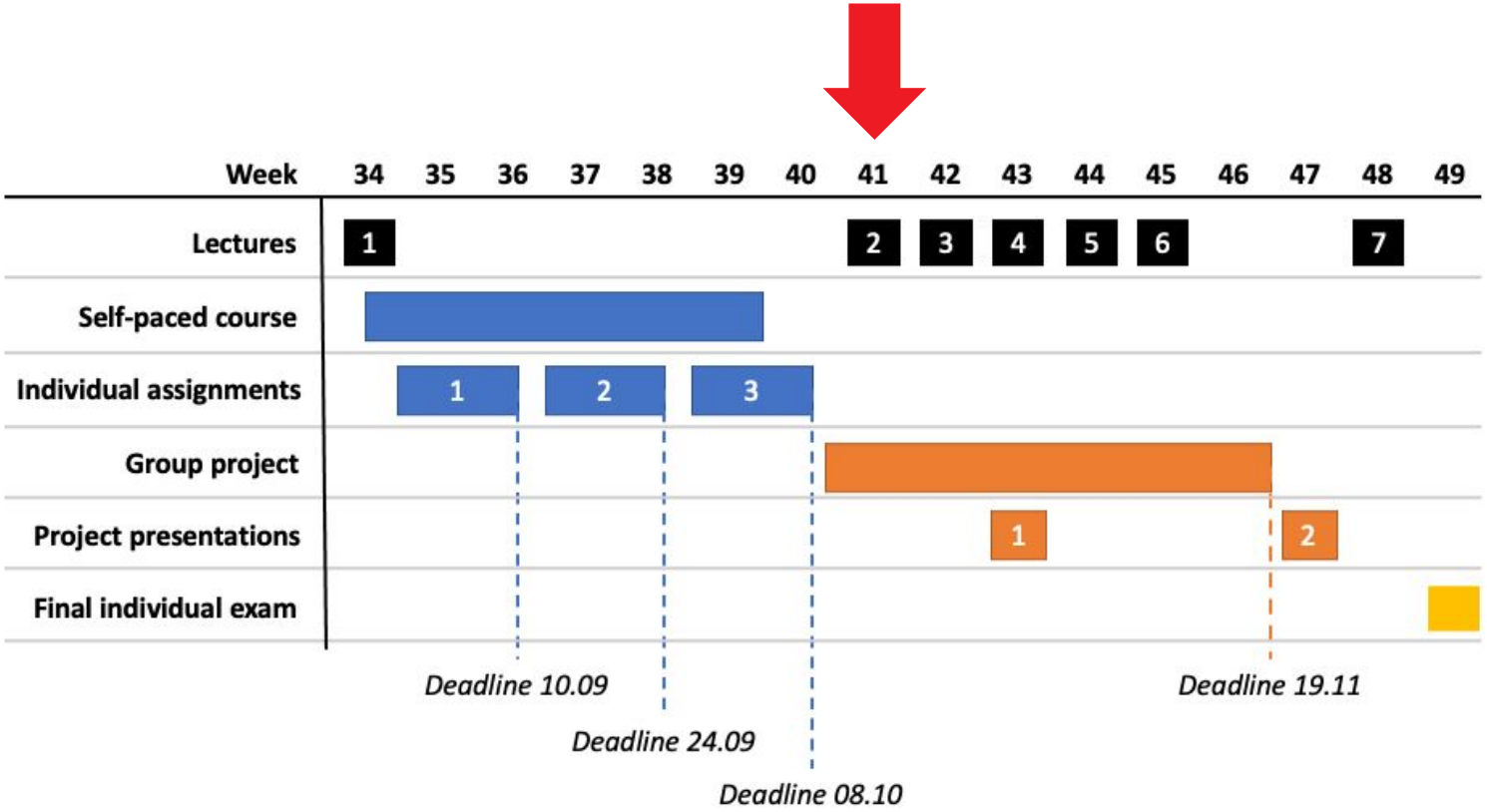


IN5320 - Development in Platform Ecosystems

Lecture 2: *Information systems and complexity*

14th of October 2021
Department of Informatics, University of Oslo
Magnus Li - magl@ifi.uio.no

The semester



Upcoming lectures

Th. 14. Oct	10:15–12:00	Information Systems, design, and innovation	OJD, Aud Simula	M. Li	**Readings** ▪ Sommerville et al. (2012)
Th. 21. Oct	10:15–12:00	Platform Ecosystems Fundamental Concepts	OJD, Aud Simula	M. Li	**Readings** ▪ Tiwana (2013) chapter 2 ▪ Tiwana (2013) chapter 5
Th. 28. Oct	10:15–12:00	Governance in Platform Ecosystems	OJD, Aud Simula	M. Li	**Readings** ▪ Tiwana (2013) chapter 6 ▪ Ghazawneh & Henfridsson (2013) ▪ Karhu, Gustafsson & Lyytinen (2018)
Th. 4. Nov	10:15–12:00	Enterprise Software Platform Ecosystems	OJD, Aud Simula	M. Li	**Readings** ▪ Li (2019) ▪ Foereder (2019)
Th. 11. Nov	10:15–12:00	Platforms in the Public Sector	OJD, Aud Simula	A. M. Kempton	**Readings** ▪ Kempton et al., (2020)

The project

- Cases are available, and hopefully, you've already started working on it with your group

- You can get support with the technical aspects at the seminar groups

Project

Project timeline

- Now: select a case and start identifying requirements for a MVP
- Week 43: mid-term presentation.
- 19.11: project code submission - final “push”
- 23 & 24.11: final project presentations

All information about the projects is available on the course page

Ask in Mattermost or in the seminar groups if you have any questions!

Information Systems

Today’s lecture

Aim:

- To provide context to the proceeding lectures about platforms
- Gain a fundamental understanding of what we mean by ‘Information Systems’

Today's lecture

Four important concepts

1. Information Systems
2. Complexity
3. Socio-technical complexity
4. Standards
5. Architecture

Note: The point of academic literature and theory

- Research is typically driven by problems that we need to understand better or ‘solve’

- Within the field of Information Systems (IS), existing research may serve two purposes for us in this endeavour:

a) As *related literature* that says something about what we know about the problem area.

b) As theory that provides us a language / lens to analyze the problem, how to investigate it further, or our findings related to it.

Software Platform concepts and the topics that will be covered in the following weeks are relevant to both aspects (understanding relevant IS problems, and conceptual language for analysis).

Information Systems - exercise

For one minute:

Note down some bullet points on what you think when you hear the word “Information Systems”

Information Systems

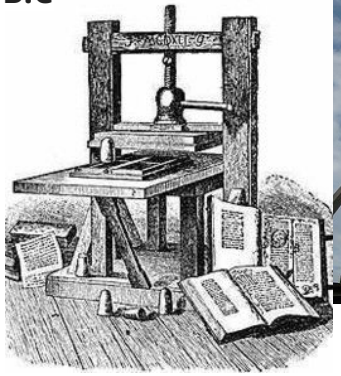
An information system is not the information technology alone, but the system that emerges from the ***mutually transformational interactions*** *between the* ***information technology*** *and the* ***organization***.

(Allen S. Lee, 2004)

Information and communication technology

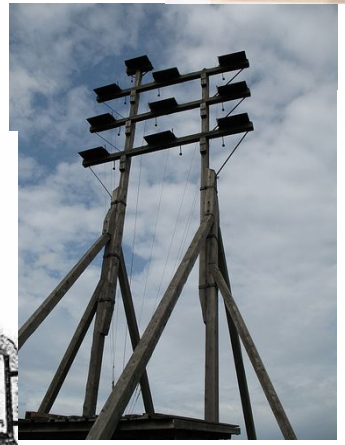


3200 B.C



Ca 1450 A.C

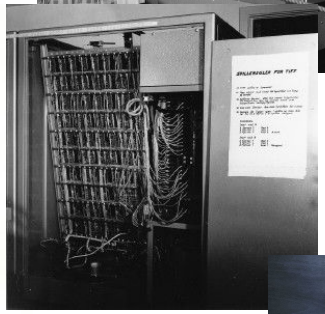




1792 - 1881







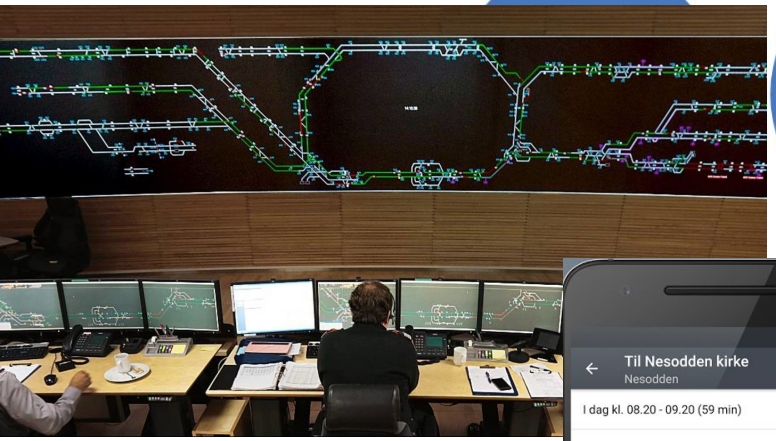








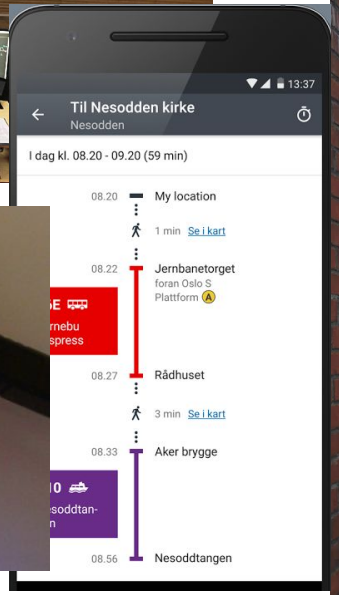
Information and communication technology

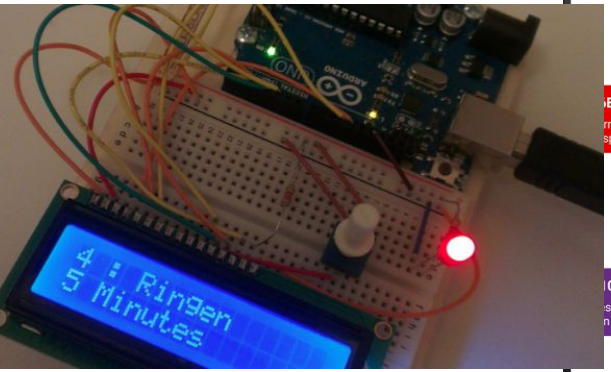
















Information Systems

Information Technology - examples?

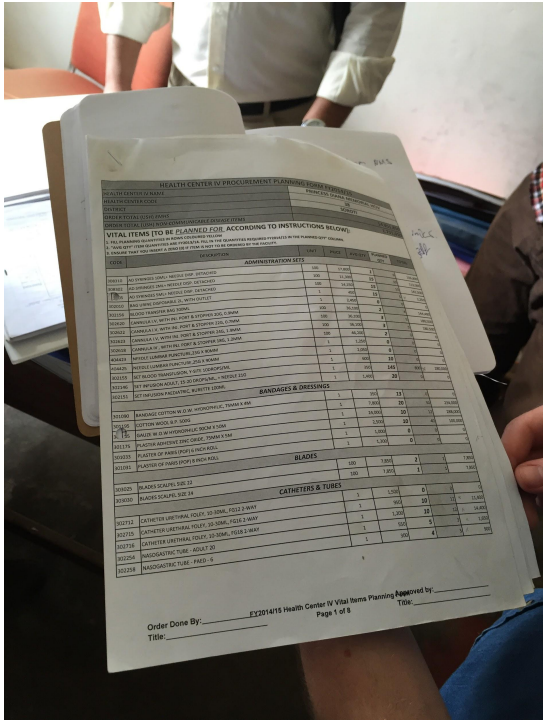




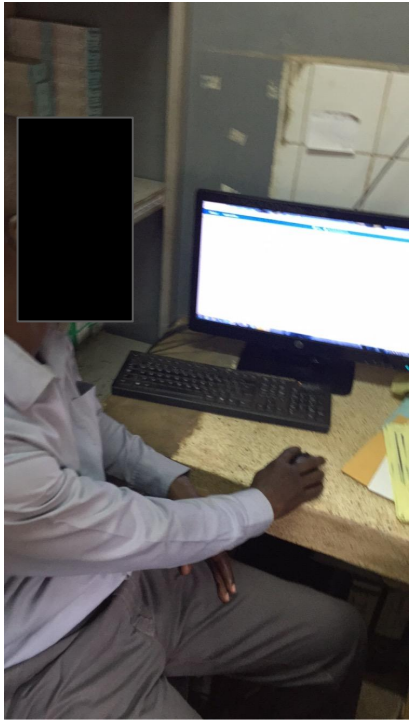


Information Systems

Information Technology







Information Systems = technology + organization

Organization

An organized group of people with a particular purpose, such as a business or government department. (Oxford english dictionary)

Humans

Technologies / artifacts

Practices

Culture

Products

++++

Information Systems

- **‘Practices’** is a fundamental part of organizations

“The customary, habitual, or expected procedure or way of doing of something.”
(Oxford English dictionary)

- Practices “lives” and evolves through production and reproduction

- May be *cultivated* towards a desired state, but cannot be strictly designed or controlled.

‘Socio-technical

- We often say that information systems are socio-technical

Socio

Humans
Routines and practices
Hierarchies
Norms
Rules
Politics
Motives
Culture
++

Technical

Physical structures and artifacts
Hardware
Software
Paper-based tools
++

Why a socio-technical perspective in informatics?

- A socio-technical perspective is relevant to understand why systems fail and succeed, and to design working systems

- Looking just at the technical part will limit our ability to understand how real systems work, and how to design new artifacts that work within them

Complexity

Complexity

Complicated systems

Linear behavior

Total is equal to the sum of its parts

Complex systems

Non-linear behavior (change in input is not proportional to new output)

System can not be fully understood by investigating its parts.

"Complexity stems from the number and type of relationships ***between the systems's components*** *and* ***between the system and its environment***" (Hanseth & Lyytinen, 2010)

Complicated or complex system?

A bike

US politics

One computer

The human brain

The internet

Climate and weather

Why is it complex?

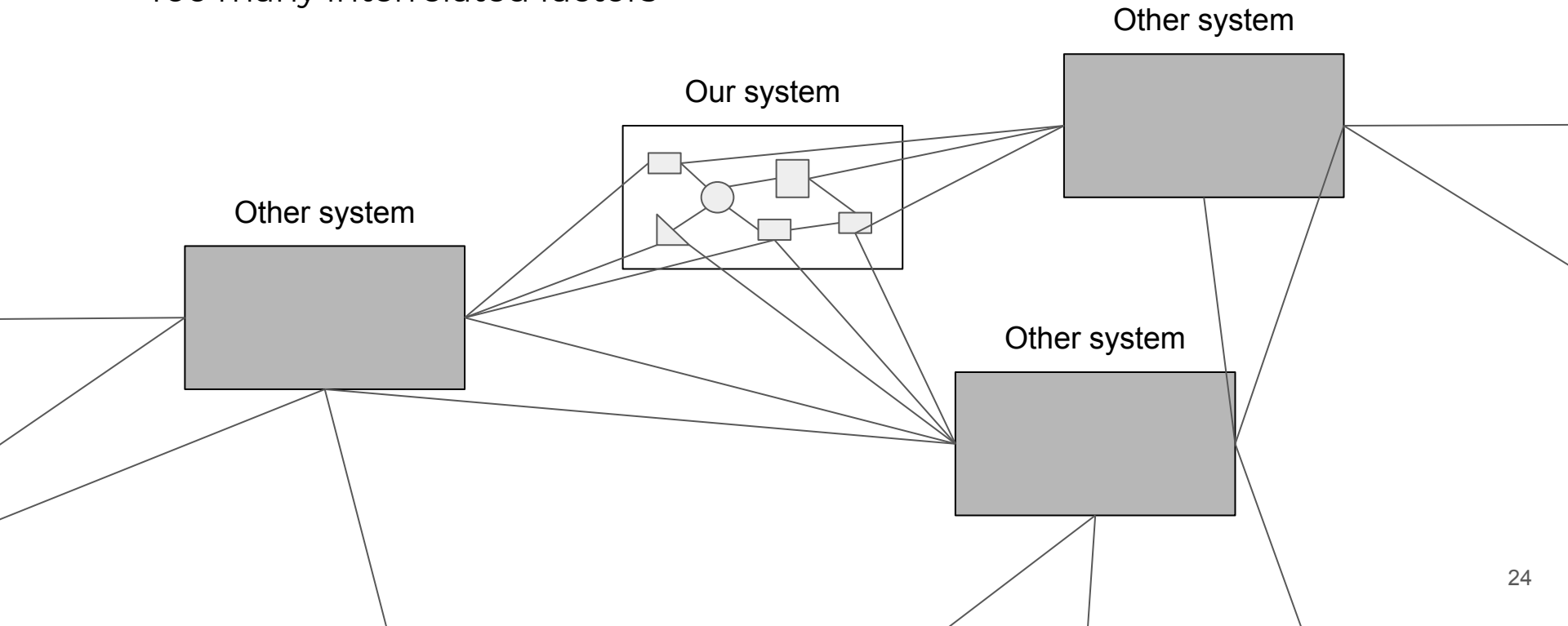
- Too many unknowns
- Too many interrelated factors



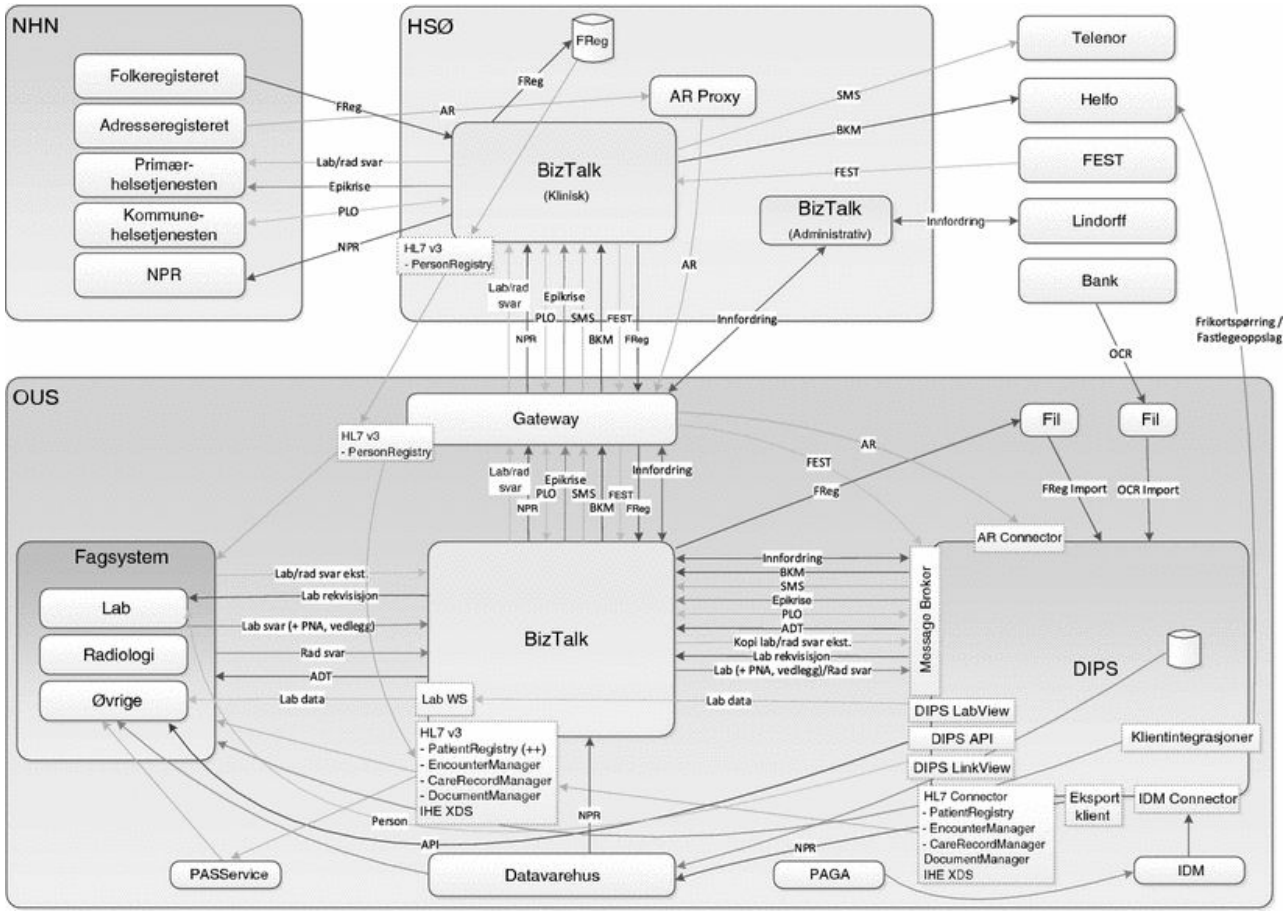


Why is it complex?

- Too many unknowns
- Too many interrelated factors



Why is it complex?

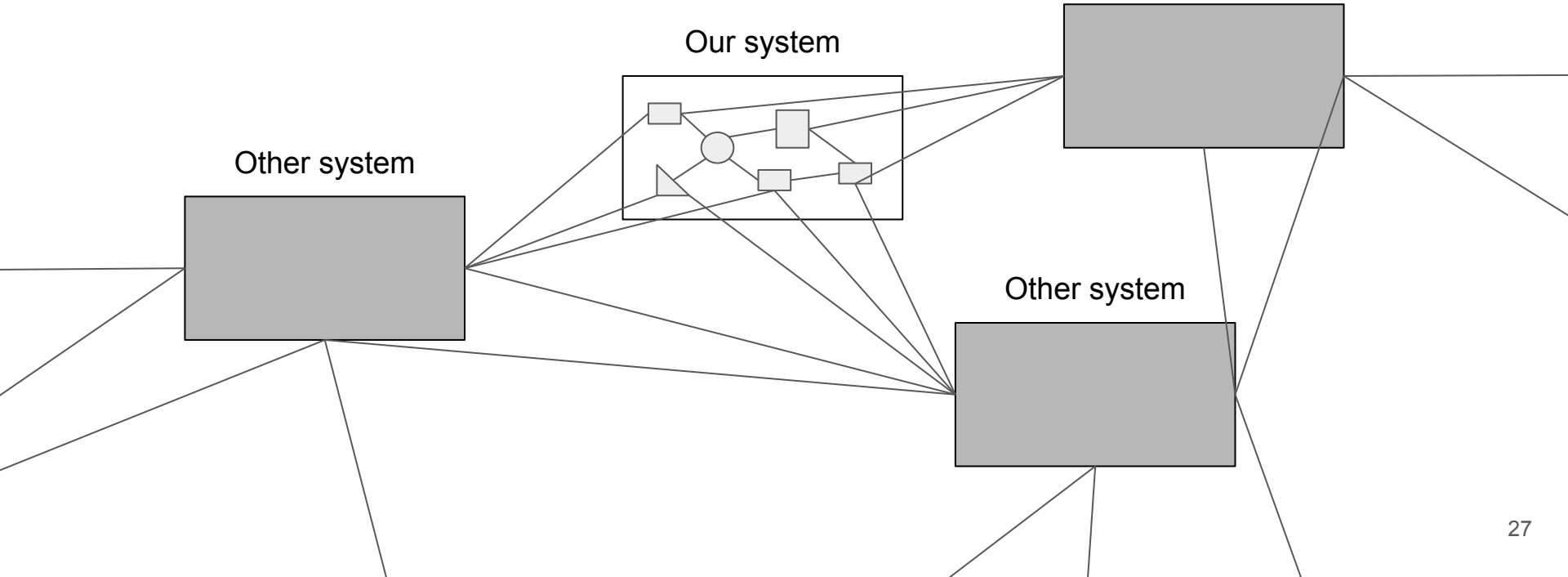


Bygstad (2007)

Socio-technical complexity

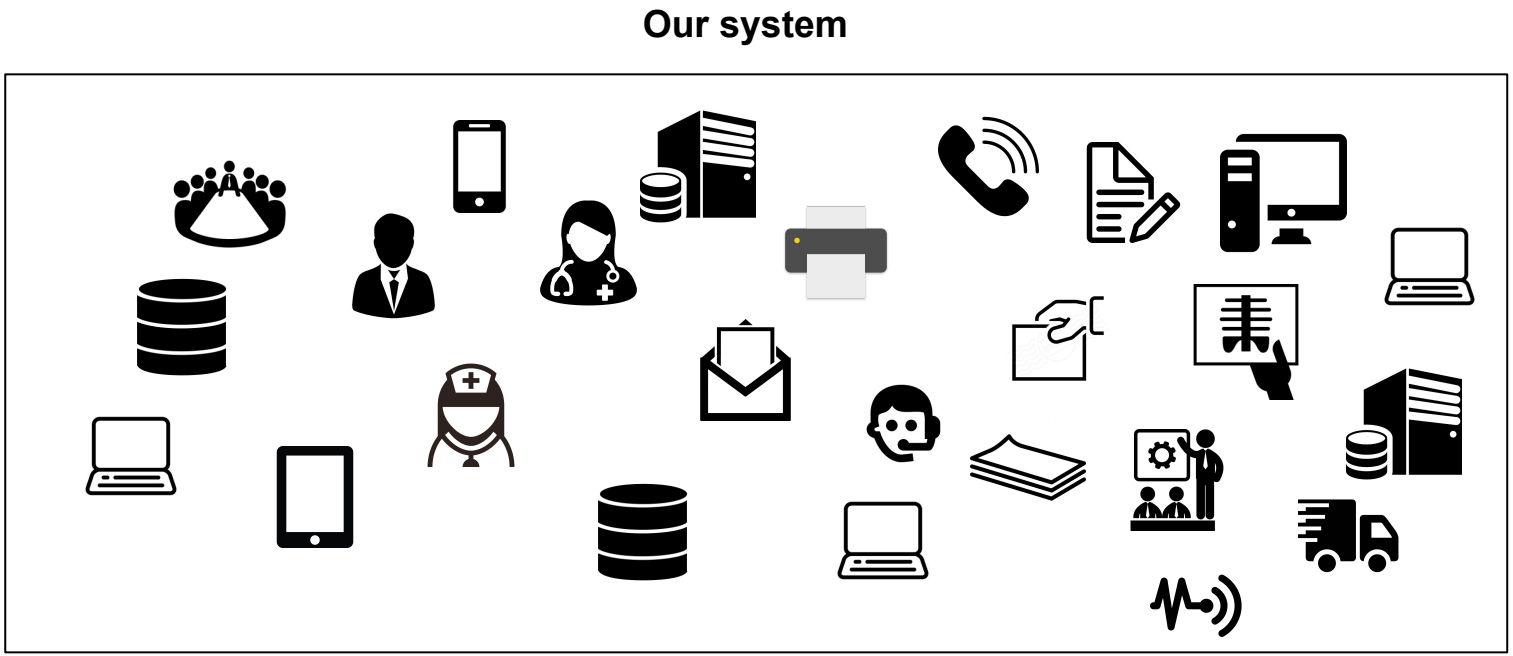
Socio-technical complexity

- Information systems do not only consist of technical components.
- They do not exist in a vacuum



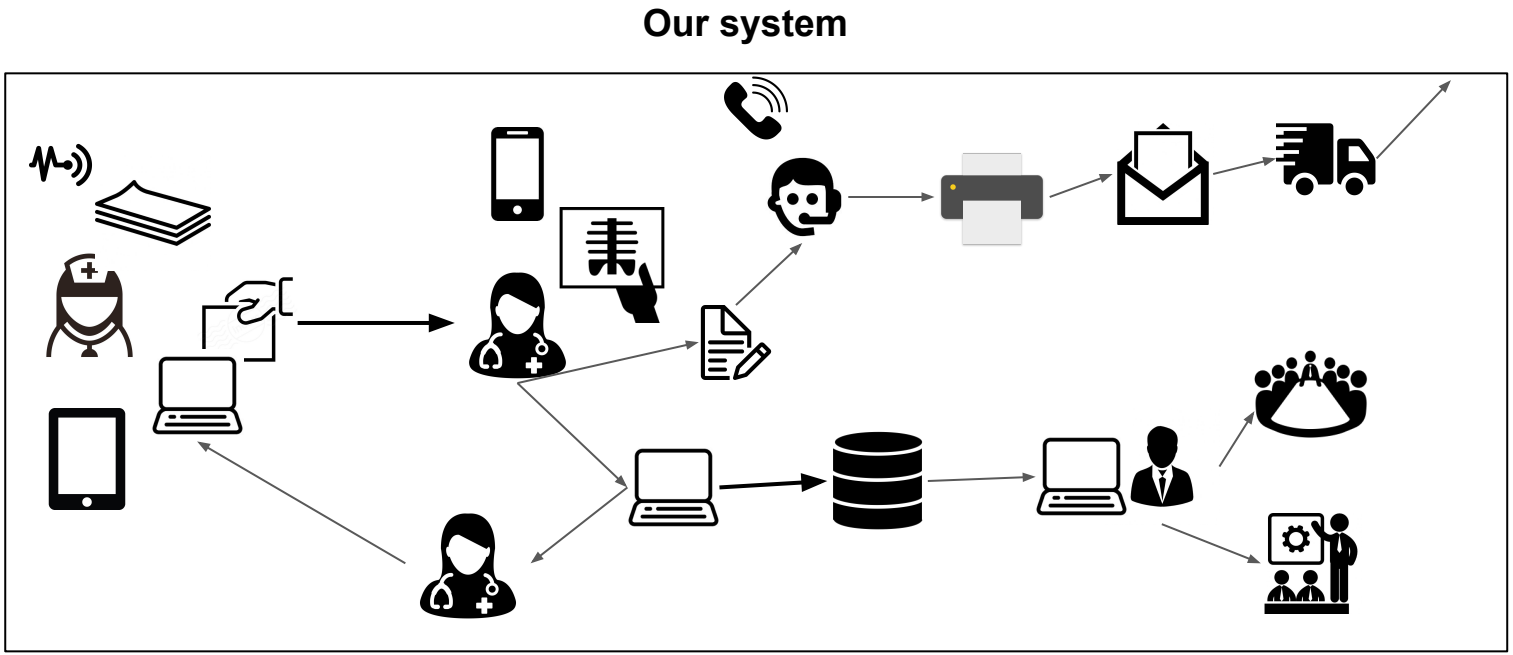
Socio-technical complexity

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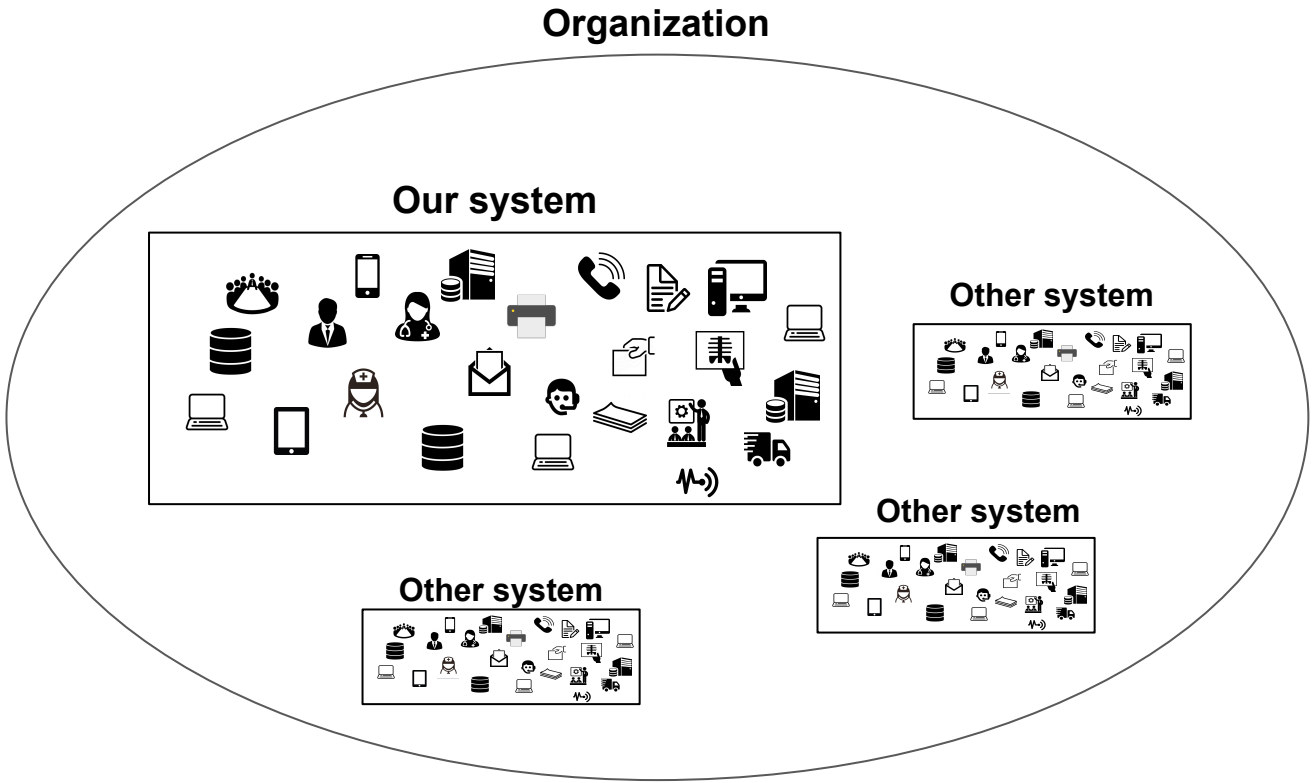
Socio-technical complexity

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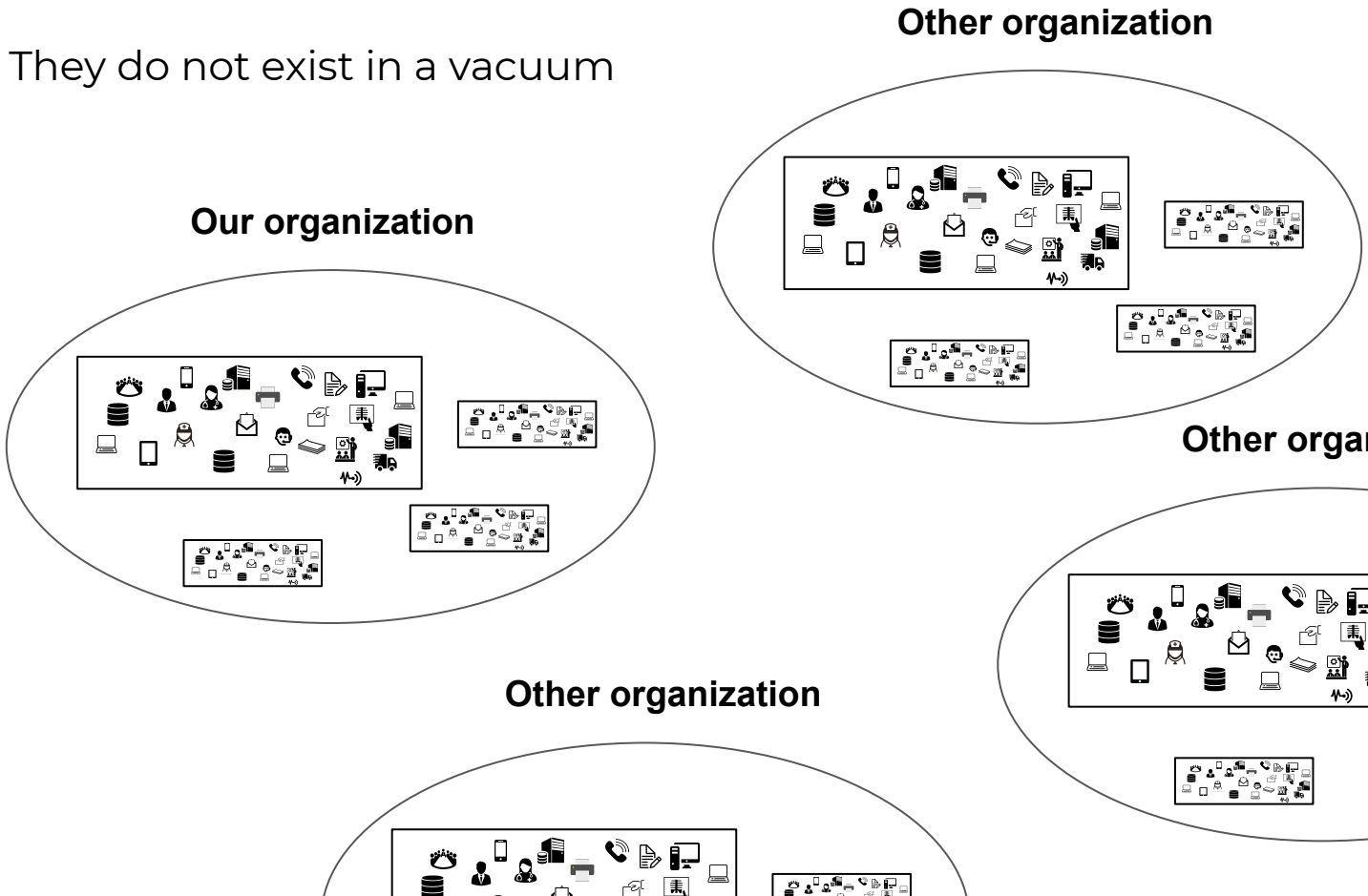
Socio-technical complexity

- They do not exist in a vacuum



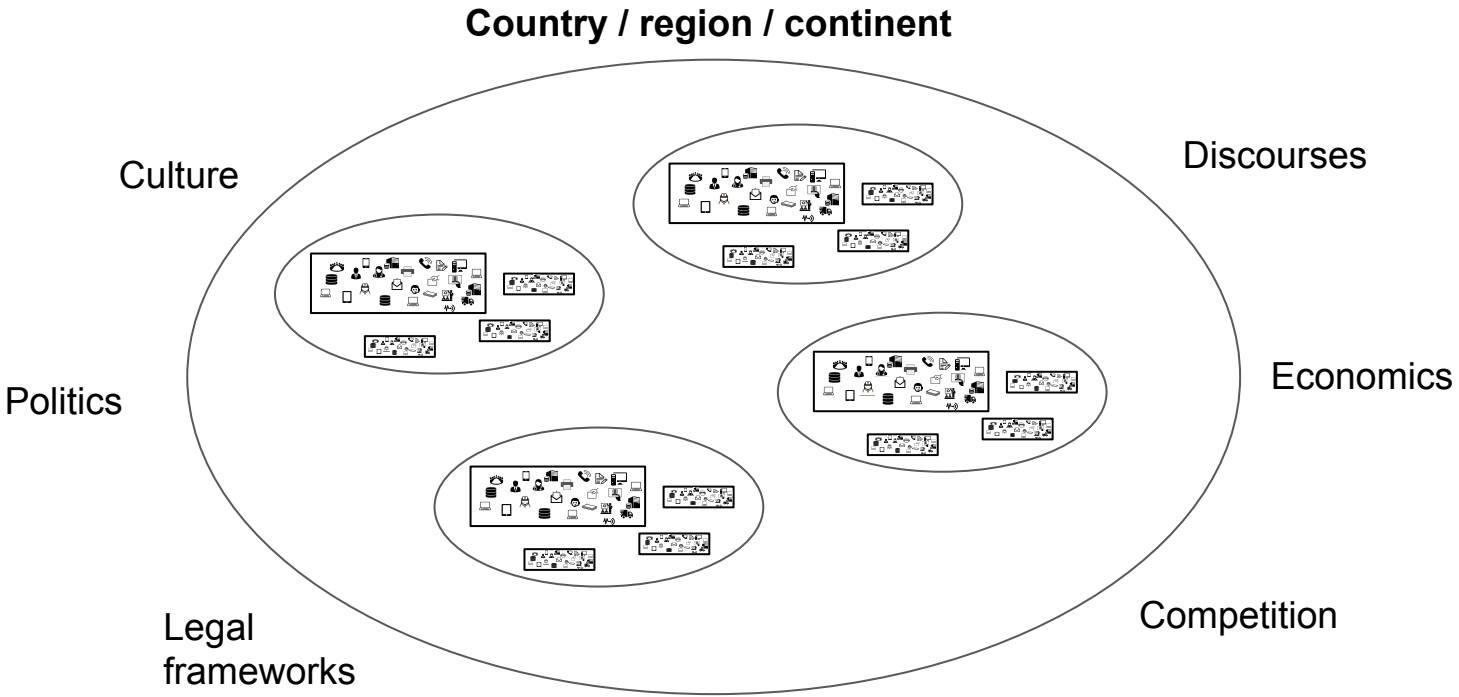
Socio-technical complexity

- They do not exist in a vacuum



Socio-technical complexity

- They do not exist in a vacuum



Socio-technical complexity - exercise

For one minute:

Note down some bullet points:

Do socio-technical complexity have any implications for Information Systems development and design?

Standards

Standards - exercise

For one minute:

Note down some bullet points on what you think when you hear the word “Standards” and why it may be relevant when talking about Information Systems and socio-technical complexity

Standards

- How to communicate?

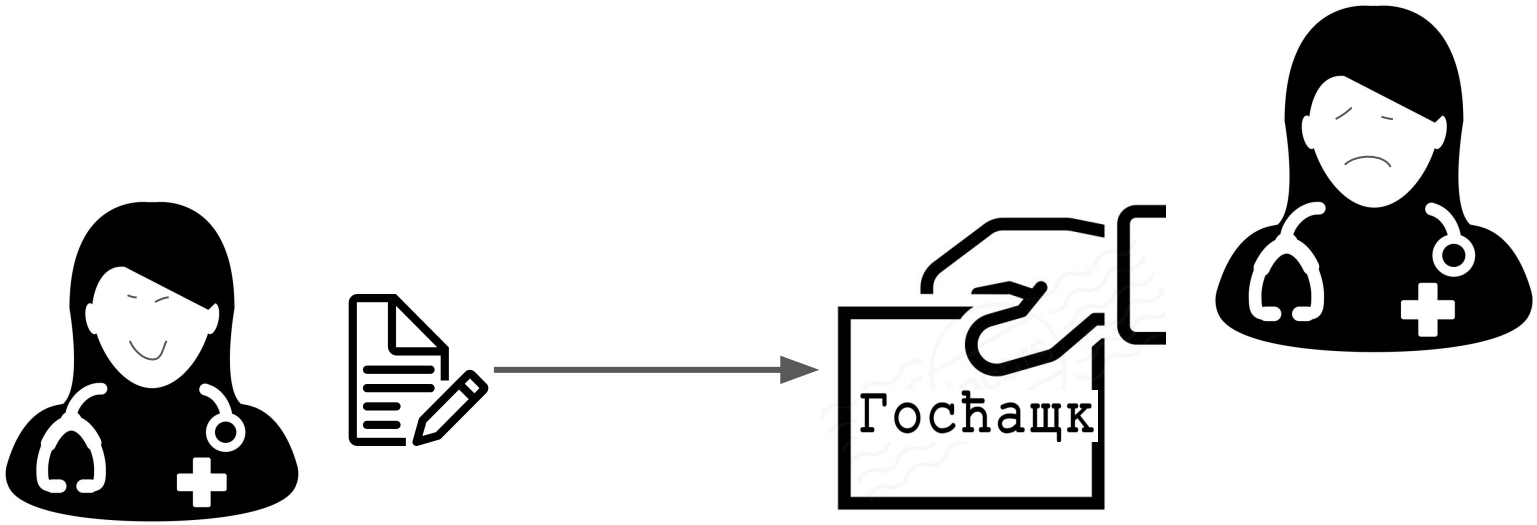





КАТЕГОРИЯ НАПРАВЛЕНИЕ ПРИСТИГА ЗАМИНАВА КОЛОВОЗ ЗАКЪСНЕНИЕ
П СТ. ЗАГОРА-Г. ОРЯХ 1820 ---- 3
М БУКУРЕЩ-Р-СОФИЯ 1828 1833 6
М Г. ОРЯХ-СЗ-ИСТАНБУЛ ---- 1845 4
П КОМУНАРИ-ШУМЕН-ГО 1910 ---- 1
Б СОФИЯ-РУСЕ-РР 1922 1932 5
Б ПЛОВДИВ-СЗ-ВАРНА 1922 1934 1
П РР-РУСЕ-Г. ОРЯХ 2027 ---- 4
П ПЛАЧКОВЦИ-Г. ОРЯХ 2045 ---- 1
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П Г. ОРЯХ -ГАБРОВО ---- 2150 4

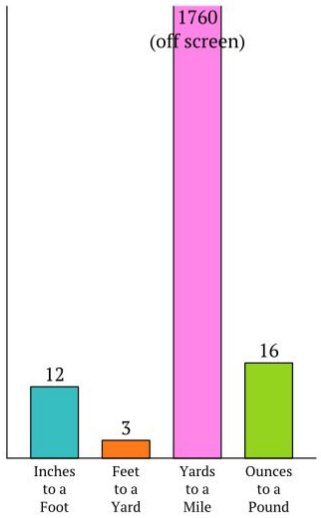
Standards

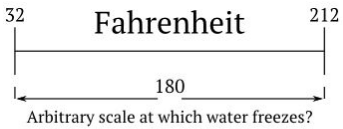
- How to communicate?



United States

Arbitrary Rollercoaster



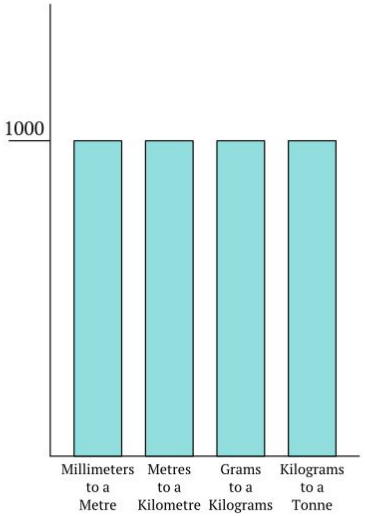


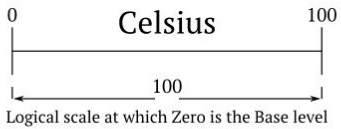
Arbitrary scale at which water freezes?



The Rest of the World

Logical Smooth Sailing





Logical scale at which Zero is the Base level





Stockholm, 3 September 1967

Standards

- How to communicate?



Example: DHIS2

- DHIS2 as part of *health information systems*

Health management information systems

Logistics management information system

Human resource information system

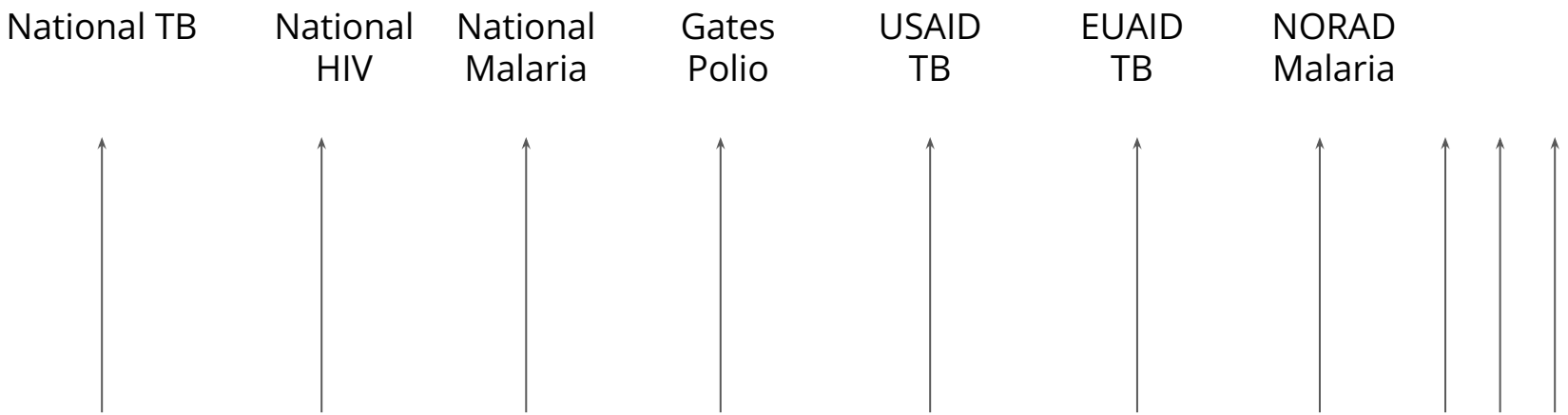
Electronic medical record information system

Patient self-use appliances

Enterprise resource planning systems

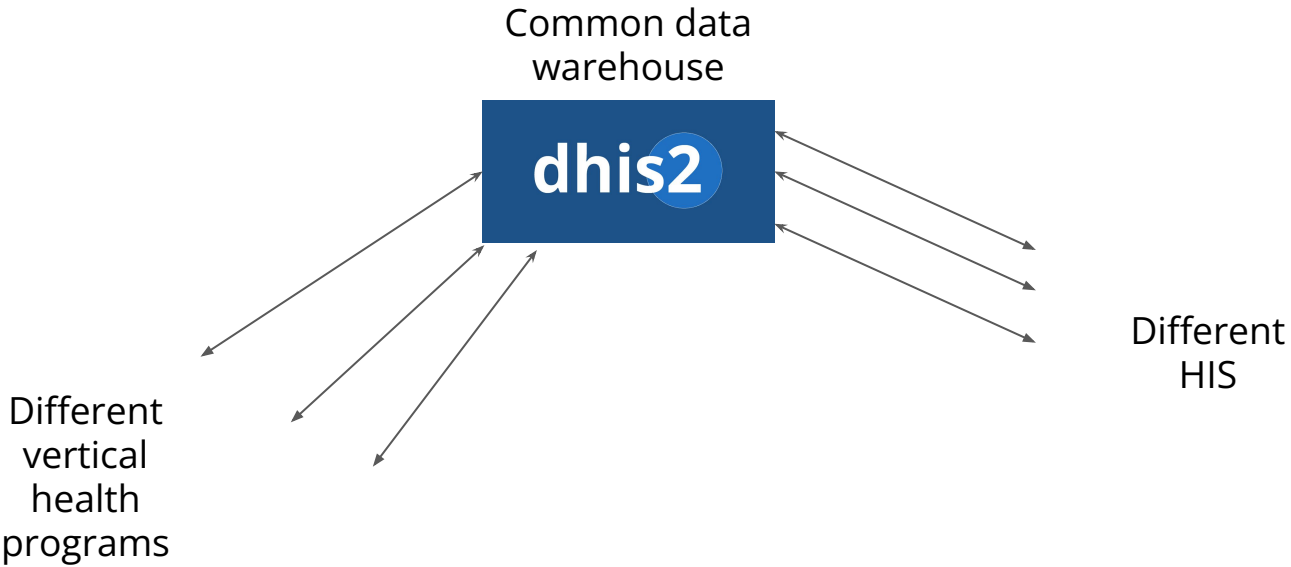
Example: DHIS2

- DHIS2 as part of *health information systems*
- In many countries: many ‘silo’ vertical reporting regimes.
- Different technology, terminology, political actors



Example: DHIS2 as platform and ‘data warehouse’

- DHIS2 aims at supporting standardization and integration of information across vertical programs



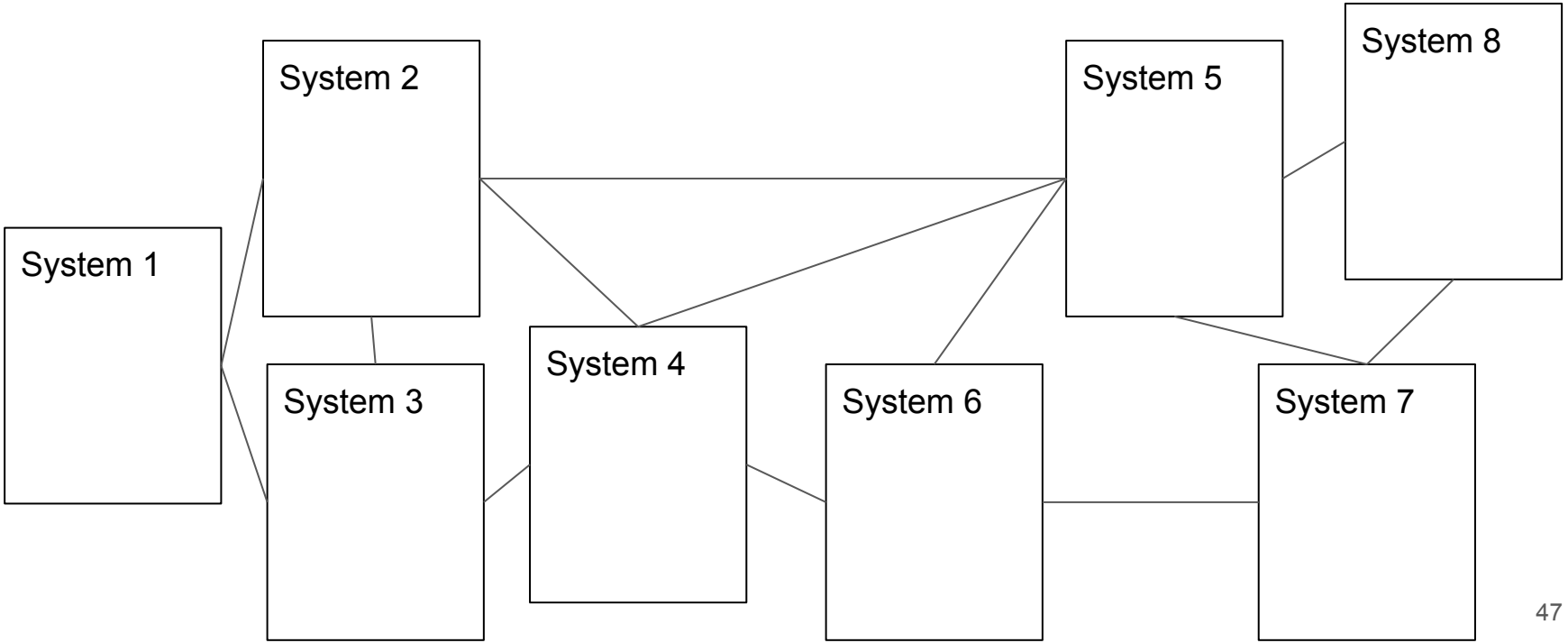
Architecture

Architecture

- A “blueprint” of a systems modules and relations.
- May be technical or/and socio-technical

Architecture

Silo-systems - a typical problem within many organizations



Architecture - exercise

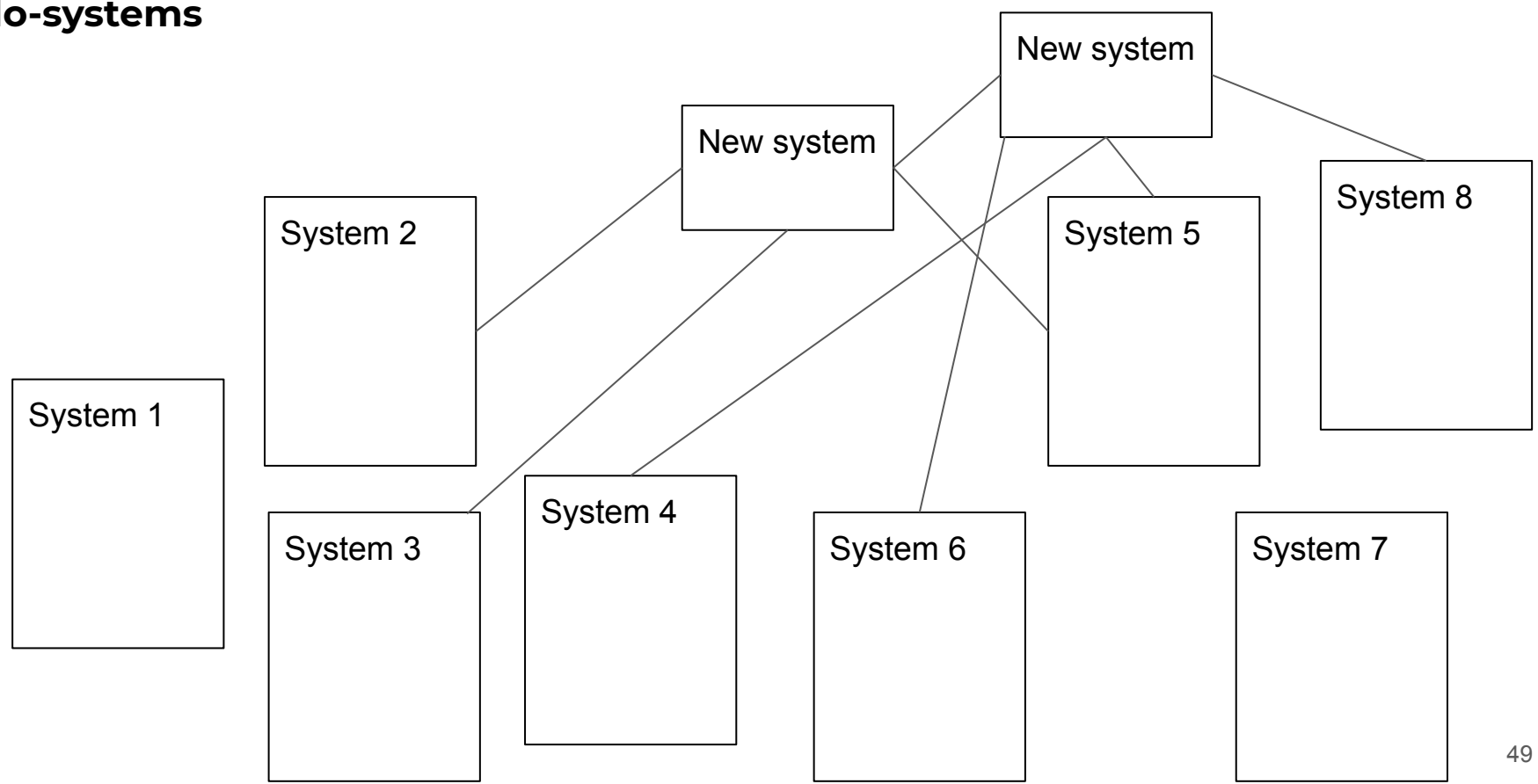
For one minute:

Note down some bullet points on:

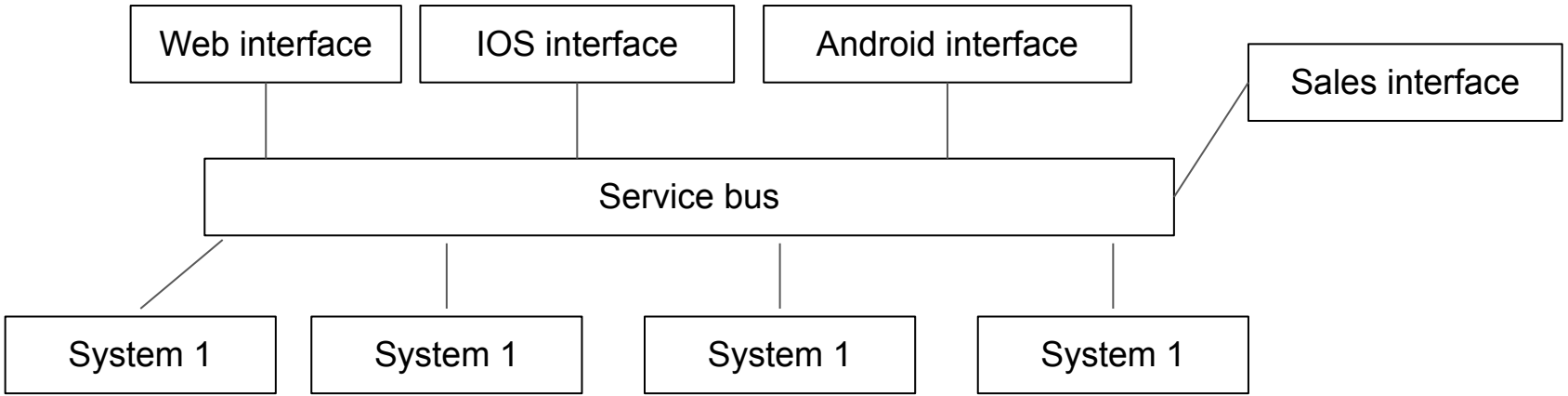
May such a silo-architecture have any implications for the possibility for digital innovation within an organization?

Architecture

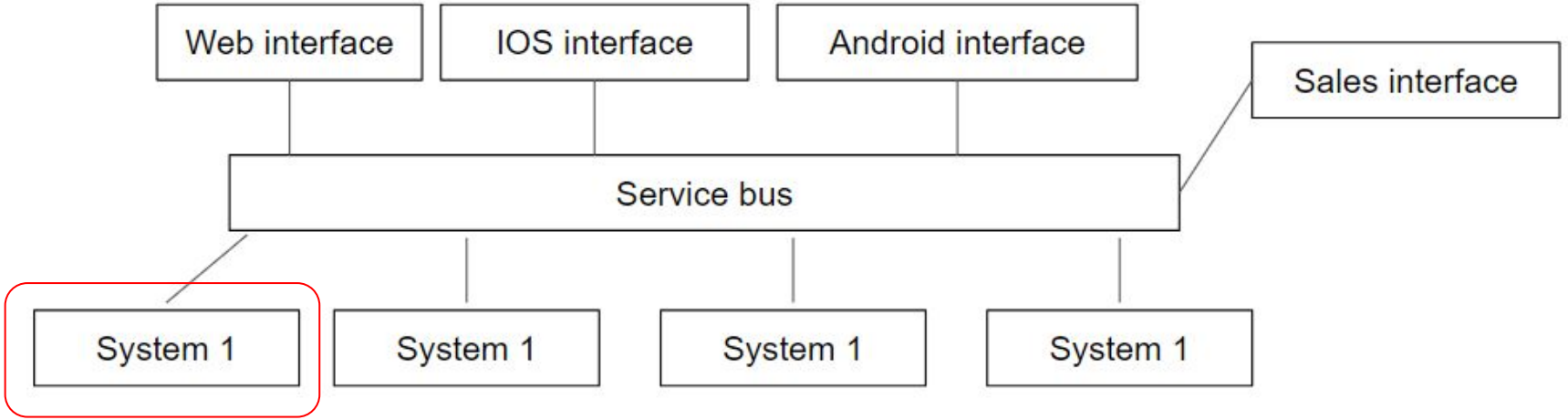
Silo-systems



Service-oriented architectures

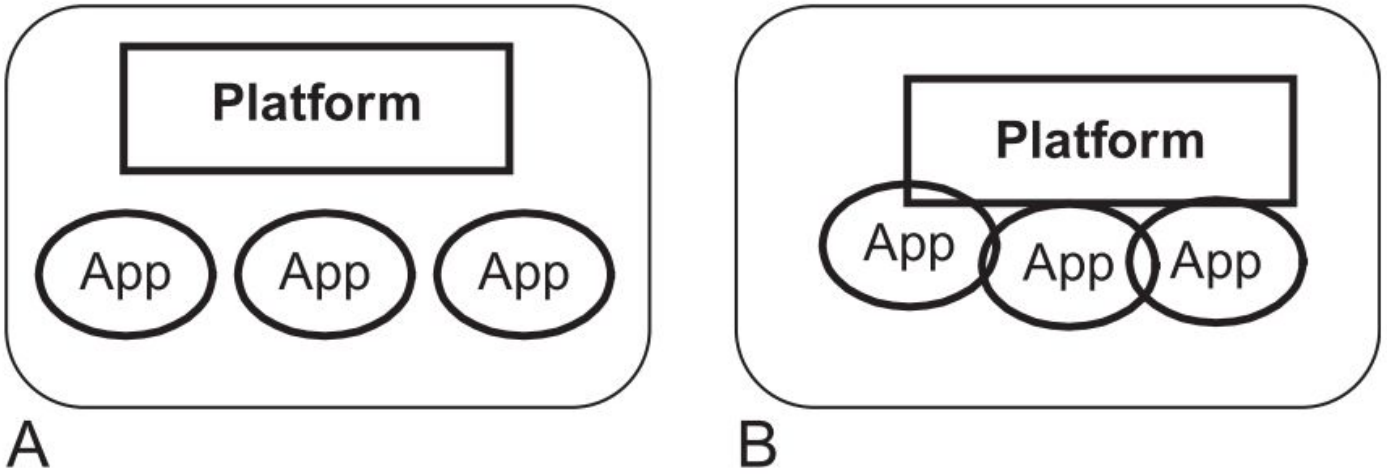


Modularization / partitioning



Module

Modularization / partitioning



Tiwana 2012 p 80

Summary

Summary

- Platform ecosystems take part in, and may be seen as ***information systems***

- They are thus part of **socio-technically complex** environments

- **Standards** are essential to information systems, and are an important part of platform architectures

- In the coming weeks, we will see that platforms has certain **architectural traits** that may promote desirable aspects
  - Reducing complexity, promoting innovation, enabling different levels of design, facilitating integration