Network: iPerf

jperf-2.0.2.zip

iperf3.18_64.zip

iperf3 is an open-source tool for testing network performance (bandwidth). It allows to measure the maximum data transfer rate between two points and additional network parameters (e.g. delay, delay variations, packet loss). It works in a client-server architecture - a server (listening) is run on one host and a client initiating a connection on the other. iperf3 supports both TCP and UDP (or even SCTP), as well as IPv4 and IPv6. It is available on various systems (Linux, Windows, VMware, etc.) and is usually installed from the package manager (e.g. `apt`, `yum`).

Operating principle

- **Client-server architecture:** iperf3 requires an instance to run in server mode (`-s`) on one machine and in client mode (`-c `) on the other. The client establishes a TCP connection to the server (default port 5201) and sends a data stream, which the server accepts and measures. The test is unidirectional - by default it is the client that sends data to the server. In UDP mode (with the option `-u`), the client sends UDP packets at a preset throughput (measurement can take into account packet loss and delay variation). Switch `-R` or `--reverse` reverses the direction of transmission: the connection is initiated by the client anyway, but it is the server that sends the data to the client.
- **Single connection:** The iperf3 server only accepts one connection at a time (unlike iperf2). Once the test is complete, the server can be reconnected, possibly by restarting the server multiple times.
- **TCP vs UDP protocol:** In TCP mode, the tool measures throughput including flow control and retransmission (it uses TCP buffers), whereas in UDP mode it sends packets without acknowledgements and can ask for the maximum throughput using the `-b` . By default with UDP `iperf3` sets 1 Mbit/s, and with TCP no limit (the test takes 10 s by default).
- **Other comments:** You can specify the test time (`-t`), the number of parallel streams (`-P`), or the output format (`--json`). The server and client should use the same port values (`-p`). Additionally, the flags `-4`/`-6`to force IPv4 or IPv6.

Key options (parameters)

- **`-s, --server`** - runs iperf3 in **server** listening server mode. The server listens on the default port 5201 (can be changed from `-p`). In server mode, the programme accepts one connection from the client.
- **`-c , --client`** - starts the **client mode**by connecting to the specified server. Parameter specifies the IP address or name of the iperf3 server to which the client sends data.
- **`-t , --time`** - test duration in seconds. Default test duration is 10 s; option `-t` option allows you to change the duration.
- **`-p , --port`** - TCP/UDP port on which the server listens and to which the client connects. The default is 5201. Used when you need a non-standard port (e.g. due to network restrictions).

- **-u, --udp** - enables test in **UDP** mode instead of TCP mode. In UDP mode, the packet throughput can additionally be specified via the option `-b`.
- **-b , --bandwidth** - Target bandwidth for transmission. Format is, for example. `100M` for 100 megabits/s. With UDP, this value indicates the packet sending rate (default: 1Mbit/s), and with TCP it can limit the stream (default: „unlimited”).
- **-J, --json** - test result displayed in JSON format (useful for further analysis).
- **--logfile** - saves the test result to the specified file, instead of (or in addition to) displaying it on screen.
- **-R, --reverse** - mode **reversed**: the client initiates the connection to the server, but it is the server that sends the data to the client. Allows the download speed to be measured, keeping the same connection path.
- **-V, --verbose** - Detailed diagnostic information about the test (optional).