Implementation of the „Maintenance Planning and Improvement" Process in a central and integrated ILS-Repository

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Maintenance development from the design phase to the in-service support phase is a complex process with many involved procedures, systems and stakeholders. This presentation considers the challenges and provides a solution approach on basis of an Integrated Central IPS/ILS Repository.
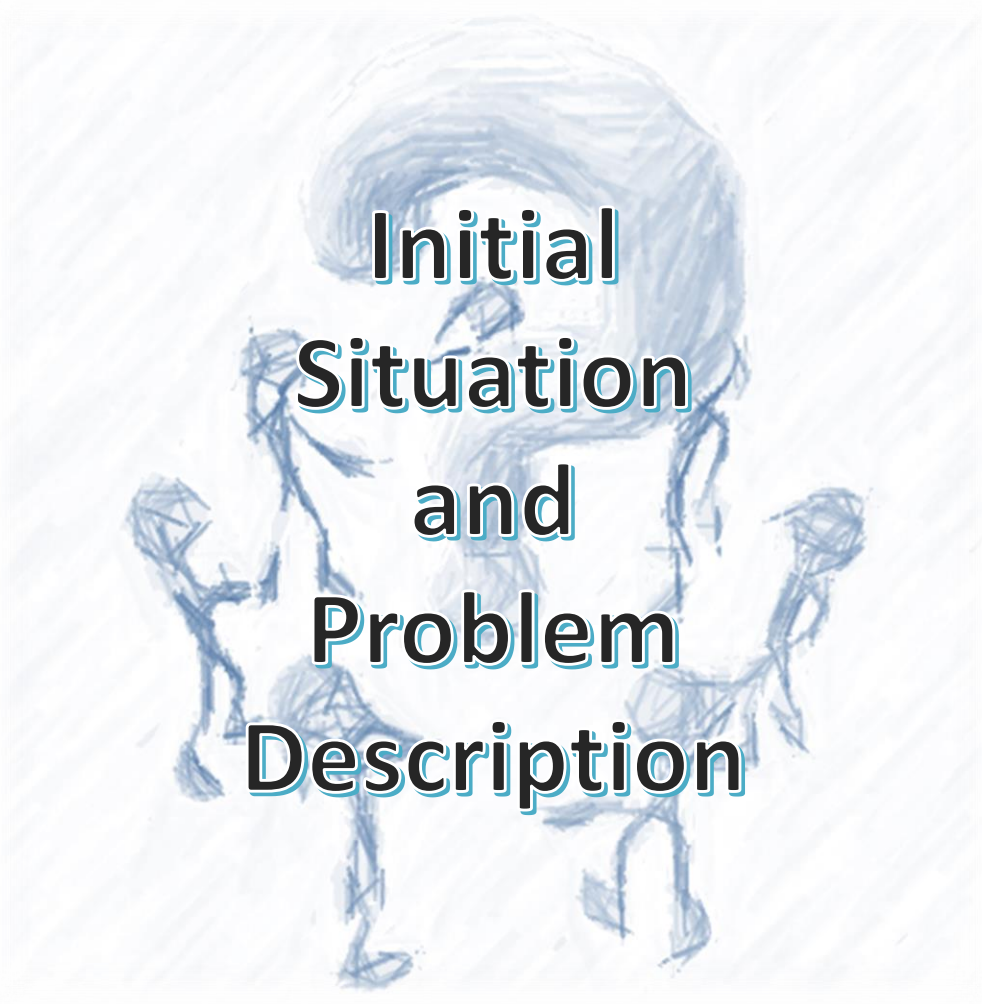Implementation of this solution approach will be epitomized with projects of the naval and the aviation industry.

Integrated Product Support (IPS) / Integrated Logistics Support Prozess - Theory

ILS-/IPS-Disciplines

Integrated Product Support (IPS) / Integrated Logistics Support (ILS)

Supply Support & Provisioning — ILS/IPS Discipline

Technical Data & Document. — ILS/IPS Discipline

Training & Training Devices — ILS/IPS Discipline

Product Support Management — ILS/IPS Discipline

Maintenance Planning & Improvement — ILS/IPS Discipline

System Design Interface — ILS/IPS Discipline

Feedback & In-Service Maintenance Optimization

Theory

The IPS/ILS process is a highly dynamic process with many data flows and many influencing (external) factors.

Communication
Data Consistency
Traceability

Integrated Product Support (IPS) / Integrated Logistics Support Prozess - Reality

The Maldives Scenario

Supply Support & Provisioning

Technical Data & Document.

Training & Training Devices

Product Support Management

Maintenance Planning & Improvement

System Design Interface

Reality

Processes and people are not connected bidirectional. Work packages are created, delivered and forgotten. Data at the end of the process are updated, while forgetting the sources.
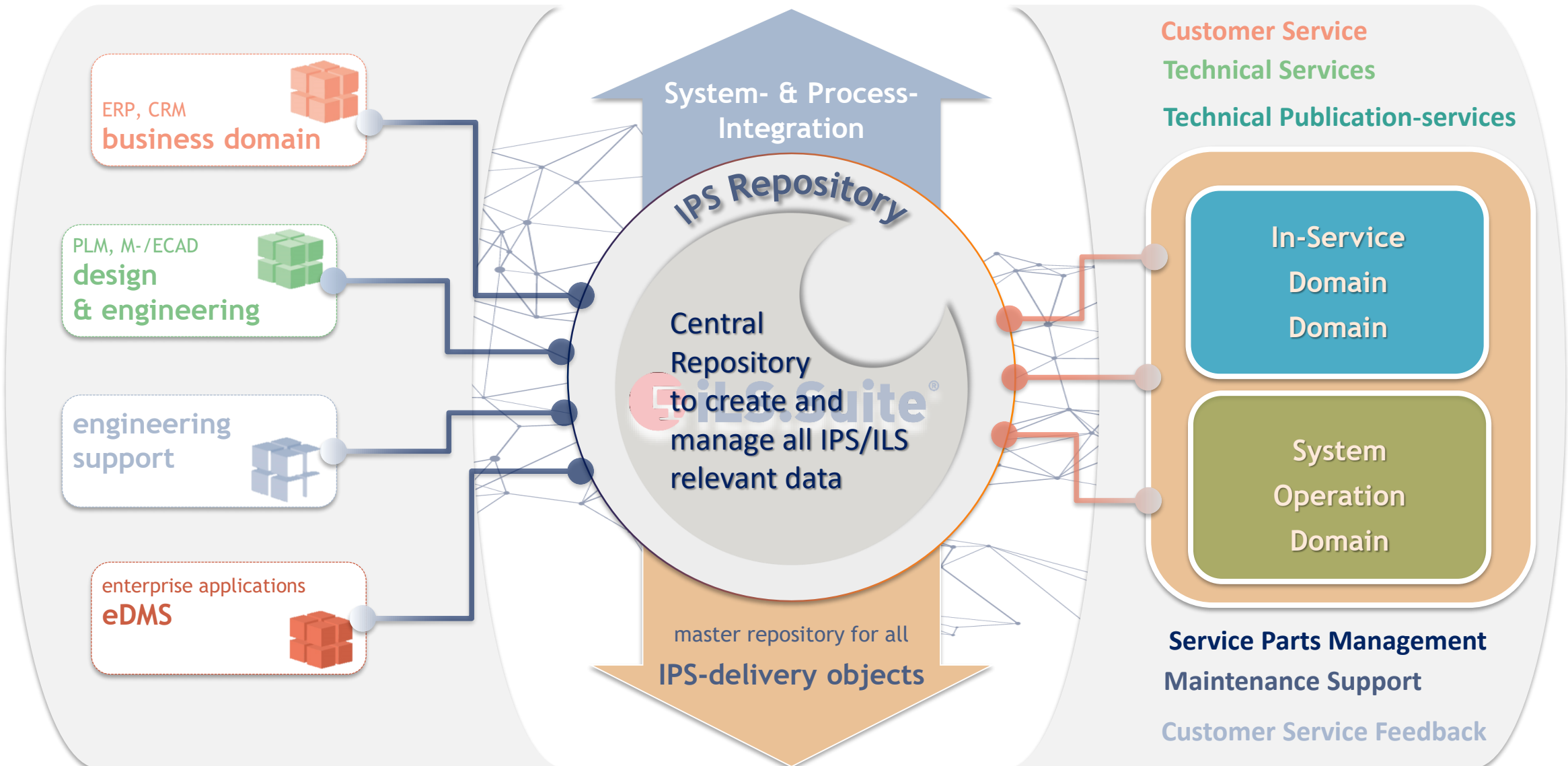
The Maldives Scenario

The Integrated Approach

The integrated approach builds bridges between the different ILS-/IPS processes and people, as they all work with the same **data**. Bridges allow to „walk" in both directions.
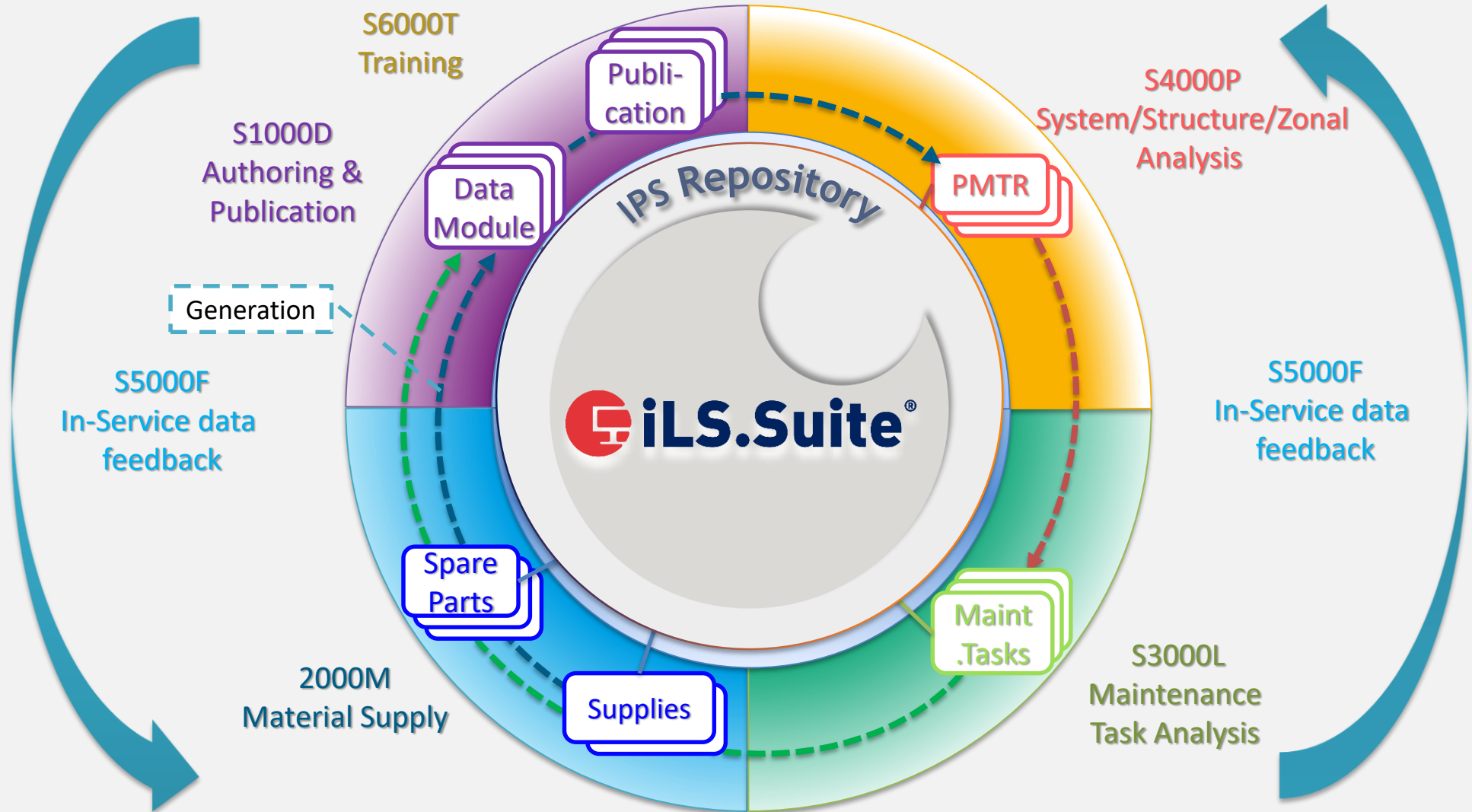
Approach and Concept of an Integrated Central IPS-Repository

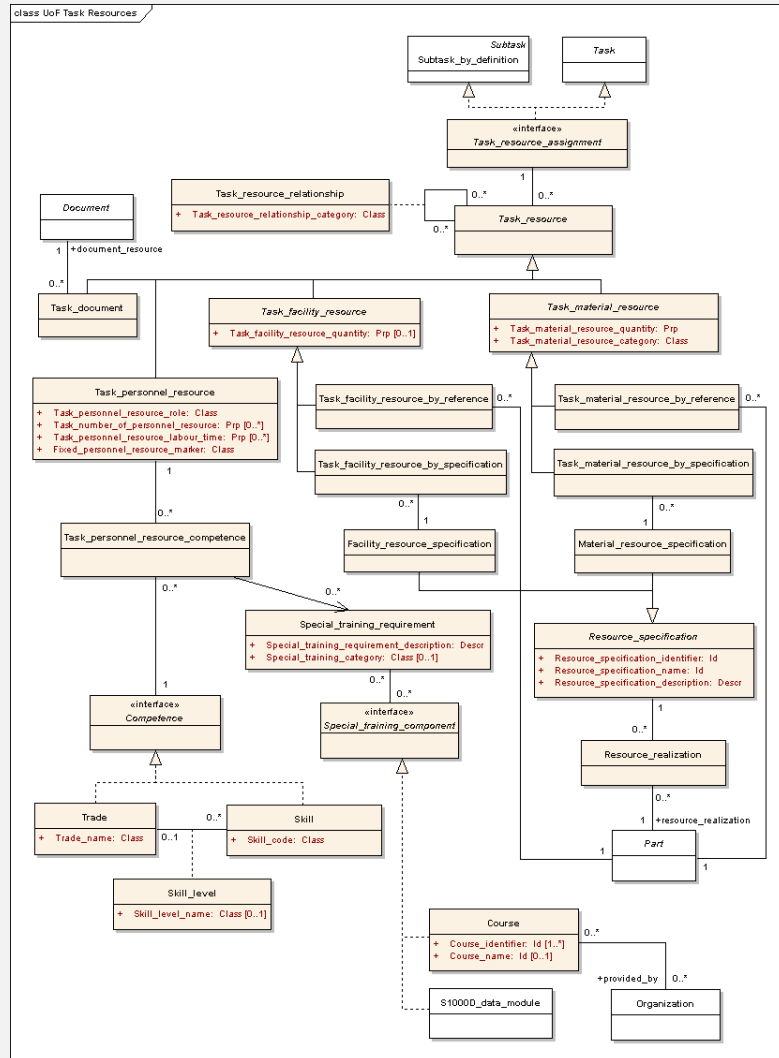# General Definition of an Integrated Central ILS/IPS-Repository

ERP, CRM
business domain

PLM, M-/ECAD
design
& engineering

engineering
support

enterprise applications
eDMS

System- & Process-
Integration

IPS Repository

Central
Repository
to create and
manage all IPS/ILS
relevant data

iLS.Suite®

master repository for all
IPS-delivery objects

Customer Service
Technical Services
Technical Publication-services

In-Service
Domain
Domain

System
Operation
Domain

Service Parts Management
Maintenance Support
Customer Service Feedback

Determination

None of the specifications of the ASD Suite of ILS Specifications (besides ASD S1000D) forces the software developing companies to store the data in the data model defined by these specifications.
The data model gives guidance for the required elements and attributes.

The objective of the schemas and data modules is the standardization of the data exchange between different software tools and parties.
The more important aspect of the ASD Suite of ILS Specifications are the defined processes.
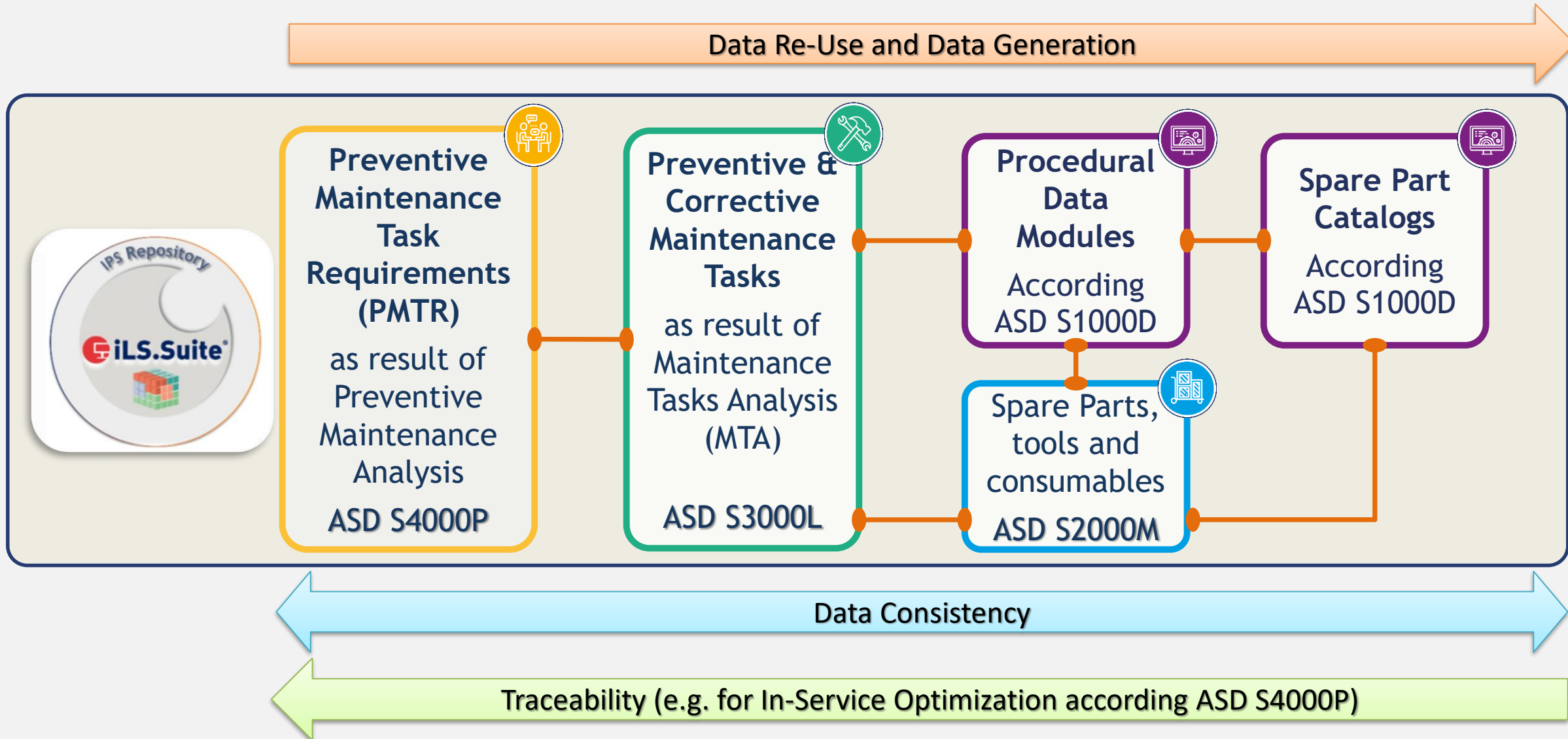
An ILS/IPS Repository can have any database model. Standard compliance in the context of schemas and data models is a requirement for its interfaces.

Freedom to extend or reduce and data relation (especially between the different standards) especially for optimal user guidance and data traceability.

Strengths of an Integrated Central IPS Repository in the context of Maintenance Plannning

Data Re-Use and Data Generation →

IPS Repository
iLS.Suite®

Preventive Maintenance Task Requirements (PMTR)

as result of Preventive Maintenance Analysis

ASD S4000P

Preventive & Corrective Maintenance Tasks

as result of Maintenance Tasks Analysis (MTA)

ASD S3000L

Procedural Data Modules

According ASD S1000D

Spare Parts, tools and consumables

ASD S2000M

Spare Part Catalogs

According ASD S1000D

← **Data Consistency** →

← **Traceability (e.g. for In-Service Optimization according ASD S4000P)**

Cross-Program Reusability and Applicabilty

Integrated Central IPS Repository

Maintenance Tasks

Product

Program A

Program B

Modified Task

ASD 3000L

Applicability

ASD S1000D

Procedure

Not Applicable

Procedure

Product AA

Product AA
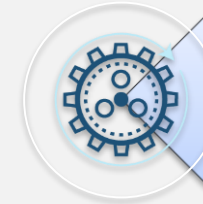
Product BA

In an Integrated Central IPS Repository:

Data can be reused in projects and programs.

Applicability can be set on S3000L and/or S1000D level

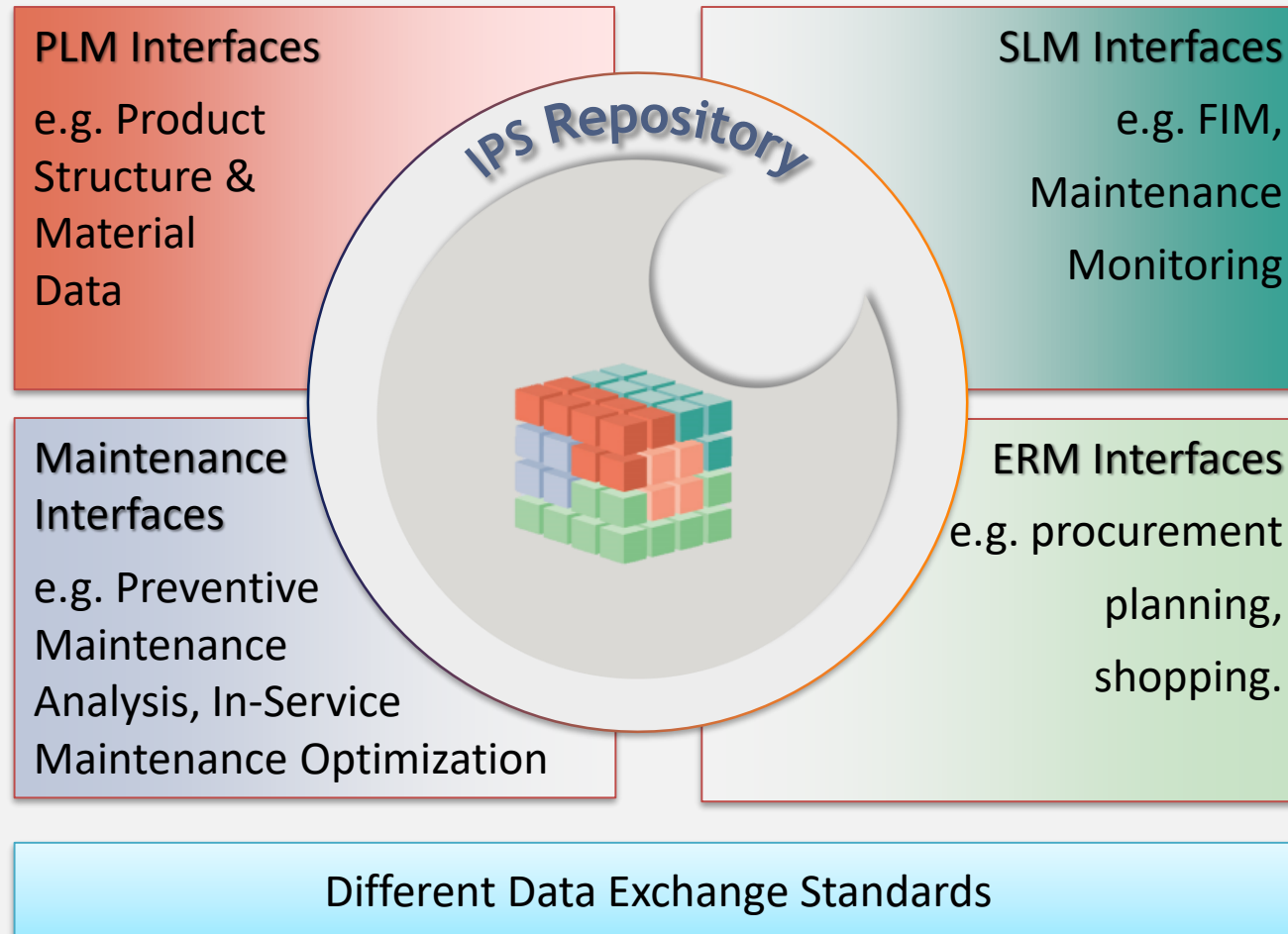Obsolescence can be managed (cross-)program wide.

Applicability must be planned and often requires a more abstract way of thinking!

Interfaces

PLM Interfaces

e.g. Product Structure & Material Data

SLM Interfaces

e.g. FIM, Maintenance Monitoring

IPS Repository

Maintenance Interfaces

e.g. Preventive Maintenance Analysis, In-Service Maintenance Optimization

ERM Interfaces

e.g. procurement planning, shopping.

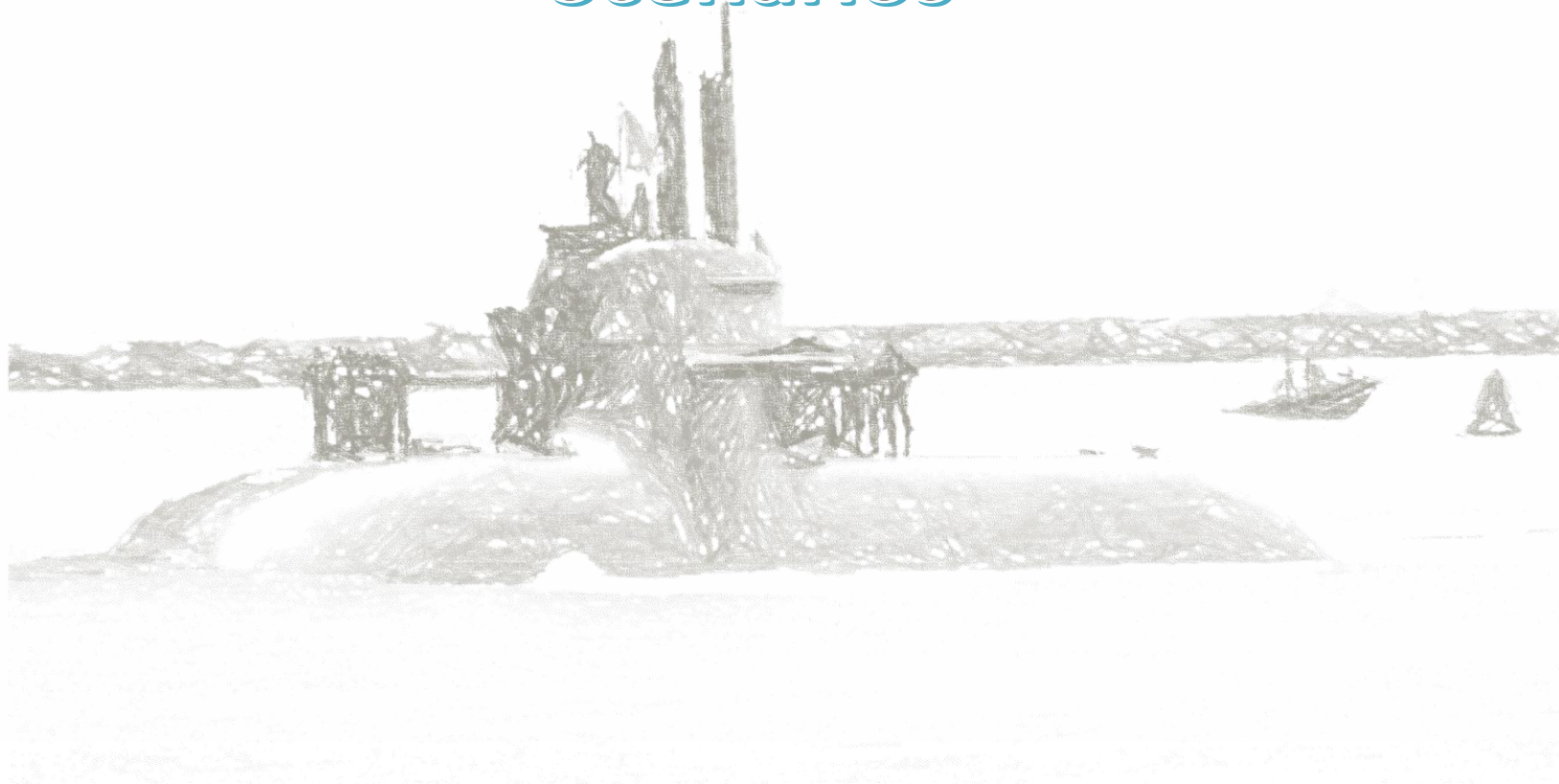## Different Data Exchange Standards

Importance of Interfaces

Interfaces are an important aspect to integrate an IPS Repository into the customers system landscape.

Besides this, although an IPS/ILS-Repository provides many functions to create IPS/ILS-deliverables, the customer may prefer other tools.
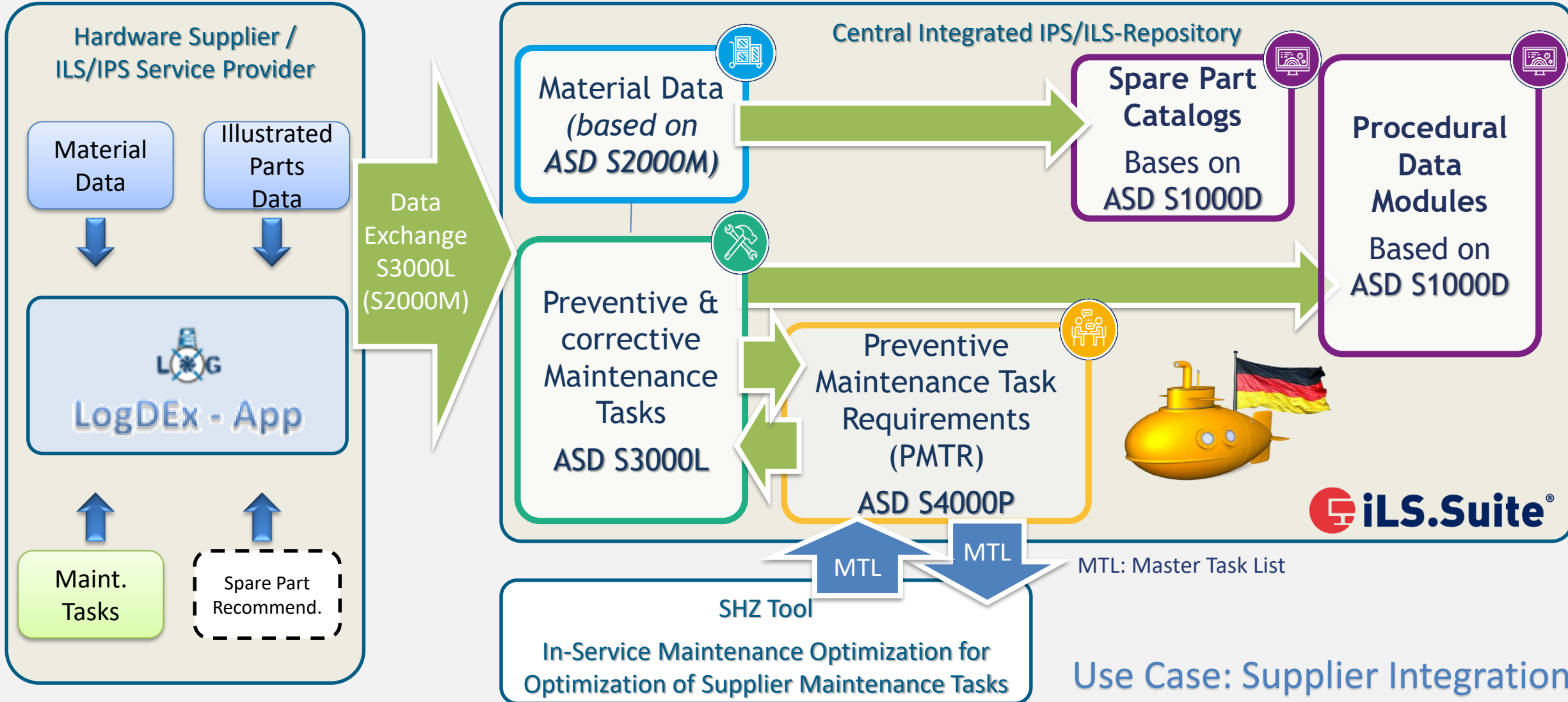
Standardized interfaces, like the schemas of the ASD Suite of ILS-Specification make things easier, but are not always available in each tool/software.

Customer Scenarios

Maintenance Planning at a German Submarine Construction Company

Hardware Supplier / ILS/IPS Service Provider

Material Data

Illustrated Parts Data

Data Exchange S3000L (S2000M)

LogDEx - App

Maint. Tasks

Spare Part Recommend.

Central Integrated IPS/ILS-Repository

Material Data *(based on ASD S2000M)*

Preventive & corrective Maintenance Tasks
ASD S3000L

Spare Part Catalogs
Bases on ASD S1000D

Procedural Data Modules
Based on ASD S1000D

Preventive Maintenance Task Requirements (PMTR)
ASD S4000P

MTL

MTL

MTL: Master Task List

SHZ Tool

In-Service Maintenance Optimization for Optimization of Supplier Maintenance Tasks
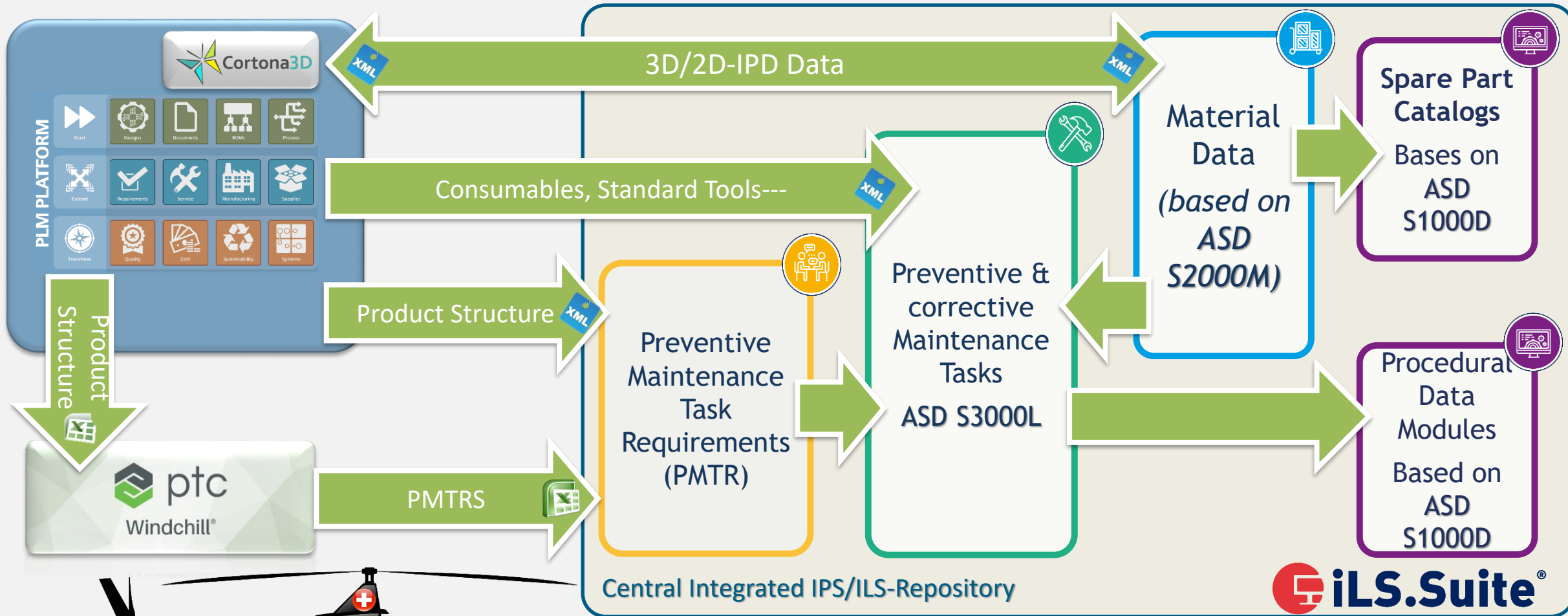
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Use Case: Supplier Integration

Maintenance Planning at a Dutch Helicopter/Aircraft (Supplier) Company

Generation of MIL-STD-1388-2B messages specified and proof of concept has been conducted.

Process implementation planned for 2019

Central Integrated IPS/ILS-Repository

Procedural Data Modules
ASD S1000D

Spare Part Catalogs
Bases on
ASD S1000D

Preventive & corrective Maintenance Tasks
ASD S3000L

Material Data
(based on ASD S2000M)

MIL-STD-1388-2B

S2000M Message

Customer / Integrator

iLS.Suite®

Use Case:
Cross Standard Transformation

Maintenance Planning at a Swiss Helicopter Company

Use Case: PLM / Engineering Integration

Thank you

for your attention!

Questions?