TVs4JESUS

CONFIGURATION GUIDE 1.6.0.0 VER 3

Updated December 14, 2020

WHAT'S NEW IN THIS VERSION OF THE MANUAL

- Support for Raspberry Pi 4 as Server! This is a substantial increase in performance.
- The Raspberry Pi 4 cannot be used as a TV Client Pi due to third-party software that has not been written yet.

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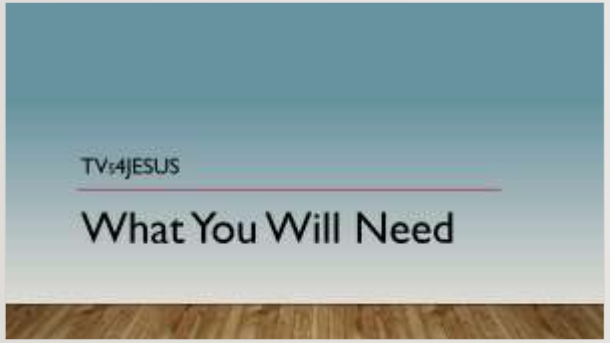
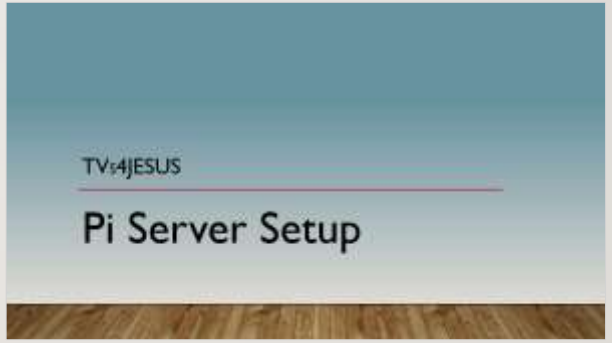
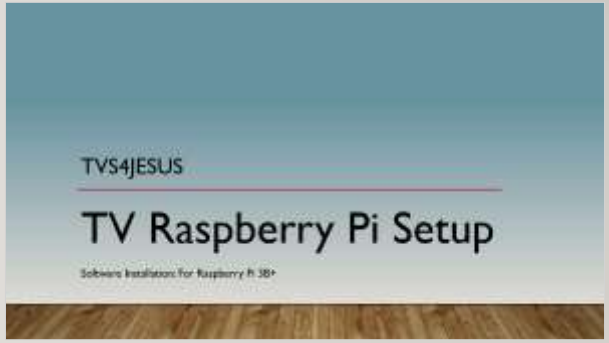
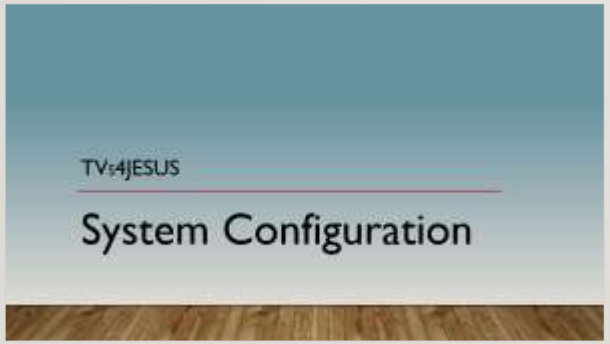
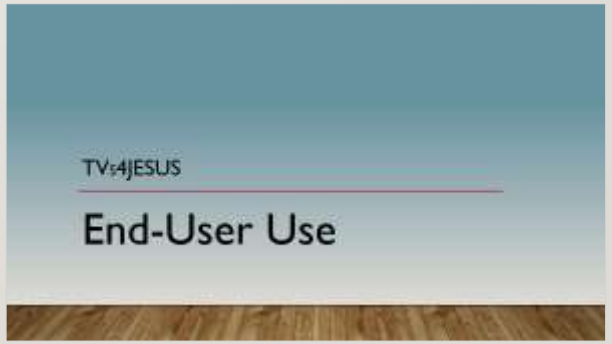










TVs4JESUS

Basic Design Concept

BASIC INSTALL: MINIMUM WIRING

Standard HDMI Compatible TV
or Analog RCA Inputs

Raspberry Pi 3B+
(Gets its power over Ethernet Cable)

PoE Network Switch

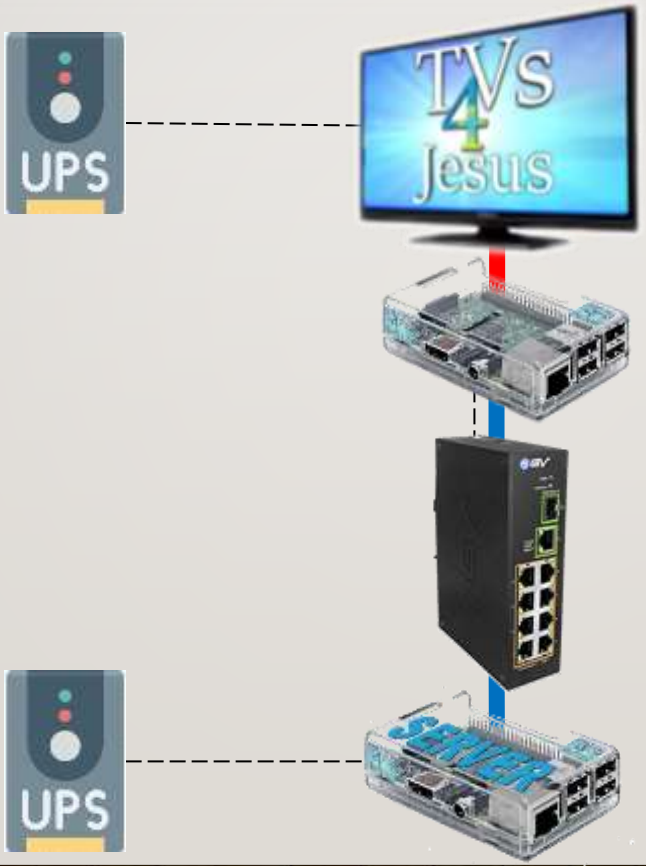
Raspberry Pi Server

HDMI

Ethernet

Power

BASIC INSTALL: RECOMMENDED WIRING



Standard HDMI Compatible TV
or Analog RCA Inputs

Raspberry Pi 3B+
(Gets its power over Ethernet Cable)

PoE Network Switch

Raspberry Pi Server

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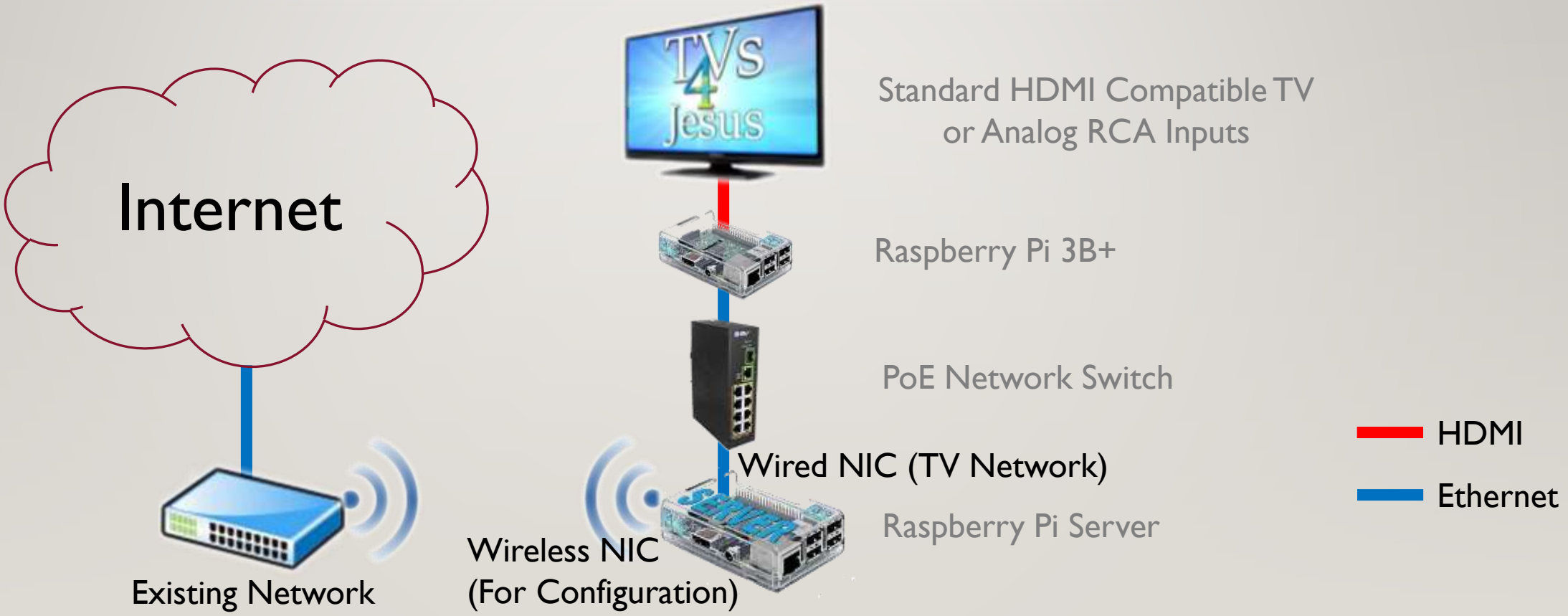
Ethernet

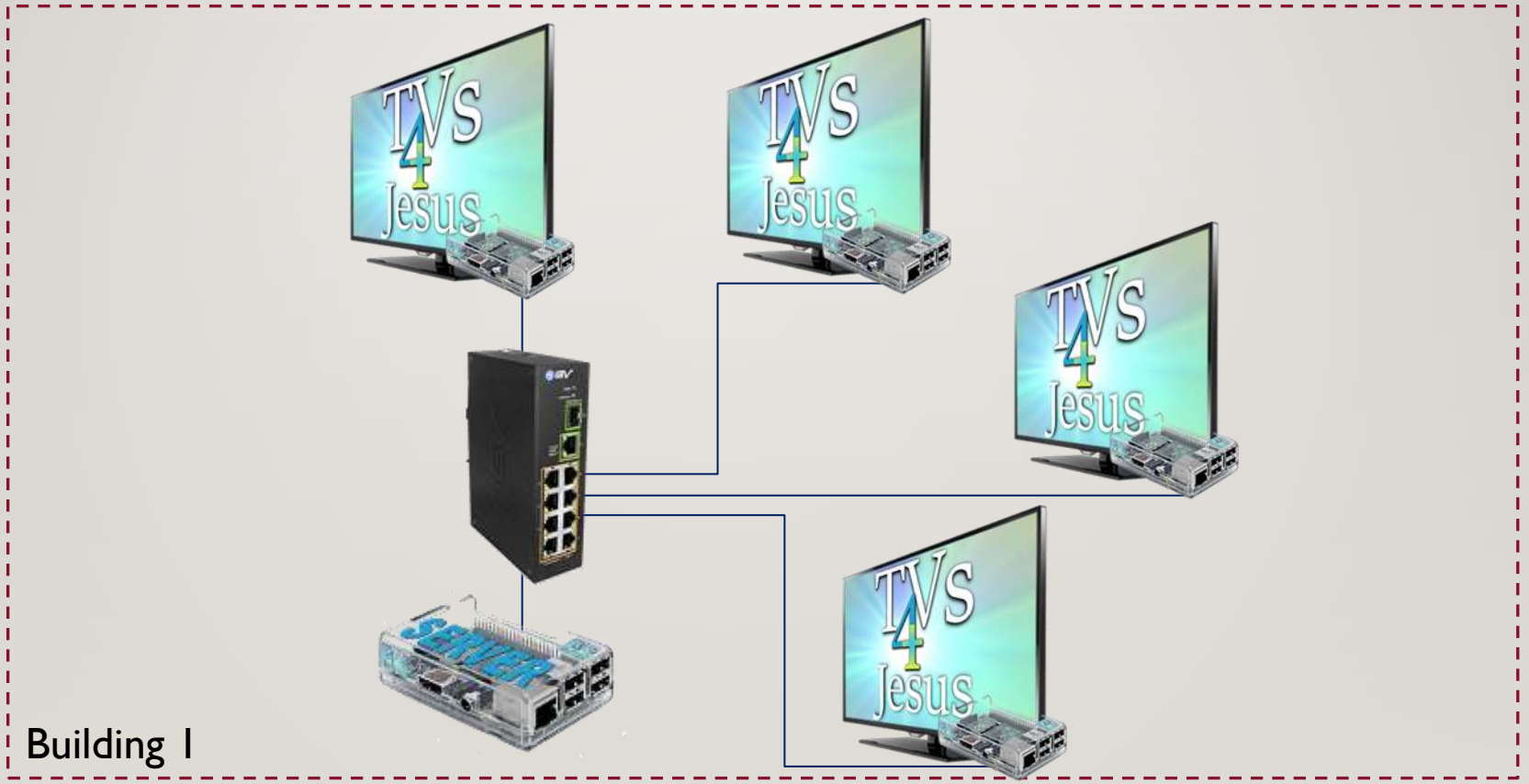
Power

BASIC INSTALL OVERVIEW



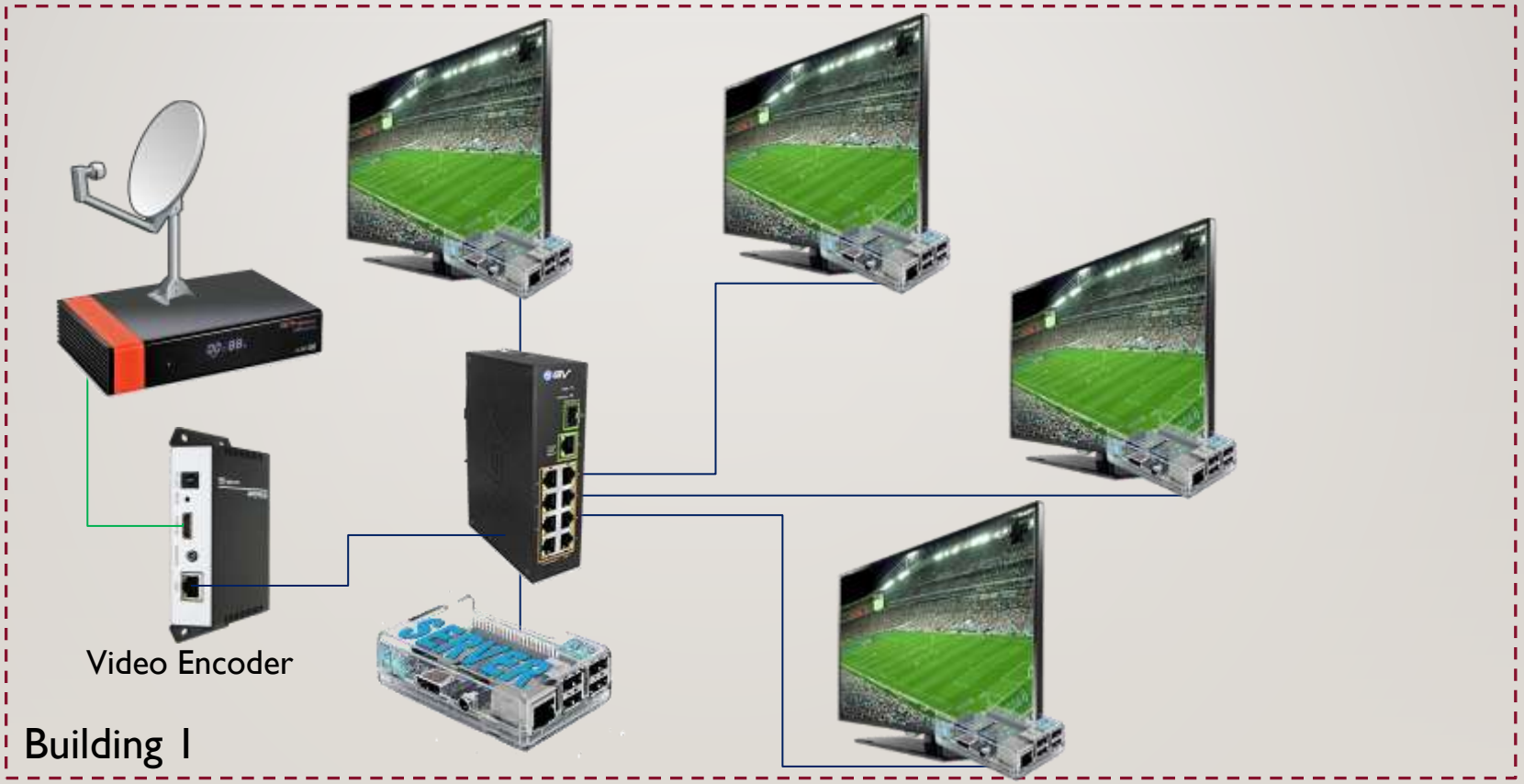
ADDING TVS

Add additional TVs (with a Pi at each) by connecting to PoE switch



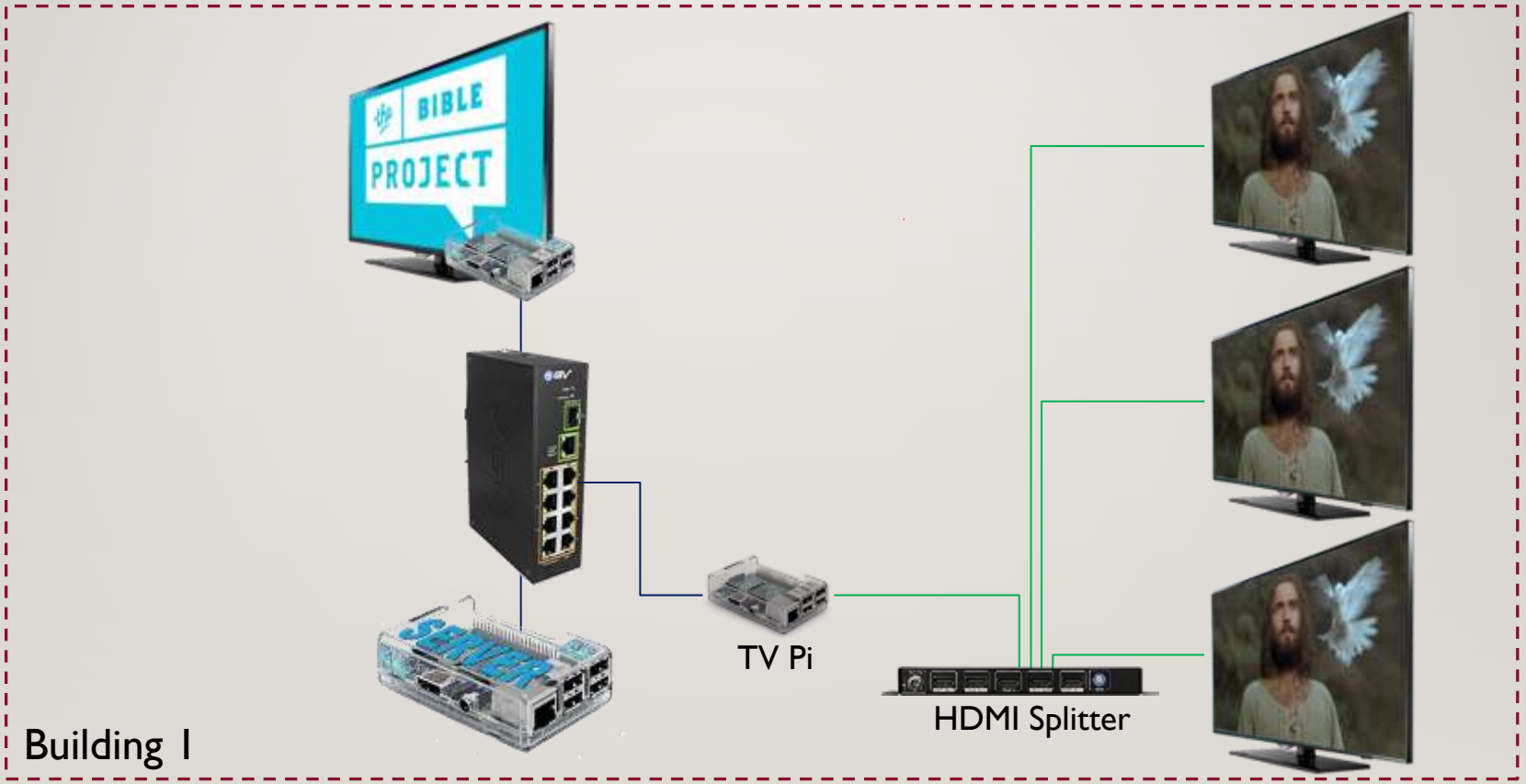
EXTERNAL SOURCES

Adding satellite, cable and other feeds via a video encoder



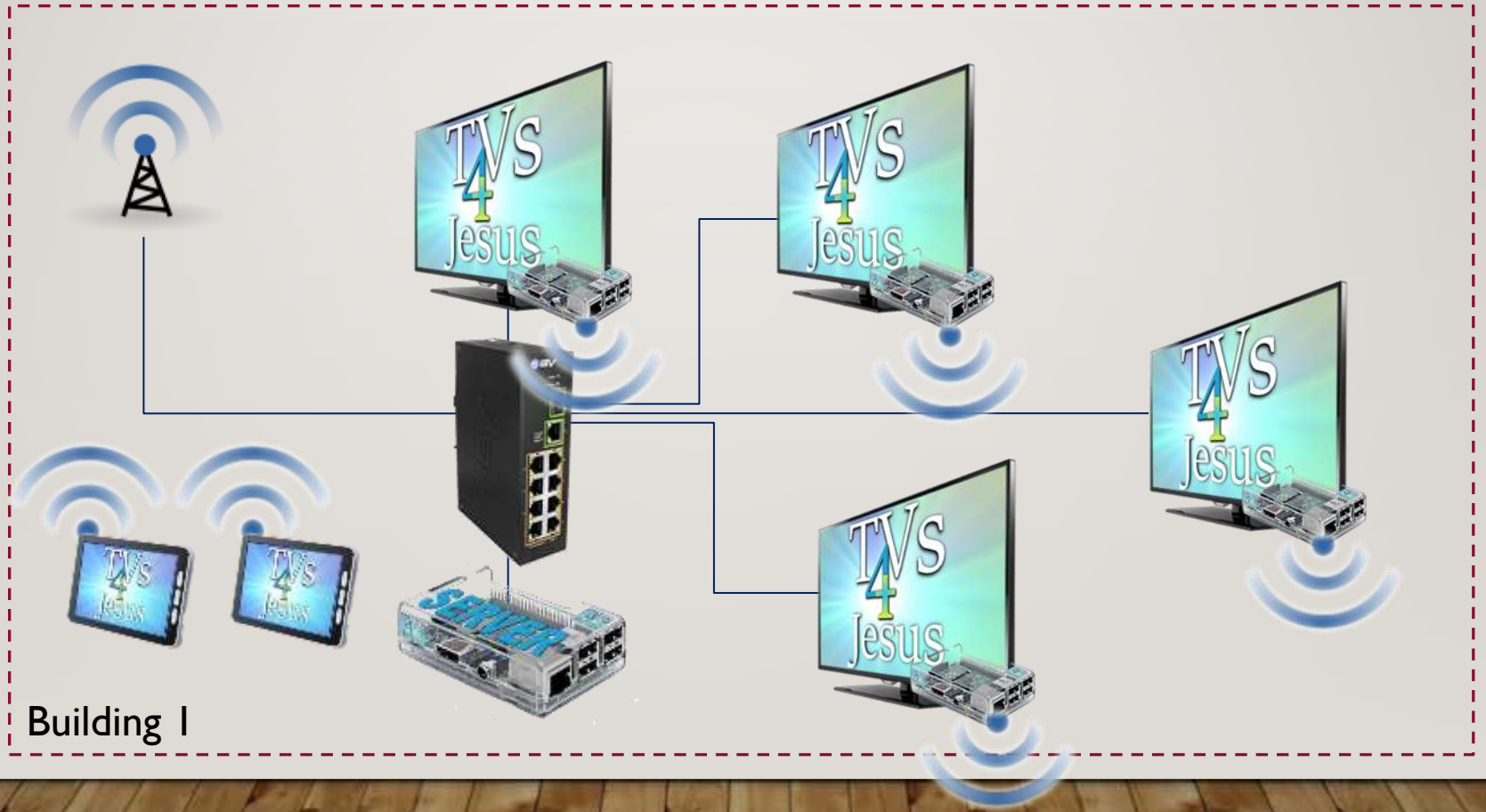
HDMI SPLITTERS

Duplicating to multiple TVs using an HDMI Splitter



ADDING WI-FI ACCESS FOR MOBILE DEVICES

Each Pi can broadcast Wi-Fi to a small area (a few rooms)
Additional stand-alone APs can be added to expand range

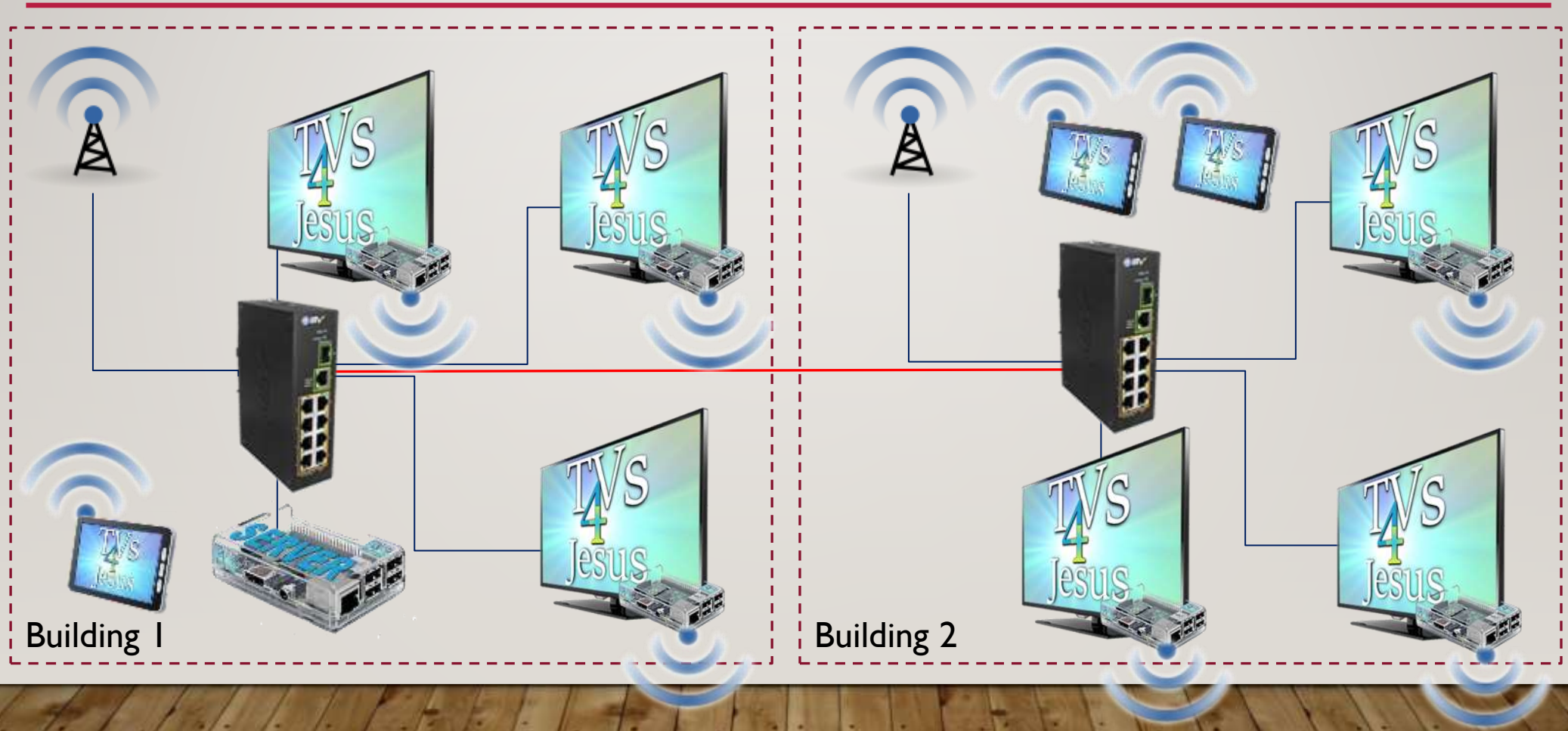


MULTIPLE BUILDINGS

Multiple distant buildings can be connected to one Pi server via fiber

Ethernet up to 100M

Fiber up to 550M



FOR ADVANCED INSTALLATIONS ONLY:

(For users not building a stand-alone system i.e. adding TVs4Jesus to existing switches and Wi-Fi)

- The 'TV Network' must be a separate LAN from general traffic by using either dedicated switches or using vLANs to separate traffic on your main switches.
- Using vLANs is recommended so that a 'public' ssid can be created using your current Wi-Fi system to allow people to browse content over Wi-Fi and still maintain security and Internet access restrictions.
- The TVs4Jesus Server will broadcast DHCP but only on its 'TV Network' NIC. This is required so the Pi will autoconfigure/PXE boot and all 'public' Wi-Fi access is redirected to the server.
- The wireless NIC on the Pi3B+ can be used so TVs4Jesus can be configured from outside the 'TV Network', updates can be delivered and additional content can be easily installed.

TVs4JESUS

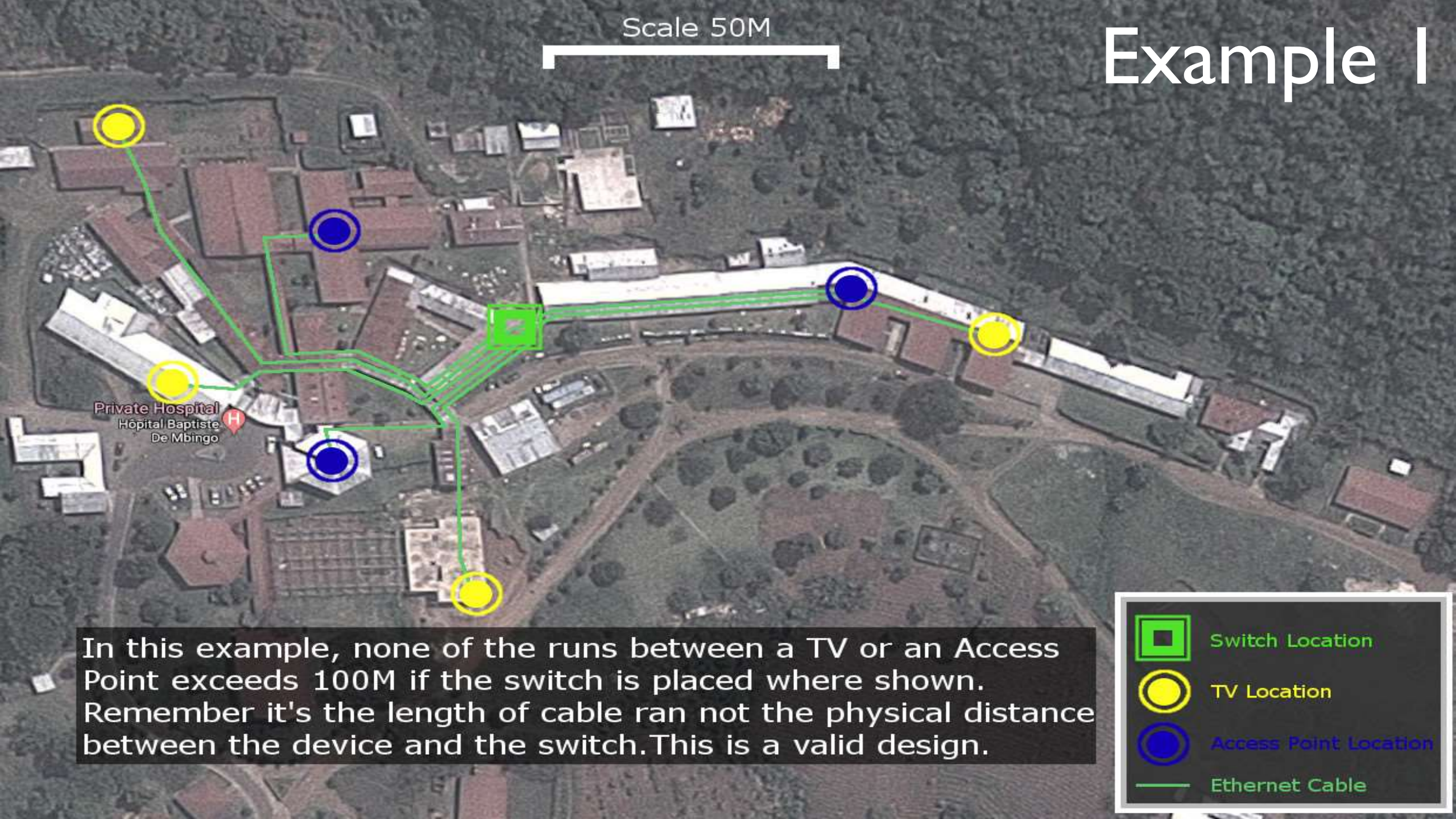
What You Will Need

PARTS WIZARD

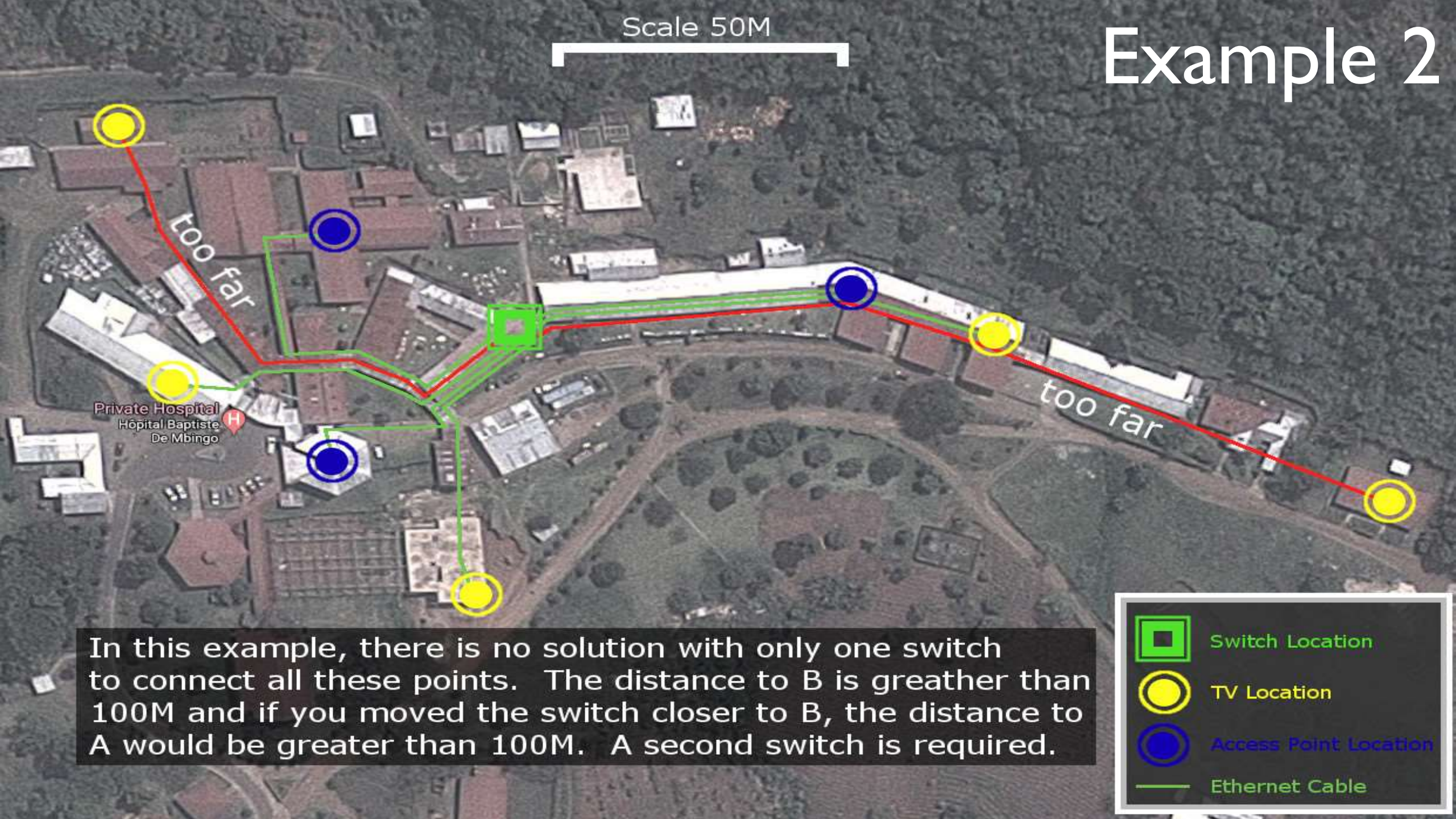
- Visit http://www.tvs4jesus.org/design-wizard/ for an online wizard to generate exactly which parts you will need, verify your design specs and simplify installation.

DETERMINING LOCATION: TVS, ACCESS POINTS AND SWITCH

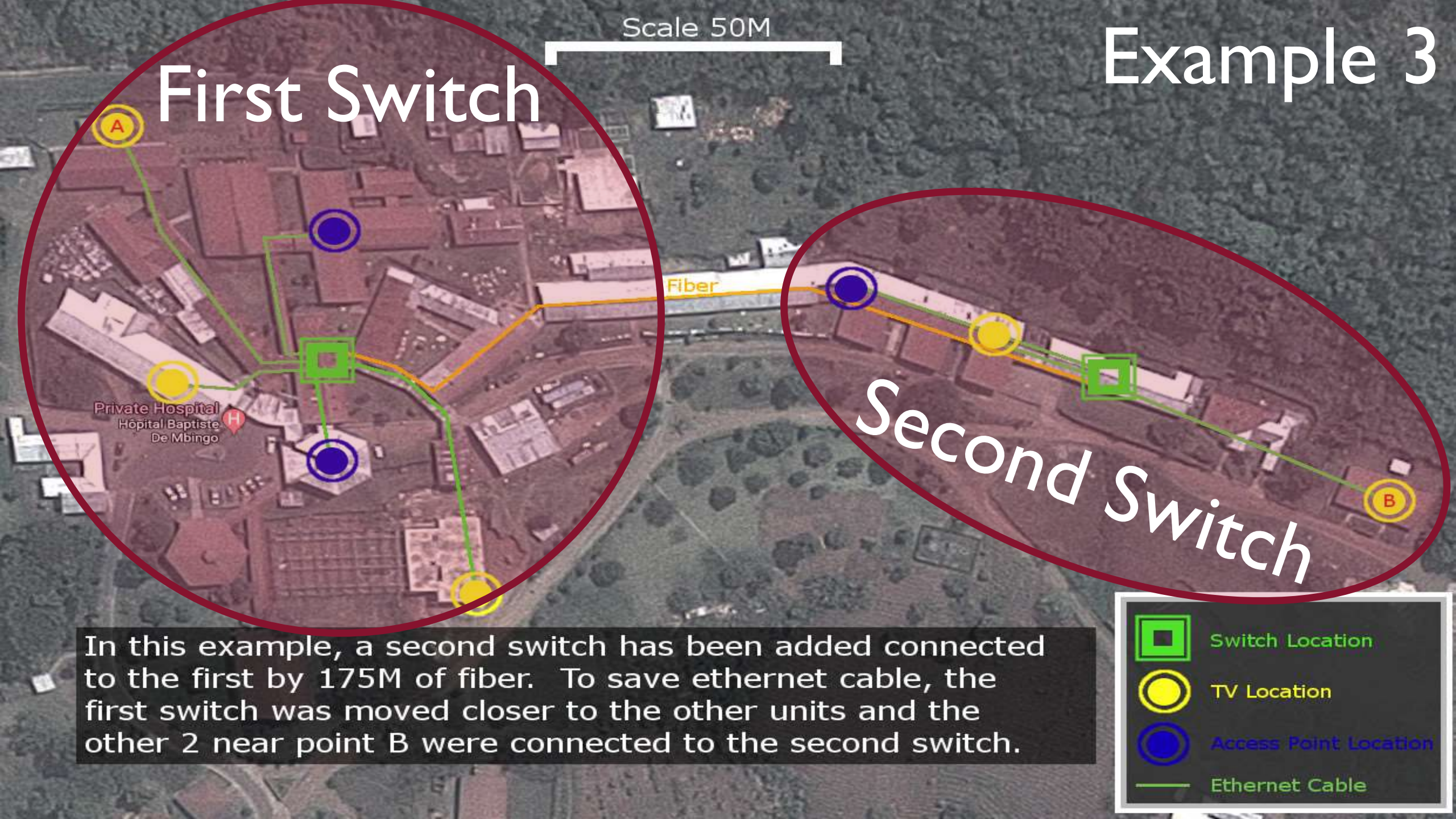
- The following 3 slides show examples of different ways to link your site together.
- Here are the limitations:
  - Ethernet cable will only go 100 meters MAX and at 100m you have a good chance of signal/voltage problems unless the cable is run and terminated perfectly and there is no interference.
  - Ethernet cable distance and physical distance are not the same. Remember that the cable will zigzag and extra distance is needed at the ends and the vertical component. Much more cable will be used than you might think. Estimating the max at 80M for design is probably wise.
  - Ethernet cable should be protected from the elements (water, sun, wind, heat, EM interference).
  - Fiber used here can run up to 550M and protects from lightning since it is non-conductive. The fiber chosen in the parts kit is designed to work outdoors.
  - Each switch can have up to 8 devices (either TVs or APs).
  - The Pi Server can be connected to the switch's gigabit port at any switch location.


Scale 50M
Example I
Private Hospital
Hôpital Baptiste
De Mbingo
In this example, none of the runs between a TV or an Access Point exceeds 100M if the switch is placed where shown. Remember it's the length of cable ran not the physical distance between the device and the switch.This is a valid design.
Switch Location
TV Location
Access Point Location
Ethernet Cable

Example 2



In this example, there is no solution with only one switch to connect all these points. The distance to B is greather than 100M and if you moved the switch closer to B, the distance to A would be greater than 100M. A second switch is required.


Scale 50M
Example 3
First Switch
A
Private Hospital
Hôpital Baptiste
De Mbingo
Fiber
Second Switch
B
In this example, a second switch has been added connected to the first by 175M of fiber. To save ethernet cable, the first switch was moved closer to the other units and the other 2 near point B were connected to the second switch.
Switch Location
TV Location
Access Point Location
Ethernet Cable

WHAT YOU'LL NEED

- TVs4Jesus is part of a non-profit group. It prefers not to get involved with buying and selling kits.
- To simplify and create standard installations, it has created a list of parts which can be purchased directly by you on amazon.com to build a stand-alone system. See the "Part Kits" section for links.
- You will, however, need to buy standard TVs from your own supplier.

PART KITS

- Up-to-date part kits are available online at:

  http://www.tvs4jesus.org/part-kits/

- Note on UPS (if not buying the one in the parts kit):
  - A UPS is required for the server and recommended for each switch but not required.
  - Make sure the UPS you choose is compatible with your destination's power (including frequency!) (Stepping down 220V to 110v and using a 110V UPS will likely not work due to the UPS detecting under frequency and switching to battery).
  - It is often best to buy the UPS in country when the destination country differs from the origin country's power standard. Be sure to get plug converters too.

REMARKS

- Max distance from Pi to switch is 100M including patch cables. Recommended max is 90M.
- Use good Ethernet cable and properly terminate all pairs.
- UPS is strongly recommended at server
- In-country Ethernet cable is usually poor quality. Recommend using good, thick copper conductor cable.
- Heat is not a problem for the TV Pi but the Pi Server can benefit from a case with fans in hot climates.
- Power adapter needs at least 2.1A. Smaller greatly reduces Pi performance
- Pi Zero is not recommended nor cheaper once upgraded, no NIC
- Connecting Pi wirelessly to server is not solid and prevents Wi-Fi Broadcast at Pi.
- Pi3B+ as TV Client Pi needs PoE Splitter designed for it because it is gigabit. It won't work otherwise (tested).

TVs4JESUS

Pi Server Setup

SOFTWARE INSTALLATION:

Pi3B+ or Pi4 Server

- You will need a Pi3B+ or a Pi4 (any amount of RAM) to use as a server as well as a USB SSD drive.
- From a Windows PC, download and install Win32 Disk Imager
- Download "TVs4Jesus for Raspberry Pi Version 1.6.0.0" installation file from http://www.tvs4jesus.org/downloadsoftware/
- Run the downloaded self-extracting installation file to create a corresponding .img file
- Insert USB SSD into PC's USB port
- Open Win32 Disk Imager
- Under "Image File" select the newly extracted .img file. Select the appropriate "device" drive. (Be absolutely sure this is the right device or you could accidentally overwrite your hard drive!) Click write.
- Continued on next page…

SOFTWARE INSTALLATION:

Pi3B+ or Pi4 Server

- For Pi3B+
  - When finished, insert USB SSD into Pi's top, furthest from the Ethernet cable USB port
- For Pi4 (see troubleshooting on the next page if this doesn't boot properly)
  - When finished, plug in the USB SSD into the Pi4's top, blue USB port.
- Connect HDMI to TV, Ethernet cable to switch and power on.
- --If you don't eventually see a prompt asking you to login on a text screen see next page--
- The first time your Pi Server boots it will resize to the full size of the drive. This could take as long as 10 minutes depending on the size of your SSD. Once it finishes your Pi is now accessible through its web interface at http://tvcontroller.local
- The Pi server does not need a screen during normal operations. It can be configured entirely via the web interface.

SOFTWARE INSTALLATION: TROUBLESHOOTING

Pi4 Server

- Firmware and Bootloader EEPROM Update
  - If your Pi4 shipped with an early firmware loaded on it, it may not be able to boot directly from the USB SSD drive without first getting an update. The update is on the SD card.
  - Repeat the procedure for installing the Pi Server software only this time write it to a 4GB or greater SD card rather than a USB SSD drive. Insert the SD card into the Pi4 and power on.
  - After it finishes booting, log in using the username: "root" and password: "Controller".
  - Type:
    - sudo rpi-eeprom-update -d -f /lib/firmware/raspberrypi/bootloader/beta/pieeprom-2020-07-31.bin
    - sudo reboot (let it reboot fully, log in again and type "sudo shutdown now")
  - Power it off, then insert the **USB SSD drive** into the Pi4's top blue USB port (closest to the NIC port) or the top furthest port from the NIC port on the Pi3B+. Power it back on. It should now boot off the USB SSD.

TVS4JESUS

TV Raspberry Pi Setup

Software Installation: For Raspberry Pi 3B+

SOFTWARE INSTALLATION:
TV Pi Clients

- You do not need to put an SD card into the TV Pi Clients at any time.
- Simply connect them to the Ethernet cable and power them while the server is running.
- They will download their OS from the server during boot.
- This will not work with a Pi4.

TVS4JESUS

Physical Installation

STEP1: CONNECT UPS

1. Connect both the US-style plug adapters to the UPS's "Battery, Surge and Noise Protected" outlets.
2. Connect the country specific supply cable to the UPS.
3. Plug in the supply cable to the wall. Verify a well grounded outlet.
4. Press the power on button on the UPS.

STEP2: CONNECT SWITCH'S POWER

1. Connect the power supply of the switch to one of the UPS's US-style plug adapters.
2. Connect the switch power supply to the switch.
3. Connect a cable (16AWG or greater) from the ground screw on top of the switch to the UPS's ground screw terminal.

STEP3: THE PI SERVER

1. After finishing setting up Pi Server, plug in the USB-C cable into the SSD.
2. Connect the other end to any USB port on the Pi.
3. Connect an Ethernet cable to the Pi
4. **Plug the other end into the 1000 Base-T port on the Switch (labelled port 9 on the BV Switch)**
5. Plug the Pi Power supply into the remaining US-style plug adapter from UPS.
6. Plug the other end of the Pi power supply into the Pi's Micro USB port.

STEP4: THE TV AND ITS PI

1. Mount the TV and give it wall power (through a UPS/voltage regulator/grounded surge protector for protection)
2. Connect the HDMI cable to the TV's HDMI port
3. Connect the other side to the Pi HDMI port
4. Connect the splitter's Ethernet cable to the Ethernet port on the Pi
5. Connect the micro USB on the splitter to the micro USB port on the Pi
6. Connect the splitter to the Ethernet cable
7. Connect the Ethernet cable to the switch in any of the ports numbered 1 through 8.

STEP5: ADDING ADDITIONAL BUILDINGS (OPTIONAL)

1. Follow "Step 1:Connect UPS" to first connect an additional UPS to the locations where the second switch will go. Connect the secondary switch power supply to this UPS.
2. Connect power supply to switch.
3. Connect ground screw to UPS ground
4. (and 7) Insert SFP Transceivers into switches.
5. Remove dust caps on both fiber and SFP Transceiver and insert fiber LC connectors into SFP Transceiver.
6. Repeat with other end of fiber and SFP Transceiver on primary switch

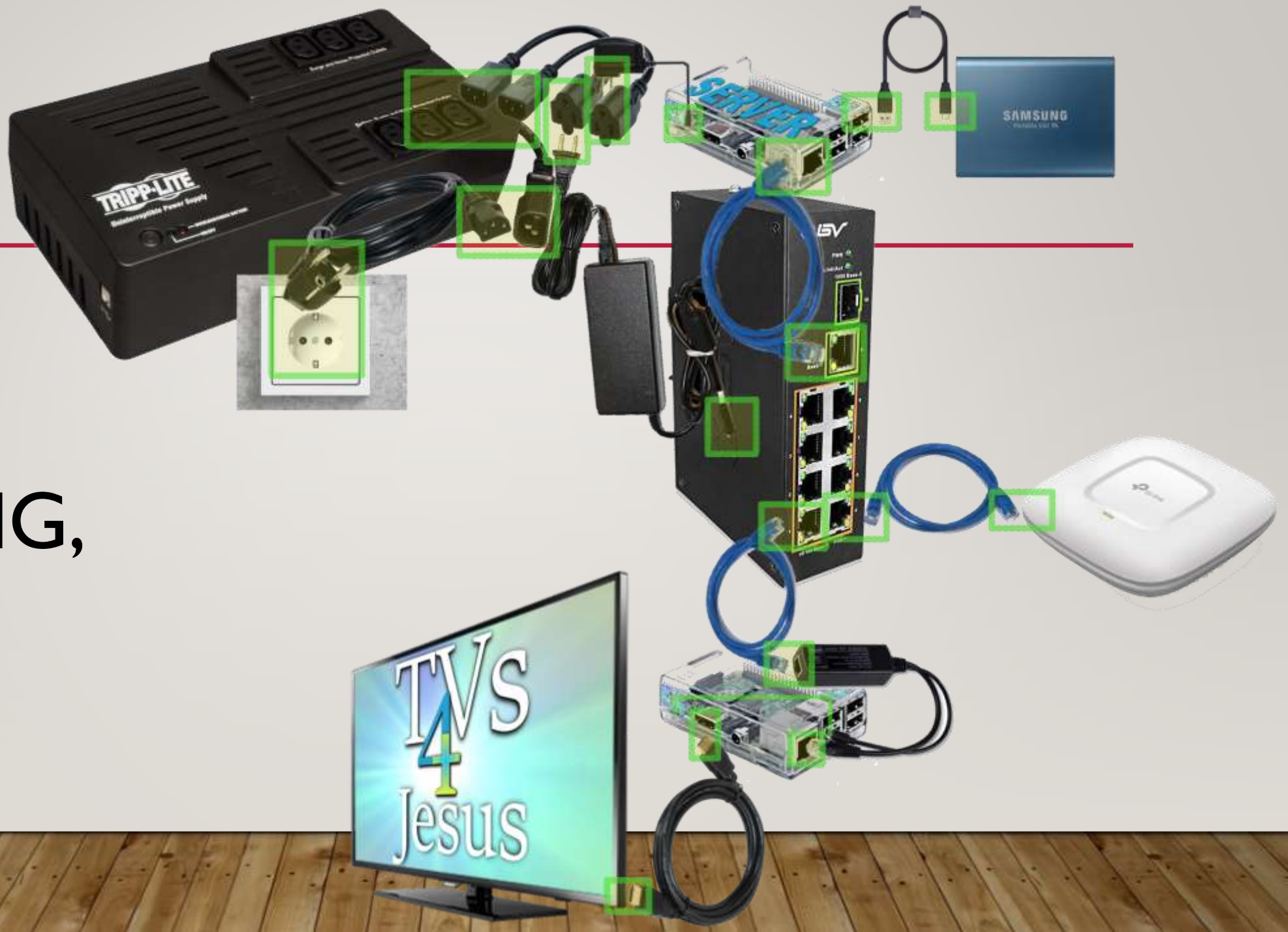
Primary Switch

Secondary Switch

STEP5: ADDING ADDITIONAL WI-FI (OPTIONAL)

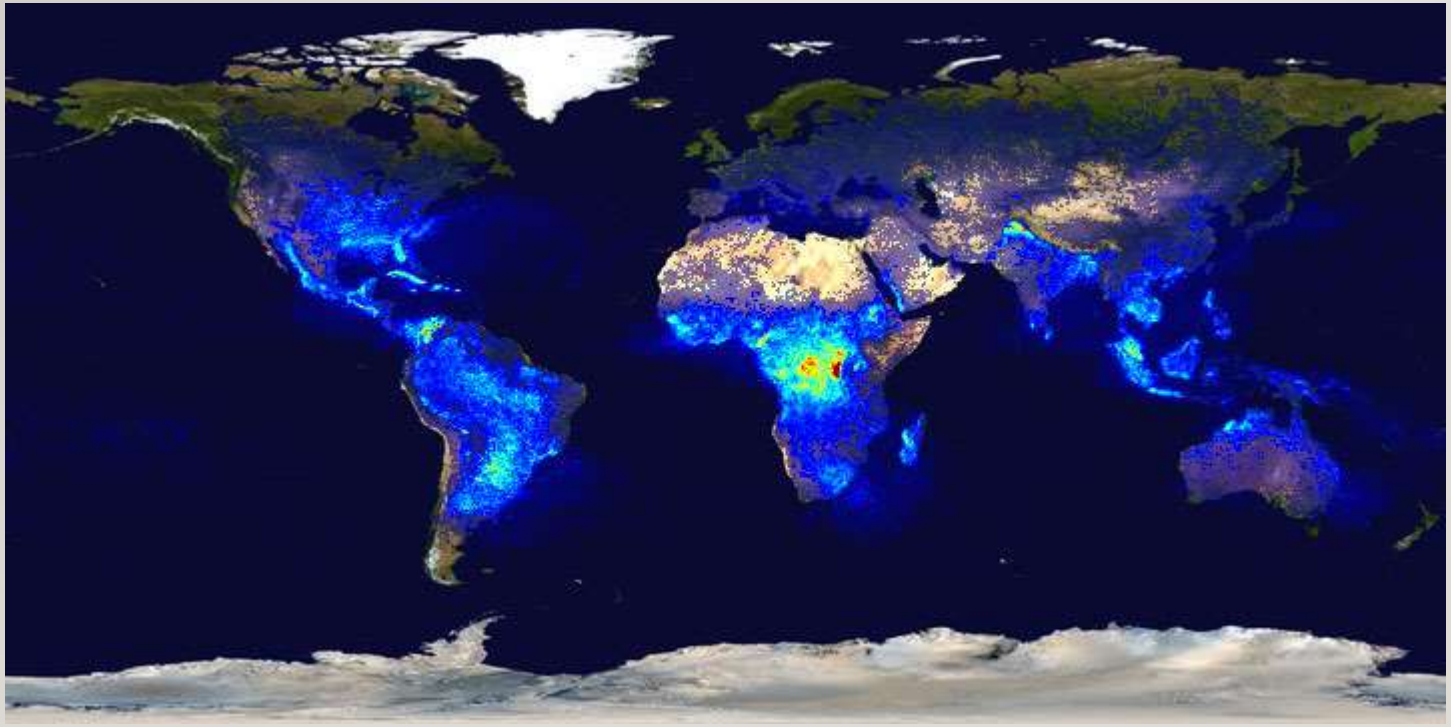
1. Connect Ethernet cable into a free switch port numbered 1-8
2. Connect other side to Access Point

SINGLE BUILDING, MAX DETAIL



MULTIPLE BUILDINGS, MAX DETAIL

LIGHTNING PROTECTION



This picture from www.nasa.gov shows lightning strikes across the planet.

If you are in an area of heavy lightning, we recommend protecting your system's power and ethernet lines especially on lines that are outside or widely exposed to sky. Even distant strikes can induce strong current on long lines.

For recommendations visit: tvs4jesus.org/part-kits/

MULTIPLE PI SERVER SYSTEMS ON ONE SITE

- If you have more TVs than a single 3B+ Server can handle, we first recommend upgrading to a Pi4 as a server. This will likely double or triple the number of streams you can have. If you are at this max, you can build fully disjoint systems but still centrally manage them from a single network.
- To do this connect each Pi Server's WAN to your main network via wireless. It is recommended to use static DHCP assignments to them so they maintain the same IP addresses. This would be done on your existing wireless network's router.
- For management connect to http://<WAN ip address of desired pi server>
- This IP address can also be found by mousing over the white Wi-Fi icon on the status page. You would need to get to the management page first to find this though.
- Note: in order to do live broadcast to disjoint systems, you would need to connect that live source to each disjoint network concurrently.

TVs4JESUS

System Configuration

GETTING AND CREATING CONTENT

- We highly recommend starting at http://www.jesusfilm.org for finding content especially in the right language.
- thebibleproject.com -- A great place for bible study/discipleship material (mainly English but expanding)
- Don't put content on from youtube or vimeo as it is a violation of their terms of service. If you want content you find there, you would need to contact the author for permission and the mp4 file.
- If you want to make content using your own video equipment, feel free! We recommend recording at 720p. Let's us know if you would like to share your content with the world by visiting http://www.tvs4jesus.org/contribute-content/

CONNECTING TO SERVER

- Plug a computer into the "TV Network" switch via Ethernet (or connect to the Wi-Fi network that TVs4Jesus is broadcasting if enabled). You should get an IP automatically.
- Open the TVs4Jesus web console from the Chrome Browser. Any of these addresses should work:
  - http://tvcontroller.local
  - http://10.10.40.3
  - http://<EXTERNAL NIC IP>
- If none of these work, verify network connectivity and verify that server is properly setup. Make sure you only have one active network card (not Ethernet and Wireless concurrently).
- Click on the "setup" link at top of page.
- Log in with username "controller" and your password (default password is "Controller")

UPLOADING CONTENT

- In the server console window, under the "Setup" tab, click "Manage Content".
- Click the "Upload Here" button.
- Drag and drop mp4 video and/or mp3 audio to the white box or click the box to select files to upload.
- If you receive any red x's over the upload, hover over it to see the reason.
- For maximum compatibility with Wi-Fi users, you may only upload video files with a .mp4 extension, h.264 codec and a bitrate of less than 3 mbps. You may also upload audio files in mp3 format. The files will be checked and an error displayed if your uploads do not meet the requirements. To easily reencode your files to meet these requirements please see the help section (About > Help) on the web interface.

MODIFYING CONTENT

- In the server console window, under the "Setup" tab, click "Manage Content".
- You may delete, copy, move, create folders and add content.
- Notes:
  - Copying (as opposed to moving) your media to multiple locations will take more space on the drive.
  - It is not recommended to use folders to arrange playlists. Do this under "Playlists". The arrangement here is how it will appear for Wi-Fi users.

CREATING PLAYLISTS

- In the server console window, under the "Setup" tab, click "Playlists".
- Under to "Make Playlists" click "add".
- Under "Available Media" you should see an expandable window showing all the media you have uploaded.
- Expand the list until you find the media you would like to add to your playlist.
  - Click on the ">" next to them to add your playlist on the right.
- Once you've adding the items, you can drag and drop the list to rearrange the order.
- Give this playlist a name.
- When you are finished click the "Save Playlist" button to save your changes.

ADOPTING TVS TO SERVER

- Once the TV Pi has booted, it should start displaying "Please adopt this device through the Controller" on the TV to which it is connected.
- This Pi should then appear on the server status console with something like: "New Device Found: Pi3: Model B+ Adopt".
- Click "Adopt".
- A message saying "Device Adopted Successfully" should appear on the status console.
- Rename the device from its serial number to something meaningful by clicking its serial number.
- Click the "Play even when no HDMI Device Detected (Use this only when this Pi does not use HDMI but uses an analog audio/video 3.5mm plug)" if you do not intend to use the HDMI port on this TV Pi.
- The TV will begin displaying "No playlist is set for this device".
- Assign the device a playlist.

ASSIGNING PLAYLISTS

- In the server console window, click on the "Setup" tab then "Playlists".
- Under "Assign Playlists to TVs" select the desired playlist you want to assign to a TV.
- Select any or all of the Pi devices for which you would like this playlist to apply.
- Click "Submit".
- You should see a "Device(s) Updated" message.
- The selected TVs should begin playing the new playlist from the beginning.

ADDING LIVE FEEDS (OPTIONAL)

- You can add live feeds to the system by connecting cameras that stream RTSP such as cell phones, security cameras, laptops, tablets, video cameras, etc. Try "RTSP Camera" on android cell phones.
- You will need to configure your particular video source such that it gives you an address like: "rtsp://10.10.40.9:554/s1". The device also needs to be statically IP assigned on the "TV Network" so the TVs can pull from it. 10.10.40.4-10.10.40.9 is available outside the DHCP pool.
- Once you have the address, in the server console window, under the "Settings" tab, click on "Live Sources". Under "Create a Live Feed" click the "add" button.
- Enter a meaningful name and the address from above (ex: rtsp://10.10.40.9:554/s1).
- Click "Save".

MANUALLY PLAY A LIVE FEED (OPTIONAL)

- In the server console window, under the "Setup" tab, click "Live Sources".
- Under "Manually Play a Live Feed" select the desired feed you would like to start playing on the selected TVs.
- Select any or all of the Pi devices for which you would like this feed to apply.
- If the "Feed is Not Ready Message" appears next to the "Assign live feed" drop down, it is unlikely the TVs will be able to play this live feed successfully. Check the source before submitting.
- Click "submit".
- You should see a "Device(s) Updated" message.
- The selected TVs should begin displaying the live feed.
- Assign "--disable--" from "Assign live feed" list to return the Pi to its regular playlist.

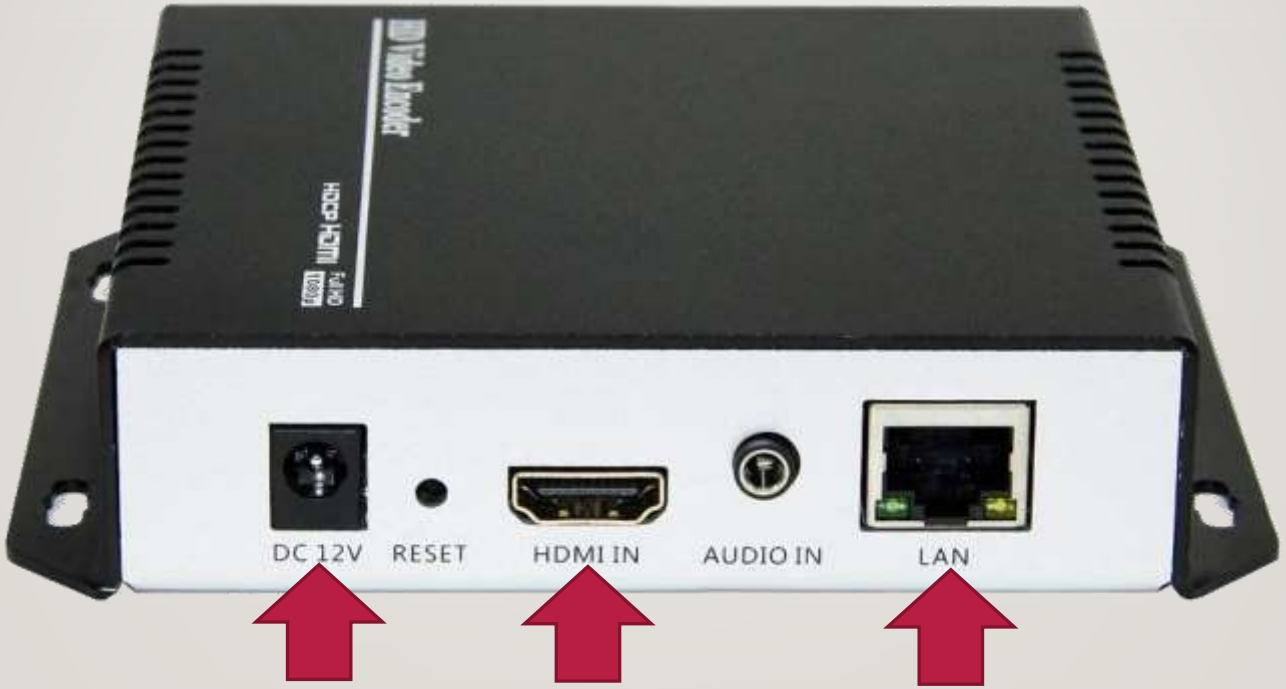
SCHEDULING A LIVE FEED (OPTIONAL)

- In the server console window, under the "Setup" tab, click "Live Sources".
- Under "Schedule a Live Feed", click "add".
- Verify the time as your schedule will not start at the expected time if the clock is wrong. If it is wrong, click on the time to adjust it.
- Give the schedule a meaningful name.
- Select the feed you want to schedule.
- Select the TVs you want to have play this feed.
- Select the starting time and ending time (in 24 hour format).
- Select the day of the week you would like this live feed to play.
- Select if you would like the feed to be verified working before switching TVs.
- Click the submit button.

VIDEO ENCODERS: USING CONTENT FROM AN HDMI SOURCE

- TVs4Jesus can display on all (or selected TVs) from anything that has an HDMI out
  - For example, cable/satellite decoders, video game consoles, computers, cameras, etc.
- You will need an HDMI h.264 video encoder
  - We recommend and have tested the $158 URAY h.264 video encoder here
- Physically connect the encoder as shown on next slide

VIDEO ENCODERS: PHYSICAL CONNECTIONS



Power from wall

From Your Source's HDMI out

Connect to your TVs4Jesus Switch

VIDEO ENCODERS: ENCODER SETUP CONTINUED

- Follow the instructions out of the box to set the encoder to a static IP address
  - (Temporarily set your PCs IP to the 192.168.1.5 and browse to 192.168.1.168)
  - Recommend setting encoder's IP to 10.10.40.5 / 255.255.255.0
- Under Encoder : Main Stream set the screen as follows on next slide.
  - Notice that only the RTMP URL is set to "Enable" everything else is "Disable"

H.264 Encoder | tvcontroller.local:83/liveSources | Not secure | 10.10.40.5/OutputP1MainE.html

Video Encoder

- Status
- Encoder
  - Main stream
  - Substream1
  - Substream2
  - Substream3
  - Audio
  - Advanced
- OSD
- System

Encoding Type:	H.264	
FPS:	30	[5-60]
GOP:	30	[5-300]
Bitrate(kbit):	2800	[32-32000]
Encoded Size:	same as the input	
H.264 Level:	main profile	
Bitrate Control:	cbr	

TS URL:	/0.ts	Disable
HLS URL:	/0.m3u8	Disable
FLV URL:	/0.flv	Disable
RTSP URL:	/0	Disable
RTMP URL:	/0	Enable
RTMP/RTSP PUSH URL:	rtmp://10.10.40.5/live/0	Disable
Multicast IP:	238.0.0.1	Disable
Multicast Port:	1234	[1-65535]

Apply

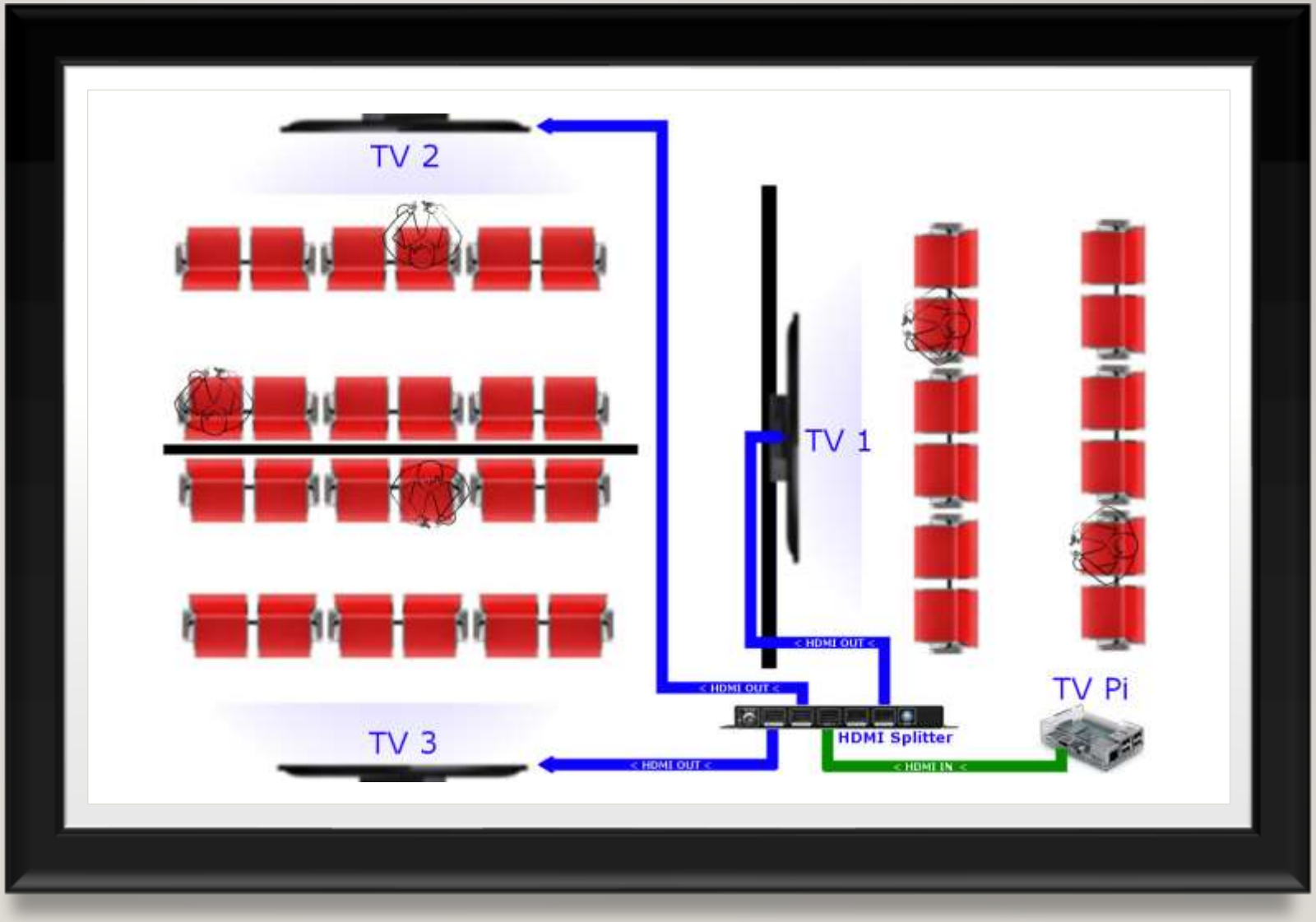
VIDEO ENCODERS: ENCODER SETUP CONTINUED

- Leave everything else as default
- Reboot the encoder.
- In the server console window, under the "Setup" tab, click on "Live Sources". Under "Create a Live Feed" click the "add" button.
- Next to name, enter a meaningful name
- Next to "URL Address of live feed", enter and the address from above (ex: rtmp://10.10.40.5/live/0).
- Click "Save".
- You can now manually play or schedule a time for this source to be played on your TVs.
- Please note that the system may not automatically detect that this source is ready even when it is.

HDMI SPLITTERS: ONE INPUT TO MANY TVS

- You can clone the HDMI output from a given TV Pi to many TVs at the same time
- They will all display the exact same thing at the exact same time
- This can be helpful if you have a shared room with many TVs where the audio of different concurrent programs would be difficult to hear.
- This can decrease the cost of a system by needing less TV Pi units
- We have tested and recommend the AV Access 4KSP14-D $23.99
  - Recommend only using this with TVs that natively support HDMI. Adapted TVs seem to be flaky.
  - There are splitters at least up to 16 out for a single HDMI in by the same manufacturer.
  - Remember you will need long HDMI cables to reach from each TV to the splitter.
    - 50 ft is the max safe HDMI cable length
- See the next slide for a use case.

HDMI SPLITTER: USE CASE



All 3 TVs show the exact same image and sound

WEB-REMOTE USERS

- TVs can be remote controlled by authorized individuals using the web-remote feature.
- In the server console window, under the "Setup" tab, click "Users".
- Create a username and password for a user and to which TVs they should have access.
- Click "submit".
- To get your newly created users set up, go here.

CHANGING WI-FI USERS DOWNLOAD OPTION

- To allow Wi-Fi users to download content, on the server console window under the "Setup" tab, select "General Settings".
- Under "General Settings", toggle to enable the "Allow the users to download files to their local devices" option.
- Click "submit" when finished.
- Wi-Fi users will now be able to save media content from the TVs4Jesus system to their local devices.

CHANGING THE WI-FI LANDING PAGE LANGUAGE

- To customize the greeting and language settings for your Wi-Fi users, on the server console window, click on the "Setup" tab and select "General Settings".
- Under "Language Settings" change the words that you would like to appear on the landing page.
- Click "submit" when finished.

MANAGEMENT FROM INTERNET (OR COMMON NETWORK)

- You can configure, add content, and manage your TVs4Jesus Pi Server from anywhere in the world by using a 3rd party service called Remote.IT. This will allow you to manage one or many locations from a single screen anywhere you can get Internet access around the world. For personal use Remote.IT is free! You will need to first create an account using an email address (don't use "sign-in with Google"): Sign Up.
- After your have successfully verified your account, and after connecting your Pi Server to your wireless network (that has Internet access), click on "Setup", "General Settings".
- Under "Manage System from Internet" toggle the enable switch, name the device, and enter your remote.it username and password.
- Click "Submit".
- To verify a successful connection to remote.it, on the status page, mouse over the Wi-Fi icon.

CHANGING THE CONSOLE PASSWORD

- To change the web console, SSH and hard console password, on the server console window, click on the "Setup" tab and select "General Settings".
- Type the old password (the default is "Controller")
- Type your new password.
- Type your new password again to verify.
- Click "change password"
- If you lost your password, you can reset you Pi server to default settings by reflashing the SSD drive with the .img file that you installed the Pi Server with. Please note this will erase all your content off your drive. You should backup your media content before reflashing by either downloading it from the default Wi-Fi portal or logging into it via SMB with username tv and password tv. (start -> run \\tvcontroller.local\)

CHANGING THE SYSTEM TIME

- The system time and time zone settings are important so that scheduled live feeds start and stop as expected within the time zone.
- To change the system time and time zone on the server console window, click on the "Setup" tab and select "General Settings".
- It is highly recommended to get the time from the Internet as the Pi doesn't have an internal clock that keeps time when the unit is not powered on. If the power goes out the clock will be off by that same amount of time the system was off for. Using the Internet, they system will resync its clock automatically.

CHECKING FOR UPDATES

- To check to see if a newer version of TVs4Jesus is available, click on the "Setup" tab and select "General Settings". At the bottom under "Check For Updates", if the system has Internet access, it will automatically check to see if a newer version is available and show you how to download the latest version.

ENABLE WI-FI BROADCAST ON PI

- Raspberry Pi are equipped with on-board Wi-Fi which can be used to broadcast a wireless network that allows users to view your content from the Pi server (this does not allow users to access your Internet connection).
- To enable this, on the server console window under the "Setup" tab click "Wifi".
- Click the "Enable" toggle button.
- Select a name you would like users to see. Recommend calling it "public" or similar.
- Select a Wi-Fi channel that is not in use. If other Wi-Fi equipment is using something other than 1, 6 or 11, change them to 1, 6 or 11 for maximum throughput.
- Enter a password (recommended to leave blank)
- Click "submit"

STAND-ALONE WI-FI ACCESS POINT SETUP

You can add additional stand-alone access points to increase coverage area or bring connectivity where there is no TV near.

- Connect your Wi-Fi Access Points directly to the "TV Network" switch or vLAN.
  - Recommended SSID: "public" with no password, no encryption.
  - Disable broadcasting DHCP. Set the IP from DHCP or set them statically to the unassigned pool of 10.10.40.4-10.10.40.9.
  - Enable Band Steering to 5GHz if available.
  - Choose wireless channels that are not the same as the ones nearby. Stick to only 1, 6 or 11 on the 2.4GHz band.
- The TVs4Jesus server will assign your APs an IP as well as the clients who connect through them. If the user opens a browser they will automatically be directed to the TVs4Jesus landing page regardless of the address entered.
- This landing page will be automatically updated with the content you have uploaded to the TVs4Jesus server.

CONNECTING PI SERVER TO INTERNET (OR COMMON NETWORK)

- The Pi Server can wireless connect to your Wi-Fi network to allow management from the Internet or common network, and get help from outside support. (Don't worry; this will not give Internet access to TVs4Jesus Wi-Fi users)
- To enable this, on the server console window under the "Setup" tab click "Wifi".
- Under "Connect To Internet", Click the "Enable" toggle button.
- Type the SSID (name) of your existing Wi-Fi network.
- Enter your existing wireless password.
- Click "save and apply".
- If the Pi Server was able to successful connect, on the status page, you will see a white Wi-Fi icon next to the words, "Current Status".

WI-FI SETUP ON VERY OLD MOBILE DEVICES

- Not all mobile browsers can play videos within the browser (rare)
- A viable workaround is to install VLC on the end devices. You can download VLC one time from the Internet and place it in the content folder so users who cannot play the files natively can install this program without needing Internet access. You can also download and install it from the google play store. You will need to upload this file to the Pi server manually via WinSCP or SSH.
- https://www.videolan.org/vlc/download-android.html (you will most likely want the file with ARMv7)

THE STATUS PAGE

- WAN Wireless Icon
  - This icon shows the status of the Pi Server's Wireless WAN connection to your Internet connection or common network. It will also show its WAN IP and status of connectivity to remote.it.
- Temperature Icon
  - Next to the words "Current Status", there is an icon which looks like a thermometer. This should always be a white. If it is yellow or red, the Pi Server is getting too hot. In order to prevent overheating, the Pi Server will slow down and possibly create problems. It could even shutdown automatically.
  - Consider increasing airflow around the Pi Server or adding case fans to keep it cool. Don't place the SSD drive too near the Pi Server if heat is a problem.

THE STATUS PAGE (CONT)

- "Name" Column
  - The serial number of the Pi or the given name assigned.
  - Mousing over shows the Pi Model, serial, IP Address and version of client installed on it.
  - Click on it to change the serial number to something more memorable and change if you plan to use HDMI or RCA cables.
- "TV Attached" Column
  - Shows the name for which the TV reports itself. Usually a brand name or model.
  - If no TV is attached (or the power is pulled on TV), you will see "No Device Present"
  - If the TV is turned off but plugged in, you will not see the "No Device Present" message.
  - Mousing over will give additional information about the state, resolution, aspect ratio and frequency of the current running mode.

THE STATUS PAGE (CONT)

- “Playlist” Column
  - Shows the name of the playlist currently assigned to the device even if the device is playing a live feed.
- “Position” Column
  - Shows the “Playlist Number” > “Time Index” of the given playlist
  - During a Live Feed, it displays Live>”Time LiveFeed has been playing”

THE STATUS PAGE (CONT)

- "File Playing" Column
  - Shows the name of the file currently playing or the name of the LiveFeed during a live feed event.
  - Mousing over shows the full path to the file or live feed.
- "Volume" Column
  - Shows the audio volume on the Pi (not the audio volume set on the TV).
  - A volume around 80 is generally ideal.

THE STATUS PAGE (CONT)

- "Status" Column
  - Play/Paused/Stopped Icon
    - Shows the status of the Pi. The Pi will pause if it detects the TV is powered off. It will resume when the TV returns.
  - Mute/Unmuted
    - Shows if the Pi is set to mute, muting the audio (this is different than the TV itself being muted).
  - Connected
    - This shows if the HDMI cable is plugged in and attached to a TV that has power (not necessarily turned on though).
  - Wi-Fi Broadcasting Icon
    - If you have setup for your Pi to broadcast a Wi-Fi signal (Under Setup > Wi-Fi), an icon will appear here showing the status. Mousing over will show the SSID and number of users connected to this individual access point.

THE STATUS PAGE (CONT)

- "Actions" Column
  - Remote Control Icon
    - Click here to control the TV playback for the automatic playlist mode in real time.
    - Click the Icon next to the TV name to control the TV manually. In this mode you can manually select a video which will play to completion then return to the automatic playlist. Click Videos > Network > to see the list of available content stored on the Pi Server.
  - Circling Arrow
    - This will force the Pi to reboot.
  - Circle with X
    - This will release the Pi device from its adoption to the server and set it back to default settings
    - After releasing, you may adopt this device to another controller or readopt to the same controller.
- "Report" Column
  - This displays the last time the client Pi device has contacted the server. If it is greater than a few minutes, then there is a network interruption, the device is powered off or is not running properly.

GETTING STATISTICS FOR WHAT IS BEING VIEWED OVER WI-FI

- On the server console window under the "About" tab, click "Usage Statistics"
- The default view will show you the current month's full downloads (files saved to end-user's device), partial downloads (watched via Wi-Fi but not saved), the total amount downloaded and the average size.
- To change the reporting period, adjust the "Reported Period" values to the month and year desired.
- Click OK.
- To view the full range of statistics available click the "Back to main page" link above the top of the table.
- Statistics are updated once per day.
- These statistics do not include plays of the video by the TVs.

TVs4JESUS

End-User Use

CONNECTING TO WEB-REMOTE

- Connect your device to either the TVs4Jesus Wi-Fi network or your hospital wide Wi-Fi network for which the Pi Server is also a member.
- Open the TVs4Jesus landing page from the Chrome Browser:
  - http://tvcontroller.local
    - Use this if your computer or mobile device is connected to the TVs4Jesus Wi-Fi Network.
  - http://<EXTERNAL NIC IP>
    - Use this if you are connecting through your normal Wi-Fi Connection of which the Pi Server is connected to via its wireless WAN connection.
- Click on the "web remote" link at top of page.
- To control a TV using its web remote, you must have a user account on the Pi Server.
- Log in with the username and password given to your user.

PI WEB-REMOTE

- First login to the web-remote
- The first screen will show you the status and automatic playlist controls for all the TVs of which you have access.
- From here you can play/pause, mute/unmute, next/previous, fast-forward/rewind and adjust the volume of the videos in your assigned playlist. You can click on the title playing to view and select from the whole playlist.
- Click the remote icon next to the TV name to control the TV manually. In this mode you can manually select a video which will play to completion then return to the automatic playlist. Select 'Video' or 'Audio' to see the list of available content stored on the Pi Server.

PI LOCAL ACCESS

- While the TV4Jesus system is designed to manage the content of the TVs, a user can use a USB remote control plugged into the Pi to manually select programming.
- When the manually selected program finishes, the playlist/live feed configured in the TVs4Jesus server will resume control.
- Conversely a USB keyboard can also be plugged into the Pi for local access.

WI-FI ACCESS

- Content on the TVs4Jesus server is available to Wi-Fi enabled devices.
- Your location can advertise (posters, flyers, etc) that the network exists and is free to use.
- The user will connect to the Wi-Fi ssid you setup under Setup>Wifi.
- If the user opens a browser they will automatically be directed to the TVs4Jesus landing page. They may need to try to open a non https site for it to redirect. Recommend using "tv.com" as a link that will get redirected.
- Users can also type http://tvcontroller.local into the browser to force a connection (rarely needed).

TV USE RECOMMENDATIONS

- When TVs are not in use (perhaps overnight) it is recommended to unplug them from wall power to protect them from lightning and overvoltage.
- The system will detect that the TV is off and pause the playback until it gets plugged back in.

TVs4JESUS

Troubleshooting

TROUBLESHOOTING

- Symptoms:
  - TV Pi red light is steady but no green light during power on. Nothing is seen on the TV.
- Fix:
  - Your Pi can't connect to the server to boot. Be sure all ethernet wires are connected, switches are powered on and Pi Server is running properly.
- How to troubleshoot:
  - If other Pi are NOT having same issue-Connect TV Pi's ethernet cable directly to Pi server's ethernet port or closest known working switch. If it works then you know the problem is with your network. If it doesn't work, TV Pi may be bad. Verify it is a Pi model 3B+
  - If other Pi are having same issue-Verify server is running properly, switches are powered, cable is good

TROUBLESHOOTING

- Symptoms:
  - TV video stutters, is jittery, audio is out of sync sometimes, digital blocking, or ghosting.
- Challenge:
  - Your network is unable to keep up, is dropping packets, has bad wiring, or has EM interference.
  - You are using wireless bridges or wireless connections with intermittent problems.
- Fix:
  - Verify the server is plugged into the gigabit port on the switch
  - First determine the cause of problem by reducing the number of TVs/Wi-Fi users and doing network diagnostics.
  - When you upload a video using the server console "Manage Content" option, the video is checked to make sure it is reasonably sized, has the right codec and right format. If your videos passed this test, they should not be the source of a system wide problem. The standard Pi3B+ Server can easily handle 16 TVs and 10 Wi-Fi users concurrently using these verified types of video files. The system will slow down Wi-Fi downloads to assure the TVs don't stutter.

TROUBLESHOOTING

- Symptoms:
  - Pi will not start playing videos and the console reports “No Device Present”.
- Challenge:
  - The Pi is unable to identify the TV plugged into its HDMI port or there is nothing plugged into its HDMI port. This usually occurs if you are using the analog video out on the Pi instead of the HDMI port.
- Fix:
  - Log into server console. On the Status page, find the name of the device and click on it.
  - Click the “Play even when no HDMI Device Detected (Use this only when this Pi does not use HDMI but uses an analog audio/video 3.5mm plug)”
  - Click Submit.

TROUBLESHOOTING

- Symptoms:
  - I have a lightning bolt or a rainbow box in the top right hand corner on my TVs.
- Challenge:
  - This is the way the Raspberry Pi indicates that the Pi is not getting enough power to run at optimal performance.
- Fix:
  - The Ethernet cable for PoE may be too long, poor connection, or missing continuity on some of its wire pairs. Verify cable is good, try a different cable, shorter run or use a power adapter at the TV.
  - Use a power adapter that can provide at least 2.1A @ 5V or preferably 2.4A @ 5V.

SUPPORT

- TVs4Jesus is a completely free and open source project with a number of contributors.
- Please use the forum located at http://www.tvs4jesus.org/community/
- You can also send specific questions to support@tvs4jesus.org