

Microsoft Teams Direct Routing with Session Initiation Protocol

Siddarth Kaul¹, Anuj Jain², Surender Kumar³

Research Scholar Bhagwat University Rajasthan India ¹(Siddarthkaul7@gmail.com)

SEEE, Lovely Professional University Jalandhar²(a1978jain@gmail.com)

Dr. Akhilesh Das Gupta Institute of Technology and Management³(suren001@gmail.com)

Abstract

The purpose of the paper is the elaboration of how SIP (Session Initiation Protocol) works for Direct Routing with teams in conjunction with Cloud SBC (Session Border Controllers) for direct routing. The direct routing happens over various subnets over the Microsoft Cloud and the Cloud routing happens in background and various services like Telepresence routing works in conjunction with Session Initiation Protocol.

Keywords

Session Border Controller (SBC), Session Imitation Protocol (SIP), PSTN (Public Switched Telephone Network) and Unified Communication.

1. Introduction

Microsoft Teams nowadays involves Direct Routing pairing with SBC (Session Border Controllers) to connect for PSTN Dialing and nowadays Skype for Business also uses admin Centre using PowerShell for Direct Dialing[1]. Microsoft Teams with Pexip also provides video Interoperability[2]. Other Third party systems can also connect to Microsoft Teams using Pexip distributed Gateway there are also some features added to the Microsoft teams Disaster recovery and backup resiliency added to direct routing[3].

2. Teams Direct Routing

Teams direct routing involves you to connect an SBC (Session Border Controller)[1] to Microsoft Phone System the Microsoft Teams direct routing involves interconnection With a Third party PSTN equipment the direct routing enables you to connect to any of The PSTN trunk available within the country and access to various resources involving Hybrid voice and other related components.

2.1 Packet Loss Resilience

Correlation and loss of AMR-WB from the encoder is about 30%; opus format have group of full-code a very quiet and varied speech format. Opus is one of the audio codecs that was selected as compulsory for implementation by Web as codecs. Opus can keep a narrow band up to full stereo range while using a low bit rate with high durability



Figure 1. Teams Direct Calling Architectural Diagram[4]

The Microsoft teams involves the following: -

1. PSTN Provider
2. Telephony Trunk
3. Session Border Controller
4. Cloud PBX

The Microsoft Teams also uses these components in conjunction with PSTN provider with E1 and T1 links connected using cloud connector edition with direct routing customers can schedule a conference and involves both simple licensing at low cost and easy to use feature rich access through teams to various office 365 applications. Microsoft teams is also used with CUCM (Cisco Unified Communication Manager). The Figure 2 depicts the connection between CUCM and SBC in the different VLAN ID 1 and VLAN ID 2 to telephone system⁴.

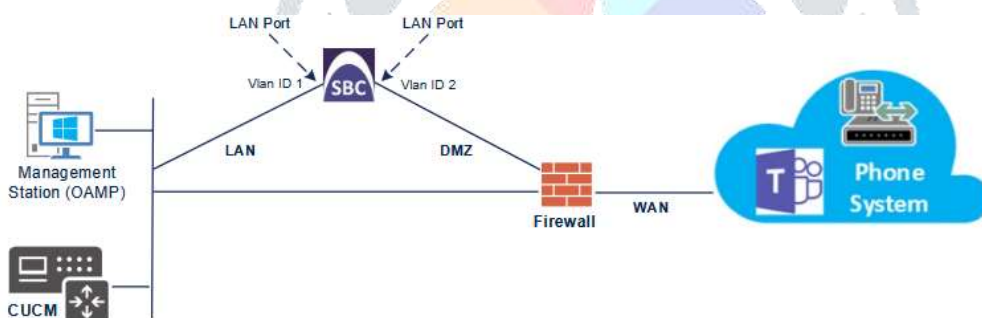


Figure 2. Cisco Call manger sequence for enabling Microsoft Teams

3. OGG opus

OGG OPUS is a type lost auditory codec advanced by the Cyprus Basis[5]. Intended for low-end audio streaming with key features, including metadata and quick search, Opus-capable error detection with minimum[5][3]. The buffer. OBCs are made up of a continuous stream of pages that stores data since one or more posts, separately flow containing a package to capture the beginning and end of a logical flow from dissimilar packages. Package setup is organized into the first batch of OGGGGs, which defines the stream as a codec in the primary page stream. Additional packet in the stream bio complex with the header for the given metadata, the audio duration on the metadata page, should have the opus packet in the different stream. Location of audio data files with a total sample rate of 48 KHZ Decoder reduces congestion and other latitude ratios 5

4. Big data analytics in Teams

The Microsoft Teams uses the active users and channels and big data analytics in the different Flow chart depictions to understand various parameters like Call quality Analytics, Video and Content Sharing analytics and work flow and Segmentation of the day to day analytics is normally provided on the basis of actual call quality and the desirable call quality[6][7].



Figure 4. Opus Depiction by Using Big Data Analysis

5. Microsoft Teams and Opus Codec

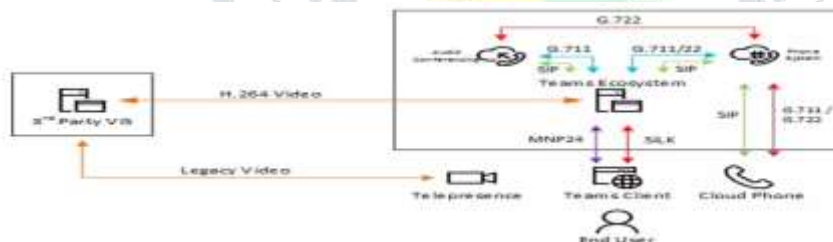
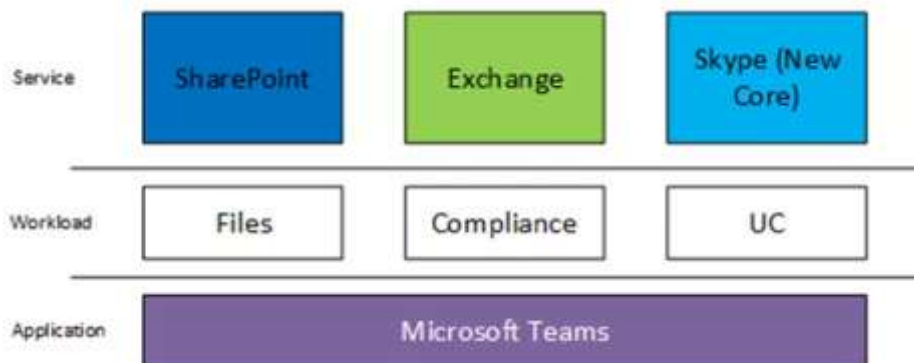


Figure 5 Microsoft Teams Architecture With Opus and SIP[8]

The codecs were used for several days by the Microsoft team. Microsoft architecture company includes H.264 mobile video presence, cloud phones, group connected clients, integrated ecosystem with MNP24 and CD codecs for group calls, group messages, calls Phone (Code G711 / G722 Snooping Initiative and Support Protocol The Microsoft® team integrates Azure services and sharing point-of-sale, SD and codecs, including transparent data flows where protocol background services are evaluated in real time[9][10].



Sample rate [kHz]	Audio bandwidth	Used encoder bitrate [kbps]		Operation mode	Parameters
		Mono	Stereo		
8	Narrowband	12	24	SILK	Manipulated
12	Mediumband	20	40	SILK	Manipulated
16	Wideband	20	40	SILK	Manipulated
24	Super-WB	32	64	Hybrid & CELT	Manipulated
48	Fullband	32	64	Hybrid & CELT	Default

Figure 6. Microsoft Teams Communication Flow

Figure 5 Emphasize the integration of service workloads and software interaction between different flow levels so that Microsoft teams include sharing points and Skype to work as a nonstop workflow service. These services are separated into different jobs, including different file sharing, regulatory options Compliance characteristics and unique communication characteristics.

All of these services, regardless of technicality, operate at a continuous pace, including SIP, an important communication flow protocol with RTP media, The opus protocol is working protocols standards on a regular basis. Simulation of the protocols of these protocols with the SP and SSP protocols improves the experimental results as shown in the diagram above. Opus Protocol and Voice over IP (VOIP) protocols make it clear that Opus protocol is a lost audio encoder that is integrated with SIP that is standardized by ITF for little latency, more complexity. Improved bit rate ratios and speech analysis.

Opus obviously improves concert and audio, thus reducing the wide audio gap to about 5 m / s from the 100m / s mark as an open-source audio-visual standard, without a patent, software, and freely available under conditions. Any license can easily help. Integrate this codec with other media flow protocols 9.

Opus has many uses from organizations like Microsoft, Broadcom, Huawei and Qualcomm. They use the opus source with SIP. Various modes of operation include hybrid and Cisco speakers using a Sigma audio frequency for frequencies greater than 8 kHz. SILK also supports different SOS and SIP frames of 10, 20, 40, 60 meters / sec. Frames shorter than 10 m / s using the CEL mode, the normal opus package can be transparent for switching between profile, frame size, bandwidth, partner pack analysis, and differential values and 10 channels. Sampling and Density Bandwidth Bandwidth assists in encoding and decoding sample frequencies of narrow band, half band, wide band. Opus helped standardize the large-format audio and broadband. The development and standardization of audio audio encoding formats with Egypt has assisted in the development of different message standards such as Skype, video conferencing, multimedia and believe that hybrid forms often represent a new way of codec modeling, where information is transmitted or other forms of communication media often help to compare the quality and poor performance of the new standard. Up for 10 contact environments around the world.

Direct group transmission is supported with PC (Switched Public Telephone Network), which allows you to use almost all CMS and MPM systems and configure interoperability among PC (private branch switches) and Microsoft Hybrid voice solutions that include scheduled conferences that require proper authorization with online capabilities, live referrals, support your users' telephone systems, domain names are your tenant, it may be available for address SIP in a single tenant. Direct relays support SAN tips that must comply with HTTP standards on TLS11.

6. Conclusion

Implementation of Microsoft Teams has a number of benefits like online meetings shown over teams are dependable and of very high audio and video excellence as a result there are less call quality issues. The office 365 features are a part of the teams app which include stream and collaboration the cloud based application has a high rate of reliability to good disaster recovery and improved features like power BI implementation for real time call information and better security than on premises solution

References

- [1] G. Monteleone and P. Paglierani, "Session border controller virtualization towards" service-defined" networks based on nfv and sdn," in *2013 IEEE SDN for Future Networks and Services (SDN4FNS)*, 2013, pp. 1–7.

- [2] J. Hautakorpi, G. Camarillo, R. Penfield, A. Hawrylyshen, and M. Bhatia, "Requirements from Session Initiation Protocol (SIP) Session Border Control (SBC) Deployments," *RFC5853, IETF*, 2010.
- [3] S. Loreto and S. Pietro Romano, *Real-time communication with WebRTC: peer-to-peer in the browser*. "O'Reilly Media, Inc.," 2014.
- [4] S. Kaul and A. Jain, "Opus and Session Initiation Protocol Security in Voice over IP (VOIP)," *Eur. J. Eng. Res. Sci.*, vol. 4, no. 12, pp. 27–37, 2018.
- [5] K. Vos, K. V Sørensen, S. S. Jensen, and J.-M. Valin, "Voice coding with opus," *135th Audio Eng. Soc. Conv. 2013*, pp. 722–731, Jan. 2013.
- [6] Y. Yu, W. Wang, J. Zhang, Q. Weng, and K. Ben Letaief, "Opus: Fair and efficient cache sharing for in-memory data analytics," in *2018 IEEE 38th International Conference on Distributed Computing Systems (ICDCS)*, 2018, pp. 154–164.
- [7] J. Bankoski, M. Frost, and A. Grange, "The internet needs a competitive, royalty-free video codec," *APSIPA Trans. Signal Inf. Process.*, vol. 6, 2017.
- [8] M. Al-Ahmadi, P. Pocta, and H. Melvin, "Instrumental Estimation of E-model Equipment Impairment Factor Parameters for Super-wideband Opus Codec," in *2018 30th Irish Signals and Systems Conference (ISSC)*, 2018, pp. 1–5.
- [9] A. M. Townsend, *Smart cities: Big data, civic hackers, and the quest for a new utopia*. WW Norton & Company, 2013.
- [10] B. N. Ilag, "Introduction: Microsoft Teams," in *Introducing Microsoft Teams*, Springer, 2018, pp. 1–42.

