Successful IoT?

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Plan

- Telecare with IoT
- Function mapping
- “Service Templates”
- Standards

Om Knut Yrvin

- Co-founder of Skolelinux project which is a part of Debian Edu. Where rpm is king deb is God ;)
- Started in Telenor, a phone carrier. Graduated with an engineering degree in electronics 1992 and later a Masters (Cand.Scient) in Computer Science 2000.
- Community Manager for Qt in Trolltech, Nokia and later Digia.
- Standardisation i Standard Norway, European Committee for Standardization (CEN) and OASIS - EPR Forum. 2007 ->
- XL Web 2016 ->

Example

Care Home Schwartzgate Drammen Norway

- Unike “homeshare” with individually adapted elderly service
- Relevant Telecare used as geo fence with GPS, fall sensors, light control, bed alarm, sensory technologhy and more
- Cooperation with residents, relatives and care taker personel for adapting the right tech

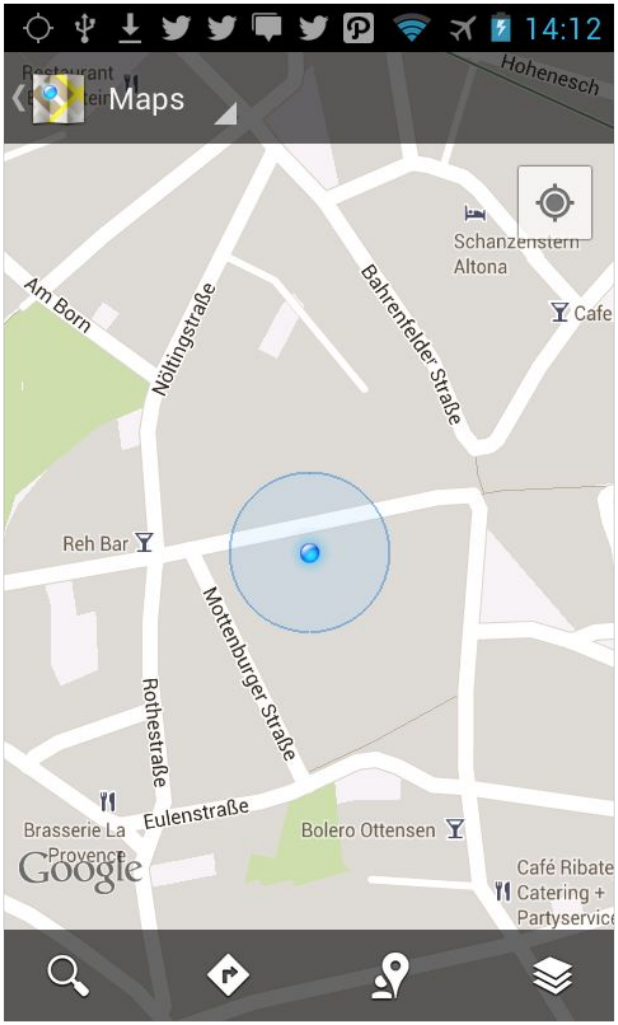
Photo: Drammen kommune (2. tertialrapport 2013)

Kilde:
https://www.drammen.kommune.no/no/Om-kommunen/Virksomheter/Omsorg/Marienlyst_helse-_og_omsorgsdistrikt/Schwartzgate-bofellesskap/

«Continuous» talk when needed (e.g after falling)

Caretaker don’t need to call after a patient has fallen, since they can communicate directly with the patient with the phone that senses that the patient has fallen. The caretaker then can calm the patient, “observe” and inform that assistance is on its way

GPS - geo fence



Caretakers experience that dementia are develops faster if the patient are being kept inside their apartment, without walking outside.

By allowing being outside, they might wander away, being difficult to find. It might rally a rescue with a lot of people.

Geofence make them much easier to find. (Understatement)

Fall - fall sensor gives a signal - caretaker rushes to help

Heart condition - system reports
- caretaker responds

Automatic pill dispenser - Telehealth

Service templates are connected with sensors and activators

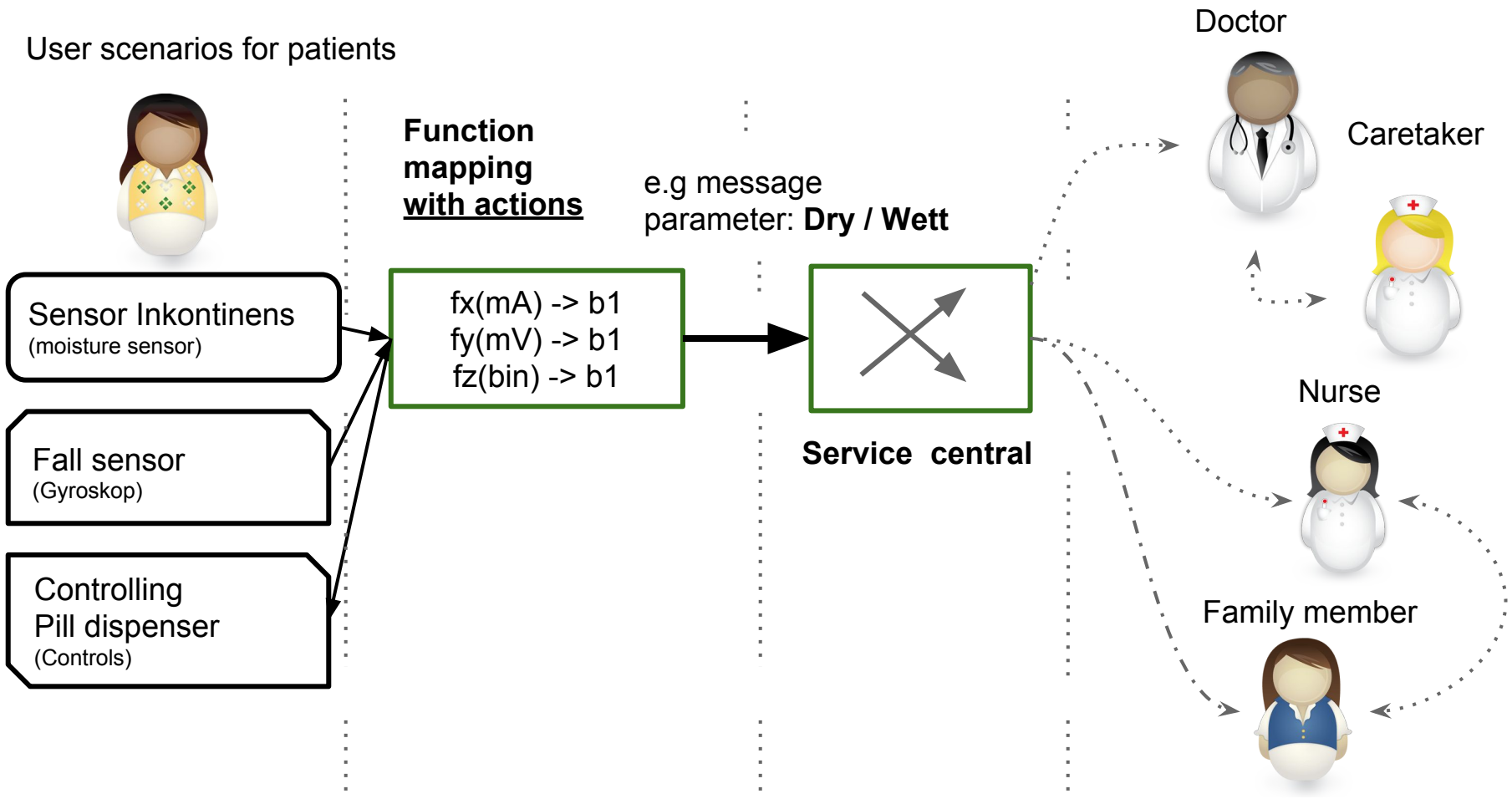
- Sensor Emergency call
- Sensor Tracking (GPS)
- Sensor Fall
- Sensor Heart condition
- Controlling Automatic pill dispenser
- Controlling Light
- Controlling Notification to take medicin
- Controlling Moisture (dependent on the diagnose)

«Everything» controlled by the **service central**

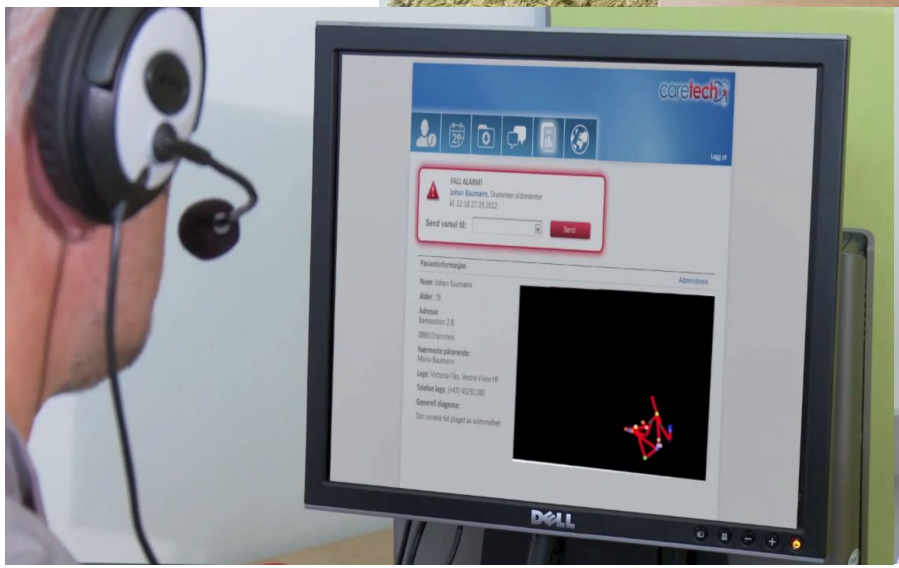
Service scenarios managed with help of service templates

- Emergency call with phone from a family member
- Tracking when feeling ill and need attention
- Fall, calling for help
- Heart condition are alarming, needs ambulans
- Automatic pill dispenser with prescription drugs
- Communication with the alarm central
- And more ...

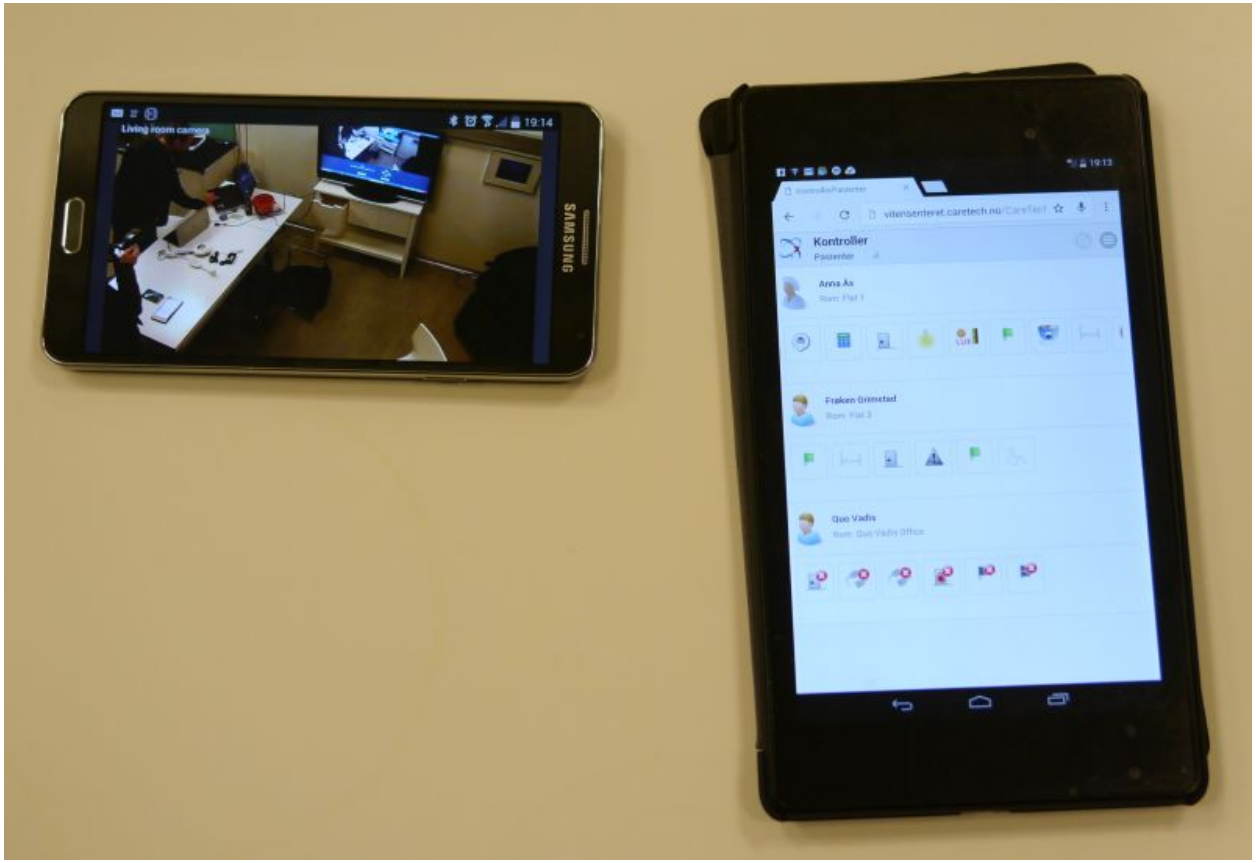
A function mapping overview of the Alarm chain to the service central



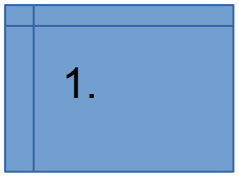
Communication by a «service central»



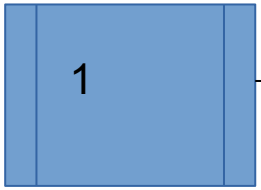
Sentral capabilities can be run everywhere on any device

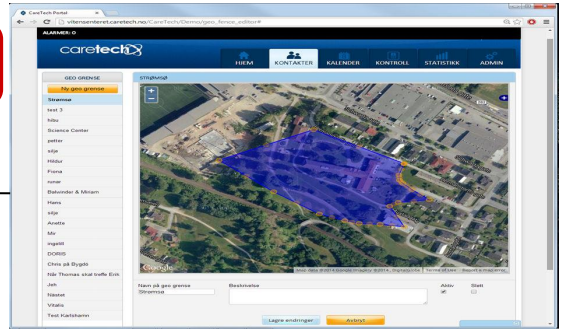


User adapted care



Sensor





Patient

Caretaker

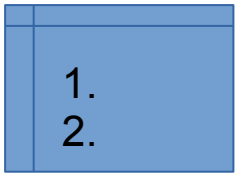
Service standard (function)
Find patient with dementia

Service template (technical)
Actions which help caretaker find the patient

Telecare technology with GPS tracking which are controlled by the service template

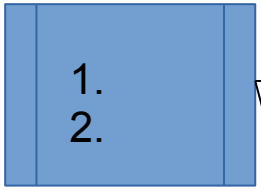
Service standards and the connection to service templates

Caretaker



Service standard (function)
Find patient with dementia

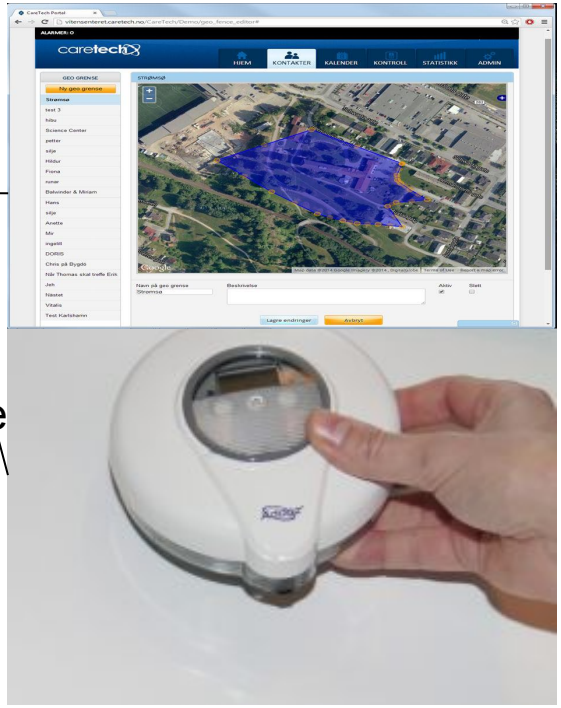
Patient



Sensor

Control

Service template (technical)
Actions which help caretaker find the patient



Controlling the pill dispenser

Service standards and the connection to service templates

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Service-mal

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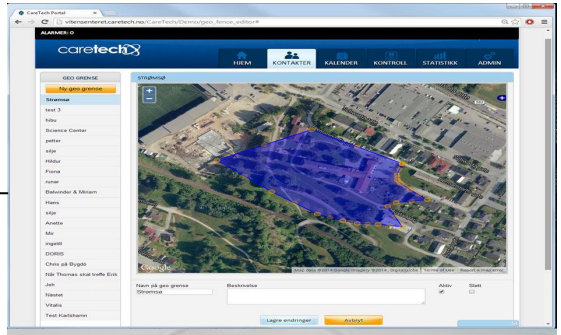

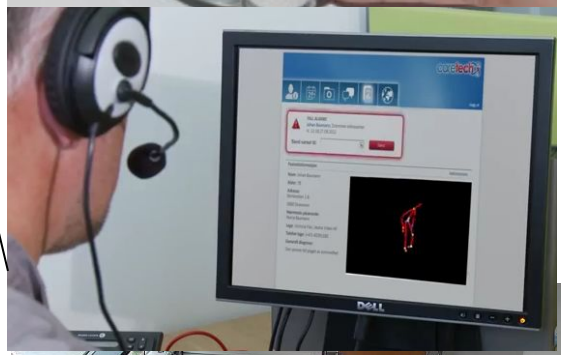

Service done by caretakers

Service templates with caretaker scenarios

Service standards and the connection to service templates

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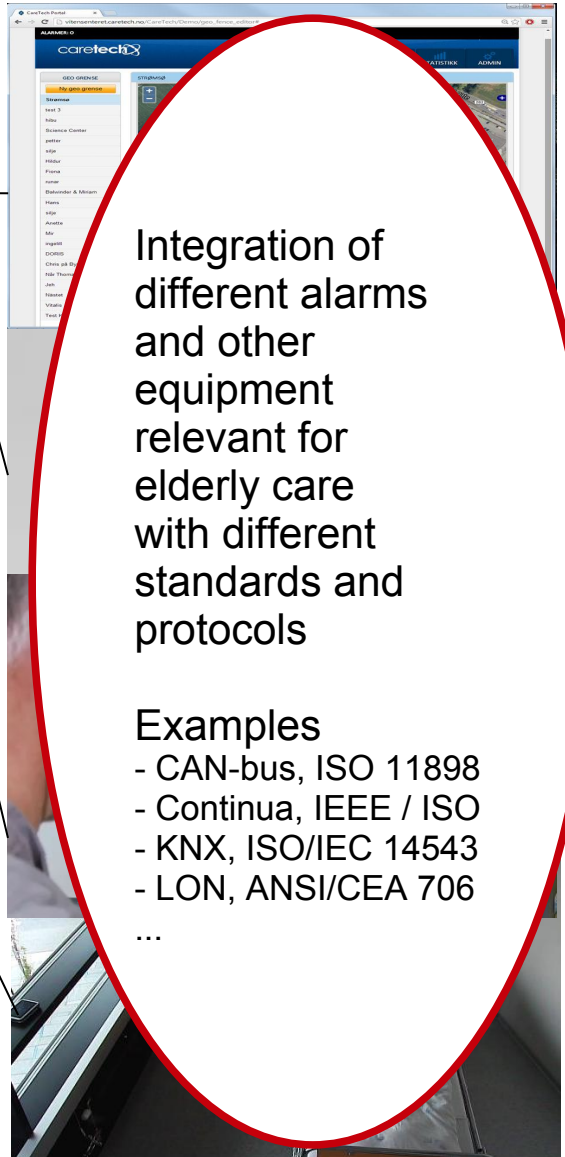

Integration of different alarms and other equipment relevant for elderly care with different standards and protocols

Examples
- CAN-bus, ISO 11898
- Continua, IEEE / ISO
- KNX, ISO/IEC 14543
- LON, ANSI/CEA 706
...

Service standards and the connection to service templates

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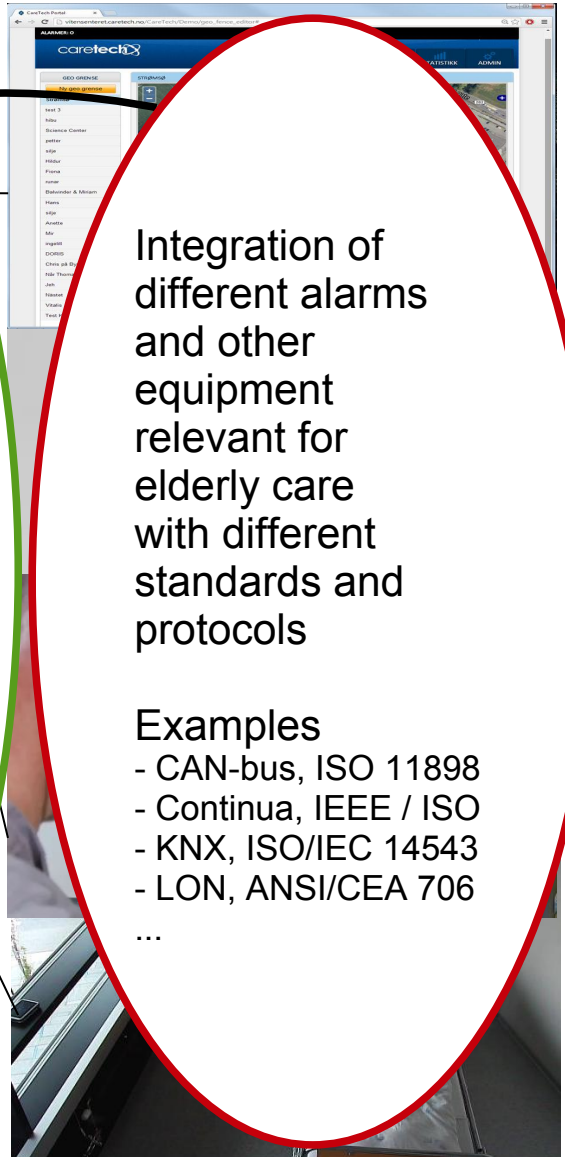
Service done by caretakers

Service t… caretaker s…

Service templates adapted to the patient's individual needs. This in cooperation with caretaker personnel, family and physicians.



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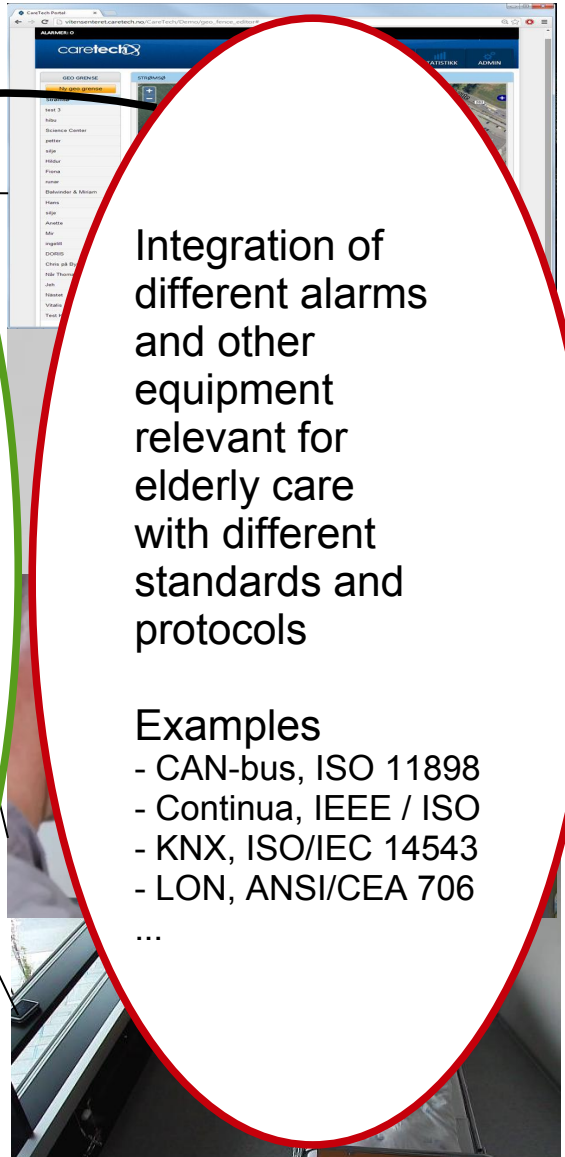
Service standards and the connection to service templates

Service “standards” which “warranties” that the patients get the appropriate care

Service o… caretakers

Service templates adapted to the patient's individual needs. This in cooperation with caretaker personnel, family and physicians.

Service t… caretaker s…



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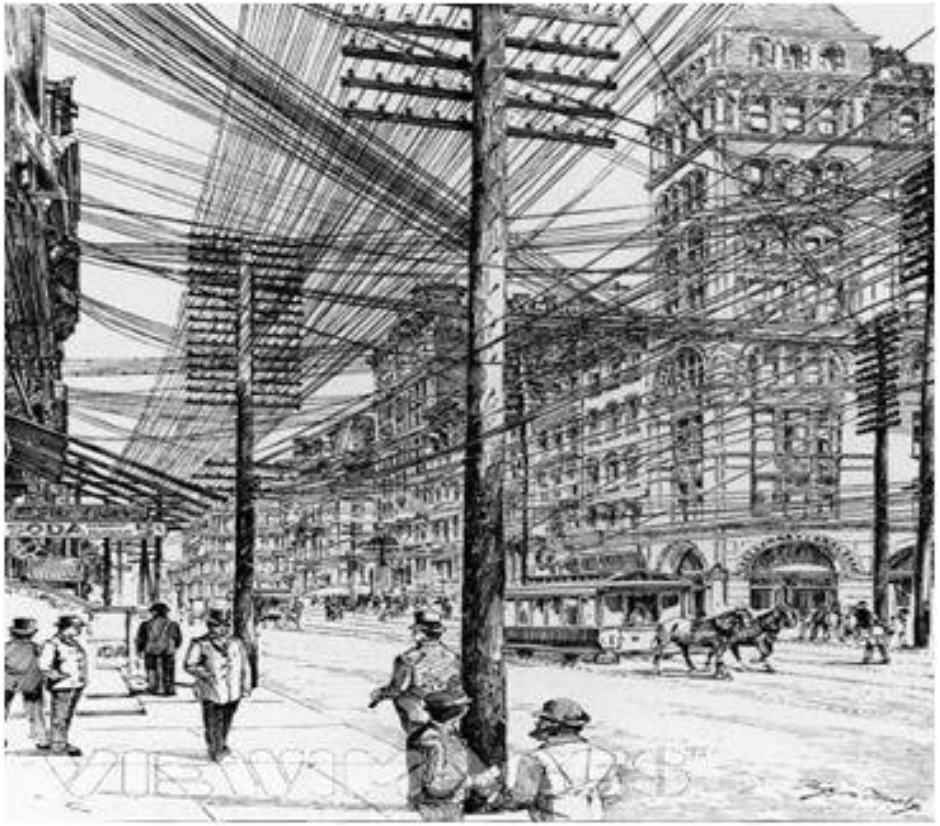
And yes, it becomes a spaghetti of systems



An oacen of different device protocols

- Ethernet:	ISO/IEC/IEEE 8802, Most widely used method of linking computers together in LAN & WLAN
- Firewire:	IEEE 1394, Short distance and high speed serial cablecommunication with computer equipment
- USB:	ISO/IEC 7816, Short distance and high speed serial cable communication with computer equipment
- Bluetooth:	IEEE 802.15.1, Wireless technology standard for exchanging data over short distances.Mobile personal area network
- ZigBee:	IEEE 802.15.4, A wireless communication protocol for personal data network (WPAN).
- Continua*:	USB+Bluetooth+ZigBee Trade organization
- CAN:	ISO 11898, Vehicle bus standard designed to allow microcontrollers and devices to communicate with each other within a vehicle without a host computer.
- DALI:	IEC 62386, Technical standards for network-based systems that control lighting in building automation
- KNX:	ISO/IEC 14543, Network communications protocol for intelligent buildings (EIB, EHS, BATIBUS)
- RFID:	ISO 11784, A technology to electronically record the presence of an object using radio signals
- LON:	ANSI/CEA 709, A networking platform specifically created to address the needs of control applications in building automation
- CEBus/SCP:	ANSI/CEA-600, A set of electrical standards and communication protocols for electronic devices to transmit commands and data. Home & Building Automation
- BACnet:	ISO 16484(ANSI), A communications protocol for building automation and control networks
X10	Industry standard, A protocol for communication among e-devices used for home automation.Power Line
- MOD bus	Industry standard, A serial communications protocol for use with its programmable logic controllers (PLCs)
- MDB	a Industry standard, A computer bus in which all components are connected to the electrical circuit.Vending Machines
- Z-Wave	Z-Wave alliance

More to come as e.g **xComfort**

Several more standards than Continua* which initially was recommended by Denmark and Norway

By supporting more protocols and standards, we are not limiting ourselves to certain vendors or equipment

What happens if we limits ourselves?

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Service template

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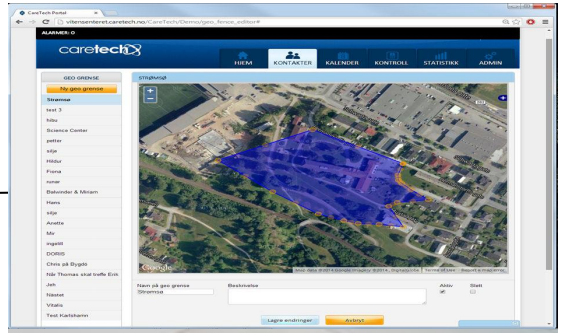
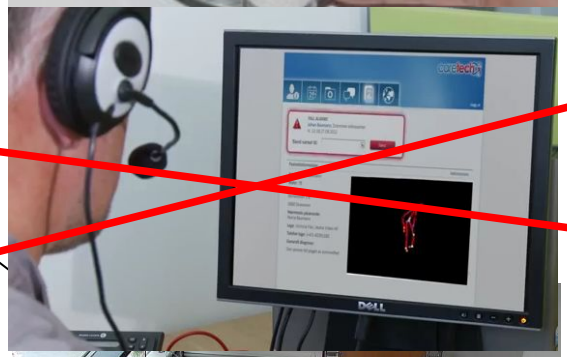
Caretaker service templates





Service-standarder i omsorgstjenesten koblet til service-maler

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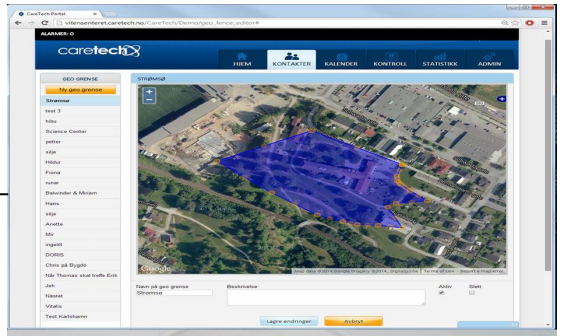
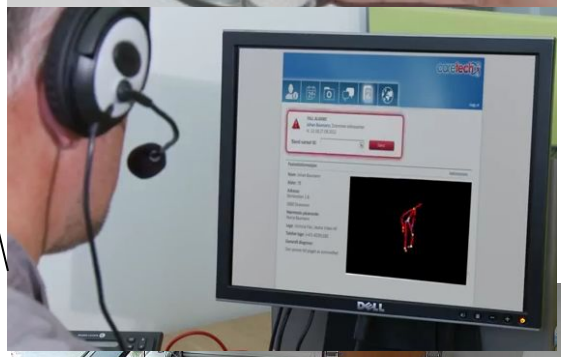
Service-mal

Service utført av
omsorgspersoner

Service-maler
med omsorg-scenarier





Each bed: 200.000 kroner in reduced cost annually (21.377 Euro)

- Return on investment (ROI) in 123 days. The reduced cost the first year was almost 3.5 million kroner (374,100 €)
- Total of 37.2 percent reduction in cost of salary
- The city of Drammen got back 2.9 times the money invested the first year when licenses for upkeep and support was taken into account
- They did service innovation and organizational changes in parallel with technical implementation in the apartments
- Some of the things done could been done without technology, which would reduced the effects considerably

Kilde: http://arenahelseinnovasjon.no/customer-example/

Thank you!