



Enterprise Data & BI
Conference Europe 2013

4-6 November 2013

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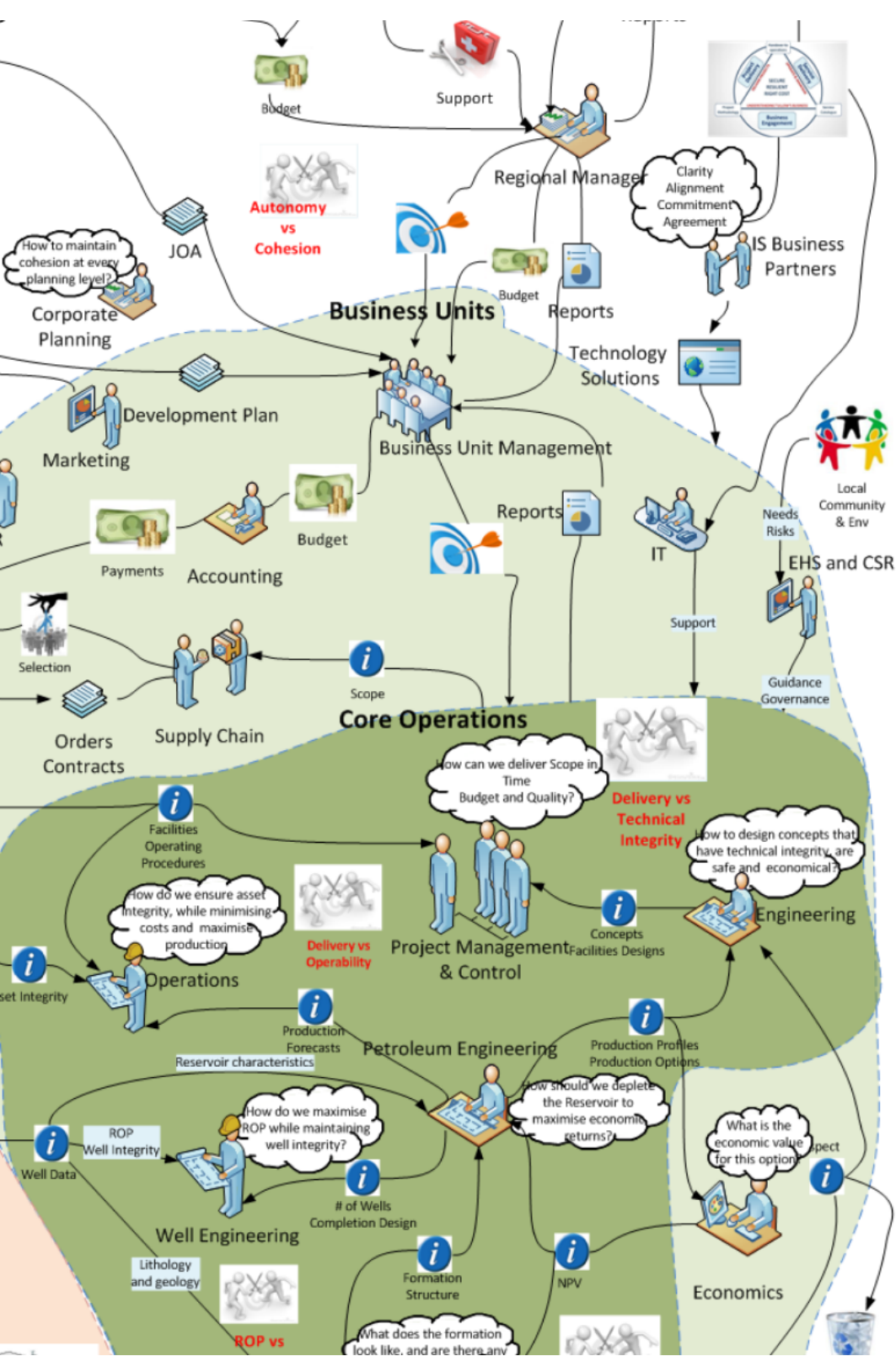


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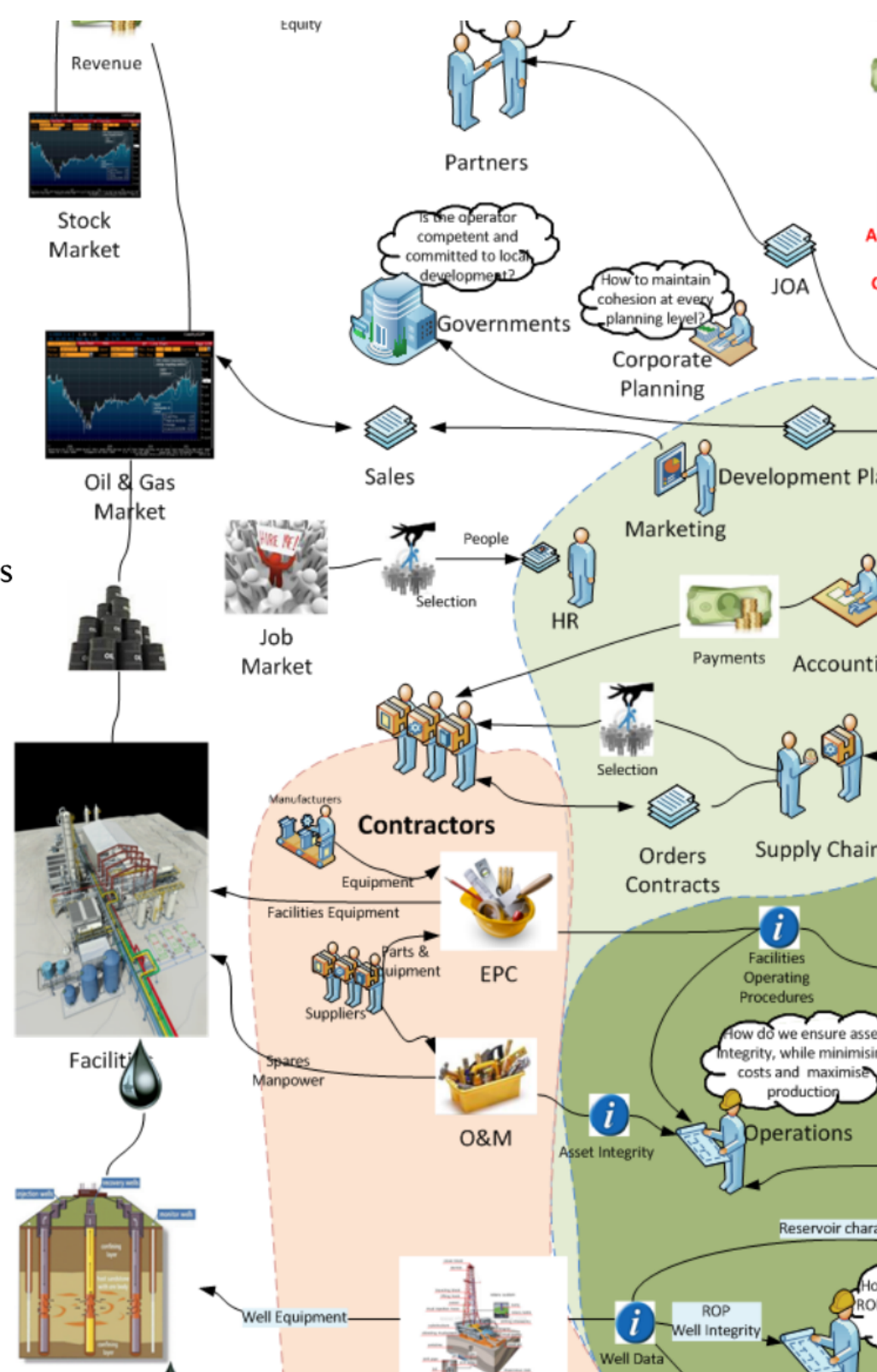
A Robust Common Master Data Foundation for Oil & Gas

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WEDNESDAY 6 NOVEMBER 2013
Conference Day 2 - 11:20-12:10



The Upstream Oil and Gas industry is formed of a complex network of contractual structures to manage highly specialised technical disciplines and technologies that interact across deep and multilateral supply chains

One of the key challenges that organisations face in this industry, is ensuring interoperability across organisational and functional boundaries due to the highly stratified supply chain and deeply specialised technical domains that it creates.



Our strategy is to CLEAN the data using a robust process; at the centre of which is a PURE data architecture for the oil industry.

CLEAN Process

Source Systems

to CLEAN legacy data using a PURE model of the business

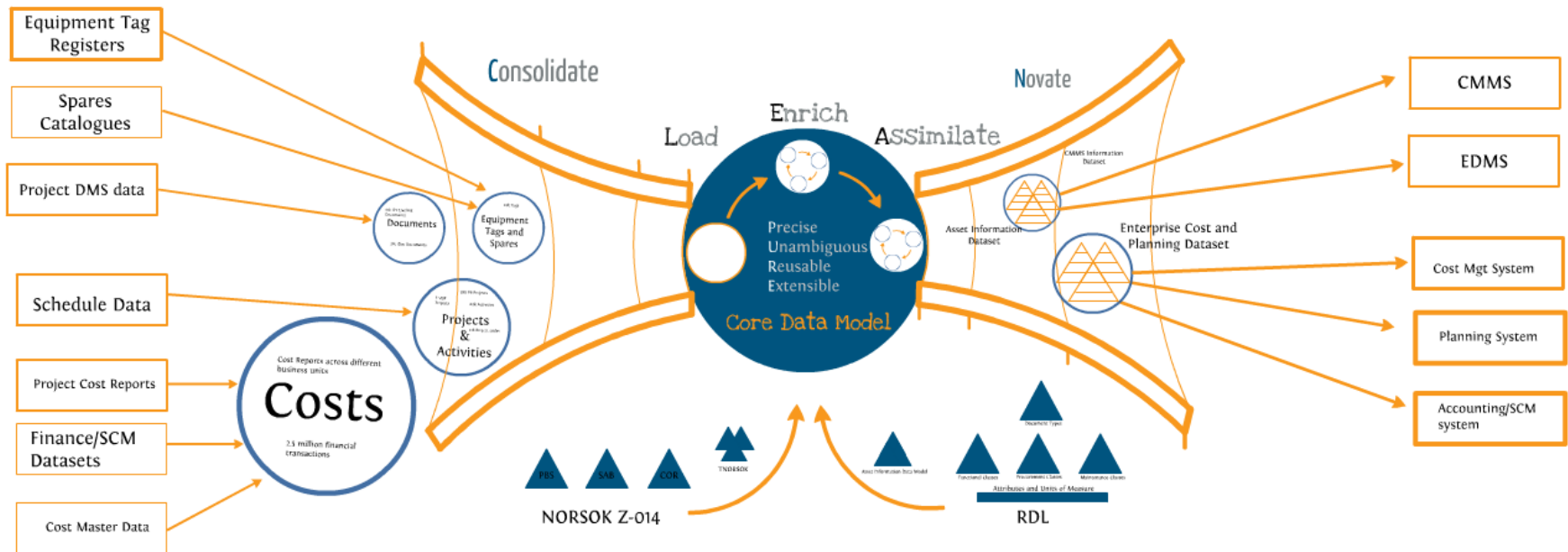
Target Systems

Domains

IM

Planning

Cost Management



Semantic Requirements

Requirements for the common foundation:

- Expressive enough to capture without workarounds the full range of information
- Sufficiently constraining to severely limit the range of possible ways of representing the same information

Need to recognize these as semantic requirements.

Semantic Layer

System Layer

Domain Layer

Application Layer

Computation Layer

Technology Layer

Features of the selected Foundational Ontology

Ontological categories; the most general types of things that exist

Criteria of Identity; basis for sameness and difference

An extensional (4D) ontology

What is a Common Foundation?

Operations

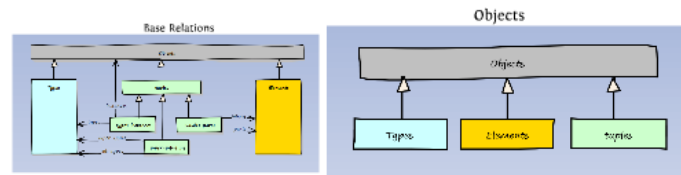
e.g. Well X

Domain

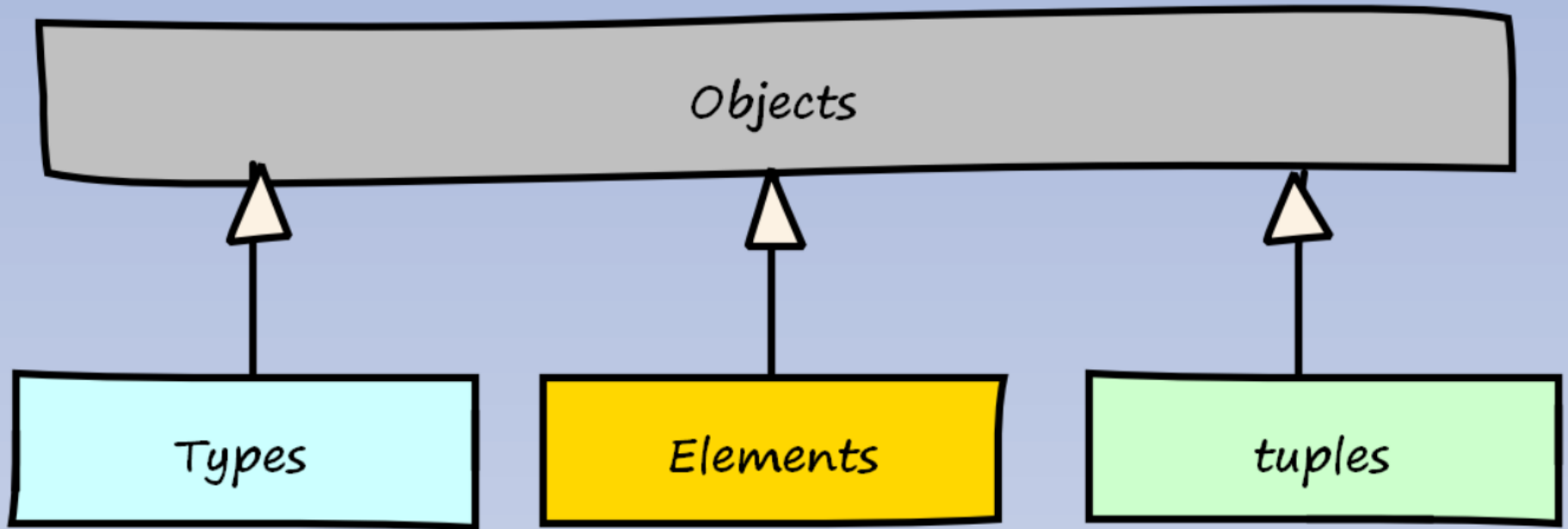
e.g. Oil Wells

Foundation

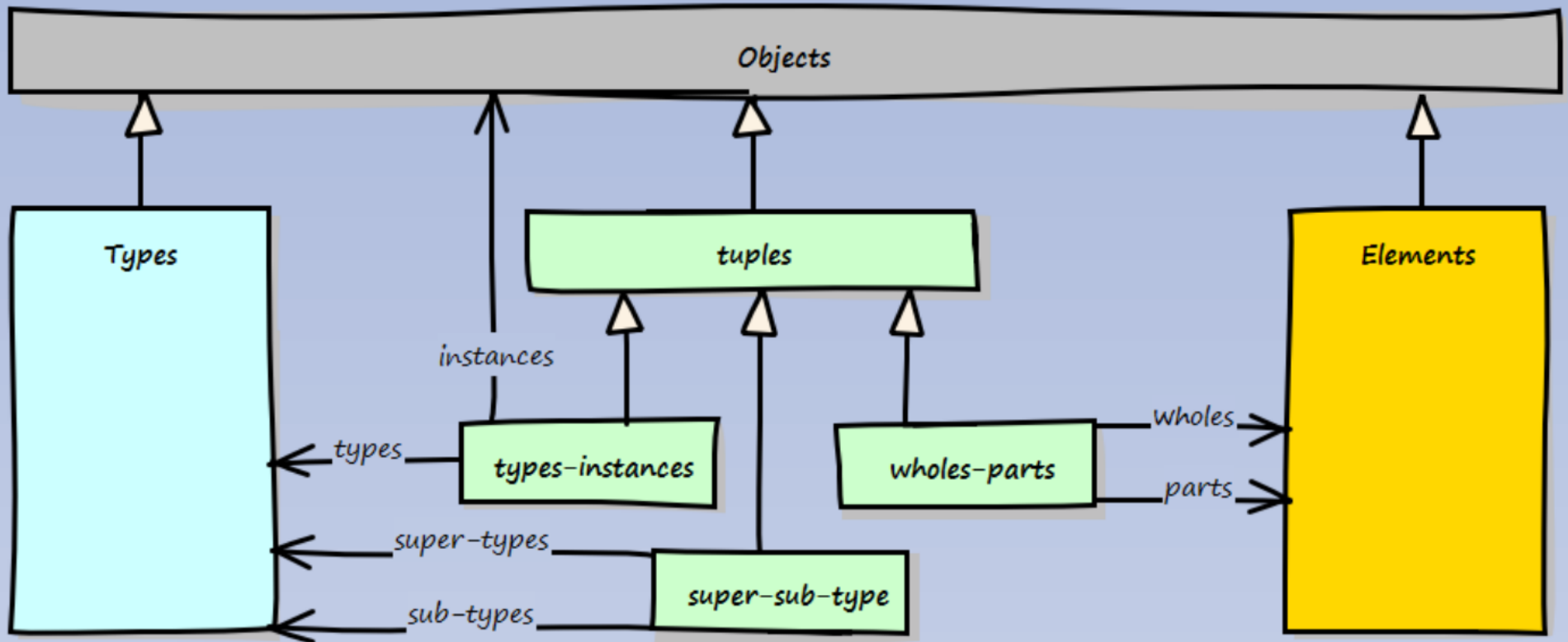
e.g. Things

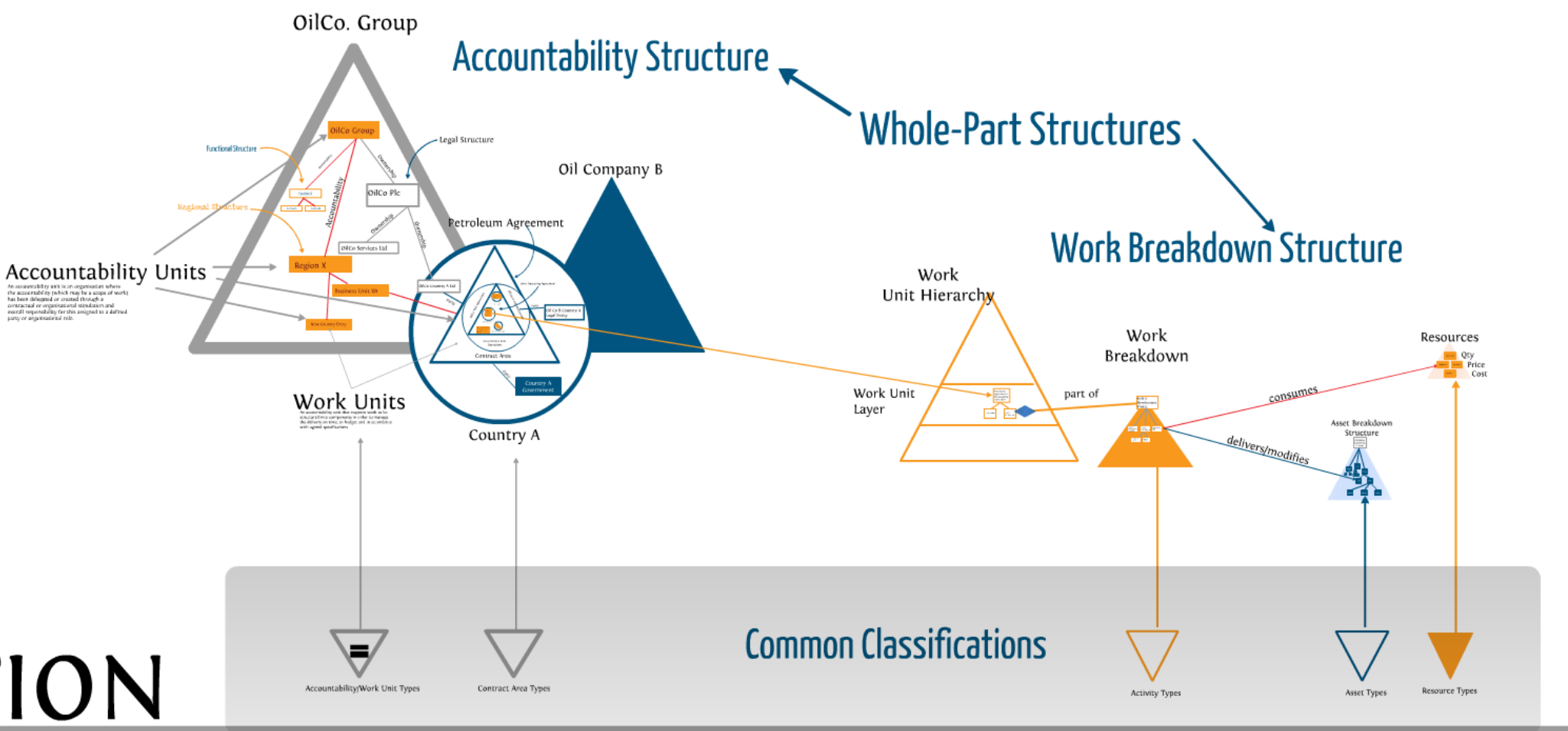
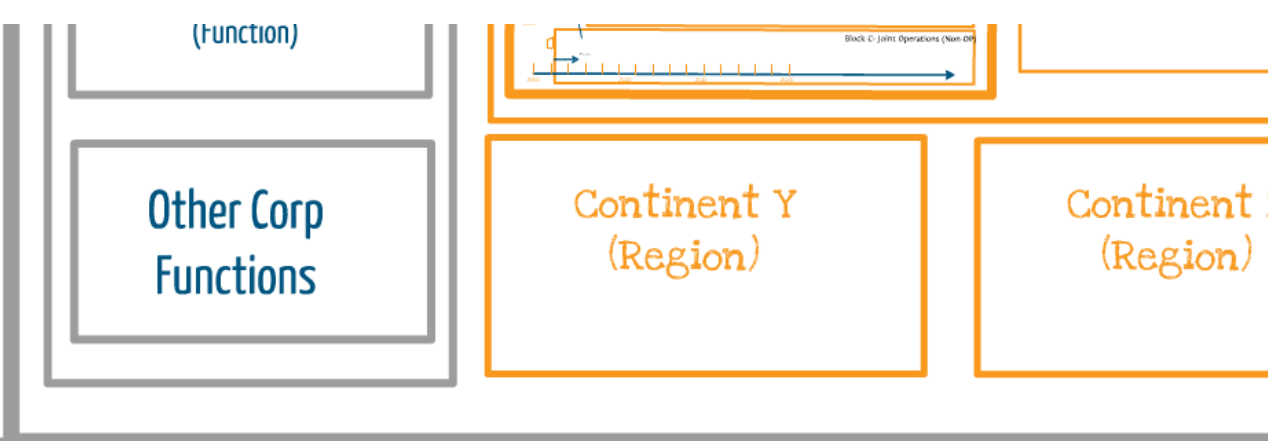
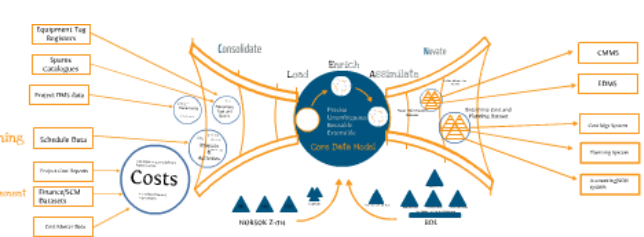


Objects



Base Relations

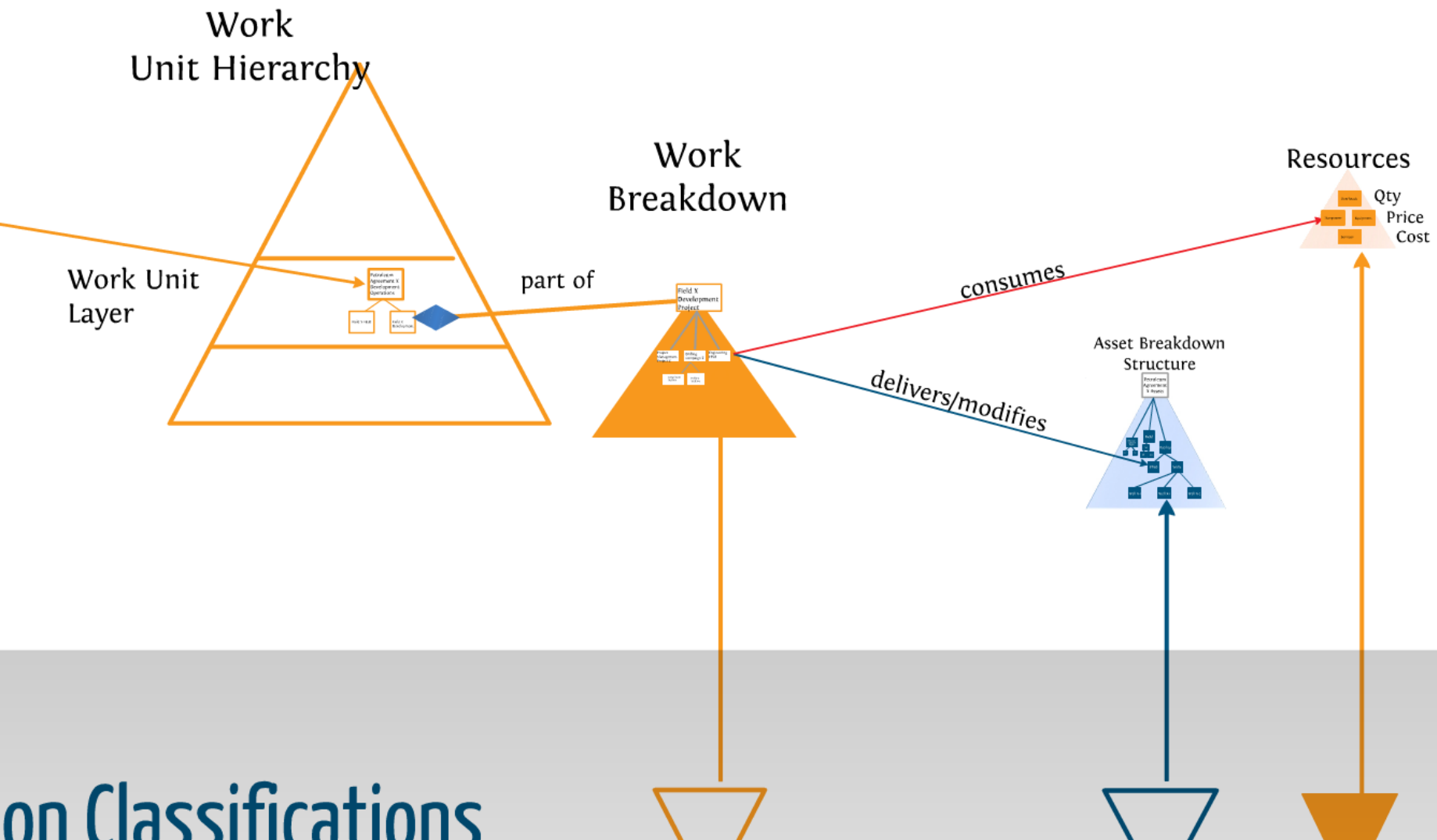




TION

Whole-Part Structures

Work Breakdown Structure

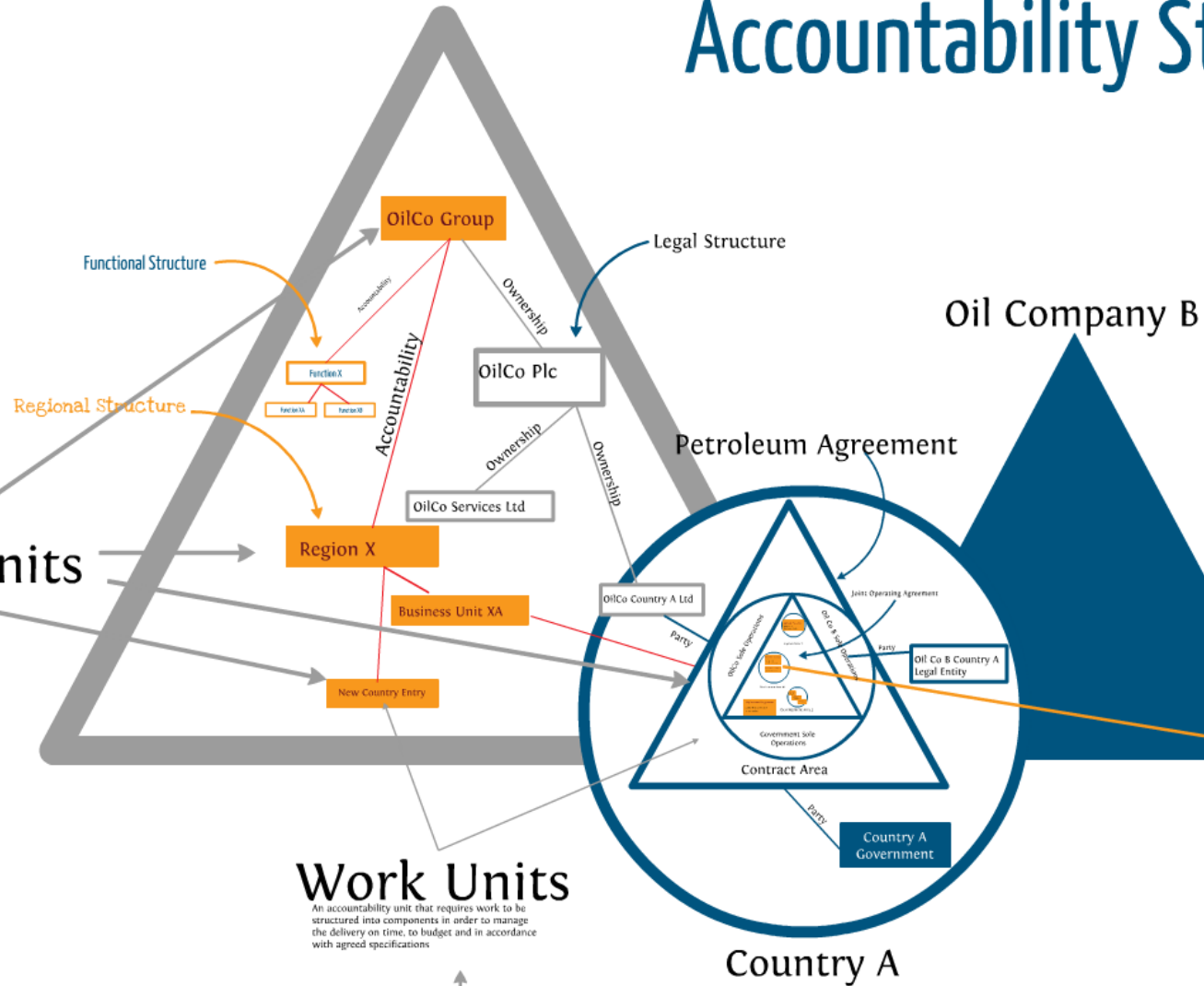


Accountability Structure

OilCo. Group

Accountability Units

An accountability unit is an organisation where the accountability (which may be a scope of work) has been delegated or created through a contractual or organisational stipulation and overall responsibility for this assigned to a defined party or organisational role.



Work Units

An accountability unit that requires work to be structured into components in order to manage the delivery on time, to budget and in accordance with agreed specifications

Functional Structure

Exploration
(Function)

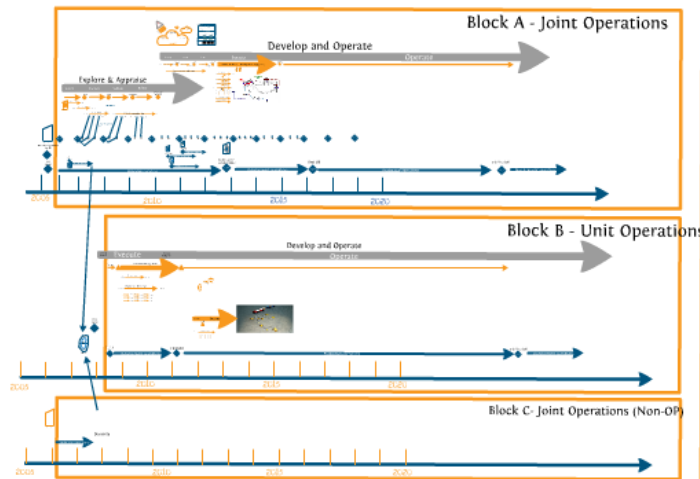
Development &
Production
(Function)

Other Corp
Functions

Regional Structure

Continent X (Region)

Country X (Business Unit)



Country Y
(Business Unit)

Country Z
(Business Unit)

Continent Y
(Region)

Continent Z
(Region)

Time: An extensional 4D ontology

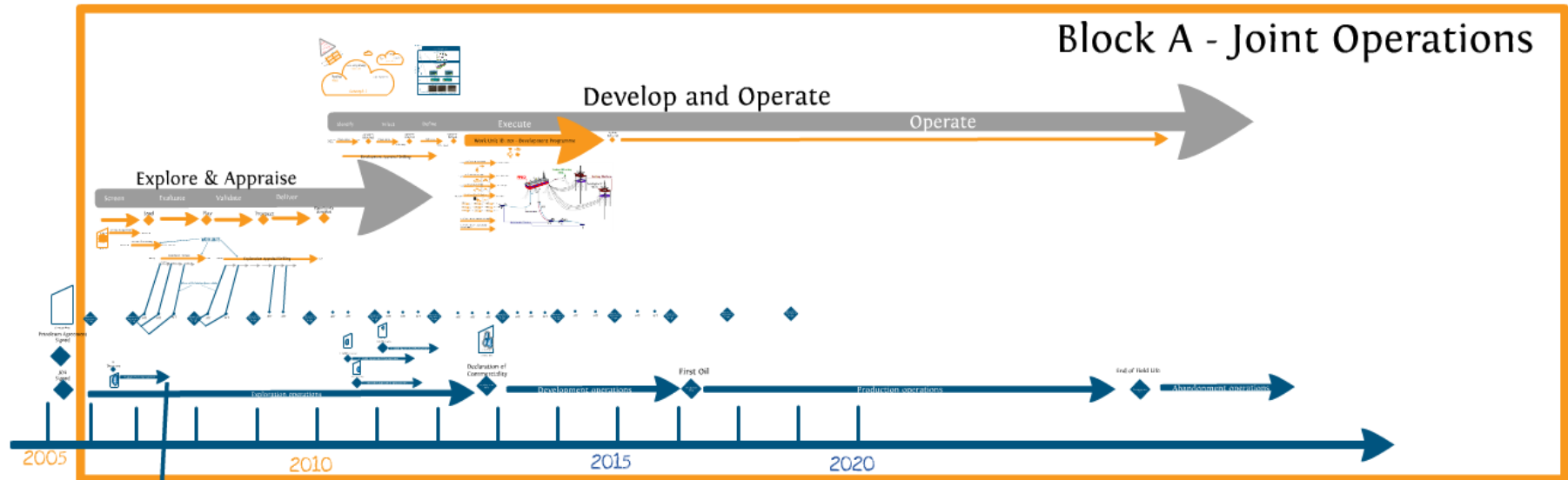
Takes spatio-temporal extent (AKA extension) as the criteria of identity for individuals

Leads to the need to represent spatio-temporal extent:

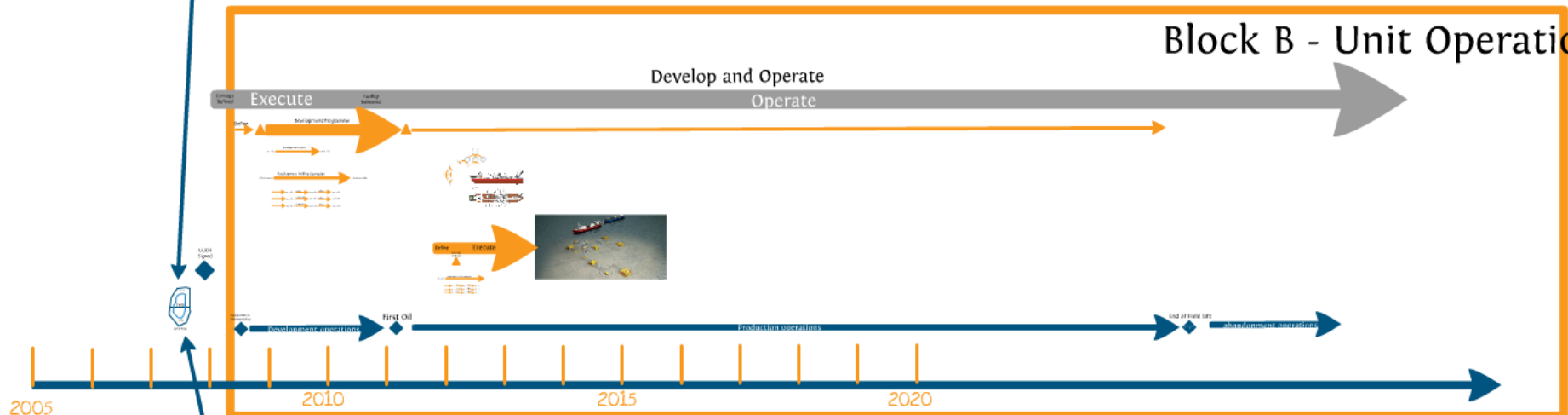
this was used to model petroleum agreements and contract areas

Country X (Business Unit)

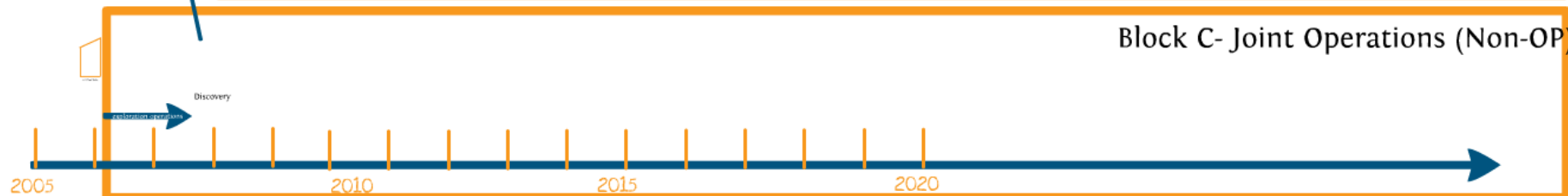
Block A - Joint Operations



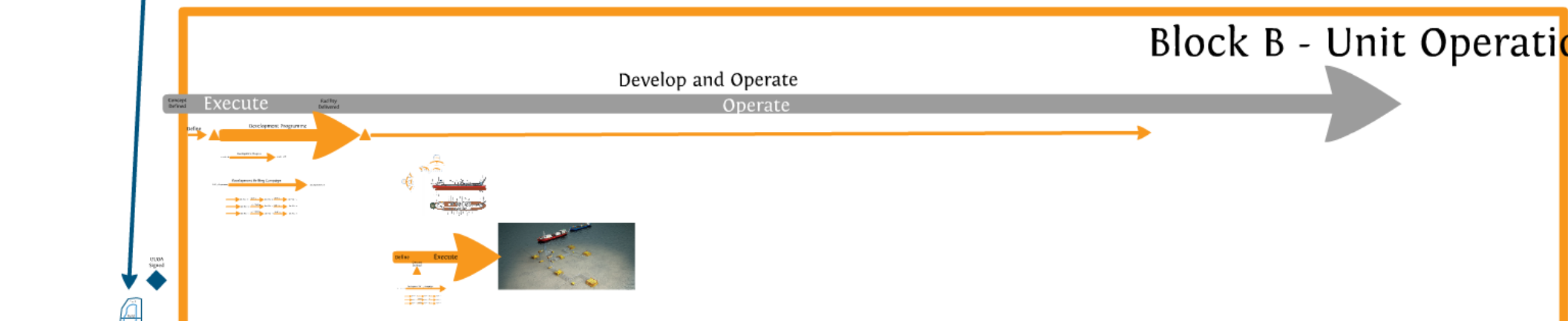
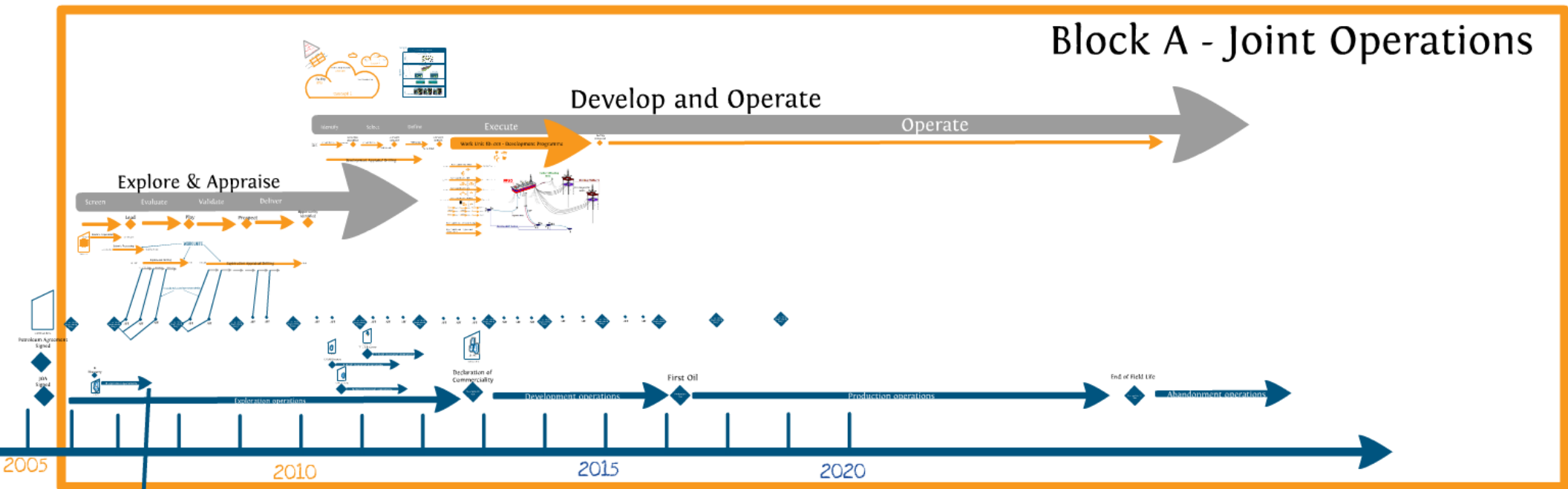
Block B - Unit Operations

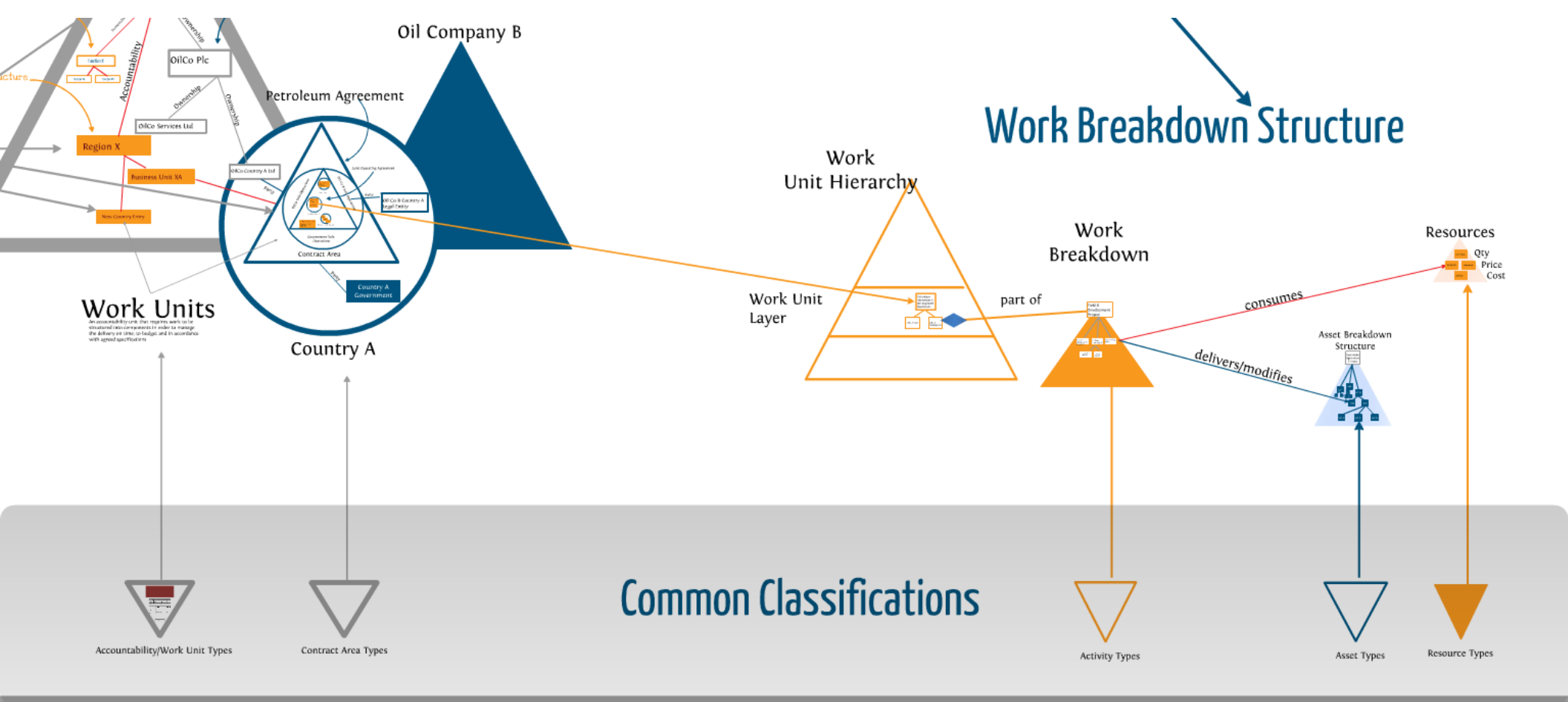


Block C - Joint Operations (Non-OP)



Country X (Business Unit)





Work Breakdown Structure

Work Unit Hierarchy

Work Breakdown

Resources

Work Unit Layer

part of

consumes

delivers/modifies

Common Classifications

Accountability/Work Unit Types

Contract Area Types

Activity Types

Asset Types

Resource Types

Disentangling NORSO K Cost Classifications

NORSOK Z-014 Standard Cost Coding System is a widely used cost classification system for the oil industry

Z-014 has three code structures based on

Activity

Current 'tree' hierarchy structure, squeezes some patterns into a flatter structure. These can be identified and make explicit.

150 codes
4 Levels



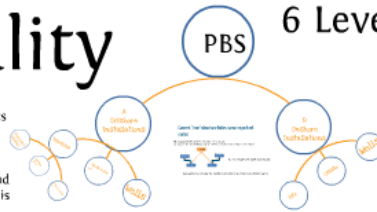
Physicality

What is the meaning/semantics of the hierarchy?

All three NORSOK sets are hierarchies technically tree hierarchies; where each node has only one parent. However, the meaning (semantics) of the hierarchy links is not clear.

What is the semantics of this arrow? (and the other arrows?)
Is a Site a type of Land based Installation or is it part of one?

751 codes
6 Levels



Sample - Adding the semantics (1)

Topologies are part of different field installations. Wells are a type of and part of Oil/Gas field installations.

Code	Code	Code	Code	Code	Code	Code	Code	Code	Code
...

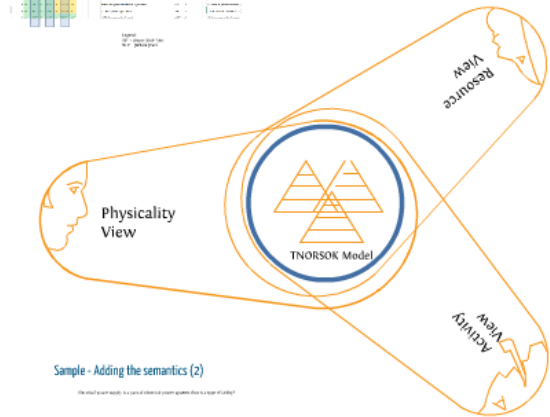
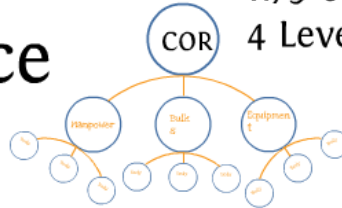
Revised patterns identifying conditions for faults

Code	Code	Code	Code	Code	Code	Code	Code	Code	Code
...

Showing a dimension that structure is dimension based. It makes, meaning patterns to be extracted and managed.

Resource

1179 codes
4 Levels



Sample - Adding the semantics (2)

The field system needs to control electrical systems across the scope of safety.

Code	Code	Code	Code	Code	Code	Code	Code	Code	Code
...

multiple complicated structures with duplication and redundancies

only focused on development operations, with very little classifications for exploration and production operations

a single elegant model that can be cut into the required dimensions and at the right level of detail as required by a project.

enriched with the classifications already available in Tullow data for exploration and production activities.

a scalable structure that can be enhanced to include new requirements as we evolve.

