Representing and Reasoning with

Heterogeneous, Modular and Distributed ontologies

UniTN/IRST contribution to

KnowledgeWeb.WP 2.1

Knowledge Web

Inputs

- *Well founded ontologies*, top level ontologies
- *Domain specific ontologies* (medial, earth-science, gene, e-business standard catalogues
- A huge number of relatively **small "ontologies"** (DB-schema, classification, linguistic ontologies, web services specifications ..,..
- *semantic correspondences* between ontologies
- *Modular links:* Links that relates parts of an ontology to the global one
- *Ontological Hyperlinks* (links to external ontologies)
- *Versioning Links. …*
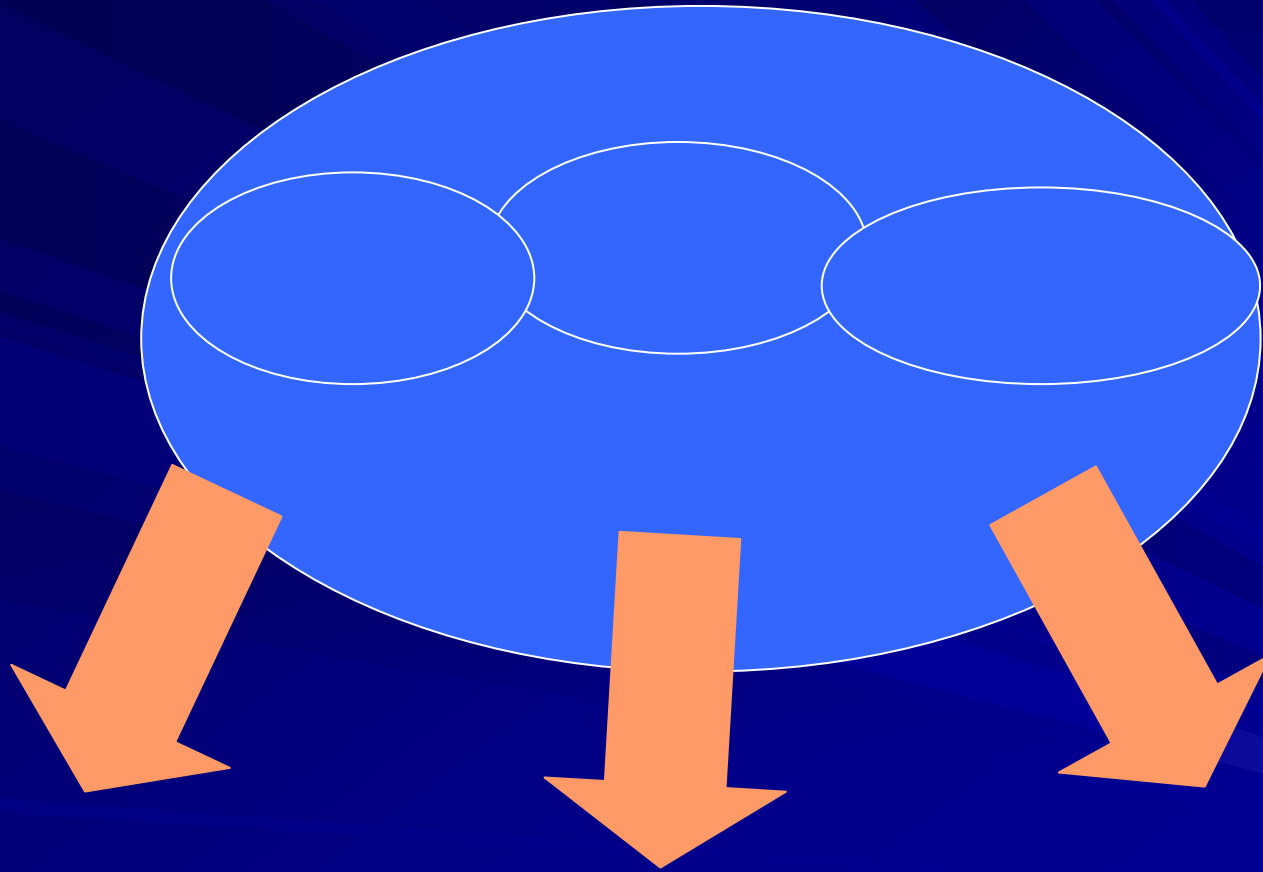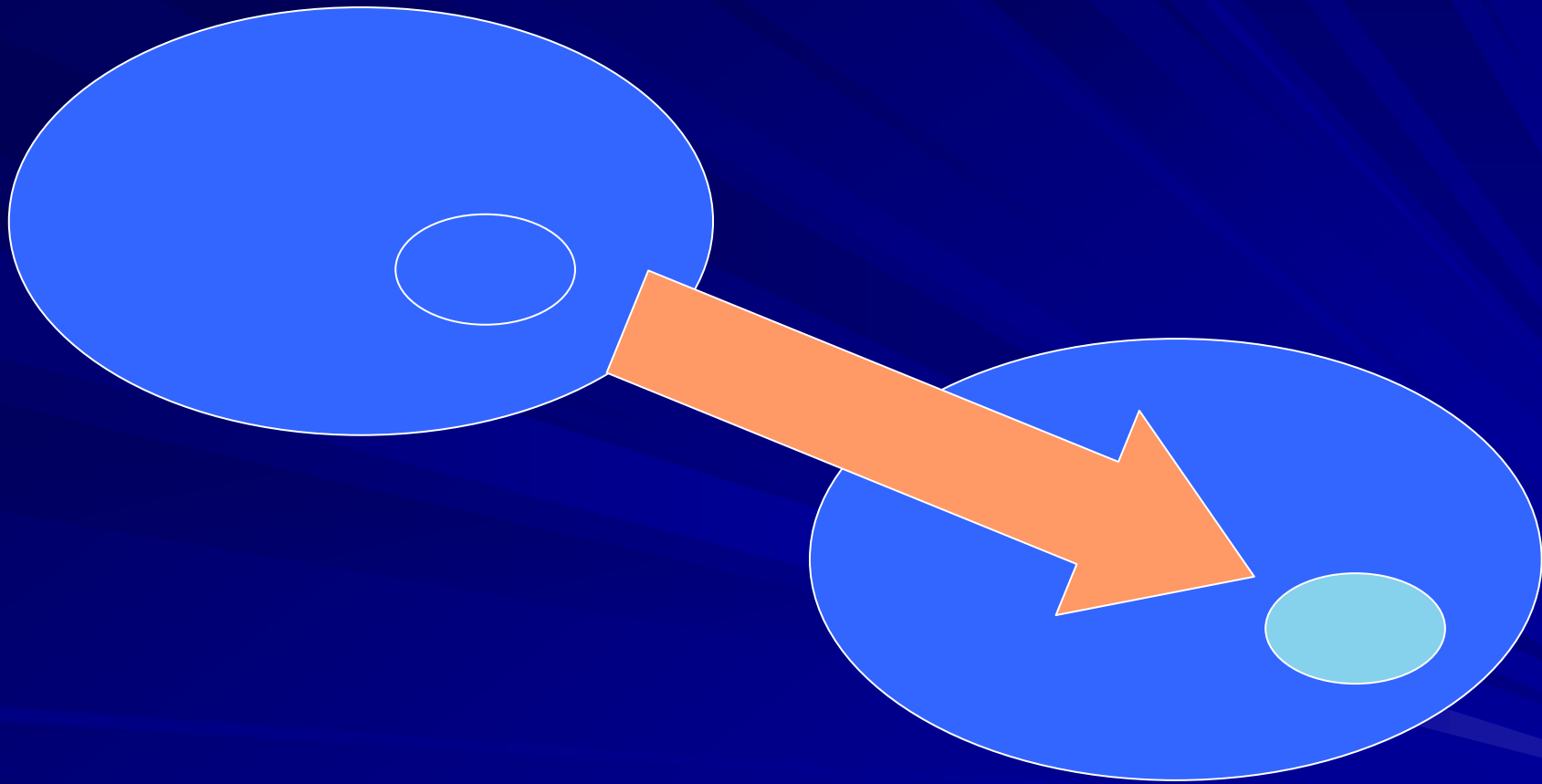
Semantic correspondence links
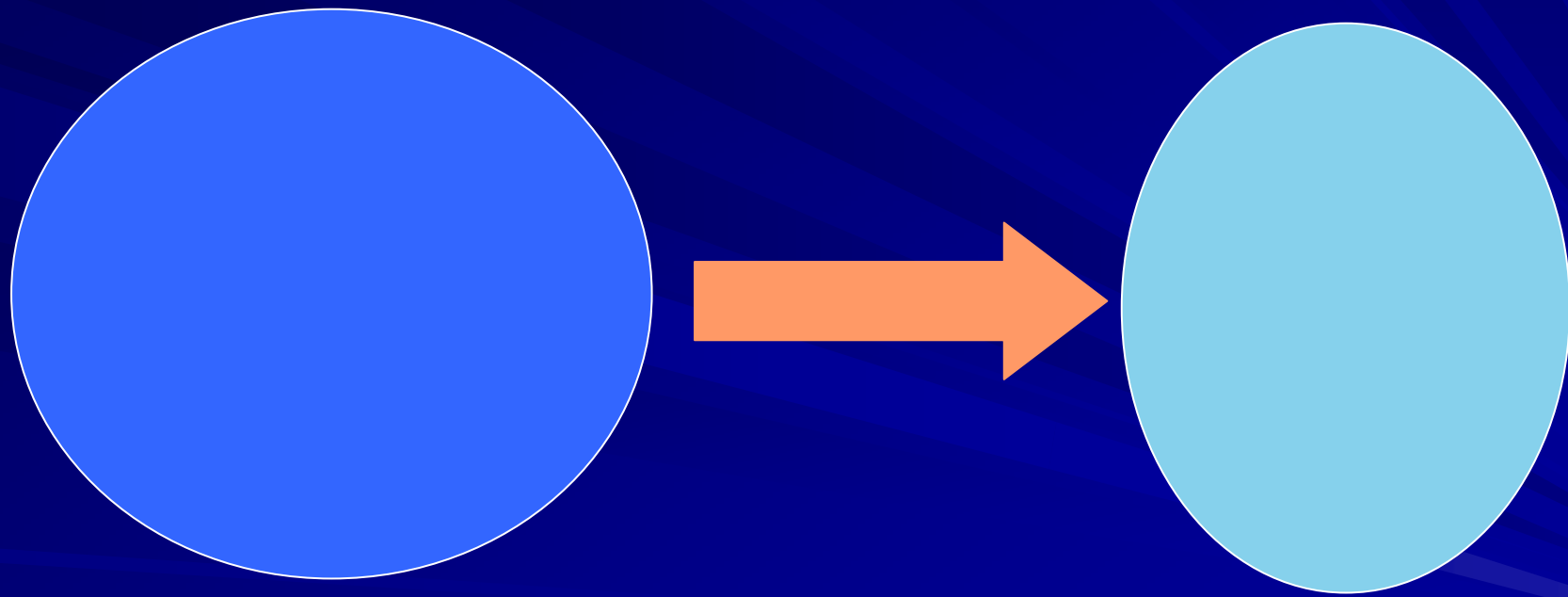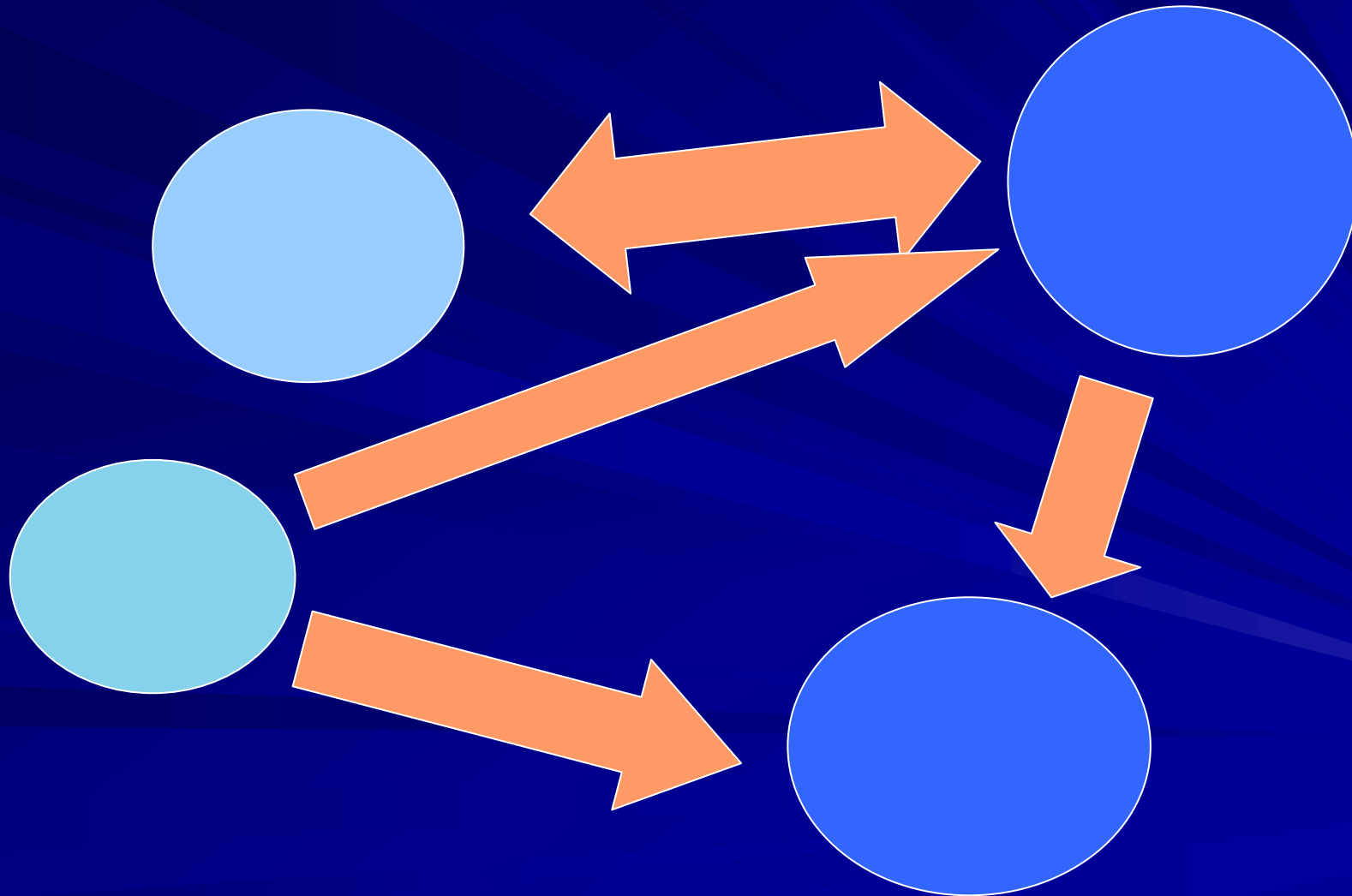
Ontology hyperlink
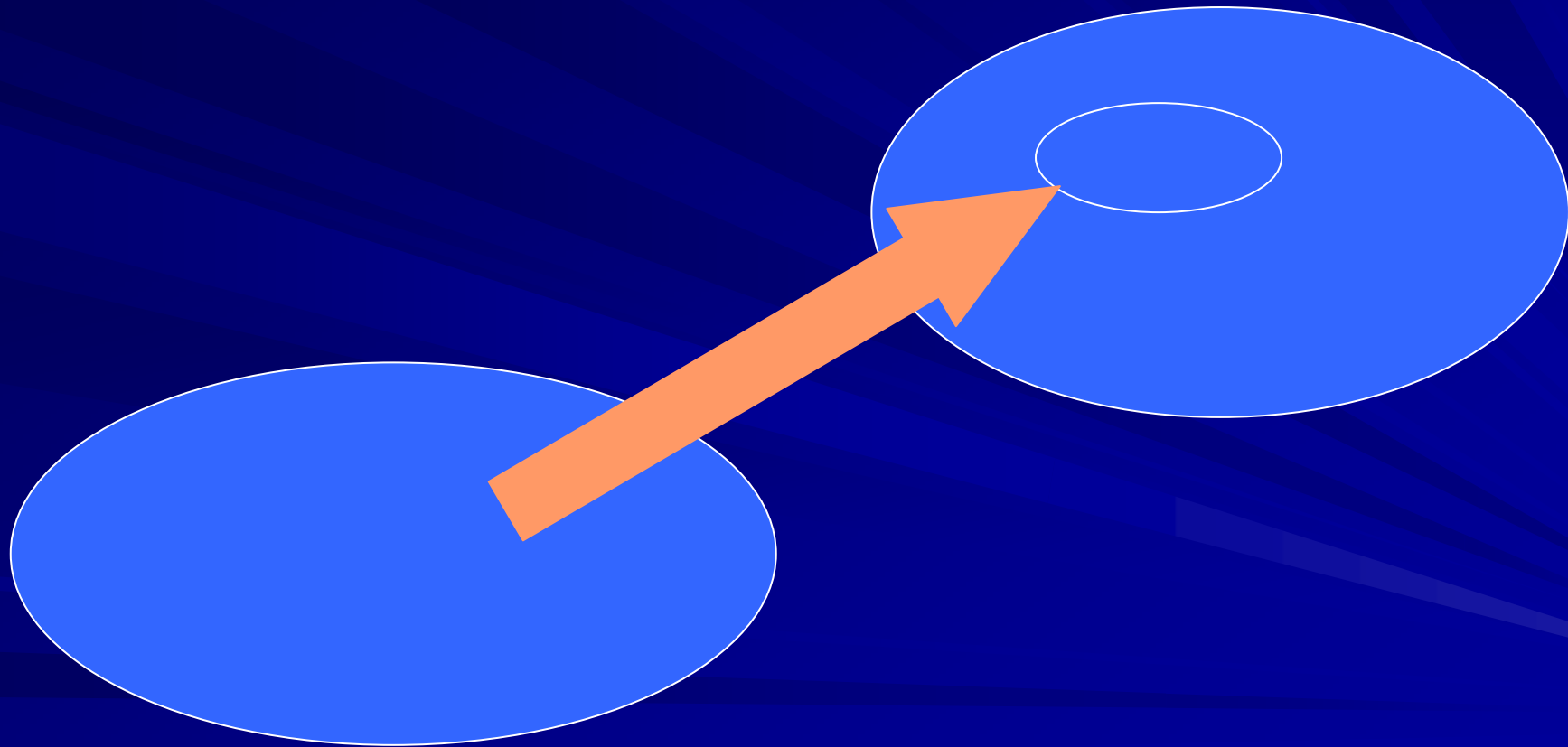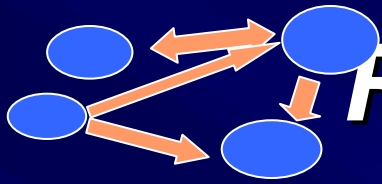
Modularization links

Versioning links

Ontology Space

Reasoning Services in an ontology space

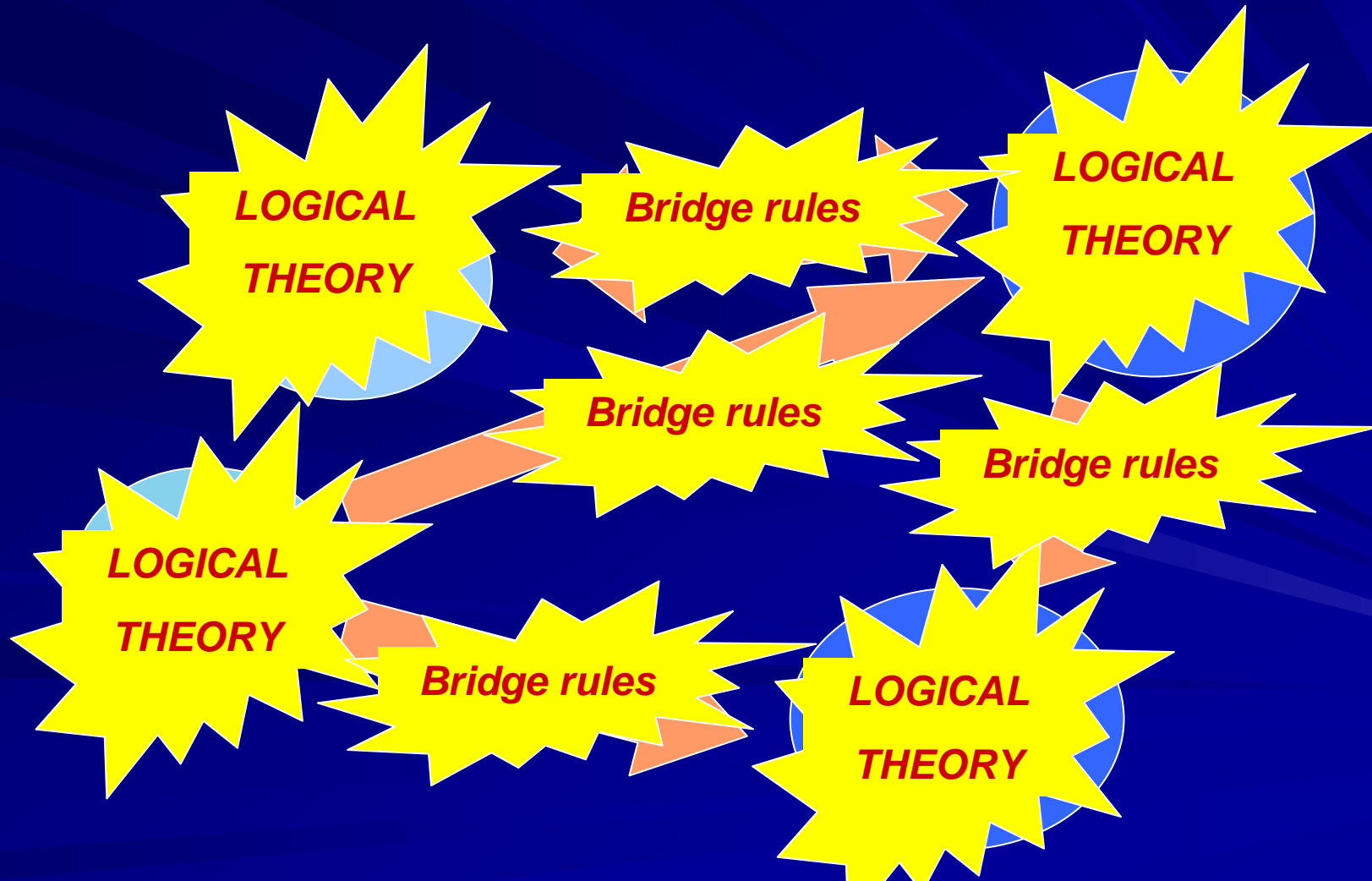- Local Ontology Services (Local Subsumption, Local Consistency, ...)

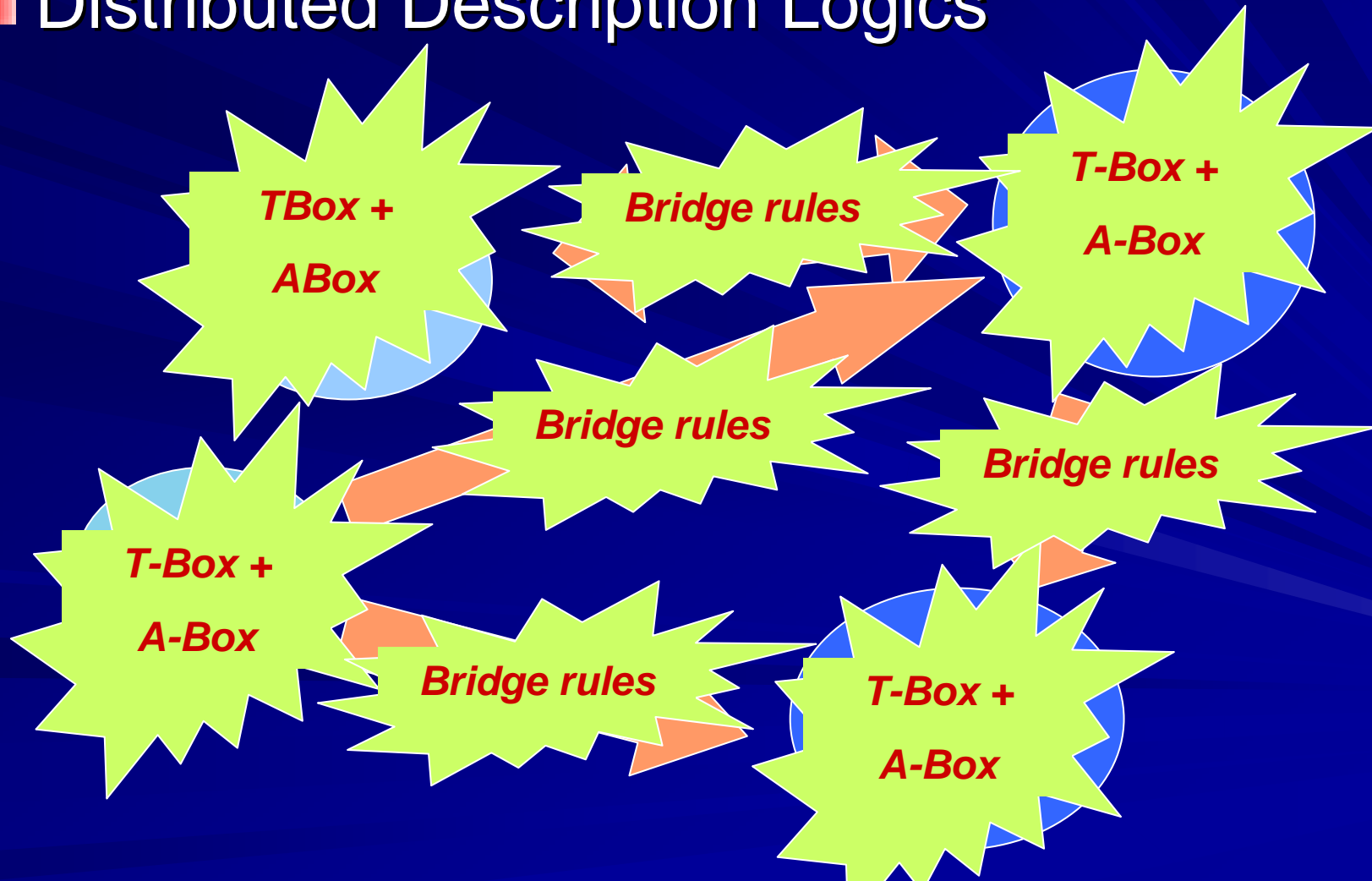- Coordination between local reasoning services

What do we need:

- Formal Framework (see also WP2.2 Het.)
- Concrete Language (see also WP2.? Lang)
- Distribute Decision Procedures

Formal Framework

Special Case (DDL)

- Distributed Description Logics

TBox + ABox

Bridge rules

T-Box + A-Box

Bridge rules

Bridge rules
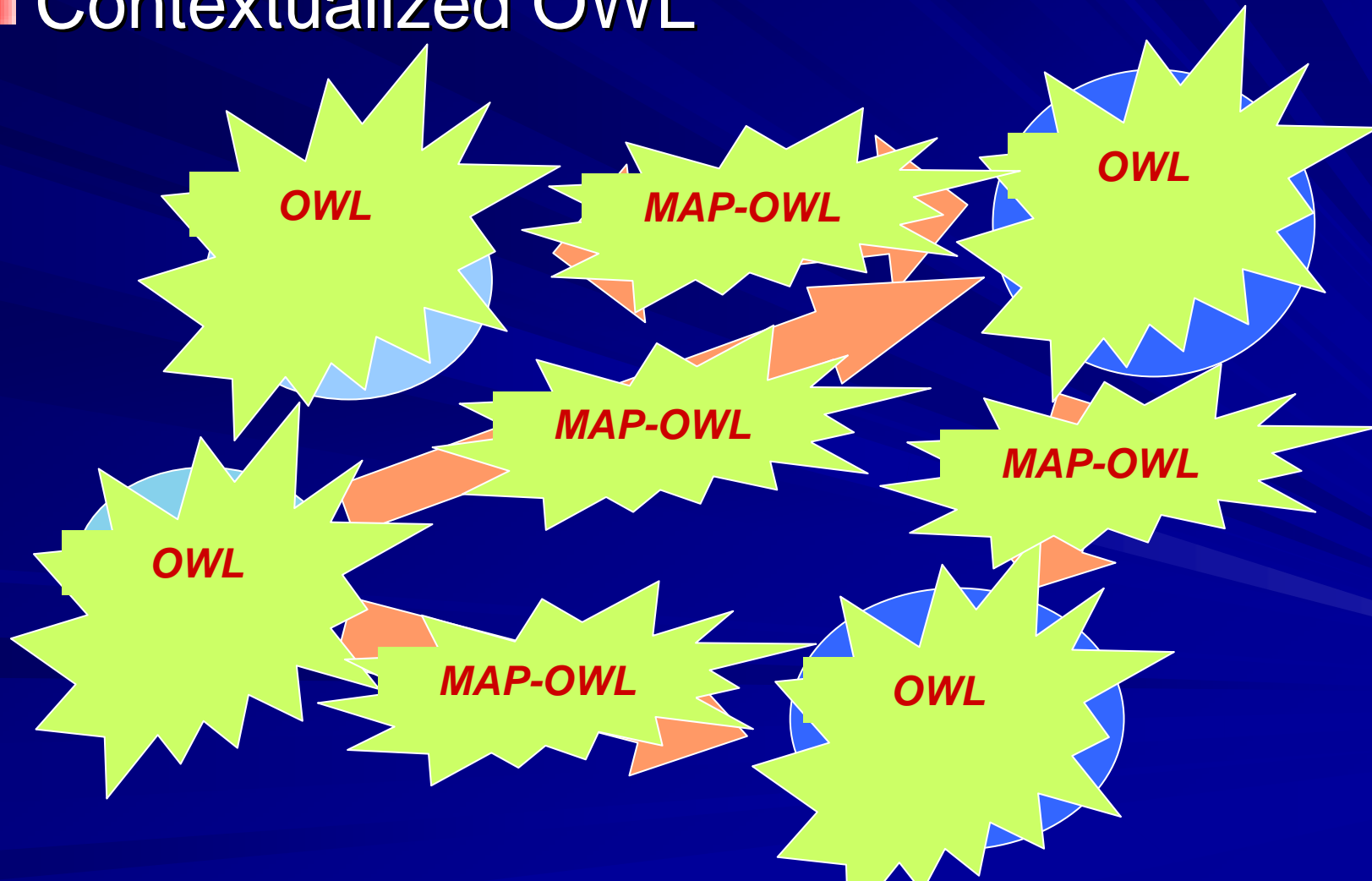
T-Box + A-Box

Bridge rules

T-Box + A-Box

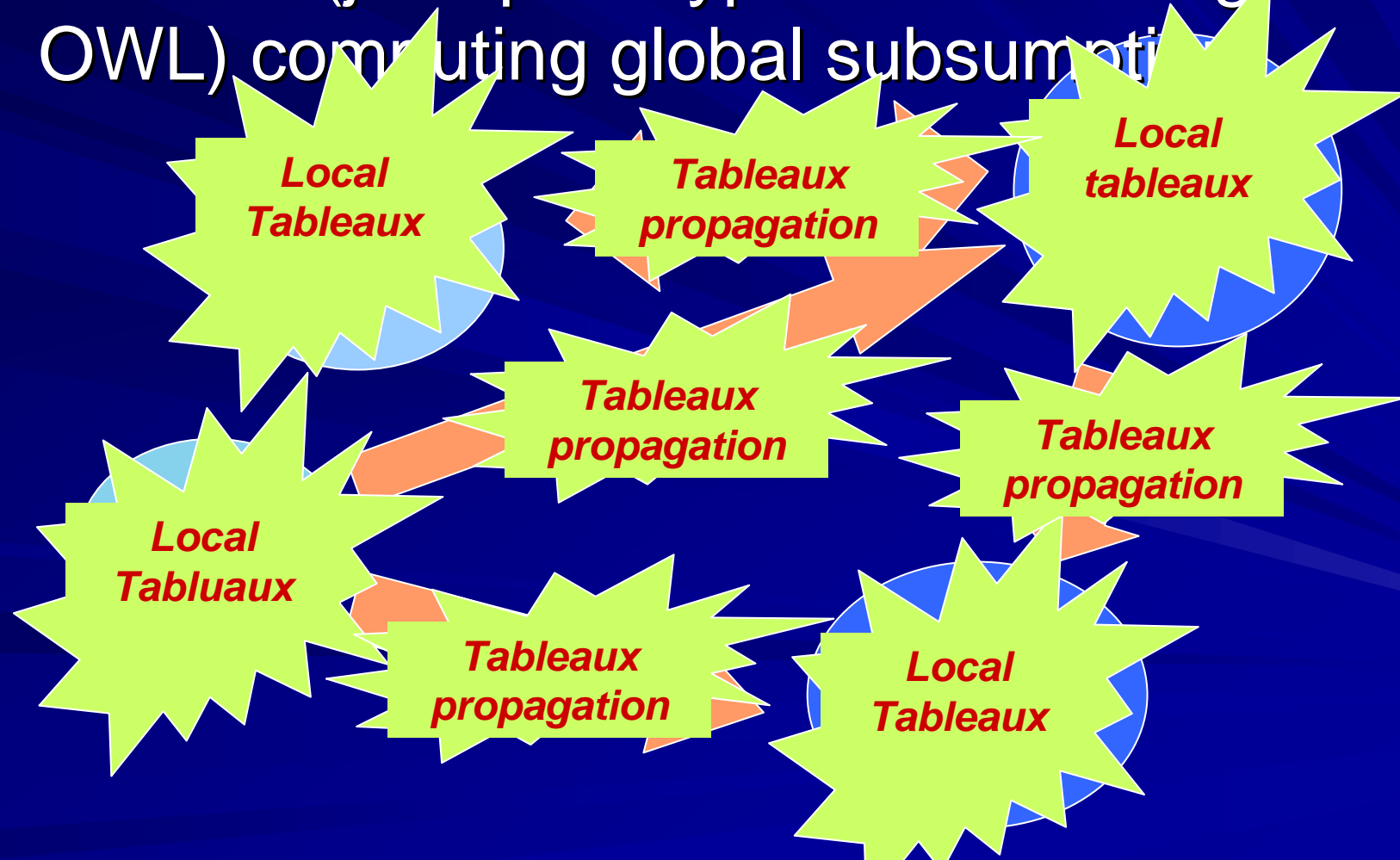# Concrete Language

Special Case (C-OWL)

- Contextualized OWL

Distributed Decision Procedure

Special Case (Reasoning in DDL)

- D-Pellet (java prototype for reasoning in C-OWL) computing global subsumption

Local Tableaux

Tableaux propagation

Local tableaux

Tableaux propagation

Tableaux propagation

Local Tabluaux

Tableaux propagation

Local Tableaux

Overall Picture

	OWL	C-OWL
Specification language for	A single stand alone ontology	Ontology Space = Ontologies + Semantic Mappings
underlying logic	DL	DDL
Semantics	First order logic	Local Model Semantics = FOL semantics + Domain Relations
Automated reasoning tools	Racer, IFaCT, Pellet	D-Pellet (0.01 prototype)