bewys
The wise side of data

Digital innovations in the Health Sector

Prospects from big data, deep-learning and blockchain technologies deployment in Africa

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Key Figures be ys Group 2019

15yr+ of Investments in R&D

450 employees in France and 3100 in the world

65 000 MenDay per year dedicated to Research and Development

1 000 000 calls per year

99% of requests managed in less than 24 hours

300 000 companies & professionals connected to be ys eco-system

Present in 14 countries worldwide

€100 M
of Revenues

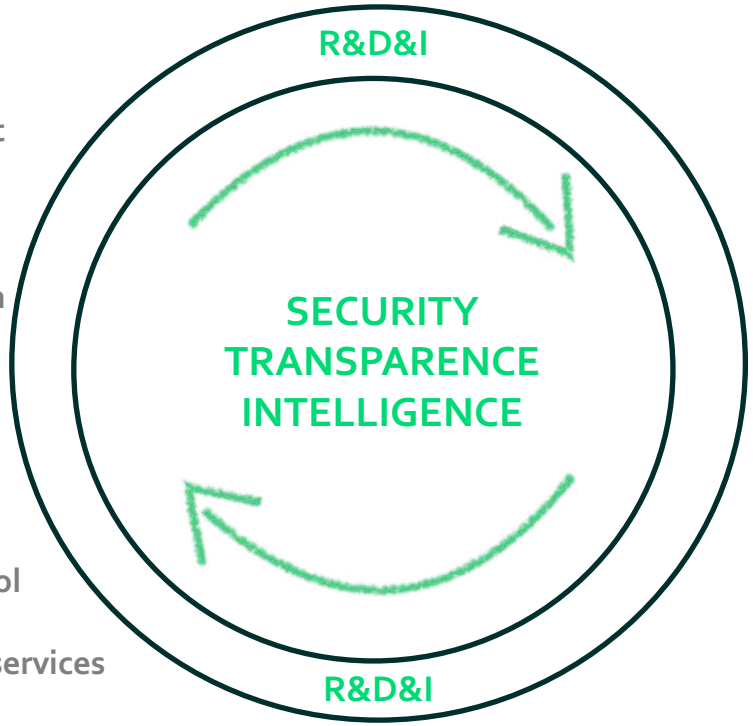
€6bn+
of financial flows processed per year in real time

30mn+
people using be-ys services

Enhancement of your Data Governance in a Trusted Ecosystem

Data Analytics & Intelligence
- Big Data scalability
- AI power
- Aggregation of customer data
- Real time interactions

Digital Vault
- Data retention and management in a fully trusted environment
- Total traceability backed by Blockchain technology
- Automatic data archiving system
- GDPR compliant



Data Governance
- Integrated KYC process
- ID monitoring (automatic/manual intelligence)
- Digital Identity – IAM
- AML/CFT

Smart Tools
- Market insight/Reporting
- Financial Audit & Internal Control
- AI Fraud detection
- Full customization of products/services
- E-signature

Data Processing
- Data collection
- Data Validation
- Anonymize/ De-identify Data

Security & Data protection
(EU Data Storage Center)
- Privacy by design/default
- Informational self determination

A master system enabling you to secure and manage the HERITAGE of your company data

What are we talking about?

Digital innovations in the Health Sector

Prospects from big data, deep-learning and blockchain technologies deployment in Africa

Definitions:

- **Big data**: technology that can handle TeraBytes or PetaBytes of information, mostly unstructured, Used for data science: transforming data into knowledge through algorithms
- **Deep-Learning**: a type of artificial intelligence, evolution of machine learning, relying on artificial neural networks using representation learning. Generates creative and often experts results.
- **Blockchain**: distributed ledger providing immutable and unbreackable storage. Used to create trusted registries or trusted ledgers.

Challenges:

- Big data and Deep-learning require large (very large) infrastructures in storage, computation and networks.
- Blockchains require computation nodes and trusted identities.
- Health care is very complex, ontology and semantics on one hand, large data sets on the other hand, together with a large number of actors involved in the exchanges.

What are the benefits?

In health care, what are the main benefits of using those technologies?

- More **efficient care**: identify what works, optimize capacities
- Better **interoperability**: data transformation and semantic interoperability. More efficient exchanges and better services.
- Better management of the **payments**: Directed payments, very low management costs.
- Rise of nationwide **centralized platforms** for medical and financial data exchanges for healthcare.
- Better **Fraud Management**, allowing for an easier deployment of services and competition by leveling the business contexts.
- Better **clinical research**: data sharing combining blockchain for traceability and big data for analysis: example of My health My data, a European project to deploy the infrastructure for data sharing.

One example: MHMD

My Health My Data: http://www.myhealthmydata.eu/

Use-cases

- Institutional use-case: registration, download and secure computation
- Individual use-case: registration, download and right to be forgotten

Platform

• Blockchain (based on Fabric 1.2.1)	GNU
• Distributed Driver	GNU
• FedEHR Data Capsule	GNU
• Global Catalogue	HES
• Local Catalogue	GNU
• DiGiMe	DGM
• MHMD Mobile App	LYN
• Amnesia	ATH
• SMPC	

Demoed later

• DeepReasoner	SIE

Infrastructure

- 4 hospitals QMUL, OPBG, Charité, UCL
  - 81 K Patients
  - 820 K Medical events
  - 71 M Clinical variables
- 2 research nodes (Almerys/gnúbila and Siemens)

One example: MHMD

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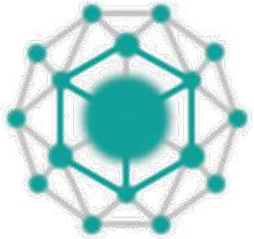


Data
→ Private data storage **off** the blockchain (thanks to FedEHR Data Capsule & Driver)
→ Information about **the status of the data sharing process** is recorded in the blockchain anonymously

Dynamic consent
→ Taking **control over who has access** to my data and for what purpose
→ Requested by the MHMD mobile app and enforced by a smart contract and executable RTBF

Protect the identity & rights of the data owner
→ Different **pseudo-anonymization** levels
→ **Privacy preserving** blockchain scheme (preventing statistical inference)
→ **Right to be forgotten**: smart contract removing link between blockchain and data off-chain

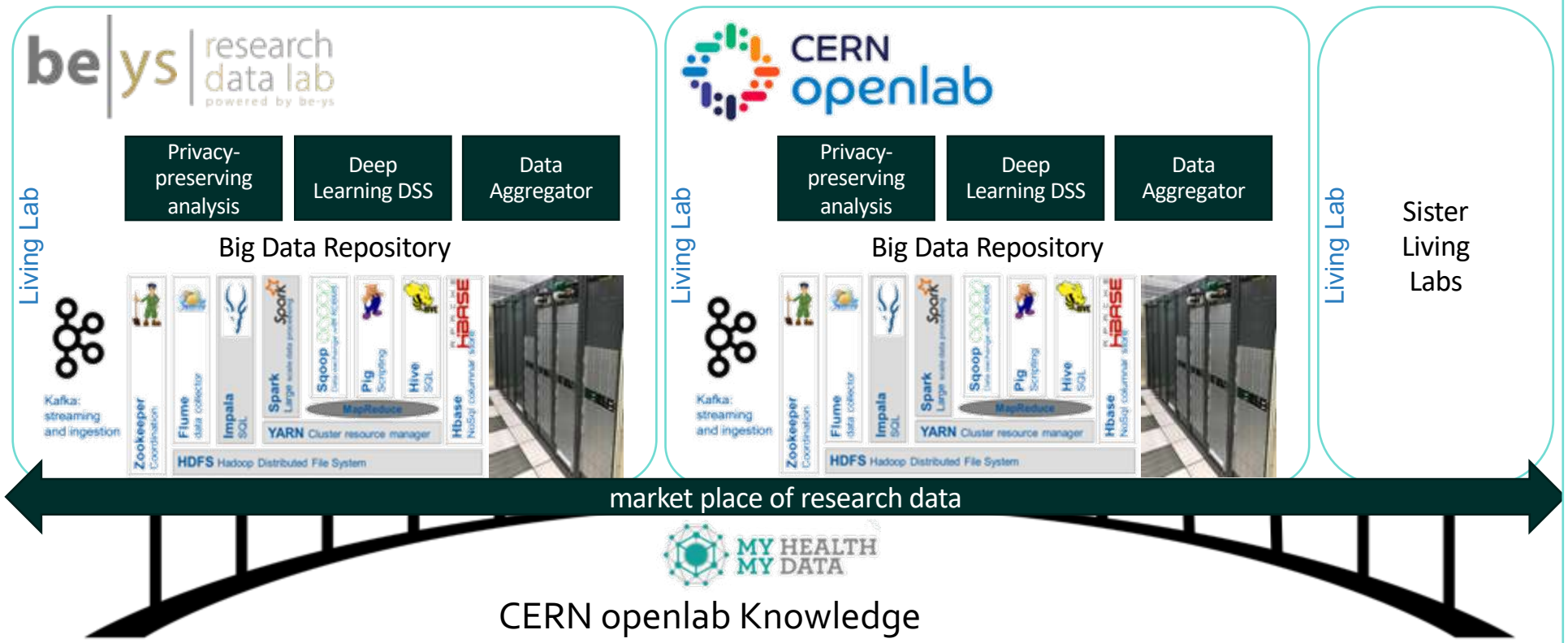
Blockchain & smart contract
→ **Smart contracts** to orchestrate the data sharing lifecycle and to enforce the security policies and different business rules
→ **Keep the record** of all the actions taken in the system for the data sharing process
→ **Modular design** allowing to use different types of consensus algorithms (e.g., PBFT or ZKP)

GDPR COMPLIANCE BLOCKCHAIN SCHEME!

One example: MHMD

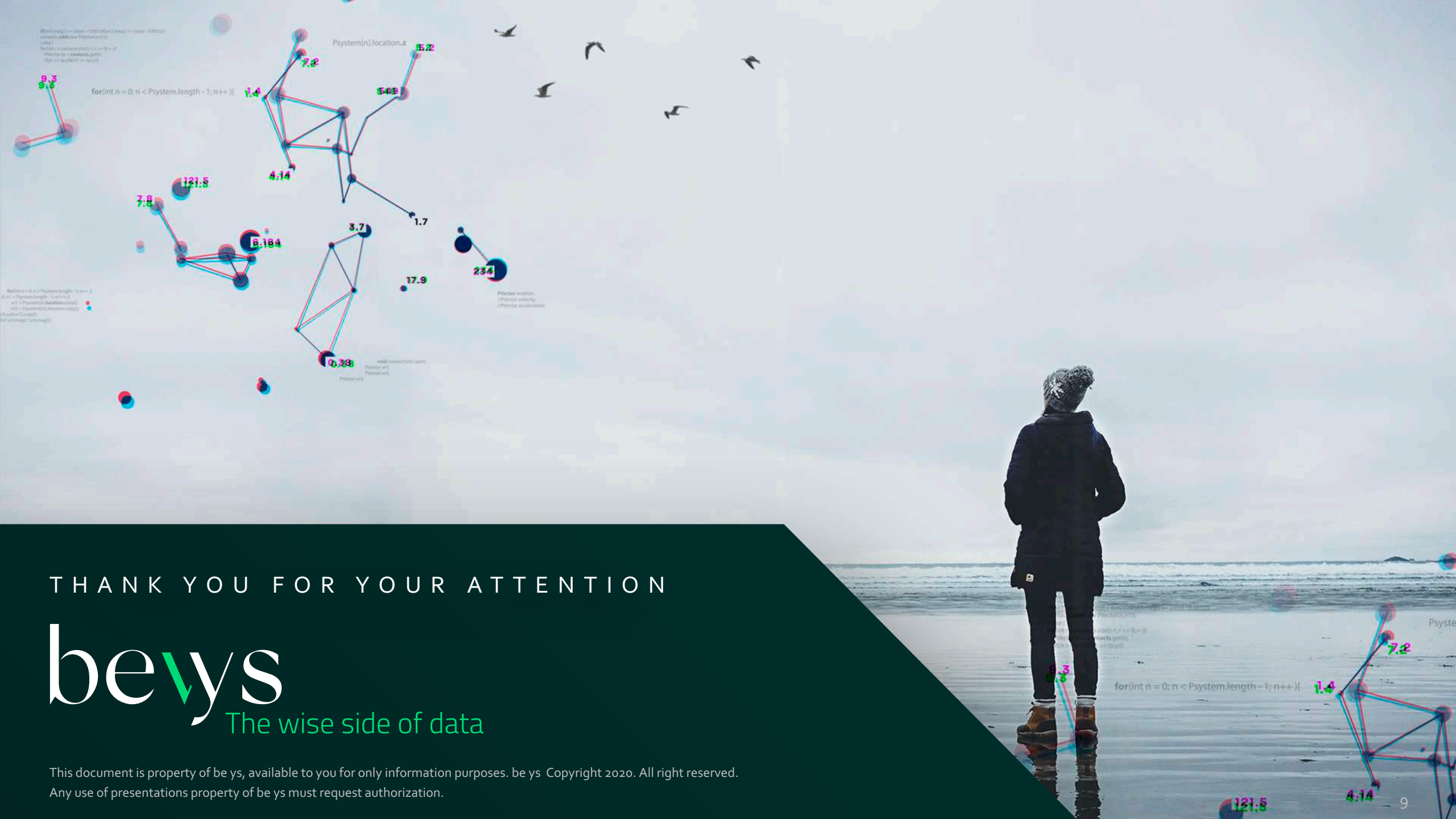
My Health My Data: Next steps

- CERN Openlab, CERN IT-DB and Be-ys



CERN openlab Knowledge Sharing Platforms

- Setting up nodes in hospitals is relatively simple.
- Patient access to their own information and control of its usage through an app, minimizing data transfer.
- Capacity to deploy **personnalized services**
- Progessively increase the capacity to **understand** and control the **specificities** of healthcare in Africa.



THANK YOU FOR YOUR ATTENTION

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