

## **Policy Management & On-line Charging - Standards Based or Proprietary Solutions?**

Today there is huge hype around policy management, and most notably around data traffic policy management. In its simple form, this refers to the ability of the Operator to control the network resources utilized by the end-user.

Due to competition Operators have historically moved to all you can eat data plans. Therefore the subsequently introduction of data hungry devices is now choking the 2G/3G networks and is out of control.

Congestion of the radio layer and the backhaul infrastructure is one obvious reason for deploying data control solutions. In a recent press release, O2 said that 3 percent of its Smartphone users use a whopping 36 percent of all mobile data traffic. O2 will simply put an end to “unlimited data plans”, and all traffic will be capped, given the users the possibility to buy additional data packages when limits are reached.

This creates opportunities, including creating new revenue streams by granting high bandwidth for a premium and providing a personalized service bundle based on traffic shaping and filtering. There are as many opportunities as there are challenges in the network and many opportunities currently remain on the wish list of marketing. Data traffic policies will be required.



*Bridging the gap between IT and telecoms*

The current approach to policy management builds on new architectural concepts and attempts to support new business models. One example are third party application servers that are delivering value added services like video on demand, which can also directly affect the QoS during the streaming period.

This can work when talking about new business models, however in the short term the old services need to be supported as well. And this is the place where most complex issues are encountered as most likely, the policy management solution will need to be added on top of an existing on-line charging solution.

### **What the standards say**

#### **3GPP Policy and charging control architecture TS 23 203**

“It shall be possible for the PCC architecture to base decisions upon subscription information.”

“The PCRF provides network control regarding the service data flow detection, gating, QoS and flow based charging (except credit management) towards the PCEF.”

“It shall be possible with the PCC architecture, in real-time, to monitor the overall amount of resources that are consumed by a user and to control usage independently from charging mechanisms, the so-called usage monitoring control.” (from Rel9 onwards)

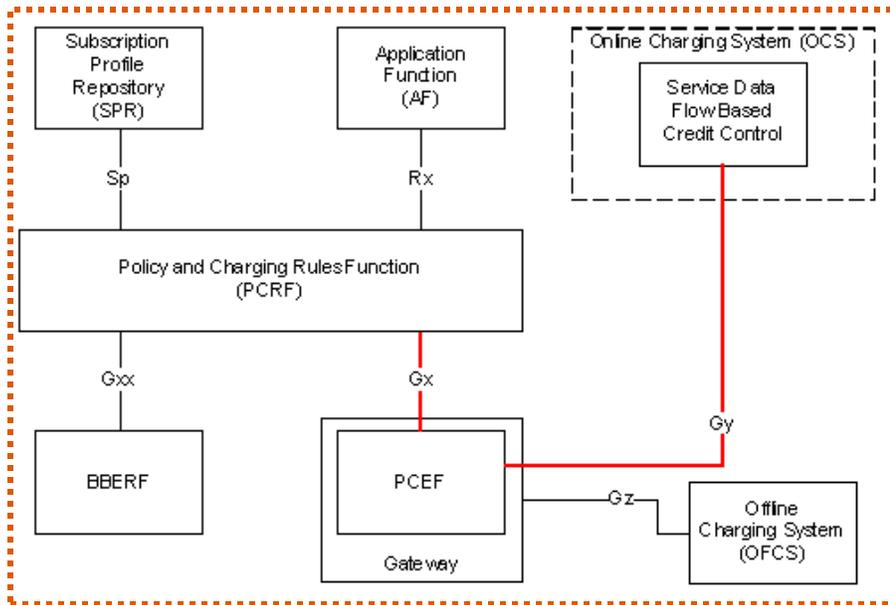
#### **3GPP Charging architecture and principles TS 32 240**

“Online charging: charging mechanism where charging information can affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with bearer/session/service control is required”

“In conclusion, online charging is a mechanism where charging information can affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with the control of network resource usage is required.”

Therefore, it is recognized in the charging architecture document, that affecting the service requires direct interaction between the OCS (Online Charging System) and the element controlling the network resource usage – PCRF in this case.

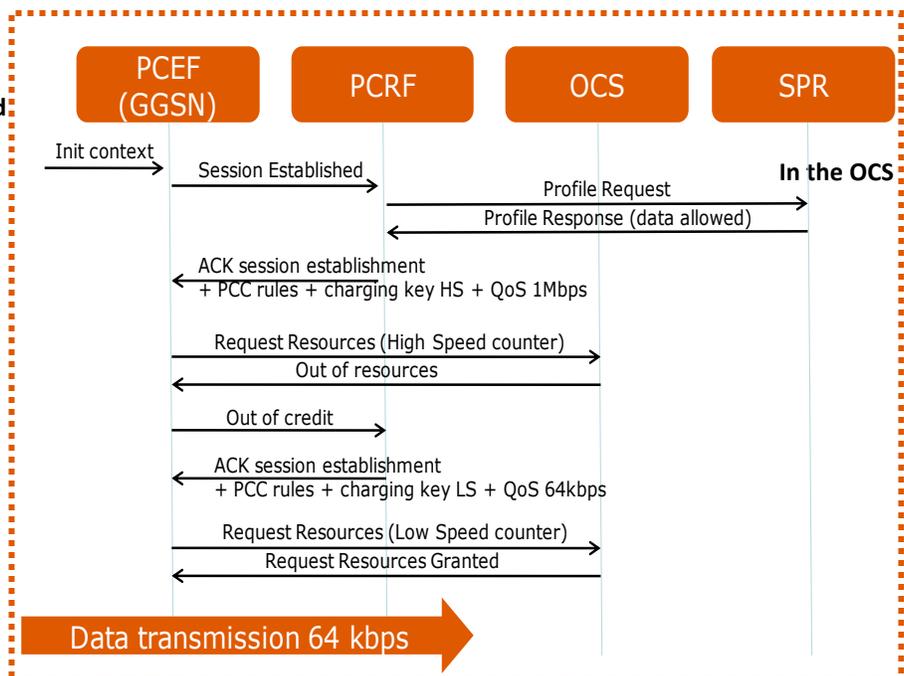
However, in a 3GPP environment such interaction does not take place, is rather about two systems sharing responsibilities and influencing each other on how to control the bearer. Applying policies does not imply direct interactions, but having indirect dependencies between the OCS and the PCRF as we will see below.



**Figure 1:**  
3GPP architecture  
for policy and  
charging control

For example, in a 3GPP compliant environment, once a data session is established, the PCRF would provision its policies in the FCEF then the PCEF would try to authorize the traffic against the OCS. If the user accounting information does not allow for that particular QoS the OCS would reject the charging REQUEST, and the PCEF would fall back to the PCRF and ask for new policies. This scenario would repeat each time a change in policy is needed because of differences between the subscriber's profile/configuration data/charging logic in the OCS and the policy rules pushed by the PCRF. That means wasted signaling and processing capacity.

**Figure 2:**  
3GPP Solution for  
QoS adaptation based  
on the information



Continuous interrogation between the OCS and PCRF can be avoided if both systems have access to the same QoS/charging configuration and subscriber profile and can employ similar logic when interpreting them. This approach requires the OCS and PCRF to be kept in synch, not only configuration wise, but also from the subscriber information point of view. If we are to extend the above example, and consider that we have several data plans, each with different bandwidth tiers, then the data plans and the tier information would have to be replicated between the OCS and the PCRF. This means operational effort or upgrades in the provisioning systems in order to maintain the charging keys configuration in two systems.



Let's consider a slightly more complex scenario. A prepaid subscriber has a default bandwidth of 64Kbps. He/she can also buy a monthly recurring bundle that offers 128Kbps for up to 2Gb rated at a certain price per Kb. Once the 2 Gb are consumed, the QoS is lowered to the default value and the default price per Kb is applied for the remaining of the month. There is also a cost associated with the monthly renewal of the bundle, and the Operator allows up to 200Mb of unused high QoS to be reported from one month to the other. If the subscriber does not have enough credit when the renewal is attempted, the bundle is deactivated and default QoS is used.

In this scenario, both the OCS and PCRF's database (SPR) would need to be provisioned with subscription information, i.e. the bundle being activated in OCS, the associated policy in the PCRF. Also, the PCRF would need to know the validity of the bundle, in order to properly arm policy expiration triggers in the PCEF.

The usage limit after which the QoS is decreased also must be shared between the two systems. Failing to renew the bundle in the OCS due to lack of credit, should also deactivate the high QoS option in the SPR, to keep the systems in sync. This simply means that the logic/profile information from the OCS to the SPR and PCRF need replicating.

There are further examples, with increasing complexity in the business requirements. Operators want specific traffic inspection based policies (e.g. throttling the P2P usage), sponsored access with dedicated high bandwidth enabled only for the duration of the download or streaming session, dynamic policies based on events happening in the charging system, etc.

### **Standards based or proprietary solutions?**

While trying to apply the simple cases mentioned above the Vendors and Operators are facing a simple question: where is the distinction between charging and policy management? And what information do I need in each system, what information needs replication and how can I employ really dynamic policies without requiring extensive operational & investment effort?

The truth is that there is no simple answer as it all depends on the operator's business needs. In real environments the standard 3GPP policy management architecture allows simple scenarios to be developed as it builds on the principle of separating the policy management from the charging management with the PCRF replicating or accessing some of the charging system functionality, configuration and subscriber profile data. But the pure standards based approach introduces a high cost which might be prohibitive for simple use cases (e.g. Bill Shock).

On the other hand, the charging systems have been built from the ground to handle the complexities of usage monitoring, complex pricing, account and subscription management and control of network usage. Complex policy enforcements need to take into consideration charging events and information from the OCS. This simply means returning to the basics as stated in the 3GPP charging principles: "a direct interaction of the charging mechanism with the control of network resource usage is required". As this is exactly what is missing from 3GPP policy architecture, we expect in the short term to see proprietary extensions/architectures and custom built solutions that address this gap.

This will remain the status quo until a new version of standards which solve this problem is available, the business needs change or potentially the Operators gradually upgrade older systems and evolve towards a subscriber profile centric architecture. Operators or vendors need to appraise the direction and work to their strengths; Computaris is able to assist them from an unbiased view and can progress the operator's or vendor's choice of business direction.

### **About Computaris**

Computaris specializes in system integration, BSS technical consulting and software development for software vendors and communication services providers (CSP) in Europe, Middle East, Africa and SE Asia.

It provides the highest level of expertise in the domain of communications BSS: billing, rating and charging, SDP (Service Delivery Platform), VAS (Value Added Services), messaging, provisioning, mediation, service management, mobile commerce and mobile money.

Computaris Policy Management expertise enables CSPs (Communication Service Providers) to experience a unified view of subscribers across networks and applications, to be more creative in building truly compelling and distinctive offers by leveraging their unique mobile capabilities and to distribute and control their network resources more effectively. As a long standing system integrator, Computaris provides consultancy, design, integration and deployment services in the field of policy management.

Computaris has been successfully involved in more than 200 projects implemented to Communication Service Providers worldwide, supporting a broad range of services in the field of policy management such as personalized services (Bill shock, Roaming management, Parental control or Tiered services), Resource Management (Fair usage, Traffic optimization, Differential charging) or future proof KPIs (Average Revenue per Megabyte).

#### Notes

1. The policy management architecture has other components like the application function which are not mentioned in this document. The study focuses on the relation between policy control and online charging mechanisms.
2. Current architecture limitations are being also recognized by 3GPP itself and a study on how to address the existing problems is ongoing. But until a new version of the standard comes out, Operators will have to live with the dilemma of choosing between pure standard solutions and deploying proprietary extensions that can support their product strategy and offer differentiated services on the market.

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