

20 AWESOME USES FOR A RASPBERRY PI

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20 Awesome Uses for a Raspberry Pi

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You've been thinking about it for a while, and you've finally taken the plunge: you've bought a Raspberry Pi. Looking at the device, you know you can use it for so many projects... but you're not sure how. Can this little device really act as a desktop PC? As a server? As a radio station?

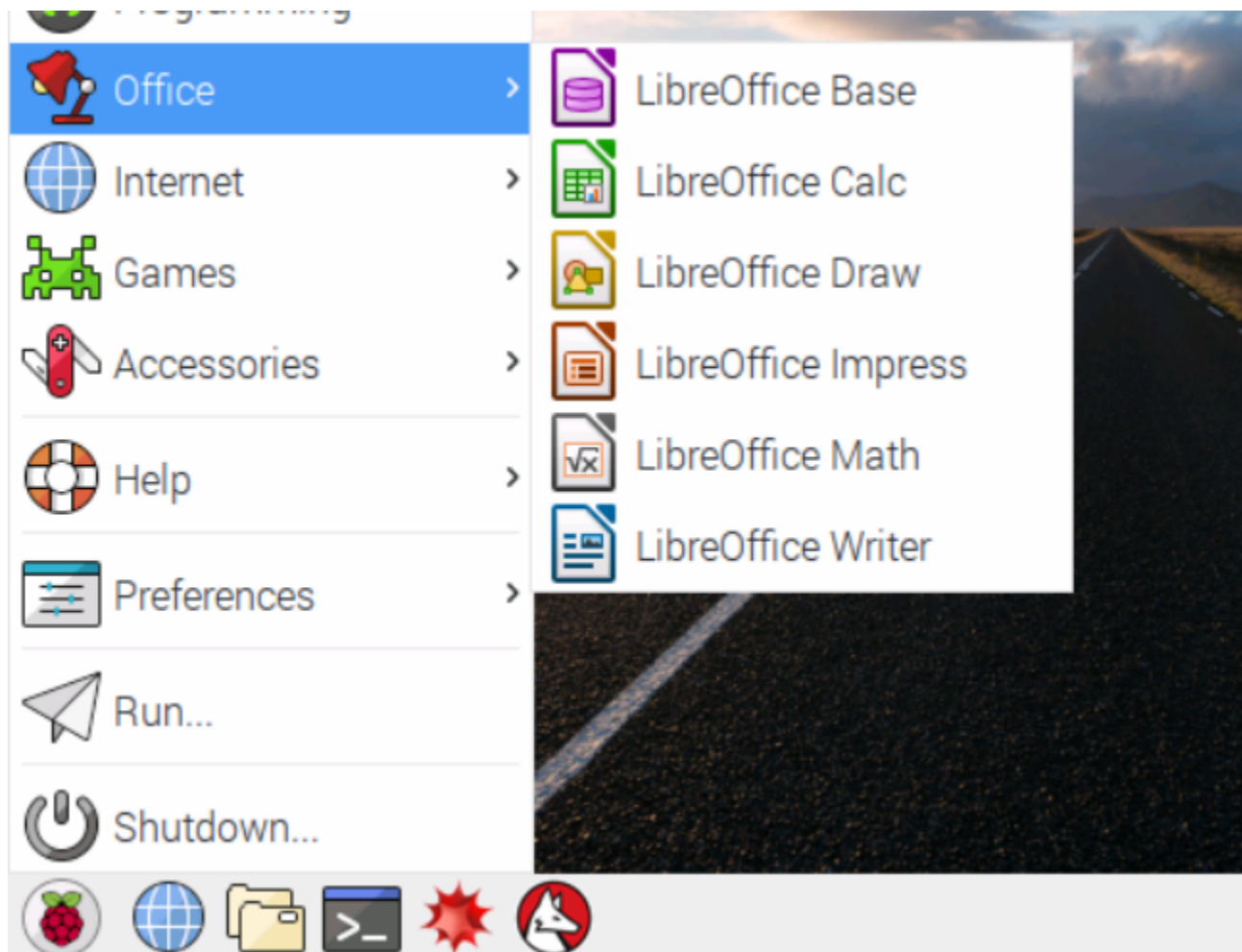
Yes, it can. Simply by **installing an operating system on the SD card** you'll have a number of awesome uses at your fingertips. Occasionally, a specialized operating system is required, but overall the process is the same: boot up, configure your Raspberry Pi (**or pre-configure with PiBakery**), install some software, and enjoy!

To get you started, we've collected 20 great uses for the Raspberry Pi, all with detailed tutorials from us all at MakeUseOf.

We'll assume you're using a **Raspberry Pi 3**, but most of these projects will work on the older models.

1. Desktop PC

Let's start with the simplest use for a Raspberry Pi: a desktop computer. This makes sense in several ways, not least because this project ensures you have almost all of the equipment you'll need for your Raspberry Pi.



Along with the Pi itself, the microSD card, and power supply, you'll need a HDMI cable and a suitable display. As with a traditional computer, you'll also need a USB keyboard and mouse.

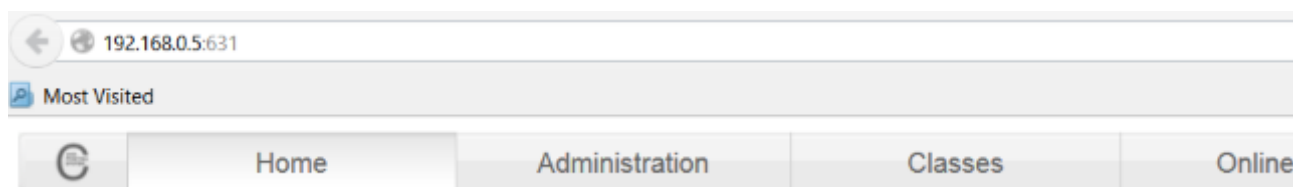
The Raspberry Pi 3 has built in Wi-Fi and Bluetooth, but if you're using a different model, you'll need compatible USB dongles (you can check compatibility at [elinux.org's Raspberry Pi Hub](https://elinux.org/Raspberry_Pi_Hub)). If you prefer to use Ethernet, however, the Pi is equipped with an Ethernet port.

Once you're set up, and have your preferred operating system installed (unless specified, all of these projects require the **latest version of Raspbian**), you'll find all of the tools you need to run your Raspberry Pi like a desktop computer.

LibreOffice is pre-installed, along with the Chromium browser. Any other tools you need can be **installed via the repositories, or downloaded via the browser**.

2. Wireless Print Server

If you have an old printer that you really like using, but which cannot be connected to wirelessly, you're probably inclined to **dispose of it safely**. But you really don't need to. All you need is a Raspberry Pi connected to your home network, and some print server software.



CUPS 1.5.3

CUPS is the standards-based, open source printing system developed by [Apple Inc.](https://apple.com) for Mac OS

CUPS for Users

[Overview of CUPS](#)

[Command-Line Printing and Options](#)

[What's New in CUPS 1.5](#)

CUPS for Administrators

[Adding Printers and Classes](#)

[Managing Operation Policies](#)

[Printer Accounting Basics](#)

This is done by installing the Samba file sharing software, followed by CUPS. The Common Unix Printing System provides drivers for your printer, and provides an administration console.

Once this is set up, configure the Pi to ensure any Windows or macOS computers on your home network can access the printer. That's all there is to it. Note that this really depends on your printer having a USB cable. If it doesn't, adaptors are available... but if your printer is that old, it should probably be upgraded to something that is cheaper to run.

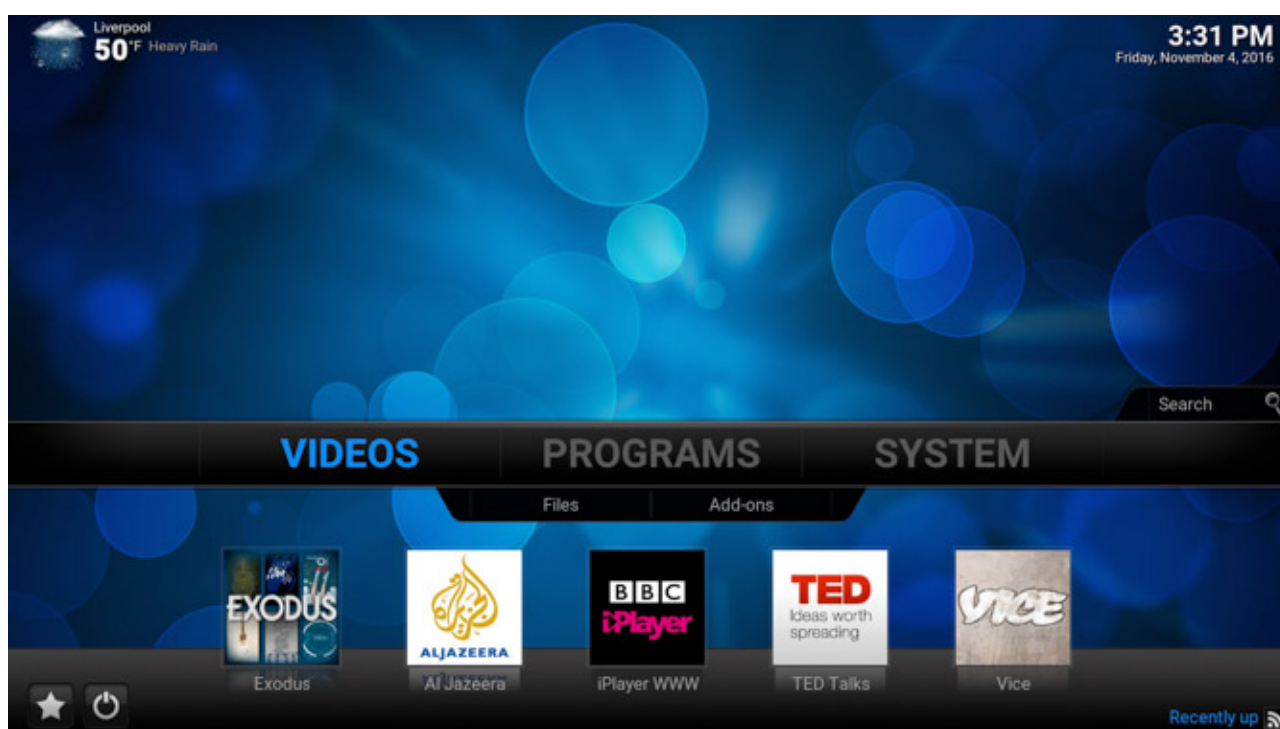
3. Add AirPrint Support to Your Pi Print Server

The above project only takes things so far. It's ideal for printing from a Windows, Mac or Linux computer, but what about tablets and phones? For that, you'll need Air Print support, which can be added via a single script.

Although printing is available natively on iOS devices, Android tablets and phones will require a dedicated app. Most new printers offer support for printing from mobile devices. With a Raspberry Pi, you can extend this functionality to older printers!

4. Media Center

While there are no figures, there's a very strong possibility that the main use for a Raspberry Pi is as a Kodi media center. Available as disk images, several Kodi builds have been released, with OSMC and OpenElec among the most popular.



If you prefer to keep your Raspberry Pi available for other projects, however, Kodi can simply be installed. It can also be added to retro gaming systems (see below). Installing Kodi comes with some caveats, however. Not all add-ons are available, and of those that are, many will be intended to stream pirated content.

As such, we recommend you only install **safe and legal add-ons from the official Kodi repositories**. But it doesn't end there. As with any device, a Raspberry Pi running Kodi is vulnerable to some security issues. To combat this, you can **set up a VPN to encrypt data** to and from your device.

5. Retro Gaming Machine

One of the Raspberry Pi's most popular uses, the device is ideal as a retro gaming machine. After all, it's compact and powerful enough to be used in a number of different ways. Not least to fit it as one of the lightest components of a **full-sized arcade machine**! The Raspberry Pi Zero is particularly adept at being **slipped into small spaces for gaming projects**!



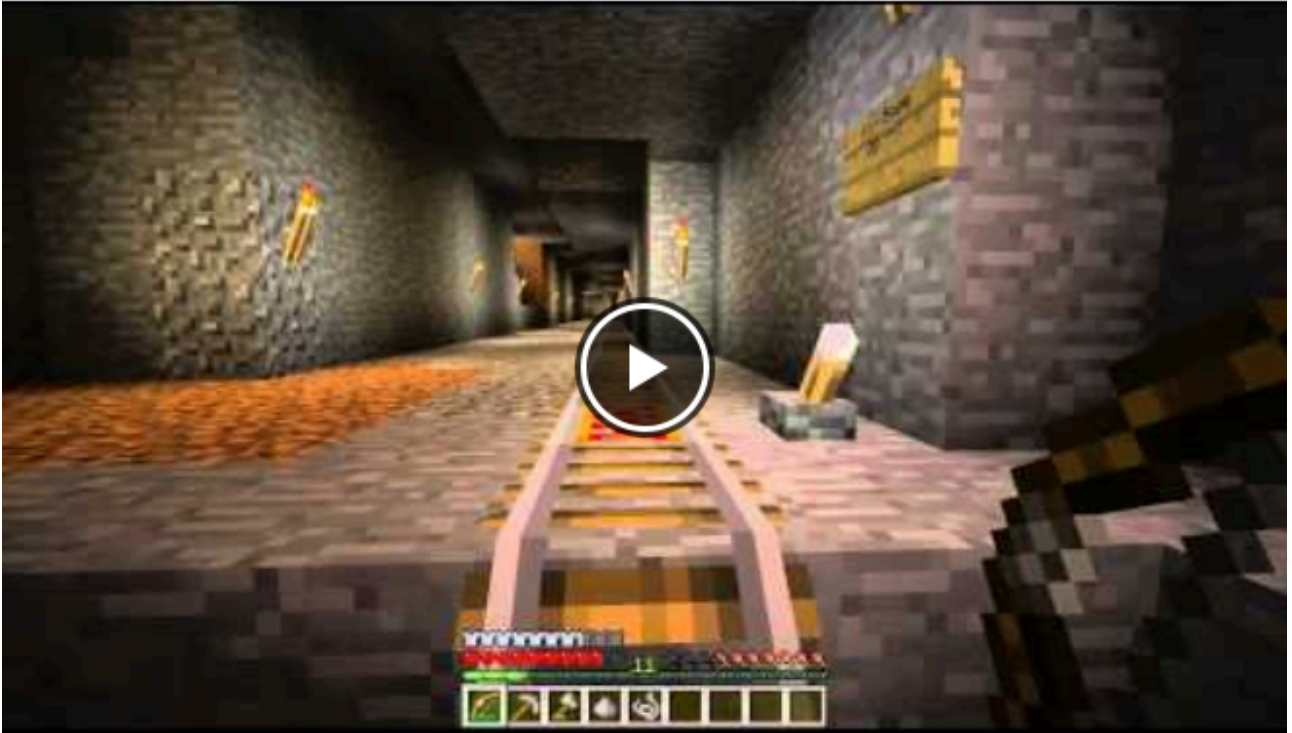
Watch the Youtube video here: [RECALBOX 4 0 0 Final](#)

Two main options are available for retro gaming, Recalbox and RetroPie. Others can be used, but all will need a suitable controller that will need some **initial configuration**. So many platforms can be emulated, from classic MS-DOS PC gaming to the Commodore 64, with a number of **popular 16-bit games consoles along the way**.

But you don't actually need to emulate games. Some **great games can be run on your Raspberry Pi without emulators**. A great **example is Doom**, but if you're looking for something a bit different, RISC OS, developed not far from the Raspberry Pi's headquarters in Cambridge, England, **can also be installed**. This opens a number of retro gaming options that you might not see in other, emulated platforms!

6. Minecraft Game Server

It doesn't stop with retro gaming. You probably know that your Raspberry Pi's default operating system, Raspbian, comes with a special version of *Minecraft* pre-installed. But did you know that your Pi can be used as a game server too?



Watch the Youtube video here: [Raspberry Pi \(Model B\) Minecraft Server](#)

Most effectively, your Pi makes an excellent game server for *Minecraft*, housing the world in which you can play from anywhere on your home network. If you have multiple Raspberry Pis, having one as dedicated server will give you a great gaming experience. This works particularly well if you have plenty of *Minecraft* fans to play with.

Beyond *Minecraft*, however, other multiplayer network games can be set up on the Raspberry Pi. Open source ports of *Quake*, *Civilization*, *Doom*, *Open TTD* and even the official version of *Windward* can be **installed as game servers on your Raspberry Pi**.

7. Robot Controller

There are so many projects that feature a robot-controlled Raspberry Pi that it's difficult to settle on a single example. You might, for instance, rely on a dedicated robotics package for your Pi, with the device battery powered and used to communicate and control your robot.



Watch the Youtube video here: [K-9 Replica With Raspberry Pi](#)

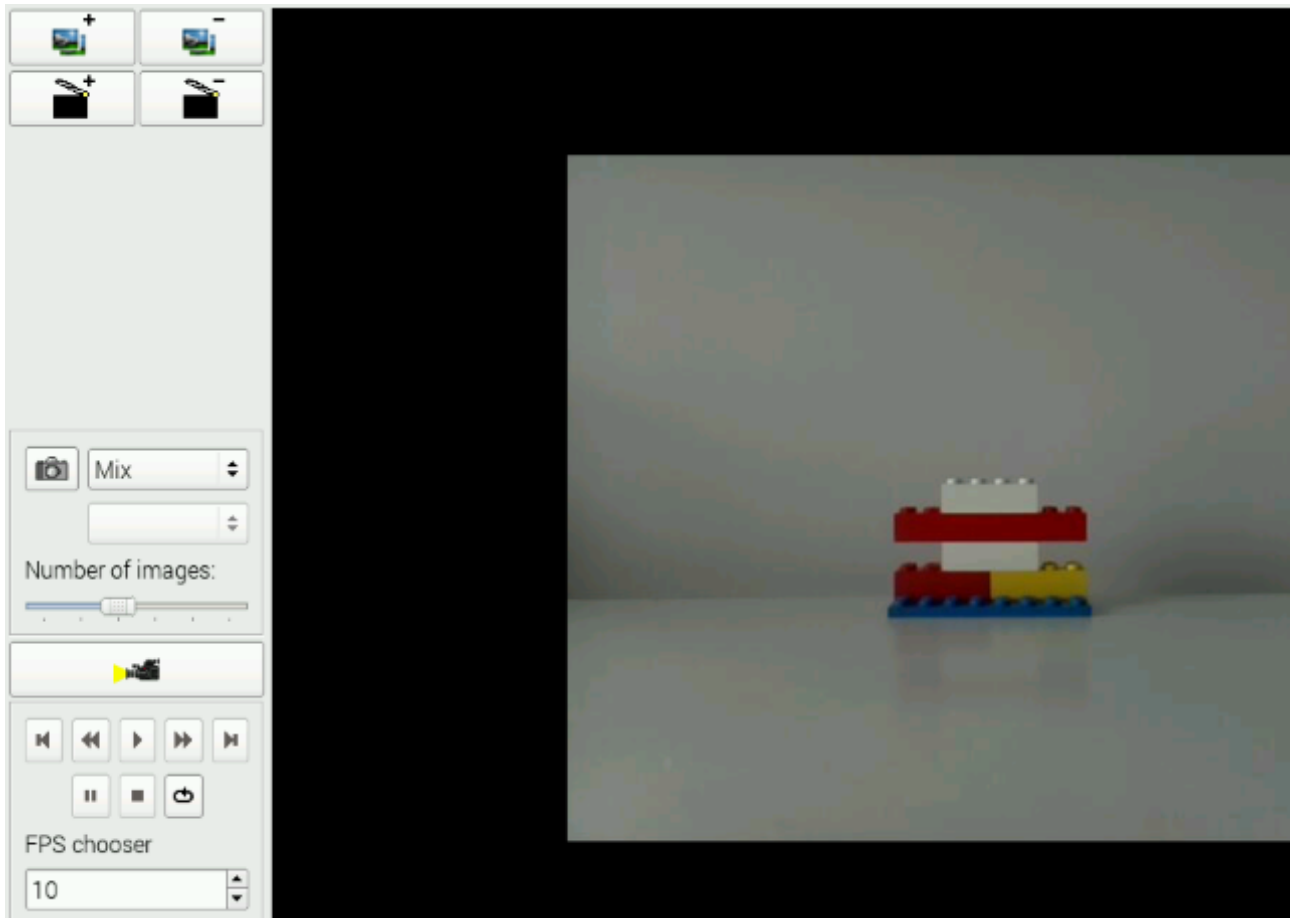
Or you might prefer your own design, built from components you already own. Either way, you'll need to make the right choice of Raspberry Pi, and for robots it can only be the Pi Zero W. This slimline version of the Raspberry Pi features onboard wireless connectivity, making it absolutely ideal for lightweight robots.

It's noticeably lighter than the Model B+ boards of the Raspberry Pi 2 and 3, and the low profile means it can be placed in the most efficient position, without worrying about USB ports.

Want some inspiration? Our look at [film and TV robots that can be built with a Raspberry Pi](#) should help. Otherwise, if you want to get started right away, [robot car kits](#) can be bought online.

8. Stop Motion Camera

Everybody loves stop motion video. From Wallace and Gromit to renowned director Terry Gilliam's early *Monty Python's Flying Circus* work, it never fails to amuse. But how is stop motion made? You can find out with a Raspberry Pi and a dedicated camera module.



Using the Python programming language, a suitable mount (overhead for Gilliam-esque paper craft animation, a standard tripod for clay- or toy-based), and a well-lit area, this is a time-consuming process. Some practice is needed to get good results, and you'll need to add a sound track.

You'll also need a breadboard to mount a button (unless you already have a suitable plunger button that can be connected to the Raspberry Pi's GPIO), and a Python script to snap each image.

9. Time Lapse Camera

Combining the Raspberry Pi camera module with a different script, it's also possible to capture time lapse movies. This is done by taking single frames with a timed delay. How you then use the Raspberry Pi for photographing time lapse is up to you. You'll perhaps need a portable battery solution, and a tripod may come in useful again. This time, you may prefer a smartphone tripod (the clamp should fit your Pi's case perfectly), to keep the device sturdy.



Watch the Youtube video here: [Raspberry Pi Time Lapse at Costa Coffee](#)

But what should you film? Flowers in the garden, fruit in a bowl, people passing by... perhaps the clouds in the sky, or the changing weather? You're really only limited by your own imagination, and how far you're willing to travel to get a good video.

Meanwhile, if your Raspberry Pi isn't giving you the photo quality you want, or the processing is too slow, why not use it to [manage time lapse on your DSLR](#)?

10. FM Radio Station

Do you have a message you want to share? Need to communicate with a group or community of people who don't have access to the internet? The answer is radio: and the Raspberry Pi is capable of broadcasting on the FM band!



Before you hit the link, however, it's caveat time: broadcasting over FM is illegal without a license. Fortunately, the Pi can only broadcast over a short distance, so you should be able to avoid getting into any trouble. Really, this is a proof of concept project. It might prove useful in some remote part of the world... it's certainly not suitable for setting up in a city center or suburban neighborhood.

A **portable battery solution** and **soldering skills** are required here. Any audio you wish to broadcast will need to be pre-loaded to the microSD card, and played in a loop.

11. Web Server

Another fantastic thing you can do with a Raspberry Pi is to set it up as a web server. This basically means that it can be configured to host a website. It might host your blog, for example.



Several methods can be used. You'll need to get started by installing the right software: Apache and its associated libraries. Or you might install a full LAMP stack, with PHP and MySQL alongside Apache. It's useful if you also set up FTP.

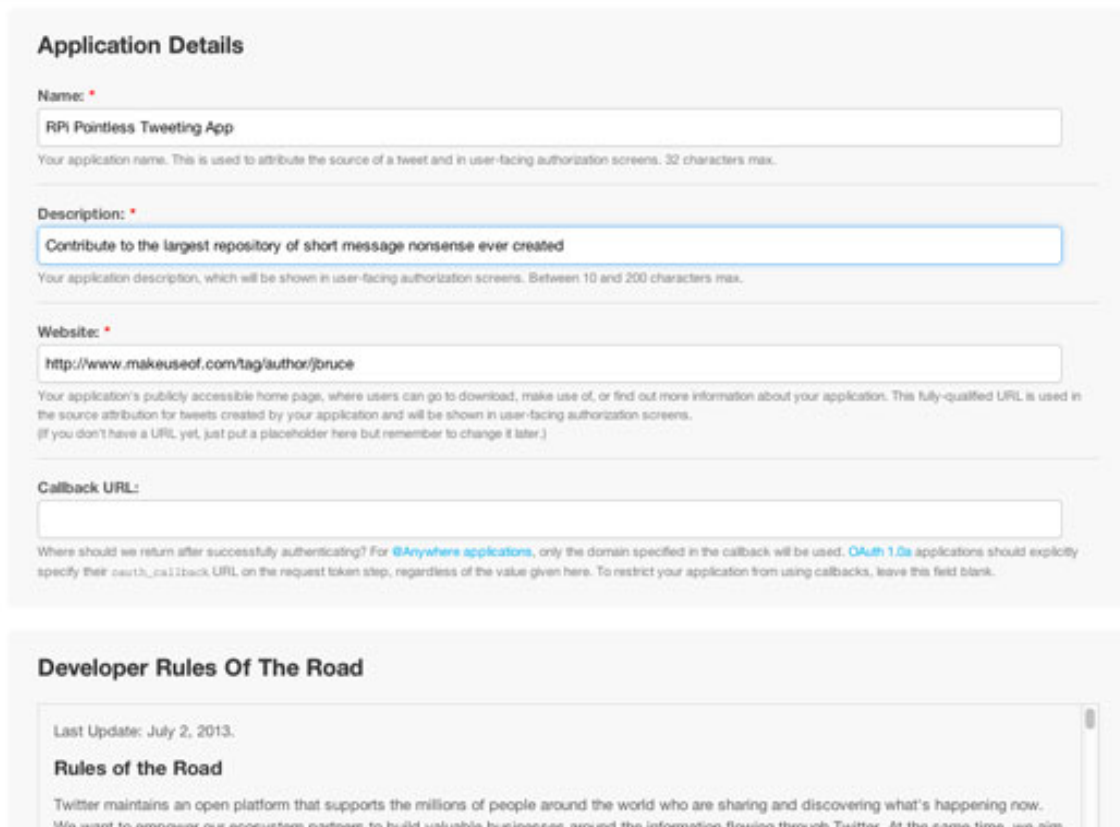
Once these steps are completed, you can save HTML files into the `/www/` directory, and your web server is ready. Or you might install some specific web software like WordPress, or its **slimline competitor, Ghost**.

To get your website online, using a solution like **No-IP.com** can get around the lack of a static IP address from your internet provider.

For a more educational approach to creating a website, **Google provides the Coder disk image**, which teaches HTML, CSS, and JavaScript skills.

12. Create a Twitter Bot

Twitter is full of nonsense. Much of it is courtesy of bots, programs that are created with the intention of posting messages. Some of these are useful; they might be updates from your favorite websites, for instance. Many are annoying, however, or even unpleasant. Most of these automated accounts are just targeted spam.



Application Details

Name: *

RPI Pointless Tweeting App

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description: *

Contribute to the largest repository of short message nonsense ever created

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

Website: *

http://www.makeuseof.com/tag/author/bruce

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens. (If you don't have a URL, yet, just put a placeholder here but remember to change it later.)

Callback URL:

Where should we return after successfully authenticating? For @Anywhere applications, only the domain specified in the callback will be used. OAuth 1.0a applications should explicitly specify their oauth_callback URL on the request token step, regardless of the value given here. To restrict your application from using callbacks, leave this field blank.

Developer Rules Of The Road

Last Update: July 2, 2013.

Rules of the Road

Twitter maintains an open platform that supports the millions of people around the world who are sharing and discovering what's happening now. We want to empower our ecosystem partners to build valuable businesses around the information flowing through Twitter. At the same time, we aim

But there are a few useful things you can do, and rather than utilize an online service to publish these messages, you can use a Python application on your Raspberry Pi. As long as your Pi has a permanent connection to the internet, it's possible to create a Twitter bot.

You'll need to register a Twitter app via the Twitter website. This enables access to the Twitter API, which the Twython software will interact with. All you need to do then is specify the type of content to be tweeted (anything from CPU temperature to a randomly selected "quote of the day"), with a cron job ensuring the bot tweets regularly. That's all there is to it!

But what sort of Twitter bot should you create? Our round up of the **best Twitter bot projects** should help you out here!

13. Build a Motion Capture Security System

Who is trespassing on your property? Who thinks they can break into your room and go through your things? And just what are they doing with your toothbrush?!



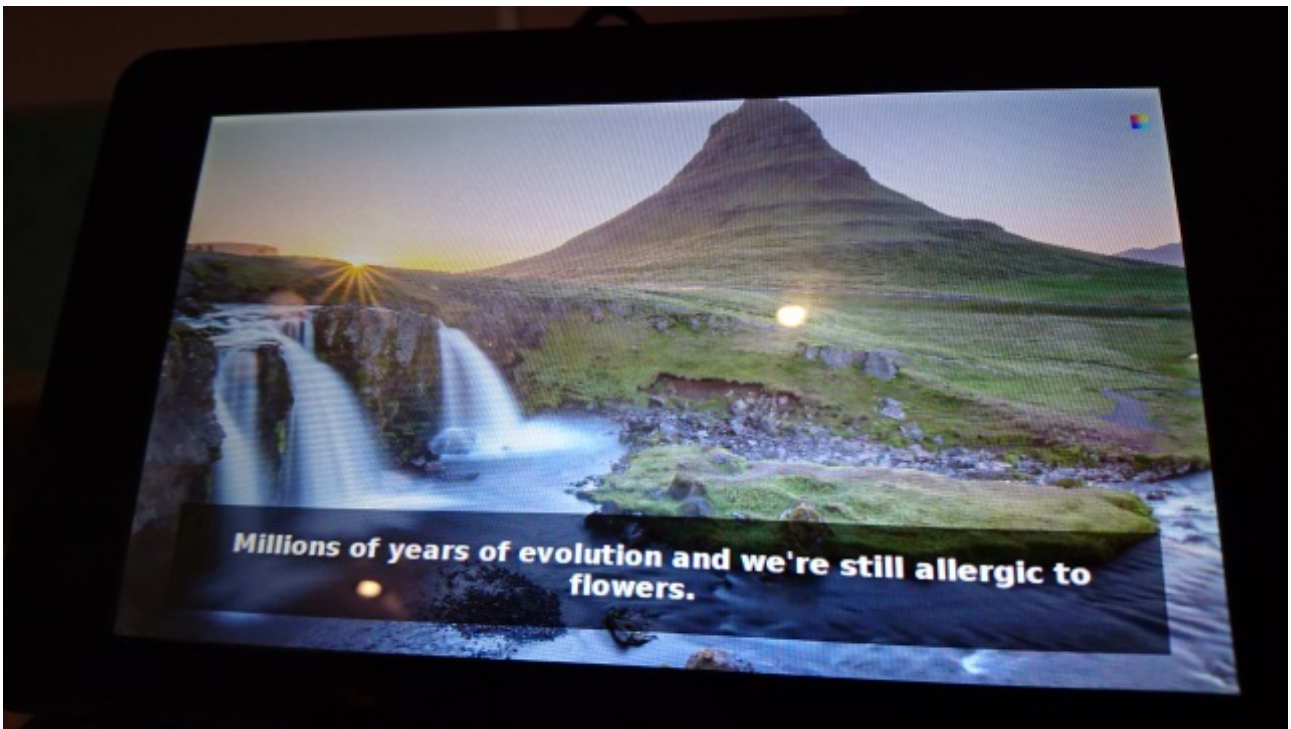
The only way to find the answer to these questions is with some sort of security system. With the Raspberry Pi Camera Module attached, or a generic USB webcam, you can build a motion capture security system.

Note that you will need a high capacity microSD card, or a USB storage device, for storing footage from the device.

This project combines the motion software with `uvccapture`, a tool for capturing the footage from your webcam. The `ffmpeg` software is also used to for managing the bitrate and time lapse. Once it's all up and running, you can expect the system to start recording whenever motion is detected. Email alerts can also be configured.

14. Inspiring Digital Photo Frame

Off-the-shelf digital photo frames are attractive, if somewhat limited in space, storage, and purpose. What if they could do more than just display your favorite family photos?



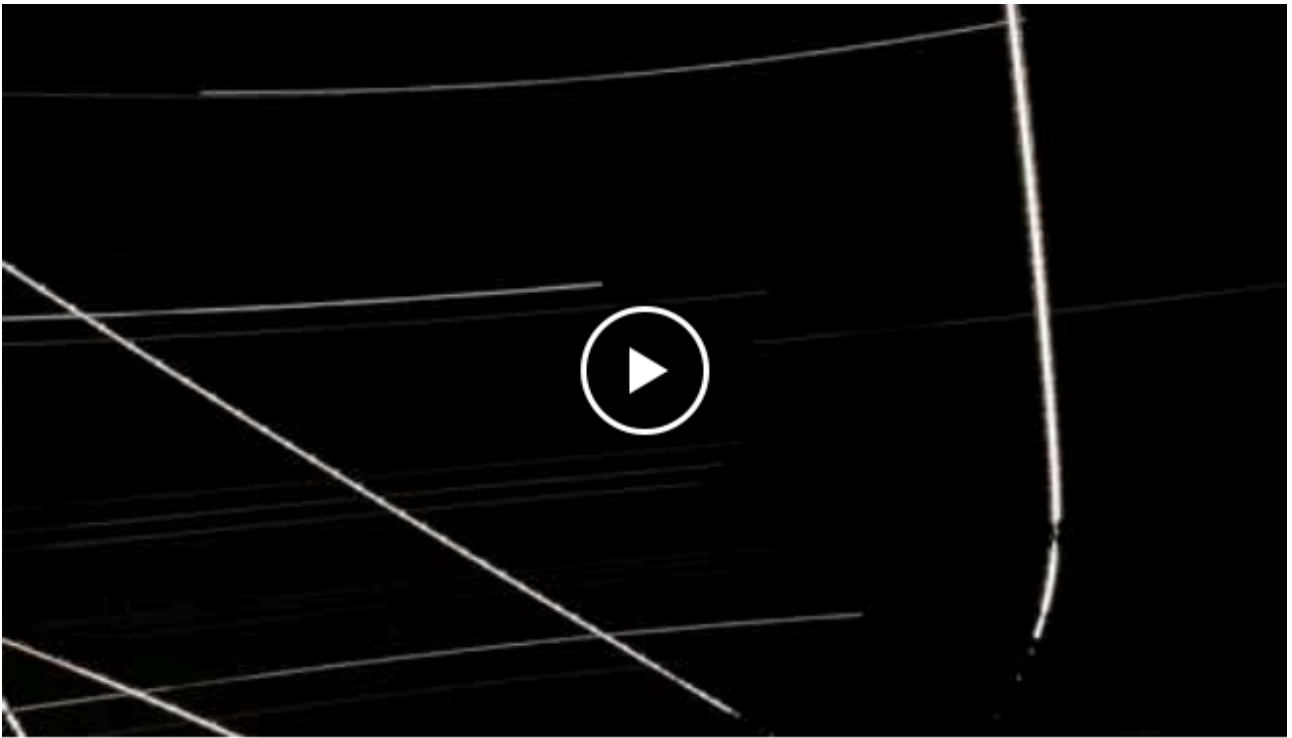
Using this build, you can create a digital photo frame that delivers inspiring messages alongside photos of beautiful scenes from around the world. The result is something that dazzles your eyes while making you really think about the message. While we used a Raspberry Pi touchscreen display for this project, any LCD display that can be connected to the Pi should be suitable.

You don't have to use the project linked to above, either. There are many other great [picture frame projects for the Raspberry Pi](#) – you might use these as inspiration for your own project.

15. Photograph the Night Sky

If stop motion, time lapse, and motion capture security aren't enough for your Raspberry Pi's Camera Module, why not try some night photography? For this, you'll need a [Raspberry Pi No-IR Camera Module](#).

With the IR filter removed, the camera gives better night-time results, letting you photograph what is happening above while you sleep below. This gives you the opportunity to snap stars, meteors, the moon, planets, even UFOs.



Watch the Youtube video here: [Meteotux pi windowcam](#)

For instance, you might use time-lapse photography to track the path of the stars and the moon overnight. Or employ a slow shutter speed to get a trace effect. Whatever your plan for night photography, the Raspberry Pi should suit your requirements perfectly.

16. Build a Network Monitoring Tool

Interested in being able to monitor the devices on your network? Concerned about a lack of connectivity, or want quick notice when your blog or website is offline?

Home

Basic Items

- > Show History
- > Show Host parent / child view
- > Generate Nagios config
- > Hosts Show / Add
- > Hostgroups Show / Add
- > Services Show / Add
- > Advanced Services Show / Add
- > Servicegroups Show / Add

Additional Items

- > OS Show / Add
- > Contacts Show / Add
- > Contactgroups Show / Add
- > Checkcommands Show / Add
- > Misccommands Show / Add
- > Timeperiods Show / Add

Advanced Items

- > Host presets Show / Add

Show: host







Searchfilter

OS

Search

Overview

Entries 1 - 6

hostname	address
 FreeNAS	192.168.1.20
 hpj2605dn	192.168.1.30
 linksys-srw224p	192.168.1.253
 NagiosPi	127.0.0.1
 winserver	192.168.1.2
 www.kasterborous.com	104.131.232.79

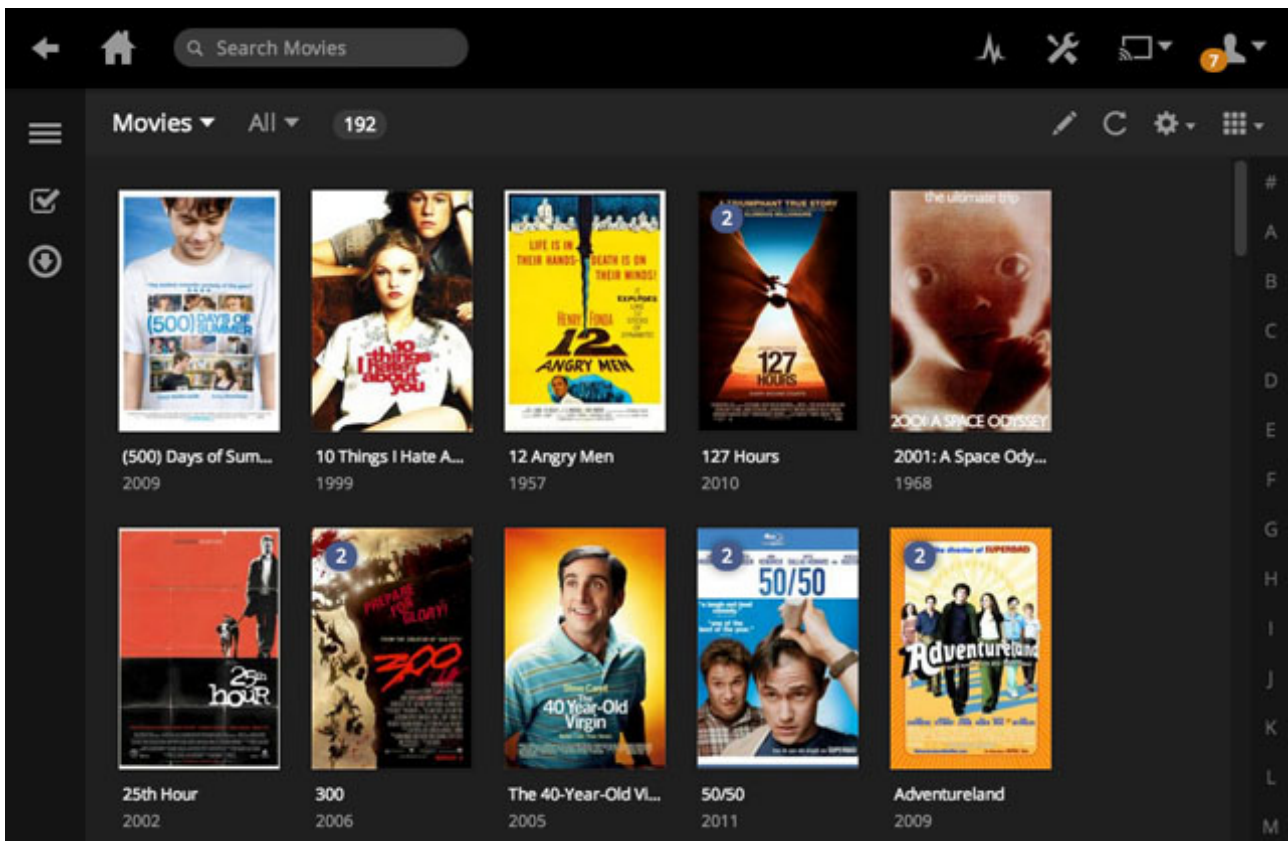
The answer is a network monitoring solution. Several are available, but perhaps the most popular is the open source Nagios tool, which is easy to install and configure. With this installed, you can monitor up time, view a visualization of the devices on your network, and more.

Traditionally, it has been installed on Linux boxes, but in truth, it's a bit of a waste of a full desktop PC or server. However, it is ideal for a Raspberry Pi!

All you need to do is download the Nagios disk image and flash it to your Pi's SD card. For the best results, use a Raspberry Pi 2 or later for this project, as Nagios can get a bit resource-intensive.

17. Your Raspberry Pi as a Smart TV

We've already looked at Kodi as a media center, but there are more TV-based entertainment projects you can do with a Raspberry Pi. In short, you can turn your standard, dumb TV into a smart TV. As if that wasn't enough, you can even enhance the features of an existing smart TV!



For a TV to be “smart” it should be able to play media from a USB or flash storage device, stream video from Netflix, YouTube, and similar sites, and offer remote control. This is often from a mobile device when it comes to Raspberry Pi projects. Smart TVs should also offer news and weather, and PVR support, which a Raspberry Pi can manage thanks to a USB TV card.

Beyond Kodi (or in conjunction with it) a Raspberry Pi can be used as a Plex client. This means that you have a PC or server running Plex, and have the RasPlex software installed on your Pi. Browsing the server's media should be straightforward, enabling you to enjoy all movies, TV shows and music stored upon it.

Meanwhile, the Raspberry Pi 3 can mimic the Google Chromecast thanks to MiracleCast. This means you can “cast” video from your mobile device to your Pi. Pretty handy! Other smart TV projects are available, as you’ll discover.

18. **DIY NAS Box**

Want to create your own local network drive? It’s a **great idea to have a Network Attached Storage device**, if only for browsing from a media center. My personal favorite use is as a network drive where I can store all of my writing projects.

Personal NAS drives are very small, too, which means they can be hidden away in cupboards, or on top of wardrobes. The same is true of a Raspberry Pi NAS, which is simply your Pi connected to an external hard disk drive or high capacity flash storage. You might even use an SSD drive.



You can set this up manually with Samba, or you can flash a dedicated **NAS4Free image from Sourceforge**. It won’t be long before your vital data is stored on your home network drive, freeing up space on your PC. Just remember to back up your NAS drive regularly!

19. A Home Automation System With Arduino

The Raspberry Pi makes an ideal brain and interface for a home automation system. Coupled with an Arduino, and running the Node.js app Heimcontrol, home automation is made possible via a few remote-controlled radio-enabled mains adaptors. Heimcontrol lets you enable or disable any devices plugged into the adaptors, via the Raspberry Pi, with signals transmitted by the Arduino.



Watch the Youtube video here: [Heimcontrol.js Pi + Arduino Home Automation](#)

To be honest, this approach is best taken if you're looking for a way to familiarize yourself with the basics of home automation. However, if you're interested in a system that more or less works right away, with smart home automation tools, hardware, and equipment that is already up and running in your home, then teaming up a **Raspberry Pi with OpenHAB** should work perfectly.

20. Build an AirPlay Receiver

We've already seen how AirPrint support can be added to a Raspberry Pi acting as a wireless print server. Concluding this list, here's AirPlay in operation, enabling you to turn your Raspberry Pi into a smart speaker. Want to stream audio from your mobile device through a DIY speaker set up?



Watch the Youtube video here: [DIY Raspberry Pi Streaming Music Station](#)

Utilizing the **Pi Music Box dedicated disk image** for the Raspberry Pi, and connecting the minicomputer to a suitable speaker (in our example, a combi amp), you can also stream audio directly from the web. Google Music, Spotify, SoundCloud and many other services.

Along with AirPlay, the Pi Music Box uses Spotify Connect, DLNA/OpenHome, and BubbleUPnP, has USB audio support, and compatibility with several Raspberry Pi soundcards.

Your Favorite Raspberry Pi Project?

We've shown you an immense collection of 20 uses for a Raspberry Pi, all with the links you'll need to get these projects off the ground. MakeUseOf writers have been tinkering with the Raspberry Pi since its launch in 2012. As such we have a massive library of projects for the device, which you can find using our search tool.

What's your favorite use for a Raspberry Pi? What would you like to see us do with a Raspberry Pi? Tell us in [the comments section](#), or even better, share your photos!

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