IN5320 - Development in Platform Ecosystems

Lecture 6: *Information systems and complexity*

24th of September 2018

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Assignment 2

Collection of open APIs

Tutorial for React-users

Delivery in both Devilry and git

Deadline moved one week! (to October 5th)

Group project

Start to form groups now!

You must register your group here **before 5th of October**

Cases will be presented on the lecture October 8th (in two weeks)

The week after, you will present initial requirements.

Today’s lecture

Aim:

- To provide context to platform concepts
- Gain an understanding of basic concepts such as:
  - Information Systems
  - Complexity
  - Architectures
  - Standards

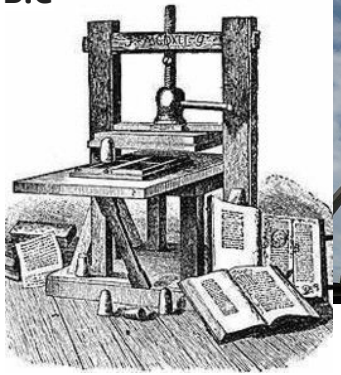
Today's lecture

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

Information Systems

ICT

3200 B.C



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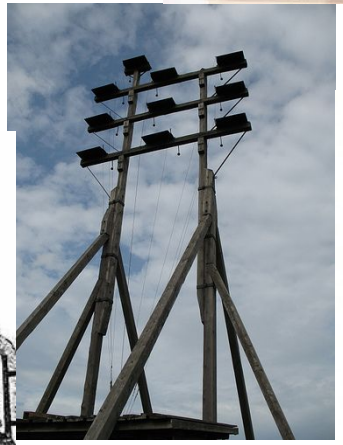
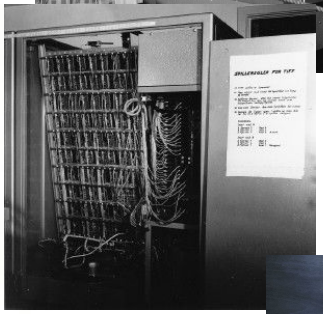
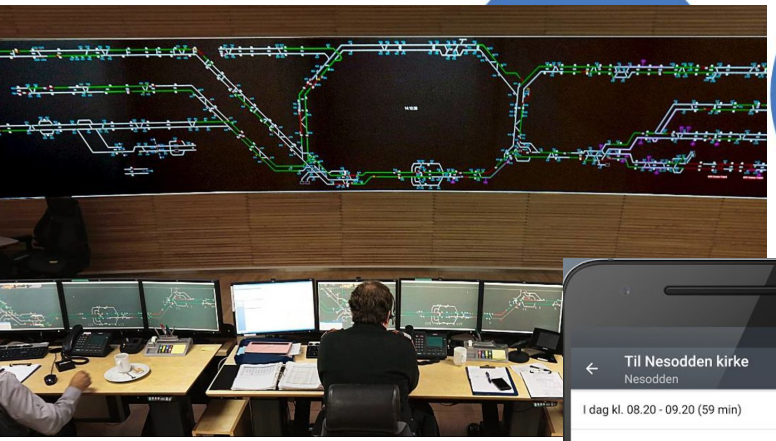


1792 - 1881



ICT

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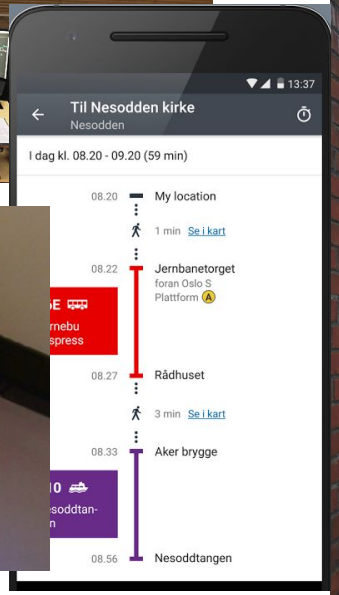
13 minutt
Avvik!


18 Ljabru
19 Ljabru 7 min
4 min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Nesodden
I dag kl. 08.20 - 09.20 (59 min)
08.20
My location
1 min Se i kart
08.22
Jernbanetorget
foran Oslo S
Plattform A
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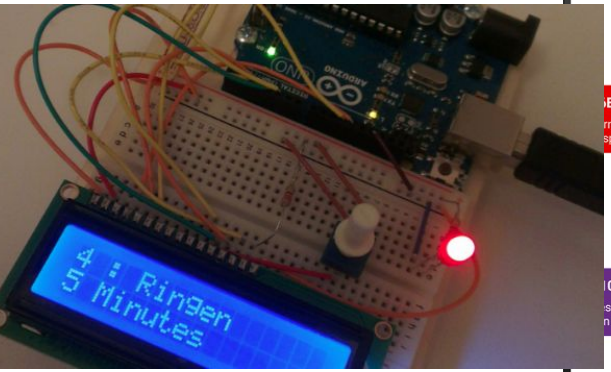
Rådhuset
3 min Se i kart
08.33
Aker brygge
08.56
Nesoddtangen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5 Minutes


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Spor Track 2
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Direction Sognsvann/Storo
4 Vestli
5 Ringen
7
5 Sognsv


41 Sørkedalen
08:26
3 Vennerstua
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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 Systems

Information Technology

The study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information. (Oxford english dictionary)

Information Systems

Information Technology - examples?

Laptops

Smartphones

Tablets

Smartboards

Servers

SMS

Software (email, calendars, snapchat, etc.)

Paper forms

Whiteboards

Notepads

Mail

Pneumatic tubes

Information Systems

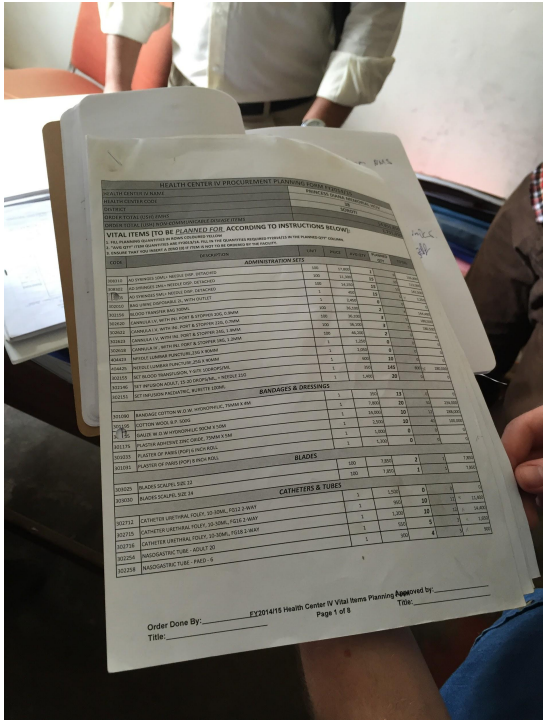
Information Technology - examples?

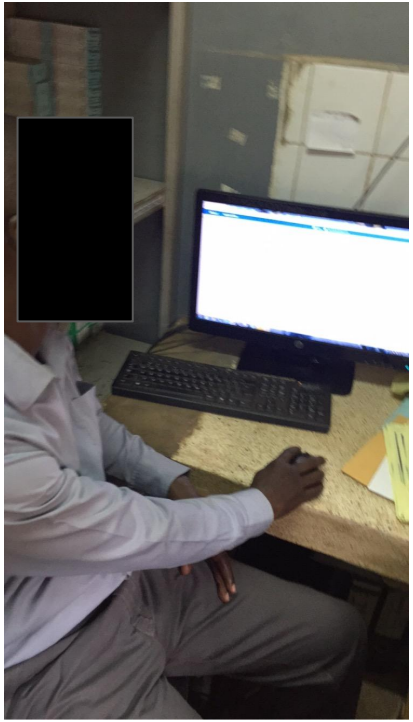
Why is analog technology of interest?

- To understand how systems work
- Why systems fail
- Why systems succeed
- How to design and integrate new systems

Information Systems

Information Technology





Information Systems

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(Allen S. Lee, 2004)

Organization

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

Institution

An established law or practice. (ibid.)

Organization

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

Humans

Routines

Hierarchies

Norms

Rules

Politics

Motives

Buildings

Products

Information Technology

Culture

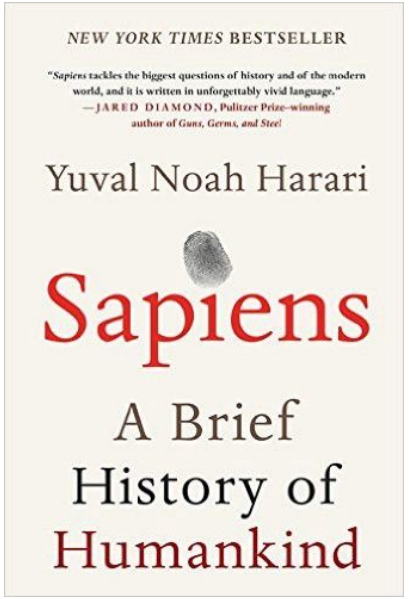
Language

What makes an organization?

Organizations and institutions are, as many social phenomenon, an *inter-subjective* entity.

"You could kill every employee and stakeholder in Peugeot, but the corporate entity would still exist. The building isn't Peugeot—it can move offices. Peugeot could make planes rather than cars, so it isn't what they do that defines them. The only thing that makes Peugeot Peugeot is everyone's agreement that Peugeot exists, duly noted in the papers of some lawyer"

Corey Breier, 2016 paraphrasing from "Sapiens" by Yuval Harari



Why are organizations and institutions of interest?

- To understand how systems work
- Why systems fail
- Why systems succeed
- How to design and integrate new systems

Imbrication

“if we were to examine routines and technologies under a microscope, we would find that each is made up of the same basic building blocks: human and material agencies”
Leonardo 2011 p 151

Theorizing Information Systems

Structuration theory: Intersubjective social structures.

Institutional theory: Organizations consists of webs of values, norms, and beliefs.

Actor network theory: Net of “actors” that together form systems (work net).

Information Infrastructure: Open, shared, and heterogeneous installed base enabled by standards.

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

A human

The internet

Climate and weather

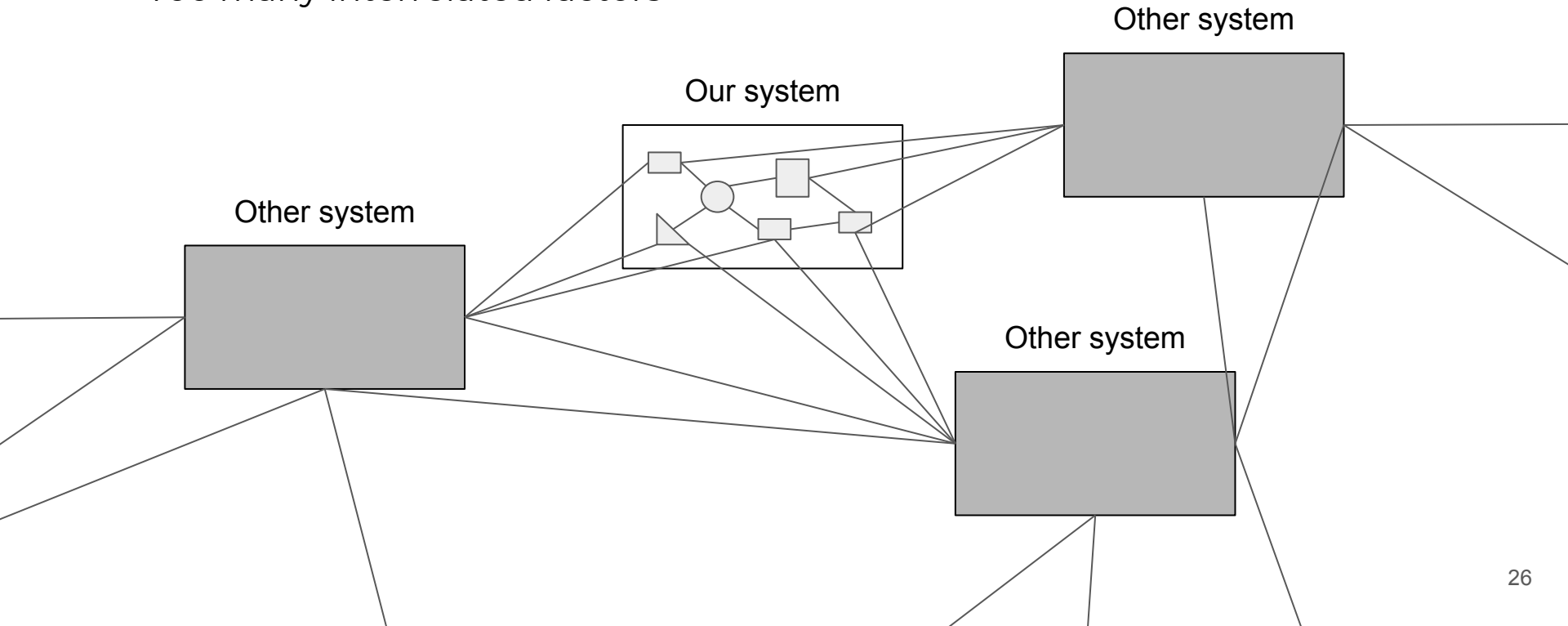
Cosmos (space)

Why is it complex?

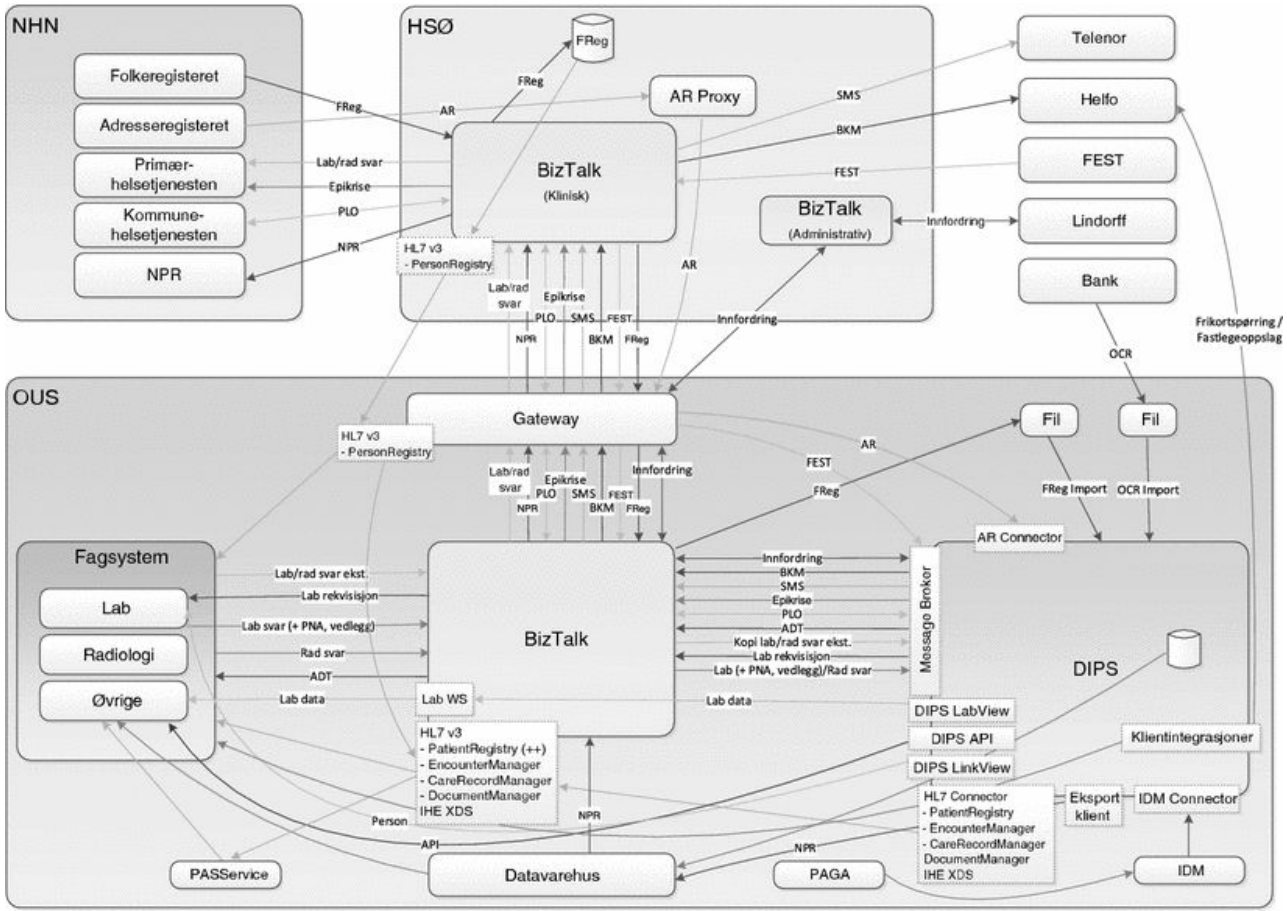
- Too many unknowns
- Too many interrelated factors

Why is it complex?

- Too many unknowns
- Too many interrelated factors



Why is it complex?



Bygstad (2007)

Why is it complex?

Inherent complexity

How the system behaves is dependent on the environment.

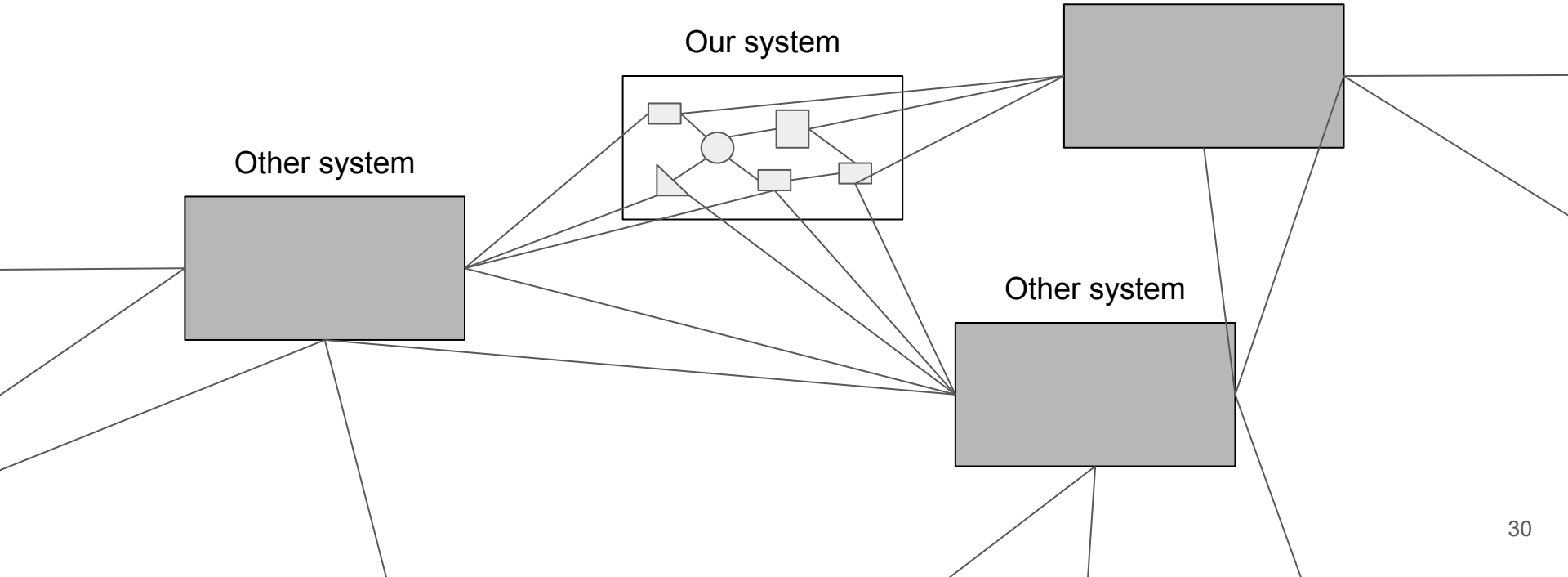
Epistemic complexity

The system consist of such an amount of components that knowing the workings of all, and how they will interact is “impossible”.

Socio-technical complexity

Socio-technical complexity

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



Socio-technical complexity

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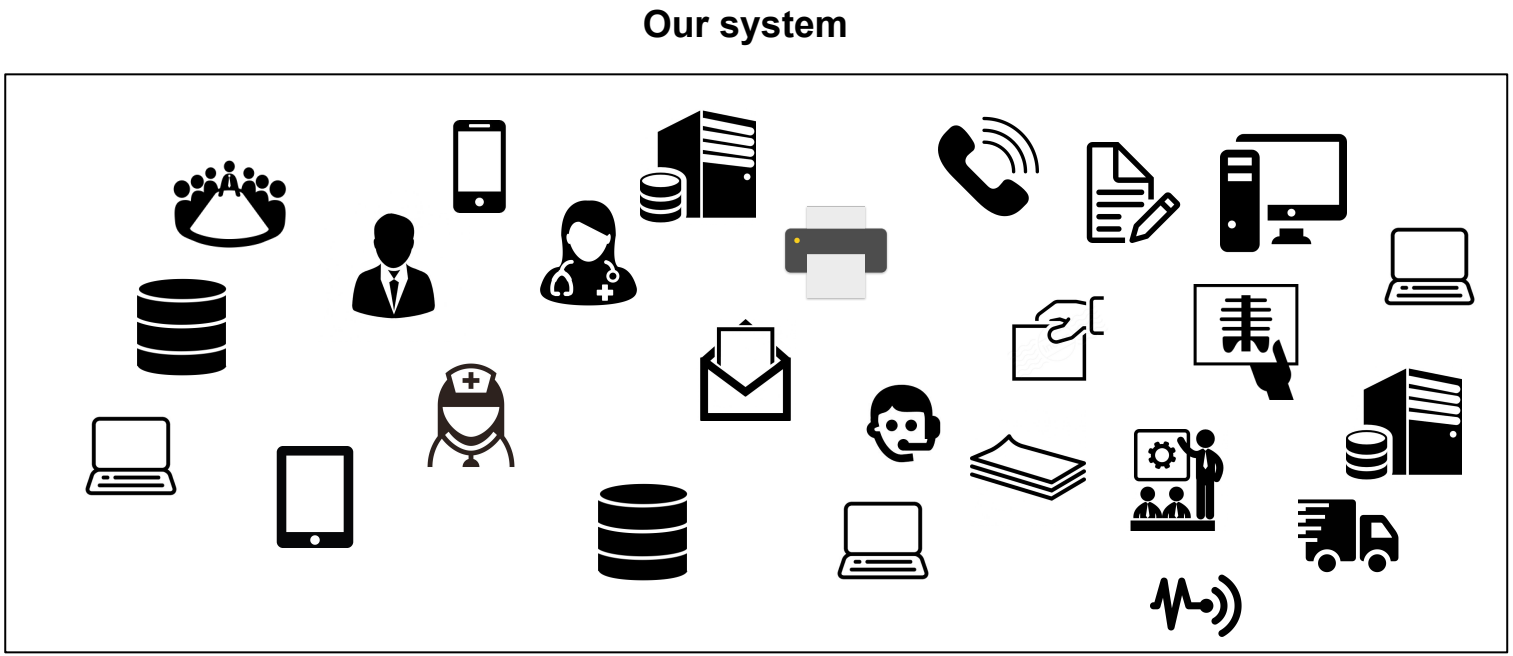

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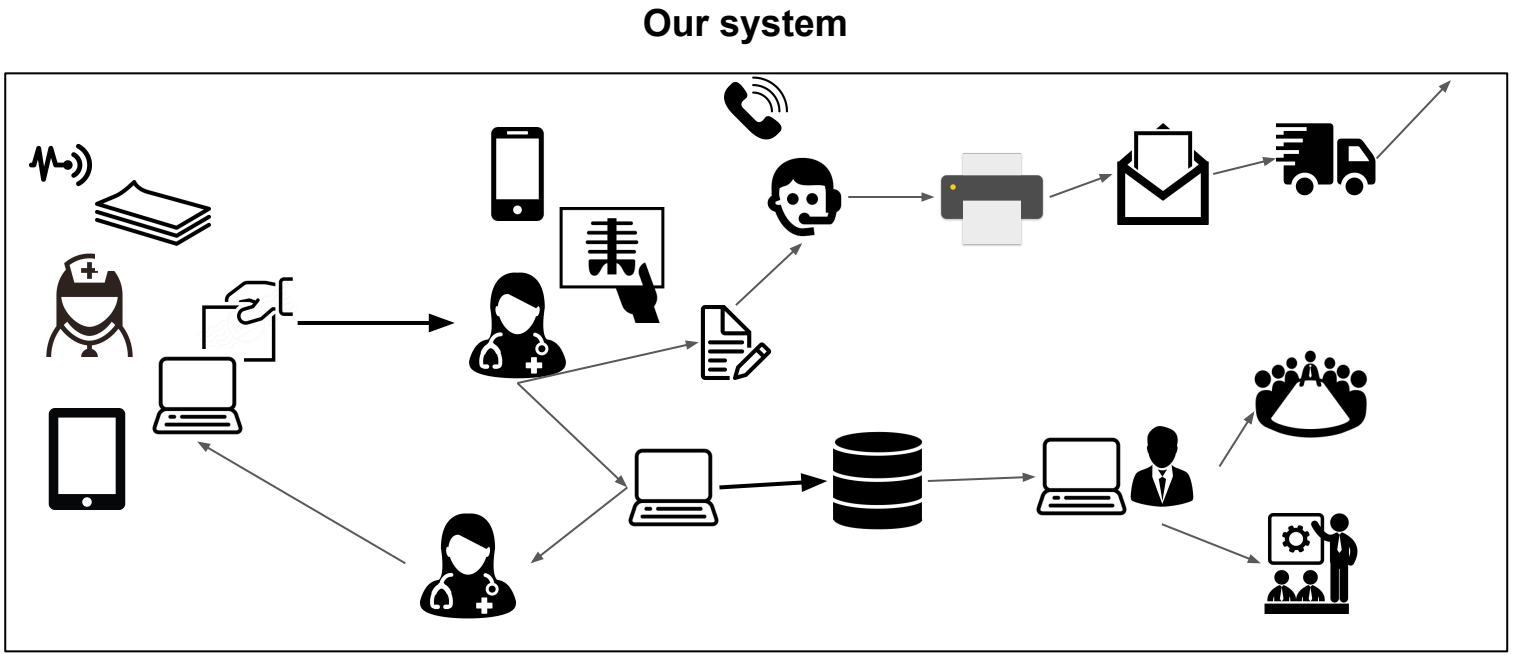
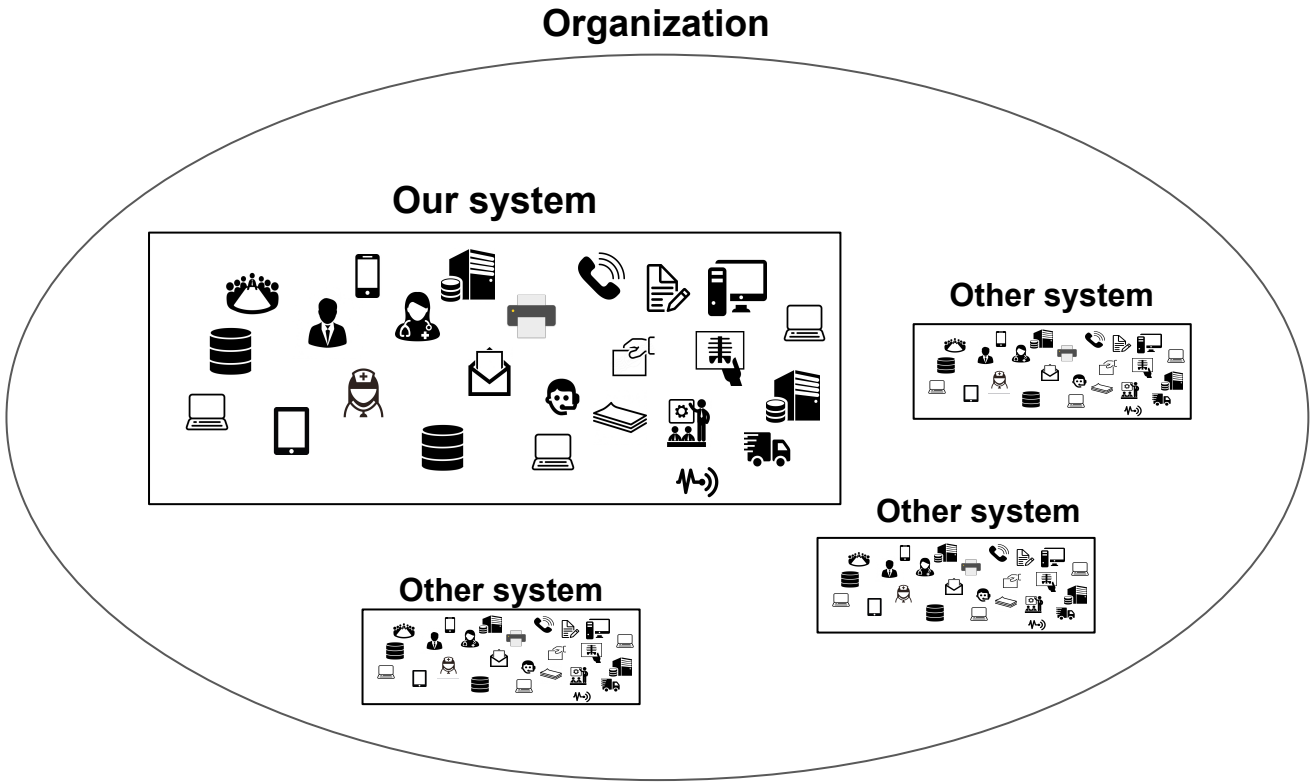


Socio-technical complexity

- They do not exist in a “digital vacuum”



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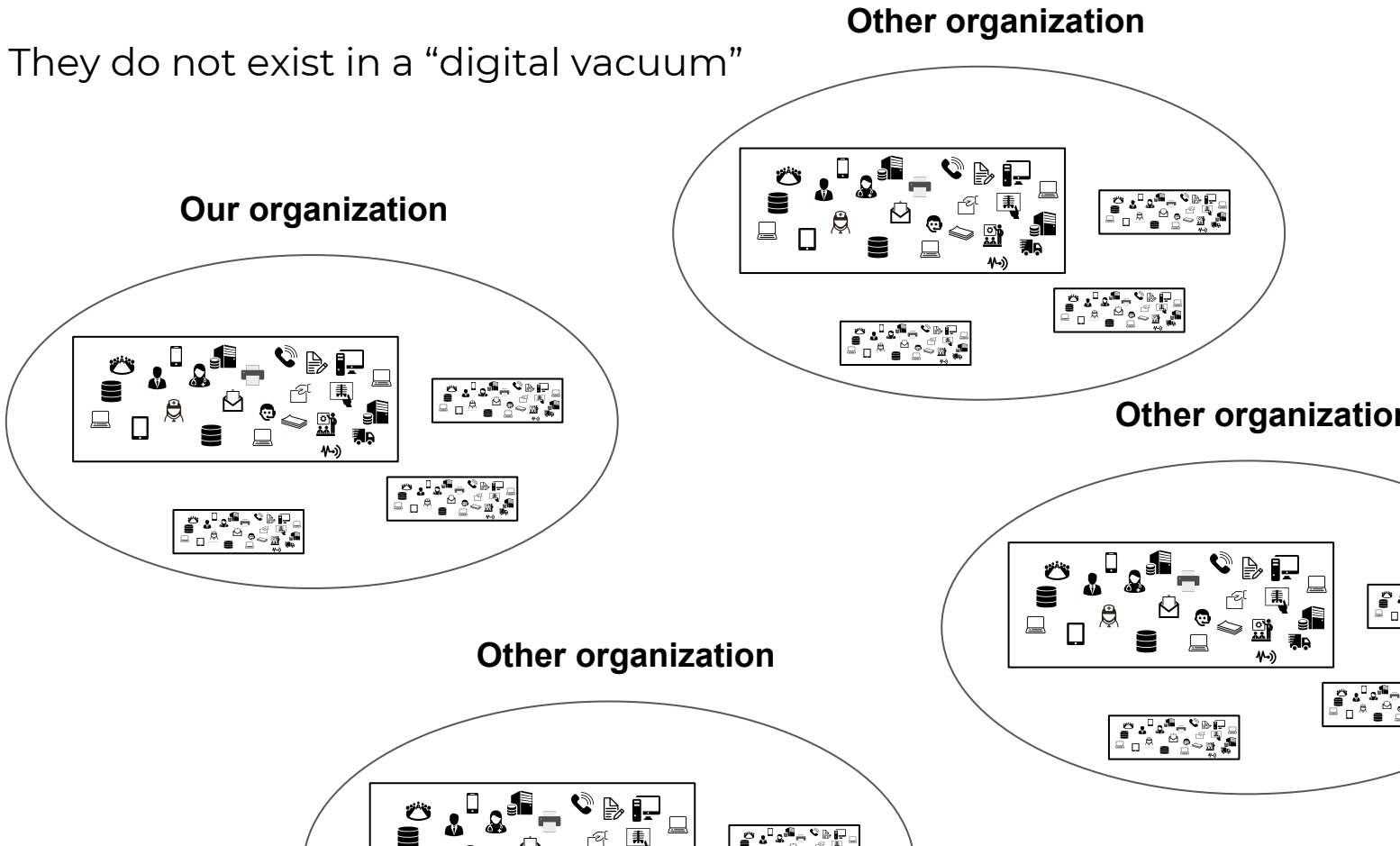

Socio-technical complexity

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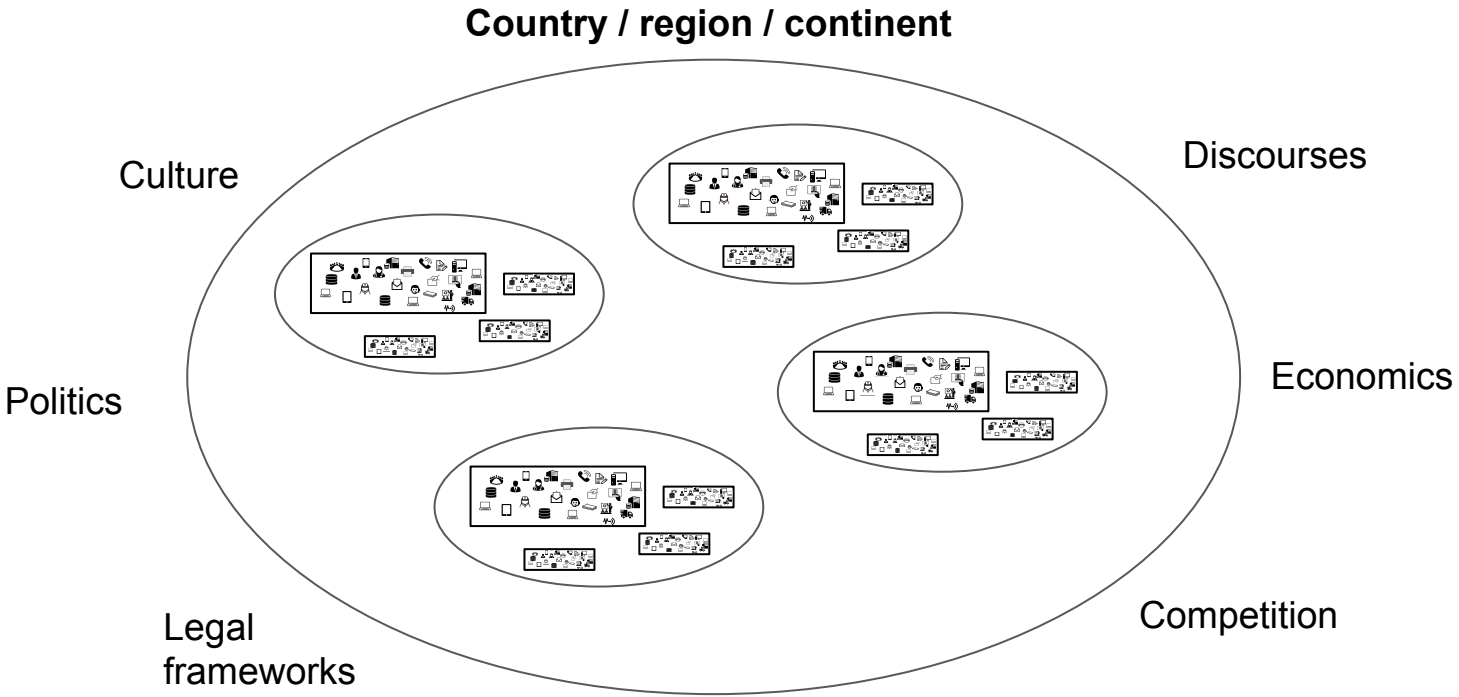
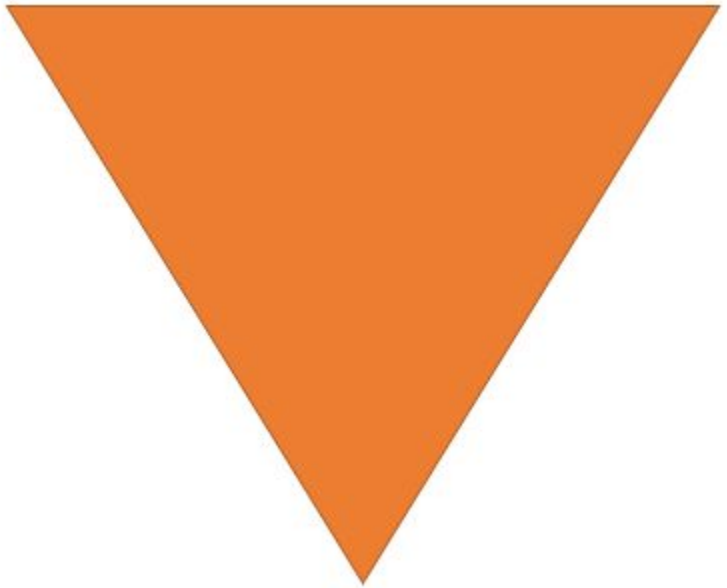


Socio-technical complexity

Humans, organizations, institutions

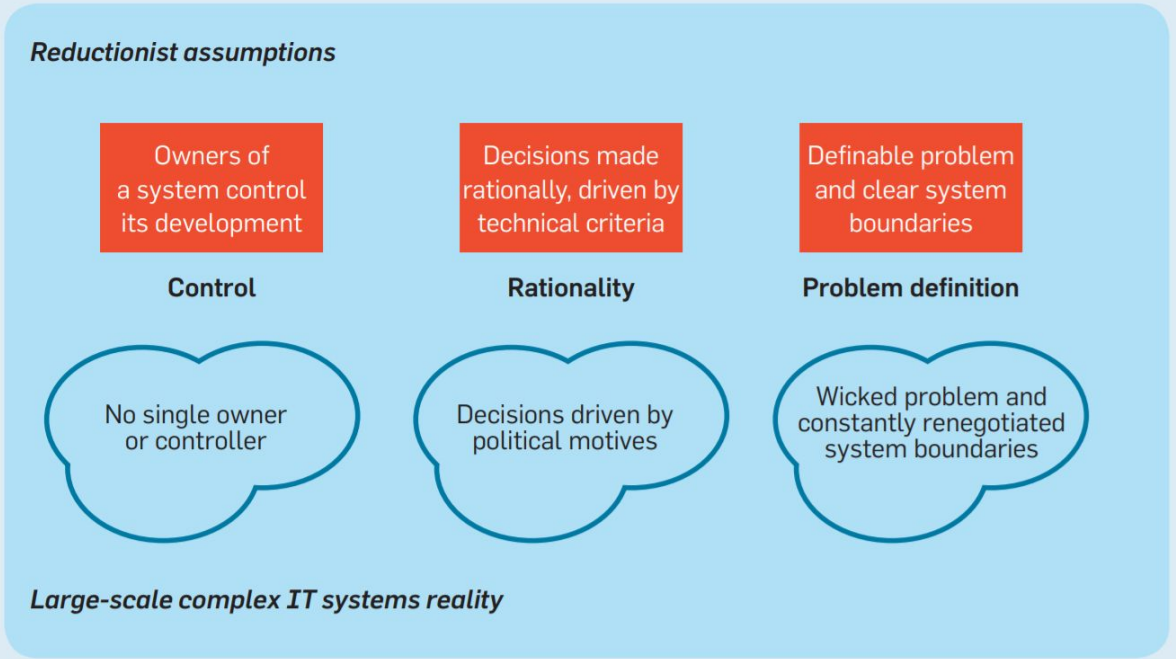
Human

Computers



Socio-technical complexity

Figure 1. Reductionist assumptions vs. LSCITS reality.



(Sommerville et al., 2012)

Standards

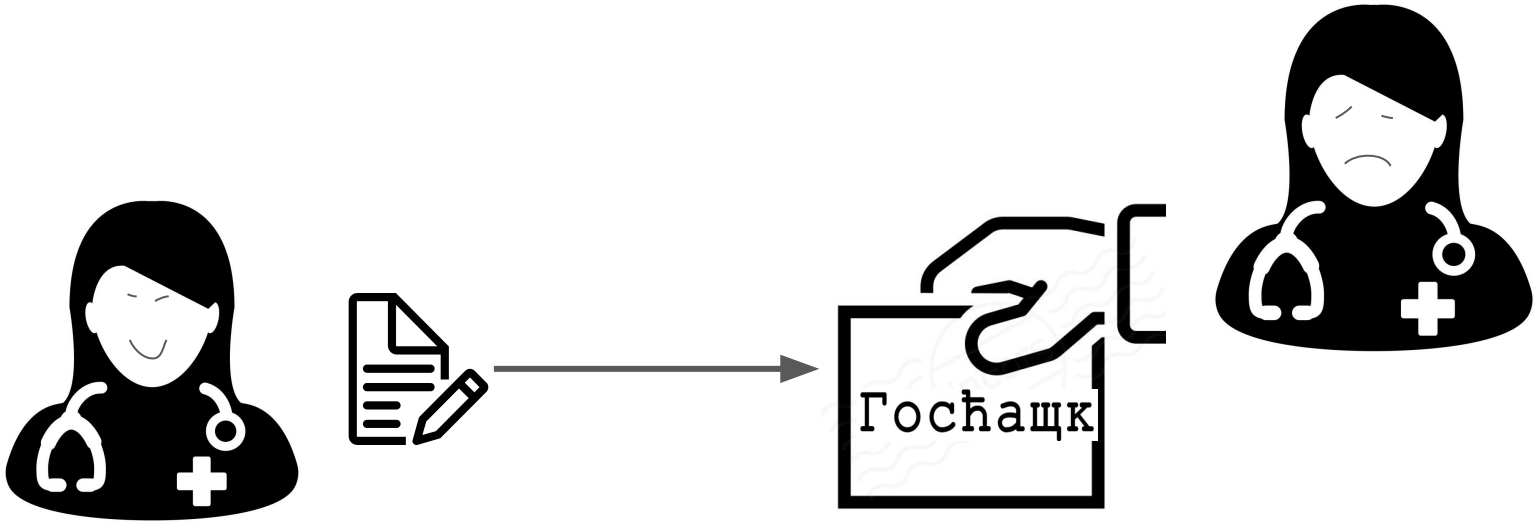
Standards

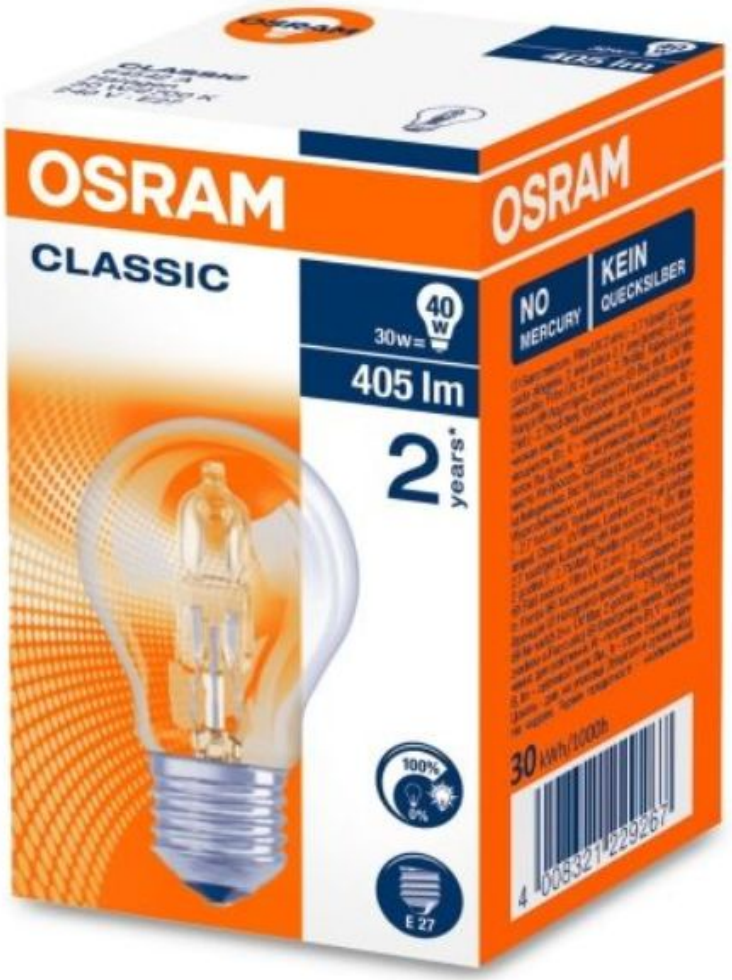
- How to communicate?


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
Б СОФИЯ-Г. ОРЯХОВИЦА 2138 ---- 1
П Г. ОРЯХ -ГАБРОВО ---- 2150 4

Standards

- How to communicate?




OSRAM
CLASSIC
40 W
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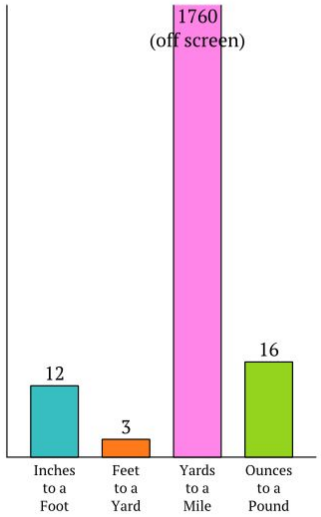
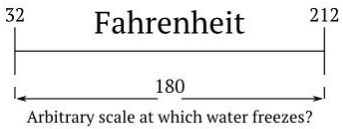
NO MERCURY
KEIN QUECKSILBER
30 kWh/1000h
100%
E 27
OSRAM

United States

Arbitrary Retarded Rollercoaster

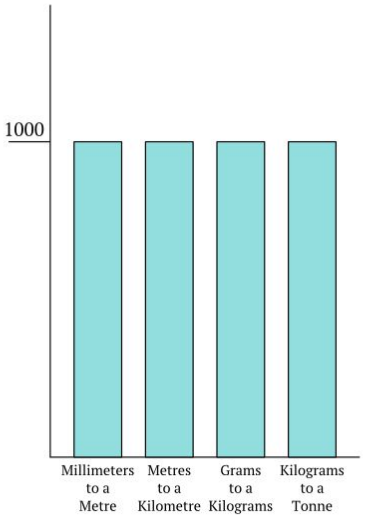


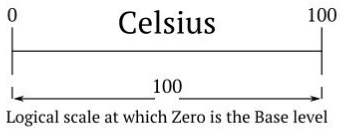


Arbitrary scale at which water freezes?

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?

Standards

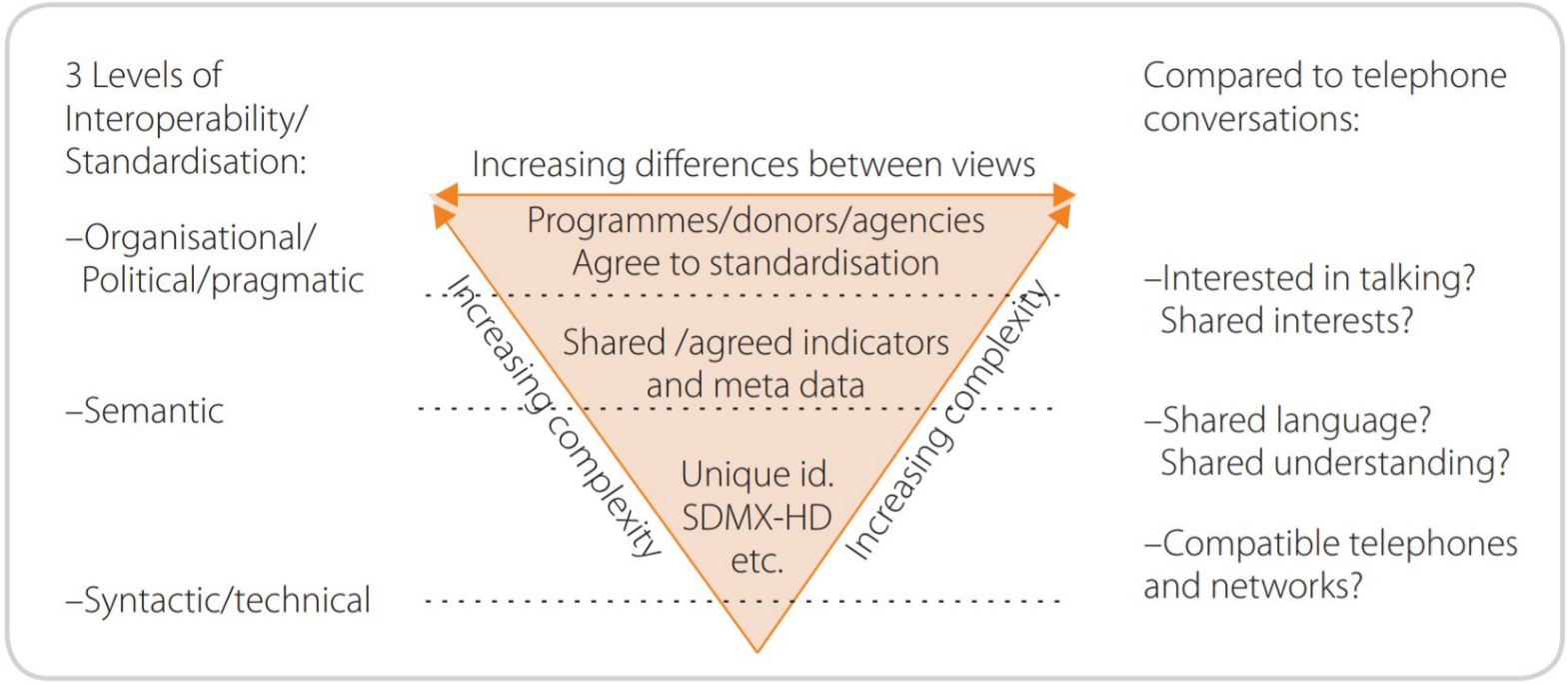


Figure 3.4 Three levels of standardisation of the increasing differences and complexities

Braa & Sahay 2012

Standards

Rolland & Monteiro (2011) describe a standardization initiative by a large international maritime classification company.

Located on 300 sites in 100 countries.

Information system to support surveying of ships.

Balance between global uniform standards and local particularities.

Standards

“We are adding a lot of functionality to the system—some work arounds disappear after doing these modifications—but new ones tend to turn up. It’s an ongoing battle. “

(Quoted manager in Rolland & Monteiro, 2011, p97)

Architecture

Architecture

The complex or carefully designed structure of something.

The conceptual structure and logical organization of a computer or computer-based system.

Oxford english dictionary

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

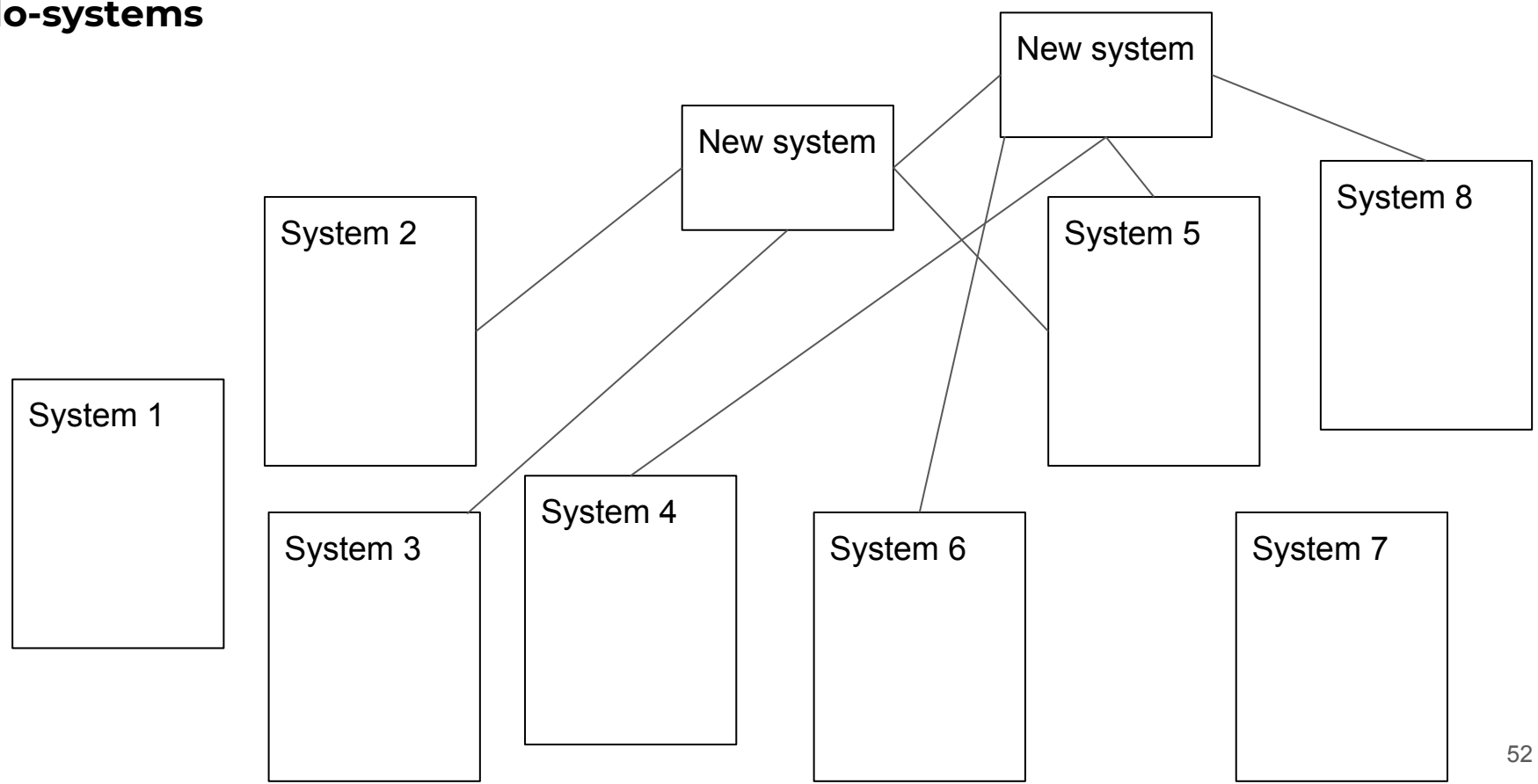
Architecture

A good architecture must exhibit four simple properties that it shares with the architecture of modern cities: simplicity, resilience, maintainability, and evolvability.

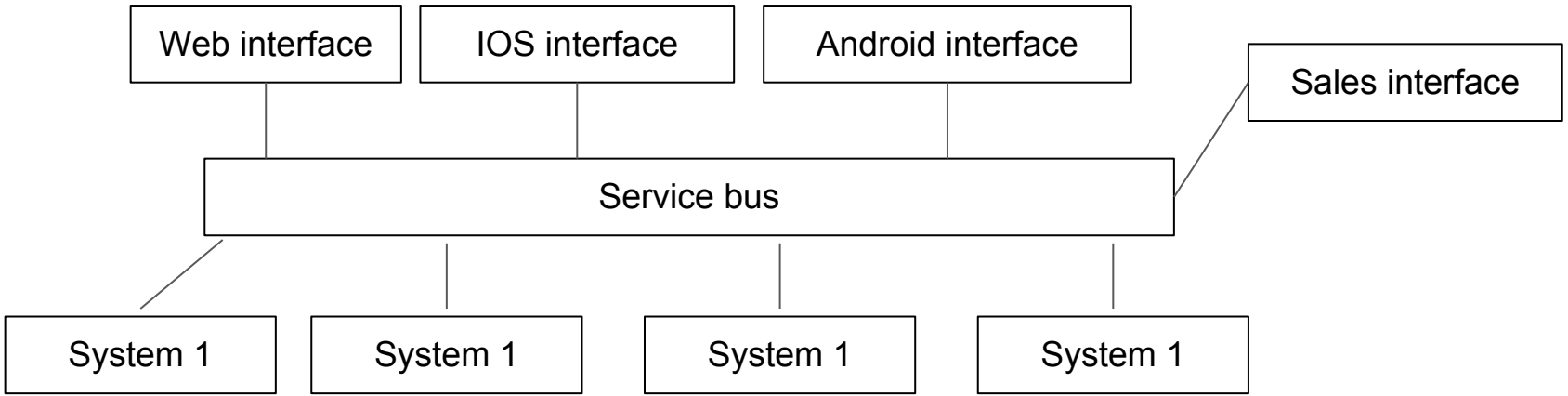
Tiwana 2012 p77

Architecture

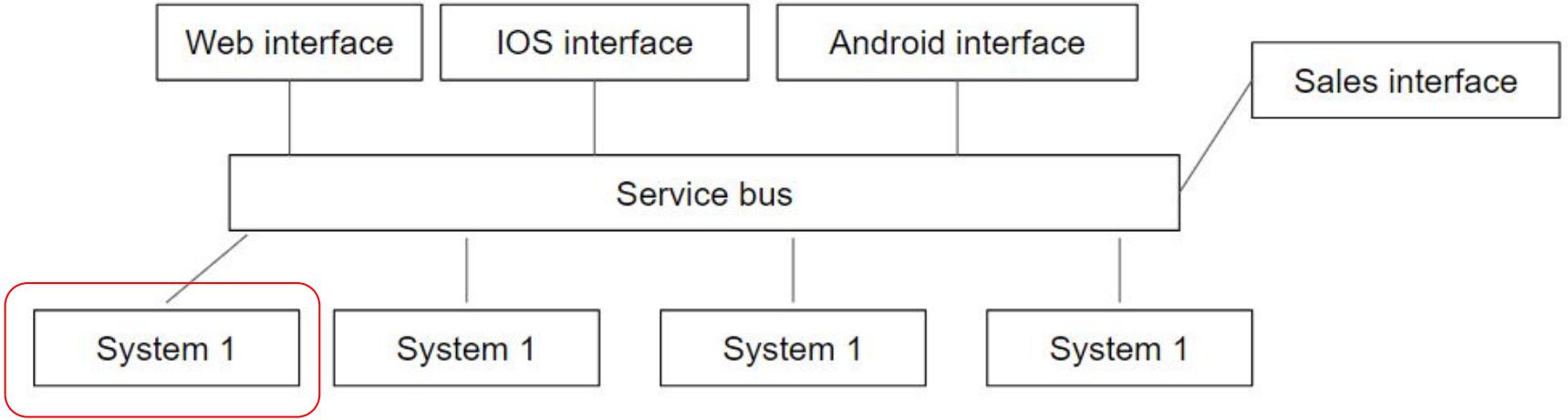
Silo-systems



Service-oriented architectures

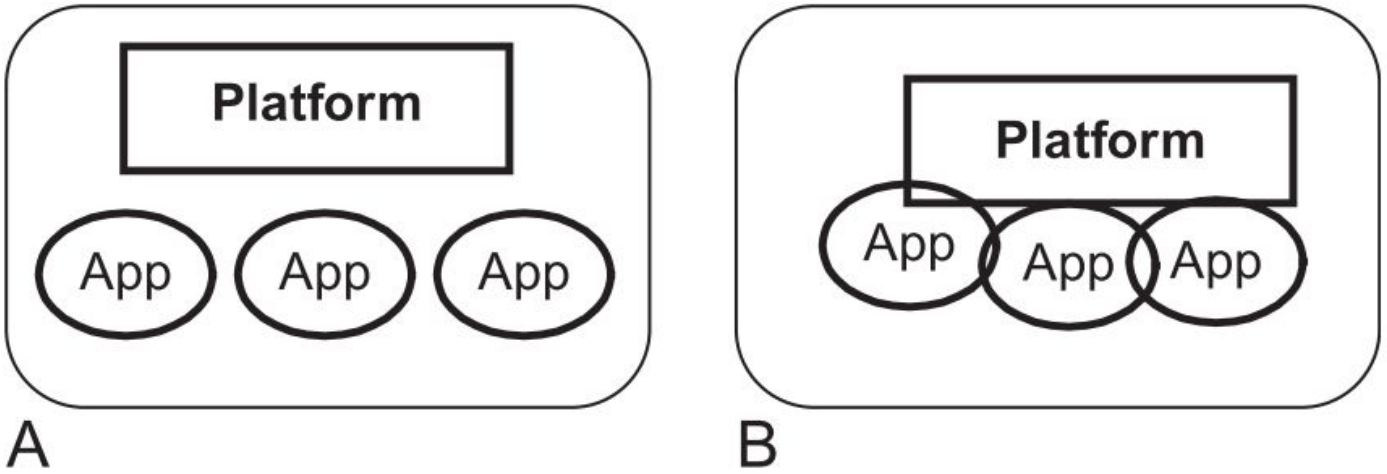


Modularization / partitioning



Module

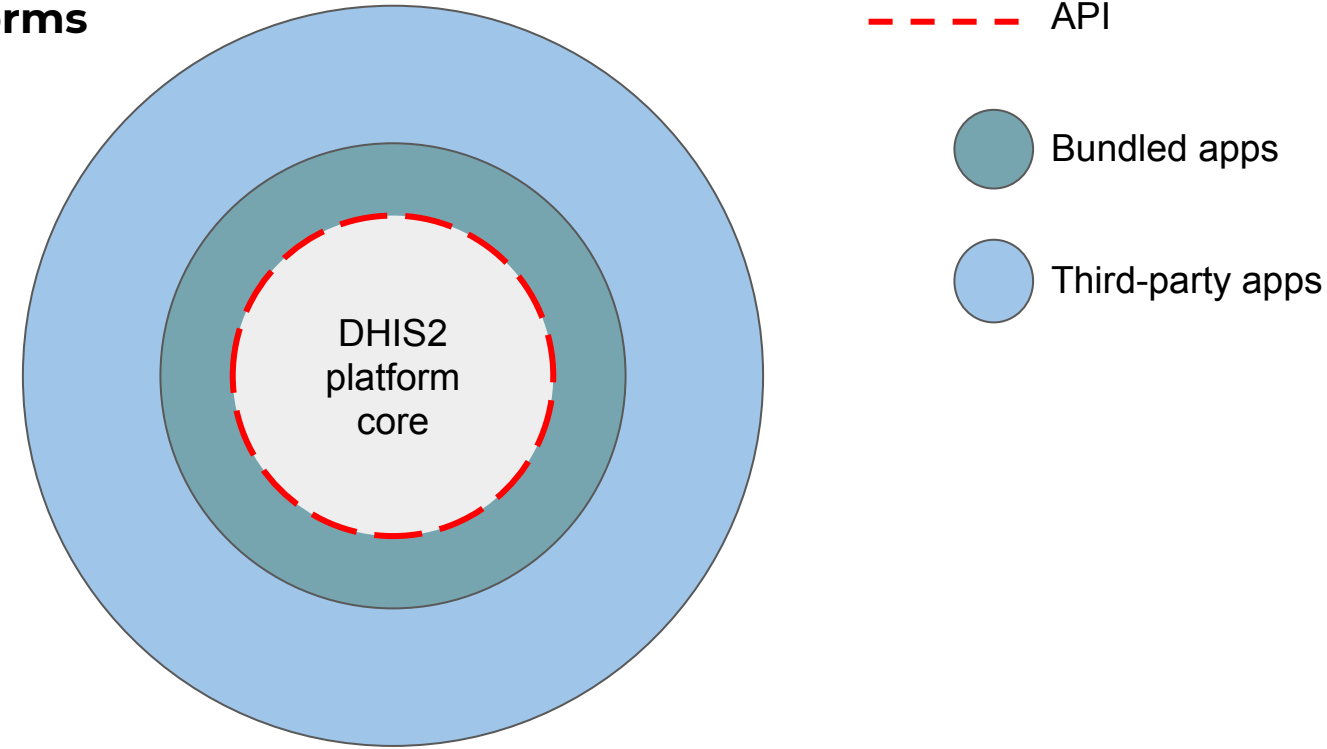
Modularization / partitioning



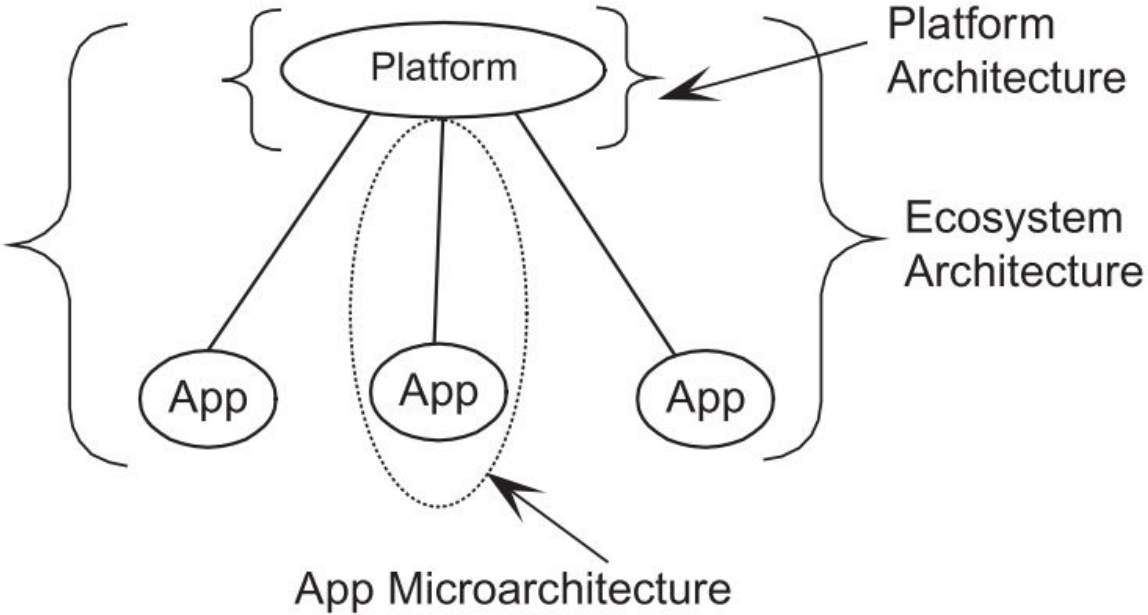
Tiwana 2012 p 80

Architecture

Platforms



Platforms



Tiwana 2012 p 85

Mo. 24. Sep	14:15–16:00	Theoretical: Information systems and complexity	KN Store auditorium	M. Li	I. Sommerville et al., (2012) K. Rolland, E. Monteiro (2002)
Mo. 1. Oct	14:15–16:00	Theoretical: Platforms and ecosystems - fundamental concepts	KN Store auditorium	M. Li	A. Tiwana (2013) chapter 1 A. Tiwana (2013) chapter 2 A. Tiwana (2013) chapter 5 Ghazawneh & Henfridsson (2013)
Mo. 8. Oct	14:15–16:00	Theoretical: Design, requirements and user participation in platform ecosystems	KN Store auditorium	M. Li	O. H. Titlestad, K. Staring, J. Braa (2009) L. Roland, T. Sanner, J. Sæbø, E. Monteiro (2017) Y. Dittrich (2014)