Wirelessly Connecting Sensors to your Smartphone

Volker Prueller
Texas Instruments
Connecting everything wirelessly

24 billion connected devices anticipated by 2020
Driving the connected world revolution

**Smart Energy**

Energy conservation awareness and legislation is increasing. New standards such as SEP 2.0 and Econnet.

**Cloud Connectivity**

Lower cost Wi-Fi and other IP based radios. Smart phones and tablets enabling remote control anywhere.

**The Mobile Hub**

Personal accessories connected to a phone, a car or other mobile hubs.
Smart energy management

**Use It**
- Motors
- Appliances

**Move It**
- Transmission & Distribution
- Heat Cost Allocators
- Smart Thermostats

**Make It**
- Smart Meters
  - 2-way
  - Price signaling
  - Demand response
  - Supply response

**End-to-end need for wireless connectivity**

- **ZigBee™**
  - Sensors, concentrators
  - Very low power, long range

- **LoWPAN**
  - Sensors, concentrators
  - Very low power, short range

- **Bluetooth**
  - Gateways, sensors, end devices
  - High throughput, mid range

- **WiFi**
  - Energy harvesters
  - HVAC
  - Public Lighting

- **Real-Time Monitoring**
- **Distributed** (Local)
- **Renewable** (Clean)
- **Conventional** (Fossil)
The Internet of Things: Cloud connectivity

1. Node
2. Low Power Node
3. Gateway
4. Custom/ODM Service
5. Phone App
6. Established Standard Services
7. IOT Provisioning

- gmail.com
- tweeter.com
- dropbox.com
- ...
Wireless sensor requirements

- Long battery life, low power
- Sensor data collection engine & memory
- IP compatibility
- OS integration on mobile hubs
- Easy development tools
The mobile hub revolution

**Personal Area Networking**
- Bluetooth
  - Voice/Audio
- Wearable sensors
- Proximity sensors

**Local Area Networking**
- WiFi
- Bluetooth Low Energy
- Data logging / sensors

**Wide Area Networking**
- WiFiDirect™
- Mobile to mobile
- Miracast™
- Mobile to TV / Car
- Data concentrators
- Universal smartphone connectivity
- Seamless pairing
- Easy setup

**Voice / Data access**
- Cloud access

**Fitness & Health**
- Remote Control
- Auto. Infotainment
- Monitoring Sensors

**Auto. Infotainment**
- Fitness & Health
- Voice / Data access
- Cloud access
Portable CO monitor solution

- Complete sensor solution with analog front end, power management and wireless interface
- Readout via short range wireless to portable computing device or smartphone
- Using Bluetooth low energy technology on SoC with MCU for configuration & calibration
Bluetooth low energy SensorTag

What can YOU create?
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- TMP006 Temperature Sensor
- Humidity Sensor
- Pressure Sensor
- Accelerometer
- Gyroscope
- Magnetometer/Compass
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How can YOU create with the SensorTag?

- **Easy development**
  - All sensors individually controlled from a smartphone/tablet (makes RF easy)
  - No embedded SW knowledge required
  - Over-the-air downloads of firmware updates

- **Free App brings sensors to life**
  - Demonstrates the use of all sensors
  - iOS available today on App Store, Android support will follow
  - Download new firmware directly from the app
  - Source code available for download

- **Low cost**
  - Affordable $25 dev kit with royalty-free software
  - FCC, IC and ETSI certified solution = no certification cost for you

- **3rd party App support**
  - Use techBASIC App builder to make SensorTag apps
How can YOU create?
SensorTag: Six sensors, one small board

- Pressure sensor
- IR Temperature sensor
- Compass
- Accelerometer
- Gyroscope
- User Buttons
- Airflow for Humidity Sensor
- LEDs
- Debug Header
- Interface Connector (For EZ430 battery packs, optional)
- MCU + BLE Transceiver
- PCB Antenna
- CR2032 Coincell Battery Holder
- Pairing Button
- DCDC Converter
- Humidity sensor
Bluetooth low energy SensorTag

Have an iPhone? Download the SensorTag app today

Weblink: www.ti.com/sensortag
Thank you

www.ti.com/ble