May 31 – June 2, Oslo Spektrum

10th anniversary

Peter Schmidt & Michael Mardahl

Teams Architecture Deep Dive

About Peter

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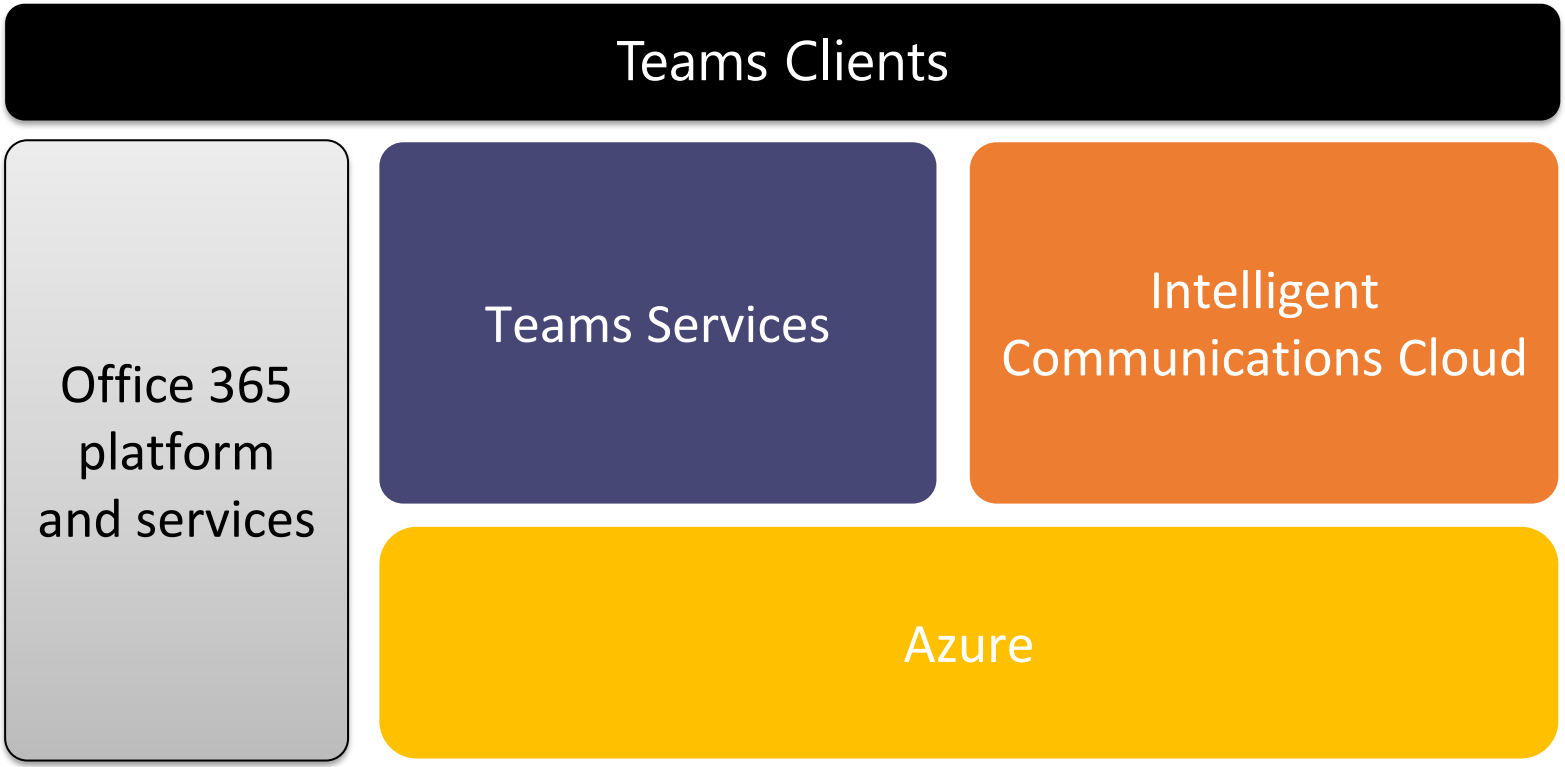
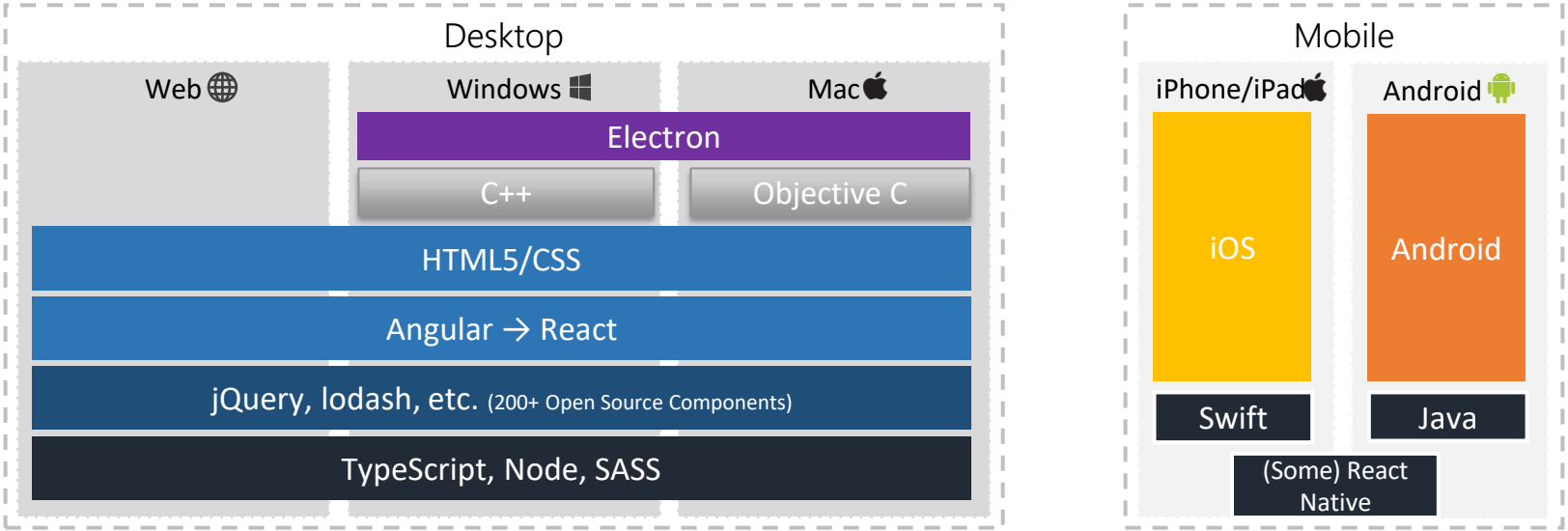
High-level client + services architecture

Teams joins O365 with Intelligent Communications



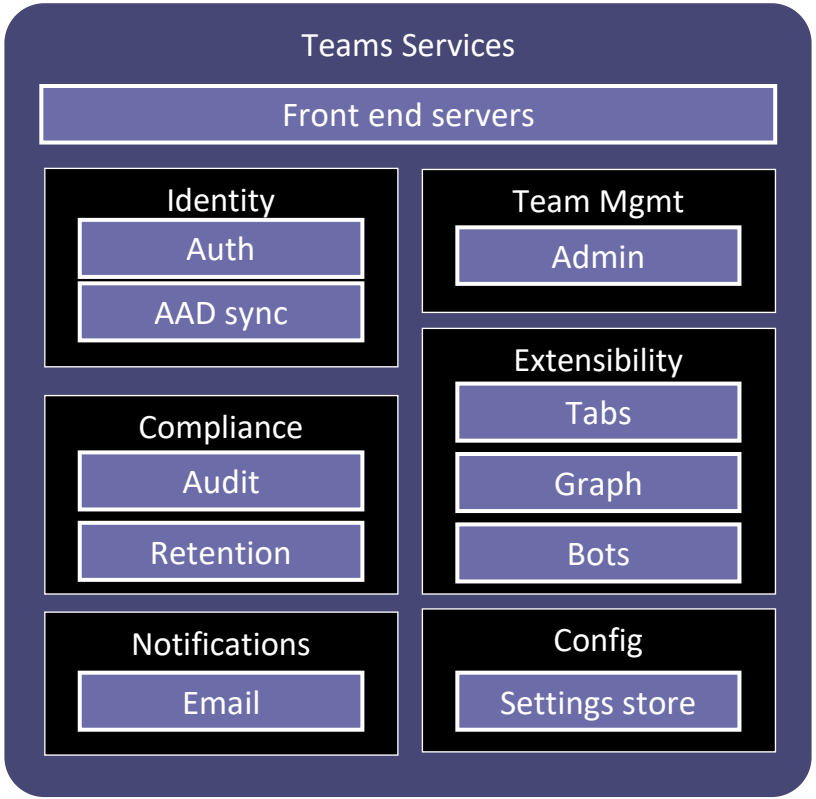
Teams Client Architecture

Optimized for agility
Auto-updates



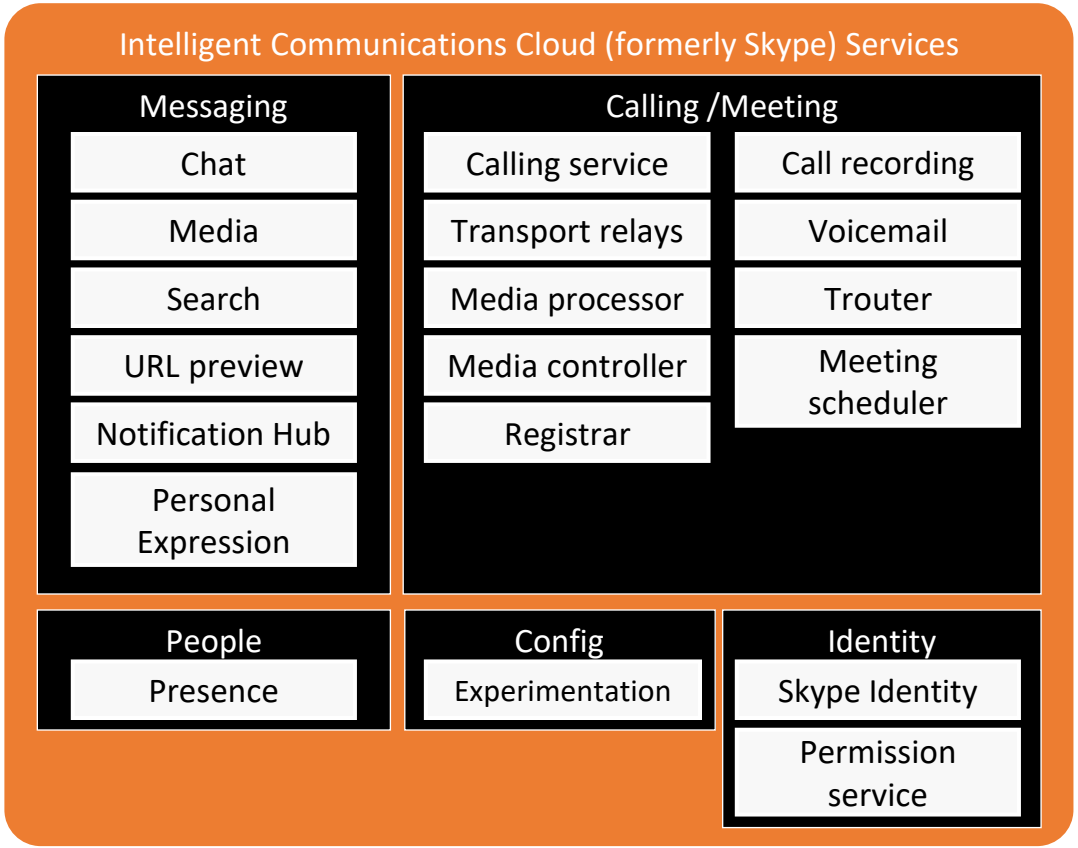
Browsers: Edge, ~~IE11~~, latest Chrome, latest Firefox, Safari
Desktop: Windows 11, 10, 8.1, 7(SP1), Mac OS X 10.10+ (M1 in beta)

Teams services



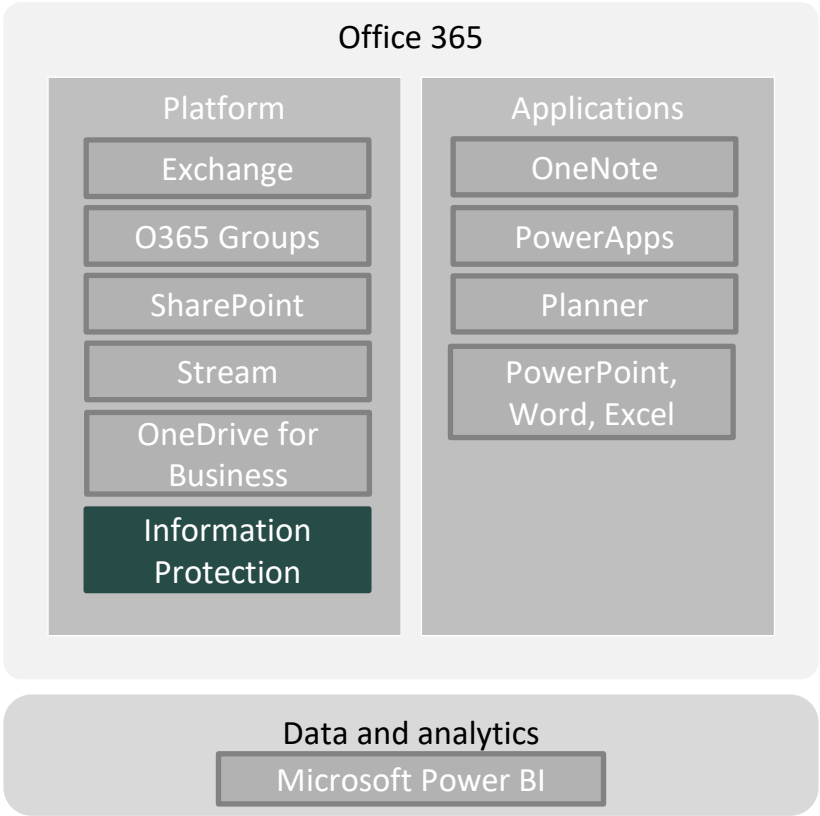
- Often referred to as the “Middle Tier” although it is actually a collection of microservices
- More efficient / Less complex
- Scale flexibility
- Lower risk / deployment agility
- Optimize for evolutionary change

Intelligent Communications Cloud



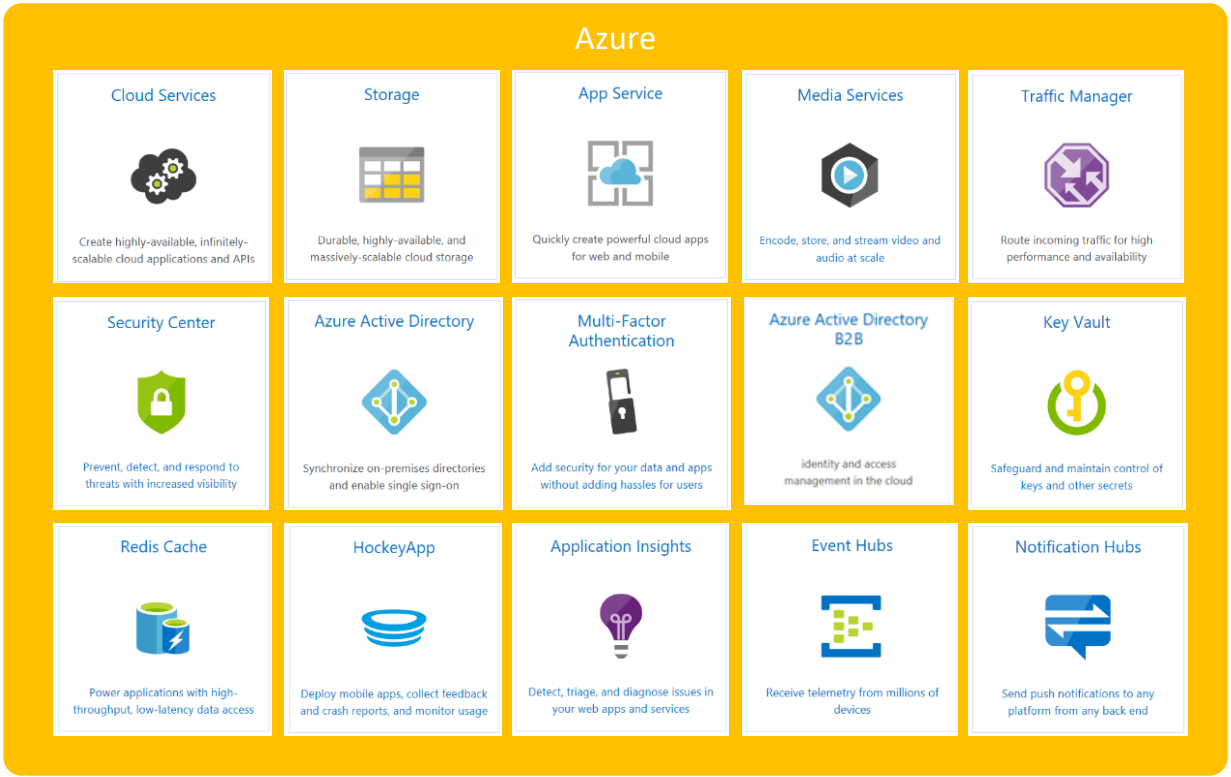
- Leverage the next generation compliant skype services for messaging and VOIP calling
- PSTN calling and conferencing leverages the Skype for Business Online stack
- Presence to leverage the new unified presence services

Teams and Office 365



- Teams strives to realize the full benefits of O365 both as a platform and for end user capabilities
- A part of MS Teams vision is to be an App hub for Office 365 and bring together the best capabilities
- Teams does not aim to re-invent the wheel, instead leverages the features of other O365 workloads

Teams and Azure Services



- Azure is the core platform that Teams is built on (cloud-first)
- Massive scale support
- Global footprint
- Redundancy and Disaster recovery
- Compliance

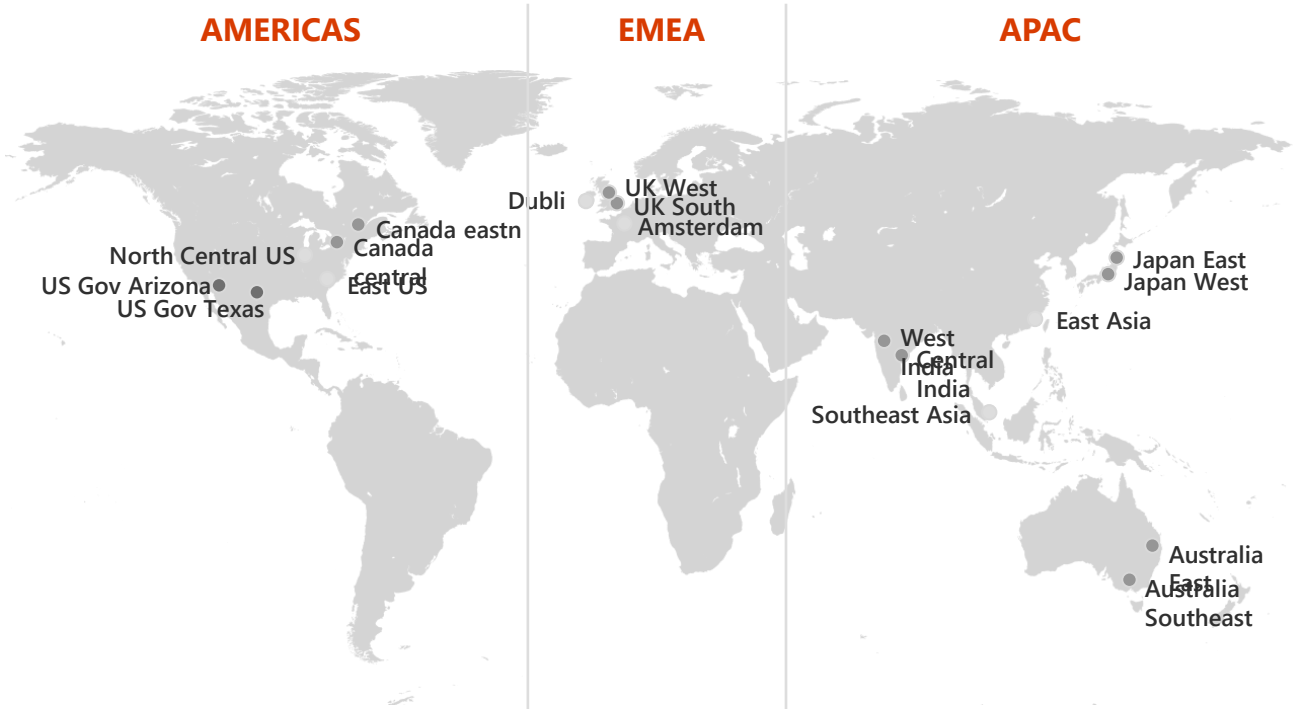
Deployment and data residency

In region In country US Gov

Microsoft Teams. If Customer provisions its tenant in Australia, Canada, the European Union, India, Japan, the United Kingdom, or the United States,

Microsoft will store the following Customer Data at rest only within that Geo:

(1) Microsoft Teams chats, Team conversations, images, voicemail, and contacts
(2) SharePoint Online site content and the files stored within that site
(3) files uploaded to OneDrive for Business



181 countries | 33 languages
(NOTE: Hebrew and Arabic RTL languages now supported)

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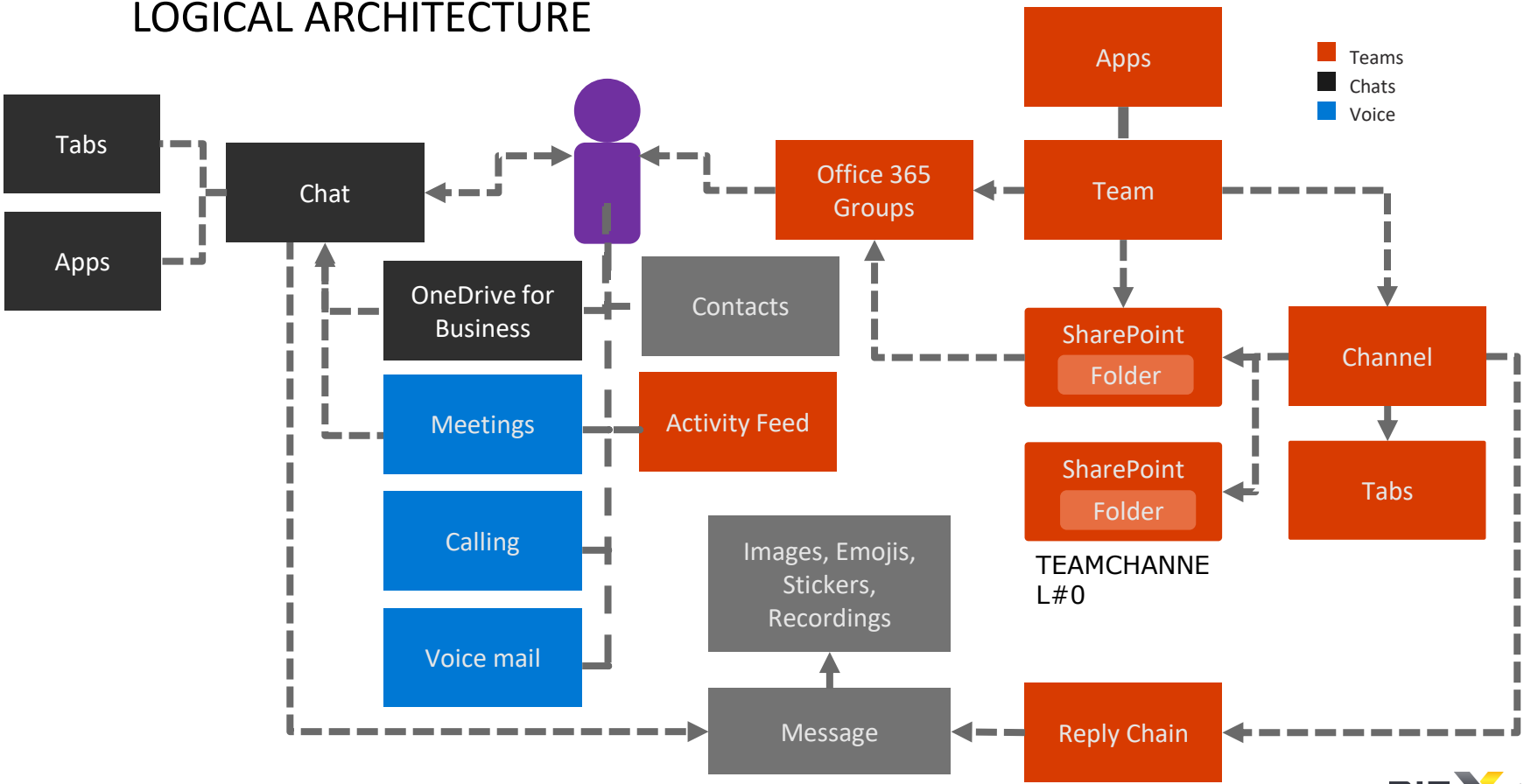
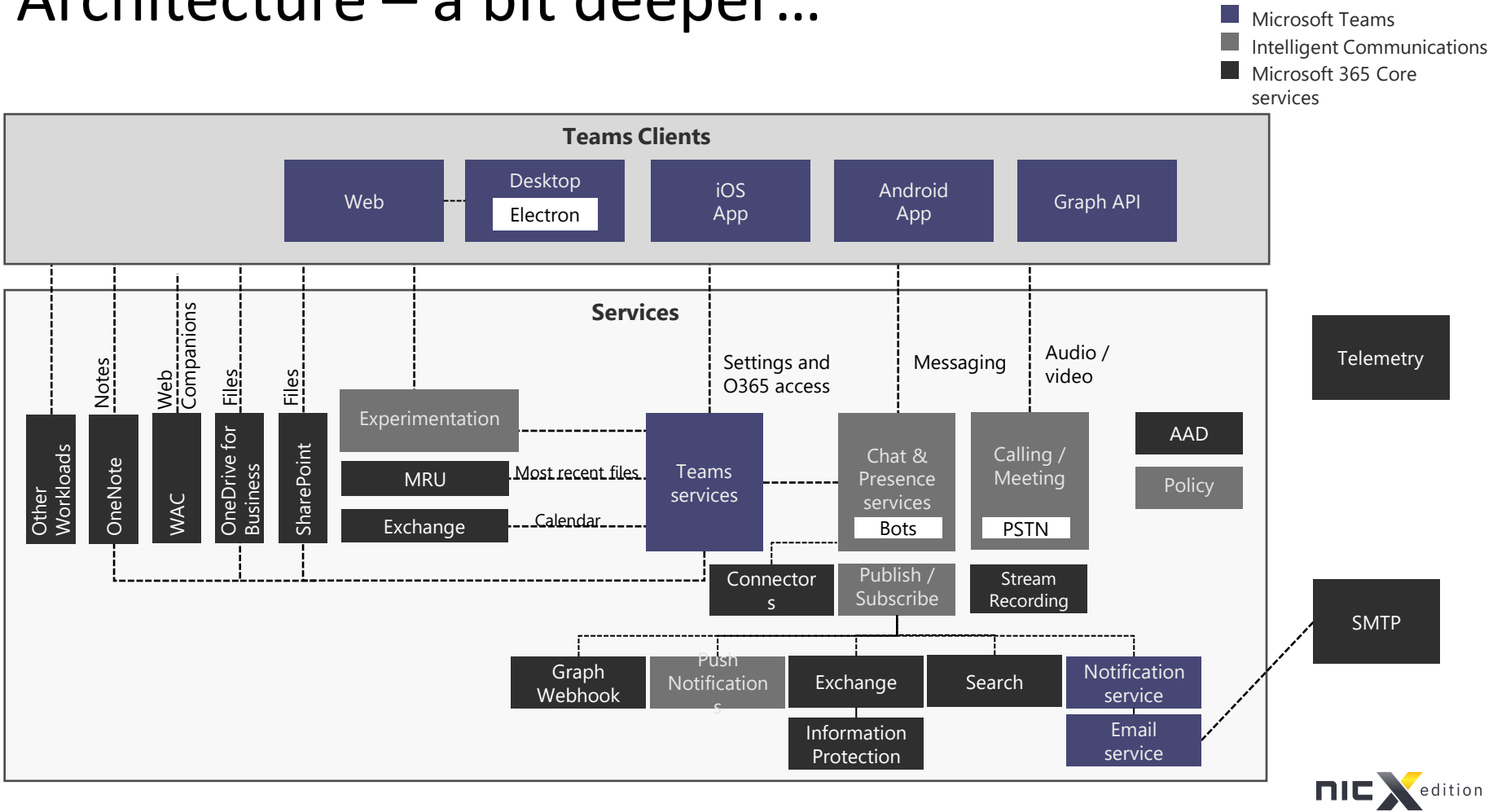
MICROSOFT TEAMS LOGICAL ARCHITECTURE



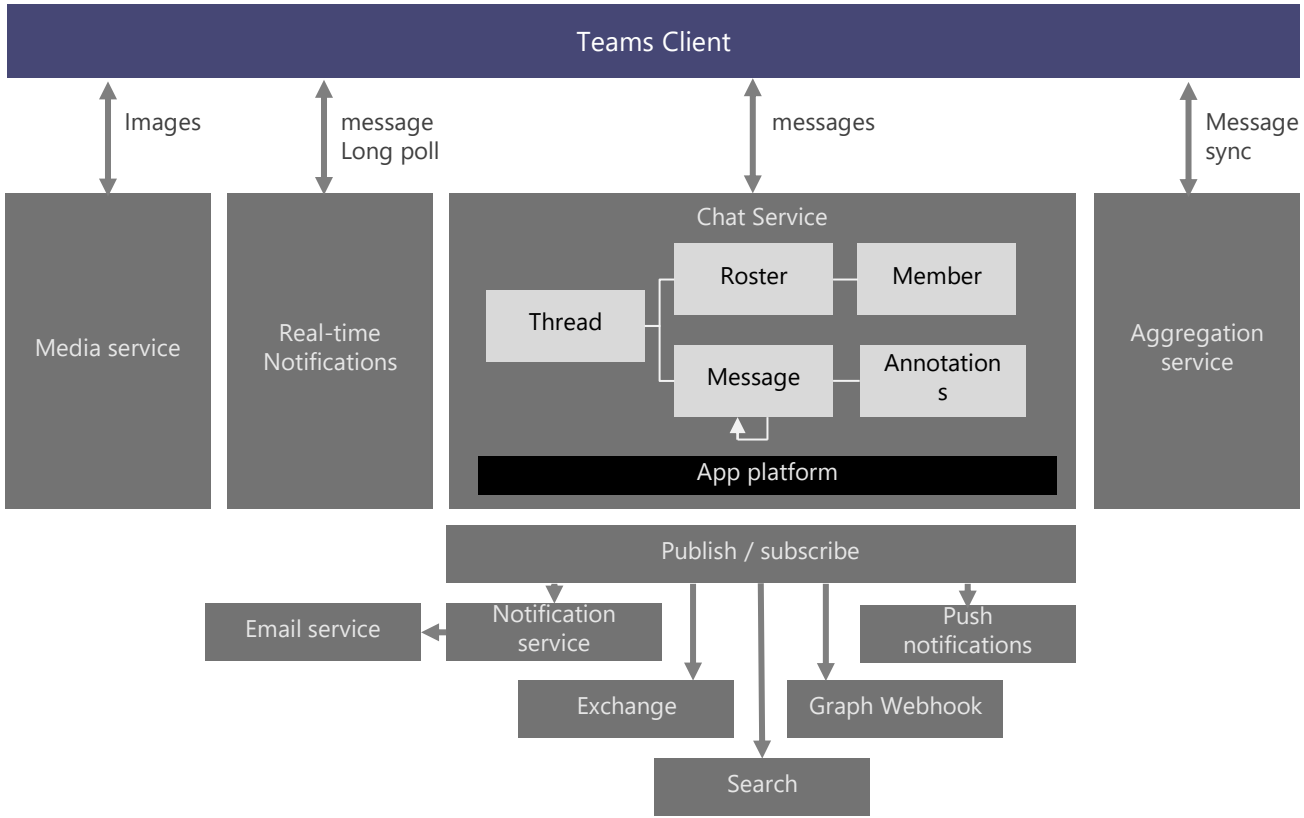
Architecture – a bit deeper…



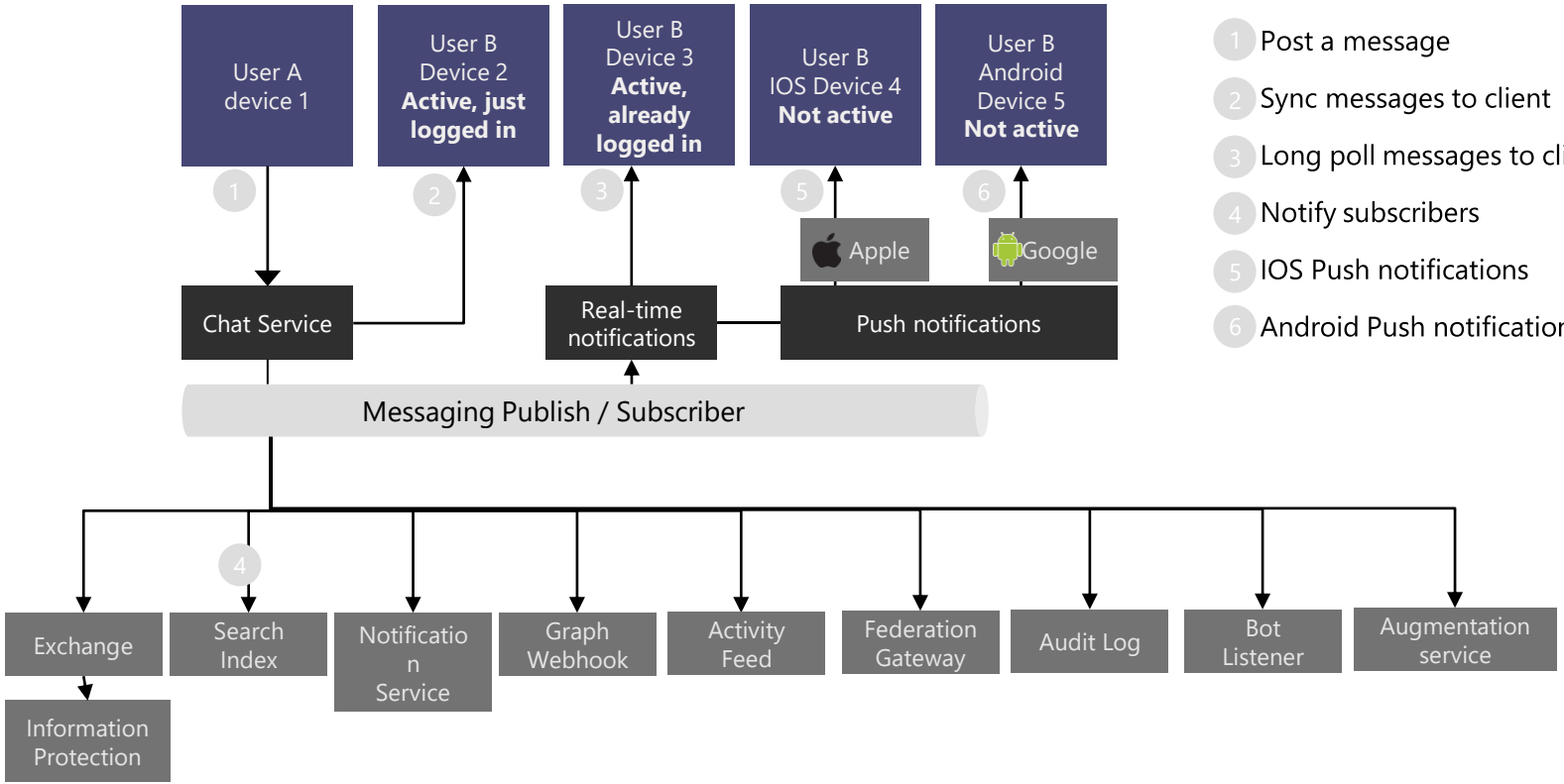
Messaging Architecture and Data Storage

Messaging (1:1, 1:M, Channels)

Secure, fast, reliable



Post a message (1:1, 1:M, channel)



Conversation storage

Where are conversations stored?

Chat service

In memory processing for speed

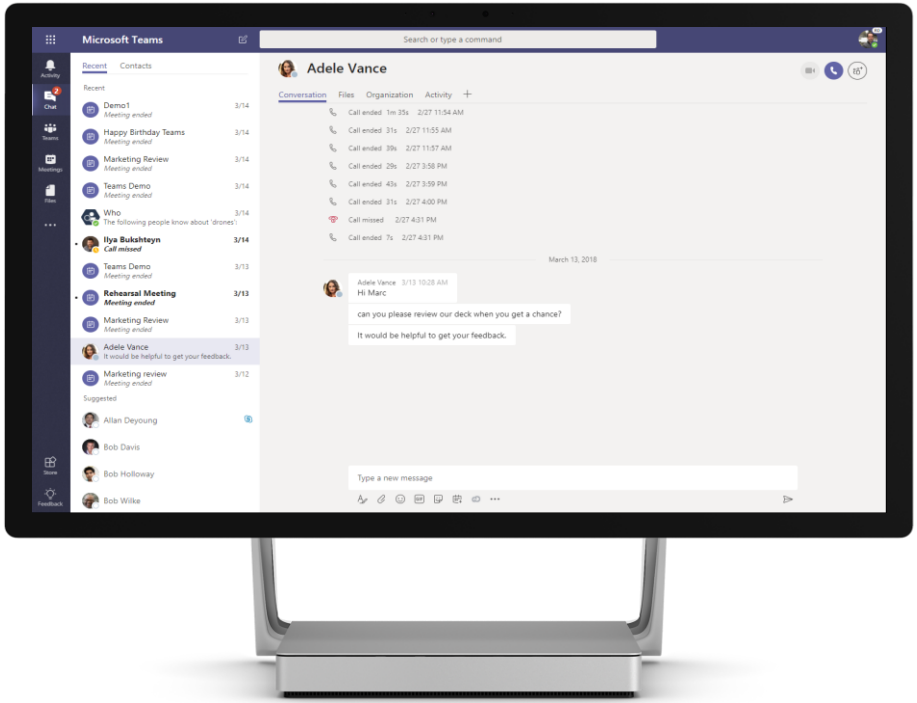
Leverages Azure storage (blob, tables, queues), moving to Cosmos DB

Substrate / Exchange

Chat and channel messages are also stored in Exchange for information protection

Conversation images & media

Inline Images/Stickers are stored in a media store; Giphys are not stored



File storage

Where are files stored?

1:N chats

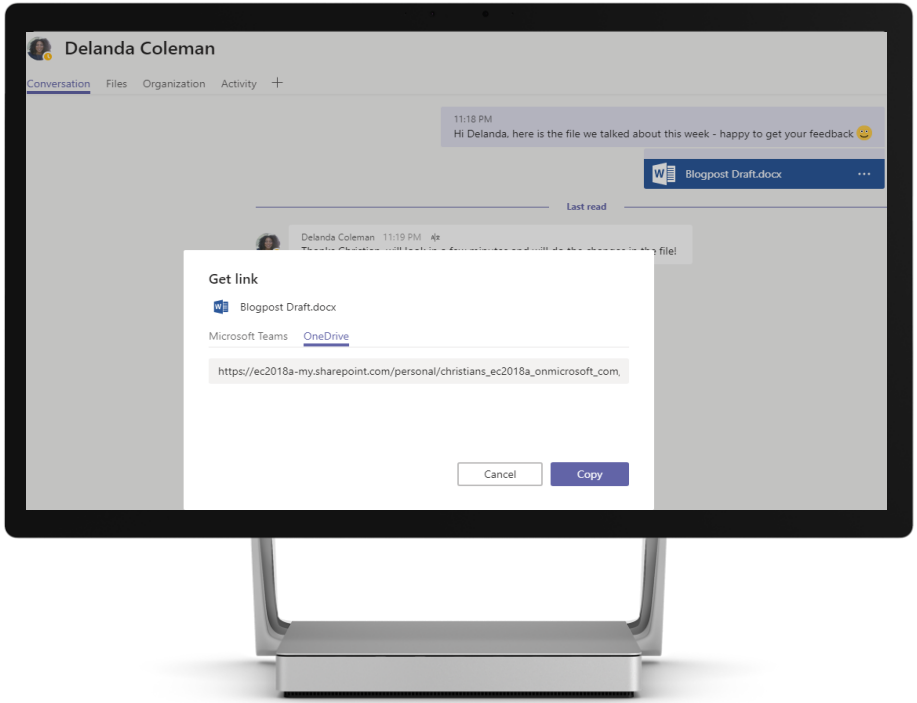
Files are uploaded to **OneDrive for Business** and permissions are set for the members of the chat

Team conversations

Files are uploaded to **SharePoint.** A folder is associated with each channel in the team

Cloud storage

Dropbox, Box, Citrix ShareFile, Google Drive



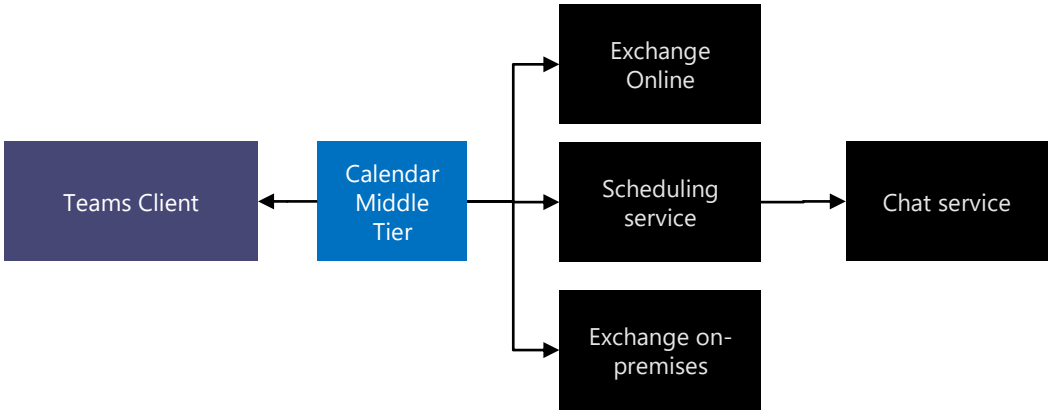
Where is everything stored ?

Key data entities and location where data is stored at rest

Entity	Storage	Storage
Message	Chat service table storage (moving to Cosmos DB)	Ingested to Exchange to enable compliance
Image	Media service on Azure (using Blob storage)	Ingested to Exchange to enable compliance
Files	Team files → SharePoint Chat files → OneDrive for Business	
Voicemail	Individual mailbox in Exchange	
Recording	Media service on Azure (using Blob storage) (<24 hours)	Saved to OneDrive / Team
Calendar meeting	Individual mailbox in Exchange	
Contacts	Exchange	
Telemetry	Microsoft Data warehouse (No customer content)	

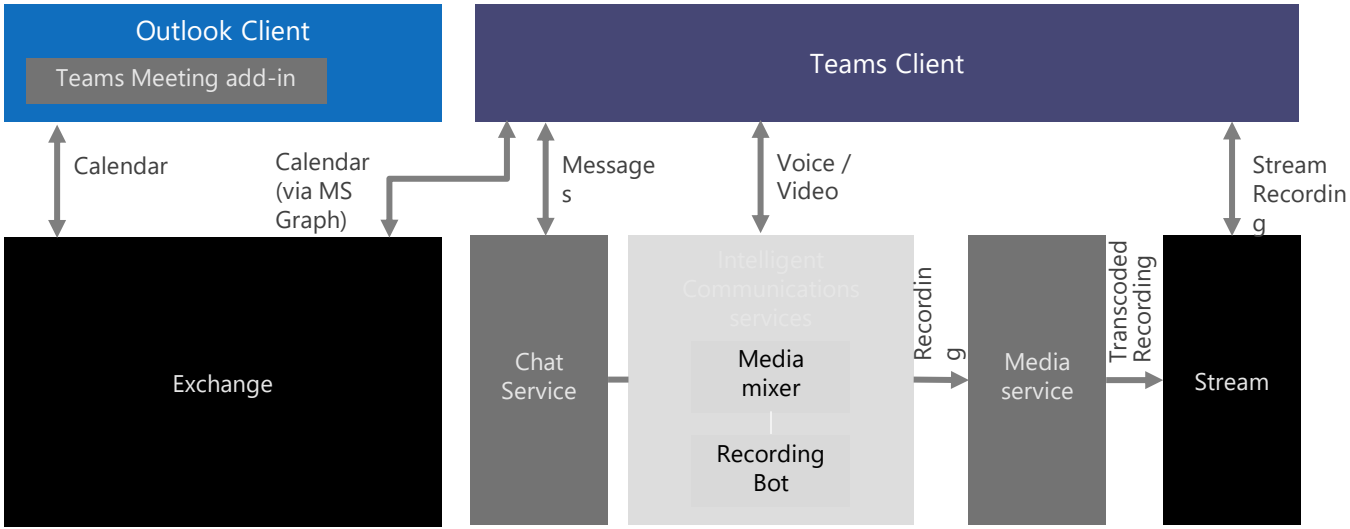
Meetings, Calendar, and Presence

Calendar Architecture

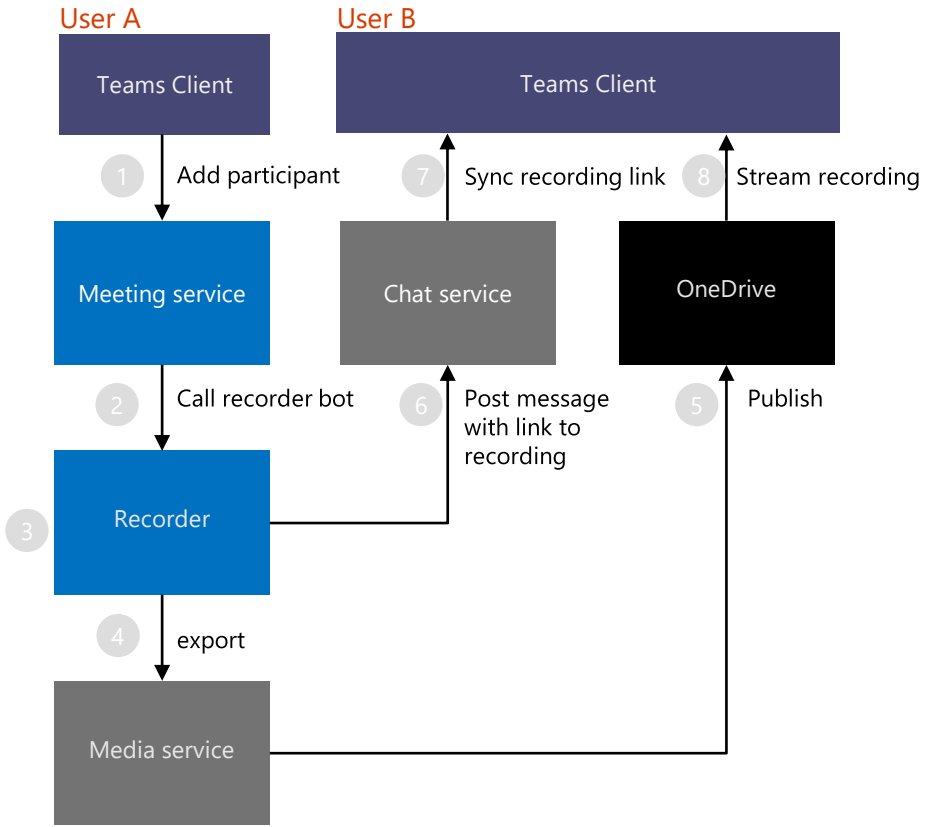


Meetings

Seamless
High Quality



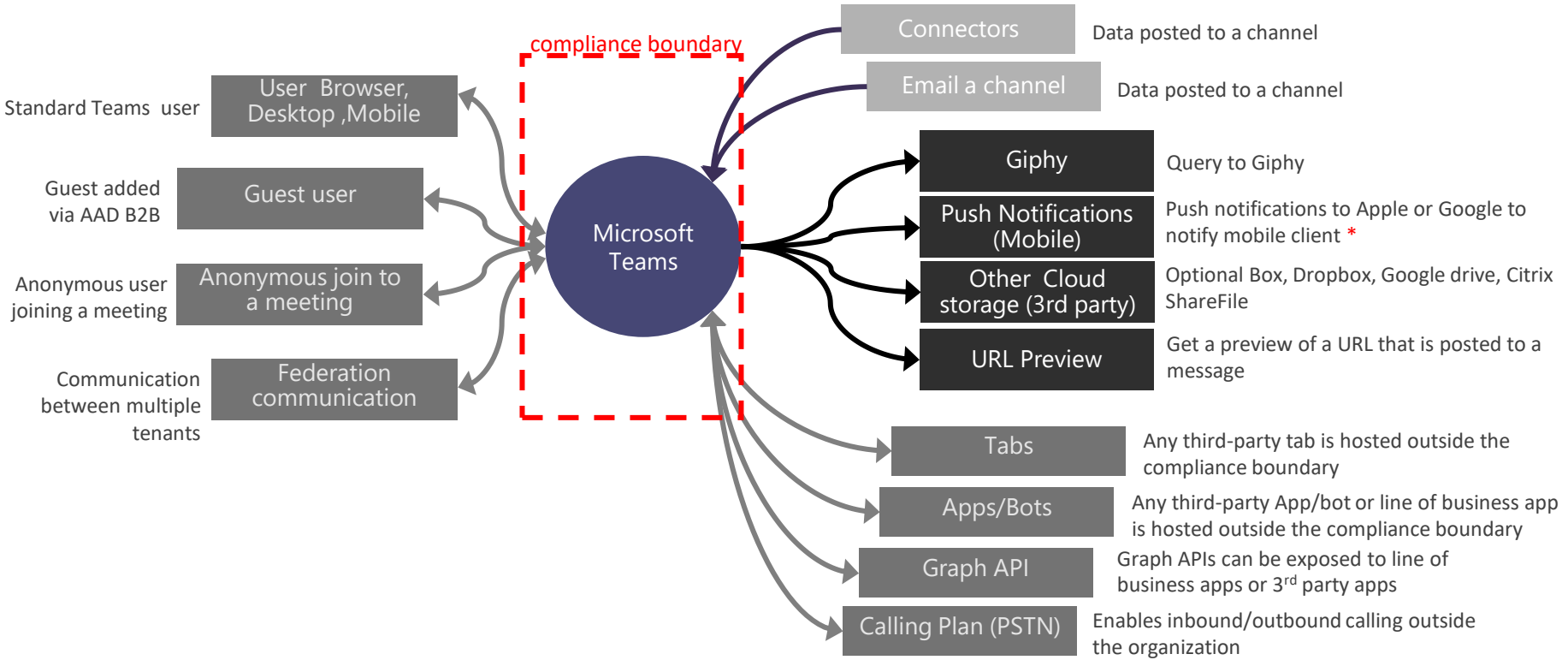
Meeting recording



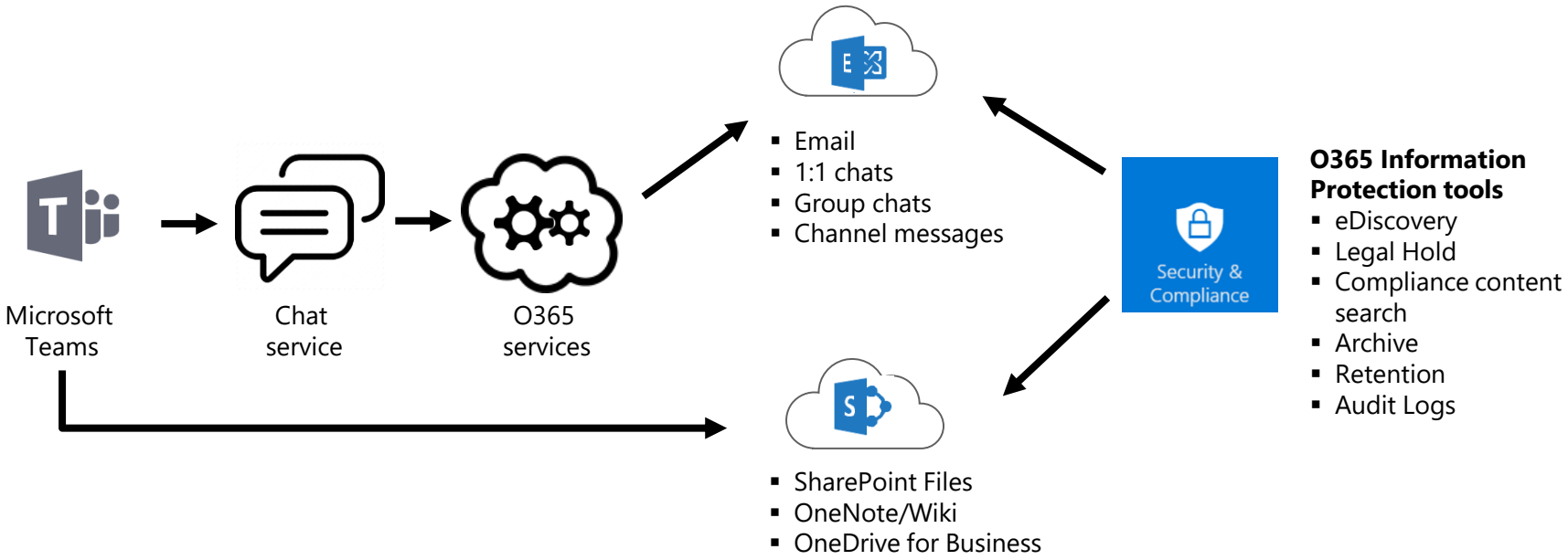
1. User starts recording
2. Recorder is added to call
3. Recorder (Azure service) records call
4. Recorder sends data to media service
5. Media service transcodes video and uploads to OneDrive or Teams
6. Recorder sends message with link to recording
7. User(s) receive message on client
8. User(s) stream the recording

Information Protection and the Compliance Boundary

Data flows and the compliance boundary



How Teams enables O365 Information Protection



MEMBERSHIP AND ROLES

	Team Owner	Team Member	Team Guest
Create team	✓	-	-
Leave team	✓	✓	✓
Edit team name/description	✓	-	-
Delete team	✓	-	-
Add channel	✓	✓*	✓*
Edit channel name/description	✓	✓*	✓*
Delete/restore channel	✓	✓*	✓*
Edit messages	✓	✓*	✓*
Delete messages	✓*	✓*	✓*
Add members	✓	-	-
Add tabs	✓	✓*	-
Add connectors	✓	✓*	-
Add bots	✓	✓*	-

* Can be restricted through Team Settings by the owner

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Teams Architecture Take-aways

Client Architecture

Service Architecture

Meeting and recording

Questions

Remember the feedback !

Slides and demos from the conference will be available at

https://github.com/nordicinfrastructureconference/2022

Remember to rate the session – Thanks !