

ϕHREAD

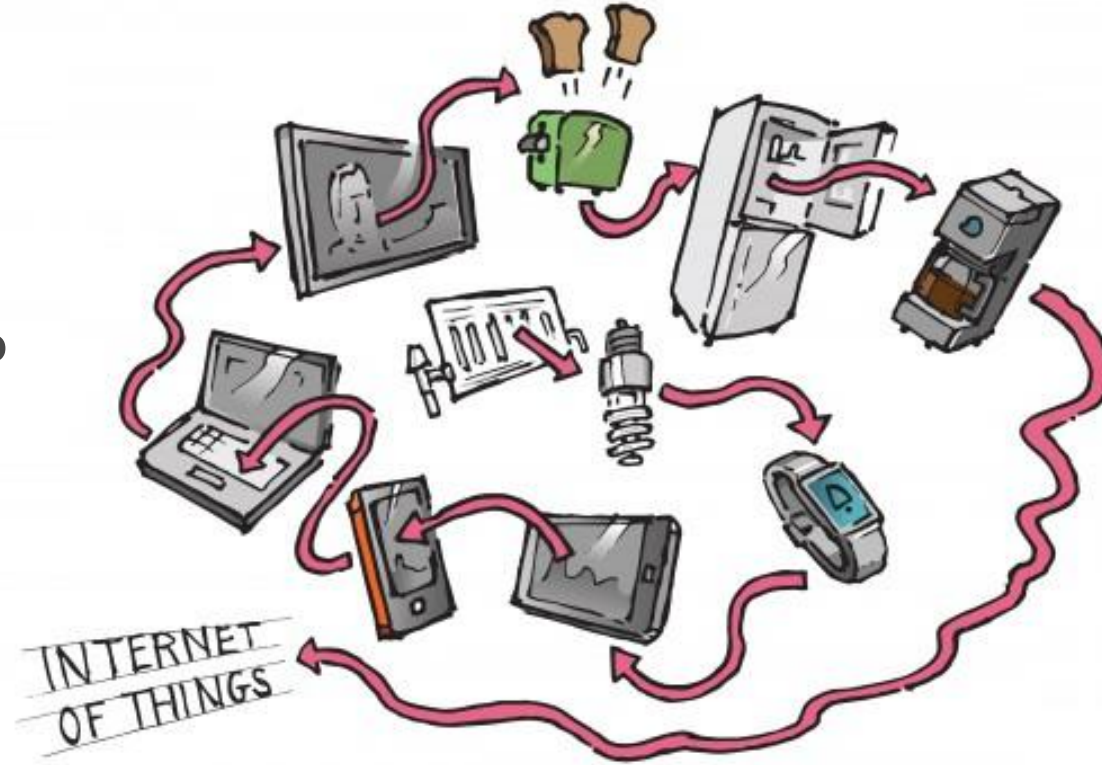
Simplifies connecting “Things” using IP-based mesh networking

Introduction Alcom Electronics

- Independent technical distributor in the Benelux
- 35+ years expertise in semiconductor, modules and wireless solutions
- 50+ people in Netherlands and Belgium
- Technical salesforce and engineering support
- Frans Lutz – Product Manager Wireless Modules
- Mark Korsloot – Product Specialist Semiconductors & Wireless

Internet of Things

- Hype or Reality?
- Where are we?
- What is needed to achieve this?



Overview Wireless Technologies for IoT

PAN/LAN/HAN

Short Range
Communicating Devices



Well established standards

Good for:

- Mobile
- In-home / Office building
- Short range

Not good for:

- Battery life
- Long range

Cellular

Long Range w/ Power
Traditional M2M



2G

3G

4G

Well established standards

Good for:

- Long range
- High data-rate
- Coverage

Not good for:

- Battery long life

Low-Power WAN

Long Range w/ Battery
Internet of Objects



4G NB-IoT

Emerging standards

Good for:

- Long range
- Long battery
- Low cost

Not good for:

- High data-rate

What is Thread?

- Low Power, low data-rate embedded networking stack for device-to-device communication
- Designed to provide IPv6 connectivity all the way down to the embedded nodes with minimal memory footprint and low latency
- Optimized for low power over proven 802.15.4 networks
- Based on public IETF / IEEE standards



Where did Thread come from?

- Architected 2014-2015 by Thread Group
- Founding members: Nest (Google), Silicon Labs, Freescale, ARM, Assa Abloy, Samsung, BAF
- 250+ Thread group members and growing rapidly



Why choose Thread?

- Direct addressability of devices from network or mobile device
- Scalable mesh network up to 200 - 300 devices
- Easy seamless installation of devices within the network
- Latency less than 100ms for typical user interaction
- Multiple gateways (border routers) on network possible
- Battery operated devices with years of life expectancy
- No single point of failure

Typical examples

Normally Powered

- Gateway
- Lighting
- Appliances
- Smart meter
- Garage door opener
- HVAC equipment
- Smart plugs
- Fans

Normally or Battery Powered

- Thermostat
- Light switches
- Smoke detectors
- CO detectors
- In home display
- Shades or blinds
- Door bell
- Glass break sensors
- Presence detection

Battery Powered

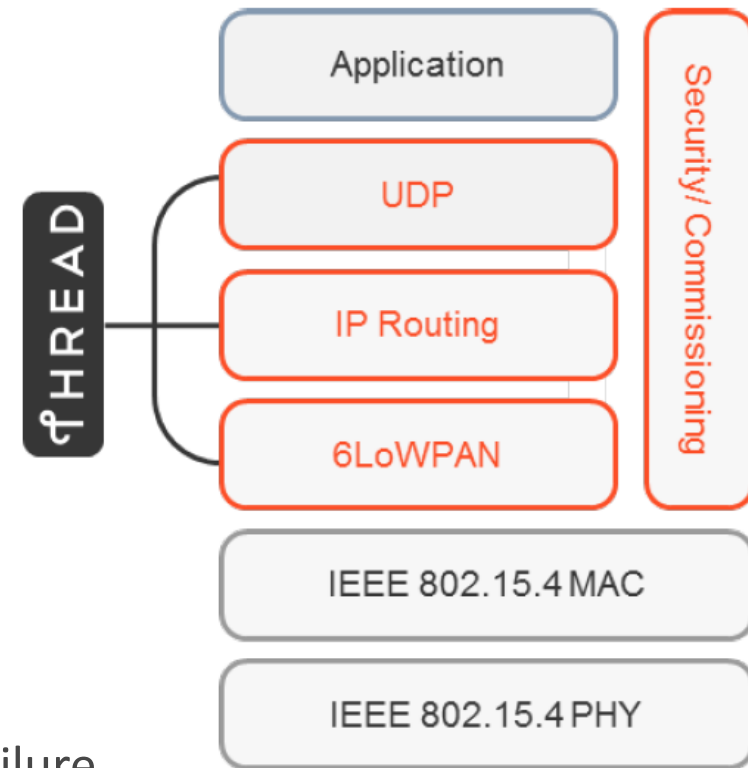
- Door sensors
- Windows sensors
- Motion sensors
- Door locks
- Radiator valves
- Body sensors



Thread Technology

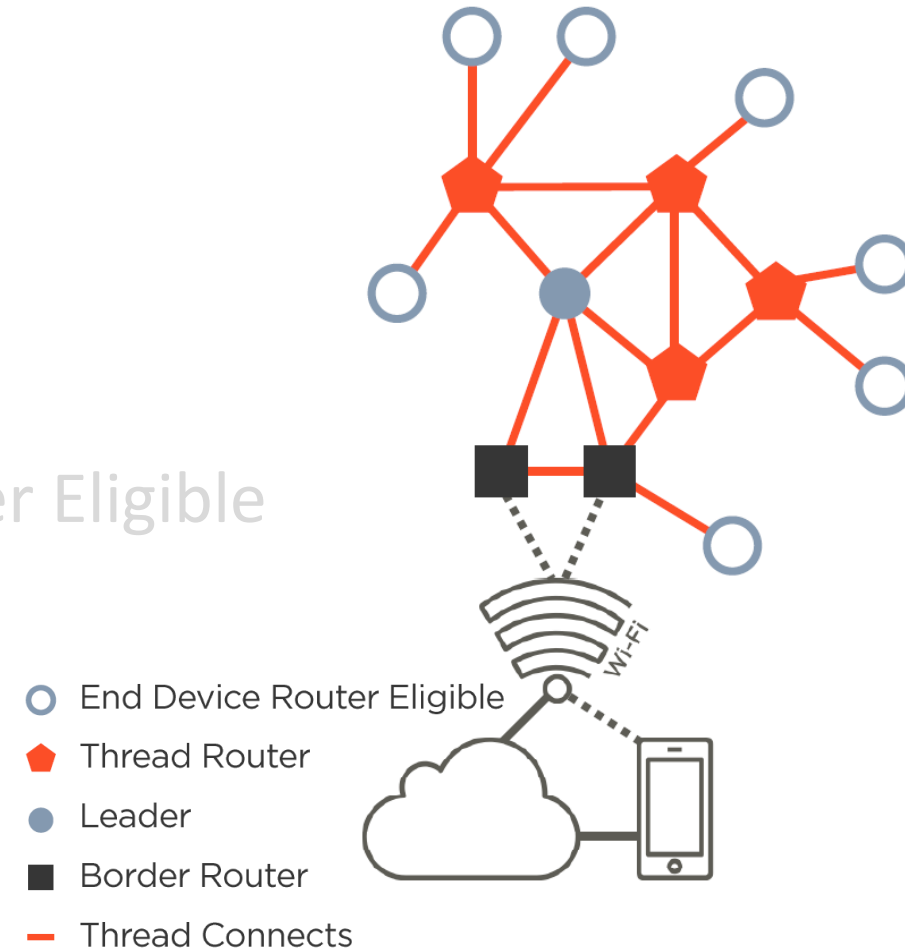
A secure, wireless mesh networking protocol that:

- Supports IPv6 addresses and simple IP bridging
- Is built upon a foundation of existing standards
- Is optimized for low-power / battery-backed operation
- Is intended for control and automation (250kbps)
- Can support networks of more than 250 nodes
- Supports low latency (less than 100ms)
- Offers simplified security and commissioning
- Runs on well-proven 802.15.4 radio available today
- Is reliable, self healing mesh network with no single point of failure



Flexible Network

- Direct addressability via IPv6
 - Device to device
 - Device to smart phone
 - Device to cloud
- All devices power up as router or “Router Eligible (no coordinators)”
- Leader used to make decisions and optimize the network
- Sleeping devices poll and switch parents, optimizing power efficiency



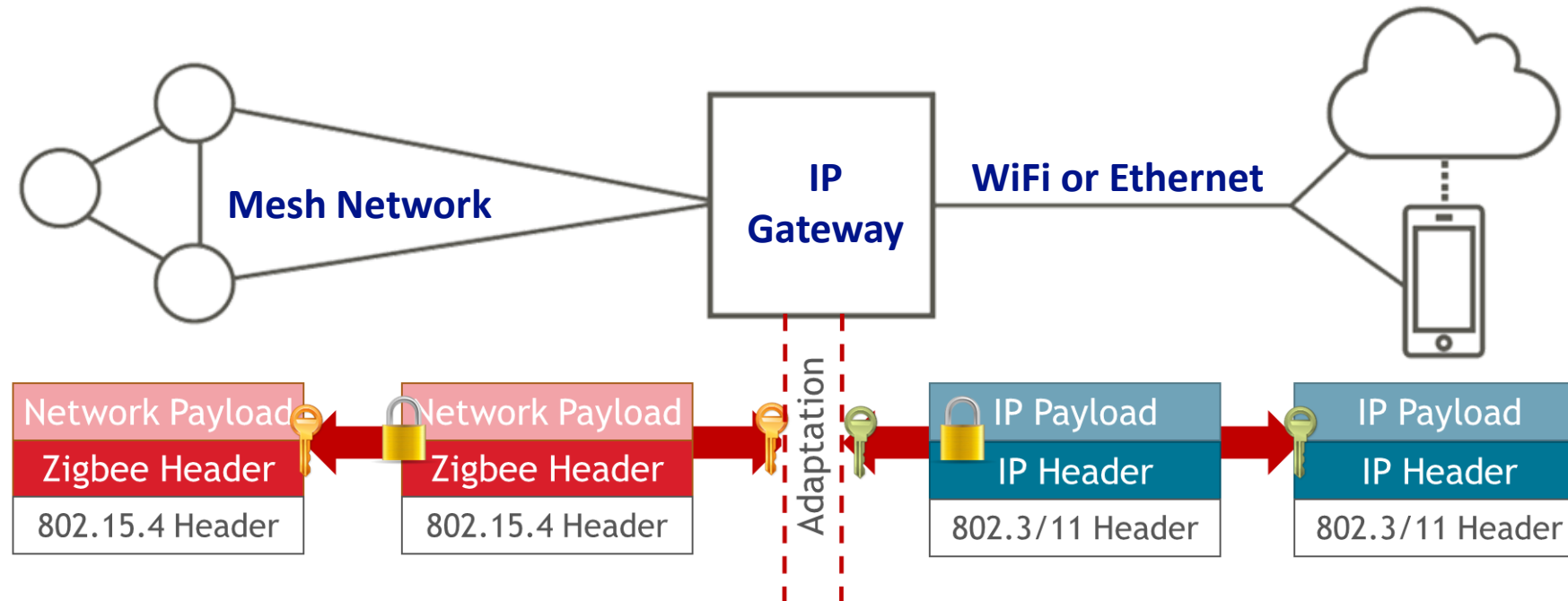
Why is Internet Protocol (IP) so important?

Because we're building the Internet of Things

- Historically, “constrained” embedded devices have used specialized communication protocols
 - Low power, low bandwidth, fit-for-purpose application layer
- The Internet is built on a layered stack of open standards
 - Each layer is independent and NOT tied to a specific application
 - This is why the Internet is so flexible and pervasive
- Thread provides the technology to use Internet standards on constrained embedded devices
 - Devices and application can be developed independently
 - Applications can run anywhere (cloud, controller, router or endpoint device)

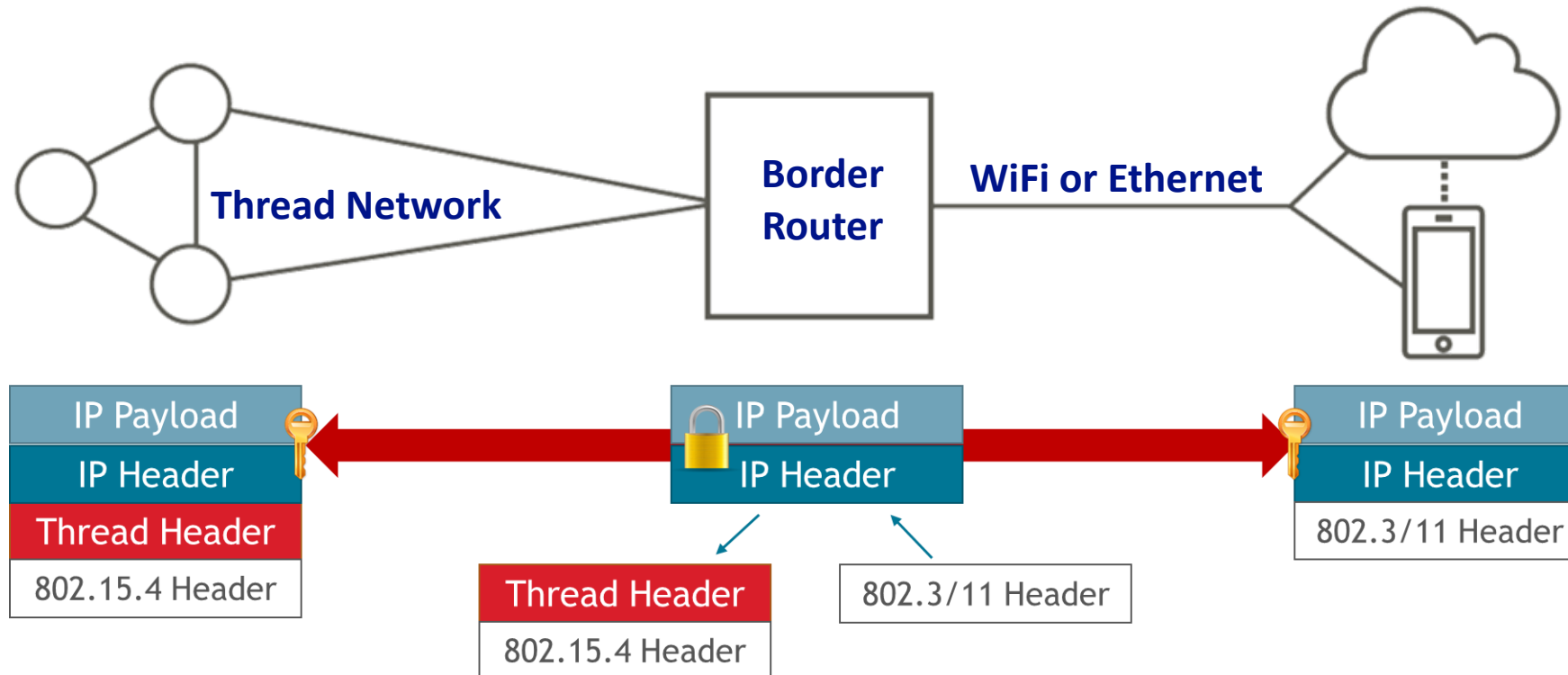
Why Internet Protocol (IP) matters

- Non-IP networking technologies must adapt to IP at a gateway
 - This process involves address translation and repackaging
 - It also requires decryption and re-encryption of all packets



Why Internet Protocol (IP) matters

- A seamless IP connection allows full end-to-end security!



How to build a Thread enabled product?

- Digi XBee Thread modules
 - Based on EM3587 products from SiLabs
 - Indoor/urban range: 60 mtr
 - Outdoor/RF Line-of-Sight range: 1200 mtr
 - Available with RF-pad/u.FI/internal antenna
 - Regulatory approvals:
FCC, IC (North America), ETSI (Europe)



How to build a Thread enabled product?

- SiLabs MGM111 Wireless modules
 - ARM Cortex-M4 based
 - Mesh networking module for ZigBee and Thread
 - Can work stand-alone or as co-processor



How to build a Thread enabled product?

- SiLabs EFR32 Mighty Gecko Wireless System-on-Chips
 - ARM Cortex-M4 based
 - Mesh networking SoCs for ZigBee, Thread and BLE
 - Proprietary 2.4GHz and Sub-GHz Radio



Take away

- Thread makes your devices accessible using IP
- No application layer, can work with any IP based application layer
- Focus on application for home and buildings
- Border router needed to enable IP access to devices
- No single point of failure

Thank you !

THREAD

Simplifies connecting “Things” using IP-based mesh networking