Enterprise Knowledge Map:
Toward Subject Centric Computing

March 21st, 2007
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Are we ready?

"...The idea of an application is an artificial one, convenient to the programmer but not to the user. From a user's point of view there is content (a set of objects created or obtained by the user) and there are commands that can operate on objects..."

Summary of The Humane Interface, Jeff Raskin

Before we jump into discussion about enterprise...

- Let's look at our desktops; email, for example

- You receive an email from your friend...

- Name of your friend is not just a string and is not just an entry in an address book

- (In your memory) you have a lot of associations with this person (activated immediately)

- This associative memory is a core of our ability to organize and process information

We do not need email as a separate application!

- We need email "function" which generates information items with indication that they are received via email

- Each "email" item can be connected with various entities and other information items

- We need explicit representation of those entities and information items

- On the sending side: email message is an example of a compound document

- We just should be able to create a compound document and send it via email

We do not need RSS aggregator

- As a separate application (web-based or desktop)

- But...

  - We would like to have the ability to receive updates about topics that we are interested in

  - We should be able to look at information items from various perspectives

  - In many cases we prefer "topic centric" perspective, not "source/feed centric"

 - Source is an important attribute of an item

Email and RSS as "functions"
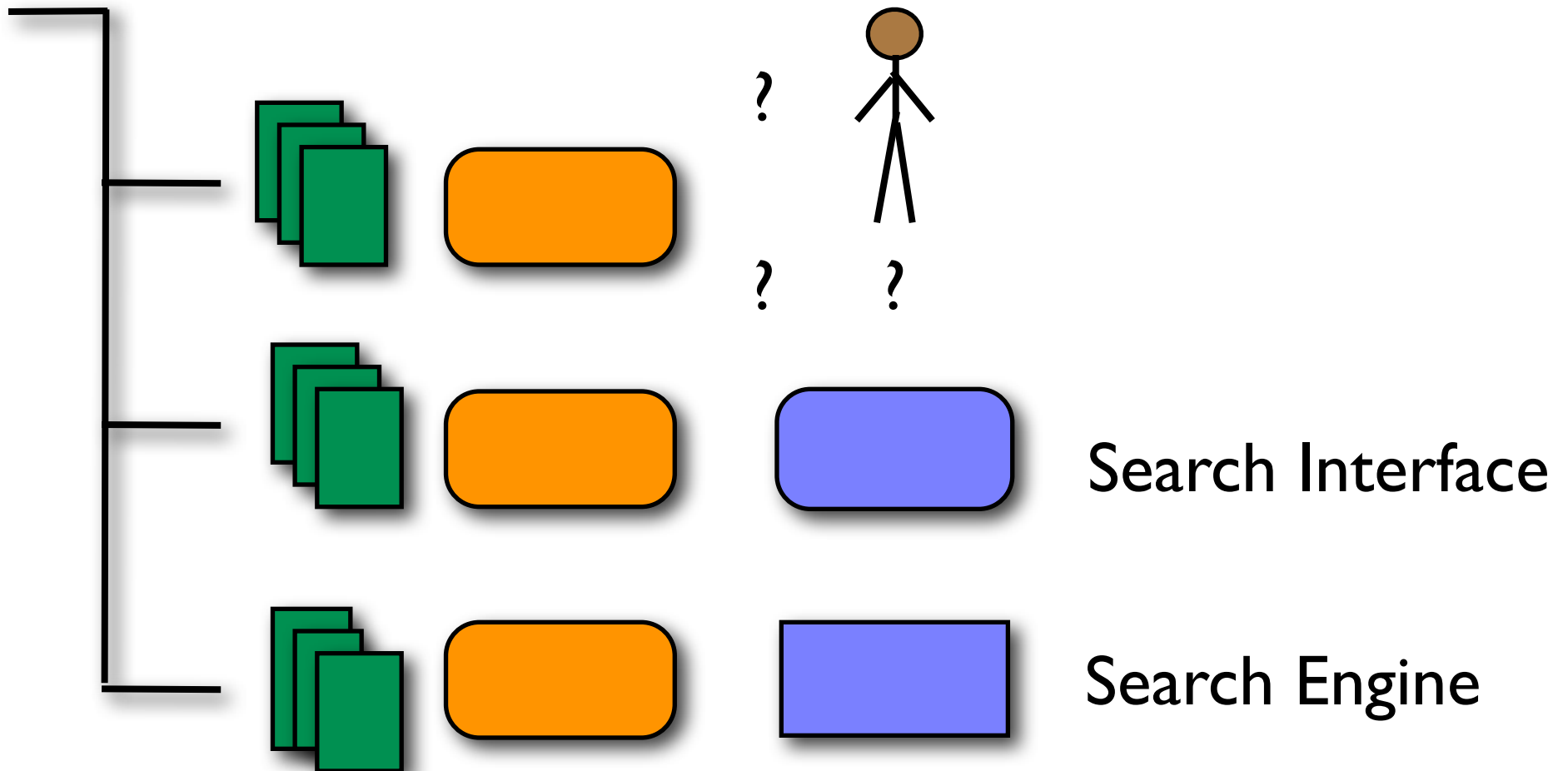

Information Items, Updates

My Topics
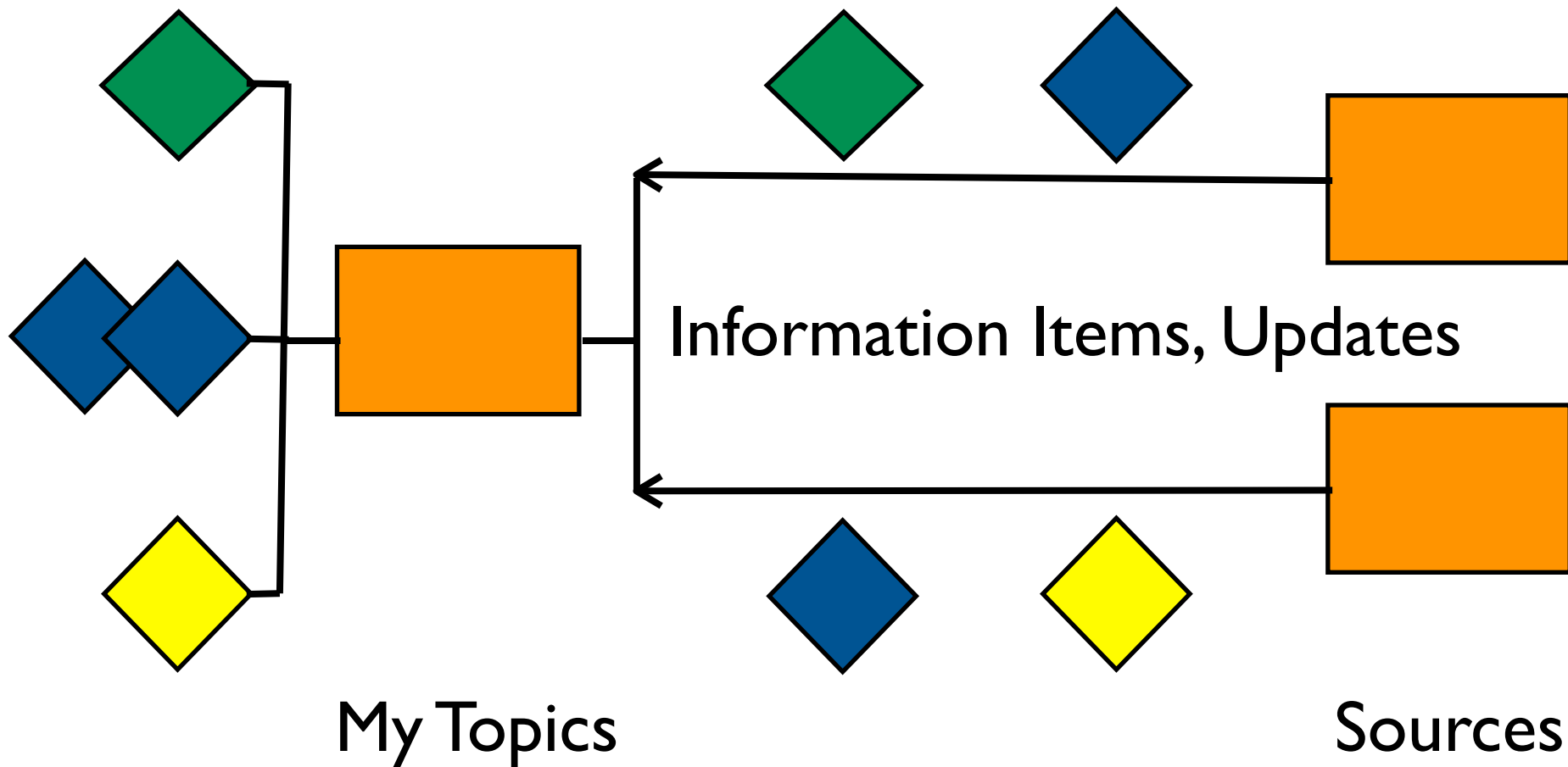
Sources

What about Enterprise Information Systems?

- Barriers to Identifying, Accessing and Understanding Information Resources

  - Business silos

  - Application silos

  - Data silos

Traditional Applications

Interface

Data

Unstructured data

Search Interface

Search Engine
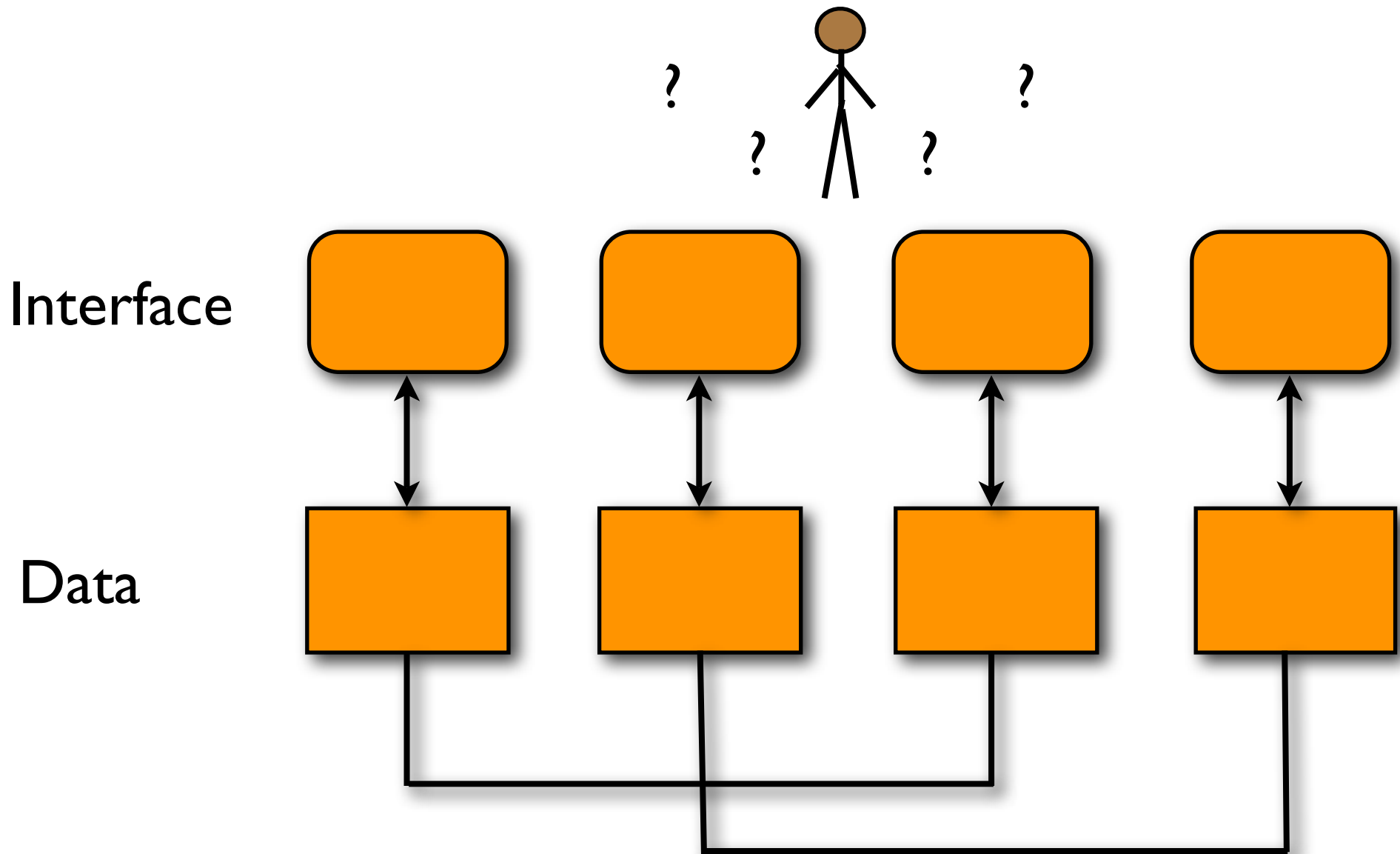
Summary of what we have

- There is no holistic view on information resources in an enterprise

- We use multiple applications for solving specific tasks

- It is not easy to relate information from different applications

- Structured information is not integrated with unstructured information

- Associative nature of our thinking is not supported well

- We do not have enterprise-wide explicit representations of objects important for our business

Is there a problem?

- That is "OK" if we have predefined small relatively static set of tasks

- We can learn three-five applications and can manage several hundreds documents

But there is a growing gap...

- Between:

- Agile business environment, requirements for knowledge worker

- Traditional application and document centric IT infrastructure

Agile business requires:

- Search for new information

- Information assimilation

- Evaluation

- Re-ordering, synthesis

- Identifying opportunities

- Measuring risks

- Defining and re-evaluating preferences

What about SOA?

- It helps to optimize a server side environment

- Does not help much for organizing and searching information

- Does not help much on the user interaction layer
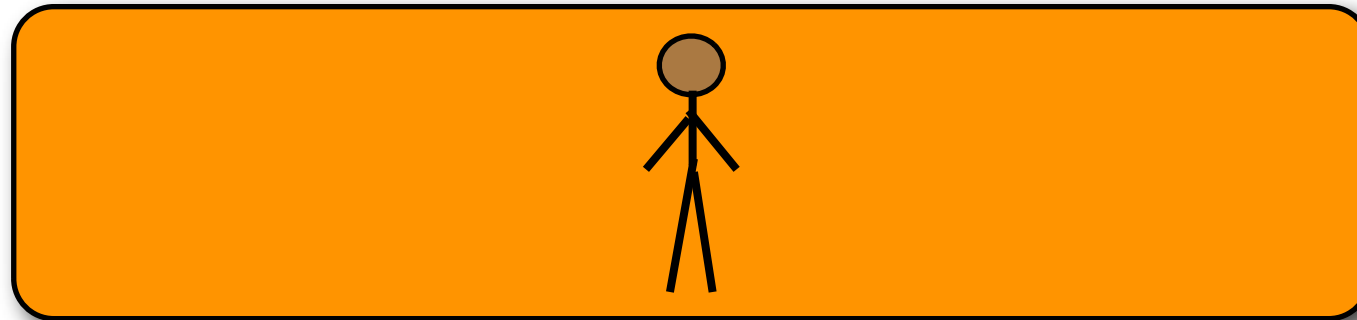 - May be a little bit more dynamic and user configurable interface

Portals?

- In many cases we just make windows smaller and present them on the same screen

- Visual integration

- Portal products include a lot of features which are not essential for integration and presenting information

- New wave: widgets, gadgets follow the same old route

  - Hint: make your widgets subject-centric/sensitive

  - If we add "weather widget" to "Oslo" page, widget should automatically show weather in Oslo

What can help

- Being more subject centric

  - Explicit representations of main subjects (enterprise-wide)

- Holistic view on enterprise information resources:

  - Global/Enterprise/Department/Team/Personal

  - Structured/Semistructurted/Unstructured

  - Text/audio/video...

- Breaking application boundaries (from the perspective of accessing information)

- Introduction of explicit "knowledge layer" into enterprise architecture

Architecture: adding knowledge layer
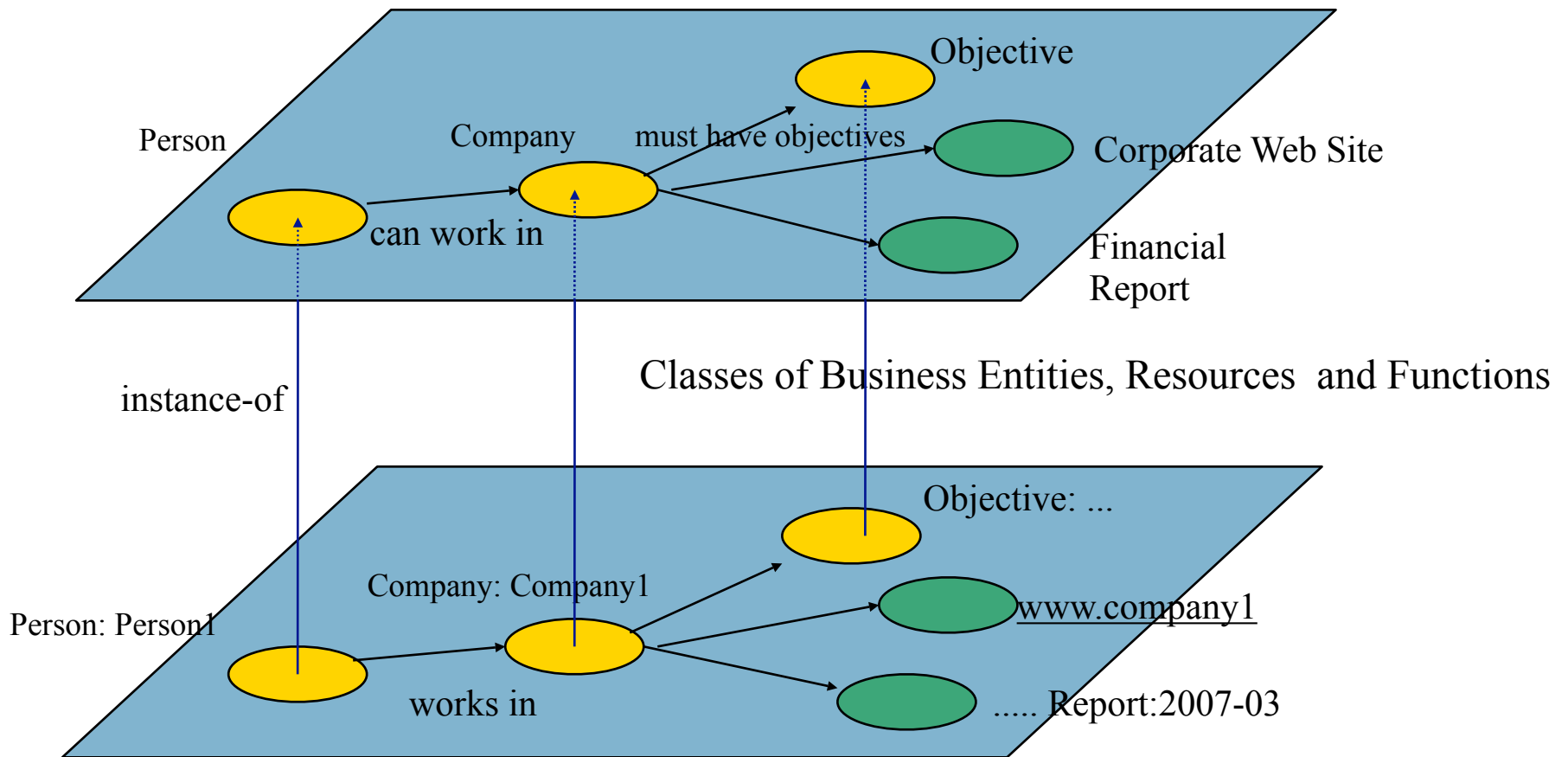
Interaction Layer

Knowledge Map

Services

Data

Knowledge Map

Objective

Person   Company   must have objectives

Corporate Web Site

can work in

Financial
Report

instance-of   Classes of Business Entities, Resources and Functions

Objective: ...

Company: Company1

Person: Person1   www.company1

works in Report:2007-03

Facts (summary)

How to create a knowledge map

- Identify

  - business functions

  - main entity types

  - main resource types

  - properties and associations for entities, resources and functions

- Map and integrate existing data sources

- Find and fill the gaps

- Use Topic Maps to implement enterprise knowledge map!

Example: traditional approach

- Information about people, several sources:

  - Personal Address book

  - Corporate User/Departments directory

  - Contact management system

- Each source is implemented by a specific application with own interface, search, naming conventions

- What can be used to collect, analyze, synthesize information about people?

Example: new approach

- Identify type "Person" as "to be included" in a knowledge map

- Define (combined) information model for type "Person"
  - possible properties
  - associations
  - constraints

- Include information model of "Person" type into a knowledge map

Example: new approach

- Map existing data sources covering different kind of people/ different info related to people

- Export summary information about people to a knowledge map

- Allow easily to create new instances of type "Person"

- Allow to associate different information items with instances of type "Person"

How to integrate existing data into knowledge map

Expose types of business entities
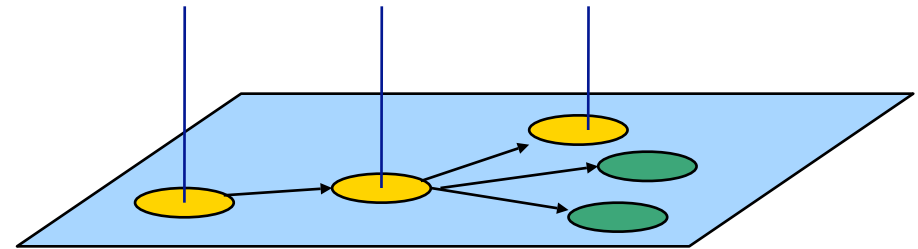and main relationships:
- Map existing models: UML, ER
- Use Topic Map ontology editor
- Re-use as much as possible existing definitions
- *Key attention: enterprise-wide identifiers*
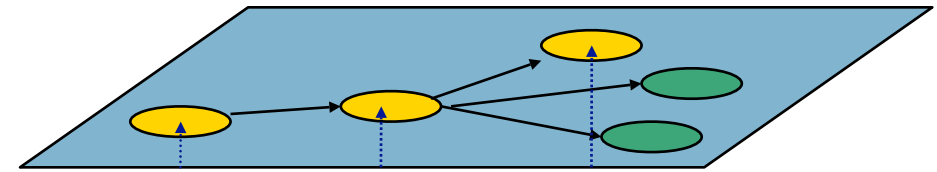
Types and Relationships (ontology)

Expose summary of existing data:
- Use mapping/exporting tools
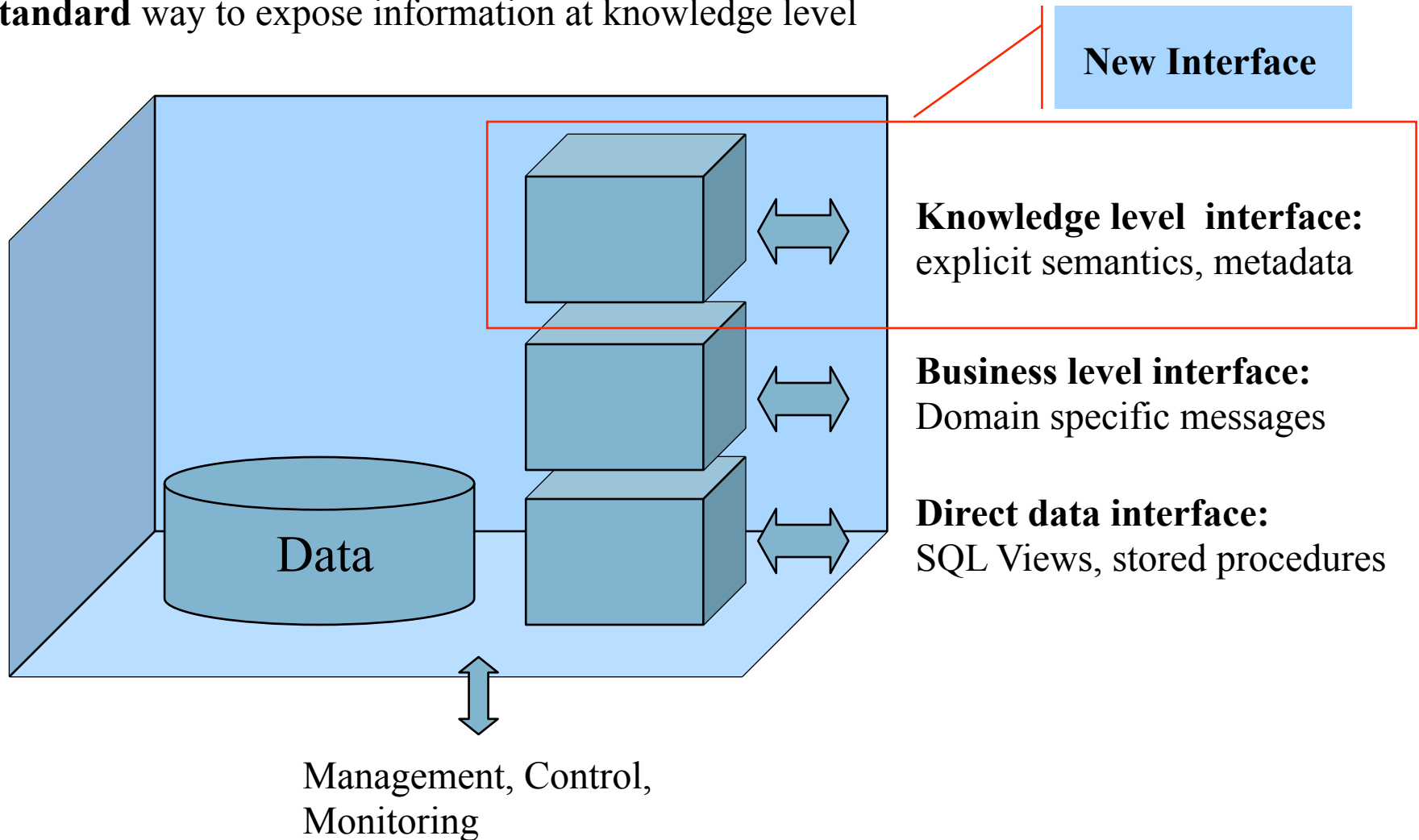- *Key attention: enterprise-wide identifiers*

Facts (summary)

Exporting summary of existing data

Application/Service:
- Add a new interface
- **Standard** way to expose information at knowledge level

New Interface

Knowledge level interface: explicit semantics, metadata

Business level interface: Domain specific messages

Direct data interface: SQL Views, stored procedures

Data

Management, Control, Monitoring

For Some services/applications

- **Use Topic Maps as a main representation mechanism**
  - Topic maps are often implemented on top of relational database
  - Provide access to information at "business" level
  - Flexible in terms of defining new entities, properties and relationships
  - Handles very well directory-like reference data
  - Can represent various scopes including time sensitivity
  - It is like 4GL for information resources

We have a knowledge map, what is next?

- Use knowledge map for "tagging" resources

- Create subject centric pages

- Introduce integrated faceted based search and navigation

- Define configurable subject centric RSS feed

"Tagging" resources

- Use knowledge map as a source for "fixed vocabularies"

  - support for inheritance (and querying)

  - synchronized with existing data sources

  - exists at the "conceptual level"

- Check if your ECM vendor/product supports ability to use "fixed vocabulary" from external sources for tagging resources

- Or create a resource map using topic maps directly

  - issues with moving, deleting resources

Subject centric pages

- Each main subject should have explicit representation which is visualized through a "subject page"

  - Every person, department, company, project, business function ... has own subject page

- Subject page is a combination of "structural/reference" information and links to various resources

- Subject page renders integrated information about a subject (360° view), integration is already done at a knowledge map level

- Hint: it is like a combination of Wikipedia page + RSS + widgets

Faceted Navigation and Search

- http://en.wikipedia.org/wiki/Faceted_classification

- Efficient way to implement "findability"

    - Integrated full-text, metadata search and browsing

    - Dynamic filtering: easy to add/delete conditions

    - Hints about possible directions for search/browsing

    - Multi-path access to information items

    - Universal: for resources, entities, activities, events

- Based on idea of "facets"

- Knowledge map is an excellent source for facets

Facets

- Think how main subjects can be classified using faceted approach

- What is a correlation between a facet and subject properties/relationships?

  - facet can include some path from a main subject

- Example: categorization of people

  - http://en.wikipedia.org/wiki/Wikipedia:Categorization_of_people

- Each basic type can have a primary type-subtype hierarchy which can used as a facet for classification of other subjects

Generating RSS feeds

- Leveraging existing RSS infrastructure

- Knowledge Map is an excellent source for RSS feeds

- Information integration is already done

- We can be subject centric or we can be source centric

- Integration with subject pages

  - easy to jump from information item related to a subject to a full subject page

Custom vs. Generic User Interface
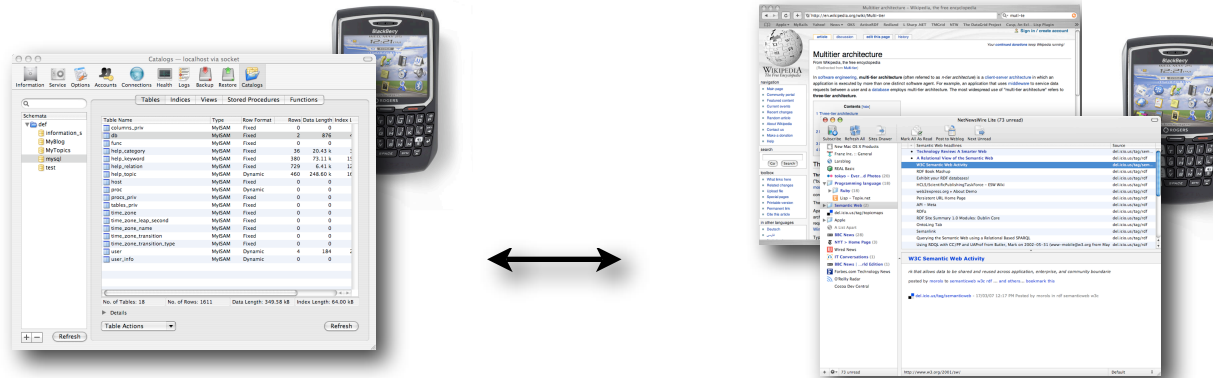
Application specific User Interface:
• Specific functions

Generic User Interface:
- Search, smart navigation,
- 360° view
- RSS

Knowledge Map

Services

Data

Knowledge Map evolution

- Start with main object, resource and function types:

  - People, organizational units, main business functions

- Extend knowledge map, introduce new types, cover more areas

- Use logging for search and navigation, access to subject pages

- Analyze usage statistics

- Be proactive - modify knowledge map based on business objectives

Knowledge Management Process: be proactive
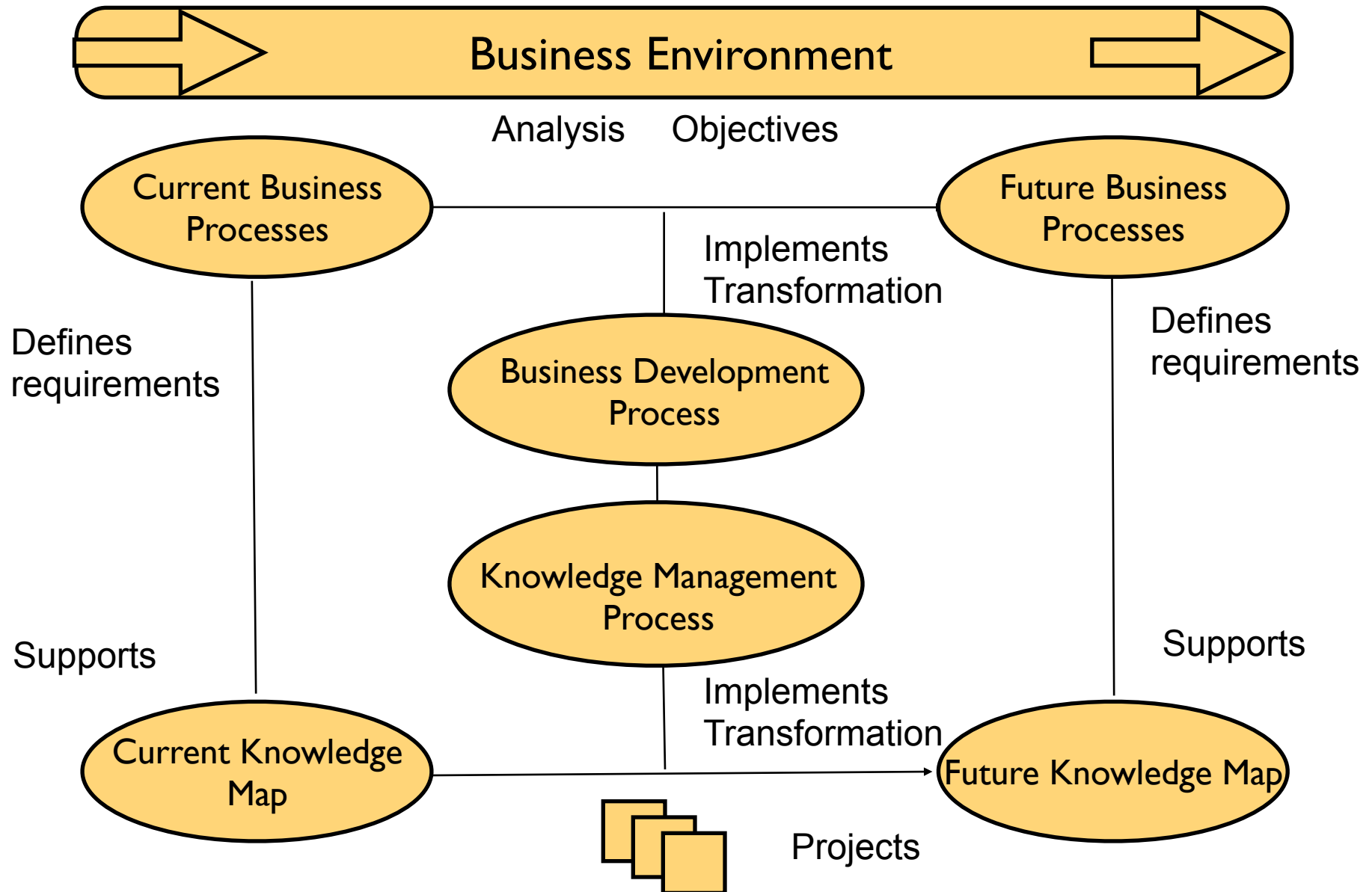
Summary

- Create a knowledge map for your organization

- Use Topic Maps

- Utilize existing data sources, fill the gaps

- Build a new interaction layer: subject pages, faceted search and navigation, subject centric RSS

- Introduce proactive knowledge management process

- Evolve your knowledge map together with your business