

# Содержание

<b>Equipment Recommendations</b> .....	3
Minimum Requirements .....	3
Recommended Requirements for Every 10Gbps Peak Traffic on DPI .....	3
Detailed Recommendations .....	3
Tips from Yandex ClickHouse .....	4



# Equipment Recommendations



Do not install the module on a server with a DPI platform!

## Minimum Requirements

The component can be installed on a VM for testing purposes with the following minimum requirements:

1. Processor (CPU) 2.5 GHz - 1 core
2. RAM - at least 16 GB
3. Hard disk (SSD highly recommended) - at least 500 GB
4. Operating system - CentOS 8.x, [VEOS](#), CentOS Stream 8.x, Oracle Linux Server 8.x, AlmaLinux 8.x
5. Network interface card (NIC) - at least 1Gbps

## Recommended Requirements for Every 10Gbps Peak Traffic on DPI

1. Processor (CPU) from 2.5 GHz - 6 cores
2. RAM - 64 GB
3. Hard disk (SSD highly recommended) - at least 500 GB, see below for storage volume calculation and storage organization recommendations
4. Operating system - CentOS 8.x, [VEOS](#), CentOS Stream 8.x, Oracle Linux Server 8.x, AlmaLinux 8.x
5. Network interface card (NIC) - 2x10Gbps. It should be noted that each DPI generates an IPFIX flow at a speed of 0.5% to 1% of the real traffic speed. It is also recommended to aggregate the ports on QoE into a LAG for fault tolerance.

Example of a QoE server receiving IPFIX from DPI for 100Gbps peak traffic (in+out): Server platform (2U, AMD EPYC 7713 processor with 64 cores, 512 GB RAM, HW RAID Controller, 2 x 960GB SSD RAID1 for OS, 4x3.84TB SSD NVME RAID0 stripe default disks + HDD/SSD RAID50 disks for storage of a specific volume, 2x network adapter 2x25GbE, 2xPSU)

## Storage Volume Calculator Based on Average Traffic Speed

It is assumed that the average daily traffic is 60% of the total peak (in+out) traffic.

In the provided calculator, you need to change the traffic value to get the storage volumes.

## Detailed Recommendations

CPU	<p><b>One processor</b> supporting <b>SSE 4.2</b> instructions starting from <a href="#">Intel Nehalem</a> and <a href="#">AMD EPYC Zen2</a> <b>with 4 or more cores</b>, base clock speed of <b>2.5 GHz and higher</b>. Choose processors with more cores. Clock speed is less important. For example, 16 cores at 2600 MHz is better than 8 cores at 3600 MHz.</p> <p><b>Do not disable Hyper-threading and Turbo-Boost.</b></p>
RAM	<p>At least 16 GB, memory modules must be installed <b>in all processor channels</b> on the motherboard. Memory should be no less than the volume of requested data. More memory improves performance when generating reports. More memory also reduces disk load.</p> <p><b>Always disable swap file.</b></p>
Disks	<p>To optimize storage costs, several types of disks are used:  default — fast disks for data reception and aggregation process, it is recommended to use SSD NVMe in RAID0.  hot — disks for storage during periods of higher likelihood of report requests on this data, typically up to 3 months, SSD disks in RAID-10, RAID-5, RAID-6, or RAID-50.  cold — slow, large-volume disks for long-term storage, HDD disks in RAID-10, RAID-5, RAID-6, or RAID-50 are recommended.</p> <p>The storage duration for each level is set in the configuration via the GUI. Data migration between disks and data cleanup happens automatically based on the settings. A mechanism for overflow control is also provided to protect the database. The main volume of data is stored in the /var/lib/clickhouse directory. Temporary data (IPFIX dumps) are stored in the /var/qoestor/backend/dump directory. For better performance, it is important (recommended) that these directories are located on a separate disk or array. See <a href="#">Disk Configuration</a>.</p> <p>For OS and QoE Stor software installation, use 2 disks of at least 256GB capacity, combined in RAID 1 (mirror). A hardware RAID controller is required.</p>
QoE Cluster (Sharding)	<p>It is better to create multiple nodes and combine them into a cluster:  GUI optimizes queries so that all nodes generate reports in parallel.  <a href="#">IPFIX-balancer</a> is used to evenly distribute data across nodes (roundrobin), significantly improving system performance.</p> <p>In case of node failure, the balancer will automatically distribute data to the remaining nodes. General recommendation: as many nodes as possible and as little data per node as possible. This will provide:</p> <ol style="list-style-type: none"> <li>1. High performance</li> <li>2. Good fault tolerance</li> <li>3. Scalability (by adding nodes to the cluster)</li> </ol>

## Tips from Yandex ClickHouse

You can read Yandex ClickHouse operation tips at <https://clickhouse.yandex/docs/ru/operations/tips/>.