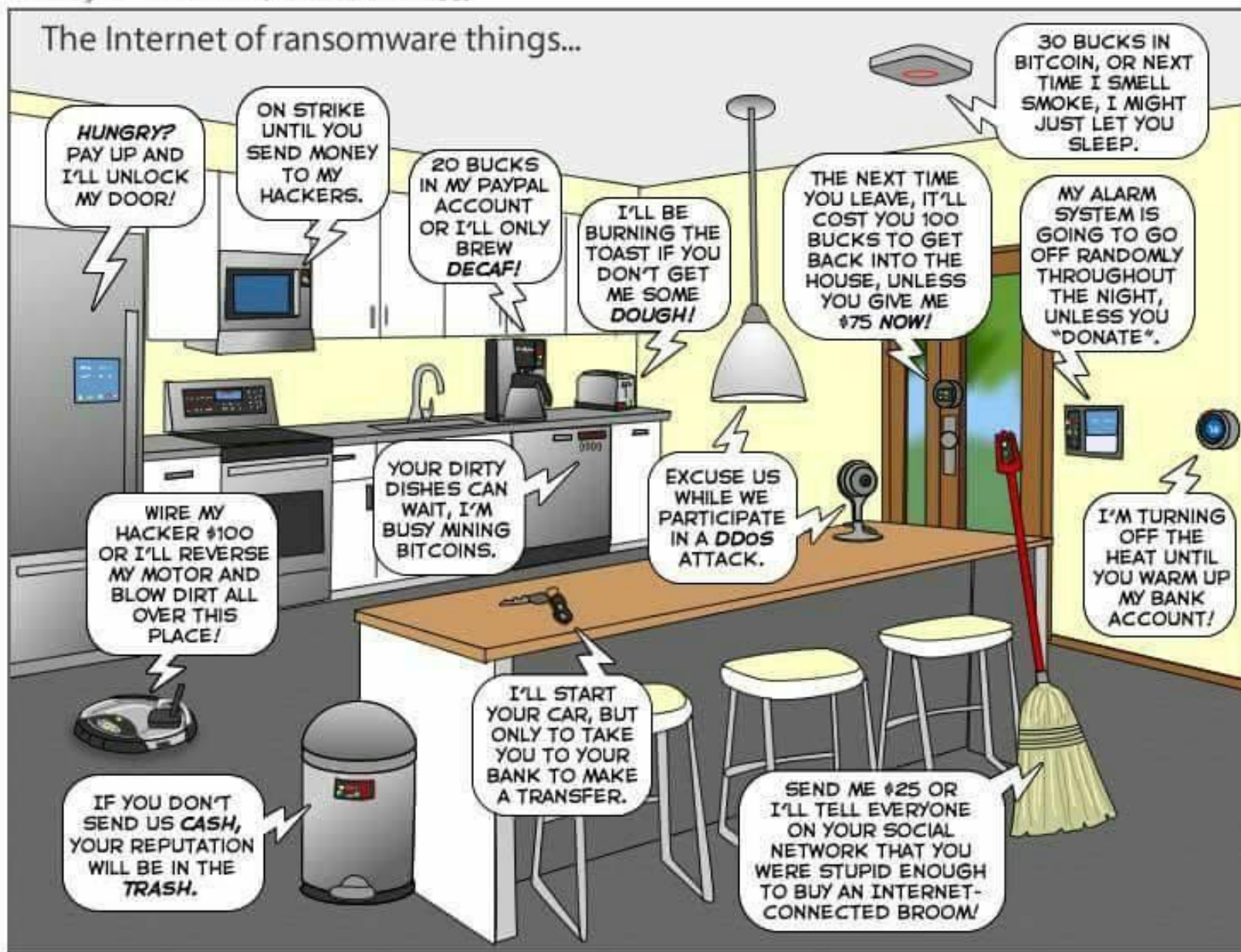


Telio







Telia and Smart City

Urmo Lehtsalu

26/10/2017



Telia Company

- 5th biggest telecom in Europe
- 20 markets and 156 milion clients
- Estonia as a small Proof-of-Contsept market'
- Telia Estonia is 100% Telia Company subsidiary



Urmo Lehtsalu

- Tallinn Polytechnic school
 - Automation Systems
- Estonian Business School
 - (BBA) International Business
- Tallinn University of Technology
 - (M.Sc) Health Care Technology*

- Telia Estonia R&D from 2010
 - Connected Home
 - STB'less IPTV
 - eHealth concept for Telia/Estonia
 - IoT and Smart City



Telia „Smart Environment“ experience so far



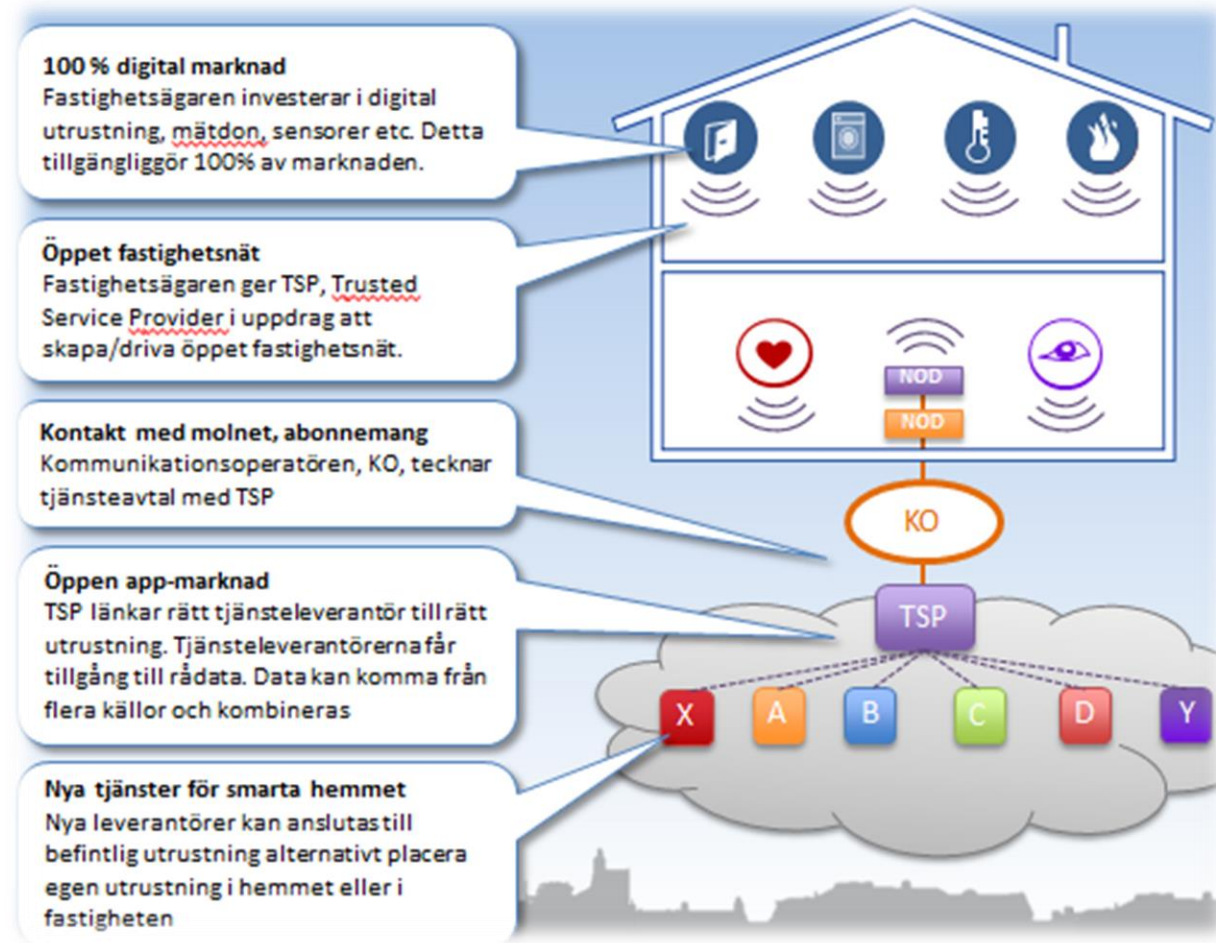
Home Control Service

- 3 years on the market
- Hundreds of clients in Estonia and Finland
- Hardware cross-usage between domains
 - Security
 - Video surveillance
 - Energy monitoring
 - Elderly Home Care

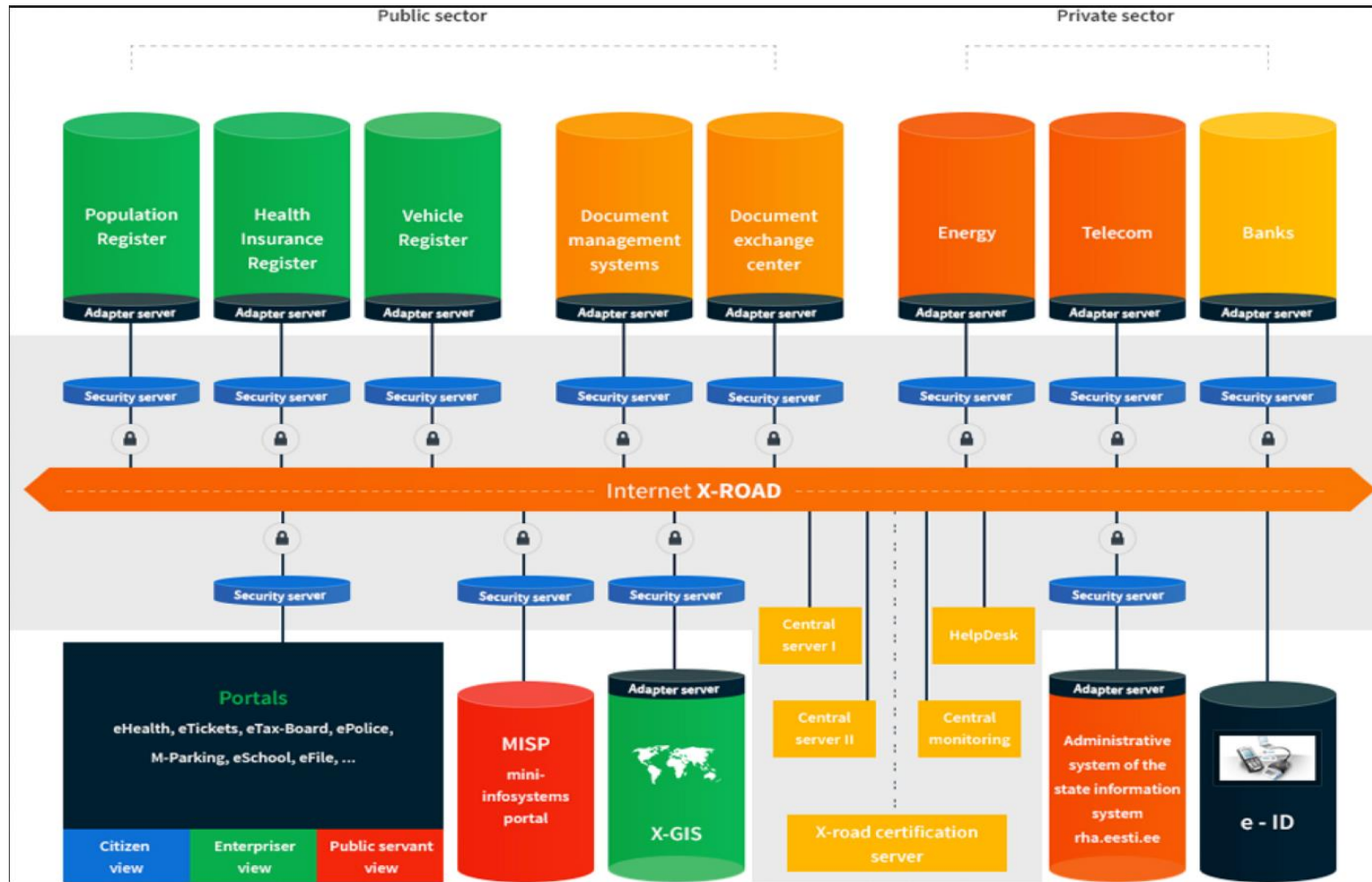


Swedish real estate management platform

- Swedish „Smart Environment“ and real estate management project
- Goal:
 - Connect closed verticals into one pool of services
- Operations:
 - Use-Cases' from Sweden
 - Telia Estonia to develop and maintain the solution in Estonia
- Scope of the Project:
 - 100 homes
 - 400 persons
 - 30 partners
 - 10 service verticals



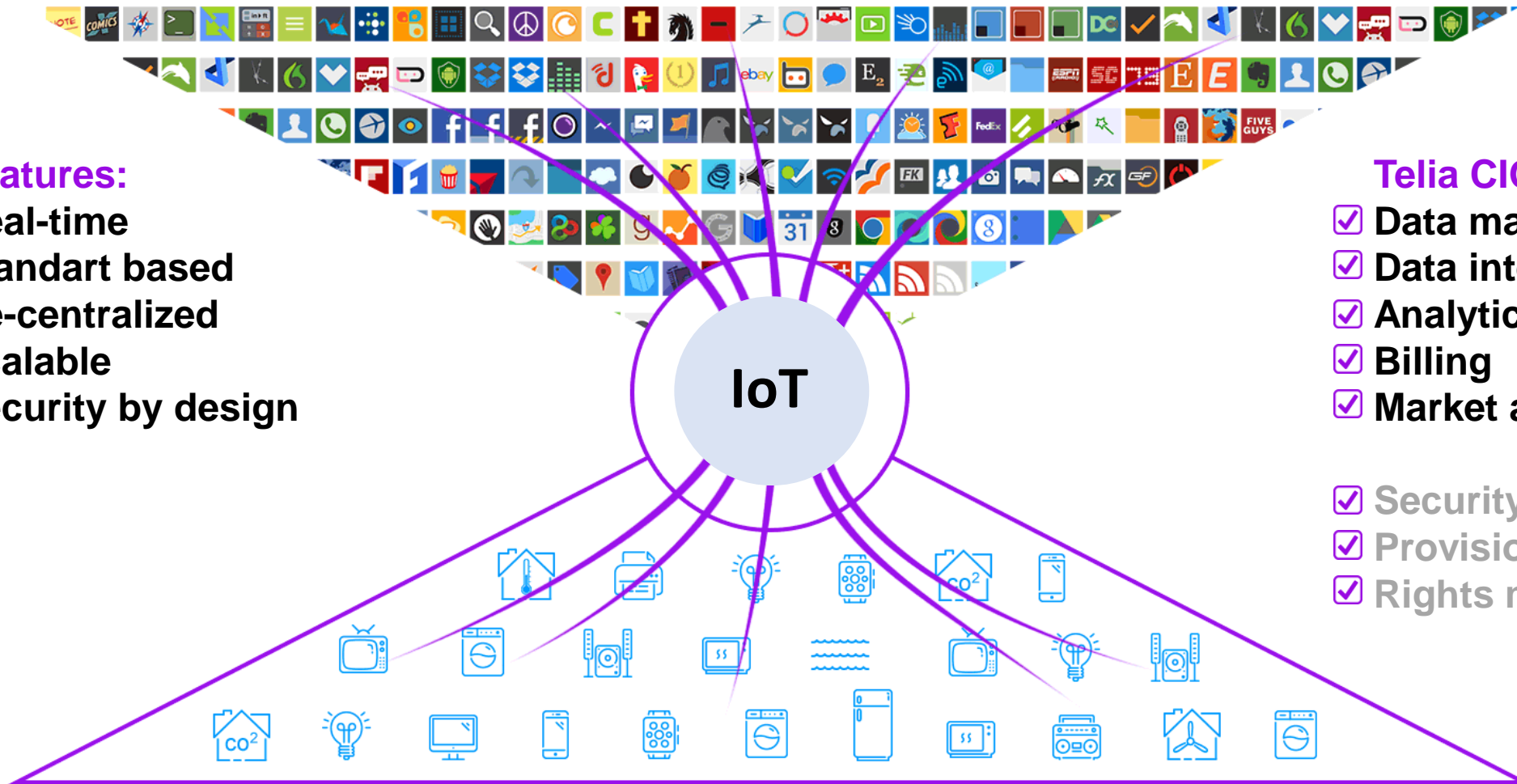
X-Road for the Estonian eGovernance



Telia „Smart Environment“ expectations for the future



Pool of local services



Features:

- ✓ Real-time
- ✓ Standart based
- ✓ De-centralized
- ✓ Scalable
- ✓ Security by design

Telia CIOP Value add:

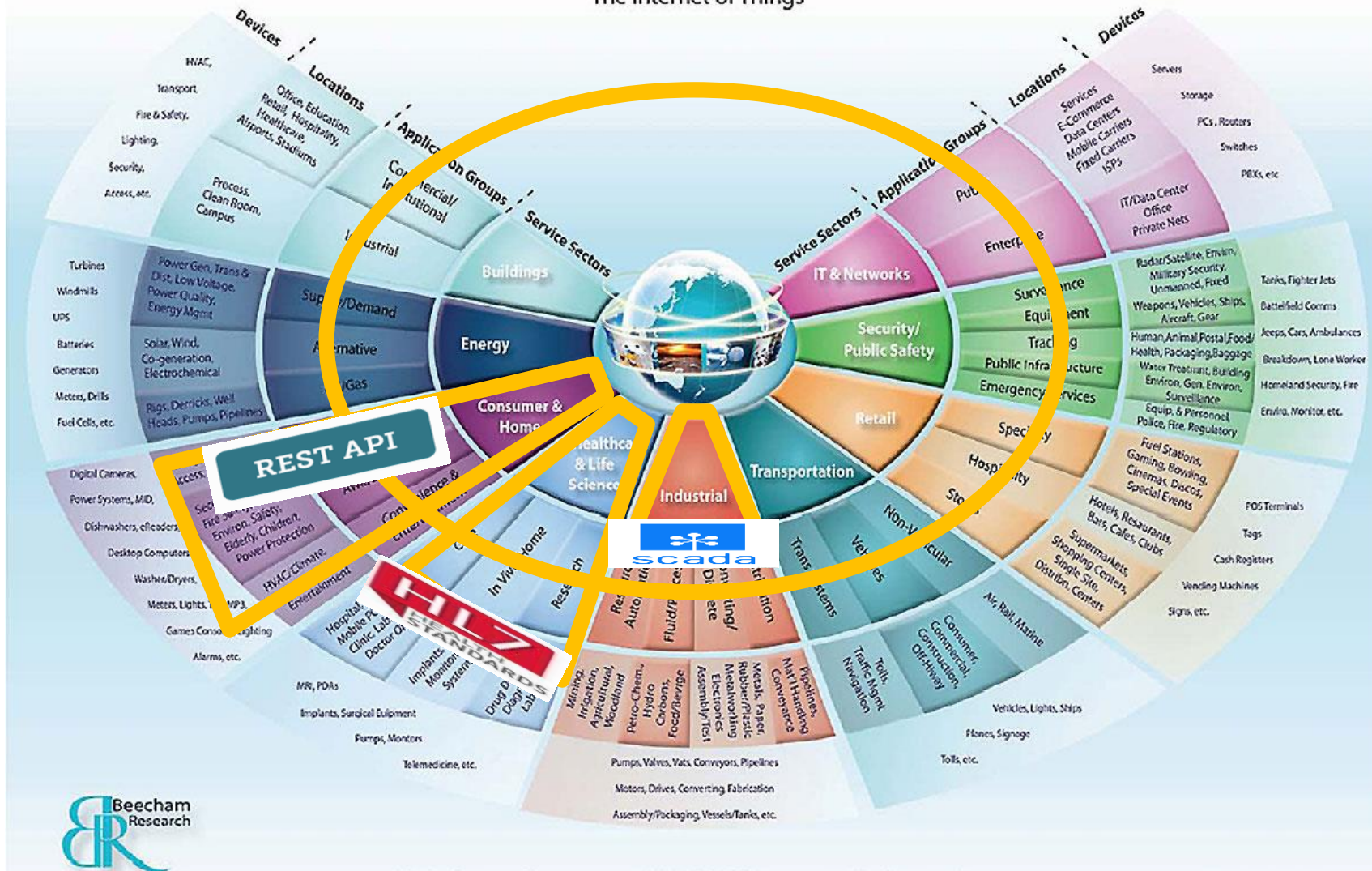
- ✓ Data management
- ✓ Data integrity
- ✓ Analytics
- ✓ Billing
- ✓ Market access

- ✓ Security
- ✓ Provisioning
- ✓ Rights management



Different domains to be connected through DATA

The Internet of Things



Stakeholders

European commission

Work package 7

City of Tartu

University of Tartu

Tartu
CIOP

Building unions

Third party applications

Residents

Telia

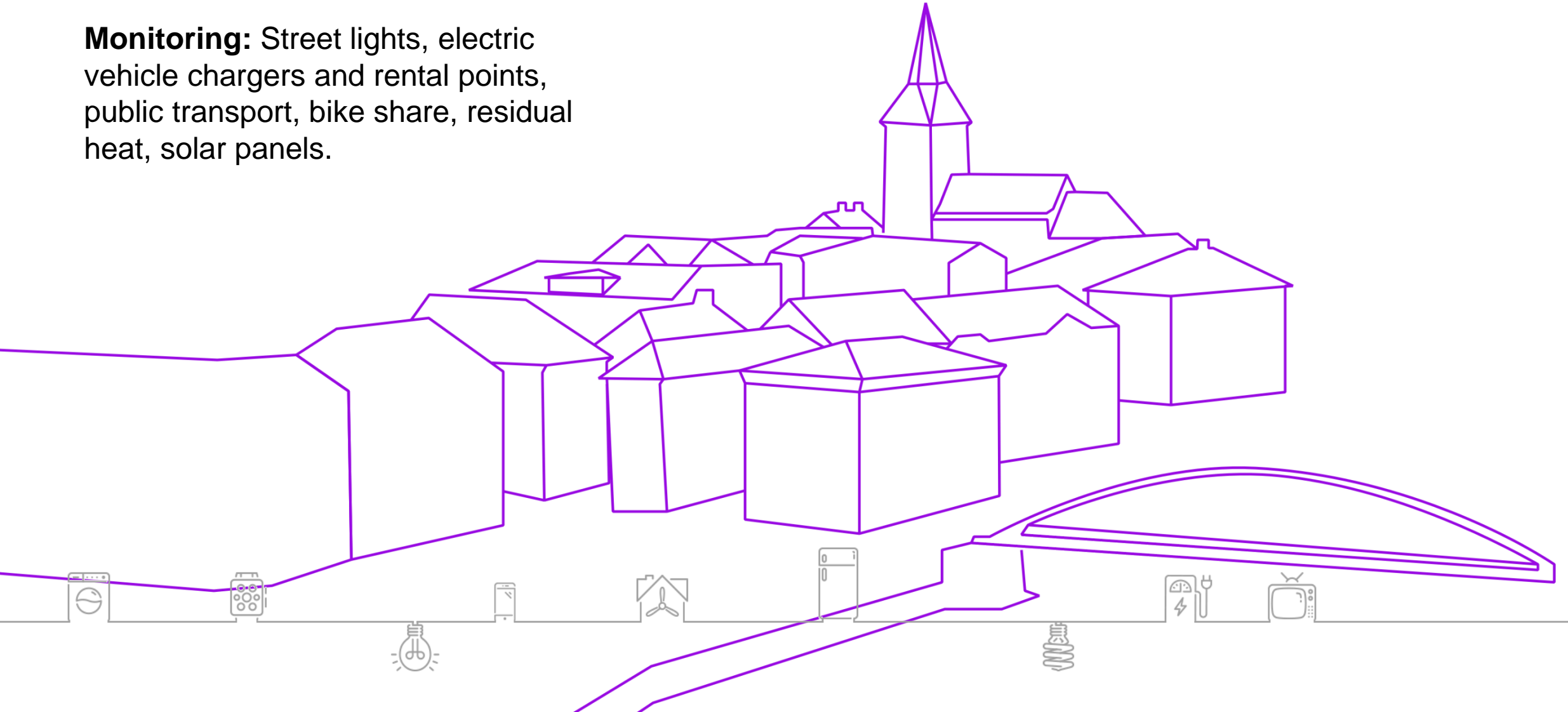
Fortum

Electric taxy



City Level

Monitoring: Street lights, electric vehicle chargers and rental points, public transport, bike share, residual heat, solar panels.



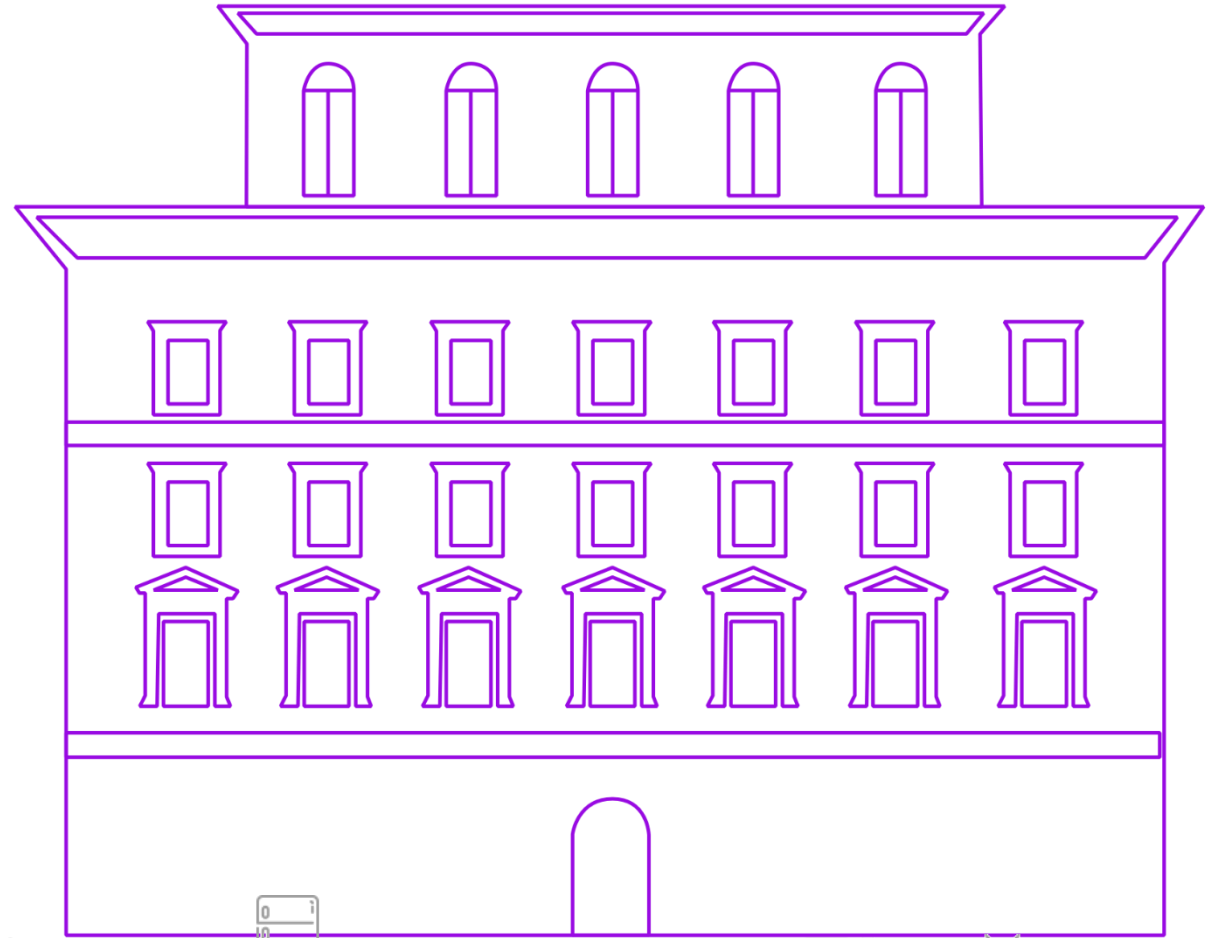
Building Level

Monitoring:

Electricity, gas, hot water, cold water, heating consumption and solar panels.

Control:

Heating and ventilation.



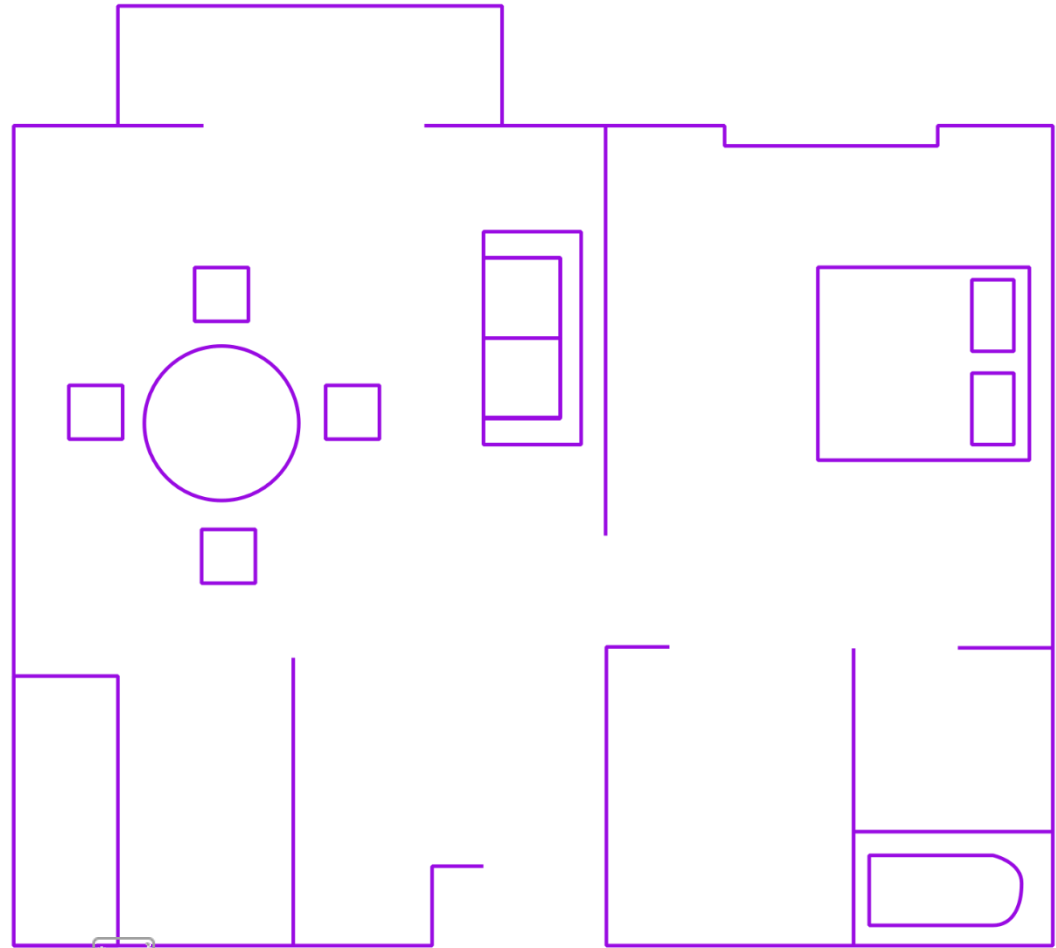
Apartment Level

Monitoring:

Electricity, gas, hot water, cold water, heating consumption, air moisture CO2 levels, smoke and solar panels.

Control:

Heating and ventilation.



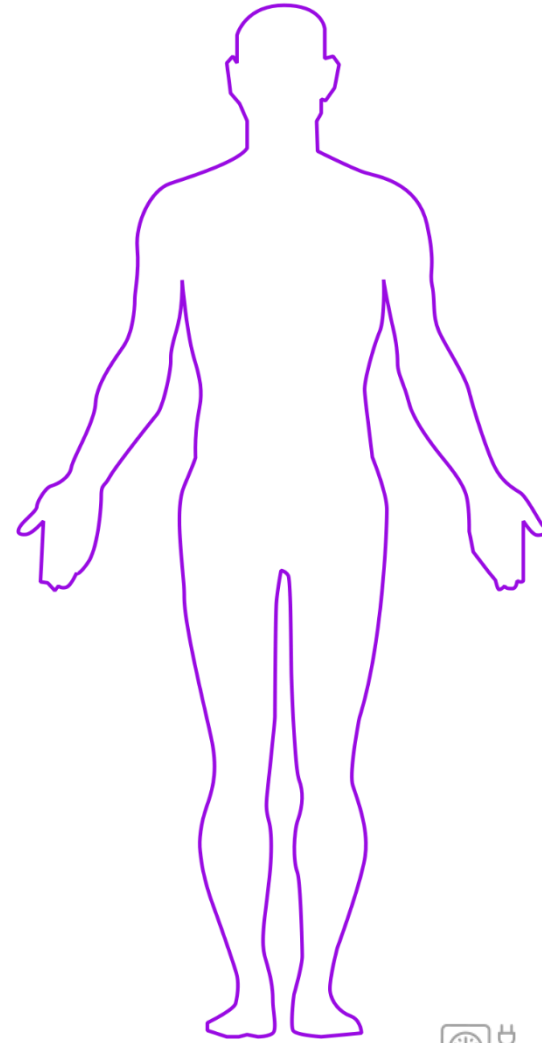
Personal Level

Monitoring:

Activity data, blood pressure, nutrition, weight, sleep.

Control:

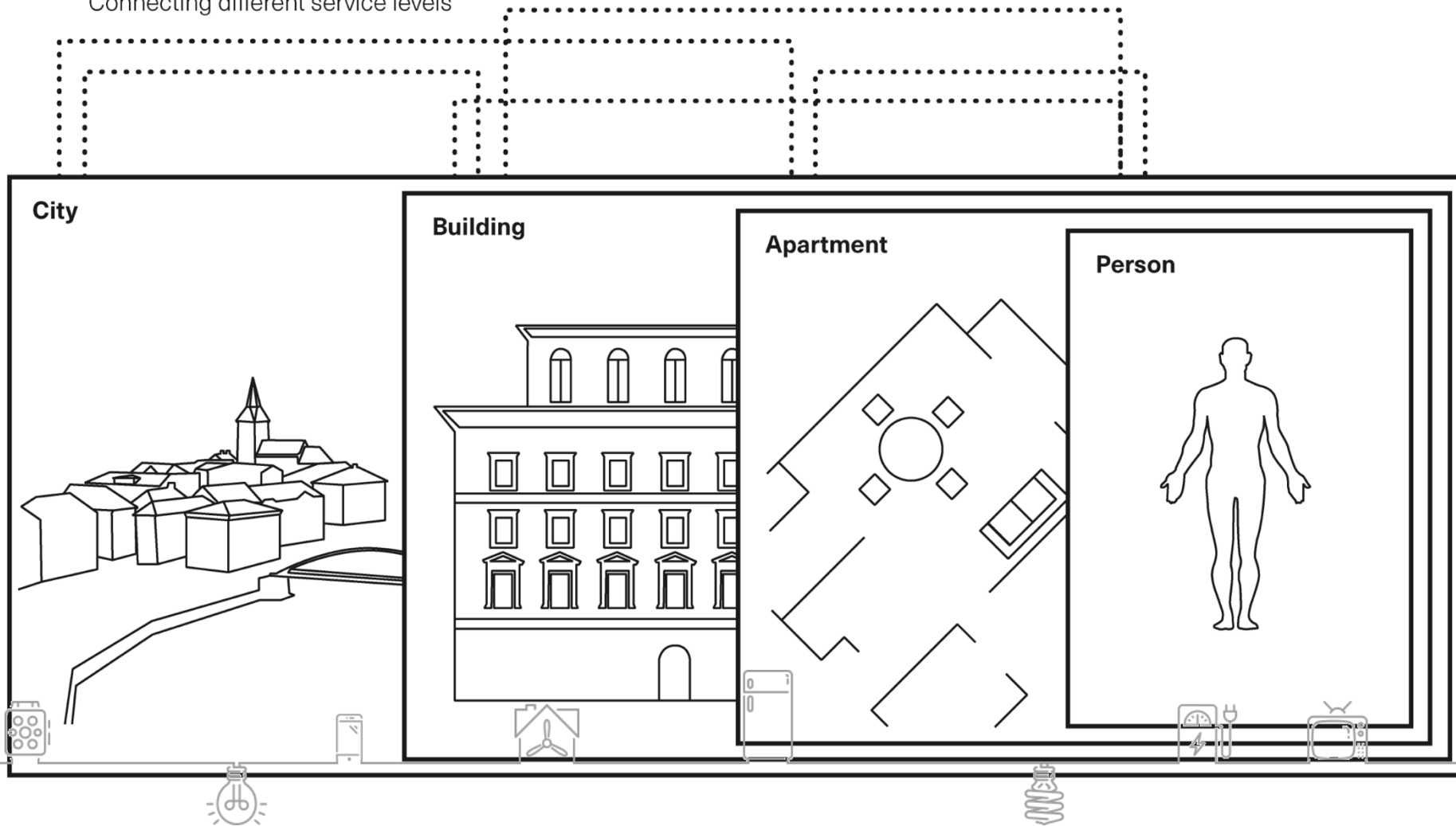
Alarm, emergency button, etc.



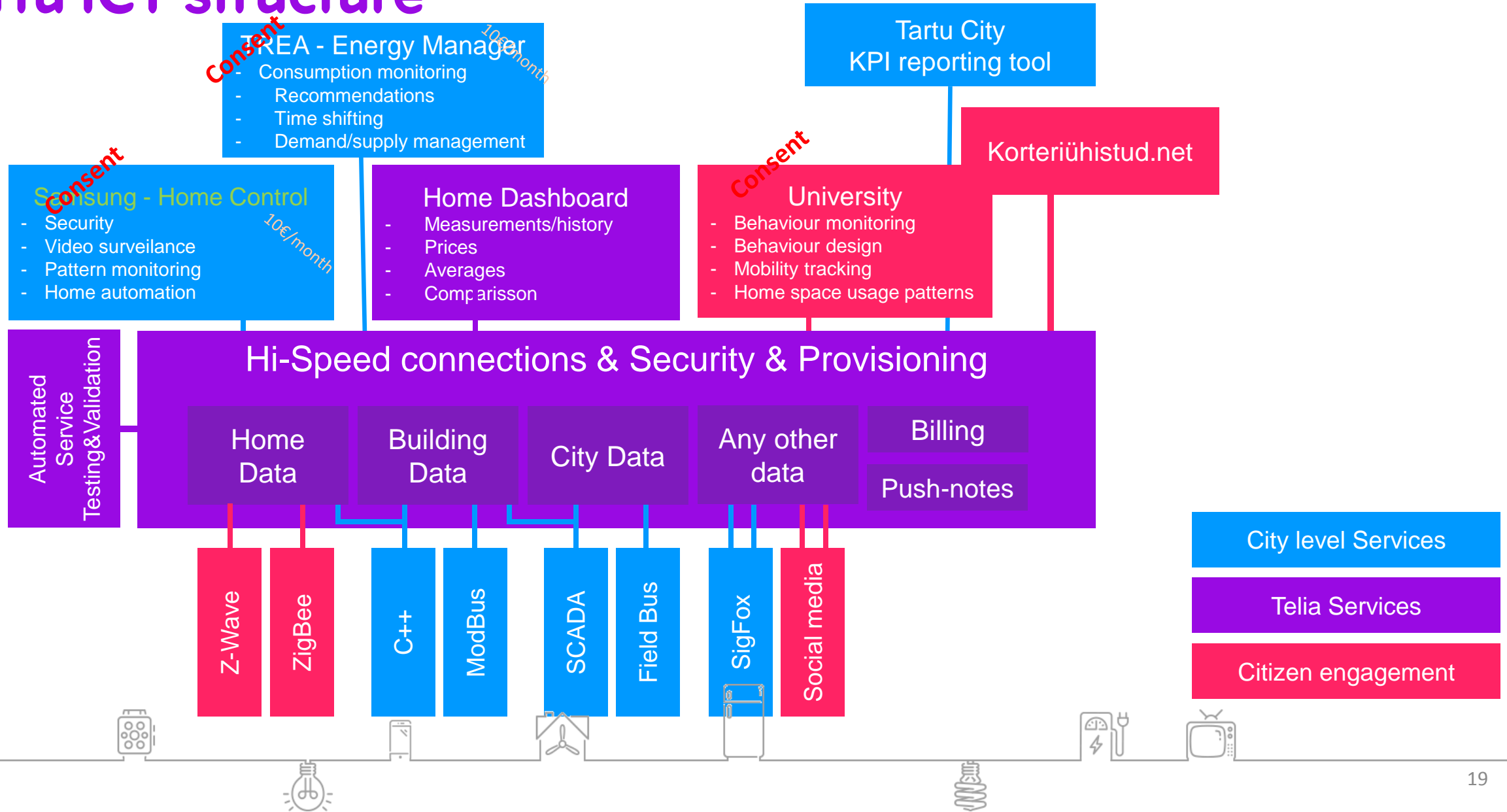
Service Levels

Cross Domain Services

Connecting different service levels



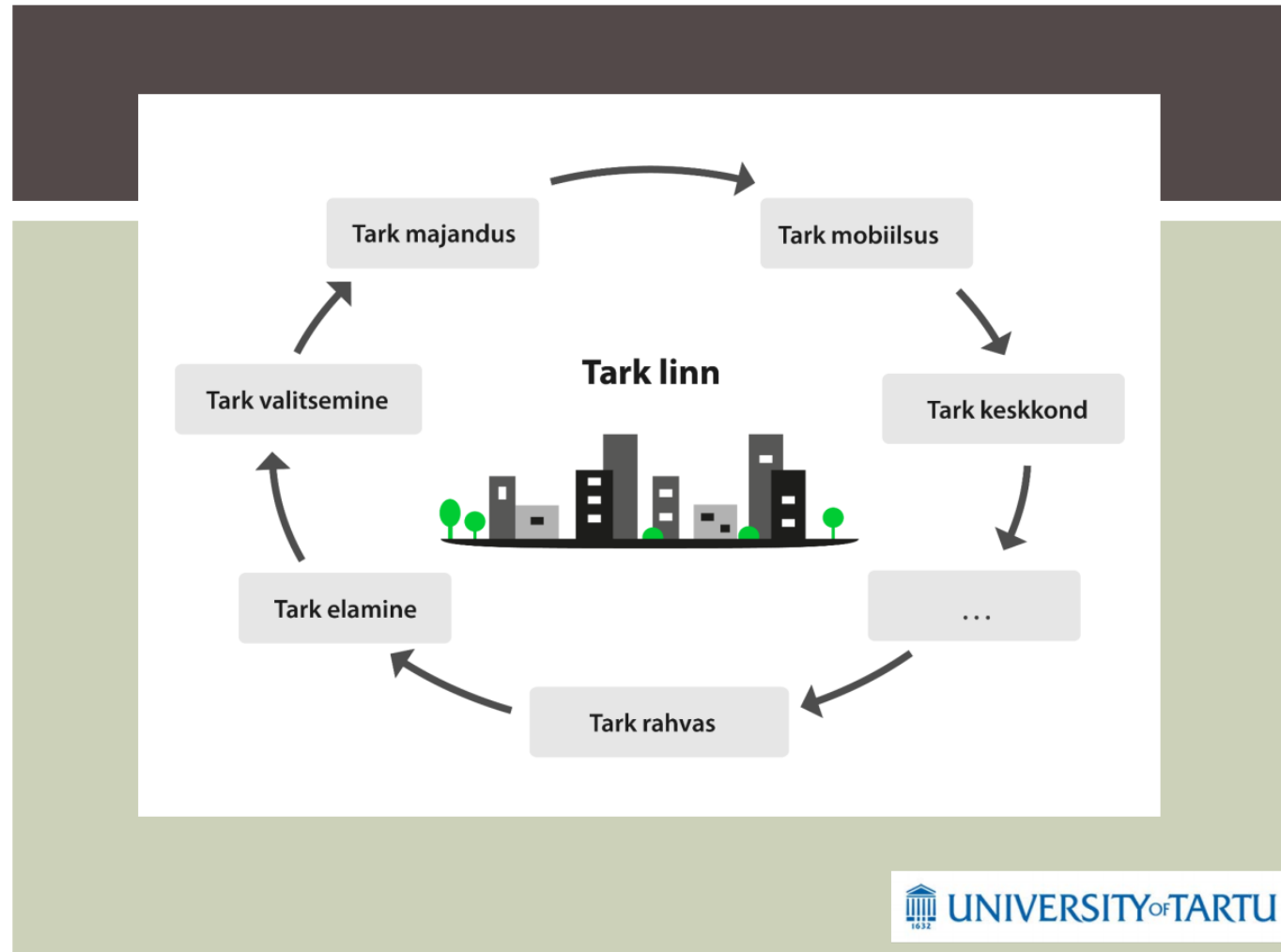
Tartu ICT structure



But if you ask people ...



It all starts with smart and wholistic planning



Some role-models from the world



Energy related services

RIGHT AMPERE



DEVELOPER
Elektrilevi

With the help of this application you can find out how large the main fuse needs to be where you use energy.

[Watch the animation](#)
[Watch the demo](#)

READ MORE

RIGHT AMPERE

AGGREGATOR



DEVELOPER
Elering

The aggregator helps you to decide how many consumers should band together so as to buy electricity at lower prices.

[Watch the animation](#)

READ MORE

AGGREGATOR

VIRTUAL POWER PLANT



DEVELOPER
Estonian Renewable Energy Association

A virtual power plant helps you decide which renewable energy sources would make most sense where you use energy.

[Watch the animation](#)

READ MORE

VIRTUAL POWER PLANT

HEAT MONITOR



DEVELOPER
VKG Soojus

The heat monitor is able to track energy losses related to your consumption.

[Watch the animation](#)
[Watch the demo](#)

READ MORE

HEAT MONITOR



Services for Housing associations

The screenshot displays the homepage of Korteriyhistu.net. At the top, there are navigation links for 'EESTI KEELES' and 'HA PYCCKOM', and a search bar with 'Otsing'. The main header features the logo and the text 'Meie teenust kasutab 2370 maja üle Eesti'. Below this is a dark blue navigation bar with links for 'Tutvustus', 'Teenusest', 'Kasutajatugi', and 'Firmast'. The main content area is split into two columns. The left column has a green background with the text 'Korteriyhistu.net on iseteeninduskeskkond, mis muudab korteriühistu tegevuse efektiivsemaks ja läbipaistvamaks'. It lists services: 'Suhtlus', 'Üldandmed', 'Üüriarvestus', 'Haldus', 'Raamatupidamine', and 'Dokumendid', with a 'Proovi demoversiooni' button. The right column has a blue background with four service categories: 'ÜHISTU JUHILE', 'RAAMATUPIDAJALE', 'KORTERIOMANIKULE', and 'HALDUSFIRMALE'. Below this is a 'REGISTREERU KASUTAJAKS' button with a '3 KUUD TASUTA!' badge. A 'Uudised' section on the left shows two news items: 'Uuendused 30.05.2017' and 'Seminarid Tallinnas'. A list of services on the right includes 'Vajad abi? Telli tasuta konsultant', 'Liitu kaugraamatupidamisega ja säästa raha', 'Tutvu hinnakirja ja erinevate pakettidega', 'Küsi täisteenus pakkumist meie partneritelt', and 'Kontrolli, kas Sinu maja on juba liitunud?'. The bottom of the page features icons for a washing machine, a stove, a lightbulb, a refrigerator, another lightbulb, a power outlet, and a television.

EESTI KEELES HA PYCCKOM Foorum | KKK | Kontakt | Sisukaart Otsing

KORTERIYHISTU.NET

Meie teenust kasutab **2370** maja üle Eesti

Tutvustus Teenusest Kasutajatugi Firmast

Korteriyhistu.net on iseteeninduskeskkond, mis muudab korteriühistu tegevuse efektiivsemaks ja läbipaistvamaks

- ✓ Suhtlus
- ✓ Üldandmed
- ✓ Üüriarvestus
- ✓ Haldus
- ✓ Raamatupidamine
- ✓ Dokumendid

Proovi demoversiooni

ÜHISTU JUHILE

RAAMATUPIDAJALE

KORTERIOMANIKULE

HALDUSFIRMALE

REGISTREERU KASUTAJAKS 3 KUUD TASUTA!

Uudised Uudiste arhiiv

31.05.2017 **Uuendused 30.05.2017**

Paigaldasime uuendused, mis peaks muutma osaluste ja näitudega tegelemise vaated kiiremaks. Uue valikuna lisandus osalused vaatesse osaluste ülevaade, mis annab risttabelina ülevaate osalevatest isikutest ja võimaldab ühel vormil muuta korraga korteri osalusi kõikides kulluühikutes. Samuti optimeerisime arvestivahetusega seonduvat, näitude importi ja täpsustasime mittevivislaekumiste kajastamist saldodes. Järgnevalt kõige olulisematest uuendustest lähemalt.

19.05.2017 **Seminarid Tallinnas**

Kogume kokku huvilised Tallinnas ja kõneleme kortermaja tegevuse korraldamise parimatest praktikatest kasutades korteriyhistu.net lahendusi. Kutsume piirkonna kortermajade esindajad seminarile.

Tasuta seminarid toimuvad algusega kell 17:15 Tallinnas järgneva kahe nädala kuuel päeval, et kõik huvilised saaksid valida sobivaima päeva ja koha. Valikus on Lasnamäe teisipäeval (23. mai), Mustamäe kolmapäeval (24. mai), Kala maja neljapäeval (25. mai) ning Kesklinn esmaspäeval (29. mai), Lasnamäe teisipäeval (30. mai) ja Lilleküla neljapäeval (1. juuni). Täpsem info ja registreerumine [veebivormil](#)

Vajad abi? Telli tasuta konsultant

- Liitu kaugraamatupidamisega ja säästa raha
- Tutvu hinnakirja ja erinevate pakettidega
- Küsi täisteenus pakkumist meie partneritelt
- Kontrolli, kas Sinu maja on juba liitunud?

Services for realestate owners

The screenshot displays the famager.com web application interface. The main content area is dimmed, showing a dashboard with two sections: "Actions" and "Realties".

- Actions:** Includes buttons for "Invitations", "Subordinates", "Reports", and "Documents".
- Realties:** Includes buttons for "New realty", "Tallinna maant...", "Tartu maantee 2", and "EEDEN".

The right-hand side of the interface shows a "Settings" panel for the user "Elon Musk" (Snowhound OÜ - Manager). The settings are organized into three sections:

- Global settings:** Includes "Language" (English) and "Time Zone" (Europe/Tallinn).
- Task settings:** Includes "Workbank period: 7 days", "Handyman dayplan reminder: 3 days", and "Emergency task comply periods" (toggled on).
- Emergency/Fault settings:** Includes "Emergency: 8h" and "Fault: 16h".

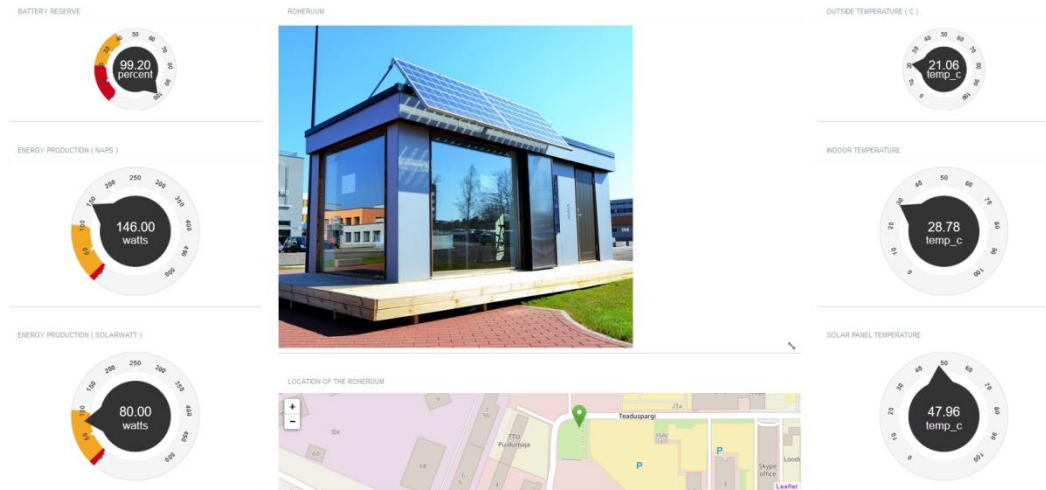
A "SAVE" button is located at the bottom of the settings panel.



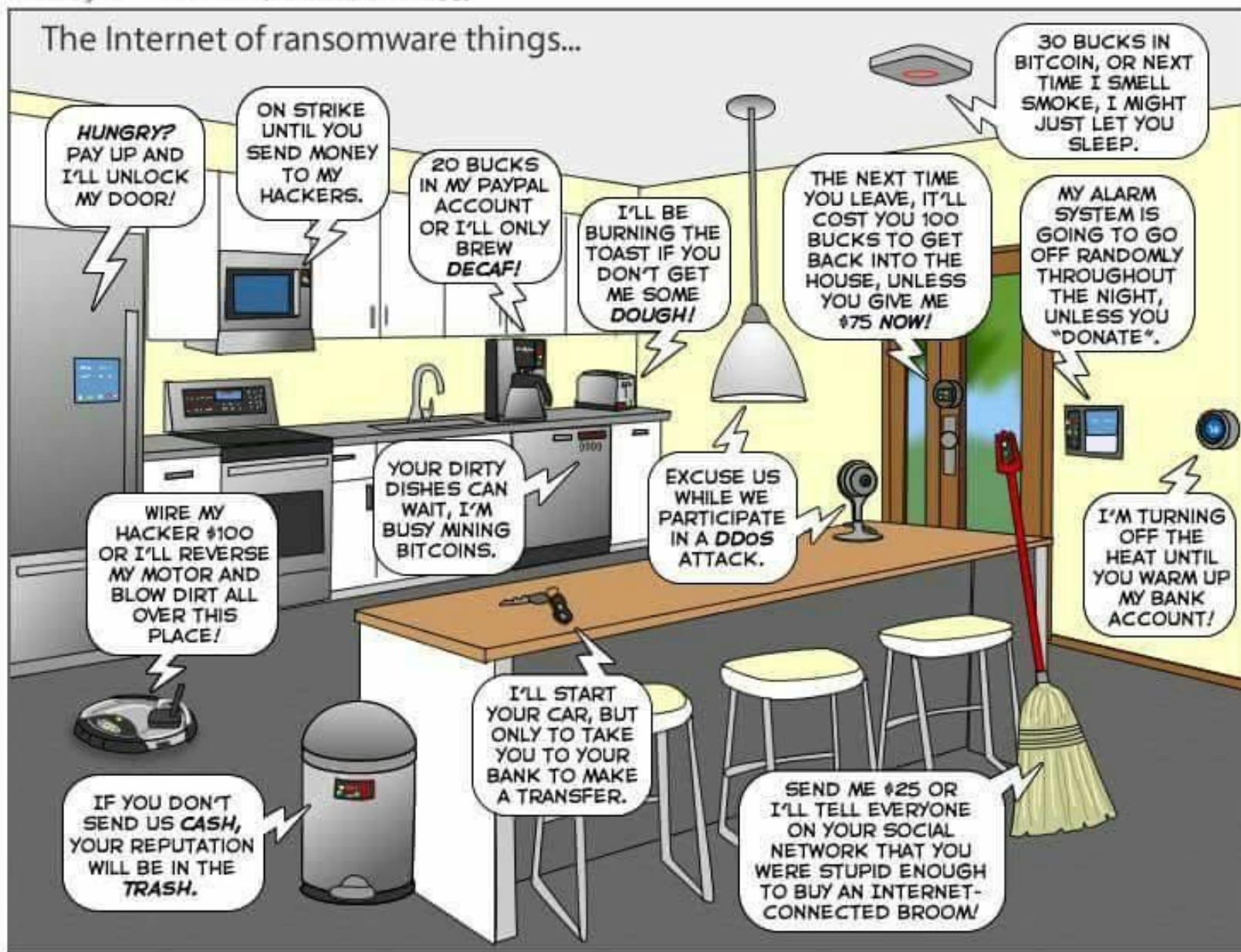
Tartu demo environments

- Runs on actual CIOP environment - Cumulocity
- Presents actual use-cases
- Can be controlled remotely

iot.telia.ee – dashboard view



- Weather station
- Parking sensors
- Electric Vehicle charging
- Street light controlling
- Solar panel electricity production
- Public transportation and its infotainment management



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joyoftech.com



THANK YOU

Urmo Lehtsalu



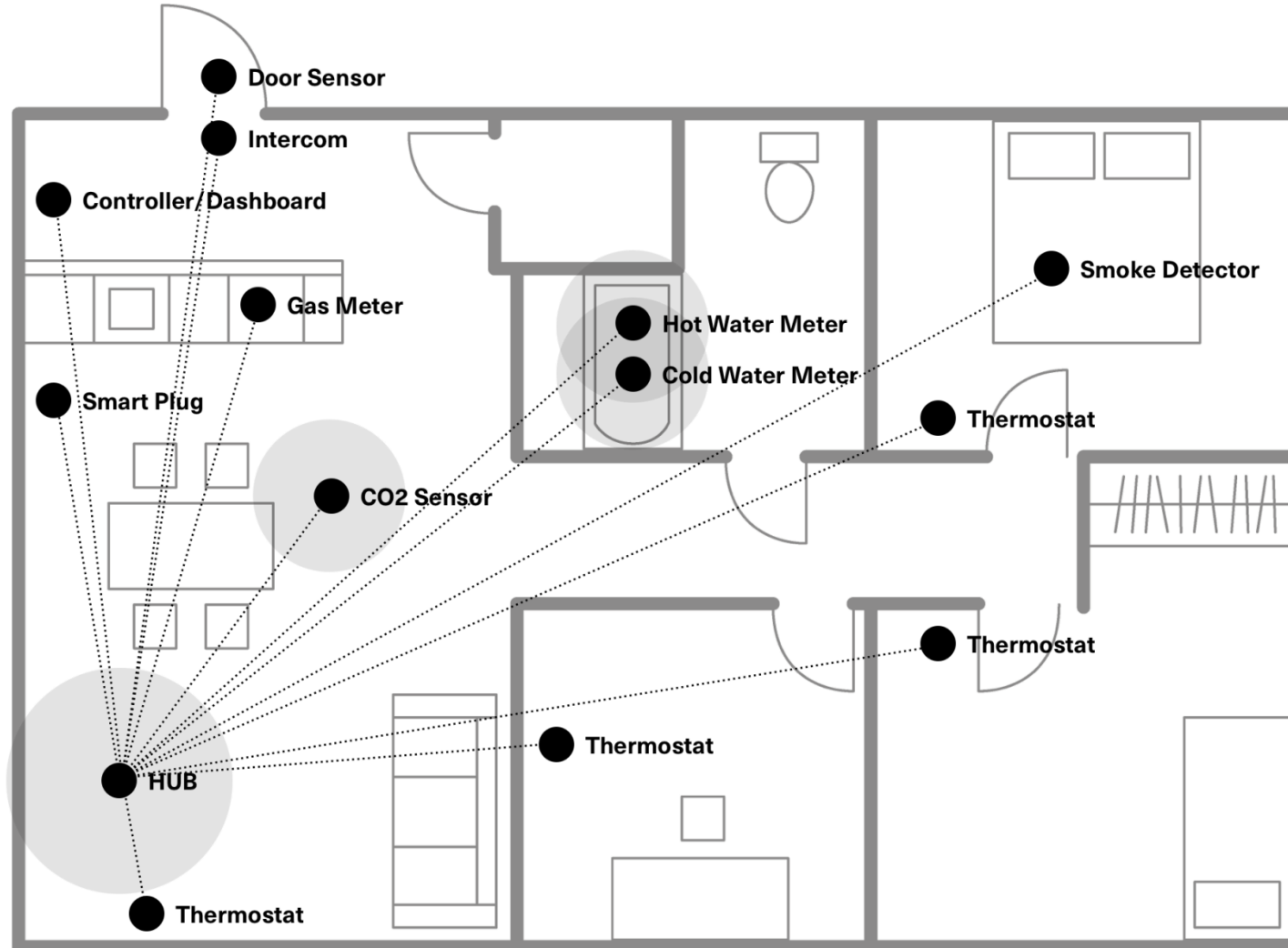
Extras



Use-case development in Tartu

Energy	Monitoring	Apartment	Electricity readings	Hourly consumption by apartment
				second based consumption from devices
				second based consumption from smart-plugs
			Gas Readings	Monthly consumption by apartment
			CO2 readings	Monthly consumption for KPI's
				Live consumption for Ventilation controls
		City	Street lights	Light ON/OFF status information
				Light level by % on every change
			EV chargers	kW consumption for billing purposes
				Vacancy readings for availability of chargers
				Charge level of (available) machines
	Control	Apartment	Heating	Radiator based thermostats
				System controlled automation rules
		Ventilation	CO2 based automated controls	
			"Boost" button for fast ventilation	
Visuals	Home Dashboard gives general overview on Pad/TV screen			"Vacation" mode for minimal ventilation
				Energy consumptions by original values (kW, L, ...)
				Energy consumptions by cost
				Apartment comparison to Building average
				Security overview - doors/windows closed/opened
			Building union information - Memos, notifications, ...	

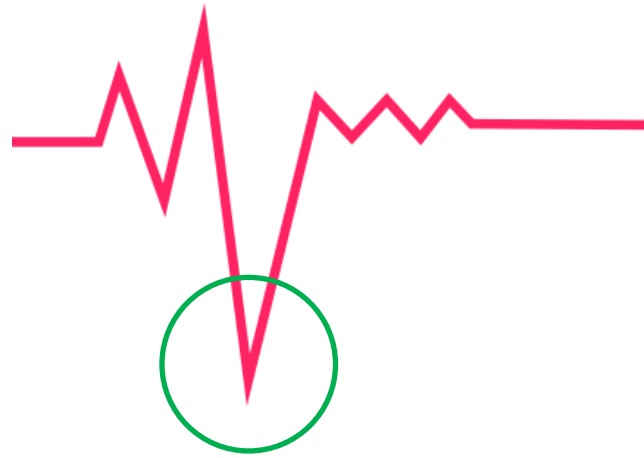
Home level devices in Tartu



IoT + Analytics + digital service



Things



Value

YOUR PHONE



People

Challenges in Smart Cities

Lack of fixed standards

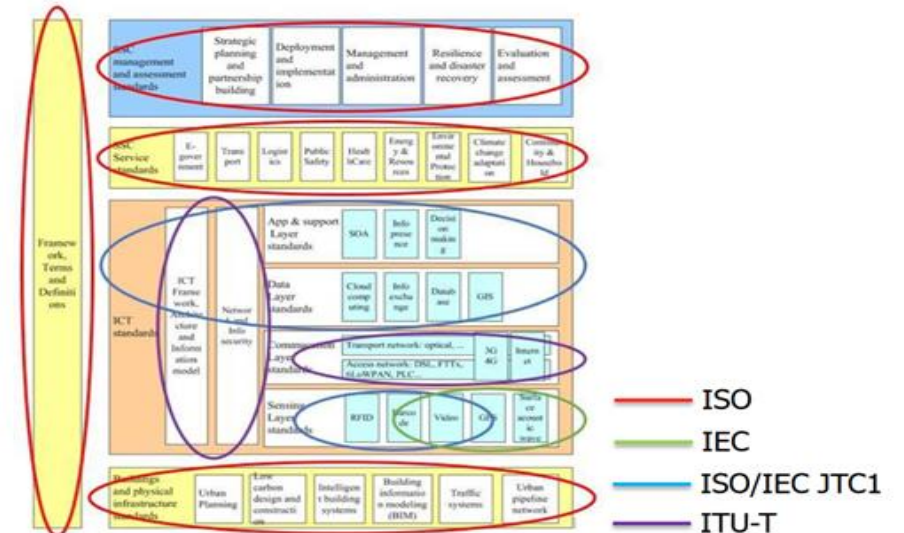
- New vs “old” standards – e.g. MQTT vs mBus
- Legacy investments in the city have set the bases for standards to be supported
- There are so many standards one can choose for solving the same case
- Every use-case can be solved on different standard
- Many legacy systems use proprietary approach

Lack of common API’s

- Until now most of the Cloud solutions use proprietary API’s
- Thus most of the actors will not be seamlessly connected

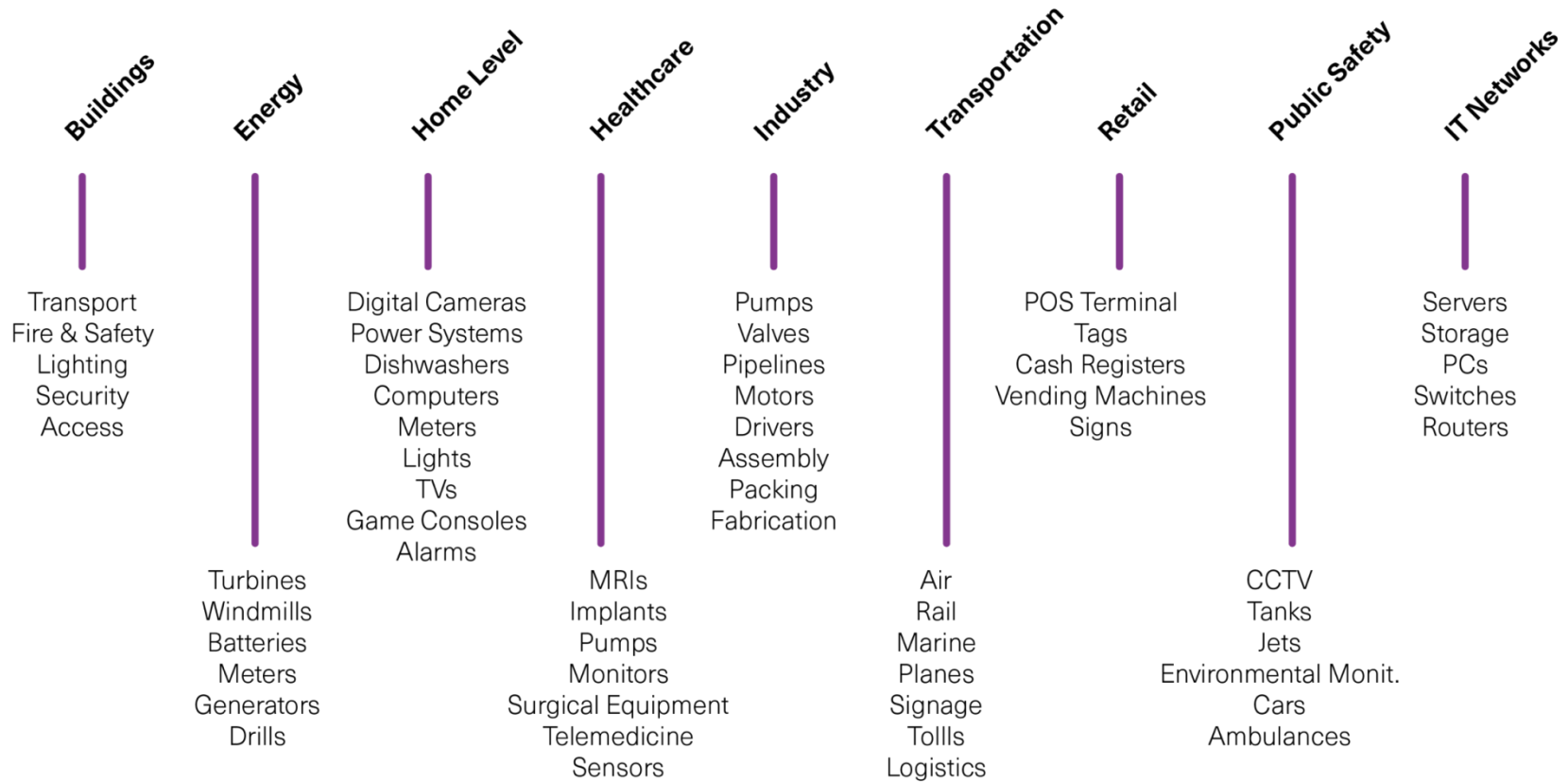
Lack of standards

- Project ESPRESSO



Source: Report on standardization needs for Smart Cities, ISO/IEC JTC1 SG1

IoT possibilities

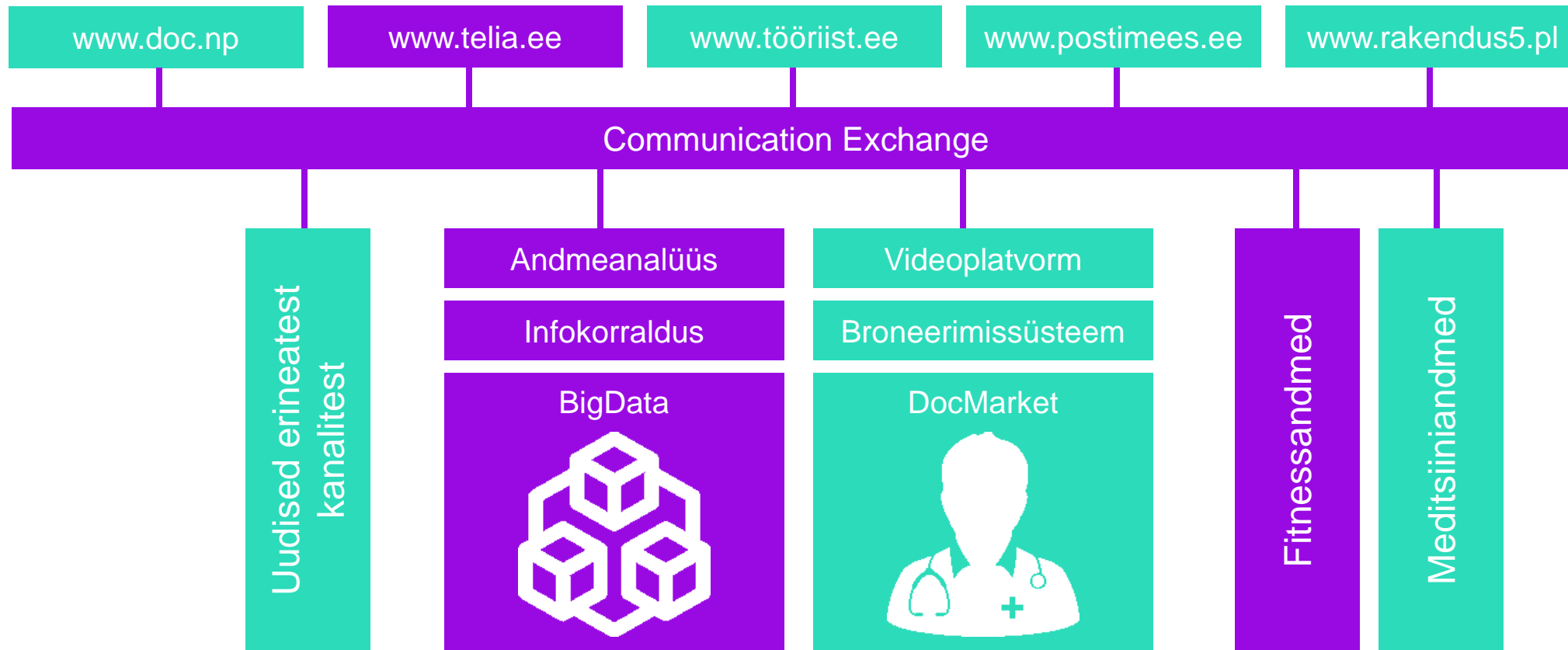


Based on the M2M World of Connected Services chart by Beecham Research

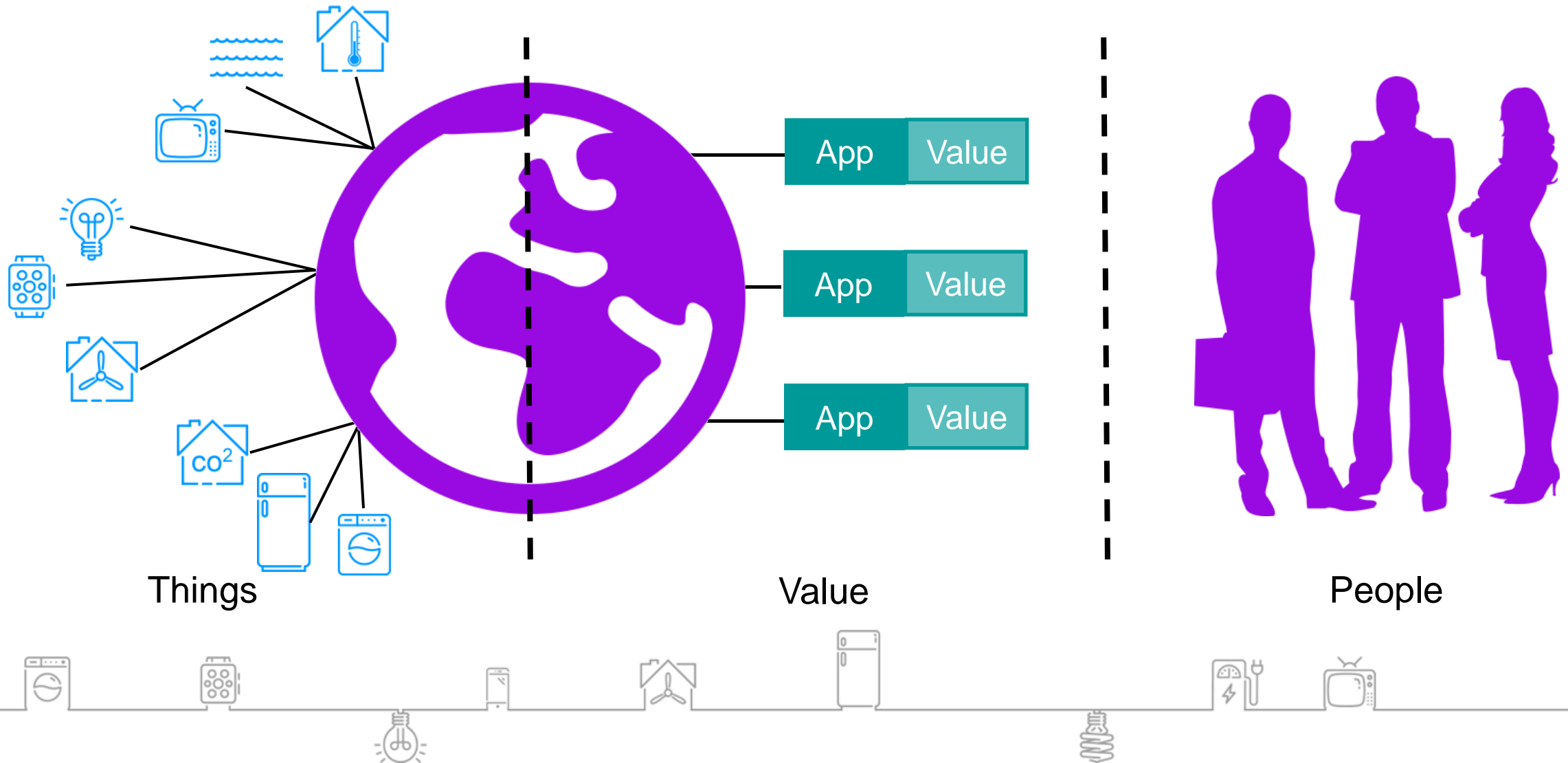
Technology evaluation matrix

Categories and attributes	Kaa	Cumulocity	FIWARE	Ericsson*	Octoblu	Thing Worx	Thing Speak	IBM Watson	Xively	AWS IoT	HPE	Jasper (Cisco)
Supplier	45	80	58	77	48	73	48	72	61	61	67	68
Community and openness	80	48	76	20	76	44	72	32	36	28	20	20
Cost (less is better)	85	62	78	62	80	63	89	52	60	58	43	39
Functional requirements	69	80	62	74	64	69	51	77	61	58	65	39
Non-functional requirements	80	75	75	65	72	65	66	71	62	68	63	47
Final score	73	71	69	62	68	64	64	63	57	56	54	42

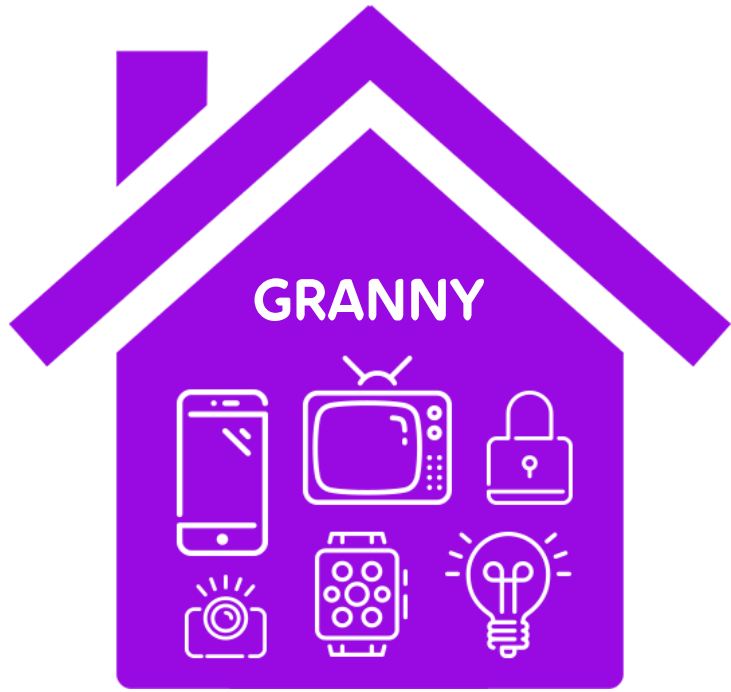
IoT ARHITEKTUUR



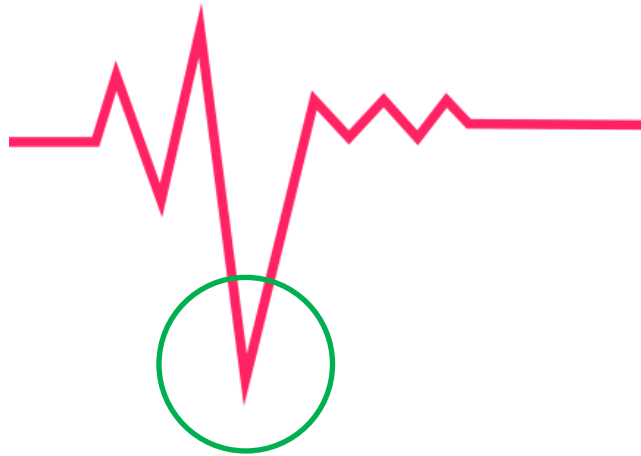
NEW PARADIGMA – OPENING SERVICES AND DEVICES



HOW? "GRANNY TRENDS"



Things



Value

YOUR PHONE



People



New paradigm

