

# JUNIPER NETWORKS AAA SOLUTION FOR UMA/GAN

Secure, Scalable, Flexible, Reliable, Roaming Access

## Challenge

With the emergence of UMA/GAN, service providers can improve GSM service quality in the home, which relieves network congestion, expands coverage and extends revenue-generating service offerings. However, achieving the benefits of UMA/GAN requires a scalable, high performance AAA solution.

## Solution

The Juniper Networks SBR SIM Server provides a robust, flexible and scalable AAA solution for UMA/GAN environments that is supported by leading vendors of UMA/GAN infrastructure equipment. The SBR SIM Server provides full compatibility with Third-Generation Partnership Project (3GPP) interface standards and offers seamless and cost-effective migration to FMC.

## Benefits

The SBR SIM Server is an industry-leading platform for AAA based on standard interfaces and architectures. SBR SIM supports extensive authorization capabilities and enables broad flexibility for service providers to customize business rules for their UMA/GAN network subscribers.

Universal Mobile Access (UMA), also known as Generic Access Network (GAN) or UMA/GAN, improves the quality of Global System for Mobile Communications (GSM) service in the home by allowing mobile subscribers to roam seamlessly between mobile cell sites and wireless LANs. UMA/GAN provides a means for mobile service providers to deliver voice and data applications to mobile devices and helps transition toward Fixed Mobile Convergence (FMC). Service providers look to UMA/GAN as a cost-effective means to expand service coverage, improve service quality within buildings, relieve network congestion and generate additional revenues. Customers benefit from improvements in service quality and cost reduction.

To manage their UMA/GAN services effectively, mobile service providers need a system for Authentication, Authorization and Accounting (AAA) that leverages existing infrastructures, performs effectively and seamlessly, and supports tomorrow's service suites—especially technologies based upon the emerging IP Multimedia Subsystem (IMS) protocol. The Juniper Networks® AAA solution for UMA/GAN provides a scalable, standards-based mechanism for authenticating and authorizing subscribers to the UMA network, as well as recording usage for accounting and network planning purposes.

## The Challenge

UMA/GAN technology allows subscribers to leverage their broadband Internet connections and home Wi-Fi networks as an alternative to GSM or universal mobile telecommunications system (UMTS) cellular radio access. However, UMA/GAN also requires service providers to authenticate and authorize this new access technology onto their networks. Service providers need the ability to track UMA/GAN usage separately for billing, marketing and network planning purposes. Also, with the rapid increase in sophistication among mobile users, service providers need to achieve high standards and increase the quality of experience. Yet, how can General Packet Radio Service (GPRS) service providers architect AAA to serve both UMA/GAN and conventional UMTS? How can they extend existing AAA servers to accommodate UMA/GAN sessions? Service providers must also face security challenges such as how they can best secure control-plane communications and media communications between the wireless handset and the wireless core network. Among all these issues, UMA/GAN service providers must provide full service transparency for end users.

To enjoy the benefits of UMA/GAN, mobile subscribers need only to make modest changes. To roam from a cellular radio signal to a UMA/GAN site (the “homezone”) using Wi-Fi, users only need a dual-mode (GSM and UMA/GAN) handset.

To implement UMA/GAN on the network side, GMS service providers must add the following components:

- Security gateway to terminate IPsec tunnels between the wireless handset and operator network
- UMA Network Controller (UNC) to manage user connections to the mobile core (similar in function to the base station controller)
- AAA server to authenticate users onto the network and authorize service delivery

When both user and service provider sides are equipped, a subscriber essentially “roams” onto the UMA/GAN network when using a dual-mode handset within the homezone. Similar to roaming between cell sites, the user experiences no interruption in service and no change in service quality.

UMA/GAN can help service providers improve service quality in several ways: by improving reception within the home, office and commercial buildings, where conventional cellular signals may be blocked or diminished; by moving traffic off cell sites where bottlenecks and service problems often occur; and by offering customers a cost-effective alternative to landline telephone services. UMA/GAN offers several operational benefits as well including: expanding a service provider’s scope of revenue-generating offerings; enabling new creative bundling and packaging possibilities; and expanding service provider Wi-Fi and hotspot offerings to strengthen customer loyalty or add incremental revenues. Service providers can apply any combination of these approaches in their quest to achieve a greater FMC vision. Finally, UMA/GAN can extend service coverage into sparsely populated rural areas and remote industrial outposts, which can potentially increase subscription and usage rates.

### The Juniper Networks AAA Solution for UMA/GAN

To meet these challenges, Juniper offers the SBR SIM Server. This AAA server solution provides the scalability, reliability, flexible deployment and life-cycle value that enables service providers to realize the full potential of their UMA/GAN service offerings. The SBR SIM Server scales to meet the needs of service providers with growing subscriber bases and service offerings. The high-performance design of SBR SIM allows thousands of RADIUS requests per second on suitable hardware. Among its carrier-class attributes, SBR SIM also supports 99.999 percent uptime, making it a mission-critical component of a service provider’s comprehensive revenue assurance system.

SBR SIM is inherently flexible to enable a variety of business models. It allows service providers to perform authentication and authorization in a single combined step, or in two discrete steps, depending upon the service provider’s preferred AAA architecture. SBR SIM complies fully with RADIUS and other AAA standards, which facilitates integration and transition from UMA/GAN to FMC. With these attributes, SBR SIM provides optimized life-cycle OpEx.

When a mobile subscriber with a UMA-enabled, dual-mode handset moves within range of an unlicensed Wi-Fi network (see Figure 1), the SBR SIM Server provides mission-critical authentication and authorization during call setup through the following sequence of transactions:

- a. After connecting to the local Wi-Fi network and acquiring an IP address on the local network, the handset establishes an IPsec tunnel with the security gateway using IKEv2. IKEv2 uses Extensible Authentication Protocol (EAP) to exchange the phone credentials with the security gateway. Either EAP Subscriber Identity Module (SIM) or EAP Authentication and Key Agreement (AKA) can be used for the credential exchange between the phone and network.
- b. The security gateway communicates with the AAA server over the Wm interface, a standard RADIUS-based interface that carries the EAP-SIM/AKA conversation.
- c. The AAA server validates the SIM credentials against the Home Location Register (HLR) using either an SS7 or SIGTRAN interface.
- d. Upon successful authentication by the AAA server, an IPsec tunnel is established between the handset and the security gateway.
- e. The handset connects to the UNC through the IPsec tunnel and attempts to register for service.
- f. The UNC authorizes the session against the AAA server. (This is an optional step since the SBR SIM Server can perform authentication and authorization simultaneously when this approach better supports the service provider’s business model. Performing authorization as a separate step may suit specific business logic, such as tiered access or roaming services for subscribers to other service providers).
- g. Upon successful authorization, the subscriber’s location information stored in the core network is updated and all mobile voice and data traffic is routed to the handset via the UMA Network, rather than the cellular radio access network (RAN).

After call setup and during the call session, the SBR SIM Server provides highly reliable accounting capabilities, ensuring delivery of all accounting data to service provider billing systems and enabling multiple business models and differentiated services. The SBR SIM Server allows service providers to define user profiles, which can then be associated with connection attributes. The SBR SIM Server also allows the association of multiple IP address pools to a single access server for simplified configuration and reduced OpEx.

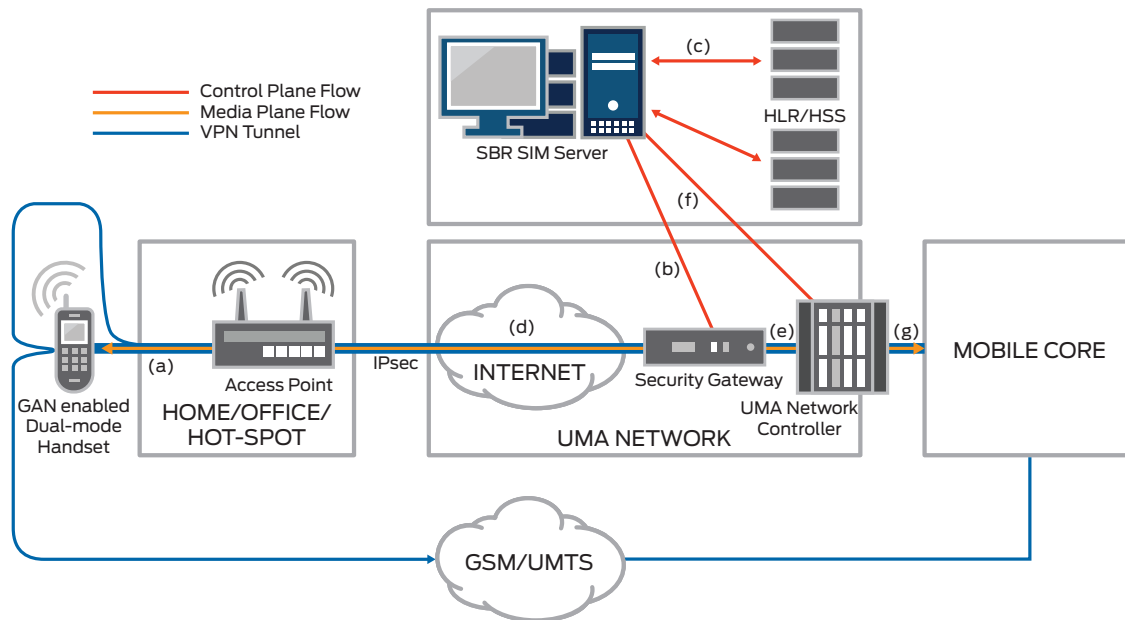


Figure 1: Juniper Networks AAA solution for UMA/GAN

### Features and Benefits

- Full-function RADIUS/AAA server for GSM and Code Division Multiple Access (CDMA) operators
- Proven reliability and scalability
- Enables IP-based services to GSM customers without having to upgrade customer care infrastructure
- Works in 802.1X, non-802.1X, and UMA environments

When deployed as an AAA solution for UMA/GAN service platforms, SBR SIM Server offers the right combination of service transparency, flexibility and overall life-cycle value. Key benefits include:

- Fully compliant with RADIUS and RADIUS accounting RFCs
- Reliable accounting with guaranteed delivery of accounting records
- Simplified real-time usage tracking (for prepaid services, for example)
- Integrates seamlessly with existing subscriber data and billing systems
- Supports a wide variety of service delivery and business models
- Offers a clear migration path to DIAMETER-based 3GPP IMS solutions

### Why Juniper Networks SBR SIM Server for UMA/GAN?

UMA/GAN is a technology innovation that offers service providers a new vehicle for extending service coverage that decreases congestion in access networks, and expands upon services and service bundles. However, AAA for UMA/GAN services poses certain challenges to service providers, who need to leverage existing AAA resources, keep options open for new bundling and billing approaches, and guarantee seamless operation for subscribers.

The SBR SIM Server has proven itself in some of the world's busiest networks and brings service providers the knowledge that comes with more than 12 years of experience in both service provider and enterprise networks. The SBR SIM Server is a trusted solution industry-wide, providing full support for Kineto and other industry-standard UNC systems. The SBR SIM Server is also featured in the reference UMA/GAN architectures of market leaders like Motorola and Nokia Siemens Networks.

Because of its scalability, reliability, flexibility and high performance, SBR SIM Server offers particular value to service providers seeking to support UMA/GAN services. With support for both RADIUS and DIAMETER, SBR SIM Server offers unsurpassed value to service providers developing UMA/GAN as a part of a long-term migration strategy toward FMC.

## Next Steps

Whatever the access mode, service mix, or business model, SBR SIM Server can play a vital role in policing network access, tracking usage patterns, and integrating legacy assets with next-generation elements. Contact your Juniper Networks representative today to discover how SBR SIM can expand the potential of your networks.

## About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at [www.juniper.net](http://www.juniper.net).

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