

TEAMS ARCHITECTURE FOR IT-PROS AND ARCHITECTS



Microsoft Teams



TARGET AUDIENCE

DECISION
MAKER

ADMIN /
ARCHITECTS

ENDUSER

DEVELOPER

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

Teams side-by-side with Skype for Business

Office 365 Microsoft Teams & Skype for Business Admin Center Adam Jarman

Dashboard

ORGANIZATION INFORMATION

MAR 25, 2014 Organization Created
Off Active Directory Syncronization
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%

TEAMS CALL VOLUME

7 DAYS 30 DAYS 60 DAYS

TEAMS USER STATS

7 DAYS 30 DAYS 60 DAYS

PHONE NUMBERS CAPACITY

120 Available
25,210 Assigned Numbers
25,330 Total Numbers

View Details

USERS PER 1000

USAGE BY DEPARTMENT

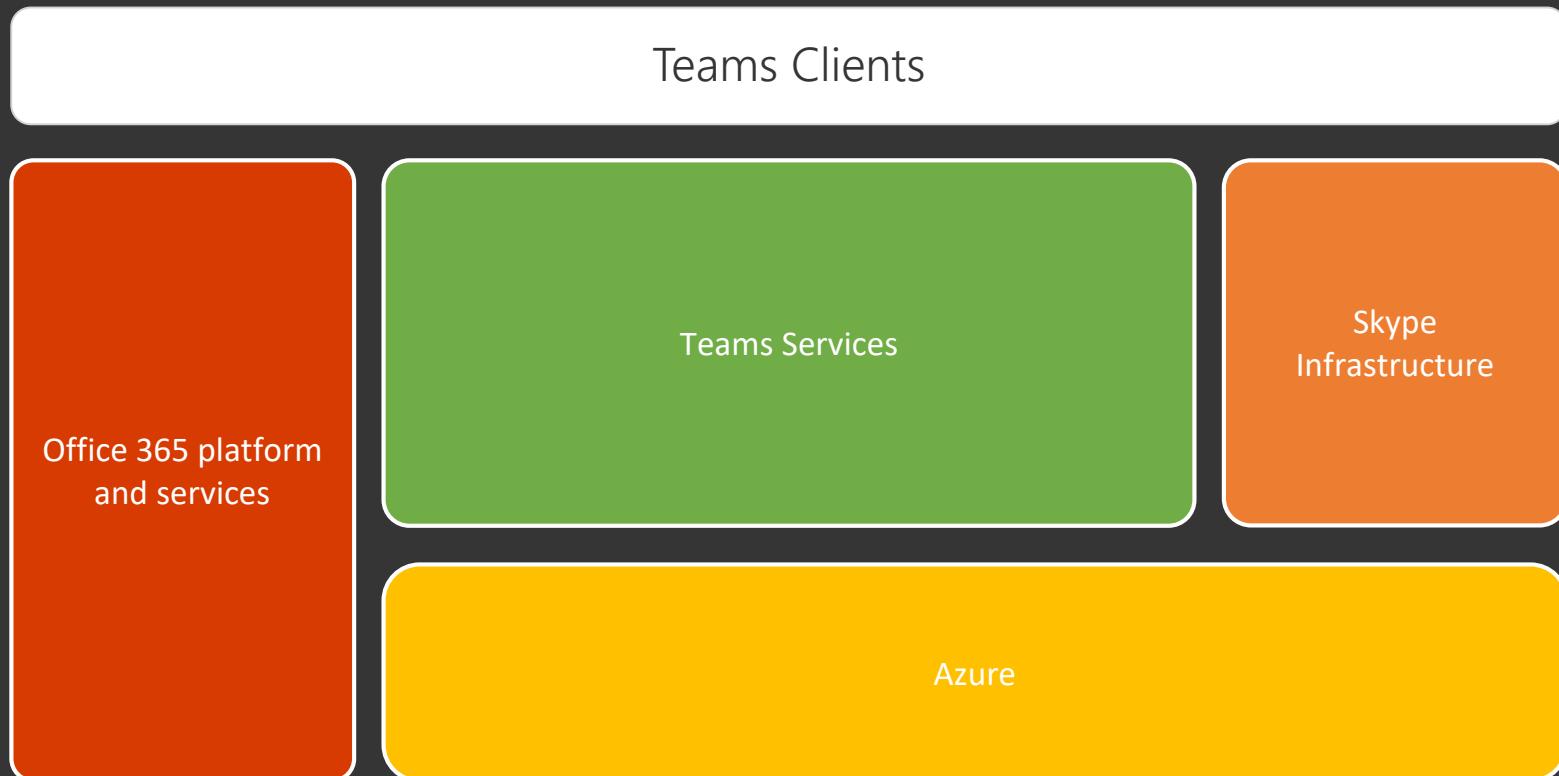
Department	Usage
Marketing	6,329
Engineering	14,190
Sales	981
Design	2,320

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

Microsoft Teams Architecture

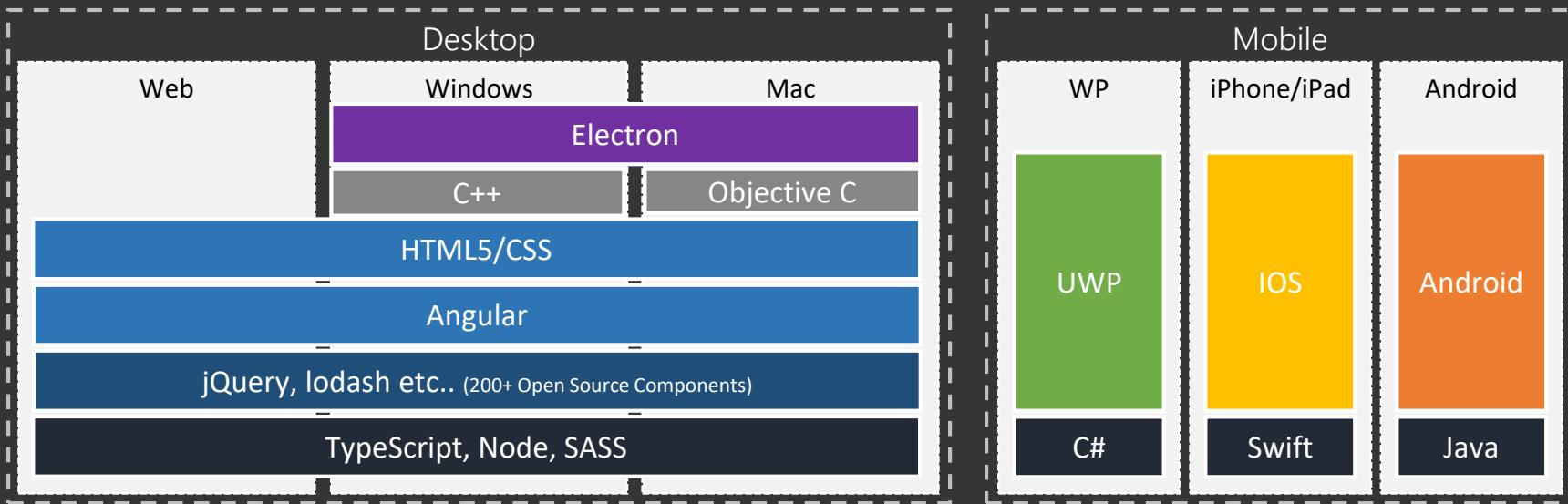
- Designed for the cloud
- Agility at scale
- Amplify the value of O365

Teams brings together O365 and Skype



Teams Client Architecture

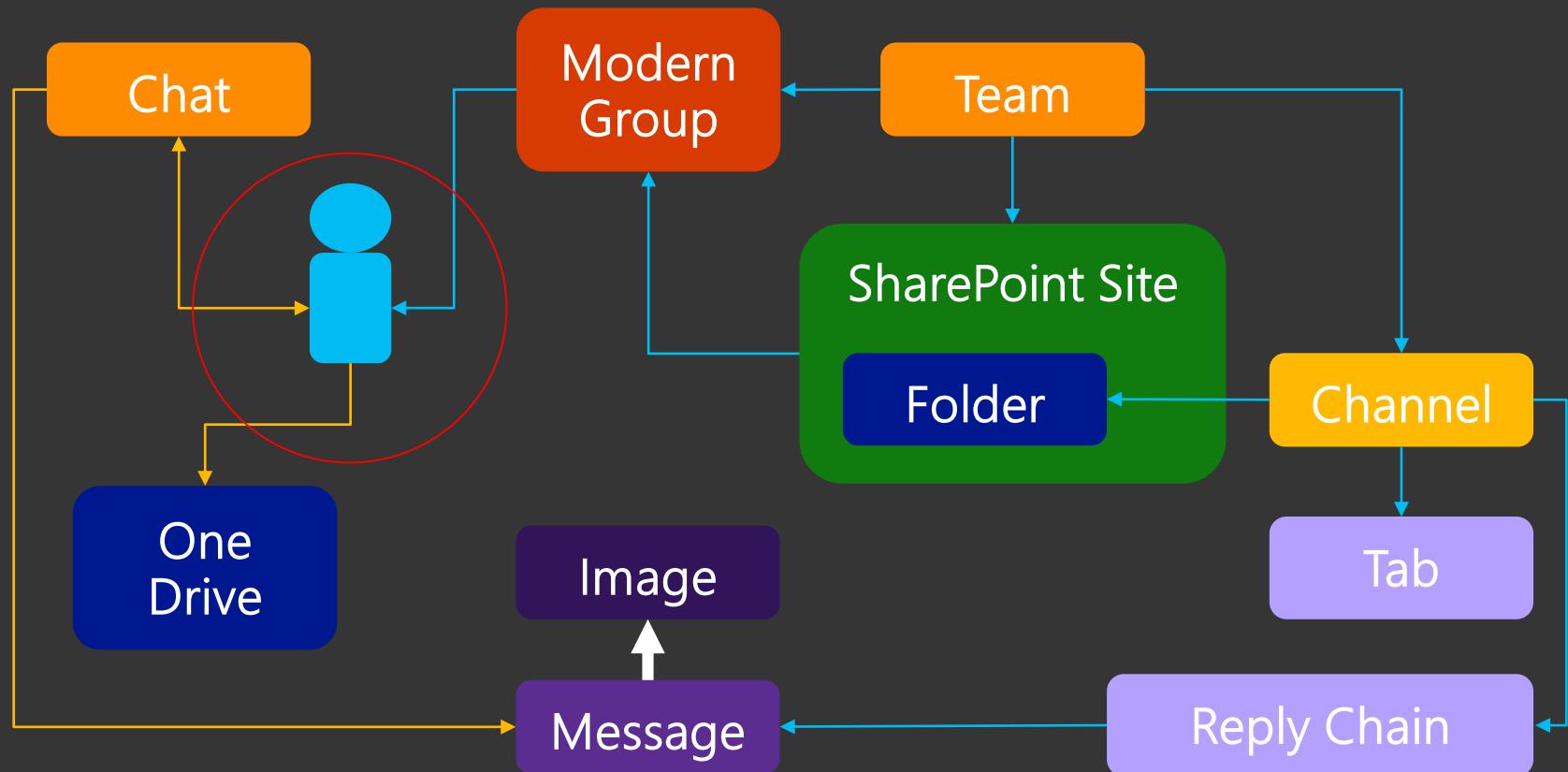
Optimized for agility
Auto-updates



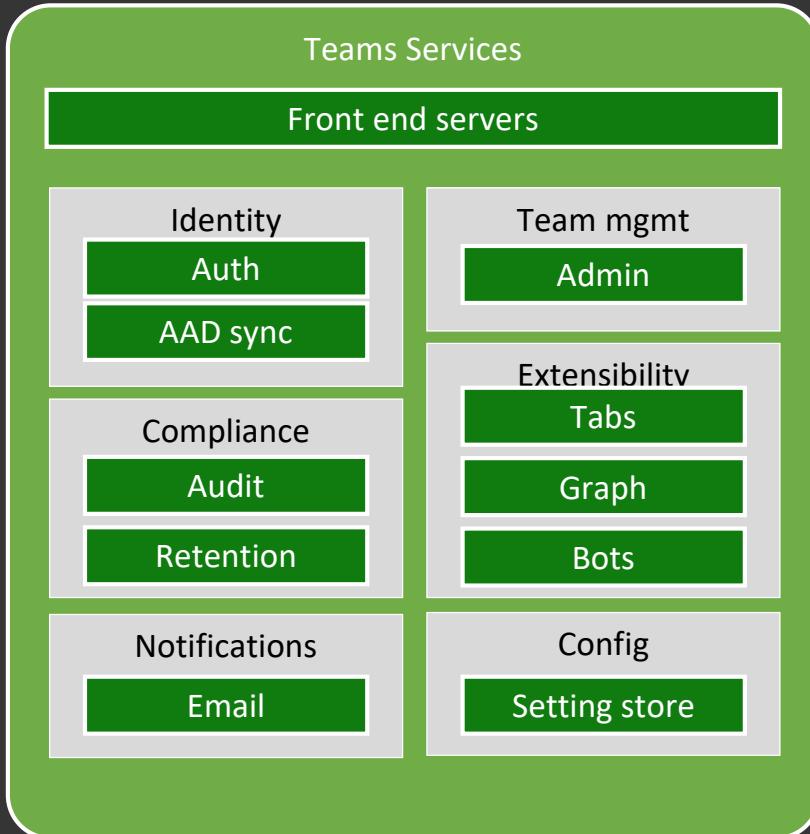
Browsers: Edge, IE11, latest Chrome, latest Firefox

Desktop: Windows 10, 8.1, 7(SP1), Mac OS X 10.10+

Teams Conversations Logical Architecture

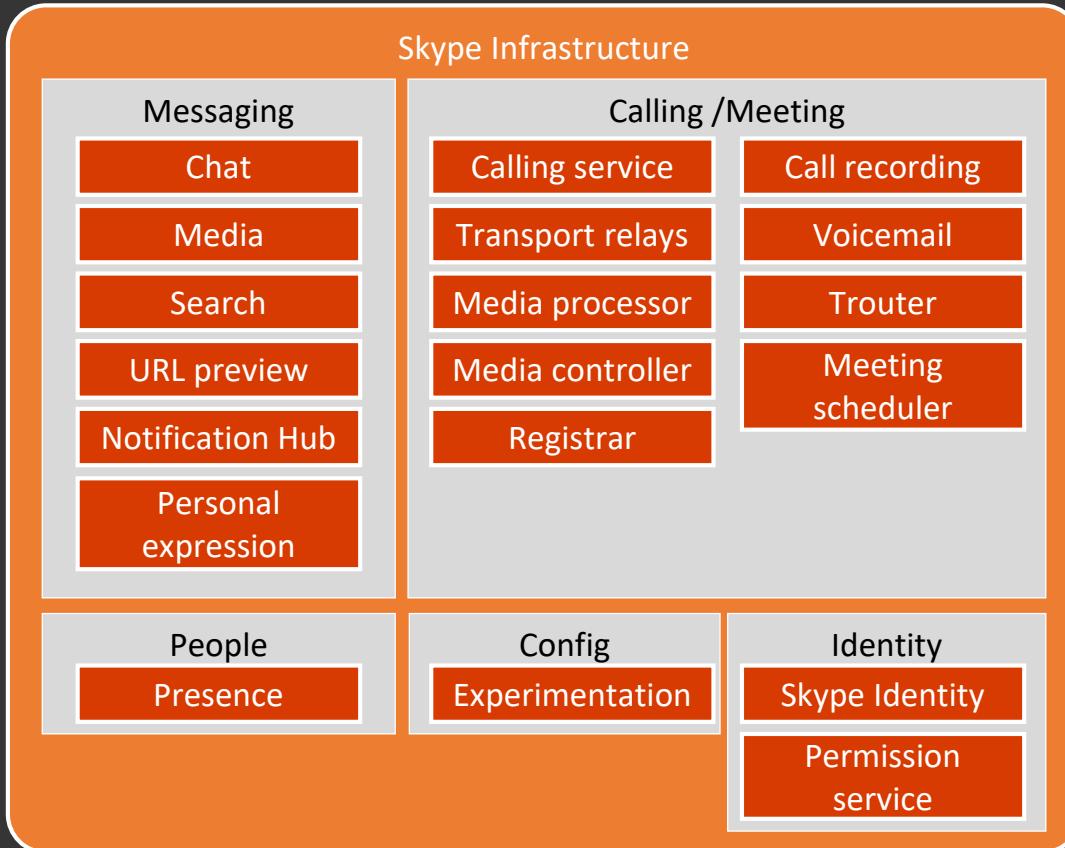


Teams services



- 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

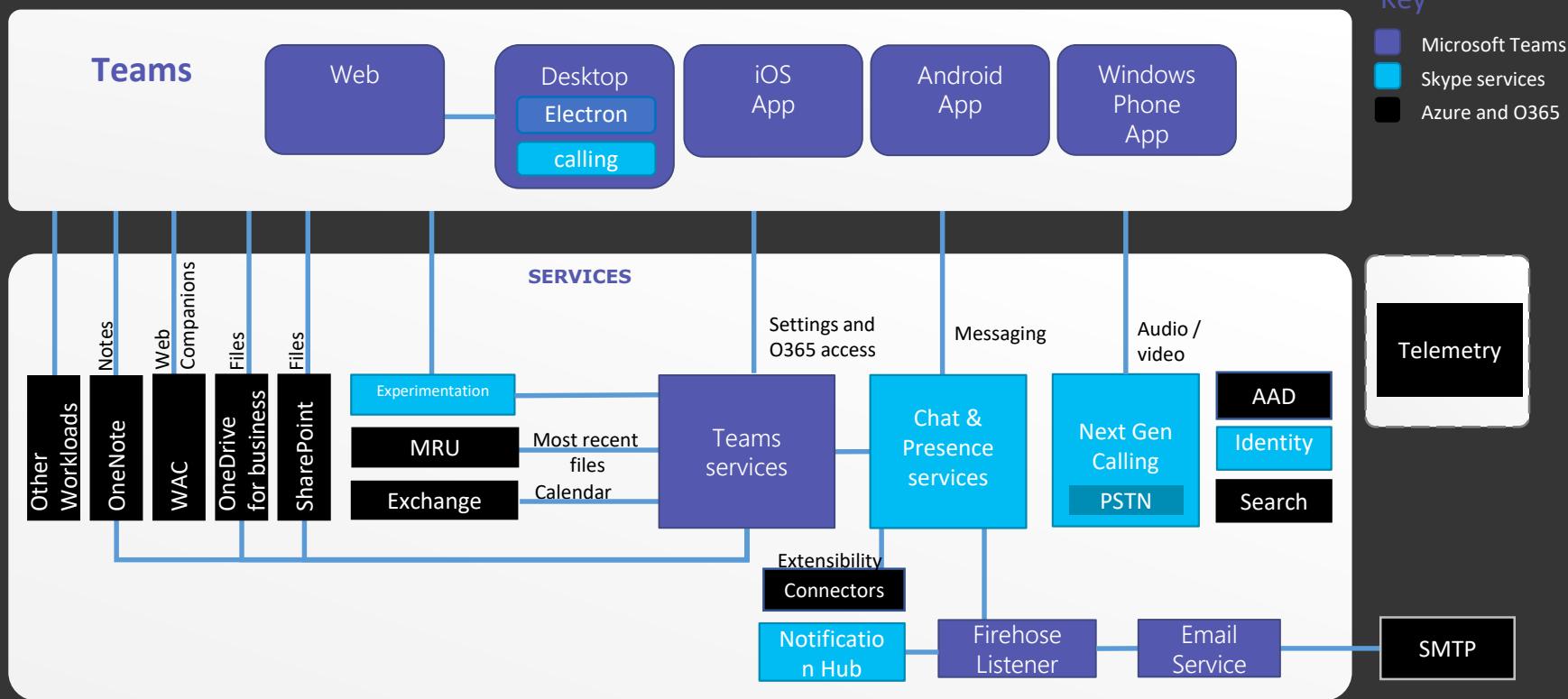
Teams on Azure

Azure

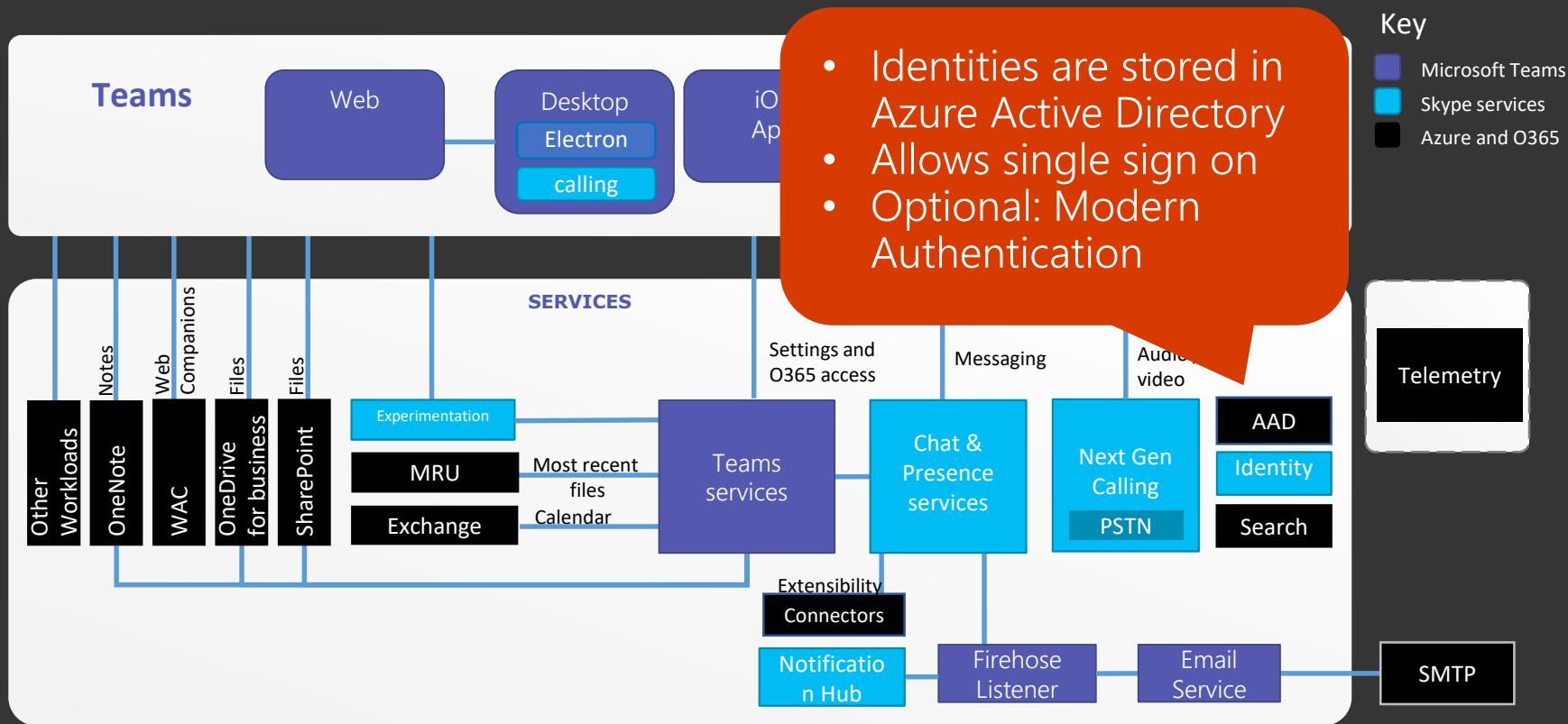
Cloud Services  Create fully-featured, enterprise-class applications and APIs.	Storage  Store large-scale and infinitely scalable cloud storage.	App Service  Quickly create powerful cloud apps for web and mobile.	Media Services  Encode, store, and stream video and audio.	Traffic Manager  Route incoming traffic for high availability and scalability.
Security Center  Protect, detect, and respond to threats with improved visibility.	Azure Active Directory  Sync, manage, and secure identities and entitlements.	Multi-Factor Authentication  Add security to your data and apps without changing user behavior.	Azure Active Directory B2B  Identity and access management in the cloud.	Key Vault  Safekeep and maintain control of keys and other secrets.
Redis Cache  Power applications with instant, transparent, low-latency data access.	HockeyApp  Deploy mobile apps, collect feedback, and track errors and monitor usage.	Application Insights  Detect, map, and diagnose issues in your code quickly and easily.	Event Hubs  Receive telemetry from millions of devices.	Notification Hubs  Send push notifications by any platform from any back-end.

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

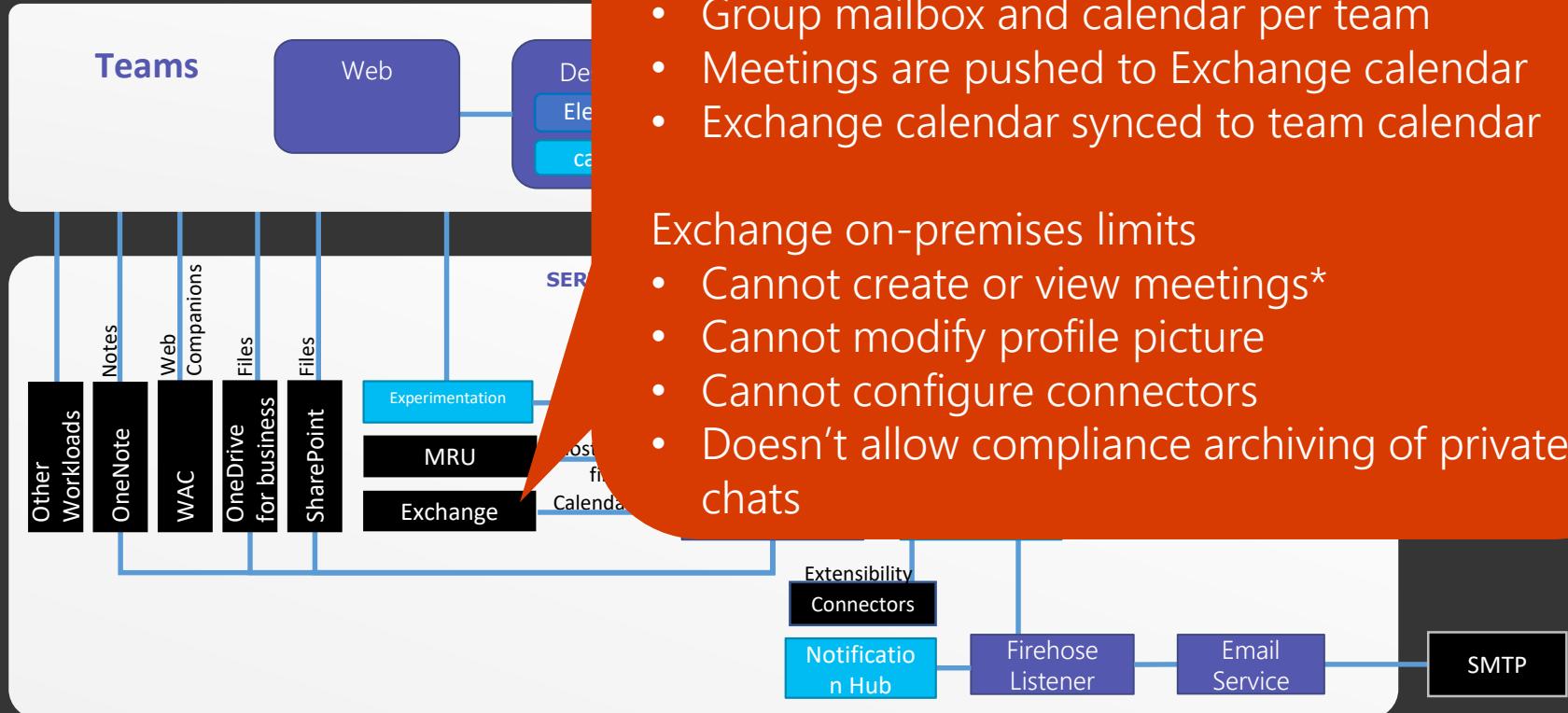
High Level Architecture



High Level Architecture

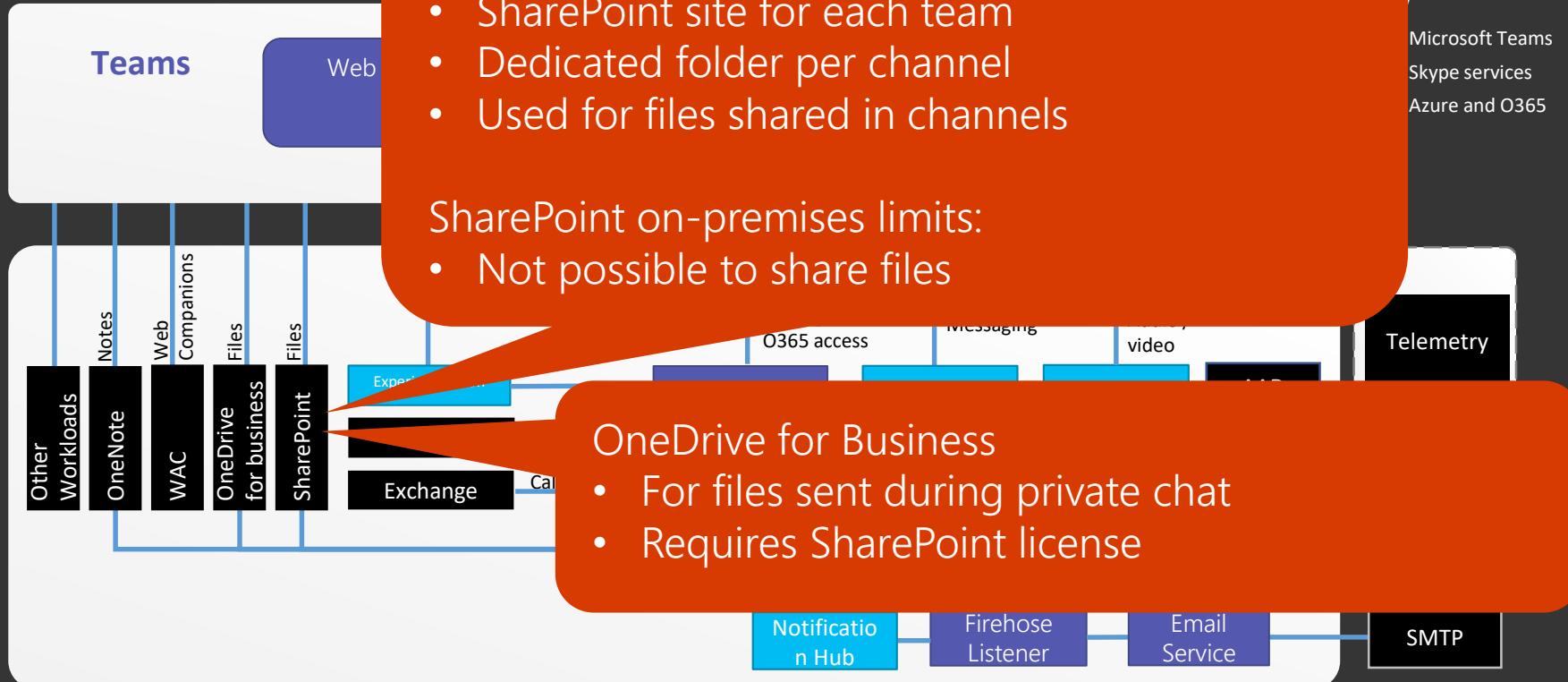


High Level Architecture



* Exchange 2016 CU3 and above supported

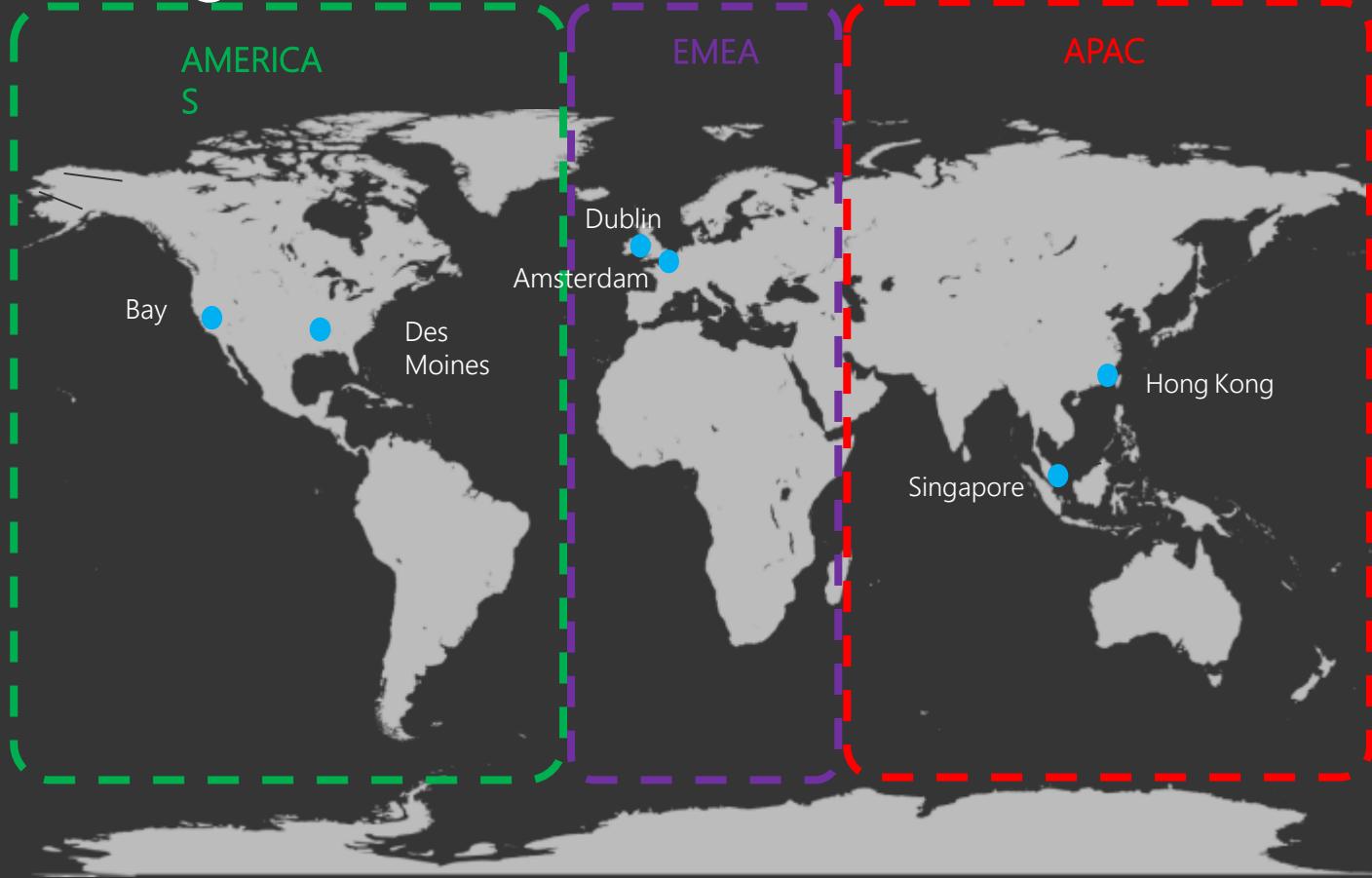
High Level Architecture



Regional Partitioning

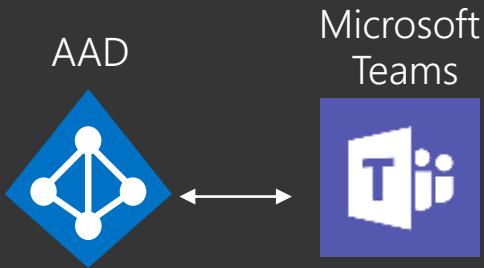
181 countries | 25 languages

- 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 synched 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

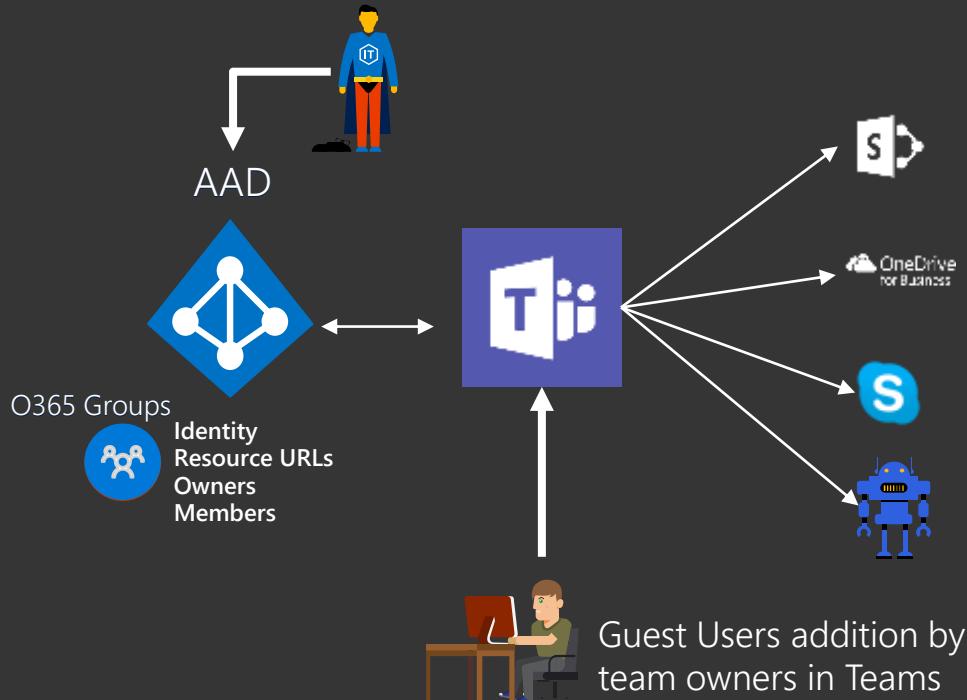
- Azure Active Directory (AAD) is the master for Teams identity and membership across Office 365 (Teams, SharePoint, Apps, etc.)

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

O365 Admin Portal

The screenshot shows the Microsoft 365 Admin center interface. The left sidebar contains various navigation links: Home, Users, Groups, Resources, Billing, Support, Settings (which has a red arrow pointing to it), Services & add-ins (which is highlighted in blue and has a red arrow pointing to the breadcrumb), Security & privacy, Organization profile, Partner relationships, Setup, Reports, Health, and Admin centers.

The main content area displays the 'Home > Services & add-ins' page. At the top, there are buttons for '+ Upload Add-in', 'View' (set to 'All'), and a search bar. Below this is a table header with columns for 'Name', 'Host Apps', and 'Status'. The table lists several services:

- Manage your settings for Azure multi-factor authentication
- Calendar
- Contana
- Directory Synchronization
- Docs.com
- Gigamon Preview
- Integrated Apps
- Mail
- Microsoft Azure Information Protection
- Microsoft Forms
- Microsoft Teams
- Office 365 Groups
- Office Online

O365 Admin Portal

The screenshot shows the Microsoft 365 Admin Center interface. On the left, there's a navigation sidebar with various options like Home, Users, Groups, Resources, Billing, Support, Settings, and Admin Centers. The main area is titled "Home > Services & add-ins". It lists several services with icons and names: Multi-factor authentication, Calendar, Groups, Direct Connect, SharePoint, OneDrive, Groups, Sigantr, Integrated Apps, Mail, Microsoft 365 Information Protection, Microsoft Teams, Microsoft 365 Admin, and Office 365 Groups. A red box highlights a modal dialog for "Microsoft Teams".

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. [Learn more](#)

View practical guidance on how to successfully plan, deliver, and operate Microsoft Teams. [Get started](#)

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](#)

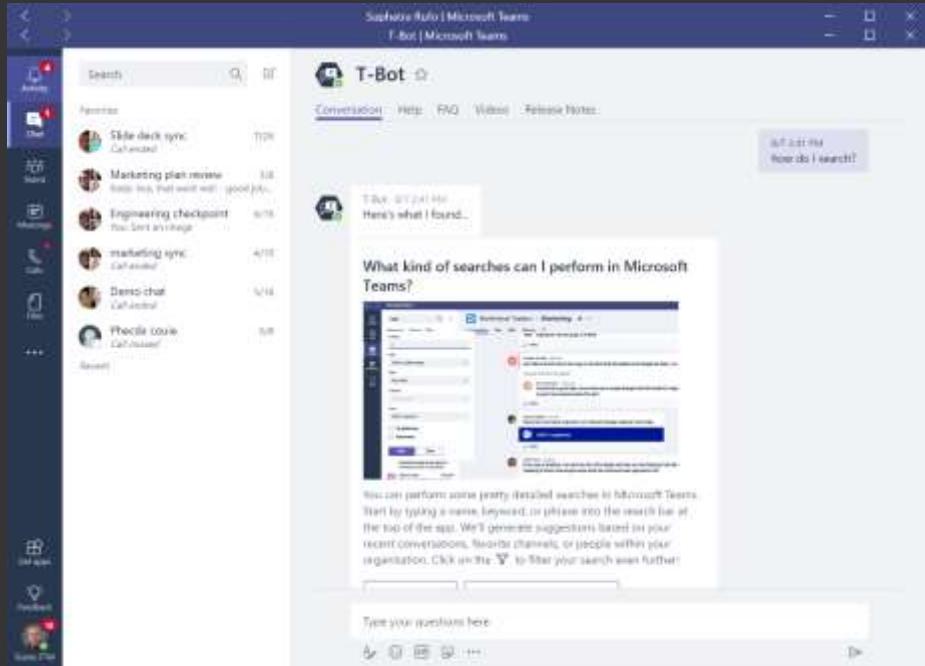
General Tenant Level Settings

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

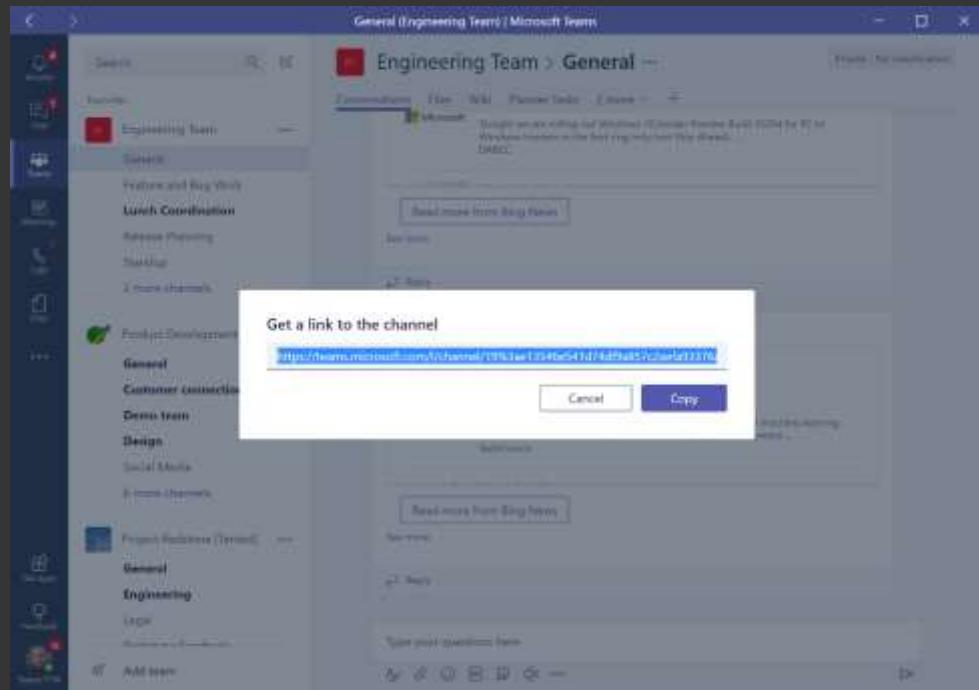


Email Integration

Email integration

Allow users to send email to channels On

Allow senders list (separated each domain with a comma)
contoso.net,microsoft.com



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 

Tab 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  Empressense  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

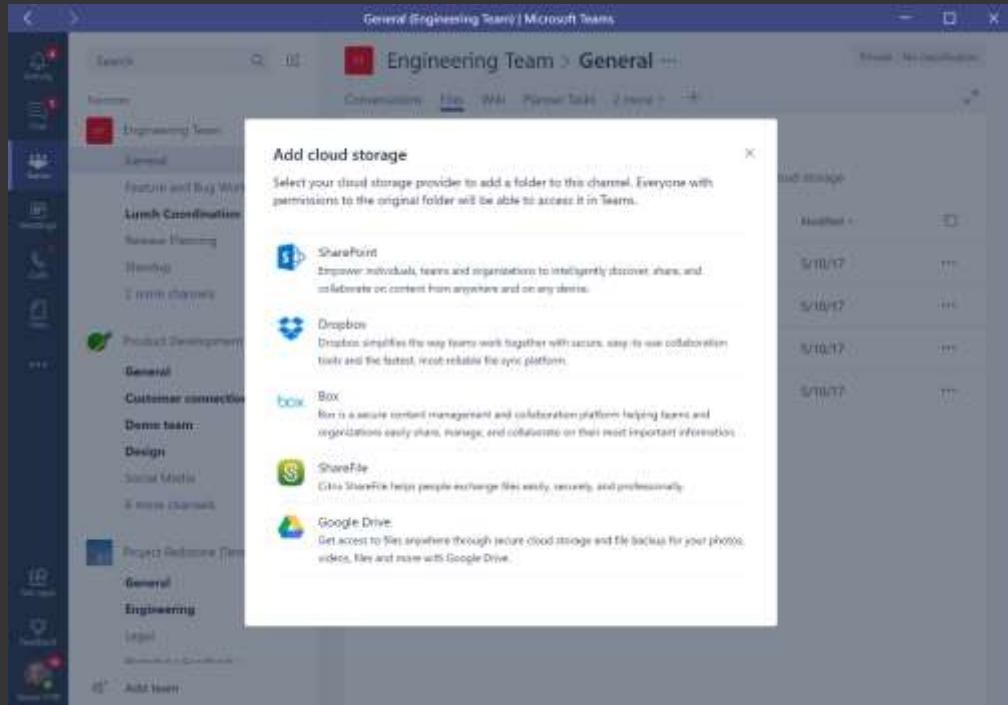
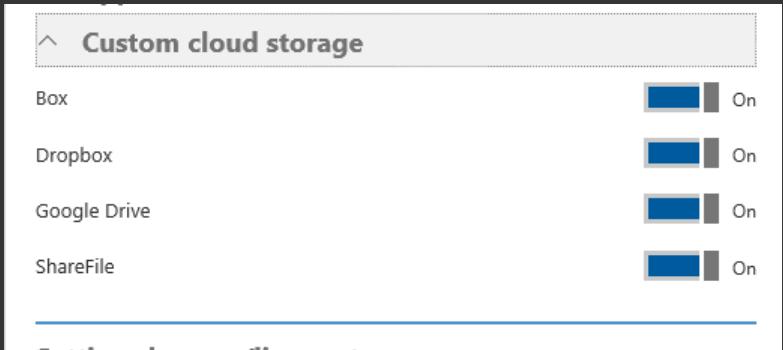
Business & Enterprise ▾

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



On

Custom cloud storage



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. [↗](#)

Office 365 Admin center

Home > Groups

Not using new items list? Go to the classic view.

<input type="checkbox"/>	Group name	Email	Type	Status
<input type="checkbox"/>	A Team	ATeam@ER3509.onmicrosoft.com	Office 365 group	In cloud
<input type="checkbox"/>	All Employees	Employees@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Executives	Executives@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Finance Team	Finance@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Legal Team	Legal@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	My first team	Myfirstteam@ER3509.onmicrosoft.com	Office 365 group	In cloud
<input type="checkbox"/>	Northwind Traders	Northwind@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Project Falcon	ProjectFalcon@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Sales Team	Sales@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Talipin Toys	Talipin@ER3509.onmicrosoft.com	Distribution list	In cloud
<input type="checkbox"/>	Test	Test@ER3509.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 things. Need tips on picking the right type of group?

Calls and Meetings

Anyone on the team can add and manage channels. [Edit](#)

^ 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



Content Rating

Moderate



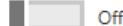
Enable memes that users can edit and add to conversations



Enable stickers that users can edit and add to conversations



Allow owners to delete all messages



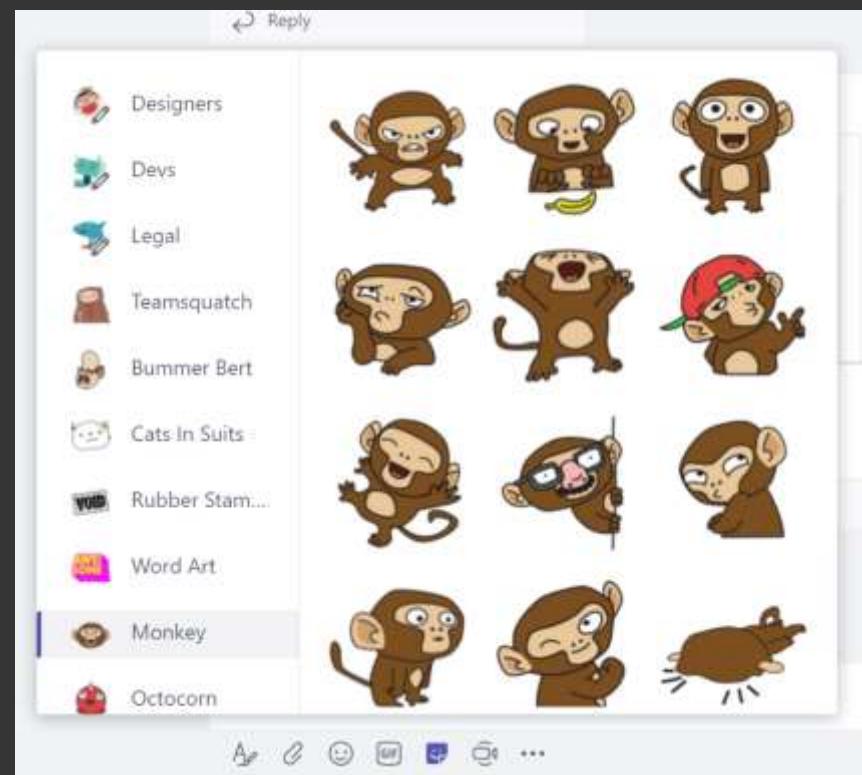
Allow users to edit their own messages



Allow users to delete their own messages



Allow users to chat privately



Enable/Disable user licenses

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

Product licenses

Location *

United States

Office 365 Enterprise E3	On
Microsoft StaffHub	On
Flow for Office 365	On
PowerApps for Office 365	On
Microsoft Teams	On
Microsoft Planner	On
Sway	On
Mobile Device Management for Office 365 (These licenses do not need to be individually assigned)	Off

About Guest Access

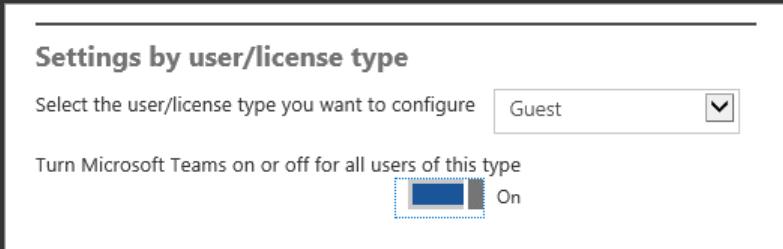
- Allows business guests to join specific teams
 - enable collaboration with users with external organizations
 - External team members are granted access to participate in channels, conversations, chats, files, meetings, OneNote and apps.
- Based on Azure AD account
- Controlled by Teams and Azure AD 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

The screenshot shows the Microsoft Admin center interface. The left sidebar contains various navigation links: Home, Users, Groups, Resources, Billing, Support, Settings (which has a red arrow pointing to it), Services & add-ins (selected and highlighted in grey), Security & privacy, Organization profile, Partner relationships, Setup, Reports, Health, and Admin centers. The main content area is titled "Home > Services & add-ins". It features a search bar with "All" selected and a "Search" input field. Below the search bar are two dropdown menus: "Name" and "Host Apps". The main list displays several services with icons and descriptions:

- 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 (this item has a red arrow pointing to it).
- Office Online: Let people use third-party hosted storage services.

Control adding guest users

The screenshot shows the Microsoft Admin center interface. On the left, there's a sidebar with various icons and links like 'Office 365', 'Admin center', 'Home > Services & add-ins', and 'Office 365 Groups'. The main content area is titled 'Office 365 Groups' and contains two sections with toggle switches:

- Let group members outside the organization access group content**: The switch is set to 'On'. Description: '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.' A link 'Learn more about guest access to Office 365 groups' is provided.
- Let group owners add people outside the organization to groups**: The switch is set to 'On'. Description: '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.'

At the bottom of the dialog are 'Save' and 'Close' buttons.



Home > Security & privacy

Home

Users

Groups

Resources

Billing

Support

Settings

Services & add-ins

Security & privacy

Organization profile

Partner relationships

Setup

Reports

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

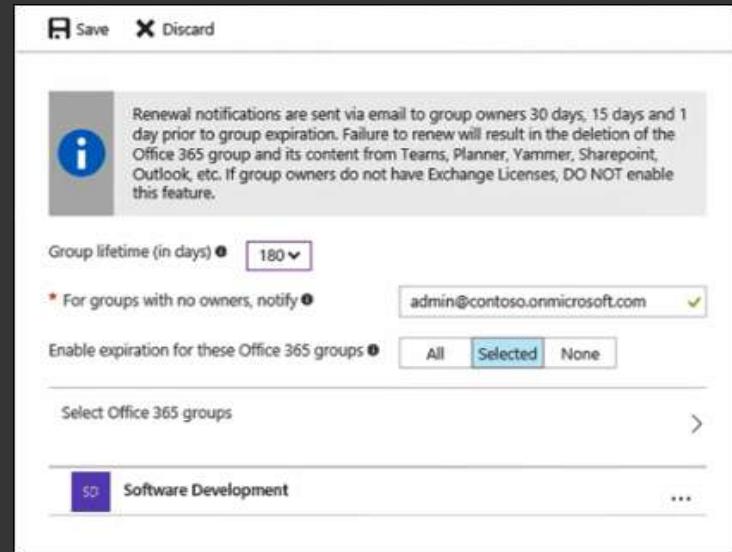
180, 365 or custom number of days

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



Group Naming Policies

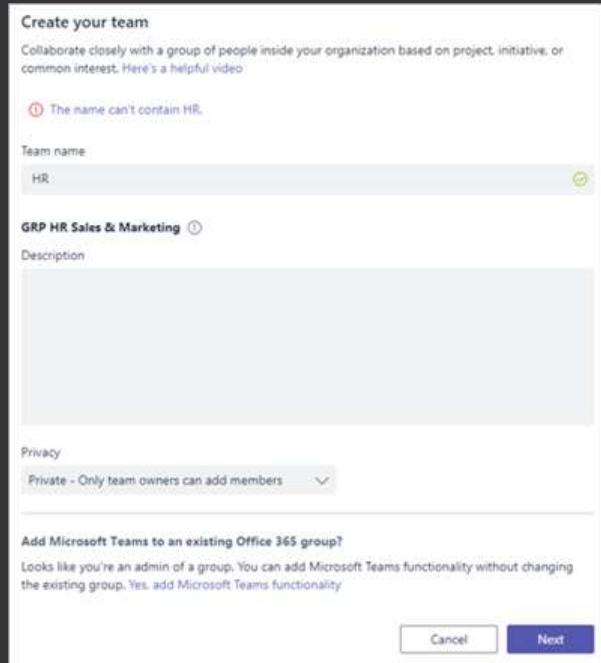
Specify prefix, suffix, and forbidden word list

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
```



Data Classification

Classify your data

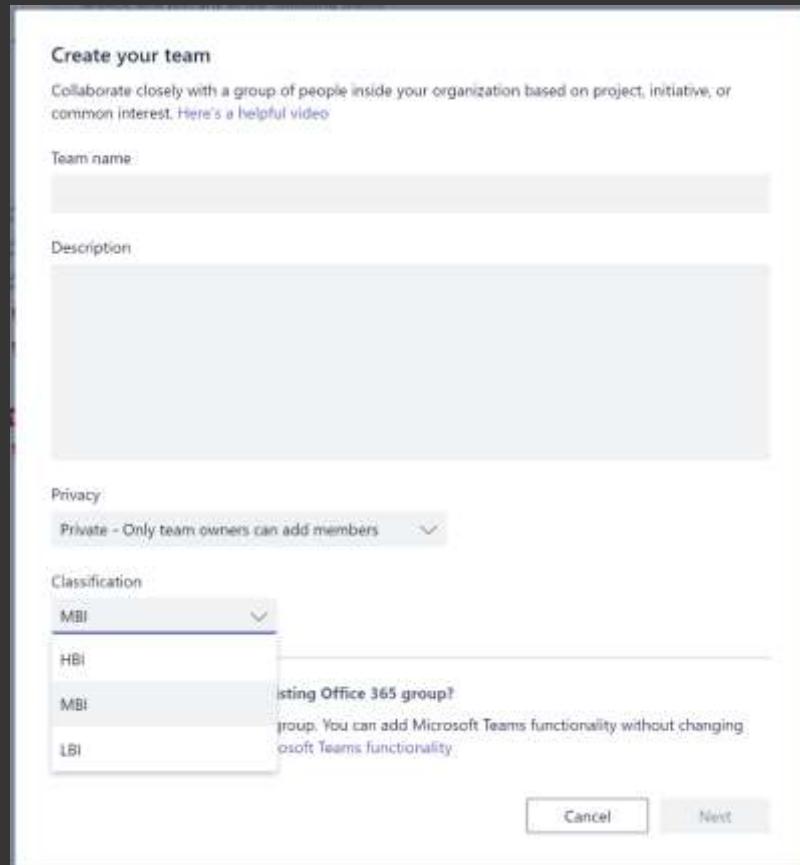
Settings stored in Azure AD

Configure via PowerShell

More info at

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

Support for default policies
coming in the future



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
 - ...

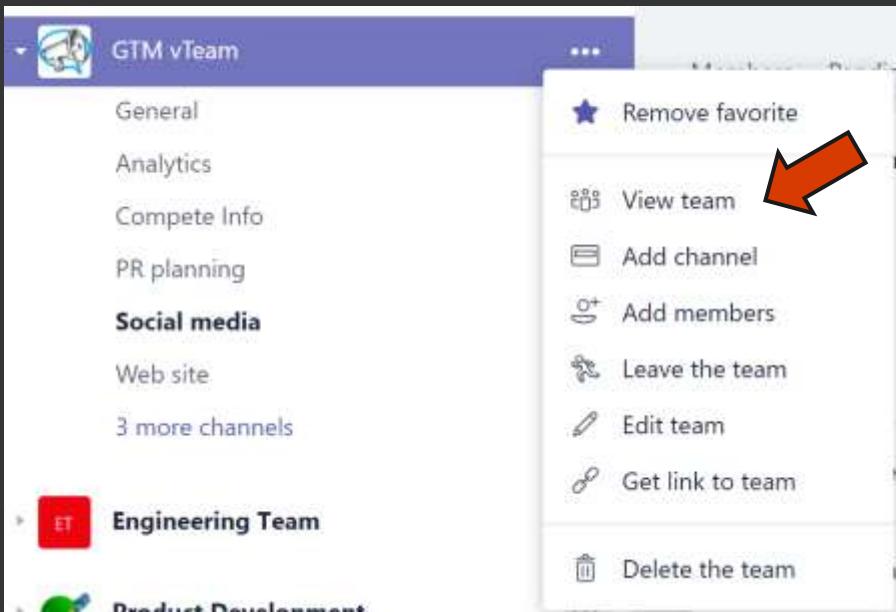
Client Updates

- 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	<input checked="" type="checkbox"/>
Allow members to delete channels	<input checked="" type="checkbox"/>
Allow members to add and remove apps	<input checked="" type="checkbox"/>
Allow members to create, update, and remove tabs	<input checked="" type="checkbox"/>
Allow members to create, update, and remove connectors	<input checked="" type="checkbox"/>
Owners can delete all messages	<input checked="" type="checkbox"/>
Everyone can delete their messages	<input checked="" type="checkbox"/>
Everyone can edit their messages	<input checked="" type="checkbox"/>
General Channel:	
<input checked="" type="radio"/> Anyone can post messages	
<input type="radio"/> Anyone can post; show alert that posting will notify everyone (recommended for large teams)	
<input type="radio"/> Only owners can post messages	

Team: Guest settings and @mentions/@team

Guest permissions	Enable channel creation
	<input type="checkbox"/>
	Allow creating and updating channels
	<input type="checkbox"/>
	Allow guests to delete channels
	<input type="checkbox"/>
@mentions	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-and-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)

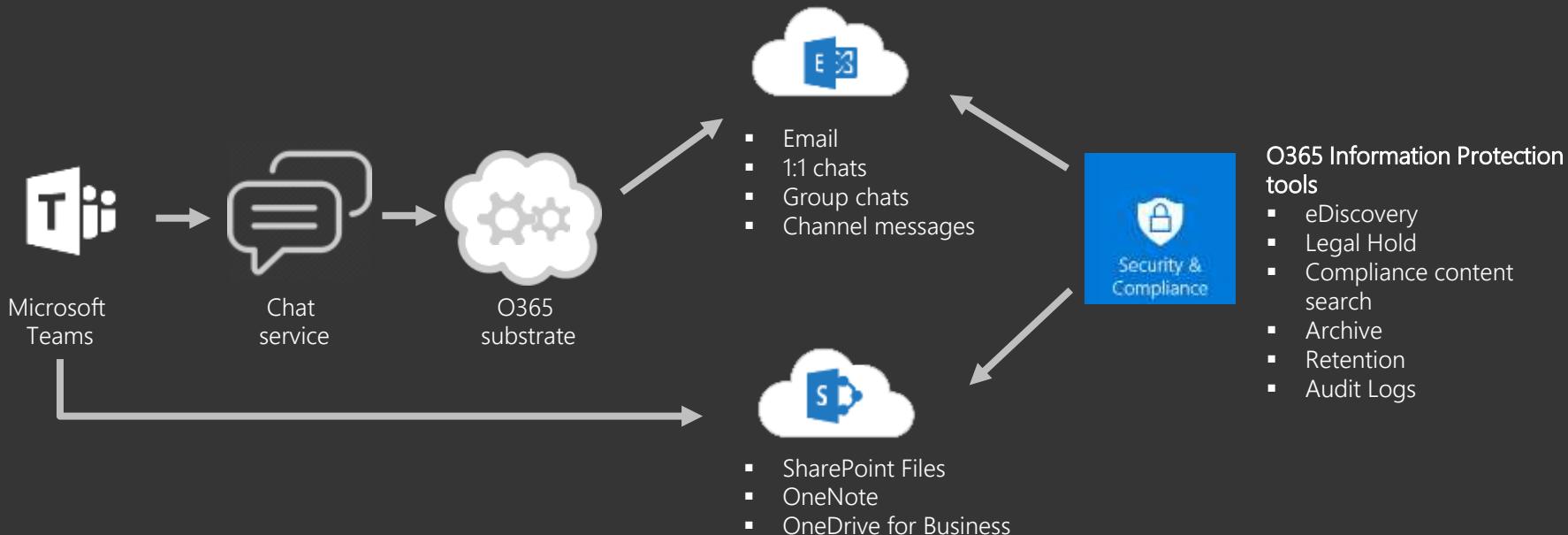
Privacy

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



Preview Search Results

Redstone leaks

Subject/Title	Type	Sender/Author	Modified
Redstone Kick off Production Server Status	Email	Don Stevens...	9/23/2017 1...
Redstone Kick off Production Server Status	Email	Don Stevens...	9/23/2017 1...
Redstone Kick off Production Server Status	Email	Don Stevens...	9/23/2017 1...
Project Redstone/Security/1493052103449	M	Don Stevens...	8/8/2017 8...
Project Redstone/Security/1493052103449	M	Don Stevens...	8/8/2017 8...
Project Redstone/Security/1493052103449	M	Don Stevens...	8/2/2017 1...
Project Redstone/Security/1493052103449	M	Don Stevens...	8/2/2017 1...
Project Redstone/Security/1493052103449 Serv 4 issues No...	M	Tucker Burns	4/24/2017 5...

From: Don Stevens <donstevens@teamsumothe.com>
To: Project Redstone (Team) <ProjectRedstone@teamsumothe.com>
Subject: Project Redstone/Security/1493052103449
Sent Date (J/T): 8/8/2017 1:38:55 AM
[Download Original Item](#)

My Original Reaction to going out in the dark pool to check on the **production server** was this, and bear in mind only I can turn this feature on/off. S4 is not appropriate.



However since then, I have figured out a way to reach the server in an easier manner and it took me only 30 mins to diagnose this 54 error. Service is restored. Long live Redstone!

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

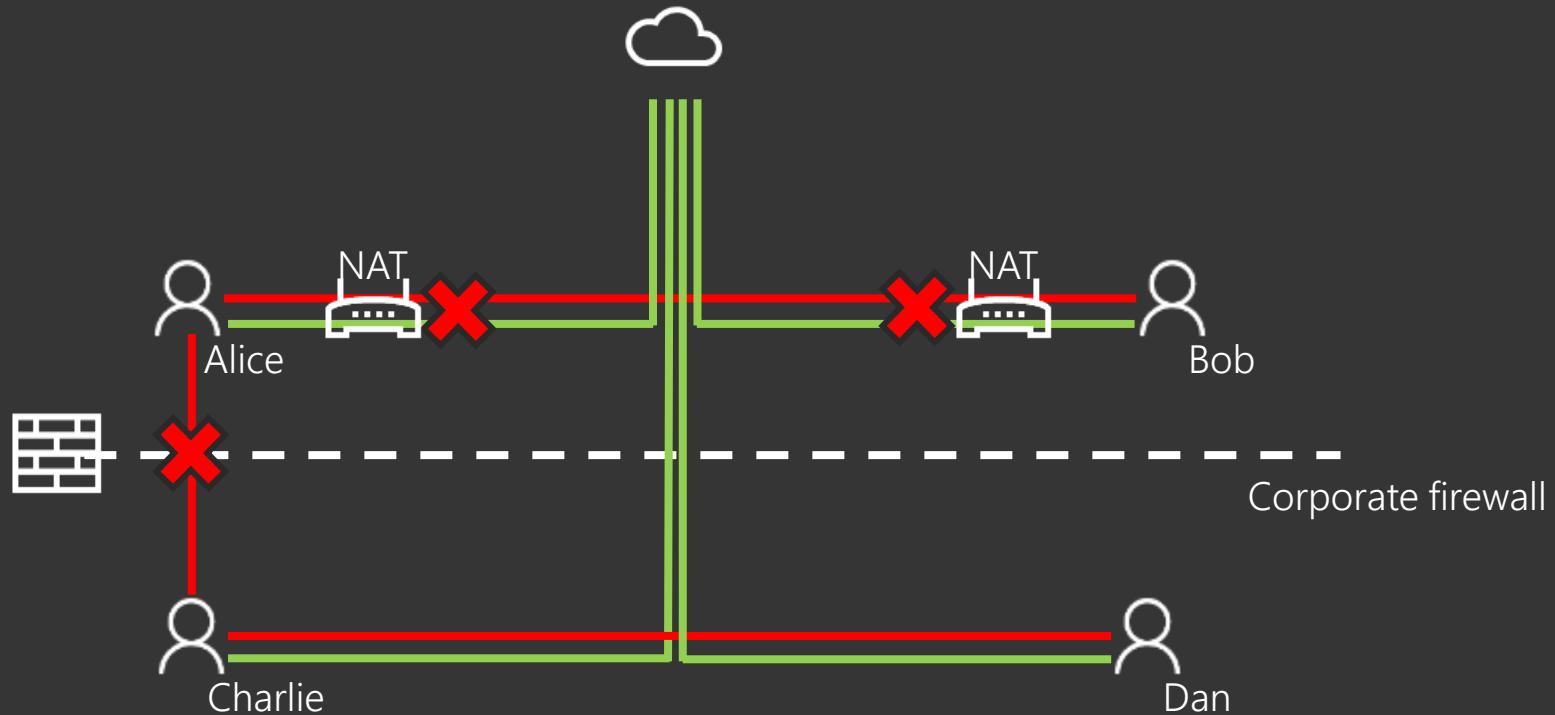
** Requires Active Directory (AAD) Premium subscription

Media Flows in Microsoft Teams and Skype for Business

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

The Challenge

— Signal
— 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

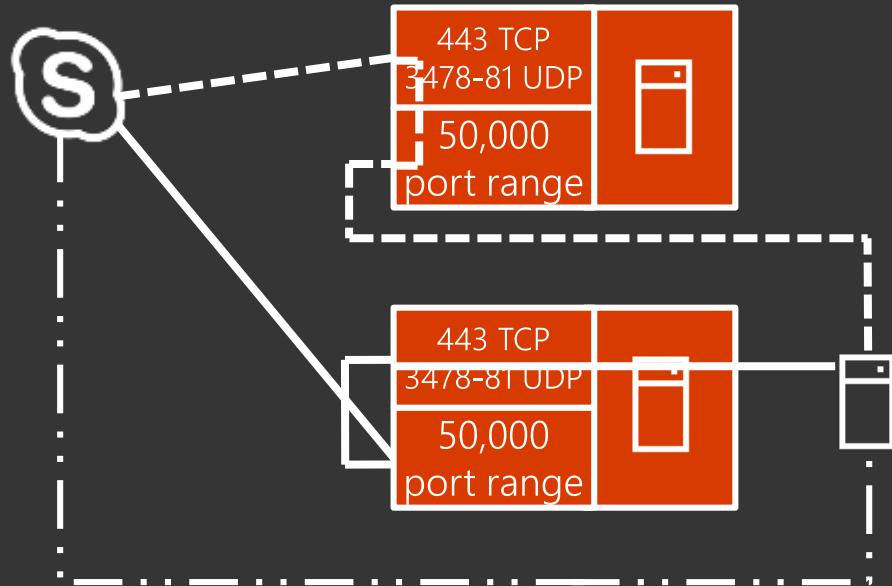
Different UDP ports per workload

In progress for Skype for Business

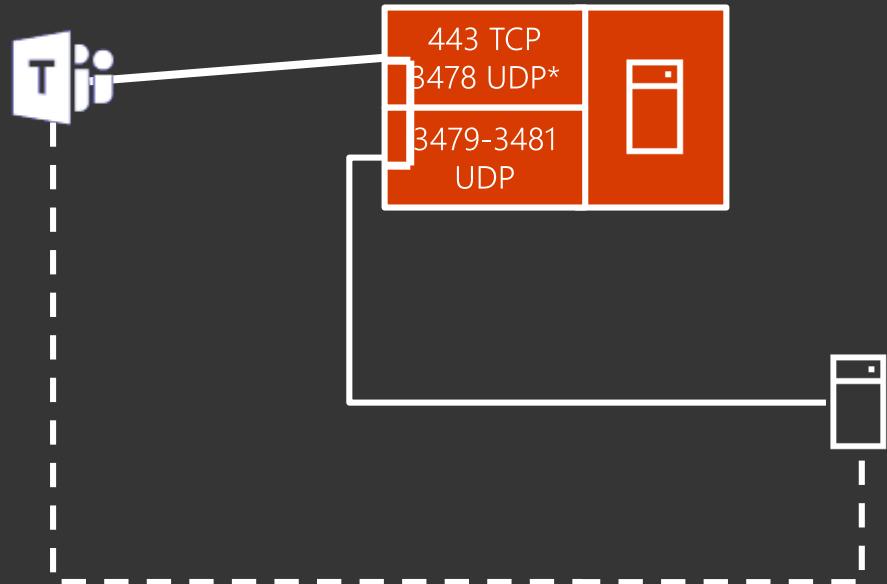
Used by Teams

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 team
- GET** channels of a team
- GET** channel info
- POST** create channel
- POST** create channel
- GET** items in a team

[View more samples](#)

History

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

[Show more](#)

Request Body Request Headers

GET beta https

Success - Status Code 200

Response Preview Response

```
  "odata.context": "http://schemas.microsoft.com/oData/2.0#odata/edm/edm",  
  "value": [  
    {  
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      "displayName": "Getting Started",  
      "description": "A sample category for getting started with the Microsoft Graph API.",  
      "category": "Getting Started",  
      "order": 1  
    },  
    {  
      "id": "13be4937",  
      "displayName": "Users",  
      "description": "A sample category for users.",  
      "category": "Users",  
      "order": 2  
    },  
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      "description": "A sample category for groups.",  
      "category": "Groups",  
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    {  
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      "displayName": "Outlook Mail",  
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      "category": "Outlook Mail (beta)",  
      "order": 5  
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    {  
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      "description": "A sample category for Outlook Calendar.",  
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      "order": 6  
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      "order": 8  
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      "order": 10  
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      "displayName": "Insights",  
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      "category": "Insights",  
      "order": 11  
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      "category": "Insights (beta)",  
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      "description": "A sample category for people.",  
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      "order": 13  
    },  
    {  
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    {  
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      "category": "Microsoft Teams (beta)",  
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  ]
```

Sample Categories

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

