PLM Overview

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Agenda

- Understanding PLM
  - Understanding a Product
    - Product & It's Lifecycle
    - Product Data & Process Data
    - Product Relationship
    - Issues in Product Development
  - What is PLM?
  - Evolution of PLM
  - PLM Vendors
- Understanding PLM with an Example
- PLM Terminologies
- ENOVIA 3DEXPERIENCE

UNDERSTANDING PLM

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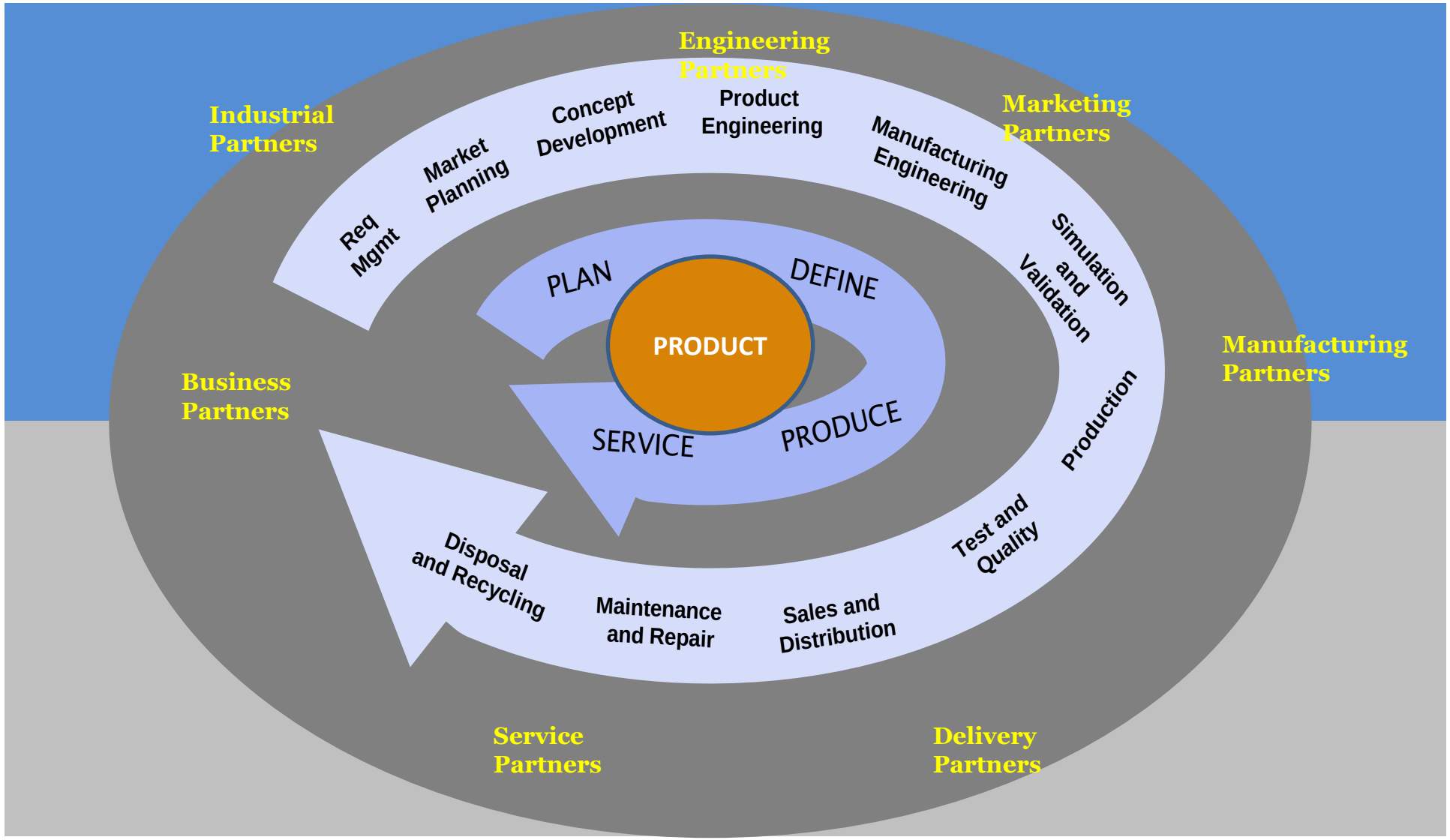
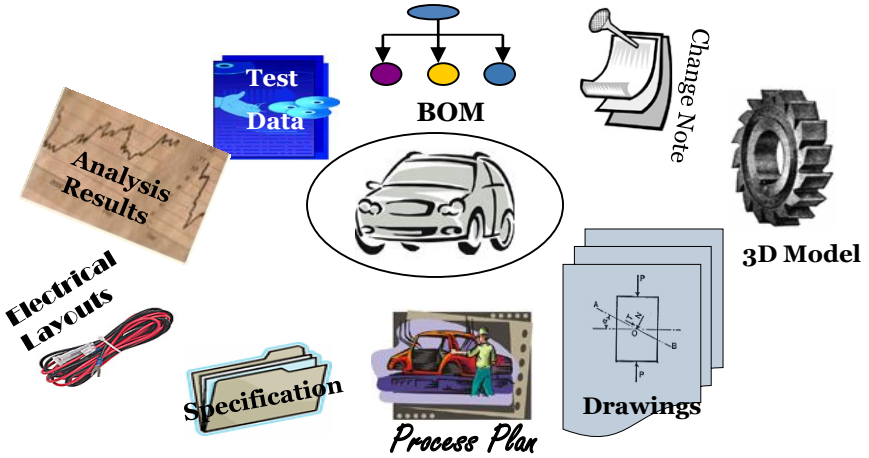
Product & It's Lifecyle



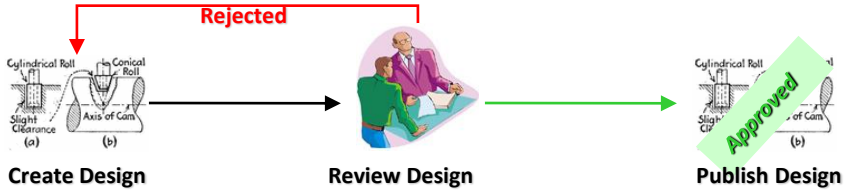
Product & Process Data

- Product
  - 3D Models
  - Engineering Drawings
  - Product & Material Specifications
  - Bill of Materials
  - Test Results
  - FEA Results
- Manufacturing
  - Manufacturing Process
  - Tool Drawings
  - Routings
  - Validation Reports
  - NC Code
- Quality
  - Quality Plans
  - Quality Operating Procedures
  - Quality Standards
- Other Documentation
  - Non ECN document
- New Product Development
  - Technical Design Docs.
  - Market Assessments
  - Risk Assessments
  - Operational/Quality Strategies
  - Engineering Orders
  - Validation Strategies
  - Design & Development Plan
  - Product Authorizations
  - Design Verifications/Validations
- Regulatory
  - International Submissions
  - Strategies
- ECN
- Supplier Qualification
  - Preferred supplier list / Qualification Data
  - Electronic procurement

✓ Need to manage increasing volumes of distributed but related data
✓ Types of data and systems that create data are continuously changing
✓ Need constant framework to locate data

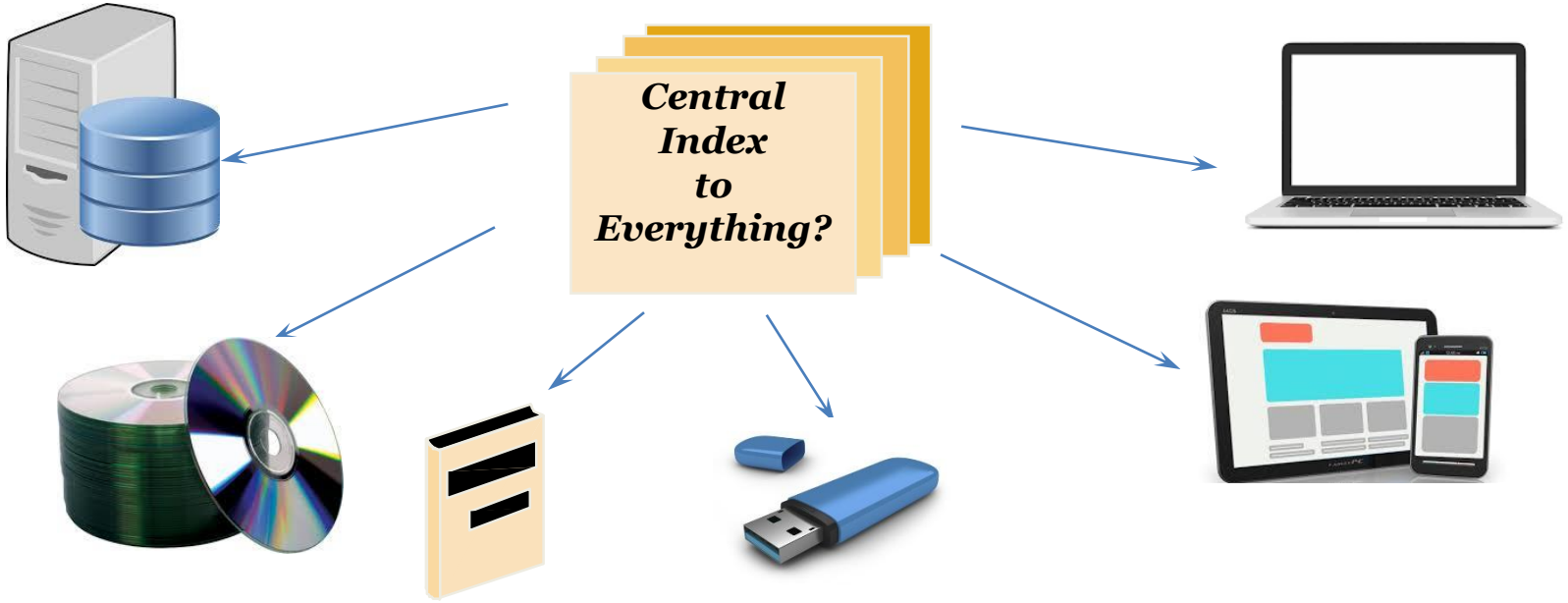


✓ Release Process
✓ Engineering Change Management
✓ NPDI (New Product Development and Introduction)
✓ Design Review Process



Access to Product Data

- What Is Available & Where Is It?



- Who has access to the data?
- Is the data current?

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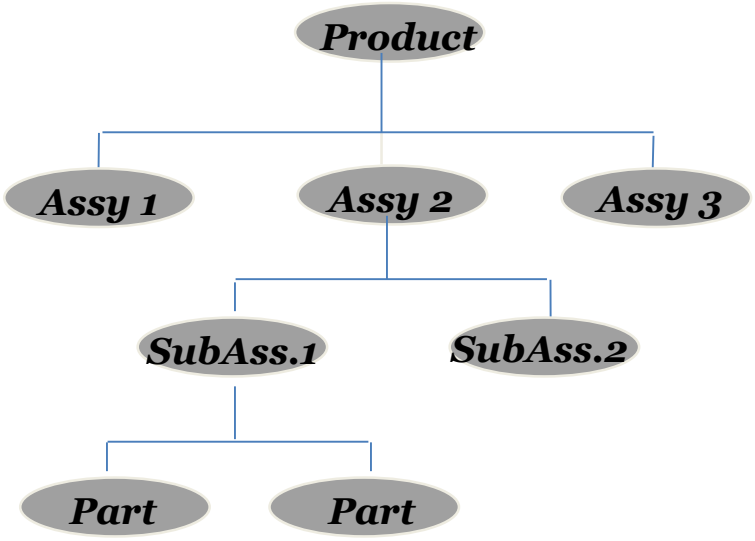
Product Relationships

- Definition of the structure of the product
- What are the relationships between data and structure?



- Manage versions of products and structure items

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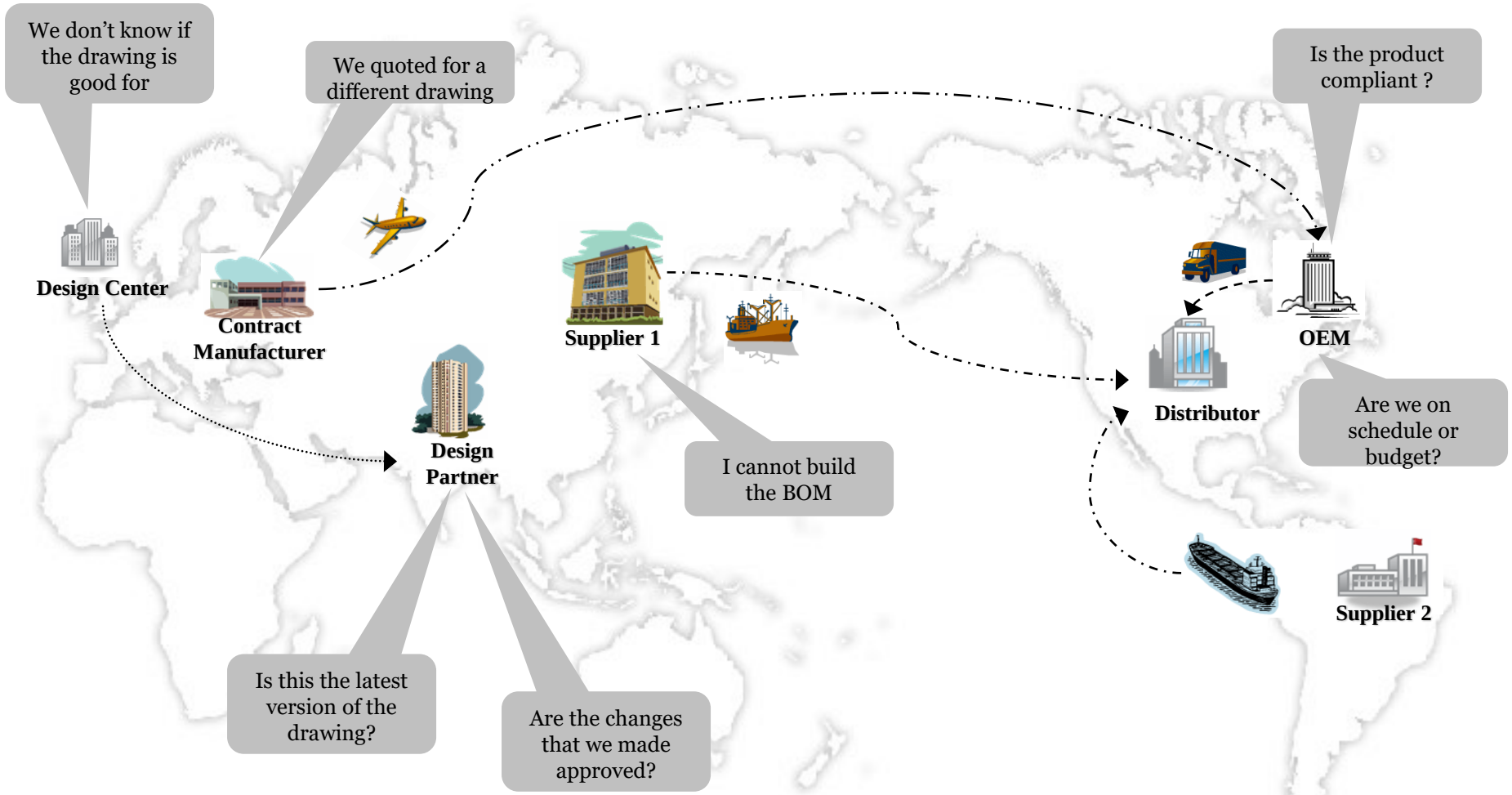
Issues in Product Development



What is PLM?

Every product that gets introduced to the marketplace goes through a series of steps starting when the product is first conceptualized, then proceeding through design, development, validation, production and support, until it is eventually retired or withdrawn from the marketplace.

At each of these steps several tasks must be performed, often by multiple people, who each create, modify, or rely on a variety of information relating to that product.

PLM refers to the management of this product related information and how it is used by the people that rely on it in completing their respective tasks.

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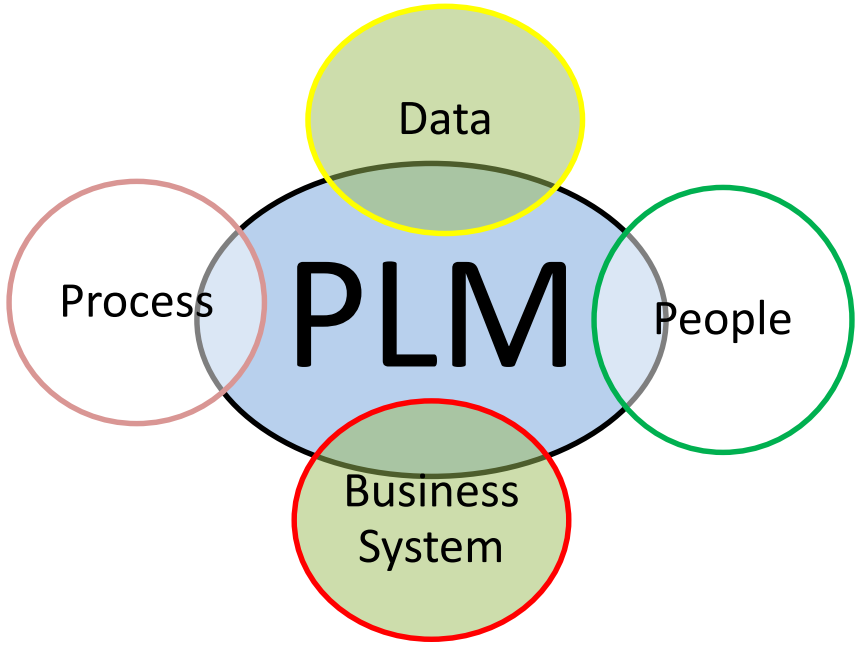
PLM Defined!

CIMdata defines PLM as

- ✓ A strategic business approach that applies a consistent set of business solutions that support the collaborative creation, management, dissemination, and use of product definition information
- ✓ Supporting the extended enterprise (customers, design and supply partners, etc.)
- ✓ Spanning from concept to end of life of a product or plant
- ✓ Integrating people, processes, business systems, and information



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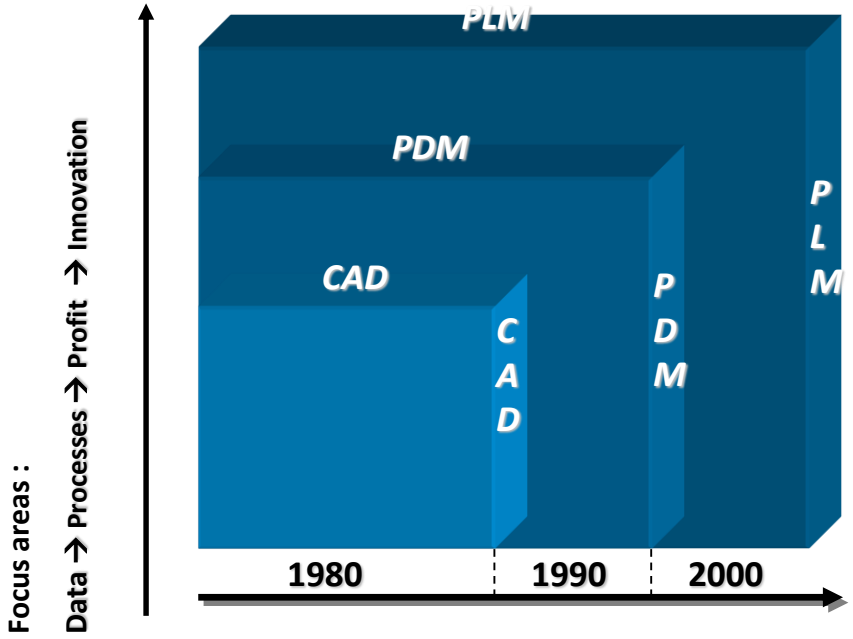
Evolution of PLM



- C – Computer
- A – Aided
- D – Design

- P – Product
- D – Data
- M – Management

- P - Product : Output of any organization
- L - Lifecycle : From cradle to grave
- M - Management

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Evolution of Enterprise Applications

ERP > SCM > CRM > PLM

Accounting, Distribution, Manufacturing	1990 ERP
Manufacturing, Supply Chain, Inventory, WIP	1995 SCM
Sales Force Automation, Call Center, Marketing Automation	2000 CRM
Computer-aided Design, Engineering & Manufacturing, Product Data Management, Digital Manufacturing	2005 PLM

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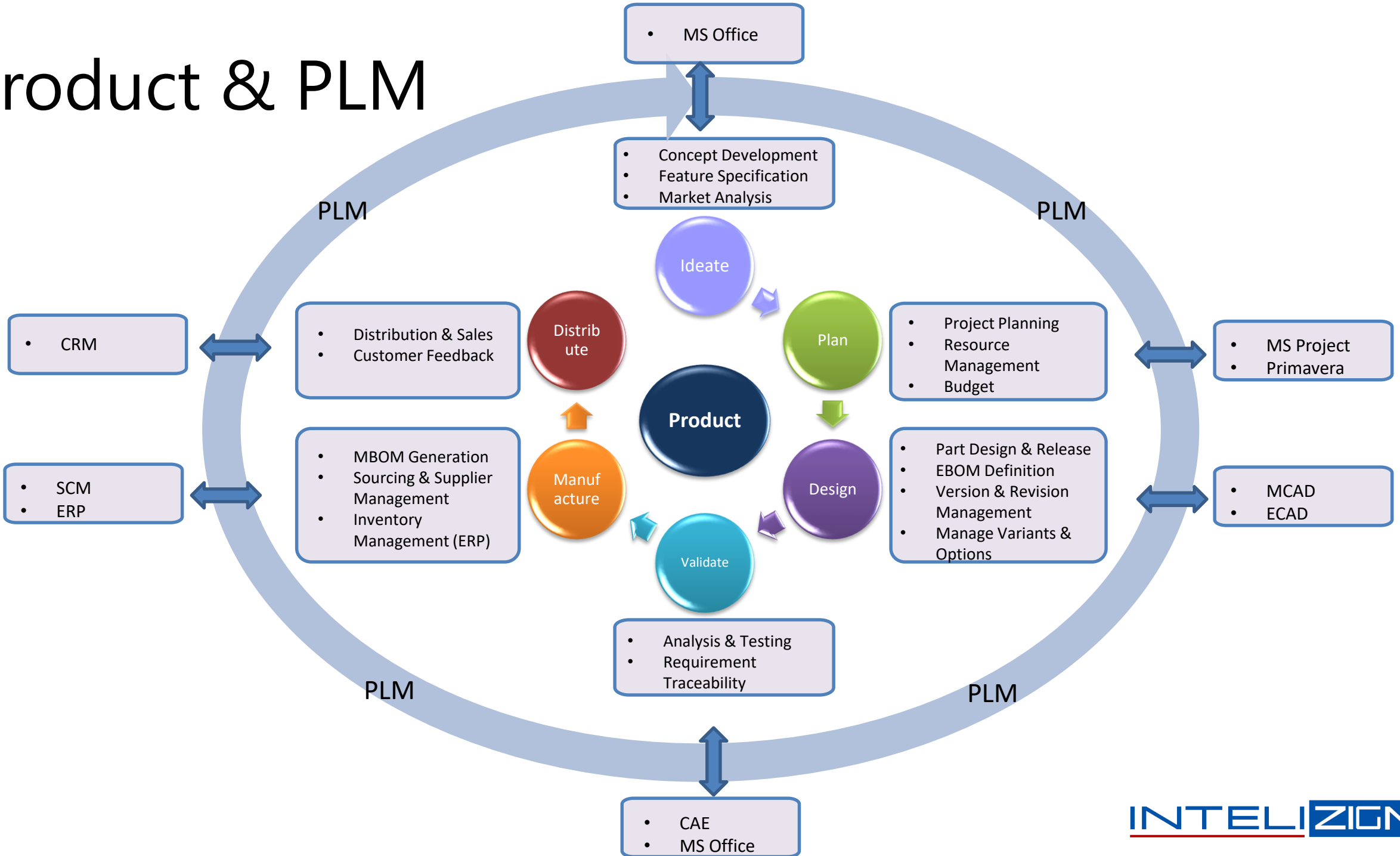
Product & PLM



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PLM Vendors

Vendor	Product
Siemens PLM Software	Teamcenter
Dassault Systemes	3DEXPERIENCE (ENOVIA)
PTC	Windchill
Oracle	Agile
SAP	SAP PLM
Microsoft	MS PLM
Aras Corp	Aras

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UNDERSTANDING PLM WITH AN EXAMPLE

Basics of PLM

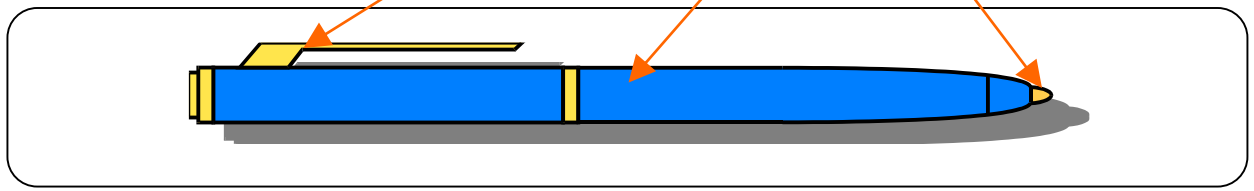
Let us start with very simple example.

You buy a pen from shop.

Do you know what Pen is made of ?

You need following items to assemble a Pen

- Cap Assembly
- Body Assembly
- Refill



They manufacture 100s of models

So, You will need 100s of Caps assemblies, Body Assemblies and Refills. … and in many colors

Defining Part

How do everyone working in Pen Manufacturing company know what to buy, Assemble and sell?

You need to identify items with a *unique number*

These *unique numbers* are called Part Numbers

In our example the Part numbers are

- Cap Assembly - A12 456 09
- Body Assembly- B14 443 65
- Refill - B45 112 77

As you know there are 100s of Caps assemblies, Body Assemblies and refills. All of them have part numbers.

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Defining BOM

How do you know which part numbers to assemble to make a Pen?
You have to *group* correct part numbers.

The grouping of part numbers is called Bill of Material (BOM)

In our example, the Bill of Material is

- Pen - P 23 887 33
  - ➢Cap Assembly - A12 456 09 - Quantity 01
  - ➢Body Assembly- B14 443 65 - Quantity 01
  - ➢Refill - B45 112 77 - Quantity 01

BOM helps all know what to Buy, Assemble & Sell.

But how does one know ***how*** to manufacture?
You can't manufacture only with Part numbers.

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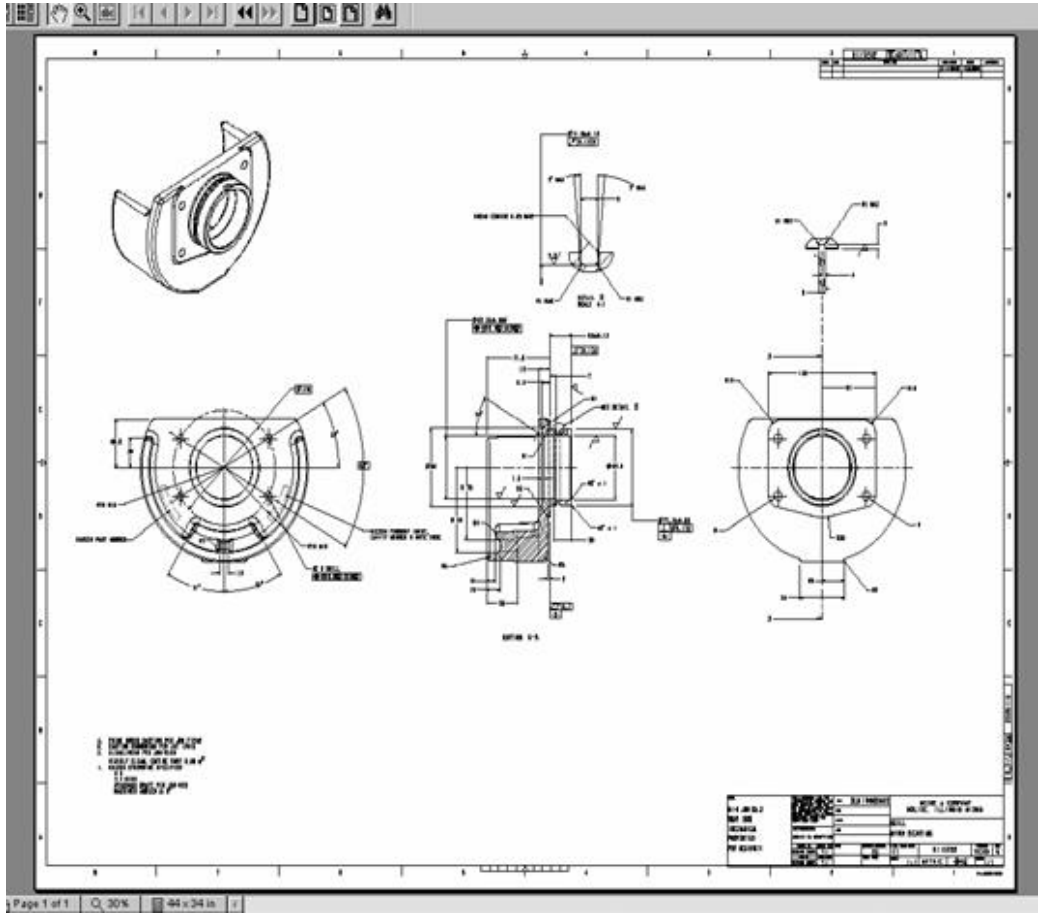
Defining Part Drawings

The engineer prepares a drawing providing details for manufacture.



CAD Drawing

Drawing provides following details

- Dimensions
- Raw material
- Tolerances
- Standard references
- Three dimensional views

There are Drawings

- Drawn manually over drawing boards
- Drawn using CAD packages

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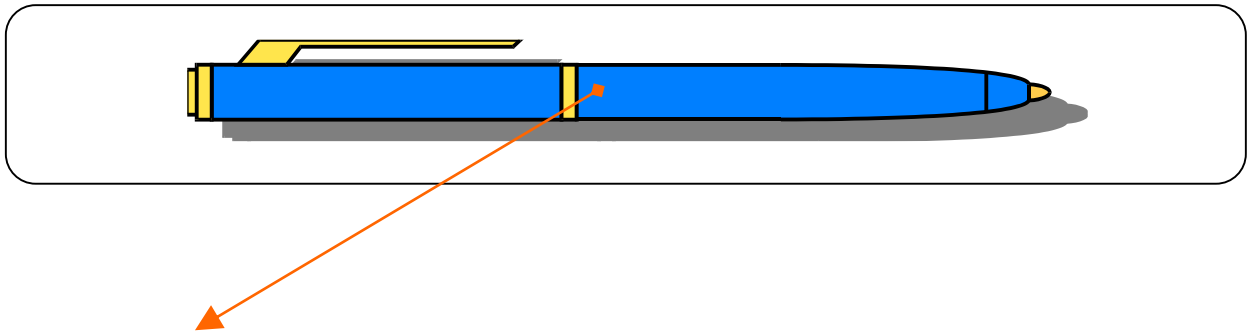
Change Management



Many customers **complained** that **Body assembly** broke with in one month of buying

After analysis it was concluded that defect in design caused this failure.

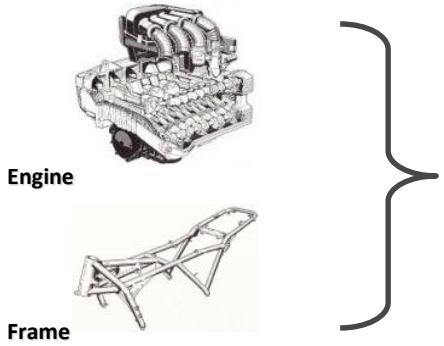
The design engineer analyses and identifies changes required in drawing of Body Assembly- B14 443 65.

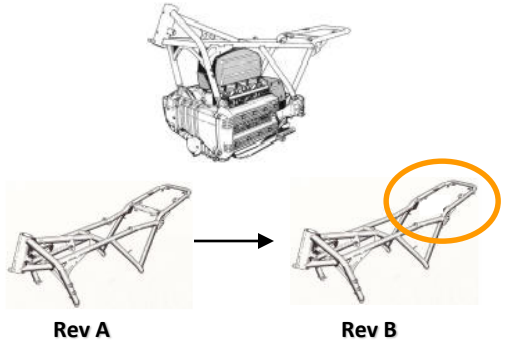
Drawing B14 443 65 is revised and released with new **revision**.

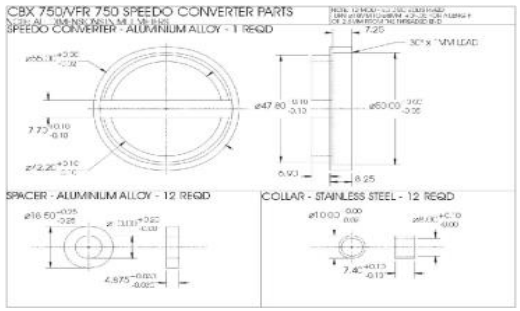
Process of releasing this change to everyone is called **Change Management**.

PLM TERMINOLOGIES

Item, Part, Assembly, Revision







Item/ Business Item –

A managed object that has generic characteristics such as Name, Description, Item-id, Creation date, etc.

Part/ Component –

A physical item which is produced, procured or consumed while manufacturing a product. In general Parts cannot be disassembled without impairing

Assembly –

A combination of Parts/ Sub-assemblies to perform a specific function and subject to disassembly without impairing any of its parts

Revision –

A formally-recorded item iteration that represents a modification to an item

Part Specifications –

Actual physical representation of an item. It could be drawing, document, etc.

Metadata –

Characteristics of any business object. E.g. part number, description, creation data, etc.

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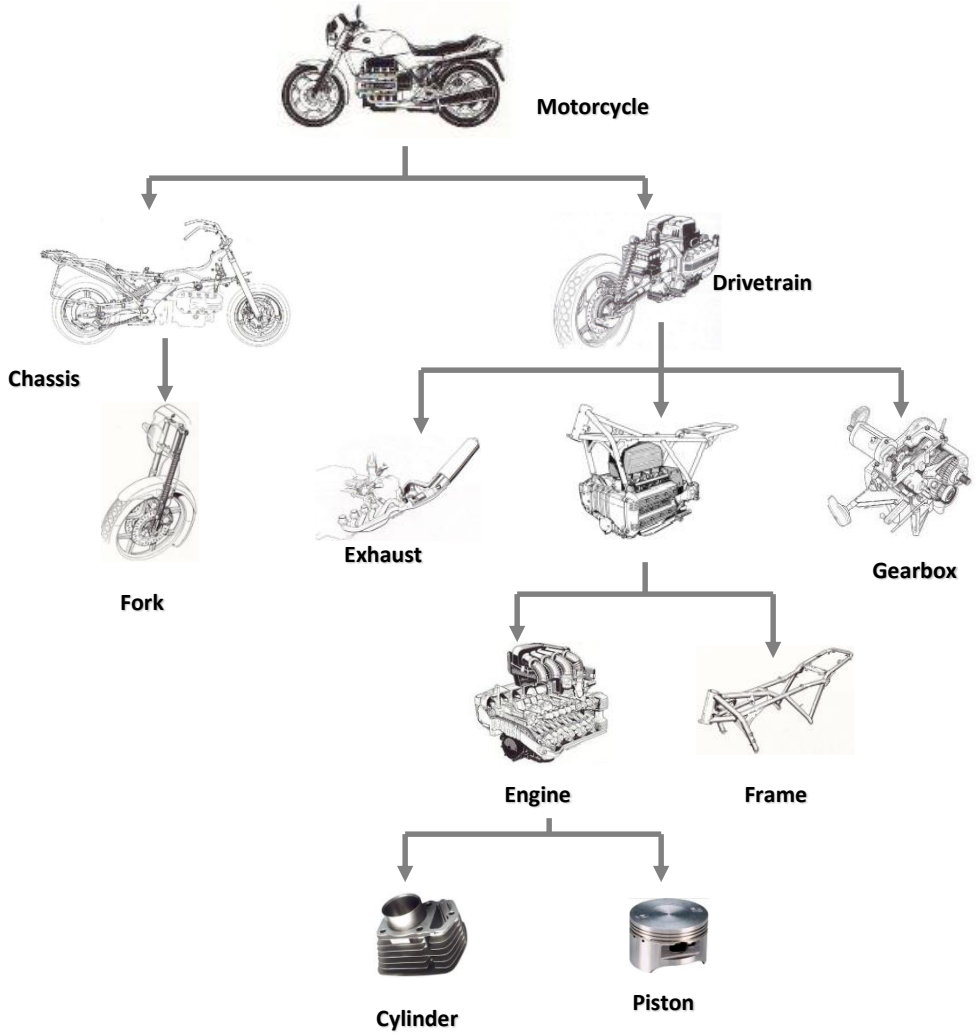
Product Structure/BOM (Bill of Materials)



- ✓ A list of components/ parts that go into an assembly
- ✓ It consists of a break-down structure of a product
- ✓ It provides “Where-used” information
- ✓ It contains attributes/ properties, instance and location information of parts/ assemblies

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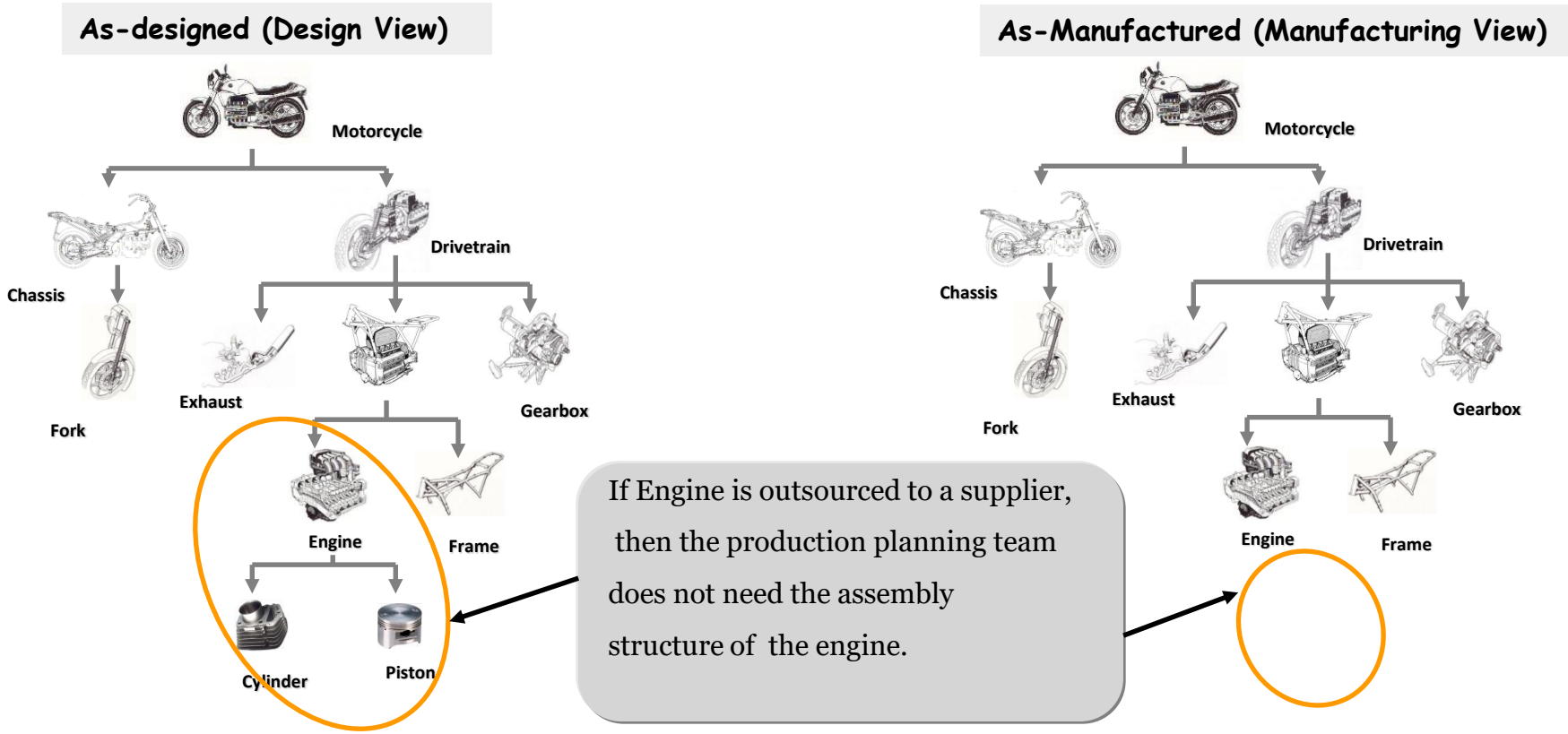
Views



View –

How a product would look from different perspective like Design, Manufacturing, Sales, etc. Following are the typical views that can be found.

As-Designed, As-Manufactured, As-Shipped, As-Maintained

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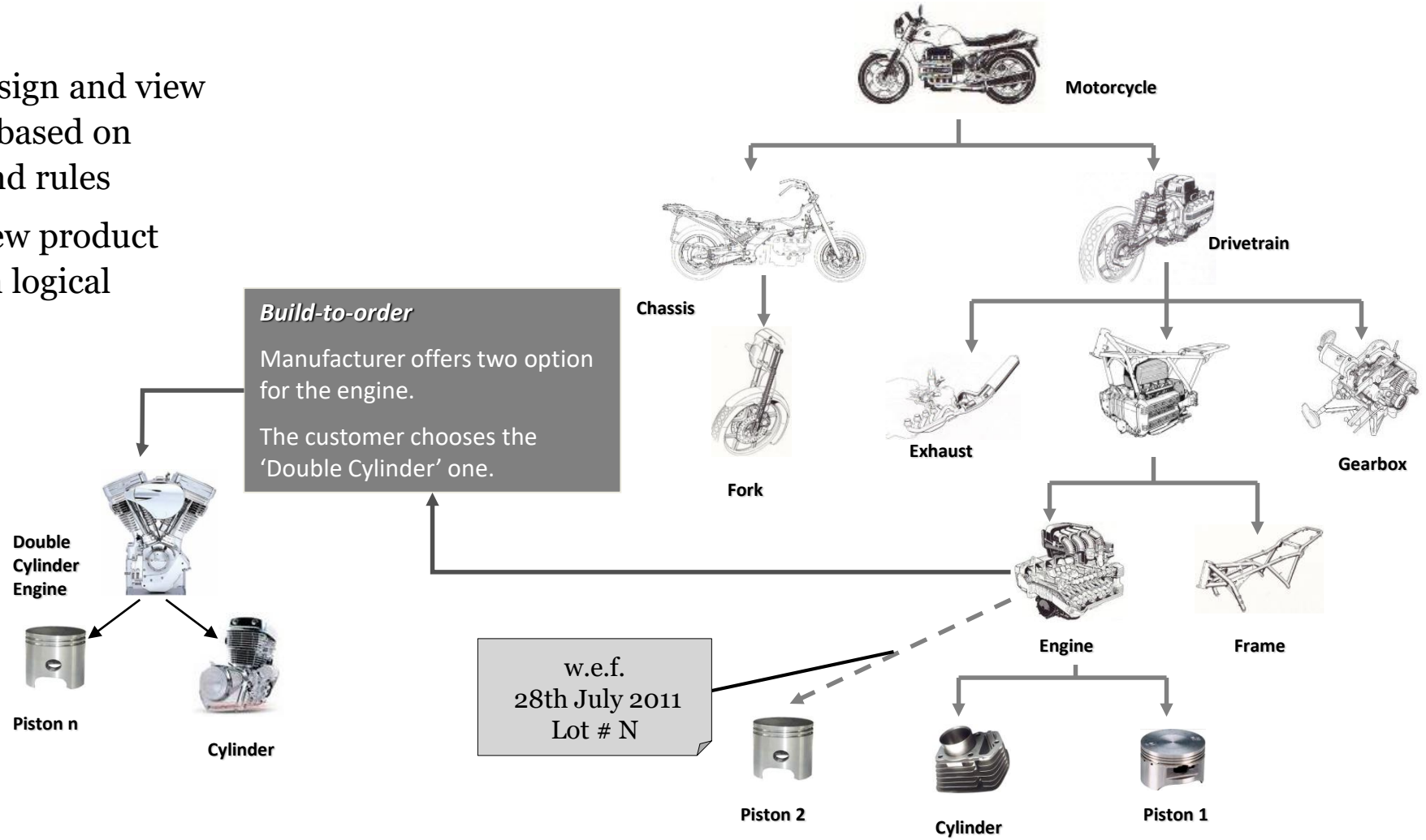
Configuration Management

- ✓ A mechanism to design and view product structures based on features, options and rules
- ✓ A mechanism to view product structures based on logical parameters

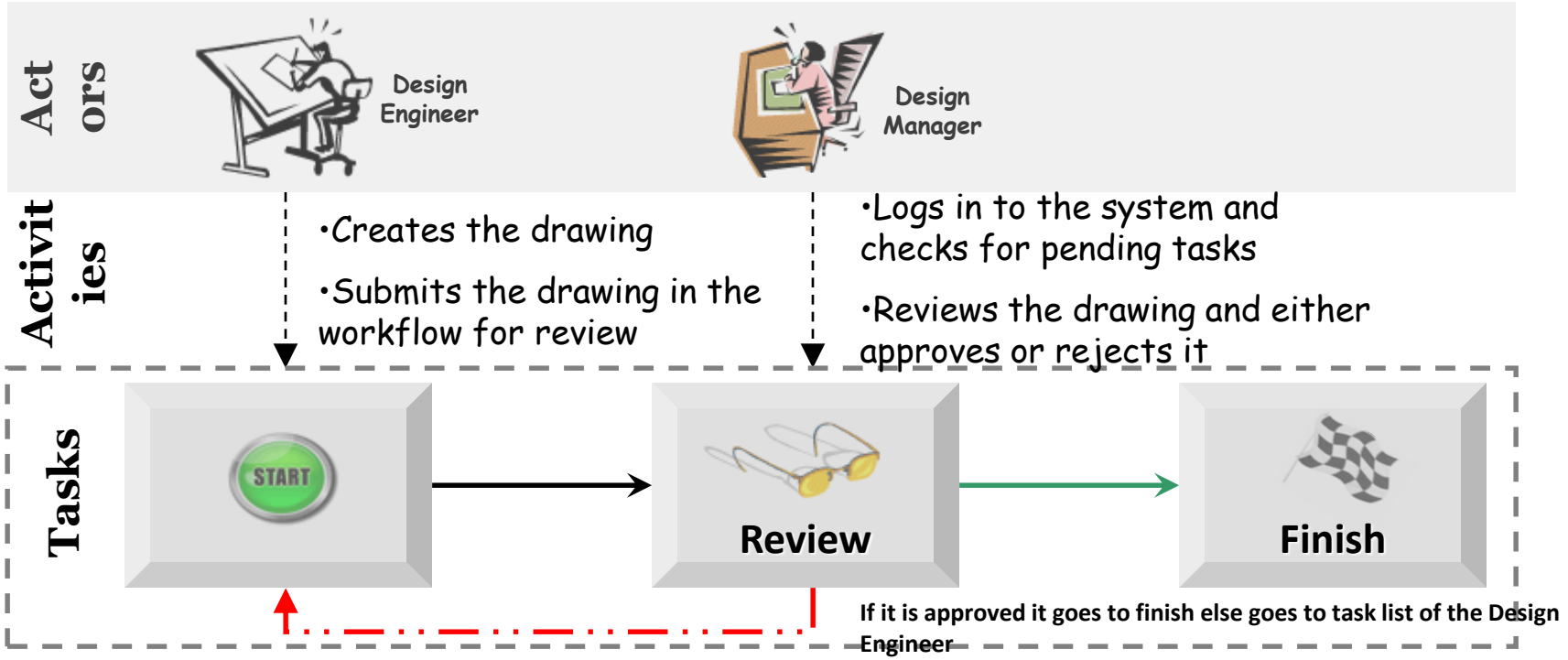


Workflow Management

Workflow –

A sequence of events defined to manage a set of tasks like review, notification, do, condition, etc.

Simple Drawing Review Workflow



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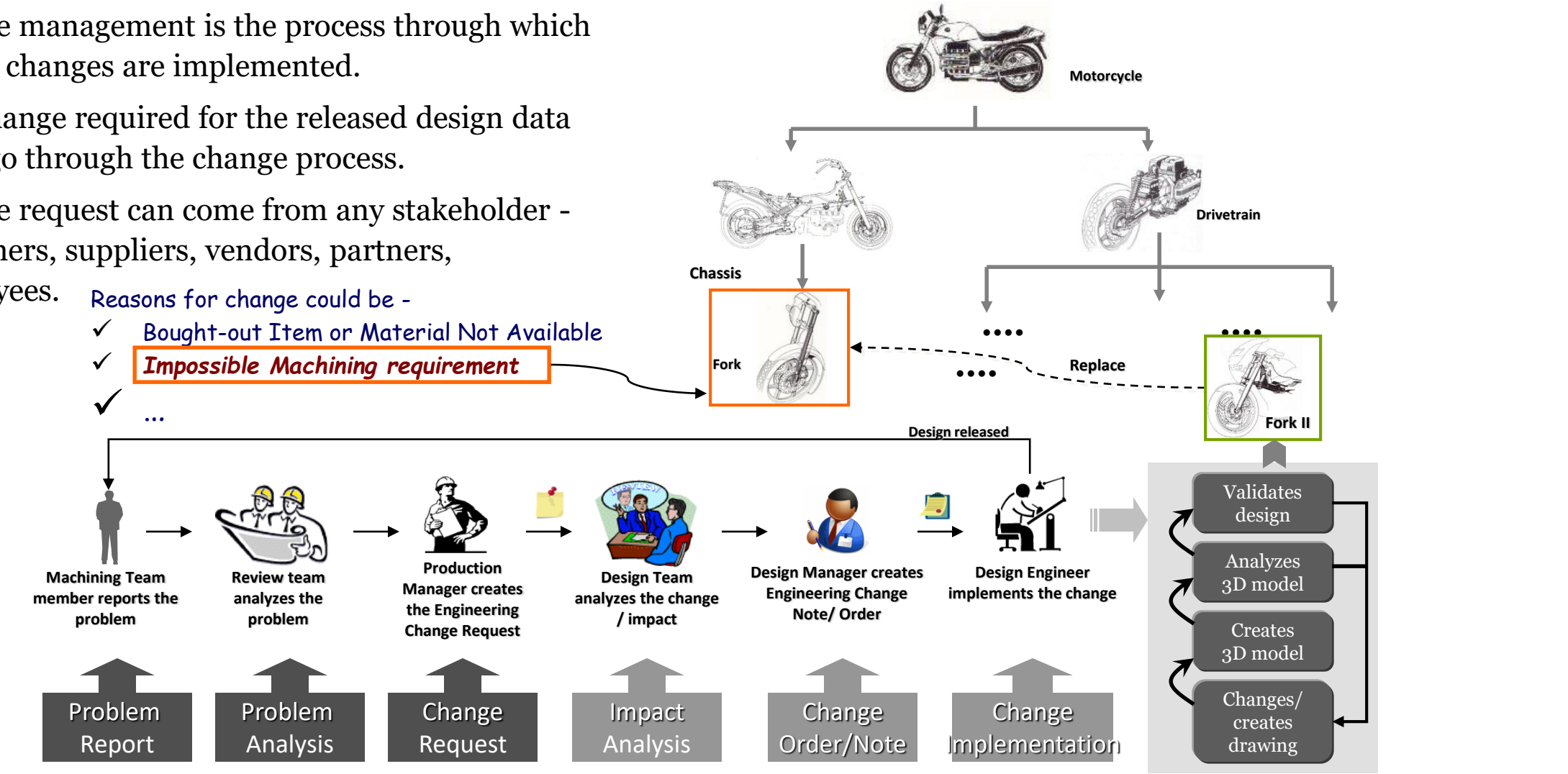
Change Management

- ✓ Change management is the process through which design changes are implemented.
- ✓ Any change required for the released design data must go through the change process.
- ✓ Change request can come from any stakeholder - customers, suppliers, vendors, partners, employees.



Dassault Systemes
ENOVIA 3DEXPERIENCE

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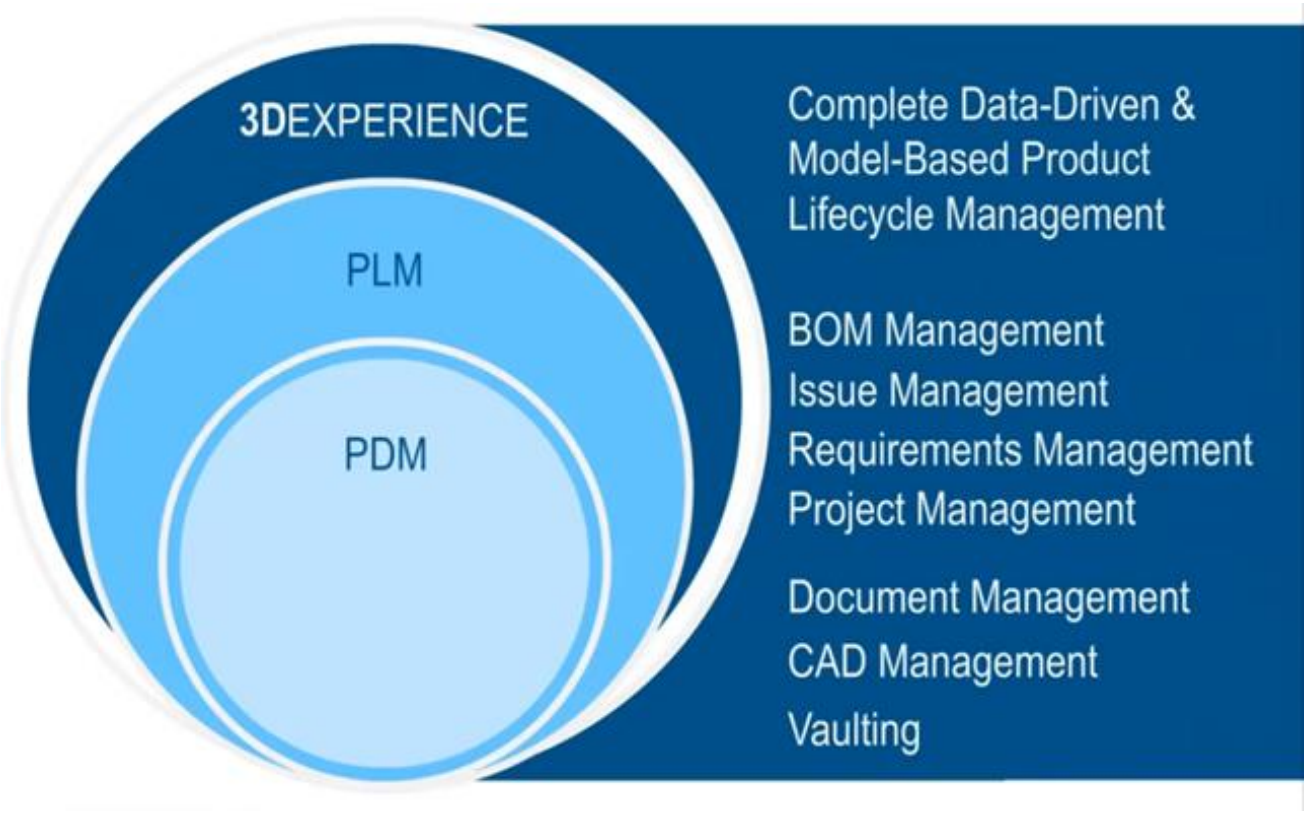
Dassault Systemes Journey

3DEXPERIENCE Platform



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What is Experience for Your Clients?

It is an **Holistic Economic Offer** taking into account the **consumer journey**:

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All Industries are in the Experience Economy!

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3DEXPERIENCE open innovation platform


Thank
you!!