



CONFERENCE

“Artificial Intelligence and Chronic disease management”

**Change behaviour of heart patients via personalised nudging
Experiences from EU H2020 Do CHANGE project**

18 – 19 June 2018

Provincia Autonoma di Trento (headquarter)

P.zza Dante 15

TRENTO

*Ad van Berlo, Ph.D.
Smart Homes, NL*

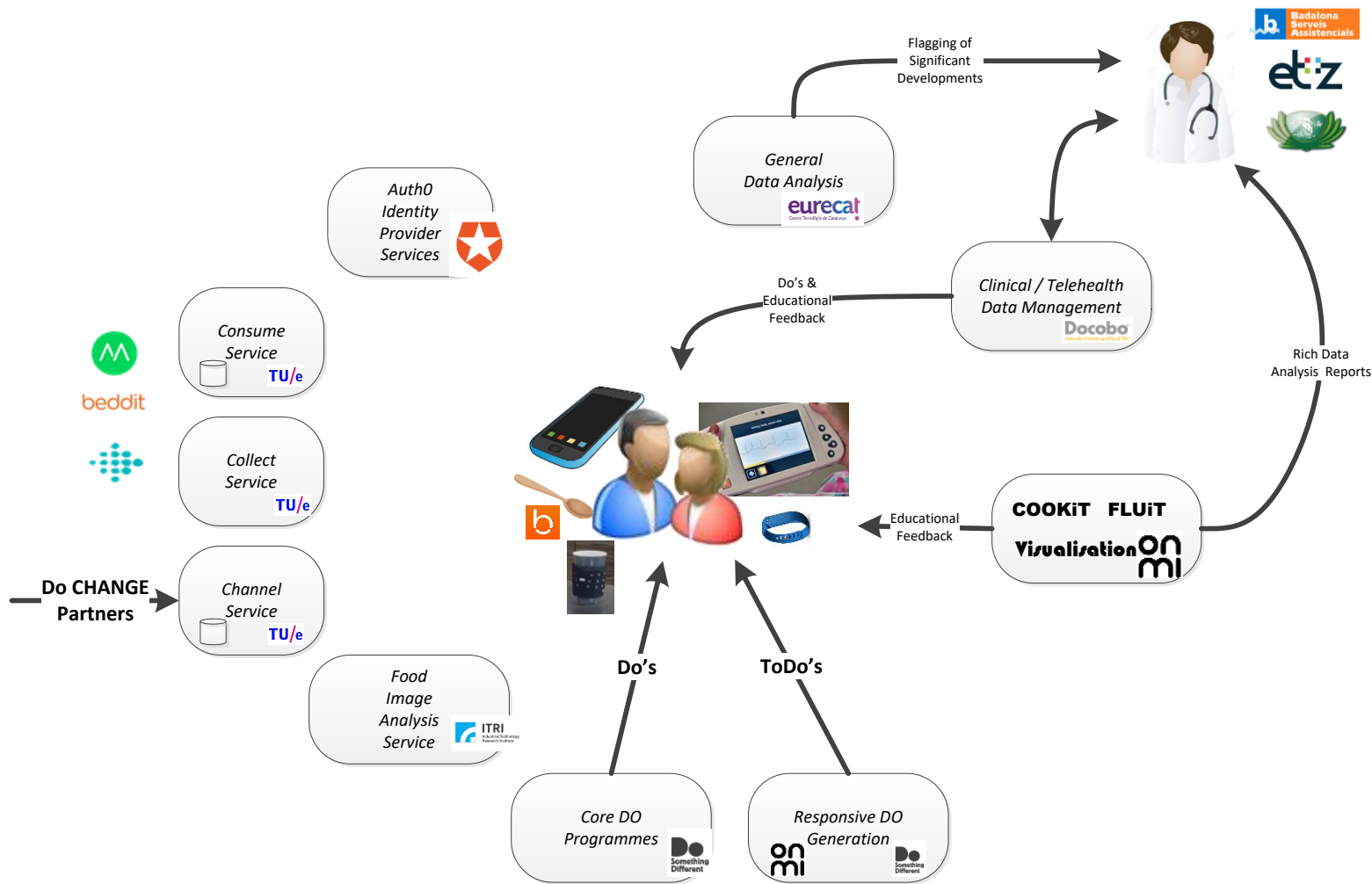


- Introduction to Do CHANGE
- Behaviour change
- Do Something Different methodology
- AI components in the solution
- Wrap-up

Pillars of Do CHANGE:

- Personalised behaviour change system:
 - Responsive Do's for corrective actions if levels of Physical Activity, Social Opportunity and Variety are deviating;
- New tools to support the behaviour change of heart patients and persons with HT;
- New relation Doctor – Patient:
 - Integration of clinical and non-clinical data visible for both patient and care providers;
 - Doctor as coach, patient more central.

Data collection (1)



Data collection (2)



Modifiable behavioural risk factors for all DALYs for many NCDs

- Reduce tobacco use
 - Improve diet (reduce salt, sugar; increase vegetables)
 - Increase physical activity levels
 - Increase social networks
 - Reduce alcohol consumption
 - Use cognitive functions more
-
- In the EU-28 small shifts in behavioural risks could reduce vascular deaths by 71.400/year (Briggs, 2013).

“Important metabolic risks, including high blood pressure, high fasting plasma glucose and high cholesterol, overlap significantly with modifiable behavioural risk factors, such as diet and physical activity; ...**The combination of unhealthy diets, physical inactivity, and high BMI is the biggest overall contributor to DALYs.**For national government, the quantification of the continuing burden of preventable ill health more than justifies recent calls for a radical upgrade in prevention and public health” (p2272)

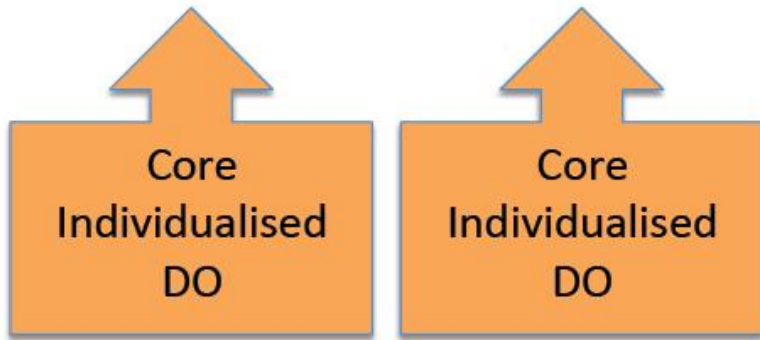
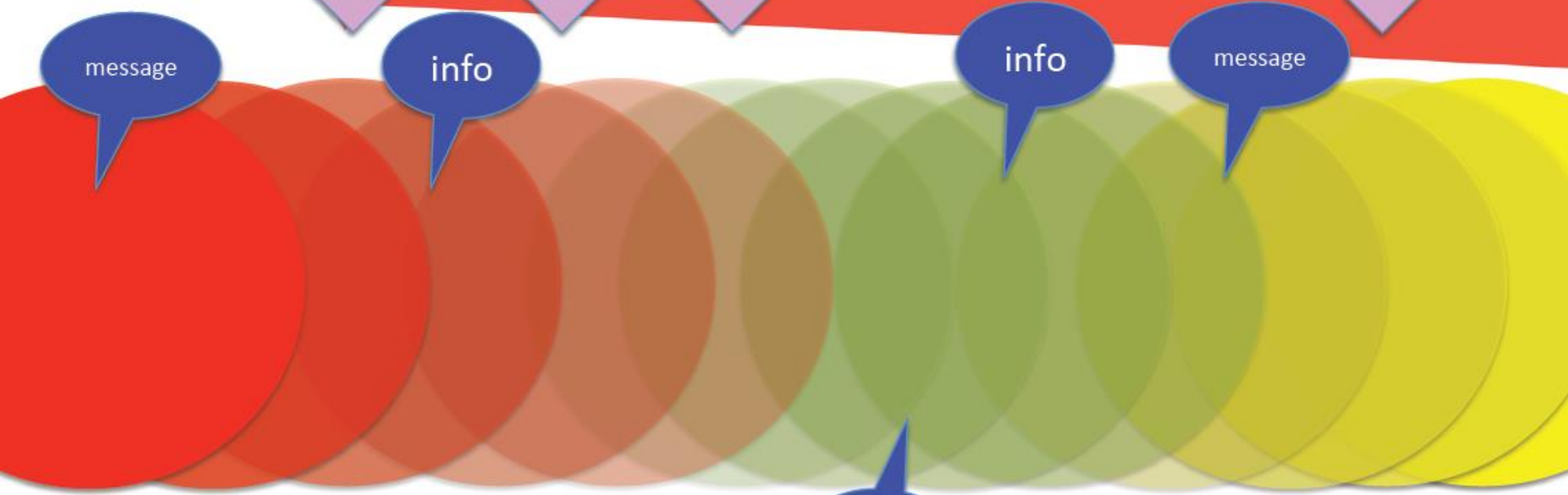
The need for a new health proposition

- The difficulty of behaviour change – education, knowledge and willpower are not enough: these have failed dramatically;
- Need and personal threat are poor change agents;
- There is the brain's automatic pilot;
- Habits are cued by environment and past behaviours;
- There is the knowing-doing gap: people do not do what they know they should do.

Do CHANGE mechanisms for change

- Do Something Different – use small required changes **in behaviour** to lever healthy habit change:
 - Not thinking or intention based;
 - Use the sensors, physiological, medical and wearable data to prompt responsive and contextual Do's. Target proximal behaviours;
 - Healthy habit thinking and intentions change as an outcome.
 - Personalised, digital, scalable, channel-shifting solution.
 - Patient privacy and control over their data.

Integrating core person and context



Design of Do's based on review in mHealth

- Give patient strategies, not education
- Tailor messages to the person
- Provide feedback and support
- Send with sufficient frequency
- Amplify or reinforce memory
- Make relevant to the context/everyday life

Behavioural Flexibility

← The range of possible behaviours →



UNASSERTIVE

ASSERTIVE

← The range of appropriate behaviours →

UNACCEPTABLE
BEHAVIOURS

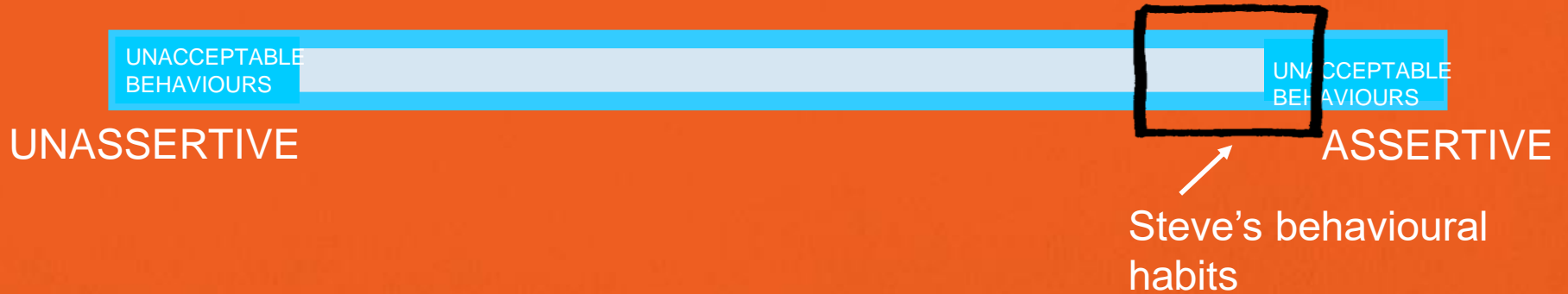
UNACCEPTABLE
BEHAVIOURS

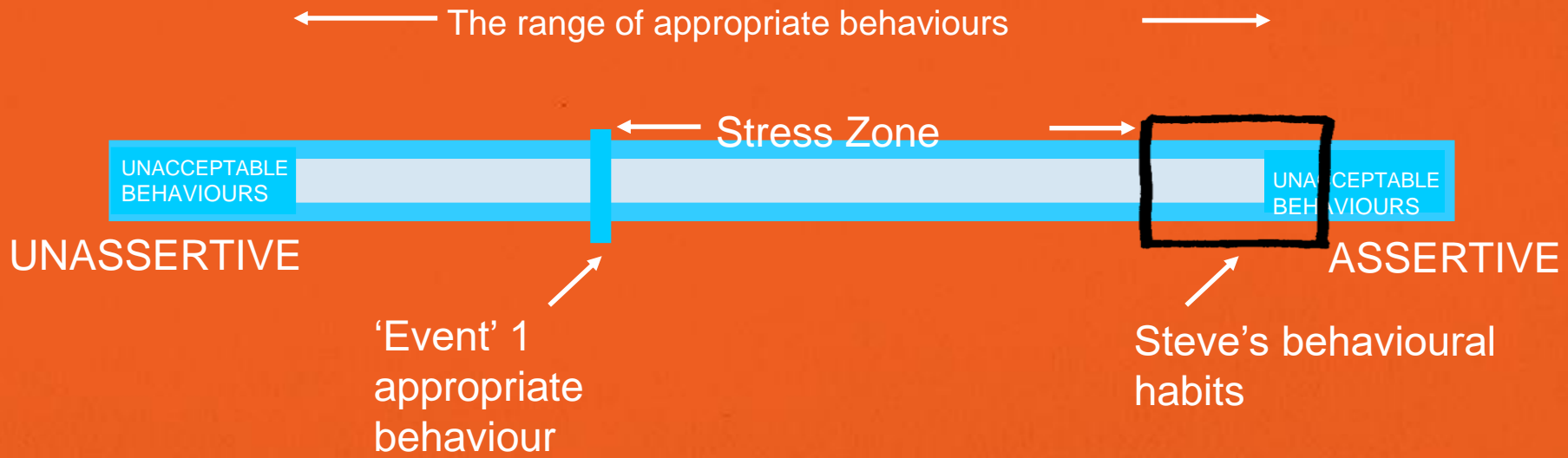
UNASSERTIVE

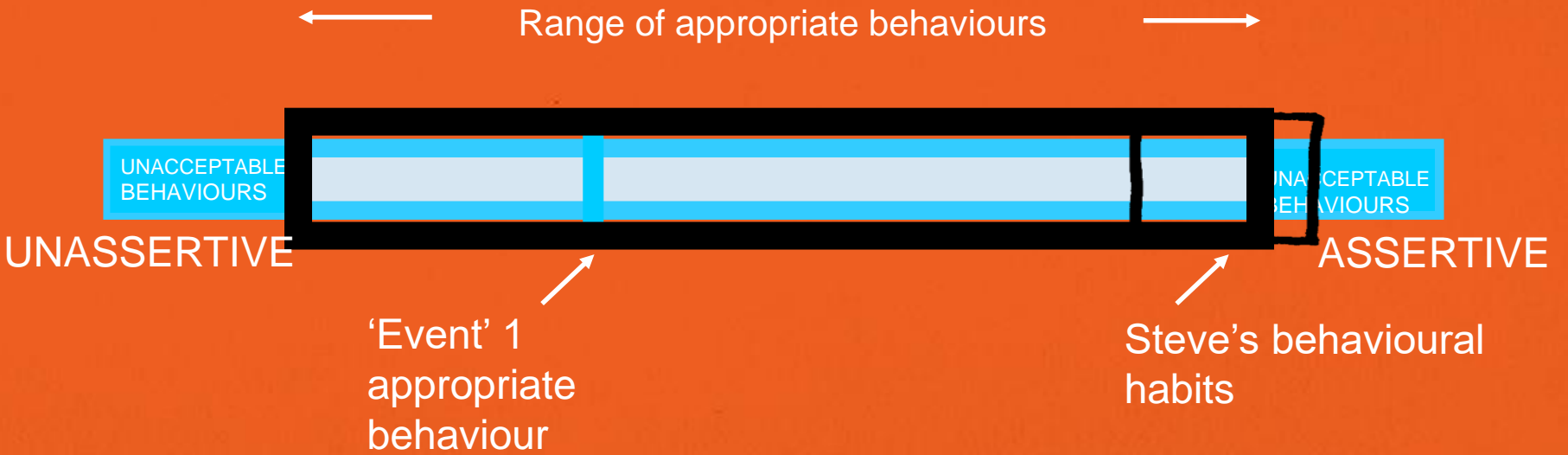
ASSERTIVE

Inflexibility

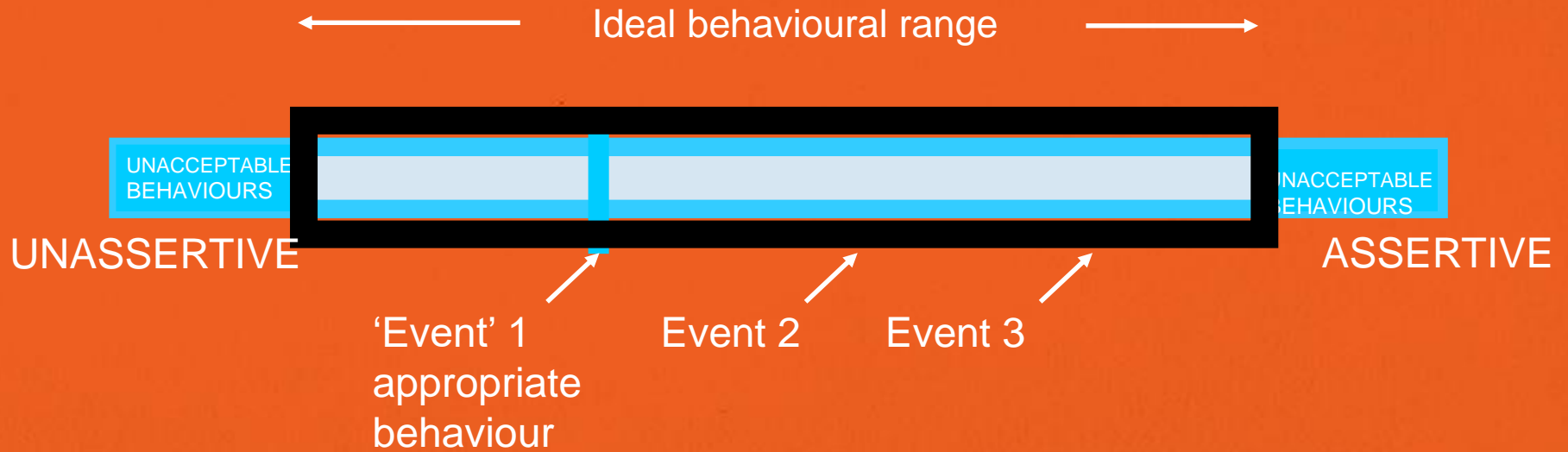
← The range of appropriate behaviours →







Flexibility



Behavioural

FLEXIBILITY...

	Unpredictable	Individually-centred	Behave as others want you to	Behave as you wish
Reactive	Lively	Definite	Calm / Relaxed	Gentle
Play it safe	Proactive	Individual-centred	Open-minded	Assertive
Introverted	Systematic	Extroverted	Predictable	Conventional
Flexible	Trusting	Group-centred	Spontaneous	Risk-taker
Wary of others	Unconcerned	Single minded	Unassertive	Energetic / Driven

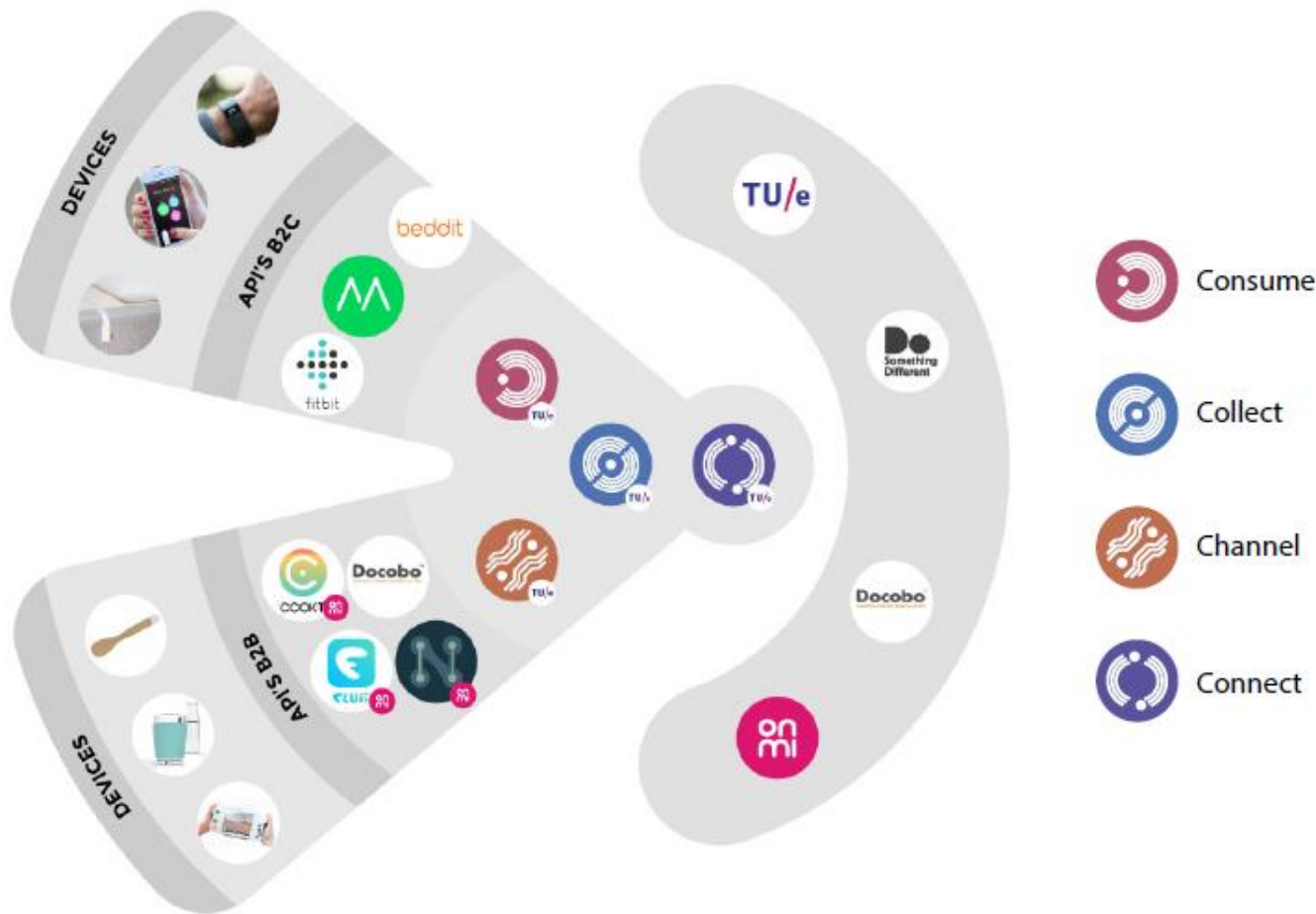
Reactive	Unpredictable	Individually-centred	Behave as others want you to	Behave as you wish
Reactive	Lively	Definite	Calm / Relaxed	Gentle
Play it safe	Proactive	Individual-centred	Open-minded	Assertive
Introverted	Systematic	Extroverted	Predictable	Conventional
Flexible	Trusting	Group-centred	Spontaneous	Risk-taker
Wary of others	Unconcerned	Single minded	Unassertive	Energetic / Driven

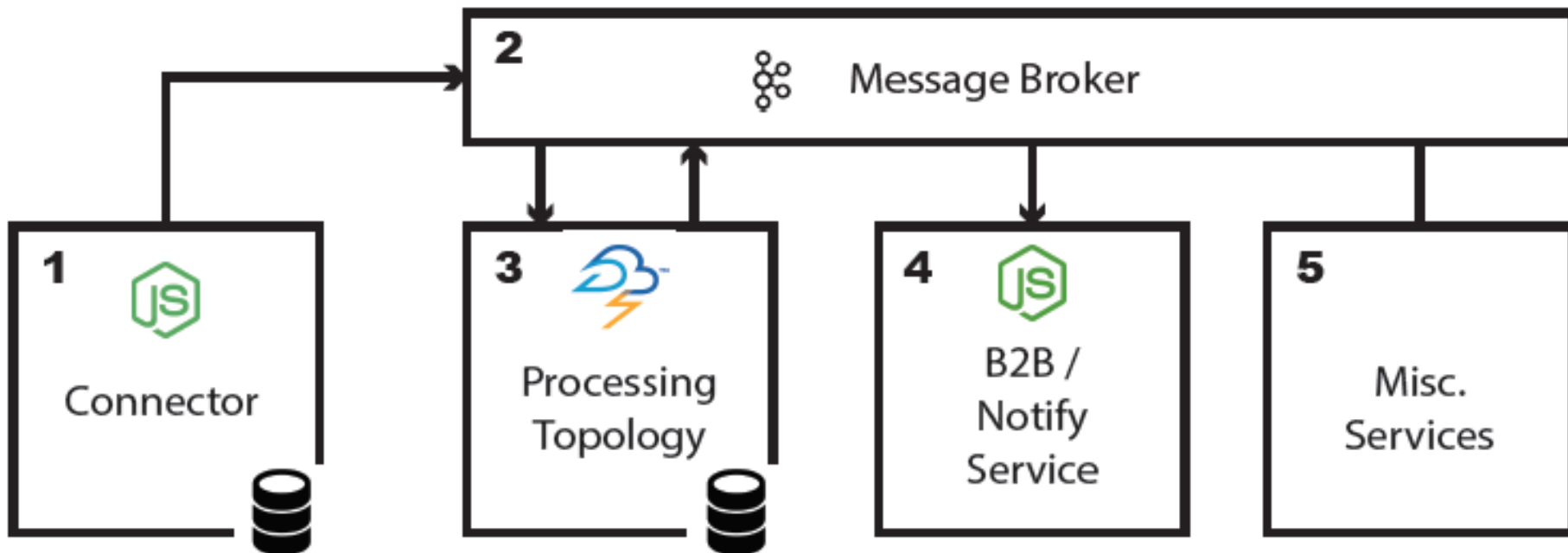
HIGH LEVELS

- More options in different situations
- More likely to optimise results
- Bigger comfort zone
- Less fearful
- Higher levels of confidence
- Less stressed
- More successful

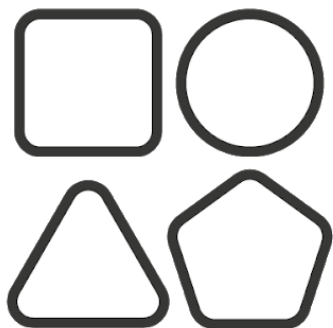
low levels

- Less options in different situations
- Less likely to optimise results
- Smaller comfort zone
- More fearful
- Lower levels of confidence
- More stressed
- Less successful

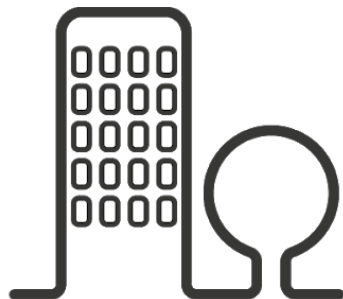




Monitor real behaviour via wearables and sensors



VARIETY



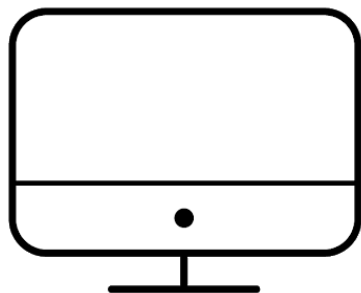
**CONNECTION TO
ENVIRONMENT**



**SOCIAL
OPPORTUNITY**



**PHYSICAL
ACTIVITY**



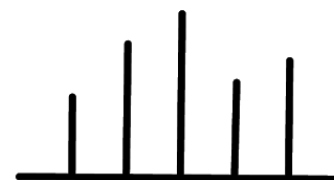
**Pre program
Diagnostics (pc or app)**



**Authorise data sharing
and setup Vire App**

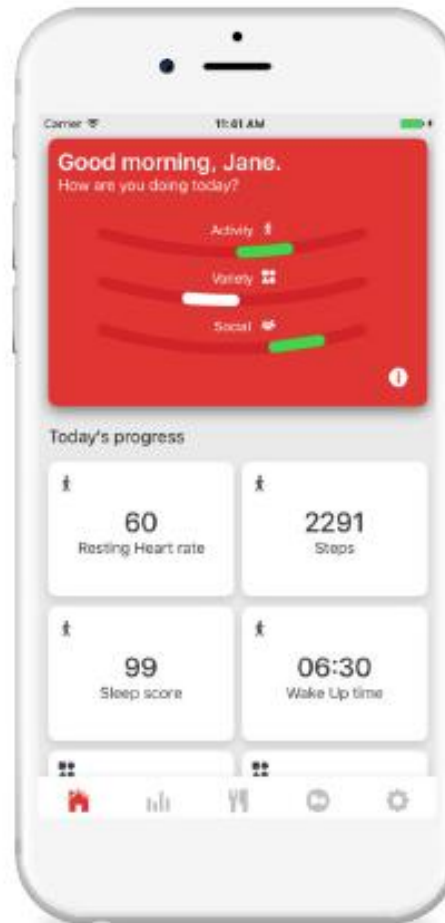


**CORE and DATA Driven
Do's sent through App**



**Diagnostics to measure
improvements**





- We have now an innovative IoT system for continuous monitoring of medical and non-medical data, which
- are offered for near-real-time analyses and intervention;
- In our case this includes continuous user behaviour measurement and
- delivering personalised and contextualised prompts for extending the person's behaviour flexibility;
- Users have control over their data;
- Extension to other devices and services easily possible.

- Recent evidence shows the increased importance of behavioural risks in many NC diseases;
- Do CHANGE will focus on changing everyday behaviours, not telling, information or teaching;
- Changing behavioural risks means altering the person's core and contextual habits to achieve this;
- All sensors and measurements will give feedback and AI tools provide important personalisation;
- The social and economic values of Do CHANGE are potentially massive.

THANKS FOR YOUR ATTENTION

a.vberlo@smart-homes.nl
+31654988654