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Sensors and multimedia applications: a complementary perspective

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Sensors

What is it?

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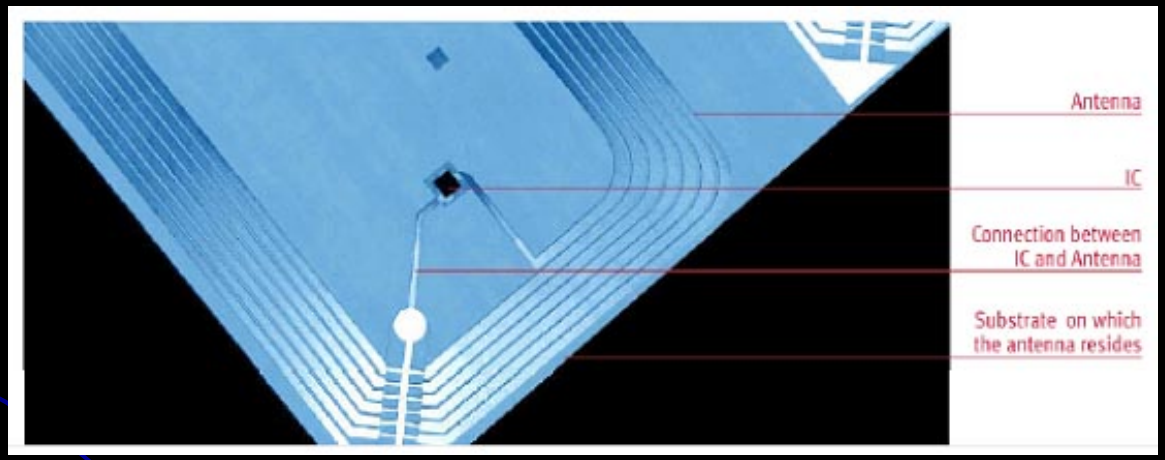
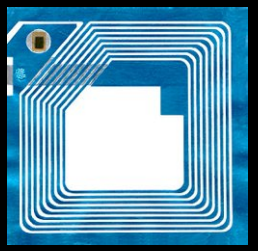
In the news (1/2)…

- RFID (Radio Frequency Identification) as Key enabling Technology for “Smart Items”.

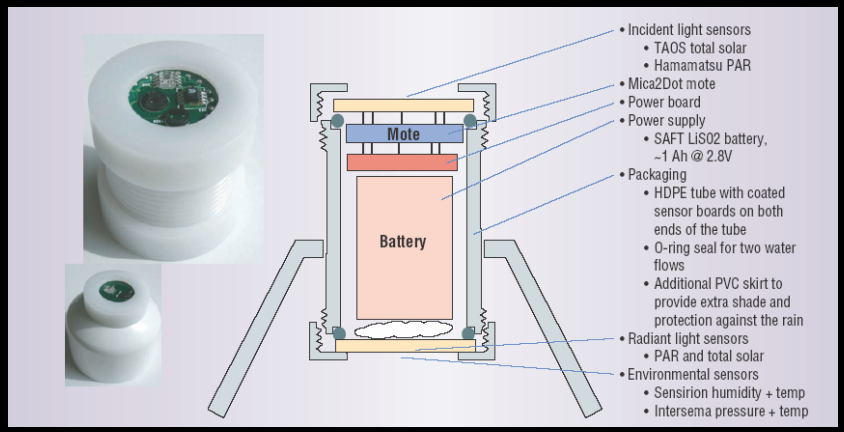




- It’s an automated identification and data collection technology, leading to accelerated business processes and more accurate and timely data entry.

In the news (2/2)…

- **Motes** also called **smart dust** and **wireless sensing networks**.



- The core is a small, low-cost, low-power **computer**.
- The computer monitors one or more **sensors**. All sorts of sensors: for temperature, light, sound, position, acceleration, vibration, stress, weight, pressure, humidity, etc.
- The computer connects to the outside world with a **radio link**. The radio links allows transmission of few hundreds meters. Limiting factor for longer distances are power consumption, size and cost.

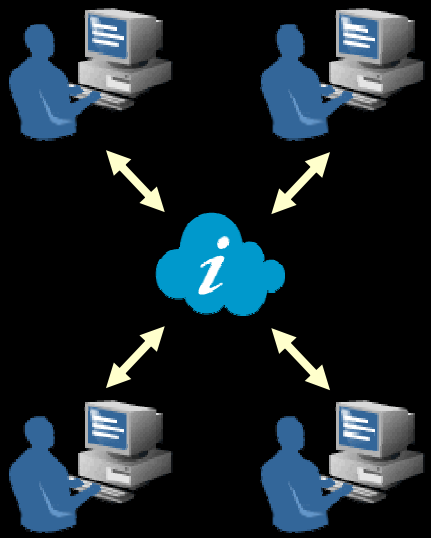
The Third Transformation

First Transformation: Computers

Power to Compute Lots of Data
Available to Few

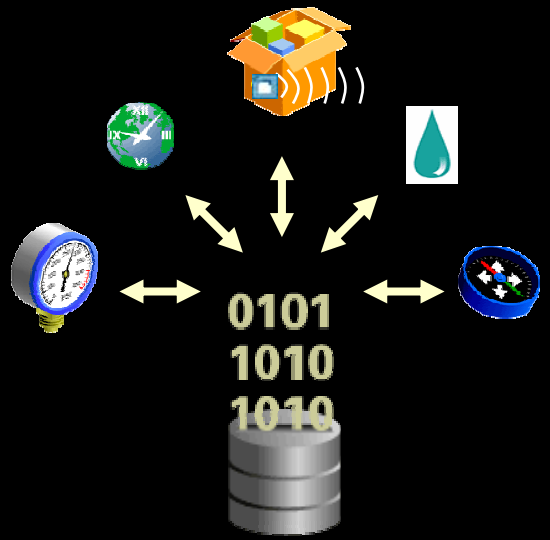
Second Transformation: Internet

(Still Happening)



Manual Intervention; UI Driven
Available to Many

Third Transformation: Sensor-Based Computing



Automated Data Collection; Real-TIme
Available to Everything, Everywhere

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Multimedia

What is it?

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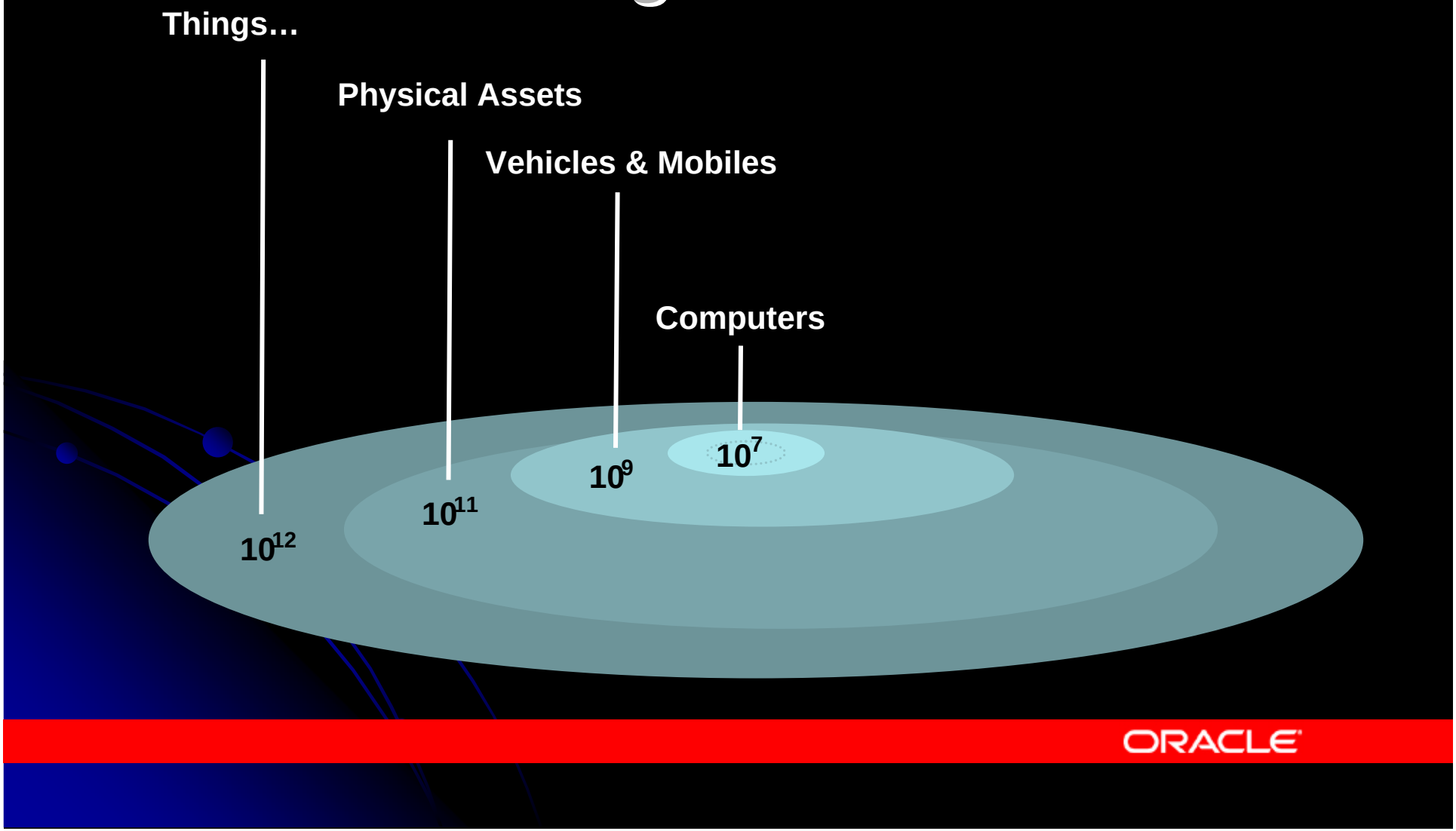
Booh!!!

Nevertheless we can think of it as:

DATA

A LOT of them!

Reality: Increasing Data Volumes



Network of Things (1/2)

- Two major properties[1]:
  - They will be **ubiquitous**; by default, everything will be connected to a network of some form and work in coordination with other devices, services, and network-enabled entities.
  - They will be **invisible**, always there and always in use; we will notice them only in those rare instances when they are not available.

[1] Jim Waldo, "When the network is everything", Communications of the ACM, Volume 44, Number 3 (2001)

Network of Things (2/2)

- Nodes will be distributed
  - Self-Organizing (Ad Hoc Networks)
- Nodes will be points for
  - Data Aggregation
  - Data Storage
  - Data Fusion
  - (Self-similar) Data Hierarchies (Fractals)
- Nodes will be source of new Communication styles
  - *directed diffusion*, i.e. nodes express interest in data by attribute

To conclude, let's define the system…

…where we have:

- A "sea" of sensors
- Capable of measuring higher order derivatives
- With decision logic about these derivatives
- Capable or memorize the system status at steady condition

This is able to adapt to local variations and locally react differently


QUESTIONS
ANSWERS
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Oracle Edge Services

Functionality Overview

- Collect Sensor Data
  - Any sensor source
- "Cleanse" Sensor Data
  - Only save the relevant data
  - Relevance defined at implementation
- Dispatch Sensor Data
  - Deliver relevant sensor data to backend
- Device Management
  - Manage, upgrade, and interface with readers, sensors and other hardware

New in OracleAS Wireless 10.0.2