



# Integrated Lifecycle Assets Planning (ILAP) standard

ILAP project team  
2 September, 2013

# The Integrated Lifecycle Assets Planning (ILAP) standard

1. The ILAP project
2. What is the ILAP standard?
3. Who is involved in the ILAP standard?
4. Why an ILAP standard?
5. What are the deliverables from the ILAP project?
6. How is the ILAP standard developed?

# THE ILAP PROJECT

# ILAP project

- ILAP project is funded by
  - ✓ **ConocoPhillips Scandinavia AS**
  - ✓ **ENI Norge AS**
  - ✓ **Statoil Petroleum AS**

All operators on the NCS (all members of EPIM) are invited to participate in the ILAP project

## Contractor - management

- **EPIM** ([www.epim.no](http://www.epim.no))
  - ✓ Established and governed by the operators on the NCS
  - ✓ Facilitating solutions and services for the oil & gas industry through **standardization of requirements and processes**

EPIM solutions based on the GIM standard:

- ✓ **EPIM ReportingHub** - drilling and production
- ✓ **EPIM EqHub** - standard equipment information
- ✓ **EPIM EnvironmentHub** - environment data
- ✓ **EPIM LogisticsHub** - tracking of CCUs

## Sub-contractor - standardization

- **PCA** ([www.posccaesar.org](http://www.posccaesar.org))
  - ✓ Focus on **life cycle industry data integration and interoperability** through **GIM standard** and **W3C recommendations**

PCA has the custody of the **Generic Information Modeling (GIM)** standard (ISO 15926) and has been heavily involved in the development of EPIM's solutions above.

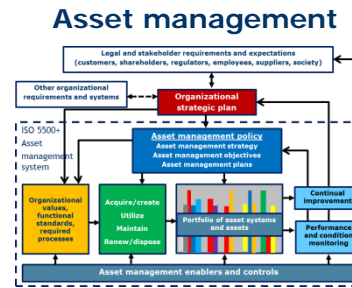
# WHAT IS THE ILAP STANDARD?

# Integrated Lifecycle Assets Planning (ILAP) standard

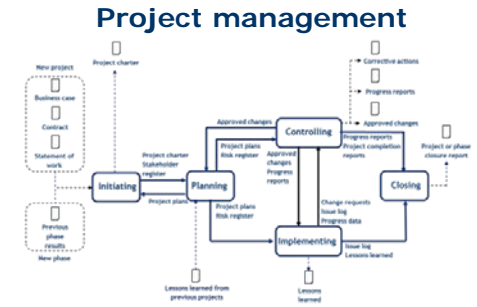
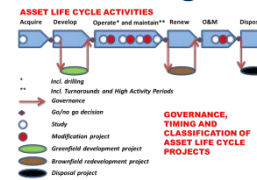
The integrated life cycle assets planning (ILAP) standard will increase the lifecycle value of the physical assets by defining, developing, implementing and deploying a common planning standard for exchange and sharing of plan data between relevant stakeholders across all phases of the asset lifecycle.

ILAP shall cover planning activities for:

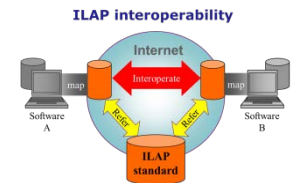
- **Assets management** - lifecycle value optimization for physical assets
- **Project management** - planning of projects in all asset lifecycle phases
- **Adapted for use in the oil & gas industry**
- **Integrated and modeled for interoperability** (machine readability)



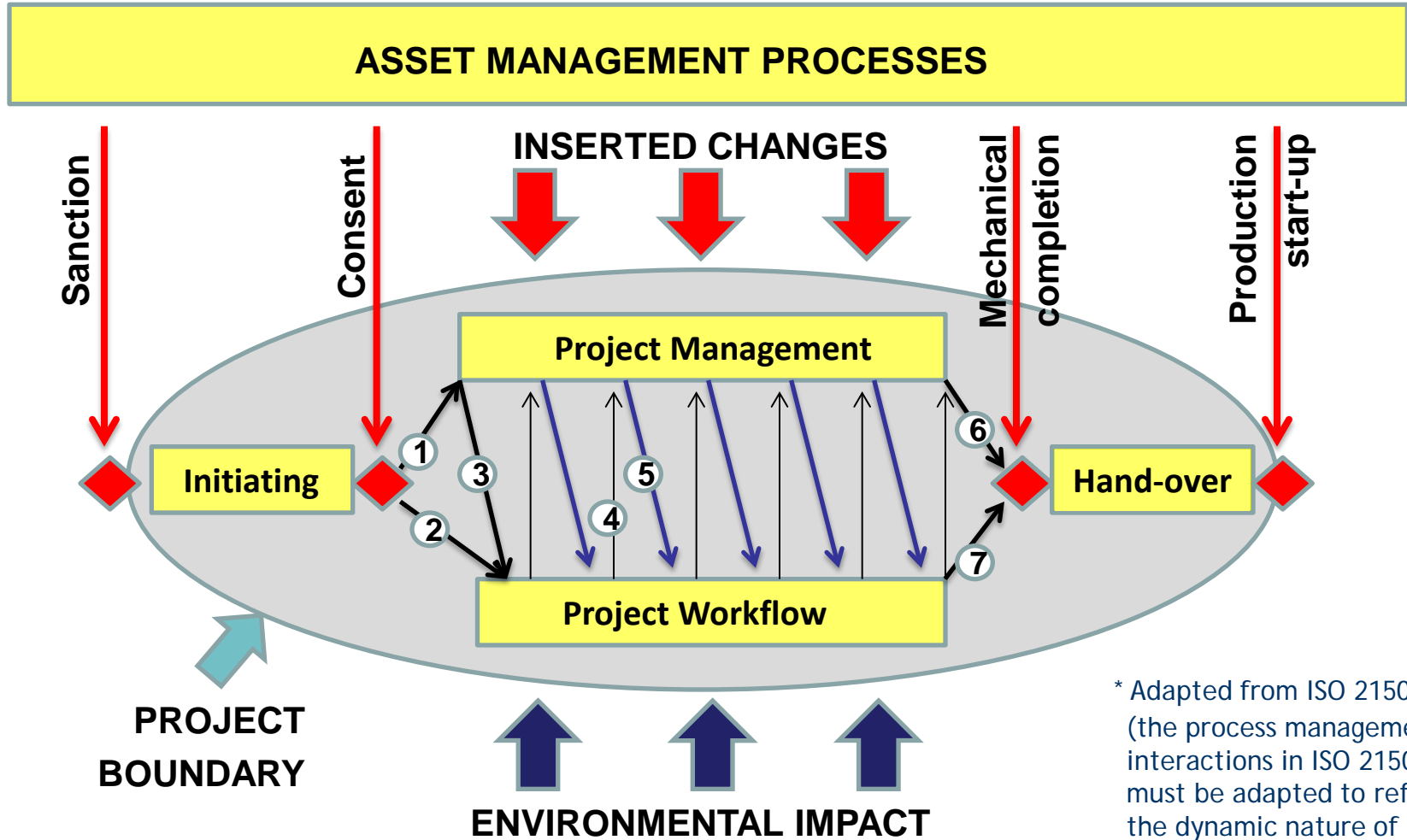
## The oil and gas asset



## Integration and modeling

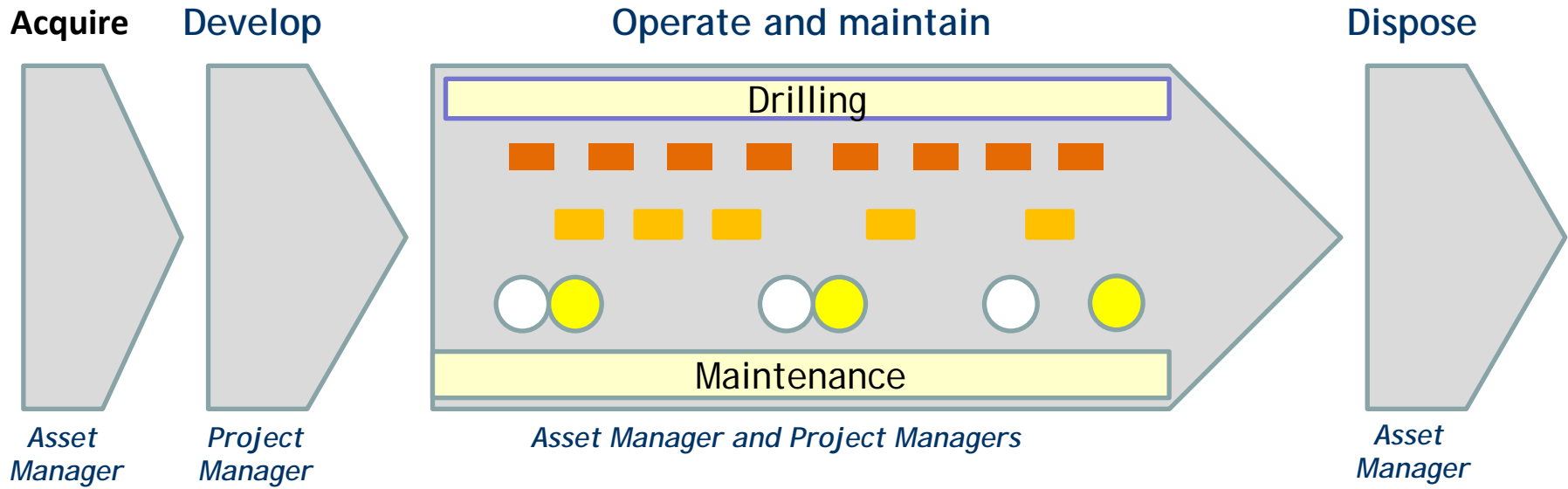






# ILAP greenfield development project\*



\* Adapted from ISO 21500 (the process management interactions in ISO 21500 must be adapted to reflect the dynamic nature of projects in the oil & gas industry)

# ILAP operations and maintenance



-  *Turnaround*
-  *High activity period*
-  *Study*
-  *Modification project*

Note the transfer of responsibility between Asset Manager and Project Manager at the start of projects, and transfer back to Asset Manager at the completion of projects

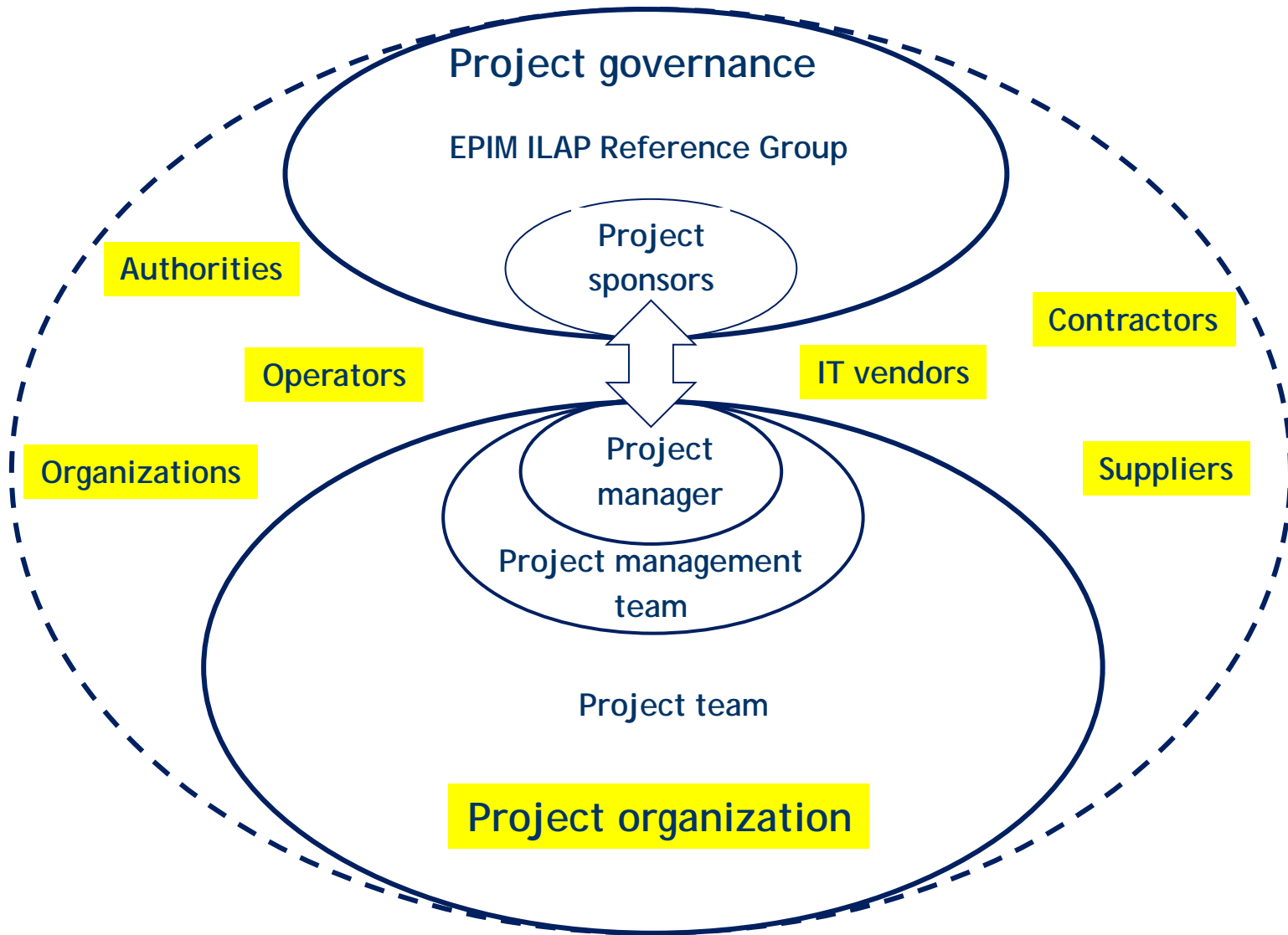


# ILAP classification framework

<i>Actor Structure</i>	<i>Type of Project</i>	<i>Activity Structure</i>	<i>Unit of Analysis</i>	<i>Development Objectives</i>	<i>Focus Area</i>
Asset Owner	Fesibility and Concept	Aquire	Portfolio	Sustainable development	Continent
License Parnter	Green Field project	Develop	Program	Incremental improvement	Country
Contractor	Brown Field project	Operate	Project	Radical change	Area
Vendor	Operation	Maintain	Contract	Disaster revocery	Field
Service Supplier	Maintenance	Renew	Work Packet	Managed closedown	Facility
Other Actors	Modification	Dispose	Task	Org. Learning	Well

# WHO IS INVOLVED IN THE ILAP STANDARD?

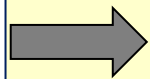
# ILAP stakeholder model



# WHY AN ILAP STANDARD?

# General business case for GIM standard

NORSOK concluded in 1995 that, the GIM technology had a potential of reducing CAPEX and OPEX with 25% and 20%, respectively.



**NOK 50 billion in cost reduction per year on the NCS !**

**Think global – act local!**



**Operators**

Initiator	Standardization	Operations	Potential
Environment reporting	Part of GIM	EPIM EnvironmentHub	License to operate
Drilling/prod. reporting	Part of GIM	EPIM ReportingHub	NOK 10+ billion per year
Top site	Part of GIM		NOK ? billion per year
Subsea installation	Part of GIM		NOK ? billion per year
Equipment	Part of GIM	EPIM EqHub	NOK 10 billion per year
Logistics	Part of GIM	EPIM LogisticsHub	NOK 2 billion per year

# General business case for EPIM's solutions

	Internal costs	External costs
<b>Operators cost structure:</b>	<b>20 %</b>	<b>80 %</b>
<b>Consequence:</b>		
Common industry requirements:	5 times higher	cost reductions!
Individual operator requirements:	Not sustainable	
<b>Plus the benefit of sharing development and operations costs!</b>		

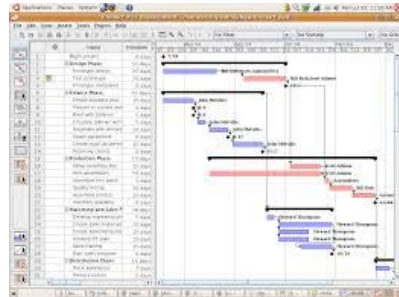
## Example 1 ILAP as common industry requirement

25% cost reduction within planning for the operators	Internal	5%
25% cost reduction within planning for the suppliers	External	20%
Total cost reduction for the operators		5% x5 = 25 %

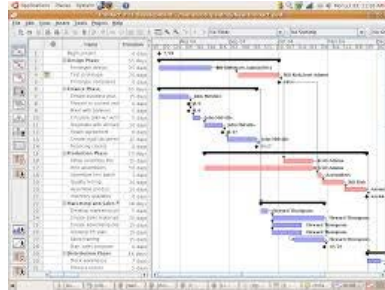
## Example 2 ILAPs as individual operator requirements

25% cost reduction within planning for the operators	Internal	5%
10% cost increase within planning for the suppliers	External	-8%
Total cost increase for the operators		3 %

# Potential of ILAP



*Transfer and integration of plan data*



*Planning efficiency*

*25%*



*Transfer of experience*



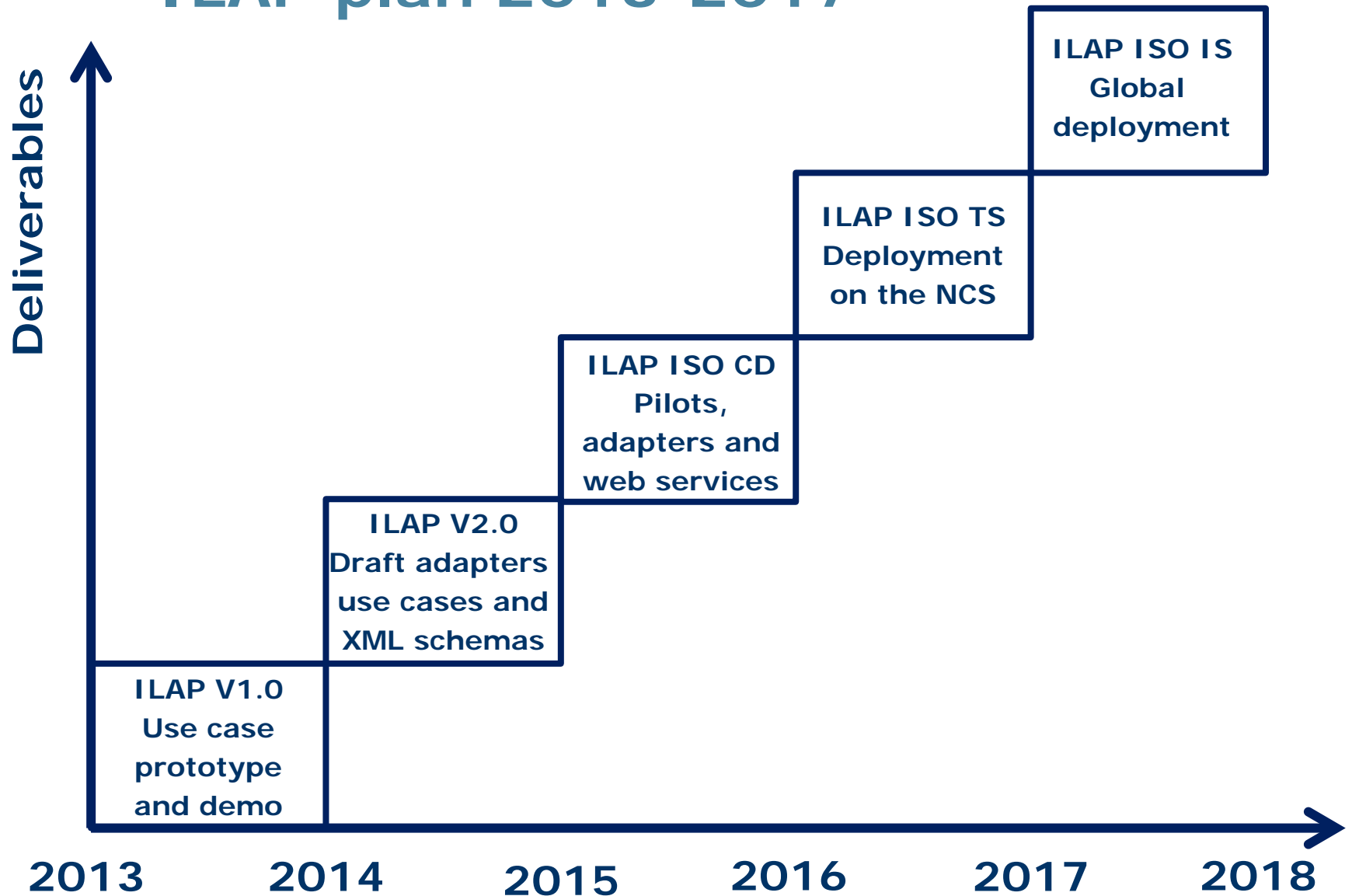
*Planning effectiveness*

*NOK 5 billion per year*

# WHAT ARE THE DELIVERABLES FROM THE ILAP PROJECT?

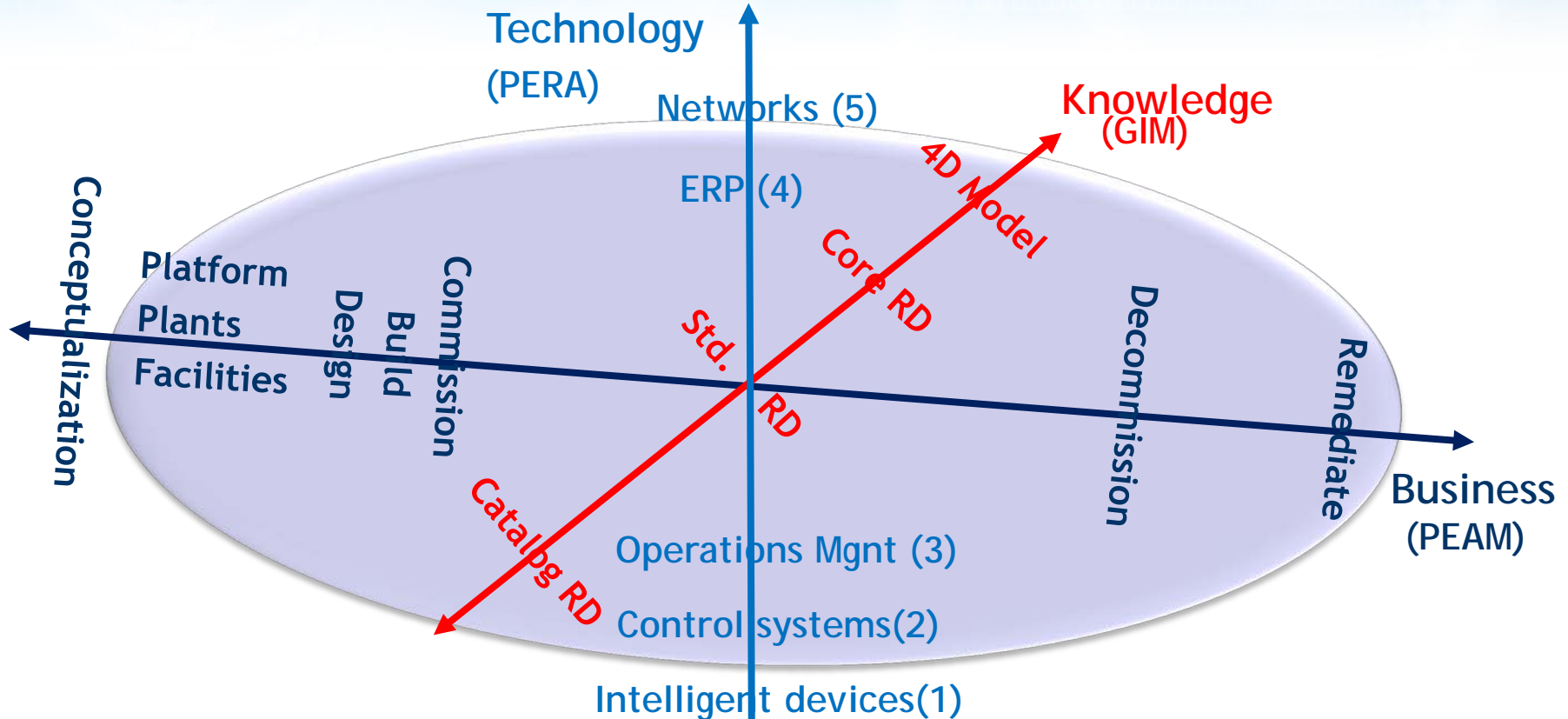


# ILAP plan 2013-2017



# HOW IS THE ILAP STANDARD DEVELOPED?

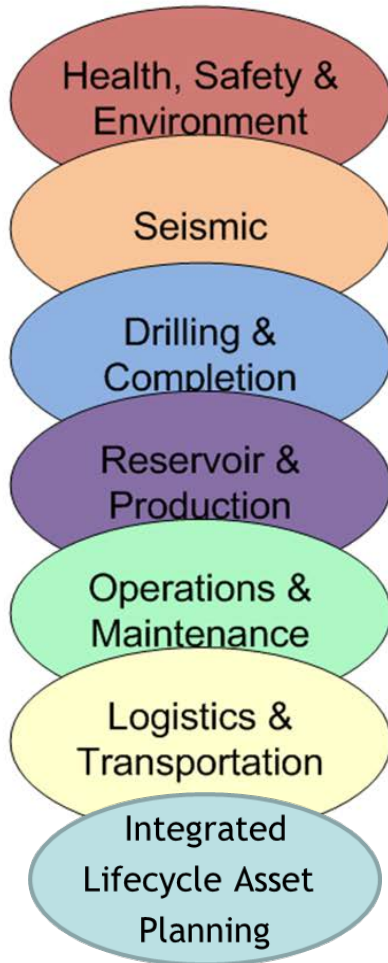
# Holistic view on Asset Management



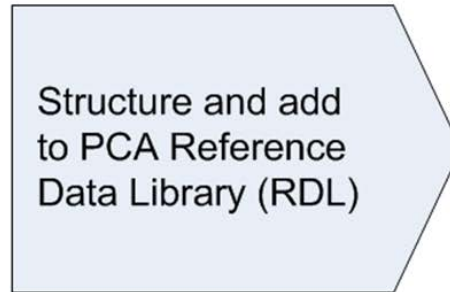
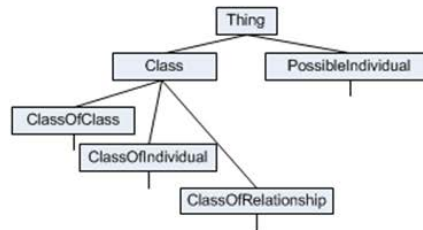
GIM = Generic Information Modeling  
 = ISO 15926 Integrated Life-Cycle data  
 RD = Reference Data  
 PERA= Purdue Enterprise Reference Architecture  
 PEAM = PISTEP Engineering Activity Model

# GIM Reference Data Library

Domain Specific  
Nomenclatures

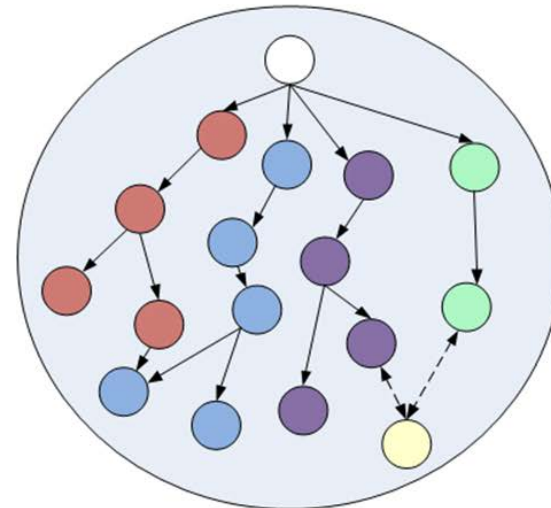


**GIM  
Data Model**



Determine  
entity type

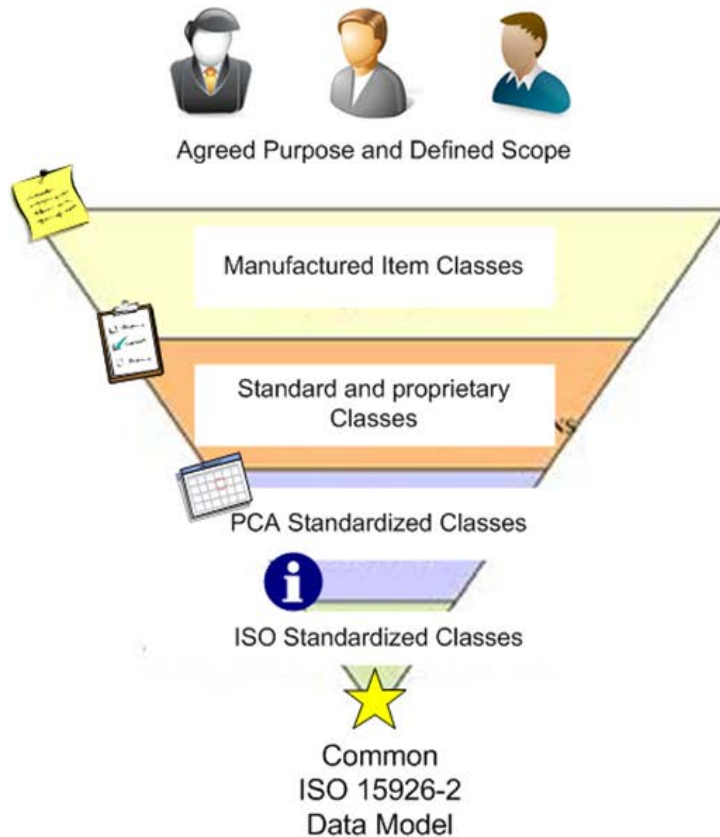
PCA (Oil & Gas & Process  
Industry Ontologies  
and Reference Data)



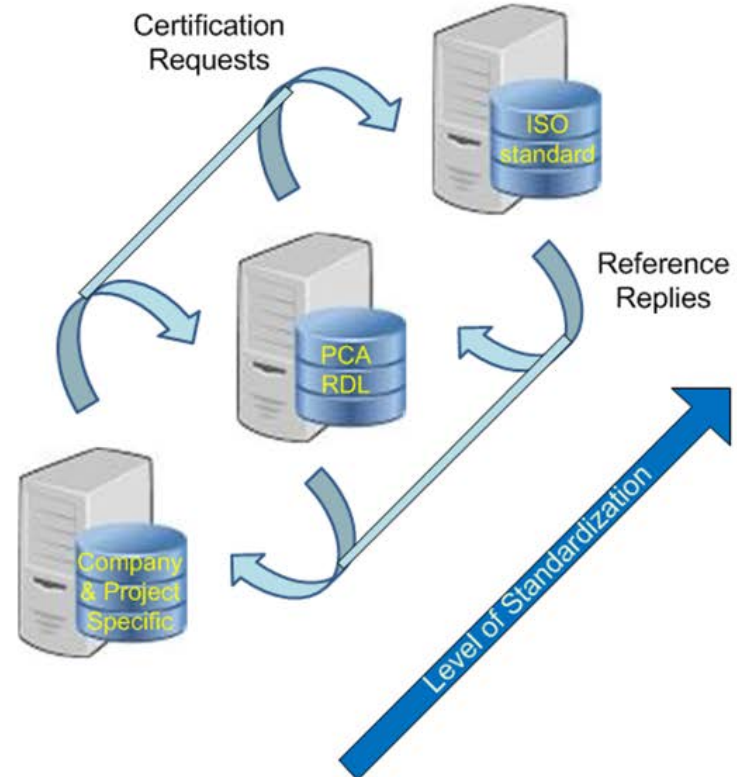
Determine specialization  
and other relationships

# GIM Reference Data System

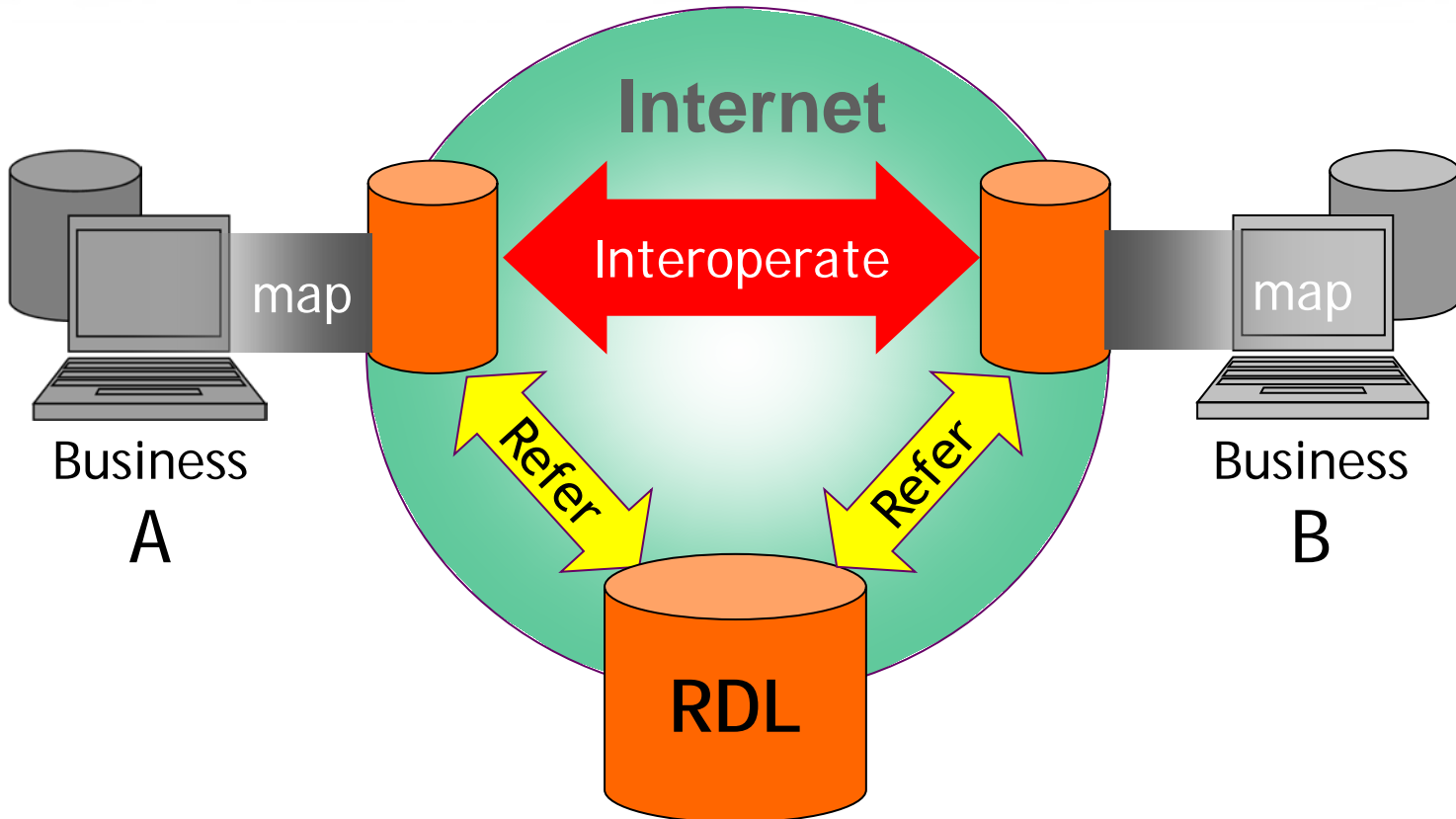
Logical organization of  
reference data



Federated arrangement of  
many web connected libraries



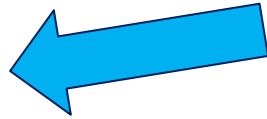
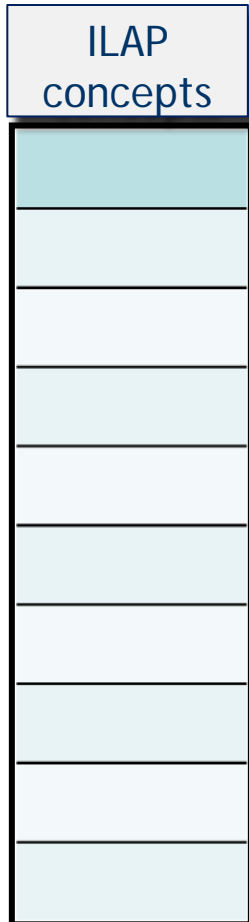
# GIM interoperability at its simplest



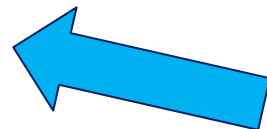
Using *standard shared references* & sharing references used,  
reduces business ambiguity & reduces mapping overheads.

**Makes interoperability easier and reduces risk & cost**

# Define one set of ILAP concepts (reference data) from many sources



Creating on common set of concepts based on today's practices



## Terminology used by the ISO and operators

ISO terms	PCA RDL terms	CoP terms	ENI terms	Statoil terms	VDT terms

*Add relevant terms from various models here and use as basis for defining a unified set of Reference Data terms*

*For each of these reference data sources we need to identify, clarify and unify their models (documents and drawings) and extract all relevant terms and definitions*

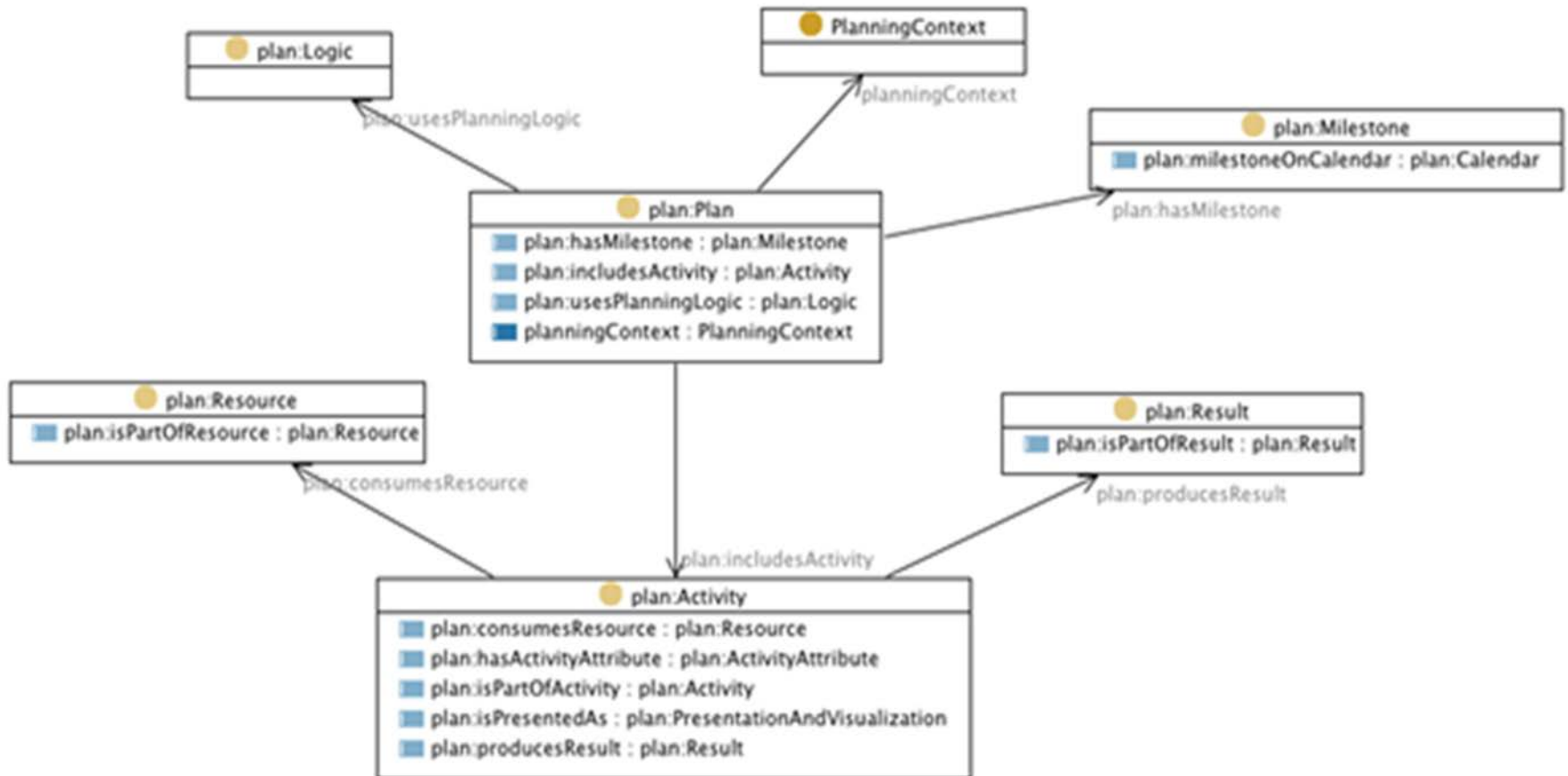
## Terminology in planning tools

Safran	Primavera	MS Project	SAP	CoP plan tools	Top Quadrant

*Add relevant terms from various tools here and use as basis for identifying translations from/to Reference Data terms*

*For each of these tools we need to identify, clarify and unify how these tools use terms (documents and drawings) and extract all relevant terms and definitions for use in the Reference Data Library*

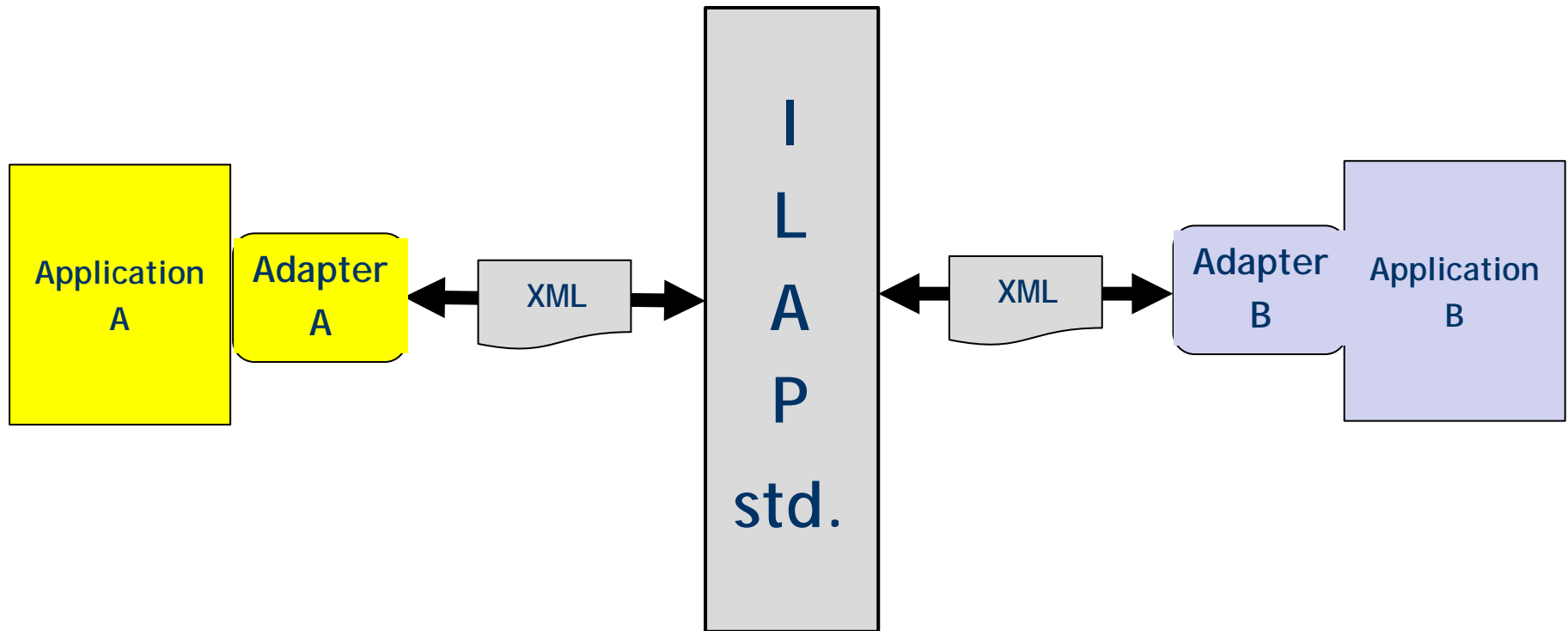
# GIM modeling of the ILAP standard using the common set of reference data





# Deploying the ILAP standard

- exchange of plan data using XML schemas

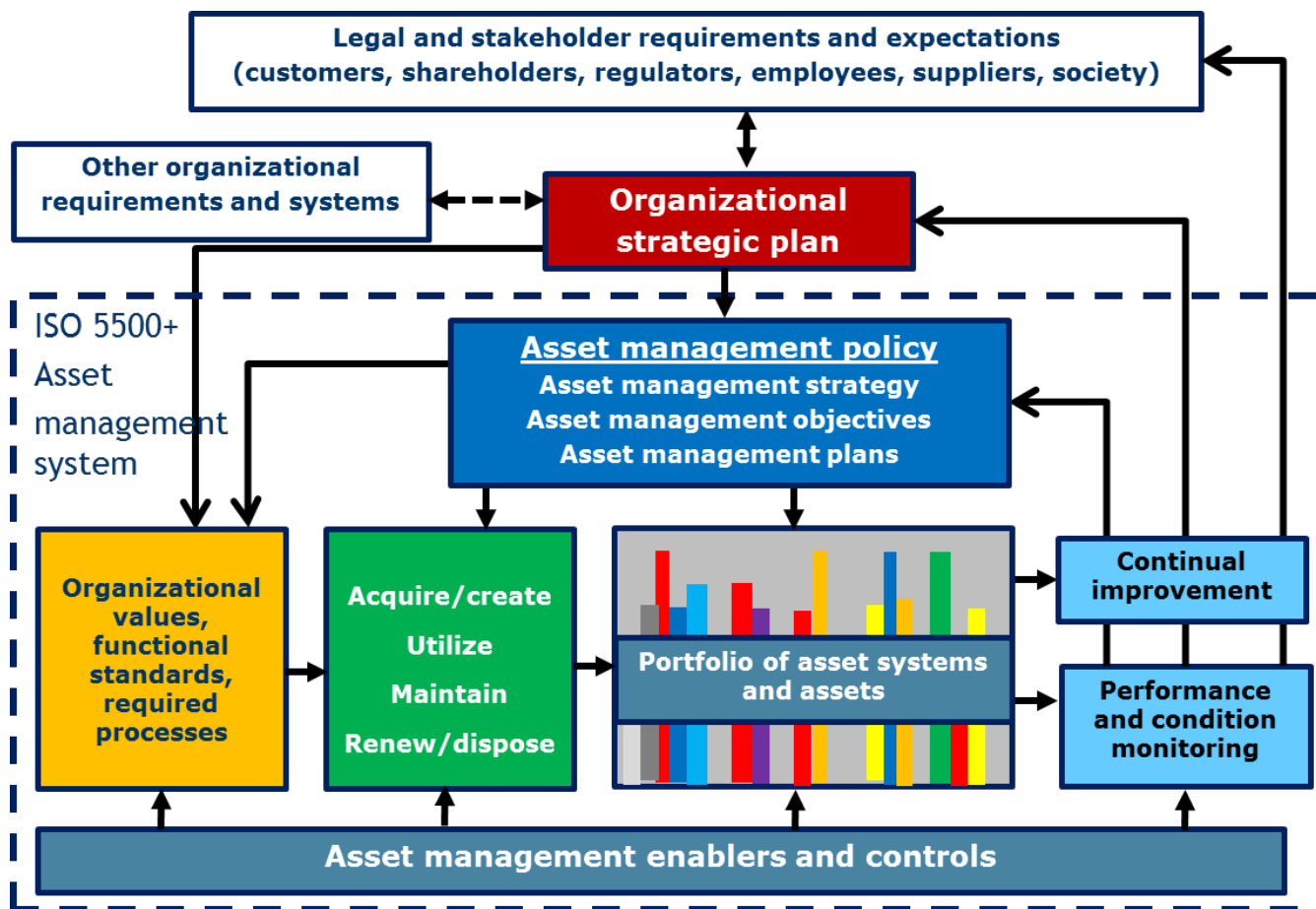


Note that the application providers have to build adapters for exchanging ILAP plan data

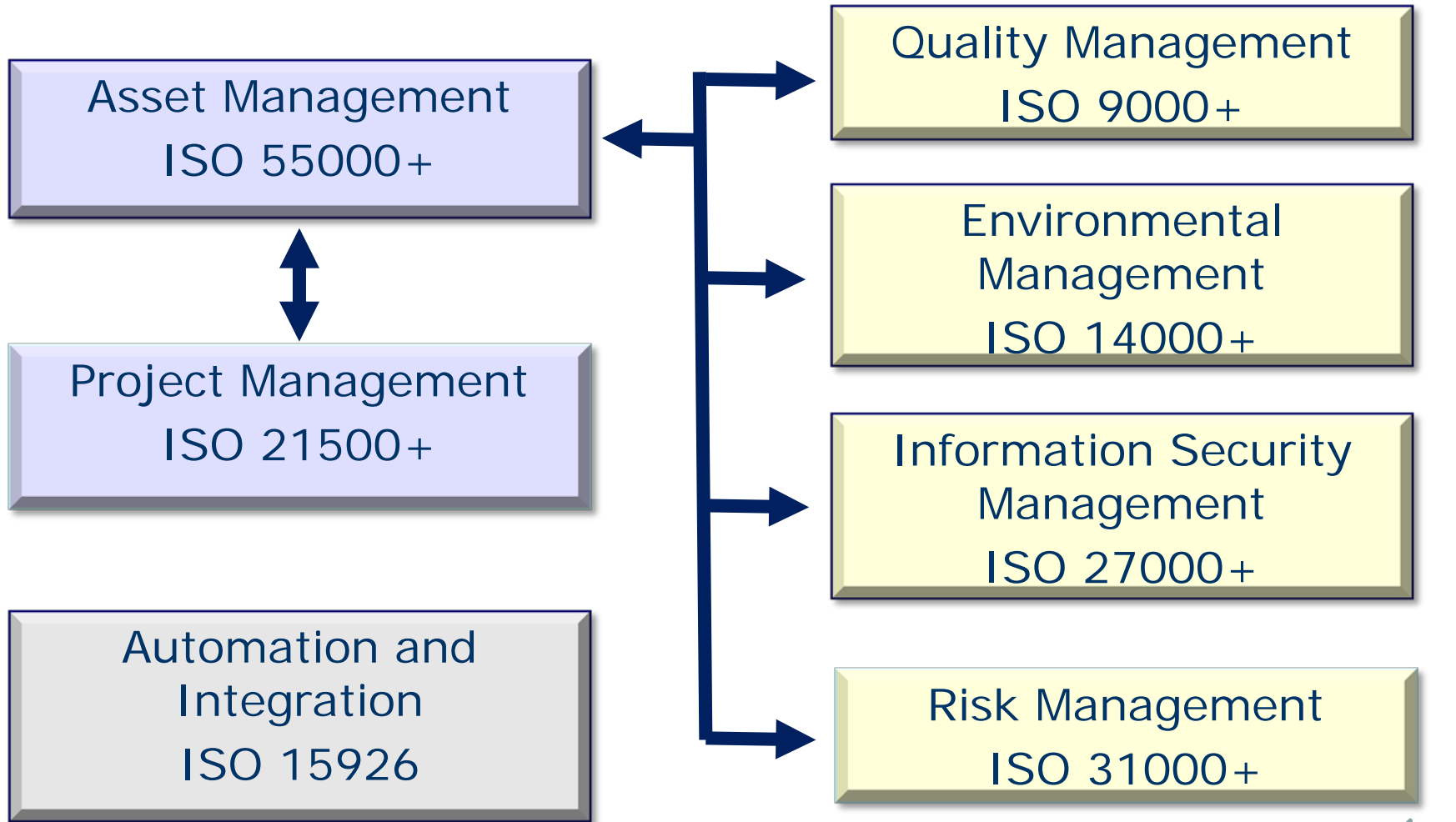
**THANK YOU FOR YOUR  
ATTENTION!**

# Asset management (ISO 55000+)

Asset management perspective is needed for defining the strategic and tactic planning activities of lifecycle optimization across the corporate physical assets. ISO has developed assets management standards (ISO 55000+) and these will be the base for asset management part of the ILAP standard.



# Asset Management in ISO

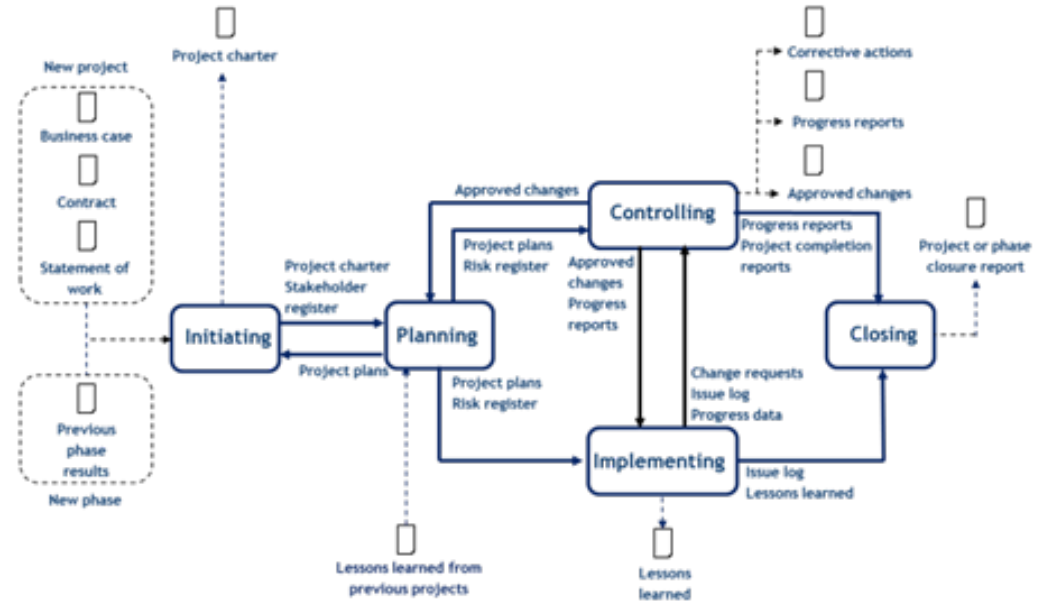


# Project management (ISO 21500+)

PMI and BSI have been the drivers of developing standards for project management in USA and UK, respectively. Now they have joined forces and are now developing a series of ISO standards numbering ISO 21500+. These standards will be the base for the project management part of the ILAP standard with necessary adaption to the oil and gas industry.

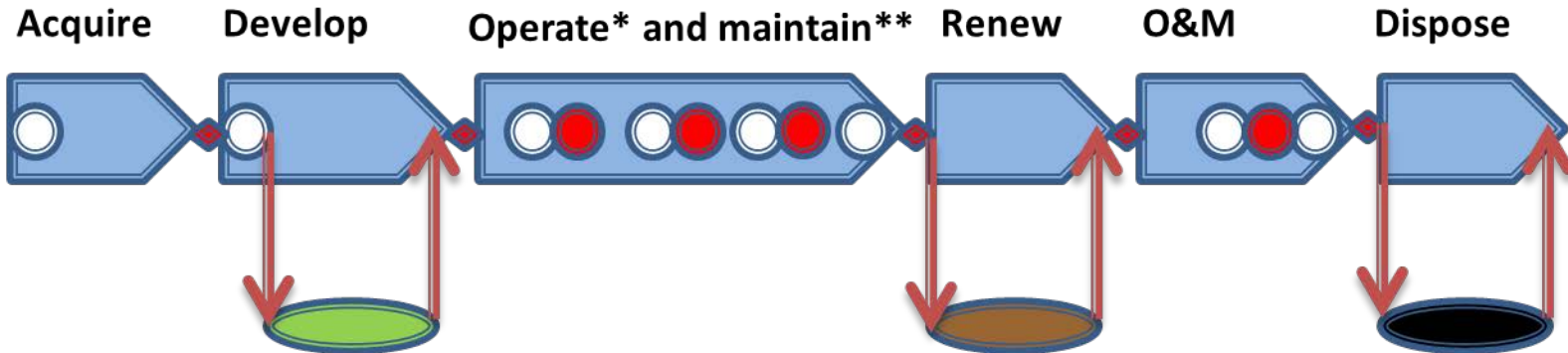
Subject group	Process group				
	Initiating	Planning	Implementing	Controlling	Closing
<b>Integration</b>	Develop project charter	Develop project plans	Direct project work	Control project work Control changes	Close project phase/project Collect lessons learned
<b>Stakeholder</b>	Identify stakeholders		Manage stakeholders		
<b>Scope</b>		Define scope Create WBS Define activities		Control scope	
<b>Resource</b>	Establish project team	Estimate resources Define project organization	Develop project team	Control resources Manage project team	
<b>Time</b>		Sequence activities Estimate activity durations Develop schedule		Control schedule	
<b>Cost</b>		Estimate costs Develop budget		Control costs	
<b>Risk</b>		Identify risks Assess risks	Treat risks	Control risks	
<b>Quality</b>		Plan quality	Perform quality assurance	Perform quality control	
<b>Procurement</b>		Plan procurements	Select suppliers	Administer procurements	
<b>Communication</b>		Plan communications	Distribute information	Manage communications	

## Process management groups interactions



# Asset lifecycle projects

## ASSET LIFE CYCLE ACTIVITIES



\* *Incl. drilling*  
 \*\* *Incl. Turnarounds and High Activity Periods*

 *Governance*

 *Go/no go decision*

 *Study*

 *Modification project*

 *Greenfield development project*

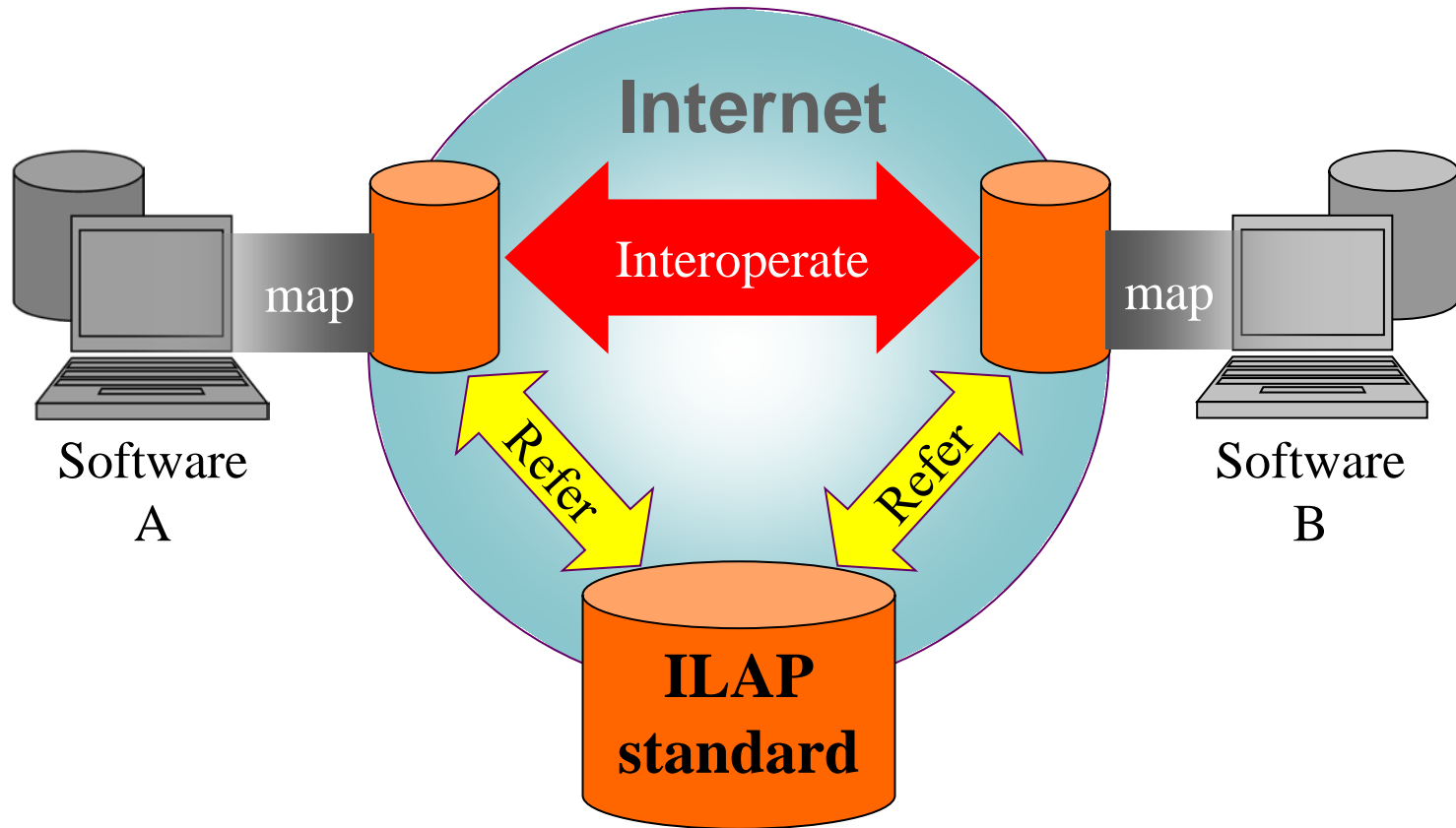
 *Brownfield redevelopment project*

 *Disposal project*

**GOVERNANCE,  
 TIMING AND  
 CLASSIFICATION OF  
 ASSET LIFE CYCLE  
 PROJECTS**



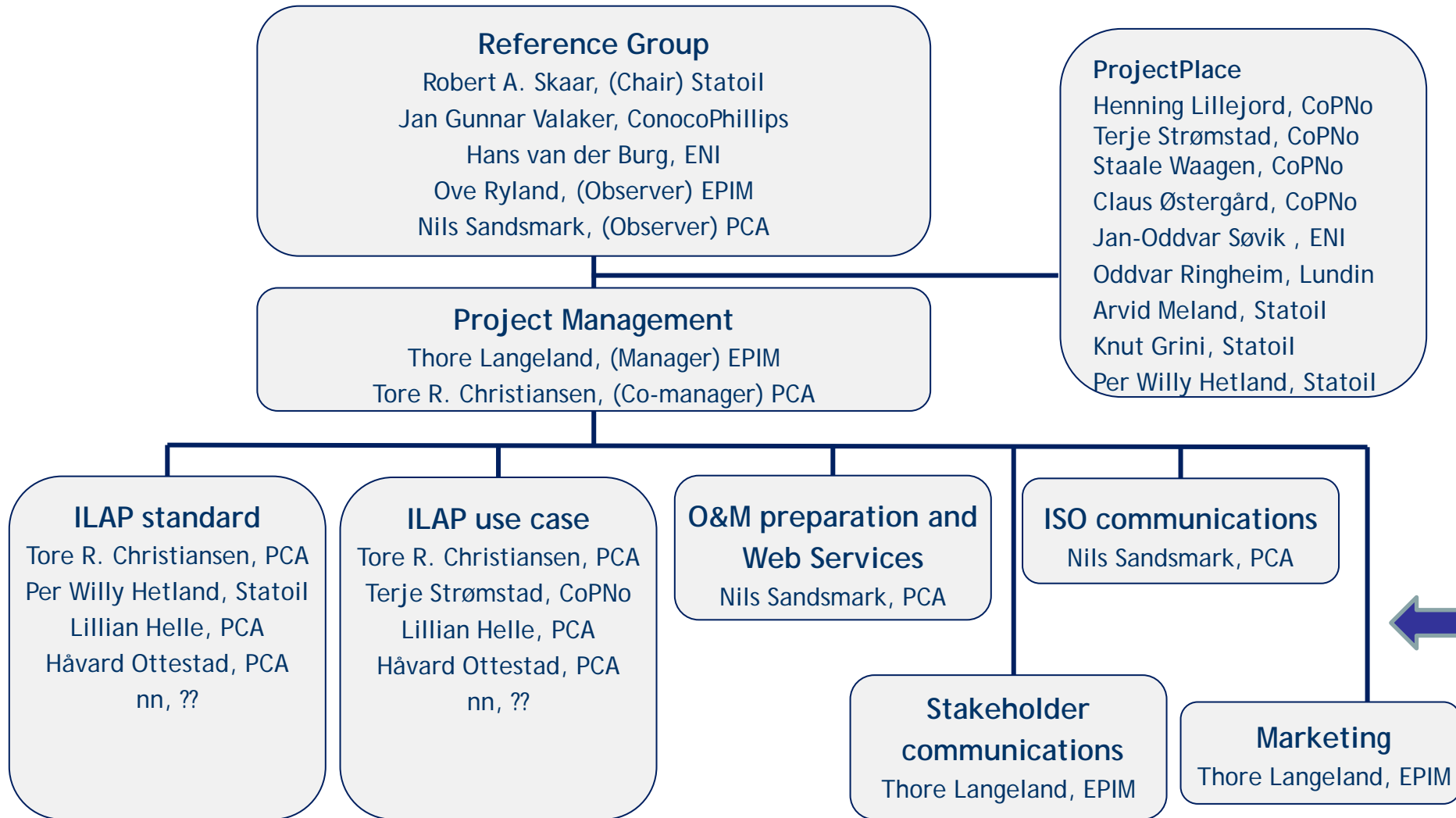
# ILAP interoperability



Using *standard shared references* & sharing references used, reduces business ambiguity & reduces mapping overheads.

Makes interoperability easier and reduces risk & cost

# ILAP project organization





# Norwegian governmental agencies

The oil and gas resources:

- ✓ Norwegian Petroleum Directorate (NPD) - largest possible value for the society

The HSE regulations:

- ✓ Petroleum Safety Authority Norway (PSA) - safety and working environment
- ✓ Norwegian Environment Agency (NEA) - environmental matters
- ✓ Norwegian Radiation Protection Authority (NRPA) - radiation/nuclear
- ✓ Directorate of Health (DH) - public health and living conditions
- ✓ Norwegian Food Safety Authority (NFSA) - seafood/ health and welfare of fish



# Operators on the NCS in 2013

## Operators

A/S Norske Shell  
Bayerngas Norge AS  
BG Norge AS  
BP Norge AS  
Bridge Energy Norge AS  
Centrica Resources  
(Norge) AS  
Chevron Norge AS  
ConocoPhillips Skandinavia  
AS  
Dana Petroleum Norway AS  
Det norske oljeselskap ASA  
DONG E&P Norge AS  
E.ON E&P Norge AS  
Edison International  
Norway Branch

## Operators (Cont.)

Eni Norge AS  
ExxonMobil Exploration &  
Production Norway AS  
Faroe Petroleum Norge  
AS  
GDF SUEZ E&P Norge AS  
Gassco AS  
Idemitsu Petroleum  
Norge AS  
Ithaca Petroleum Norge  
AS  
Lotos Exploration and  
Production Norge AS  
Lundin Norway AS  
Maersk Oil Norway AS  
Marathon Oil Norge AS  
Noreco Norway AS

## Operators (Cont.)

North Energy ASA  
OMV (Norge) AS  
PGNIG Upstream  
International AS  
Premier Oil Norge AS  
Repsol Exploration Norge AS  
Rocksourc Exploration  
Norway AS  
RWE Dea Norge AS  
Statoil Petroleum AS  
Suncor Energy Norge AS  
Talisman Energy Norge AS  
Total E&P Norge AS  
Tullow Oil Norge AS  
VNG Norge AS  
Wintershall Norge AS



# ILAP relevant organizations

## Standard organizations

**PCA**  
**MIMOSA**

**Standard Norge**

**ANSI (BMI)**  
**BSI**

**ISO**  
**ISO TC 184**  
**Automation & Integration**

**ISO TC 251**  
**Asset management**

**ISO TC 258**  
**Project management**

## Interest organizations

**EPIM**

**NOROG**  
**Konkraft**

**NSP**

**Fiatech**

**Construction Industry**  
**Institute (CII)**

## Educational organizations

**BI**

**NTNU**

**UiO**

**University of South**  
**Australia**

**University of Texas,**  
**Austin**



# IT vendors

## Software for project planning:

- ✓ Microsoft - MS project
- ✓ Oracle - Primavera
- ✓ Promatica - AnyPlan
- ✓ Safran
- ✓ .

## Software for operation & maintenance:

- ✓ Intergraph - Smartplant
- ✓ AVEVA - Workmate
- ✓ Bentley
- ✓ SAP
- ✓ .



# Contractors/Suppliers

## Contractors:

- ✓ Aibel
- ✓ Aker Solutions
- ✓ Apply Sørco
- ✓ Bechtel
- ✓ CCC
- ✓ Fabricom
- ✓ Fluor
- ✓ Hart Construction
- ✓ Kværner
- ✓ Reinertsen
- ✓ Rosenberg
- ✓ Technip
- ✓ Worley Parsons
- ✓ .

## Suppliers:

- ✓ ABB
- ✓ Baker Hughes
- ✓ Emerson
- ✓ Halliburton
- ✓ Odfjell Drilling
- ✓ Seadrill
- ✓ .
- ✓ .



# Challenges in transfer of plan data

## ➤ Terminology

- ✓ Activity not connected to operator's project identifier
- ✓ Task not connected to contractor activity
- ✓ Activity (contractual estimate) not maintained after detail task has been defined

## ➤ Methodology

- ✓ Same plan is used to house several projects across time
- ✓ Cost control or «notes» modelled as activities (non-prod.time, conditions)
- ✓ Change management of attributes, e.g. custom fields

## ➤ Structures and formats

- ✓ Duplicated or changed identifiers, «copy-paste planning»
- ✓ Lack of corporate reference data

## ➤ Other challenges

- ✓ Rules regarding plans maintained in two parallel systems (e.g. Safran and SAP)
- ✓ Complex work breakdown –e.g. a SAP work order with several sub work orders both levels having operations, and possibly sub-operations
- ✓ Different interpretations on how date sets are used in plans
- ✓ Difference in relation between activity and jobcards (1..\*, 1..1)
- ✓ Many different jobcard systems, not tightly connected to planning systems
- ✓ Time horizon on plans
- ✓ Data models in different plan systems varies a lot
- ✓ Different plan-update cycles



# Lately overruns on the NCS

## Overruns compared to PDO:

- NOK 95 billion in 2008

Statoil's Snøhvit



Marathon's Alvheim



.....

- NOK 40 billion in 2012

BP's Skarv



Talisman's Yme



.....

In 2013 MPE asked NPD to review the overruns and come up with a recommendation for strengthen the transfer of experience between the operators to avoid repetition of mistakes.

