

Digital Signage for the Home

mirror, mirror, on the wall...

First, apologies

I updated my slideware last night and my colour scheme does not work and I can't make things go flush left.

I have some reading to do :)

Digital Signage

What do I mean when I'm talking digital signage?

Well, not billboards, demos, or anything like that.

I'm thinking about live information - summaries,
short items.

There are a lot of options

The decreasing cost of larger LCD displays has basically caused a large growth in display systems. Most of these are meant for commercial use, but there are a few that allow you to use them for personal activities.

Some options

A quick internet search will give you hundreds of resources. These include:

- Screenly
- Rise Vision
- Opti Signs
- Screen Cloud
- Signage Live
- and too many more to list here.

Home use

Well, pretty much all of that is geared at a monthly cost and proprietary gear. If all you want is an information display, we can do better with commonly available items.

What do you need?

That is a great question.

The answer is “It depends...”

Do you know what you want from this kind of system?

If not, you will be doing some homework to see what is out there.

Context is always king.

The probability is that you actually want something that shows:

- Date and time (everybody likes a clock)
- Weather forecast (we have an obsession with that)
- Headlines from some news feeds
- Calendar(s)
- Some pictures, view from the ISS, etc.

Typical items people view

- Finance
 - Stock market
 - Bitcoin
 - Currency exchange
- Sports
 - Formula 1
 - NHL
 - NFL

Tech inspired items

- Alarm system status
- Home sensors
- IoT device status
- Views from security cameras
- Home system dashboard
 - NAS
 - Hypervisor

Setting some expectations

I'm looking for something simple. I don't need to go crazy and I can expand as necessary.

- It can use what I already have - or not.
- Do I have selection criteria?
- How powerful does it need to be?

Decisions

- RaspberryPi 3 (I have a few that are idle)
- Underutilized Monitor
- Easy to manage
- Free (I can always create a Kiosk on a browser if necessary)
- Can access info services/data feeds

New criteria/Scope creep

My wife thought this was a great idea, now it has to show things like:

- Incoming calls
- Daily summary page
- Calendar
- Schedules
- To Do List
- Headlines
- etc.

Does something for this exist?

I hinted on the title page.

A lot of this is handled by the various magic mirror projects that have been published for years. I'm not doing that, as I don't want a smart mirror, this will be sitting in a room corner on a wall mount.

Other than adding a "fancy box" and some one way glass, this is the same project.

Magic Mirror 2

After looking at a number of projects, I thought I'd use the Magic Mirror 2 software at <https://magicmirror.builders/> for my base.

It is open source, actively developed and has a ton of third party integrations.

I might make a mirror sometime, but this is just an info display.

The Information Cul-de-sac

With the revised criteria and my wife wanting it to be tailored for her use, it is no longer a spare monitor.

I decided to get a cheap smart TV from Costco as it is reasonably large and “low resolution”, so it will be perfect in a corner on a wall mount.

It will also be hung portrait as the space is small and there is a window and a stairwell. to deal with.

Parts

- Existing Raspberry Pi 3
- 16GB SD card
- HiSense “smart” TV
- 3A power supply for the Pi

System Requirements

- A full (not lite) Raspberry Pi OS (formerly raspbian).
- Magic Mirror Software
- Internet connection for data feeds
- A selection of modules to display information

The fun begins

This project was actually conceived back in November of 2020. The requirements kind of evolved after a comment that I really should get that shared calendar I had on the side of the fridge back up and running. We don't have that option any more since the renovations, so maybe something new...

It started so innocently

I picked up a wall mount that would extend on an arm for ease of access since this was a tight corner and it would be at a 45° angle from the wall.

I mounted the wall plate and opened the TV box. Surprise, the TV had a non standard arrangement. It would not work with this mount.

I ordered another after carefully making sure it would work.

Mounting the TV

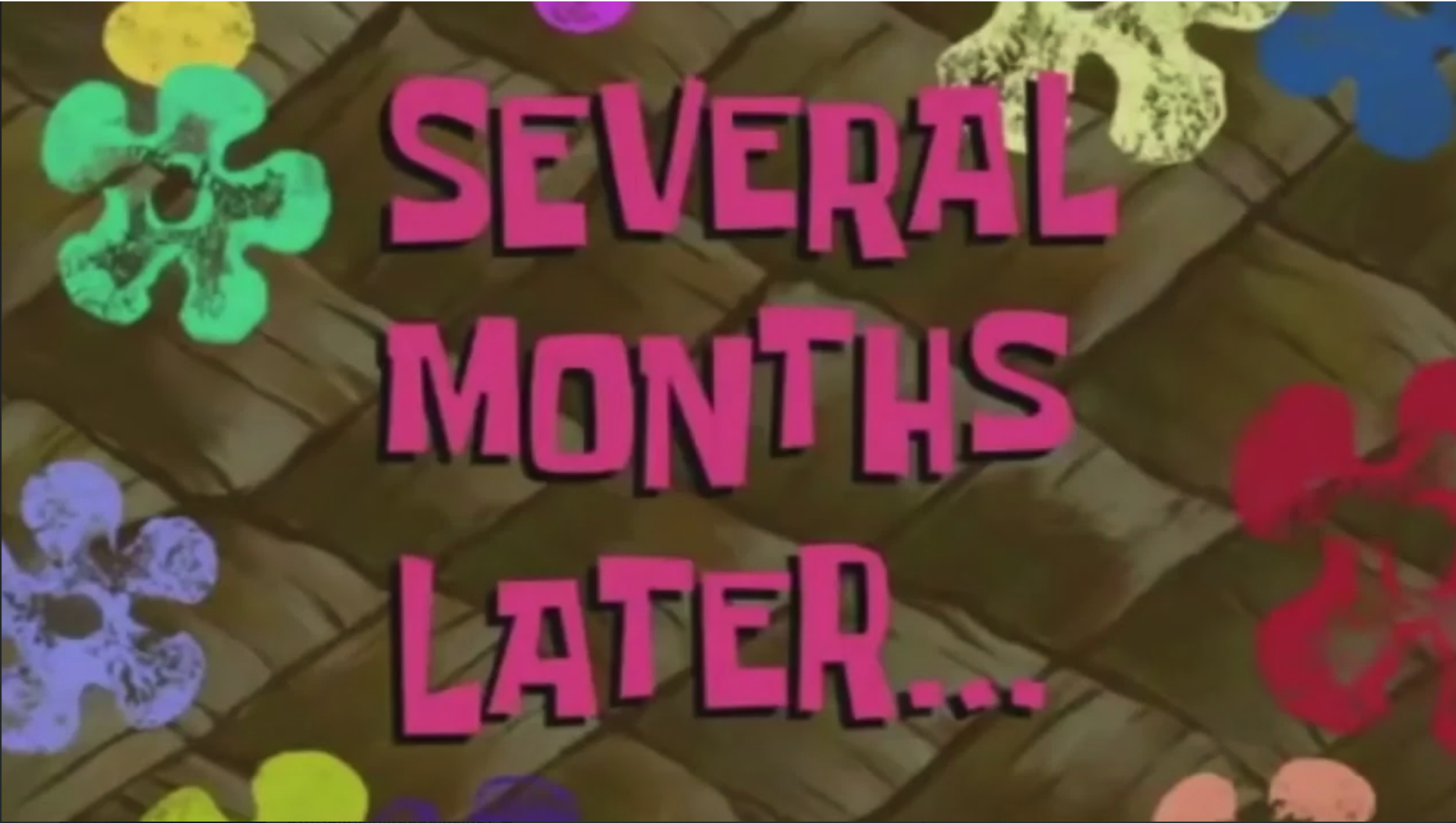
This part went very well - initially.

That should have been the warning for things to come. The next gotcha was I only have one spare outlet, so I needed a small power bar that would easily wall mount. All of mine are rather industrial and would not hide cleanly behind the rather limited coverage provided by the TV.

I got one and some 3M command strips so I could mount it without drilling holes in the wall be able to move it.

Checklist so far

- [X] TV Mounted
- [X] Power available



**SEVERAL
MONTHS
LATER...**

Life intervened

I got distracted by some other things and this remained a stalled project for months. I eventually got it back on track by deciding to talk about it.

Motivation 101.

Pro Tip: If you need to get something done, volunteer to give a talk on it.

Finding the right software

I already discussed that, but it took time to read up on everything and decide to use this one. It had the right things and looked reasonably easy to do.

This software uses a full distro. More on that later.

Burning the image

We have talked about burning images in several meetings in the past. The Raspberry Pi foundation has created an image burner package that runs on pretty much anything and will create a proper image for you. I tried it out and it worked quite well.

Booting the image

I inserted it into the Pi 3 case, hooked up the video to HDMI 1, added a dongle for a wireless keyboard, and added power.

It booted and I realized my first mistake, it was rotated 90°.

That should be easy to fix, most distros have ways of fixing that once X is running... Nope. Not the Pi.

You have to edit the config.txt file in /boot on the SD card. and reboot. At the bottom, add `display_rotate=3` (in my case, 270° rotation.)

Initial config

Of course, there is an initial config that lets you do some basics:

- New password for the pi user
- Screen resolution
- Overscan
- Country, timezone, language
- WiFi

The WiFi (and bluetooth)

The Pi 3 has WiFi and bluetooth built in.

This is now mounted on a wall, and I don't have a LAN drop nearby. I do have WiFi, so we can use that. Or so we think.

It had issues finding my access point. Many attempts and it kept disassociating.

Try 2

I have a few WiFi dongles, so maybe one of those?

Again, No!

I had one on a longer cable and an extended range antenna. That seemed to work.

On to the next step - updates

Segue - Wolfram Alpha

For those who are unaware (or have forgotten), the official OS comes with Wolfram Alpha, which is a very interesting piece of software, but has little use for an info display system. The update took ages (it is big) and eventually locked up the Pi.

I suspect it was the more powerful antenna power draw and the very large download that caused the Pi to overheat.

Hardware Change

After changing the Pi, just in case there was something else wrong, I tried updating again. It eventually succeeded after 5 hours. The load on the system eventually went over 10 and it was swapping.

Magic Mirror

The magic Mirror site has some basic install steps:

- Download and install the latest Node.js version:
 - `curl -sL`
`https://deb.nodesource.com/setup_14.x |`
`sudo -E bash -`
- `sudo apt install -y nodejs`
- Clone the repository and check out the master branch:
`git clone`
`https://github.com/MichMich/MagicMirror`

Install (contd)

- Enter the repository: `cd MagicMirror/`
- Install the application: `npm install`
- Make a copy of the config sample file: `cp config/config.js.sample config/config.js`
- Start the application: `npm run start`

Do not second guess

I looked at the dates and checked out the current Node.js version. It is 16, not 14, so I installed that. This was a mistake. Use 14 and save yourself some rebuild time.

As a matter of fact, the previous page states use 10, even though the install instructions say 14.

Time invested so far

At this point, I had used Friday evening and the vast bulk of Saturday.

I was in a unknown state with the system.

I had lousy WiFi for some reason (probably a lot to do with the location and the Pi power issues). A powered hub may have helped here, but I don't have a small one to test with.

Why do it this way?

Now, I could have stopped at any time and mitigated my grief, but I was being stubborn and wanted to see how bad it would be with a bad connection and assuming little knowledge of how to fix things. Surprisingly hard if you are new to this and don't know who to ask or have extra resources.

Other things 1

I disabled the onboard WiFi and Bluetooth (there are config.txt items for that as well), to see if that would help with the power draw for the antenna. It did help a lot. It also gave me a single wireless adapter to configure.

When I first plugged it in, I forgot it had WiFi and bluetooth, so I added a dongle. I had three radios and I thought I had plugged in a multi-radio USB dongle.

Other things 2

When I was having the WiFi issues, I decided to turn on the TV WiFi. That was an educational mistake. I figured I'd leave it on and the TV clock would be right as well and maybe I'd connect an antenna or something later. When I associated it to the WiFi, it immediately downloaded new firmware and insisted I create an account for features by providing an email address. I could not use any menu functions, this is to get an activation code so you can use the smart functions. I factory reset it.

Moving along

On Sunday, I just burned the SD card for a clean image and used a third Pi to connect to my main TV, added a wired LAN cable and a wireless keyboard.

The whole thing took about two hours and the bulk of that was the same items that slowed down the previous install (but much faster). The initial three modules show up and need configuration.

A terrible view



Next steps

- Add a few modules and test
- See how to integrate it with my doorbell
 - No, not a ring or any camera, a physical button. If it gets pressed, it pops up the security camera frame and plays a doorbell sound.

Lessons Learned

- Don't second guess the instructions
- Build in a wired environment first
- Don't mount the monitor in portrait mode before you are ready
- Did I say follow the instructions?
- Keep having fun! This was so far

References

- [Raspberry Pi Home Page](#)
- [Magic Mirror 2 Homepage](#)
- [Several Months Later Image](#)
- [Raspberry Pi Imager](#)