

**FIT-IT '08 – SPRING RESEARCH**

# **Semantics and Real World Multimedia**

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Vienna, 8. May 2008

# Outline

- Expectations: Technology developments
- Multimedia is everything
- Semantics for integration and more....
  
- The proximity, mobile and user dimensions
- Case studies
  - Digital Music Archive (NRK.no)
  - Personalised Music
  - Integrated TV and service world
  - Oil and Gas exploitation
- My wishes for Semantic developments

- Research and Education at Kjeller
- Close relation to FFI, IFE, NILU,...



## Welcome to Josef Noll @ UniK



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Pb 70, 2027 Kjeller, Norway

[Movation AS](#), 0158 Oslo

Prof. Dr. Josef Noll is professor at the [University of Oslo](#) in the area of Mobile Services. His group [ConnectedLife](#) concentrates on the working areas mobile-based trust and authentication, personalised and context-aware service provisioning, wireless broadband access, mobile-fixed integration and the evolution towards beyond 3G systems. He is also Senior Advisor in [Movation](#), Norway's leading innovation company for mobile services.





"Discovery consists of seeing what everybody has seen and thinking what nobody has thought"

### Tenk hva som kan skapes når Norges ledende innovatører...

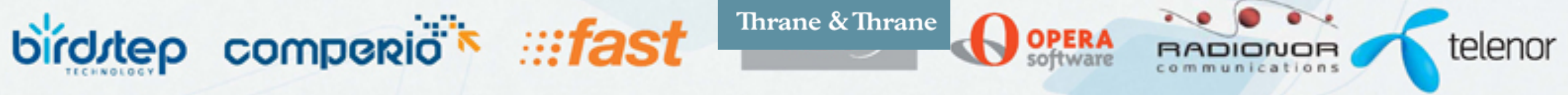
MOVATIONs rolle som innovasjonssenteret innen telekomunikasjon er basert på den unike kompetansen som finnes i Norge. Vi tar tak i spennende idéer og utvikler dem til en innovativ løsning.

**"Movation is a very exciting initiative where some of the best companies in Norway commit themselves to build the Norwegian national team in wireless technology innovation"**

– Paul Chaffey, Abelia

Det handler om å hjelpe gründere, k...

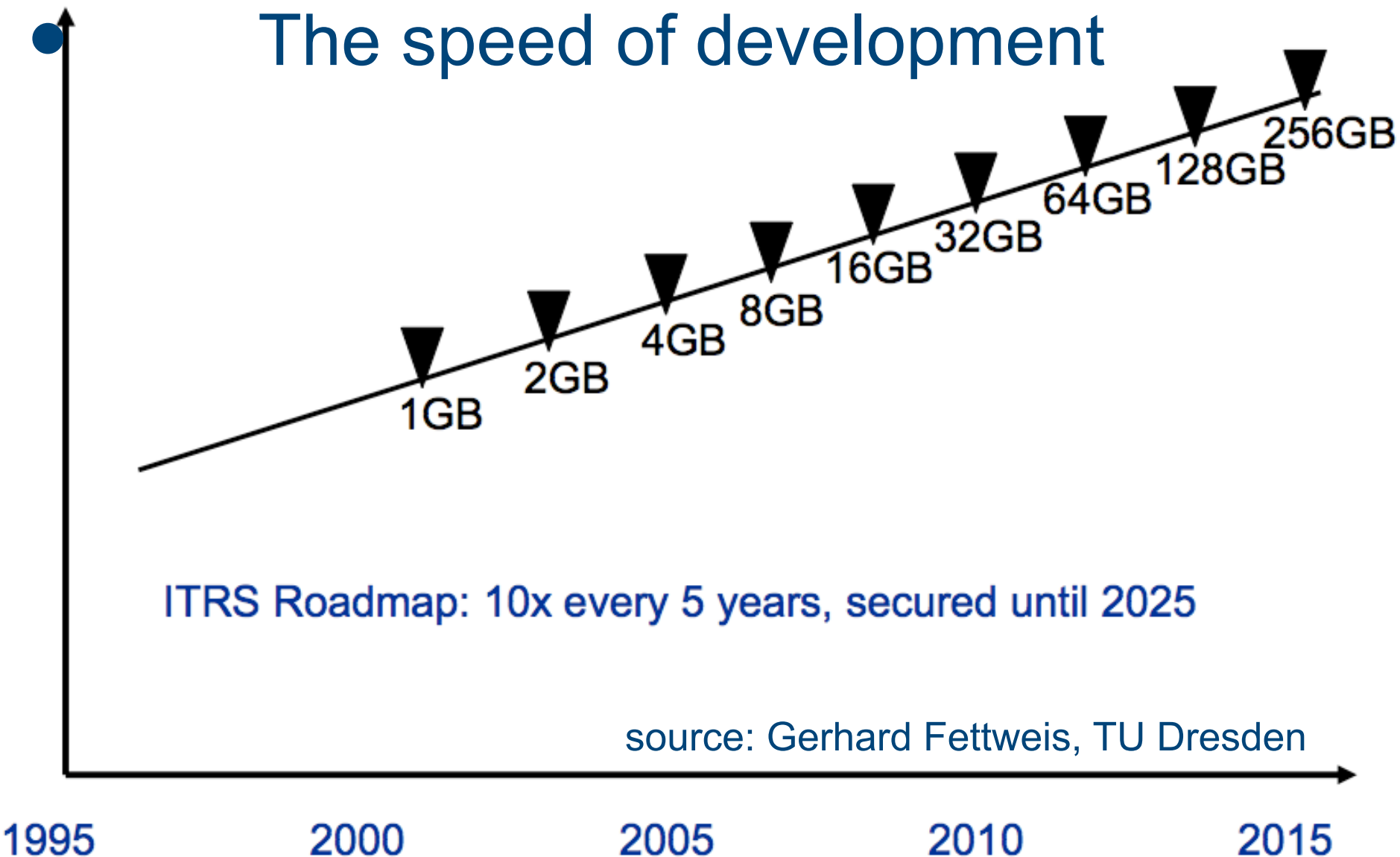
[www.mova.no](http://www.mova.no)



nytt...

# The complexity of technology

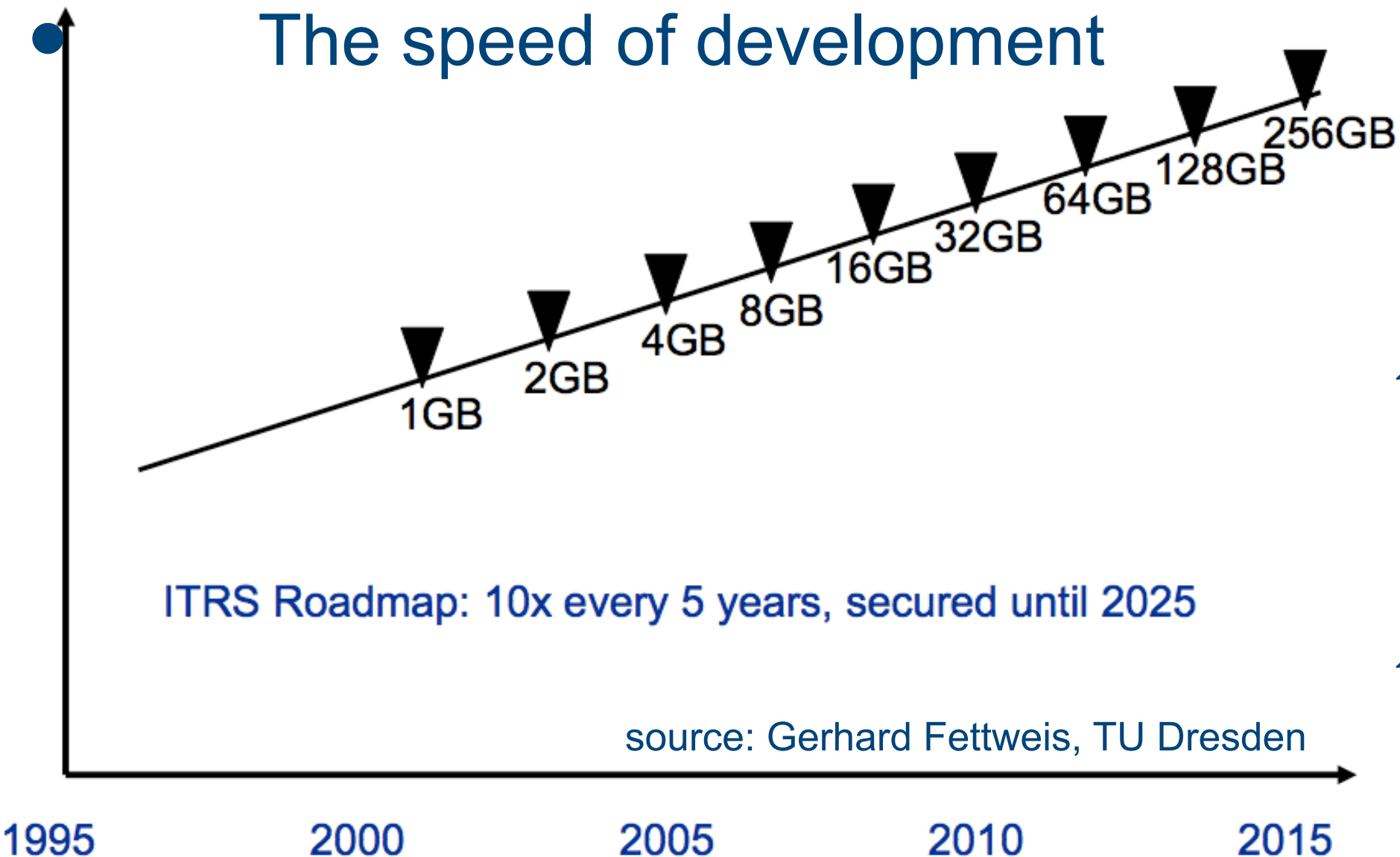
## The speed of development



- Do you remember: “*There might be a need for 5 computers*” (1943 Watson(?), 1951 Hartree)
- Mobile: NMT, GSM, GPRS, EDGE, UMTS, 3G, HSDPA, SMS, EMS, MMS,... DVB-H,...

# The complexity of technology

## The speed of development



“Much faster than I ever thought!”

“Too complex for me to handle!”

- Do you remember: “*There might be a need for 5 computers*” (1943 Watson(?), 1951 Hartree)
- Mobile: NMT, GSM, GPRS, EDGE, UMTS, 3G, HSDPA, SMS, EMS, MMS,... DVB-H,...



# Have you heard these ones?

**"Last year (2007) the world produced more transistors than rice corns"**  
– Hans Christian Haugli, CEO, Telenor R&I

**"In three to five years we will interact with to 30-50 devices in our vicinity"**  
– Marie Austenstaa, Connected Objects, Telenor R&I

# Push services on the mobile - Personalised service access

personalised  
mine nyheter  
**news**

public  
trafikanter  
**transport**

**map**

**weather**

**Web**

nettleser mitt abonnement

hjelp

**Mine nyheter**  
Kategori: Alle

- Kakalrønn i Isulla VG Utenski- 01.04 11:31
- Påskesnadder for voksne Dagbladet Magasinet- 01.04 11:26
- Påskens størster: Dagbladet Innenriks- 01.04 11:07
- 2 Ber for narko-Whitney Side2- 01.04 11:00
- Brann leier Suazo Dagbladet Sport- 01.04 11:00
- Kan bli tiltalt for forse...

Start 2/3 Kategori

**Er trikken eller bussen din i rute?**  
Stoppsteder i Oslo og Akershus

Mine stoppesteder

- Arkitekt Rivertz' pl (Uelandsgt)
- Birkelunden [spurvogn]

vis sanntidsdata

slett fra mine stoppesteder

vis på kart

Claus Riis gate

Jernbanetorget (i Strandveien)

Start Oppdater

**Kart**

**Basarhallene**

(Inntresepunkter/Turistatraksjon)

Start Steder

**Værmelding**  
Værvensikt

Her jeg er 0.7°C 01m/s

Hjemme 0.7°C 01m/s

Hytta 1.8°C 0.5m/s

Trondheim 0.3°C 3m/s

Vierli 1.4°C

Steder kan legges til fra kartet og fra søk

Start

**Tjenstemeny**  
nyheter, Trafikanten, Kart, Vær, Nettleser, Mitt Abonnement og Hjelp.

**Anrop og meldinger**  
Viser antall tapte anrop og nye meldinger (SMS, MMS og e-post).

**Søkefelt**  
Her kan du søke på navn, adresse, telefonnummer, firma, bransje, nyheter, arrangementer etc.

**Venstre tast**  
Windows Start-meny (til telefonens hovedmeny).

**Hjem-tast**  
Trykk for å returnere til Aida (Desktop / Startskjermbilde).

**Kontaktliste**

**Statuslinje**  
Posisjonsstatus og nettverksstatus, batteristatus, signalstyrke, dato og klokkeslett.

**Nyheter**  
Viser de 15 siste nyhetene fra selvvalgte kilder. Uleste meldinger er merket med stjerne.  
Nyheter og informasjon fra Telenor / Aida er merket med utropstegn.

**Høyre tast (softkey)**  
Kontekstavhengig:  
**Søk:** Flytter marker til søkefelt. Påfølgende trykk starter søk.  
**Forrige:** Blar i nyhetsliste.

**Tilbake-tast**  
Tar deg alltid ett trinn tilbake, som tilbakeknapp i nettleser.

**Meldinger**  
SMS, MMS, e-post.

**Navigasjonstast**  
Brukes for navigasjon på telefonen: Opp, ned, høyre, venstre og "klikk".

mate 17.10 13:30

Tapte anrop: 0

Meldinger: 0

Siste nytt: 00.10 01:25

- Mass Venezuela opposition
- Op-Ed Contributors: How L.
- Editorial Observer: Ame
- Chechen war reporter foun.
- Editorial: Roller Coaster...
- Editorial: Speedy Lines f...

Start Søk

**search**  
søk

**Søk**

Søk ut fra Her jeg er

fast

Søkeresultater for "Nærsøk":

- Verdt å se 30 treff
- Verdt å gjøre 29 treff
- Nyheter 30 treff
- Bransjer 28 treff
- Steder 20 treff
- Trafikanten 20 treff
- Tlf 1881 0 treff

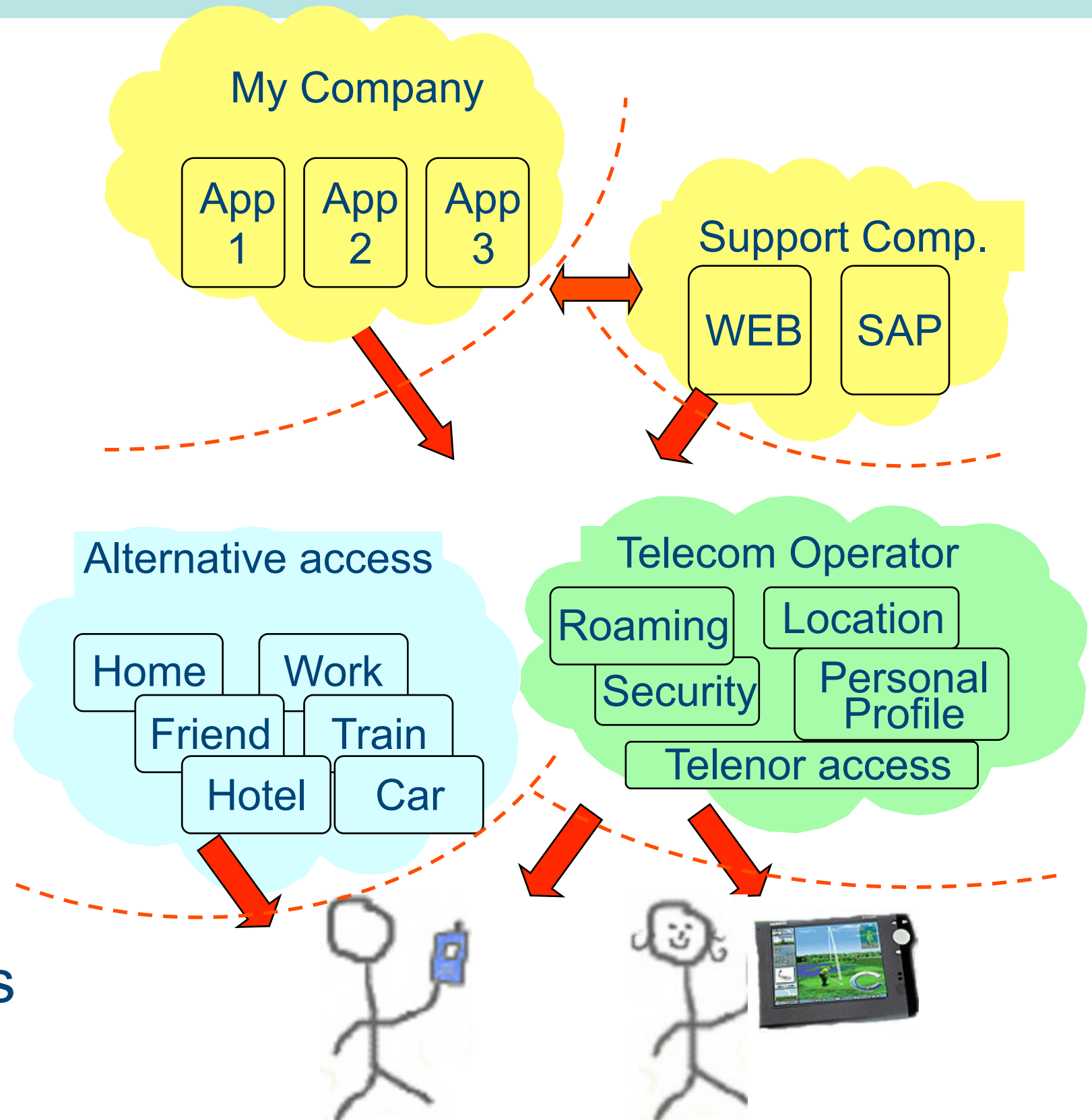
Start Søk

**zizzr**



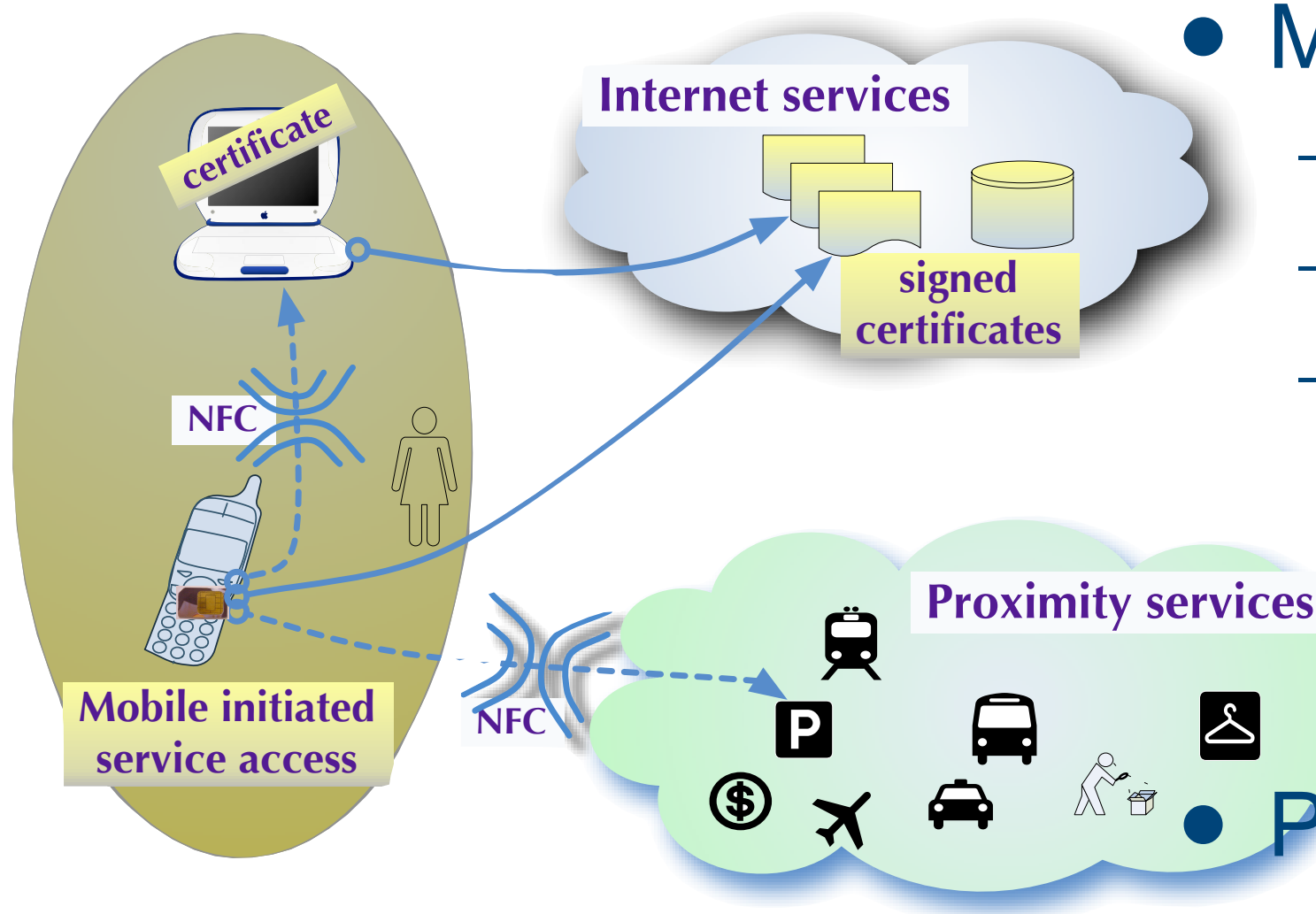
# Service centric/Business view

- Everything is a service
  - network access
  - phone call
- Managed through service oriented architecture (SOA)
- Main deficiencies
  - phone services
  - wireless/mobile environment
  - proximity services (pop-up)



# The Service Challenge

## Mobile and Proximity Services

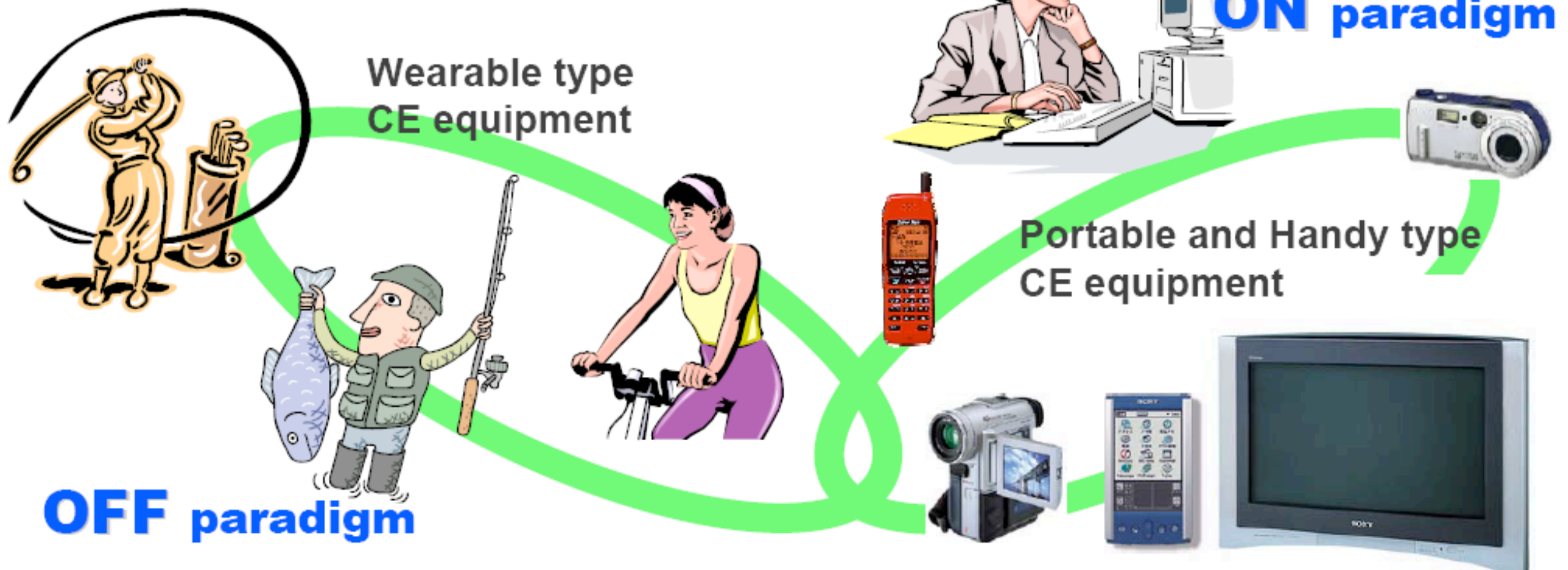


- Mobile services
  - services in the mobile
  - mobile network services
  - Internet services

- Proximity services
  - Payment
  - Access, Admittance

# Example of sensor technology: NFC – Near field communication

- Based on RFID technology at 13.56 MHz
- Typical operating distance 10 cm
- Compatible with RFID
- Data rate today up to 424 kbit/s
- Philips and Sony
- ECMA-340, ISO/IEC 18092 & ECMA-352, ...standards
- Powered and non-self powered devices

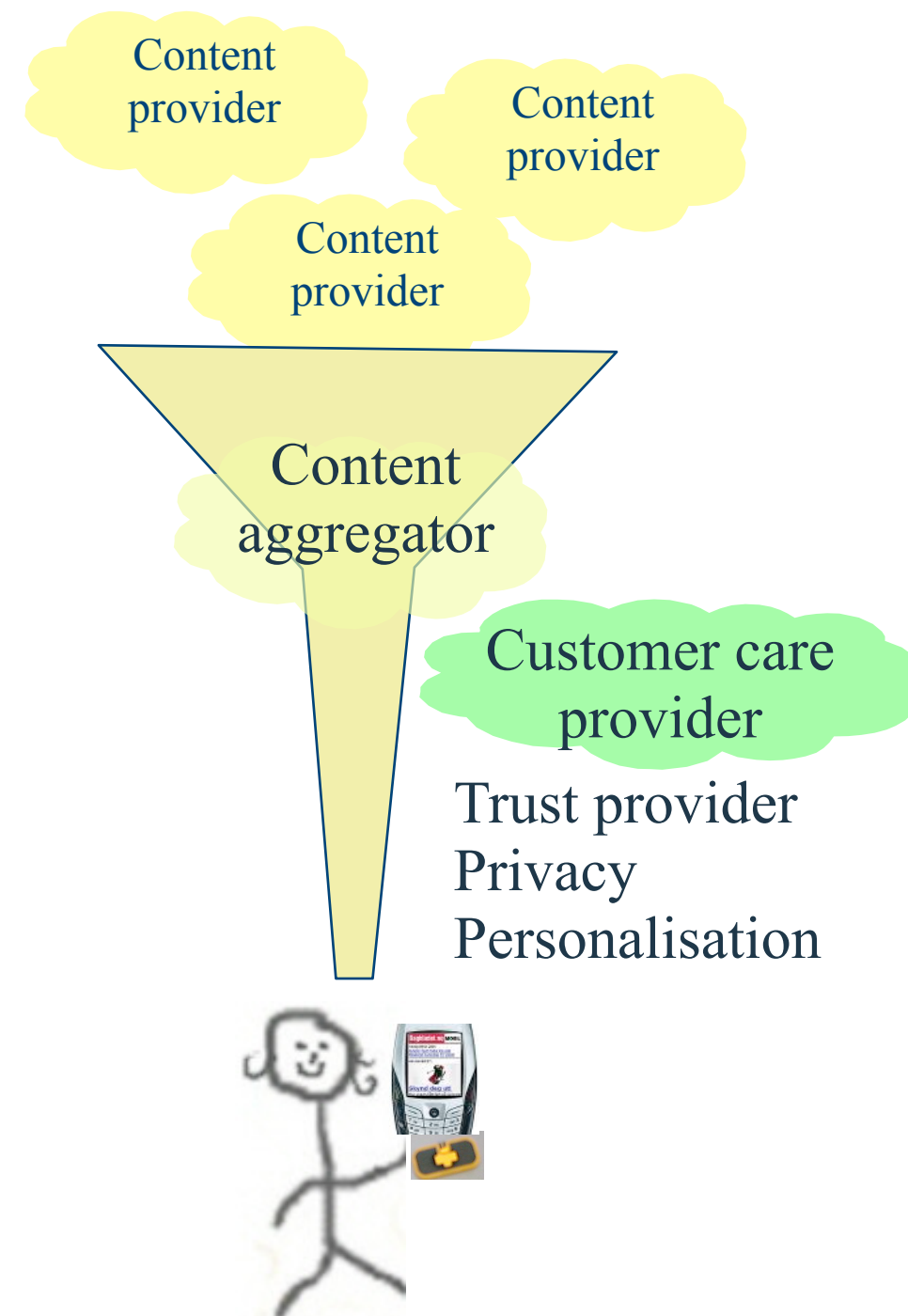


NFC technology supports both paradigms



# User-Centric View

- Customer preferences
  - Trust relation
  - Clear value proposition (convenience)
  - Information/advertisement overload
- Main duties for service players
  - Customer relation (paying the bill)
  - Service integration
  - New business ideas
  - Customer protection (information overload)



# Internet developments: The Internet helps

- Moore's law is still true...
- And information amount will become overwhelming
- “Let the web help me”:
- From Web, Web 2.0 to a Web that understands me (Semantic Web)
- From searching the web to providing me answers solutions, and services

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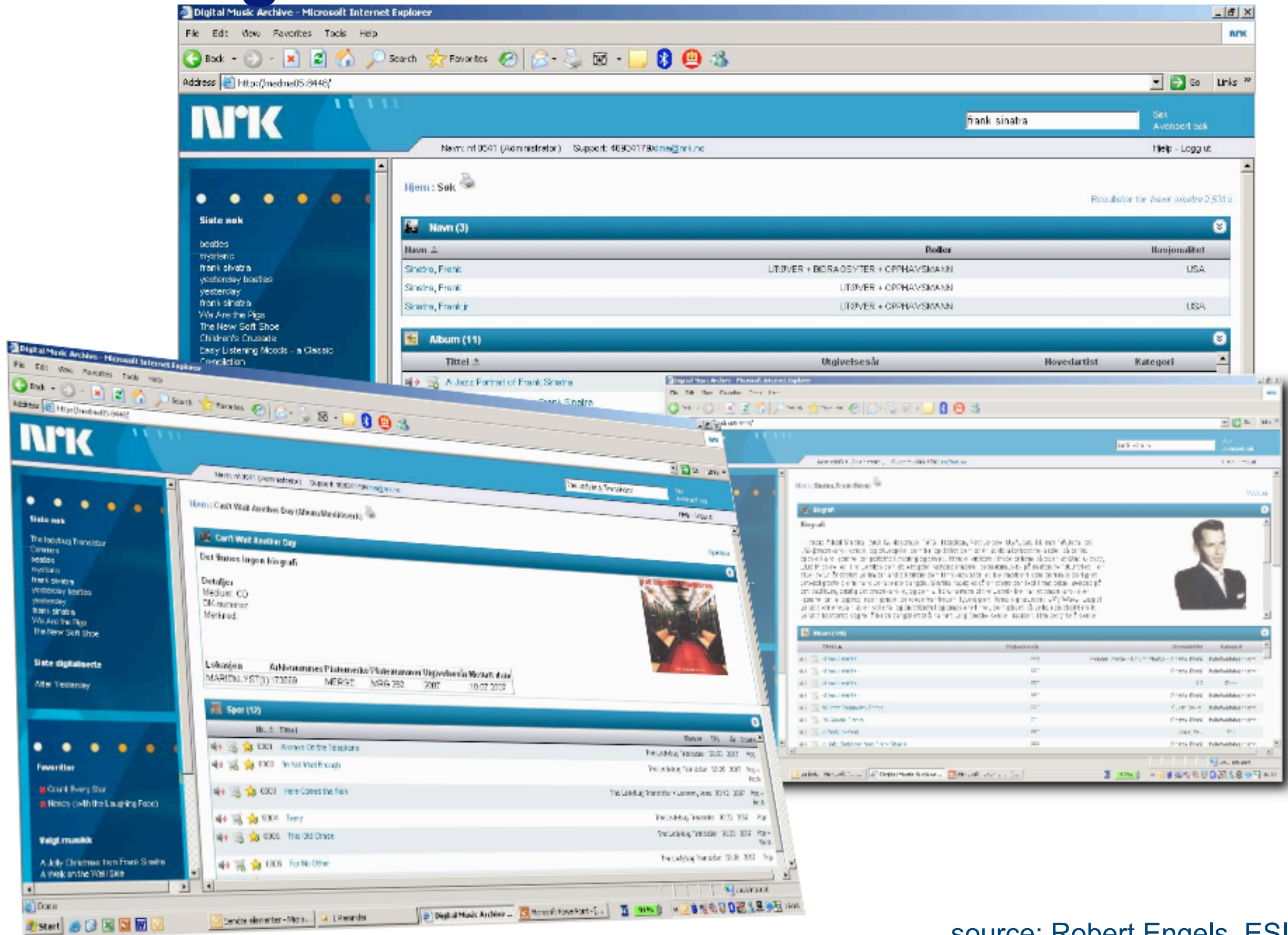
# Case 1

## Norwegian National Broadcaster (NRK) Digital Music Archive

# Digital Music Archive (NRK)

- NRK (Norwegian National Broadcaster):  
"Many tapes recorded in the late 80's and early 90's cannot be recovered within 5 years"
- Semantics used for enclosing metadata on music tracks
- System components (summer 2007)
  - Digital metadata
  - representation of all metadata using Semantic Web
  - make relations visible to the users (journalists and program makers)

# NRK Digital Archive



source: Robert Engels, ESIS

8. May 2008, Josef Noll

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# Key benefits for NRK

- Significantly enhance and facilitate archive access
- Navigation and Discovery of new, potentially interesting facts «hidden» in the repository
- Highly efficient music archive, combining multi-channel access with a fully automatized ordering and production flow
- Enhanced metadata representation, including multiple file formats (not only music files with flat metadata, but including pictures, links, interviews and many other resources) helping journalists to faster produce better trailers and talk-throughs
- Ease of integration across multiple archives and resources in the nearby future.

source: Robert Engels, ESIS

8. May 2008, Josef Noll

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# Case 2: Comperio.no Semantic Music Search

Comperio Music Search™  
beta  
*Let the music find you!*

Don't know where to start? Try searching for one of these artists:

- Air
- Johnny Cash
- Miles Davis
- Radiohead



# Blockbuster

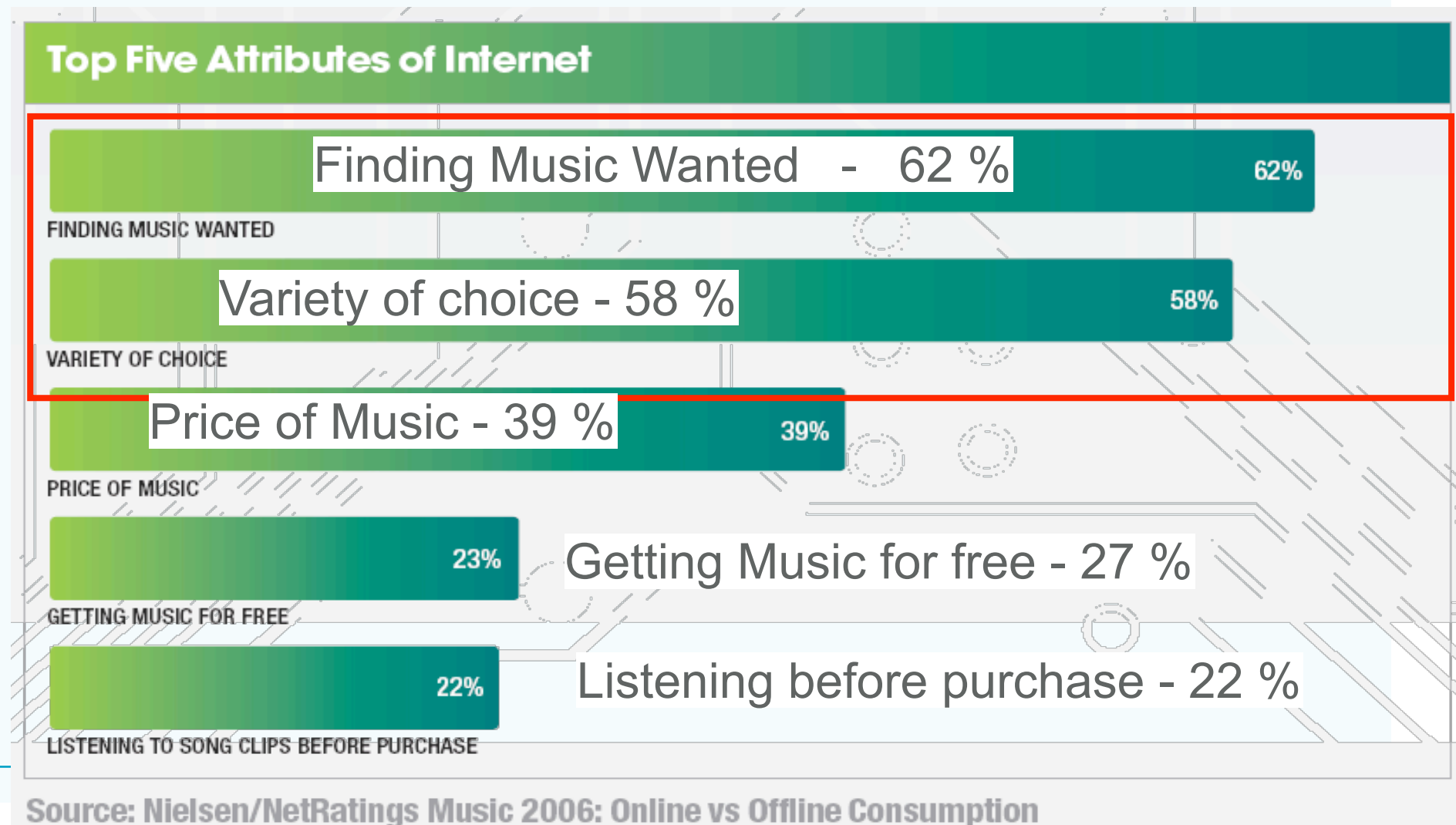


source: Vegard Sandvold, Comperio



# The market of digital Music

- Turnover of digital music (worldwide)
  - 2006: NOK 12 bill (10%)
  - 2010: NOK 25 – 30 bill (25%)
- Turnover of digital musikk in Norway (only 4.8 Mio people)
  - 2006: NOK 49 millioner (3,4%)
  - 2010: NOK 350 – 375 millioner (25%)



## Similar Artists

Coldplay



R.E.M.



The Police



Oasis



Red Hot Chili Peppers



Queen



Sting

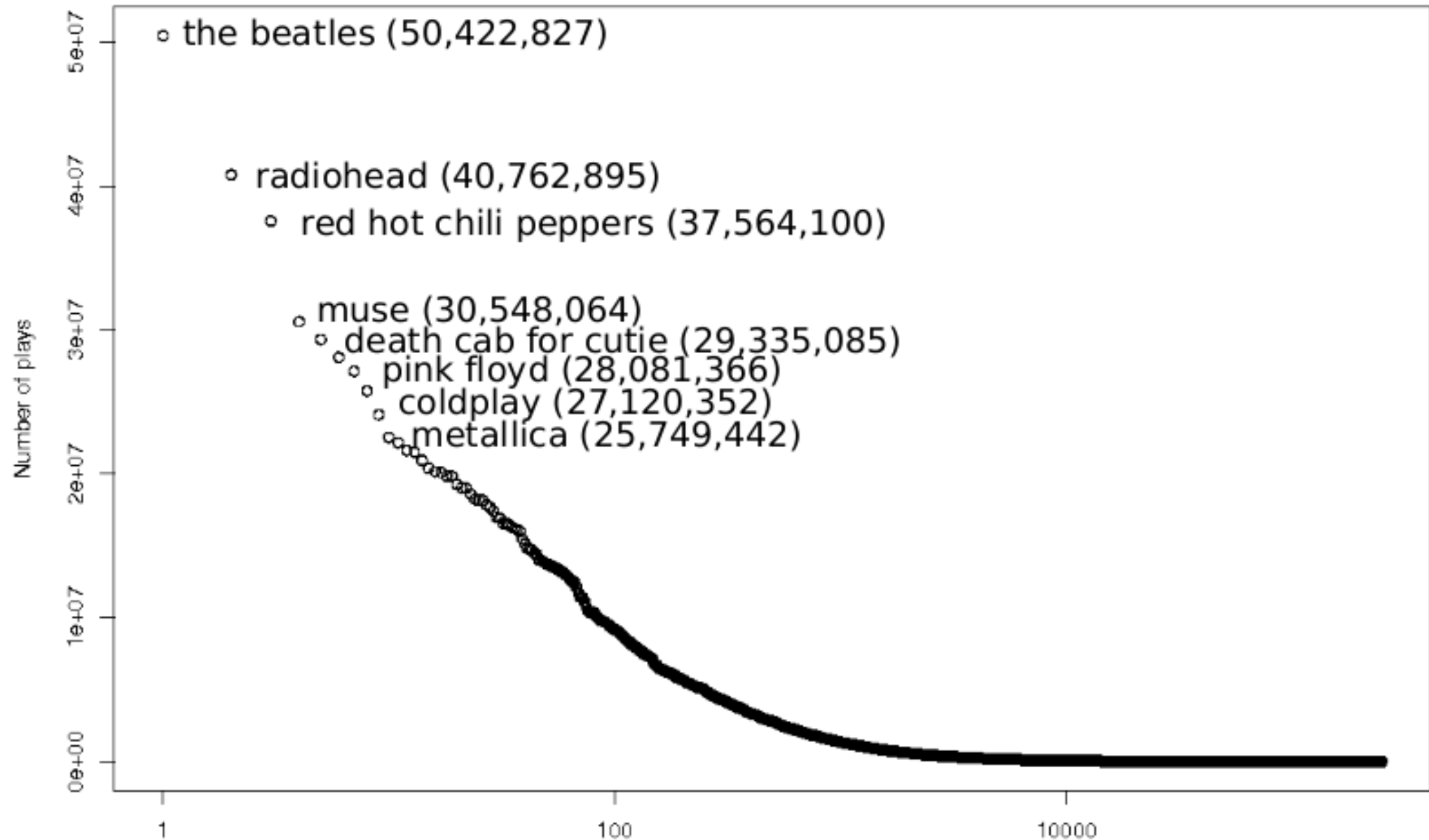


The Killers



[More similar artists...](#)

# Artists Similar to U2



Source: Celma & Lamere, Music Recommendation Tutorial, ISMIR 2007

# Case 3

## StatoilHydro

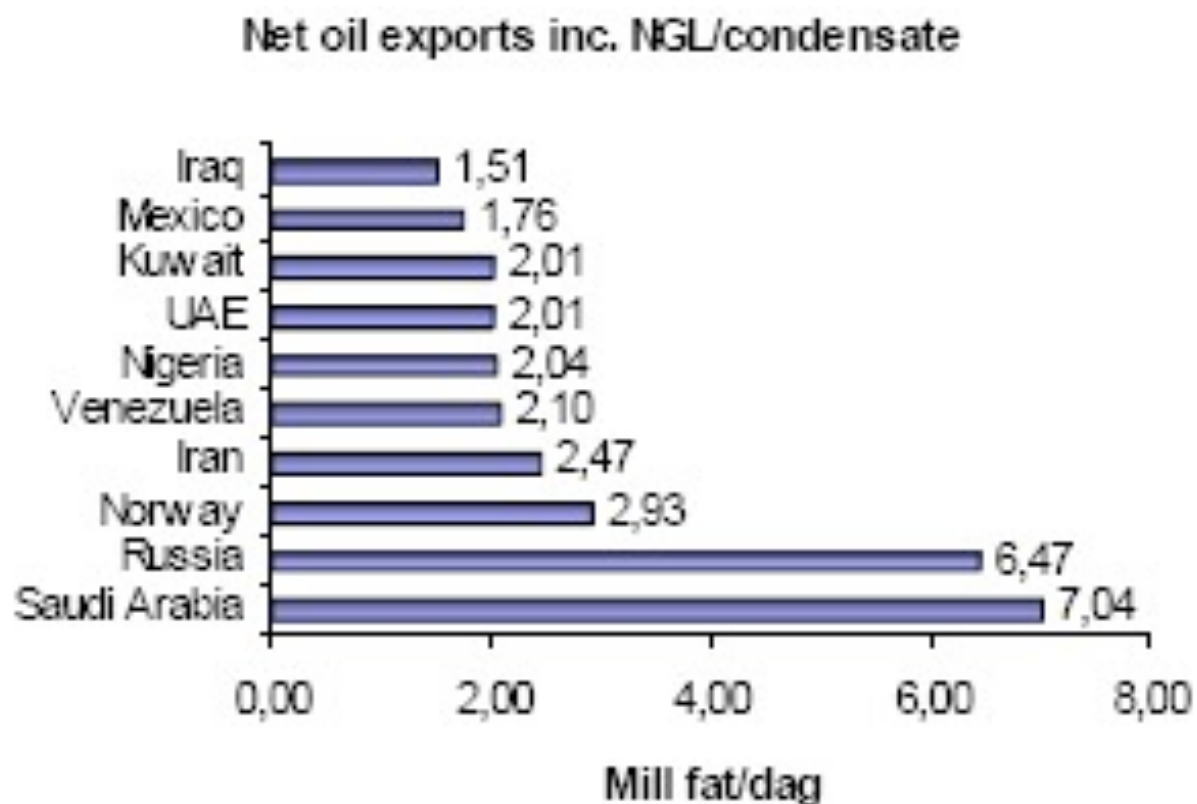
Integrated Operation for Oil and Gas  
Exploitation

(300 bill. NOK on the NCS [OLF, 2008])



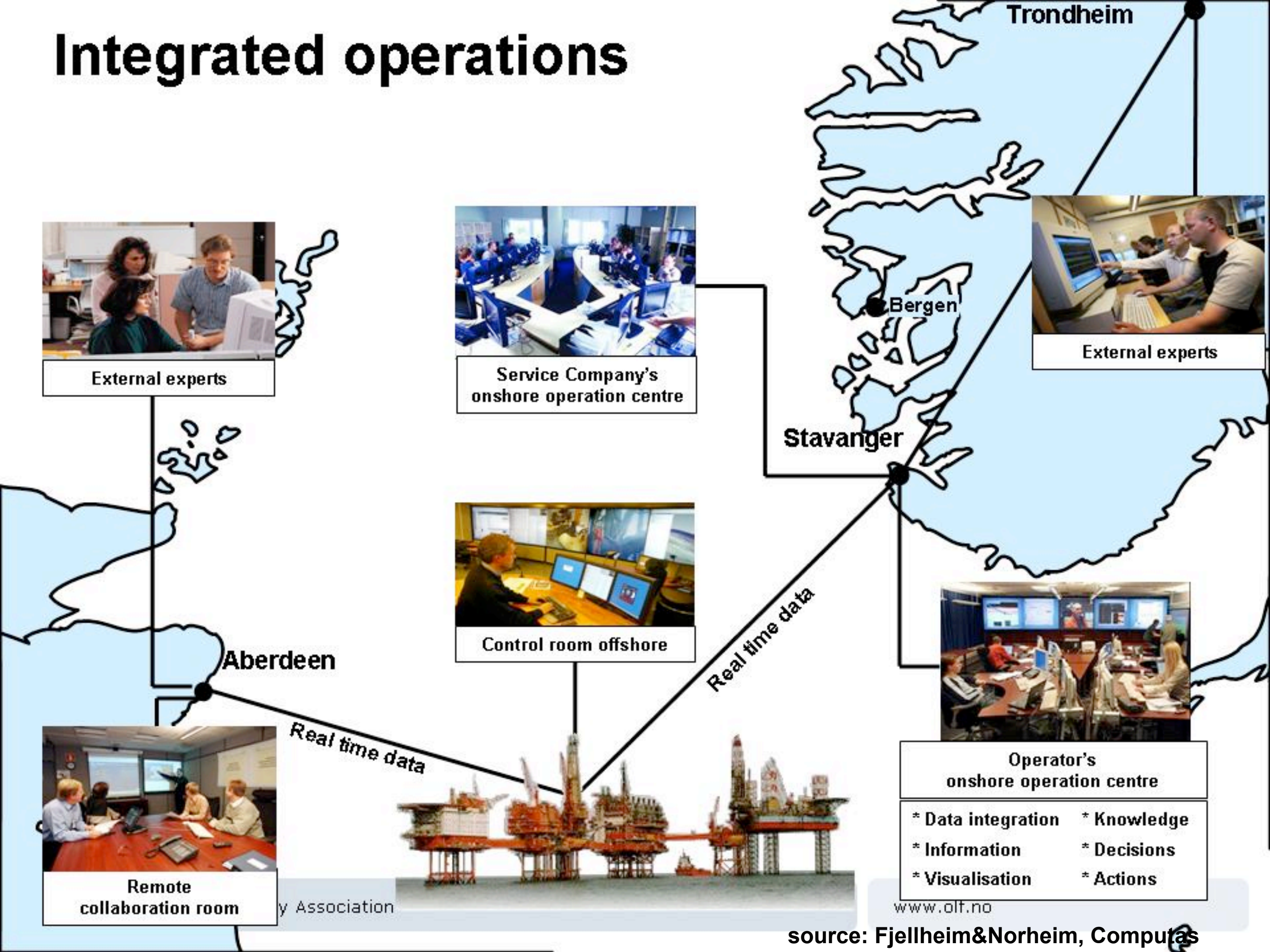
## Background - Oil in the North Sea

- Norway is the world's 7<sup>th</sup> largest producer and 3<sup>rd</sup> largest exporter of crude oil





# Integrated operations



External experts



Service Company's onshore operation centre



External experts



Control room offshore



Operator's onshore operation centre



Remote collaboration room



Real time data

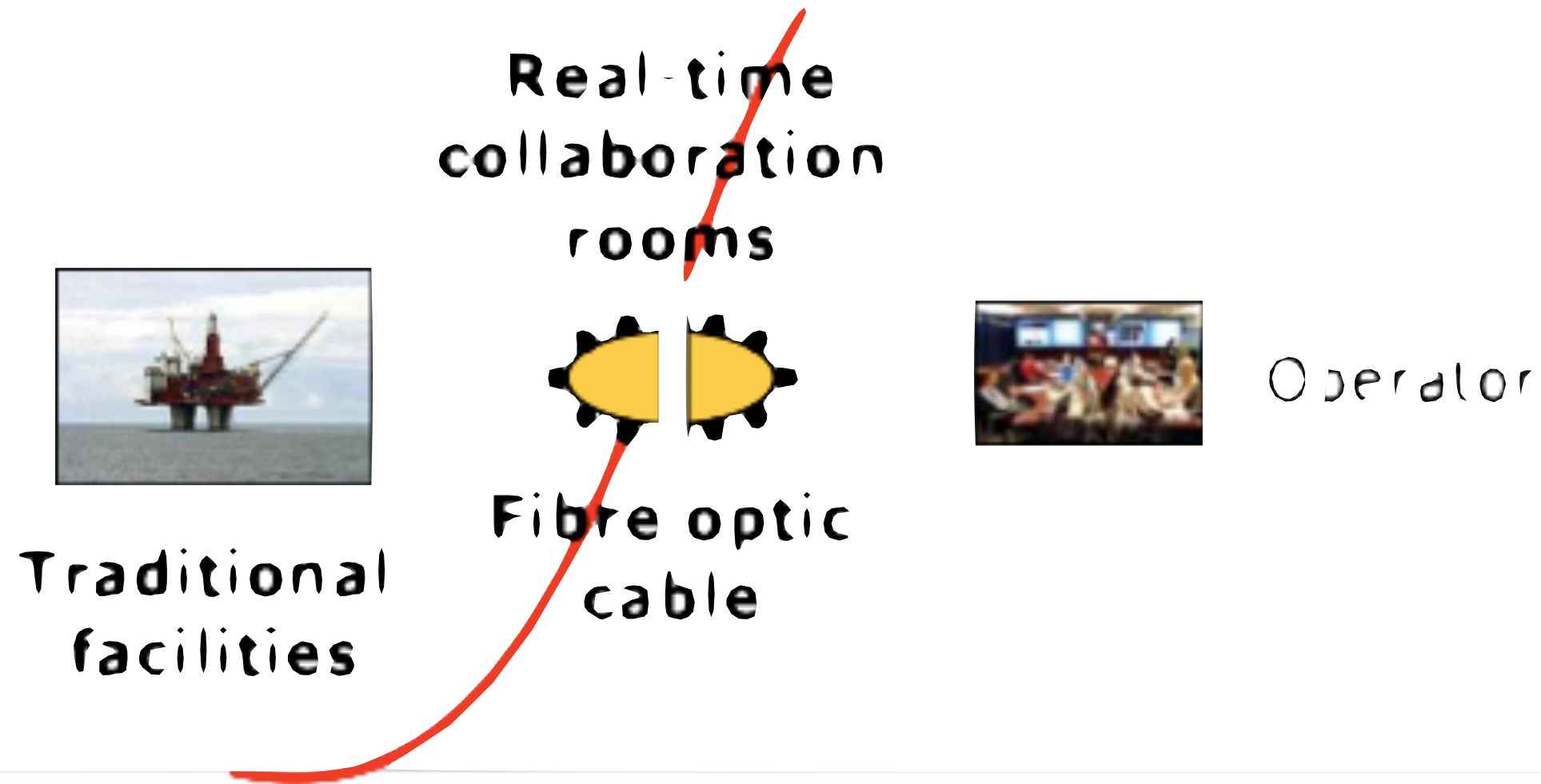
Real time data

Association

www.olf.no

source: Fjellheim&Norheim, Computas

# Challenges in integrated operations

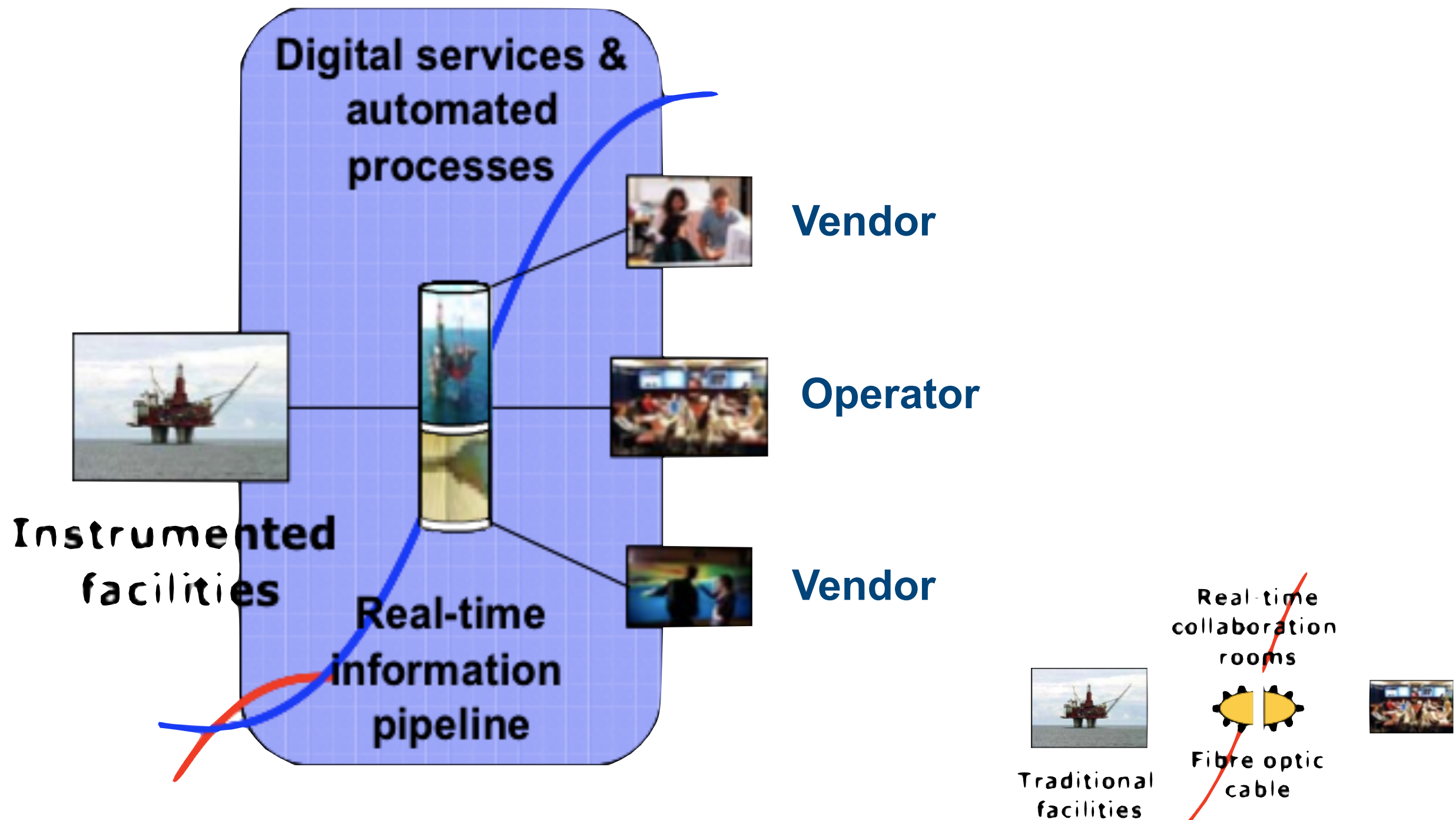


source: Kaare Finbak, IBM



# Challenges in integrated operations

## IO Generation 2

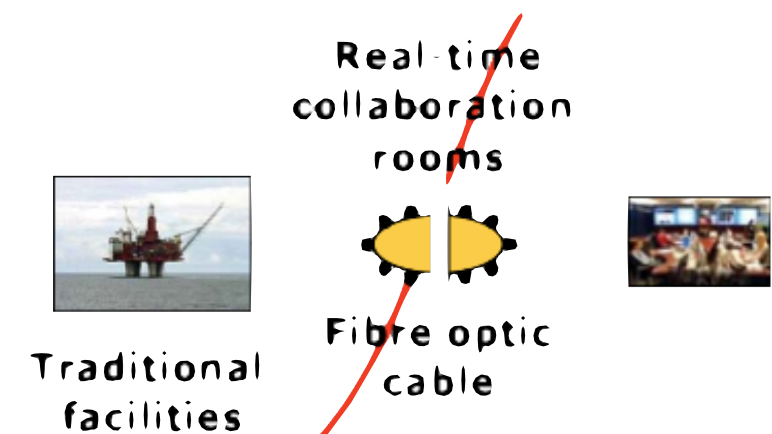
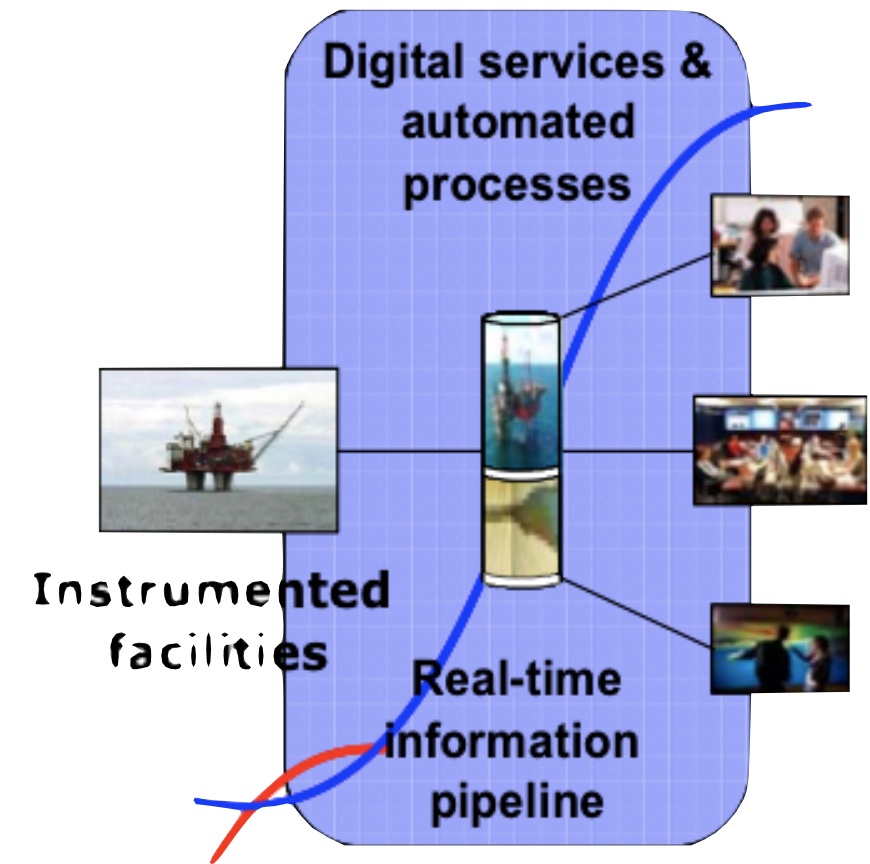


source: Kaare Finbak, IBM



# Challenges in integrated operations

IO Generation 2

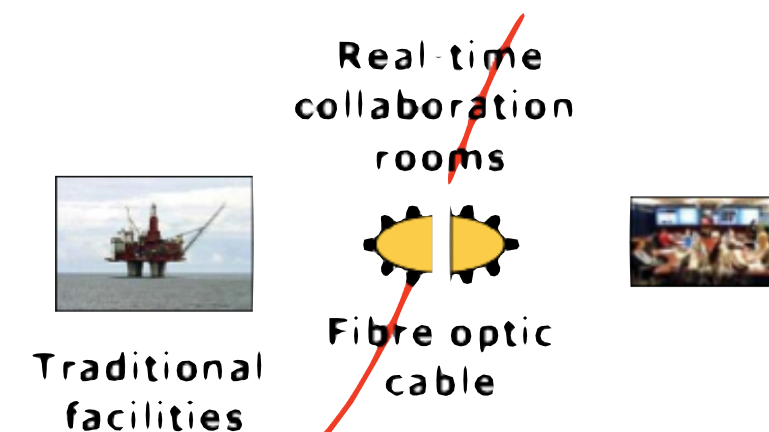
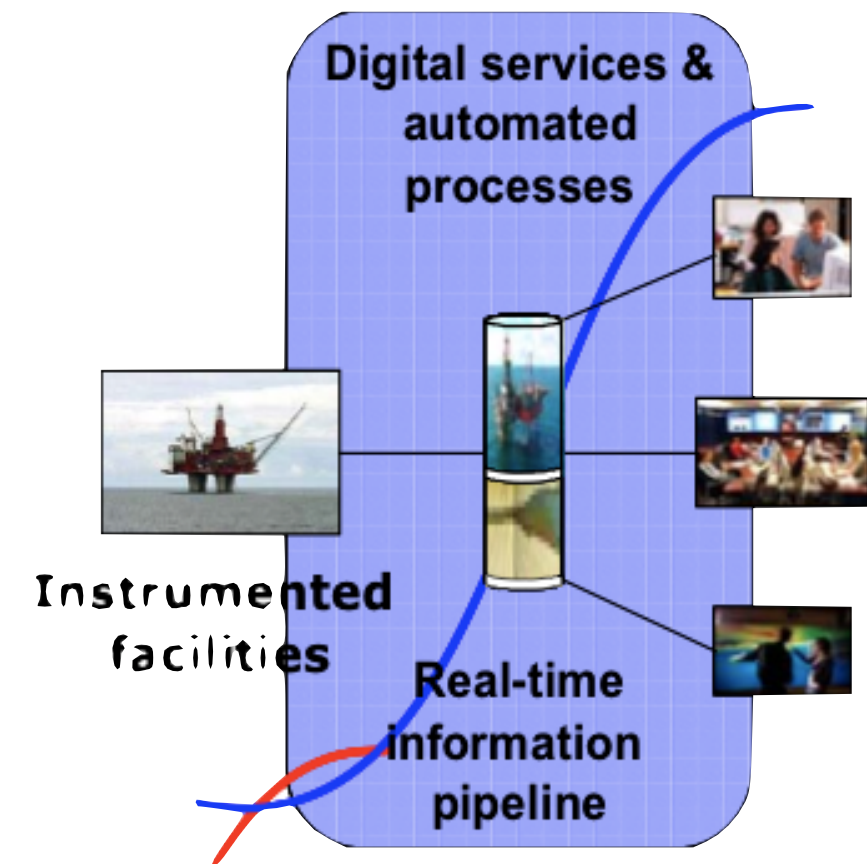


source: Kaare Finbak, IBM

# Challenges in integrated operations

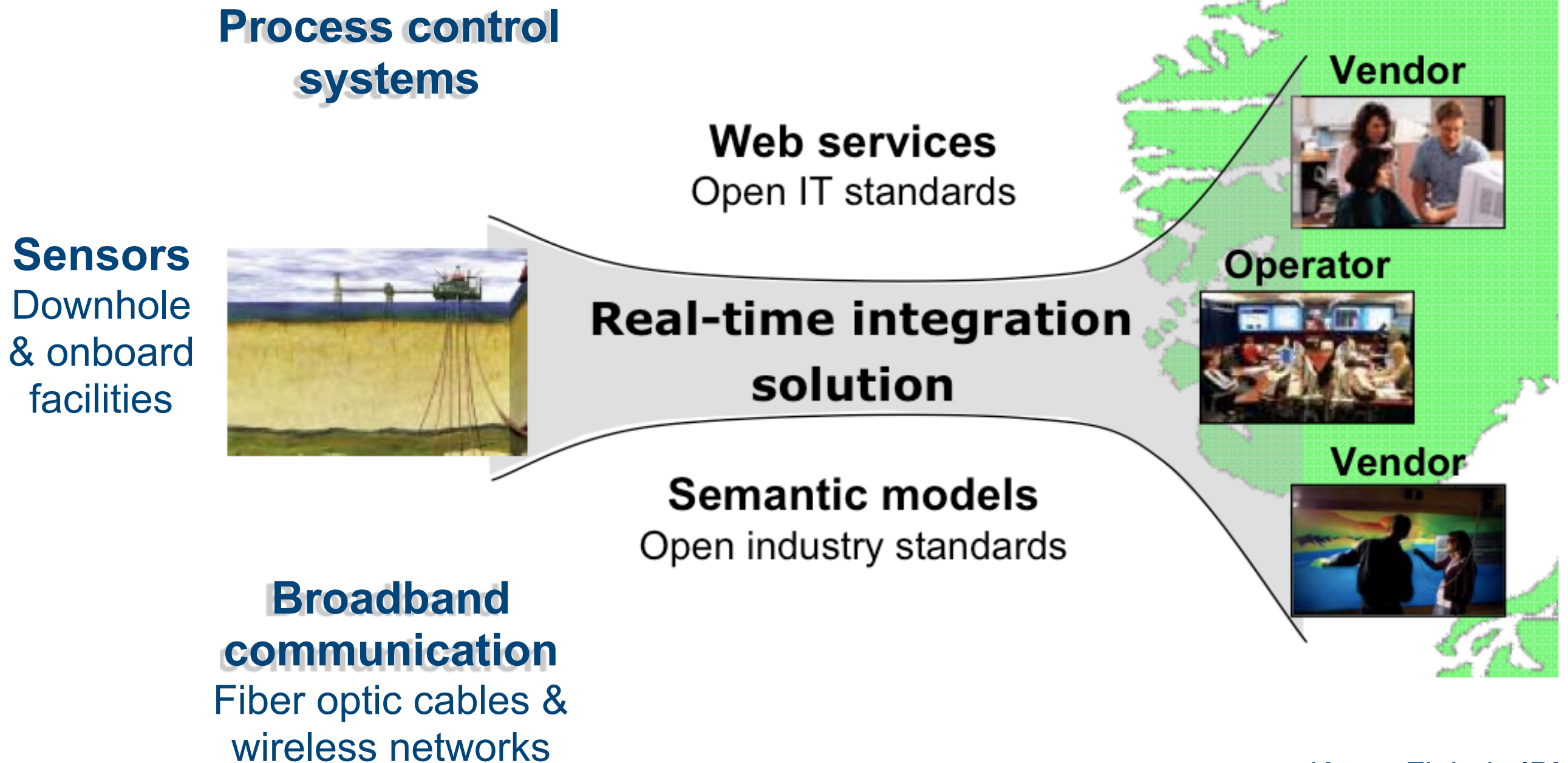
IO Generation 2

- Automatic detection of events
  - well, process, critical equipment
- Automatic evaluation of the effect of events
  - Production targets, costs
  - From corporate to equipment level
- Automatic generation of advices on how to manage events
- Automatic processing of events
- Automatic follow-up of events, e.g. actions required to handle events



source: Kaare Finbak, IBM

# Need for new & highly scalable technologies



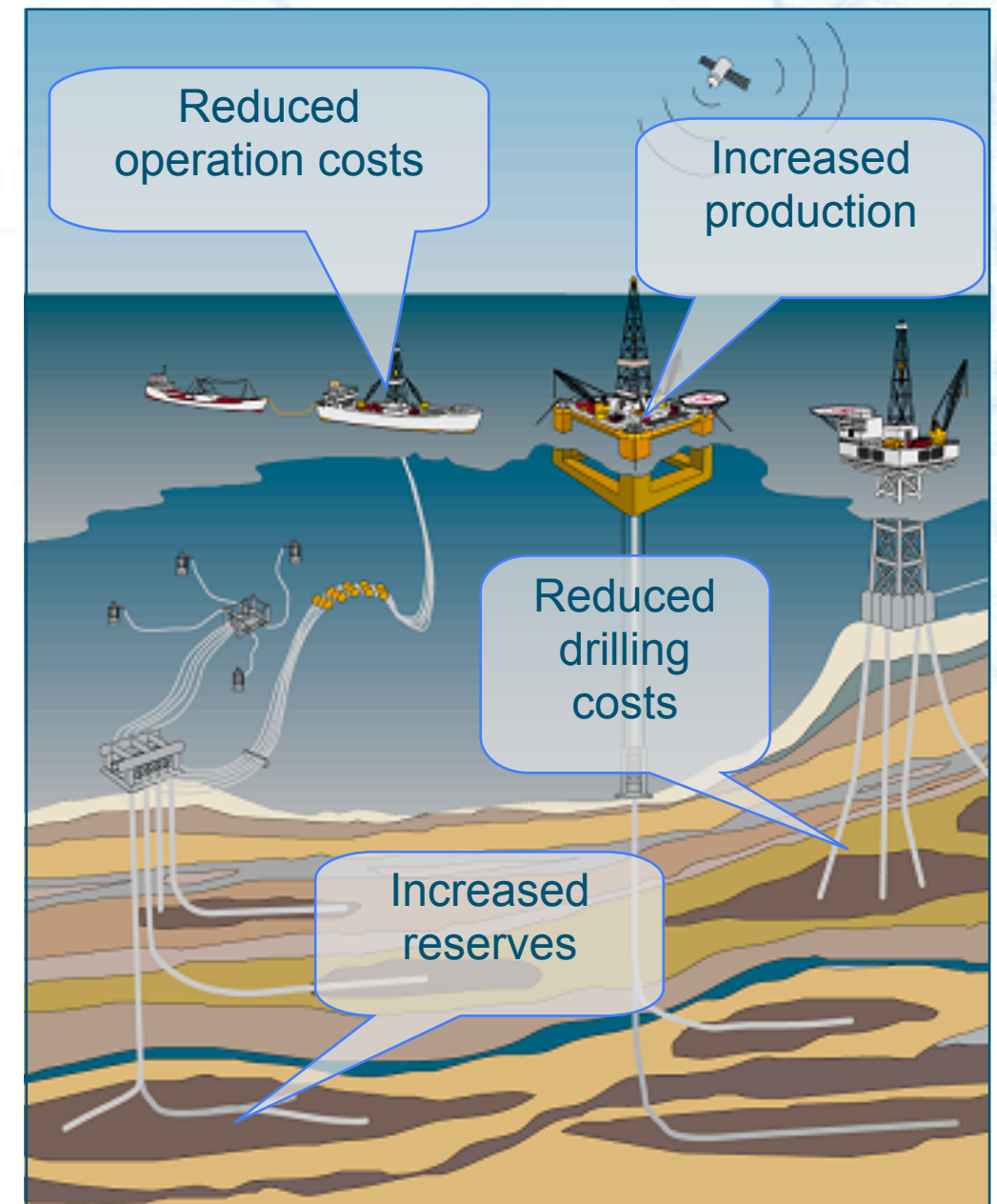
source: Kaare Finbak, IBM



# 40 bill US\$ added economic value (now-2015)

## Integrated Operations on the NCS - OLF numbers

- **Increased production (5 -10 %)**
  - Real time coordination between offshore and onshore
  - Real time simulation of process and operation data
- **Increased reserves (5 -10 %)**
  - Improved location of wells
  - Smart wells and real time management of reservoirs
- **Reduced operation costs (30 -50 %)**
  - Conditioned based maintenance
  - Reduced use of personnel offshore
- **Reduced drilling costs (30 - 50 %)**
  - Real time optimized well trajectory
  - Fewer off-track
  - Reduced use of personnel offshore



source: Fjellheim&Norheim, Computas



# Case 4

ITEA Wellcom project

Future TV

# Current TV

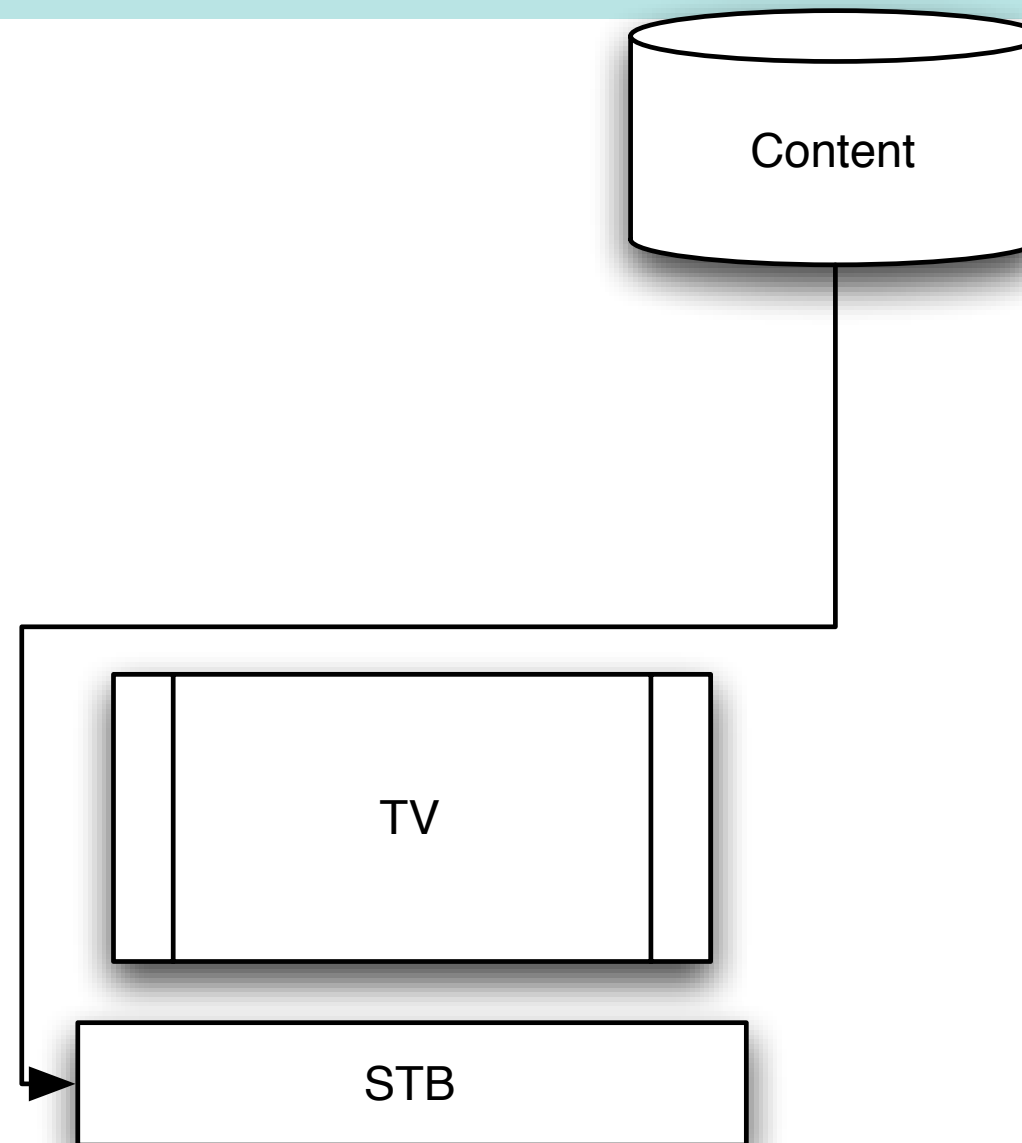


source: Sony

And some of the partners working on tomorrows TV experience:

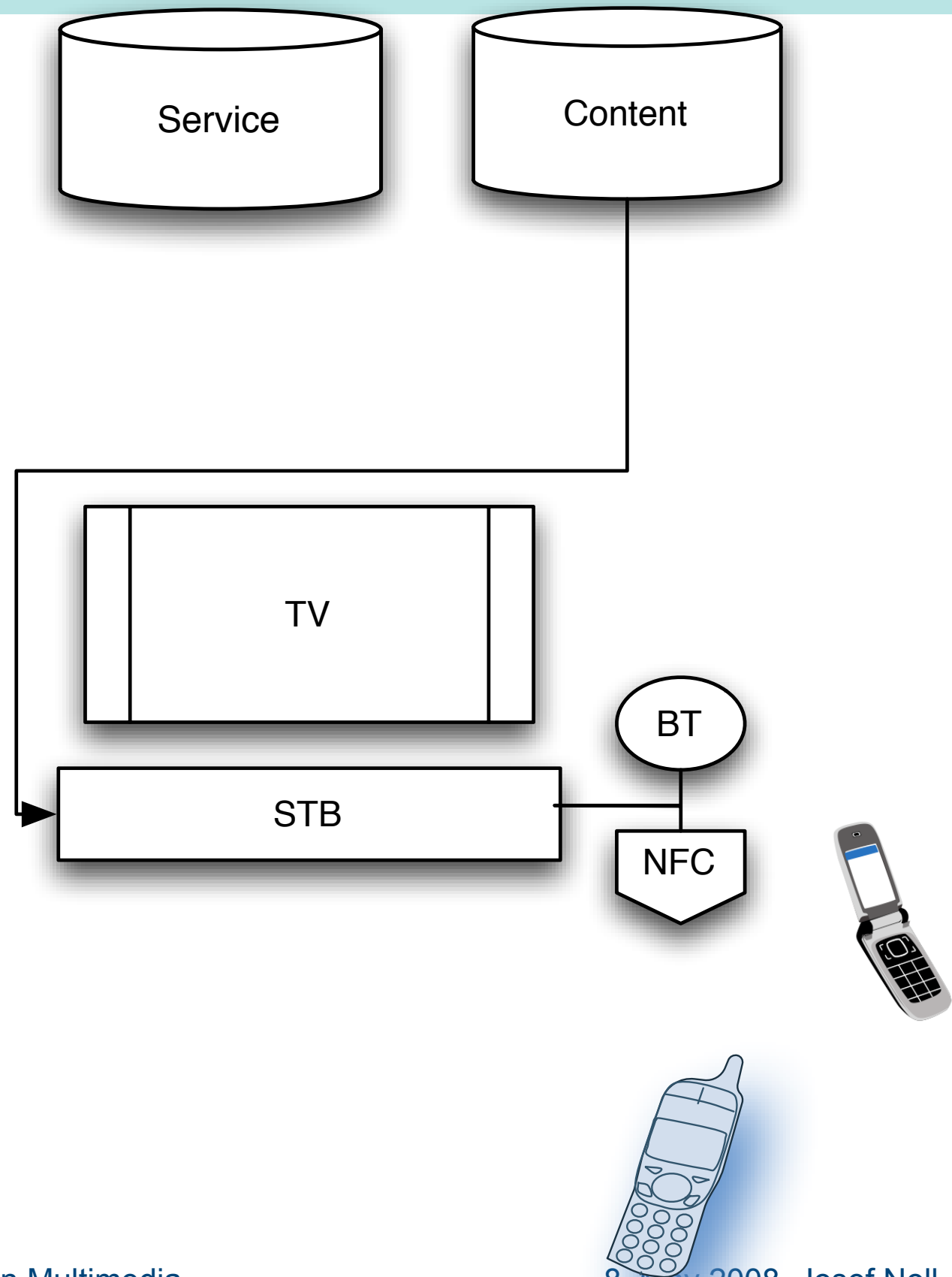


# TV today and tomorrow

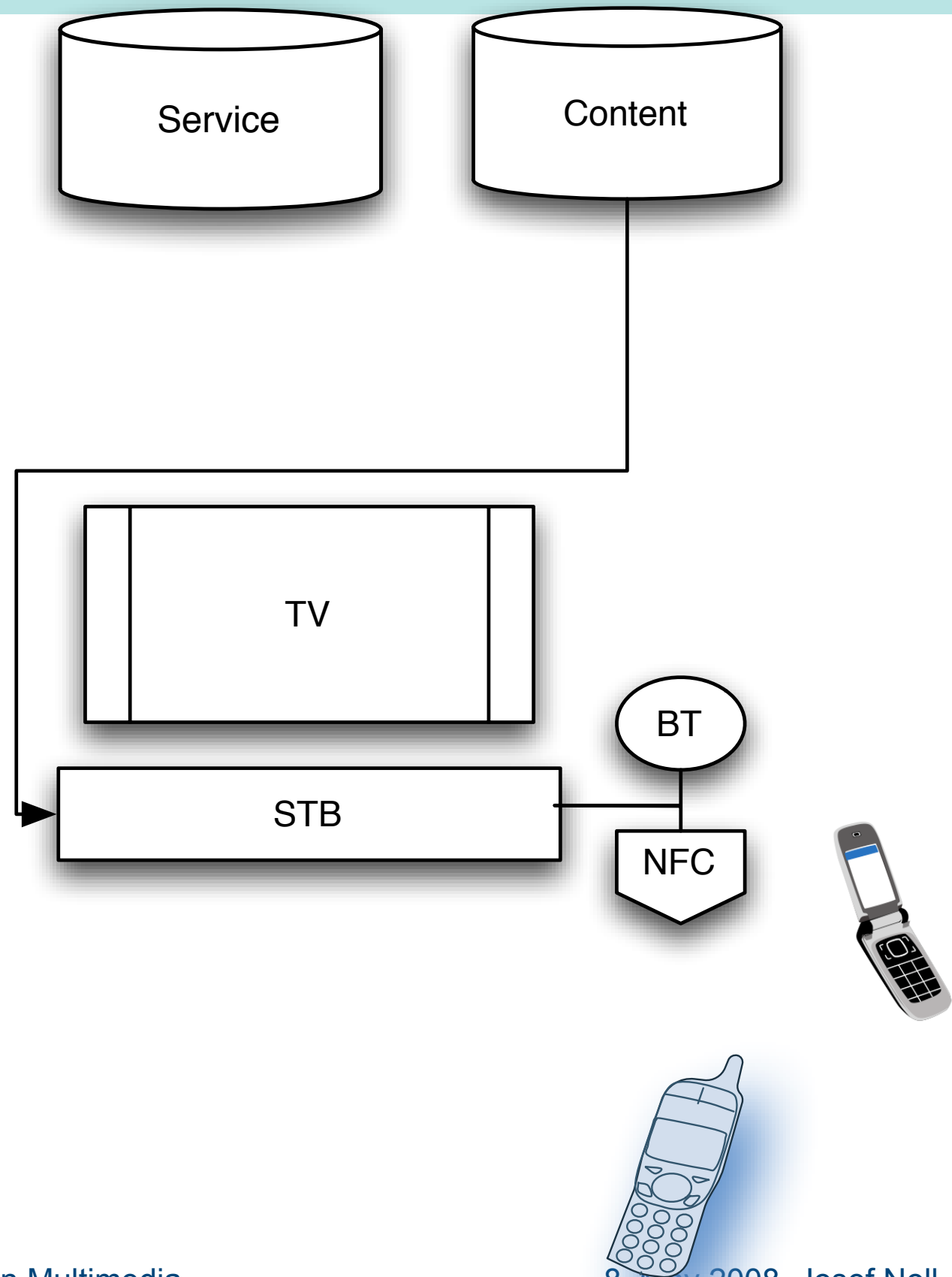




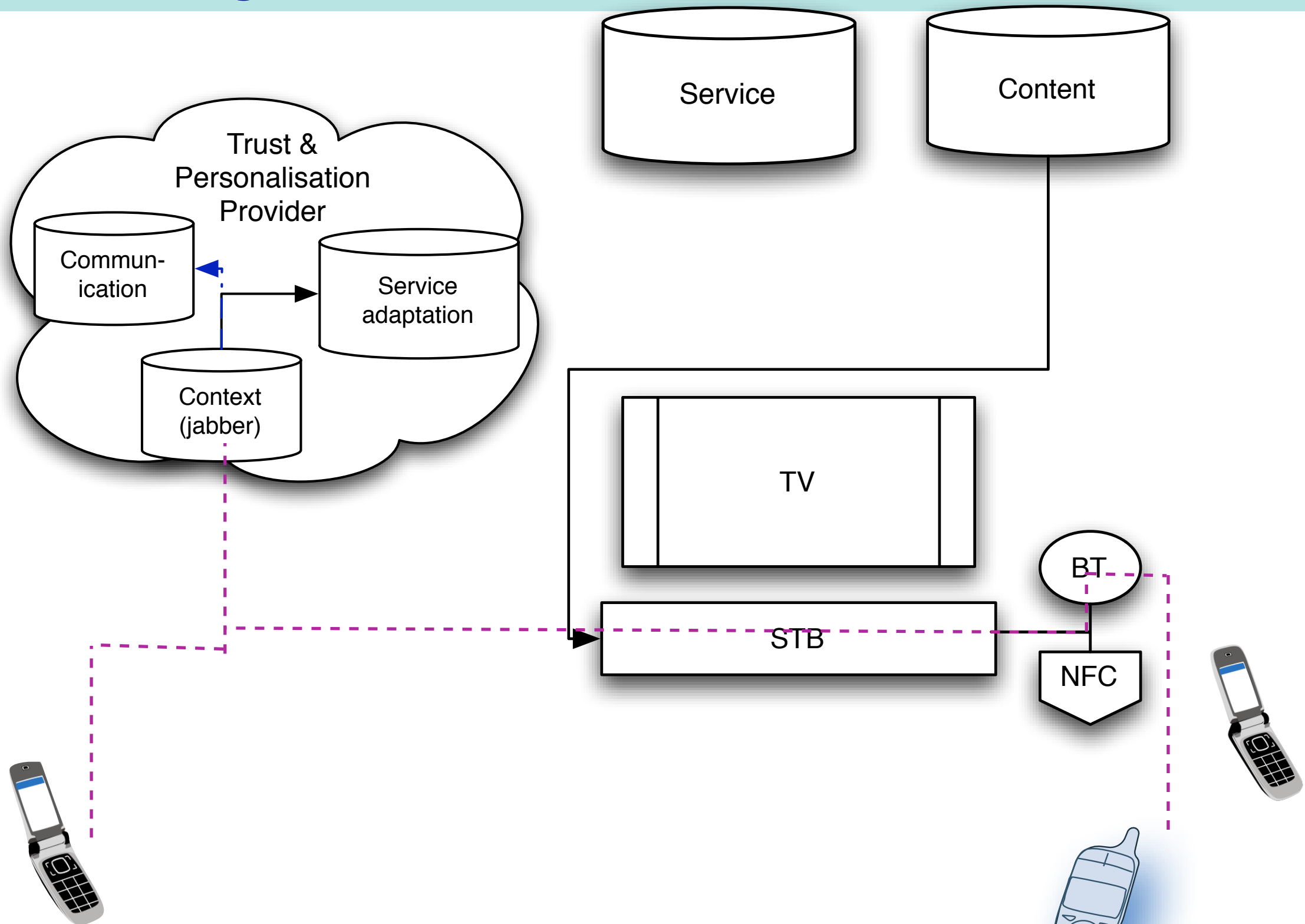
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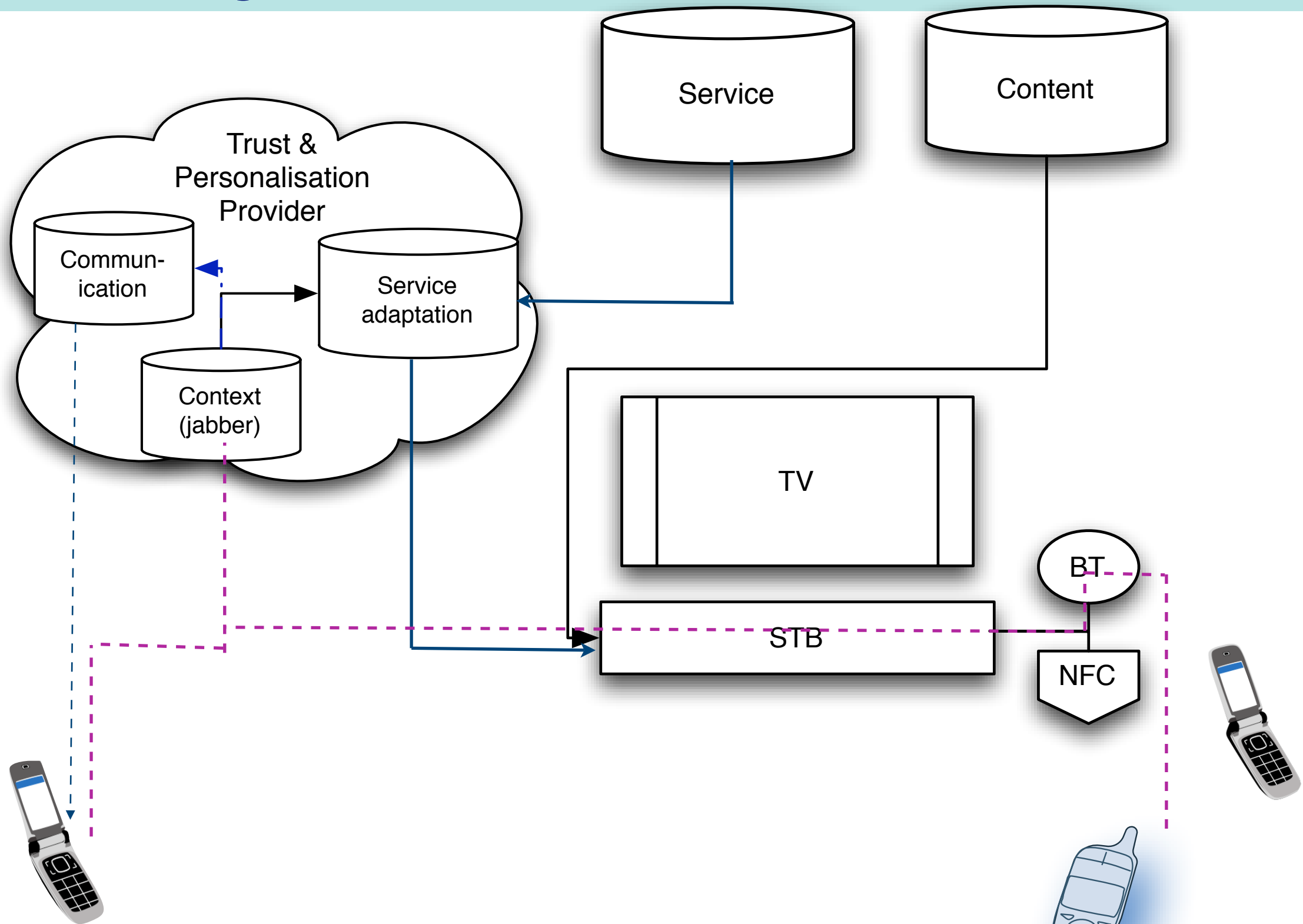


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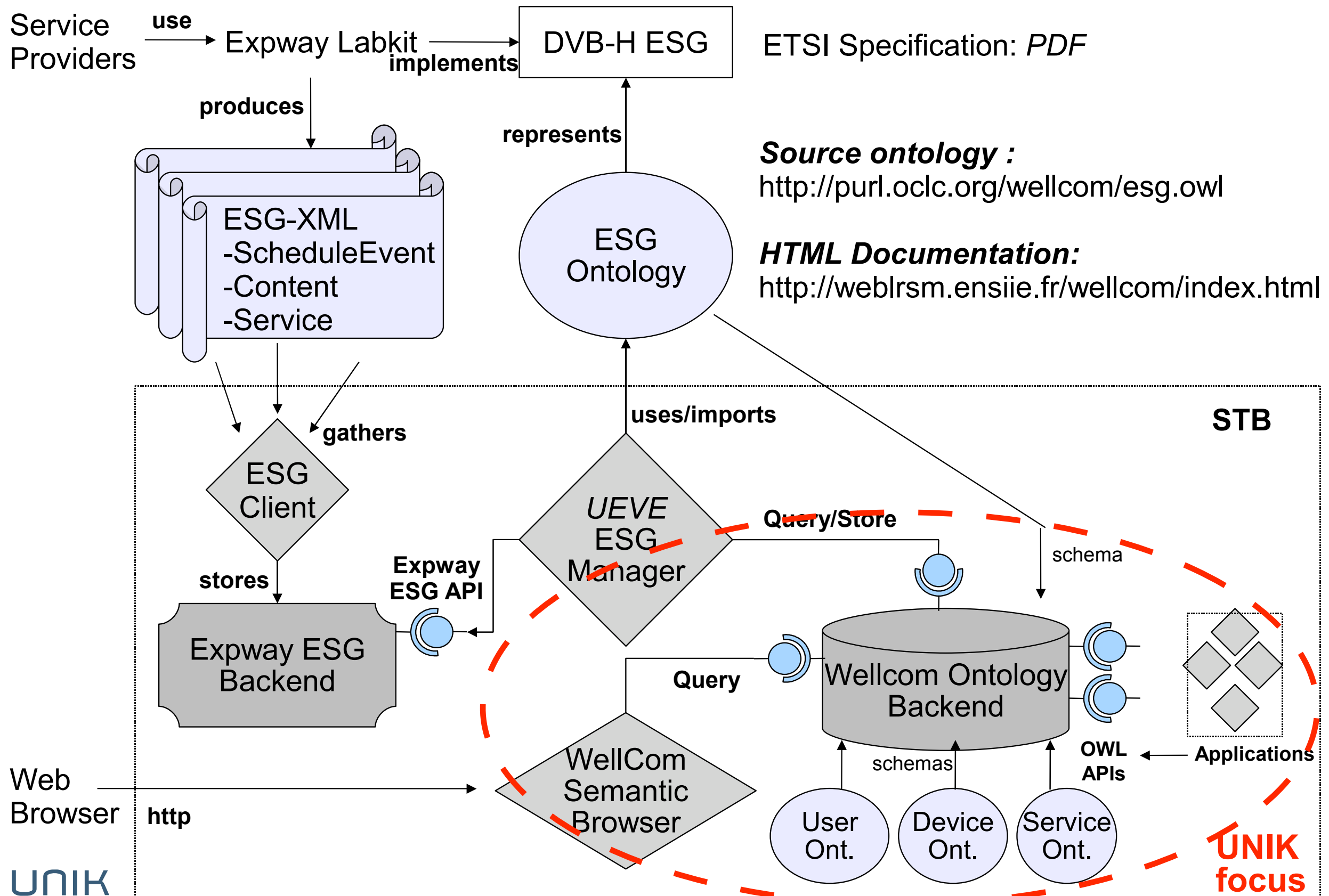


# TV today and tomorrow



# ITEA WellCom: Implementation examples

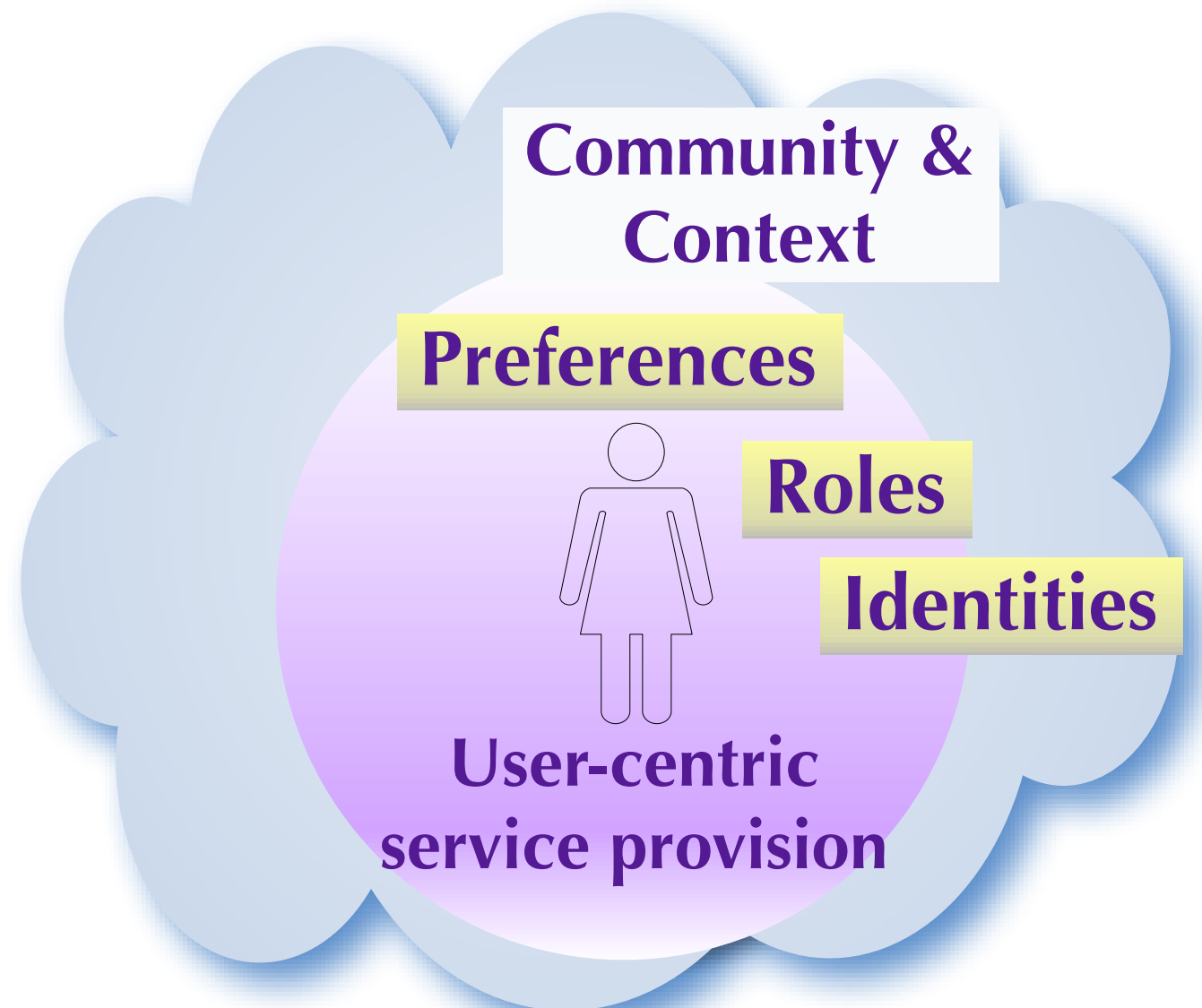
## Current development



UNIK focus

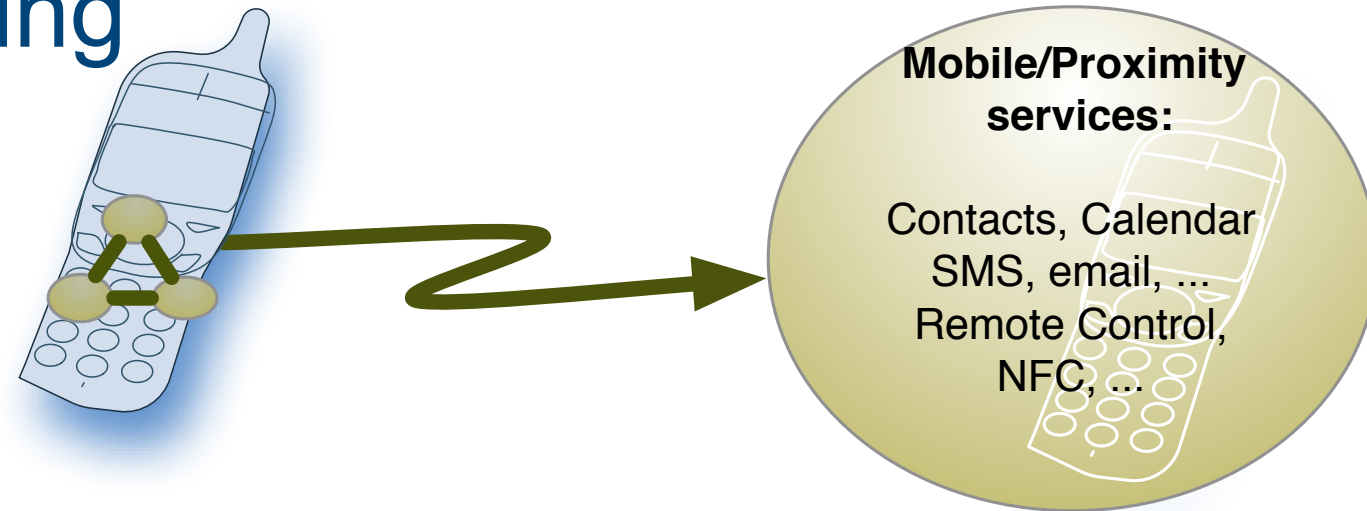
# Some ideas about Identity Management

- Semantics as the **service glue**
- Context/Community awareness
- **Semantic Identity (SemID.org)** for role-based identity and content access



# Integrating the Mobile into a Semantic Web Services delivery

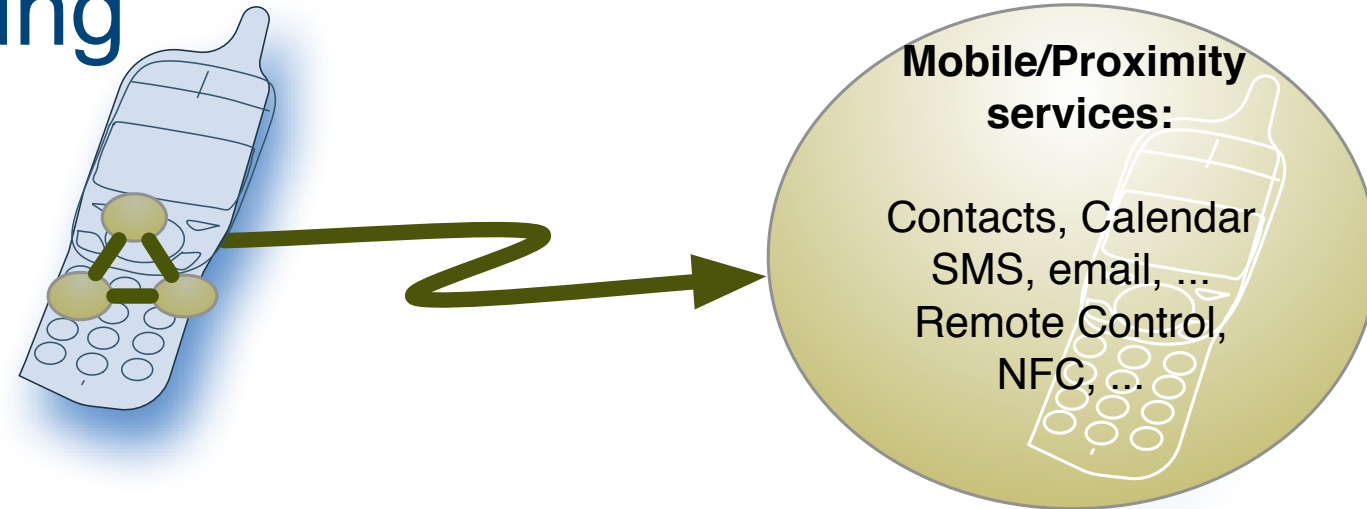
- A virtual mobile, representing the mobile and proximity services in the Internet service world



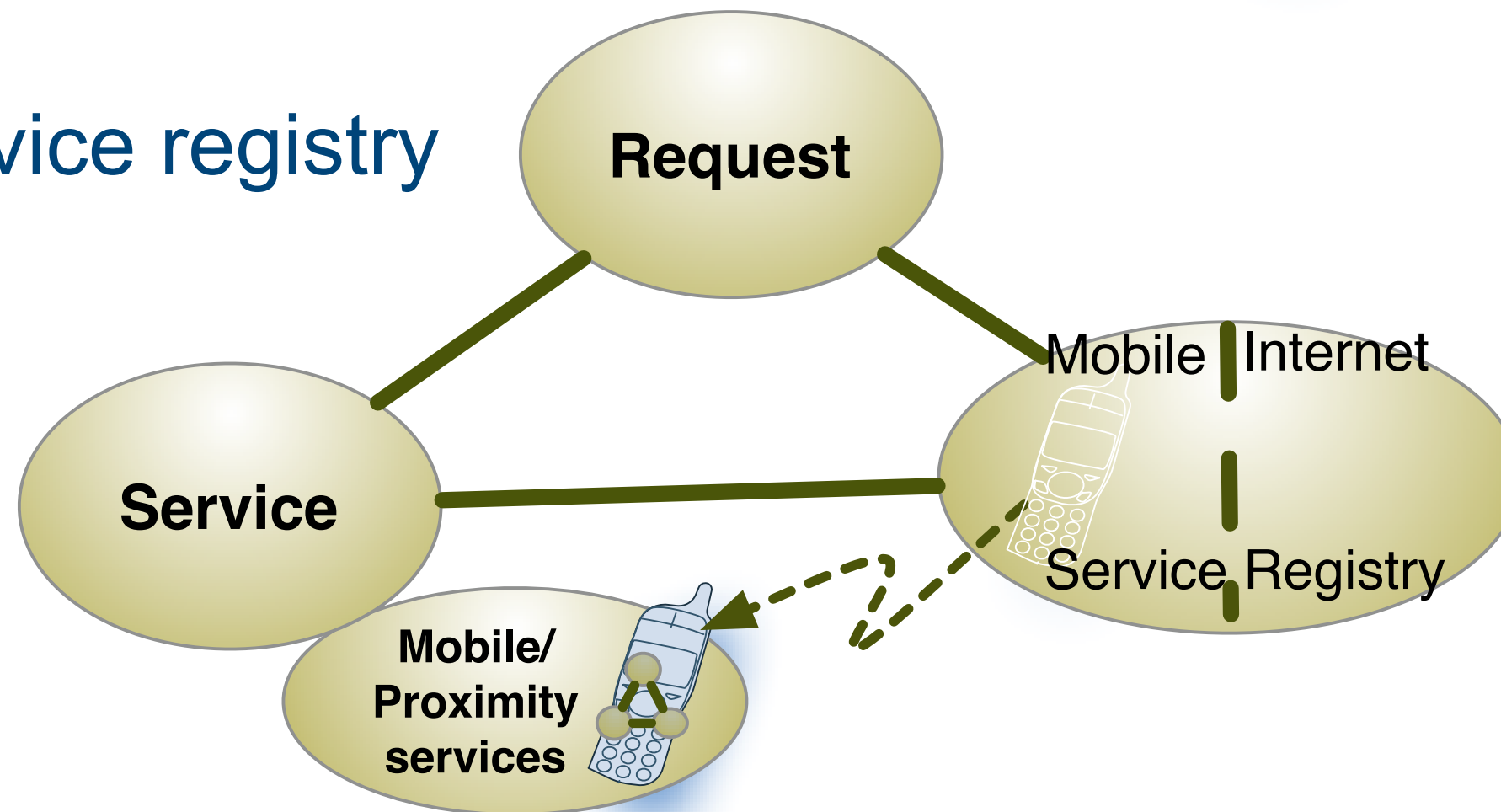


# Integrating the Mobile into a Semantic Web Services delivery

- A virtual mobile, representing the mobile and proximity services in the Internet service world



- An integrated service registry



# Conclusions

- “The last time we were connected by a wire was at birth!” [Motorola]
- The service world is wireless
  - Q: “what is if you loose your phone?”
  - A: “A real crisis in life!”
- Easy access to devices and services, dependent on the context of the user
- Challenges
  - get control of complexity
  - get people understanding what they are doing and us understanding people

