Problem Solving with the Internet of Things and Python

Unit 1

Unit 1 Topics

- 1.1 What is IoT? What is a Thing?
- **1.2 IoT Connectivity**
- 1.3 IoT Communication Protocols
- 1.4 IoT Services
- 1.5 IoT Security

Unit 1.2

IoT Connectivity

What is IoT Connectivity?

"IoT connectivity is a term defining connection between all the points in the IoT ecosystem, such as sensors, gateways, routers, applications, platforms and other systems. It usually refers to different types of network solutions based on their power consumption, range and bandwidth consumption."

taken from: https://www.avsystem.com/blog/iot-connectivity/

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In general we are talking about:

- Ethernet
- WiFi
- BLE
- Cellular
- Zigbee
- LoRa

Adafruit has an excellent video although their video series uses a different name for basic connectivity, "Transports". Check it out on the next slide.

Connectivity considerations

- Power
- Distance
- Bits

Connectivity considerations

- Power

How much power is required to connect?
How much power is required to transmit data?
Where will the power come from?
    Will your thing plug into a wall outlet?
    Will your thing be battery powered?
Must your thing be portable or can it be tied to a location?
If it is portable, what is the required operation time?
Can it be charged daily or monthly?
Can your thing "sleep" most of the time and only power up when transmitting?

Connectivity considerations

- Distance

How far apart can devices be and still connect to the network?
Does your application require a wired connection?
Does your application require a wireless connection?
Does your wireless connectivity require line of sight?
Can one thing act as a relay for another thing?
Does your wireless connection connect directly to the internet or is a gateway needed?

Connectivity considerations

- Bits

How much data needs to be transmitted?
How often does data need to be transmitted?
How fast does your data need to be transmitted?
Can your data be broken into smaller chunks?

- User Interface

How do you plan to interact with your thing?
    MacOS? Windows PC? Linux? Ios Phone? Android Phone? Web application?

Connectivity considerations

All about trade-offs

More resources

https://learn.adafruit.com/alltheiot-transports

https://data-flair.training/blogs/iot-technology/

https://www.iotforall.com/beginners-guide-to-iot-connectivity-technologies

https://www.educba.com/iot-connectivity/