

Internet of Things (IoT)

Raspberry Pi Summer Camp Tech Talk

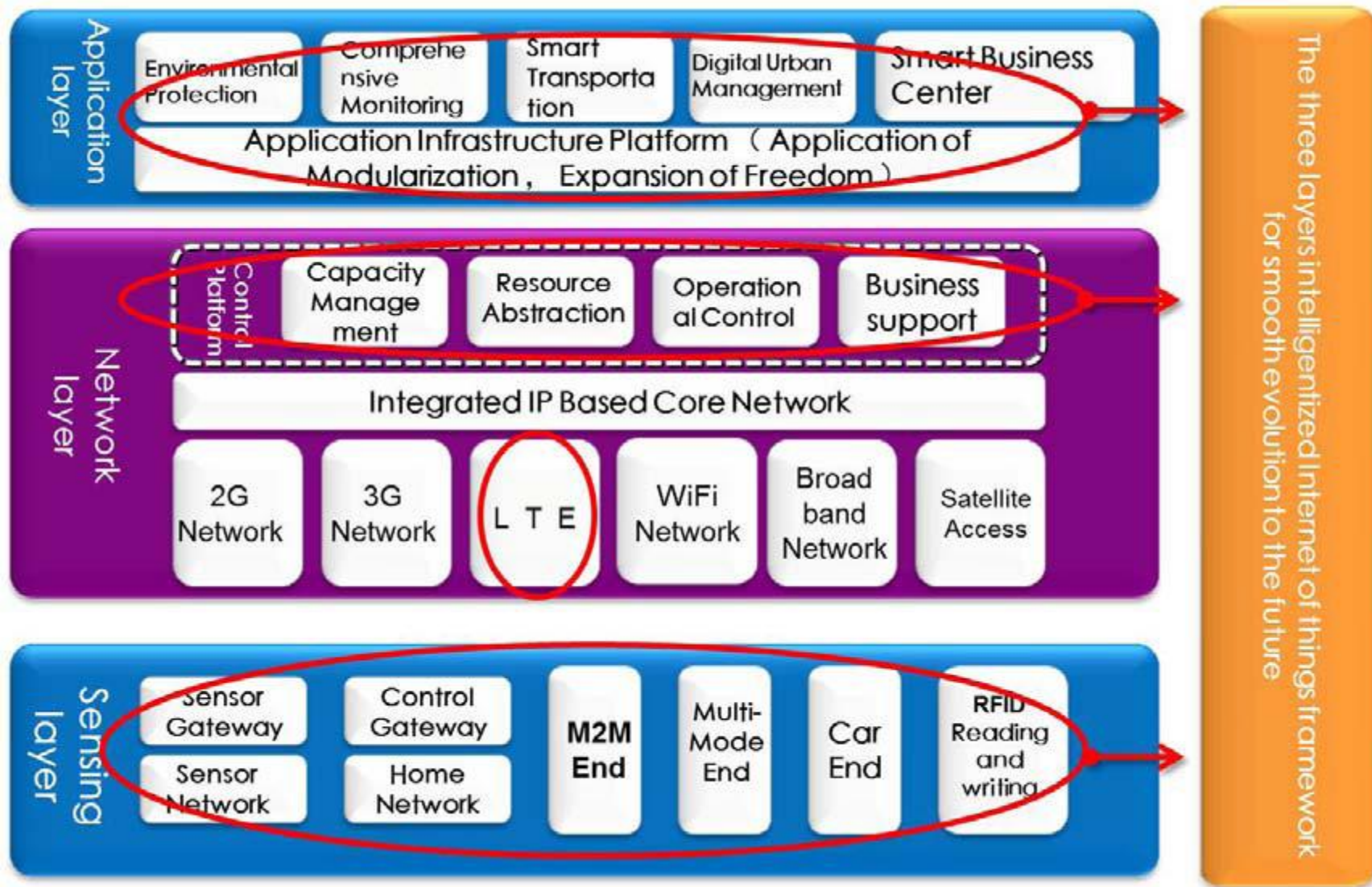
Introduction to IoT

- According to Wikipedia, IoT refers to the interconnection of uniquely identifiable embedded computing-like devices within the existing Internet infrastructure.

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a Smart Grid.

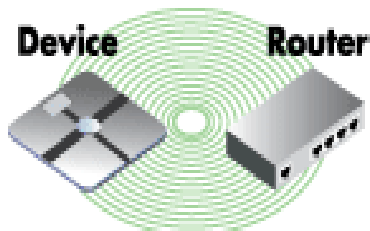
- Things, in the IoT, can refer to a wide variety of devices such as heart monitoring implants, bio-chip transponders on farm animals, automobiles with built-in sensors, or field operation devices that assist fire-fighters in search and rescue. Current market examples include smart thermostat systems and washer/dryers that utilize WiFi for remote monitoring.

- Due to the ubiquitous nature of connected objects in the IoT, an unprecedented number of devices are expected to be connected to the Internet. According to [Gartner](#), there will be nearly 26 billion devices on the Internet of Things by 2020. [ABI Research](#) estimates that more than 30 billion devices will be wirelessly connected to the IoT by 2020. Per a recent survey and study done by Pew Research Internet Project, a large majority of the technology experts and engaged Internet users who responded. 83% agreed with the notion that the [Internet/Cloud of Things](#) and embedded and wearable computing will have widespread and beneficial effects by 2025. It is, as such, clear that the **IoT will consist of a very large number of devices being connected to the Internet.**

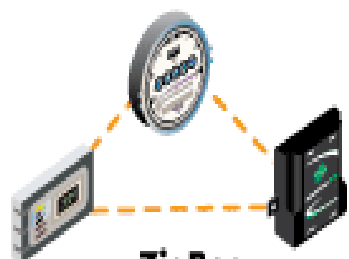


Source: Datang Telecom Technology & Industry Group

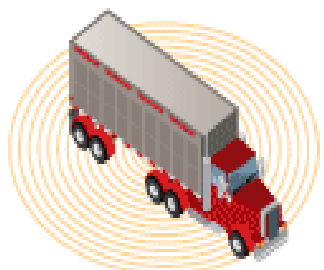
Network of Things



Wi-Fi



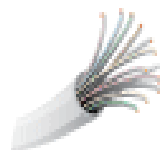
ZigBee



Wireless Vehicle Area Network

Infrastructure

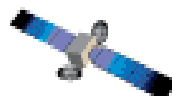
Backhaul Networks



Cable

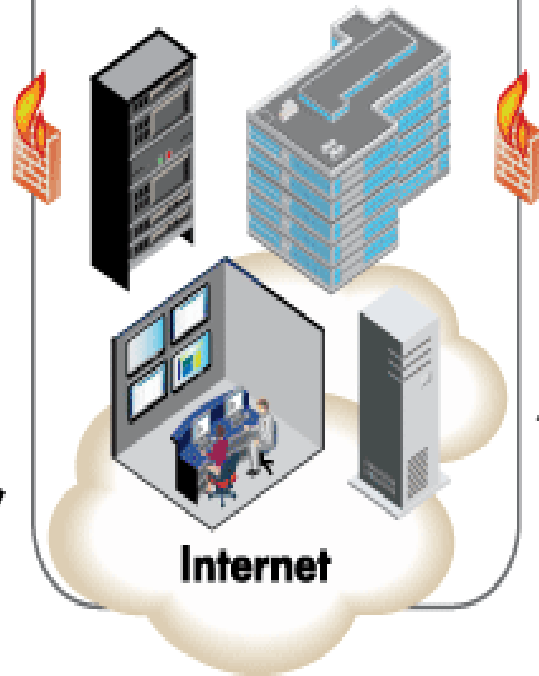


Cellular



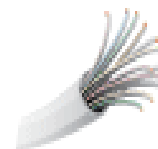
Satellite

Comprised of facilities, servers, storage, network routers, management software, middleware, device interfaces, application interfaces, security systems, network operations center, network backbone access, etc.

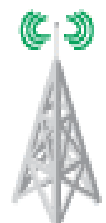


Internet

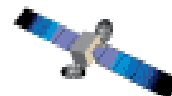
Backhaul Networks



Cable

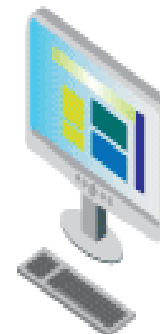


Cellular

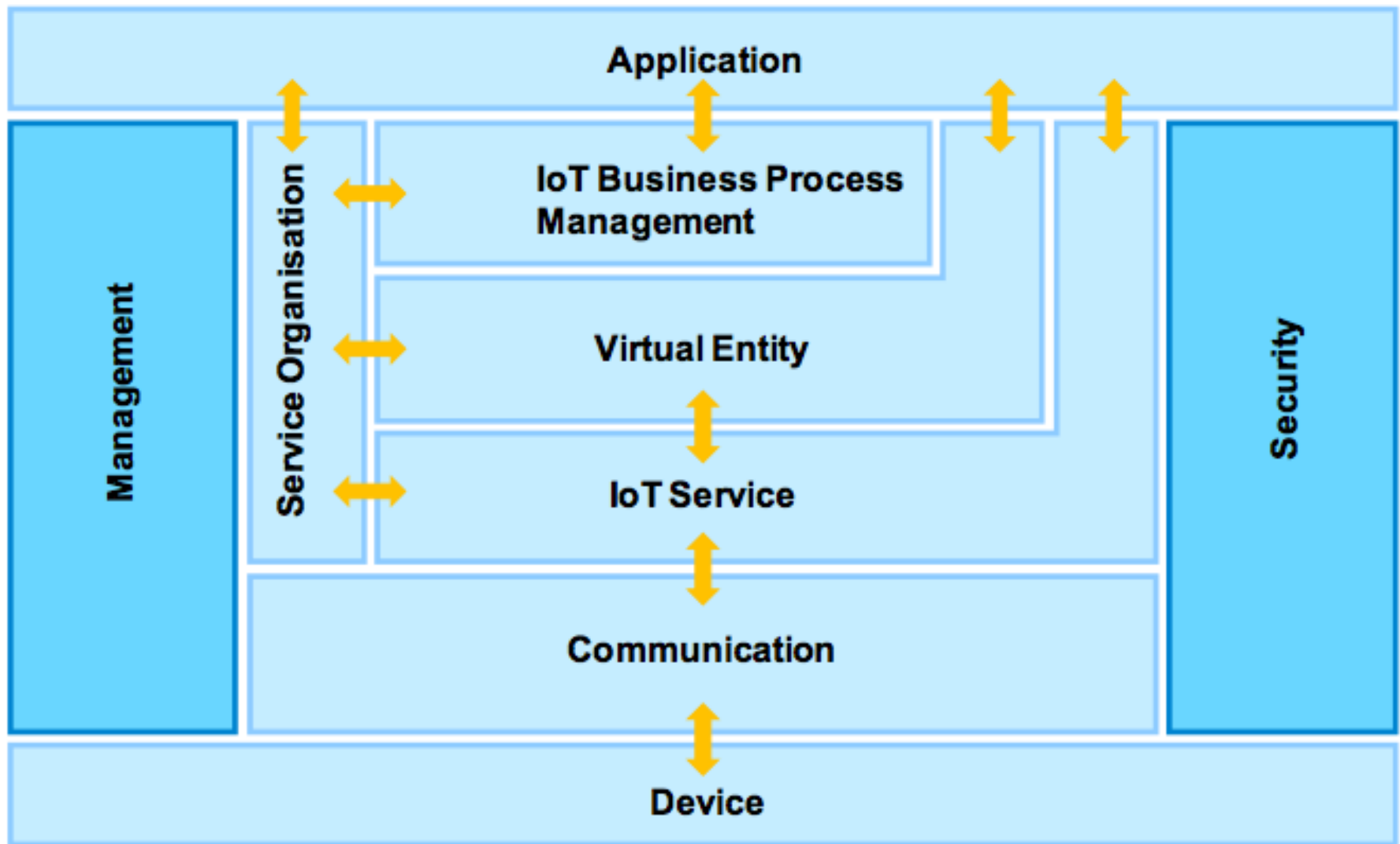


Satellite

Application Interfaces

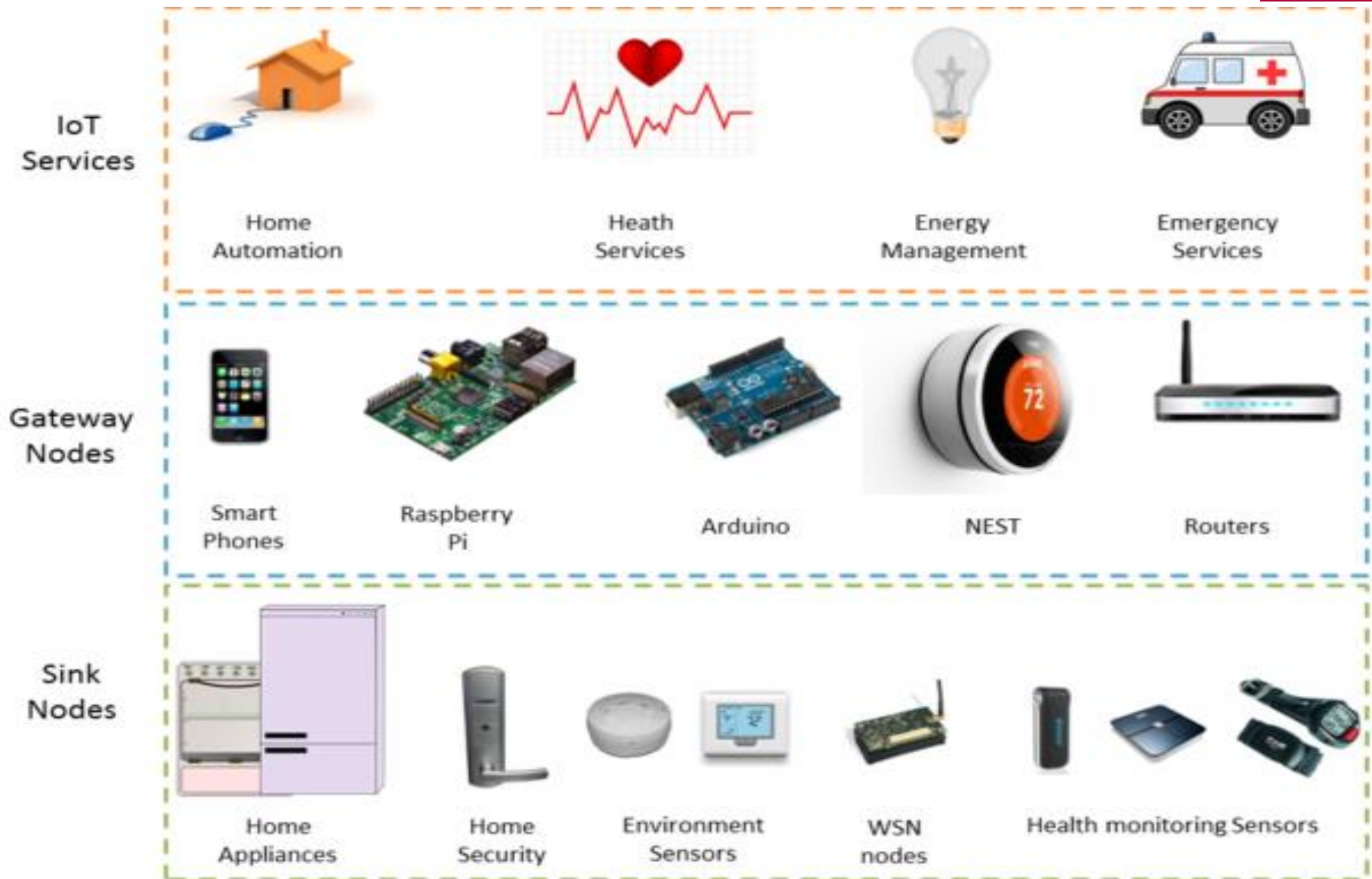


Source: digi.com



Source: IoT-A

Architecture for Open IoT Services



Source: kno.e.sis

- **Intel IoT -- What Does The Internet of Things Mean?**
 - <http://www.youtube.com/watch?v=Q3ur8wzzhBU>
- **Cisco - How the Internet of Things Will Change Everything--Including Ourselves**
 - http://www.youtube.com/watch?v=B_hjAfPJeRA
- **IBM – Internet of Things**
 - <http://www.youtube.com/watch?v=df9xAZZ-8zg>
- **Dr. John Barrett at TEDxCIT – The Internet of Things**
 - <http://www.youtube.com/watch?v=QaTIt1C5R-M>

- 1. Sensors/Actuators**
- 2. Communication between servers or server platforms**
- 3. Server/Middleware Platforms**
- 4. Data Analytics Engines**
- 5. Apps (iOS, Android, Web)**

1. **Bluetooth**
2. **Zigbee**
3. **Z-Wave**
4. **NFC (Near-Field Communication)**
5. **RFID**
6. **WiFi**
7. **2G/3G/LTE**
8. **Wibro/Mobile WiMax**
9. **PLC (Power Line Communication)**
10. **Ethernet**
11. **What else?**

1. **USN (Ubiquitous Sensor Networks)**
2. **M2M (Machine-to-Machine)**
3. **IoE (Internet of Everything) – Cisco's favorite term**
4. **Cloud of Things**
5. **Web of Things**

A scenic view of a rocky coastline. Two prominent, jagged rock formations (sea stacks) stand in the ocean. The water is a deep blue-green, and white foam from waves is visible crashing against the base of the rocks. The sky is a pale, overcast grey. The text "Q&A" is overlaid in a white, serif font on the right side of the image.

Q&A