Bluetooth 4.2

New Features for Linux and IoT

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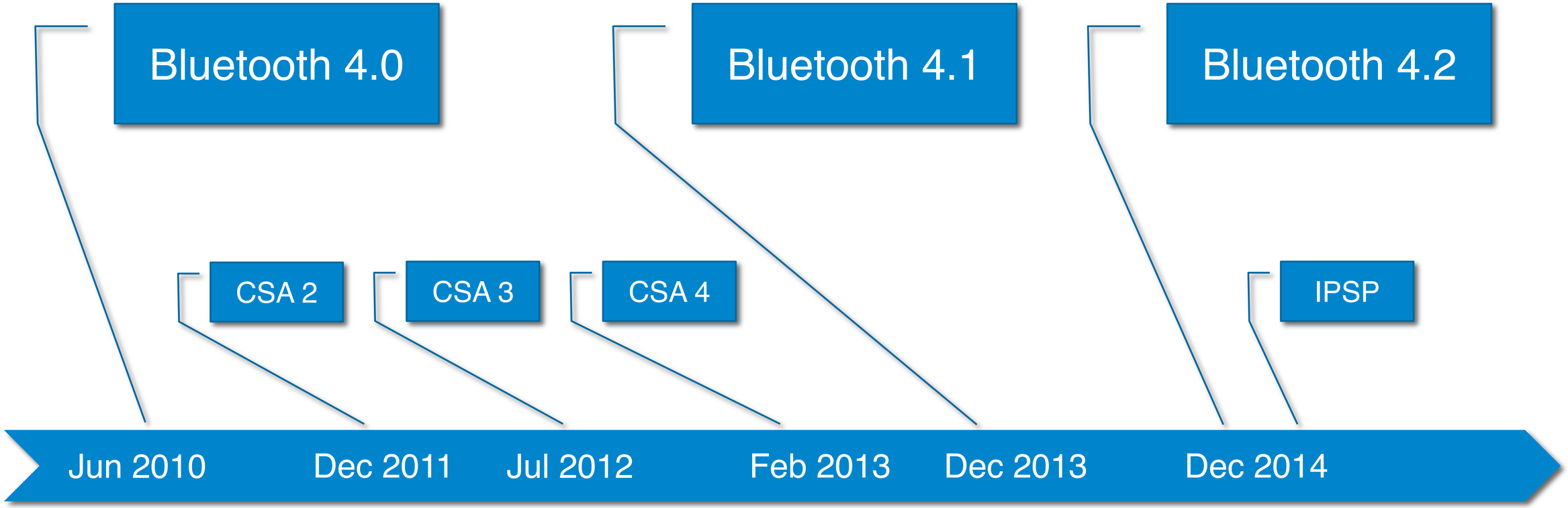
intel Software
Intel OpenSource TECHNOLOGY CENTER

WITH BLUETOOTH® 4.2
THE SKY'S
THE LIMIT

Bluetooth 4.2 was brought to life by some of the brightest minds & companies in technology. Their mission: To provide you with the freedom to create anything you can imagine.

Evolution


Bluetooth 4.0
Bluetooth 4.1
Bluetooth 4.2
CSA 2
CSA 3
CSA 4
IPSP
Jun 2010
Dec 2011
Jul 2012
Feb 2013
Dec 2013
Dec 2014

Bluetooth 4.0

Smart Ready

for dual-mode devices with Bluetooth Classic (BR/EDR) and Bluetooth Low Energy (LE) support

Bluetooth® SMART READY

Smart

for single mode devices with Bluetooth Low Energy (LE) support

Bluetooth® SMART

Bluetooth 4.1

BR/EDR secure connections with P-256 ECDH and AES encryption
Dual mode topology allowing BR/EDR and LE connections at the same time
Link layer topology allowing LE Central and LE Peripheral mode at the same time
Low duty cycle directed advertising for peripheral connections
L2CAP LE connection oriented channels with credit based flow control

Inclusion of CSA 2, CSA 3 and CSA 4

Bluetooth 4.2

LE secure connections with P-256 ECDH

Link layer based privacy with controller based address resolution

Extended scanner filter polices for directed advertising with random address

Data length extension with 2.5x speed increase

Internet Protocol Support Profile (IPSP) adoption

SMARTER & WORRY FREE

It's the best of all worlds – improved privacy protection with lower power consumption.

Industry-leading privacy.
Keeps Bluetooth Smart devices from being tracked.

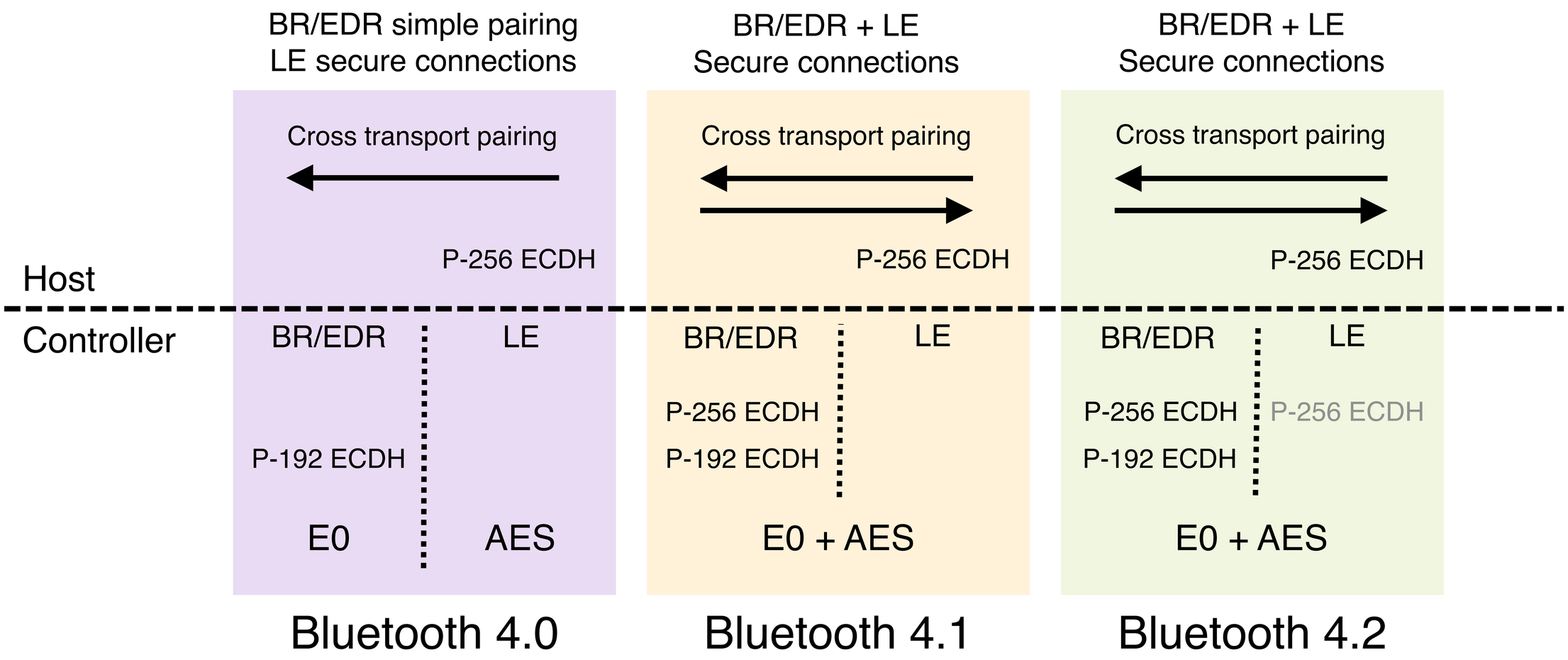
Highly secure.
Features industry-standard encryption ensuring confidential data stays that way.

More power efficient.
Introduces refinements that make Bluetooth Smart even more power-stingy.

Secure connections feature

	Bluetooth SMART READY		Bluetooth SMART	
Bluetooth 4.2	P-192 ECDH E0 Encryption	**P-256 ECDH** **AES Encryption**	Legacy Pairing AES Encryption	**P-256 ECDH** **AES Encryption**
Bluetooth 4.1	P-192 ECDH E0 Encryption	**P-256 ECDH** **AES Encryption**	Legacy Pairing AES Encryption	
Bluetooth 4.0	P-192 ECDH E0 Encryption		Legacy Pairing AES Encryption	

Secure connections integration



Linux and secure connections

Linux 3.15	BR/EDR secure connections support
	BR/EDR out-of-band pairing support
Linux 3.17	BR/EDR debug key generation support
Linux 3.19	LE secure connections support
	LE debug key generation support
	Cross-transport pairing support
Linux 4.1*	LE out-of-band pairing support

* Not yet released

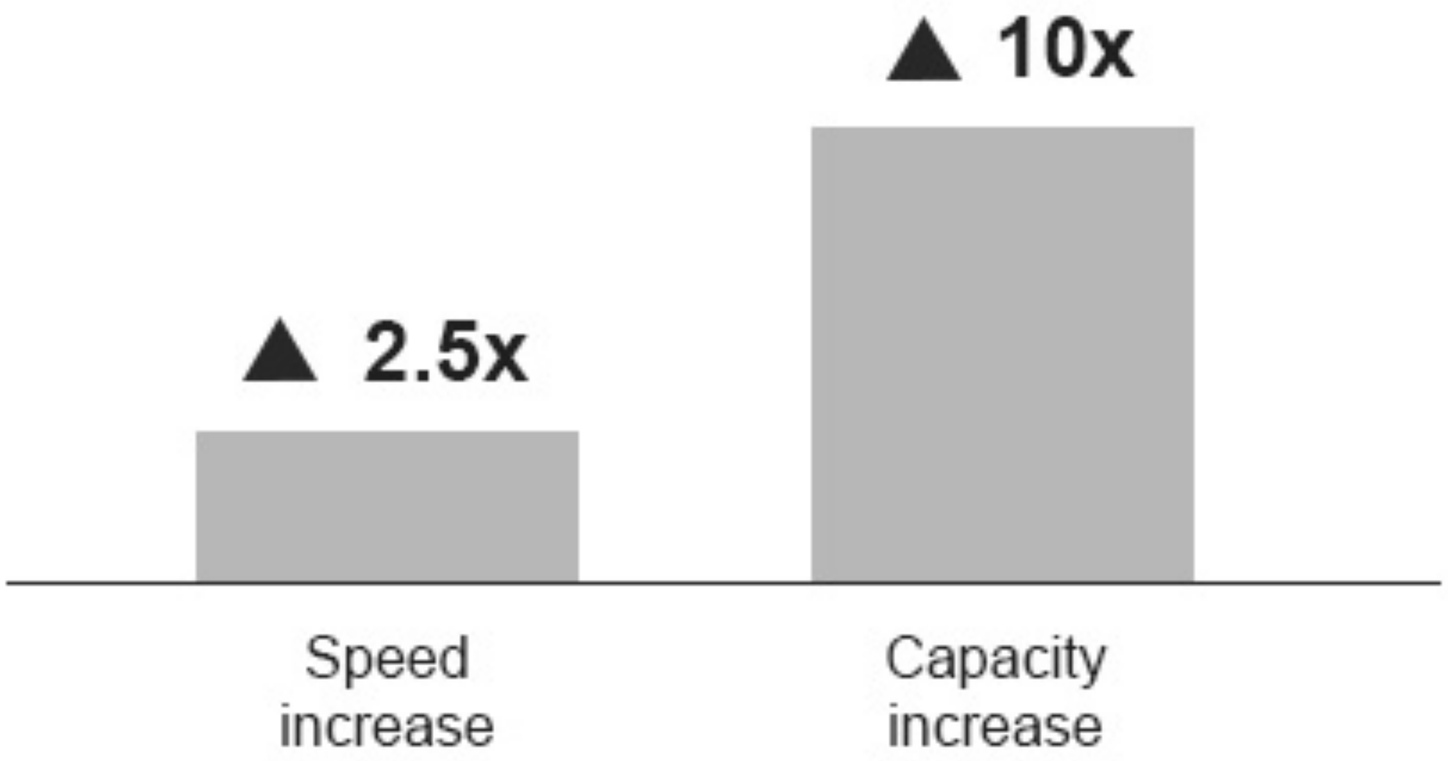
Linux and low energy privacy support

Linux 3.15	LE privacy support
Linux 3.19*	Extended scanner filter policies support
TBD*	Link layer based privacy support

* Requires Bluetooth 4.2 controller

FASTER & MORE RELIABLE

Sync data quickly and reliably. In 4.2, Bluetooth Smart is up to 2.5x faster with a huge packet capacity increase – nearly 10x more versus previous versions.



Linux and faster low energy data transfers

Linux 3.19* Data length extension support

* Requires Bluetooth 4.2 controller

TAKE FULL CONTROL OF
INTERNET CONNECTIVITY

28
billion

Number of “things” connected to the Internet by 2020 (estimated)

SOURCE:hbr.org

Bluetooth® Core Specification 4.2 makes the Internet of Things (IoT) better with multiple ways to connect to the Internet:

Low-power IP connectivity

The latest version of internet protocol (IPv6/6LoWPAN) for Bluetooth Smart devices.

Bluetooth Smart technology gateways

Internet connectivity with the flexible Bluetooth Smart Generic Attribute Profiles (GATT) architecture.*

*Available early 2015

Linux and Internet of Things

Linux 3.14	L2CAP LE connection oriented channels support
Linux 3.16	6LoWPAN over Bluetooth LE support
TBD	Internet Protocol Support Profile (IPSP) support HTTP Proxy Service (HPS) support GAP + GATT REST API support

6LoWPAN and Linux

Introduced with IEEE 802.15.4 subsystem (2009)

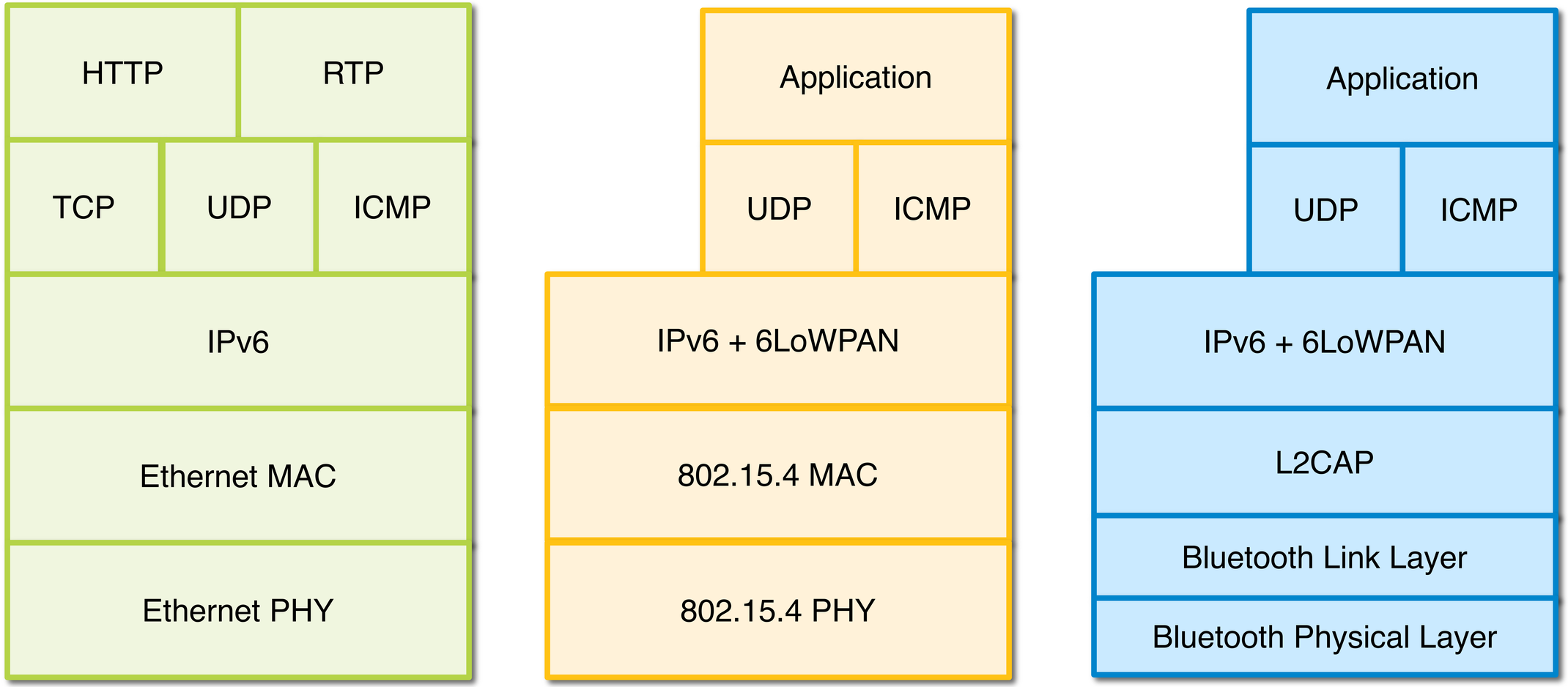
Bluetooth subsystem adopts IP Header and Next Header compression (2013)

6LoWPAN fragmentation is handled by Bluetooth L2CAP layer

IP Header and Next Header compression have been moved into its own net/6lowpan/ directory and are now independent modules

New mailing list at linux-wpan@vger.kernel.org

6LoWPAN integration



Setup of Bluetooth 6LoWPAN connections

```
On the slave side (peripheral) do this:

    $ modprobe bluetooth_6lowpan
    $ echo 35 > /sys/kernel/debug/bluetooth/6lowpan_psm
    $ btmgmt advertising on


On the master side (central) do this:

    $ modprobe bluetooth_6lowpan
    $ echo 35 > /sys/kernel/debug/bluetooth/6lowpan_psm
    $ echo 'connect E0:06:E6:B7:2A:73 1' > \
                        /sys/kernel/debug/bluetooth/6lowpan_control
```

Bluetooth 4.1 host stack

Linux 3.16 and later

Bluetooth 4.0 controller

BlueZ for Android and Bluetooth 4.2

Bluetooth 4.1 and 4.2 features are integrated with BlueZ for Android on KitKat and Lollipop

01.org/bluez-android

code.google.com/p/aosp-bluez

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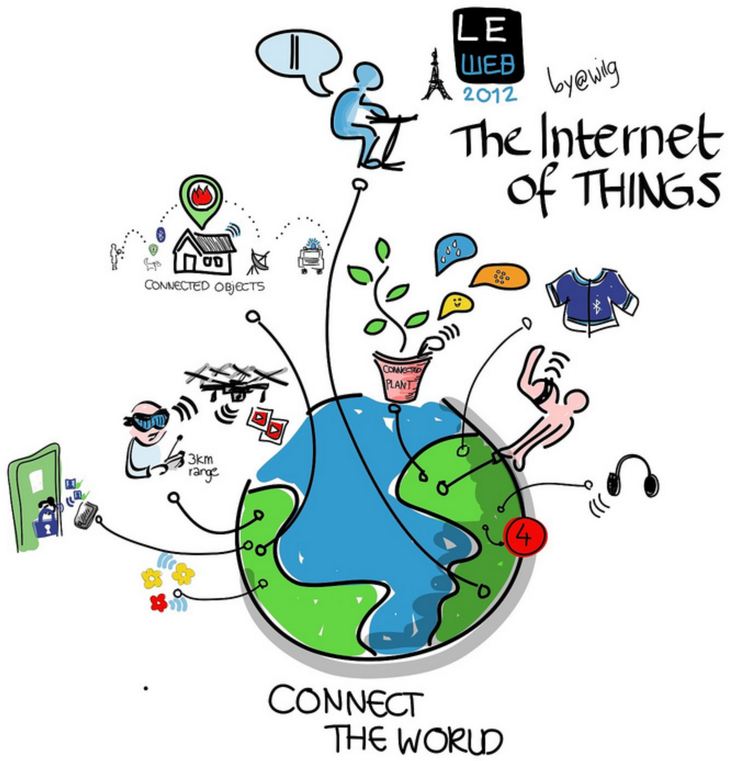

Bluetooth 4.2

Smarter. Faster. Ideal for the Internet of Things.

Bluetooth future

Bluetooth® Technology Adding Mesh Networking to Spur New Wave of Innovation

Bluetooth SIG sets course to revolutionize smart home, automation, and the IoT with Bluetooth Smart Mesh

"The value proposition for Bluetooth technology in the Internet of Things (IoT) is unmatched – it consumes the least amount of power, is the lowest cost, and most widely available wireless solution enabling the IoT today," added Powell. "Bringing mesh networking to the Bluetooth specification will propel the technology to entirely new market segments."

The Smart Mesh Working Group expects to have the specification ready for prototype testing later this year, and the SIG will look to officially adopt profiles in 2016.

Q & A