OPM Costing – 11i & R12: The Concepts and Set-ups for Standard Costs in Oracle Process Manufacturing

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Introduction – This presentation will cover the basic concepts, processes and functionality for OPM Costing. Standard cost setup and cost calculation processes will be explained. Formulas, including Products, CoProducts and ByProducts will be discussed. Resource, Operation and Routing setup will also be covered. Actual lot costing and the Sub Ledger Architecture (SLA), new to R12 OPM Costing, will also be covered. This presentation primarily covers the standard cost process. However, alternative costing methods, to include lot costing will also be addressed at a high level.

Company Background – Schreiber Foods, Inc, founded in 1945, is a $3+ billion global company. Schreiber is the world's largest Customer Brand Dairy Company and supplier of private label dairy products, including Natural and Process Cheese, Cream Cheese and Yogurt, with numerous production and distribution facilities throughout the United States and several production facilities throughout the world. Schreiber has been an OPM/GEMMS user since 1995, going from version 3.1 to our current version of 11.5.10. Since 2000 Schreiber has implemented most of the Oracle E-Business Suite products. Schreiber Foods uses OPM Standard Cost processes, updating raw materials on a period basis and conversion costs on an annual basis.

Presenter Background – I have been with Schreiber Foods for 17 years, working with OPM costing since implemented at Schreiber in 1995. I am currently the Manager of Cost and Systems Development. I have been involved in all of the OPM upgrades between v3 and 11.5.10 at Schreiber. I am the Process SIG Membership chairperson, the Enhancements chairperson and the Process SIG Costing Sub-Committee chairperson.

OPM Costing Overview – OPM Costing provides the capability to calculate costs for Process Manufacturing companies at an Item level. It allows you to develop and maintain different costs by warehouse. Costs are defined for each period in the Cost Calendar, which is setup by the user. There are three cost models: ▪ Standard, calculated based on formulas and routing cost rollups, ▪ Actual , calculated based on actual production data and allocations and ▪ Lot costing, calculated based on actual production data for a specific lot. Multiple cost methods can be maintained within each of these cost models simultaneously, giving you the ability to compare costs for an item between cost methods.

OPM costing supports all inputs to costing an item: material costs, acquisition costs, overhead costs, employee and plant resources and indirect fixed costs. Flexibility is provided in the setup process to allow for a very low level of detail within a cost record through the use of Cost Component Classes and Analysis Codes. This level of detail flows from the raw material costs through the finished product cost.

Common Costing Setups – Many of the setups needed for OPM Costing are common whether you plan to use Standard, Actual or Lot costing. These common setup steps are as follows: 1) establish a Cost Method, 2) establish a costing calendar for that Cost Method, 3) establish Cost Component Classes.   Cost Component Classes are buckets that you can use to define the elements of cost detail you want to view. Different kinds of costs, e.g. ingredients, routings or burdens can be summarized or grouped within a cost detail into a Cost Component Class. Users can define an unlimited number of Cost Component Classes, giving you the granularity that you require for costing. Analysis Codes are established to allow you to break down further the information within a Cost Component Class.

Cost Warehouse Associations need to be established which allows you to associate several inventory warehouses to a single Cost Warehouse. Each Cost Warehouse Association is assigned an effective date
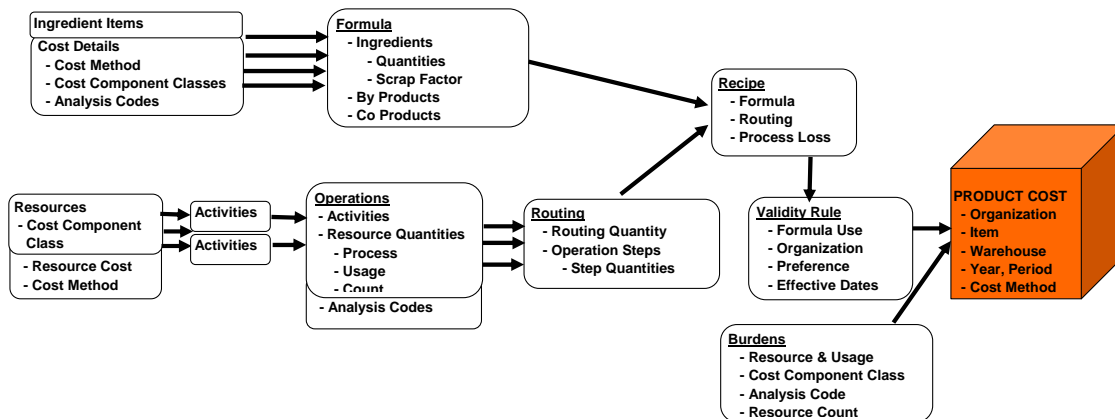
range, defining when the association is valid. Costs will need to be established for the Cost Warehouse only.

Additional burden costs can be established using two methods: Cost Burdens and Percentage Burdens. Cost Burdens allow you to assign additional resource burden costs at an item level. Percentage Burdens allow you to assign additional costs based on a percentage of other costs, which are defined by the user. Unlimited burdens can be setup.
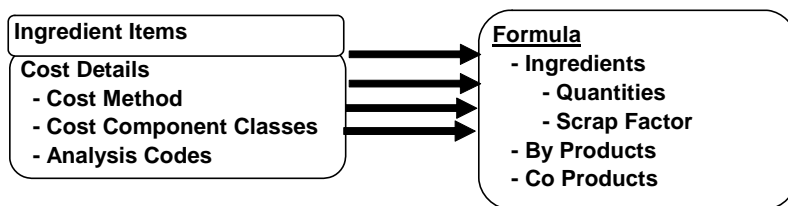
Establishing Standard Costs – OPM calculates the standard cost of items based on formula cost rollups. Costs are assigned to individual raw material items, resources and burdens. These raw material items and resources are then used in formulas, operations and routings. Through the cost rollup process the standard production cost is calculated for a specific item, warehouse, costing period and cost method. As mentioned earlier, the rolled up cost for the item is broken out by cost component class and analysis code.

The cost rollup process looks at Formulas, Resources, Operations, Routings, Recipes, Validity Rules and Burden Details. Exhibit 1 shows the basic flow of these various steps in the rollup process.

Exhibit 1

Ingredient Items

Cost Details
- Cost Method
- Cost Component Classes
- Analysis Codes

Formula
- Ingredients
  - Quantities
  - Scrap Factor
- By Products
- Co Products

Recipe
- Formula
- Routing
- Process Loss

Resources
- Cost Component Class
- Resource Cost
- Cost Method

Activities

Operations
- Activities
- Resource Quantities
  - Process
  - Usage
  - Count
- Analysis Codes

Routing
- Routing Quantity
- Operation Steps
  - Step Quantities

Validity Rule
- Formula Use
- Organization
- Preference
- Effective Dates

Burdens
- Resource & Usage
- Cost Component Class
- Analysis Code
- Resource Count

PRODUCT COST
- Organization
- Item
- Warehouse
- Year, Period
- Cost Method

Product Material Costs through Ingredients and Formulas

Ingredient Items

Cost Details
- Cost Method
- Cost Component Classes
- Analysis Codes

Formula
- Ingredients
  - Quantities
  - Scrap Factor
- By Products
- Co Products

The materials portion of the cost for a Product is derived from the raw materials and corresponding costs. The raw material cost for an item can have one or more cost component classes and analysis codes. Costs are defined for a given item, warehouse, cost period, and cost method. Oracle provides a mass copy process so that you can copy the costs from one period to one or more periods or from one warehouse to one or more warehouses. There is also capability to increase those costs by a fixed amount or a percentage.

The raw material items are used as Ingredients, or inputs into the Formula. Quantities are assigned for each Ingredient in the Formula. Scrap factors can be assigned to each individual item as well, if applicable. Formulas are version controlled, so multiple Formula versions can be setup allowing for flexibility when building the Product cost, i.e. the Product cost will vary depending on the Formula version used in the cost rollup process for a given cost period.

The outputs to a Formula are the ByProducts and the Product or CoProducts, when multiple products result from this formula. If the value of a ByProduct is setup with a positive cost then the product cost is reduced appropriately. If the value of a ByProduct is setup with a negative cost then the product cost is increased appropriately.

Product Conversion Costs through Resources, Operations and Routings
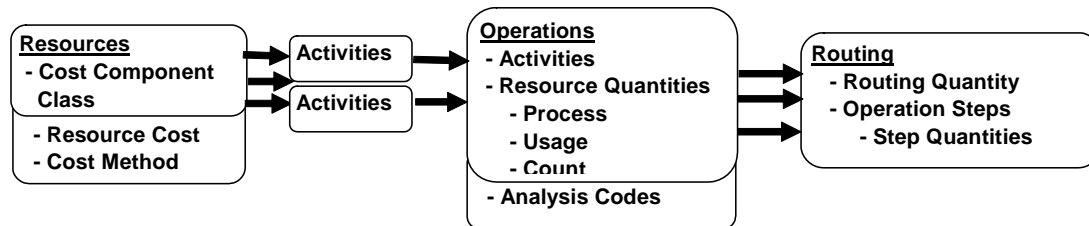
The cost of conversion (people, plant equipment and overheads) for a Product is derived from the Resources and corresponding Resource Costs. Individual resources are setup defining the various people, equipment or overhead costs you want to capture. An unlimited number of Resources may be setup for use in the conversion cost process. Each Resource is assigned usage unit of measure and also a Cost Component Class so that you can group like costs together in the final Product cost calculation, e.g. direct labor, indirect labor, etc.

Each Resource is assigned a corresponding Resource cost for each of the Cost Methods you are using. The costs are assigned to each warehouse and Costing period within each Cost Method.
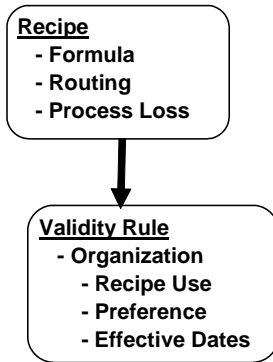
Activities are the next step in the process for setting up the information for calculating conversion costs. Activities are basic tasks performed at a plant. Multiple Activities can be setup and are used to group Resources together that are used in a particular Activity. Activities are then combined to make up the Operation.

An Operation is a set of Activities that have to be completed for a specific step in the production process. Operations list the various Activities within that production process. Resource usage, process quantities and counts are assigned to each Activity within the Operation. Operations have effective dates, i.e. start and end dates that are used during the cost rollup process. Operations are version controlled.

Routings are the next step to assigning costs for conversion processes and overheads to a Product. A Routing combines all of the Operations that need to be performed in a production batch. Operations are organized within the Routing in a sequenced set of steps and corresponding step quantities.

The Routing includes the total Routing quantity and the Routing unit of measure. Routings also have effective dates, i.e. start and end dates which are used during the cost rollup process. Similar to Operations, Routings are also version controlled. Multiple Routing versions can be setup allowing for flexibility when building the Product cost, i.e. the Product cost will vary depending on the Routing version used in the cost rollup process for a given cost period
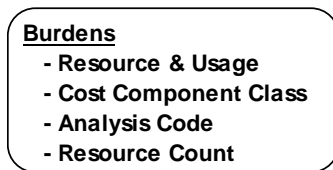
Recipes and Validity Rules

```
┌─────────────────────┐
│ Recipe              │
│   - Formula         │
│   - Routing         │
│   - Process Loss    │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│ Validity Rule       │
│    - Organization   │
│       - Recipe Use  │
│       - Preference  │
│       - Effective Dates │
└─────────────────────┘
```

Recipes are used to tie the Formula/version and Routing/version, bringing the material costs and the conversion costs together. Formulas and Routing are built independently and both are version controlled to allow the greatest flexibility when calculating the costs for a given period.

A Recipe also has Validity Rules. The Validity Rule defines the Organization or Organizations that will use the Recipe, i.e. the specific Formula/version and Routing/version defined in the Recipe for the cost rollup. Each Organization that is setup with a Validity Rule is setup independently for the effective dates (start and end dates), the Recipe Use (whether it should be used for costing, production or other process), and preference. When more than one formula can be used to produce a product the preference determines which one must be used first. Lower numbers indicate a higher preference, so the cost rollup process looks for the lowest number preference that is effective and uses that Recipe when calculating the cost. One thing to note is that for a Product to get a cost through the cost rollup process the Recipe/Validity Rule must be effective for the whole costing period.

Burdens

```
┌─────────────────────────┐
│ Burdens                 │
│    - Resource & Usage   │
│    - Cost Component Class│
│    - Analysis Code      │
│    - Resource Count     │
└─────────────────────────┘
```

Burdens are additional costs that can be assigned via a resource that is not part of the Routing. They are additional costs you want to apply to a particular Product cost. The resource and corresponding costs are assigned through the Burdens and are added directly to the warehouse, costing period and cost method for the Product through the cost rollup process.

Product Cost – Cost Rollup Process

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PRODUCT COST
 - Organization
 - Item
 - Warehouse
 - Year, Period
 - Cost Method
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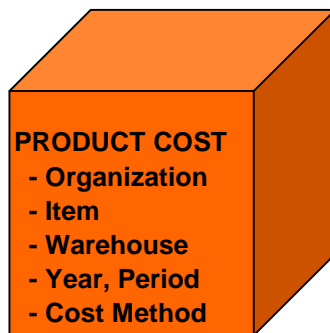
Product costs are calculated through the cost rollup process. The cost rollup process uses the cost component class values that you setup for each item and resource.

Cost Rollups are submitted using the following selection criteria: Costing Calendar, Cost Method, Period and whether or not the cost rollup should be done using just a single level. Additional criteria allow you to select the Organization - or a range of Organizations, the Item Cost Class - or a range of Item Cost Classes, the Item, a list of Items or a range of Items. You also have the ability to select when you want the cost rollup to run.

The Validity Rules are what drives whether or not a Product will get a cost during a cost rollup.

There is a profile option called: GMF: Use Only Costing Validity Rules for Cost Rollup that determines if only costing Validity Rules will be considered or if Production Validity Rules will also be considered. If Yes, only costing Validity Rules will be used. If No, the process will look first for a costing Validity Rule and if there is none it will look for a Production Validity Rule.

Validity Rules must be effect for the entire costing period for which the rollup is run. If multiple Validity Rules exist for the same item the following factors will be considered (in the same order that they are listed): Formula Use, Generic or Organization Specific, Preference, with the lowest number being the one selected, and the Creation Date, using the Validity Rule with the latest creation date.

Calculating the Material (Formula) Costs – The cost rollup process will scale the materials in the formula to the Quantity on the Validity Rule. The scaling for each ingredient within the formula determines how that ingredient quantity will be scaled. There are three types of scaling: Proportional (linear), Fixed (the quantity will not change during the scaling) and Integer (the ingredient quantity will be scaled to the nearest whole number). Scrap factors for each individual ingredient and Process Loss on the formula are also used in the material cost calculation.
The scrap and loss factor calculations are as follows:
Scrap Factor: Required Quantity = Scaled Quantity * (1 + Scrap Factor)
Process Loss: Required Quantity = Scaled Ingredient Quantity * (100 / (100- Process Loss))

The calculated required quantity and the appropriate ingredient cost are used in the cost material cost calculation.

Calculating the Conversion (Routing) Costs – The cost rollup process also scales each individual resource, based on the Routing quantity and the Validity Rule quantity. There are three scale types for Resources as well. They are setup on the Operation: Proportional, Fixed and Fixed by Charge (based on the capacity of a resource, the number of times the resource must be used to create the desired batch quantity).

Resource Cost calculations are as follows:
Resource cost = (1 / Product Yield Qty) * [(Standard Qty / Routing Qty) * (Step Quantity / Process Quantity)] x Resource Count x Resource Usage x Nominal Cost x Activity Factor
- UOM used is the Routing quantity UOM. All other UOMs are converted to this Routing UOM
- Product Yield Quantity is the scaled Product quantity
- Standard Quantity picked from Recipe Validity rule
- Routing quantity picked from Routing
- Step quantity = Recipe Step Quantity * (Total output after scaling / Total output before scaling)
- Process quantity is picked from Operations linked to the Routing
- Resource Count is picked from the Scheduling information of Operation
- Resource Usage = Count * Usage * Charges
- Nominal Cost is picked from Resource Cost
- Activity Factor picked up from Operation Details

Calculating Burden Costs – The cost rollup process also considers any Burdens or Percentage Burdens that have been setup when calculating the Product cost.

For Burden Details the calculation is: (nominal cost * usage * count) / Item Quantity.

For Percentage Burdens the calculation is: sum of Source Component Class costs * Percentage

Calculating CoProduct Costs – If there are multiple Products in the Formula, the cost for each Product is calculated provided separate Validity Rules are setup for each CoProduct. The Cost Allocation factor on the Formula Product line determines the allocation of the material and resource cost for each CoProduct.

Once the cost rollup process is complete the Product cost can be viewed, at the Cost Component Class/Analysis Code level. In addition, the cost detail information for each type of process can viewed as well. You can view the Formula and Recipe details, which will show the cost for each ingredient that is in the Product cost. You can view the Routing and Resource details, which will show the cost for each resource within the Product cost. You can view the Burden details.

Establishing Actual Costs – OPM calculates the Actual cost of a Product by using all of the actual costs from business transactions throughout OPM. The actual cost process considers: Purchasing receipts, Price changes on receipts, invoices paid, batch ingredient consumption, resource usage, direct and indirect expense allocations, prior inventory balances, cost burdens, cost adjustments and general ledger expense allocations. Actual costs are averaged to determine the product cost in three different ways. See Exhibit 2.

Exhibit 2
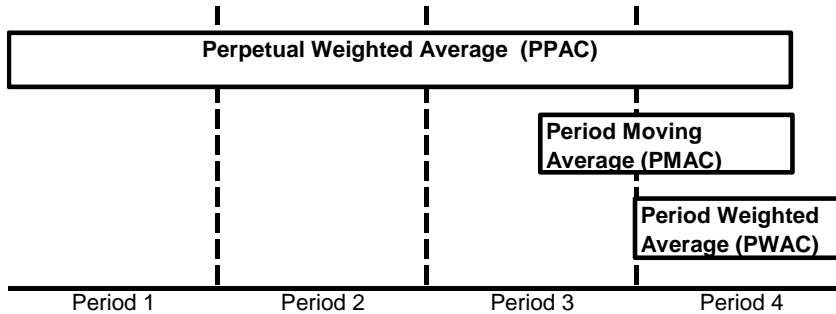
Perpetual Weighted Average (PPAC) is calculated as follows, using all of the transactions within all periods in the Costing Calendar:

$$\frac{\sum \textbf{(Transaction Quantity * Price)}}{\sum \textbf{Transaction Quantity}}$$

Period Moving Average (PMAC) is calculated as follows:

$$\frac{\sum \textbf{(Transaction Quantity * Price + Prior Ending Balance * Prior Period Cost)}}{\sum \textbf{Transaction Quantity + Prior Ending Balance}}$$

Period Weighted Average (PWAC) is calculated as follows, using only the transactions within the current period of the Costing Calendar:

$$\frac{\sum \textbf{(Transaction Quantity * Price)}}{\sum \textbf{Transaction Quantity}}$$

Establishing Lot Costs – OPM Lot Costing allows you to calculate and store actual costs at the lot level. Every lot will have a unique cost associated with it and the lot will retain that cost until the entire lot has no inventory balance. Each lot is calculated on a perpetual basis.

Lot Cost Details can be viewed using the Lot Cost Details form. This form is similar to the Cost Details form but it includes the lot and sublot rather than the calendar year and period. In addition there is an Item Cost Detail report that prints detailed component level cost information.

Lot costing functionality is available in OPM Family Pak L (11.5.10).

Release 12 Changes to OPM Costing – In the converged inventory model, Process and Discrete Inventory Organizations can potentially co-exist within the same Operating Unit. However, Discrete Costing and Process Costing will remain distinct applications. Inventory Organizations that are Process Enabled will use Process Costing, while Discrete Inventory Organizations will use Discrete Costing. To prevent both systems from costing the same transactions, Process users are denied access to Discrete Costing forms. Therefore, a Process-Enabled organization can not set up costs or costing information in the Discrete Costing application.

Additionally, in a converged environment, it is possible for inventory transfers to occur between Process Organizations and Discrete Organizations. When such transfers occur, both costing applications will properly account for their respective side of the transaction.

One of the major changes to the OPM Costing Process is the replacement of the Manufacturing Accounting Controller (MAC) by the Oracle Sub Ledger Accounting (SLA). OPM transactions flow into the OPM Costing engine which generates costs for each transaction. The Cost Preprocessor then creates accounting events, which the SLA uses to create the journal entries. Exhibit 3 illustrates the major steps below.

Exhibit 3
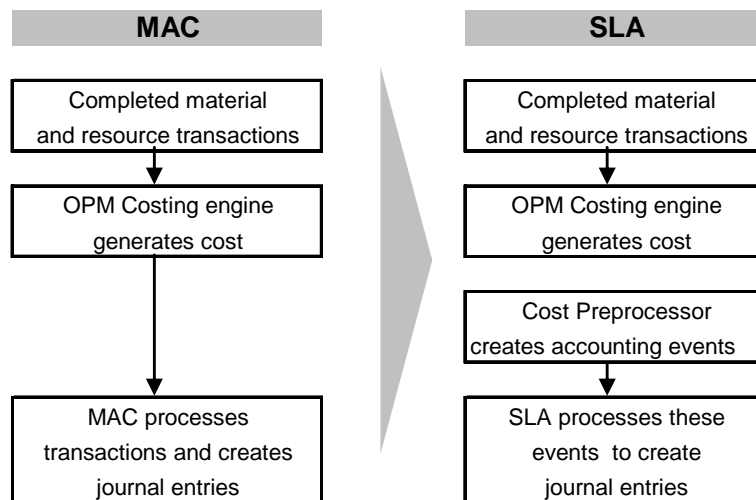
There are numerous terminology/process changes between the SLA and the MAC, however the Sub Ledger Accounting has equivalent functionality to the Manufacturing Accounting Controller, with additional flexibility.   See Exhibit 4 below.

Exhibit 4

MAC	SLA	Comments
Source	Process Category	
Event	Event Entity	
Sub-event	Event Class	
Account Titles	Journal Line Types (JLT)	
Account Template	Application Accounting Definitions (ADD)	
Account Mapping Attributes	(SLA) Sources	
Priorities and Account Mapping	Account Derivations Rules (ADR)	
Test Mapping		
OPM Currency, OPM Ledger, OPM Exchange Rates		Use GL setups
Test and Actual Subledger	Draft and Final Accounting	
Subledger Program	Accounting Pre-Processor	
Run Subledger for multiple valuations/cost methods for a ledger	Supports multiple valuation methods	SLA supports mutiple representations at the same time
Detailed Subledger Report		SLA offers comparable reports/inquiries

When upgrading from 11i to release 12 Oracle offers automated migration scripts for most of the steps. All of the Account definitions will be migrated as Account Derivation Rules. Some manual steps will need to be completed: ▪ assigning the Account Derivation rules to Journal Line Definitions ▪ Validated Application Accounting Definition ▪ assigning the User Sub Ledger Accounting Method to the Ledger.

Additional information on the SLA can be found on the Process SIG website: http://procsig.oaug.org under the Costing Sub-Committee section. There is an Introduction to SLA power point and an SLA Account Derivation Rules Setup Viewlet. Both of these documents were supplied by Oracle. More information about Release 12 OPM Costing can be found on MetaLink.

Conclusion – OPM costing provides companies the capability to calculate costs numerous ways. Costs are calculated at the Item level by costing period. OPM Costing allows you to develop and maintain different costs by warehouse. You can use Standard Cost, Actual Cost and/or Lot Costing.   Flexibility is provided in the setup to allow you to track the costs within a cost detail at a very low level. Using multiple cost methods simultaneously allows you to effectively compare costs between the various methods. This can help your company to make better business decisions when considering product costs.