

# Benefits of IP In IoT and M2M systems

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Chair 6LoWPAN

# Building the Internet of Things: New protocols need not apply

# *IP is Essential*

Leverage existing knowledge, tools, protocols,  
experience

Support for multiple PHYs

End to end connectivity, security

No gateways/translation

# *But – Is v6 essential*

Need the address space

SLAAC is good

No NAT!

Better header compression

# *Speaking of Header Compression*

6Lowpan is a mechanism  
to fit IPv6 into small data frames  
and  
improve transmission efficiency

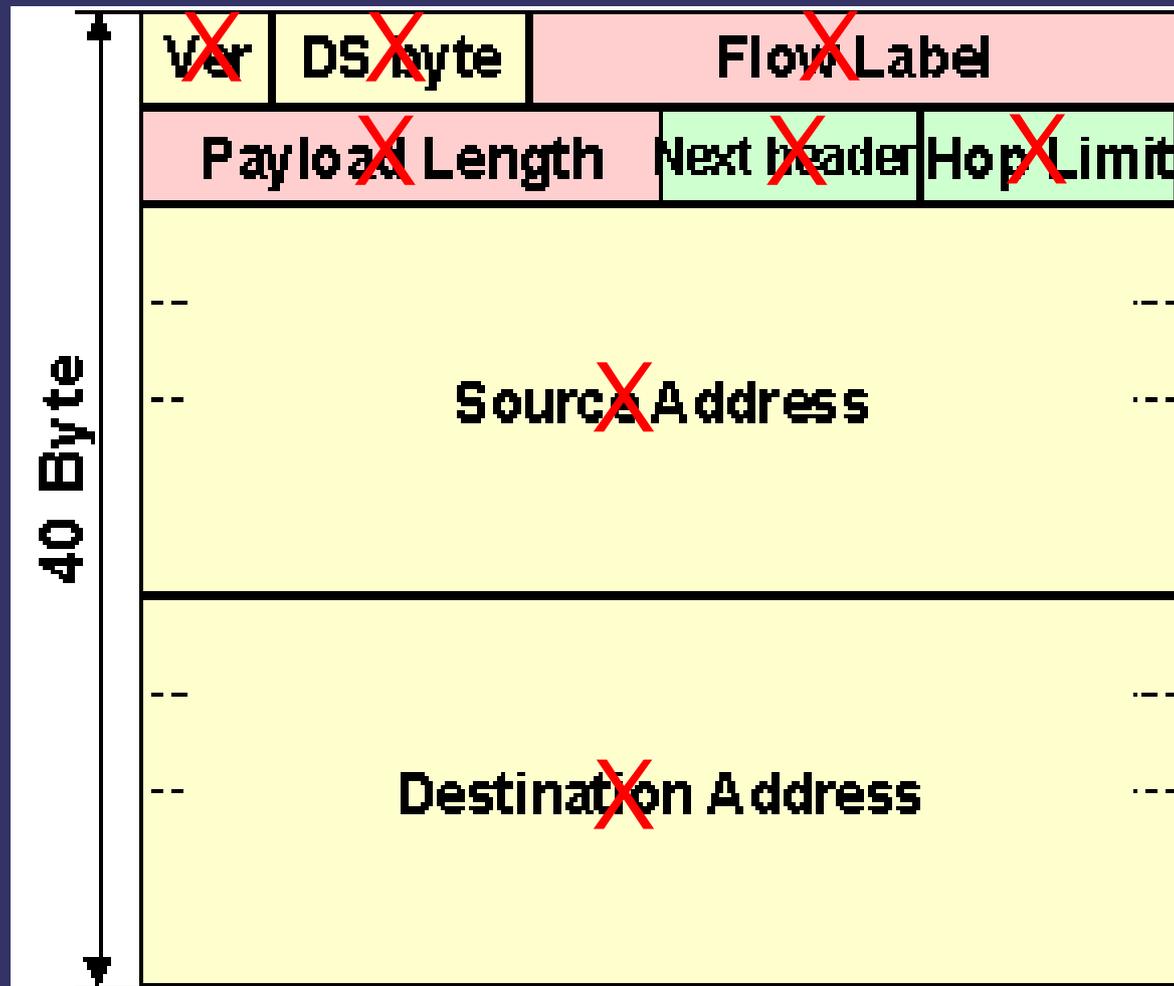
WHAMOND 12-9



MUST HAVE  
SOMETHING  
TO DO WITH  
WIRELESS  
TECHNOLOGY...

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# 6LowPAN Compression



# *Not just for 15.4*

Originally designed for IEEE 802.15.4

Draft to use with Bluetooth Low Energy

Power Line Control (P1901.2, G3)

Low Power WiFi

# *Inventing new protocols*

- Zigbee - delayed the market by years
  - Only recently adopted IP (for Smart Energy)
  - Multiple non-interoperable stacks
- COAP – interesting but not required
  - HTTP can be made small
  - TCP can be improved
- RPL – good for specific scenarios
  - AODV, OLSR, DSR, even RIP work just fine

“Premature optimization is the root of all evil”

– Donald Knuth

# *IPSO Application Framework*

- IPSO Alliance – [www.ipso-alliance.org](http://www.ipso-alliance.org)
  - 60+ member companies promoting IP in sensor/control, M2M and IoT applications
- Application Framework
  - Application agnostic
  - “Restful” compatible – COAP or HTTP
  - License Free





# Promoters



## Contributors:

Aidon Oy ~ Concept Reply ~ ConnodeCubic GTS ~ Econocom ~ ElectroTest Sweden ~ Eliko  
Elster ~ Emerson ~ EPRI ~ Google ~ Inria ~ ISMB ~ Lulea Univ of Tech ~ MAXFOR  
Maxim Integrated Products ~ Millennial Net ~ Nokia ~ Novo ~ Sensus ~ Synapse Wireless  
Tampere Univ of Tech ~ Texas Instruments ~ TMC ~ UTRC-I ~ Watteco ~ WISENET



## **About IPSO:**

The IPSO Alliance is the leading organization promoting the use of Internet Protocol (IP) for smart object communications for use in energy, consumer, healthcare and industrial applications.

## **Vision:**

Providing the foundation for a network that will allow any sensor-enabled physical object to communicate to another as individuals do over the Internet.

## **Value Proposition:**

Create awareness of available and developing technology with IP for Smart Objects  
Coordinate marketing efforts to complement the standard work of the IETF  
Support, organize and market interoperability events

# *Really, IP for stand-alone M2M?*

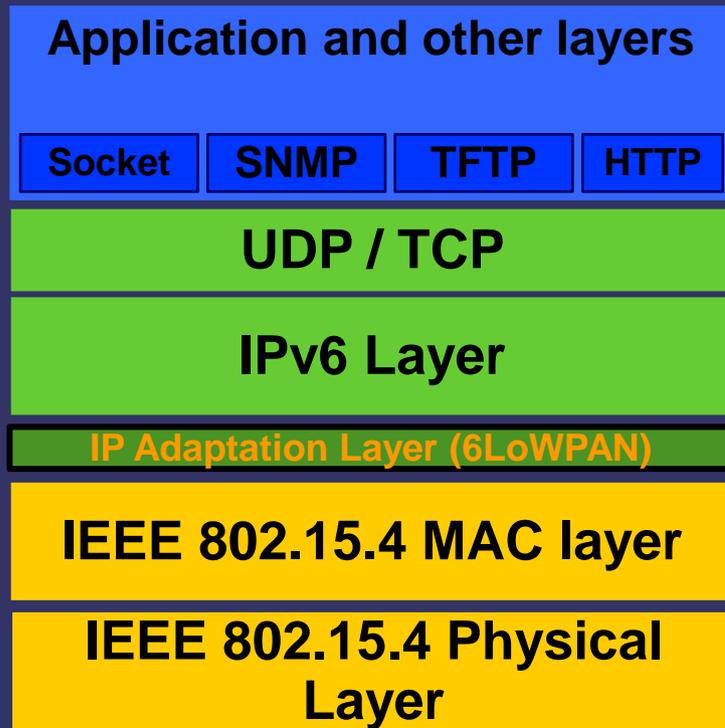
Most computing devices use IP

No matter if isolated, private or public

Software and tools use IP

Knowledge, tools and protocols apply equally

# *Embedded IP – it can be small*

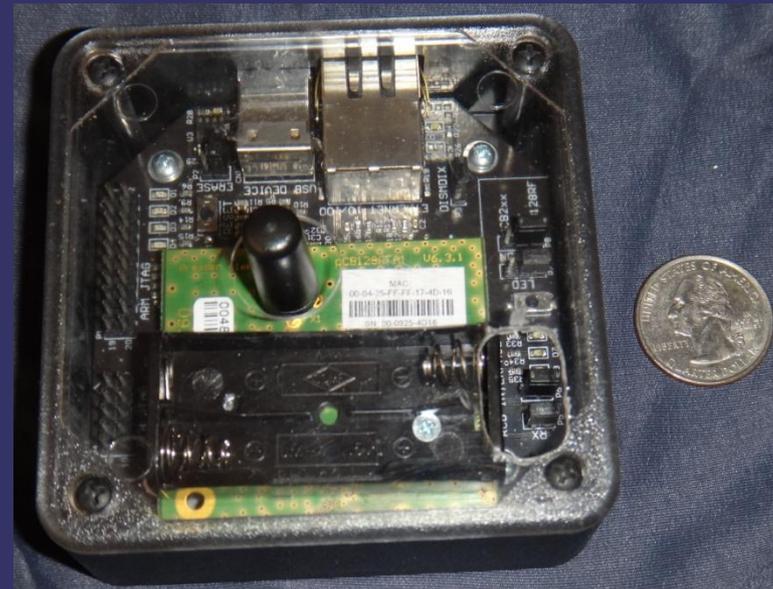


	6LowPAN	Zigbee
Packet Size	3 to 12 bytes	14+ bytes
Code Size		
End Node (RFD)	11K	64K+
Routing Node (FFD)	17K	128K+
RAM		
End Node (RFD)	2K	8K
Routing Node (FFD)	4K-8K	8K+

# IP Capable Modules



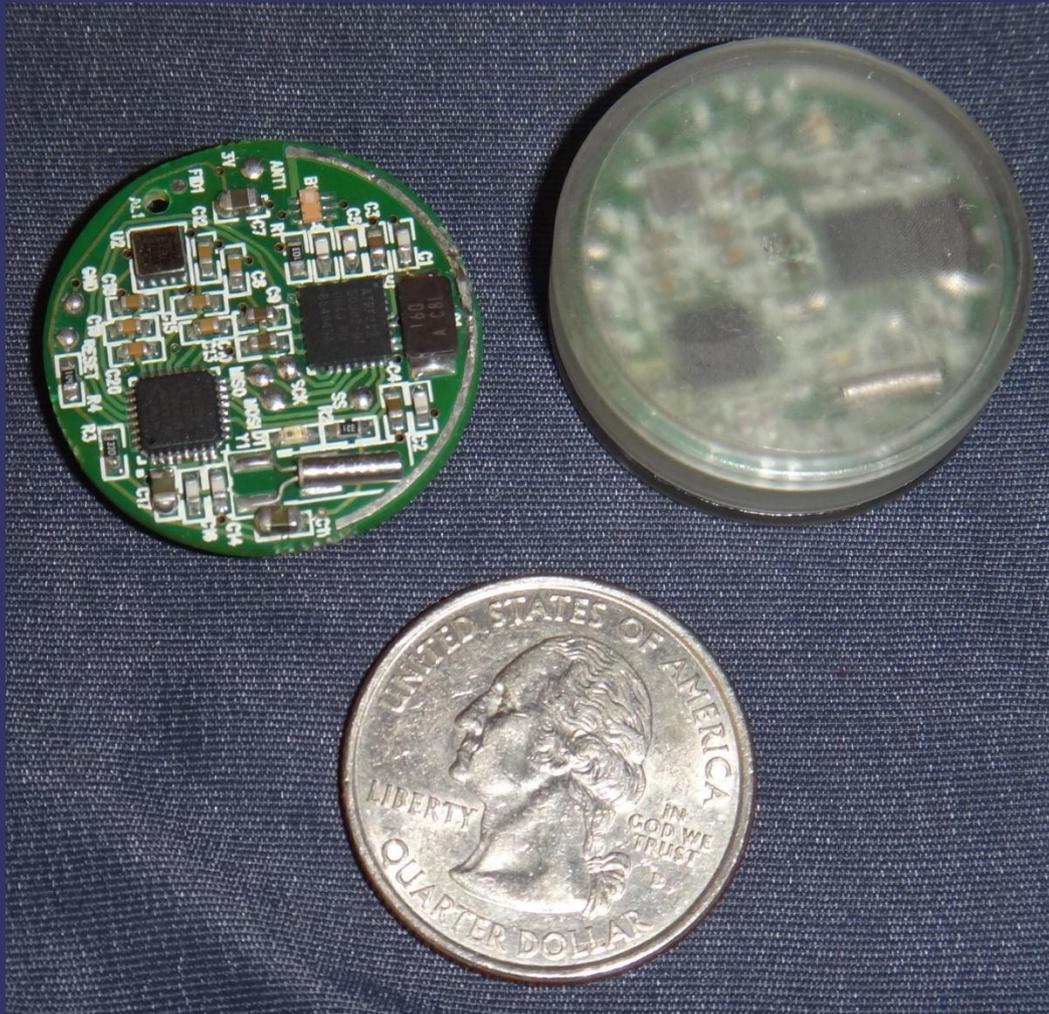
GPS Enabled



15.4 to Ethernet Bridge



# Coin Cell Module

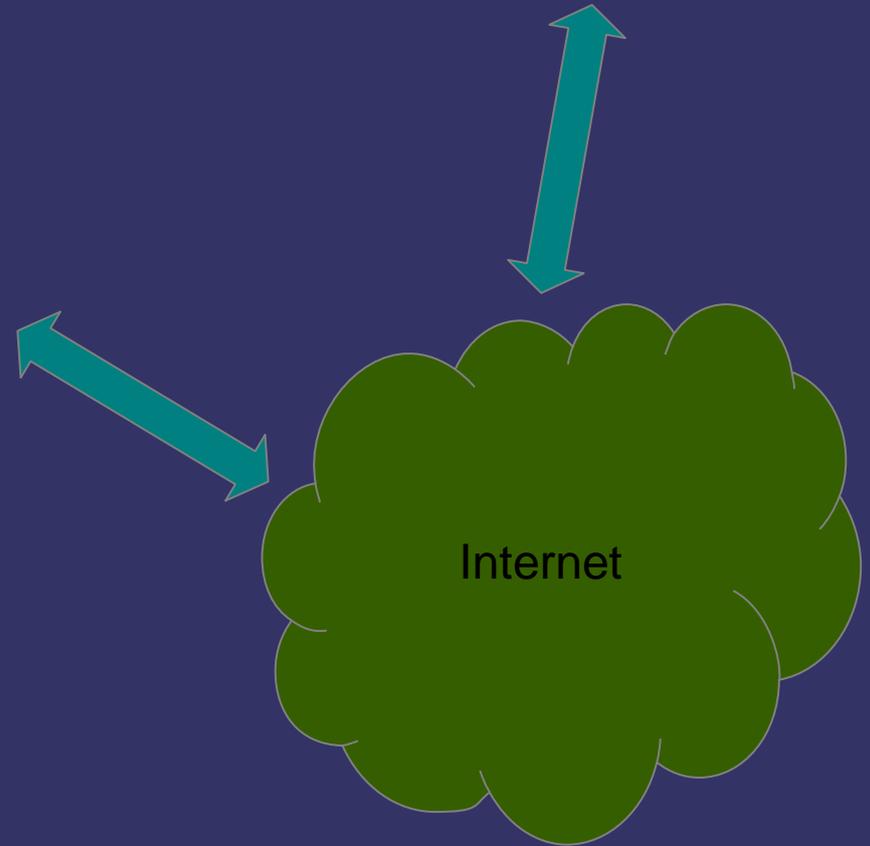
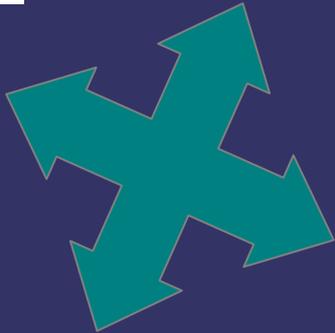


- ✓ Battery Operated
- ✓ 3-D accelerometer
- ✓ Temp Sensor
- ✓ Light Sensor
- ✓ 802.15.4
- ✓ IPv6/6lowpan
- ✓ Multi-year battery life
- ✓ Coin Flip application

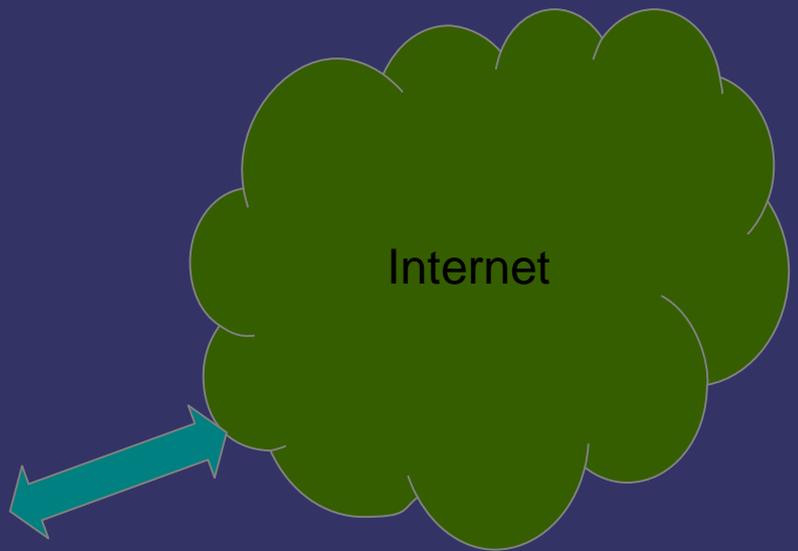
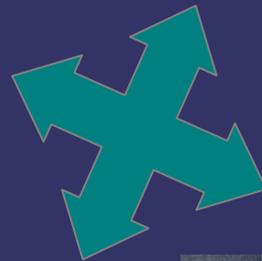
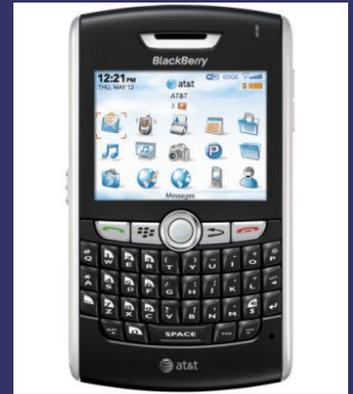
# *IPv6 Enabled Light Bulb*



# A Use Case



# A Use Case



# New Product Idea



The IPv6 Ready Ethernet Cable

*Thank you*

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