

## FUTURE-PROOF YOUR ACCESS CORE WITH MULTIPROTOCOL SUPPORT USING BRIDGEWATER SYSTEMS AAA SERVICE CONTROLLER

### **New Choices, New Opportunities in 3G, 4G, and IMS Frameworks**

New technologies and readily available content and applications are allowing subscribers to enjoy high-value, high-bandwidth multimedia applications regardless of the network or device that is used. They also present Service Providers with new opportunities to increase average revenue per user (ARPU) and reduce churn.

Many Service Providers are investing in new 4G access technologies such as World Interoperability for Microwave Access (WiMAX) to enable delivery of last-mile broadband access without the need for direct line of sight (LOS). Because WiMAX is the first wireless technology to be built on IP, it can support high-value applications such as VoIP, video calling, and streaming media applications across a broad range of deployment types. In addition to extending networks for improved geographic coverage, WiMAX enables Service Providers to offer a range of new services and gain a competitive edge.

Service Providers also want to take full advantage of innovations and services made possible with next-generation 4G networks and IP Multimedia Subsystem (IMS)/Multimedia Domain (MMD) frameworks.

To deliver these latest technologies, applications, and services, Service Providers need to be able to extend their existing networks and infrastructures to support multiple access technologies simultaneously. To effectively offer services over multiple networks while maintaining a single subscriber view with the ability to manage a broader range of services for all subscribers, they also need to leverage a common network access control core that includes subscriber management and AAA.

As Service Providers add new access networks to grow their business, differing standards and protocols — such as RADIUS and Diameter — come into play. It is critical that the AAA platform provides simultaneous support for these protocols to ensure a future-proof access core that supports new standards and business growth initiatives.

### **Implications for AAA Infrastructure**

Because the AAA server provides the initial point through which subscribers gain access to networks and applications, it also represents a critical point in the subscriber experience. As a result, the efficiency of this network experience will have an immediate impact on the Service Provider's bottom line through customer care costs, subscriber churn, etc. To meet these challenges, the AAA server must offer carrier-grade performance, cohesive subscriber management, and multiprotocol support.

**MULTIPROTOCOL SUPPORT —  
THE CRITICAL ADVANTAGE  
FOR MIGRATION AND  
GROWTH.**

## WHY MULTIPROTOCOL SUPPORT

A key capability of AAA that's also important for a successful migration and growth strategy is the ability to support RADIUS and Diameter natively from the same platform.

Introduced approximately five years ago, Diameter is an AAA protocol for applications such as network access or IP mobility. It provides a base protocol that can be extended to provide AAA services to new access technologies or applications. While Diameter is positioned as a next-generation alternative to RADIUS, the reality is that both protocols will likely co-exist for some time because of the high number of existing RADIUS implementations and wide range of supporting network equipment.

Diameter is the AAA protocol implemented in IMS. Service Providers migrating to IMS/MMD/A-IMS will need to implement Diameter support for SIP services, with ongoing RADIUS support for non-SIP services. While RADIUS is the AAA protocol supported in the first WiMAX version of the standard, Diameter support is slated for future variants starting with release 1.5.

To support service extension to WiMAX and service expansion with IMS, the AAA server will need to support both protocols. With multiprotocol support, Service Providers can:

- > Leverage existing CAPEX expenditures by using a common AAA platform serving multiple access networks.
- > Improve time to market — less provisioning with a common platform eliminates AAA infrastructure silos.
- > Offer service in a legacy environment (RADIUS), and then seamlessly migrate over time (Diameter).
- > Continue to leverage a common subscriber database while offering an even broader range of services over multiple networks — for example, SIP-based applications in IMS/MMD environments while supporting legacy non-SIP-based applications, and network extensions with new 4G technologies such as WiMAX.
- > Buy time with an evolutionary approach, and wait for the critical mass of subscribers.
- > Slowly migrate at their own pace, taking advantage of the fact that early adopters pay a premium.

## MULTIPROTOCOL SUPPORT VS. PROTOCOL TRANSLATION

An intermediate box solution — which translates RADIUS to Diameter — may not be the optimal solution for many Service Providers because it means an additional box to support, another potential point of failure in the network, and the risk of mapping errors between messages. The translation process and the overhead it carries may have an impact on network performance.

## DIAMETER VS. RADIUS

Diameter was originally designed to overcome issues in RADIUS, including security, reliability, lack of a peer-to-peer relationship between the client and the server, lack of real-time accounting, and lack of standardization of usage in certain environments.

Some of the differences between RADIUS and Diameter:

- > Diameter uses reliable transport protocols (TCP or stream control transmission protocol [SCTP] vs. user datagram protocol [UDP]).
- > Diameter can use transport-level security (IPSec or TLS).
- > Diameter has larger address space for attribute value pairs (AVPs) and identifiers.

While Diameter is not directly backwards compatible with RADIUS, it does provide an upgrade path.

## OTHER BUSINESS IMPLICATIONS FOR AN AAA SERVER

### Performance

As the underlying network access control core in CDMA, WiMAX, and GSM networks, the pressure on the AAA server to perform is tremendous owing to the growth in transactions and subscribers and the need to maintain a consistent and positive subscriber experience. Service Providers need to be assured that their AAA system has the proven carrier-grade pedigree to perform in the most demanding environments and meet demands for business growth through the addition of new technologies.

### Common subscriber management

Service Providers need to adopt a subscriber-centric approach that supports flexible modeling of subscribers and services across networks. This requires a common policy and profile repository serving all subscribers and services across access networks, enabling Service Providers to:

- > Eliminate the need to re-provision subscribers as new networks are brought online — to improve time to market.
- > Bundle services across the networks — to differentiate service offerings and create a seamless subscriber experience.

### MULTIPROTOCOL SUPPORT IN THE AAA SERVICE CONTROLLER

The Bridgewater Systems AAA Service Controller features dual-stack technology that provides simultaneous support of both RADIUS and Diameter protocols:

- > Provides native RADIUS and Diameter support from a single platform with the ability for a single subscriber to have the AAA function performed via either protocol depending upon the network elements being used.
- > Enables a co-existence strategy that allows Service Providers to support existing and new applications from a single platform and enables a cost-effective migration from RADIUS to Diameter by re-using many existing components such as servers and databases and facilitating gradual introduction of Diameter-based network elements.
- > Offers the potential for higher performance and scalability with improved processing over an intermediate box solution.
- > Reduces the risk in a migration strategy, with less opportunity for translation errors between the protocols.

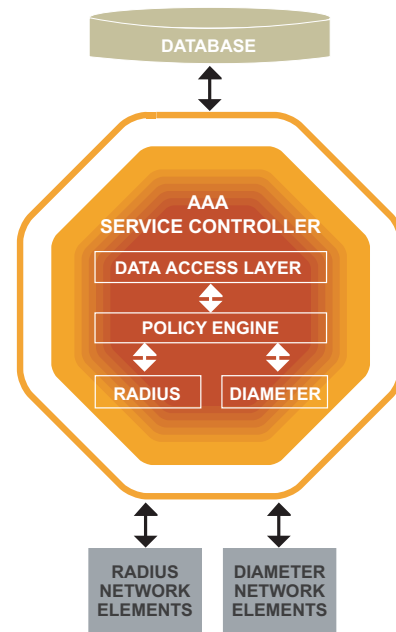


FIGURE 1: Dual-stack RADIUS and Diameter support for AAA Service Controller.

### MULTIPROTOCOL SUPPORT DEPLOYMENT EXAMPLES

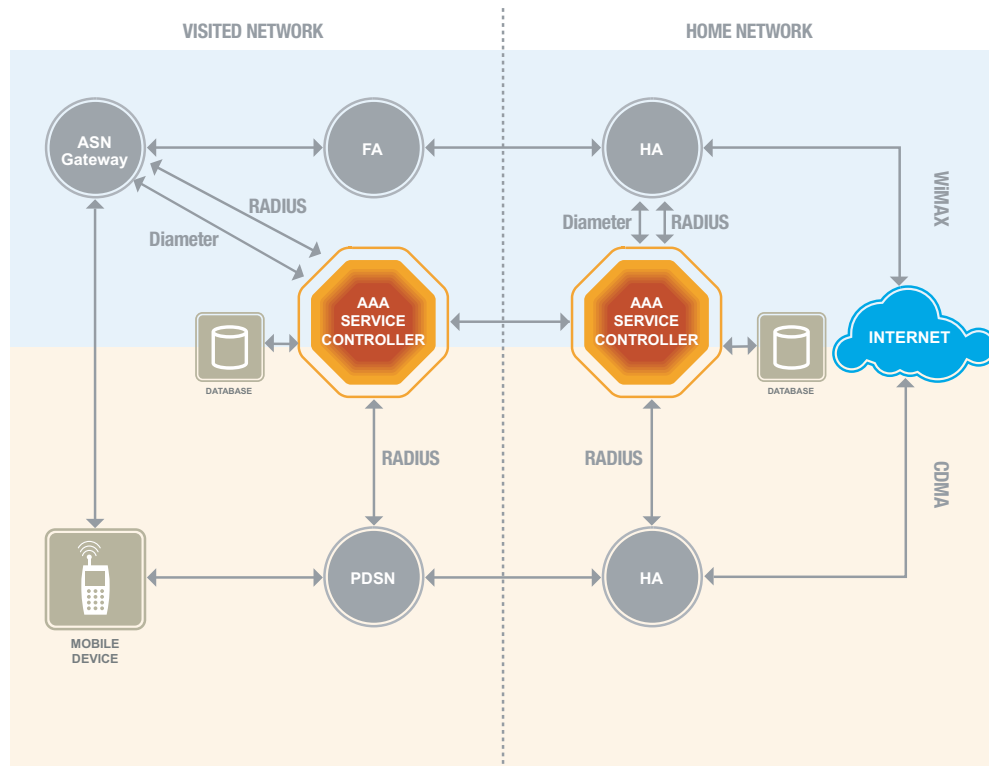


FIGURE 2: CDMA and WiMAX Deployment

In this example, a CDMA Service Provider can leverage a common AAA Service Controller infrastructure, including a common subscriber policy and profile repository, to support CDMA and WiMAX access networks with Mobile IP simultaneously. Note that this depicts a scenario in which two AAA solutions are required to support visited and home networks operated by different Service Providers. The AAA Service Controller infrastructure supports RADIUS-based network elements in CDMA and WiMAX and can support Diameter-based network elements when required for future versions of WiMAX.

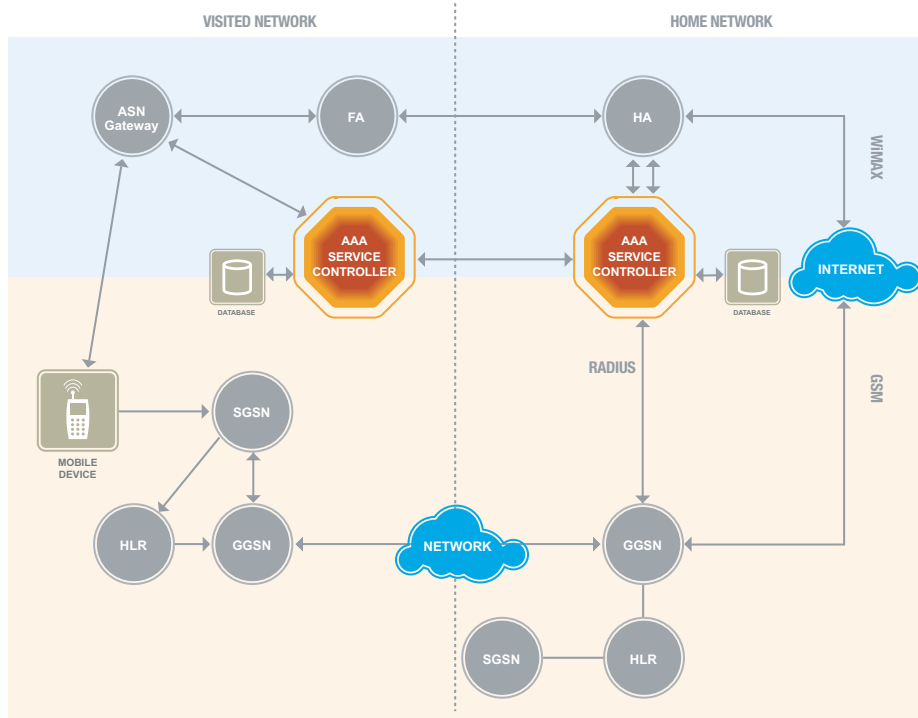


FIGURE 3: GSM and WiMAX Deployment

In this example, a GSM Service Provider can leverage a common AAA Service Controller infrastructure, including a common subscriber policy and profile repository, to support GSM and WiMAX access networks simultaneously. Note that this depicts a scenario in which two AAA solutions are required to support visited and home networks operated by different Service Providers. The AAA Service Controller infrastructure supports RADIUS-based network elements in GSM and WiMAX and can support Diameter-based network elements when required for future versions of WiMAX.

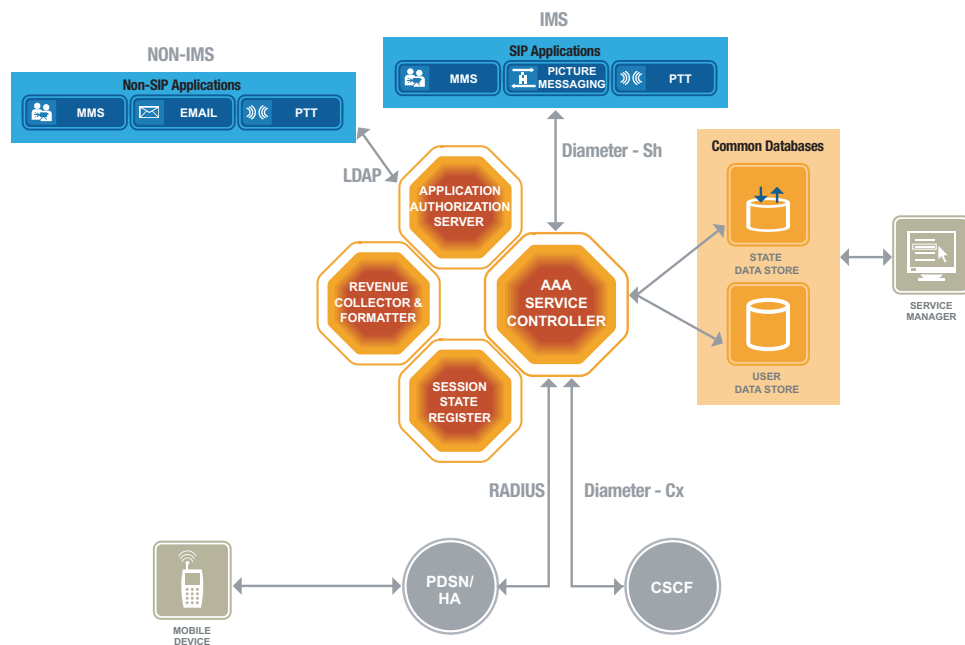


FIGURE 4: CDMA Service Provider Migrating to IMS/MMD

Because the AAA Service Controller can support both RADIUS and Diameter simultaneously, the CDMA Service Provider can support legacy non-SIP applications and RADIUS-based network elements, as well as SIP-based applications and IMS network elements using Diameter. This allows the Service Provider to migrate to IMS/MMD frameworks over time using a common AAA infrastructure offering native Diameter and RADIUS support.

## BRIDGEWATER SYSTEMS AAA SERVICE CONTROLLER AND MULTIPROTOCOL SUPPORT

As Service Providers extend networks with 4G technologies such as WiMAX and migrate to IMS/MMD frameworks, Bridgewater Systems offers a proven AAA solution with extensive mobile WiMAX support such as device authentication and mobile IP. The latest enhancements to the AAA Service Controller feature dual-stack RADIUS/Diameter support, allowing Service Providers to migrate to new network variants such as WiMAX 1.5 and IMS frameworks, where Diameter and/or RADIUS protocols are required. Because the AAA Service Controller supports RADIUS and Diameter interfaces simultaneously, Service Providers can deploy a common multiprotocol network access platform to protect their investment in legacy applications and services and leverage new SIP-based services as they migrate to next-generation networks and IMS/MMD frameworks.

## ABOUT BRIDGEWATER SYSTEMS

Bridgewater Systems develops the industry's most advanced subscriber-centric policy management software for fixed, mobile, and converged networks. Its solutions help global Service Providers launch new services faster and maximize profits by creating a subscriber-centric policy decision point to control and monetize the dynamic subscriber interaction with IP-based services. Vendor-neutral and access-network agnostic, Bridgewater Systems' comprehensive policy management portfolio features network access control products, including authentication, authorization, and accounting (AAA) and dynamic host configuration protocol (DHCP) systems; entitlement control products to manage subscriber access to applications and network resources; and robust subscriber management via a centralized policy and profile repository solution. Bridgewater Systems' proven carrier-class products help Service Providers enrich the subscriber experience and enable extensive revenue capture capabilities and out-of-the-box value that can be deployed in weeks — instead of months.

More than 80 leading Service Providers around the globe, including Verizon Wireless, Sprint, Bell Mobility, and Virgin Mobile USA, trust Bridgewater's technology and business insight to help them deliver world-class services.

Founded in 1997, Bridgewater Systems is a privately held company.

### BRIDGEWATER SYSTEMS

Copyright © 2007 Bridgewater Systems Corporation. All rights reserved. Bridgewater and the Bridgewater logo are registered trademarks and "One View. Infinite Possibilities." is a trademark of Bridgewater Systems Corporation.

[WWW.BRIDGEWATERSYSTEMS.COM](http://WWW.BRIDGEWATERSYSTEMS.COM)

### HEADQUARTERS

303 Terry Fox Drive, Suite 500  
Ottawa, Ontario  
Canada K2K 3J1  
Phone: +1 613 591 6655  
Fax: +1 613 591 6656

### EUROPEAN OFFICE

200 Brook Drive, Suite 102  
Green Park, Reading, Berkshire  
United Kingdom RG2 6UB  
Phone: +44 (0) 118 925 3298  
Fax: +44 (0) 118 925 3299

### ASIA PACIFIC OFFICE

04-13 Technopreneur Centre  
Block 1003 Bukit Merah Central  
Singapore 159836  
Phone: +65 6276 3447  
Fax: +65 6270 3781

### U.S. OFFICE

3959 Electric Road, Suite 357  
Roanoke, Virginia  
United States 24018  
Phone: +1 540 772 3103  
Fax: +1 540 725 1067