

# Ethical Hacking: Hacking the Internet of Things (IoT)

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## IOT CONCEPTS



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# LIVE VIDEO INTRO



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## IOT CONCEPTS



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# What We'll Cover



**IoT Concepts**

**IoT Threat Types**

**The Method To The Madness of IoT  
Hacking**

**The Tools for IoT Hacking**

**Our Countermeasures**



# This Module



**What is IoT?**

**Protocols and Technologies**

**The Challenges IoT Presents**



# What is IoT?

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# LIVE VIDEO

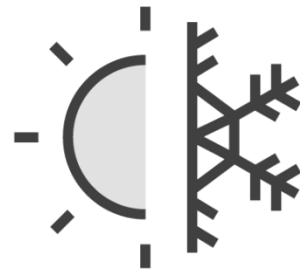
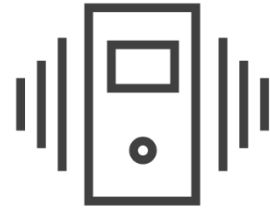


# How Does It All Work?

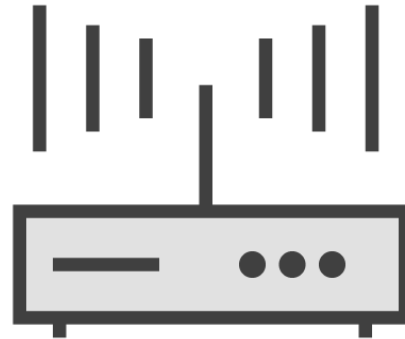
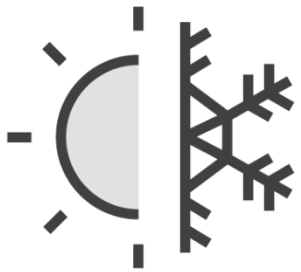
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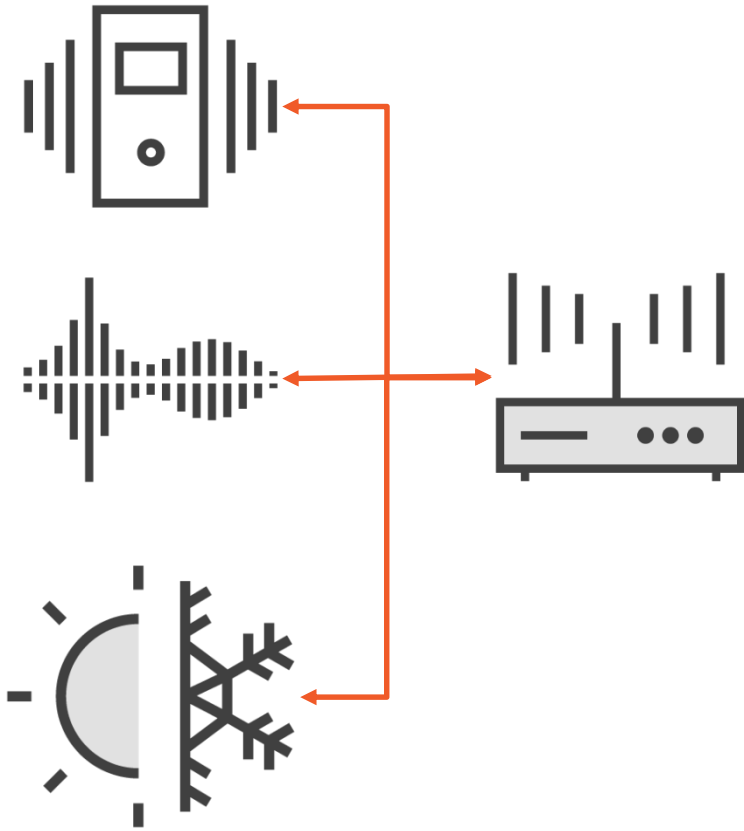
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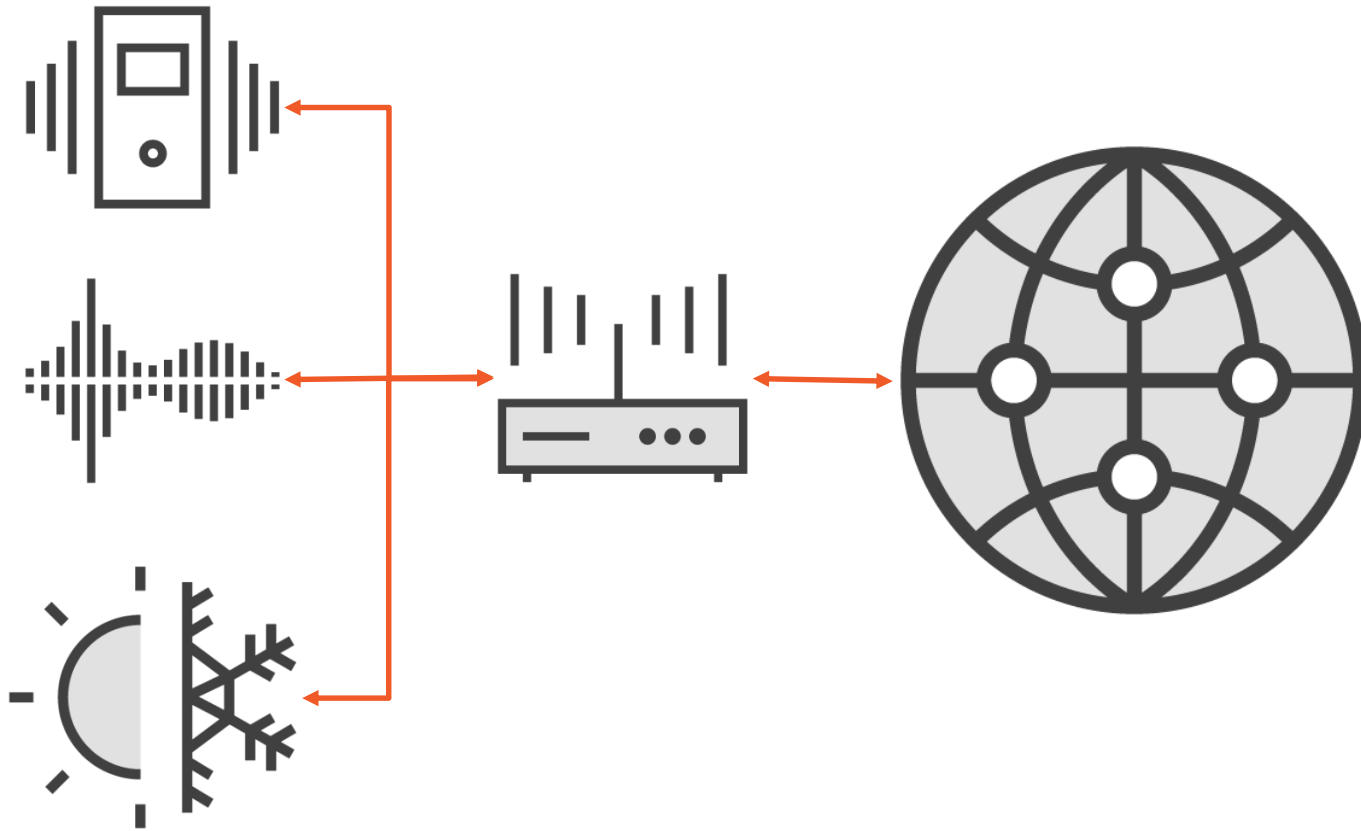
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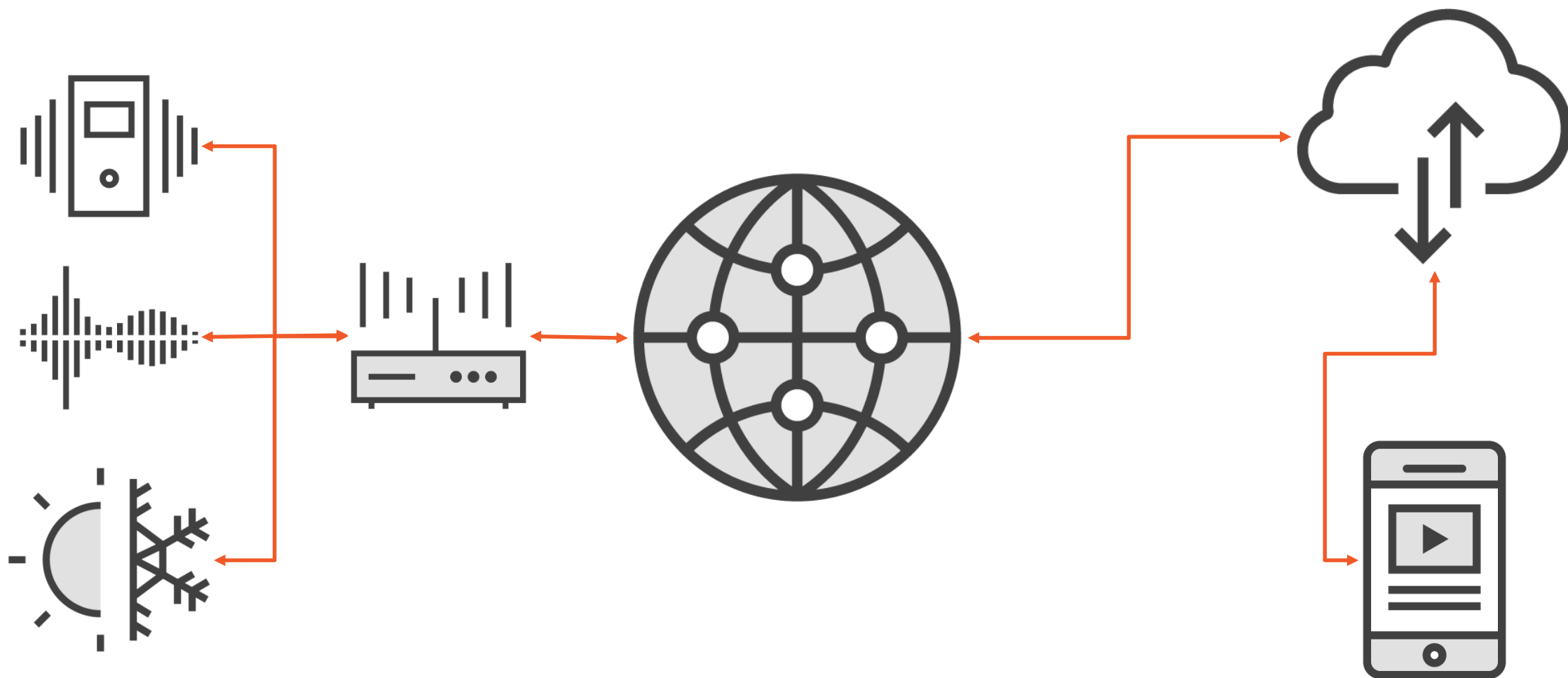
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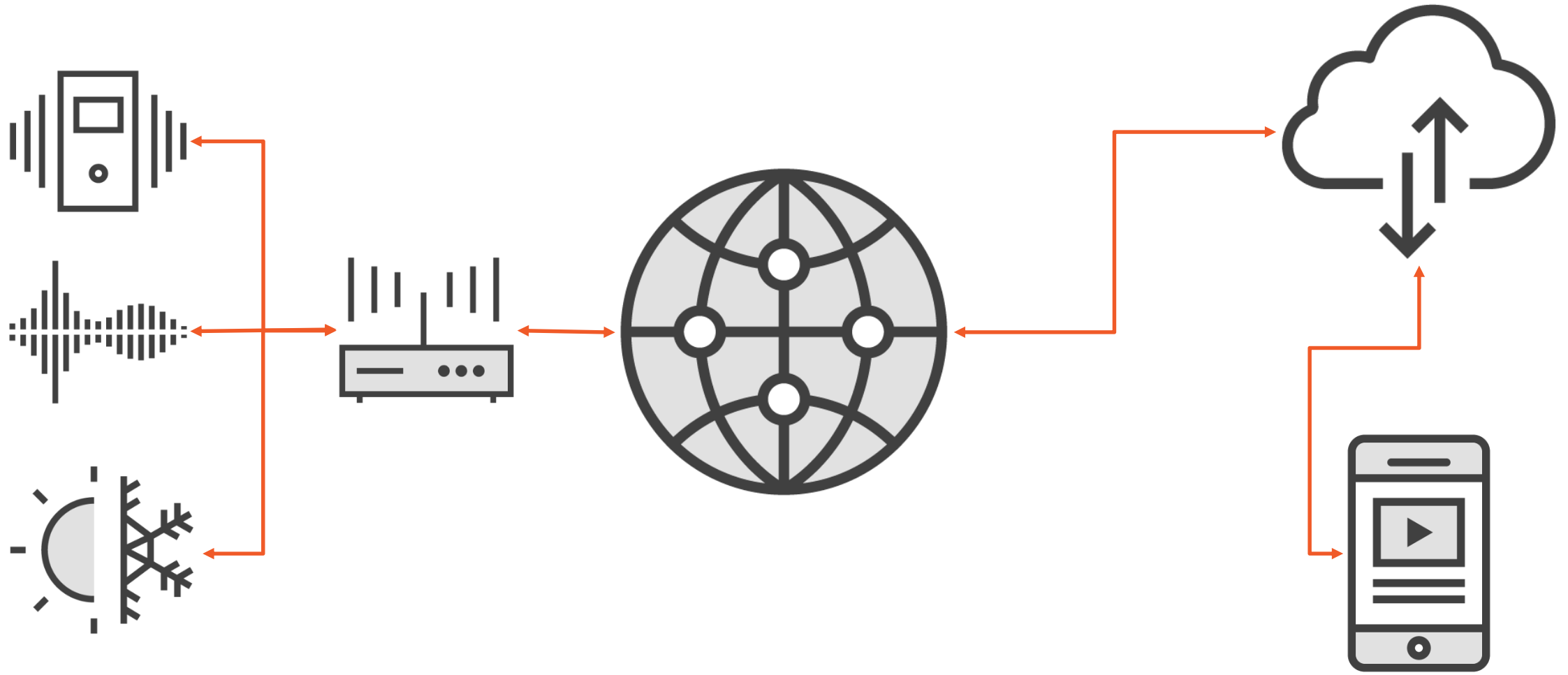
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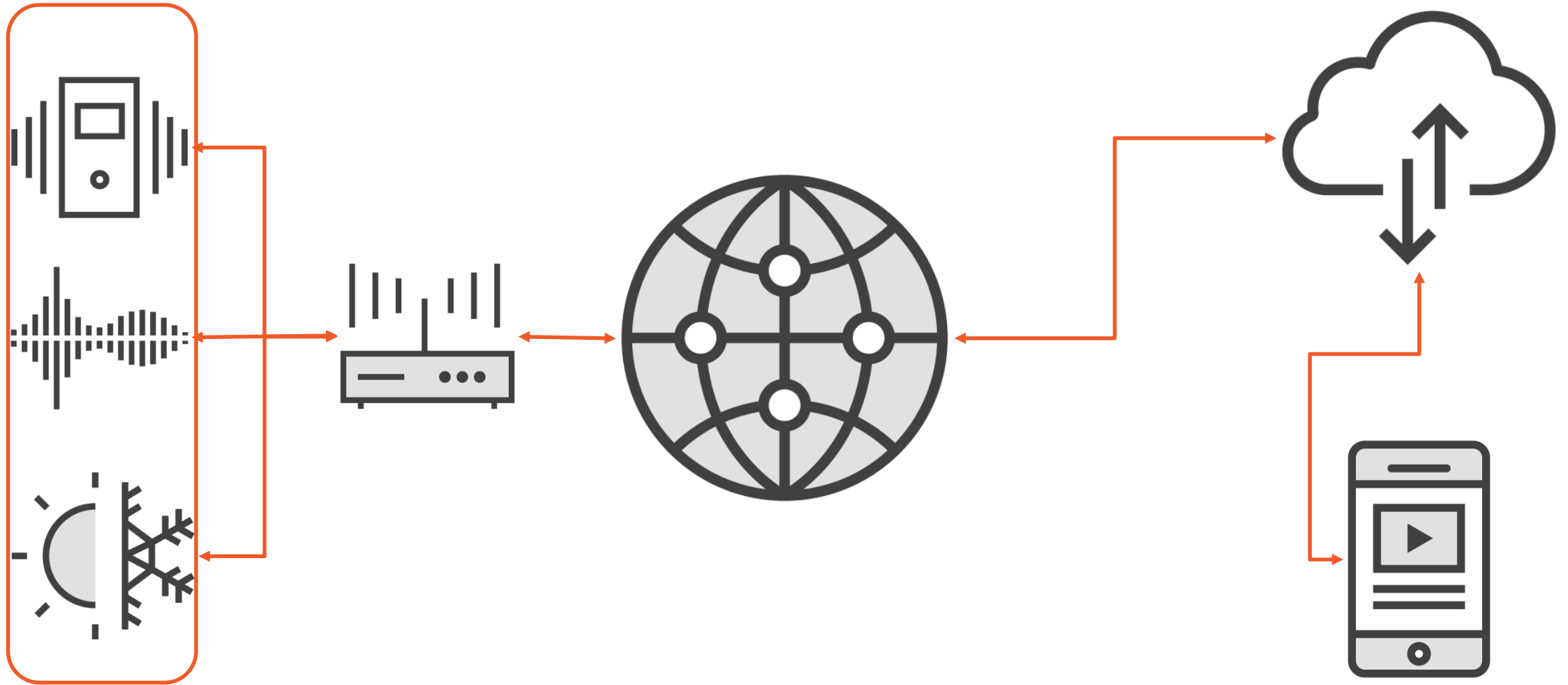
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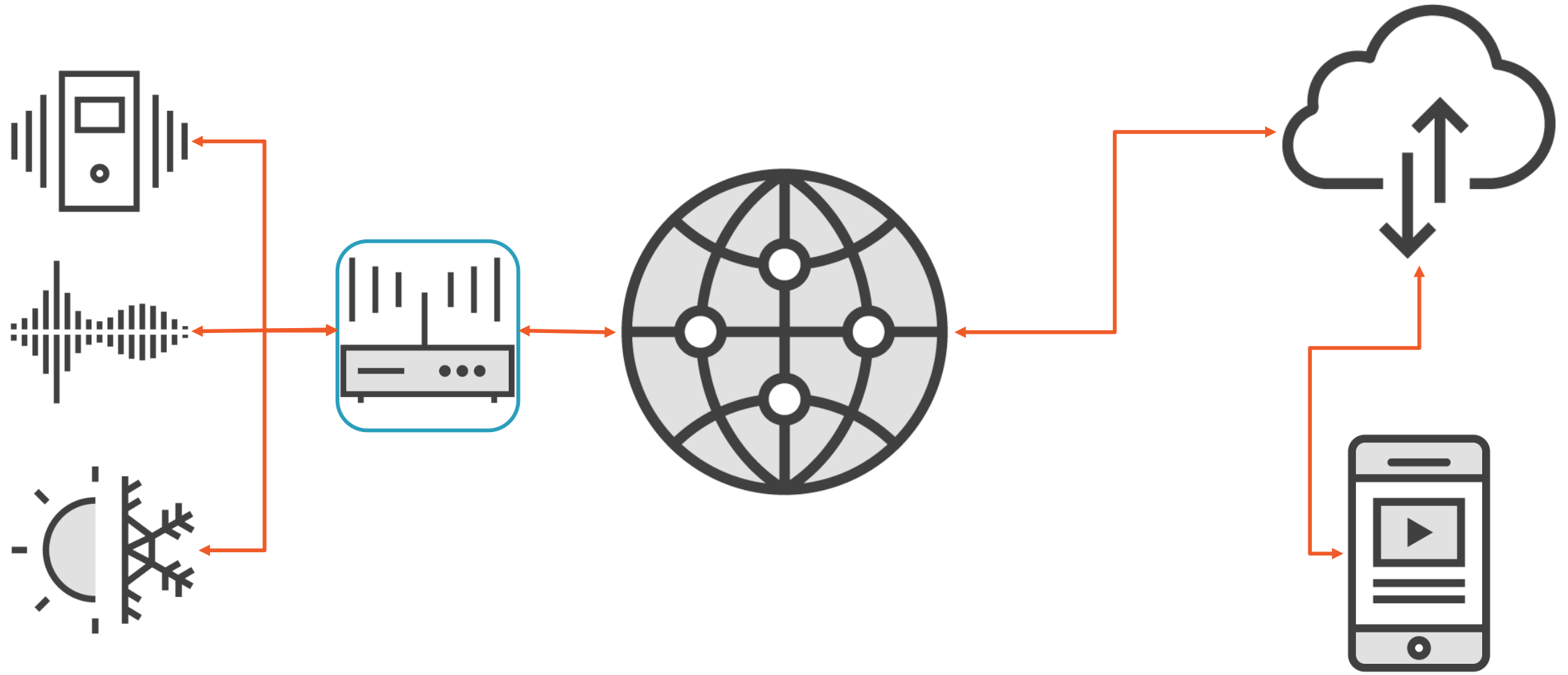
# The Architecture of IoT



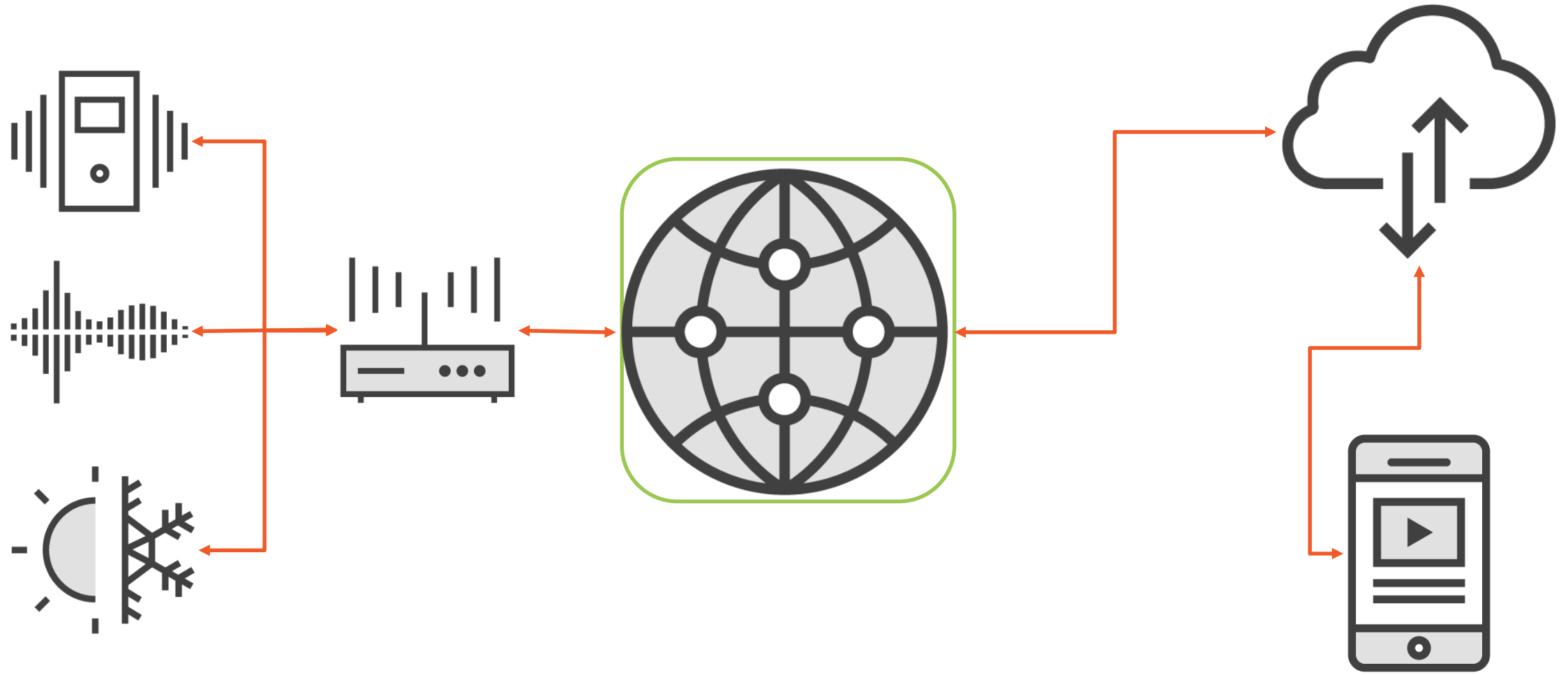
# Edge Technology Layer



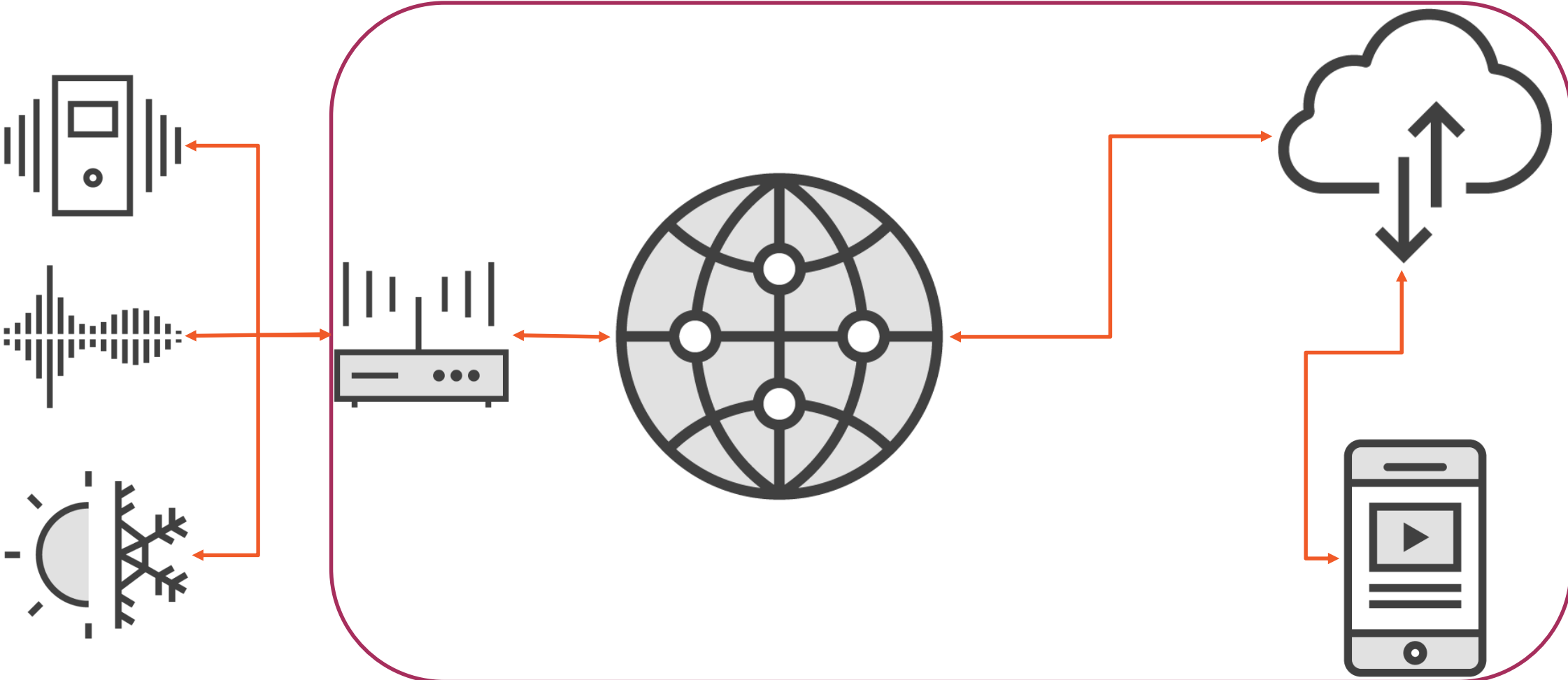
# Access Gateway Layer



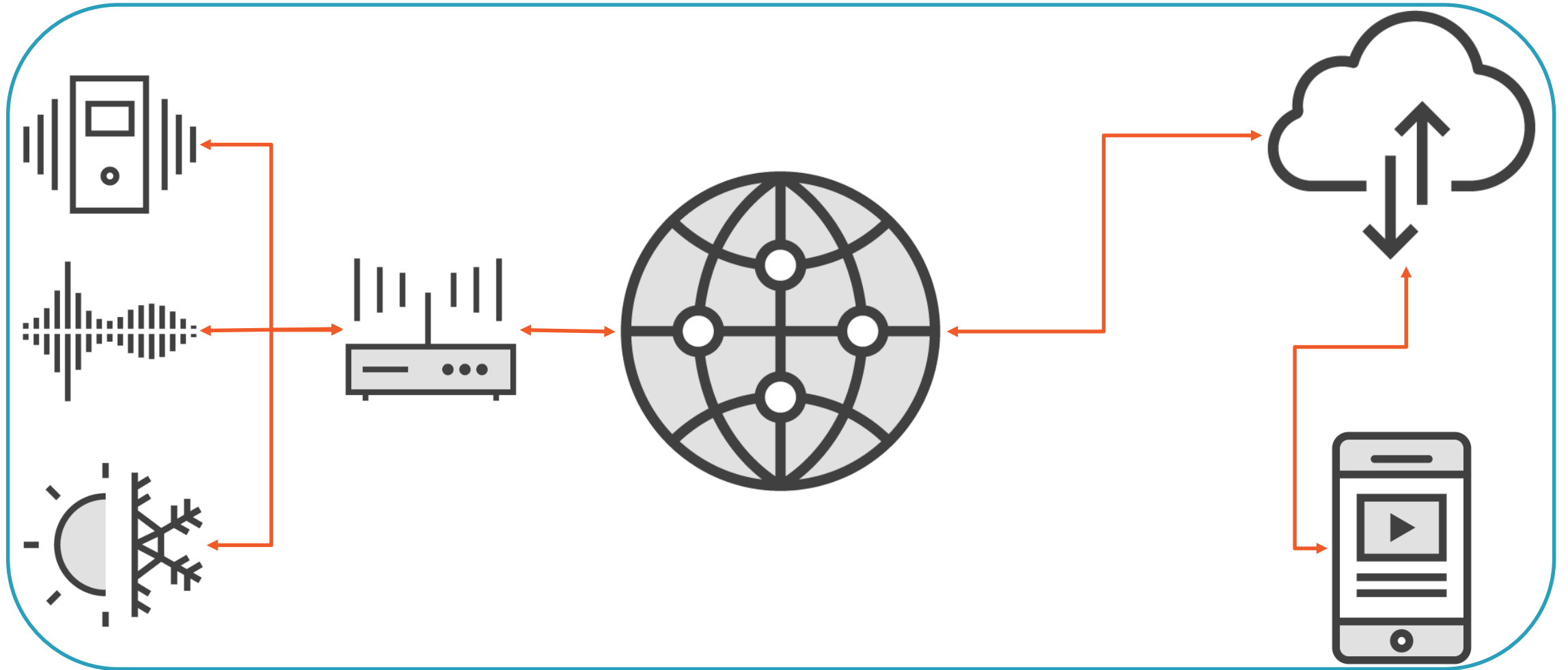
# Internet Layer



# Middleware Layer



# Application Layer



# IoT Is in More Places Than You Think!

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# IoT Is in More Places Than You Think!



HVAC, fire, safety, security, lighting, transport



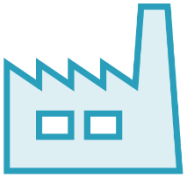
Windmills, generators, meters, turbines, fuel cells, drills



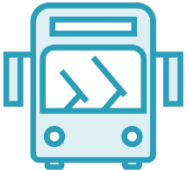
Appliances, TV, game systems, alarms, locks, lighting and MORE!



# IoT Is in More Places Than You Think!



Conveyors, assembly, packing, pumps, valves, tanks



Vehicles, aircraft, signage, tolls, lights, ships



Tags, POS, registers, signage, vending machines



# IoT Is in More Places Than You Think!



Ambulance, military vehicles, environment, monitoring



Switches, routers, storage, phone systems, servers and more



Implants, surgical equipment, monitors, pumps, MRI, tablets



# Protocols and Technologies

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# Short-range Communication



Z-Wave

ZigBee

WiFi

WiFi-Direct

RFID

Bluetooth Smart



# Short-range Communication



Light-Fidelity

NFC

QR Codes/Barcodes



# Medium-range Communication



Ha-Low

LTE-Advance



# Long-range Communication



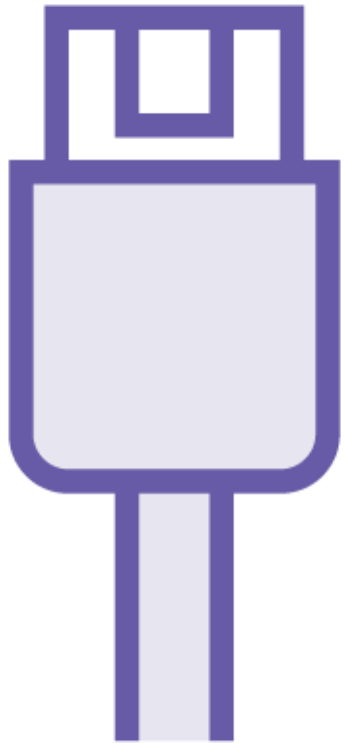
**LPWAN**

**VSAT**

**Cellular**



# Wired Communication



**Ethernet**

**Multimedia over Coax Alliance (MoCA)**

**Power-Line Communications (PLC)**



# OS's for IoT



ARM mbed

Zephyr

Ubuntu Core

Apache Mynewt

RIOT



# OS's for IoT



**RealSense**

**Nucleus RTOS**

**Brillo**

**Contiki**

**Integrity RTOS**



# Communication Models

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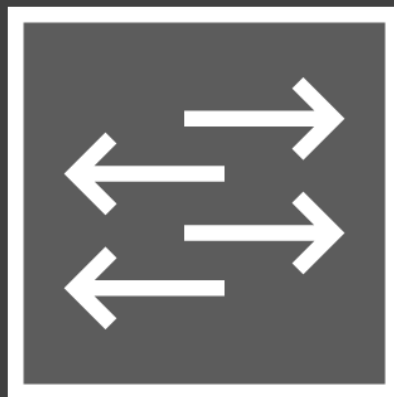
# Communication Models



# Device To Device



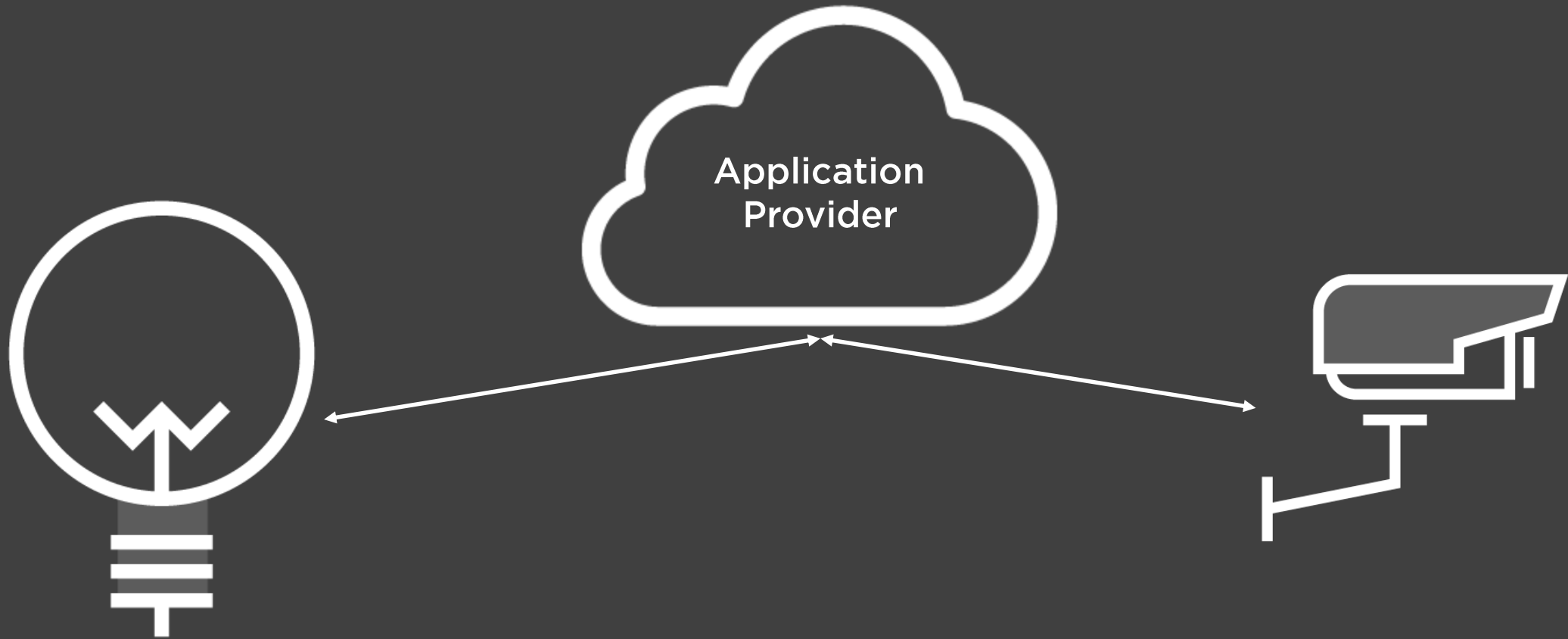
# Device To Device



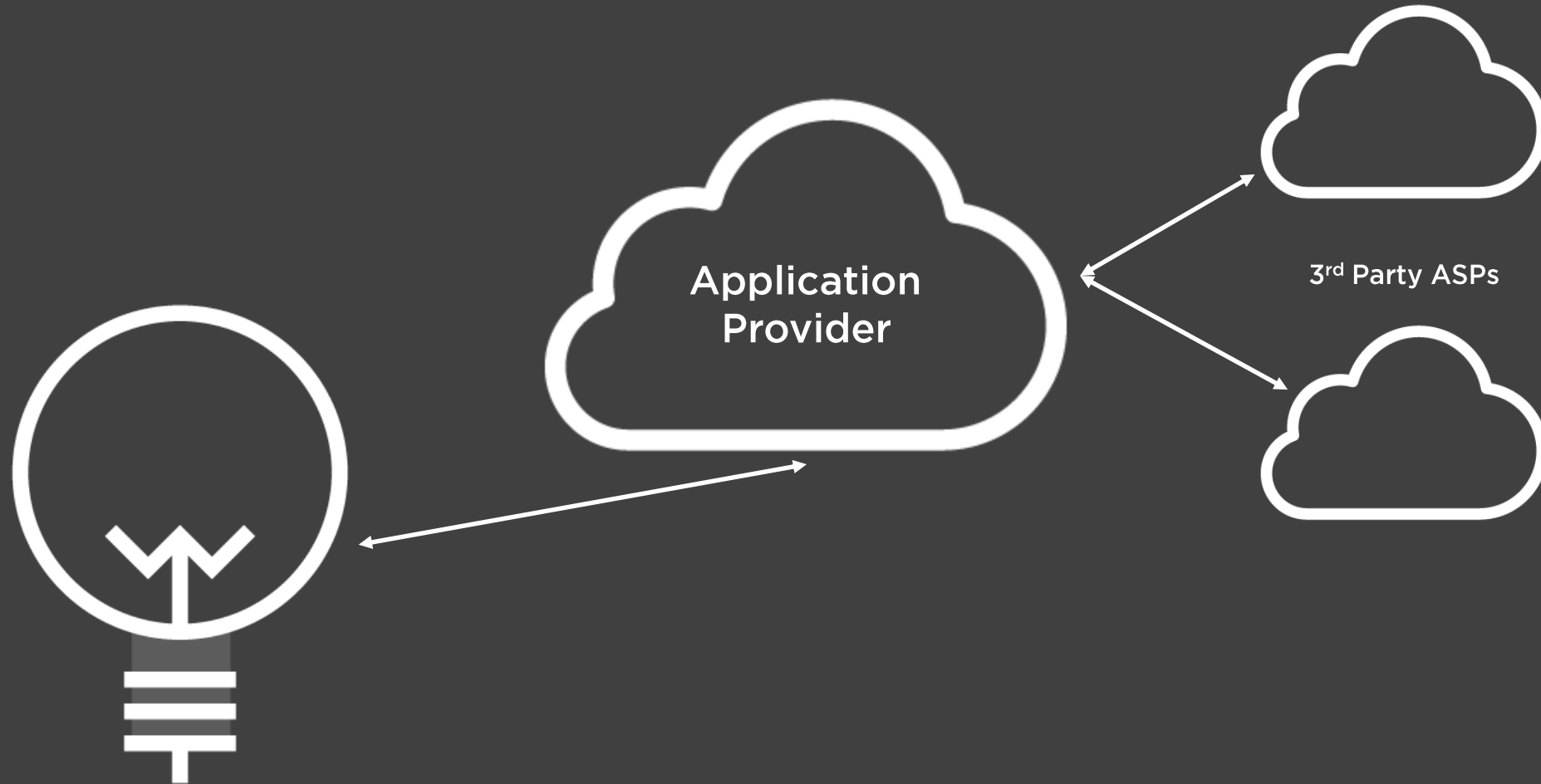
# Device To Gateway



# Device To Cloud



# Back-End Data-Sharing



# The Challenges IoT Presents

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# The Challenges IoT Presents

Interoperability  
standards

Clear text and  
open ports

No basic  
security or  
privacy

Support for  
firmware and  
OS updates

Storage issues

Default, weak  
credentials



# The Challenges IoT Presents

**Theft and  
tampering**

**Insecure web  
interfaces**

**Buffer overflow  
issues**

**Development  
issues**

**Vendor support**

**Regulatory/Rights  
issues**



# LIVE VIDEO



# What We Talked About



**What is IoT?**

**Protocols and Technologies**

**The Challenges IoT Presents**

