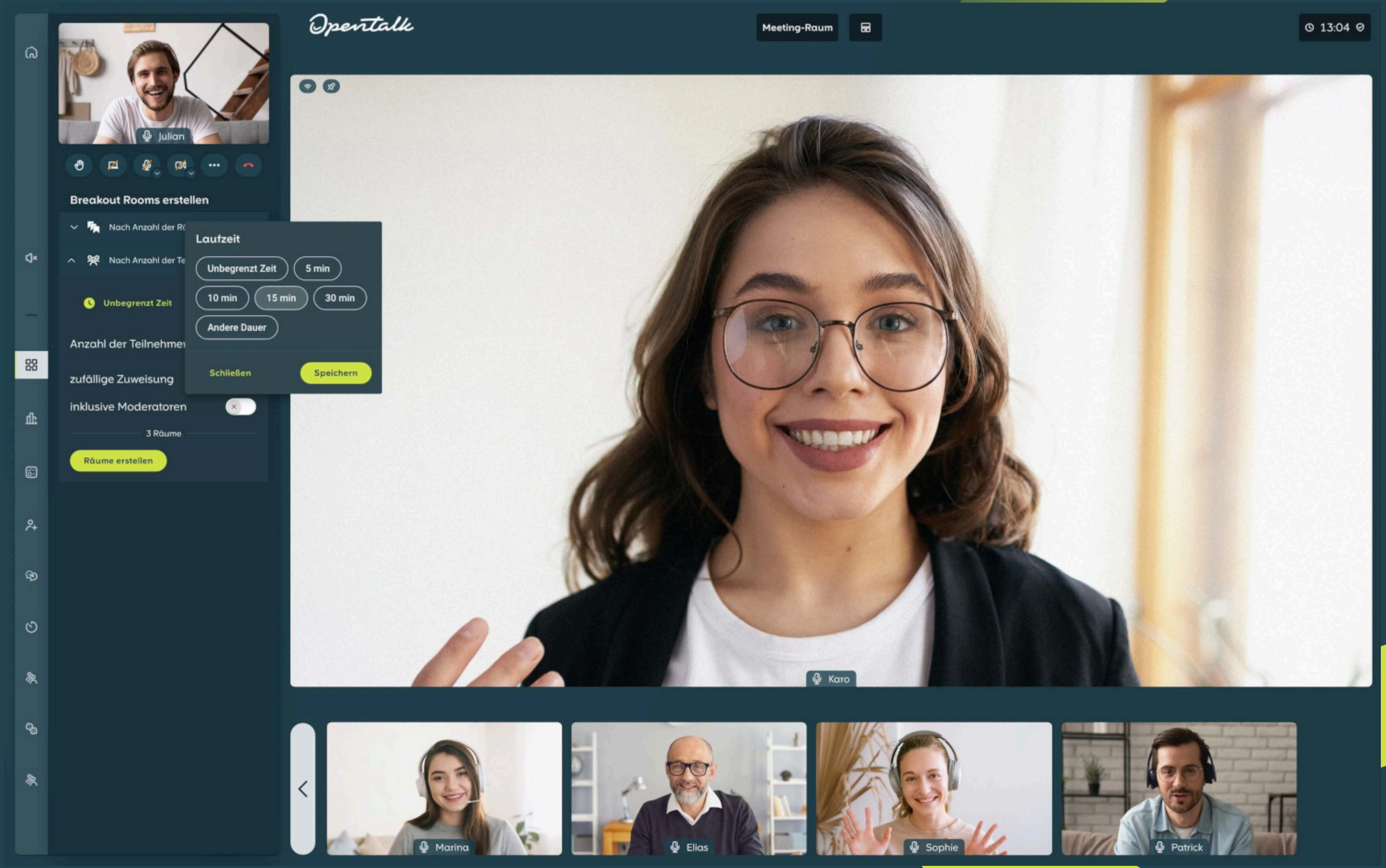
Über Mich

- Daniél Kerkmann
- 30 Jahre alt
- Expert Lead, bei OpenTalk seit knapp zwei Jahren
- Zuständig im Bereich Media
- Eine schreiende Katze
- Ein niedliches Kind (aktueller Stand: Kleinkind (1 1/2 Jahre alt))
- Liebe Anime (aktueller Stand: 618 Anime, 181.3 Tage, 11.113 Episoden)
- Rust Enthusiast

Was ist OpenTalk?



Wie wir mit Cisco "zusammen" arbeiten

Wie arbeitet OpenTalk mit Cisco zusammen?

Ist es sinnvoll Cisco zu unterstützen?

Welche Probleme traten dabei auf?

Sanfter Einstieg, worum geht es genau?

Quelle: https://www.best4systems.de/cisco-8945-ip-telefon-general-uuml-berholt

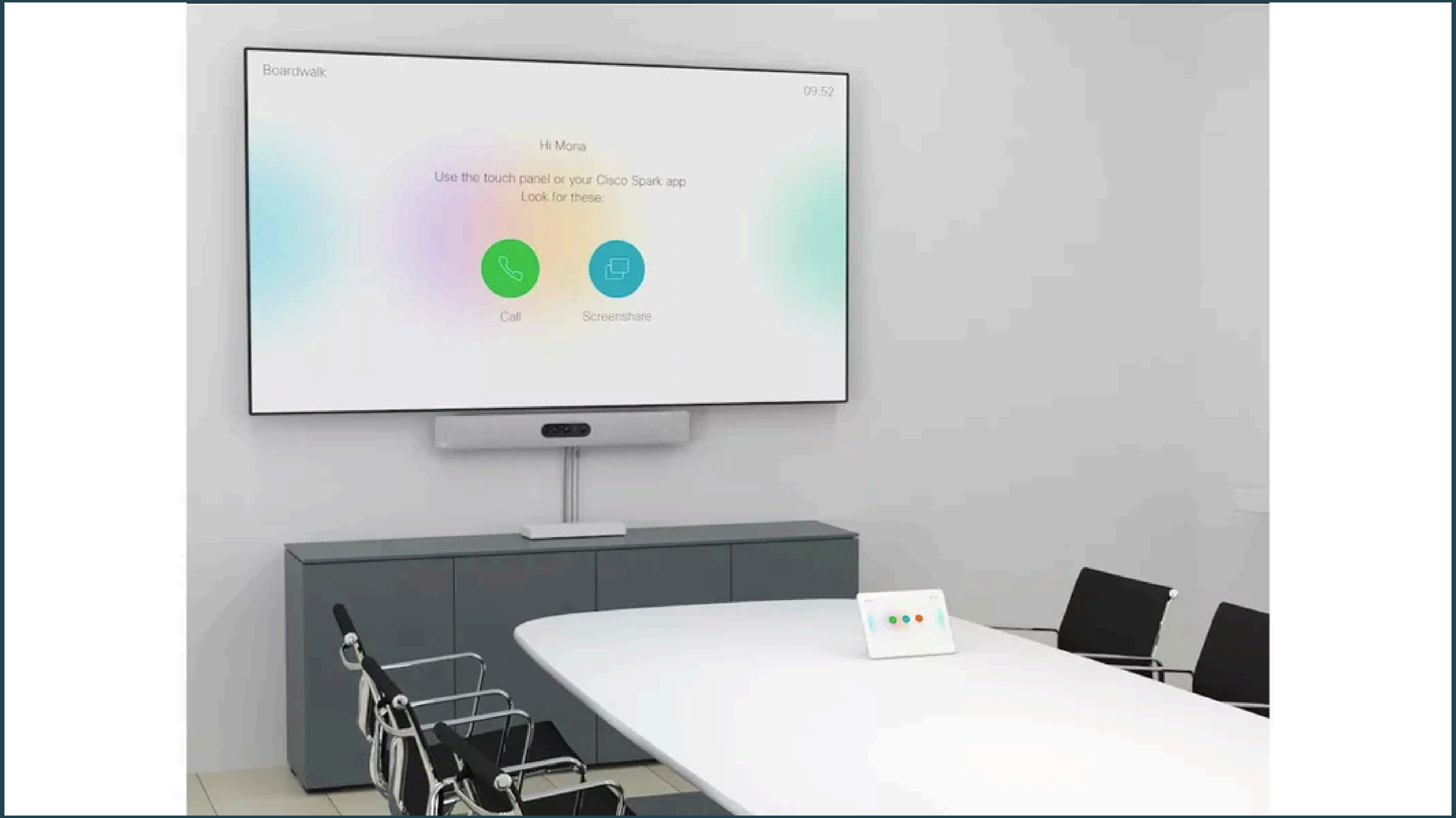
Cisco 8945

- Provisionierung über TFTP
- TFTP? (Trivial File Transfer Protocol) Ö.Ö
- XML über TFTP ausgelierfert anhand der MAC.
-
  - SEP[MAC].cnf.xml

Room Kit

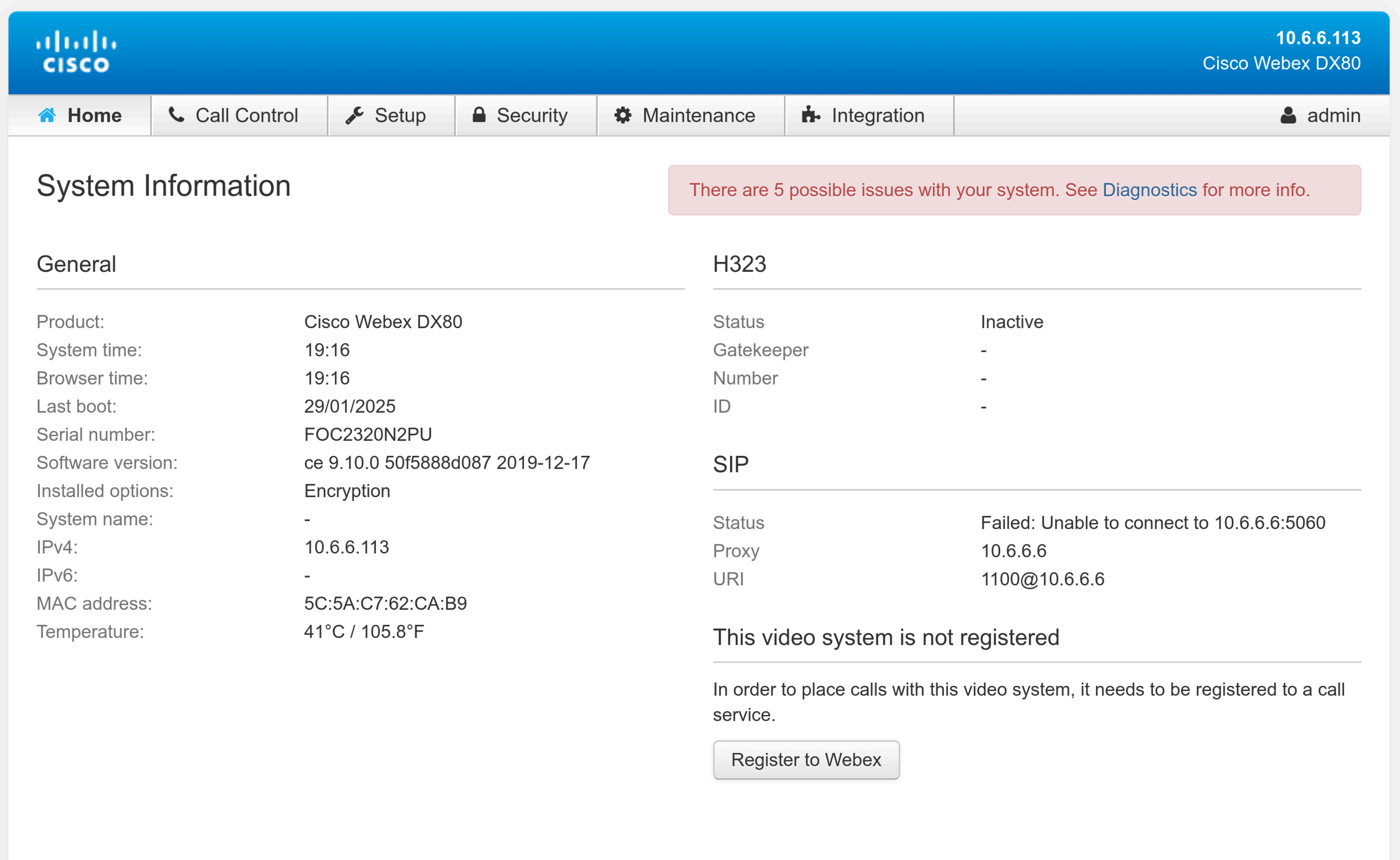
Quelle: https://www.ipphone-warehouse.com/cisco-room-bar-with-room-navigator-for-table-first-light-cs-bar-t-k9/

Room Kit

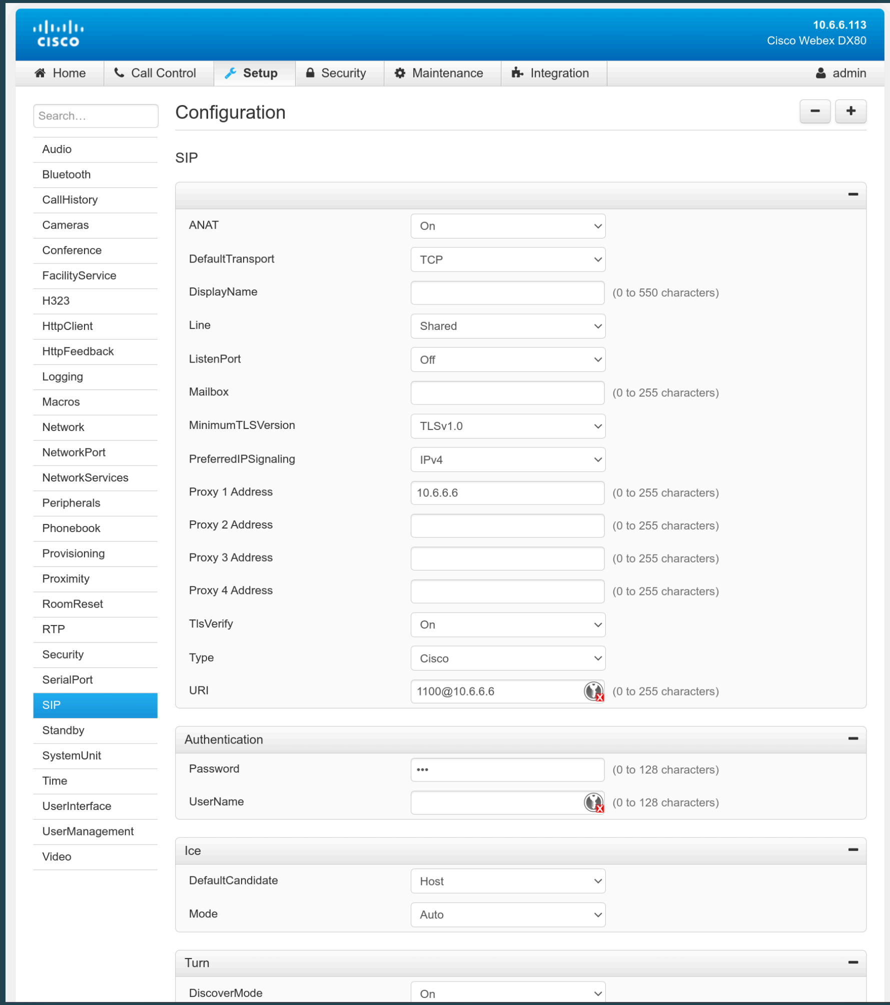


Quelle: https://www.dekom.com/de-de/Raumsysteme/Cisco/Cisco-Room-Kit-Pro

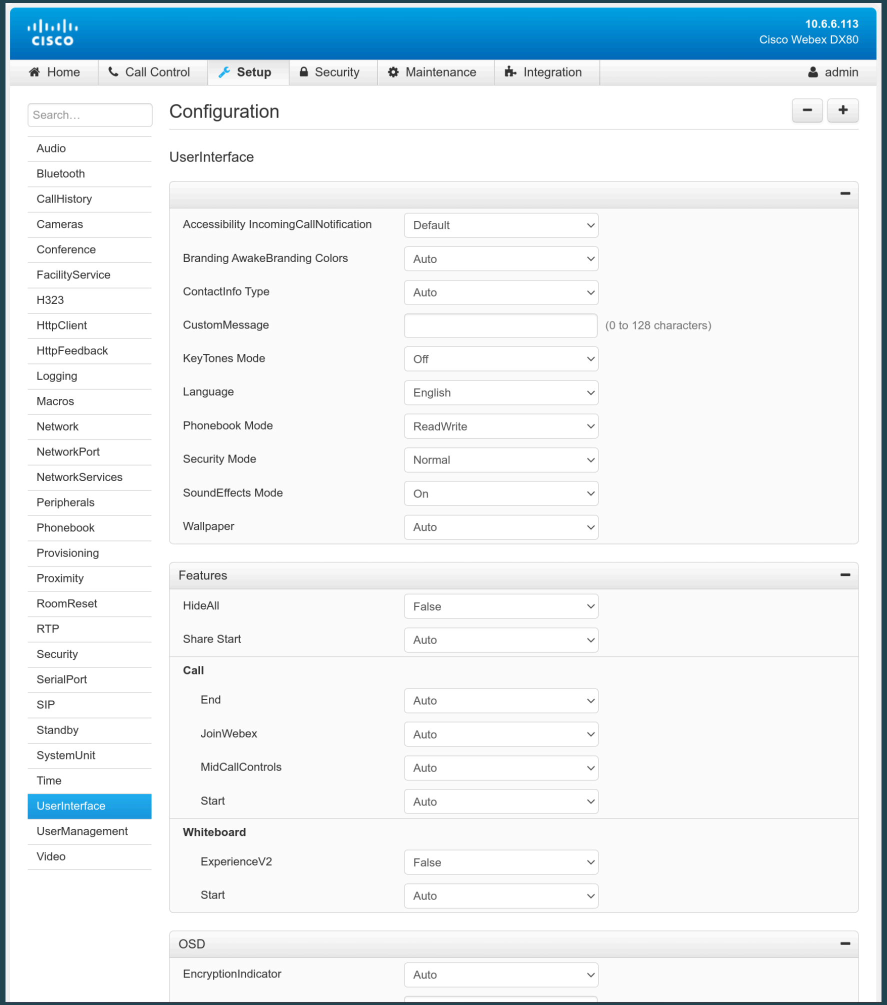
Room Kit - Dashboard



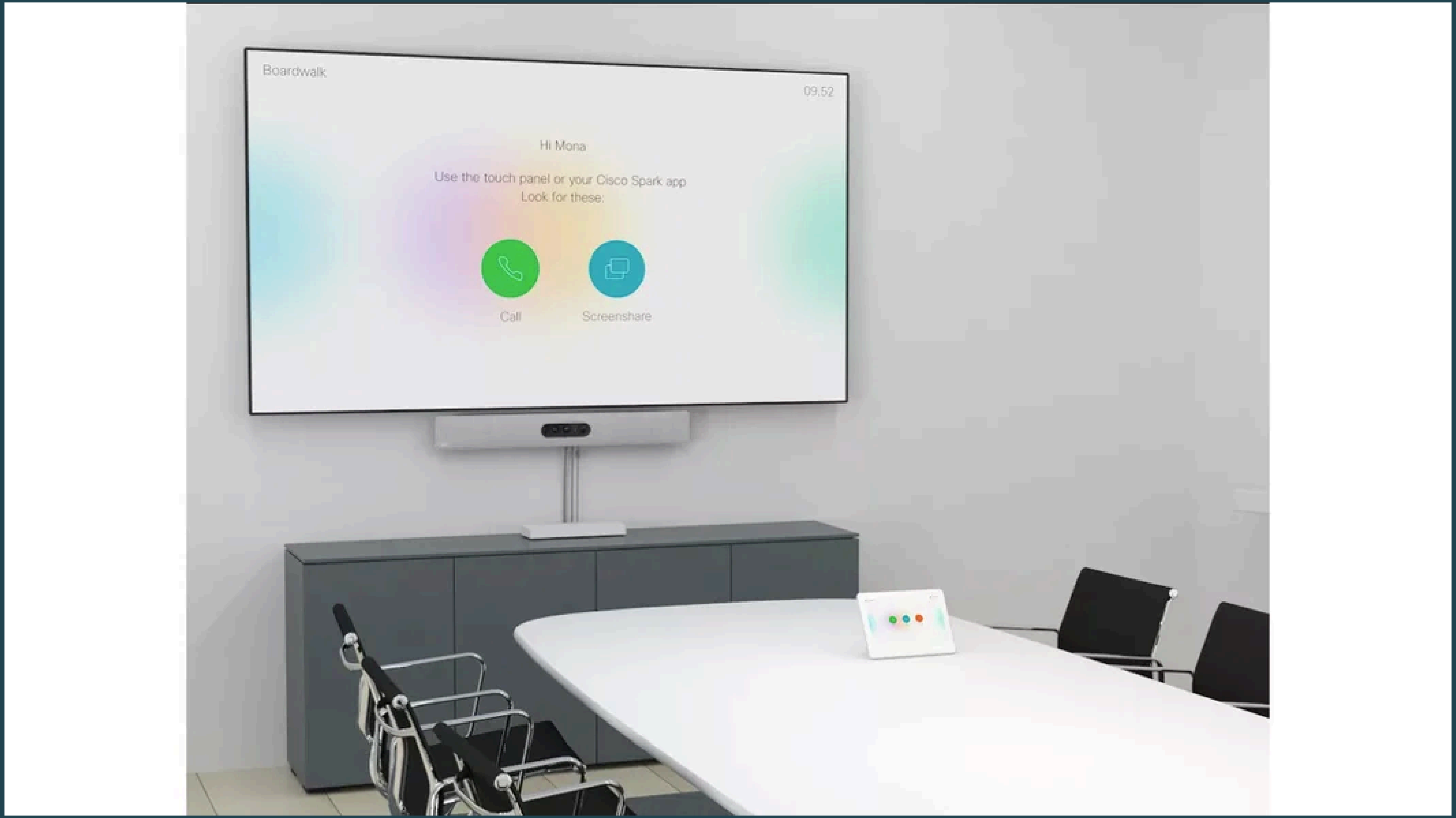
Room Kit - SIP Settings



Room Kit - User Interface



Room Kit - User Interface



Quelle: https://www.dekom.com/de-de/Raumsysteme/Cisco/Cisco-Room-Kit-Pro

Webex DX80

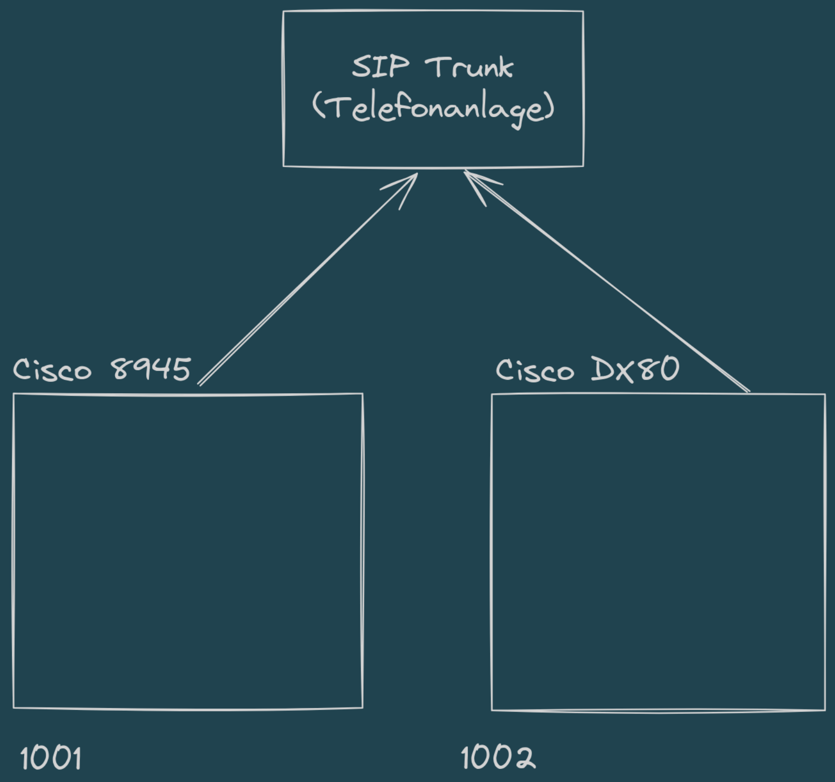
Quelle: https://www.cisco.com/c/de_de/support/collaboration-endpoints/dx80/model.html

Genug Cisco!

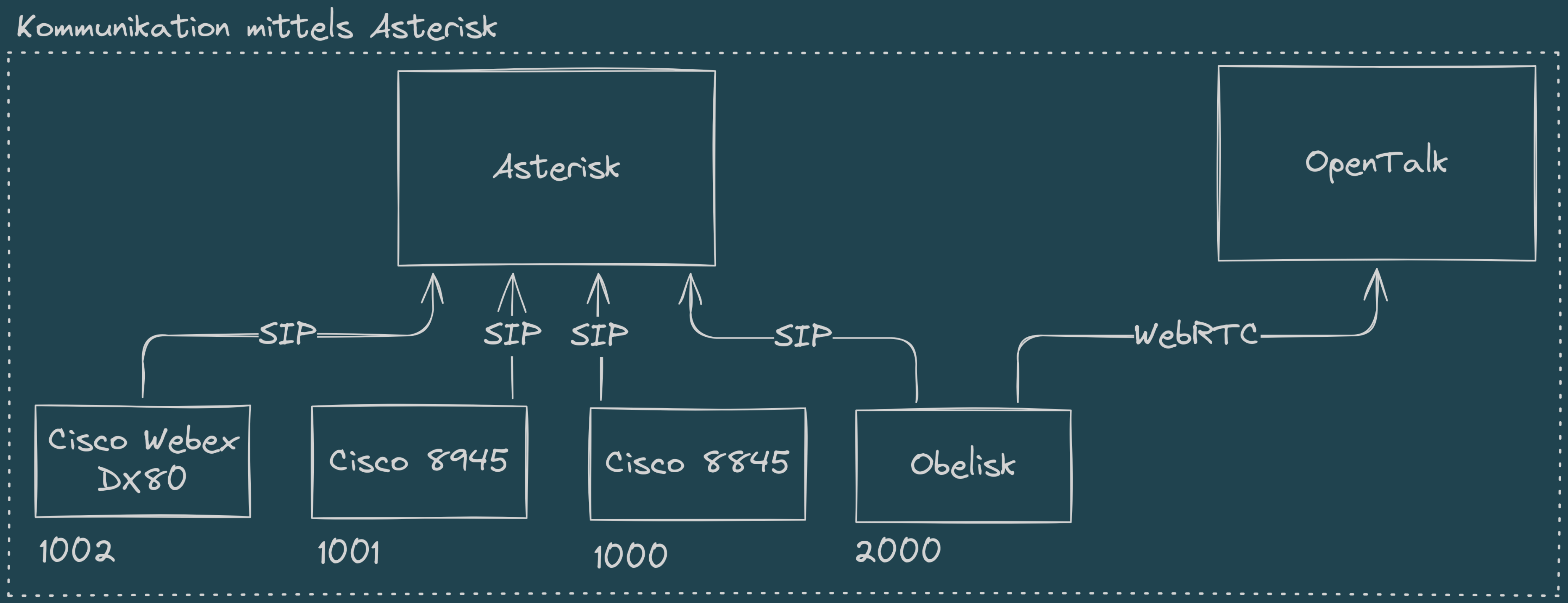
Was ist SIP (Session Initiation Protocol)?

Interne Anrufe

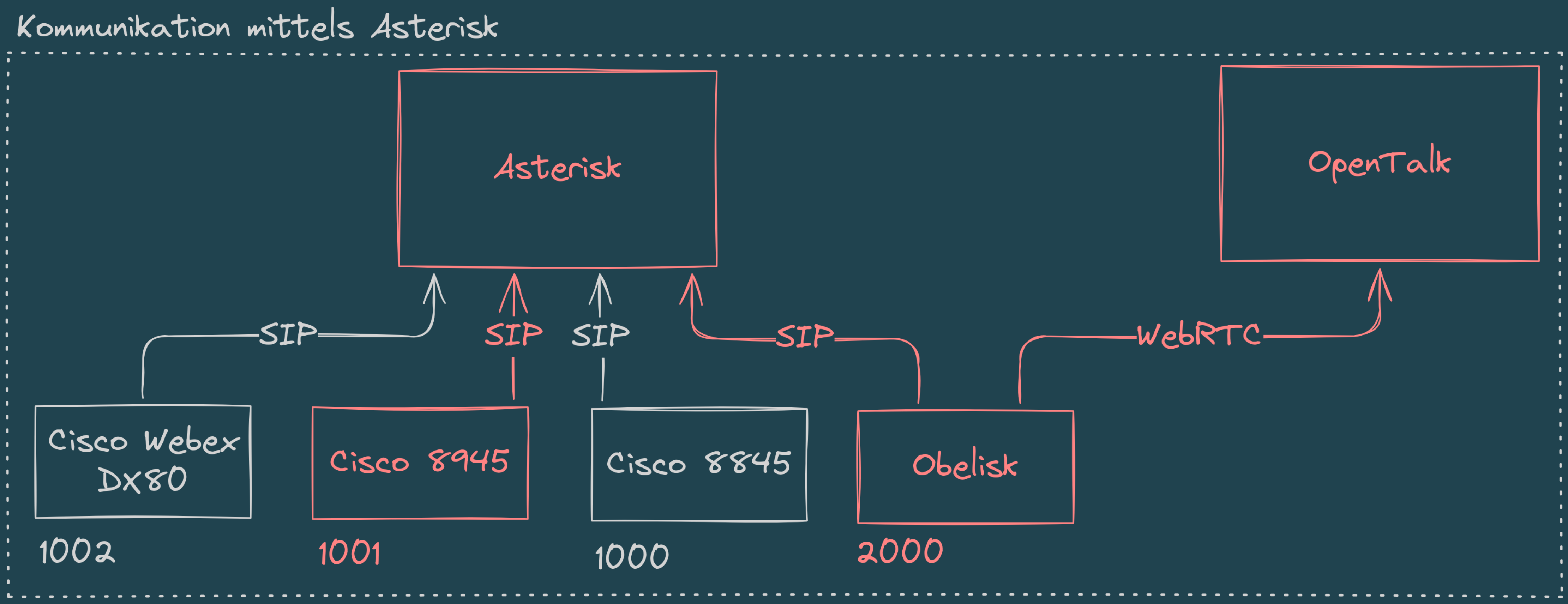
- Cisco 8945: Rufnummer 1001
- Cisco DX80: Rufnummer 1002
- 1001 kann 1002 anrufen (und vice versa)



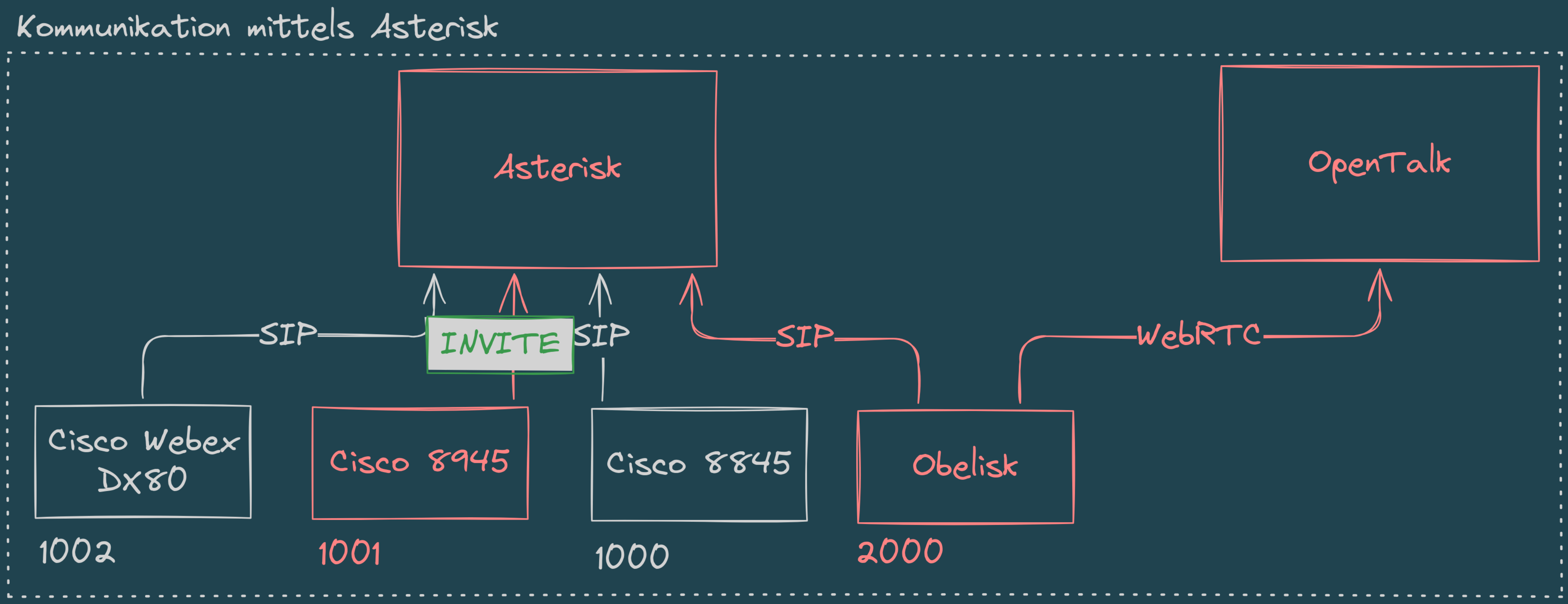
Wie binden wir OpenTalk an die SIP-Welt an?



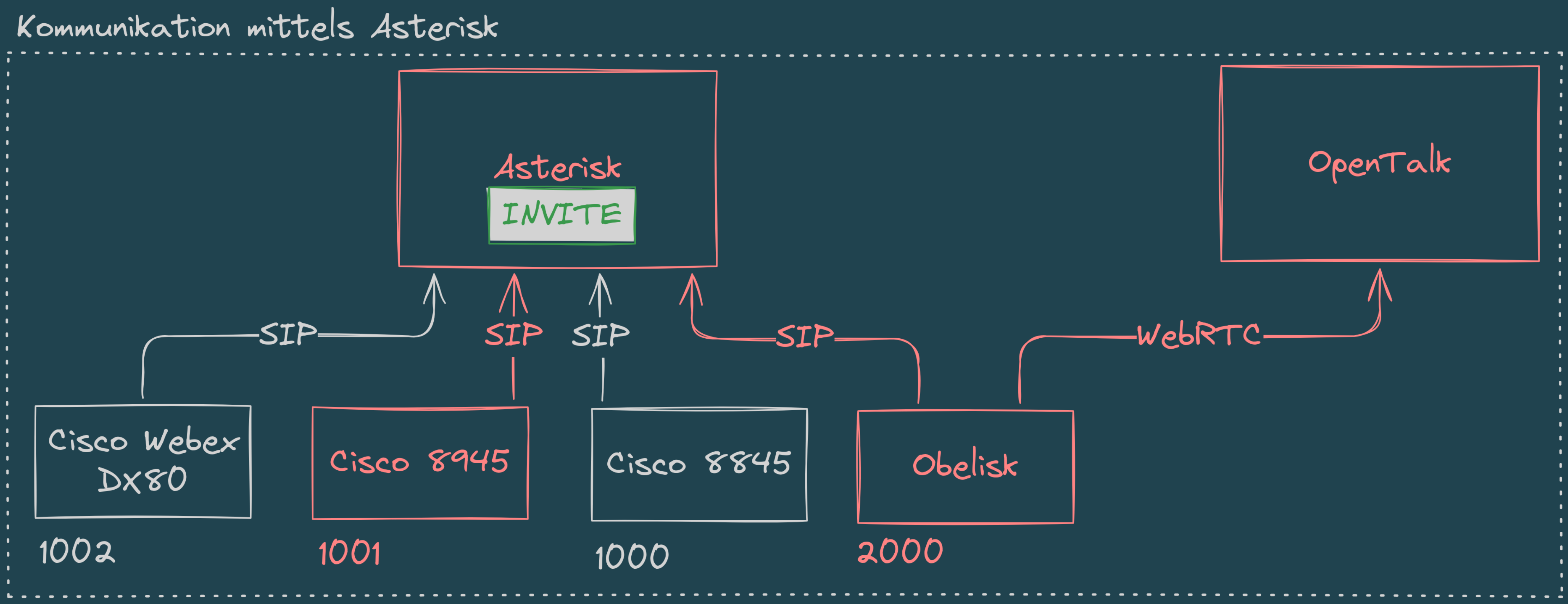
Beispielanruf 1001 -> 2000



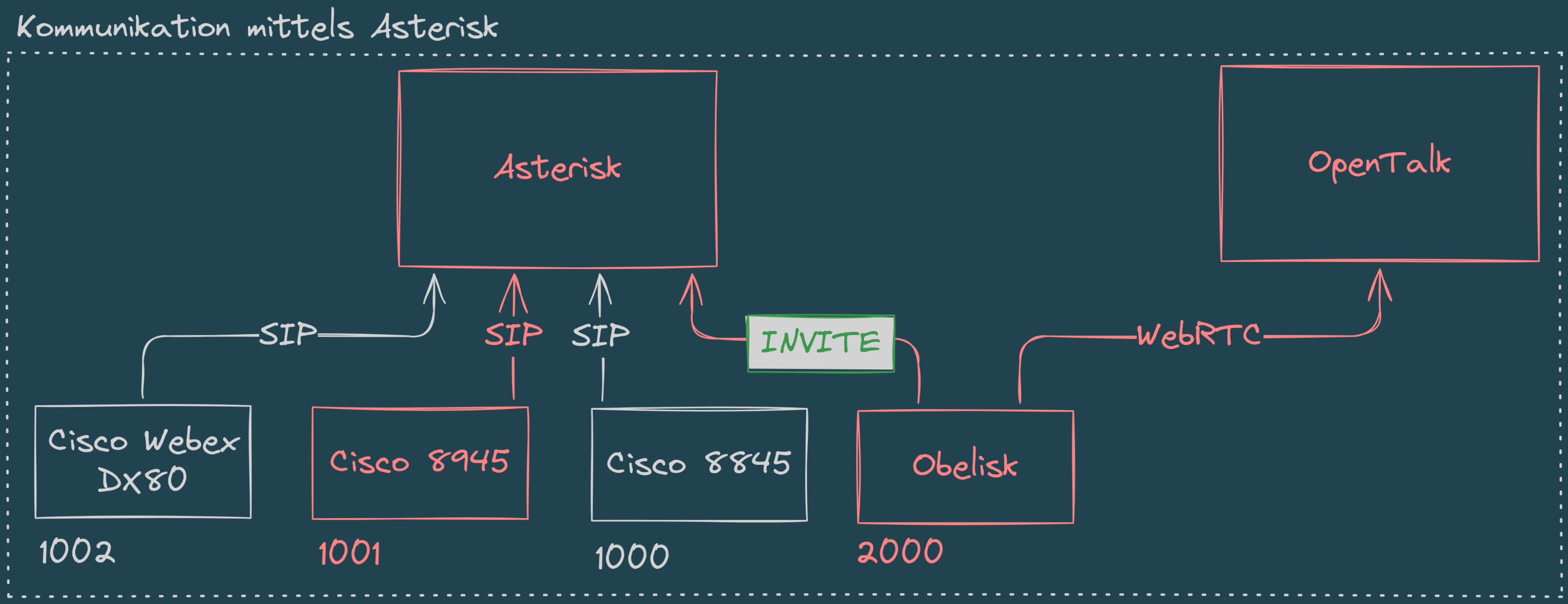
Beispielanruf 1001 -> 2000



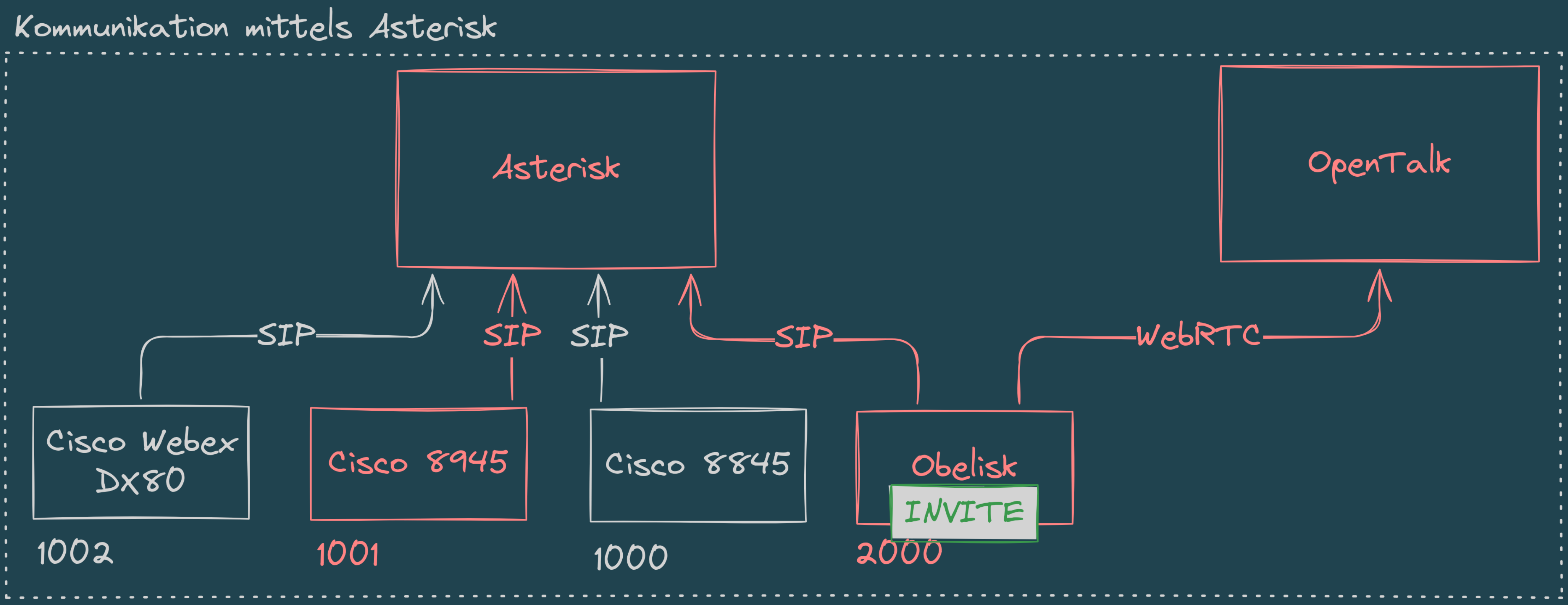
Beispielanruf 1001 -> 2000



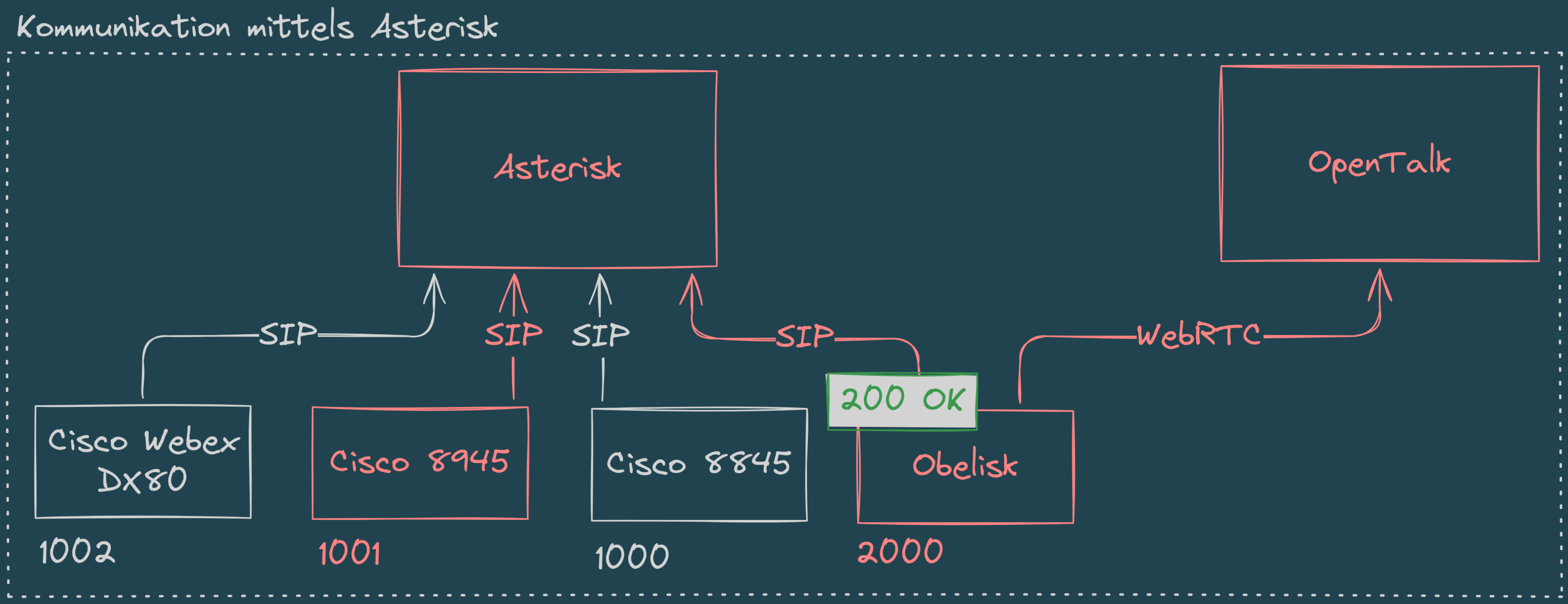
Beispielanruf 1001 -> 2000



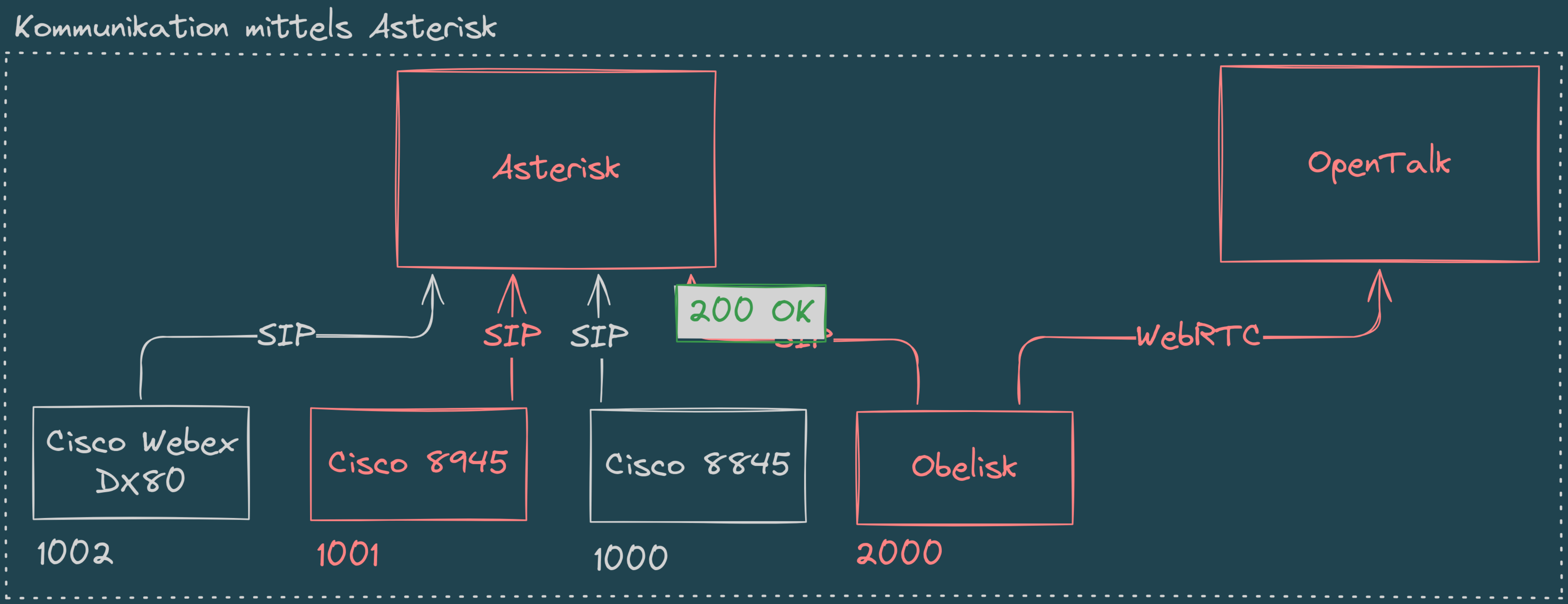
Beispielanruf 1001 -> 2000



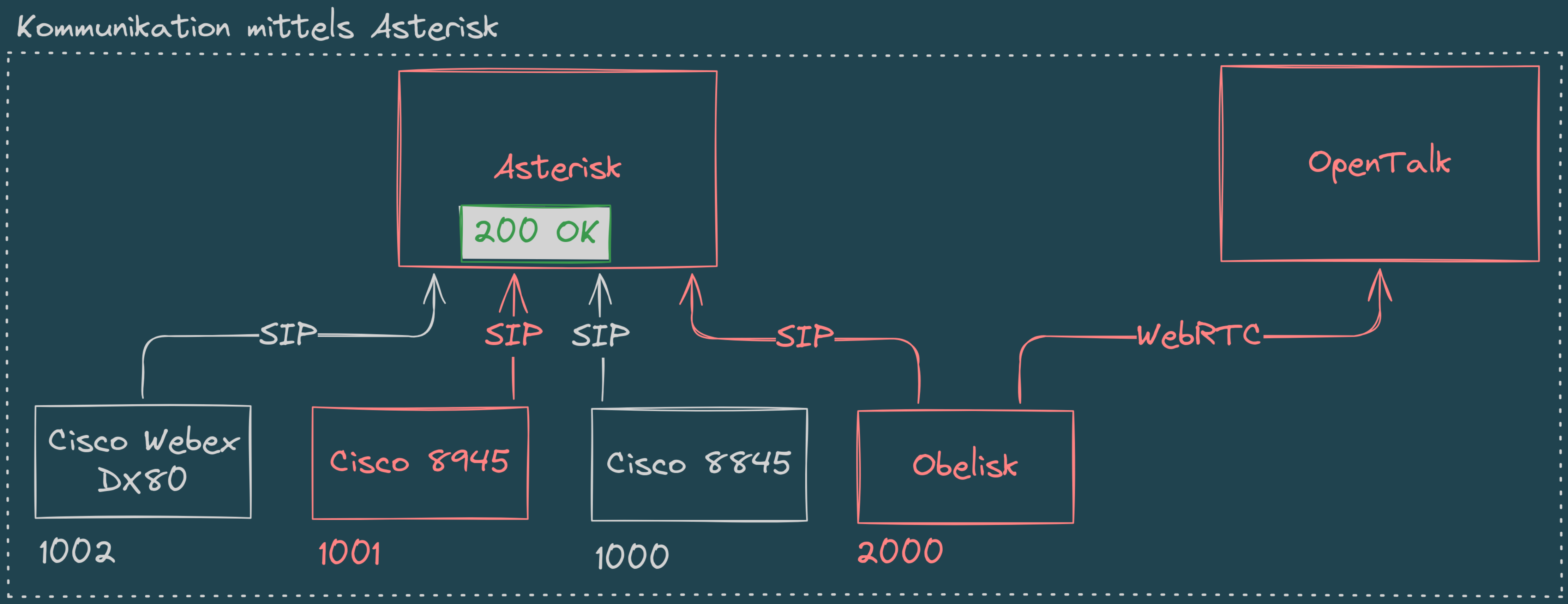
Beispielanruf 1001 -> 2000



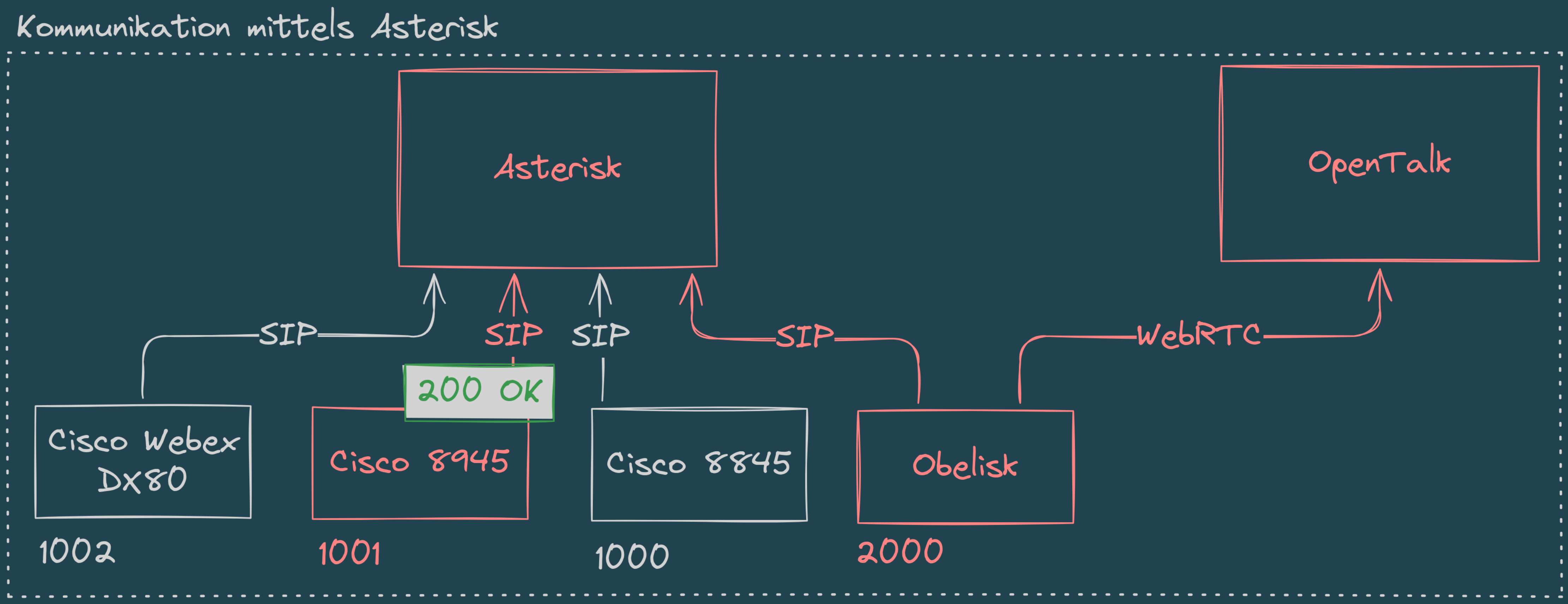
Beispielanruf 1001 -> 2000



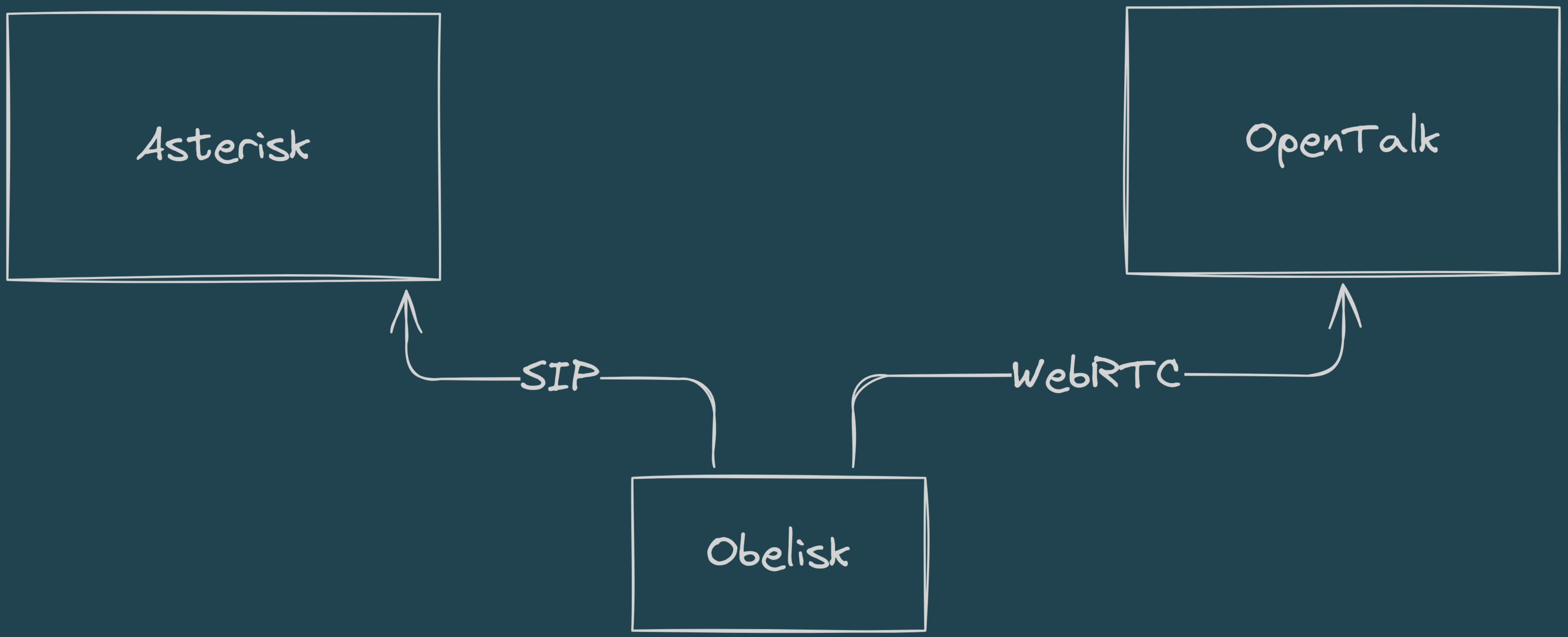
Beispielanruf 1001 -> 2000



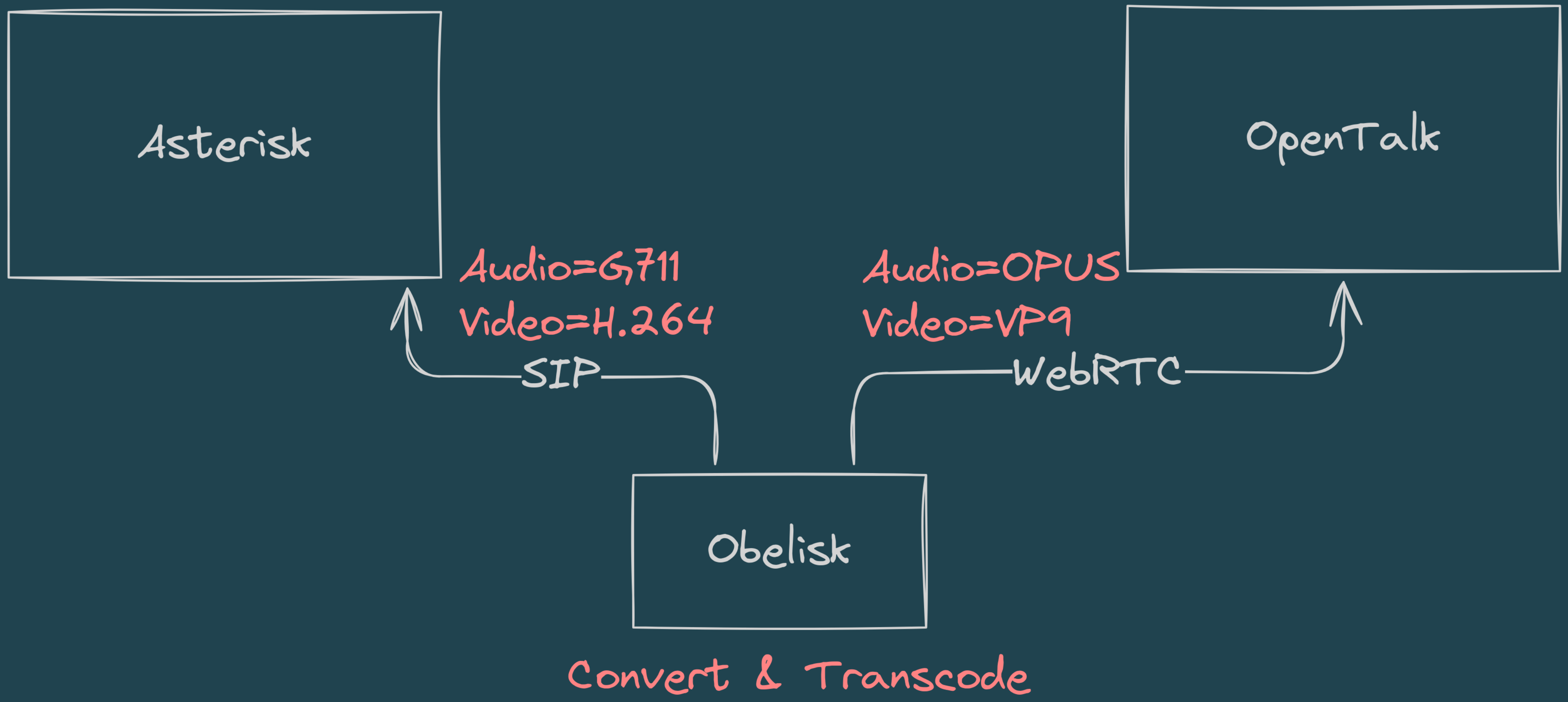
Beispielanruf 1001 -> 2000



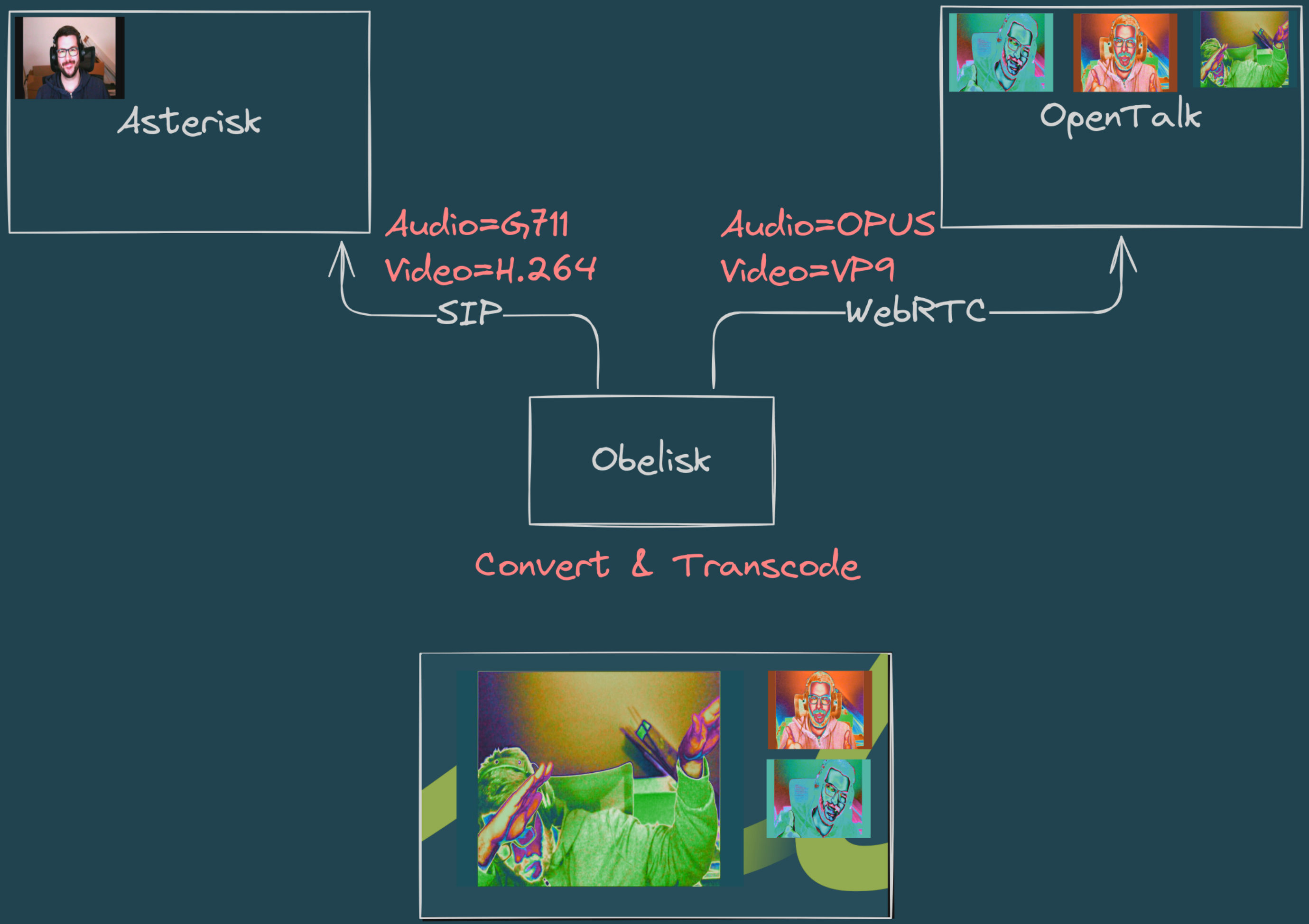
Obelisk im Detail



Obelisk im Detail



Obelisk im Detail



Asterix und Obelix?

Quelle: https://www.britannica.com/topic/Asterix-cartoon-character

Genug SIP/WebRTC!

Was ist SDP (Session Description Protocol)?

Wie sieht ein SDP-Offer aus?

```
INVITE sip:1001@192.168.3.178:5061 SIP/2.0\r\n
Via: SIP/2.0/UDP 192.168.3.178:5060;rport;branch=z9hG4bKPj46f589cd-a132-4f88-b6da-92f2a70e9541\r\n
From: \"2003@OpenTalk\" <sip:user01@192.168.3.178>;tag=48e31812-96d7-4774-97bc-b460a7d2c721\r\n
To: <sip:1001@192.168.3.178;user=phone>;tag=DQoiUShQCIJewLtWhXLljLr5OLT4zp\r\n
Contact: <sip:asterisk@192.168.3.178:5060>\r\n
Call-ID: 1fde3c91-981e-439e-a4e9-9d6262e41017\r\n
CSeq: 22777 INVITE\r\n
Allow: OPTIONS, REGISTER, SUBSCRIBE, NOTIFY, PUBLISH, INVITE, ACK, BYE, CANCEL, UPDATE, PRACK, INFO, MESSAGE, REFER\r\n
Supported: 100rel, timer, replaces, norefersub, histinfo\r\n
Session-Expires: 1800;refresher=uac\r\n
Min-SE: 90\r\n
Max-Forwards: 70\r\n
User-Agent: OpenTalk VoIP Asterisk Proxy\r\n
Content-Type: application/sdp\r\n
Content-Length:  3264\r\n
\r\n
v=0\r\n
o=- 380173281 380173282 IN IP4 192.168.3.178\r\n
s=Asterisk\r\n
c=IN IP4 192.168.3.178\r\n
t=0 0\r\n
m=audio 14392 RTP/AVP 9 101\r\n
a=crypto:1 AES_CM_128_HMAC_SHA1_80 inline:a7MWmqvmulIjHeqdTNPKTVFoq3jqTq2WkmsgqLGH\r\n
a=ice-ufrag:68ecefe744f649fc0aeb9a306c8c0875\r\n
a=ice-pwd:5f19aad1128a8a0956a4800b54f93a2f\r\n
a=candidate:Hc0a803b2 1 UDP 2130706431 192.168.3.178 14392 typ host\r\n
a=candidate:Hac110001 1 UDP 2130706431 172.17.0.1 14392 typ host\r\n
a=candidate:Hac170001 1 UDP 2130706431 172.23.0.1 14392 typ host\r\n
a=candidate:Hac150001 1 UDP 2130706431 172.21.0.1 14392 typ host\r\n
a=candidate:Hac120001 1 UDP 2130706431 172.18.0.1 14392 typ host\r\n
a=candidate:Hac130001 1 UDP 2130706431 172.19.0.1 14392 typ host\r\n
a=candidate:Hac140001 1 UDP 2130706431 172.20.0.1 14392 typ host\r\n
a=candidate:Hc0a87a01 1 UDP 2130706431 192.168.122.1 14392 typ host\r\n
a=candidate:Ha003016 1 UDP 2130706431 10.0.48.22 14392 typ host\r\n
a=candidate:Hc0a803b2 2 UDP 2130706430 192.168.3.178 14393 typ host\r\n
a=candidate:Hac110001 2 UDP 2130706430 172.17.0.1 14393 typ host\r\n
a=candidate:Hac170001 2 UDP 2130706430 172.23.0.1 14393 typ host\r\n
a=candidate:Hac150001 2 UDP 2130706430 172.21.0.1 14393 typ host\r\n
a=candidate:Hac120001 2 UDP 2130706430 172.18.0.1 14393 typ host\r\n
a=candidate:Hac130001 2 UDP 2130706430 172.19.0.1 14393 typ host\r\n
a=candidate:Hac140001 2 UDP 2130706430 172.20.0.1 14393 typ host\r\n
a=candidate:Hc0a87a01 2 UDP 2130706430 192.168.122.1 14393 typ host\r\n
a=candidate:Ha003016 2 UDP 2130706430 10.0.48.22 14393 typ host\r\n
a=rtpmap:9 G722/8000\r\n
a=rtpmap:101 telephone-event/8000\r\n
a=fmtp:101 0-16\r\n
a=ptime:20\r\n
a=maxptime:140\r\n
a=sendrecv\r\n
m=video 14184 RTP/AVP 103 99\r\n
a=crypto:1 AES_CM_128_HMAC_SHA1_80 inline:CNI3haHVYr2rIME59idfVnkL+rRm7OkldGIx1r0O\r\n
a=ice-ufrag:3cc7bc704d150b5f4a71ed0b73ed5dcb\r\n
a=ice-pwd:7626025f51a15160720372474984cccf\r\n
a=candidate:Hc0a803b2 1 UDP 2130706431 192.168.3.178 14184 typ host\r\n
a=candidate:Hac110001 1 UDP 2130706431 172.17.0.1 14184 typ host\r\n
a=candidate:Hac170001 1 UDP 2130706431 172.23.0.1 14184 typ host\r\n
a=candidate:Hac150001 1 UDP 2130706431 172.21.0.1 14184 typ host\r\n
a=candidate:Hac120001 1 UDP 2130706431 172.18.0.1 14184 typ host\r\n
a=candidate:Hac130001 1 UDP 2130706431 172.19.0.1 14184 typ host\r\n
a=candidate:Hac140001 1 UDP 2130706431 172.20.0.1 14184 typ host\r\n
a=candidate:Hc0a87a01 1 UDP 2130706431 192.168.122.1 14184 typ host\r\n
a=candidate:Ha003016 1 UDP 2130706431 10.0.48.22 14184 typ host\r\n
a=candidate:Hc0a803b2 2 UDP 2130706430 192.168.3.178 14185 typ host\r\n
a=candidate:Hac110001 2 UDP 2130706430 172.17.0.1 14185 typ host\r\n
a=candidate:Hac170001 2 UDP 2130706430 172.23.0.1 14185 typ host\r\n
a=candidate:Hac150001 2 UDP 2130706430 172.21.0.1 14185 typ host\r\n
a=candidate:Hac120001 2 UDP 2130706430 172.18.0.1 14185 typ host\r\n
a=candidate:Hac130001 2 UDP 2130706430 172.19.0.1 14185 typ host\r\n
a=candidate:Hac140001 2 UDP 2130706430 172.20.0.1 14185 typ host\r\n
a=candidate:Hc0a87a01 2 UDP 2130706430 192.168.122.1 14185 typ host\r\n
a=candidate:Ha003016 2 UDP 2130706430 10.0.48.22 14185 typ host\r\n
a=rtpmap:103 h263-1998/90000\r\n
a=fmtp:103 CIF4=1;CIF=1;QCIF=1;CUSTOM=352,240,1;MaxBR=30000\r\n
a=rtpmap:99 H264/90000\r\n
a=fmtp:99 max-mbps=245000;max-fs=8160;max-br=2500;max-smbps=245000;max-fps=3000;packetization-mode=0;profile-level-id=428014\r\n
a=sendrecv\r\n
```

Wie sieht ein SDP-Offer aus? (Meta)

```
INVITE sip:1001@192.168.3.178:5061 SIP/2.0\r\n
Via: SIP/2.0/UDP 192.168.3.178:5060;rport;branch=z9hG4bKPj46f589cd-a132-4f88-b6da-92f2a70e9541\r\n
From: \"2003@OpenTalk\" <sip:user01@192.168.3.178>;tag=48e31812-96d7-4774-97bc-b460a7d2c721\r\n
To: <sip:1001@192.168.3.178;user=phone>;tag=DQoiUShQCIJewLtWhXLljLr5OLT4zp\r\n
Contact: <sip:asterisk@192.168.3.178:5060>\r\n

Call-ID: 1fde3c91-981e-439e-a4e9-9d6262e41017\r\n
CSeq: 22777 INVITE\r\n

Allow: OPTIONS, REGISTER, SUBSCRIBE, NOTIFY, PUBLISH, INVITE, ACK, BYE, CANCEL, UPDATE, PRACK, INFO, MESSAGE, REFER\r\n
Supported: 100rel, timer, replaces, norefersub, histinfo\r\n
Session-Expires: 1800;refresher=uac\r\n
Min-SE: 90\r\n
Max-Forwards: 70\r\n
User-Agent: OpenTalk VoIP Asterisk Proxy\r\n
Content-Type: application/sdp\r\n
Content-Length:  3264\r\n

v=0\r\n
o=- 380173281 380173282 IN IP4 192.168.3.178\r\n
s=Asterisk\r\n
c=IN IP4 192.168.3.178\r\n
t=0 0\r\n
```

Wie sieht ein SDP-Offer aus? (Audio)

```
m=audio 14392 RTP/AVP 9 101\r\n

a=crypto:1 AES_CM_128_HMAC_SHA1_80 inline:a7MWmqvmulIjHeqdTNPKTVFoq3jqTq2WkmsgqLGH\r\n

a=ice-ufrag:68ecefe744f649fc0aeb9a306c8c0875\r\n
a=ice-pwd:5f19aad1128a8a0956a4800b54f93a2f\r\n
a=candidate:Hc0a803b2 1 UDP 2130706431 192.168.3.178 14392 typ host\r\n
a=candidate:Hac110001 1 UDP 2130706431 172.17.0.1 14392 typ host\r\n
...
a=candidate:Hc0a87a01 2 UDP 2130706430 192.168.122.1 14393 typ host\r\n
a=candidate:Ha003016 2 UDP 2130706430 10.0.48.22 14393 typ host\r\n

a=rtpmap:9 G722/8000\r\n

a=rtpmap:101 telephone-event/8000\r\n
a=fmtp:101 0-16\r\n
a=ptime:20\r\n
a=maxptime:140\r\n

a=sendrecv\r\n
```

Wie sieht ein SDP-Offer aus? (Video)

```
m=video 14184 RTP/AVP 103 99\r\n

a=crypto:1 AES_CM_128_HMAC_SHA1_80 inline:CNI3haHVYr2rIME59idfVnkL+rRm7OkldGIx1r0O\r\n

a=ice-ufrag:3cc7bc704d150b5f4a71ed0b73ed5dcb\r\n
a=ice-pwd:7626025f51a15160720372474984cccf\r\n
a=candidate:Hc0a803b2 1 UDP 2130706431 192.168.3.178 14184 typ host\r\n
a=candidate:Hac110001 1 UDP 2130706431 172.17.0.1 14184 typ host\r\n
...
a=candidate:Hc0a87a01 2 UDP 2130706430 192.168.122.1 14185 typ host\r\n
a=candidate:Ha003016 2 UDP 2130706430 10.0.48.22 14185 typ host\r\n

a=rtpmap:103 h263-1998/90000\r\n
a=fmtp:103 CIF4=1;CIF=1;QCIF=1;CUSTOM=352,240,1;MaxBR=30000\r\n

a=rtpmap:99 H264/90000\r\n
a=fmtp:99 max-mbps=245000;max-fs=8160;max-br=2500;max-smbps=245000;max-fps=3000;packetization-mode=0;profile-level-id=428014\r\n

a=sendrecv\r\n
```

What about H.264?

Table A-1 – Level limits

Level number	Max macroblock processing rate MaxMBPS (MB/s)	Max frame size MaxFS (MBs)	Max decoded picture buffer size MaxDpbMbs (MBs)	Max video bit rate MaxBR (1000 bits/s, 1200 bits/s, cpbBrVclFactor bits/s, or cpbBrNalFactor bits/s)	Max CPB size MaxCPB (1000 bits, 1200 bits, cpbBrVclFactor bits, or cpbBrNalFactor bits)	Vertical MV component limit MaxVmvR (luma frame samples)	Min compression ratio MinCR	Max number of motion vectors per two consecutive MBs MaxMvsPer2Mb
1	1 485	99	396	64	175	64	2	-
1b	1 485	99	396	128	350	64	2	-
1.1	3 000	396	900	192	500	128	2	-
1.2	6 000	396	2 376	384	1 000	128	2	-
1.3	11 880	396	2 376	768	2 000	128	2	-
2	11 880	396	2 376	2 000	2 000	128	2	-
2.1	19 800	792	4 752	4 000	4 000	256	2	-
2.2	20 250	1 620	8 100	4 000	4 000	256	2	-
3	40 500	1 620	8 100	10 000	10 000	256	2	32
3.1	108 000	3 600	18 000	14 000	14 000	512	4	16
3.2	216 000	5 120	20 480	20 000	20 000	512	4	16
4	245 760	8 192	32 768	20 000	25 000	512	4	16
4.1	245 760	8 192	32 768	50 000	62 500	512	2	16
4.2	522 240	8 704	34 816	50 000	62 500	512	2	16
5	589 824	22 080	110 400	135 000	135 000	512	2	16
5.1	983 040	36 864	184 320	240 000	240 000	512	2	16
5.2	2 073 600	36 864	184 320	240 000	240 000	512	2	16
6	4 177 920	139 264	696 320	240 000	240 000	8 192	2	16
6.1	8 355 840	139 264	696 320	480 000	480 000	8 192	2	16
6.2	16 711 680	139 264	696 320	800 000	800 000	8 192	2	16

Quelle: Recommendation ITU-T H.264

Wie sieht die SDP-Answer aus?

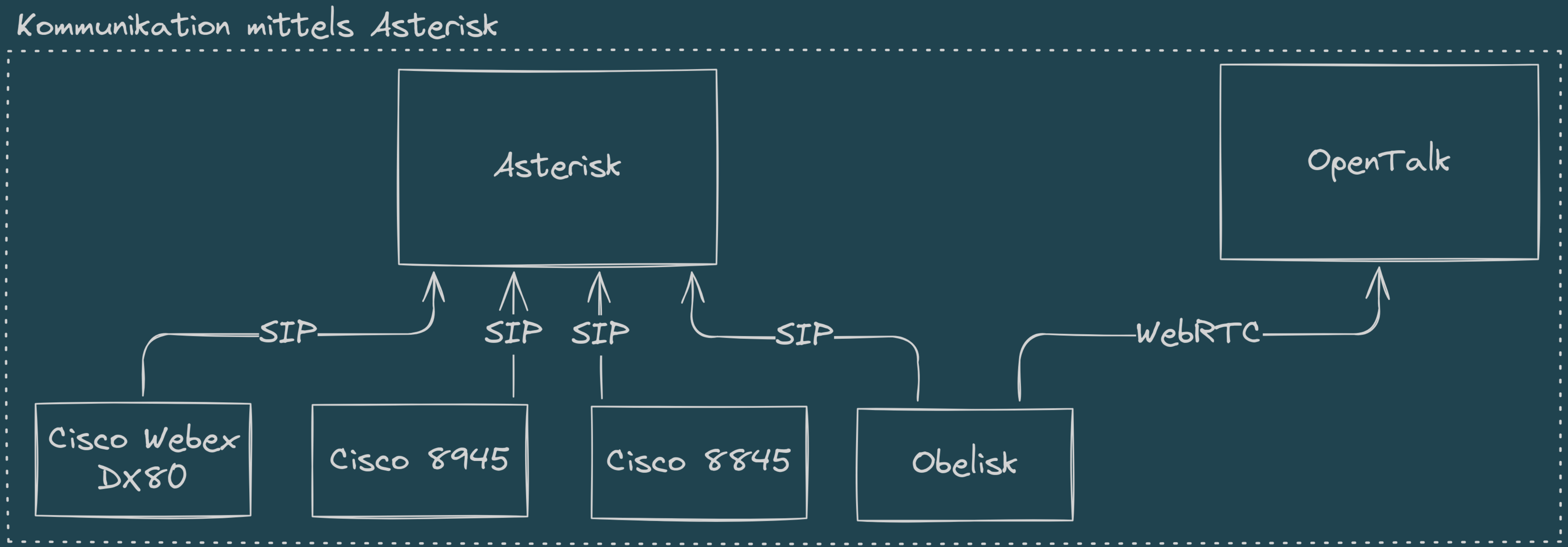
```
SIP/2.0 200 OK\r\n
Via: SIP/2.0/UDP 192.168.3.178:5060;rport=5060;branch=z9hG4bKPj46f589cd-a132-4f88-b6da-92f2a70e9541\r\n
From: \"2003@OpenTalk\"<sip:user01@192.168.3.178>;tag=48e31812-96d7-4774-97bc-b460a7d2c721\r\n
To: <sip:1001@192.168.3.178;user=phone>;tag=DQoiUShQCIJewLtWhXLljLr5OLT4zp\r\n

Call-ID: 1fde3c91-981e-439e-a4e9-9d6262e41017\r\n
CSeq: 22777 INVITE\r\n

Contact: <sip:1001@192.168.3.178:5061>\r\n

Allow: INVITE, UPDATE, BYE, ACK, CANCEL, PRACK\r\n
Supported: 100rel, timer\r\n
Content-Type: application/sdp\r\n
Content-Length: 333\r\n

v=0\r\n
o=- 1733237008 1733237009 IN IP4 192.168.3.178\r\n
s=opentalk-obelisk\r\n
t=0 0\r\n

m=audio 43734 RTP/AVP 9 101\r\n
c=IN IP4 192.168.3.178\r\n
a=sendrecv\r\n
a=rtcp:43735\r\n
a=rtpmap:9 G722/8000\r\n
a=rtpmap:101 telephone-event/8000\r\n
a=fmtp:101 0-16\r\n

m=video 46808 RTP/AVP 99\r\n
c=IN IP4 192.168.3.178\r\n
a=sendrecv\r\n
a=rtcp:46809\r\n
a=rtpmap:99 H264/90000\r\n
```

Genug Erklärungen!

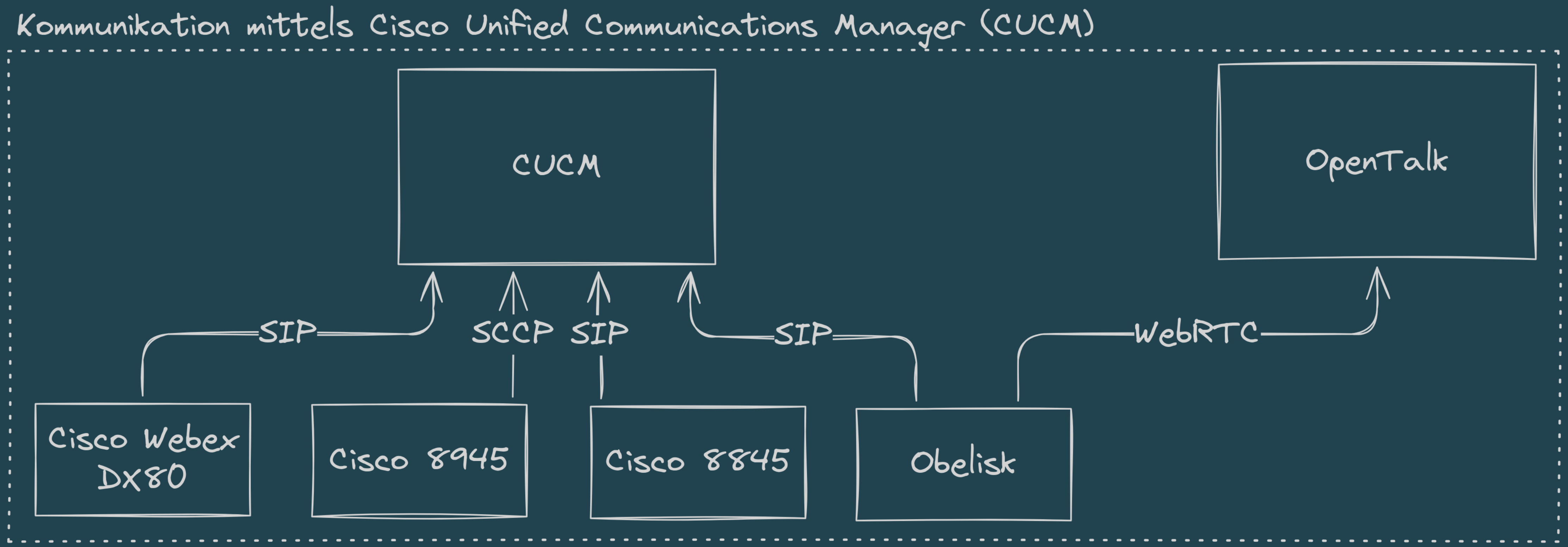
Demo mit Asterisk.

Encoding läuft gut :^)

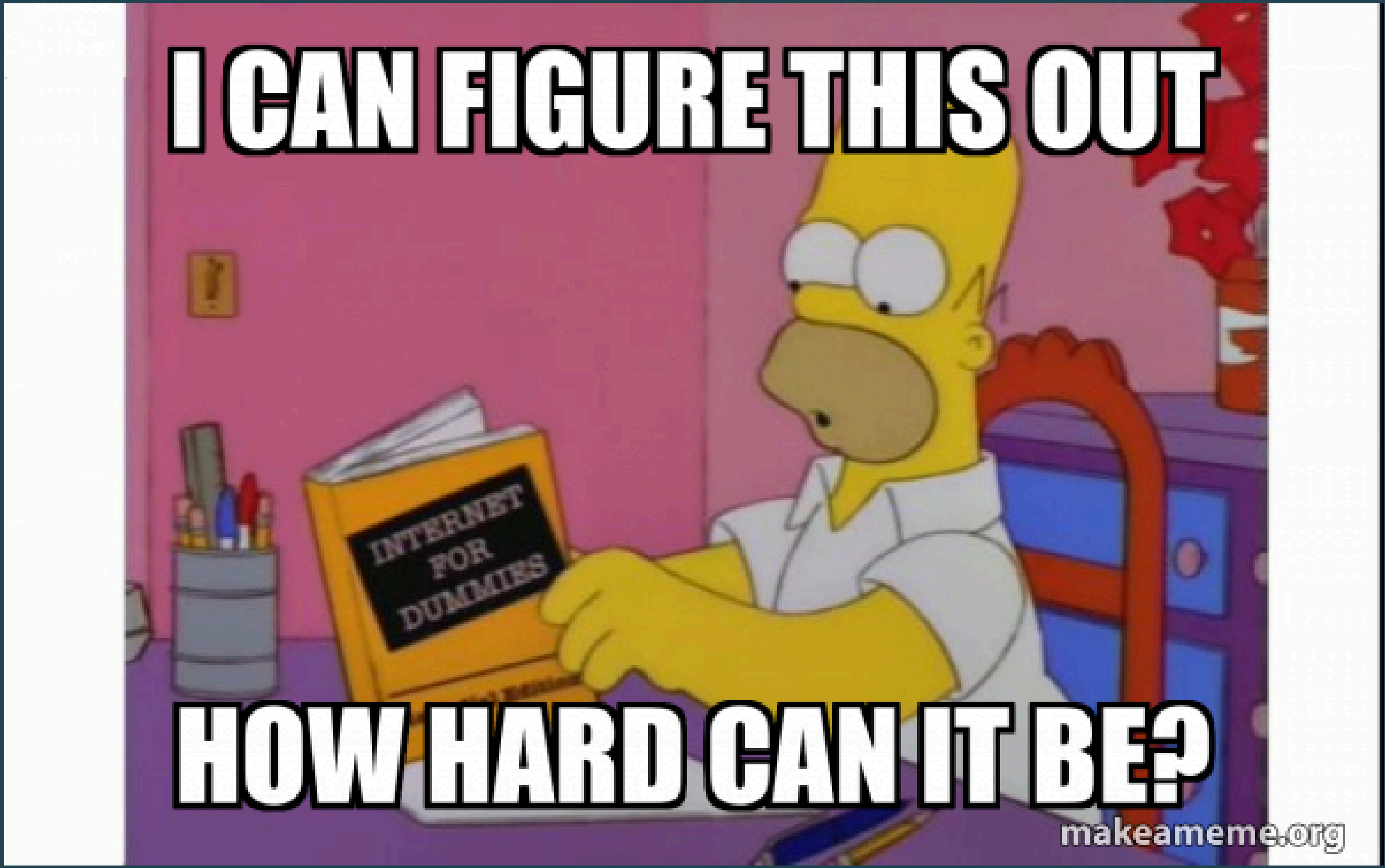
Rückblick wie Asterisk funktioniert



Einfach den Asterisk durch Cisco ersetzen, right?

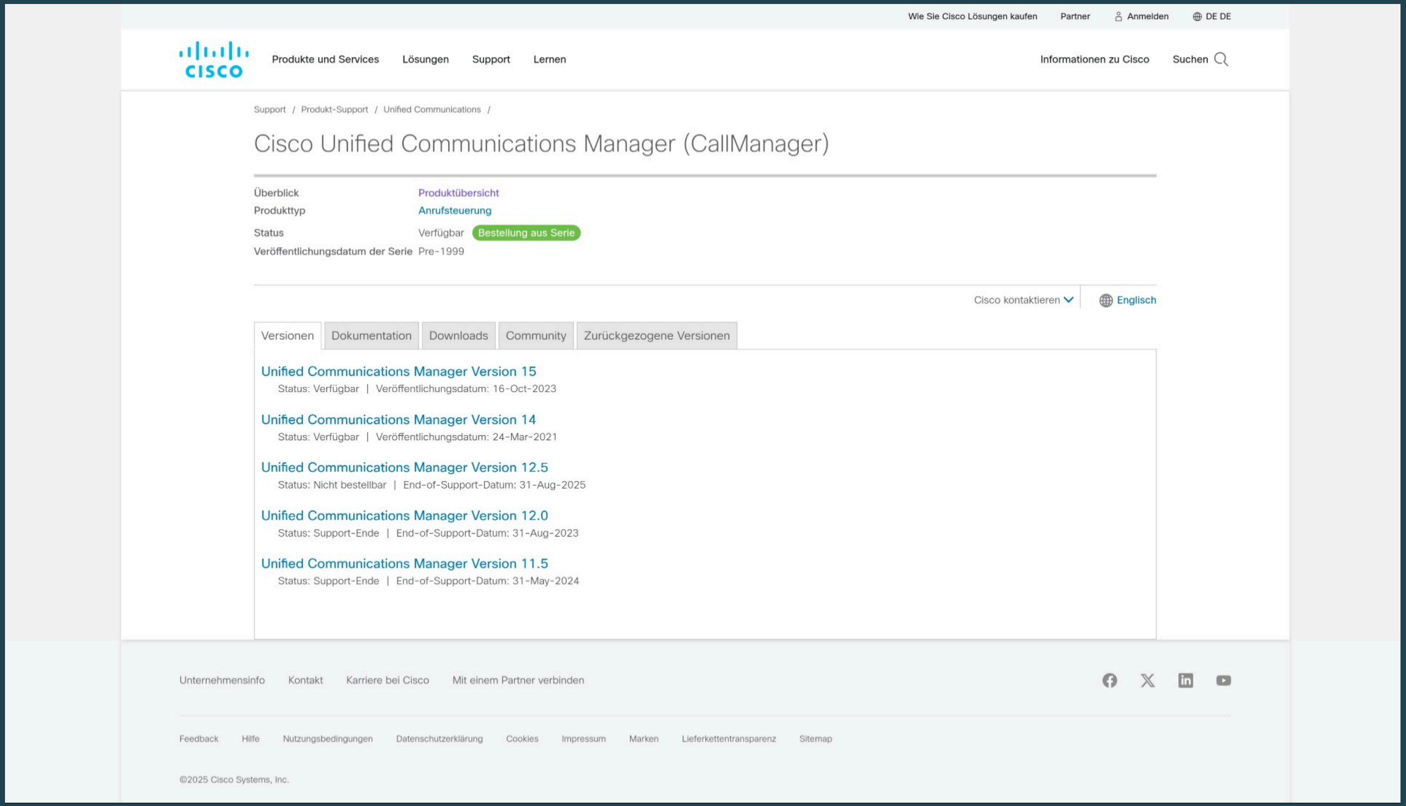


Cisco installieren, wie schwierig kann es sein ...



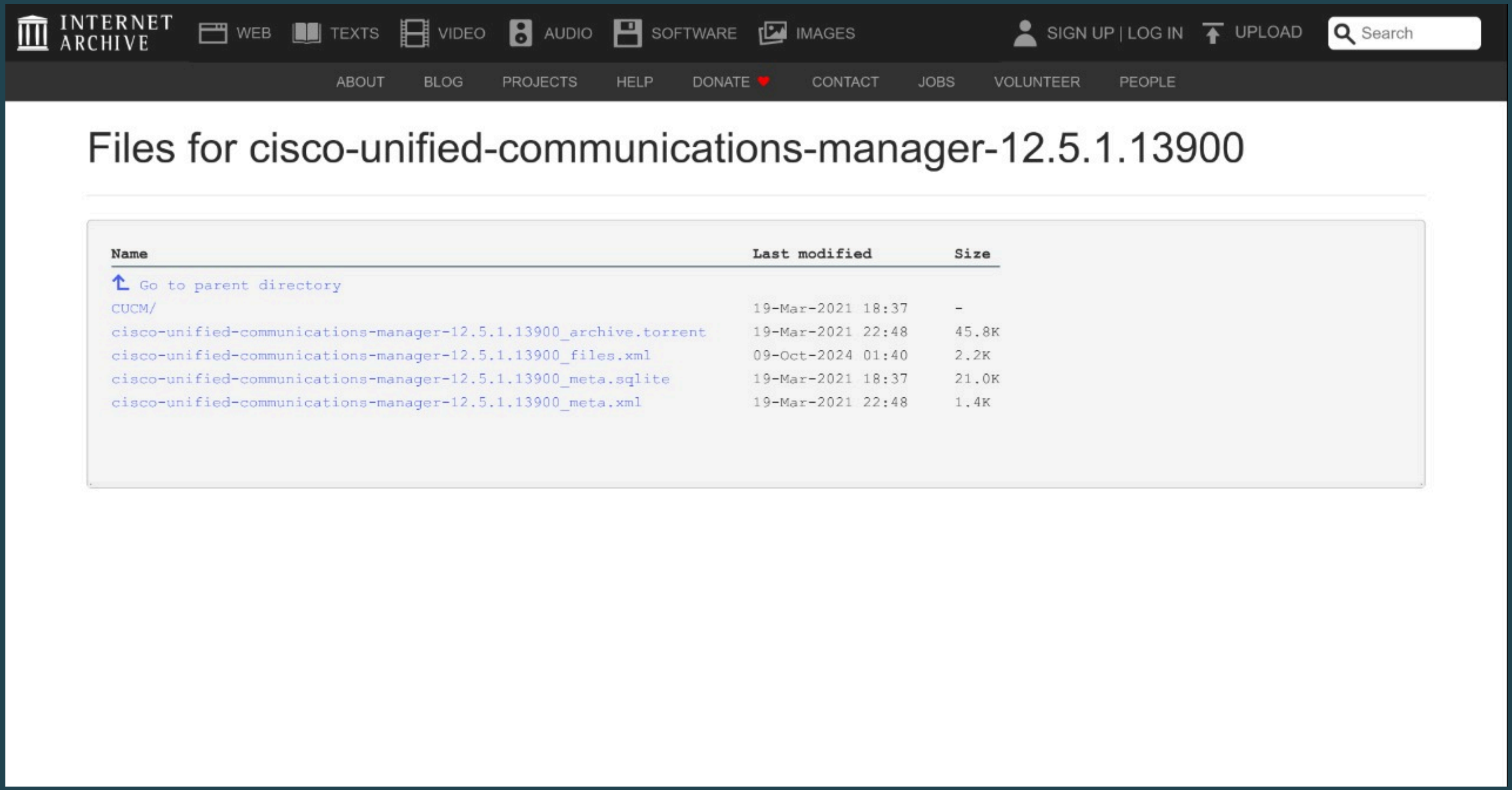
Quelle: https://makeameme.org/meme/i-can-figure-cf4697c86a

Cisco installieren, wie schwierig kann es sein ...

- Schritt 1: Cisco Unified Communications Manager downloaden
- 

- Möchten Sie Cisco Partner werden?

Die Lösung

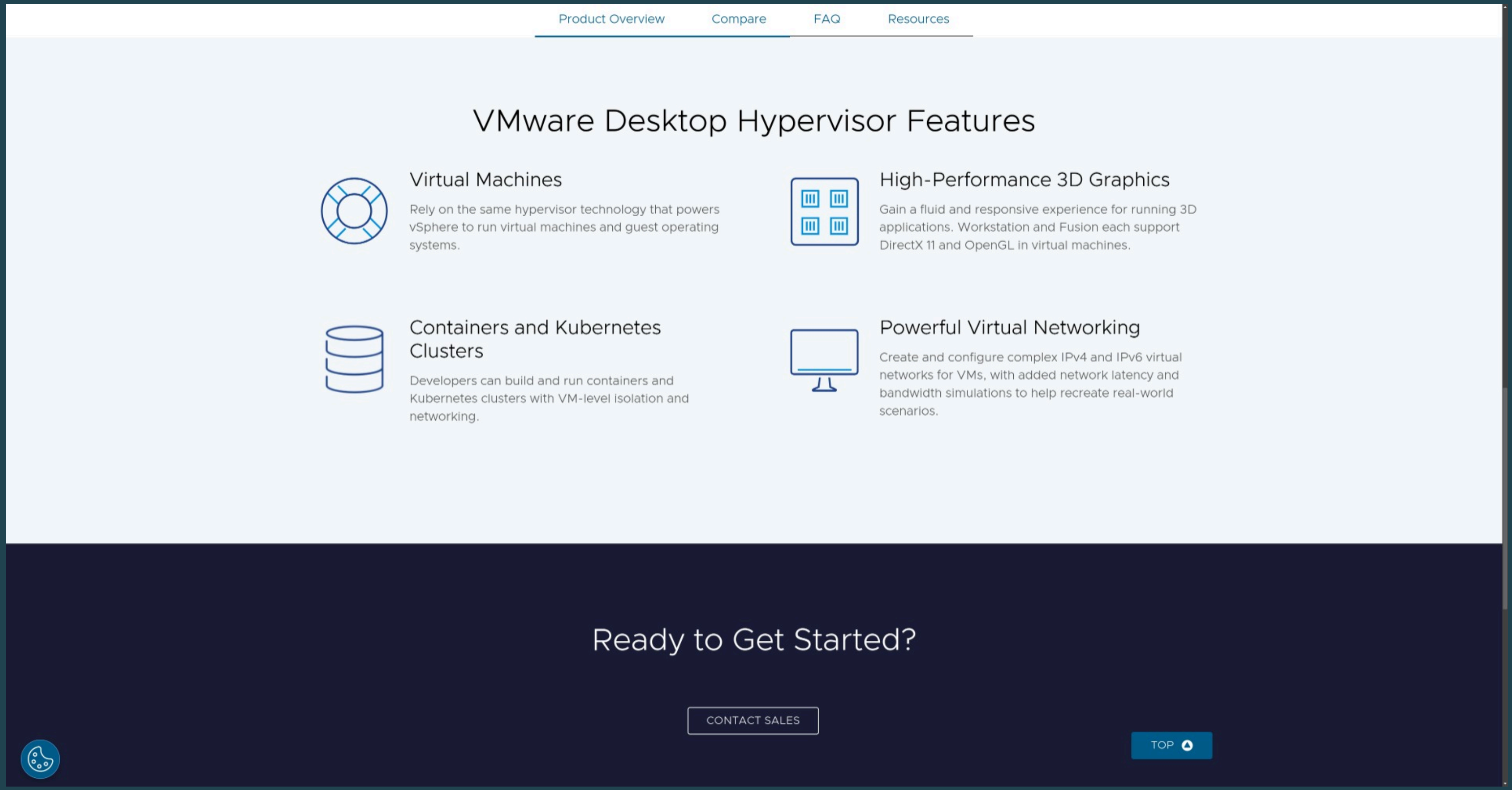

INTERNET ARCHIVE
WEB
TEXTS
VIDEO
AUDIO
SOFTWARE
IMAGES
SIGN UP | LOG IN
UPLOAD
Search
ABOUT
BLOG
PROJECTS
HELP
DONATE
CONTACT
JOBS
VOLUNTEER
PEOPLE
Files for cisco-unified-communications-manager-12.5.1.13900
Name
Last modified
Size
Go to parent directory
CUCM/ 19-Mar-2021 18:37 -
cisco-unified-communications-manager-12.5.1.13900_archive.torrent 19-Mar-2021 22:48 45.8K
cisco-unified-communications-manager-12.5.1.13900_files.xml 09-Oct-2024 01:40 2.2K
cisco-unified-communications-manager-12.5.1.13900_meta.sqlite 19-Mar-2021 18:37 21.0K
cisco-unified-communications-manager-12.5.1.13900_meta.xml 19-Mar-2021 22:48 1.4K

Virtuelle Maschine angeschmissen und los gehts!

```
Detecting Server Hardware - this can take several minutes
Detecting Server Hardware - this can take several minutes
Detecting Server Hardware - this can take several minutes
Detecting Server Hardware - this can take several minutes
```

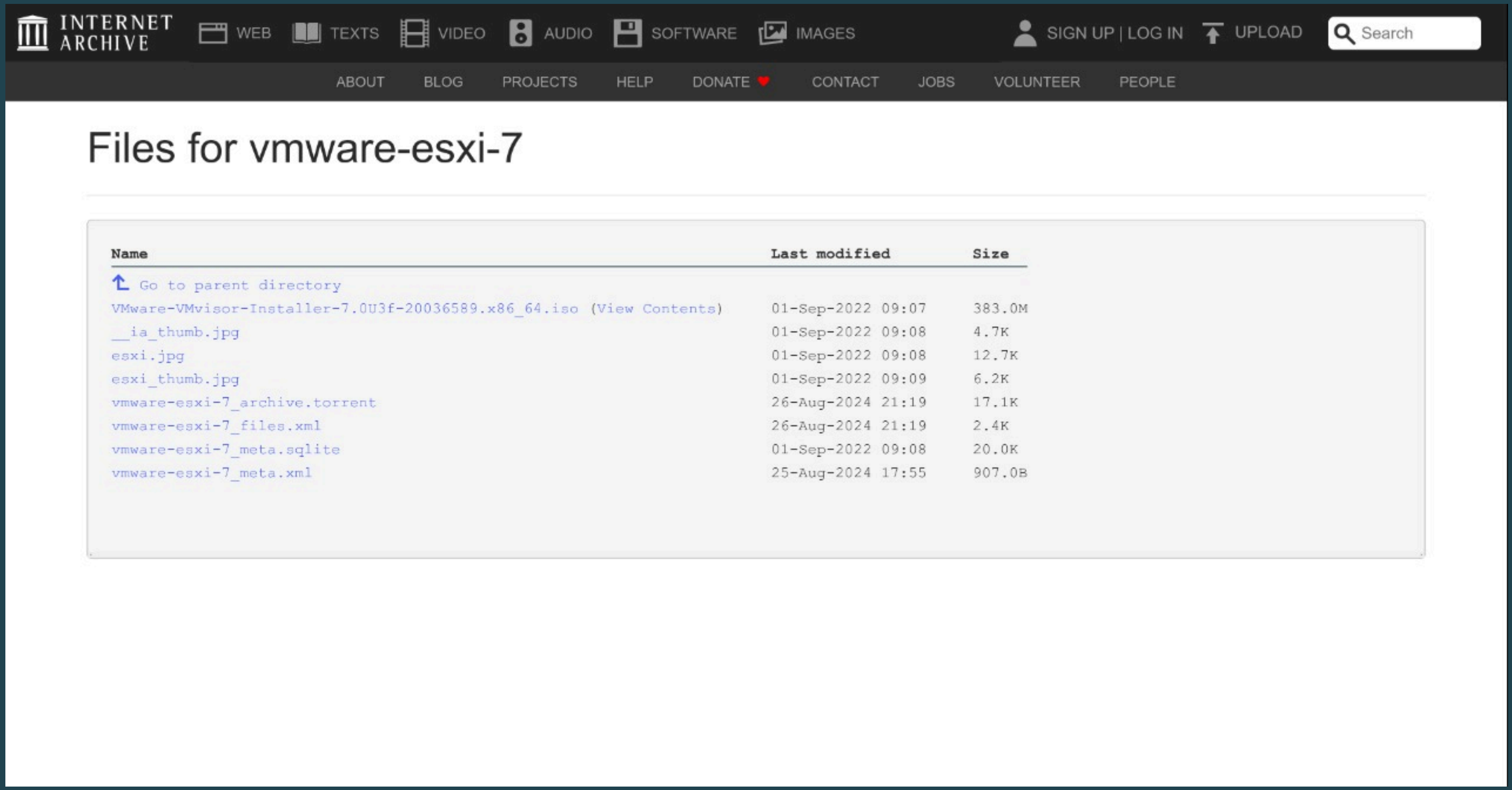

Critical Error
The hardware you are using is not supported for this product.
Installation will now halt.
Continue

VMWare installieren, wie schwierig kann es sein ...

- Schritt 1: VMWare downloaden
- 

- Möchten Sie VMWare Partner werden?

Die Lösung

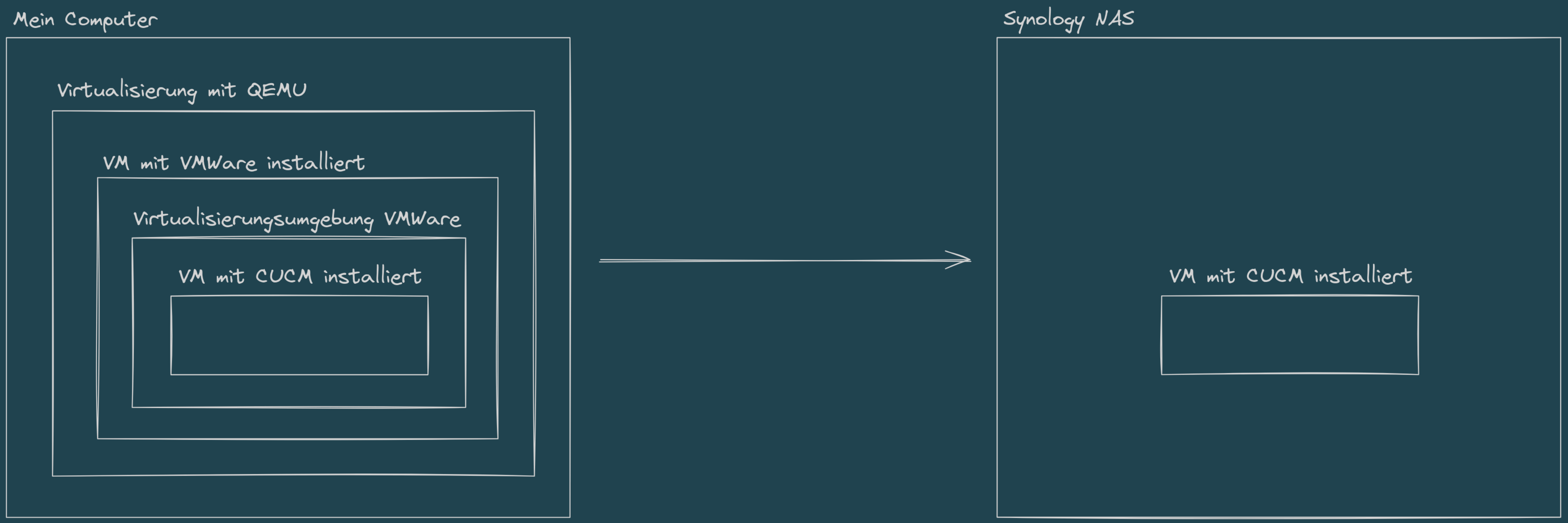

INTERNET ARCHIVE
WEB
TEXTS
VIDEO
AUDIO
SOFTWARE
IMAGES
SIGN UP | LOG IN
UPLOAD
Search
ABOUT
BLOG
PROJECTS
HELP
DONATE
CONTACT
JOBS
VOLUNTEER
PEOPLE
Files for vmware-esxi-7
Name
Last modified
Size
Go to parent directory
VMware-VMvisor-Installer-7.0U3f-20036589.x86_64.iso (View Contents) 01-Sep-2022 09:07 383.0M
__ia_thumb.jpg 01-Sep-2022 09:08 4.7K
esxi.jpg 01-Sep-2022 09:08 12.7K
esxi_thumb.jpg 01-Sep-2022 09:09 6.2K
vmware-esxi-7_archive.torrent 26-Aug-2024 21:19 17.1K
vmware-esxi-7_files.xml 26-Aug-2024 21:19 2.4K
vmware-esxi-7_meta.sqlite 01-Sep-2022 09:08 20.0K
vmware-esxi-7_meta.xml 25-Aug-2024 17:55 907.0B

Unser aktuelles Setup

VM-Ception

Quelle: https://www.linkedin.com/pulse/running-vm-container-ramesh-kumar

Unser neustes neustes Setup (Note)



Now we got it ... Let's install

NTP Error?!


Cisco Unified Communications Manager 15.0.1.11901-2
Error
The NTP server(s) are mistyped, inaccessible or unreliable.
Verify that valid NTP server names or IP addresses were entered, that they are running NTPv4 at stratum 6 or less, and that port 123 is not blocked by a firewall.
OK

Checking Network

- 5 Minuten Netzwerk-check
- Network check timeout exceeded
- Network check timeout exceeded, extending timeout by 20 minutes

Finally, ein Terminal!

```
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.
TERM environment variable needs set.


Cisco Unified Communications Manager 15.0.1.11901-2
cucm login: _
```

Finally, ein Terminal!

```
Command Line Interface is starting up, please wait ...
```

Erstmal eine statische IP

```
admin:set network ip eth0 ?
Syntax:
set network ip eth0 addr mask
addr      mandatory   IP addr to be assigned
mask      mandatory   IP mask to be assigned
gw        mandatory   IP default gw to be assigned

admin:set network ip eth0 _
```

Erstmal eine statische IP einstellen

Erstmal 5 Minuten nichts

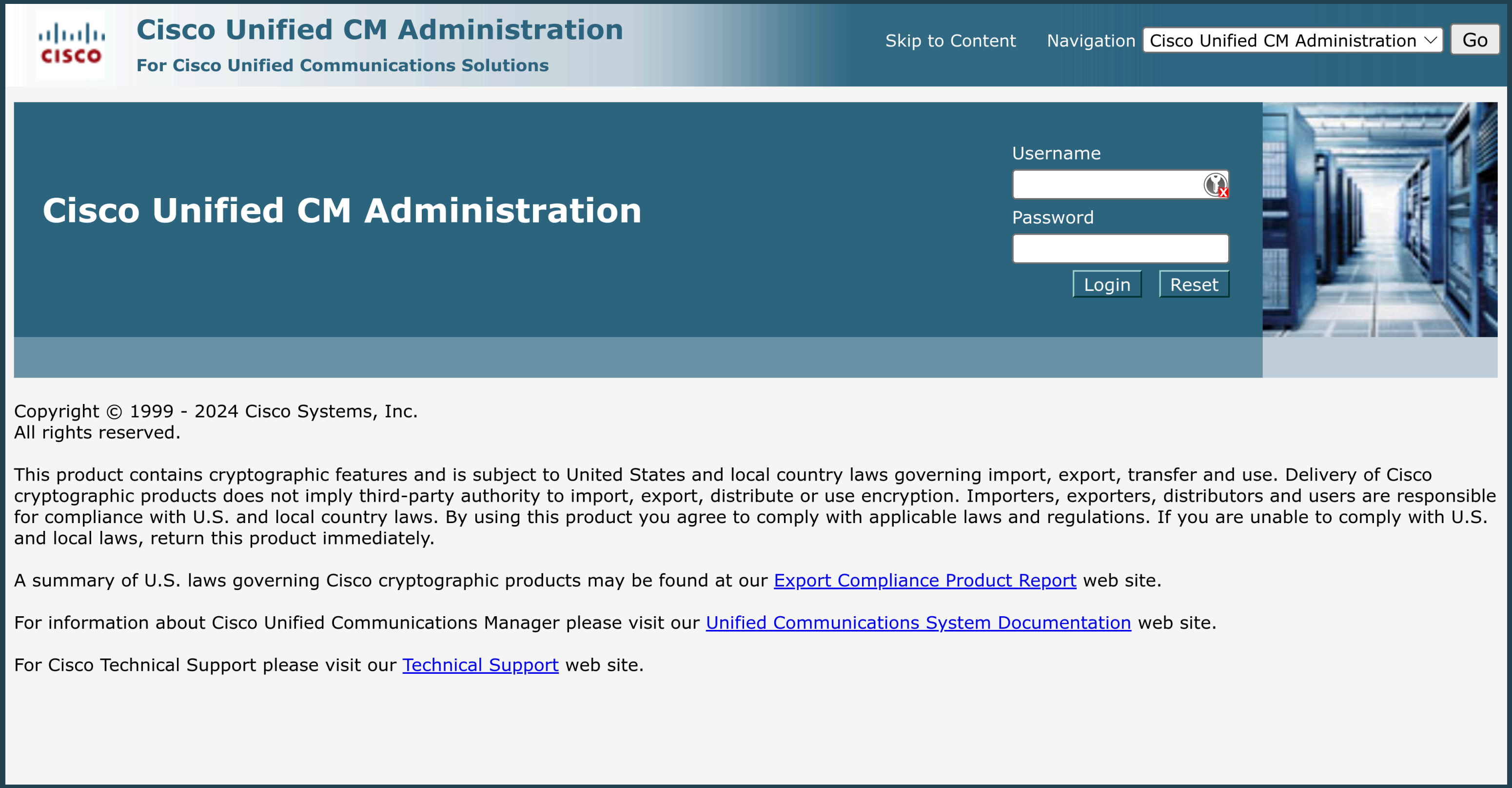
Erstmal eine statische IP einstellen

Database corrupted

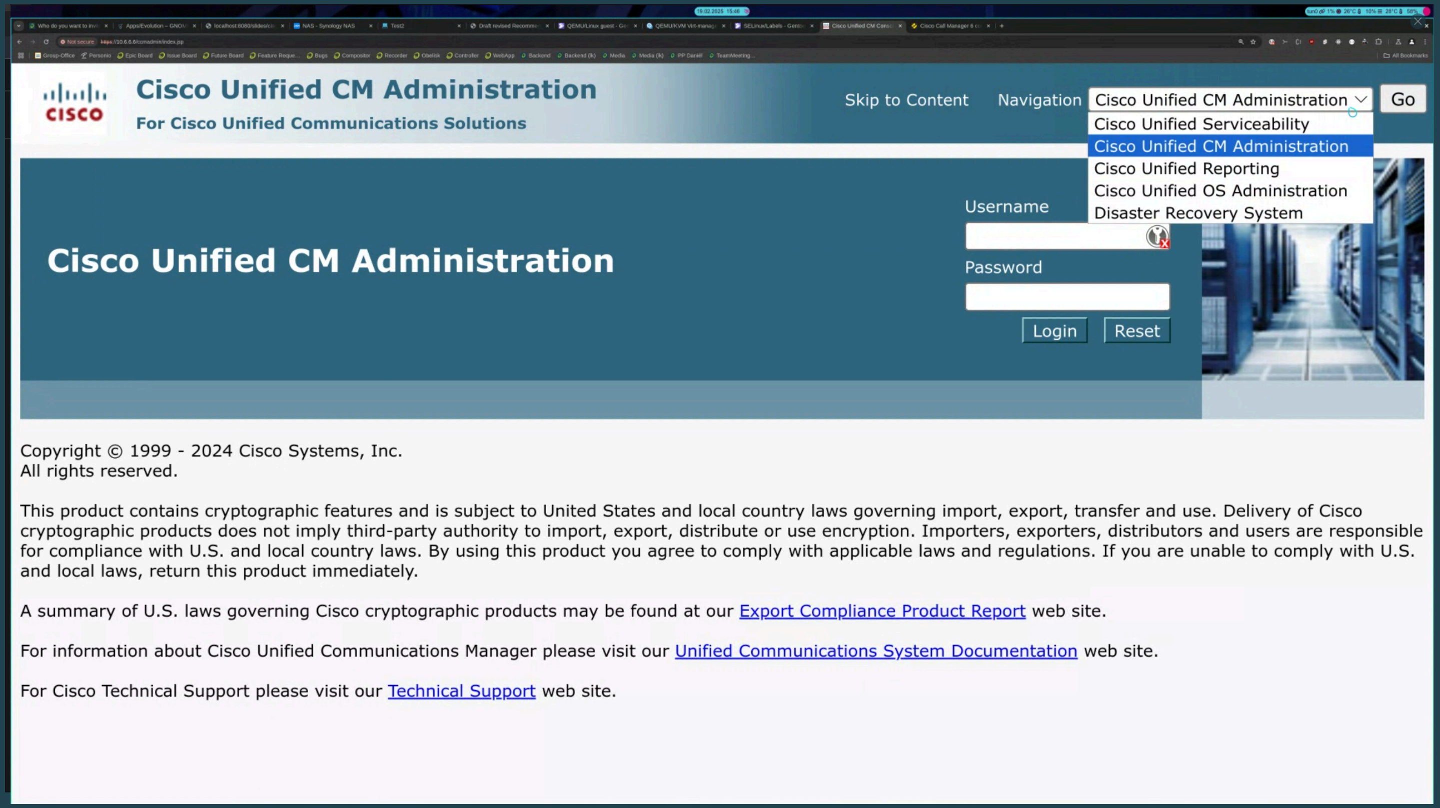
Die Lösung

- CUCM neu installieren
- DHCP-Server sagen welche IP die MAC bekommen soll
- Installation dauert ja nur mehrere Stunden :^)

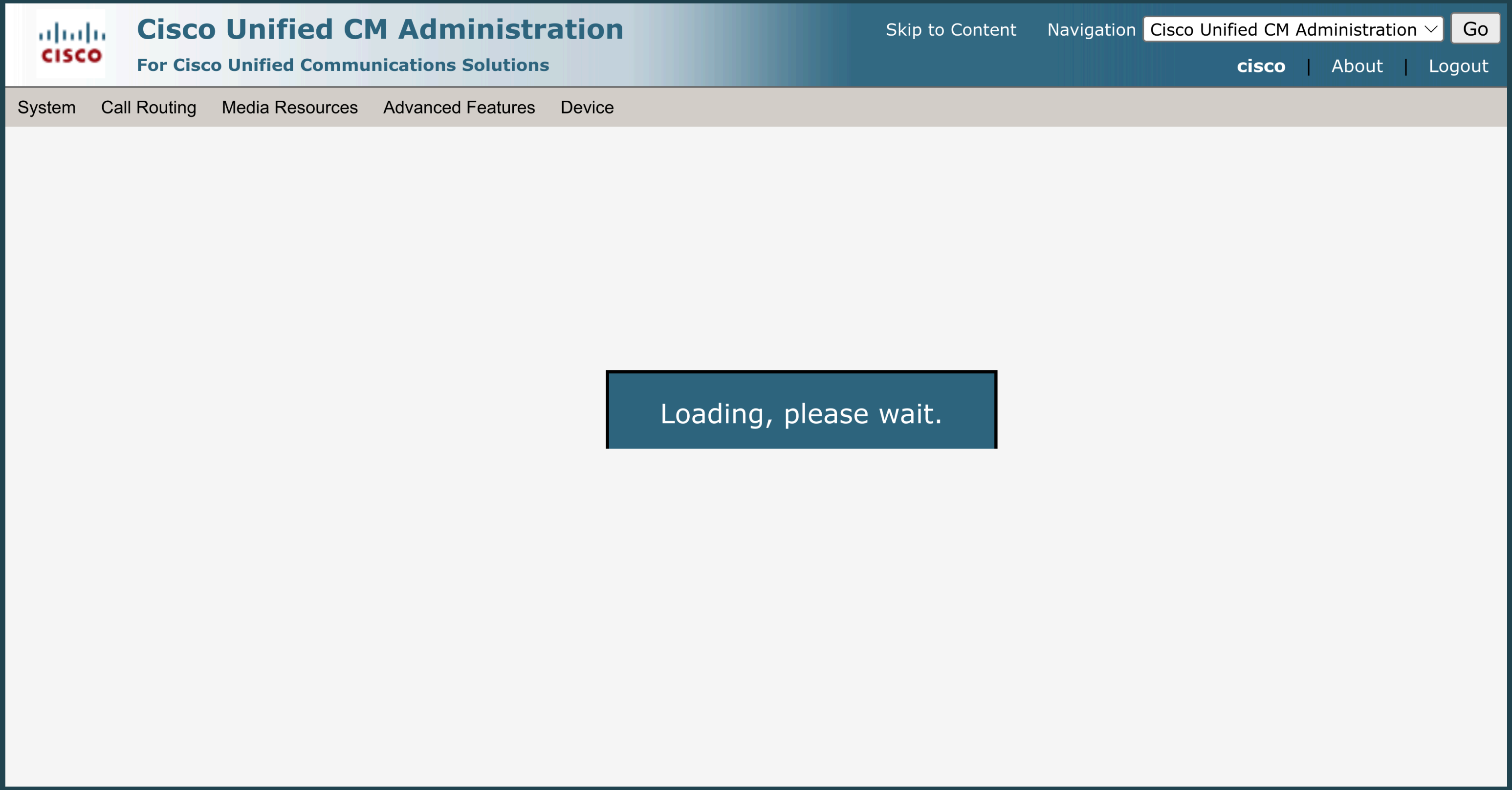
Finally, eine WebUI!



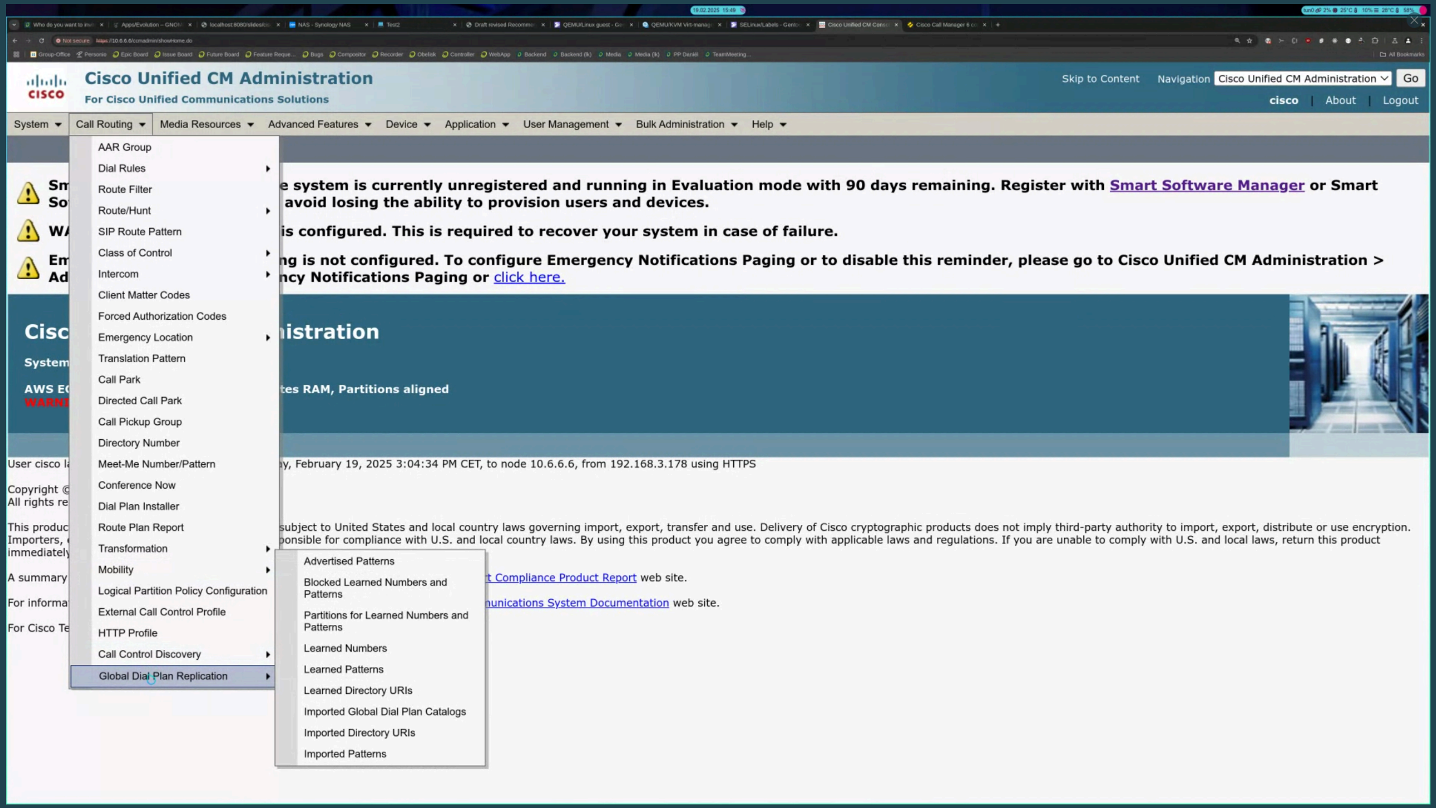
Finally, "EINE" WebUI?



Egal, erstmal anmelden …



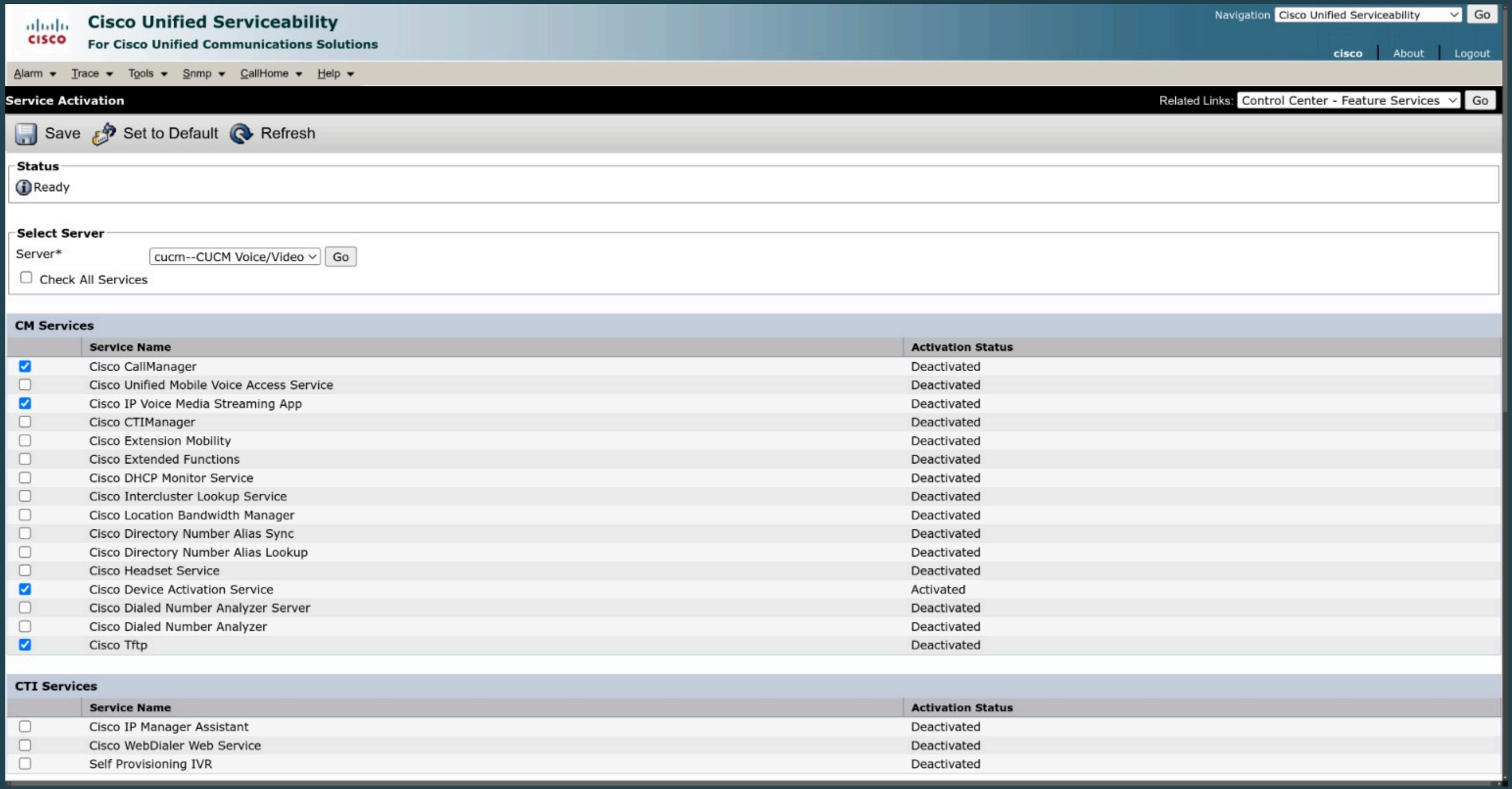
Wie schlimm kann eine WebUI denn bitte sein?



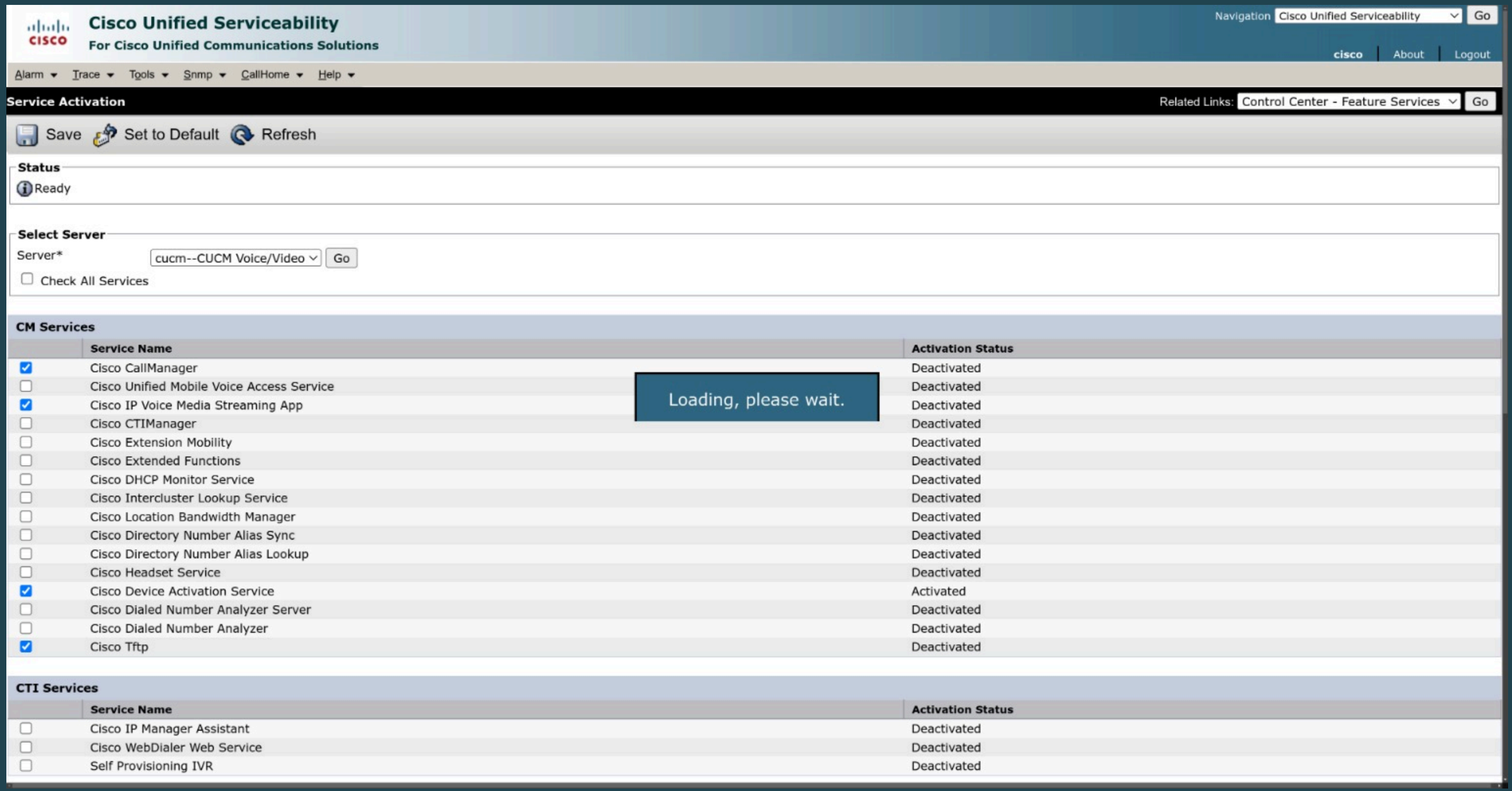
Egal, erstmal Call-Service aktivieren ...

Call-Service aktivieren beim CallManager?

Erstmal die Call-Services aktivieren

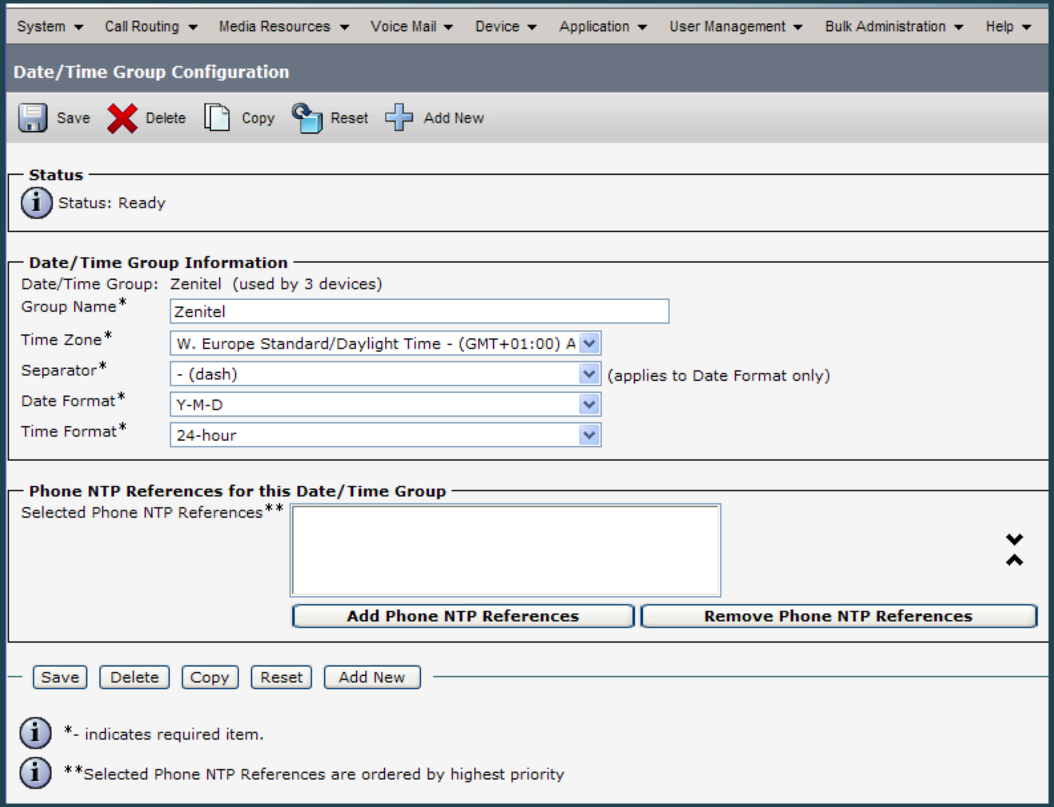


Erstmal die Call-Services aktivieren



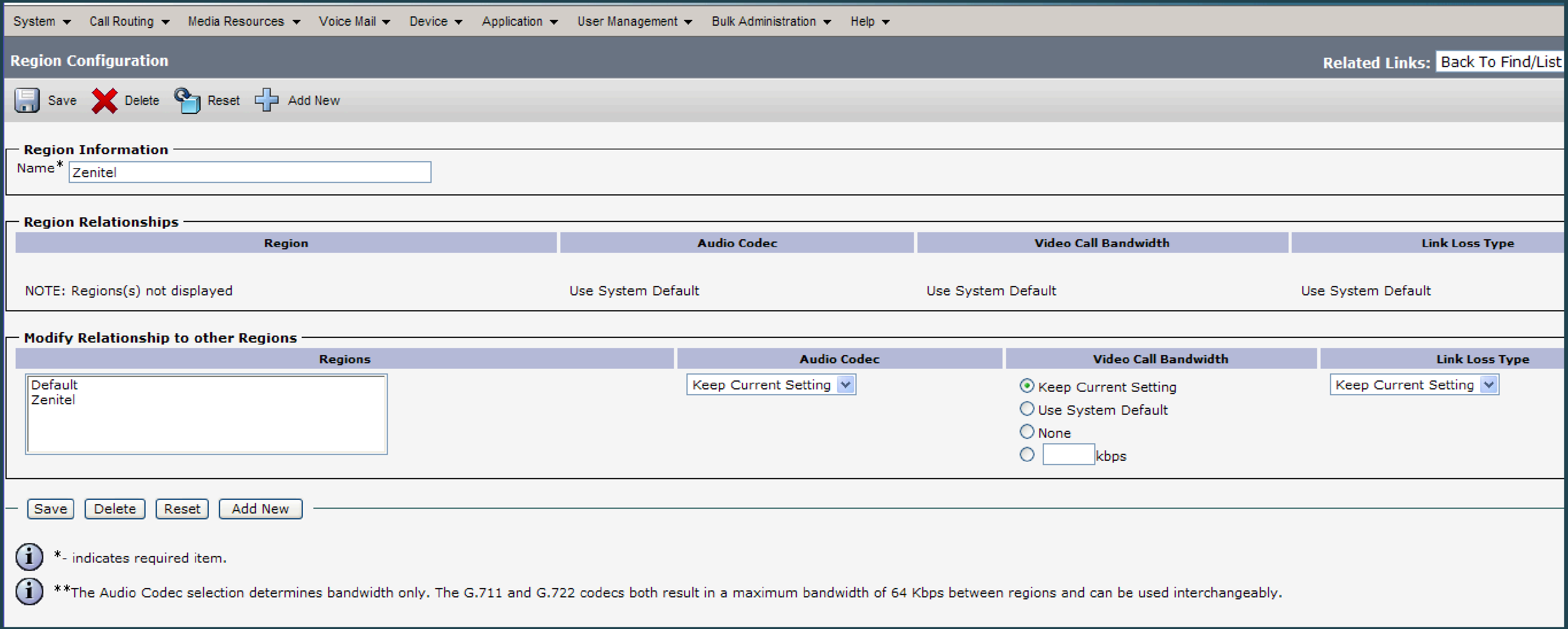
Schwamm drüber, noch 22 weitere Schritte

Date/Time Group Configuration



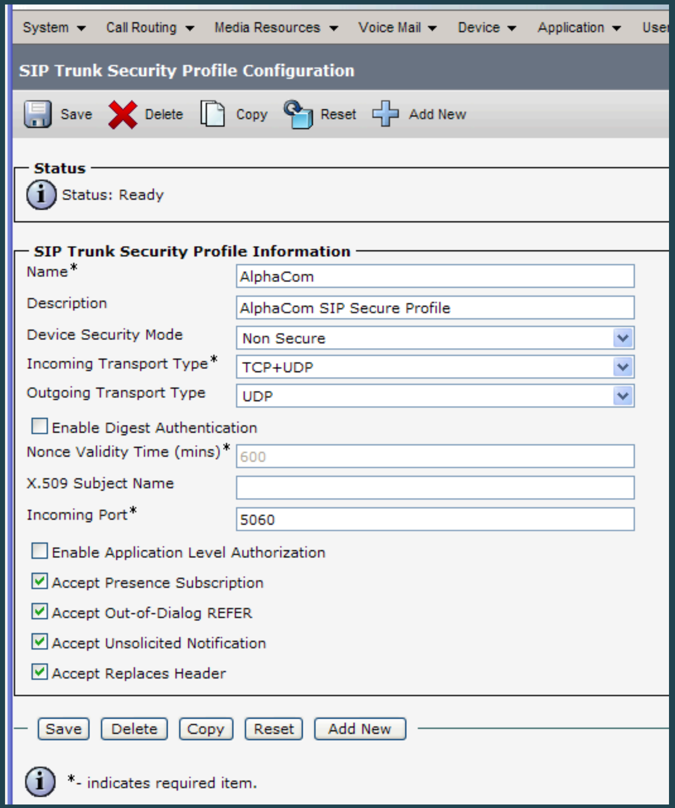
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Region Configuration



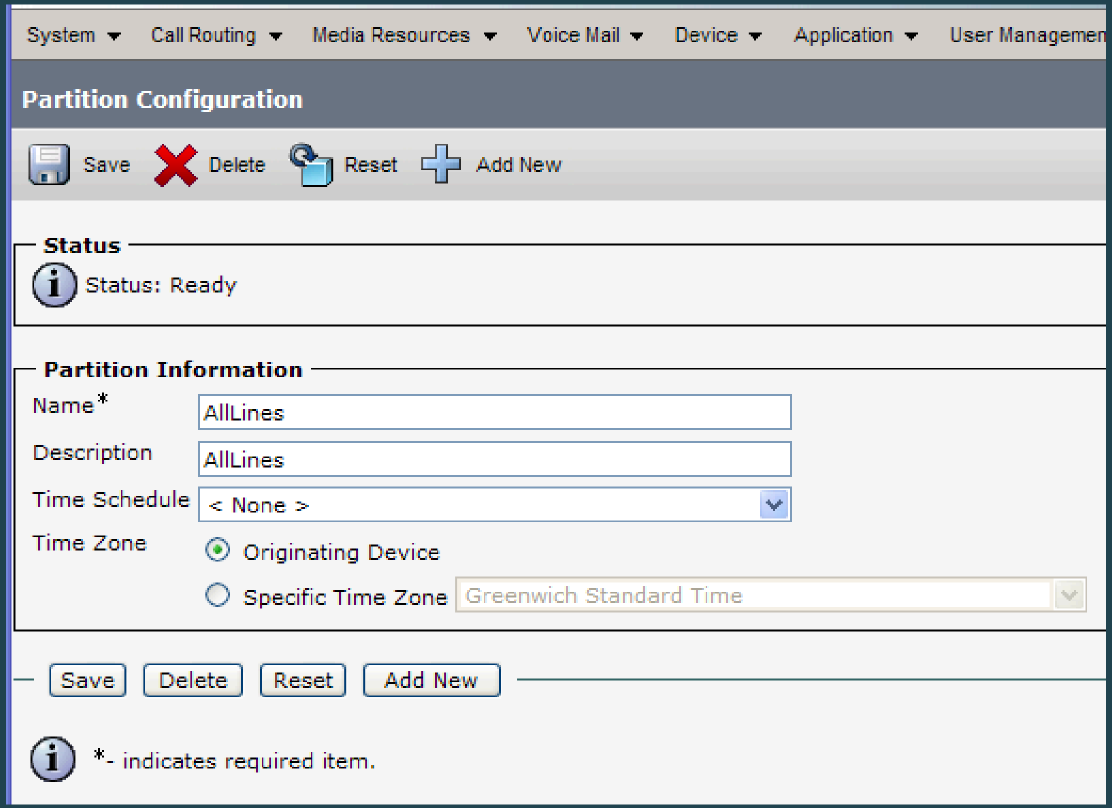
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

SIP Trunk Security Profile Configuration



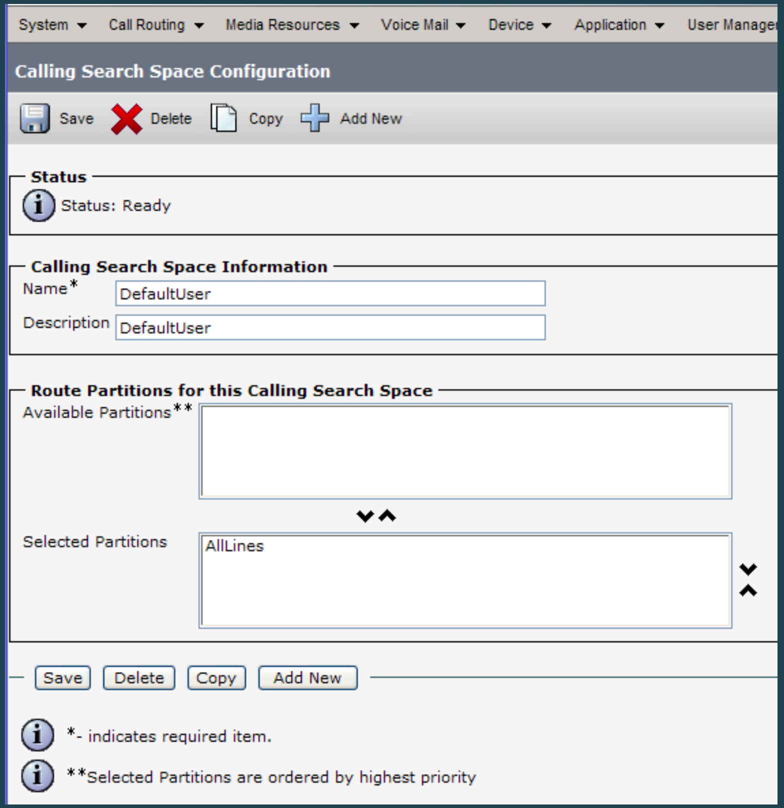
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Partition Configuration



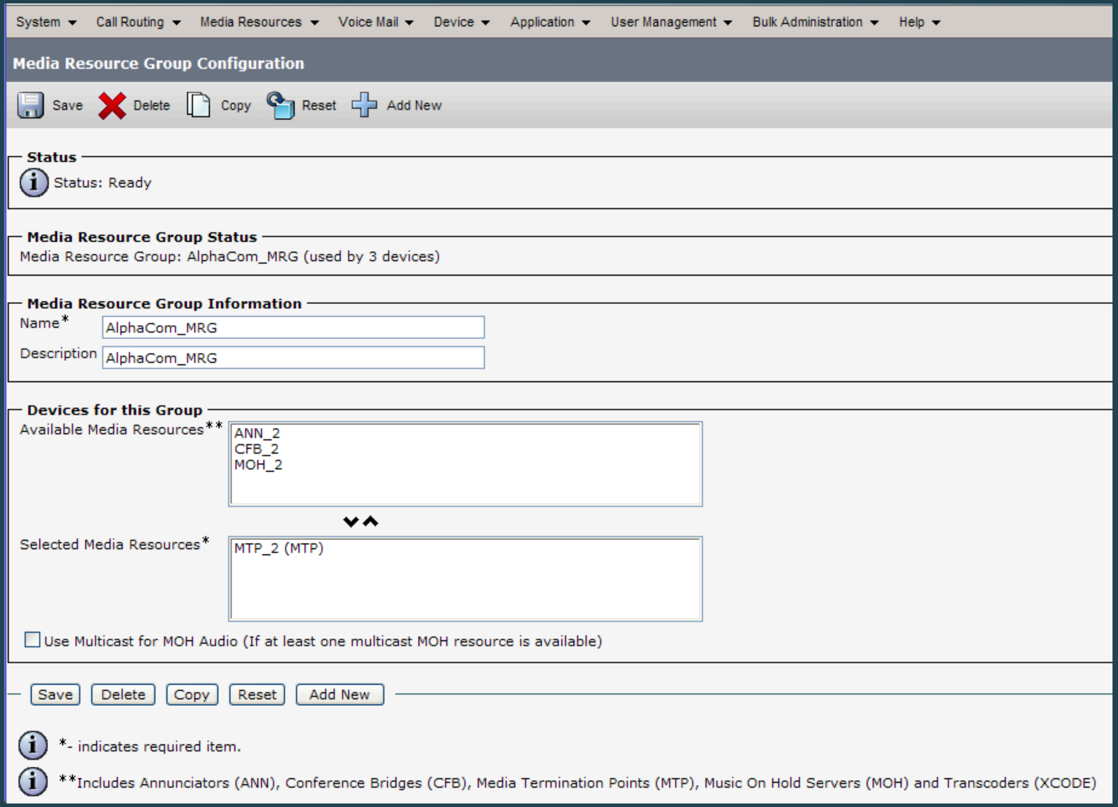
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Calling Search Space Configuration



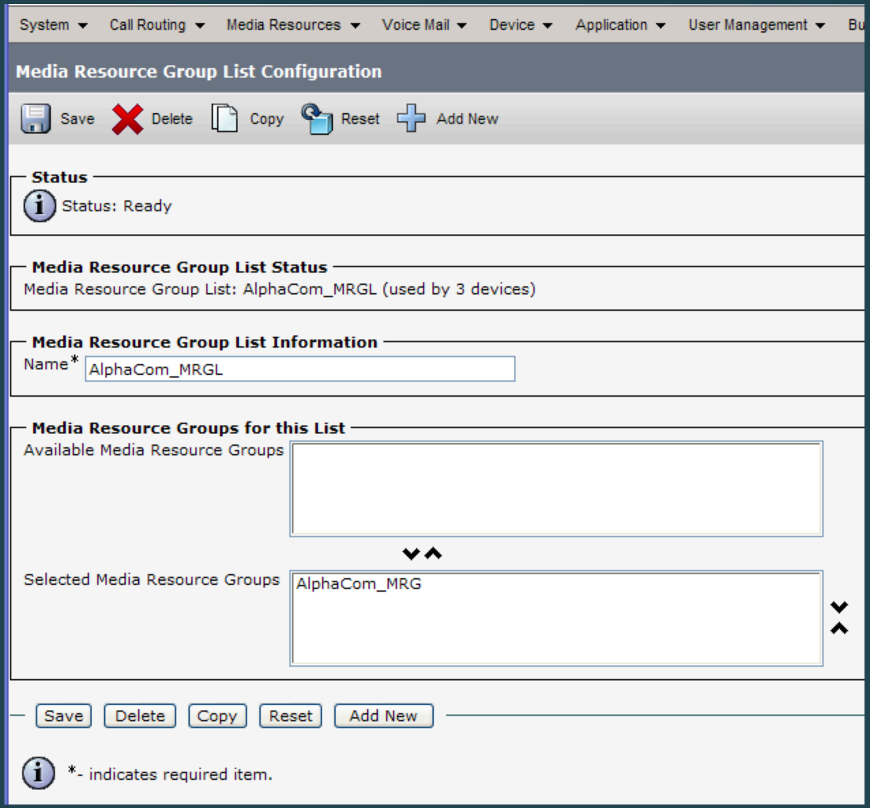
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Media Resource Group Configuration



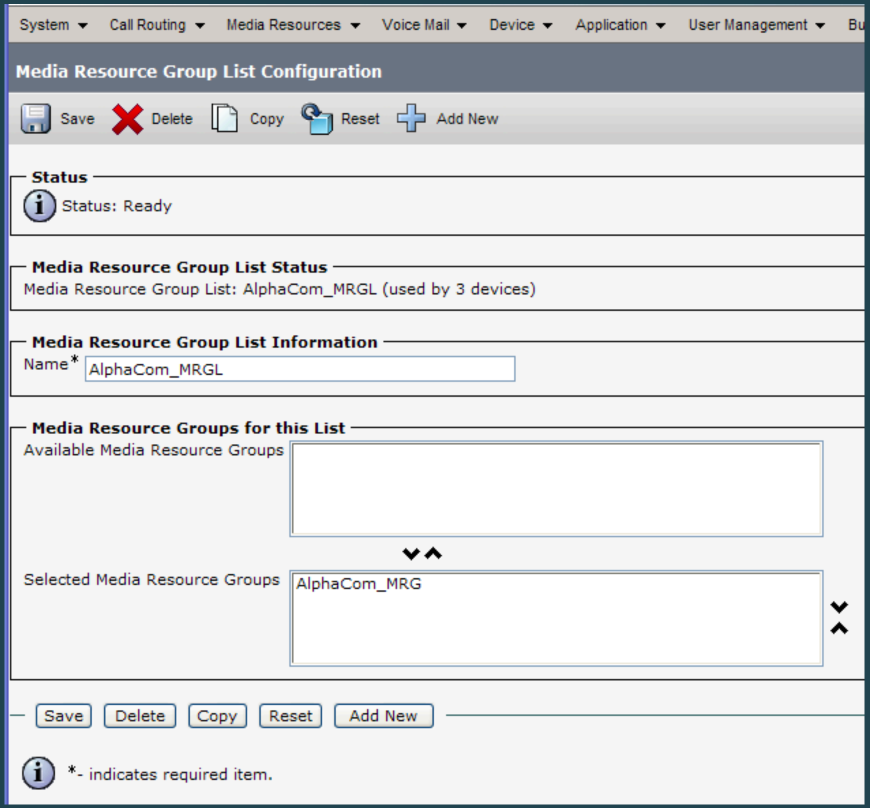
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Media Resource Group List Configuration



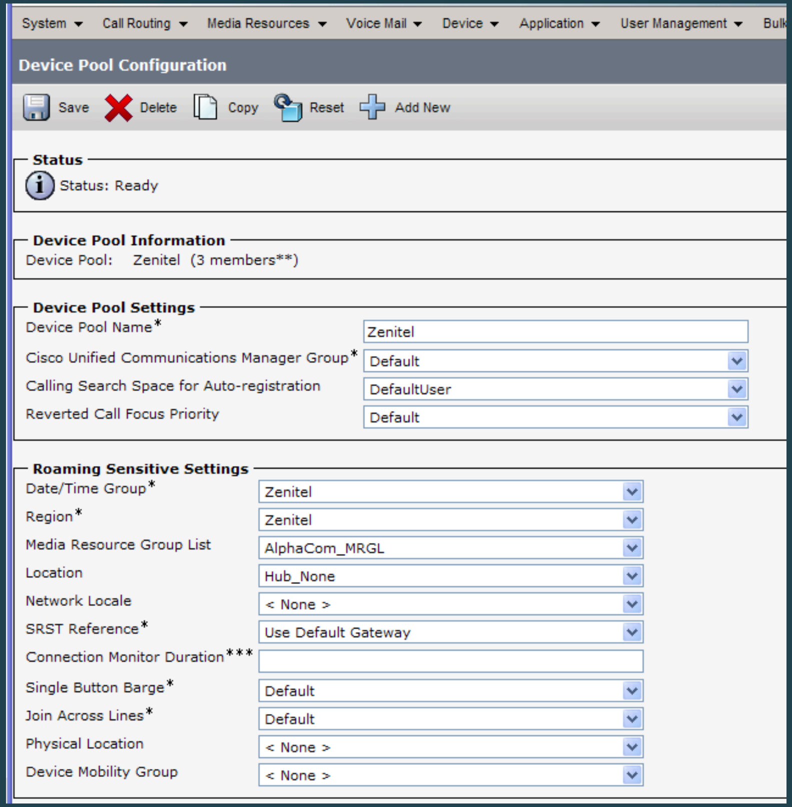
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Device Pool Configuration



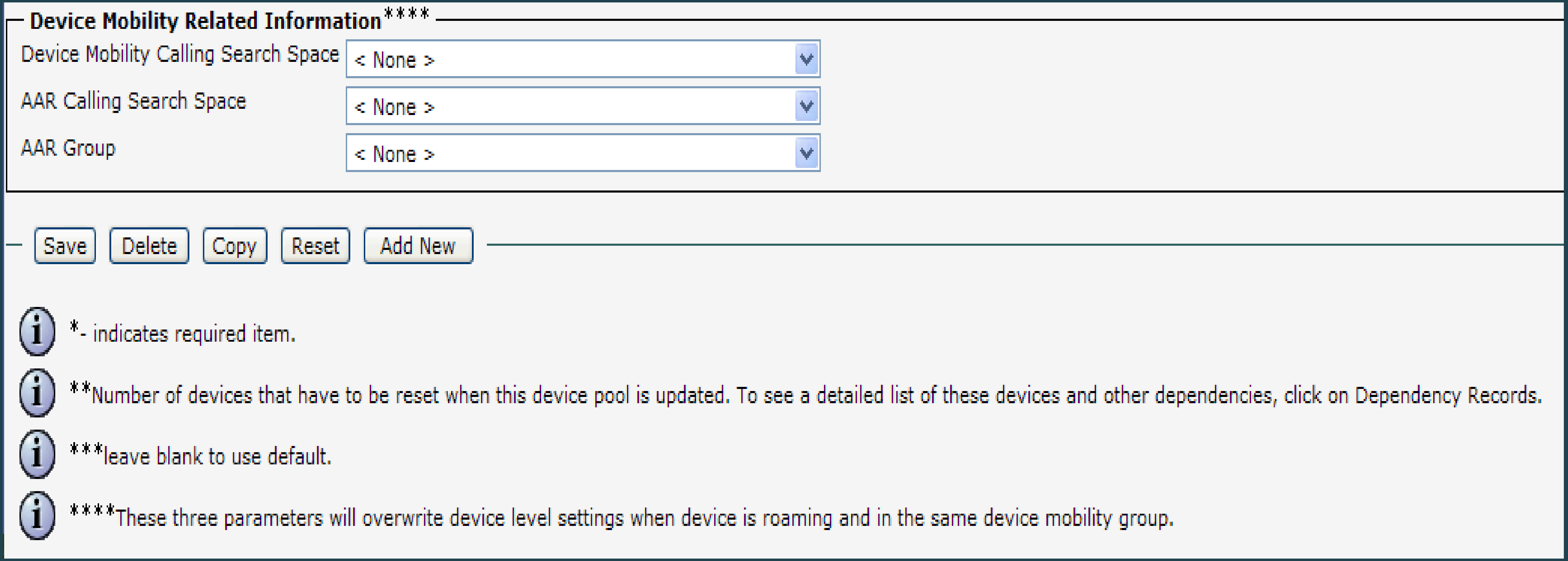
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Device Pool Configuration, continued



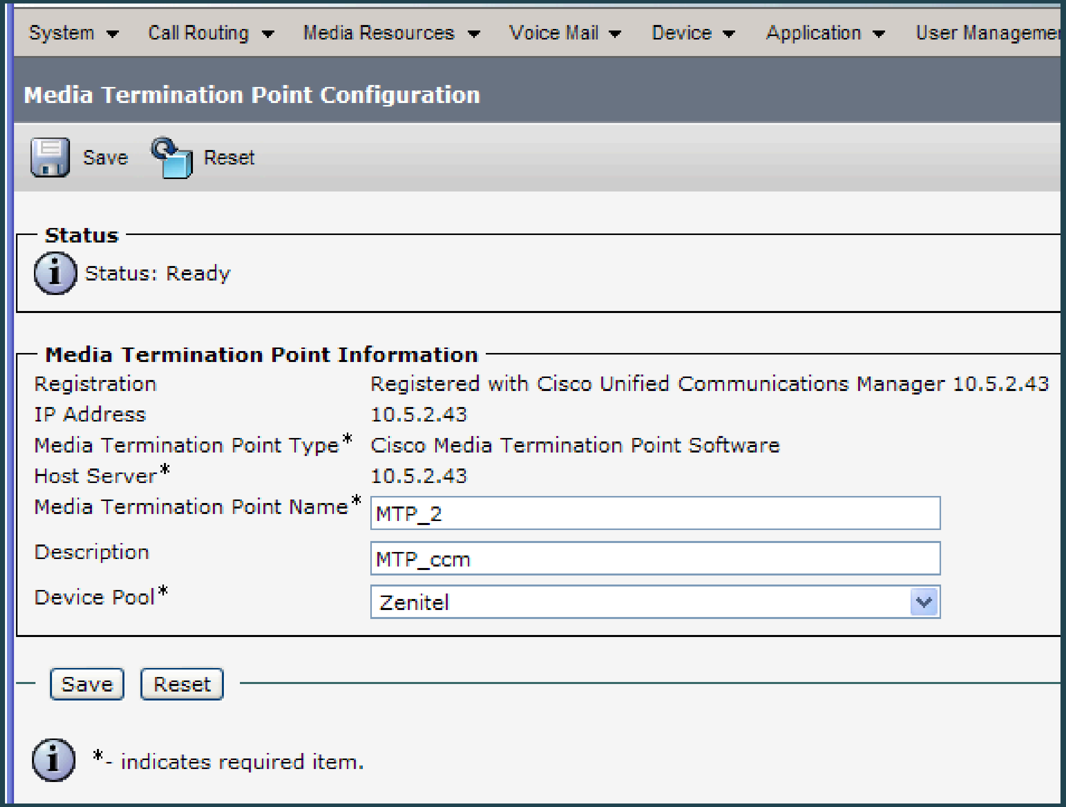
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Media Termination Point Configuration



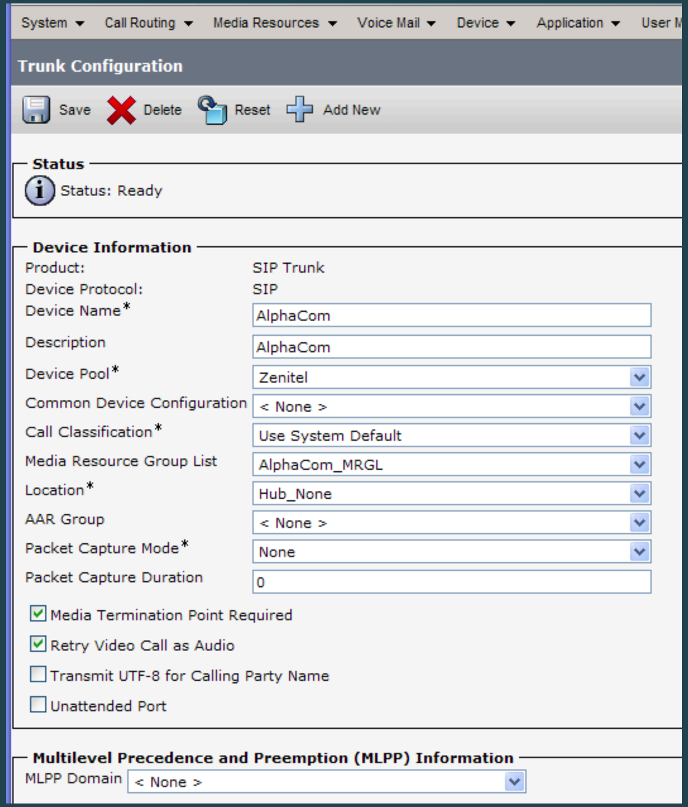
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Trunk Configuration



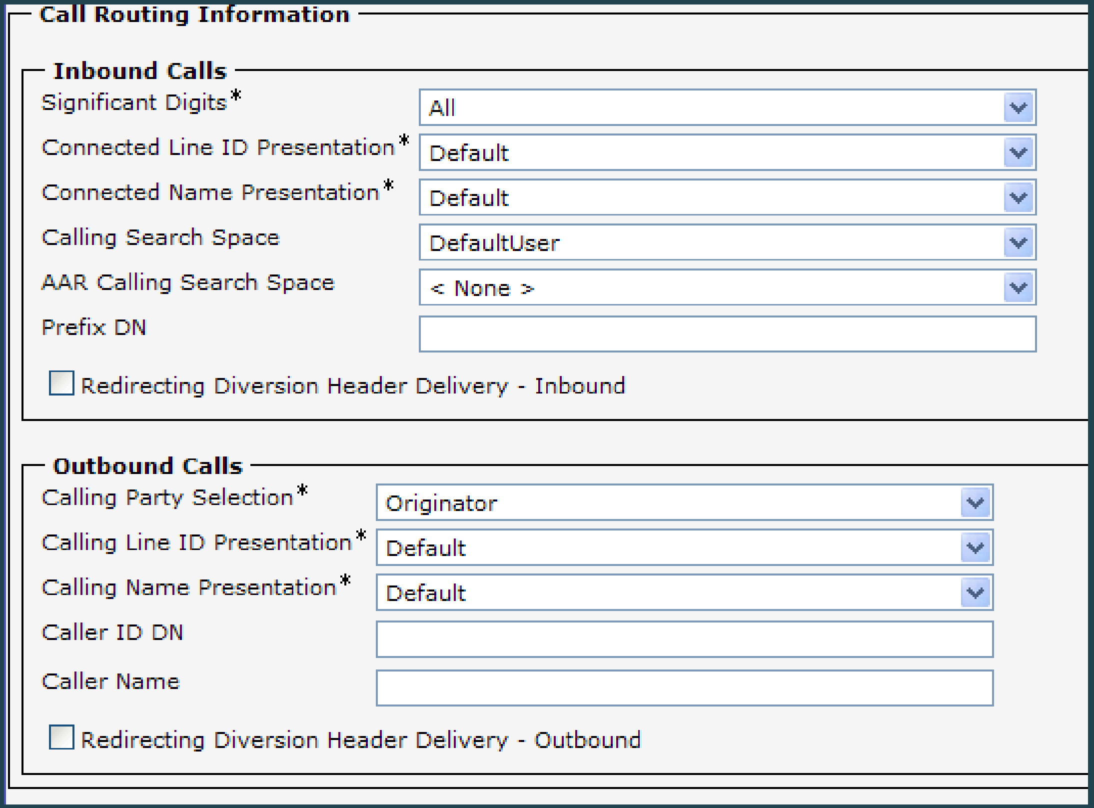
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Trunk Configuration, continued



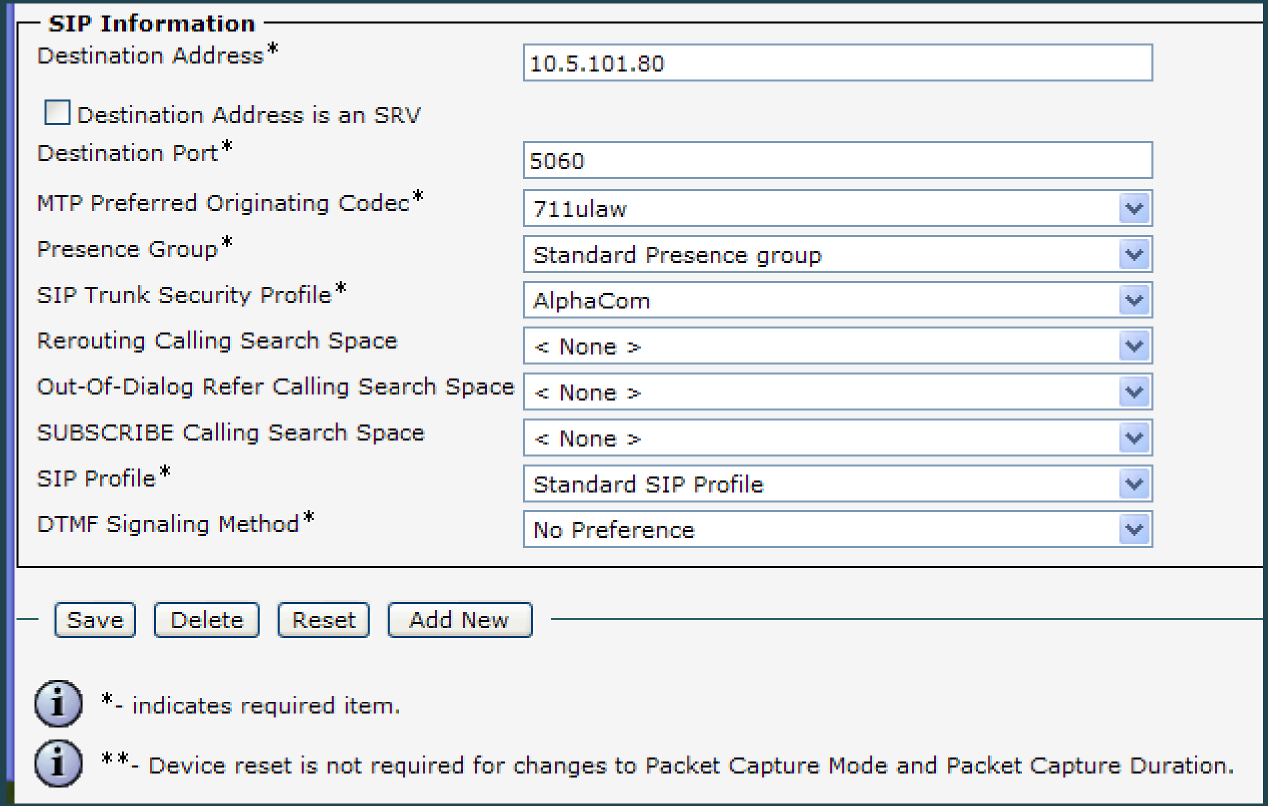
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Trunk Configuration, continued



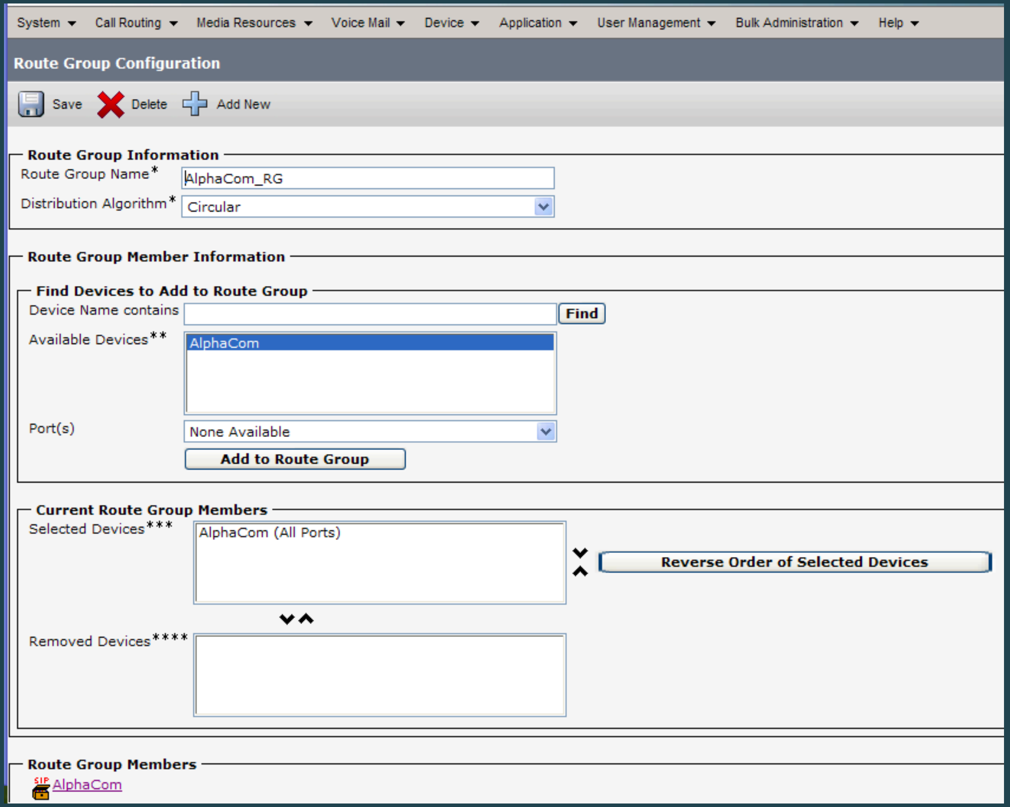
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Route Group Configuration



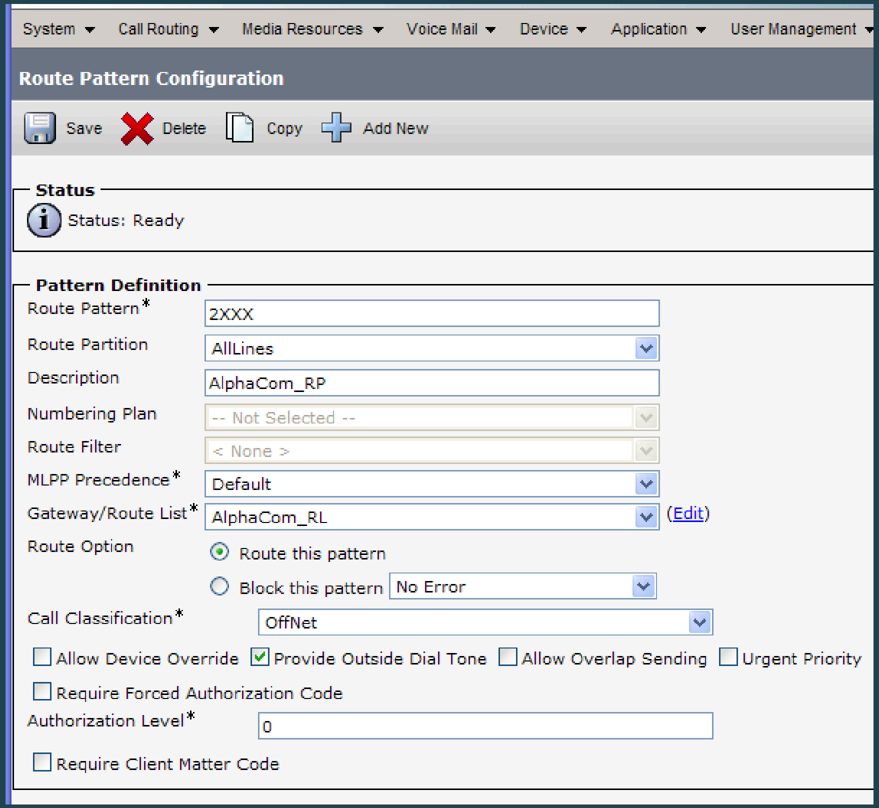
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Route List Configuration



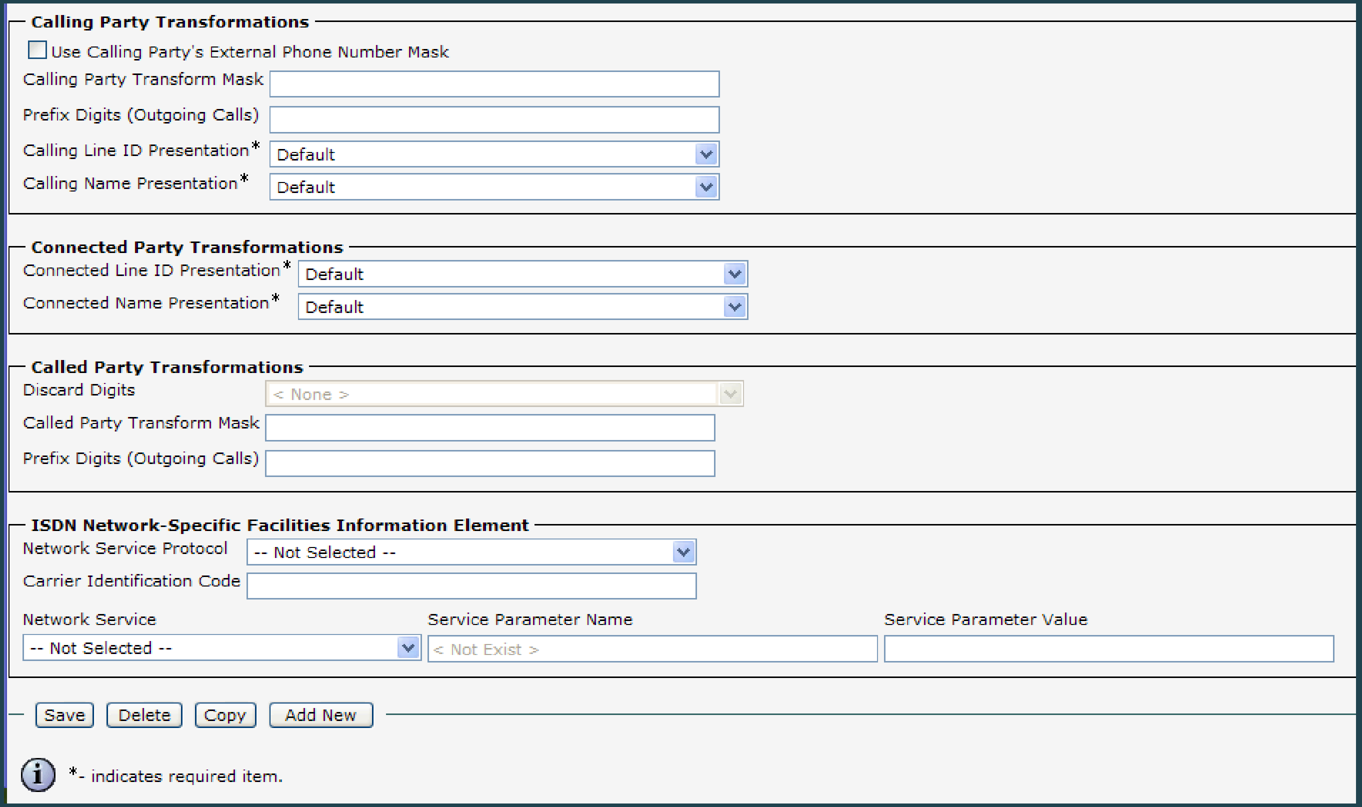
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Route Pattern Configuration



Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Route Pattern Configuration, continued



Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask

Prefix Digits (Outgoing Calls)

Calling Line ID Presentation* Default

Calling Name Presentation* Default

Connected Party Transformations

Connected Line ID Presentation* Default

Connected Name Presentation* Default

Called Party Transformations

Discard Digits < None >

Called Party Transform Mask

Prefix Digits (Outgoing Calls)

ISDN Network-Specific Facilities Information Element

Network Service Protocol -- Not Selected --

Carrier Identification Code

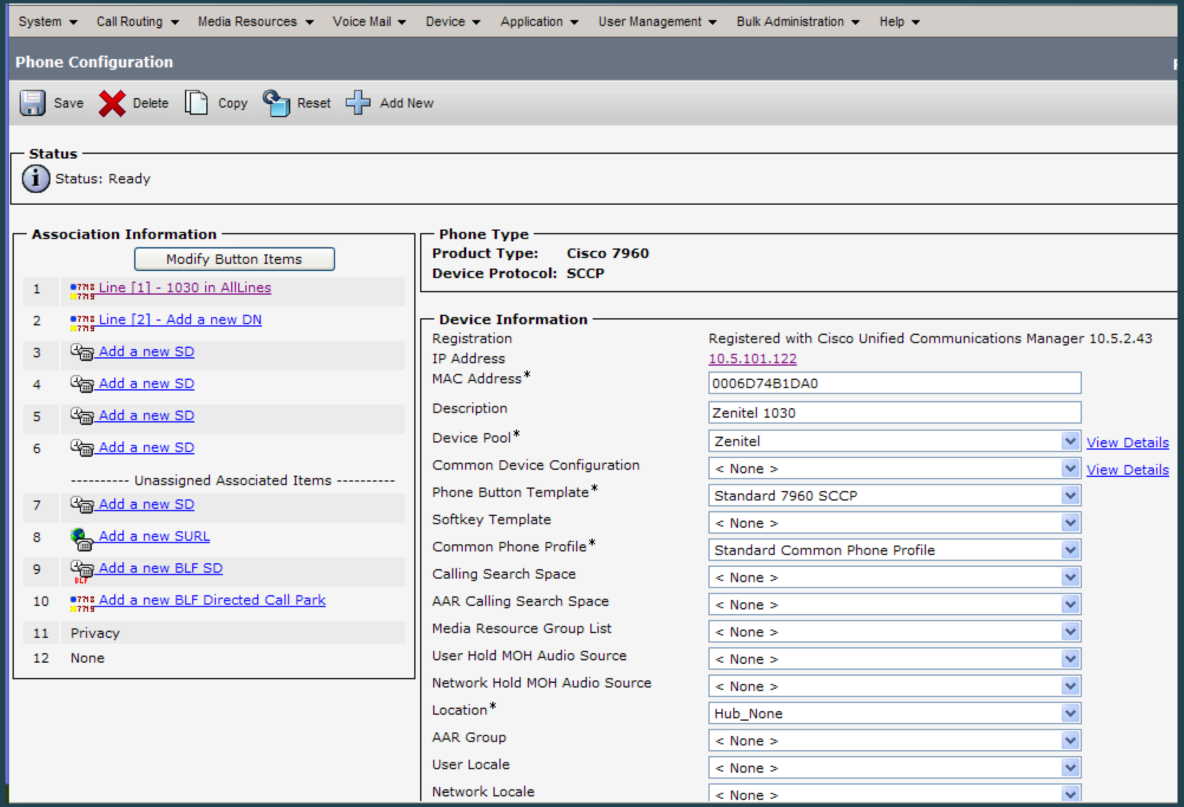
Network Service	Service Parameter Name	Service Parameter Value
-- Not Selected --	< Not Exist >	

Save | Delete | Copy | Add New

*- indicates required item.

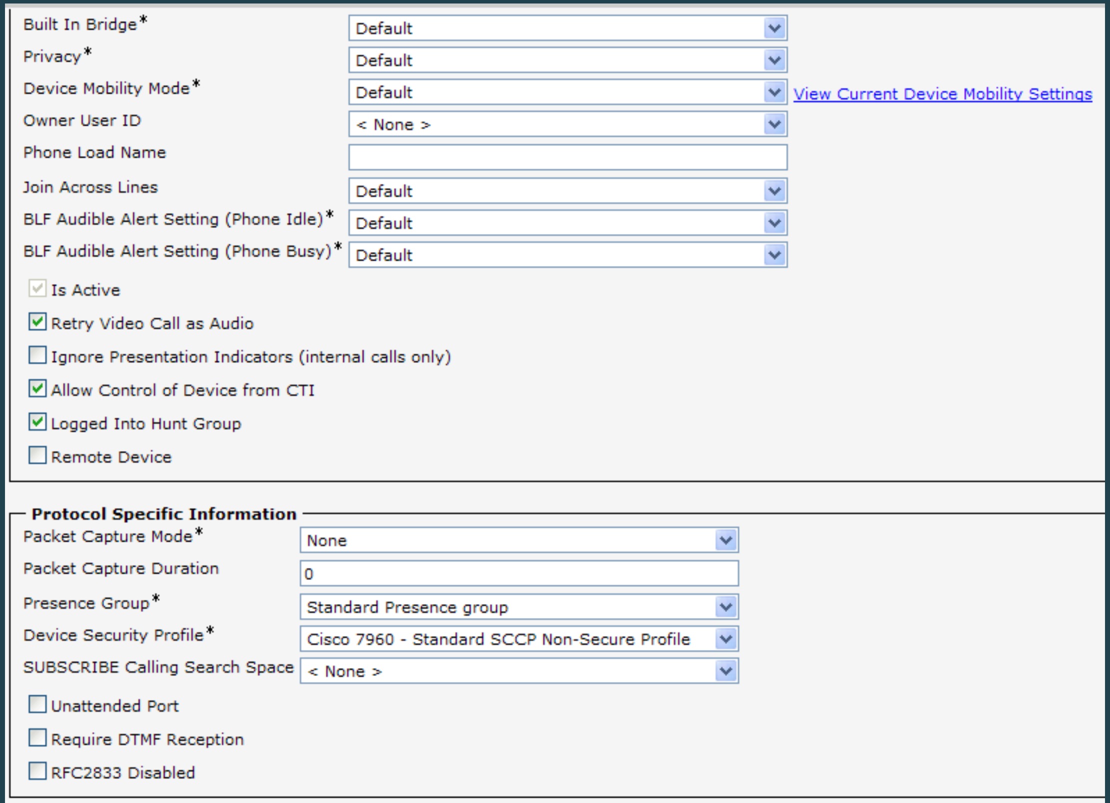
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Phone Configuration



Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Phone Configuration, continued



Built In Bridge* — Default
Privacy* — Default
Device Mobility Mode* — Default — View Current Device Mobility Settings
Owner User ID — < None >
Phone Load Name
Join Across Lines — Default
BLF Audible Alert Setting (Phone Idle)* — Default
BLF Audible Alert Setting (Phone Busy)* — Default

- [x] Is Active
- [x] Retry Video Call as Audio
- [ ] Ignore Presentation Indicators (internal calls only)
- [x] Allow Control of Device from CTI
- [x] Logged Into Hunt Group
- [ ] Remote Device

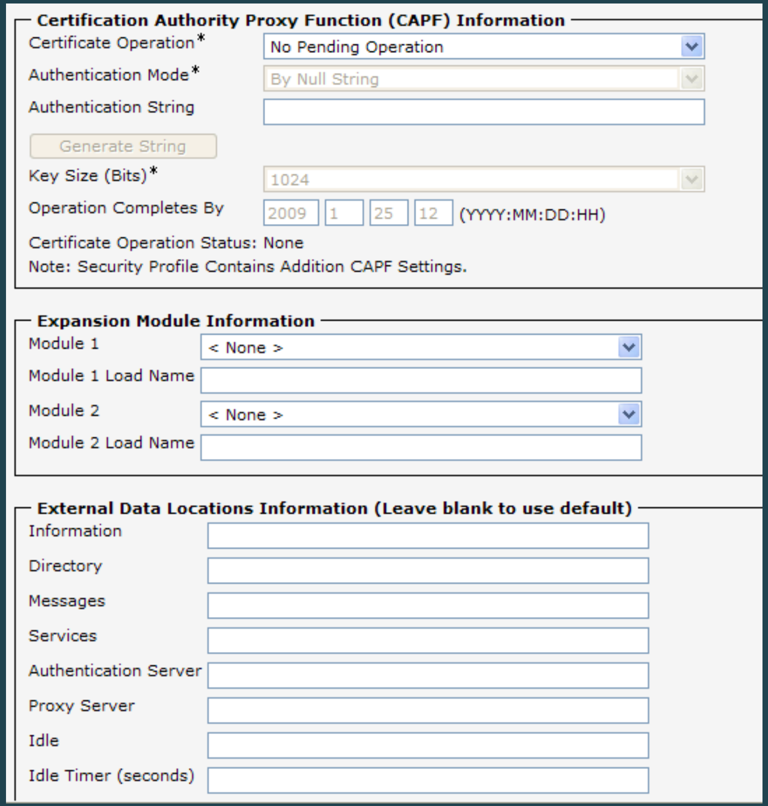
Protocol Specific Information

Packet Capture Mode* — None
Packet Capture Duration — 0
Presence Group* — Standard Presence group
Device Security Profile* — Cisco 7960 - Standard SCCP Non-Secure Profile
SUBSCRIBE Calling Search Space — < None >

- [ ] Unattended Port
- [ ] Require DTMF Reception
- [ ] RFC2833 Disabled

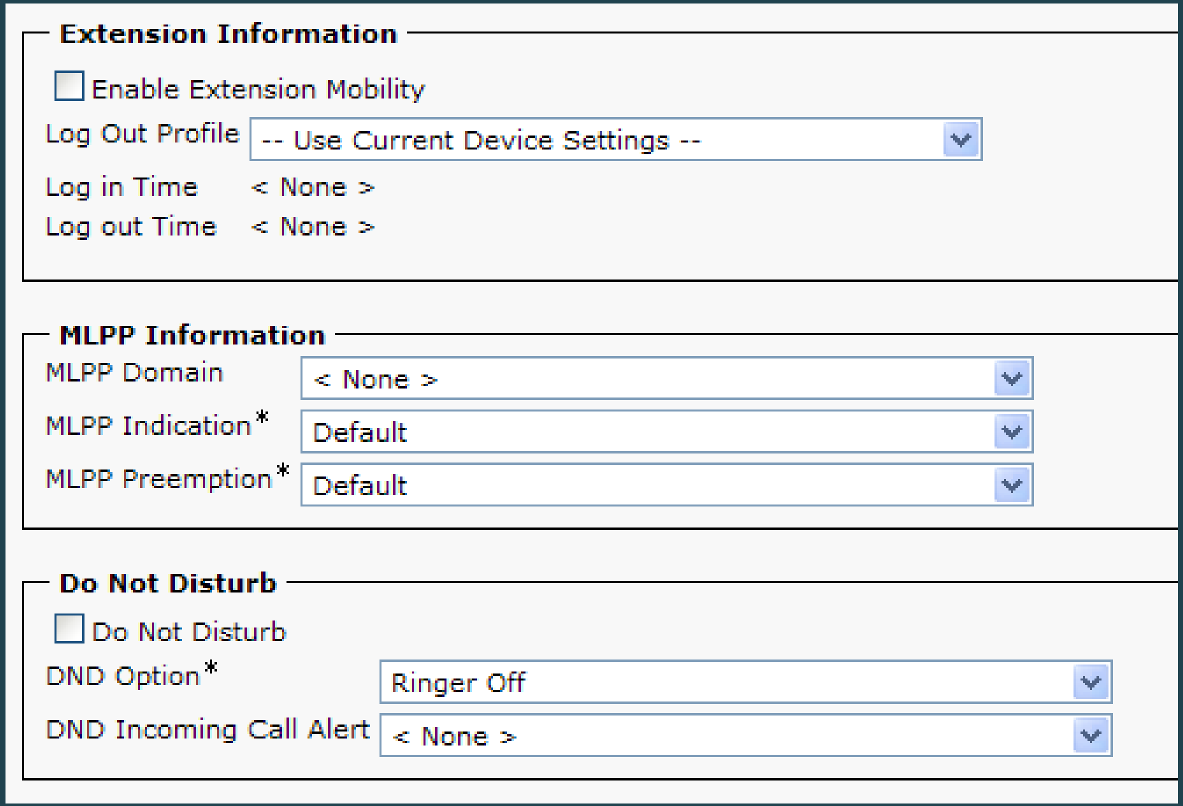
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Phone Configuration, continued



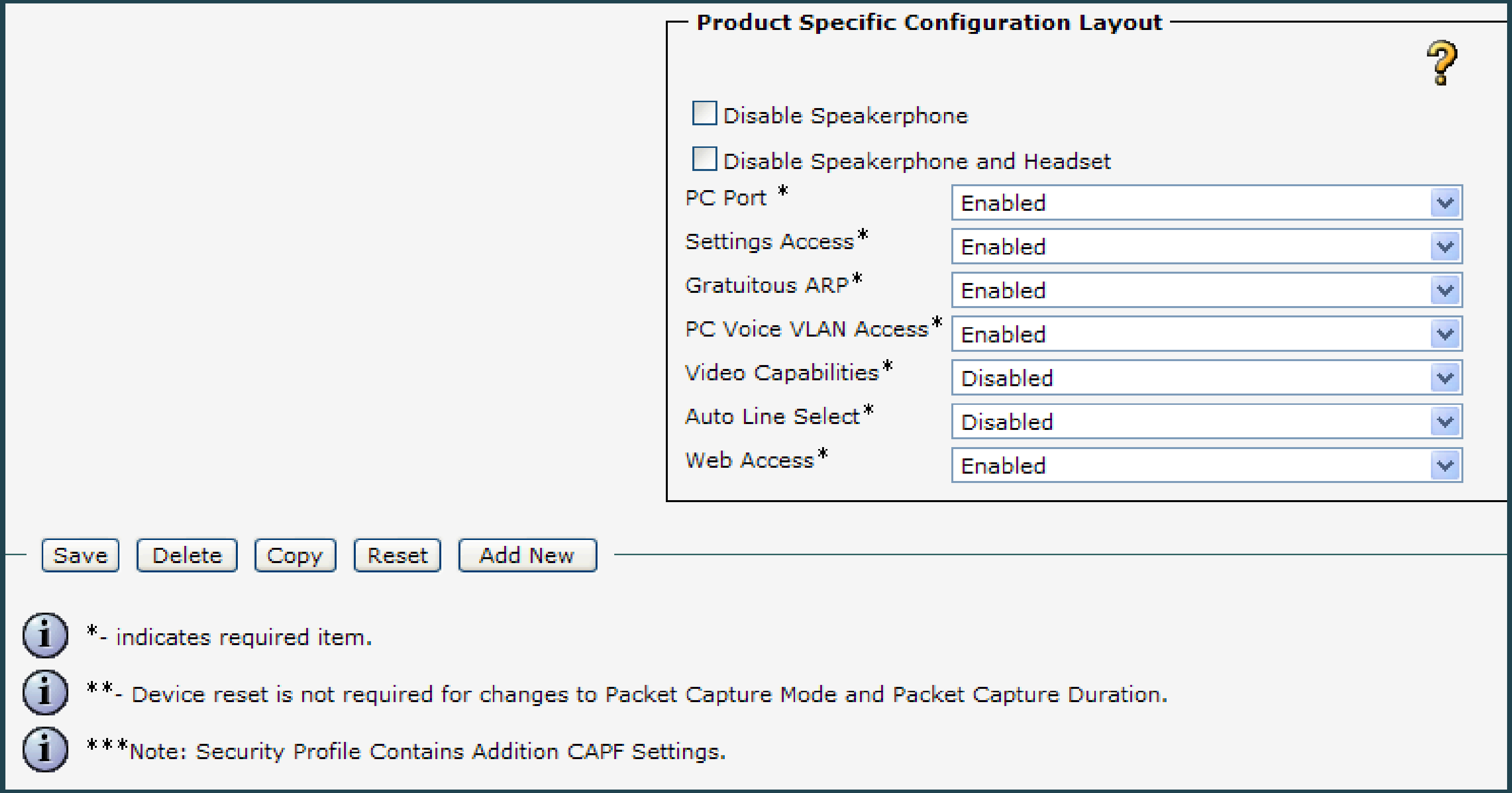
Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Phone Configuration, continued



Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

Phone Configuration, continued

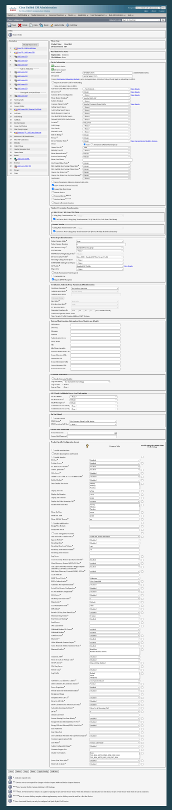


Quelle: https://wiki.zenitel.com/wiki/Cisco_Call_Manager_6_configuration_guide

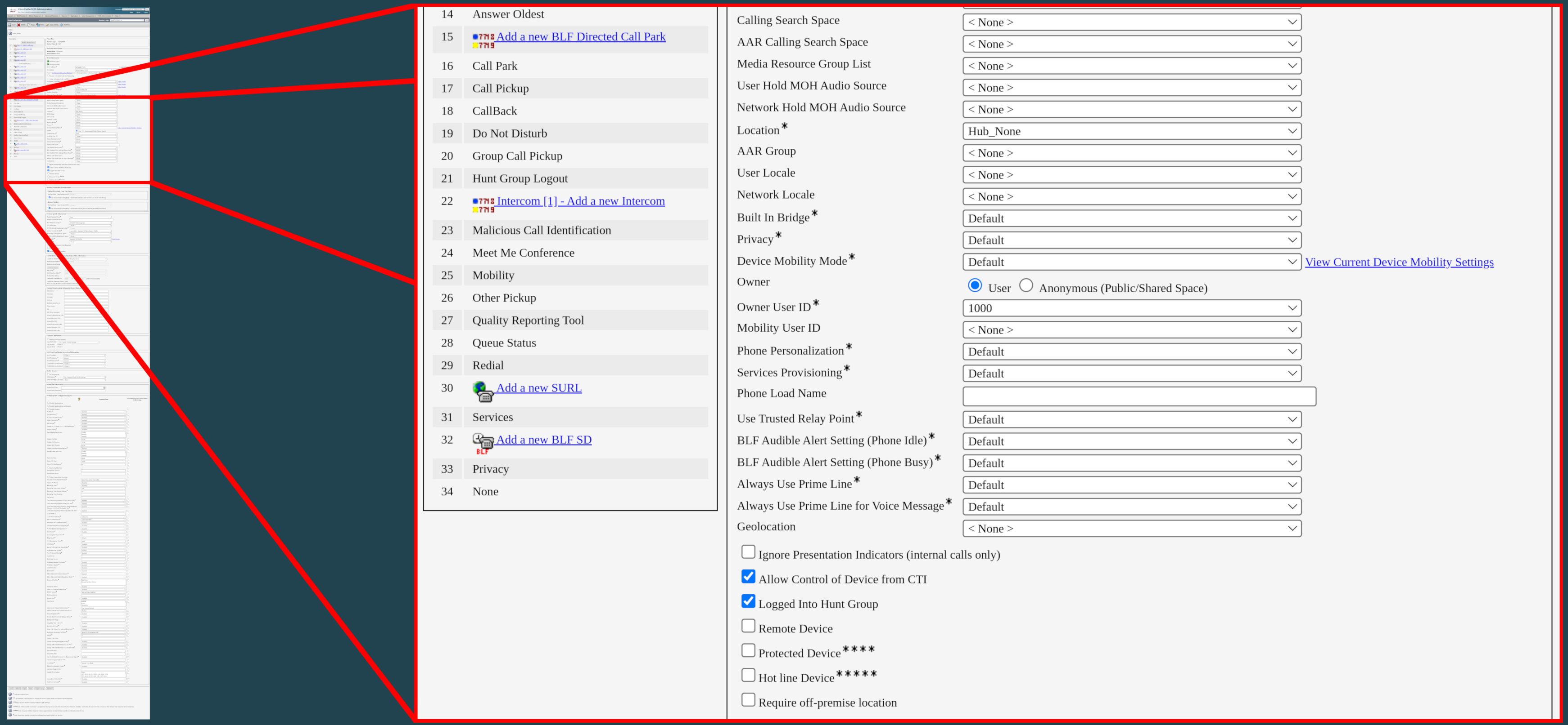
Please stop ...

Quelle: https://www.kapwing.com/explore/crying-cat-meme-template

Setup Cisco 8845



Setup Cisco 8845 (800% Zoom)



Genug Einrichtung!

Demo mit CUCM (Cisco 8945).

Warte … das kennen wir doch?!

Schauen wir uns den SDP-Invite nochmal an

```
m=video 14184 RTP/AVP 103 99\r\n

a=crypto:1 AES_CM_128_HMAC_SHA1_80 inline:CNI3haHVYr2rIME59idfVnkL+rRm7OkldGIx1r0O\r\n

a=ice-ufrag:3cc7bc704d150b5f4a71ed0b73ed5dcb\r\n
a=ice-pwd:7626025f51a15160720372474984cccf\r\n
a=candidate:Hc0a803b2 1 UDP 2130706431 192.168.3.178 14184 typ host\r\n
a=candidate:Hac110001 1 UDP 2130706431 172.17.0.1 14184 typ host\r\n
...
a=candidate:Hc0a87a01 2 UDP 2130706430 192.168.122.1 14185 typ host\r\n
a=candidate:Ha003016 2 UDP 2130706430 10.0.48.22 14185 typ host\r\n

a=rtpmap:103 h263-1998/90000\r\n
a=fmtp:103 CIF4=1;CIF=1;QCIF=1;CUSTOM=352,240,1;MaxBR=30000\r\n

a=rtpmap:99 H264/90000\r\n
a=fmtp:99 max-mbps=245000;max-fs=8160;max-br=2500;max-smbps=245000;max-fps=3000;packetization-mode=0;profile-level-id=428014\r\n

a=sendrecv\r\n
```

SDP-Invite (nur Video-Bereich)

```
m=video 14184 RTP/AVP 103 99\r\n

a=rtpmap:99 H264/90000\r\n
a=fmtp:99 max-mbps=245000;max-fs=8160;max-br=2500;max-smbps=245000;max-fps=3000;packetization-mode=0;profile-level-id=428014\r\n

a=sendrecv\r\n
```

Die Lösung

Bitrate richtig berechnen!

Encoder richtig einstellen!

Genug Einrichtung!

Demo mit CUCM (Webex DX80).

Warte … das kennen wir doch?!

Hatten wir die Bitrate nicht gefixed?

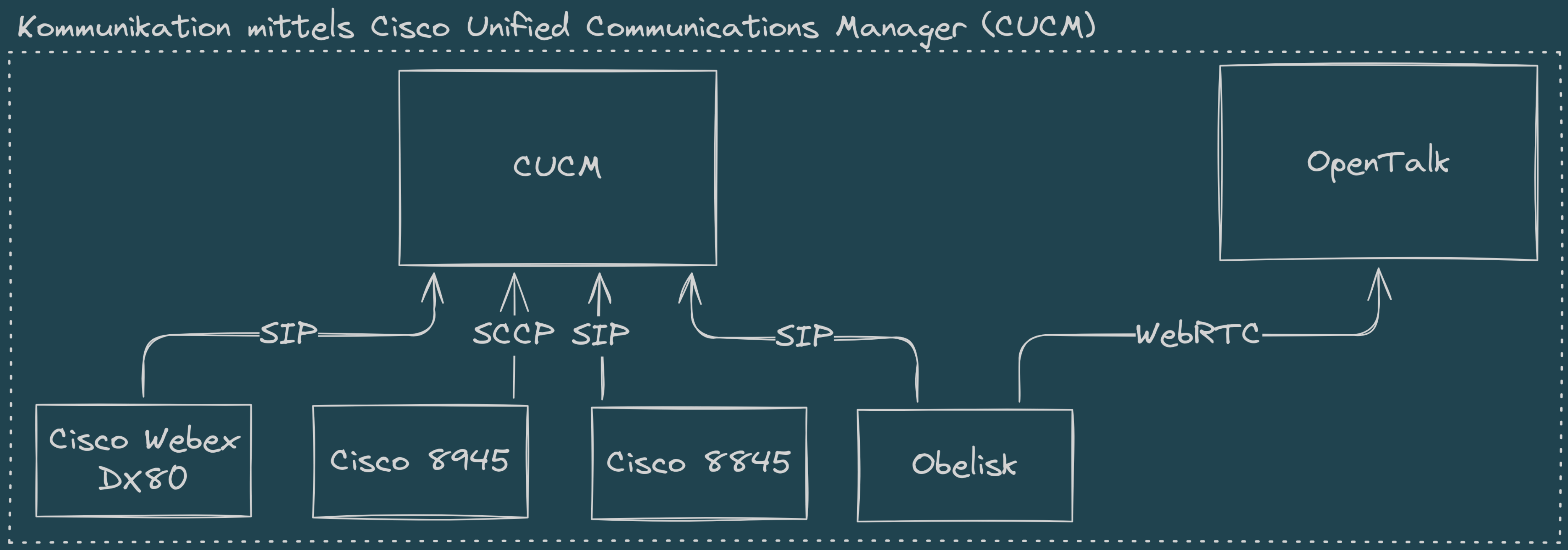
Die Lösung

Bitrate durch Zwei teilen!

- Cisco geht von "Duplex" aus (Hin- und Rück-Transport)

Kleinere Fuckups

"Fun" mit dem Cisco 8945



Senden der Kamera -> Crash des Telefons (Obelisk)

"Fun" mit Langzeittests

- Verbindung hängen geblieben nach 15 Minuten
- Decoder-Error nach 15 Minuten (Video bleibt stehen)
- Lösung: Senden bei Decoder-Fehlern ein Keyframe-Request in XML über SIP

Scheinbar kein ICE-Support

- Standardmäßig nicht an
- Keine Doku gefunden
- Nach Consultig-Anfrage angeblich nicht vorhanden
- Netzwerk-Topologien zu überkreuzen (sprich verschiedene Netzwerke)

SRTP (Secure RTP)

- Ist eine eigene Lizenz
- "Kostenlos" bei jeder Telefon-Lizenz dabei
- Verwirrend aufzusetzen (kein Guide)

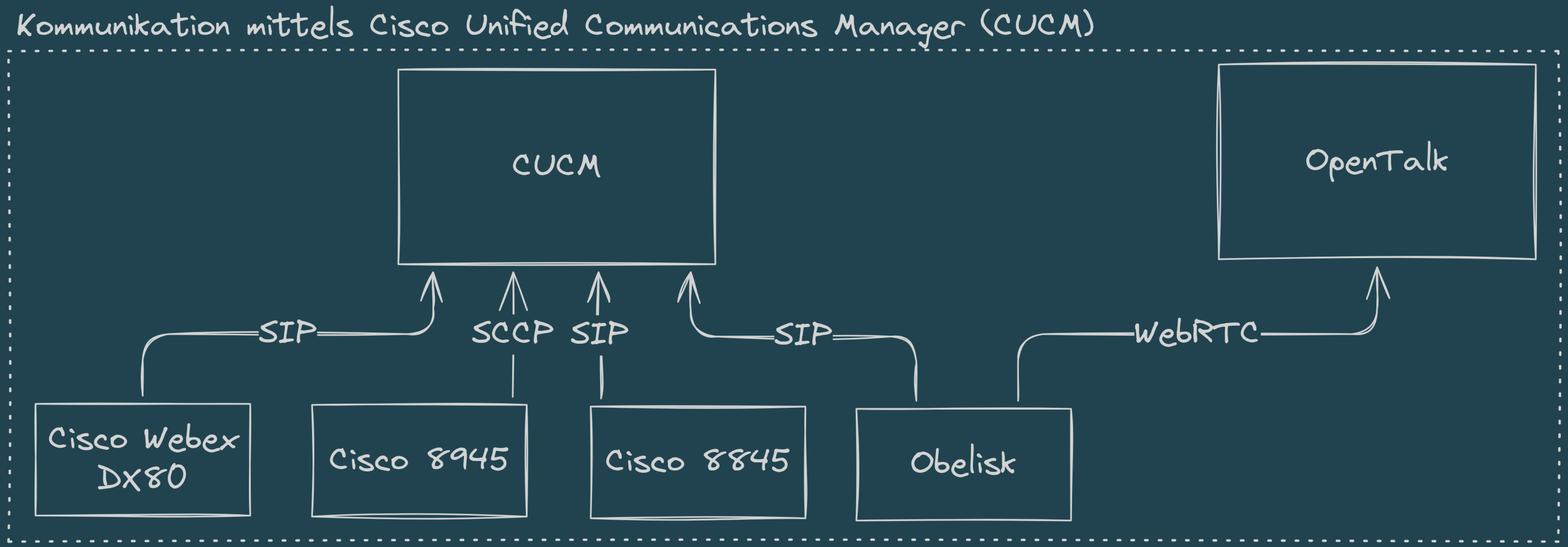
Lizenzmodell

- Intransparent
- Verwirrend

Vendor-Lock

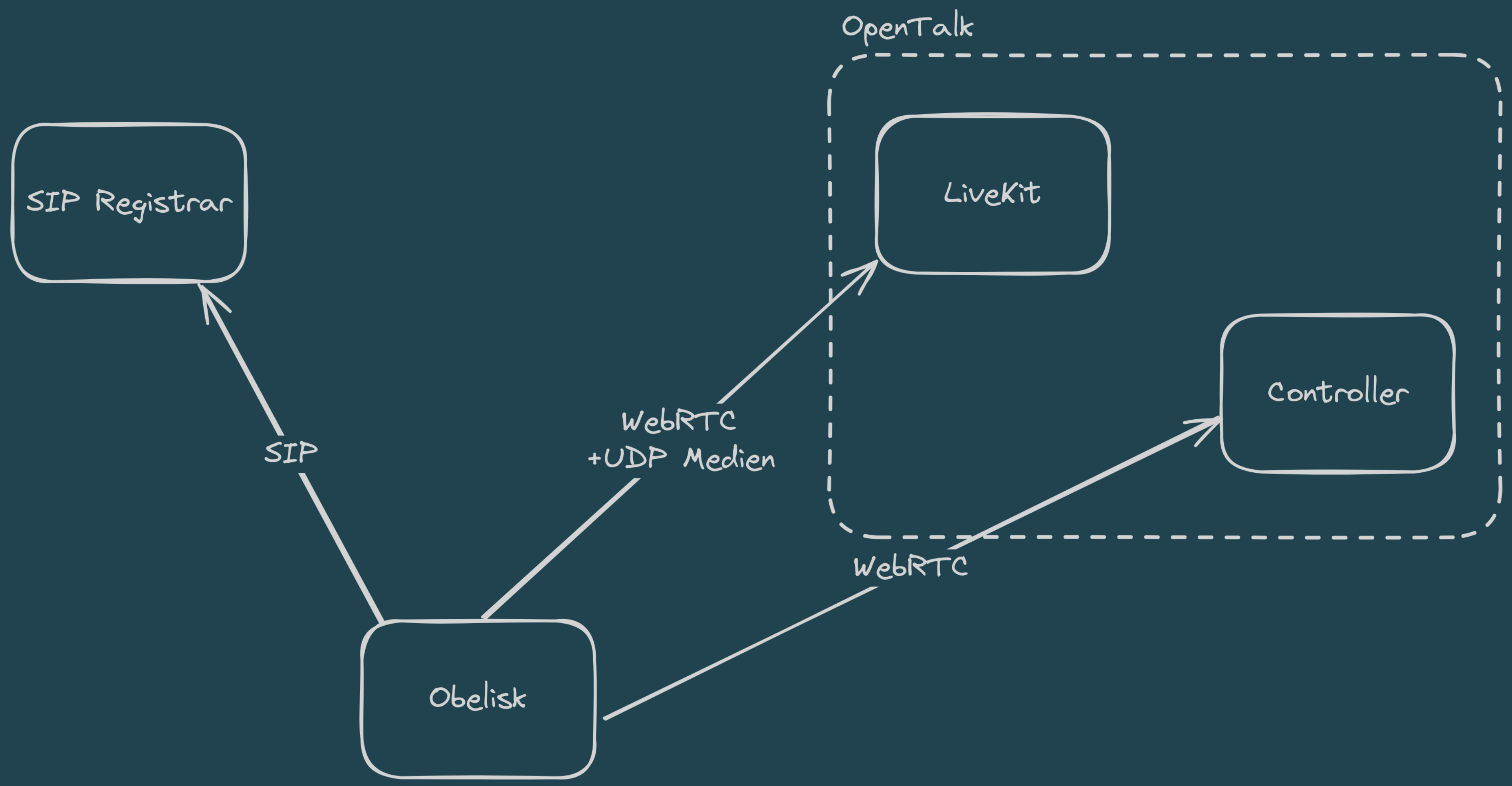
- Webex DX80 möchte "nach Hause telefonieren"
- Upgrader der Firmware unmöglich
- Startup-Netzwerk-Check
- Reset hat nichts gebracht

LiveKit



Kommunikation mittels Cisco Unified Communications Manager (CUCM)
CUCM
OpenTalk
SIP
SCCP
SIP
SIP
WebRTC
Cisco Webex DX80
Cisco 8945
Cisco 8845
Obelisk

LiveKit


OpenTalk
SIP Registrar
LiveKit
Controller
SIP
WebRTC
+UDP Medien
WebRTC
Obelisk

Wechsel von Janus zu LiveKit

- LiveKit skaliert extrem gut
- Fertige Helm-Charts
- Rust SDK
- Stabilere Verbindung

We appreciate Rust

- Komplette Codebase ist in Rust
- Alle Services (bis auf das Frontend)
- Kein GStreamer
- Alles selbst in Rust und mit SIMD neu geschrieben
- Kudos an das Team

Warum der ganze Schmerz?

- Weil wir es können … ;)

Warum der ganze Schmerz?

- Kunden haben viele Cisco Geräte
- Geräte wurden teuer angeschafft
- Geräte vom Aussterben retten (Nachhaltigkeit, reduce, reuse, ...)

Outcome

- SIP ist nicht gleich SIP
- Standard ist schwammig und jeder Hersteller hat seine eigene Auslegung
- Eigene Auslegung selbst Modellzpezifisch (in der gleichen Firma)

Dankeschön!

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*Alle Diagramme wurden mit Excalidraw gezeichnet