

IPTV into TvHeadEnd and into a Media Server

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Why Use This Setup?

Note: This guide does work for most IPTV providers but has a focus on LayerSeven and has some items unique to their service referenced herein.

Many IPTV providers can be fed into a media server directly from a m3u URL. If you buy four connections from these providers they will give you one URL you can dump into your media server that contains your user and password. The first person watching uses up one connection, second comes along and gets number two, then so on. In this setup with four connections a fifth person can not watch until one of the others stops and releases a connection.

This one URL looks like this:

http://hostname/get.php?username=bob&password=givemetv&type=m3u_plus&output=ts

LayerSeven is different as they will give you four URLs in this setup (if you bought four as I am saying in this hypothetical setup). It will also give you four sets of user and passwords to use for xtream codes. Emby and many other media servers won't use xtream codes. So we will ignore that here.

The four URLs is an issue. If you punch in these four URLs into your media server it will show each channel four times. If someone is watching any channel using connection one and then someone selects another channel that is also tied to connection one they will get an error. It's ugly and not nice. Emby has talked about adding a merge feature but as of now it is not there.

This can get deeper if you have more than one provider where you have duplicates you need to merge. TVHeadEnd can help in all of these cases. With TVHeadEnd two or more people can watch the same channel but it will only use one connection to your IPTV provider. TVHeadEnd can also pull in streams from HDHomeRun units, some sat cards, IP based tuners, etc and feed into your media player. That is beyond what we are talking about here. TVHeadEnd will be called TVH in this document.

Note: TVH will also only allow Live TV channels. VOD/Movies/Shows from your IPTV won't play via TVH. There are hacks, but if you are setting up a media server chances are you are getting your movies and shows from torrents or another place.

1.1 What are these programs?

Emby/Jellyfin/Plex and a few others are media servers. They need a server running with clients using the same media server brand app on your TV devices, tablets, phones, etc. On the server side you can setup IPTV connections and media files (music/TV shows/movies) you get from other sources. You can then access them from the apps on your devices. This is in place of using an IPTV only app like Smarters or TiviMate.

TVH is a program on your Linux server that provides a way to setup several connections from one or more IPTV providers and make output playlist to feed to your media server. It allows you to disable channels as needed (You can also do this in your media server). It allows you to setup backups for streams from other providers if you want. It will sit between your IPTV provider and media server in this setup. You can get an idea on the data path here: 2.5 on page 4.

1.2 What Will I Gain or Lose With This Setup?

Live TV will be 100% there. It will come from your IPTV provider to TVH and into the media server. But TVH does not handle VOD (TV Shows and Movies on demand). TVH can't handle those streams. Catch up channels are live only, no way to rewind.

You will get to gain access to files you have on the server from other sources. Emby and other media servers have options for custom content like photos and videos from your phone.

Short Version: Live only, no VOD, but you can roll your own VOD (Movies/TV Shows). Catch up channels will be live only.

One promising plugin for Emby is called WebStreams. Its new and in testing as of this writing, but is supposed to allow VOD from your IPTV provider to appear in the TV Shows and Movies section like a local file would but would come direct from a M3U. Not sure how it will work with LayerSeven and the separate user/passwords.

What Do I Need For This Setup

This is not for most people out there. Advanced setup of a server is required. Many of these tools are for Linux. Media servers can run on Windows but TVH is Linux. In that case you can run it from WSL (Windows Subsystem for Linux) or a Linux VM. The server will need to be at your home or in the “cloud”. It will normally left on all the time. If you plan to open the server to users over the web security must be high to prevent unauthorized access to content or do other bad things with it.

Many tools are command line based. This will mean commands will need to be typed into a shell/terminal prompt.

There are many steps to cover and things you will need to take care of. Running a server means you will need to run updates from time to time, both of the OS and programs. You may need to troubleshoot issues do research.

If you have a server set it up first. I am not going to discuss setting up Emby, Plex, *arr programs and more. There are many guides out there for that. I will only talk about IPTV side of it all (TVH and some goodies).

You will be using a text editor. If you don’t know the difference as to why config files are edited in notepad/vim/-nano vs in Word or Excel, this may not be for you.

You will need service with LayerSeven or another IPTV for most of this guide. LayerSeven focused but other IPTV providers can be used with this guide with a few adjustments.

2.1 Media Server Money Requirements

While Plex and Emby server/client software are free programs, there are some things you pay for. You will need Emby Premiere for the live TV option to be enabled (but you also get their EPG). Plex has some payment tiers for remote users and some features. If you are in the cloud then all users are remote. Its \$1.99 a month per user, or \$6.99 a month to cover everyone. There is yearly and lifetime offerings to choose from. There is other issues with Plex noted in the next section.

2.2 Plex

2.2.1 Plex Free Content?

Plex does come with some free content. Many of these streams are available for free online; they just package them up for you with a bow on it. Emby is empty at install but there are plugins and ways to get similar content. Don’t expect any real winners like free HBO. Many are old TV shows, westerns and weather channels. Many of these channels and even PlutoTV can be dumped into TVH without Plex.

There is also hacked versions that have more content included or services that host a server that contains tons of content to watch. You just buy a user. On these you don’t have a way to setup IPTV.

2.2.2 Plex IPTV Support Sucks

Plex years ago supported IPTV m3u with plugins right out the gate. They have since removed this feature. It does support an HDHomeRun device. There are some programs that fake the device like telly and xsteve. You set your playlist up in these programs, then Plex sees it as a HDHomeRun device. Both programs have not been updated in years. This is worrisome if changes to systems in the future will cause these programs to stop working.

There is great news: TVH to the rescue! TVH has Enable HDHomeRun Server Emulation option now that will work with Plex. We will talk about it in TVH setup. See: 4.1.2 on page 11

2.3 Bandwidth, CPU and More

So on the server side, what kind of hardware? Emby lists on their site that for no transcoding, (but chances are you may transcode) as a Intel Core 2 Duo 2.4 GHz but will more than that for more than one active user. A user can be doing live TV, a movie or TV show. They say two gig ram and an up to date OS: Winblows Vista being the oldest supported. I really think if you ran it on such a system it would suck. A more modern system is needed even a few years old with a few gigs of ram. If you are running a media server, TVH, download server *arr and more goodies you need a more powerful machine. If you are doing a ton of media downloading then a large hard drive is needed. Emby supports hardware transcoding. Drivers and tools may need to be installed and configured for your graphics card and chipset. We will not go into this here.

On the bandwidth side for live TV its going in and out for each user. The stream comes in from the IPTV provider, and then out to clients at home or over the internet. FHD (1080p) video needs about 5 mbps, 4K about 15 to 20. You need double if its going out over the web to a remote client. You will need overhead data. I know a few that have 100 mbps setups and they are fine for a few users streaming FHD.

2.3.1 Speed Tests

These suck. ISP owned tests are known to be faked or misleading. They test from your modem to a nearby ISP owned node. It is good to see if your *last mile* connection and modem are happy. Other online tests also test to a nearby server pool. Some ISPs have been known to fake these results in the past (Comcast and Cox). They say they don't do it now but I don't trust them.

It also does not show the real internet. Your provider connects to others that connect to others and so on. We don't know where your IPTV servers are in the world. Its very possible that you are connecting to them through many different internet providers in a chain. Any one of these providers can be the weakest link and cause issues.

2.4 Cool Tools

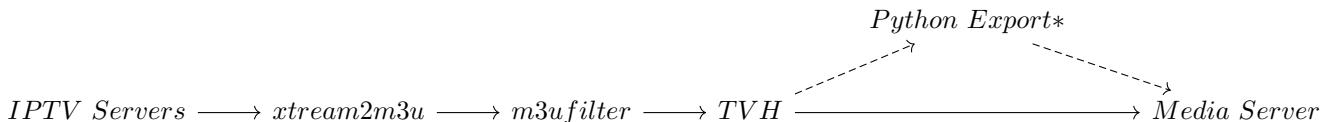
Linux command line (you are not running a GUI on your server, right?) can be intimidating to many people. I suggest learning the commands but there is some tools that speed up work.

1. **Midnight Commander.** This may need to be installed with a command like `apt install mc`. It can be ran with `mc`. You will get a left and right side set of directories on the screen. You can use **Tab** to flip between each side. Moving the cursor up to the `..` and hitting `Enter` will go up a directory. Highlight a directory by name, hit `Enter` to go into it. Highlight a file and use `F4` to edit, `F5` to copy the file to the other side, `F6` to move the file to the other side, `F8` to delete. You can press `Ctrl` + `O` to pop in and out of the program, or exit with `F10`.
2. ***arr tools.** These apps called Lidarr (Music), Prowlarr (NZB Indexer and Torrent site Manager), Radarr (Movies), Readarr (Books), Sonarr (TV Shows), and Whisparr (Adult) each can be setup with a torrent site and torrent downloader, or a NZB indexer with NZB downloader to manage your collection for your media player. I shunned these at first and did manual updates of new TV episodes but once I took the time to install and setup (and let it take over my files) I was pretty happy. The wiki with more info and to install is on servarr.com. This is outside of IPTV and this guide and heavily documented so I wont discuss more here.

2.5 Data Path Overview

2.5.1 Playlist Data

This shows the basic path the playlist data flows from IPTV sever to your media server.



*Python export is optional but does provide tags like “US”, “UK” etc.

2.5.2 Video Playback Data

This is the path of data flow from IPTV provider to your client app for watching Live TV.

IPTV Servers —→ *TVH* —→ *Media Server* —→ *Client App*

Getting The Streams Into m3u and Filters

If your provider gives you one m3u for all your connections and you have only one provider then you won't be here as you can dump it direct into your media server. If all your providers have working m3u urls, you don't need this section. But if they don't this is for you. {cough: L7!}. So what can you do? TvHeadEnd has to have an m3u. We mentioned xtream codes before. You can also convert that data into a m3u playlist. There are sites out there that will do it but I don't trust them since you have to put in your username and password. I would also have to do it for each line I have then transfer them to my server. Its also not able to be automated with an entry in crontab.

Channel Lineup Limit Tip:

Go to the LayerSeven panel site and turn off countries you don't want. 30,000 streams is too many and can cause issues in most players and TVH. You will never watch streams in many other languages anyway. Login to the panel, go to **Orders**, find your active/paid connection. Use the **Adjust Channels** button. Uncheck what you don't want, check what you do. Save and wait for an email to say its processed, about 15 minutes.

Bri61 on the LayerSeven Discord rocks. He wrote a Rust script to make a m3u from xtream codes and a m3u filter. We will talk here about both.

3.1 Installing Rust

Rust is a programming language. Your system will need to know how to run these programs and it is required for xtream codes to m3u and m3u filter to run.

3.1.1 Installing Rust on Linux

3.1.1.1 Arch Linux

```
sudo pacman -S pkgconf openssl gcc
```

3.1.1.2 Debian and Ubuntu

```
sudo apt-get install pkg-config libssl-dev gcc
```

3.1.1.3 Fedora

```
sudo dnf install pkgconf perl-FindBin perl-IPC-Cmd openssl-devel gcc
```

3.1.1.4 Alpine Linux

```
apk add pkgconf openssl-dev gcc
```

3.1.1.5 openSUSE

```
sudo zypper in libopenssl-devel gcc
```

3.1.1.6 General setup on Linux

```
curl --proto '=https' --tlsv1.2 -sSf https://sh.rustup.rs | sh
```

3.1.2 Windows or Mac

Go to <https://www.rust-lan.org/tools/install> and follow the instructions.

3.2 Install Git

Git is used to pull in the files from GitHub in the next section. This can be as simple as running `apt install git` or a similar command on your distro.

3.3 xtream2m3u

`xtream2m3u` is handy. It will grab the data from the xtream codes server and spit out a nice m3u formatted file. If your providers m3u does not work (L7!), but has xtream codes then this is for you.

In this example I will use `/path` as in `/path/xtream2m3u`. Make the `/path` directory if needed but you don't need to make one for `xtream2m3u`. `cd` into it such as `cd /path`.

You may want to make directories for output of each line you have with LayerSeven. So something like `/path/m3u/1`, `/path/m3u/2` and so on.

3.3.1 Cloning Time

Run this command to grab the files from your `/path` as we are using in this example.

```
cd /path
git clone https://github.com/bmillham/xtream2m3u
```

This will make the `/path/xtream2m3u` directory and fill it full of the code needed. Do a `cd xtream2m3u` to go into this directory.

3.3.2 Build it

Run `cargo build --release` and let it go.

Now you have a nice `xtream2m3u` program to play with in the `target/release` directory. `cd` into it (`cd target/release`). If you are doing what I am showing, you will be in `/path/xtream2m3u/target/release`.

3.3.3 Running

Make it executable with: `chmod +x ./xtream2m3u`.

In our sample setup we have four connections from LayerSeven. We will do this command *four* times in our case (or however many connections you have) each with a separate user and password and you will get four m3u files. To do the first one, run:

```
./xtream2m3u -- -s HOST -u USER -p PASS -lmS -o /path/m3u/1
```

This will also download some goodies the first time it is ran but will use the first connection's user and password to grab and output into `/path/m3u/1`. Substitute `HOST`¹ for the LayerSeven server, then `USER` and `PASS` for the connections username and password. Run it again, changing the user and password to second connection and the path to be 2. Then repeat for each additional connection.

In each directory will be a directory called `live_m3u`, then in there `all.m3u`. In other words, you will have `/path/m3u/1/live_m3u/all.m3u`, `/path/m3u/2/live_m3u/all.m3u` and so on.

¹Note, I have only had to change hosts one time with LayerSeven and that was because the host was shutdown I was using. Many ISPs do blocking and the fix is to change hosts. If you have to change hosts in the future this is where you would update it. This will result in a set of "new" to TVH channels to appear, meaning you will have to rematch the EPG in Emby. It sucks. Do lots of testing on a host first to make sure it works well so you don't have to change it.

3.3.4 Crontab

Each of the commands you ran in the last step can be put into a crontab to run from time to time. Updating once a day, or maybe every 12 hours is plenty. Run `crontab -e`. Enter the command four times in our case with each set of credentials. Maybe stagger them to run every few minutes as I show here.

```
10 */12 * * * /path/xtream2m3u/target/release/xtream2m3u -- -s HOST -u USER1 -p PASS1
-lmS -o /path/m3u/1 >/dev/null 2>&1
15 */12 * * * /path/xtream2m3u/target/release/xtream2m3u -- -s HOST -u USER2 -p PASS2
-lmS -o /path/m3u/2 >/dev/null 2>&1
20 */12 * * * /path/xtream2m3u/target/release/xtream2m3u -- -s HOST -u USER3 -p PASS3
-lmS -o /path/m3u/3 >/dev/null 2>&1
25 */12 * * * /path/xtream2m3u/target/release/xtream2m3u -- -s HOST -u USER4 -p PASS4
-lmS -o /path/m3u/4 >/dev/null 2>&1
```

3.3.5 Tips

- Once you do the code build and get the resulting `target/release/xtream2m3u` file, you can copy the file to another location and it will work. I did suggest leaving it for ease of use for many people in the directions. Updating code later with `git pull` and running the commands to build (`cargo build --release`) will still output to the release directory and you will have to copy it over to the new place. But if you want to play and test before updating the live version you can.
- There is a Windows release on the github page if you wish to have it. Run it at the command prompt with the same commands.

3.4 m3u_filter. Get Rid of Stuff

You may just want to turn off channels you don't want in TVH. If you turned off categories on the LayerSeven panel you won't have channels from countries you don't want. But this optional section can help filter more, like to remove all "NBA" or "PPV" channels. This step is optional.

Two Sets of Files:

In the last step, you made several m3u files, one for each connection you have at LayerSeven. They were in the location of `/path/m3u/1/live_m3u/all.m3u`, where 1 in this sample can be any number of connections, or whatever you named them. These files will not be edited in place, and are "unfiltered". This filter option will filter them and put out several new filtered m3us. These are the ones you want to put into TVH. In our example of four connections, you will end up with eight m3u files, four unfiltered, and four filtered. If you decide not to use the filter program, just use the unfiltered files in TVH.

Lets go back to `/path` where we did `xtream2m3u`. It will have its own directory. So `cd /path`.

3.4.1 Cloning Time

Run this command to grab the files:

```
git clone https://github.com/bmillham/m3u_filter
```

This will make the `/path/m3u_filter` directory and fill it full of the code needed. Do a `cd m3u_filter` to go into this directory.

3.4.2 Build it

Run `cargo build --release` and let it go. It will take some time.

Now you have a nice `m3u_filter` program to play with in the `target/release` directory. `cd` into it. If you are doing what I am showing, you will be in `/path/m3u_filter/target/release`.

3.4.3 Config File Editing

1. Copy `config.example.toml` to where the executable is named as `m3u_filter_config.toml`. If you are in `/path/m3u_filter` directory, then you can run `cp config.example.toml target/release/m3u_filter_config.toml`
2. `cd /target/release`
3. `vim/nano/whatever the m3u_filter_config.toml file.`
4. Edit the urls. First to edit at the top is the list of files. You can also do URLs, but that is not what we are doing here so do paths.

Default in the file is this:

```
urls = ["http://server.domain/get.php?username=uname&password=pw&type=m3u_plus&output=ts",
        "/path/to/file.m3u"]
```

Change it to something like this: (Note each entry has a comma after it except the last one)

```
urls = ["/path/m3u/1/live_m3u/all.m3u",
        "/path/m3u/2/live_m3u/all.m3u"]
```

5. template. I set this to “L7”. This will net output of “L7-1”, “L7-2” and so on.
6. all_channels and new_channels can be ignored here, Just the output name for their respective data.
7. channels. Here you can specify a term or terms to filter on. Personally I leave this at `channels = [".*"]` and use other filters below in the config.
8. ignore_url. I have it set to `ignore_url = [".mkv$"]` but I am not sure I need it. You can leave blank.
9. ignore_title. This is a good one. You can remove chunks here. Maybe all PPV, NBA or others. Remember a comma after each just not on the last one. A sample may be:

```
ignore_title = [ "PPV",
                 "24/7",
                 "SKY",
                 "TELEMUNDO",
                 "TENNIS",
                 "SPECTRUM",
                 "HULU",
                 "PAC 12"]
```

10. countries. This can be a list of what channels to keep. You may not want this and just rely on the categories you have on/off on the panel. Keep in mind it may over filter. Some US channels start with “US:” and others with “US|”. Example:

```
countries = ["^US:", "^UK:", "^CA:", "^AU:]
```

11. Save and exit from your editor.

3.4.4 Run Time

Make it executable. (Linux) `chmod +x ./m3u_filter`. Then, run `./m3u_filter`. Let it go. If you have a config file someplace else, or want output someplace else, you can use the -c or -o respectively.

If you did the config file right, you will get a few new output files. In our case, four files starting with “L7-” and ending with “.m3u”. The number in line will be in the middle. You can use a text editor to take a look at them and see if they look good. They can be long!

3.4.5 Crontab

The command you ran in the last step can be put into a crontab to run from time to time. Run it once after you run the xtream2m3u command. Run `crontab -e`.

Dump in a line like this:

```
45 */12 * * * /path/m3u_filter/target/release/m3u_filter >/dev/null 2>&1
```

3.4.6 Windows

1. There is a Windows release on the github page if you wish to have it. Run it at the command prompt after editing the toml file.

Setup TvHeadEnd

I know some dislike TvHeadEnd. There is other options but they are limited on features. Dispatcharr, Threadfin and tuliprox. Another older one is xTeVe but it is no longer updated.

4.1 Install and Basic Setup

This is not too bad on Linux. The page at <https://docs.tvheadend.org/documentation/installation/linux> will tell you for Debian/Ubuntu and Fedora/RedHat. A simple one line will run it. Windows can run it from WSL or Windows Subsystem for Linux, or a Linux VM.

For Debian and Ubuntu:

```
curl -1sLf 'https://dl.cloudsmith.io/public/tvheadend/tvheadend/setup.deb.sh' | sudo -E bash
```

RPM for Fedora and RedHat:

```
curl -1sLf 'https://dl.cloudsmith.io/public/tvheadend/tvheadend/setup.rpm.sh' | sudo -E bash
```

4.1.1 First time Wizard

Browse to your new server on port 9981. On the local machine if it has a GUI, it will be <http://localhost:9981>. On a remote machine it will be the same but your domain name or IP address in place of localhost. You may need to open a port for a remote machine in the firewall. If you do, limit its connections as only your remote machine and the Emby server needs to see it. Security first.

The wizard will start. You will setup an admin account and user account. It will ask you about tuner cards and most here can be ignored. At some point it will ask you to login. Do so with the admin user and password you made.

4.1.2 Basic Setup

1. On the **Configuration** ▷ **General** ▷ **Base** tab, give it a name in the server name if you wish. Change **Default view level** to Expert. This will enable some settings you may need. **Save**.
2. On the same tab, **Authentication Type** needs to be changed to Both Plain and Digest. Digest hash type is set to MD5. Then **Save**.
3. If using TVH in HDHomeRun emulation mode (Plex) check **Enable HDHomeRun Server Emulation** box. and **Save**.¹
4. Next tab in the second section is **Users**. Add a new user with the username of *. Make sure it is enabled. Uncheck **Web Interface** and **Admin** if they are checked. Steaming can be set to **Basic** and **HTSP**. If your media server is on the same host, set **Allowed Networks** to 127.0.0.1. If it is a remote machine you may need to set its IP address here. If its just on your local LAN with no external access then 0.0.0.0/0 will be okay. This is important for security. **Limit Connections** can be left at 0. **Save**.
5. **Passwords** tab. Make a new entry and enable it. Set username as * and **password** is left blank. Persistent authentication as **Enable**. **Save**.

¹There is other configs you may need to do here. If running Plex and TVH in a Docker, on separate devices or something funny, you will need to change other settings. Refer to the TVH documents in this case.

4.1.3 m3u Data From LayerSeven

This is easier to add just LayerSeven for now, then add other providers. This will allow you to easily merge lines together. Other providers can be added later.

1. On the **Configuration > DVB Inputs > Networks** tab, you will add an entry for EACH connection from LayerSeven. In our example we are doing four.
2. **Add** button, IPTV Automatic Network. Enabled checked, then name it something like “L7-1” for network name. Uncheck Create Bouquet. Set Max Input Streams as 1. URL can be an URL, but we want files in our case. This is a bit strange for some folks with its formatting. Remember to use the filtered set of files if you did the filtering step. A filtered example would be: `file:///path/m3u_filter/L7-1.m3u`. An unfiltered version may be like: `file:///path/m3u/1/live.m3u/all.m3u`.
3. **Channel Numbers From**. This is the starting number for channel numbers. I set this to 100 as I plan to allow local channels to use their normal numbers below 100 with a HDHomeRun. You can offset these however you want.
4. Uncheck **Scan after Creation**.
5. Set **Service ID** to 1. I was told to do that in what I read a long time ago. I really don’t know what it does, but it does not seem to hurt.
6. **Save**, then do the same for each IPTV connection you have with the next file in the list.

4.1.4 Fun Making Channels!

This will map and merge channels with same name. This way all four or however many connections you have will merge into one streamlined channel service for your app. If you have more than one provider and they do similar names for the same channel it wont match them. This is for merging several connections with a provider like LayerSeven.

1. Go to **Configuration > DVB Inputs > Services**.
2. Hit the **Map Services** button and then **Map All Services**. This will take a few seconds to load all channels into the modal.
3. Don’t try to expand the **Services** box. It may crash the browser. Check **Merge Same Name**. Then hit **Map Services**.
4. This will take you to a screen under **Status > Service Mapper**. It will take a few seconds or more to do its thing.
5. Once done, go to **Configuration > Channel/EPG > Channels**. See what it did.
6. Disable channels you don’t want here by unchecking the box for **Enabled** and hit **Save**.

4.1.5 Tossing in Another Providers Channels

If you add another providers m3u to TVH you can map them into the channel lineup or add them as a backup.

4.1.5.1 You Just Want to Add Them to the Lineup:

1. Go to **Configuration > DVB Inputs > Services**.
2. Click on the heading of **Network**. This will sort by the different networks you have.
3. Change the **Per Page** option to something higher. **All** may work but can take a few seconds to load.
4. Find the first one from the other provider in the list. Select it. Then scroll down to the last one for the other provider. **Shift+Click** the last one. This will highlight all of that providers entries.
5. Hit the **Map Services** button and then **Map Selected Services**. This will take a few seconds to load all channels into the modal.
6. Since we are not merging, you don’t need to check **Merge Same Name**. Then hit **Map Services**.
7. This will map the selected channels to a number and put them in the lineup. This will narrow it down.

8. The existing channels will be checked in the list. Find the one for your backup that is the same channel name and check it.
9. Hit **Save**.

4.1.5.2 Manually Add Another Providers Channels as Backup

Startup configuration:

1. Go to **Configuration**▷**DVB Inputs**▷**Networks** tab. Add new providers m3u files or URLs like you did before. Set the **Priority** on each new m3u and also edit the existing ones. The lower the priority the less likely it is to be picked. So if you want provider A to be used first and B second, set all of A connections to say 10 and B to 5. A will be used first and B as backup.
2. Go to **Configuration**▷**Stream**▷**Stream Profiles** tab. Select **pass** at the left and at the right make sure **Switch to another service** is checked. Then **Save**.

Now time to edit them, one at a time:

1. Go to **Configuration**▷**Channel/EPG**▷**Channels**.
2. Find the existing channel you want to add another provider to. Click it to highlight it, then **Edit** button.
3. On **Services**, select the drop-down and you can type in the field. Type in a few letters from the title of the channel. Check the new providers box to add it to that channel.
4. Hit **Save**.
5. Repeat for next channel.

4.1.6 EPG from LayerSeven or Another Place

This is optional. If you do live TV in Emby you need the premiere option and it has EPG. If you want to put the EPG into TVH, here is two options to get it working.

4.1.6.1 Option One: Internal Grabbers

Internal grabbers may be easy for most as you don't have to use command line or crontab. A must for Windows users.

1. Under **Configuration**▷**Channel/EPG**▷**EPG Grabber Modules**.
2. Select **Internal: XMLTV: Simple file grabber**.

If missing, install it from https://github.com/b-jesch/tv_grab_file. Once you do this, restart TVH and go back to this section and it will be there.

3. Check **Enabled** and in **Extra Arguments** put in the EPG URL. This is in your LayerSeven welcome email. It does not matter what one you use when you have several lines (you don't have to do all of them). It may look like:
`http://SERVER/xmltv.php?username=USER&password=PASS`
4. Save it, then hit **Re-run Internal EPG Grabbers** button.
5. Give it a moment to grab and match data. Switch to the **Electronic Program Guide** tab and see your work.

4.1.6.2 Option Two: External Grabbers With socat on Linux

You need a shell script to `wget` or `curl` your xml file. `gunzip` if its a gz file. Use `socat` it to send it into the `sock`. Got all that? Oh, and put it into `crontab` to run every 12 hours or so. Easy, right? In the examples below we use a fake LayerSeven EPG URL. But you can substitute a third party URL instead.

1. In TVH, go to **Configuration**▷**Channel/EPG**▷**EPG Grabber Modules**, find **External: XMLTV**.

2. Check **Enabled**. Copy the data in the **Path** box for later. Hit **Save**.
3. The following commands need to be ran as the **hts** user (the user running TVH) or **root**.
 - (a) Do not save the script in later steps in the `/var/lib/tvheadend` as it could be over written with an update. We use `/path/hts/` for the script example, but make a spot the **hts** user has access to. You may need to `chown` the location for the **hts** user to see and write files. So `chown -R hts:video /path/hts`. If your install is running TVH as another user or group instead of **hts** and **video** you may need to change these commands. One way to verify the service is to run `ps aux |grep tvheadend`. This will show the command that started it, with `-u` and `-g` flags for user and group. To run as the **hts** user: Run `sudo -u hts bash` to run commands as the **hts** user.
 - (b) Or be naughty and run everything as **root**. `su root`. Turn in your sysop badge at the closest BBS to your home.
4. Test first. Run this command but change with your server name, username and password in the first line (Or use a third party URL²). Then in the last line it will have the data from the path box.

```
cd /path/hts/
wget "http://SERVER/xmltv.php?username=USER&password=PASS" -O epg.xml
socat FILE:epg.xml UNIX-CONNECT:YOURSOCKPATHFROMSTEP2
```

5. Give it a moment to process. Then in TVH go to the **Electronic Program Guide** section and you should have content.
6. If all is well, time to make a shell script. Use whatever text editor you want for a file named something like `grabepg.sh`. Enter the same commands you did in testing into your editor. You can add clean up commands like `rm epg.xml` if you want to the end. Save and edit your editor.
7. `chmod +x ./grabepg.sh` so its able to be ran.
8. Run it with `./grabepg.sh`.
9. Add it to `crontab`. Run `crontab -e`. Every 12 hours is fine so add a line like this:


```
0 */12 * * * /path/hts/grabepg.sh >/dev/null 2>&1
```
10. `exit` or `logout` from the **hts** user.

4.1.7 Testing

It is a good idea to test channels are working. I use VLC on my computer to carry these out.

1. Under **Configuration** ▷ **Channel/EPG** ▷ **Channels**, find a channel that is enabled you want to test. Technically you can click the blue icon with play on it but it did not work for me. Instead I right click on it and use the option to copy link.
2. Open VLC. Go to **Media** ▷ **Open Location From Clipboard**. Hit **Play**.
3. It should start playing. Let it run and go back to TVH.

Note: if it asks for a username and password then the * user may not be setup correctly or have the wrong limits on IP ranges.

4. On **Status** ▷ **Stream** in TVH, you will see it in use. On the **Subscriptions** tab it will show you who is connected. On this tab, the **Profile** section will show **Pass**. This means TVH is not reencoding the stream in any way and this is what you want. The media server will reencode if your user needs it for bandwidth limits or settings. You don't want your computer to encode twice so let the media server do its thing.
5. Let it play for a bit and see if it is stable. Try a few other channels you use often.

²If your EPG file ends with `.gz` instead of `.xml` you will need to extract it. Change the first line where it says `epg.xml` into something like `epg.xml.gz`. Then run `gunzip epg.xml.gz`. In the third line change `epg.xml` to the output xml file name.

4.2 Bonus: HDHomeRun Into TVH For Fun

Just for the fun of it you can get an HDHomeRun unit with an antenna to get locals. This is not using TVH to emulate an HDHomeRun for Plex.

Some HDHomeRun units have a recording feature builtin but that is not used in this setup. They plug into your network and the unit needs to be on the same network as the TVH server. If they are in your home and the TVH server is in a data center or somewhere else they wont be detected. If you setup your IPTV to put channels starting at 100 like I did, your locals will use the correct numbers they should be at (2-99). Setup the device with your antenna and use its web page or app to scan for channels. If you are not finding the channels you want, you may need to adjust your antenna and scan again. Do this before setup in TVH.

1. Under **Configuration > DVB Inputs > TV Adapters** they each should be auto detected and show up. If you have a two tuner device, you will see it listed with two tuners under it. I will use two tuners here in this setup.
2. On the **Networks** tab, make two entries for our dual tuner. Single tuner you will do one. So hit **Add** and select ATSC-T network for most places that broadcast TV in ATSC³. Name it **HDHomeRun 0**. Uncheck **Ignore Providers Channel Numbers**. This uses the standard channel numbers in your area like 2.1, 2.2, 3.1 and so on. **Save** and then repeat for second tuner if you have one naming this one with a 1 on the name instead of 0.⁴
3. Back to the **TV Adapters** Tab. Select the first one, **Tuner #0**. Make sure its **Enabled** on the right side panel and check **Over The Air EPG** if you want that. For **Networks**, select your **HDHomeRun 0** you made in the last step, then **Save** button. Repeat for the second **Tuner #1**, and select **HDHomeRun 1** this time.
4. Since you made the networks and assigned them to a tuner, go back to the **Networks** tab. Click on the first one and then shift click on the last one to highlight all. Do a **Force Scan** button on them. This can take time. Digital broadcasts can be all over the list of frequencies and it will scan all that it can find. This is not the same as the HDHomeRun scan feature on its web page as this is TVH finding them all over again.
5. Once done, on the **Muxes** tab you will have one entry for each of the findings. This is *not* channels. The network will be **HDHomeRun 0** and **1** as you named them and repeat for each frequency down the list. On the **Services** tab you will find data with channel numbers and you will see repeats for each channel from each tuner. Here do the button for **Map Services** and then **Map all Services**. Check the **Merge Same Name** and then hit the **Map Services** button. This will only take a second with the few dozen channels you have.
6. EPG. Go to **Configuration > Channel/EPG > EPG Grabber Modules**. You will want **Over-the-air: PISP: ATSC** and **Over-the-air: EIT: EPG Grabber** version enabled depending on what your area uses. Select each, check **Enabled** and **Save**. PSIP has limited data but EIT has more data like episode summaries. In my area most channels are EIT but a few are PSIP. Once enabled and saved, hit **Re-run Internal EPG Grabbers**. This will cause all tuners to start up. TVH and the HDHomeRun tuners will tune to each channel for a bit and catch meta data broadcast. This data is over the air and not from an online source. This data can take a while to come in. The grabber runs twice a day. It normally has about 18-27 hours of data but some channels only have current and next up data like those on PSIP.

Bonus: Add Local Tag

If you use tags, go to **Configuration > Channel/EPG > Channel Tags** and make one called **Locals** then **Save**. Then for the HDHomeRun 0 and 1 you made, check **Internal** on it and hit **Save**. This will prevent them from being spit out to Emby or another client (Tags that is as channels will still work). Then on the **Channels** tab, click on the top entry, then scroll to the bottom and shift click it. This will highlight all. Hit **Edit**, check the box at left for **Tags** and select **Locals**. Hit **Save**. If you have many channels then go to the second page and do the same thing. This will spit out the playlist with these tagged as **Locals** or whatever you want to call it.

4.3 Bonus Two: Extra Goodies

1. PlutoTV m3u is available here: nocords.xyz.

³ATSC-T is for broadcast or over the air TV in many places. The ATSC-C is cable broadcasts but those are usually encrypted.

⁴TVH starts numbering at 0 instead of 1.

2. Cabernet is a Python program with web interface to output m3u files for PlutoTV, XUMO and a few others.

Media Server Setup

Emby has a TVH Plugin that sucks. Don't use it. Its more manual work but the TVH plugin is out of date (last update is 2022) and lacks some features. It also did not work too well in my tests when it fails to update new channels. I suggest using my guide here and use the built in IPTV feature.

5.1 Getting Channel Data Out Of TVH In m3u Format

For use in Emby and Jellyfin. Sorry, not for Plex. See 5.2 on the following page for Plex setup.

5.1.1 Easy Way (Without Tags)

If you don't care to have tags, like UK, or Kids, this is for you. Otherwise use the next section.

1. On the Emby Admin site, go to **Live TV > Add TV Source**.
2. In the **File or url** box, use the URL for the TVH server. This may be localhost, IP address of the server, or domain name of your server. Example:
<http://localhost:9981/playlist/channels.m3u>
3. On stream limit, set it to how many connections you have from LayerSeven. In our sample here, it would be 4.¹
4. You can add a tag to all these channels but its optional.
5. Hit **Save**.
6. It will take a bit to load, then it will show, without EPG. We will do that later.

5.1.2 Harder Way But Nicer Since it Has Tags

1. You will need `python3` for your computer. It can be added easily. Google it.
2. Make a place to house the script. We will use `/path/m3utag`.
3. Double click the pin to download the script: 
4. Upload the file to its new home, in our case `/path/m3utag/m3utag.py`.
5. On the line called `token` you will need this data from TVH. Remember making a user named `*`? Go to **Configuration > Users > Passwords**. Find the password for `*` select it and **Edit** it. Expand the **Read Only Info**. There is the **Persistent authentication** code field. Copy it to `token` in your file.
6. `filepath` needs to be set to the output location and file of the m3u that Emby will use.
7. `tags_url` needs to have the host put in (IP, localhost, domain name). Leave the rest of the URL alone.
8. `channels_all_url` needs to have the host put in (IP, localhost, domain name). Leave the rest of the URL alone.
9. Save it, then run it with `python3 m3utag.py`.
10. If all is well, you will have a new m3u in the place you selected in `filepath`.
11. In Emby Admin side go to **Live TV > Add TV Source**.
12. Use the file you made as you setup in `filepath` in the script. Example: `/path/tvh_output.m3u`.

¹If you setup more than one IPTV provider, or locals using an HDHomeRun, the number can be higher.

13. On stream limit, set it to how many connections you have from LayerSeven. In our sample here, it would be 4. If you have several providers or HDHomeRun units in your TVH, you need to go higher.
14. You can add a tag to all these channels, but its optional.
15. Hit **Save**.
16. It will take a bit to load and then it will show channels without EPG. We will do that later.

5.2 Getting Channel Data Out Of TVH In HDHomeRun Emulation

For Plex users. You will need Plex Pass for this feature to work. It is also far from nice. You will need to turn on HDHomeRun emulation in TVH. See 4.1.2 on page 11.

1. In Plex Server, go to **Settings**▷ **Live TV & DVR**.
2. Click **Set Up Plex DVR or DVR Setup**.
3. At this point it should find your TVH server as an HDHomeRun. If so, select **Cable** instead of **Antenna** and **Setup Device** button.²
4. It may ask for your location/country and postal code for EPG.
5. At this point it will try to match your local channel EPG to all the channels from TVH. Good chance it will be missing a ton. You can select **Add channels form another lineup/location** and add another Plex EPG for another area.

5.3 EPG

There are three ways to do EPG. The LayerSeven EPG if you want to use it (from TVH) third party EPG or the Emby version if using Emby.

5.3.1 LayerSeven EPG, or Whatever You Have in TVH

This can come from TVH if you set it up in there and will mostly auto match. However, it will not be all channels.

1. In Emby Admin, Go to **Live TV**▷ **Add Guide Data Source**.
2. Put in the URL from the TVH server. The path will need to be changed to your IP/localhost/domain of the TVH server. Example:
<http://localhost:9981/xmltv>
3. Under **Tuners** section, check the m3u you added for your TVH setup so it will apply to it. Otherwise it wont try to auto match.
4. Hit **Save**, then wait for it to process.

5.3.2 Third Party EPG Data

These come with a URL from a paid or free service. They can be added just like the TVH EPG above but instead with the URL from them then manually mapped to the channels. Manually mapping EPG to the channel will need to be done.

5.3.3 Emby Guide Data

You are paying for it if you have Premiere with Emby. Its rich as it has categories, ratings, color coding, and sometimes photos of box art or logos. The bad is this takes some work. Since many IPTV providers give you channels from around the world you will need to do this guide in sections; in other words do Canada, then US, then UK, your locals and so on.

1. Lets start with Canada here in the example. In the Emby admin section, go to **Live TV**▷ **Add Guide Data Source**. Select Canada in the list of countries. It will ask for Zip Code. This is a US term for postal code. You can input a Canada Post code here, like K1A0B1.

²If it does not show up, it could be a networking issue or you can try the manual option to put in the IP address for the TVH server.

2. The Lineup Box will populate. Here I will select Bell Fibe TV. The options will change depending on the country and region you select. I normally go with larger providers and satellite for a large area.
3. It will not auto match channels and what it does do automatically is normally wrong. I go into each step by step. Uncheck **Enable for all tuner devices** and uncheck each tuner. Hit **Save**. Just because you have it disabled for a tuner does not prevent it from working.

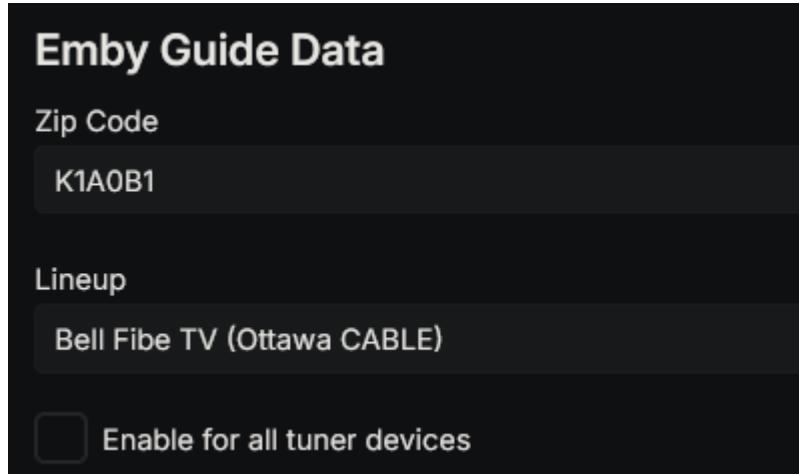


Figure 5.1: Emby Add Guide Data Screen

4. The next part is done outside of Emby admin section, and instead the user part. Hit **Home** ▷ **Live TV**.
5. You can narrow your lineup to Canada in our case using tags if you set them up.
6. Open another browser tab and Google for a TV lineup. In our case, **Bell Fibe TV Lineup**. Some pages stink from providers, and some third party sites are all ads. You want the line up that shows the channel name and the channel number they assign. I am starting with A&E, and it shows it is channel 615. This is what you need. You may also find regional lineups that don't match up or out of date ones. This is not the fun part.
7. On the Emby side, click the title of the channel saying A&E in this case. Next to the name is a pencil icon to edit. Part way down, select the **Guide Data Source** you want to use. Since we are doing Canada, its "CAN-" and a number. Select the channel number from the guide you found. The name of the channel should match up. You don't need to change anything else here. Save, then **X** the modal about the channel. See 5.2 on the following page
8. Channel data will reload. After a few moments the EPG data will appear. Repeat this for each channel in Canada. Then add repeat for the next country. And repeat. It will take a few hours.

5.3.3.1 A few more notes

1. UK does not seem to need the entire code for it to work right in Emby. I used BR6 instead of the entire postal code as it would not work.
2. Selecting a provider...This can be hard as any given area will have several cable, internet and satellite providers. Try one, and if not, remove it and try another.
3. You can add many EPG sources as you want/need. Regional cable companies may not have all the channels you want. I have stuck mostly with large providers that have a wide coverage range.
4. If doing your local channels (Both from LayerSeven and/or HDHomeRun): Add a guide with your local postal code and select the option for over the air broadcast.
5. Some channels are fun to line up. Some have East and West Coast feeds (two channels from LayerSeven), separate channel numbers in different regions/countries, and +1 channels that are an hour delayed. Try yours in this case and if its wrong, you may need to try another feed, or a post code in another region.
6. I have had good luck with tvtv.us for listings/listup for Canada and US channels.

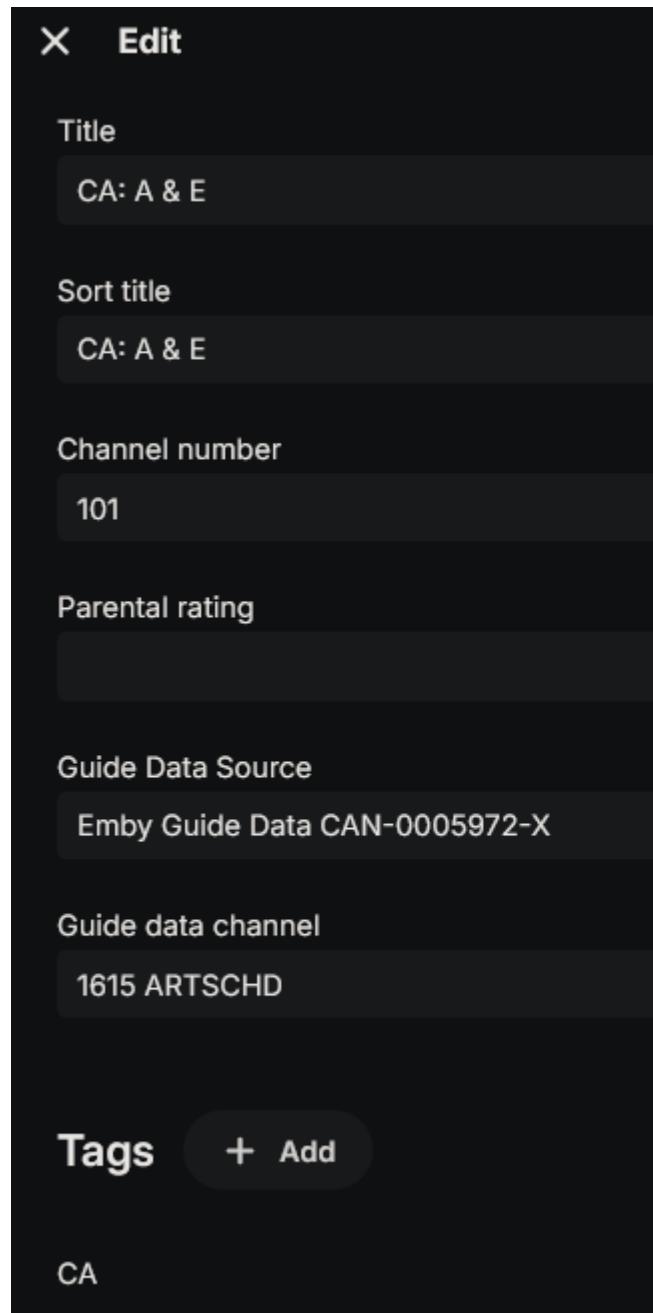


Figure 5.2: Emby Channel Edit for A&E Canada

7. Take a break often. This takes time.
8. Make a backup in Emby when done. See 6.5 on page 24,
9. Some channels flat do not have a guide on paid, free or other providers. If you can find a site that has the correct data, it is possible to use a scraper tool to grab the data, format it into the EPG XML file and then add into Emby. This is way beyond the scope of this document and the vast majority of channels are available in normal setup.

5.4 Permissions and Blocking Channels For Users

One thing nice with the Emby guide data is it includes ratings such as TV-G, R, M and so on. This allows you to set limits for your kids accounts.

On the Emby server, go to **Users**. Make a new user for each person you want to or even a generic **Kids** user for all the kids to use. Be sure to put a password on the accounts that parents/adults use to prevent those crazy kids from using your account. You don't have to make it heavy or long as you need to be able to put it in easily via remote on your TV. Having your own user also keeps a watched section separate from others, and keeps the cartoons showing up in your playlist.

On the **Kids** account, select the max allowed level they are allowed to view (Such as PG-13). Hit **Save**.

This only works on items that have ratings data. Movies and TV shows have this data downloaded from meta data sites, and Live TV comes from the EPG.

Password Tip:

On the web based version of Emby first login as you, then click the person icon top right. Select **App Settings** then **Profile**. Here you can setup a password if you have not done so already but also a four digit pin. This means you can login once on a device with your password, then when watching later use the pin. Its much easier to put in with a remote. You do want a password on the admin accounts!

5.4.1 Blocking Dirty Channels

XXX channels don't have an EPG so it may not be blocked since there is no rating information. To fix this you can go to **Live TV** on the user side of Emby, click the title of the channel in question (Will have the name and a number if configured.). Then the pencil icon next to the name to edit. You can do a **Parental rating** and set the value to **XXX** or whatever you want to. Select something of a *higher* rating than what the user in question can watch. **Save** it and close the modal window. Repeat for the others and test it out. They will not be in the TV Guide or other screens for your kids.

Updates, Backups, Firewalls and a Few Quality of Life Features

Running a server of any type needs love from time to time. If its accessible over the internet you need to stay on top of security issues and use a firewall with holes for services.

6.1 Firewall and Security

6.1.1 Firewalls

If your server is in the cloud (VPS, bare metal or whatever at a data center) then you will have to open some ports in the firewall for users to even think about using the media server. Normally all ports are closed. If you have remote users you may only need to open for Emby. A port is like a door on a building. Some doors will be open for all, others only if you are on a list (whitelist of IPs) and by default, closed.

Opening a port varies depending on the router you have, or the data centers setup. You will have a few options. This will need to be repeated for each service you have to open.

- Port Number. This may be asked twice as a source and destination port, or a range. In our case we will set source and destination port to the same thing (see list later), or just a range of one port¹.
- TCP or UDP or both. TCP will normally be fine.
- Source/remote IP address(es) or open to all addresses. If you open it up to all anyone on the internet anywhere can see it. If your users are all in a few homes you can add each of their IP addresses. You can do ranges, like all IPs used by a cell phone company to allow any phone users to use it. There is a fine line here between making it easy to use with low security, or higher security and less easy to use.
- Destination IP addresses. This would be the internal IP of the server at your home.

What does this mean? If your buddy's internet at home has the IP address of 198.51.100.25 then that would be the source. Your server is local IP of 192.168.1.50 would be the destination IP (In the cloud you may just make a firewall profile and apply it to a server/VPS so the destination is not needed).

¹For source and destination: set both to the same, ex: 1234 and 1234. Ranges can open several ports in order like 1-10. But here you may just need to put a starting port and no ending, or put both to the same number ex: 1234-1234.

Port Numbers:

- **22** (SSH). I suggest using a VPN link instead to your home network for remote management, or a VPN server installed on a VPS to connect to port 22 for SSH management. If you do open port 22 in the cloud you must limit it to your home IP address. Use SSH keys instead of password login for added security.
- **8096** (Emby/Jellyfin) or **32400** (Plex). **8920** can be used on Emby if you setup HTTPS/SSL. Limit this for select user IP addresses. Use passwords on accounts, especially admin accounts.
- *arr apps: **8989** – Sonarr, **7878** – Radarr, **8686** – Lidarr –, **9696** – Prowlarr, **6969** – Whisparr. [Be sure to limit to access from home IP]
- **6789** (NZBGet) [Limit to access from home IP to monitor]
- **9981** (TVH) [Limit to home IP to manage it. Your media server will most often use localhost to connect to TVH]

6.1.2 Basic Security

- Everyone knows root is the admin of a Linux server, and administrator was the one for Windows. If you have SSH enabled make sure root login is not allowed. Otherwise people can slam it all day trying to guess passwords. Instead login as your username and use `sudo` to run commands as root. The same with media servers like Emby and TVH. Don't call the admin user admin. Its easy to guess.
- Emby allows you to hide users from the login screen. Hide the admin level users from the list on the login page.
- Limit the users with access to do big changes like reset passwords, delete media and make system changes. Setup notifications for these big tasks so you know if they are going on at the server.
- You can change the port number some services run on like Emby. A port scan can still find it at some point. Setting up client software will need to have the port number to put in.
- Use a whitelist or blacklist. Similar to the allow firewall IP lists you can also block (blacklist) or allow (whitelist) in many setups like Emby. The firewall setup would be a whitelist (allow).
- Don't run strange software. Use care with new software and test first outside of your main server. The more things you run the more possibility of a security hole to open up.

6.2 Updates of Software and Playlists

- System/OS upgrades. This can be as simple as `apt update` and then `apt upgrade` on Debian/Ubuntu based Linux. It will be different on whatever your distro uses. On Windows it will be Windows Updates.
- On Linux this will update TVH at the same time if installed from a repository. Updates for TVH come out often; sometimes twice a week. If yours is not a repository, manual update will be needed. Windows users will need to manually update.
- Emby/Jellyfin/media servers have updates. For Emby on Debian you just `wget` the new server deb, then run `dpkg -i` on it. Emby has this outlined on the download section of the website. Install method is the same as upgrading, it knows what to do.
- Updates to Rust scripts `xtream2m3u` and the `m3u_filter`: `cd` into each directory, backup your config, and do a `git pull` command followed by `cargo build --release`.
- Check TVH and Emby for new channels. You may want to setup an EPG for them.
- Clients on phones, TVs, Rokus, etc will auto update if enabled from whatever sources they use.
- Many scripts here are ran via crontab and samples are given in their respective sections.

6.3 Domain Names

For an externally accessed server, you can buy a domain name to run your server off of. This is nice since you punch in an easy to remember domain name in the clients. If you move server hosts, home IP address changes, etc you just update the A record in the domains DNS and you will be up shortly once the changes propagate.

You have two options:

1. Buy a domain name at a register and use their DNS servers to set an IP address for the A record. No need to mess with MX, TXT or other records. The pro is you own it, but have to pay for it every year. (or prepay)
2. Use a free sub domain service like afraid.org. You can make something like smithfamilymedia.mooo.com and set the A record to your IP. While free the con is you have to login to their website every so many months or your account becomes dormant and later removed. I just put it on my calendar for every few months and login. Takes all of 30 seconds to do it.

Do not use the Emby name (or maybe Plex, Kodi, etc) in the domain name or or the login page. So don't put up Smith Family Emby Server on the page. Chrome/Google will see it and think its a scam Emby site and your users may get a red warning screen in Chrome browser. A friend and myself both had this issue. Chrome was fine for an long time and one day got mad. After removing the *bad word* you can go into Google Search Console and request Google to re-index the site. The Emby `robots.txt` file will keep it from really indexing it (and it can't login anyway). This fixed it a few days later for us.

You will need a domain if you enable HTTPS for your media server. This is optional, but you will need a domain host that supports TXT records. Most all do.

6.4 Notifications

I use the Emby Pushover plugin for notifications. This means I need the Pushover app on my phone and a pushover.net account. Its free for basic use. I have Emby, Radarr/Sonarr and other tools setup to send messages on issues. There are other plugins outside of Pushover like Discord, Email, Prowl and PushBullet.

Once you install the plugin and restart Emby go to **Preferences > Notifications**. **Add Notification** button. You will need to select type (Email, Pushover, etc) and then punch in settings and select the **Events** you want. Then **Save**.

I suggest getting notifications for Emby needing an update, user locked out/created/deleted/password changed, and backup failed. This lets you know if an update is needed or backup failed, but also when users are having issues (my dad) or maybe an attacker messing with it.

Some notifications are pointless. I don't need to know my kid added a channel to their favorites or each time they play/pause/stop playback. That would be annoying.

6.5 Backups

I cant say this enough. **Backup!** Emby/Jellyfin have a backup option. Set it up to backup nightly. This is your channel/epg lineup, users/passwords, settings, watched history and more. Its important.

`m3u.filter` has a config file. Once you get it going, make a copy of it.

Some items are all 100% command line with options. Copy the command into a text document and save so you can get them back fast.

TVH has a set directory with many config files. It may be in `/home/hts/.hts/tvheadend` or another location. You can do a command to make a tar.gz of it. You will need to preserve permissions that the hts or whatever user TVH is running in has. A command like `tar -czvf /pathfouroutput/tvhbackup.tar.gz /home/hts/.hts/tvheadend` may do the trick.

6.5.1 Copy Those Backups to Another Home

Once you get all the backups configured; copy them off to another machine or location. That way if the drives fail in your server you can get them back.

Here is a sample SFTP script you can play with. Here we are making a backup with the date on it with two files and two directories. Edit as needed. Then we SFTP it to another machine. You could replace this section with another command like rclone copy, or `cp` it to a mounted NFS share. Last is cleanup of the backup file. Make it a

file with your editor then `chmod +x` on the file and add to crontab. Set Emby and others to backup shortly before this script runs.

```
#!/bin/bash

# Compress one or more files/directories. Replace with correct directory path
#(home/...).
tar -czvf /backuppather/tvbackup_$(date +'Y-%m-%d').tar.gz /path/somefile.txt
/path2/anotherfile.blah /path3/somedirectory /path4/someotherdirectory

# Copy the compressed file to the SFTP server. Replace with correct username, server and
target directory path.
sftp username@sftp.mydomain.com:target_dir <<EOF
put /remotepathforbackus/backup_*.tar.gz
exit
EOF

# Delete compressed file from the local machine after sending it to its new home.
rm /backuppather/tvbackup_*.tar.gz
```