Internet of Things: Smart Cities

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- Internetworking of physical deices with sensors, softwate and network coenecivty to allow devices to talk to each other
- Overview
  - Smart City: Urban development vission to integrate IOT in a secure fashion to managw a city's assent
  - Goals:
    - Make bettr use of public resources
    - Increase quality of services to citizens
    - Reduce operating cost
  - 100 million market
- Current Implementations
  - Smart Governance: noise management
  - Mobility: traffic
  - Waste Management
    - Detect when they are full and optimize collection route
    - Reduce cost of waste collection and improves recycling quality
  - Noise monitoring
    - Having microphones that can tell law enforcement if someplace is too louad
    - Offers promise in recognizing glass crashes, gunshots, and fights in public places
      - Allows for automation of police dispatc
  - Traffic congestion
    - Reads cellphone location data to sense wwhere cars are and give realtime traffic data
    - Allows city planners to intelligently plan out routes
  - Architecture
    - IOT as Web Services
      - Representational State TranswferVery simila to traditional web sevices
    - Transport layers: HTTP/TCP too complex
    - Use COAP

- Link Layer
  - Wifi, Ethernet, Fiber optic are overkill
  - More suitable: Bluetotth, IEEE 802.11 low power, PLC, NFC, RFID
- Backend
  - Servers aren't necessary in principle
    - Fundamental for urban though" facilitate access and open data
  - Database management systems
    - Store info produces by IOT peripheral nodes
    - As sensors/info scale, databases must be able to scale their storage

- Case Study: Padova Smart City
  - Uni of Padova and Patavina Tech partnership
  - Current system
    - Monitor enviornmental parameters
    - Control street lights and feed inforation to admins
    - Need to use ipV6: handles billions and billons of devices
- What's Next
  - More widespread rollout of IOT
  - More intelligent neural networks to interpret data
  - Bigger database