

# **Not a Dumb Pipe: Using Control Plane Information to Increase Revenue**

**A Whitepaper by Traffix Systems**

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# 1 Overview

Telecom operators today are trying to avoid becoming a “dumb pipe”. They do not wish to see their future as a commoditized network that carries valuable traffic and applications for others. Past examples of this development are ISPs becoming "Internet Dumb Pipe" providers at the same time that some of the device and Internet application providers, such as Google, Apple, Amazon and others, managed to generate healthy returns and create valuable brands.

By becoming "smart pipe" providers, telecom operators can avoid this destiny. Nevertheless, this may require changing the operator's business model, a tough proposition in itself, much like Alice plunging into a rabbit hole and getting to Wonderland. You know where you started, but you never know where and how it will end. For successful companies, changing business models is even more difficult; like an overweight Alice jumping down the rabbit hole, without verifying beforehand that it is wide enough. However, this is where many telecom operators are. The world of telecommunication is changing and their fear of losing their most important asset, the value of the network to their customers, increases as more signals gather up fast on the horizon. Telecom service providers must re-asses their strategies.

In this paper we claim that the concept of a “pipe” does not mean that telecom data traffic has to fall into the “dumb pipe” trap. We will introduce the concept of the “smart pipe” and how it can increase telecom operator revenue, and change its sources. We will then explain how the smart pipe model can be implemented using control plane network information.

## 2 Using Subscriber-generated Network Information

How can telecom operators avoid becoming a “dumb pipe”?

The key is to utilize the information which is generated by subscriber activity on the network. To truly become "smart", the information needs to directly benefit the individual users by providing a value that is distinct to them and tied to the network.

Information is a valuable resource in our society. How can control plane information be used to generate customer value? There are two questions that we first need to answer:

- What is the value that the information can bring?
- How can it be extracted in real-time and cost effectively?

## 3 Creating Subscriber Value

### 3.1 *Individual Subscriber Value*

The key to becoming a smart pipe is to provide unique service capabilities together with the data connectivity "pipe" to give the subscriber a value proposition that exceeds plain connectivity and that is tied to network use.

An example: rather than provide access to various traffic congestion applications over the mobile phone, the provider can offer a service that notifies subscribers about the likelihood that they would be late to their next meeting. An operator can do this by combining data from their phone-based (or synchronized) calendar, network-created current location information and known applications about the traffic ahead.

Another example would be the ability to push selective ads (mobile advertisements) to the subscriber based on their current entertainment consumption on the smart phone, specific location and historical preferences and actions (someone who likes going to the movies and to a certain type of movies). All this information is available on the telecom operator's network.

Providing these "smart-pipe" services requires the combination of information from the network domain, the telecom IT domain (Billing and CRM systems) as well as information from other sources. This is one of the main challenges for the evolution of the services provided by the telecom industry, but one that is outside the scope of this paper.

### **3.2 *Subscriber Behavior Analysis***

Aggregating subscriber-based information is very valuable and can provide unique market data to cellular operations. For example, in this case the operator can provide real time information about the types of people with a preference for certain products in a mall, the amount of people redeeming a mobile coupon or even search trends in certain locations. Understanding and analyzing trends of customer behavior in real time has operational value as well – for instance the telecom service provider may indicate to a store chain that they are likely to have more customers in their mall A rather than mall B, by “understanding” where the relevant traffic for each mall. This is done by getting information about the network location of the relevant people using the store’s target market demographics and real time network information.

Similar analysis can reveal that a specific mall is becoming more popular amongst 14-16 year old girls over the last 6 months, or by comparing last summer July - August to this year.

### ***3.3 Real-Time, Cost Effective Information– the Control Plane***

One of the main arguments in this paper is that real time and cost effective information extraction can only happen when information is extracted from the control plane and not the data plane.

So far much of the effort that was invested by telecom operators in extracting information from the network was focused on the data plane, technologies often referred to as Deep Packet Inspection (DPI).

Deep Packet Inspection is used to find, classify or extract information or code from the data packets. Typically, conventional packet filtering, that only examines packet headers, cannot derive the same level of information that control plane analysis can provide. Deep Packet Inspection, while useful in some cases, is also known to have drawbacks and definitely requires more computing resources and a big commitment from the operator. This is where the advantages of extracting the information from the control plane should be considered. Control plane information extraction can complement Deep Packet Inspection, or replace Deep Packet Inspection.

Real-time control plane information extraction can certainly usher in a new era in the uses and value derived from network information.

### ***3.4 Advantage of Using Control Plane Information***

The following summarizes the advantages of using control plane information compared to traditional data layer DPI techniques:

- Information Relevance
- Smaller traffic volumes
- Simpler data correlation and synchronization
- Simpler collection

### **3.5 Information Relevance:**

Control plane information contains the most valuable and strategic information from the subscriber standpoint: location, buddy list (IM friends), their phone number, the kind of technology they use to connect to the network, their charging scheme, their IP Address, services they are using, etc. Typically this information is not available on the data plane.

### **3.6 Smaller amount of traffic:**

Control plane signaling flows make it easy to extract information. Traffic is one-thousandth of data path traffic, and as a result a software-based approach with commercial off the shelf (COTS) servers can suffice to collect control plane information.

### **3.7 Simpler synchronization and correlation:**

The signaling flows in the control plane enable easy synchronization between different transactions and extraction of information according to pre-configured definitions. For example: extraction of all information related to a specific subscriber, a specific service, a group of users or even a specific location. This type of correlation is sometimes impossible in the data domain alone, limiting the resulting applications and value add to the network or customer.

### **3.8 Simpler Collection:**

Most operators know all too well that extracting information from the data plane is not a simple task. Messages go through one route, and return by another, as is the nature of IP-based environments. As a result, a data plane based collection approach requires a huge operational effort so all possible data routes are covered. This also results in huge processing requirements. On the other hand, in the control plane signaling domain, traffic is controlled, interactions and routing are fixed. As a result implementation effort is much

smaller, making daunting tasks such as correlation of information, much easier.

## 4 The Traffix Solution

The Traffix control plane solution based on the Traffix set of control plane and Diameter products enables any telecom operator to extract information from their network, easily and in a very short Implementation time.

The Traffix solution can be implemented between any two or more control entities in the network. It provides a configurable architecture that plugs into the information generated by the network every second, "listening" on the data going through the system. Its advanced algorithms generate valuable business information from the control plane.

The Traffix solution does not require making any special adjustments to the various network entities. It is a non-intrusive "plug and play" product; its use doesn't create any latency although it does "see" all the control information that goes through the network.

## 5 Summary

The control plane signaling transactions in telecom networks are the perfect enabler for "smart pipe" offerings; be they to provide subscribers with novel value-added mobile services, or to create better network intelligence, analysis and user behavior monitoring. Although Deep Packet Inspection is considered as a mainstream way to collect information, it comes with many drawbacks. In the telecom market, using control plane data and analyzing it offers a much richer and more customer-relevant source of information which is encapsulated in the signaling path.

Using the signaling as the main source for smart pipe offerings promises several advantages:

- Control plane signaling information is easier to collect - smaller in size, routes are predictable
- Control plane signaling is much richer in information compared to the data path
- Control plane signaling could be correlated easily
- In converged networks and roaming scenarios Control plane signaling is the only source of intelligence
- Cost efficient – no need for large scale deployment of expensive super processors, signaling domain – 1/1,000 of the usual amount of traffic, in predictable routes

## Appendix – Information that can be extracted from Control Plane

Some Examples:

- Accounting-Record-Type
- WLAN-Information // used in WLAN access//
- Unit-Cost
- Traffic-Data-Volumes
- Time-Usage
- Tariff-Information
- Supplementary-Service // info on additional supported services //
- Charging-Rule-Base-Name
- QoS-Information
- Rating-Group
- Time-First-Usage
- Time-Last-Usage
- Time-Usage
- 3GPP-User-Location-Info
- SDP-Media-Name //file name //
- SDP-Media-Description // type, size,format ...////
- Authorized-QoS
- SDP-Type
- 3GPP-Charging-Id
- 3GPP-PDP-Type
- PDP-Address
- QoS-Information
- GGSN-Address

- 3GPP-IMSI-MCC-MNC // Mobile Network Identifier //
- 3GPP-Charging-Characteristics
- Traffic-Data-Volumes
- User-Equipment-Info // terminal related information – vendor, model....//
- Terminal-Information
- Number-Of-Participants //for multi participant services //
- Participants-Involved //for multi participant services //
- Participant-Group //for multi participant services //
- LCS-Client-ID //Location info//
- Location-Type
- Location-Estimate
- Positioning-Data
- Calling-Party-Address //the call participants info//
- Called-Party-Address //the call participants info//
- Low-Balance-Indication
- Remaining-Balance
- MSISDN
- Service-Indication
- Service-area-ID
- Global-Cell-ID
- Location-area-ID
- Bearer-Identifier
- Guaranteed-Bitrate-DL //QoS//
- Guaranteed-Bitrate-UL //QoS//
- QoS-Information
- RAT-Type AVP // Radio Access WLAN (0) UTRAN (1000) /GERAN (1001)/GAN (1002)/ HSPA(1003) ..//
- Termination-Cause
- User-Name