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Quality of Experience
DPI Statistics Module

- Monitoring • Analysis • Improvement

Index

Service Providers Challenges

Decline in ARPU	Competition	High cost of network upgrades

Financial

Challenges for ISP

Technical

Congestion	Subscribers' expectations and demands	Encrypted traffic
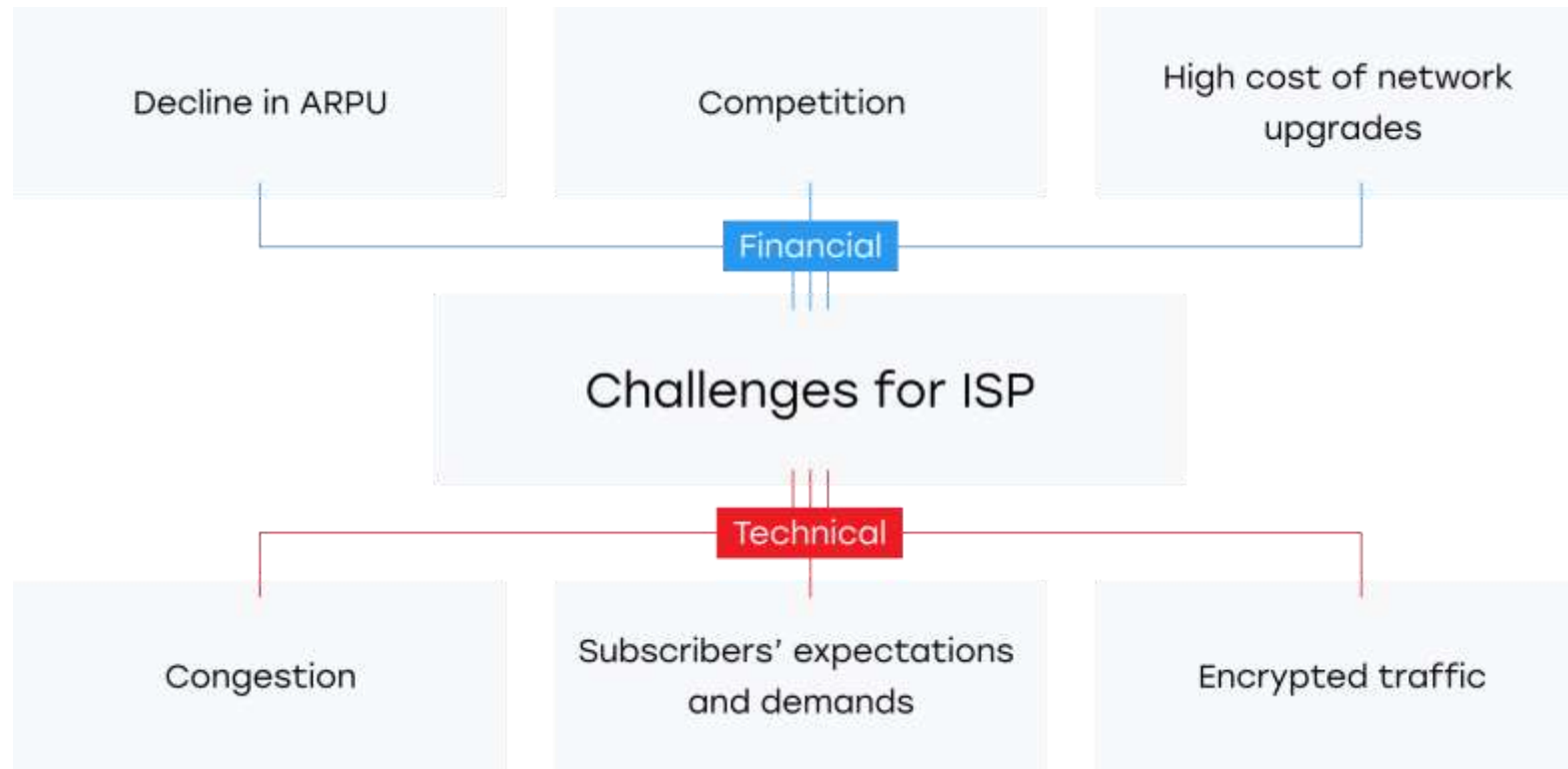
Improving the QoE (Quality of Experience or Service Perception) makes it possible to reduce the risks faced by **the operator's business.**
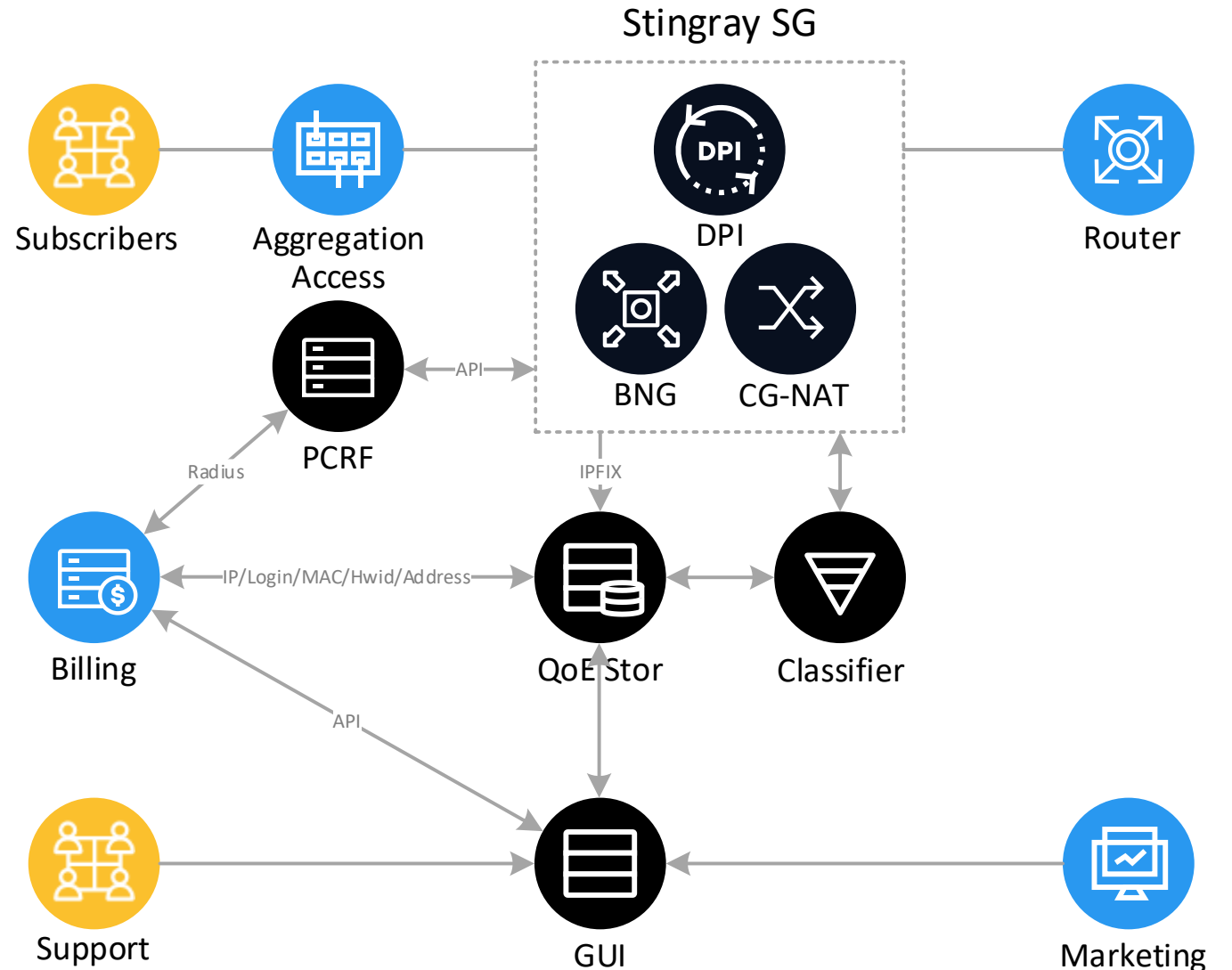
Analysis of network resources usage and user experience can reduce costs and helps to find the ways to get additional benefits.

Quality of Experience module

QoE is a software product responsible for statistic gathering and viewing subscribers' perception of services.

The statistics is transferred to special metrics which allow to define users' experience. It provides the operator with information about what kind of problems does he or she encounter.

The data obtained allows the operator to take action and to improve the services quality. The result is increasing customer loyalty.

Stingray SG

Subscribers

Aggregation Access

Router

PCRF

DPI

BNG

CG-NAT

API

Radius

IPFIX

Billing

IP/Login/MAC/Hwid/Address

QoE Stor

Classifier

Support

API

GUI

Marketing

Graphical user interface

1. Access restriction by role

2. Managing several DPI: monitoring and configuration

3. White and Black lists

4. Managing subscriber tariff plans

5. Creating of NAT-pools

6. HotSpot and Clickwrap option control

7. Work with statistics

8. API support for integration with external systems.
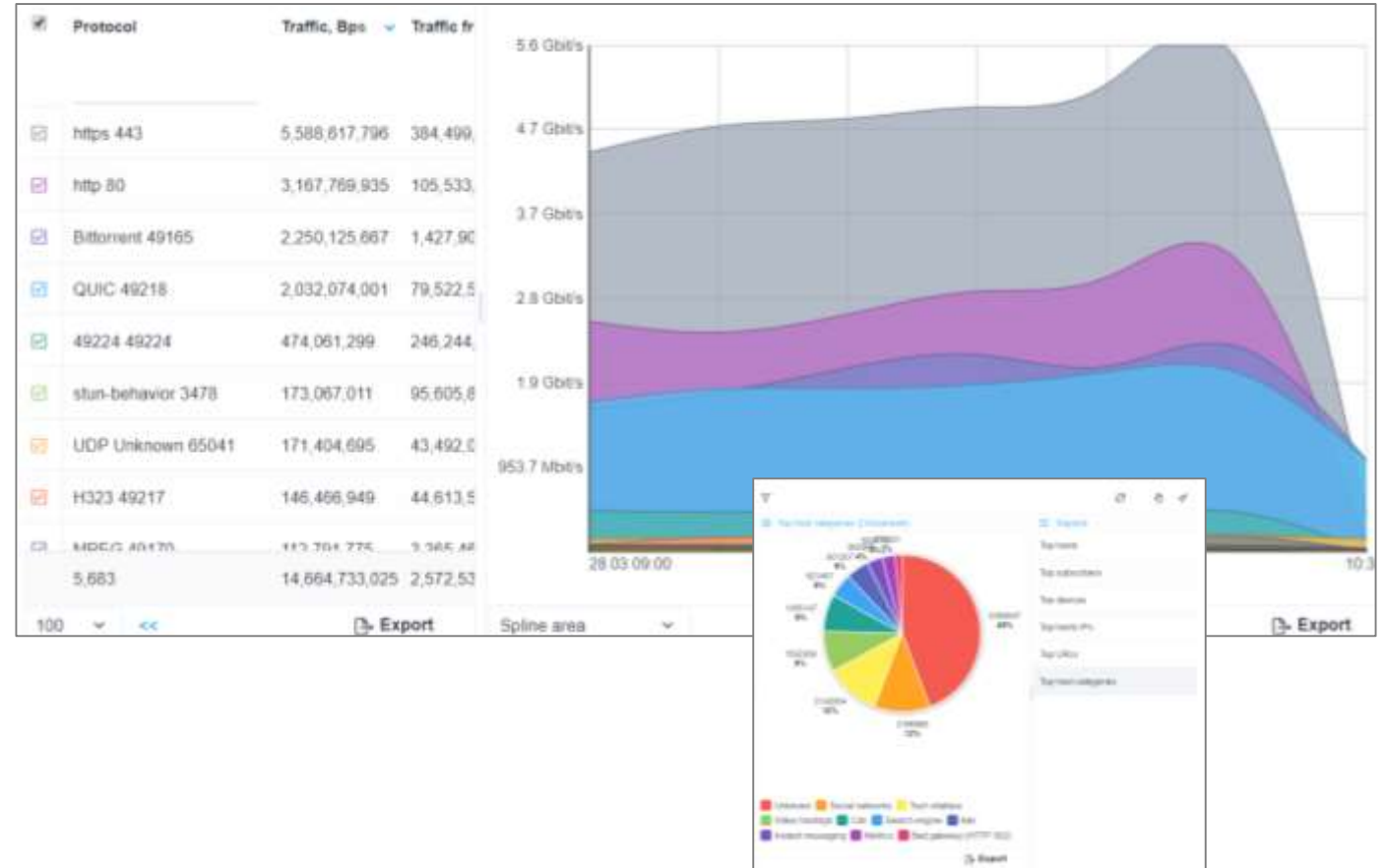
QoE metrics

1. Round-trip-time (RTT);
2. Indicators of retries number;
3. The number of sessions, devices, agents, IP-addresses per subscriber;
4. Traffic distribution by application and transport protocols;
5. Traffic distribution by autonomous system (AS) numbers;
6. Clickstream for each subscriber.

$$RTT = (ACK - SYN\text{-}ACK)/2$$
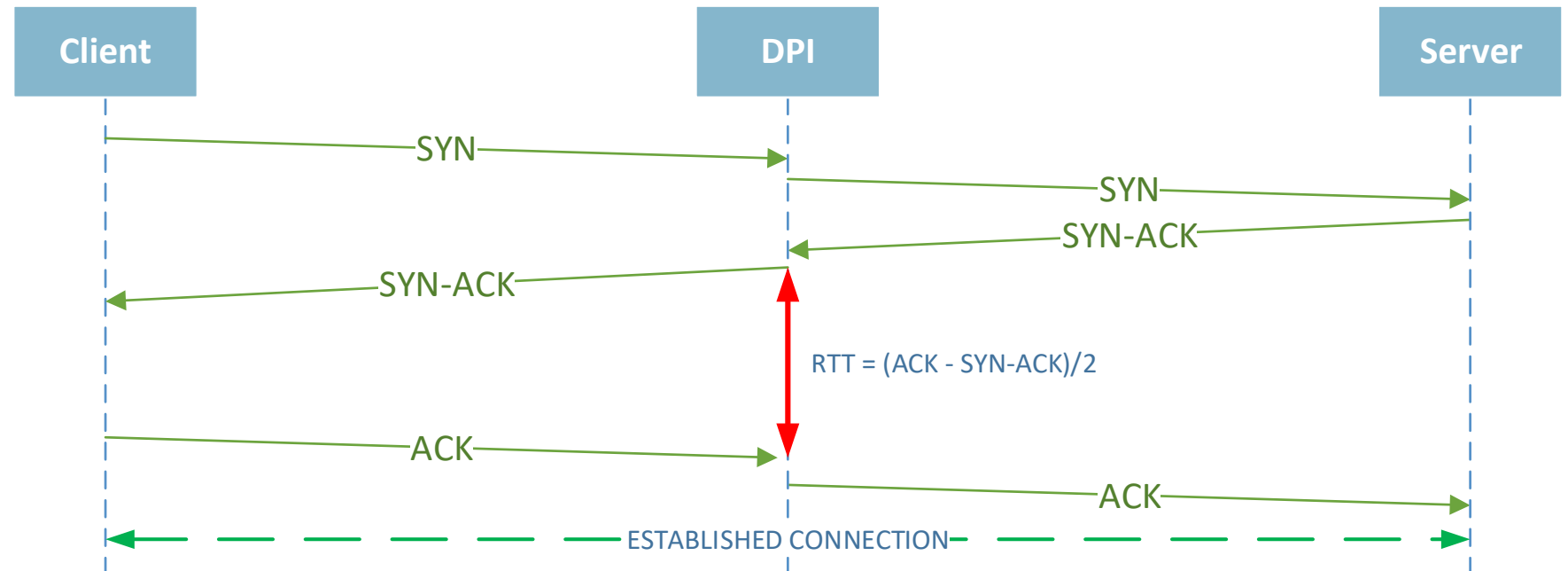
How to use QoE metrics?

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Customer Retention

- Determination and prompt response to quality degradation

- Management of possible customers outflow and analysis of its causes

- Automatic survey after subscriber's request to support
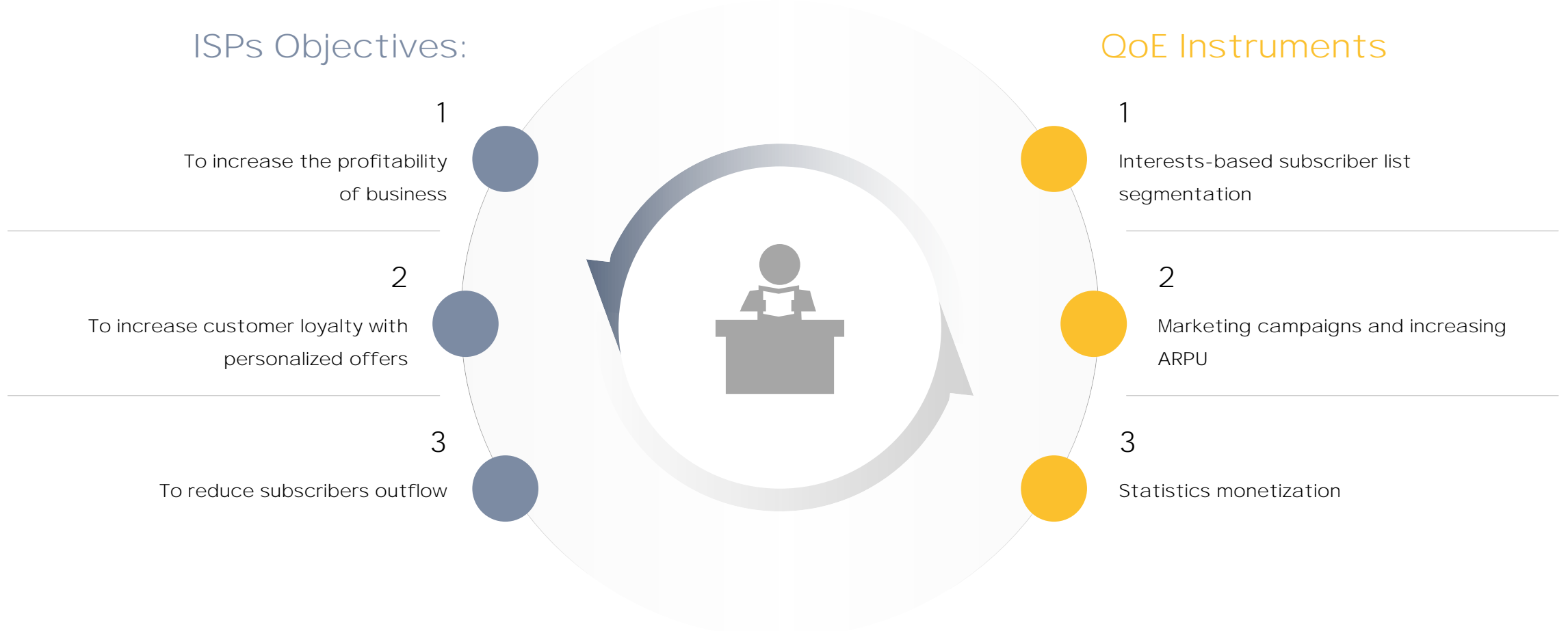
Improving Loyalty

- Conducting marketing campaigns concerning new tariffs, services and offers based on customer interests

- The service of user's personal account which provides information about the load and quality of Internet connection

- Notifications about BotNet activity in subscriber's network (relevant for IoT)

Proactive Support

- Deep troubleshooting and monitoring with using Round Trip Time and TCP retransmitting

- Identification of problems with client terminal equipment, Wi-Fi router, access switch and aggregation

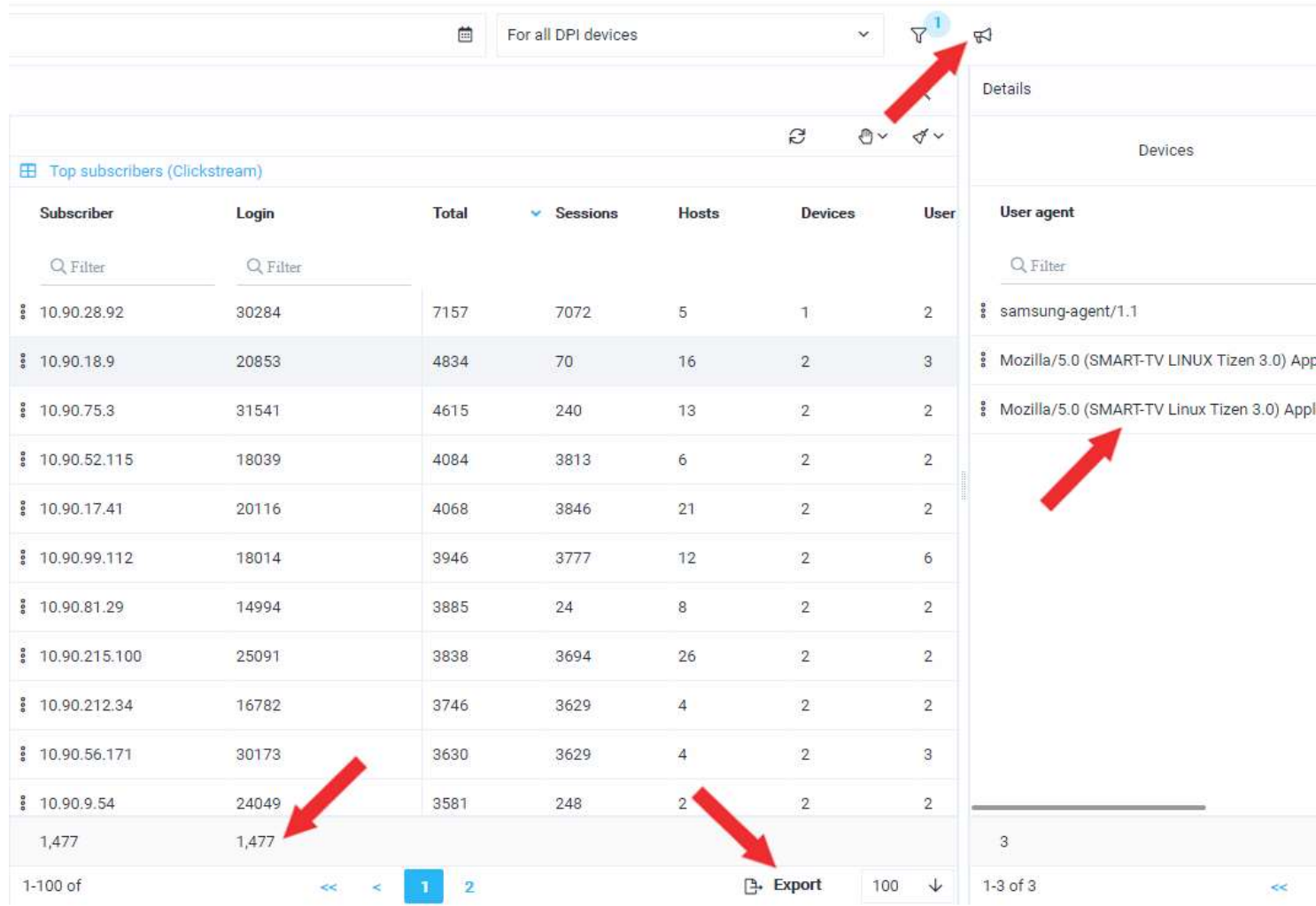- Search for optimal peering points and connections to higher providers

Upselling

- Selling equipment with better performance and coverage

- Restriction of services resale and transferring such subscribers to tariffs for legal entities

- Segmentation of subscribers: identification of clients' interests, hobbies and favorite online services, as well as their solvency

How to Improve QoE

ISPs Objectives:

1

To increase the profitability of business

2

To increase customer loyalty with personalized offers

3

To reduce subscribers outflow

QoE Instruments

1

Interests-based subscriber list segmentation

2

Marketing campaigns and increasing ARPU

3

Statistics monetization
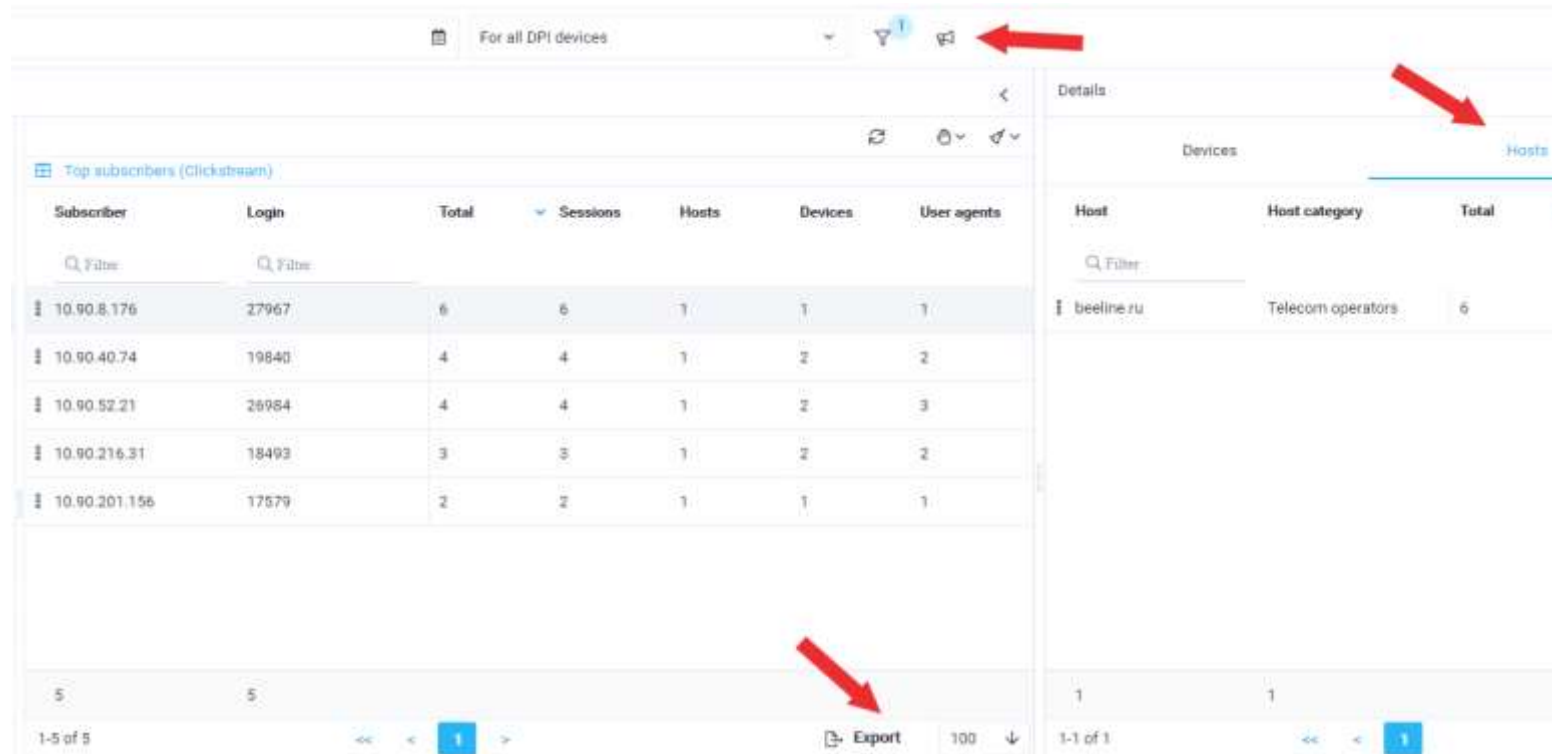
Use Case: Subscriber Profile

Category filters allow you to determine:

- Popular services (messengers, social networks, banking, telephony, dating sites)
- Volume of consumed traffic
- Level of income
- The presence of children, pets
- Hobbies
- Smart-TV devices

This example displays 1 477 clients who use devices like LG and Samsung SmartTV.

You can add these subscribers to a marketing campaign and show them special offers directly.

Use Case: Prevent the Churn

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DPI uploads CickStream - all HTTP/HTTPS requests to your competitors web-sites. The QoE module aggregates information for each IP (login, if used). The statistics fix the URL for HTTP and the domain name for HTTPS.

Filtering is handled according to your own list of competitors in your location or according to the category "Telecom-operators".

This example displays 5 clients who probably have interest for **competitors' offers.**

Use Case: Search for Service Resellers

DPI uploads the unique UserAgent from the HTTP request. The QoE module aggregates information for each IP (login, if used). In statistics, each phone and PC is fixed for subscriber NAT.

This example displays 12 clients that might be reselling services.

In the "Details" you can find more information about the devices indicated in the report.

Use Case: Improve The ARPU
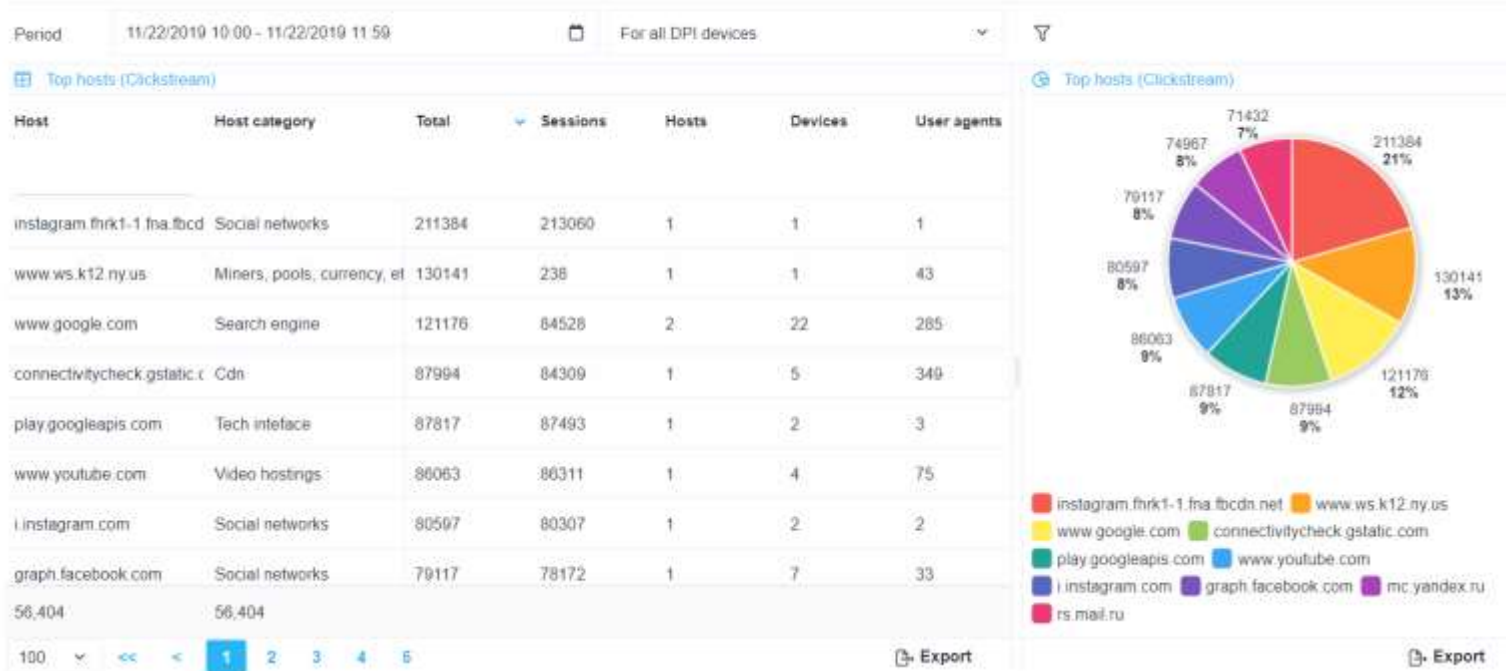
Create personalized offers, services and tariffs for your subscribers and offer comfortable conditions for legal entities by segmenting your database:

- learn about subscribers interests (sport, movies, videogames, news, nature, children content)

- select subscribers by certain criteria in order to conduct a marketing campaign

- find the users who resell services and transfer them to corporate tariff plans.

Use Case: Communicate With Your Clients

Mobile formats

Icon	Fullscreen	Text and graphics	Native	Header	Native video

Desktop formats

Fullscreen	Fullsize vertical	Page banner	Native / Text and graphics

Notify your subscribers about special offers and new services via the browser. The formats are:

- desktop and mobile

- interactive

- fullscreen

- heading

- native advertising

- video

- menu and filling out the form

Use Case: Proactive Support & Upselling
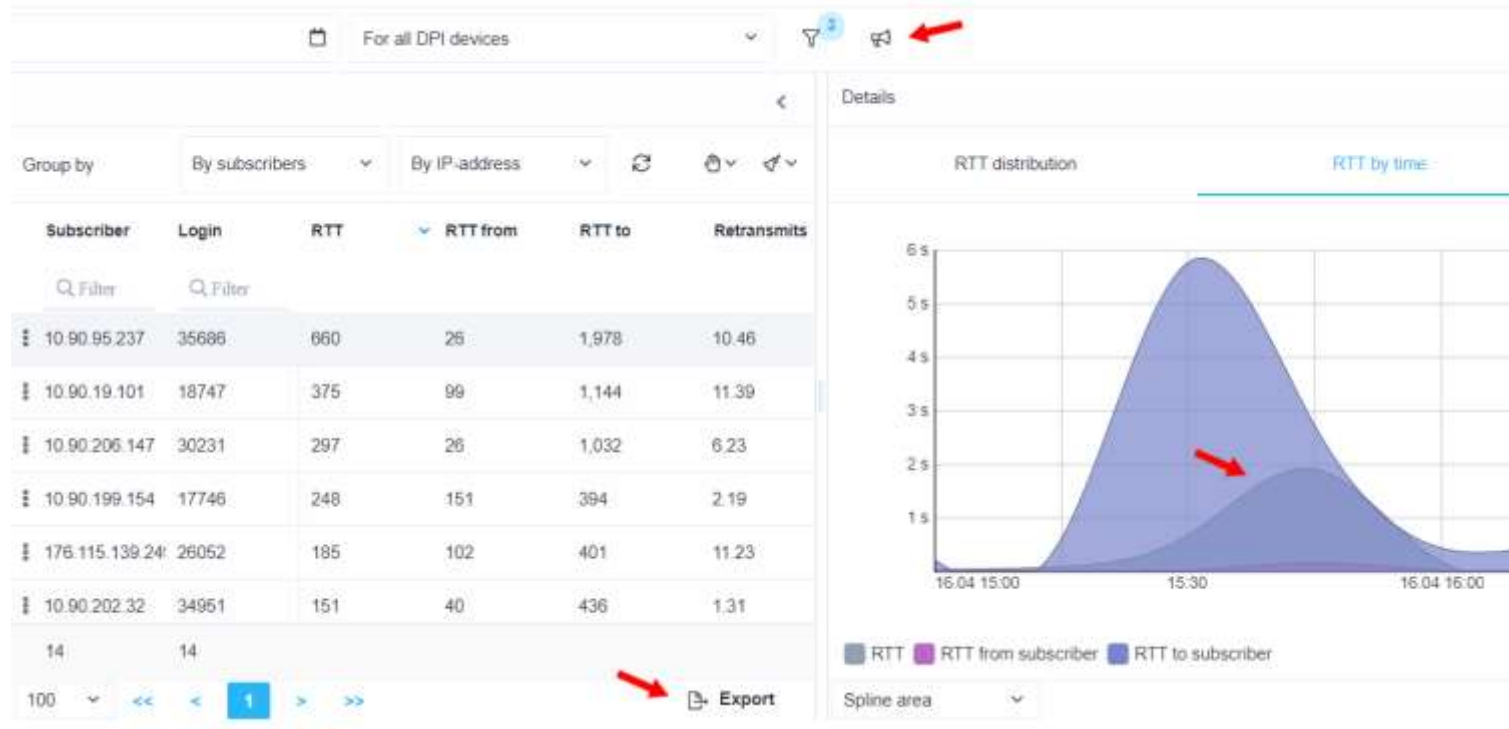
The QoE Module allows you to analyze the Round Trip Time during the TCP connection establishment and find the subscribers who may have Internet access problems.

- detect low-quality CPE (Wi-Fi routers), access and aggregation switch and other equipment

- search for optimal peering points and connections to the upstream providers

- track DDoS and virus attacks, develop a system of countermeasures

QoE Licensing

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QOE MODULE FEATURES	BASE	STANDART
NetFlow statistics collector with re-export support	Yes	Yes
API support for integration with external systems	Yes	Yes
Full NetFlow and ClickStream statistics visualization	Yes	Yes
Built-in reports of Full NetFlow-based TOP: high RTT, by traffic volume, by number of re-requests, by application protocols, by AS, by subscribers AS, by access switches and aggregation	Yes	Yes
Built-in ClickStream-based TOP reports: URLs, hosts, subscribers, devices, IP resources	Yes	Yes
Reports export in *.xlsx, .*csv, *.pdf and *.png	Yes	Yes
NAT log collector with re-export support	-	Yes
Unloading NAT log from Full NetFlow	-	Yes
GTP collector with re-export support	-	Yes
Reports on web resources categories, updating the list of categories	-	Yes
Full NetFlow and ClickStream reports with detailed information per user	-	Yes
Setting up triggers and actions on events, sending reports by email	-	Yes
DDoS and BotNet detection	-	Yes

About VAS Experts

- Over 1000 installations on ISPs in Russia, Europe and Asia

- More than 25 Tbps

- 10M+ users

Latest Installations:

- Lebanon

- Cyprus

- Turkey

- Moldova

MTS Virgin connect StarNet YOTA Rostelecom СевСтар CRIMEA-IX CONVEX

Products Portfolio

Deep Packet Inspection 01		QoE 02
BNG 03	CG-NAT 04	DLP 05

Key Features

Analytics

- IoT, DDoS, BotNet
- NetFlow, Interception
- QoE metrics

Subscriber Management

- Prioritization, policing
- Block/Allow lists
- BNG, CG-NAT

VAS for ISP

- **Subscriber's profiling and marketing** campaigns
- Parental control
- Mini-Firewall

Follow the experts

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