

A Knowledge-Engine Architecture for a Competence Management Information System

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Positive Information Systems

Organisational Knowledge

Managing and Representing Competencies and Work Experiences

Focus on Knowledge-Intensive Organisations (KIOs)

The resource-based view of the firm includes human competencies

Competence management to manage competencies and 'natural talent'

Focus on the management of competence elements

Experience, skills and areas of domain expertise

Rules of thumb, 'experience' - things that are usually unarticulated

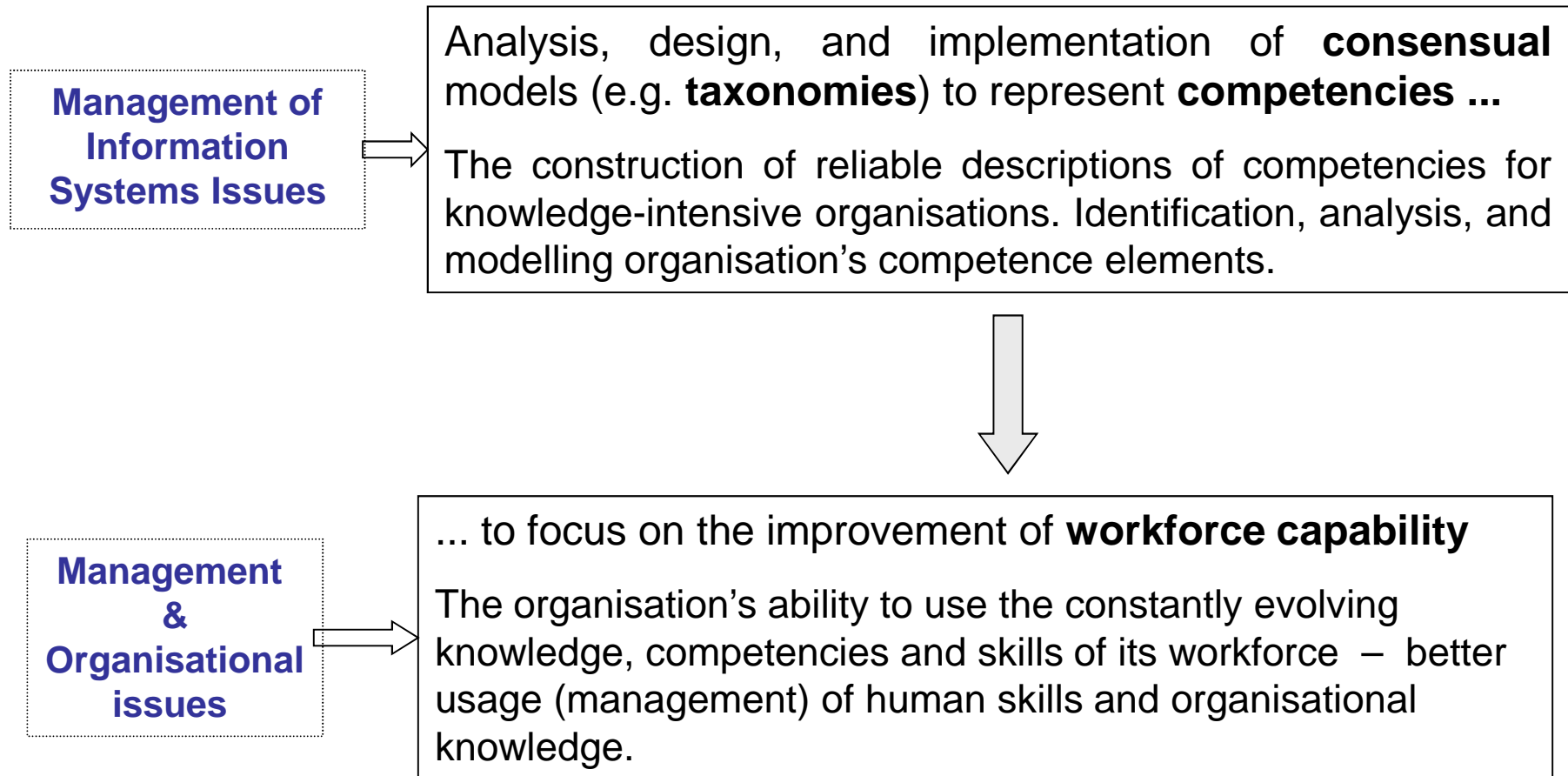
Focus on the representation of competencies and projects

Ontologies / Taxonomies / Semantic Networks

Portal technology (internet-based networking technologies)

K-Now / K-Engine prototype (competence management tool)

KM Approach to Managing Competencies



Target Domains for KM and Competence Management

Knowledge Intensive Organisations

Organisational environment

- Decision making in a fluid and dynamic environment
- HR characterised by highly skilled people: knowledge workers
- Individuals and workgroups are the prime location of knowledge

Information level

- Many (heterogeneous) sources of information
- Information may be unstructured, semi-structured or structured

Knowledge level

- Knowledge intensive tasks
 - Dealing with abstraction and uncertainty
 - Recognising patterns of organisational behaviour
 - Managing complex and changing web of relationships
- Expert knowledge bottleneck
 - Distributed and untraceable expert knowledge
 - Lack of expert knowledge in terms of business demand

K-Now prototype description

K-Now acts as an **Organisational Memory IS** which continuously captures and analyses the (competence-based) knowledge assets of an organisation.

K-Now is a **collaborative system** where HR can query and browse both **structured** and **unstructured** information in order to **retrieve** and **preserve** competence-based organisational knowledge.

Starting points:

- Individual and Group Competencies
 - Domain-independent (or primitive) competence taxonomies
 - Domain/organisational-dependent competence taxonomies
- Business and work experiences and related heuristics
- Problem-solving resources
- Patterns of organisational, group or individual behaviour
- Strategic information (organisational and stakeholder levels)

Competence Management Information System

Focus of k-now prototype

Capturing undocumented and unstructured knowledge

- unwritten procedures
- undocumented individual and group competencies

Context sensitive retrieval of information

- not keyword-based retrieval

Semi-automatic generation of information

- through the use of inference mechanisms

Working collaboratively (improve and preserve collaborative work)

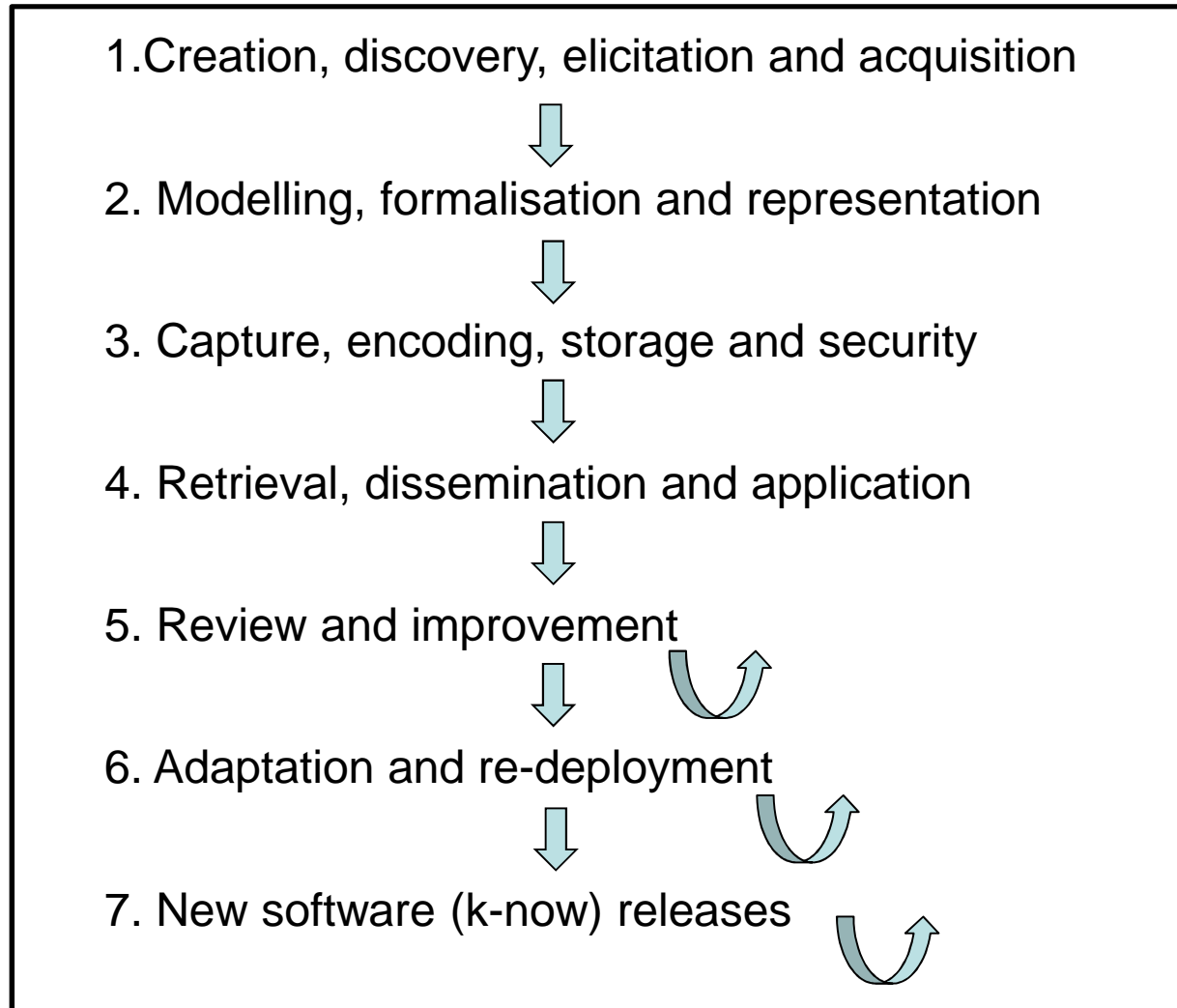
- facilitating collaboration through the definition of competence taxonomies

Communicate, co-ordinate and collaborate:

- Share our tacit knowledge
- Make our tacit knowledge explicit
- Learn and gain insights
- Reveal our blind-spots and assumptions
- Build our working relationships using shared competence views

Knowledge engineering process

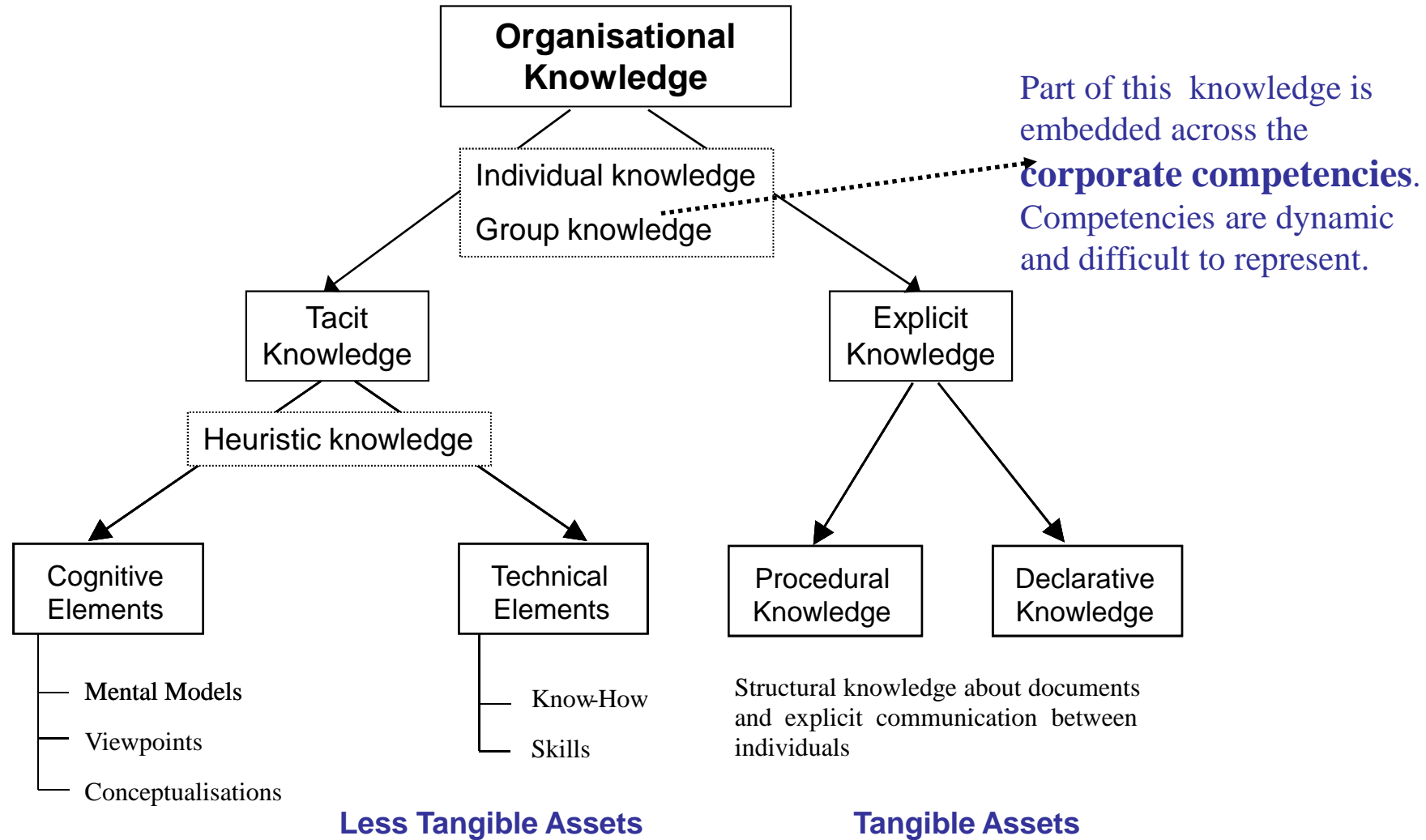
The project: k-know design and development



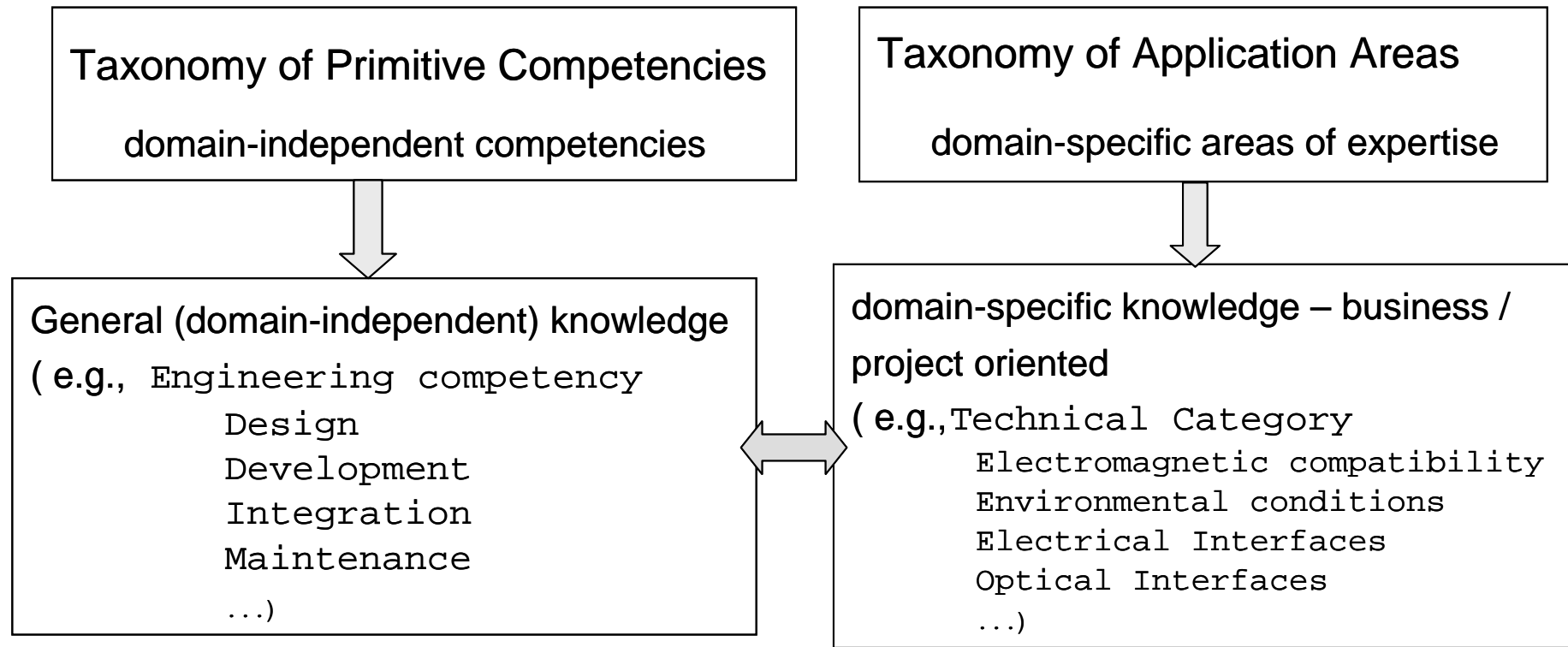
Iterative
and
staggered
approach

Organisational Knowledge Classification

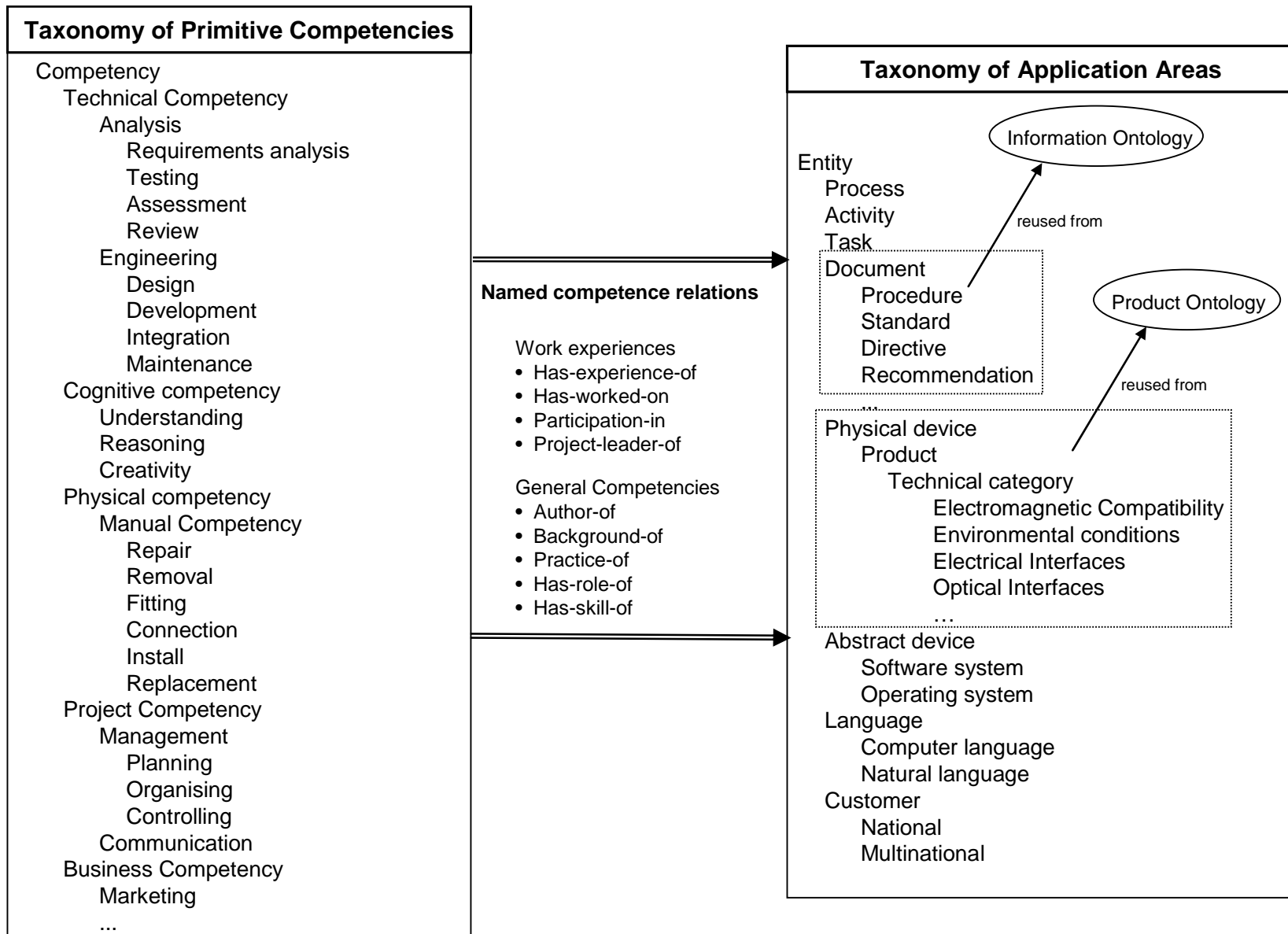
Organisation Taxonomy for Knowledge Assets



Dimensions of an organizational competency

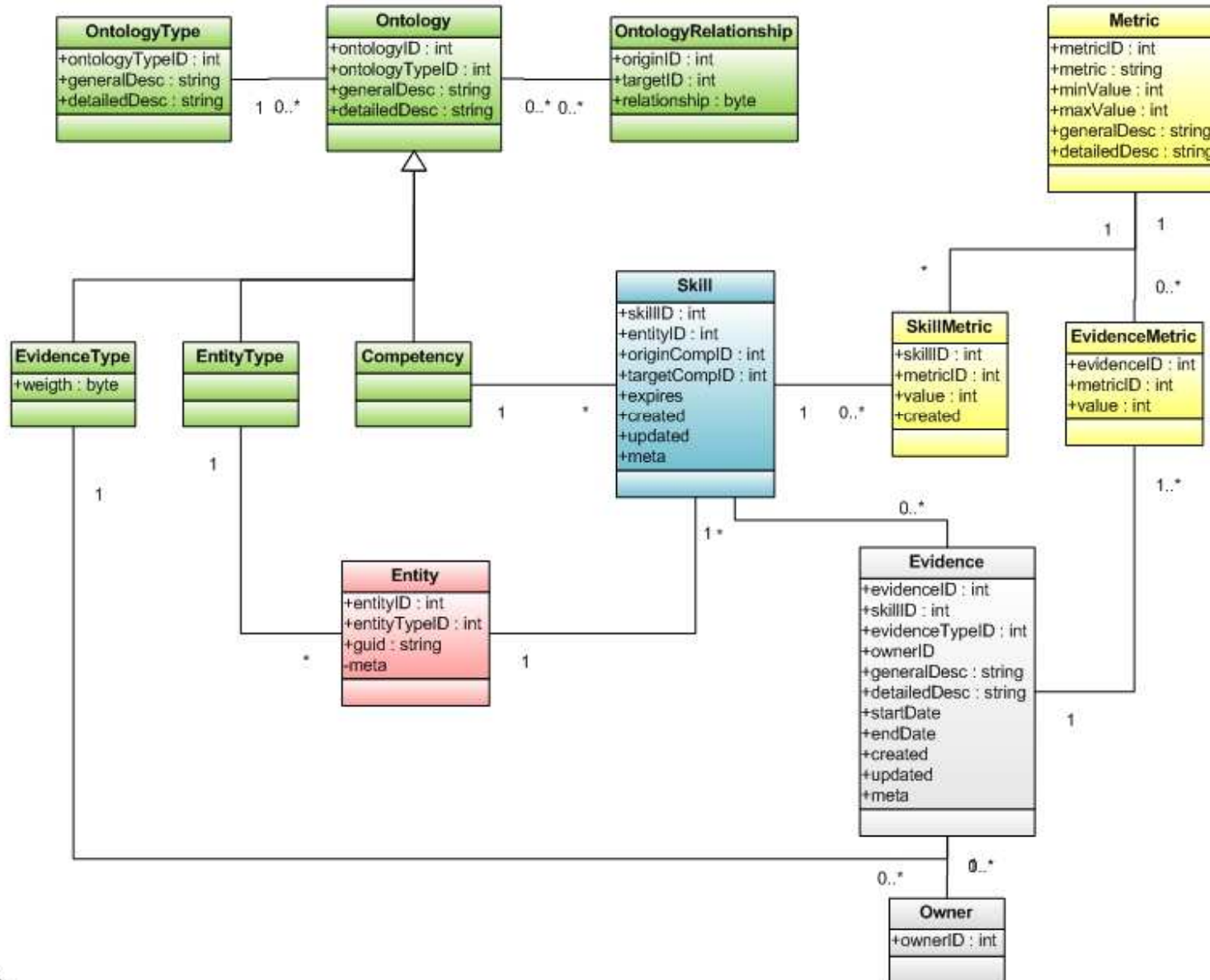


Competence Taxonomy (example)



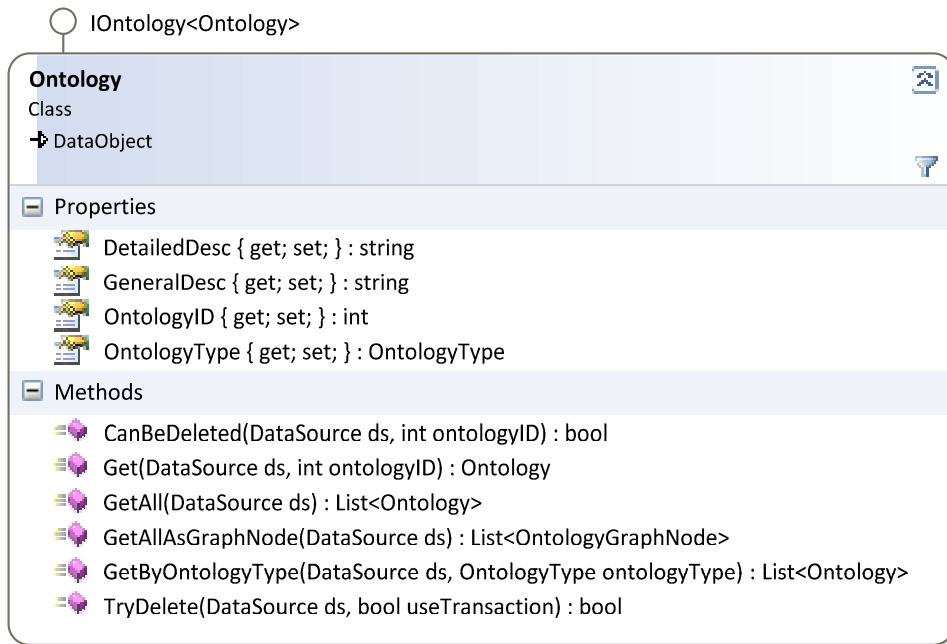
Ontology-skill meta-model

KnowledgeEngine Ontology-Skill Architecture



K-Now

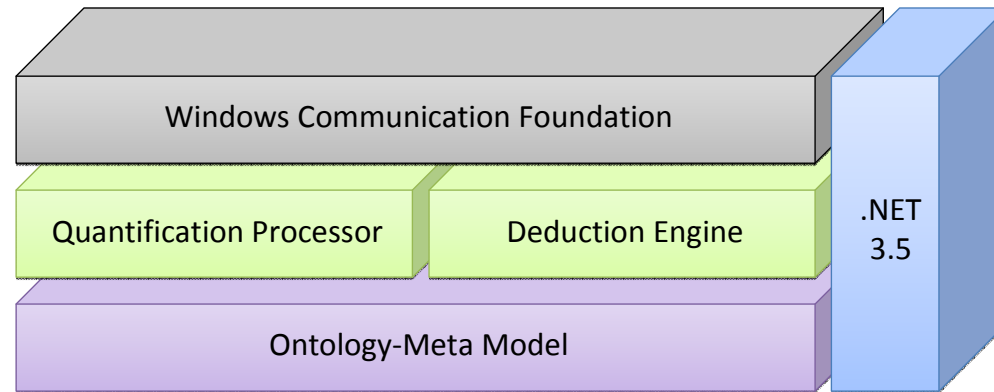
Domain-independent (and ontology) design



- object-oriented implementation of the ontology-skill approach
- conceptual layer (meta-model) for a web-based KM application
- focus on corporate competence elements
- competency-based practices to assist strategic decision support in KIO
- provide a innovative solution (and domain-independent) for competence modelling
- empower competence assessment with a flexible software system
- knowledge gap analysis (and follow-up activities)

K-Engine architecture

Focus on knowledge quantification



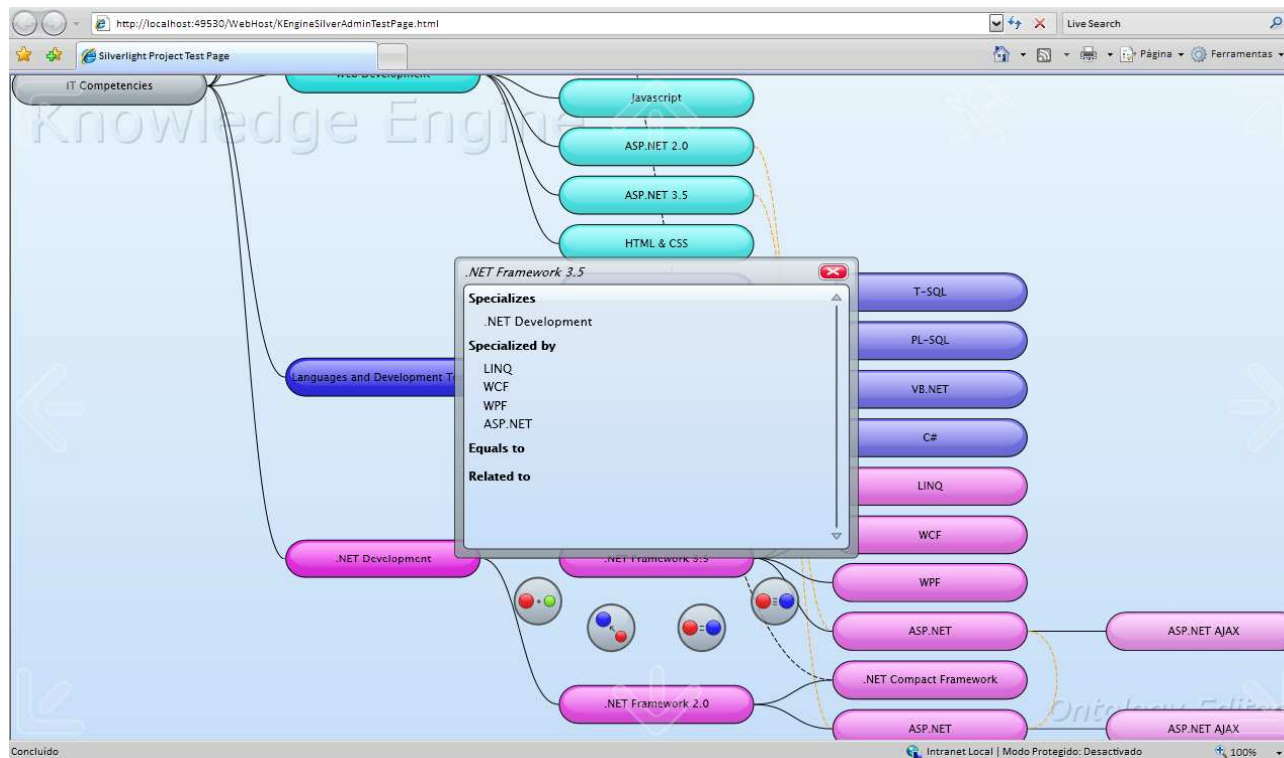
Knowledge quantification

- How much does someone knowledgeable about a specific area of knowledge?
- How sure are we that they effectively know this?
- How do we measure and assess that knowledge?

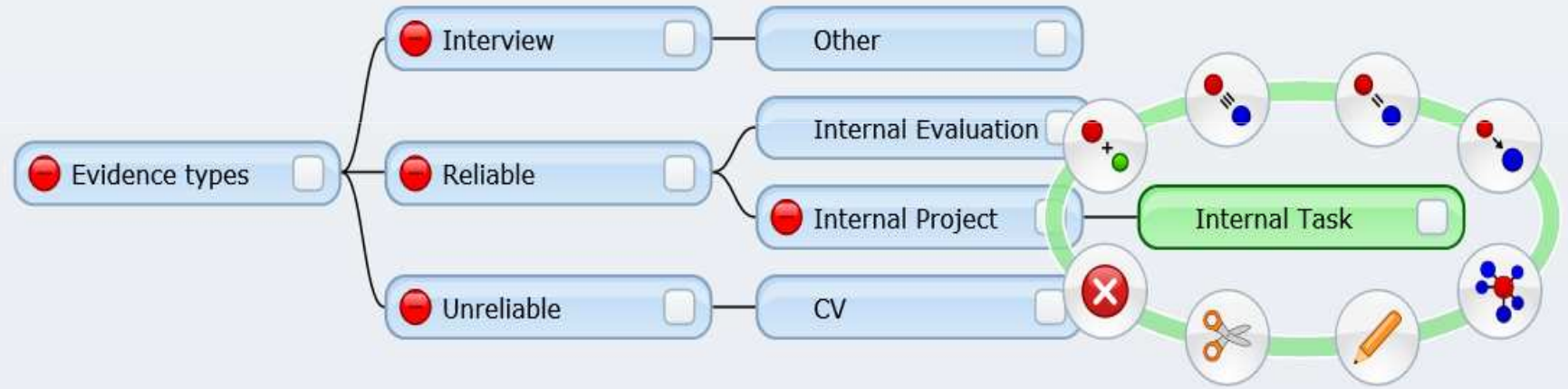
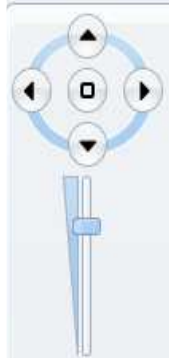
Types of metrics are used to express expertise

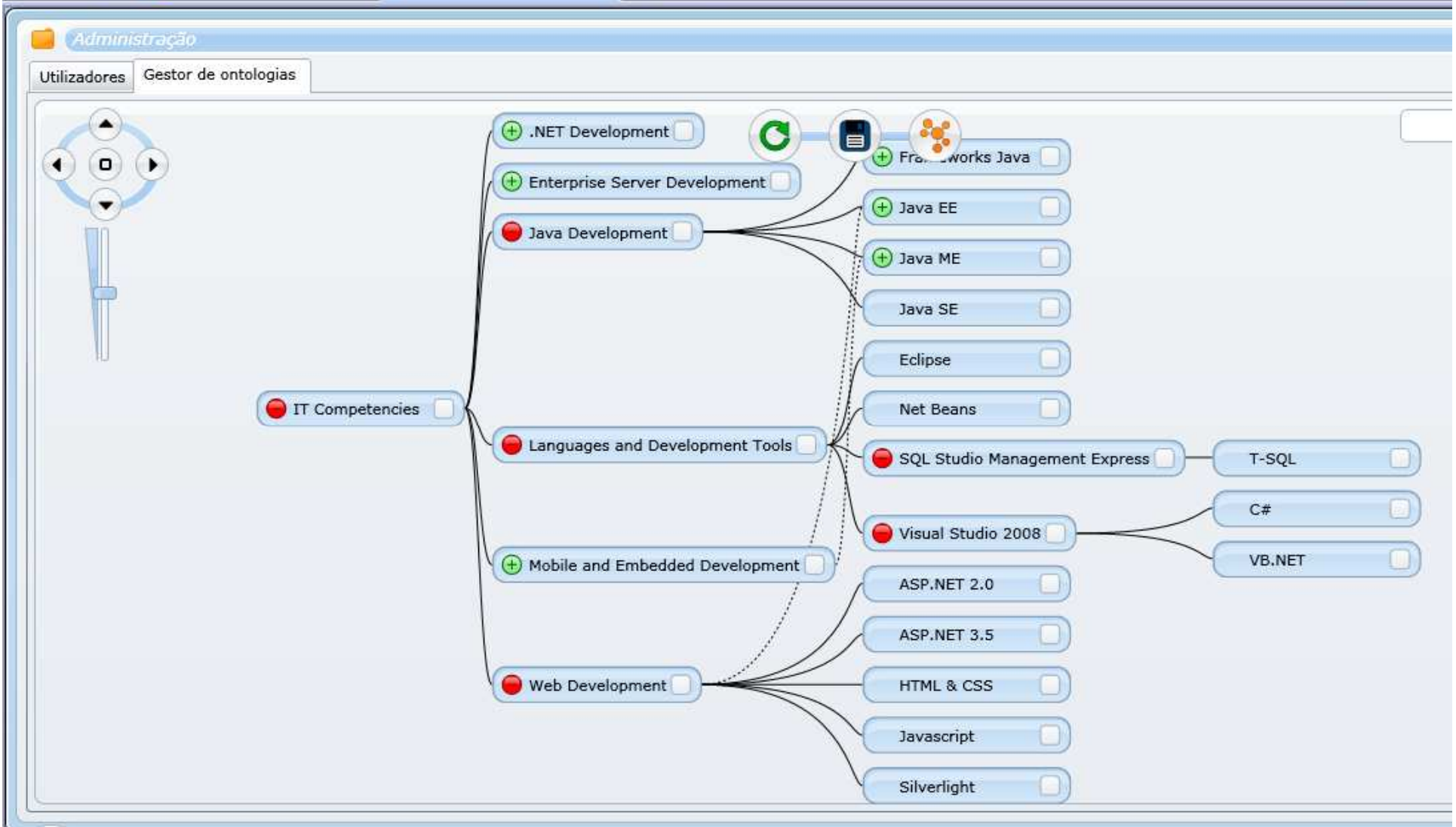
- Quantification value (how much is known)
- Reliability value (how sure are we about it)

k-engine and competence-based practices



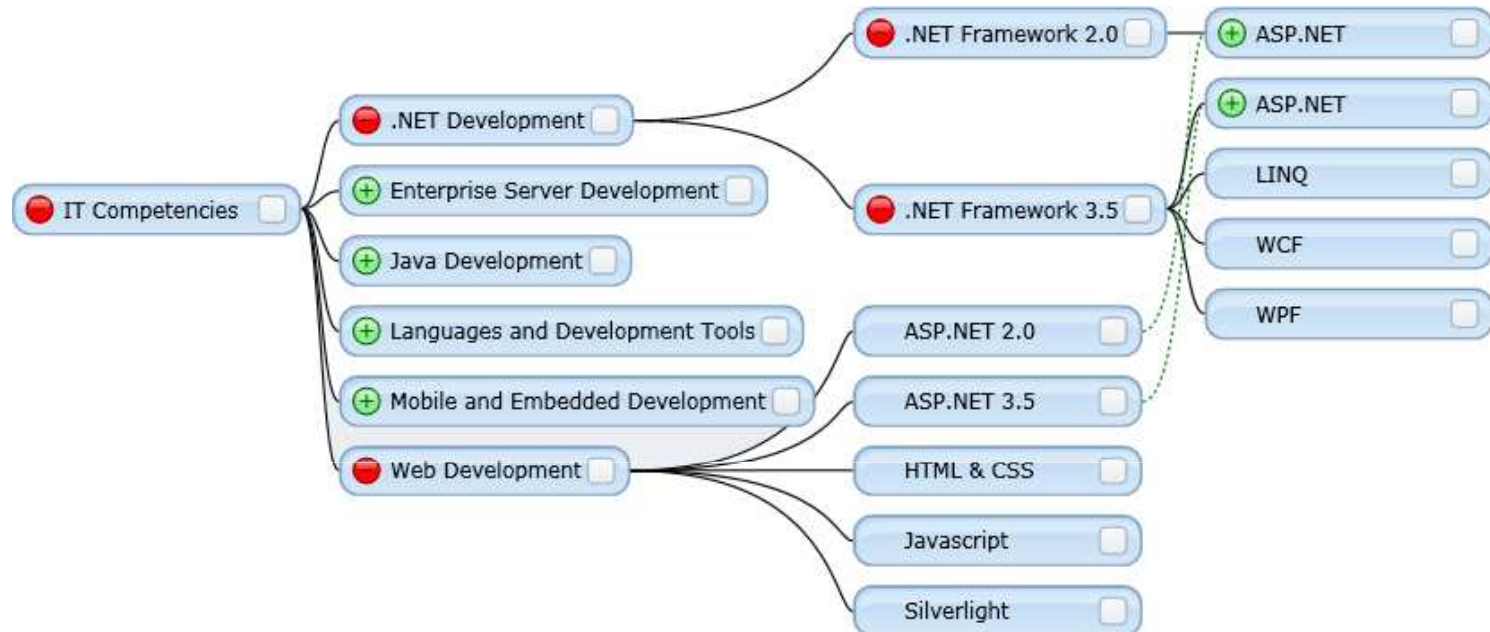
- K-Engine enables the representation of semantically rich networks of competencies.
- Skills are considered and represented as composite competencies.
- Inference mechanisms include rules that allow the retrieval of meaningful (competence) information.
- The quantity and reliability of knowledge is not a static value, it depends on which rules we define and apply.
- The main factor in the rule definition is the “distance” between the given skills and the set of deduced skills.
- The query result consists of a set of quantified entities, which includes a match rating, quantification rating and quality rating.





Competence Management Information System

k-now - R&D focus (final remarks)



- **minimise the loss of corporate expertise** when a specialist leave the company;
- explore and **reuse the experience acquired in past projects** in order to avoid the repetition of previous mistakes;
- **improve the information circulation** and communication across the company;
- **integrate the know-how** and expertise from different sources in the company;
- improve the process of individual and **organizational learning** through the effective application of collaborative (and dynamic) **competence taxonomies**.