Building a borderless health society with blockchain technology

openEHR DAY

London | October 28th 2019 | skills matter

Presented by

Wael Alkhalidi

SVP Operations

wael@medicalchain.com

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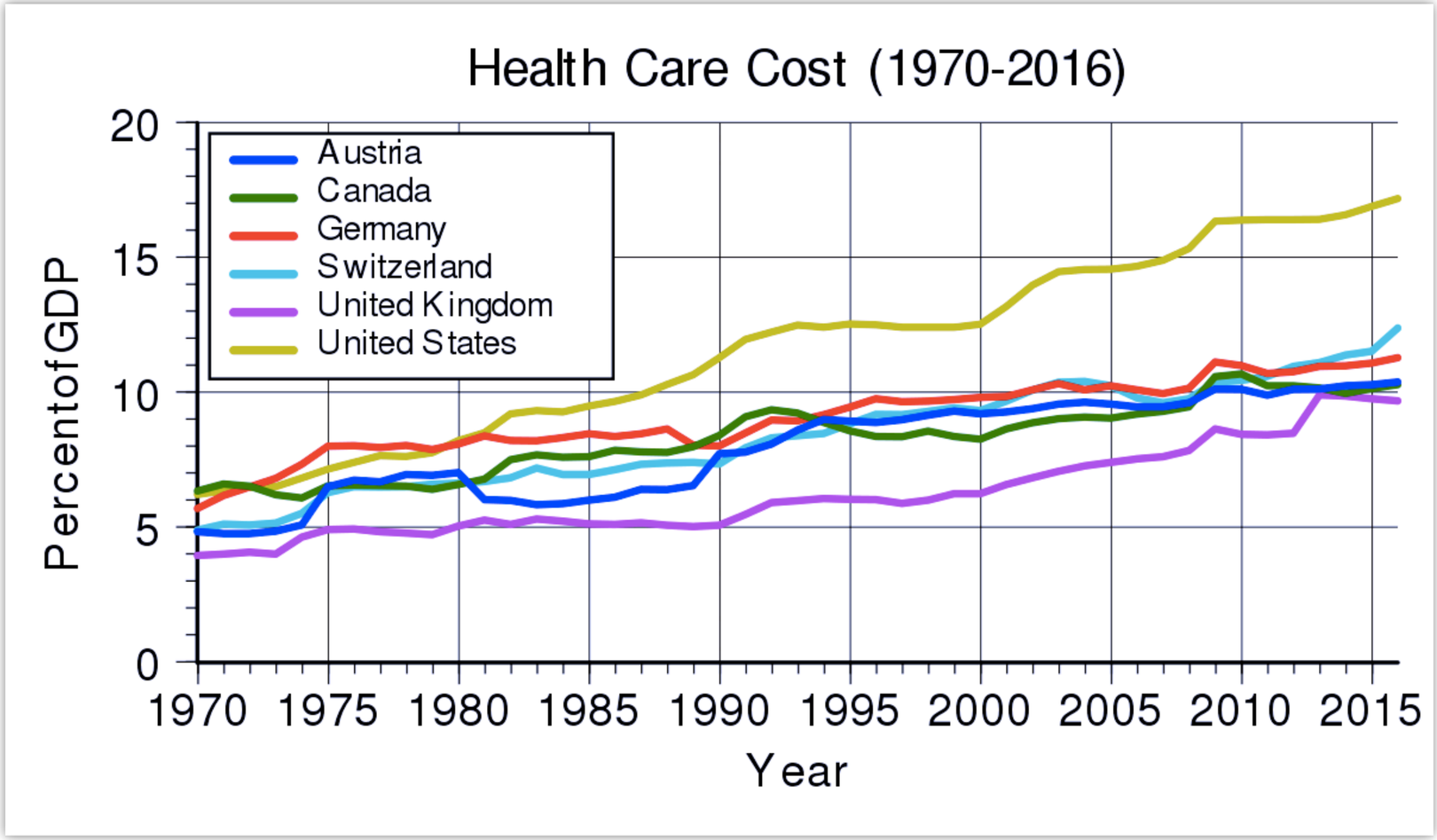
Health Care Cost (1970-2016)



OECD (Organisation for Economic Co-operation and Development) data for Health Expenditure and Financing

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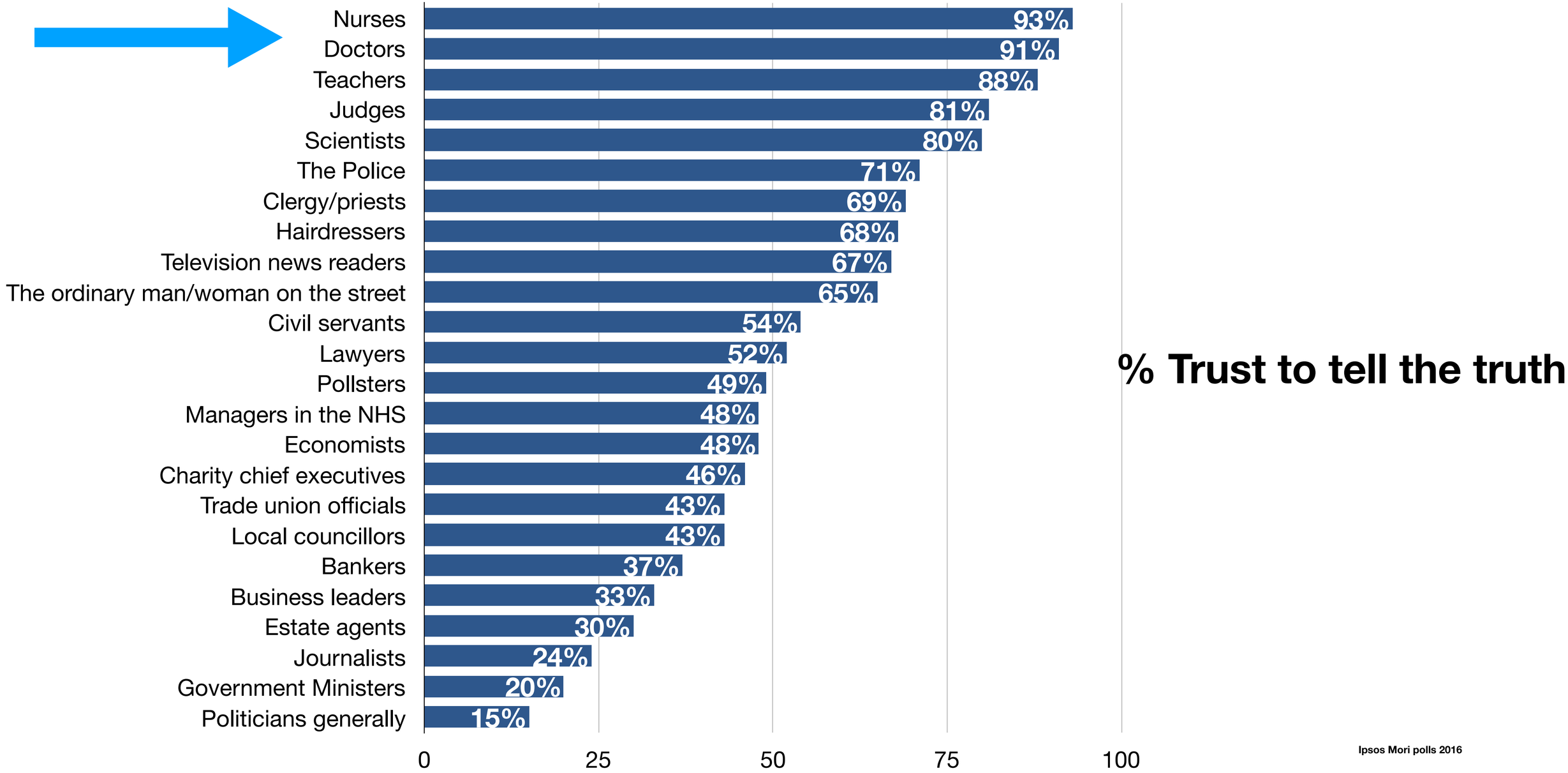
Survey: Which profession do you trust to tell you the truth?



Ipsos Mori polls 2016

Medical errors

The Washington Post
Democracy Dies in Darkness

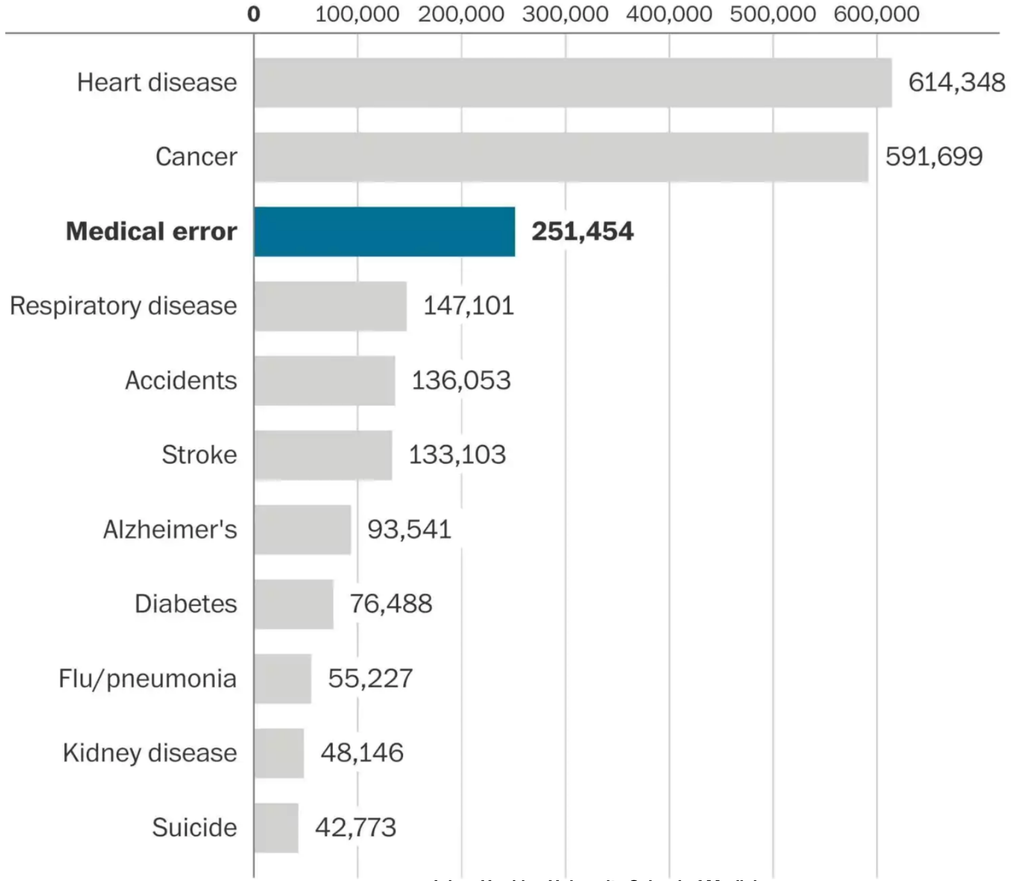
To Your Health

Researchers: Medical errors now third leading cause of death in United States

By Ariana Eunjung Cha May 3, 2016

Death in the United States

Johns Hopkins University researchers estimate that medical error is now the third leading cause of death. Here's a ranking by yearly deaths.



Johns Hopkins University School of Medicine

"It boils down to people dying from the care that they receive rather than the disease for which they are seeking care,"

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What are the medical errors?

- Poorly coordinated care
- Fragmented insurance networks
- Absence or underuse of safety nets

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Security and Fraud

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Security breach fears over 26 million NHS patients

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Cybercrime

Massive ransomware cyber-attack hits nearly 100 countries around the world

More than 45,000 attacks recorded in countries including the UK, Russia, India and China may have originated with theft of 'cyber weapons' from the NSA

- Global cyber-attack – live updates
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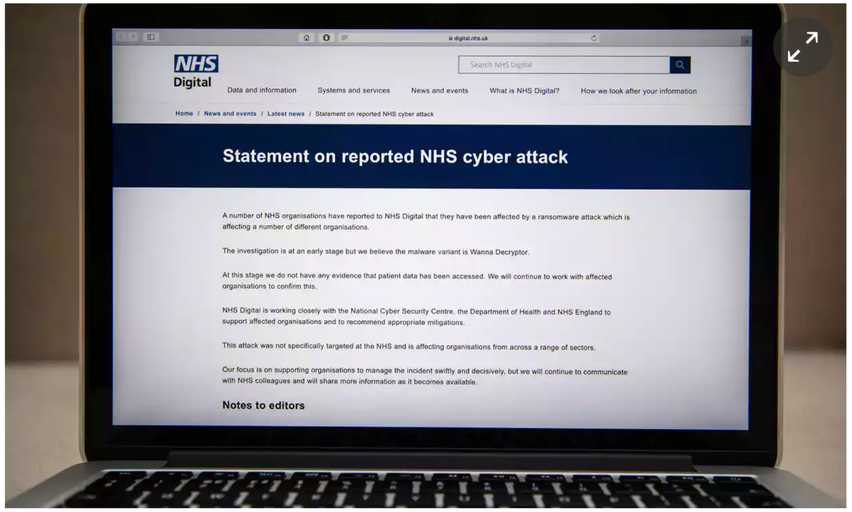
This article is 7 months old

7190

Julia Carrie Wong and Olivia Solon in San Francisco

Friday 12 May 2017
20.57 BST



The attack hit England's National Health Service (NHS) on Friday, locking staff out of their computers and forcing some hospitals to divert patients. Photograph: Carl Court/Getty Images

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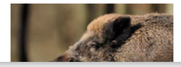
Hunter dies in Germany after wild boar he was

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Security and Fraud

REUTERS

Your medical record is worth more to hackers than your credit card

#TECHNOLOGY NEWS SEPTEMBER 24, 2014 / 9:25 PM / 3 YEARS AGO

Your medical record is worth more to hackers than your credit card

Caroline Humer, Jim Finkle

6 MIN READ

NEW YORK/BOSTON (Reuters) - Your medical information is worth 10 times more than your credit card number on the black market.

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Data Storage

NHS lost 700,000 records in 2017

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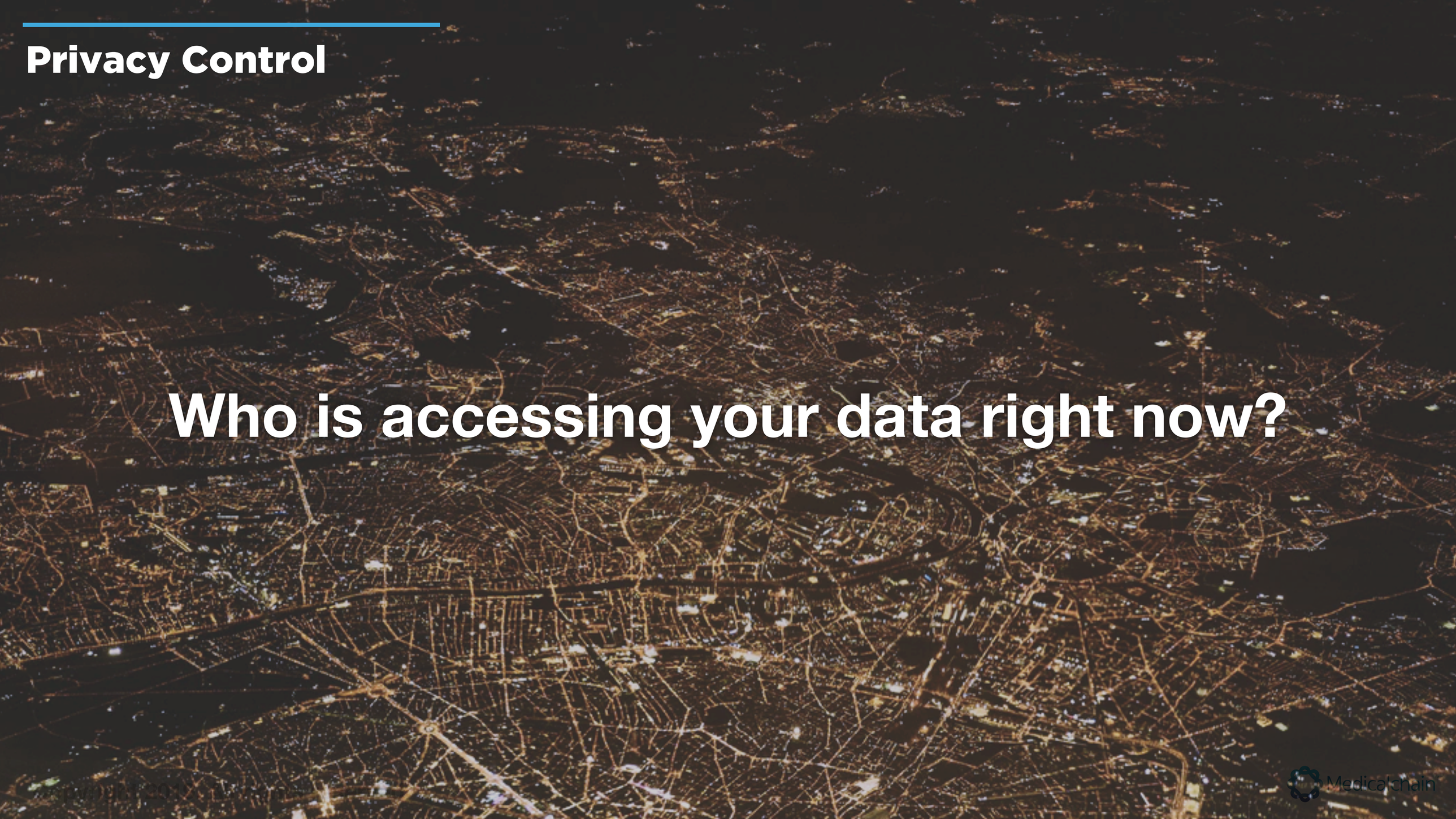
Privacy Control



Privacy Control

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Privacy Control

YORKSHIRE Evening Post

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Hospital trust probes Hammond scan 'spy'

Published: 11:23
Tuesday 03 October 2006

By Ian Rosser An investigation has begun after hospital staff were accused of spying on Richard Hammond's medical records.

The Top Gear presenter spent more than a week at Leeds General Infirmary (LGI) following a high-speed accident on a York airfield.

His jet-powered car, which was capable of speeds in excess of 300mph,

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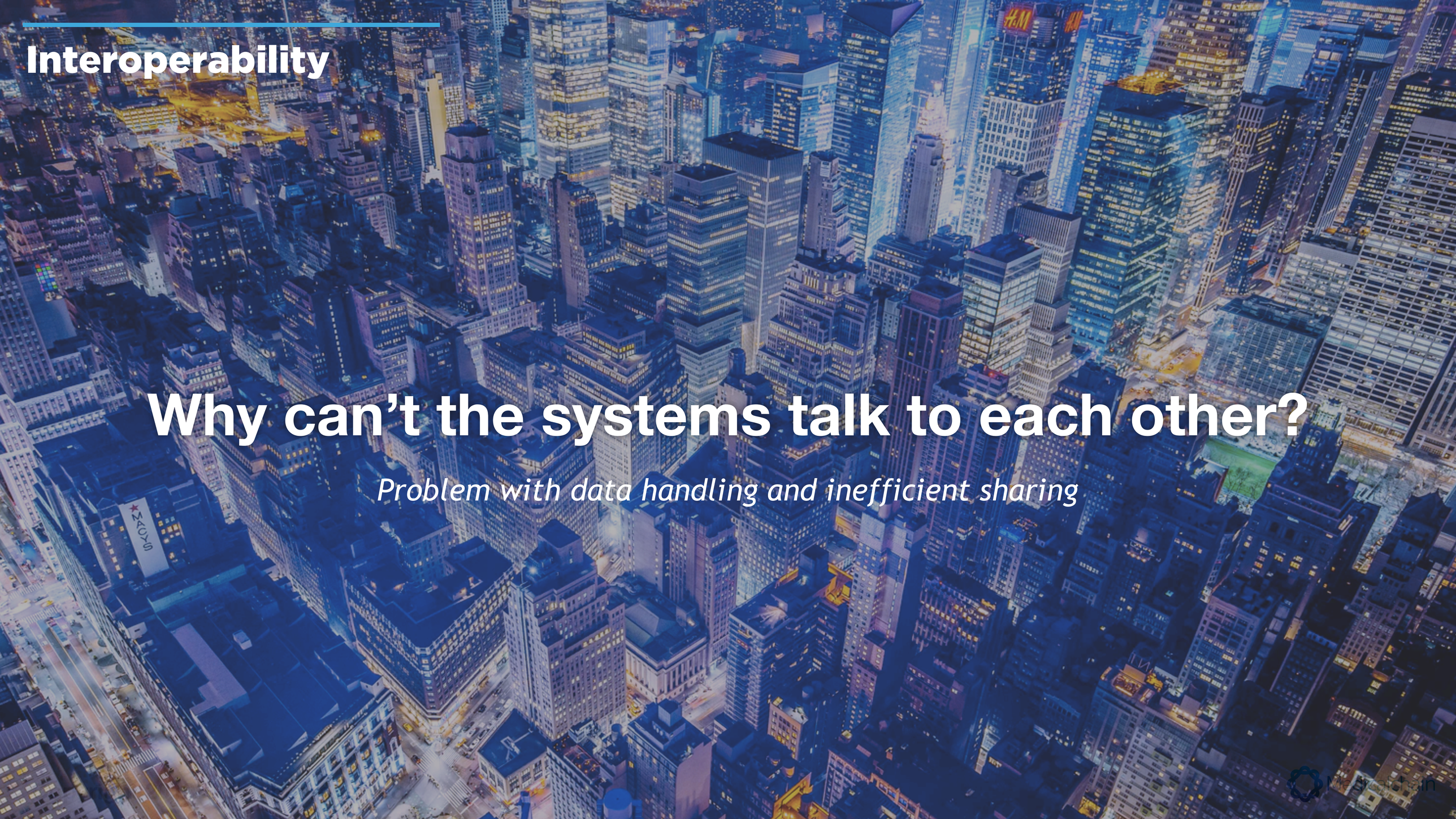
Interoperability

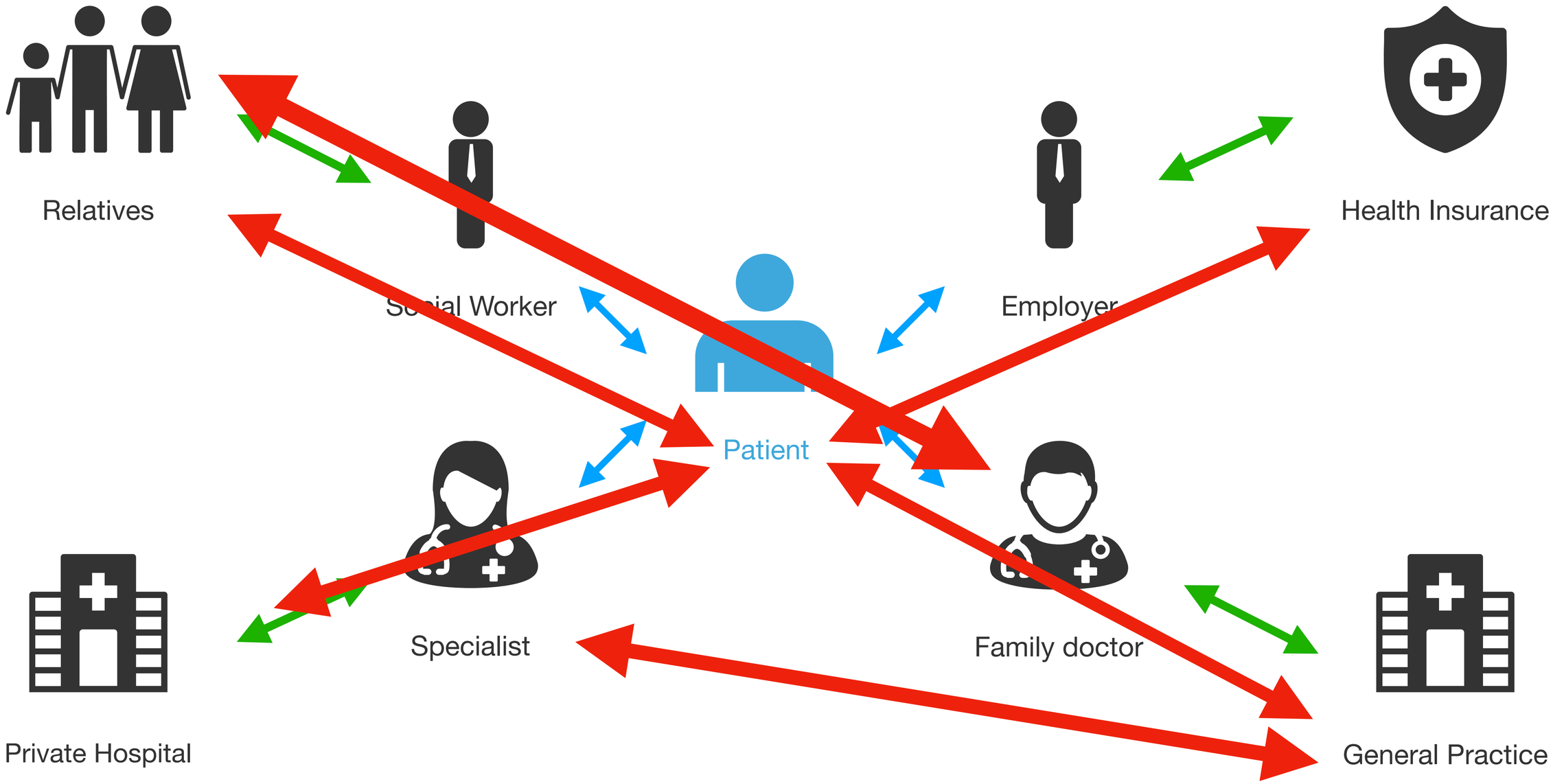


Why can’t the systems talk to each other?

Problem with data handling and inefficient sharing

MetaBlockchain

Patient data held in many silos



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Patient

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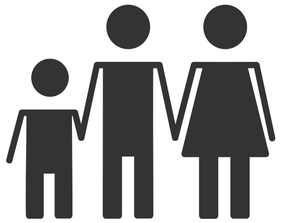
Health Insurance

Private Hospital

Specialist

Family doctor

General Practice



Relatives

Social Worker

Employer

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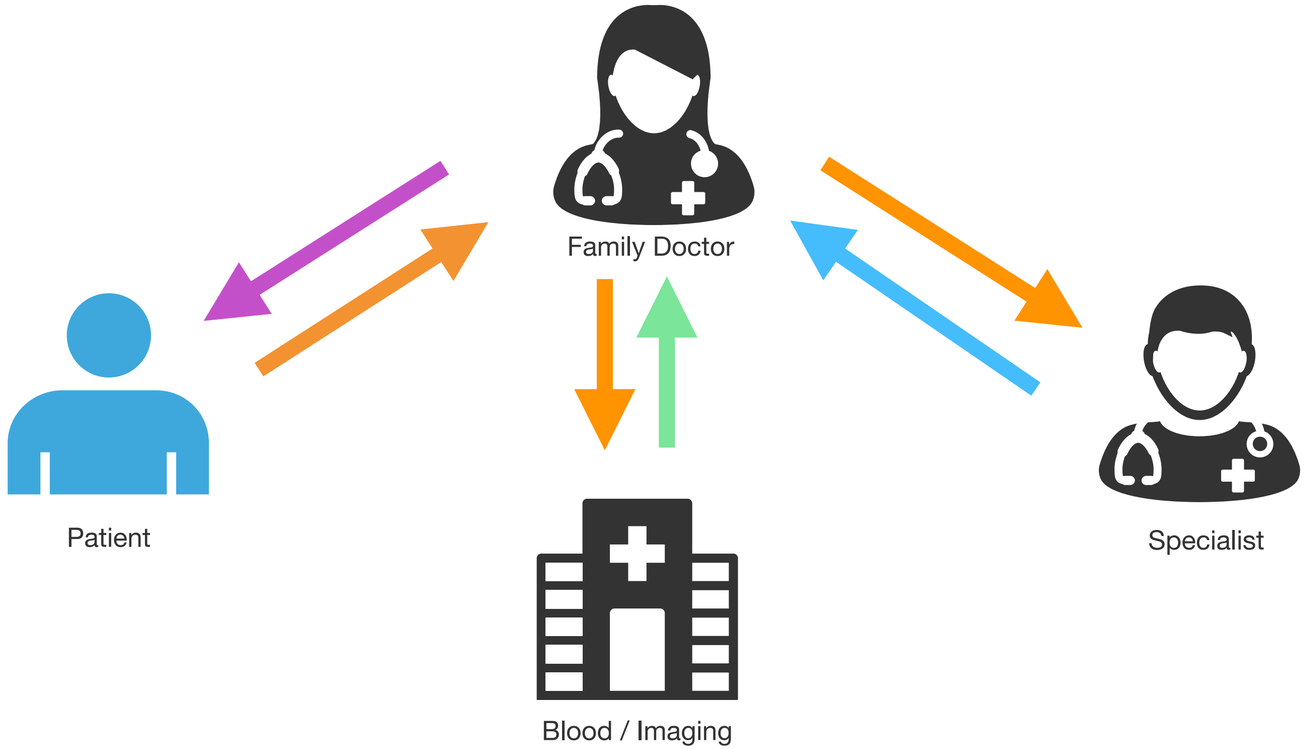
Classic patient pathway

Scenario 1:
Family doctor manages query without investigations

Scenario 2:
Family doctor requests investigations then manages the condition based on results

Scenario 3:
Family doctor refers patient onto a specialist +/- after requesting investigations



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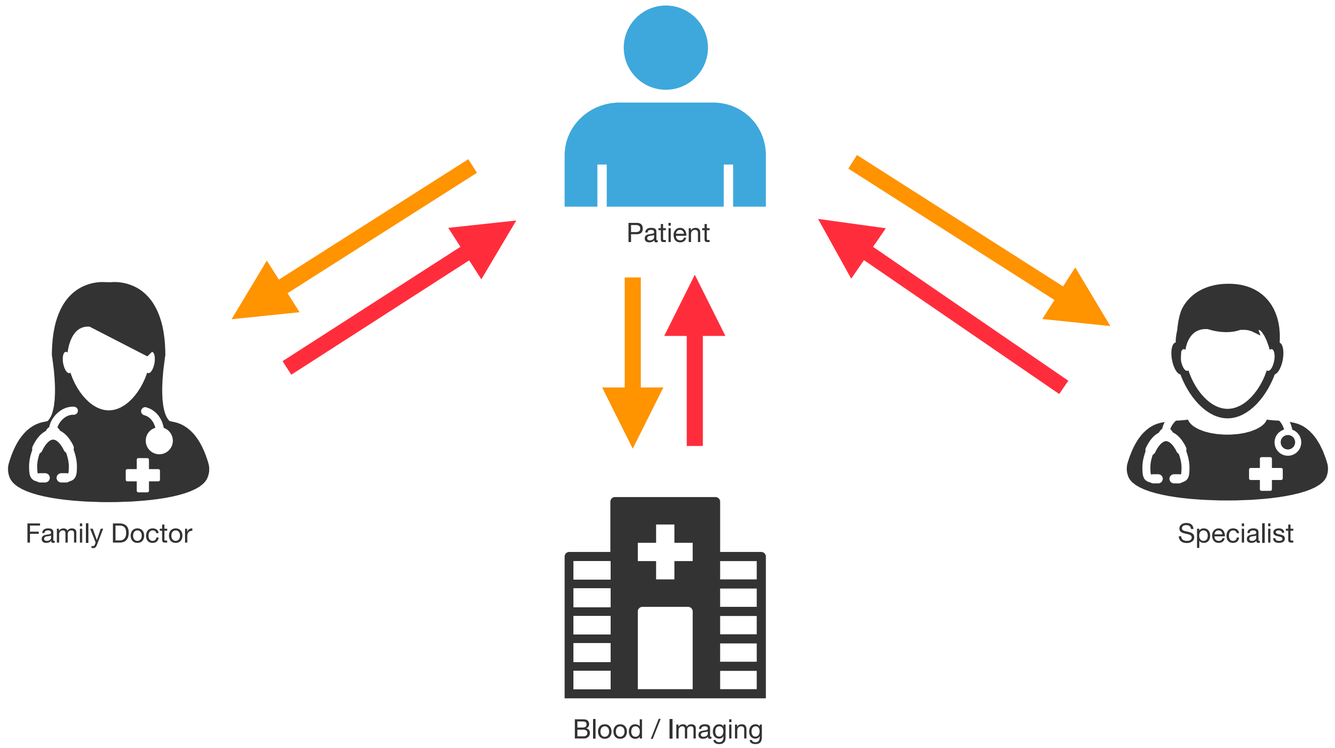
Future patient pathway (borderless patient driven)



The patient is at the centre of their care

Sending and receiving information from different stake holders and granting access to their records to those who are involved in their care

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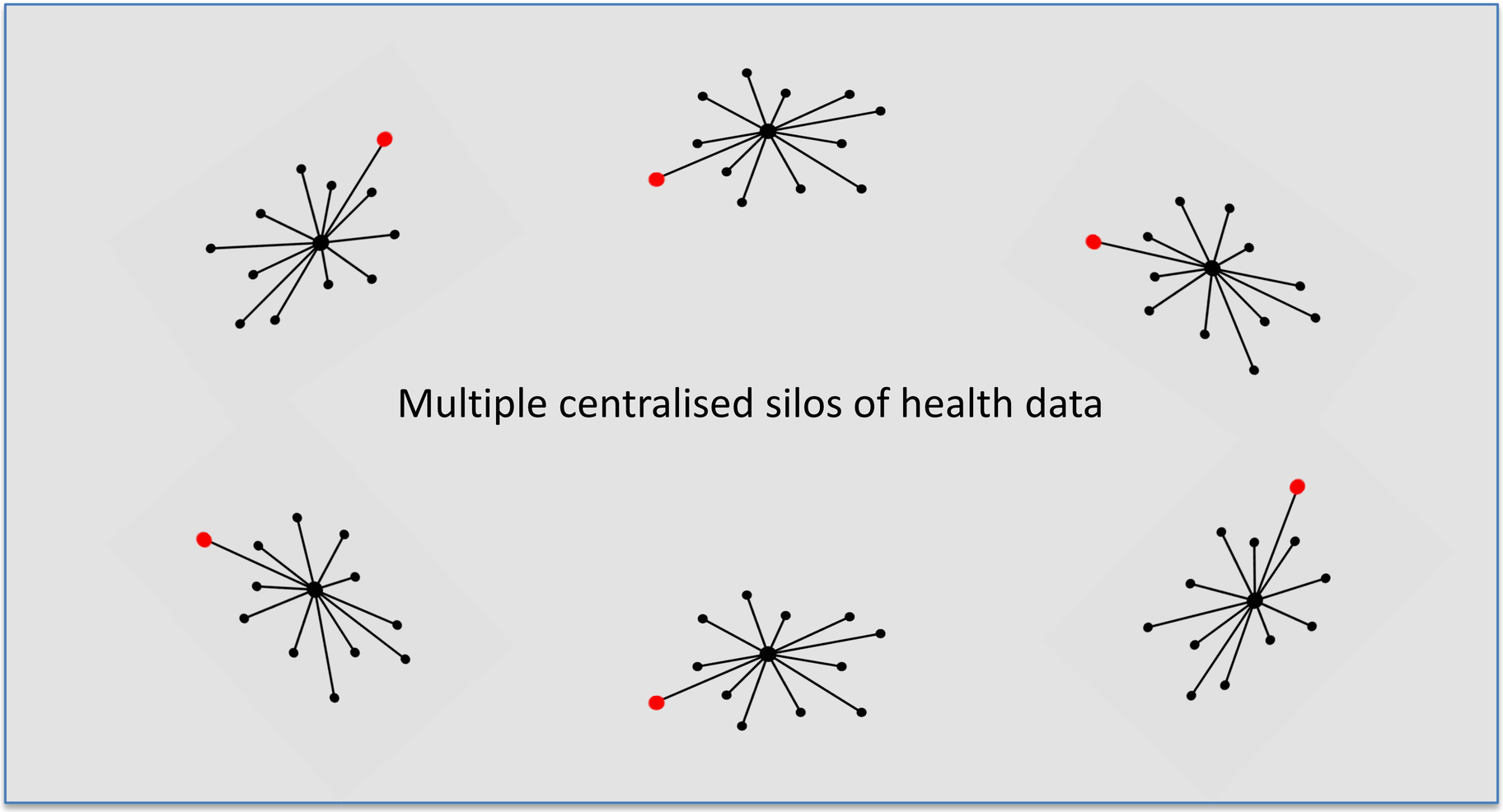
What we currently have....



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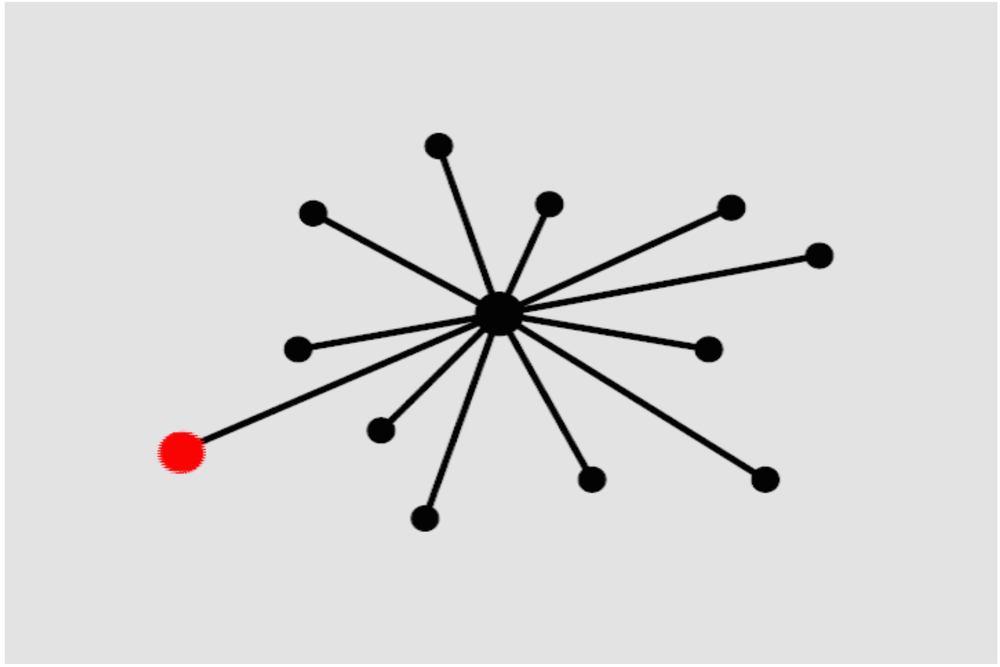
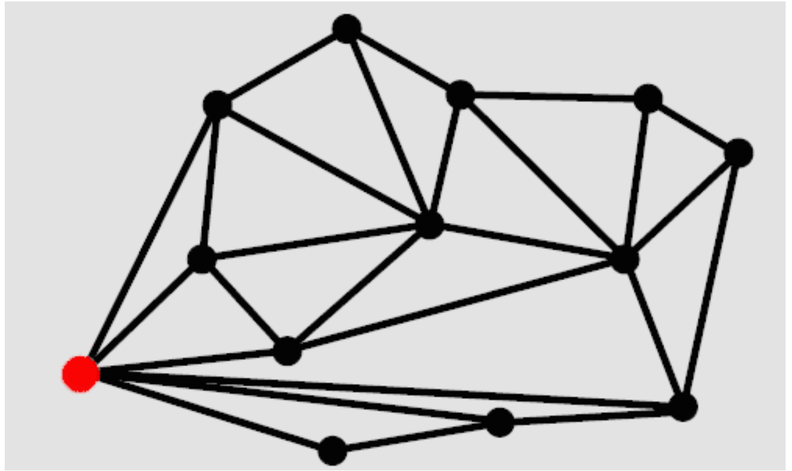
Centralised vs Distributed



Centralised



Distributed

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What is blockchain?

- A distributed decentralised ledger based on cryptography that improves reliability, transparency, robustness and trust

- Blocks of information are added piece by piece to form a chain. This chain structure is shared across different holders named nodes

- If any information is changed within a block, this would be identified by the other node holders and the information would be deemed corrupted

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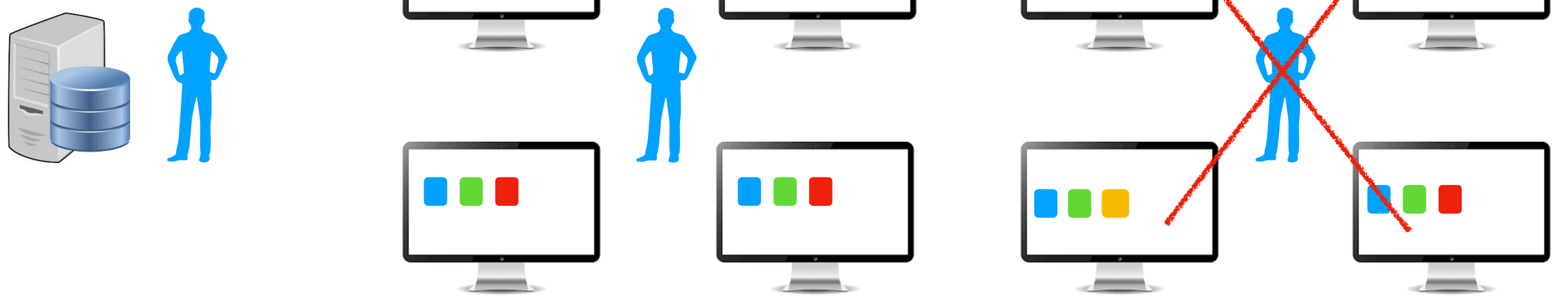
Medicalchain = Blockchain + Healthcare

Traditional Servers

Blockchain Storage



Blockchain is an incorruptible digital ledger of transactions that can be utilised to record, store and share information in a trustless decentralized system.

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Digitalised Ecosystems

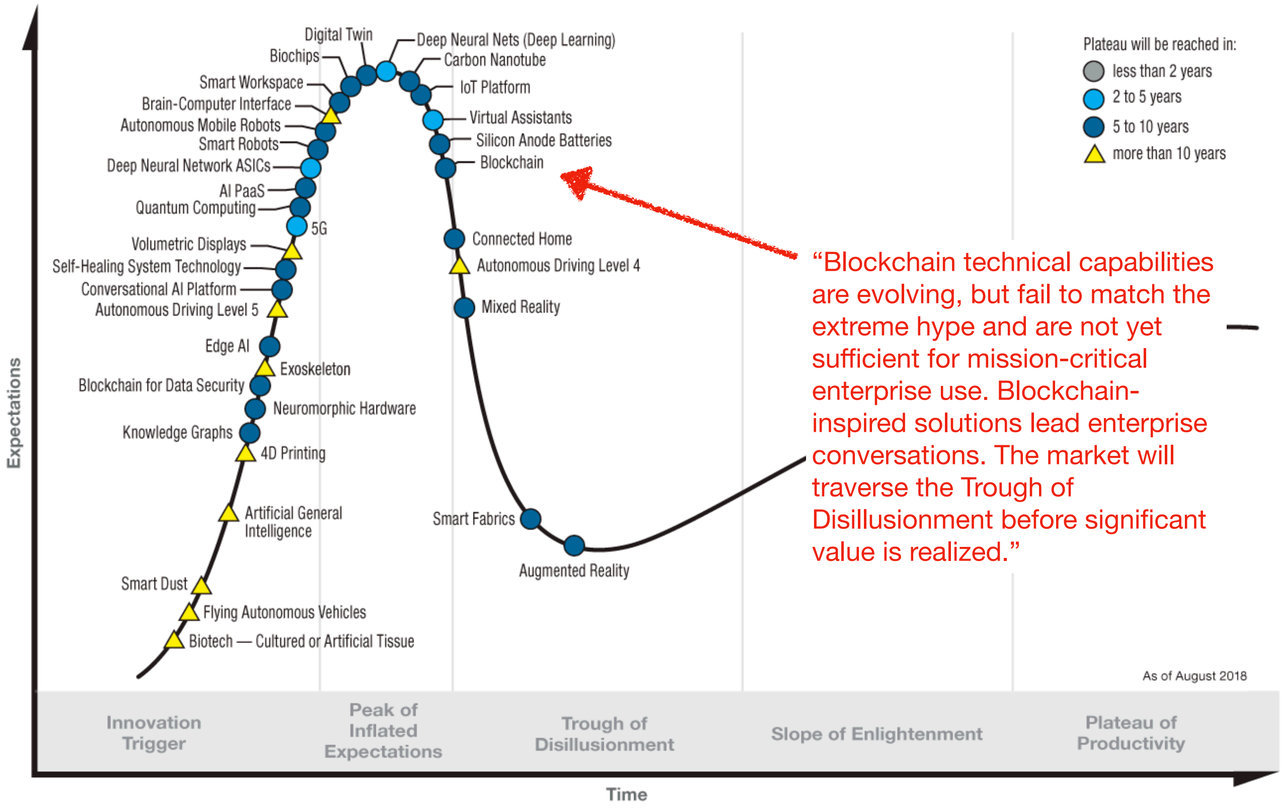
- Emerging technologies require revolutionising the enabling foundations that provide the volume of data needed, advanced compute power and ubiquity-enabling ecosystems. The shift from compartmentalized technical infrastructure to ecosystem-enabling platforms is laying the foundations for entirely new business models that are forming the bridge between humans and technology.

- This trend is enabled by the following technologies: Blockchain, Blockchain for Data Security, Digital Twin, IoT Platform and Knowledge Graphs.

- Digitalized ecosystem technologies are making their way to the Hype Cycle fast

.

Hype cycle of emerging technologies 2018



"Blockchain technical capabilities are evolving, but fail to match the extreme hype and are not yet sufficient for mission-critical enterprise use. Blockchain-inspired solutions lead enterprise conversations. The market will traverse the Trough of Disillusionment before significant value is realized."

gartner.com/SmarterWithGartner

Source: Gartner (August 2018)

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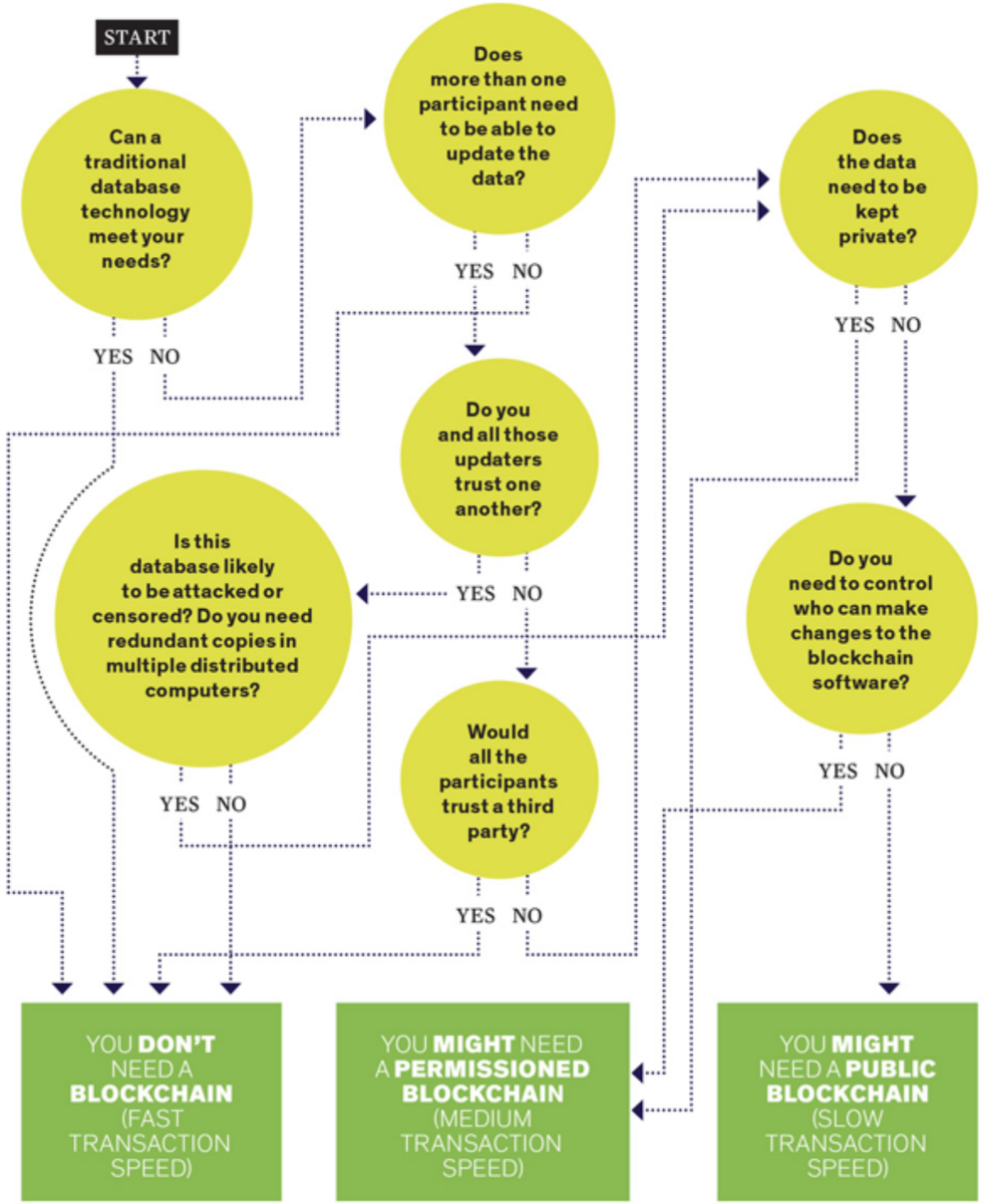
Blockchain Decision Tree



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Challenges

What are the challenges that we are facing?

Dave Ebbitt

Health Informatics Manager

dave@medicalchain.com

Challenges?

"In essence, there will no longer be an Electronic Health Record in the traditional sense, an institution-centric record whose patient portal is a small tip of the hat to patient-centeredness. Rather, there will be **one digital patient-centered health record that combines clinician-generated notes and data with patient-generated information and preferences. Its locus of control will be, unambiguously, with the patient.**"

Bob Wachter MD, Chair of National Advisory Group on Health IT, England

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How do we get there?

Fast Healthcare Interoperability Resources

a standard for exchanging healthcare information electronically

Open Electronic Health Records

open source specifications and reference implementations for EHR systems

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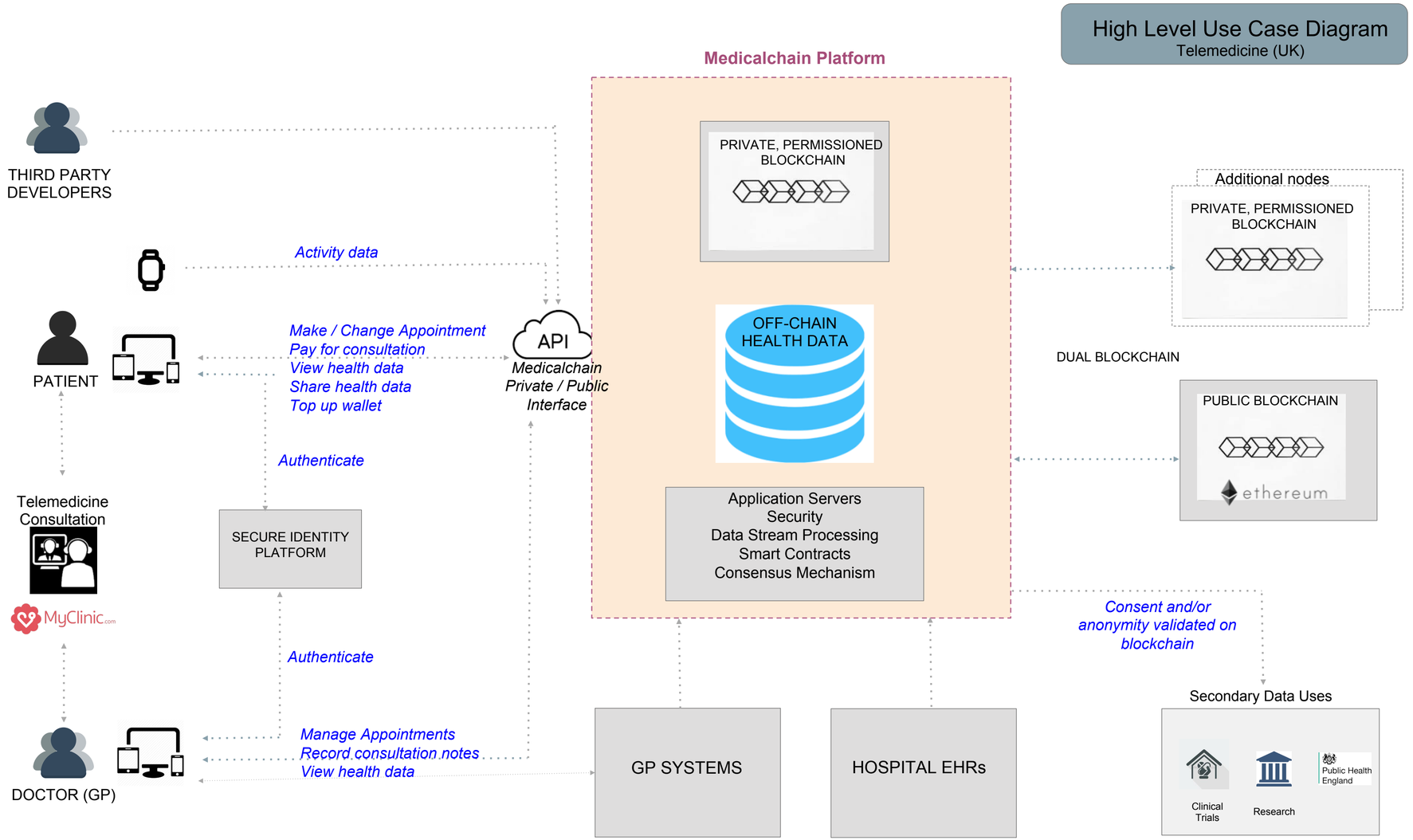
Challenges?



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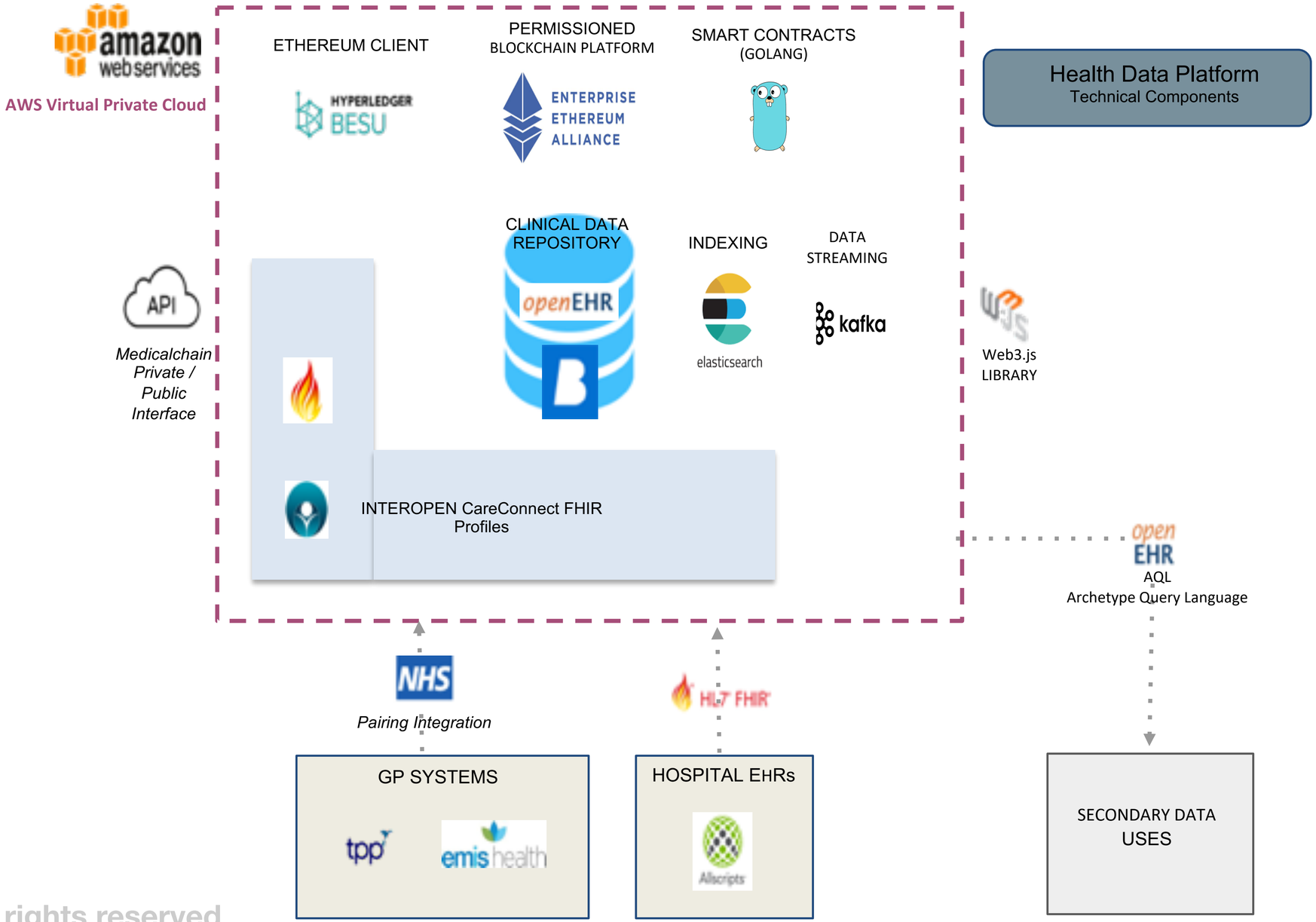
Challenges?



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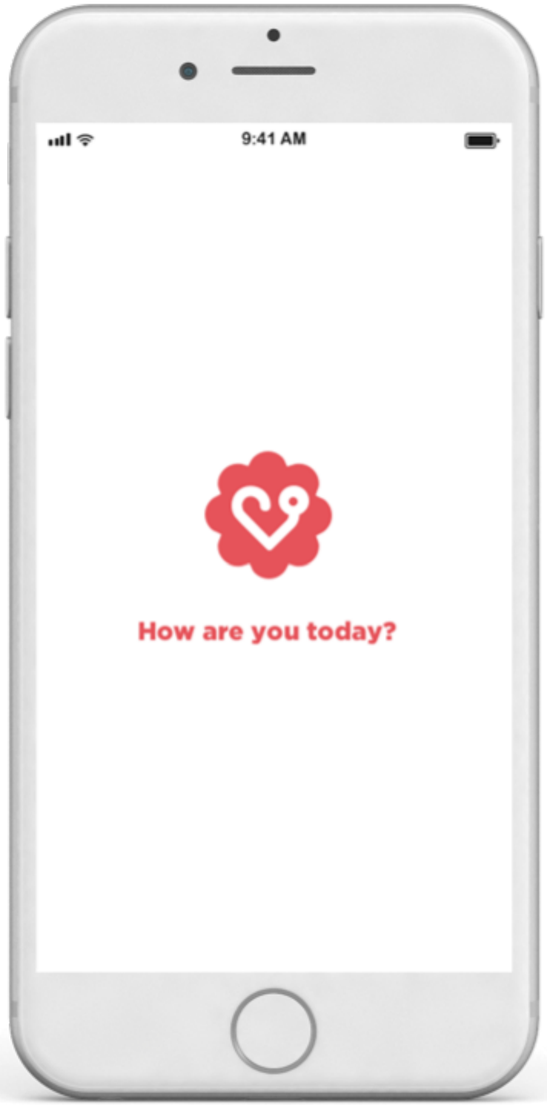
Application

MyClinic.com



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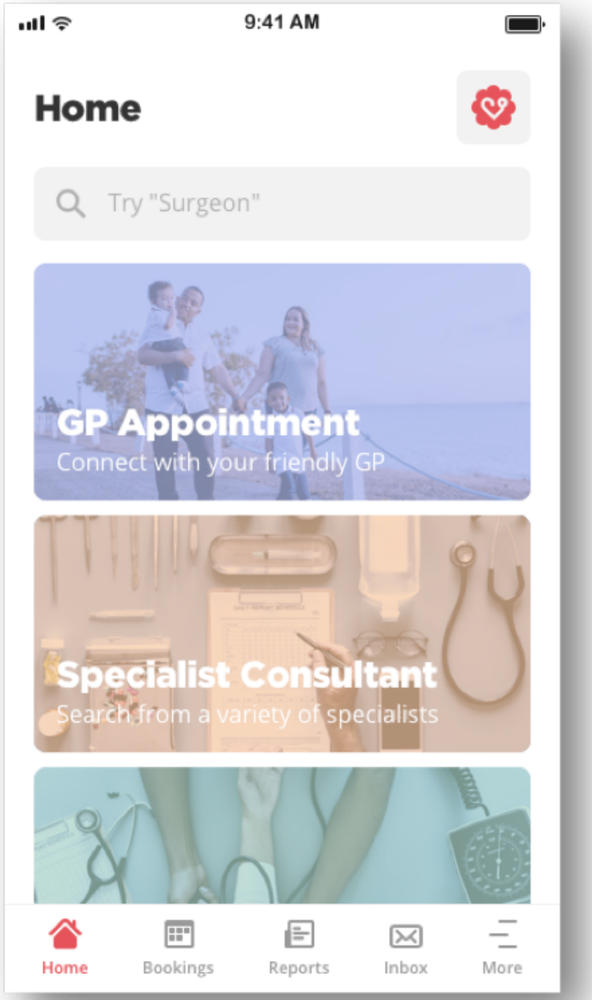

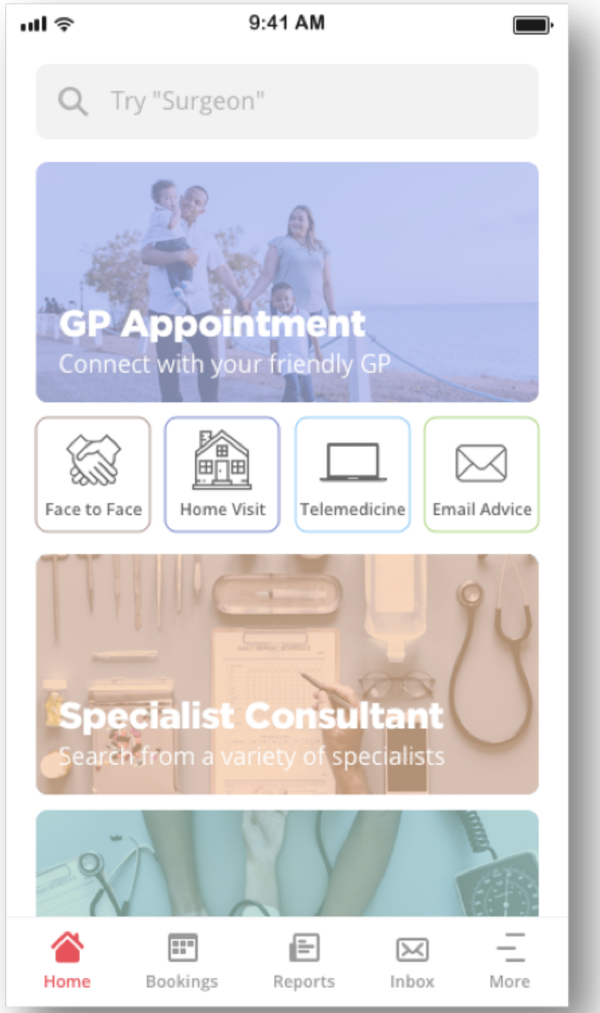

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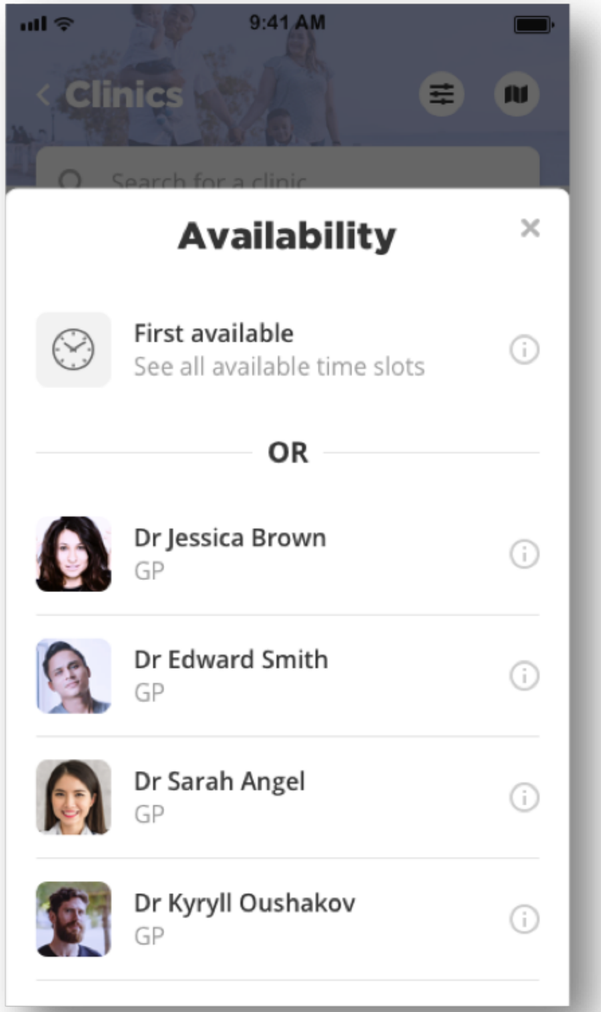
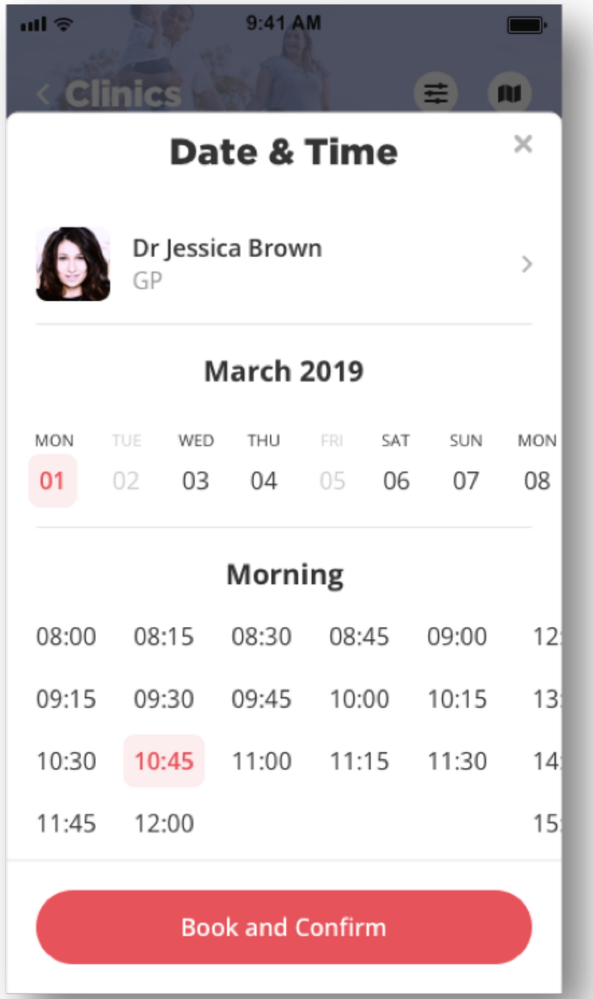
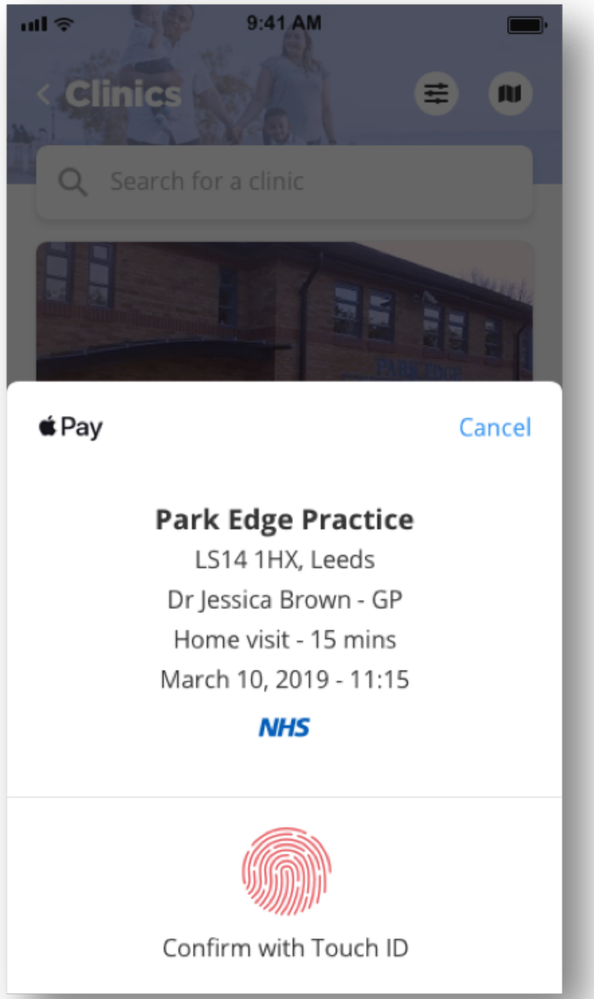
Application







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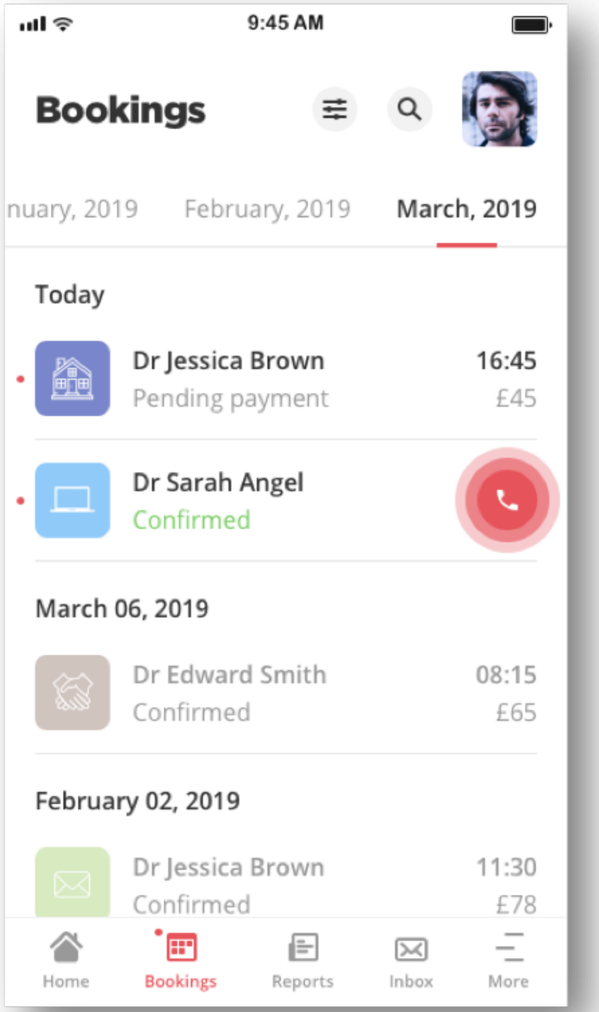

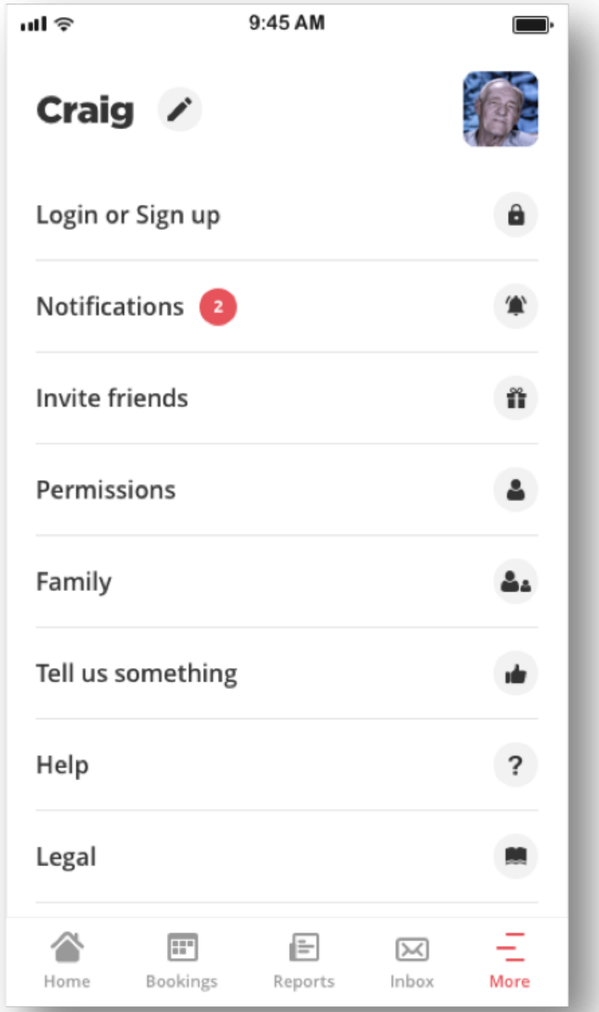

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Wearable Devices and Emergency Access

- Basic health information recorded
- Collected data uploaded to records
- Possible private key on NFC
- Emergency access to health record
- Allergies
- Next of kin
- Chronic conditions
- Advanced decisions recorded

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THANK YOU

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Get involved!

- Join our community
- Propose a partnership
- Host a blockchain node
- Join us on the innovation journey

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