IKS – Interactive Knowledge Stack for Semantic Content Management Systems

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IKS is co-funded by the European Union and develops new technology for intelligent content management

WHO and WHY? → Six Industrials and seven Research Groups make a start …

- IKS has 6 SME CMS technology providers
- 4 of them are fully based on open source CMS

The CMS Vendors want to introduce knowledge based technologies into their existing software frameworks

- The research and development will be focussing on extending current CMS technology with:
  - Intelligent User Interfaces
  - Knowledge based Systems Modelling
  - Software Engineering Methodology
  - Future Internet – Ambient Intelligence applications
  - Semantic Web Application Building

The IKS Consortium

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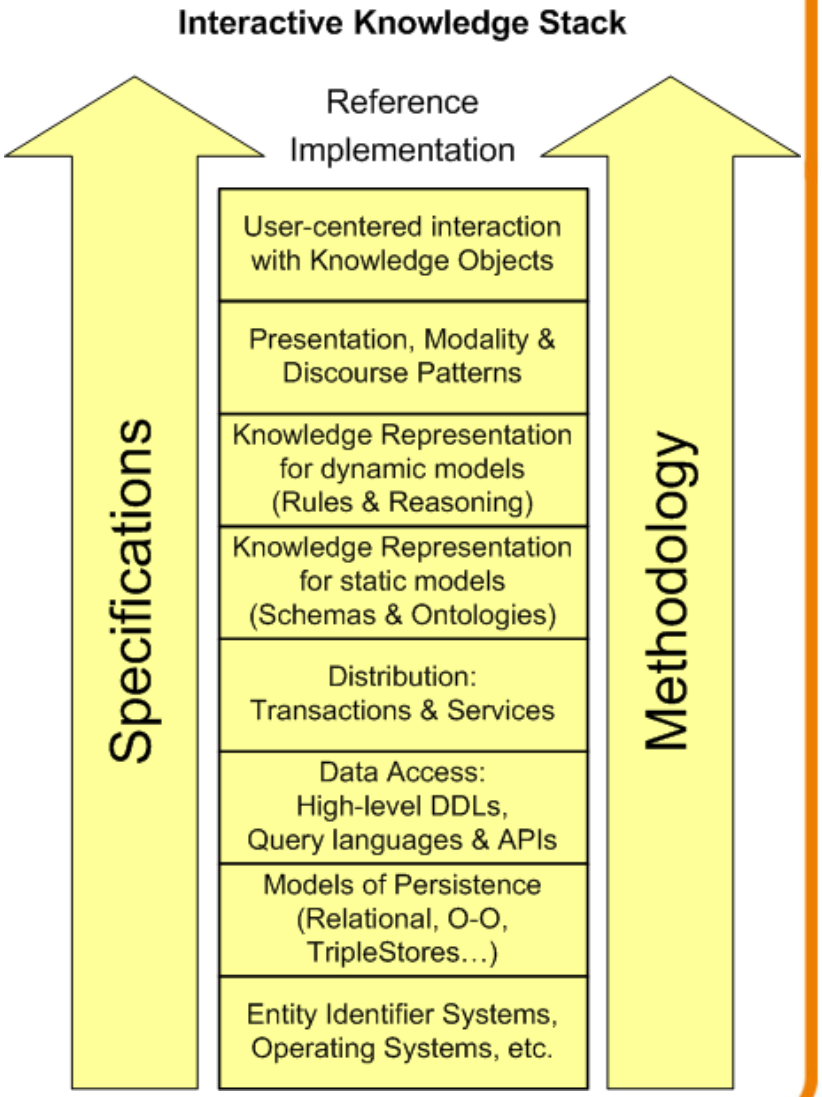
Consiglio Nationale delle Ricerche (CNR)	Software Quality Lab Unversität Paderborn
Software Research and Development Consultancy Ltd (SRDC)	Hochschule Furtwangen
Nuxeo Sa.	Alkacon Software GmbH
TXT Polymedia	Pisano Holding GmbH
Nemein Oy	Day Software AG

WHAT? → Add Knowledge Technologies to existing CMS

Interactive Knowledge Stack

A Reference Architecture for Semantically Enabled Content Management Systems

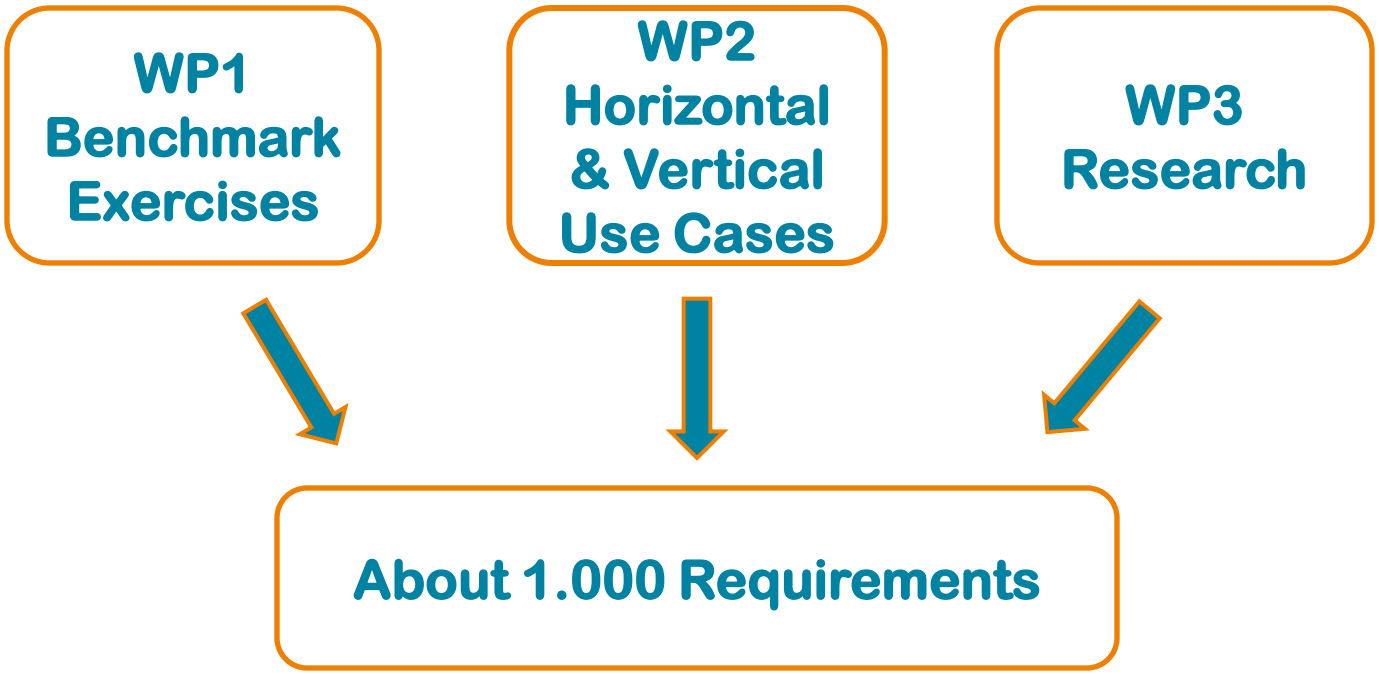


Comparison of Technology Stacks LAMP, IKS and JEE

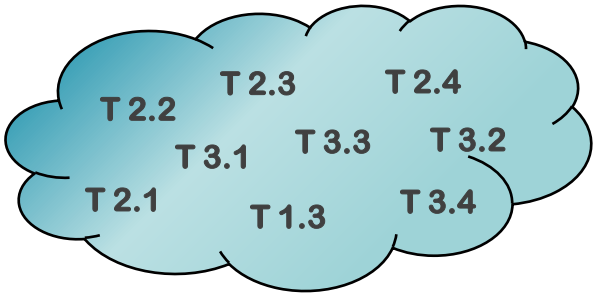
The IKS Stack is a working hypothesis at present …

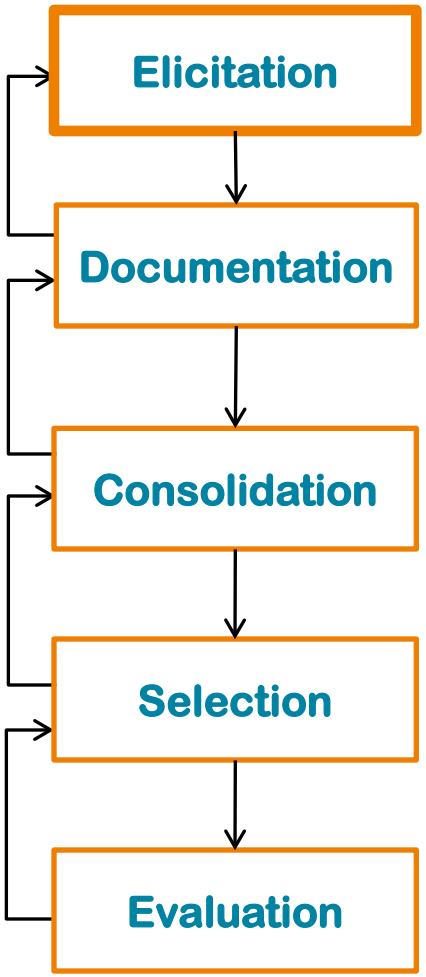
LAMP CMS Stack	Interactive Knowledge Stack	JEE-based CMS Stack
Php, HTML	User-centered interaction with Knowledge Objects	AJAX, HTML, ...
XML, CSS, bespoke Code	Presentation, Modality & Discourse Patterns	CSS, XML, forms, Java bespoke code
Php bespoke Code	Knowledge Representation for dynamic models (Rules & Reasoning)	Java bespoke Code
Php bespoke Code	Knowledge Representation for static models (Schemas & Ontologies)	OO Model + Java Code
Apache	Distribution: Transactions & Services	JBOSS
SQL	Data Access: High-level DDLs, Query languages & APIs	SQL, OQL, Java Code
mySQL	Models of Persistence (Relational, O-O, TripleStores…)	RDBMS, OODBMS, JCR
Entity Identifier Systems, Operating Systems, etc.	Entity Identifier Systems, Operating Systems, etc.	Entity Identifier Systems, Operating Systems, etc.

Requirements Engineering in IKS



RE Process





What are our requirements for the IKS?

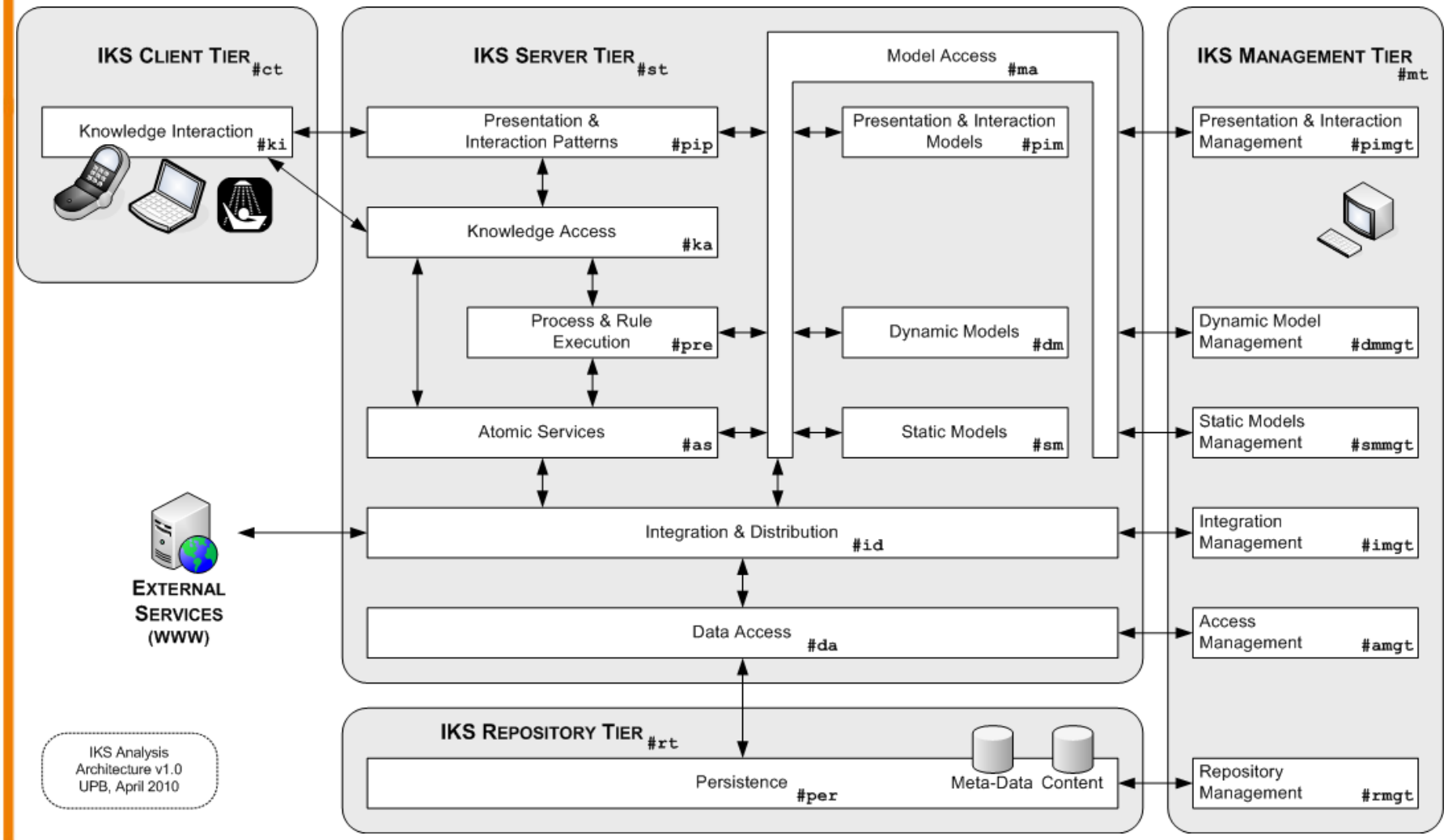
How do we get a common documentation of the elicited requirements?

Are the requirements complete and consistent?

Which requirements do we actually implement?

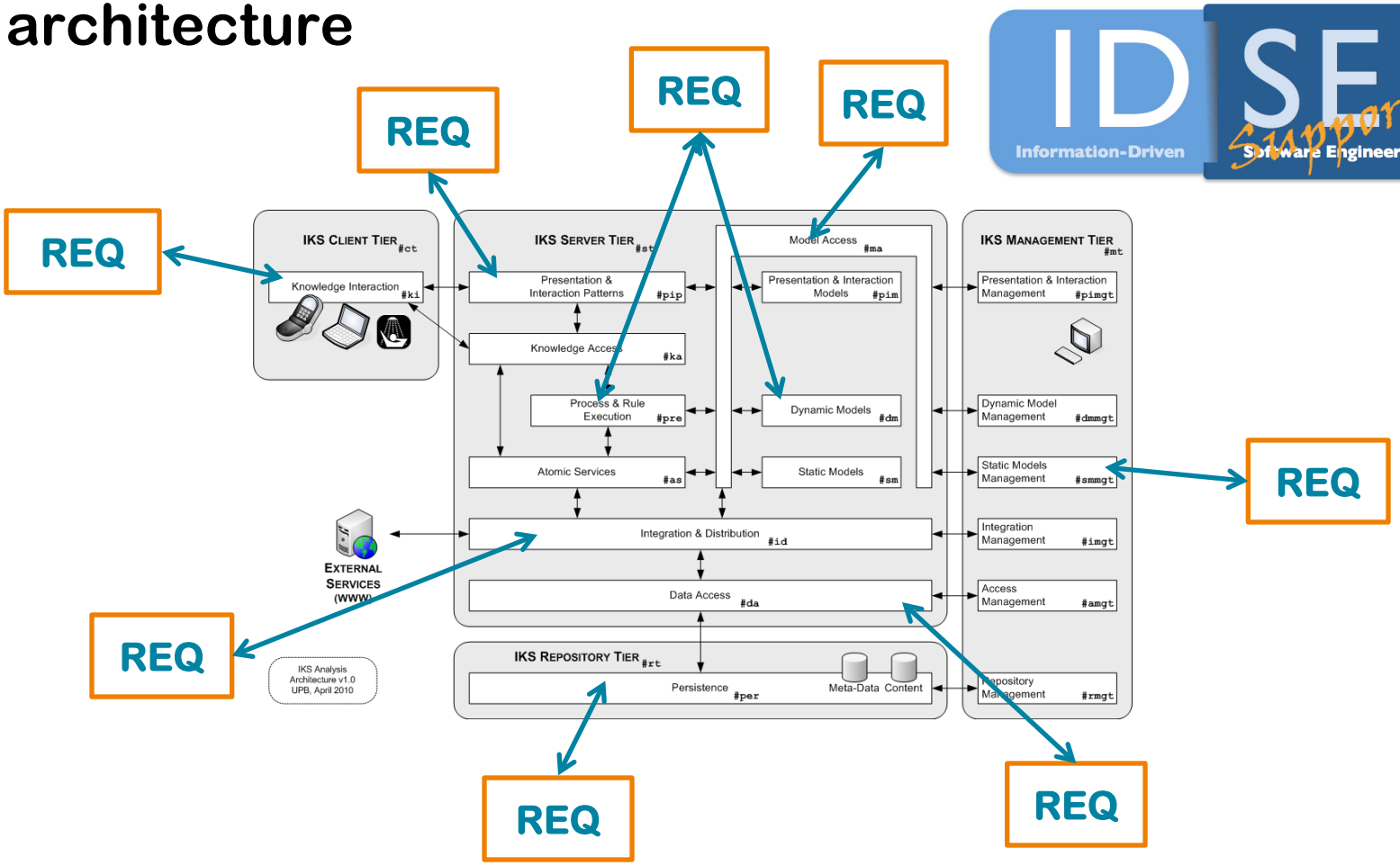
Did we finally get what we aim for?

Current Analysis Architecture



Connect RE and Architecture

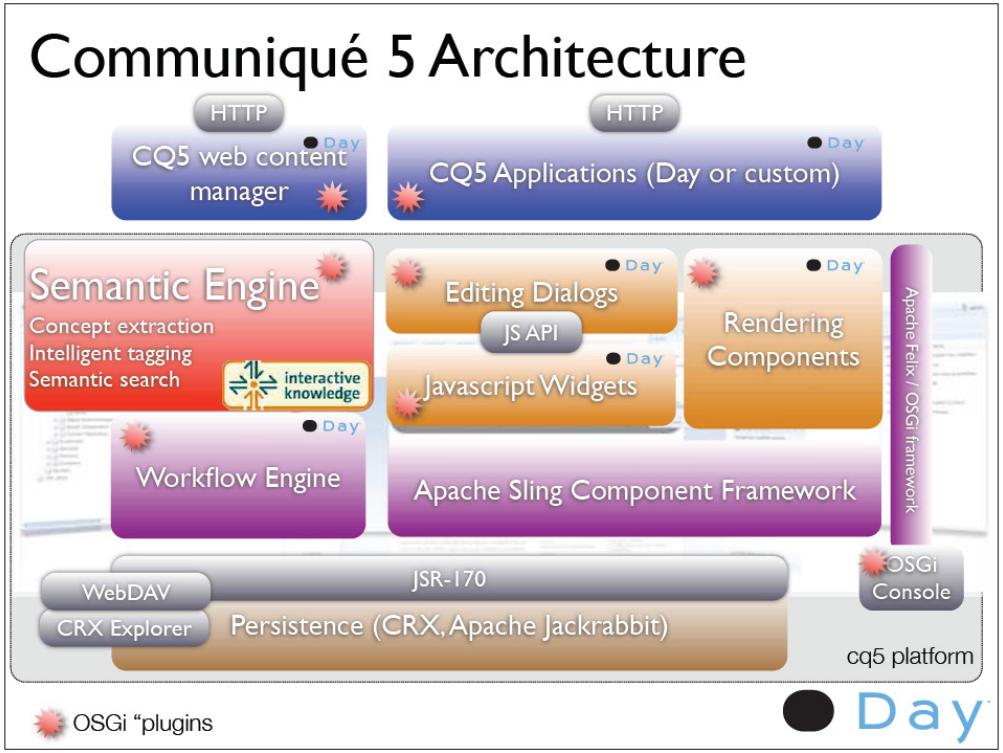
- Traceability between requirements and architecture



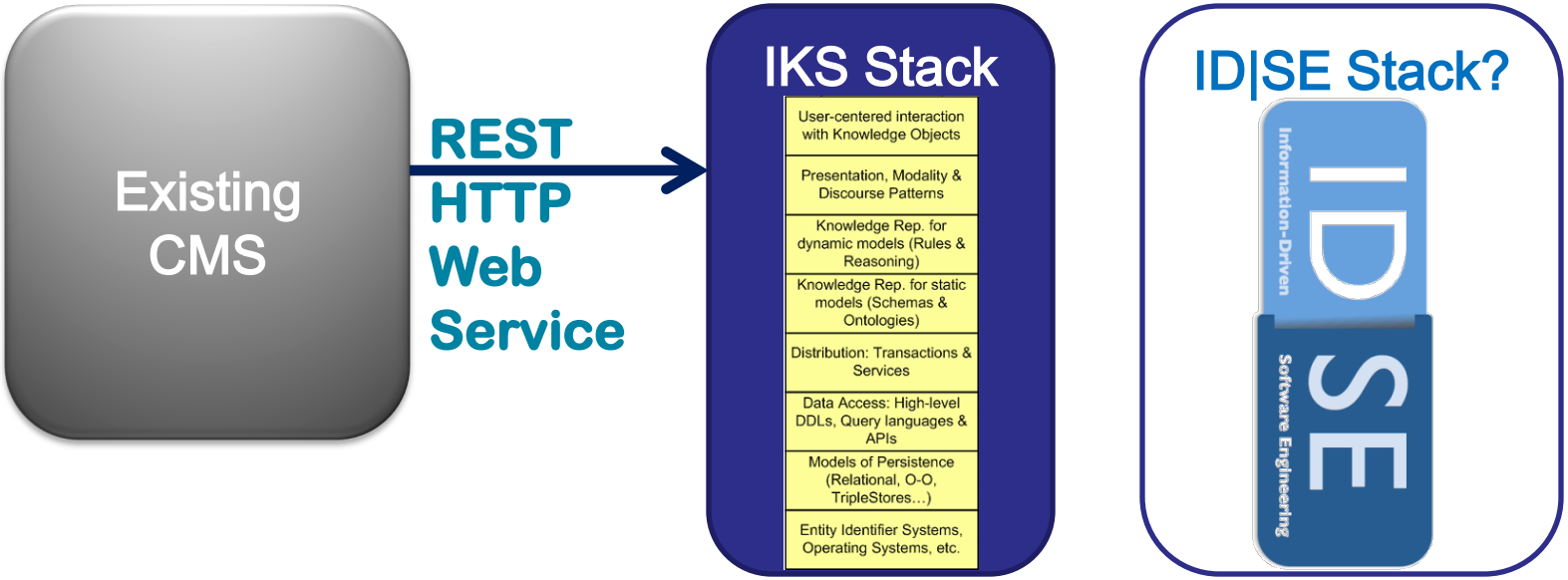
The Interactive Knowledge Stack must live alongside a real architectural stack!

Here is the Day Software Stack for CQ5 WCMS …
IKS components must be usable from within CQ5

IKS must offer value to every CMS technology provider who wants to move into „semantics“



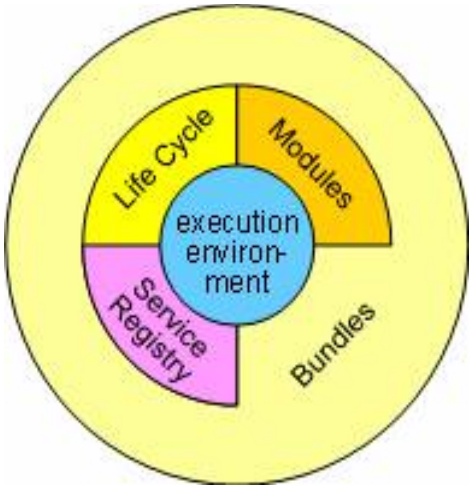
RESTful Services



And here is an additional challenge … IKS must work with a de facto standard!

The core element of the OSGi Specifications is the OSGi Framework.

IKS partner NUXEO uses the OSGi specifications



IKS must be compatible with OSGi in order to enable interoperation

IDSE Information-Driven Software Engineering

Technology?

The Workplan

Interactive Knowledge Workplan	Y1Q1	Y1Q2	Y1Q3	Y1Q4	Y2Q1	Y2Q2	Y2Q3	Y2Q4	Y3Q1	Y3Q2	Y3Q3	Y3Q4	Y4Q1	Y4Q2	Y4Q3	Y4Q4	
																	Distrib
1 WP: Benchmarking industrial software capabilities																	42,0
1.1 Task: Design the benchmarking experiment	4,0	3,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,0
1.2 Task: Industrial benchmark exercise	-	6,0	9,0	8,0	-	-	-	-	-	-	-	-	-	-	-	-	23,0
1.3 Task: Validating the results and capturing requirements	-	-	3,0	5,0	4,0	-	-	-	-	-	-	-	-	-	-	-	12,0
2 WP: Understanding & Requirements Capture through Use Cases																	58,0
2.1 Task: AmI Case: Analysis and Specifications	-	-	8,0	8,0	-	-	-	-	-	-	-	-	-	-	-	-	16,0
2.2 Task: Horizontal industrial case: Analysis and Specifications	5,0	5,0	5,0	5,0	-	-	-	-	-	-	-	-	-	-	-	-	20,0
2.3 Task: Vertical industrial case: Analysis and Specifications	-	-	4,0	4,0	4,0	-	-	-	-	-	-	-	-	-	-	-	12,0
2.4 Task: Intelligent project planning tool: Analysis and Specifications	4,0	3,0	3,0	-	-	-	-	-	-	-	-	-	-	-	-	-	10,0
3 WP: Research into Requirements of the Interactive Knowledge Stack																	106,0
3.1 Task: IKS: Requirements for Knowledge-based Interaction and Presentation	4,0	6,0	6,0	6,0	6,0	-	-	-	-	-	-	-	-	-	-	-	28,0
3.2 Task: IKS: Requirements for Knowledge Representation and reasoning	5,0	5,0	4,0	4,0	5,0	5,0	-	-	-	-	-	-	-	-	-	-	28,0
3.3 Task: IKS: Requirements for Semantic Lifting Components for traditional content resources	5,0	5,0	4,0	3,0	3,0	3,0	-	-	-	-	-	-	-	-	-	-	23,0
3.4 Task: IKS: Requirements for Semantic data access and persistence	4,0	5,0	5,0	3,0	5,0	5,0	-	-	-	-	-	-	-	-	-	-	27,0
4 WP: Design and Implementation of the Use Cases																	108,0
4.1 Task: AmI Case: Design and Implementation	-	-	-	-	6,0	6,0	6,0	6,0	7,0	7,0	-	-	-	-	-	-	38,0
4.2 Task: Horizontal industrial case: Design and Implementation	-	-	-	-	-	-	8,0	6,0	6,0	6,0	6,0	4,0	-	-	-	-	36,0
4.3 Task: Vertical industrial case: Design and Implementation	-	-	-	-	-	-	-	3,0	4,0	4,0	4,0	4,0	-	-	-	-	19,0
4.4 Task: Intelligent project planning tool: Design and Implementation	-	-	2,0	2,0	2,0	3,0	3,0	3,0	-	-	-	-	-	-	-	-	15,0
5 WP: Design and Implementation of the Interactive Knowledge Stack																	127,0
5.1 Task: IKS: Design and Implementation of presentation and interaction components	-	-	-	4,0	6,0	9,0	-	8,0	8,0	-	6,0	6,0	-	-	-	-	47,0
5.2 Task: IKS: Design and Implementation of KR and reasoning components	-	-	-	2,0	3,0	4,0	-	4,0	4,0	-	3,0	2,0	-	-	-	-	22,0
5.3 Task: IKS: Design and Implementation of Semantic Lifting Components for traditional content resources	-	-	-	2,0	3,0	4,0	-	6,0	6,0	-	3,0	3,0	-	-	-	-	27,0
5.4 Task: IKS: Design and Implementation of semantic data access and persistence components	-	-	2,0	3,0	3,0	3,0	-	6,0	6,0	-	4,0	4,0	-	-	-	-	31,0
6 WP: Validating the Interactive Knowledge Stack																	80,0
6.1 Task:Validation of IKS through internal use case application developers	-	-	-	-	-	6,0	6,0	-	-	-	-	-	-	-	-	-	12,0
6.2 Task: Validation of IKS through industrial use case application developers	-	-	-	-	-	-	12,0	-	-	12,0	12,0	6,0	-	-	-	-	42,0
6.3 Task: External Validation of IKS through "early adopters"	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	1,0	1,0	6,0
6.4 Task: Empirical studies with end users	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,0	4,0	7,0
6.5 Task: Performance benchmarks for IKS	-	-	-	-	-	-	-	-	-	1,0	2,0	2,0	2,0	2,0	2,0	2,0	13,0
7 WP: Methodology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59,0
7.1 Task: Semantic Technologies in CMS	-	-	-	-	1,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	7,0
7.2 Task: Handbook for developing semantic CMS applications	-	-	-	-	-	-	-	-	-	-	-	-	4,0	4,0	4,0	4,0	16,0
7.3 Task: Curriculum and training material for university teaching	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	2,0	2,0	3,0	17,0
7.4 Task: Curriculum and training material for industrial training	-	-	-	-	-	-	-	-	2,0	2,0	3,0	3,0	2,0	2,0	2,0	3,0	19,0
8 WP: Community Activation: "Semantic Wave Europe"																	88,0
8.1 Task: IKS project dissemination	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	20,0
8.2 Task: Liaising with open source communities	0,5	0,5	0,5	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	7,0
8.3 Task: Liaising with W3C and standards bodies	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	1,0	1,0	1,0	1,0	0,5	0,5	10,0
8.4 Task: Ensuring industrial uptake through training	-	-	-	-	-	-	-	-	-	-	1,0	1,0	2,0	2,0	1,0	1,0	8,0
8.5 Task: Ensuring academic diffusion in IT-related studies	-	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	1,0	1,0	6,0
8.6 Task: Open Source semantic CMS grant scheme	-	-	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	-	-	6,0
8.7 Task: Recruiting, selection and training of "early adopters"	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,5	1,0	1,0	0,5	0,5	0,5	0,5	6,0
8.8 Task: Semantic CMS technology Roadshow	-	-	-	-	-	-	-	-	-	1,0	1,0	2,0	4,0	4,0	4,0	4,0	20,0
8.9 Task: Impact monitoring	-	-	-	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	2,0	5,0
9 WP: Industrial Application building and Demo																	38,0
9.1 Task: Showcasing AMI	-	-	-	-	-	-	-	-	-	-	-	-	4,0	4,0	2,0	2,0	12,0
9.2 Task: Showcasing horizontal semantic CMS application	-	-	-	-	-	-	-	-	-	-	-	-	3,0	2,0	1,0	1,0	7,0
9.3 Task: Showcasing vertical semantic CMS application	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	1,0	1,0	4,0
9.4 Task: Showcasing intelligent project planning application	-	-	-	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	4,0
9.5 Task: Showcasing domain specific applications	-	-	-	-	-	-	-	-	-	-	-	-	4,0	4,0	2,0	1,0	11,0
10 WP: Project Management																	64,0
10.1 Task: Coordination and Financial Administration	1,5	0,5	0,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	2,5	23,0
10.2 Task: Technical Coordination & Contingency Planning	1,0	1,0	1,0	2,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	2,5	18,5
10.3 Task: Quality Management and Self Assessment	1,0	1,0	1,0	2,0	1,0	1,0	1,0	2,0	2,0	1,0	1,0	2,0	2,0	1,0	1,0	2,5	22,5
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	36,6	42,6	60,1	67,0	57,0	56,0	43,0	51,0	52,2	41,5	55,5	48,5	41,0	41,0	35,0	42,0	770

Major Expected Results of IKS

- 06/2009: First Community Workshop (29/05/2009)
- 12/2009: Scenarios; IKS Stack Spec.; 1st Demos

- 06/2010: Alpha-prototype of the IKS Stack
- 12/2010: Validation Results of IKS Stack Alpha

- 06/2011: Beta-Version of the IKS Stack
- 12/2011: Final Version of the IKS Stack

- 06/2012: Early Adopter Success Stories
- 12/2012: Impact Assement of IKS on CMS Market

Join the IKS Community at www.iks-project.eu

IKS Kick-off Meeting in January 2009

First Community Workshop on IKS Requirements in May 2009

IKS invites „governance by stakeholders“ → more than 20 people from CMS communities joined us for the first workshop in 2009!

IKS and ID|SE

- Vertical IKS Use Case:
  Software Engineering Domain
  - Content clustering
  - Traceability among content items
  - Calculation of correlation among content
- Content = Software Engineering Artefacts
  - Requirements
  - Use Cases
  - Unstructured textual specifications