UiO : Institutt for informatikk
Det matematisk-naturvitenskapelige fakultet

IN5430 IT and Management

Lightweight IT and Platforms

Feb 20, 2019

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Learning outcomes

Part 1:

- Can define heayweight and lightweight IT
- Appreciate the balance of standardization and innovation

Part 2:

- Understand and asses governance models for lightweight IT

Background I: Large-Scale Integration of Systems

"IT Silo systems"

- Legacy of non-integrated systems
- Hindrance for: User-oriented services, interaction between systems, innovation of new services
- Can be mitigated by new technology and integrated (SOA) architectures
- "Expensive, increasingly complex coalitions of systems
- - new paradigm needed" (Sommerville et al. 2013)

Electronic Patient Record

Lab systems

Imaging systems

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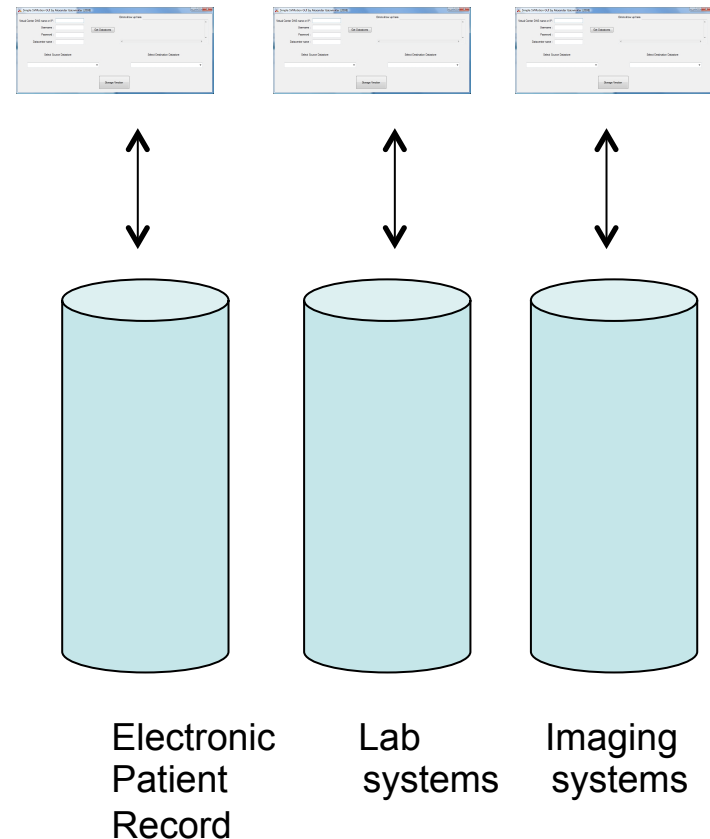
Good heavyweight IT:
Regional integration platform
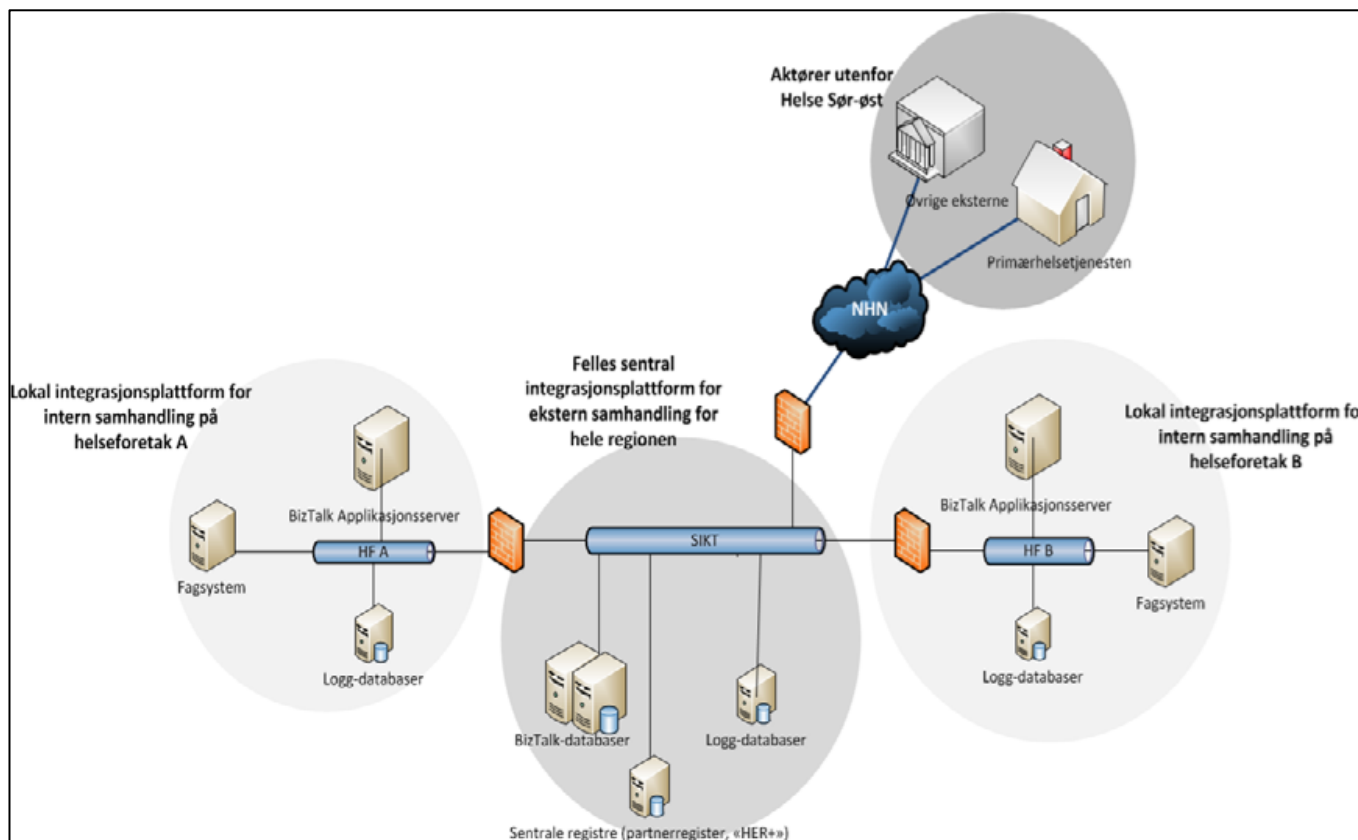
Data Flow at Oslo University Hospital
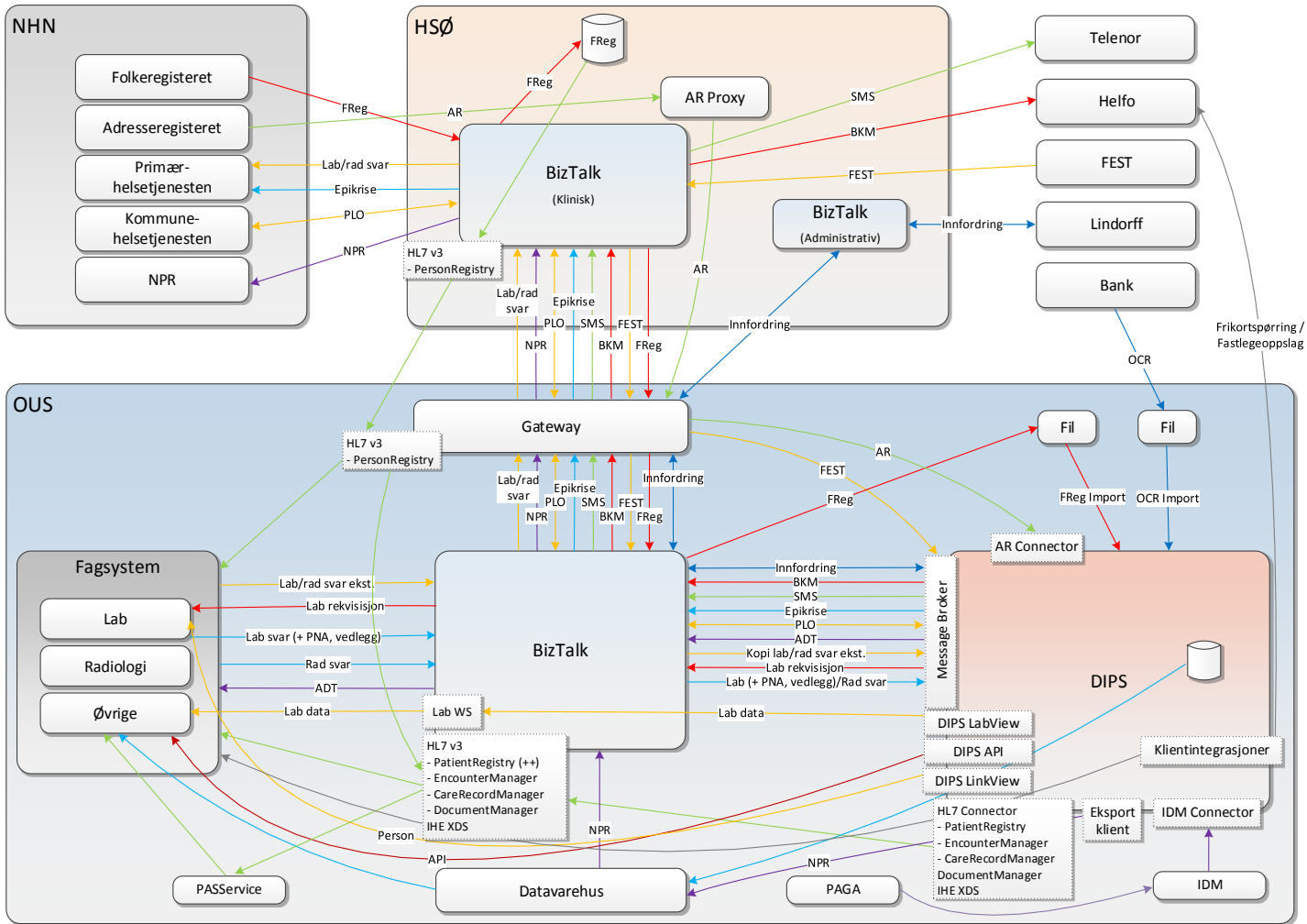
Good lightweight IT: St.Hanshaugen in Oslo

- Controlled by patients
- Surveilled by health personnel
- Delivered by vendor
- Simple, but flexible
- Owned by local health adm.

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Background II: Consumerization and Internet-of-Things

II: "Lightweight IT" coming

- Sensors, tablets, mobile
- "Bring your own device"
- Commercially available
- Outside of the control of the IT dept.
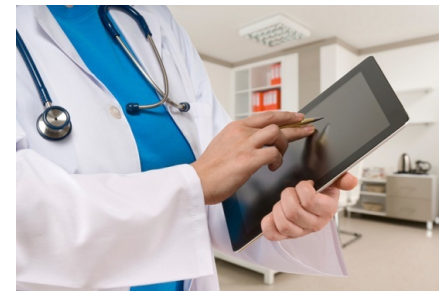
"Consumerization"

"Internet-of-Things"

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Heavyweight- and lightweight IT: Two socio-technical knowledge regimes

|	Heavyweight IT	Lightweight IT
Profile	Back-end: Supporting documentation of work	Front-end: Supporting work processes
Systems	Transaction systems	Process support, apps, BI
Technology	Servers, databases, enterprise bus technology	Tablets, electronic whiteboards, mobile phones
IT architecture	Centralized or distributed	Meshworks
Owner	IT department	Users and vendors
Development culture	Systematics, quality, security	Innovation, experimentation
Problems	Increasing complexity, rising costs	Isolated gadgets, security
Discourse	Software engineering	Business innovation

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Heavyweight- and lightweight IT:
Two socio-technical knowledge

	Heavyweight IT	**Lightweight IT**
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Gartner (2014) use the tern "bimodal IT" on suggesting two different IT departments: one for traditional IT, focused on stability and efficiency, and one experimental and agile, focused on time-to-market and tight co-operation with business units.

Research questions

- How is generativity different in heavyweight and lightweight IT?
- What is the generative relationship between heavyweight and lightweight IT?

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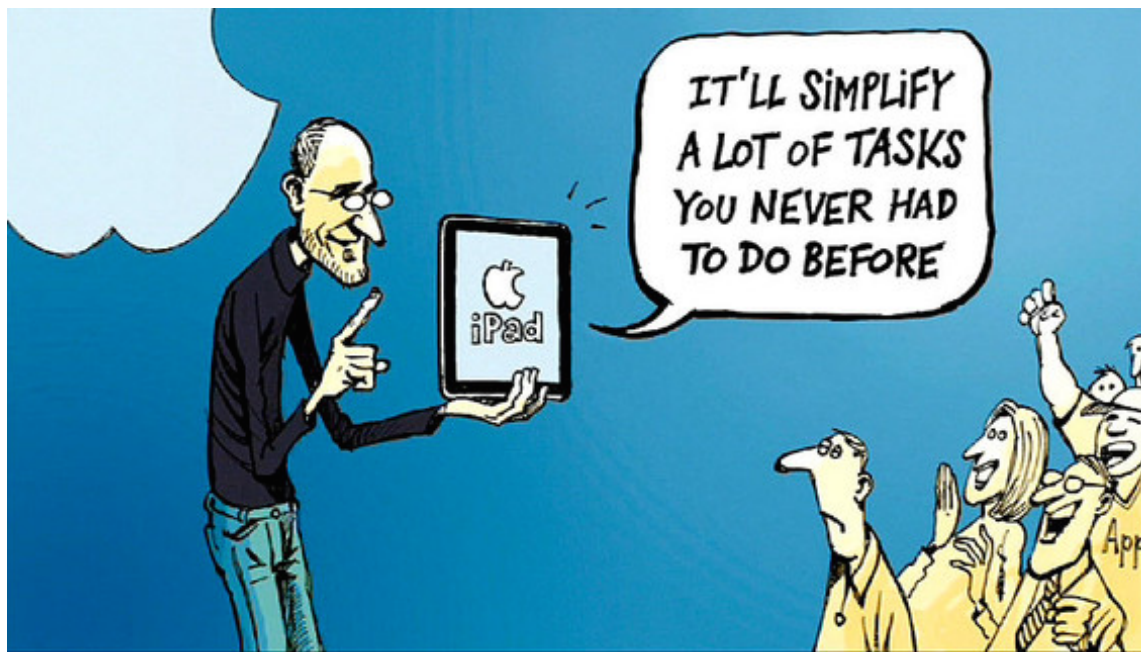
Theoretical Lens: Generativity

- *Generative technology*, "a technology's overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences" (Zittrain, 2006)
- *Generative relationships:* a community' capacity to innovate *(*Lane, 2011)
- *Generativity:* an entity's capacity to interact" with other entities (DeLanda, 2006)

- Henfridsson and Bygstad (2013): Evolution of digital infrastructures as the interplay between three self-reinforcing generative mechanisms
  - *Innovation:* The creative combination of social and technical elements in order to create new services
  - *Adoption:* The recruitment of users, through easy-to-use solutions that solve short-term problems
  - *Scaling:* The expansion of the network to include more partners to provide more services.

Lightweight IT at Østfold Hospital

Figure 4. Self check-in, patient information on mobile phone, and nurse using whiteboard (Photo: HSØ)
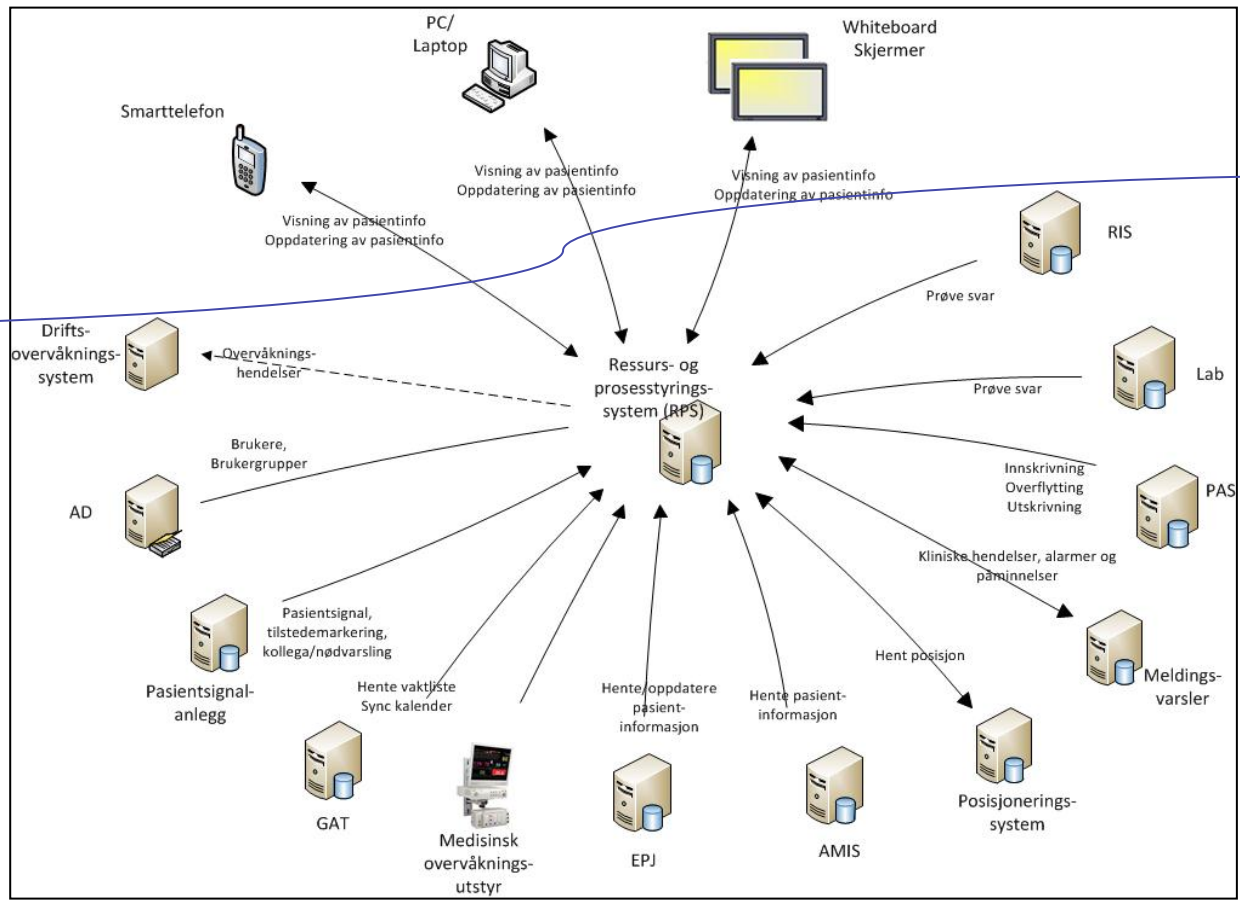
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Imatis at Østfold Hospital

Hospital Kalnes in Østfold: Combination of lightweight- and heavyweight-IT

Light-weight

Heavy-weight

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Case analysis: Generativity…

Generative mechanism	Heavyweight	Lightweight
Innovation	IT professionals recombine systems and middleware	Medical professionals and vendors recombine lightweight components with work tasks
Adoption	Mostly mandatory use, with organized implementation	Mostly voluntary use, where increased adoption generates more resources for the solutions
Scaling	Middleware software enables the linking of partner solutions	Limited, but successful scaling by replication

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Discussion:
# What is the generative relationship between heavyweight and lightweight IT?

- Knowledge regimes tend to be more incompatible than often assumed, due to their nested structures of technology and work practices (Howard-Grenville and Carlile, 2006).

- Interaction, not integration

- Loose coupling (Parnas, 1972)

The principle of loose coupling

- Loose technical coupling (Parnas 1972)

- Loose coupling in terms of standards (Hanseth and Bygstad, 2015)

- Loose organisational coupling (Perrow 1984; Howard-Grenville and Carlile, 2006)
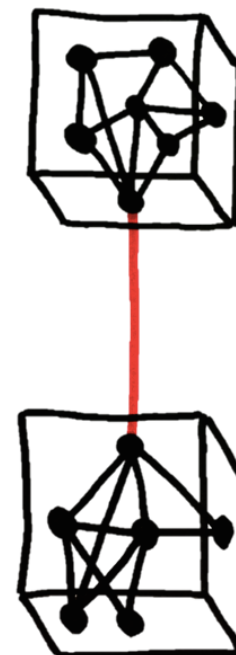
Generativity arises from the interaction of loosely coupled heavyweight and lightweight IT

- **Loose technical coupling:**
  "Interaction, not integration!"

- **Loose coupling on standards:**
  Don't stop the innovation process by early standardization

- **Loose organisational coupling**:
  Different knowledge regimes, different vendors

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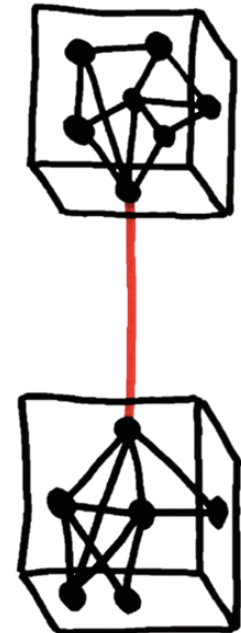
Exercise 1

- How should organisations relate to the lightweight phenomenon?
  - Ban it? Support it? Build it? Integrate?

Part 2: Governance models

Governance models

Resourcing

Low   High

	Low	High
Low	Laissez-faire	Plat-form
High	Central Control	Bi-modal

Low
Securing
High

Definitions

Resourcing: Enhancing innovation of lightweight IT
Securing: Controlling the use of lightweight IT

Laissez-faire: Allowing local implementations, but no support
Central Control: Lightweight IT is subjected under heavyweight regime
Platform: Division of labour between core heavyweight and 3rd party lightweight IT
Bimodal: Lightweight solutions are developed by business units, but set into production under heavyweight regime
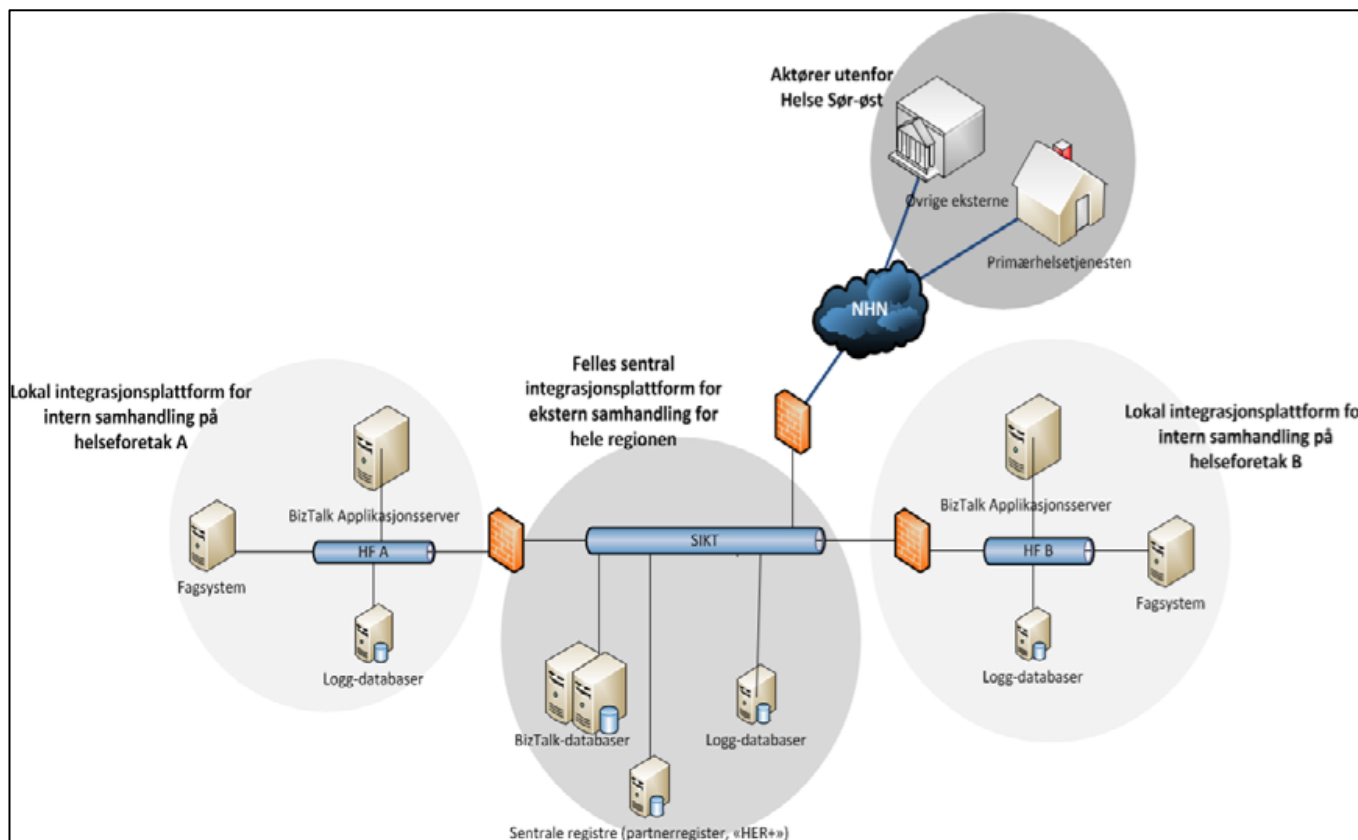
Fig. 1. Four governance models for lightweight IT

Bygstad and Iden: A Governance Model for Lightweight IT. WorldCIST 2017

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Examples

Case	Description	Challenges and strategies	Model type
St. Hanshaugen	Welfare technology in town district	Visionary manager and innovative vendors Developed outside heavyweight IT No policy	Laissez-faire
Digital renewal	E-health mega-project in 'Helse Sør-Øst'	Satisfy local needs Increasing IT cost No experiments!	Monopoly
Hospital Østfold	New hospital with IT ambitions	Heavyweight did not have capacity nor motivation for LW IT Centrally funded and managed locally	Bimodal
MediCloud	Small 'rebel' initative in Helse Sør-Øst	Local initiative. 3rd party apps and central systems and registers	Platform

Good lightweight IT: St.Hanshaugen in Oslo

- Controlled by patients
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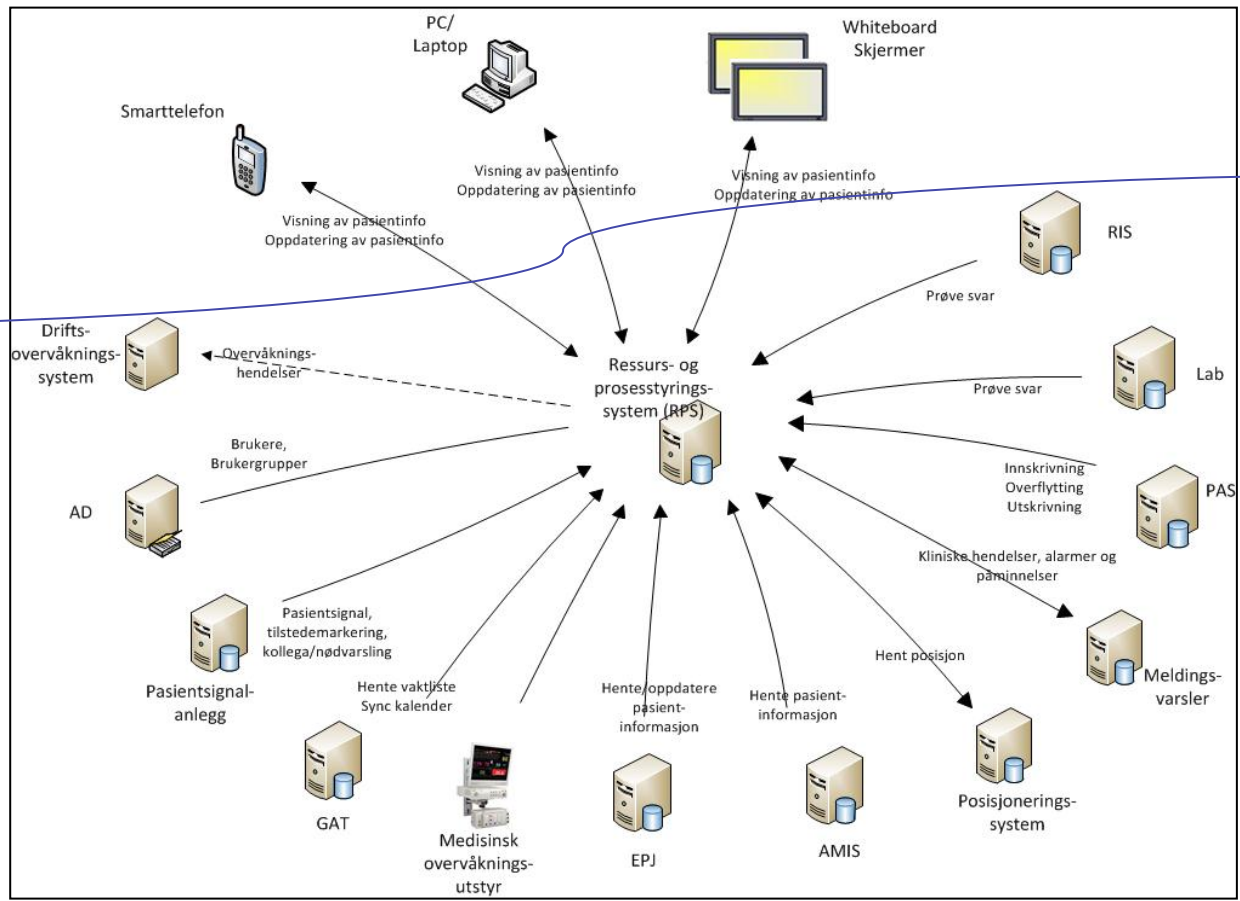- Simple, but flexible
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Good heavyweight IT:
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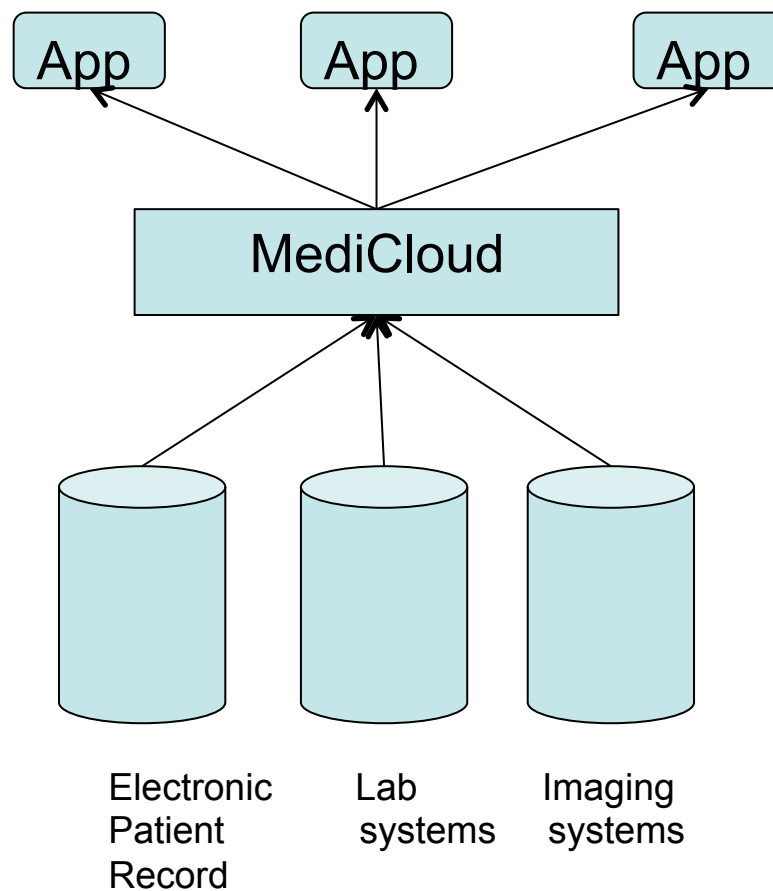# Hospital Kalnes in Østfold: Combination of lightweight- and heavyweight-IT

Light-
weight

Heavy-
weight

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MediCloud: Platform initiative 2012-

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Exercise 2

- In which situations are each of the four models suitable?

References

- Bygstad, B. (2016). Generative innovation: a comparison of lightweight and heavyweight IT. *Journal of Information Technology*

- Bygstad, B. and Iden, J.: A Governance Model for Lightweight IT. WorldCIST 2017