PRO.M.I.S.
Programma Mattone Internazionale Salute

CONFERENCE

"Artificial Intelligence and Chronic disease management"

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

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Provincia Autonoma di Trento (headquarter)
P.zza Dante 15
TRENTO

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Ministero della Salute
REGIONE DEL VENETO
REGIONE DEL VENETO ULSS4 VENETO ORIENTALE

Agenda

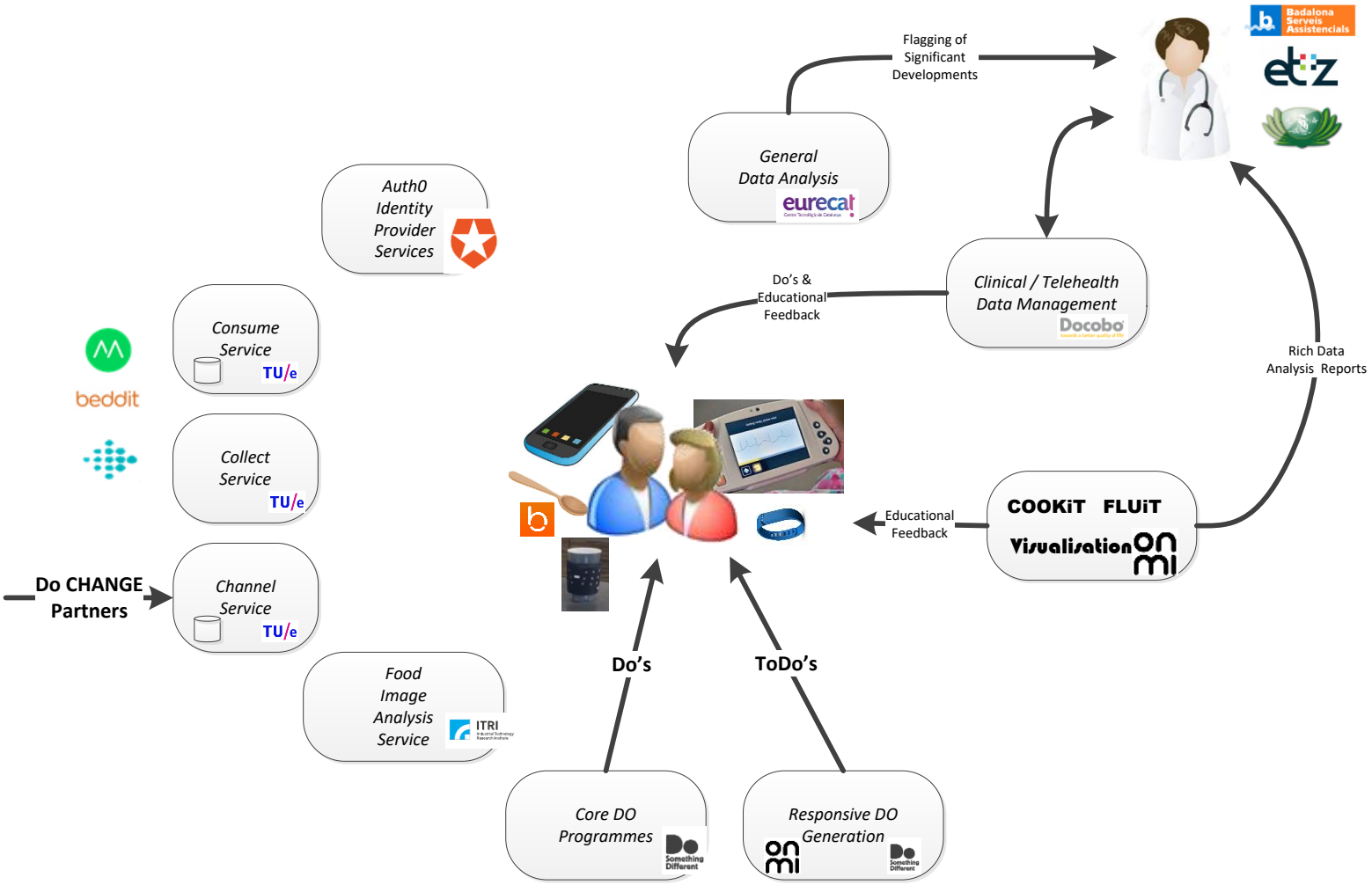
- Introduction to Do CHANGE
- Behaviour change
- Do Something Different methodology
- AI components in the solution
- Wrap-up

Introduction

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).

Authors conclude:

"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)

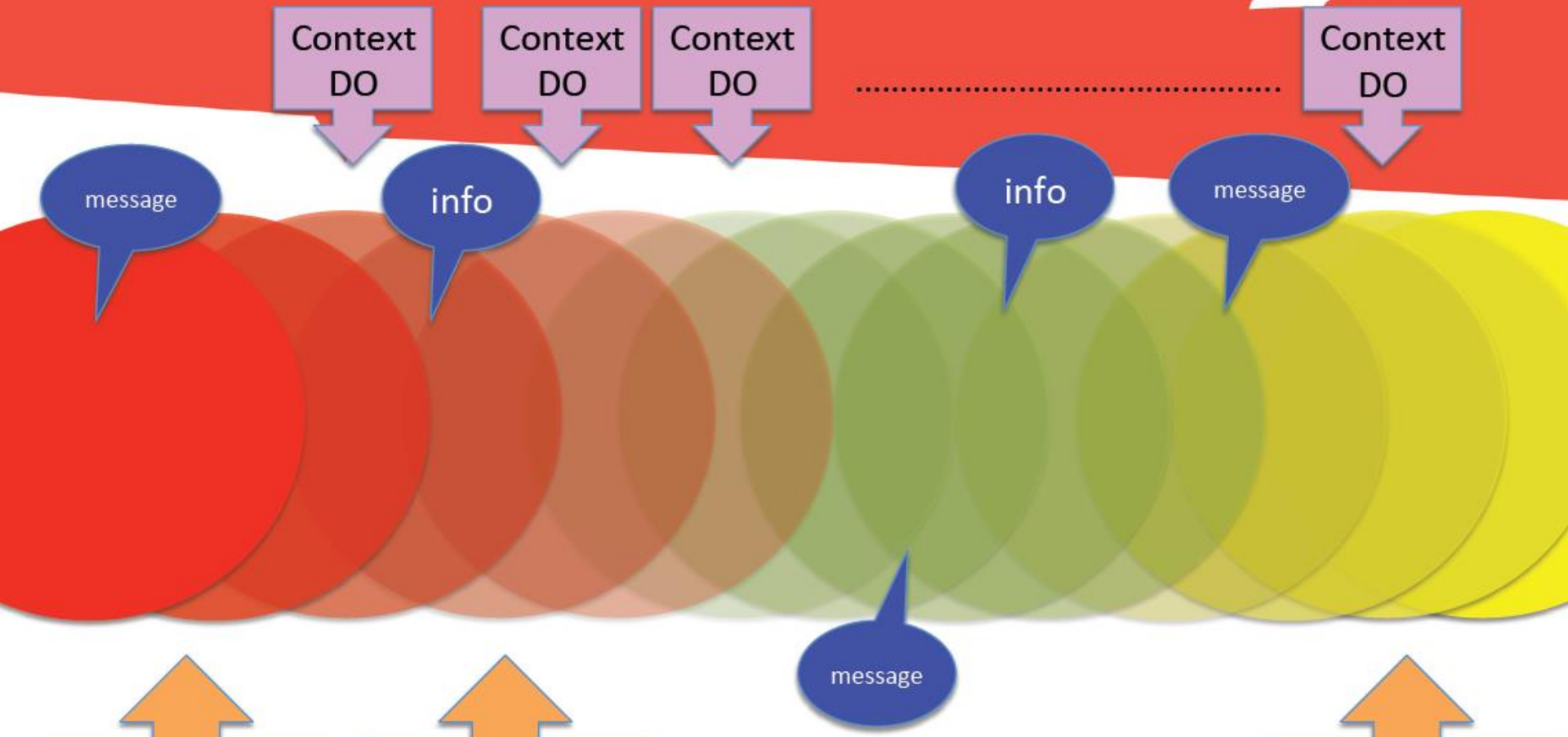
The need for a new health proposition

- 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.

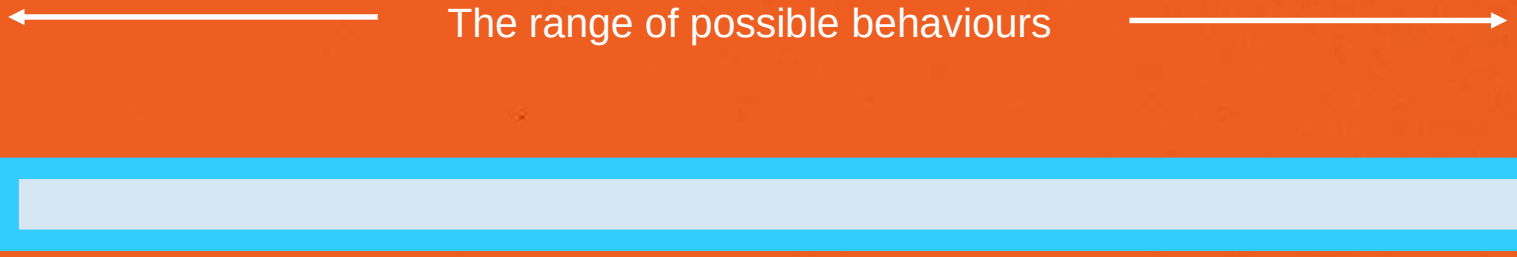
Integrating core person and context

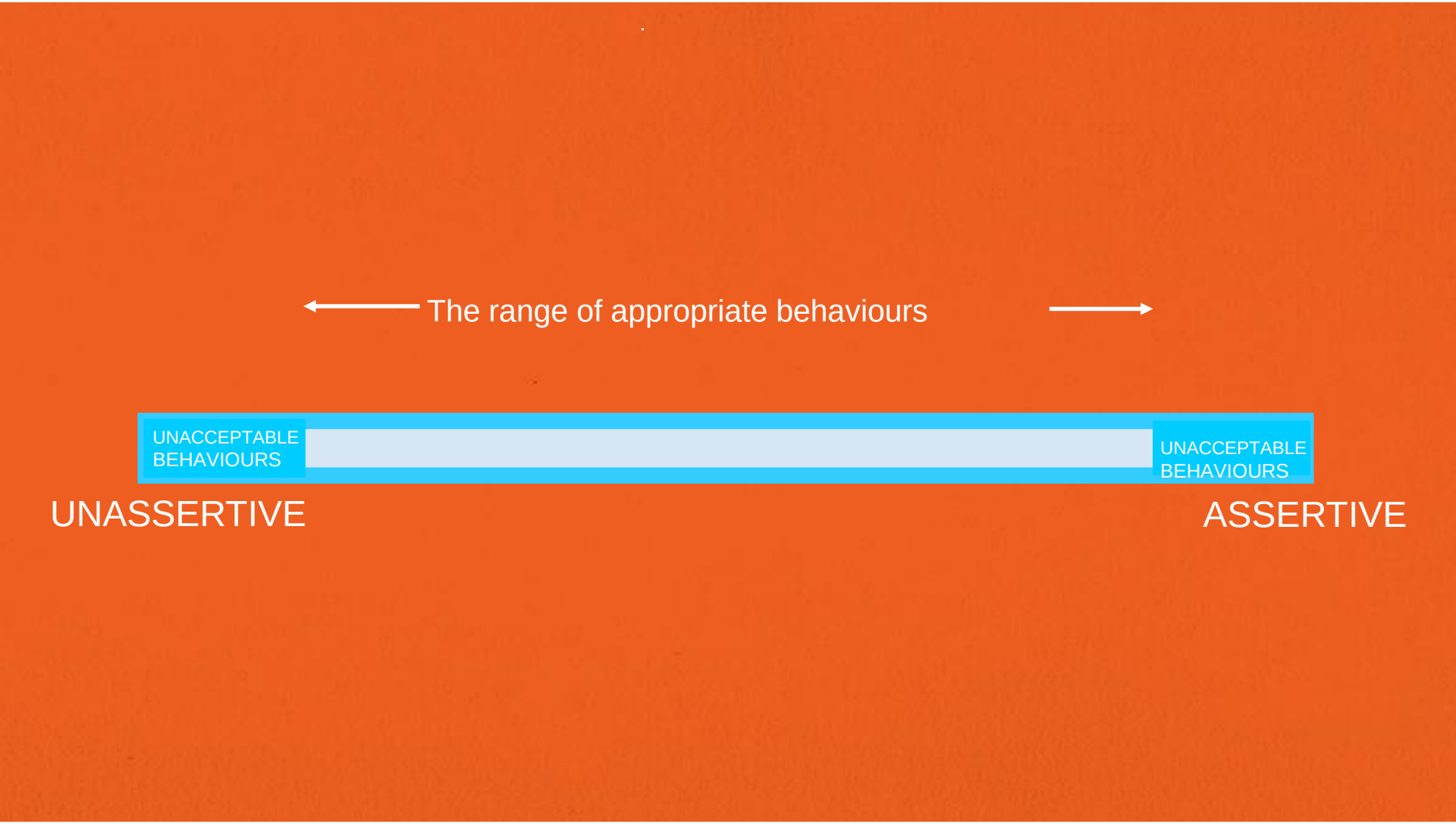


Design of Do's based on review in mHealth

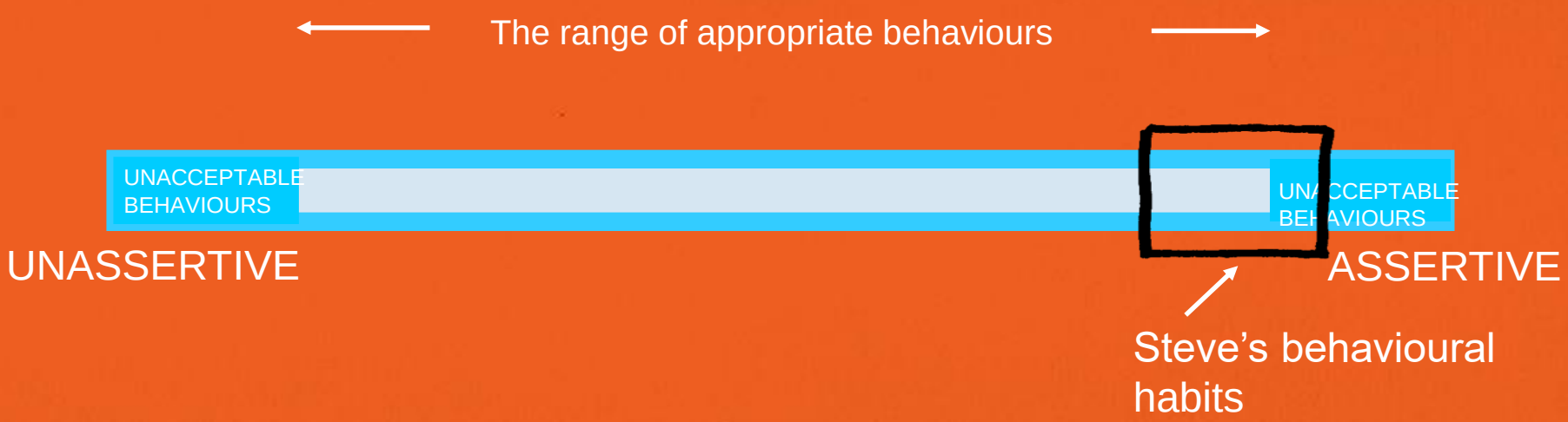
- Give patient strategies, not education
- Tailor messages to the person
- Provide feedback and support
- Send with sufficient frequency
- Amplify or reinforce memory
- Make relevant to the context/everyday life

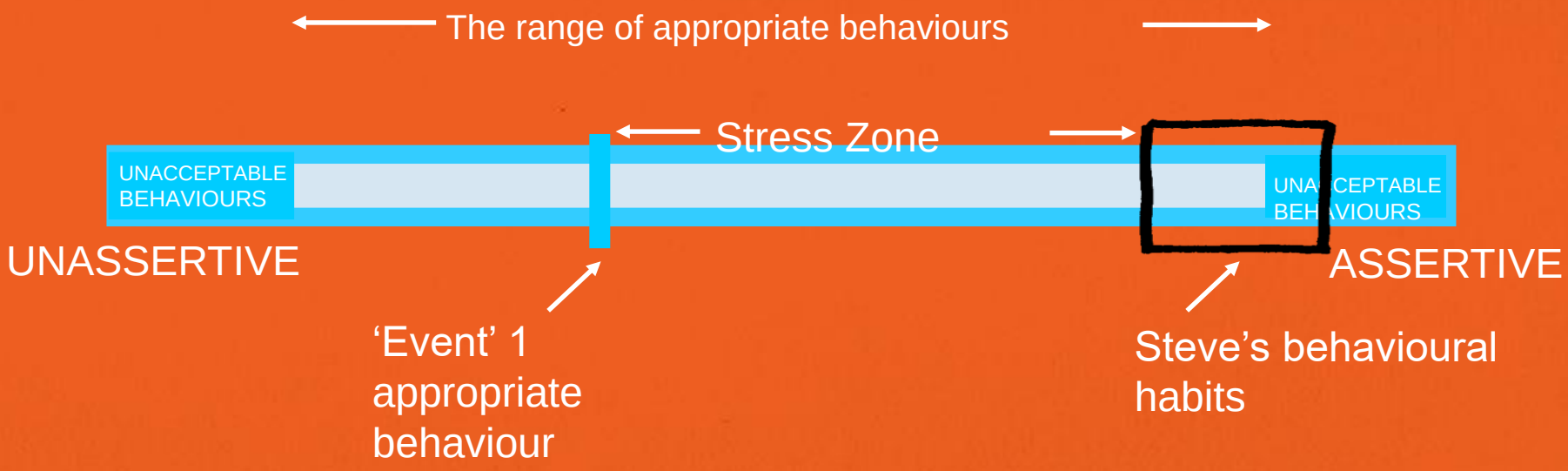
Behavioural Flexibility

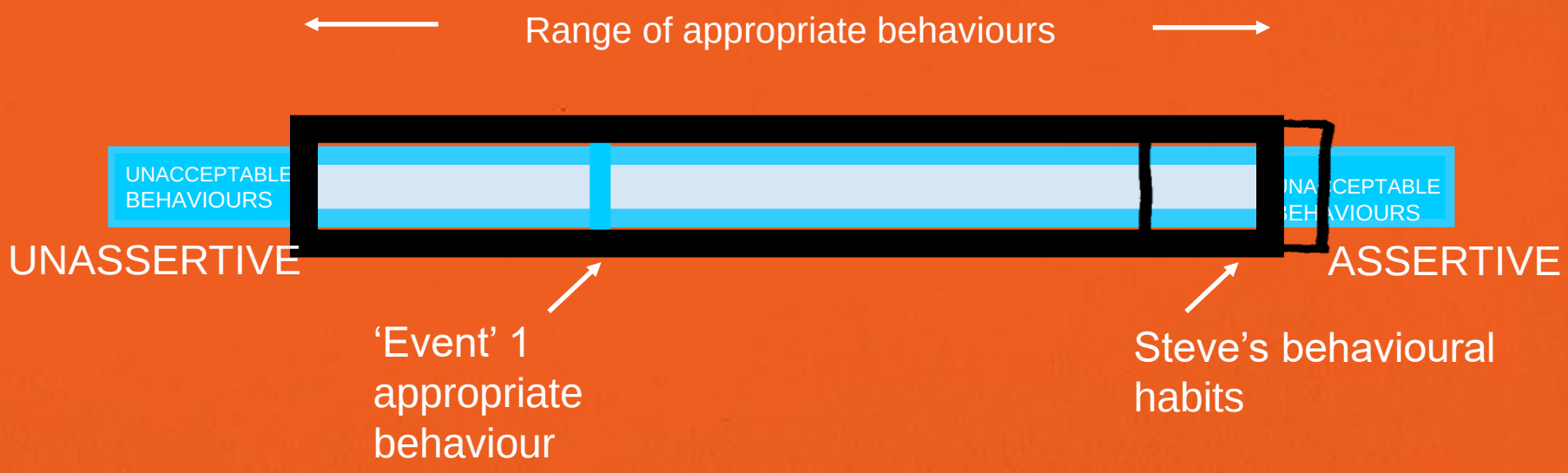



The range of appropriate behaviours
UNACCEPTABLE BEHAVIOURS
UNACCEPTABLE BEHAVIOURS
UNASSERTIVE
ASSERTIVE

Inflexibility

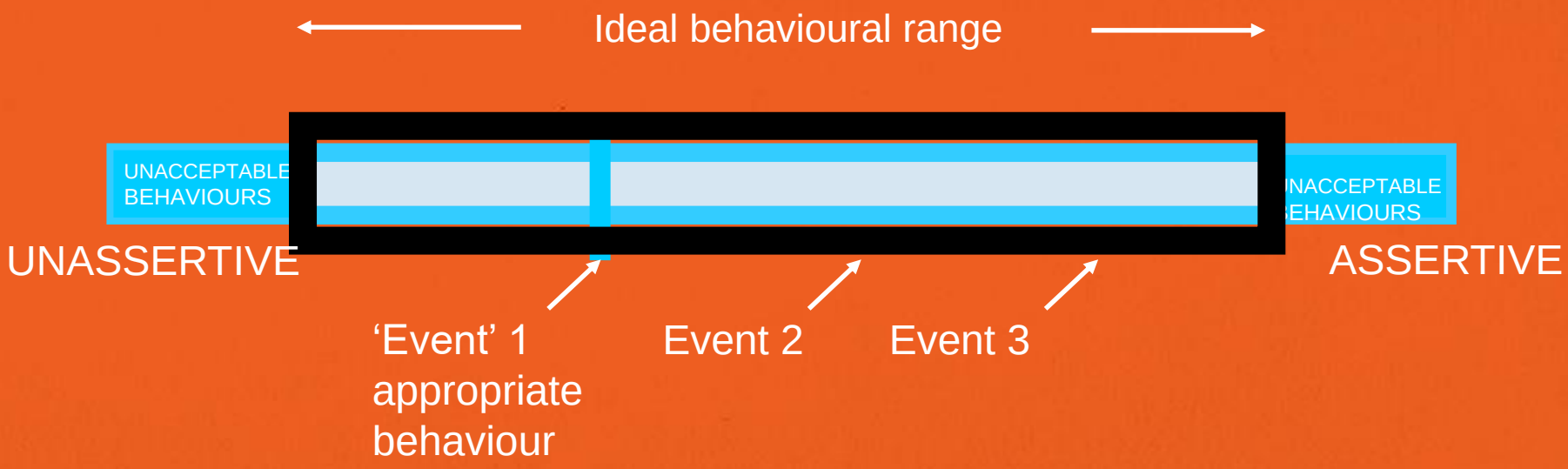



The range of appropriate behaviours
Stress Zone
UNACCEPTABLE BEHAVIOURS
UNACCEPTABLE BEHAVIOURS
UNASSERTIVE
ASSERTIVE
'Event' 1 appropriate behaviour
Steve's behavioural habits



Do Something Different

Flexibility



Do Something Different

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		Open-minded	Assertive
Introverted	Systematic	Extroverted	Predictable	Conventional
Flexible	Trusting	Group-centred	Spontaneous	Risk-taker
Wary of others		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

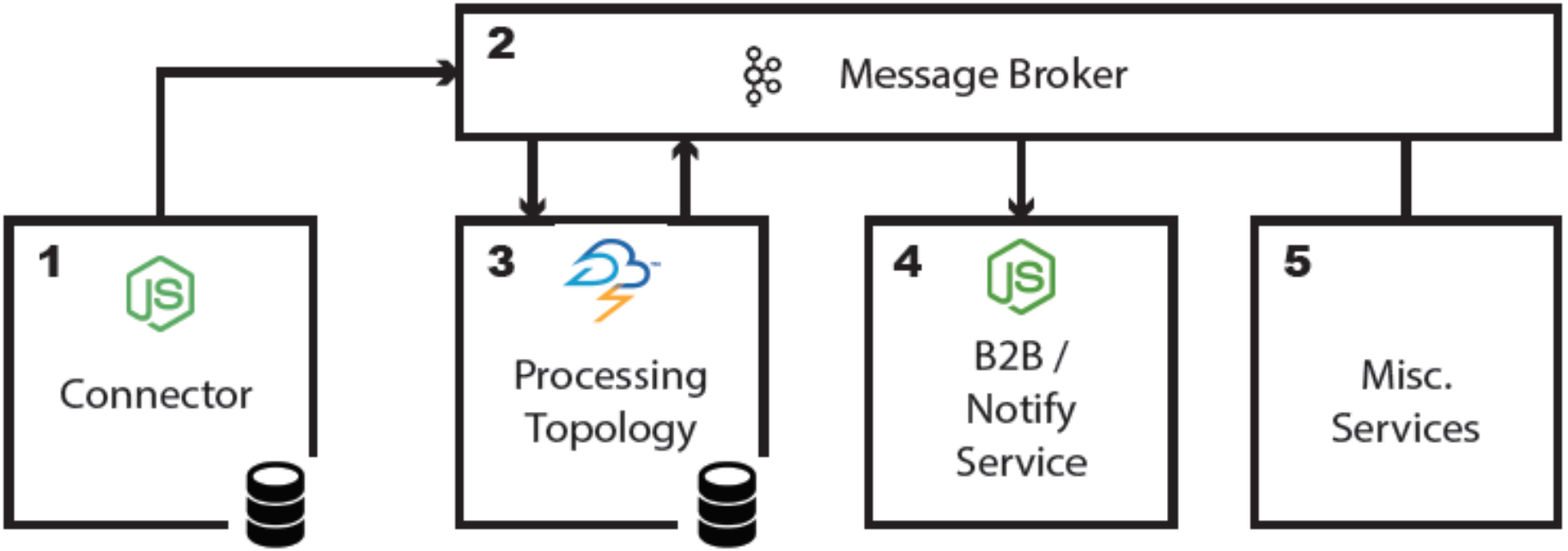
				Assertive
Introverted				
		Single minded		

low levels

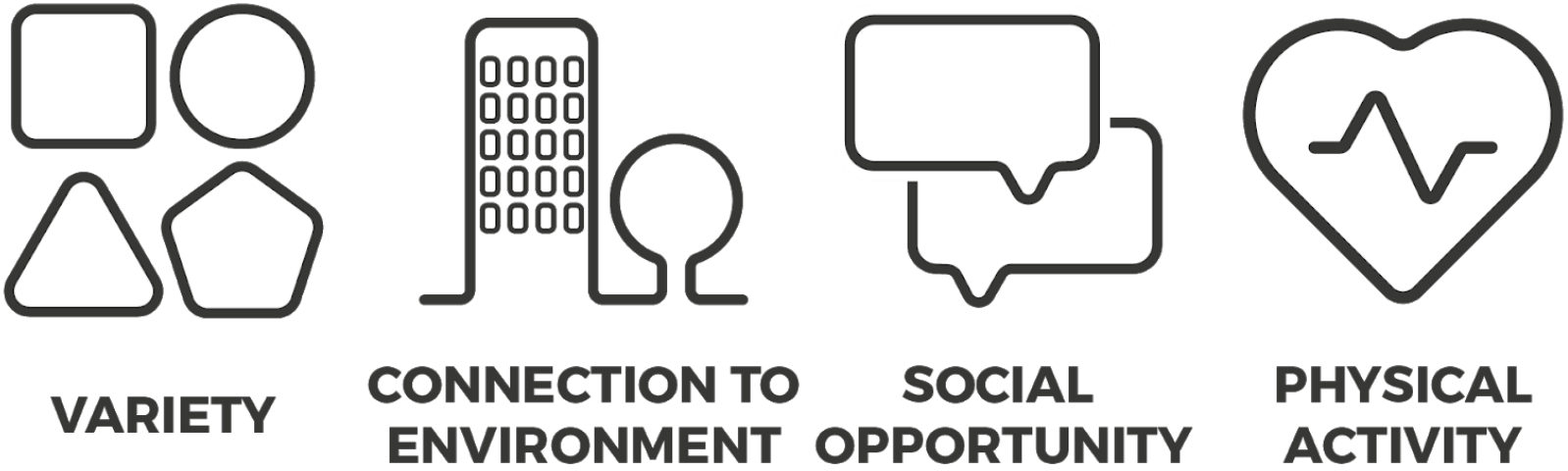
- Less options in different situations
- Less likely to optimise results
- Smaller comfort zone
- More fearful
- Lower levels of confidence
- More stressed
- Less successful

Overall system architecture

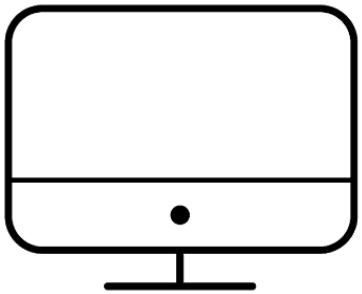
Data Analytics and AI platform



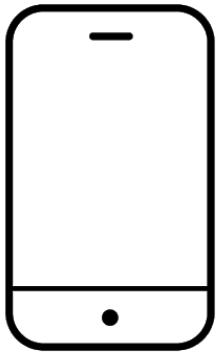
Monitor real behaviour via wearables and sensors



In practice (1)

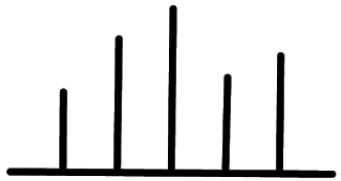


Pre program
Diagnostics (pc or app)



Authorise data sharing
and setup Vire App

CORE and DATA Driven
Do's sent through App



Diagnostics to measure
improvements

Personalised - Contextualised- Responsive

In practice (2)

Conclusions

- 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.

Wrap-up

- 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

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