Remote Broadcasts - part 1

Technically there are a number of obstacles we can encounter when trying to accomplish a remote or outside broadcast. Before we look at doing a remote, we need to decide what we are trying to achieve. OB's can be full on stereo remote broadcasts or simple voice reporting. It can be as simple as a quick link to the patients or to bring a full show from an external event to the listener. The first obstacle is location. Depending on where we hope to broadcast from will also affect what is available to use technically. A basic telephone line, WiFi, ISDN, ADSL, wireless can all be used to bring our remote back to the studio, so when on location find out what can be used.

So first, the technical's of a remote….

ISDN. For many years ISDN (digital telephone line) was used extensively by radio stations to do remotes. It is still used today for sports commentaries, Voice-Over sessions and full broadcast quality stereo programme remotes. ISDN lines are expensive and so many OB's are now being done using AoIP. The equipment is also expensive. A Glensound™ ISDN mixer with headsets can cost £3500 for sports/news reporting. The studio equipment will be a similar price.

Telephone/POTS. A standard telephone is the easiest way to connect to the studio. Very fast, simple and effective. Great for short items but not very good for long broadcasts due to the audio quality.

Similar to ISDN, digital equipment that uses Plain Old Telephone System (POTS) have been used with good effect. A Comrex™ system converts analogue audio to a digital signal similar to ISDN units, but sends this digital noise down an ordinary telephone line (like a Fax). These units rely on a good quality telephone connection but good results can be found.

ADSL/Broadband/AoIP. Having Broadband Internet connection can open up a whole new world. Quality depends on what you use to connect remote to studio. The quality of connection will also depend on if the remote end is using a hardwire connection or **WiFi** connection.

Assuming we have a good ADSL connection at each end, Skype™ or similar voice over ip (Voip) can produce adequate results for voice only remotes. Some hospitals now have free WiFi available and allow Skype™ to be used. Other types of connectivity can be used with greater quality. Fideliphone® is free to download and use (although no longer supported) and is excellent in quality. It is a peer to peer connection that can be used as stereo or mono although delay may affect its practical use for OB's.

 ipDTL™ and Cleanfeed® uses Google Chrome® as it's platform. Again this can be used wherever an internet connection is available. They offer a low bandwidth "free" service for hospital radio stations and a higher quality connection can be found with the ipDTL subscription version. Similar to the old POTS and ISDN systems, the companies that made the equipment (like Comrex and Glensound) have now ventured into the internet market and have produced very similar ISDN/POTS kit that now works via a broadband connection. Some also offer a PC to PC style system utilising tablets or laptops (via an app) to connect to a studio PC.

UHF Radio Links. Some established ILR radio stations still use the UHF radio link (radio car) but these annual licences are being replaced by AoIP kit. For hospital radio stations, there is still part of the UHF radio spectrum that can be used without the need of a licence in the UK. Although not guaranteed against interference from other users, low power UHF equipment is readily available for close links (providing a local link to the remote kit, In-Ear Monitoring and Radio Mics, etc). Although these frequencies were once the analogue UHF TV band, they are now part of the 4G/5G mobile phone network and so interference can result. Arqiva™ have recently taken over the administration of licensing programme making radio links (including radio mics and In Ear monitoring).

Special permission may be required for use at large events or some geographic areas of the UK.

Fixed Landline/Tie lines. The best quality would come from a fixed line between the studio and remote. If you have a cable feeding the main hospital system, why not put in another cable from the studio to the distribution amplifier or main reception so you can connect from the hospital back to the studio? These are known as Tie-Lines and can be a point of reference for other equipment to connect to for your remote. If you use professional standard audio equipment with balanced inputs/outputs, you can use CAT5/CAT6 data cable to good use and much cheaper than audio coaxial cable.

Delay also known as latency. Delay exists with all forms of transmission. This can be so slight that you will not notice. Longer forms of delay can be caused by digital equipment. Any form of converting an analogue signal to digital also needs to be converted back from digital into an analogue signal for us to hear. CODECS are used to do this conversion process and all will incur some delay. Some are better than others with handling/converting audio signals and so some systems will incur more delay than others.

Skype has a low latency whereas Fideliphone® can have a delay of 3 seconds or more depending on the route it takes. ISDN in G722 mode will have less delay (and audio bandwidth) than stereo MPEGII mode. So we have to be careful what system we can use to prevent the difficulty of a presenter talking to the remote end.

Cleanfeed. Most remotes would need to hear station output so they can hear what is being broadcast but it can be very difficult (especially with delay) to hear their voices back again. Because of this we need to supply the remote end with a cleanfeed.

A cleanfeed is the output of the desk without the remote channel, and so eliminating the remote end hearing their voice being broadcast back to them. Cleanfeeds can be arranged by sending some channels to the remote equipment using an AUX channel or it can be arranged electronically by Mix-Minus.

Mix-Minus is an electronic way of feeding the remote equipment with desk output without the remote signal – and so the remote end should hear all of the desk output, minus the remote signal.

Talkback (IFB). It is helpful for the studio to be able to talk to the remote end without broadcasting on air. Talkback is used to speak to the remote end and so messages or direction can be sent to the remote end. This can be either "open talkback" (a permanent on talkback circuit that is mostly used for TV) or ordinary talkback which is programme output broken by talkback by depressing a button in the studio.

Four Wire. The old style of remote broadcasting using telephone lines in quality audio for remote send and studio return and before the invention of digital telephone circuits was known as Four Wire circuit. Some of today's modern digital remote systems still use these basic principles. The four channels used provided Programme, Programme Return, Cue and Reverse Cue.

Conclusion.

There are ways and means to bring a remote event to our listeners but with some obstacles. The points to remember are how simple or complicated the OB can be and the quality of the sound. Quick links can be achieved with telephone/Smartphone technology. Better quality with talkback would be wanted for full programmes being broadcast from the remote site (although music etc. would be played in from the studio).

Remember if using equipment within the hospital (particularly wireless/radio equipment) to get clearance from the hospital.

Remote Broadcasting - part 2

There are various levels of remote broadcasting. From the simplest form of just a remote voice to a complex full audio broadcast. The equipment used will depend on the style of broadcast and the budget available.

So let's start with a simple voice only remote...

Voice Only Remote.

In some circumstances, just the voice from a remote location is required, whether this is from a news reporter or from an interviewee. Nowadays the use of the internet is used to connect remotely rather than expensive ISDN lines but remember that there is a difference in quality depending on the remote equipment and the software used.

There is a difference between "VOICE over IP" (VoIP) and "AUDIO over IP" (AoIP). Some software or apps like Skype™ are considered low quality due to limiting the bandwidth for delay (also known as "latency") purposes and are filtered for voice. They also "feature" noise cancelling which isn't great for broadcast use. These VoIP programmes are OK for short interviews/inserts but not considered useful for outside broadcasts. Programmes and apps like Cleanfeed™ use different codec's that digitize the audio so offering better sound quality with little delay. So for a simple remote insert into your programme, consider getting the interviewee or guest to connect using Cleanfeed™ or ipDTL™ – your listeners will be thankful for the quality even from an Android phone!

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For outside broadcast purposes, the presenter can quite easily be sat at home with a USB microphone and a pair of headphones connected to a relatively hi-spec/fast laptop to broadcast a few hours back to the studio (with a studio assistant or engineer playing in the audio). Slightly more complex setup would be to use a good quality studio condenser microphone into a small mixer that is then fed into the laptop using an external audio device.

Sports Broadcasting

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Again, many radio stations are now moving to internet connection and if you consider that some hospital radio stations are still using a telephone hybrid connection, the difference in quality is very much welcomed when changing to AoIP! Many stadia also offer the use of free media WiFi saving the cost of a business telephone line or even the expensive ISDN lines! Note that many sports clubs may not allow hardwired connection to their networks but only offer free WiFi for the media.

Check out Cleanfeed quality here: Cleanfeed Cricket commentary example

Full Audio Remote Broadcast

This would require a good internet connection (using Cleanfeed™/ipDTL™ etc) along with a small mixer and playout system that would have the audio files needed for the broadcast – so some planning would also be required so you already have all the audio items ready to play. Important "radio junctions" such as news bulletins and commercial breaks also need to be considered and planned for.

So a laptop or PC with suitable software feeding a small mixer with presenter microphone and a pair of headphones should suffice for a two hour show from home without the need of constant studio engineering. Remote PC connection software such as Google™ Remote or Teamviewer™ could be used if there is no one at the studio. Connecting to the studio, stopping the studio playout system and putting out your remote connection live could all be done remotely!

Technical Review

Before we start to explore what equipment can be used, a word about "audio cleanfeed" and "talkback". It is essential that the equipment at both the studio and remote ends have their audio configured so don't hear each other in delay or some audio loop. It is most off-putting hearing yourself within a few milliseconds of speaking. To prevent this, we need to set up a "cleanfeed" configuration.

The remote audio will need to connect to the studio mixer, BUT the return audio to the remote end should have the mixer audio without the remote audio. This can be done electronically (mix-minus) or

simply by sending the remote end an AUX channel of everything except the remote channel. By doing this, the remote end won't hear themselves echoing back.

If possible, the same configuration should be achieved at the remote end. Depending on the audio soundcard used in the PC or laptop, this may have to be done at the remote mixer – so the return studio audio is heard in the headphones, but not sent back to the studio.

TALKBACK/IFB – Whilst audio is being played out from the studio, the engineer should be able to PFL the remote channel and listen to the remote end. If the studio engineer needs to talk to the remote end and there is no dedicated "Talkback" button (or Control Line), they should be able to send a studio microphone audio down the AUX channel (and therefore the remote headphones) without it being broadcast live on air (Pre-fader). Talkback is also known as IFB (Interruptible Fold Back) or Control Line.

BIG BUDGET EQUIPMENT – if budget allows you to have an open chequebook, Comrex™ and Tieline™ provide excellent remote equipment that will already be designed specifically for a remote broadcast. Along with the big price tag, you also get a manual that will explain all the configuration and usage – so I'll leave that and aim towards explaining about using equipment with a lower budget.

LOW BUDGET EQUIPMENT – If your remote is to mimic a studio based programme, this can be achieved using a small analogue mixer (e.g. Behringer™) feeding the laptop/PC. Please note that most laptops don't have a great soundcard that can be configured for broadcast use. So an external audio interface may be used (e.g. Behringer UCA222 USB).
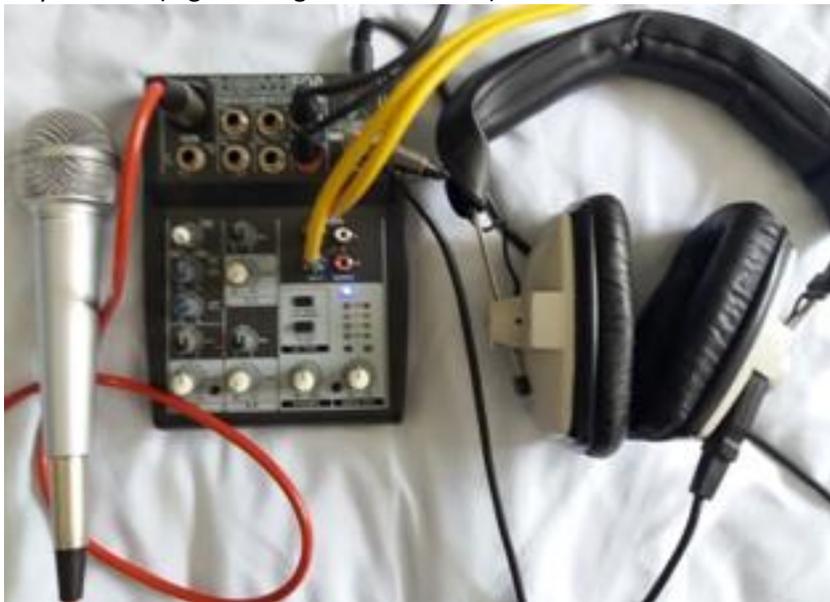
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NO BUDGET EQUIPMENT? – So for a simple remote insert, Cleanfeed™ using Google Chrome™ works well with any Smart-phone device and the audio quality is much better than using a VoIP app such as Skype™.

Programme Planning

It is all about the planning and if possible, testing the kit before you use it for real. If possible do a site test at the remote location to ensure there are no issues. Test the internet connection and were possible use a hardwired data connection as WiFi could get swamped in a busy public area such as a football stadium. The same can be said about the 3G/4G networks. 50,000+ people at a Premier League stadium all streaming to their mates as the teams walk out just before kick-off can cause major network problems! So if you use WiFi or a mobile phone for your connection, expect the odd dropout as connection may be lost.

It may help if you have a printout of the stations music schedule (or a PDF version). Here you can plan on where your links need to go for a smoother running show and to help back-timing to the top of the hour. This will also prevent the studio assistant/engineer who will be shouting down talkback to tell you if you are running to time or not! If the whole show is live from the remote location, this will remind you of what you should be playing and keep the station PC/Content Director happy.

Time	Type	Cat	Typ	Title	Artists	Length	Cart
08:00:00	H Strt			Hour Start	Auto		
	Cart			21 BiB RBGTBTFL Gr		: 8	5
: 8	Song	A List		Power Over Me	Dermot Kennedy	3:16S	12713
3:23	Song	B List		I'm Falling	Bluebells	5:14F	9399
8:38	Link	Sweep		Best Music 2	Jingles	:25	9
9:03	Song	B List		Heartache Tonight	Michael Bublé	3:47S	13427
12:49	Song	B List		Sweet Surrender	Bread	2:30S	8515
15:20	Link	Jingle		84 RadioBG TBTFL	84 DRUMS	: 9E	16
15:29	Song	B List		Just Call Me Angel Of	Pretenders	3:28F	5167
18:56	Ad			Advert Break			
19:56	Link	Promo		RB AtoZ weekday trail	Richard Smith	1:00E	2022
20:56	Song	A List		What A Man Gotta Do	Jonas Brothers	2:55S	12830
23:51	Song	B List		Wonderous Stories	Yes	3:46E	10373
27:38	Song	B List		A Night In New York	Elbow Bones + The R	3:41F	5575
31:19	Link	A-Z Tri		The AtoZ of Pop Trivi		:59E	39364
32:18	Song	B List		Yeh Yeh	Matt Bianco	3:06F	10100
35:24	Song	B List		Take Good Care Of Y	Three Degrees	3:20F	13446
38:44	Link	Jingle		82 TLHaTGM RadioB	82	:10E	212
38:54	Song	B List		The Cave	Mumford and Sons	3:31E	5282
42:24	Ad			Advert Break			
43:24	Link	PSA		Silver Line Spoken Pr	SilverLine	1:00E	2108
44:24	Song	A List		Didn't I	One Republic	3:23E	14603
47:47	Song	B List		You've Got A Friend	The Brand New Heavi	3:05F	15145
50:53	Link	Sweep		SW TGHoAT BOYS R	Sweepers	: 4E	224
50:57	Song	B List		Whole Again	Atomic Kitten	3:02E	9113
53:59	Song	B List		No Regrets	Midge Ure	3:59E	11400
57:58	Time			Wait until, or fade to ti			

A radio-controlled clock would be useful and don't forget to share your mobile with the studio just in case they lose connection with you!

Software/Applications

There are numerous radio playout systems now available – some are a one off cost, others free to download and use. If you are not able to remotely connect to the studio playout system, you may have to download such software.

 PlayIt™ software

PlayIT software is free to download and use (after registration) although some studio add-ons are buy only. But it is helpful for remote use - just drag and drop the audio files.

Streaming software will depend on quality of audio and latency (delay). When we convert analogue audio to digital using a codec, this has to be converted from digital back to analogue and this can cause some delay. Some codec's are better than others for audio quality and delay caused. Speech on ISDN will use G722 or ACC+ codec with a narrow audio frequency range (it's only streaming your voice) and so delay is just milliseconds. An MP3 stream at 128k can have 15 seconds of delay whereas an OGG/Opus codec can have just a short delay. Because delay is a real issue for remote broadcasts, many apps like Cleanfeed™ will use the Opus codec.
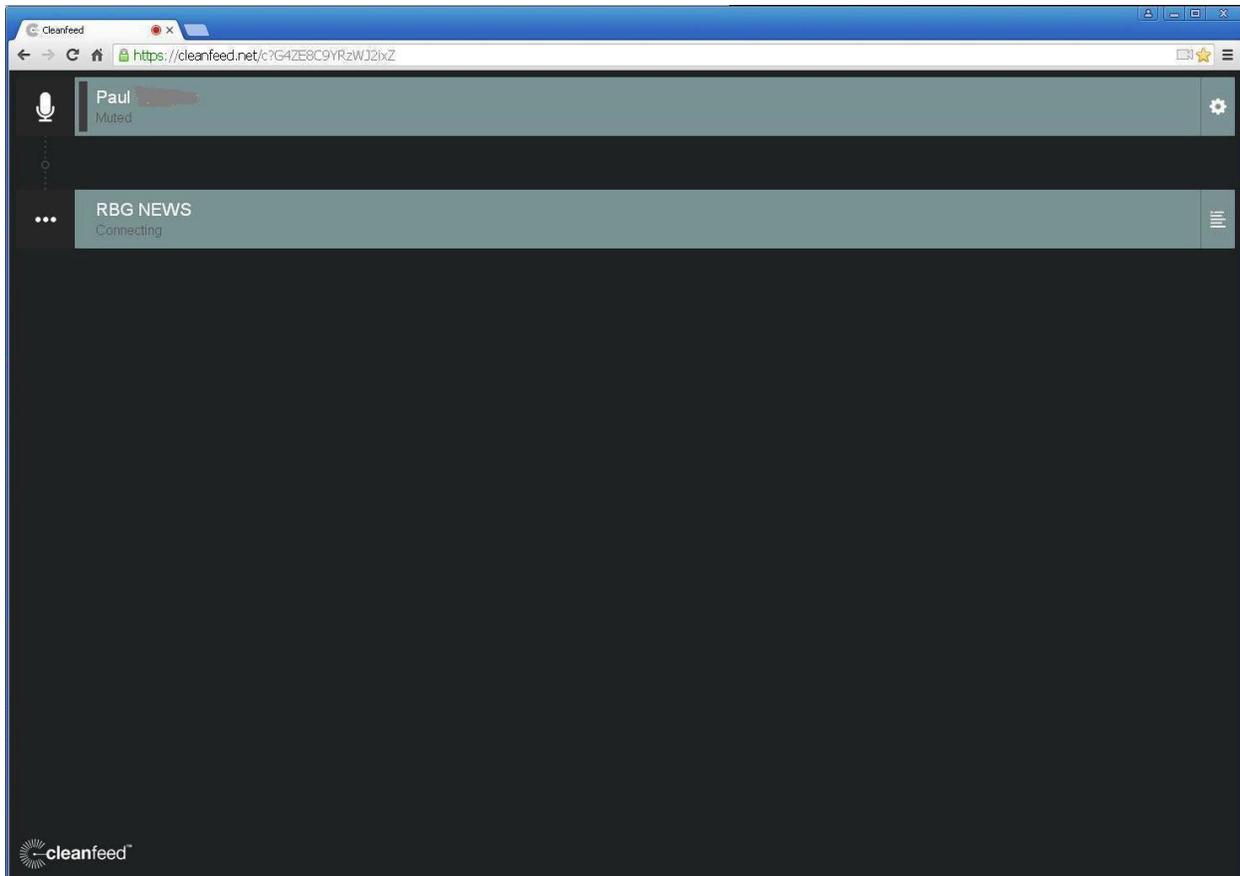
Cleanfeed™

Cleanfeed™ is free to register and use. The similar ipDTL is subscription based but also has the added benefits of connecting to an ISDN unit, telephony and a virtual mixer.

If delay isn't an issue and you just plan to stream your remote back to the studio as a complete package, you could use the freeware BUTT (Broadcast Using This Thing). Excellent results can be obtained using the Opus codec at a high bit rate although the studio end would have to use something like VLC that will decode Opus streams. It is very much a stand-alone bit of streaming software.
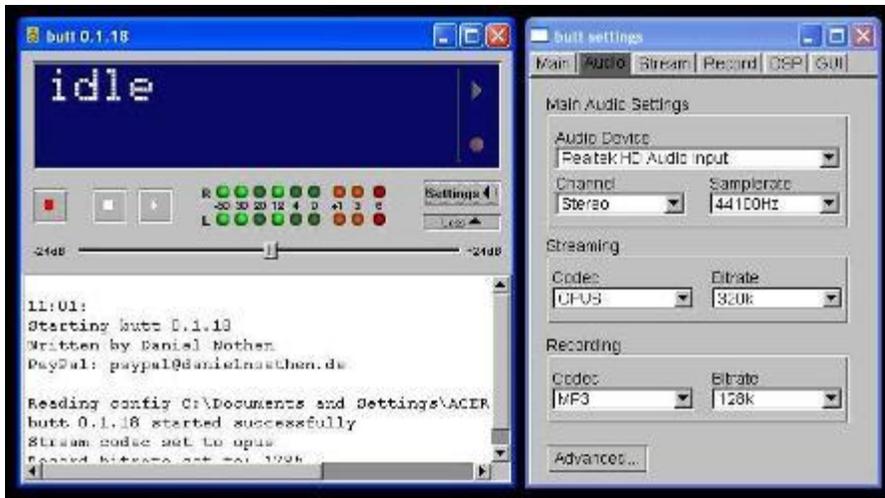
There is some software that will do both mixing and stream the output. Just connect up your USB microphone, and away you go...


Voice Meeter ©VB Audio

SAM Broadcaster and VB Audio's VoiceMeeter are examples of software that could be useful in remote locations although some do come at a cost – if you can, try before you buy.

Remote Software

Remotely accessing the studio can be trying and I would always advise having someone in the studio to tech-op. If this cannot be done, remote access software is available to help out. Teamviewer™ is popular but costly. Ammyy is free for "home use" and fast connecting but there are limitations such as a 15 hour limit per month. Google™ Remote Access is free and although a bit slow, is useable.
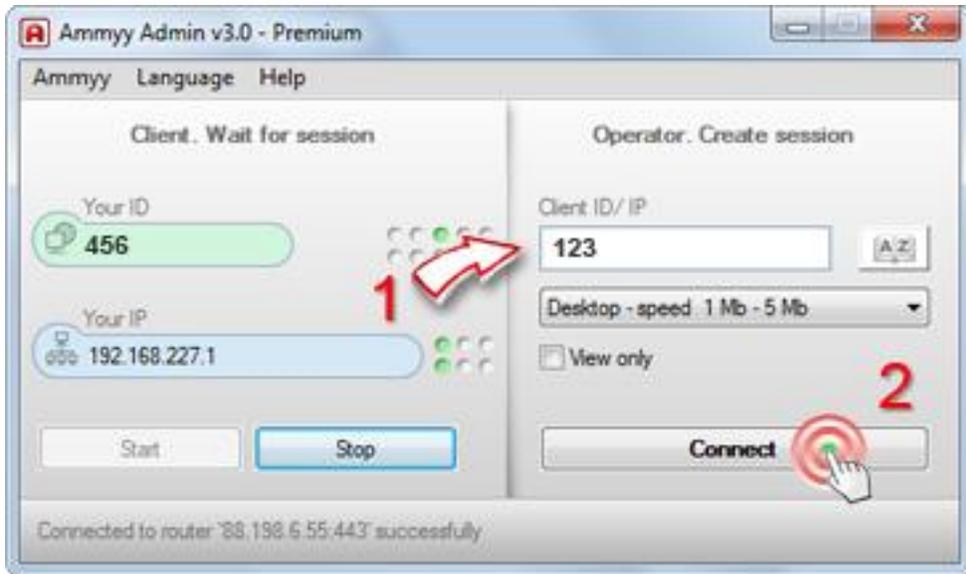
Ammyy®
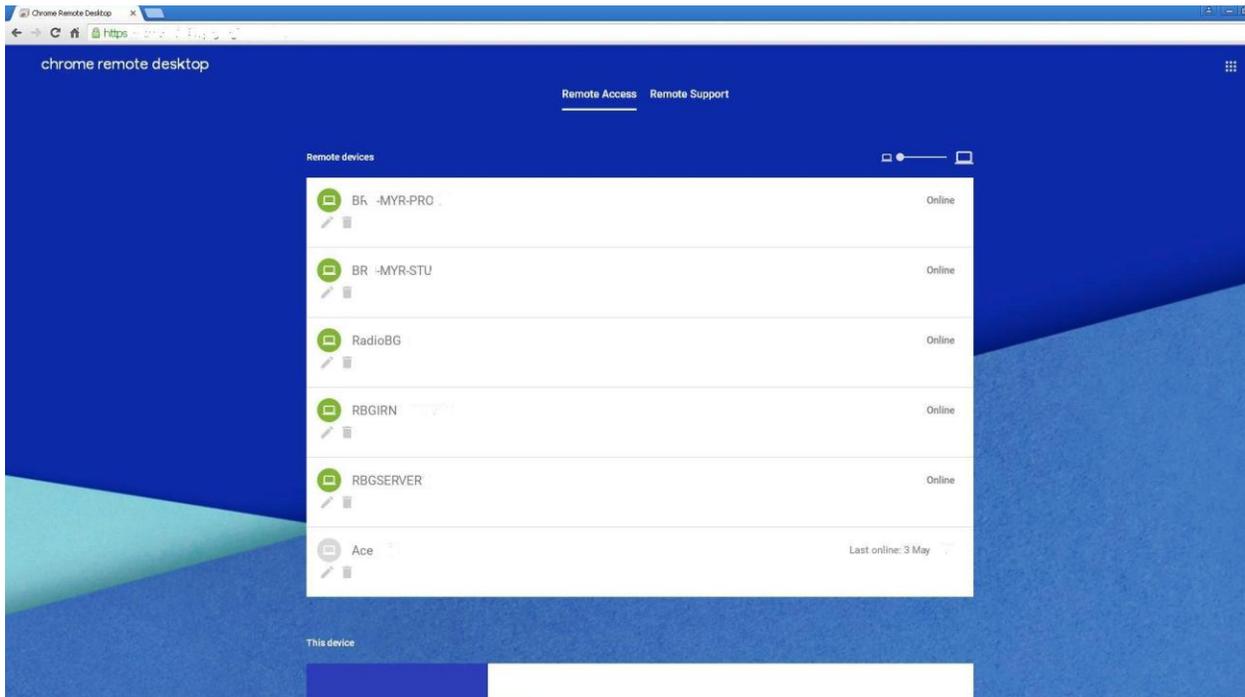
Google® Remote

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