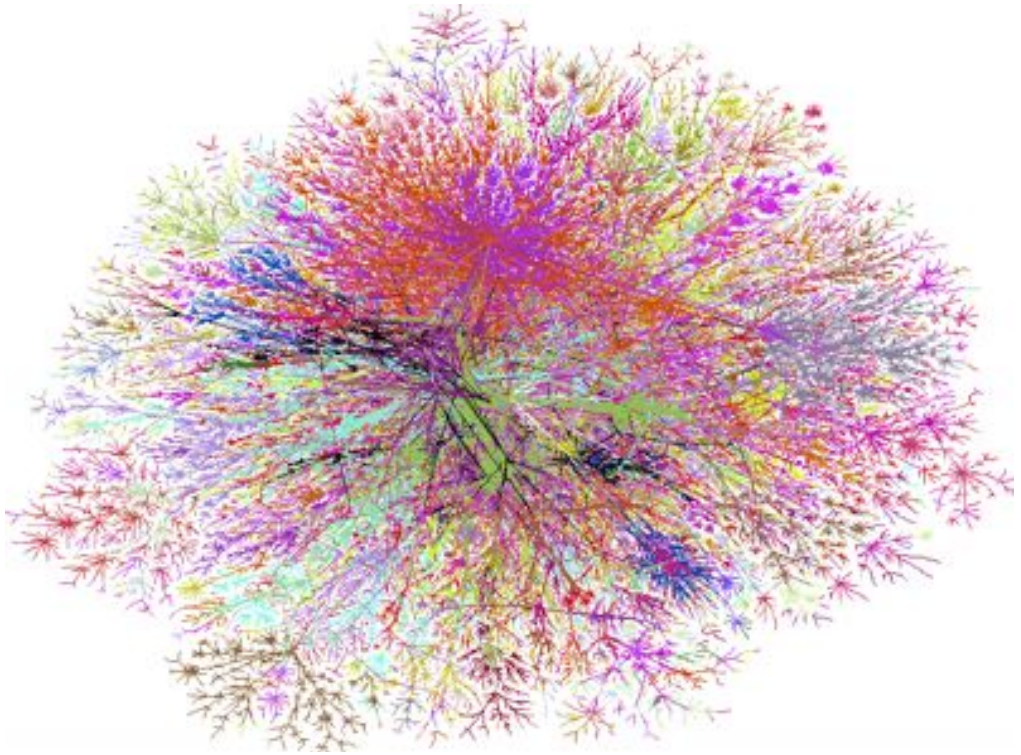
Research in ICT
- what we should do, and why it matters

Professor Olav Lysne
Simula Research Laboratory,
and
University of Oslo



Who am I?

Professor at the University of Oslo

Part of Simula Management from 2003-2010

Leading a research group with 20 people spanning both institutions

Focusing on Networks and Resilience

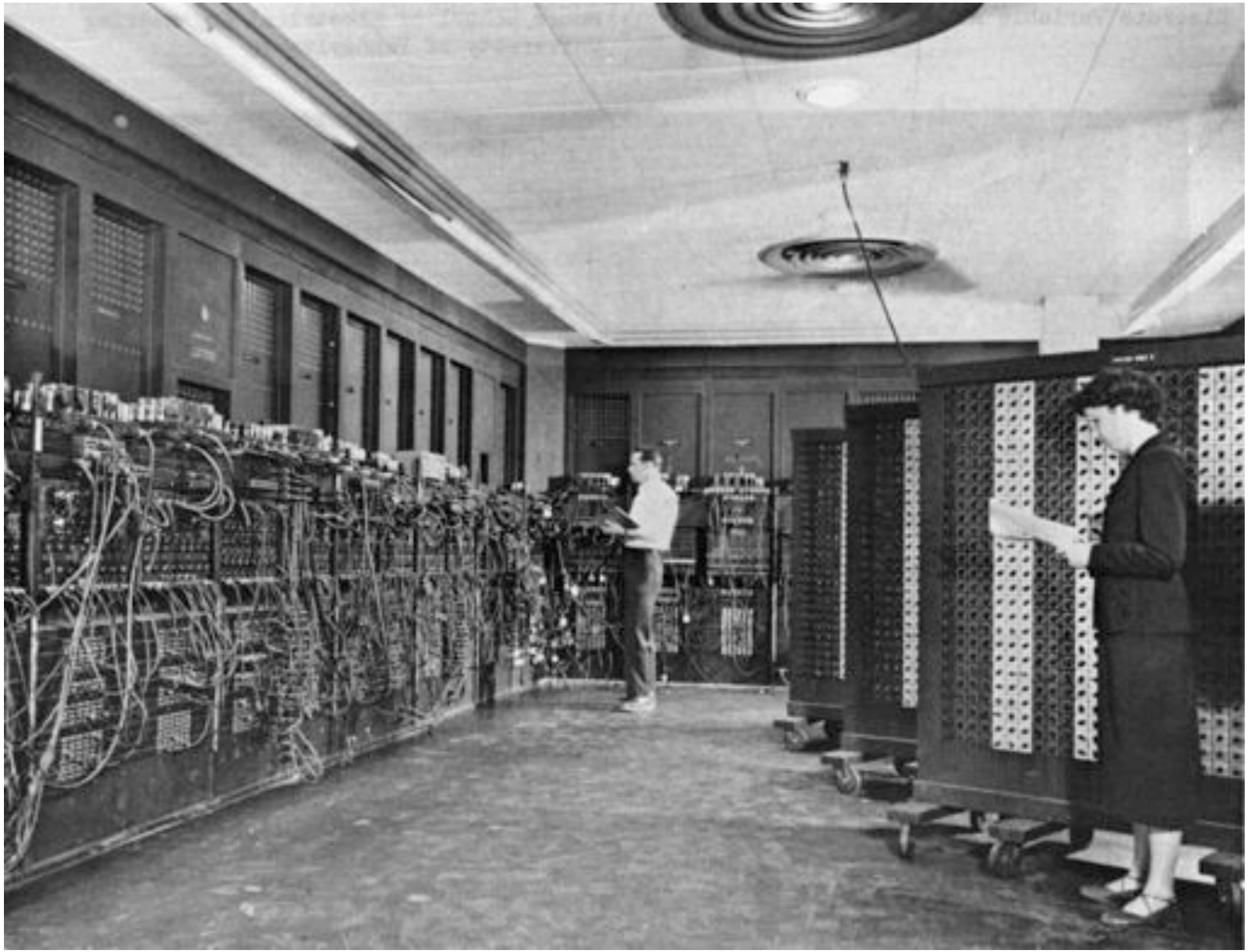

A Telegraph in England

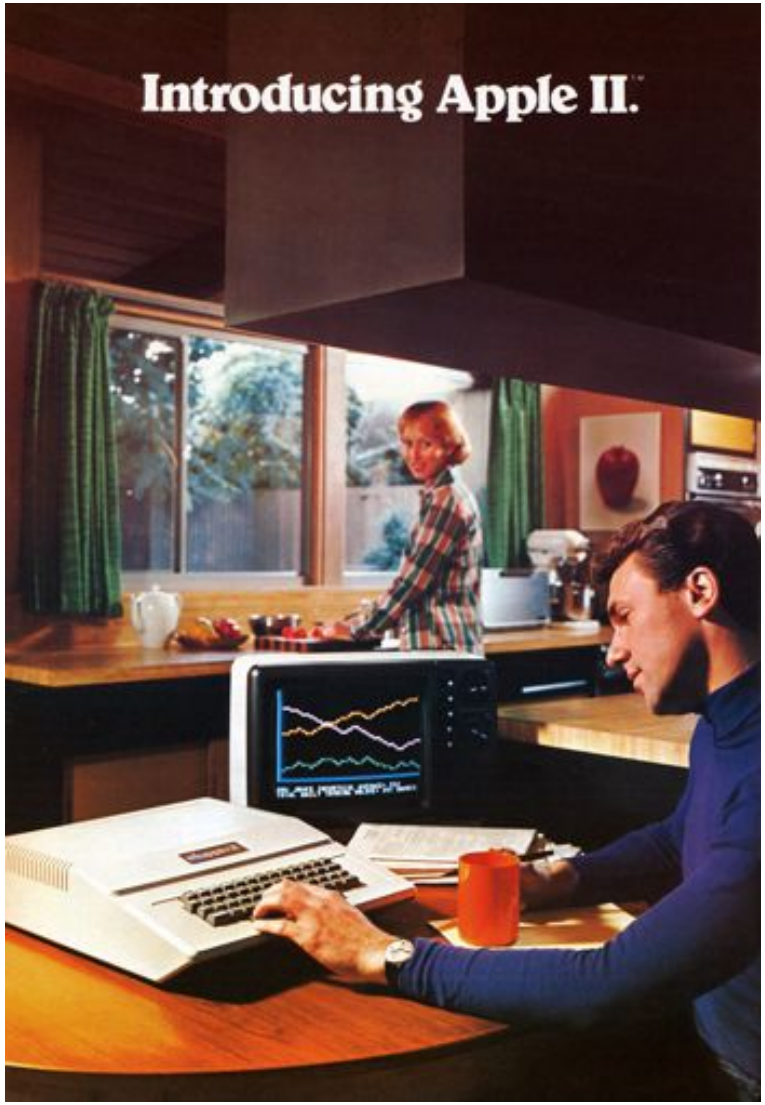
"It's a great invention but who would want to use it anyway?”

President Rutherford B. Hayes after a demonstration of Bell's telephone

"The Americans have need of the telephone, but we do not. We have plenty of messenger boys.”

Sir William Preece, Chief Engineer, British Post Office, 1876




Introducing Apple II.


IBM

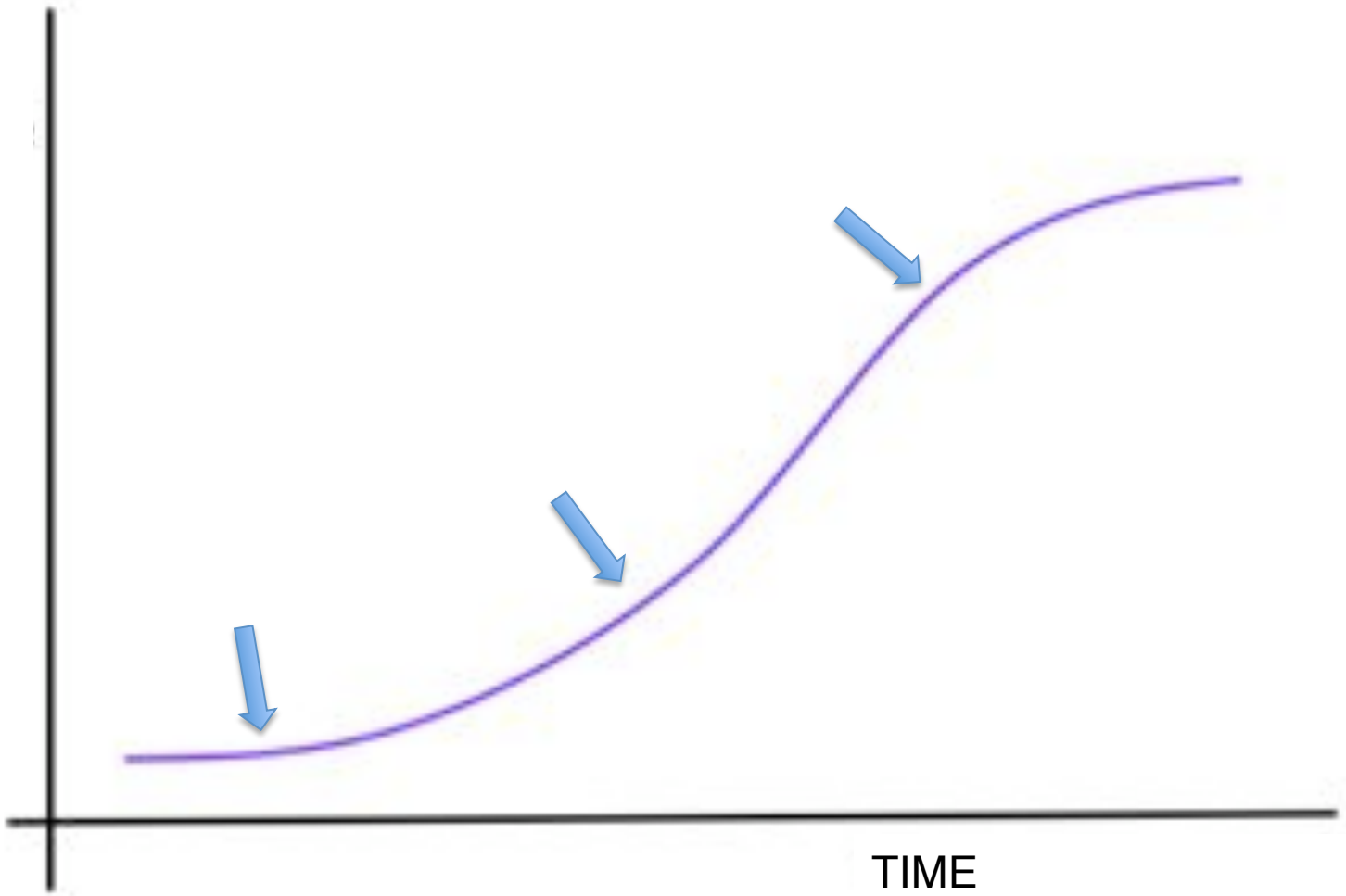
"I think there is a world market for maybe five computers."

Thomas Watson, Chairman, IBM 1949

"There is no reason for any individual to have a computer in his home."

Ken Olson, President, Digital Equipment Corporation, 1977

IMPACT ON SOCITEY



“Important topics for the future” is a notion that takes on different meanings depending on who you ask

Approaches to research agenda

What does industry say they need?

What do researchers say is necessary?

What do we have a potential to be good at?

WHAT IS THE REASON THAT SOCIETY NEEDS A NEW LARGE PROGRAM ON ICT?

WHAT IS GOING ON?

1: Infrastructures are moving from being important to being critical.

WHAT IS GOING ON?

2: Personal information systems are moving from being “nice to have” to being important. They will soon become critical

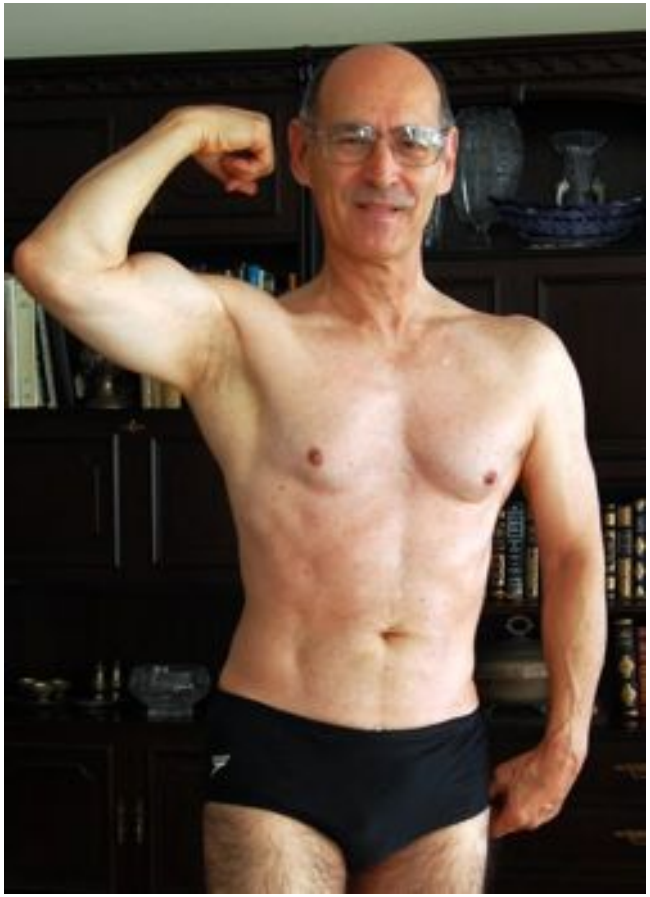
WHAT IS GOING ON?

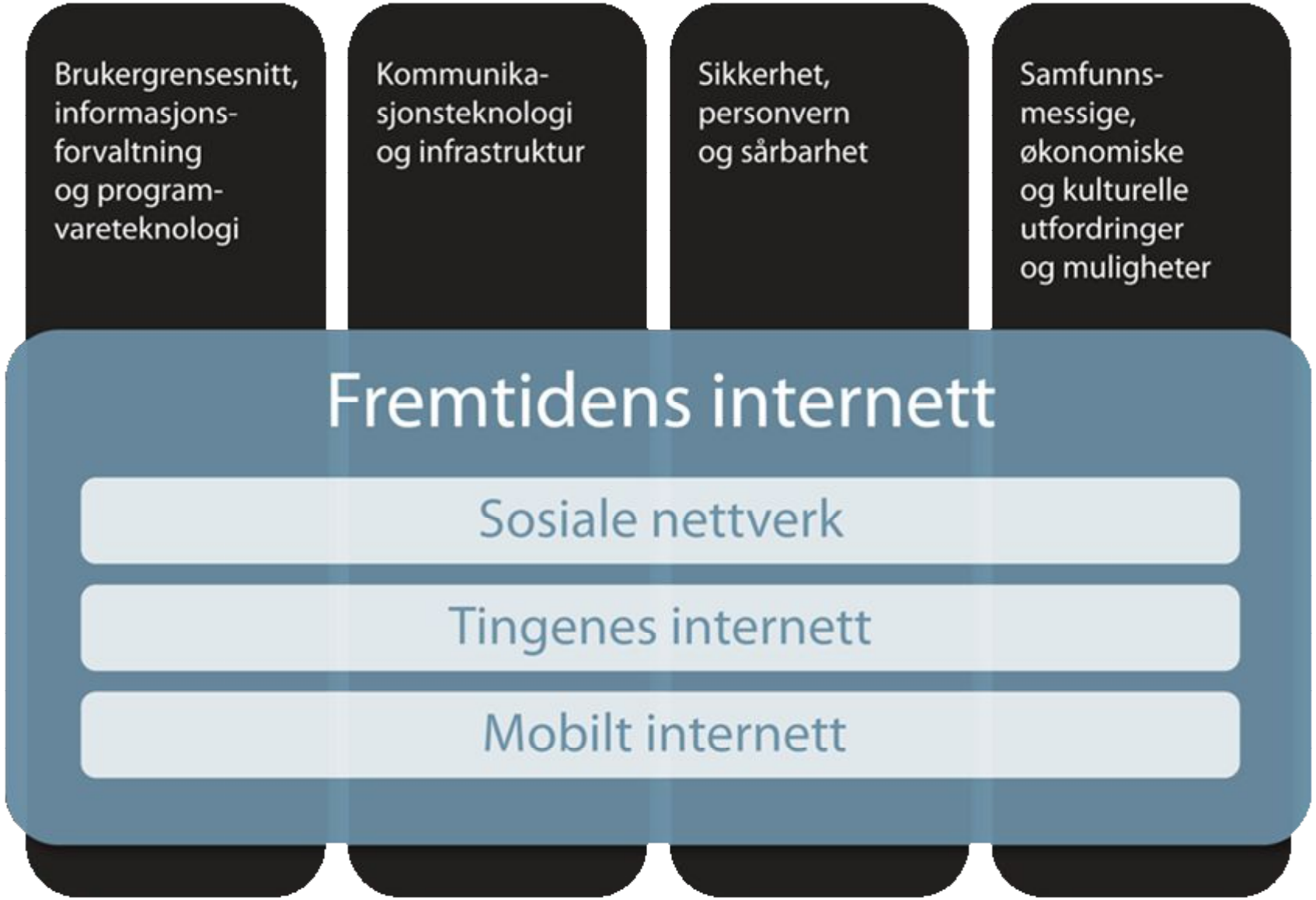
3: Almost every conceivable innovation on sustainability and future growth will both be enabled, and limited, by ICT

ENGAGE ALL NORWEGIAN RESEARCH POTENTIAL

APPEAL TO ALL OF NORWEGIAN ICT INDUSTY

Topics should age gracefully




Brukergrensesnitt, informasjons-forvaltning og program-vareteknologi
Kommunika-sjonsteknologi og infrastruktur
Sikkerhet, personvern og sårbarhet
Samfunns-messige, økonomiske og kulturelle utfordringer og muligheter
Fremtidens internett
Sosiale nettverk
Tingenes internett
Mobilt internett

ASPECTS – ARE STABLE

APPLICATION AREAS – CHANGE FAST

TECHNOLOGIES AND INFRASTRUCTURES – DO CHANGE, BUT MORE SLOWLY

MOST IMPORTANT ASPECTS

SECURITY

AVAILABILITY

TRUSTABILITY

GREENNESS

MAN/SOCIETY - MACHINE/INFRASTRUCTURE INTERDEPENDANCY

Interdiciplinarity within our own field

In your device

Verilog or VHDL

Synthesis tools

FPGA programming

PCB-design

Computer Architecture

System integration, optimization

Hardware adaptation layer

Languages/Compilers

Algorithms doing…all sorts of things

Application programs/databases…

User Interfaces

Influence on individuals and on society

In the network

Signal processing

Coding

Error detection/correction

Medium access protocols

Switching protocols

Interior Gateway Protocols

Border Gateway Protocols

Transport protocols

Streaming & Media

Application layer protocols

Architectures for Distributed Systems

In the Server Park

Hypervisors

Virtualized IO-devices

Live Migration

Interconnection networks

Parallelization

Power aware methods/Dynamic scaling

Fault containment

For all of these specialties

Software/ engineering

Systems administration

Fault tolerance/availability

Security

Parallelization

…

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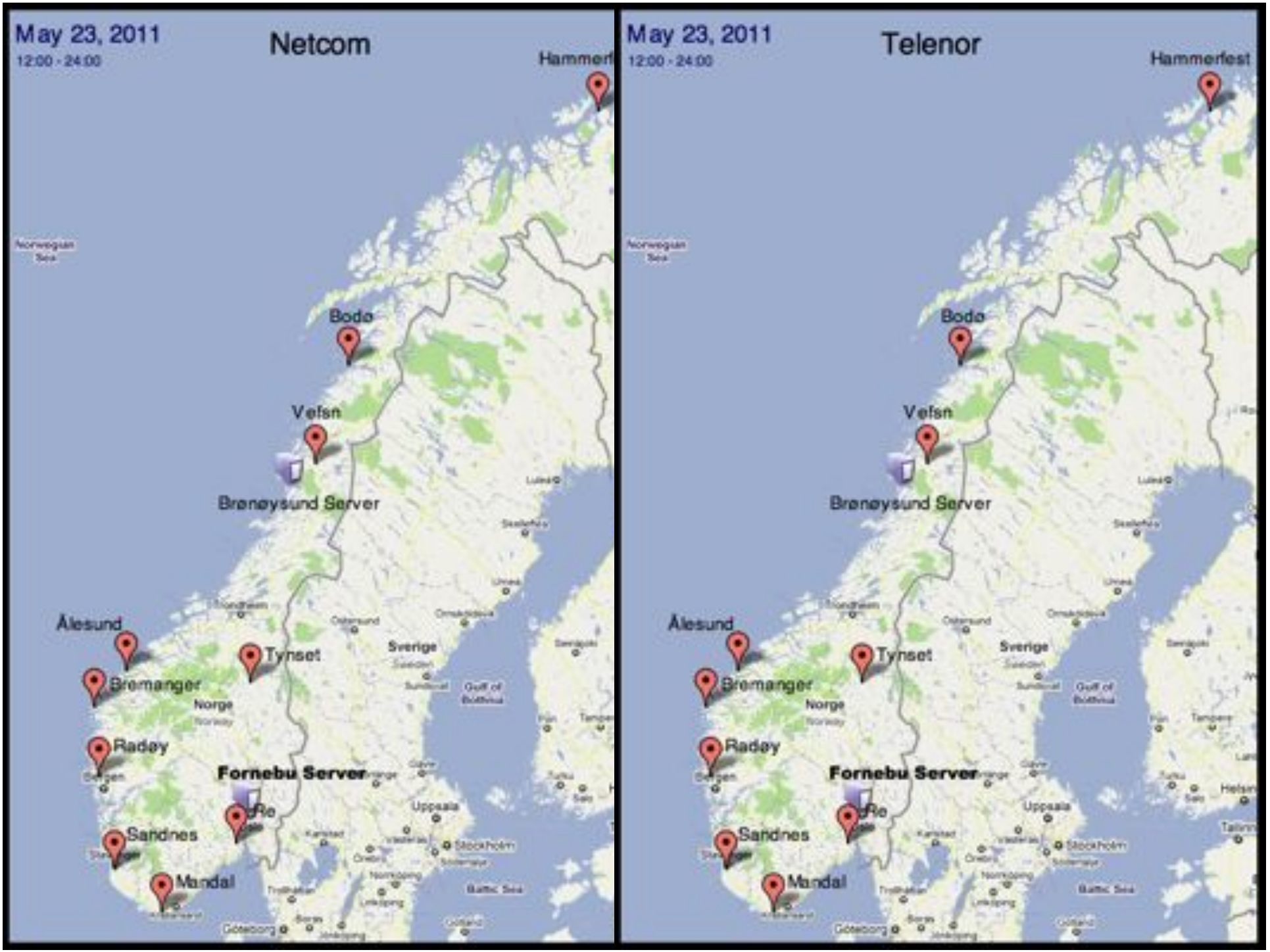
Understand Infrastructures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12:00 - 24:00
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Mandal
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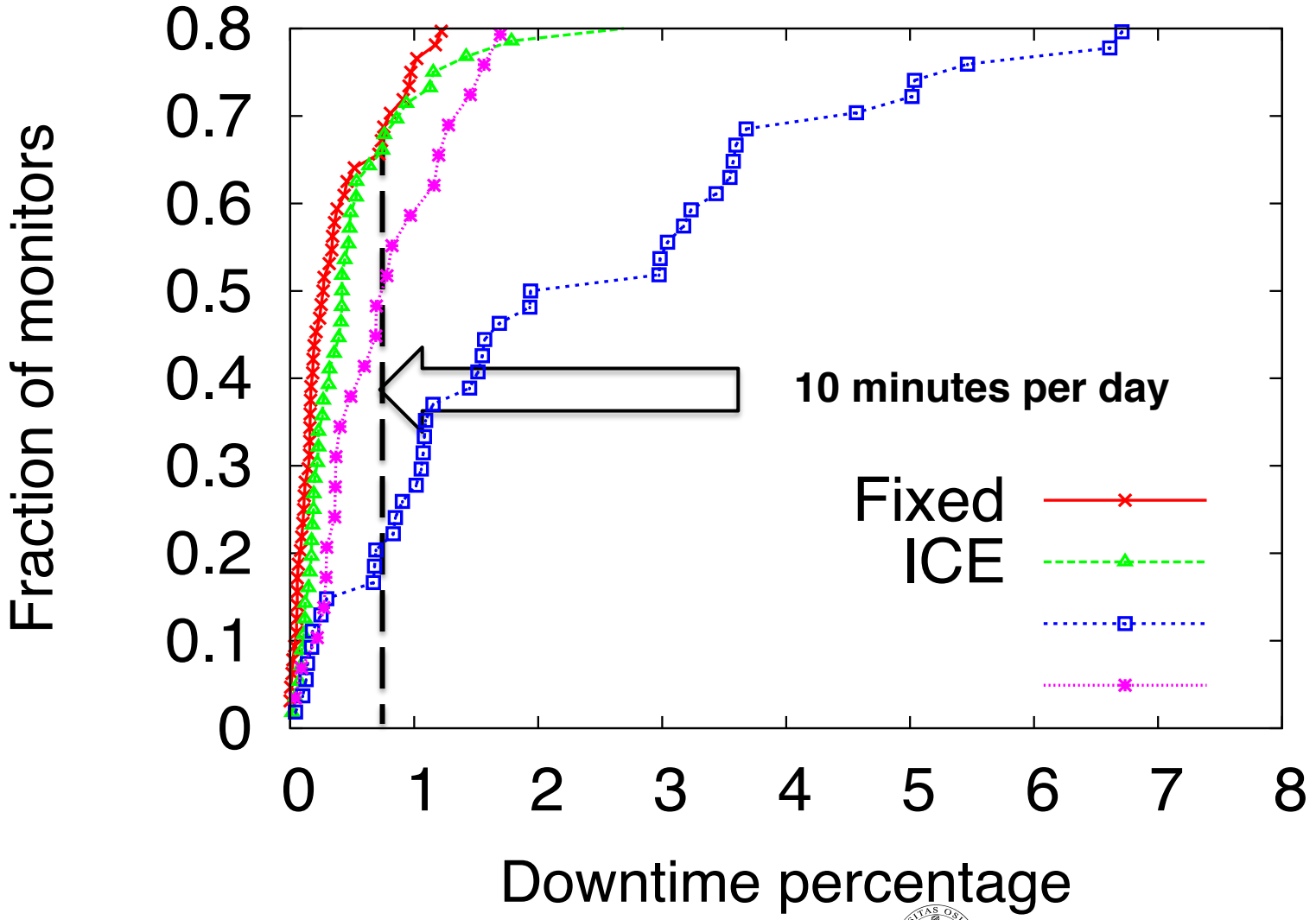
There are large differences in stability between operators and between monitors in the same operator



To conclude – here are my two pence:

Aspects – these will remain important for the foreseeable future:

- **Security**
- **Availability**
- **Man/society/machine/infrastructure interdependency**
- **Green IT**
- **Cross disciplinary within our own field**

Application areas – these change fast:

- **Start with Medicine, Smart*, Subsea-IT**
- **We must have agility in the program on applications**

Technologies and Infrastructures – change at a moderate speed:

- **Networks, cloud facilities, novel user interfaces, electronics**
- **We must have agility in the program**

[simula . research laboratory]

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FACULTY OF MATHEMATICS AND NATURAL SCIENCES