White Paper

DPI and Policy

Complementary tools for network optimization and new revenue creation

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INTRODUCTION

The case for integrating DPI and Policy

The rapid growth in mobile broadband has been a great success story, but one that has left in its wake many challenges, as well as opportunities, for mobile operators. Adoption of smartphones, which in many markets now account for over half of new devices, and extensive availability of applications and services, with video accounting for over half the traffic, has created a surge in the data load on the networks. Accommodating the increased traffic volume can be an expensive proposition for mobile operators, and yet discouraging subscriber use limits the opportunity for revenue growth.

How can mobile operators encourage data use expansion without breaking the bank? How can they do so in a cost-effective way? The time-honored method of increasing radio access network (RAN) capacity by adding base stations is no longer sufficient because it is expensive and increasingly difficult in urban areas, and because spectrum allocations are limited.

At the same time, unlimited all-you-can-eat plans have proven to be unsustainable, because they promote heavy usage, and limit the perceived value of the service. Basic plans with traffic caps protect mobile operators from excessive usage, but fail at creating the right incentives in usage behavior and in offering the personalized services that subscribers value the most.

A better understanding of the data traffic and intelligence in its real-time dynamics provide the foundation needed to manage traffic cost-effectively, and to offer more relevant and better-targeted services to subscribers.

Three Policy Control and Charging (PCC) tools, designed to work in concert, help mobile operators’ efforts in this direction:

- **Deep packet inspection (DPI)** to gain actionable intelligence on traffic flows.
- **Policy rules** to define how to manage traffic based on information gathered through DPI, network resources, subscriber profiles, and offered services.
- **Policy enforcement** to implement policy at a granular level in real-time across the network, applying policy rules to DPI data.

The joint implementation of DPI and Policy enables operators to optimize network resource allocation, to segment their subscribership effectively, and to create value-based, personalized services. This in turn may lead to improved network performance and utilization, a higher perceived value for the service, lower churn, and expanded revenue opportunities. The tight interdependency between DPI, policy rules and policy enforcement presents a strong case for integration, to enable mobile operators to leverage DPI data in defining and enforcing policy, while keeping complexity under control and enabling a fast time-to-market deployment.

In this paper, we discuss the advantages of pre-integrating DPI and Policy, and how this approach can be beneficial in use cases tailored to meet mobile operator requirements and subscriber expectations.
2. COMPLEMENTARY TOOLS TO MANAGE TRAFFIC AND SERVICES

Acquiring and leveraging network intelligence

To realize the benefits of the growth in mobile broadband adoption, mobile operators have to move beyond rudimentary solutions such as cap enforcement or throttling, and develop a new approach to subscribers and services that requires them to:

- Understand real-time network traffic dynamics, i.e., type of traffic per location, subscriber and device
- Use subscribers preferences to develop personalized, value-added services
- Have the flexibility to quickly launch new services that subscribers want, and to refine them as necessary based on subscriber response, network load or other criteria
- Use available intelligence and policy rules to manage traffic and services in real time

While mobile operators have access to the information they need, analyzing it effectively to drive traffic and to improve service management has proven to be a daunting task. Extrapolating actionable intelligence from huge amounts of data in real time, identifying effective policy rules and implementing them is not trivial. The increased complexity, latency, processing overhead, deployment time and costs may void the benefits of this approach to a more active traffic and service management.

Most of the policy employed by operators today is based on static plan features that do not require deep real-time traffic intelligence. For instance, throttling subscribers when they reach a monthly traffic threshold does not require any knowledge on what type of traffic (i.e., voice, video, file download) or what the network load conditions are. As a result, a subscriber may be throttled even if the base station connected to the device is not at capacity, which results in a non-efficient use of network resources (i.e., leaves free capacity unused) and an unsatisfactory user experience.

DPI and Policy: what do they do?

Deep packet inspection (DPI) analyzes IP packets to detect security threats or to gather intelligence on traffic flows and sessions. DPI looks at headers and payload to determine and classify which type of traffic (e.g., video, voice, best-effort data) crosses the network on the basis of the protocol used (e.g., SMTP, HTTP, SIP, or RTP). This information enables actionable operations such as traffic admission, prioritization and shaping, lawful intercept, restriction of access, security monitoring, content optimization, and support for new services and revenue models.

Policy and Charging Rules Function (PCRF) is the element in the mobile core that defines the policy and charging rules that can be used to offer many value-added services, to implement advanced charging functionality, and to support QoS. PCRF relies on subscriber profile information, service definitions, and real-time network information to prescribe the rules to manage traffic and services.

Policy and Charging Enforcement Function (PCEF) enforces the rules defined by the PCRF in real time, using DPI and network load data. Policy enforcement can optimize and protect the network, manage congestion, support the introduction of new services and billing models, and provide additional intelligence on network traffic.

Table 1: DPI and Policy: what do they do?
A policy strategy with real-time, concurrent awareness of RAN, overall network load and subscriber activity empowers mobile operators to move beyond the limitations of simplistic policy rules, but requires them to tightly integrate 3GPP PCC elements. In mobile and converged networks, PCC components include the PCRF, the PCEF, Online Charging System (OCS), and Offline Charging System (OFCS). In this ecosystem, the DPI platform interacts with these network elements within the PCEF, the enforcement function.

DPI and Policy (Table 1) are intrinsically tied to each other. DPI provides the real-time information about traffic flows and sessions that is then used as the PCEF to enforce the rules set by the PCRF. If the operator has access to accurate DPI-based intelligence but the PCRF and PCEF cannot fully leverage it, the quality of policy implementation will inevitably suffer. Similarly, poor DPI analysis will make robust policy rules ineffective.

It is not enough to classify traffic by website URLs alone, because URLs do not provide crucial information on the mechanics of access. Traffic flowing through a DPI platform needs to be continuously analyzed in multiple ways with minimal impact on latency. All packets contain information regarding source and destination IP address, VLAN ID, port and protocol. To create a context of usage, packets are associated with user-initiated sessions that occur over time to define signature mechanisms to understand a pattern of access. Analyzing these sessions in the context of protocol behaviors allows mobile operators to determine the type of traffic (i.e., HTTP, FTP, BitTorrent, SIP or other protocols) transported in their network.

With DPI, operators can extract additional traffic features from data packets, such as the SIP calling, IRC channel, or FTP file transfer name, and can detect and classify session flow behavior using categories such as browsing, downloads, streaming or interactive access. DPI can also identify connection patterns such as authentication and login sequences, using session analysis logic to detect intentionally evasive traffic behavior by monitoring varying packet size, distribution, and patterns over time.
The DPI platform has to correctly identify the type of traffic and relate it to the subscriber. DPI scalability is crucial to meet the rapidly increasing processing requirements driven by traffic increase. At the same time, the solution has to be sufficiently agile to keep the increase in overhead and latency at a minimum. All of this combines to help network operators to accurately classify all traffic monitored and implement policy solutions that may result in higher revenues.

At the same time, the PCRF has to define rules that work in concert with DPI data and hence need to be designed to facilitate the task of the PCEF in enforcing policy using traffic data, while at the same time resonate with subscriber preferences, requirements, and plan commitments. Bad policy rules can lead to inconsistent or erroneous enforcement, which may in turn result in lower network utilization and/or subscriber satisfaction. A plan to institute a new service and revenue model may backfire if implementation is poor.

Policy platforms formulate actions that need to be enforced, and DPI identifies the traffic on which the policy has to be enforced. In the example of a shared service plan, the policy platform’s role is to interface to OSS/BSS systems in a mobile operator network to get information about the service plan, identifying each device and its associated data quota in order to create policies that establish the boundaries of the service. Thereby creating rules that can result in limiting bandwidth, packet rate, or connection rate when users surpass limits. By analyzing and classifying traffic, DPI determines where and how these rules should be applied, and, as a result, it can prioritize traffic or filter traffic, by selectively accepting, rejecting, dropping, re-writing, or diverting (i.e., steering) it. All of these policies and actions in concert establish the basis for DPI-based policy management monetization.

Figure 2. DPI, PCRF and PCEF within a 3G/4G mobile network. Source: Senza Fili
3. EXPLORING THE TIES BETWEEN DPI AND POLICY

Does integration make sense?

An effective PCC platform that optimizes network utilization and performance, and acts as a tool to increase revenues and subscriber retention has to be grounded in a deep and well-tested integration between DPI and Policy. In the following pages, we explore how operators can benefit from a pre-integrated DPI and Policy approach such as Revenue Express, which Openet and Procera have launched.

A smooth integration of a new policy and traffic management platform within the existing networks requires a careful assessment of how the new tools interact with existing elements and with each other, and what are the tradeoffs between custom, in-house integration of solutions from different vendors, and pre-integration of selected functionality.

Integration options. Mobile operators have multiple options when selecting their DPI and policy solutions:

- **Adopt the solution offered by the current core vendor.** This choice may force mobile operators to choose a solution that is not the best suited to their requirements and may be less innovative, but compatible functionality may facilitate the integration with the rest of the network.

- **Pick separate vendors for the DPI, PCRF and PCEF functions.** Solutions can be integrated internally or with the help of a system integrator. While providing maximum flexibility in selecting vendors, this approach requires more efforts and resources to complete the integration and, typically, a longer time to deploy and a higher complexity.

- **Select an integrated solution.** This may limit the flexibility in the vendor choice and in the implementation, but it offers end-to-end functionality out of the box, allowing for faster and less complex deployments that promote a more nimble approach to service creation.

Large operators with networks in multiple countries often have more resources and funding available to integrate and customize solutions from multiple vendors. Smaller operators or those in emerging countries with lower ARPUs are more likely to select an integrated solution that is easier to manage and faster to deploy.

Benefits of an integrated DPI and Policy solution. An integrated solution not only reduces the complexity and time to market to deploy a DPI and Policy solution, but it may also reduce costs, as equipment requirements and operating costs can be lower. In addition, pre-integration can provide tested end-to-end functionality, and remove possible performance or functionality bottlenecks in the network.

With Revenue Express, operators also have access to additional features that the vendors include in the stand-alone solutions:

- Openet’s pre-packaged solutions, which distill a set of service creation and management use cases that Openet has developed through ongoing collaboration with mobile operators worldwide. We will discuss these solutions in the second half of the paper.

- Procera’s analytics tools that are included in its Intelligent Policy Enforcement (IPE) system along with DPI and PCEF functionality, which is designed to provide operators with greater visibility into their traffic.
Openet and Procera have worked together aiming to provide the following:

- Accuracy of DPI traffic classification
- Easy access through a common user interface that combines DPI and PCRF functionality
- Analytics to provide real-time feedback on services and to evaluate policies
- Scalability and high availability across the PCRF and PCEF designed to enable multiple Service Passes
- Flexibility and simplicity in the configuration of services and definition of policy rules
- Identification of applications and subscriber behavior to enable revenue generating actions such as promotional services for a specific device or application

### What they do

<table>
<thead>
<tr>
<th>PCRF</th>
<th>DPI / PCEF</th>
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<tbody>
<tr>
<td>- Value-based, tiered and personalized services</td>
<td>- Traffic monitoring and steering</td>
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<td>- Flexible service definition and updates</td>
<td>- Congestion management</td>
</tr>
<tr>
<td>- Subscriber segmentation</td>
<td>- Network optimization</td>
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<td>- Fair usage and traffic prioritization</td>
<td>- Application and service QoS</td>
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<td>- Monitoring and assessment of service performance</td>
<td>- Real-time, RAN-aware policy enforcement</td>
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<td></td>
<td>- Analytics</td>
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### Benefits

- Creation of new services to boost revenues and reduce churn
- Optimize utilization of network resources
- Improve network performance
- Expand network intelligence

Table 2. The value proposition of Openet and Procera pre-integrated DPI and Policy solution
4. USE CASES FOR NEW SERVICE AND REVENUE MODELS

Impact of an integrated approach to DPI and Policy

Intuitively, it is easy to see how more detailed, real-time information about network traffic and subscriber behavior can be valuable to mobile operators. Yet, can we point to concrete examples of the role that an integrated approach to DPI and Policy have on new service and revenue models? What functionality do they enable? What benefits do they bring?

We explore these questions on the basis of six use cases supported by the Openet PCRF solution that leverage the integration with Procera’s PCEF and DPI:

- **Fair Use**
  - Traffic caps
  - Fair Use caps
  - Interim data caps

- **Tiered Services**
  Tiers defined by:
  - Data quota
  - Applications allowed
  - Connection speed

- **Shared Data**
  - One subscription including multiple devices/subscribers
  - Traffic caps per user or per device

- **Service Pass**
  - Additional data allowance
  - Occasional services
  - Applications prioritized access

- **Access Type**
  - RAT selection
  - Traffic quotas based on RATs
  - Traffic counters for each RAT

- **Device Type**
  - Control of SIM swapping
  - Policy rules specific to the type of device

Figure 3: Service Pass Use Cases Source: Senza Fili
4.1 FAIR USE

Optimize resource allocation

What it is: With Fair Use mobile operators can enforce data quotas by monitoring usage, enforcing traffic caps, sending notifications, and blocking or restricting service.

Benefits: Fair Use policy gives mobile operators the ability to enforce existing data caps, while allowing flexibility in managing usage above traffic quotas. Fair Use is effective in protecting the network from excessive subscriber use and can lower the overall network traffic. Fair Use enables operators to better match revenues with network utilization and protect quality of service by enforcing the terms of data price plans which typically restrict data usage beyond a preset quota.

Impact on subscribers: Not only does fair usage reduce the impact of congestion on the network, it also prevents a small percentage of high-traffic users to disrupt the experience of the rest of subscribers.

Fair Use : Examples

- Interim data limits can be set to allow subscribers to manage their usage and operators to distribute network usage more evenly
- In addition to total usage, the operator can track Fair Use balance and set policy rules based on both
- SMS and email notifications ensure that the subscriber is aware of reaching Fair Use limits or traffic quotas
- Enforcement rules can be applied to define bandwidth, volume, and/or priority for a time period
- Subscribers with unlimited data plans can be excluded from usage tracking
4.2 TIERED SERVICES

Attract new subscribers, retain the existing ones

**What it is:** Tiered services enable operators to segment the market, and to personalize the service plan to match individual preferences and traffic needs. Operators can define tiers in terms of data quota, applications allowed or excluded, and/or connection speed. Subscribers can choose the tier that best suits their preferences and willingness to pay, but retain the ability to change tiers as needed. Quota limitations are enforced and managed through Fair Use policy rules.

**Benefits:** The more granular segmentation that tiered services bring enable mobile operators to extract more revenues from subscribers with higher requirements and more spending flexibility, while attracting more price-sensitive subscribers to add a data plan that without tiering would have been too expensive. Offering a tailored number of data tiers to the consumer allows operators to better match their usage needs to their actual data bundle and provide upsell opportunities when the needs of the customer change.

**Impact on subscribers:** Subscribers have the freedom to choose the desired trade-offs between the more expensive plan that provides a higher level of service (quota or speed), and a lower cost plan with limited functionality.

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**Tiered Services: Examples**

- In addition to the basic plan, interim allowances can be set for 1 to 7 days
- Connection speed, data volume, and/or queue priority can be set specifically for a specific type of applications or services
- Multiple categories (e.g., VoIP, video, tethering and gaming) can be defined and used to further define the tier based on a data quota

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**Notifications**

- (limits reached, upsell opportunities), block/restriction or restoration of service

**Tiers defined by:**
- Data quota
- Applications allowed
- Connection speed
4.3 SHARED DATA

Expand the reach of a single service plan

What it is: Mobile plans typically cover a device and not a subscriber. With an increased number of devices per subscriber and the number of connected users per family, mobile operators have started to offer shared data plans that include multiple devices that are shared by different users within a family or a small business, or that are used by a single subscriber. Shared data allows an operator to easily configure a group of devices or users with a shared data allowance, a time expiry and apply per device or per user limits.

Benefits: Shared data plans encourage subscribers to use the wider range of devices that would otherwise remain unconnected. As a result, the utilization of the service is likely to increase, as will its perceived value and, hence, the propensity to upgrade to a tier with higher quota, speed or applications enabled. At the same time, shared data plans are stickier, and are likely to result in lower churn. Within a family or a small business, shared data plans may entice new users to join in and leave a competing operator.

Impact on subscribers: Shared data plans shift the focus of service from a device, to the subscriber or a group of users, thus opening the way to the more personalized approach to service creation. As subscribers own and share multiple devices, and regard mobile connectivity as central to their family and business, they are receptive to move from a plan for a single connection to a more encompassing service proposition. Shared data plans may result in a more attractive proposition for low-tier subscribers who can pool their traffic allowances. As a result, shared plans may make the upgrade to smartphones affordable for feature-phone users.

Shared Data: Examples

- A single data allowance may be shared among users and devices, providing flexibility. For instance, different users might have varying needs at different times, and shared plan will accommodate such variability across users
- Within the shared-plan overall data allowance, separate data allowances can be set for individual users or devices. For instance, a shared plan that includes four devices might have an overall traffic quota of 10 GB, with a 2.5 GB allowance for each device.
- Real-time usage during the billing cycle can be tracked for each user & for the entire shared plan
- Data allowance is set at provisioning time and can be subsequently modified
- SMS and email notifications for the overall shared plan can be sent to the subscriber or to all users included in the plan. Notifications that apply only to one or more users are sent to the contract subscriber (and, if desired, to the subscriber) only.


4.4 SERVICE PASS

Flexibility to deliver personalized services

What it is: Add-on services have been offered by mobile operators for a long time, but they have always played a peripheral and limited role in terms of revenues and functionality supported. Service Pass greatly expands the opportunity to include the wider range of add-on services, which span from the basic increase in monthly allowance to more sophisticated services, such as prioritized access during peak hours. The Service Pass option enables subscribers to purchase additional data allowances when they reach their monthly limits, or to temporarily sign-up for a service or for access to a specific application or category of applications.

Benefits: An operator that can only manage service plans that are defined in terms of MB or GB per month has very little room to offer add-on VAS services that subscribers may purchase on an occasional, as-needed basis. These services, however, have great potential to capture a demand that today is unmet and not well understood, and we expect them to account for a growing percentage of the ARPU. Service-pass services and pricing can be tailored to real-time network load, thus encouraging additional use during nonpeak hours, and increasing pricing at peak hours at busy locations.

Impact on subscribers: Service Pass options offer subscribers the opportunity to try out new services without lengthy commitments, or to simply use services or applications, or access content when they want. Service Pass allows them to do so directly from their phones, without having to contact the operator by simply selecting the desired option from their mobile device. Furthermore, the limited scope and straightforward cost of Service Passes facilitates the purchase by eliminating worries about unpredicted fees.

Service Pass: Examples

- A subscriber may purchase an additional data allowance during a month of heavier than average usage
- A temporary plan upgrade can be used to give a subscriber faster access speed during a billing cycle or another time interval
- The additional data allowance or plan upgrade may be assigned to an increased QoS level
- Real-time usage is tracked by the operator and available to the subscriber
4.5 ACCESS TYPE

Matching networks and subscribers

**What it is:** When multiple radio access technologies (RATs) are available, the mobile operator can direct each device to connect to the appropriate network, based on multiple criteria, such as tier, application and network conditions.

**Benefits:** Access Type gives mobile operators the ability to monetize network selection and application performance, and to add a further dimension in the tier selection (e.g., access to some RAN technology may be blocked or limited in some tiers). Access Type can be a tool for network load optimization, as it ensures that subscribers use a combination of network RATs (i.e., that they do not all use LTE when it becomes available, leaving LTE congested and 3G underutilized).

**Impact on subscribers:** Based on their needs and willingness to pay, subscribers can choose the tier that represents the best value for them. This allows high-end subscribers to connect to the fastest network available by subscribing to a higher-cost plan. At the same time, subscribers can select a lower-cost, lower-tier plan that steers them towards slower networks. In this context, the Access Type use case gives mobile operators an additional tool to segment the market.

### Access Type: Examples

- Depending on the tier, a subscriber may be steered to a specific RAT when available. For instance, devices of high-tier subscribers may connect to LTE whenever available, while low-tier subscribers may be limited to 2G and 3G.
- Certain applications (e.g., video streaming) may be blocked when using some RATs, e.g., 2G or 3G. The block may be in effect at all times, or during certain times, or at times of peak usage.
- Subscribers that exceed their monthly quota, may be forced to use a slower network (e.g., 2G) for the rest of the billing cycle, unless they wish to pay for an additional traffic allowance.
- Mobile operators can assign different quotas to different interfaces, to ensure better traffic distribution among RATs.
- Traffic counters can be set for different RATs or different applications.

**Notifications (limits reached, upsell opportunities), block/restriction or restoration of service for each RAT**

**Access Type**

- RAT selection
- Traffic quotas based on RATs
- Traffic counters for each RAT
4.6 DEVICE TYPE

Enforcing data plans that are limited to Device Types

**What it is:** Limits the devices, which can use a subscriber plan, and the applications that each device can use within this subscriber plan.

**Benefits:** Mobile operators can define device-specific plans, priced based on the traffic load they are expected to generate, and manage traffic on a per-device and per-application basis, to ensure even traffic distribution among RATs. The Device Type use cases protect the network from excessive data usage from devices that are not authorized to use the network.

**Impact on subscribers:** Cost-sensitive subscribers may choose lower-tier plans that only work on one device. Other subscribers, who have multiple devices and yet do not want to pay for each device they want to be connected, can do so by selecting a higher target account. Device Type rules can drive subscribers to upgrade to a tier without device limitations when they want to use multiple devices within the current plan.

**Device Type: Examples**

- Mobile operators can block SIM swapping from users that move their SIM across different devices to avoid the additional cost (e.g., moving the SIM from a phone to a laptop, which typically has a more expensive monthly data contract)
- Mobile operators can restrict application availability to some devices depending on the tier level, while leaving access to all applications and content to others
- QoS rules can be re-defined as needed to match the device the subscriber uses
- New services can be defined for specific devices and application, such as unlimited Facebook access for Android devices

**Notifications**

- Control of SIM swapping
- Policy rules specific to the type of device

(limit reached, upsell opportunities), block/restiction or restoration of service for each device
5. SUMMARY

New paths in revenue creation and network optimization

A deep integration among DPI, policy rules and policy enforcement provides the foundation for a fine-grained, real-time management of mobile data traffic that combines network and subscriber awareness, with personalized and flexible services. Better intelligence from DPI and the ability to act on it through PCRF and PCEF enable mobile operators to address two of the main challenges they face today:

- Optimize network traffic, thus increasing network utilization. A more efficient use of the available infrastructure allows mobile operators to deliver a better experience to the existing subscribers, to serve more subscribers, or to reduce the investment in increasing capacity. DPI and Policy make it possible to manage traffic efficiently – allocating network resources to the RATs, subscribers, devices and applications based on policy rules and priority level.

- Find a sustainable revenue generation model that personalizes service offerings, and creates the services that subscribers want, at a price that matches their perceived value and quality. To shore up ARPU’s erosion due to the continuing decline in voice revenues, mobile operators are under intense pressure to develop a new framework that streamlines the creation and modification of new services in response to market demand. DPI and Policy are effective tools that define a new revenue generating platform capable of monetizing RATs, devices, services, applications, and quality of experience.

6. ACRONYMS

2G  Second Generation  PCRF  Policy and Charging Rules Function
3G  Third Generation  PGW  Packet Data Network
3GPP  Third Generation Partnership Project  QoE  Quality of Experience
ARPU  Average Revenues per User  QoS  Quality of Service
BSS  Business Support System  RAT  Radio Access Network
CAGR  Compound Average Growth Rate  RAN  Radio Access Technology
DPI  Deep Packet Inspection  RNC  Radio Network Controller
FTP  File Transfer Protocol  ROI  Return On Investment
GGSN  GPRS Gateway Serving Node  RTP  Real-time Transport Protocol
GPRS  General Packet Radio Service  SGSN  Serving GPRS Support Node
HTTP  HyperText Markup Language  SGW  Serving Gateway
IPE  Intelligent Policy Enforcement  SIM  Subscriber Identity Module
LTE  Long Term Evolution  SIP  Session Initiation Protocol
OCS  Online Charging System  SMS  Short Message Service
OFCS  Offline Charging System  SMTP  Simple Mail Transfer Protocol
OSS  Operations Support System  VLAN  Virtual Local Area Network
PCC  Policy Control and Charging  VoIP  Voice over Internet Protocol
PCEF  Policy and Charging Enforcement Function  PGW  Packet Gateway
ABOUT REVENUE EXPRESS

Revenue Express solutions operate within a 3GPP compliant policy framework built on Openet’s market leading policy manager product and Procera’s widely deployed PacketLogic Intelligent Policy Enforcement (IPE) system.

Revenue Express benefits from the tight integration of policy management and policy enforcement made possible by the close cooperation between Procera and Openet in developing the joint solution. This has resulted in a suite of off-the-shelf solutions that are capable of very fast network deployment, flexible service configurability, and interoperability with existing operator OSS/BSS systems. The extensive testing and product hardening of Revenue Express up front helps operators de-risk their service launch plans, and enables them to quickly expand service offerings to reach millions of mobile network subscribers.

Pre-configured and easy to deploy, Revenue Express Solutions enable operators to rapidly configure revenue generating services based on optimized software and hardware configurations. Standardized and pre-packaged functionality is designed to reduce cost of ownership and address time to market challenges faced by today’s service providers while delivering flexible service configurability and interoperability with existing operator OSS/BSS systems.

ABOUT OPENET

Since the introduction of mobile data services in 1998, Openet has helped service providers capitalize on opportunities and overcome challenges. With competitive pressure accelerating, today’s service providers rely on Openet software to evolve business models around networking smartphones, M2M devices and third party services. Openet’s portfolio combines policy and charging control with device and third party interaction to enable innovative charging models, to control operating cost and to personalize services. More than 80 of the world’s largest service providers in 28 countries use Openet’s high performance software. For more information, please visit www.openet.com.

ABOUT PROCERA NETWORKS, INC.

Procera Networks, Inc. (NASDAQ: PKT) delivers industry-leading network intelligence for millions of broadband connections worldwide. Procera’s PacketLogicTM and NAVL solutions enable carrier, service provider, enterprise, and consumer networks to deliver a high quality of experience to their users through actionable intelligence and sophisticated policy enforcement. For more information, visit www.proceranetworks.com or follow Procera on twitter at @ProceraNetworks.
ABOUT SENZA FILI

Senza Fili provides advisory support on wireless data technologies and services. At Senza Fili we have in-depth expertise in financial modeling, market forecasts and research, white paper preparation, business plan support, RFP preparation and management, due diligence, and training. Our client base is international and spans the entire value chain: clients include wireline, fixed wireless and mobile operators, enterprises and other vertical players, vendors, system integrators, investors, regulators, and industry associations.

We provide a bridge between technologies and services, helping our clients assess established and emerging technologies, leverage these technologies to support new or existing services, and build solid, profitable business models. Independent advice, a strong quantitative orientation, and an international perspective are the hallmarks of our work. For additional information, visit www.senzafiliconsulting.com or contact us at info@senzafiliconsulting.com or +1 425 657 4991.

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