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Exercises

- **Coffee:** Make a working IoT device using the SLX rapid prototyping tools and starter kit
- **Amber:** Configure a rudimentary wappsto dashboard for your working device
- **Coal glow:** Control your Rapid prototyping device from the dashboard wapp and Seluxit Device List mobile app
- **Free speech magenta:** Download some of your historical data
- **Guardsman red:** SSH into your porcupine and do stuff...
- **Cerulean:** Setup WiFi on your porcupine
- **Royal purple:** Interact with your device using our REST API using your favorite programming language
- **Conifer:** Share your data with someone else (collaboration)
- **Malachite:** Interlink two sensors and/or actuators **device-side**. Download the python code from exercise 1 and modify it to get started. *(Hard)*
- **Lipstick:** Interlink two sensors and/or actuators **cloud-side**. Use the wapp creator wapp. *(Harder)*
- **Mulled wine:** Control one porcupine from another (collaboration/need two)
- **Tomato:** Forward data to a Microsoft Azure Service Bus or MQTT broker
- **Steel blue:** Factory reset your porcupine

https://github.com/Wappsto/IoT_RapidPrototyping/

https://documentation.wappsto.com

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Coffee exercise

Make a working IoT device using the SLX rapid prototyping tools and starter kit

Hint: Use the “IoT Rapid Prototyping” wapp

Coffee solution

http://seluxit.com/porcupinesetup

1. Take a SLX Starter Kit
2. Go to wappsto.com.
3. Create a Wappsto account and sign in or use a third-party sign-on
    - If creating a new account, remember to acknowledge confirmation mail
4. Take ownership of your porcupine
    - Via the “Seluxit Device List” mobile app: Click “(+)” -> “Add via QR code” **(easiest)**
    - Via the “Dashboard” wapp: “IoT Devices” -> “Add an IoT Device”
    - Verify your Porcupine is added and online (in the app or in the dashboard)
5. At *wappsto.com*, go to “Store”
6. Install and open the “IoT raping prototyping” wapp
7. Start creating your prototype following the instructions in the wapp
    - Add a new template
    - Add sensors/actuators of your choice in the online template
    - Physically add hat + sensors/actuators (according to the descriptions)
        i. Verify that the LED on the hat lights up orange
    - Click “save and deploy” and follow flow when done
        i. Be sure that your Porcupine lights up green and is connected (with ethernet cable)
8. Deploy the code to your Porcupine
9. See your data and/or control your device
    - in the “dashboard” wapp
    - with the ‘Seluxit Device List” mobile app

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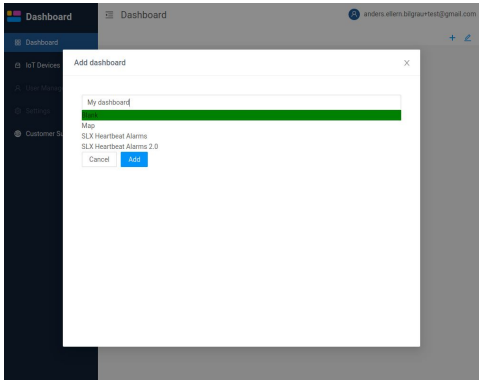
Amber exercise

Configure a rudimentary wappsto dashboard for your working device

Hint: Use the “Dashboard” wapp

Amber solution



Prerequisites

- A wappsto account
- Data in wappsto account

Walkthrough

1. Go to wappsto.com and log in
2. Open the “dashboard” wapp
3. Press “+” and “Add dashboard”
    a. Select “blank” and name your new dashboard: e.g. ”My Dashboard”
4. Add a widget by pressing “+” -> “Line chart”
    a. Rename the widget and find one or more value of interest to chart
5. Add another widget by “+” -> “log list”
    a. Rename widget and choose your values of interest.
6. Try to rearrange widget by pressing the pencil icon in the upper right and “Re-arrange widgets” and drag the widgets as you desire.
    a. Press “save” when done

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Coal glow exercise

Control your Rapid prototyping device from 1) a browser and 2) a mobile phone

Hint 1: Use the “Dashboard” wapp
Hint 2: Use the “Seluxit Device List”

Coal glow solution

- Controlling from a browser
  a. Go to wappsto.com and log in
  b. Open Dashboard wapp
  c. Go to the “IoT Devices” tab
  d. Pick the network/device/value of interest
  e. Change the control value of interest
- Controlling from a mobile phone
  a. Download the “Seluxit Device List” from the appropriate store
  b. Log in with your wappsto account
  c. Pick the network/device/value of interest
  d. Change the control value of interest

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Free speech magenta exercise

Download some of your historical data

Hint: Use the “Historical Data” wapp

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Free speech magenta solution

1. Go to wappsto.com
2. Open the “Historical Data” wapp
3. Search for the ID your interested in
4. Download and check your data

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Guardsman red exercise

SSH into your porcupine and do stuff:

For example (recommended):

1. Find OS version and details
2. Find full UUID.
3. Print out pin header information (ioinfo)
4. **Enable Blu-Fi onboarding**

Additional:

5. Add / remove root password
6. Investigate services with systemctl and journalctl ‘wappsto-device’
7. Stop the rapid prototype runner (remember to start again if needed)
8. Fetch last factory reset date

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Guardsman red solution

https://github.com/Wappsto/IoT_RapidPrototyping/blob/master/2020-12-02-workshop/guardsman_red.md

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Cerulean exercise

Setup WiFi on your porcupine

Hint 1: Use the Seluxit Device List app
or
Hint 2: Use ssh and configure linux

Cerulean solution

Using the “Seluxit Device List” mobile app:

1. Press ⊕
2. Select “Add and configure WiFi”
3. Find your Porcupine in the list and follow the flow

Using ssh:

- https://github.com/Wappsto/IoT_RapidPrototyping/blob/master/2020-12-02-workshop/cerulean.md

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Royal purple exercise

Interact with your device using our REST API using your favorite programming language

For example:
Try to fetch data
Try to control a control value

Royal purple solution

Strategy:

1. Visit https://documentation.wappsto.com/ and find the API documentation
2. Register a new session to get a x-session ID with a POST to
   “`https://wappsto.com/services/2.0/session`”
   and your username an credentials in the body.
3. Fetch all your data in a network by sending a GET-request to
   “`https://wappsto.com/services/2.0/network/`**`<uuid>`**`?expand=3`”
   substituting your Porcupine network UUID.
4. If you have a relay (or other controllable device), find the UUID of the **report state** in the response to your get request.
5. Send a PATCH request to update the relay

Full solution:

- https://github.com/Wappsto/IoT_RapidPrototyping/blob/master/2020-12-02-workshop/royal_purple.py

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Conifer exercise

Share your data with someone else (collaboration)

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Conifer solution

1. Go to wappsto.com
2. Go to the store and install the “Permissions” wapp
3. Open the ‘Permissions’ wapp

Mulled wine exercise

Control another porcupine from yours (needs collaboration)

Strategy hint 1: Share permissions and control via REST

Strategy hint 2: Claim both on the same account, control via REST

Tomato exercise

Forward your data to a Microsoft Azure Service Bus or an MQTT broker

E.g. mosquitto.org

NOTE: **Unencrypted**

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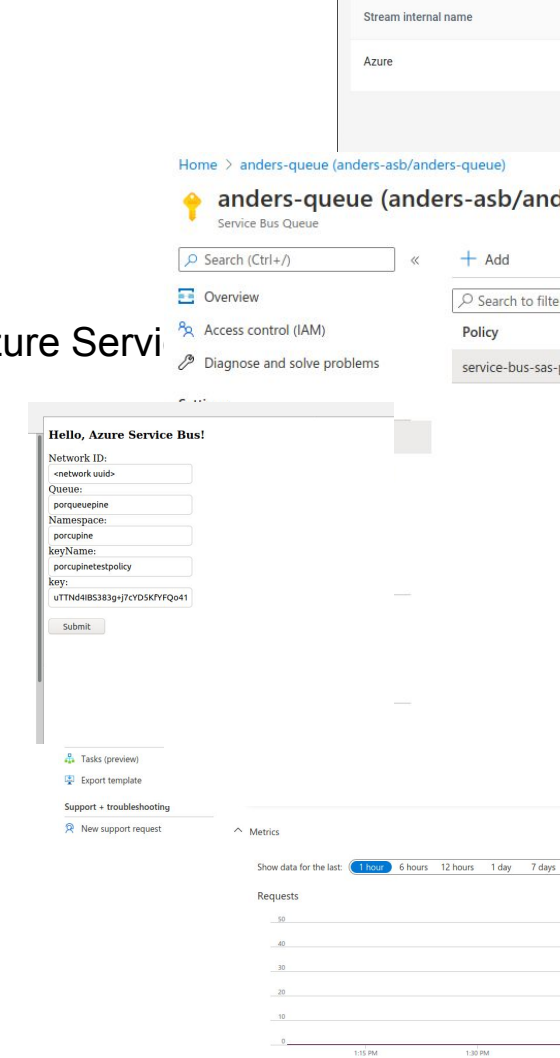
Tomato walkthrough

1. Install the “Data forwarder” wapp
2. Enter the needed information based on the choice (Azure [Azure Servi
   MQTT)



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Malachite exercise

Interlink two sensors and/or actuators **device-side**.

For example: try to make the buzzer go off or make relay switch the when the button is pressed. Or make a LED turn on when the relay is closed

Hint: Download the python code from the **coffee exercise** and modify to get started.

Malachite solution

https://github.com/Wappsto/IoT_RapidPrototyping/blob/master/2020-12-02-workshop/malachite.md

Hint strategy 1:

- Use rapid prototyping to generate code and deploy
- Disable automatic updating of code (`touch ~/wappsto-device.conf`)
- SSH to the PQPI, and modify code (using vi)

Hint strategy 2:

- Use rapid prototyping to generate code and deploy
- Download and modify code on your laptop
- Copy the modified code to your PQPI
- Disable automatic updating of code (‘ssh root@<ip> “touch ~/wappsto-device.conf”)

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Lipstick exercise

Interlink two sensors and/or actuators **cloud-side**. Use the wapp creator wapp.

For example:
Turn a relay on/off conditioned based on the room temperature.

Hint:
Create a Wapp that does it

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Lipstick walkthrough:

Interlink two sensors and/or actuators **cloud-side**. Use the wapp creator wapp.

For example: turn a relay on/off conditioned based on the room temperature.

Solution example:
https://github.com/Wappsto/IoT_RapidPrototyping/blob/master/2020-12-02-workshop/lipstick/

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Steel blue exercise

Factory reset your porcupine

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Steel blue solution

1. Disconnect power from the Porcupine
2. Ensure the ethernet cable is plugged in
3. Press and hold the button on the Porcupine
4. Plug in power while holding the button until the Porcupine light up bright orange