

# *Hybrid Skype for Business Best Practice for Cloud PBX with PSTN Connectivity*

Alessandro Appiani

*Founder & CTO - Pulsar IT*

[alessandro.appiani@pulsarit.net](mailto:alessandro.appiani@pulsarit.net)

[www.pulsarit.net](http://www.pulsarit.net)

@AlexAppiani



# Alessandro Appiani - About me



- 30-years experience in IT Technologies and Solutions
- Computer Science Master's Degree (full marks with honors) in 1989
- Founder of Italian Association for Artificial Intelligence in 1988
- Microsoft Certified since 1995
- Microsoft TechNet speaker & Train-the-trainer since 1996
- MVP, MCT, MCITP Windows+Exchange+Lync+Office365
  - Microsoft Most Valuable Professional Skype for Business (Office Servers)
  - Microsoft Windows Expert since version NT 3.51 (1995)
  - Microsoft Exchange Expert since first product release (Exchange 4.0 - 1996)
  - Microsoft Lync/Skype Expert since first product release (LCS 2003)
  - Microsoft Office 365 Expert since first Cloud version (BPOS - 2009)
- Pulsar IT Founder & CTO
  - technologies, strategy, digital transformation, advisory, ...
- Twitter: @AlexAppiani



Skype for Business  
Office Servers



# Agenda - it's all about hybrid!

- Skype for Business Hybrid
  - intro & ... why? 😊
- Skype for Business Hybrid Architecture
- Skype for Business Hybrid Cloud PBX & PSTN Telephony
- Best Practice & Lesson learned



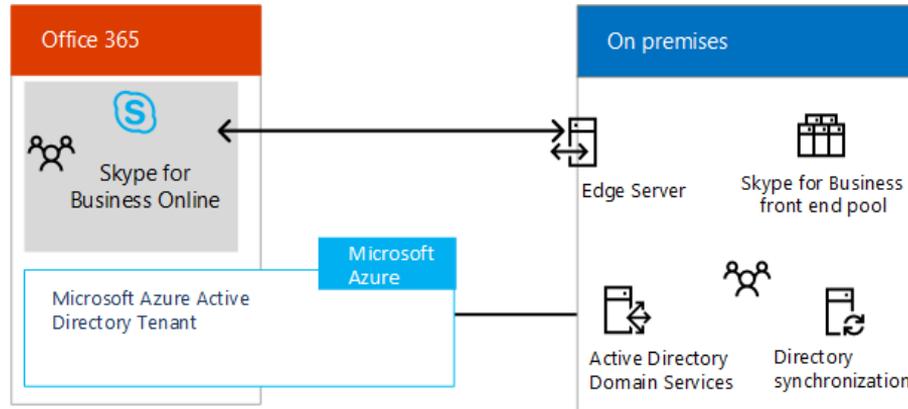
# SKYPE FOR BUSINESS HYBRID

Why? 😊



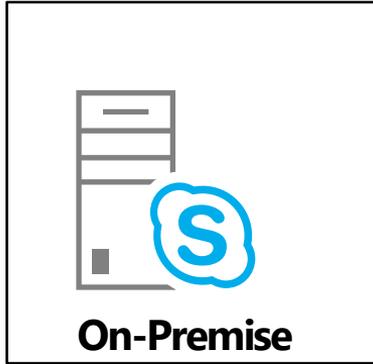
# What's Hybrid?

- *"A hybrid deployment is a combination of on-premises applications or data and cloud-based services."*
- With Skype for Business Hybrid, SfB Users maybe hosted on-premises or online
- They share the same SIP Domain (ie: contoso.com)



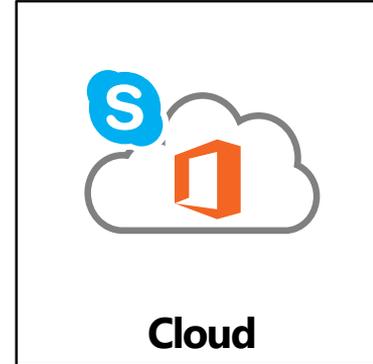
# Deployment choices

Highest control  
Deepest integration

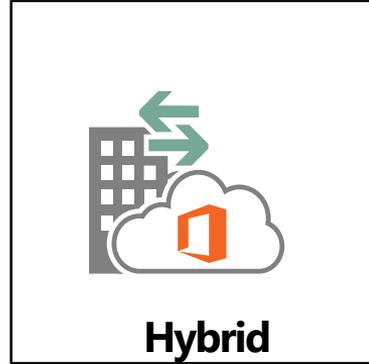


**Skype for Business 2015**  
**Private cloud/dedicated**

Cloud service  
Lowest maintenance



**Microsoft Office 365, Skype for Business Online**  
**Partner-hosted multi-tenant**

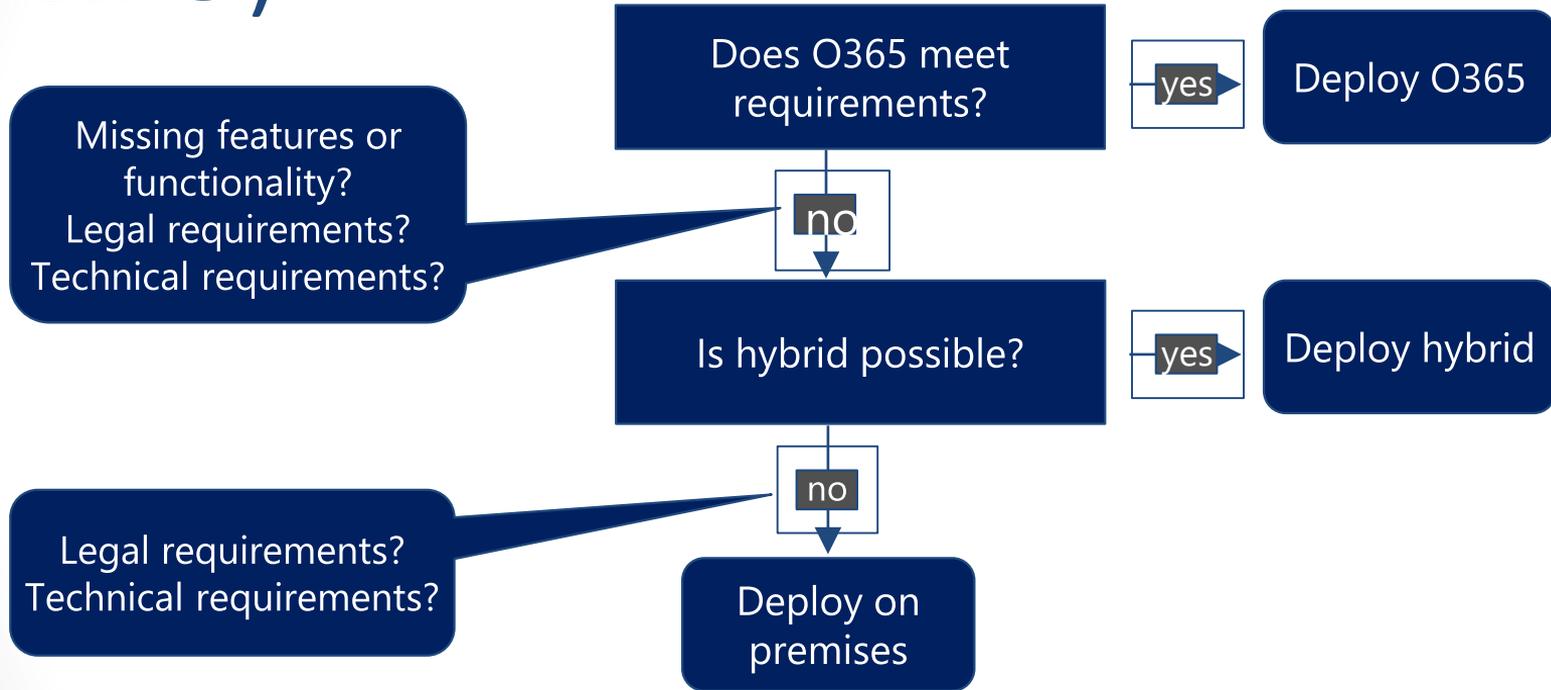


**Single domain and directory**  
**Users split-server/online**

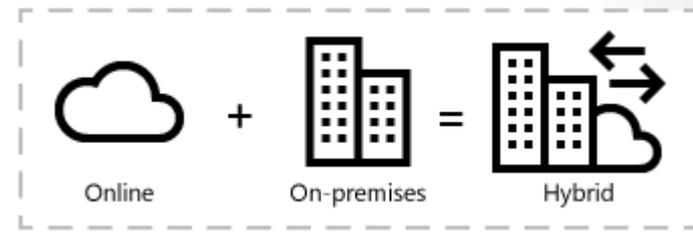
Pick and choose the  
best of both worlds



# Deployment decision tree (MS Cloud First! 😊)



# Why Hybrid?



- vs Cloud Only or Cloud PBX with CCE
  - leverage existing Lync/Skype4B on-premises and existing Telephony (PBX/PSTN Numbers/Dialplan)
  - want to keep communications local (ie: sites with hundreds/thousands users)
  - Internet bandwidth not robust-enough (ie: branch offices)
  - Branch Telephony Resiliency without WAN/Internet
  - Simplified management of local/branches Emergency call
  - Full control on Skype Server / Components



# Why Hybrid?



- vs On-prem only

- mixing on-prem / online user hosting for better bandwidth management
  - ie: Conference with High Resolutions video and external attendees
  - users "living" outside of private networks (ie: business agents)
- cloud features not available onprem
  - Skype Meeting Broadcast
  - Skype PSTN Calling (ie: for subsidiaries/branches)
  - Skype PSTN Conferencing (dialin worldwide)

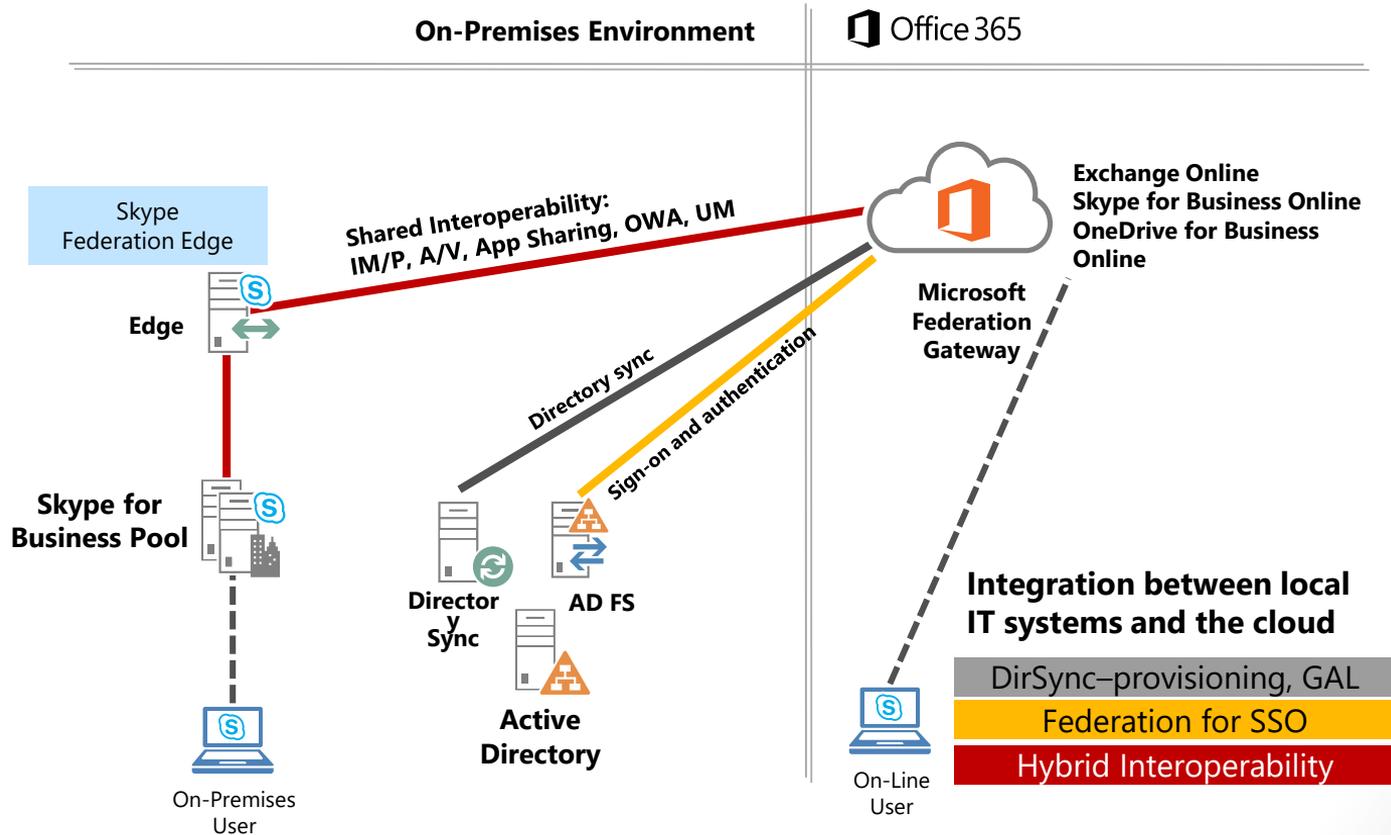


# SKYPE FOR BUSINESS HYBRID

Architecture



# Skype for Business 2015 Hybrid

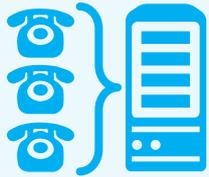


# SKYPE FOR BUSINESS HYBRID

Cloud PBX & PSTN Telephony



# Telephony / Voice / PSTN Choice



On Premises

End-user features & customer PSTN services integrated on-premises



Hybrid

Users online or on-premises

Integration with PSTN services on-premises



Online

Cloud PBX in Office 365

PSTN services provided by Microsoft



# Hybrid enables use of Office 365 Voice Services

- **PSTN Conferencing** provides the flexibility to dial in to a meeting from a traditional phone, in addition to the existing ability to join a meeting with a single click on your PC or mobile device.
- **Skype Meeting Broadcast** makes it easier than ever to produce large virtual meetings for up to 10,000 meeting attendees, who can join from virtually any browser or device. Now Skype for Business truly is a single platform for every type of meeting.
- **Cloud PBX** enables companies to eliminate separate PBX systems and transition to the cloud with Office 365 as the central location to manage users for communication *and*
- With **PSTN Calling**, Office 365 customers can also subscribe to Microsoft managed calling plans and phone numbers, starting in the U.S. with more markets coming later.

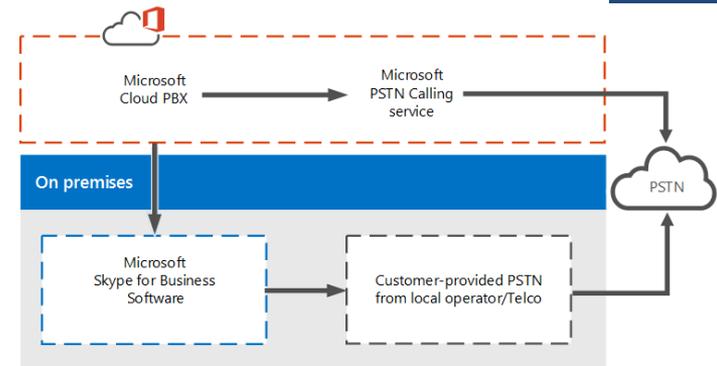
Office 365 brings significant new value to business customers worldwide

<https://blogs.office.com/2015/11/30/office-365-brings-significant-new-value-to-business-customers-worldwide/>



# Skype for Business & PSTN Calling

- Cloud-only
  - PSTN services (PSTN Calling Plans) provided by Microsoft as a Telco / Carrier
- Hybrid
  - Users hosted on-prem or on-line
  - PSTN services integrated on-premises
  - Users hosted on-prem with On-prem PSTN Calling (same features as on-prem)
  - Users hosted online with On-prem PSTN Calling (less voice features)
- On Premises
  - Users hosted on-prem
  - local/on-prem PSTN connectivity (no need for another PBX, but maybe integrated if present)
  - Full Voice features (on-prem)



# Skype for Business international availability

- Move all your communications to Skype for Business Online  
<https://blogs.office.com/2016/09/26/move-all-your-communications-to-skype-for-business-online/>
- Expanding the reach of Skype for Business meetings and voice services in Office 365 - March 2016  
<https://blogs.office.com/2016/03/09/expanding-the-reach-of-skype-for-business-meetings-and-voice-services-in-office-365/>
  - Office 365 brings significant new value to business customers worldwide - November 2015  
<https://blogs.office.com/2015/11/30/office-365-brings-significant-new-value-to-business-customers-worldwide/>
- Expanding the preview of Skype for Business services in Office 365 - October 2015  
<https://blogs.office.com/2015/10/07/expanding-the-preview-of-skype-for-business-services-in-office-365/>
- Announcing preview of new Skype for Business services in Office 365 - July 2015  
<https://blogs.office.com/2015/07/01/announcing-preview-of-new-skype-for-business-services-in-office-365/>
- Service availability varies by country
  - Microsoft Online Services International availability  
<https://products.office.com/en-us/business/international-availability>
  - Countries and regions that are supported for Skype for Business Online PSTN Services  
<https://support.office.com/en-us/article/Countries-and-regions-that-are-supported-for-Skype-for-Business-Online-PSTN-Services-6ba72f37-d303-4795-aa8f-7e1845078ed7>

Expand to see where can PSTN Calling can be purchased

Country/region
France
Ireland
Puerto Rico
Spain
The Netherlands
United Kingdom (U.K.)
United States (U.S.)



# Cloud PBX: Features comparison (Oct 2016)

Skype for Business capabilities	Skype for Business on premises	Cloud PBX with on premises PSTN calling with an existing pool	Cloud PBX with on-premises PSTN calling via Cloud Connector	Cloud PBX with PSTN calling
Basic call features (hold/retrieve, transfer, forwarding, simultaneous ringing)				
Voice mail	Exchange UM	Cloud PBX Voice Mail (Exchange Online Recommended)		
Delegation, team call		Users should be in the same environment		
Auto attendant		Available in CY16	Available in CY16	Available in CY16
Hunt groups		Available in CY16	Available in CY16	Available in CY16
Voice resiliency				Secured by SLA
Ability to restrict international calling per user				
Per country dial plan	Manual configuration	Automatically assigned based on user location or manual configuration	Automatically assigned based on user location	
Extension dialing	Via Lync/Skype For Business on premises dial plan	Via Lync/Skype For Business on premises dial plan or Gateway dial plan	Via Gateway dial plan	
Branch survivability	Requires deploying local pools/SBAs	Via local pool or redundant internet connection/Express route	Redundant internet connection or Express route required	
Bring your own PSTN connectivity				
911		Static 911	Static 911	Static 911
Media bypass			On roadmap	Not Applicable
IP phones "Optimized for Skype for Business"				
IP phones "Compatible with Skype for Business"		Polycom VVX, Yealink, more solutions coming	Polycom VVX, Yealink, more solutions coming	Polycom VVX, Yealink, more solutions coming
Analog devices		Using on premises deployment	Can be integrated via local GW	
Common area phone		Using on premises deployment		

# Cloud PBX: Calling Features

Call answer / initiate (by name & number)

Call hold / retrieve

Call History

Call Delegation & Call On-behalf

\*\*Call Queuing & Routing

Call Transfer (Blind, Consult & Mobile)

Camp-on

Caller ID

Call Waiting

Call forwarding & simul-ring

Clients for PC, Mac & Mobile

Device switching

- Distinctive ringing
- Do-not-disturb routing & call blocking
- Enterprise calendar call routing
- Financially-backed SLA
- Integrated dial-pad
- Music on Hold
- \*\*Organizational Auto Attendant
- Qualified IP Desk Phones
- Skype & Federated calling
- Team calling
- Video call monitor
- Voice Mail

\*\*Just released!



# Cloud PBX Roadmap (Oct 2016)

## Enabling ongoing user expansion

Information workers—especially mobile and remote workers

Branch offices—specialized workers like help desk

Entire organizations

### USER COVERAGE

NOW

2H CY2016

CY2017

### CLOUD PBX FEATURE SET

Android, iOS, Windows clients  
IP desk phones  
Answer/hold/transfer  
Voicemail  
Team calling  
Delegation  
Static E-911

Org Auto Attendant  
Hunt Groups/Call Queues  
Common Area Phones  
Additional voice policies  
Simple phone authentication  
Extension dialing  
Outbound DID manipulation

Busy on Busy  
Private Line  
Location Discovery  
Voicemail transcription  
Group Call Pickup  
Multi-line appearance  
Dynamic E-911

### VOICE CONNECTIVITY

PSTN Calling in US  
Cloud Connectivity

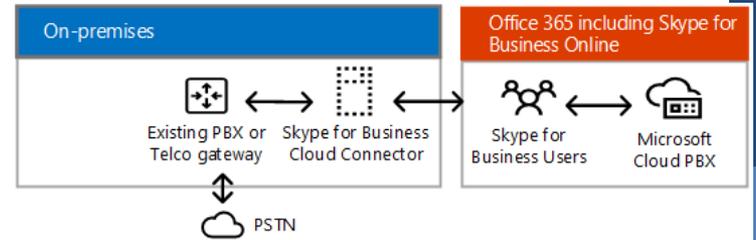
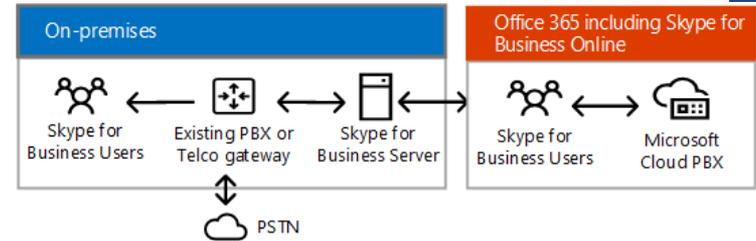
PSTN Calling in UK + more countries  
Cloud Connectivity

PSTN calling expansion  
Cloud Connected Appliance



# Cloud PBX with on premises PSTN Connectivity

- On premises PSTN Connectivity via in place SfB/Lync Topology  
**(Existing SfB / Hybrid topology)**
  - Users of a domain are split between using on-premises and Online
  - On Premises deployment configured to seamlessly interoperate with Cloud PBX
- On premises PSTN Connectivity via PBX or SIP Trunk **(GreenField only / No existing installation / CCE)**
  - Cloud PBX option for locations where we don't yet offer native PSTN Calling
  - SfB Cloud Connector and Cloud-Connected Appliances will be simple approaches



# Hybrid Voice...Many Combinations

PSTN Connectivity	User Homed	Existing Lync-SFB onPrem Customers	Green Field (PBX/SIP Trunk)
PSTN onPrem	onPrem (nothing changes)	Existing Customers, Nothing New from Cloud	Not supported
	(migrate to cloud) online	Hybrid Config Doc Split Domain Add EV or Migrate Available October 2015	minTopology VM / Cloud Connector Edition Migrate users to O365 Cloud PBX Available October 2015
PSTN in Cloud	(all in for cloud, US only)	Migrating to cloud with EV (also in cloud) Available October 2015	PBX migrating to all cloud Rip & Replace Available October 2015
	onPrem	Not Supported	Not Supported

“classic” Skype for Business Hybrid Deployment  
with full on-prem/pbx telephony support

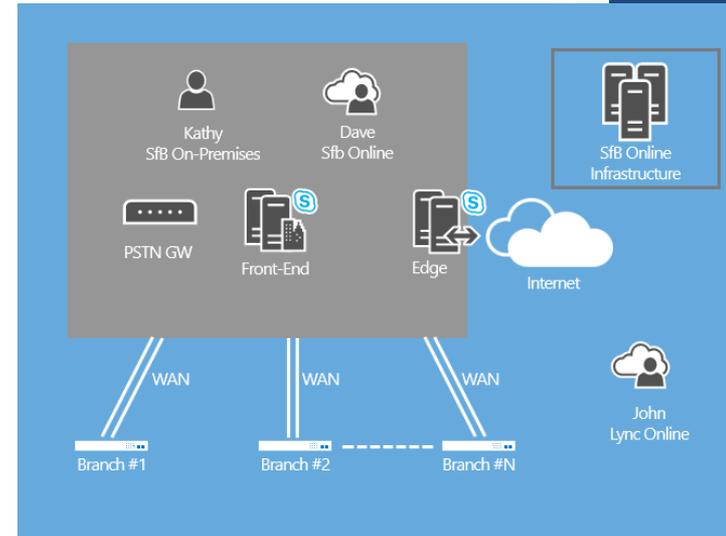
Skype for Business  
Cloud-only Deployment



# Cloud PBX Hybrid Topology and Requirements

- Edge Server must be Skype for Business 2015
- “Next hop” must be Lync Server 2013 or Skype for Business Pool
- PSTN egress through various gateways as appropriate
- Skype for business Online users signed in from tenant network or the Internet

Server role	Supported versions
Front End Server	Skype for Business Server 2015 Lync Server 2013
Edge Server	Skype for Business Server 2015
Mediation Server	Skype for Business Server 2015 Lync Server 2013



Plan Cloud PBX with on-premises PSTN connectivity in Skype for Business Server 2015 or Lync Server 2013

<https://technet.microsoft.com/en-us/library/mt455212.aspx>

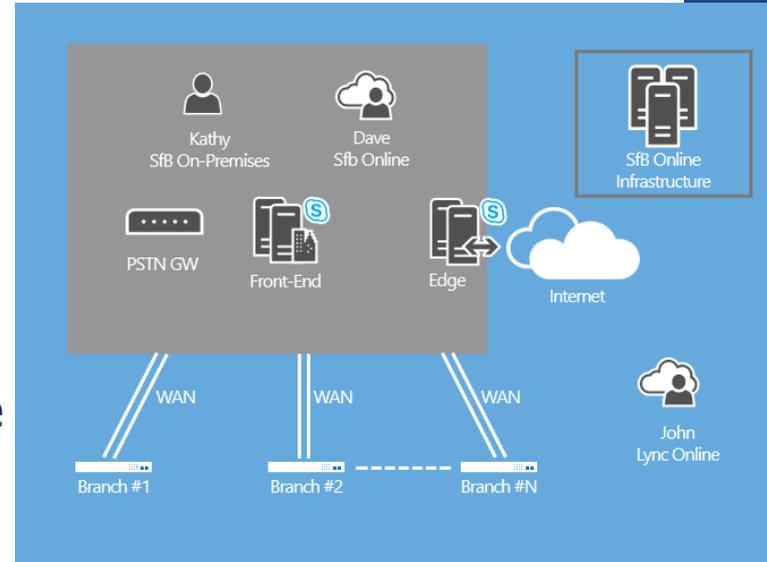
Deploy Cloud PBX with on-premises PSTN connectivity in Skype for Business Server 2015 or Lync Server 2013

<https://technet.microsoft.com/en-us/library/mt634319.aspx>



# Cloud PBX with On premises PSTN Connectivity - Hybrid

- Enables PSTN / PBX connectivity for cloud users through hybrid/on-prem PSTN infrastructure
- Leverage existing PBX / Voice infrastructure & PSTN Provider
- Support Branches and Enterprise Voice features (SBA/SBS, CAC, QoS, ...)



Plan Cloud PBX with on-premises PSTN connectivity in Skype for Business Server 2015 or Lync Server 2013  
<https://technet.microsoft.com/en-us/library/mt455212.aspx>



# Cloud PBX with On premises PSTN Connectivity - Hybrid

- Dial Plan Assigned based on user location (set by admin)
- Call routes created in on premises environment
- Media traffic always flows via Mediation server
- Users have to be created on premises and synchronized online using DirSync or Azure AD
- Enterprise Voice must be enabled on-prem and online



# BEST PRACTICE

and lesson learned



# Cloud PBX PSTN Calling - Voice limits

(without on-prem PSTN Connectivity)

- No Geographic number Sharing between Microsoft and other Carriers
- No Voice Resiliency / Branch Survivability (SBA/SBS) concept
- No location based call (limited emergency / static by user)
- No analog device
- No media by-pass
- No Delegation / Team calling / ... between on-prem & online
  - users from same groups must be hosted in same place (on-prem/online)
- Advanced Voice features under development



# Hybrid PSTN Mix & match is a Plus!

- Multinational organization may benefit from Hybrid Topology mix and match
  - On-prem PSTN
  - Cloud PBX with PSTN Calling
  - Cloud PBX with on-prem PSTN Connectivity
- On-prem SfB servers can go virtualized
- On-prem SfB server licences are free with new Microsoft Secure Productive Enterprise licence suites
- Hybrid has full power



# Best Practice - not everything is smooth

- User & Voice policies
  - double management in some context (ie: enterprise voice)
- What to manage where not always clear
  - on-prem, online, AD, Skype
  - management tools could be better 😊
- Mix and match not always possible
  - delegates, hunt groups, ...
- Be careful with sub-domains (ie: italy.contoso.com)
- Cannot leverage On-prem PSTN Conferencing Dialin for Online hosted users
  - requires Microsoft provided PSTN Conferencing & licence fees



# UC = Universal Communications 😊

- Skype for Business UC & Telephony is communications of the future made real
  - “The Next Stage in Communications”  
<http://blogs.microsoft.com/blog/2014/02/18/from-unified-to-universal-the-next-stage-for-communications/>
  - ability to seamlessly navigate/use UI regardless of generation, work or life
  - ability to seamlessly communicate across networks regardless of platform, device or firewall boundary
- Skype for Business Cloud Features and PBX are growing and spreading worldwide
  - Italian connectivity infrastructure not always ready for Cloud-based real-time media ☹️
- Hybrid topology and PSTN Connectivity is best of both worlds and give maximum flexibility

→ Hybrid is my best choice ←



# Need more info?

- Interested in Skype telephony, voice or conference deployment?
- Interested in Innovation Scenarios with Microsoft Technologies?

## Contact me!

- @AlexAppiani
- [www.pulsarit.net](http://www.pulsarit.net)
- alessandro.appiani@pulsarit.net

# Grazie!

