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Internet of Services, SOA, & Semantics

Semantic Web Services Winter Retreat 2009

Seefeld, Austria

Graham Hench – STI International

Topics

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- **Future Internet**
- Internet of Services
- SOA
- Services
- Semantics
- Use cases

Big Picture

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What is the “Future Internet”?

Future Internet

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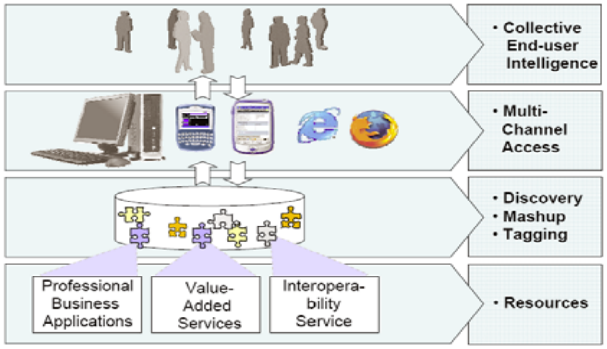
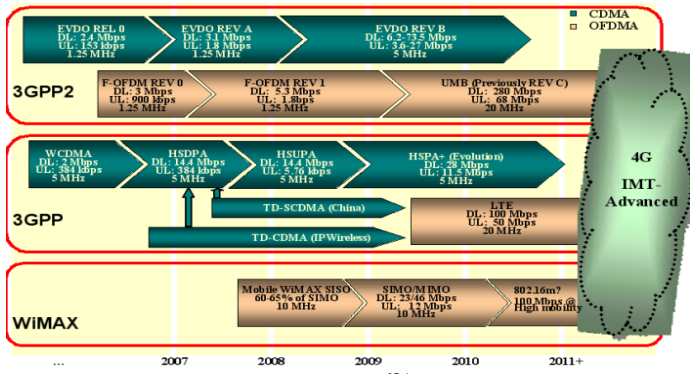
Internet of Services, Service Web



3D Internet

Trust



Networks of the Future

Security

Internet of Things

Future Internet: Simple Terms

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- Internet of Services, where services are ubiquitous;
- Internet of Things where in principle every physical object becomes an online addressable resource;
- Mobile Internet where 24/7 seamless connectivity over multiple devices is the norm;

- Need for semantics in order to meet the challenges presented by the dramatic increase in the scale of content and users.

Future Internet: Expectations

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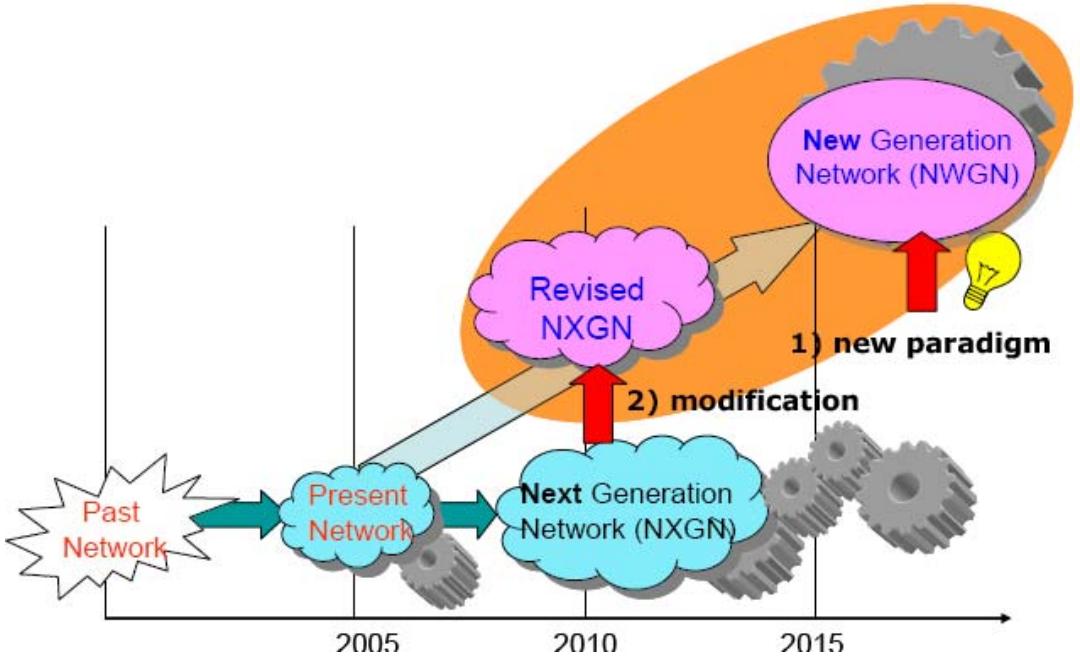
- **Open**
  - Status, size, nature of organisation; individual circumstances are no barrier
- **Scalable**
  - A platform which integrates billions or trillions of entities;
- **Dynamic and Proactive**
  - Services and service requesters may appear and disappear
  - Services should adapt smoothly
- **Decentralised**
  - New approaches to management are required in order to extract business value from utilisation
- **Partially predictable**
  - Size, dynamicity and distribution of coordination prohibits a predictable global behaviour
- **Perfectly Interactive**
  - Permanent, transparent, seamless, trustworthy

Japan



AKARI - New Generation Network (NWGN)

Europe/Japan Collaborative Efforts:

- This year: Cooperation Forum & Symposium – USA?

USA

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- **GENI** - develop a shared experimental facility (test-bed) for promoting research and development of new Internet architectures or network services. *Clean slate approach*
- **FIND** - comprehensive network architecture design research towards the establishment of the Internet architecture of the future
- **SING** - Another clean-slate approach to network design focusing upon communications, computing, signal processing and network science
- **NGNI** - development of both the information systems and the networking technologies

International Service Industry

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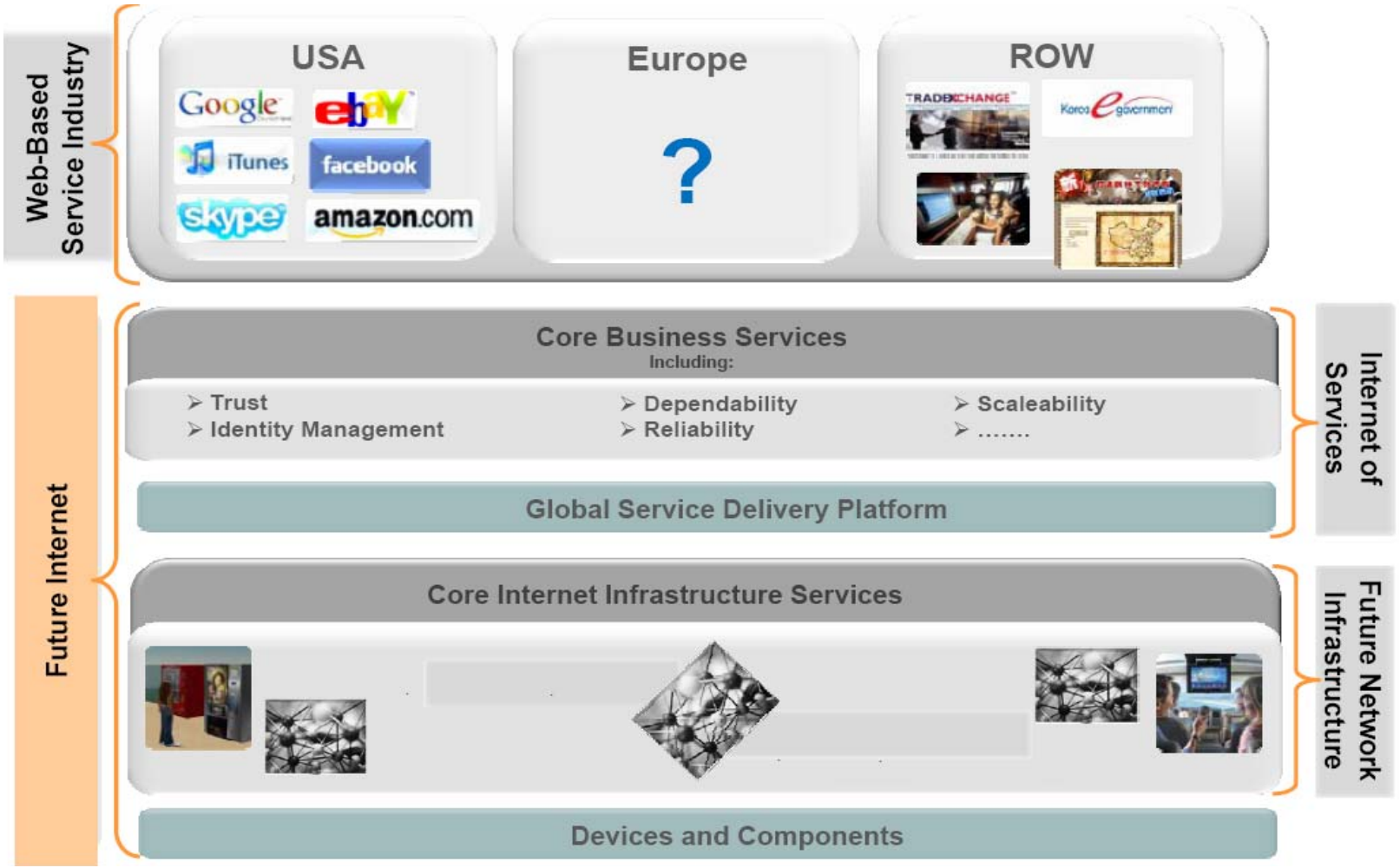

Future Internet

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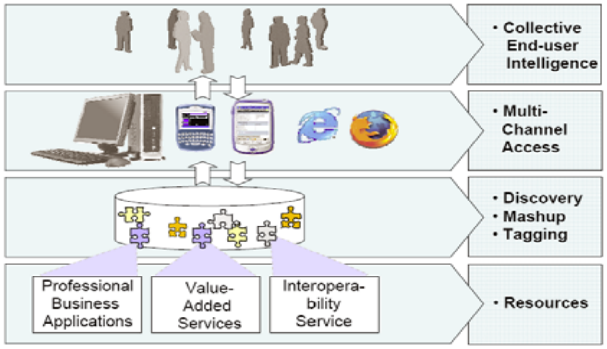
Internet of Services, Service Web



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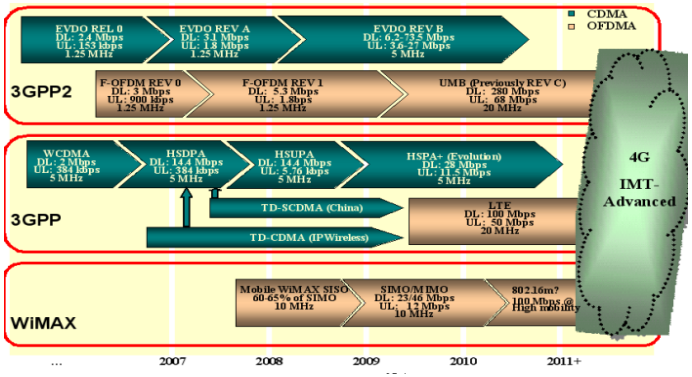
Trust

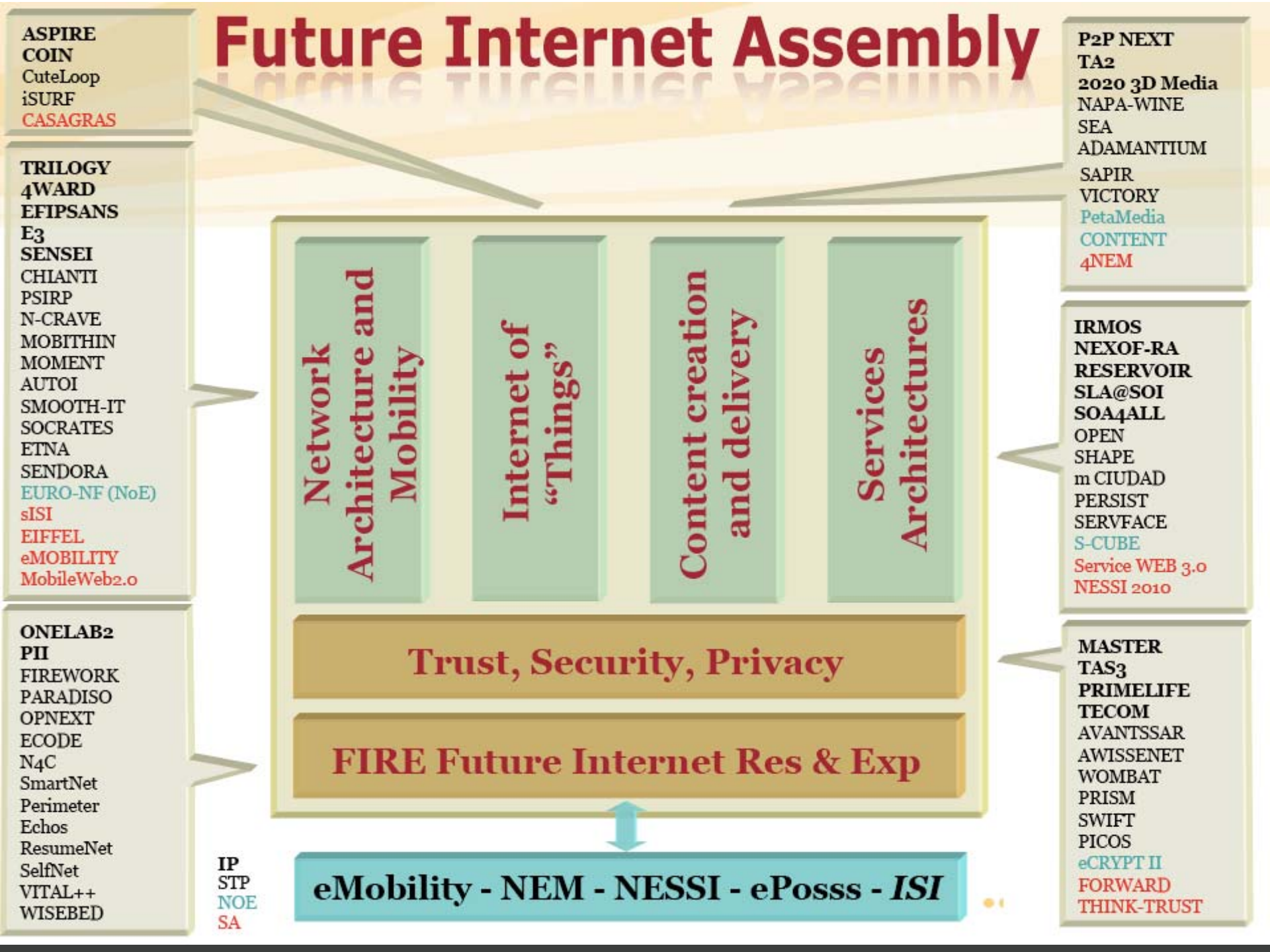


Networks of the Future

Security

Internet of Things

Future Internet Assembly



Future Internet:
Network Architecture & Mobility

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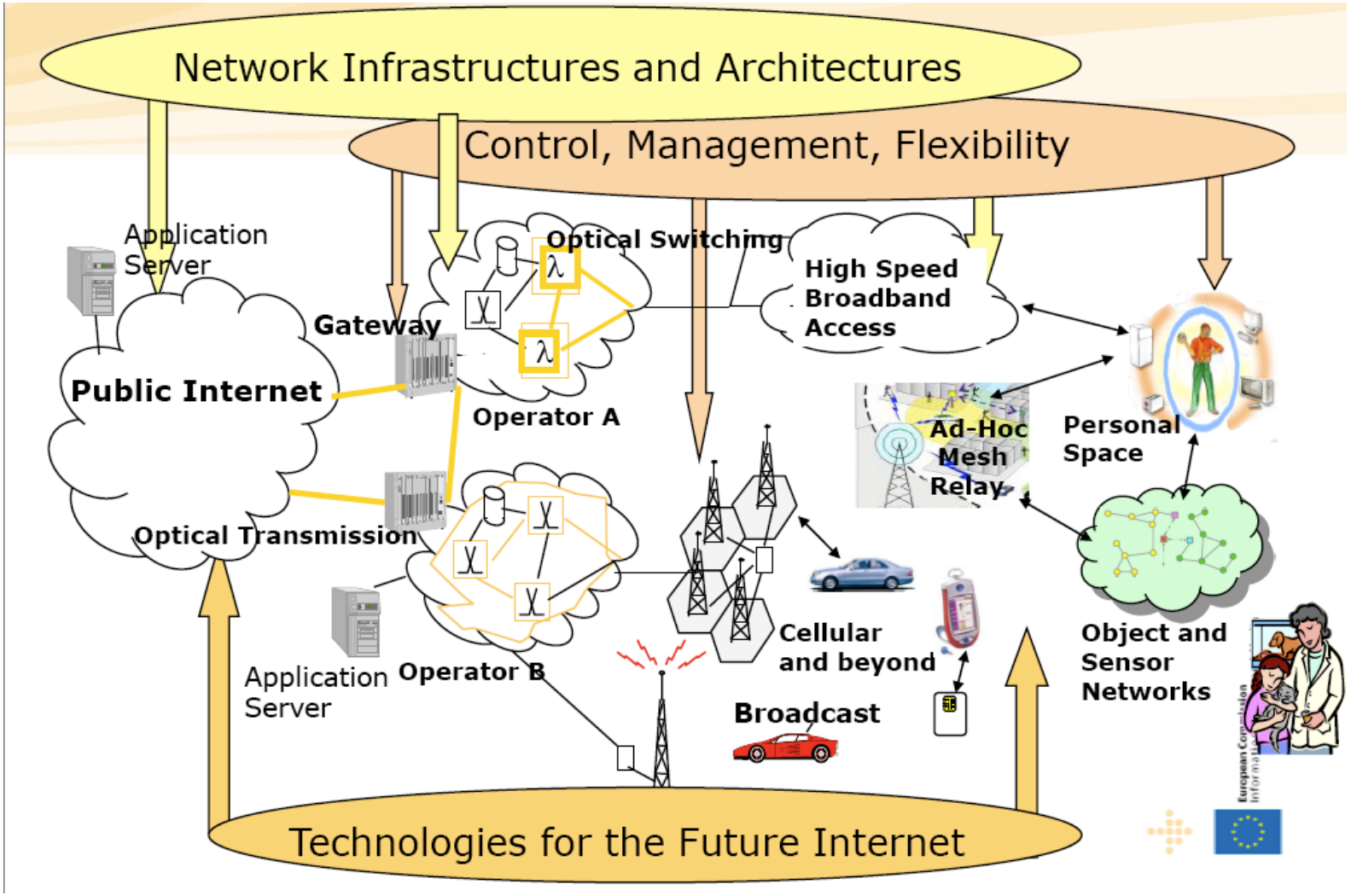

Future Internet:
Network Architecture & Mobility

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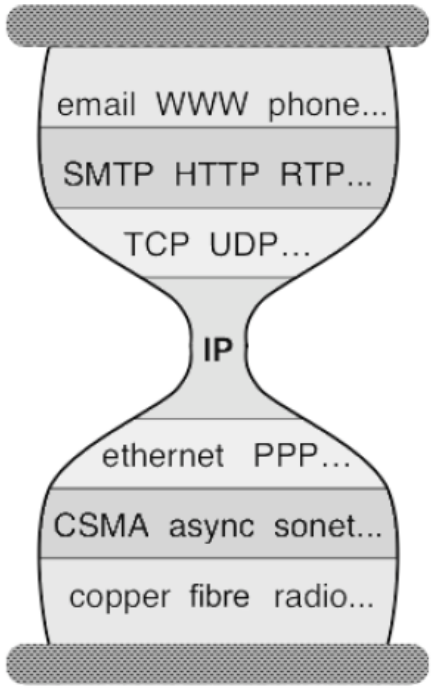

IP Bottleneck

Future Internet: Internet of Things

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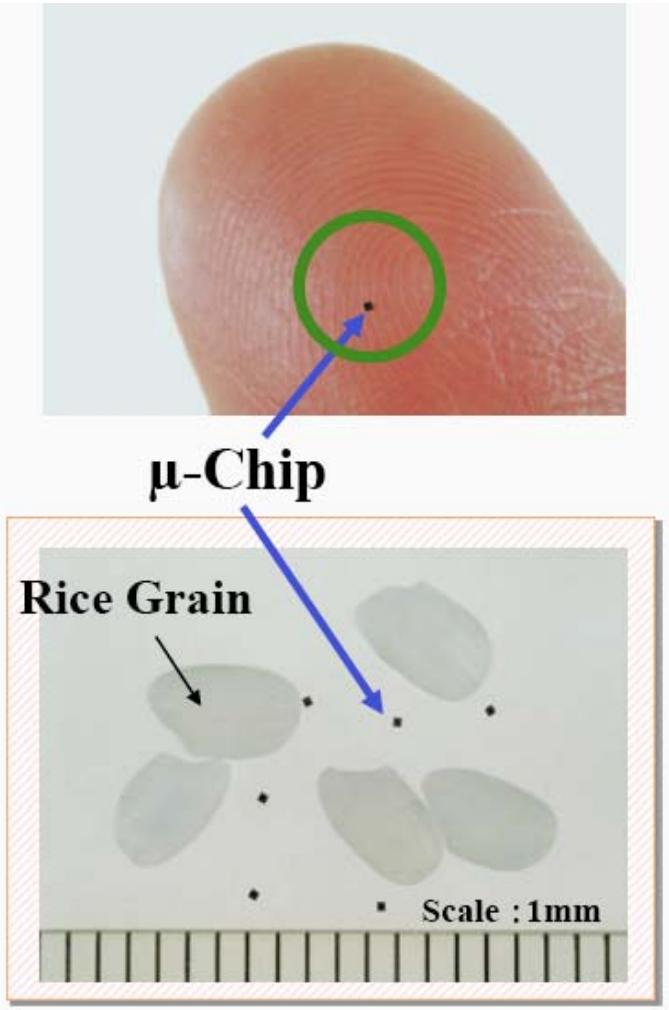
- Chip Size 0.4mm x 0.4mm
- Radio Frequency 2.45GHz
- ROM
- ID Data Length : 128bit
- ID written in Silicon Wafer
- Unique ID Assignment



Future Internet: Content Creation & Delivery

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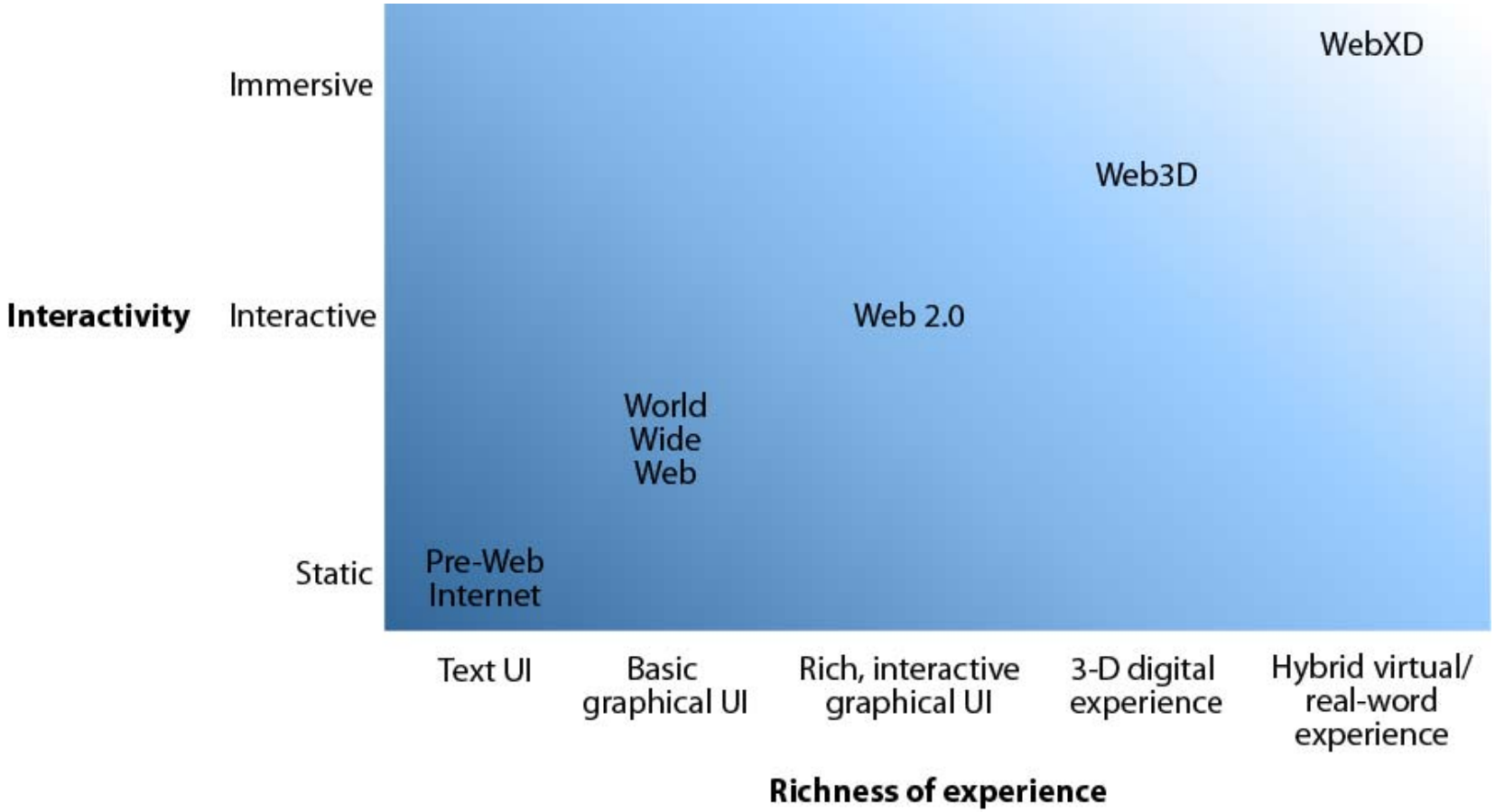
FORRESTER®

April 2008 **"Web3D: The Next Major Internet Wave"**

Evolution Of The Multidimensional Web



Future Internet: Services Architectures

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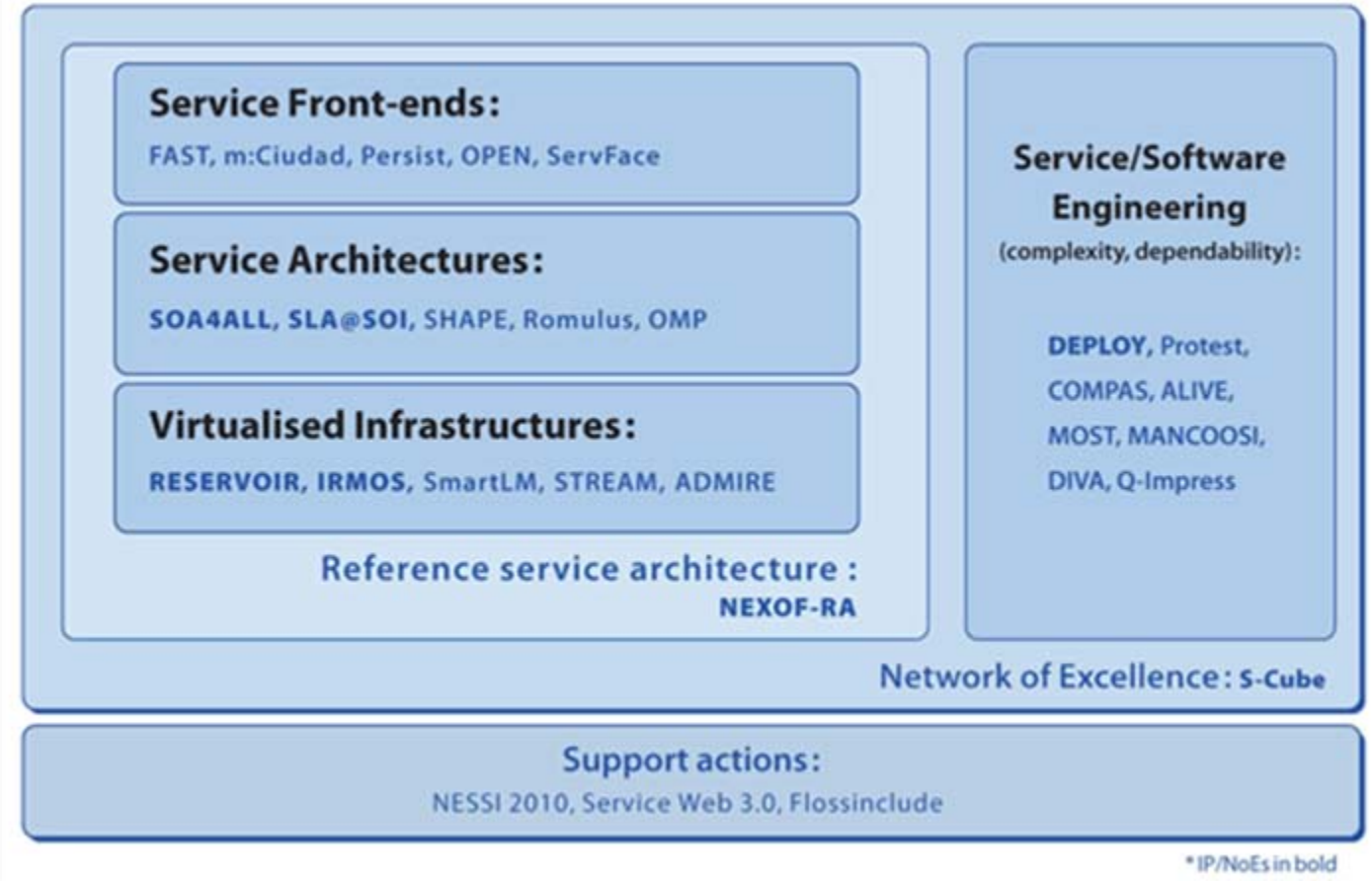

Future Internet: Trust, Security, Privacy

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Future Internet:
Trust, Security, Privacy

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Future Internet:
Trust, Security, Privacy

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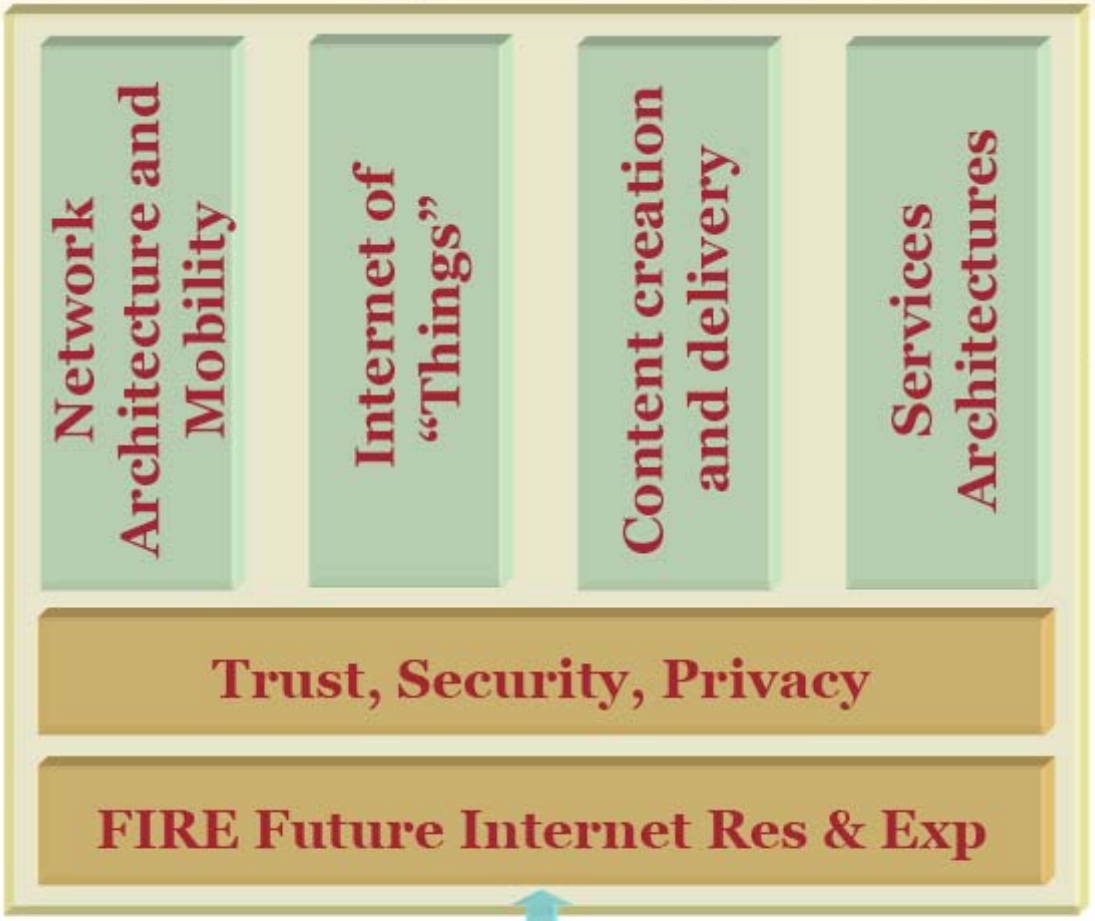
4oD uses peer to peer ("P2P") technology. This allows content to be transferred directly from the computers of users of the Service (rather than through a website or directory). If you download Content to your computer, during the License Period, we may upload this from your computer (using part of your upstream bandwidth) for the purpose of transferring Content to other users of the Service. Please contact your Internet Service Provider ("ISP") if you have any queries on this.

Future Internet Assembly



ASPIRE
COIN
CuteLoop
iSURF
CASAGRAS

TRILOGY
4WARD
EFIPSANS
E3
SENSEI
CHIANTI
PSIRP
N-CRAVE
MOBITHIN
MOMENT
AUTOI
SMOOTH-IT
SOCRATES
ETNA
SENDORA
EURO-NF (NoE)
sISI
EIFFEL
eMOBILITY
MobileWeb2.0

ONELAB2
PII
FIREWORK
PARADISO
OPNEXT
ECODE
N4C
SmartNet
Perimeter
Echos
ResumeNet
SelfNet
VITAL++
WISEBED

IP
STP
NOE
SA

P2P NEXT
TA2
2020 3D Media
NAPA-WINE
SEA
ADAMANTIUM
SAPIR
VICTORY
PetaMedia
CONTENT
4NEM

IRMOS
NEXOF-RA
RESERVOIR
SLA@SOI
SOA4ALL
OPEN
SHAPE
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PERSIST
SERVFACE
S-CUBE
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NESSI 2010

MASTER
TAS3
PRIMELIFE
TECOM
AVANTSSAR
AWISSENET
WOMBAT
PRISM
SWIFT
PICOS
eCRYPT II
FORWARD
THINK-TRUST

Topics

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- Future Internet ✓
- **Internet of Services**
- SOA
- Services
- Semantics
- Use cases

Internet of Services

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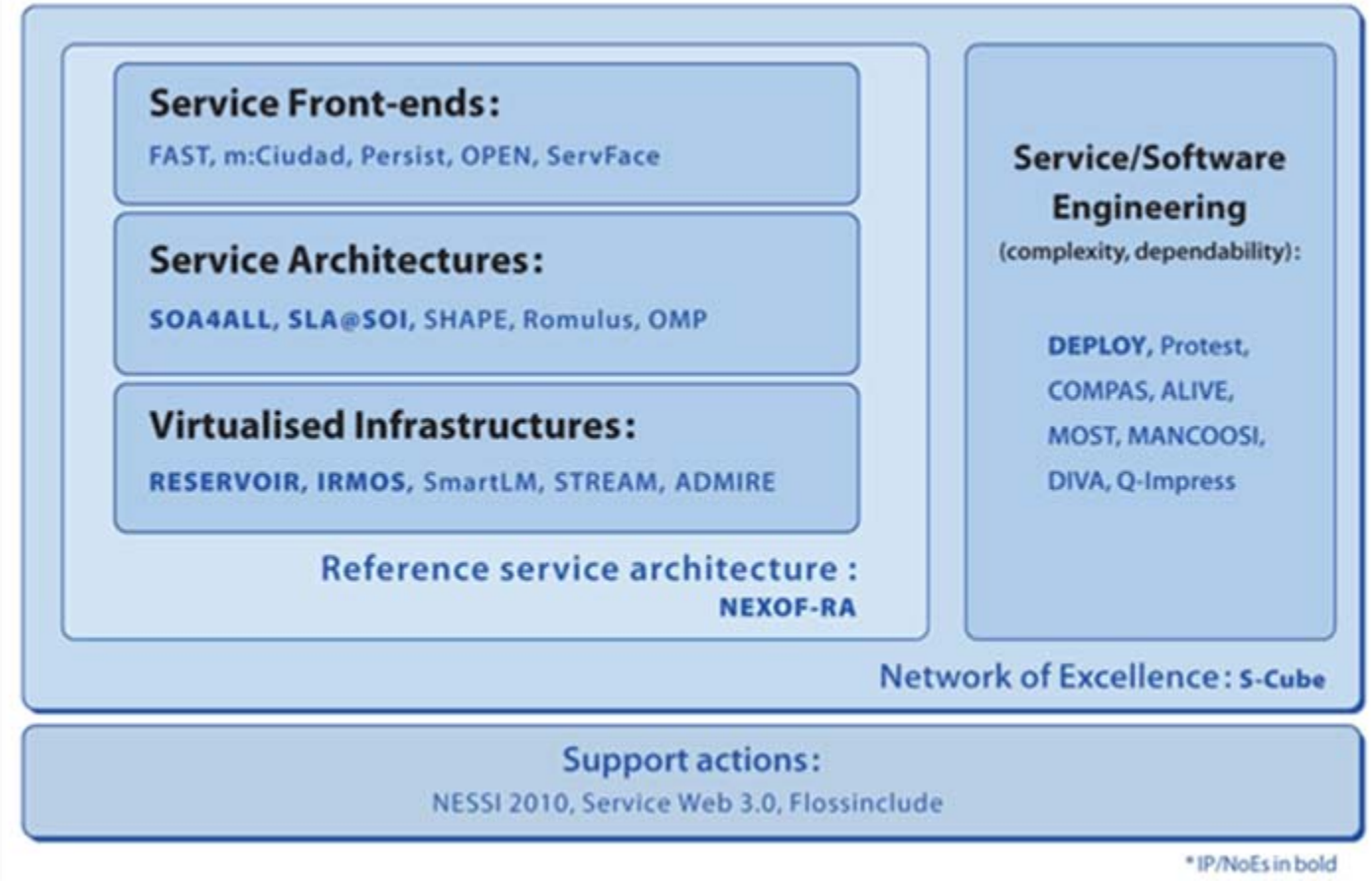

Internet of Services

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- Service Front-ends
  - Automatic service discovery, description, composition, negotiation; SLA QoS; access rights
- Service Architectures
  - Robust, scalable, open
- Service and Software Engineering
  - Methods and tools for faster development
  - Higher-quality lower-cost services.
- Virtualized Infrastructures
  - Abstraction over different platforms

Internet of Services

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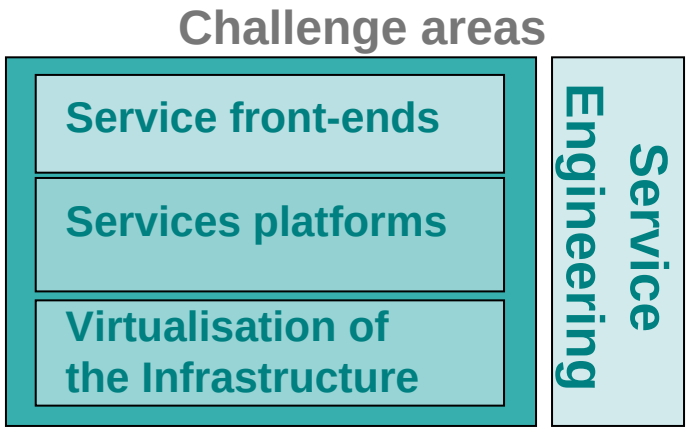
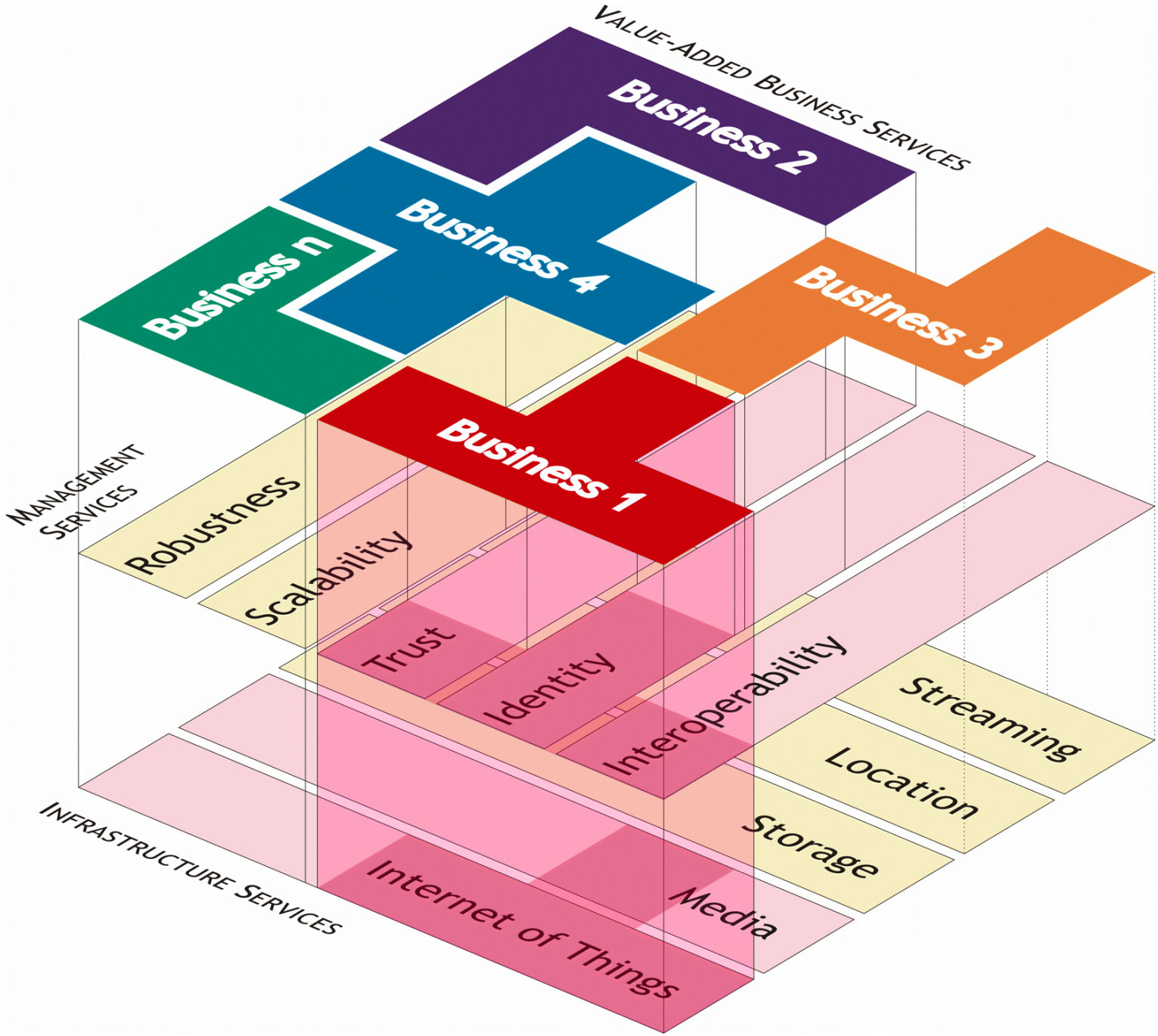
- **Openness** – everybody can act as a provider or consumer of services.
- **Heterogeneity** – services are created in isolation from one another thus interoperability is an issue.
- **Distributedness** – there is no central control of services. Services can appear, change or disappear at any time in an uncontrolled fashion.
- **Scalability** – with so many services available on the Internet of Service, the Human may become the bottleneck.

Questions: Software and Service Challenges

- What will be in the network and what in the service layer? How will content and media impact be addressed?
- How do we address the likely architectural differences between Telecoms, Media and IT service cultures?
- Is there scope for an open service framework? What are the security and trust implications? How to best address standards issues?
- How will we personalise and contextualise applications for individuals and empower them to compose their own services?
- Do we need to rethink current business processes in light of the upcoming Internet of Things? What are the implications from a service architecture perspective?
- Will this lead to a lowering of the barriers for service development and the repositioning of industrial players or opportunities for new players?




Value-Added Business Services
Business 2
Business 4
Business n
Business 3
Business 1
Management Services
Robustness
Scalability
Trust
Identity
Interoperability
Streaming
Location
Storage
Media
Internet of Things
Infrastructure Services

Where are we now?

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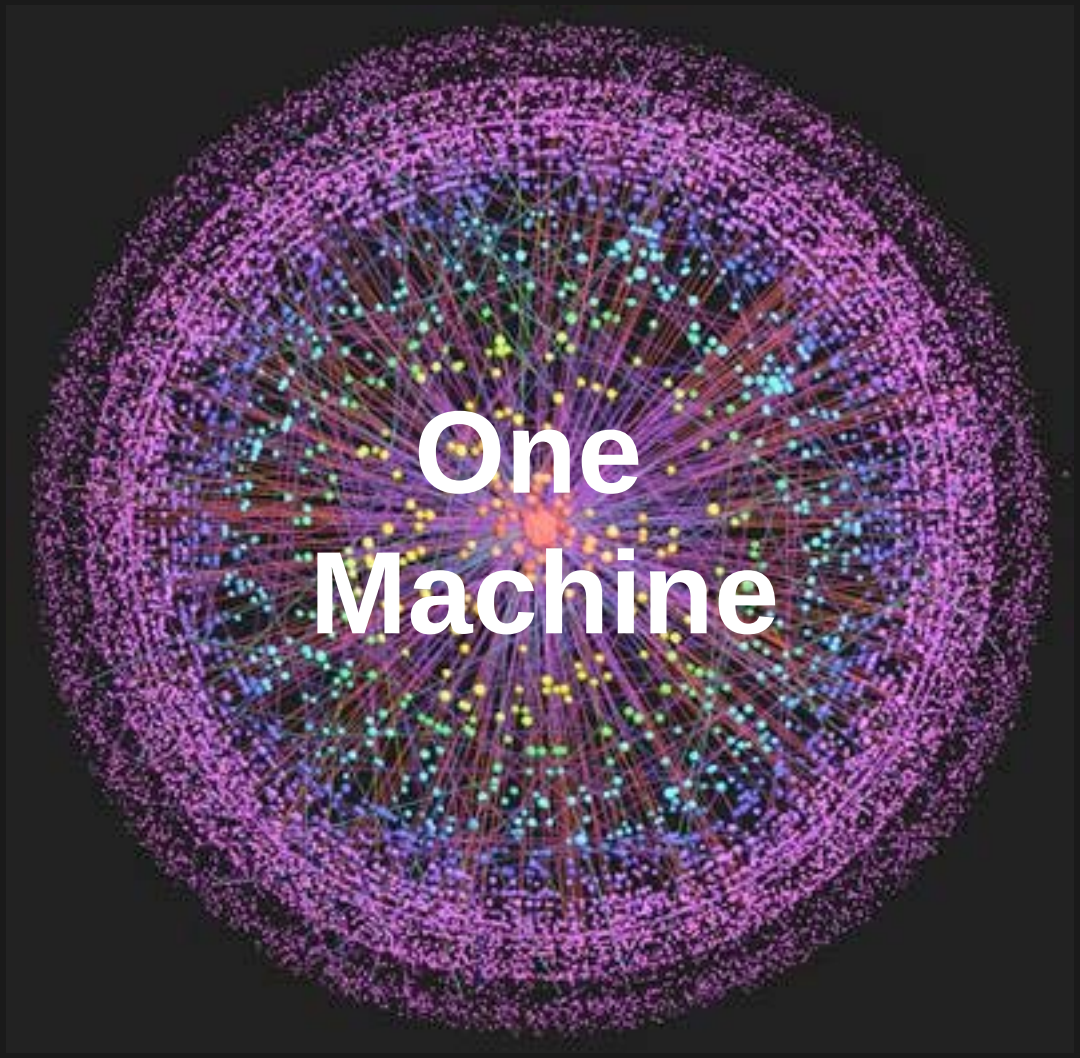
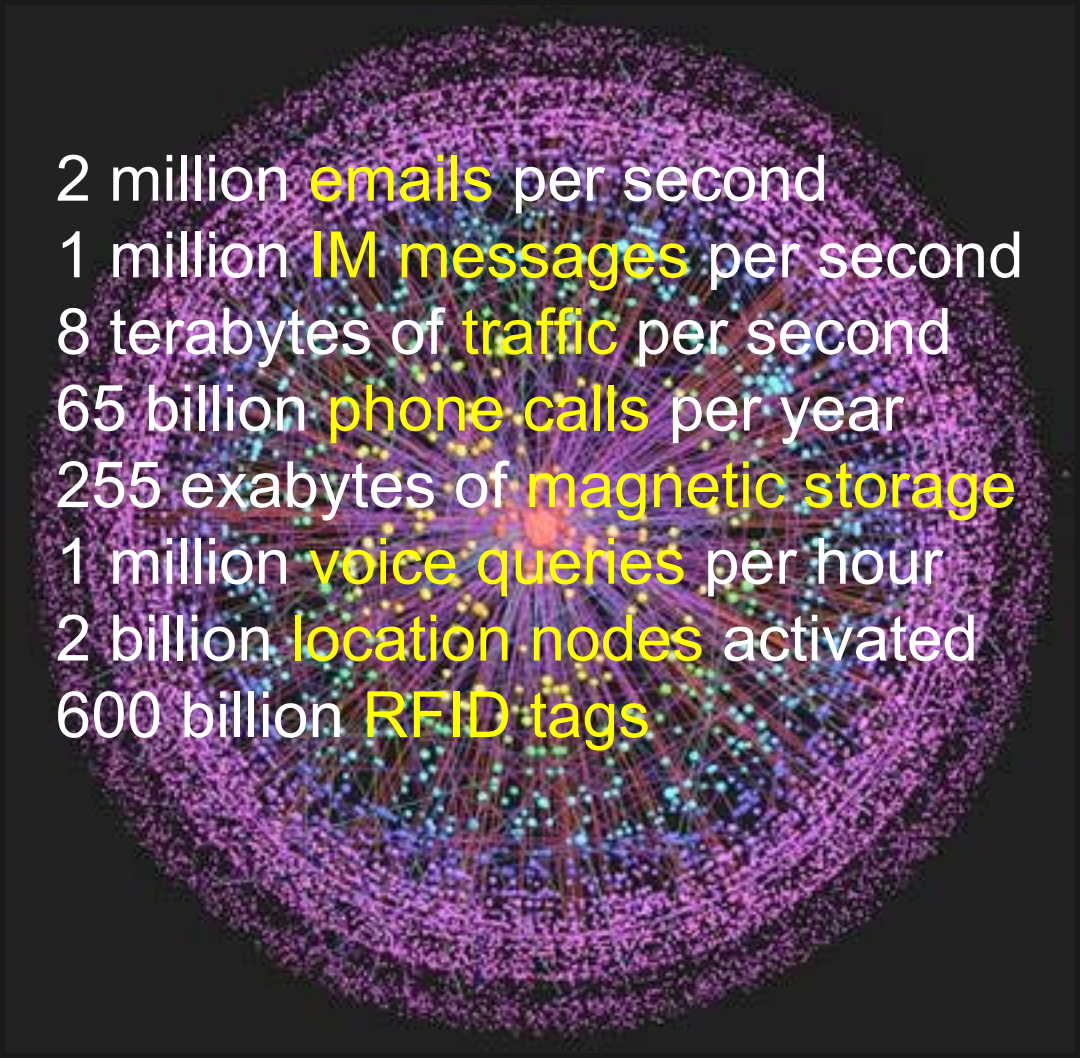
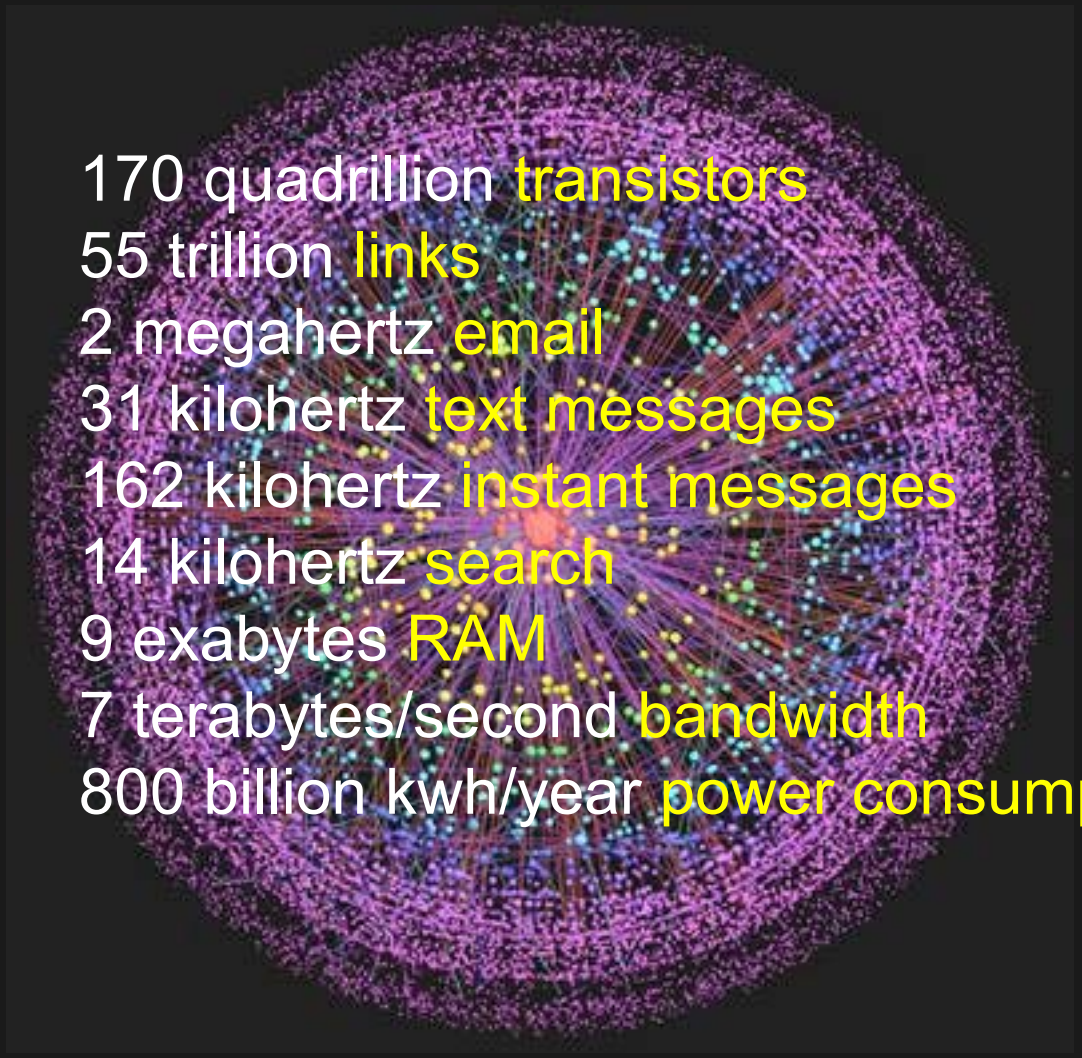
- Internet =
  - *Urgent necessity to redesign the Internet, taking a broad multidisciplinary approach, to meet Europe's societal and commercial ambitions.*
    - » The BLED Declaration - European Commission
  - *With over a billion users, today's Internet is arguably the most successful human artifact ever created.*
    - » Service Web 3.0 & STI International
  - *One global machine – the most reliable machine ever made.*
    - » Kevin Kelly – Executive Editor Wired Magazine

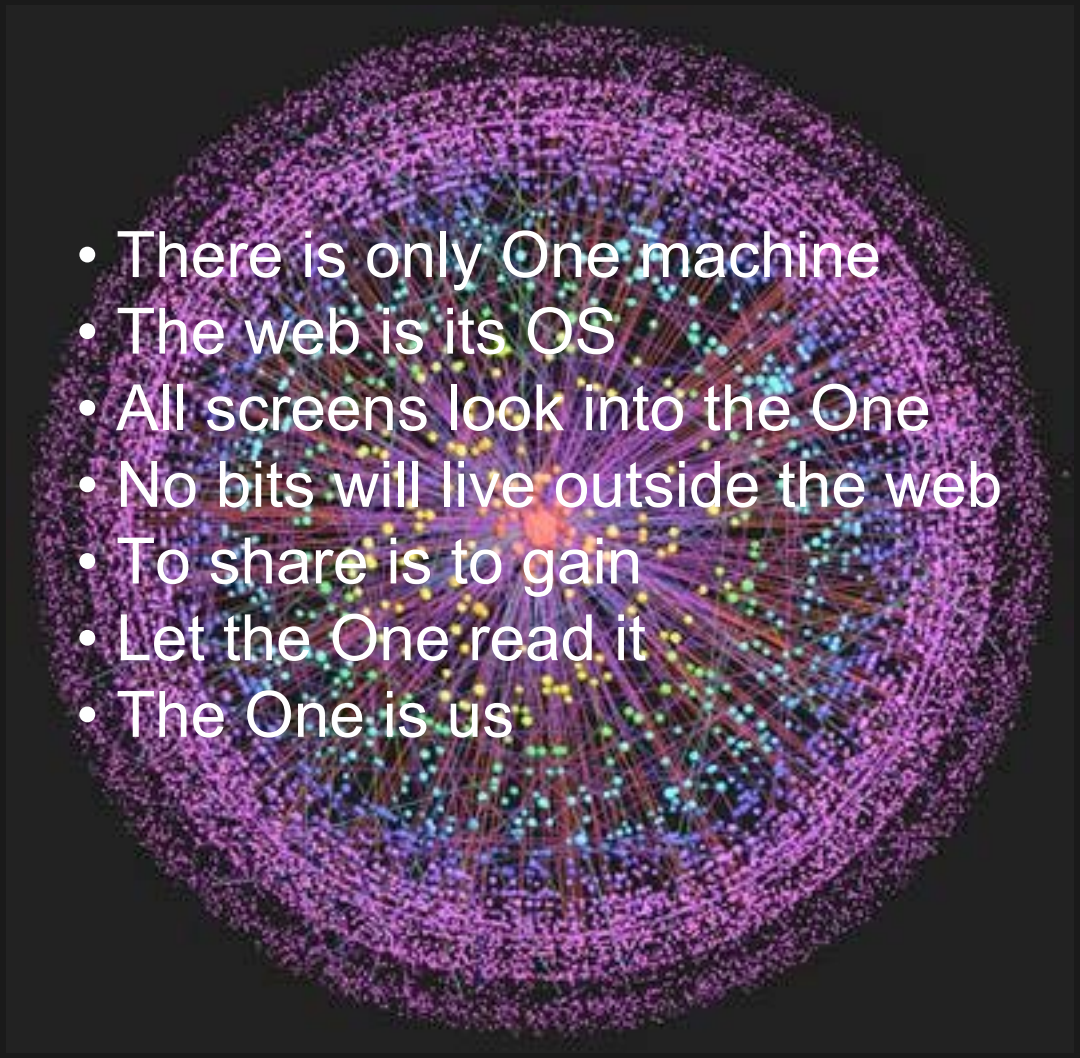

One
Machine



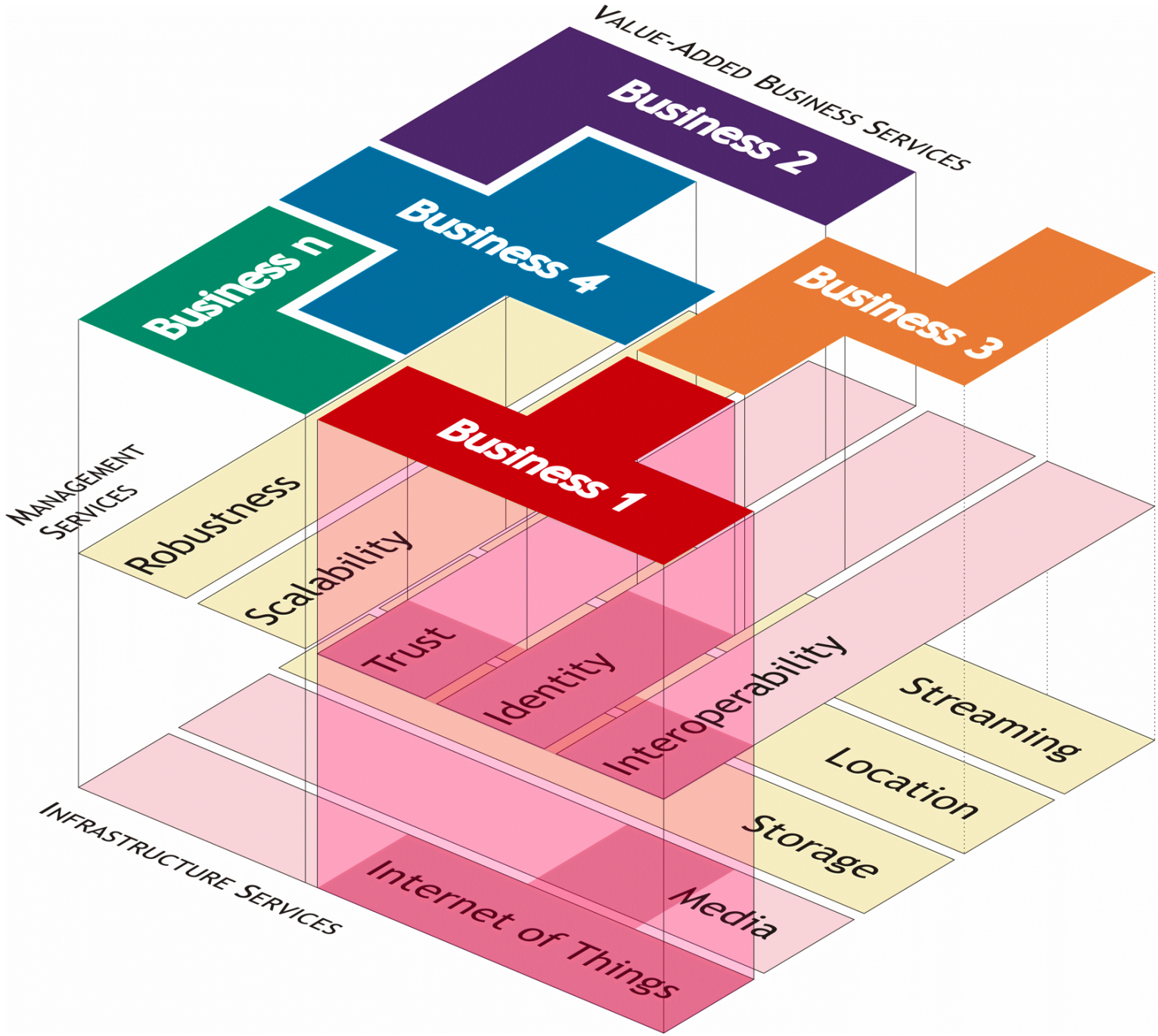
... all of which only uses 5% of global electricity



Specifications of the *One Machine*



Kevin Kelly’s predictions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Topics

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- Future Internet ✓
- Internet of Services ✓
- **SOA**
- Services
- Semantics
- Use cases

SOA - Defined

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- *"A set of components which can be invoked, and whose interface descriptions can be published, discovered and invoked over a network."(W3C)*

  » http://www.w3.org/

SOA – Further Defined

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- *The policies, practices, frameworks that enable application functionality to be provided and consumed as sets of services published at a granularity relevant to the service consumer. Services can be invoked, published and discovered, and are abstracted away from the implementation using a single, standards-based form of interface. (CBDI) www.cbdiforum.com*

SOA

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- Web services offer a technological means for exposing functionality on the Web
- Very easy to create bad Web services
  - Wrong granularity
  - Wrong abstraction
  - Wrong generality
  - Not decoupled
- SOA is a paradigm for building applications from Web services to achieve business goals but…

SOA

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- It is also a discipline ensuring services are right for consumer and producer
  - Reduces the effort of integration
  - Minimizes the impact of change
  - Delivered at appropriate levels of granularity, abstraction and generality

SOA Model

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- Service provider - Provides software applications for specific needs as services.
- Service requester - A requester could be a human user/application program/another service accessing the service through a desktop or a wireless browser; it could be an application program.
- Service broker - A service broker provides a searchable repository of service descriptions. Examples of service brokers are UDDI (Universal Description, Discovery, and Integration).

Topics

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The Rise of the Service Economy

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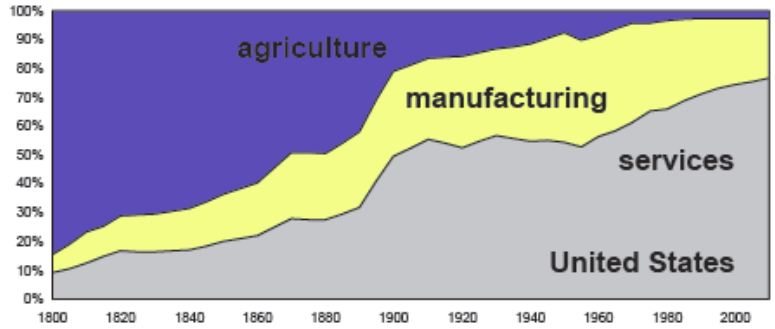

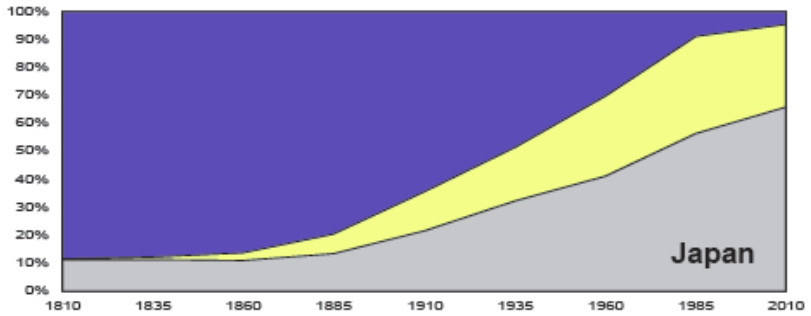

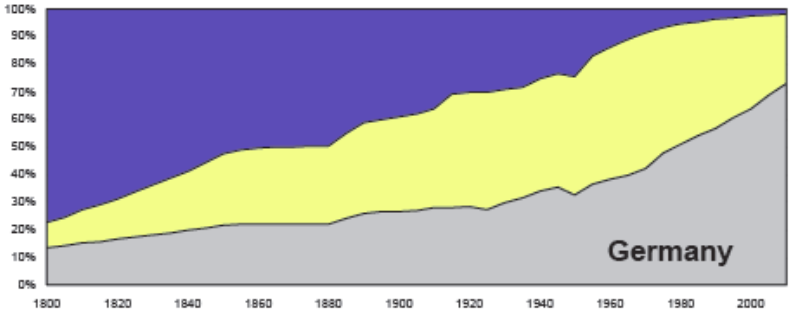

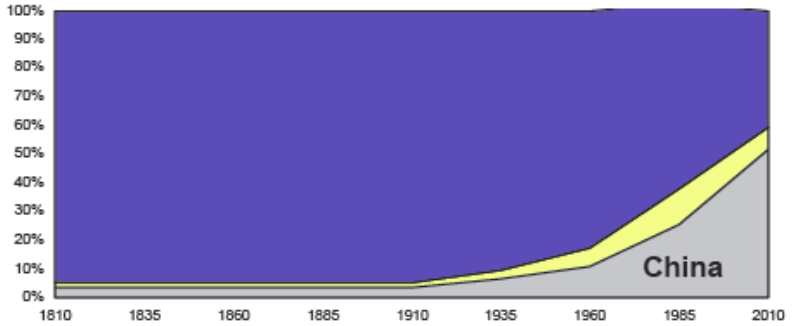

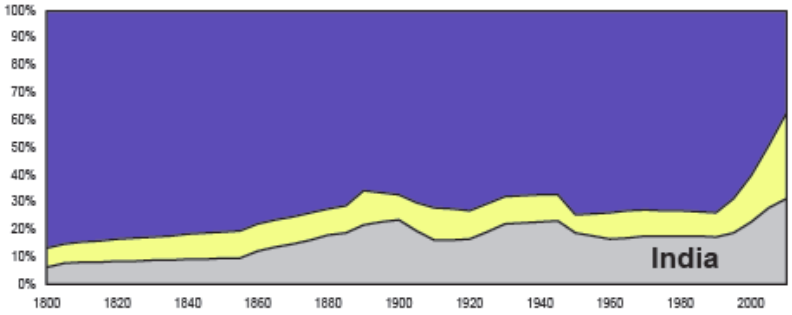

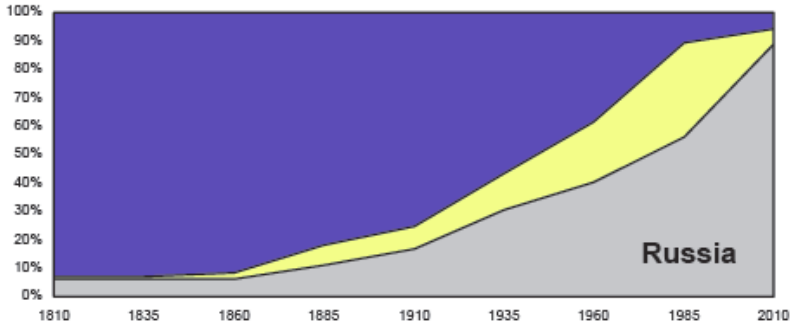

Services

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- Wide range of services:
  - Communication Service
  - Ticket Reservation Service
  - Transport Service
  - Information Service
  - Finance Service
  - E-government Service

But what is a Service?

What is a service?

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Main Entry: ser·vice

Function: *noun*

Etymology: Middle English, from Anglo-French *servise,* from Latin *servitium* condition of a slave, body of slaves, from *servus* slave

1 a: the occupation or function of serving <in active *service*> b: employment as a servant <entered his *service*>

2 a: the work performed by one that serves <good *service*> b: help , use , benefit <glad to be of *service*> c: contribution to the welfare of others d: disposal for use <I'm entirely at your *service*>

3 a: a form followed in worship or in a religious ceremony <the burial *service*> b: a meeting for worship —often used in plural <held evening *services*>

4: the act of serving: as a: a helpful act <did him a *service*> b: useful labor that does not produce a tangible commodity —usually used in plural <charge for professional *services*> c: serve

5: a set of articles for a particular use <a silver tea *service*>

6 a: an administrative division (as of a government or business) <the consular *service*> b: one of a nation's military forces (as the army or navy)

7 a: a facility supplying some public demand <telephone *service*> <bus *service*> b: a facility providing maintenance and repair <television *service*>

8: the materials (as spun yarn, small lines, or canvas) used for serving a rope

9: the act of bringing a legal writ, process, or summons to notice as prescribed by law

10: the act of a male animal copulating with a female animal11: a branch of a hospital medical staff devoted to a particular specialty <obstetrical *service*>

Merriam-Webster Online, http://www

What is a service?

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- For different people the term Service has different meaning:
- **In Computer Science:**
  - the terms service and Web service are often regarded as interchangeable to name a software entity accessible over the Internet.
  - a service is seen software system designed to support interoperable machine-to-machine interaction over a network

What is a service?

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- **In Business and Economics:**
  - a service is seen as a business activity that often results in intangible outcomes or benefits
  - a service is the non-material equivalent of a good. Service provision has been defined as an economic activity that does not result in ownership, and this is what differentiates it from providing physical goods.
  - a process that creates benefits by facilitating either a change in customers, a change in their physical possessions, or a change in their intangible assets.

Service vs. Web Service

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- Service
  - A provision of value in some domain (not necessarily monetary, independent of how service provider and requestor interact)
- Web Service
  - Computational entity accessible over the Internet (using Web Service Standards & Protocols), provides access to (concrete) services for the clients.

Service properties

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- *Functional*
  - contains the formal specification of ***what*** exactly the service can do.
- *Behavioral*
  - ***how*** the functionality of the service can be achieved in terms of interaction with the service and as well in terms of functionality required from the other Web services.
- *Non-functional properties*
  - captures constraints over the previous mentioned properties

Service related tasks

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- **Discovery:** "*Find services that matches to the service requester specification*" .
- **Selection and Ranking**: "*Choose the most appropriate services among the available ones*"
- **Composition**: "*Assembly of services based in order to achieve a given goal and provide a higher order of functionality*".
- **Mediation**: *"Solve mismatches among domain knowledge used to describe the services, protocols used in the communication, data exchanged in the interaction (types used, and meaning of the information) and business models of the different parties".*
- **Execution**: "*Invocation of a concrete set of services, arranged in a particular way following programmatic conventions that realizes a given task*".
- **Monitoring**: "*Supervision of the correct execution of services and dealing with exceptions thrown by composed services or the composition workflow itself*".
- **Handover**: "*Replacement of services by equivalent ones, which solely or in combination can realize the same functionality as the replaced one, in case of failure while execution*".

Service Lifecycle

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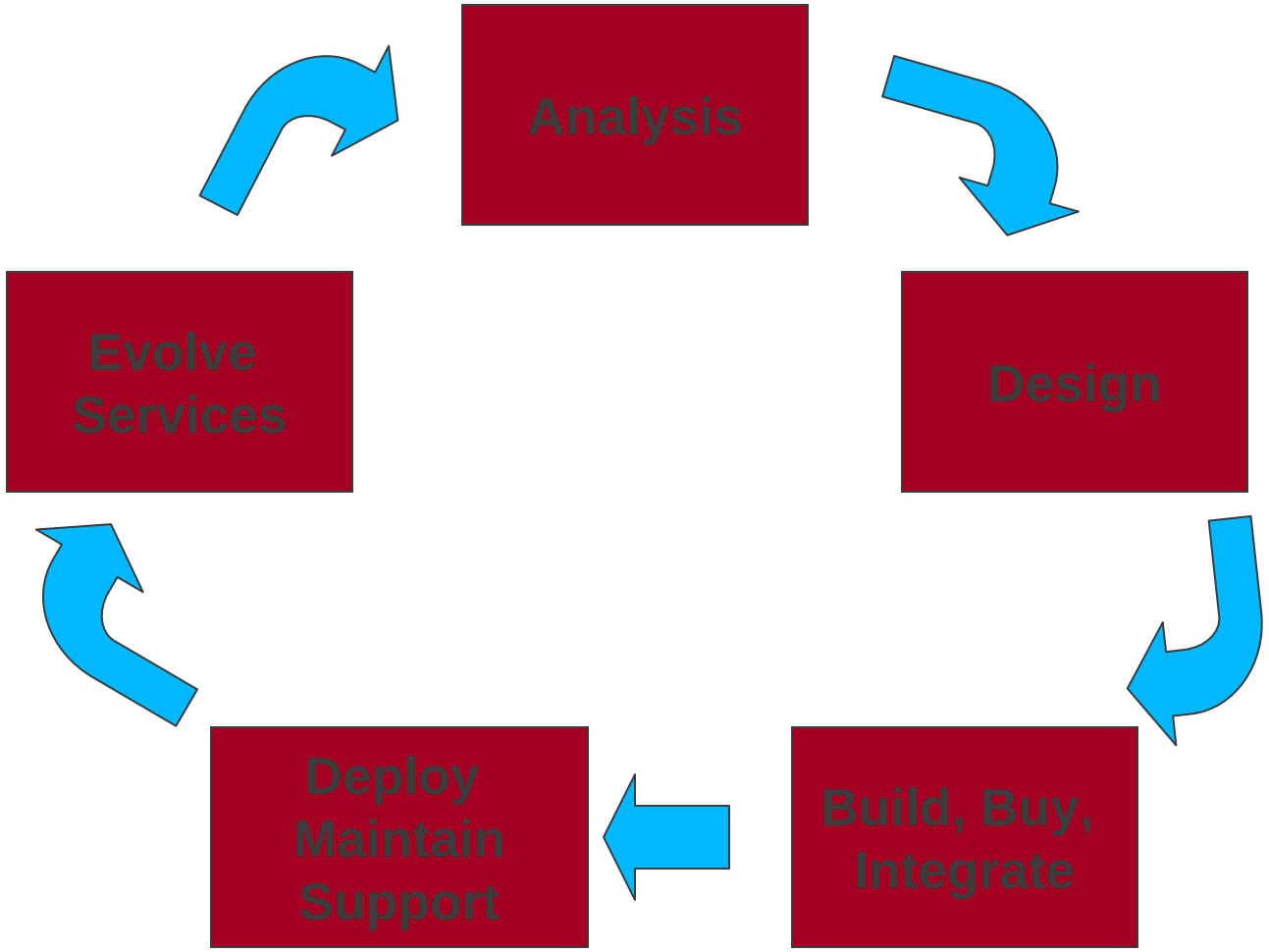

Topics

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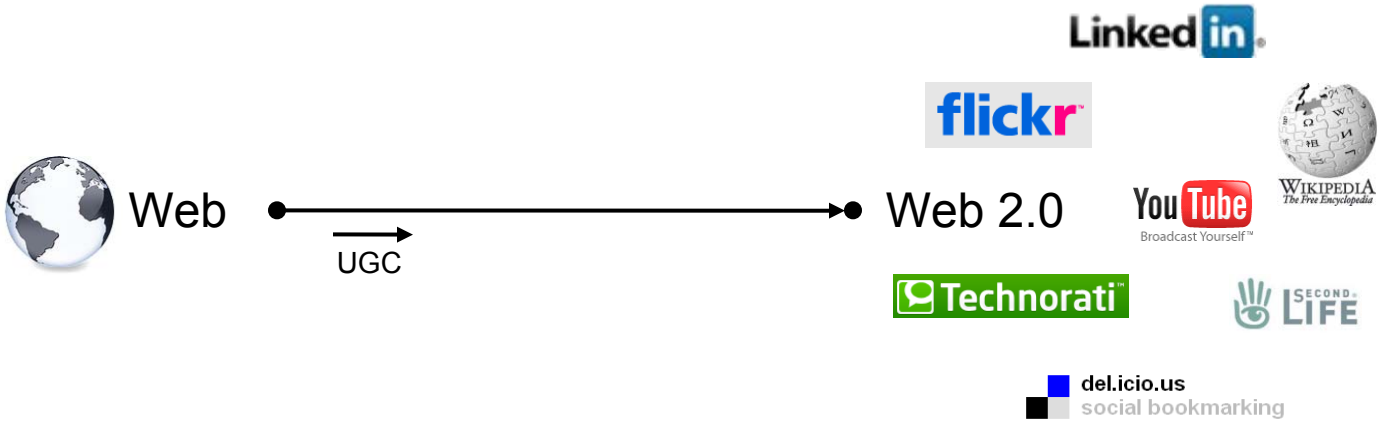
- **Semantics**
- Use cases

Web 2.0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UGC
Web 2.0
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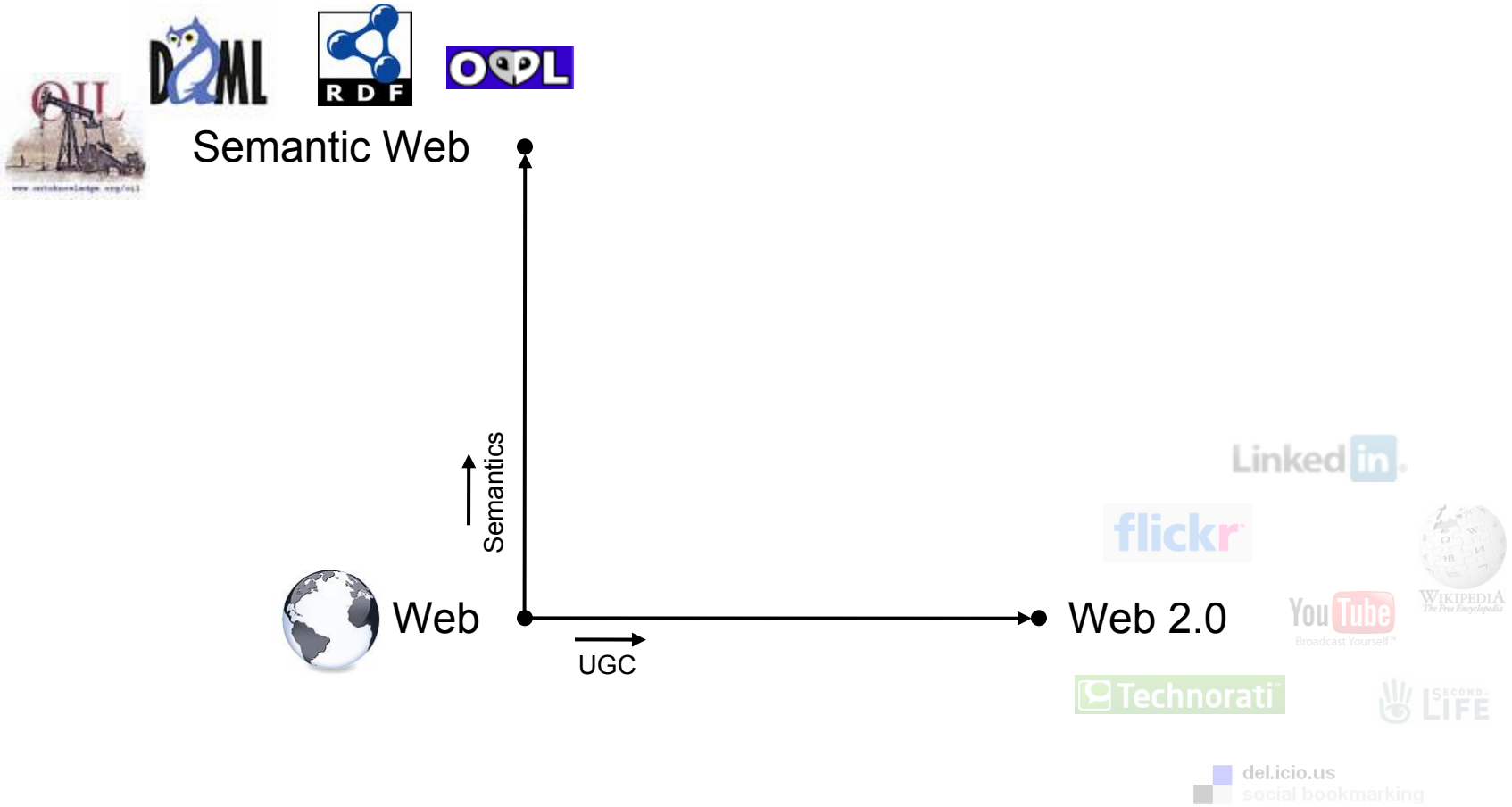
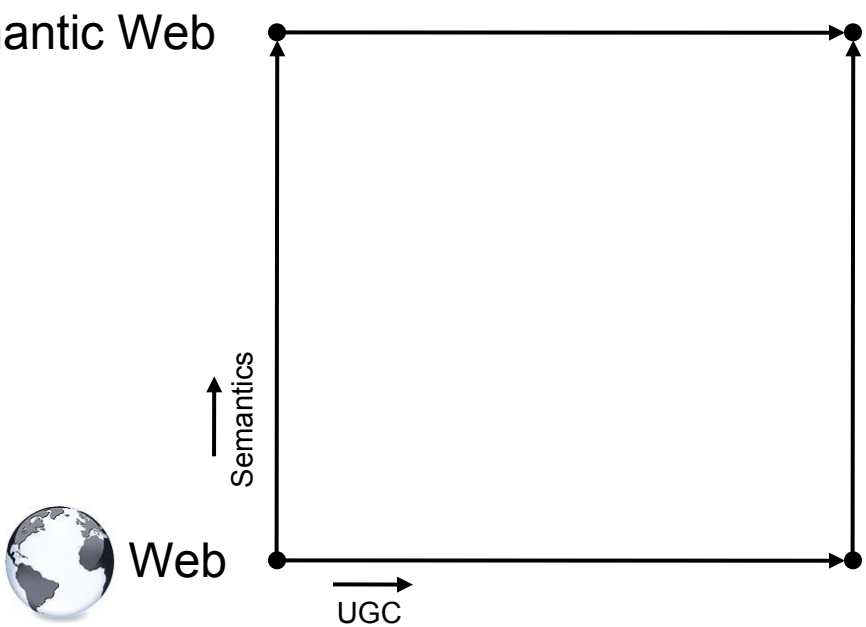
flickr
WIKIPEDIA
The Free Encyclopedia
YouTube
Broadcast Yourself™
Technorati
SECOND LIFE
del.icio.us
social bookmarking

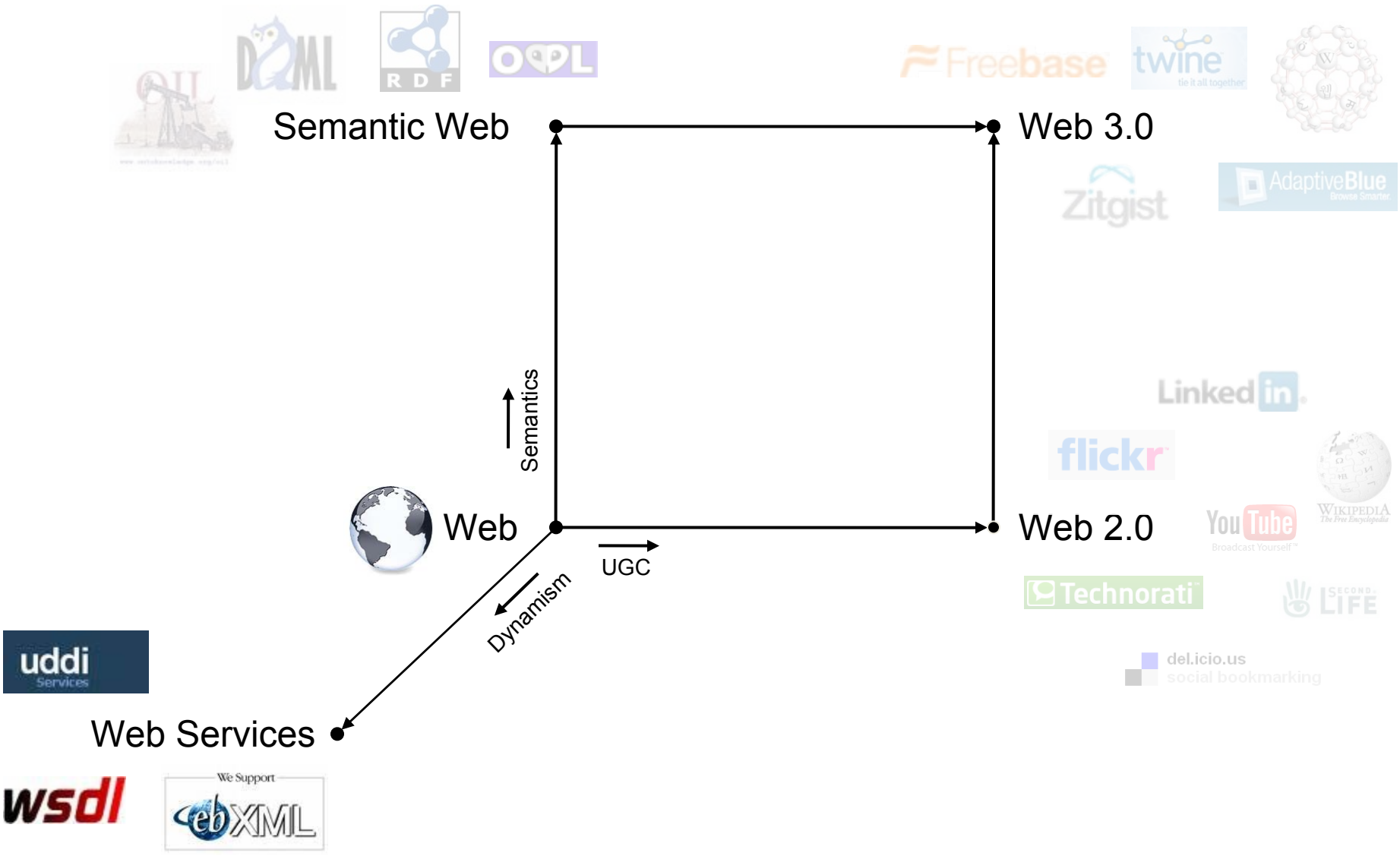
Semantic Web



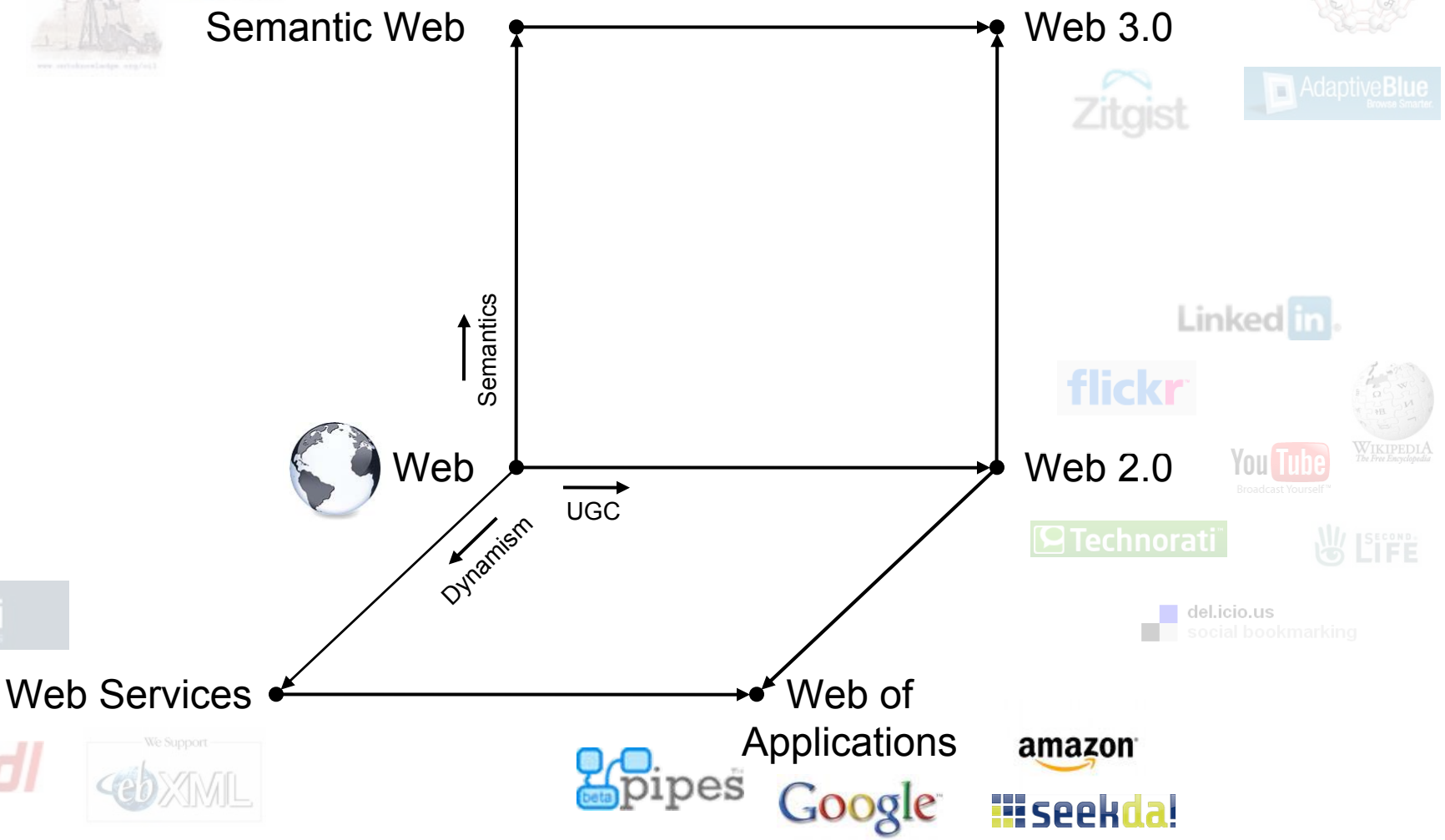
Web 3.0



Web Services



A Web of Applications

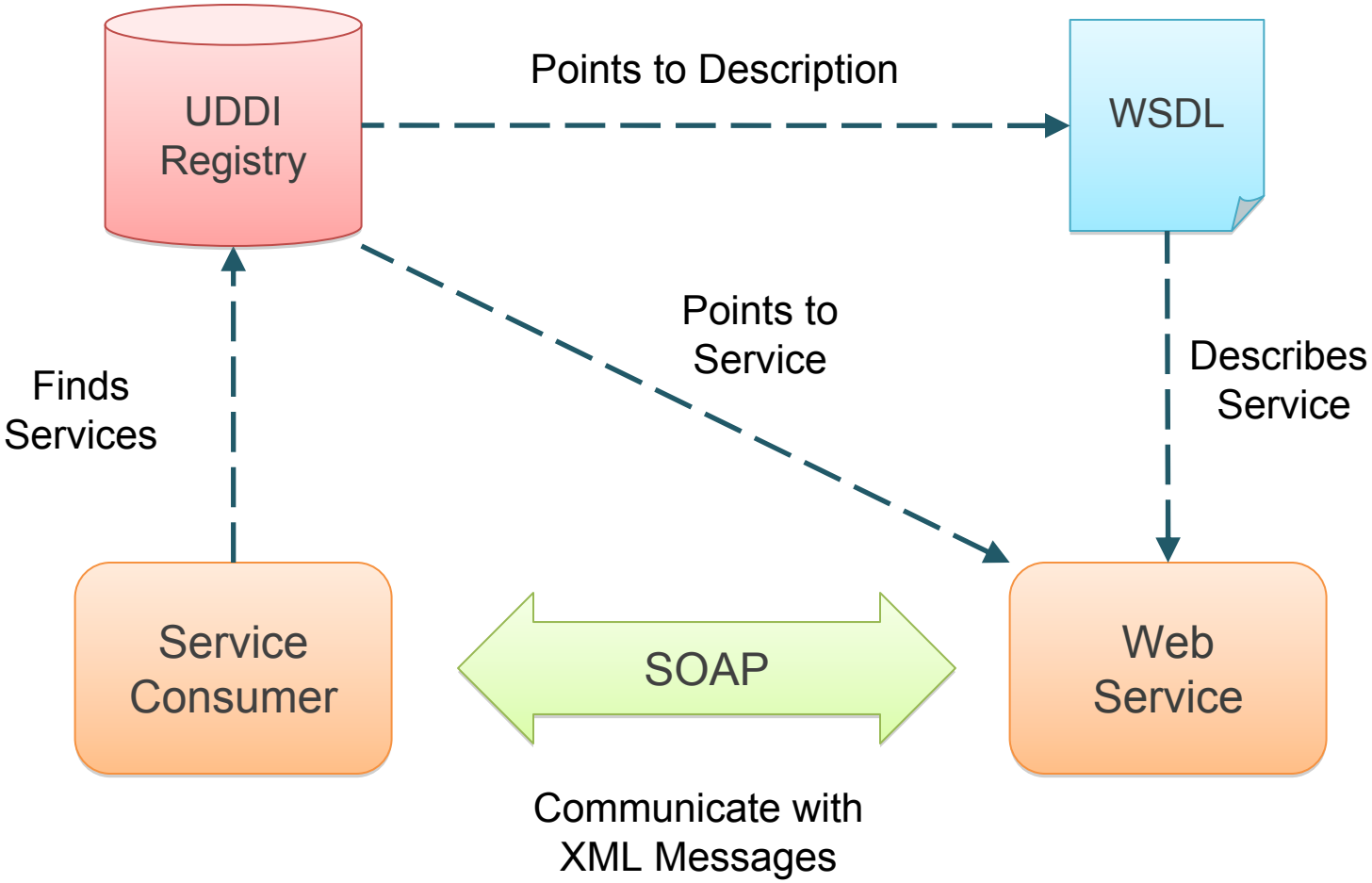


Web services

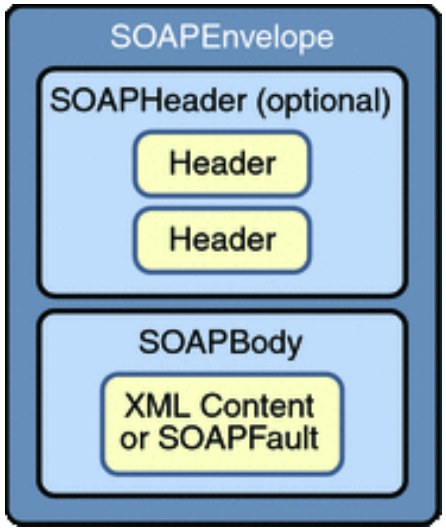
STI · INNSBRUCK

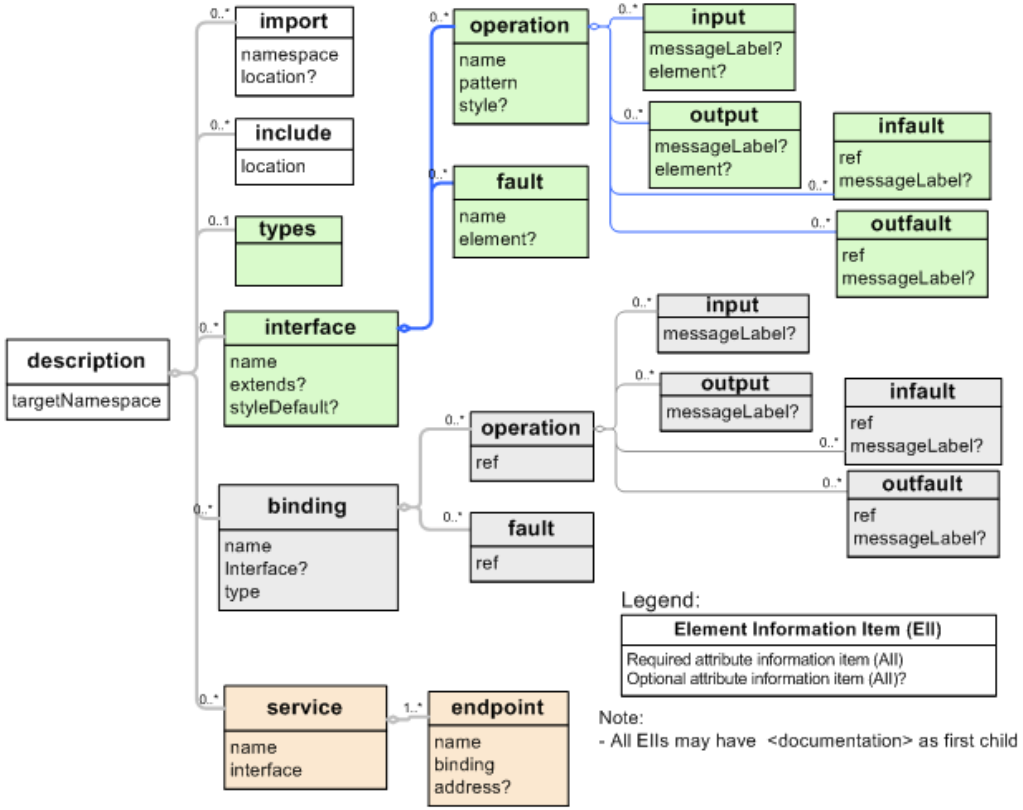
- Bring the computer back as a computational entity on the Web
- Discrete pieces of functionality exposed for consumption
- Aim of Web services:
  - Platform independence
  - Loose coupling
  - Facilitate reuse
  - Reduce maintenance costs and impact of change
  - Consistent approach to integration
  - Reduce integration costs
- Two main approaches to services
  - WSDL/SOAP services
  - Restful services

WSDL/SOAP Web Services



WSDL/SOAP Web Services





Rest Web Services

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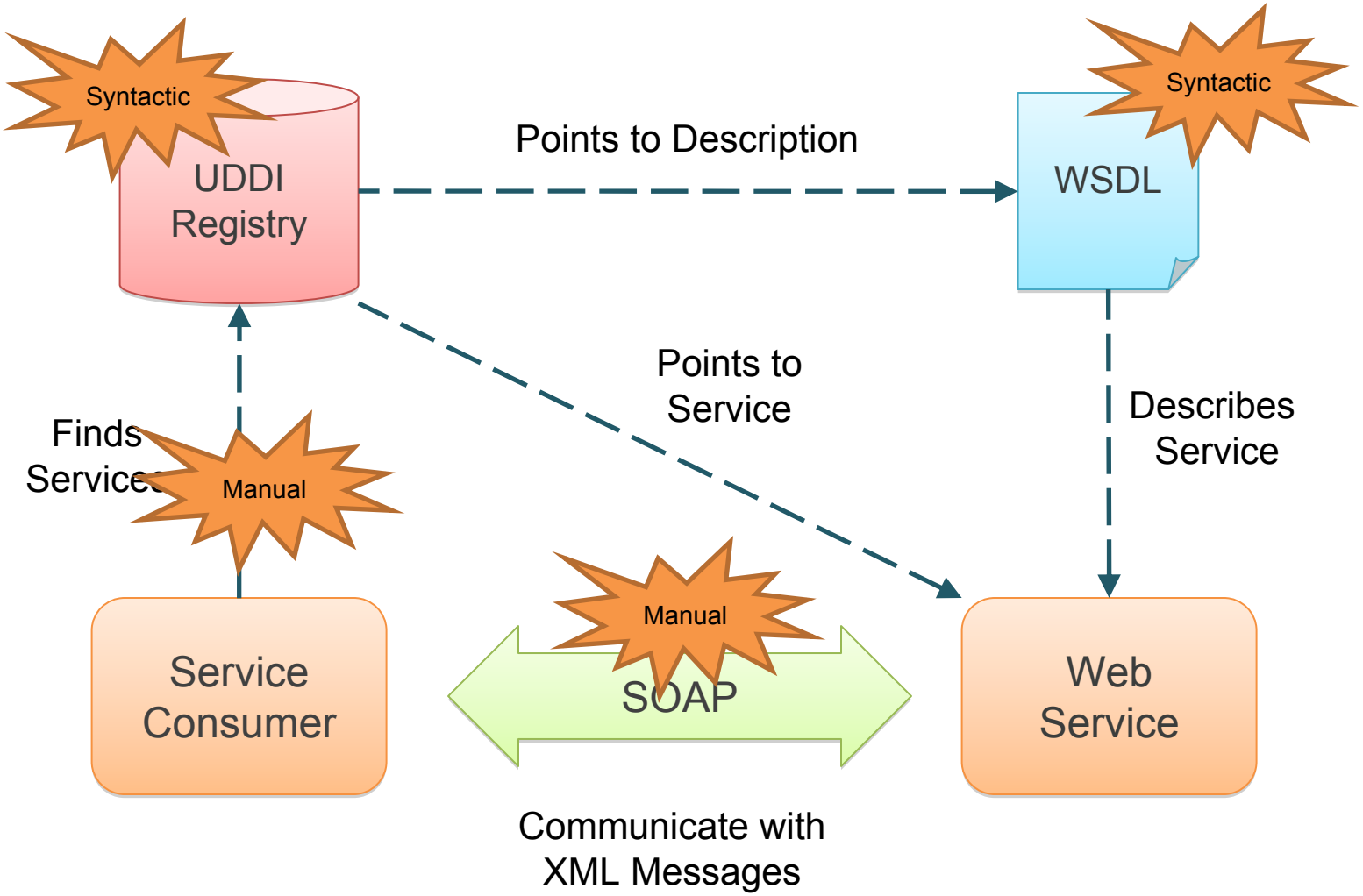
- Much more flexible means for service creation….
- …. but flexibility can make them harder to consume and easier to get wrong
- 4 methods:
  - GET
  - PUT
  - POST
  - DELETE
- No necessity for using XML
- Appear to be becoming more common but WSDL/SOAP still prevalent

Service Oriented Architectures

STI · INNSBRUCK

- Web services offer a technological means for exposing functionality on the Web
- Very easy to create bad Web services
  - Wrong granularity
  - Wrong abstraction
  - Wrong generality
  - Not decoupled
- SOA is a paradigm for building applications from Web services to achieve business goals but….
- It is also a discipline ensuring services are right for consumer and producer
  - Really reduces the effort of integration
  - Truly minimizes the impact of change
  - Delivered at appropriate levels of granularity, abstraction and generality

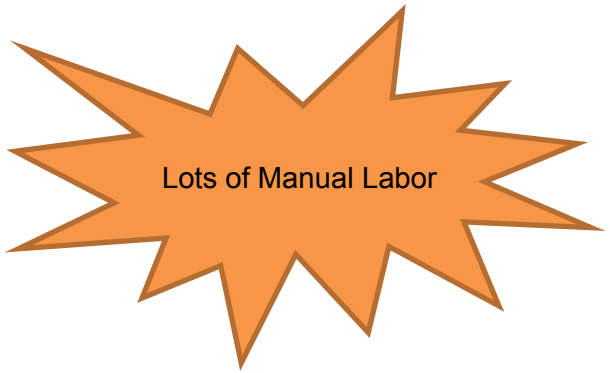
Deficiencies of Web services



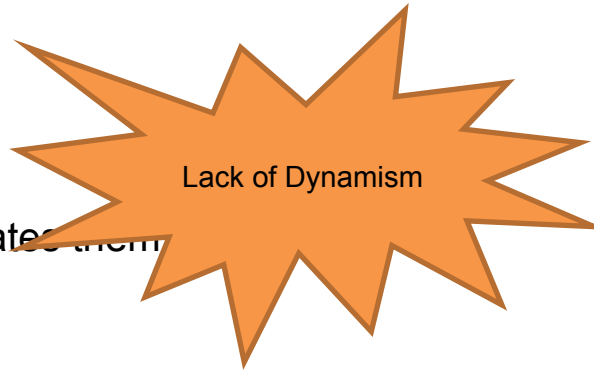
Service Engineer activities

STI · INNSBRUCK

- Find services that can be integrated within an application
  - Browse UDDI repository reading textual description
  - Check WSDL to ensure it says what it says it does
- Identify the best service
  - Lookup additional data sources
  - Very hard without invoking each service
  - Find someone who used it before?
- Understand the interface
  - What is the order of the operations?
  - What do I have to send? and What do I get back?
- Compose services together
  - Make different identified services work together
  - Lots of XML transformation



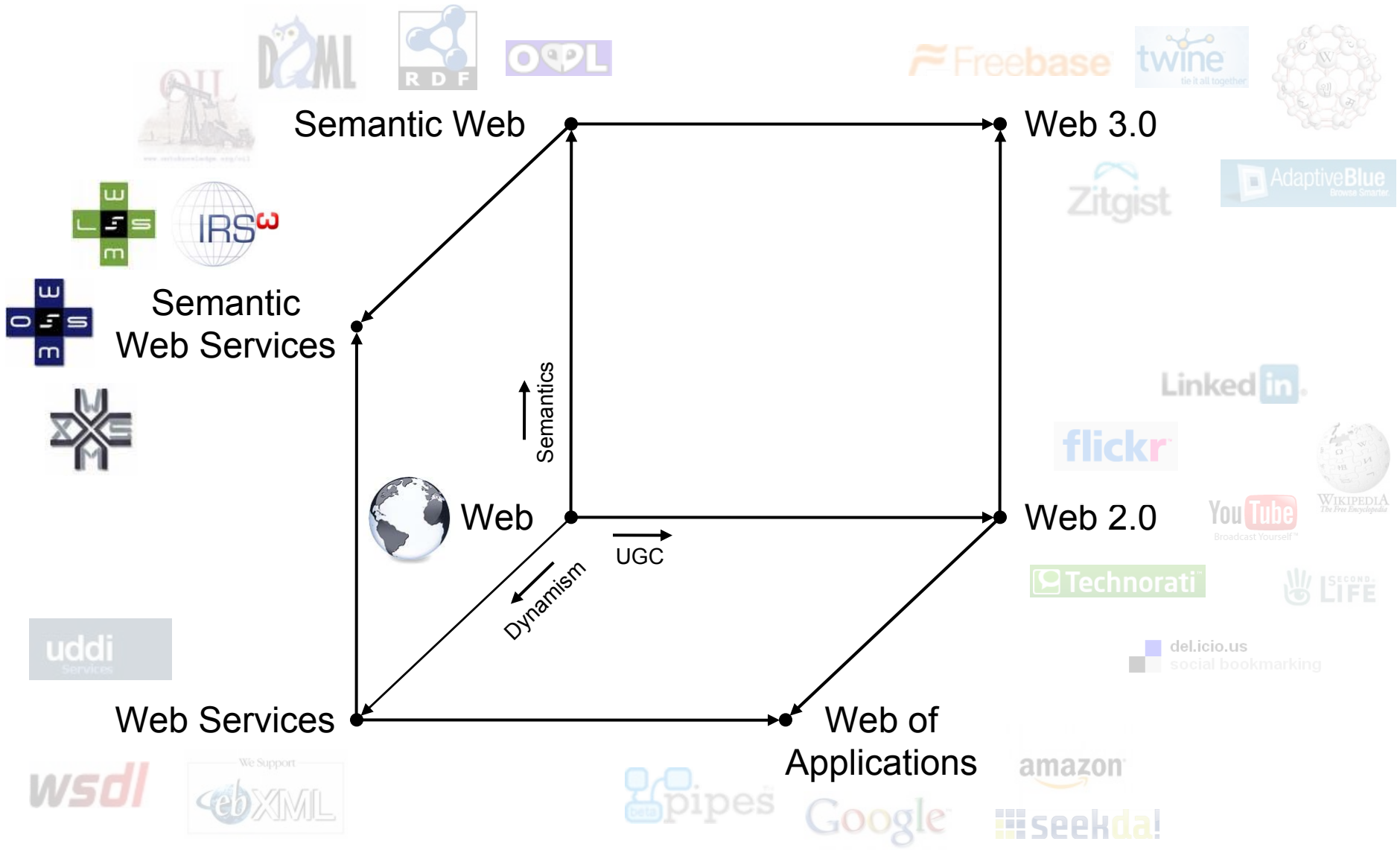
What happens when…



- New services appear
  - May be cheaper, faster, more available
  - Application cannot use them until engineer finds and integrates them
- Existing services change
  - Web services promise decoupling but interface changes still break integration
  - Application goes offline until engineer can repair integration
- Existing services disappear or go offline
  - Services may be discontinued
  - Services may go down due to overload or maintenance
  - Application goes offline until engineer replaces service or services returns from outage

➔ Failover can be built in but catastrophic failure is just one or two services away

Semantic Web Services



Semantic Web Services

STI · INNSBRUCK

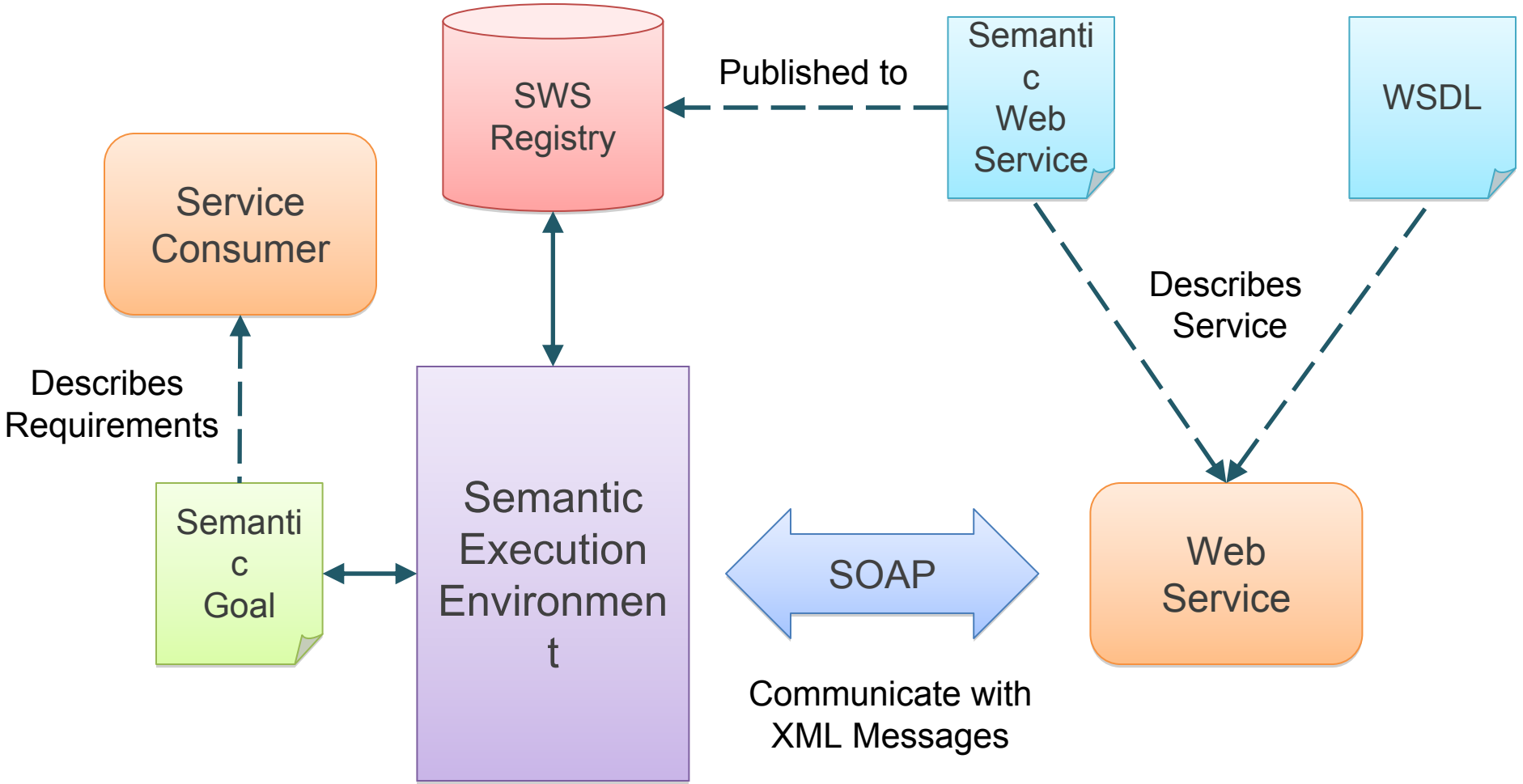
- Brings the benefits of Semantics to the executable part of the Web
  - Ontologies as data model
  - Unambiguous definition of service functionality and external interface
- Reduce human effort in integrating services in SOA
  - Many tasks in the process of using Web services can be automated
- Improve dynamism
  - New services available for use as they appear
  - Service Producers and Consumers don’t need to know of each others existence
- Improve stability
  - Service interfaces are not tightly integrated so even less impact from changes
  - Services can be easily replaced if they are no longer available
  - Failover possibilities are limited only by the number of available services

Semantic Web Services

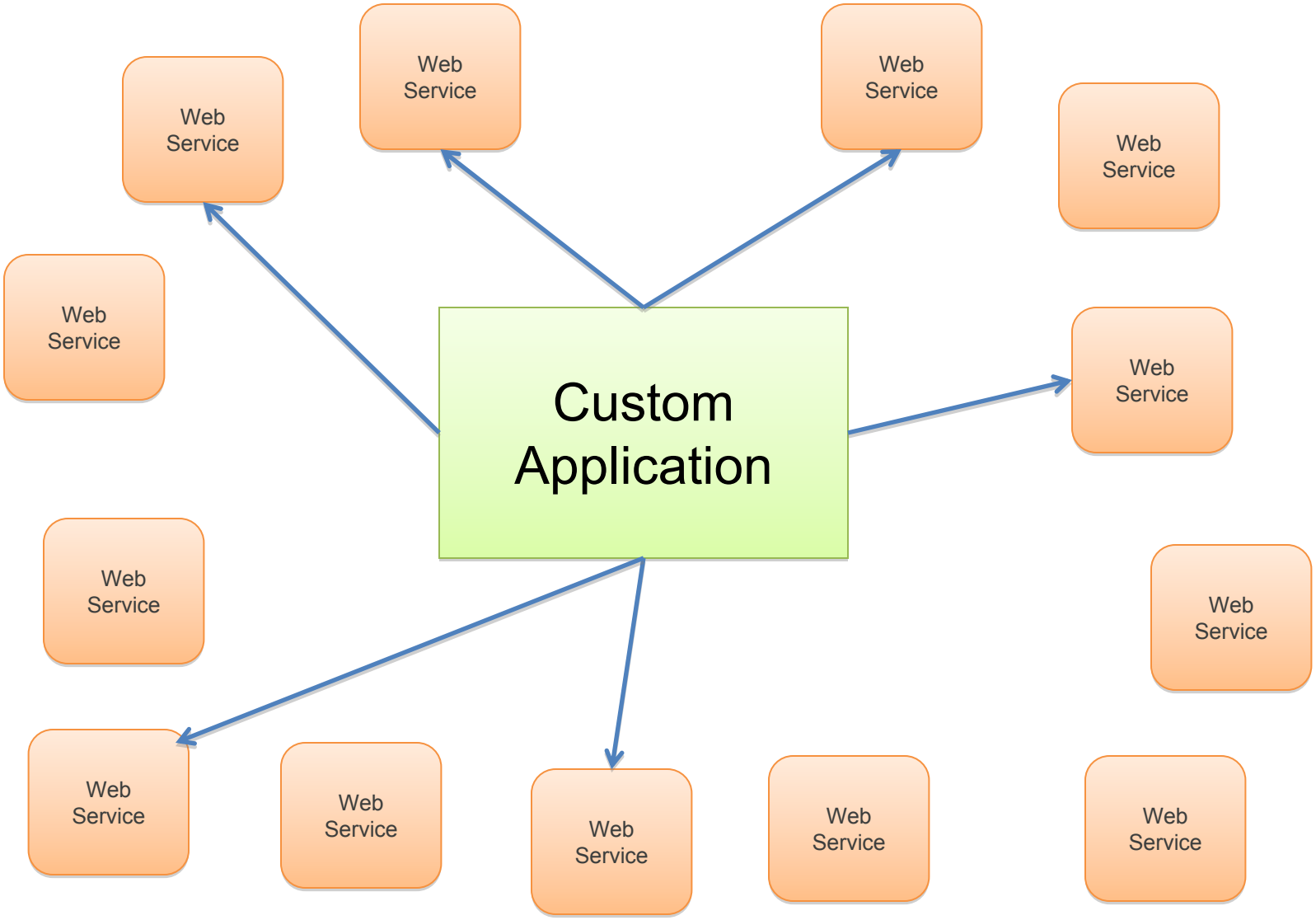
STI · INNSBRUCK

- Semantic Web Services are a layer on top of existing Web service technologies and do not aim to replace them
- Provide a formal description of services, while still being compliant with existing and emerging technologies
- Distinguish between a Web service (computational entity) and a service (value provided by invocation)
- Make Web services easier to:
  - Find
  - Compare
  - Compose
  - Invoke

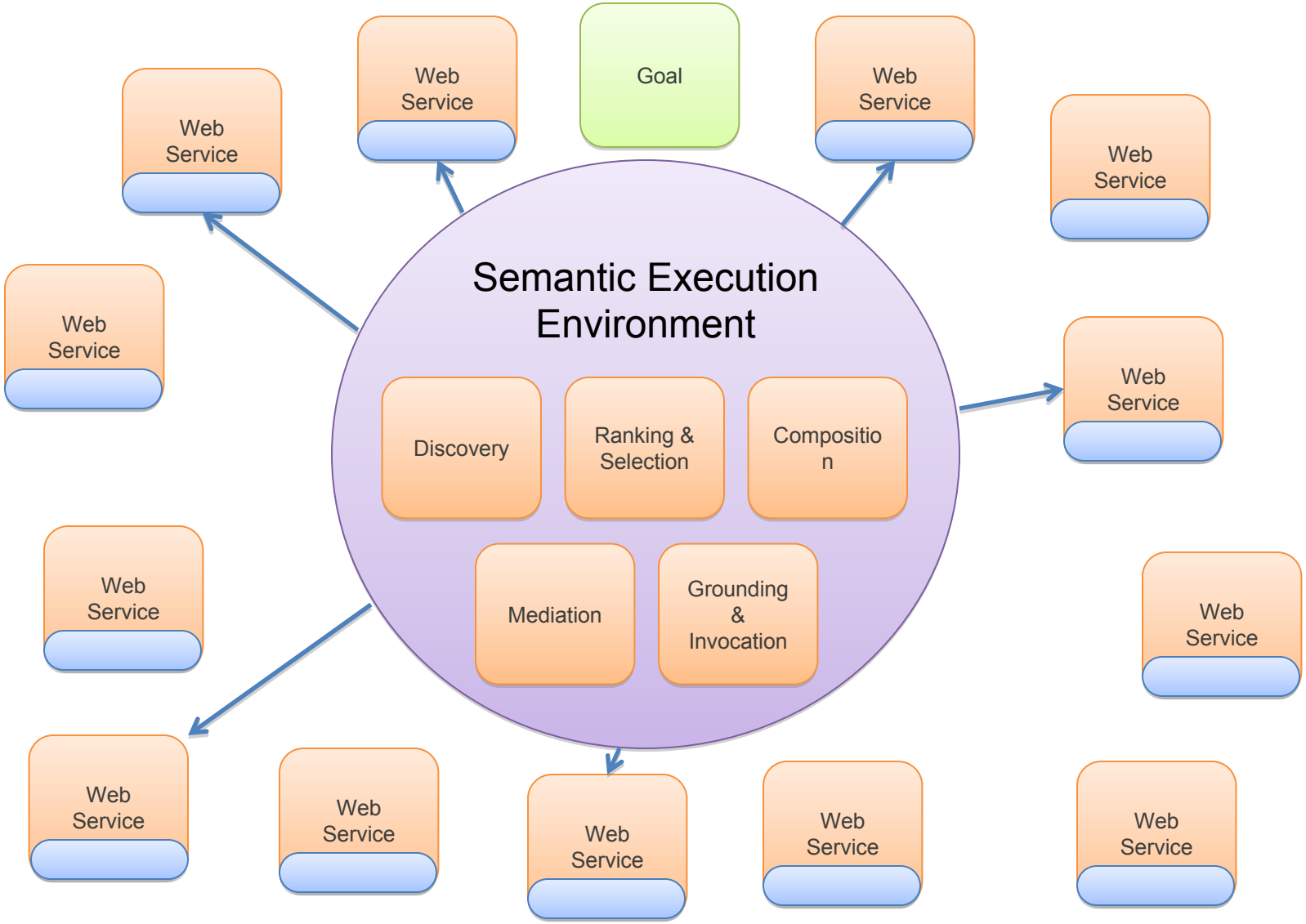
Semantic Web Services



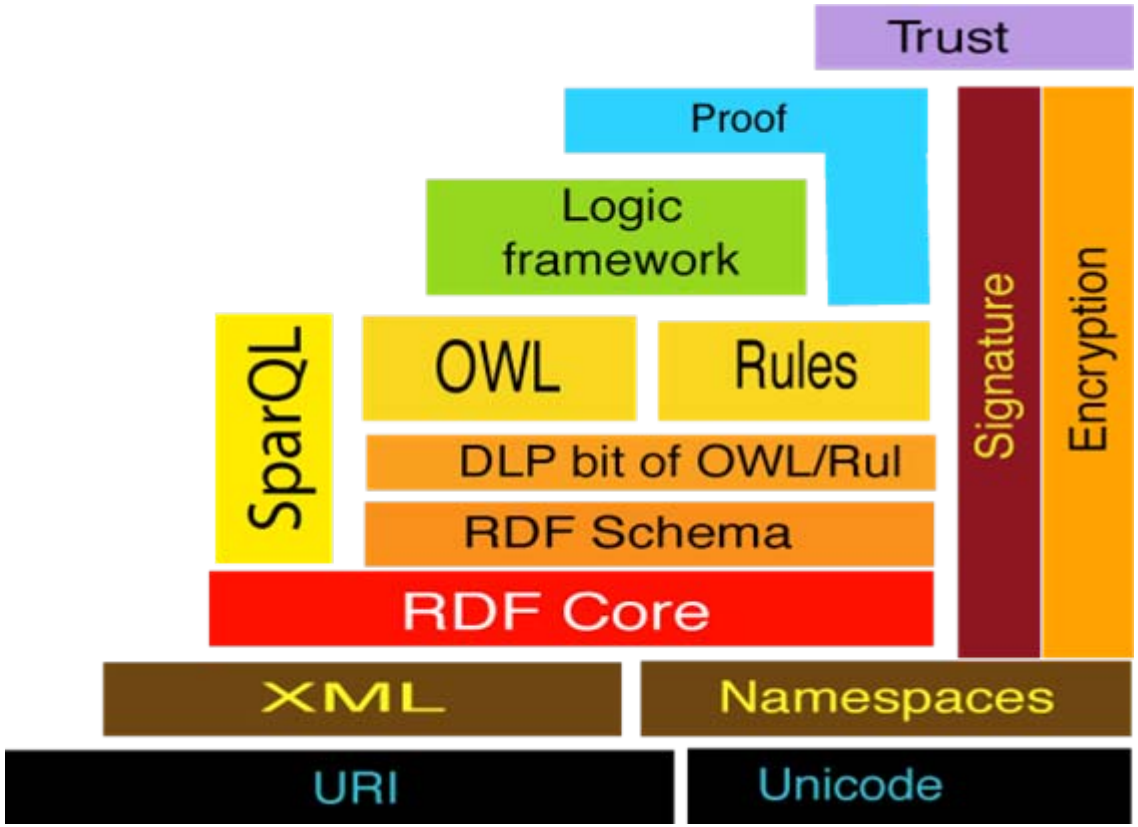
Service Oriented Architecture



Semantically Enabled SOA



Semantic Web Layer Cake



Technology Trends

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- AI
- Semantic Web
- SOA

… all still alive and well.

Topics

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- Future Internet ✓
- Internet of Services ✓
- SOA ✓
- Services ✓
- Semantics ✓
- **Use cases**

Use Cases

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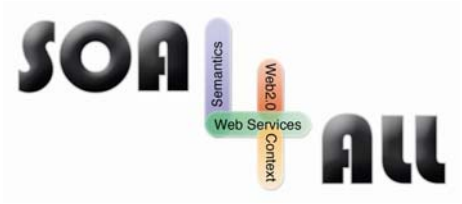
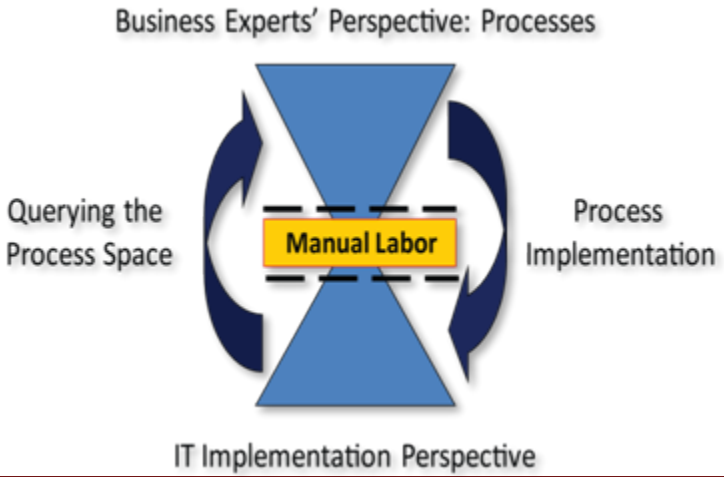
- SUPER

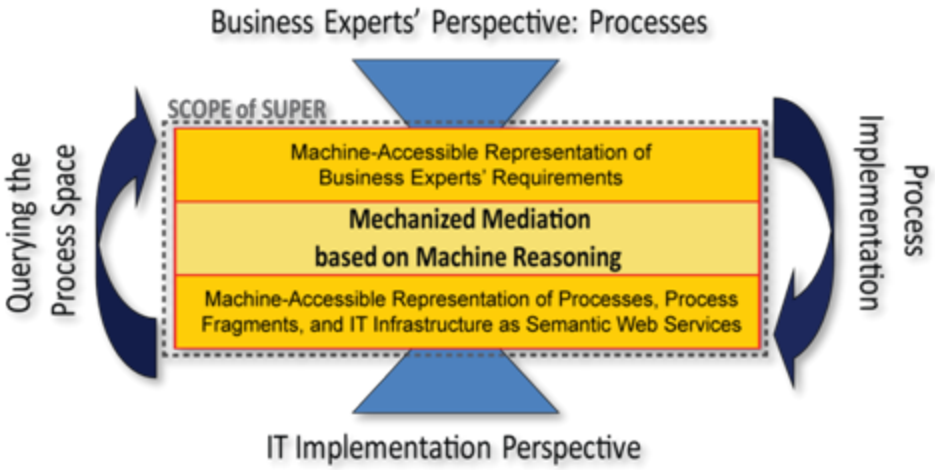
- SOA4ALL



- COIN

- Semantics Utilized for Process management within and between Enterprises (SUPER)
- The major objective of SUPER is to raise Business Process Management (BPM) to the business level, where it belongs, from the IT level where it mostly resides now. This objective requires that BPM is accessible at the level of semantics of business experts.





Key Objectives

- Scientific objectives
  - construction and assessment of technological framework for SBPM,
  - acquiring new generic languages suited for representation of processes, different process models and goal description having in mind all aspects of system behaviour (e.g. costs, dependencies, constraints, other data flows, time limitations),
  - creation of automated annotation techniques of already existing BPs, their fragments, IT components etc,
  - development of process query tools
  - adjustment existing reasoners to the specific needs of SUPER
  - elaboration of industrial-strength mediation procedures for automated coupling between business and IT perspectives
  - augmentation of SWS foundations on the basis of new experiences obtained from their deployment to large-scale test environments.
- Technical objectives
  - building horizontal ontologies in aim to annotate both complete BPs and their fragments,
  - assembling vertical ontologies for the chosen implementation domain,
  - complete inventory of tools supporting every stage of SBPM.

How Semantics Help

- Semantic technology improves the utility of BPM by creating a semantic glue between different layers, artefacts and models
- Links between business artefacts help to keep the big picture and to improve the overall understanding of complex relationships and interdependencies
- By unifying the vocabulary and explicating differences in a structured way, semantics support the understanding of business people and technicians

SUPER Model Stack

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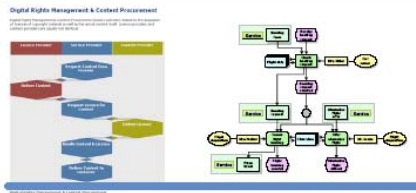
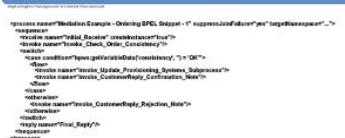
- Making sense of a domain\problem
- Communication tool
- What is it all about?

- Solution maps
- Mind maps
- Ad-hoc modelling techniques
- ...



- Visualizing\specifying business process
- Focus: Business Problem
- Who does what, when, how and why?
- Usually multiple layers

- Business Scenario Maps
- Event-driven process chains
- Flowchart techniques
- BPMN
- ...



- Process execution specification
- Formal, clearly specified grammar
- Focus: Implementation
- Which component is called when, how, by whom with which data?

- BPEL
- ...

- Web service encapsulation
- Focus: Implementation
- Which components can and should be exposed how as services?

- WS*
- ...

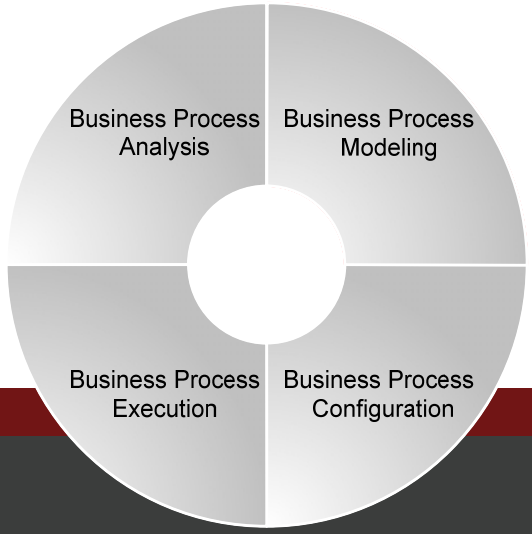
- Implementation of components

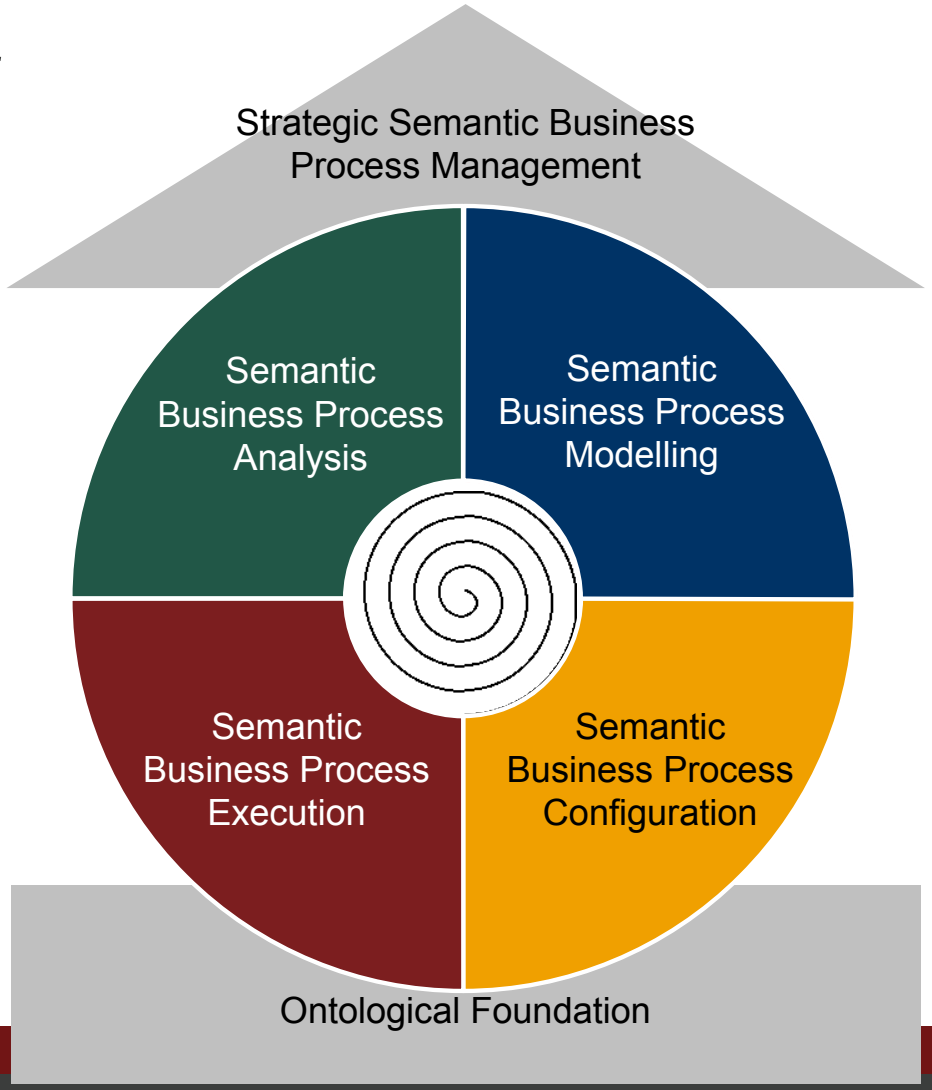
- Programming languages
- ...

Use of semantics allows us to cross business process representational boundaries

SUPER Methodology Framework

The ***SUPER methodology*** is a set of phases, methods and techniques to perform activities using SUPER technologies. Like a traditional BPM methodology, the SUPER methodology owns a proper business process lifecycle, that is enriched with the semantic connotation of the overall SUPER framework.





SUPER Architecture

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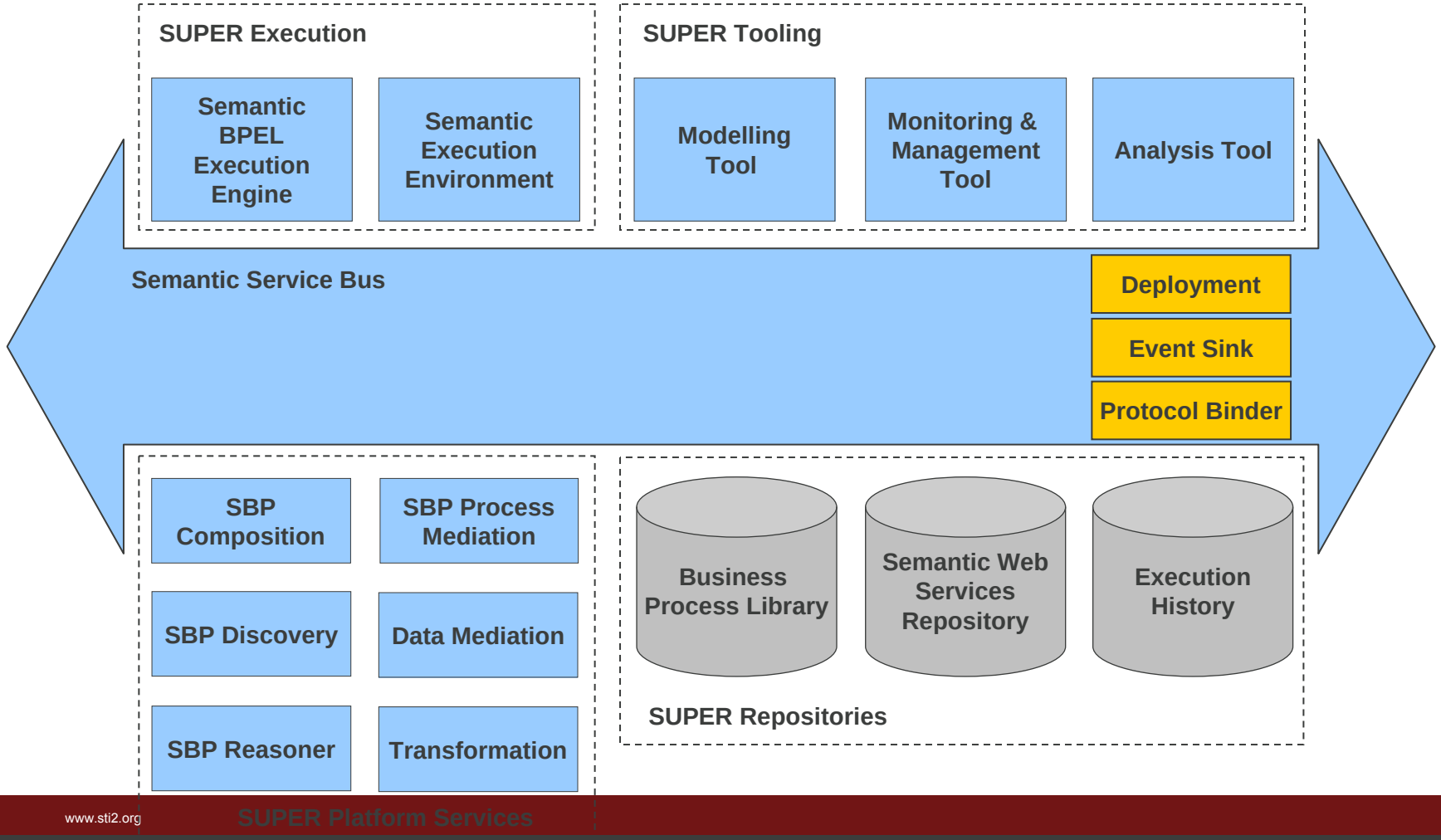
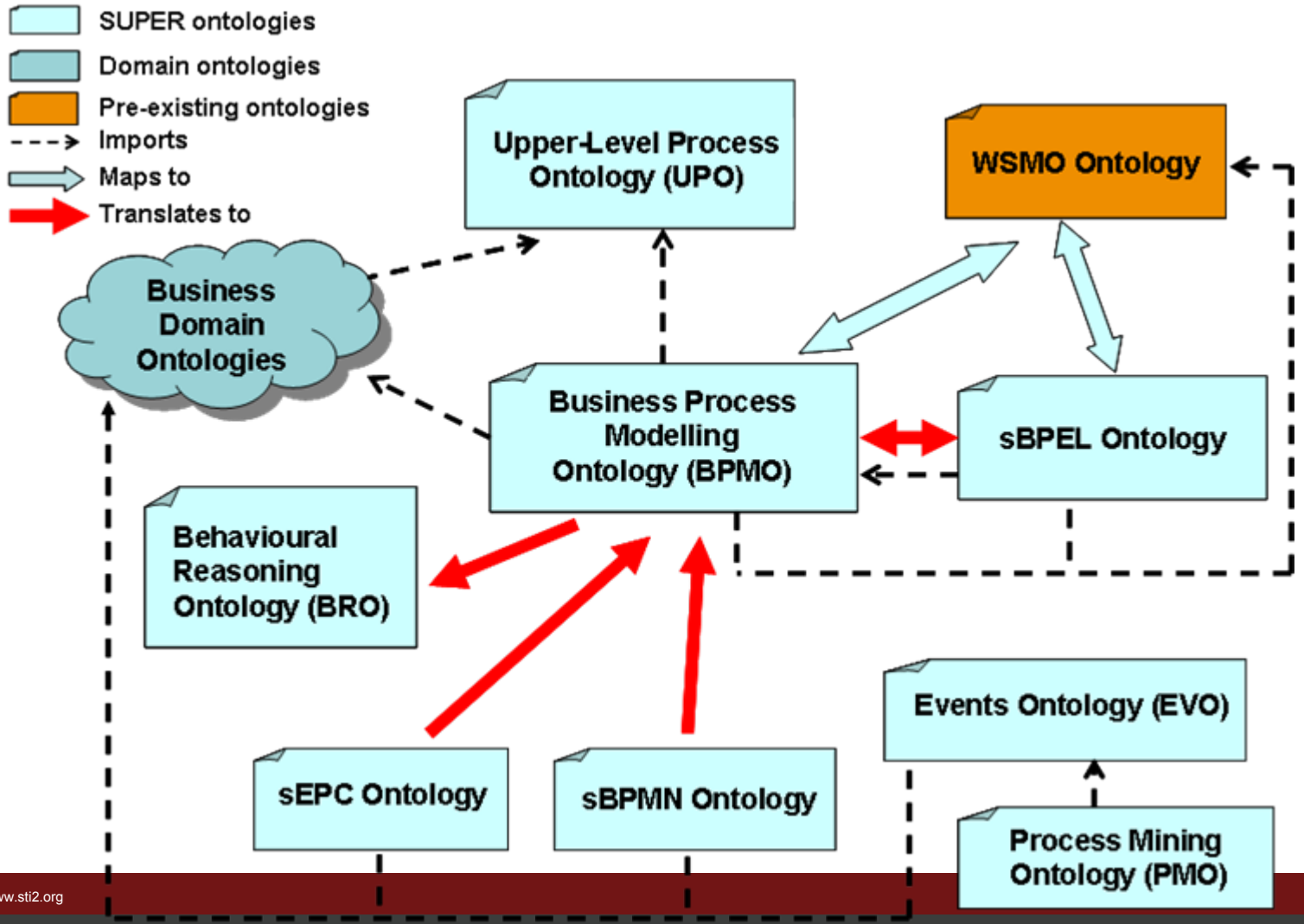


SUPER Ontology Stack



Benefits

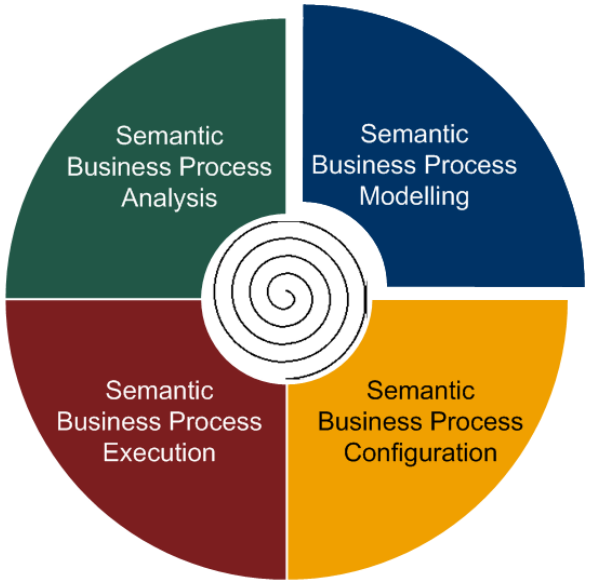
STI · INTERNATIONAL

- Explicate Semantic Meaning of Data & Models
- Semantic Coherency of Information among several levels of BPM
- Higher Flexibility for Web Service usage
- Automated Handling of Potential Heterogeneities
- Make process definitions better understandable

Semantic Business Process Modelling

STI · INTERNATIONAL

- First step of the SUPER Life Cycle
- Development of the Business Processes Model based on the Business Process Modelling Ontology (BPMO)
- Use of a Semantic Process Modelling Environment
  - WSMO Studio
  - Integrated BPMO Editor



Modelling Requirements and Methodology

STI · INTERNATIONAL

- Business Process Model based on:
  - Company specific Business Function and Domain Ontologies
  - Semantic Web Services and Goals
- Business Process Model sources are:
  - Business Analyst implicit knowledge and studies (business questions, Key Performance Indicators (KPIs), business outcomes, etc.)
  - Analysis reports created in an eventual previous Semantic Business Process (SBP) Analysis phase
- Several modelling methodology are possible:
  - Start business process modelling from scratch
  - Modify existing semantic business processes
  - Annotating non-semantic business processes
  - Re-use process patterns previously modeled

Benefits of SUPER Modelling

STI · INTERNATIONAL

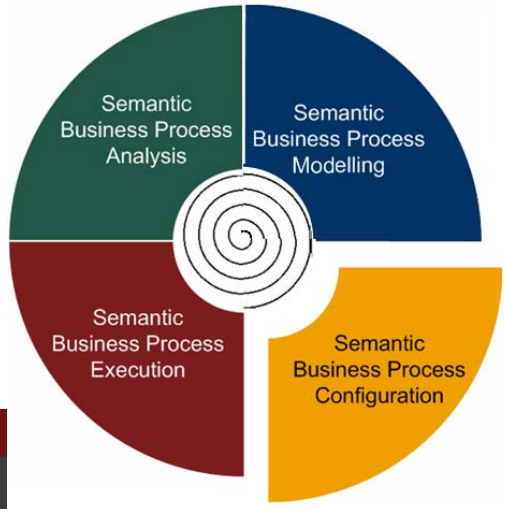
- Business Process Modelling Notation (BPMN) independence (BPMO representation)
- Discovery of existing Business Processes exploiting the semantic information
  - Search on specified Business Function, Business Domain and Business Patterns
  - Search on specified Business Goals, KPIs and Business Rules
- Automatic validation and simulation of the BPM
- Better readibility of models through a clear semantic

Screencast:
http://www.wsmostudio.org/demo/BPMO-editor.htm

Semantic Business Process Configuration

STI · INTERNATIONAL

- Modelled Business Processes are configured
- Functions supported
  - Mapping of semantic BPEL processes (BPEL4SWS)
  - Integration of BPEL with SWS
- SUPER functionalities used
  - Task and process composition (SBP Composition)
  - SWS and process fragment discovery (SBP Discovery)
  - Semantic Business Process Repository



Example: SBP Configuration Scenarios

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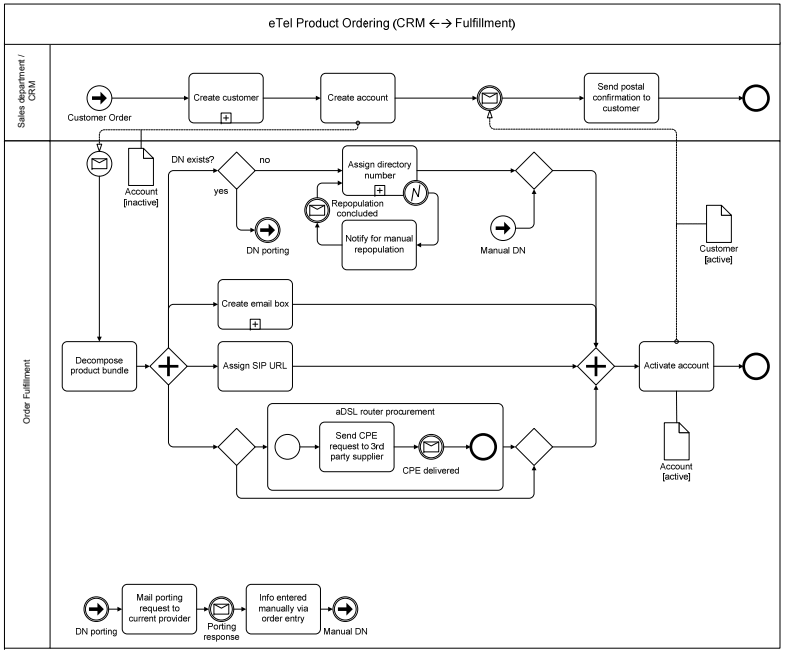
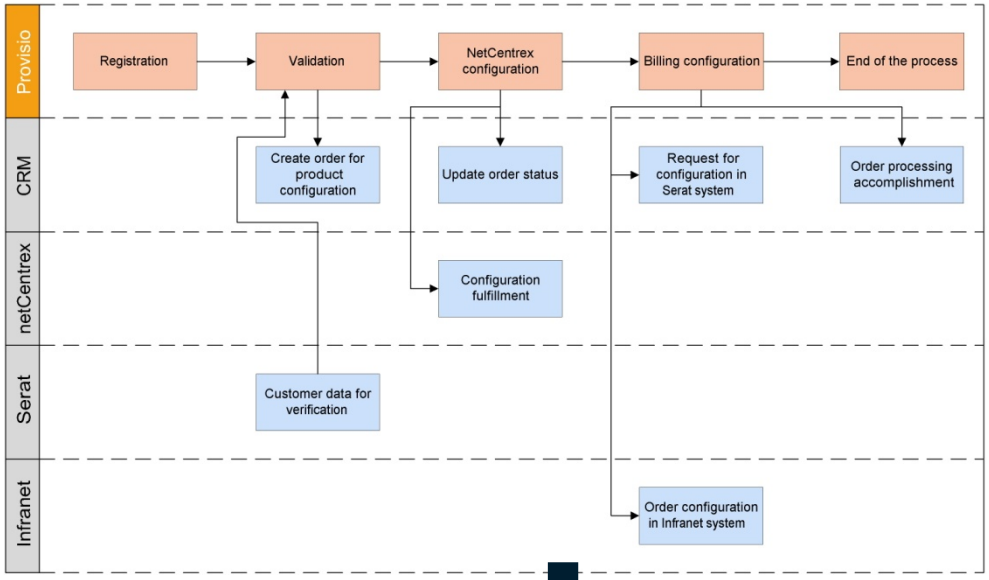
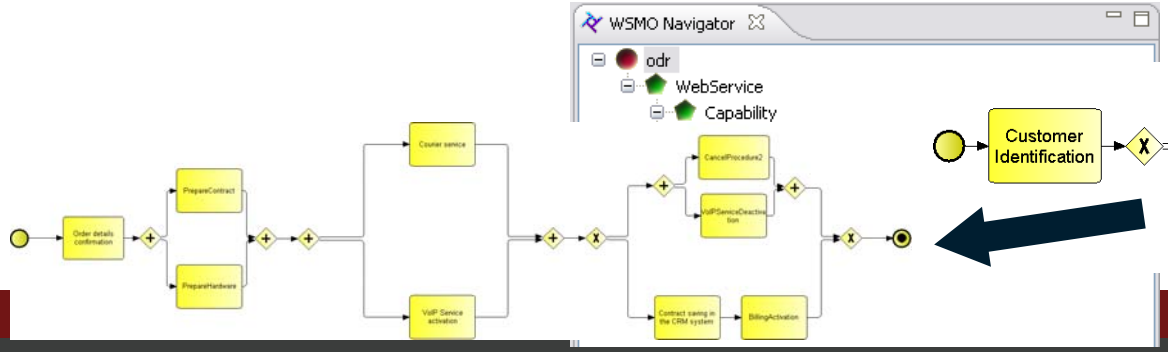
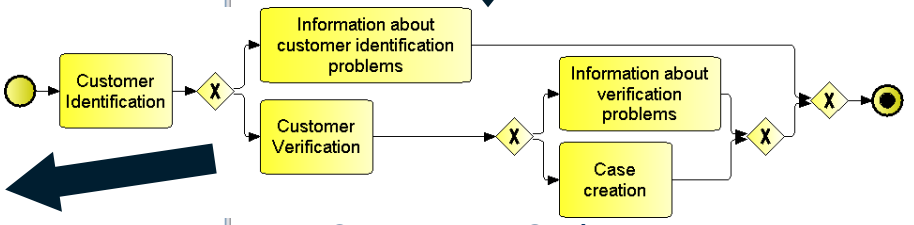
CRM & Fulfilment (eTel)



DSL Fulfilment (TP)







Customer Order Request

Configuration Requirements

STI · INTERNATIONAL

- Each subsystem (its functionalities) represented by Semantic WS's (SWS)
- Each SWS described by the ontology
- BPMO process composition
  - **Task Composition** implements each BPMO task with a combination of WS
  - **Consistency Checking** finds and removes bugs in the overall process
- Use of SUPER Ontologies
  - Mapping **BPMO into executable BPMO** – all tasks bound to existing WS
  - **Domain ontologies** specify how WS affect the world – basis for combining WS and for checking/fixing the process

Benefits of SUPER Configuration

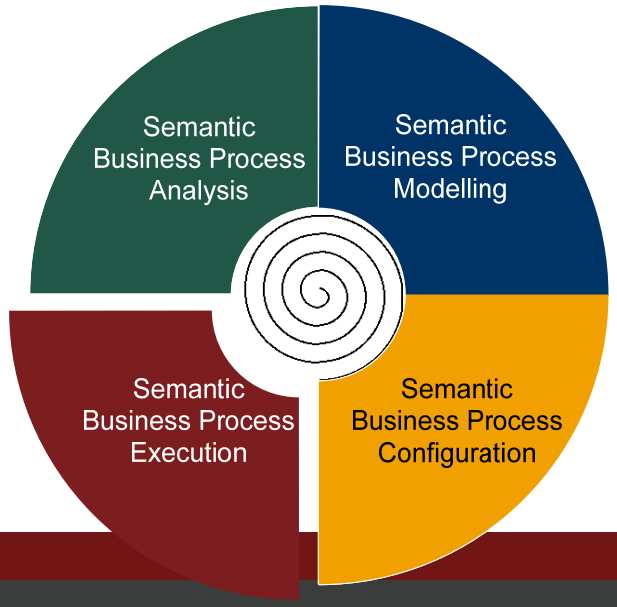
STI · INTERNATIONAL

- Binding process to company IT infrastructure
- Coming from general process model to its concrete realisation
- Bridging the gap between business process analyst and IT professional

Semantic Business Process Execution

STI · INTERNATIONAL

- Modeled and configured Semantic Business Processes are executed
- Execution history for SBP Analysis is produced
- Automates business activities
- Minimizes time-to-offer
- Supports
  - Execution of semantic BPEL processes (BPEL4SWS)
  - Discovery and execution of Semantic Web Services (SWS)



Semantic Business Process Execution Scenario

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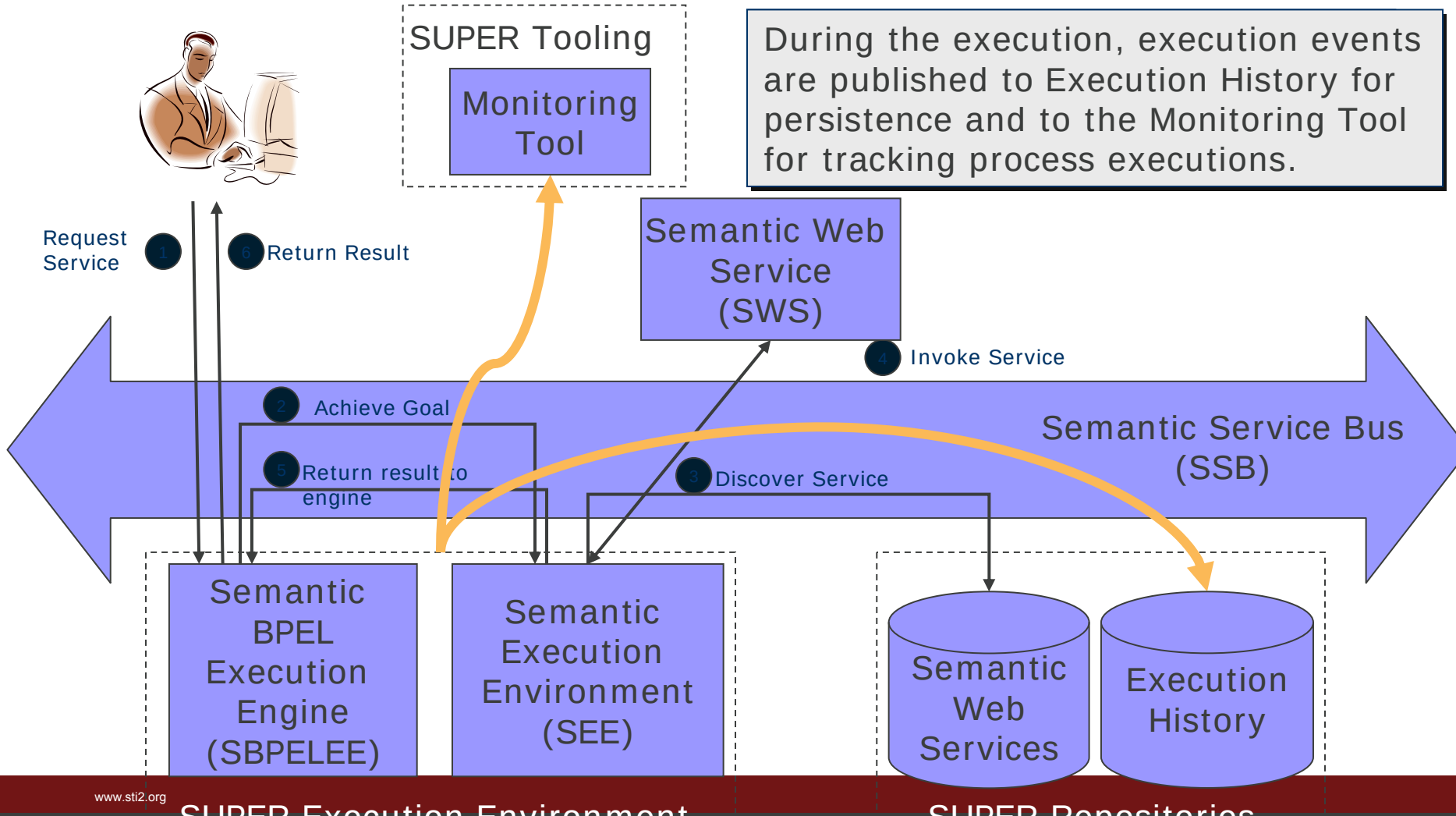
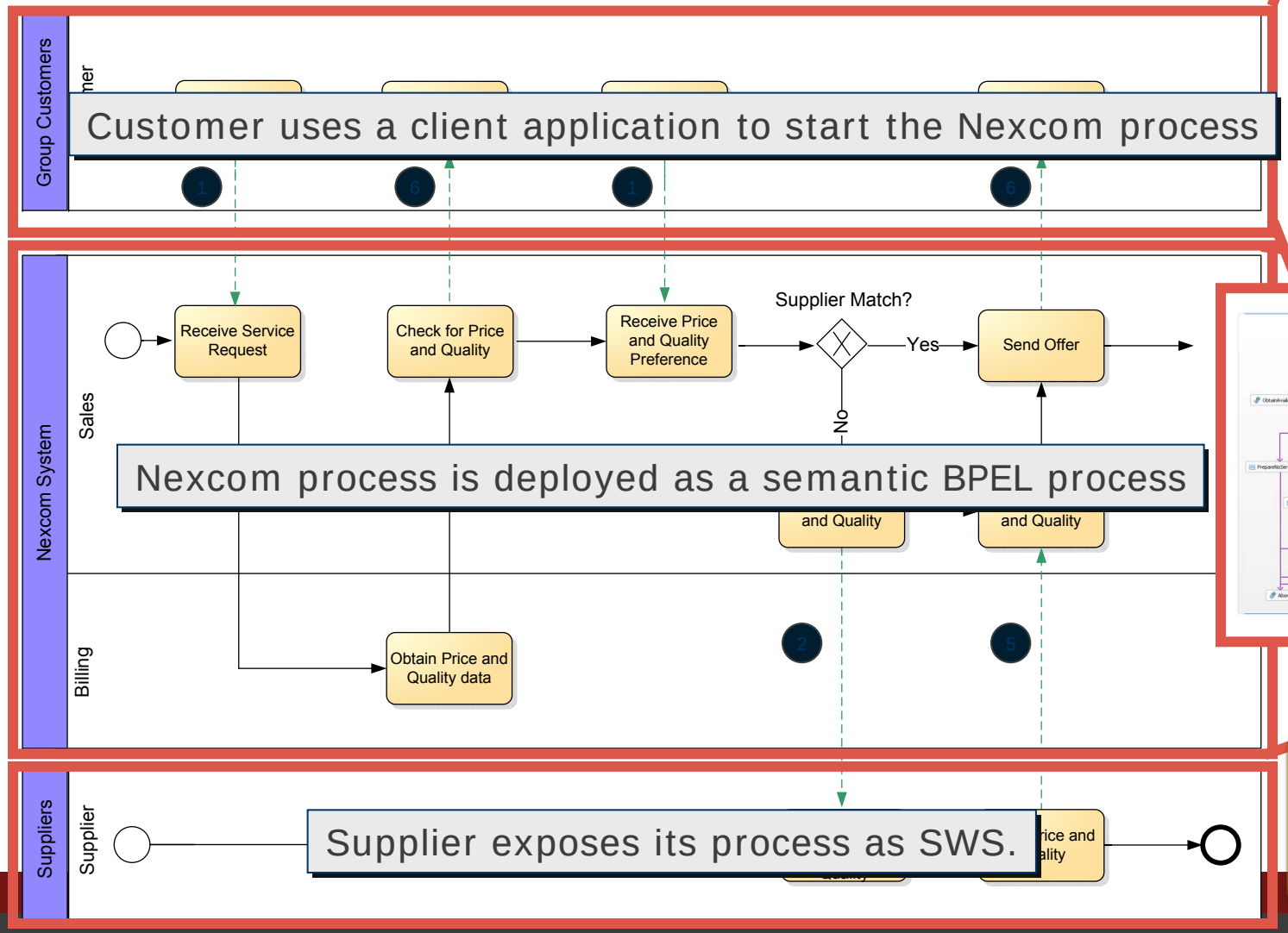
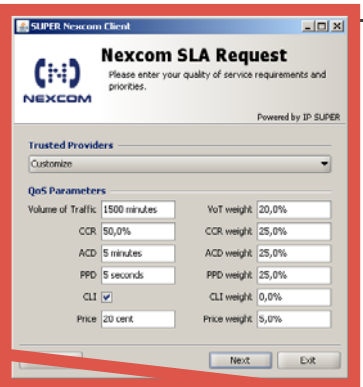
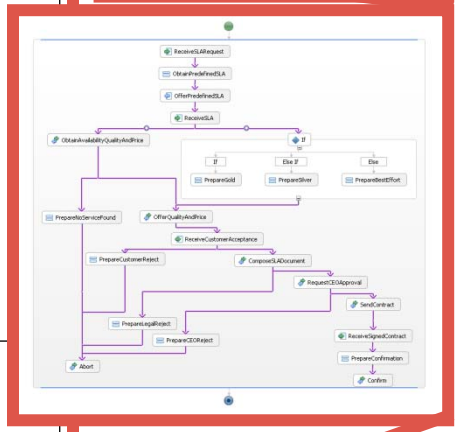


Example: Nexcom Customer Order Management Process

STI · INTERNATIONAL







Benefits from SUPER SBP Execution

STI · INTERNATIONAL

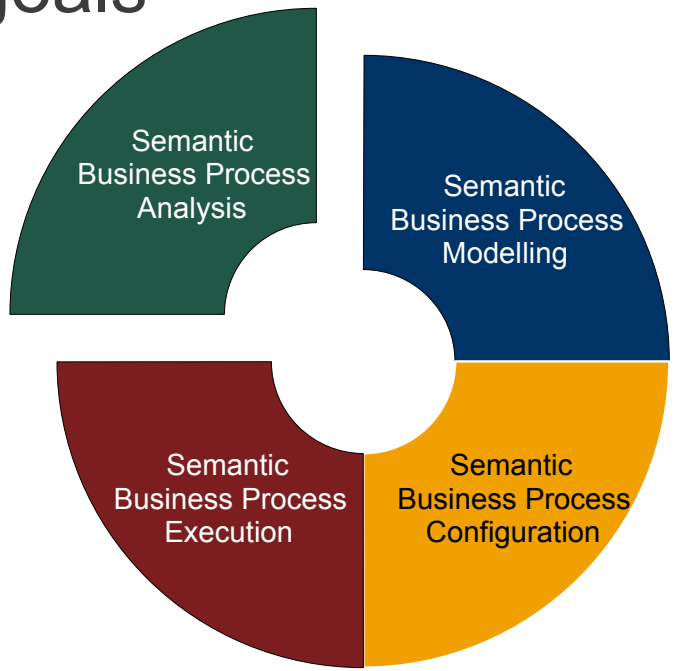
- Nexcom Use case requirements addressed by the SUPER SBP Execution phase
  - Supplier **matching** supported by Semantic Web Service discovery and invocation from within semantic business processes
  - Allows for more **flexible** traffic routing
  - **Automates** supplier matching and traffic routing process taking into account all existing suppliers
  - **Minimizes** time-to-offer

Screencast:
http://www.iaas.uni-stuttgart.de/forschung/projects/super/nexcom-usecase.avi

Semantic Business Process Analysis

STI · INTERNATIONAL

- Analysis of executed processes
- Support of various analysis goals
  - Overview over process usage
  - Detect business exceptions
  - Detect technical exceptions
  - Compare As-Is with To-Be
- Analysis Methods
  - Semantic Process Mining
  - Semantic Reverse Business Engineering



Semantic Process Mining

STI · INTERNATIONAL

- Semantic auditing
  - Use semantic information to check for properties in logs
- Semantic control-flow mining
  - Use semantic information to support different levels of abstraction in the mined models
- Semantic organizational mining
  - Automatically derive the teams and groups in the organization based on task similarity
- Semantic performance analysis
  - Use semantic information to check for Service Level Agreements (SLAs), throughput times, bottlenecks etc.

Semantic Reverse Business Engineering (RBE)

- Scenario based analysis with predefined content to ensure continuous business improvement
  - *As-Is-Analysis*
    Provide Details and statistics about executed processes
  - *Exception analysis*
    Focus on business exceptions (deviation from the standard processes)
  - *Standardisation & Harmonisation*
    Check compliance of processes between organisational units or with predefined guidelines
  - *User & Role analysis*
    Check user and role behaviour and authorizations

Scenario Based Analysis

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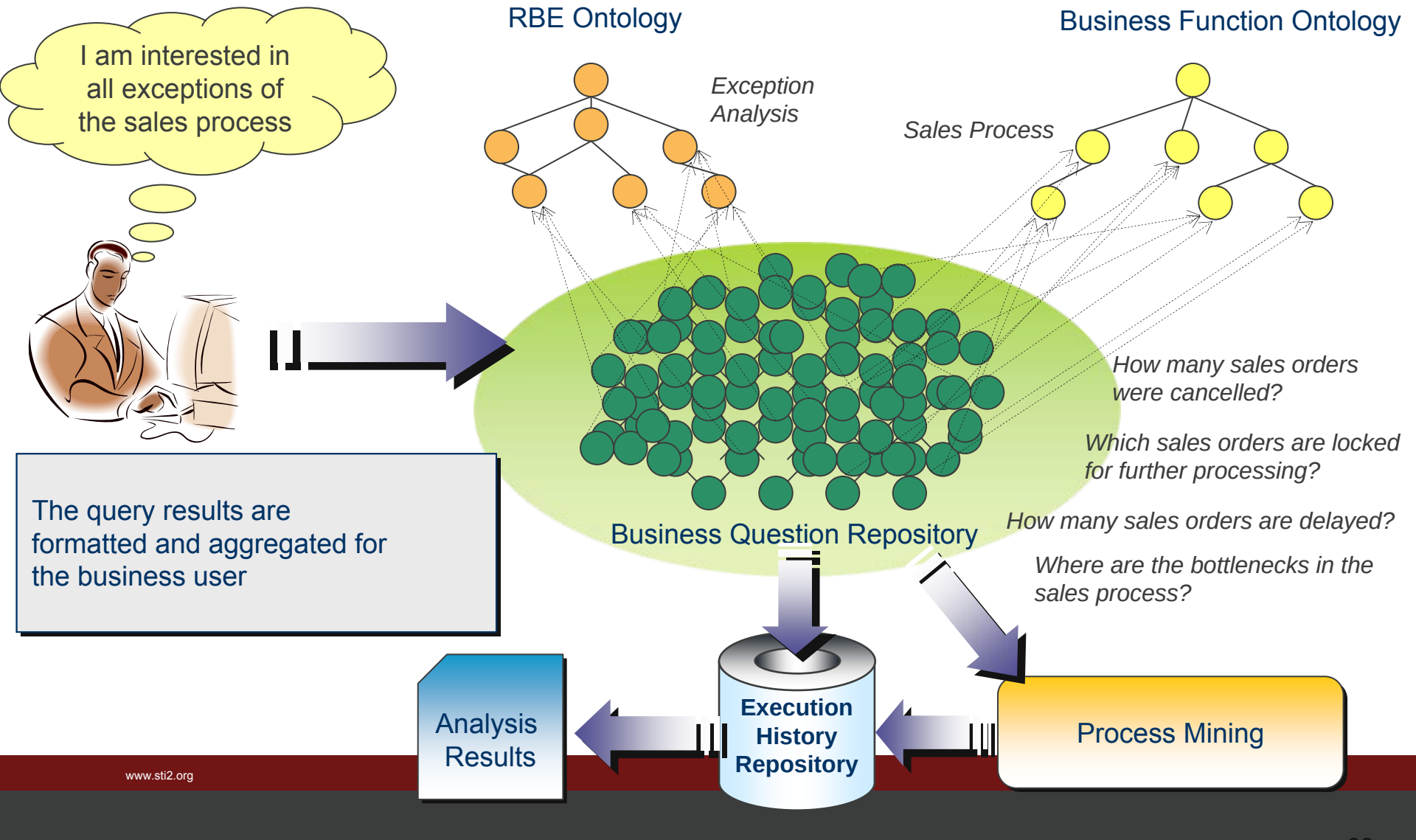

Analysis Results

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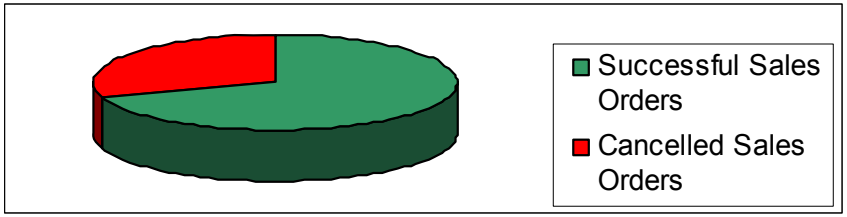
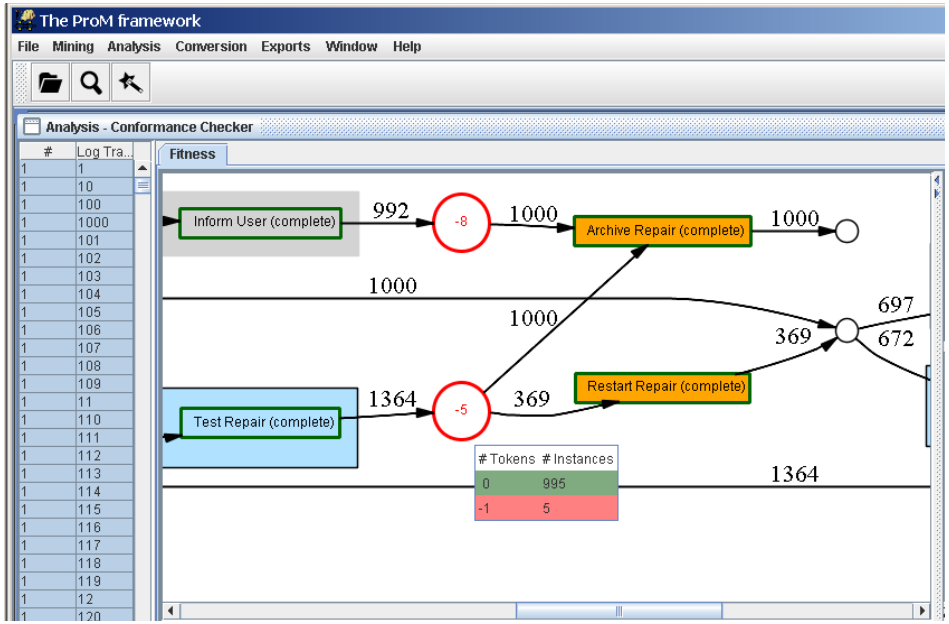
How many sales orders were cancelled?



Which sales orders are locked for further processing?

Locked Sales Orders
SO_0040
SO_0345
SO_0423
....



- Get overview about system usage
- Find out exceptions within process flow
- Check conformance to defined Process model
- Find bottlenecks

SUPER Benefits

STI · INTERNATIONAL

- SUPER bridges the gap between Business experts and IT experts in setting up new products and processes
- SUPER provides a new set of integrated BPM tools for
  - Modelling
  - Automated Composition of Processes
- SUPER uses Semantics to gain a new level of automation for the modelling and configuration of business processes
- SUPER tools are based on open standards to guarantee independence from particular vendors
- Economic advantages
  - lower development costs and
  - shorter time-to-market for new services and products
- Target Group Business Users
  - Global players
  - SMEs and government agencies

SUPER - Business Impact

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- Better process monitoring leading to more transparency
  - Faster reactions to emergency situations (technical problems, market requirements…)
  - Optimization of CRM, customer analysis, market analysis
- Flexible product design and management
  - Design: SUPER offers the opportunity to create new products out of a library of existing processes - in short time, without involving IT resources and without additional costs
  - Flexible product provisioning: technical realization of business processes can be changed without redesigning the process itself
- Enabling the user to rapidly implement and test business processes

SUPER - Business Opportunities

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- Improved service discovery & matching in existing products
- Ontology modelling support and semantic search for existing BPM products
- R&D and consultancy services for early adopters
- Creation of custom components for the alignment of existing products with recent SWS and BPM standards
- Introduction of semantic BPM solutions to heterogeneous service landscapes

SOA4All

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- SOA4All will facilitate a Service Web of billions of services revolutionizing the access and usage of software.
- SOA4All will significantly impact the competitiveness of the European Software and IT Services industry

SOA4All - Main Innovations

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SOA

As the emerging dominant paradigm for application development which abstracts from software to the notion of a service

Web principles

To scale SOA to a world wide web communications infrastructure

Context

Adapting to meet local environment constraints, organizational policies and personal preferences

Web 2.0

As a means to structure human-machine cooperation in an efficient & cost-effective manner

Semantic Web

To automate service discovery, mediation & composition

Use Case: Public Sector

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- Current Situation
  - high number of administrative procedures
  - for many procedures manual execution and monitoring
  - wide variety between locations and countries (e.g., 3-28 steps for registering a business within different EU states)
- Goals
  - accelerate, simplify, and unify administrative procedures
  - intensify cooperation among administrations
- Requirements
  - electronic procedures and document exchange
  - single point of contact
  - information transparency (responsibilities and status)
  - limited and well-known execution time for procedures

BT Web21c Case Study

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- Currently Web21c offers a Web Services based toolkit for accessing and using some of BTs ‘capabilities’ (such as VOIP, SMS etc.), allowing 3rd party developers to create mash-ups with other services.

- This case study will investigate creating the future Web21c infrastructure based on SOA4ALL technology.

- The case study will aim to utilise the key advances in research conducted in the technology work packages to help provide the next generation of Web21c where the process of discovering, integrating and using BTs capabilities can be done much more effectively, reducing the cost and time of using and combining the services

C2C Service e-Commerce Case Study

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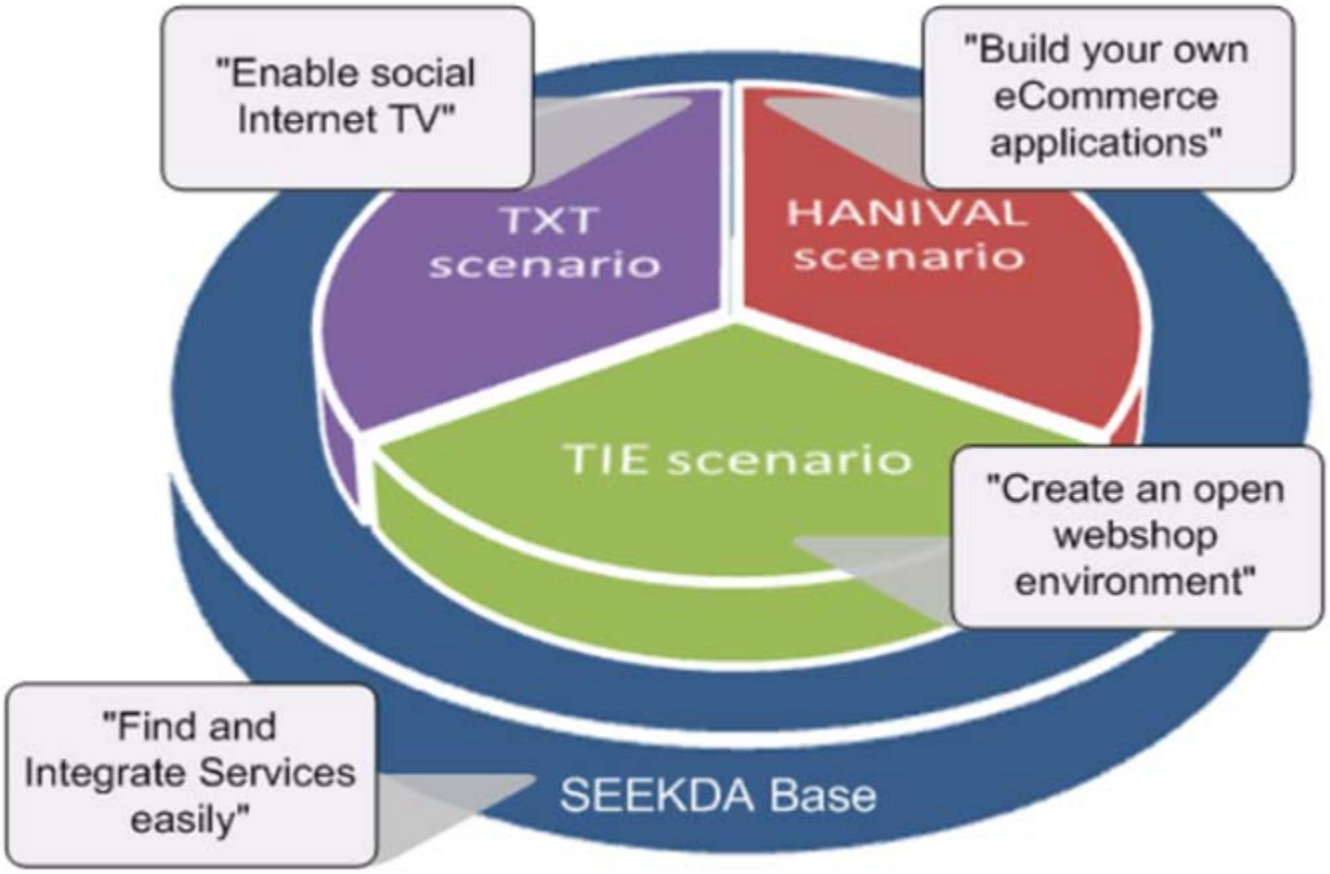
- Use Case Scenarios:



COIN

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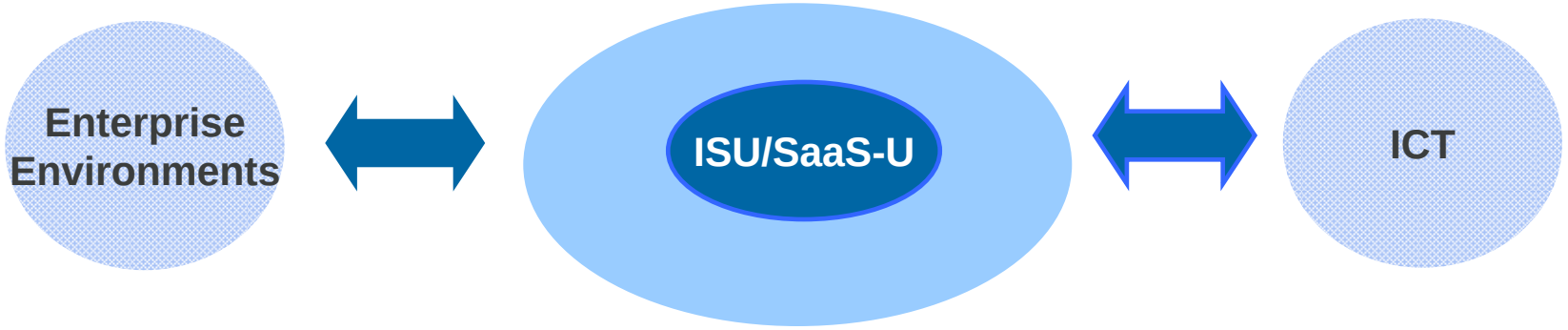
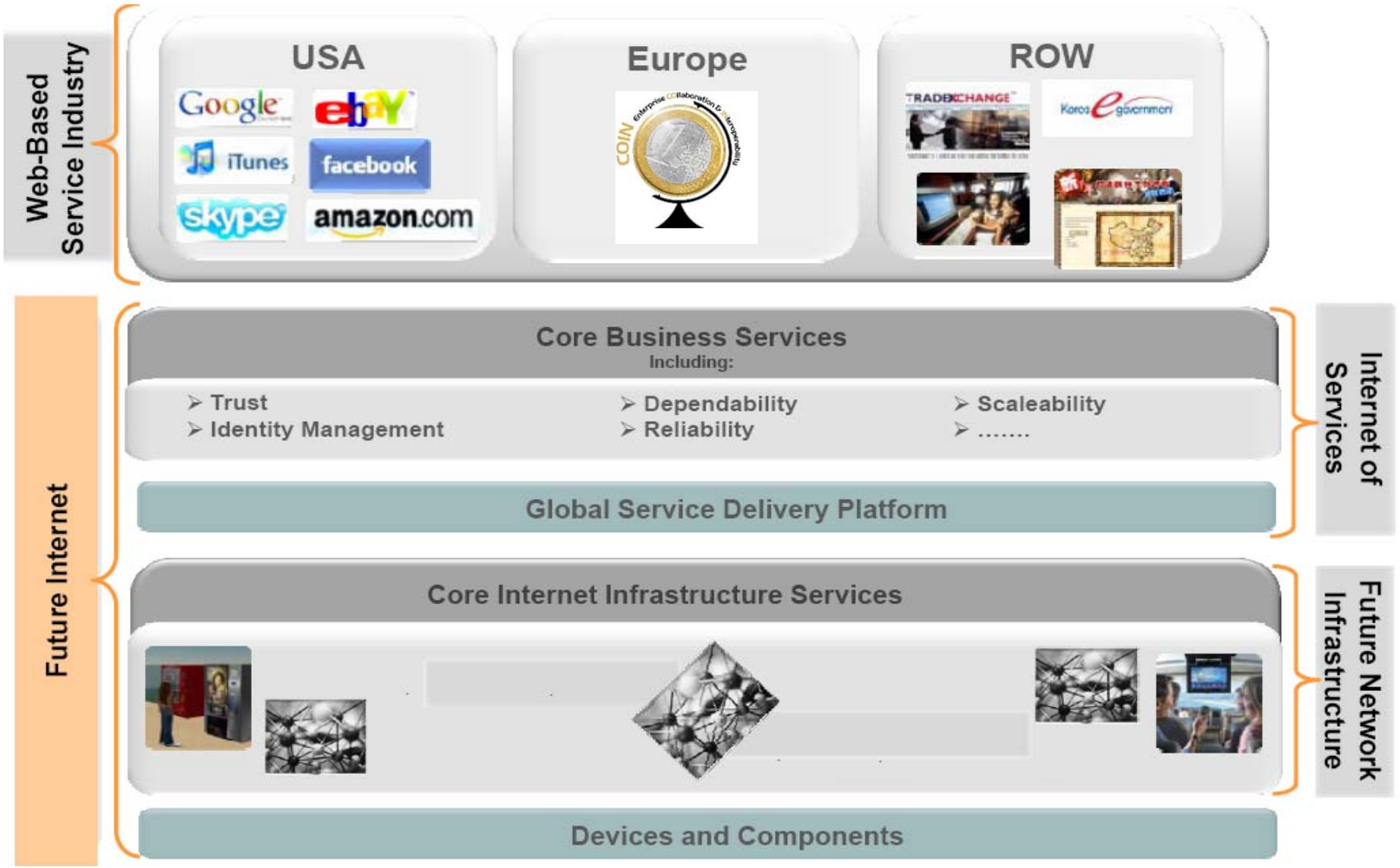


COIN – Global Service Platform



Virtual Travel Agent

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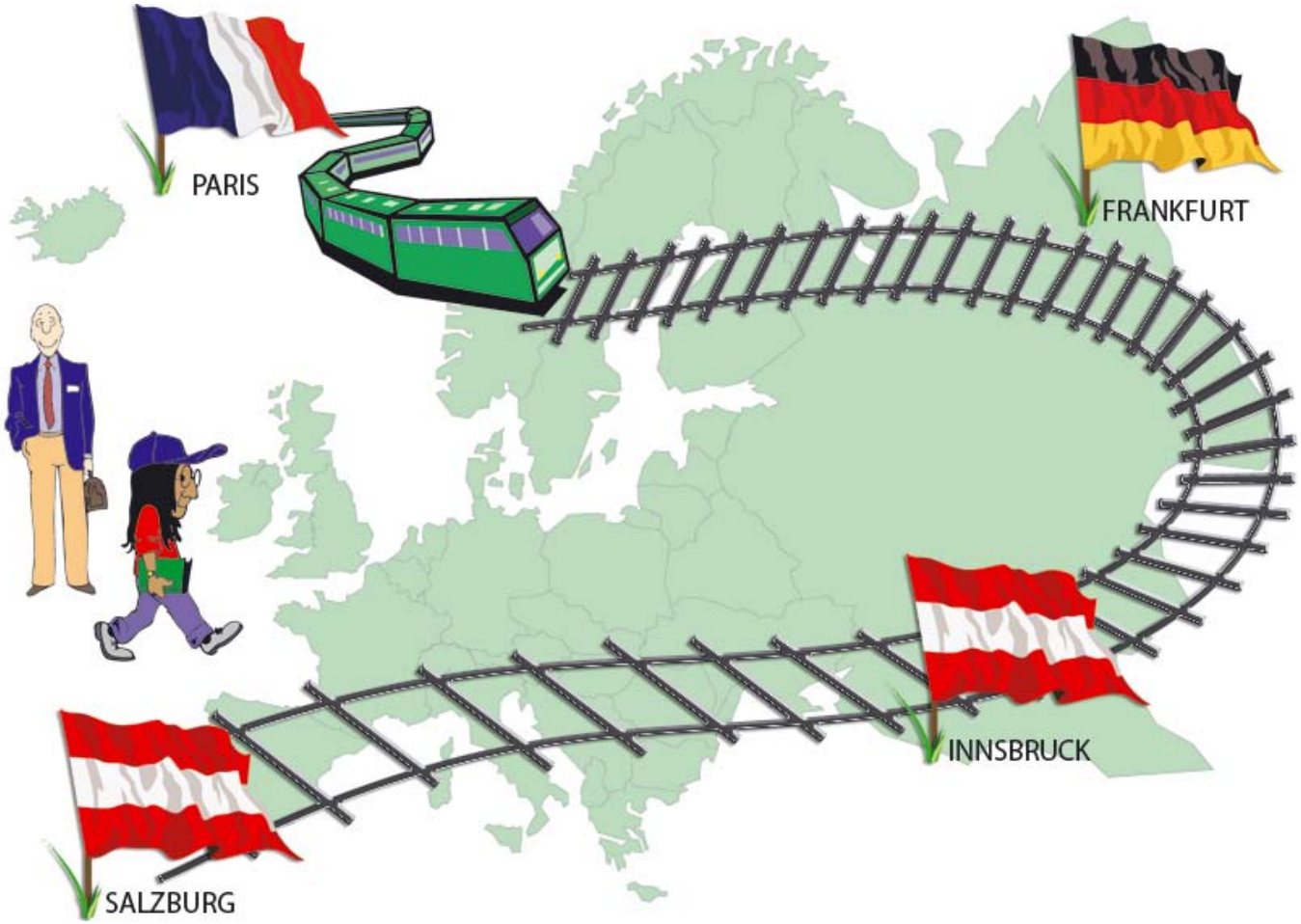

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