INF 5890 IT og Ledelse

Service Oriented Architecture

Bendik Bygstad
IFI March 2015
Learning outcomes

• Can define Service Oriented Architecture
• Know the principles of SOA
• Understand different implementations
• Understand the role of SOA in service innovation
A service is...

A mechanism where needs and capabilities are brought together.

OASIS Open Referansemoddell, 2006

A service is an autonomous unit of functionality.

Loosely coupled, not connected to other services

Can be reused, changed and moved without changing the basic functionalities
Example: «Check account»

• Offered by a service provider
• Available through a service catalogue
• Used by a service consumer

A defined encapsulated business functionality, which is specified by standards and defined interfaces. In practice: a component that can be accesses via Internet.

Hirschheim et.al, 2010

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SOA at three levels

1. **Principles**
   1. Services (instead of applications)
   2. Loose coupling, strong cohesion
   3. Horizontal thinking: Decoupling of process and service logic

2. **High-level architecture**
   1. Enterprise bus
   2. Distributed solutions

3. **Implementation**
   1. Web services
   2. ESB-løsninger
   3. WSDL, SOAP, UDDI, XML...
   4. SOAP versus REST
Decoupling of process logic and service logic
Service Oriented Architecture: Layers

- SOA is a framework for designing flexible and loosely-integrated services, in distributed environments.

- Web services are often used as building blocks.

Figure:
http://abdennour-insat.blogspot.no/2012/04/soa-tutorial.html
Service Oriented Architecture: Benefits

– **Flexibility**: the ability to include both new and old systems into a distributed but seamless whole
– **Reuse**: sharing components over the whole organization and even outside it
– **Efficiency**: the ability to run the operation 24/7 at acceptable costs

Implementation of SOA: The Enterprise Service Bus

Enterprise Service Bus
Connectivity, Routing, Transformation, Security

Application
ERP system
CRM system

Legacy system
External ERP

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Felles arkitektur i offentlig sektor (FAOS-tapporten, 2007)
SOA is not an easy technology...

Promise of SOA

Overcomes silo systems and supports innovation

Status of SOA

Mainly perceived as technical solution

Fragmented implementation

Hirschheim et al. 2010.
Case: Norwegian

- Starting in 2002
- Deregulation of air traffic in Scandinavia and Europe

Today:
- 391 routes to 125 destinations in Europe, Middle East, Thailand og USA.
- 20 million passengers in 2013
- 3000 employees
- Revenues 2.5 bn Euro (15.5 mrd NOK)

# Key Figures Norwegian

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Norwegian timeline: SOA

Airline company start

Establishing A service oriented architecture (SOA)

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

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Norwegian: Internet bookings and tickets – bypassing travel agencies

Airline company start

Establishing A service oriented architecture (SOA)

Internet bookings

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

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2003: Bar code on tickets
Norwegian timeline

Airline company start

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

Establishing A service oriented architecture (SOA)

Establishing Low-Price Calendar

Internet bookings

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2005: Low Price Calendar
2007: Bank Norwegian

Internet bank
Handles Norwegian’s FFP system
Profits 2012: 165 mill NOK
Norwegian timeline

Airline company start

2002  |  2003  |  2004  |  2005  |  2006  |  2007  |  2008  |  2009  |  2010  |  2011

Establishing a service oriented architecture (SOA)

Internet bookings

Establishing Low-Price Calendar

Digital customer communication dominating

Internet bank

Mobile portal

Bank Norwegian

Call Norwegian

2002  |  2003  |  2004  |  2005  |  2006  |  2007  |  2008  |  2009  |  2010  |  2011
Norwegian timeline

- **2002**: Airline company start
- **2003**: Internet bookings
- **2004**: Establishing a service oriented architecture (SOA)
- **2005**: Establishing Low-Price Calendar
- **2006**: Digital customer communication dominating
- **2007**: Internet bank
- **2008**: Mobile portal
- **2009**: Using Facebook in the ash crisis
- **2010**: Call Norwegian
- **2011**: Bank Norwegian
Ash crisis in 2010

Number of requests for SAS and Norwegian during the ash crisis

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Norwegian timeline

Airline company start

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

Establishing A service oriented architecture (SOA)

Internet bookings

Establishing Low-Price Calendar

Digital customer communication dominating

Internet bank

Mobile portal

Using Facebook in the ash crisis

In-flight Broadband services

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Recent developments at Norwegian

• 2012: Largest airplane order: Norwegian purchases 122 fly from Boeing

• 2013: Start of long-haul operations to Thailand and USA
Some characteristics of Norwegian

• First, there is a strong entrepreneur culture. Innovation is done in small teams, flat organization, empowered employees and a strong determination to succeed.

• Second, there are no “IT projects”, only business projects. New ideas come along as business proposals. They are evaluated on the sole criterion of financial benefits.

• Third, it is a relatively flat organization. Employees are empowered to a large degree, with clear business accountabilities. A middle manager commented: “As long as I reach the company objectives I am free to choose my actions."
Innovation

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Self-reinforcing mechanisms

Exercise

• What are the key benefits of SOA
• Which implementation technologies are available?
• Can SOA be implemented step-wise?