



Minimum hardware requirements and technical parameters that a participant of the training for candidates for TGE Brokers should be carried out in the form of an on-line meeting

Training in the form of on-line meetings is conducted through the generally available Microsoft Teams or Zoom application. It is the Meeting Participant's responsibility to provide devices and access to Microsoft Teams or Zoom. The condition for participation in the training course organized in the form of an on-line meeting is meeting the following minimum equipment and technical requirements:

- Obtaining a computer equipment with access to the Internet with sufficient bandwidth to handle multimedia content.
- Obtaining a speaker and microphone connected to the above-mentioned computer hardware.
- Optionally, obtaining a web camera connected to the above-mentioned computer hardware.
- Microsoft Teams or Zoom application
- For the convenience of users, we recommend using devices with screens with a minimum size of 14 inches.

Detailed requirements are presented below.

Hardware requirements for MS Teams:

<u>Hardware requirements for Teams on a Windows PC</u>	
Component	Requirement
Computer and processor	Minimum 1.6 GHz (or higher) (32-bit or 64-bit).
Memory	2.0 GB RAM
Hard disk	3.0 GB of available disk space
Display	1024 x 768 screen resolution
Graphics hardware	Minimum of 128 MB graphics memory
Operating system	Windows Server 2012 R2+, Windows 10, or Windows 8.1 in 32 bit and 64-bit. For the best experience, use the latest version of your operating system.
.NET version	Requires .NET 4.5 CLR or later
Video	USB 2.0 video camera
Devices Standard laptop	camera, microphone, and speakers
Video calls and meetings	• For a better experience with 1:1 video calls, we recommend using a computer that has a dual-core processor and 4.0 GB RAM (or higher). • For a better experience with online meetings, we recommend using a computer that has a dual-core processor and 8.0 GB RAM (or higher). • The optional Background video effects are not supported on processors without an AVX2 instruction set running on Windows 8.1 or below. • See Hardware decoder and encoder driver recommendations for a list of unsupported decoders and encoders. • Joining a meeting using proximity detection in a Microsoft Teams Room requires Bluetooth LE, which requires Bluetooth to be enabled on the client device, and for Windows clients requires the 64-bit Teams client. It's not available on 32-bit Teams clients.
<u>Hardware requirements for Teams on a Mac</u>	
Component	Requirement
Processor	Minimum Intel processor, Core 2 Duo or higher
Memory	2.0 GB RAM
Hard disk	1.5 GB of available disk space



Display
Operating system
Video
Voice

1280 x 800 or higher resolution
Mac OS X 10.11 El Capitan or later
Compatible webcam
Compatible microphone and speakers, headset with microphone, or equivalent device

Video calls and meetings

- For a better experience with 1:1 video calls, we recommend using a computer that has a dual-core processor and 4.0 GB RAM (or higher).
- For a better experience with online meetings, we recommend using a computer that has a dual-core processor and 8.0 GB RAM (or higher).
- See Hardware decoder and encoder driver recommendations for a list of unsupported decoders and encoders.
- Joining a meeting using proximity detection in a Microsoft Teams Room is not available on Mac OS.

Hardware requirements for Teams on Linux

Component
Computer and processor
Memory
Hard disk
Display
Graphics hardware
Operating system
Video
Devices Standard laptop
Voice

Requirement
Minimum 1.6 GHz (or higher) (32-bit or 64-bit).
2.0 GB RAM
3.0 GB of available disk space
1024 x 768 screen resolution
Minimum of 128 MB graphics memory
Linux distribution capable of installing DEB or RPM.
USB 2.0 video camera
camera, microphone, and speakers
Compatible microphone and speakers, headset with microphone, or equivalent device

Video calls and meetings

- For a better experience with 1:1 video calls, we recommend using a computer that has a dual-core processor and 4.0 GB RAM (or higher).
- For a better experience with online meetings, we recommend using a computer that has a dual-core processor and 8.0 GB RAM (or higher).
- See Hardware decoder and encoder driver recommendations for a list of unsupported decoders and encoders.
- Joining a meeting using proximity detection in a Microsoft Teams Room is not available on Linux.

System requirements for MS Teams:

Minimum System Requirements:
iOS 11
Windows: Windows 10 build 14393
Android: Android 5.0 operating system

Web Features:

The latest version of Safari, Internet Explorer 11, Chrome, Edge, or Firefox
MacMacOS 10.13 computers

System requirements for Teams on mobile devices:

Microsoft Teams personal
You can use Teams for your personal life on your iOS or Android device.

Android phones and tablets:

Teams works with Android devices using the last four major versions of the operating system. As new versions of Android OS are released, the oldest version will no longer be supported.

IPhones, iPads and iPods:

Teams work on devices running iOS 11-13.

For the best experience, please use the latest version of iOS and Android.

Hardware requirements for MS Teams:

System requirements

- An internet connection – broadband wired or wireless (3G or 4G/LTE)
- Speakers and a microphone – built-in, USB plug-in, or wireless Bluetooth
- A webcam or HD webcam - built-in, USB plug-in, or:



- An HD cam or HD camcorder with a video-capture card
Note: See the list of supported devices.
- Virtual camera software for use with broadcasting software like OBS or IP camera.
Note: For macOS, Zoom client 5.1.1 or higher is required.

Supported operating systems

- macOS X with macOS 10.9 or later
- Windows 10*
- Note: Devices running Windows 10 must run Windows 10 Home, Pro, or Enterprise. S Mode is not supported.
- Windows 8 or 8.1
- Windows 7
- Ubuntu 12.04 or higher
- Mint 17.1 or higher
- Red Hat Enterprise Linux 6.4 or higher
- Oracle Linux 6.4 or higher
- CentOS 6.4 or higher
- Fedora 21 or higher
- OpenSUSE 13.2 or higher
- ArchLinux (64-bit only)

Supported tablet and mobile devices

- iOS and Android devices
- Blackberry devices
- Surface PRO 2 or higher, running Windows 8.1 or higher
- Tablet PCs running Windows 10 must run Windows 10 Home, Pro, or Enterprise. S Mode is not supported.
- Tablet PCs only support the desktop client.

Supported browsers

- Windows: Internet Explorer 11+, Edge 12+, Firefox 27+, Chrome 30+
- macOS: Safari 7+, Firefox 27+, Chrome 30+
- Linux: Firefox 27+, Chrome 30+

Note: Some features in the web client are not supported on Internet Explorer.

Processor and RAM requirements

	Minimum	Recommended
Processor	Single-core 1Ghz or higher	Dual-core 2Ghz or higher (Intel i3/i5/i7 or AMD equivalent)
RAM	N/A	4 Gb

Notes:

- Dual and single-core laptops have a reduced frame rate when screen sharing (around 5 frames per second). For optimum screen-sharing performance on laptops, we recommend a quad-core processor or higher.
- Linux requires a processor or graphics card that can support OpenGL 2.0 or higher.

High-DPI support

- High-DPI displays are supported in Zoom version 3.5 or higher

Bandwidth requirements

The bandwidth used by Zoom will be optimized for the best experience based on the participant's network. It will automatically adjust for 3G, WiFi, or wired environments.

Recommended bandwidth for meetings and webinar panelists:

- For 1:1 video calling:
 - For high-quality video: 600kbps (up/down)
 - For 720p HD video: 1.2Mbps (up/down)
 - For 1080p HD video: 3.8Mbps/3.0Mbps (up/down)
- For group video calling:
 - For high-quality video: 1.0 Mbps/600kbps (up/down)
 - For 720p HD video: 2.6Mbps/1.8Mbps (up/down)



- For 1080p HD video: 3.8Mbps/3.0Mbps (up/down)
- For gallery view receiving: 2.0Mbps (25 views), 4.0Mbps (49 views)
- For screen sharing only (no video thumbnail): 50-75kbps
- For screen sharing with video thumbnail: 50-150kbps
- For audio VoIP: 60-80kbps
- For Zoom Phone: 60-100kbps

Recommended bandwidth for webinar attendees:

- For panelists video on:
 - ~600kbps (down) for high-quality video
 - ~1.2-1.8Mbps (down) for 720p HD video
 - ~2-3Mbps (down) for 1080p HD video
- For screen sharing only (no video thumbnail): 50-75kbps (down)
- For screen sharing with video thumbnail: 50-150kbps (down)
- For audio VoIP: 60-80kbps (down)

If you have any questions regarding technical issues, please contact us at:

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