

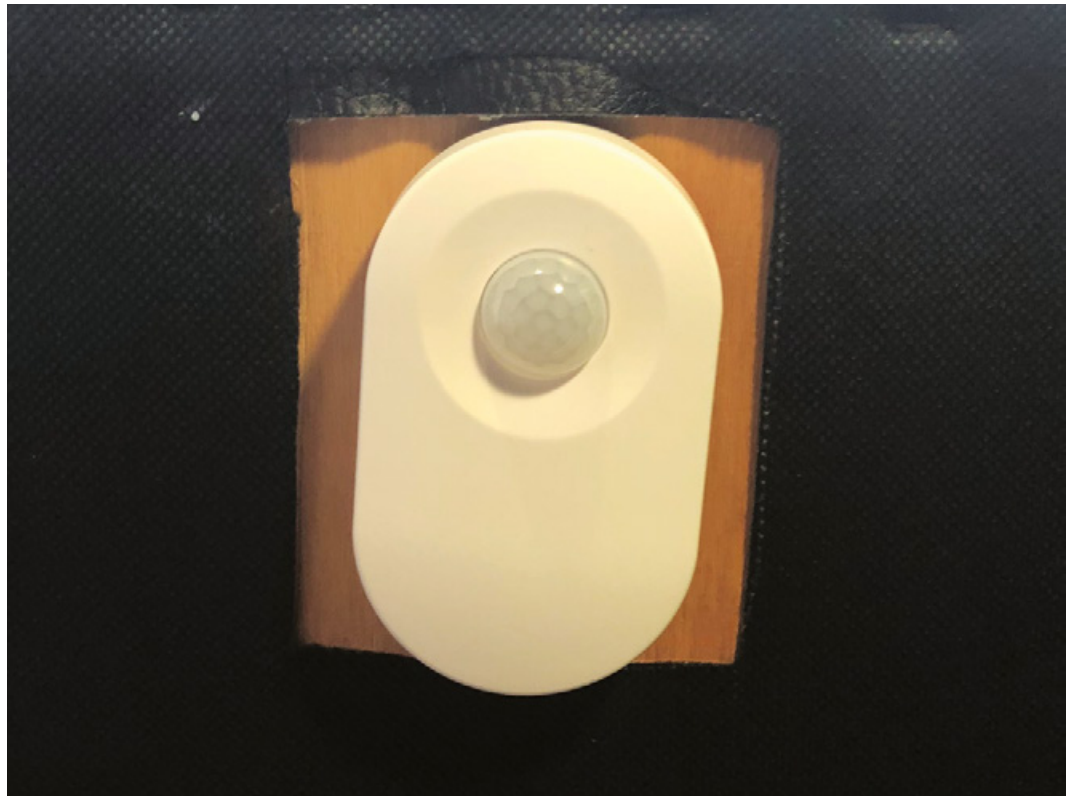
Controlling smart lights with Home Assistant

Making IKEA's smart lights a bit smarter



Dylan Murphy

Dylan is an app and website developer. He is a vintage Macintosh collector and lover of all things IKEA.



YOU'LL NEED

- ◆ **Raspberry Pi**
(preferably Pi 3 for better performance but can work with any model)
- ◆ **Trådfri gateway**
- ◆ **Trådfri bulb**
- ◆ **Trådfri steering device**
- ◆ **iOS or Android mobile device**

OPTIONAL

- ◆ **Trådfri motion sensor**

Home automation is great for a plethora of possibilities, but can be expensive and restricted by the manufacturer. Home Assistant aims to change that and IKEA's Trådfri helps to reduce the cost.

IKEA's Trådfri smart home lighting system is an inexpensive way to introduce yourself into the world of smart home gadgets. The Trådfri system is relatively inexpensive but, unfortunately, is very restricted – that's where Home Assistant comes in.

Home Assistant is an open-source home automation platform that runs on Python 3. It requires very little processing power and therefore is perfect to be run on a Raspberry Pi. Home Assistant combines smart home devices and allows them to all be controlled together from a single app or online UI. At the time of writing, Home Assistant has support for 988 components. A component is an extra piece of software that is installed onto your HA instance (the Home Assistant UI), to allow a smart home device to be controlled with Home Assistant. This

number is increasing all the time. Home Assistant then allows you to create automations that link all of these components together. This opens a vast range of possibilities that were never open before. An example of this is turning on a fan connected with your smart plug when the temperature goes above 20°C. Or, you could do something more extreme such as playing music on your Sonos at home and turning on your Roomba to vacuum your house if your Tesla door is unlocked, but only if it is precisely 03:15 in the

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morning. This allows the restricted Trådfri system to unlock its full potential for a fraction of the cost of a more expensive smart lighting system.

To get started with IKEA's Trådfri smart home lighting system, you will first need to set up the gateway on the Trådfri app. This is free from the Google Play Store or the Apple App Store. Firstly, plug in the Trådfri gateway to a wall socket and a network port. Launch the IKEA Trådfri app on your mobile device and connect to the same network as your Trådfri gateway. Follow the instructions on the app to connect your bulb and steering device together (Figure 1).

To be able to still use and edit your HA instance, you will use your Raspberry Pi in headless mode (using a Raspberry Pi without a keyboard, mouse, or monitor) – the end goal is to leave your Raspberry Pi alone acting as your home automation hub.

Once you have successfully set up the Trådfri hub you need to set up Home Assistant. There are 14 different ways to install Home Assistant through varying methods and on different systems. Our favourites are hass.io and Hassbian. Despite it requiring a few more command lines, we've found it to be more reliable in the long run and gives you more freedom to do what you.

To install Hassbian, go to hsmag.cc/xRzRvm and select 'Download the Hassbian image'. Use Etcher to flash the image onto your SD (or microSD) card. Etcher is a free piece of software available on macOS, Windows, and Linux. Once the image has flashed



Figure 1 ◆ IKEA also sells a small wireless dimmer which is more minimalistic than the steering device. You can set that up here as well

onto an SD card, insert the card into the Raspberry Pi. Connect the Pi to the internet and boot it up. Boot up the Pi and wait approximately five minutes. After that time, go to hassbian.local:8123. This is your Home Assistance instance.

To be able to use your Raspberry Pi without a keyboard, mouse, or monitor, you need to access it via an SSH connection. Connecting via SSH is when you connect from one computer to another. This can be done on macOS, Windows, Linux, or even a mobile device.

Setting up an SSH connection on a macOS or Linux computer is simple. All you need to do is find out the IP address of your Raspberry Pi. (This can be easily found on your router's online UI, although this will differ with each manufacturer. Your Raspberry Pi will usually be labelled 'hassbian'.) Then open up a Terminal and type... →

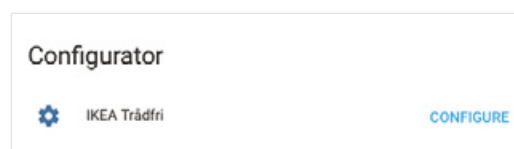
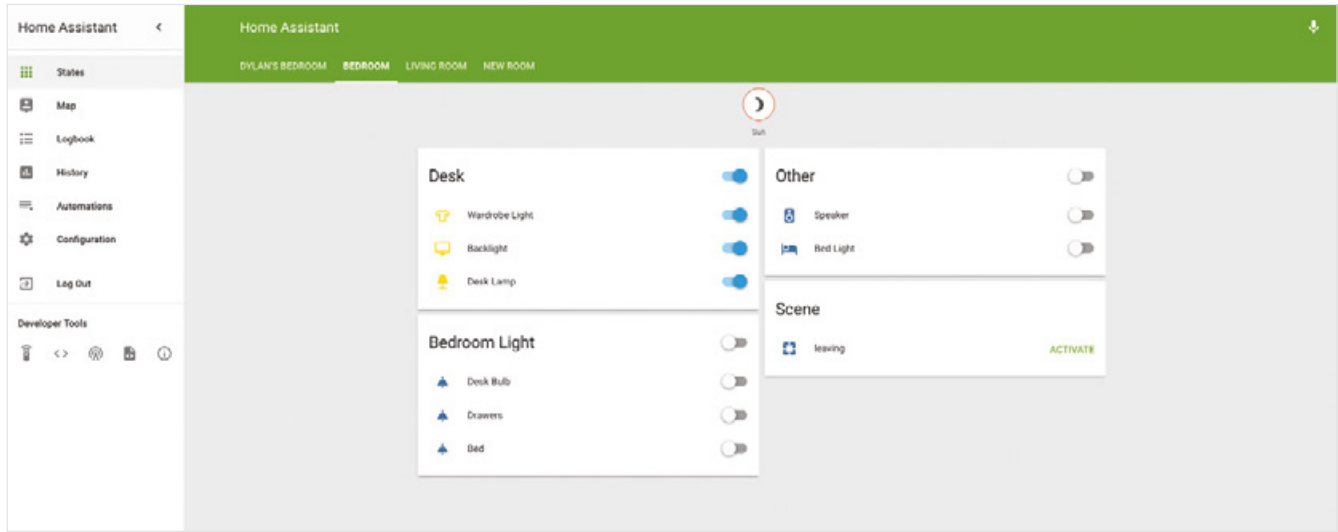



Figure 2 ◆ Trådfri can be a bit temperamental sometimes, so you may need to restart the gateway

TUTORIAL



Above  With 988 Home Assistant components, your Home Assistant Instance could get really messy really quickly

`ssh Pi@your_IP_address`

Then type 'yes' if prompted and log in with the password – **raspberry** (Figure 3). Setting up SSH on Windows is more tedious as you need to use separate software such as PuTTY. Go to putty.org and download the appropriate version for you.

Once you have opened up the application, go to input the IP address into the Host Name field and select the SSH option. Press open and select 'yes'. Enter the login as **pi** and the password as **raspberry**, (Figure 4).

You are now successfully into your Pi's command line and you can install some scripts. Firstly, install Samba. This allows your Pi to be accessed as a network drive. This will be useful when you want to create automations but you don't want to log

into your Pi via an SSH connection. To do this, run the command:

```
sudo hassbian-config install samba
```

Once this has been installed, you need the Trådfri script to eventually use your Trådfri lights. To do this type:

```
sudo hassbian-config install tradfri
```

into the terminal. The Home Assistant Instance is now configured and ready to use.

Connecting your Trådfri lighting system to HA is also simple. All you need to do is to go to **hassbian.local:8123** and then press the CONFIGURE button next to IKEA Trådfri (Figure 2). Here you need to input the security code written at the bottom of your IKEA Trådfri Gateway. You'll then see all of your Trådfri bulbs show up on a 'Light' card.


You now have all of the ingredients to start creating Home Assistant automations. To view your Home Assistant automations, go to your network folders and find **automations.yaml** in the Home Assistant folder. These are located under the **hassbian** directory. The **automations.yaml** file is where you create your automations. The YAML file is formatted as a list as opposed to being formatted as code. Automations consist of three main parts. The 'alias' is the name for your automation. The name of your automation doesn't

GOING FURTHER

These are some useful – and not so useful – ideas for other automations:

- Set off an intruder sequence for a room in your house, and send a notification to your phone when your door sensor is triggered.
- Set your lights to dim and turn blue when you turn on your Chromecast and start watching something.
- Start playing music on your Sonos and flash the lights when your Bitcoin goes above a certain value.
- Use an Amazon Dash button as a trigger for any automation.
- Home Assistant automations lack reliability from time to time, so all automations are created at your own risk...



Figure 3  SSH gives you a tunnel into your Raspberry Pi and allows you to execute commands as though you were directly connected

matter and is only for your personal reference. The second part of an automation is the 'trigger'. The trigger is what activates the automation, for example a motion sensor inside your house. The final part of an automation is the 'action'. This defines what happens when the trigger is activated. For example, the action could be something simple such as turning on a light or it could be something more advanced such as turning on an intruder sequence which consists of sending you a notification whilst also flashing your smart lights and locking all your doors.

Let's start with a simple automation: turn the lights on when the sun sets. We have installed the Trådfri component and the sun component is pre-installed onto Home Assistant, so all that we need to do is join them together in **automation.yaml**. Firstly, give a name to your automation. The second part of an automaton is the trigger. In our case, the trigger would be the sun. Finally, the action is the turning on of the light. Putting all of this together gives you this:

```
- alias: "Bye Sun, Hello World"
  trigger:
    platform: sun
    event: sunset
    #time offset is optional
    offset: '-00:45:00'
  action:
    - service: Home Assistant.turn_on
      entity_id: light.bathroom
```

This is an example of a basic Home Assistant automation, but you can get more creative. A more advanced automation is turning on your desk backlight, desk lamp, and speaker charging dock when you sit in your chair. Despite this seeming complicated, it uses the same foundations that the sun rising automation does – it just expands on it by adding more actions and a more advanced trigger.

IKEA has a Trådfri motion sensor (£16, €17.99, \$17.99, 179kr.) Unfortunately, IKEA does not currently expose the motion sensor to HA, which means it can't be used on its own (this is correct at time of writing). Therefore, the only other option is to install a smart bulb in your desk lamp and then connect to the motion sensor. From there you could attach the motion sensor to the bottom of your desk chair. This will give the result of turning on your desk lamp when you sit on your chair, but it doesn't turn on your desk. To solve this you need to create an automation to turn on your desk when your Trådfri desk light-bulb goes from an 'OFF' state to an 'ON' state:

“ Home Assistant is continuously expanding its components list, so the possibilities of automations subsequently carry on expanding ”

```
- alias: Trådfri Motion Sensor On
  trigger:
    - platform: state
      entity_id: light.desk_lamp
      from: 'off'
      to: 'on'
  action:
    - service: Home Assistant.turn_on
      entity_id: group.desk
```

This article is the tip of the iceberg when it comes to the possibilities of Home Assistant and Trådfri. Home Assistant is continuously expanding its components list so the possibilities of automations subsequently carry on expanding. IKEA's Trådfri system will eventually release more colour bulbs, so the future is bright for the low-cost smart home lighting system. □

Figure 4 □
Putty can save your SSH connections to make it easier when connecting next time. Just press Save

