

# Ipoque

## PRX-5G Traffic Manager

### Peer-to-Peer Traffic Management Test

#### Introduction

Ipoque commissioned the European Advanced Networking Test Center (EANTC) to verify the performance and accuracy of the new PRX-5G DPI filter solution. The focus of the test was peer-to-peer (P2P) traffic management including P2P protocol detection and traffic regulation. EANTC engineers configured a multi service, carrier grade test setup to challenge the product by a large number of parallel P2P sessions/protocols and legacy Internet services alike.

The results proofed readiness to accurately control traffic of famous P2P protocols and P2P clients. Furthermore, the device showed stable throughput behavior during large load stages and proofed seamless integration with limited effects on performance of existing network infrastructures.

#### Tested Devices & Test Environment

Ipoque's PRX-5G device detects application traffic based on a combination of deep packet inspection (DPI) technology and behavioral traffic analyses. The solution detects and manages popular and emerging Internet application, such as P2P file sharing, instant messaging, media streaming and Internet telephony. The transparent bridging mode of the PRX-5G DPI product allows seamless network integration with no need to change the underlying network topology or routing configuration.

The test environment consisted of ISP carrier grade IP routers and test equipment from Ixia (Ixia1600-T equipped with ALM1000-T8 and LM1000STXS4 load modules) and Shenick's diversifEye analyzer used to emulate thousands and millions of application sessions including P2P protocols of BitTorrent, eDonkey, Gnutella, FastTrack, as well as legacy Internet services of Web browsing (HTTP), Mail transfer (POP3, SMTP) and File transfer (FTP).

#### Throughput Performance

DPI technology requires to track each session individually in order to detect known patterns or certain protocol behavior. With large and fast session numbers this is expected to be a processing intensive operation. With this test EANTC verified if and how a real world traffic mix effects forwarding characteristics of the PRX-5G DPI product. EANTC defined a challenging traffic mix including 70% of the vendor claimed parallel session

#### Test Highlights

- Major P2P protocols successfully detected
- Close to 100% detection & regulation accuracy for major protocols
- Support for more than 2,450,000 parallel sessions
- Transparent network integration with limited effects on throughput and latency

number and large bidirectional load scenarios. The traffic analyzers of Ixia and Shenick emulated a total of 134,115 IP clients each with an individual TCP stack. In addition we sent stateless traffic from 2,000 IP addresses simulating traffic of streaming applications like IPTV or VoIP.

#### Test Setup

- A total of 2,450,000 parallel application sessions
- Average session rate of 2,091 TCP Syns/Second
- 971 Mbit/s of bidirectional traffic for 30 seconds
- Four legacy Internet services (HTTP, POP3, SMTP, FTP)
- Three P2P protocols (BitTorrent, eDonkey, FastTrack)

#### Test Methodology

For determining the maximum possible throughput EANTC executed throughput tests according to RFC 1242. The IETF definition describes throughput as the maximum rate at which none of the offered frames are dropped by the device. EANTC engineers first setup all application sessions and varied the traffic load of the stateless traffic up to the maximum bandwidth in order to test the throughput.

In addition, EANTC engineers verified active protocol recognition of the PRX-5G by looking at the device's statistics, which had to show successful detection of the sent P2P protocols.

#### EANTC Test Analyses

The results proofed that large parallel session numbers and different sent protocols have very limited and reproducible impact on throughput performance and latency.

All offered P2P protocols were successfully detected, which proofed active detection operation.

Max. Throughput	Average Latency	Total Session Loss	P2P Detection
922 Mbit/s	220 $\mu$ s	187 Sessions	OK

### P2P Detection and Regulation Accuracy

EANTC engineers configured a total of Ten P2P protocols to verify comprehensive detection capabilities including most popular P2P file sharing applications. The Shenick diversifEye analyzer was used to replicate several thousands P2P sessions on a real TCP stack basis in order to accurately emulate session behavior of 13 well known P2P client applications. Three of them were using the same P2P protocol to test whether P2P detection is not dependent on a certain implementation. All emulated P2P sessions included file search as well as file exchange operation between different P2P servants, some of them acting as servers (uploaders) and others as clients (downloaders).

Like in the throughput test other network protocols like HTML sessions, video transmission, file transfer and mail services were sent in addition to reproduce typical Internet traffic. The challenge was not only to detect the protocols occurrence but also to measure its bandwidth or traffic volume during sustained load reflecting utilization of ISP links.

### Test Setup

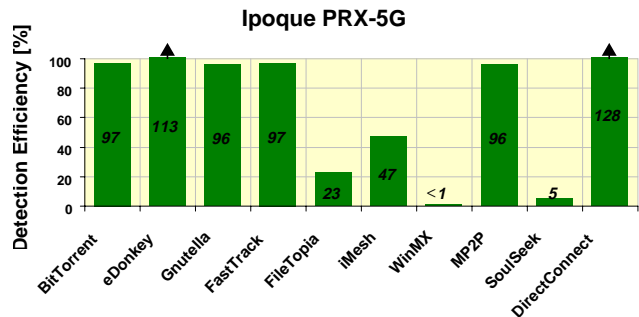
- 13 P2P client types including 10 P2P protocols: BitTorrent (Azureus &  $\mu$ Torrent), eDonkey (eMule & aMule), Gnutella (Limewire & Shareaza), FastTrack (KaZaZ), FileTopia, iMesh (BearShare), WinMX, MP2P (Manolito), Souleseek, DirectConnect
- 37,800 parallel P2P sessions in total
- A total of 2,405,900 parallel legacy Internet sessions (HTTP, FTP, SMTP, POP3)
- Maximum bandwidth of 464 Mbit/s per direction

### Test Methodology

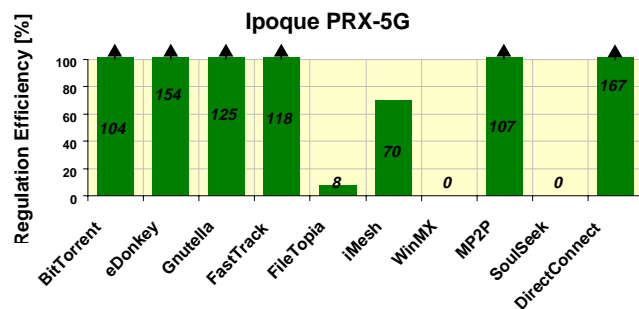
EANTC verified detection and regulation accuracy by comparing the per protocol traffic volume reported by the traffic analyzer and the tested PRX-5G device. All Ten P2P protocols were tested at the same time. Traffic regulation was tested in three runs: 25%, 50% and 75%. Ipoque's product was configured to regulate each protocol individually. For example in the first run with 25% regulation rate, Bandwidth rates of BitTorrent traffic were set to 19 Mbit/s regulation rate while 78 Mbit/s was sent unregulated.

### EANTC Test Analyses

Ipoque's PRX-5G DPI solution was able to detect all Ten P2P protocols. EANTC verified that the most popular protocols (BitTorrent, eDonkey, Gnutella, FastTrack) were detected with good accuracies (not less than 96% for Gnutella). Less popular protocols gave mixed detection results, ranging from less than 1% (WinMX) up to an accuracy of 96% (MP2P) and 128% (DirectConnect).



The regulation efficiencies were comparable to the detection efficiencies. Most popular P2P protocols were tested with regulation efficiencies above 100%. Less popular protocols showed mixed efficiencies.



### About EANTC



The European Advanced Networking Test Center (EANTC) offers vendor-neutral network test services for manufacturers, service providers and enterprise customers. Primary business areas include interoperability, conformance and performance testing for IP, MPLS, ATM, VoIP, Triple Play, and IP applications.

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