E-HEALTH: CHALLENGES AND LESSONS LEARNED

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ERICSSON NIKOLA TESLA GROUP

An associated company of the Ericsson Group. Provider of communication products and services in the operators' segment, and a provider of innovative ICT solutions related to healthcare, transport, state administration, municipal services and multimedia

- Focused on knowledge and innovations
- Socially responsible

> 2900

Employees

PARENT COMPANY

Ericsson Nikola Tesla d. d.

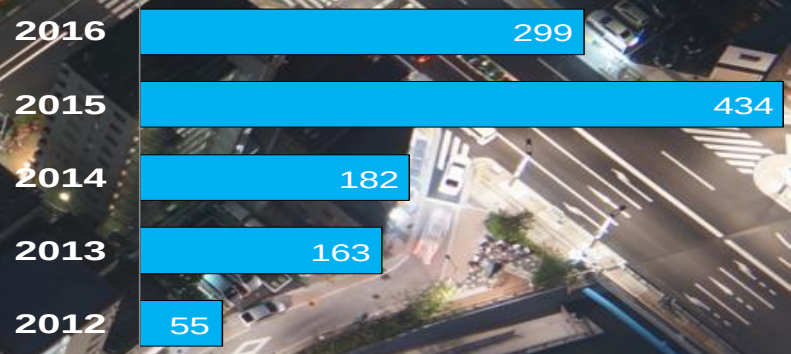
SUBSIDIARIES

Ericsson Nikola Tesla Servisi d.o.o.
Libratel d.o.o.
Ericsson Nikola Tesla BH d.o.o.

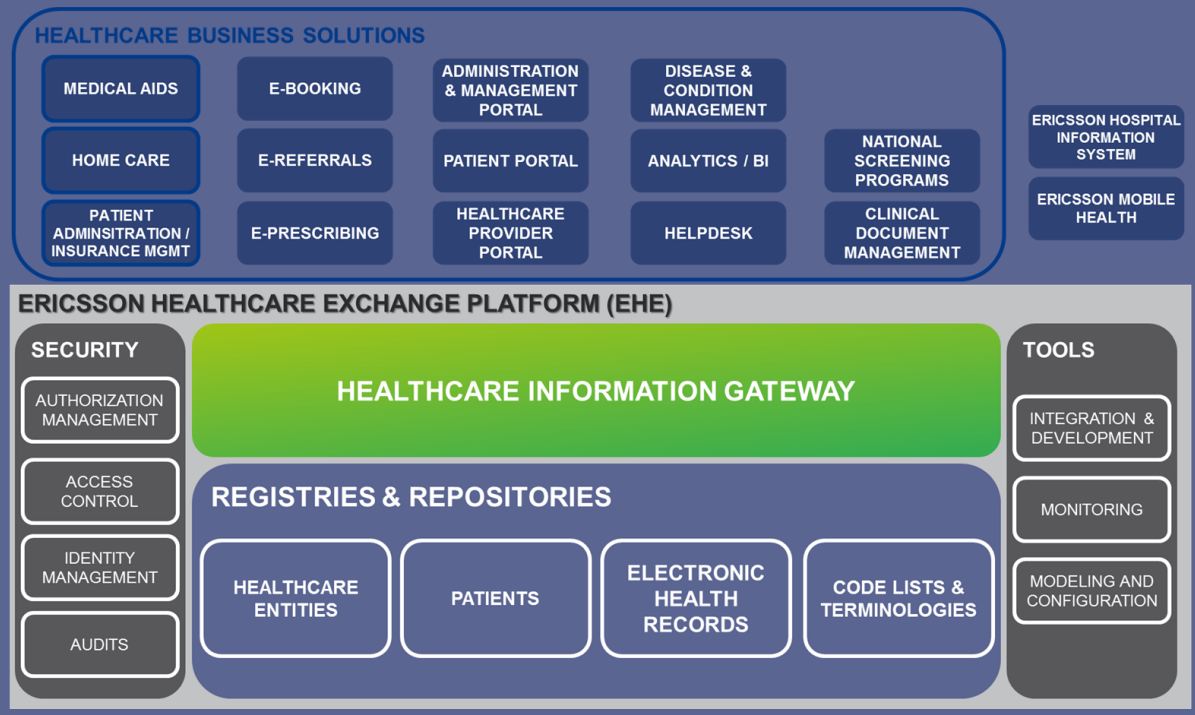
MARKETS

- Croatia
- Exports markets
- Services to Ericsson

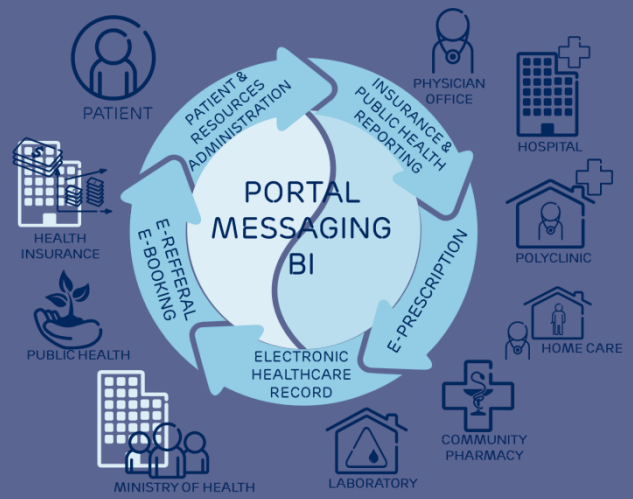
NEW EMPLOYEES



ERICSSON NIKOLA TESLA IN HEALTHCARE



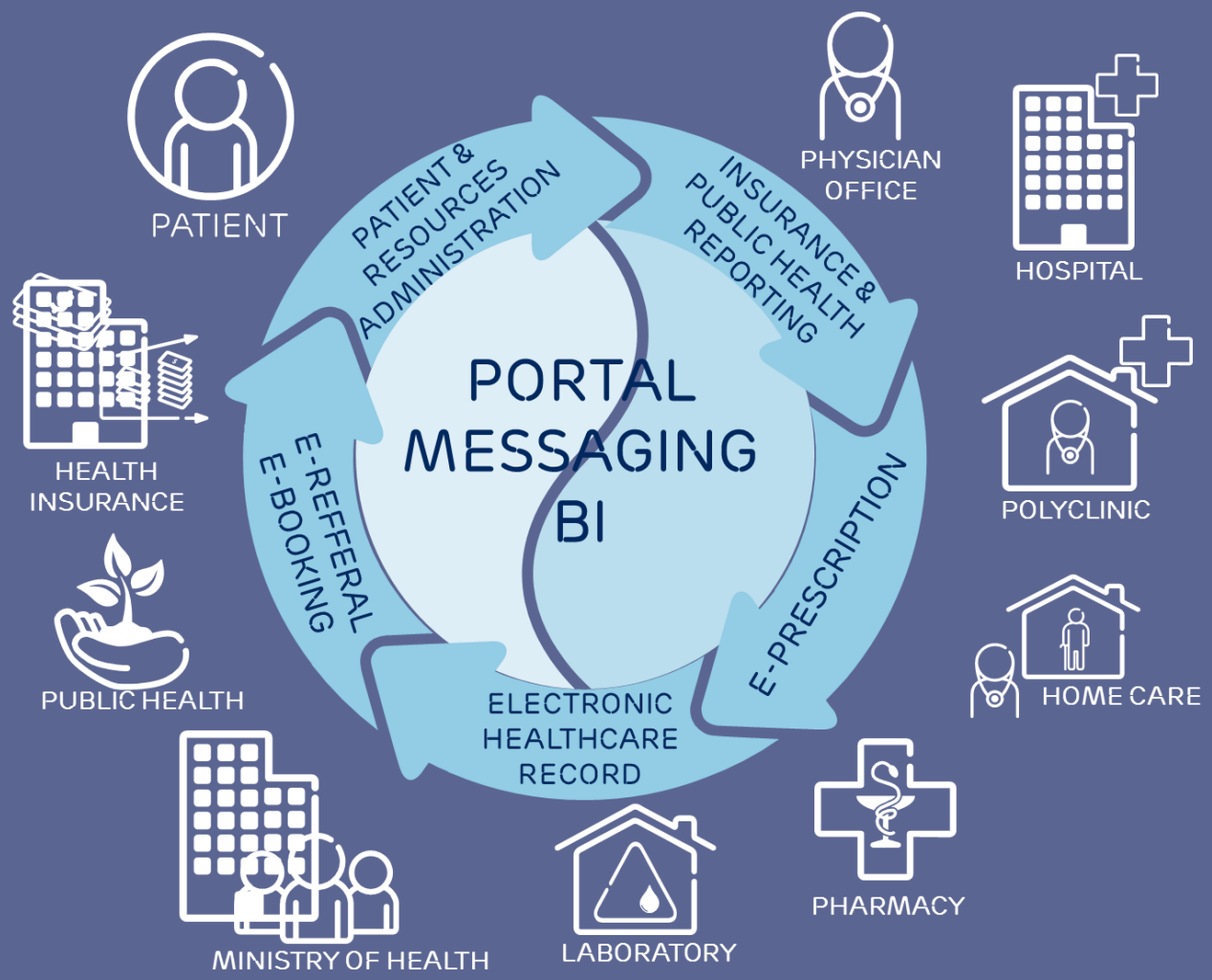
EXAMPLE: CROATIAN NATIONAL HEALTHCARE INFORMATION SYSTEM (CEZIH)



OUR EXPERIENCE:

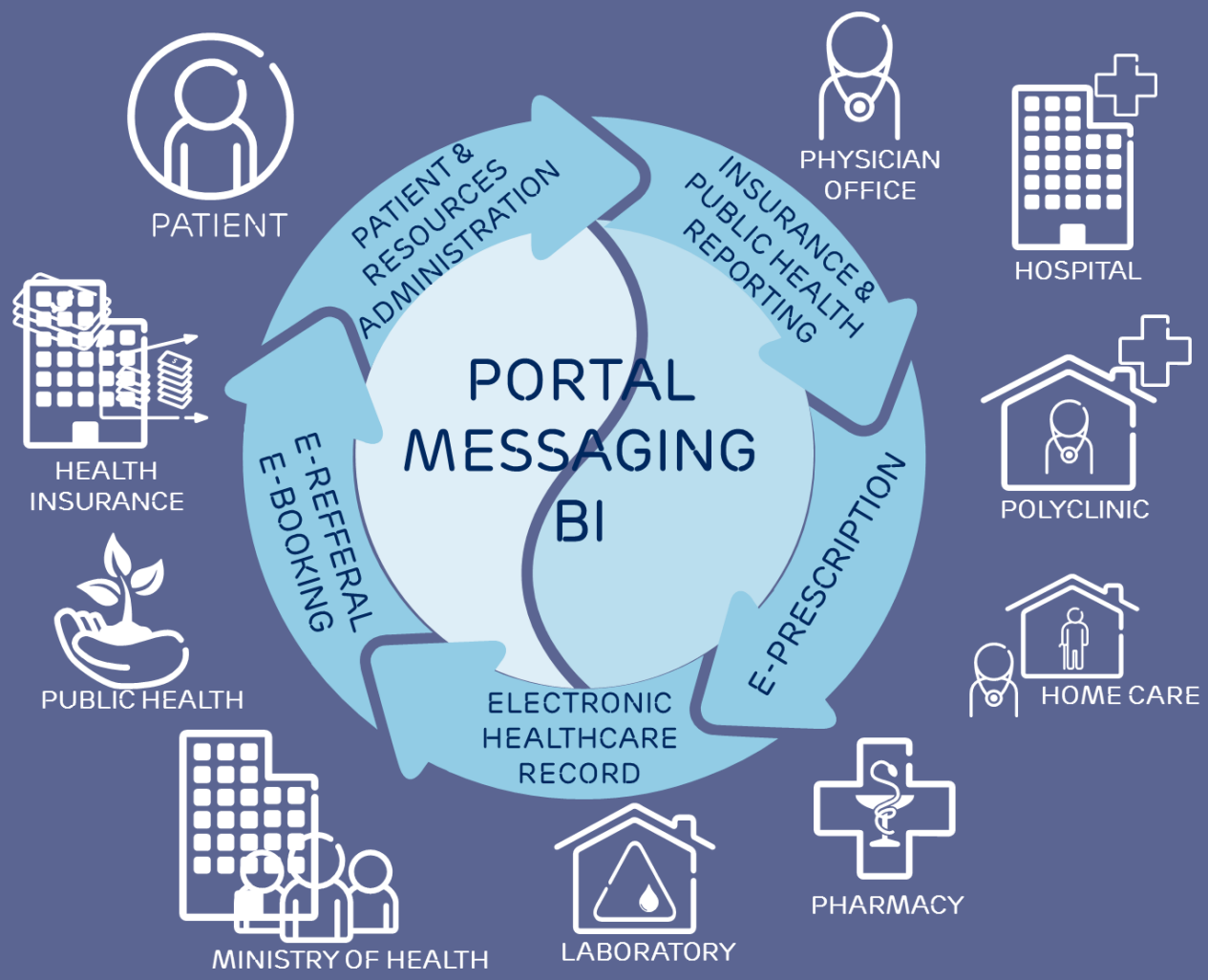
- CROATIAN NATIONAL HEALTHCARE INFORMATION SYSTEM
- INTEGRATED HEALTH INFORMATION SYSTEM OF ARMENIA (WORLD BANK FINANCED PROJECT)
- HEALTH INFORMATION SYSTEMS INFORMATIZATION AND INTER-OPERABILITY PLATFORM IN KAZAKHSTAN (WORLD BANK FINANCED PROJECT - ONGOING)
- ERICSSON HOSPITAL INFORMATION SYSTEM – STANDALONE AND CLOUD
- MOBILE HEALTH SOLUTION FOR MONITORING DIABETIC PATIENTS INTEGRATED WITH THE CROATIAN NATIONAL HEALTHCARE SYSTEM
- MOBILE HEALTH CAREWELL - EU PROJECT IN 6 EU REGIONS

NATIONAL HEALTHCARE INFORMATION SYSTEM OF THE REPUBLIC OF CROATIA (CEZIH)



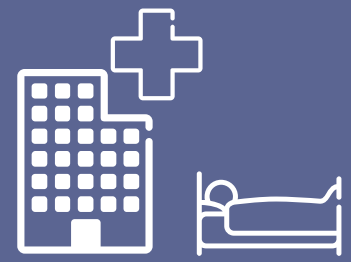
- 2,300+ GP OFFICES
- 192 PEDIATRICIAN OFFICES
- 180 GYNECOLOGIST OFFICES
- >2,000 DENTIST OFFICES
- 1,100+ PHARMACIES
- 100+ BIOCHEMISTRY LABORATORIES
- 66 HOSPITALS / SPECIALIST CARE OFFICES

NATIONAL HEALTHCARE INFORMATION SYSTEM OF THE REPUBLIC OF CROATIA (CEZIH)



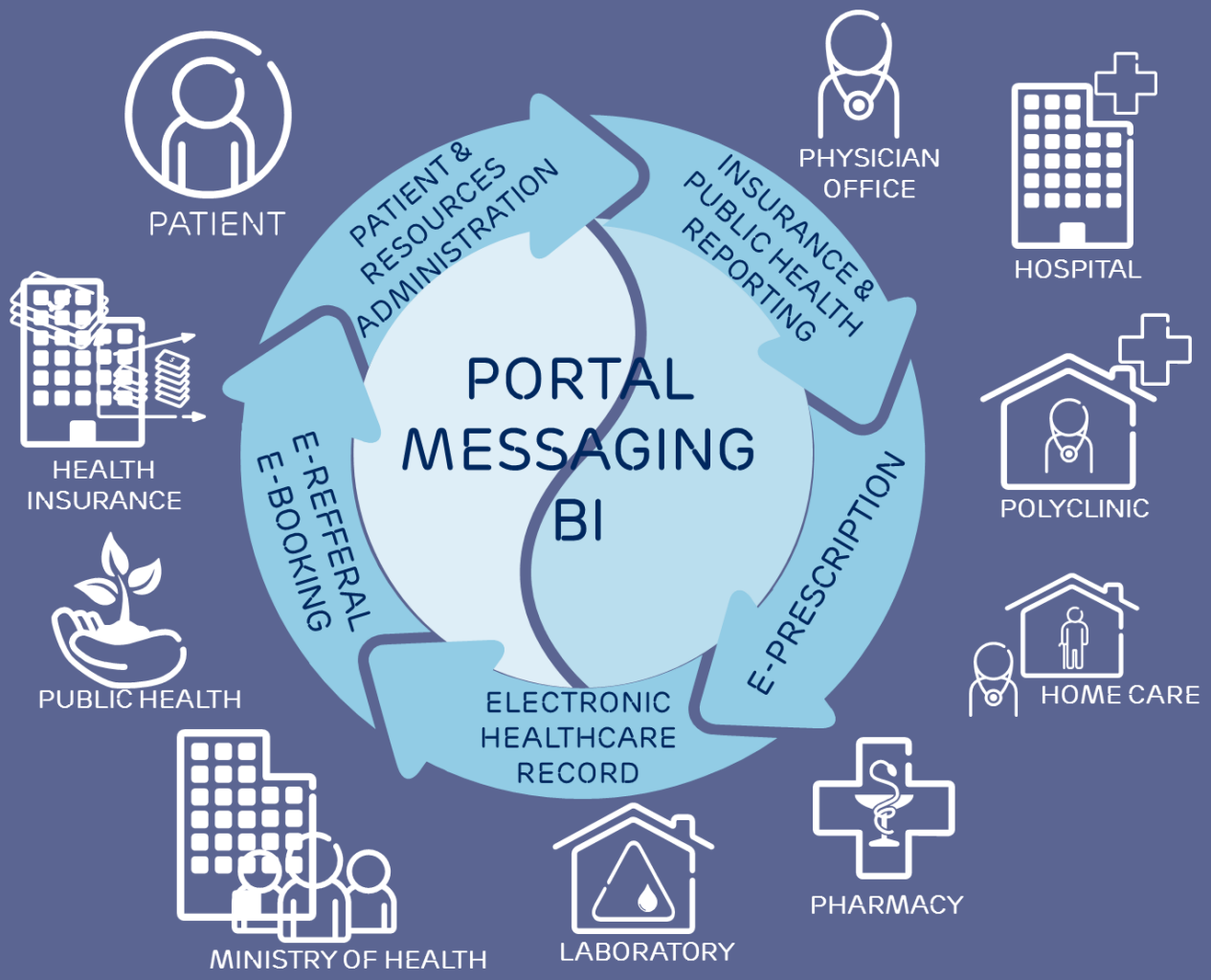
E-PRESCRIPTION (>50M/YEAR)
PREVENTS ERRORS & SAVES LIVES
EPSOS

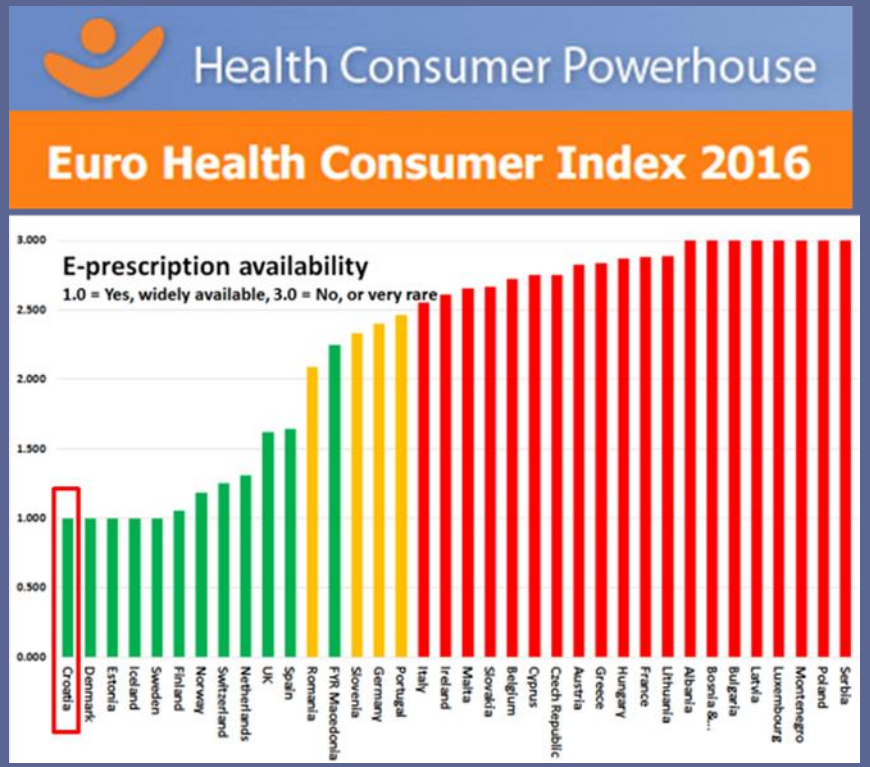
E-REFERRAL – 15,000 PEOPLE DO NOT NEED TO DRIVE EACH DAY



E-REFERRAL IN ALL HOSPITALS (12M/YEAR)
E-BOOKING IN SPECIALIST CARE & HOSPITALS

NATIONAL HEALTHCARE INFORMATION SYSTEM OF THE REPUBLIC OF CROATIA (CEZIH)





THE STARTING POINT 15 YEARS AGO - A HEALTHCARE SYSTEM WHERE:

Focus was on the process and „seller" not the customer

Costs were mostly fragmented, isolated, not easily manageable

Processes were mostly fragmented and isolated

Decisions were often made upon individual knowledge and experience

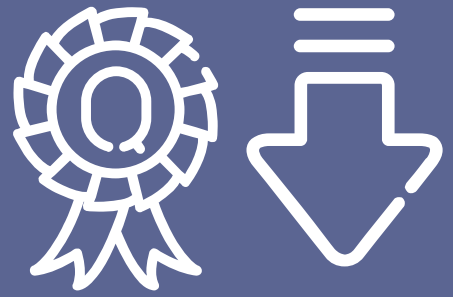
Ordering process was mostly manual and paper based

Experience was mostly individual and not truly shared

Information for any participant in the process was mostly fragmented, isolated and not always available

WHAT ABOUT FUTURE COSTS?

WHAT ABOUT QUALITY IN THE FUTURE ?



YES, THIS IS CAN BE TOUGH!

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WHAT SHOULD WE DO?

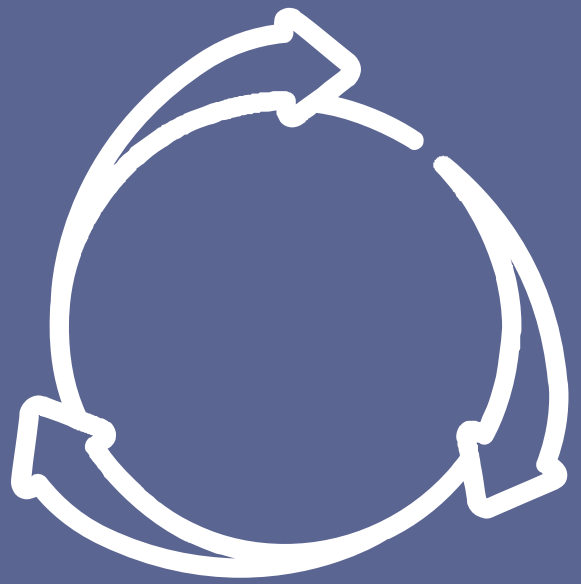
WHAT CAN WE DO?

HOW CAN WE DO IT?

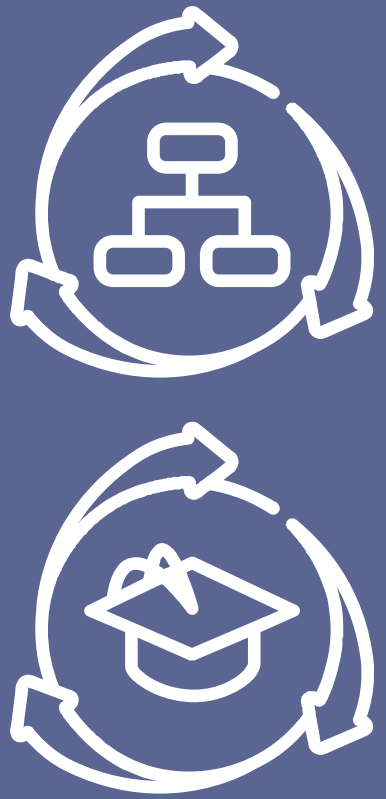
WHAT IF IT COULD BE LIKE THIS...?

Focus was on the process and „seller” not the customer	Patient centric
Costs were mostly fragmented, isolated, not easily manageable	Centralized cost management
Processes were mostly fragmented and isolated	Managed processes, clinical pathways and guidelines
Decisions were often made upon individual knowledge and experience	Guidelines, evidence-based and personalized care
Ordering process was mostly manual and paper based	Automated
Experience was mostly individual and not truly shared	Best practices
Information for any participant in the process was mostly fragmented, isolated and not always available	Consolidated, centralized, comprehensive, available wherever and whenever needed

HOW TO DO IT?



TRANSFORMATION



RE-ORGANIZATION, NEW PROCESSES, NEW & REUSED KNOWLEDGE AND COMPETENCES

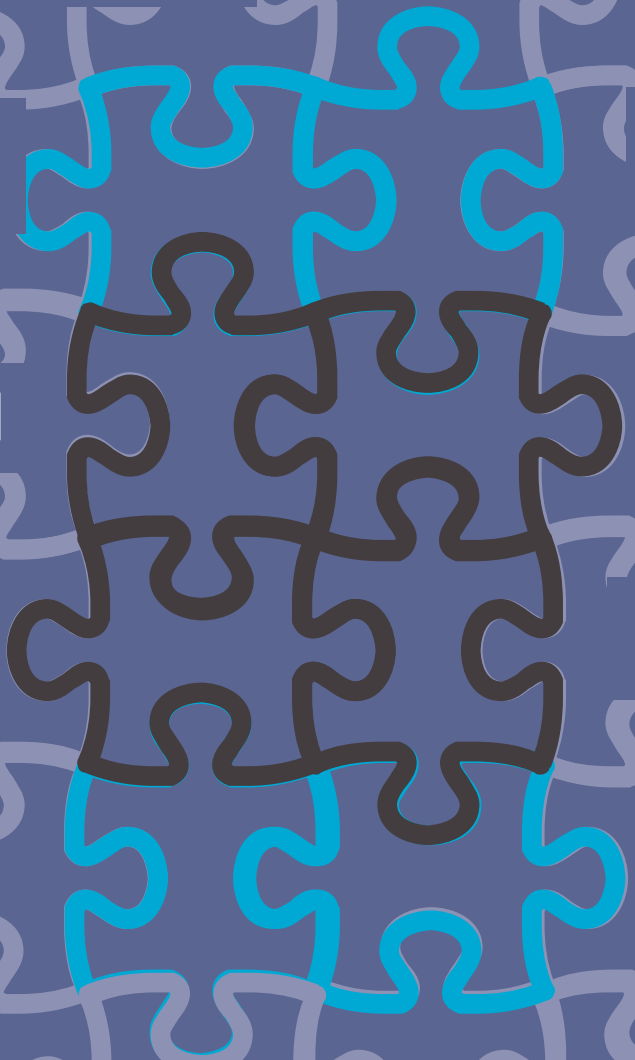
THROUGH USING ICT

WHERE TO START?

DISCHARGE SUMMARY FROM PHC

REPORTING INFECTIOUS, MALIGNANT DISEASES

E-PRESCRIPTION



E-REFERRAL

EHR

PATIENT PORTAL

PREVENTION PROGRAMS

RETRIEVING ADMINISTRATIVE INFO (INSURANCE STATUS, MEDICAL AIDS AVAILABILITY...)

A LONG (AND SOMETIMES ROUGH) ROAD…

2002	E-HEALTH CROATIA STARTED AS A RESEARCH PROJECT
2003	1st CONTRACT WITH THE MINISTRY OF HEALTH(CARE) → START OF DEVELOPMENT AND IMPLEMENTATION
2007	SYSTEM IN NATIONWIDE OPERATION WITH ALL PRIMARY PHYSICIANS INTEGRATED
2011	E-PRESCRIPTION/E-REFERRAL IN FULL NATIONWIDE OPERATION
2012-2014	NEW HARDWARE/MIDDLEWARE, NATIONAL PREVENTION PROGRAMS, E-BOOKING, CENTRAL CALENDAR,…
2015→	E-MEDICAL AIDS, E-PHYSICAL THERAPY, M-HEALTH **ELECTRONIC HEALTH RECORD, PATIENT PORTAL**

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Republic of Armenia

„Supply and Installation of Integrated Health Information System in Armenia (IHISA)”

Contract awarded in 09/2013, project finished, system in production

Republic of Kazakhstan

„Delivery of Health Information Systems Informatization and Interoperability Platform”

Contract awarded in 12/2015, project ongoing

- The begining is hard.
  - legal, process, architectural, technical, motivation, resistance to change issues
- There are no quick wins. But it takes time for eHealth to make sustainable wins.
- It’s not about technology. It’s about processes.
- You need to choose the right partner – experienced **solution builder** rather than a solution supplier.
- Each new step is somewhat easier than the previous.
- Each new step brings significantly more benefits than the previous.
- After some point, the momentum is there and you should only not ruin it

The real cases show that there is no single, ‘right’ strategy for implementing interoperable EHR and ePrescribing systems.
The most transferrable features from different projects are the experiences and capabilities gained, and requirements for success identified.

European Commission, „The socio-economic impact of interoperable electronic health record (EHR) and ePrescribing systems in Europe and beyond“, October 2009

SOFTWARE PROJECT CHALLENGES

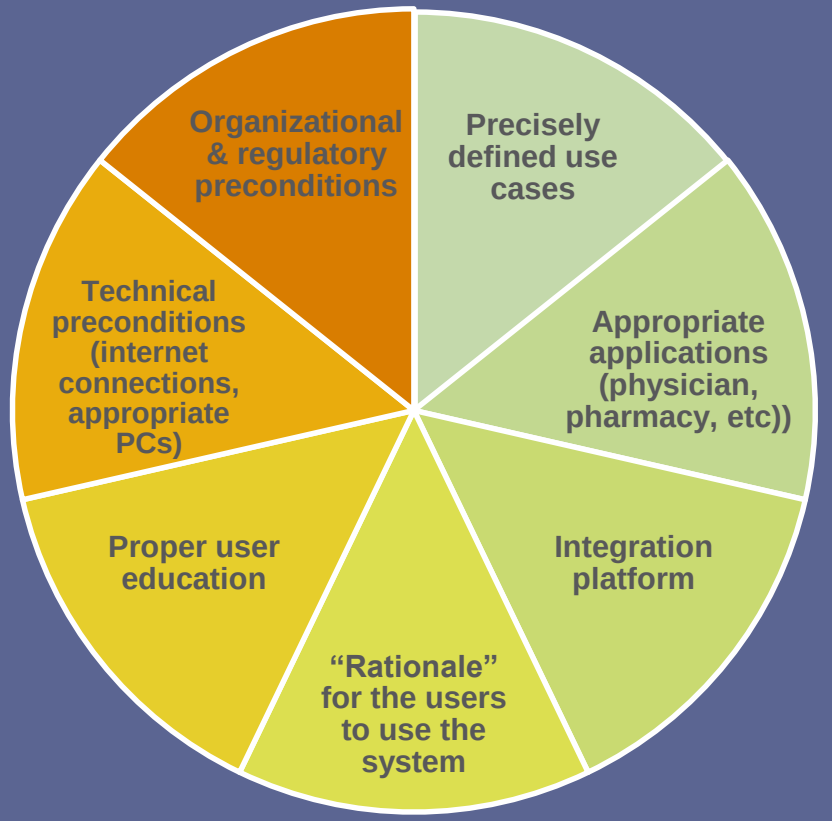
Sucessful software projects rate

(on time, on budget, with a satisfactory result)
Source: *The Standish Group International, 2015 CHAOS Report*

	2011	2012	2013	2014	2015
SUCCESSFUL	29%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

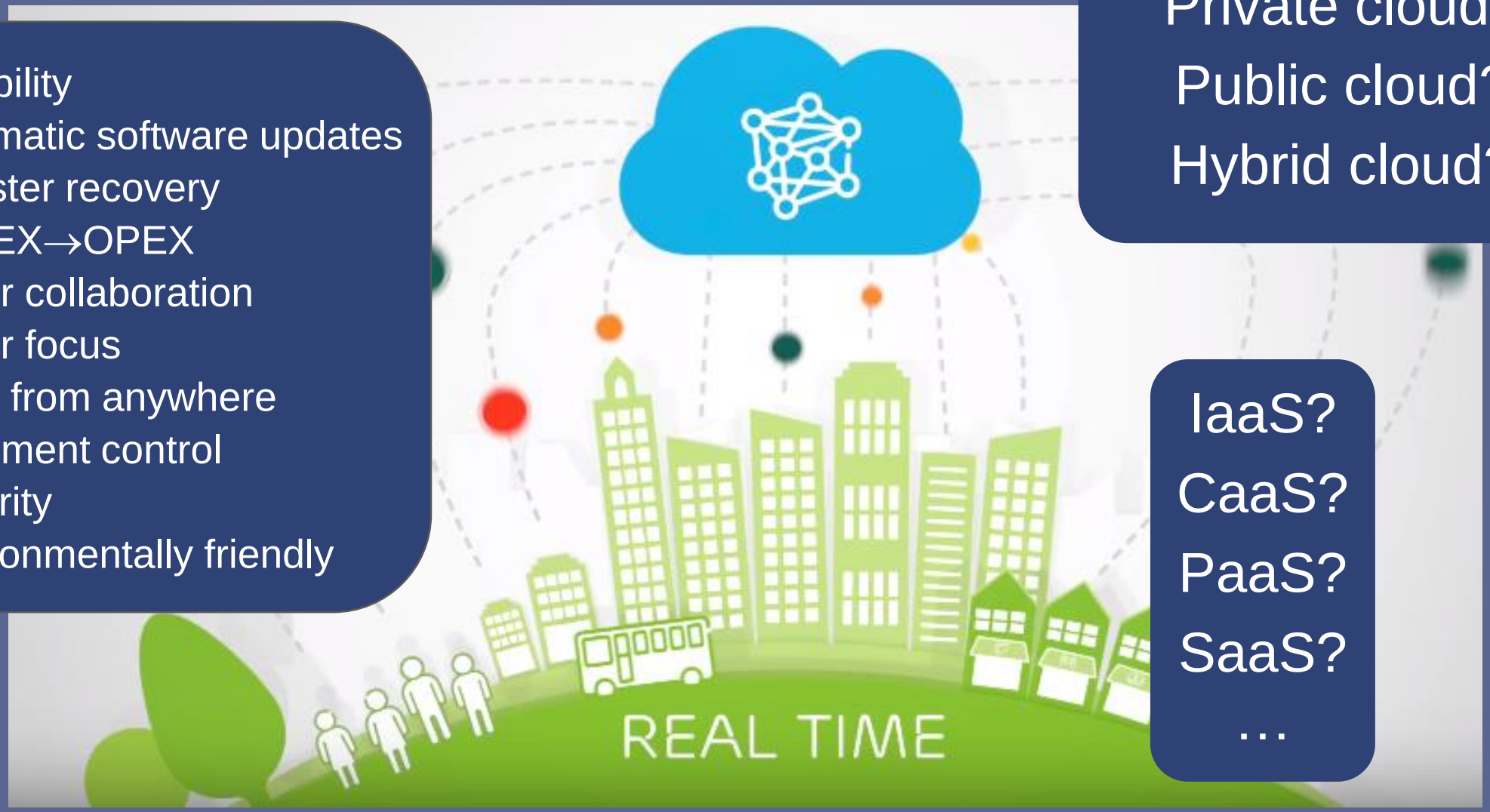
- Understanding of the strategic role of ICT in healthcare reform
- Clear goals & phases in eHealth implementation
- High quality requirements gathering and analysis
- Pragmatic project approach with eHealth domain leadership in project management
- Right decisions at the right time

Experiences from Ericsson Nikola Tesla
eHealth projects
(important project challenges)



ENTERS CLOUD COMPUTING...

- Flexibility
- Automatic software updates
- Disaster recovery
- CAPEX→OPEX
- Better collaboration
- Better focus
- Work from anywhere
- Document control
- Security
- Environmentally friendly



Private cloud?
Public cloud?
Hybrid cloud?

IaaS?
CaaS?
PaaS?
SaaS?
…

ENTER BIG DATA ANALYTICS…

VOLUME petabytes, exabytes…

VALUE
VERACITY
VARIABILITY
VISCOSITY
VIRALITY

VELOCITY
- Data in motion
- Latency
- Usefulness period
- Real-time results

VARIETY
- Various types
- Various sources
- Semistructured or unstructured

AND THEY FURTHER EMPHASIZE THE ISSUES OF...

DATA PRIVACY AND SECURITY?!

Where does the data reside?

Who owns the data?

Who controls the data?

Who processes the data?

How is the data governed?

DATA PROTECTION & PRIVACY

USA

- HIPAA (Health Insurance Portability and Accountability Act)
- HIPAA BAA (Business Associate Agreement)
- HITECH Act (Health Information Technology for Economic and Clinical Health Act)

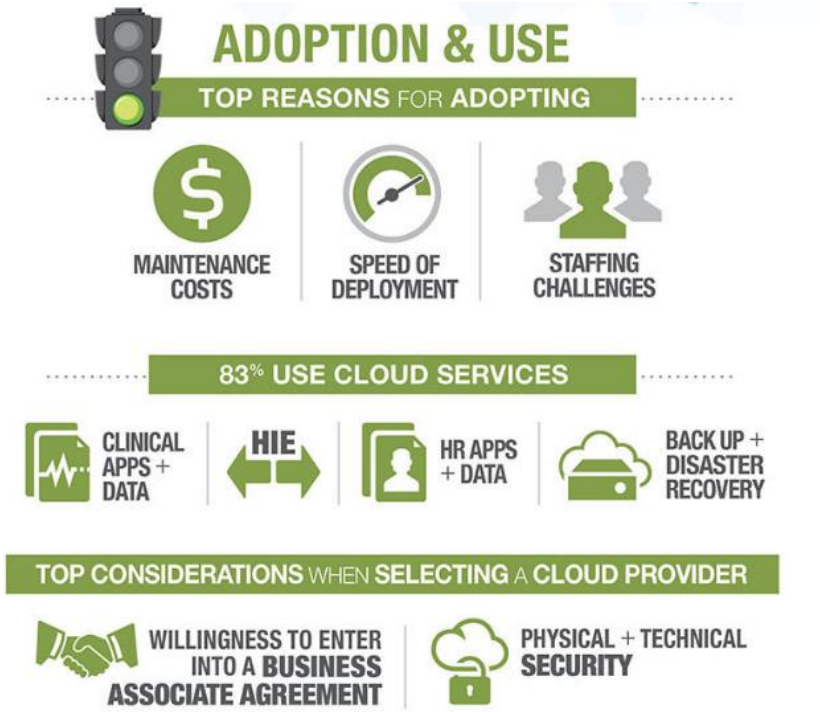
EU*

- Regulation 2016/679 → **GDPR**
- Regulation 45/2001 + Directive 2016/680
- Directive 2002/58/EC („e-Privacy")
- COE Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data
- Contracts and clauses for the transfer of personal data to third countries
- HIPAA – „useful as an initial yardstick"
- EU-U.S. Privacy Shield

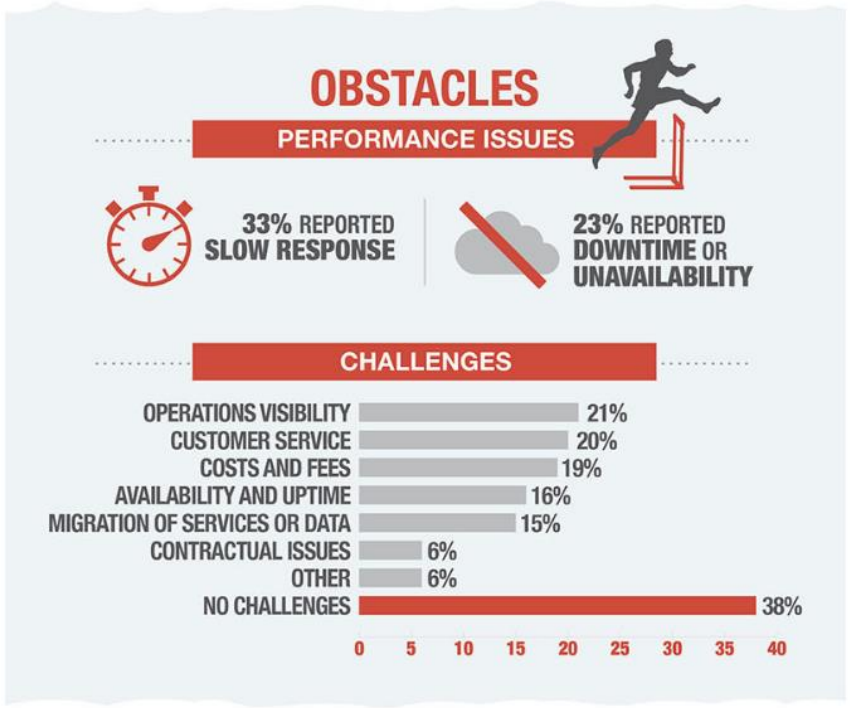
*** ENISA - European Union Agency for Network and Information Security**

HEALTHCARE IN THE CLOUD?

HIMSS ANALYTICS CLOUD SURVEY 2014*



Infographic source: Forbes



*HIMSS – Health Information and Management Systems Society
http://www.himss.org/ResourceLibrary/genResourceDetailPDF.aspx?ItemNumber=41958

HIMSS ANALYTICS CLOUD SURVEY 2014

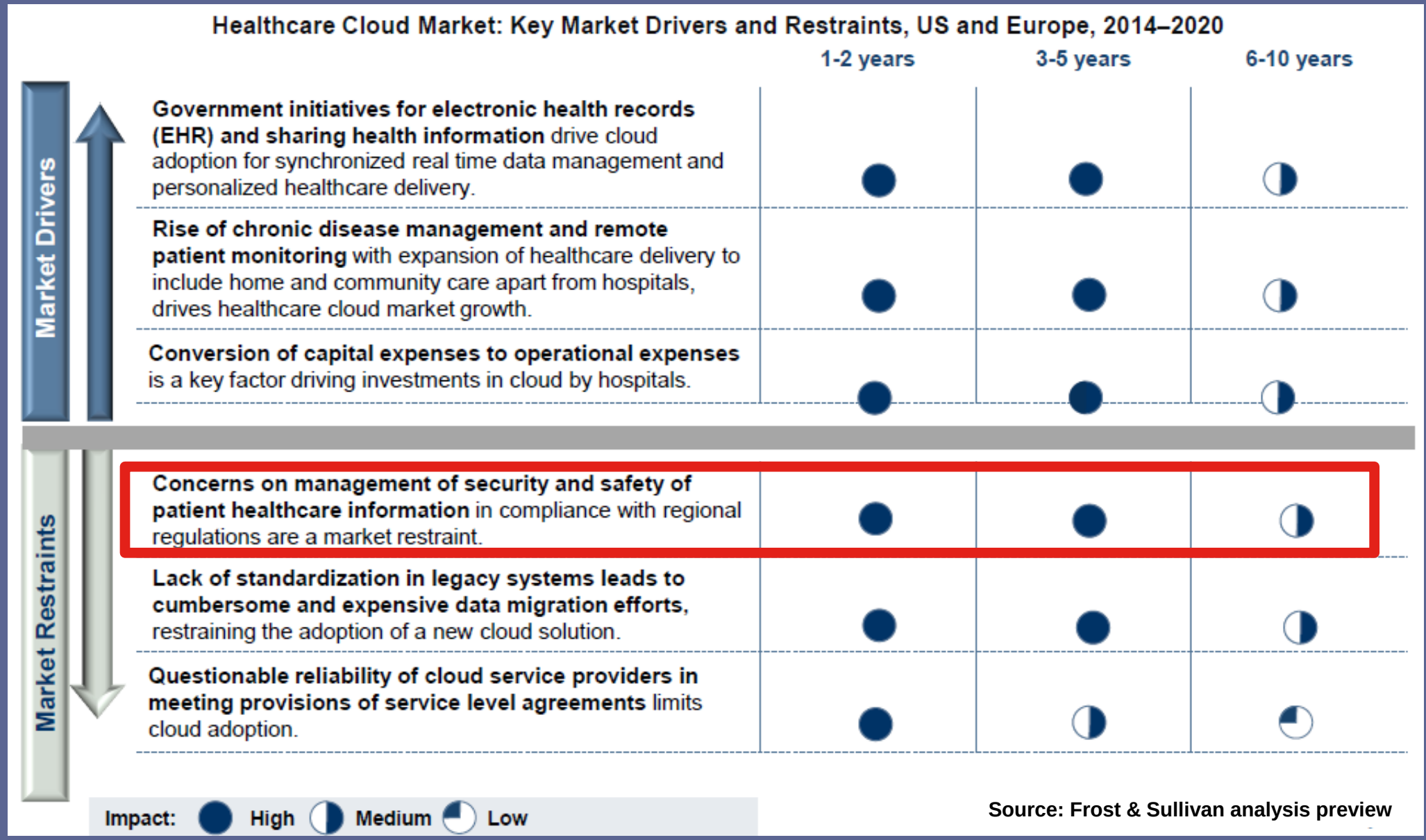
If you have not adopted a cloud solution at this time, what are the reasons for not doing so?	Frequency	Percent
Security Concerns	16	61.5%
IT Operations are Solely Internal to Organization	11	42.3%
Availability and Uptime Concerns	10	38.5%
Risks Outweigh the Benefits	9	34.6%
Cloud Provider Does Not Have Own Data Center (Uses a Third Party)	8	30.8%
Geographic Location of Cloud Provider and/or Data Center	5	19.2%
Contractual Issues with Cloud Providers	5	19.2%
Geographic Location of Cloud Provider's Disaster Recovery Site	3	11.5%
Human Factor Considerations	2	7.7%
Not Sure Which Provider to Select	2	7.7%
Other	7	26.9%
Don't Know	0	0.0%
Total	**26**	**100.0%**

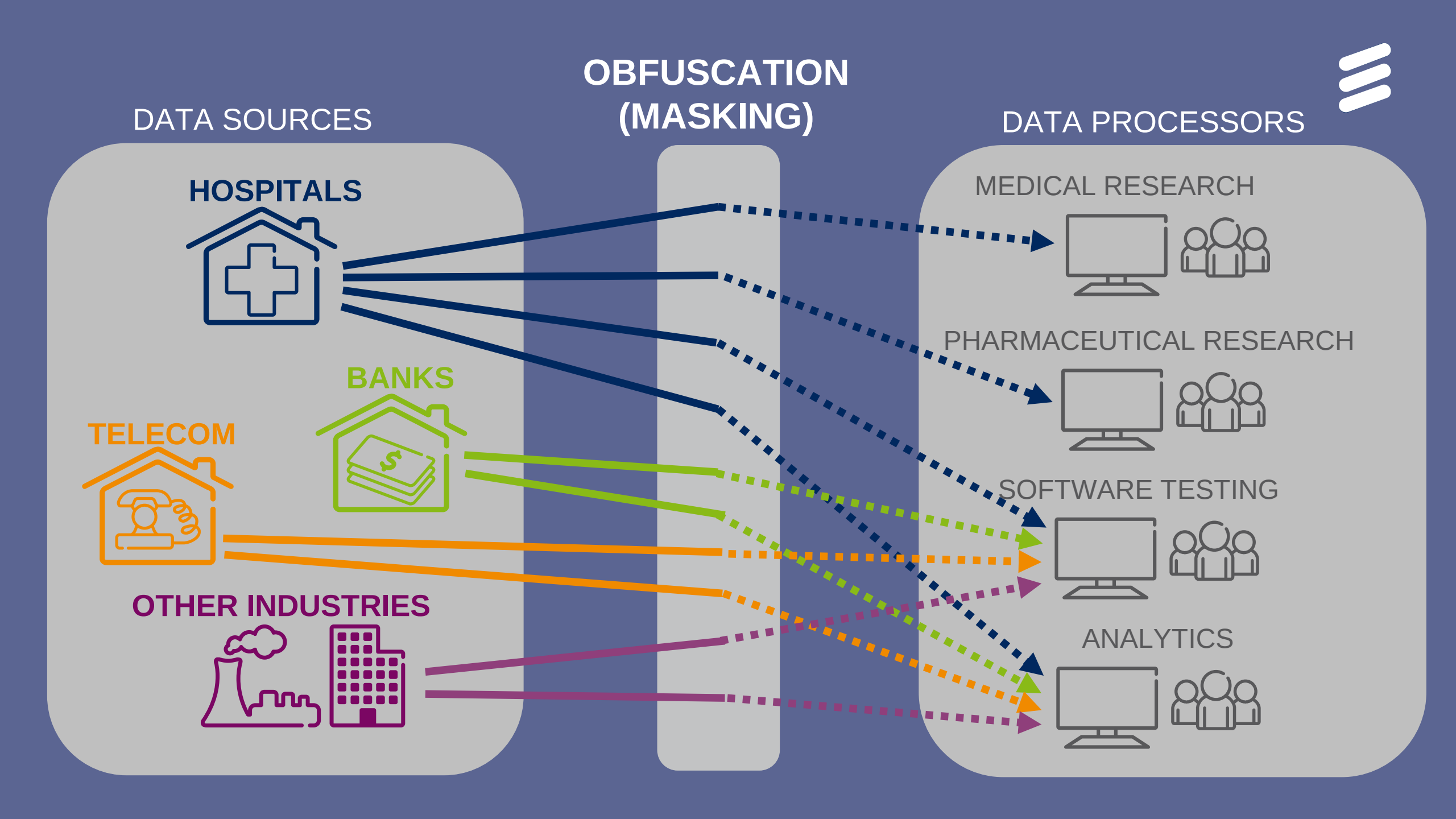
HIMSS ANALYTICS CLOUD SURVEY 2016

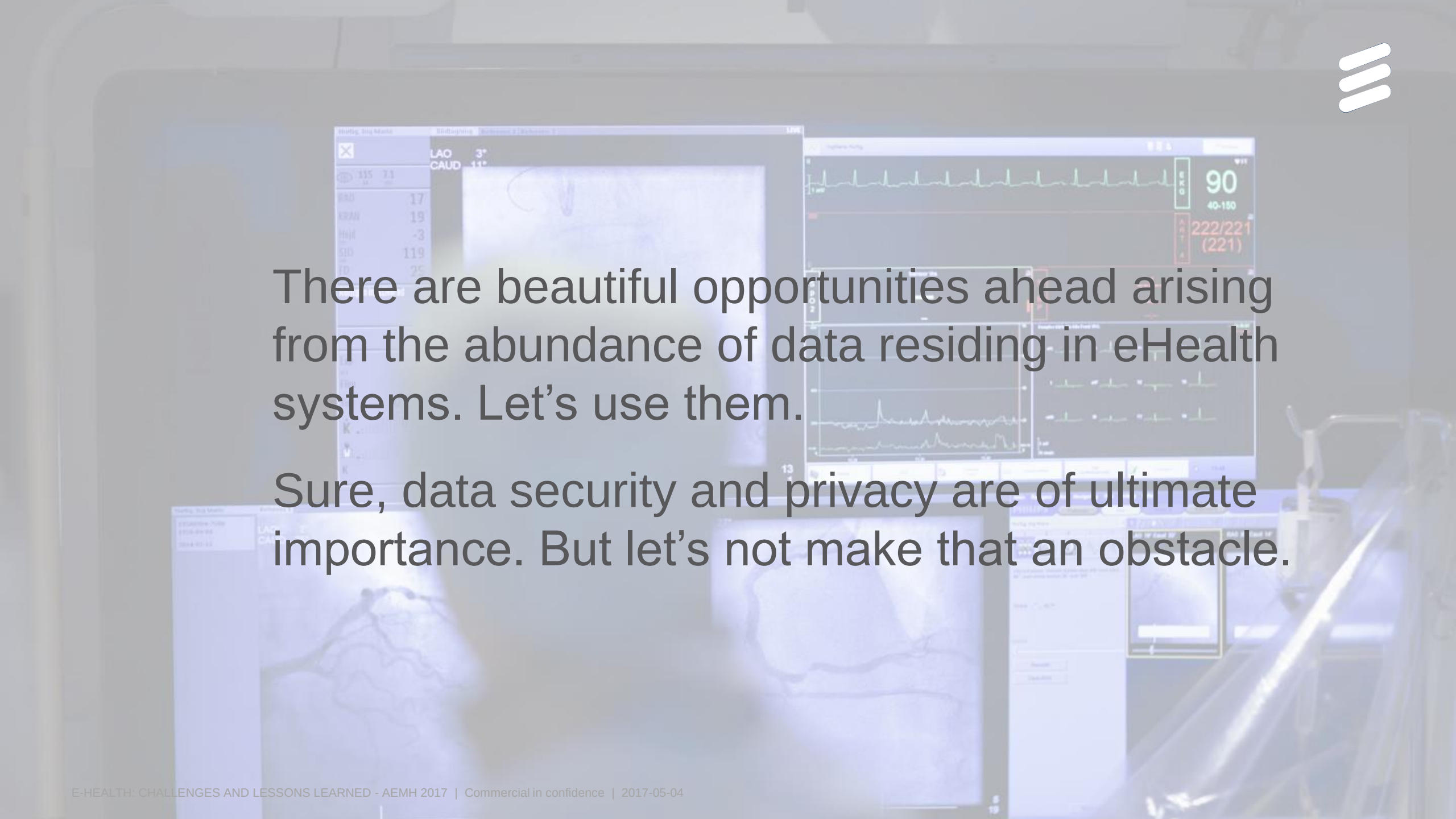
What concerns, if any, slow your adoption of cloud computing?

Concern	Frequency	Percent
Security (protection of PHI from breach)	27	54.0%
Performance (availability, latency)	21	42.0%
Compliance (adherence to regulatory requirements)	19	38.0%
Migration (moving existing workloads)	19	38.0%
Financial (depreciation of existing assets or ongoing costs)	19	38.0%
Support (response times, time to resolution)	19	38.0%
Other	2	4.0%
I have no concerns	4	8.0%
Total	**50**	**100.0%**

HIMSS ANALYTICS CLOUD SURVEY → USA

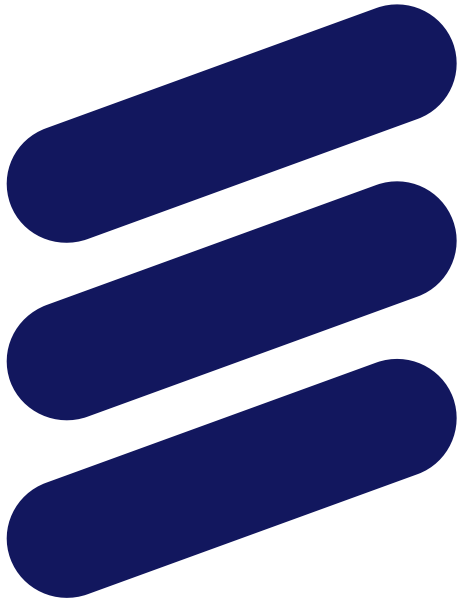

Healthcare Cloud Market: Key Market Drivers and Restraints, US and Europe, 2014–2020
1-2 years
3-5 years
6-10 years
Market Drivers
Government initiatives for electronic health records (EHR) and sharing health information drive cloud adoption for synchronized real time data management and personalized healthcare delivery.
Rise of chronic disease management and remote patient monitoring with expansion of healthcare delivery to include home and community care apart from hospitals, drives healthcare cloud market growth.
Conversion of capital expenses to operational expenses is a key factor driving investments in cloud by hospitals.
Market Restraints
Concerns on management of security and safety of patient healthcare information in compliance with regional regulations are a market restraint.
Lack of standardization in legacy systems leads to cumbersome and expensive data migration efforts, restraining the adoption of a new cloud solution.
Questionable reliability of cloud service providers in meeting provisions of service level agreements limits cloud adoption.
Impact: High Medium Low
Source: Frost & Sullivan analysis preview


OBFUSCATION
(MASKING)
DATA SOURCES
DATA PROCESSORS
HOSPITALS
BANKS
TELECOM
OTHER INDUSTRIES
MEDICAL RESEARCH
PHARMACEUTICAL RESEARCH
SOFTWARE TESTING
ANALYTICS



There are beautiful opportunities ahead arising from the abundance of data residing in eHealth systems. Let’s use them.

Sure, data security and privacy are of ultimate importance. But let’s not make that an obstacle.



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