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# Detecting DDoS attacks, BotNet activity, and visits to specific resources using triggers in QoE

[Triggers](#) are used to search data in QoE Stor based on specified parameters. When a trigger fires, one of the following actions can occur:

- Notification in GUI
- HTTP action
- Email notification

Required SSG DPI options:

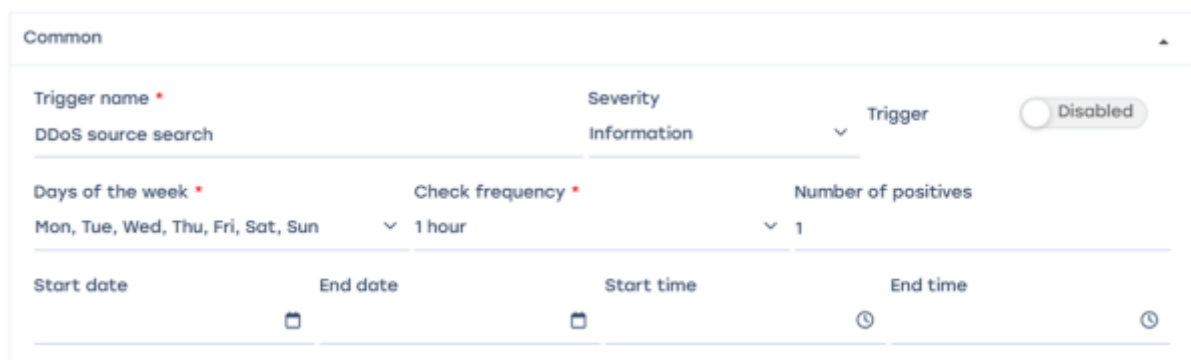
- [Statistics gathering and analysis on protocols and directions](#)
- [Subscriber notifications](#)

Required additional modules:

- [DPIUI2 \(GUI - Graphical User Interface\)](#)
- [Implementation and administration](#)

## Example: configuring a trigger to detect the source of a Flood-type DDoS attack

### General trigger information



The screenshot shows a configuration window titled 'Common'. It contains several fields and a 'Trigger' toggle switch. The 'Trigger name' is 'DDoS source search'. The 'Severity' is 'Information'. The 'Trigger' toggle is set to 'Disabled'. Below these, there are three rows of settings: 'Days of the week' is 'Mon, Tue, Wed, Thu, Fri, Sat, Sun'; 'Check frequency' is '1 hour'; and 'Number of positives' is '1'. At the bottom, there are four fields for 'Start date', 'End date', 'Start time', and 'End time', each with a calendar icon.

Trigger name *	Severity	Trigger
DDoS source search	Information	Disabled

Days of the week *	Check frequency *	Number of positives
Mon, Tue, Wed, Thu, Fri, Sat, Sun	1 hour	1

Start date	End date	Start time	End time

Trigger name: "DDoS source detection", days of the week - all, check frequency - 1 hour, trigger activation frequency - once, start and end times not set.



Every day, the system will perform a check every hour based on the conditions described below.

## Queries

Queries						
+						
	Query name	Report		Period from	Period to	
<input checked="" type="checkbox"/> On	A	Maxi		now - 15 minutes	now	

- Add field
- Name: A
- Select table for scanning: Raw full netflow → Tables → Attacks detection → Top hosts IPs → Maxi
- Select period from “now - 15 minutes” to “now”



In this case, the system analyzes traffic for the selected page during the last 15 minutes.

## Conditions

Conditions							
+							
	Bind	Query name	Function	Combinator	Serie	Operator	Value
<input checked="" type="checkbox"/> On	AND	A	avg		Session lifetir	<=	20
<input checked="" type="checkbox"/> On	AND	A	avg		Sessions	>=	1500

- Add two "+" fields
- Link - AND
- Function - avg
- Condition 1 - session lifetime <= 20 (ms)
- Condition 2 - number of sessions >= 1500



This means the trigger will fire if sessions with lifetimes  $\leq 20\text{ms}$  AND more than 1500 sessions from the same IP host are detected.

## Error handling

No data & error handling	
If no data *	If execution error or timeout *
No data	Keep last state

- “If no errors” — no data
- “If there is an error or timeout” — save last state



In this configuration, no data will be saved if there are no errors, but if errors occur, information about suspicious sessions will be saved as a table.

## Actions

### E-mail action

Actions

E-mail X

Send to

your@email.com

On

Subject

Trigger fired: {trigger.name}

Message

B I U [list] [link] [font-size] [font-family] [font-format] [bulleted-list] [numbered-list] [indent-left] [indent-right] [outdent-left] [outdent-right] [undo] [redo] [copy] [paste] [text-color] [background-color] [text-align] [bullet-point] [link] [unlink]

Id: {trigger.id}  
Trigger: {trigger.name}  
Status: {trigger.state}  
Severity: {trigger.severity}  
  
Queries:  
{trigger.queries}

- Click the "</>" icon to auto-fill the form
- Enter the recipient email address in the "To" field
- When triggered, a notification will be sent to the specified email containing the trigger ID, name, status, and report link (saved state).

## Notification

Actions

E-mail x Notification x

Notification title  
{trigger.name}

Notification subtitle  
{trigger.id}

Notification type  
Warning

Message

Id: {trigger.id}  
Trigger: {trigger.name}  
Status: {trigger.state}  
Severity: {trigger.severity}

Queries:  
{trigger.queries}

- Click "</>" to auto-fill the form
- Select notification type — "Warning"
- A notification will be created in the SSG system

The report link can be obtained from the notifications menu.

Select the notification Click **Details**

Follow the report link — it will open in a new browser window.

## HTTP action

Actions

E-mail x Notification x Http x

Method  
POST

Url  
https://your\_redmine\_host/issues.xml?key=your\_redmine\_api\_key

Headers

Body

Content-Type  
application/xml

<?xml version="1.0"?>  
<issue>  
  <project\_id>1</project\_id>  
  <subject>Trigger fired: {trigger.name}</subject>  
  <priority\_id>1</priority\_id>  
  <description>Id: {trigger.id}\nTrigger: {trigger.name}\nStatus:  
  {trigger.state}\nSeverity: {trigger.severity}\nQueries:  
  {trigger.queries}\nReasons for the occurrence of notification:  
  {trigger.notification.notes}\nLinks to  
  reports:\n{trigger.report.link}\n\nLinks to  
  files:\n{trigger.report.csv}\n\n{trigger.report.tsv}\n\n{trigger.report  
  .xlsx}\n\n{trigger.report.xlsx}</description>  
</issue>

json Default template  
xml Default template

Click "</>" to auto-fill the form, select the method suitable for your ticket system, and enter the URL address.



Keep in mind — values such as session count and packet rate are averaged. Fine-tuning should be performed based on your network specifics.

### Example: configuring a trigger to detect the target of a Flood-type DDoS attack

This configuration differs from the previous example in steps 2 and 3 (Queries and Conditions).

## Queries

The screenshot displays the NetFlow Analyzer interface for configuring a new query. The 'Queries' table at the top shows a query named 'A' with report 'Maxi' and period 'now - 15 minutes'. The 'Conditions' section is active, displaying a list of available conditions in a dropdown menu. The conditions include 'Raw full netflow', 'Tables', 'Raw log', 'Attacks detection', 'Top application protocols', 'Top application protocols groups', 'Top subscribers', 'By traffic', 'By flow', 'By session lifetime', 'By subscribers and hosts', and 'Maxi'. The 'Operator' and 'Value' fields are also visible, showing '<=' and '20' respectively.

In the report field, select Raw full netflow → Tables → Attacks detection → Top subscribers → Maxi

## Conditions

Conditions								
+								
	Bind	Query name	Function	Combinator	Series	Operator	Value	
<input checked="" type="checkbox"/> On	AND	A	avg		Flow volume t	>=	10000	

Series — “Flow volume to subscribers, Pct/s” >= 10000



Values such as session count and packet rate are averaged. Fine-tuning should be performed based on your network specifics.

## BotNet analysis

This configuration differs from the previous example in steps 2 and 3 (Queries and Conditions).

### Queries

Queries						
+						
	Query name	Report		Period from	Period to	
<input checked="" type="checkbox"/> On	A	Maxi		now - 15 minutes	now	
<input checked="" type="checkbox"/> On	B	Full raw log		now - 15 minutes	now	

- Select Raw full netflow → Tables → Attacks detection → Top application protocols → Maxi for “A”
- Raw full network → Tables → Raw log → Full raw log for “B”

### Conditions

Conditions								
+								
	Bind	Query name	Function	Combinator	Series	Operator	Value	
<input checked="" type="checkbox"/> On	OR	B	avg		Destination p	=	6667	
<input checked="" type="checkbox"/> On	OR	B	avg		Source port	=	6667	
<input checked="" type="checkbox"/> On	OR	B	avg		Destination p	=	1080	
<input checked="" type="checkbox"/> On	OR	B	avg		Source port	=	1080	
<input checked="" type="checkbox"/> On	AND	A	avg		Flow	>=	2000	



Since BotNet often uses ports 6667 and 1080 — add each destination/source port by selecting query “B” with “OR” condition, and Flow Pcts/s  $\geq$  2000.







In this configuration, the trigger will fire if on any of the ports (6667/1080) the packet rate exceeds 2000 per second.



Values such as session count and packet rate are averaged. Fine-tuning should be performed based on your network specifics.

## Detecting subscriber visits to competitor resources

### General trigger information

Common			
Trigger name *	Severity	Trigger	
Interest in competitors	Information	▼	<input type="radio"/> Disabled
Days of the week *	Check frequency *	Number of positives	
Mon, Tue, Wed, Thu, Fri, Sat, Sun	▼ 1 hour	▼ 1	
Start date	End date	Start time	End time
			 

Trigger name: “Interest in competitors”, days of the week – all, check frequency – 1 hour, trigger activation frequency – once, start and end times not set.



Every day, the system will perform a check every hour based on the conditions described below.

### Queries

Queries						
+						
	Query name	Report		Period from	Period to	
<input checked="" type="checkbox"/> On	A	Raw clickstream	▼	now - 1 hour	now	🗑
<input checked="" type="checkbox"/> On	B	Maxi	▼	now - 1 hour	now	🗑

- Add “+” field
- Name A — select table: Raw clickstream → Tables → Raw clickstream
- Name B — select table: Raw full netflow → Tables → Attacks detection → Top hosts IPs → Maxi
- Select period from “now - 1 hour” to “now”
- This setup analyzes traffic hourly based on the selected tables.

## Conditions

Conditions							
+							
	Bind	Query name	Function	Combinator	Series	Operator	Value
<input checked="" type="checkbox"/> On	OR	A	avg		Host	=	*megafon.ru
<input checked="" type="checkbox"/> On	AND	B	avg		Flow volume f	>=	800
<input checked="" type="checkbox"/> On	OR	A	avg		Host	=	*mts.ru

- Add 3 “+” fields
- First field — select table “A”; Link - “OR”; Function - “avg”; Series Host = \*megafon.ru (or your competitor)
- Second field — select table “B”; Link - “AND”; Function - “avg”; Series Flow volume from subscriber, Pct/s >= 800



The trigger will fire if at least 800 packets (indicating a meaningful visit) from a subscriber to a competitor’s website are detected.

## Error handling



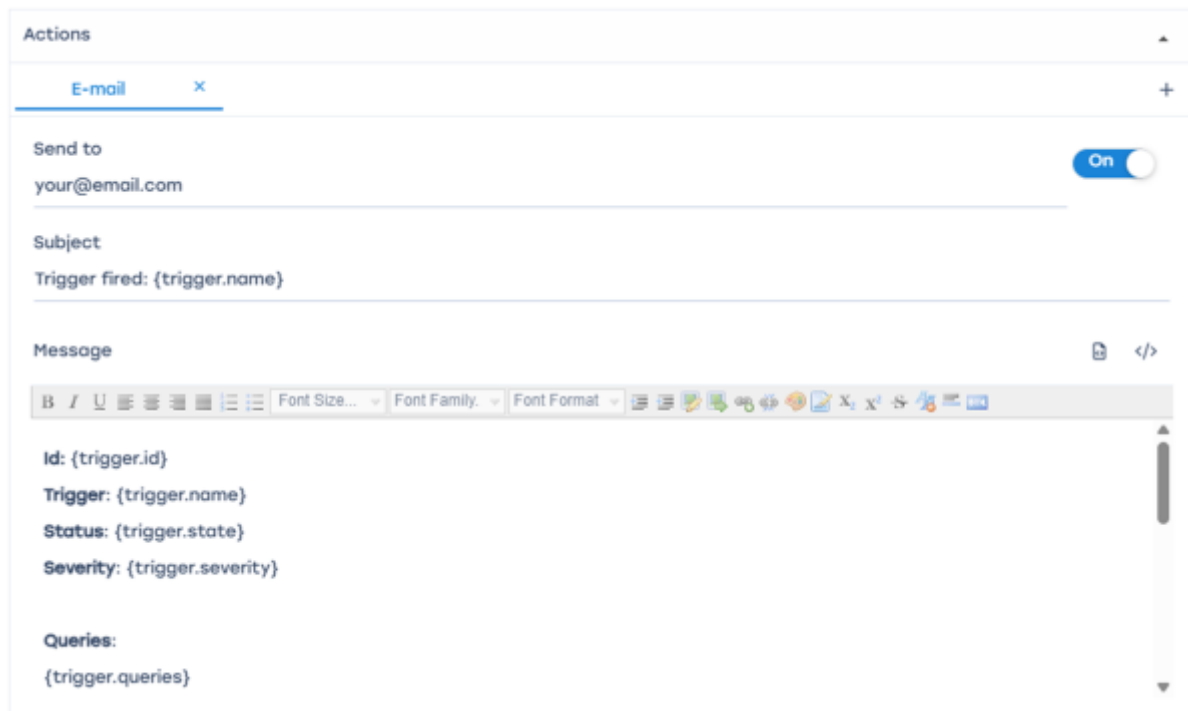
- “If no errors” — no data
- “If there is an error or timeout” — save last state



In this configuration, no data will be saved if there are no errors, but if errors occur, information about suspicious sessions will be saved as a table.

## Actions

### E-mail action



The screenshot shows the 'Actions' configuration window with the 'E-mail' tab selected. It includes fields for 'Send to' (with a toggle switch set to 'On'), 'Subject' (pre-filled with 'Trigger fired: {trigger.name}'), and a 'Message' editor. The message editor has a rich text toolbar and contains the following text: 'Id: {trigger.id}', 'Trigger: {trigger.name}', 'Status: {trigger.state}', 'Severity: {trigger.severity}', 'Queries:', and '{trigger.queries}'.

- Click to auto-fill the form
- Enter recipient email address in “To” field



When triggered, an email containing notification details — ID, trigger name, status, and report link (saved state) — will be sent to the specified address.

### Notification



- Click "</>" to auto-fill the form
- Select notification type — “Warning”
- A notification will be created in the SSG system

The report link can be obtained from the notifications menu.

Select the notification Click **Details**

Follow the report link — it will open in a new browser window.

## HTTP action

Actions

E-mail × Notification × Http ×

Method POST Url ☒ On

Url: `https://your_redmine_host/issues.xml?key=your_redmine_api_key`

Headers

Name	Value
Content-Type	application/xml

Body

json Default template  
xml Default template

```
<?xml version="1.0"?>
<issue>
  <project_id>1</project_id>
  <subject>Trigger fired: {trigger.name}</subject>
  <priority_id>1</priority_id>
  <description>Id: {trigger.id}\nTrigger: {trigger.name}\nStatus:
{trigger.state}\nSeverity: {trigger.severity}\nQueries:
{trigger.queries}\nReasons for the occurrence of notification:
{trigger.notification.notes}\nLinks to
reports:\n{trigger.report.link}\n\nLinks to
files:\n{trigger.report.csv}\n\n{trigger.report.tsv}\n\n{trigger.report
.xlsx}\n\n{trigger.report.xlsx}</description>
</issue>
```

- Click "</>" to auto-fill the form
- Select the method suitable for your ticket system and enter the URL address



Keep in mind — values such as session count and packet rate are averaged. Fine-tuning should be performed based on your network specifics.