



SOGETI

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



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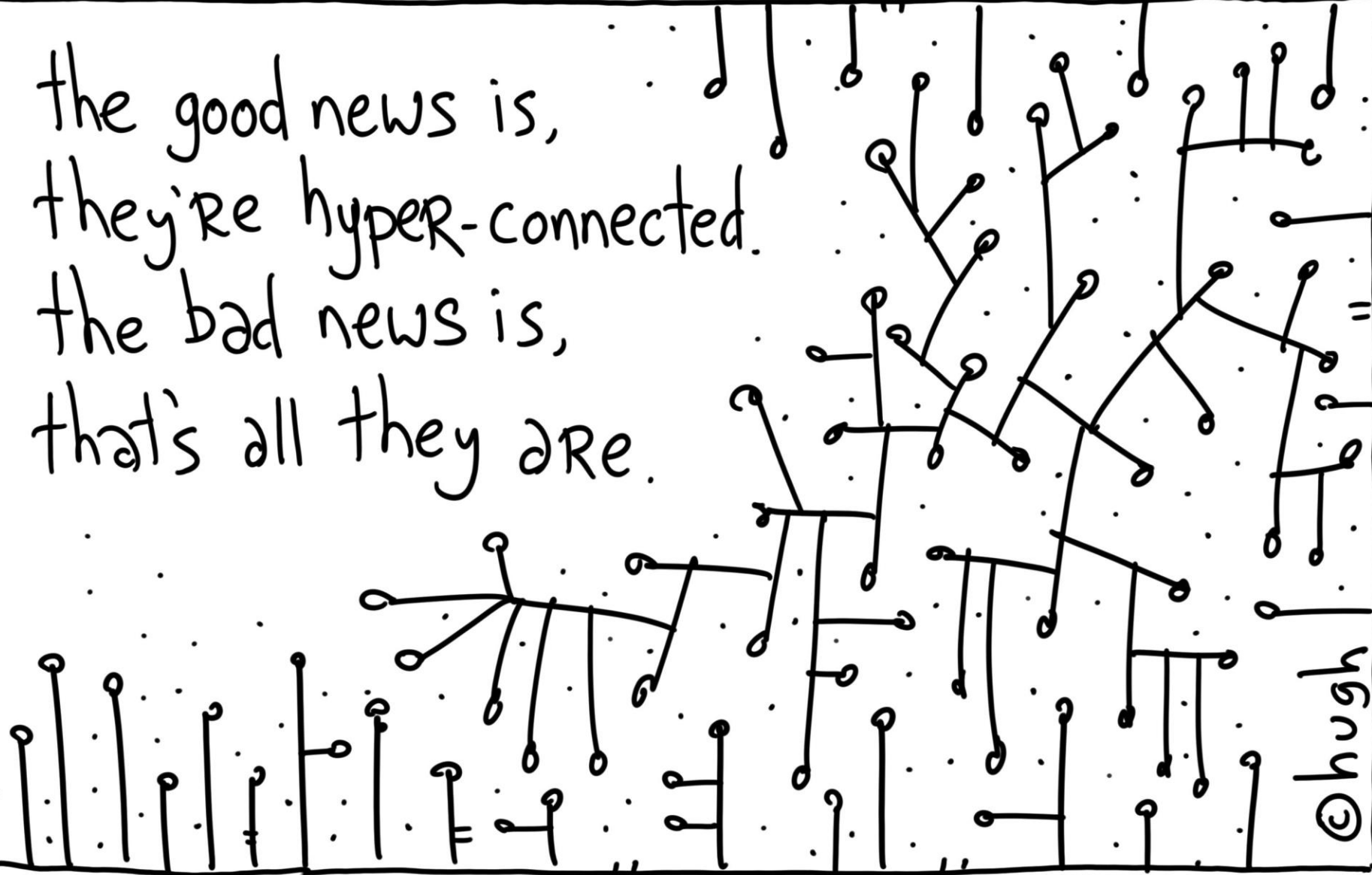
SHOPPING LIST

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



CES

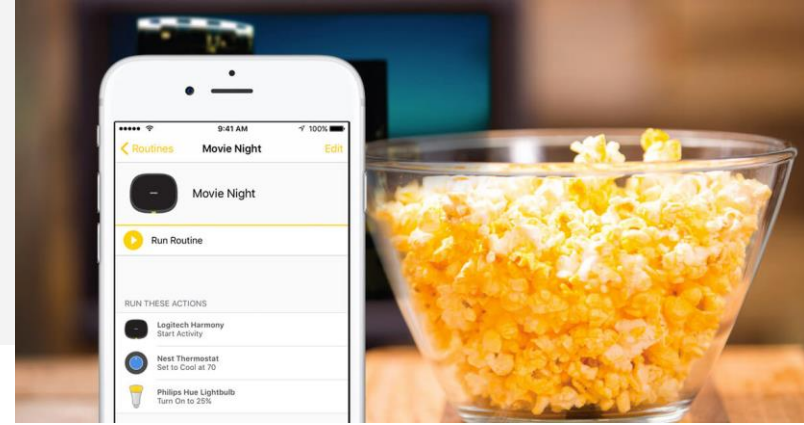
the good news is,
they're hyper-connected.
the bad news is,
that's all they are.



©hugh

Connected because...

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



**This is all fine, but
beware!**



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Zombie IoT

What about reputation

Do not become a Zombie IoT device!

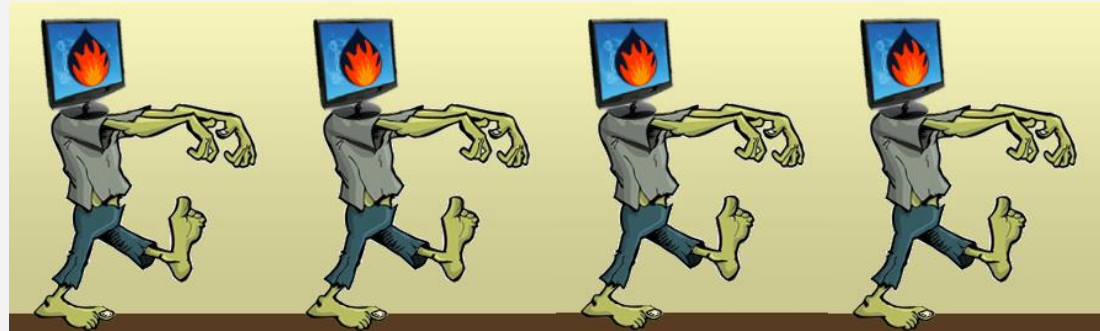
Must-read:
The Day the
Toaster Turned –
an IoT Apocalypse



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."



HOW TO SURVIVE A ZOMBIE APOCALYPSE

3 STEPS TO SURVIVING INFESTATION

1. Evasion
2. Execution
3. Escaping

EVASION



If the **zombie** infestation causes your location to be uninhabitable, **DO NOT** hide. They **WILL** find you. Locate the nearest **exit** and **safely** evacuate the building.

Make sure you are wearing dark **clothing**, preferably **black**. This will allow yourself to successfully evade the **zombies**, without bringing too much attention to yourself.

WHEN EVADING:

1. Keep moving
2. Stay low
3. Remain quiet
4. Stay alert

DO NOT ENGAGE!

Contagion is transmitted through **bite** and any interaction with a **zombie** poses a risk with becoming **infected**. If you happen to come in contact with a **zombie**, follow the instructions below.

If you have access to a first aid kit, **safely** retrieve it before evacuating the building. This can save your life when needed.

EXECUTION



USE YOUR HEAD: CUT OFF THEIRS

The most **effective** way to **execute** a **zombie** is by blunt force trauma to the **brain** and/or decapitation.

If **attacking** the **zombies** brain is not possible, focus on **attacking** the **heart** to **slow** down the **zombie**. This may or may not **terminate** the target, but it will **slow** the target down enough to allow you to successfully **escape**.

Aiming for arms and legs are optional but not suggested.

If you do not have access to the following **ideal weapons**, you can still **fight** off a **zombie** if you act smart. These tips will **NOT** work if **fighting** off a **group** of **zombies**.

IDEAL WEAPONS

1. Firearms
2. Bladed Weapons
3. Blunt Objects

HAND-TO-HAND COMBAT

If you come in contact with a **zombie** and you have no weapons, take down the **zombie** by **kicking** in **knees** or **striking** the **knees** with a **blunt** object. When the **zombie** falls, repeatedly **stomp** on its **head** to **execute** the **zombie**.

DO NOT TRY ESCAPING IN A VEHICLE!

Trying to **escape** in a **vehicle** will bring **attention** to you and you are more at **risk** of being **trapped** inside. If you have no other choice, make sure the **vehicle** you are using has **plenty** of **gas** and there has been **no damage** done to the **vehicle**.

ESCAPING



IDEAL WAYS OF ESCAPING

1. On foot
2. Bicycle

WHEN ESCAPING

- Stay in a **group** (if possible)
- Try **escaping** through **large** areas and not through areas where **zombies** would most likely be **lurking**.
- As always, try to **escape** while making as **little** of sound as possible.
- **DO NOT** go into any buildings unless you are **certain** that it is **NOT** infested with **zombies**.

Stay hidden from the **zombies** by **hiding** behind large objects and keep your **noise** level to a minimum.

Keep travelling until there is **NO** sign of **zombie** infestation. Once you reach your destination, **stay** alert. There still might be a **zombie** lurking in that area. Once you find **human** life and they show **NO** signs of being infected, you are now **safe**.

Bike or Die



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



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TO SURVIVE:

- We need a good connected design!

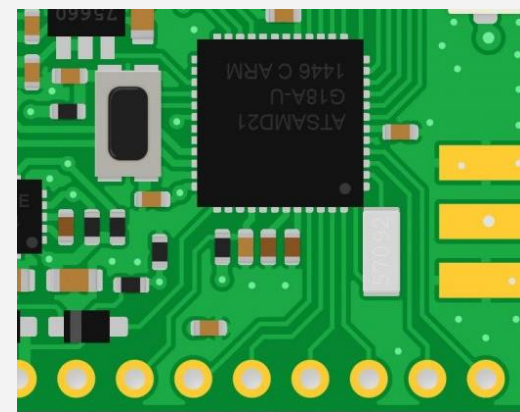


RWS Connected Bridge

32-Bit ARM Cortex microcontroller

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

LoRa Microchip RN2483 Module



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Rijkswaterstaat Connected Bridges



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Insight in status of all bridges

No Boat Jams: "Blauwe golf"

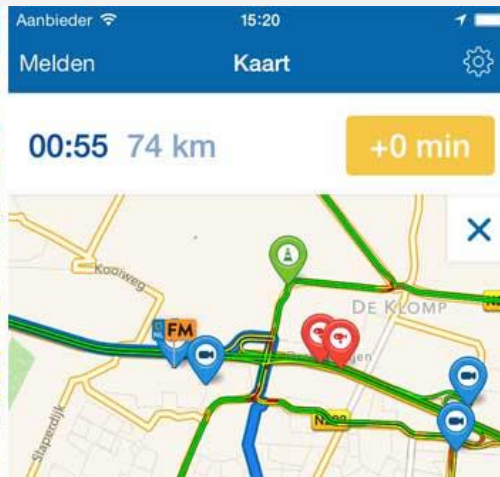


Focus on the connected part of our solution

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

- ▶ 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 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 Routers IP/IPX/ICMP	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		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	Can be used on all 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 Land Based Layers	

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

