



Hybrid Conference Guide

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1 Introduction

This guide is a do-it-yourself guide on how to set up and manage a hybrid conference. This guide will discuss the most important technical aspects of a hybrid conference such as the equipment, technologies and people required to host a successful event.

In 2020 the Covid-19 pandemic has changed the world of conferences and events in general by forcing everything online. Faced with no other choice, conference managers were required to adapt to the new online life during the pandemic and host the conferences online. At the time of writing the pandemic has largely subsided and the world has opened up again for large in-person conferences. However, the pandemic has shown us that it is possible to hold virtual conferences and that there are even some advantages to these online events. Virtual events are much cheaper for attendees since it eliminates all travel and accommodation costs that comes with an in-person conference. Virtual conferences are also safer as the threat of a new coronavirus variant or novel virus is ever-present. Therefore, it is safe to assume that there will always be a small percentage of people that would prefer to attend the next conference online.

Fully virtual conferences are always a possibility, but as many have realised during the pandemic, these conferences are not sufficient replacements for in-person conferences. The experience of an in-person conference is very hard to replicate in a virtual environment and too much of the networking value of the conference is lost. The hybrid conference is the solution to these problems and provides the best of both worlds and are quickly becoming a new standard for conferences. This manual will assist conference organisers in taking a normal in-person conference and expanding it into the virtual domain. A hybrid conference can make it possible for many people to attend an event from the comfort of their home that they would not have been able to attend otherwise.

2 Hybrid Conference Scenario

This guide has been written from experiences gained during the Control Conference Africa in December 2021 which was a small hybrid conference with roughly 20 attendees on-site and 30 attendees online. The guide will focus on a similar scenario but will include some changes that will have to be made to change the scenario to a larger conference. The guide will mostly focus

on the hybrid and virtual section of the conference, and the in-person section of the conference such as venue booking and catering are not covered. This guide would ideally be used to turn a small standard in-person conference into a hybrid conference.

3 Conference Setup

In this guide two similar setups will be considered, the first setup is shown in Fig. 1 and is similar to the setup that was used at the CCA2021 conference. This setup worked well during the conference and would be sufficient for a small conference. The second setup, shown in Fig. 2, includes some improvements that would enable easier scaling to larger hybrid conferences. The two setups are discussed below with the advantages and disadvantages of each.

3.1 Setup A

Conference setup A is centred around two computers, the main computer and a presenter computer. Note that if the physical part of the conference is split between two or more venues or conference rooms, the equipment has to be duplicated for each room. The main computer controls the audio, camera and webcam is only responsible for sharing the presentations with the online platform. There are two main drawbacks to this setup: firstly, the main computer does not have any control over the presentation that is shared to the online platform and secondly, the presentation shown on the projector is subjected to decreased resolution and detectable latency as it has to pass through the online platform first.

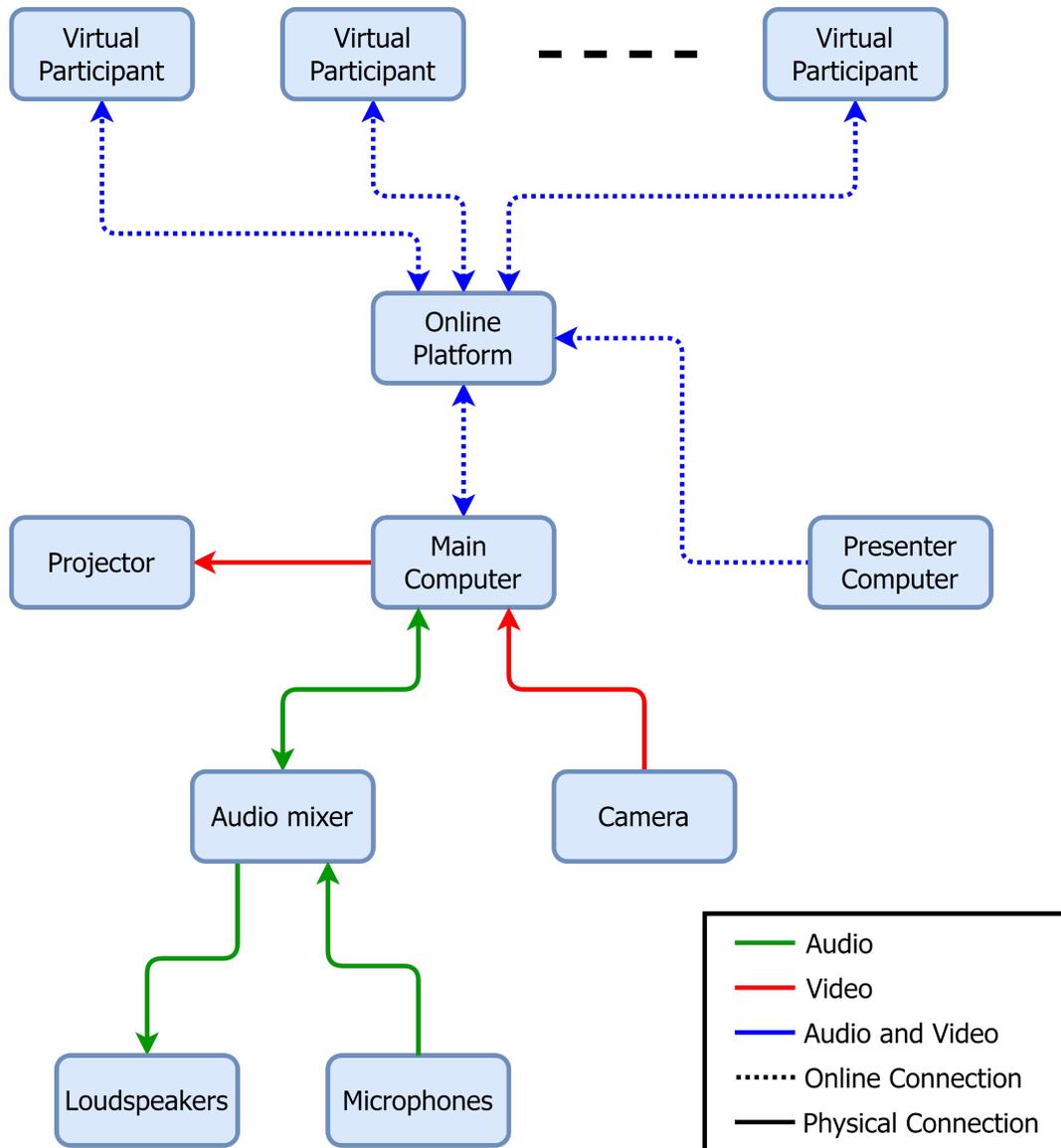


Figure 1: Conference setup A

3.2 Setup B

To fix the shortcomings of setup A, a new setup is proposed: setup B. In this setup the output of the presenter computer is fed to the main computer instead of to the online platform directly. The drawback of setup B is the addition of more equipment to enable the main computer to manage the different video feeds. The advantage of this setup is complete control from the main computer over everything that is shared with the online platform.

This would also allow for multiple camera inputs that can easily be switched live to give the virtual audience alternate views of the presenter and stage.

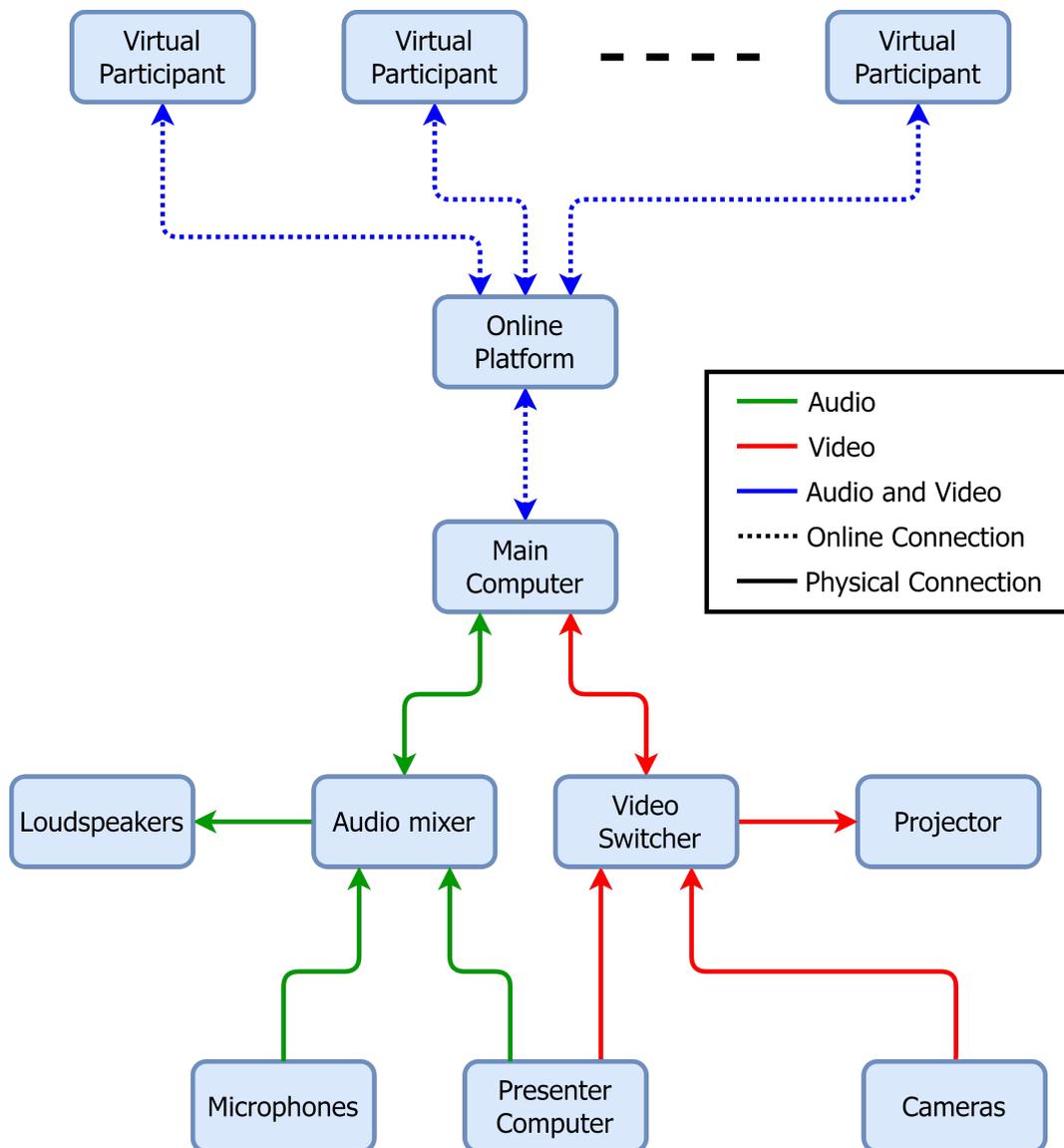


Figure 2: Conference setup B

4 Equipment and Technologies

There are a lot of different equipment and technologies needed to make a hybrid conference work. In this section, the conference setup will be divided into its main components and all of the different pieces of equipment that make up the component will be discussed.

4.1 Audio

The audio component of the conference is everything that is connected with green arrows on the setup diagrams. The audio equipment is standard equipment that is needed for any event where a lot of people are listening to someone speak and does not change much for a hybrid conference.

4.1.1 Loudspeakers

The loudspeaker system will allow the in-person attendees to hear the presenter better. The speakers also allow the virtual attendees to be heard clearly by all the people in the conference venue when they are presenting or contributing to the discussions in a session. The number of speakers required will depend on the number of conference rooms used as well as the size of the rooms.

4.1.2 Microphones

Multiple microphones are used to allow anyone that speaks during the conference to be heard clearly by the physical as well as the virtual audience. The most important microphone is the main presenter microphone and there are three main options: a Lapel microphone is a good choice as it can be attached to the clothing of a presenter and provide clear audio while not limiting the range of motion or hand movement of the presenter. Another good choice is a fixed microphone at the podium, this would presenter changes more seamless as the microphone do not have to be passed along to the new presenter, but it does limit the speaker to one location behind the podium. A handheld microphone is not recommended for the presenter, but two or more handheld microphones are required for other people that contribute to the session. This includes the session chair and co-chair that introduce the speaker and members of the in-person audience that ask questions or engage in discussions. It is recommended to have one presenter microphone and two handheld microphones per conference room.

4.1.3 Audio Mixer

The audio mixer is essential to manage all the audio streams between the microphones, loudspeakers and main computer. The mixer makes it possible to easily control what microphones are on and what audio should play over the loudspeakers and be streamed through the online platform to the virtual audience. The mixer connects to the main computer to send audio to the computer as well as receive audio from the computer to play over the loudspeakers.

4.2 Video

The video component of the setup is everything that is connected with red arrows in the setup diagrams. In a normal in-person conference the video component is limited to a computer connected to a projector to show the presentation to the audience. In a hybrid conference, it becomes a bit more complicated, the virtual audience should always be able to see what is happening in the venue, including a camera view of the venue and the presentation shown in the venue. The in-person audience also wants to be able to see the virtual attendees when they are presenting or participating in discussions.

4.2.1 Camera

The camera is responsible for capturing a video feed of the presenter to be streamed to the virtual audience. For a small conference, setup A could work that has a single camera connected to the main computer. For this purpose, a good quality HD webcam would be sufficient. However, as the conference becomes bigger, it is a very good idea to upgrade the camera to a professional DSLR camera or camcorder for better image quality. These cameras will be more expensive but will provide a substantial improvement over a webcam. It is recommended to hire a good quality dedicated live streaming camera instead of purchasing a webcam. A setup such as setup B also allows for multiple cameras to be used in the same venue, if the budget allows it is encouraged to have two or three cameras. Multiple cameras give multiple views that can be switched between and give the virtual audience a far more engaging experience.

There are some accessories that will be needed for the cameras. Tripods are essential to keep the cameras stable and at the correct height. Each camera should be secured in a dedicated location on a stable tripod. Cameras need a lot of light and good lighting is essential to giving the live stream a professional look. The stage and podium should be properly lit with stage lights.

4.2.2 Projector

The projector will be used to display the presentation as well as the virtual presenters to the in-person audience. Most conference venues will already have a projector installed that can be connected to the main computer.

4.2.3 Video switcher

The video switcher is an additional piece of equipment added to setup B that allows for full control over all of the video feeds present in the conference. The switcher takes in a number of video feeds from the cameras, presenter computer and online platform and provide outputs that can easily and quickly be switched between the inputs. Therefore, the switcher would control what is shown on the projector and what is streamed to the virtual audience. Depending on the type of switcher used, it might also be necessary to add a capture card or [HDMI to SDI converter](#) as well in order to properly input the feed from the presenter computer into the switcher.

4.3 Computers

4.3.1 Main Computer

When hosting a hybrid conference there needs to be a link between the people at the venue and the people online. In the conference setup, this link will be a computer that is connected to all the equipment and the online platform. The computer will manage all of the audio and video feeds between the online platform and the conference venue and ensure that everyone can see and hear what they should at all times. The main computer has the following responsibilities:

- Show the in-person audience the presentation or virtual presenter on the projector.
- Show the virtual audience the correct camera feed and presentation.
- Share the audio from the venue microphones with the virtual audience.
- Play the audio from the virtual presenter to the in-person audience.

It is recommended to have more than one monitor connected to the main computer so that the different feeds can be seen at the same time and a decision can easily be made on what feed to share with the virtual audience and what feed to share with the in-person audience. If a video switcher is used, some of the responsibilities can be taken over by the switcher. If there

is not a switcher, it is recommended to use a software switcher like [OBS](#) to make it easier to manage the different video feeds.

4.3.2 Presenter Computer

The presenter computer is responsible for sharing the presentation of the in-person presenters with the main computer to show on the projector as well as sharing the presentation with the online platform. The presenter computer needs to have access to the presentation files that should be collected from the presenters ahead of the conference. The computer should also have the required software installed, for example Microsoft PowerPoint and a PDF reader. Before each presentation, the correct file should be opened for the presenter. IF the setup allows, it would be beneficial to have a display from this computer where the presenter can see it while presenting to use as a reference without having to use the projector. The presenter also has to be able to control the computer to move between slides, it is recommended to use a wireless presenter remote for this purpose.

For presenters that are presenting virtually from somewhere else and may not have constant reliable internet, it is a good idea to have a recording available to play in case of a lost connection. The recording can then be played from the presenter computer.

4.3.3 Internet

The internet connection is a very important component to make the hybrid conference work flawless. The main computer has to be connected to the online platform at all time and constantly share video and audio in both directions. Therefore, the conference venue will need a high bandwidth, low latency, wired internet connection. A fibre connection of at least 50 *Mbps* upload and download bandwidth is recommended per conference room. It is also a good idea to have a WiFi network in the venue for the attendees to use, in which case the bandwidth requirement is even higher.

4.4 Online Platform

The online platform is the central hub that connects virtual attendees to the physical conference. The online platform will be the interface that the online attendees use to interact with the conference and their experience depends heavily on how good the platform is. The most basic online platforms are online meeting services like [Zoom](#), [Microsoft Teams](#) or [Google Meet](#). These

platforms are cheap to use easy to set up and the majority of attendees will be familiar with the platform. For small conferences, these platforms will be sufficient and can provide the essential functionality of sharing audio and video content between the conference venue and the virtual attendee.

As the conference becomes bigger it is necessary to look towards dedicated online event platforms. These platforms provide better integration of different tools and can give a better overall experience for virtual participants. Some functions of these platforms include:

- Custom landing page with conference registration and payments menu
- Conference program and agenda
- Live streaming of presentations
- Breakout rooms
- Speaker and attendees profiles
- Sponsorship pages and booths
- Live chat
- Webinars
- Speaker engagement tools
- Networking tools
- Mobile apps
- Interpreting and other accessibility tools

There are many different virtual event platforms available that provide a wide array of different tools, some options are: [Hopin](#), [vFairs](#), [Hubilo](#), [WorkCast](#), and [many](#) more. These platforms are generally quite expensive, but it's possible to find a platform that provides exactly what is needed to provide a good experience for the virtual audience. Along with the online platform, a conference website is also required to provide essential information about the conference. The website is ideal for handling the conference registrations and hosting the program.

4.5 Cloud Storage

There will be a lot of data generated before and during the conference and it is essential that the data remains organised and easily available to all the organisers. Cloud storage is ideally suited for data storage as it enables access from anywhere and gives everyone access to the latest versions of the files. Some essential files to store on the cloud storage is all the presentations and recordings organised according to the conference program. These files should be quick to access from the presenter computer before each presentation. There are many cloud storage services that can be used for the conference data, including [Google Drive](#), [OneDrive](#) or [Dropbox](#). Select a plan with sufficient storage capacity for all the conference files.

5 Human Resources

A hybrid conference will require many people working behind the scenes to ensure that everything works well. The list below is the essential personnel needed to manage the technical equipment, for larger conferences more people might be required.

- At least one person per conference room at the main computer to control the content that is presented on the projector and shared with the virtual audience.
- One person per room at the presenter computer responsible for loading the correct presentations and recordings between the presentations.
- One person per room managing the sound mixer and the microphones, this person will be responsible for handing out microphones to the correct people and making sure the audio is correct everywhere.
- When multiple cameras are used, someone is needed to manage the cameras and switch between the different views.
- Someone needs to be present on the online platform to manage the live chat and ensure that everything is working well for the virtual audience.

This list is just a recommendation and as the conference scales larger there might be additional roles that should be filled.

6 Conclusion

Hybrid conferences are becoming more common as the world transition from fully virtual conferences during the pandemic back to in-person conferences and it is very possible that hybrid conferences becomes the standard for conferences in the near future. This guide serves as an introduction and DIY manual to hosting a hybrid conference and give an overview of the most important equipment, technologies and tools needed to host a successful hybrid conference.