Eduard Marfà, EMEA Marketing Director, Lifecycle Management

Teamcenter
Simplifying PLM
The Teamcenter Vision

Deliver world class applications

On the PLM platform of choice

For internal and external partners
Teamcenter is changing

A Simpler Approach to PLM

Teamcenter 8

- Mechatronics Datamodel
- Service Lifecycle Management ...

Teamcenter 9

- Systems Engineering
- Content Management ...

Platform and Apps Model

Teamcenter applications

Teamcenter 9 Platform

Teamcenter 10 Platform

Teamcenter .. Platform
Teamcenter
Simplifying PLM
Product Cost Management
Challenges

Understanding and Controlling

- Costing spreadsheets disconnected from up-to-date product information
- Costing with ERP after-the-fact (SOP) too late to enable design-to-cost
- Poor visibility and control of key product cost drivers and levers during development
- Inability to understand the impact of change on product cost
- No clear understanding on how product cost is trending to targets

Source: CFO.com

80% of the product cost is locked in the first 20% of the product's lifecycle

Life Cycle Cost Avoidance Determined

Cost Reduction Opportunities

<table>
<thead>
<tr>
<th>Conceptual Design (Creative, Early Phase)</th>
<th>Conceptual Design (Creative, Early Phase)</th>
<th>Production</th>
<th>Operations and Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>29%</td>
<td>75%</td>
<td>95%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: CFO.com
Product cost management
Solution vision

Provide more opportunities to drive costs down to maximize savings.

Prove Product Virtually
Prove Manufacturing Virtually
Prove Cost Virtually

Requirements Design Analysis Validation Change Manufacture

Cost Analysis and Visibility

Knowledge
Factors influencing Product Cost Estimation
Much of the data is already in PLM

- Materials DB
  - Machines & setup times
  - Standard mfg. processes
- Labor & Burden rates
  - Exchange rates
  - Global Overhead rates

- Target program metrics
- Target costs allocation
- Market volumes
- Lifetime profitability
- Capital requirements and timing

- Geometr/Volume
  - Materials
  - Tolerance/PMI
  - Bill of Materials (BOM)
  - Predictive VE
  - Should cost

- Program, Cost Engineering
- Design
- Manufacturing Planning
- Purchasing, Suppliers

- Scrap
- Location
- Machine selection
- Routings/Bill of Process
- Cycle times
- Cost center rates
- Stock size

- Capabilities
  - Locations, Labor
  - Tool cost
  - Cost breakdown
  - Material commodity

ERP
Actual costs for carryover
Historical costs
## Teamcenter Product Costing (Formerly Perfect ProCalc)

### Current Target Roles

<table>
<thead>
<tr>
<th>Program Mgmt./Sales</th>
<th>Product Development</th>
<th>Purchasing/Cost Engineering</th>
<th>Finance/Controlling</th>
<th>Finance Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Book negotiation</td>
<td>Design-to-Cost</td>
<td>Purchase Price Analysis</td>
<td>Product Costing</td>
<td>Profitability Calculation</td>
</tr>
</tbody>
</table>

### Enterprise-wide, cross-functional Costing Platform

- **Profitable Sales Prices**
  - Reliable quotation prices
  - Customer-specific cost breakdowns
  - Consistent cost repository
  - Detailed system-based cost discussions
  - Project history & change control

- **Cost Aware Product Designs**
  - Cost comparisons of alternative materials and designs
  - Cost comparisons of processes
  - Product Cost Benchmarking
  - Cost evaluation & validation of engineering changes

- **Best-Cost-based Purchase Prices**
  - Cost breakdowns of purchase prices
  - Bottom-up validation of purchase prices
  - Target pricing in advanced purchasing
  - "Should-Cost" analysis
  - Best-cost-country sourcing

- **Target Costs Analysis**
  - Pre and quotation costing
  - Cross-functional Target costing
  - Sensitivity analysis/cost simulations
  - Comparisons of variants and versions

- **Program ROI**
  - ROI analysis and capital budgeting
  - Lifecycle costing/NPI program P&L
  - Cash-flow calculations
  - Metrics: NPV, IRR, ROCE
  - Evaluate alternative "What-if" Scenarios

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Product Cost Management
Controlling part and product costs

Manage product costs in visible, consistent models

- Creating uniform costing standards (methods, data, workflows) to increase transparency, quality and efficiency of cross functional costing processes
- Sophisticated and easy to use cost models to increase accuracy and repeatability of cost estimates
- Bottom-up (detailed) and cost-rate based part cost modeling for flexible level of detail for the cost estimates and comparable results.
Calculation types

- Division calculation
- Equivalence coefficient costing
- Activity Based Costing
- Overhead calculation

*) ...of course there are a million different calculation methods, which in practice are of no particular interest in this case!
Overhead calculation

Area of use

“Multiple-product enterprises” whose products do not have a fixed cost relationship.

Direct costs are directly allocated to the product.

Indirect costs are allocated to the product by means of percentage overhead rates.

Advantages:
+ Universally applicable
+ Any number of different products can be calculated
+ Exact if used correctly

Disadvantage:
- Problems determining indirect cost overhead rates
- Changes in product structure lead to the necessity to calculate new overhead rates
- Requires sophisticated accounting infrastructure
General Structure of Overhead Calculation

Direct material costs
+ Material overhead costs (% on DMC)
+ Manufacturing costs *)
+ Manufacturing Overhead costs
+ Special Direct Costs of Manufacturing
+ General Administration overheads
+ Sales Overheads
+ Profit
+ Revenue Reductions

Material Costs = Production Costs
= Prime Costs
= Cash Sales Price
= Net Sales Price

*) costs for machine, laborer and tool  ATTENTION: Latent risk of „Double-Counting“
Product costing calculation sheets

- **Basic data**
  Part, Calculation Variant, Quantity, Views and File Attachments

- **Material**
  Direct Material Costs and Indirect Material Costs

- **Manufacturing**
  Overview of Manufacturing Steps and Manufacturing Costs

- **Manufacturing step**
  Organizational, Process, Working System, Set-up, Direct labor, Tools and devices (Details vary depending on the type of manufacturing step)

- **Overheads**
  Special individual costs, Overheads after production costs, Profit Terms of Payment, Incoterms.

- **Calculation**
  Display of the Net Sales Price with all cost types.

- **One-time payments**
  Overview of all costs for tools and devices that are not allocated to parts or to Special direct costs.
Basic Data Tab

1. Part
   Description of the part

2. Calculation Variant
   Description of the calculation variant. For each part any number of calculation variants is possible.

3. Quantity
   Quantities, lot sizes and life time of the calculated product, and it SOP (Start of Production)

   It is possible to store views of the part in the calculation and also to attach files, links to files and URLs
Material Tab

1. Materials
   Creation / selection of raw materials and parts
   Display of ext. manufacturing (calculation on the “Manufacturing” tab)

2. Direct material costs
   (without material provision)
   Summary of the material costs from the “Materials” section in the categories
   - Raw material
   - Purchased part
   - Consumable
   - ext. manufacturing step

3. Material costs
   Input / display of additional components of the material costs
   - Material scrap
   - Material overhead costs
   - Interest on material stock

Distinguishing between Substance and Raw Material in Perfect ProCalc®:
In Perfect ProCalc® a Substance (e.g. steel, non-ferrous metal, plastic) is unformed,
classified according to its material composition and describes the physical properties of a material.
A Raw material consists of a substance, a geometric property (e.g. chips, sheet metal, piping) and a price that depends on a price class (e.g. base price, scrap yield, AS = alloy surcharge.)
Manufacturing Tab

1. Manufacturing steps
Creation, display and management of the individual manufacturing steps

2. Manufacturing costs I and II
Display of cost types per manufacturing step

3. Manufacturing costs III
Display of manufacturing costs acc. to item 2 plus interest on work in progress

4. Manufacturing costs III plus directly paid tools
Display of manufacturing costs acc. to item 3 plus directly paid tools

Creation of a new manufacturing step, among others for
- Changing the production system, the tool or direct labor
- Introducing a new material to the manufacturing step (→ scrap calculation)
- Different cycle times for the manufacturing steps
- Changing from in-house manufacturing to external processing (or vice-versa)
Calculation Tab

- Direct Material Cost (DMC)
- Material Overhead Cost (MOC)
- Manufacturing Wages (MW)
- Manufacturing Overheads (MO)
- Special Direct Manufacturing Cost (SDMC)
- Production Cost
- Indirect Admin. Overheads
- Indirect Sales Overheads
- Special Direct Costs of Sales
- Prime Costs
- Profit
- Cash Sales Price

In the „Calculation“ tab all cost components of the part are represented.
The One-time costs tab shows all of the one-time payments (not or only partially allocated costs) for:

- Tool costs
- Part-specific development costs
- Part-specific start-up costs
- Packaging and carrier costs
- Direct input one-time costs.

The sum of the one-time payments is shown in the “One-time payments” field on the Basic data tab in the Calculation variant section.
Product Cost Management
Cost knowledge management

Standard and extendable cost knowledge for calculation

- Worldwide factor costs (labor, production area, energy, interest rates etc.)
- Complete reference processes for many manufacturing methods
- Physical material data of all prevalent materials
- Reference machines for all prevalent manufacturing technologies
- Option to incorporate custom costing knowledge
Product Cost Management
Supporting financial analysis

Profitability calculation

- Time dependent (annual) profitability calculation based on project specific information of invests, income and annual requirements
- Project / program margin calculation / profit and loss analysis
- Dynamic sampling of custom cost types
- Calculation of the (discounted) cash flow and cumulated cash flow
- Calculation and reporting of common or customer specific KPI’s such as net present value (NPV), internal rate of return (IRR), ROCE, ROS, amortization period (payback) etc.
- Sensitivity analyses for cost adjustments, lot size effects etc.
Product Cost Management
Supporting financial analysis

Profitability calculation
Product Cost Management

Benefits

Visibility in costs drivers and consistent models leads to control

**Improve margins** using sophisticated cost models that incorporate product change and provide visibility

**Anticipate global impact on cost** by understanding international cost drivers

**Improve comparisons and benchmarks** based on common cross-functional costing knowledge

**Have more effective negotiations** with the appropriate transparency into cost drivers
Intelligently Integrated information

Sustainability
Sustainability and Environmental Compliance

Challenges

Regulatory requirements keep increasing both in complexity and number

- OEMs and Suppliers must report on the materials and substances used in a product
- Liability issues for non-compliance with regulations
- Tracking substances of concern must be done earlier in the design phase
- Need for a sustainability framework to help companies develop compliant, environmentally friendly products
Sustainability and Environmental Compliance
Solution vision

Enable customers to establish a sustainability framework to support the development of compliant, environmentally friendly products.
Design for the Environment (DfE) ...one of the key domains of industrial sustainability

### CORPORATE SUSTAINABILITY

<table>
<thead>
<tr>
<th>Environmental Health &amp; Safety</th>
<th>Environmental management systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial / Legal risk management</td>
<td>Corporate carbon foot print (CDP, GRI, ISO, PAS, ...)</td>
</tr>
<tr>
<td>Audit management</td>
<td>Regulatory &amp; incentive management</td>
</tr>
<tr>
<td>Corporate social responsibility</td>
<td>Resource (Energy, Water, Material) optimization</td>
</tr>
</tbody>
</table>

### PLANTS & BUILDINGS

<table>
<thead>
<tr>
<th>Manage and monitor energy and emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon and energy foot print</td>
</tr>
<tr>
<td>Energy &amp; Incentive management</td>
</tr>
<tr>
<td>Resource optimization</td>
</tr>
<tr>
<td>Building and Plant design optimization</td>
</tr>
</tbody>
</table>

### PRODUCT SUSTAINABILITY (DfE)

<table>
<thead>
<tr>
<th>Multi-Function optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifecycle Scenarios</td>
</tr>
<tr>
<td>Material &amp; Process selection</td>
</tr>
<tr>
<td>Requirements &amp; Change</td>
</tr>
<tr>
<td>Substance Regulations</td>
</tr>
</tbody>
</table>

### SUPPLIERS

<table>
<thead>
<tr>
<th>Co-innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifecycle</td>
</tr>
<tr>
<td>Standards</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Declarations</td>
</tr>
</tbody>
</table>

Siemens PLM Solutions
Compliance Involves the Entire Supply Chain

Substances

Thresholds

Exemptions
Teamcenter Substance Compliance

Compliance Officer

Suppliers

Design

TEAMCENTER

Compliance Reports
- Industry standard reports
- Company standard reports

Materials & Substances

BOM

Sulfur | Nickel | Iron
---|---|---
2g | 3g | 2g
1g | 1g | 6g
4g | .04g | -
Total | 7g | 4.04g | 8g

CPM (PE International)

Checker Plugin Rule sets
- RoHS
- REACH
- Conflict Minerals
- Others TBD

Supplier Declarations
- IPC 1752 support
- Spreadsheets
- Etc.

Compliance Grading

email
Sustainability and Environmental Compliance
Material and Substance Management

Trace materials and substances across a product BOM

- Manage a BOM down to its constituent materials and substances
- Drill down to a constituent substance in a BOM tree and roll up material and substance amounts across a structure
- Provide a single source of material information uniting the applications across the SPLM portfolio
- Enable a sustainability framework to support DfE initiatives
<table>
<thead>
<tr>
<th>Materials</th>
<th>Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECU</td>
<td></td>
</tr>
<tr>
<td>tin gold and tungsten Material Conflict</td>
<td>300.0</td>
</tr>
<tr>
<td>PCB</td>
<td>1000.0</td>
</tr>
<tr>
<td>wire mesh</td>
<td>160.05</td>
</tr>
<tr>
<td>Iron 3-pentafluoropropane</td>
<td>0.02</td>
</tr>
<tr>
<td>Lead Material</td>
<td>10.0</td>
</tr>
<tr>
<td>pentafluoropropane Material REACH</td>
<td>260.0</td>
</tr>
<tr>
<td>Wire Harness</td>
<td>10.0</td>
</tr>
<tr>
<td>for Wire</td>
<td>30.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substances</th>
<th>CAS Number</th>
<th>Mass in Range (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>tungsten</td>
<td>7440-33-7</td>
<td>75.0</td>
</tr>
<tr>
<td>tin</td>
<td>7440-31-5</td>
<td>120.0</td>
</tr>
<tr>
<td>gold</td>
<td>7440-57-5</td>
<td>105.0</td>
</tr>
<tr>
<td>Synthane (plastic)</td>
<td>PCB</td>
<td>1000.0</td>
</tr>
<tr>
<td>STAINLESS STEEL</td>
<td>12597-68-1</td>
<td>160.05</td>
</tr>
<tr>
<td>1,1-Dichloro-1,2,3,3-pentafluoropropane(HCFC-225cc)</td>
<td>13474-88-9</td>
<td>5.0E-4</td>
</tr>
<tr>
<td>3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)</td>
<td>422-56-0</td>
<td>26.0005</td>
</tr>
<tr>
<td>2,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ba)</td>
<td>422-48-0</td>
<td>39.0005</td>
</tr>
<tr>
<td>1,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225bb)</td>
<td>422-44-6</td>
<td>65.0005</td>
</tr>
<tr>
<td>1,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ab)</td>
<td>136013-79-1</td>
<td>5.0E-4</td>
</tr>
<tr>
<td>Iron</td>
<td>7439-89-6</td>
<td>0.016</td>
</tr>
<tr>
<td>2,2-Dichloro-1,1,1,3,3-pentafluoropropane(HCFC-225sa)</td>
<td>128903-21-9</td>
<td>117.0005</td>
</tr>
<tr>
<td>1,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225cb)</td>
<td>507-55-1</td>
<td>13.0005</td>
</tr>
<tr>
<td>1,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225da)</td>
<td>431-86-7</td>
<td>5.0E-4</td>
</tr>
</tbody>
</table>
Sustainability and Environmental Compliance
Supplier Material and Substance Declarations

Automate the exchange of declaration forms with suppliers

- Route industry standard (IPC-1752) declaration forms to suppliers to request material and substance disclosure
- Email server polling for automatic processing of material substance declaration from suppliers
- Process templates to support supplier collaboration
Sustainability and Environmental Compliance
Standard and Configured Rules for Compliance Grading

Grading and reporting to demonstrate compliance or non-compliance

- Compliance grading with preconfigured rule sets address standard industry regulations such as REACH, RoHS and Conflict Minerals
- Configurable rules editor for customer specific regulations
- Compliance dashboards, dynamic queries and reporting for compliant and non-compliant parts
Sustainability and Environmental Compliance

Benefits

An overall compliance and sustainability framework

Support for Sustainability and Design for the Environment (DfE) initiatives

Intelligently integrated material and substance information for full traceability across the product BOM

Automation of supplier material and substance declaration request process to minimize rework and errors

Compliance grading and reporting to reduce risk of non-compliance
Active Workspace Vision, Overview & Roadmap
Why a new client and why now?

**Market Drivers**

A growing number of users are “trained” by popular websites, creating demand for a “web-intuitive” user experience.

User experience has become an irrefutable product differentiator across the tech market from search engines to devices to apps.

Device proliferation and usage patterns have shifted the focus of enterprise software from a computer-based usage pattern to a multi-device usage pattern.

The frontier of PLM has moved towards global integration requiring easier deployment to extend the reach of the enterprise to users companies cannot effectively train.
Active Workspace client vision

Active Workspace client key capabilities

**Improved user experience** lowers barriers to adoption and helps organizations to execute their PLM strategies more effectively.

**Mobile users require a Teamcenter client** they can work with on the move. Users increasingly switch between multiple devices throughout the work day.

Global users require a performant, **zero-install client architecture** to integrate the value chain and provide ubiquitous access from any device.

**Embedding the Active Workspace client** into NX, the Rich client, TcVis and MS Office provides a powerful, flexible & consistent user experience for all.

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Examples
Example 2: Document Change Request

Document CR-000001/D-Test Procedure Update

Change Properties
Owner: Scott Gerus (sgerus)
Synopsis: Test Procedure Update
Description: Test Procedure Update
Site: Dallas
Change Rule: OP.DFP05.001
Package Type: OP
Change Request Type: New

Change Status
Last Modified Date: 17-Jul-2013 13:04
Release Status:

New Display Name
Example 2: Document Change Request

Document Info = “Problem Items”
Example 2: Document Change Request

Document Info = “Problem Items”
Example 2: Document Change Request

Supporting Documents = “Reference Items”
Example 3: Surgeon Interface for Image to Implant

- Customized Gateway Tiles for quick access
Example 3: Surgeon Interface for Image to Implant
Example 3: Surgeon Interface for Image to Implant
Example 3: Surgeon Interface for Image to Implant
Example 3: Surgeon Interface for Image to Implant Case Management
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Thank you.