Home Assistant
Ohio Linux Fest | 9/9/2023
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Agenda

1. What is Home Assistant (HA)?
2. Why use HA vs other platforms?
3. Hardware & system setup
4. HA Runtime Environments
5. External access
6. HA Use Cases & IoT
7. Live demo
8. Tips & lessons learned
0. Quick poll

1. How many have used Home Assistant?
2. How many have used another security/IoT system?
3. How many have not used any security/IoT system (true beginners)?

IoT = Internet of Things

Image credit: https://openclipart.org/
1. What is Home Assistant (HA)?

“Open source home automation that puts local control and privacy first. Powered by a worldwide community of tinkerers and DIY enthusiasts. Perfect to run on a Raspberry Pi or a local server.”

https://www.home-assistant.io/

Image credit: https://www.home-assistant.io/blog/2019/01/23/release-86/
demo: https://demo.home-assistant.io/#/lovelace/0
1. What is Home Assistant (HA)?

Very quick peek!
2. Why use HA vs other platforms?

<table>
<thead>
<tr>
<th>Home Assistant</th>
<th>Vendor Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOSS</td>
<td>closed source</td>
</tr>
<tr>
<td>privacy: video footage &amp; IoT device activity kept local</td>
<td>vendor cloud service lock-in/fees &amp; fee increases, habits/data exposed</td>
</tr>
</tbody>
</table>
2. Why use HA vs other platforms?

<table>
<thead>
<tr>
<th>Home Assistant</th>
<th>Vendor Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>hardware freedom, mix &amp; match</td>
<td>one vendor for hardware</td>
</tr>
<tr>
<td>choice of IoT protocol (Zigbee, Z-Wave, Matter, WiFi, Bluetooth, other)</td>
<td>typically one IoT standard protocol supported (or non-standard)</td>
</tr>
</tbody>
</table>
2. Why use HA vs other platforms?

<table>
<thead>
<tr>
<th>Home Assistant</th>
<th>Vendor Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>highly customizable</td>
<td>may not be versatile or extendable</td>
</tr>
<tr>
<td>(1,900+ plugins)</td>
<td></td>
</tr>
<tr>
<td>great support</td>
<td>varied levels of support</td>
</tr>
<tr>
<td>(active discord server, YouTube tutorials, online help docs, Reddit &amp; more)</td>
<td></td>
</tr>
</tbody>
</table>
2. Why use HA vs other platforms?

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<th>Home Assistant</th>
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<tbody>
<tr>
<td>monthly updates, backup/restore</td>
<td>varied levels of updates</td>
</tr>
<tr>
<td><em>(core engine, mobile app, 10+ years 9/13/13)</em></td>
<td></td>
</tr>
</tbody>
</table>
3. Hardware & System Setup

Our path...

Many options.
3. Hardware & System Setup

Image credit: https://www.microcenter.com/site/stores/sharonville.aspx?storeid=71
3. Hardware & System Setup

Build a dedicated PC, buy cameras, IoT devices
3. Hardware & System Setup

Download and install a VM

3. Hardware & System Setup

Prep & run ethernet cables for computer, switch & PoE cameras.
3. Hardware & System Setup

Router & PoE (Power over Ethernet) switch setup (set static camera IPs)
3. Hardware & System Setup

Install PoE cameras.
3. Hardware & System Setup

Drill through brick wall, drywall patching
3. Hardware & System Setup

Detect wild animals at night!
3. Hardware & System Setup

Several YouTube videos can help with all of this!
## 4. HA Runtime Environments

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operating System Options</th>
</tr>
</thead>
</table>
| **Home Assistant Yellow** | - Home Assistant Operating System  
  - Home Assistant Container  
  - Home Assistant Core |
| **ASUS Tinkerboard** | - Home Assistant Operating System  
  - Home Assistant Container  
  - Home Assistant Core |
| **Raspberry Pi**    | - Home Assistant Operating System  
  - Home Assistant Container  
  - Home Assistant Core |
| **Generic x86-64 (e.g. Intel NUC)** | - Home Assistant Operating System  
  - Home Assistant Container  
  - Home Assistant Core |
| **ODROID**          | - Home Assistant Operating System  
  - Home Assistant Container  
  - Home Assistant Core |
| **Windows**         | - Home Assistant Operating System (VM)  
  - Home Assistant Core |
| **macOS**           | - Home Assistant Operating System (VM)  
  - Home Assistant Core |
| **Linux**           | - Home Assistant Operating System (VM)  
  - Home Assistant Container  
  - Home Assistant Core  
  - Home Assistant Supervised |
| **Alternative**     | VM's not covered by other categories, NAS installations and community guides |

*source: https://www.home-assistant.io/installation/*
4. Runtime Environments

Home Assistant **YELLOW**

~$190 Pi CM4, 16GB SSD, Zigbee

Or use the $125 kit and add your own Pi compute module & SSD.

source: https://www.home-assistant.io/yellow/
5. External mobile access, notifications

Use your own **local VPN**.

Or, support HA dev team with **Nabu Casa** ($65/year) remote access (1 month free trial).

https://www.nabucasa.com/

6. HA Use Cases

Sensors

- water leak, water level, soil moisture, temperature, humidity, gas, door/window open, motion detection, pressure, light, vibration, human presence & count, lightning detector, CO2, gas, distance, wind speed

Image: https://a.co/d/hNY0NNL (Amazon)
6. HA Use Cases

Devices

- lights, smart outlet, sirens, switch, door lock, wearable health device, curtain/shades motor, energy monitor, smoke alarm, button pushers, pet feeder

Image: https://a.co/d/3RBPWUm (Amazon)
6. HA Use Cases

- Turn water main valve off with leak detection
- Play a sound/siren when a person is detected
- Turn on lights based on people in a zone

Image: [https://a.co/d/0mFkY1K](https://a.co/d/0mFkY1K) (Amazon)
6. IoT - Communication Protocols

Zigbee vs Z-Wave vs Matter vs Bluetooth vs WiFi vs other

Do your research!

- Pros & Cons with each.
- Cost differences.
- Open vs closed protocol.
- Private vs vendor cloud required.
- Bandwidth vs distance.
- Mesh vs limited mesh vs no mesh.
- # of devices allowed.
- Battery life.
- Reliability.

Images:
- [Bluetooth](https://commons.wikimedia.org/wiki/File:Bluetooth.svg)
- [WiFi](https://commons.wikimedia.org/wiki/File:WiFi_Logo.svg)
- [Z-Wave](https://en.wikipedia.org/wiki/Z-Wave)
- [Zigbee](https://en.wikipedia.org/wiki/Zigbee)
- [Matter](https://en.wikipedia.org/wiki/Matter_(standard))

1999

2004

Oct ‘22
6. IoT - Communication Protocols

Zigbee vs Z-Wave vs Matter vs Bluetooth vs WiFi vs other

Home Assistant supports all of them!

Images:
- https://commons.wikimedia.org/wiki/File:Bluetooth.svg
- https://commons.wikimedia.org/wiki/File:WiFi_Logo.svg

Dates:
- Zigbee: 1999
- Z-Wave: 2004
- Matter: Oct ‘22
6. IoT w/Zigbee

**Zigbee Terms**

- **coordinator**
- **router**
- **end device**

**LQI - Link Quality Indication**

0-255
6. IoT w/Zigbee

Zigbee Terms

- **coordinator**
- **router**
- **end device**
- **LQI - Link Quality Indication**

Image: [https://a.co/d/e3ix2dk](https://a.co/d/e3ix2dk) (amazon)
6. IoT w/Zigbee

Zigbee Terms

- coordinator
- **router**
- end device
- LQI - Link Quality Indication

Image: [https://a.co/d/3ynd0pJ](https://a.co/d/3ynd0pJ) (amazon)
6. IoT w/Zigbee

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6. IoT w/Zigbee

Zigbee Terms

- coordinator
- router
- end device
- LQI - Link Quality Indication

Scale 0 - 255

- < 200 = high error rate
- 200 = 80% quality

Image: https://vatsai0901.medium.com/beginners-understanding-of-zigbee-c73535242524
7. Live demo

Live demo!

Ohio Linux Fest 2013
7. Live demo

- General overview
- Dashboards
- Create a dashboard
- Update a dashboard
- Devices
- Charts

- Motion/object detection
- Water sensor
- Trigger lamp on/off
- Motion sensor
- Temperature & humidity sensor
- Config door sensor
- Notifications
7. Live demo

btw...

11 year old laptop!!

5 year old SSD!!
8. Tips, lessons learned

- Plan ahead for the location of cameras and a central location for the HA computer.
- Buy based on your needs.
8. Tips, lessons learned

- Pick a sensor protocol first (Zigbee, Z-Wave, etc).
- Do your research and buy one sensor first to test before buying many.
- Some sensors come with batteries, some do not (extra cost).

Images: https://commons.wikimedia.org/wiki/File:Bluetooth.svg
https://commons.wikimedia.org/wiki/File:WiFi_Logo.svg
https://en.wikipedia.org/wiki/Matter_(standard)
8. Tips, lessons learned

- Do your research for cameras and don’t think you need to spend top dollar.
- Camera - WiFi, battery/electric, PoE

Images: microcenter.com  reolink.com
8. Tips, lessons learned

- Expect a learning curve. This is DIY. It’s fun to learn!
- Seek help from YouTube, Discord, HA Community forum, Reddit.
- Tweak settings as needed, ie Frigate settings (zones, % confidence for alerts, frame rate)

Image credit: https://www.reddit.com/r/homeassistant/
https://discord.com/invite/home-assistant
Thank you!!

Questions?

Scan for presentation & links
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