The Internet of Things

Living in a Connected World

Mike Anderson
Chief Scientist
The PTR Group, Inc.
http://www.theptrgroup.com
mailto: mike@theptrgroup.com
What We Will Talk About

- Evolution of the Internet
- Connected things
- Enablers
- Instrumenting things
- Improving life
- Connectivity and addressing
- Powering it all
- Experiments underway
- Reaching out
- Summary
Evolution of the Internet
The Internet of Things

noun "in-tern-et -əv -things" (abbr.: IoT)

- the point in time when more devices or objects were connected to the Internet than people
Connected Things
Connected Earth
Enablers
RFID Everywhere
Instrumenting Things/People

Getting Started with the Internet of Things
Cuno Pfister
Smart Dust, Nanobots and MEMS

Smart Dust Mote

A connector  ←  flexible cable
thorax  ←  flexible probe

no actuation (rest)

evoked upstroke

evoked downstroke
The DIKW Relationship

- Data → Understanding Relations
- Information → Understanding Patterns
- Knowledge → Understanding Principles
- Wisdom
Improving the Human Condition
Better Energy Efficiency

SMART GRID
A vision for the future — a network of integrated microgrids that can monitor and heal itself.

Smart appliances
Can shut off in response to frequency fluctuations.

Demand management
Use can be shifted to off-peak times to save money.

Solar panels

Houses

Offices

Disturbance in the grid

Wind farm

Processors
Execute special protection schemes in microseconds.

Sensors
Detect fluctuations and disturbances, and can signal for areas to be isolated.

Storage
Energy generated at off-peak times could be stored in batteries for later use.

Generators
Energy from small generators and solar panels can reduce overall demand on the grid.

Central power plant

Isolated microgrid

Industrial plant

Copyright 2012, The PTR Group, Inc.
Connections Everywhere

Social Networking Your Everything!
A PIC32 Web Server.

THE TUBES

SOCIAL NETWORK

Friendfeed
Facebook
Twitter
Foursquare
del.icio.us
Plurk
Google
Myspace
Brightkite
Joff
Sandy
API
Whatever

MiWi PAN Coordinator
802.15.4
transmitter/receiver

PIC32 HTTP WEB SERVER
index.html
index.php

PIC32 HTTP WEB SERVER
index.html
index.php

PIC32 HTTP WEB SERVER
index.html
index.php

PIC32 HTTP WEB SERVER
index.html
index.php

PIC32 HTTP WEB SERVER
index.html
index.php

CAMERA

MINI COOPER

COFFEE MAKER

PLANT

HW

WATER HEATER
Addressability – IPv4 vs. IPv6

340,282,366,920,938,463,463,374,607,431,768,211,456 addresses!
Powering the IoT
“All things are subject to interpretation. Whichever interpretation prevails at a given time is a function of power and not truth.”

F. Nietzsche
Experiments are Underway
Reaching Out...

Addressable Advertising

John
30-something Bachelor

Jane
Mother of 3

HEY! THERE IS A STARBUCKS RIGHT BEHIND YOU!
Summary

Chaos and Opportunity