KMapper
An Ontology-Based Knowledge-Mapping application

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Ontologies and knowledge-mapping

- Objective of a DND/CF knowledge-mapping application
- Knowledge-mapping approaches
- KMapper: an ontology-based alpha prototype application
- Using ontologies – rational

Ontologies and knowledge mapping

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Canadian Forces Background

Federal: Health Canada
Environment Canada
Royal Canadian Mounted Police (RCMP)
Public Safety
etc. ...

Provincial

Municipal

And more… in international operations

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What is Knowledge Mapping in this context?

Knowledge Mapping is a process to discover, locate, and map specific knowledge assets that are key for individuals to perform their work.

- Related Domains
  - Knowledge/Information/Data Discovery
  - Organization of Knowledge
  - Knowledge Sharing and Organizational Memory
  - Situation and Knowledge Awareness
  - Ontologies
  - Social aspects: groups and individuals

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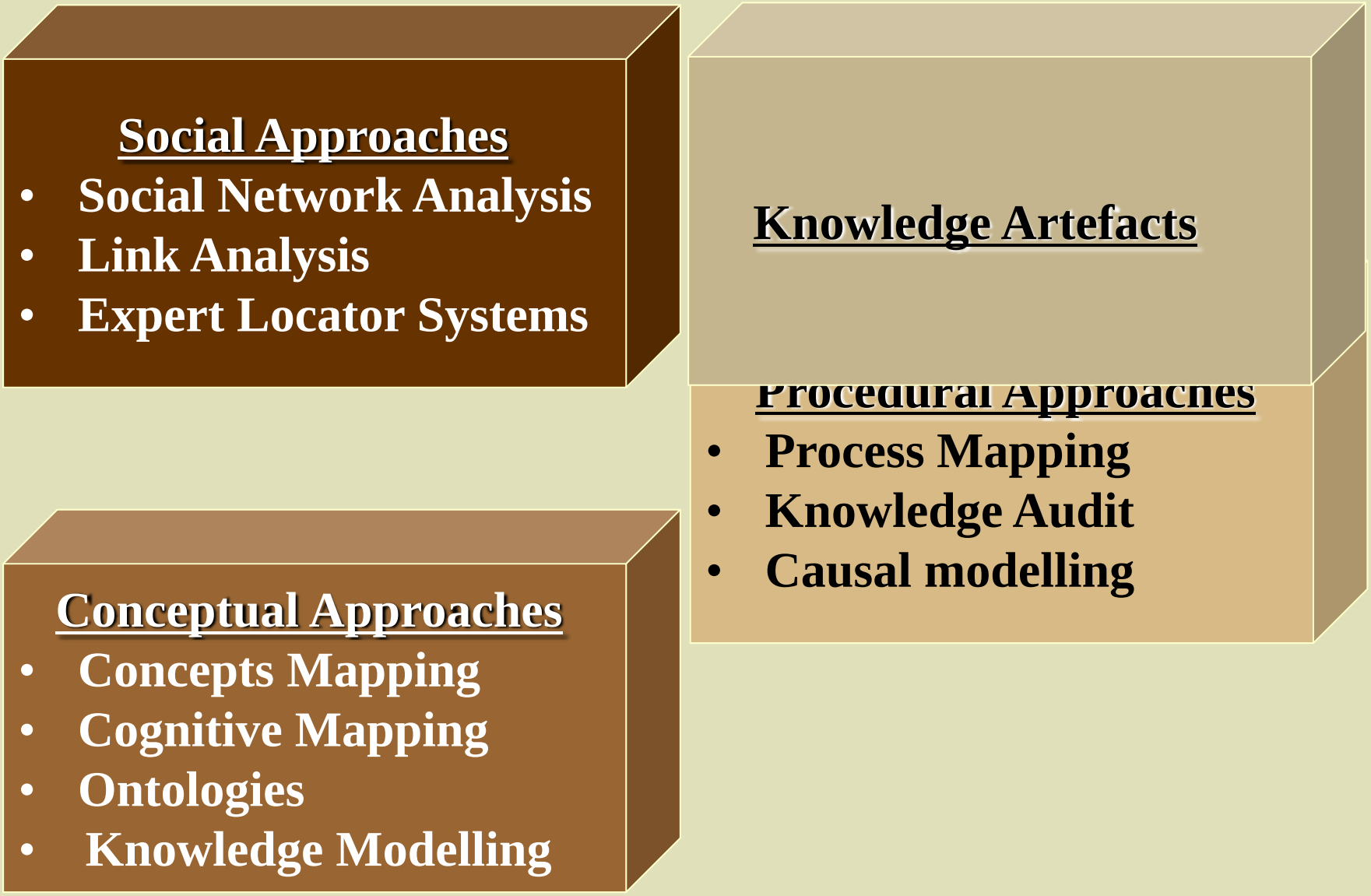
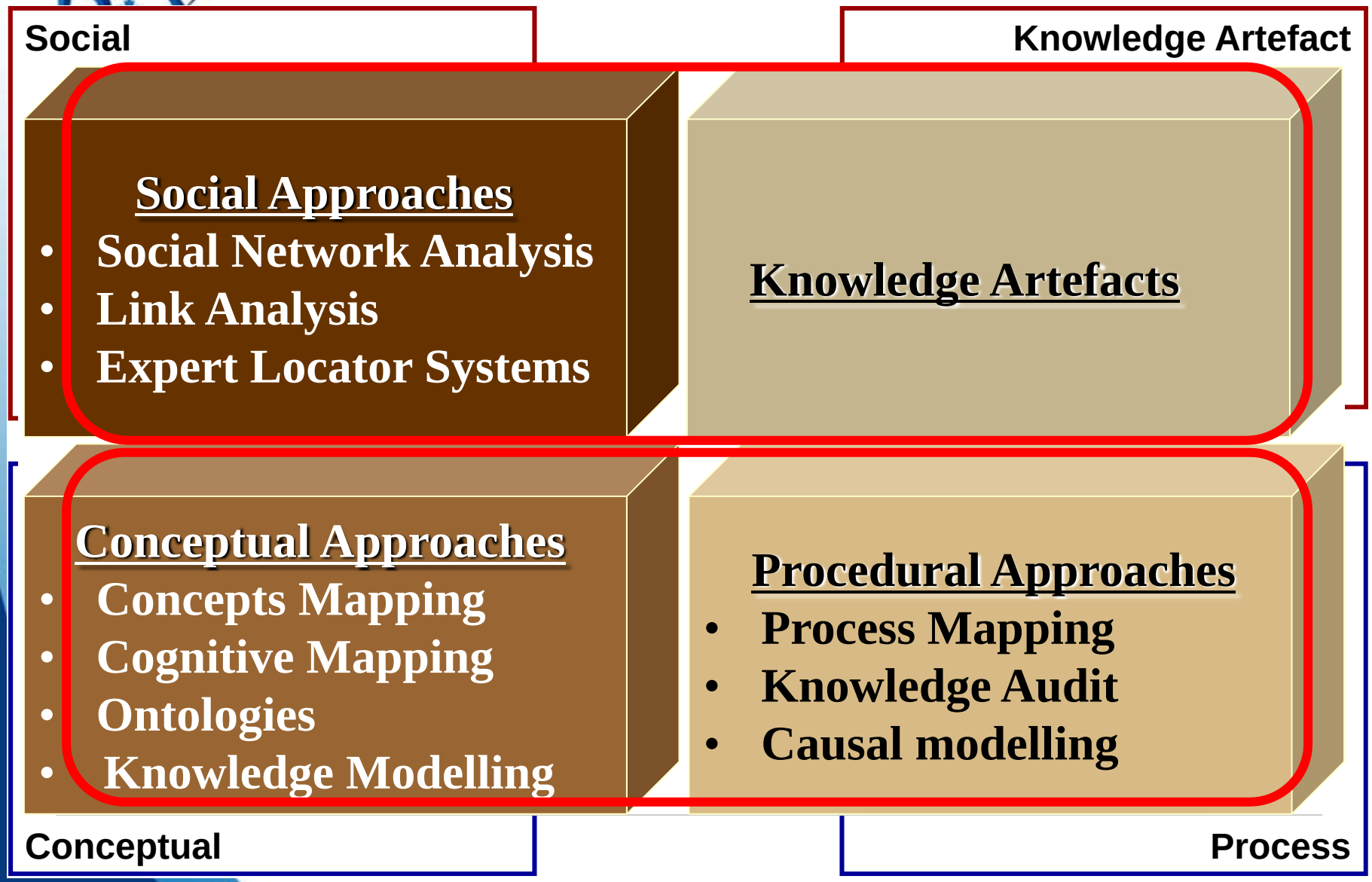

Social Approaches
• Social Network Analysis
• Link Analysis
• Expert Locator Systems
Knowledge Artefacts
Procedural Approaches
• Process Mapping
• Knowledge Audit
• Causal modelling
Conceptual Approaches
• Concepts Mapping
• Cognitive Mapping
• Ontologies
• Knowledge Modelling


Social
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Conceptual
Process

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KMapper: alpha prototype key features

- Correspond to the multidimensional approach
- Be:
  - Context driven
  - As automated as possible
  - Dynamic
  - Generic
  - Incremental
- Lever end-users as KAs
- Provide end-users with an adapted suite of tools
  - Statistics – reports – collaboration functions

File Edit User Export Help

Search

Dimension Filters

Metadata Filters

Metadata

Attributes

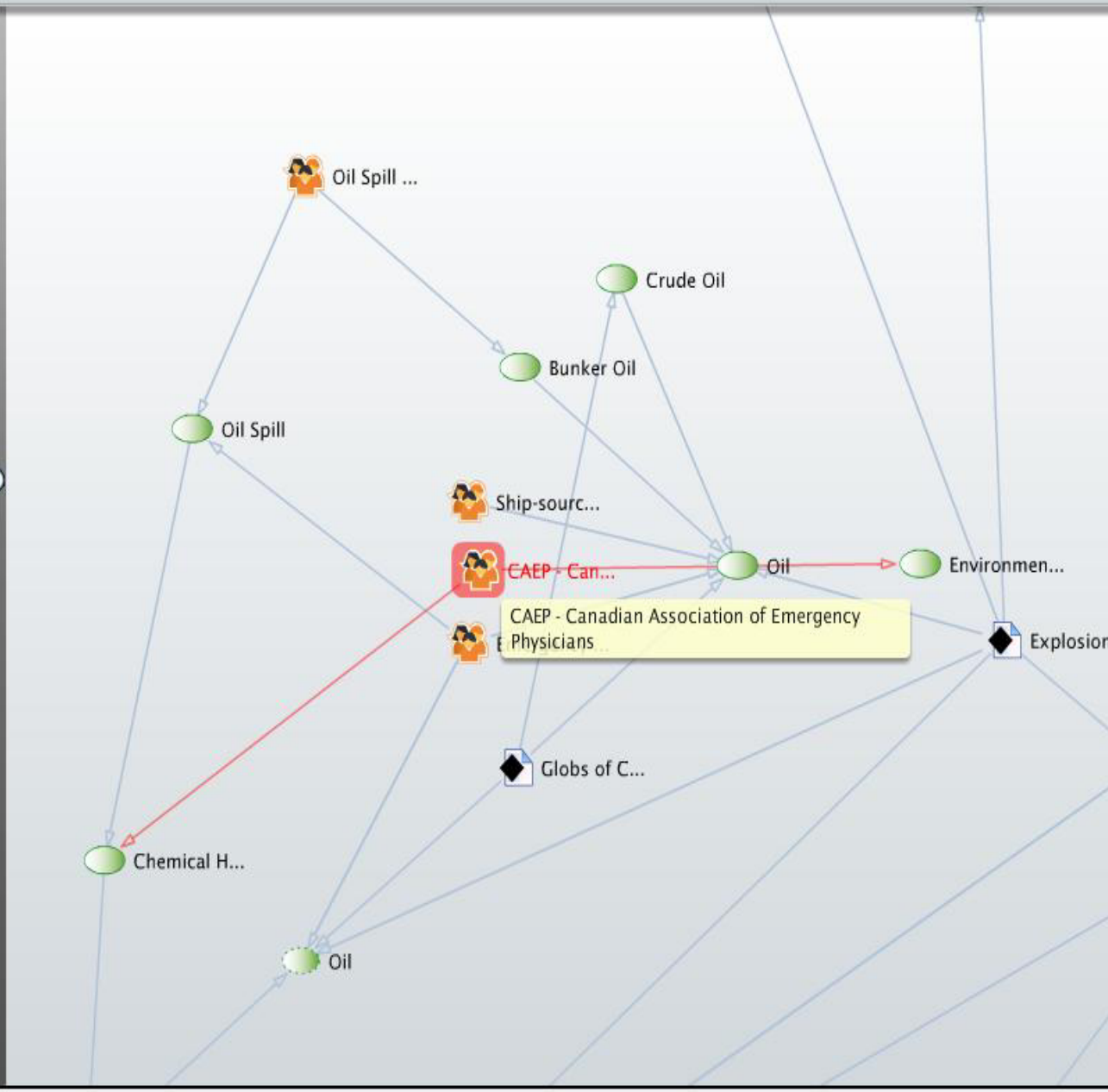
Name	Value
Address	104 - 1785 Alta Vista Drive Ottawa,...
EmailAddress	
Fax	(613) 523-0190
GroupName	CAEP - Canadian Association of Emer...
Hyperlink	
Telephone	1-800-463-1158

Relations

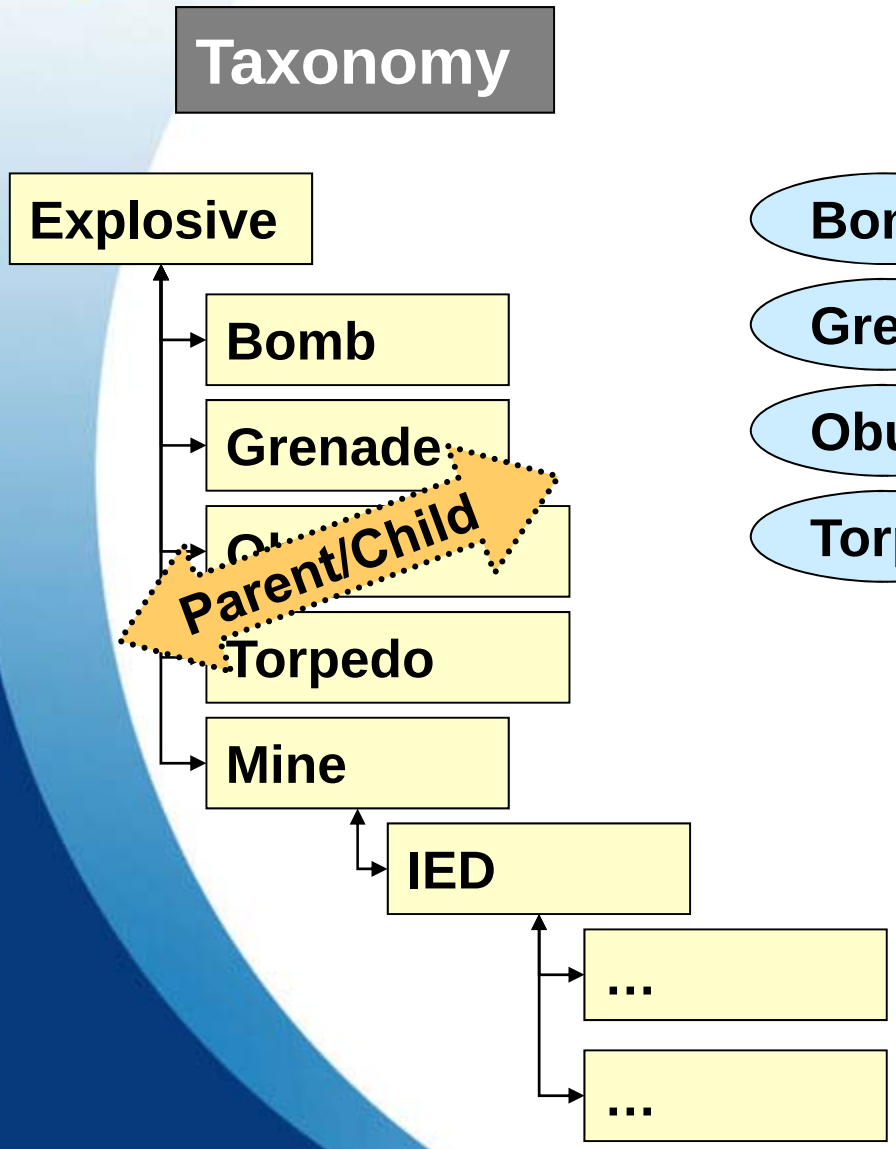
Source	Type	Target	Drag Status
CAEP - Canadi	hasKnowledge	Environment E	Already On Map
CAEP - Canadi	hasKnowledge	Chemical Haz	Already On Map
CAEP - Canadi	isA	Group	Not Draggable

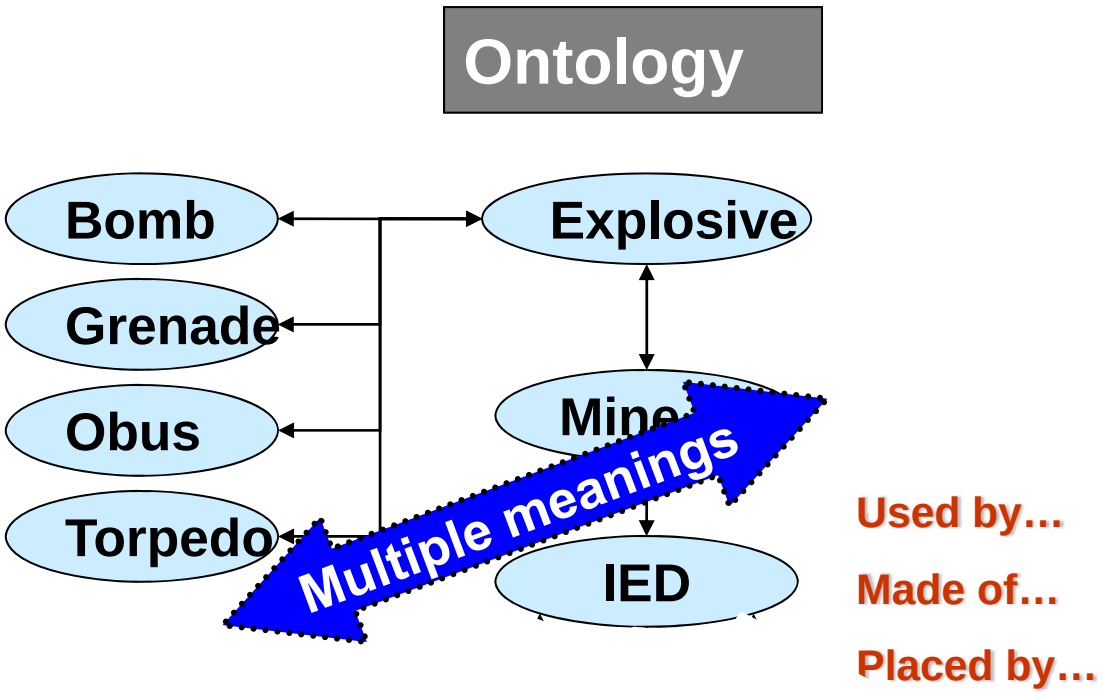
Comments

Show Overview

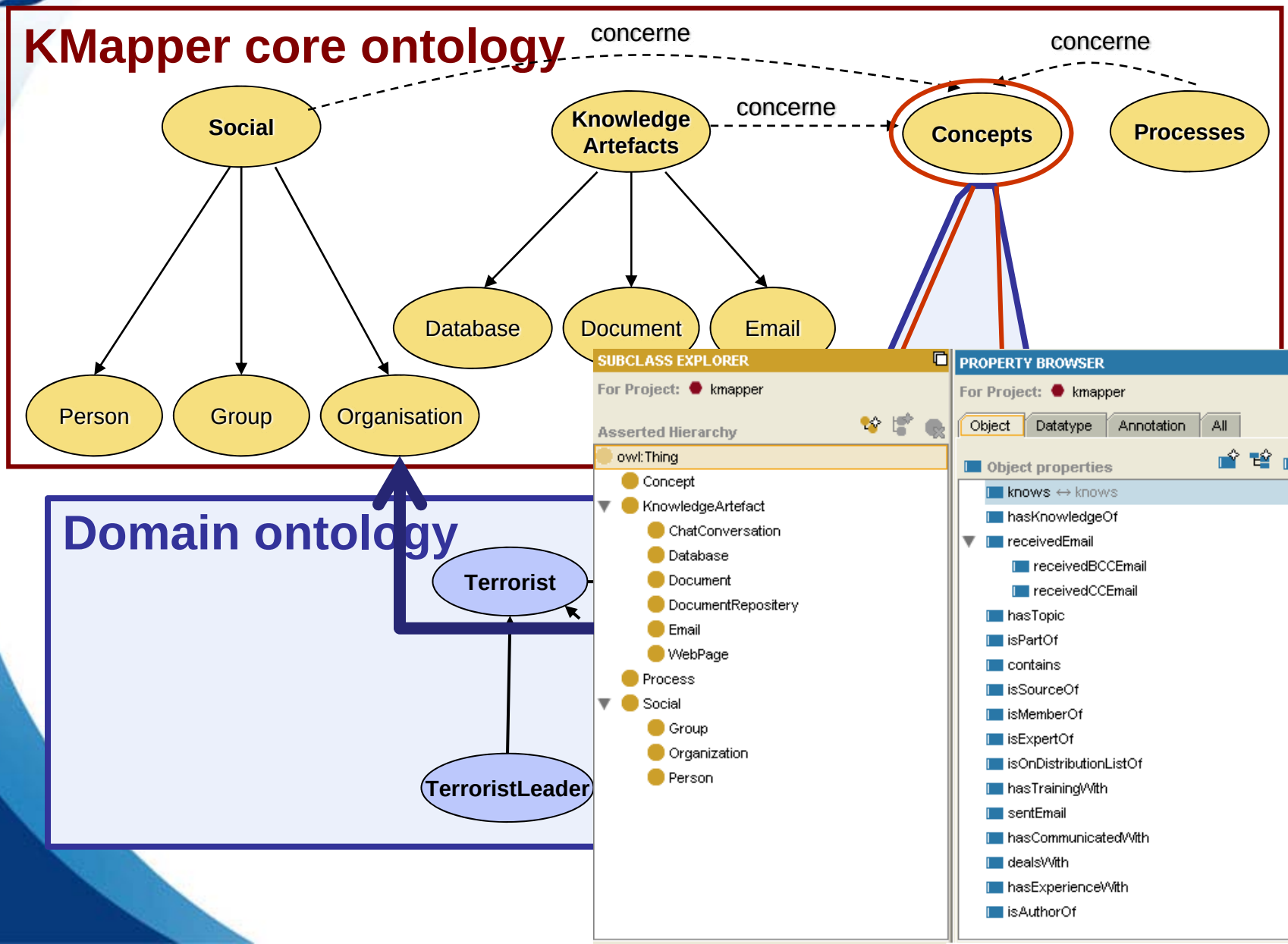


Ontologies and taxonomies?





Ontology-Based Application

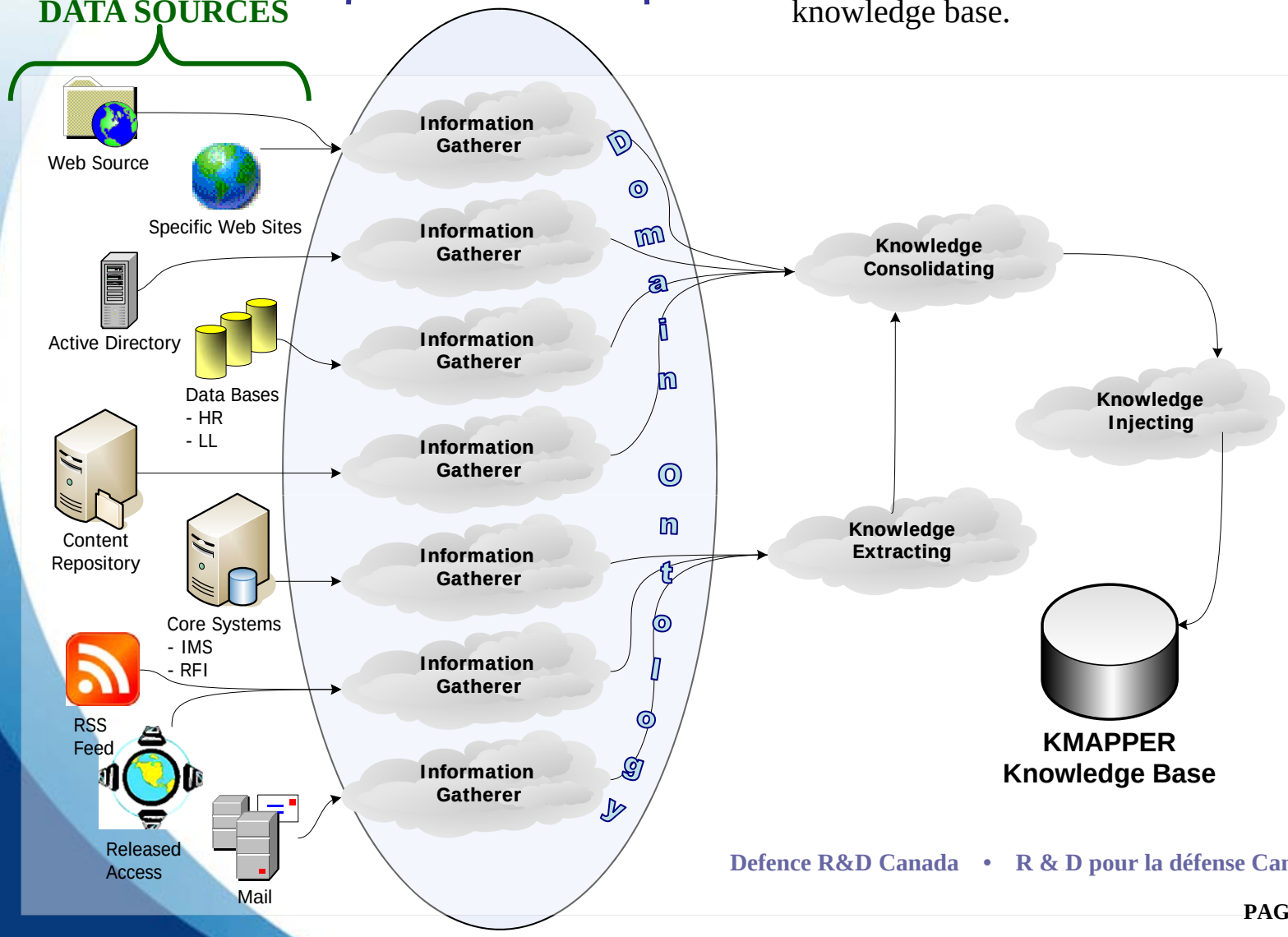


KMapper domain ontology

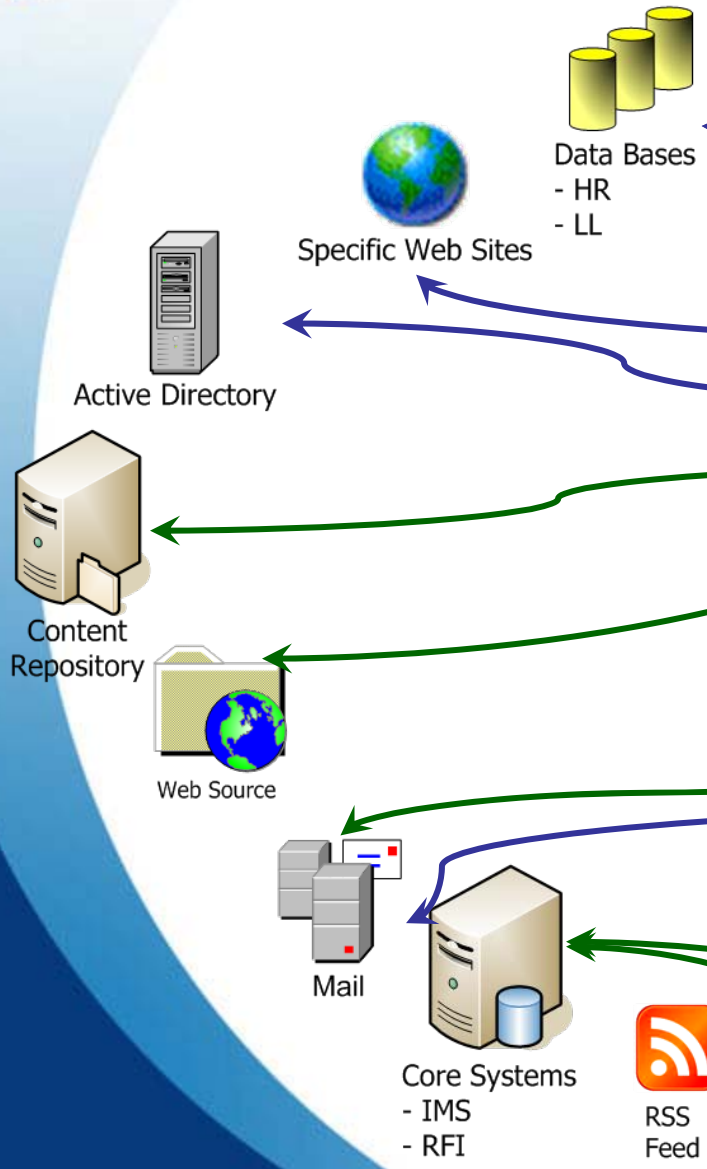
- AKTiveSA* – CBRNE ontology
- 2000+ concepts/instances
- Augmented the ontology
  - Terrorist domain
  - Maritime domain
  - Defence domain

***University of Southampton, UK**

INFORMATION GATHERER = long running process, acting as an active or a passive peripheral service, that allows inputting information from a data source in the knowledge base.



Data Sources



- Individuals and groups extracted from:
  - Human Resources Databases
  - Lessons Learned
  - Web Sites
  - Active Directories
  - Documents (Authors)
- Artefacts Supported
  - Text Documents (TXT);
  - Word Documents (DOC);
  - PDF Documents (PDF);
  - Outlook Messages (MSG):
    - Sender & recipients;
    - Attachments, replies and body content;
- Core Systems
  - Request for information
  - Incidents logs
- And… the metadata

Ontologies and knowledge mapping

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- **Using ontologies – rational**

Rationals

- Reason 1: Matching the selected approach
- Reason 2: Providing a context driven prototype
- Reason 3: Enabling a high-level of automation
- Reason 4: Creating a dynamic prototype
- Reason 5: Sharing the knowledge among partners
- Reason 6: Developing a generic prototype

Reason 1: Matching the selected approach

- Ontology for the Conceptual dimension
- Philosophical aspect and machine readable issue
  - What type of ontology?
    - RDF - OWL DL - OWL Full
- Ontology formalization
  - Definitions
  - Properties
  - Name Format (natural language issue)
- Challenge – Natural language

File Tools User Help

Dimension Filter

Search

Search for InstanceType

Keyword akt

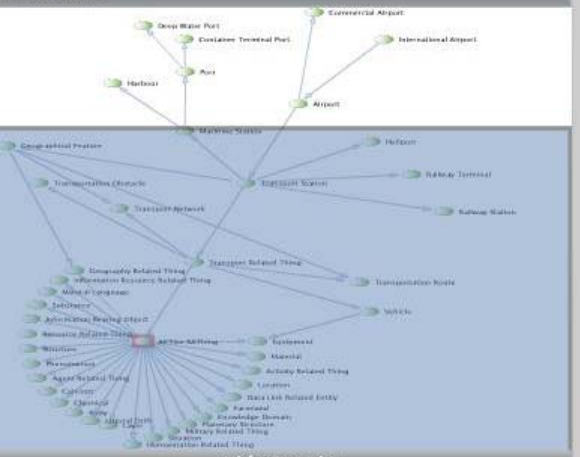
Scope K-Base K-Map

Submit Reset Advanced

Results	Drag Status
AKTive SAThing	Already On ...

Metadata

Comments



Hide Overview

Current Workspace name = ScreenShot6 Success : Search completed.

Done Local intranet

Reason 2: Providing a context driven prototype

- Provide context to the visualized knowledge asset
- Reducing and organizing the different knowledge assets
- Increasing knowledge and understanding of the situation

File Edit User Export Help

Search

Dimension Filters

Metadata Filters

Metadata

Attributes

Name	Value

Relations

	Source	Type		Target	Drag Status
	Ruth Fawcett	hasKnowledge		Ammonia	Connects T...
	Minnesota Edu	hasKnowledge		Ammonia	Connects T...
	Depository Se	hasKnowledge		Ammonia	Connects T...
	CFL_000MSDS	hasTopic		Ammonia	Connects T...
	Removal of Ai	hasTopic		Ammonia	Connects T...
	Ammonia- wik	hasTopic		Ammonia	Already On ...
	EGU2008-A-0	hasTopic		Ammonia	Connects T...
	ammonia - sir	hasTopic		Ammonia	Connects T...
	Ammonia - hea	hasTopic		Ammonia	Connects T...
	AmmoniaRecl	hasTopic		Ammonia	Connects T...
	Emergency Re	hasTopic		Ammonia	Already On ...
	ammonia-amn	hasTopic		Ammonia	Connects T...

Comments

Show Overview

Increasing knowledge and understanding of the situation

File Edit User Export Help

Search
Dimension Filters
Metadata Filters
Metadata

Attributes

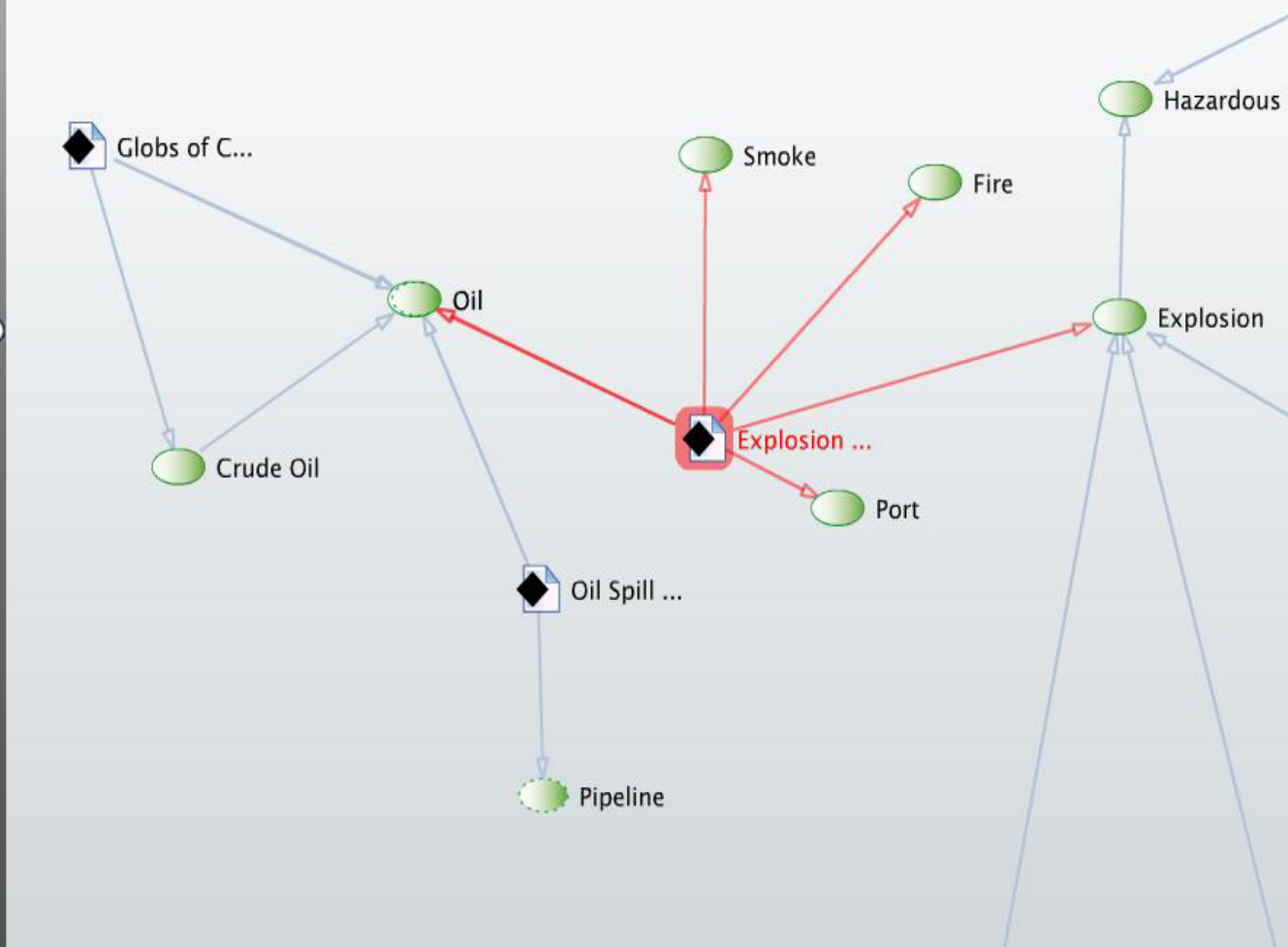
Name	Value
Category	Test Category
IncidentNumber	UC_TRAININGIMS_00030
Location	Port Moody, BC Canada
Operation	Operation Podium
Source	IMS
Status	Open

Relations

Source	Type	Target	Drag Status
Explosion - Po	hasTopic	Port	Already On Map
Explosion - Po	hasTopic	Oil	Already On Map
Explosion - Po	hasTopic	Fire	Already On Map
Explosion - Po	hasTopic	Event	Creates New Graph
Explosion - Po	hasTopic	Oil	Already On Map
Explosion - Po	hasTopic	Smoke	Already On Map
Explosion - Po	hasTopic	Explosion	Already On Map
Explosion - Po	isA	Incident Log	Not Draggable

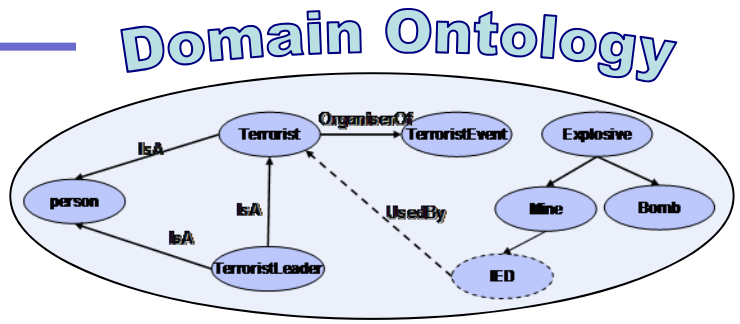
Comments

Show Overview



Reasons 3-4-6: Generic/Dynamic/ High-level of automation prototype

- In order to bring sufficient information
- In order to keep the application up-to-date
  - Information gatherers
    - Knowledge assets
    - Metadata



INFORMATION GATHERERS

DATA SOURCES

Web Source

Specific Web Sites

Active Directory

Data Bases
- HR
- LL

Content Repository

Core Systems
- IMS
- RFI

RSS Feed

Released Access

Mail

Information Gatherer

Information Gatherer

Information Gatherer

Information Gatherer

Information Gatherer

Information Gatherer

Information Gatherer

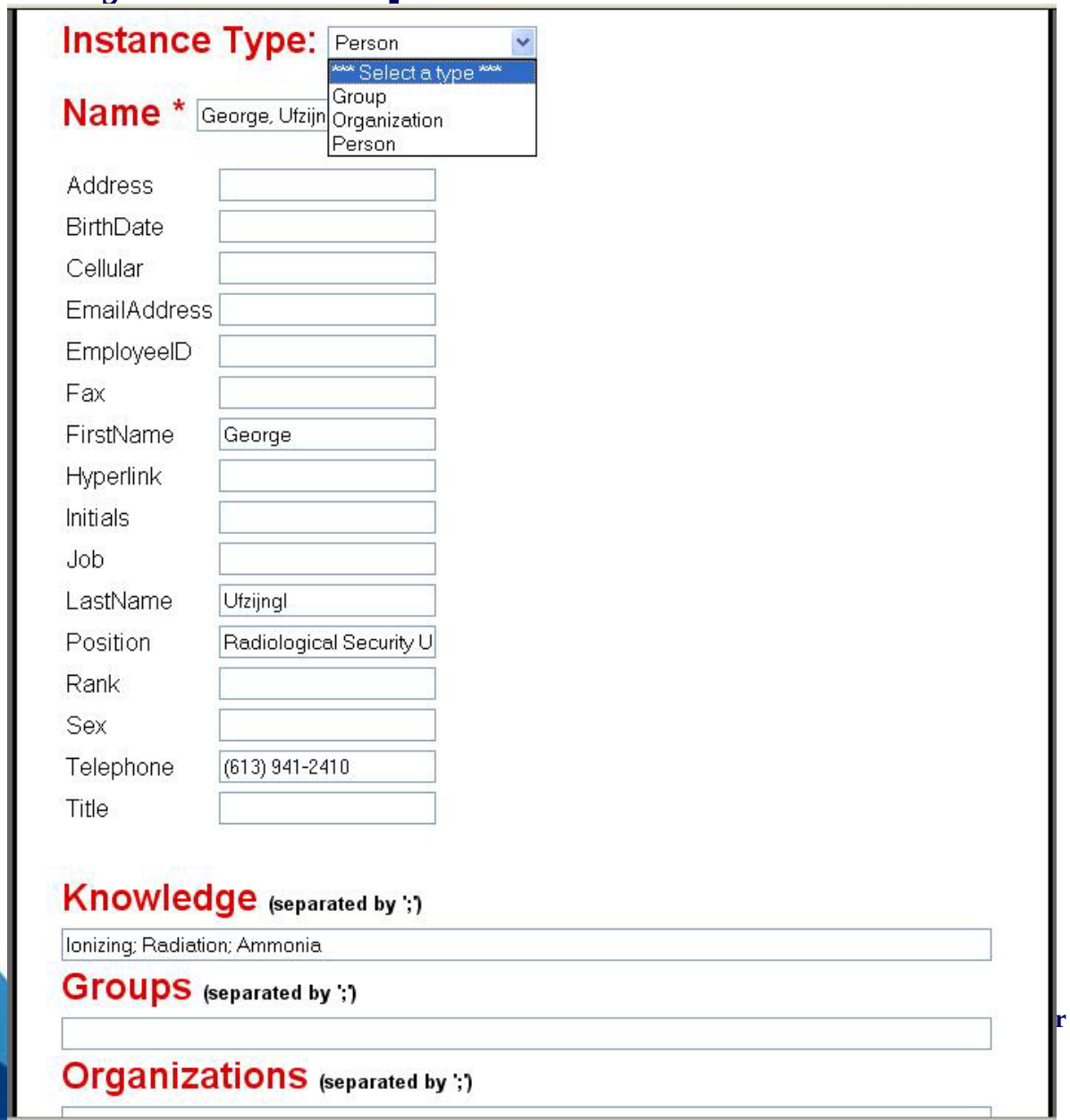
Knowledge Consolidating

Knowledge Extracting

Knowledge Injecting

KMAPPER Knowledge Base

Dynamic aspect



Reason 5: The knowledge should be easily shared among partners

- Essence of ontologies
- Sharing workspaces
  - Between KMappers applications
  - Under different format
- Downloads of related documents
- Phone numbers or emails of experts
- Sharing of information and knowledge with allies
  - Provide access to databases/metadata
  - Connection to other incident management systems
- Possibility to add comments – mission memory

Future works

- Improve of the prototype
  - Inserting spatiotemporal components
  - Reducing information overload
    - Improve filtering & knowledge inference services
  - Integrate process dimension
- Migrate the KMapper to a Multi-intelligence tool suite
- Lever some of the KMapper services for SNA purpose

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