

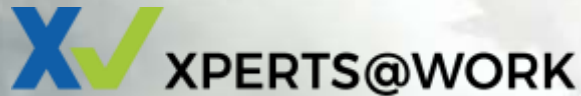
# TEAMS ARCHITECTURE FOR IT-PROS AND ARCHITECTS



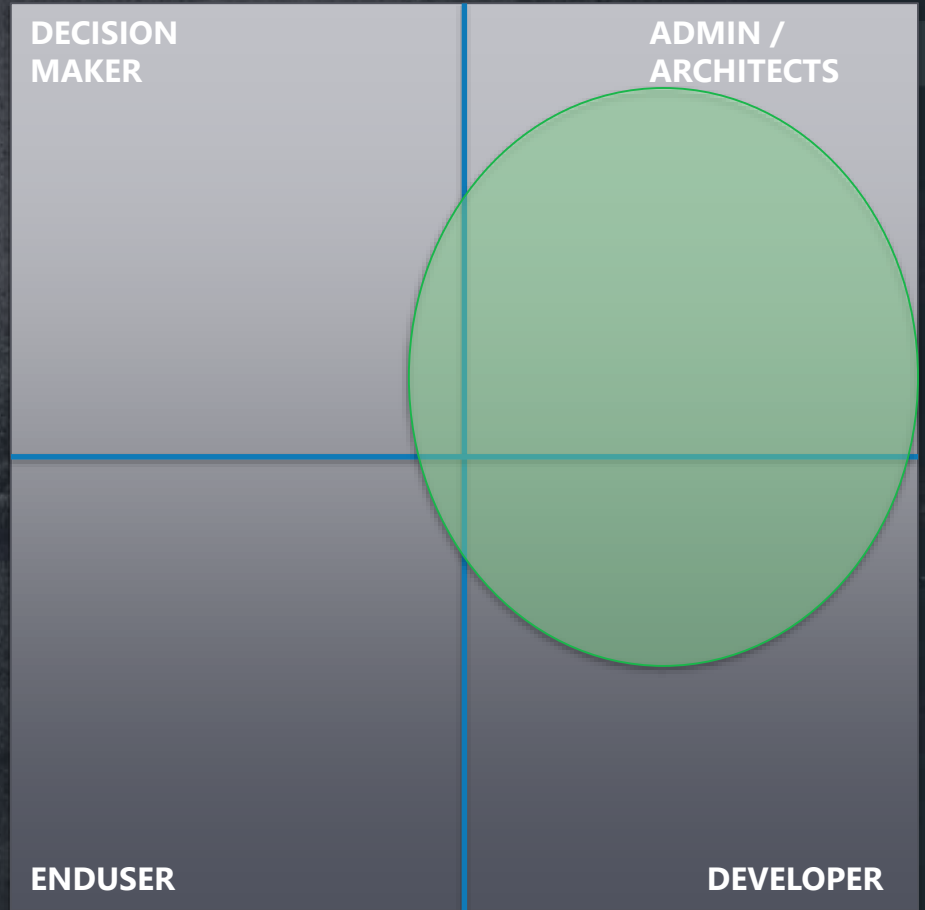
**atwork**  
*information technology*



Microsoft Teams



TARGET AUDIENCE



# Based on Ignite 2017 Sessions:

- BRK2294 - How to enable and configure Microsoft Teams for your users
- BRK3071 - Get an overview of Microsoft Teams architecture
- BRK4000 - Learn about enterprise security and compliance with Microsoft Teams
- BRK2031 - Real Time Communications with Network Planner
- BRK4004 - Understanding Media Flows in Microsoft Teams and Skype for Business

# Topics

- Microsoft Teams architecture overview
- Microsoft Teams administration overview
- Office 365 security and compliance features for Microsoft Teams
- Media Flows in Microsoft Teams and Skype for Business
- Microsoft Teams for developers



# Microsoft Teams

It is a cloud based chat centric workspace bringing together nearly all Office 365 capabilities.

# Microsoft Teams architecture overview

<https://docs.microsoft.com/en-us/microsoftteams/teams-overview>

# Teams side-by-side with Skype for Business


Office 365 Microsoft Teams & Skype for Business Admin Center

Adam Jarman

## Dashboard

CONTOSO CORP  
MAR 12, 2017 10:31:07 AM (PT)

### ORGANIZATION INFORMATION



MAR 25, 2014  
Organization Created

Off  
Active Directory Synchronization

23,330  
Users in Cloud

### TEAMS USAGE TREND

7 DAYS 30 DAYS 60 DAYS

512.3K  
Chat Messages

214.7K  
Conversations

4.3K  
Meetings

### USERS ON DEFAULT PLAN

91%  
OF USERS

View Details


### ORG. CALL QUALITY

7 DAYS 30 DAYS 60 DAYS

87%  
CSAT

### TEAMS CALL VOLUME


7 DAYS 30 DAYS 60 DAYS



Teams Calls

### TEAMS USER STATS

7 DAYS 30 DAYS 60 DAYS



Desktop Users Web Users Mobile Users

### PHONE NUMBERS CAPACITY


120  
Available

25,210  
Assigned Numbers

25,330  
Total Numbers

View Details

### USERS PER LOCATION



### USAGE BY DEPARTMENT

Marketing	6,329
Engineering	14,390
Sales	981
Design	2,320

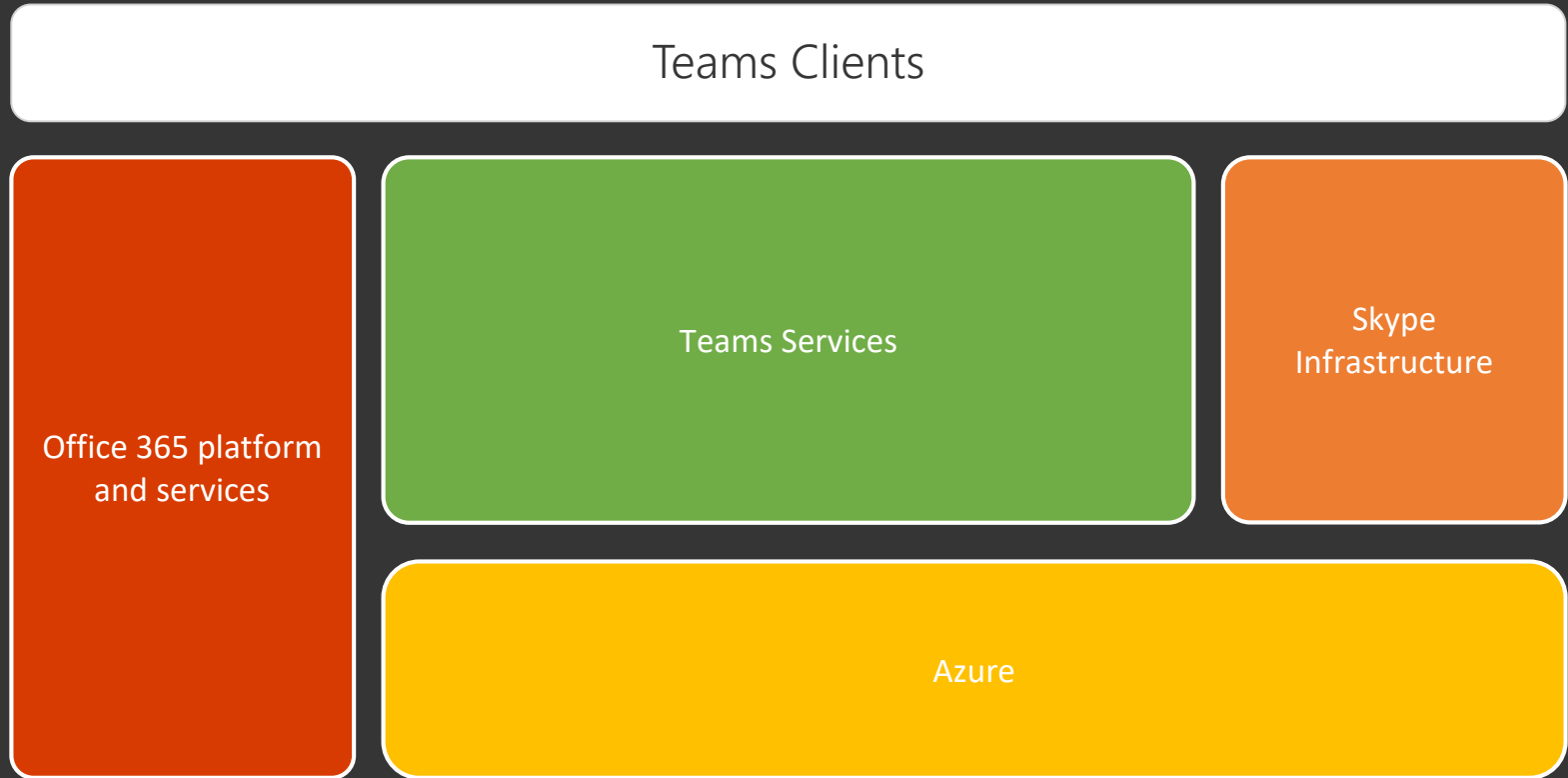
<https://docs.microsoft.com/en-us/microsoftteams/guidance-skypeforbusiness>

# Microsoft Teams Architecture

- Designed for the cloud
- Agility at scale
- Amplify the value of O365

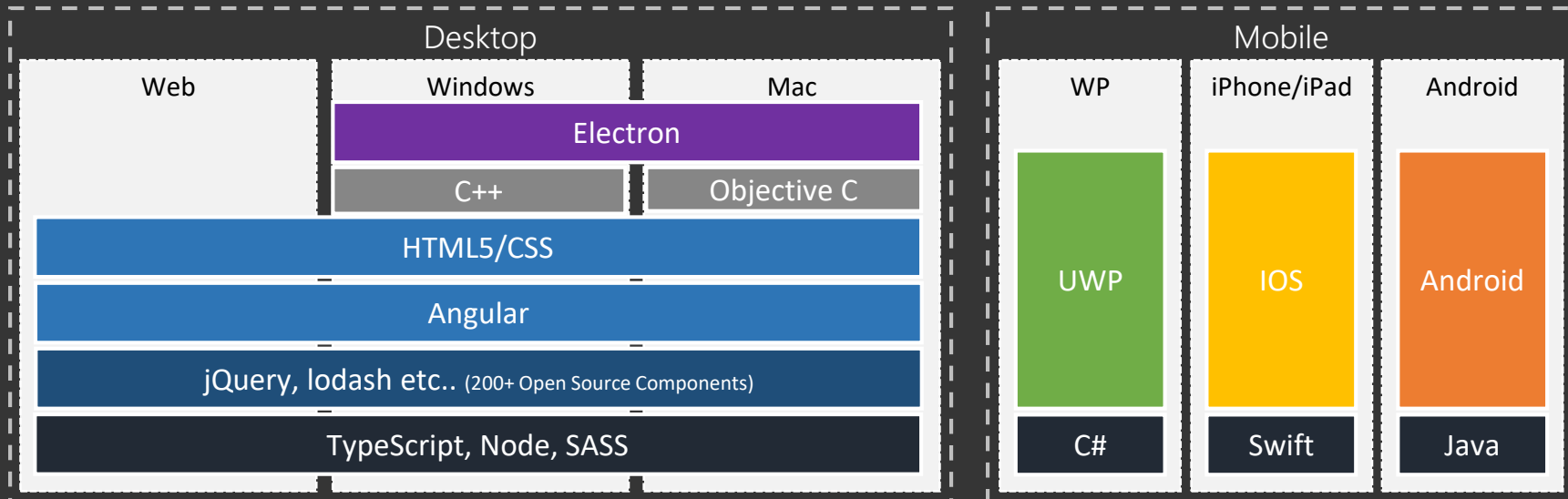


# Teams brings together O365 and Skype



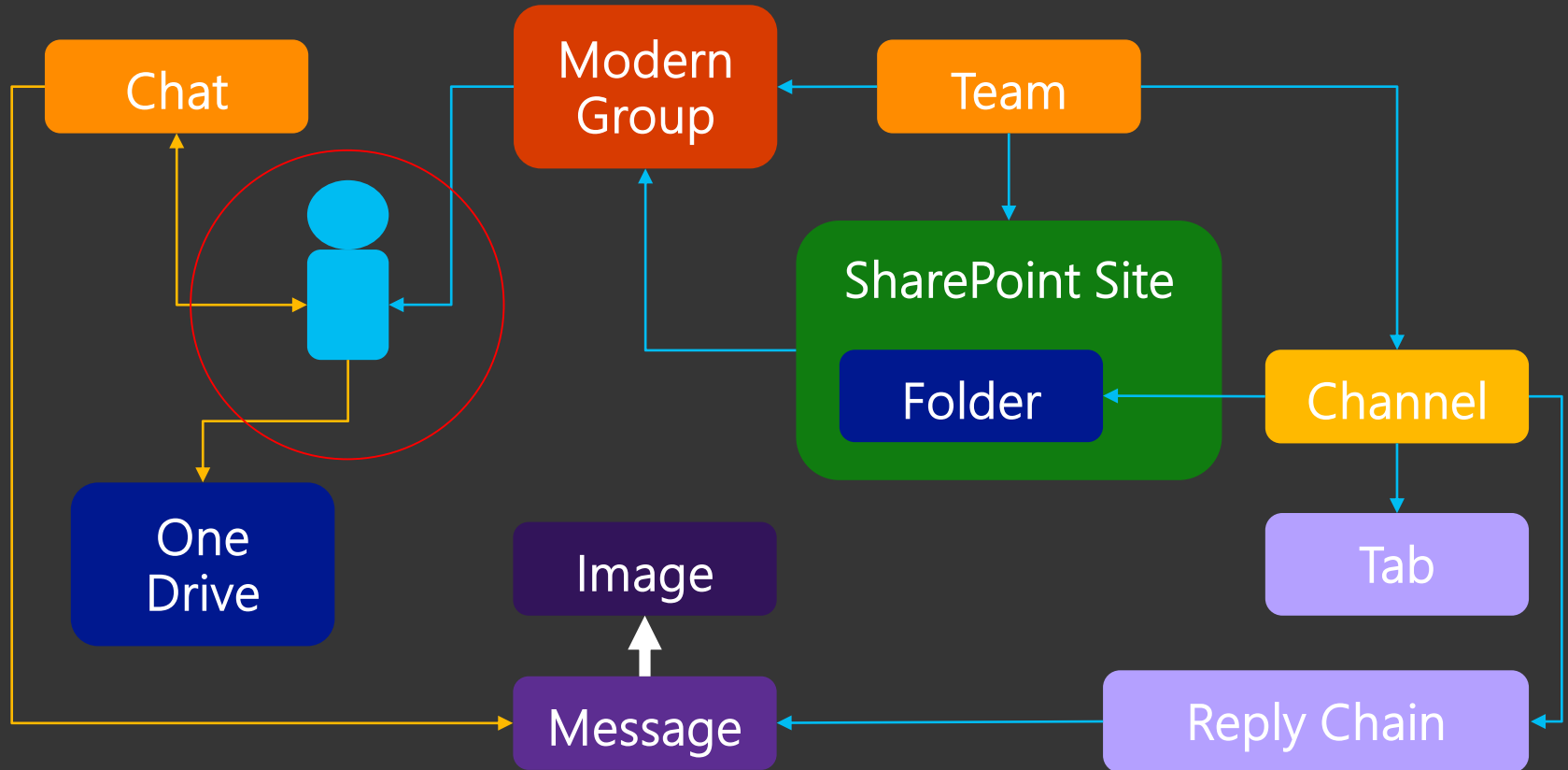
# Teams Client Architecture

Optimized for agility  
Auto-updates

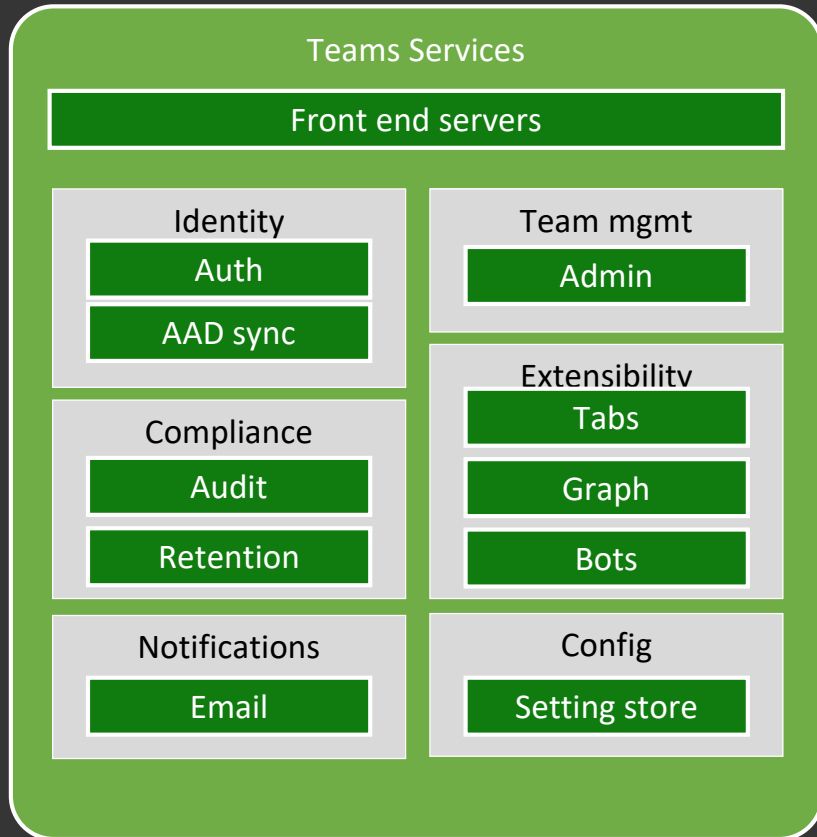


Browsers: Edge, IE11, latest Chrome, latest Firefox  
Desktop: Windows 10, 8.1, 7(SP1), Mac OS X 10.10+

# Teams Conversations Logical Architecture

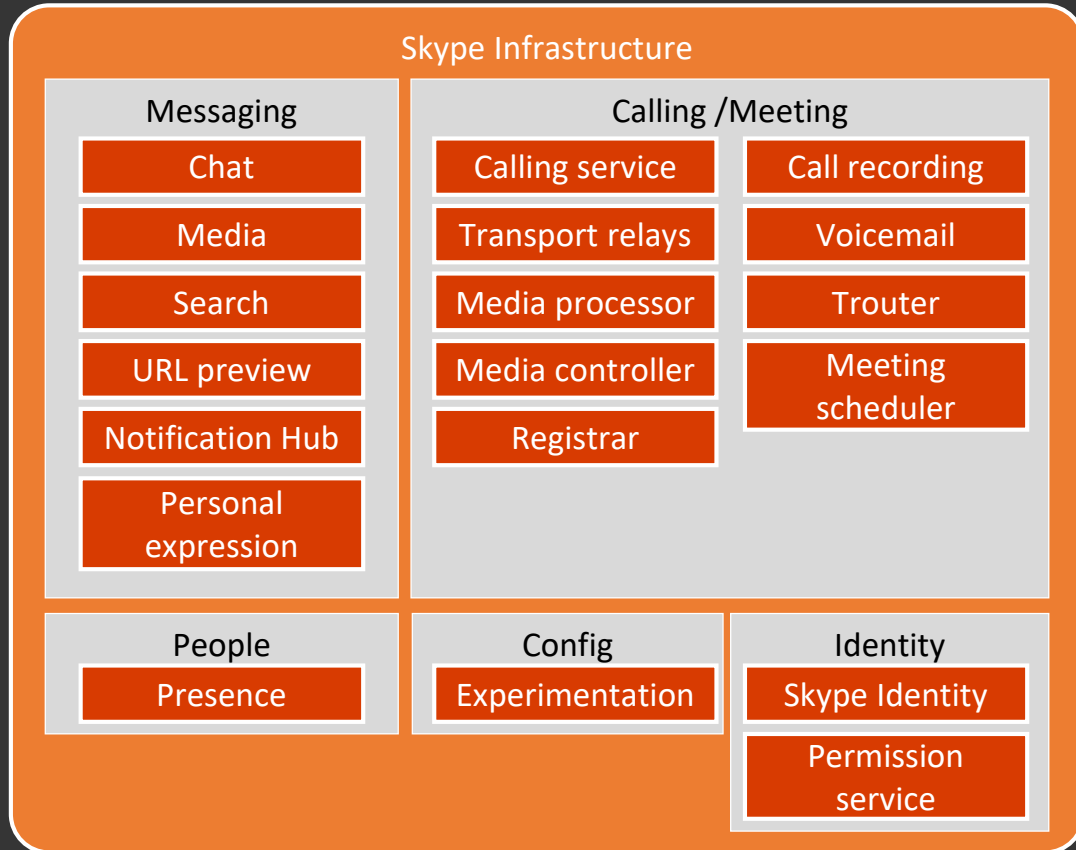


# Teams services



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

# Teams and Skype



- Leverage the next generation compliant skype services for messaging and VOIP calling
- PSTN calling leverages the Skype for Business Online services

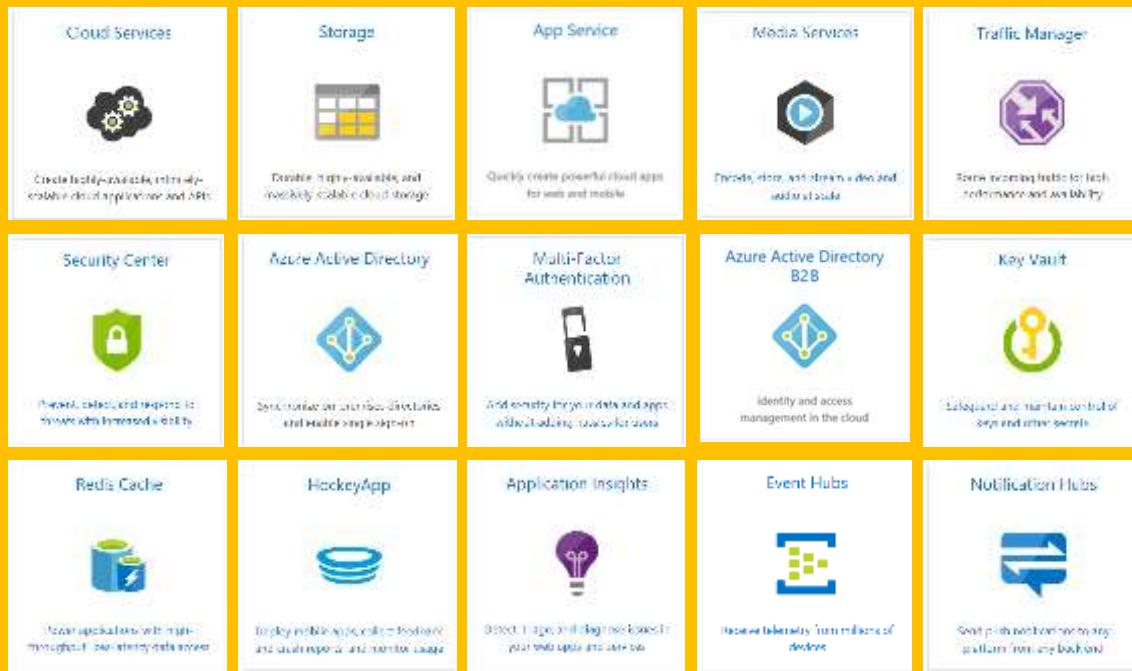
# Teams and Office 365



- Teams strives to realize the full benefits of O365 both as a platform and for end user capabilities
- A part of our vision is to be an App hub

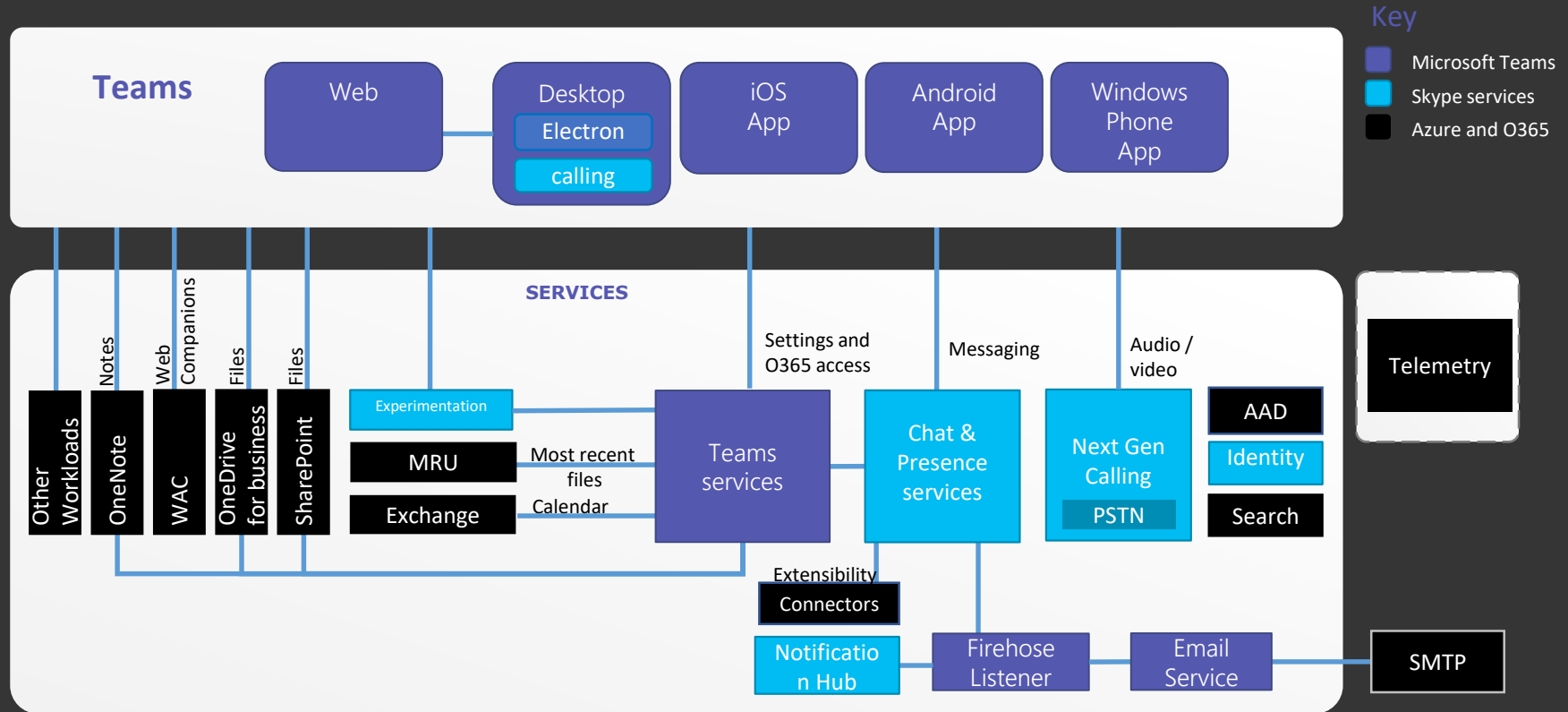
# Teams on Azure

## Azure



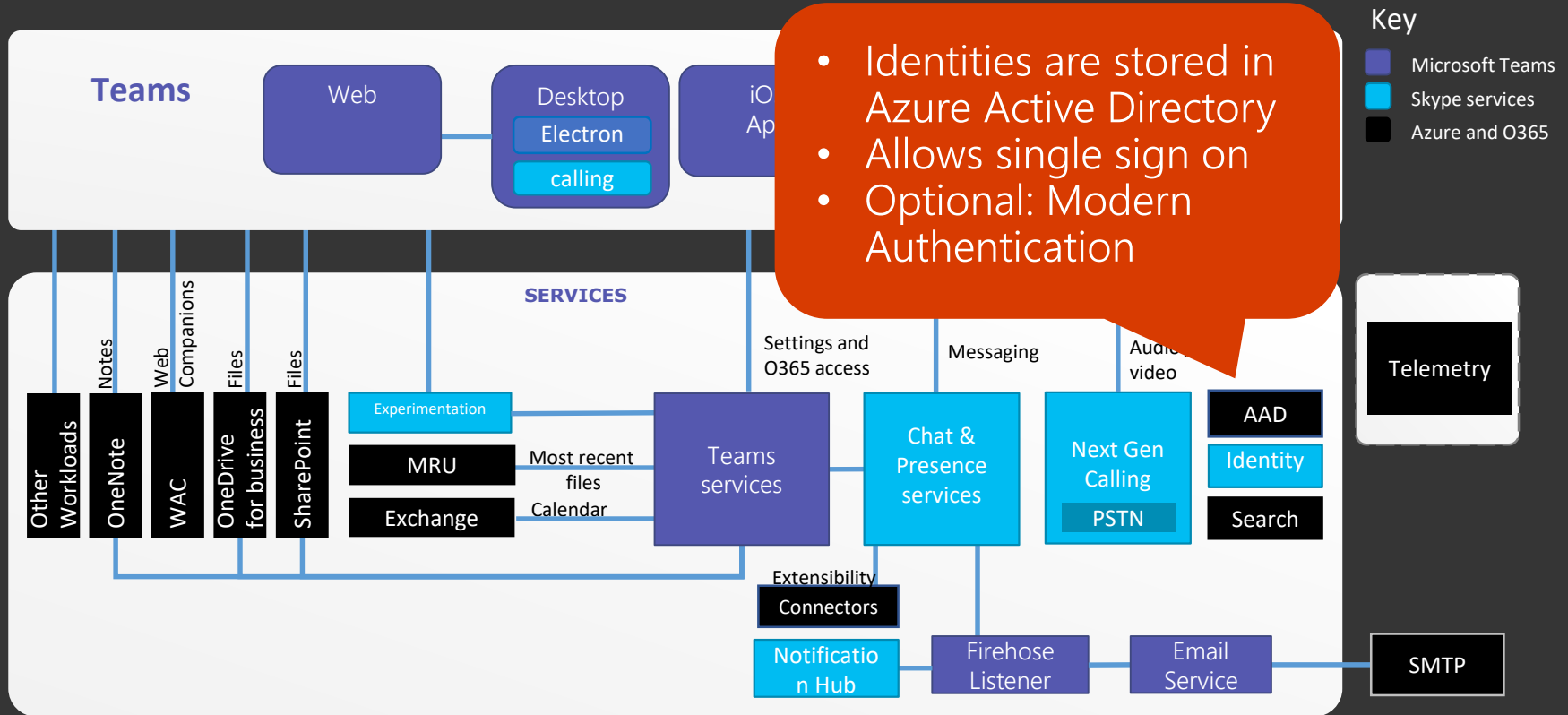
- Azure is the core platform that Teams is built on
- Massive scale
- Global foot print
- Redundancy

# High Level Architecture

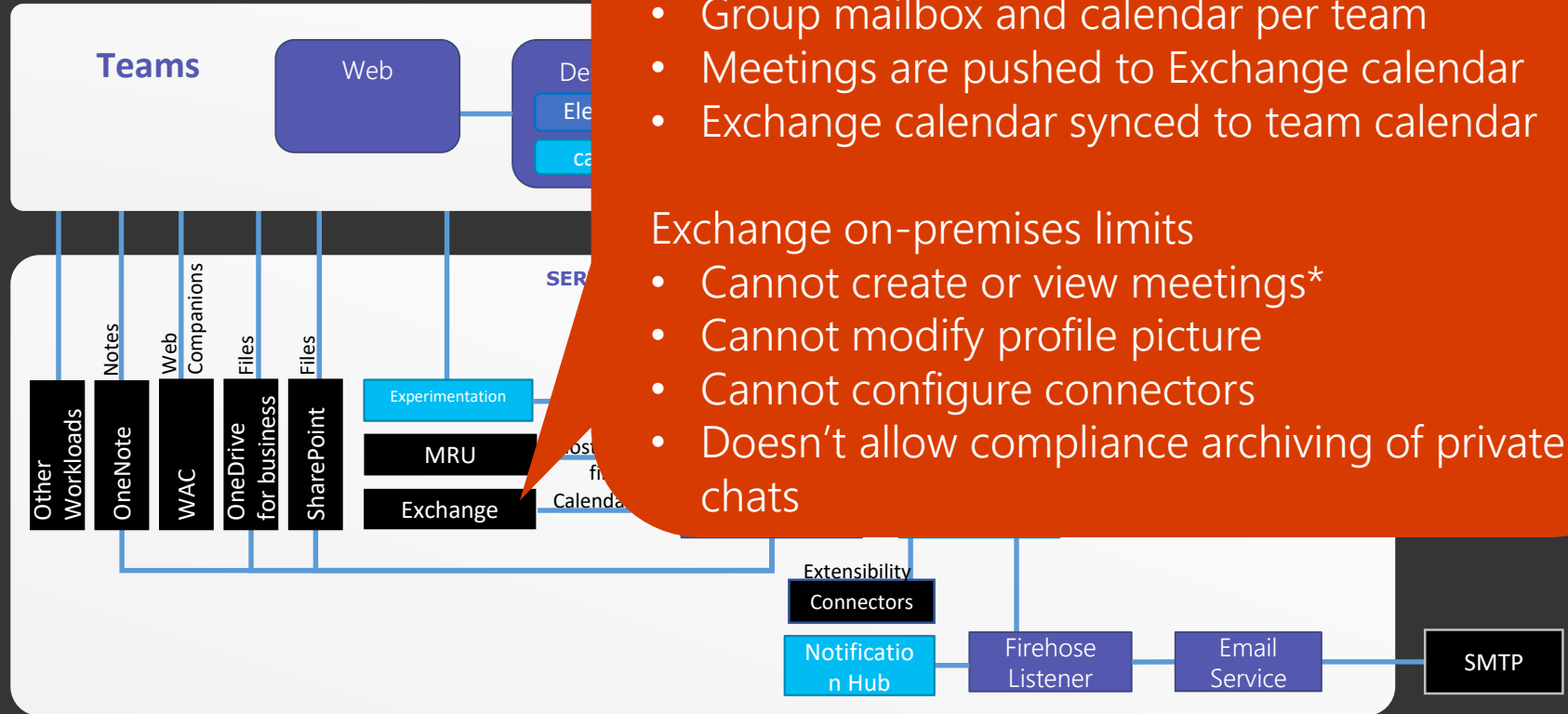




# High Level Architecture



# High Level Architecture



## Exchange Online

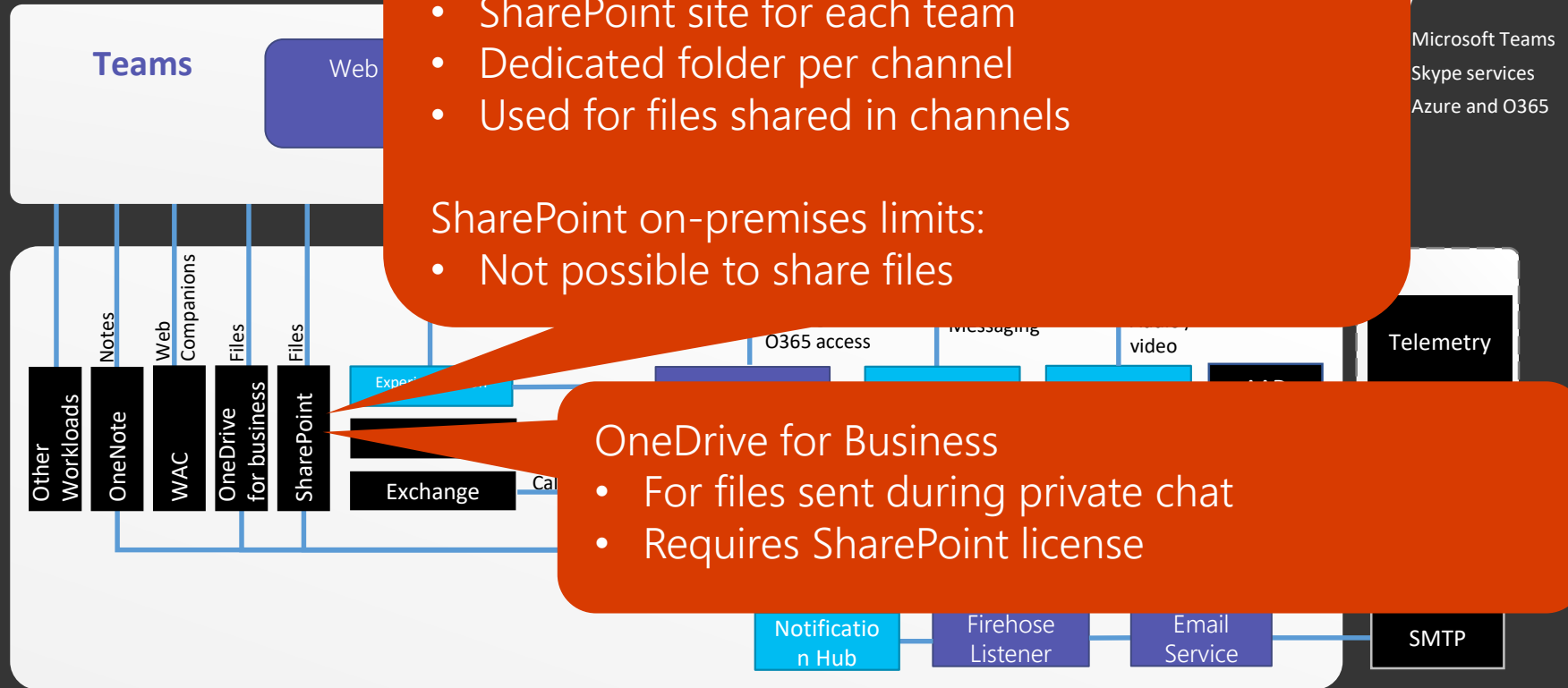
- Group mailbox and calendar per team
- Meetings are pushed to Exchange calendar
- Exchange calendar synced to team calendar

## Exchange on-premises limits

- Cannot create or view meetings\*
- Cannot modify profile picture
- Cannot configure connectors
- Doesn't allow compliance archiving of private chats

\* Exchange 2016 CU3 and above supported

# High Level Architecture



## SharePoint Online

- SharePoint site for each team
- Dedicated folder per channel
- Used for files shared in channels

## SharePoint on-premises limits:

- Not possible to share files

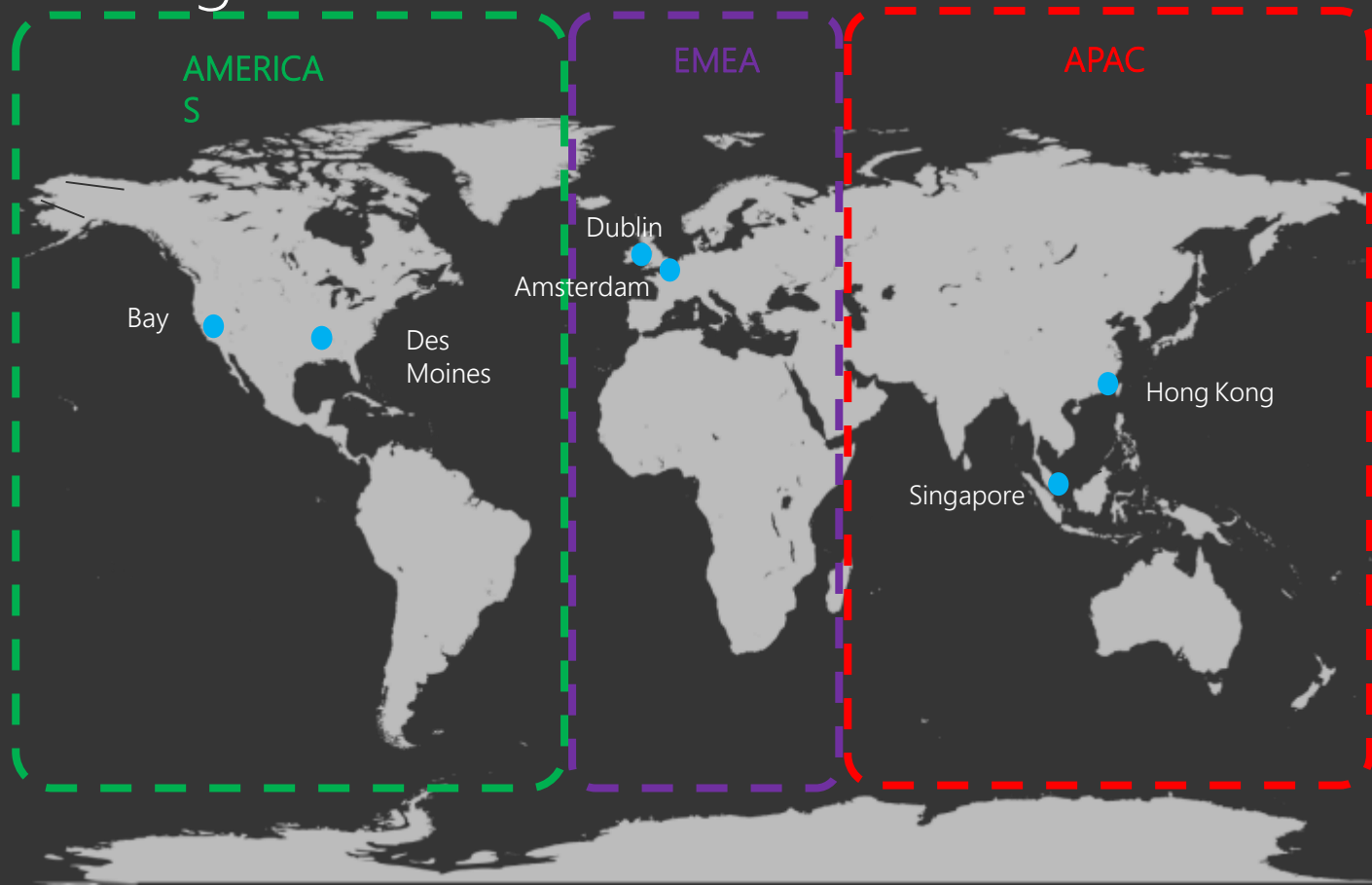
## OneDrive for Business

- For files sent during private chat
- Requires SharePoint license

# Regional Partitioning

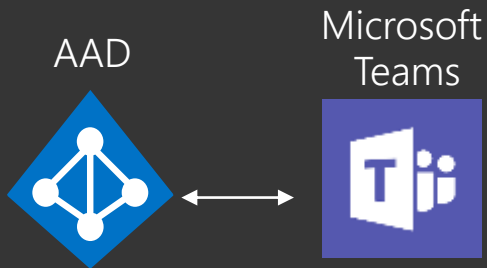
181 countries | 25 languages

- Chat data stored 'In Region' based on tenant affinity
- If tenant in Australia, Canada, India, Japan, the United Kingdom, or the United States Files are stored 'In Country'
- Teams honors EU model clauses
- Chat data stored 'In Country' available the UK in 4Q CY2017 and in India 1Q CY2018
- US Gov clouds in 2018



# AAD sync

Operations performed on Groups are synced to Microsoft Teams



- Sync normally completes in 15 minutes.
- SLA is 24 hours

## Currently supported

Group property updates  
Group manager changes  
Group member changes  
Group hard delete  
User property updates  
User hard delete

## Under development

Group soft-delete and restore

# Where Are My conversations Stored?

## **Chat service**

In memory processing for speed

Leverages Azure storage (blob, tables, queues)

## **Substrate / Exchange**

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

## **Conversation images**

Images are stored in a media store

# Where Are My 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

# Microsoft Teams Guest Access Architecture

## One identity

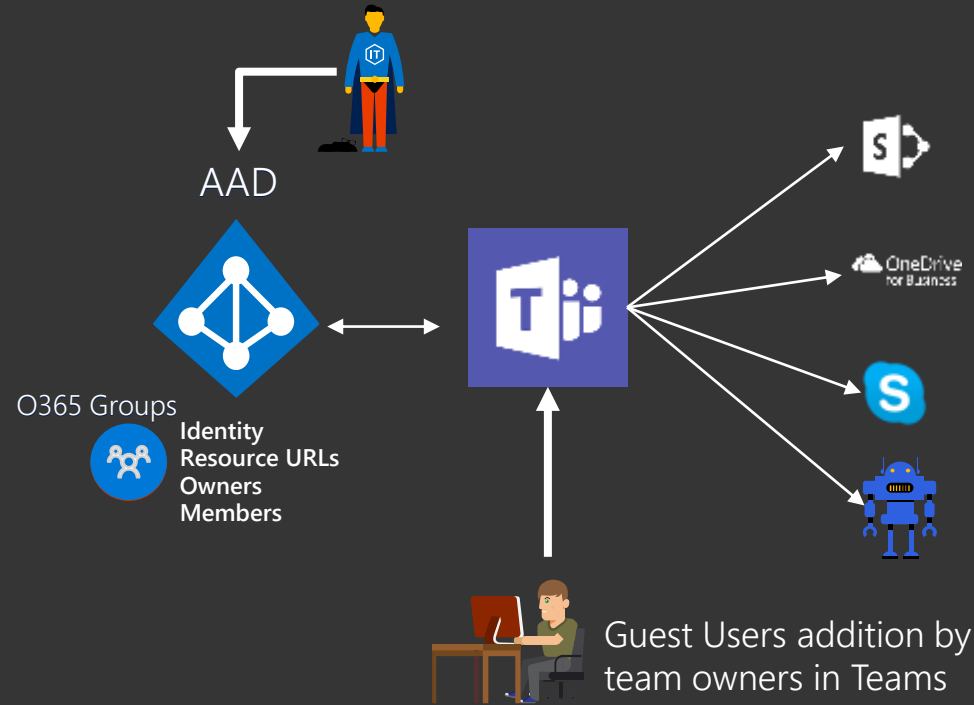
- Azure Active Directory (AAD) is the master for Teams identity and membership across Office 365 (Teams, SharePoint, Apps, etc.)

## Federated resources

- O365 services extend with their data (e.g., conversations stored in Teams chat service & documents stored in SPO & OneDrive)

## Loose coupling

- Services notify each other of changes to a team (e.g., creation, deletion, updates)
- Using sync from AAD to Teams, Exchange Online AD and SharePoint Online AD they achieve reliability if they miss notifications





# Enabling Microsoft Teams

For the full Microsoft Teams experience, every user should be enabled for Exchange Online, SharePoint Online, OneDrive for Business and Office 365 Group creation.

User's mailbox is hosted in:	Team and Channel mgmt	Create and view meetings	Modify user profile picture	Add and configure connectors	Add and configure tabs & bots	Info Protection (eDiscovery)
Exchange Online	Yes	Yes	Yes	Yes	Yes	Yes
Exchange Online Dedicated vNext	Yes	Yes	Yes	Yes	Yes	Yes
Exchange Online Dedicated – Legacy (Sync to Azure AD required)	Yes	No	No	No	Yes	No
Exchange on-premises (Sync to Azure AD required)	Yes	Exchange 2016 CU3 or later	No	No	Yes	No

# Microsoft Teams administration overview

<https://docs.microsoft.com/en-us/microsoftteams/enable-features-office-365>

# O365 Admin Portal

Office 365 | Admin center

Home > Services & add-ins

+ Upload Add-In View All Search

Name	Host Apps	Status
Manage your settings for Azure multi-factor authentication		
Calendar		Let people share their calendars with external users.
Contoso		Turn Contoso access on or off for your entire organization.
Directory Synchronization		Sync users to the cloud using Active Directory.
Docs.com		Manage and update your Docs.com settings.
Gigamon Preview		Manage and update your Gigamon settings.
Integrated apps		Manage your integrated Apps settings.
Mail		Set up auditing, track messages, and protect email from spam and malware.
Microsoft Azure Information Protection		Update your settings for Microsoft Azure Information Protection.
Microsoft Forms		Manage and update your Microsoft Forms settings.
Microsoft Teams		Manage and update your Microsoft Teams settings.
Office 365 Groups		Control settings for Office 365 Groups.
Office Drive		

# O365 Admin Portal

Office 365 | Admin center

Home > Services & add-ins

Microsoft Teams

Note: Users with active Microsoft Teams licenses see the Microsoft Teams app tile even if you turn off Microsoft Teams here.

Please be aware this control is temporary and will be removed in the future. To manage individual user access to Microsoft Teams, use licenses.

View practical guidance on how to successfully plan, deliver, and operate Microsoft Teams.

**Tenant-wide settings**

- General
- Email integration
- Apps
- Custom cloud storage

**Settings by user/license type**

Select the user/license type you want to configure: Business & Enterprise

Turn Microsoft Teams on or off for all users of this type:  On

Teams and channels

Calls and meetings

Messaging

Save Cancel

# General Tenant Level Settings

**Tenant-wide settings**

**General**

- Show organizational chart in personal profile  On
- Use Skype for Business for recipients who don't have Microsoft Teams  On
- Allow T-bot proactive help messages  On

**Email integration**

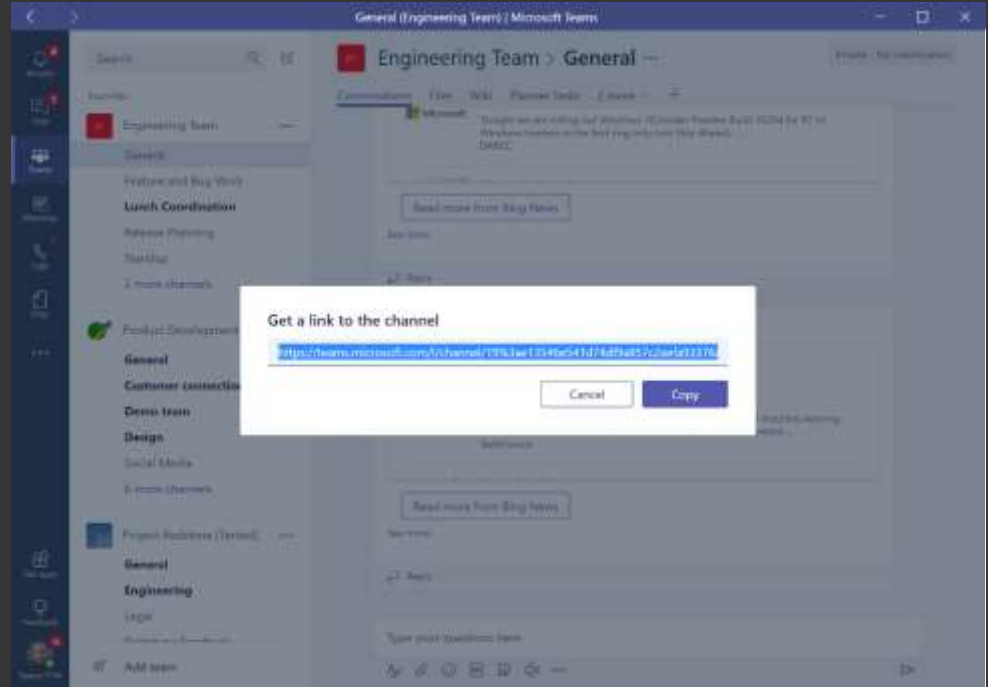
The screenshot shows the Microsoft Teams interface. On the left, a search bar is active, displaying a list of search results for 'marketing sync' and 'Demo chat'. The main chat area shows a conversation with 'T-Bot'. The bot has responded to a search query with the text 'Here's what I found...' and a card titled 'What kind of searches can I perform in Microsoft Teams?'. The card contains a screenshot of the search interface and text explaining search capabilities: 'You can perform some pretty detailed searches in Microsoft Teams. Start by typing a name, keyword, or phrase into the search bar at the top of the app. We'll generate suggestions based on your recent conversations, favorite channels, or people within your organization. Click on the v to filter your search even further!'. Below the card is a text input field with the placeholder 'Type your questions here' and a send button.

# Email Integration

^ **Email integration**

Allow users to send email to channels  On

Allow senders list (separated each domain with a comma)



# Apps

## ^ Apps

Enable/disable default apps

Name

Website

Allow external apps in Microsoft Teams

On

Allow sideloading of external apps

Off

Name

AceBot

Aha!

Airbrake

Aircall

AppSignal

Asana

Assistant @ Zoom.ai

Enable new external apps by default

On

## Add a tab

Turn your favorite apps and files into tabs at the top of the channel.

Search

### Apps for your team



Excel



Forms



OneNote



OneNote (B...)



PDF



Planner



Power BI



PowerApps



PowerPoint



SharePoint



Stream



Visual Studio



Website



Wiki



Word

### All Tabs



Adobe Crea...



Adobe Sign



Asana



Bitbucket



Egnyte



Empsense



Flipgrid



Hootsuite



Intercom



Jira Cloud



MindMeister



Nimble Con..



Polly



POPin

# Settings by user/license type

## Settings by user/license type

Select the user/license type you want to configure

Business & Enterprise ▾

Turn Microsoft Teams on or off for all users of this type



On



# Custom cloud storage


Custom cloud storage


Box	<input checked="" type="checkbox"/>	On
Dropbox	<input checked="" type="checkbox"/>	On
Google Drive	<input checked="" type="checkbox"/>	On
ShareFile	<input checked="" type="checkbox"/>	On

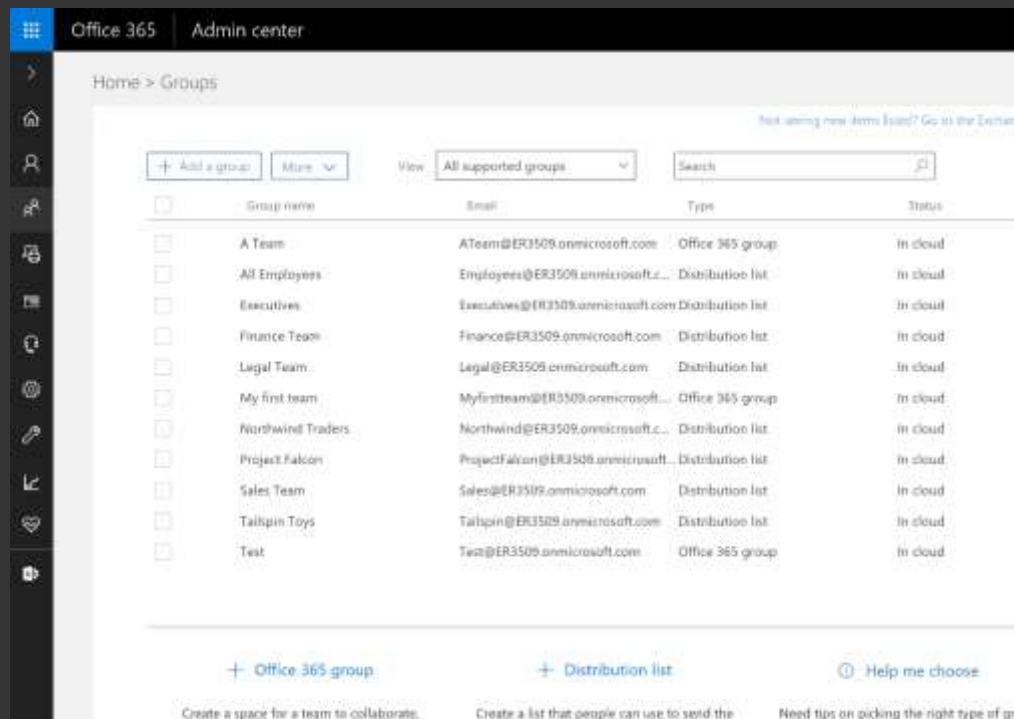
The screenshot shows the Microsoft Teams interface for the 'Engineering Team' in the 'General' channel. A dialog box titled 'Add cloud storage' is open, prompting the user to select a cloud storage provider. The dialog box contains the following text: 'Select your cloud storage provider to add a folder to this channel. Everyone with permissions to the original folder will be able to access it in Teams.' Below this text, there are four options, each with a logo and a brief description: 'SharePoint' (improve discovery), 'Dropbox' (simplify collaboration), 'Box' (secure content management), and 'Google Drive' (secure access to files). The background shows the Teams navigation pane with various channels and a list of recent files.

# Teams and channels

## ^ Teams and channels

Use the Groups dashboard in admin center to manage teams. 

Anyone on the team can add and manage channels. 



The screenshot shows the Office 365 Admin Center interface for managing groups. The top navigation bar includes 'Office 365' and 'Admin center'. The main content area is titled 'Home > Groups' and features a sidebar with navigation icons. The main area contains a table of groups with columns for Group name, Email, Type, and Status. At the bottom, there are buttons to create a new Office 365 group or Distribution list, and a help link.

Office 365 Admin center

Home > Groups

Not using new Teams icon? Go to the Teams

+ Add a group More View All supported groups Search

<input type="checkbox"/>	Group name	Email	Type	Status
<input type="checkbox"/>	A Team	ATeam@ER3508.onmicrosoft.com	Office 365 group	In cloud
<input type="checkbox"/>	All Employees	Employees@ER3508.onmicrosoft.c...	Distribution list	In cloud
<input type="checkbox"/>	Executives	Executives@ER3508.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Finance Team	Finance@ER3508.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Legal Team	Legal@ER3508.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	My first team	Myfirstteam@ER3508.onmicrosoft...	Office 365 group	In cloud
<input type="checkbox"/>	Northwind Traders	Northwind@ER3508.onmicrosoft.c...	Distribution list	In cloud
<input type="checkbox"/>	Project Falcon	ProjectFalcon@ER3508.onmicrosof...	Distribution list	In cloud
<input type="checkbox"/>	Sales Team	Sales@ER3508.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Talpin Toys	Talpin@ER3508.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Test	Test@ER3508.onmicrosoft.com	Office 365 group	In cloud

+ Office 365 group + Distribution list Help me choose

Create a space for a team to collaborate. Create a list that people can use to send the Need tips on picking the right type of g

# Calls and Meetings

Anyone on the team can add and manage channels. 

## ^ **Calls and meetings**

Allow scheduling for private meetings  On

Allow ad-hoc channel meetup  On

Allow scheduling for channel meetings  On

Allow videos in meetings  On

Allow screen sharing in meetings  On

Allow private calling  On

## ∨ **Messaging**

# Messaging

## ^ Messaging

Enable Giphy so users can add gifs to conversations  On

Content Rating

Moderate

Enable memes that users can edit and add to conversations  On

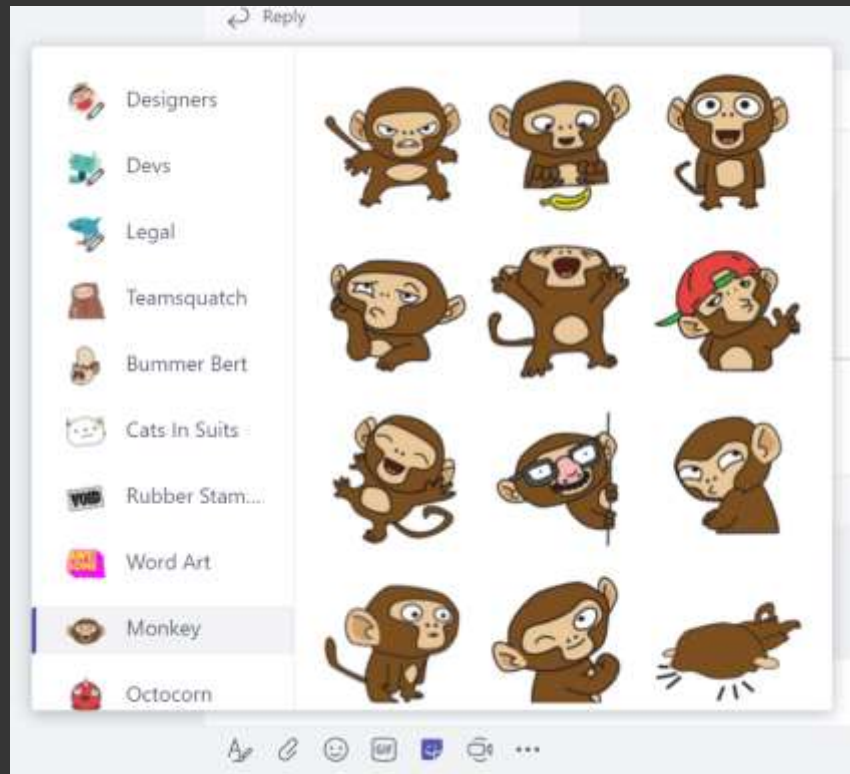
Enable stickers that users can edit and add to conversations  On

Allow owners to delete all messages  Off

Allow users to edit their own messages  On

Allow users to delete their own messages  On

Allow users to chat privately  On



# Enable/Disable user licenses

- Users > *specific user* > Product Licenses > Edit

**Product licenses**

Location \*  
United States

Office 365 Enterprise E3	<input checked="" type="checkbox"/>	On
Microsoft StaffHub	<input checked="" type="checkbox"/>	On
Flow for Office 365	<input checked="" type="checkbox"/>	On
PowerApps for Office 365	<input checked="" type="checkbox"/>	On
Microsoft Teams	<input checked="" type="checkbox"/>	On
Microsoft Planner	<input checked="" type="checkbox"/>	On
Sway	<input checked="" type="checkbox"/>	On
Mobile Device Management for Office 365 (These licenses do not need to be individually assigned)	<input type="checkbox"/>	Off

# About Guest Access

- Allows business guests to join specific teams
  - enable collaboration with users with external organizations
  - External team members are granted access to participate in channels, conversations, chats, files, meetings, OneNote and apps.
- Based on Azure AD account
- Controlled by Teams and Azure AD settings
- Block/allow list in Preview
  - Will require Azure AD subscription
- Disabled by default

# Turn on Guest Access

## Settings by user/license type

Select the user/license type you want to configure

Guest 

Turn Microsoft Teams on or off for all users of this type













On



# Control adding guest users

Office 365 | Admin center

Home > Services & add-ins

+ Upload Add-In View All Search Search

Name	Host Apps
Turn Cortana access on or off for your entire organization	
 Directory Synchronization Sync users to the cloud using Active Directory	
 Docs.com Manage and update your Docs.com settings	
 GigJam Preview Manage and update your GigJam settings	
 Integrated Apps Manage your Integrated Apps settings	
 Mail Set up auditing, track messages, and protect email from spam and malware	
 Microsoft Azure Information Protection Update your settings for Microsoft Azure Information Protection	
 Microsoft Forms Manage and update your Microsoft Forms settings	
 Microsoft Teams Manage and update your Microsoft Teams settings	
 Office 365 Groups Control settings for Office 365 Groups	
 Office Online Let people use third-party hosted storage services	





# Control adding guest users

The screenshot shows the Office 365 Admin center interface. The top navigation bar includes the Office 365 logo and the text 'Office 365 Admin center'. The main content area is titled 'Home > Services & add-ins' and contains a list of services with icons and brief descriptions. A red rectangular box highlights a settings panel for 'Office 365 Groups'.

Office 365 Admin center

Home > Services & add-ins

Office 365 Groups

Let group members outside the organization access group content  On

If you turn this off, guests will still be listed as members of the group, but they won't receive group emails or be able to access any group content. They'll only be able to access individual group files that were directly shared with them. [Learn more about guest access to Office 365 groups.](#)

Let group owners add people outside the organization to groups  On

Even if you turn this off, guests who are already members of groups will still be able to access group content. Guests who are already member of the group will continue to have access to group resources.

Save Close

Directory Sync (Exchange)  
Synchronize users to the cloud using Active Directory

SharePoint  
Manage and update your SharePoint settings

Custom Themes  
Manage and update your custom settings

Integrated Apps  
Manage your Integrated Apps settings

Mail  
Set up auditing, track messages, and protect email from spam and phishing

Microsoft Azure Information Protection  
Update your settings for Microsoft Azure Information Protection

Microsoft Forms  
Manage and update your Microsoft Forms settings

Microsoft Teams  
Manage and update your Microsoft Teams settings

Office 365 Groups  
Control settings for Office 365 Groups

Office Online  
Let people use third-party hosted storage services



Home

Users

Groups

Resources

Billing

Support

Settings

Services & add-ins

Security & privacy

Organization profile

Partner relationships

Setup

Reports



Home > Security & privacy

### Password policy

Edit

Set the password policy for all users in your organization.

Days before passwords expire 90

Days before a user is notified about expiration 14

### Customer Lockbox

Edit

Set requirements for data access:

Require approval for all data access requests Off

### Sharing

Edit

Control access for people outside your organization.

Let users add new guests to the organization On



- Dashboard
- Azure Active Directory
- Users and groups
- Enterprise applications
- More services >



## contoso - User settings

Azure Active Directory

- Overview
- Quick start
- MANAGE
  - Users and groups
  - Enterprise applications
  - Devices (Preview)
  - App registrations
  - Application proxy
  - Licenses
  - Azure AD Connect
  - Domain names
  - Mobility (MDM and MAM)
  - Password reset
  - Company branding
  - User settings**
  - Properties
  - Notifications settings
- SECURITY



Save Discard

### Enterprise applications

Users can consent to apps accessing company data on their behalf **i**  Yes  No

Users can add gallery apps to their Access Panel **i**  Yes  No

### App registrations

Users can register applications **i**  Yes  No

### External users

Guest users permissions are limited **i**  Yes  No

Admins and users in the guest inviter role can invite **i**  Yes  No

Members can invite **i**  Yes  No

Guests can invite **i**  Yes  No

### Administration portal

Restrict access to Azure AD administration portal **i**  Yes  No

# Limit Group Creation

Control who can create groups by specifying a security group

Also impacts who can create teams

Set policy with PowerShell

More info at <https://aka.ms/CreateO365Groups>

# Group Expiration

Requires Azure Active Directory (AAD) Premium

Administrator can specify expiration period

180, 365 or custom number of days

Group owner will get email before expiration to renew group

Notifications sent 30, 15 and 1 day before expiration

Administrator can recover group up to 30 days

Coming soon: renewal in Teams

The screenshot shows the 'Office 365 Groups' settings page in the Microsoft 365 Admin Center. At the top, there are 'Save' and 'Discard' buttons. Below that is an information icon and a text box stating: 'Renewal notifications are sent via email to group owners 30 days, 15 days and 1 day prior to group expiration. Failure to renew will result in the deletion of the Office 365 group and its content from Teams, Planner, Yammer, Sharepoint, Outlook, etc. If group owners do not have Exchange Licenses, DO NOT enable this feature.'

The 'Group lifetime (in days)' is set to 180 days via a dropdown menu. Below this, there is a field for 'For groups with no owners, notify' with the email address 'admin@contoso.onmicrosoft.com' and a checkmark. The 'Enable expiration for these Office 365 groups' section has three radio buttons: 'All', 'Selected' (which is selected), and 'None'. Below this is a 'Select Office 365 groups' section with a right-pointing arrow. A list of groups is shown below, with the first group being 'Software Development' with a blue icon and a three-dot menu to its right.

# Group Naming Policies

Specify prefix, suffix, and forbidden word list

Configure via PowerShell

More info at

<https://aka.ms/GroupNamingPolicy>

```
$Setting = Get-AzureADDirectorySetting -Id (Get-AzureADDirectorySetting |  
where -Property DisplayName -Value "Group.Unified" -EQ).id
```

```
$Setting["PrefixSuffixNamingRequirement"] = "Grp_ [GroupName]_[Country]"
```

```
$Setting["CustomBlockedWordsList"]="Payroll,CEO,HR"
```

```
Set-AzureADDirectorySetting -Id (Get-AzureADDirectorySetting |  
where -Property DisplayName -Value "Group.Unified" -EQ).id  
-DirectorySetting $Setting
```

**Create your team**

Collaborate closely with a group of people inside your organization based on project, initiative, or common interest. Here's a helpful video

ⓘ The name can't contain HR.

Team name  
HR ✓

**GRP HR Sales & Marketing** ⓘ

Description

Privacy  
Private - Only team owners can add members ▼

**Add Microsoft Teams to an existing Office 365 group?**  
Looks like you're an admin of a group. You can add Microsoft Teams functionality without changing the existing group. Yes, add Microsoft Teams functionality

Cancel Next

# Data Classification

Classify your data

Settings stored in Azure AD

Configure via PowerShell

More info at

<https://aka.ms/Data-Classification>

Support for default policies  
coming in the future

The screenshot shows the 'Create your team' dialog box. It includes a title bar, a subtitle 'Collaborate closely with a group of people inside your organization based on project, initiative, or common interest. Here's a helpful video', and several input fields: 'Team name', 'Description', 'Privacy' (set to 'Private - Only team owners can add members'), and 'Classification' (set to 'MBI'). A dropdown menu is open for 'Classification', showing options 'HBI', 'MBI', and 'LBI'. At the bottom, there are 'Cancel' and 'Next' buttons. A partially visible message at the bottom right asks 'Existing Office 365 group?' and provides instructions on adding Microsoft Teams functionality without changing Office 365 functionality.

# Clients

## Web clients

<https://teams.microsoft.com>

Edge, Chrome (latest), Firefox (latest), Internet Explorer 11+  
Offers to install desktop client and mobile apps

## Desktop and mobile clients

<https://teams.microsoft.com/downloads>

Windows 7+, Mac OSX 10.10+, Android 4.4+, iOS 10+,  
Windows Mobile 10+

Windows Store app under development

Mobile clients available via app stores



# Mobile device management

- Intune-based Mobile Application Management
  - Supported on iOS and Android
  - Requires Active Directory (AAD) Premium
- Conditional access can be enforced via Intune
- Policies such as
  - PIN based access
  - Restriction on cut/copy/paste
  - Restrict data transfer to other apps
  - Encrypt app data
  - ...

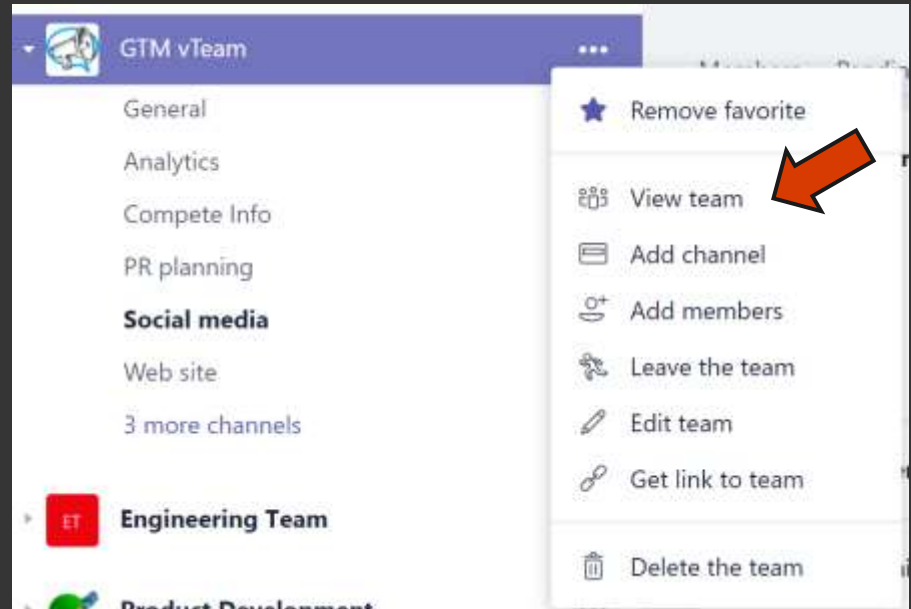
# Client Updates

- All clients will auto-update
  - As often as once a week
  - Desktop client will update during inactive hours
- Release notes
  - In client: chat with T-Bot and go to “release notes” tab
  - Web: <http://aka.ms/TeamsReleaseNotes>

# Settings managed on a per-team basis

Team owners can control member permissions and content settings

Most behaviors are scoped just to Teams scenarios



# Team: Picture/avatar

Members Pending Requests Channels Settings Apps

▾ **Team picture**

Add a team picture



 Change picture

▸ **Member permissions**

Enable channel creation, adding bots, and more

▸ **Guest permissions**

Enable channel creation

▸ **@mentions**

Choose who can use @team and @channel mentions

▸ **Fun stuff**

Allow emoji, memes, GIFs, or stickers

# Team: Member settings

## Member permissions

Enable channel creation, adding bots, and more

Allow creating and updating channels



Allow members to delete channels



Allow members to add and remove apps



Allow members to create, update, and remove tabs



Allow members to create, update, and remove connectors



Owners can delete all messages



Everyone can delete their messages



Everyone can edit their messages



General Channel:

- Anyone can post messages
- Anyone can post; show alert that posting will notify everyone (recommended for large teams)
- Only owners can post messages

# Team: Guest settings and @mentions/@team

<b>Guest permissions</b>	Enable channel creation	
	Allow creating and updating channels	<input type="checkbox"/>
	Allow guests to delete channels	<input type="checkbox"/>
<b>@mentions</b>	Choose who can use @team and @channel mentions	
	Allow @team or @[team name] mentions (this will send a notification to everyone on the team)	<input checked="" type="checkbox"/>
	Allow @channel or @[channel name] mentions (this will send a notification to everyone who has favorited the channel being mentioned)	<input checked="" type="checkbox"/>

# Team: Fun controls (giphy, memes, stickers)

## Fun stuff

Allow emoji, memes, GIFs, or stickers

Giphy

Enable Giphy for this team



Filter out inappropriate content using one of the setting below:

Moderate



Stickers and memes

Enable stickers and memes



Custom Memes

Allow memes to be uploaded



# Office 365 security and compliance features for Microsoft Teams

- <https://docs.microsoft.com/en-us/microsoftteams/security-compliance-overview>
- <https://techcommunity.microsoft.com/t5/Microsoft-Teams-Blog/Top-Features-of-Microsoft-Teams-amp-Information-Protection-in/ba-p/63046>



# Security and Privacy

## Security

### Security by design

- Data Encryption at rest and in transit
- Dedicated security professionals
- Threat models, Security Reviews, Automated Security Tools
- Penetration testing with regular rotation of 3rd party penetration testers
- All keys stored in Azure Key Vault
- Admin: Screening, training, access control
- Host: Access control, anti-malware, patch management, AAD Modern Authentication
- Network: Firewalls, edge routers
- Facility: Physical controls, video surveillance, access control
- Bug Bounty Program (We pay friends, hackers and researchers to find security bugs)

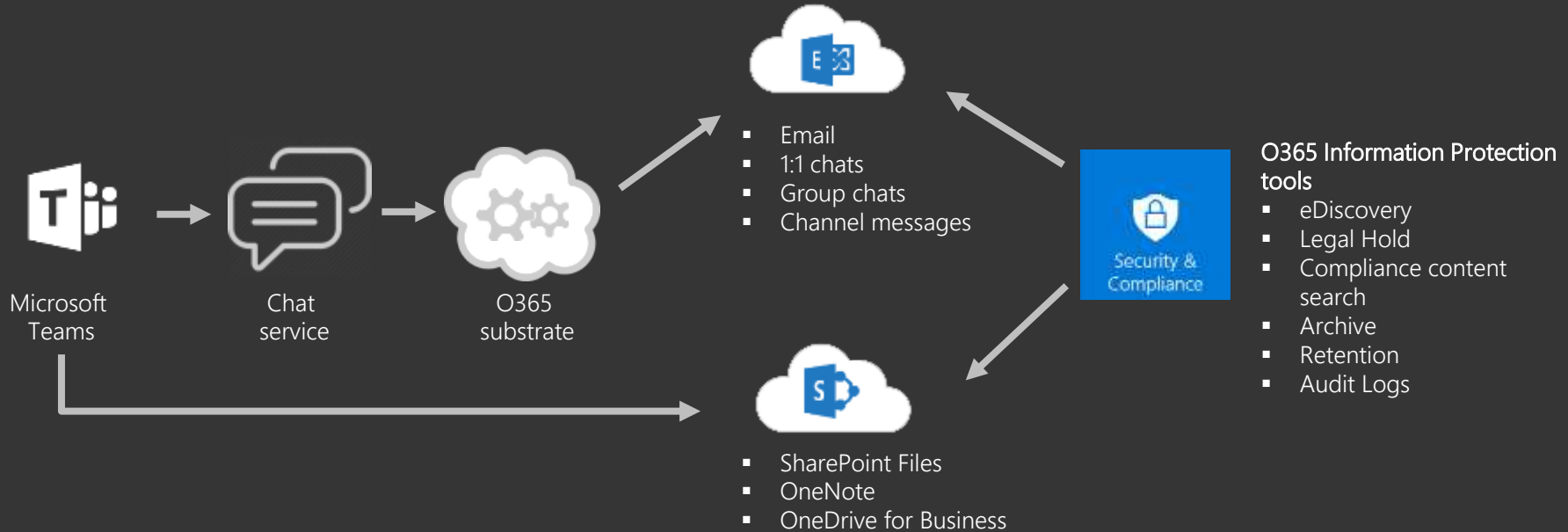
## Privacy

### Privacy by design

- Data stored in-region based on tenant affinity
- No customer content accessible in logs or telemetry
- Grant least privilege required to complete task
- Dedicated Privacy professionals
- Adhere to Office 365 data classification and data handling standards
- Access to Production environments is locked down
- Working to support General Data Protection Regulation (GDPR) ahead of May 2018 deadline



# How Team Enables Information Protection





# Overview of supported security and compliance features for Microsoft Teams

- **Archiving**
  - Archiving in Office 365 enables preservation of all content immutably and enables retention, eDiscovery and other compliance capabilities.
- **Compliance Content Search**
  - Content Search can be used to search mailboxes, SharePoint Online sites, OneDrive for Business Locations and Teams Data across all of the organization.
- **Auditing and Reporting**
  - Auditing and reporting supports the need for IT Admins to track important business events within Office 365 and also in Teams.
- **Conditional Access and MAM**
  - IT admins can make the use of Microsoft Teams more secure by enforcing restrictions on both managed and non managed devices using Intune MAM and CA policies.
- **Retention**
  - Retention Policies allow IT admins to manage the lifecycle of content within Office 365, including all data from Teams.
- **Moderator Support**
  - Moderation provides the ability for a Team or Tenant Admin to control the nature of messages being sent and persisted in any chat in Teams.
- **Allowed List of Apps**
  - IT Admins have ways of controlling usage and distribution of apps within their organization.
- **Windows Information Protection**
  - Teams Windows client is a WIP aware App. Data created from Teams is subject to encryption and protection offered through WIP Policies on Windows 10 Enterprise devices.
- **eDiscovery**
- **Legal Hold**

# Compliance Licensing

Teams IP Capability	Business Essentials	Business Premium	E1	E3	E5
Archive	_*	_*	_*	✓	✓
In-Place eDiscovery	-	-	-	✓	✓
Advanced eDiscovery	-	-	-	-	✓
Legal hold	-	-	-	✓	✓
Compliance Content search	-	-	-	✓	✓
Auditing and reporting	✓	✓	✓	✓	✓
Conditional Access and MAM**	✓	✓	✓	✓	✓

\* Exchange Online Archiving can be purchased as an Add-On

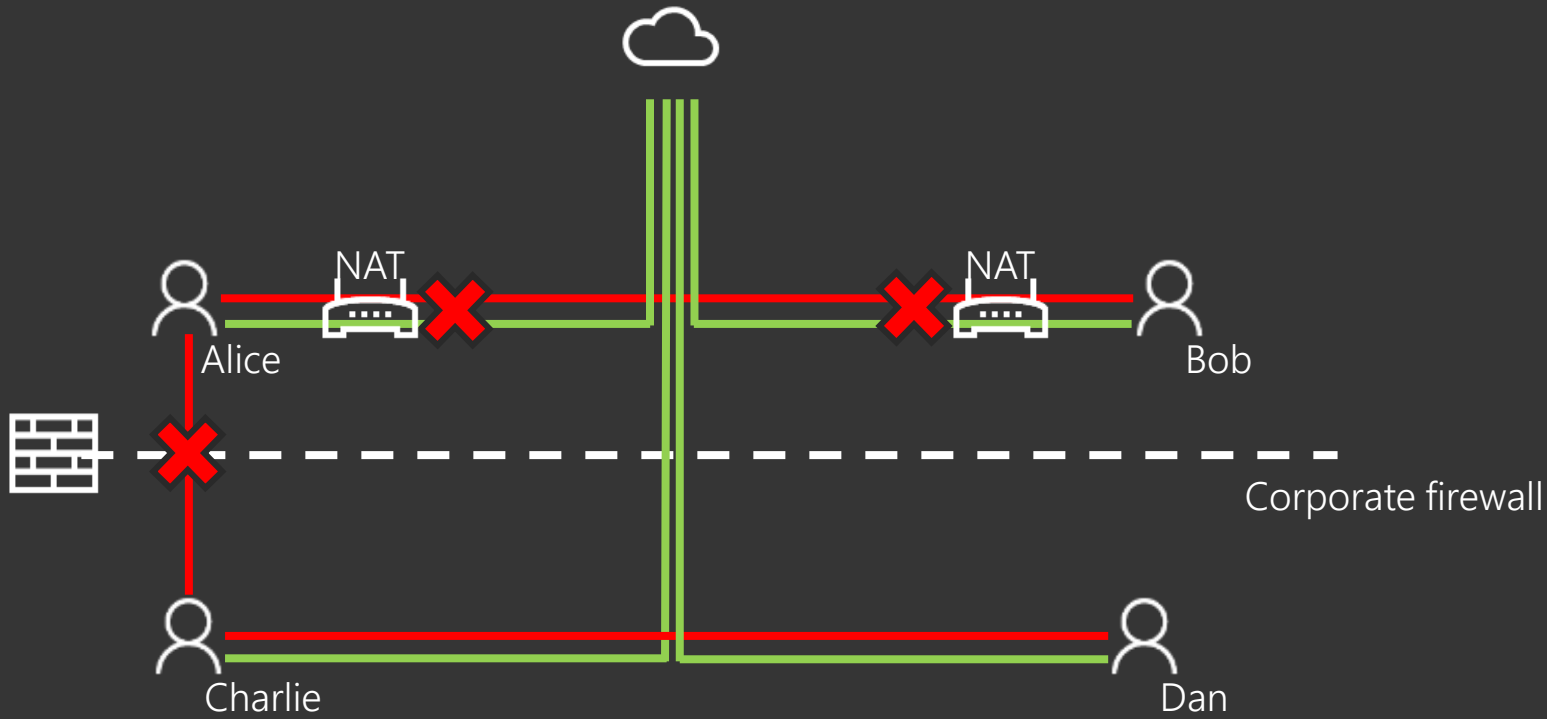
\*\* Requires Active Directory (AAD) Premium subscription

# Media Flows in Microsoft Teams and Skype for Business

<https://channel9.msdn.com/Events/Ignite/Microsoft-Ignite-Orlando-2017/BRK4004>

# The Challenge

— Signaling  
— Media



# Network paths with Teams

- Usually, Office 365 application communicate only to the cloud
- Teams (and Skype for Business)
  - For real time communication, we will keep traffic locally if possible
  - 1:1 media traffic will flow peer-to-peer
  - Cloud can relay traffic if required
- Real time media prefers UDP over TCP
- Skype for Business uses SIP
- Teams uses REST API via https and WebSocket



# Two types of relay

## Media Relay

Build for on-premises

Static in one datacenter

Same UDP ports for all workloads

Used by Skype for Business

## Transport Relay

Cloud born service

Dynamic discovery via Anycast IP

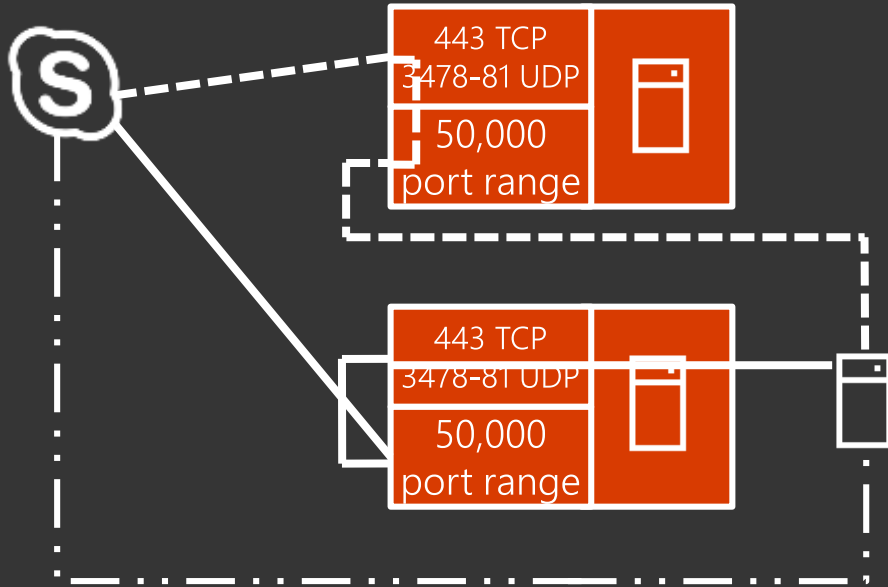
Different UDP ports per workload

In progress for  
Skype for Business

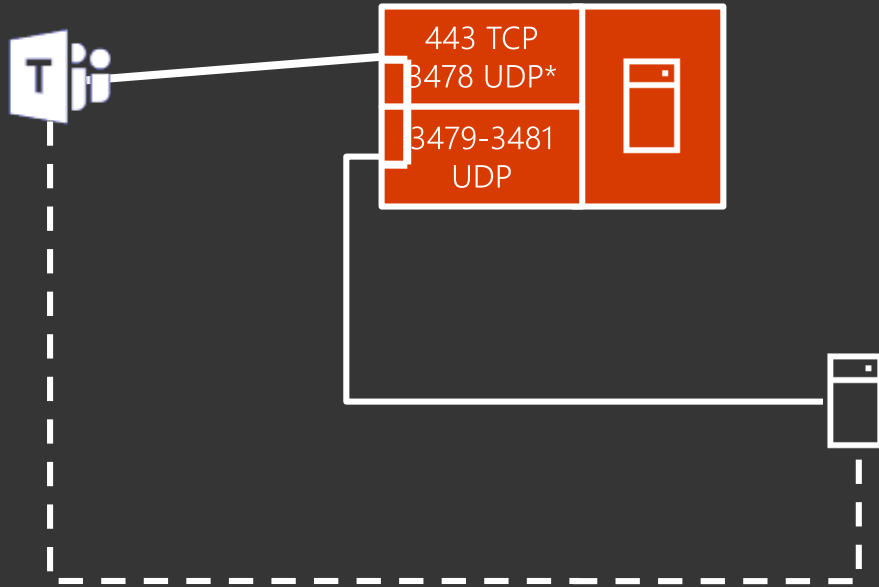
Used by  
Teams

Customers can only benefit of this, if local internet breakouts are used.

# Skype for Business: Client to service



# Teams: Client to service



# Ports overview

Workload	Skype for Business Client Port	Teams Client port	Service Port (Media Relay)	Service Port (Transport Relay)*
Allocate candidates	Audio: 50,000-50,019 Video: 50,020-50,039 Desktop Sharing: 50,040-50,059	High ports	443 TCP, 3478 UDP	443 TCP, 3478 UDP
Audio	50,000-50,019			443 TCP, 3479 UDP
Video	50,020-50,039			443 TCP, 3480 UDP
Desktop sharing	50,040-50,059			443 TCP, 3481 UDP

*\*Teams will speak currently to it's own relay on port 3478.*

# Do's and Don'ts

- Direct connectivity required
  - Clients need to directly connect to O365
  - Configure your firewalls, proxies, packet shapers etc. accordingly
- Use local internet breakouts
  - Don't make the traffic travel around the world
- UDP and TCP
  - Media will prefer UDP
  - TCP required for some scenarios and workflows
- Documented IPs and FQDNs
  - "Office 365 URLs and IP address ranges" <http://aka.ms/o365endpoints>
  - Subscribe to the RSS feed!
- Open UDP ports
  - Verify that 3478-3481 UDP are open

# Networking requirements & Tools

- Allow required connections
  - Include all IPs, FQDNs and ports UDP is important for real time media
  - <https://aka.ms/Teams-IPs-Ports>
- Allow local internet breakouts
- Avoid proxy servers
- Plan network connectivity
  - For bandwidth and quality
- Performance Goals for Real-time Media
  - <https://aka.ms/PerformanceRequirements>
- Network Assessment Tool
  - <https://aka.ms/NetworkTool>
- Office 365 URLs and IP address ranges
  - <http://aka.ms/o365endpoints>

Microsoft Teams for developers



# Graph Explorer

Authentication

You are currently using a sample account.  
To access your own data:

Sign in with Microsoft

Sample Queries

## Microsoft Teams (beta)

- GET** my joined teams
- GET** members of a te...
- GET** channels of a te...
- GET** channel info
- POST** create cha...
- POST** create cha...
- GET** items in a team ...

[show more samples](#)

## History

- GET** /beta/me/joinedTeams  
200 a minute ago  
1962 ms

[show more](#)

GET beta https

Request Body Request Headers

Success - Status Code 200

Response Preview Response

```
{
  "@odata.context": "https://graph.microsoft.com/beta/$metadata",
  "value": [
    {
      "id": "820d5e0d-11e1-4861-8080-000000000000",
      "displayName": "Channel 1",
      "description": "Channel 1 description"
    },
    {
      "id": "1330e607-11e1-4861-8080-000000000000",
      "displayName": "Channel 2",
      "description": "Channel 2 description"
    },
    {
      "id": "8080c407-11e1-4861-8080-000000000000",
      "displayName": "Channel 3",
      "description": "Channel 3 description"
    }
  ]
}
```

## Sample Categories

- Getting Started (6)  Off
- Users (8)  Off
- Groups (8)  Off
- Outlook Mail (6)  Off
- Outlook Mail (beta) (1)  Off
- Outlook Calendar (6)  Off
- Personal Contacts (2)  Off
- OneDrive (5)  Off
- Excel (7)  Off
- Planner (13)  Off
- Insights (1)  Off
- Insights (beta) (3)  Off
- People (3)  Off
- Extensions (7)  Off
- OneNote (6)  Off
- SharePoint Sites (7)  Off
- SharePoint Lists (5)  Off
- Batching (beta) (2)  Off
- Microsoft Teams (beta) (7)  On