Internet of Things towards Ubiquitous and Mobile Computing



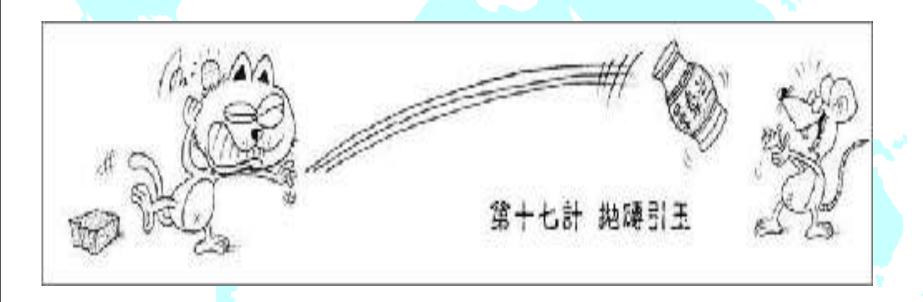
Guihai Chen October 17, 2010





Claims

- Any opinions expressed here are those of myself, and do not reflect the views of any agencies of China government
- Throw out a brick to attract a jade





Outline of Contents

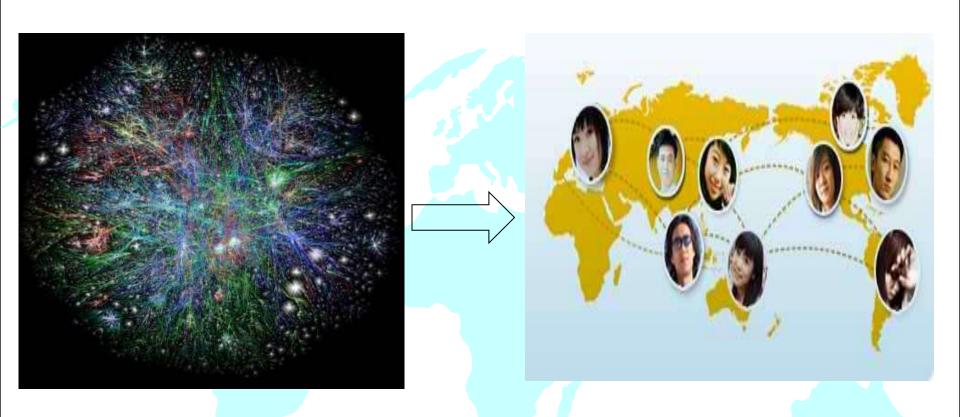


- ♦ IoT, UC and
 - Magic Pen and Its Demo
- Air computing





Starting from the Internet



- Internet appears everywhere in the world;
- but it is still a connection between people and people



What is IOT?



Naming→ name

Sensing→ 5 sense orgrans

Processing→ brain

Communication → **language**

IOT is more like a Human Society



IOT is a communication network connecting things which have naming, sensing and processing abilities.



Insight into Challenges

What kind of address is used?

- Can we use IP address?
- How to combine IP and RFID Tag?

•

how to embed sensors?

- Anti-collision for tag and readers
- Diversity of sensors
- WSN → Super WSN
- Miniaturized Sensor

Naming

Sensing

Processin g

Communicating

oes anything need processor?

- So many Brainless things?
- IOT + Cloud Computing !
- C/S succeeds P2P again?
- Exaflood or data deluge?

What language is used?

- Can we still use TCP/IP?
- Standardization
- Which is bigger, Internet or WSN?

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Smart Planet, Pervasive Computing

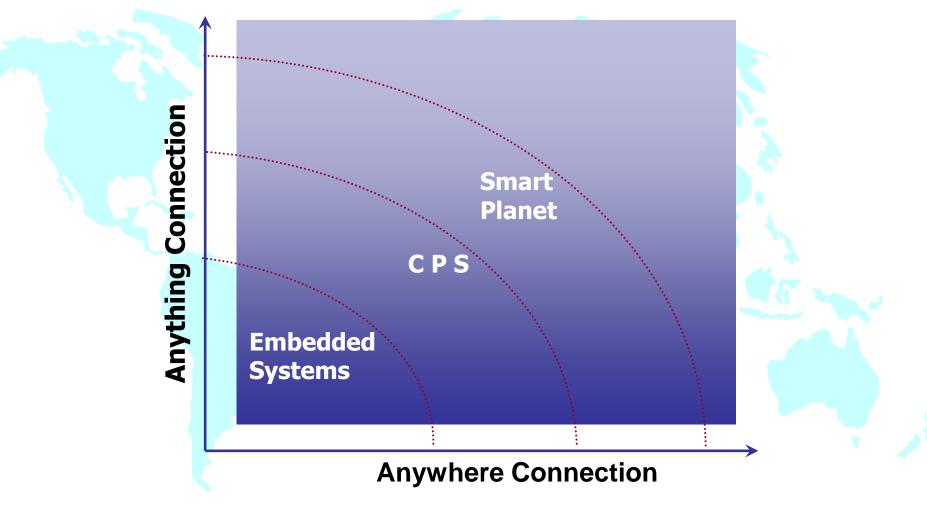


All such buzzwords refers to the same balloon. When it is blown to large size, it is called Smart Planet; when to middle size, it is called CPS; When to small size, it is called pervasive or embedded system.



Smart Planet, Pervasive Computing







IoT and CPS



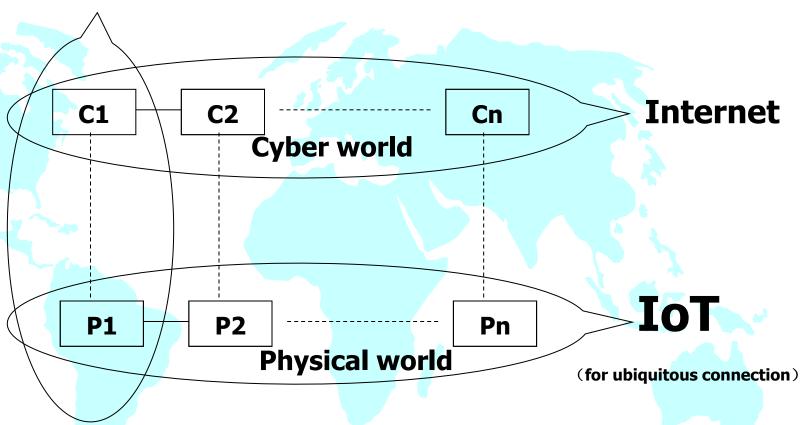
are a pair of Twins.





IOT and CPS

CPS (for harmonious interaction)



- Cyber world: C=C1 ∨ C2 ∨ ···· ∨ Cn
- Physical world: P=P1 v P2 v.....v Pn



IOT and CPS

- Fact 1
 - USA likes to use CPS.
 - China likes to use IoT.
- ◆ Fact 2
 - Academia likes to use CPS.
 - Government likes to use IOT



IoT and WSN

X Wrong: IoT is WSN, or IOT a.k.a. WSN

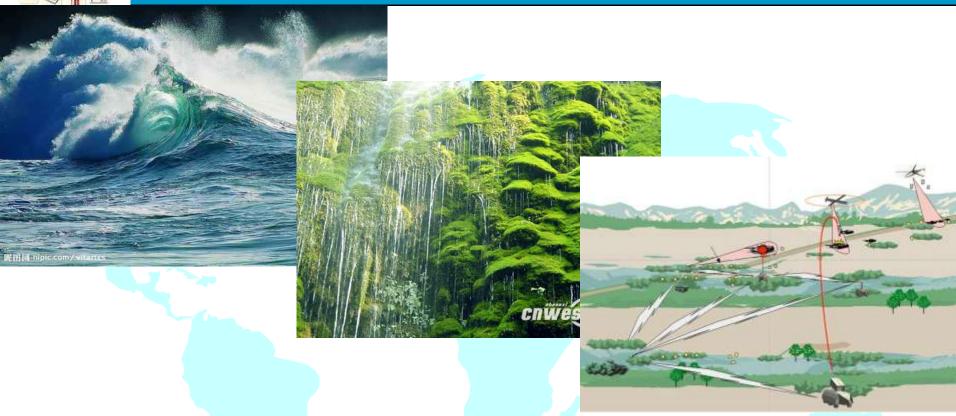
 \rightarrow IoT = WSN

√ Right: IoT is not WSN → IoT ≠WSN

IoT includes WSN → IoT ≥WSN



When to Use WSN



We care not only about Water, tree and soldier, but also about Sea, Forest and battle field.



In Large Environments



So, we have Ocean Monitoring, Forest Management and Battlefield Control.



IoT covers many disciplines

IoT Culture

> IoT Economy

IoT Technology **Application**

Network Layer

Sensing Layer



Big 3 layers

Hundreds of Billions Industry

Small 3 layers

Technicians

Departments of Computer Science, Communications, Electronic and Control



Demo---Magic Pen





Write in the Air





Use pen and paper before keyboard



hit keys every day



Air writing or
Writing in the air
or Ubiquitous writing



Sensing Wall



Matrix can be extended to a wall of any size.



Touch















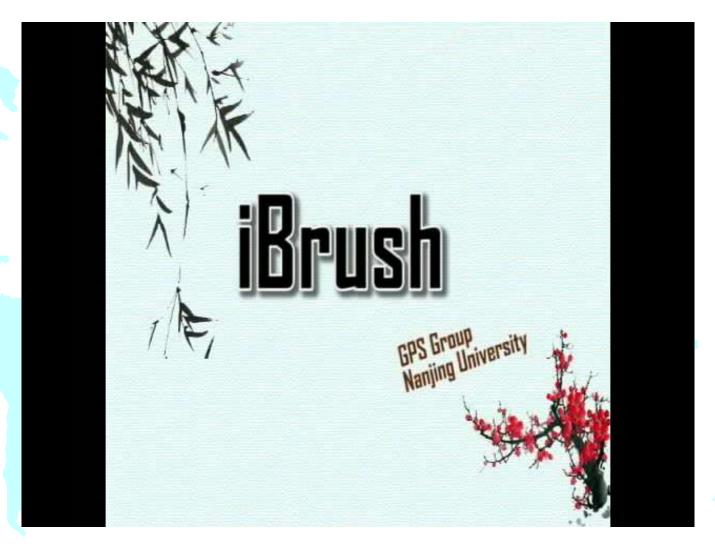














Similar Works







Related Works

- Microsoft has a project of "Writing in the air",
 - **◆They use camera.**
 - You have to face to the camera.
 - Your stand position is restricted.



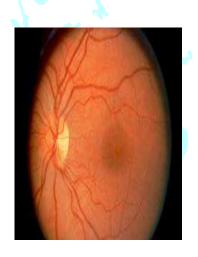
Future Plan

- Discard the touch
 - ◆Trace light
 - Trace your finger movement
 - ◆Trace a mobile sensor



- trace your action movement
- ◆ Replace X-box
- Air computing







Questions

"A teacher can never truly teach unless he is still learning himself. A lamp can never light another lamp unless it continues to burn its own flame."

-- Rabindranath Tagore (1861-1941)

Indian Poet, Nobel Laureate 1913