

# Open Source Implementation of ZigBee

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4th FRUCT seminar

Tampere  
29 November 2008

# Agenda

- Introduction in Home Automation
- ZigBee overview
- Problem definition
- Implementation design
- Tools
- Current situation and future plans

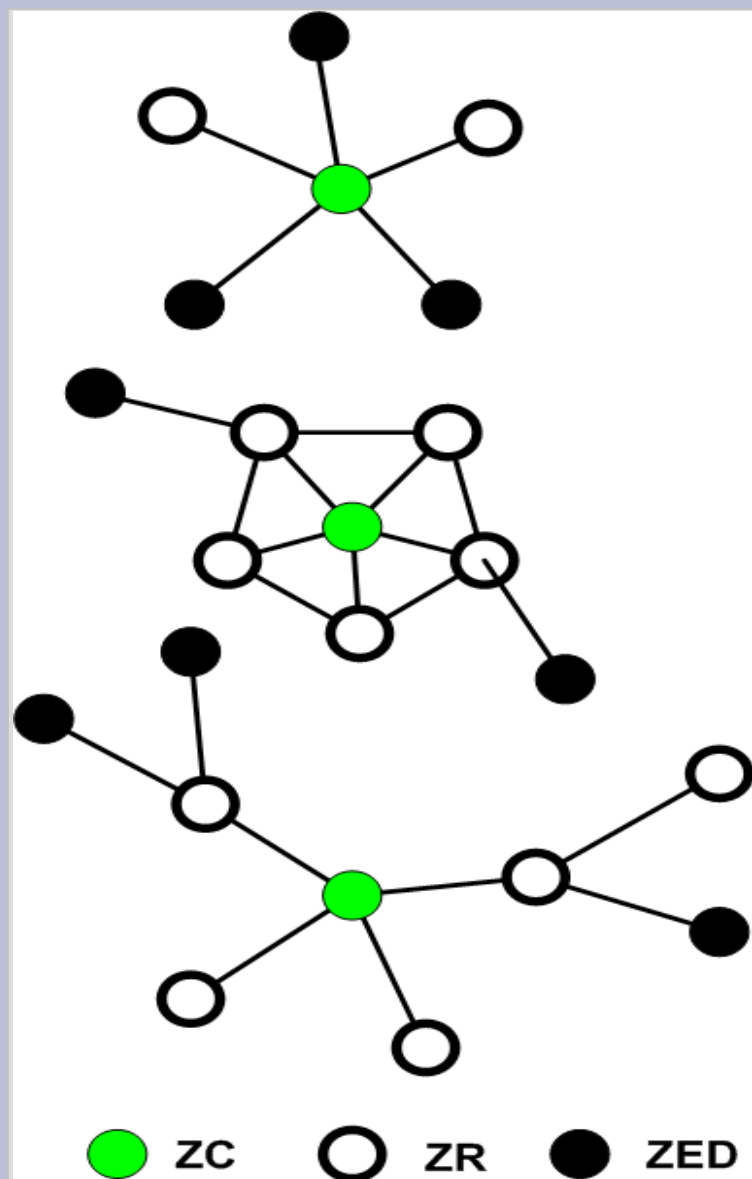
# Applications

- Where
  - Home Entertainment and Control
  - Home Awareness
  - Mobile Services
  - Commercial Building
- How
  - Smart lighting
  - Temperature/Humidity control
  - Water sensors, smoke/fire detectors
  - Mobile (payment, monitoring and control, healthcare)
  - Energy monitoring and control
  - Access control

# History and standards

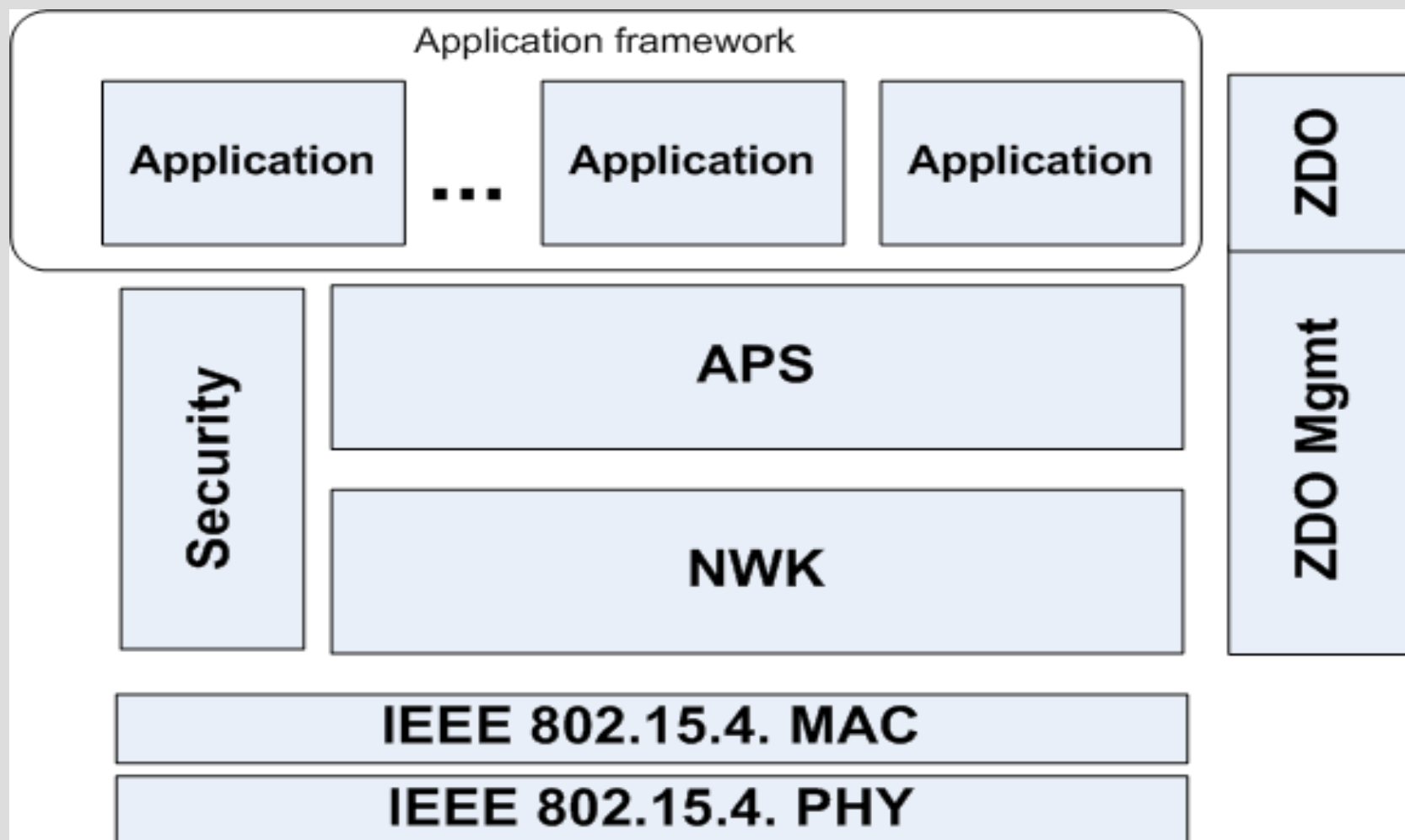
- 1998 ZigBee-style networks began to be conceived
- May 2003 The IEEE 802.15.4 standard was completed
- 14 December 2004 ZigBee specifications were ratified
- 13 June 2005 The ZigBee 2004 Specification
- September 2006 The ZigBee 2006 Specification
- End of 2007, ZigBee PRO was finalized

# ZigBee nodes and topologies



- Nodes type
  - ZigBee coordinator(ZC)
  - ZigBee Router (ZR)
  - ZigBee End Device (ZED)
- Topologies
  - Star network
  - Mesh network
  - Mesh-Tree network

# ZigBee stack architecture



# Kernel ZigBee stack layout

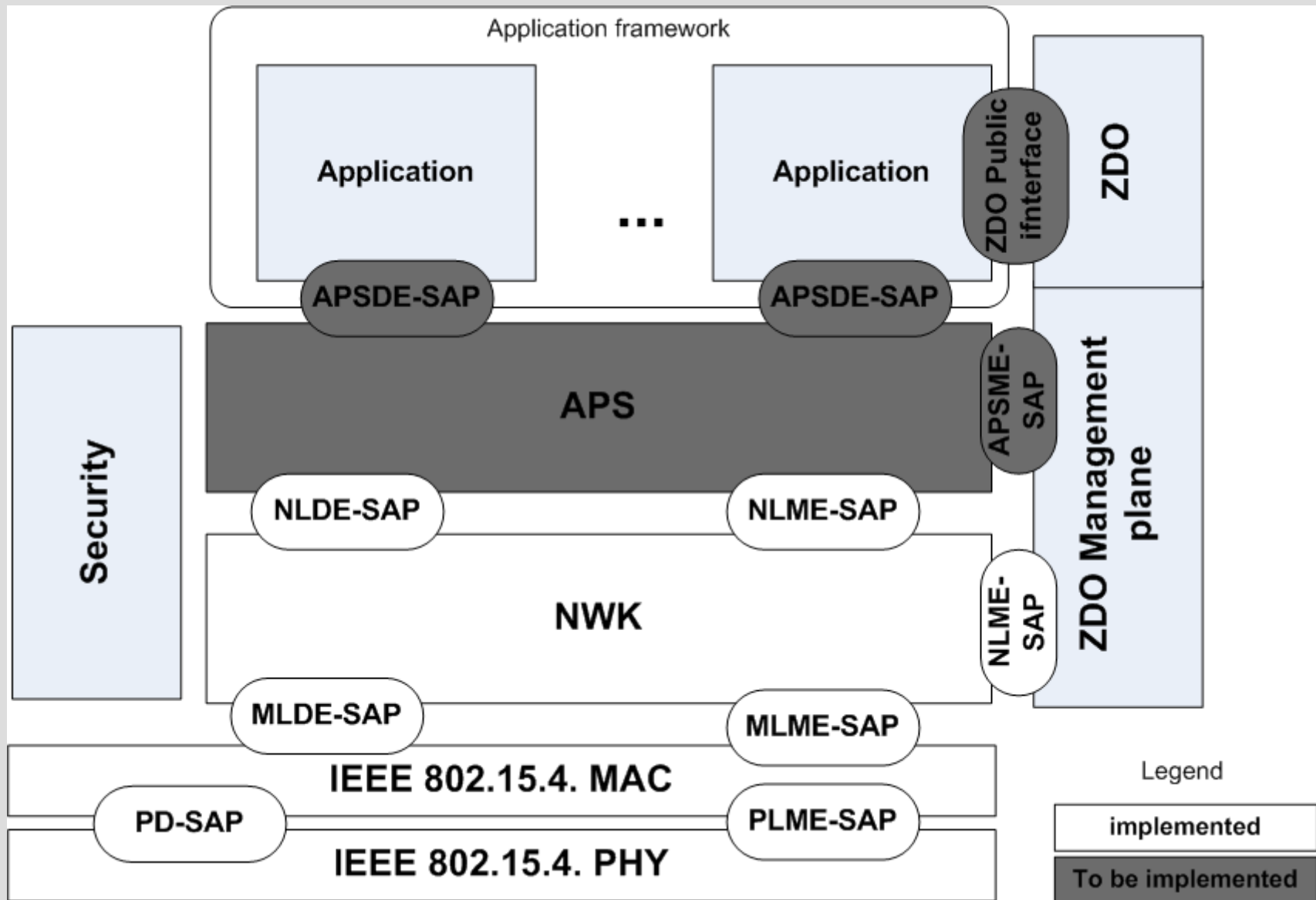
Kernel	Modules	Layers
net/zb	af_zigbee.ko	NWK
	zb.ko	
net/ieee80215	ieee80215.ko ieee80215_lib.ko	MAC PHY
drivers/net/ieee80215	zb_ldisc.ko	RF

# Work plan

- Add wireshark dissector;
- Make protocol layers independent;
- Define and implement socket interfaces on IEEE802.15.4 and ZigBee NWK layers;
- Implement ZigBee APL user-space library.



# Implementation progress



# Wireshark dissector

- report transient packets from PHY layer;
- capture reported packets;
- add PHY layer dissector to wireshark.

# Socket interfaces on IEEE802.15.4 and ZigBee layers<sup>11</sup>

- introduce socket type for IEEE802.15.4 layer;
- define interface primitives;
- map interface primitives to socket ioctl codes.

**Thank you!**

Your questions, please.