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The Internet of Things and Some Examples for its Exploitation for Terrorist Activities

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The Internet of Things

- Devices (refrigerators, cooling systems, car components, …)

- Embedded systems (control functions)

- Connectivity
  - RFID/NFC
  - Bluetooth
  - LTE mobile phone
  - WiFi
  - ….

- Identified objects: IP V4 => IP V6
  IP V4: 127.208.1.10 max. 2^{32} = 4.3b addresses
  IP V6: 2001:0db8:85a3:08d3:1319:8a2e:0370:7344 max. 2^{128} = 3.10^{38} addresses

The Internet of Things

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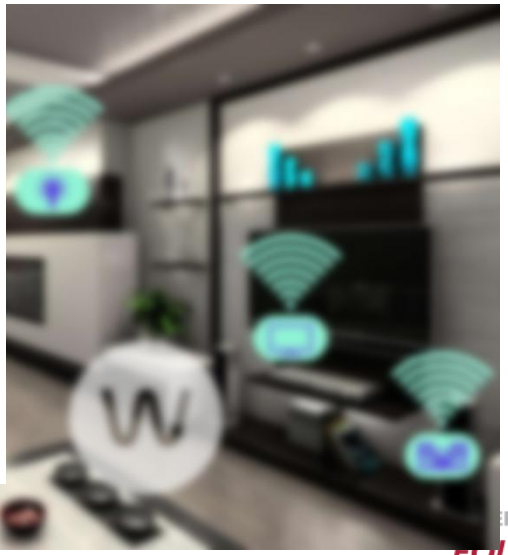
The Internet of Things



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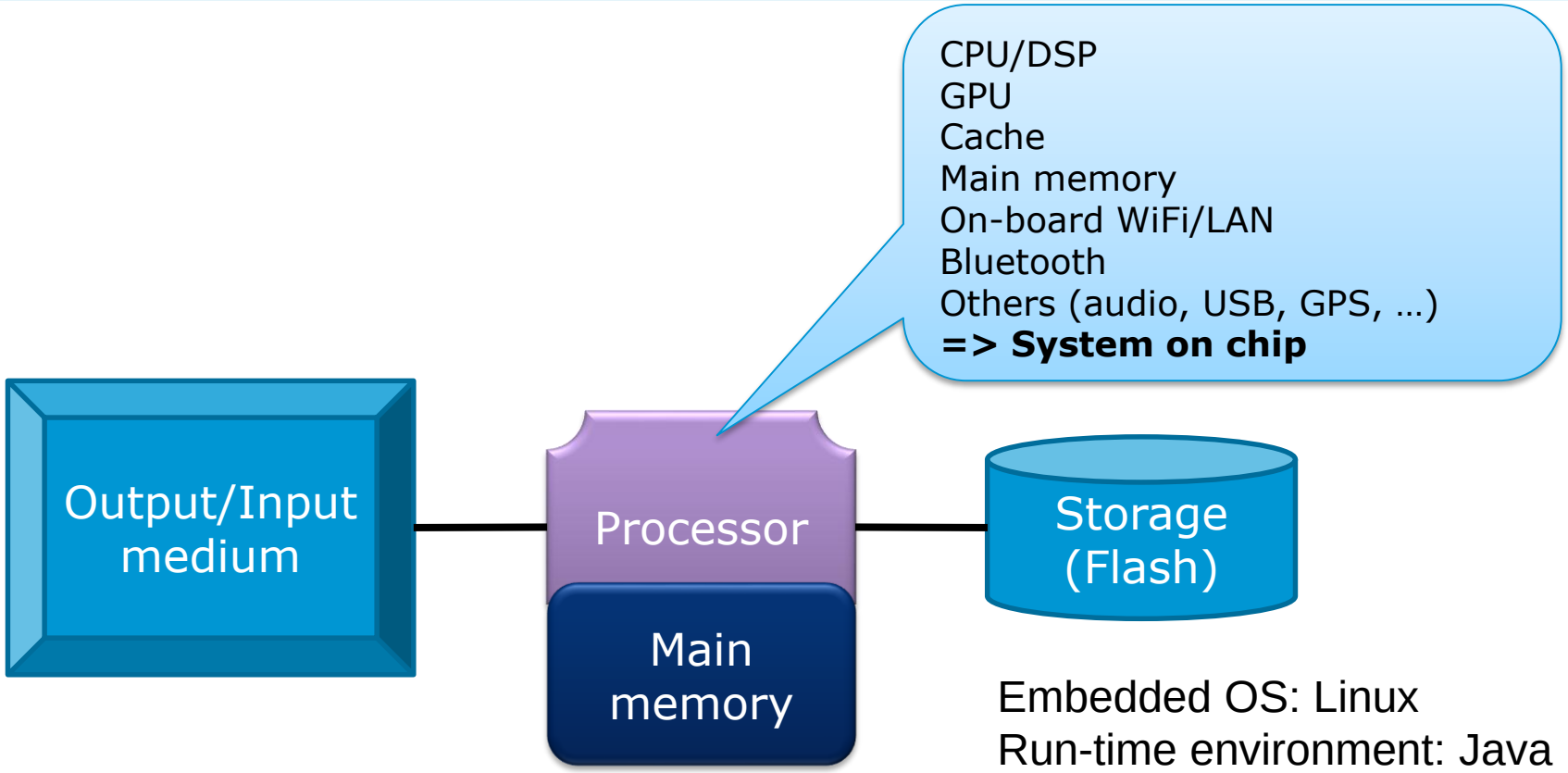
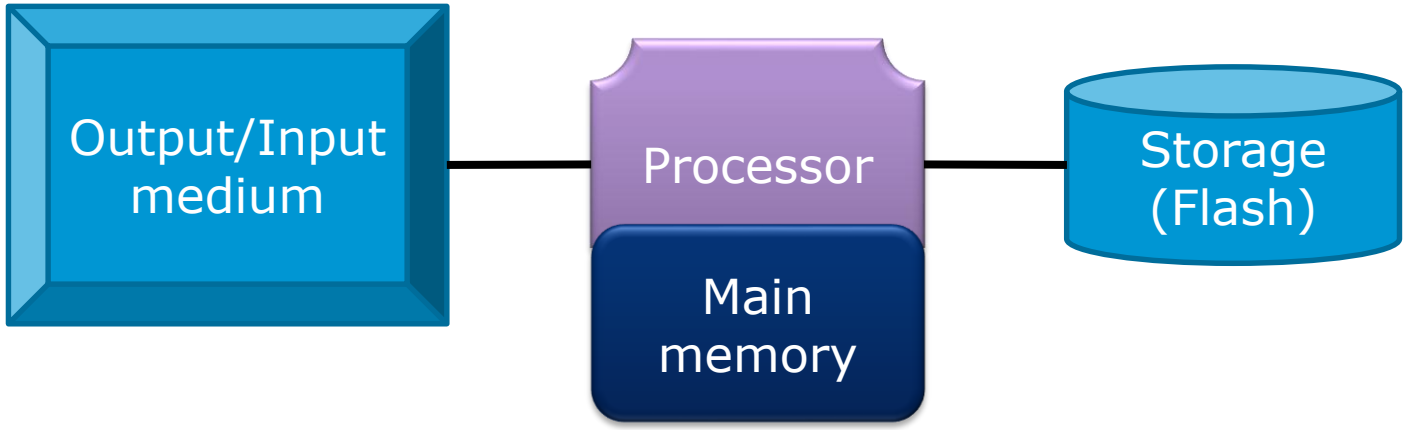
The Smart Fridge



Embedded OS: Linux
Run-time environment: Java
Java: 8b+ devices w/w

The Smart Fridge

Access needs to be remote, for
- „Smart home“ functions
- Software upgrades by the producer
- Services provided by producer/third parties



The Smart Fridge

Some questions:

- Password default/reset/enforced reset on start-up?
- Regular software upgrades/security patches
- Virus scanner
- OS accessible to the user (eg, for virus scanner installation)?

Things that hardly work with privately owned PCs, where awareness is just being created.

“Hey, c’me on – it’s only a *fridge!*”

The Smart Fridge

Bottom line:

- We have a full-fledged computer …
- … with a general-purpose OS …
- … that can run anything …
- … that just happens to reside in a fridge.

… and that device is designed/specified by a fridge maker.

The Smart Fridge – And its usage

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Application #1:

- Install AES encryption programme
  - Accessible via socket (Java), web service or command line interface
  - Send files to be en/decrypted to fridge
  - Communications mode depends on operating mode (socket call, SOA call or ftp)
  - Retrieve en/decrypted file
  - Configure AES service with low OS priority so that it does not slow down normal fridge usage (eg., creation of shopping list on user's smart phone) discernibly

The Smart Fridge – And its usage

Application #2:

- Install onion router (eg., TOR)
    - Check CPU and main memory first
    - Check OS compatibility
    - Install TOR router
    - Install at least one private authoritative directory server (ADS)
    - Reconfigure your TOR network (incl. browsers) to your private ADS
    - For the above, you can use Chutney or similar to manage ADS
    - Use Java SOCKS to adapt your Java applications to use your private TOR (do not use DNS as this may give you away)

The Smart Fridge – And its usage

Application #3:

- File repository
    - Check storage capacity of the fridge
    - Create hidden directories
    - Store/retrieve files with standard ftp or create and install simple web service with SaveFile(), RetrieveFile(), DelFile(), etc.

The Smart Fridge – And its usage

Application #4:

- File and message exchange (simple)
    - Create directory for each user
    - Create subdirectories /in, /out, /archive per user
    - /archive may be subdivided according to “projects”
    - Use ftp to save and retrieve messages
    - Combine with Application #1 (AES) to ensure privacy

The Smart Fridge – And its usage

Application #4a:

- File and message exchange (advanced)
    - Implement #4
    - Write a simple SOA shell (Java) to support these operations

The Smart Fridge – And its usage

General: Appoint CIO that

- Provides Internet of Things Devices as resources
- Writes applications and installs them
- Assigns and manages resources
- Constantly moves resources from device to device, particularly onion routers
- Provides configuration facility to keep resource moves transparent from the other users in the organisation

The Smart Fridge – Active now

"This is all theoretical"

The Smart Fridge – Active now

"This is all theoretical"

BBC world news, Jan 17, **2014**:
"Fridge sends spam emails as attack hits smart gadgets"

http://www.bbc.com/news/technology-25780908

… and this is the harmless application.

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