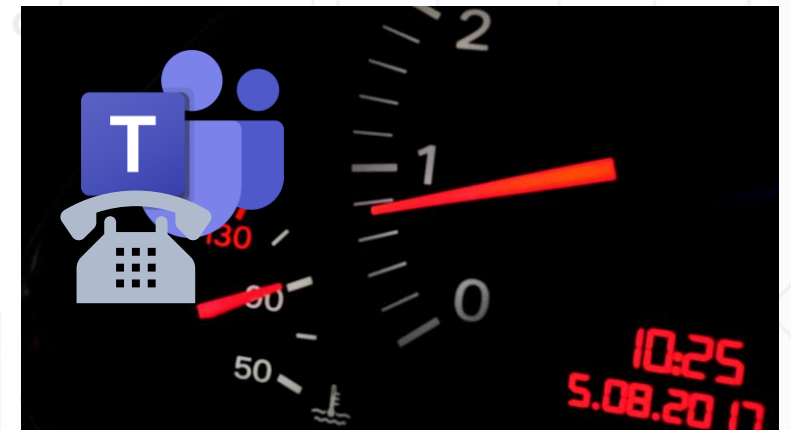




# Local Media Optimization with Teams Direct Routing

Teams Nation MeetUp

March 2021



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Microsoft UC Consultant

 @tpickhan

Blog: <https://office365.thorpick.de>

Video Blog:

<https://youtube.thorpick.de>



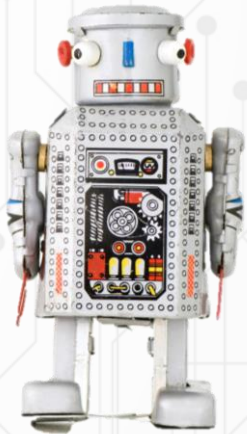
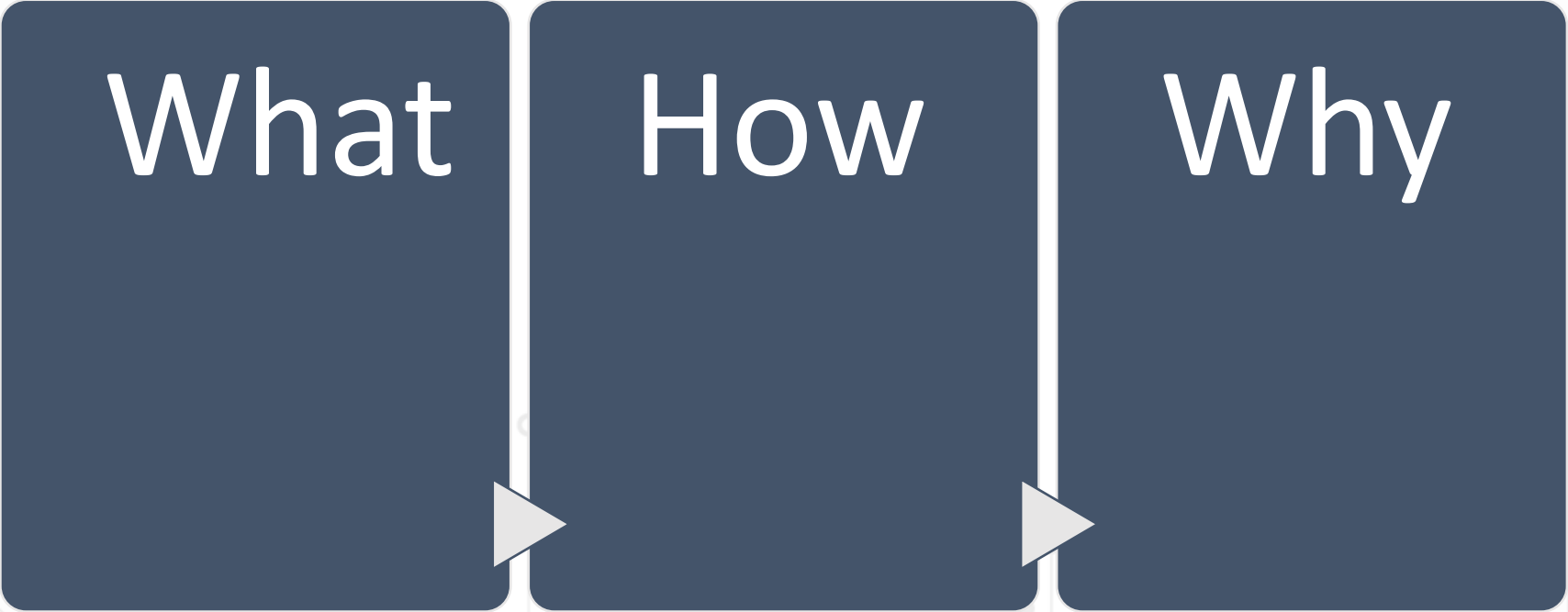
<https://www.talkm365.net>

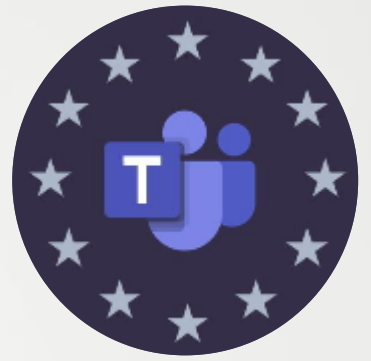
Host Teams User Group Germany (Bochum)

<https://www.skype4b-ug.de>



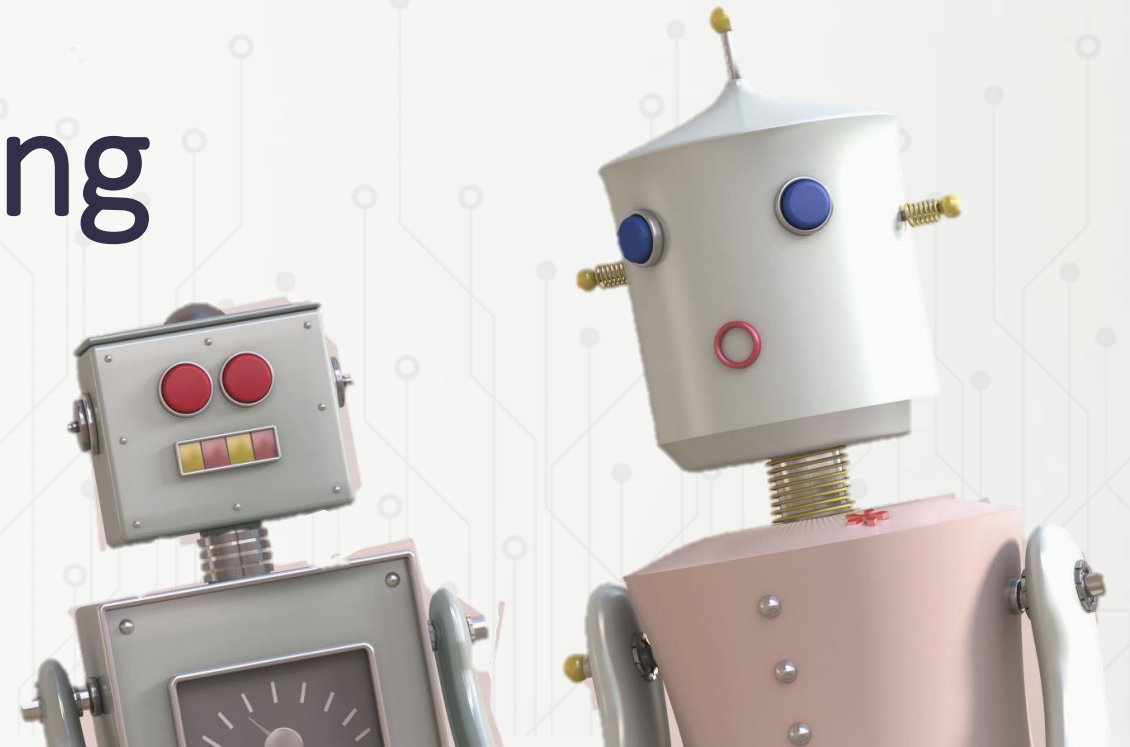
# The next few minutes...



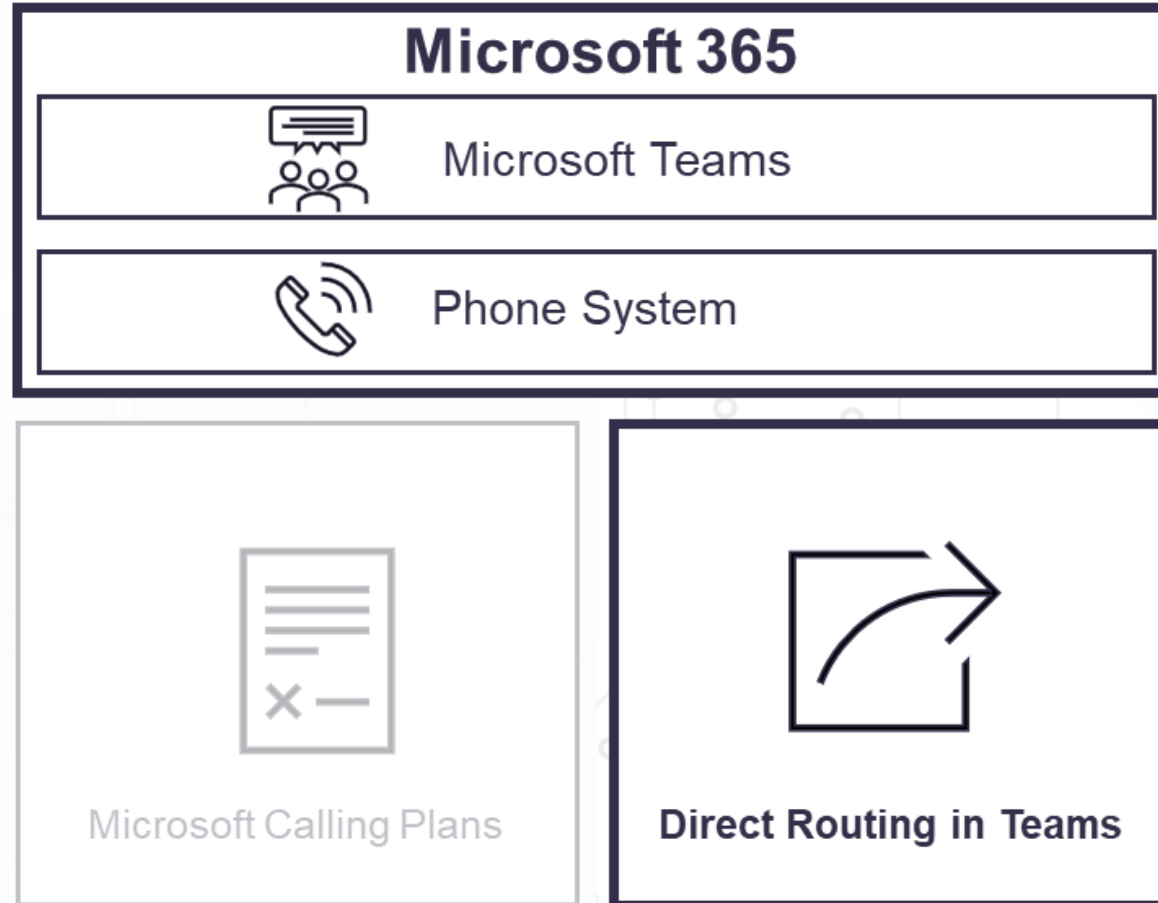


# Teams Direct Routing

## Basics



# Teams Direct Routing - Basics

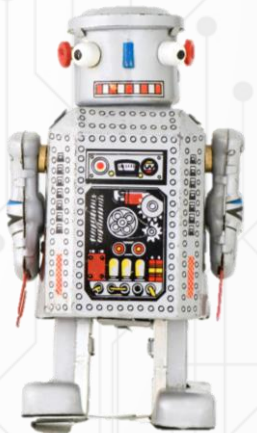


Microsoft/Office 365 Plan  
with Phone System

Session Border Controller

Public IP address

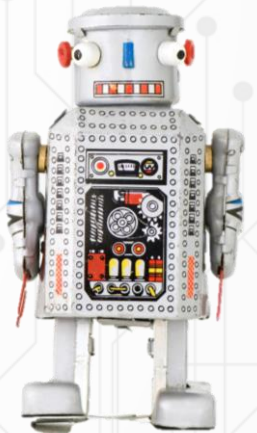
Public SSL Certificate

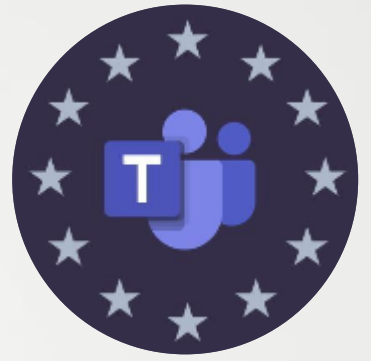


# Teams Direct Routing - Basics



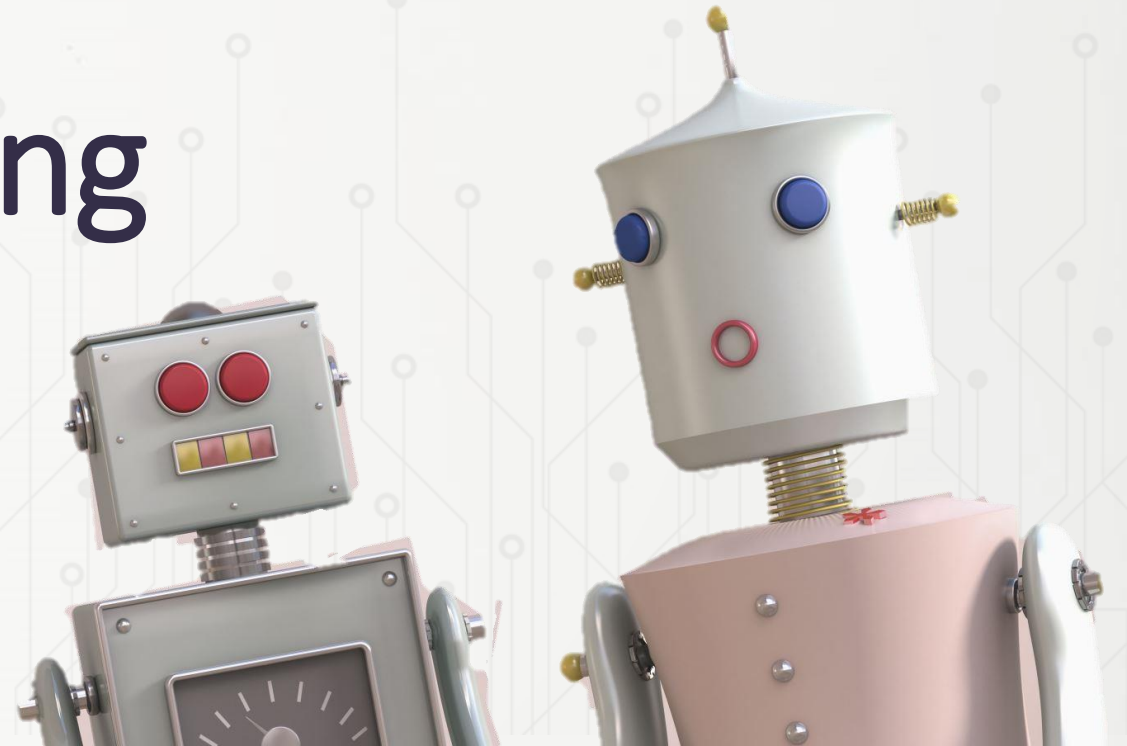
- SBC converts carrier SIP into Microsoft Teams SIP & vice versa
- Kind of firewall for SIP communication
- Could be virtual or physical
  - Amazon AWS and Azure are supported as virtual platform



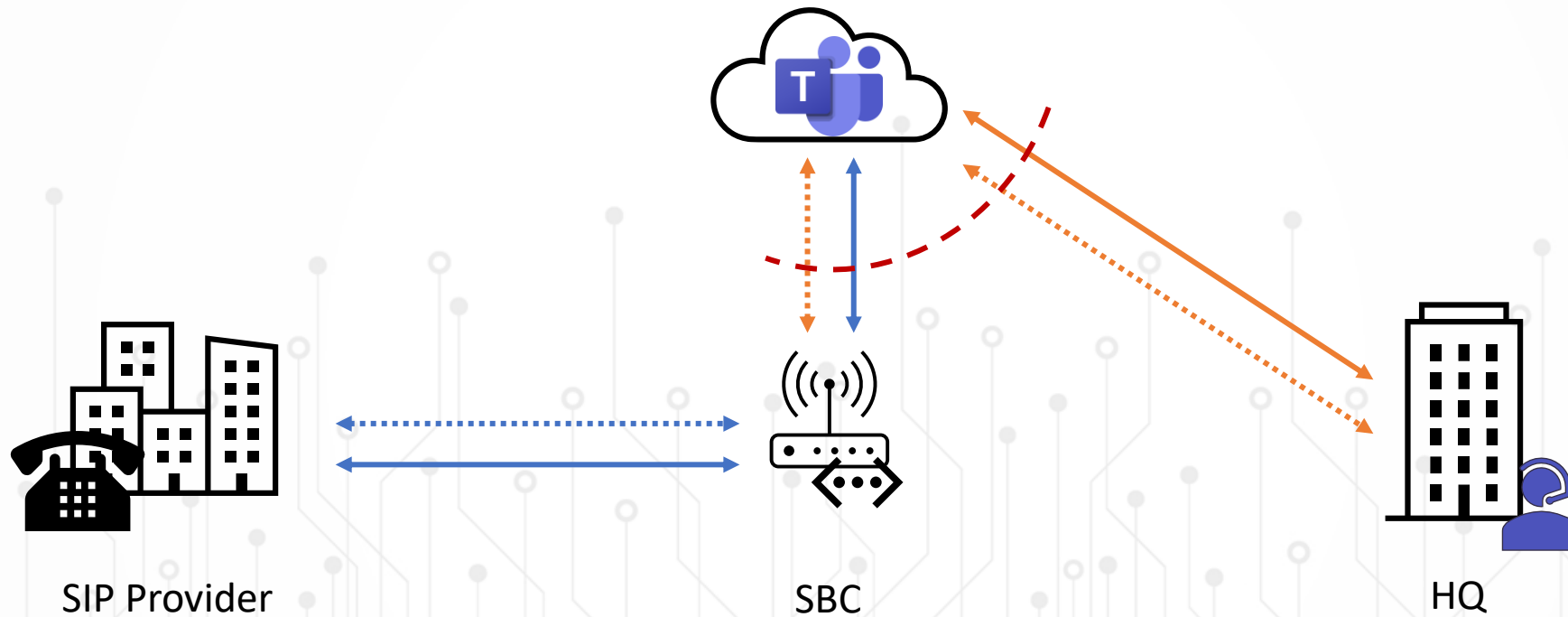


# Teams Direct Routing

Media Flow



# Teams Direct Routing – Media Flow

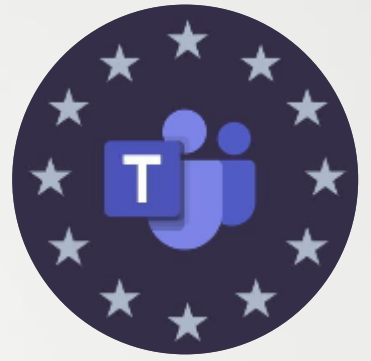


— SIP (Control)  
... Media (G.711)

— HTTP REST (Control)  
... Media (SILK)

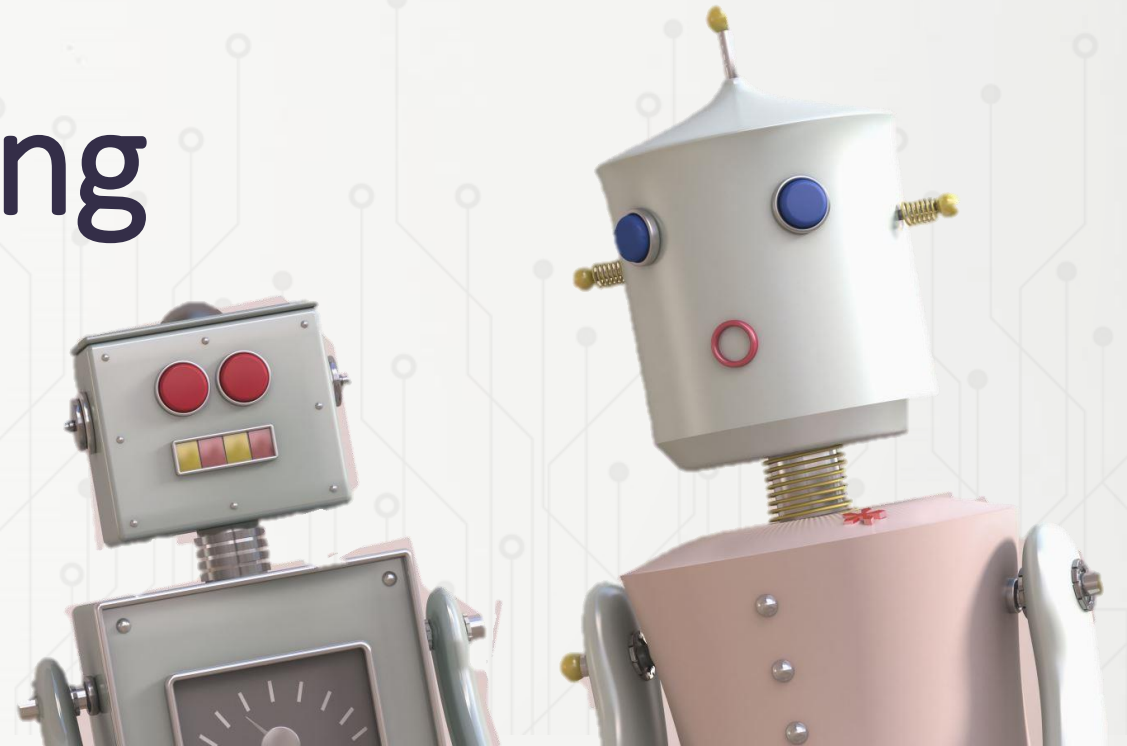




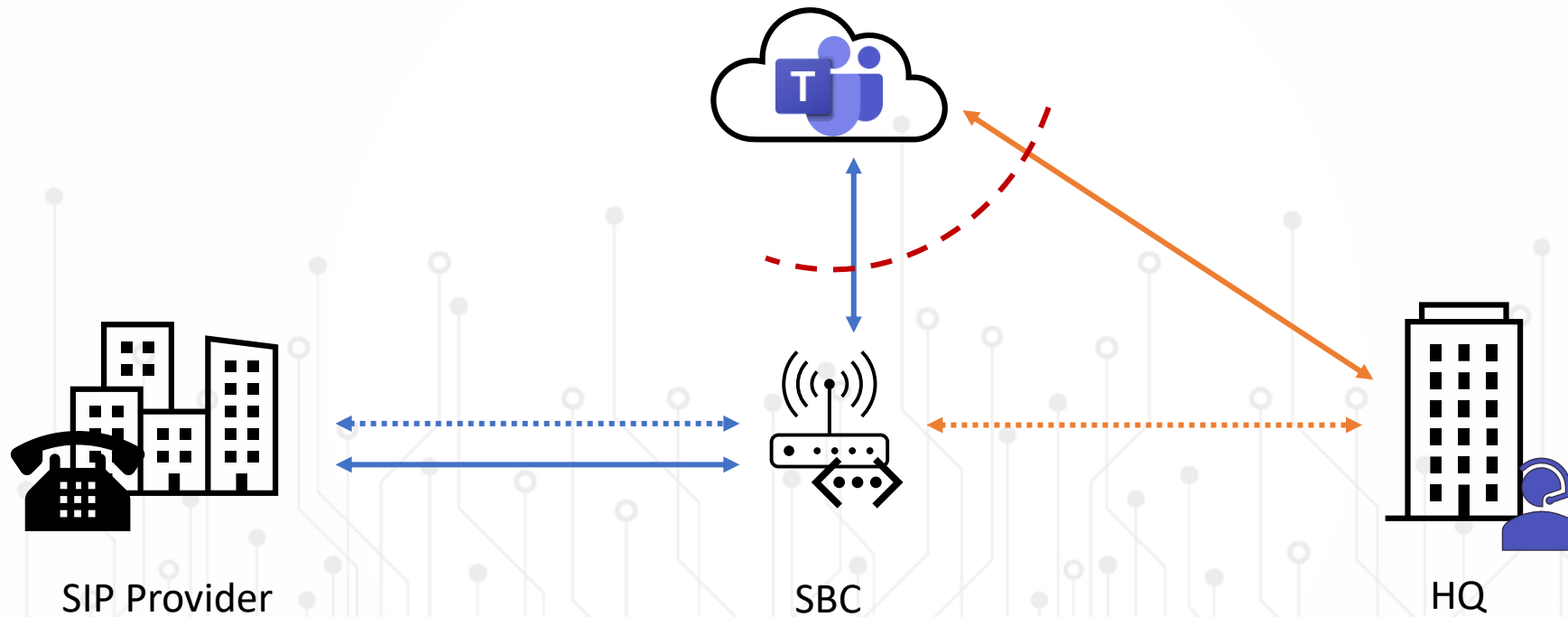


# Teams Direct Routing

Media Optimization



# Teams Direct Routing – MediaByPass



— SIP (Control)  
... Media (G.711)

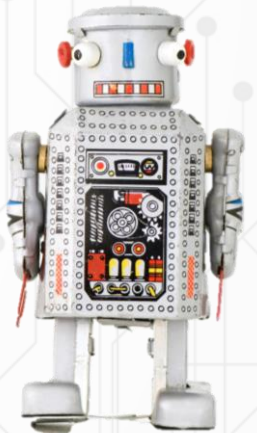
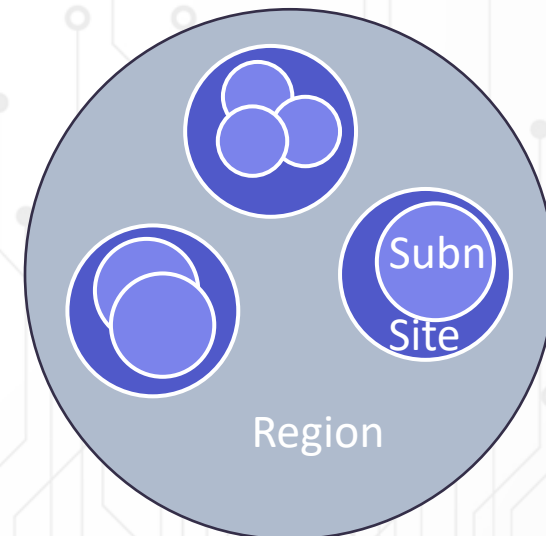
— HTTP REST (Control)  
... Media (SILK)



# Local Media Optimization - Requirements



- Certified SBC with current firmware
- List of all internal Client networks and external IPs used for Client connection to Teams
- Network topology in Office 365 as needed for Location based Routing or dynamic emergency calling
  - Network region, Network site, Network subnet
- Network Topology is required for Media flow routing and Local Media Optimization



# Configure your Network Topology



```
# Define New Region
# New-CsTenantNetworkRegion -NetworkRegionID "APAC"
New-CsTenantNetworkRegion -NetworkRegionID "Contoso"

New-CsTenantNetworkSite -NetworkSiteID "EU" -NetworkRegionID "Contoso"
New-CsTenantNetworkSite -NetworkSiteID "US" -NetworkRegionID "Contoso"
New-CsTenantNetworkSite -NetworkSiteID "APAC" -NetworkRegionID "Contoso"
```

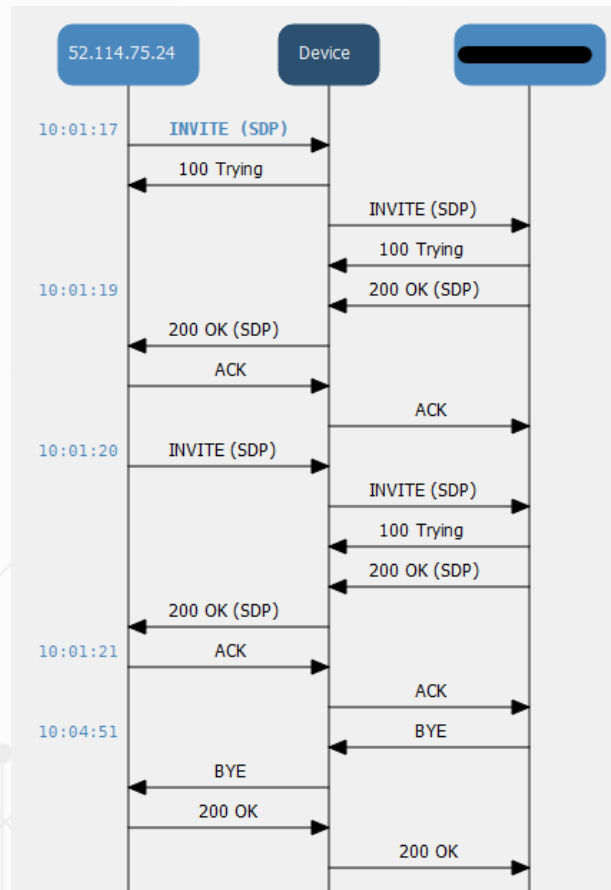
```
# Define Networks
## New-CsTenantNetworkSubnet -SubnetID <Subnet IP address> -MaskBits <Subnet bitmask> -NetworkSiteID <site ID>

New-CsTenantNetworkSubnet -SubnetID 172.16.33.0 -MaskBits 24 -NetworkSiteID "EU"
New-CsTenantNetworkSubnet -SubnetID 192.168.178.0 -MaskBits 24 -NetworkSiteID "EU"
New-CsTenantNetworkSubnet -SubnetID 192.168.70.0 -MaskBits 24 -NetworkSiteID "EU"
```

```
Set-CsOnlinePSTNGateway -Identity SBC01.contoso.com -GatewaySiteID EU -MediaBypass $True -BypassMode OnlyForLocalUsers
```



# SIP Flow – User external

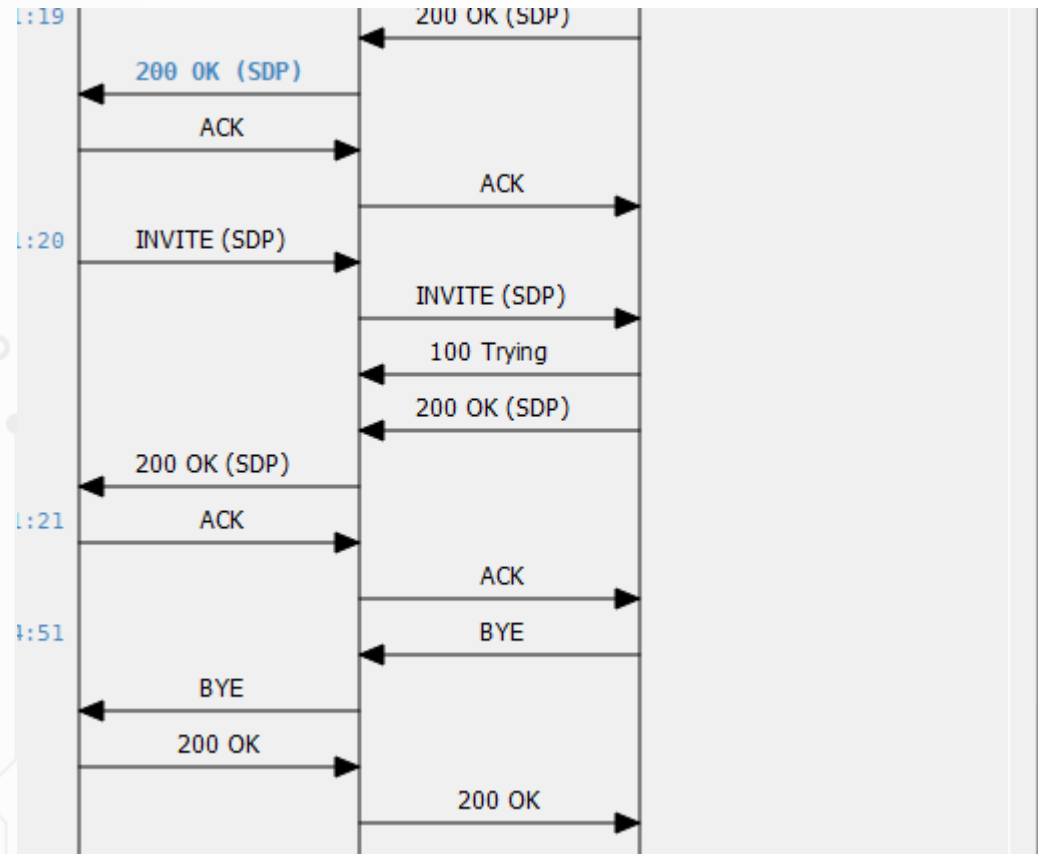


```
Message | CDR |
10:01:17.432 --- Incoming SIP Message from 52.114.75.24:5440 to SIPInterface #1 (SIPInterface_Teams) TLS TO(#:
INVITE sip:+49[redacted]@[redacted]sb02[redacted]:5061;user=phone;transport=tls SIP/2.0
FROM: "[redacted]" <sip:+49[redacted]@sip.pstnhub.microsoft.com:5061;user=phone>;tag=733297f0b1
TO: <sip:+49[redacted]@[redacted]sb02[redacted]:5061;user=phone>
CSEQ: 1 INVITE
CALL-ID: 87d9f5d39ccf552abc1bd0f86e613970
MAX-FORWARDS: 70
VIA: SIP/2.0/TLS 52.114.75.24:5061;branch=z9hG4bKc519a42
RECORD-ROUTE: <sip:sip-du-a-eu.pstnhub.microsoft.com:5061;transport=tls;lr>
CONTACT: <sip:api-du-a-euwe.pstnhub.microsoft.com:443;x-i=dae975ca-6f71-4c67-9f4c-9b519aa5cbc0;x-c=87
CONTENT-LENGTH: 2652
USER-AGENT: Microsoft.PSTNHub.SIPProxy v.2021.3.10.9 i.EUWE.1
CONTENT-TYPE: application/sdp
ALLOW: INVITE,ACK,OPTIONS,CANCEL,BYE,NOTIFY
P-ASSERTED-IDENTITY: <tel:+49[redacted]>
PRIVACY: id
X-MS-UserLocation: external
X-MS-MediaPath: [redacted]sb02[redacted]

v=0
o=- 0 0 IN IP4 52.114.254.113
s=
```



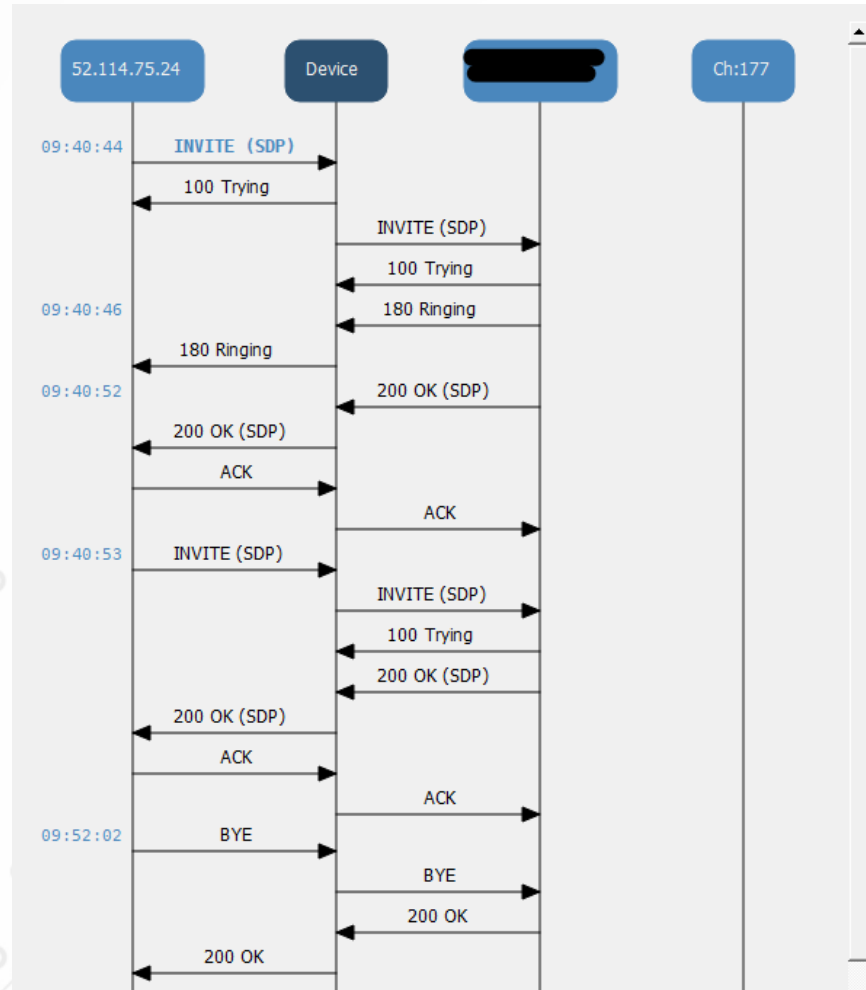
# SIP Flow – User external



```
<< Prev Find Next >> Export
Message CDR
10:01:19.072 --- Outgoing SIP Message to 52.114.75.24:5440 f
SIP/2.0 200 OK
Via: SIP/2.0/TLS 52.114.75.24:5061;branch=z9hG4bKc519a42
From: [REDACTED] <sip:+49[REDACTED]@sip.pstnhub.micro:
To: <sip:+49[REDACTED]@[REDACTED]zsbco2[REDACTED]5061;user=p
Call-ID: 87d9f5d39ccf552abc1bd0f86e613970
CSeq: 1 INVITE
Contact: <sip:+49[REDACTED]@[REDACTED]6BC02[REDACTED]:5061;t
Record-Route: <sip:sip-du-a-eu.pstnhub.microsoft.com:5061;tran:
Supported: sdp-anat
Allow: INVITE, ACK, CANCEL, BYE, NOTIFY, REGISTER, REFER
Server: Mediant SW/v.7.20A.258.459
Content-Type: application/sdp
Content-Length: 685
v=0
o=[REDACTED] IN IP4 20.[REDACTED]
s=jcsip receive
c=IN IP4 20.[REDACTED]
t=0.0
```



# SIP Flow – User internal



# SIP Flow – User internal



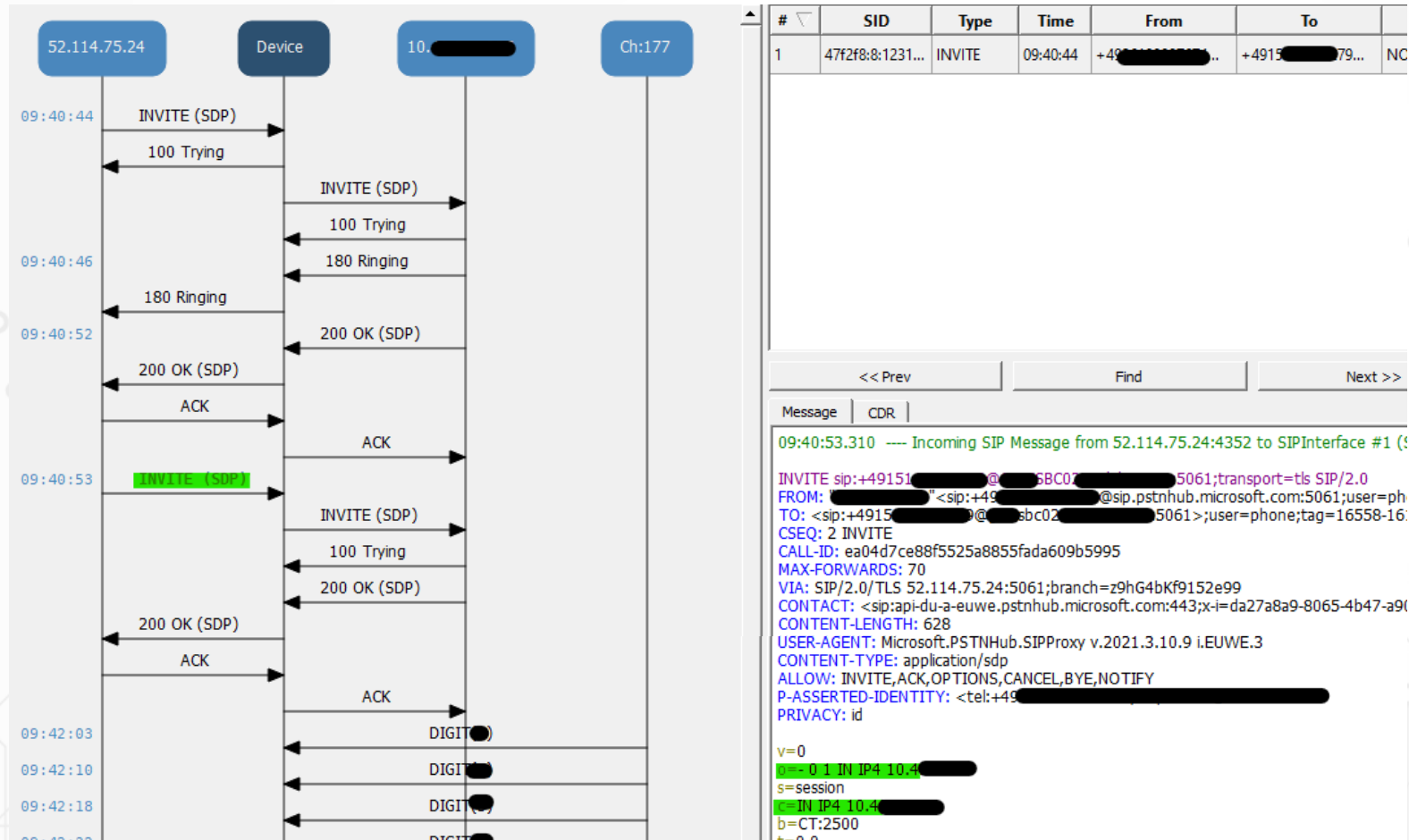
09:40:44.043 --- Incoming SIP Message from 52.114.75.24:7680 to SIPInterface #1 (SIPI\_Teams) TLS TO(#2927) SocketID(414) ---

```
INVITE sip:+49151[REDACTED]@[REDACTED].sbc02[REDACTED]:5061;user=phone;transport=tls SIP/2.0
FROM: "[REDACTED] Stefan" <sip:+49[REDACTED]74@sip.pstnhub.microsoft.com:5061;user=phone>;tag=be1550e19c9d458aba934804989beb80
TO: <sip:+49151[REDACTED]@[REDACTED].sbc02[REDACTED]:5061;user=phone>
CSEQ: 1 INVITE
CALL-ID: ea04d7ce88f5525a8855fada609b5995
MAX-FORWARDS: 70
VIA: SIP/2.0/TLS 52.114.75.24:5061;branch=z9hG4bKd3e9e08e
RECORD-ROUTE: <sip:sip-du-a-eu.pstnhub.microsoft.com:5061;transport=tls;lr>
CONTACT: <sip:api-du-a-euwe.pstnhub.microsoft.com:443;x-i=da27a8a9-8065-4b47-a909-5f7b148ab46c;x-c=ea04d7ce88f5525a8855fada609b5995/d/8/0f5b62d3f
CONTENT-LENGTH: 2356
USER-AGENT: Microsoft.PSTNHub.SIPProxy v.2021.3.10.9 i.EUWE.4
CONTENT-TYPE: application/sdp
ALLOW: INVITE,ACK,OPTIONS,CANCEL,BYE,NOTIFY
P-ASSERTED-IDENTITY: <tel:+49[REDACTED]>
PRIVACY: id
X-MS-UserLocation: internal
X-MS-MediaPath: [REDACTED].sbc02[REDACTED]
X-MS-UserSite: EU
```





# SIP Flow – User internal



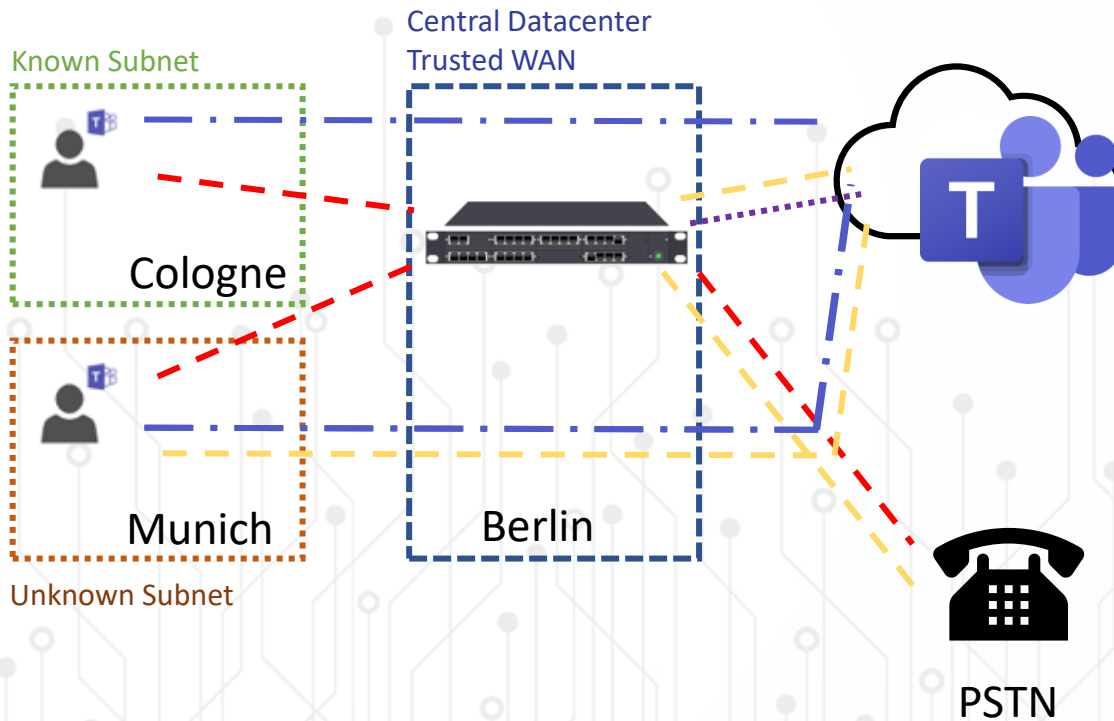
# Local Media Optimization - Modes

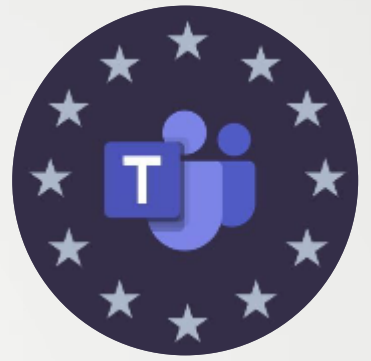


Always Bypass  
Local Only

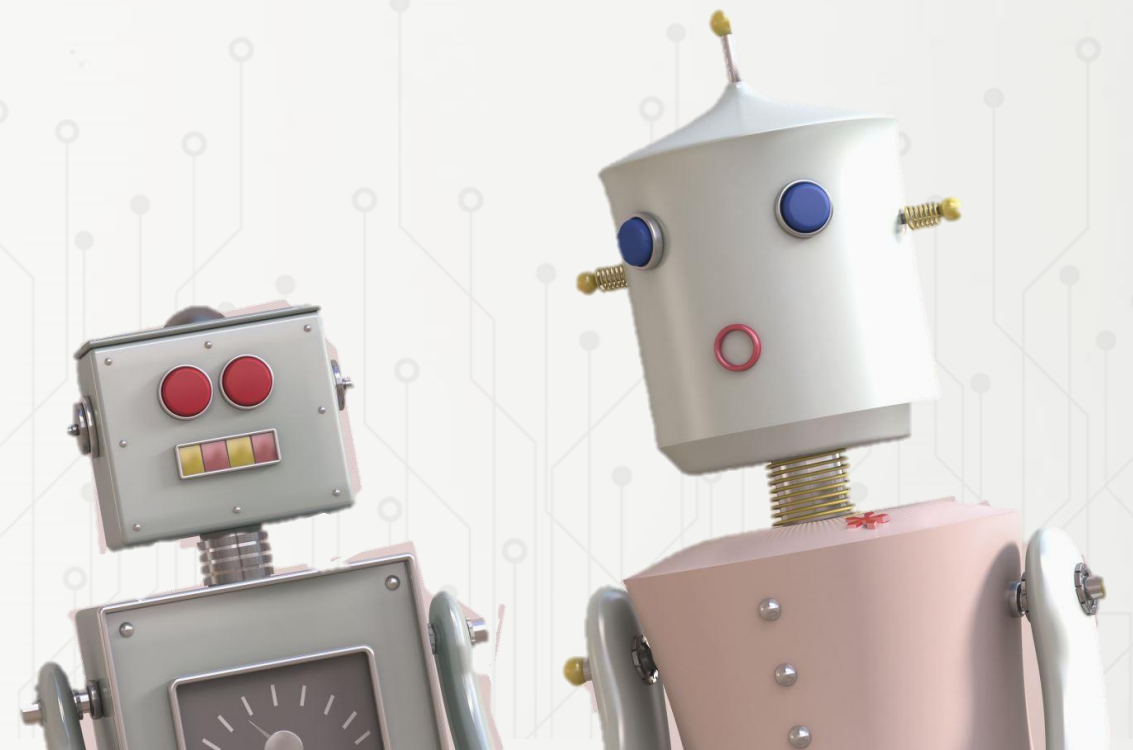
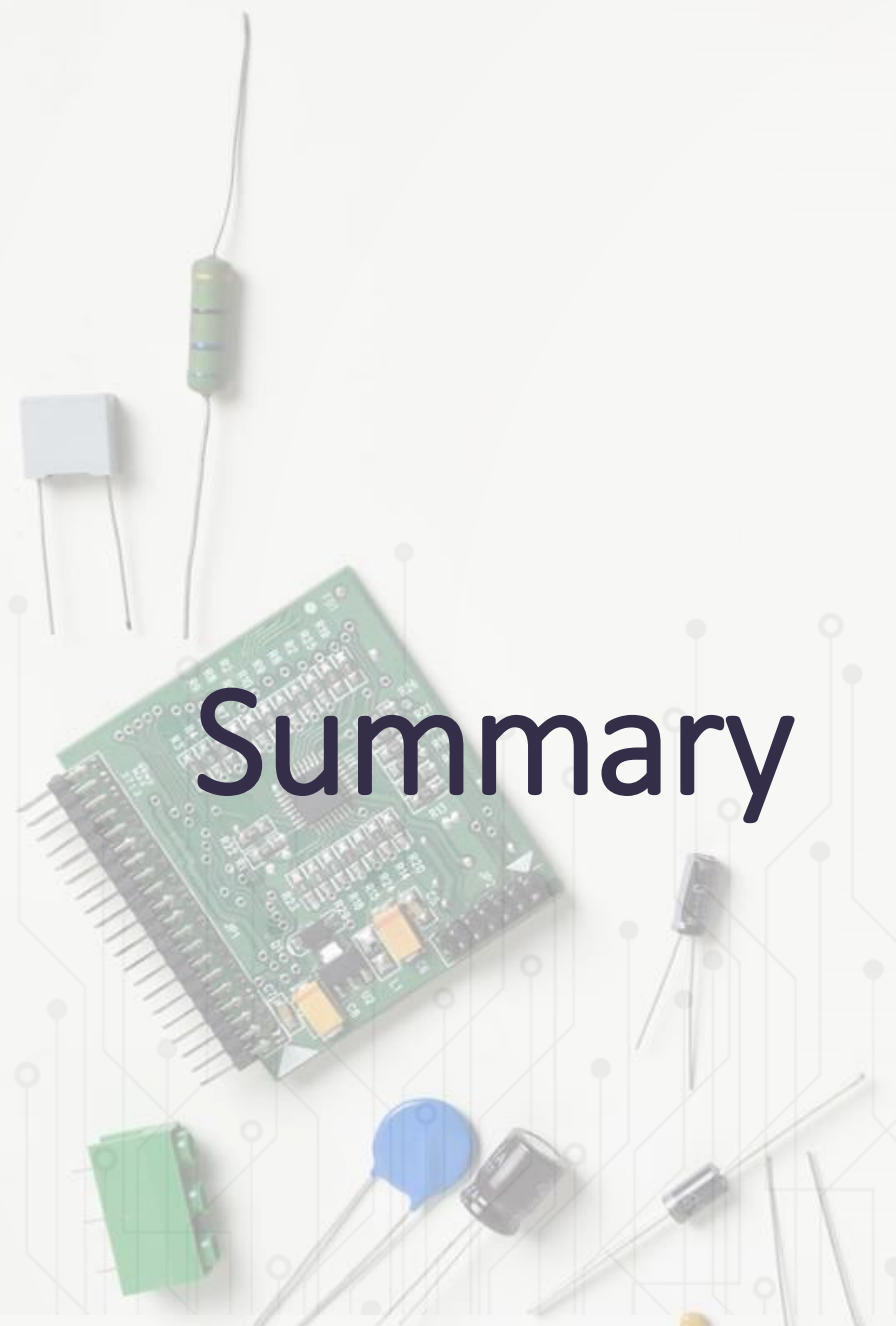


- ..... SIP Kommunikation
- - - Audio / RTP (Direct)
- - - Audio / RTP
- REST HTTP





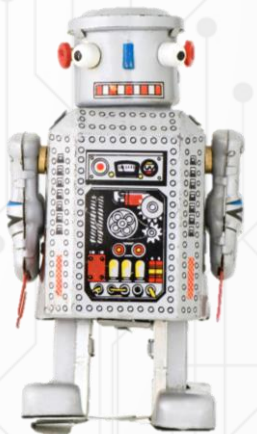
# Summary



# Benefits by Local Media Optimization



- Media ByPass reduces bandwidth consumption and delivers better call quality
- No need to implement SBCs in Branch Offices
  - reduced requirements for the infrastructure
- Users can benefit from the Global Microsoft Network





Thank you!

