

# TCP - UDP

## Portnummern

0 - 1023	Well Known Ports System Ports	Server applications FTP: 20, 21, Telnet: 23, SMTP: 25, DNS: 53, HTTP:80, POP 110
1024 - 49151	Registered Ports User Ports	user processes or applications, clients
49152 - 65535	Dynamic Ports Private Ports	client applications

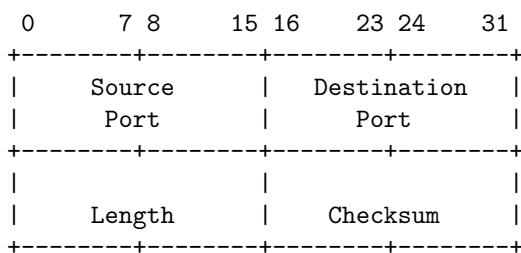
**Offizielle Liste:** [iana.org/assignments/port-numbers](http://iana.org/assignments/port-numbers)

## UDP

- No connection establishment: connectionless
- Applications: DNS(53), TFTP (69), Streaming Video, VoiceOverIP
- wenig Overhead: 8 Byte Header

### UDP-Header

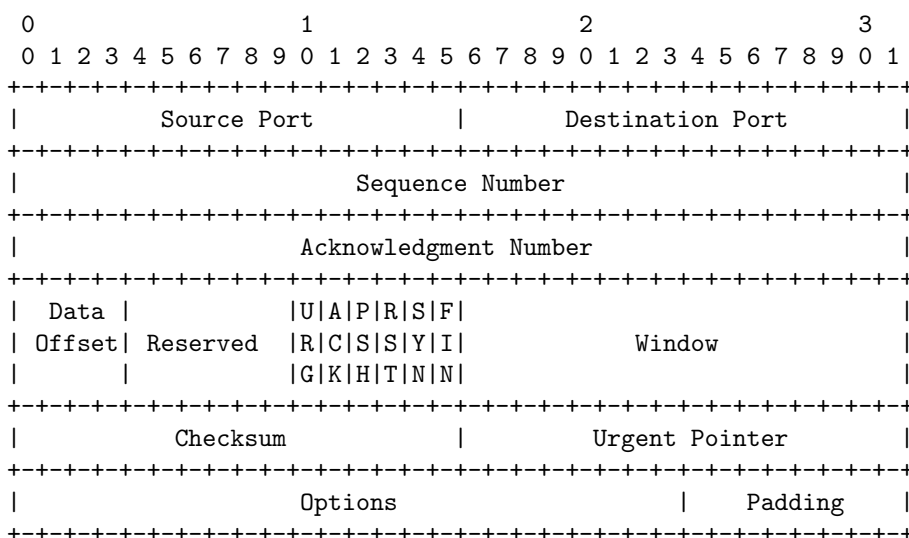
RFC 768



## TCP

### TCP-Header

RFC 793



## Ordered Delivery (Segment Reassembly)

Empfänger ordnet Segmente anhand der Sequence-Number

## Reliability (Zuverlässigkeit)

(Zuverlässigkeit): acknowledgements (receiver), timer + retransmission (sender)

```

Sender                                     Empfänger
----- Daten 1 ----->
----- Daten 2 ----->
----- Daten 3 ----->
<----- ACK 4 -----
----- Daten 4 ----->
----- Daten 5 ----->
----- Daten 6 ----->
Timer starten <----- ACK 7 -----
----- Daten 8 ----->
----- Daten 9 ----->
----- Daten 10 ----->
                <-X-X- ACK 11 -X-X-   kommt nicht an
Timer abgelaufen
----- Daten 8 ----->
----- Daten 9 ----->
----- Daten 10 ----->
<----- ACK 11 -----

```

## Connection Establishment (Three-Way-Handshake)

Connection-oriented: Verbindungsaufbau: Austausch der initial sequence number

```

Client                                     Server
---- SYN, Seq = 23 ----->
<--- SYN, ACK, Seq = 98, Acknr = 24 ---
---- ACK, Seq = 24, Acknr = 99 ----->

```

## Flow Control

Flusskontrolle, Stauvermeidung: sliding windows

Window-size: Datenmenge in Byte, die empfangen wird, bevor Acknowledgement geschickt wird

## Error Checking

### Overhead

20 Byte Header, Three-way-handshake, ACK

## Applications

FTP (20, 21), Telnet (23), SMTP (25), DNS(53), HTTP (80)