

# Hexabus

## Wireless Home Automation System

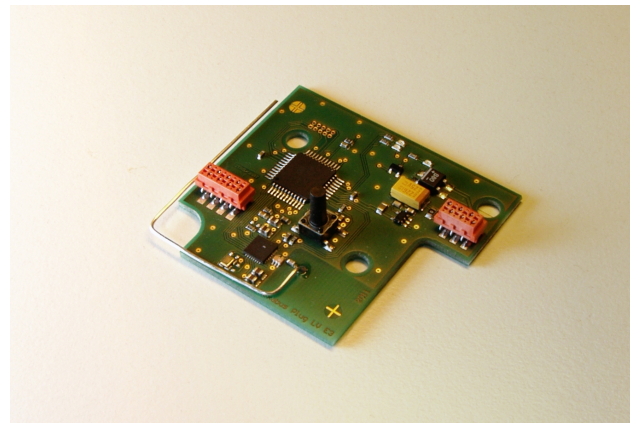
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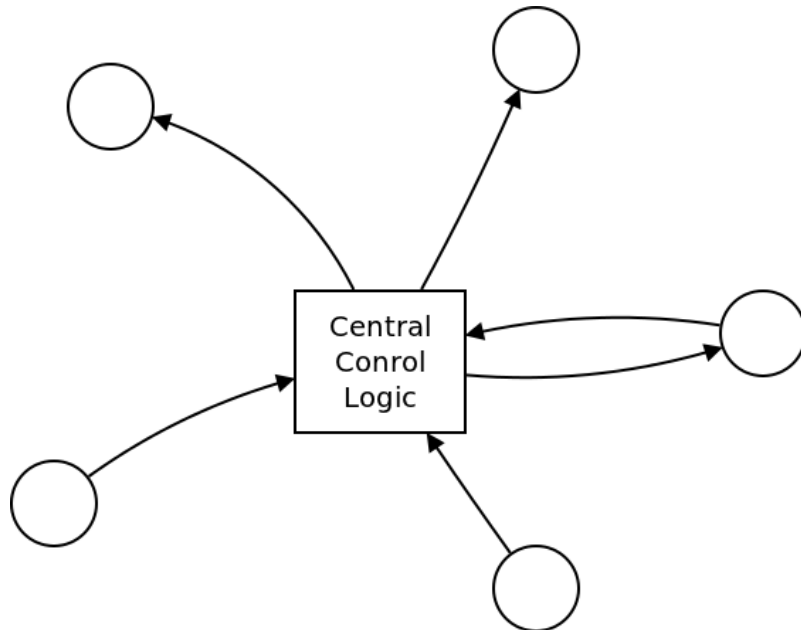
# Hexabus: Facts

- IPv6 – 6LoWPAN
  - Wireless IP network
- Contiki
  - Open Sorce Microcontroller OS for the “Internet of Things”
  - Protothreads
  - IP stack



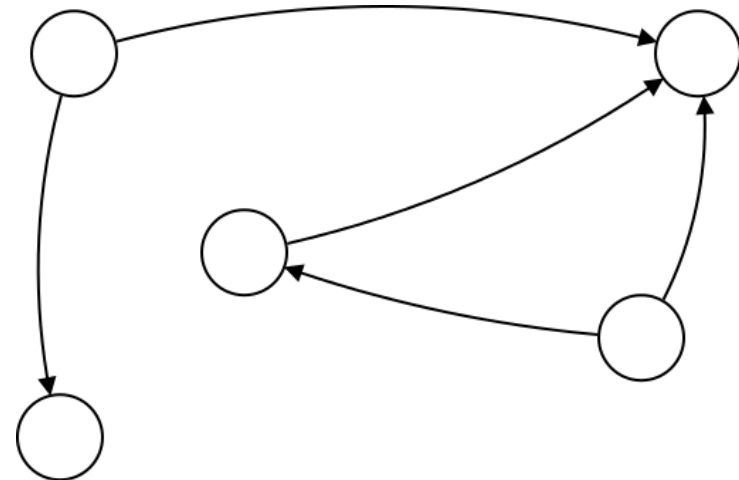
# Hexabus: Concept

## Traditional Home Automation System



- Defining devices
- Controller has to know all the devices

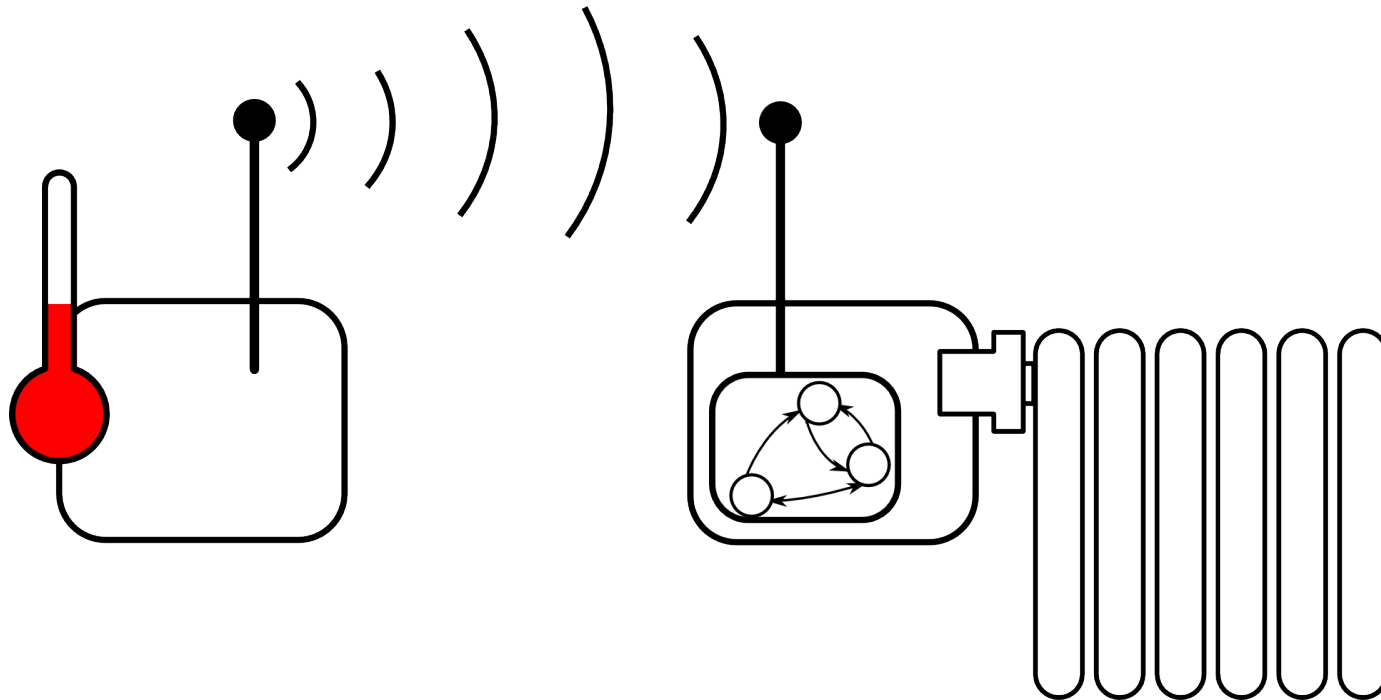
## Hexabus



- Self-contained, autonomous devices
- Defining the *communication channel*
  - No central control entity
  - Everyone can create \$f00

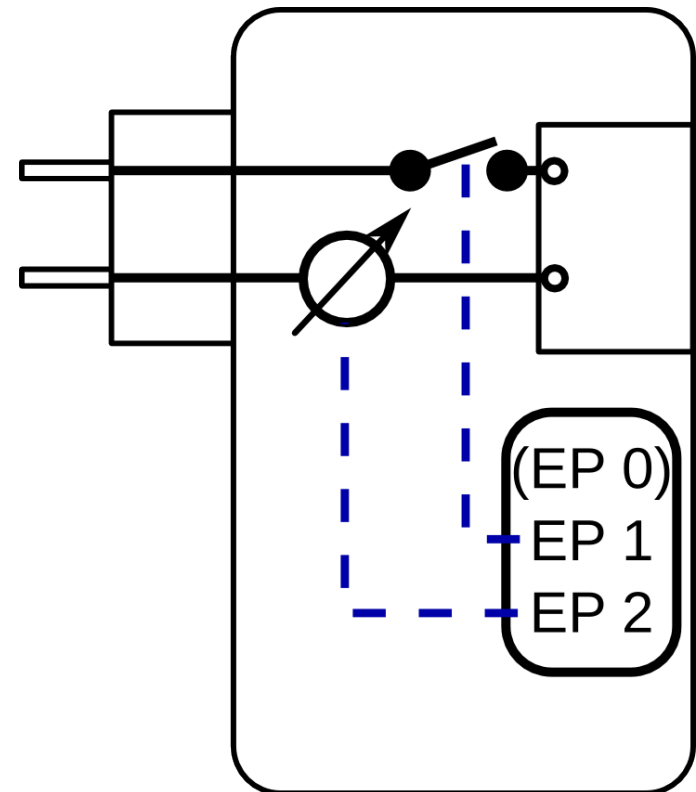
# Hexabus: Concept

- Sensors broadcast readings
- Actors react to broadcasts
  - Control programs using state machines



# Hexabus Network Protocol

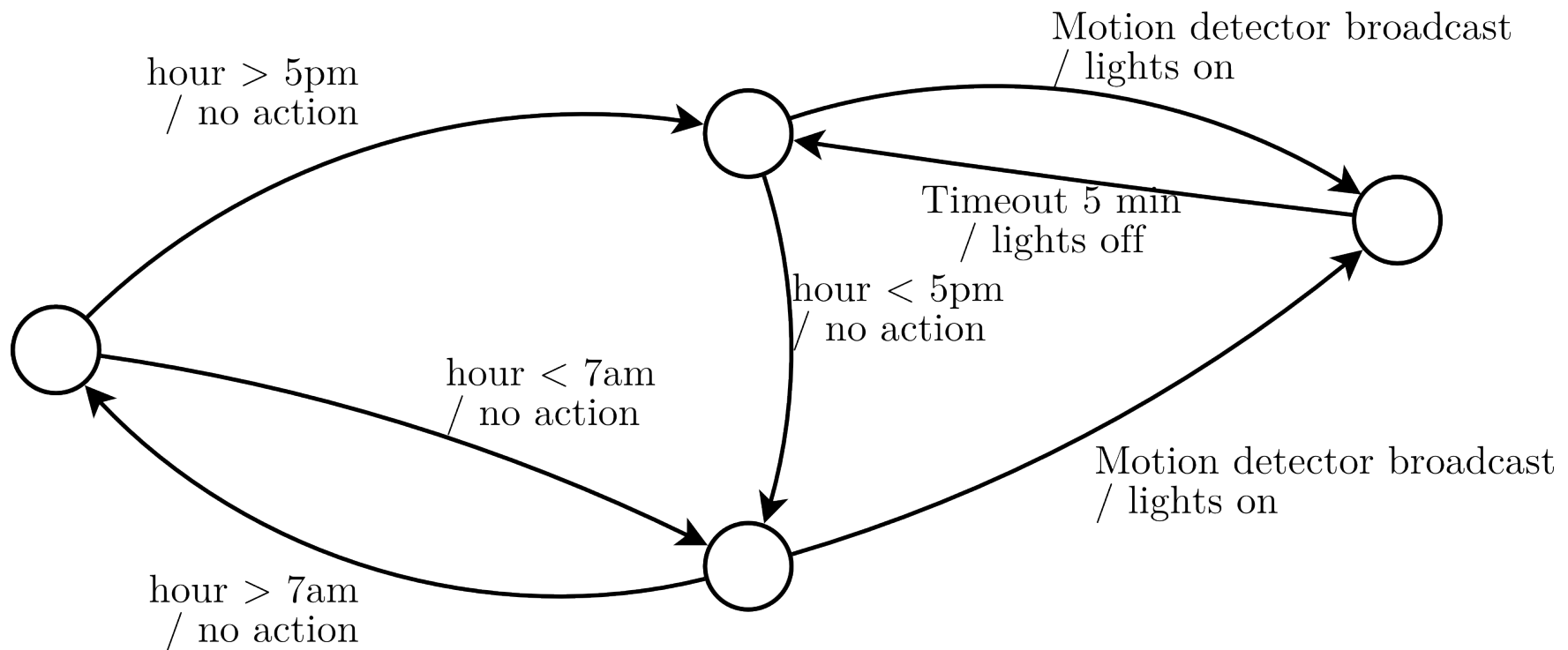
- Functionality is organized in *endpoints*
- Access: “Query” and “Write” requests
- Broadcast
- Control programs write to endpoints



# Control Programs: State Machines

- “extended” Mealy Machines
  - States
  - Input: (IP, EID, value)
  - Output: Action (EID, value)
  - Transitions
    - Condition: (IP, EID, value) match
    - Action succeeds → go to *goodState*
    - Action fails → go to *badState*

# Control Programs: State Machines



# Hexabus Assembler

- Currently in development
- Textual representation of state machines

```
1 # this is a comment
2 startstate off;
3 condition toggle_on {
4   ip := fe80:0000:0000:0000:00b5:5aff:fe0b:0302;
5   eid := 25;
6   value == 1;
7 }
8 condition toggle_off {
9   ip := fe80:0000:0000:0000:00b5:5aff:fe0b:0302;
10  eid := 25;
11  value == 1;
12 }
13 state off {
14   if toggle_on {
15     set 1 := 1;
16     goodstate on;
17     badstate off;
18   }
19 }
20 state on {
21   if toggle_off {
22     set 1 := 0;
```



# The Future: Hexabus Compiler

- User defines one big control program
  - We're even planning to have a GUI
- Hexabus Compiler slices it
  - Each device gets its own program

# And now...

- Live demonstration

Find out more at

[hexabus.net](http://hexabus.net)

[github.com/mysmartgrid/hexabus](https://github.com/mysmartgrid/hexabus)

[#hexabus](https://irc.hackint.eu)

# One more thing...

<https://github.com/mysmartgrid/hexabus/wiki/Hexabus-quickstart-guide>

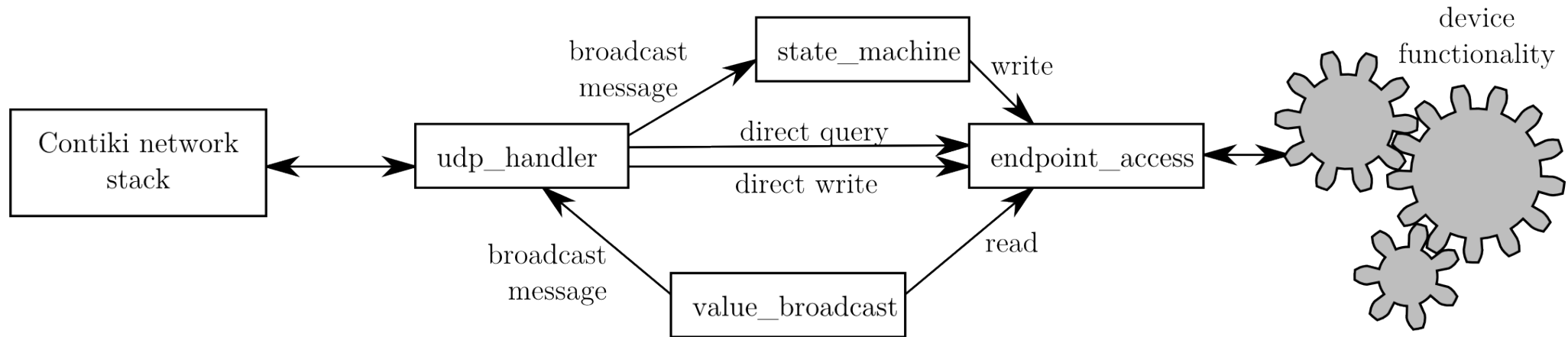
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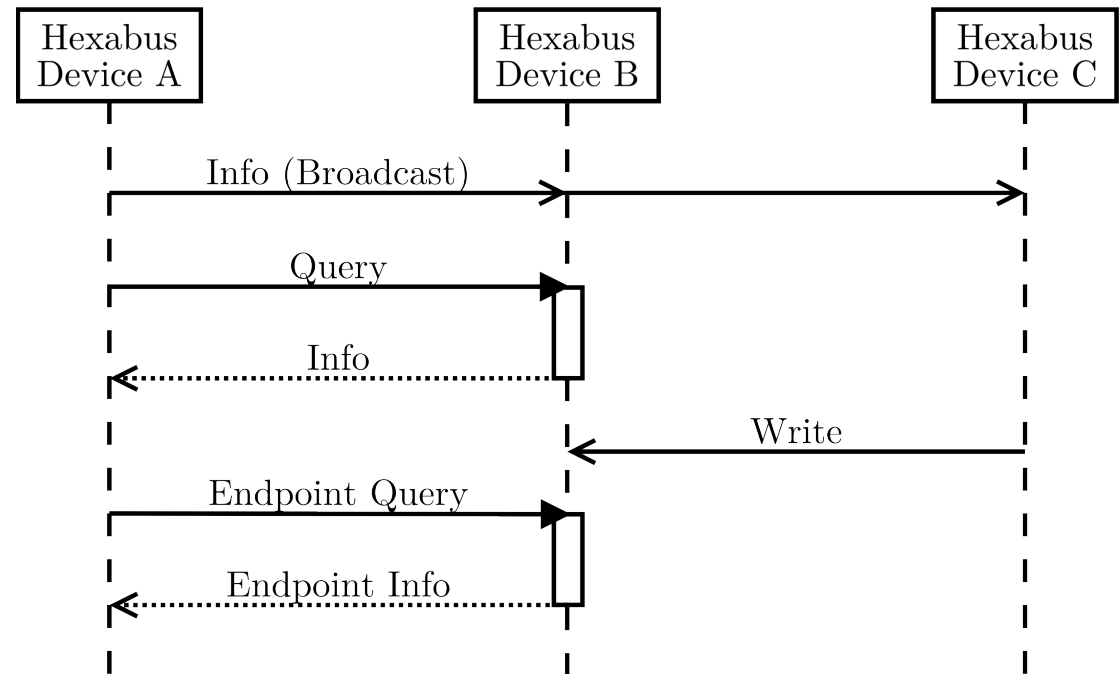
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# Hexabus Software



# Network Packets

- Info
- Query
- Write
- EP Query / EP Info



Info packet:

Byte	0-3	4	5	6	7	8..	$n - 1, n$
Field	Header	Type	Flags	EID	Data type	Value	CRC
Content	"HX0B"	0x01					