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# Sharding configuration and QoE cluster setup

QoE Stor can operate in sharding mode — horizontal cluster scaling, where parts of a single database are distributed across different shards (nodes).

Sharding allows you to:

1. Distribute the IPFIX insertion load from multiple DPI units by spreading it across nodes.
2. Significantly accelerate report generation by leveraging the combined computational power of all nodes — reports are built in parallel and merged into a final result.

## 1. Cluster creation

To create a QoE Stor cluster, configure the cluster node settings on each node in the file `/etc/clickhouse-server/config.d/qoestor-cluster-config.xml`.

Edit the file on the first node:

```
<?xml version="1.0"?>
<yandex>
  <remote_servers>
    <qoestor_cluster>
      <shard>
        <replica>
          <host>127.0.0.1</host>
          <port>9000</port>
        </replica>
      </shard>
      <shard>
        <replica>
          <host>127.0.0.2</host>
          <port>9000</port>
        </replica>
      </shard>
      <shard>
        <replica>
          <host>127.0.0.3</host>
          <port>9000</port>
        </replica>
      </shard>
    </qoestor_cluster>
  </remote_servers>
</yandex>
```

Specify the IP address or hostname for each shard. Save the changes.

Copy the file to the remaining cluster nodes.

Restart the database with the `fastor-db-restart` command on each node. The cluster is now ready for operation.



Port 9000 must be open on all cluster nodes in the internal network between nodes.

## 2. Adding the cluster in GUI

### 1. Master node connection

Select which node will act as the master. Connect it in the GUI settings and enable cluster mode. See the screenshot below.

The screenshot shows the VAS Experts GUI configuration page for the 'QoE Stor: DB (Clickhouse) connection'. The left sidebar lists various configuration categories, with 'Administrator' expanded and 'GUI configuration' selected. The main panel displays the configuration form for the database connection. Key settings include:

- QoE Stor host (QOESTOR\_DB\_HOST):** 192.168.1.183 (labeled 'Master node' with a red arrow).
- QoE Stor port (QOESTOR\_DB\_PORT):** 8123 (labeled 'Port should be opened on FW' with a red arrow).
- QoE Stor username (QOESTOR\_DB\_USER):** default.
- QoE Stor password (QOESTOR\_DB\_PASS):** "".
- QoE Stor database name (QOESTOR\_DB\_NAME):** qoestar.
- QoE Stor cluster mode (QOESTOR\_DB\_CLUSTER\_MODE):** Cluster mode enabled (labeled 'Enable cluster mode' with a red arrow).



Port 8123 must be open on all cluster nodes.

### 2. Management via SSH

In the GUI section **Administrator / Equipment**, add all nodes for SSH management.

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Administrator

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GUI update

QoE Stor configuration

QoE Stor logs

Captcha configuration

Captcha template

Captcha logs

Administrator > Equipment

Equipment

| ID | Name     | Type            | Version | Host        | Port | Login |  |  |
|----|----------|-----------------|---------|-------------|------|-------|--|--|
| 1  |          |                 |         |             |      |       |  |  |
| 2  |          |                 |         |             |      |       |  |  |
| 3  |          |                 |         |             |      |       |  |  |
| 4  |          |                 |         |             |      |       |  |  |
| 5  |          |                 |         |             |      |       |  |  |
| 6  |          |                 |         |             |      |       |  |  |
| 10 |          |                 |         |             |      |       |  |  |
| 20 |          |                 |         |             |      |       |  |  |
| 29 | QoE-main | QoE Stor server |         | 192.168.2.2 | 22   | test  |  |  |
| 30 | QoE-2    | QoE Stor server |         | 192.168.2.3 | 22   | test  |  |  |
| 32 | QoE-3    | QoE Stor server |         | 192.168.2.4 | 22   | test  |  |  |

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### 3. IPFIX receiver configuration

In the QoE Stor configuration, set up receivers for each node.

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Captcha configuration

Captcha template

Captcha logs

Administrator > QoE Stor configuration

QoE Stor nodes

QoE Stor

QoE-main

QoE-2

QoE-3

Configuration

Save

Settings

Receivers

Filtration

Common

UIR settings

FULLFLOW log settings

CLICKSTREAM log settings

NAT log settings

ONLINEFLOW log settings

OpenCellID settings

GTP settings

UPLINK LOAD RATE settings

Kaspersky list of infected hosts

Receivers

| Reo         | Port | Port | Rotx | Rotx | Rotx | Delx | Que | Inse | Exp | DPI | Balc | Balc | Balc | Balc |
|-------------|------|------|------|------|------|------|-----|------|-----|-----|------|------|------|------|
| Netflow tcp | 1500 | 1    | 0    | 0    | 0    | 10   | 0   |      | -1  |     |      | tcp  |      |      |
| Clickst tcp | 1501 | 1    | 0    | 0    | 40   | 10   | 0   |      | -1  |     |      | tcp  |      |      |

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Reconfigure the DPI to send IPFIX to the corresponding QoE cluster nodes.