	5 million concurrent users (per system), expandable
	Throughput	Up to 80 Gbps with 8x 10GE ports VM performance : up to 20 Gbps
	Latency	< 20µs
	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 PDN-Gateway, DPI-PCEF and Wireless Access Gateway software solutions, CSPs take informed actions for better:

- Traffic connectivity and control (Internet access and optimization in volume and bandwidth to reduce congestion and improve quality of experience)
- Traffic monetization (with new data services based on subscriber’s usage).

Vedicis’ leading NVF ready platform uniquely enables the technology migration of CSPs to Software Defined Networks and to reap the benefits of more flexibility, faster integration and better ROI.

Visit [www.vedicis.com](http://www.vedicis.com) or email to [info@vedicis.com](mailto:info@vedicis.com)

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