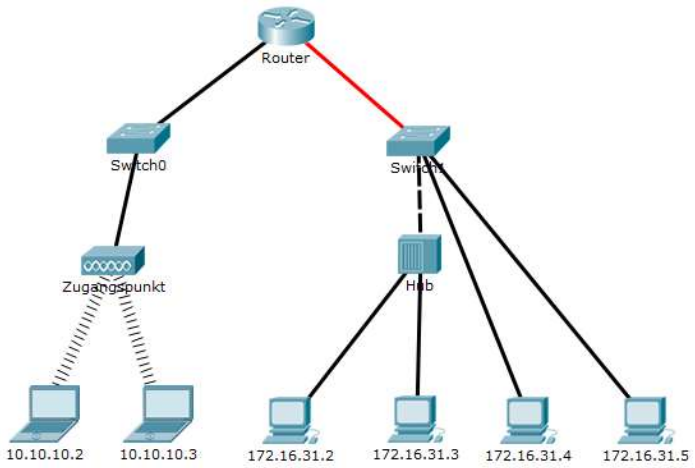
Situation: Gegeben sei folgendes Netzwerk:

Markieren Sie Kollisions- und Broadcast-Domänen mit unterschiedlichen Farben.



Entwicklung der MAC-Address-Table:

Vorbereitung: Leeren der MAC-Address-Table

Schritt 1: Laden und starten Sie die Datei AdressTable.pkt mit dem Packet Tracer.
Schalten Sie in den Simulationsmodus um. Stellen Sie durch geeignete Wahl der Filter sicher, dass nur ICMP- und ARP-PDUs angezeigt werden.

Schritt 2: Inhalt der MAC-Address-Table leeren
Öffnen Sie den CLI des Switch0 und des Switch1. Falls die MAC-Adress-Tabellen einen Inhalt zeigen, so leeren sie diese Tabellen.

Hinweis: Auf der letzten Seite finden Sie einen Auszug aus einem Cisco Configuration Guide.

Schritt 3: Verfolgen der PDUs und des Inhaltes der MAC-Address-Table

Hinweis: Halten Sie vor jeder Teilaufgabe den Inhalt der MAC-Address-Table fest, ohne die Tabelle zu leeren!

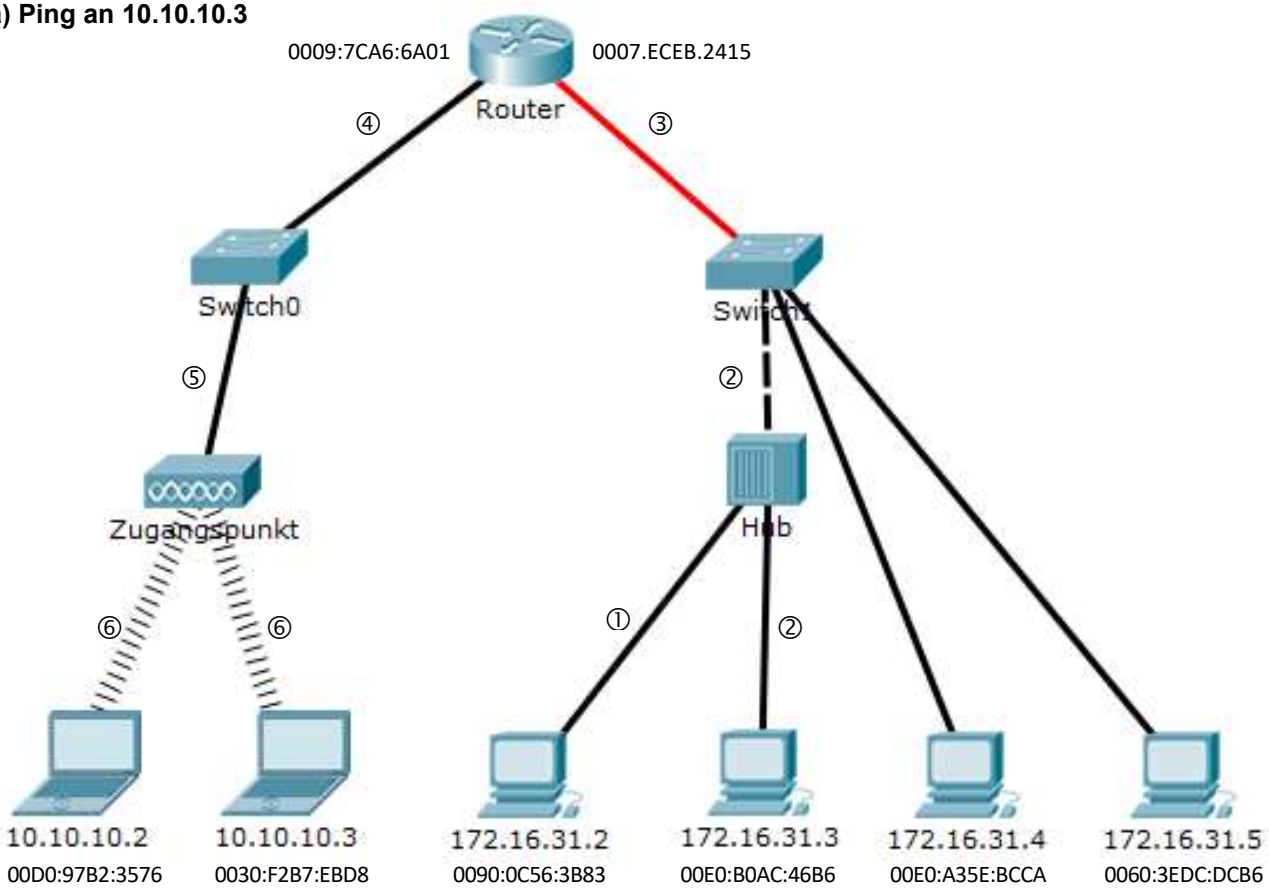
a) Geben Sie an der Station **172.16.31.2** den **ping 10.10.10.3** ein.
Verfolgen Sie die PDUs schrittweise (*Capture / Forward*) . Entnehmen Sie dem *Outbound PDU Layer* jeweils die *Destination MAC Address*, die *Source MAC Address*, die *Source IP Address* und die *Destination IP Address*.
Notieren Sie ebenfalls die Inhalte der *MAC-Adress-Table* und kennzeichnen Sie, wann die Einträge hinzugefügt werden. Notieren Sie ebenfalls, falls auch ARP-PDUs gesandt werden.
Nutzen Sie hierzu die Graphiken und die Tabellen der Innenseiten.

b) Geben Sie an der Station **172.16.31.2** den **ping 172.16.31.5** ein.
Dokumentieren Sie den Verlauf der PDUs wie im Schritt a)

c) Geben Sie an der Station **172.16.31.2** den **ping 10.10.10.2** ein.
Dokumentieren Sie den Verlauf der PDUs wie im Schritt a)

d) Ändern Sie die Konfiguration, so dass der Ping an 10.10.10.2 Erfolg hat.

a) Ping an 10.10.10.3



Address Table Switch 0

VLAN	MAC Address	Type	Port

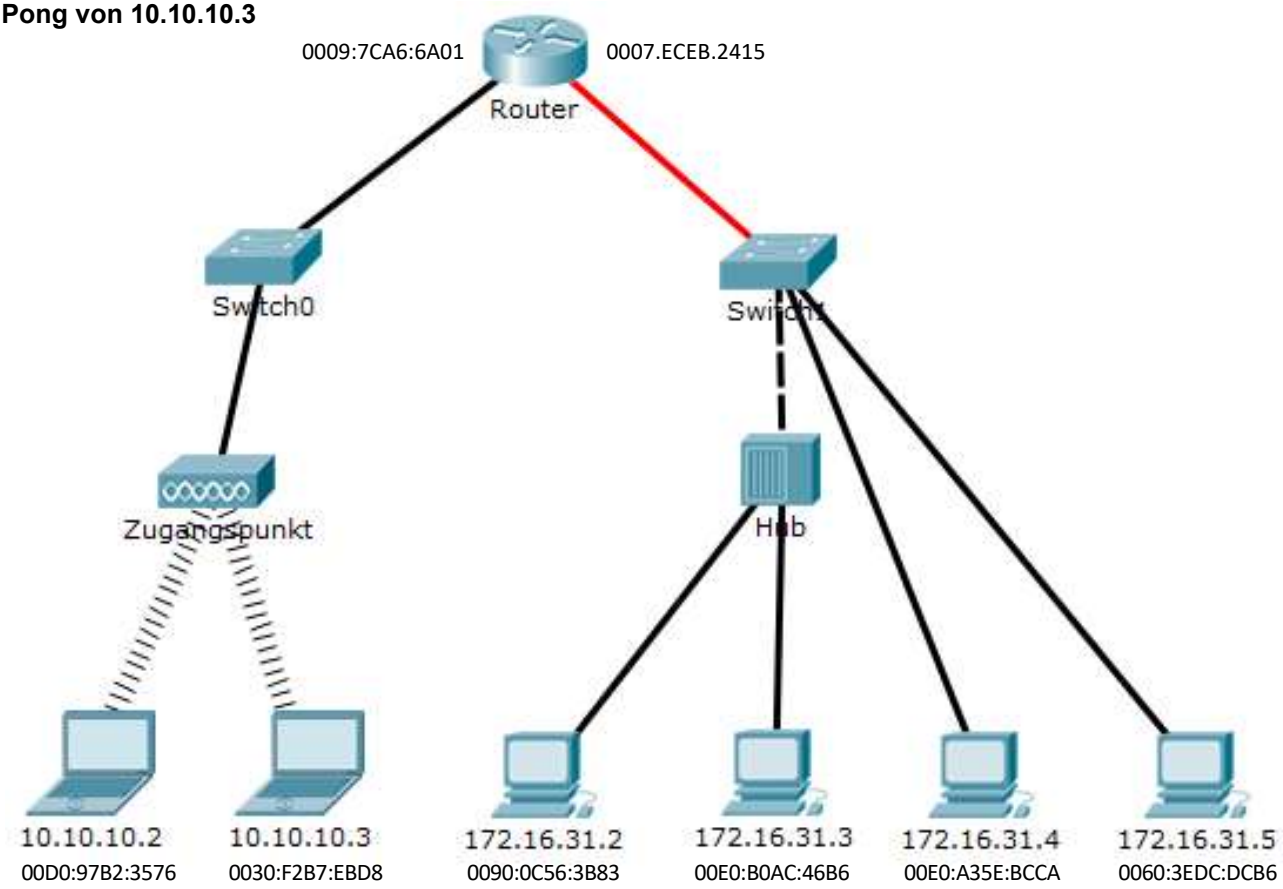
Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

	an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4	
	172.16.31.2					
①	Hub	--	--	--	--	①
②	Switch1			--	--	②
③	Router					③
④	Switch0			--	--	④
⑤	Zugangspunkt	--	--	--	--	⑤
⑥	10.10.10.3					⑥

Pong von 10.10.10.3



Address Table Switch 0

VLAN	MAC Address	Type	Port

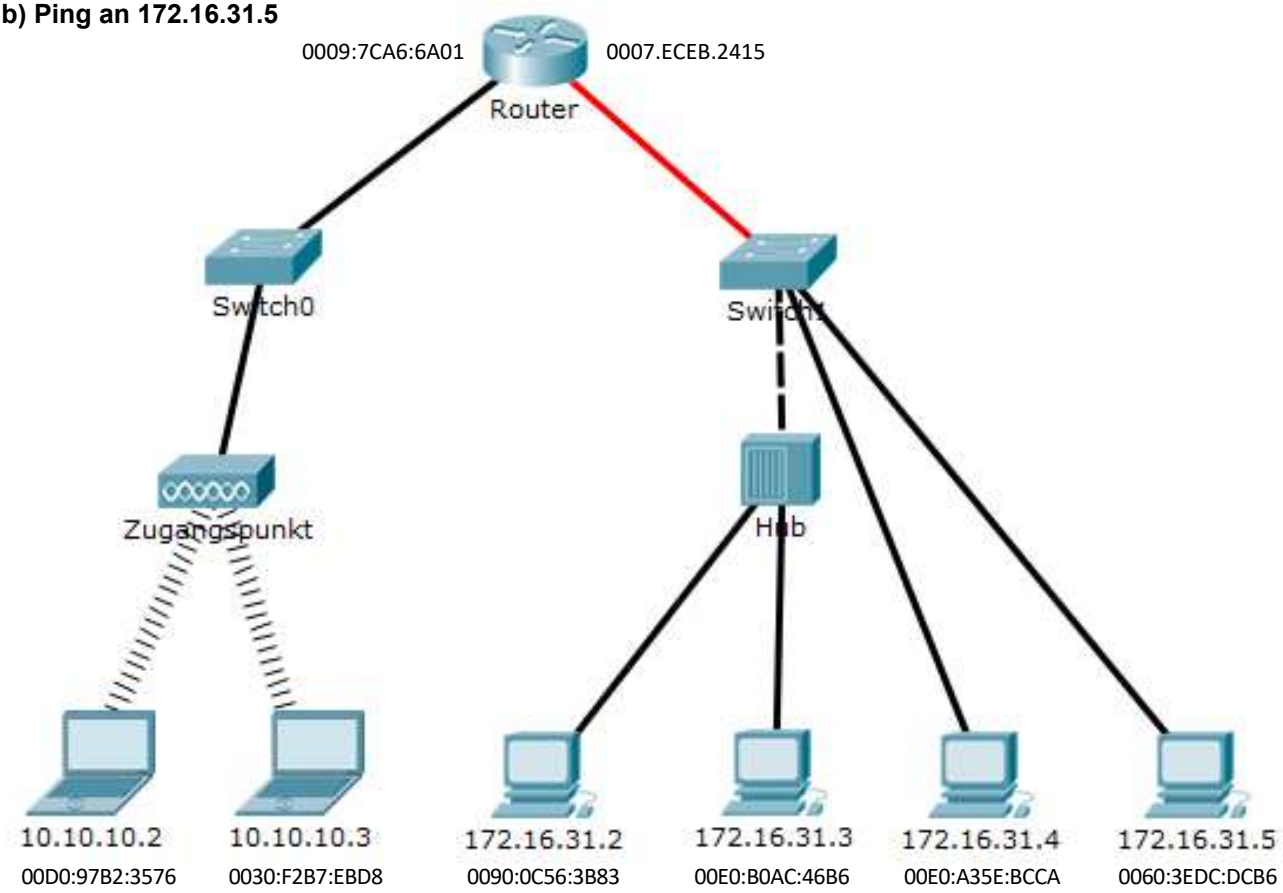
Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4

b) Ping an 172.16.31.5



Address Table Switch 0

VLAN	MAC Address	Type	Port

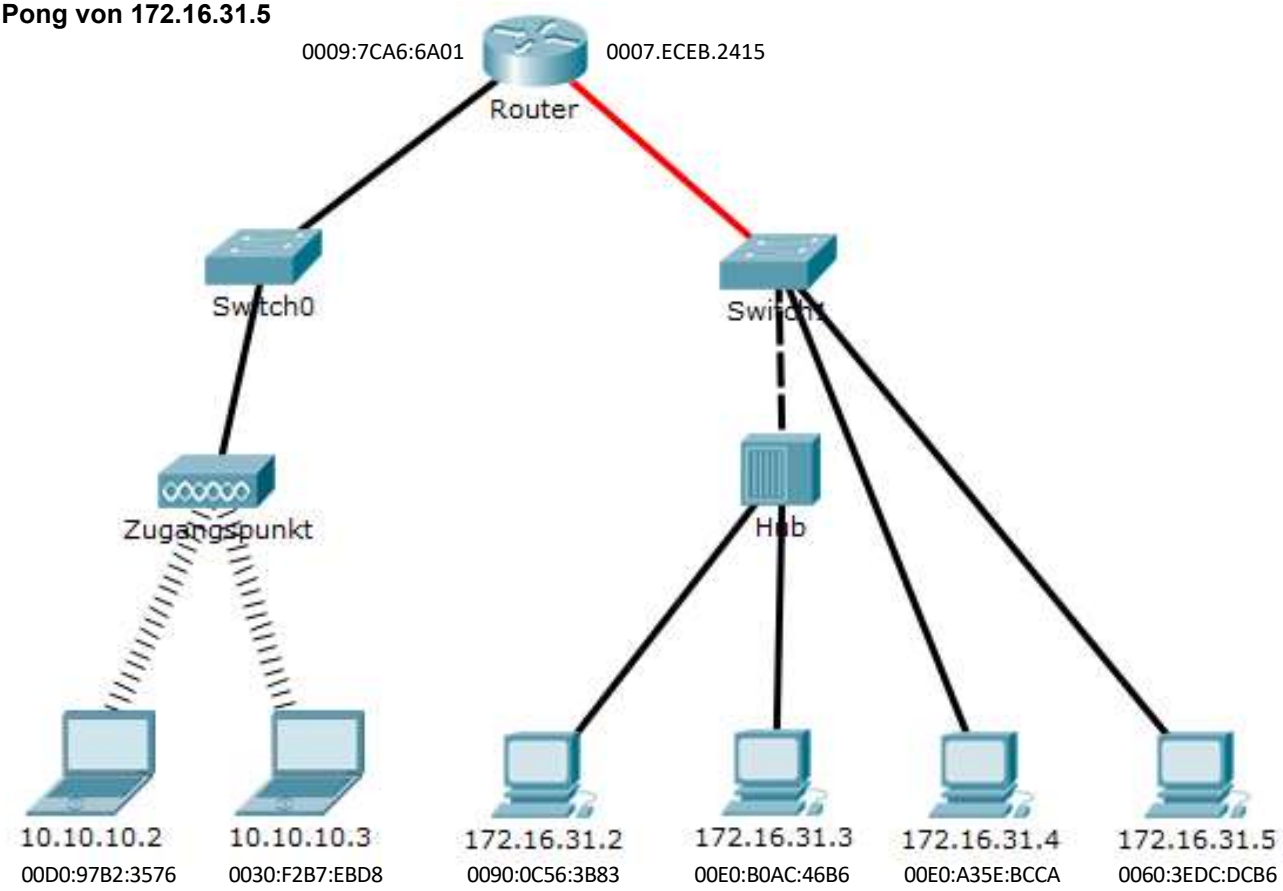
Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4

Pong von 172.16.31.5



Address Table Switch 0

VLAN	MAC Address	Type	Port

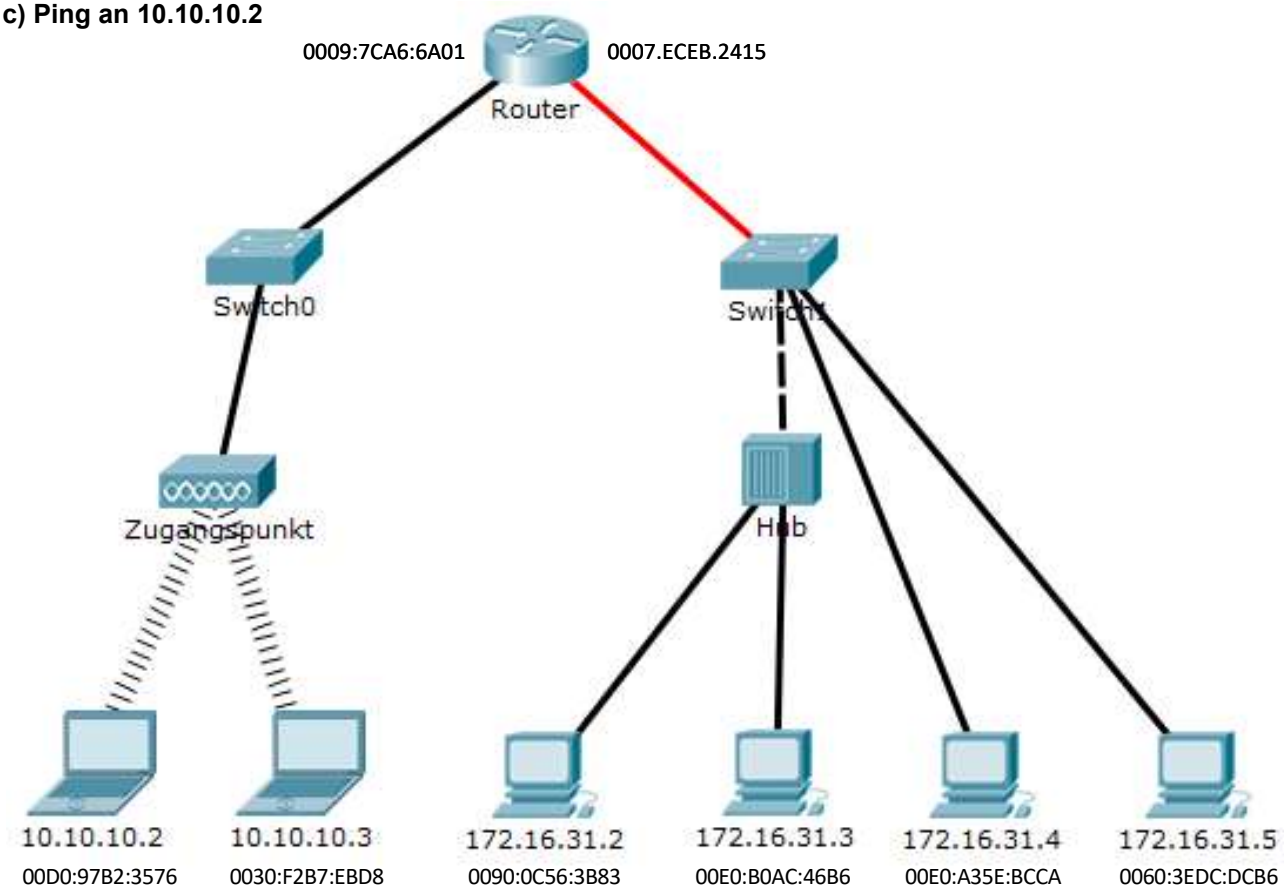
Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4

c) Ping an 10.10.10.2



Address Table Switch 0

VLAN	MAC Address	Type	Port

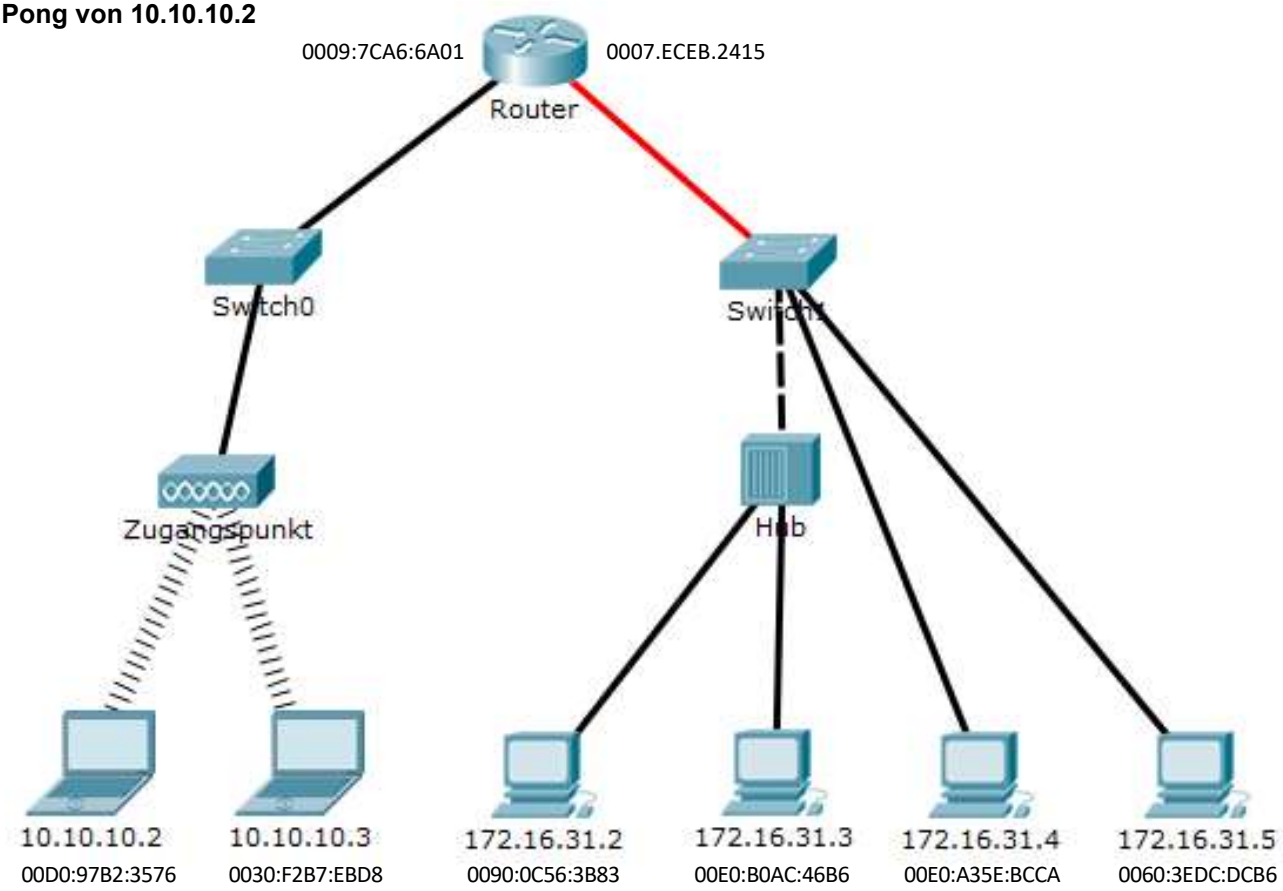
Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4

Pong von 10.10.10.2



Address Table Switch 0

VLAN	MAC Address	Type	Port

Address Table Switch 1

VLAN	MAC Address	Type	Port

ICMP-PDUs

an Gerät	Ziel- MAC	Quell-MAC	Quell-IPv4	Ziel-IPv4

Auszug aus: **Cisco Nexus 5000 Series Switch CLI Software Configuration Guide**

Configuring a Static MAC Address

You can configure MAC addresses for the switch. These addresses are static MAC addresses.

Note You can also configure a static MAC address in interface configuration mode or VLAN configuration mode.

To configure a static MAC address, perform this task:

	Command	Purpose
Step 1	`switch# configure terminal`	Enters configuration mode.
Step 2	`switch(config-)# mac-address-table static` *mac_address* `vlan` *vlan-id* {`drop` | `interface` {*type slot/port*} | `port-channel` *number*} [`auto-learn`]	Specifies a static address to add to the MAC address table. If you enable the **auto-learn** option, the switch will update the entry if the same MAC address is seen on a different port.

This example shows how to put a static entry in the MAC address table:

```
switch# configure terminal
switch(config)# mac-address-table static 12ab.47dd.ff89 vlan 3 interface ethernet 2/1
```

To delete a static MAC address, perform this task:

Command	Purpose
`switch(config-if)# no mac-address-table static` *mac_address* `vlan` *vlan-id*	To delete the static entry from the MAC address table, enter the **no** form of the command.

To configure the aging time for all MAC addresses, perform this task:

	Command	Purpose
Step 1	`switch# configure terminal`	Enters configuration mode.
Step 2	`switch(config)# mac-address-table aging-time` *seconds* [`vlan` *vlan_id*]	Specifies the time before an entry ages out and is discarded from the MAC address table. The range is from 0 to 1000000; the default is 300 seconds. Entering the value 0 disables the MAC aging. If a VLAN is not specified, the aging specification applies to all VLANs.

This example shows how to set the aging time for entries in the MAC address table to 600 seconds (10 minutes):

```
switch# configure terminal
switch(config)# mac-address-table aging-time 600
```

Clearing Dynamic Addresses from the MAC Table

You can clear all dynamic entries in the MAC address table.

To clear the MAC address table, perform this task:

Command	Purpose
`switch(config)# clear mac-address-table dynamic` {`address` *mac_addr*} {`interface` [*type slot/port* | `port-channel` *number*}] {`vlan` *vlan_id*}	Clears the dynamic address entries from the MAC address table.

This example shows how to clear the dynamic entries in the MAC address table:

```
switch# clear mac-address-table dynamic
```

Verifying the MAC Address Configuration

To display MAC address configuration information, perform one of these tasks:

Command	Purpose
`switch# show mac-address-table aging-time`	Displays the MAC address aging time for all VLANS defined in the switch.
`switch# show mac-address-table`	Displays the contents of the MAC address table.

This example shows how to display the MAC address table:

```
switch# show mac-address-table
VLAN      MAC Address       Type    Age       Port
---------+-----------------+-------+---------+------------------------------
1         0018.b967.3cd0    dynamic 10        Eth1/3
1         001c.b05a.5380    dynamic 200       Eth1/3
```