

Smart Homes and Cities

Wireless Sensors at Smart Home

- Security sensors, cameras, thermostats, smart plugs, lights, Entertainment systems. Do-it-Yourself (DIY) sensors
- Actuators
- Smart plug
- Motion detector and Door/window detector

Wireless sensors for Smart Home

- Smoke detector, meter interfaces (electric, gas and water)
- Remote control (built-in authentication), smart relay, surveillance camera
- Wireless Hi-Fi Speakers,
- HUE LED lights

Applications

- Mobile, tablets, IP-TV, VOIP telephony, video-conferencing, video-on-demand, videosurveillance,
- Wi-Fi and Internet,
- Home security: access control and security alerts

Applications

- Wi-Fi and Internet
- Lighting control
- Home health care
- Fire detection: Leak detection
- Energy efficiency Solar panel monitoring and control, Temperature monitoring and HVAC control

Home Automation Software

- Intel-based intelligent gateway enables creation a home automation system offered by the service providers for telephony, mobile, cable, broadband, and security
- OpenHAB enables the smart home devices communicate at home.

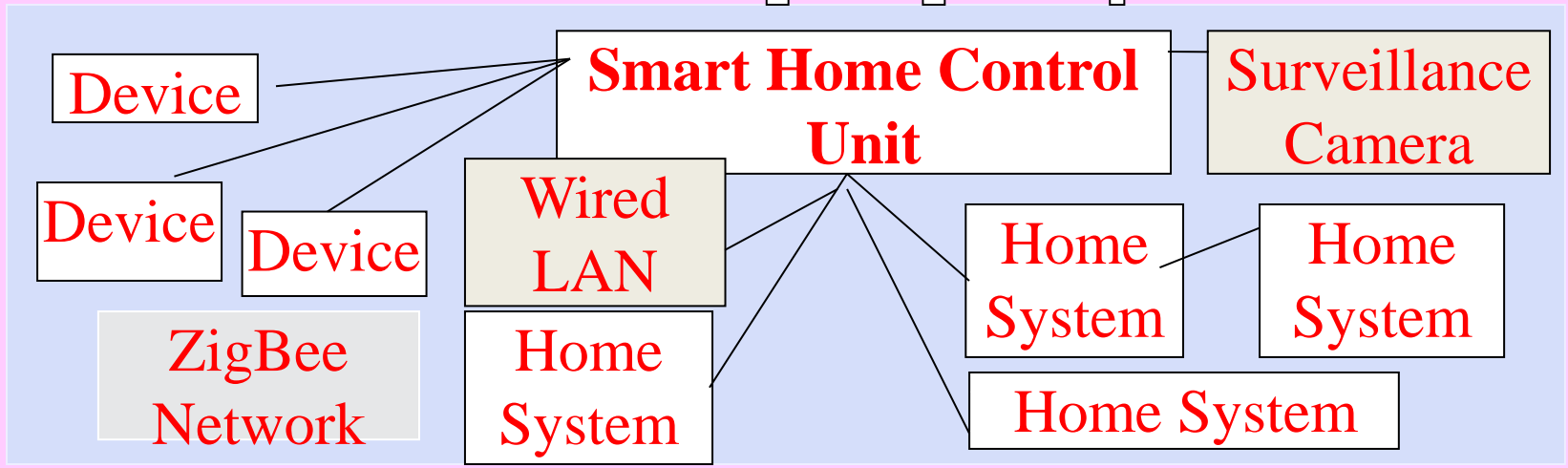
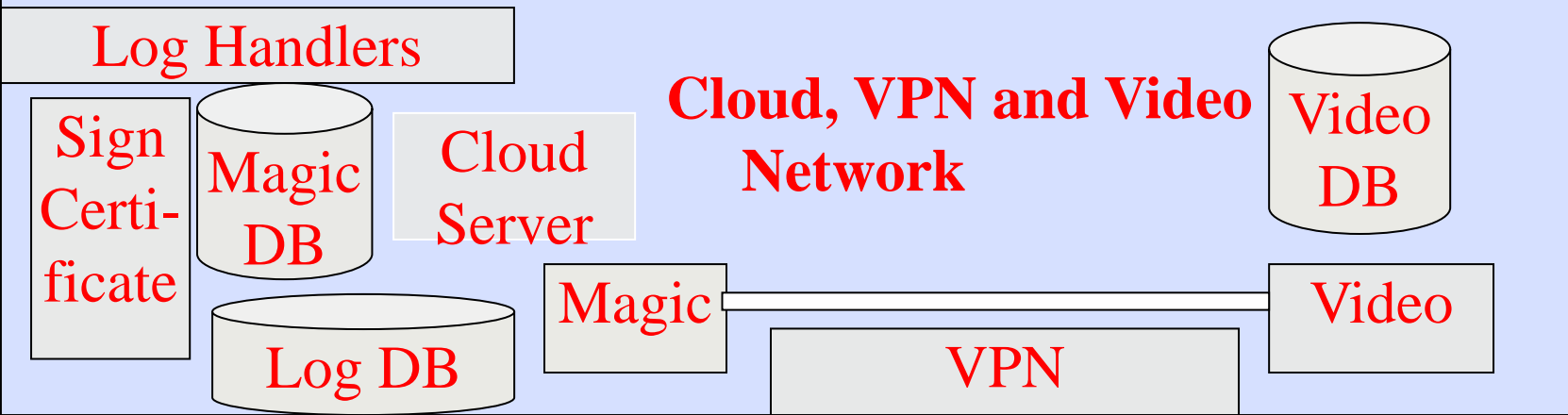
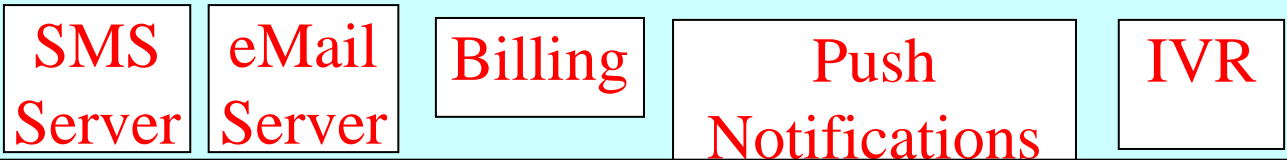
..... Home Automation Software

- A Companion cloud computing service called my.openHAB
- Runs on any Java enabled system.

An architectural view

- Cloud (named Magic) based IoT platform for smart home
- VPN: Virtual Private Network
- DB: Database
- IVR: Interactive Voice Response System,
- UWB: Ultra Wideband

Service Provide Infrastructure



Abbreviations

- VPN: Virtual Private Network
- DB: Database
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Smart City

- The IoT concept extends to Internet of Everything (IoE)
- Four-layer architectural framework developed at CISCO for a city

Layer 4: New and innovative applications and services for city managers, Government and resident services

Smart
Streetlights

Smart Parking

Smart Waste
Mgmt.

Traffic data
acquisition,
control and
monitoring

Health Services

Fire
Services

Smart
Surveillance

Layer 3: Data Collection services, Data Accumulation (storage) at Servers, Connected Data Centre, Cloud or Enterprise server, Data analytics, data element analysis and transformation, for Data Abstraction (Aggregation and Access) for the Applications and APIs, collaborations, services and processes (involving peoples, city services and processes)

Layer 2: Distributed Data capture, processing, storage, and analytics at distributed points for scalability and responsiveness to real-time and context-critical data

Layer 1: Physical devices with sensor networks in parking spaces, hospitals, streets, vehicles, banks, water supply, roads, bridges and railroads

Layer 1

- Sensors
- sensor networks and devices
- Network in parking spaces, hospitals, streets, vehicles, banks, water supply, roads, bridges and railroads
- Bluetooth, ZigBee, NFC, WiFi

Layer 2

- Capturing data at distributed computing points
- Data processing,
- Data storing
- Data analysing

Layer 3

- Central collection services
- Connected data centres, cloud and enterprise servers
- Data analytics for the applications

Layer 4

- New innovative applications, such as:
- waste containers monitoring,
- WSNs for power loss monitoring
- Bike sharing management,
- smart parking, means services for motorist that inform the nearby parking services with vacant spaces in advance.

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Summary

We learnt

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- New innovative applications

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- Fire Services
- Health Services

End of Lesson 7 on Smart Homes and Cities