

PRX-PE: Traffic Manager for Policy Enforcement

Solution Overview

- Subscriber policy enforcement based on policy rules from an external policy manager
- Enforce priorities, bandwidth guarantees and limits
- Traffic redirection of selected IP traffic to an IP service platform
- Subscriber-aware usage statistics to charging or quota management systems



PRX-PE is a policy enforcement and monitoring system. It is designed for seamless integration with third-party policy control and quota management systems. It can also forward traffic to IP service platforms and provide real-time data to accounting, charging and billing systems. In 3G mobile networks it assumes the role of the Policy and Charging Enforcement Function (PCEF), receiving and requesting rules from the Policy and Charging Rules Function (PCRF).

Architecture

PRX-PE sends statistical data to a policy management system and receives subscriber policy information from it. PRX-PE provides two interfaces: the Policy Interface (PI) and the Messaging Interface (MI). Additionally, PRX-PE provides a Provisioning Interface (PVI) for general system setup and management. PRX-PE only enforces policies. Policy decisions (e.g. quota or service plan decisions) are made at the external policy manager and then sent as real-time rules to PRX-PE.

Deployment

PRX-PE is placed inline between the operator's network gateway (e.g. GGSN, PDSN or BRAS) and the edge router. Its support for real-time decapsulation of all relevant encapsulations and tunneling protocols, including GTP, IP-in-IP, GRE, L2TP, provides the necessary flexibility for seamless integration into the operator's existing infrastructures.

As an inline system, PRX-PE sees the entire data traffic and uses its deep packet inspection engine for application-layer quality-of-service and traffic management. It provides all the carrier-grade performance, availability and DPI precision required for such a critical infrastructure element.

Key Features

- Carrier-grade performance at 70 Gbit/s, 10 million packets/s and 7 million concurrent subscribers
- High availability and full hardware redundancy
- Unmatched DPI accuracy certified by independent test lab: "Close to 100% detection & regulation accuracy"
- Seamless integration with third-party policy, accounting and charging systems
- Completely invisible to network users
- Tunnel management

Policy Interface

PRX-PE receives subscriber policy updates from the external policy management system via its Policy Interface (PI), which is the Gx interface in a 3GPP environment. The following policy rules are supported and can be set per subscriber and per application-layer protocol or protocol group:

- Bandwidth limitations
- Bandwidth guarantees
- Priorities
- Redirecting traffic
- Messaging frequency (time or volume)

High Availability

PRX-PE features a failover architecture to support high availability requirements. The PRX-10G hardware platform supports a fully redundant configuration within a single chassis. If one of the internal hardware components fails, backup hardware automatically takes over.

There is no information loss in case of soft failover, i.e., the restart of a component. For a hard failover, i.e., one component fails due to a hardware fault, the worst-case information loss is determined by the length of the application traffic report interval of the Messaging Interface.

Messaging Interface

PRX-PE's Messaging Interface (MI) is a high performance interface that provides subscriber usage data to external systems. This data can be used for policy decisions, quota management, billing and usage reporting. The amount of the messaging data is approximately 3% of the monitored data traffic.

The following message types are supported:

- New subscriber
- Subscriber removal
- Application start: first occurrence of data traffic for a specific application and subscriber
- Application traffic report: per subscriber usage report for an application and application groups
- Application end: last flow of an application's data traffic has ended
- Connection start: flow opens
- Connection traffic report: per subscriber usage report for a flow
- Connection end: flow end message

Traffic Rerouting

PRX-PE supports data traffic rerouting to external service platforms for filtering, caching or manipulation. Triggered by IP addresses, port numbers, application protocol or subscriber identity, or a combination thereof, matching traffic can be rerouted through any third-party system by altering any of the following attributes:

- MAC address
- ToS (or DSCP) IP header field
- VLAN tag
- MPLS label

PRX-PE Platforms

	PRX-5G	PRX-10G
Throughput (Gbit/s)*	2	70
Packet Rate (Packets/s)	320,000	11,200,00
Concurrent Flows (million)	4.0	200
New Flow Rate (Flows/s)	300,000	10,000,000
Concurrent Subscribers	150,000	7,000,000
Active Policy Rules	6 million	280 million

* ISP-Mix: Average packet size 749 Bytes

PRX-PE Traffic Manager Deployment

