

## Was geschieht wenn der Befehl ping ausgeführt wird?

```

ktdss05.local:> ping -c 1 ktdss03.local
PING ktdss03.local (10.23.5.3) 56(84) bytes of data.          Daten-Bytes (ICMP + Header = IP)
64 bytes from ktdss03.local (10.23.5.3): icmp_seq=0 ttl=64 time=3.09 ms  Daten + Header = ICMP

--- ktdss03.local ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 3.094/3.094/3.094/0.000 ms, pipe 2
ktdss05.local:>
    
```

1. Der lokale Rechner sendet ein **ICMP Echo (ping) request** an den Zielrechner.
2. Der Zielrechner antwortet mit einem **ICMP Echo (ping) reply** auf die Anfrage.

Die übertragenen Pakete setzen sich wie folgt zusammen:

14 Byte	Ethernet (2*6 Byte MAC +2 Byte Type, z.B. 0x0800 für IP)
20 Byte	IP-Header (60 Bytes bei ping -R)
64 Byte	ICMP (8 Header und 56 Daten Bytes)
<b>98 Byte</b>	<b>Summe</b>

### zu 1.:Echo request

No.	Time	Source	Destination	Protocol	Info
80	27.077753	10.23.5.5	10.23.5.3	ICMP	Echo (ping) request

#### Frame 80 (98 bytes on wire, 98 bytes captured)

```

Arrival Time: Nov 14, 2006 14:08:31.606378000
Time delta from previous packet: 27.077753000 seconds
Time since reference or first frame: 27.077753000 seconds
Frame Number: 80
Packet Length: 98 bytes
Capture Length: 98 bytes
Protocols in frame: eth:ip:icmp:data
Coloring Rule Name: ICMP
Coloring Rule String: icmp
    
```

#### Anfang vom Ethernet (14 Byte)

```

Ethernet II, Src: 3Com_d2:c0:0e (00:04:75:d2:c0:0e), Dst: 3Com_d2:c5:6f (00:04:75:d2:c5:6f)
Destination: 3Com_d2:c5:6f (00:04:75:d2:c5:6f)
Address: 3Com_d2:c5:6f (00:04:75:d2:c5:6f)
.... 0... = Multicast: This is a UNICAST frame
.... 0... = Locally Administrated Address: This is a FACTORY DEFAULT address
Source: 3Com_d2:c0:0e (00:04:75:d2:c0:0e)
Address: 3Com_d2:c0:0e (00:04:75:d2:c0:0e)
.... 0... = Multicast: This is a UNICAST frame
.... 0... = Locally Administrated Address: This is a FACTORY DEFAULT address
Type: IP (0x0800)
    
```

#### Anfang vom IP (20 Byte)

```

Internet Protocol, Src: 10.23.5.5 (10.23.5.5), Dst: 10.23.5.3 (10.23.5.3)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0.. = ECN-Capable Transport (ECT): 0
.... 0.. = ECN-CE: 0
Total Length: 84
Identification: 0x0000 (0)
Flags: 0x04 (Don't Fragment)
Fragment offset: 0
Time to live: 64
Protocol: ICMP (0x01)
Header checksum: 0x1c74 [correct]
Good: True
Bad: False
Source: 10.23.5.5 (10.23.5.5)
Destination: 10.23.5.3 (10.23.5.3)
    
```

Header length: 20 bytes  
 5 \* 32 bit = 160 bit = 20 bytes  
 (ping -R --> 4f --> 15 \* 32 bit = 480 bit = 60 bytes)

#### Anfang vom ICMP 64 Byte

```

Internet Control Message Protocol
Type: 8 (Echo (ping) request)
Code: 0
Checksum: 0xae70 [correct]
Identifier: 0x1552
Sequence number: 0x0000
Data (56 bytes)
    
```

#### Ethernet

0000	00 04 75 d2 c5 6f 00 04 75 d2 c0 0e 08 00	..u..o..u.....	14 Bytes Ethernet-Header
	45 00	E.	
0010	00 54 00 00 40 00 40 01 1c 74 0a 17 05 05 0a 17	.T..@..@..t.....	20 Bytes IP-Header
0020	05 03	..	
	08 00 ae 70 15 52 00 00	...p.R..	8 Bytes ICMP-Header
	cf bf 59 45 17 35	..YE.5	
0030	09 00 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15	.....	56 Bytes Daten
0040	16 17 18 19 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25	..... !"#\$\$%	
0050	26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35	&'()*+,-./012345	
0060	36 37	67	

zu 2.:Echo reply

No.	Time	Source	Destination	Protocol	Info
81	27.077884	10.23.5.3	10.23.5.5	ICMP	Echo (ping) reply

=====  
Frame 81 (98 bytes on wire, 98 bytes captured)

Arrival Time: Nov 14, 2006 14:08:31.606509000  
Time delta from previous packet: 0.000131000 seconds  
Time since reference or first frame: 27.077884000 seconds  
Frame Number: 81  
Packet Length: 98 bytes  
Capture Length: 98 bytes  
Protocols in frame: eth:ip:icmp:data  
Coloring Rule Name: ICMP  
Coloring Rule String: icmp

**Anfang vom Ethernet (14 Byte)**

Ethernet II, Src: 3Com\_d2:c5:6f (00:04:75:d2:c5:6f), Dst: 3Com\_d2:c0:0e (00:04:75:d2:c0:0e)  
**Destination:** 3Com\_d2:c0:0e (00:04:75:d2:c0:0e)  
Address: 3Com\_d2:c0:0e (00:04:75:d2:c0:0e)  
.... 0 = Multicast: This is a UNICAST frame  
.... 0 = Locally Administrated Address: This is a FACTORY DEFAULT address  
**Source:** 3Com\_d2:c5:6f (00:04:75:d2:c5:6f)  
Address: 3Com\_d2:c5:6f (00:04:75:d2:c5:6f)  
.... 0 = Multicast: This is a UNICAST frame  
.... 0 = Locally Administrated Address: This is a FACTORY DEFAULT address  
Type: IP (0x0800)

**Anfang vom IP (20 Byte)**

Internet Protocol, Src: 10.23.5.3 (10.23.5.3), Dst: 10.23.5.5 (10.23.5.5)  
Version: 4  
Header length: 20 bytes  
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)  
0000 00.. = Differentiated Services Codepoint: Default (0x00)  
.... 0 = ECN-Capable Transport (ECT): 0  
.... 0 = ECN-CE: 0  
Total Length: 84  
Identification: 0xb7e5 (47077)  
Flags: 0x00  
Fragment offset: 0  
Time to live: 64  
Protocol: ICMP (0x01)  
Header checksum: 0xa48e [correct]  
Good: True  
Bad : False  
**Source:** 10.23.5.3 (10.23.5.3)  
**Destination:** 10.23.5.5 (10.23.5.5)

Header length: 20 bytes

5 \* 32 bit = 160 bit = 20 bytes  
(ping -R --> 4f --> 15 \* 32 bit = 480 bit = 60 bytes)

**Anfang vom ICMP (64 Byte)**

Internet Control Message Protocol  
Type: 0 (Echo (ping) reply)  
Code: 0  
Checksum: 0xb670 [correct]  
Identifier: 0x1552  
Sequence number: 0x0000  
Data (56 bytes)

0000	00 04 75 d2 c0 0e 00 04 75 d2 c5 6f 08 00	..u.....u..o..	14 Bytes Ethernet-Header
	IP	E.	
0010	00 54 b7 e5 00 00 40 01 a4 8e 0a 17 05 03 0a 17	.T.....@.....	20 Bytes IP-Header
0020	05 05	..	
	ICMP	...p.R..	8 Bytes ICMP-Header
0030	09 00 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15	.....	56 Bytes Daten
0040	16 17 18 19 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25	..... !"#\$\$%	
0050	26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35	&'()*+,-./012345	
0060	36 37	67	