FIT-IT ’08 – SPRING RESEARCH

Semantics and Real World Multimedia

Josef Noll
Prof. Dr., ConnectedLife
University Graduate Center, Kjeller/
University of Oslo, UiO
josef@unik.no

Senior Advisor
Movation AS, Oslo
josef.noll@movation.no

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

Phone: +47 6484 4745
Mobile: +47 9083 8066
email: josef@unik.no
email: josef.noll@ieee.org

Address:
University Graduate Center (UniK)
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.
"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
The complexity of technology

The speed of development

ITRS Roadmap: 10x every 5 years, secured until 2025

source: Gerhard Fettweis, TU Dresden

- 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

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,...

source: Gerhard Fettweis, TU Dresden

“Much faster than I ever thought!”

“Too complex for me to handle!”

ITRS Roadmap: 10x every 5 years, secured until 2025


1GB 2GB 4GB 8GB 16GB 32GB 64GB 128GB 256GB
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
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

ON paradigm

- ECMA-340, ISO/IEC 18092 & ECMA-352, …standards
- Powered and non-self powered devices

OFF paradigm

NFC technology supports both paradigms

- Philips and Sony
- Powered and non-self powered devices
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
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
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)
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 automized 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
Case 2: Comperio.no
Semantic Music Search

Comperio Music Search™
Let the music find you!

johnny cash

Don't know where to start? Try searching for one of these artists:
- Air
- Johnny Cash
- Miles Davis
- Radiohead
Orders of Information Management

1st order: Structuring
2nd order: Classification
3rd order: Tagging and other metadata

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%)

Source: Vegard Sandvold, Comperio
Artists Similar to U2

- the beatles (50,422,827)
- radiohead (40,762,895)
  - red hot chili peppers (37,564,100)
  - muse (30,548,064)
  - death cab for cutie (29,335,085)
  - pink floyd (28,081,366)
  - coldplay (27,120,352)
  - metallica (25,749,442)

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 7th largest producer and 3rd largest exporter of crude oil

![Map of the North Sea](source:Fjellheim&Norheim, Computas)
Integrated operations

- External experts
- Service Company’s onshore operation centre
- Control room offshore
- Operator’s onshore operation centre

Real time data

Aberdeen

Stavanger

Bergen

Trondheim

source: Fjellheim&Norheim, Computas
Challenges in integrated operations

source: Kaare Finbak, IBM
Challenges in integrated operations

IO Generation 2

Digital services & automated processes

Vendor

Operator

Vendor

source: Kaare Finbak, IBM

Semantics in Multimedia

8. May 2008, Josef Noll
Challenges in integrated operations

source: Kaare Finbak, IBM
Challenges in integrated operations

- 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

Process control systems

Web services
Open IT standards

Real-time integration solution

Semantic models
Open industry standards

Sensors
Downhole & onboard facilities

Broadband communication
Fiber optic cables & wireless networks

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

And some of the partners working on tomorrow's TV experience:

- Alcatel-Lucent
- telenor
- SES Astra
- NXP
- Telefonica
- TF1
- PHILIPS
- UNIK
ITEA-WellCom.org

TV today and tomorrow

Service

Content

TV

STB

BT

NFC
ITEA-WellCom.org

TV today and tomorrow

Service

Content

TV

STB

BT

NFC

Semantics in Multimedia

8. May 2008, Josef Noll
ITEA-WellCom.org

TV today and tomorrow

Trust & Personalisation Provider

Communication

Service adaptation

Service

Content

Context (jabber)

TV

STB

BT

NFC

TV today and tomorrow

Semantics in Multimedia

8. May 2008, Josef Noll
TV today and tomorrow

- Trust & Personalisation Provider
- Communication
- Service adaptation
- Content
- Service
- TV
- STB
- BT
- NFC

ITEA-WellCom.org
ITEA WellCom: Implementation examples
Current development

Service Providers

use

Expway Labkit

implements

DVB-H ESG

ETSI Specification: PDF

Source ontology:
http://purl.oclc.org/wellcom/esg.owl

HTML Documentation:
http://weblrsm.ensiie.fr/wellcom/index.html

Expway ESG Backend

stores

UEVE ESG Manager

uses/imports

Wellcom Ontology Backend

schema

Queries/Store

W eb Browser

http

O W L A P I s

Applications

service

User Ont.

Device Ont.

Service Ont.

UEVE ESG Manager gathers

Expway ESG API

Expway Labkit produces

ESG-XML
-ScheduleEvent
-Content
-Service

ESG Ontology

represents
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