EPIM

E&P Information Management Association

EPIM ReportingHub (ERH)

A new powerful knowledge sharing platform

ISO 15926 and Semantic Technologies
Sogndal , September 8, 2011

EPIM is the instrument for the operators on the Norwegian Continental Shelf to secure efficient information sharing among all relevant stakeholders by providing cost effective and user friendly common digital solutions based on international standards

- ➤ License2Share (L2S)
- ➤ EqHub
- ➤ EnvironmentHub
- ➤ EPIM ReportingHub (ERH)

Content

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1. EPIM REPORTINGHUB (ERH)

- MAIN OBJECTIVES

ERH – Main Objectives

➢ Shall receive drilling and production reports from operators on the NCS, validate, store and send them to authorities and partners

➢ Shall provide drilling and production data to the partners on request

➢ Shall be flexible for changes in the reports and easy to extend to new types of reports

➢ Shall be based on NPD Fact Pages and PCA E&P ontology
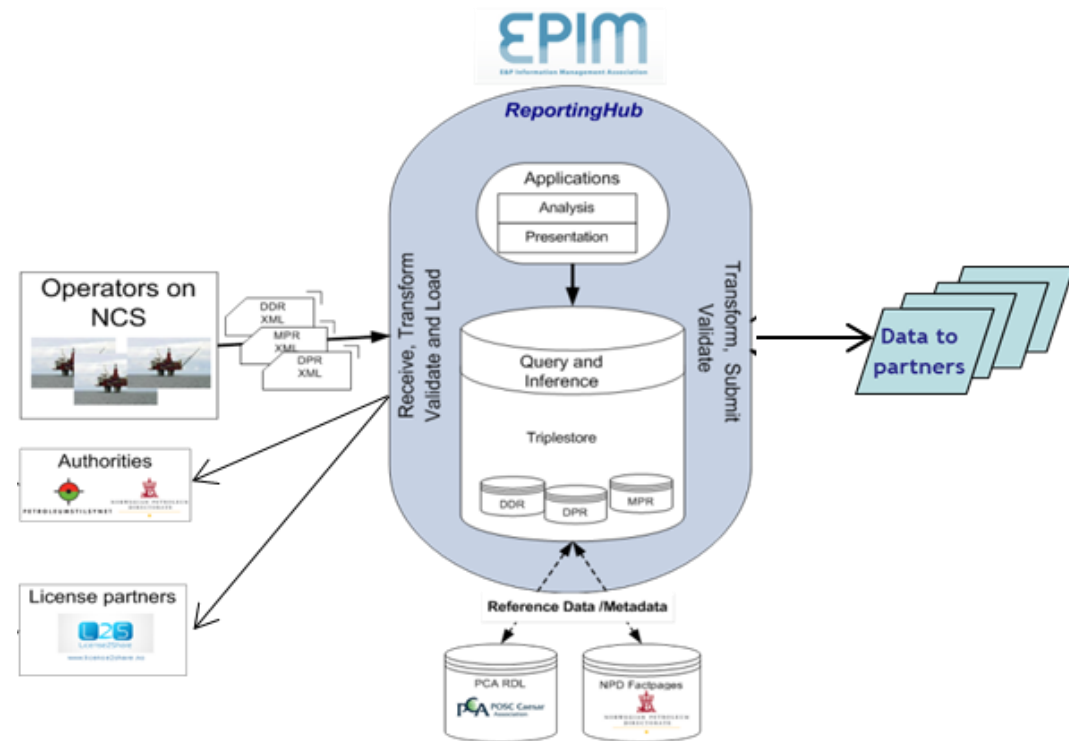
2. EPIM REPORTINGHUB (ERH)

- IMPLEMENTATION PROJECT

- ORGANISATION
- SUPPLIERS
- IMPLEMENTATION PLAN

ERH – Organisation of the implementation project

➤ ERH solution has been communicated to and approved by EPIM's Reporting Forum, Board of Directors and General Assembly

➤ The Daily Drilling Report (DDR) is managed by the chairman for the Drilling Domain, Geir Aas, ExxonMobil

➤ The Daily and Monthly Production Reports (DPR & MPR) are managed by the chairman for the Production Domain, Magnus Svensson, DONG
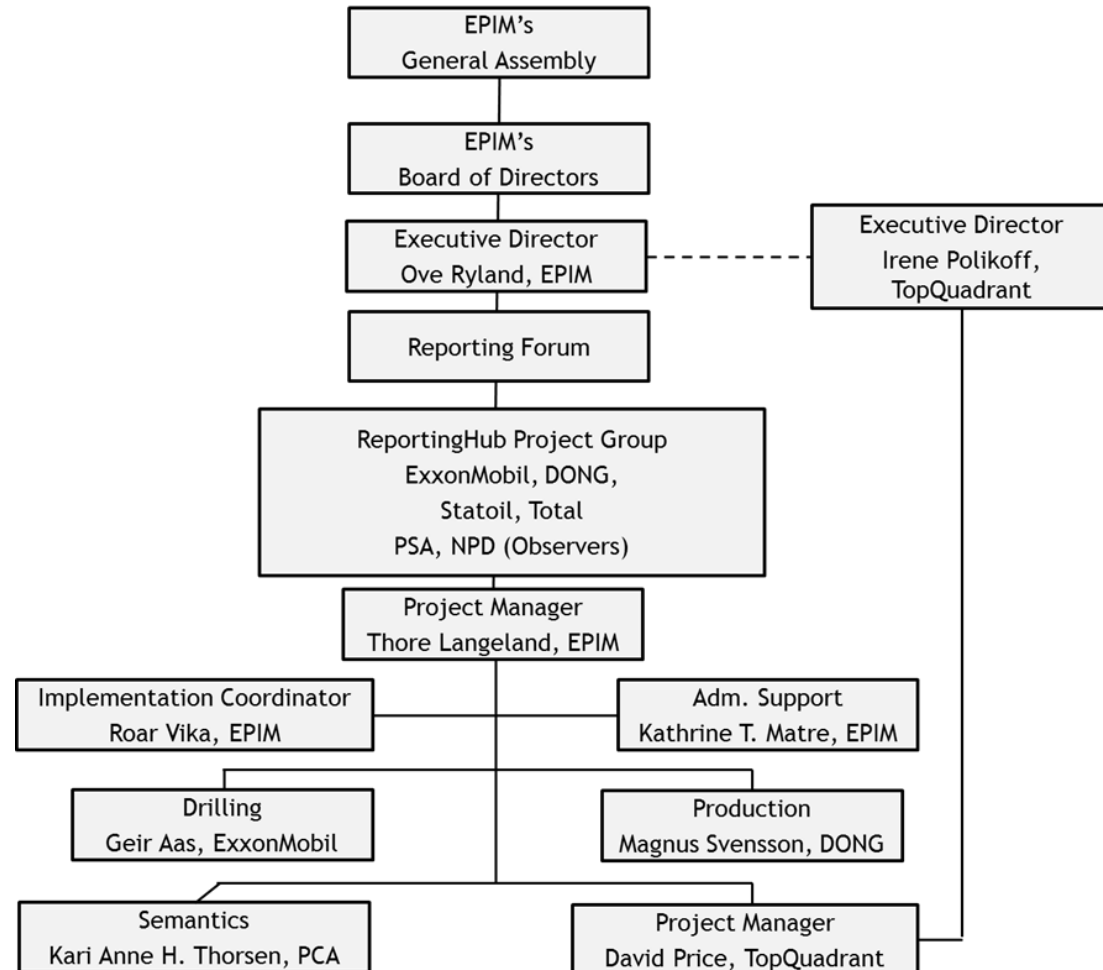
ERH - Suppliers

was es*t*ablished in 2001 with the mission to make frictionless data possible with **data flowing freely between systems as desired and when appropriate**. TopQuadrant's W3C standards compliant semantic web solutions, which incorporate SPIN, SPARQLMotion, SPARQL Web Pages and Semantic XML, enable enterprises to master the challenges of the global marketplace with agile, cost effective business processes that **easily adapt to change**. For more information, visit www.topquadrant.com.

is an innovative technology company with expert knowledge in developing and deploying Semantic Web technologies and providing Common Lisp based tools that offer an ideal environment to create complex, mission-critical applications. **AllegroGraph is adistinct platform that provide scalable technology infrastructures** which offer the ability to realize new **knowledge-rich applications** for enhanced business intelligence.

Logica is a **business and technology service** company. It provides **business consulting**, **systems integration** and **outsourcing** to clients around the world, including many of Europe's largest businesses.

is a non-profit global-standardization member organization that shall promote the development of open specifications to be used as standards for enabling the interoperability of data, software and related matters.

ERH - Implementation plan

➢ TopQuadrant has already made a demo for Daily Drilling Report (DDR)

➢ The modelling of DPR and MPR is expected to be done by October 15

➢ Logica is expected to have up running the hosting environment by October 1

➢ There will be a lot of testing on actual reports before going live November 15
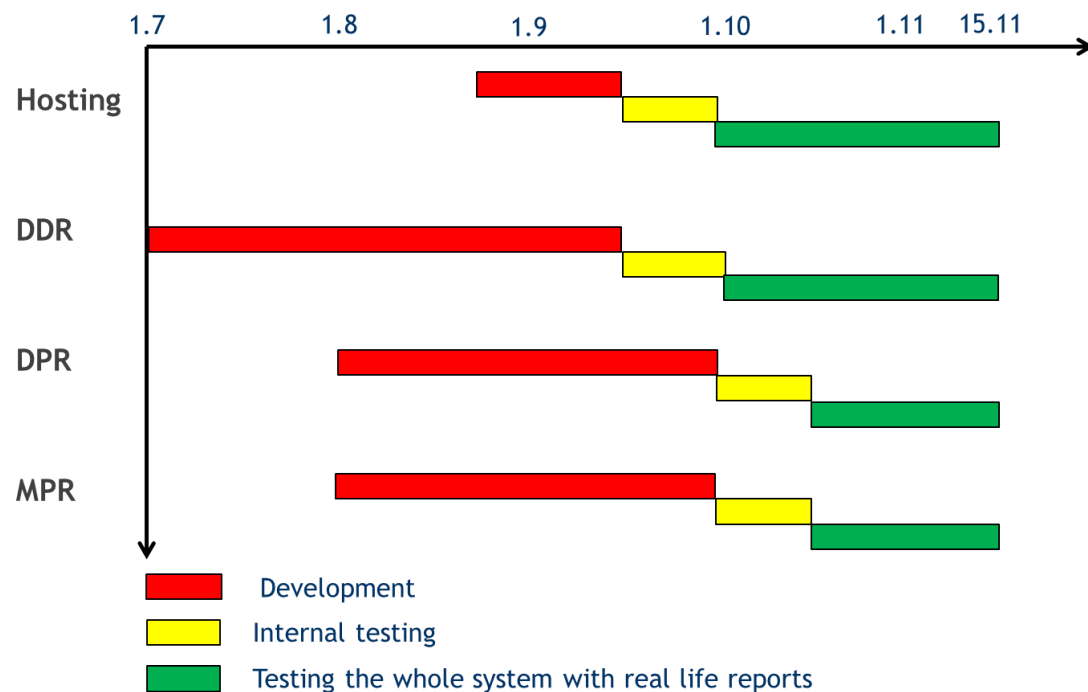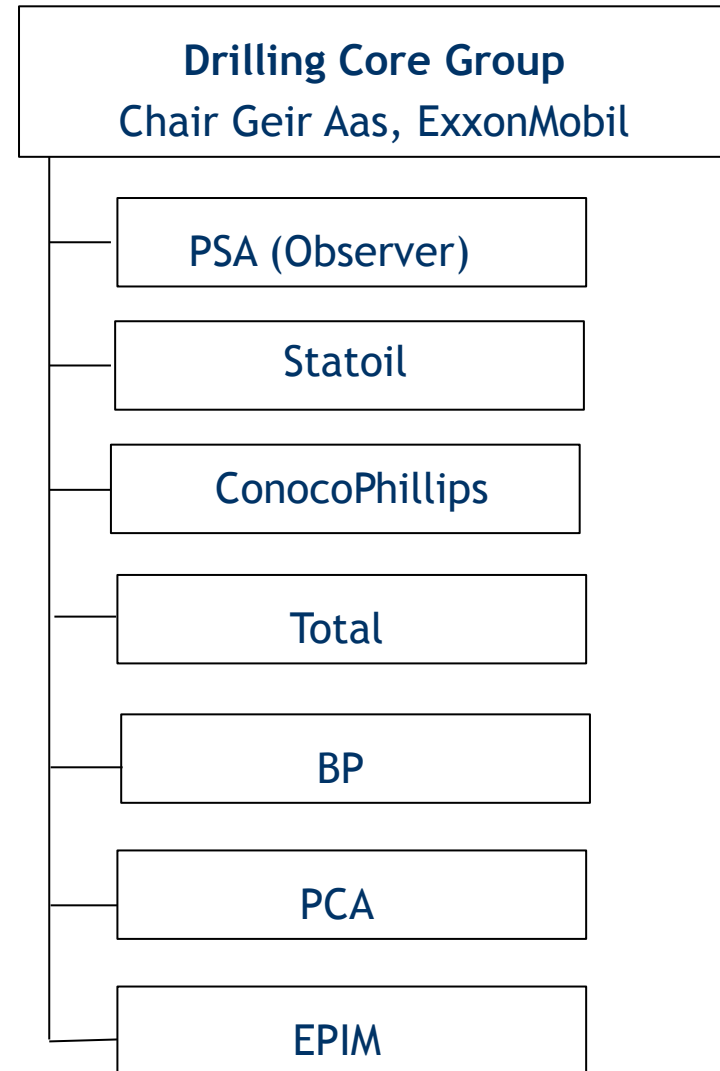
3. EPIM REPORTINGHUB (ERH)

- DAILY DRILLING REPORT (DDR)
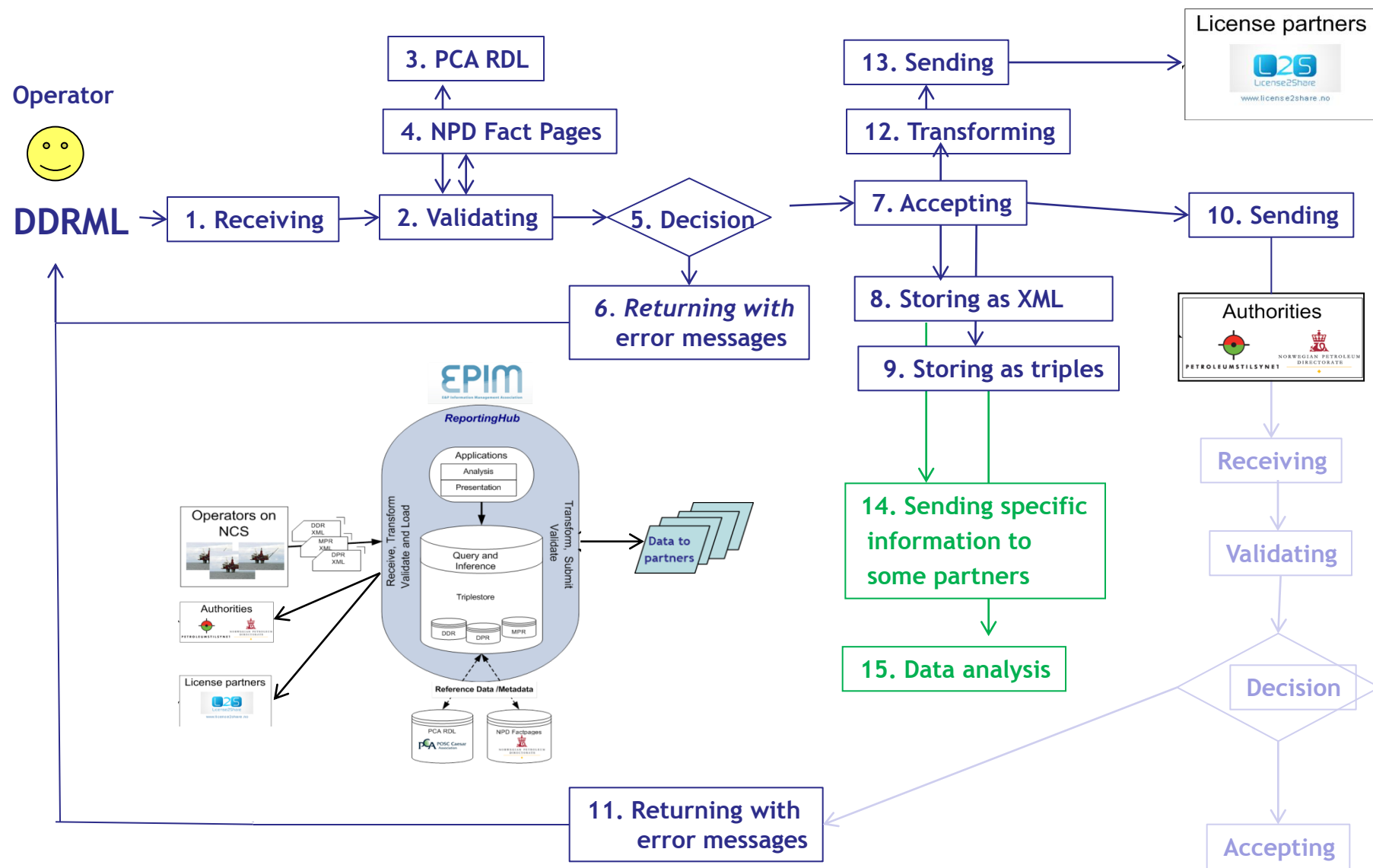
- DDRML™ [1)]

[1)] **Based on PCA's E&P ontology**

ERH - Drilling

➤ The Daily Drilling Report (DDR) based on XML Schema has been mandatory on the NCS since February 17, 2008.

➤ The DCG has extended today's version with some 30+ new concepts and some of them will be mandatory in 2012

➤ Extensive testing is planned both for new and existing version of the DDR in October/November

➤ From November 15 all DDRs shall be sent to ERH using web services

Drilling Core Group
Chair Geir Aas, ExxonMobil

PSA (Observer)

Statoil

ConocoPhillips

Total

BP

PCA

EPIM

Key elements of the Daily Drilling Reporting (DDR)
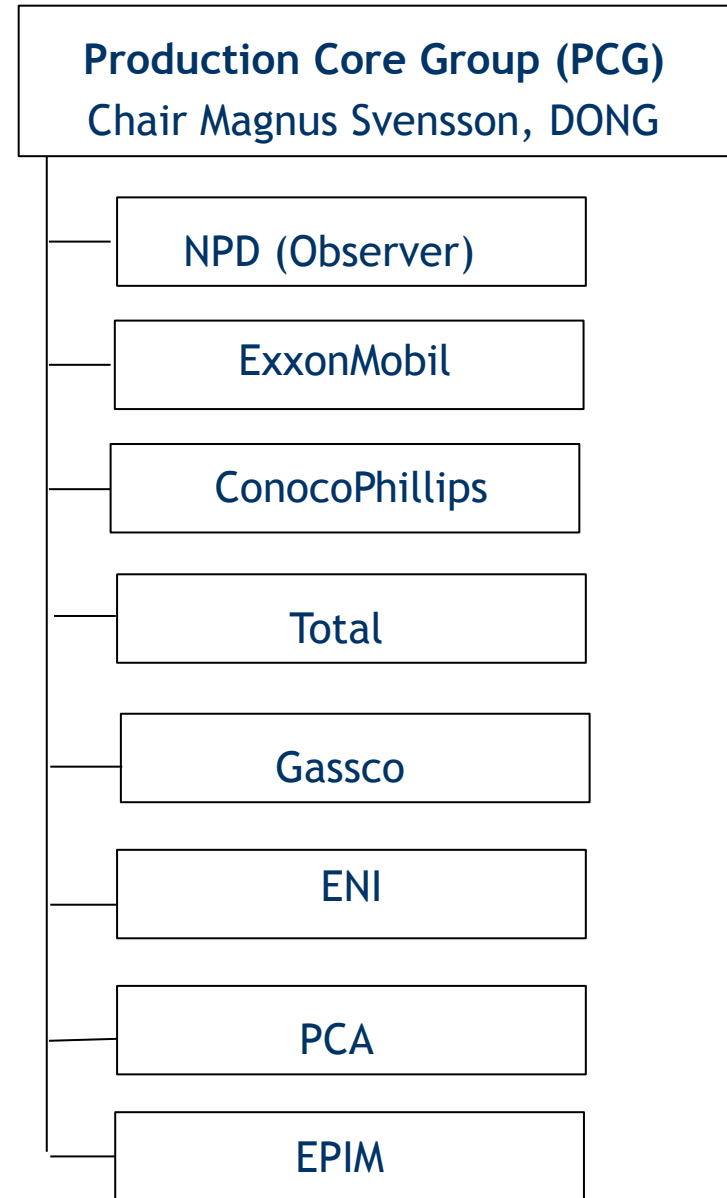
4. EPIM REPORTINGHUB (ERH)

- DAILY PRODUCTION REPORT (DDR)
- DPRML™ [1]

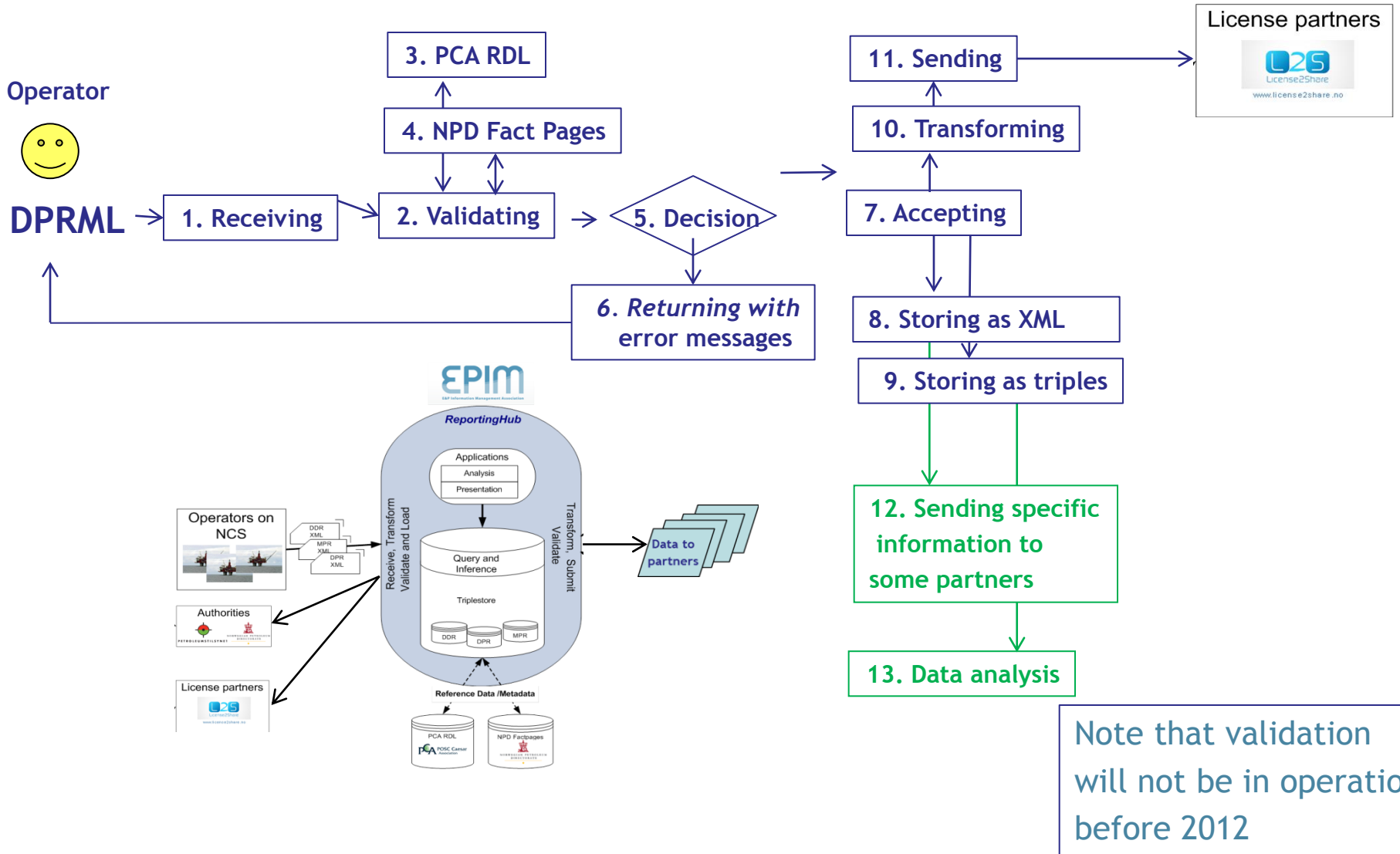- MONTHLY PRODUCTION REPORT (MPR)
- MPRML™ [1]
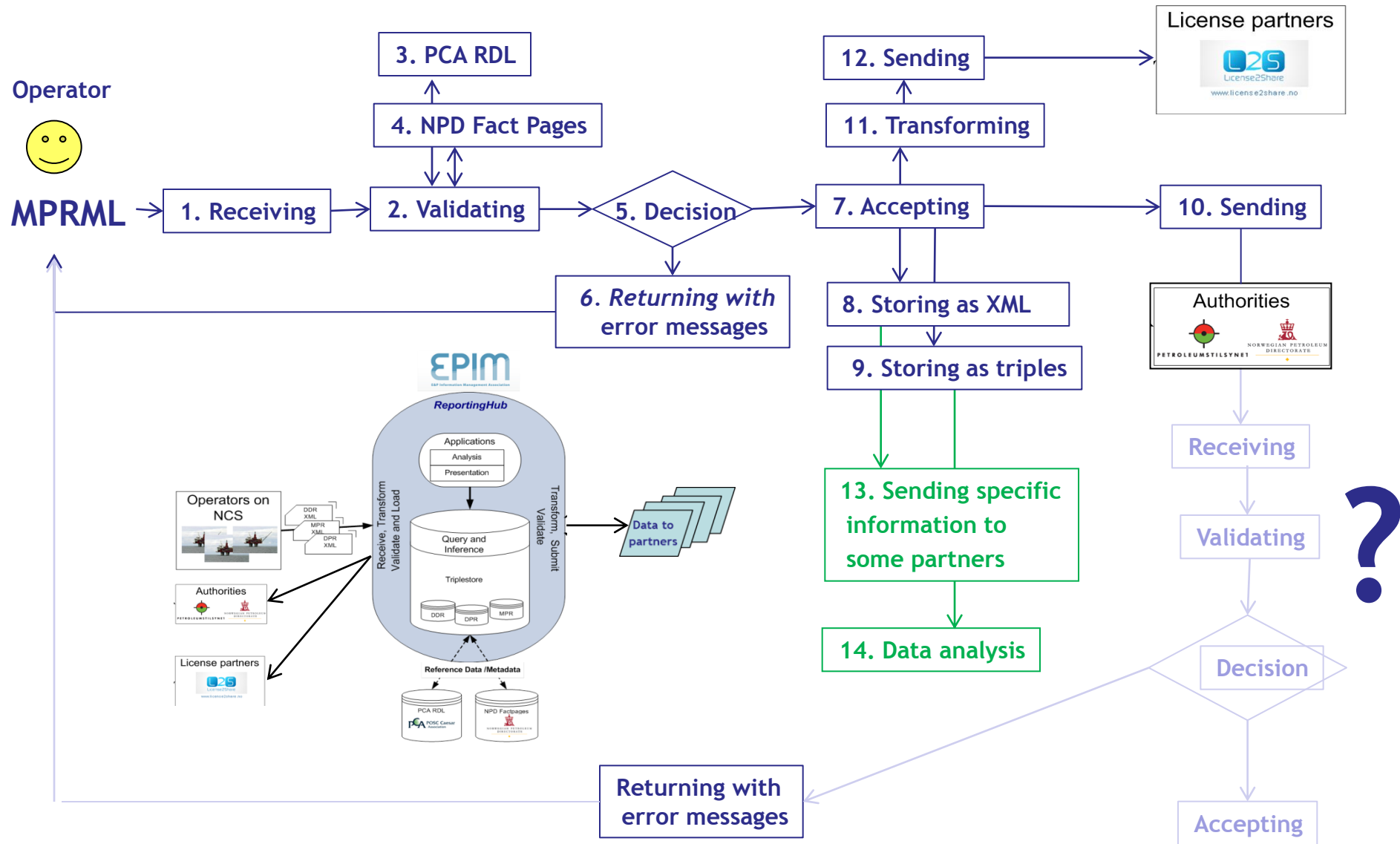
[1] Based on PCA's E&P ontology

ERH - Production

➢ The Monthly Production Report (MPR) XML schema used by Statoil/NPD for testing this summer is the basis for implementation in ERH

➢ The PCG has agreed to use the MPR XML schema also for the Daily Production Report (DPR) from November 15, 2011. IDs from NPD Fact Pages have to be made available.

➢ Member of the PCG are now preparing simulated data and actual reports for testing both MPR and DPR in September/ October

➢ Depending on approval from NPD, some operators will start using the MPR XML Schema in November 2011

Production Core Group (PCG)
Chair Magnus Svensson, DONG

- NPD (Observer)
- ExxonMobil
- ConocoPhillips
- Total
- Gassco
- ENI
- PCA
- EPIM

Key elements of the Daily Production Reporting (DPR)

Operator

DPRML → **1. Receiving** → **2. Validating** → **5. Decision**

3. PCA RDL

4. NPD Fact Pages

6. *Returning with error messages*

7. Accepting

8. Storing as XML

9. Storing as triples

10. Transforming

11. Sending → License partners

12. Sending specific information to some partners

13. Data analysis

Note that validation will not be in operation before 2012

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Key elements of the Monthly Production Reporting (MPR)

5. EPIM REPORTINGHUB (ERH)

- TECHNOLOGY

- SEMANTIC WEB

- NPD FACT PAGES/ E&P ONTOLOGY

- WEB SERVICES

ERH – Semantic Web

Evolution:

➢ **Web 1.0 – Pages and documents**

➢ **Web 2.0 – Social networking**

➢ **Web 3.0 – Semantic Web**

  ✓ **Resource[1] Description Framework (RDF)**

    o **RDF is a distributed data model on the Semantic Web consisting of a triple**
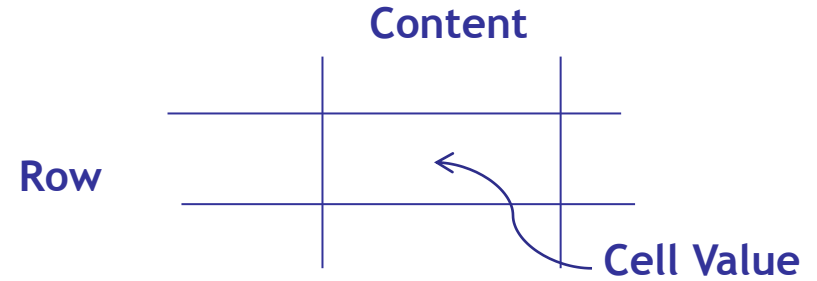

  ✓ **Web Ontology Language (OWL)**

    o **OWL is very expressive language and provides bases for reasoning – all written as triples**

  ✓ **Simple Protocol and RDF Query Language (SPARQL)**

    o **Query on RDF triples - similar to SQL for RDB**

[1] A **resource** is anything that someone want to talk about and that has a unique address through a **Uniform Resource Identifier (URI)**

Table

Content

Row

Cell Value

Any table of data might be expressed as RDF triples where

✓ **Subject is the row number**

✓ **Predicate is the column content**

✓ **Object is the cell value**

**Subject and Predicate are resources**

Why ontologies?

The real world is complex and changing, you need a solution that can cope with that complexity and adapt with the changes.

That's what ontology does for you

ERH – NPD Fact Pages / ISO 15926

- ➢ NPD Fact Pages providing IDs for wells, licensees, installations and rigs, are available as RDF triples according to ISO 15926 and regularly updated

- ➢ NPD Fact Pages are used both for validation and for access control in ERH

- ➢ All information in ERH are presented as RDF triples, represented as ontologies using OWL and structured according to ISO 15926 and PCA RDL

ERH's metadata and standard ontologies
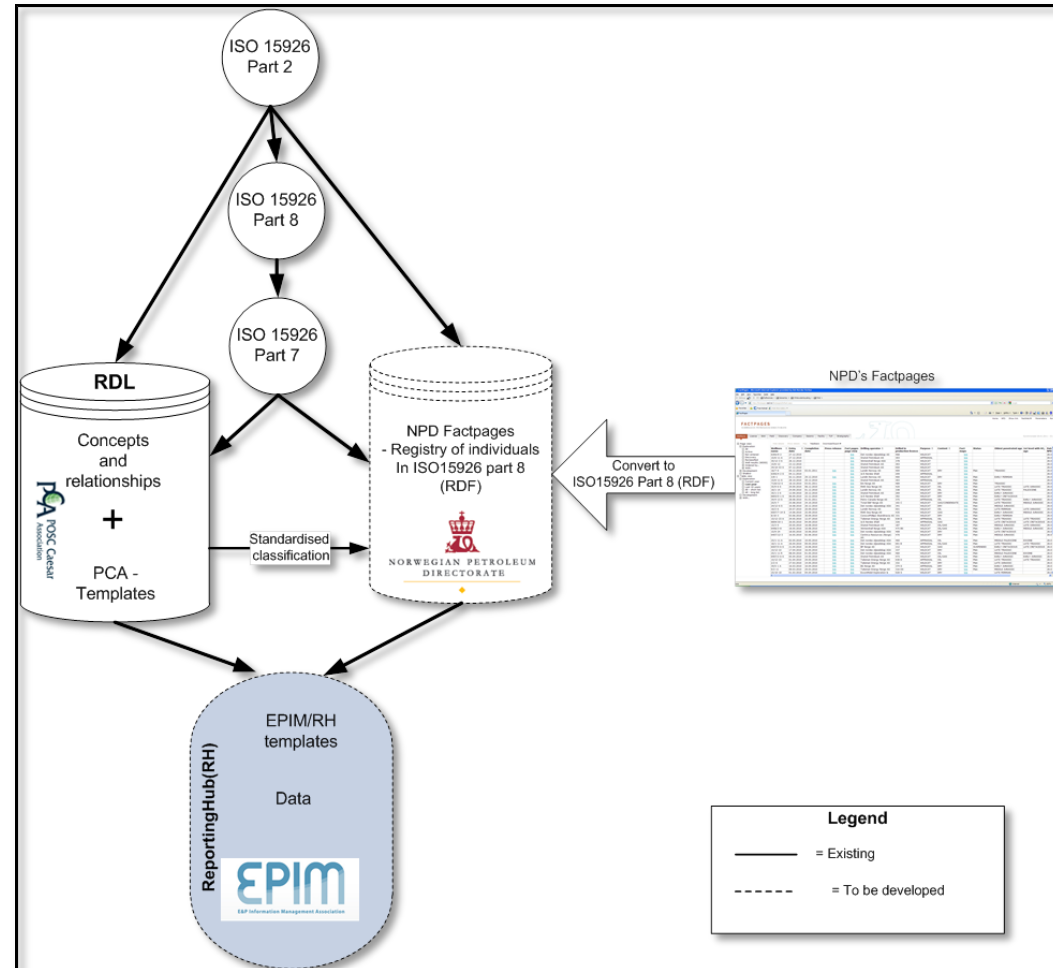
ERH – ReportingHub architecture

- A Common Asset Model (CAM) representing the infrastructure on NCS is developed according to NPD Fact Pages and ISO 15926

- To support work processes separate ontologies are developed for
  - NPD Fact Pages
  - Drilling & Production
  - E&P

- To secure cost efficient updates of changes in the reports templates are developed according to ISO 15926 for
  - DDR
  - DPR
  - MPR

ReportingHub architecture
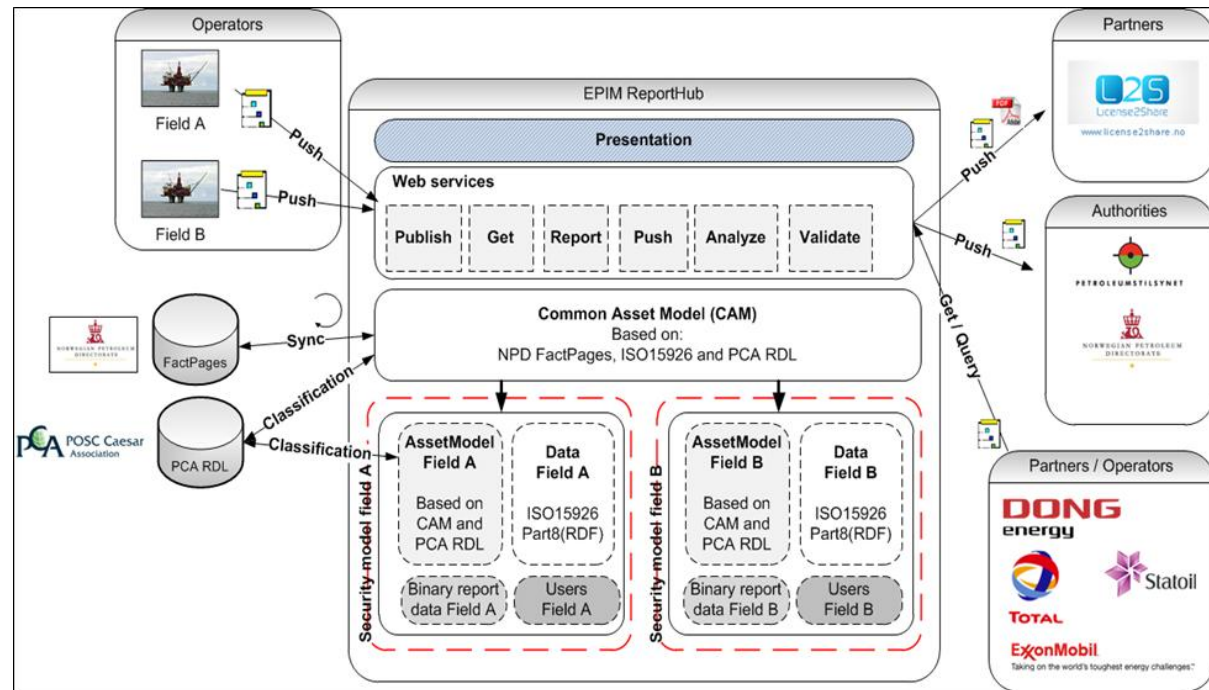
ERH – Web Services

- ➢ ERH has six different services
  - ✓ Operators
  - ✓ Authorities
  - ✓ L2S
  - ✓ Partner
  - ✓ NPD Fact Pages
  - ✓ PCA RDL

- ➢ The web services shall be SOX compliant

- ➢ The web services with authorities and operators shall be based on existing or similar services on SOIL

- ➢ The web services with the partners shall all run under encryption and require user verification

- ➢ The web services with L2S will be improved

Web Services

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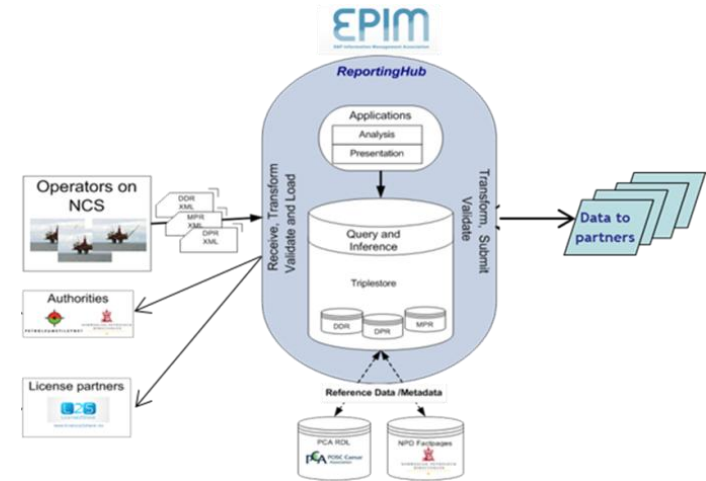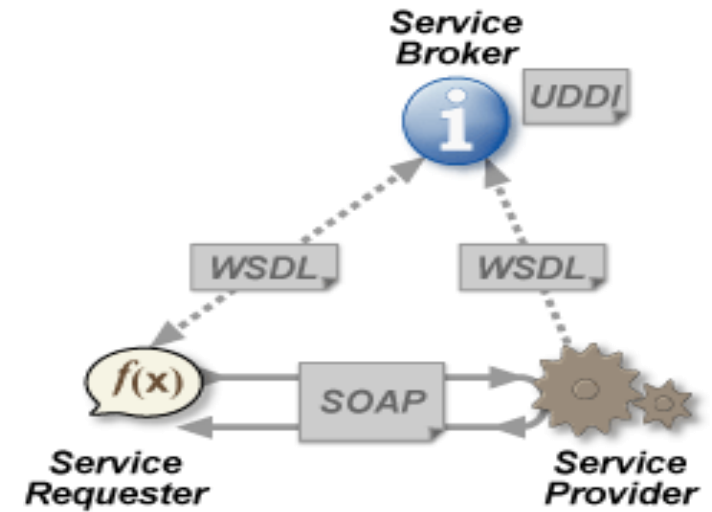
5. EPIM REPORTINGHUB (ERH)

- SUMMING UP

ERH – Summing up

ERH is a powerful knowledge sharing platform which provides huge flexibility:

➢ The technology can model the complexity of the world and easily adapt to changes

➢ The reports can easily be updated (adding/deleting data) and the triplestore will handle such changes without any modification

➢ The ontologies allows us to do reasoning such as validation

➢ The data has now well defined meaning so they can be used outside ERH

➢ Triplestores can be build one at a time and query all of them as one database

➢ Easy to transfer data between triplestores without loss of information

➢ More and more public data is available as RDF triples (open linked data)

ERH – Summing up

EPIM is now in very good position for offering the operators enhanced services by building an integrated report system covering all reports from the operators to the authorities and the partners.

Some of these reports are:

- ✓ Monthly sales of gas
- ✓ Monthly economic reporting
- ✓ Monthly HSE reporting
- ✓ Revised national budget
- ✓ RiskNivå Norsk Petroleumsvirksomhet (RNNP)
- ✓ Yearly environment report
- ✓ Yearly reports to Statistics Norway (SSB)
- ✓ Yearly reports to Oil and Gas Producers (OGP)

This will greatly improve the partners ability to analyse all the data in the reports in an integrated holistic way.