

Making Knowledge Management Work with XML, XLink, Topic Maps, and AI

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Roadmap

- Knowledge Management Methodologies
- Enterprise Knowledge Management powered by XML, XLink, Topic Maps
- CBR – A Practical AI Approach
- Enterprise Knowledge Management – A System Architecture

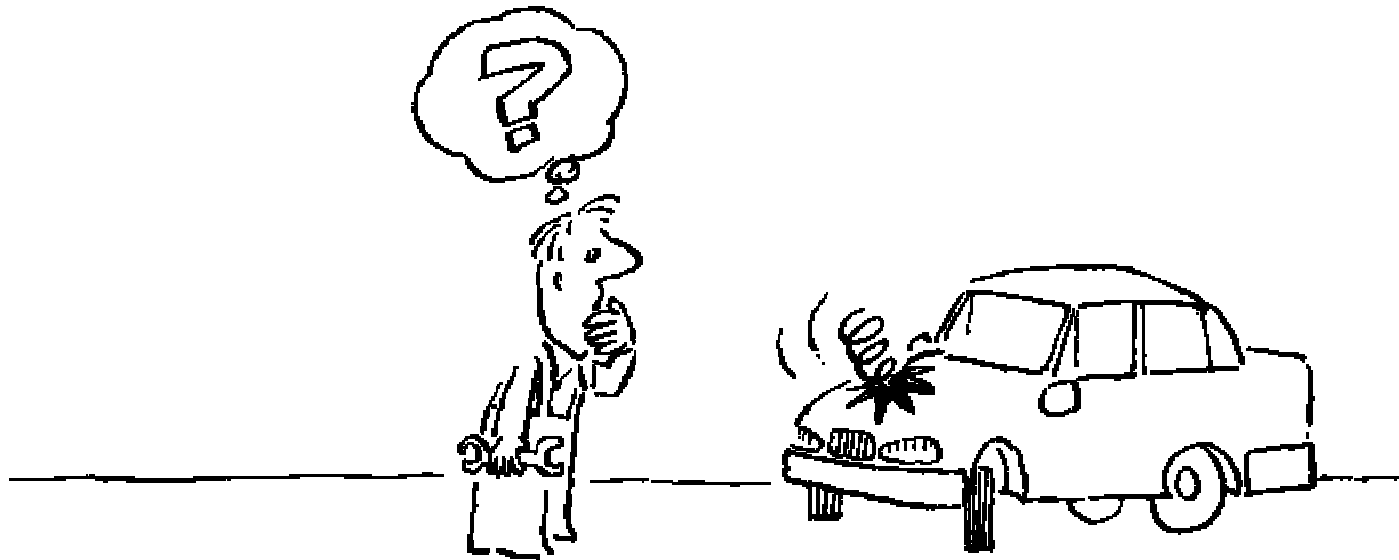


Part I:

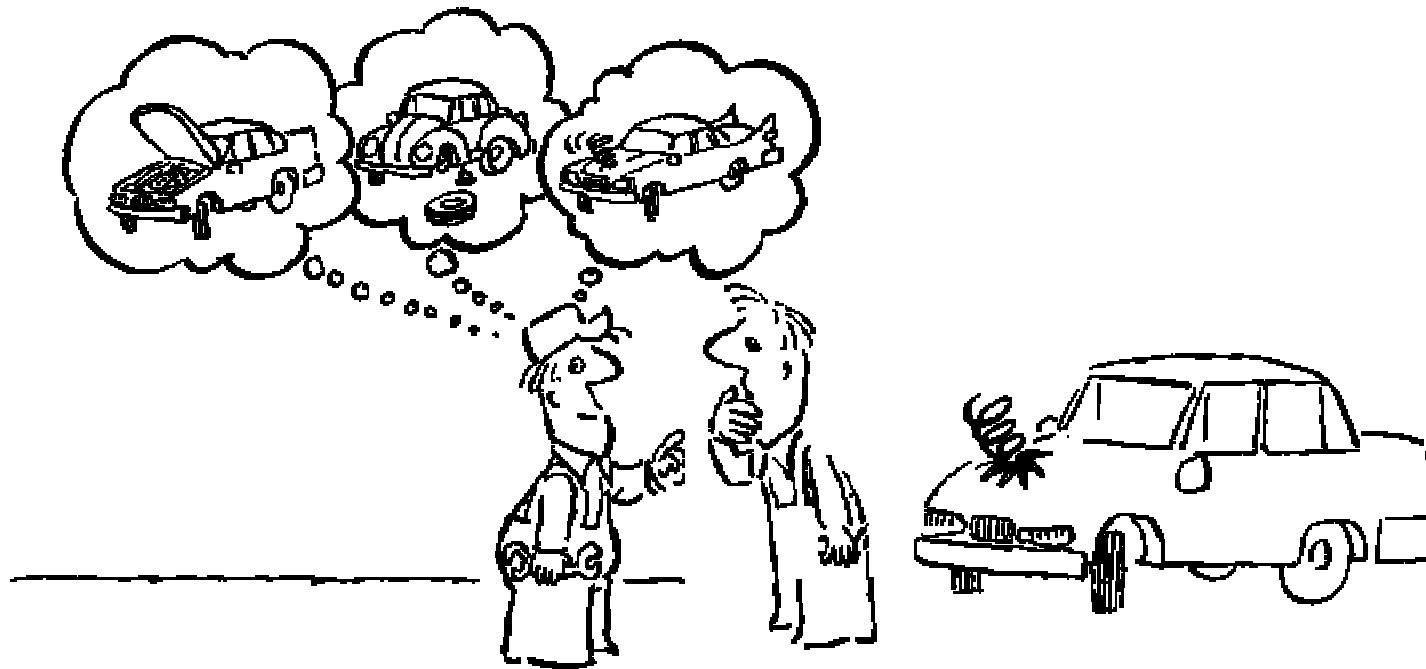
Knowledge Management Methodologies



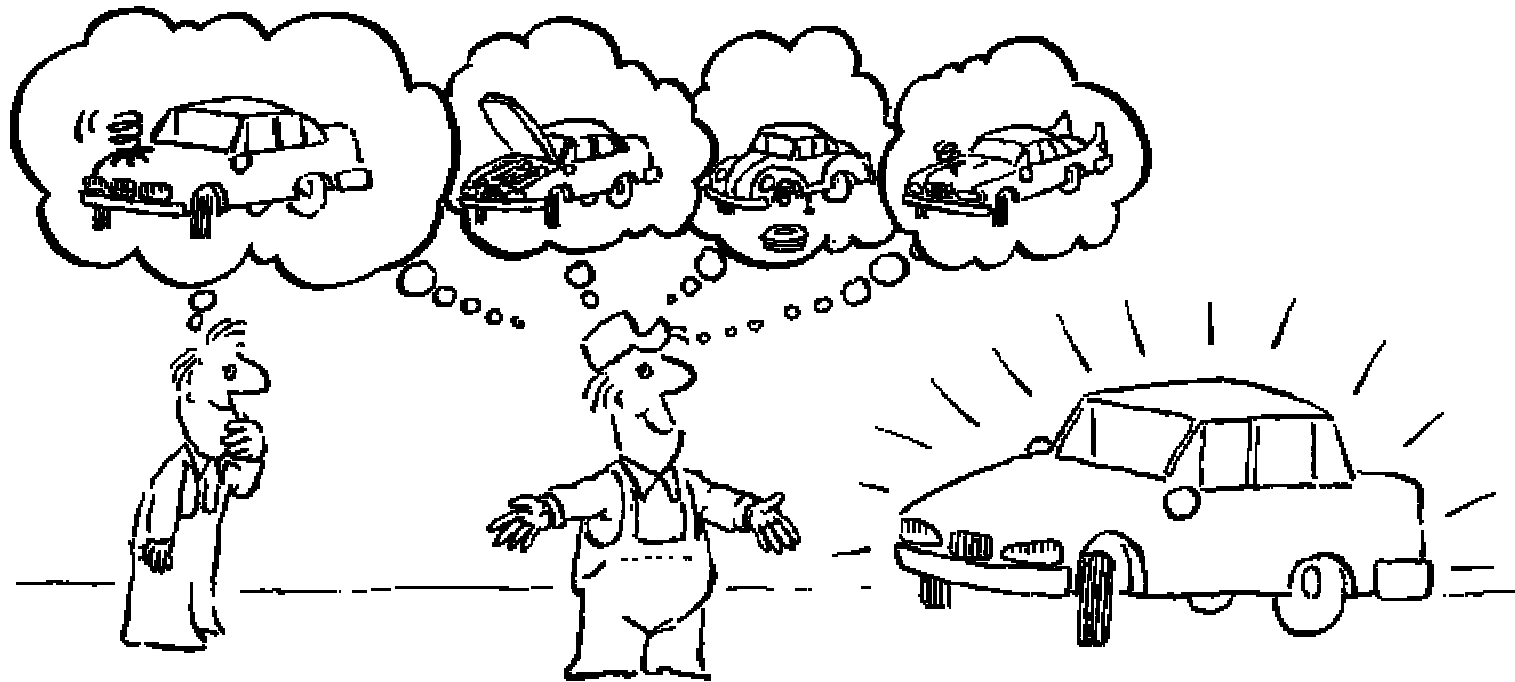
Problem?



May I Help You?

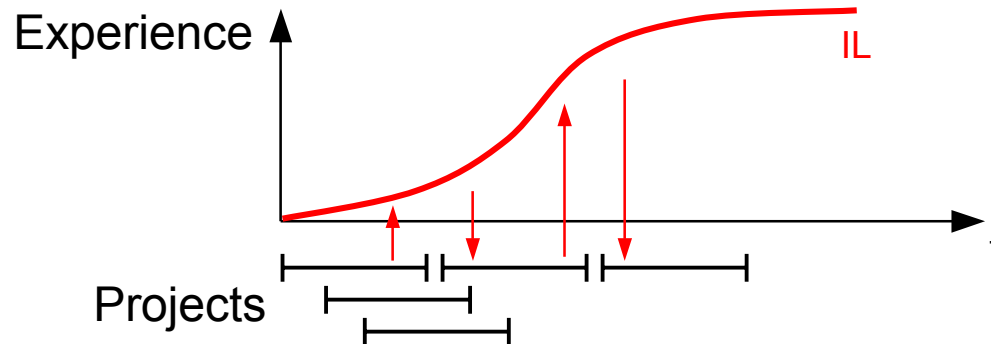


That's It!

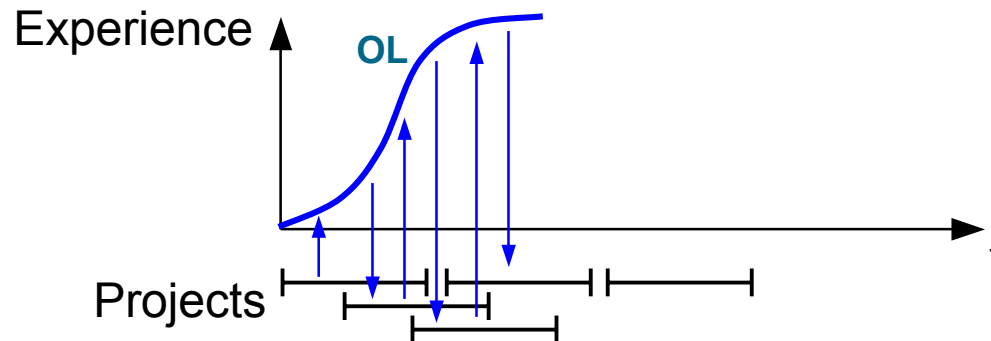


Organisational Learning (OL)

Individual learning (IL)
used to keep pace with
innovation

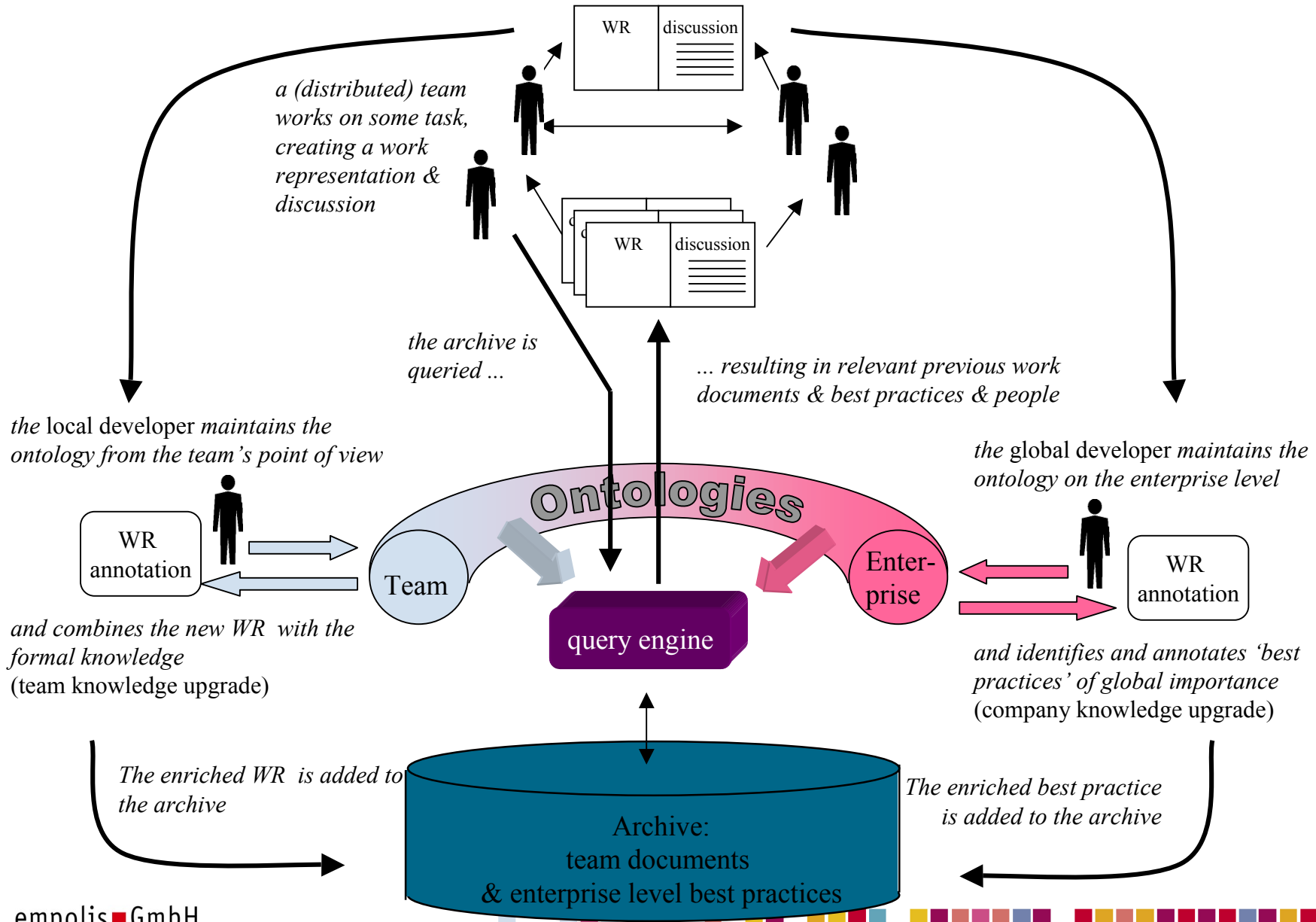


OL shall keep pace
with innovation:
intensified sharing

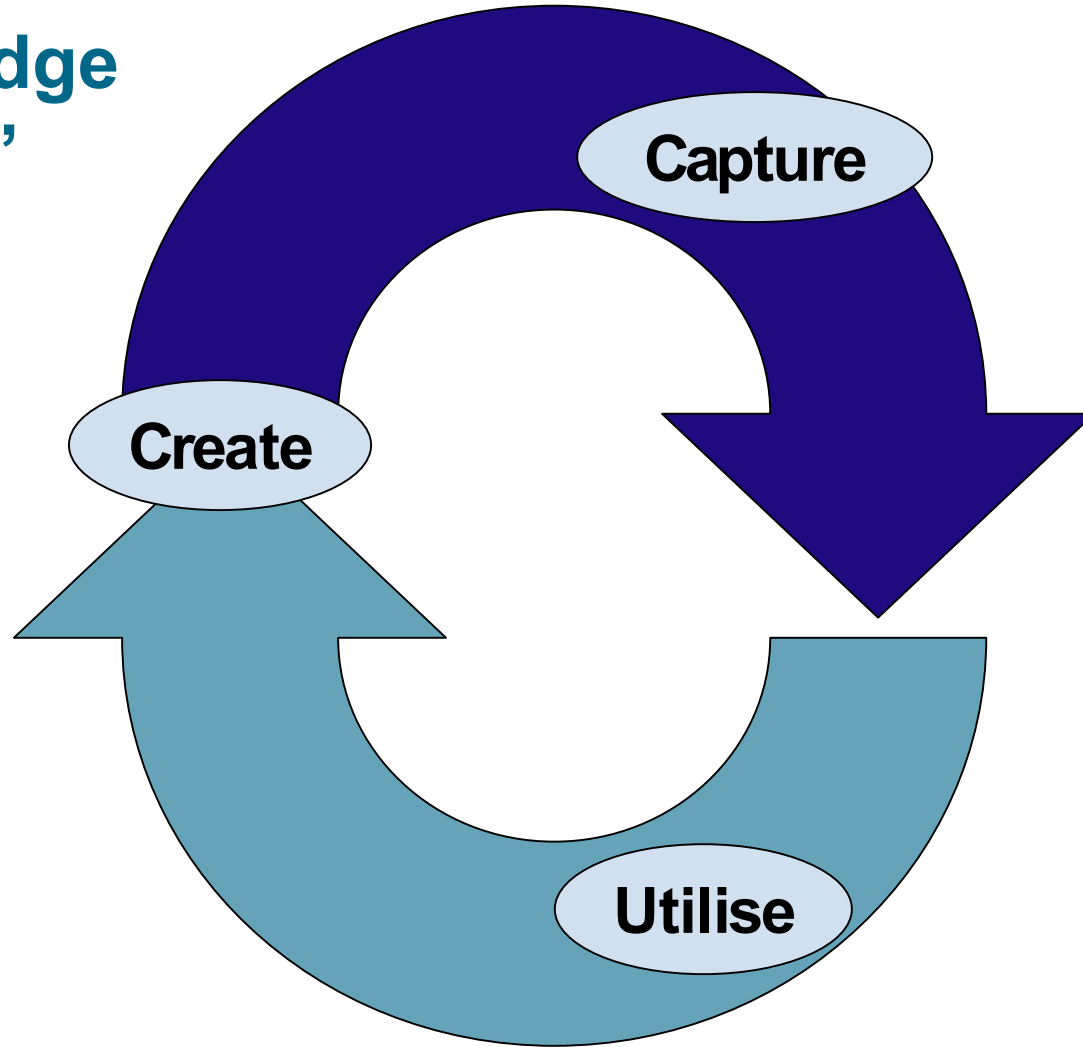


Approach: Use Organizational Memory to intensify knowledge sharing!

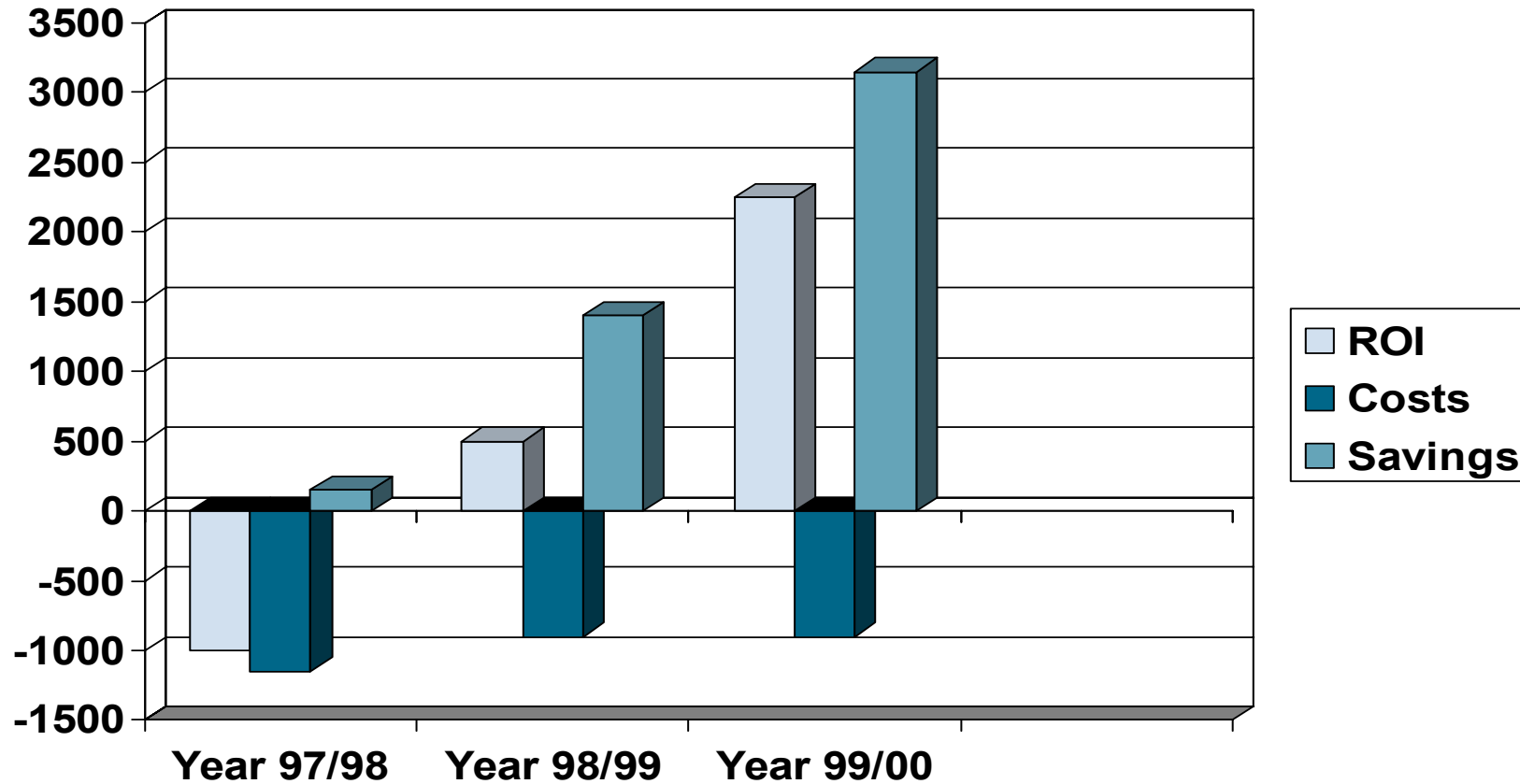




“Knowledge Working”



Return on Investment



Some Remarks on Knowledge Management

- ... is expensive (so is stupidity)
- ... requires a mixture of humans and technology
- ... is political
- ... requires knowledge managers / engineers / workers
- ... requires markets, not hierarchies
- ... is not natural
- ... requires knowledge process improvement
- ... never ends
- ... requires contracts



Part II:

Enterprise Knowledge Management Powered by XML, XLink, Topic Maps



XML

Semantic Markup and its Limitations



From Data to Information

- Structured data becomes accessible information
- XML elements provide a “handle” to the information assets
- “Semantic” XML elements describe the purpose of the tagged information
- “Neutral” XML elements do not



Semantic in Content – The Right Balance

- Semantic elements are application specific
- Too many semantic elements
 - are expensive
 - might not be coded by authors
 - will not be used by processes
- Too few semantic elements
 - reduce the capabilities of processes
 - may make the instances unuseable



Extracting Knowledge from Semantic Markup

- Semantic elements
 - express the meaning of the content
 - contain meta data e.g. for subject classification
 - help to distinguish relevant and irrelevant content
 - base for intelligent processing of the content
 - could be used for automatically generated summaries



Limits of Semantic Markup

- Semantic markup is part of the “regular” markup
- Semantic markup has to follow the well-formed rule (no overlapping allowed)
- Instance cannot be tagged supporting more than one semantic view
- Changes in view (= new semantic elements) require changes in the DTD and in the content



XML and Searching

- Full text search becomes context-sensitive enabling the user to search in relevant parts of the information only
- But: elements have to be known to the search engine and to the user (closed communities with controlled DTDs)
- Semantic markup could be additional input for linguistic analysis software



XLink

Information in Context



The Objectives of the Information Society

Deliver
the right information
for the right person
at the right point in time



The Objectives of the Information Society

Deliver
the right information
for the right person
at the right point in time
in the right context



What is Information in Context? ... Hypertext!



“The process of tying two items together is the important thing”

Vannevar Bush, 1945: “As We may Think”

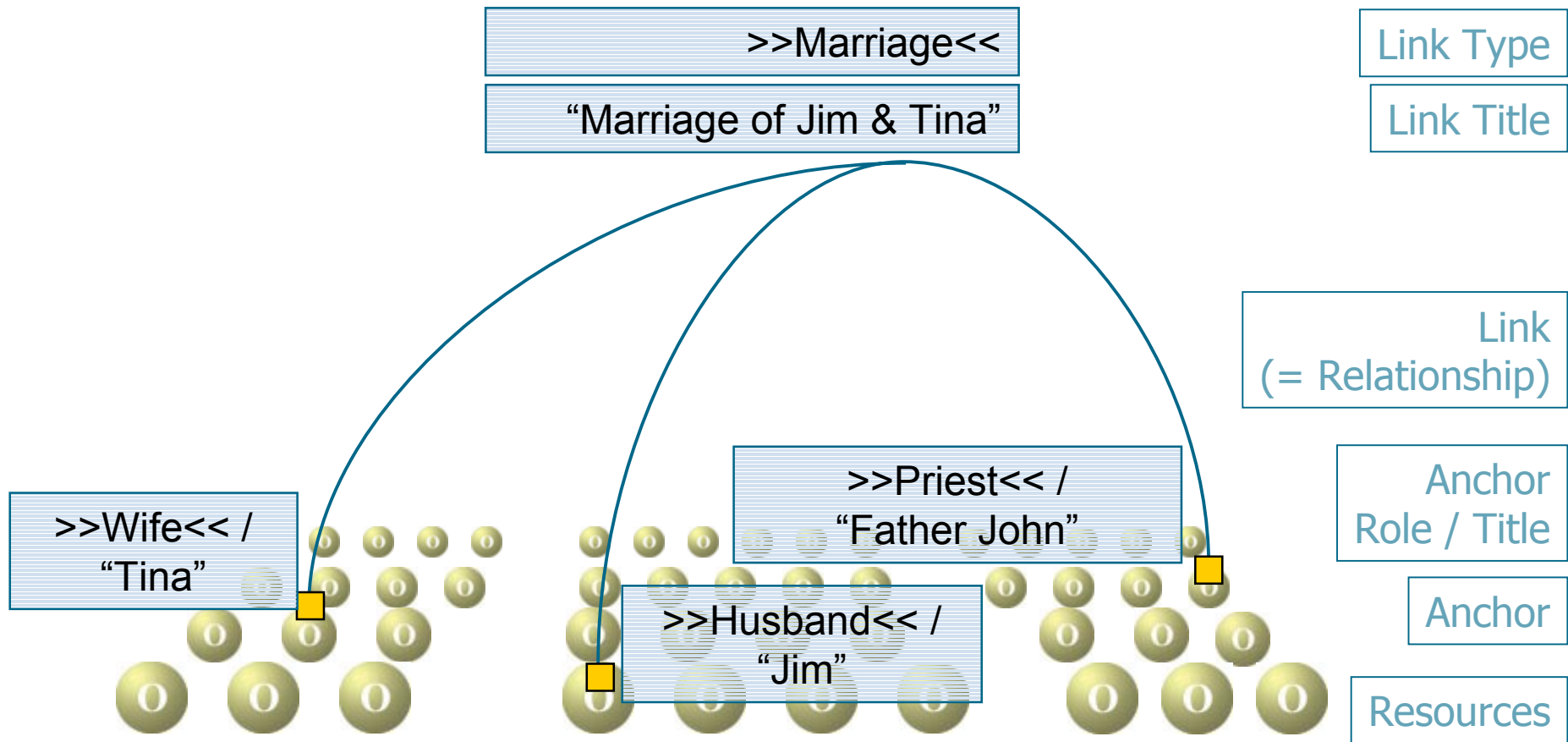


Purpose of “Hypertext”

- Personalized navigation support
 - Index, TOC, explicit references
- Explain meaning of information
 - Glossary, Thesaurus
- Associate internal knowledge with external information resources
 - Re-use without copy & paste
- Add own associations to internal and external information assets
 - Roles of reader and author merge



Linking Concepts



XLink Provides the Necessary Power

- Link types, anchor roles, and their titles
- Multi-ended links, arcs, including links
- Relative anchor addressing using the XML tree structure
- Extended links stored and managed independently from the resources (= out-of-line linking)
- Multiple link networks (= views) over same set of resources



Knowledge and Links – As We May Think

- Links express the relationships / associations between information objects or parts of objects
- Links provide navigation paths through the information objects
- Paths help to better understand the content
- Links bring information in a context
=> knowledge



Link Management Becomes an Important Issue

- Because links are that important they should be treated as first class objects
- Because links should be stored separately from resources the need their own link management system
- When links are first class objects they should carry meta data, user access rights
- Meta data could be used to create personalized link networks (1:1 publishing of content & links)



Topic Maps

Knowledge Representation on a Meta Level



Topic Maps and XML

- XML is format to exchange TMs between software tools
- XML **is not** the internal data structure of TM tools but the ASCII serialization of a complex knowledge network
- Resources could be of any notation / format; they just have to be addressable
- If resources are XML occurrences can easily point into the resources

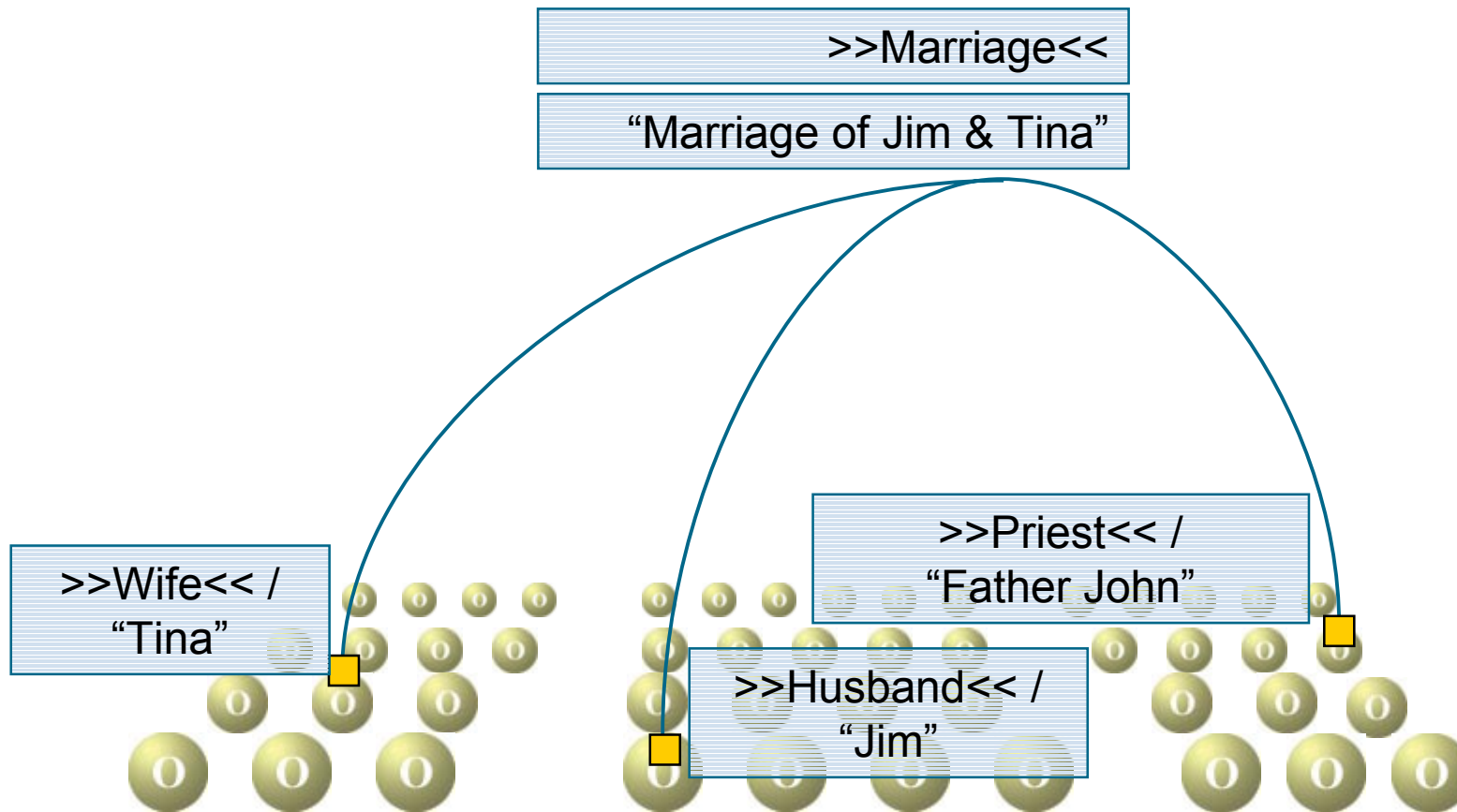


Topic Maps and XLink

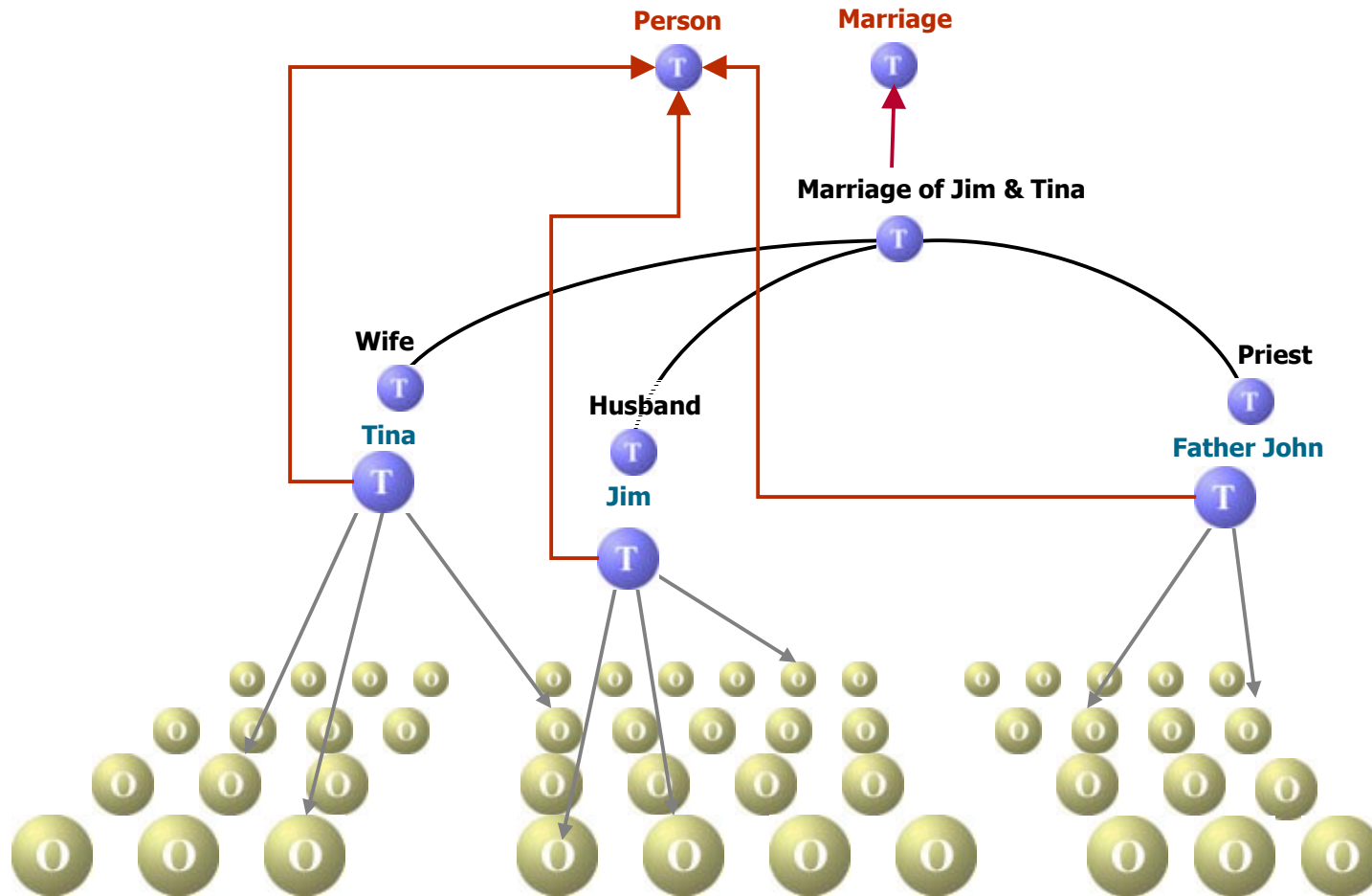
- XLink is format to exchange the links in TMs (between nodes and occurrences)
- TMs can point to resources which are addressable by XLink
- TMs organize link networks like XML structures data



Topic Maps and XLink cont'd



Topic Maps and XLink cont'd



Topic Maps and KM Methodologies

- Ontologies
- Taxonomies
- Constraints (TMCL)
- Query Language (TMQL)
- Inferencing



Typical Topical Applications

- Subject classification
 - Connecting resources with a classification scheme
- Knowledge representation
 - Model domain knowledge in a topic map explicitly
- Publishing knowledge networks
 - Selling added-value (e.g., commentaries, rich metadata)
- Search engines
 - Intelligent 'find' technologies



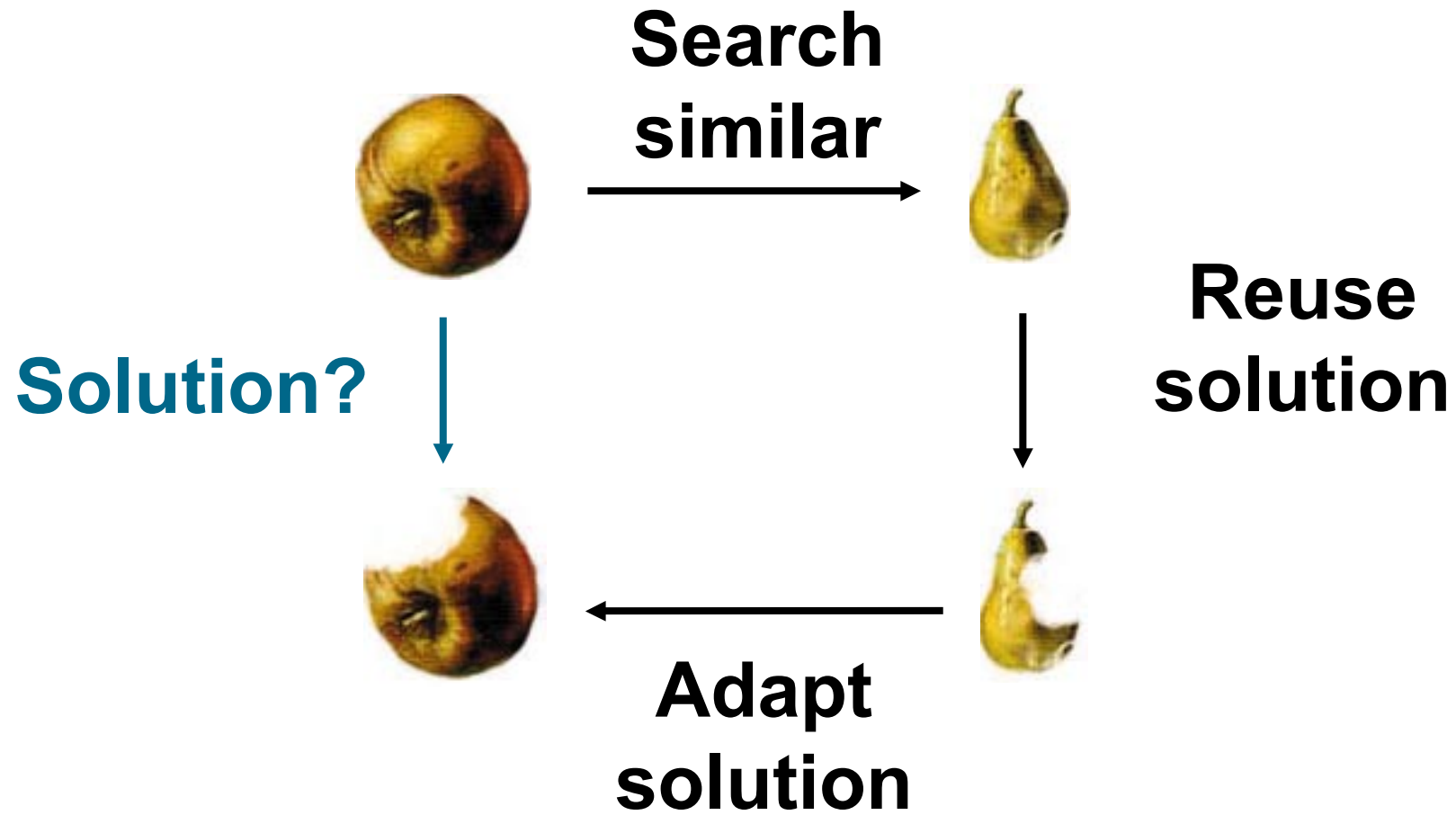
Part III:

CBR –

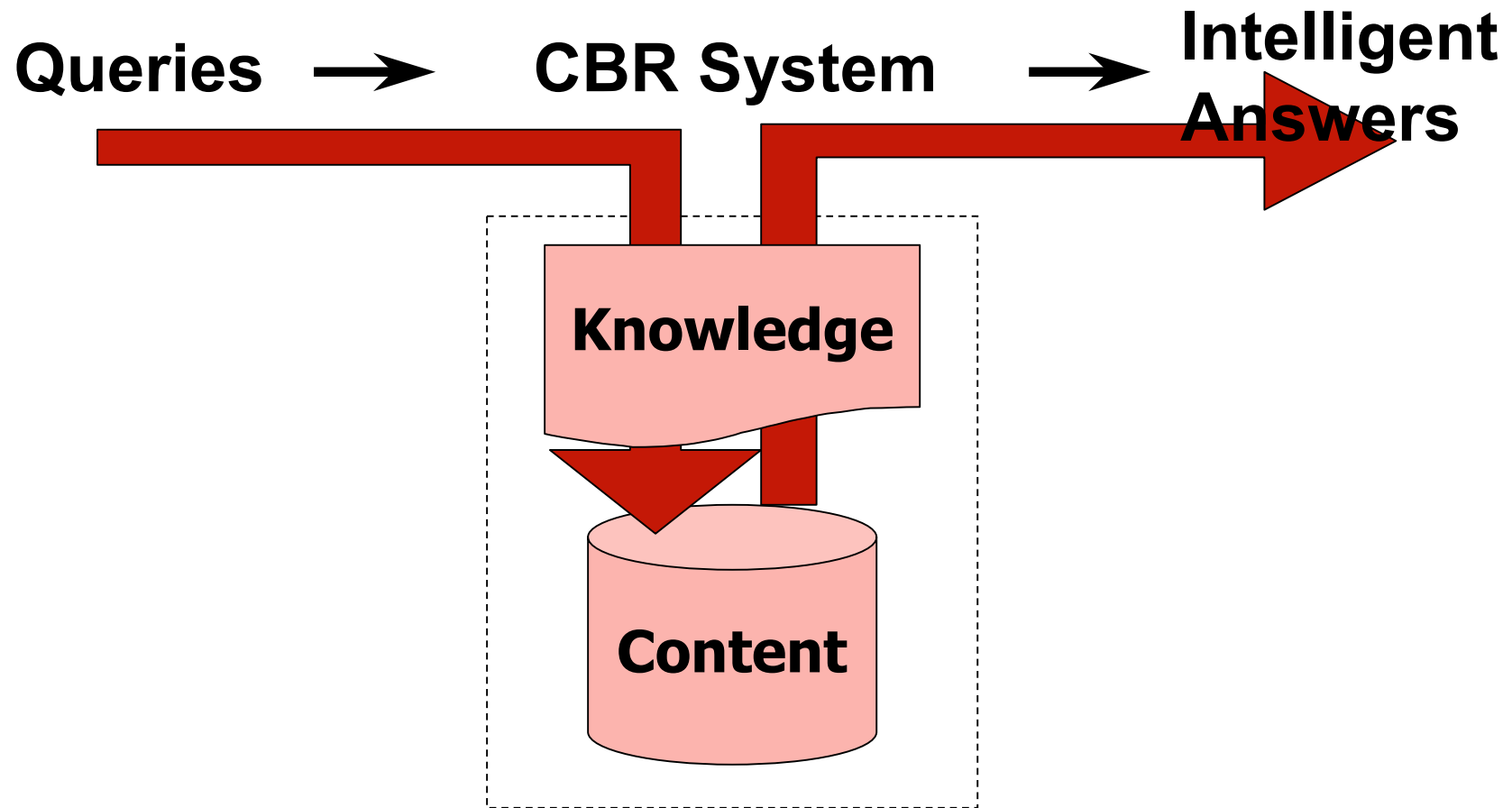
A Practical AI Approach



Problem solving



CBR System

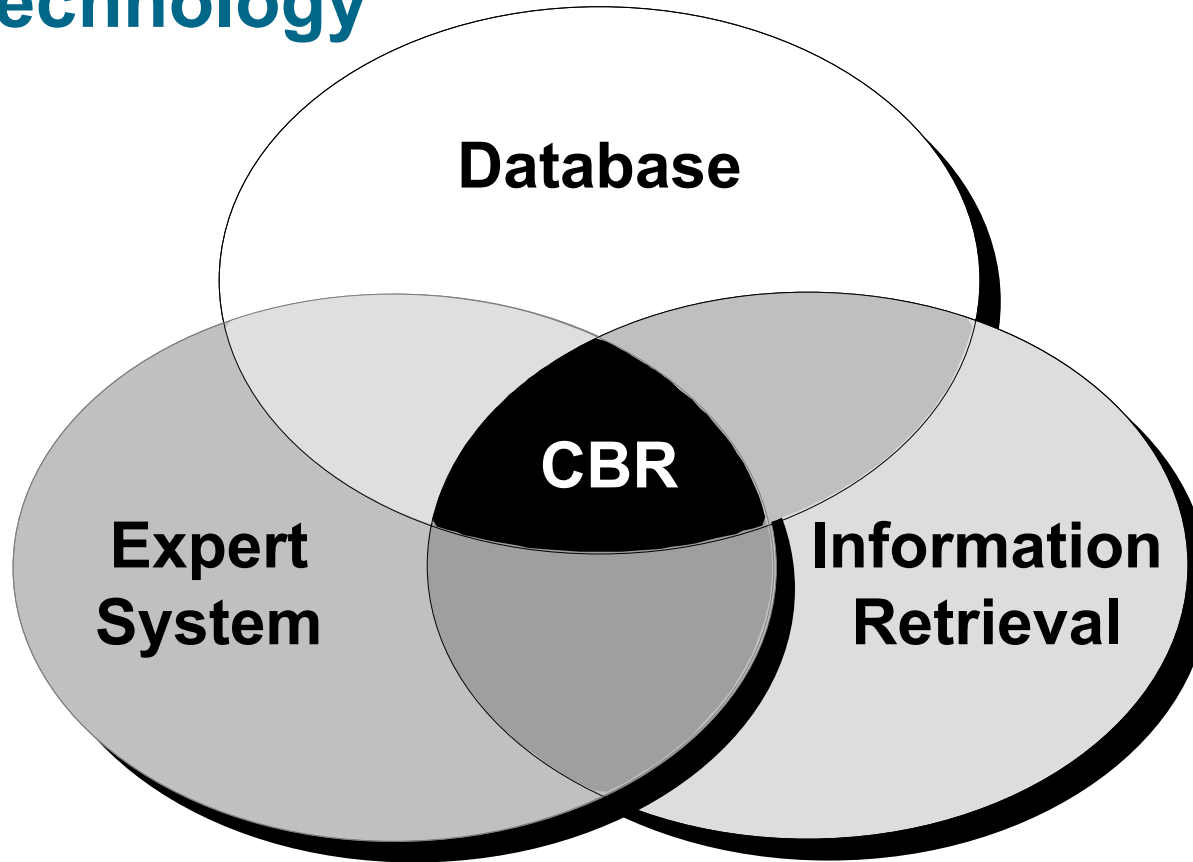


CBR Key Issues

- Instead of storing knowledge store cases
- Model knowledge in application domain to map content to cases
- Queries are just new cases
- Exact matches do not work – similarity algorithm finds most similar cases which answer the query
- “Fuzzy” search works on text and data (RDB)



CBR Technology



CBR Applications

- **Semantic search and ranking**
 - full-text, relational, hierarchical, graph-like data
 - perfectly ordered result list
- **Assistance**
 - online shopping, decision making
- **Automated dialogs**
 - query refinement, user feedback
- **Personalization**
 - user preferences
- **Multi-lingual**
 - content in one language, queries & answers in many languages

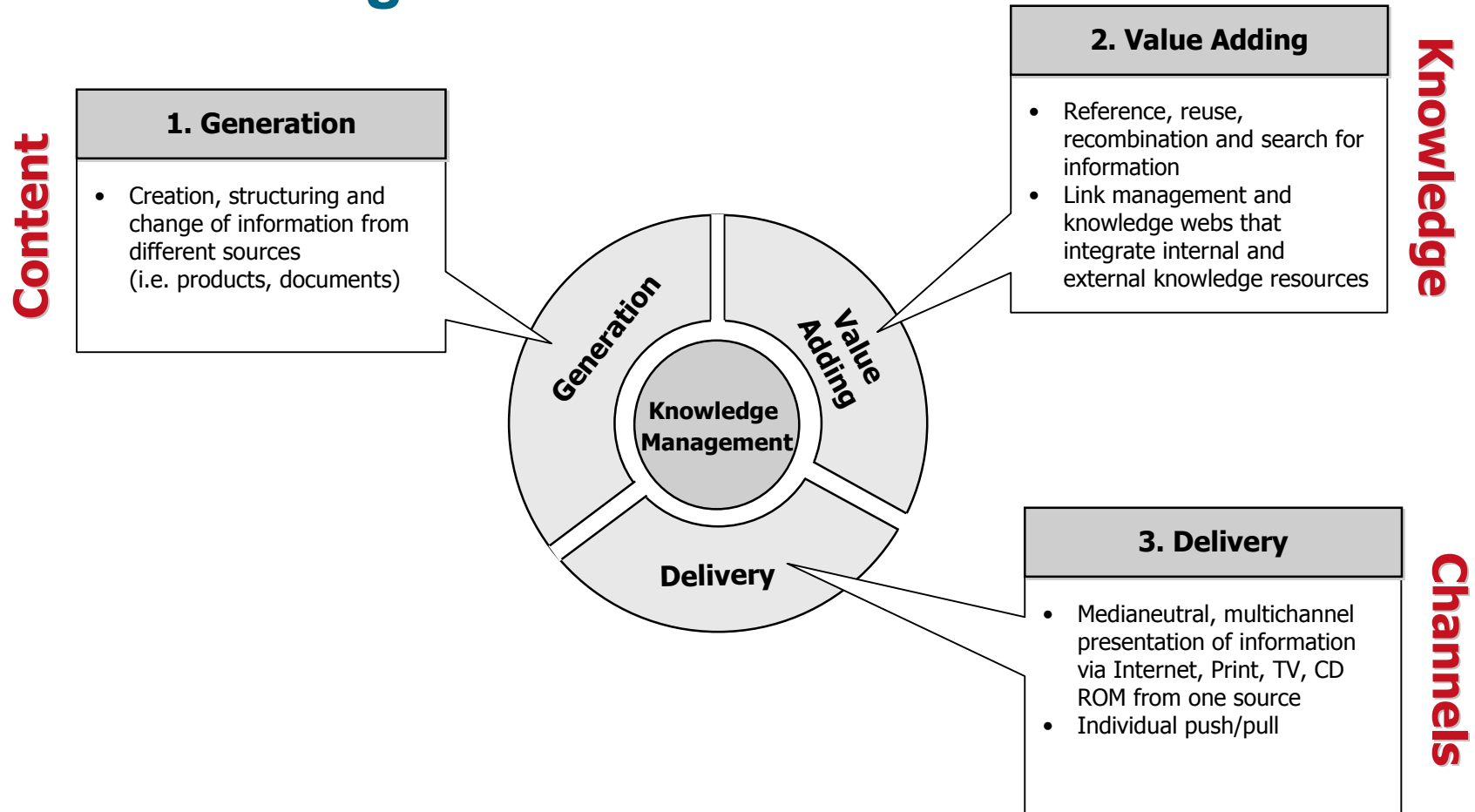


Part IV:

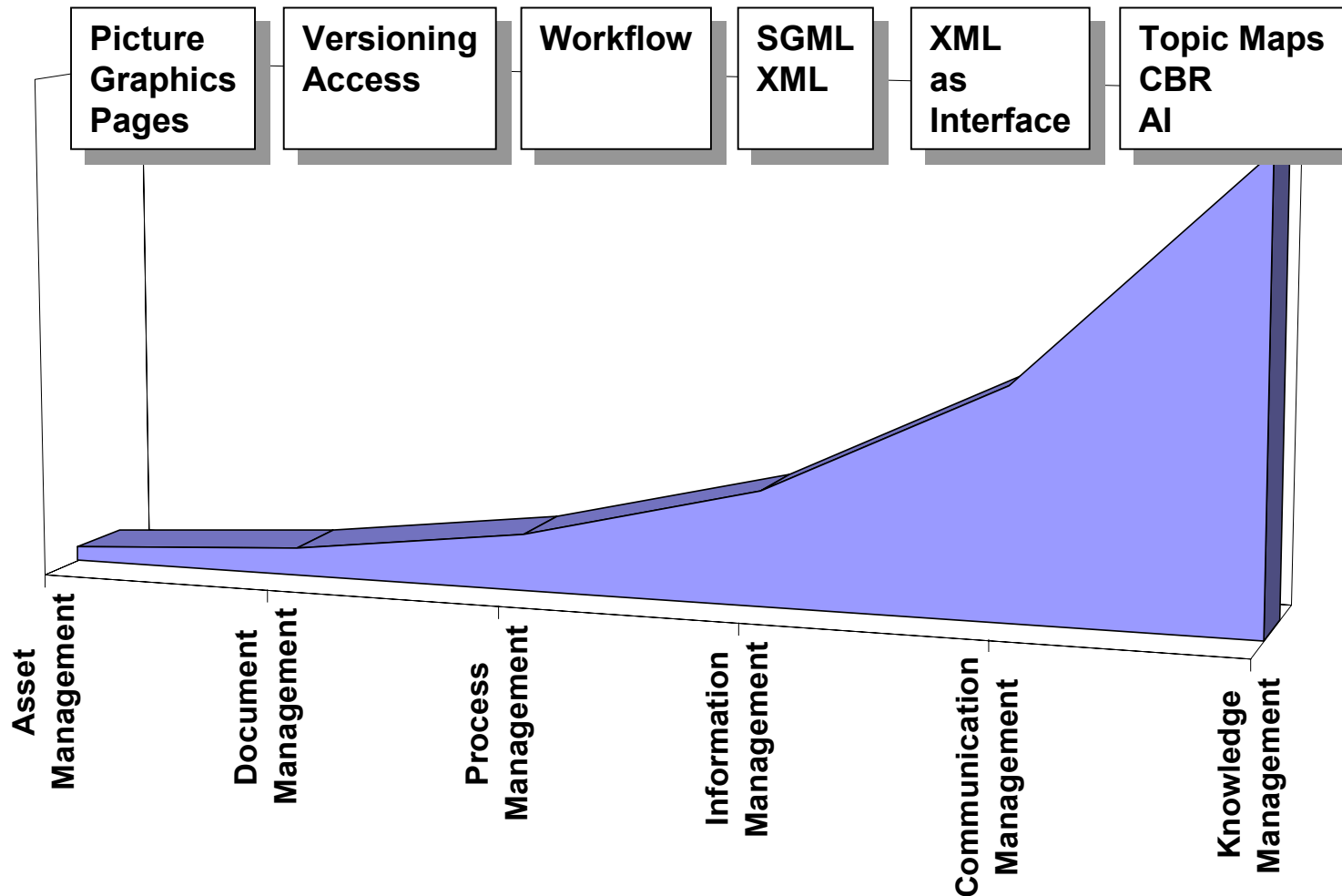
Enterprise Knowledge Management – A System Architecture



The Knowledge Process Chain



Evolution of Digital Infrastructures

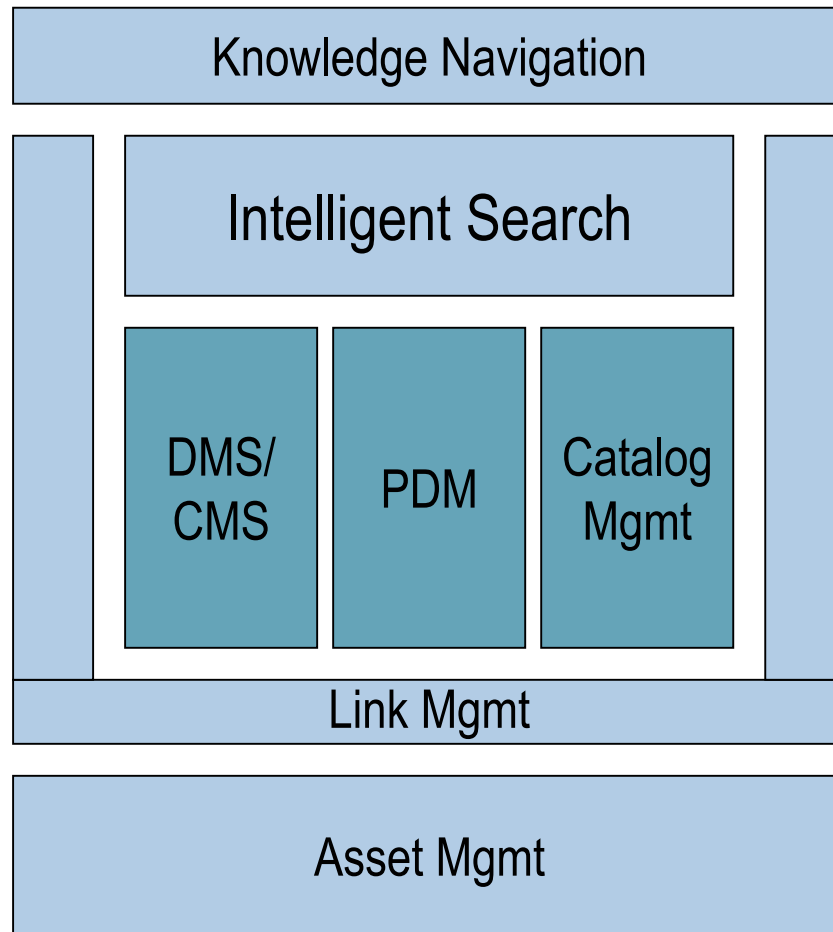


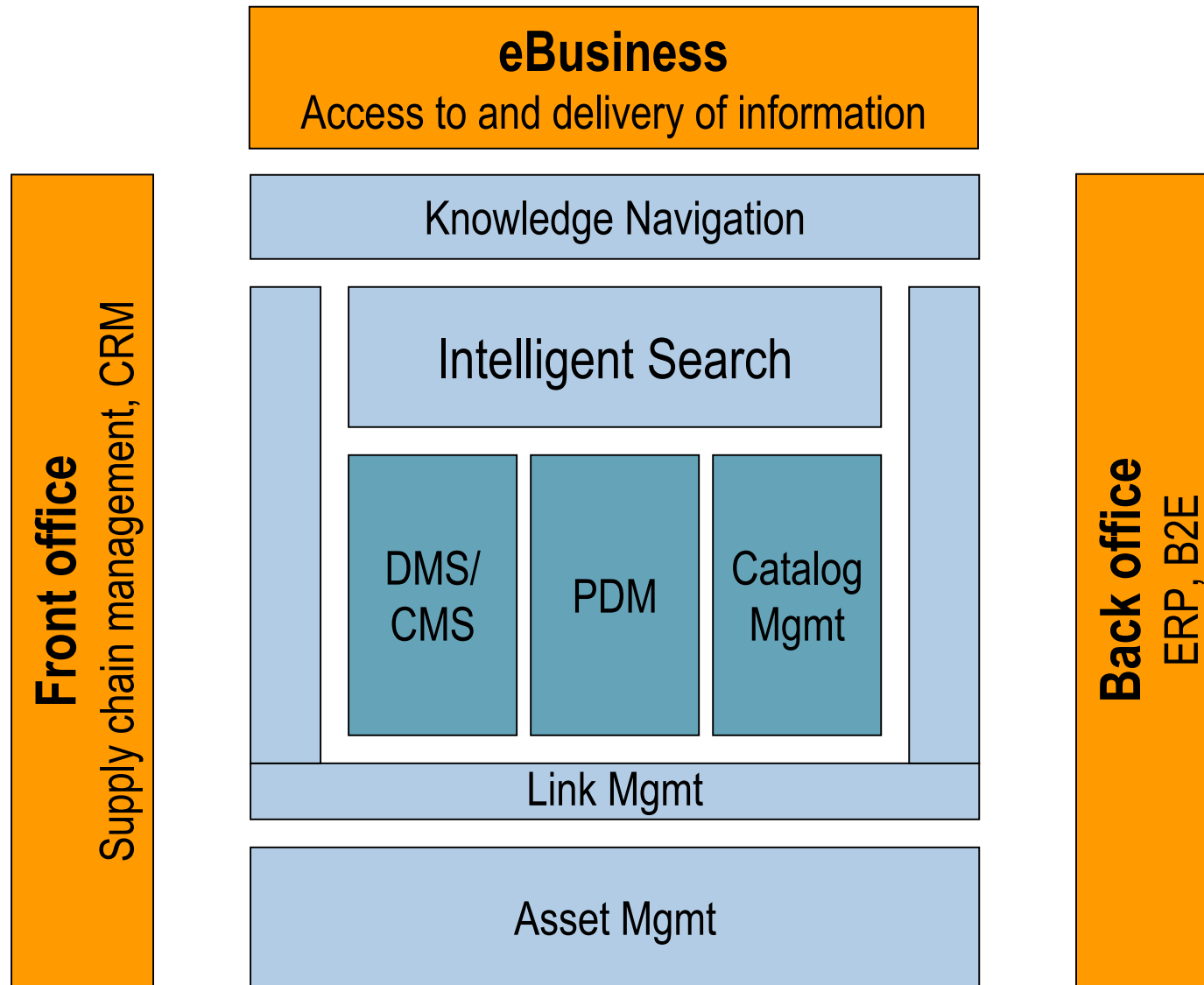
Data Management Paradigms

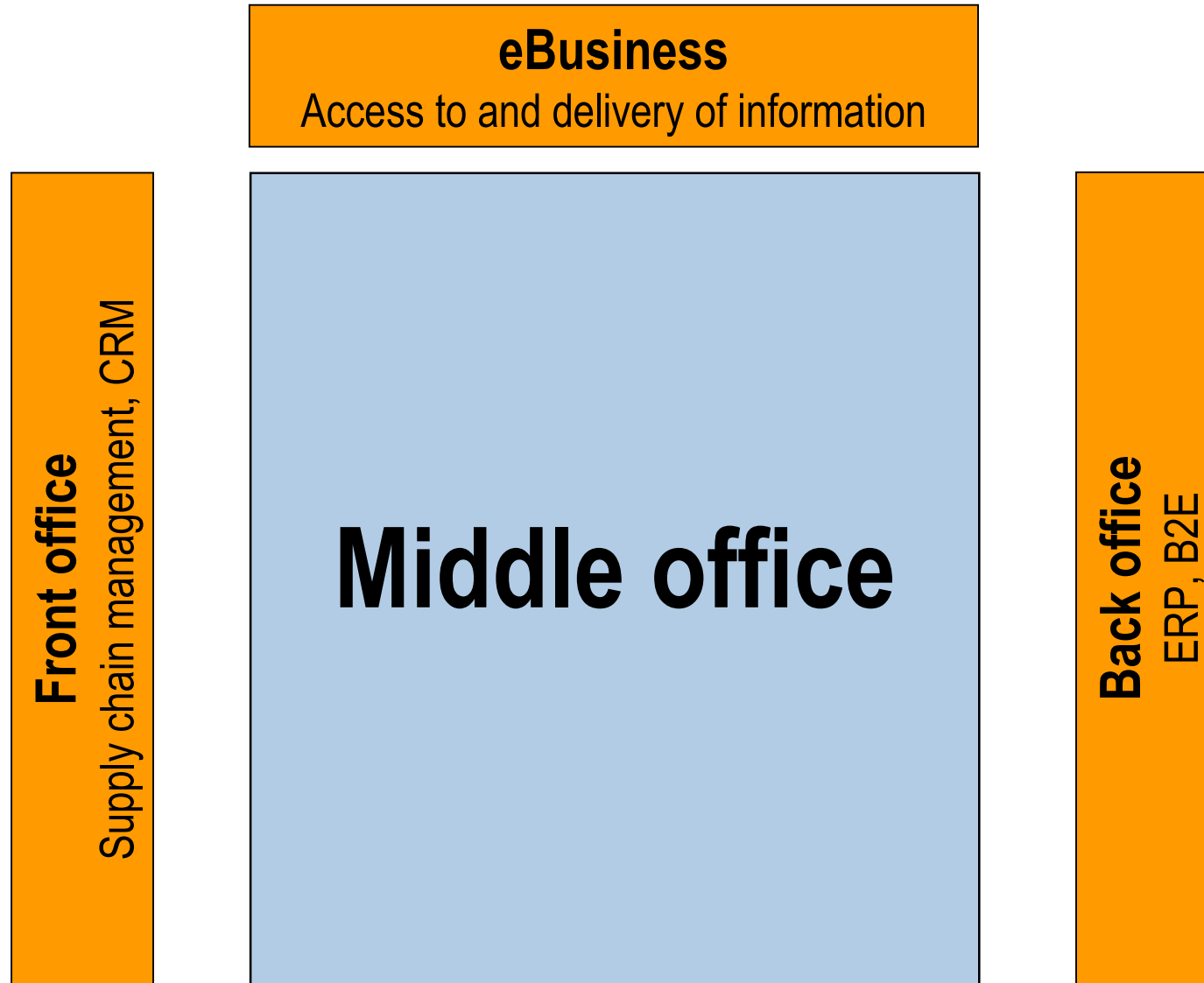
- Asset management
- Document management
- Workflow management
- Content management /
Product data management /
Catalog management
- Link management
- Knowledge management



Backbone Technologies







Finally

**What is the value
of a piece of information
you cannot find?**



</End>

Thank you!



Transforming Information into Value



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