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Configuring DDoS and BotNet Detector Based on QoE

The detector allows automatic monitoring of incoming traffic, identifying DDoS attacks, and quickly taking measures to protect the network. When a threat is detected, the system can fully isolate the malicious stream or clean the traffic while maintaining service availability for users.

The solution requires SSG version BASE, COMPLETE, or BNG with additional options and is deployed on an existing server with QoE.



[More about tools for DDoS protection and BotNet detection](#)

1. Updating QoE

On the QoE server.

[Update QoE](#) to the latest version, stopping the receivers beforehand. Before starting receivers, patch ClickHouse:

```
dnf --refresh install clickhouse-patched
```

Start the receivers.

2. Updating GUI

On the GUI server.

[Update GUI](#) to the latest version. Connect GUI to VAS Cloud if not already connected. Enable the aniddos license option.

In the file `/var/www/html/dpiui2/frontend/env.js` set the option `AppEnv.DDoSAttack_isVisible = 1;`

3. Installing the Detector

On the QoE server.

Install the mitigator package `fastm_qoe` on all nodes:

```
dnf install fastm_qoe
```

Switch Python version:

```
dnf install -y python39 python39-devel -y
sudo update-alternatives --install /usr/bin/python3 python3
/usr/bin/python3.6 60
sudo update-alternatives --install /usr/bin/python3 python3
/usr/bin/python3.9 70
sudo update-alternatives --config python3
```

Select version 3.9:

```
python3 --version
```

4. Configuring the Detector

On the QoE server.

On all nodes, or on selected ones:

1. Edit the file `/var/fastm_qoe/etc/.env`.
It should contain the following:

```
ANALYZER=avg-based-z-score
ANALYZER_RULES_KEY=avg-based-z-score-any

IDLE_MODE=1
FORCE_MODE=0
DB_DROP_TABLES=1

FM_ATTACKS_METRICS_BY_SUBS_FILTER="and has_attack = 0"
FM_ATTACKS_METRICS_BY_SUBS_LIMIT=1
FM_ATTACKS_METRICS_BY_SUBS_COLLAPSE=1
FM_ATTACKS_METRICS_BY_SUBS_DAY='day_'
```

2. Update schema:

```
fastm-db-scheme
```

3. Enable metrics collection

Add to file `/var/questor/backend/.env` the following:

```
FM_FULLFLOW_HOOK_ENABLE=1
GEO_IP_DIC_AUTOLOAD_ENABLED=1
```

Execute the daily cron:

```
sh /var/questor/backend/app_bash/cron_daily.sh
```

Collect metrics for several hours, ideally 24 hours. Then edit `/var/fastm_qoe/etc/.env` again and change 2 parameters:

```
IDLE_MODE=0
DB_DROP_TABLES=0
```

This activates the detector.

5. Trigger Thresholds

In the file `/var/fastm_qoe/lib/rules/config.json`, edit the section `avg-based-z-score-any` as follows:

```
"avg-based-z-score-any": {
  "octets": { "th": 100, "weight": 0.1 },
  "octets_dropped": { "th": 1000, "weight": 0.3 },
  "packets": { "th": 100, "weight": 0.3 },
  "packets_dropped": { "th": 1000, "weight": 0.3 },
  "flows": { "th": 100, "weight": 0.4 },
  "sessions": { "th": 100, "weight": 0.4 },
  "duration": { "th": 100, "weight": 0.01 },
  "host_ips": { "th": 100, "weight": 0.3 },
  "protos": { "th": 100, "weight": 0.3 },
  "bits_sec": { "th": 100, "weight": 0.05 },
  "bits_dropped_sec": { "th": 1000, "weight": 0.05 },
  "packets_sec": { "th": 100, "weight": 0.05 },
  "packets_dropped_sec": { "th": 1000, "weight": 0.05 }
},
```

6. Metrics Storage (DDoS Attack Logs)

In the GUI web interface, configure storage of raw and aggregated metrics, as well as raw and aggregated attack logs.

In Admin → GUI Configuration → QoE Stor: set DB retention time values as follows:

- `QOESTOR_FM_ATTACKS_MAIN_LOG_PARTITIONS_LIFE_TIME_HOUR = 720`
- `QOESTOR_FM_ATTACKS_AGG_LOG_PARTITIONS_LIFE_TIME_DAYS = 30`
- `QOESTOR_FM_METRICS_MAIN_LOG_PARTITIONS_LIFE_TIME_HOUR = 72`
- `QOESTOR_FM_METRICS_AGG_LOG_PARTITIONS_LIFE_TIME_DAYS = 7`

Administrator > GUI configuration

Save

Settings

Common

Jobs intervals and periods

QoE Stor: DB (Clickhouse) connection

QoE Stor: Raw log aggregation settings

QoE Stor: DB lifetime settings

QoE Stor: Discs settings

SMTP settings

System

DB (MySQL) connection

Ulr settings: System settings

Ulr settings: Web rules lists

Push notifications settings

SSO authorization settings

Maps settings

VasCloud settings

Cluster settings

Backup settings

Backup auto restoration settings

Telegram settings

QoE Stor: DB lifetime settings

100

GTP LOAD RATE from fullflow logs lifetime in days (GTP_LOAD_RATE_FROM_FULLFLOW_LIFE_TIME_DAYS)

30 days

UPLINK LOAD RATE from fullflow logs lifetime in days (UPLINK_LOAD_RATE_FROM_FULLFLOW_LIFE_TIME_DAYS)

30 days

DDoS attack logs lifetime in hours (QOESTOR_FM_ATTACKS_MAIN_LOG_PARTITIONS_LIFE_TIME_HOUR)

72d

DDoS attack aggregated logs lifetime in days (QOESTOR_FM_ATTACKS_AGG_LOG_PARTITIONS_LIFE_TIME_DAYS)

30

DDoS attack metrics logs lifetime in hours (QOESTOR_FM_METRICS_MAIN_LOG_PARTITIONS_LIFE_TIME_HOUR)

72

DDoS attack metrics aggregated logs lifetime in days (QOESTOR_FM_METRICS_AGG_LOG_PARTITIONS_LIFE_TIME_DAYS)

7

Default page size of QoE query (QUERY_PAGE_SIZE)

100

Max page size of QoE query (QUERY_MAX_PAGE_SIZE)

10000

Export files life time in hours (EXPORT_FILES_LIFE_TIME_HOURS)

24

Limit lines in export file (LIMIT_LINES_IN_EXPORT_FILE)

1000000

7. Attack Analysis

Detected attacks can be examined in the DDoS attack sections in QoE Analytics.

1. Start with the "TOP Attacks" section for the last 24 hours.
Sort attacks by number of sessions and note a few IPs with the highest session count.

Period: 04/06/2026 11:21 - 04/06/2026 11:21 | For all DPI devices | 10 minutes

Top attacks (DDoS attacks)

Target IP address	Number of attacks	Number of attack	Sessions	Average duration	Traffic speed	flow speed
10.24.165.167	1	1	12076528	8.4 s	10.6 Mbit/s	1.1 Kpkts/s
10.29.65.249	1	1	4939850	13.9 s	4.9 Mbit/s	872 Pkts/s
10.21.143.162	1	1	4759639	13.3 s	2.3 Mbit/s	392 Pkts/s
10.17.140.164	1	1	2005908	20.6 s	2.2 Mbit/s	234 Pkts/s
10.29.240.241	1	1	1265823	5.4 s	523.2 Kbit/s	55 Pkts/s
10.29.102.74	1	1	1063588	9.1 s	1.2 Mbit/s	144 Pkts/s
10.22.61.219	1	1	640078	7 s	178.1 Kbit/s	31 Pkts/s
10.248.116.80	1	1	565021	14.6 s	617.6 Kbit/s	106 Pkts/s
10.8.125.162	1	1	559637	965 ms	95.3 Kbit/s	27 Pkts/s
10.29.76.96	1	1	333443	16.9 s	130.5 Kbit/s	16 Pkts/s
10.138.20.57	1	1	314470	26.3 s	551.8 Kbit/s	64 Pkts/s
10.25.200.147	1	1	287159	16.3 s	473.1 Kbit/s	55 Pkts/s
10.20.218.178	1	1	266081	15 s	82.7 Kbit/s	27 Pkts/s
10.17.88.12	1	1	224360	10.5 s	794.3 Kbit/s	103 Pkts/s

2. Check the "TOP Attacks by Protocols" section
Also sort by session count. Note these protocols.
3. Check the "TOP Attacking IP Addresses" section, note a few IPs with the highest session count

Period		04/05/2026 11:21 - 04/06/2026 11:21			For all DPI devices	
Top attacker Ip addresses (DDoS attacks)						
<input checked="" type="checkbox"/>	Attacker IP address	Country code	State	City	Sessions	Average duration
	<input type="text" value="Q FILTER"/>	<input type="text" value="Q FILTER"/>	<input type="text" value="Q FILTER"/>	<input type="text" value="Q FILTER"/>		
<input checked="" type="checkbox"/>	175.45.176.68	US	California	Los Angeles	648894	3.8 s
<input checked="" type="checkbox"/>	87.76.218.2	NL	Overijssel	Hengevelde	365396	10.2 s
<input checked="" type="checkbox"/>	103.7.141.197	CN	Hubei	Shiyan (Maoji	348483	19.3 s
<input checked="" type="checkbox"/>	87.98.244.172	DE	Saarland	Saarbrucken	305586	29.8 s
<input checked="" type="checkbox"/>	181.214.214.24	IL	Haifa	Giv'at Nili	273252	18.3 s
<input checked="" type="checkbox"/>	82.167.183.26	SA	Riyadh Region	Riyadh	253765	17.1 s
<input checked="" type="checkbox"/>	31.56.144.4	US	Virginia	Reston	209256	8.9 s
<input checked="" type="checkbox"/>	37.202.197.131	DE	Hesse	Frankfurt am	174740	19.8 s
<input checked="" type="checkbox"/>	101.98.88.216	NZ	Auckland	Auckland (Au	168953	16.3 s
<input checked="" type="checkbox"/>	156.246.66.20	HK	Kowloon	Hong Kong	139354	14.4 s
<input checked="" type="checkbox"/>	181.176.42.160	PE	Cajamarca De	Catilluc	129449	2.6 s
<input checked="" type="checkbox"/>	156.246.66.4	HK	Kowloon	Hong Kong	112427	18.9 s
<input checked="" type="checkbox"/>	45.138.202.181	IT	Tuscany	Scarperia e S	97502	13.8 s
<input checked="" type="checkbox"/>	200.40.36.1	UY	Montevideo D	Montevideo	92730	4.4 s

4. Check the Attack Log

Filter by previously selected subscribers and protocol.

Here you can get attack details and make additional conclusions to take actions.

For example, the screenshot below clearly shows port scanning on the same address via UDP protocol. In this case, it is sufficient to place the attacker IP into a separate AS and set it to drop.



AS blocking is detailed in the scenario [Blocking IP by placing it into an autonomous system](#)

Subscription status: REMAIN 15 DAYS

Period: 04/05/2026 11:30 - 04/06/2026 11:30

For all DPI devices

10 minutes

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Row DDoS attack log

Reports

Application protocol	Group	Source AS	Attacker IP address	Attacker ports	Target IP address	Target port	Subscriber login	Octet delta	Dropped bytes
Q.FILTER	▼	Q.FILTER	Q.FILTER	Q.FILTER	Q.FILTER	Q.FILTER	Q.FILTER	Q.FILTER	Q.FILTER
udp unknown 65041	Unknown	65535	175.45.176.68	20290, 38977, 56667, 61278, 41168, 8126, 33792, 8845, 32747, 7417, 42658, 36988, 15856, 61686, 5074	10.24.155.167	54266		9256720	0
udp unknown 65041	Unknown	65535	175.45.176.68	41801, 21641, 43282, 15432, 41651, 30492, 47866, 33961, 63451, 15169, 38592, 10144, 29589, 10859, 6	10.24.155.167	54266		9329722	0
udp unknown 65041	Unknown	65535	175.45.176.68	57562, 29531, 45034, 21648, 41954, 49691, 5754, 29908, 11732, 56415, 62049, 21484, 51246, 21859, 7	10.24.155.167	54266		9048488	0
udp unknown 65041	Unknown	65535	175.45.176.68	36750, 34734, 47253, 63460, 16227, 22415, 46393, 18158, 54218, 20362, 36853, 18573, 36464, 5866,	10.24.155.167	54266		8995740	0
udp unknown 65041	Unknown	65535	175.45.176.68	11002, 43755, 44114, 32100, 29038, 58225, 29132, 64948, 59065, 57195, 10453, 42997, 19988, 15335,	10.24.155.167	54266		6732620	0
udp unknown 65041	Unknown	65535	175.45.176.68	37842, 16966, 26369, 61616, 7951, 29737, 47981, 44202, 47751, 47972, 42462, 49604, 45672, 28133, 1	10.24.155.167	54266		6592660	0
udp unknown 65041	Unknown	65535	175.45.176.68	43484, 35873, 31417, 35455, 44085, 49575, 37896, 61274, 25099, 30893, 18084, 58259, 31525, 12354	10.24.155.167	54266		6663041	0
udp unknown 65041	Unknown	65535	175.45.176.68	6906, 62309, 10978, 55078, 37223, 59196, 5222, 62754, 34150, 8585, 61017, 35029, 10325, 6862, 338	10.24.155.167	54266		6540590	0
udp unknown 65041	Unknown	65535	175.45.176.68	33003, 57353, 49799, 14626, 49418, 41069, 67733, 7468, 60845, 35396, 37619, 67440, 41031, 40424,	10.24.155.167	54266		6523733	0
udp unknown 65041	Unknown	65535	175.45.176.68	58632, 51896, 22830, 23648, 47753, 5514, 46357, 9464, 54439, 51628, 49442, 61691, 57933, 45206,	10.24.155.167	54266		6600399	0
udp unknown 65041	Unknown	65535	175.45.176.68	36298, 40580, 19826, 12713, 42766, 19755, 25163, 25860, 22220, 12583, 27988, 63438, 10925, 55963	10.24.155.167	54266		6570488	0
udp unknown 65041	Unknown	65535	175.45.176.68	27978, 35174, 58046, 32676, 12942, 52575, 64742, 17591, 54537, 38391, 57533, 16727, 8858, 42081, 6	10.24.155.167	54266		6554810	0
udp unknown 65041	Unknown	65535	153.80.28.212	6798, 26569, 7140, 14148, 59342, 29597, 61210, 16439, 25514, 38237, 27001, 64362, 51949, 53704, 59	10.24.155.167	32945		158374	0
udp unknown 65041	Unknown	65535	153.80.28.139	54768, 28638, 32877, 57904, 40114, 47485, 57580, 4423, 60193, 56481, 27730, 14148, 14072, 17033, 1	10.24.155.167	32945		155204	0
udp unknown 65041	Unknown	65535	153.80.28.247	62498, 32119, 5345, 43570, 8425, 6816, 57642, 60799, 21941, 29299, 5560, 17784, 20259, 9473, 6104	10.24.155.167	32945		152738	0

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