



SOA Theory Used in Practice

Registration of title to land and property in Denmark

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About the books

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- Published in Denmark in 2003
 - Used on Copenhagen and Aarhus University
- Second Edition published in
 - Denmark 2006
 - Norway 2007 (Local Co-author Erik Billington)
- Purpose is to write a local book on SOA
 - In local language
 - With national examples
- I am looking for additional co-authors
 - In other countries
 - Contact me on henrik.hvid@devoteam.dk



- Registration of title to Land and Property today and in the future
- Service Orientation in Theory and Practice
 - Business Event
 - Exposing business processes as services
 - External business process orchestrations
 - Semantic Interoperability
- Conclusion

Why registration of title to land and property

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- Titles has to be registered in order to receive protection against other agreements
 - Property, land, cars, person, wills
 - transfers of ownership
 - mortgages
 - Easement (Special rights)
- The government guarantees that you can act according to the registrations
 - Government will cover eventual loss
- 4-5 mill. registration per year
- Total value of 1 billion Euro
- Fundamental right that the information is public
- Registration is currently done in 82 county courts

- Receive document
 - Paper based
 - Registration in diary
- Verification
 - Correct fulfilled
 - Do you own the property?
 - Is it legal?
 - Is it possible to obtain the requested title?
- Registration in the Land and property Registry
 - Only summary information is registered in current it system
 - Manuel writing on the document
 - Paper number plus date of registration
- Final handling of the document
 - Copy is placed in the suspension file for this property
 - Paper based file of all document for every property in Denmark
 - 70 mill papers
 - We are also running a project where these are scanned to PDF-documents

Significant changes within registration of titles

- **Centralization** – All employees will be gathered in one single location
 - The Land and Property Registration Court.

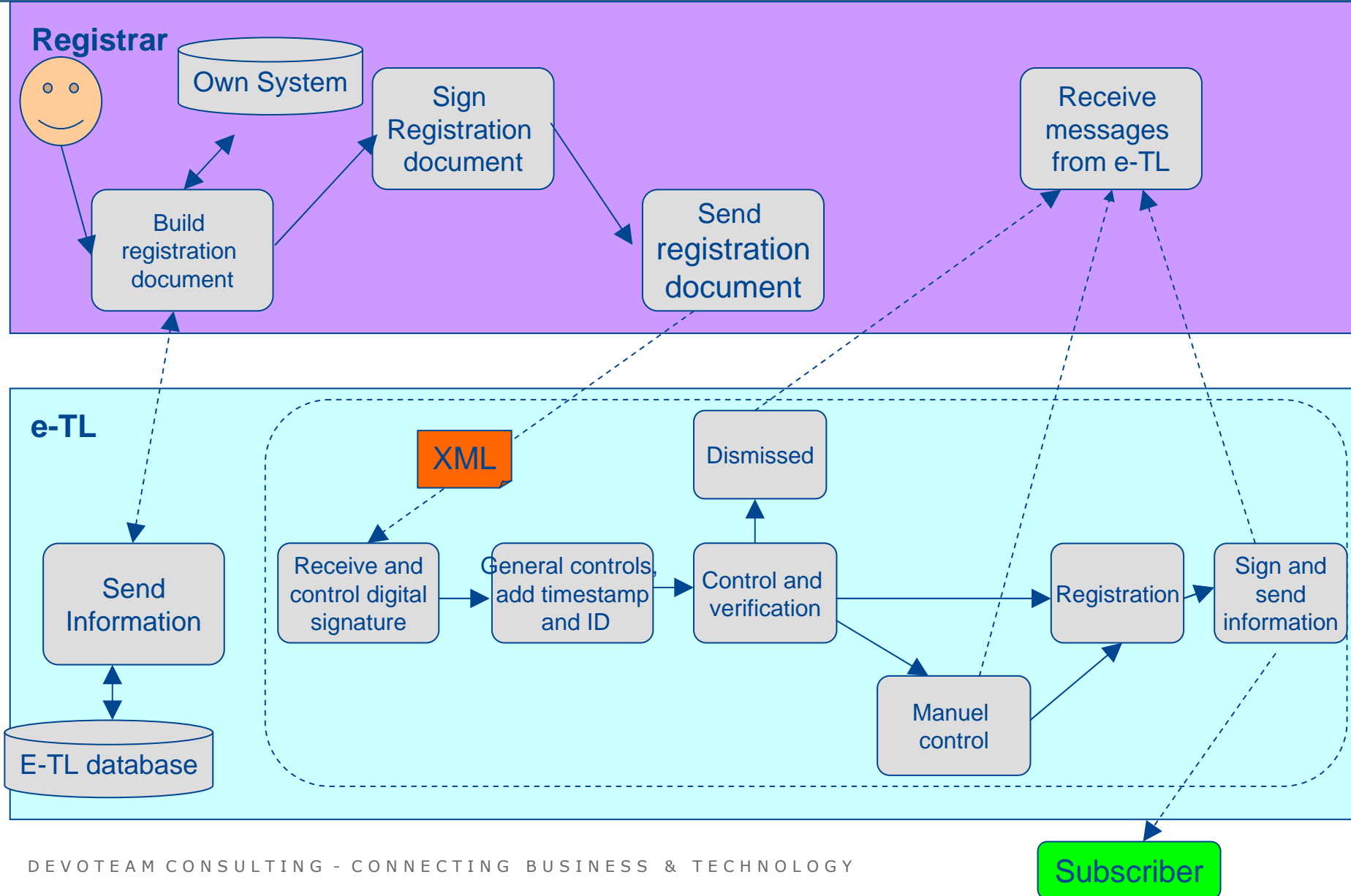
- **Digitalization** – After 25th of March 2008 will it solely be possible to register your titles to land and property, by sending an electronic document (in XML) signed with your digital signatures.
 - All normal papers will be rejected.
 - Digital signature is central
 - For signature
 - To control your rights

- **Automation** – Major part of the process of controlling and verifying the registration will be automated.
 - Verification done by 200 automatic controls
 - Are you the owner? Does it contain the necessary statements? Is the interest acceptable? etc.
 - Follows the existing rules
 - Focus on automating 70 %
 - The difficult 30 % remains
 - Manuel control

Expected improvement with e-TL

- Reduction from 400 to 150 employees
- Build to cooperate with many external entities
 - Professional actors can integrate it directly in their systems
 - Financial institutions, Real Estate-agent, Lawyers, Chartered Surveyors, etc
 - Using Web Services
- The business case shows a potential yearly saving of 50 million Euro
 - Reduced resources used at the professional actors
 - Automatic gathering of information
 - Automatic fulfilment of electronic document
 - Fewer broken business processes and fewer customer meeting due to immediate handling of the registration
 - Immediate answers (From average 5 days (up to 14 days) to few seconds)
 - Automation of administrative and routine task
 - Reduction in the direct cost (materials, postage, etc.)
 - Saved financial cost for the citizen due to a faster registration process (estimated to 20 million Euro)
 - Bankers guarantee in a shorter period
 - Reduced loss of interest of proceeds from selling a property
- Foundation for the paperless buying of real estate
- Total cost for the it-system in a five year period is 30-35 million Euro

Registration business process in e-TL



Service orientation in practice



- Registration og rights today and in the future
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- **The message** : Organization most immediate capture and react on changes, threats and possibilities
 - Changes, threats and possibilities is manifested as business events
 - Is of interest to the business
 - A registration of something that happens in the real world
 - Sent out immediately when it happens

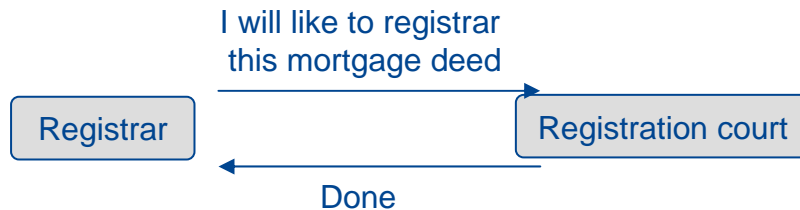
- **Business principle**: Any important business event should be easily, effective and reliable identified, captured and published
 - Information the describes the business event continues throughout the organization
 - Potential to affect more business unit
 - Can deduct unique value by subscribing to these business events
 - Simple business events can be aggregated to complex business events

- **Architecture**: Business events is an important part of an effective integration architecture
 - Enables immediate reaction
 - Extends traditional SOA

Business events compared to services

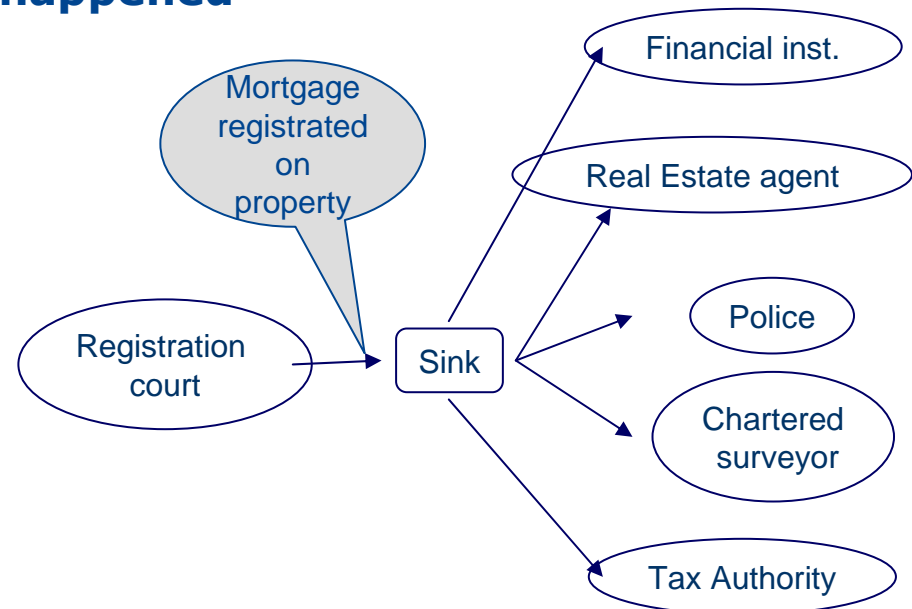
Examples of services

- Registration of right
- Inquire on banc account
- Transfer to another account
- A desire for something to happen**



Examples of business events

- A registration has happened
- A customer enters the shop
- A stock price has changed
- Information that something has happened**



- All registrations is published as business event
 - XML document that describes the business event
 - Signed with the registration courts digital signature

- Everyone can subscribe to business events
 - Ready to receive it electronically
 - Using the WS-Eventing standard

- All subscribers
 - Receives an event immediate after registration is done
 - Can react according to their own business context

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Exposing business processes as services - Theory

- **The Message:** In the future will all organization expose internal and external services, that:
 - Represent the total offering from that organization
 - Allows other to use, extend and specialize the content, wherein the business service is used
 - Independent partners can cooperate to combine a complete solution

- **Characteristic of a service:**
 - Functionality origins from existing systems or is developed from scratch
 - Independent of underlying technology
 - Only integration with the interface

 - Can be independently updated and replaced
 - As long as the interface specification is followed

 - Performs business functionality across all systems
 - Focus is in interoperability between heterogeneous it-systems

 - Don't know in advance all the places it will be used
 - Independent of physical location
 - Functionality can be accessed where and when there is a need

E-TL is service oriented according to the book

- Internal e-TL services
 - The 200 controls all performs well defined independent tasks
 - Can be changed independently of the other controls
 - Well defined result of all controls
 - Dismissed, take to manual control, ok, registration with respite
 - Can be compounded independently
 - The whole registration document is available (means no specific input parameters)
- External e-TL services
 - All functionality is exposed as services
 - Will be accesses from several hundred different platforms
 - Big mainframes, minor standalone, Unix, Linux, Windows ...
 - All access the same service
- External services
 - Prepared to access al external data sources as Web Services
 - Civil Registration, Central Business Register, Survey and Cadastre
 - Clear strategy of Network Data
 - Data is accessed at the source
 - No redundant reigstries

Selected details on services in e-TL

- Version
 - We cannot expect everyone will change at the same time
 - Several versions active at the same time

- Extensible
 - Focus on making it easy to extend e-TLs functionality
 - Expect our services to be integrated in Internet banks, Real Estate Agents business process, Surveyors daily tool etc.

- Reliable messaging
 - Both parties have to have the same understanding of the status of the message
 - Using WS-ReliableMessaging ensures independence of technology

- Using XML – Digital Signature
 - Many roles involved in a registration
 - Registrar, owner, creditor ...
 - Everyone can sign their part of the document

- The portal is exposed using WSRP – Web Service for Remote Portlets

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Business processes orchestrates services - Theory

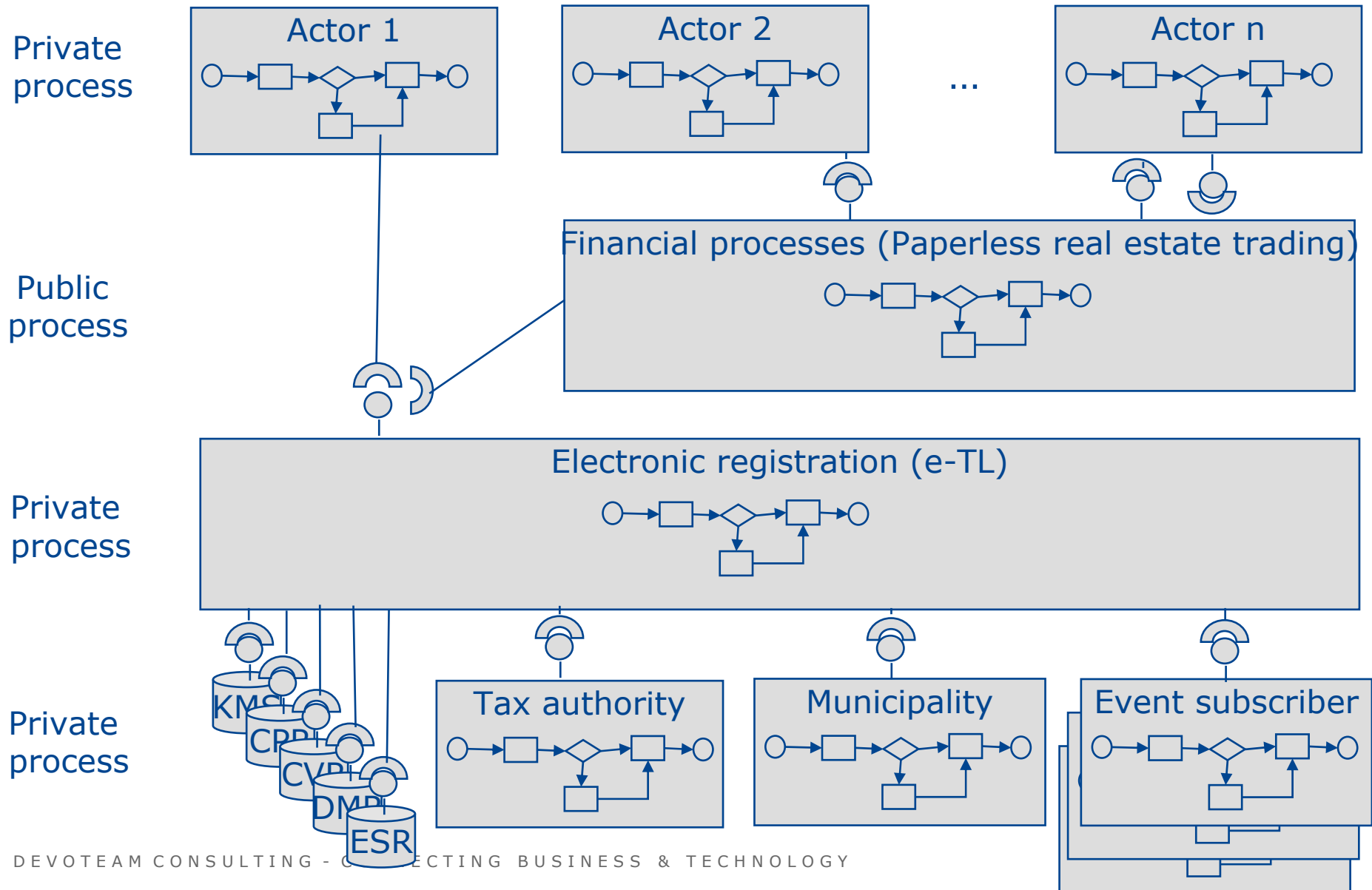
- Standardising functionality on Web Services means
 - No more silos and island
 - Same presentation of all partners service offerings

- It is not enough to open your systems!
 - You also have to connect them across systems, department and organizational boarder
 - Business process is orchestrated by a conductor
 - Responsible for why, what, who, when

- Private orchestration
 - Done by business people
 - Implemented by it
 - Contains the detailed business rules of the organization
 - Eg. under what conditions should we give a customer credit

- Public orchestration
 - Mainly description of process flow in an external proces
 - Contains limited logic
 - Yes/No to question whether this customer should have credit
 - Can be difficult to decide which organization that should take on the responsibility
 - Leading industry player?
 - Government organization?
 - Industry federation?
 - Can be a huge responsibility

Orchestration in e-TL



- Registration og rights today and in the future
- **Service Orientation in Practice**
 - Business Event
 - Exposing business processes as services
 - External business process orchestrations
 - **Semantic Interoperability**
- **Conclusion**

- Semantic Web is the standards that supports semantic interoperability
 - An infrastructure that will ease the cooperation between services and application on the web
 - Removes the semantic barrier between applications
 - Supports integration of data from many different independent sources

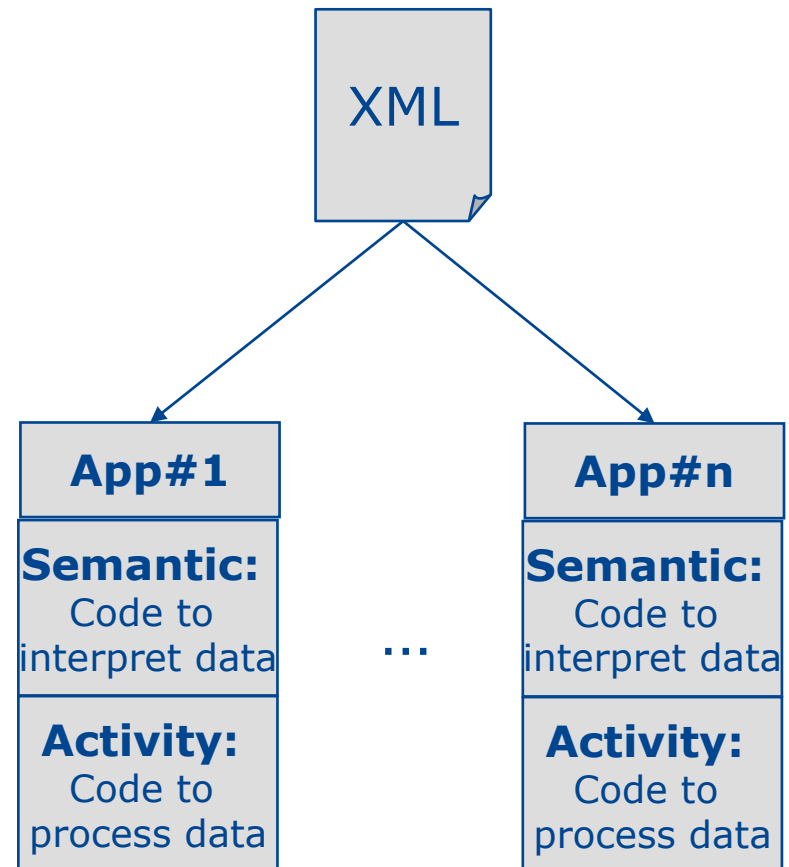
- Contains tools to ensure common understanding of information within a domain
 - Information at public organization
 - An industry domain
 - Within the organization
 - The understanding is accessible by machines

- Loosely coupled – Independent of underlying platform
 - Match the existing it-ecosystem

- Semantic Web is the glue that allows systems to communicate between organization borders

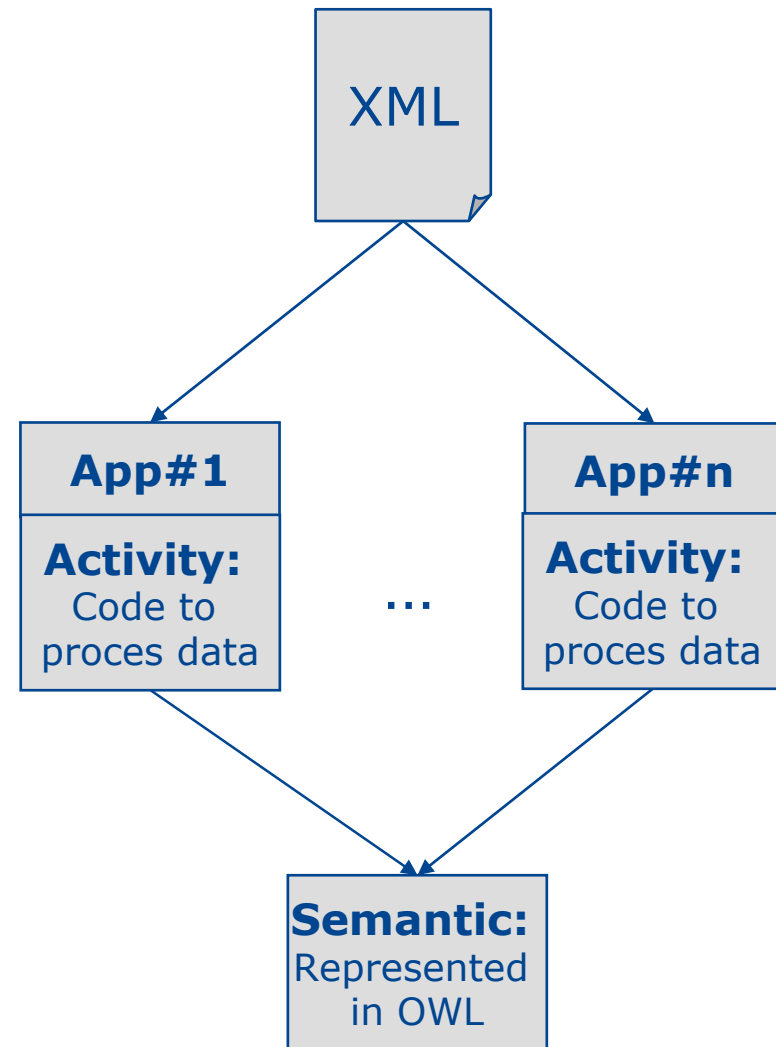
Why is Web Services not sufficient?

- Web Service standards focus on sharing functionality
 - Secure that information is send reliable from source to destination
 - Focus on the physical connection and the infrastructure to move data to the right place
 - XML and XML Schema describe the syntax for exchanging information
- The semantic/meaning of data is embedded in the programs logic
 - No shared understanding of the information
 - Application can contain their own interpretation
 - Double work
 - Dynamic adjustment is not possible



The semantic is placed in a loosely coupled layer outside the application

- Not embedded in the logic of individual programs
- Semantic Web standards focus on the logical information structure in a network
 - Meaningful exchange of separately produced information
 - Describe the meaning of the exchanged information
- Expressed in a XML-standardized ontology
 - Conceptual model accessible for machines (Standard is called OWL)
 - How to interpret information
 - Precise description of specific concepts and how they relate to other concepts



- All concepts described in a conceptual model
 - Agreed among all industry players
 - Not yet in OWL

- All elements registered in the governmental infostructurebase
 - As XSD
 - Support exchange and reuse of data related to public and private service delivery
 - Means everyone use the same elements
 - Important first step in semantic interoperability

- All registrations can contain additional metadata
 - For exchanging metadata according to an industry specific conceptual model

- Discussion of connecting it to the Danish Wordnet
 - Advisory board
 - WordNet® is a large lexical database. Synsets are interlinked by means of conceptual-semantic and lexical relations. The result is a network of meaningfully related words and concepts
 - Done in OWL
 - Should be extended with industry specific conceptual models
 - Wikipedia like extensions

- **Electronic Registration of Title to Land and Property:**
 - Is one of the most interesting governmental digitalization in Europe
 - Has impressive ROI
 - Significant cost reduction for Danish companies and citizens
 - Increase speed of when information is available to Danish companies
 - Is build according to the SOA book
 - Service oriented
 - Business Event Driven
 - Prepared for Semantic Interoperability

More information on www.e-TL.dk

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E-TL is designed for network data

- *“One single data source available for the whole network”*
 - No redundant data
 - All partners in the network acts on identical data
 - No double work

- E-TL is designed to access the data directly at the source using Web Services
 - Control civile registration number
 - Control company information
 - Verification of location of property
 - Ownership of car

- E-TL expose registration information as network data
 - Complete document is transmitted
 - Receiver can decide themselves what to use

- Recommendation
 - Network data should be a clear strategy for the public sector
 - All data that isn't part of your competitive advantage should be network data