



Role of SDP in Service Management

An AdvOSS Solution White Paper

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<http://advoss.com/resources/whitepapers/role-of-sdp-in-service-management.pdf>

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Abstract

Real-Time, active, online Service Management is a major concern of new generation Communication Service Providers (CSPs). New generation Service Providers are not only concerned about 'what' service is delivered but also 'how' is the service delivered. They want to 'control' the service delivery every inch of the way while it is being delivered.

The traditional silos of Service Provisioning, Service Delivery and Service Charging cannot function in isolation anymore. They all have to be integrated within an all-encompassing "Service Management" function; a function that controls service delivery as it is happening by communicating with all other silos in real-time.

This has made the function of "Service Management" at least as complex if not more so than the function of "Service Delivery" itself. CSPs have long found the benefits of using a Service Delivery Platform (SDP) to deliver the services instead of through a black box application server. This is because only a SDP offers the required extensibility, configurability, programmability, interoperability, scalability and functionality required to keep service delivery evolving with growing business needs.

This white paper describes the basics of what Service Management is for new generation of CSPs and highlights the need on why a CSP's Service Management strategy should be built on top of a Service Delivery Platform. It discusses its business need, stake holders, some technology and in the end discusses what AdvOSS has to offer for new generation of CSPs in terms of their Service Management and a SDP that delivers it.

The Business Need

Simply put a Service Provider's function is to deliver a service. Multiple driving forces (at times competing with each other) demand that the service delivery be 'managed' in different ways.

The 'Service Management' is dictated by many competing forces all affecting the way service is finally delivered. Wireless broadband providers are facing an acute shortage of bandwidth and can no longer afford an 'all you can eat' policy on their subscriptions.

Rising costs of frequency spectrums require that the radio resources be used with maximum efficiency wherever possible. Such and other requirements of 'maximizing efficiency' are another driving force for Service Management.

In the midst of shortage of resources, it is having an impact on customer loyalty and there is a drive to salvage the Quality of Experience of the end user even when the required quality of service cannot be delivered.

Declining revenues and margins require product differentiation to the extreme where there is pressure to monetize the service down to a single feature available and to be able to control and charge all 'aspects of value' within the overall Service Delivery.

These demands require that service management cannot function in isolation. It has to be integrated with all other functions within the Service Provider network.

Technology:

Service Management requires an active real-time link between the Service Delivery functions and the Service Management functions. Gone are the days when a CDR was made available after the Service Delivery was complete. A real-time interface is now almost always there which will be over some type of AAA Server either a Radius or a Diameter server.

Service Management needs to be integrated with Policy Enforcement points and some kind of provisioning interfaces need to be there for Service Management to communicate to enforcement points about changes required in service delivery.

Real-time credit control requires an interface with billing and account balance management functions. Quota based subscriptions require a real-time interface with the Charging and Rating engine.

Access to information about base Subscriptions, purchased add-ons and the states of different subscriptions and add-ons require an interface with the HSS or other subscriber and subscription managers

Integration and interface will be required with any other network function that 'may' have an impact on how the service is being delivered. The range is almost limitless with any conceivable point of concern requiring integration within the Service Management solution.

This requires the Service Management solution to be flexible, extensible, configurable, scalable, highly available and enhance-able among others. It is very important that the architecture of the Service Management solution allows for all of these.

This can all be achieved by running the Service Management Applications over a Service Delivery Platform that offers the required functionalities.

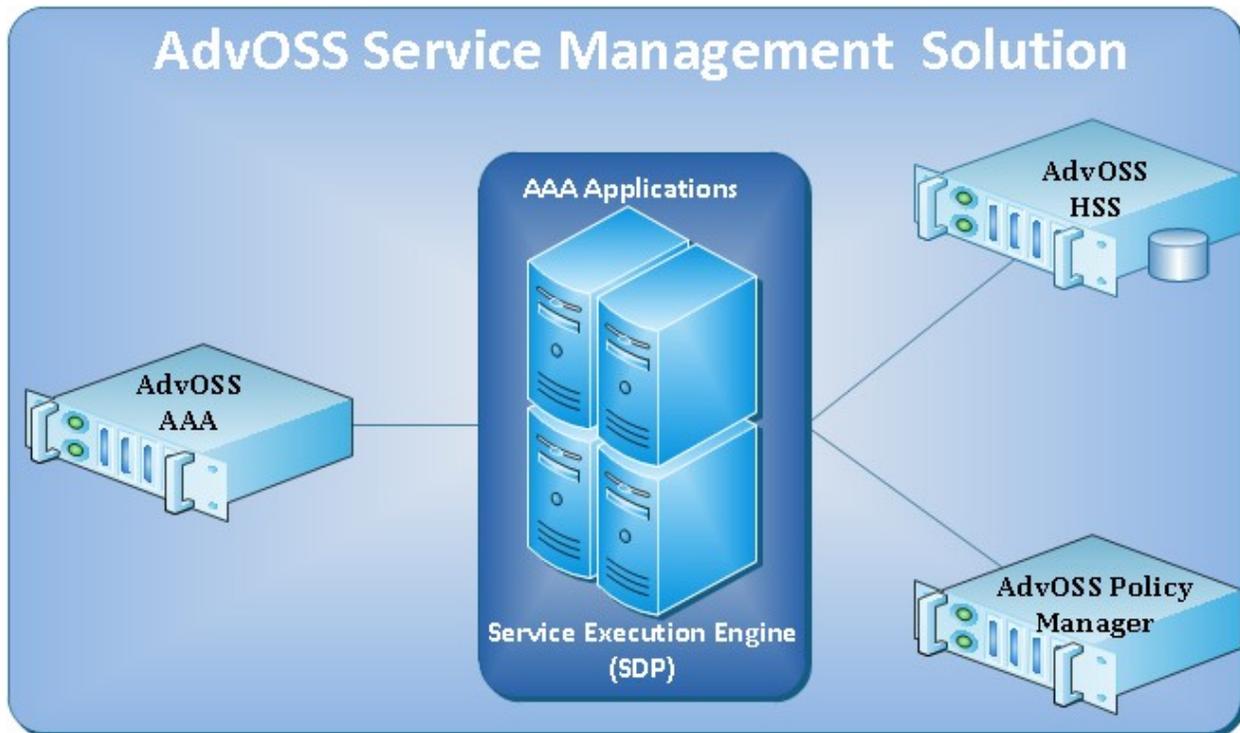
Overview of AdvOSS Service Management Solution:

AdvOSS Service Management Solution is a set of AdvOSS products closely functioning together to render service management functions for today's communication service providers (CSPs). It

interfaces with Service Delivery and Policy Enforcement points on one side and multiple other functions inside the core network of the CSP. In addition to it, it provides multiple functions within itself which are needed to realize service management use cases of CSPs.

Solution Architecture

AdvOSS Service Management Solution is composed of four products:



- a. **AdvOSS-AAA server** that acts as the protocol specific front-end for interfacing with AAA clients. It provides RADIUS and DIAMETER based interfaces to AAA clients. Clients in this case are network elements that are performing service delivery or policy enforcement functions.
- b. **AdvOSS HSS** (Home Subscriber Server) that is the main Subscriber Repository for subscriber, service and subscription related data.
- c. **AdvOSS Policy Manager** that is Policy evaluation function with a built-in rule based engine to handle different policy decisions according to CSP policies.
- d. **AdvOSS SDP** (Service Delivery Platform) with multiple **AAA Applications** realized on the SDP. This makes the heart of the full solution and provides the glue between different network elements. These AAA Applications include Authentication, Authorization and Accounting and in addition to their basic functions, handle advanced business logic and workflows for service management. They realize end to end business use cases and service management scenarios. These are built on the service creation and

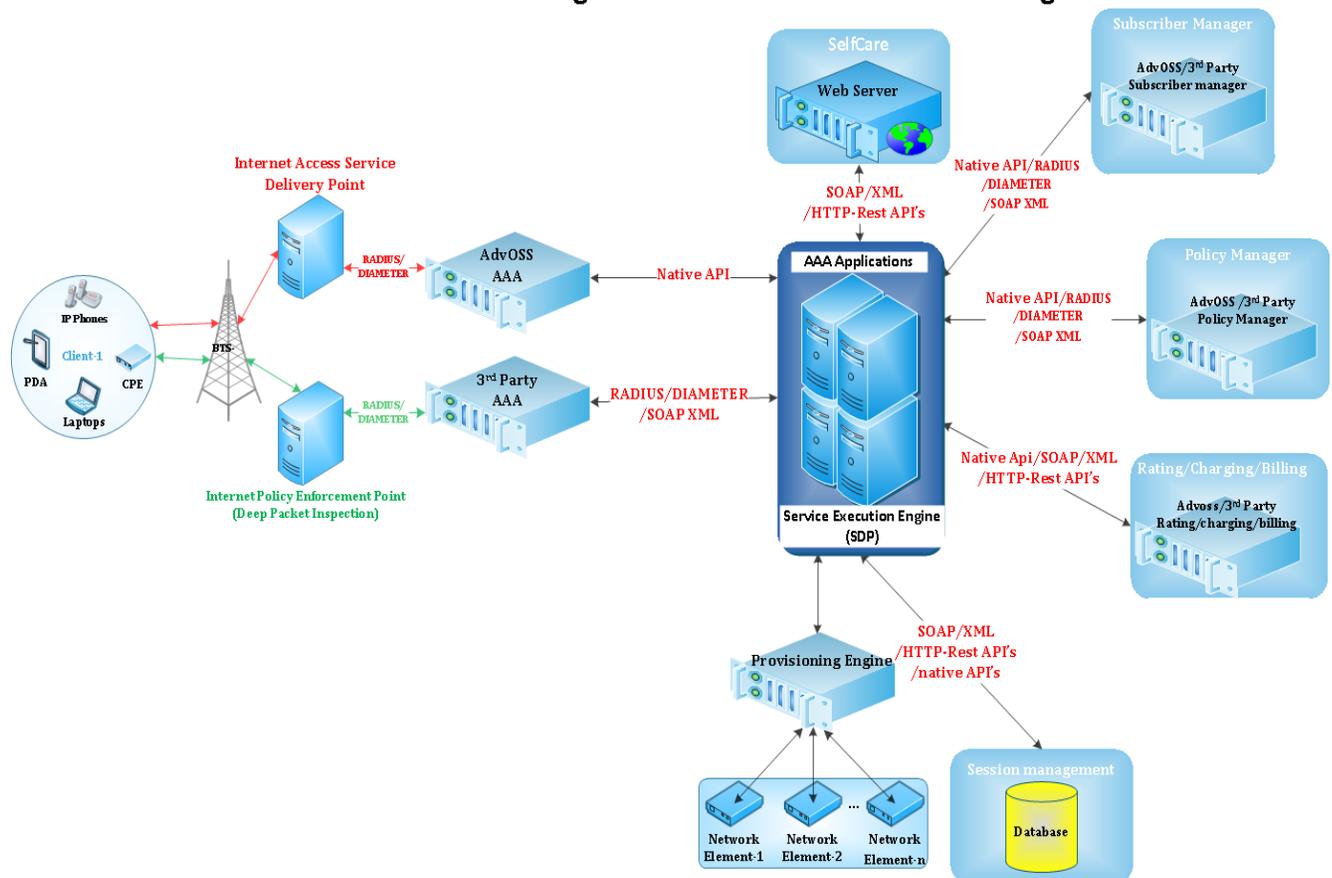
execution environment provided by SDP. SDP is an advanced workflow execution system that can execute complex business logic.

Business Requirements

The real challenge faced by today's Communication Service Providers (CSPs) is that the proliferation of smart-phones and other sophisticated end-point devices, coupled with the high volume of Over-The-Top (OTT) applications has placed high demands on service management solutions. Once thought to be merely Authentication for username/passwords, Authorization for basic credit control, and Accounting for simple Call Data Record (CDR) generation, today's AAA systems need to realize complex business use cases to help CSPs monetize the new explosive growth in use of data services and the ability to offer converged multiple services.

AAA Applications: Interfaces and Integration Points

AdvOSS Service Management Solution Architecture & Integration Points



AAA Applications integrate with several other components and functional elements in the CSPs core network. These may or may not be AdvOSS products. In case of AdvOSS products, the integration is seamless whereas for third party products, the integration may be done via their exposed APIs on standard interfaces such as SOAP/XML, HTTP- REST APIs or other web-

services based APIs and RADIUS/DIAMETER based standard protocols. The main core elements with which AAA Applications integrate are the following:

- AAA server
- AdvOSS or third party Mediation system
- AdvOSS or third party HSS or other Subscriber Manager
- AdvOSS or third party Policy Manager
- AdvOSS or third party Rating and Charging Engine
- AdvOSS or third party Billing
- AdvOSS or third party CRM
- AdvOSS or third party Self-care portals for hot-lining
- AdvOSS or third party monitoring systems
- AdvOSS or third party Revenue Assurance systems
- AdvOSS or third party Service Assurance systems
- AdvOSS or third party provisioning engine for provisioning of network elements

SDP execution environment features and benefits in the context of Service Management

Service logic execution

- The core of AdvOSS-SDP is a highly scalable and high performance execution engine for real-time execution of complex business workflows and service logic.
- It acts as a container for customized AAA applications that can be modified using simple XML based programming for different CSP environments, thus realizing their specific business use cases. This gives great flexibility to CSPs since they know they are not purchasing a closed, static system with a limited feature list.
- In service management applications, it uses the front-end RADIUS or Diameter servers such as the AdvOSS-AAA server as mere transports to talk to network elements. It can integrate with a third party AAA server on RADIUS or Diameter, and with AdvOSS-AAA server via internal native APIs for faster performance.

A flexible, dynamic system that is easily enhanced with new requirements

- It is a ground reality in today's dynamic business environments that CSPs need to enhance and improve their services. Furthermore, new business use cases and the ability to monetize them, thus resulting in new revenue generation opportunities are bound to come by for modern CSPs, if they want to stay competitive in today's market. Any new requirements and business use cases have traditionally required costly system

upgrades by CSPs. Even after the upgrade, they get a new list of features from the system that may cater to their requirements for a specific time period, but after a while, still new opportunities emerge which give rise to new requirements and completely new use cases. Following such requirements with closed and static systems is a futile effort at best. No vendor can claim that he has catered for all the requirements in the farthest future to come for a CSP. Therefore, highly programmable and workflow based execution environments like AdvOSS-SDP present a very strong value proposition.

Performance and scalability is a key factor for Service execution engines

- CSPs have to be careful when purchasing such a programmable solution. The solution has to scale in a future proof manner as well. As the subscriber base grows, the system should be able to cater to the increased work-load for years to come, or even beyond that. Ideally, the system should be architected in a manner that it is able to scale by merely adding hardware resources with software itself never becoming a bottleneck. The operator should be able to give more hardware resources to the software system and it should scale itself seamlessly on the new hardware by expanding its components to utilize the newly added hardware. AdvOSS-SDP provides such an environment for Service Management that is high performance and scalable to almost any number of subscribers by simply adding hardware resources.

Base AAA applications

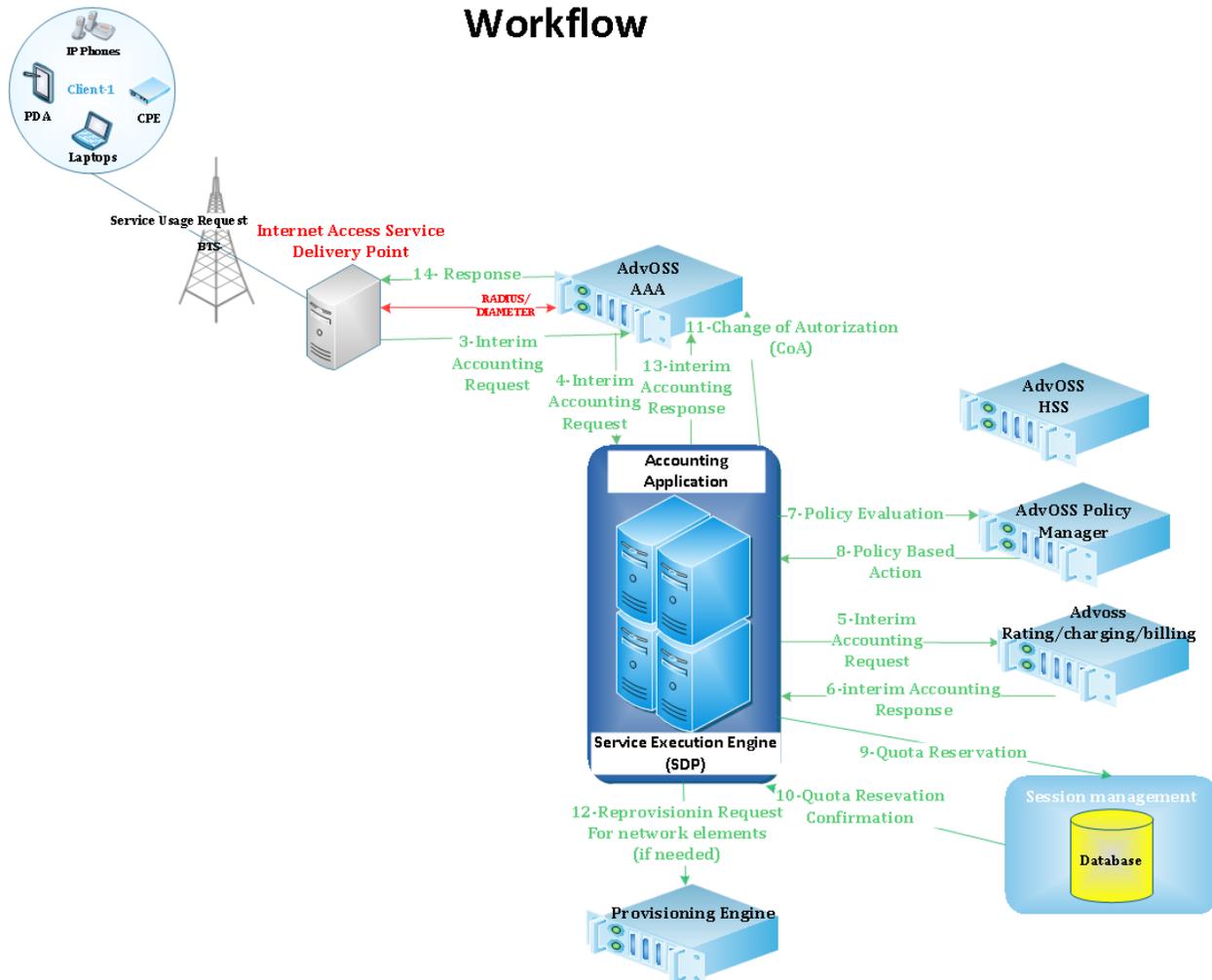
- AdvOSS-SDP, when used as the core part of a Service Management solution comes bundled with base AAAA Applications that are invoked by AAA server on Authentication, Authorization, Re-Authorization, Start, Interim and Stop Accounting. An additional application is invoked asynchronously by external events sent to the Service Management component to modify service behavior for subscribers.
- The AAA Applications are seamlessly integrated with other AdvOSS components i.e. AdvOSS-AAA, AdvOSS-HSS and AdvOSS Policy Manager, and can be integrated easily with several other AdvOSS and third party components. The base Applications are easily customizable through a simple XML based scripting language and the well-known Javascript language. Thousands of programmers around the world understand both XML as well as Javascript. AdvOSS itself provides development and customization services to quickly deploy new business use cases the CSPs may have.

Service Management applications common functionality

The AAA Applications running in the AdvOSS-SDP container perform the following tasks, although they can be modified to perform other tasks in their workflows as required:

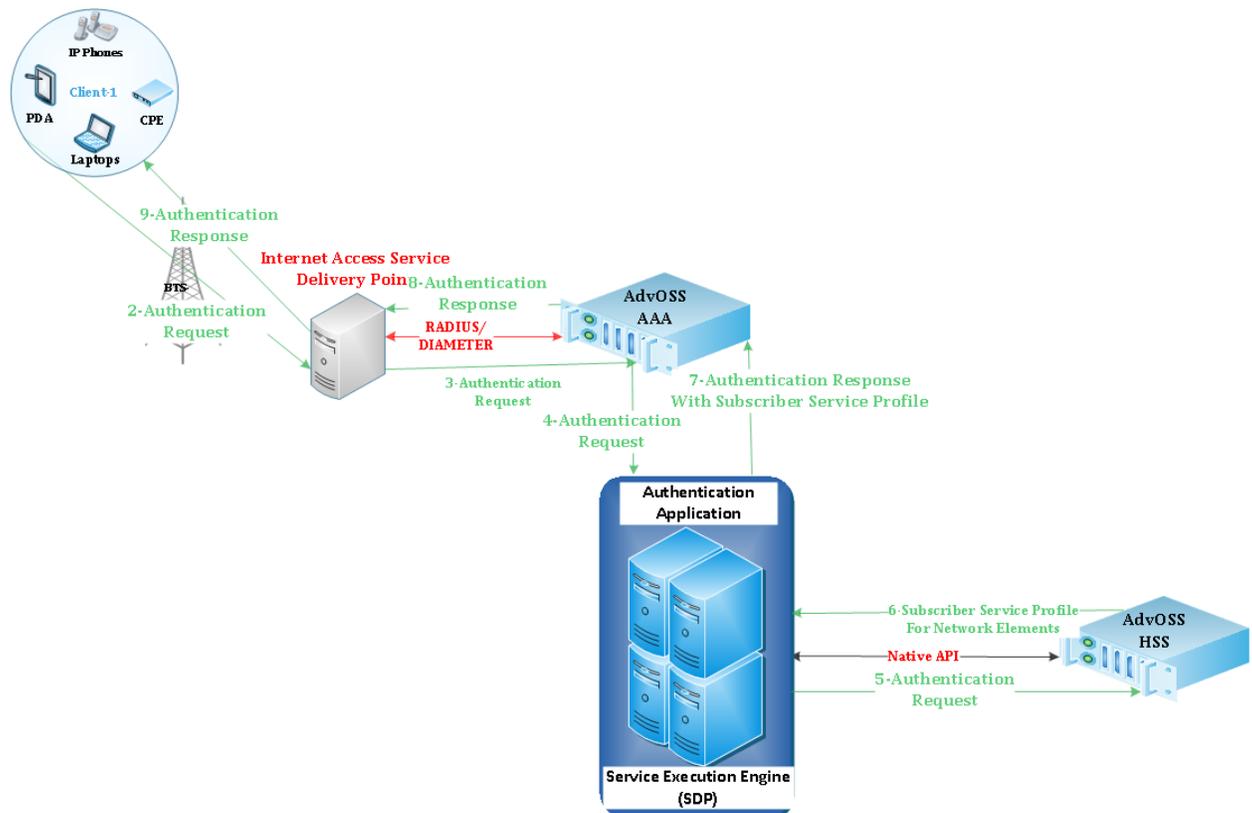
- Receive RADIUS or Diameter packets from network elements via standard protocol modules. Extract information from the received packets and execute any business logic processing on the received attributes.
- Perform Queries into one or more databases via SDP's database connector module to get information using keys from the received packets. Alternatively, they can call an external web-service via SOAP/XML or HTTP-REST API and that service may perform the query into the database. Database query or web-based API call may also be required for session management since the AAA Application is responsible for managing user sessions while the subscriber is using the services, and close the accounting CDRs for different services and close the sessions on termination of service usage.
- Execute API calls into other solution components, passing information required by those APIs from the received attributes, retrieved from database or web-service calls, and any additional information self generated by the AAA workflow. Examples of other solution components include, but not limited to Subscriber Manager such as AdvOSS-HSS, Policy Manager, Database connector etc. They may retrieve additional data as a result of these calls such as subscriber's service and personal profiles, filters and other specific service related and the client network element related information. For example, they may retrieve a specific service profile for this subscriber if the network element that sent the request is a Deep Packet Inspection Engine that filters subscriber traffic based on her specific profile.
- Execute the programmed business logic specific to the CSP for Authentication, Authorization or Accounting as the case may be. As a result of this execution, the AAA Application may have to take certain actions as dictated by the business logic, or the information returned from the APIs of other solution elements. For example, the Policy Server might have instructed the application to send an alert SMS to the subscriber, or redirect her to a specific self-care portal for a pop-up based alert when using Internet service, or disconnect the subscriber session on the network element, or re-provision a specific network element with certain new values etc. The AAA Application may have to invoke a front-end protocol specific method to get the work done on a network element. Example of such a method is the Change of Authorization (CoA) in RADIUS.

Typical Interim Accounting Workflow



- Push network element specific profiles to different network service delivery and policy enforcement points. This can be required in a typical authentication workflow at the time of initial Authentication and also mid-session as a result of Interim Accounting or Re-authorization and may also be dictated by Policy Manager. These profiles are retrieved from the Subscriber Manager in a generic or native format like XML, and then translated into network element specific format. For example, a profile may be retrieved from HSS in XML form and then values from the profile encapsulated in vendor specific RADIUS attributes understandable by the network element.

Basic Authentication Workflow



- In certain cases, the SDP may receive specific data via its own exposed APIs from external web-services or network elements in an asynchronous manner. As an example use case of this scenario, a subscriber was redirected by the AAA Application in conjunction with the network element providing Internet access service to a self-care web portal to recharge her account using a voucher management system. Once she recharges it, her Internet services must be resumed. The self-care portal calls an XML or HTTP-REST API of the SDP. SDP will instantiate a new instance that will process the resumption request, may consult the HSS to retrieve subscriber's new status, and send a CoA to the Internet Service network element to remove the redirection to self-care for this subscriber and resume her Internet service.

Conclusion

CSPs need to craft their strategy regarding Service Management solution with great care. In order to remain competitive, they must ask the right questions when evaluating such a solution. The key questions in this regard is, whether the solution is extensible, programmable, scalable, future proof in terms of both growth and functionality and yet cost effective. The solution must

be able to execute arbitrary business logic and workflows to realize today's and future use cases. AdvOSS AAA Applications running in the SDP container, along with bundled products acting as the components of the solution e.g. AdvOSS-HSS and Policy Managers offer such a solution that has all the key ingredients of a new generation Service Management platform and a strong value proposition for dynamically growing CSP environments at a highly competitive price point.

About AdvOSS:

AdvOSS is an emerging B/OSS and Switching vendor that offers core-to-edge Billing, AAA & Call Control products to diverse range of Communication Service Providers (CSPs) across the globe. It provides customizable, scalable and cost effective solutions that add value and reduce overall operating expenses of Telecom Operators & CSPs.

More than 400 medium size customers and many Tier 1 telecoms in 40 countries rely on AdvOSS products for their business. This includes leading Operators like Wateen Telecom (Warid Telecom Group), Qatar Telecom, Orascom Telecom and many other CLECs and Carriers.

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