Een antenne maakt nog geen connected design

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@Tomvandeven

Let’s connect!

Everything connected

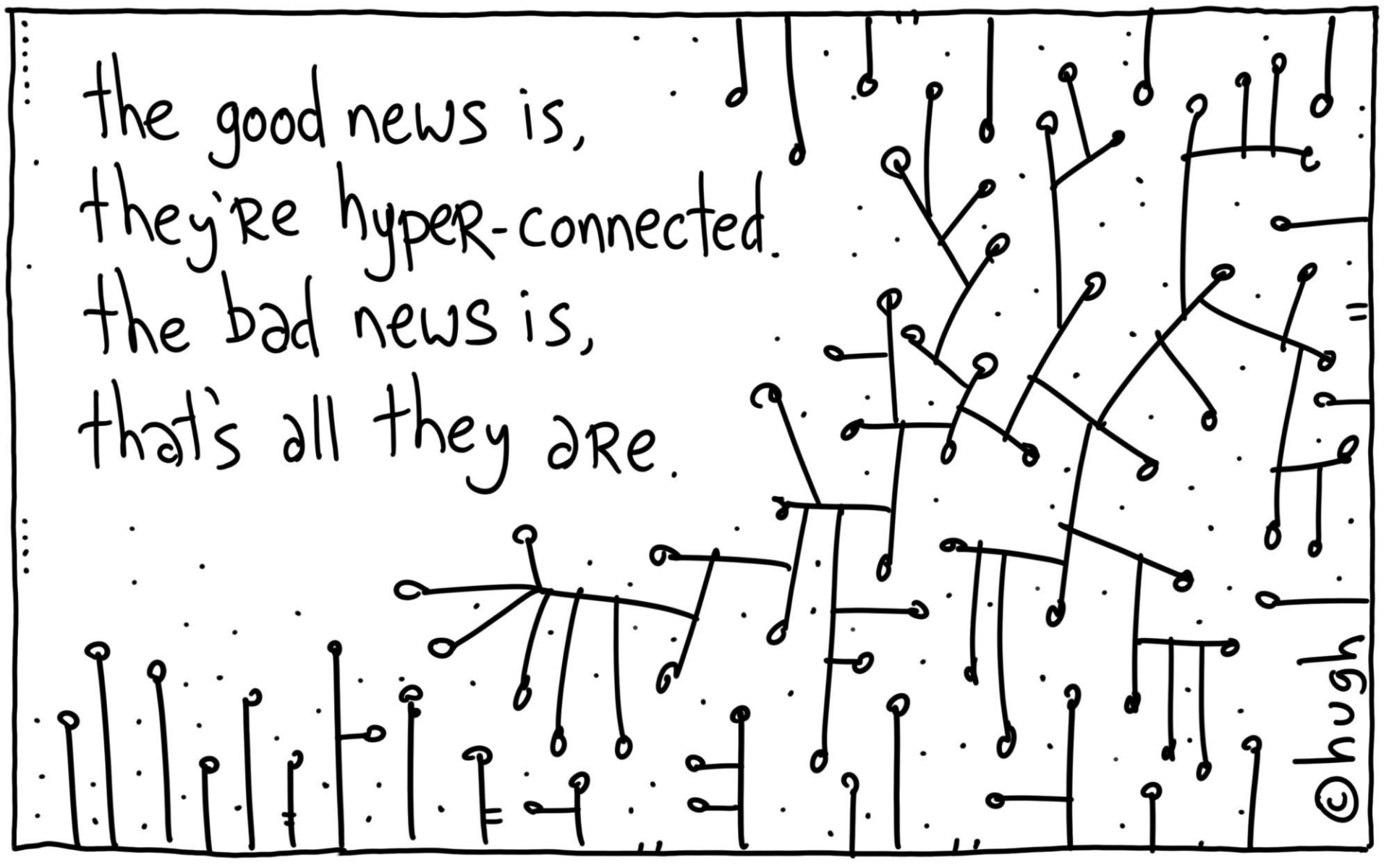
Zombie IoT

RWS connected bridges

5 steps to connected design

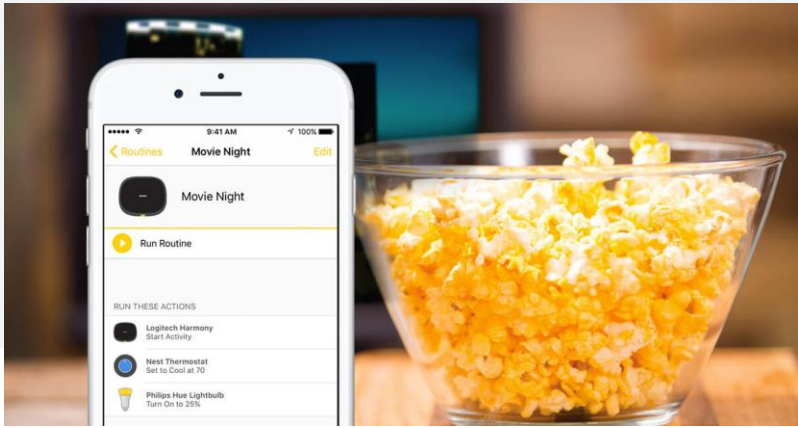
Everything connected

Alexa, is my laundry done?
Alexa, can you preheat the oven?
Alexa, send me my shopping list from the fridge


the good news is,
they're hyper-connected.
the bad news is,
that's all they are.
©hugh

Connected because…

- Keep up with competition
- Premium appearance
- Acquiring valuable data (profiles, debug)
- Technology is there



This is all fine, but beware!


SOGETI
Zombie IoT

What about reputation

Do not become a Zombie IoT device!

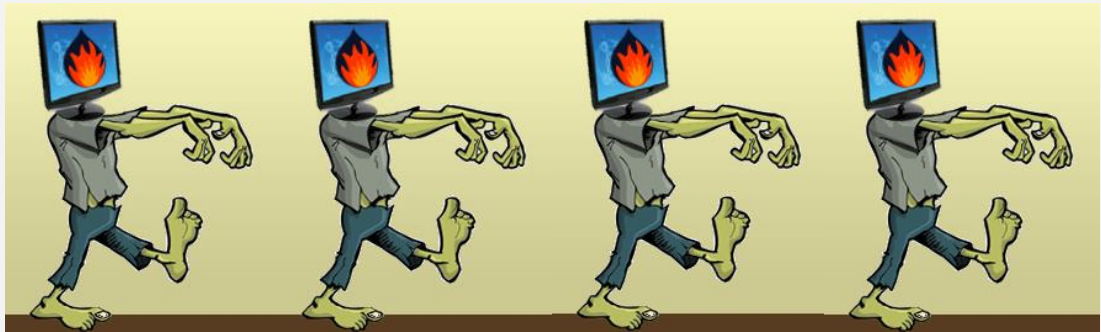
Must-read: The Day the Toaster Turned – an IoT Apocalypse

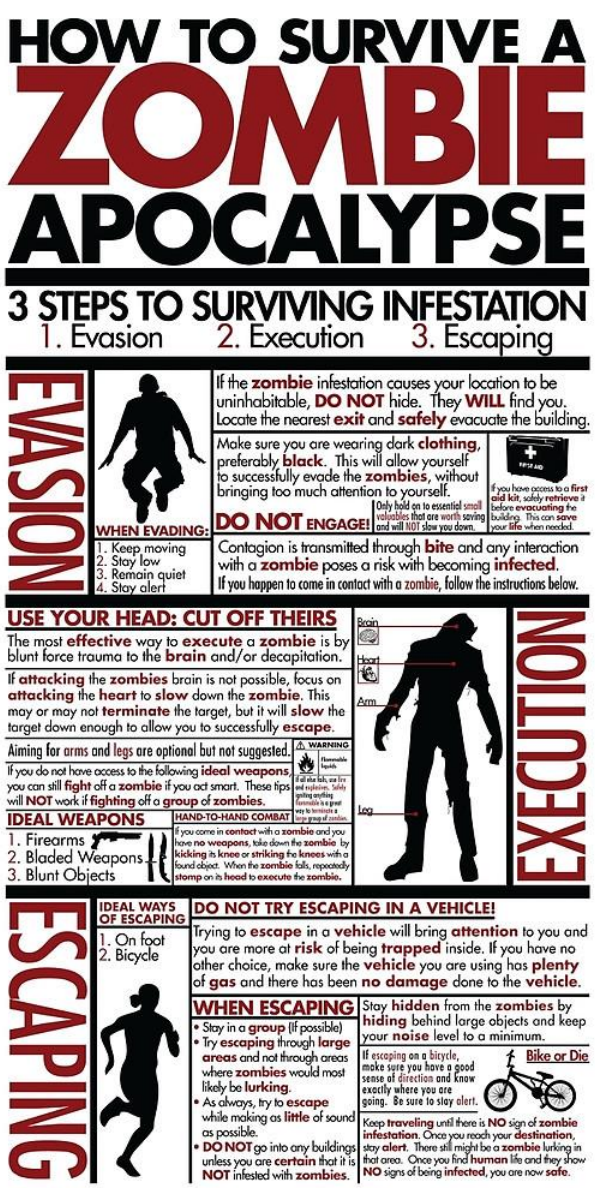
SOGETI

Zombie IoT

"Typically, a zombie is a home-based PC whose owner is unaware that the computer is being exploited by an external party."

"The term originated in the West Indies, where a zombie is a will-less, automaton-like person who is said to have been revived from the dead and must now do the will of the living."





- Connections everywhere
- Wild growth
- Standards
- Ever growing tech

TO SURVIVE:

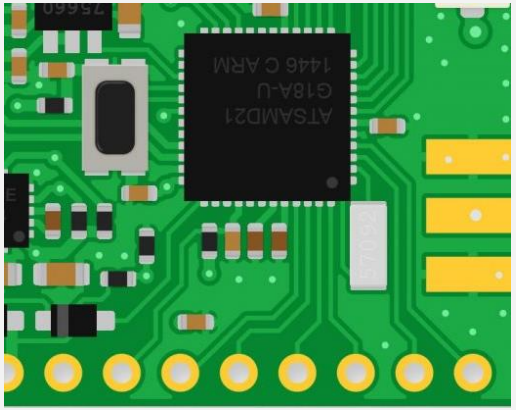
- We need a good connected design!

RWS Connected Bridge

32-Bit ARM Cortex microcontroller

LiPo battery: Power consumption from 220 µA to 22 µA in sleep!

LoRa Microchip RN2483 Module



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Rijkswaterstaat Connected Bridges

SOGETI

Insight in status of all bridges

No Boat Jams: ”Blauwe golf

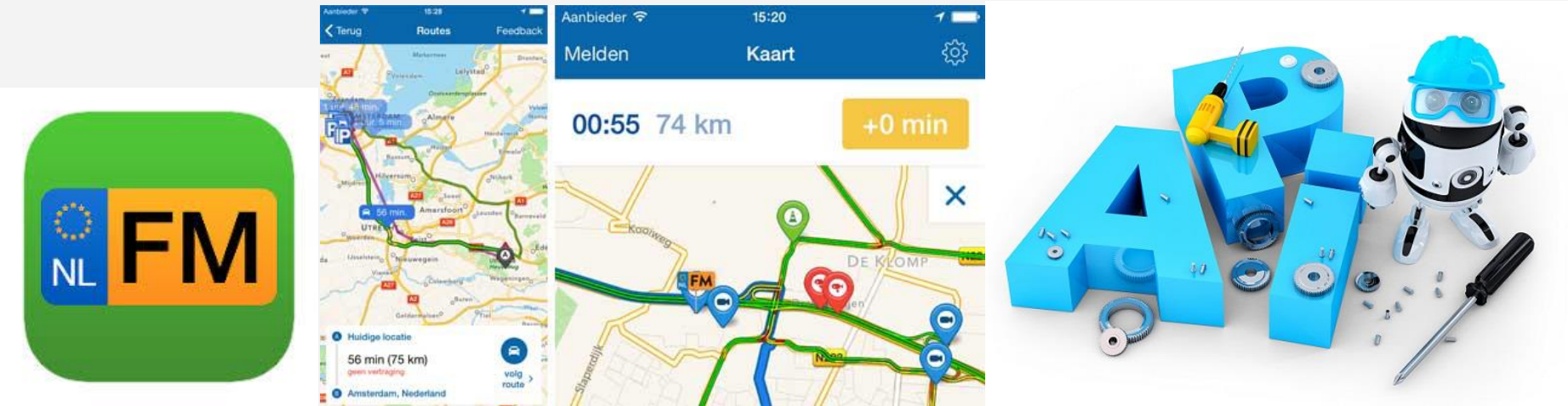
Focus on the connected part of our solution

First element: **functionality**

RWS situation

- Solution must be separate from existing infrastructure
- No power supply
- Connect to existing RWS systems (think Flitsmeister apps)

- Tech choices: LoRa iso Sigfox (fits: low power & low data traffic)



RWS situation

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- Other tech to consider?
- Maybe power supply steers technology?
- Not in this case

- Design for security and privacy!
- For RWS: checks communication layers
- On the device: no debug modus,

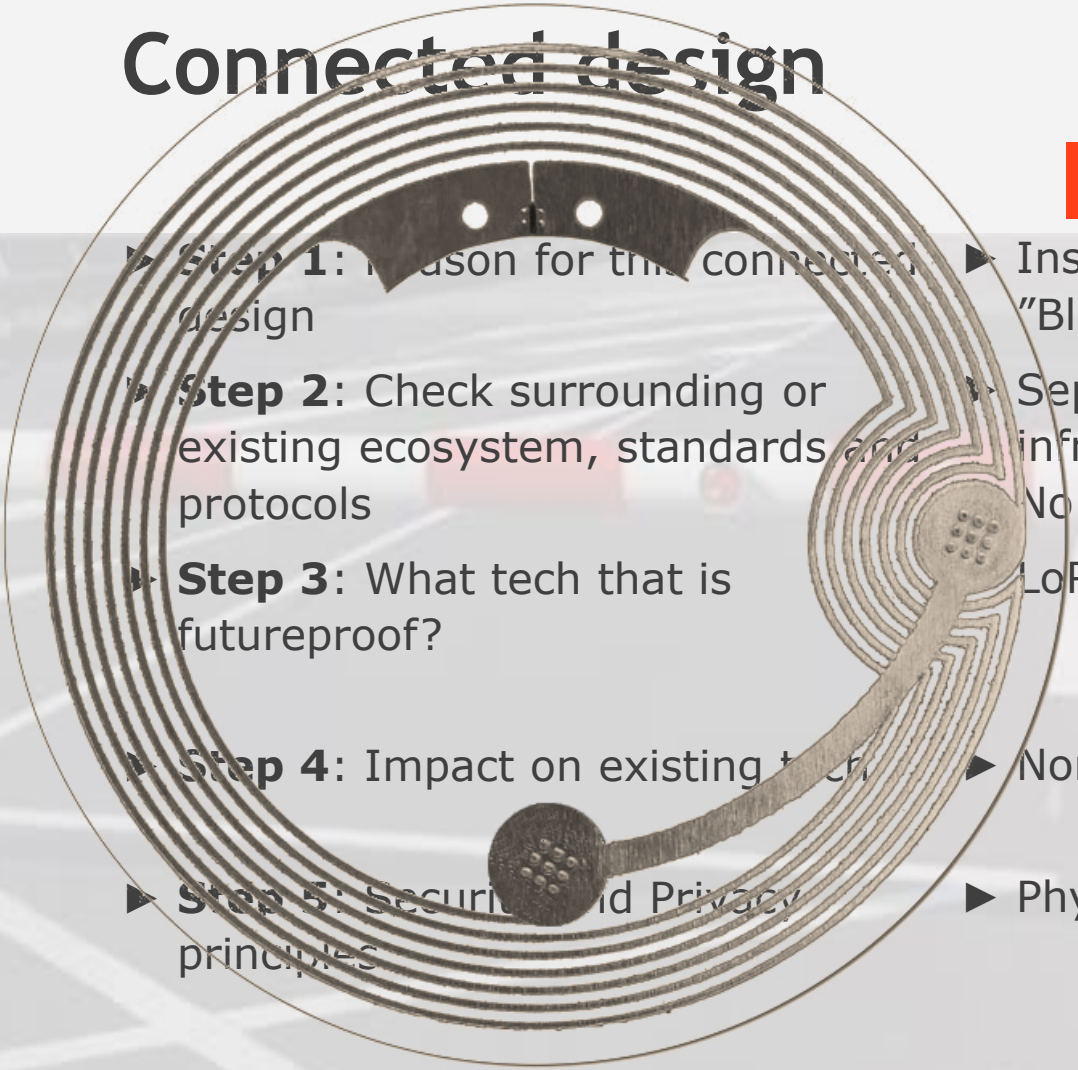
OSI (Open Source Interconnection) 7 Layer Model

Layer	Application/Example	Central Device/ Protocols		DOD4 Model
Application (7) Serves as the window for users and application processes to access the network services.	**End User layer** Program that opens what was sent or creates what is to be sent. Resource sharing • Remote file access • Remote printer access • Directory services • Network management	**User Applications** SMTP	GATEWAY Can be used on all layers	Process
Presentation (6) Formats the data to be presented to the Application layer. It can be viewed as the "Translator" for the network.	**Syntax layer** encrypt & decrypt (if needed). Character code translation • Data conversion • Data compression • Data encryption • **Character Set Translation**	JPEG/ASCII EBDIC/TIFF/GIF PICT		
Session (5) Allows session establishment between processes running on different stations.	**Synch & send to ports** (logical ports). Session establishment, maintenance and termination • Session support - perform security, name recognition, logging, etc.	**Logical Ports** RPC/SQL/NFS NetBIOS names		
Transport (4) Ensures that messages are delivered error-free, in sequence, and with no losses or duplications.	**TCP** Host to Host, Flow Control. Message segmentation • Message acknowledgement • Message traffic control • Session multiplexing. PACKET FILTERING	TCP/SPX/UDP		Host to Host
Network (3) Controls the operations of the subnet, deciding which physical path the data takes.	**Packets** ("letter", contains IP address). Routing • Subnet traffic control • Frame fragmentation • Logical-physical address mapping • Subnet usage accounting	**Routers** IP/IPX/ICMP		Internet
Data Link (2) Provides error-free transfer of data frames from one node to another over the Physical layer.	**Frames** ("envelopes", contains MAC address) [NIC card — Switch — NIC card] (end to end). Establishes & terminates the logical link between nodes • Frame traffic control • Frame sequencing • Frame acknowledgment • Frame delimiting • Frame error checking • Media access control	**Switch Bridge WAP** PPP/SLIP	Land Based Layers	Network
Physical (1) Concerned with the transmission and reception of the unstructured raw bit stream over the physical medium.	**Physical structure** Cables, hubs, etc. Data Encoding • Physical medium attachment • Transmission technique - Baseband or Broadband • Physical medium transmission Bits & Volts	**Hub**		

Physical access =! Data access

5 steps to connected design

Connected design



RWS Connected Bridge

- **Step 1**: Reason for this connected design
- **Step 2**: Check surrounding or existing ecosystem, standards and protocols
- **Step 3**: What tech that is futureproof?
- **Step 4**: Impact on existing tech
- **Step 5**: Security and Privacy principles

- Insight in status of all bridges ”Blauwe Golf”
- Separate from existing infrastructure. No power
- LoRa
- None
- Physical