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Quality of Experience

DPI Statistics Module

- Monitoring
- Analysis
- Improvement

Content

QoE

Use Cases

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Service Providers Challenges

Improving the Quality of Experience or Service Perception (QoE) 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.

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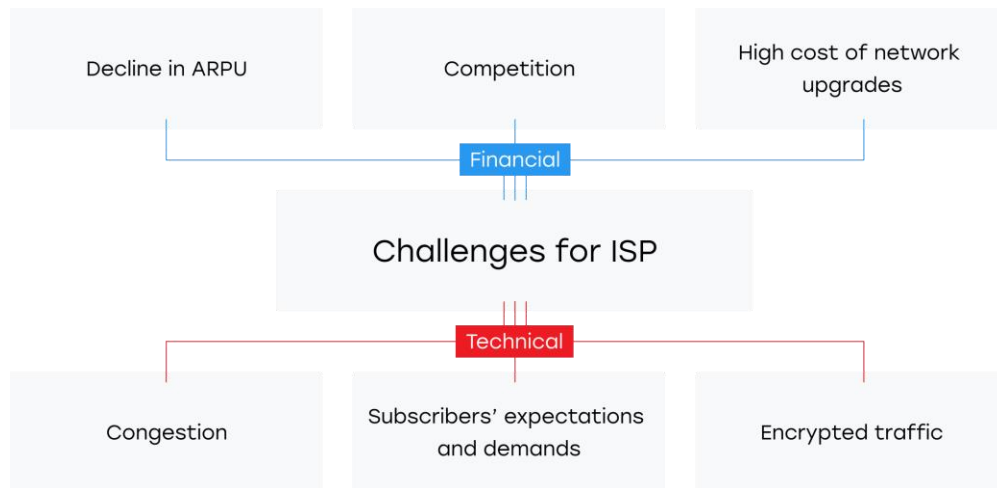
Quality of Experience module

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.
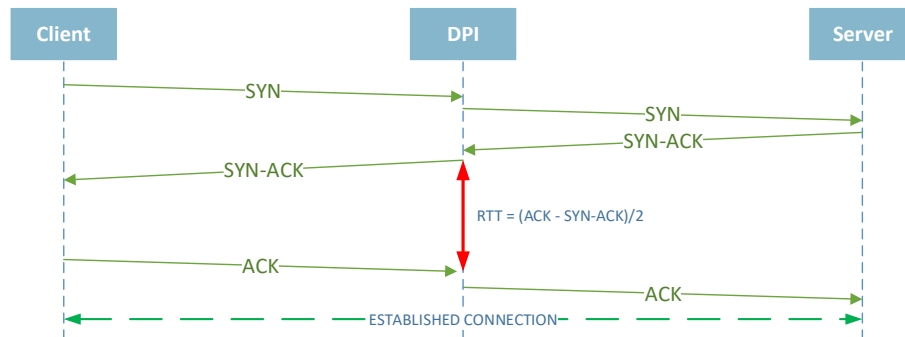
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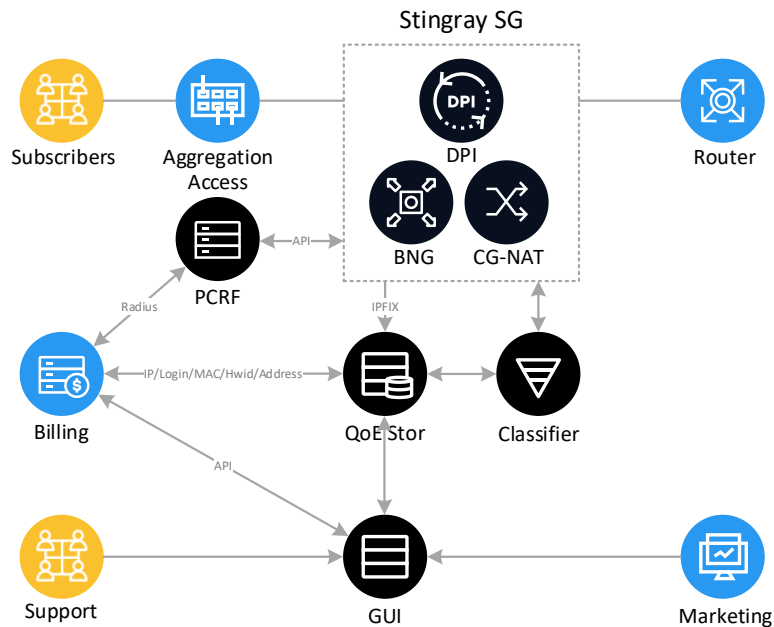
Graphical user interface

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.

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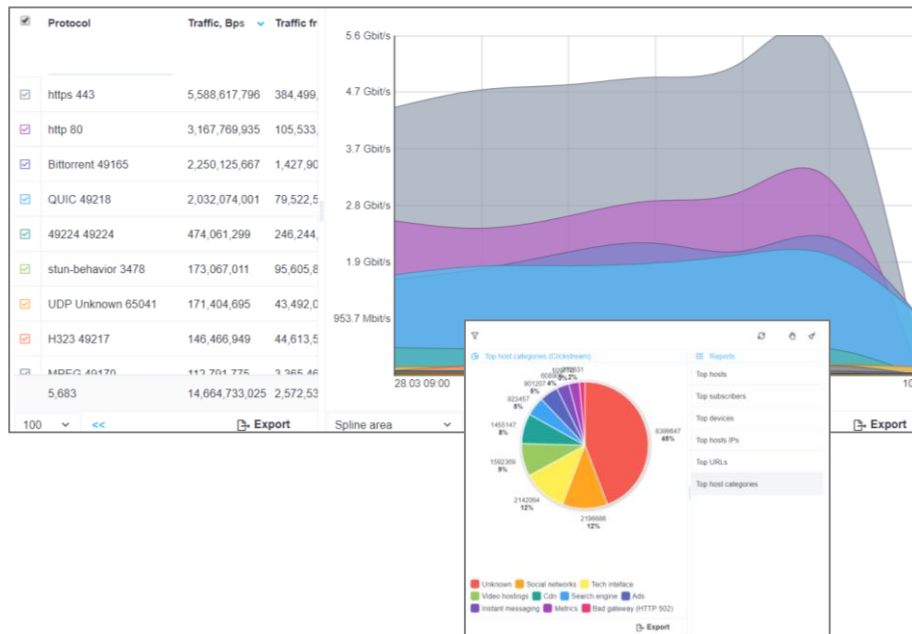
QoE metrics

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.

Diagram: Client — DPI — Server sequence

- Client → DPI: SYN
- DPI → Server: SYN
- Server → DPI: SYN-ACK
- DPI → Client: SYN-ACK
- RTT = (ACK - SYN-ACK)/2
- Client → DPI: ACK
- DPI → Server: ACK
- ESTABLISHED CONNECTION

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How to use QoE metrics?

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

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How to use QoE metrics?

Upselling

– 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

Customer Retention

– 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

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How to Improve QoE

ISPs Objectives

To increase the profitability of business

To increase customer loyalty with personalized offers

To reduce subscribers outflow

QoE

QoE Instruments

Interests-based subscriber list segmentation

Marketing campaigns and increasing ARPU

Statistics monetization

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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

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

For all DPI devices

Details

Devices

Top subscribers (Clickstream)

Subscriber	Login	Total	Sessions	Hosts	Devices	User
Filter	Filter					
10.90.28.92	30284	7157	7072	5	1	2
10.90.18.9	20853	4834	70	16	2	3
10.90.75.3	31541	4615	240	13	2	2
10.90.52.115	18039	4084	3813	6	2	2
10.90.17.41	20116	4068	3846	21	2	2
10.90.99.112	18014	3946	3777	12	2	6
10.90.81.29	14994	3885	24	8	2	2
10.90.215.100	25091	3838	3694	26	2	2
10.90.212.34	16782	3746	3629	4	2	2
10.90.56.171	30173	3630	3629	4	2	3
10.90.9.54	24049	3581	248	2	2	2
1,477	1,477					

User agent
Filter
samsung-agent/1.1
Mozilla/5.0 (SMART-TV LINUX Tizen 3.0) App
Mozilla/5.0 (SMART-TV Linux Tizen 3.0) Appl
3

1-100 of   << < 1 2   Export   100 ↓

1-3 of 3   <<

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Use Case: Prevent the Churn

DPI uploads ClickStream –
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
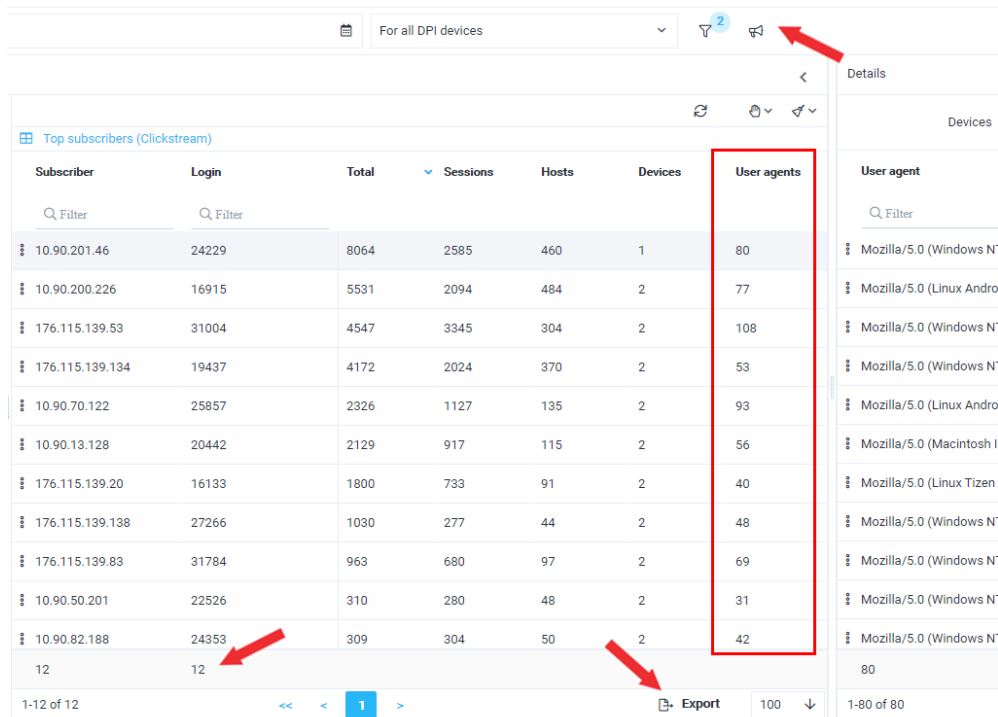"Telecom-operators".

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

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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.

Subscriber	Login	Total	Sessions	Hosts	Devices	User agents	User agent
🔍 Filter	🔍 Filter						🔍 Filter
10.90.201.46	24229	8064	2585	460	1	80	Mozilla/5.0 (Windows NT
10.90.200.226	16915	5531	2094	484	2	77	Mozilla/5.0 (Linux Androi
176.115.139.53	31004	4547	3345	304	2	108	Mozilla/5.0 (Windows NT
176.115.139.134	19437	4172	2024	370	2	53	Mozilla/5.0 (Windows NT
10.90.70.122	25857	2326	1127	135	2	93	Mozilla/5.0 (Linux Androi
10.90.13.128	20442	2129	917	115	2	56	Mozilla/5.0 (Macintosh I
176.115.139.20	16133	1800	733	91	2	40	Mozilla/5.0 (Linux Tizen
176.115.139.138	27266	1030	277	44	2	48	Mozilla/5.0 (Windows NT
176.115.139.83	31784	963	680	97	2	69	Mozilla/5.0 (Windows NT
10.90.50.201	22526	310	280	48	2	31	Mozilla/5.0 (Windows NT
10.90.82.188	24353	309	304	50	2	42	Mozilla/5.0 (Windows NT
12	12						80

Top subscribers (Clickstream)

For all DPI devices

Details

Devices

1-12 of 12   << < 1 >   Export   100   1-80 of 80

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Use Case: Improve The ARPU

Create personalized offers, services and tariffs for your subscribers and offer conditions for legal entities by segmenting your database.
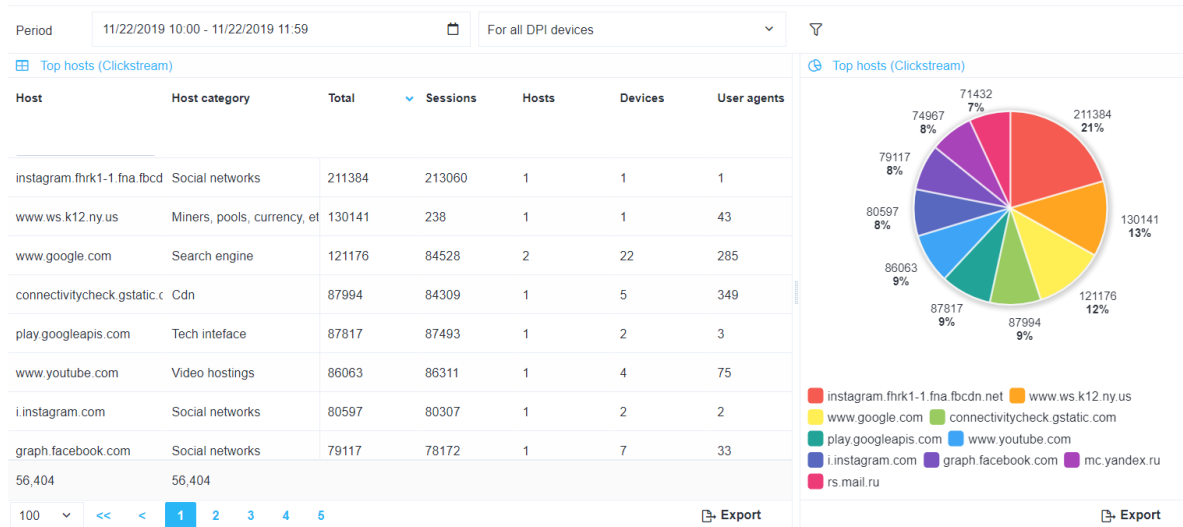
- Learn about subscribers interests (sport, movies, videogames, news, nature, children content)

- 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.

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Use Case: Communicate With Your Clients

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

Mobile formats

Icon Fullscreen Text and graphics Native Header Native video

Desktop formats

Fullscreen Fullsize vertical Page banner Native / Text and graphics

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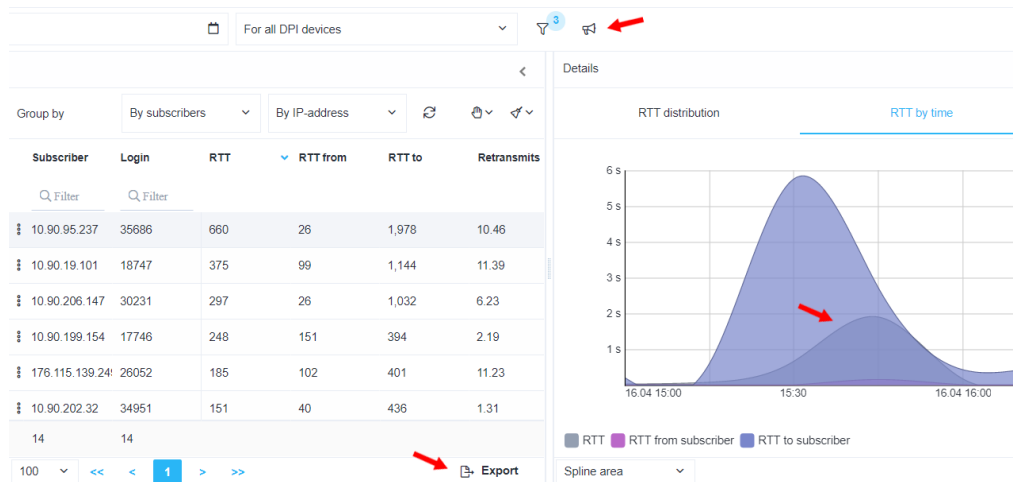
Use Case: Proactive Support & Upselling

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

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QoE Licensing

LITE	STANDARD	OPTIONS
✅	✅	NetFlow statistics collector with re-export support
✅	✅	API support for integration with external systems
✅	✅	Full NetFlow and ClickStream statistics visualization
✅	✅	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
✅	✅	Built-in ClickStream-based TOP reports: URLs, hosts, subscribers, devices, IP resources
✅	✅	Exporting reports using *.xlsx, .*csv, *.pdf and *.png formats
✅	❌	Reports on web resources categories, updating the list of categories
✅	❌	Full NetFlow and ClickStream reports with detailed information per user
✅	❌	Setting up triggers and actions on events, sending reports by email
✅	❌	DDoS and BotNet detection

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About VAS Experts

VAS Experts is a telecom software developer. Since 2013 we have built trust of more than 1100 providers in Russia, CIS and Europe that are using our Stingray Service Gateway.

Our team has over 20 years work experience in telecommunication software development and wide knowledge in technologies.

10M+ users

More than 30 Tbps

Latest Installations:

- Lebanon
- Cyprus
- Turkey
- Moldova
- Nicaragua
- Argentina

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Our products

Deep Packet Inspection

BRAS / BNG

CG-NAT

QoE Analytics

Key Features

Subscriber Management

- QoS Traffic policing
- Block/Allow lists
- BNG, CG-NAT

Analytics

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

VAS for ISP

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

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Products

Stingray SG

Software based BRAS

QoE module

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