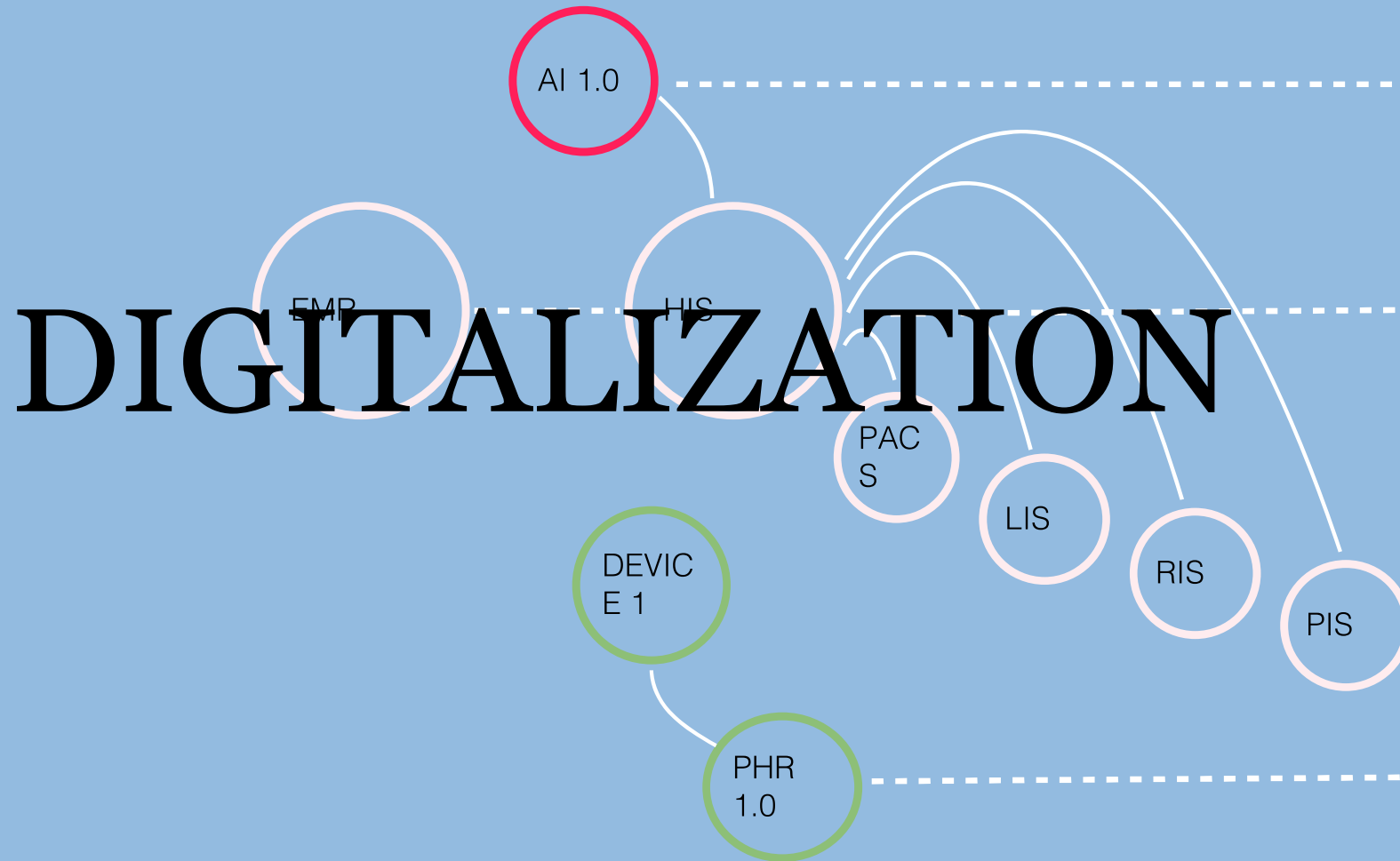


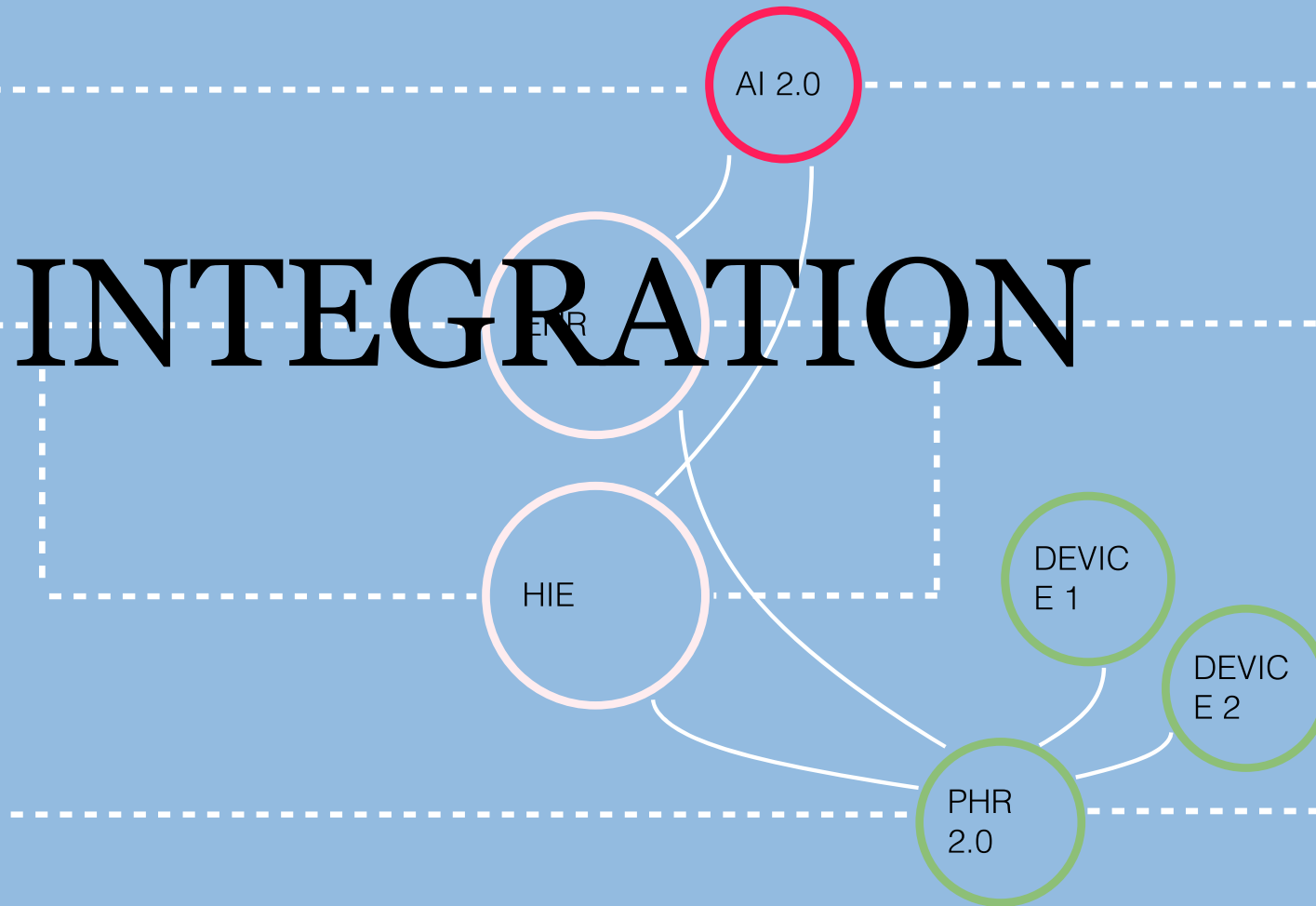
Health 3.0 – yksilökeskeinen palveluekosysteemi

*Madis Tiik, MD, PhD
Senior Advisor, Sitra*

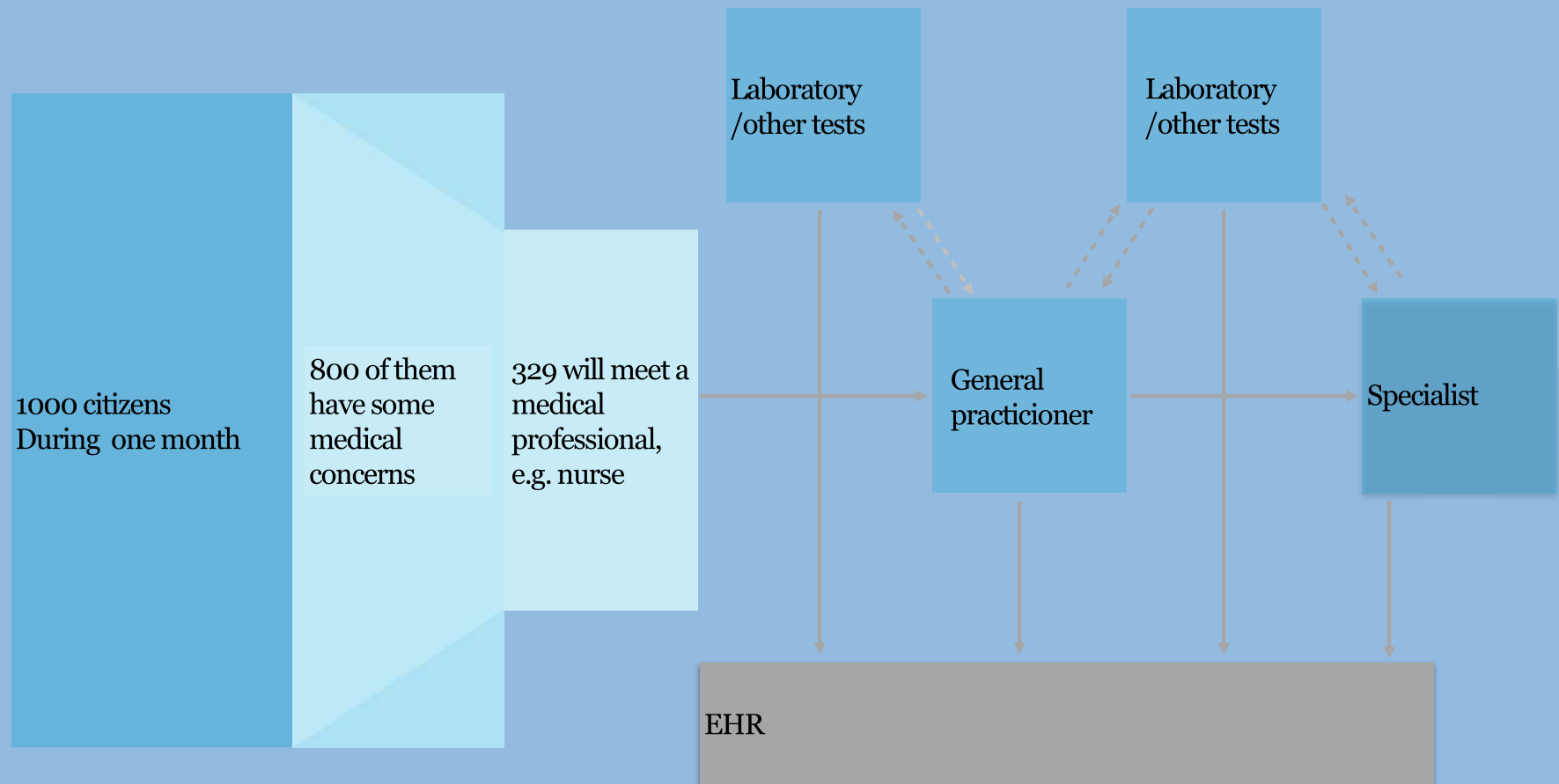
Health 1.0



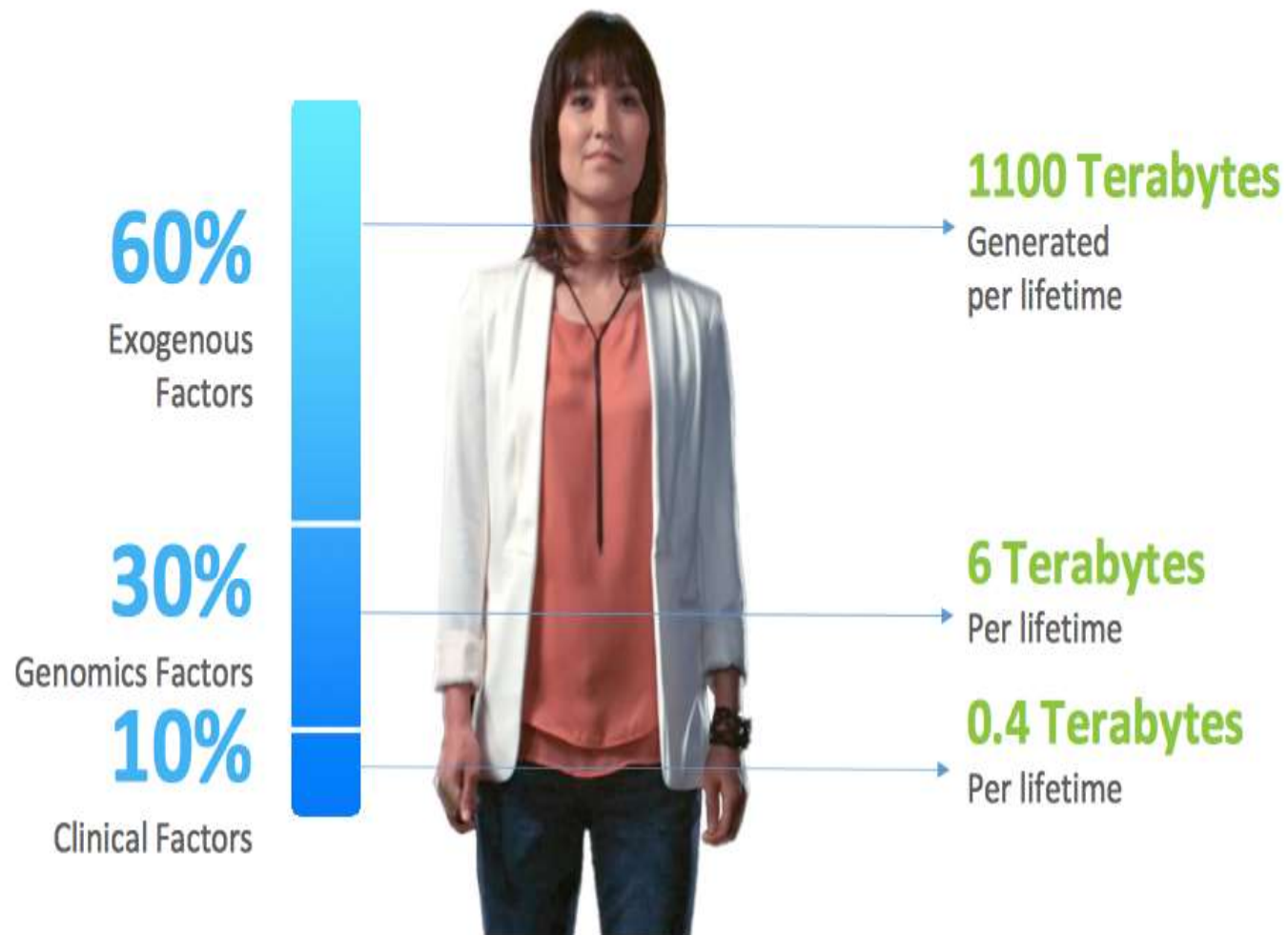
Health 2.0



HEALTHCARE SYSTEM TODAY



Green, LA. Fryer, GE Jr. Yawn, BP. Lanier, D. Dovey, SM (2001). 'The ecology of medical care revisited.' New England Journal of Medicine, 344(26): 2021–2025

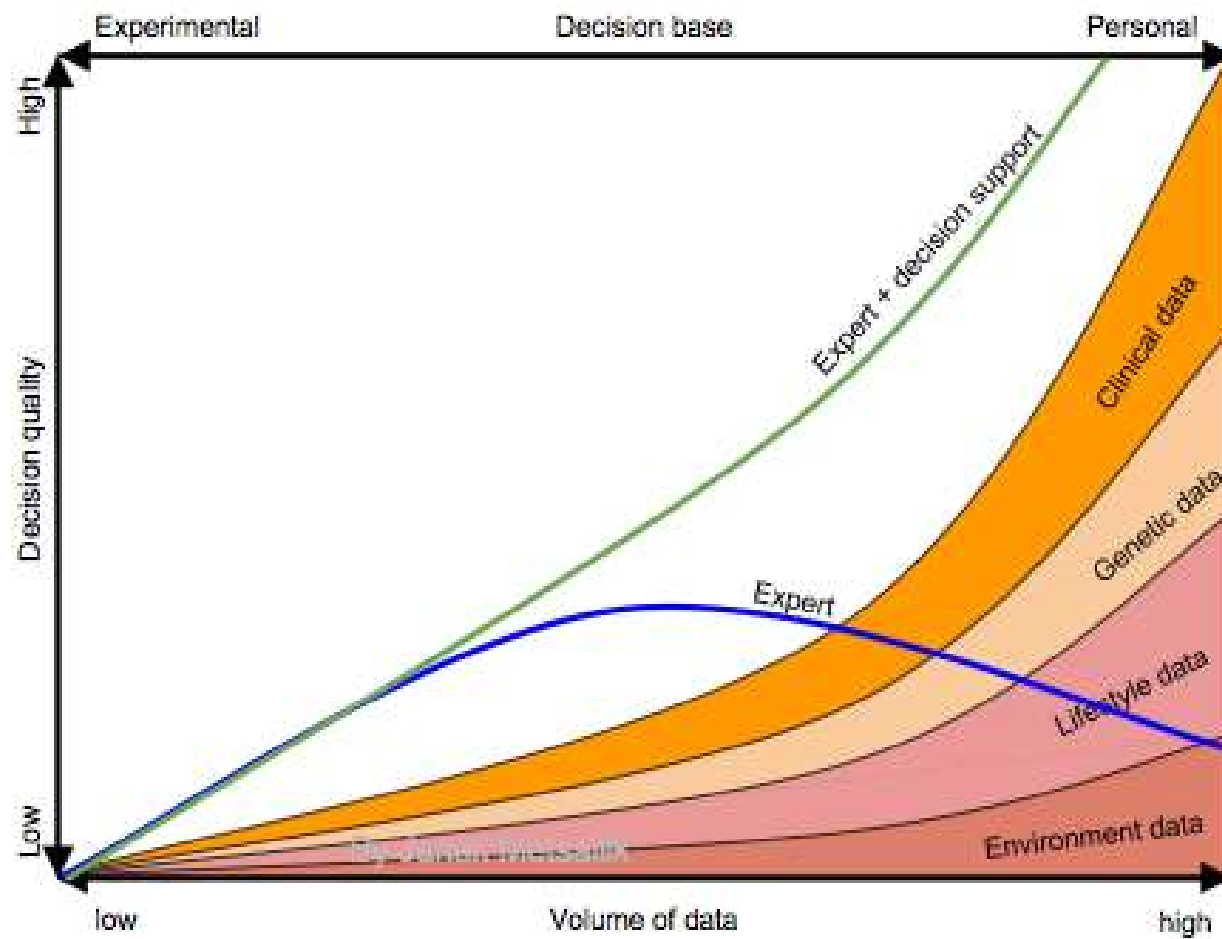


Source: J.M. McGinnis et al., "The Case for More Active Policy Attention to Health Promotion," Health Affairs 21, no. 2 (2002):78-93
<http://content.healthaffairs.org/content/21/2/78.full>

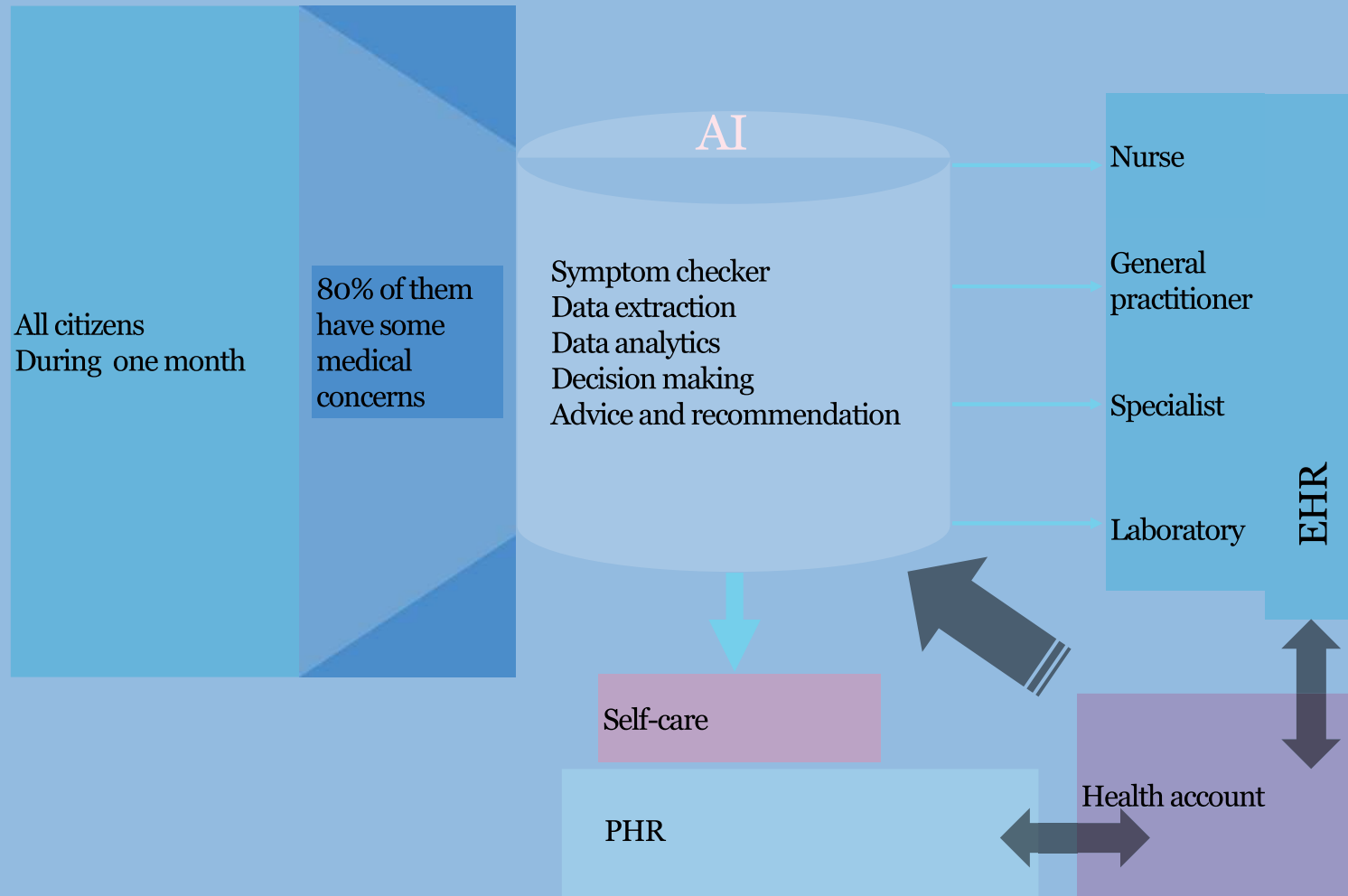
Impact of Prevention

- **Cardiovascular disease: 73-83%** (Nurses Health Study, NEJM 2000;343:16-22, NEJM 2001;345:790-97)
- **Diabetes type II: 58-91%** (Tuomilehto, 2001 NEJM 344(18): 1343-50 Nurses Health Study, NEJM 2000;343:16-22, NEJM 2001;345:790-97)
- **Cancer: 60-69%** (De Lorgeril, Arch Int Med 1998;158:1181-87 HALE Project. Knoop JAMA 2004;292:1433- 1439)





Healthcare model in Health 3.0



Preconditions for Health 3.0

 **Personal data ownership**

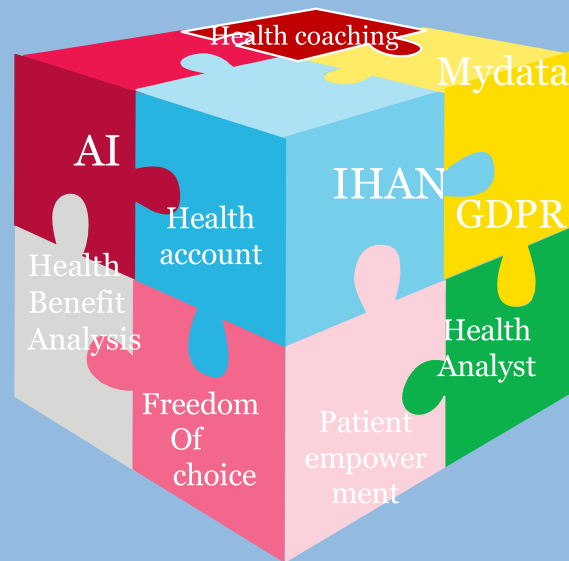
 **Interpretation service**

 **Health account**

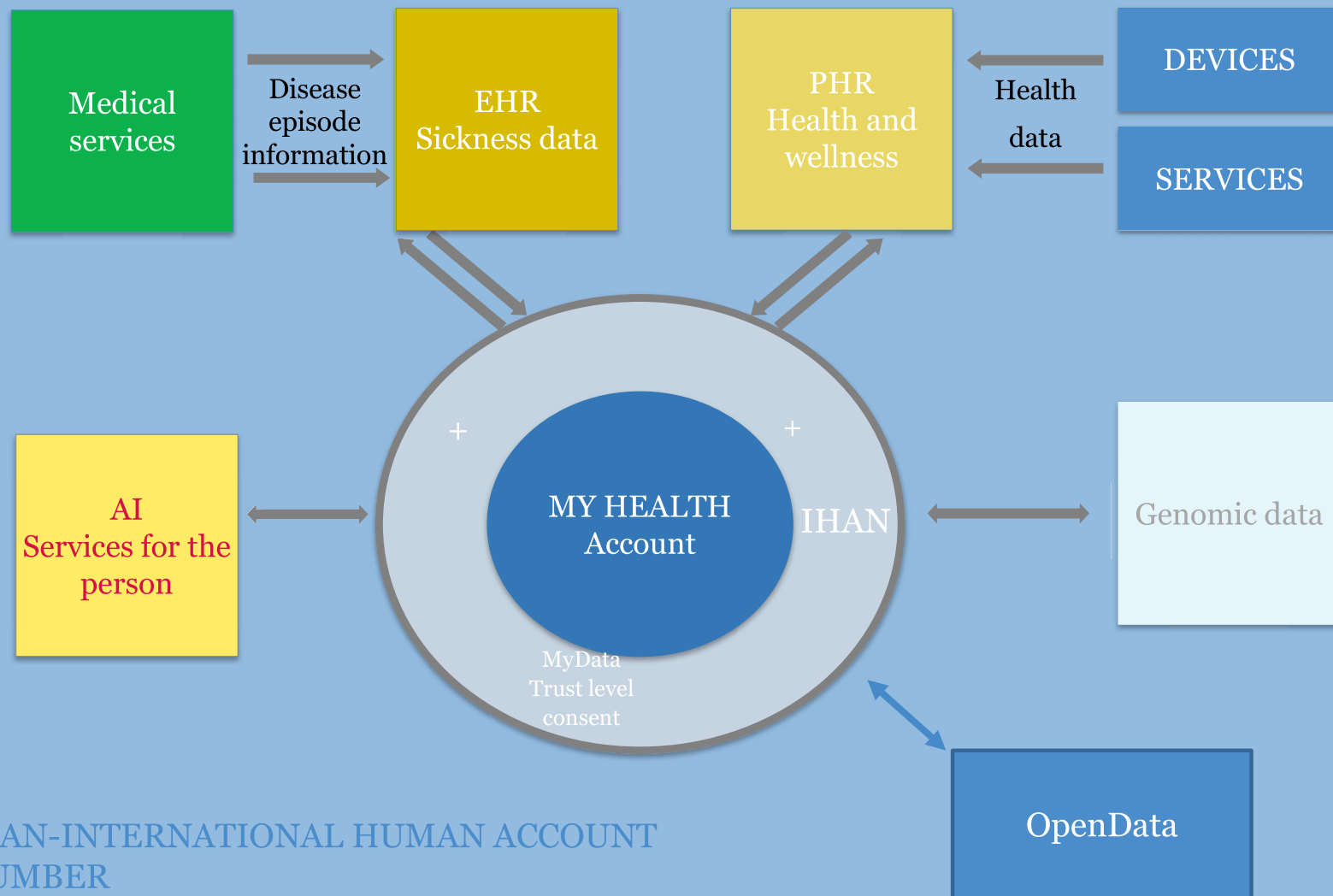
 **Health analyst**

 **Analytical services**

 **Patient involvement**



Vision of Health 3.0



Why
IHAN®?



SITRA

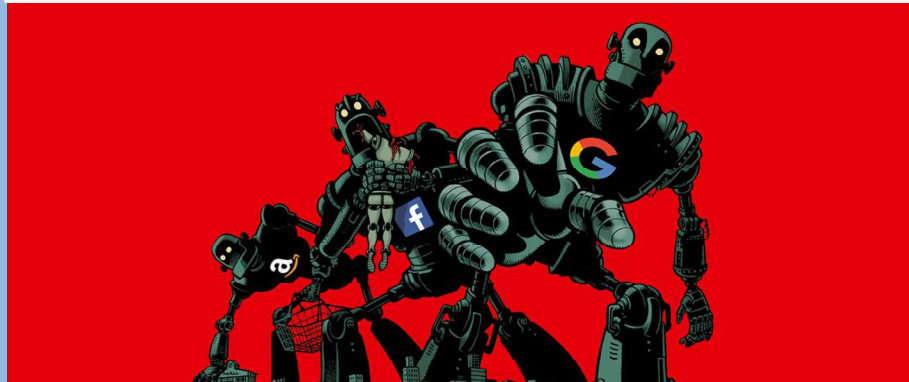
Competition in the digital age

How to tame the tech titans

The dominance of Google, Facebook and Amazon is bad for consumers and competition

Print edition | Leaders

Jan 18th 2018



MAR 5, 2018 @ 05:04 PM 12,042

Equifax's Enormous Data Breach Just Got Even Bigger



Nick Clements, CONTRIBUTOR

[FULL BIO](#)

Opinions expressed by Forbes Contributors are their own.



Last Thursday, Equifax reported that another 2.4 million Americans were impacted by their already enormous data breach. That brings the total to 147.9 million Americans. The only good news from this

Cambridge Analytica and Facebook: The Scandal and the Fallout So Far

Revelations that digital consultants to the Trump campaign misused the data of millions of Facebook users set off a furor on both sides of the Atlantic. This is how The Times covered it.

The New York Times

U.S.

Facebook's Role in Data Misuse Sets Off Storms on Two Continents

By MATTHEW ROSENBERG and SHEERA FRENKEL MARCH 18, 2018



Mark Zuckerberg says fixing Facebook's data scandal will "significantly impact" its profitability

The CEO's prepared testimony ahead of Wednesday's US Congressional hearing has been released, and Facebook's investors won't be pleased about what he has to say.

Zuckerberg: Facebook will apply EU data privacy standards globally

Europe's tough new data protection rules come into force in May.

By MARK SCOTT | 4/5/18, 7:00 AM CET | Updated 4/5/18, 11:39 AM CET

MIT
Technology
Review

EU strategies in support

Digital single Market

Free flow of non-personal data

European Data Economy

Data is an essential resource for economic growth

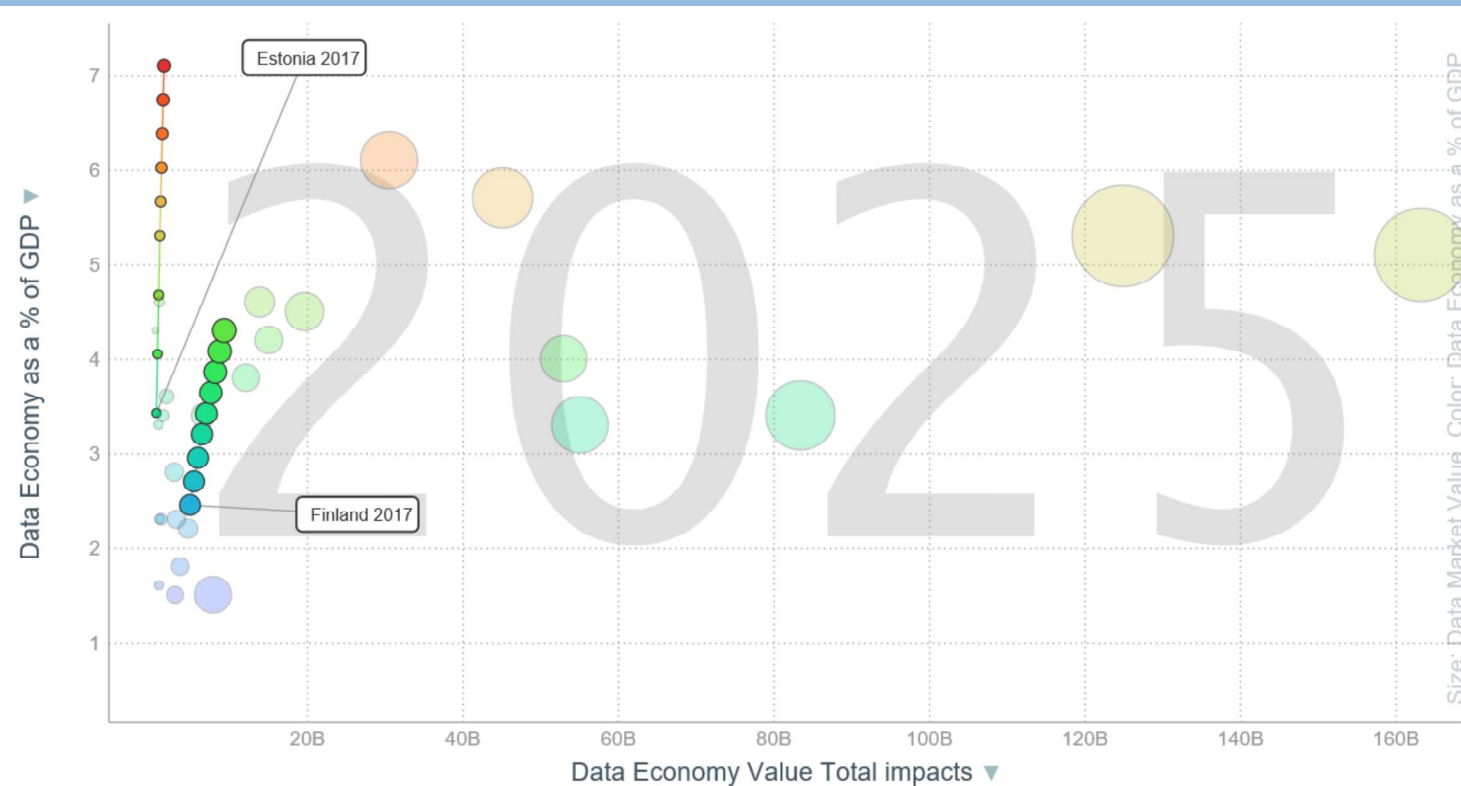
Digitising European Industry

The Internet of Things (IoT), cloud computing, big data and data analytics, robotics and 3D printing



SITRA

Importance of Data Economy is projected to grow substantially both in Estonia and Finland



Source: <http://datalandscape.eu/european-data-market-monitoring-tool-2018>

The momentum for Human-Driven Data Economy is right now...

#GDPR

General Data Protection Regulation

#EIDAS

EU regulation on electronic identification and trust services for electronic transactions

#PSD2

Payment Services Directive



SITRA

3. A data subject who has obtained restriction of processing pursuant to paragraph 1 shall be informed by the controller before the restriction of processing is lifted.

Article 19

Notification obligation regarding rectification or erasure of personal data or restriction of processing

The controller shall communicate any rectification or erasure of personal data or restriction of processing carried out in accordance with Article 16, Article 17(1) and Article 18 to each recipient to whom the personal data have been disclosed, unless this proves impossible or involves disproportionate effort. The controller shall inform the data subject about those recipients if the data subject requests it.

Article 20

Right to data portability

1. The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided, where:

(a) the processing is based on consent pursuant to point (a) of Article 6(1) or point (a) of Article 9(2) or on a contract pursuant to point (b) of Article 6(1); and

(b) the processing is carried out by automated means.

2. In exercising his or her right to data portability pursuant to paragraph 1, the data subject shall have the right to have the personal data transmitted directly from one controller to another, where technically feasible.

3. The exercise of the right referred to in paragraph 1 of this Article shall be without prejudice to Article 17. That right shall not apply to processing necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller.

4. The right referred to in paragraph 1 shall not adversely affect the rights and freedoms of others.

Section 4

Right to object and automated individual decision-making

Article 21

Right to object

1. The data subject shall have the right to object, on grounds relating to his or her particular situation, at any time to processing of personal data concerning him or her which is based on point (e) or (f) of Article 6(1), including profiling based on those provisions. The controller shall no longer process the personal data unless the controller demonstrates compelling legitimate grounds for the processing which override the interests, rights and freedoms of the data subject or for the establishment, exercise or defence of legal claims.

2. Where personal data are processed for direct marketing purposes, the data subject shall have the right to object at any time to processing of personal data concerning him or her for such marketing, which includes profiling to the extent that it is related to such direct marketing.

3. Where the data subject objects to processing for direct marketing purposes, the personal data shall no longer be processed for such purposes.

GDPR Article 20 : Right to data portability

Current regulation is a good start, but even with Article 29 Working party clarifications*, it does not define the format, governance nor method for personal data sharing in our **real-time, many-to-many** world

“structured, commonly used and machine-readable **format**” needs to be unambiguously and explicitly defined for personal data across all industries so automated data interchange is possible

“the data subject has given **consent** to the processing of his or her personal data for one or more specific purposes; ” individuals do not have a way to **manage** their consents across data processors

“... personal data **transmitted directly** from one controller to another, where technically feasible. ” protocols for **real-time** transfer of information do not exist and thus need to be created

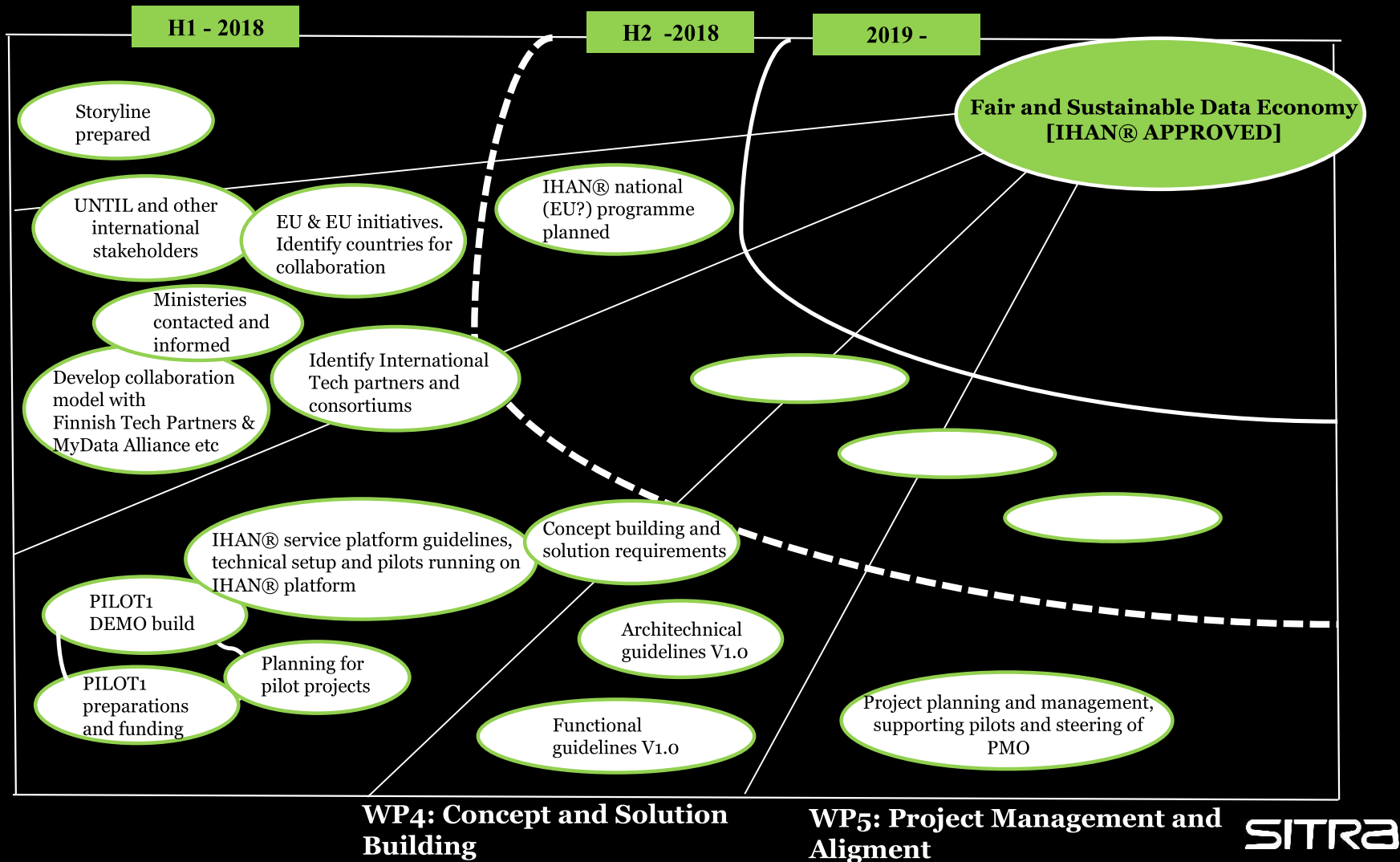


Our project aims to create an international protocol that gives *people* control over how and what their data is being used for.

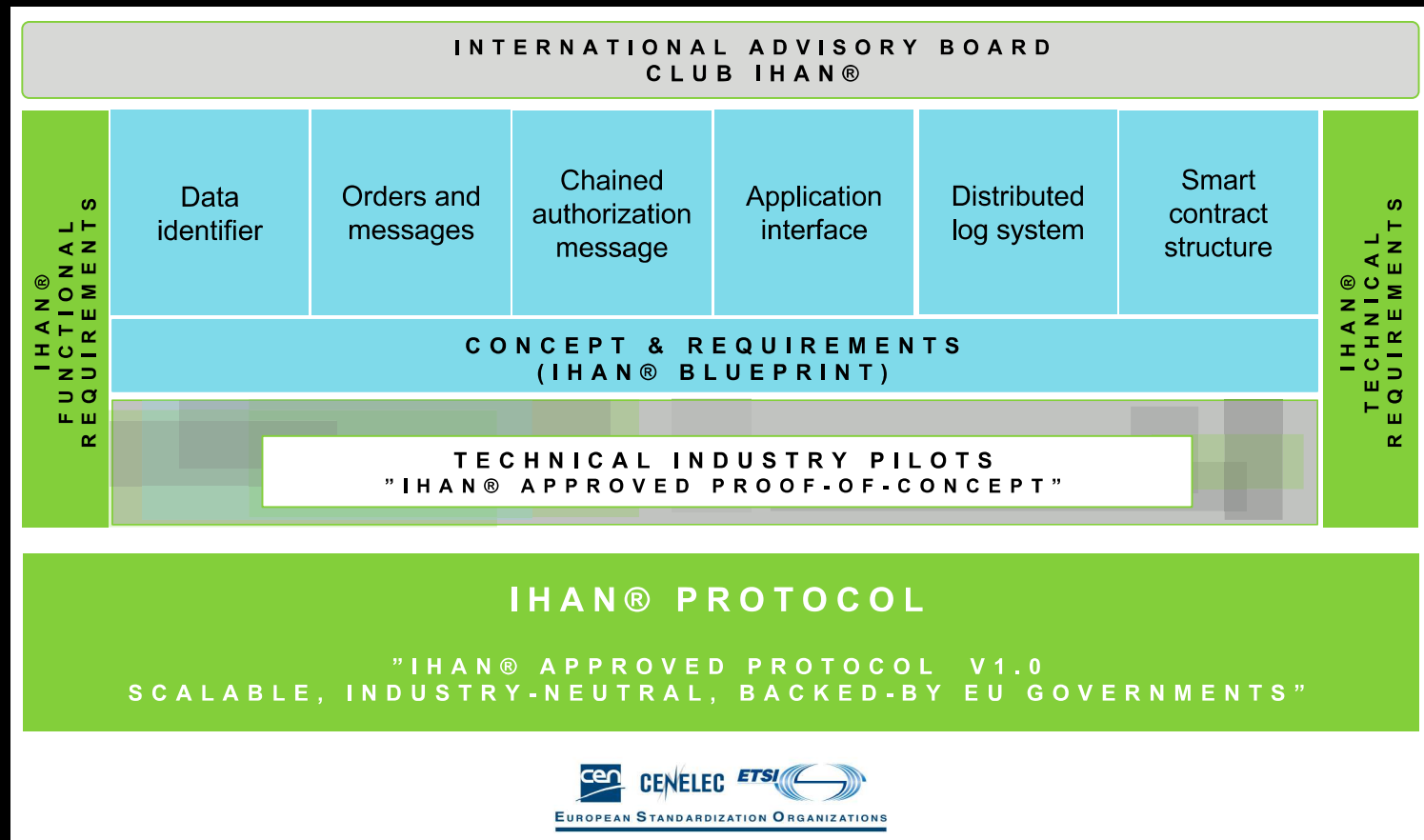
Think of it as a kind of IBAN (International Bank Account Number) for personal data.

Our project in nutshell

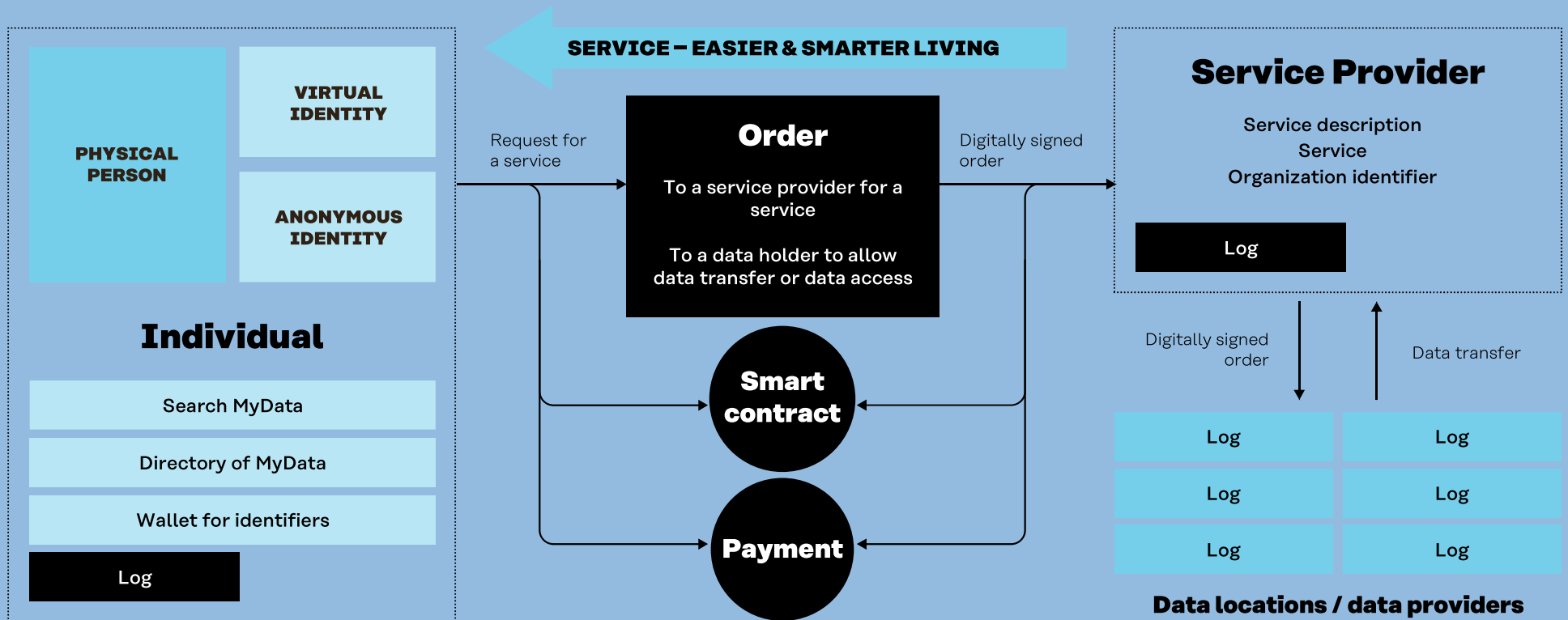
- Establish key principles, rules & guidelines for human-driven Data exchange Platform. Build awareness and engage people across Europe
- Test, develop and scale Platform to multiple industries and EU countries. Ensure interoperability through technology Proof-of-Concepts [IHAN® APPROVED]
- Branding. Develop common Roadmap for fair Data exchange Method. Build Common Governance Model [IHAN® APPROVED]



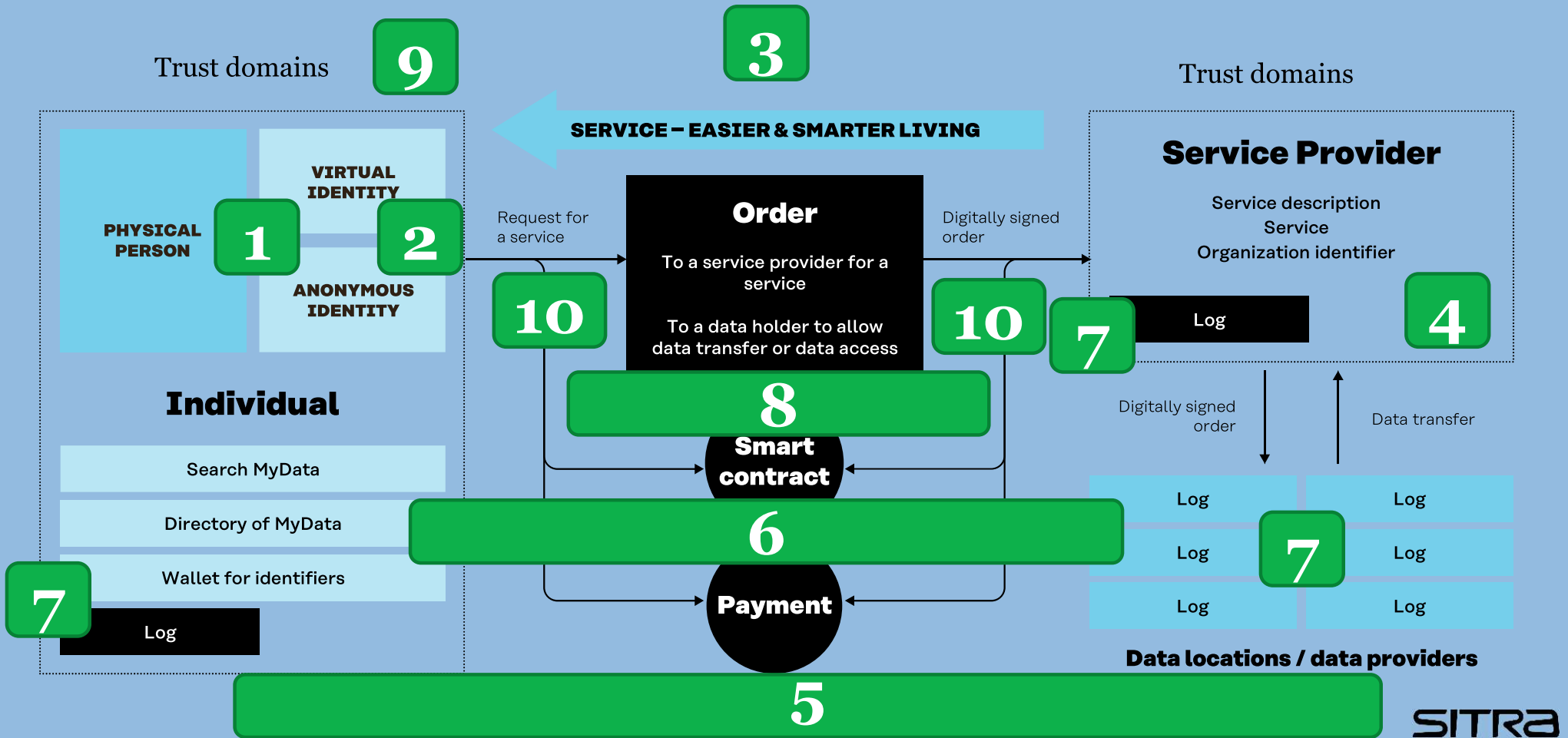
IHAN® will be validated through CEN/CENELEC Workshop standardization process



Good news: We've already got the technology...



... and main building blocks identified



1

Wallet of identifiers

Authentication

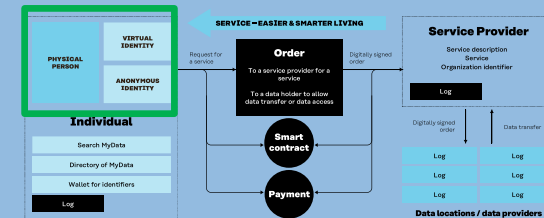
- Collaboration with existing authentication solutions and development work
- Strong authentication
- Two factor authentication
- Dezentralized authentication
- OAuth, OpenID, OpenID Connect
- Distributed Ledger Technology
- FIDO, UAF, U2F

Uniform Resource Identifier, Uniform Resource Locator

- IHAN number
- Data
- Credentials

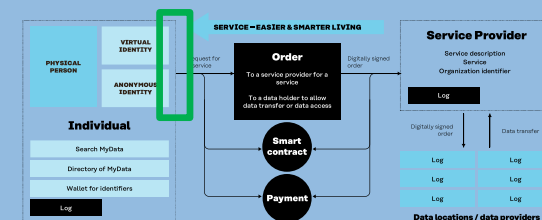
Wallet

- Various authentication mechanism
- Various URI/URL of data
- Credentials
- Combination of an individual and URI of data = IHAN number?
- Cryptography
- Interfaces, protocols, APIs



2 Authorization

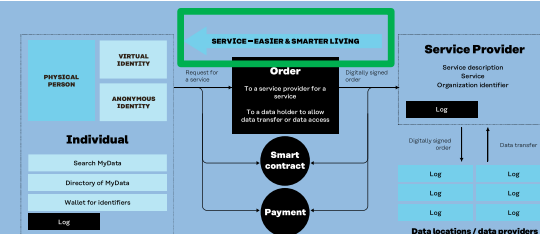
- Content
- Metadata structure and process
- Encryption
- PKI
- IKE (Internet Key Exchange)
- Chained authorization
- Protocols
- APIs
- Log messages



3

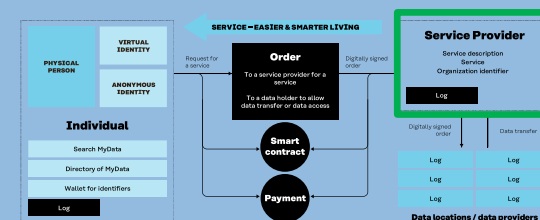
Personal Service Directory

- Content
- Creation
- iOS, Windows, Android
- IE, Chrome, Mozilla, ...
- APIs
- UI
- Use cases
- Similarity w X-Road



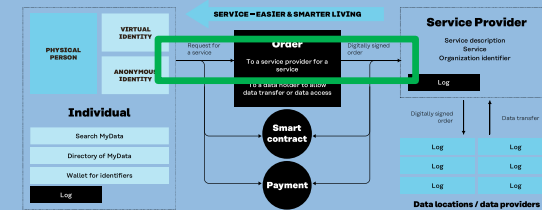
4 Registration

- Protocol
- Content
- GDPR message
- API
- Creation of
 - Identifiers
 - Service directory entry
 - Basic authorization
 - Terms of usage



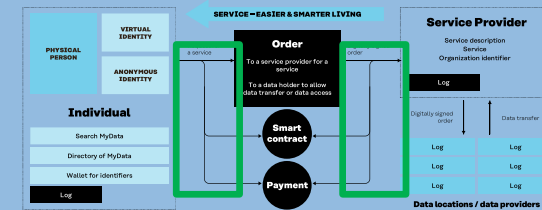
5 Encryption mechanism

- Security stack
- Encryption
- Hash
- Dezentralization
- Blockchain
- Regulatory requirements
- Cybersecurity
- Security servers



6 Data transportation

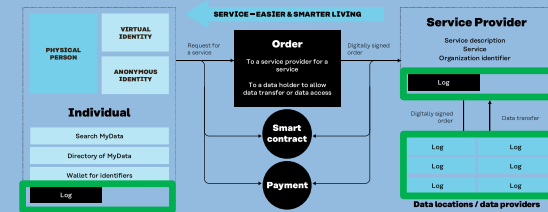
- X-Road, National service bus
- P2P over Internet
- Blockchain
- Protocols
- APIs



7

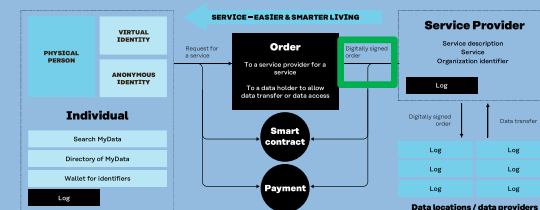
Log systems and log messages

- For an individual
- Undeniable
- iOS, Windows, Android, ...
- Security
- Recovery
- UI
- Messages
- APIs
- Smart contracts



8 Routing

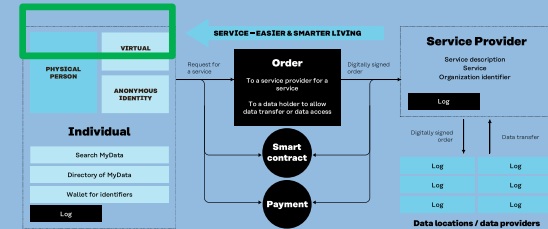
- Focus on Internet messages and data transportation
- Authorization
- Data
- Blockchain



9

Data management Console

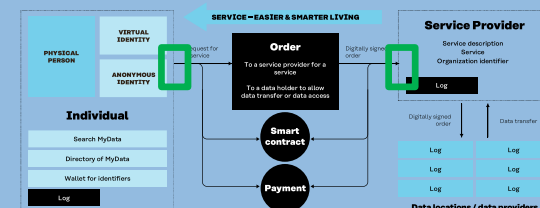
- Functionality
- UI
- Security
- Use cases
- APIs



10

Web communication architecture, Interfaces, APIs

- Registration
- Authorization
- Data requests
- Data send, receive, (REST...)
- Service directory
- Trust domains
- Data management console
- Log
- Data transportation
- Wallet of identifiers



IHAN is Collaborating with multiple bodies

- **IETF**
- **W3C**
- **CEN/CENELEC**
- **EU**
- **Industry specific consortiums**
- **HyperLedger**
- **DLT development**

Proposed collaboration Estonia - Finland

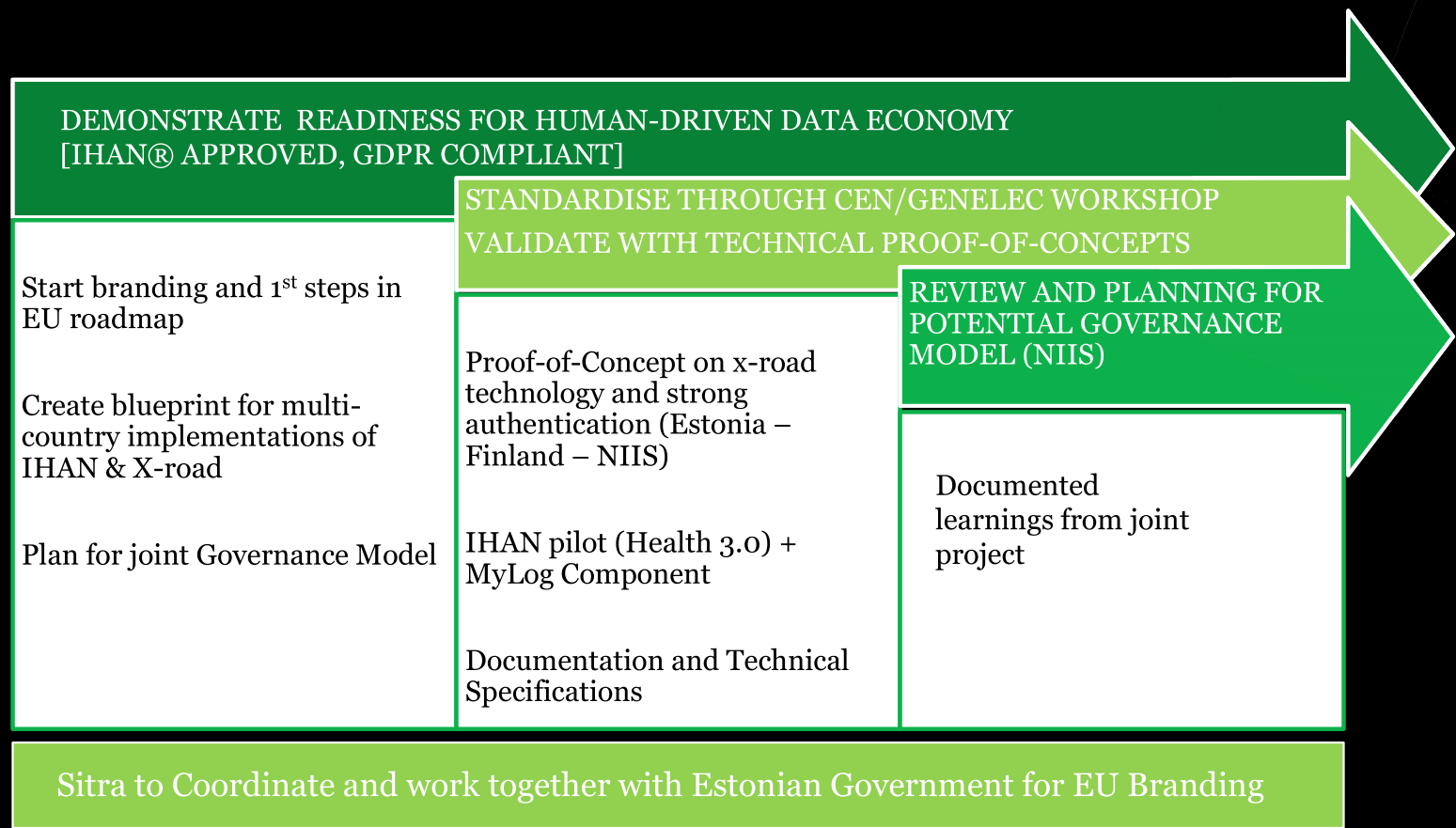
Background:

- Meetings spring 2018 with different people - Siim Sikkut, Riho Oks, Priit Tohver, Janne Viskari among others
- Proposals:
 - IHAN testing environment planning and consultation - email 30.4.2018 Riho Oks, Roksnet Solutions OÜ
 - IHAN health account pilot Estonia (MyData pilot) - email 17.5.2018 Madis Tiik
 - “New Social Business Concept Document” (Foundation Model) - email 10.5. Andrew Bushell

Goals:

- 1) Demonstrate how IHAN Concept will apply to countries where data exchange is based on x-road technology and strong authentication (ID, mID, SmartID). IHAN health account pilot + MyLog component from IHAN Concept + PoC build jointly Estonia (Roksnet) – Finland (VRK) - Nordic Institute for Interoperability Solutions (NIIS)
- 2) Create roadmap for further development and analyse potential ways to build cross-governmental governance model (Sitra will provide resources through Project Management office)
- 3) Create Best Practice for multi-country implementations of IHAN Concept (Sitra will provide resources through Project Management office)

Summary



Goal:
Estonia together with Finland lead the way for IHAN® approved data platforms