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Technical requirements for smooth events in virtual space

WebRTC is used for audio and video transmission.
WebRTC (Web Real Time Communications) is a pioneering open standard from W3C that enables real-time communication natively via web browsers without additional software and plug-ins.
Low latency times and the peer-to-peer connection under https make it very efficient and tap-proof.

To check the technical requirements, please obtain the support of a technically experienced person in your company (e.g. system administrator).

1. **Internet Access**

   Test your internet connection, e.g. via

   https://www.wieistmeineip.de/speedtest/

   Minimum download rate of 3 MBit/s and minimum upload rate of 1 MBit/s

   Please also carry out a ping test. This tests the network connections and routing in the network. The lower the ping value, the better.

   Please note that there may be temporary fluctuations in your Internet connection, despite contractually guaranteed upload and download bandwidths from your Internet provider. Therefore, the actual bandwidth available at the time of your online event and the quality of your internet connection are decisive.

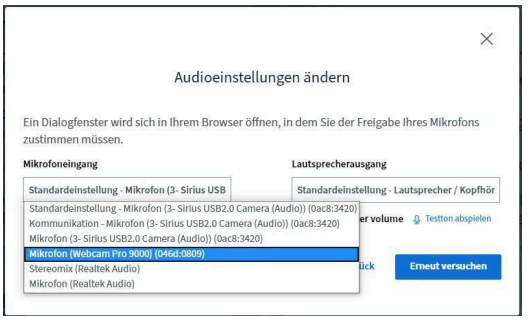
   For WLAN connections, please ensure the stability/quality of the connection.

2. **Use current versions of the following web browsers**

- Google Chrome oder Mozilla Firefox (auf Mac)
- Google Chrome, Mozilla Firefox oder Microsoft Edge ab Version 83.0.478.37 (auf Windows)
- Safari auf iOS (iPad und iPhone)

3. **Use high-quality end devices**

Use high-quality end devices (microphone, webcam, headset) to ensure good audio and video quality.
Make sure that you select the correct end devices in the browser when starting the virtual room if several end devices (e.g. several webcams) are connected to your computer.



To ensure that the correct device is used

Poor audio quality can also be caused by participants. You can identify possible sources of interference by switching off the microphone of the person concerned.

4. **Use powerful end devices (computer / tablet / smartphone)**

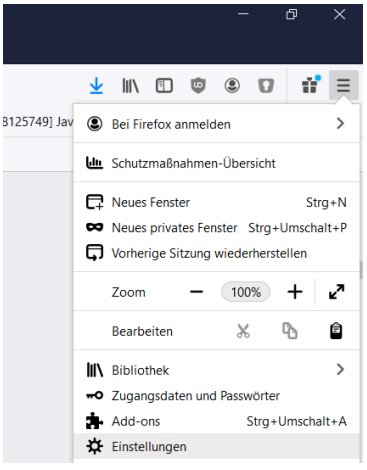
Sufficient CPU power is required, especially if several participants with webcams are taking part in an event.
Close all unnecessary programmes and check the CPU load, e.g. via the task manager. This should not be at the limit.

Please also consider the drivers of your end devices. Update the drivers if necessary.

5. **Please check whether the required authorisations are set correctly in the web browser**

This is only necessary if the pop-ups for accessing the webcam etc. are not displayed and instead a message is displayed stating that access was not possible.

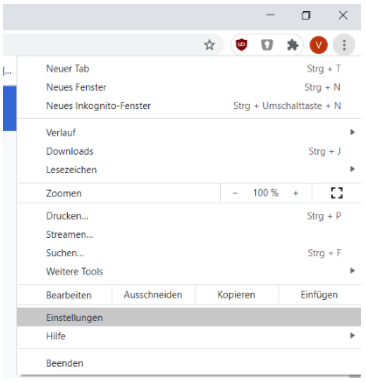
Firefox:



1. Click on Settings -> Privacy and security -> Permissions (camera, microphone) -> Settings

2. Check whether the website address of the virtual room (the entry in the address bar of your browser, e.g. https://virtualroom8.de or https://bilduin-virtualroom16.de) is included in the list and whether access to the devices is permitted.
3. ‘Block new requests for access to your camera’ should not be ticked.

Chrome:



1. Click on Settings -> Privacy and security -> Website settings
2. For each device (camera, microphone) ‘Ask before accessing’ must be active

Safari:

- Settings -> Websites
- Check per device

Mac in general:

- Access to the devices is also strictly controlled by the operating system.
- So if a device does not work:
  - System settings -> Security -> Data protection
  - Depending on the device, check whether the browser is generally authorised to use the device

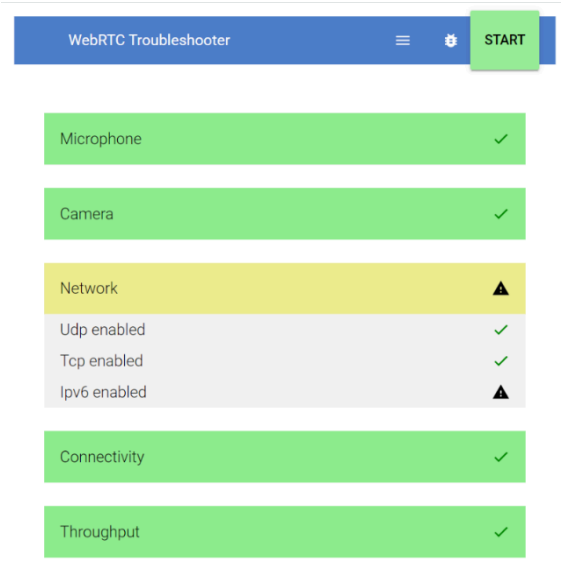
iOS

- Settings -> Safari -> Settings for websites -> Camera / Micro -> at least on ‘Ask

6. **Ensure that WebRTC is not blocked in the web browser Webbrowser nicht blockiert ist** (WebRTC is not blocked by default)

   Local firewall, WLAN or router settings or web browser blockers can prevent WebRTC communication.

   You can test WebRTC compatibility via this URL:
   https://test-webrtc.bilduin.de



If necessary, carry out the test several times with different browsers if at least one tick is not set in the respective area.

You can check the WebRTC settings/blocker in your browser and set them if necessary as follows:

Firefox:

1. Enter **about:config** in the address bar
2. Click on the "I take the risk!" button that appears
3. Enter **media.peerconnection.enabled** in the search bar
4. If the value is set to ‘false’, please double-click to set the value to ‘true’

Chrome:

There are several known Chrome extensions that could block WebRTC, such as uBlock Origin and WebRTC Network Limiter:

1. uBlock Origin:
   chrome-extension://cjpalhdlnbpafiamejdnhcphjbkeiagm/dashboard.html#settings.html

Please enable WebRTC here if necessary - this is the case by default.

2. WebRTC Network Limiter

If the WebRTC Network Limiter is in use, please select the following option via the ‘Options’ menu: **„Give me the best media experience“**

7. Firewall configuration

If firewalls are in use, the following ports must be enabled, which is usually the case.

Ports	Protokoll	Beschreibung
80	TCP	HTTP
7443	TCP	HTTPS
443	TCP/UDP	TLS listening port (TURN over TLS)

Ports	Protokoll	Beschreibung
3478	TCP/UDP	Coturn listening port (STUN)
16384 - 32768	UDP	WebRTC, FreeSWITCH, Kurento, HTML5 RTP streams

- **Allow server addresses for the virtual room:**
  - virtualroom2.de (146.0.35.121), virtualroom7.de (217.79.181.5), virtualroom8.de (217.79.189.165), virtualroom9.de (93.186.201.193)
  - bilduin-virtualroom18.de (85.114.128.23), bilduin-virtualroom19.de (89.163.135.62)
  - meet.virtualroom1.de (93.186.201.65), meet.virtualroom2.de (146.0.35.121)

- **Allow access to TURN Servers:**
  - turn-1.de (89.163.231.211), turn-2.de (5.199.138.48), turn-3.de (62.141.44.220)

8. **VPN client or proxy does not block WebRTC**
   Please check whether WebRTC is blocked via your VPN clients and/or via your proxy.

9. **Proxy Server behindert keine HTML5-WebSocket Kommunikation**
   HTML5 web socket communication leads to an enormous reduction in unnecessary network traffic and latency compared to conventional polling and long polling solutions.
   Proxy servers usually work well with WebSockets. In some cases, an additional proxy server configuration or an update of the proxy server may be required for smooth communication.

   You can test the WebSocket and WebRTC compatibility of your browser via the following links:

   https://websocketstest.com/

   https://www.webrtc-experiment.com/DetectRTC/

   https://html5test.co/

10. **Deactivate SSL scanning if necessary**

11. **If you have fulfilled all the requirements, please test against our test server as described above.**

    https://test-vr.educateonline.de/