

# An IoT Forecast That's Sunny ☀️ and Clear (No Clouds!)



Philippe Coval (on behalf of Kathy Giori)  
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web: [iot.mozilla.org](https://iot.mozilla.org) | twitter: @MozillalIoT @kgiori @RzrFreeFr | source: [github.com/mozilla-iot](https://github.com/mozilla-iot)

**moz://a**

## Security

I don't want hackers accessing my home network nor launching attacks.

## Privacy

My data in the wrong hands would reveal when to break in. Analysts viewing my home habits feels creepy. I don't want any of those listening devices!

# Smart home concerns

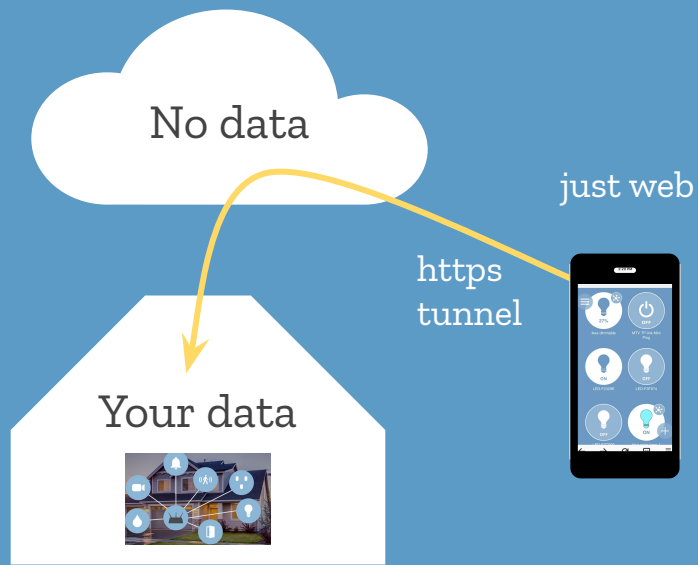
What risks are worth the value?

## Overall Value

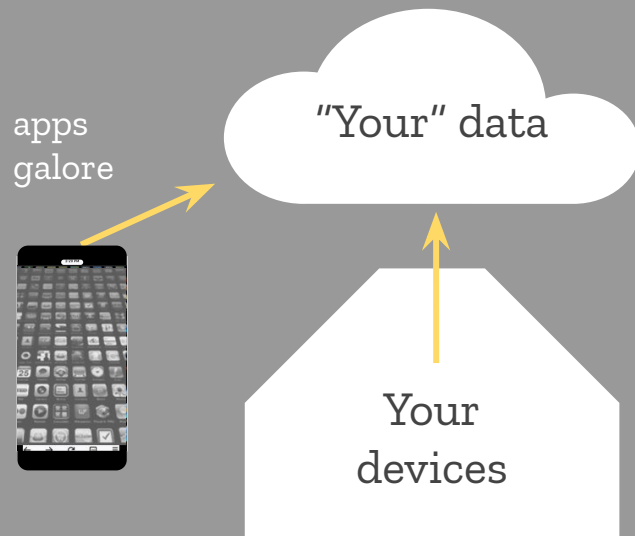
I worry that my investment in time, money, and effort will not provide sufficient value.

## Interoperability

I can't figure out how pushing the doorbell can trigger turning on the outside light.



Mozilla Smart Home  
(data local, private)



Typical Vendor  
(data in cloud)

# Decentralized Web of Things Approach

## WebThings Gateway



A software distribution for smart home gateways focused on privacy, security and interoperability

[Learn More](#)



[iot.mozilla.org](https://iot.mozilla.org)

## WebThings Framework



A collection of re-usable software components to help developers build their own web things

[Learn More](#)



[devices](https://devices.mozilla.org)

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# Your Own **Private** Smart Home

## Gateway



WebThings Gateway

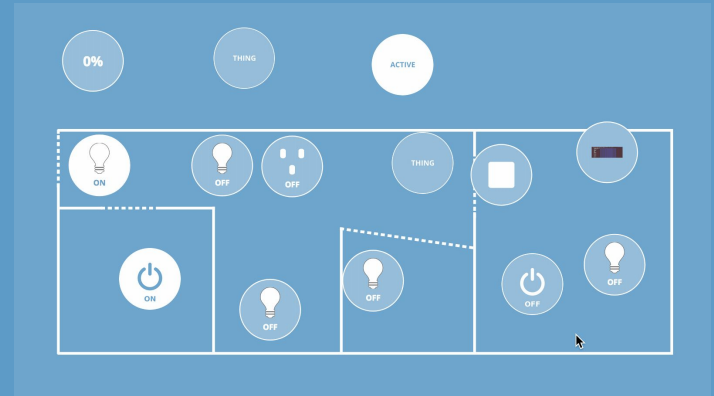
[moz://a](https://moz://a)

## Smart Devices



=

## Consumer Privacy



[moz://a](https://moz://a)

# Security

## Welcome

Choose a secure web address for your gateway:

  https://



subdomain

.mozilla-iot.org

Email



Please keep me updated about new features and contribution opportunities. [Privacy Policy](#)

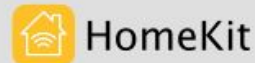
Create

Skip

# Web of Things **Interoperability**

## W3C Web of Things

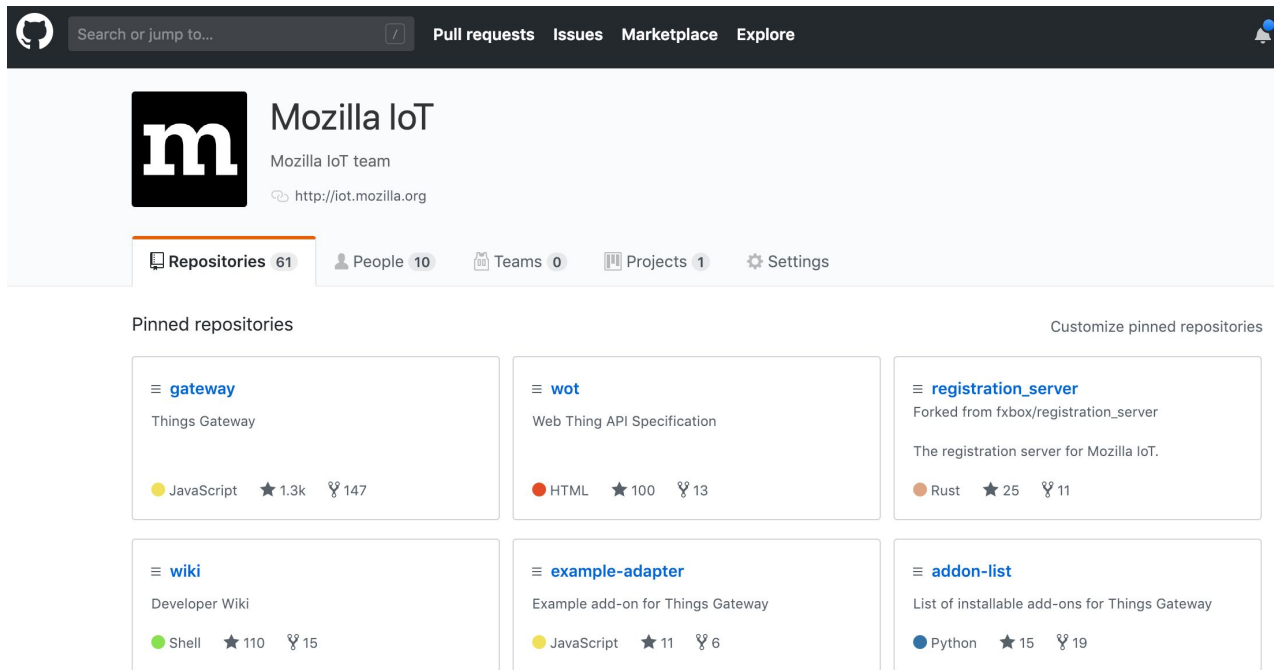
HTTP & WebSockets



IP Connected Devices (Wi-Fi, Ethernet,...)

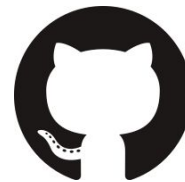
*Linking together different smart home systems using the Web of Things.*

# Open Source Community Development



The screenshot shows the GitHub profile for Mozilla IoT. The header includes the GitHub logo, a search bar, and navigation links for Pull requests, Issues, Marketplace, and Explore. The profile section features the Mozilla IoT logo, the name 'Mozilla IoT', the team name 'Mozilla IoT team', and the website 'http://iot.mozilla.org'. Below this is a navigation bar with 'Repositories 61', 'People 10', 'Teams 0', 'Projects 1', and 'Settings'. The main content area is titled 'Pinned repositories' and contains six repository cards:

- gateway**: Things Gateway, JavaScript, 1.3k stars, 147 forks.
- wot**: Web Thing API Specification, HTML, 100 stars, 13 forks.
- registration\_server**: Forked from fxbbox/registration\_server, The registration server for Mozilla IoT., Rust, 25 stars, 11 forks.
- wiki**: Developer Wiki, Shell, 110 stars, 15 forks.
- example-adapter**: Example add-on for Things Gateway, JavaScript, 11 stars, 6 forks.
- addon-list**: List of installable add-ons for Things Gateway, Python, 15 stars, 19 forks.

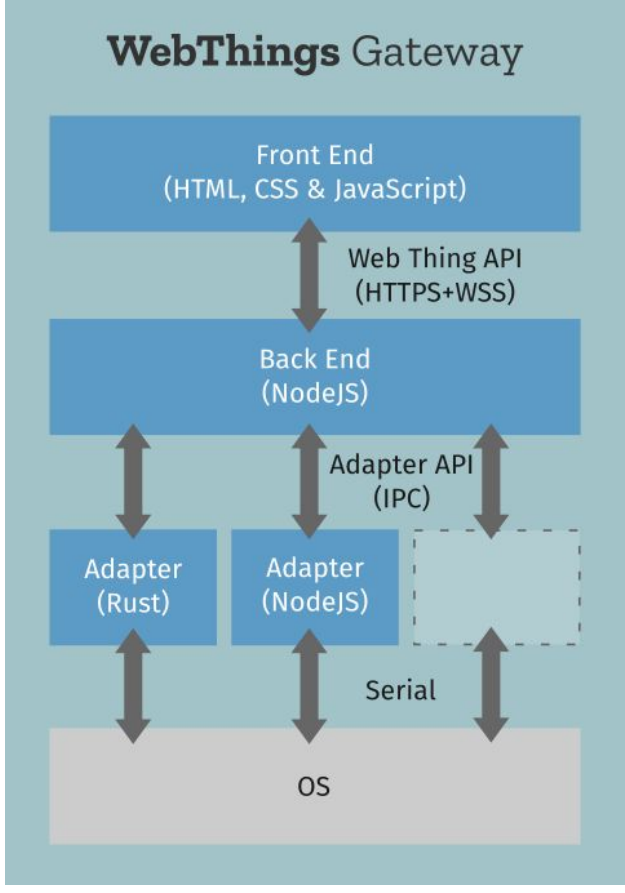
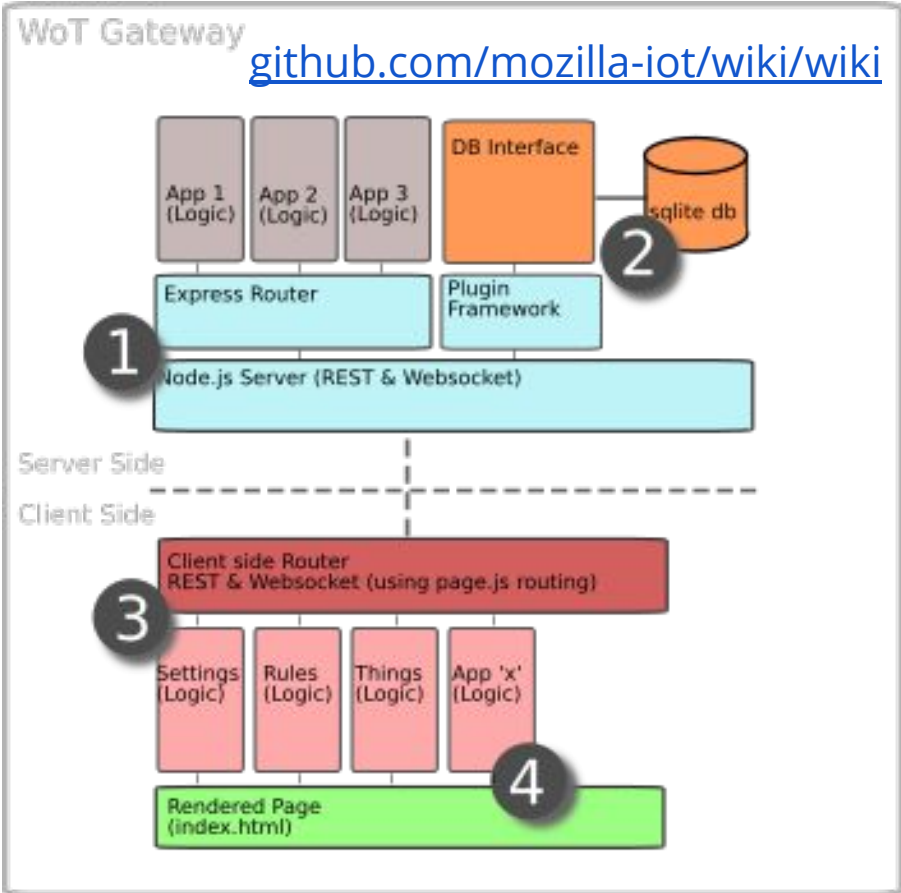


All of our source code is on [GitHub](#) and you can find us in #iot on [irc.mozilla.org](#) or ask questions on [Discourse](#).

[github.com/mozilla-iot](#)  
(post issues to gateway repo)



# WebThings Gateway Architecture



## Value Proposition

# Directly monitor and control your home over the web, without a middleman

- Affordable one-off purchase, no monthly subscription
- Private data stays in your home by default
- Expand with devices from multiple manufacturers

# Live Demo

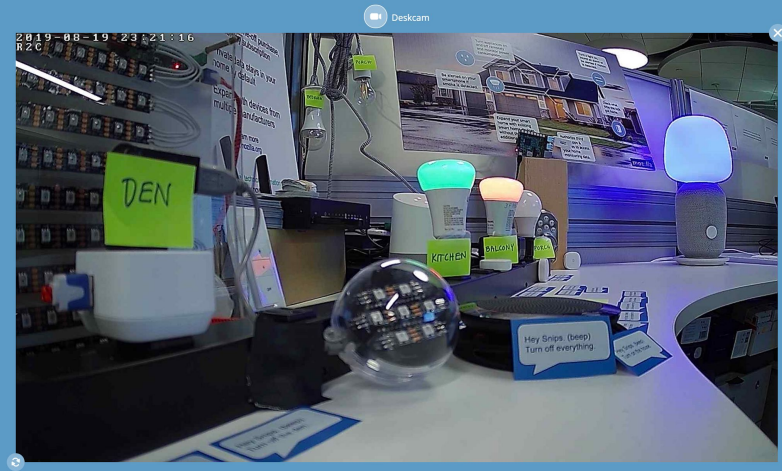
- WebThings Gateway
- Tunneling into my office desk in Mountain View, California

or see:

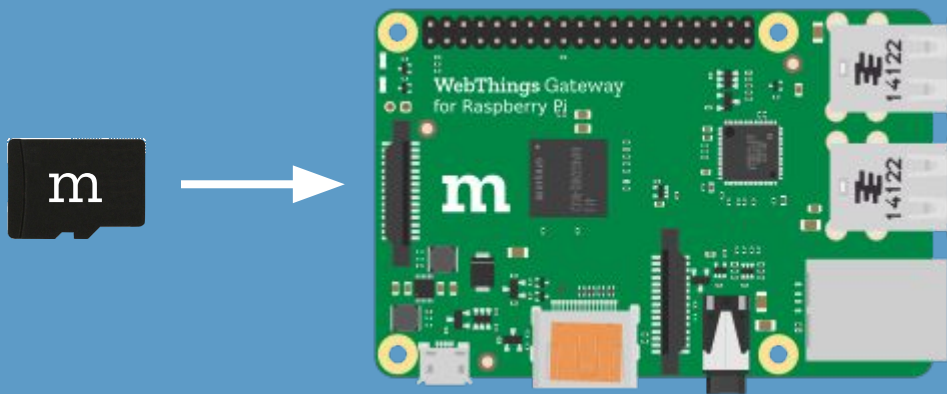
<https://youtu.be/3VtH5eVcWSE>

[https://youtu.be/KF2T58\\_c4dM](https://youtu.be/KF2T58_c4dM)

<https://youtu.be/YVjNrUwpmgs>



# WebThings Gateway Software Image for Raspberry Pi



Do you own an RPi? I have a few uSD cards,  
pre-loaded with the image (limited quantity)



**moz://a**

# Easily Build Your Own Web Things

The image displays a series of MicroBlocks code blocks for building a web thing. The blocks are as follows:

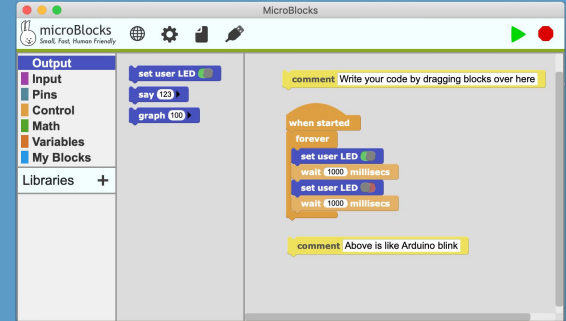
- when started** (orange block)
- set on to** (orange block with a green toggle switch set to 'on')
- wifi connect to** (orange block with fields for `Network_Name`, `password`, and `try 3 times`)
- define thing** (orange block with fields for `Hello LED`, `capability Light`, and a dropdown arrow)
- add boolean property** (orange block with fields for `title state`, `variable on`, `@Type`, and `OnOffProperty`)
- forever** (orange block containing a sub-block):
  - set user LED** (blue block with a green toggle switch set to 'on')
- comment** (yellow block with text `click to test`)
- set on to** (orange block with a green toggle switch set to 'not on')
- set user LED** (blue block with a green toggle switch set to 'on')

Download MicroBlocks from <http://microblocks.fun>

Libraries



Web of Things



Let's build a web thing!

# Thank You!

iot.mozilla.org  
@MozillaIoT

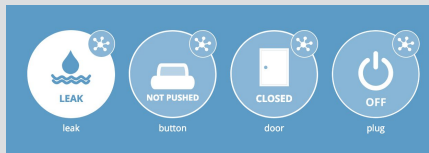
Phil Coval, WebThings community contributor and hacker.

Kathy Giori, huge fan (and advisor) MicroBlocks for education,  
also huge fan of Mozilla (former Mozilla IoT team member)



**moz://a**

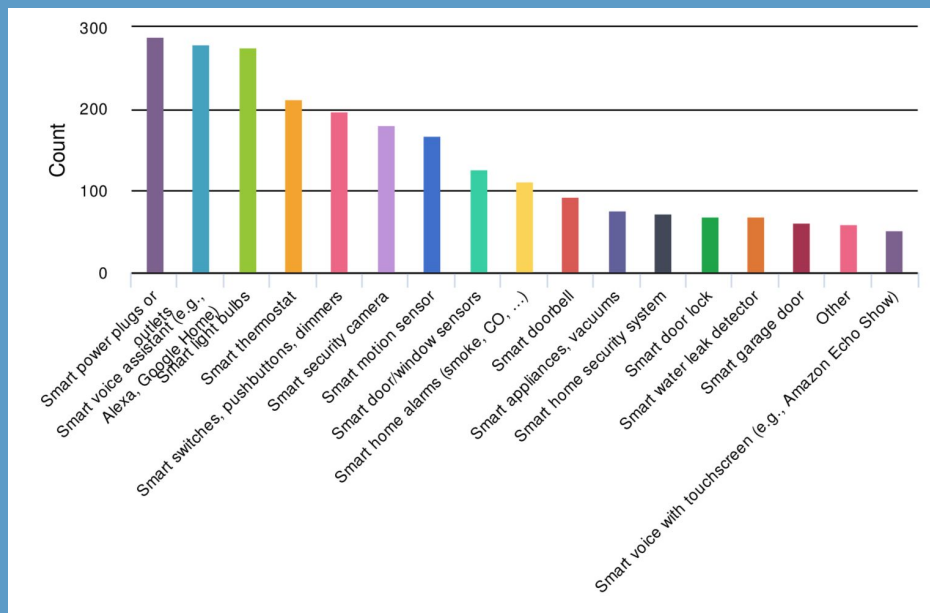
# Backup Slides



**WebThings**  
**moz://a**

# Smart Home Survey Results

- Firefox and WebThings Gateway users (~260 each)



Those WITH at least one smart device but NOT a smart voice assistant

Item	Overall Rank	Rank Distribution	Score	No. of Rankings
Smartphone app	1		1,053	207
Secure website	2		729	187
Dedicated touch screen	3		683	175
Wireless remote control	4		600	157
Voice	5		522	150
Text message	6		359	147

Legend: Lowest Rank (green), Highest Rank (orange)

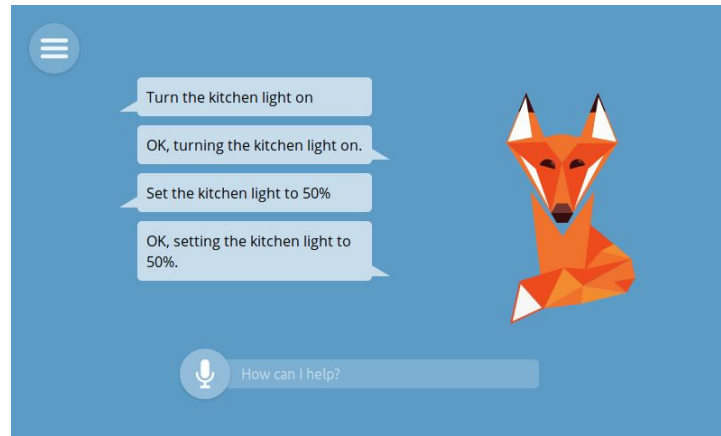
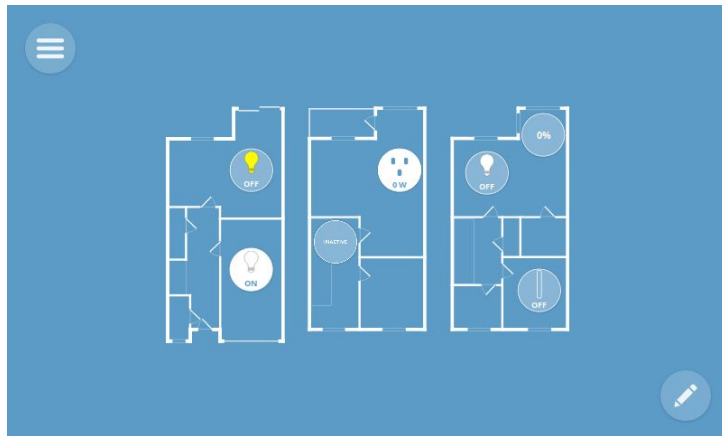
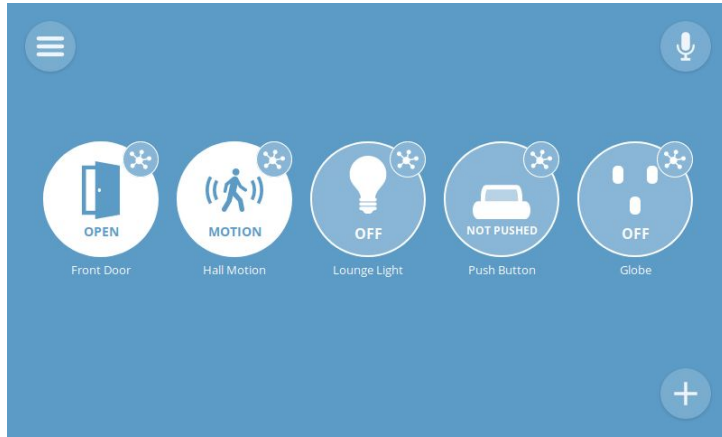
Those WITH a smart voice assistant

Item	Overall Rank	Rank Distribution	Score	No. of Rankings
Voice	1		1,221	252
Smartphone app	2		1,203	257
Wireless remote control	3		804	217
Dedicated touch screen	4		788	219
Secure website	5		708	220
Text message	6		328	178

Legend: Lowest Rank (orange), Highest Rank (grey)



# WebThings Gateway UI



# Useful Reference Links

- [iot.mozilla.org](https://iot.mozilla.org)
- [github.com/mozilla-iot](https://github.com/mozilla-iot)

# Connected Smart Home Use Cases



Credit: The Hartford and MIT AgeLab

*10 Example Use Cases*



49%

Enhancing the safety and security of my home and family



47%

Saving energy



33%

Making day-to-day life easy and convenient

Credit: The Hartford and MIT AgeLab

*Main Categories of Uses*

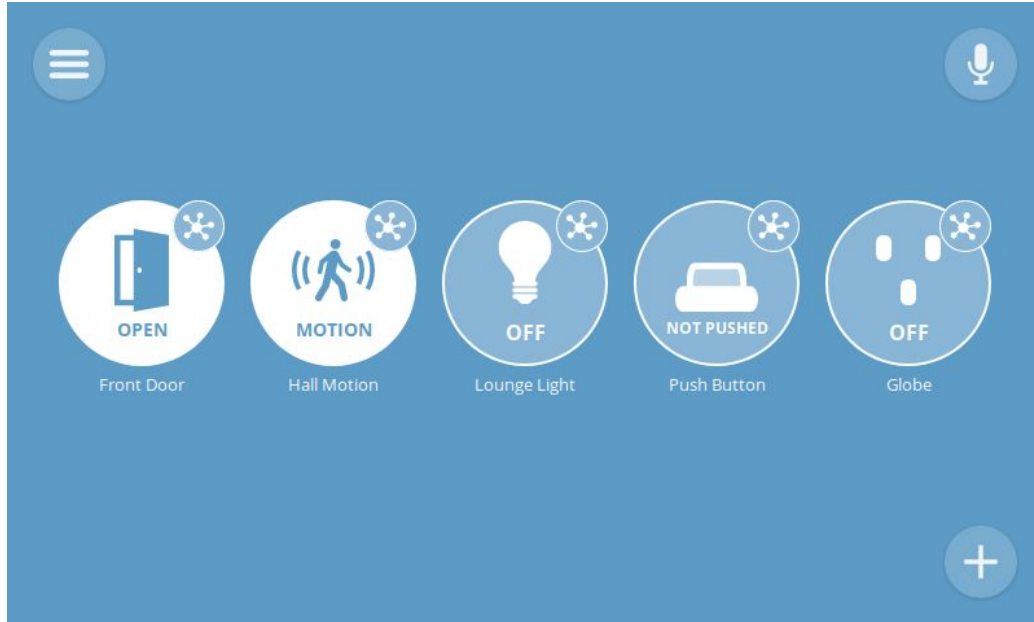
# Mozilla's Decentralized and Privatized Approach to IoT

*Enabling IoT devices to be discoverable "on the web"*

≠

*Connecting your IoT devices "to the cloud"*

# Home Security and Home Automation



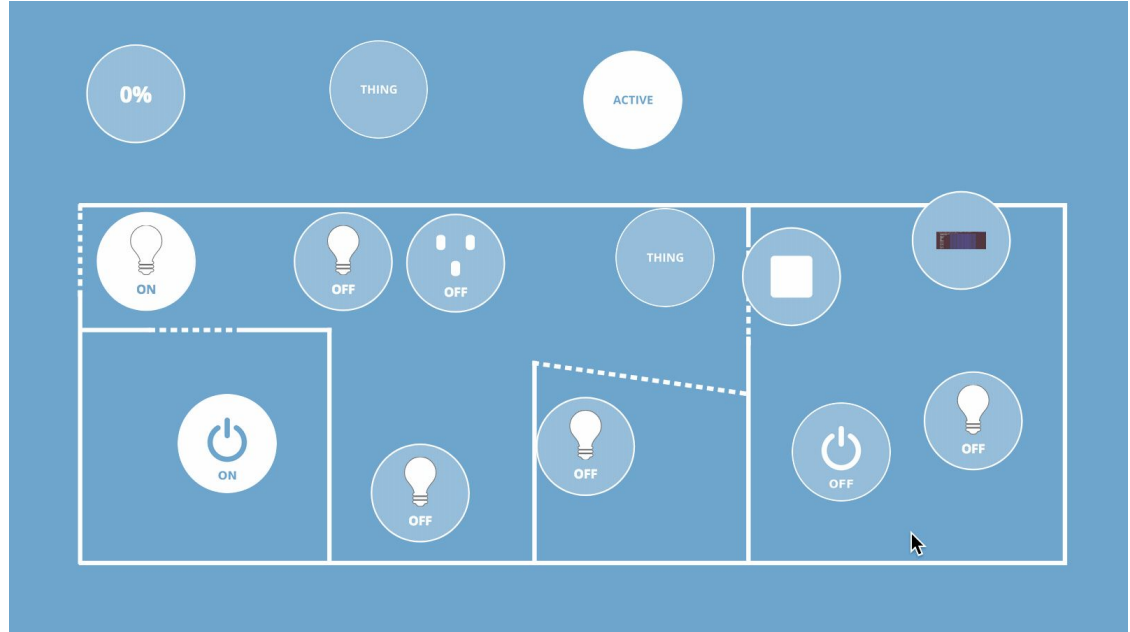
## Sensors / Actuators

Support for door sensors, motion sensors, pushbuttons, bulbs, plugs, and more..

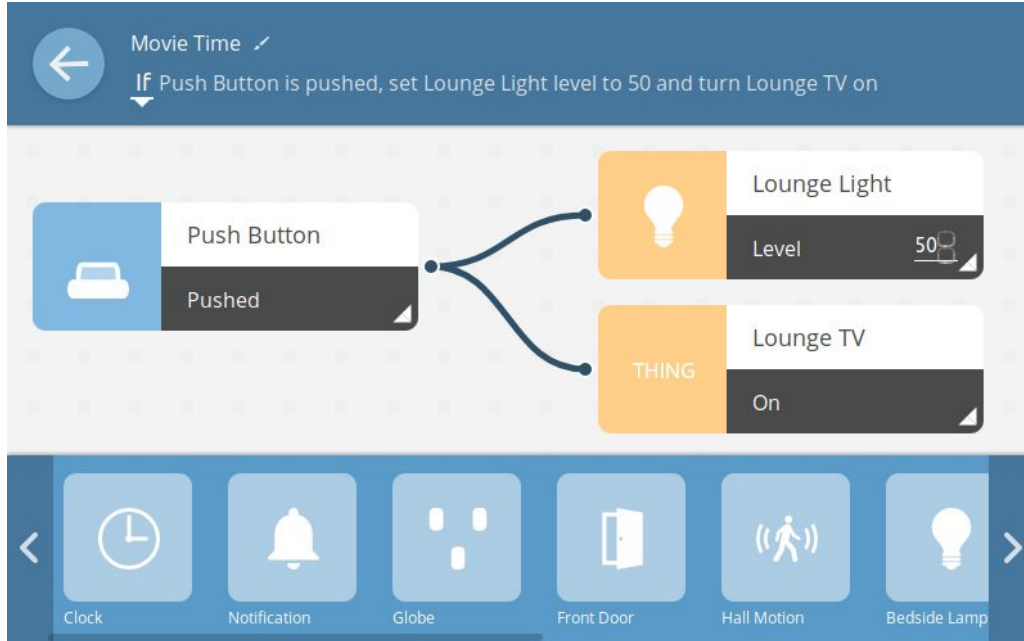
# More Intuitive View Based on Thing Locations

## Interactive Floorplan

View status of devices and control them directly inside the floorplan.



# Wireless Pushbuttons: Like "TV Remote Controls" for Your Whole Home



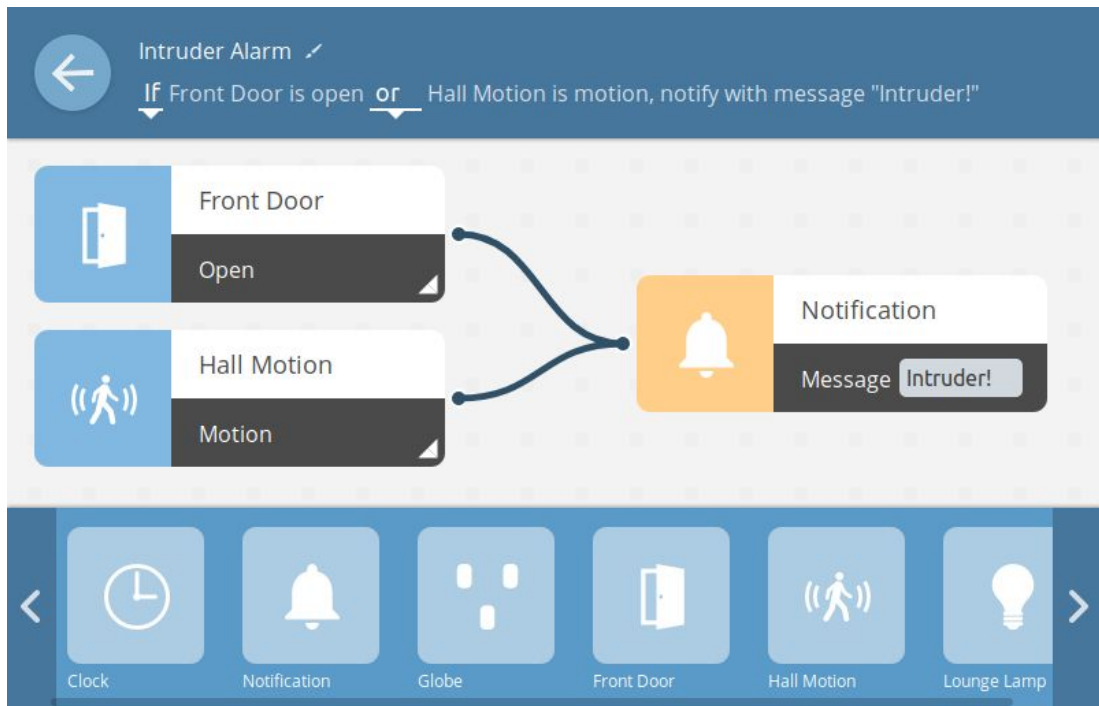
## Push Buttons

Trigger anything with the push of a button.

# Say YES to "Allow Notifications" Dialog Box (Because Only You Can Create Them)

## Push Notifications

Create rules which trigger a push notification with a custom message.





# Go Crazy With Your Own Rules Logic

The screenshot displays a rule configuration interface. At the top, a dark blue header contains a back arrow, the text "Rule Name ✓", and the rule description: "If Virtual Thing stringProperty is fdsa, Virtual Thing is boolProperty, or the time of day is 15:54 then pulse Virtual Thing boolProperty to false and pulse Virtual Thing numberProperty to 0".

The main area shows a logic flow diagram. On the left, three input blocks are connected to a central junction. The first block is "Virtual Thing" with a power icon and a dropdown menu showing "String... fdsa". The second block is "Virtual Thing" with a power icon and a dropdown menu showing "BoolProperty". The third block is "Time of day" with a clock icon and a dropdown menu showing "03 : 54 PM".

On the right, two output blocks are connected to the central junction. The first block is "Virtual Thing" with a power icon and a dropdown menu showing "BoolProperty". The second block is "Virtual Thing" with a power icon and a dropdown menu showing "NumberPrope... 0".

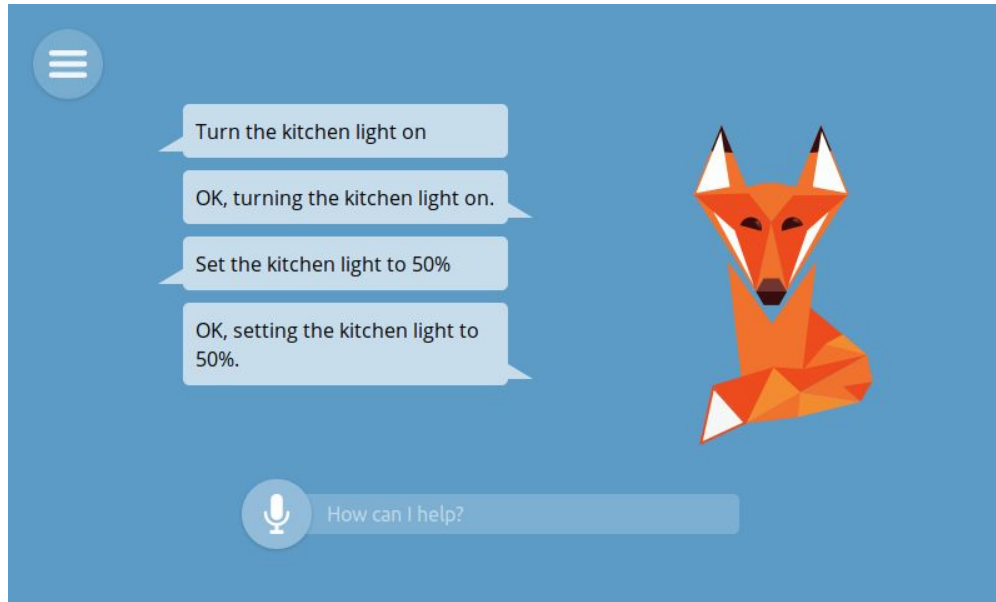
At the bottom, a blue bar contains a row of seven icons with labels: "Clock", "Virtual Smart Plug", "Virtual Thing", "Virtual Actions & Events Thing", "Virtual On/Off Color Light", "Virtual On/Off Switch (with PIN)", and "Hue color lan".

## Advanced Rules Engine

Multiple inputs, multiple outputs.

If, while, and, or and equals operators.

# Talk or Type



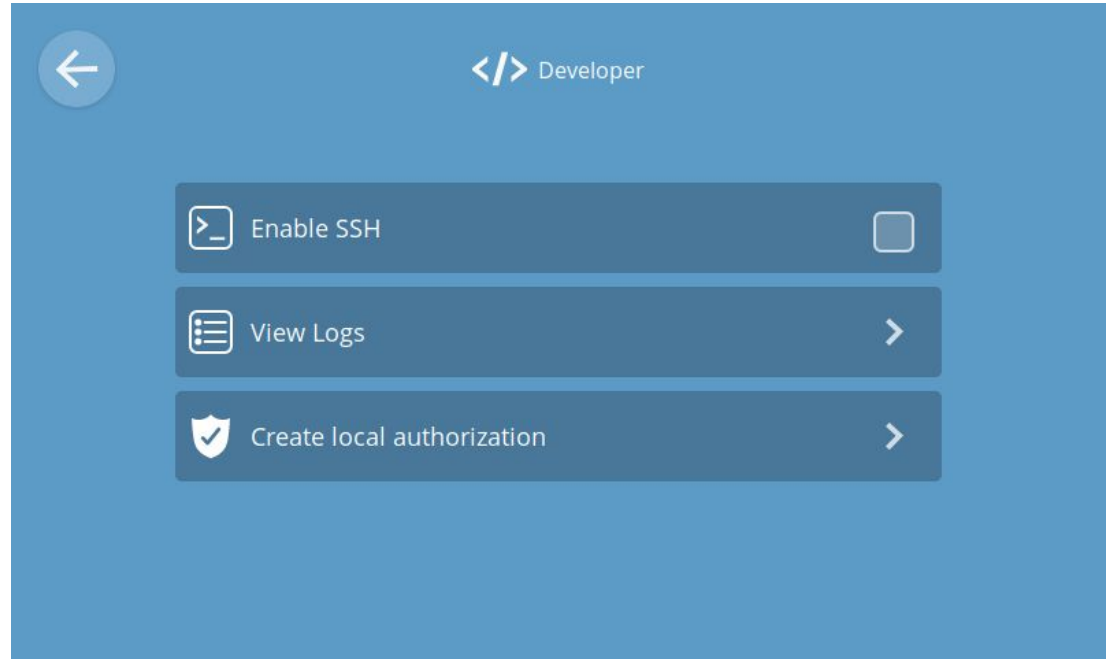
## Smart Assistant

Control your home using speech and text via a chat style interface.

# Secure Framework for 3rd Party Services

## Developer Settings

Enable/disable SSH, view logs, and create OAuth tokens for secure web service interaction.



# Open webthing-\* Library Options

<https://iot.mozilla.org/framework/>

Node  
Python  
Java  
Rust  
Arduino  
Moddable (javascript)  
MicroPython  
MicroBlocks  
C/C++  
etc.



## Installation

Node.js Python Java **Rust** Arduino

Cargo:

```
[dependencies]
webthing = "0.9"
```

## Example

Node.js Python Java **Rust** Arduino

```
extern crate env_logger;
#[macro_use]
extern crate serde_json;
extern crate uuid;
extern crate webthing;

use std::sync::{Arc, RwLock, Weak};
```

# WoT Spec (Schemas) & Example

<https://iot.mozilla.org/schemas/>

## Capabilities

- properties
- actions
- events

### Example

```
{
  "@context": "https://iot.mozilla.org/schemas/",
  "@type": ["Light", "OnOffSwitch"],
  "name": "My Lamp",
  "description": "A web connected lamp",
  "properties": {
    "on": {
      "@type": "OnOffProperty",
      "type": "boolean",
      "description": "Whether the lamp is turned on",
      "href": "/things/lamp/properties/on"
    },
    "brightness" : {
      "@type": "BrightnessProperty",
      "type": "integer",
      "description": "The level of light from 0-100",
```

- **Capabilities**
  - OnOffSwitch
  - MultiLevelSwitch
  - BinarySensor
  - MultiLevelSensor
  - ColorControl
  - EnergyMonitor
  - SmartPlug
  - Light
  - MotionSensor
  - DoorSensor
  - TemperatureSensor
  - LeakSensor
  - PushButton
  - Camera
  - VideoCamera
- **Properties**
  - BooleanProperty
  - OnOffProperty
  - MotionProperty
  - OpenProperty
  - LeakProperty
  - PushedProperty
  - LevelProperty
  - BrightnessProperty
  - ColorProperty
  - ColorTemperatureProperty
  - InstantaneousPowerProperty
  - CurrentProperty
  - VoltageProperty
  - FrequencyProperty
  - TemperatureProperty
  - ImageProperty
  - VideoProperty
- **Actions**
  - ToggleAction
  - FadeAction
- **Events**
  - OverheatedEvent
  - PressedEvent
  - DoublePressedEvent
  - LongPressedEvent

# Add-ons: Bridge to JSON Web Thing API

ActivityPub

Broadlink

Chromecast

DateTime Adapter

Email Sender

Eufy

Flic Button

Generic Sensors

GPIO

HomeKit

Lifx

Logitech Harmony

MicroBlocks

Nanoleaf

Netatmo Wx

Philips Hue

Pimoroni Blinkt!

Pulse

Serial

Sonos

TP-Link

Twilio

Virtual Things

Voice Control

Wake-on-LAN

Web Thing

Wemo

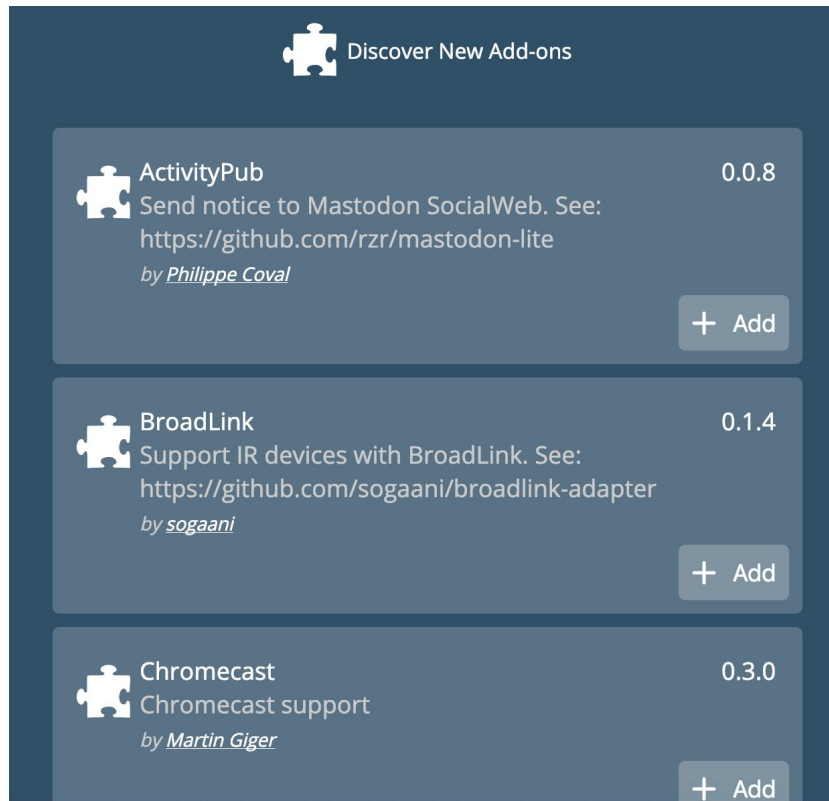
X-10

Yeelight

Z-Wave

Zigbee

and more...



Discover New Add-ons

- ActivityPub** 0.0.8  
Send notice to Mastodon SocialWeb. See: <https://github.com/rzr/mastodon-lite>  
*by Philippe Coval* + Add
- BroadLink** 0.1.4  
Support IR devices with BroadLink. See: <https://github.com/sogaani/broadlink-adapter>  
*by sogani* + Add
- Chromecast** 0.3.0  
Chromecast support  
*by Martin Giger* + Add