

DIPL.ING.(FH)KLAUS ROCK

HTTP-QuSS

HTTP - QUANTUM
SPEED AND SECURITY



February 14, 2022

**TCP 1 GBIT/S
LATENCY BENCHMARKS**



ROCK TECHNOLOGIES

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1.0 Types of Benchmark Tests and Limitations

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1.0 Types of Benchmark Tests and Limitations

1.0 Types of Benchmark Tests and Limitations

The following Benchmark Measurement Series, performed with Software and highly accurate Hardware supported Network Simulators, will deliver Figures and Facts how the **Latency** affects the real used **TCP Bandwidth** and an Evidence that the **HTTP-QuSS Technology** solves this Problem.

This is especially important because in the Field of Human–Machine Interaction, **perceptible Latency has a strong effect on User Satisfaction.**

1.1 Physical Latency

Latency is a Time interval between the Stimulation and Response, or, from a more general Point of View, a Time Delay between the Cause and the Effect of some physical change in the system being observed. Latency is physically a consequence of the limited Velocity with which any physical Interaction can propagate. The Magnitude of this Velocity is always less than or equal to the Speed of Light. Therefore, every physical System with any physical Separation (**Distance**) between Cause and Effect will experience some sort of Latency, regardless of the nature of Stimulation that it has been exposed to.

The precise Definition of Latency depends on the System being observed and the Nature of Stimulation. In Communications, the lower Limit of Latency is determined by the Medium being used for Communications. In reliable two-way Communication Systems, Latency limits the maximum Rate that information can be transmitted, as there is often a limit on the amount of Information that is "in-flight" at any one moment.

1.2 Hop Latency

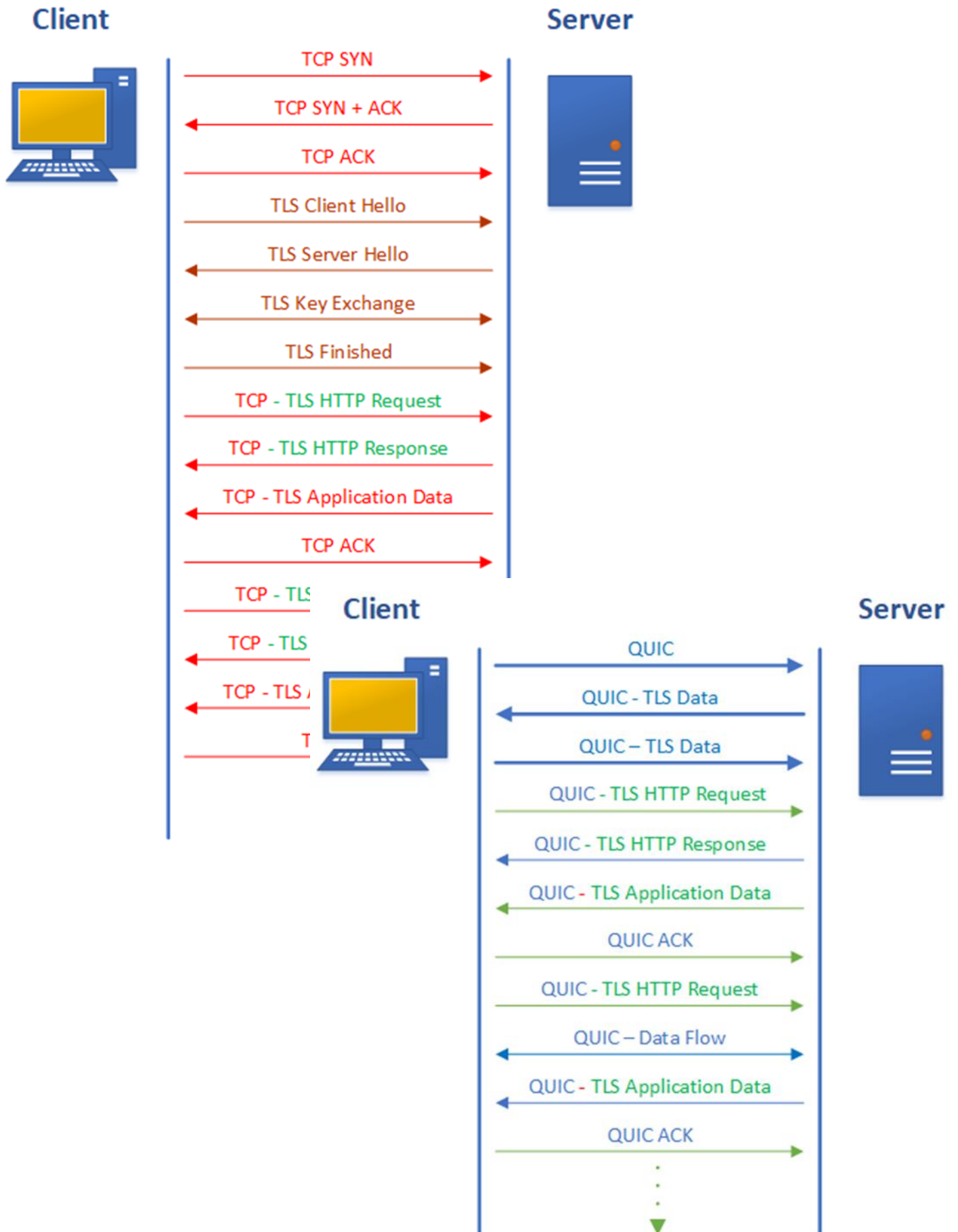
In Computer Networking, including the Internet, a Hop occurs when a Packet is passed from one Network Segment to the next. Data Packets pass through Routers and Switches as they travel between Source and Destination. The Hop Count refers to the Number of intermediate Devices through which Data must pass between Source and Destination.

Since store and forward, analyse the Header Information, adding additional Information's and other Latencies are incurred through each Hop, many Hops between Source and Destination increases the Round-Trip Time and implies therefore to a lower real-time performance caused by Bandwidth Losses.

1.3 Protocol Round Trip Latency

Internet Protocols like http, TLS, TCP, QUICK, RDP, only to mention a few, use heavy Flow Control Handshakes to guarantee a secure Package Delivery, Retransmission Algorithm in Case of Package Losses, Congestion Control and much more which leads into higher Latencies which at last destroys the available Bandwidth significantly.

1.0 Types of Benchmark Tests and Limitations

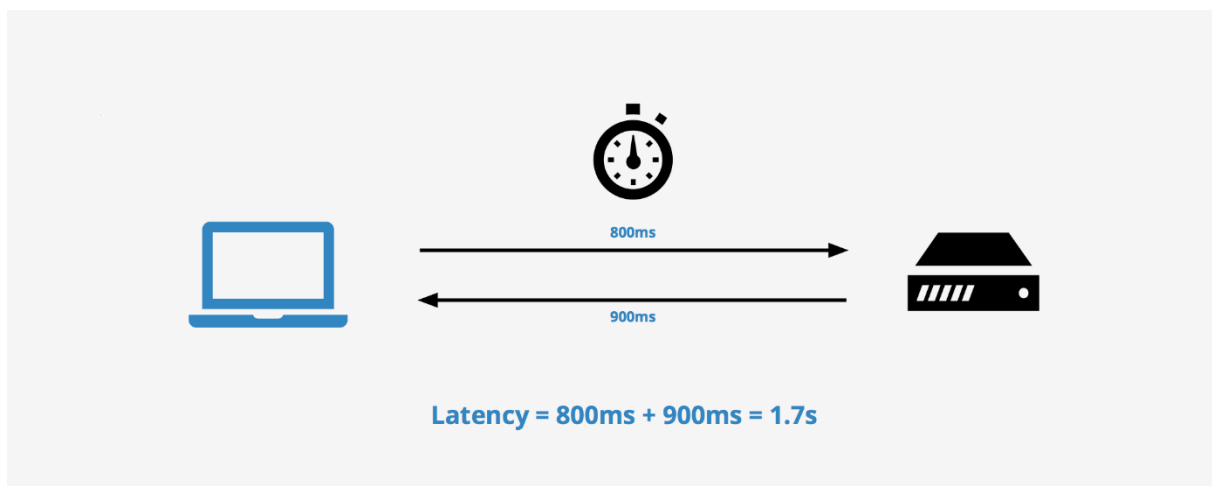


1.0 Types of Benchmark Tests and Limitations

1.4 Round Trip Time

In Telecommunications, the Round-Trip Delay Time (**RTD**) or Round-Trip Time (**RTT**) is the Length of Time it takes for a Signal to be sent plus the Length of Time it takes for an Acknowledgment of that Signal to be received. This Time Delay therefore consists of the Propagation Times between the two points of a Signal and are directly dependent on Latency see **Chapter 1.1 – 1.3**.

In the Context of Computer Networks, the Signal is generally a Data Packet, and the RTT is also known as the **Ping Time**. An Internet User can determine the RTT by using the ping command which we will also use within this Benchmark Tests.



1.5 Types of Benchmark Tests

The following Latency Benchmark Test Series are divided into 3 Types.

1. **Available TCP bandwidth** depending on Latency when 1 Gbit/s is available

See Chapter: [3.3](#) | [4.3](#)

2. **HTTP-QuSS - Available Bandwidth** for File Download, VoIP, Media Streaming and all other TCP Applications in Dependency of Latency when 1 Gbit/s is available.

See Chapter: [3.4](#) | [4.4](#)

3. **TCP/HTTP ./ HTTP-QuSS Browser Page Load Time** for a Test WEB Site in Dependency of Latency when 1 Gbit/s is available

See Chapter: [3.5](#) | [4.5](#)

4. **Low Latency High Speed TCP Bandwidth Dependency**

See Chapter: [4.6](#)

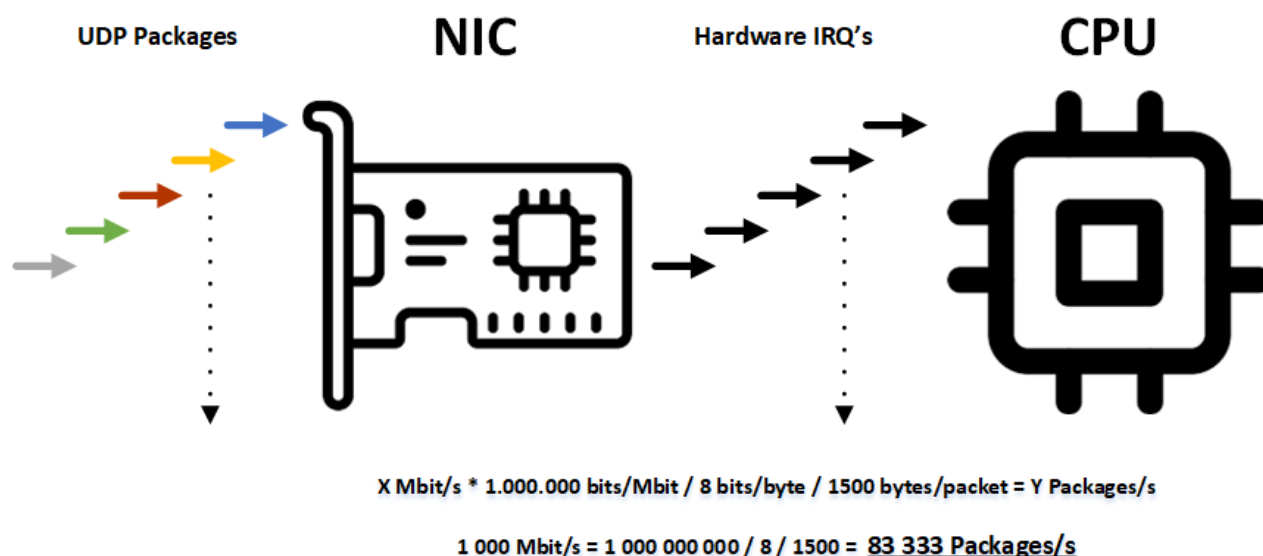
1.0 Types of Benchmark Tests and Limitations

1.6 Bandwidth Usage

Max. possible Bandwidth was **700 Mbit/s** respectively **800 Mbit/s**

Reasons

- Because the Test Environment was built up on a real local LAN and Internet Environment there was a high **Background Traffic**.
- Client **CPU Speed** was too slow for this 1 Gbit/s Bandwidth and no Hardware Offload support on NIC Card was available.
- **Hardware CPU Interrupts** in the Area above 700 Mbit/s are coming in too fast which causes Latency and Package Loss on the Client Site (CPU Utilization)



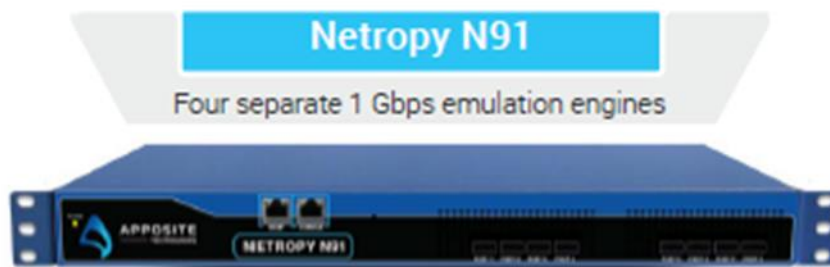
In a first Phase a Software **WANem Satellite Simulator** between Server and Client was used and, in some Cases, a special Traffic Control Script with various **netem** parameters for a realistic Jitter with a normal Distribution was used before Packages left the Server.

But **netem** has shown some major Limitation related to Timer granularity and Accuracy because no real-time Linux Kernel was used for these Measurement Series.

Also, there are still Software Bugs within the netem Code which produces large Inaccuracies with unusable Results.

1.0 Types of Benchmark Tests and Limitations

In a second Phase (**Chapter 4**) a Netropy N91 | 1 Gbit/s Network Emulator was used to avoid the above Inaccuracies.



The existing **HTTP-QuSS** Client for the Browser Page Load Time Test Series is still in a Proof of Concept (*POC*) Status and has shown some Software Bugs in the Latency Ranges 1 - 25 ms.

Despite these remaining Inaccuracies, however, it can clearly be proved that there is only a **minimal Dependency between Latency and Bandwidth Utilization** when the HTTP-QuSS Data Transmission Technology is used compared to state-of-the-art TCP/TLS/HTTP and other Protocol Families.

1.7 Benchmark Summary Pages

Bandwidth - TCP Latency Dependency:

[3.3.16 Benchmark Summary](#)

[4.3.17 Benchmark Summary](#)

HTTP-QuSS - http Download | FTP | VoIP | Media Streaming etc.:

[3.4.17 Benchmark Summary](#)

[4.4.16 Benchmark Summary](#)

TCP/HTTP ./ . HTTP-QuSS - WEB Page Load Time – Latency Dependency:

[3.5.19 Benchmark Summary](#)

[4.5.17 Benchmark Summary](#)

Low Latency High Speed TCP - Bandwidth Dependency

[4.6.22 Benchmark Summary](#)

2.0 HTTP-QuSS - TCP Benchmark Environment

2.1 OSI Model and Layer Bandwidth Dependencies

This TCP 1 Gbit/s Bandwidth Benchmark Test affects OSI Layers 3 – 7 and so Network Simulators, Traffic Generators and a Protocol Analyser must be used.

			Bandwidth Dependencies	Measurement Tools
Upper Layers	7	Application Layer Message Format – Human Machine Interface	E-Mail, WEB Browser Search Engine, FTP, SMTP..	Network Simulators Traffic Generator Protocol Analyzer
	6	Presentation Layer Encryption - Compression	JPEG, MDI, MPEG,TIFF, GIF	
	5	Session Layer Authentication – Permissions – Session Registration	Concurrent Database Access SQL, RPC, NFC	
Lower Layers	4	Transport Layer End to End Error Control	TCP / UDP	Distance and Latency Packet Fragmentation Distance and Repeaters Cable and Connector Issues Physical Latency Local Weather Conditions Atmospheric Turbulences Signal Noises RF Interferences Error Detection and Correction
	3	Network Layer Network Addressing, Routing, Switching	Routers and Layer 3 Switches IPSec, ARP, ICMP	
	2	Data Link Layer Error Detection and Flow Control	Bridges and Layer 2 Switches, NIC, MAC	
	1	Physical Layer Bitstream Physical Medium	Cable, Fibre Optics, RF, Laser	

2.1.1 Layer 1: Physical Layer

The physical layer is responsible for the transmission and reception of unstructured raw data between a device and a physical transmission medium. It converts the digital bits into electrical, radio, or optical signals. Layer specifications define characteristics such as voltage levels, the timing of voltage changes, physical data rates, maximum transmission distances, modulation scheme, channel access method and physical connectors. This includes the layout of pins, voltages, line impedance, cable specifications, signal timing and frequency for wireless devices. Bit rate control is done at the physical layer and may define transmission mode as simplex, half duplex, and full duplex. The components of a physical layer can be described in terms of a network topology. Bluetooth, Ethernet, and USB all have specifications for a physical layer.

Please Note:

The possible Bandwidths on this Physical Layer is much higher compared to the real utilized Bandwidths on Layers 3 – 7.

2.0 HTTP-QuSS - TCP Benchmark Environment

2.1.2 Layer 2: Data Link Layer

The data link layer provides node-to-node data transfer—a link between two directly connected nodes. It detects and possibly corrects errors that may occur in the physical layer. It defines the protocol to establish and terminate a connection between two physically connected devices. It also defines the protocol for flow control between them.

IEEE 802 divides the data link layer into two sublayers:

- Medium access control (MAC) layer – responsible for controlling how devices in a network gain access to a medium and permission to transmit data.
- Logical link control (LLC) layer – responsible for identifying and encapsulating network layer protocols, and controls error checking and frame synchronization.

The MAC and LLC layers of IEEE 802 networks such as 802.3 Ethernet, 802.11 Wi-Fi, and 802.15.4 ZigBee operate at the data link layer.

The Point-to-Point Protocol (PPP) is a data link layer protocol that can operate over several different physical layers, such as synchronous and asynchronous serial lines.

The ITU-T G.hn standard, which provides high-speed local area networking over existing wires (power lines, phone lines and coaxial cables), includes a complete data link layer that provides both error correction and flow control by means of a selective-repeat sliding-window protocol.

2.1.3 Layer 3: Network Layer

The network layer provides the functional and procedural means of transferring variable length data sequences (called packets) from one node to another connected in "different networks". A network is a medium to which many nodes can be connected, on which every node has an address and which permits nodes connected to it to transfer messages to other nodes connected to it by merely providing the content of a message and the address of the destination node and letting the network find the way to deliver the message to the destination node, possibly routing it through intermediate nodes. If the message is too large to be transmitted from one node to another on the data link layer between those nodes, the network may implement message delivery by splitting the message into several fragments at one node, sending the fragments independently, and reassembling the fragments at another node. It may, but does not need to, report delivery errors.

Message delivery at the network layer is not necessarily guaranteed to be reliable; a network layer protocol may provide reliable message delivery, but it need not do so.

A number of layer-management protocols, a function defined in the management annex, ISO 7498/4, belong to the network layer. These include routing protocols, multicast group management, network-layer information and error, and network-layer address assignment. It is the function of the payload that makes these belong to the network layer, not the protocol that carries them.

2.0 HTTP-QuSS - TCP Benchmark Environment

2.1.4 Layer 4: Transport Layer

The transport layer provides the functional and procedural means of transferring variable-length data sequences from a source to a destination host, while maintaining the quality of service functions.

The transport layer controls the reliability of a given link through flow control, segmentation/desegmentation, and error control. Some protocols are state- and connection-oriented. This means that the transport layer can keep track of the segments and re-transmit those that fail delivery. The transport layer also provides the acknowledgement of the successful data transmission and sends the next data if no errors occurred. The transport layer creates segments out of the message received from the application layer. Segmentation is the process of dividing a long message into smaller messages.

OSI defines five classes of connection-mode transport protocols ranging from class 0 (which is also known as TP0 and provides the fewest features) to class 4 (TP4, designed for less reliable networks, similar to the Internet). Class 0 contains no error recovery, and was designed for use on network layers that provide error-free connections. Class 4 is closest to TCP, although TCP contains functions, such as the graceful close, which OSI assigns to the session layer. Also, all OSI TP connection-mode protocol classes provide expedited data and preservation of record boundaries. Detailed characteristics of TP0-4 classes are shown in the following table

Feature name	TP0	TP1	TP2	TP3	TP4
Connection-oriented network	Yes	Yes	Yes	Yes	Yes
Connectionless network	No	No	No	No	Yes
Concatenation and separation	No	Yes	Yes	Yes	Yes
Segmentation and reassembly	Yes	Yes	Yes	Yes	Yes
Error recovery	No	Yes	Yes	Yes	Yes
Reinitiate connection ^a	No	Yes	No	Yes	No
Multiplexing / demultiplexing over single virtual circuit	No	No	Yes	Yes	Yes
Explicit flow control	No	No	Yes	Yes	Yes
Retransmission on timeout	No	No	No	No	Yes
Reliable transport service	No	Yes	No	Yes	Yes

An easy way to visualize the transport layer is to compare it with a post office, which deals with the dispatch and classification of mail and parcels sent. A post office inspects only the outer envelope of mail to determine its delivery. Higher layers may have the equivalent of double envelopes, such as cryptographic presentation services

2.0 HTTP-QuSS - TCP Benchmark Environment

that can be read by the addressee only. Roughly speaking, tunneling protocols operate at the transport layer, such as carrying non-IP protocols such as IBM's SNA or Novell's IPX over an IP network, or end-to-end encryption with IPsec. While Generic Routing Encapsulation (GRE) might seem to be a network-layer protocol, if the encapsulation of the payload takes place only at the endpoint, GRE becomes closer to a transport protocol that uses IP headers but contains complete Layer 2 frames or Layer 3 packets to deliver to the endpoint. L2TP carries PPP frames inside transport segments.

Although not developed under the OSI Reference Model and not strictly conforming to the OSI definition of the transport layer, the Transmission Control Protocol (TCP) and the User Datagram Protocol (UDP) of the Internet Protocol Suite are commonly categorized as layer-4 protocols within OSI.

2.1.5 Layer 5: Session Layer

The session layer controls the dialogues (connections) between computers. It establishes, manages and terminates the connections between the local and remote application. It provides for full-duplex, half-duplex, or simplex operation, and establishes procedures for checkpointing, suspending, restarting, and terminating a session. In the OSI model, this layer is responsible for gracefully closing a session, which is handled in the Transmission Control Protocol at the transport layer in the Internet Protocol Suite. This layer is also responsible for session checkpointing and recovery, which is not usually used in the Internet Protocol Suite. The session layer is commonly implemented explicitly in application environments that use remote procedure calls.

2.1.6 Layer 6: Presentation Layer

The presentation layer establishes context between application-layer entities, in which the application-layer entities may use different syntax and semantics if the presentation service provides a mapping between them. If a mapping is available, presentation protocol data units are encapsulated into session protocol data units and passed down the protocol stack.

This layer provides independence from data representation by translating between application and network formats. The presentation layer transforms data into the form that the application accepts. This layer formats data to be sent across a network. It is sometimes called the syntax layer. The presentation layer can include compression functions. The Presentation Layer negotiates the Transfer Syntax.

The original presentation structure used the Basic Encoding Rules of Abstract Syntax Notation One (ASN.1), with capabilities such as converting an EBCDIC-coded text file to an ASCII-coded file, or serialization of objects and other data structures from and to XML. ASN.1 effectively makes an application protocol invariant with respect to syntax.

2.1.7 Layer 7: Application Layer

The application layer is the OSI layer closest to the end user, which means both the OSI application layer and the user interact directly with the software application. This layer interacts with software applications that implement a communicating component. Such application programs fall outside the scope of the OSI model. Application-layer functions typically include identifying communication partners, determining resource

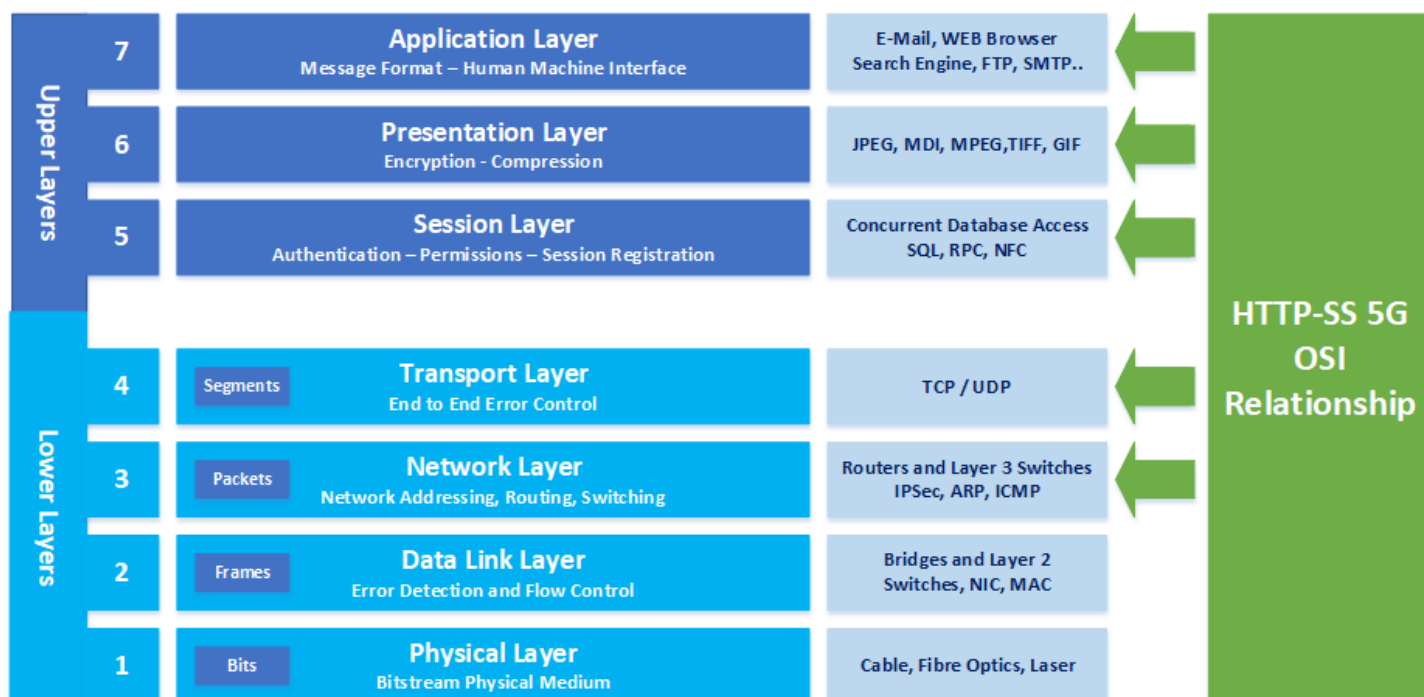
2.0 HTTP-QuSS - TCP Benchmark Environment

availability, and synchronizing communication. When identifying communication partners, the application layer determines the identity and availability of communication partners for an application with data to transmit. The most important distinction in the application layer is the distinction between the application-entity and the application. For example, a reservation website might have two application-entities: one using HTTP to communicate with its users, and one for a remote database protocol to record reservations. Neither of these protocols have anything to do with reservations. That logic is in the application itself. The application layer per se has no means to determine the availability of resources in the network.

2.1.8 HTTP-QuSS Cross-Layer Technology

HTTP-QuSS is a Cross-layer Technology which is not tied to a given layer, but affects Layer 3 - 7. Some orthogonal aspects, such as management and security, involve all of the layers (See ITU-T X.800 Recommendation). The HTTP-QuSS Technology is aimed at improving the CIA triad - Confidentiality, Integrity, Availability and additional high Speed - of the transmitted data. This Cross-layer Technology is very important because the availability of a communication service is determined by the interaction between network design and network management protocols. Appropriate choices for both of these are needed to protect against all kinds of Cyber Attacks.

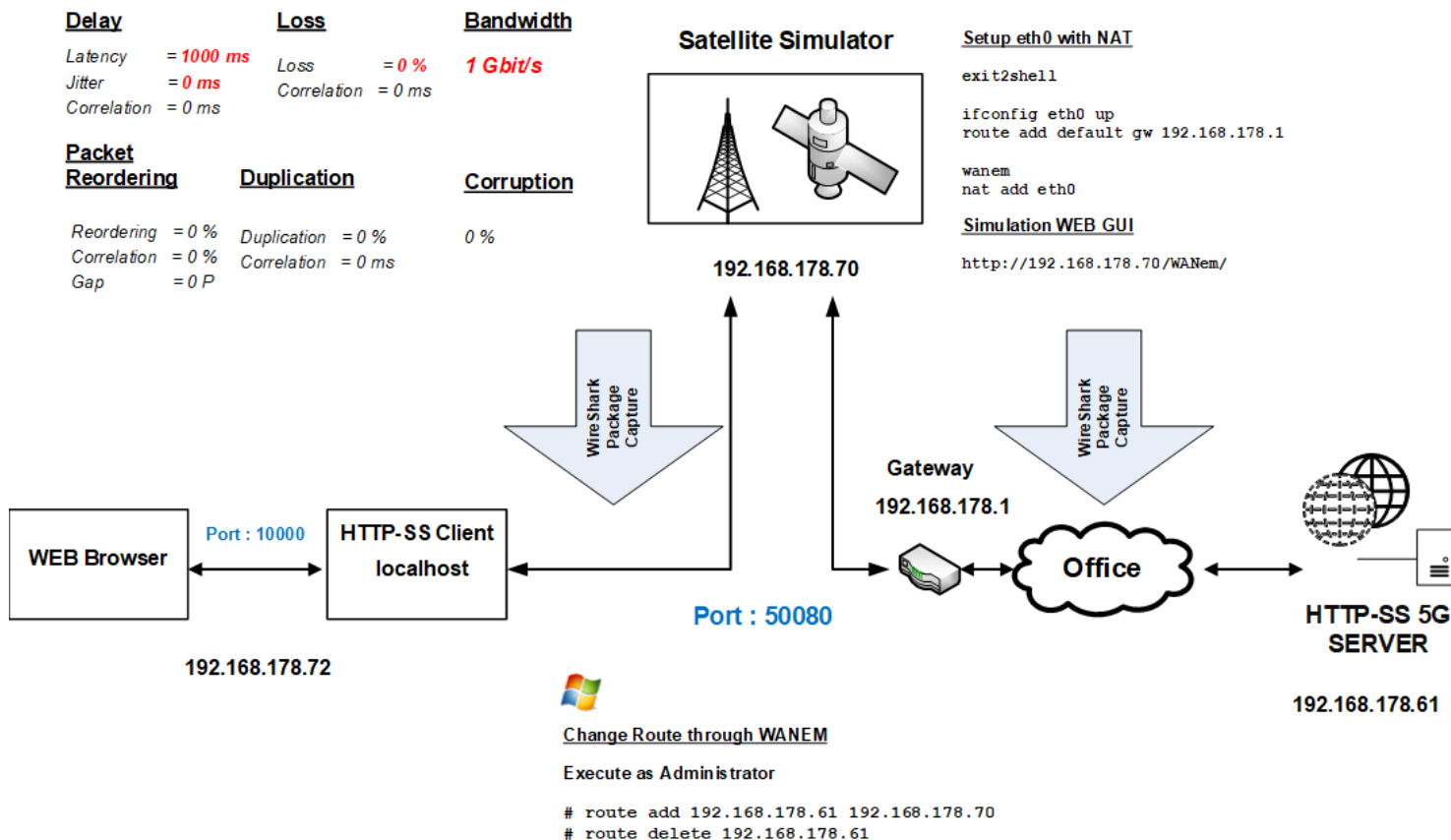
HTTP-QuSS affects the following Layers:



2.0 HTTP-QuSS - TCP Benchmark Environment

2.1 HTTP-QuSS - Test Network

HTTP-SS 5G - Benchmark Measurement Environment with Satellite Simulator



2.2 HTTP-QuSS - Server Hardware

```
# lshw -short
```

H/W path	Device	Class	Description
system	PowerEdge 860		
/0		bus	0XM089
/0/0		memory	64KiB BIOS
/0/400	processor Intel(R) Xeon(R) CPU	3050	@ 2.13GHz
/0/400/700		memory	64KiB L1 cache
/0/400/701		memory	2MiB L2 cache
/0/1000		memory	4GiB System
/0/1000/0	memory	1GiB DIMM DDR2 Synchronous	667 MHz (1.5 ns)
/0/1000/1	memory	1GiB DIMM DDR2 Synchronous	667 MHz (1.5 ns)
/0/1000/2	memory	1GiB DIMM DDR2 Synchronous	667 MHz (1.5 ns)
/0/1000/3	memory	1GiB DIMM DDR2 Synchronous	667 MHz (1.5 ns)

2.0 HTTP-QuSS - TCP Benchmark Environment

```

/0/100      bridge      E7230/3000/3010 Memory Controller Hub
/0/100/1    bridge      /3000/3010 PCI Express Root Port
/0/100/1c   bridge      NM10/ICH7 Family PCI Express Port 1
/0/100/1c/0 bridge      6702PXH PCI Express-to-PCI Bridge A
/0/100/1c.4 bridge      82801GR/GH/GHM (ICH7 Family)PCI ExpressPort 5
/0/100/1c.4/0 enp4s0 network NetXtreme BCM5721Gigabit Ethernet PCI
/0/100/1c.5 bridge      82801GR/GH/GHM (ICH7 Family)PCIExpress Port 6
/0/100/1d   bus          NM10/ICH7 Family USB UHCI Controller #1
/0/100/1d/1 usb2      bus          UHCI Host Controller
/0/100/1d.1 bus          NM10/ICH7 Family USB UHCI Controller #2
/0/100/1d.1/1 usb3     bus          UHCI Host Controller
/0/100/1d.2 bus          NM10/ICH7 Family USB UHCI Controller #3
/0/100/1d.2/1 usb4     bus          UHCI Host Controller
/0/100/1d.7 bus          NM10/ICH7 Family USB2 EHCI Controller
/0/100/1d.7/1 usb1     bus          EHCI Host Controller
/0/100/1d.7/1/3 bus    CY7C65640 USB-2.0 "TetraHub"
/0/100/1d.7/1/3/1     scsi4        storage      Cruzer Glide
/0/100/1d.7/1/3/1/0.0.0 /dev/sdc     disk         31GB Cruzer Glide
/0/100/1d.7/1/3/1/0.0.0/0 /dev/sdc     disk         31GB
/0/100/1d.7/1/3/1/0.0.0/0/1 /dev/sdc1    volume      29GiB Windows FAT
/0/100/1d.7/1/3/2     scsi5        storage      USB to ATA/ATAPI bridge
/0/100/1d.7/1/3/2/0.0.0 /dev/sdd     disk         160GB SCSI Disk
/0/100/1d.7/1/3/2/0.0.0/1 /dev/sdd1    volume      149GiB Windows FAT
/0/100/1e     bridge      82801 PCI Bridge
/0/100/1e/5    display     ES1000
/0/100/1f      bridge      82801GB/GR (ICH7 Family) LPC Interface Bridge
/0/100/1f.1    storage     82801G (ICH7 Family) IDE Controller
/0/100/1f.2    storage     NM10/ICH7 Family SATA Controller [IDE mode]
/0/100/1f.3    bus         NM10/ICH7 Family SMBus Controller
/0/1           scsi2       storage
/0/1/0.0.0     /dev/sda    disk         2TB Hitachi HUA72202
/0/1/0.0.0/1   /dev/sda1   volume      1859GiB EXT4 volume
/0/1/0.0.0/2   /dev/sda2   volume      4095MiB Extended partition
/0/1/0.0.0/2/5 /dev/sda5   volume      4095MiB Linux swap / Solaris
/0/2           scsi3       storage
/0/2/0.0.0     /dev/sdb    disk         160GB Hitachi HDP72501
/0/2/0.0.0/1   /dev/sdb1   volume      145GiB EXT4 volume
/0/2/0.0.0/2   /dev/sdb2   volume      4094MiB Extended partition
/0/2/0.0.0/2/5 /dev/sdb5   volume      4094MiB Linux swap / Solaris

```

2.3 HTTP-QuSS - Server OS

```
# cat /proc/version
```

```
Linux version 4.4.140 (root@HTTP-SS) (gcc version 5.4.0 20160609
(Ubuntu 5.4.0-6ubuntu1~16.04.10) ) #1 SMP Sat Jul 14 11:15:14 CEST
2018
```


2.0 HTTP-QuSS - TCP Benchmark Environment

2.4 HTTP-QuSS - Server IP

```
# Ifconfig
```

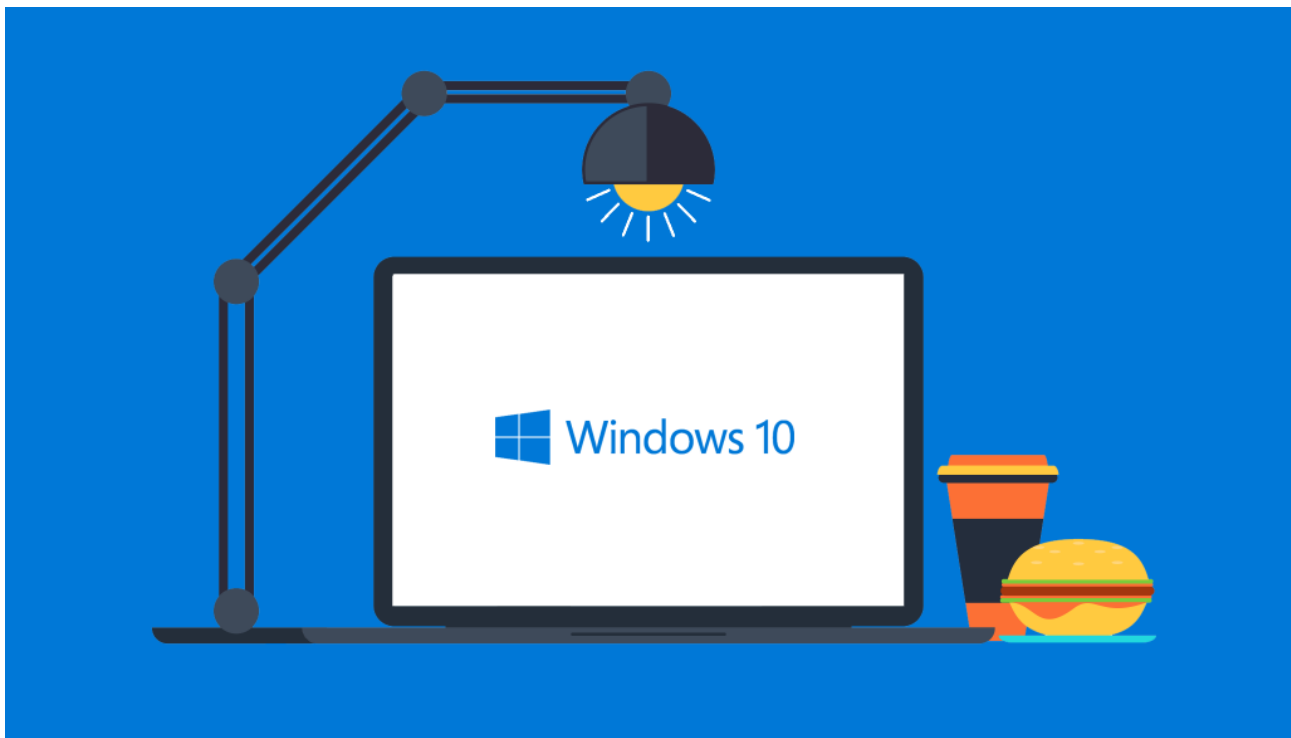
```
enp4s0    Link encap:Ethernet  HWaddr 00:1c:23:e2:0d:b2
          inet addr:192.168.178.61  Bcast:192.168.178.255
          Mask:255.255.255.0
          inet6 addr: fe80::21c:23ff:fee2:db2/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:7018  errors:0  dropped:0  overruns:0  frame:0
          TX packets:4615  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:7134624 (7.1 MB)  TX bytes:421621 (421.6 KB)
          Interrupt:16
```

2.5 HTTP-QuSS - Server NIC Speed

```
# ethtool enp4s0 | grep Speed
```

```
Speed: 1000Mb/s
```

2.6 HTTP-QuSS - Client Hardware



2.0 HTTP-QuSS - TCP Benchmark Environment

Device name KLAUS-RAD
 Processor Intel(R) Core(TM) i5-3470 CPU @ 3.20GHz 3.20 GHz
 Installed RAM 16.0 GB (15.9 GB usable)

2.7 HTTP-QuSS - Client OS

Windows specifications

Edition Windows 10 Pro
 Version 1809
 Installed on 07/03/2019
 OS build 17763.805

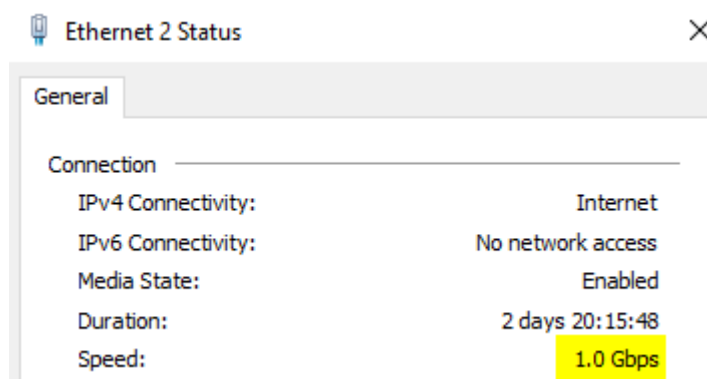
2.8 HTTP-QuSS - Client IP

```
# ipconfig
```

```
Ethernet-Adapter Ethernet 2:
```

```
Verbindungsspezifisches DNS-Suffix: fritz.box
Verbindungslokale IPv6-Adresse . . : fe80::acf7:1412:85aa:ed46%16
IPv4-Adresse . . . . . : 192.168.178.72
Subnetzmaske . . . . . : 255.255.255.0
Standardgateway . . . . . : 192.168.178.1
```

2.9 HTTP-QuSS - Client NIC Speed



3.0 Real Network Condition with Background Traffic

3.0 Real Network Condition with Background Traffic

3.1 WANem - Network Emulation Software

WANem is a Software Tool which brings the Internet into the development/test/lab Environment. It emulates internet like Conditions so that it can be checked how an Application Performance under various real Network Conditions.

3.2 Initial Functional Tests

3.2.1 WANem - Satellite Simulator Latency Test

Latency = **1 000 ms**
 Bandwidth = **1 Gbit/s**
 Jitter = **0 ms**
 Loss = **0 %**
 Correlation = 0 ms
 Reordering = 0 %
 Corruption = **0 %**
 Duplication = 0 %

3.2.2 Satellite Simulation Settings

Interface: eth0		Packet Limit 1000 (Default=1000)				Symmetrical Network: Yes ▾	
Bandwidth		Choose BW		Other		Other: Specify BW(Kbps)	
Delay		Loss		Duplication		Packet reordering	
Delay time(ms)	482	Loss(%)	0	Duplication(%)	0	Reordering(%)	0
Jitter(ms)	0	Correlation(%)	0	Correlation(%)	0	Corruption(%)	0
Correlation(%)	0	Correlation(%)		Correlation(%)		Corruption(%)	
Distribution	-N/A-	Correlation(%)		Correlation(%)		Corruption(%)	
Idle timer Disconnect		Type	none ▾	Idle Timer		Disconnect Timer	
Random Disconnect		Type	none ▾	MTTF Low	MTTF High	MTTR Low	MTTR High
Random connection Disconnect		Type	none ▾	MTTF Low	MTTF High	MTTR Low	MTTR High
IP source address	any	IP source subnet		IP dest address	any	IP dest subnet	
						Application port if any	any

3.2.3 Routing through Satellite Simulator

POC-Client ↔ Satellite Simulator ↔ HTTP-QuSS Server

```
# route add 192.168.178.61 192.168.178.70
```

3.2.4 Ping Test for Satellite Simulation

192.168.178.72 ↔ 192.168.178.61

```
# Ping 192.168.178.61
```

```

Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=968ms TTL=63
Antwort von 192.168.178.61: Bytes=32 Zeit=967ms TTL=63
Antwort von 192.168.178.61: Bytes=32 Zeit=967ms TTL=63
Antwort von 192.168.178.61: Bytes=32 Zeit=968ms TTL=63
  
```

3.0 Real Network Condition with Background Traffic

3.3 TCP Bandwidth – Latency Dependency

Available Layer 1 Bitstream Bandwidth : **1000 Mbit/s**

3.3.1 iPerf3 - Network Performance Measurement Tool

iPerf is a widely used tool for network performance measurement and tuning. It is significant as a cross-platform tool that can produce standardized performance measurements for any network. Iperf has client and server functionality and can create data streams to measure the throughput between the two ends in one or both directions. Typical Iperf output contains a time-stamped report of the amount of data transferred and the throughput measured.

The data streams can be either Transmission Control Protocol (TCP) or User Datagram Protocol (UDP):

- **UDP:** When used for testing UDP capacity, Iperf allows the user to specify the datagram size and provides results for the datagram throughput and the packet loss.
- **TCP:** When used for testing TCP capacity, Iperf measures the throughput of the payload. Iperf uses 1024 × 1024 for mebibytes and 1000 × 1000 for megabytes.

The network link is delimited by two hosts running Iperf.

The quality of a link can be tested as follows:

- Latency (response time or RTT): can be measured with the Ping command.
- Jitter (latency variation): can be measured with an Iperf UDP test.
- Datagram loss: can be measured with an Iperf UDP test.

The bandwidth is measured through TCP tests.

To be clear, the difference between TCP (Transmission Control Protocol) and UDP (User Datagram Protocol) is that TCP use processes to check that the packets are correctly sent to the receiver whereas with UDP the packets are sent without any checks but with the advantage of being quicker than TCP.

Iperf uses the different capacities of TCP and UDP to provide statistics about network links.

Finally, Iperf can be installed very easily on any UNIX/Linux or Microsoft Windows system. One host must be set as client, the other one as server.

3.3.2 Starting iperf3 Server

Starting iPerf3 on HTTP-QuSS Server 192.168.178.61 as Domain on Port 5200

```
./iperf3 -s -D -p 5200
```


3.0 Real Network Condition with Background Traffic

3.3.3 TCP - max Bandwidth with RTT = 1 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 63852 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec    108 MBytes    906 Mbits/sec
[ 4]  1.00-2.00    sec    109 MBytes    913 Mbits/sec
[ 4]  2.00-3.00    sec    109 MBytes    917 Mbits/sec
[ 4]  3.00-4.00    sec    112 MBytes    939 Mbits/sec
[ 4]  4.00-5.00    sec    108 MBytes    904 Mbits/sec
[ 4]  5.00-6.00    sec    110 MBytes    923 Mbits/sec
[ 4]  6.00-7.00    sec    108 MBytes    908 Mbits/sec
[ 4]  7.00-8.00    sec    110 MBytes    920 Mbits/sec
[ 4]  8.00-9.00    sec    108 MBytes    909 Mbits/sec
[ 4]  9.00-10.00   sec    108 MBytes    902 Mbits/sec
[ 4] 10.00-11.00   sec    110 MBytes    923 Mbits/sec
[ 4] 11.00-12.00   sec    103 MBytes    867 Mbits/sec
[ 4] 12.00-13.00   sec    109 MBytes    913 Mbits/sec
[ 4] 13.00-14.00   sec    108 MBytes    907 Mbits/sec
[ 4] 14.00-15.00   sec    109 MBytes    915 Mbits/sec
[ 4] 15.00-16.00   sec    110 MBytes    921 Mbits/sec
[ 4] 16.00-17.00   sec    106 MBytes    888 Mbits/sec
[ 4] 17.00-18.00   sec    113 MBytes    945 Mbits/sec
[ 4] 18.00-19.00   sec    112 MBytes    942 Mbits/sec
[ 4] 19.00-20.00   sec    111 MBytes    927 Mbits/sec
[ 4] 20.00-21.00   sec    109 MBytes    916 Mbits/sec
[ 4] 21.00-22.00   sec    111 MBytes    930 Mbits/sec
[ 4] 22.00-23.00   sec    111 MBytes    927 Mbits/sec
[ 4] 23.00-24.00   sec    110 MBytes    925 Mbits/sec
[ 4] 24.00-25.00   sec    111 MBytes    933 Mbits/sec
[ 4] 25.00-26.00   sec    111 MBytes    934 Mbits/sec
[ 4] 26.00-27.00   sec    111 MBytes    928 Mbits/sec
[ 4] 27.00-28.00   sec    111 MBytes    934 Mbits/sec
[ 4] 28.00-29.00   sec    113 MBytes    944 Mbits/sec
[ 4] 29.00-30.00   sec    112 MBytes    943 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec    3.21 GBytes    920 Mbits/sec    0
[ 4]  0.00-30.00   sec    3.21 GBytes    920 Mbits/sec
CPU Utilization: local/receiver 31.9% (10.4%/21.6%), remote/sender 1.9% (0.0%/1.9%)
```

Average used bandwidth : **920 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.2 TCP - max Bandwidth with RTT = 25 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58331 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  6.75 MBytes  56.5 Mbits/sec
[ 4]  1.00-2.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  2.00-3.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  3.00-4.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  4.00-5.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  5.00-6.00    sec  6.89 MBytes  57.8 Mbits/sec
[ 4]  6.00-7.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  7.00-8.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  8.00-9.00    sec  6.92 MBytes  58.1 Mbits/sec
[ 4]  9.00-10.00   sec  6.86 MBytes  57.6 Mbits/sec
[ 4] 10.00-11.00   sec  6.95 MBytes  58.3 Mbits/sec
[ 4] 11.00-12.00   sec  6.89 MBytes  57.8 Mbits/sec
[ 4] 12.00-13.00   sec  6.92 MBytes  58.1 Mbits/sec
[ 4] 13.00-14.00   sec  6.92 MBytes  58.0 Mbits/sec
[ 4] 14.00-15.00   sec  6.96 MBytes  58.4 Mbits/sec
[ 4] 15.00-16.00   sec  6.86 MBytes  57.6 Mbits/sec
[ 4] 16.00-17.01   sec  6.95 MBytes  57.9 Mbits/sec
[ 4] 17.01-18.01   sec  6.93 MBytes  58.4 Mbits/sec
[ 4] 18.01-19.01   sec  6.94 MBytes  58.1 Mbits/sec
[ 4] 19.01-20.00   sec  6.88 MBytes  57.9 Mbits/sec
[ 4] 20.00-21.00   sec  6.98 MBytes  58.8 Mbits/sec
[ 4] 21.00-22.01   sec  6.91 MBytes  57.7 Mbits/sec
[ 4] 22.01-23.00   sec  6.90 MBytes  58.1 Mbits/sec
[ 4] 23.00-24.00   sec  6.86 MBytes  57.4 Mbits/sec
[ 4] 24.00-25.00   sec  6.90 MBytes  58.1 Mbits/sec
[ 4] 25.00-26.00   sec  6.98 MBytes  58.4 Mbits/sec
[ 4] 26.00-27.00   sec  6.86 MBytes  57.5 Mbits/sec
[ 4] 27.00-28.00   sec  6.93 MBytes  58.1 Mbits/sec
[ 4] 28.00-29.00   sec  6.89 MBytes  57.8 Mbits/sec
[ 4] 29.00-30.00   sec  6.96 MBytes  58.4 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  209 MBytes  58.5 Mbits/sec      0
[ 4]  0.00-30.00   sec  208 MBytes  58.0 Mbits/sec
CPU Utilization: local/receiver 2.4% (0.9%u/1.5%u), remote/sender 0.1% (0.0%u/0.1%u)
```

Average used bandwidth : **58.5 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.3 TCP - max Bandwidth with RTT = 50 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58248 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  3.25 MBytes  27.2 Mbits/sec
[ 4]  1.00-2.01    sec  3.85 MBytes  32.0 Mbits/sec
[ 4]  2.01-3.01    sec  3.65 MBytes  30.7 Mbits/sec
[ 4]  3.01-4.01    sec  3.71 MBytes  31.0 Mbits/sec
[ 4]  4.01-5.00    sec  3.59 MBytes  30.3 Mbits/sec
[ 4]  5.00-6.00    sec  3.72 MBytes  31.2 Mbits/sec
[ 4]  6.00-7.01    sec  3.60 MBytes  30.1 Mbits/sec
[ 4]  7.01-8.01    sec  3.68 MBytes  30.8 Mbits/sec
[ 4]  8.01-9.01    sec  3.61 MBytes  30.3 Mbits/sec
[ 4]  9.01-10.01   sec  3.71 MBytes  31.0 Mbits/sec
[ 4] 10.01-11.01   sec  3.60 MBytes  30.1 Mbits/sec
[ 4] 11.01-12.00   sec  3.65 MBytes  30.8 Mbits/sec
[ 4] 12.00-13.00   sec  3.63 MBytes  30.5 Mbits/sec
[ 4] 13.00-14.01   sec  3.71 MBytes  30.8 Mbits/sec
[ 4] 14.01-15.01   sec  3.62 MBytes  30.4 Mbits/sec
[ 4] 15.01-16.00   sec  3.59 MBytes  30.5 Mbits/sec
[ 4] 16.00-17.00   sec  3.67 MBytes  30.7 Mbits/sec
[ 4] 17.00-18.00   sec  3.57 MBytes  30.0 Mbits/sec
[ 4] 18.00-19.00   sec  3.67 MBytes  30.8 Mbits/sec
[ 4] 19.00-20.00   sec  3.63 MBytes  30.5 Mbits/sec
[ 4] 20.00-21.00   sec  3.69 MBytes  30.8 Mbits/sec
[ 4] 21.00-22.01   sec  3.71 MBytes  30.9 Mbits/sec
[ 4] 22.01-23.01   sec  3.63 MBytes  30.4 Mbits/sec
[ 4] 23.01-24.01   sec  3.45 MBytes  28.9 Mbits/sec
[ 4] 24.01-25.00   sec  3.55 MBytes  30.1 Mbits/sec
[ 4] 25.00-26.01   sec  3.70 MBytes  30.8 Mbits/sec
[ 4] 26.01-27.01   sec  3.58 MBytes  30.0 Mbits/sec
[ 4] 27.01-28.01   sec  3.72 MBytes  31.2 Mbits/sec
[ 4] 28.01-29.01   sec  3.55 MBytes  29.9 Mbits/sec
[ 4] 29.01-30.00   sec  3.64 MBytes  30.7 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec   111 MBytes  31.1 Mbits/sec    0
[ 4]  0.00-30.00   sec   109 MBytes  30.5 Mbits/sec
CPU Utilization: local/receiver 1.9% (1.0%/0.8%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **31.1 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.4 TCP - max Bandwidth with RTT = 75 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58529 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec    2.43 MBytes  20.3 Mbits/sec
[ 4]  1.01-2.00    sec    2.62 MBytes  22.1 Mbits/sec
[ 4]  2.00-3.01    sec    2.68 MBytes  22.4 Mbits/sec
[ 4]  3.01-4.00    sec    2.71 MBytes  22.8 Mbits/sec
[ 4]  4.00-5.00    sec    2.70 MBytes  22.7 Mbits/sec
[ 4]  5.00-6.00    sec    2.68 MBytes  22.5 Mbits/sec
[ 4]  6.00-7.00    sec    2.71 MBytes  22.7 Mbits/sec
[ 4]  7.00-8.00    sec    2.68 MBytes  22.5 Mbits/sec
[ 4]  8.00-9.01    sec    2.71 MBytes  22.7 Mbits/sec
[ 4]  9.01-10.00   sec    2.68 MBytes  22.6 Mbits/sec
[ 4] 10.00-11.00   sec    2.69 MBytes  22.6 Mbits/sec
[ 4] 11.00-12.00   sec    2.69 MBytes  22.6 Mbits/sec
[ 4] 12.00-13.00   sec    2.68 MBytes  22.5 Mbits/sec
[ 4] 13.00-14.01   sec    2.71 MBytes  22.6 Mbits/sec
[ 4] 14.01-15.00   sec    2.67 MBytes  22.5 Mbits/sec
[ 4] 15.00-16.00   sec    2.71 MBytes  22.7 Mbits/sec
[ 4] 16.00-17.00   sec    2.69 MBytes  22.6 Mbits/sec
[ 4] 17.00-18.00   sec    2.68 MBytes  22.5 Mbits/sec
[ 4] 18.00-19.00   sec    2.69 MBytes  22.6 Mbits/sec
[ 4] 19.00-20.00   sec    2.69 MBytes  22.6 Mbits/sec
[ 4] 20.00-21.00   sec    2.70 MBytes  22.6 Mbits/sec
[ 4] 21.00-22.00   sec    2.70 MBytes  22.7 Mbits/sec
[ 4] 22.00-23.00   sec    2.67 MBytes  22.4 Mbits/sec
[ 4] 23.00-24.00   sec    2.70 MBytes  22.6 Mbits/sec
[ 4] 24.00-25.00   sec    2.71 MBytes  22.7 Mbits/sec
[ 4] 25.00-26.01   sec    2.66 MBytes  22.2 Mbits/sec
[ 4] 26.01-27.01   sec    2.70 MBytes  22.6 Mbits/sec
[ 4] 27.01-28.00   sec    2.65 MBytes  22.3 Mbits/sec
[ 4] 28.00-29.00   sec    2.70 MBytes  22.6 Mbits/sec
[ 4] 29.00-30.00   sec    2.68 MBytes  22.5 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec   82.7 MBytes  23.1 Mbits/sec    0
[ 4]  0.00-30.00   sec   80.6 MBytes  22.5 Mbits/sec
CPU Utilization: local/receiver 2.1% (1.0%/1.1%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **23.1 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.5 TCP - max Bandwidth with RTT = 100 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58582 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  1.49 MBytes  12.4 Mbits/sec
[ 4]  1.00-2.00    sec  1.99 MBytes  16.7 Mbits/sec
[ 4]  2.00-3.00    sec  2.01 MBytes  16.9 Mbits/sec
[ 4]  3.00-4.00    sec  2.01 MBytes  16.9 Mbits/sec
[ 4]  4.00-5.00    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  5.00-6.00    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  6.00-7.00    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  7.00-8.00    sec  2.02 MBytes  16.9 Mbits/sec
[ 4]  8.00-9.00    sec  1.98 MBytes  16.6 Mbits/sec
[ 4]  9.00-10.00   sec  1.98 MBytes  16.6 Mbits/sec
[ 4] 10.00-11.01   sec  1.97 MBytes  16.4 Mbits/sec
[ 4] 11.01-12.00   sec  1.97 MBytes  16.7 Mbits/sec
[ 4] 12.00-13.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 13.00-14.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 14.00-15.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 15.00-16.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 16.00-17.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 17.00-18.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 18.00-19.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 19.00-20.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 20.00-21.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 21.00-22.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 22.00-23.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 23.00-24.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 24.00-25.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 25.00-26.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 26.00-27.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 27.00-28.00   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 28.00-29.01   sec  1.98 MBytes  16.6 Mbits/sec
[ 4] 29.01-30.00   sec  1.99 MBytes  16.7 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  61.3 MBytes  17.1 Mbits/sec    0
[ 4]  0.00-30.00   sec  59.3 MBytes  16.6 Mbits/sec
CPU Utilization: local/receiver 0.8% (0.5%/0.4%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **17.1 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.6 TCP - max Bandwidth with RTT = 150 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58632 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec   836 KBytes   6.79 Mbits/sec
[ 4]  1.01-2.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  2.01-3.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  3.01-4.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  4.01-5.00    sec   1.40 MBytes  11.8 Mbits/sec
[ 4]  5.00-6.01    sec   1.24 MBytes  10.3 Mbits/sec
[ 4]  6.01-7.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  7.01-8.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  8.01-9.01    sec   1.42 MBytes  11.9 Mbits/sec
[ 4]  9.01-10.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 10.01-11.00   sec   1.22 MBytes  10.3 Mbits/sec
[ 4] 11.00-12.01   sec   1.41 MBytes  11.8 Mbits/sec
[ 4] 12.01-13.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 13.01-14.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 14.01-15.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 15.01-16.00   sec   1.26 MBytes  10.6 Mbits/sec
[ 4] 16.00-17.01   sec   1.37 MBytes  11.4 Mbits/sec
[ 4] 17.01-18.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 18.01-19.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 19.01-20.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 20.01-21.00   sec   1.42 MBytes  12.0 Mbits/sec
[ 4] 21.00-22.01   sec   1.22 MBytes  10.2 Mbits/sec
[ 4] 22.01-23.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 23.01-24.01   sec   1.42 MBytes  11.8 Mbits/sec
[ 4] 24.01-25.02   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 25.02-26.00   sec   1.21 MBytes  10.3 Mbits/sec
[ 4] 26.00-27.01   sec   1.42 MBytes  11.8 Mbits/sec
[ 4] 27.01-28.01   sec   1.42 MBytes  11.9 Mbits/sec
[ 4] 28.01-29.02   sec   1.23 MBytes  10.2 Mbits/sec
[ 4] 29.02-30.01   sec   1.40 MBytes  11.8 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  42.5 MBytes  11.9 Mbits/sec    0
[ 4]  0.00-30.01   sec  40.9 MBytes  11.4 Mbits/sec
CPU Utilization: local/receiver 1.4% (0.3%u/1.1%r), remote/sender 0.0% (0.0%u/0.0%r)
```

Average used bandwidth : **11.9 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.7 TCP - max Bandwidth with RTT = 200 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58682 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec   629 KBytes   5.13 Mbits/sec
[ 4]  1.00-2.00    sec   1.01 MBytes   8.49 Mbits/sec
[ 4]  2.00-3.00    sec   1.01 MBytes   8.49 Mbits/sec
[ 4]  3.00-4.00    sec   1.01 MBytes   8.49 Mbits/sec
[ 4]  4.00-5.00    sec   1.01 MBytes   8.49 Mbits/sec
[ 4]  5.00-6.00    sec   1.02 MBytes   8.51 Mbits/sec
[ 4]  6.00-7.00    sec   1.09 MBytes   9.15 Mbits/sec
[ 4]  7.00-8.00    sec   1.13 MBytes   9.48 Mbits/sec
[ 4]  8.00-9.00    sec   1.01 MBytes   8.49 Mbits/sec
[ 4]  9.00-10.00   sec   1.01 MBytes   8.49 Mbits/sec
[ 4] 10.00-11.00   sec   1.01 MBytes   8.49 Mbits/sec
[ 4] 11.00-12.00   sec   1.01 MBytes   8.51 Mbits/sec
[ 4] 12.00-13.00   sec   1.05 MBytes   8.81 Mbits/sec
[ 4] 13.00-14.00   sec   1.12 MBytes   9.37 Mbits/sec
[ 4] 14.00-15.00   sec   1.03 MBytes   8.60 Mbits/sec
[ 4] 15.00-16.00   sec   1.00 MBytes   8.42 Mbits/sec
[ 4] 16.00-17.00   sec   1.01 MBytes   8.43 Mbits/sec
[ 4] 17.00-18.00   sec   1.01 MBytes   8.50 Mbits/sec
[ 4] 18.00-19.00   sec   1.06 MBytes   8.91 Mbits/sec
[ 4] 19.00-20.00   sec   1.11 MBytes   9.32 Mbits/sec
[ 4] 20.00-21.00   sec   1.01 MBytes   8.45 Mbits/sec
[ 4] 21.00-22.00   sec   1.01 MBytes   8.43 Mbits/sec
[ 4] 22.00-23.00   sec   1.00 MBytes   8.42 Mbits/sec
[ 4] 23.00-24.00   sec   1.03 MBytes   8.66 Mbits/sec
[ 4] 24.00-25.00   sec   1.06 MBytes   8.85 Mbits/sec
[ 4] 25.00-26.00   sec   1.11 MBytes   9.28 Mbits/sec
[ 4] 26.00-27.01   sec   1.00 MBytes   8.35 Mbits/sec
[ 4] 27.01-28.01   sec   1.01 MBytes   8.41 Mbits/sec
[ 4] 28.01-29.01   sec   1.01 MBytes   8.43 Mbits/sec
[ 4] 29.01-30.00   sec   1.00 MBytes   8.51 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  32.2 MBytes   9.00 Mbits/sec    0
[ 4]  0.00-30.00   sec  30.8 MBytes   8.62 Mbits/sec
CPU Utilization: local/receiver 1.7% (0.7%u/1.1%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used bandwidth : **9 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.8 TCP - max Bandwidth with RTT = 300 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```

[ 4] local 192.168.178.72 port 58769 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec    214 KBytes    1.75 Mbits/sec
[ 4]  1.00-2.00    sec    622 KBytes    5.09 Mbits/sec
[ 4]  2.00-3.00    sec    700 KBytes    5.73 Mbits/sec
[ 4]  3.00-4.00    sec    751 KBytes    6.15 Mbits/sec
[ 4]  4.00-5.00    sec    622 KBytes    5.09 Mbits/sec
[ 4]  5.00-6.00    sec    670 KBytes    5.49 Mbits/sec
[ 4]  6.00-7.00    sec    780 KBytes    6.39 Mbits/sec
[ 4]  7.00-8.00    sec    622 KBytes    5.09 Mbits/sec
[ 4]  8.00-9.00    sec    697 KBytes    5.71 Mbits/sec
[ 4]  9.00-10.00   sec    753 KBytes    6.17 Mbits/sec
[ 4] 10.00-11.00   sec    622 KBytes    5.09 Mbits/sec
[ 4] 11.00-12.00   sec    686 KBytes    5.62 Mbits/sec
[ 4] 12.00-13.00   sec    765 KBytes    6.26 Mbits/sec
[ 4] 13.00-14.01   sec    620 KBytes    5.08 Mbits/sec
[ 4] 14.01-15.00   sec    652 KBytes    5.35 Mbits/sec
[ 4] 15.00-16.00   sec    798 KBytes    6.53 Mbits/sec
[ 4] 16.00-17.01   sec    622 KBytes    5.08 Mbits/sec
[ 4] 17.01-18.00   sec    643 KBytes    5.29 Mbits/sec
[ 4] 18.00-19.01   sec    808 KBytes    6.59 Mbits/sec
[ 4] 19.01-20.01   sec    622 KBytes    5.10 Mbits/sec
[ 4] 20.01-21.00   sec    653 KBytes    5.37 Mbits/sec
[ 4] 21.00-22.01   sec    797 KBytes    6.46 Mbits/sec
[ 4] 22.01-23.02   sec    622 KBytes    5.08 Mbits/sec
[ 4] 23.02-24.00   sec    647 KBytes    5.37 Mbits/sec
[ 4] 24.00-25.01   sec    803 KBytes    6.56 Mbits/sec
[ 4] 25.01-26.01   sec    622 KBytes    5.08 Mbits/sec
[ 4] 26.01-27.00   sec    636 KBytes    5.23 Mbits/sec
[ 4] 27.00-28.01   sec    815 KBytes    6.61 Mbits/sec
[ 4] 28.01-29.02   sec    622 KBytes    5.08 Mbits/sec
[ 4] 29.02-30.00   sec    624 KBytes    5.18 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec   21.6 MBytes    6.03 Mbits/sec    0
[ 4]  0.00-30.00   sec   19.9 MBytes    5.56 Mbits/sec
CPU Utilization: local/receiver 1.5% (0.6%/0.9%), remote/sender 0.0% (0.0%/0.0%)

```

Average used bandwidth : **6.03 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.9 TCP - max Bandwidth with RTT = 400 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58808 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  99.8 KBytes   807 Kbits/sec
[ 4]  1.01-2.01    sec  322 KBytes   2.64 Mbits/sec
[ 4]  2.01-3.01    sec  622 KBytes   5.11 Mbits/sec
[ 4]  3.01-4.01    sec  414 KBytes   3.38 Mbits/sec
[ 4]  4.01-5.01    sec  622 KBytes   5.09 Mbits/sec
[ 4]  5.01-6.01    sec  415 KBytes   3.40 Mbits/sec
[ 4]  6.01-7.01    sec  622 KBytes   5.09 Mbits/sec
[ 4]  7.01-8.01    sec  415 KBytes   3.40 Mbits/sec
[ 4]  8.01-9.01    sec  622 KBytes   5.09 Mbits/sec
[ 4]  9.01-10.01   sec  414 KBytes   3.39 Mbits/sec
[ 4] 10.01-11.01   sec  622 KBytes   5.09 Mbits/sec
[ 4] 11.01-12.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 12.01-13.01   sec  418 KBytes   3.42 Mbits/sec
[ 4] 13.01-14.01   sec  619 KBytes   5.06 Mbits/sec
[ 4] 14.01-15.01   sec  414 KBytes   3.39 Mbits/sec
[ 4] 15.01-16.01   sec  622 KBytes   5.09 Mbits/sec
[ 4] 16.01-17.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 17.01-18.01   sec  622 KBytes   5.09 Mbits/sec
[ 4] 18.01-19.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 19.01-20.01   sec  622 KBytes   5.09 Mbits/sec
[ 4] 20.01-21.02   sec  414 KBytes   3.37 Mbits/sec
[ 4] 21.02-22.00   sec  573 KBytes   4.77 Mbits/sec
[ 4] 22.00-23.01   sec  462 KBytes   3.78 Mbits/sec
[ 4] 23.01-24.00   sec  443 KBytes   3.65 Mbits/sec
[ 4] 24.00-25.01   sec  592 KBytes   4.80 Mbits/sec
[ 4] 25.01-26.02   sec  413 KBytes   3.38 Mbits/sec
[ 4] 26.02-27.00   sec  622 KBytes   5.16 Mbits/sec
[ 4] 27.00-28.00   sec  415 KBytes   3.39 Mbits/sec
[ 4] 28.00-29.01   sec  622 KBytes   5.06 Mbits/sec
[ 4] 29.01-30.01   sec  415 KBytes   3.39 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  16.2 MBytes   4.54 Mbits/sec    0
[ 4]  0.00-30.01   sec  14.6 MBytes   4.09 Mbits/sec
CPU Utilization: local/receiver 1.3% (0.3%u/0.9%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used bandwidth : **4.54 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.10 TCP - max Bandwidth with RTT = 500 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58849 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  42.8 KBytes  349 Kbits/sec
[ 4]  1.00-2.00    sec  171 KBytes  1.40 Mbits/sec
[ 4]  2.00-3.00    sec  415 KBytes  3.40 Mbits/sec
[ 4]  3.00-4.00    sec  415 KBytes  3.40 Mbits/sec
[ 4]  4.00-5.00    sec  414 KBytes  3.39 Mbits/sec
[ 4]  5.00-6.00    sec  415 KBytes  3.40 Mbits/sec
[ 4]  6.00-7.02    sec  415 KBytes  3.33 Mbits/sec
[ 4]  7.02-8.00    sec  414 KBytes  3.46 Mbits/sec
[ 4]  8.00-9.00    sec  415 KBytes  3.40 Mbits/sec
[ 4]  9.00-10.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 10.00-11.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 11.00-12.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 12.00-13.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 13.00-14.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 14.00-15.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 15.00-16.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 16.00-17.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 17.00-18.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 18.00-19.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 19.00-20.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 20.00-21.00   sec  413 KBytes  3.39 Mbits/sec
[ 4] 21.00-22.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 22.00-23.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 23.00-24.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 24.00-25.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 25.00-26.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 26.00-27.01   sec  414 KBytes  3.38 Mbits/sec
[ 4] 27.01-28.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 28.00-29.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 29.00-30.00   sec  413 KBytes  3.39 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  13.1 MBytes  3.67 Mbits/sec    0
[ 4]  0.00-30.00   sec  11.8 MBytes  3.30 Mbits/sec
CPU Utilization: local/receiver 1.6% (0.6%/1.0%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **3.67 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.11 TCP - max Bandwidth with RTT = 600 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58888 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval          Transfer          Bandwidth
[ 4]  0.00-1.00      sec  42.8 KBytes      349 Kbits/sec
[ 4]  1.00-2.00      sec  171 KBytes      1.40 Mbits/sec
[ 4]  2.00-3.00      sec  208 KBytes      1.70 Mbits/sec
[ 4]  3.00-4.00      sec  414 KBytes      3.39 Mbits/sec
[ 4]  4.00-5.01      sec  415 KBytes      3.40 Mbits/sec
[ 4]  5.01-6.01      sec  207 KBytes      1.69 Mbits/sec
[ 4]  6.01-7.01      sec  415 KBytes      3.40 Mbits/sec
[ 4]  7.01-8.01      sec  415 KBytes      3.38 Mbits/sec
[ 4]  8.01-9.01      sec  207 KBytes      1.69 Mbits/sec
[ 4]  9.01-10.01     sec  415 KBytes      3.40 Mbits/sec
[ 4] 10.01-11.01     sec  414 KBytes      3.39 Mbits/sec
[ 4] 11.01-12.00     sec  208 KBytes      1.72 Mbits/sec
[ 4] 12.00-13.01     sec  414 KBytes      3.38 Mbits/sec
[ 4] 13.01-14.01     sec  415 KBytes      3.38 Mbits/sec
[ 4] 14.01-15.02     sec  207 KBytes      1.69 Mbits/sec
[ 4] 15.02-16.00     sec  415 KBytes      3.44 Mbits/sec
[ 4] 16.00-17.01     sec  406 KBytes      3.32 Mbits/sec
[ 4] 17.01-18.01     sec  215 KBytes      1.76 Mbits/sec
[ 4] 18.01-19.01     sec  415 KBytes      3.39 Mbits/sec
[ 4] 19.01-20.01     sec  207 KBytes      1.69 Mbits/sec
[ 4] 20.01-21.02     sec  415 KBytes      3.39 Mbits/sec
[ 4] 21.02-22.01     sec  414 KBytes      3.41 Mbits/sec
[ 4] 22.01-23.01     sec  208 KBytes      1.70 Mbits/sec
[ 4] 23.01-24.01     sec  414 KBytes      3.39 Mbits/sec
[ 4] 24.01-25.01     sec  415 KBytes      3.40 Mbits/sec
[ 4] 25.01-26.01     sec  207 KBytes      1.69 Mbits/sec
[ 4] 26.01-27.01     sec  415 KBytes      3.40 Mbits/sec
[ 4] 27.01-28.01     sec  415 KBytes      3.40 Mbits/sec
[ 4] 28.01-29.01     sec  207 KBytes      1.69 Mbits/sec
[ 4] 29.01-30.01     sec  415 KBytes      3.40 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval          Transfer          Bandwidth          Retr
[ 4]  0.00-30.01     sec  12.0 MBytes      3.34 Mbits/sec      0
[ 4]  0.00-30.01     sec   9.77 MBytes      2.73 Mbits/sec
CPU Utilization: local/receiver 2.0% (0.6%/u/1.4% s), remote/sender 0.0% (0.0%/u/0.0% s)
```

Average used bandwidth : **3.34 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.12 TCP - max Bandwidth with RTT = 700 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58936 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  42.8 KBytes  350 Kbits/sec
[ 4]  1.00-2.00    sec  57.0 KBytes  467 Kbits/sec
[ 4]  2.00-3.00    sec  322 KBytes  2.64 Mbits/sec
[ 4]  3.00-4.00    sec  205 KBytes  1.68 Mbits/sec
[ 4]  4.00-5.01    sec  415 KBytes  3.39 Mbits/sec
[ 4]  5.01-6.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  6.01-7.01    sec  208 KBytes  1.70 Mbits/sec
[ 4]  7.01-8.01    sec  414 KBytes  3.39 Mbits/sec
[ 4]  8.01-9.01    sec  208 KBytes  1.70 Mbits/sec
[ 4]  9.01-10.01   sec  414 KBytes  3.39 Mbits/sec
[ 4] 10.01-11.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 11.01-12.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 12.01-13.01   sec  415 KBytes  3.40 Mbits/sec
[ 4] 13.01-14.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 14.01-15.01   sec  415 KBytes  3.40 Mbits/sec
[ 4] 15.01-16.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 16.01-17.01   sec  415 KBytes  3.40 Mbits/sec
[ 4] 17.01-18.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 18.01-19.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 19.01-20.01   sec  415 KBytes  3.39 Mbits/sec
[ 4] 20.01-21.01   sec  207 KBytes  1.70 Mbits/sec
[ 4] 21.01-22.01   sec  415 KBytes  3.40 Mbits/sec
[ 4] 22.01-23.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 23.01-24.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 24.01-25.01   sec  414 KBytes  3.39 Mbits/sec
[ 4] 25.01-26.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 26.01-27.01   sec  414 KBytes  3.39 Mbits/sec
[ 4] 27.01-28.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 28.01-29.01   sec  414 KBytes  3.39 Mbits/sec
[ 4] 29.01-30.01   sec  208 KBytes  1.70 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  10.0 MBytes  2.79 Mbits/sec    0
[ 4]  0.00-30.01   sec   8.35 MBytes  2.33 Mbits/sec
CPU Utilization: local/receiver 2.0% (0.7%u/1.3%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used bandwidth : **2.79 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.13 TCP - max Bandwidth with RTT = 800 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 58972 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  42.8 KBytes  346 Kbits/sec
[ 4]  1.01-2.01    sec  57.0 KBytes  467 Kbits/sec
[ 4]  2.01-3.01    sec  114 KBytes  934 Kbits/sec
[ 4]  3.01-4.01    sec  208 KBytes  1.70 Mbits/sec
[ 4]  4.01-5.01    sec  414 KBytes  3.39 Mbits/sec
[ 4]  5.01-6.01    sec  208 KBytes  1.70 Mbits/sec
[ 4]  6.01-7.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  7.01-8.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  8.01-9.01    sec  415 KBytes  3.40 Mbits/sec
[ 4]  9.01-10.01   sec  207 KBytes  1.70 Mbits/sec
[ 4] 10.01-11.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 11.01-12.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 12.01-13.01   sec  415 KBytes  3.40 Mbits/sec
[ 4] 13.01-14.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 14.01-15.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 15.01-16.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 16.01-17.01   sec  414 KBytes  3.39 Mbits/sec
[ 4] 17.01-18.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 18.01-19.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 19.02-20.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 20.02-21.02   sec  415 KBytes  3.40 Mbits/sec
[ 4] 21.02-22.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 22.02-23.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 23.02-24.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 24.02-25.00   sec  215 KBytes  1.78 Mbits/sec
[ 4] 25.00-26.02   sec  406 KBytes  3.29 Mbits/sec
[ 4] 26.02-27.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 27.02-28.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 28.02-29.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 29.02-30.02   sec  415 KBytes  3.40 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.02   sec  9.38 MBytes  2.62 Mbits/sec    0
[ 4]  0.00-30.02   sec  7.34 MBytes  2.05 Mbits/sec
CPU Utilization: local/receiver 1.8% (0.6%u/1.2%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used bandwidth : **2.62 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.14 TCP - max Bandwidth with RTT = 900 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

```
[ 4] local 192.168.178.72 port 59011 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.02    sec  42.8 KBytes  345 Kbits/sec
[ 4]  1.02-2.02    sec  57.0 KBytes  467 Kbits/sec
[ 4]  2.02-3.01    sec  114 KBytes  943 Kbits/sec
[ 4]  3.01-4.02    sec  208 KBytes  1.69 Mbits/sec
[ 4]  4.02-5.02    sec  207 KBytes  1.69 Mbits/sec
[ 4]  5.02-6.02    sec  207 KBytes  1.69 Mbits/sec
[ 4]  6.02-7.02    sec  208 KBytes  1.70 Mbits/sec
[ 4]  7.02-8.02    sec  205 KBytes  1.68 Mbits/sec
[ 4]  8.02-9.02    sec  208 KBytes  1.70 Mbits/sec
[ 4]  9.02-10.02   sec  414 KBytes  3.39 Mbits/sec
[ 4] 10.02-11.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 11.02-12.01   sec  207 KBytes  1.71 Mbits/sec
[ 4] 12.01-13.01   sec  207 KBytes  1.68 Mbits/sec
[ 4] 13.01-14.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 14.02-15.00   sec  207 KBytes  1.72 Mbits/sec
[ 4] 15.00-16.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 16.01-17.01   sec  208 KBytes  1.69 Mbits/sec
[ 4] 17.01-18.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 18.01-19.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 19.02-20.00   sec  415 KBytes  3.44 Mbits/sec
[ 4] 20.00-21.01   sec  207 KBytes  1.68 Mbits/sec
[ 4] 21.01-22.01   sec  208 KBytes  1.71 Mbits/sec
[ 4] 22.01-23.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 23.01-24.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 24.01-25.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 25.01-26.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 26.01-27.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 27.01-28.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 28.01-29.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 29.01-30.01   sec  415 KBytes  3.40 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  8.34 MBytes  2.33 Mbits/sec    0
[ 4]  0.00-30.01   sec  6.53 MBytes  1.83 Mbits/sec
CPU Utilization: local/receiver 2.5% (1.0%/1.5%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **2.33 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.15 TCP - max Bandwidth with RTT = 1000 ms

Starting iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

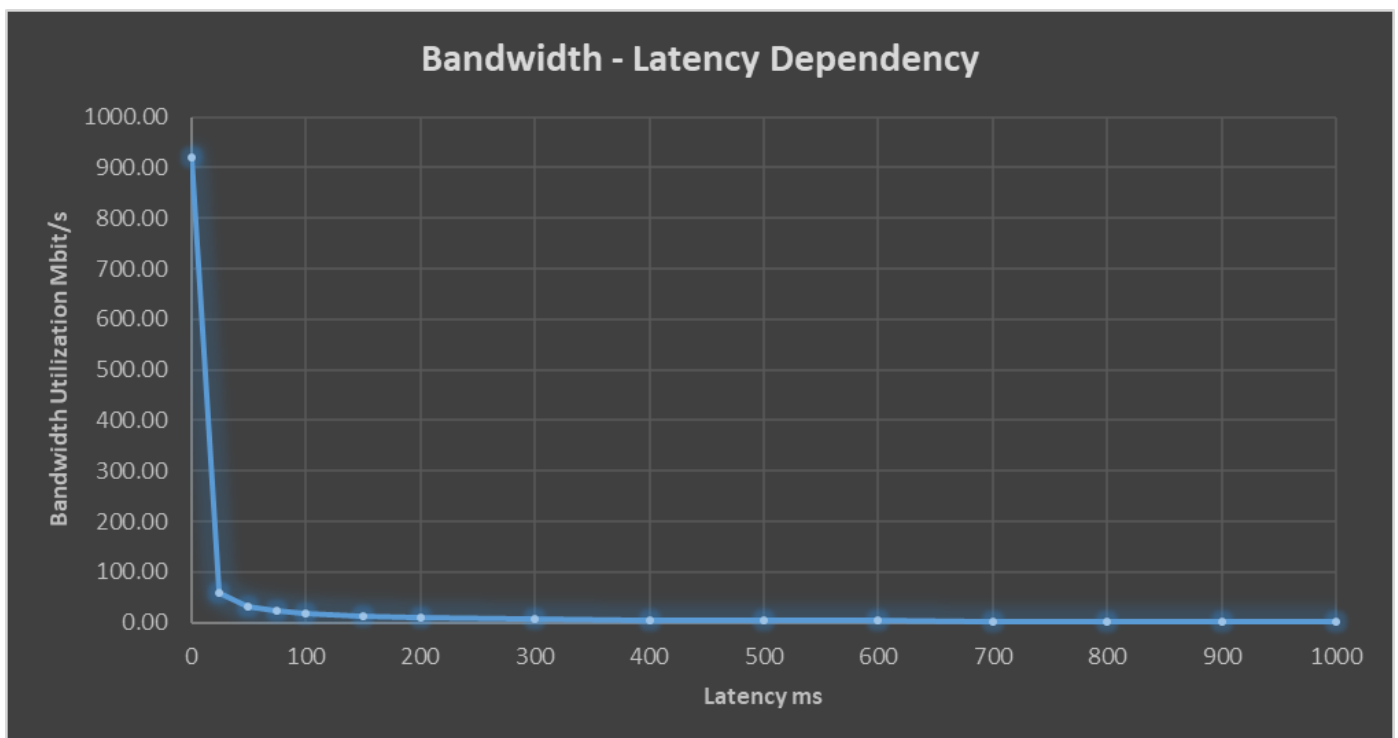
```
[ 4] local 192.168.178.72 port 59060 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.05    sec  42.8 KBytes  333 Kbits/sec
[ 4]  1.05-2.01    sec  32.8 KBytes  280 Kbits/sec
[ 4]  2.01-3.02    sec  24.2 KBytes  198 Kbits/sec
[ 4]  3.02-4.02    sec  114 KBytes  934 Kbits/sec
[ 4]  4.02-5.02    sec  208 KBytes  1.70 Mbits/sec
[ 4]  5.02-6.02    sec  205 KBytes  1.68 Mbits/sec
[ 4]  6.02-7.02    sec  208 KBytes  1.70 Mbits/sec
[ 4]  7.02-8.02    sec  205 KBytes  1.68 Mbits/sec
[ 4]  8.02-9.02    sec  208 KBytes  1.70 Mbits/sec
[ 4]  9.02-10.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 10.02-11.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 11.02-12.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 12.02-13.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 13.02-14.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 14.02-15.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 15.02-16.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 16.02-17.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 17.02-18.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 18.02-19.02   sec  207 KBytes  1.70 Mbits/sec
[ 4] 19.02-20.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 20.02-21.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 21.02-22.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 22.02-23.02   sec  207 KBytes  1.69 Mbits/sec
[ 4] 23.02-24.02   sec  208 KBytes  1.70 Mbits/sec
[ 4] 24.02-25.00   sec  207 KBytes  1.72 Mbits/sec
[ 4] 25.00-26.00   sec  207 KBytes  1.69 Mbits/sec
[ 4] 26.00-27.00   sec  208 KBytes  1.70 Mbits/sec
[ 4] 27.00-28.00   sec  207 KBytes  1.69 Mbits/sec
[ 4] 28.00-29.00   sec  207 KBytes  1.69 Mbits/sec
[ 4] 29.00-30.00   sec  208 KBytes  1.70 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  7.49 MBytes  2.09 Mbits/sec    1      sender
[ 4]  0.00-30.00   sec  5.72 MBytes  1.60 Mbits/sec    0      receiver
CPU Utilization: local/receiver 2.4% (0.9%/1.5%), remote/sender 0.0% (0.0%/0.0%)
```

Average used bandwidth : **2.09 Mbit/s of 1000 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.3.16 Benchmark Summary

Latency ms	TCP Bandwidth Utilization of 1 Gbit/s	%
1	920.00	92.0%
25	58.50	5.9%
50	31.10	3.1%
75	24.10	2.3%
100	17.10	1.7%
150	11.90	1.2%
200	9.00	0.9%
300	6.03	0.6%
400	4.54	0.5%
500	3.67	0.4%
600	3.34	0.3%
700	2.79	0.3%
800	2.62	0.3%
900	2.33	0.2%
1000	2.09	0.2%



3.0 Real Network Condition with Background Traffic

3.4 HTTP-QuSS - http | FTP | VoIP | Media Streaming | ...

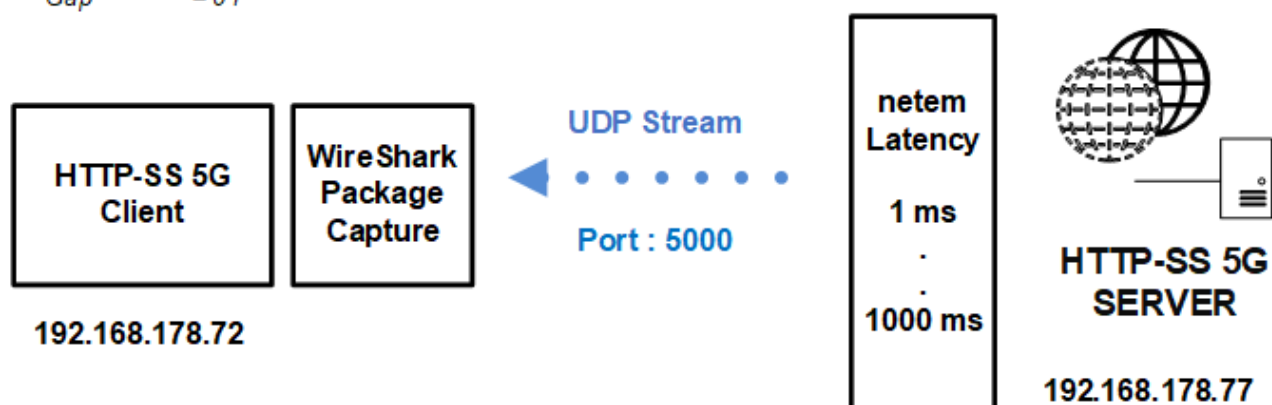
Please Note:

Due to Hardware Restrictions, Network Congestion, Processor and Timer Inaccuracy a lossless Data Transmission for this Test Scenario was only possible upto 700 Mbit/s

Sending 1000 HTTP-QuSS UDP Packages Available Bandwidth : 700 Mbit/s

<u>Delay</u>	<u>Loss</u>	<u>Bandwidth</u>
Latency = 1 - 1000 ms	Loss = 0 %	700 Mbit/s
Jitter = 0 ms	Correlation = 0 ms	
Correlation = 0 ms		

<u>Packet Reordering</u>	<u>Duplication</u>	<u>Corruption</u>
Reordering = 0 %	Duplication = 0 %	0 %
Correlation = 0 %	Correlation = 0 ms	
Gap = 0 P		



3.4.1 HTTP-QuSS - Lossless used Bandwidth with RTT = 1 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.020	0.020	—
Average pps	51119.5	51119.5	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	77 M	77 M	—
Average bits/s	619 M	619 M	—

Lossless used Bandwidth: **619 Mbit/s of 700 Mbit/s**

3.4.2 HTTP-QuSS - Lossless used Bandwidth with RTT = 25 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=25ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.017	0.017	—
Average pps	57813.4	57813.4	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	87 M	87 M	—
Average bits/s	700 M	700 M	—

Lossless used Bandwidth: **700 Mbit/s of 700 Mbit/s**

3.4.3 HTTP-QuSS - Lossless used Bandwidth with RTT = 50 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=50ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.017	0.017	—
Average pps	57813.4	57813.4	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	87 M	87 M	—
Average bits/s	700 M	700 M	—

Lossless used Bandwidth: **700 Mbit/s of 700 Mbit/s**

3.4.4 HTTP-QuSS - Lossless used Bandwidth with RTT = 75 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=75ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.020	0.020	—
Average pps	50510.0	50510.0	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	76 M	76 M	—
Average bits/s	611 M	611 M	—

Lossless used Bandwidth: **611 Mbit/s of 700 Mbit/s**

3.4.5 HTTP-QuSS - Lossless used Bandwidth with RTT = 100 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=100ms TTL=64
```


3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	56398.6	56398.6	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	85 M	85 M	—
Average bits/s	683 M	683 M	—

Lossless used Bandwidth: **683 Mbit/s of 700 Mbit/s**

3.4.6 HTTP-QuSS - Lossless used Bandwidth with RTT = 150 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=150ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	56660.6	56660.6	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	85 M	85 M	—
Average bits/s	686 M	686 M	—

Lossless used Bandwidth: **686 Mbit/s of 700 Mbit/s**

3.4.7 HTTP-QuSS - Lossless used Bandwidth with RTT = 200 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=200ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.020	0.020	—
Average pps	49714.4	49714.4	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	75 M	75 M	—
Average bits/s	602 M	602 M	—

Lossless used Bandwidth: **602 Mbit/s of 700 Mbit/s**

3.4.8 HTTP-QuSS - Lossless used Bandwidth with RTT = 300 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=300ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	54942.4	54942.4	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	83 M	83 M	—
Average bits/s	665 M	665 M	—

Lossless used Bandwidth: **665 Mbit/s of 700 Mbit/s**

3.4.9 HTTP-QuSS - Lossless used Bandwidth with RTT = 400 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=400ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.019	0.019	—
Average pps	54009.9	54009.9	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	81 M	81 M	—
Average bits/s	654 M	654 M	—

Lossless used Bandwidth: **654 Mbit/s of 700 Mbit/s**

3.4.10 HTTP-QuSS - Lossless used Bandwidth with RTT = 500 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=500ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.019	0.019	—
Average pps	53731.8	53731.8	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	81 M	81 M	—
Average bits/s	650 M	650 M	—

Lossless used Bandwidth: **650 Mbit/s of 700 Mbit/s**

3.4.11 HTTP-QuSS - Lossless used Bandwidth with RTT = 600 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=600ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.021	0.021	—
Average pps	47739.6	47739.6	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	72 M	72 M	—
Average bits/s	578 M	578 M	—

Lossless used Bandwidth: **578 Mbit/s of 700 Mbit/s**

3.4.12 HTTP-QuSS - Lossless used Bandwidth with RTT = 700 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=700ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.020	0.020	—
Average pps	51080.3	51080.3	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	77 M	77 M	—
Average bits/s	618 M	618 M	—

Lossless used Bandwidth: **618 Mbit/s of 700 Mbit/s**

3.4.13 HTTP-QuSS - Lossless used Bandwidth with RTT = 800 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=800ms TTL=64
```

3.0 Real Network Condition with Background Traffic

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	55282.0	55282.0	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	83 M	83 M	—
Average bits/s	669 M	669 M	—

Lossless used Bandwidth: **669 Mbit/s of 700 Mbit/s**

3.4.14 HTTP-QuSS - Lossless used Bandwidth with RTT = 900 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=900ms TTL=64
```

Statistics

Measurement	Captured	Displayed	Marked
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	55008.0	55008.0	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	83 M	83 M	—
Average bits/s	666 M	666 M	—

Lossless used Bandwidth: **666 Mbit/s of 700 Mbit/s**

3.4.15 HTTP-QuSS - Lossless used Bandwidth with RTT = 1000 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit=1000ms TTL=64
```


3.0 Real Network Condition with Background Traffic

Statistics

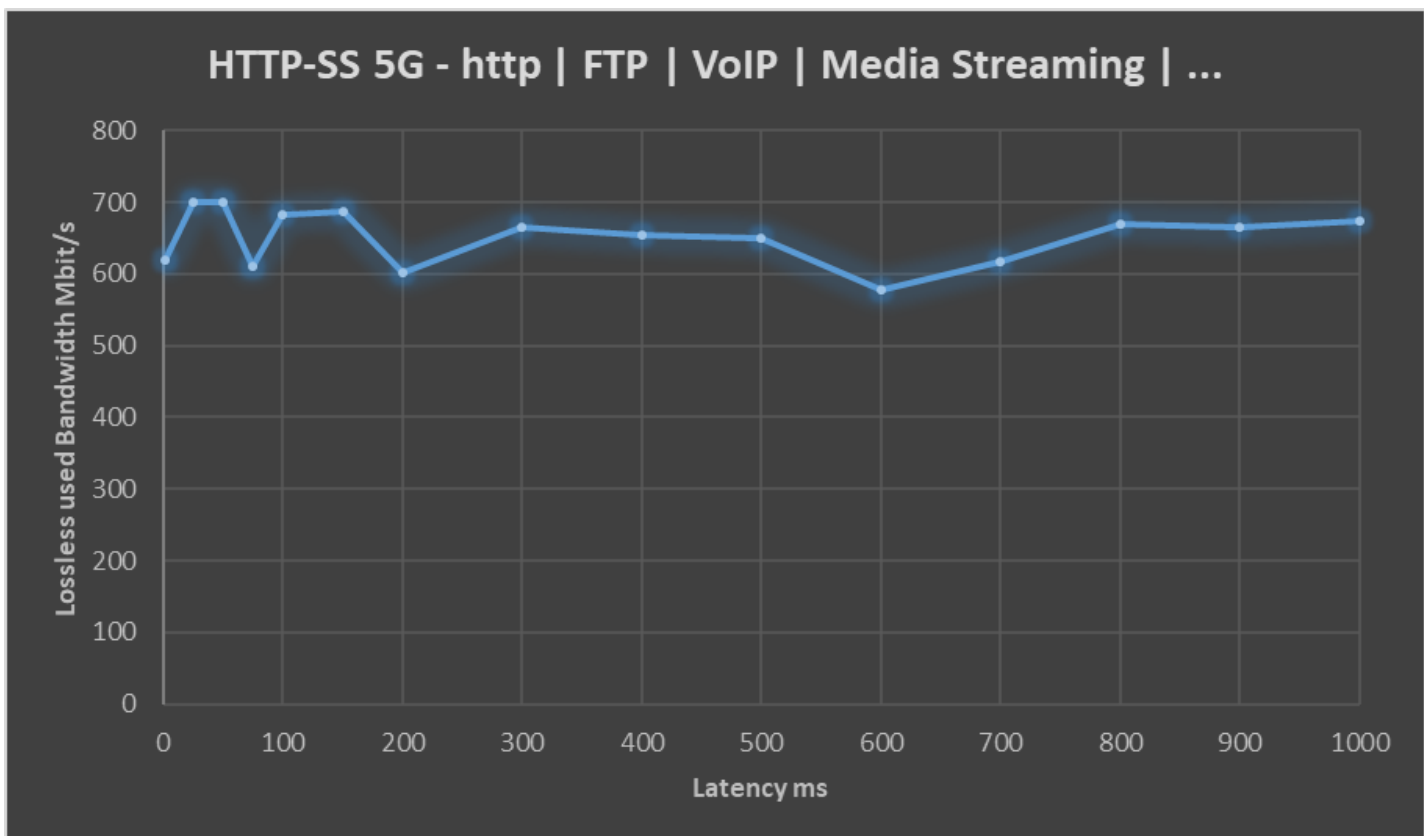
<u>Measurement</u>	<u>Captured</u>	<u>Displayed</u>	<u>Marked</u>
Packets	1000	1000 (100.0%)	—
Time span, s	0.018	0.018	—
Average pps	55564.7	55564.7	—
Average packet size, B	1514	1514	—
Bytes	1514000	1514000 (100.0%)	0
Average bytes/s	84 M	84 M	—
Average bits/s	673 M	673 M	—

Lossless used Bandwidth: **673 Mbit/s of 700 Mbit/s**

3.0 Real Network Condition with Background Traffic

3.4.17 Benchmark Summary

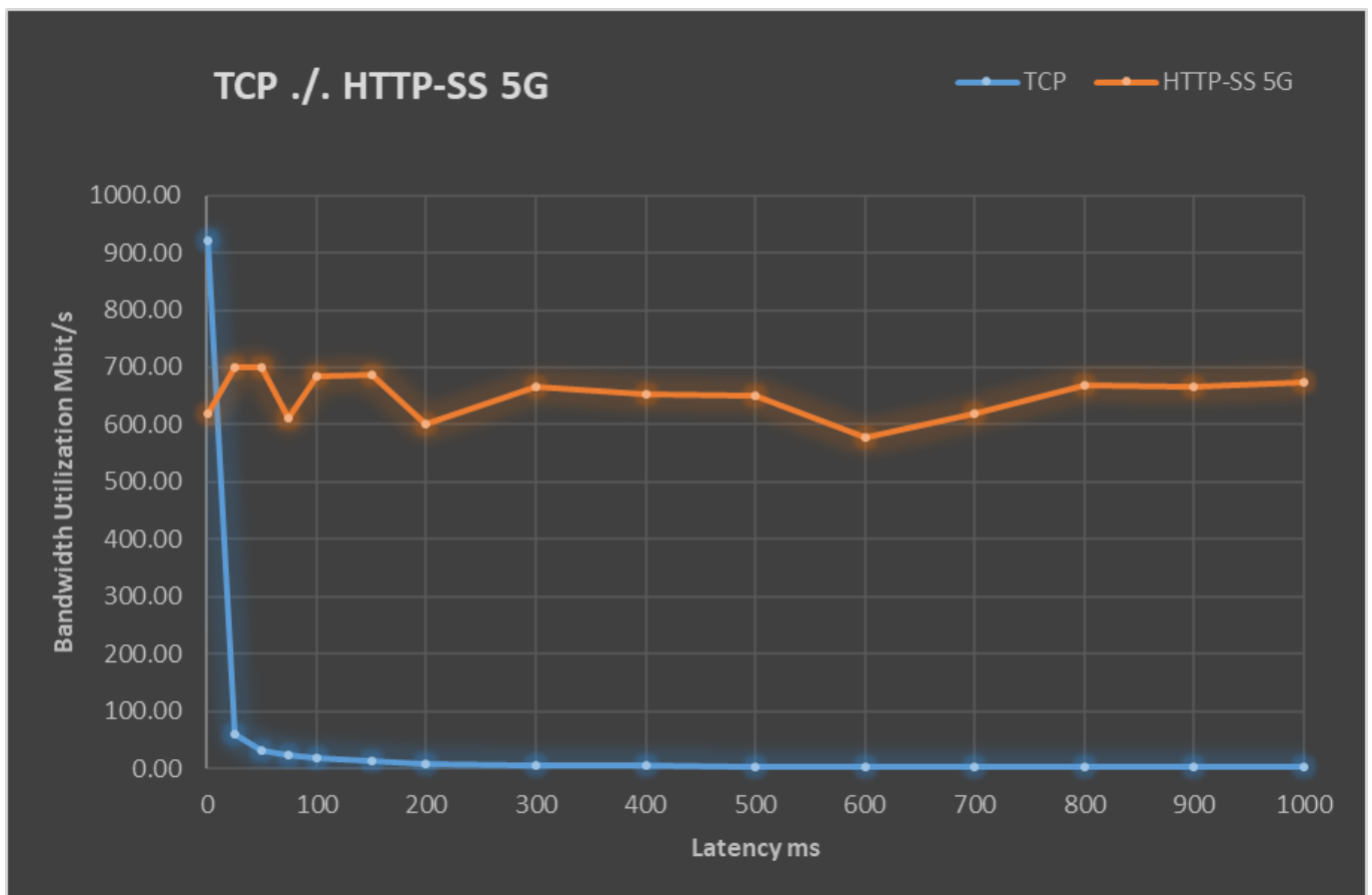
HTTP-QuSS http ftp VoIP Media Streaming 		
Latency ms	Lossless used Bandwidth of 700 Mbit/s	%
1	619.00	88.4%
25	700.00	100.0%
50	700.00	100.0%
75	611.00	87.3%
100	683.00	97.6%
150	686.00	98.0%
200	602.00	86.0%
300	665.00	95.0%
400	654.00	93.4%
500	650.00	92.9%
600	578.00	82.6%
700	618.00	88.3%
800	669.00	95.6%
900	666.00	95.1%
1000	673.00	96.1%



3.0 Real Network Condition with Background Traffic

3.4.18 Bandwidth Utilization TCP ./ . HTTP-QuSS

Latency ms	TCP Bandwidth Utilization of 1 Gbit/s	HTTP-QuSS http ftp VoIP Media Streaming ... Lossless used Bandwidth of 700 Mbit/s
1	920.00	619.00
25	58.50	700.00
50	31.10	700.00
75	23.10	611.00
100	17.10	683.00
150	11.90	686.00
200	9.00	602.00
300	6.03	665.00
400	4.54	654.00
500	3.67	650.00
600	3.34	578.00
700	2.79	618.00
800	2.62	669.00
900	2.33	666.00
1000	2.09	673.00



3.0 Real Network Condition with Background Traffic

3.5 Browser WEB Page Load Time - Latency Dependency

3.5.1 What is Page Load Time

In its simplest terms, page load time is the average amount of time it takes for a page to show up on your screen. It's calculated from initiation (when you click on a page link or type in a Web address) to completion (when the page is fully loaded in the browser).



Status	Method	Domain	File
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg
200	GET	www.ocmodshop.com	server_01.jpg
200	GET	www.ocmodshop.com	server-room.jpg
200	GET	www.kvmsolutions.uk	rkp2419.jpg
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg
200	GET	http-ss.com	img0007.png
200	GET	s3.amazonaws.com	pleiades-1a sm_1.jpg
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg
200	GET	http-ss.com	favicon.ico

20 requests 1.95 MB / 1.95 MB transferred Finish: 20.92 s DOMContentLoaded: 5.20 s **load: 20.92 s**

Page Load Time

3.0 Real Network Condition with Background Traffic

3.5.2 Available TCP Bandwidth - 700 Mbit/s

```
[ 4] local 192.168.178.72 port 51516 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval          Transfer          Bandwidth
[ 4]  0.00-1.00      sec  80.5 MBytes      674 Mbits/sec
[ 4]  1.00-2.00      sec  79.4 MBytes      666 Mbits/sec
[ 4]  2.00-3.00      sec  80.1 MBytes      672 Mbits/sec
[ 4]  3.00-4.00      sec  80.1 MBytes      672 Mbits/sec
[ 4]  4.00-5.00      sec  80.0 MBytes      671 Mbits/sec
[ 4]  5.00-6.00      sec  80.3 MBytes      674 Mbits/sec
[ 4]  6.00-7.00      sec  80.3 MBytes      674 Mbits/sec
[ 4]  7.00-8.00      sec  80.3 MBytes      674 Mbits/sec
[ 4]  8.00-9.00      sec  80.0 MBytes      671 Mbits/sec
[ 4]  9.00-10.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 10.00-11.00     sec  80.4 MBytes      674 Mbits/sec
[ 4] 11.00-12.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 12.00-13.00     sec  79.9 MBytes      671 Mbits/sec
[ 4] 13.00-14.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 14.00-15.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 15.00-16.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 16.00-17.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 17.00-18.00     sec  80.4 MBytes      674 Mbits/sec
[ 4] 18.00-19.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 19.00-20.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 20.00-21.00     sec  80.1 MBytes      672 Mbits/sec
[ 4] 21.00-22.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 22.00-23.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 23.00-24.00     sec  80.3 MBytes      674 Mbits/sec
[ 4] 24.00-25.00     sec  72.2 MBytes      606 Mbits/sec
[ 4] 25.00-26.00     sec  77.9 MBytes      654 Mbits/sec
[ 4] 26.00-27.00     sec  75.6 MBytes      634 Mbits/sec
[ 4] 27.00-28.00     sec  77.8 MBytes      653 Mbits/sec
[ 4] 28.00-29.00     sec  77.0 MBytes      646 Mbits/sec
[ 4] 29.00-30.00     sec  77.7 MBytes      652 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval          Transfer          Bandwidth      Retr
[ 4]  0.00-30.00     sec  2.33 GBytes      667 Mbits/sec    0
[ 4]  0.00-30.00     sec  2.33 GBytes      667 Mbits/sec
CPU Utilization: local/receiver 14.8% (5.3%/9.4%), remote/sender 1.1% (0.0%/1.0%)
```

Available TCP Bandwidth: 700 Mbit/s

3.5.3 TCP/http/TLS Protocol

- TCP = **T**ransport **C**ontrol **P**rotocol
- HTTP = **H**ypertext **T**ransfer **P**rotocol
- TLS = **T**ransport **L**ayer **S**ecurity

The TLS Protocol is not used for this Measurement Series because it would even worsen the Results because of his additional Handshakes.

3.0 Real Network Condition with Background Traffic

3.5.4 RTT = 1 ms

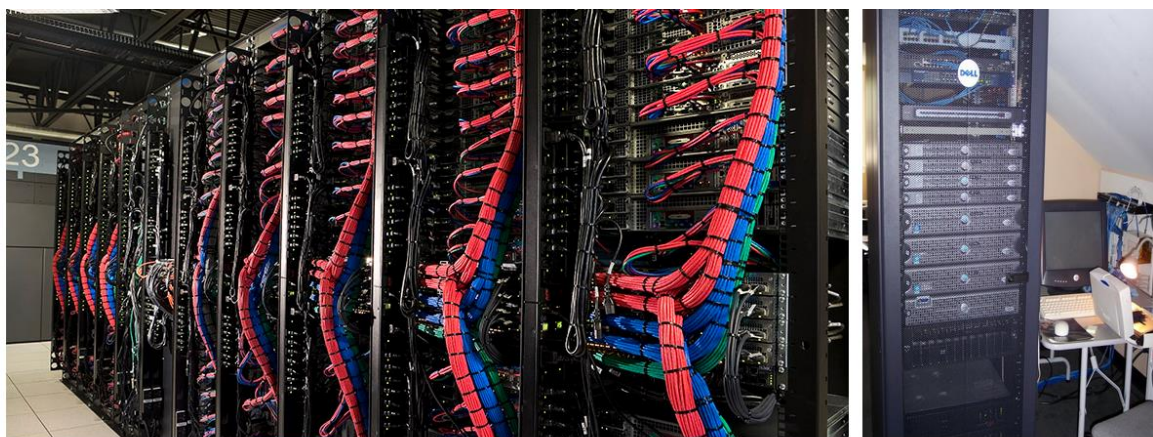
Bandwidth 700 Mbit/s

Latency 1 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
```

3.5.5.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms	1 s
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	116 ms		
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	131 ms		
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	163 ms		
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	131 ms		
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	178 ms		
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	163 ms		
200	GET	http-ss.com	HTTP-SS_Test_5.css	stylesheet	css	652 B	1.95 KB	0 ms		
200	GET	http-ss.com	index.css	stylesheet	css	776 B	5.27 KB	31 ms		
200	GET	http-ss.com	builtwithwwb11.png	img	png	2.78 KB	2.50 KB	47 ms		
200	GET	http-ss.com	img0002.png	img	png	373.20 KB	372.92 KB	100 ms		
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	63 ms		
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	63 ms		
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	132 ms		
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	147 ms		
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	0 ms		

20 requests 2.01 MB / 2.01 MB transferred Finish: 823 ms DOMContentLoaded: 71 ms **load: 820 ms**

Page Load Time: **820 ms**

3.0 Real Network Condition with Background Traffic

3.5.5.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!

Transferring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	0 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
200	GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	16 ms	
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	0 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	0 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	0 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	15 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	29 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	19 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	19 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	23 ms	
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	31 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB	18 ms	
200	GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred Finish: 580 ms DOMContentLoaded: 95 ms

Page Load Time: **580 ms**

3.0 Real Network Condition with Background Traffic

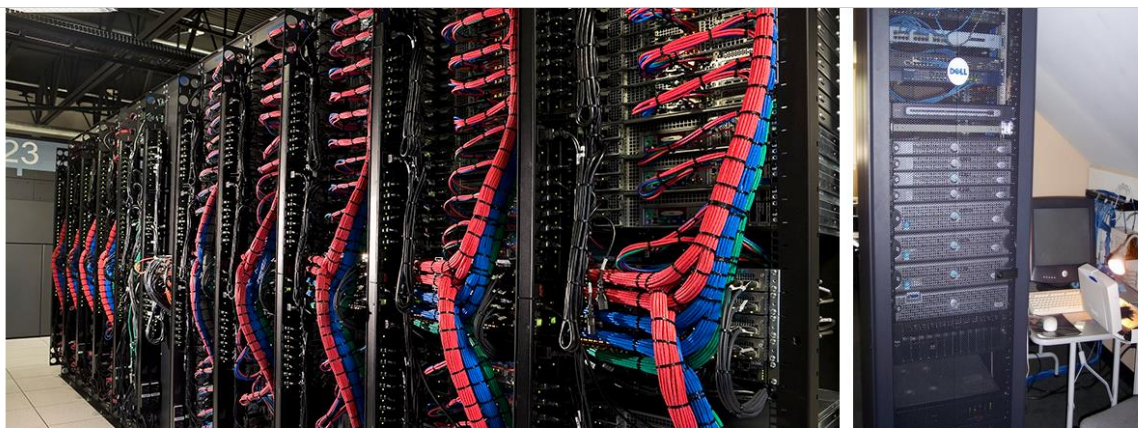
3.5.5 RTT = 25 ms

- # Bandwidth 700 Mbit/s
- # Latency 25 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=24ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=30ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=33ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=9ms TTL=64
```

3.5.5.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms	1
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	157 ms		
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	141 ms		
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	391 ms		
200	GET	http-ss.com	Satellite-dish-antenna-on-wall.jpg	img	jpeg	21.03 KB	20.74 KB	125 ms		
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	156 ms		
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	180 ms		
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	188 ms		
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	172 ms		
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	235 ms		
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	360 ms		
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	235 ms		
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	438 ms		
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	438 ms		
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	328 ms		
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B			47 ms

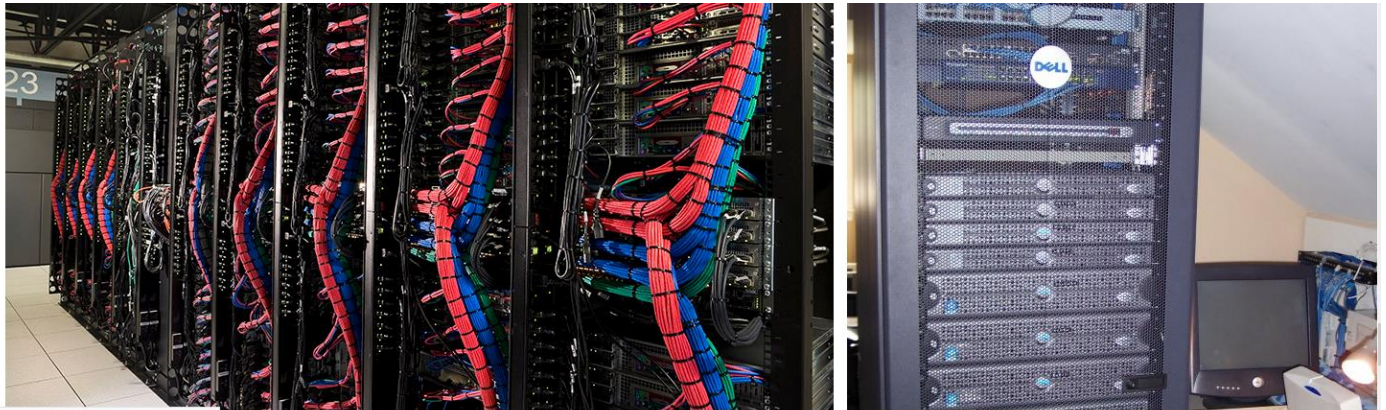
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 797 ms | DOMContentLoaded: 79 ms | **load: 682 ms**

Page Load Time: **682 ms**

3.0 Real Network Condition with Background Traffic

3.5.5.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Inspector Console Debugger **Network** Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	10 ms	
	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
200	GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	8 ms	
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	0 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	13 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	16 ms	
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	5 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	6 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	8 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	16 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	13 ms	
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	10 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	3 ms	
	GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred **Finish: 586 ms** DOMContentLoaded: 80 ms

Page Load Time: **586 ms**

3.0 Real Network Condition with Background Traffic

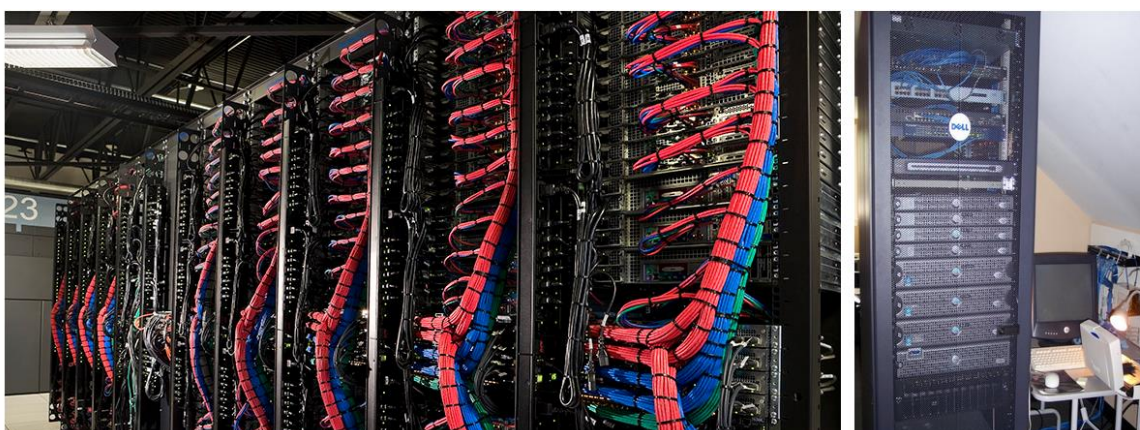
3.5.6 RTT = 50 ms

- # Bandwidth 700 Mbit/s
- # Latency 50 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=47ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=43ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=56ms TTL=64
```

3.5.6.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	236 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	251 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	720 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	266 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	266 ms	
200	GET	http-ss.com	pleiades-1a sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	313 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	328 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	297 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	406 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	656 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	375 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	938 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	734 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	609 ms	
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	63 ms	

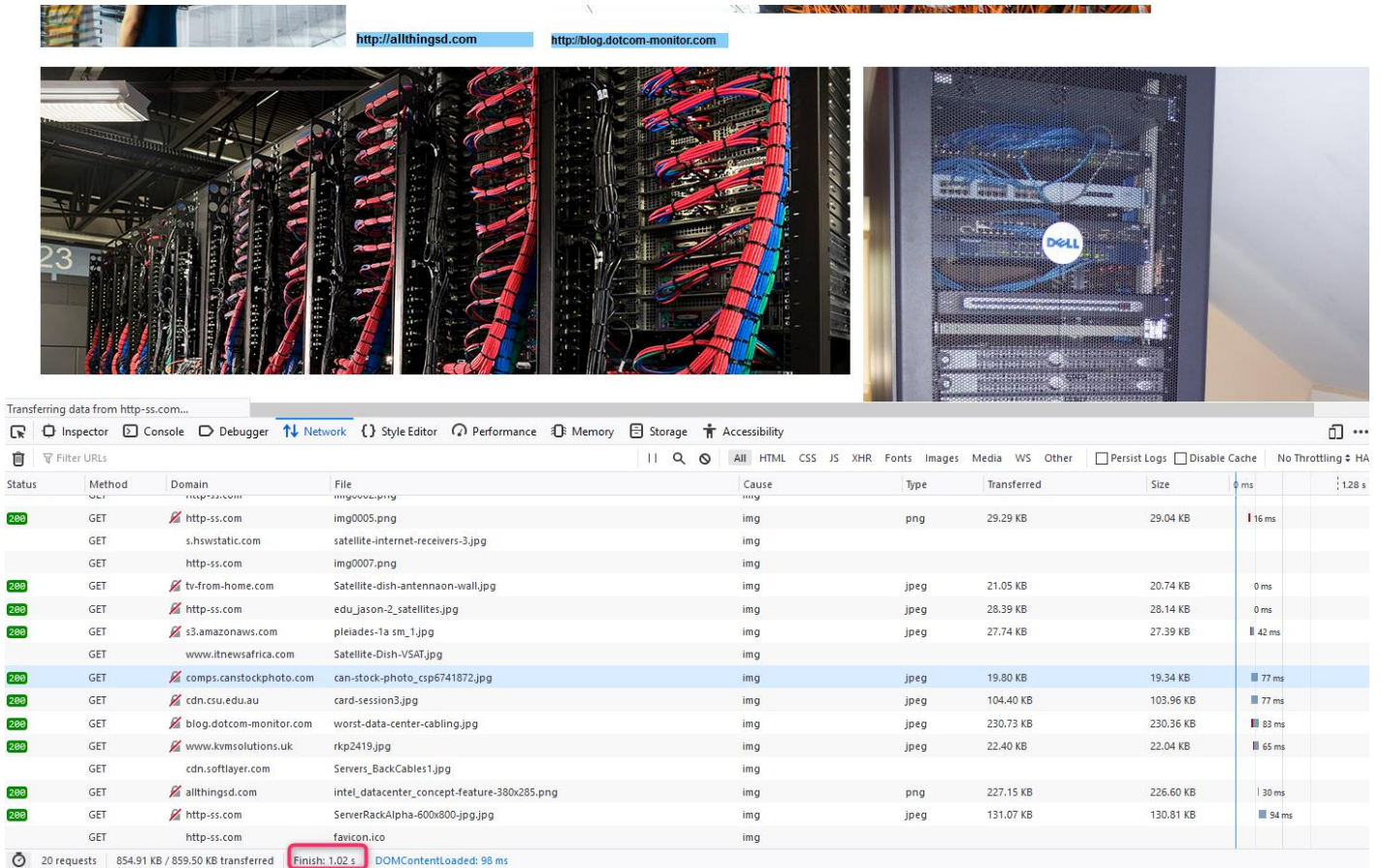
20 requests 2.01 MB / 2.01 MB transferred Finish: 1.20 s DOMContentLoaded: 183 ms load: 1.21 s

Page Load Time: **1,21 s**

3.0 Real Network Condition with Background Traffic

3.5.6.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Status	Method	Domain	File	Cause	Type	Transferred	Size	ms
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	16 ms
	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img				
	GET	http-ss.com	img0007.png	img				
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	0 ms
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	0 ms
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	42 ms
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img				
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	77 ms
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	77 ms
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	83 ms
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	65 ms
	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img				
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	30 ms
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	54 ms
	GET	http-ss.com	favicon.ico	img				

20 requests 854.91 KB / 859.50 KB transferred Finish: 1.02 s DOMContentLoaded: 98 ms

Page Load Time: **1,02 ms**

3.0 Real Network Condition with Background Traffic

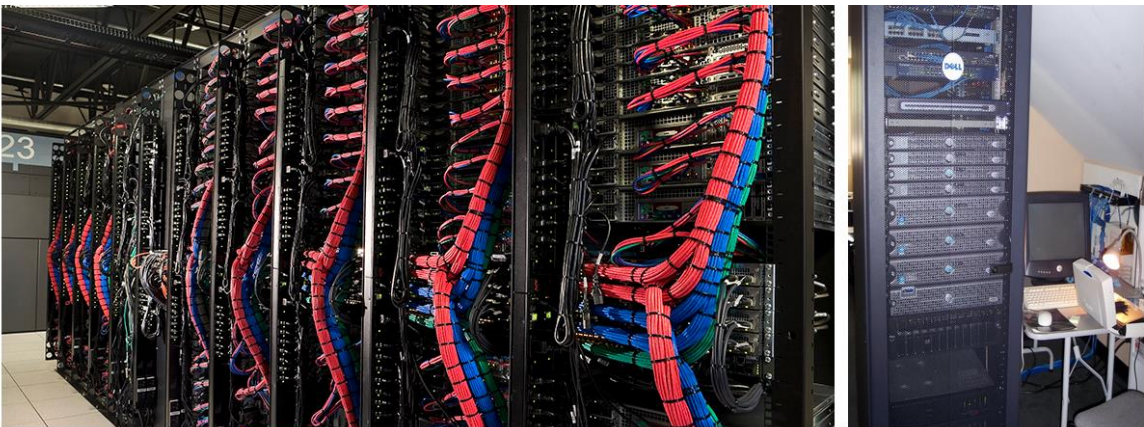
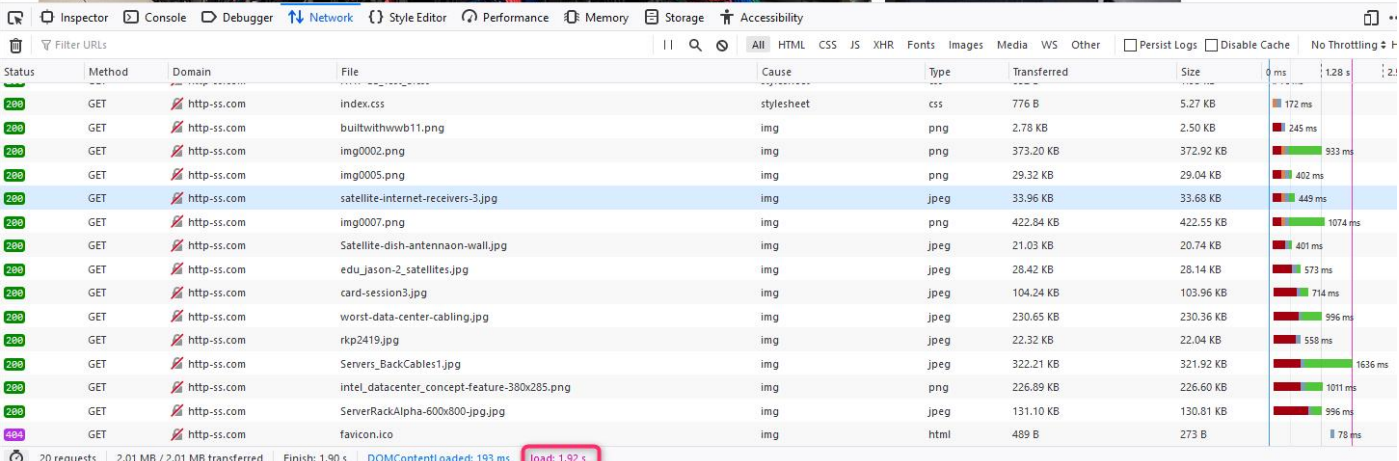
3.5.7 RTT = 75 ms

- # Bandwidth 700 Mbit/s
- # Latency 75 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=72ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=74ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=80ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=93ms TTL=64
```

3.5.7.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Status	Method	Domain	File	Cause	Type	Transferred	Size	ms
200	GET	http-ss.com	index.css	stylesheet	css	776 B	5.27 KB	172 ms
200	GET	http-ss.com	builtwithwvb11.png	img	png	2.78 KB	2.50 KB	245 ms
200	GET	http-ss.com	img0002.png	img	png	373.20 KB	372.92 KB	933 ms
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	402 ms
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	449 ms
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	1074 ms
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	401 ms
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	573 ms
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	714 ms
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	996 ms
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	559 ms
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	1636 ms
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	1011 ms
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	996 ms
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	78 ms

20 requests | 2.01 MB / 2.01 MB transferred | Finish: 1.90 s | DOMContentLoaded: 193 ms | **load: 1.92 s**

Page Load Time: **1,92 s**

3.0 Real Network Condition with Background Traffic

3.5.7.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!

Transferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	30 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	33 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	32 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg	19.80 KB	19.34 KB	120 ms	
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	104.40 KB	103.96 KB	130 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	230.73 KB	230.36 KB	190 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	22.40 KB	22.04 KB	206 ms	
200	GET	www.komsolutions.uk	rkp2419.jpg	img	jpeg	29.29 KB	29.04 KB	0 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	png	227.15 KB	226.60 KB	189 ms	
200	GET	http-ss.com	img0002.png	img	png				
200	GET	http-ss.com	img0005.png	img	png				
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	png				
200	GET	alithingsd.com	intel_datacenter_concept-feature-380x285.png	img	png				
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	ico				
200	GET	http-ss.com	favicon.ico	img					

20 requests | 724.09 KB / 728.43 KB transferred | Finish: 1.16 s | DOMContentLoaded: 185 ms

Page Load Time: **1,16 ms**

3.0 Real Network Condition with Background Traffic

3.5.8 RTT = 100 ms

- # Bandwidth 700 Mbit/s
- # Latency 100 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=105ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=94ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=95ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=106ms TTL=64
```

3.5.8.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

The screenshot shows a server room with rows of server racks and a workstation. Below it is a browser's network inspector for the URL 192.168.178.61. The network tab shows a list of 20 requests. The total page load time is highlighted as 1.80 s.

Status	Method	Domain	File	Cause	Type	Transferred	Size	0ms	1.28s	2.56s
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	625 ms		
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	625 ms		
200	GET	http-ss.com	img0002.png	img	png	373.20 KB	372.92 KB	1140 ms		
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	540 ms		
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	532 ms		
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	1329 ms		
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	516 ms		
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	640 ms		
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	907 ms		
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	1219 ms		
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	719 ms		
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	1454 ms		
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	1313 ms		
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	1250 ms		
200	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	125 ms		

20 requests | 2.01 MB / 2.01 MB transferred | Finish: 1.89 s | DOMContentLoaded: 269 ms | **load: 1.80 s**

Page Load Time: **1,80 s**

3.0 Real Network Condition with Background Traffic

3.5.8.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!

Transferring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	35 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	35 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	36 ms	
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	43 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	107 ms	
	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img					
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	129 ms	
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	13 ms	
	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
	GET	http-ss.com	img0007.png	img					
	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img					
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	85 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	81 ms	
	GET	http-ss.com	favicon.ico	img					

20 requests | 624.54 KB / 628.77 KB transferred | Finish: 1.16 s | DOMContentLoaded: 183 ms

Page Load Time: **1,16 s**

3.0 Real Network Condition with Background Traffic

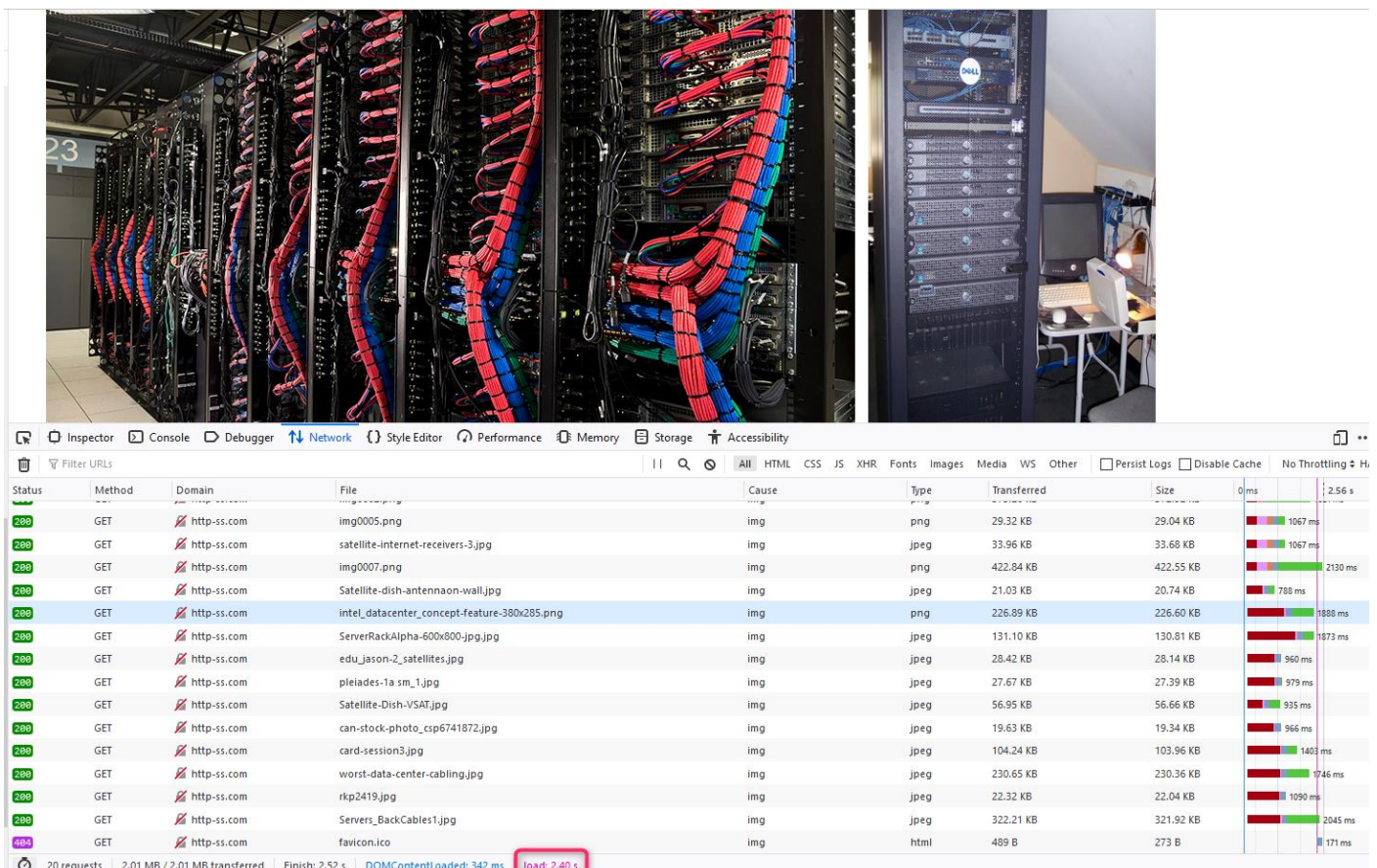
3.5.9 RTT = 150 ms

- # Bandwidth 700 Mbit/s
- # Latency 150 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=159ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=141ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=147ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=149ms TTL=64
```

3.5.9.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	2.56 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1067 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	1067 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	2130 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	788 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	1880 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	1873 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	960 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	979 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	935 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	966 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	1403 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	1746 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	1090 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	2045 ms	
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	171 ms	

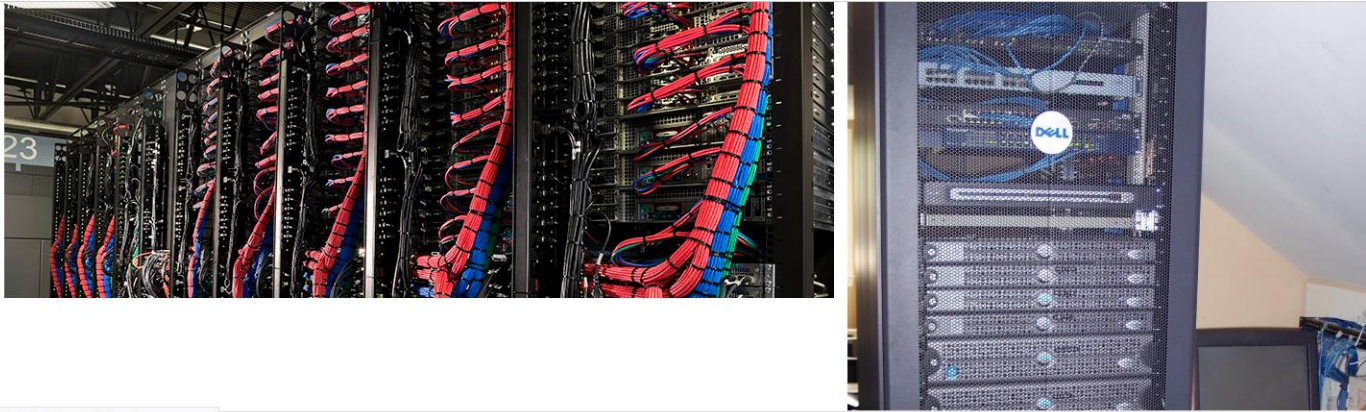
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 2.52 s | DOMContentLoaded: 342 ms | **load: 2.40 s**

Page Load Time: **2,40 s**

3.0 Real Network Condition with Background Traffic

3.5.9.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.12 s
200	GET	http-ss.com	img0002.png	img	png	2.73 KB	2.73 KB	1 ms	
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	15 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg				
200	GET	http-ss.com	img0007.png	img	png				
200	GET	tv-from-home.com	Satellite-dish-antenna-on-wall.jpg	img	jpeg	21.05 KB	20.74 KB	16 ms	
200	GET	http-ss.com	edu_jason_2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	16 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg				
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	106 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	101 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpg				
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	102 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpg				
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	100 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB	84 ms	
200	GET	http-ss.com	favicon.ico	img	ico				

20 requests 624.54 KB / 628.77 KB transferred Finish: 1.12 s DOMContentLoaded: 211 ms

Page Load Time: **1,12 s**

3.0 Real Network Condition with Background Traffic

3.5.10 RTT = 200 ms

- # Bandwidth 700 Mbit/s
- # Latency 200 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=205ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=196ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=191ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=188ms TTL=64
```

3.5.10.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	2.56 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1424 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	1448 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	2870 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	984 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	1222 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	1254 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	1236 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	1188 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	2007 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	2272 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	1396 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	2662 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	2426 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	2817 ms	
404	GET	http-ss.com	favicon.ico	img	html	489 B	273 B	203 ms	

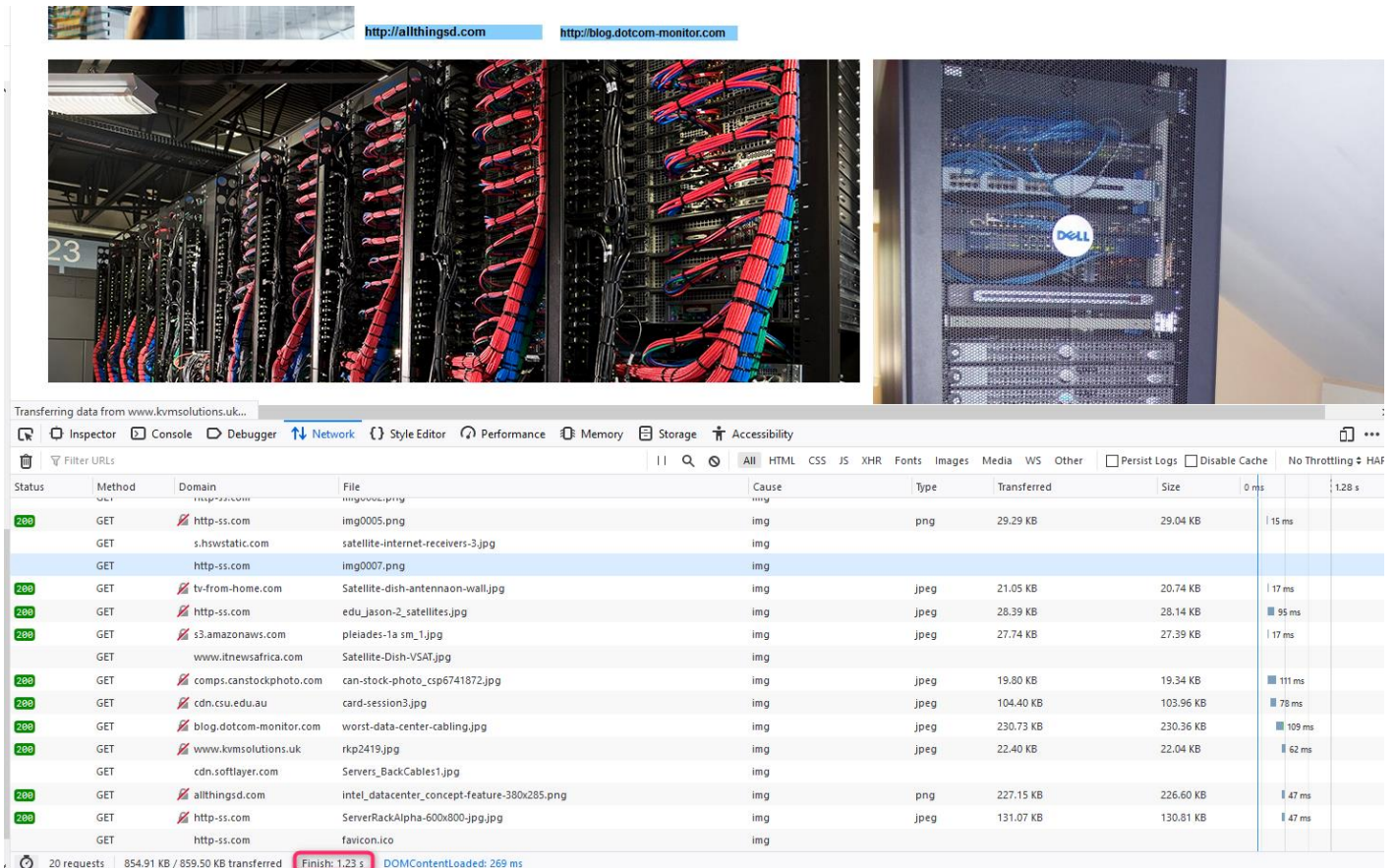
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 3.38 s | DOMContentLoaded: 462 ms | load: 3.33 s

Page Load Time: **3,33 s**

3.0 Real Network Condition with Background Traffic

3.5.10.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from www.kvmsolutions.uk...

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	15 ms	
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	17 ms	
200	GET	http-ss.com	edu_jason_2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	95 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	17 ms	
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	111 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	78 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	109 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	62 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	131.07 KB	130.81 KB	47 ms	
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	47 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB	47 ms	
200	GET	http-ss.com	favicon.ico	img	ico				

20 requests | 854.91 KB / 859.50 KB transferred | Finish: 1.23 s | DOMContentLoaded: 269 ms

Page Load Time: **1.23 s**

3.0 Real Network Condition with Background Traffic

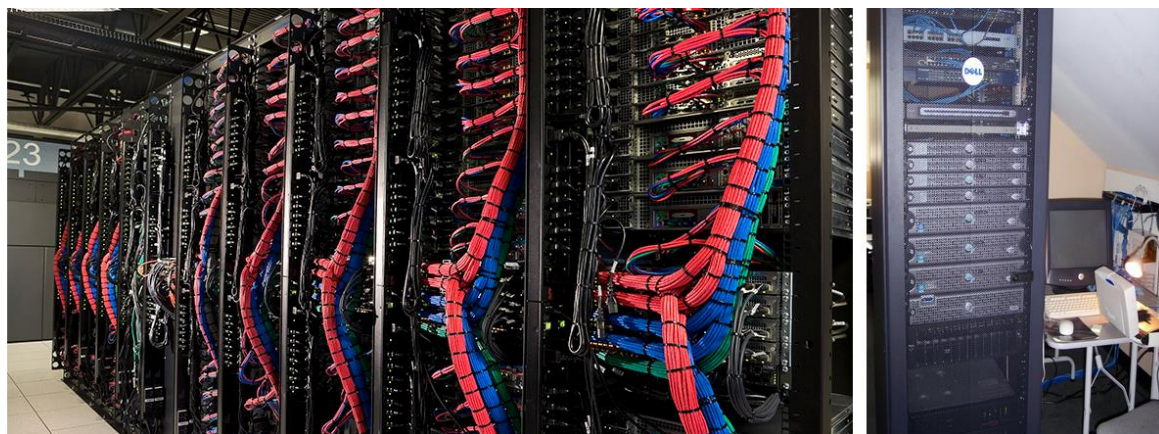
3.5.11 RTT = 300 ms

- # Bandwidth 700 Mbit/s
- # Latency 300 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=292ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=305ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=270ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=306ms TTL=64
```

3.5.11.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	5.12 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1191 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	2084 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	4192 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	1487 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	1804 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	1834 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	1760 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	1460 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	2657 ms	
200	GET	http-ss.com	worst-data-center-cablings.jpg	img	jpeg	230.65 KB	230.36 KB	3281 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	1781 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	3906 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	3295 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	3687 ms	
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	312 ms	

20 requests | 2.01 MB / 2.01 MB transferred | Finish: 4.86 s | DOMContentLoaded: 635 ms | **load: 4.60 s**

Page Load Time: **4,6 s**

3.0 Real Network Condition with Background Traffic

3.5.11.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from allthingsd.com...

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	128 s	2.56
200	GET	http-ss.com	img0000.png	img	png	29.29 KB	29.04 KB	15 ms		
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg					
200	GET	http-ss.com	img0007.png	img	png					
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	0 ms		
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	46 ms		
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	147 ms		
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	131 ms		
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	109 ms		
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	173 ms		
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	314 ms		
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpg					
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	533 ms		
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpg					
200	GET	http-ss.com	favicon.ico	img	ico					

20 requests | 724.09 KB / 728.43 KB transferred | Finish: 1.80 s | DOMContentLoaded: 377 ms

Page Load Time: **1,80 s**

3.0 Real Network Condition with Background Traffic

3.5.12 RTT = 400 ms

- # Bandwidth 700 Mbit/s
- # Latency 400 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=409ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=422ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=388ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=401ms TTL=64
```

3.5.12.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	5.12 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	2026 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	2026 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	4853 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	1614 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	2056 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	2058 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	2010 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	2038 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	3162 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	3990 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	2348 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	4770 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	4366 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	4662 ms	
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	375 ms	

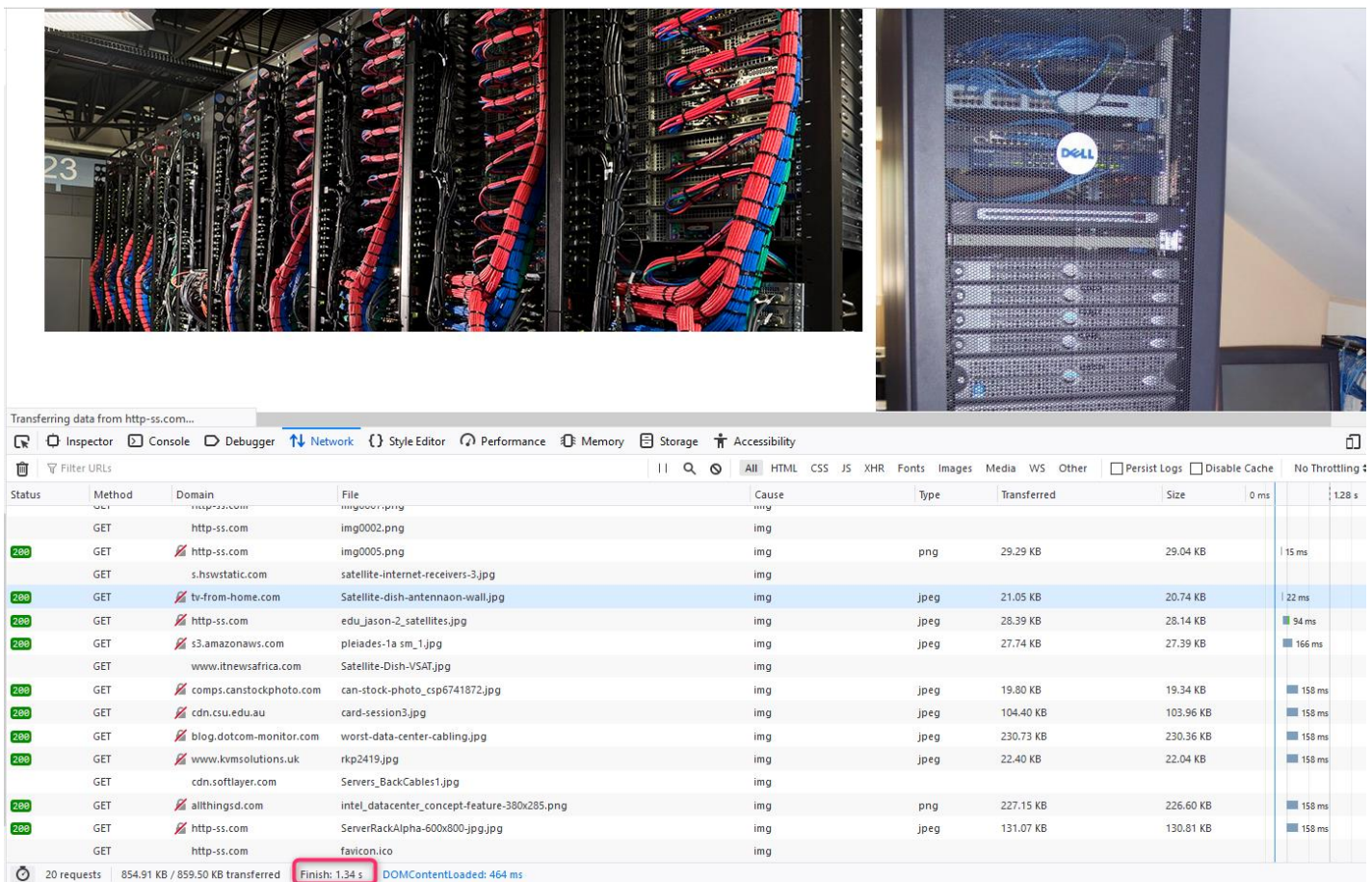
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 5.70 s | DOMContentLoaded: 826 ms | **load: 5.69 s**

Page Load Time: **5,69 s**

3.0 Real Network Condition with Background Traffic

3.5.12.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	http-ss.com	img0002.png	img					
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	15 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	22 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	94 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	166 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	158 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	158 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	158 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	158 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img					
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	158 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	158 ms	
200	GET	http-ss.com	favicon.ico	img					

20 requests | 854.91 KB / 859.50 KB transferred | **Finish: 1.34 s** | DOMContentLoaded: 464 ms

Page Load Time: **1,34 s**

3.0 Real Network Condition with Background Traffic

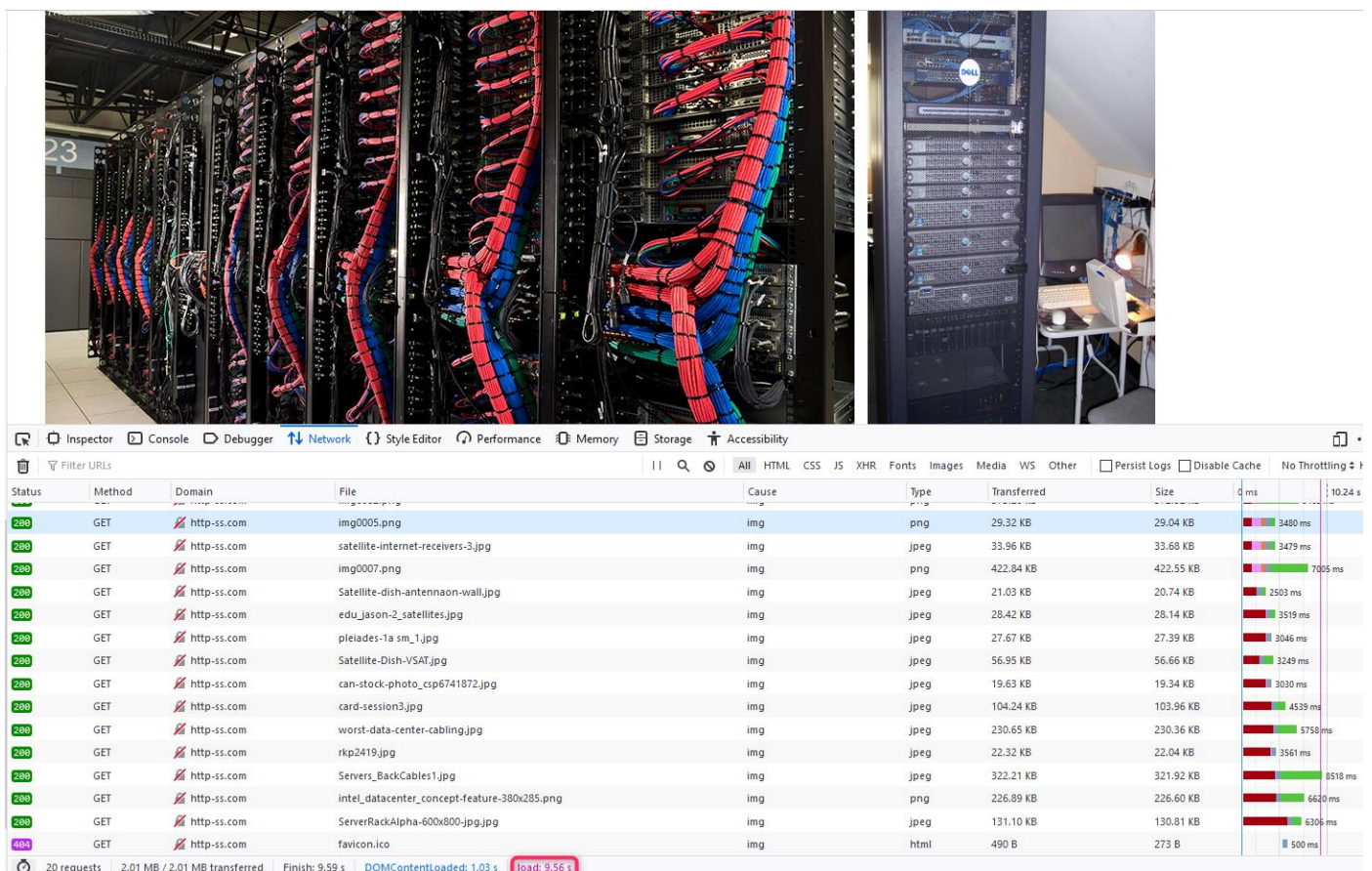
3.5.13 RTT = 500 ms

- # Bandwidth 700 Mbit/s
- # Latency 500 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=508ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=511ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=511ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=507ms TTL=64
```

3.5.13.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	Time
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	3480 ms
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	3479 ms
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	7005 ms
200	GET	http-ss.com	Satellite-dish-antenna-na-wall.jpg	img	jpeg	21.03 KB	20.74 KB	2593 ms
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	3519 ms
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	3046 ms
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	3249 ms
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	3030 ms
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	4539 ms
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	5758 ms
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	3561 ms
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	8518 ms
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	6620 ms
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	6306 ms
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	500 ms

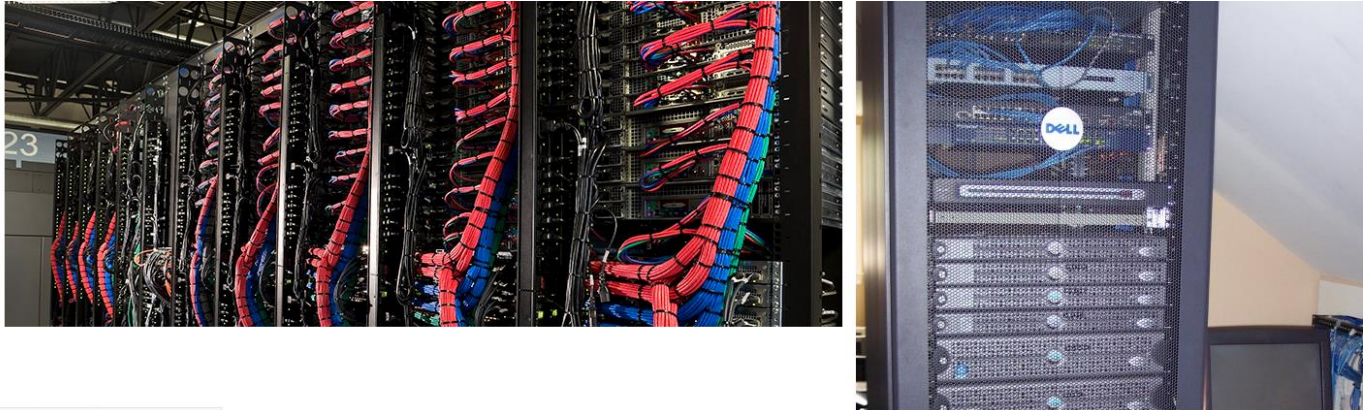
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 9.59 s | DOMContentLoaded: 1.03 s | **load: 9.56 s**

Page Load Time: **9,56 s**

3.0 Real Network Condition with Background Traffic

3.5.13.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	76 ms	
200	GET	http-ss.com	index.css	stylesheet	css	5.18 KB	4.93 KB	19 ms	
200	GET	http-ss.com	builtwithwb11.png	img	png	2.75 KB	2.50 KB	24 ms	
200	GET	http-ss.com	img0002.png	img					
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	6 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
200	GET	http-ss.com	img0007.png	img					
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	11 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	68 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	61 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	56 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img					
200	GET	alithingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	151 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB	160 ms	
200	GET	http-ss.com	favicon.ico	img					

20 requests | 854.91 KB / 859.50 KB transferred | **Finish: 1.43 s** | DOMContentLoaded: 569 ms

Page Load Time: **1.43 s**

3.0 Real Network Condition with Background Traffic

3.5.14 RTT = 600 ms

- # Bandwidth 700 Mbit/s
- # Latency 600 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=592ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=607ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=602ms TTL=64
```

3.5.15.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

192.168.178.61

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	4217 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	4245 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	7884 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	3043 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	3650 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	3647 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	3865 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	3615 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	4506 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	6606 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	4244 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	7493 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	7272 ms	
200	GET	http-ss.com	ServerRackAlpha-600x300-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	6620 ms	
200	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	556 ms	

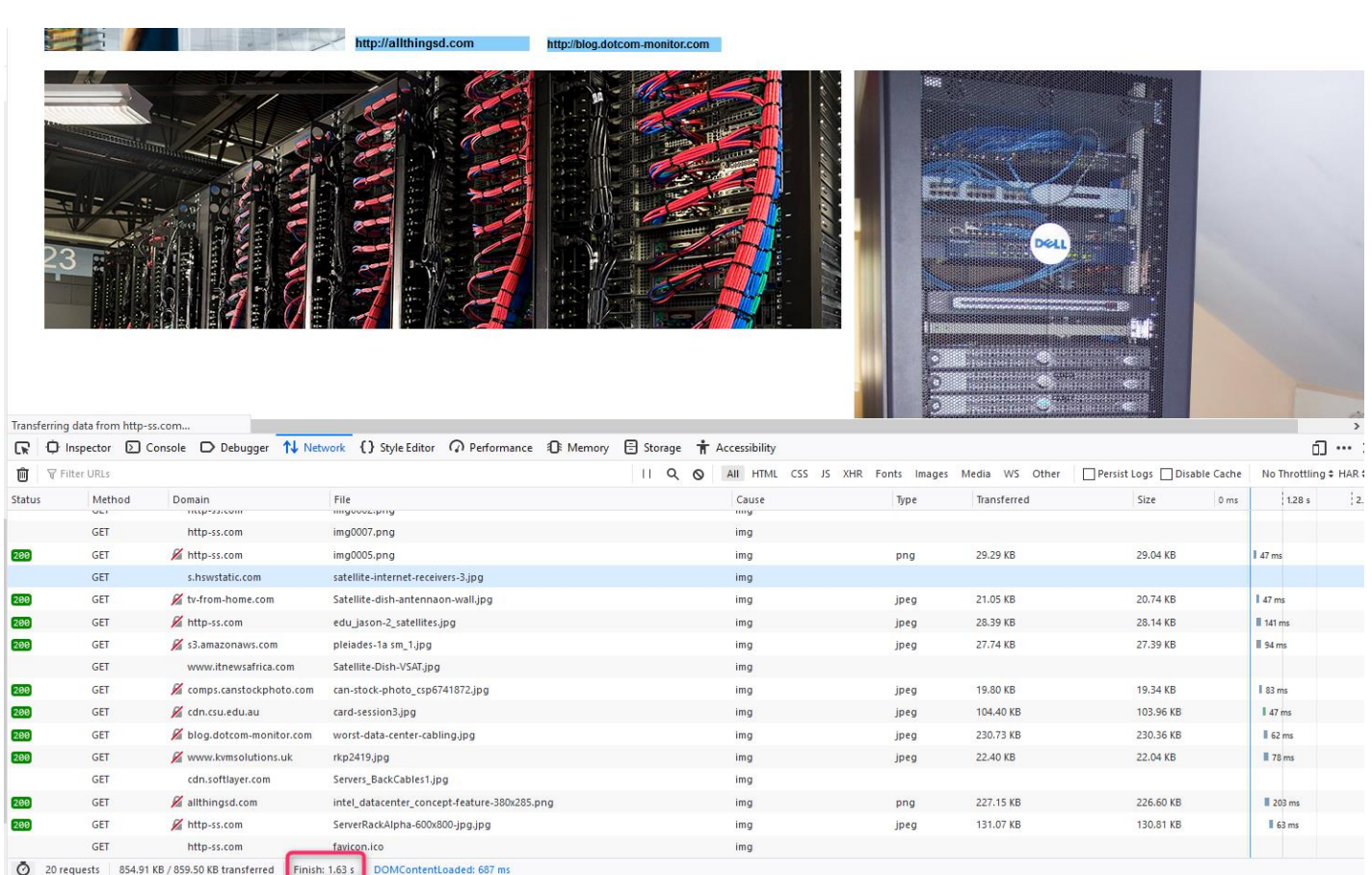
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 9.17 s | DOMContentLoaded: 1.26 s | **load: 8.75 s**

Page Load Time: **8,75 s**

3.0 Real Network Condition with Background Traffic

3.5.15.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



The screenshot shows a browser's developer tools network tab with 20 requests. The 'Finish' time for the last request is highlighted in red as 1.63 s. The table below represents the data shown in the network tab:

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s	2
200	GET	http-ss.com	img0007.png	img						
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB		47 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img						
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB		47 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		141 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		94 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img						
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		83 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		47 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		62 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		78 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img						
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		203 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB		63 ms	
200	GET	http-ss.com	favicon.ico	img						

Summary: 20 requests, 854.91 KB / 859.50 KB transferred, Finish: 1.63 s, DOMContentLoaded: 687 ms

Page Load Time: **1.63 s**

3.0 Real Network Condition with Background Traffic

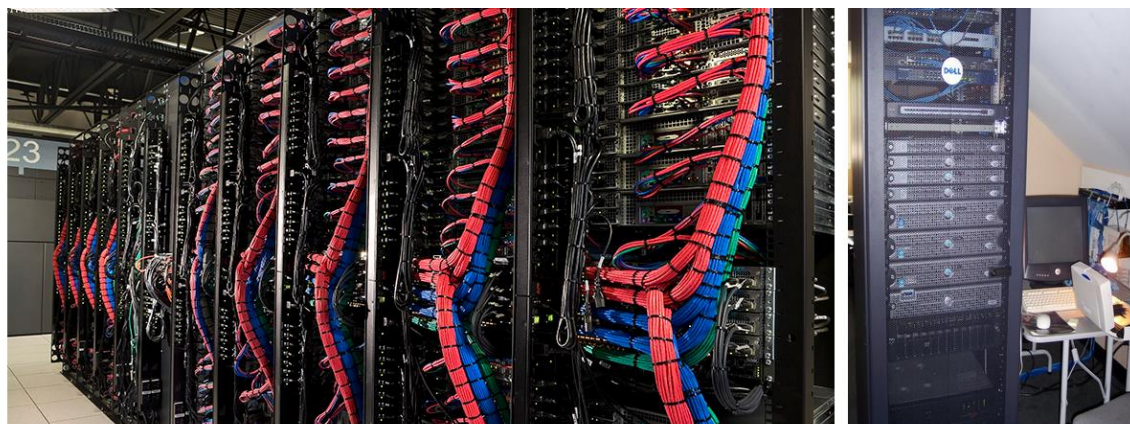
3.5.15 RTT = 700 ms

- # Bandwidth 700 Mbit/s
- # Latency 700 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=697ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=717ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=687ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=699ms TTL=64
```

3.5.15.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	4940 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	3504 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	7661 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	3534 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	4237 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	4254 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	4222 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	4237 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	7081 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	7037 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	5629 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	8472 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	8597 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	7732 ms	
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	703 ms	

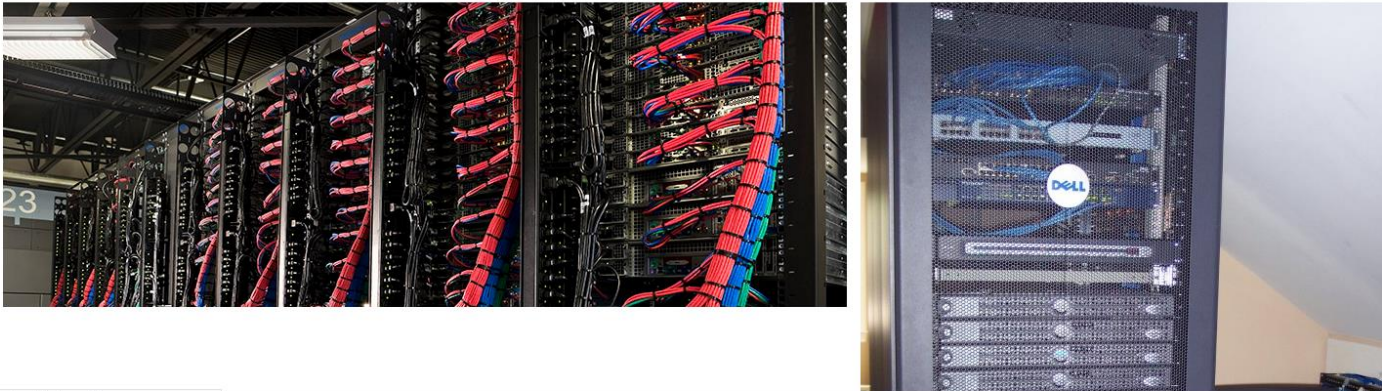
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 10.07 s | DOMContentLoaded: 1.44 s | **load: 10.05 s**

Page Load Time: **10,05 s**

3.0 Real Network Condition with Background Traffic

3.5.15.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	128 s
200	GET	http-ss.com	img0002.png	img	png	27.04 KB	27.04 KB	0 ms	128 s
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg	27.74 KB	27.74 KB	30 ms	
200	GET	http-ss.com	img0007.png	img	png	28.14 KB	28.14 KB	31 ms	
200	GET	tv-from-home.com	Satellite-dish-antenna-on-wall.jpg	img	jpeg	21.05 KB	20.74 KB	30 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	31 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	32 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg	27.74 KB	27.39 KB	32 ms	
200	GET	http-ss.com	img0002.png	img	png	27.04 KB	27.04 KB	0 ms	128 s
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	29 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	63 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	59 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	47 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpg	22.40 KB	22.04 KB	47 ms	
200	GET	allthingsd.com	inte_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	144 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	85 ms	
200	GET	http-ss.com	favicon.ico	img	ico				

20 requests 854.91 KB / 859.50 KB transferred Finish: 1.65 s DOMContentLoaded: 763 ms

Page Load Time: **1,65 s**

3.0 Real Network Condition with Background Traffic

3.5.16 RTT = 800 ms

- # Bandwidth 700 Mbit/s
- # Latency 800 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=792ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=795ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=797ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=799ms TTL=64
```

3.5.16.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	4011 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	4056 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	8029 ms	
200	GET	http-ss.com	Satellite-dish-antenna-on-wall.jpg	img	jpeg	21.03 KB	20.74 KB	7241 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	7240 ms	
200	GET	http-ss.com	ptelades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	4768 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.66 KB	56.66 KB	7157 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	8008 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	6304 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	7307 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	7198 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	6425 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	6411 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	4874 ms	
200	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	813 ms	

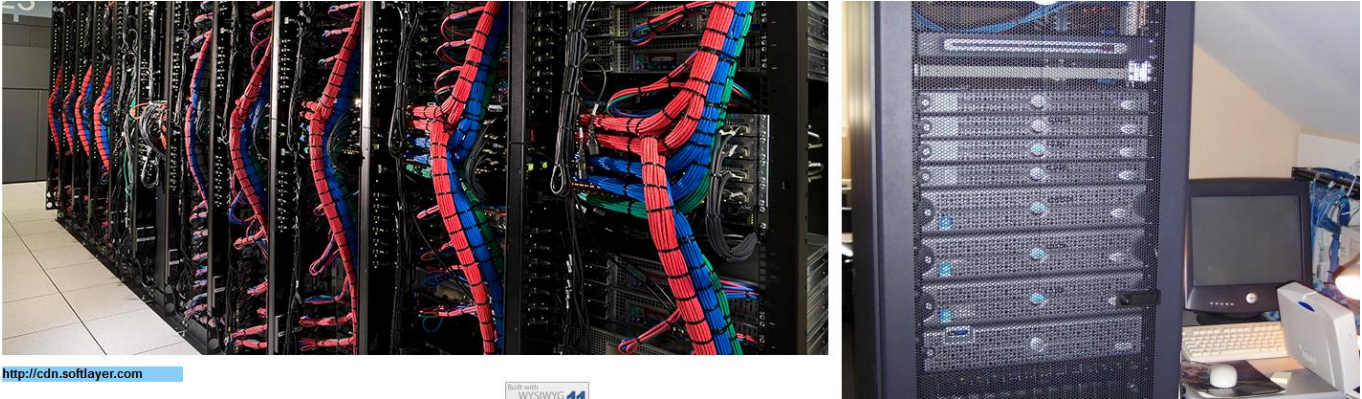
20 requests 2.01 MB / 2.01 MB transferred Finish: 9.70 s DOMContentLoaded: 1.64 s **load: 10.66 s**

Page Load Time: **10,66 s**

3.0 Real Network Condition with Background Traffic

3.5.16.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



http://cdn.softlayer.com

Transferring data from http-ss.com...

Inspector Console Debugger **Network** Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s	2.56 s
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB		15 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpeg					
200	GET	http-ss.com	img0007.png	img	png					
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB		15 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		15 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		16 ms	
200	GET	www.itnewsafrika.com	Satellite-Dish-V5Af.jpg	img	jpeg					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		62 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		93 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		31 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		94 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB		94 ms	
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		109 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg					
200	GET	http-ss.com	favicon.ico	img	ico					

20 requests 1.02 MB / 1.03 MB transferred Finish: 1.97 s DOMContentLoaded: 875 ms

Page Load Time: **1.97 s**

3.0 Real Network Condition with Background Traffic

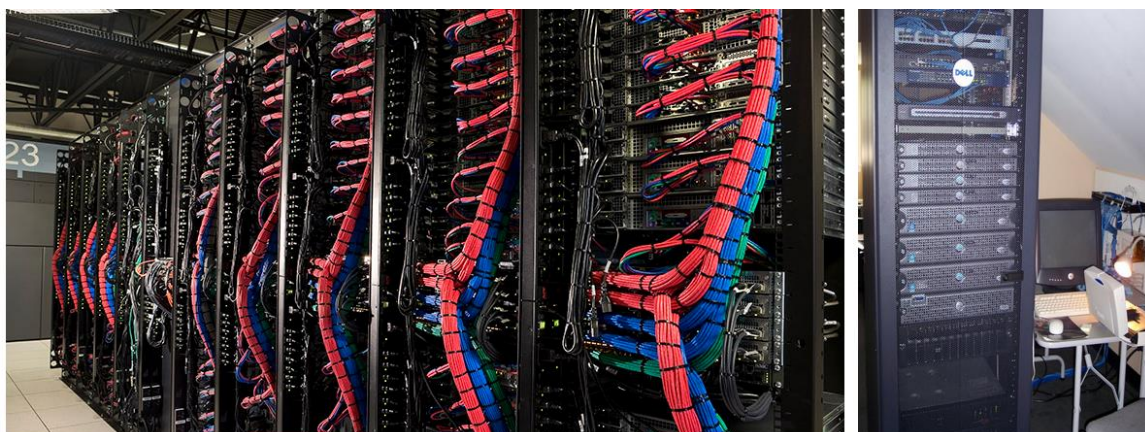
3.5.17 RTT = 900 ms

- # Bandwidth 700 Mbit/s
- # Latency 900 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=919ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=905ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=926ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=876ms TTL=64
```

3.5.17.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	3580 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	3583 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	8891 ms	
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	7838 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.14 KB	28.14 KB	7198 ms	
200	GET	http-ss.com	pleiades-la_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	5103 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	8136 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	8119 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	6916 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	8135 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	7202 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	7202 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	6295 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	5435 ms	
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	885 ms	

20 requests 2.01 MB / 2.01 MB transferred Finish: 10.03 s DOMContentLoaded: 1.85 s **load: 11.38 s**

Page Load Time: **11,38 s**

3.0 Real Network Condition with Background Traffic

3.5.17.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s	2.56 s
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB		17 ms	
200	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpeg	21.05 KB	20.74 KB		15 ms	
200	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	28.39 KB	28.14 KB		15 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	27.74 KB	27.39 KB		15 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg					
200	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg					
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		94 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		109 ms	
200	GET	http-ss.com	img0007.png	img	png					
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		47 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		63 ms	
200	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg					
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		47 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB		94 ms	
200	GET	http-ss.com	favicon.ico	img	ico					

20 requests 854.91 KB / 859.50 KB transferred Finish: 1.88 s DOMContentLoaded: 941 ms

Page Load Time: **1.88 s**

3.0 Real Network Condition with Background Traffic

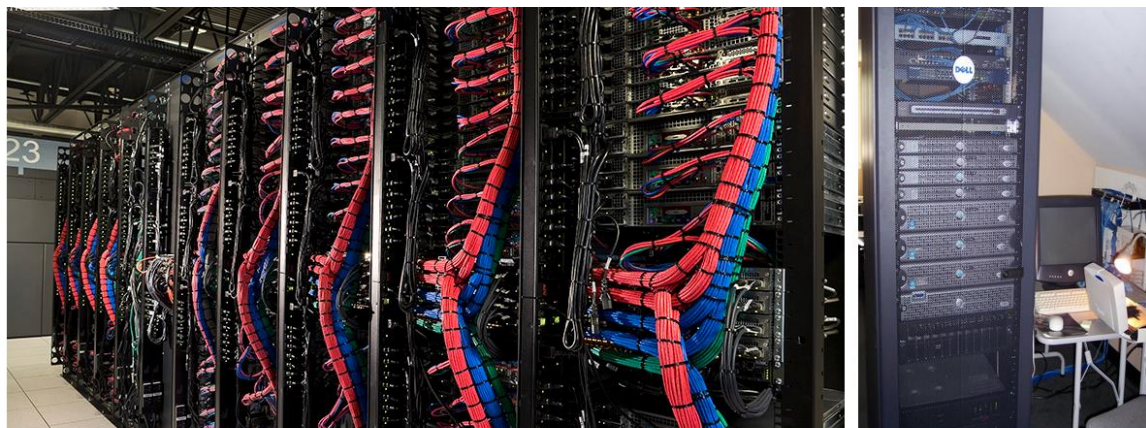
3.5.18 RTT = 1 000 ms

- # Bandwidth 700 Mbit/s
- # Latency 1000 ms
- # Jitter 25 %
- # Distribution Normal

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=997ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1003ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=991ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
```

3.5.18.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10 24 s
200	GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	4991 ms	
200	GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	5022 ms	
200	GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	8034 ms	11016 ms
200	GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	20.74 KB	20.74 KB	7066 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	8547 ms	
200	GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	5503 ms	
200	GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.66 KB	56.66 KB	8003 ms	
200	GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	10011 ms	
200	GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	7533 ms	
200	GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	9075 ms	
200	GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	8034 ms	
200	GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	7963 ms	
200	GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	7000 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	6044 ms	
404	GET	http-ss.com	favicon.ico	img	html	490 B	273 B	1002 ms	

20 requests 2.01 MB / 2.01 MB transferred Finish: 13.08 s DOMContentLoaded: 2.04 s **load: 12.10 s**

Page Load Time: **12,10 s**

3.0 Real Network Condition with Background Traffic

3.5.18.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Transferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility

Filter URLs

Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s	2.56 s
200	GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB		1.47 ms	
	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img						
	GET	http-ss.com	img0007.png	img						
200	GET	tv-from-home.com	Satellite-dish-antenna-on-wall.jpg	img	jpeg	21.05 KB	20.74 KB		1.47 ms	
200	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		62 ms	
200	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		78 ms	
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img						
200	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		94 ms	
200	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		81 ms	
200	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		78 ms	
200	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		64 ms	
	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img						
200	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		63 ms	
200	GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.07 KB	130.81 KB		140 ms	
	GET	http-ss.com	favicon.ico	img						

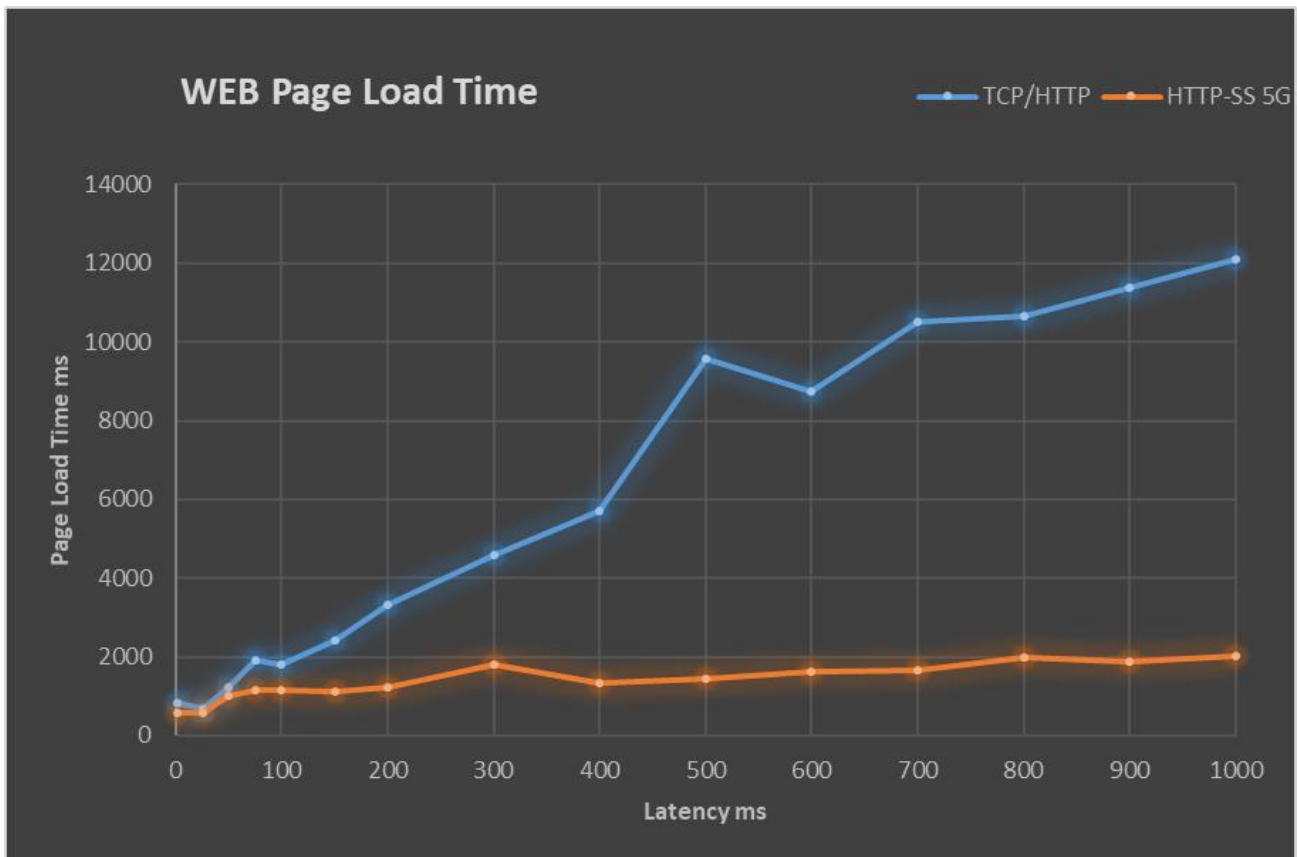
20 requests 854.91 KB / 859.50 KB transferred Finish: 2.03 s DOMContentLoaded: 1.07 s

Page Load Time: **2.03 s**

3.0 Real Network Condition with Background Traffic

3.5.19 Benchmark Summary

Latency ms	WEB Page Load Time / ms	
	TCP/HTTP	700 Mbit/s HTTP-QuSS
1	820	580
25	682	586
50	1210	1020
75	1920	1160
100	1800	1160
150	2400	1120
200	3330	1230
300	4600	1800
400	5690	1320
500	9560	1430
600	8750	1630
700	10500	1650
800	10660	1970
900	11380	1880
1000	12100	2030



4.0 LAB Network Condition

4.0 LAB Network Condition

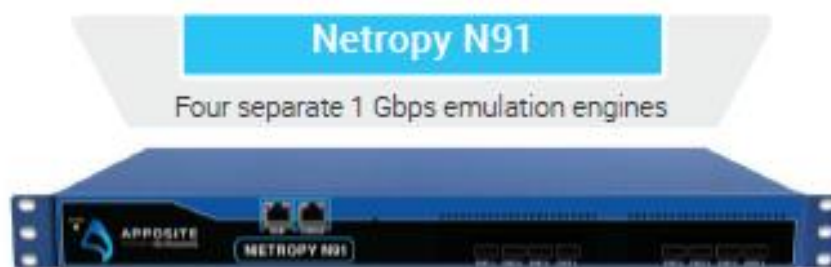
An isolated test bed in a clear lab environment with fully available 1 Gbit/s bandwidth and a realistic simulated up- and downlink satellite connection with a Hardware supported Network Emulator.

4.1 Netropy – N91 Network Emulator

Apposite’s Netropy network emulators offer advanced capabilities to benchmark, troubleshoot, and optimize the performance of critical applications. Netropy’s unique, high-performance Emulation Engine enables high-precision emulation of up to 15 separate WAN links to model complex network topologies or run multiple concurrent tests. Each link is configured with its own bandwidth, latency, loss and other properties. Packets can be assigned to the appropriate link by IP address range, VLAN, application port number, or any other packet identifier.

Netropy models are available with up to 4 separate Emulation Engines per unit, and capacities up to 100 Gbps. Netropy is also available in a software version, NetropyVE, that runs as a virtual machine in virtual test environments.

Netropy network emulators are configured and managed through an intuitive, browser-based interface for easy operation, or through a comprehensive command line interface for integration with test automation tools.



4.1.1 Features

Multiple Links

Simulate up to 15 separate WAN links through each Emulation Engine.

Multiple Engines

Take advantage of multiple Emulation Engines in the N91, 10G2 and 10G4 models for concurrent testing or multi-user environments.

4.0 LAB Network Condition

Packet filtering

Assign packets to different links by IP address, VLAN, or any other packet identifier.

Bandwidths up to 100 Gbps

Accurately simulate links from 100 bits per second up to 100 Gbps.

Latency up to 20 sec.

Emulate delay and jitter of 10 seconds or more in each direction, in increments of 0.01 ms.

Flexible interfaces

The N61 and N91 are available with copper or SFP ports. The 10G1 and 10G2 offer 1/10 Gbps dual rate SFP+ ports for easy integration into 1 or 10 Gbps networks.

Loss & Corruption

Set random, burst, or periodic packet loss. Test the effect of corruption on voice and video applications.

Capture & Replay

Record the delay and loss characteristics of the production network as they vary second-by-second and replay them through the Netropy emulator.

Background Utilization

Test how applications run over a congested network without costly traffic generators or a rack full of client machines using Netropy's unique background utilization and PCAP replay features.

Traffic Monitor

View and download up to 24 hours of throughput graphs and link statistics.

Automated Testing

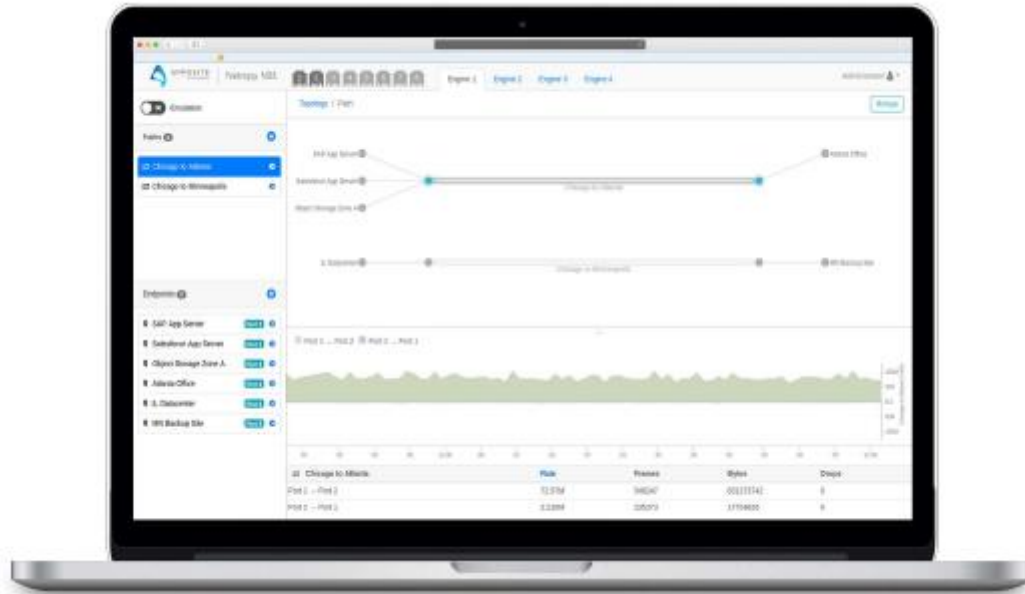
Automate testing using the comprehensive command line interface.

Unsurpassed Precision

Test with confidence — the high-precision Netropy Emulation Engine ensures accurate and reproducible results.

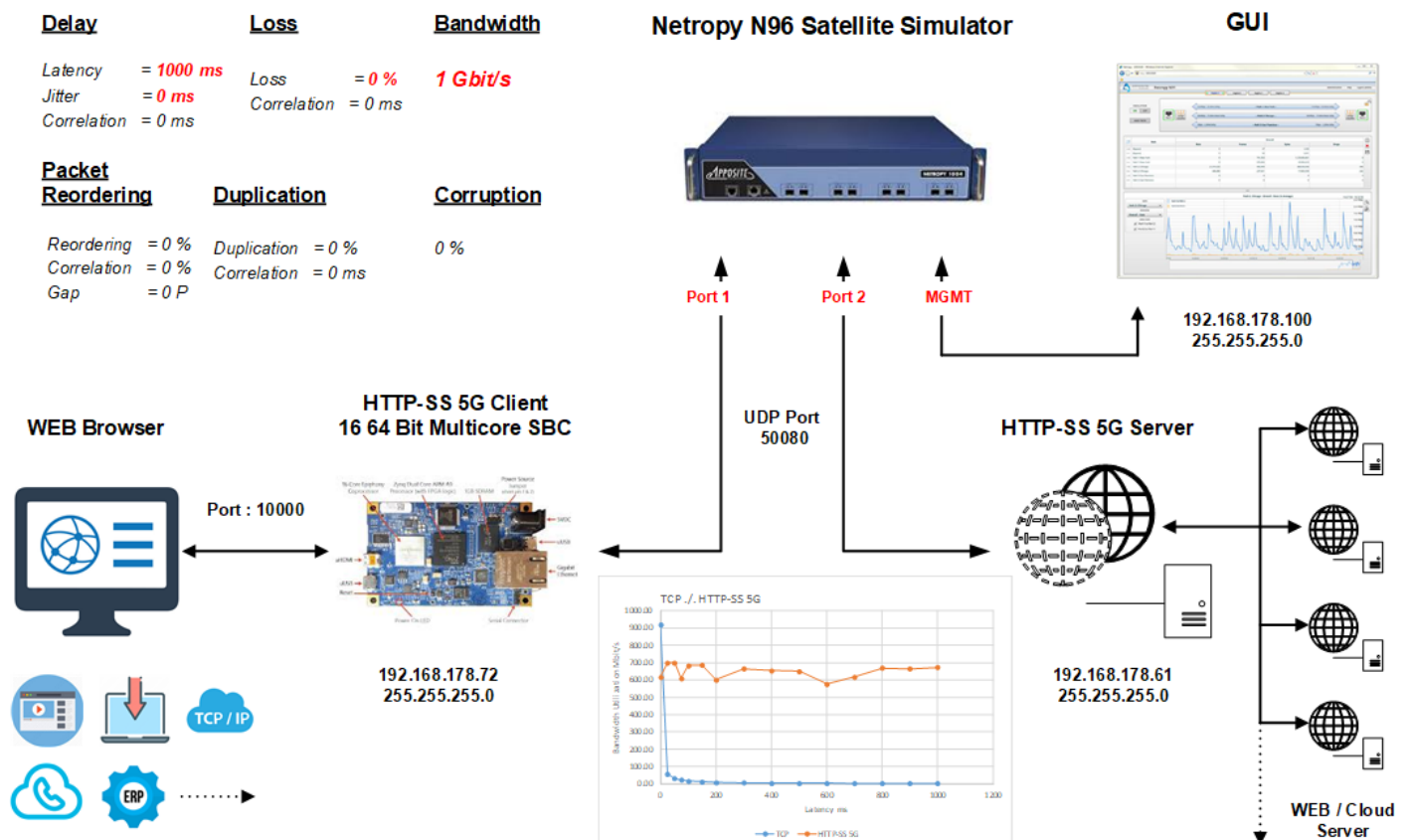
4.0 LAB Network Condition

4.1.2 WEB User Interface



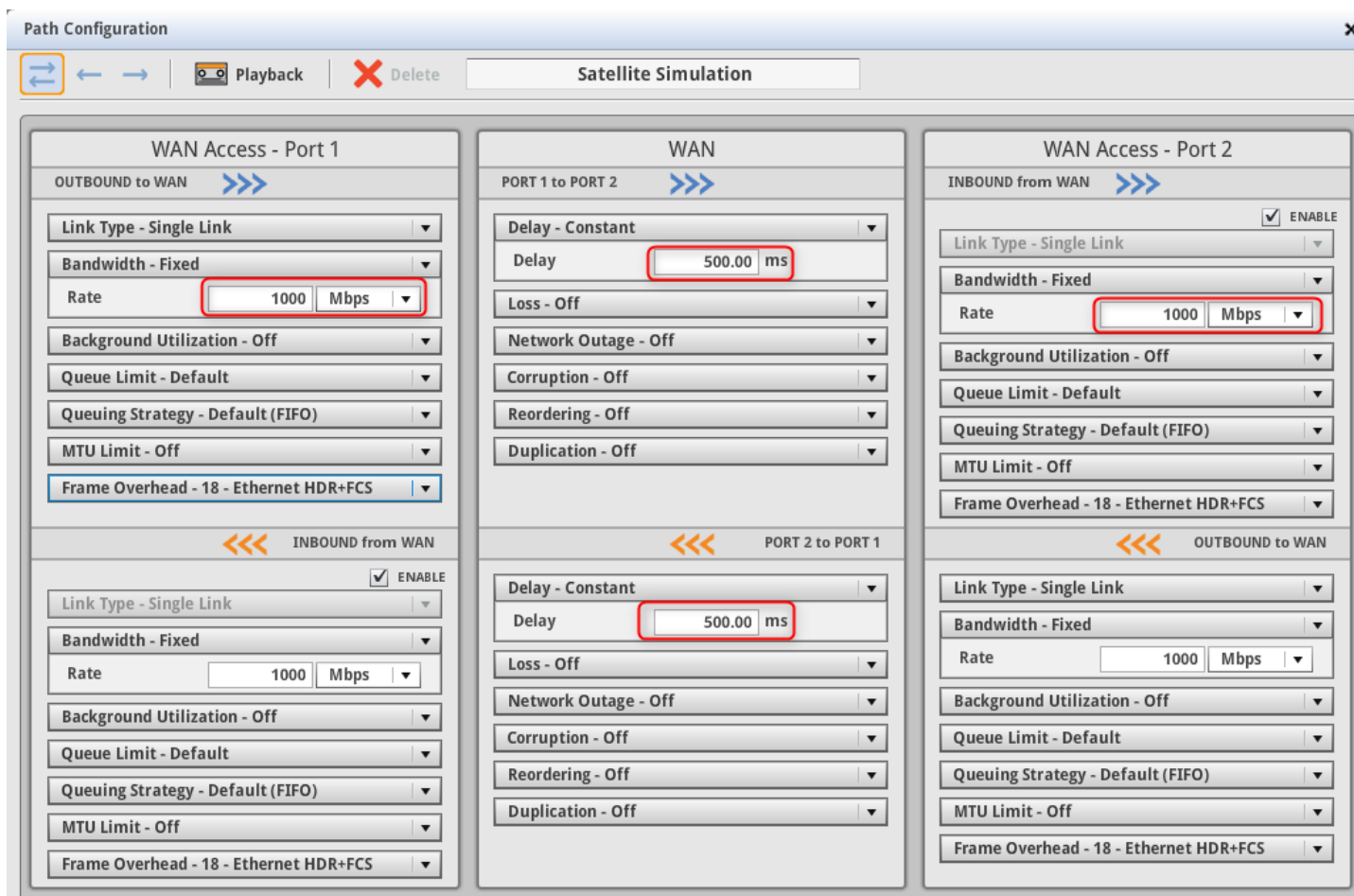
4.2 Initial Functional Tests

4.2.1 Test Environment



4.0 LAB Network Condition

4.2.2 Satellite Simulation Settings



The screenshot shows the 'Path Configuration' window for 'Satellite Simulation'. It is divided into three main sections:

- WAN Access - Port 1:**
 - OUTBOUND to WAN: Link Type - Single Link, Bandwidth - Fixed, Rate: 1000 Mbps, Background Utilization - Off, Queue Limit - Default, Queuing Strategy - Default (FIFO), MTU Limit - Off, Frame Overhead - 18 - Ethernet HDR+FCS.
 - INBOUND from WAN: ENABLE checked, Link Type - Single Link, Bandwidth - Fixed, Rate: 1000 Mbps, Background Utilization - Off, Queue Limit - Default, Queuing Strategy - Default (FIFO), MTU Limit - Off, Frame Overhead - 18 - Ethernet HDR+FCS.
- WAN:**
 - PORT 1 to PORT 2: Delay - Constant, Delay: 500.00 ms, Loss - Off, Network Outage - Off, Corruption - Off, Reordering - Off, Duplication - Off.
 - PORT 2 to PORT 1: Delay - Constant, Delay: 500.00 ms, Loss - Off, Network Outage - Off, Corruption - Off, Reordering - Off, Duplication - Off.
- WAN Access - Port 2:**
 - INBOUND from WAN: ENABLE checked, Link Type - Single Link, Bandwidth - Fixed, Rate: 1000 Mbps, Background Utilization - Off, Queue Limit - Default, Queuing Strategy - Default (FIFO), MTU Limit - Off, Frame Overhead - 18 - Ethernet HDR+FCS.
 - OUTBOUND to WAN: Link Type - Single Link, Bandwidth - Fixed, Rate: 1000 Mbps, Background Utilization - Off, Queue Limit - Default, Queuing Strategy - Default (FIFO), MTU Limit - Off, Frame Overhead - 18 - Ethernet HDR+FCS.

4.2.3 Ping Test for Satellite Simulation

192.168.178.72 ↔ 192.168.178.61

Ping 192.168.178.61

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
```


4.0 LAB Network Condition

4.3 TCP Bandwidth – Latency Dependency

Available Layer 1 Bitstream Bandwidth : **1000 Mbit/s**

4.3.1 iPerf3 - Network Performance Measurement Tool

4.3.1.1 Starting iperf3 Server

Starting iPerf3 on HTTP-QuSS Server 192.168.178.61 as Domain on Port 5200

```
./iperf3 -s -D -p 5200
```

4.3.1.2 Using iperf3 Client

```
./iperf3 -c 192.168.178.61 -p 5200 -R -t 30 -V
```

```
-c      As Client
-p      Port 5200
-R      Run in Reverse Mode (Server sends, Client receives)
-t      Time in seconds to transmit = 30 s
-V      More detailed output
```

4.0 LAB Network Condition

4.3.2 TCP - max Bandwidth with RTT = 1 ms

```

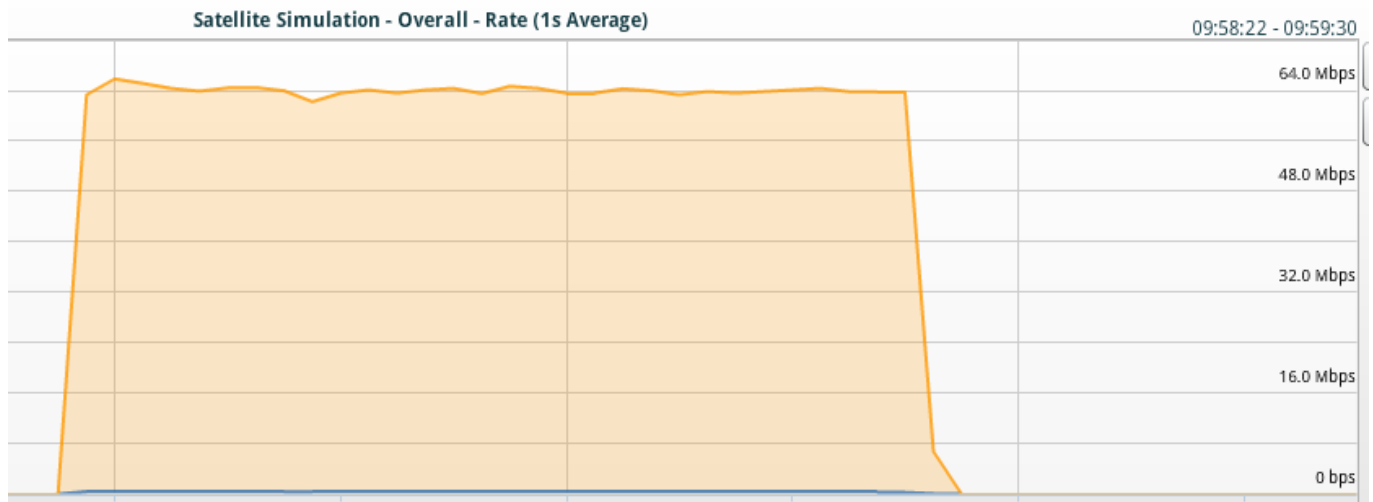
4] local 192.168.178.72 port 61814 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
ID] Interval      Transfer      Bandwidth
4]  0.00-1.00    sec  113 MBytes  951 Mbits/sec
4]  1.00-2.00    sec  112 MBytes  937 Mbits/sec
4]  2.00-3.00    sec  112 MBytes  940 Mbits/sec
4]  3.00-4.00    sec  112 MBytes  939 Mbits/sec
4]  4.00-5.00    sec  112 MBytes  939 Mbits/sec
4]  5.00-6.00    sec  111 MBytes  934 Mbits/sec
4]  6.00-7.00    sec  112 MBytes  939 Mbits/sec
4]  7.00-8.00    sec  112 MBytes  943 Mbits/sec
4]  8.00-9.00    sec  113 MBytes  946 Mbits/sec
4]  9.00-10.00   sec  112 MBytes  939 Mbits/sec
4] 10.00-11.00   sec  112 MBytes  939 Mbits/sec
4] 11.00-12.00   sec  113 MBytes  949 Mbits/sec
4] 12.00-13.00   sec  113 MBytes  944 Mbits/sec
4] 13.00-14.00   sec  113 MBytes  949 Mbits/sec
4] 14.00-15.00   sec  113 MBytes  949 Mbits/sec
4] 15.00-16.00   sec  113 MBytes  949 Mbits/sec
4] 16.00-17.00   sec  113 MBytes  949 Mbits/sec
4] 17.00-18.00   sec  111 MBytes  929 Mbits/sec
4] 18.00-19.00   sec  113 MBytes  949 Mbits/sec
4] 19.00-20.00   sec  109 MBytes  915 Mbits/sec
4] 20.00-21.00   sec  109 MBytes  914 Mbits/sec
4] 21.00-22.00   sec  104 MBytes  872 Mbits/sec
4] 22.00-23.00   sec  101 MBytes  848 Mbits/sec
4] 23.00-24.00   sec  104 MBytes  876 Mbits/sec
4] 24.00-25.00   sec  111 MBytes  931 Mbits/sec
4] 25.00-26.00   sec  107 MBytes  895 Mbits/sec
4] 26.00-27.00   sec  109 MBytes  913 Mbits/sec
4] 27.00-28.00   sec  107 MBytes  898 Mbits/sec
4] 28.00-29.00   sec  111 MBytes  934 Mbits/sec
4] 29.00-30.00   sec  111 MBytes  935 Mbits/sec
-----
Test Complete. Summary Results:
ID] Interval      Transfer      Bandwidth      Retr
4]  0.00-30.00   sec  3.24 GBytes  928 Mbits/sec      0
4]  0.00-30.00   sec  3.24 GBytes  928 Mbits/sec
CPU Utilization: local/receiver 17.0% (5.9%u/11.1% s), remote/sender 2.9% (0.1%u/2.8% s)

```

Average used Bandwidth : **928 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.3 TCP - max Bandwidth with RTT = 25 ms

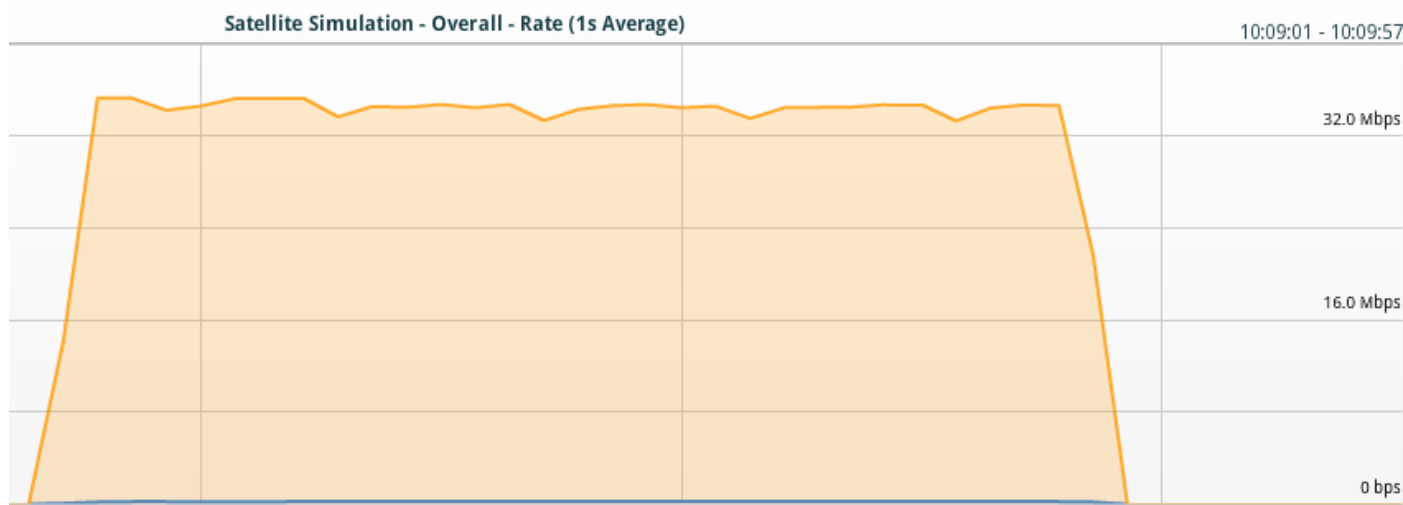


```
[ 4] local 192.168.178.72 port 61953 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  7.29 MBytes  61.1 Mbits/sec
[ 4]  1.00-2.00    sec  7.61 MBytes  63.7 Mbits/sec
[ 4]  2.00-3.00    sec  7.57 MBytes  63.4 Mbits/sec
[ 4]  3.00-4.00    sec  7.20 MBytes  60.7 Mbits/sec
[ 4]  4.00-5.00    sec  7.31 MBytes  60.4 Mbits/sec
[ 4]  5.00-6.00    sec  7.49 MBytes  63.7 Mbits/sec
[ 4]  6.00-7.00    sec  7.47 MBytes  62.8 Mbits/sec
[ 4]  7.00-8.00    sec  7.30 MBytes  61.1 Mbits/sec
[ 4]  8.00-9.00    sec  7.16 MBytes  59.9 Mbits/sec
[ 4]  9.00-10.00   sec  7.29 MBytes  61.2 Mbits/sec
[ 4] 10.00-11.00   sec  7.30 MBytes  61.4 Mbits/sec
[ 4] 11.00-12.00   sec  7.34 MBytes  61.5 Mbits/sec
[ 4] 12.00-13.00   sec  7.31 MBytes  61.5 Mbits/sec
[ 4] 13.00-14.00   sec  7.42 MBytes  61.9 Mbits/sec
[ 4] 14.00-15.00   sec  7.32 MBytes  61.4 Mbits/sec
[ 4] 15.00-16.00   sec  7.41 MBytes  62.2 Mbits/sec
[ 4] 16.00-17.00   sec  7.31 MBytes  61.5 Mbits/sec
[ 4] 17.00-18.00   sec  7.34 MBytes  61.4 Mbits/sec
[ 4] 18.00-19.00   sec  7.29 MBytes  61.2 Mbits/sec
[ 4] 19.00-20.00   sec  7.36 MBytes  61.9 Mbits/sec
[ 4] 20.00-21.00   sec  7.33 MBytes  61.5 Mbits/sec
[ 4] 21.00-22.00   sec  7.26 MBytes  61.0 Mbits/sec
[ 4] 22.00-23.00   sec  7.30 MBytes  61.4 Mbits/sec
[ 4] 23.00-24.00   sec  7.33 MBytes  61.2 Mbits/sec
[ 4] 24.00-25.00   sec  7.29 MBytes  61.4 Mbits/sec
[ 4] 25.00-26.00   sec  7.31 MBytes  61.4 Mbits/sec
[ 4] 26.00-27.00   sec  7.40 MBytes  62.1 Mbits/sec
[ 4] 27.00-28.00   sec  7.33 MBytes  61.5 Mbits/sec
[ 4] 28.00-29.00   sec  7.35 MBytes  61.4 Mbits/sec
[ 4] 29.00-30.00   sec  7.21 MBytes  60.8 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  222 MBytes  62.1 Mbits/sec      0
[ 4]  0.00-30.00   sec  220 MBytes  61.6 Mbits/sec
CPU Utilization: local/receiver 3.9% (1.4%u/2.5%S), remote/sender 0.0% (0.0%u/0.0%S)
```

Average used Bandwidth : **62 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.4 TCP - max Bandwidth with RTT = 50 ms

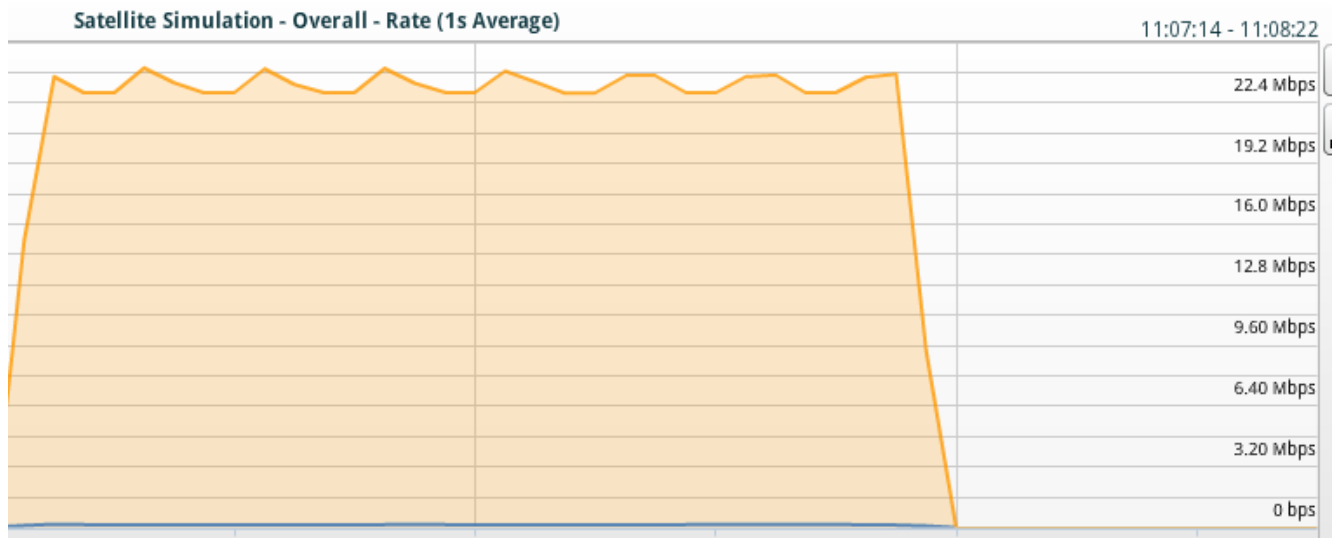


```
[ 4] local 192.168.178.72 port 62134 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  3.45 MBytes  28.8 Mbits/sec
[ 4]  1.01-2.01    sec  4.05 MBytes  33.9 Mbits/sec
[ 4]  2.01-3.01    sec  4.04 MBytes  33.9 Mbits/sec
[ 4]  3.01-4.01    sec  4.05 MBytes  34.0 Mbits/sec
[ 4]  4.01-5.00    sec  3.86 MBytes  32.6 Mbits/sec
[ 4]  5.00-6.01    sec  4.04 MBytes  33.7 Mbits/sec
[ 4]  6.01-7.00    sec  4.04 MBytes  34.0 Mbits/sec
[ 4]  7.00-8.01    sec  4.03 MBytes  33.6 Mbits/sec
[ 4]  8.01-9.01    sec  3.98 MBytes  33.4 Mbits/sec
[ 4]  9.01-10.00   sec  3.87 MBytes  32.8 Mbits/sec
[ 4] 10.00-11.01   sec  3.93 MBytes  32.9 Mbits/sec
[ 4] 11.01-12.00   sec  3.95 MBytes  33.3 Mbits/sec
[ 4] 12.00-13.01   sec  3.97 MBytes  33.1 Mbits/sec
[ 4] 13.01-14.00   sec  3.97 MBytes  33.5 Mbits/sec
[ 4] 14.00-15.01   sec  3.95 MBytes  32.9 Mbits/sec
[ 4] 15.01-16.00   sec  3.86 MBytes  32.6 Mbits/sec
[ 4] 16.00-17.00   sec  3.94 MBytes  33.1 Mbits/sec
[ 4] 17.00-18.00   sec  3.96 MBytes  33.2 Mbits/sec
[ 4] 18.00-19.00   sec  3.96 MBytes  33.3 Mbits/sec
[ 4] 19.00-20.01   sec  3.98 MBytes  33.2 Mbits/sec
[ 4] 20.01-21.00   sec  3.97 MBytes  33.4 Mbits/sec
[ 4] 21.00-22.00   sec  3.85 MBytes  32.4 Mbits/sec
[ 4] 22.00-23.01   sec  3.92 MBytes  32.8 Mbits/sec
[ 4] 23.01-24.01   sec  3.98 MBytes  33.3 Mbits/sec
[ 4] 24.01-25.00   sec  3.96 MBytes  33.4 Mbits/sec
[ 4] 25.00-26.01   sec  3.97 MBytes  33.2 Mbits/sec
[ 4] 26.01-27.01   sec  3.98 MBytes  33.4 Mbits/sec
[ 4] 27.01-28.00   sec  3.85 MBytes  32.5 Mbits/sec
[ 4] 28.00-29.00   sec  3.94 MBytes  33.1 Mbits/sec
[ 4] 29.00-30.01   sec  3.97 MBytes  33.2 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender
[ 4]  0.00-30.01   sec  121 MBytes  33.7 Mbits/sec  0         receiver
[ 4]  0.00-30.01   sec  119 MBytes  33.1 Mbits/sec
CPU Utilization: local/receiver 2.9% (1.1%u/1.8%S), remote/sender 0.1% (0.0%u/0.1%S)
```

Average used Bandwidth : **34 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.5 TCP - max Bandwidth with RTT = 75 ms

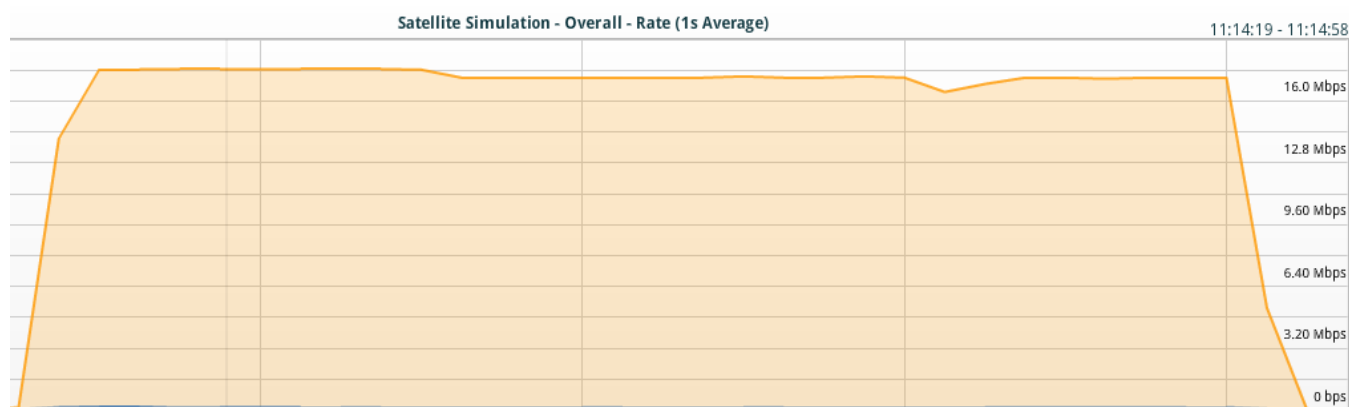


```
[ 4] local 192.168.178.72 port 60547 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.02    sec  2.23 MBytes  18.3 Mbits/sec
[ 4]  1.02-2.02    sec  2.63 MBytes  22.1 Mbits/sec
[ 4]  2.02-3.02    sec  2.63 MBytes  22.2 Mbits/sec
[ 4]  3.02-4.02    sec  2.83 MBytes  23.6 Mbits/sec
[ 4]  4.02-5.02    sec  2.63 MBytes  22.1 Mbits/sec
[ 4]  5.02-6.02    sec  2.63 MBytes  22.1 Mbits/sec
[ 4]  6.02-7.02    sec  2.63 MBytes  22.2 Mbits/sec
[ 4]  7.02-8.02    sec  2.82 MBytes  23.5 Mbits/sec
[ 4]  8.02-9.02    sec  2.63 MBytes  22.1 Mbits/sec
[ 4]  9.02-10.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 10.02-11.01   sec  2.64 MBytes  22.3 Mbits/sec
[ 4] 11.01-12.02   sec  2.82 MBytes  23.5 Mbits/sec
[ 4] 12.02-13.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 13.02-14.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 14.02-15.01   sec  2.64 MBytes  22.3 Mbits/sec
[ 4] 15.01-16.02   sec  2.83 MBytes  23.6 Mbits/sec
[ 4] 16.02-17.02   sec  2.62 MBytes  22.0 Mbits/sec
[ 4] 17.02-18.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 18.02-19.03   sec  2.75 MBytes  23.0 Mbits/sec
[ 4] 19.03-20.02   sec  2.71 MBytes  22.9 Mbits/sec
[ 4] 20.02-21.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 21.02-22.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 22.02-23.02   sec  2.64 MBytes  22.2 Mbits/sec
[ 4] 23.02-24.02   sec  2.83 MBytes  23.6 Mbits/sec
[ 4] 24.02-25.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 25.02-26.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 26.02-27.02   sec  2.64 MBytes  22.2 Mbits/sec
[ 4] 27.02-28.02   sec  2.82 MBytes  23.6 Mbits/sec
[ 4] 28.02-29.02   sec  2.63 MBytes  22.1 Mbits/sec
[ 4] 29.02-30.02   sec  2.63 MBytes  22.1 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.02   sec  82.1 MBytes  22.9 Mbits/sec      0
[ 4]  0.00-30.02   sec  80.2 MBytes  22.4 Mbits/sec
CPU Utilization: local/receiver 2.1% (0.6%u/1.5%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **23 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.6 TCP - max Bandwidth with RTT = 100 ms

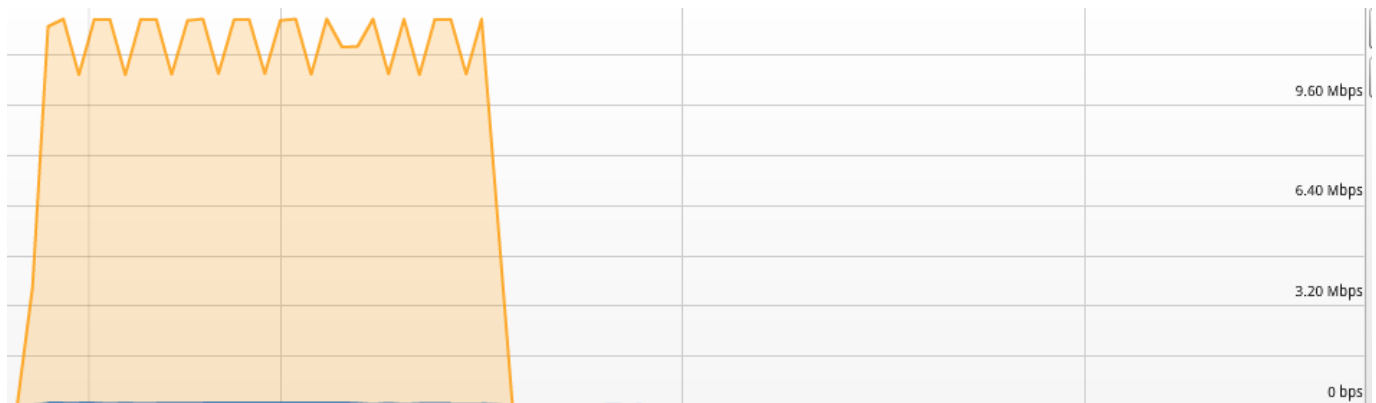


```
[ 4] local 192.168.178.72 port 60667 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.05    sec  1.63 MBytes  13.0 Mbits/sec
[ 4]  1.05-2.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  2.05-3.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  3.05-4.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  4.05-5.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  5.05-6.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  6.05-7.05    sec  2.03 MBytes  17.0 Mbits/sec
[ 4]  7.05-8.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  8.05-9.05    sec  2.02 MBytes  17.0 Mbits/sec
[ 4]  9.05-10.05   sec  2.02 MBytes  17.0 Mbits/sec
[ 4] 10.05-11.04   sec  1.86 MBytes  15.8 Mbits/sec
[ 4] 11.04-12.04   sec  1.96 MBytes  16.4 Mbits/sec
[ 4] 12.04-13.04   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 13.04-14.04   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 14.04-15.04   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 15.04-16.04   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 16.04-17.05   sec  1.98 MBytes  16.6 Mbits/sec
[ 4] 17.05-18.05   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 18.05-19.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 19.05-20.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 20.05-21.05   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 21.05-22.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 22.05-23.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 23.05-24.05   sec  1.98 MBytes  16.6 Mbits/sec
[ 4] 24.05-25.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 25.05-26.05   sec  1.97 MBytes  16.6 Mbits/sec
[ 4] 26.05-27.04   sec  1.97 MBytes  16.7 Mbits/sec
[ 4] 27.04-28.04   sec  1.93 MBytes  16.2 Mbits/sec
[ 4] 28.04-29.04   sec  1.97 MBytes  16.5 Mbits/sec
[ 4] 29.04-30.04   sec  1.97 MBytes  16.6 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.04   sec  60.8 MBytes  17.0 Mbits/sec      0
[ 4]  0.00-30.04   sec  59.4 MBytes  16.6 Mbits/sec
CPU Utilization: local/receiver 1.9% (0.9%u/1.1%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **17 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.7 TCP - max Bandwidth with RTT = 150 ms

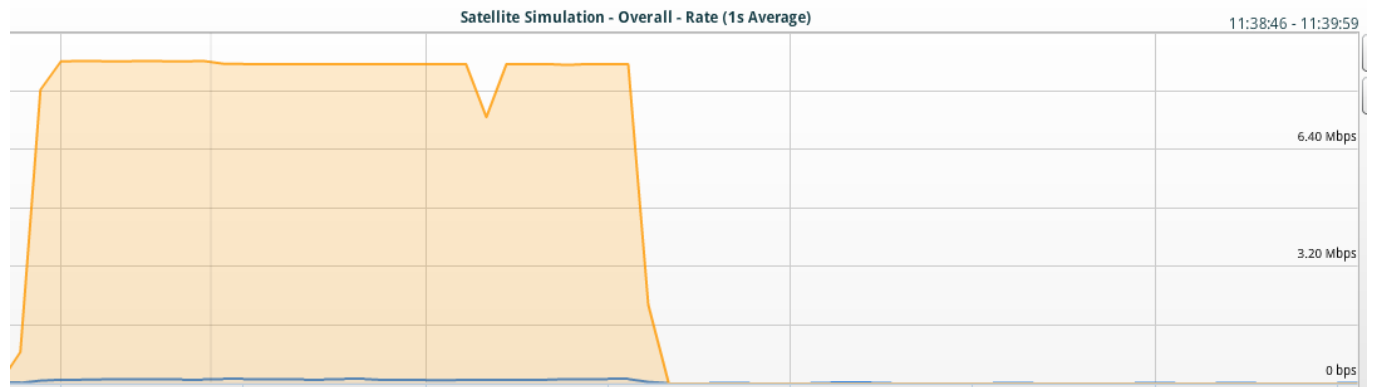


```
[ 4] local 192.168.178.72 port 61264 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  1.02 MBytes  8.49 Mbits/sec
[ 4]  1.01-2.01    sec  1.42 MBytes  11.9 Mbits/sec
[ 4]  2.01-3.01    sec  1.21 MBytes  10.2 Mbits/sec
[ 4]  3.01-4.01    sec  1.42 MBytes  11.9 Mbits/sec
[ 4]  4.01-5.01    sec  1.42 MBytes  11.9 Mbits/sec
[ 4]  5.01-6.01    sec  1.22 MBytes  10.2 Mbits/sec
[ 4]  6.01-7.01    sec  1.42 MBytes  11.9 Mbits/sec
[ 4]  7.01-8.01    sec  1.42 MBytes  11.9 Mbits/sec
[ 4]  8.01-9.01    sec  1.21 MBytes  10.2 Mbits/sec
[ 4]  9.01-10.01   sec  1.41 MBytes  11.8 Mbits/sec
[ 4] 10.01-11.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 11.01-12.01   sec  1.22 MBytes  10.2 Mbits/sec
[ 4] 12.01-13.01   sec  1.41 MBytes  11.8 Mbits/sec
[ 4] 13.01-14.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 14.01-15.01   sec  1.22 MBytes  10.2 Mbits/sec
[ 4] 15.01-16.01   sec  1.41 MBytes  11.8 Mbits/sec
[ 4] 16.01-17.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 17.01-18.01   sec  1.22 MBytes  10.2 Mbits/sec
[ 4] 18.01-19.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 19.01-20.00   sec  1.27 MBytes  10.7 Mbits/sec
[ 4] 20.00-21.01   sec  1.37 MBytes  11.4 Mbits/sec
[ 4] 21.01-22.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 22.01-23.01   sec  1.21 MBytes  10.2 Mbits/sec
[ 4] 23.01-24.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 24.01-25.01   sec  1.23 MBytes  10.3 Mbits/sec
[ 4] 25.01-26.00   sec  1.40 MBytes  11.9 Mbits/sec
[ 4] 26.00-27.00   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 27.00-28.01   sec  1.21 MBytes  10.2 Mbits/sec
[ 4] 28.01-29.01   sec  1.42 MBytes  11.9 Mbits/sec
[ 4] 29.01-30.00   sec  1.27 MBytes  10.7 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  41.7 MBytes  11.7 Mbits/sec      0
[ 4]  0.00-30.00   sec  40.2 MBytes  11.2 Mbits/sec
CPU Utilization: local/receiver 0.9% (0.5%u/0.5%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **12 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.8 TCP - max Bandwidth with RTT = 200 ms

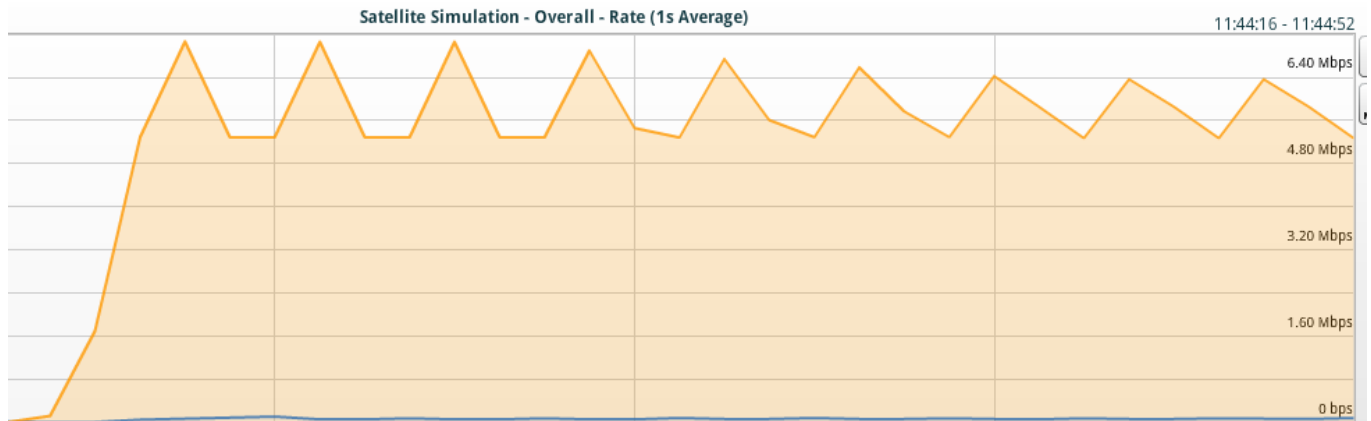


```
[ 4] local 192.168.178.72 port 61362 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec   436 KBytes   3.57 Mbits/sec
[ 4]  1.00-2.00    sec  1.00 MBytes   8.39 Mbits/sec
[ 4]  2.00-3.00    sec  1.01 MBytes   8.47 Mbits/sec
[ 4]  3.00-4.01    sec  1.01 MBytes   8.50 Mbits/sec
[ 4]  4.01-5.01    sec  1.01 MBytes   8.44 Mbits/sec
[ 4]  5.01-6.01    sec  1.01 MBytes   8.48 Mbits/sec
[ 4]  6.01-7.01    sec  1.01 MBytes   8.48 Mbits/sec
[ 4]  7.01-8.01    sec  1.01 MBytes   8.45 Mbits/sec
[ 4]  8.01-9.01    sec  1.01 MBytes   8.49 Mbits/sec
[ 4]  9.01-10.01   sec  1.01 MBytes   8.49 Mbits/sec
[ 4] 10.01-11.01   sec  1.01 MBytes   8.48 Mbits/sec
[ 4] 11.01-12.01   sec  1.01 MBytes   8.46 Mbits/sec
[ 4] 12.01-13.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 13.01-14.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 14.01-15.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 15.01-16.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 16.01-17.01   sec  1.00 MBytes   8.47 Mbits/sec
[ 4] 17.01-18.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 18.01-19.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 19.01-20.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 20.01-21.02   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 21.02-22.00   sec  1.00 MBytes   8.52 Mbits/sec
[ 4] 22.00-23.01   sec  1.00 MBytes   8.38 Mbits/sec
[ 4] 23.01-24.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 24.01-25.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 25.01-26.01   sec  1.00 MBytes   8.39 Mbits/sec
[ 4] 26.01-27.01   sec  1024 KBytes   8.40 Mbits/sec
[ 4] 27.01-28.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 28.01-29.01   sec  1.00 MBytes   8.41 Mbits/sec
[ 4] 29.01-30.01   sec  1.00 MBytes   8.41 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  31.6 MBytes   8.84 Mbits/sec    0
[ 4]  0.00-30.01   sec  29.8 MBytes   8.34 Mbits/sec
CPU Utilization: local/receiver 2.0% (0.8%/1.2%), remote/sender 0.0% (0.0%/0.0%)
```

Average used Bandwidth : **9 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.9 TCP - max Bandwidth with RTT = 300 ms

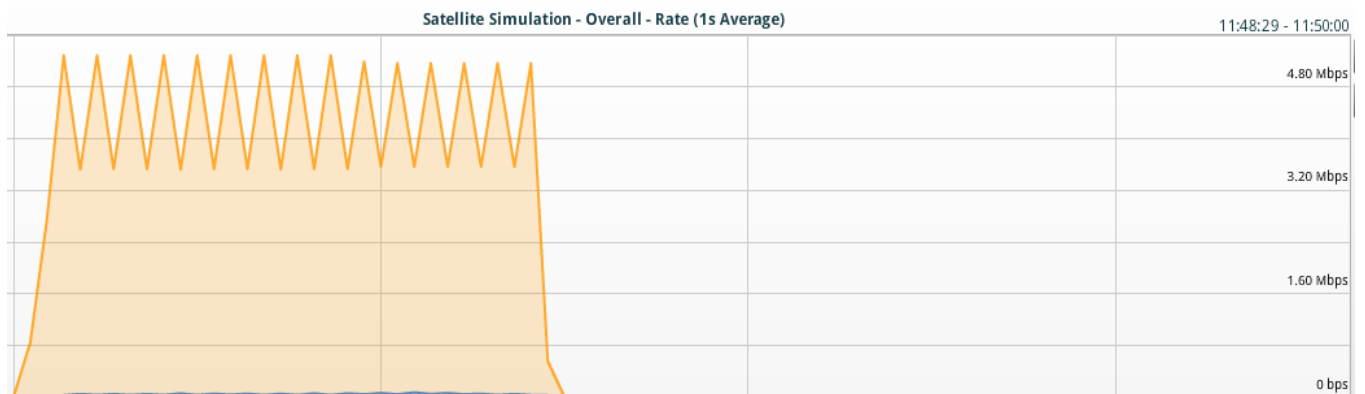


```
[ 4] local 192.168.178.72 port 61448 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 121072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec   214 KBytes   1.73 Mbits/sec
[ 4]  1.01-2.01    sec   622 KBytes   5.09 Mbits/sec
[ 4]  2.01-3.00    sec   629 KBytes   5.21 Mbits/sec
[ 4]  3.00-4.01    sec   823 KBytes   6.66 Mbits/sec
[ 4]  4.01-5.01    sec   622 KBytes   5.09 Mbits/sec
[ 4]  5.01-6.01    sec   624 KBytes   5.16 Mbits/sec
[ 4]  6.01-7.02    sec   826 KBytes   6.71 Mbits/sec
[ 4]  7.02-8.02    sec   622 KBytes   5.09 Mbits/sec
[ 4]  8.02-9.01    sec   624 KBytes   5.14 Mbits/sec
[ 4]  9.01-10.02   sec   826 KBytes   6.73 Mbits/sec
[ 4] 10.02-11.02   sec   622 KBytes   5.09 Mbits/sec
[ 4] 11.02-12.01   sec   627 KBytes   5.15 Mbits/sec
[ 4] 12.01-13.02   sec   824 KBytes   6.74 Mbits/sec
[ 4] 13.02-14.02   sec   620 KBytes   5.08 Mbits/sec
[ 4] 14.02-15.02   sec   622 KBytes   5.09 Mbits/sec
[ 4] 15.02-16.02   sec   817 KBytes   6.69 Mbits/sec
[ 4] 16.02-17.02   sec   633 KBytes   5.18 Mbits/sec
[ 4] 17.02-18.02   sec   622 KBytes   5.09 Mbits/sec
[ 4] 18.02-19.02   sec   799 KBytes   6.54 Mbits/sec
[ 4] 19.02-20.02   sec   652 KBytes   5.34 Mbits/sec
[ 4] 20.02-21.02   sec   622 KBytes   5.09 Mbits/sec
[ 4] 21.02-22.02   sec   780 KBytes   6.39 Mbits/sec
[ 4] 22.02-23.02   sec   659 KBytes   5.40 Mbits/sec
[ 4] 23.02-24.02   sec   616 KBytes   5.05 Mbits/sec
[ 4] 24.02-25.02   sec   778 KBytes   6.38 Mbits/sec
[ 4] 25.02-26.02   sec   659 KBytes   5.40 Mbits/sec
[ 4] 26.02-27.02   sec   616 KBytes   5.05 Mbits/sec
[ 4] 27.02-28.02   sec   778 KBytes   6.38 Mbits/sec
[ 4] 28.02-29.02   sec   659 KBytes   5.39 Mbits/sec
[ 4] 29.02-30.02   sec   616 KBytes   5.05 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.02    sec  21.3 MBytes   5.94 Mbits/sec      0
[ 4]  0.00-30.02    sec  19.8 MBytes   5.54 Mbits/sec
CPU Utilization: local/receiver 1.6% (0.6%u/0.9%r), remote/sender 0.0% (0.0%u/0.0%r)
```

Average used Bandwidth : **6 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.10 TCP - max Bandwidth with RTT = 400 ms

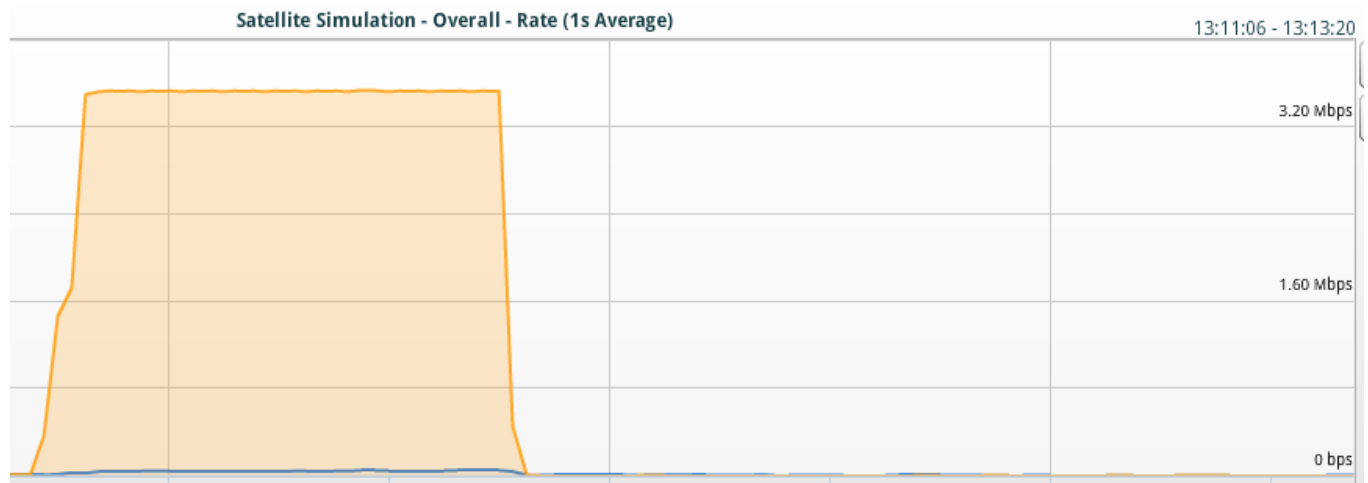


```
[ 4] local 192.168.178.72 port 61538 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.02    sec  99.8 KBytes  805 Kbits/sec
[ 4]  1.02-2.00    sec  345 KBytes  2.87 Mbits/sec
[ 4]  2.00-3.02    sec  599 KBytes  4.84 Mbits/sec
[ 4]  3.02-4.00    sec  416 KBytes  3.46 Mbits/sec
[ 4]  4.00-5.02    sec  619 KBytes  5.01 Mbits/sec
[ 4]  5.02-6.00    sec  423 KBytes  3.51 Mbits/sec
[ 4]  6.00-7.02    sec  613 KBytes  4.97 Mbits/sec
[ 4]  7.02-8.02    sec  415 KBytes  3.39 Mbits/sec
[ 4]  8.02-9.00    sec  622 KBytes  5.17 Mbits/sec
[ 4]  9.00-10.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 10.00-11.00   sec  622 KBytes  5.09 Mbits/sec
[ 4] 11.00-12.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 12.00-13.00   sec  622 KBytes  5.09 Mbits/sec
[ 4] 13.00-14.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 14.00-15.00   sec  622 KBytes  5.09 Mbits/sec
[ 4] 15.00-16.00   sec  414 KBytes  3.39 Mbits/sec
[ 4] 16.00-17.00   sec  622 KBytes  5.09 Mbits/sec
[ 4] 17.00-18.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 18.00-19.00   sec  622 KBytes  5.09 Mbits/sec
[ 4] 19.00-20.00   sec  415 KBytes  3.40 Mbits/sec
[ 4] 20.00-21.00   sec  616 KBytes  5.05 Mbits/sec
[ 4] 21.00-22.00   sec  413 KBytes  3.39 Mbits/sec
[ 4] 22.00-23.01   sec  613 KBytes  5.01 Mbits/sec
[ 4] 23.01-24.01   sec  413 KBytes  3.39 Mbits/sec
[ 4] 24.01-25.01   sec  613 KBytes  5.02 Mbits/sec
[ 4] 25.01-26.01   sec  413 KBytes  3.39 Mbits/sec
[ 4] 26.01-27.01   sec  613 KBytes  5.01 Mbits/sec
[ 4] 27.01-28.01   sec  413 KBytes  3.39 Mbits/sec
[ 4] 28.01-29.01   sec  613 KBytes  5.02 Mbits/sec
[ 4] 29.01-30.00   sec  413 KBytes  3.41 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.00   sec  16.1 MBytes  4.51 Mbits/sec      0
[ 4]  0.00-30.00   sec  14.8 MBytes  4.13 Mbits/sec
CPU Utilization: local/receiver 1.9% (0.7%/1.2%), remote/sender 0.0% (0.0%/0.0%)
```

Average used Bandwidth : **4.5 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.11 TCP - max Bandwidth with RTT = 500 ms

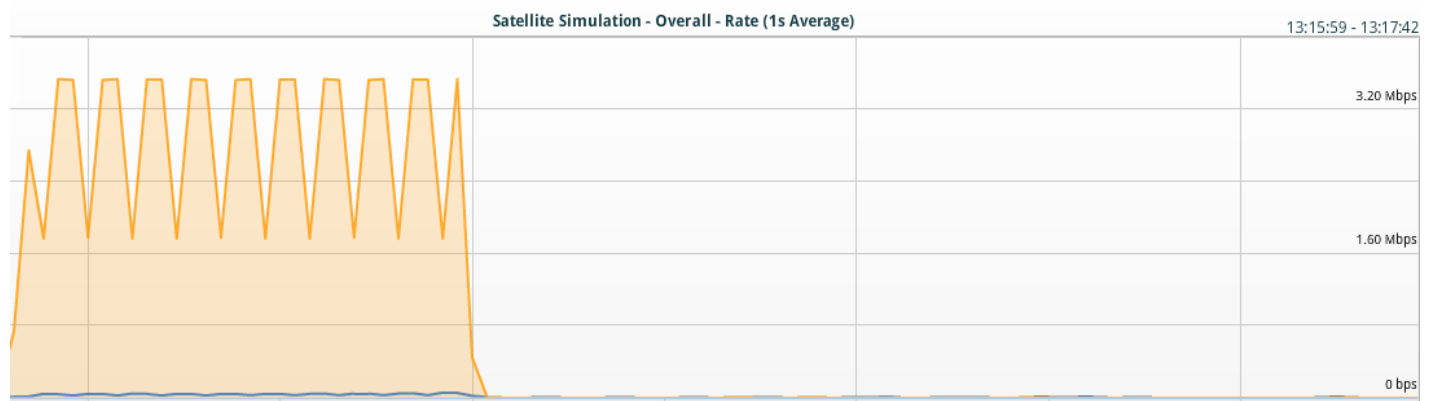


```
[ 4] local 192.168.178.72 port 63048 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec    624 KBytes    5.10 Mbits/sec
[ 4]  1.00-2.00    sec    412 KBytes    3.37 Mbits/sec
[ 4]  2.00-3.00    sec    415 KBytes    3.40 Mbits/sec
[ 4]  3.00-4.00    sec    414 KBytes    3.39 Mbits/sec
[ 4]  4.00-5.01    sec    415 KBytes    3.40 Mbits/sec
[ 4]  5.01-6.01    sec    416 KBytes    3.41 Mbits/sec
[ 4]  6.01-7.01    sec    418 KBytes    3.42 Mbits/sec
[ 4]  7.01-8.01    sec    411 KBytes    3.36 Mbits/sec
[ 4]  8.01-9.01    sec    416 KBytes    3.41 Mbits/sec
[ 4]  9.01-10.01   sec    419 KBytes    3.43 Mbits/sec
[ 4] 10.01-11.01   sec    412 KBytes    3.37 Mbits/sec
[ 4] 11.01-12.01   sec    406 KBytes    3.33 Mbits/sec
[ 4] 12.01-13.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 13.01-14.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 14.01-15.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 15.01-16.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 16.01-17.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 17.01-18.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 18.01-19.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 19.01-20.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 20.01-21.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 21.01-22.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 22.01-23.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 23.01-24.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 24.01-25.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 25.01-26.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 26.01-27.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 27.01-28.01   sec    414 KBytes    3.39 Mbits/sec
[ 4] 28.01-29.01   sec    415 KBytes    3.40 Mbits/sec
[ 4] 29.01-30.01   sec    415 KBytes    3.40 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec   14.2 MBytes    3.98 Mbits/sec      0
[ 4]  0.00-30.01   sec   12.6 MBytes    3.52 Mbits/sec
CPU Utilization: local/receiver 0.4% (0.1%u/0.3%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **4.0 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.12 TCP - max Bandwidth with RTT = 600 ms

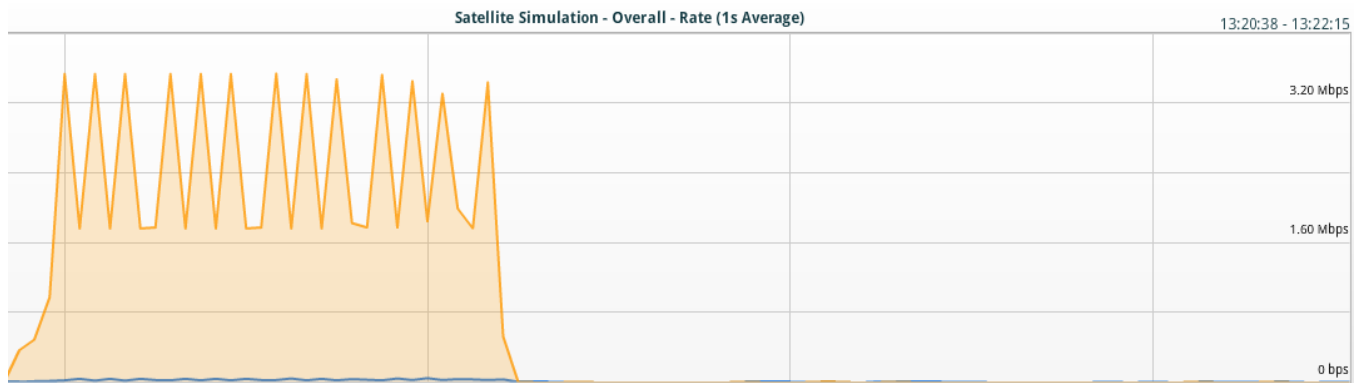


```
[ 4] local 192.168.178.72 port 63141 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  42.8 KBytes   346 Kbits/sec
[ 4]  1.01-2.01    sec  171 KBytes   1.40 Mbits/sec
[ 4]  2.01-3.00    sec  214 KBytes   1.77 Mbits/sec
[ 4]  3.00-4.01    sec  408 KBytes   3.30 Mbits/sec
[ 4]  4.01-5.01    sec  415 KBytes   3.40 Mbits/sec
[ 4]  5.01-6.00    sec  210 KBytes   1.73 Mbits/sec
[ 4]  6.00-7.01    sec  412 KBytes   3.34 Mbits/sec
[ 4]  7.01-8.01    sec  415 KBytes   3.40 Mbits/sec
[ 4]  8.01-9.01    sec  210 KBytes   1.73 Mbits/sec
[ 4]  9.01-10.01   sec  412 KBytes   3.35 Mbits/sec
[ 4] 10.01-11.01   sec  414 KBytes   3.39 Mbits/sec
[ 4] 11.01-12.01   sec  211 KBytes   1.74 Mbits/sec
[ 4] 12.01-13.01   sec  411 KBytes   3.35 Mbits/sec
[ 4] 13.01-14.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 14.01-15.01   sec  218 KBytes   1.79 Mbits/sec
[ 4] 15.01-16.01   sec  403 KBytes   3.29 Mbits/sec
[ 4] 16.01-17.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 17.01-18.01   sec  280 KBytes   2.29 Mbits/sec
[ 4] 18.01-19.01   sec  342 KBytes   2.80 Mbits/sec
[ 4] 19.01-20.01   sec  414 KBytes   3.39 Mbits/sec
[ 4] 20.01-21.01   sec  211 KBytes   1.73 Mbits/sec
[ 4] 21.01-22.01   sec  411 KBytes   3.36 Mbits/sec
[ 4] 22.01-23.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 23.01-24.01   sec  207 KBytes   1.69 Mbits/sec
[ 4] 24.01-25.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 25.01-26.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 26.01-27.01   sec  207 KBytes   1.69 Mbits/sec
[ 4] 27.01-28.01   sec  415 KBytes   3.40 Mbits/sec
[ 4] 28.01-29.01   sec  414 KBytes   3.39 Mbits/sec
[ 4] 29.01-30.01   sec  208 KBytes   1.70 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender
[ 4]  0.00-30.01   sec  11.8 MBytes   3.31 Mbits/sec  0         receiver
[ 4]  0.00-30.01   sec   9.77 MBytes   2.73 Mbits/sec
CPU Utilization: local/receiver 1.7% (0.6%u/1.1%S), remote/sender 0.0% (0.0%u/0.0%S)
```

Average used Bandwidth : **3.0 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.13 TCP - max Bandwidth with RTT = 700 ms

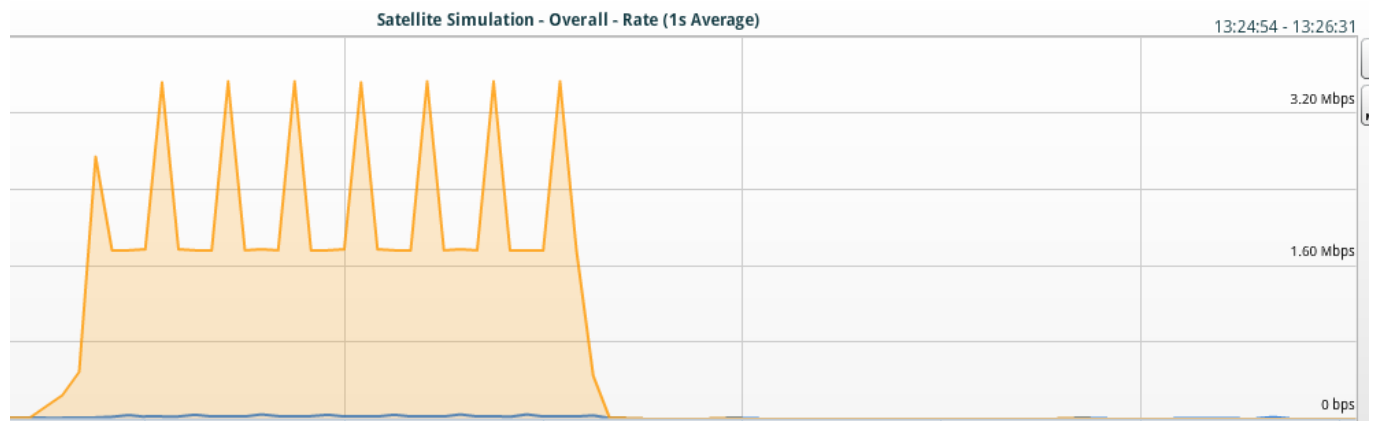


```
[ 4] local 192.168.178.72 port 63233 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec   42.8 KBytes   348 Kbits/sec
[ 4]  1.01-2.01    sec   57.0 KBytes   467 Kbits/sec
[ 4]  2.01-3.01    sec   322 KBytes   2.64 Mbits/sec
[ 4]  3.01-4.02    sec   207 KBytes   1.67 Mbits/sec
[ 4]  4.02-5.00    sec   415 KBytes   3.46 Mbits/sec
[ 4]  5.00-6.01    sec   207 KBytes   1.69 Mbits/sec
[ 4]  6.01-7.00    sec   210 KBytes   1.72 Mbits/sec
[ 4]  7.00-8.01    sec   412 KBytes   3.35 Mbits/sec
[ 4]  8.01-9.01    sec   207 KBytes   1.69 Mbits/sec
[ 4]  9.01-10.02   sec   415 KBytes   3.39 Mbits/sec
[ 4] 10.02-11.00   sec   208 KBytes   1.73 Mbits/sec
[ 4] 11.00-12.01   sec   415 KBytes   3.39 Mbits/sec
[ 4] 12.01-13.01   sec   207 KBytes   1.69 Mbits/sec
[ 4] 13.01-14.01   sec   207 KBytes   1.70 Mbits/sec
[ 4] 14.01-15.01   sec   415 KBytes   3.40 Mbits/sec
[ 4] 15.01-16.01   sec   207 KBytes   1.69 Mbits/sec
[ 4] 16.01-17.01   sec   416 KBytes   3.41 Mbits/sec
[ 4] 17.01-18.01   sec   207 KBytes   1.70 Mbits/sec
[ 4] 18.01-19.01   sec   415 KBytes   3.40 Mbits/sec
[ 4] 19.01-20.01   sec   207 KBytes   1.69 Mbits/sec
[ 4] 20.01-21.01   sec   207 KBytes   1.70 Mbits/sec
[ 4] 21.01-22.01   sec   415 KBytes   3.40 Mbits/sec
[ 4] 22.01-23.01   sec   207 KBytes   1.69 Mbits/sec
[ 4] 23.01-24.01   sec   415 KBytes   3.40 Mbits/sec
[ 4] 24.01-25.01   sec   207 KBytes   1.69 Mbits/sec
[ 4] 25.01-26.01   sec   396 KBytes   3.25 Mbits/sec
[ 4] 26.01-27.01   sec   225 KBytes   1.85 Mbits/sec
[ 4] 27.01-28.01   sec   208 KBytes   1.70 Mbits/sec
[ 4] 28.01-29.01   sec   411 KBytes   3.37 Mbits/sec
[ 4] 29.01-30.01   sec   211 KBytes   1.73 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01    sec  10.1 MBytes   2.81 Mbits/sec    0
[ 4]  0.00-30.01    sec   8.35 MBytes   2.34 Mbits/sec
CPU Utilization: local/receiver 1.7% (0.7%u/1.0%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **2.5 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.14 TCP - max Bandwidth with RTT = 800 ms

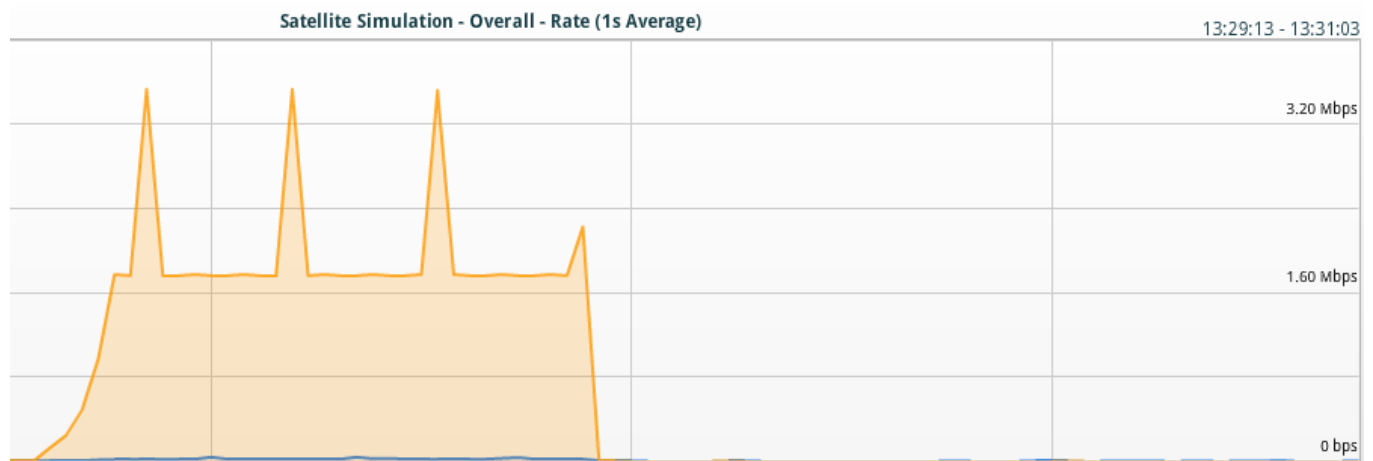


```
[ 4] local 192.168.178.72 port 63308 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  42.8 KBytes   347 Kbits/sec
[ 4]  1.01-2.01    sec  57.0 KBytes   467 Kbits/sec
[ 4]  2.01-3.01    sec  114 KBytes    934 Kbits/sec
[ 4]  3.01-4.00    sec  214 KBytes    1.77 Mbits/sec
[ 4]  4.00-5.01    sec  408 KBytes    3.31 Mbits/sec
[ 4]  5.01-6.01    sec  208 KBytes    1.71 Mbits/sec
[ 4]  6.01-7.01    sec  207 KBytes    1.69 Mbits/sec
[ 4]  7.01-8.00    sec  210 KBytes    1.72 Mbits/sec
[ 4]  8.00-9.01    sec  412 KBytes    3.36 Mbits/sec
[ 4]  9.01-10.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 10.01-11.01   sec  208 KBytes    1.70 Mbits/sec
[ 4] 11.01-12.01   sec  210 KBytes    1.73 Mbits/sec
[ 4] 12.01-13.01   sec  412 KBytes    3.36 Mbits/sec
[ 4] 13.01-14.01   sec  207 KBytes    1.70 Mbits/sec
[ 4] 14.01-15.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 15.01-16.01   sec  212 KBytes    1.74 Mbits/sec
[ 4] 16.01-17.01   sec  409 KBytes    3.35 Mbits/sec
[ 4] 17.01-18.01   sec  208 KBytes    1.70 Mbits/sec
[ 4] 18.01-19.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 19.01-20.01   sec  212 KBytes    1.74 Mbits/sec
[ 4] 20.01-21.01   sec  409 KBytes    3.35 Mbits/sec
[ 4] 21.01-22.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 22.01-23.01   sec  208 KBytes    1.70 Mbits/sec
[ 4] 23.01-24.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 24.01-25.01   sec  415 KBytes    3.40 Mbits/sec
[ 4] 25.01-26.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 26.01-27.01   sec  207 KBytes    1.69 Mbits/sec
[ 4] 27.01-28.01   sec  208 KBytes    1.70 Mbits/sec
[ 4] 28.01-29.01   sec  414 KBytes    3.39 Mbits/sec
[ 4] 29.01-30.01   sec  207 KBytes    1.69 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.01   sec  9.20 MBytes   2.57 Mbits/sec  0
[ 4]  0.00-30.01   sec  7.34 MBytes   2.05 Mbits/sec
CPU Utilization: local/receiver 2.5% (1.1%u/1.4%u), remote/sender 0.0% (0.0%u/0.0%u)
```

Average used Bandwidth : **2.25 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.15 TCP - max Bandwidth with RTT = 900 ms



```

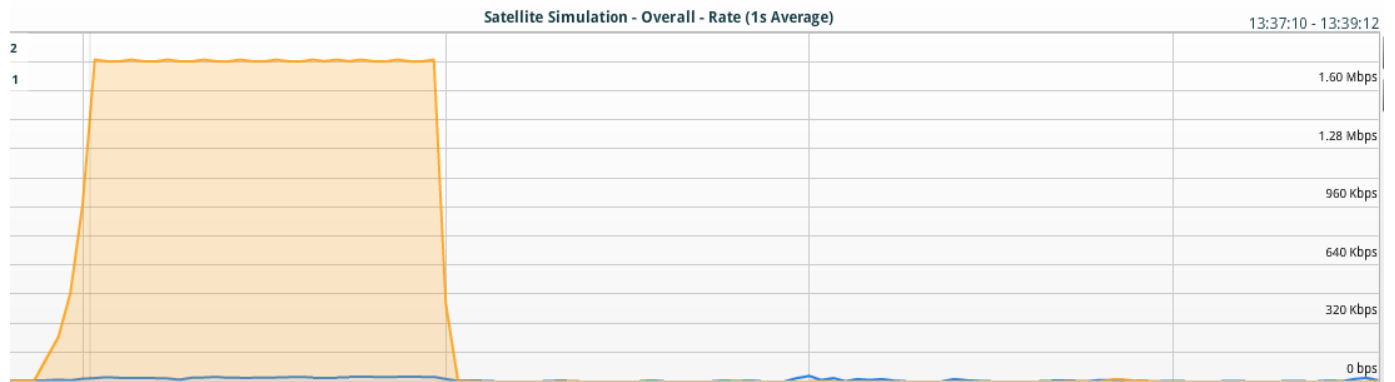
[ 4] local 192.168.178.72 port 63414 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  42.8 KBytes  347 Kbits/sec
[ 4]  1.01-2.01    sec  57.0 KBytes  467 Kbits/sec
[ 4]  2.01-3.01    sec  114 KBytes  934 Kbits/sec
[ 4]  3.01-4.01    sec  208 KBytes  1.70 Mbits/sec
[ 4]  4.01-5.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  5.01-6.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  6.01-7.01    sec  208 KBytes  1.71 Mbits/sec
[ 4]  7.01-8.01    sec  207 KBytes  1.69 Mbits/sec
[ 4]  8.01-9.00    sec  210 KBytes  1.73 Mbits/sec
[ 4]  9.00-10.01   sec  412 KBytes  3.36 Mbits/sec
[ 4] 10.01-11.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 11.01-12.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 12.01-13.01   sec  207 KBytes  1.70 Mbits/sec
[ 4] 13.01-14.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 14.01-15.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 15.01-16.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 16.01-17.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 17.01-18.01   sec  212 KBytes  1.74 Mbits/sec
[ 4] 18.01-19.01   sec  409 KBytes  3.35 Mbits/sec
[ 4] 19.01-20.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 20.01-21.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 21.01-22.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 22.01-23.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 23.01-24.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 24.01-25.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 25.01-26.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 26.01-27.01   sec  207 KBytes  1.70 Mbits/sec
[ 4] 27.01-28.02   sec  415 KBytes  3.36 Mbits/sec
[ 4] 28.02-29.01   sec  207 KBytes  1.71 Mbits/sec
[ 4] 29.01-30.01   sec  207 KBytes  1.69 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.01   sec  8.47 MBytes  2.37 Mbits/sec    0
[ 4]  0.00-30.01   sec  6.53 MBytes  1.83 Mbits/sec
CPU Utilization: local/receiver 2.4% (0.9%u/1.5%u), remote/sender 0.0% (0.0%u/0.0%u)

```

Average used Bandwidth : **2 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.16 TCP - max Bandwidth with RTT = 1000 ms



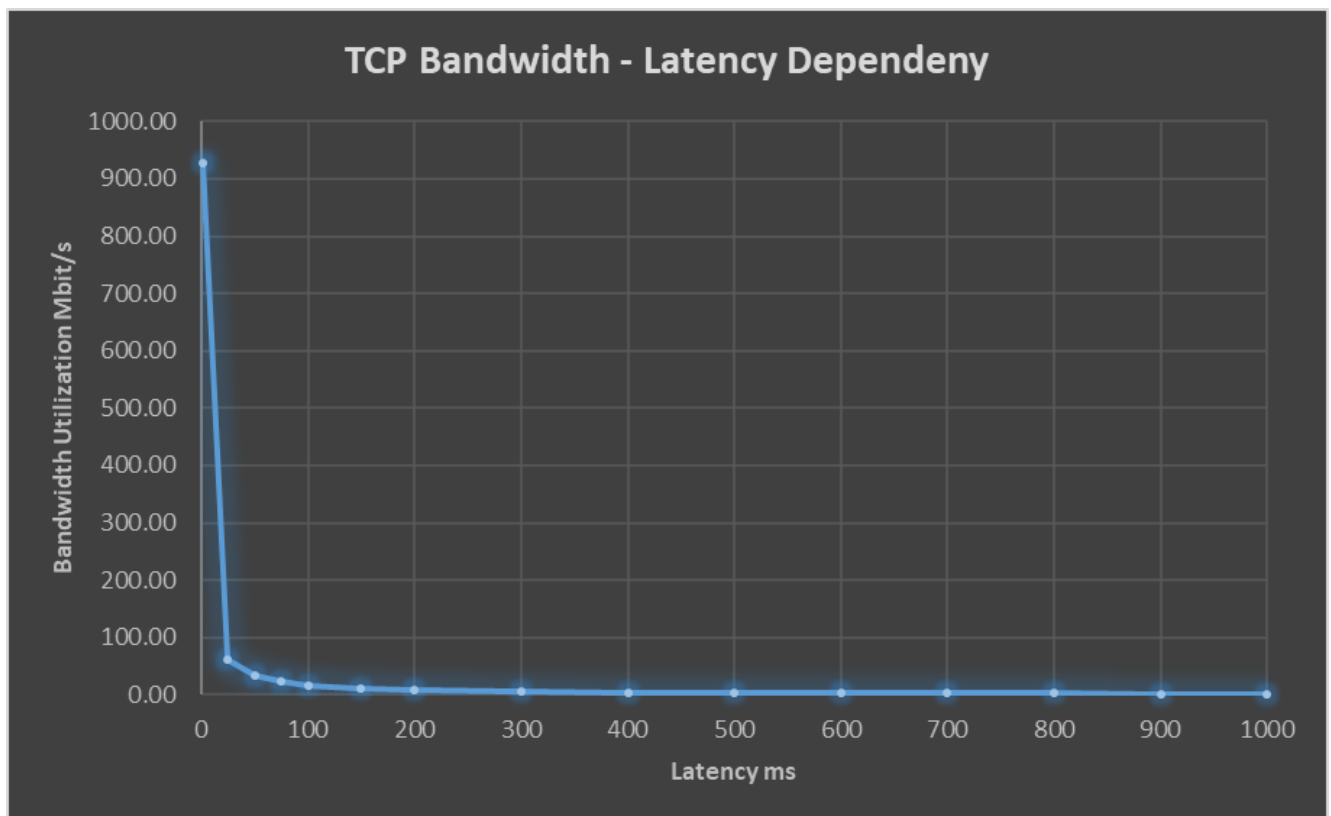
```
[ 4] local 192.168.178.72 port 63540 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  42.8 KBytes  350 Kbits/sec
[ 4]  1.00-2.00    sec  20.0 KBytes  164 Kbits/sec
[ 4]  2.00-3.00    sec  54.2 KBytes  444 Kbits/sec
[ 4]  3.00-4.00    sec  103 KBytes  841 Kbits/sec
[ 4]  4.00-5.00    sec  205 KBytes  1.68 Mbits/sec
[ 4]  5.00-6.00    sec  215 KBytes  1.76 Mbits/sec
[ 4]  6.00-7.00    sec  210 KBytes  1.72 Mbits/sec
[ 4]  7.00-8.00    sec  208 KBytes  1.70 Mbits/sec
[ 4]  8.00-9.00    sec  195 KBytes  1.60 Mbits/sec
[ 4]  9.00-10.00   sec  207 KBytes  1.69 Mbits/sec
[ 4] 10.00-11.00   sec  219 KBytes  1.80 Mbits/sec
[ 4] 11.00-12.01   sec  198 KBytes  1.62 Mbits/sec
[ 4] 12.01-13.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 13.01-14.00   sec  202 KBytes  1.66 Mbits/sec
[ 4] 14.00-15.00   sec  207 KBytes  1.69 Mbits/sec
[ 4] 15.00-16.01   sec  215 KBytes  1.76 Mbits/sec
[ 4] 16.01-17.01   sec  205 KBytes  1.68 Mbits/sec
[ 4] 17.01-18.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 18.01-19.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 19.01-20.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 20.01-21.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 21.01-22.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 22.01-23.01   sec  210 KBytes  1.72 Mbits/sec
[ 4] 23.01-24.01   sec  211 KBytes  1.73 Mbits/sec
[ 4] 24.01-25.01   sec  199 KBytes  1.63 Mbits/sec
[ 4] 25.01-26.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 26.01-27.01   sec  208 KBytes  1.70 Mbits/sec
[ 4] 27.01-28.01   sec  207 KBytes  1.69 Mbits/sec
[ 4] 28.01-29.01   sec  215 KBytes  1.76 Mbits/sec
[ 4] 29.01-30.01   sec  197 KBytes  1.61 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.01   sec  7.49 MBytes  2.09 Mbits/sec  1
[ 4]  0.00-30.01   sec  5.72 MBytes  1.60 Mbits/sec
CPU Utilization: local/receiver 2.6% (1.0%u/1.6% s), remote/sender 0.0% (0.0%u/0.0% s)
```

Average used Bandwidth : **1.5 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.3.17 Benchmark Summary

Netropy N91 Satellite Simulator		
Latency ms	TCP Bandwidth Utilization of 1 Gbit/s	Utilization %
1	928.00	92.80%
25	62.00	6.20%
50	34.00	3.40%
75	23.00	2.30%
100	17.00	1.70%
150	12.00	1.20%
200	9.00	0.90%
300	6.00	0.60%
400	4.50	0.45%
500	4.00	0.40%
600	3.00	0.30%
700	2.50	0.25%
800	2.25	0.23%
900	2.00	0.20%
1000	1.50	0.15%



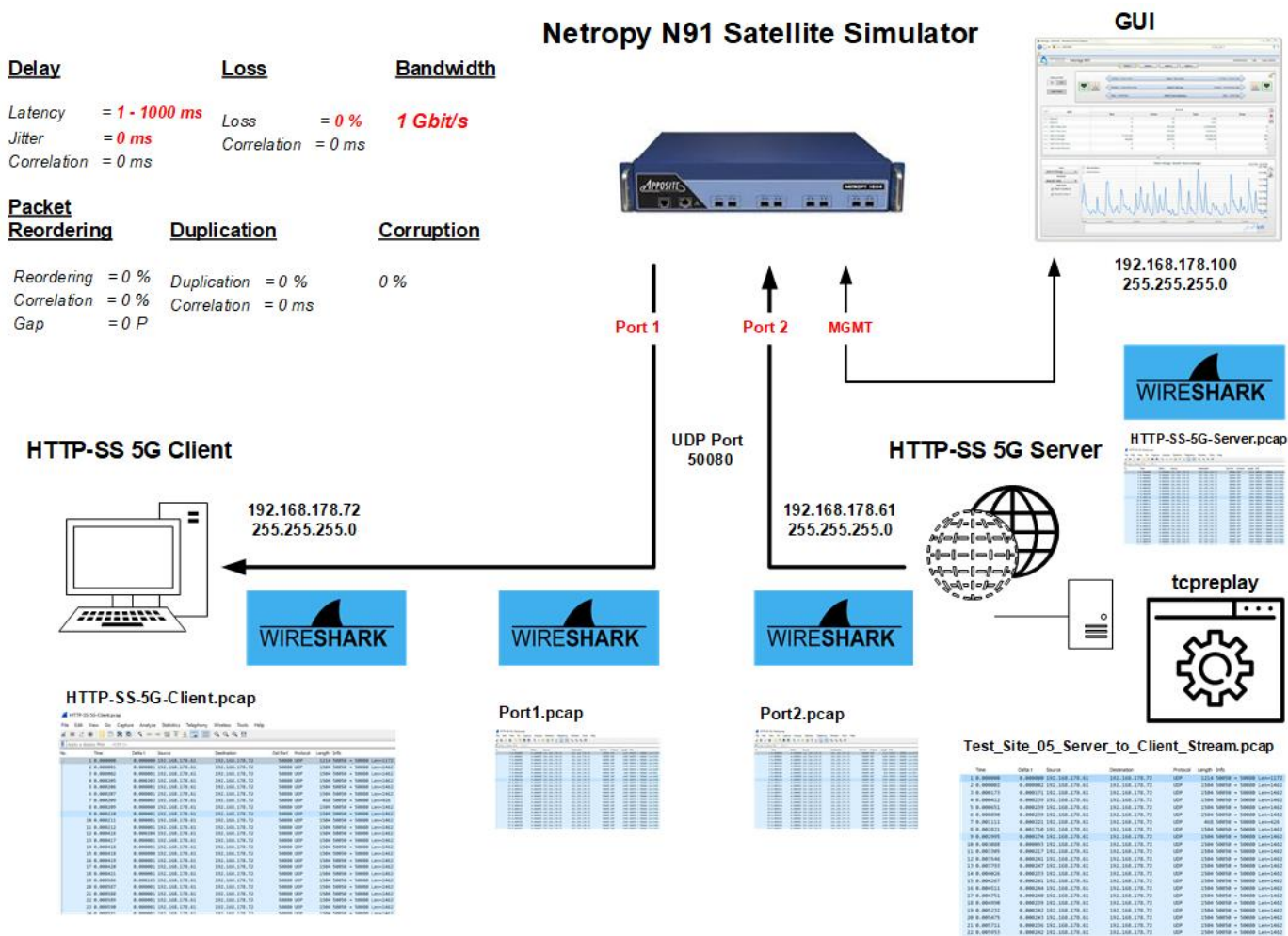
4.0 LAB Network Condition

4.4 HTTP-QuSS - http | FTP | VoIP | Media Streaming | ...

Please Note:

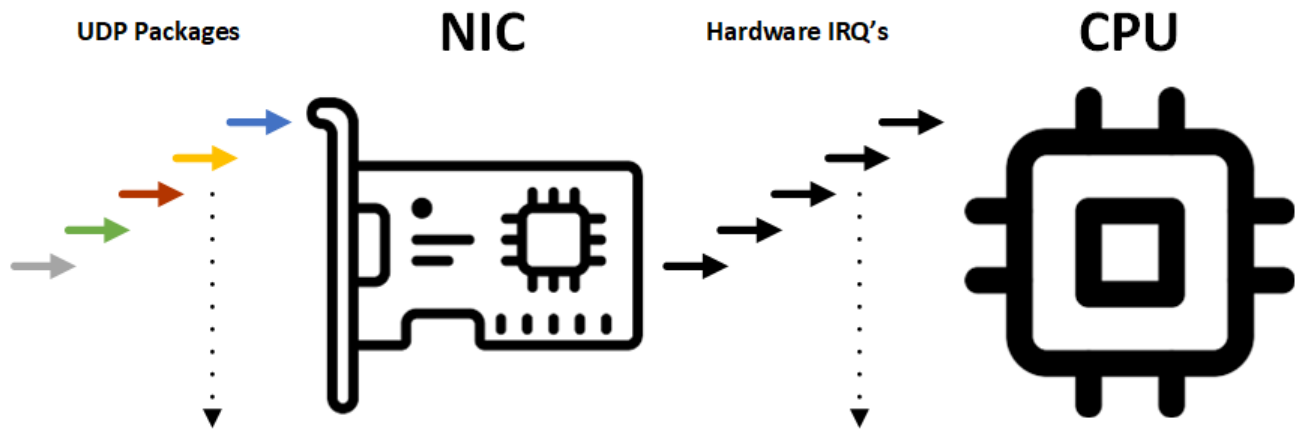
Due to Hardware Restrictions, Processor Timer Inaccuracy and most of all huge NIC Hardware Interrupts and related CPU Usage a lossless Data Transmission for this Test Scenario was only possible upto 800 Mbit/s

Sending 1495 HTTP-QuSS UDP Packages Available Bandwidth : 800 Mbit/s



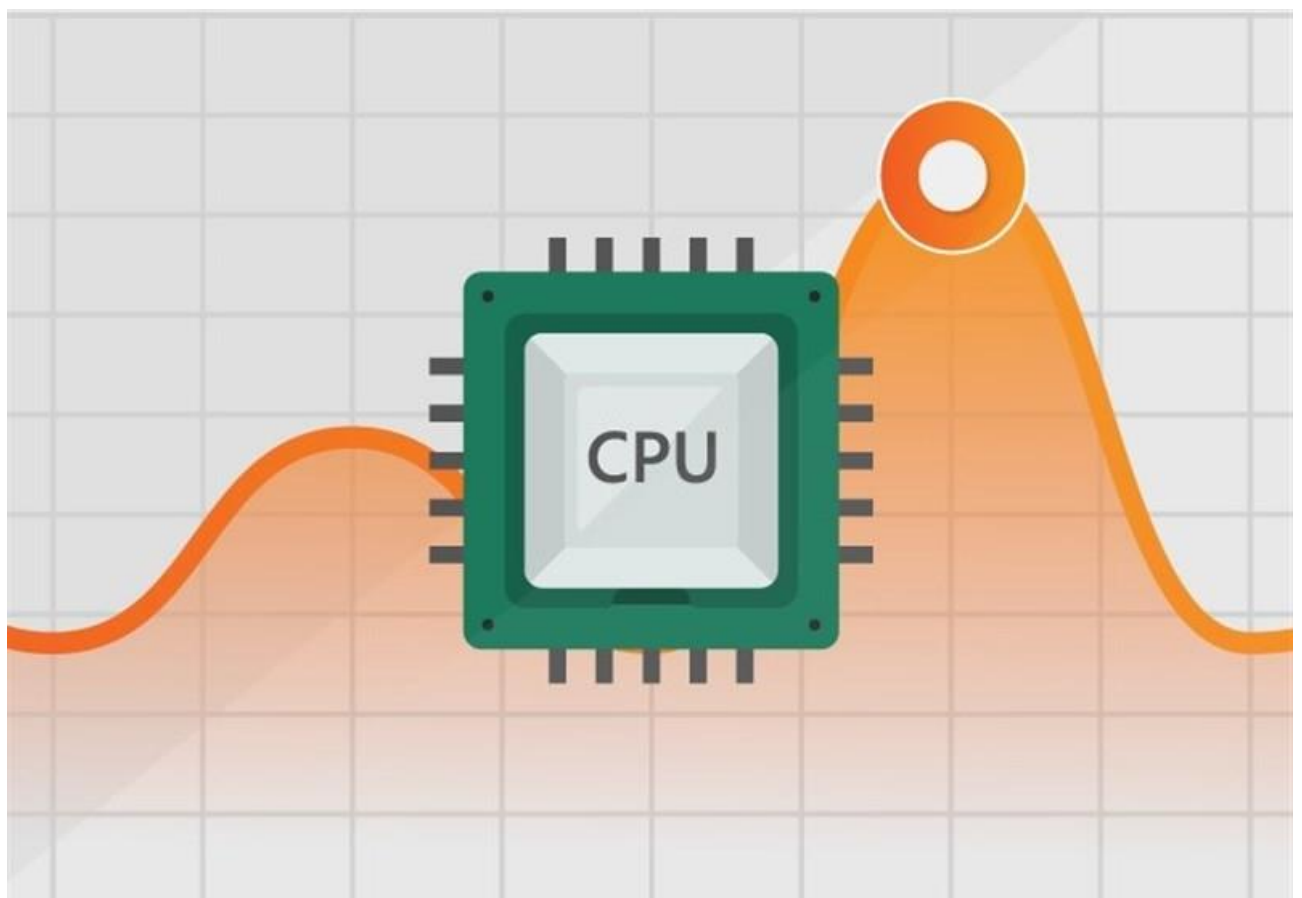
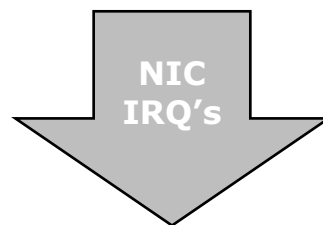
- Measured were the UDP Data Packets transmitted from the server (Number and Bandwidth) and the UDP Data Packets arriving at the Desktop Client (Number and Bandwidth)
- Used measured Results for Arrived Packages only **without any Package Losses.**
- As earlier mentioned, the additional Latencies at Receiving Site result in a lower Bandwidth which is caused due to the high CPU Utilization which must process huge NIC Hardware Interrupts.

4.0 LAB Network Condition



$$X \text{ Mbit/s} * 1.000.000 \text{ bits/Mbit} / 8 \text{ bits/byte} / 1500 \text{ bytes/packet} = Y \text{ Packages/s}$$

$$1\ 000 \text{ Mbit/s} = 1\ 000\ 000\ 000 / 8 / 1500 = \underline{83\ 333 \text{ Packages/s}}$$



4.0 LAB Network Condition

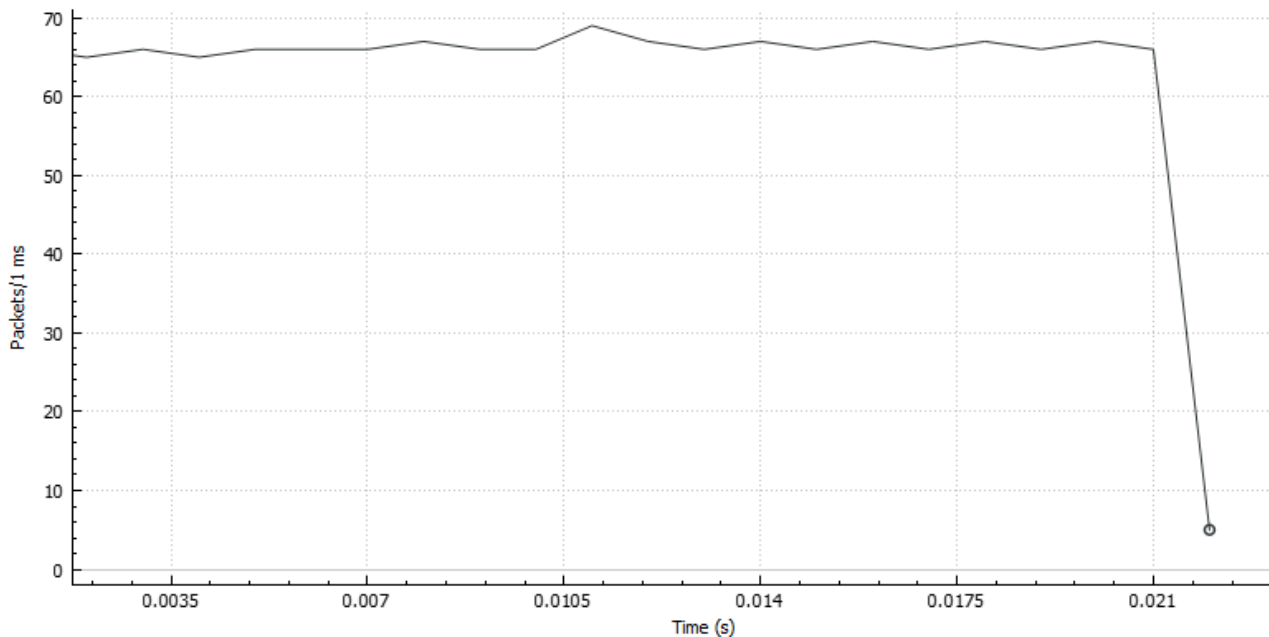
4.4.1 HTTP-QuSS - Lossless used Bandwidth with RTT = 1 ms

```
Ping wird ausgeführt für 192.168.178.77 mit 32 Bytes Daten:
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.77: Bytes=32 Zeit<1ms TTL=64
```

4.4.1.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66382.8	66382.8	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	794 M	794 M	—



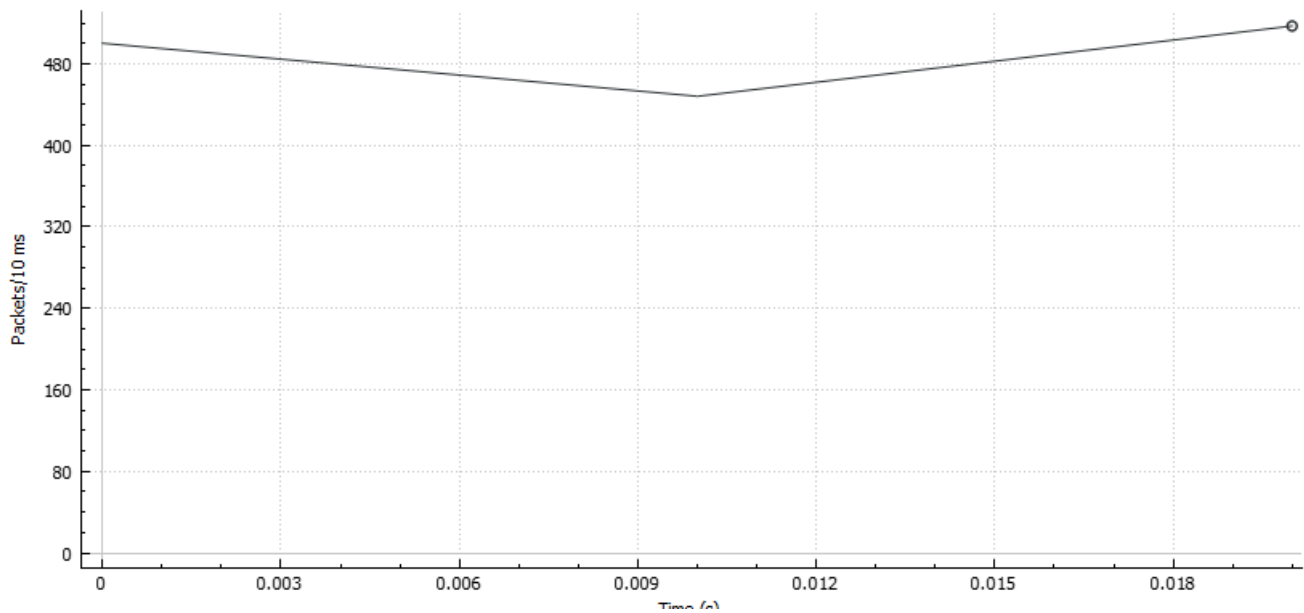
Lossless used Bandwidth: **794 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.1.1.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.028	0.028	—
Average pps	52951.1	52951.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	79 M	79 M	—
Average bits/s	633 M	633 M	—



Lossless used Bandwidth: **633 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

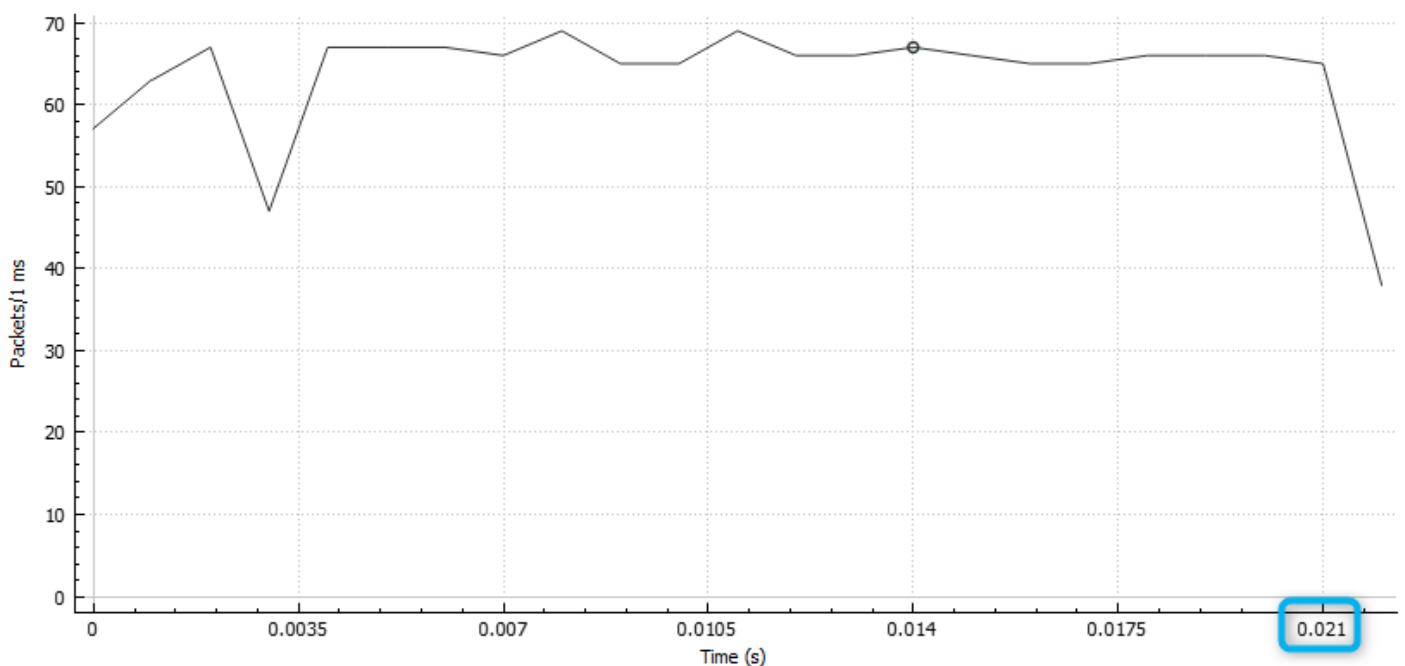
4.4.2 HTTP-QuSS - Lossless used Bandwidth with RTT = 25 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=27ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
```

4.4.2.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.023	0.023	—
Average pps	64935.5	64935.5	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	97 M	97 M	—
Average bits/s	776 M	776 M	—



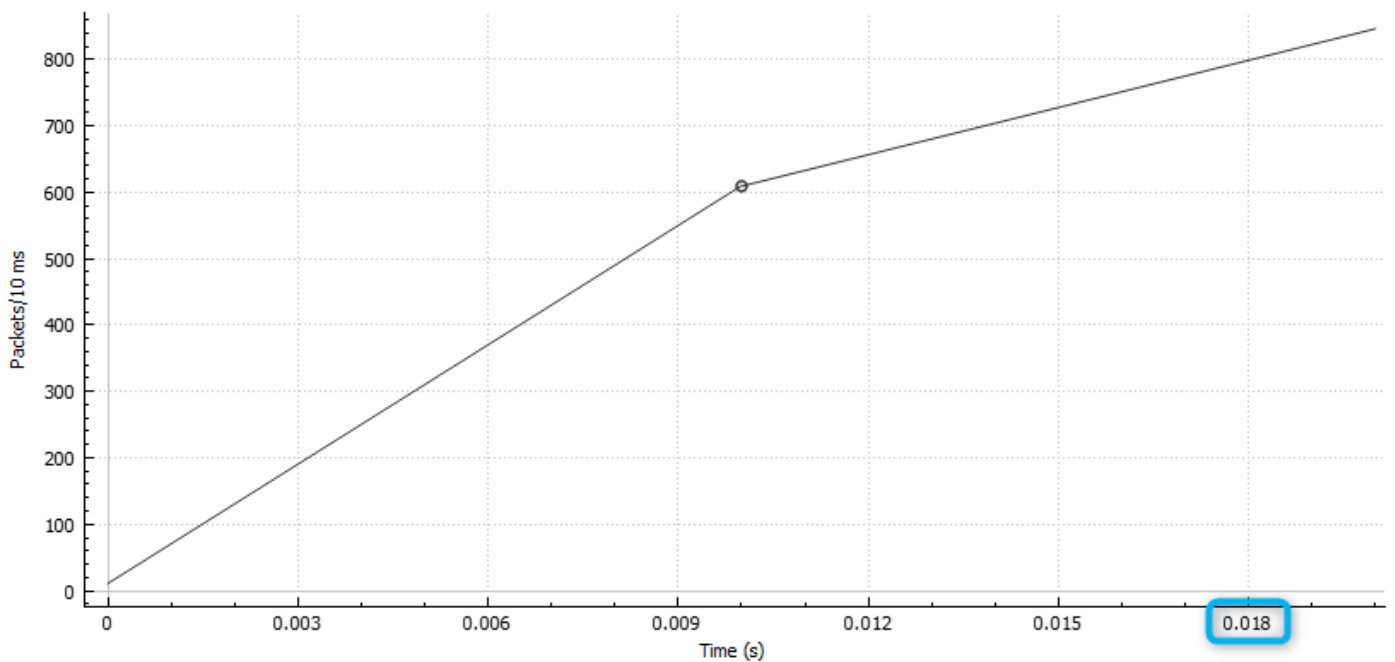
Lossless used Bandwidth: **776 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.2.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.029	0.029	—
Average pps	50894.6	50894.6	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	76 M	76 M	—
Average bits/s	608 M	608 M	—



Lossless used Bandwidth: **608 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

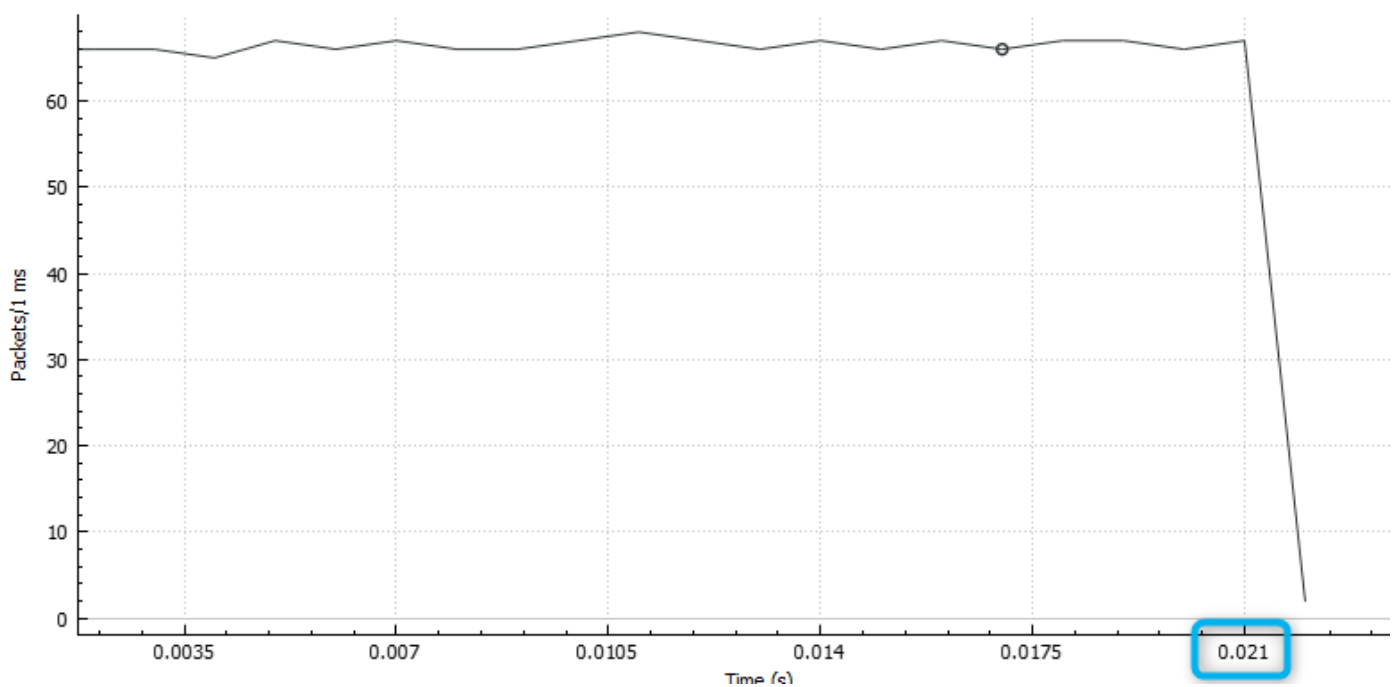
4.4.3 HTTP-QuSS - Lossless used Bandwidth with RTT = 50 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
```

4.4.3.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66530.1	66530.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	795 M	795 M	—



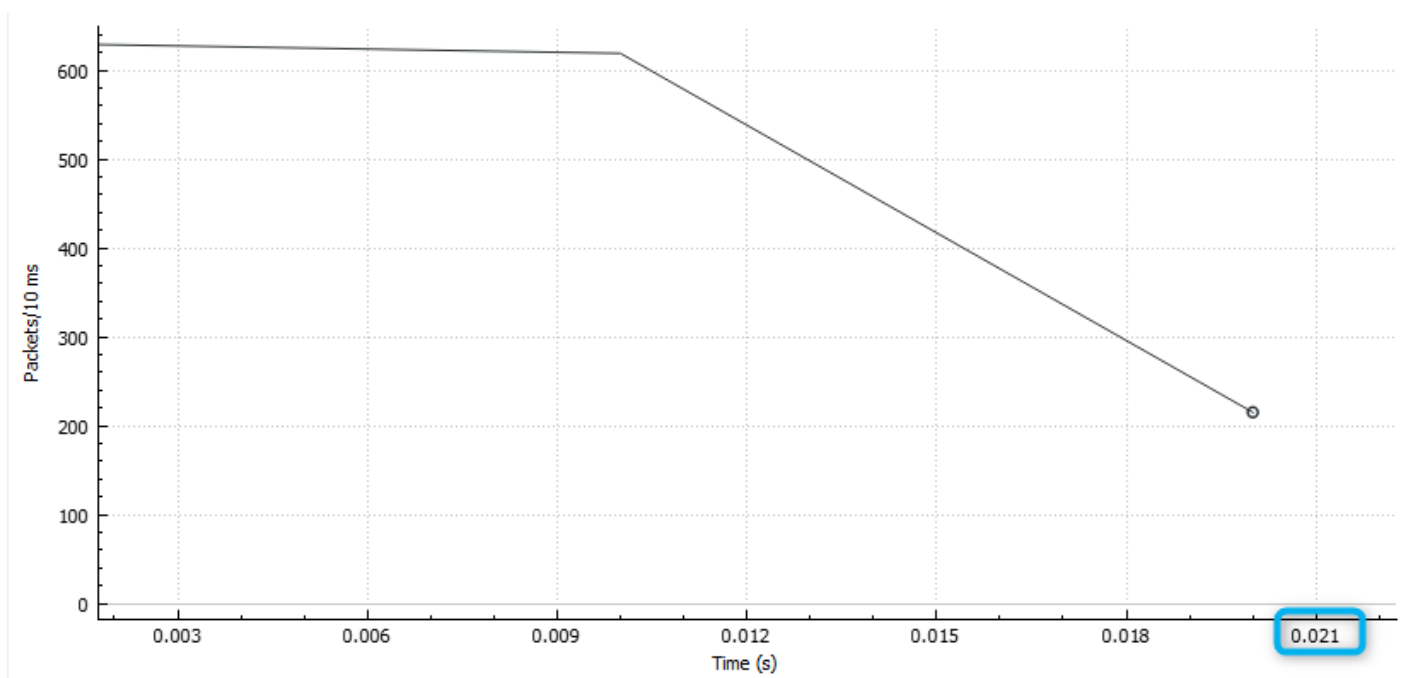
Lossless used Bandwidth: **795 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.3.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.023	0.023	—
Average pps	64341.9	64341.9	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	96 M	96 M	—
Average bits/s	769 M	769 M	—



Lossless used Bandwidth: **769 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

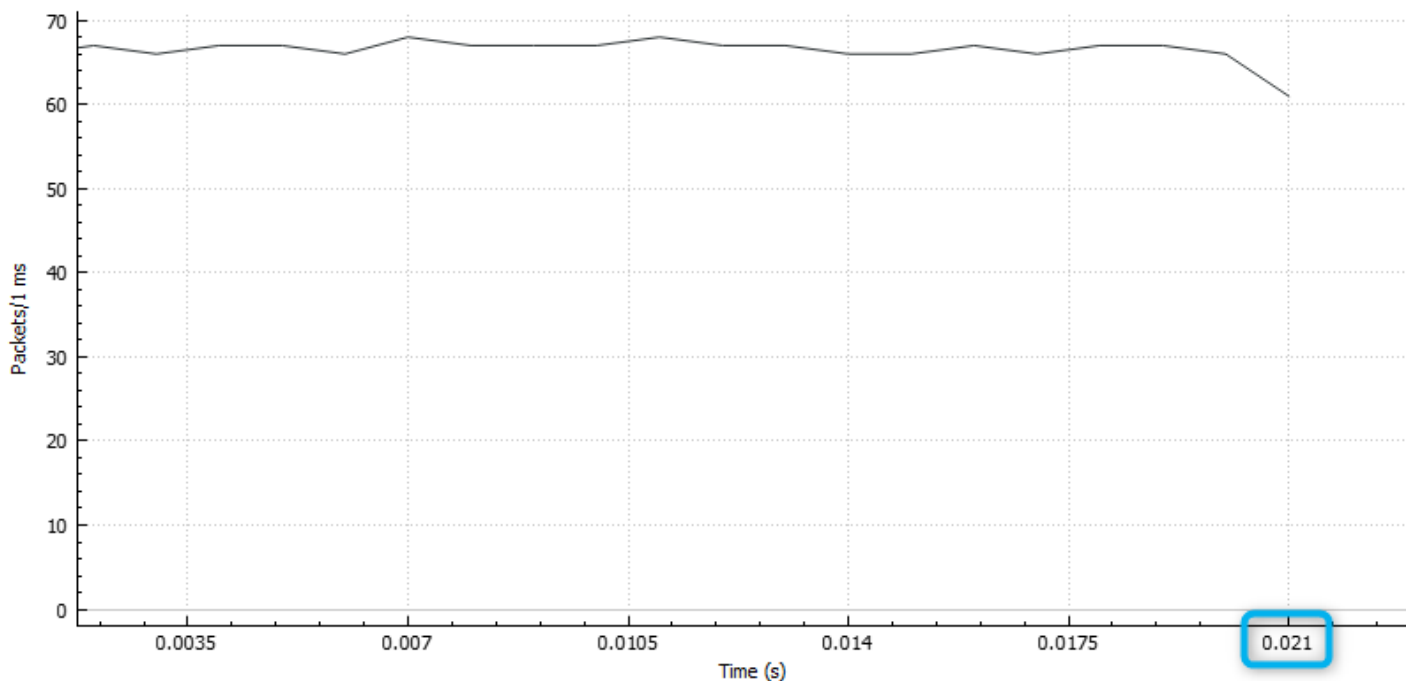
4.4.4 HTTP-QuSS - Lossless used Bandwidth with RTT = 75 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
```

4.4.4.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66861.0	66861.0	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	799 M	799 M	—



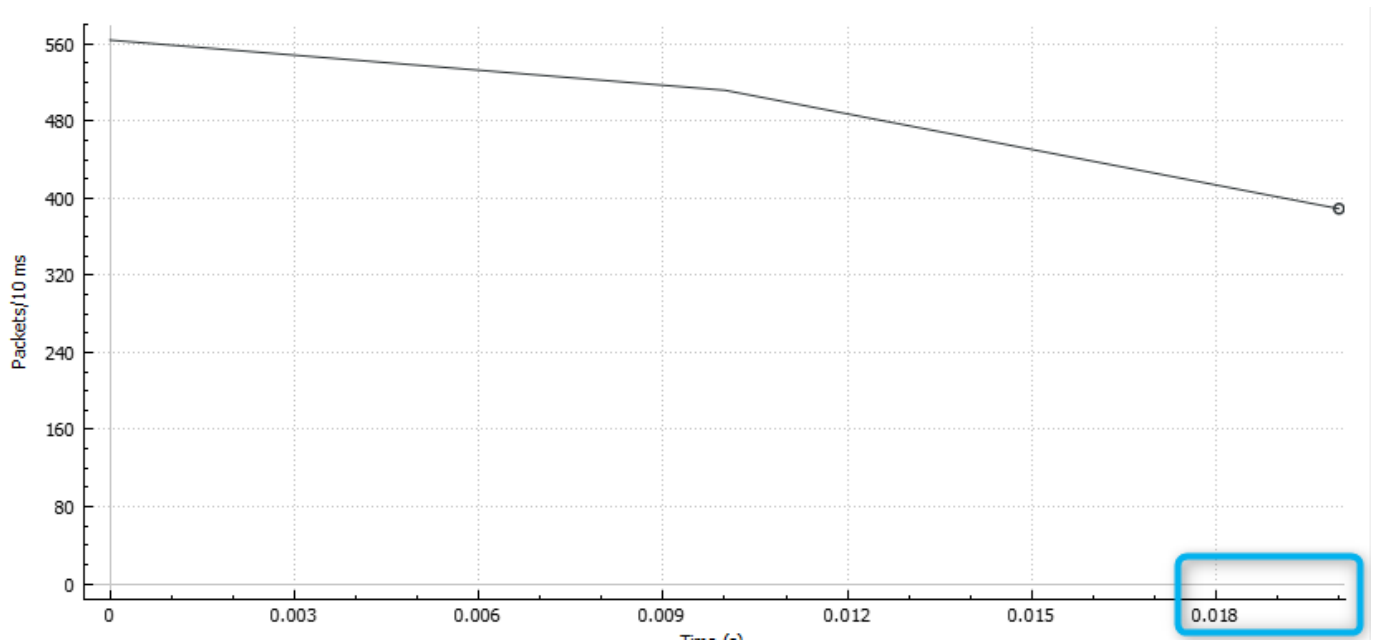
Lossless used Bandwidth: **799 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.4.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.028	0.028	—
Average pps	52121.9	52121.9	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	77 M	77 M	—
Average bits/s	623 M	623 M	—



Lossless used Bandwidth: **623 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

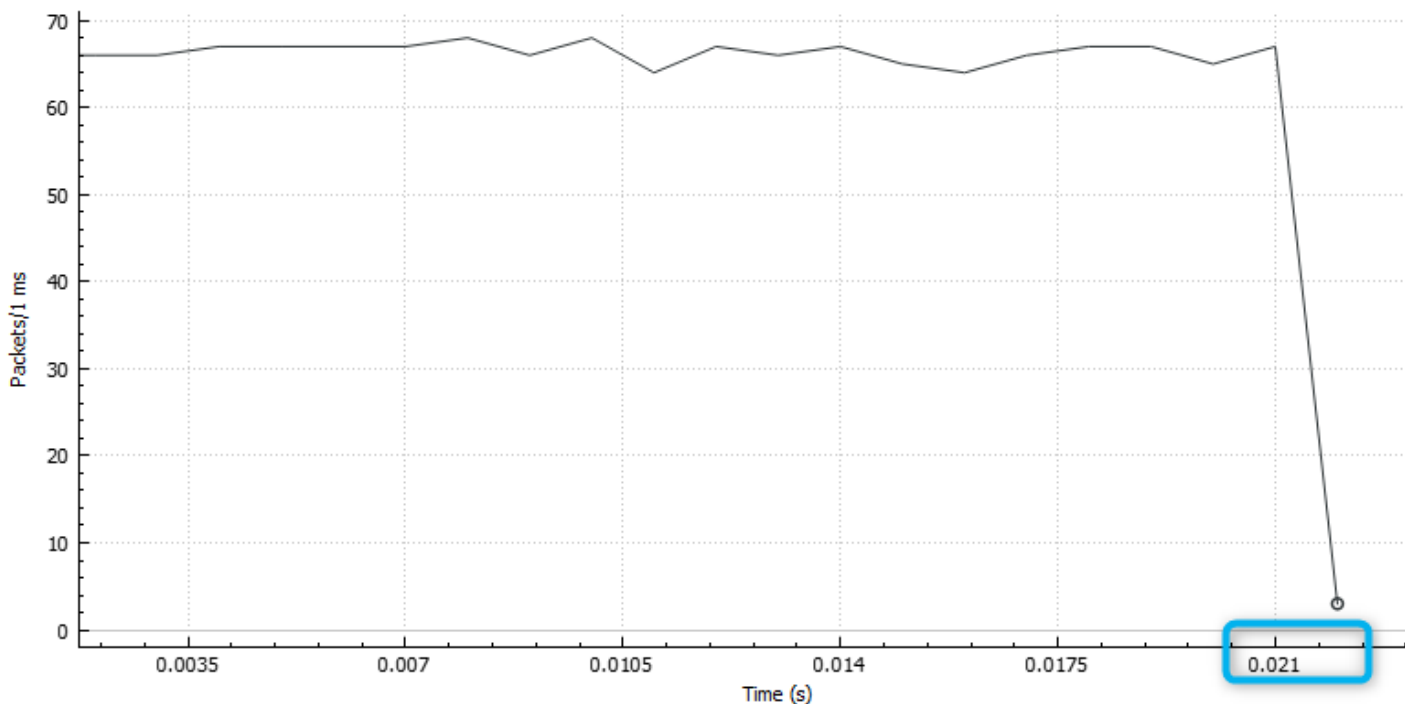
4.4.5 HTTP-QuSS - Lossless used Bandwidth with RTT = 100 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
```

4.4.5.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66481.9	66481.9	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	795 M	795 M	—



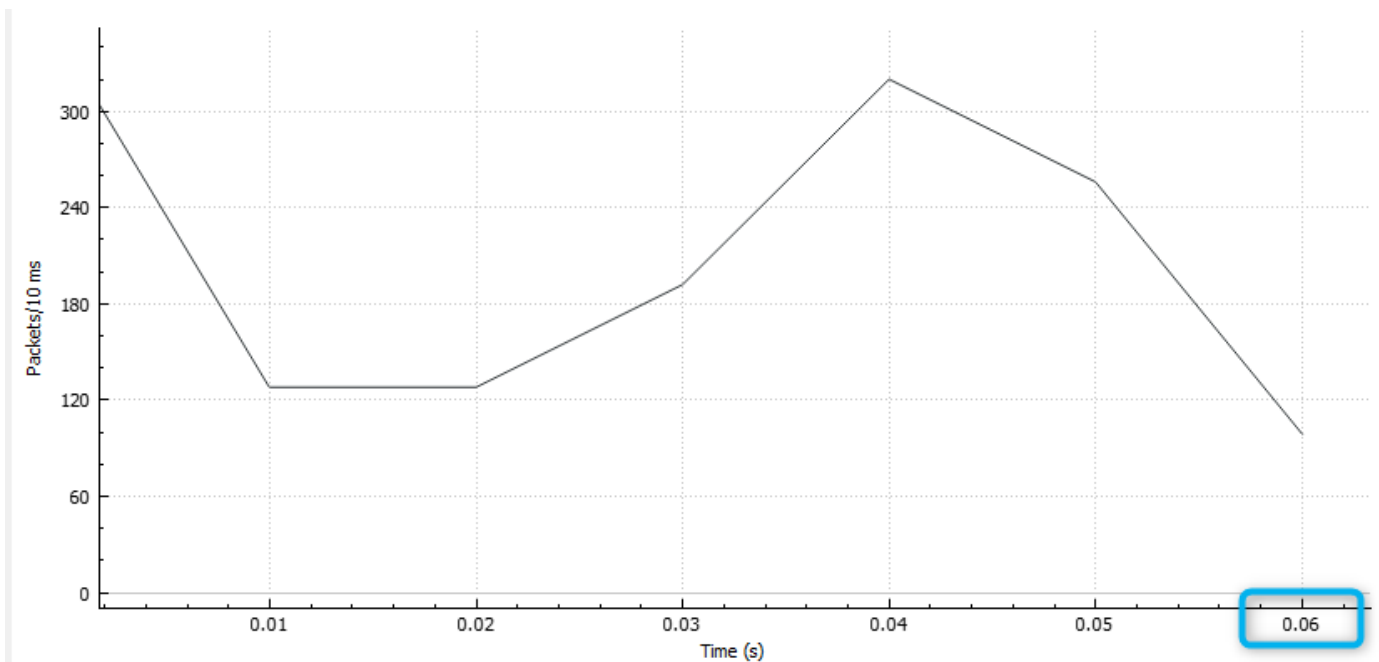
Lossless used Bandwidth: **795 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.5.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.063	0.063	—
Average pps	23403.7	23403.7	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	34 M	34 M	—
Average bits/s	279 M	279 M	—



Lossless used Bandwidth: **297 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

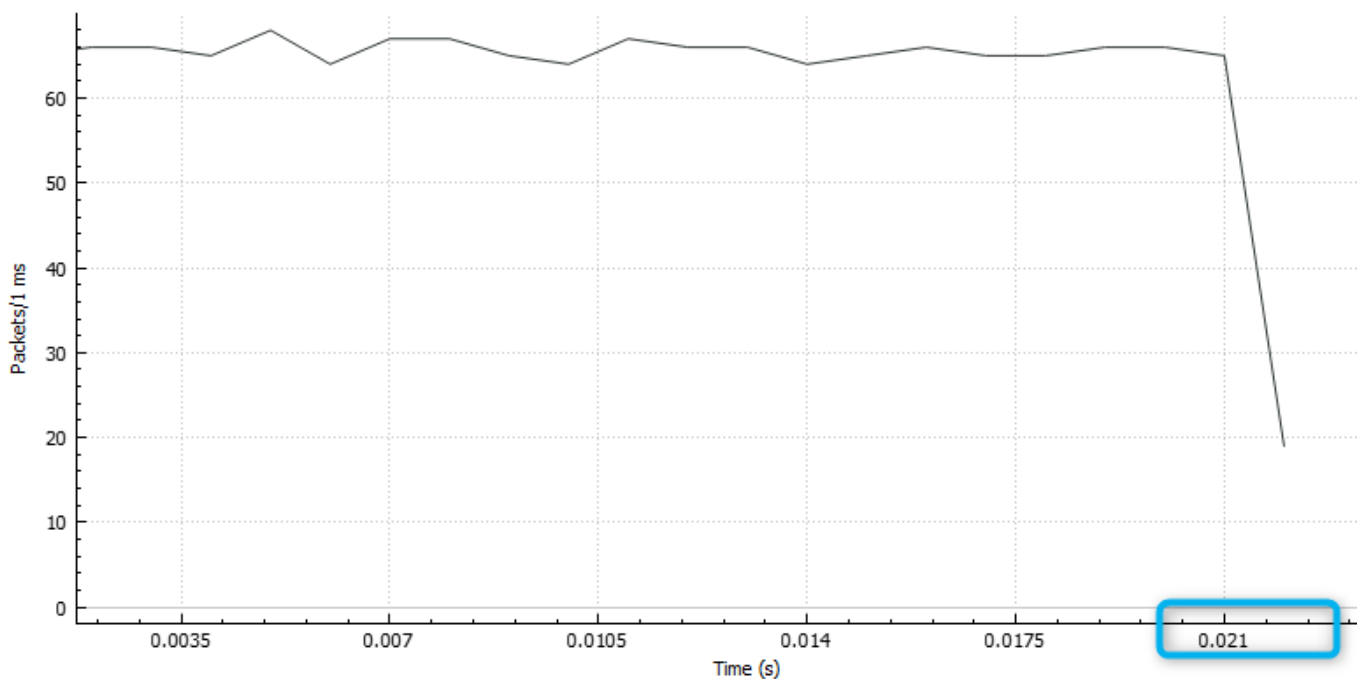
4.4.6 HTTP-QuSS - Lossless used Bandwidth with RTT = 150 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=150ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=150ms TTL=64
```

4.4.6.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	65804.1	65804.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	98 M	98 M	—
Average bits/s	787 M	787 M	—



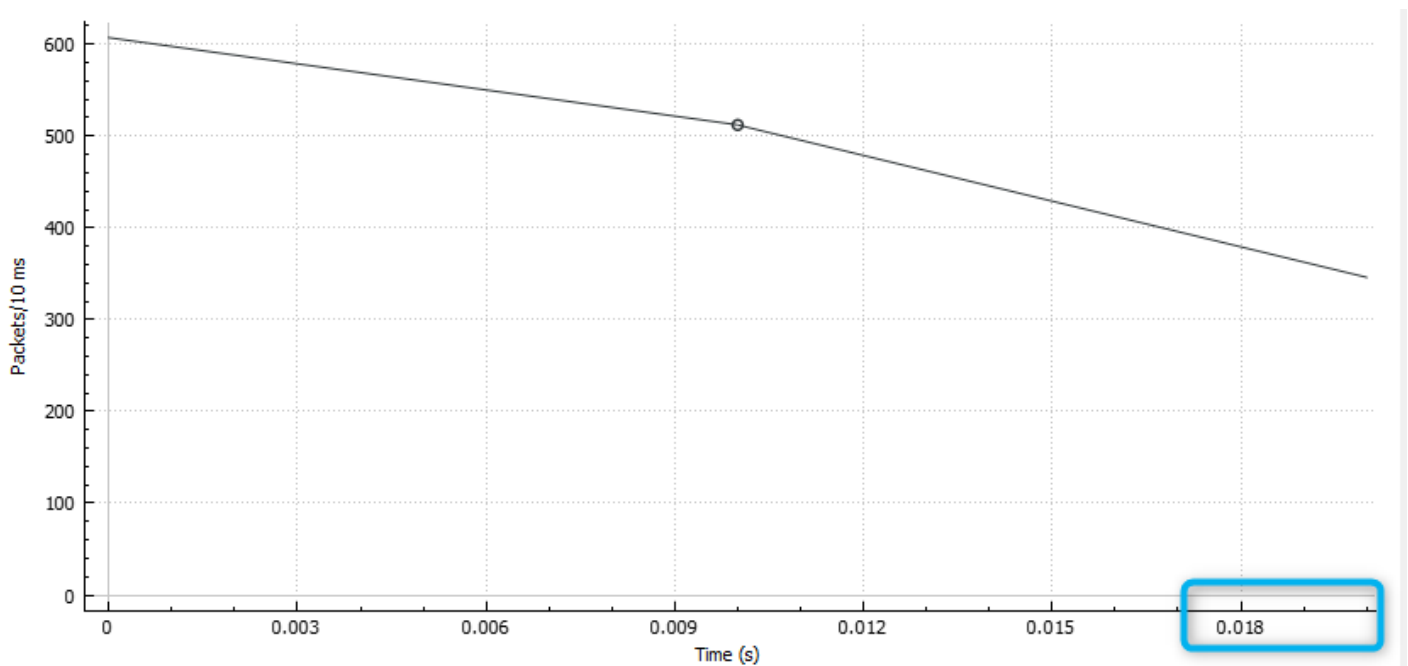
Lossless used Bandwidth: **787 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.6.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.025	0.025	—
Average pps	57627.6	57627.6	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	86 M	86 M	—
Average bits/s	689 M	689 M	—



Lossless used Bandwidth: **689 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

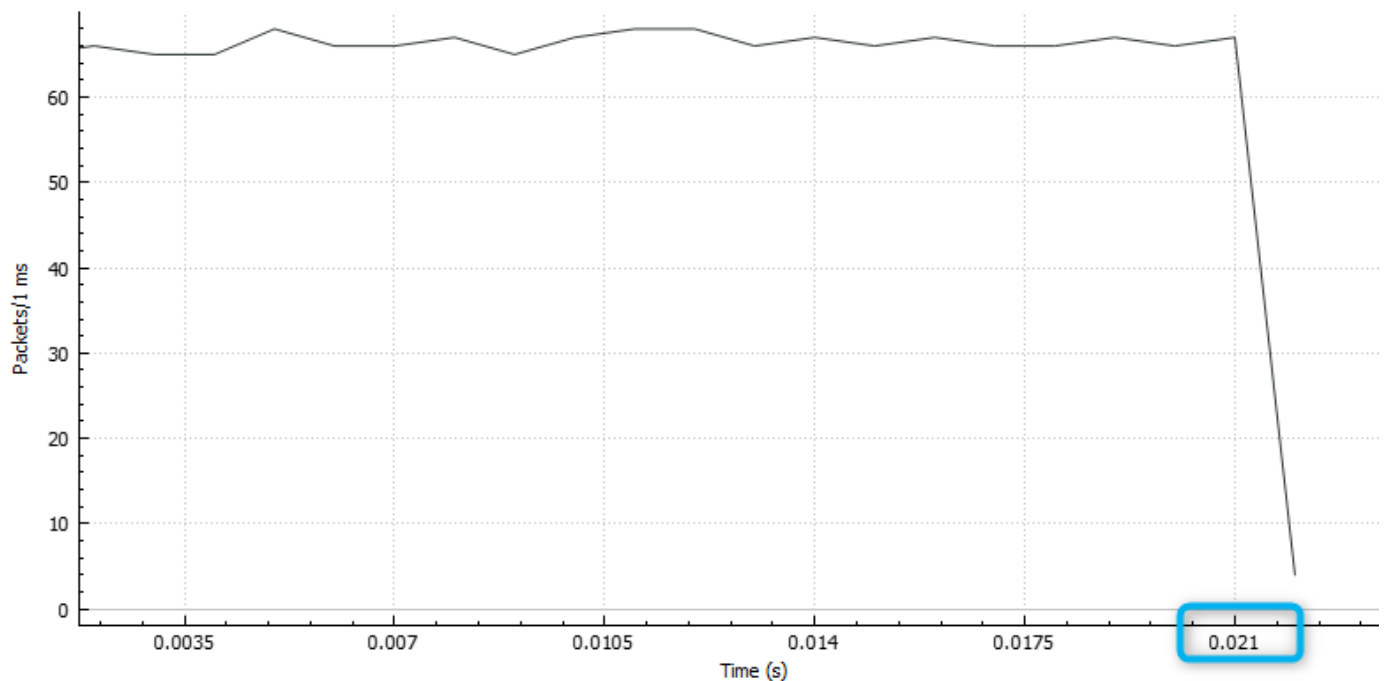
4.4.7 HTTP-QuSS - Lossless used Bandwidth with RTT = 200 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
```

4.4.7.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66415.8	66415.8	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	794 M	794 M	—



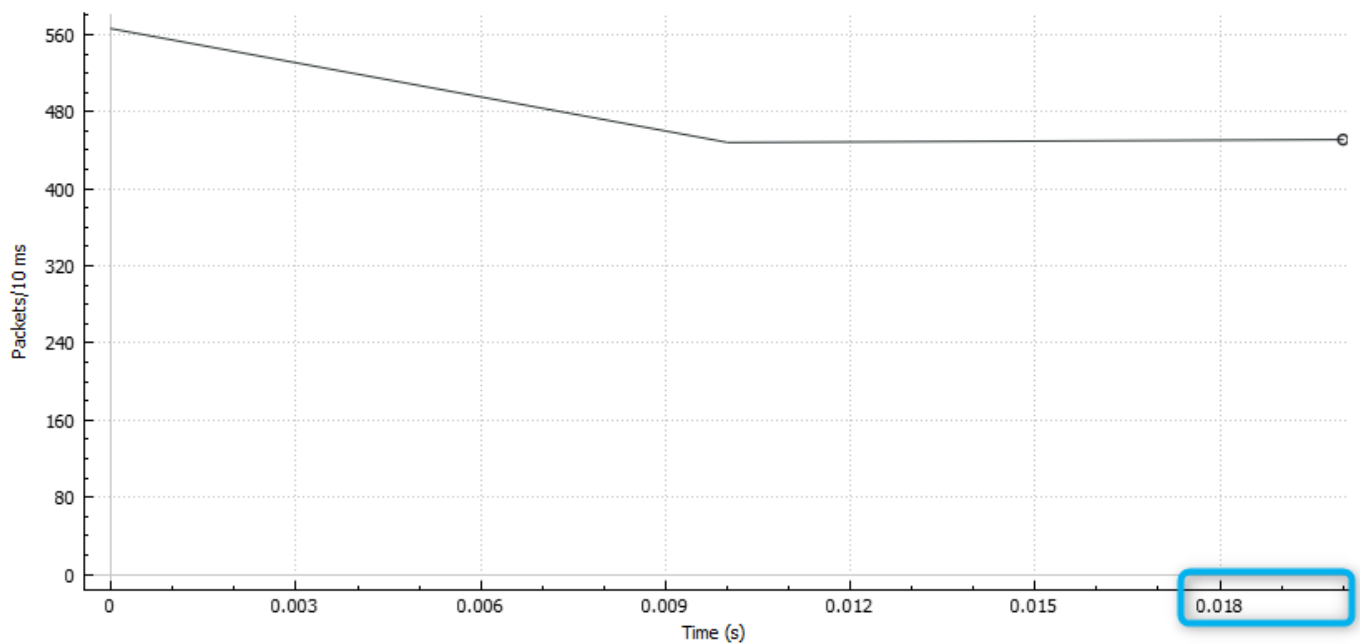
Lossless used Bandwidth: **794 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.7.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.029	0.029	—
Average pps	50210.9	50210.9	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	75 M	75 M	—
Average bits/s	600 M	600 M	—



Lossless used Bandwidth: **600 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

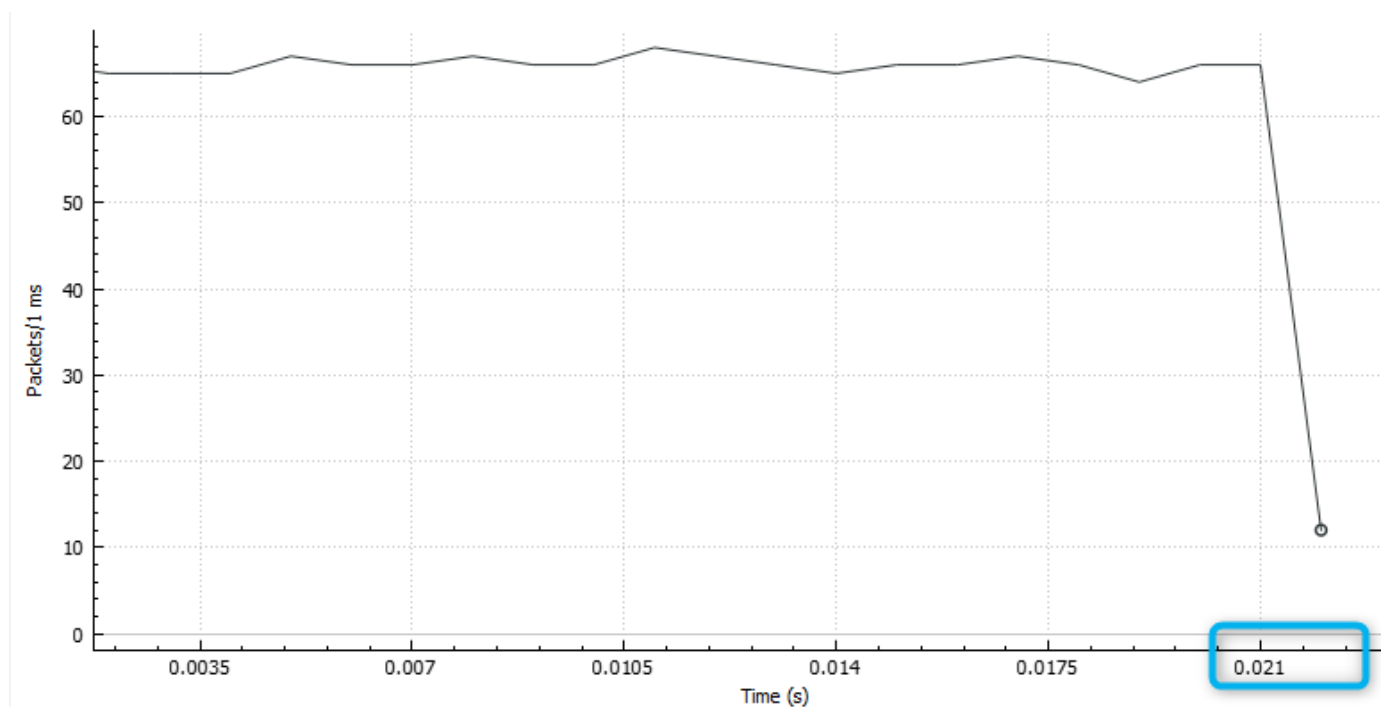
4.4.8 HTTP-QuSS - Lossless used Bandwidth with RTT = 300 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
```

4.4.8.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66083.6	66083.6	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	98 M	98 M	—
Average bits/s	790 M	790 M	—



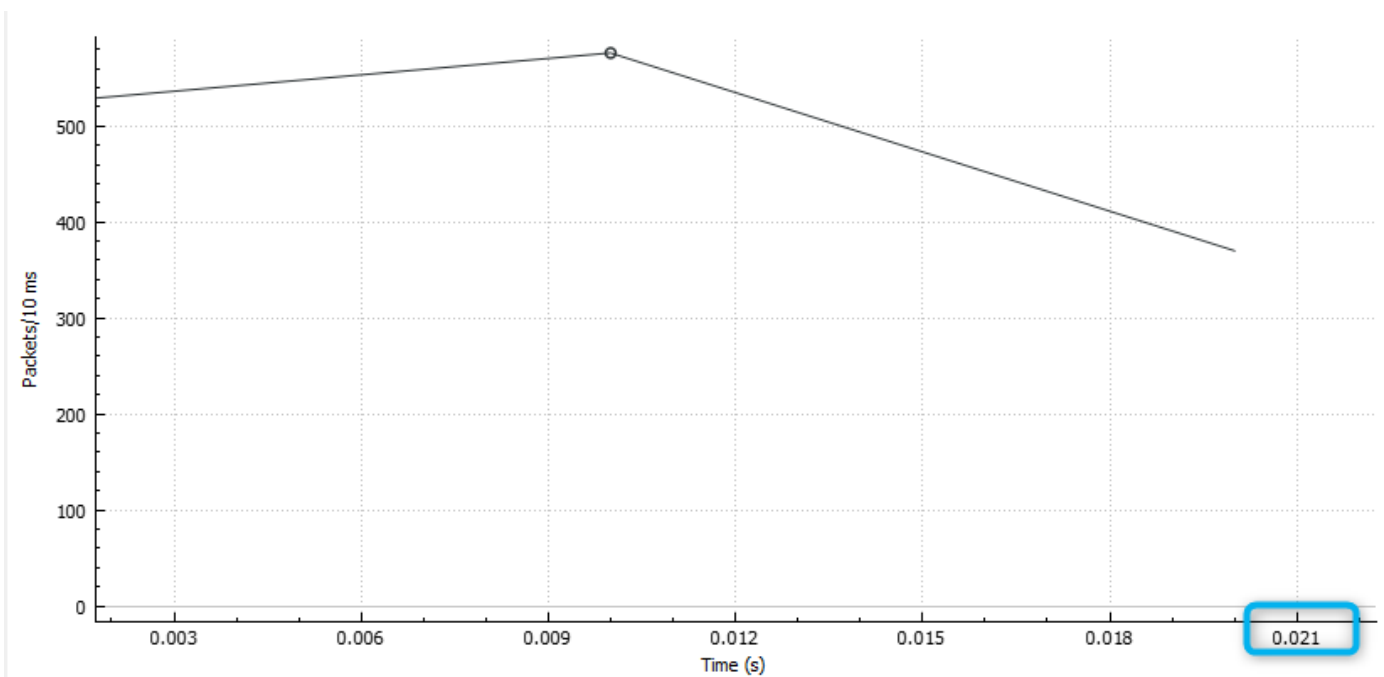
Lossless used Bandwidth: **790 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.8.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.025	0.025	—
Average pps	59509.5	59509.5	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	88 M	88 M	—
Average bits/s	711 M	711 M	—



Lossless used Bandwidth: **711 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

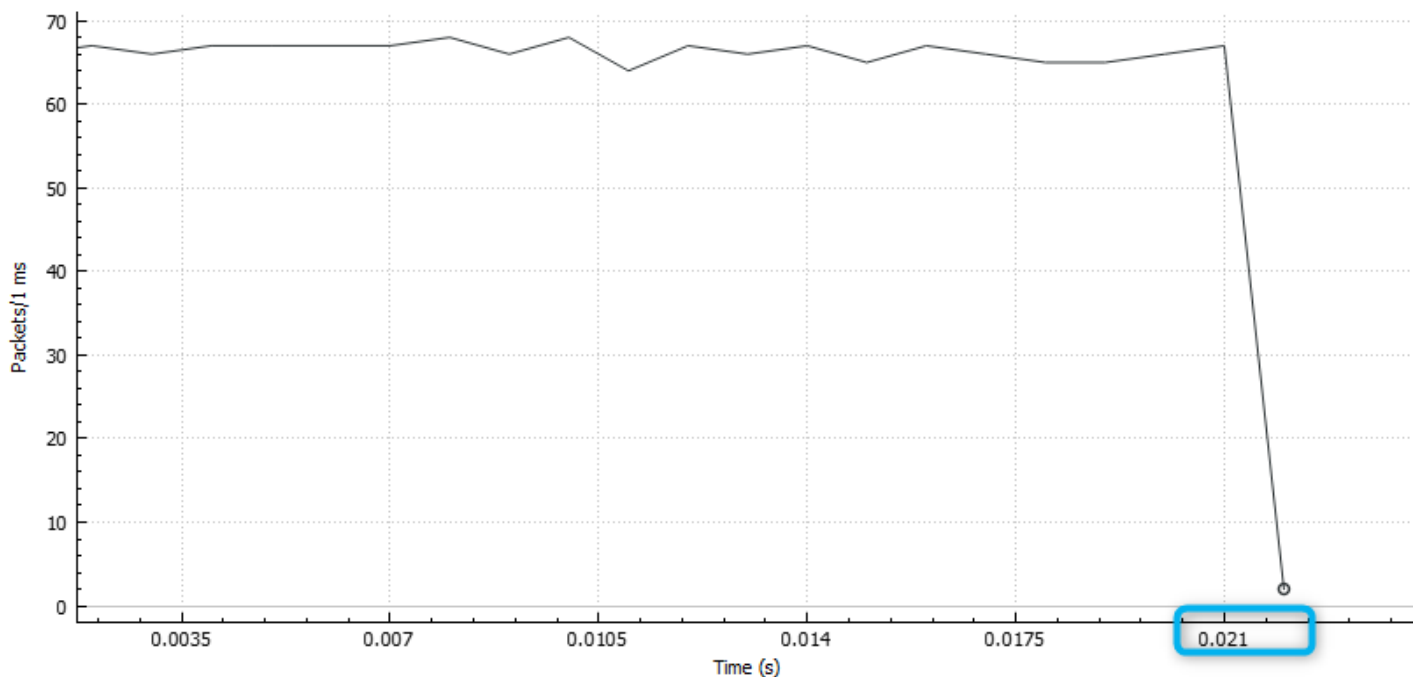
4.4.9 HTTP-QuSS - Lossless used Bandwidth with RTT = 400 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=408ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=401ms TTL=64
```

4.4.9.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66517.9	66517.9	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	795 M	795 M	—



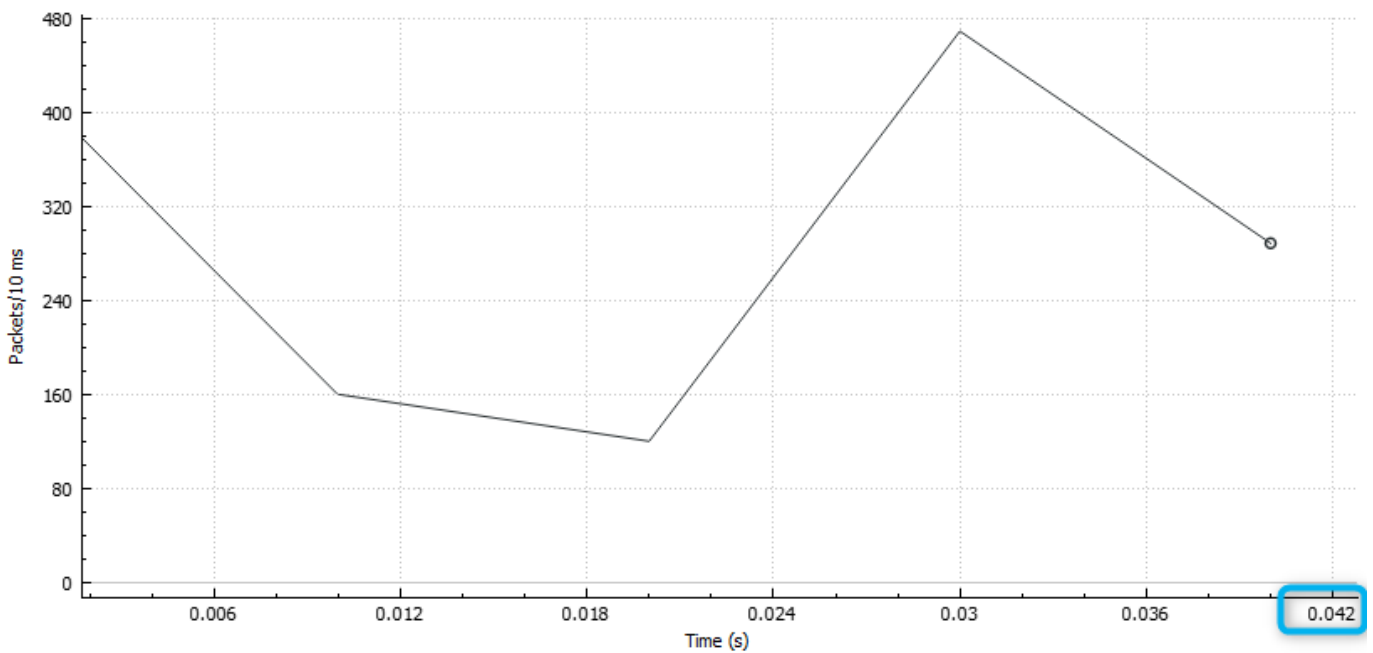
Lossless used Bandwidth: **795 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.9.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.045	0.045	—
Average pps	32749.1	32749.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	48 M	48 M	—
Average bits/s	391 M	391 M	—



Lossless used Bandwidth: **391 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

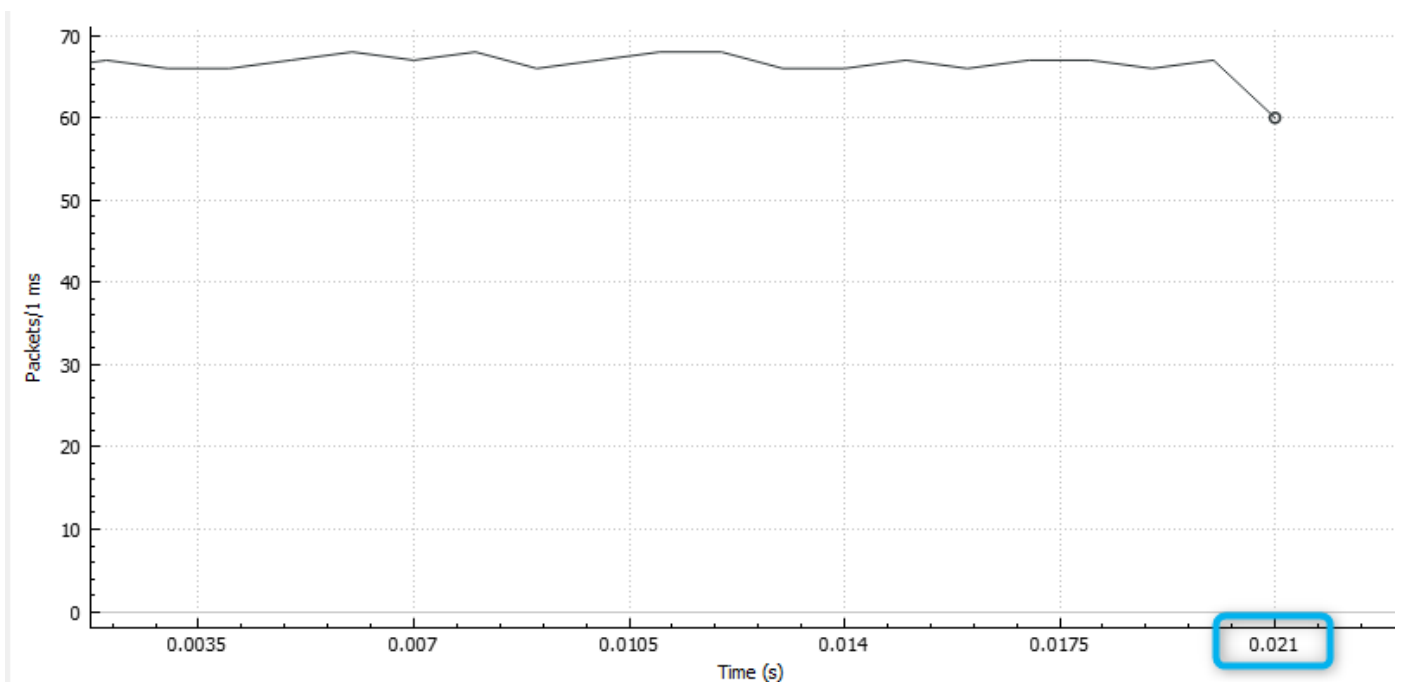
4.4.10 HTTP-QuSS - Lossless used Bandwidth with RTT = 500 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
```

4.4.10.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66892.3	66892.3	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	100 M	100 M	—
Average bits/s	800 M	800 M	—



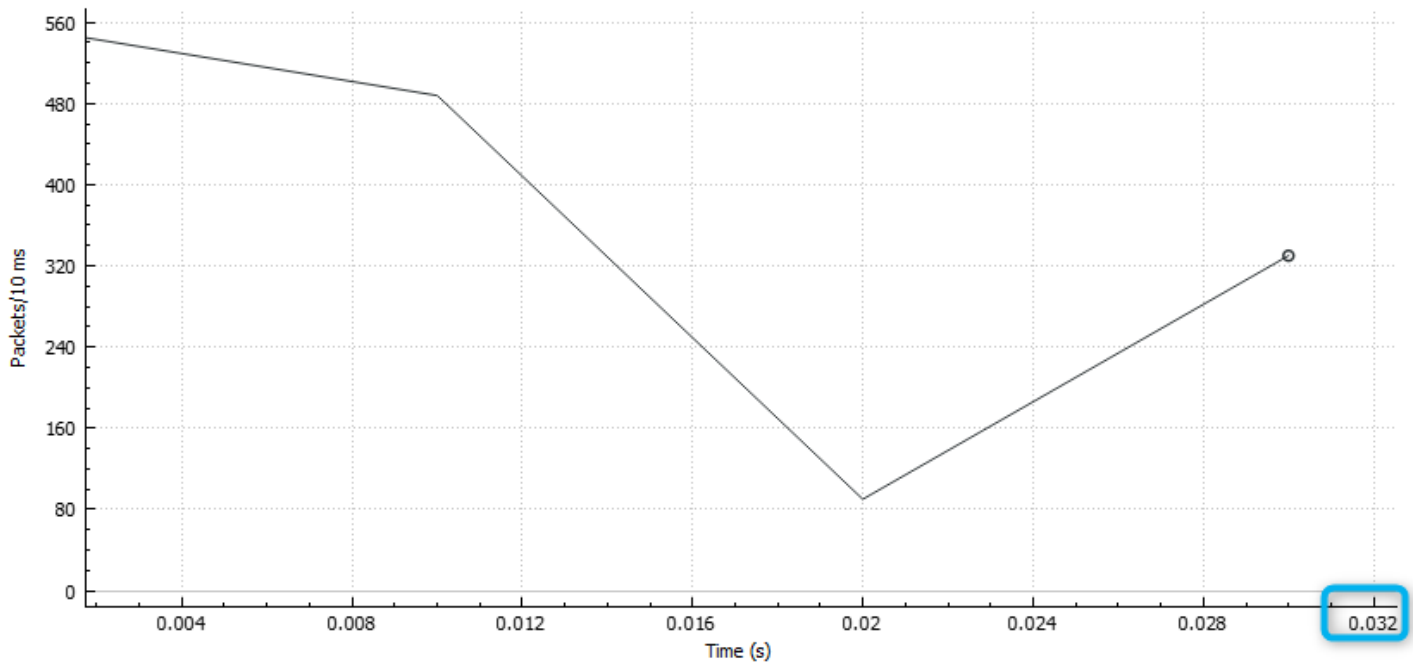
Lossless used Bandwidth: **800 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.10.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.039	0.039	—
Average pps	37109.2	37109.2	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	55 M	55 M	—
Average bits/s	443 M	443 M	—



Lossless used Bandwidth: **443 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

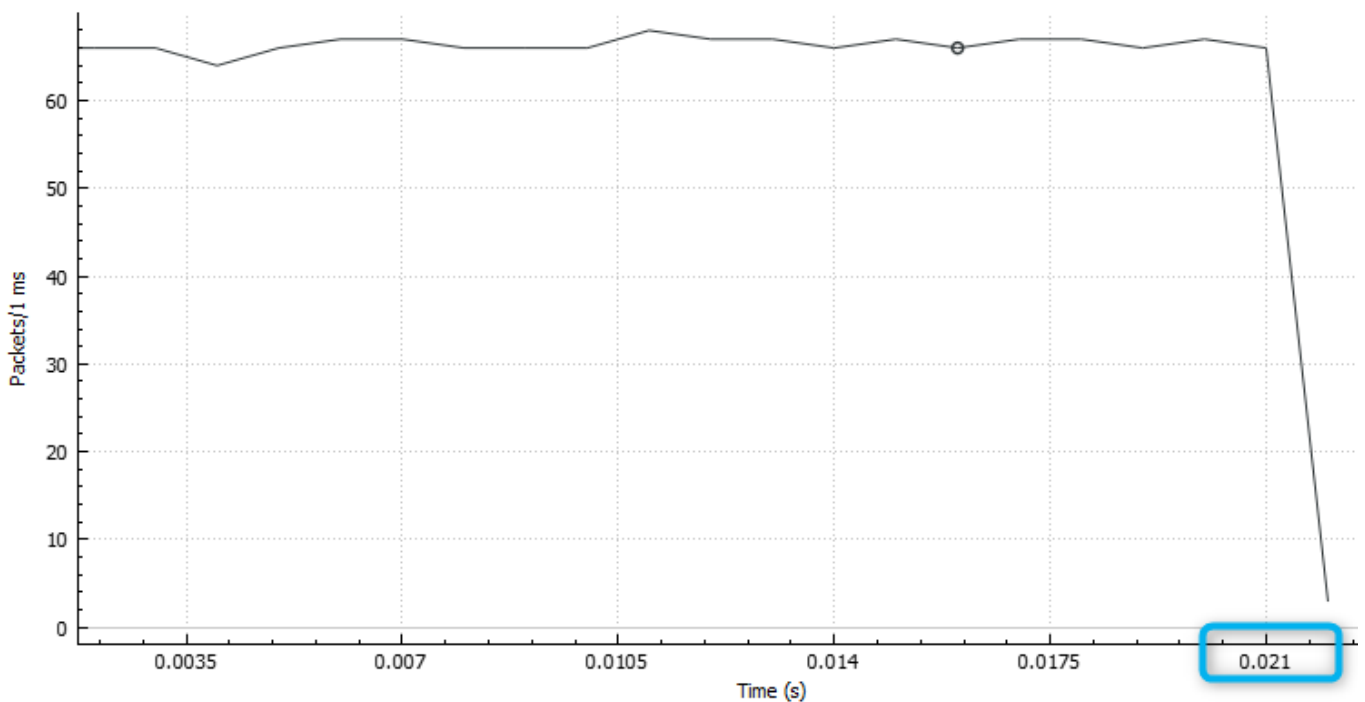
4.4.11 HTTP-QuSS - Lossless used Bandwidth with RTT = 600 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
```

4.4.11.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66469.7	66469.7	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	795 M	795 M	—



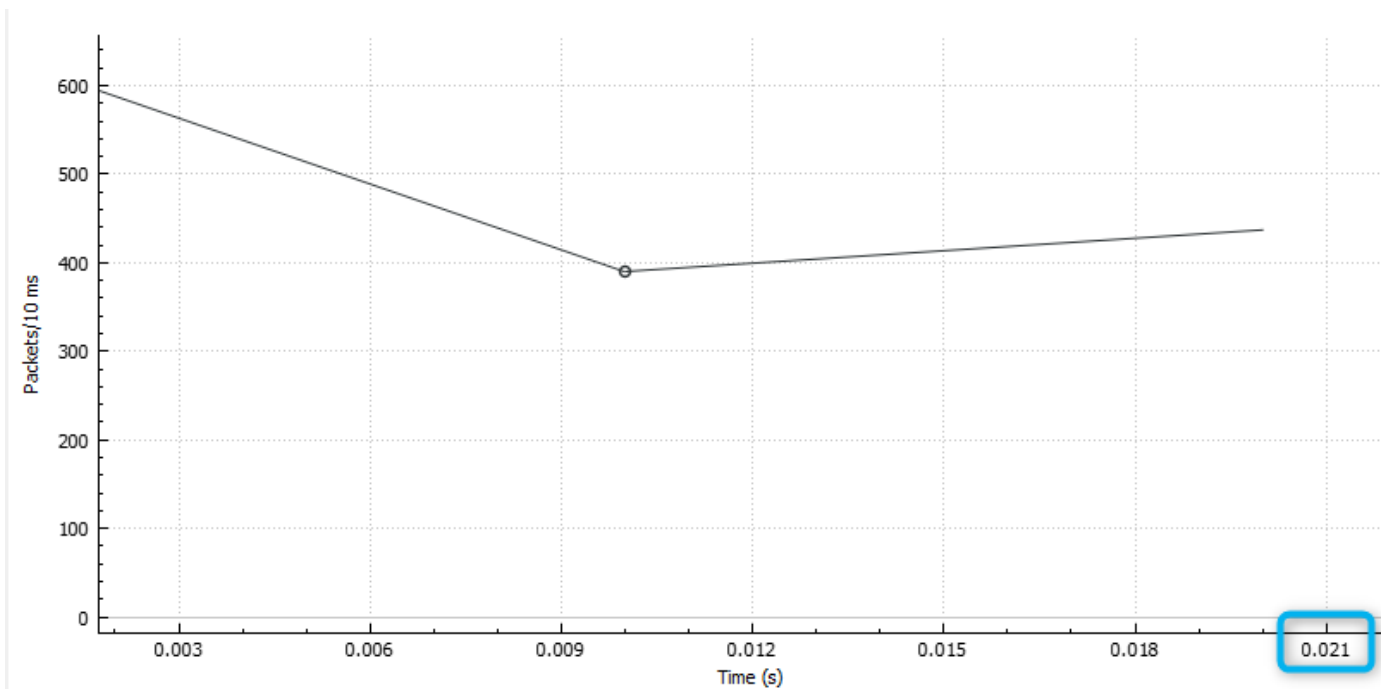
Lossless used Bandwidth: **795 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.11.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.026	0.026	—
Average pps	57195.8	57195.8	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	85 M	85 M	—
Average bits/s	684 M	684 M	—



Lossless used Bandwidth: **684 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

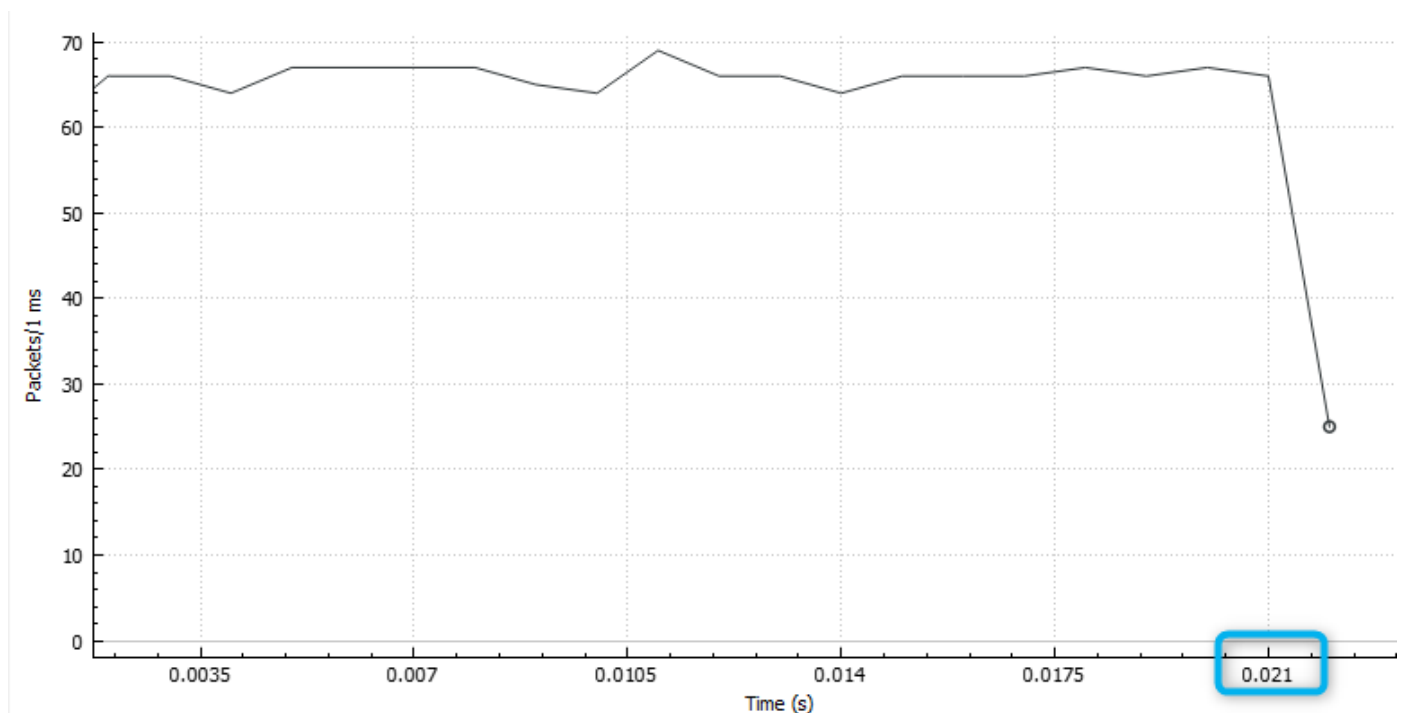
4.4.12 HTTP-QuSS - Lossless used Bandwidth with RTT = 700 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
```

4.4.12.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	65463.4	65463.4	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	97 M	97 M	—
Average bits/s	783 M	783 M	—



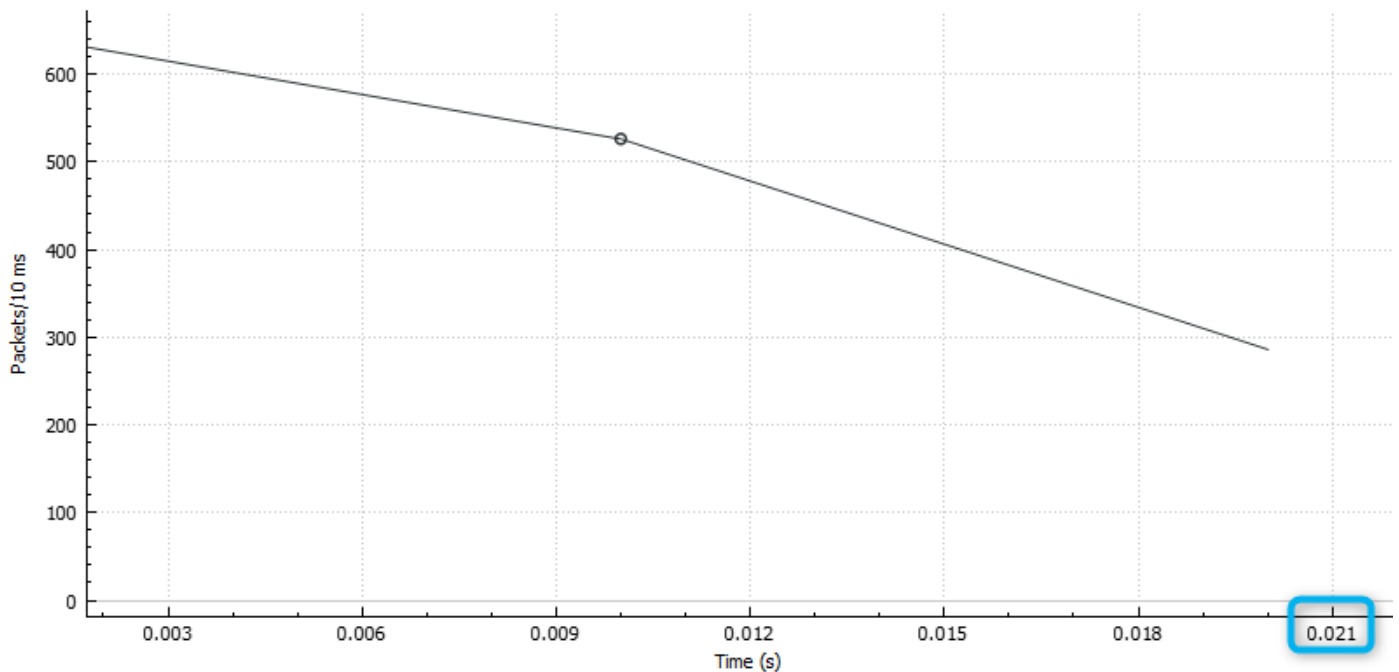
Lossless used Bandwidth: **783 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.12.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.024	0.024	—
Average pps	60695.1	60695.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	90 M	90 M	—
Average bits/s	726 M	726 M	—



Lossless used Bandwidth: **726 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

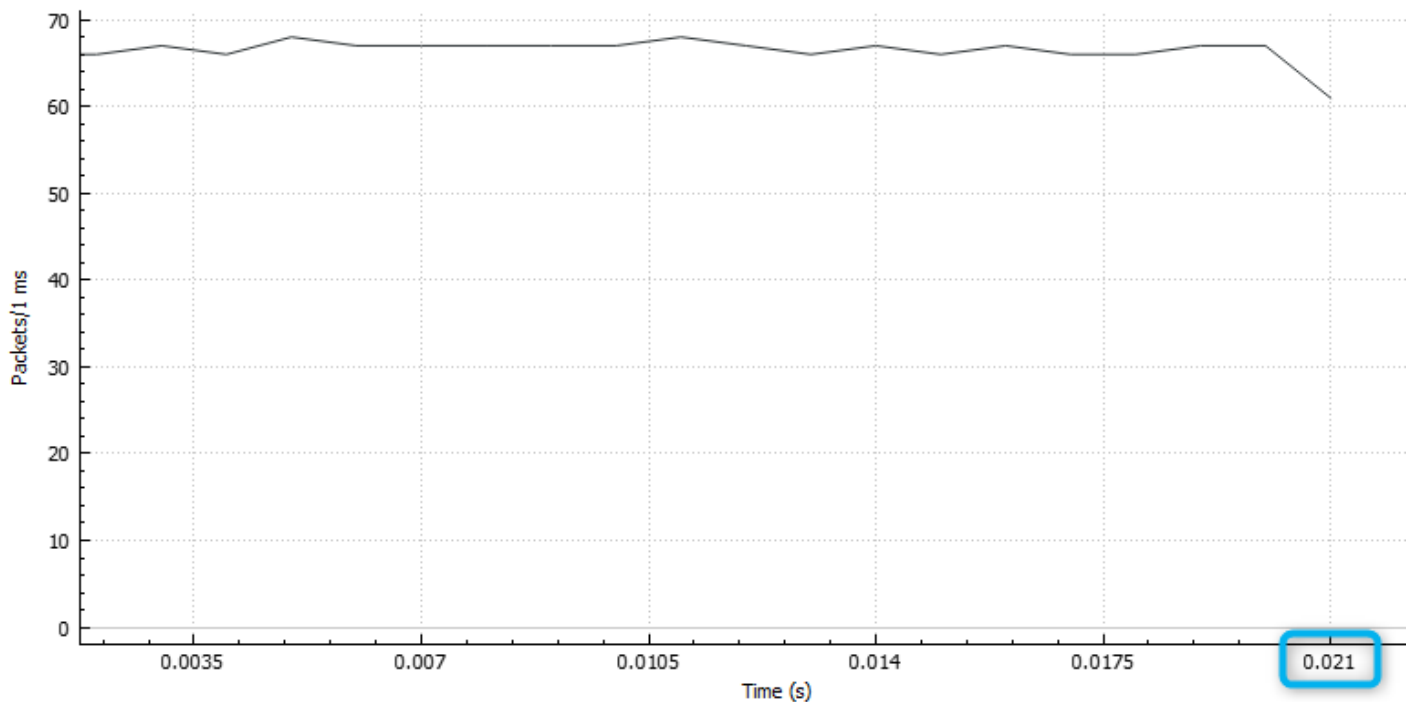
4.4.13 HTTP-QuSS - Lossless used Bandwidth with RTT = 800 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=801ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=802ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=802ms TTL=64
```

4.4.13.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66889.3	66889.3	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	100 M	100 M	—
Average bits/s	800 M	800 M	—



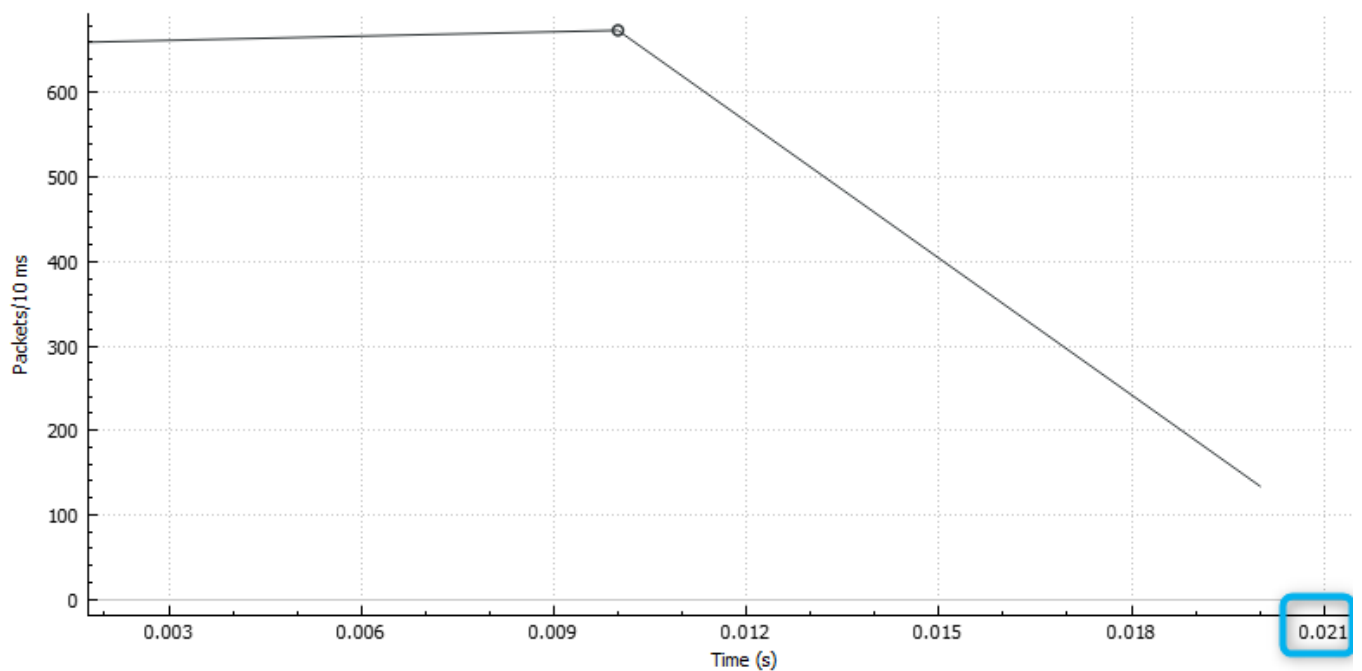
Lossless used Bandwidth: **800 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.13.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66548.1	66548.1	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	796 M	796 M	—



Lossless used Bandwidth: **796 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

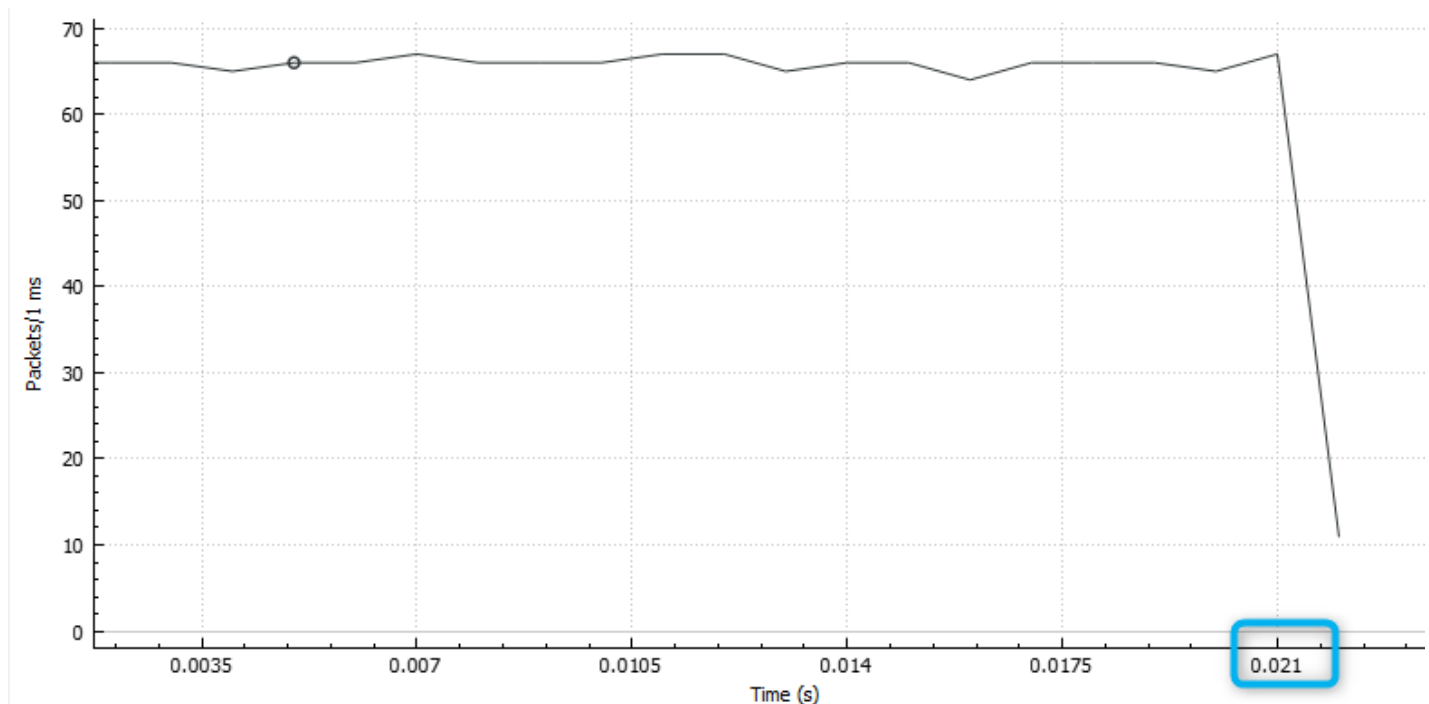
4.4.14 HTTP-QuSS - Lossless used Bandwidth with RTT = 900 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
```

4.4.14.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66101.4	66101.4	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	98 M	98 M	—
Average bits/s	790 M	790 M	—



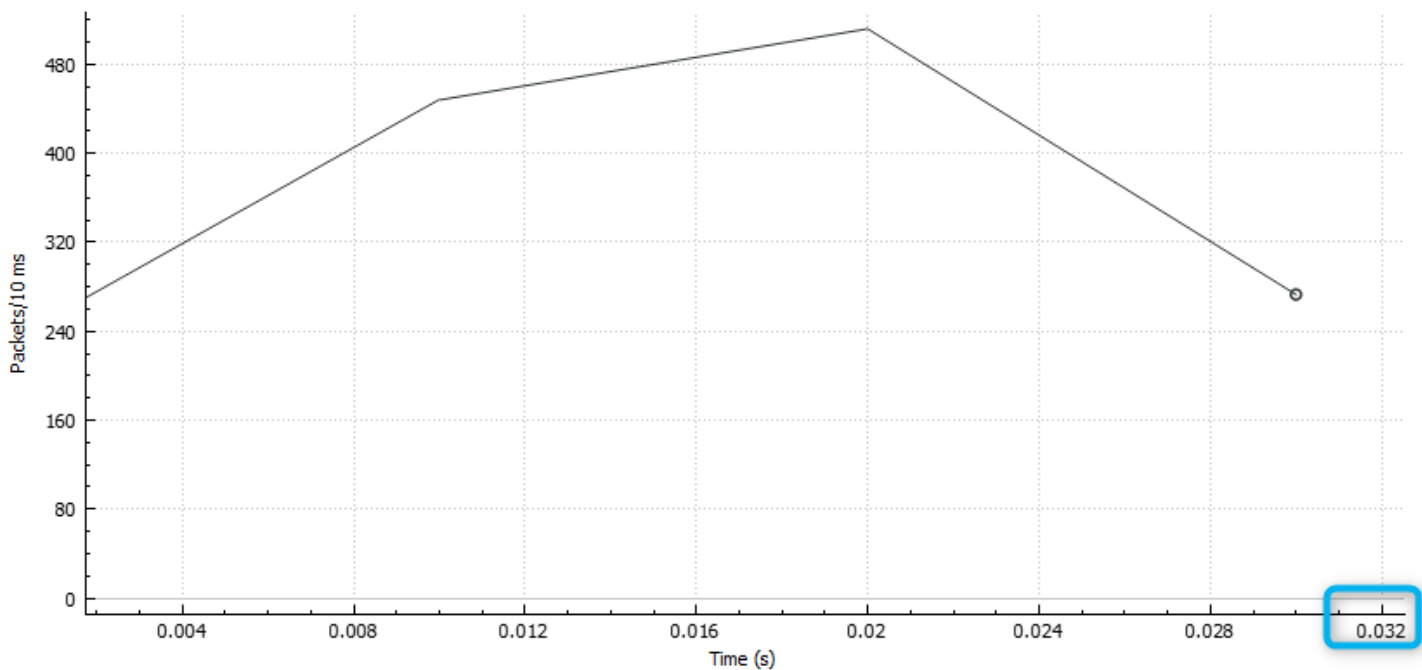
Lossless used Bandwidth: **790 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.14.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.035	0.035	—
Average pps	41739.0	41739.0	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	62 M	62 M	—
Average bits/s	499 M	499 M	—



Lossless used Bandwidth: **499 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

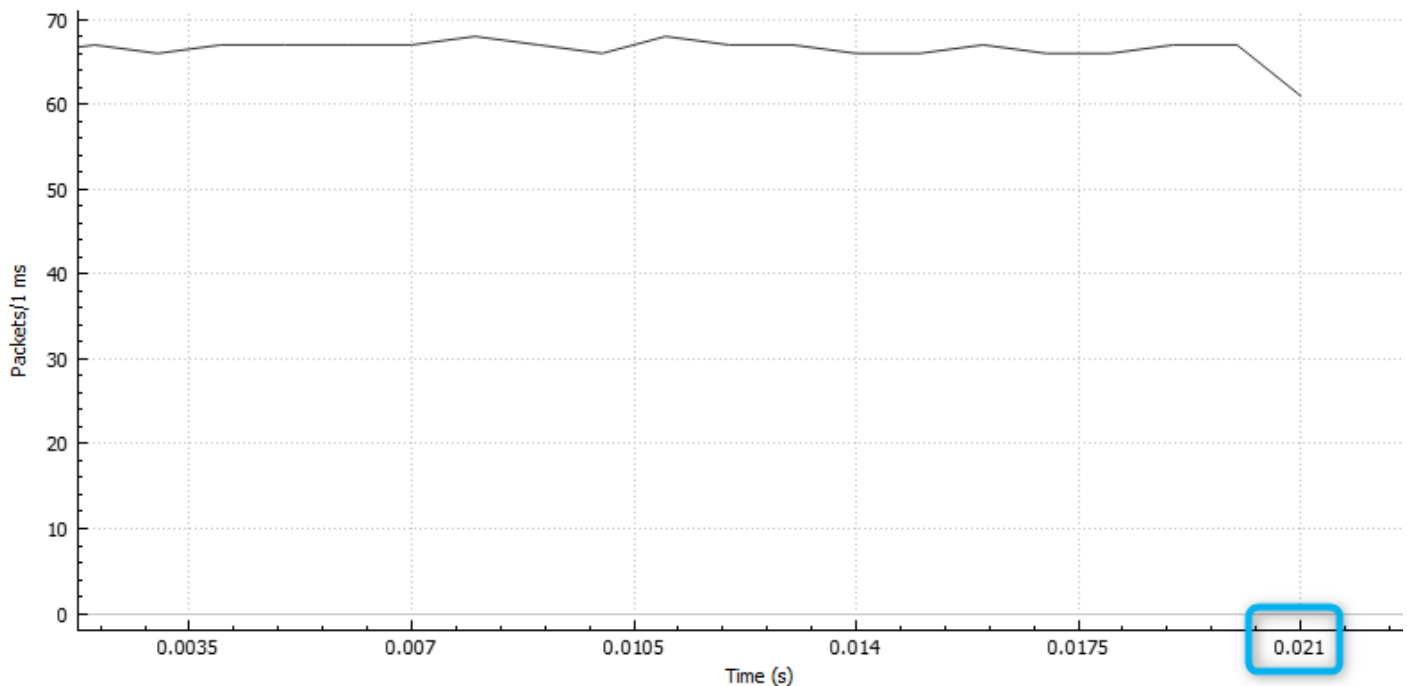
4.4.15 HTTP-QuSS - Lossless used Bandwidth with RTT = 1000 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
```

4.4.15.1 Send HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.022	0.022	—
Average pps	66861.7	66861.7	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	99 M	99 M	—
Average bits/s	799 M	799 M	—



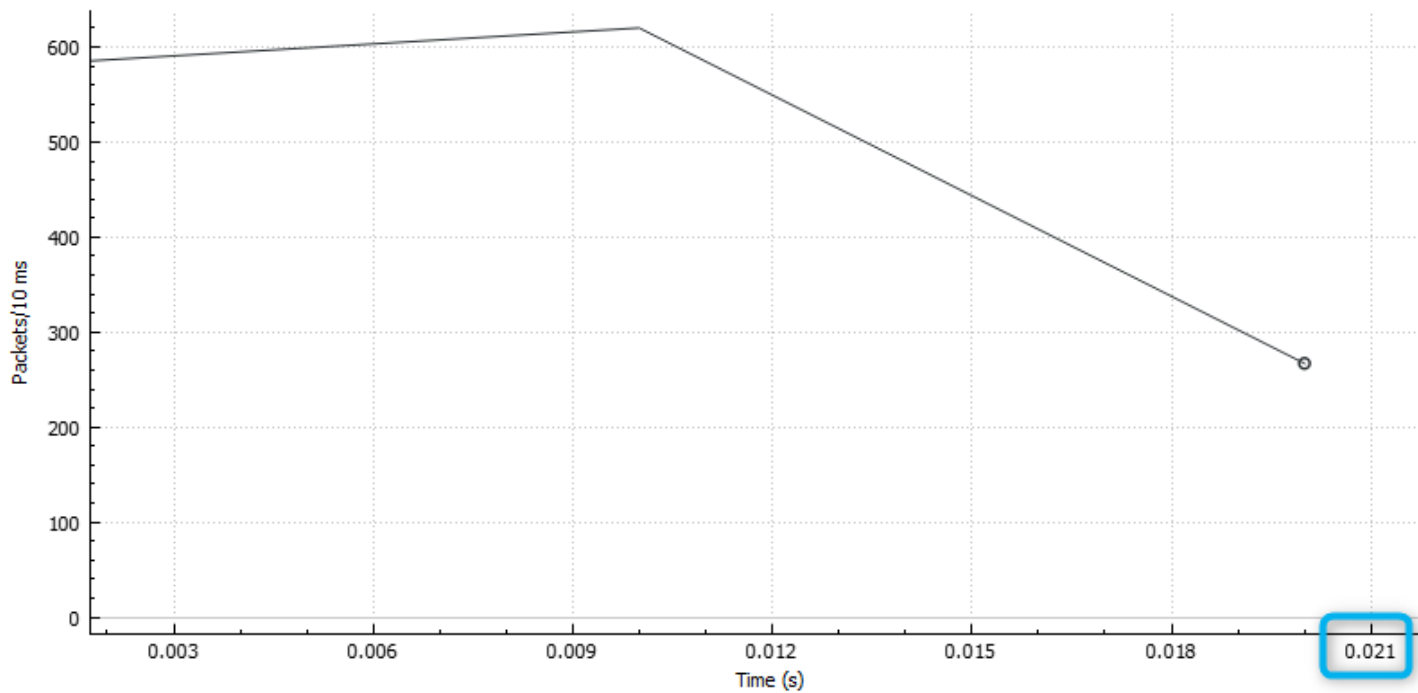
Lossless used Bandwidth: **799 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.15.2 Received HTTP-QuSS UDP Stream

Statistics

Measurement	Captured	Displayed	Marked
Packets	1465	1465 (100.0%)	—
Time span, s	0.023	0.023	—
Average pps	63759.8	63759.8	—
Average packet size, B	1495	1495	—
Bytes	2190457	2190457 (100.0%)	0
Average bytes/s	95 M	95 M	—
Average bits/s	762 M	762 M	—

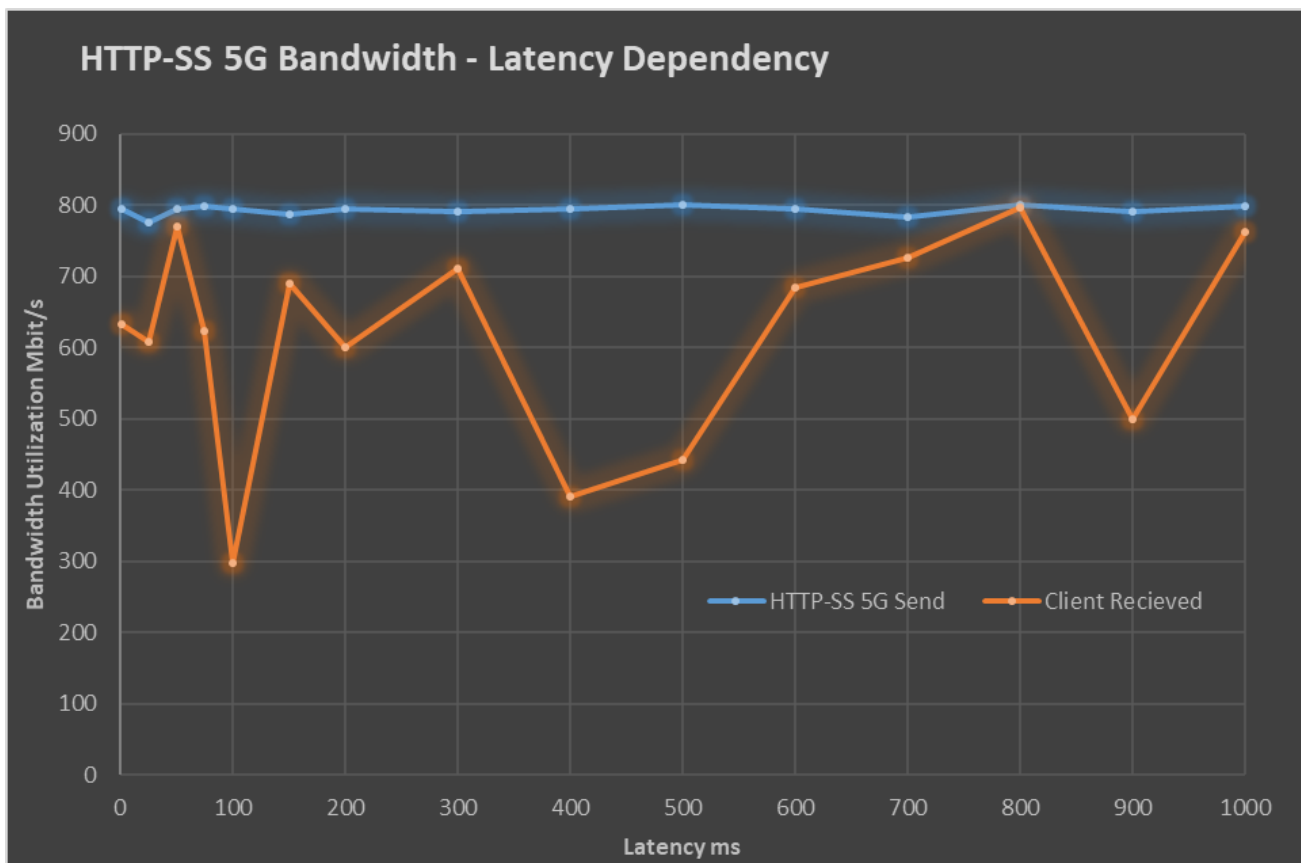


Lossless used Bandwidth: **762 Mbit/s of 800 Mbit/s**

4.0 LAB Network Condition

4.4.16 Benchmark Summary

	Netropy N91 Satellite Simulator	
Latency ms	Lossless HTTP-QuSS Transmission	Lossless HTTP-QuSS Data Reception
1	794	633
25	776	608
50	795	769
75	799	623
100	795	297
150	787	689
200	794	600
300	790	711
400	795	391
500	800	443
600	795	684
700	783	726
800	800	796
900	790	499
1000	799	762



4.0 LAB Network Condition

4.5 Browser WEB Page Load Time - Latency Dependency

4.5.1 Available TCP Bandwidth - 800 Mbit/s

```
[ 4] local 192.168.178.72 port 59505 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
```

[ID]	Interval		Transfer	Bandwidth
[4]	0.00-1.00	sec	91.2 MBytes	764 Mbits/sec
[4]	1.00-2.00	sec	90.6 MBytes	760 Mbits/sec
[4]	2.00-3.00	sec	90.4 MBytes	758 Mbits/sec
[4]	3.00-4.00	sec	91.7 MBytes	769 Mbits/sec
[4]	4.00-5.00	sec	91.7 MBytes	769 Mbits/sec
[4]	5.00-6.00	sec	91.7 MBytes	769 Mbits/sec
[4]	6.00-7.00	sec	91.7 MBytes	769 Mbits/sec
[4]	7.00-8.00	sec	91.7 MBytes	769 Mbits/sec
[4]	8.00-9.00	sec	91.7 MBytes	769 Mbits/sec
[4]	9.00-10.00	sec	91.7 MBytes	769 Mbits/sec
[4]	10.00-11.00	sec	91.3 MBytes	766 Mbits/sec
[4]	11.00-12.00	sec	91.7 MBytes	769 Mbits/sec
[4]	12.00-13.00	sec	90.7 MBytes	761 Mbits/sec
[4]	13.00-14.00	sec	91.7 MBytes	769 Mbits/sec
[4]	14.00-15.00	sec	91.3 MBytes	766 Mbits/sec
[4]	15.00-16.00	sec	91.6 MBytes	768 Mbits/sec
[4]	16.00-17.00	sec	90.5 MBytes	759 Mbits/sec
[4]	17.00-18.00	sec	90.3 MBytes	756 Mbits/sec
[4]	18.00-19.00	sec	90.7 MBytes	763 Mbits/sec
[4]	19.00-20.00	sec	90.5 MBytes	759 Mbits/sec
[4]	20.00-21.00	sec	90.8 MBytes	762 Mbits/sec
[4]	21.00-22.00	sec	90.9 MBytes	763 Mbits/sec
[4]	22.00-23.00	sec	91.3 MBytes	766 Mbits/sec
[4]	23.00-24.00	sec	91.7 MBytes	769 Mbits/sec
[4]	24.00-25.00	sec	91.7 MBytes	769 Mbits/sec
[4]	25.00-26.00	sec	91.7 MBytes	769 Mbits/sec
[4]	26.00-27.00	sec	91.3 MBytes	766 Mbits/sec
[4]	27.00-28.00	sec	90.6 MBytes	759 Mbits/sec
[4]	28.00-29.00	sec	91.0 MBytes	763 Mbits/sec
[4]	29.00-30.00	sec	90.5 MBytes	759 Mbits/sec

```
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00 sec  2.67 GBytes  765 Mbits/sec    0
[ 4]  0.00-30.00 sec  2.67 GBytes  765 Mbits/sec
CPU Utilization: local/receiver 12.2% (4.4%/7.8%), remote/sender 0.7% (0.0%/0.7%)
```


4.0 LAB Network Condition

4.5.2 RTT = 1 ms

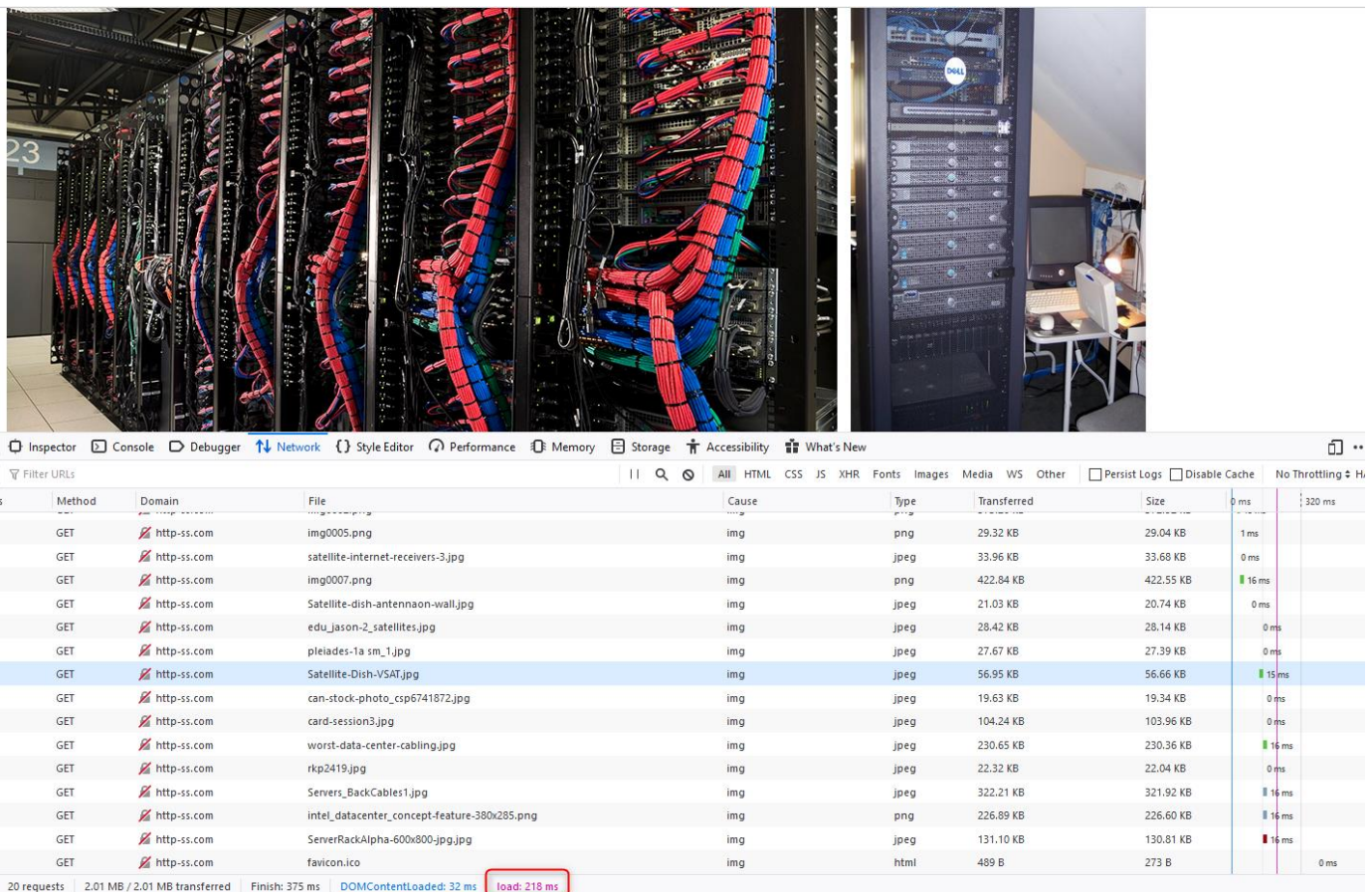
Bandwidth 800 Mbit/s

Latency 1 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
```

4.5.2.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Method	Domain	File	Cause	Type	Transferred	Size	0 ms	320 ms
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	0 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	16 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	0 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	0 ms	
GET	http-ss.com	pleiades-la_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	0 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	15 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	0 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	0 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	16 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	0 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	16 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	16 ms	
GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	16 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	0 ms	

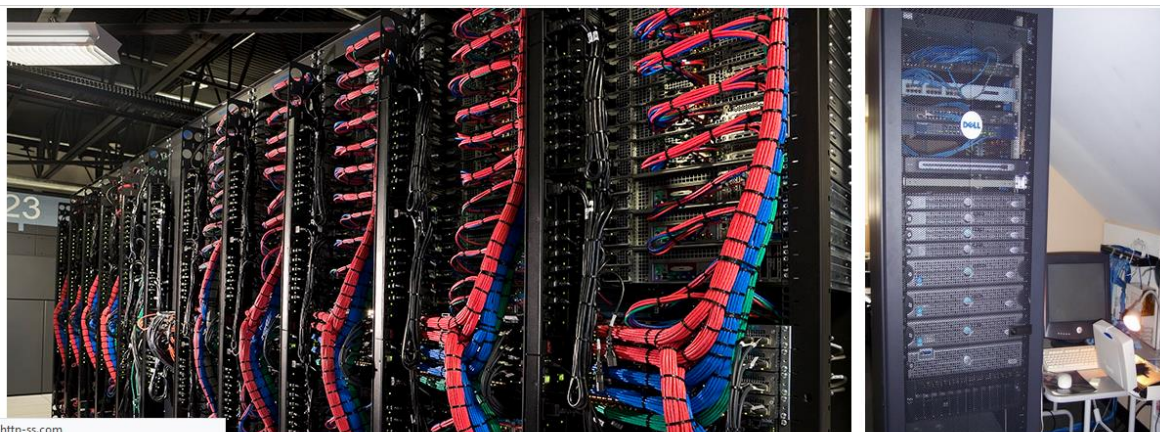
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 375 ms | DOMContentLoaded: 32 ms | **load: 218 ms**

Page Load Time: **218 ms**

4.0 LAB Network Condition

4.5.2.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



http-ss.com

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

s	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 m
	GET	http-ss.com	HTTP-SS_Test_5.css	stylesheet	css	317 B (raced)	1.95 KB	0 ms	
	GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpeg	21.05 KB	20.74 KB	40 ms	
	GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	27.74 KB	27.39 KB	43 ms	
	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg				
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg				
	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	43 ms	
	GET	cdn.csu.edu.au	card.session3.jpg	img	jpeg	104.40 KB	103.96 KB	41 ms	
	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	43 ms	
	GET	http-ss.com	index.css	stylesheet	css	696 B (raced)	5.27 KB	31 ms	
	GET	http-ss.com	img0005.png	img	png	29.29 KB (raced)	29.04 KB	27 ms	
	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB (raced)	28.14 KB	28 ms	
	GET	http-ss.com	img0002.png	img	png	cached	372.92 KB		
	GET	http-ss.com	img0007.png	img	png	cached	422.55 KB		
	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	cached	130.81 KB		
	GET	http-ss.com	favicon.ico	img	html	273 B (raced)	273 B		1 ms

20 requests | 1.93 MB / 1.02 MB transferred | Finish: 503 ms | DOMContentLoaded: 68 ms

Page Load Time: **503 ms**

4.0 LAB Network Condition

4.5.3 RTT = 25 ms

Bandwidth 800 Mbit/s

Latency 25 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=25ms TTL=64
```

4.5.3.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	320 ms	640 ms
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	124 ms		
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	116 ms		
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	237 ms		
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	cached	20.74 KB	84 ms		
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	cached	28.14 KB	131 ms		
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	158 ms		
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	139 ms		
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	107 ms		
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	160 ms		
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	210 ms		
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	155 ms		
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	335 ms		
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	128 ms		
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	205 ms		
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	26 ms		

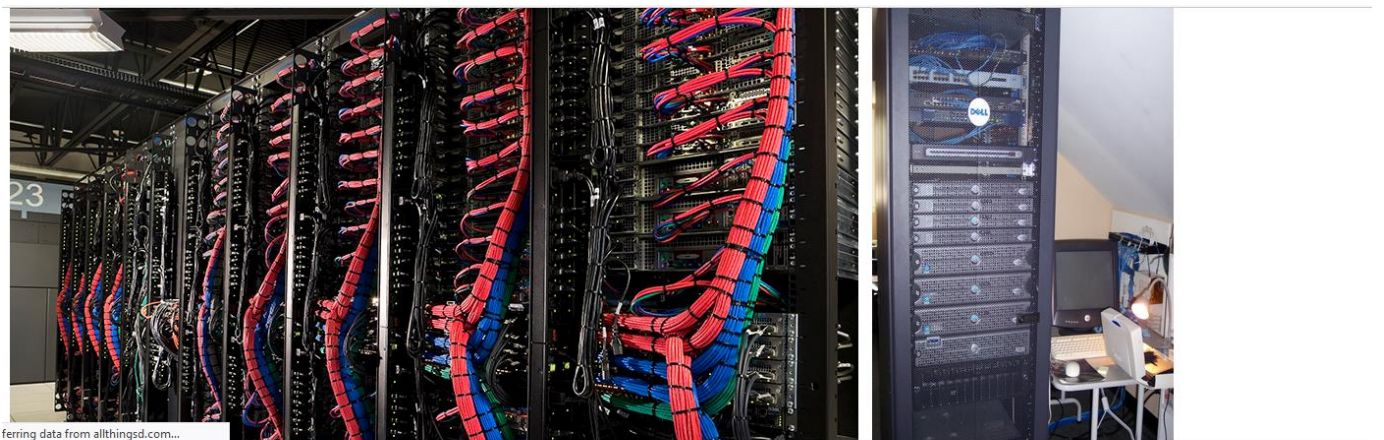
20 requests | 2.01 MB / 1.96 MB transferred | Finish: 467 ms | DOMContentLoaded: 73 ms | **load: 395 ms**

Page Load Time: **395 ms**

4.0 LAB Network Condition

4.5.3.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ferring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

s	Method	Domain	File	Cause	Type	Transferred	Size	0 ms	64
	GET	http-ss.com	inruex.css	stylesheets	css	cached	3.27 KB		
	GET	http-ss.com	builwithwb11.png	img	png	cached	2.50 KB		
	GET	http-ss.com	img0002.png	img	png	cached	372.92 KB		
	GET	http-ss.com	img0005.png	img	png	cached	29.04 KB		
	GET	http-ss.com	img0007.png	img	png	cached	422.55 KB		
	GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	0 ms	
	GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	cached	28.14 KB		
	GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
	GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	131 ms	
	GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	31 ms	
	GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	120 ms	
	GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	17 ms	
	GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	0 ms	
	GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	16 ms	
	GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	cached	130.81 KB		
	GET	http-ss.com	favicon.ico	img	html	cached	273 B		

20 requests | 1.93 MB / 982.95 KB transferred | Finish: 562 ms | DOMContentLoaded: 86 ms

Page Load Time: **562 ms**

4.0 LAB Network Condition

4.5.4 RTT = 50 ms

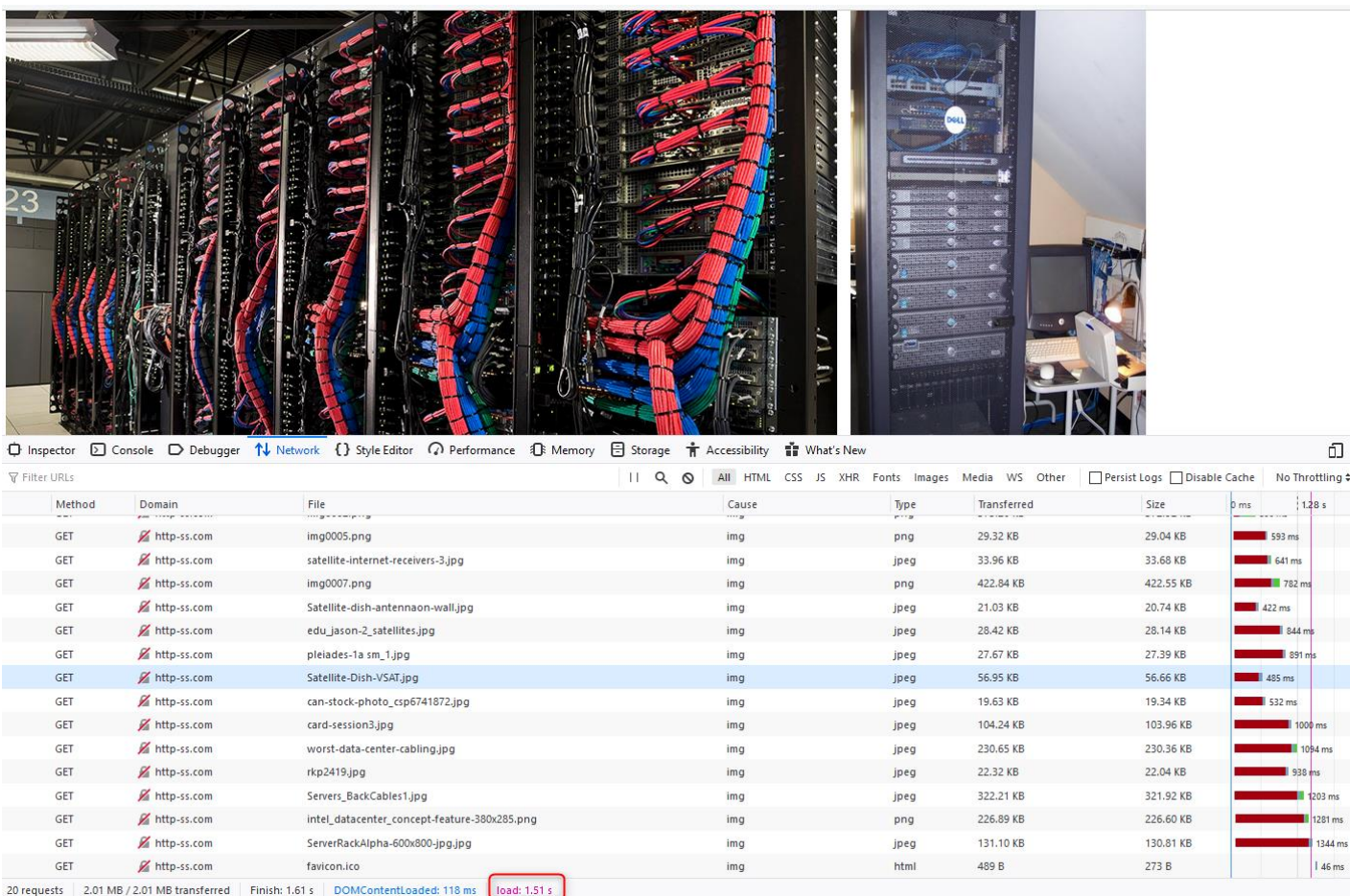
Bandwidth 800 Mbit/s

Latency 50 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=50ms TTL=64
```

4.5.4.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



The image shows a server room with rows of server racks and a close-up of a server rack. Below the server room images is a screenshot of the Chrome DevTools Network tab. The Network tab shows a list of 20 requests to http-ss.com. The 'load' event is highlighted with a red box, showing a load time of 1.51 s. The status bar at the bottom of the Network tab shows '20 requests', '2.01 MB / 2.01 MB transferred', 'Finish: 1.61 s', 'DOMContentLoaded: 118 ms', and 'load: 1.51 s'.

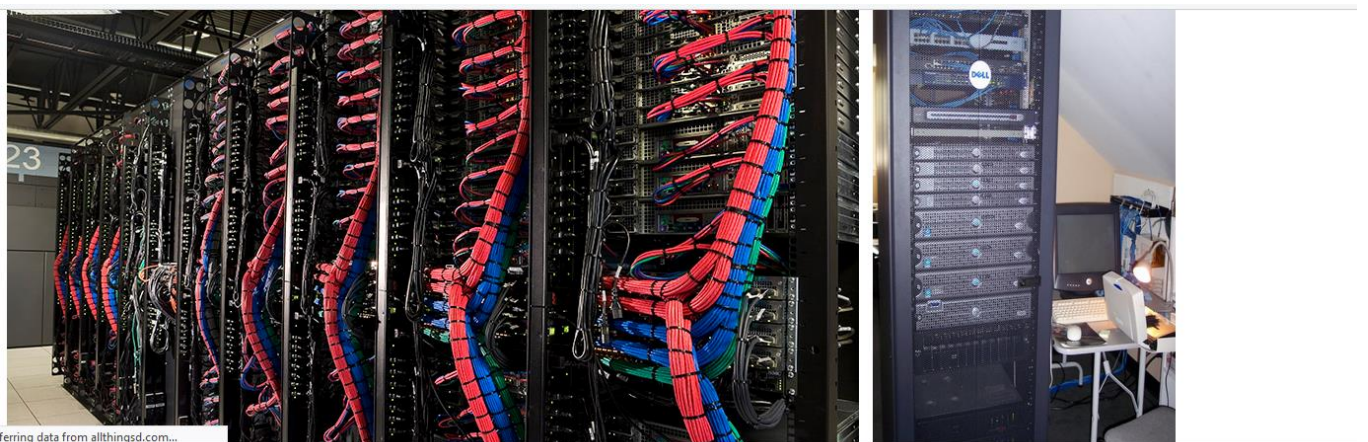
Method	Domain	File	Cause	Type	Transferred	Size	Time
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	593 ms
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	641 ms
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	782 ms
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	422 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	844 ms
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	891 ms
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	485 ms
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	532 ms
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	1000 ms
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	1094 ms
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	938 ms
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	1203 ms
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	1281 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	1344 ms
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	146 ms

Page Load Time: **1.51 s**

4.0 LAB Network Condition

4.5.4.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ferring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms
GET	http-ss.com	img0002.png	img	png	cached	372.92 KB	
GET	http-ss.com	img0005.png	img	png	cached	29.04 KB	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	1 ms
GET	s3.amazonaws.com	pleiades-1a-sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	15 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg	19.80 KB	19.34 KB	17 ms
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	104.40 KB	103.96 KB	33 ms
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	230.73 KB	230.36 KB	32 ms
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	22.40 KB	22.04 KB	31 ms
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	322.22 KB	321.92 KB	47 ms
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	227.15 KB	226.60 KB	47 ms
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	cached	422.55 KB	
GET	http-ss.com	img0007.png	img	png	cached	28.14 KB	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	cached	130.81 KB	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	cached	273 B	
GET	http-ss.com	favicon.ico	img	html	cached		

20 requests 1.93 MB / 982.95 KB transferred **Finish: 561 ms** DOMContentLoaded: 111 ms

Page Load Time: **561 ms**

4.0 LAB Network Condition

4.5.5 RTT = 75 ms

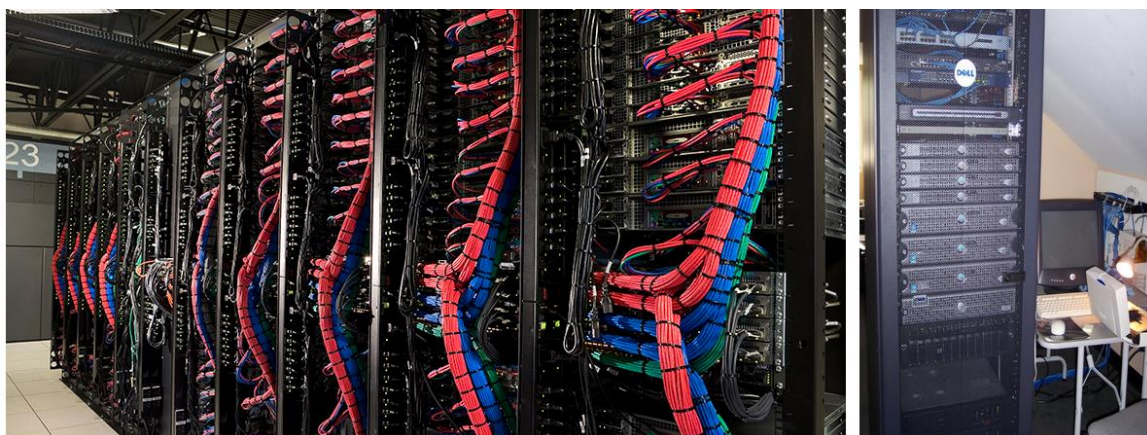
Bandwidth 800 Mbit/s

Latency 75 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=75ms TTL=64
```

4.5.5.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Method	Domain	File	Cause	Type	Transferred	Size	0 ms	2.56 s
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	906 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.66 KB	984 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	1203 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	640 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	1250 ms	
GET	http-ss.com	pleiades-la_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	1320 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	688 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	766 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	1453 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	1593 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	1359 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	1750 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	1890 ms	
GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	1968 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	78 ms	

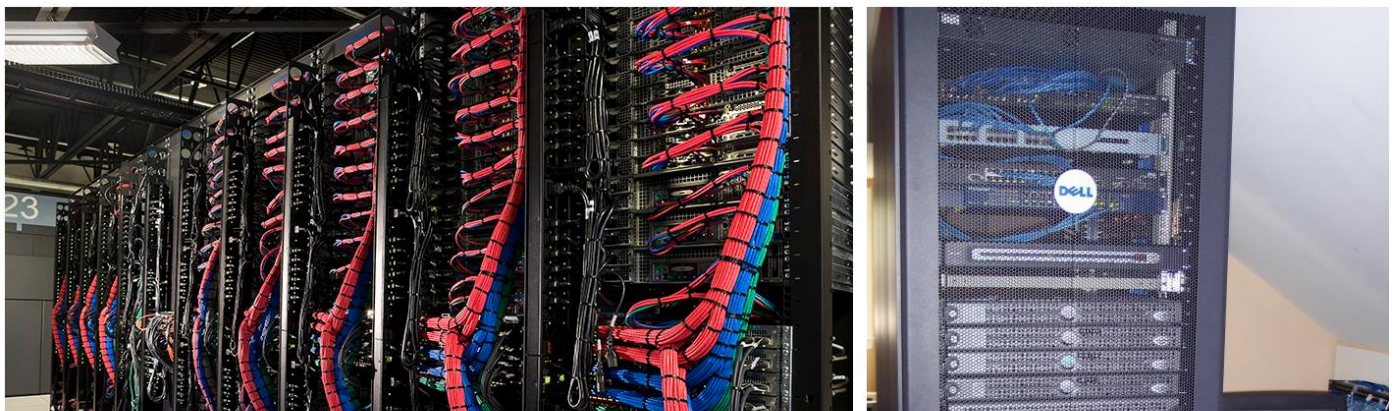
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 2.38 s | DOMContentLoaded: 195 ms | **load: 2.28 s**

Page Load Time: **2.28 s**

4.0 LAB Network Condition

4.5.5.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Fetching data from cdn.softlayer.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10 ms	640 ms
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB			
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg					
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB		42 ms	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB		18 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		15 ms	
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		15 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		9 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		7 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		20 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		19 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB		47 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		24 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB		22 ms	
GET	http-ss.com	favicon.ico	img	ico					

20 requests 1.93 MB / 1.93 MB transferred **Finish: 580 ms** DOMContentLoaded: 160 ms

Page Load Time: **580 ms**

4.0 LAB Network Condition

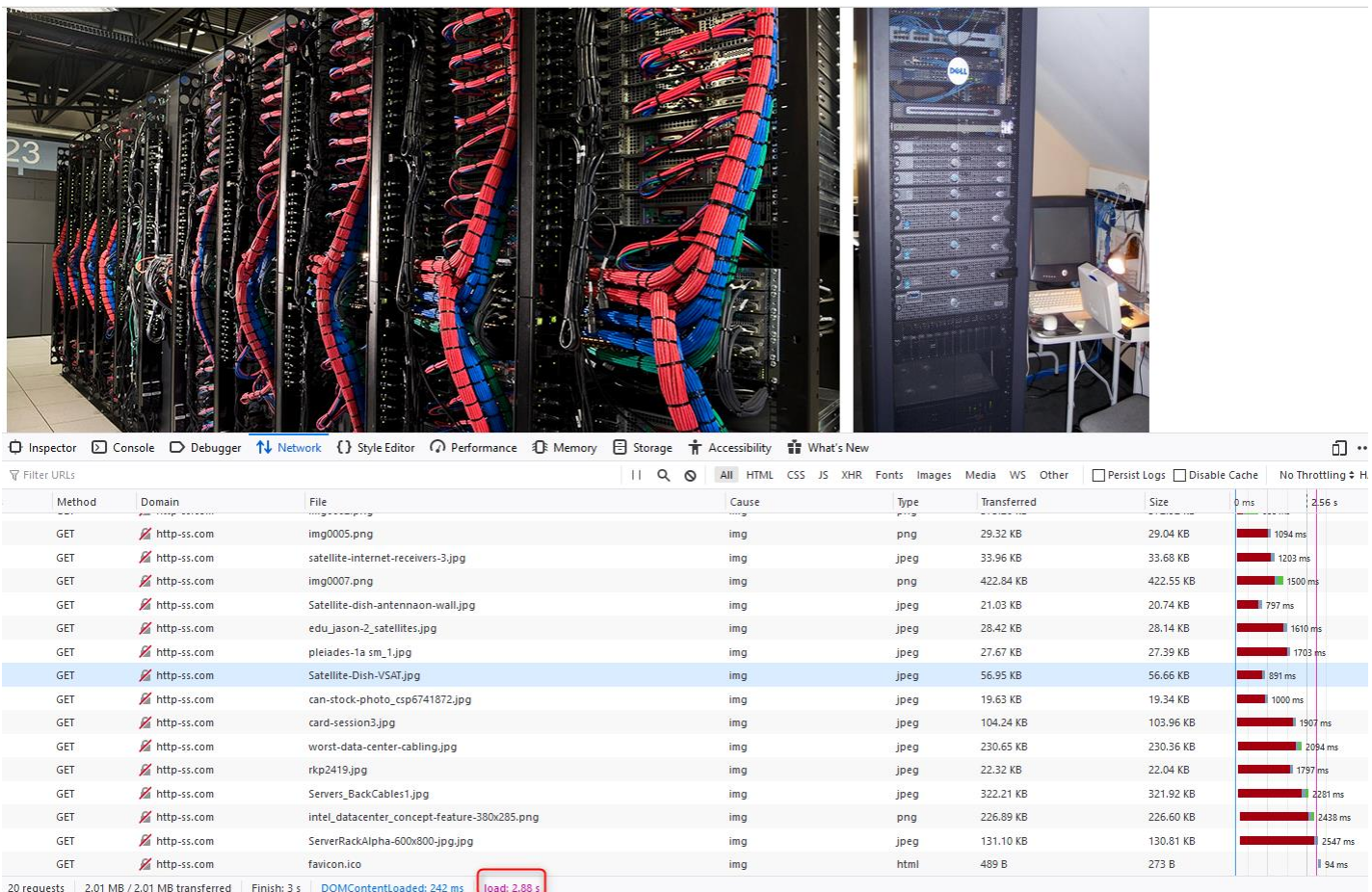
4.5.6 RTT = 100 ms

- # Bandwidth 800 Mbit/s
- # Latency 100 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=100ms TTL=64
```

4.5.6.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Method	Domain	File	Cause	Type	Transferred	Size	0 ms	2.56 s
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1094 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	1203 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	1500 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	797 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	1610 ms	
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	1703 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	891 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	1000 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	1907 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	2094 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	1797 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	2281 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	2438 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	2547 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	84 ms	

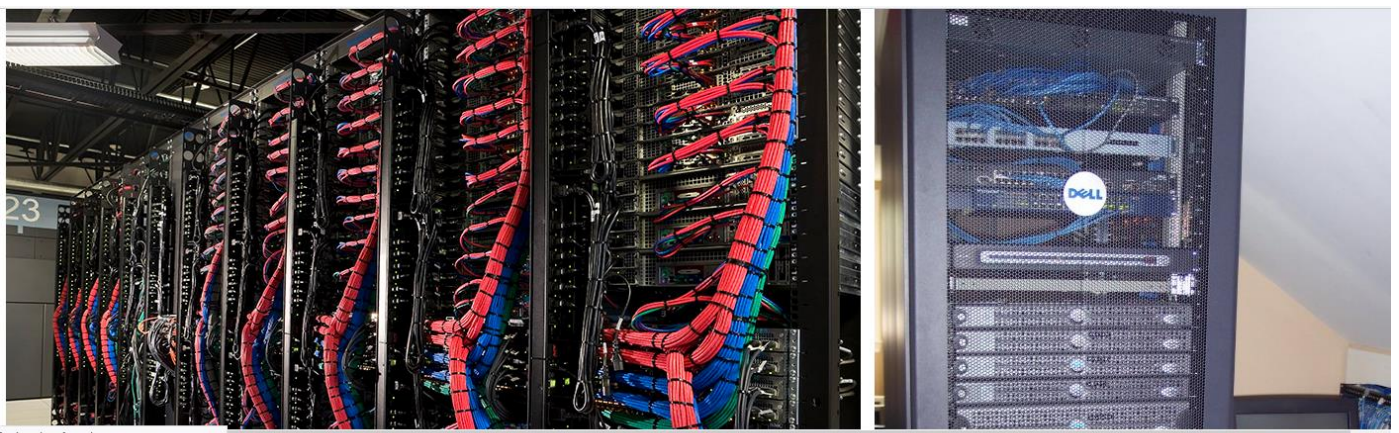
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 3 s | DOMContentLoaded: 242 ms | **load: 2.88 s**

Page Load Time: **2.88 s**

4.0 LAB Network Condition

4.5.6.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
GET	92amascornews.com	product-1-1-2018.jpg	img	jpg	211.9 KB	211.9 KB	0 ms	640 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg	21.05 KB	20.74 KB	22 ms	
GET	http-ss.com	builtwithwwb11.png	img	png	2.75 KB	2.50 KB	13 ms	
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	21 ms	
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	21 ms	
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg	21.05 KB	20.74 KB	22 ms	
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	26 ms	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	22 ms	
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	22 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	24 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	22 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	20 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	39 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	19 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	6 ms	
GET	http-ss.com	favicon.ico	img	ico				

20 requests 1.93 MB / 1.93 MB transferred Finish: 641 ms DOMContentLoaded: 174 ms

Page Load Time: **641 ms**

4.0 LAB Network Condition

4.5.7 RTT = 150 ms

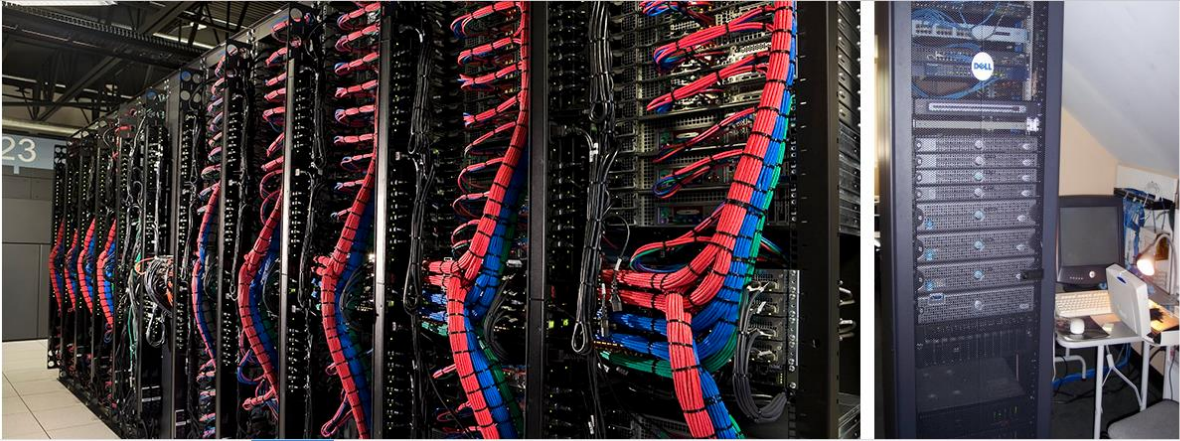
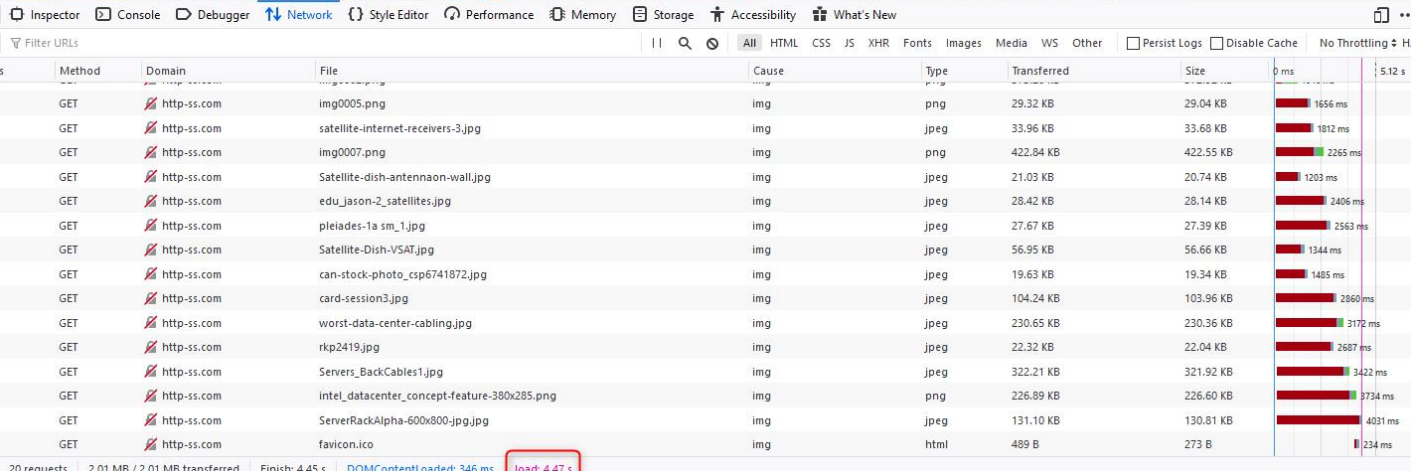
Bandwidth 800 Mbit/s

Latency 150 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=151ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=151ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=151ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=151ms TTL=64
```

4.5.7.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	Time
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	1656 ms
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	1812 ms
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	2265 ms
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	1203 ms
GET	http-ss.com	edu_jason_2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	2406 ms
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	2563 ms
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	1344 ms
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	1485 ms
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	2860 ms
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	3172 ms
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	2687 ms
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	3422 ms
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	3734 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	4031 ms
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	234 ms

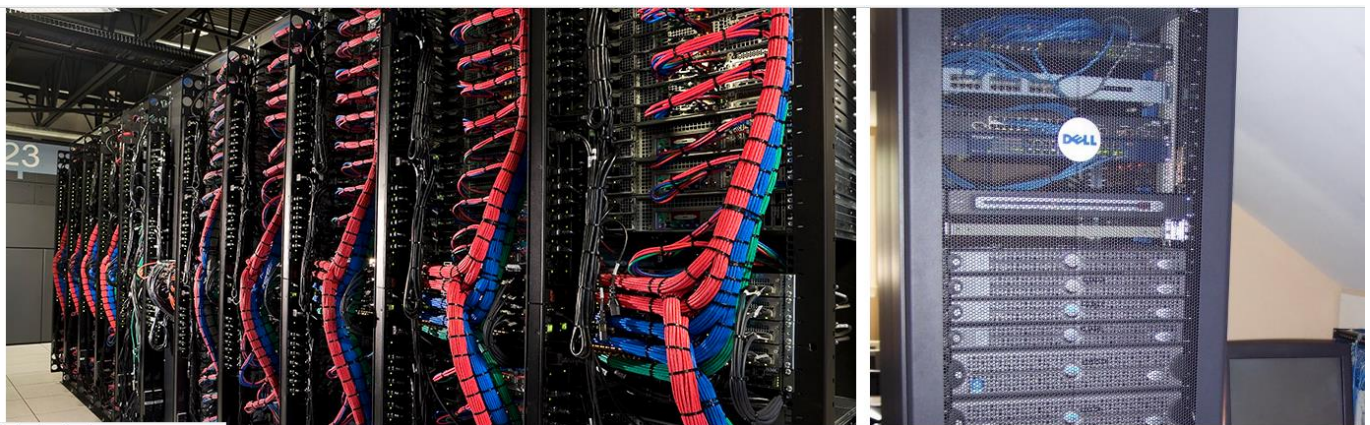
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 4.45 s | DOMContentLoaded: 346 ms | **load: 4.47 s**

Page Load Time: **4.47 s**

4.0 LAB Network Condition

4.5.7.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ferring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 r
GET	http-ss.com	builtwithwwb11.png	img	png	2.75 KB	2.50 KB	39 ms	
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	39 ms	
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	36 ms	
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	38 ms	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	35 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	12 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	28 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	15 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	6 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	21 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	9 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	9 ms	
GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred **Finish: 695 ms** DOMContentLoaded: 205 ms

Page Load Time: **695 ms**

4.0 LAB Network Condition

4.5.8 RTT = 200 ms

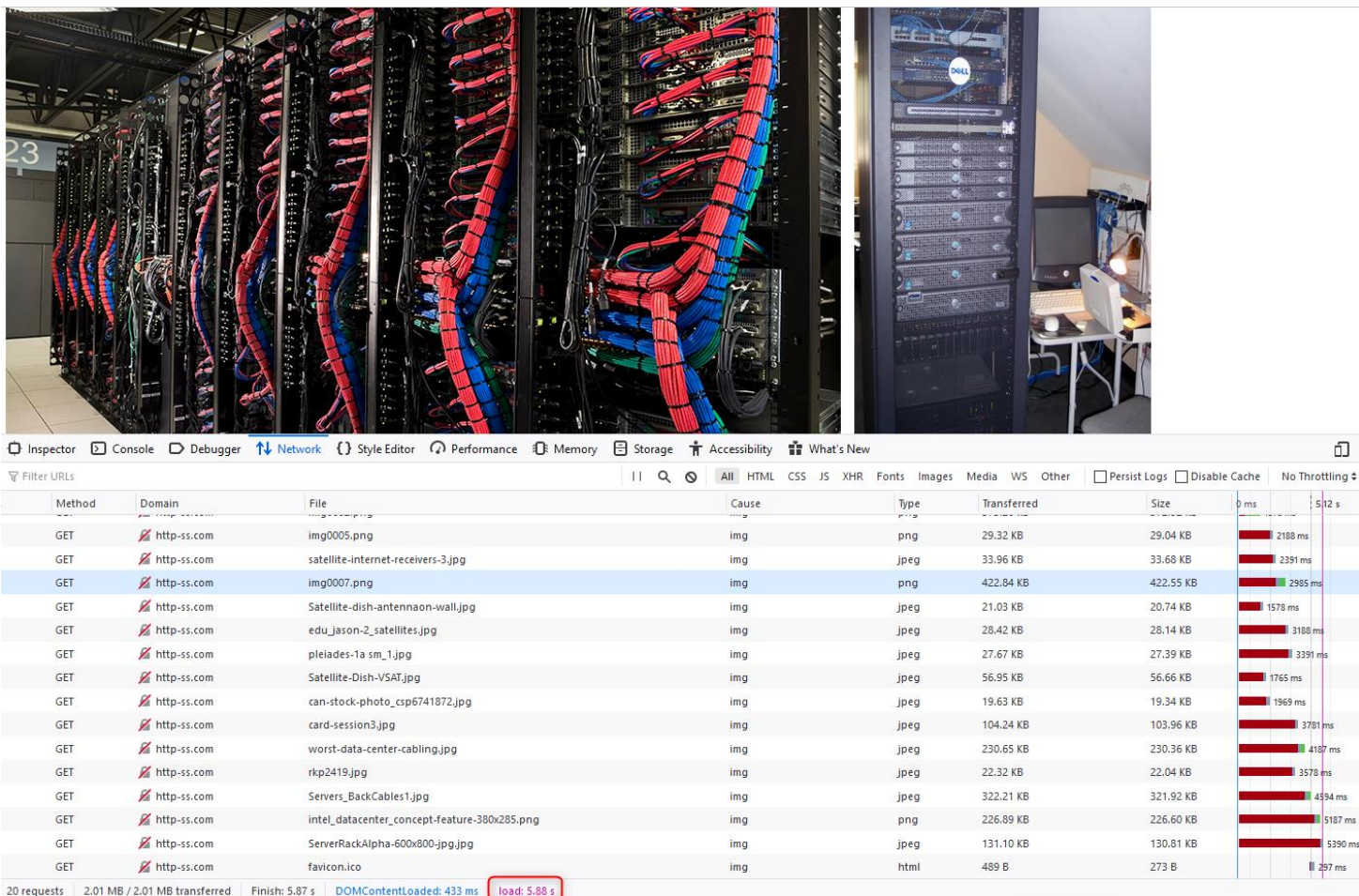
Bandwidth 800 Mbit/s

Latency 200 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=200ms TTL=64
```

4.5.8.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

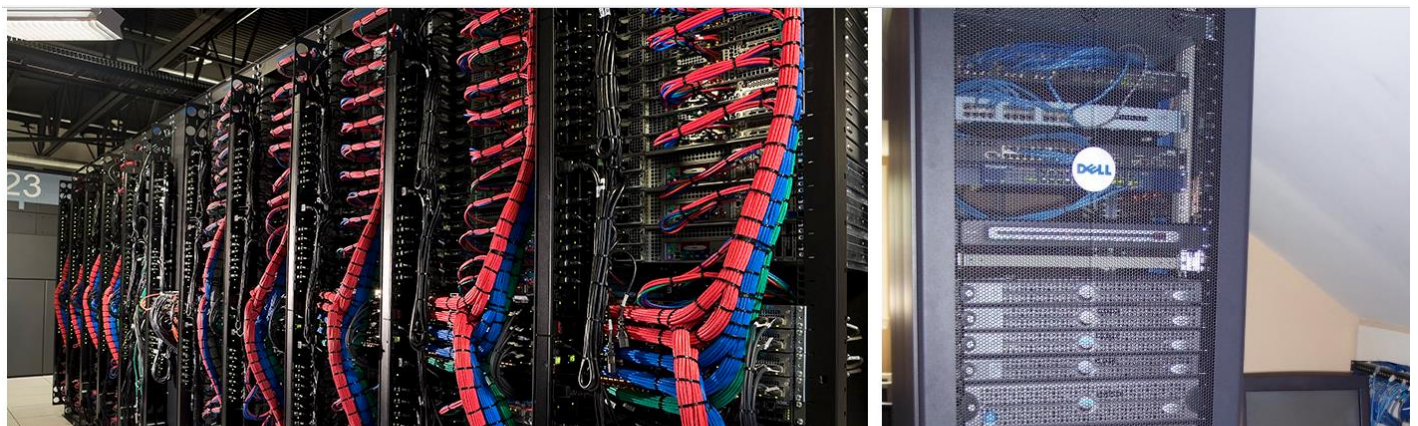


Page Load Time: **5.88 s**

4.0 LAB Network Condition

4.5.8.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



errring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	15 ms	32 ms	5 ms	6 ms	22 ms	14 ms	8 ms	37 ms	11 ms	13 ms	31 ms	
GET	resps2.com	img0000.png	img	png	29.29 KB	29.04 KB		15 ms											
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg															
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB			32 ms										
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB				5 ms									
GET	http-ss.com	edu_jason_2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB					6 ms								
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB						22 ms							
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpg									14 ms						
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB								8 ms					
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB													
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB									37 ms				
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB										11 ms			
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB											13 ms		
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB												13 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB													31 ms
GET	http-ss.com	favicon.ico	img	ico															

20 requests | 1.93 MB / 1.93 MB transferred | Finish: 623 ms | DOMContentLoaded: 255 ms

Page Load Time: **623 ms**

4.0 LAB Network Condition

4.5.9 RTT = 300 ms

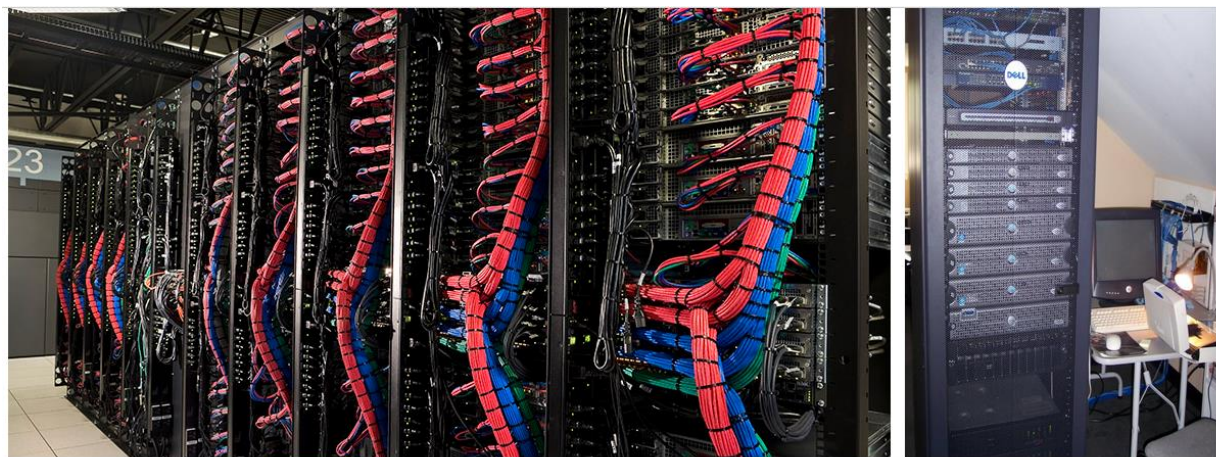
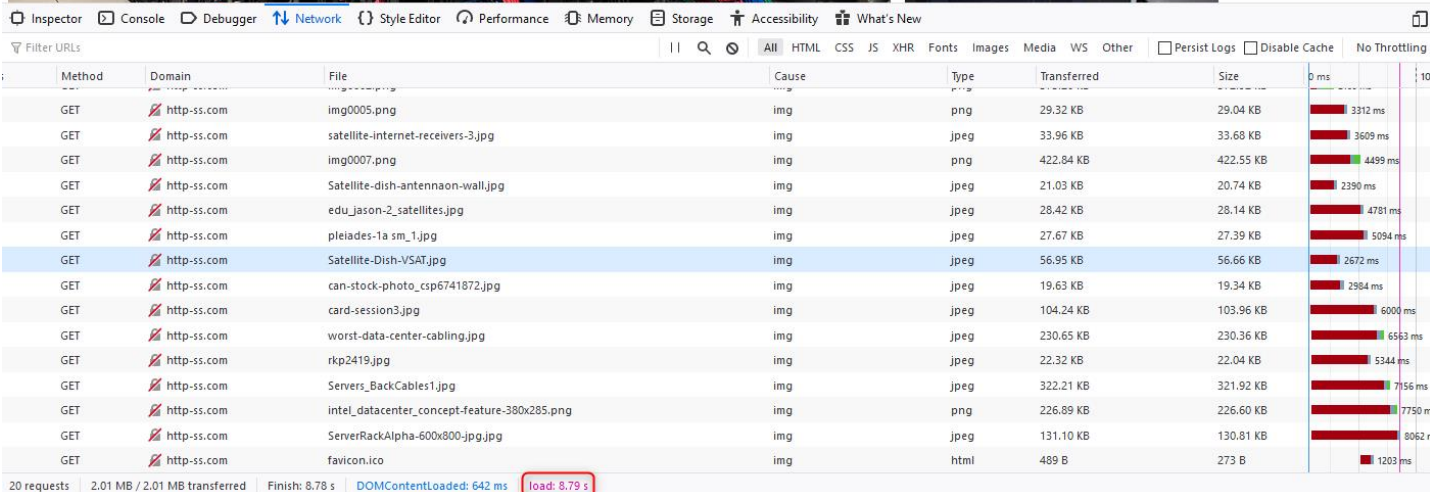
Bandwidth 800 Mbit/s

Latency 300 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=300ms TTL=64
```

4.5.9.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	3312 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	3609 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	4499 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	2390 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	4781 ms	
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	5094 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	2672 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	2984 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	6006 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	6563 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	5344 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	7756 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	7750 ms	
GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	8062 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	1203 ms	

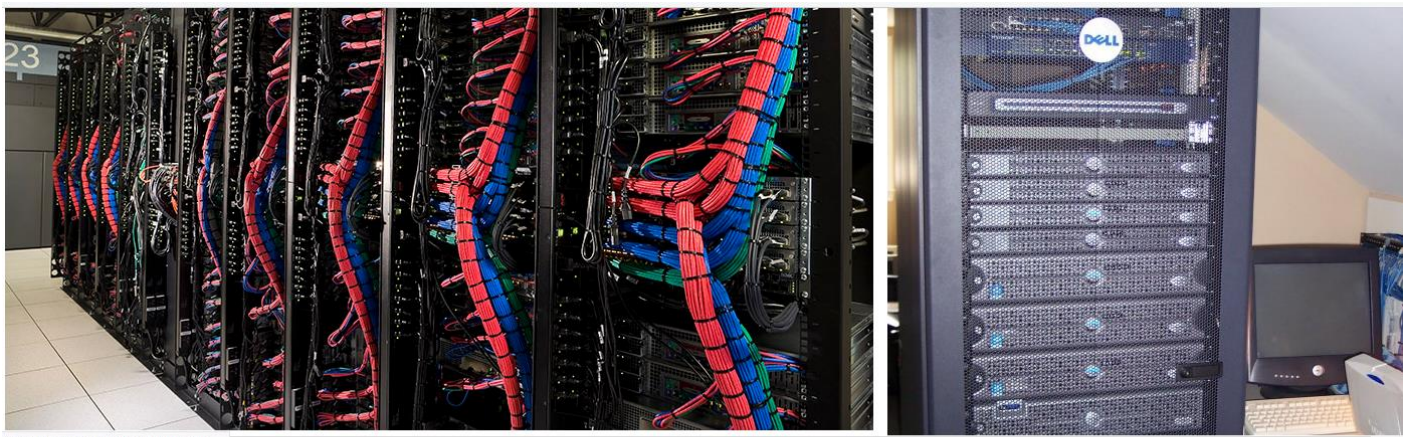
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 8.78 s | DOMContentLoaded: 642 ms | **load: 8.79 s**

Page Load Time: **8.79 s**

4.0 LAB Network Condition

4.5.9.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ering data from www.kvmsolutions.uk...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	4 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	28 ms	
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	25 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	26 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	29 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	28 ms	
GET	http-ss.com	builtwithwwb11.png	img	png	2.75 KB	2.50 KB	0 ms	
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	21 ms	
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	5 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	31 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	20 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	16 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	25 ms	
GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred **Finish: 741 ms** DOMContentLoaded: 353 ms

Page Load Time: **741 ms**

4.0 LAB Network Condition

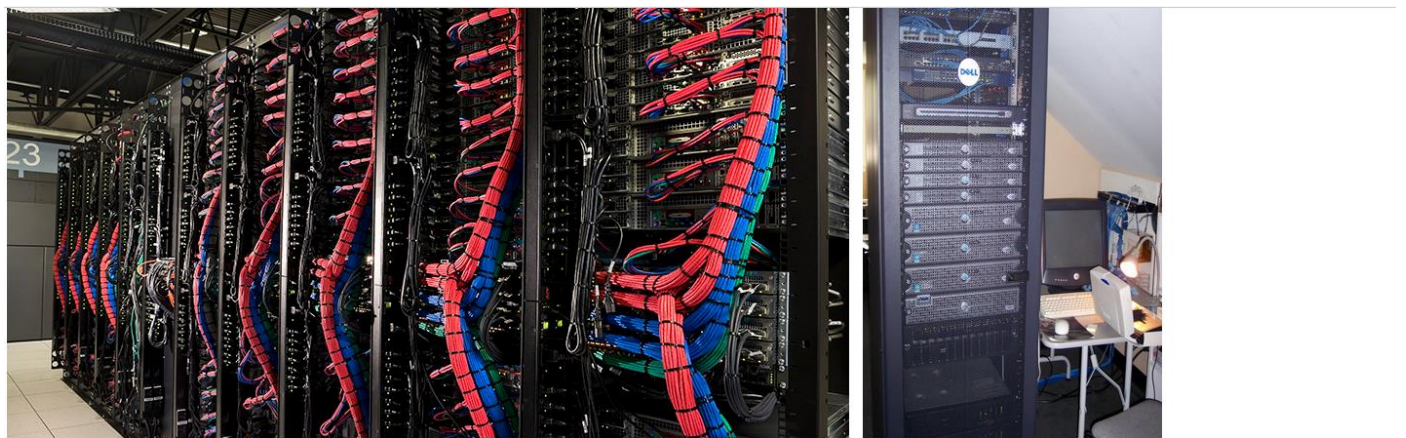
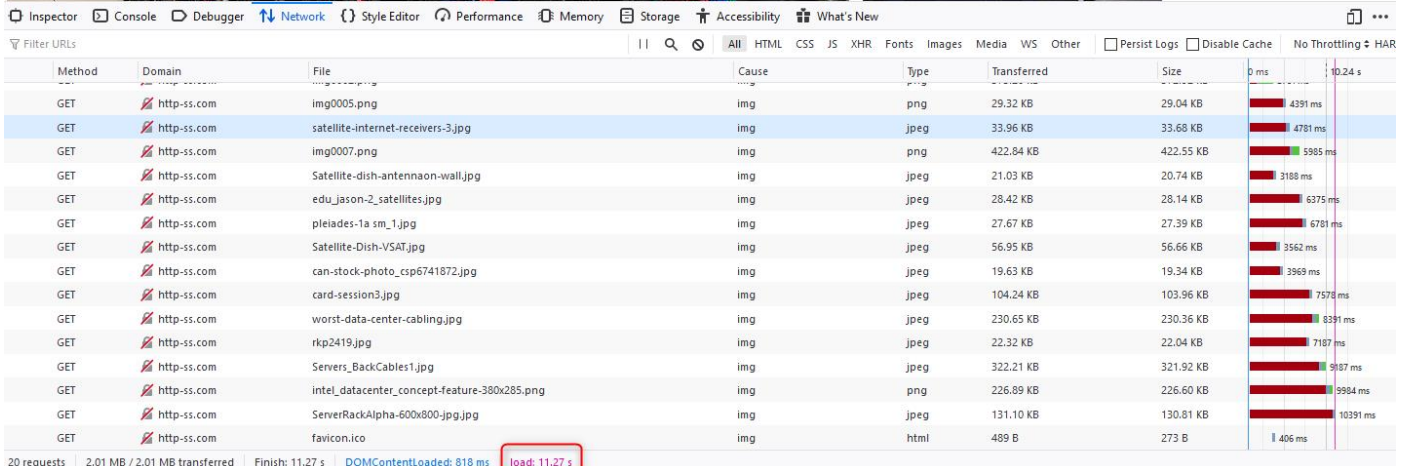
4.5.10 RTT = 400 ms

- # Bandwidth 800 Mbit/s
- # Latency 400 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=400ms TTL=64
```

4.5.10.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	4391 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	4781 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	5985 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	3188 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	6375 ms	
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	6781 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	3562 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	3969 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	7578 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	8391 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	7187 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	9187 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	5984 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	10391 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	406 ms	

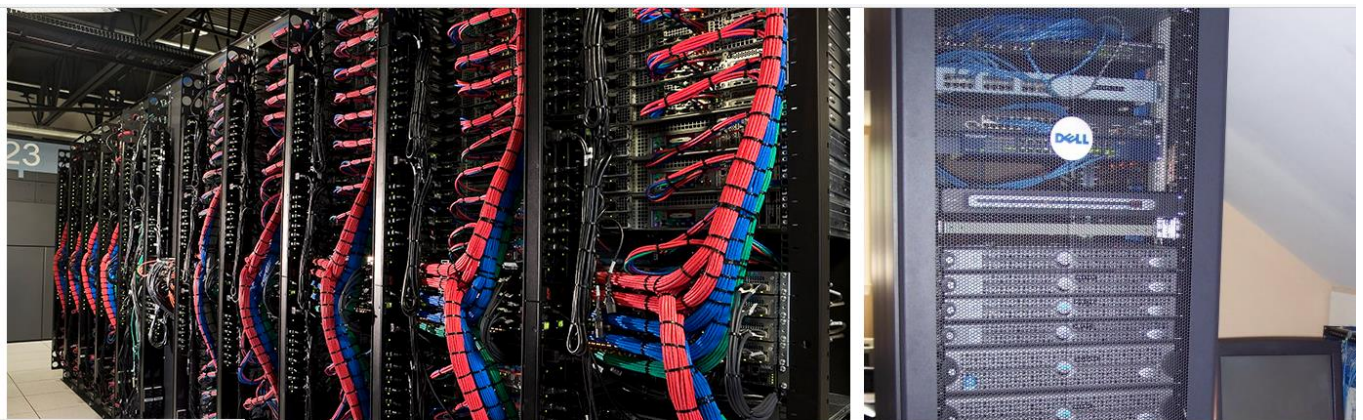
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 11.27 s | DOMContentLoaded: 818 ms | **load: 11.27 s**

Page Load Time: **11.27 s**

4.0 LAB Network Condition

4.5.10.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



Fetching data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	png				
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB		26 ms
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB		10 ms
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB		12 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		18 ms
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		15 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		15 ms
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		21 ms
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		14 ms
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		10 ms
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB		14 ms
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		12 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB		17 ms
GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred **Finish: 868 ms** DOMContentLoaded: 457 ms

Page Load Time: **868 ms**

4.0 LAB Network Condition

4.5.11 RTT = 500 ms

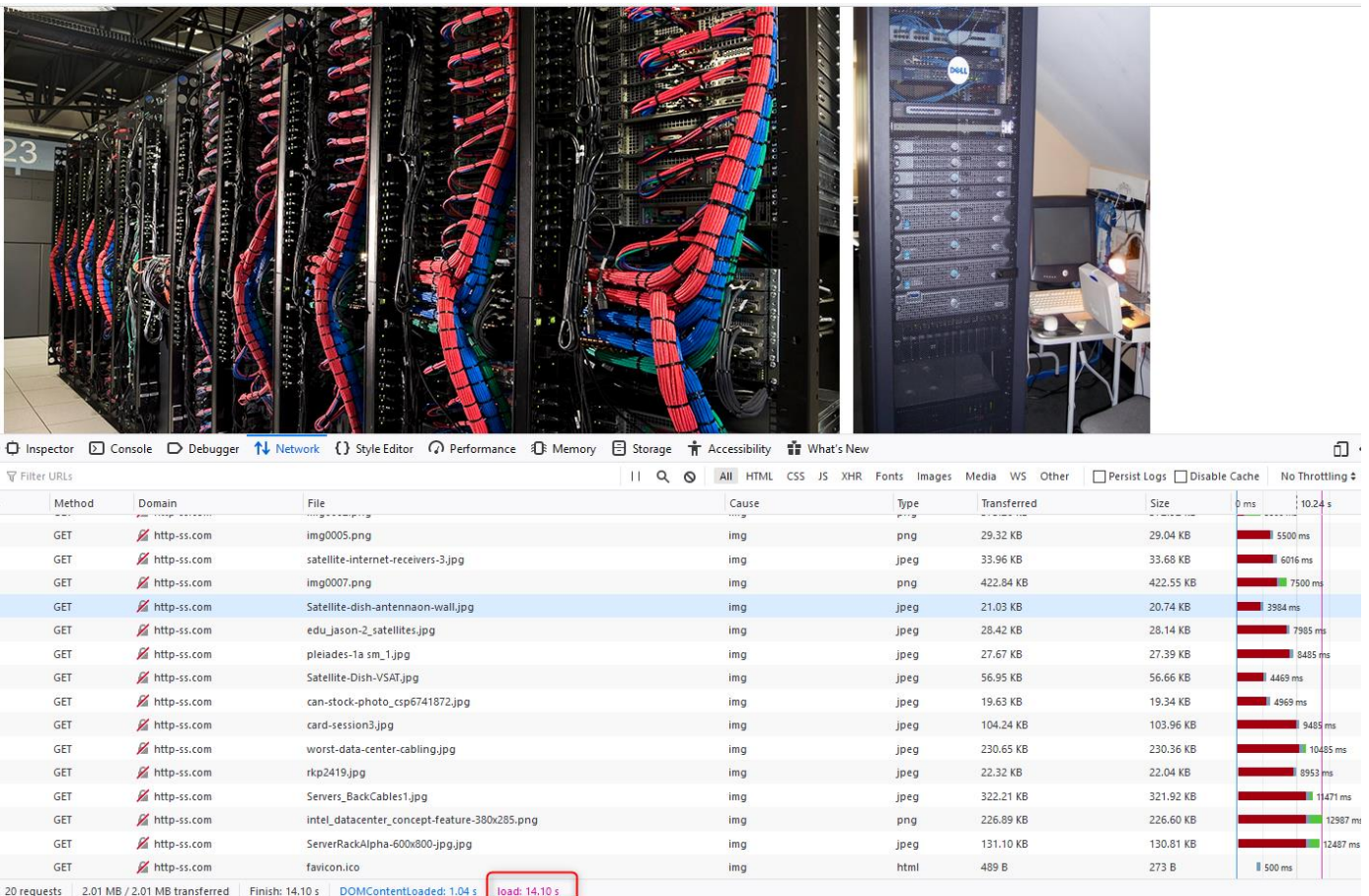
Bandwidth 800 Mbit/s

Latency 500 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=500ms TTL=64
```

4.5.11.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Method	Domain	File	Cause	Type	Transferred	Size	0 ms	10.24 s
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	5500 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	6016 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	7500 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	3984 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	7985 ms	
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	8485 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	4469 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	4569 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	9485 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	10485 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	8953 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	11471 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	12987 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	12487 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	500 ms	

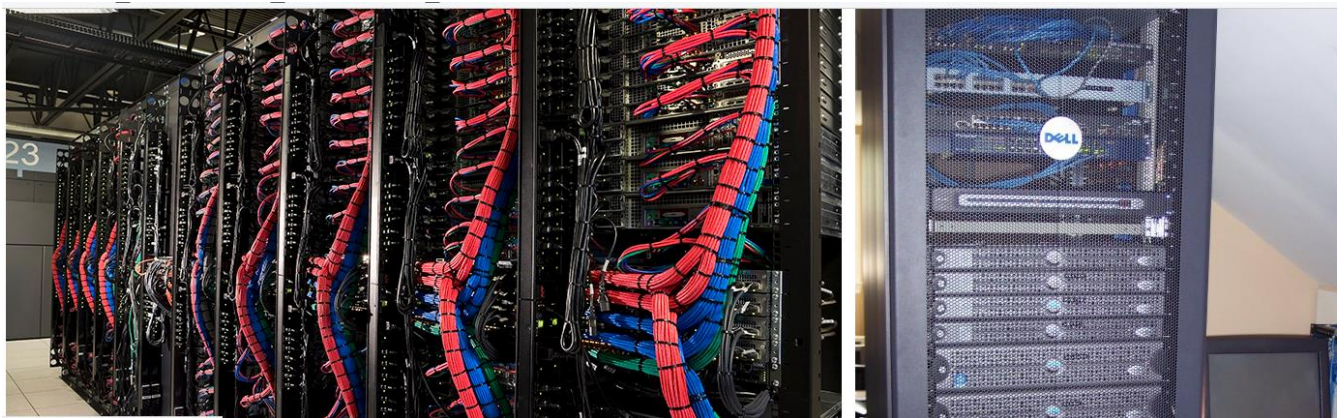
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 14.10 s | DOMContentLoaded: 1.04 s | **load: 14.10 s**

Page Load Time: **14.10 s**

4.0 LAB Network Condition

4.5.11.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



erring data from allthingsd.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	640 ms
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	27 ms	27 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	29 ms	29 ms
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	29 ms	29 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	32 ms	32 ms
GET	http-ss.com	builtwithwwb11.png	img	png	2.75 KB	2.50 KB	0 ms	0 ms
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	23 ms	23 ms
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	33 ms	33 ms
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	23 ms	23 ms
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	23 ms	23 ms
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	21 ms	21 ms
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	25 ms	25 ms
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	25 ms	25 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	28 ms	28 ms
GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred Finish: 980 ms DOMContentLoaded: 563 ms

Page Load Time: **980 ms**

4.0 LAB Network Condition

4.5.12 RTT = 600 ms

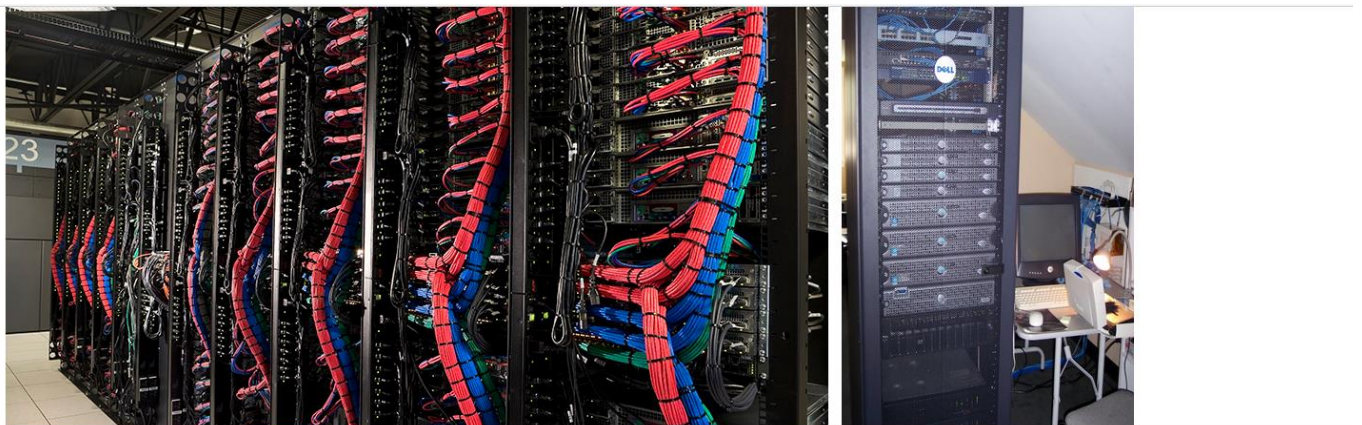
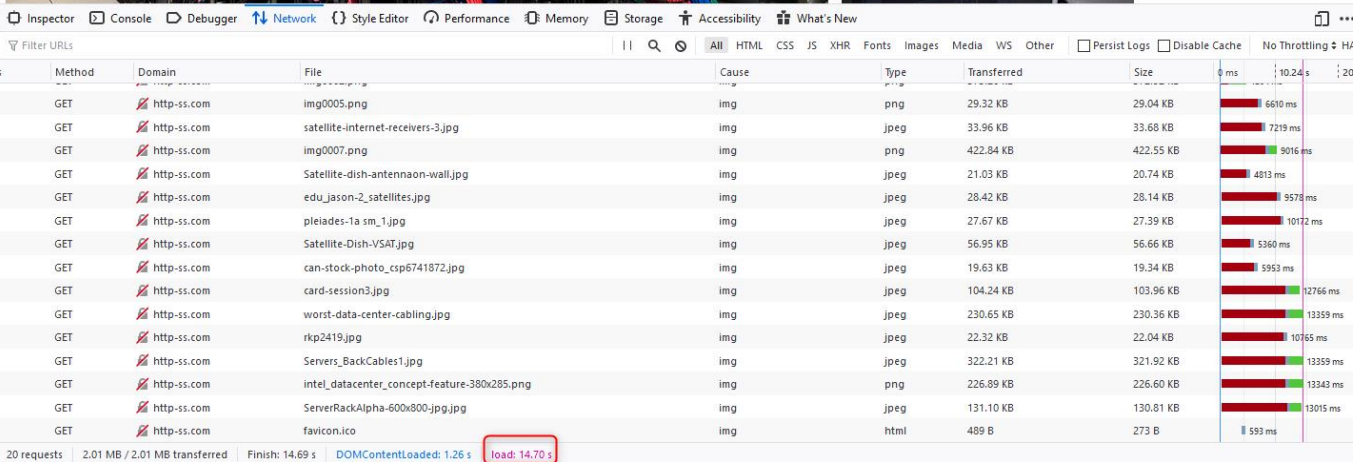
Bandwidth 800 Mbit/s

Latency 600 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=600ms TTL=64
```

4.5.12.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	Time
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	6610 ms
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	7219 ms
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	9016 ms
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	4813 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	9578 ms
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	10172 ms
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	5360 ms
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	5953 ms
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	12766 ms
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	13359 ms
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	10765 ms
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	13359 ms
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	13343 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	13015 ms
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	593 ms

20 requests | 2.01 MB / 2.01 MB transferred | Finish: 14.69 s | DOMContentLoaded: 1.26 s | **load: 14.70 s**

Page Load Time: **14.70 s**

4.0 LAB Network Condition

4.5.12.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!

ring data from http-ss.com...

Inspector Console Debugger **Network** Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	32 ms	
GET	shswstatic.com	satellite-internet-receivers-3.jpg	img					
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	32 ms	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	32 ms	
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	17 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	15 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	16 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	16 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	16 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	0 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	32 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	0 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	0 ms	
GET	http-ss.com	favicon.ico	img					

20 requests | 1.93 MB / 1.93 MB transferred | **Finish: 1.13 s** | DOMContentLoaded: 655 ms

Page Load Time: **1.13 s**

4.0 LAB Network Condition

4.5.13 RTT = 700 ms

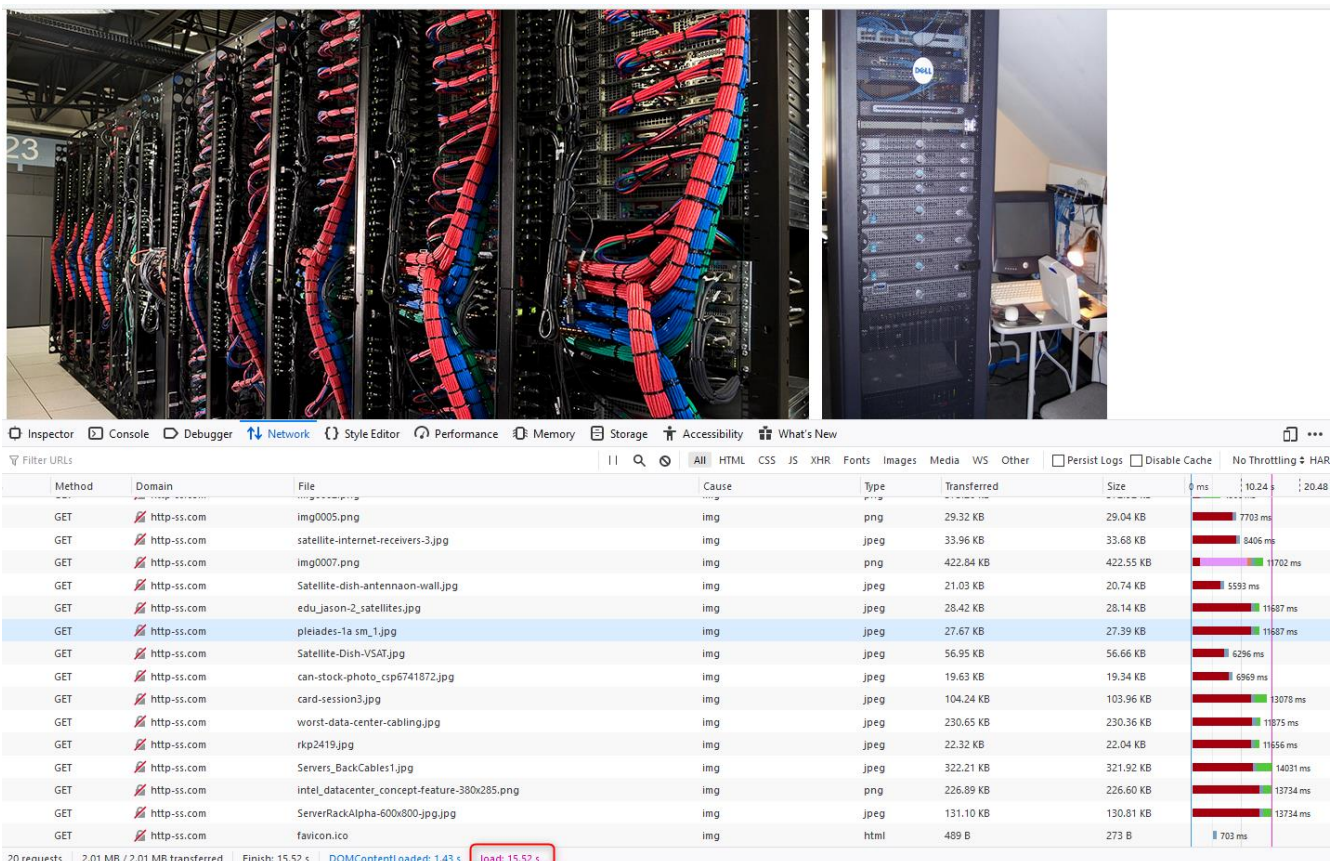
Bandwidth 800 Mbit/s

Latency 700 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=700ms TTL=64
```

4.5.13.1 Page Load Time - TCP/HTTP

Browser Cache deleted!



Method	Domain	File	Cause	Type	Transferred	Size	ms
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	7703 ms
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	8406 ms
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	11702 ms
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	5593 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	11987 ms
GET	http-ss.com	pleiades-ta_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	11987 ms
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	6296 ms
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	6969 ms
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	3078 ms
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	11875 ms
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	11656 ms
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	14031 ms
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	13734 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	13734 ms
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	703 ms

20 requests | 2.01 MB / 2.01 MB transferred | Finish: 15.52 s | DOMContentLoaded: 1.43 s | **load: 15.52 s**

Page Load Time: **15.52 s**

4.0 LAB Network Condition

4.5.13.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!

ering data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	128 s
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	18 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	18 ms	
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	17 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	http-ss.com	builtwithwwb11.png	img	png	2.75 KB	2.50 KB	4 ms	
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	25 ms	
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	10 ms	
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB	33 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB	18 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB	22 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB	22 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB	18 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB	32 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB	15 ms	
GET	http-ss.com	favicon.ico	img					

20 requests 1.93 MB / 1.93 MB transferred Finish: 1.16 s DOMContentLoaded: 757 ms

Page Load Time: **1.16 s**

4.0 LAB Network Condition

4.5.14 RTT = 800 ms

Bandwidth 800 Mbit/s

Latency 800 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=800ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=800ms TTL=64
```

4.5.14.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	20.48
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	8781 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	10155 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	11985 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	6375 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	11703 ms	
GET	http-ss.com	pleiades-1a sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	11703 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	7140 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	7937 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	13312 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	14375 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	11703 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	14906 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	14109 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	14109 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	796 ms	

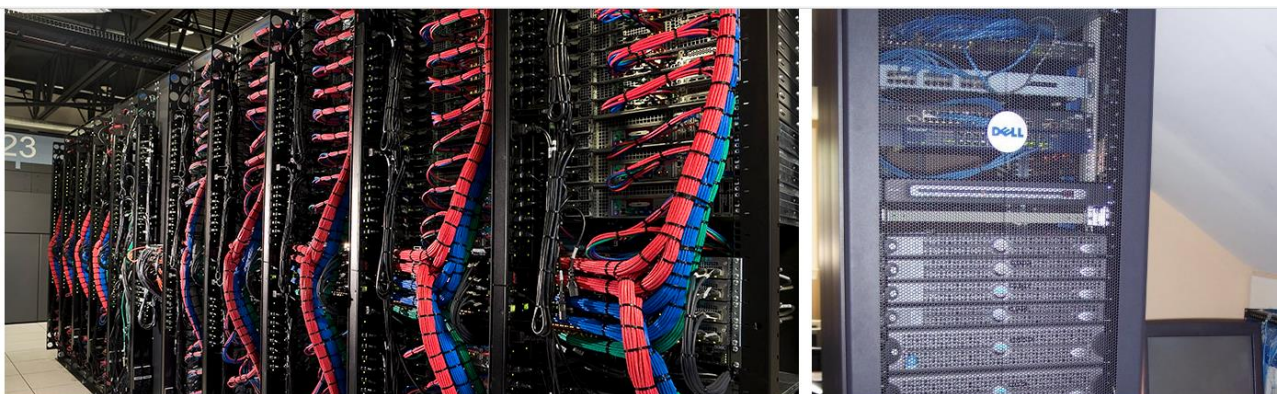
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 16.61 s | DOMContentLoaded: 1.64 s | **load: 16.62 s**

Page Load Time: **16.62 s**

4.0 LAB Network Condition

4.5.14.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



errring data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB	16 ms	
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB	16 ms	
GET	http-ss.com	img0002.png	img	png	373.18 KB	372.92 KB	0 ms	
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	0 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB	0 ms	
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB	0 ms	
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg	19.80 KB	19.34 KB	0 ms	
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	104.40 KB	103.96 KB	0 ms	
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	230.73 KB	230.36 KB	16 ms	
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	22.40 KB	22.04 KB	16 ms	
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	322.22 KB	321.92 KB	15 ms	
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	227.15 KB	226.60 KB	16 ms	
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	131.07 KB	130.81 KB	16 ms	
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg				
GET	http-ss.com	favicon.ico	img					

20 requests | 1.93 MB / 1.93 MB transferred | Finish: 1.34 s | DOMContentLoaded: 846 ms

Page Load Time: **1.34 s**

4.0 LAB Network Condition

4.5.15 RTT = 900 ms

Bandwidth 800 Mbit/s

Latency 900 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=900ms TTL=64
```

4.5.15.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	ms
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	10075 ms
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	10798 ms
GET	http-ss.com	img0007.png	img	png	422.04 KB	422.55 KB	15454 ms
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	7188 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	1184 ms
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	11860 ms
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	8078 ms
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	8954 ms
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	11673 ms
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	12470 ms
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	11797 ms
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	15391 ms
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	15391 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.10 KB	130.81 KB	14500 ms
GET	http-ss.com	favicon.ico	img	html	489 B	273 B	906 ms

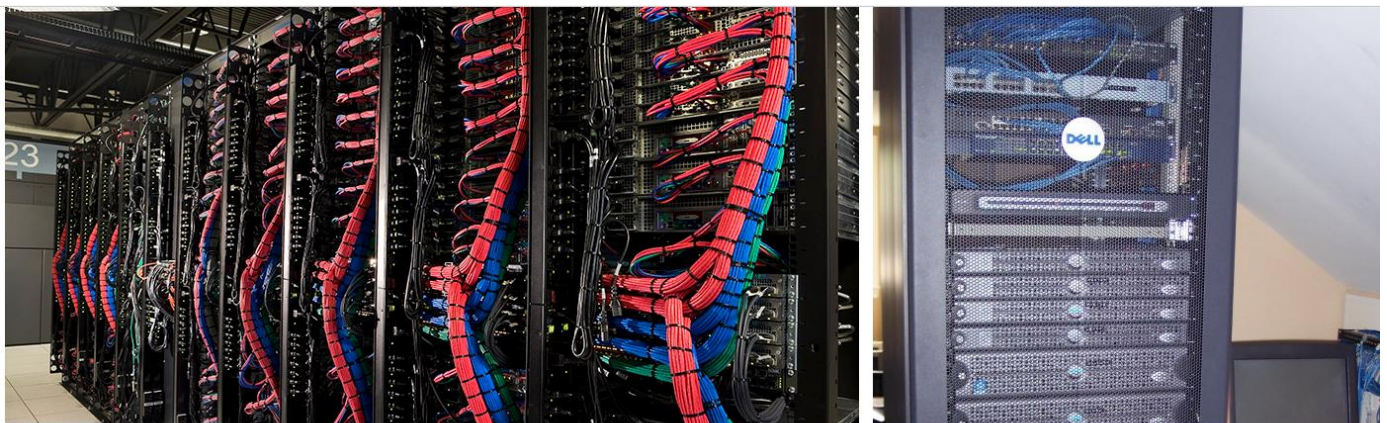
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 17.33 s | DOMContentLoaded: 1.86 s | **load: 17.34 s**

Page Load Time: **17.34 s**

4.0 LAB Network Condition

4.5.15.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



erring data from cdn.csu.edu.au...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	1.28 s
GET	mspspr.com	img0002.png	img	png	29.29 KB	29.29 KB	0 ms	15 ms
GET	http-ss.com	img0005.png	img	png	29.29 KB	29.04 KB	0 ms	15 ms
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img	jpg	422.81 KB	422.55 KB	0 ms	15 ms
GET	http-ss.com	img0007.png	img	png	21.05 KB	20.74 KB	0 ms	0 ms
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	28.39 KB	28.14 KB	0 ms	0 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	27.74 KB	27.39 KB	0 ms	0 ms
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	19.80 KB	19.34 KB	0 ms	0 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img	jpeg	104.40 KB	103.96 KB	0 ms	0 ms
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	230.73 KB	230.36 KB	0 ms	16 ms
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	22.40 KB	22.04 KB	0 ms	16 ms
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	322.22 KB	321.92 KB	0 ms	11 ms
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	227.15 KB	226.60 KB	0 ms	0 ms
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	131.07 KB	130.81 KB	0 ms	23 ms
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png				
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg				
GET	http-ss.com	favicon.ico	img	ico				

20 requests 1.93 MB / 1.93 MB transferred Finish: 1.44 s DOMContentLoaded: 972 ms

Page Load Time: **1.44 s**

4.0 LAB Network Condition

4.5.16 RTT = 1000 ms

- # Bandwidth 800 Mbit/s
- # Latency 1000 ms

```
Ping wird ausgeführt für http-ss.com [192.168.178.61] mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1000ms TTL=64
```

4.5.16.1 Page Load Time - TCP/HTTP

Browser Cache deleted!

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	20.48
GET	http-ss.com	img0005.png	img	png	29.32 KB	29.04 KB	11954 ms	
GET	http-ss.com	satellite-internet-receivers-3.jpg	img	jpeg	33.96 KB	33.68 KB	11954 ms	
GET	http-ss.com	img0007.png	img	png	422.84 KB	422.55 KB	15939 ms	
GET	http-ss.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.03 KB	20.74 KB	7970 ms	
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.42 KB	28.14 KB	11851 ms	
GET	http-ss.com	pleiades-1a_sm_1.jpg	img	jpeg	27.67 KB	27.39 KB	10930 ms	
GET	http-ss.com	Satellite-Dish-VSAT.jpg	img	jpeg	56.95 KB	56.66 KB	8938 ms	
GET	http-ss.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.63 KB	19.34 KB	9938 ms	
GET	http-ss.com	card-session3.jpg	img	jpeg	104.24 KB	103.96 KB	11954 ms	
GET	http-ss.com	worst-data-center-cabling.jpg	img	jpeg	230.65 KB	230.36 KB	14891 ms	
GET	http-ss.com	rkp2419.jpg	img	jpeg	22.32 KB	22.04 KB	12157 ms	
GET	http-ss.com	Servers_BackCables1.jpg	img	jpeg	322.21 KB	321.92 KB	15882 ms	
GET	http-ss.com	intel_datacenter_concept-feature-380x285.png	img	png	226.89 KB	226.60 KB	14891 ms	
GET	http-ss.com	ServerRackAlpha-600x800.jpg.jpg	img	jpeg	131.10 KB	130.81 KB	12954 ms	
GET	http-ss.com	favicon.ico	img	html	489 B	273 B		1000 ms

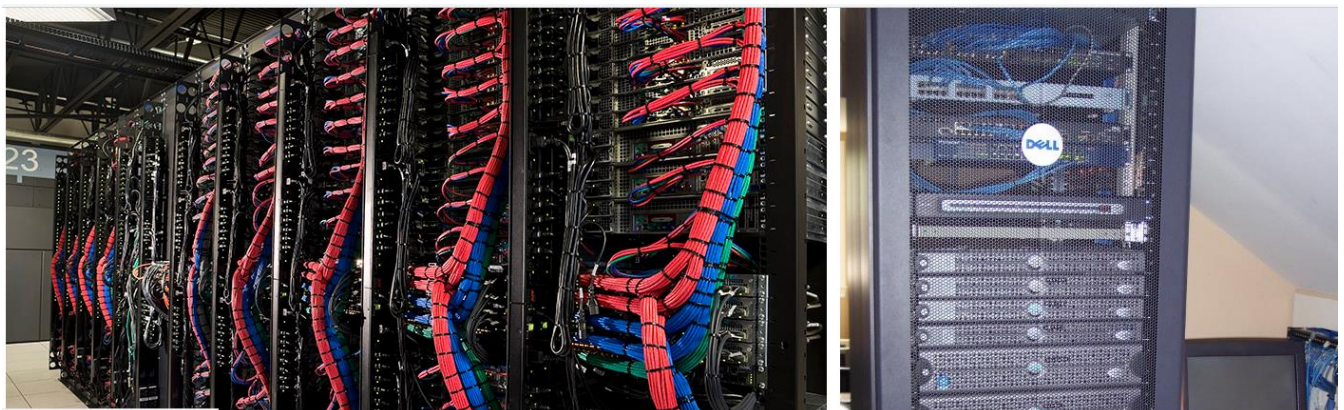
20 requests | 2.01 MB / 2.01 MB transferred | Finish: 18.02 s | DOMContentLoaded: 2.04 s | **load: 18.01 s**

Page Load Time: **18.01 s**

4.0 LAB Network Condition

4.5.16.2 Page Load Time - HTTP-QuSS

Browser Cache deleted!



ering data from http-ss.com...

Inspector Console Debugger Network Style Editor Performance Memory Storage Accessibility What's New

Filter URLs

Method	Domain	File	Cause	Type	Transferred	Size	0 ms	128 s
GET	http-ss.com	img005.png	img	png	29.29 KB	29.04 KB		15 ms
GET	s.hswstatic.com	satellite-internet-receivers-3.jpg	img					
GET	http-ss.com	img0007.png	img	png	422.81 KB	422.55 KB		16 ms
GET	tv-from-home.com	Satellite-dish-antennaon-wall.jpg	img	jpeg	21.05 KB	20.74 KB		0 ms
GET	http-ss.com	edu_jason-2_satellites.jpg	img	jpeg	28.39 KB	28.14 KB		0 ms
GET	s3.amazonaws.com	pleiades-1a_sm_1.jpg	img	jpeg	27.74 KB	27.39 KB		133 ms
GET	www.itnewsafrika.com	Satellite-Dish-VSAT.jpg	img					
GET	comps.canstockphoto.com	can-stock-photo_csp6741872.jpg	img	jpeg	19.80 KB	19.34 KB		122 ms
GET	cdn.csu.edu.au	card-session3.jpg	img	jpeg	104.40 KB	103.96 KB		121 ms
GET	blog.dotcom-monitor.com	worst-data-center-cabling.jpg	img	jpeg	230.73 KB	230.36 KB		122 ms
GET	www.kvmsolutions.uk	rkp2419.jpg	img	jpeg	22.40 KB	22.04 KB		131 ms
GET	cdn.softlayer.com	Servers_BackCables1.jpg	img	jpeg	322.22 KB	321.92 KB		13 ms
GET	allthingsd.com	intel_datacenter_concept-feature-380x285.png	img	png	227.15 KB	226.60 KB		17 ms
GET	http-ss.com	ServerRackAlpha-600x800-jpg.jpg	img	jpeg	131.07 KB	130.81 KB		15 ms
GET	http-ss.com	fajicon.ico	img					

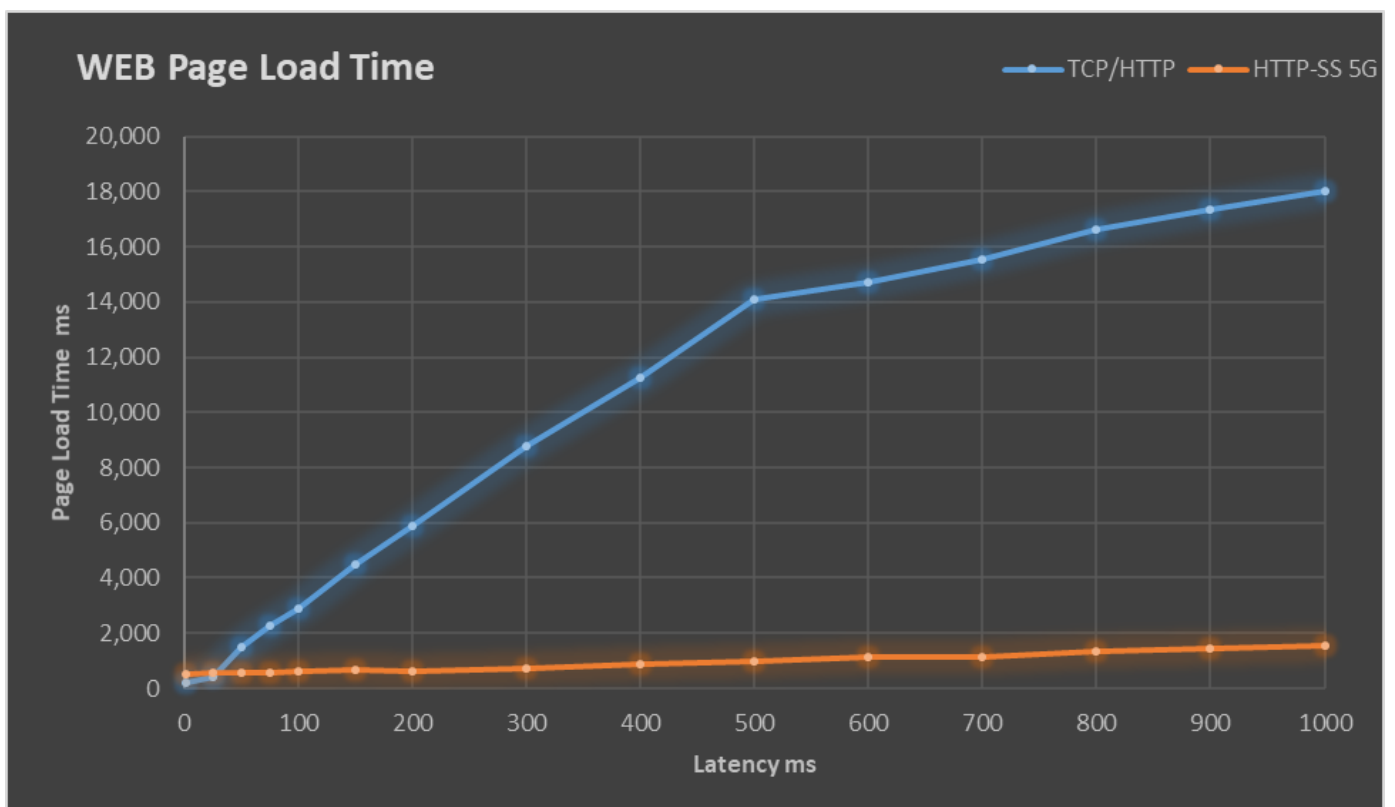
20 requests | 1.93 MB / 1.93 MB transferred | Finish: 1.53 s | DOMContentLoaded: 1.04 s

Page Load Time: **1.53 ms**

4.0 LAB Network Condition

4.5.17 Benchmark Summary

Latency ms	WEB Page Load Time / ms	800 Mbit/s
	TCP/HTTP	HTTP-QuSS
1	218	503
25	395	562
50	1,510	561
75	2,280	580
100	2,880	641
150	4,470	695
200	5,880	623
300	8,790	741
400	11,270	868
500	14,100	980
600	14,700	1,130
700	15,520	1,160
800	16,620	1,340
900	17,340	1,440
1000	18,010	1,530



4.0 LAB Network Condition

4.6 Low Latency High Speed TCP Bandwidth Dependency

Tested Latency Bandwidth Dependencies in the Range of ≤ 1 ms – 20 ms in 2 ms Steps.

4.6.1 RTT < 1 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit<1ms TTL=64
```

```
[ 4] local 192.168.178.72 port 49879 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec   112 MBytes   937 Mbits/sec
[ 4]  1.00-2.00    sec   113 MBytes   949 Mbits/sec
[ 4]  2.00-3.00    sec   112 MBytes   938 Mbits/sec
[ 4]  3.00-4.00    sec   113 MBytes   947 Mbits/sec
[ 4]  4.00-5.00    sec   113 MBytes   949 Mbits/sec
[ 4]  5.00-6.00    sec   112 MBytes   936 Mbits/sec
[ 4]  6.00-7.00    sec   113 MBytes   949 Mbits/sec
[ 4]  7.00-8.00    sec   113 MBytes   944 Mbits/sec
[ 4]  8.00-9.00    sec   113 MBytes   949 Mbits/sec
[ 4]  9.00-10.00   sec   113 MBytes   949 Mbits/sec
[ 4] 10.00-11.00   sec   113 MBytes   949 Mbits/sec
[ 4] 11.00-12.00   sec   113 MBytes   945 Mbits/sec
[ 4] 12.00-13.00   sec   113 MBytes   949 Mbits/sec
[ 4] 13.00-14.00   sec   113 MBytes   948 Mbits/sec
[ 4] 14.00-15.00   sec   113 MBytes   949 Mbits/sec
[ 4] 15.00-16.00   sec   113 MBytes   947 Mbits/sec
[ 4] 16.00-17.00   sec   112 MBytes   936 Mbits/sec
[ 4] 17.00-18.00   sec   113 MBytes   949 Mbits/sec
[ 4] 18.00-19.00   sec   113 MBytes   949 Mbits/sec
[ 4] 19.00-20.00   sec   113 MBytes   944 Mbits/sec
[ 4] 20.00-21.00   sec   113 MBytes   949 Mbits/sec
[ 4] 21.00-22.00   sec   113 MBytes   949 Mbits/sec
[ 4] 22.00-23.00   sec   111 MBytes   934 Mbits/sec
[ 4] 23.00-24.00   sec   113 MBytes   944 Mbits/sec
[ 4] 24.00-25.00   sec   113 MBytes   949 Mbits/sec
[ 4] 25.00-26.00   sec   113 MBytes   949 Mbits/sec
[ 4] 26.00-27.00   sec   113 MBytes   949 Mbits/sec
[ 4] 27.00-28.00   sec   113 MBytes   945 Mbits/sec
[ 4] 28.00-29.00   sec   113 MBytes   946 Mbits/sec
[ 4] 29.00-30.00   sec   112 MBytes   940 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec   3.30 GBytes   946 Mbits/sec    0
[ 4]  0.00-30.00   sec   3.30 GBytes   946 Mbits/sec
CPU Utilization: local/receiver 7.5% (2.4%/5.1%), remote/sender 1.9% (0.1%/1.8%)
```

Utilized TCP Bandwidth: **946 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.2 RTT = 1 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=1ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50321 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec    103 MBytes    863 Mbits/sec
[ 4]  1.00-2.00    sec    102 MBytes    852 Mbits/sec
[ 4]  2.00-3.00    sec    103 MBytes    864 Mbits/sec
[ 4]  3.00-4.00    sec   99.6 MBytes    835 Mbits/sec
[ 4]  4.00-5.00    sec    101 MBytes    843 Mbits/sec
[ 4]  5.00-6.00    sec   98.6 MBytes    827 Mbits/sec
[ 4]  6.00-7.00    sec   98.5 MBytes    826 Mbits/sec
[ 4]  7.00-8.00    sec   99.1 MBytes    831 Mbits/sec
[ 4]  8.00-9.00    sec   99.5 MBytes    835 Mbits/sec
[ 4]  9.00-10.00   sec    100 MBytes    838 Mbits/sec
[ 4] 10.00-11.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 11.00-12.00   sec    100 MBytes    842 Mbits/sec
[ 4] 12.00-13.00   sec   99.8 MBytes    838 Mbits/sec
[ 4] 13.00-14.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 14.00-15.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 15.00-16.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 16.00-17.00   sec   99.1 MBytes    831 Mbits/sec
[ 4] 17.00-18.00   sec   99.8 MBytes    837 Mbits/sec
[ 4] 18.00-19.00   sec   98.1 MBytes    823 Mbits/sec
[ 4] 19.00-20.00   sec    101 MBytes    845 Mbits/sec
[ 4] 20.00-21.00   sec    100 MBytes    841 Mbits/sec
[ 4] 21.00-22.00   sec   98.6 MBytes    827 Mbits/sec
[ 4] 22.00-23.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 23.00-24.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 24.00-25.00   sec   99.9 MBytes    838 Mbits/sec
[ 4] 25.00-26.00   sec   99.4 MBytes    834 Mbits/sec
[ 4] 26.00-27.00   sec   99.8 MBytes    837 Mbits/sec
[ 4] 27.00-28.00   sec   99.6 MBytes    835 Mbits/sec
[ 4] 28.00-29.00   sec    100 MBytes    839 Mbits/sec
[ 4] 29.00-30.00   sec   98.3 MBytes    824 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec    2.93 GBytes    838 Mbits/sec      0
[ 4]  0.00-30.00   sec    2.93 GBytes    838 Mbits/sec
CPU Utilization: local/receiver 15.3% (4.9%/10.4%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **838 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.3 RTT = 2 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=2ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=2ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=2ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=3ms TTL=64
```

```

TCP MSS: 60 (default)
[ 4] local 192.168.178.72 port 50417 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  65.3 MBytes  547 Mbits/sec
[ 4]  1.00-2.00    sec  66.3 MBytes  556 Mbits/sec
[ 4]  2.00-3.00    sec  66.3 MBytes  556 Mbits/sec
[ 4]  3.00-4.00    sec  66.8 MBytes  560 Mbits/sec
[ 4]  4.00-5.00    sec  66.7 MBytes  559 Mbits/sec
[ 4]  5.00-6.00    sec  67.1 MBytes  563 Mbits/sec
[ 4]  6.00-7.00    sec  67.0 MBytes  562 Mbits/sec
[ 4]  7.00-8.00    sec  66.9 MBytes  561 Mbits/sec
[ 4]  8.00-9.00    sec  66.7 MBytes  560 Mbits/sec
[ 4]  9.00-10.00   sec  66.6 MBytes  559 Mbits/sec
[ 4] 10.00-11.00   sec  66.4 MBytes  557 Mbits/sec
[ 4] 11.00-12.00   sec  66.8 MBytes  560 Mbits/sec
[ 4] 12.00-13.00   sec  67.0 MBytes  562 Mbits/sec
[ 4] 13.00-14.00   sec  66.6 MBytes  558 Mbits/sec
[ 4] 14.00-15.00   sec  66.9 MBytes  561 Mbits/sec
[ 4] 15.00-16.00   sec  67.1 MBytes  563 Mbits/sec
[ 4] 16.00-17.00   sec  66.3 MBytes  556 Mbits/sec
[ 4] 17.00-18.00   sec  66.4 MBytes  557 Mbits/sec
[ 4] 18.00-19.00   sec  67.2 MBytes  563 Mbits/sec
[ 4] 19.00-20.00   sec  66.3 MBytes  556 Mbits/sec
[ 4] 20.00-21.00   sec  66.7 MBytes  559 Mbits/sec
[ 4] 21.00-22.00   sec  67.2 MBytes  563 Mbits/sec
[ 4] 22.00-23.00   sec  67.0 MBytes  562 Mbits/sec
[ 4] 23.00-24.00   sec  66.4 MBytes  557 Mbits/sec
[ 4] 24.00-25.00   sec  67.1 MBytes  563 Mbits/sec
[ 4] 25.00-26.00   sec  67.1 MBytes  563 Mbits/sec
[ 4] 26.00-27.00   sec  66.9 MBytes  562 Mbits/sec
[ 4] 27.00-28.00   sec  67.1 MBytes  563 Mbits/sec
[ 4] 28.00-29.00   sec  67.1 MBytes  563 Mbits/sec
[ 4] 29.00-30.00   sec  67.1 MBytes  563 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  1.96 GBytes  560 Mbits/sec    0
[ 4]  0.00-30.00   sec  1.96 GBytes  560 Mbits/sec
CPU Utilization: local/receiver 13.0% (5.7%u/7.3%S), remote/sender 0.2% (0.0%u/0.2%S)

```

Utilized TCP Bandwidth: **560 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.4 RTT = 3 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=3ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=3ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=3ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=3ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50488 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  50.0 MBytes  419 Mbits/sec
[ 4]  1.00-2.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  2.00-3.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  3.00-4.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  4.00-5.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  5.00-6.00    sec  49.8 MBytes  417 Mbits/sec
[ 4]  6.00-7.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  7.00-8.00    sec  49.7 MBytes  417 Mbits/sec
[ 4]  8.00-9.00    sec  49.8 MBytes  417 Mbits/sec
[ 4]  9.00-10.00   sec  49.8 MBytes  418 Mbits/sec
[ 4] 10.00-11.00   sec  49.6 MBytes  416 Mbits/sec
[ 4] 11.00-12.00   sec  49.6 MBytes  416 Mbits/sec
[ 4] 12.00-13.00   sec  49.3 MBytes  413 Mbits/sec
[ 4] 13.00-14.00   sec  49.4 MBytes  414 Mbits/sec
[ 4] 14.00-15.00   sec  49.5 MBytes  415 Mbits/sec
[ 4] 15.00-16.00   sec  49.5 MBytes  415 Mbits/sec
[ 4] 16.00-17.00   sec  49.2 MBytes  412 Mbits/sec
[ 4] 17.00-18.00   sec  49.3 MBytes  413 Mbits/sec
[ 4] 18.00-19.00   sec  49.3 MBytes  414 Mbits/sec
[ 4] 19.00-20.00   sec  49.5 MBytes  415 Mbits/sec
[ 4] 20.00-21.00   sec  48.6 MBytes  408 Mbits/sec
[ 4] 21.00-22.00   sec  49.1 MBytes  412 Mbits/sec
[ 4] 22.00-23.00   sec  49.5 MBytes  415 Mbits/sec
[ 4] 23.00-24.00   sec  49.4 MBytes  414 Mbits/sec
[ 4] 24.00-25.00   sec  49.9 MBytes  418 Mbits/sec
[ 4] 25.00-26.00   sec  50.0 MBytes  420 Mbits/sec
[ 4] 26.00-27.00   sec  50.0 MBytes  419 Mbits/sec
[ 4] 27.00-28.00   sec  50.1 MBytes  420 Mbits/sec
[ 4] 28.00-29.00   sec  50.0 MBytes  419 Mbits/sec
[ 4] 29.00-30.00   sec  49.4 MBytes  415 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  1.45 GBytes  416 Mbits/sec      0
[ 4]  0.00-30.00   sec  1.45 GBytes  416 Mbits/sec
CPU Utilization: local/receiver 11.5% (5.7%u/5.8%S), remote/sender 0.2% (0.0%u/0.2%S)
```

Utilized TCP Bandwidth: 416 Mbit/s of 1000 Mbit/s

4.0 LAB Network Condition

4.6.5 RTT = 4 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=4ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=4ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=4ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=4ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50547 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
```

[ID]	Interval	Transfer	Bandwidth
[4]	0.00-1.00	sec 39.3 MBytes	329 Mbits/sec
[4]	1.00-2.00	sec 39.3 MBytes	329 Mbits/sec
[4]	2.00-3.00	sec 39.3 MBytes	330 Mbits/sec
[4]	3.00-4.00	sec 39.3 MBytes	330 Mbits/sec
[4]	4.00-5.00	sec 39.1 MBytes	328 Mbits/sec
[4]	5.00-6.00	sec 39.3 MBytes	329 Mbits/sec
[4]	6.00-7.00	sec 39.5 MBytes	331 Mbits/sec
[4]	7.00-8.00	sec 39.5 MBytes	332 Mbits/sec
[4]	8.00-9.00	sec 39.5 MBytes	331 Mbits/sec
[4]	9.00-10.00	sec 39.4 MBytes	331 Mbits/sec
[4]	10.00-11.00	sec 39.4 MBytes	331 Mbits/sec
[4]	11.00-12.00	sec 39.5 MBytes	331 Mbits/sec
[4]	12.00-13.00	sec 39.5 MBytes	332 Mbits/sec
[4]	13.00-14.00	sec 39.5 MBytes	331 Mbits/sec
[4]	14.00-15.00	sec 39.5 MBytes	331 Mbits/sec
[4]	15.00-16.00	sec 39.4 MBytes	330 Mbits/sec
[4]	16.00-17.00	sec 39.6 MBytes	332 Mbits/sec
[4]	17.00-18.00	sec 39.4 MBytes	330 Mbits/sec
[4]	18.00-19.00	sec 39.5 MBytes	332 Mbits/sec
[4]	19.00-20.00	sec 39.5 MBytes	331 Mbits/sec
[4]	20.00-21.00	sec 39.4 MBytes	331 Mbits/sec
[4]	21.00-22.00	sec 39.5 MBytes	331 Mbits/sec
[4]	22.00-23.00	sec 39.6 MBytes	332 Mbits/sec
[4]	23.00-24.00	sec 39.5 MBytes	331 Mbits/sec
[4]	24.00-25.00	sec 39.5 MBytes	331 Mbits/sec
[4]	25.00-26.00	sec 39.4 MBytes	330 Mbits/sec
[4]	26.00-27.00	sec 39.4 MBytes	331 Mbits/sec
[4]	27.00-28.00	sec 39.5 MBytes	331 Mbits/sec
[4]	28.00-29.00	sec 39.6 MBytes	332 Mbits/sec
[4]	29.00-30.00	sec 39.5 MBytes	331 Mbits/sec

```
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00  sec 1.16 GBytes  331 Mbits/sec      0
[ 4]  0.00-30.00  sec 1.16 GBytes  331 Mbits/sec
CPU Utilization: local/receiver 12.5% (7.4%u/5.1%s), remote/sender 0.3% (0.0%u/0.3%r)
```

Utilized TCP Bandwidth: **331 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.6 RTT = 5 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=5ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=5ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=5ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=5ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50609 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  32.4 MBytes  272 Mbits/sec
[ 4]  1.00-2.00    sec  32.4 MBytes  271 Mbits/sec
[ 4]  2.00-3.00    sec  32.2 MBytes  270 Mbits/sec
[ 4]  3.00-4.00    sec  32.6 MBytes  273 Mbits/sec
[ 4]  4.00-5.00    sec  32.3 MBytes  271 Mbits/sec
[ 4]  5.00-6.00    sec  32.4 MBytes  272 Mbits/sec
[ 4]  6.00-7.00    sec  32.3 MBytes  271 Mbits/sec
[ 4]  7.00-8.00    sec  32.3 MBytes  271 Mbits/sec
[ 4]  8.00-9.00    sec  32.4 MBytes  272 Mbits/sec
[ 4]  9.00-10.00   sec  32.4 MBytes  272 Mbits/sec
[ 4] 10.00-11.00   sec  32.3 MBytes  271 Mbits/sec
[ 4] 11.00-12.00   sec  32.4 MBytes  272 Mbits/sec
[ 4] 12.00-13.00   sec  32.2 MBytes  271 Mbits/sec
[ 4] 13.00-14.00   sec  32.5 MBytes  272 Mbits/sec
[ 4] 14.00-15.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 15.00-16.00   sec  32.5 MBytes  273 Mbits/sec
[ 4] 16.00-17.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 17.00-18.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 18.00-19.00   sec  32.4 MBytes  272 Mbits/sec
[ 4] 19.00-20.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 20.00-21.00   sec  32.5 MBytes  273 Mbits/sec
[ 4] 21.00-22.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 22.00-23.00   sec  32.4 MBytes  272 Mbits/sec
[ 4] 23.00-24.00   sec  32.5 MBytes  273 Mbits/sec
[ 4] 24.00-25.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 25.00-26.00   sec  32.5 MBytes  273 Mbits/sec
[ 4] 26.00-27.00   sec  32.5 MBytes  273 Mbits/sec
[ 4] 27.00-28.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 28.00-29.00   sec  32.6 MBytes  273 Mbits/sec
[ 4] 29.00-30.00   sec  32.5 MBytes  273 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  976 MBytes  273 Mbits/sec      0
[ 4]  0.00-30.00   sec  974 MBytes  272 Mbits/sec
CPU Utilization: local/receiver 7.7% (2.6%u/5.1%S), remote/sender 0.2% (0.0%u/0.2%S)
```

Utilized TCP Bandwidth: **273 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.7 RTT = 6 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=6ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=6ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=6ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=6ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50676 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  28.0 MBytes  235 Mbits/sec
[ 4]  1.00-2.00    sec  27.7 MBytes  232 Mbits/sec
[ 4]  2.00-3.00    sec  27.5 MBytes  231 Mbits/sec
[ 4]  3.00-4.00    sec  27.6 MBytes  231 Mbits/sec
[ 4]  4.00-5.00    sec  27.6 MBytes  231 Mbits/sec
[ 4]  5.00-6.00    sec  27.4 MBytes  230 Mbits/sec
[ 4]  6.00-7.00    sec  27.6 MBytes  231 Mbits/sec
[ 4]  7.00-8.00    sec  27.5 MBytes  231 Mbits/sec
[ 4]  8.00-9.00    sec  27.5 MBytes  231 Mbits/sec
[ 4]  9.00-10.00   sec  27.6 MBytes  232 Mbits/sec
[ 4] 10.00-11.00   sec  27.6 MBytes  232 Mbits/sec
[ 4] 11.00-12.00   sec  27.6 MBytes  231 Mbits/sec
[ 4] 12.00-13.00   sec  27.6 MBytes  232 Mbits/sec
[ 4] 13.00-14.00   sec  27.5 MBytes  231 Mbits/sec
[ 4] 14.00-15.00   sec  27.6 MBytes  231 Mbits/sec
[ 4] 15.00-16.00   sec  27.6 MBytes  232 Mbits/sec
[ 4] 16.00-17.00   sec  27.5 MBytes  231 Mbits/sec
[ 4] 17.00-18.00   sec  27.7 MBytes  232 Mbits/sec
[ 4] 18.00-19.00   sec  27.6 MBytes  231 Mbits/sec
[ 4] 19.00-20.00   sec  27.4 MBytes  230 Mbits/sec
[ 4] 20.00-21.00   sec  27.3 MBytes  230 Mbits/sec
[ 4] 21.00-22.00   sec  27.5 MBytes  230 Mbits/sec
[ 4] 22.00-23.00   sec  27.7 MBytes  232 Mbits/sec
[ 4] 23.00-24.00   sec  27.4 MBytes  230 Mbits/sec
[ 4] 24.00-25.00   sec  27.4 MBytes  230 Mbits/sec
[ 4] 25.00-26.00   sec  27.6 MBytes  232 Mbits/sec
[ 4] 26.00-27.00   sec  27.6 MBytes  231 Mbits/sec
[ 4] 27.00-28.00   sec  27.4 MBytes  230 Mbits/sec
[ 4] 28.00-29.00   sec  27.7 MBytes  233 Mbits/sec
[ 4] 29.00-30.00   sec  27.7 MBytes  233 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  829 MBytes  232 Mbits/sec      0
[ 4]  0.00-30.00   sec  827 MBytes  231 Mbits/sec
CPU Utilization: local/receiver 7.4% (2.9%/4.5%), remote/sender 0.2% (0.0%/0.2%)
```

Utilized TCP Bandwidth: **232 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.8 RTT = 7 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=7ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=7ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=7ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=7ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50750 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  24.9 MBytes  209 Mbits/sec
[ 4]  1.00-2.00    sec  24.1 MBytes  202 Mbits/sec
[ 4]  2.00-3.00    sec  24.3 MBytes  204 Mbits/sec
[ 4]  3.00-4.00    sec  24.2 MBytes  203 Mbits/sec
[ 4]  4.00-5.00    sec  24.2 MBytes  203 Mbits/sec
[ 4]  5.00-6.00    sec  24.3 MBytes  203 Mbits/sec
[ 4]  6.00-7.00    sec  24.2 MBytes  203 Mbits/sec
[ 4]  7.00-8.00    sec  24.2 MBytes  203 Mbits/sec
[ 4]  8.00-9.00    sec  24.4 MBytes  204 Mbits/sec
[ 4]  9.00-10.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 10.00-11.00   sec  24.2 MBytes  203 Mbits/sec
[ 4] 11.00-12.00   sec  24.5 MBytes  205 Mbits/sec
[ 4] 12.00-13.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 13.00-14.00   sec  24.2 MBytes  203 Mbits/sec
[ 4] 14.00-15.00   sec  24.2 MBytes  203 Mbits/sec
[ 4] 15.00-16.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 16.00-17.00   sec  24.3 MBytes  204 Mbits/sec
[ 4] 17.00-18.00   sec  23.9 MBytes  201 Mbits/sec
[ 4] 18.00-19.00   sec  24.3 MBytes  204 Mbits/sec
[ 4] 19.00-20.00   sec  24.2 MBytes  203 Mbits/sec
[ 4] 20.00-21.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 21.00-22.00   sec  24.1 MBytes  203 Mbits/sec
[ 4] 22.00-23.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 23.00-24.00   sec  24.1 MBytes  203 Mbits/sec
[ 4] 24.00-25.00   sec  24.3 MBytes  203 Mbits/sec
[ 4] 25.00-26.00   sec  24.2 MBytes  203 Mbits/sec
[ 4] 26.00-27.00   sec  24.1 MBytes  202 Mbits/sec
[ 4] 27.00-28.00   sec  24.1 MBytes  203 Mbits/sec
[ 4] 28.00-29.00   sec  24.4 MBytes  204 Mbits/sec
[ 4] 29.00-30.00   sec  24.4 MBytes  205 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  729 MBytes  204 Mbits/sec    0
[ 4]  0.00-30.00   sec  727 MBytes  203 Mbits/sec
CPU Utilization: local/receiver 7.0% (2.7%u/4.3%S), remote/sender 0.2% (0.0%u/0.2%S)
```

Utilized TCP Bandwidth: **204 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.9 RTT = 8 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=8ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=8ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=8ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=8ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50818 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  21.7 MBytes  182 Mbits/sec
[ 4]  1.00-2.00    sec  21.5 MBytes  180 Mbits/sec
[ 4]  2.00-3.00    sec  21.5 MBytes  181 Mbits/sec
[ 4]  3.00-4.00    sec  21.5 MBytes  180 Mbits/sec
[ 4]  4.00-5.00    sec  21.5 MBytes  180 Mbits/sec
[ 4]  5.00-6.00    sec  21.5 MBytes  180 Mbits/sec
[ 4]  6.00-7.00    sec  21.5 MBytes  181 Mbits/sec
[ 4]  7.00-8.00    sec  21.6 MBytes  181 Mbits/sec
[ 4]  8.00-9.00    sec  21.4 MBytes  180 Mbits/sec
[ 4]  9.00-10.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 10.00-11.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 11.00-12.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 12.00-13.00   sec  21.4 MBytes  179 Mbits/sec
[ 4] 13.00-14.00   sec  21.3 MBytes  179 Mbits/sec
[ 4] 14.00-15.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 15.00-16.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 16.00-17.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 17.00-18.00   sec  21.4 MBytes  179 Mbits/sec
[ 4] 18.00-19.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 19.00-20.00   sec  21.5 MBytes  181 Mbits/sec
[ 4] 20.00-21.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 21.00-22.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 22.00-23.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 23.00-24.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 24.00-25.00   sec  21.4 MBytes  179 Mbits/sec
[ 4] 25.00-26.00   sec  21.6 MBytes  181 Mbits/sec
[ 4] 26.00-27.00   sec  21.4 MBytes  180 Mbits/sec
[ 4] 27.00-28.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 28.00-29.00   sec  21.5 MBytes  180 Mbits/sec
[ 4] 29.00-30.00   sec  21.5 MBytes  180 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  647 MBytes  181 Mbits/sec      0
[ 4]  0.00-30.00   sec  645 MBytes  180 Mbits/sec
CPU Utilization: local/receiver 6.3% (2.0%/5.0%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **182 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.10 RTT = 9 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=9ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=9ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=9ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=9ms TTL=64
```

```
[ 4] local 192.168.178.72 port 50887 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  19.4 MBytes  163 Mbits/sec
[ 4]  1.00-2.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  2.00-3.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  3.00-4.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  4.00-5.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  5.00-6.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  6.00-7.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  7.00-8.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  8.00-9.00    sec  19.2 MBytes  161 Mbits/sec
[ 4]  9.00-10.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 10.00-11.00   sec  19.2 MBytes  162 Mbits/sec
[ 4] 11.00-12.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 12.00-13.00   sec  19.3 MBytes  162 Mbits/sec
[ 4] 13.00-14.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 14.00-15.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 15.00-16.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 16.00-17.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 17.00-18.00   sec  19.3 MBytes  161 Mbits/sec
[ 4] 18.00-19.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 19.00-20.00   sec  19.3 MBytes  162 Mbits/sec
[ 4] 20.00-21.00   sec  19.3 MBytes  162 Mbits/sec
[ 4] 21.00-22.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 22.00-23.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 23.00-24.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 24.00-25.00   sec  19.3 MBytes  162 Mbits/sec
[ 4] 25.00-26.00   sec  19.3 MBytes  161 Mbits/sec
[ 4] 26.00-27.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 27.00-28.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 28.00-29.00   sec  19.2 MBytes  161 Mbits/sec
[ 4] 29.00-30.00   sec  19.3 MBytes  162 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  579 MBytes  162 Mbits/sec      0
[ 4]  0.00-30.00   sec  577 MBytes  161 Mbits/sec
CPU Utilization: local/receiver 7.3% (5.3%/4.0%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **162 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.11 RTT = 10 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=10ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=10ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=10ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=10ms TTL=64
```

```

[ 4] local 192.168.178.72 port 51169 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  17.7 MBytes  148 Mbits/sec
[ 4]  1.00-2.00    sec  17.2 MBytes  145 Mbits/sec
[ 4]  2.00-3.00    sec  17.5 MBytes  147 Mbits/sec
[ 4]  3.00-4.00    sec  17.4 MBytes  146 Mbits/sec
[ 4]  4.00-5.00    sec  17.4 MBytes  146 Mbits/sec
[ 4]  5.00-6.00    sec  17.3 MBytes  145 Mbits/sec
[ 4]  6.00-7.00    sec  17.4 MBytes  146 Mbits/sec
[ 4]  7.00-8.00    sec  17.3 MBytes  146 Mbits/sec
[ 4]  8.00-9.00    sec  17.4 MBytes  146 Mbits/sec
[ 4]  9.00-10.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 10.00-11.00   sec  17.5 MBytes  147 Mbits/sec
[ 4] 11.00-12.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 12.00-13.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 13.00-14.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 14.00-15.00   sec  17.3 MBytes  146 Mbits/sec
[ 4] 15.00-16.00   sec  17.5 MBytes  147 Mbits/sec
[ 4] 16.00-17.00   sec  16.8 MBytes  141 Mbits/sec
[ 4] 17.00-18.00   sec  17.4 MBytes  145 Mbits/sec
[ 4] 18.00-19.00   sec  17.3 MBytes  145 Mbits/sec
[ 4] 19.00-20.00   sec  16.8 MBytes  141 Mbits/sec
[ 4] 20.00-21.00   sec  17.1 MBytes  143 Mbits/sec
[ 4] 21.00-22.00   sec  17.0 MBytes  142 Mbits/sec
[ 4] 22.00-23.01   sec  17.5 MBytes  146 Mbits/sec
[ 4] 23.01-24.00   sec  17.2 MBytes  145 Mbits/sec
[ 4] 24.00-25.00   sec  17.2 MBytes  144 Mbits/sec
[ 4] 25.00-26.00   sec  17.5 MBytes  147 Mbits/sec
[ 4] 26.00-27.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 27.00-28.00   sec  17.4 MBytes  146 Mbits/sec
[ 4] 28.00-29.00   sec  17.3 MBytes  146 Mbits/sec
[ 4] 29.00-30.00   sec  17.5 MBytes  146 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  522 MBytes  146 Mbits/sec    0
[ 4]  0.00-30.00   sec  520 MBytes  145 Mbits/sec
CPU Utilization: local/receiver 8.5% (3.5%/5.0%), remote/sender 0.1% (0.0%/0.1%)

```

Utilized TCP Bandwidth: 146 Mbit/s of 1000 Mbit/s

4.0 LAB Network Condition

4.6.12 RTT = 11 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=11ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=11ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=11ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=11ms TTL=64
```

```
[ 4] local 192.168.178.72 port 51243 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  16.4 MBytes  137 Mbits/sec
[ 4]  1.00-2.00    sec  16.0 MBytes  134 Mbits/sec
[ 4]  2.00-3.00    sec  16.0 MBytes  134 Mbits/sec
[ 4]  3.00-4.00    sec  16.1 MBytes  135 Mbits/sec
[ 4]  4.00-5.00    sec  16.1 MBytes  135 Mbits/sec
[ 4]  5.00-6.00    sec  16.1 MBytes  135 Mbits/sec
[ 4]  6.00-7.00    sec  16.1 MBytes  135 Mbits/sec
[ 4]  7.00-8.00    sec  16.1 MBytes  134 Mbits/sec
[ 4]  8.00-9.00    sec  16.0 MBytes  134 Mbits/sec
[ 4]  9.00-10.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 10.00-11.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 11.00-12.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 12.00-13.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 13.00-14.02   sec  16.2 MBytes  134 Mbits/sec
[ 4] 14.02-15.00   sec  15.9 MBytes  135 Mbits/sec
[ 4] 15.00-16.00   sec  15.9 MBytes  134 Mbits/sec
[ 4] 16.00-17.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 17.00-18.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 18.00-19.00   sec  16.1 MBytes  135 Mbits/sec
[ 4] 19.00-20.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 20.00-21.00   sec  16.1 MBytes  135 Mbits/sec
[ 4] 21.00-22.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 22.00-23.00   sec  15.9 MBytes  134 Mbits/sec
[ 4] 23.00-24.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 24.00-25.00   sec  15.9 MBytes  134 Mbits/sec
[ 4] 25.00-26.00   sec  16.1 MBytes  135 Mbits/sec
[ 4] 26.00-27.00   sec  15.8 MBytes  133 Mbits/sec
[ 4] 27.00-28.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 28.00-29.00   sec  16.0 MBytes  134 Mbits/sec
[ 4] 29.00-30.00   sec  16.0 MBytes  134 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  483 MBytes  135 Mbits/sec    0
[ 4]  0.00-30.00   sec  481 MBytes  134 Mbits/sec
CPU Utilization: local/receiver 7.2% (5.2%/4.1%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **134 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.13 RTT = 12 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=12ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=12ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=12ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=12ms TTL=64
```

```
[ 4] local 192.168.178.72 port 51299 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  15.0 MBytes  125 Mbits/sec
[ 4]  1.00-2.00    sec  14.7 MBytes  123 Mbits/sec
[ 4]  2.00-3.00    sec  14.8 MBytes  124 Mbits/sec
[ 4]  3.00-4.00    sec  14.7 MBytes  124 Mbits/sec
[ 4]  4.00-5.00    sec  14.7 MBytes  124 Mbits/sec
[ 4]  5.00-6.00    sec  14.8 MBytes  124 Mbits/sec
[ 4]  6.00-7.00    sec  14.7 MBytes  124 Mbits/sec
[ 4]  7.00-8.00    sec  14.7 MBytes  124 Mbits/sec
[ 4]  8.00-9.00    sec  14.7 MBytes  124 Mbits/sec
[ 4]  9.00-10.00   sec  14.7 MBytes  124 Mbits/sec
[ 4] 10.00-11.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 11.00-12.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 12.00-13.00   sec  14.8 MBytes  124 Mbits/sec
[ 4] 13.00-14.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 14.00-15.00   sec  14.8 MBytes  124 Mbits/sec
[ 4] 15.00-16.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 16.00-17.00   sec  14.7 MBytes  124 Mbits/sec
[ 4] 17.00-18.00   sec  14.8 MBytes  124 Mbits/sec
[ 4] 18.00-19.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 19.00-20.00   sec  14.7 MBytes  124 Mbits/sec
[ 4] 20.00-21.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 21.00-22.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 22.00-23.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 23.00-24.00   sec  14.8 MBytes  124 Mbits/sec
[ 4] 24.00-25.00   sec  14.8 MBytes  124 Mbits/sec
[ 4] 25.00-26.00   sec  14.7 MBytes  124 Mbits/sec
[ 4] 26.00-27.00   sec  14.7 MBytes  124 Mbits/sec
[ 4] 27.00-28.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 28.00-29.00   sec  14.7 MBytes  123 Mbits/sec
[ 4] 29.00-30.00   sec  14.7 MBytes  124 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender
[ 4]  0.00-30.00   sec  444 MBytes  124 Mbits/sec    0
[ 4]  0.00-30.00   sec  443 MBytes  124 Mbits/sec
CPU Utilization: local/receiver 6.2% (2.1%u/4.0%S), remote/sender 0.1% (0.0%u/0.1%S)
```

Utilized TCP Bandwidth: **124 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.14 RTT = 13 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=13ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=13ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=13ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=13ms TTL=64
```

```
iperf3 -c 192.168.178.61 -t 30 -P 4
[ 4] local 192.168.178.72 port 51372 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  1.00-2.00    sec    13.7 MBytes    114 Mbits/sec
[ 4]  2.00-3.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  3.00-4.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  4.00-5.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  5.00-6.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  6.00-7.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  7.00-8.00    sec    13.6 MBytes    114 Mbits/sec
[ 4]  8.00-9.00    sec    13.7 MBytes    115 Mbits/sec
[ 4]  9.00-10.00   sec    13.7 MBytes    114 Mbits/sec
[ 4] 10.00-11.00   sec    13.7 MBytes    115 Mbits/sec
[ 4] 11.00-12.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 12.00-13.00   sec    13.7 MBytes    115 Mbits/sec
[ 4] 13.00-14.00   sec    13.7 MBytes    115 Mbits/sec
[ 4] 14.00-15.00   sec    13.7 MBytes    115 Mbits/sec
[ 4] 15.00-16.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 16.00-17.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 17.00-18.00   sec    13.6 MBytes    115 Mbits/sec
[ 4] 18.00-19.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 19.00-20.00   sec    13.7 MBytes    114 Mbits/sec
[ 4] 20.00-21.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 21.00-22.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 22.00-23.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 23.00-24.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 24.00-25.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 25.00-26.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 26.00-27.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 27.00-28.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 28.00-29.00   sec    13.6 MBytes    114 Mbits/sec
[ 4] 29.00-30.00   sec    13.7 MBytes    114 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec    411 MBytes    115 Mbits/sec      0
[ 4]  0.00-30.00   sec    409 MBytes    114 Mbits/sec
CPU Utilization: local/receiver 5.8% (2.5%/3.3%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **115 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.15 RTT = 14 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=14ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=14ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=14ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=14ms TTL=64
```

```
[ 4] local 192.168.178.72 port 51445 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  12.9 MBytes  108 Mbits/sec
[ 4]  1.00-2.00    sec  12.7 MBytes  106 Mbits/sec
[ 4]  2.00-3.00    sec  12.7 MBytes  107 Mbits/sec
[ 4]  3.00-4.00    sec  12.8 MBytes  108 Mbits/sec
[ 4]  4.00-5.00    sec  12.7 MBytes  107 Mbits/sec
[ 4]  5.00-6.00    sec  12.7 MBytes  107 Mbits/sec
[ 4]  6.00-7.00    sec  12.7 MBytes  106 Mbits/sec
[ 4]  7.00-8.00    sec  12.7 MBytes  107 Mbits/sec
[ 4]  8.00-9.00    sec  12.7 MBytes  107 Mbits/sec
[ 4]  9.00-10.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 10.00-11.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 11.00-12.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 12.00-13.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 13.00-14.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 14.00-15.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 15.00-16.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 16.00-17.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 17.00-18.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 18.00-19.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 19.00-20.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 20.00-21.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 21.00-22.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 22.00-23.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 23.00-24.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 24.00-25.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 25.00-26.00   sec  12.6 MBytes  106 Mbits/sec
[ 4] 26.00-27.00   sec  12.7 MBytes  107 Mbits/sec
[ 4] 27.00-28.01   sec  12.7 MBytes  106 Mbits/sec
[ 4] 28.01-29.00   sec  12.7 MBytes  106 Mbits/sec
[ 4] 29.00-30.00   sec  12.7 MBytes  106 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  383 MBytes  107 Mbits/sec    0
[ 4]  0.00-30.00   sec  382 MBytes  107 Mbits/sec
CPU Utilization: local/receiver 4.5% (1.7%/2.7%), Remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: 107 Mbit/s of 1000 Mbit/s

4.0 LAB Network Condition

4.6.16 RTT = 15 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=15ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=15ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=15ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=15ms TTL=64
```

```

TCP 5200 (default)
[ 4] local 192.168.178.72 port 52542 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  11.7 MBytes  98.2 Mbits/sec
[ 4]  1.00-2.00    sec  11.9 MBytes  100 Mbits/sec
[ 4]  2.00-3.00    sec  11.8 MBytes  98.8 Mbits/sec
[ 4]  3.00-4.01    sec  11.7 MBytes  97.4 Mbits/sec
[ 4]  4.01-5.00    sec  11.6 MBytes  97.4 Mbits/sec
[ 4]  5.00-6.00    sec  11.6 MBytes  97.4 Mbits/sec
[ 4]  6.00-7.01    sec  11.8 MBytes  98.8 Mbits/sec
[ 4]  7.01-8.00    sec  11.6 MBytes  97.6 Mbits/sec
[ 4]  8.00-9.00    sec  12.0 MBytes  100 Mbits/sec
[ 4]  9.00-10.00   sec  11.7 MBytes  98.2 Mbits/sec
[ 4] 10.00-11.00   sec  11.8 MBytes  98.8 Mbits/sec
[ 4] 11.00-12.00   sec  11.6 MBytes  96.9 Mbits/sec
[ 4] 12.00-13.00   sec  11.9 MBytes  99.8 Mbits/sec
[ 4] 13.00-14.00   sec  11.6 MBytes  97.4 Mbits/sec
[ 4] 14.00-15.00   sec  11.8 MBytes  98.9 Mbits/sec
[ 4] 15.00-16.00   sec  11.6 MBytes  97.3 Mbits/sec
[ 4] 16.00-17.00   sec  11.8 MBytes  99.3 Mbits/sec
[ 4] 17.00-18.00   sec  11.7 MBytes  97.9 Mbits/sec
[ 4] 18.00-19.00   sec  11.8 MBytes  99.0 Mbits/sec
[ 4] 19.00-20.00   sec  11.4 MBytes  95.6 Mbits/sec
[ 4] 20.00-21.00   sec  11.9 MBytes  99.5 Mbits/sec
[ 4] 21.00-22.00   sec  11.9 MBytes  99.7 Mbits/sec
[ 4] 22.00-23.00   sec  11.9 MBytes  100 Mbits/sec
[ 4] 23.00-24.00   sec  11.8 MBytes  98.5 Mbits/sec
[ 4] 24.00-25.00   sec  12.0 MBytes  101 Mbits/sec
[ 4] 25.00-26.00   sec  11.9 MBytes  99.6 Mbits/sec
[ 4] 26.00-27.00   sec  11.6 MBytes  96.9 Mbits/sec
[ 4] 27.00-28.00   sec  11.7 MBytes  98.4 Mbits/sec
[ 4] 28.00-29.01   sec  11.8 MBytes  98.5 Mbits/sec
[ 4] 29.01-30.02   sec  12.1 MBytes  100 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.02   sec   355 MBytes  99.2 Mbits/sec      0
[ 4]  0.00-30.02   sec   353 MBytes  98.6 Mbits/sec
CPU Utilization: local/receiver 4.3% (2.1%u/2.3%S), remote/sender 0.1% (0.0%u/0.1%S)

```

Utilized TCP Bandwidth: 100 Mbit/s of 1000 Mbit/s

4.0 LAB Network Condition

4.6.17 RTT = 16 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=16ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=16ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=16ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=16ms TTL=64
```

```
[ 4] local 192.168.178.72 port 52624 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.01    sec  11.1 MBytes  92.0 Mbits/sec
[ 4]  1.01-2.00    sec  11.2 MBytes  95.2 Mbits/sec
[ 4]  2.00-3.00    sec  11.2 MBytes  94.5 Mbits/sec
[ 4]  3.00-4.00    sec  11.2 MBytes  93.8 Mbits/sec
[ 4]  4.00-5.00    sec  11.2 MBytes  93.4 Mbits/sec
[ 4]  5.00-6.00    sec  11.1 MBytes  93.2 Mbits/sec
[ 4]  6.00-7.00    sec  11.3 MBytes  94.8 Mbits/sec
[ 4]  7.00-8.00    sec  11.1 MBytes  93.1 Mbits/sec
[ 4]  8.00-9.01    sec  10.9 MBytes  90.6 Mbits/sec
[ 4]  9.01-10.00   sec  11.2 MBytes  94.9 Mbits/sec
[ 4] 10.00-11.00   sec  11.5 MBytes  96.2 Mbits/sec
[ 4] 11.00-12.00   sec  10.8 MBytes  91.3 Mbits/sec
[ 4] 12.00-13.00   sec  11.1 MBytes  92.9 Mbits/sec
[ 4] 13.00-14.00   sec  11.1 MBytes  93.1 Mbits/sec
[ 4] 14.00-15.01   sec  11.1 MBytes  93.0 Mbits/sec
[ 4] 15.01-16.00   sec  11.0 MBytes  92.5 Mbits/sec
[ 4] 16.00-17.01   sec  11.1 MBytes  92.5 Mbits/sec
[ 4] 17.01-18.00   sec  11.2 MBytes  94.8 Mbits/sec
[ 4] 18.00-19.00   sec  11.2 MBytes  94.2 Mbits/sec
[ 4] 19.00-20.01   sec  11.3 MBytes  93.9 Mbits/sec
[ 4] 20.01-21.00   sec  10.8 MBytes  90.7 Mbits/sec
[ 4] 21.00-22.01   sec  11.2 MBytes  93.2 Mbits/sec
[ 4] 22.01-23.00   sec  11.2 MBytes  94.7 Mbits/sec
[ 4] 23.00-24.00   sec  11.0 MBytes  92.7 Mbits/sec
[ 4] 24.00-25.00   sec  11.4 MBytes  95.4 Mbits/sec
[ 4] 25.00-26.00   sec  11.4 MBytes  95.4 Mbits/sec
[ 4] 26.00-27.00   sec  11.3 MBytes  94.7 Mbits/sec
[ 4] 27.00-28.00   sec  11.4 MBytes  95.4 Mbits/sec
[ 4] 28.00-29.00   sec  11.0 MBytes  92.4 Mbits/sec
[ 4] 29.00-30.00   sec  11.2 MBytes  93.4 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.00   sec  337 MBytes  94.2 Mbits/sec      0
[ 4]  0.00-30.00   sec  335 MBytes  93.7 Mbits/sec
CPU Utilization: local/receiver 6.0% (2.4%u/3.6%S); remote/sender 0.1% (0.0%u/0.1%S)
```

Utilized TCP Bandwidth: **94 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.18 RTT = 17 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=17ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=17ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=17ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=17ms TTL=64
```

```
[ 4] local 192.168.178.72 port 52705 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  10.5 MBytes  88.2 Mb/s
[ 4]  1.00-2.00    sec  11.1 MBytes  92.5 Mb/s
[ 4]  2.00-3.00    sec  10.7 MBytes  89.9 Mb/s
[ 4]  3.00-4.01    sec  10.5 MBytes  87.5 Mb/s
[ 4]  4.01-5.01    sec  10.6 MBytes  88.7 Mb/s
[ 4]  5.01-6.00    sec  10.4 MBytes  87.9 Mb/s
[ 4]  6.00-7.01    sec  10.7 MBytes  89.4 Mb/s
[ 4]  7.01-8.00    sec  10.3 MBytes  87.2 Mb/s
[ 4]  8.00-9.00    sec  10.6 MBytes  88.9 Mb/s
[ 4]  9.00-10.00   sec  10.5 MBytes  87.8 Mb/s
[ 4] 10.00-11.00   sec  10.9 MBytes  91.0 Mb/s
[ 4] 11.00-12.00   sec  10.8 MBytes  90.5 Mb/s
[ 4] 12.00-13.00   sec  10.4 MBytes  86.8 Mb/s
[ 4] 13.00-14.00   sec  10.3 MBytes  86.1 Mb/s
[ 4] 14.00-15.01   sec  10.5 MBytes  87.7 Mb/s
[ 4] 15.01-16.00   sec  10.2 MBytes  86.3 Mb/s
[ 4] 16.00-17.01   sec  10.4 MBytes  87.2 Mb/s
[ 4] 17.01-18.01   sec  10.4 MBytes  87.1 Mb/s
[ 4] 18.01-19.00   sec  10.6 MBytes  89.7 Mb/s
[ 4] 19.00-20.00   sec  10.4 MBytes  87.1 Mb/s
[ 4] 20.00-21.00   sec  10.6 MBytes  88.5 Mb/s
[ 4] 21.00-22.01   sec  10.6 MBytes  88.5 Mb/s
[ 4] 22.01-23.01   sec  10.5 MBytes  88.0 Mb/s
[ 4] 23.01-24.01   sec  10.4 MBytes  87.7 Mb/s
[ 4] 24.01-25.00   sec  10.2 MBytes  85.6 Mb/s
[ 4] 25.00-26.02   sec  10.6 MBytes  87.5 Mb/s
[ 4] 26.02-27.00   sec  10.6 MBytes  90.2 Mb/s
[ 4] 27.00-28.00   sec  10.6 MBytes  88.6 Mb/s
[ 4] 28.00-29.00   sec  10.2 MBytes  85.4 Mb/s
[ 4] 29.00-30.00   sec  10.6 MBytes  89.3 Mb/s
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  317 MBytes  88.7 Mb/s      0
[ 4]  0.00-30.00   sec  316 MBytes  88.3 Mb/s
CPU Utilization: local/receiver 4.5% (1.7%u/2.7%u), remote/sender 0.1% (0.0%u/0.1%u)
```

Utilized TCP Bandwidth: **89 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.19 RTT = 18 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=18ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=18ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=18ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=18ms TTL=64
```

```
[ 4] local 192.168.178.72 port 53237 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval          Transfer          Bandwidth
[ 4]  0.00-1.00    sec    10.3 MBytes    85.8 Mbits/sec
[ 4]  1.00-2.01    sec     9.99 MBytes    83.6 Mbits/sec
[ 4]  2.01-3.00    sec     9.92 MBytes    83.6 Mbits/sec
[ 4]  3.00-4.00    sec     9.99 MBytes    83.6 Mbits/sec
[ 4]  4.00-5.01    sec     9.99 MBytes    83.6 Mbits/sec
[ 4]  5.01-6.00    sec     9.92 MBytes    83.6 Mbits/sec
[ 4]  6.00-7.00    sec    10.0 MBytes    83.9 Mbits/sec
[ 4]  7.00-8.00    sec     9.91 MBytes    83.2 Mbits/sec
[ 4]  8.00-9.00    sec     9.97 MBytes    83.6 Mbits/sec
[ 4]  9.00-10.00   sec     9.99 MBytes    83.6 Mbits/sec
[ 4] 10.00-11.00   sec     9.97 MBytes    83.9 Mbits/sec
[ 4] 11.00-12.00   sec     9.95 MBytes    83.5 Mbits/sec
[ 4] 12.00-13.00   sec     9.97 MBytes    83.4 Mbits/sec
[ 4] 13.00-14.01   sec     9.98 MBytes    83.6 Mbits/sec
[ 4] 14.01-15.00   sec     9.97 MBytes    84.0 Mbits/sec
[ 4] 15.00-16.00   sec     9.97 MBytes    83.4 Mbits/sec
[ 4] 16.00-17.00   sec     9.95 MBytes    83.6 Mbits/sec
[ 4] 17.00-18.00   sec     9.99 MBytes    83.8 Mbits/sec
[ 4] 18.00-19.00   sec     9.96 MBytes    83.5 Mbits/sec
[ 4] 19.00-20.00   sec     9.95 MBytes    83.3 Mbits/sec
[ 4] 20.00-21.00   sec     9.94 MBytes    83.6 Mbits/sec
[ 4] 21.00-22.00   sec    10.1 MBytes    84.3 Mbits/sec
[ 4] 22.00-23.00   sec     9.96 MBytes    83.7 Mbits/sec
[ 4] 23.00-24.00   sec    10.1 MBytes    84.6 Mbits/sec
[ 4] 24.00-25.00   sec     9.97 MBytes    83.6 Mbits/sec
[ 4] 25.00-26.01   sec    10.1 MBytes    83.9 Mbits/sec
[ 4] 26.01-27.00   sec     9.93 MBytes    83.7 Mbits/sec
[ 4] 27.00-28.00   sec     9.97 MBytes    83.5 Mbits/sec
[ 4] 28.00-29.00   sec    10.0 MBytes    83.7 Mbits/sec
[ 4] 29.00-30.00   sec     9.96 MBytes    83.8 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval          Transfer          Bandwidth          Retr
[ 4]  0.00-30.00   sec    301 MBytes    84.2 Mbits/sec          0
[ 4]  0.00-30.00   sec    300 MBytes    83.8 Mbits/sec
CPU Utilization: local/receiver 4.3% (1.5%/2.8%), remote/sender 0.0% (0.0%/0.0%)
```

Utilized TCP Bandwidth: **84 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.20 RTT = 19 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=19ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=19ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=19ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=19ms TTL=64
```

```
[ 4] local 192.168.178.72 port 53306 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  9.67 MBytes  81.0 Mbits/sec
[ 4]  1.00-2.00    sec  9.52 MBytes  79.7 Mbits/sec
[ 4]  2.00-3.00    sec  9.45 MBytes  79.4 Mbits/sec
[ 4]  3.00-4.01    sec  9.52 MBytes  79.5 Mbits/sec
[ 4]  4.01-5.00    sec  9.43 MBytes  79.5 Mbits/sec
[ 4]  5.00-6.00    sec  9.62 MBytes  80.5 Mbits/sec
[ 4]  6.00-7.00    sec  9.41 MBytes  79.0 Mbits/sec
[ 4]  7.00-8.00    sec  9.52 MBytes  79.8 Mbits/sec
[ 4]  8.00-9.00    sec  9.48 MBytes  79.5 Mbits/sec
[ 4]  9.00-10.00   sec  9.49 MBytes  79.8 Mbits/sec
[ 4] 10.00-11.01   sec  9.51 MBytes  79.5 Mbits/sec
[ 4] 11.01-12.01   sec  9.47 MBytes  79.3 Mbits/sec
[ 4] 12.01-13.00   sec  9.45 MBytes  79.7 Mbits/sec
[ 4] 13.00-14.01   sec  9.56 MBytes  79.9 Mbits/sec
[ 4] 14.01-15.00   sec  9.49 MBytes  79.9 Mbits/sec
[ 4] 15.00-16.00   sec  9.51 MBytes  79.8 Mbits/sec
[ 4] 16.00-17.00   sec  9.47 MBytes  79.4 Mbits/sec
[ 4] 17.00-18.01   sec  9.45 MBytes  79.0 Mbits/sec
[ 4] 18.01-19.00   sec  9.54 MBytes  80.4 Mbits/sec
[ 4] 19.00-20.00   sec  9.40 MBytes  78.8 Mbits/sec
[ 4] 20.00-21.01   sec  9.59 MBytes  80.2 Mbits/sec
[ 4] 21.01-22.00   sec  9.41 MBytes  79.4 Mbits/sec
[ 4] 22.00-23.00   sec  9.43 MBytes  79.2 Mbits/sec
[ 4] 23.00-24.01   sec  9.48 MBytes  79.2 Mbits/sec
[ 4] 24.01-25.01   sec  9.49 MBytes  79.6 Mbits/sec
[ 4] 25.01-26.00   sec  9.49 MBytes  80.1 Mbits/sec
[ 4] 26.00-27.00   sec  9.43 MBytes  79.1 Mbits/sec
[ 4] 27.00-28.01   sec  9.54 MBytes  79.6 Mbits/sec
[ 4] 28.01-29.01   sec  9.51 MBytes  79.9 Mbits/sec
[ 4] 29.01-30.01   sec  9.50 MBytes  79.7 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr      sender receiver
[ 4]  0.00-30.01   sec  287 MBytes  80.2 Mbits/sec      0
[ 4]  0.00-30.01   sec  285 MBytes  79.7 Mbits/sec
CPU Utilization: local/receiver 4.2% (1.0%/2.0%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **80 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.21 RTT = 20 ms

```
Ping wird ausgeführt für 192.168.178.61 mit 32 Bytes Daten:
Antwort von 192.168.178.61: Bytes=32 Zeit=20ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=20ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=20ms TTL=64
Antwort von 192.168.178.61: Bytes=32 Zeit=20ms TTL=64
```

```
[ 4] local 192.168.178.72 port 53366 connected to 192.168.178.61 port 5200
Starting Test: protocol: TCP, 1 streams, 131072 byte blocks, omitting 0 seconds, 30 second test
[ ID] Interval      Transfer      Bandwidth
[ 4]  0.00-1.00    sec  9.11 MBytes  76.3 Mbits/sec
[ 4]  1.00-2.00    sec  8.99 MBytes  75.3 Mbits/sec
[ 4]  2.00-3.00    sec  9.00 MBytes  75.5 Mbits/sec
[ 4]  3.00-4.00    sec  9.00 MBytes  75.7 Mbits/sec
[ 4]  4.00-5.01    sec  9.02 MBytes  75.3 Mbits/sec
[ 4]  5.01-6.00    sec  8.97 MBytes  75.5 Mbits/sec
[ 4]  6.00-7.00    sec  8.98 MBytes  75.4 Mbits/sec
[ 4]  7.00-8.00    sec  9.00 MBytes  75.4 Mbits/sec
[ 4]  8.00-9.00    sec  9.01 MBytes  75.5 Mbits/sec
[ 4]  9.00-10.01   sec  9.01 MBytes  75.5 Mbits/sec
[ 4] 10.01-11.00   sec  8.98 MBytes  75.5 Mbits/sec
[ 4] 11.00-12.01   sec  9.00 MBytes  75.3 Mbits/sec
[ 4] 12.01-13.00   sec  9.01 MBytes  75.8 Mbits/sec
[ 4] 13.00-14.00   sec  8.98 MBytes  75.5 Mbits/sec
[ 4] 14.00-15.00   sec  8.97 MBytes  75.3 Mbits/sec
[ 4] 15.00-16.00   sec  9.05 MBytes  75.9 Mbits/sec
[ 4] 16.00-17.00   sec  8.99 MBytes  75.4 Mbits/sec
[ 4] 17.00-18.00   sec  8.98 MBytes  75.4 Mbits/sec
[ 4] 18.00-19.00   sec  9.00 MBytes  75.3 Mbits/sec
[ 4] 19.00-20.00   sec  9.01 MBytes  75.6 Mbits/sec
[ 4] 20.00-21.00   sec  9.03 MBytes  75.7 Mbits/sec
[ 4] 21.00-22.00   sec  9.03 MBytes  76.0 Mbits/sec
[ 4] 22.00-23.00   sec  9.04 MBytes  75.7 Mbits/sec
[ 4] 23.00-24.00   sec  8.99 MBytes  75.4 Mbits/sec
[ 4] 24.00-25.00   sec  8.99 MBytes  75.3 Mbits/sec
[ 4] 25.00-26.01   sec  9.02 MBytes  75.4 Mbits/sec
[ 4] 26.01-27.00   sec  8.96 MBytes  75.6 Mbits/sec
[ 4] 27.00-28.00   sec  8.97 MBytes  75.4 Mbits/sec
[ 4] 28.00-29.00   sec  9.00 MBytes  75.4 Mbits/sec
[ 4] 29.00-30.00   sec  8.97 MBytes  75.3 Mbits/sec
-----
Test Complete. Summary Results:
[ ID] Interval      Transfer      Bandwidth      Retr
[ 4]  0.00-30.00   sec  272 MBytes  76.1 Mbits/sec    0
[ 4]  0.00-30.00   sec  270 MBytes  75.6 Mbits/sec
CPU Utilization: local/receiver 4.9% (1.8%/3.1%), remote/sender 0.1% (0.0%/0.1%)
```

Utilized TCP Bandwidth: **76 Mbit/s of 1000 Mbit/s**

4.0 LAB Network Condition

4.6.22 Benchmark Summary

Latency ms	TCP Bandwidth Utilization of 1 Gbit/s	Utilization %	Loss %
0.01	946.00	94.60%	-5.40%
1.00	838.00	83.80%	-16.20%
2.00	560.00	56.00%	-44.00%
3.00	416.00	41.60%	-58.40%
4.00	331.00	33.10%	-66.90%
5.00	273.00	27.30%	-72.70%
6.00	232.00	23.20%	-76.80%
7.00	204.00	20.40%	-79.60%
8.00	182.00	18.20%	-81.80%
9.00	162.00	16.20%	-83.80%
10.00	146.00	14.60%	-85.40%
11.00	134.00	13.40%	-86.60%
12.00	124.00	12.40%	-87.60%
13.00	115.00	11.50%	-88.50%
14.00	107.00	10.70%	-89.30%
15.00	100.00	10.00%	-90.00%
16.00	94.00	9.40%	-90.60%
17.00	89.00	8.90%	-91.10%
18.00	84.00	8.40%	-91.60%
19.00	80.00	8.00%	-92.00%
20.00	76.00	7.60%	-92.40%

4.0 LAB Network Condition

