

Approvals Management Engine R12 (AME) Demystified

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Introduction

In today's world, many organizations are in need of implementing proper controls in place for faster transaction processing. The most important aspect to have proper controls in place is to have an automated approval process. Oracle E-Business Suite provides an application within its suite that will enable organization to implement automated approval process. This application is called Oracle Approvals Management. It is also referred by the name Approvals Management Engine (AME).

In simple terms, Oracle AME can be defined as a Self-Service Oracle Web Application that enables organizations to define business rules for approving transactions processed in E-Business Suite. AME provides a framework to define approval rules that determine the approval processes for Oracle Applications. The transactions that use AME are the transactions that are created in the source application such as Expense Report in iExpenses, Purchase Requisitions in iProcurement, etc...

This whitepaper demystifies Approvals Management Engine (AME) and explains the features through the 12.1.3 release in simple non-technical language tailored for business analysts and application manager. This document also presents real life examples coupled with tips and techniques that improve maintainability of AME rules and improved performance of the engine. This document uses Purchase Requisition as an example transaction type to demonstrate the features and usage of AME.

Advantages of using AME

- Enables business analysts to specify the business rules in the form of "Approval Rules" for an application without having to write code or customize the application.
- Provides a framework to define business rules for an application so that the application can communicate directly with AME to manage the approvals of a transaction.
- Rules can be defined either specific to one application or shared between different applications.
- Provides parallel approval process, thus shortening transaction processing time.
- Supports the approval hierarchies such as:
 - Job
 - Supervisor Hierarchy
 - Position
 - By list of individuals created during approval rule setup or generated dynamically when the rule is invoked

Integrating Application

Before understanding what AME is made up of, it is important to understand how the E-Business Suite applications communicate with AME. Any application within Oracle E-Business Suite that uses AME to generate an approver list for its approval process is called an "Integrating Application".

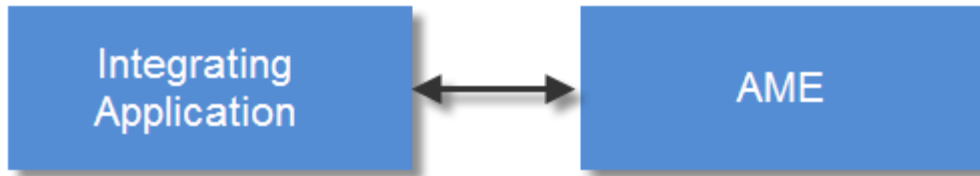


Figure 1: Integration of AME with Oracle E-Business Suite Application

Following is the list integrating applications within Oracle E-Business Suite that are enabled to integrate with AME:

#	Integrating Application	#	Integrating Application
1	Advanced Benefits	21	Oracle Deal Management
2	Bills of Material	22	Oracle Price Protection
3	Cash Management	23	Partner Management
4	Contracts Core	24	Payables
5	Engineering	25	Payroll
6	Enterprise Asset Management	26	Process Manufacturing Logistics
7	Enterprise Performance Foundation	27	Process Manufacturing Process Execution
8	E-Records	28	Process Manufacturing Product Development
9	Field Service	29	Process Manufacturing Regulatory Management
10	Financial Consolidation Hub	30	Public Sector HR
11	Financials Common Modules	31	Purchasing
12	Human Resources	32	Quality
13	iAssets	33	Quoting
14	Internal Controls Manager	34	Receivables
15	Inventory	35	Service
16	iSupplier Portal	36	Service Contracts
17	Labor Distribution	37	Sourcing
18	Learning Management	38	Student System
19	Lease and Finance Management	39	Work in Process
20	Manufacturing Execution System for Process Manufacturing		

Structure of AME

AME is a framework of well-defined approval rules constructed using the following 5 components for a given transaction type:

1. Transaction Type
2. Attributes
3. Conditions
4. Actions
5. Approver Groups
6. Rules

Each component of AME plays an important role in generating an approver list for a given transaction's approval process.

Transaction Type

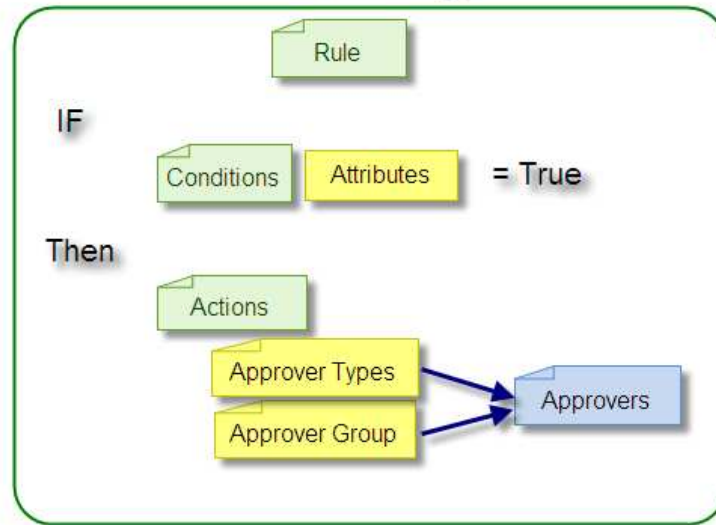


Figure 2: Structure of a Rule in AME

A “Transaction Type is a distinct set of approval rules used by certain category of transactions in an integrating application. Examples of transaction types are:

- Purchase Requisition Approval (Purchasing)
- Requester Change Order Approval (Purchasing)
- OIE Expense Reports (Payables)
- Payables Holds Resolution (Payables)
- Payables Invoice Approval (Payables)

A “Rule” is defined using “Conditions” and “Actions”. The structure of an AME Rule is exactly similar to the IF function in Microsoft Excel office application. The syntax of IF function in excel is as follows:

IF(logical_test, [value_if_true], [value_if_false])

The “logical_test” section represents the “Condition” component. The “[value_if_true]” section represents the “Action” component. Below diagram depicts an AME rule compared to an Excel IF function.

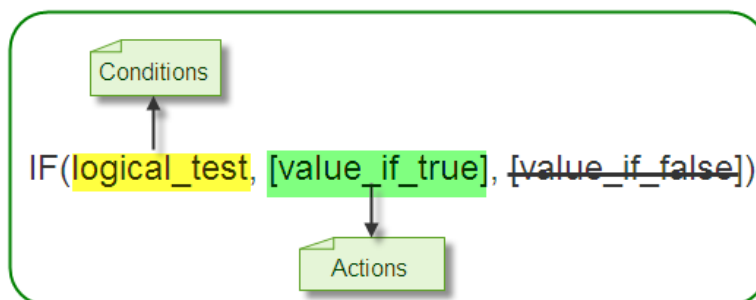


Figure 3: Microsoft Excel IF condition mapped to AME Rule

The “Condition” component consists of a business variable (known as “Attribute”) and a set of attribute values. For the rule to apply to a transaction, all the conditions must be true so the “Action” component can be invoked.

The “Action” component tells AME to modify a transaction's approval process in some fashion. This results in the “Action Type” and “Approver Group” generating the Approver List

“Action Type” component is a collection of actions having similar functionality. Every action belongs to an action type.

“Approver Group” component is a collection of approvers (or subject-matter-experts)

Setup and Usage of AME for a Transaction Type

The setup and use of AME is best explained when it is configured for a specific transaction type. In this whitepaper, the transaction type used is “Purchase Requisition Approval” from Oracle Purchasing application. The first and foremost step in setting up AME for Purchase Requisition Approval transaction type or any transaction type is to access the AME setup pages. Until 11i.AME.A patchset version, users can be directly assigned with AME responsibilities listed in the table below. However, with the introduction of 11.AME.B version, AME uses the Role Based Access Model (RBAC) to provide users access to AME functions.

AME uses roles and responsibilities to define access levels and security at 2 levels:

- Data Security:
- Function Security

While the “Data Security” enables to define access to Transaction Types for a limited role, the “Function Security” enables to define access to AME functions (modules) for a business analyst and administrator

Users accessing AME dashboard must have access to one of AME responsibilities:

#	User Type	Responsibility	Usage
a	Business User (Non-technical)	Approvals Management Business Analyst	Enables access to areas of the user interface that do not require expertise in SQL or PL/SQL programming, or technical knowledge of Oracle Applications
b	Administrative User (Technical)	Approvals Management Administrator	Full access to AME's user interface Must grant at least one user administrative privileges in AME, to perform technical tasks such as setting AME's configuration variables

In R12 / 11.AME.B onwards, getting access to AME setup and starting the configuration is a 2 step process:

1. Assign pre-defined roles to user
 2. Grant data access to user
-
1. Assign pre-defined roles to the user

Using System Administrator login (User ID = SYSADMIN) and then using User Management dashboard page, assign the following 5 roles to the application user responsible for setting up AME:

#	Role	Usage
a	Approvals Management Process Owner	View-only access to Business Dashboard, Attributes, Conditions, Action Types, Approver Groups, Test Workbench, Rules. Access to the Setup Report page
b	Approvals Management System Viewer	View-only access to the Admin dashboard and Setup Report
c	Approvals Management Business Analyst	Business dashboard View access, attributes, conditions, groups, test, rules access with create, update, delete permissions. Access to Setup Report page and Configuration Variables page with

#	Role	Usage
		permission to change transaction specific configuration values. Can create, update, delete Actions; create, update, delete Action Type Configuration Values but cannot create, update, delete Action Types
d	Approvals Management System Administrator	Admin dashboard access, Setup Report, Exceptions Log access, Configuration Variables access with permission to define transaction type specific values
e	Approvals Management Administrator	Access rights of Business Analyst and System administrator. Create, update, delete Action Types. Modify default Configuration Values

The screenshot shows the Oracle User Management interface for user 'skamath'. The user's details are as follows:

- Prefix: (empty)
- First Name: **Sujay**
- Middle Name: (empty)
- Last Name: **Kamath**
- Suffix: (empty)
- User Name: SKAMATH
- Email: (empty)
- Status: **Active**
- Active From: 30-Nov-2011
- Active To: (empty)

Below the user details is a table of assigned roles:

Role	Description	Assigned
Approvals Management Administrator	Role inherits Process Owner role and System Administrator role. Can also create action type and can modify default config variables.	Assigned
Approvals Management Business Analyst	Role which gives full access to business dashboard pages. Does not have Default config variable access and Action Type Create Access.	Assigned
Approvals Management Process Owner	Role can view all business dashboard view pages.	Assigned
Approvals Management System Administrator	Role can create, update or delete transaction types. Also inherits System Viewer. Can access Exceptions log and config variables.	Assigned
Approvals Management System Viewer	Role has access to admin dashboard with view only access.	Assigned

Figure 4: Assign pre-defined AME roles to the user

2. Grant Transaction Type access to the user using Functional Administrator responsibility.

The screenshot shows the Oracle Applications Administration interface for a grant configuration. The grant is named 'XX All Transaction Type Grant' and is effective from 11-Nov-2011. The configuration details are as follows:

- Security Context:**
 - Grantee Type: **All Users**
 - Grantee: **Everyone**
 - Operating Unit: (empty)
 - Responsibility: (empty)
- Data Security:**
 - Object: **AME Transaction Types**
 - Data Context:
 - Type: **All Rows**
 - Name: (empty)
 - Description: (empty)
- Set:**
 - Name: **AME Calling Applications**
 - Code: AME_TRANS_TYPE_DATA_PERM_SET
 - Description: AME Calling Applications

Figure 5: Grant data access to all Transaction Types

Configure AME for a given Transaction Type

Once the Roles and Grants setup is completed, the AME Dashboard can be accessed. This whitepaper uses Business Analyst Dashboard page (using Approvals Management Business Analyst responsibility) to configure approval rules for Purchase Requisition approval process in iProcurement.

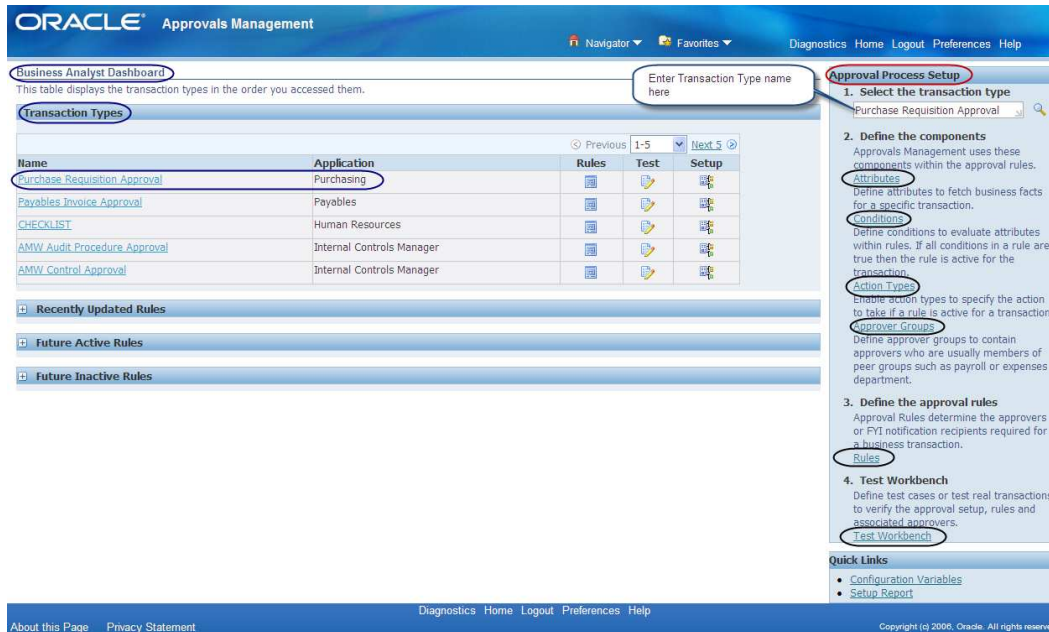


Figure 6: AME Dashboard Home

To define business rules (approval rules) in the system for generating list of approvers for a Purchase Requisition created in iProcurement, the AME business analyst needs to complete certain configuration steps needed for Purchase Requisition Approval” transaction type. The configuration steps involve setting up the components of AME listed under “Approval Process Setup” section located on the right-side of the AME Dashboard Page. The components are: Attributes, Conditions, Action Types, Approver Groups and Rules.

Attribute

Attributes in AME are placeholders for transaction data elements. They are basic elements of an AME rule. Attributes can be static (fixed value) or dynamic (SQL Query based). AME comes with several seeded attributes for each of the transaction types in the system. If the seeded attributes cannot be used for approval rules, then organizations can define their own attributes. Attributes can be shared across various transaction types. Attributes can be defined at 3 different levels – Header, Line Item and Cost Center level.

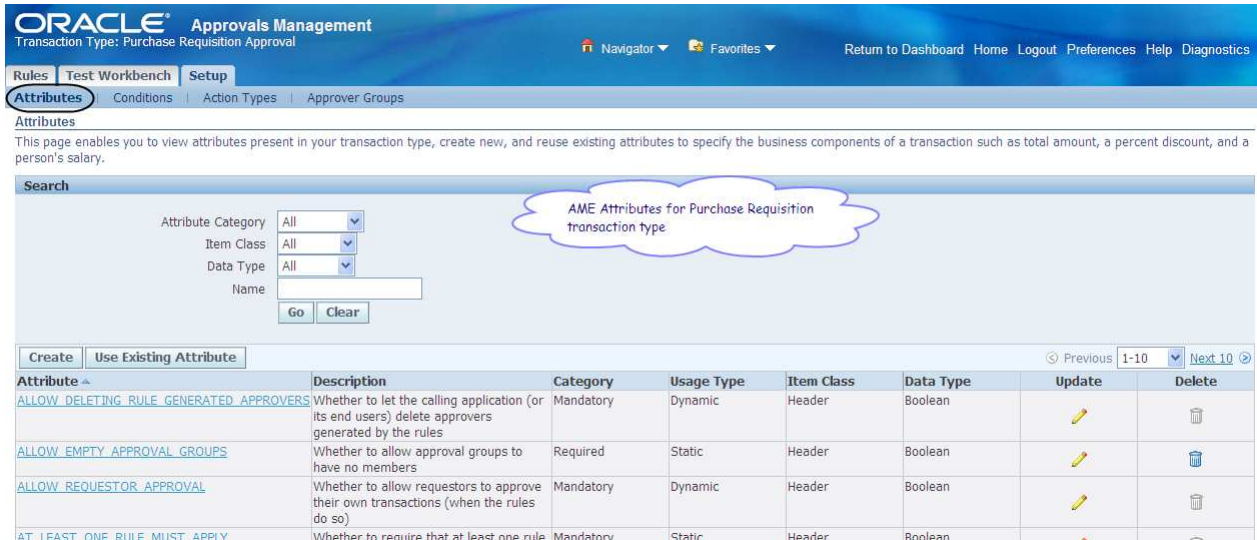


Figure 7: List of seeded AME Attributes for Purchase Requisition Approval

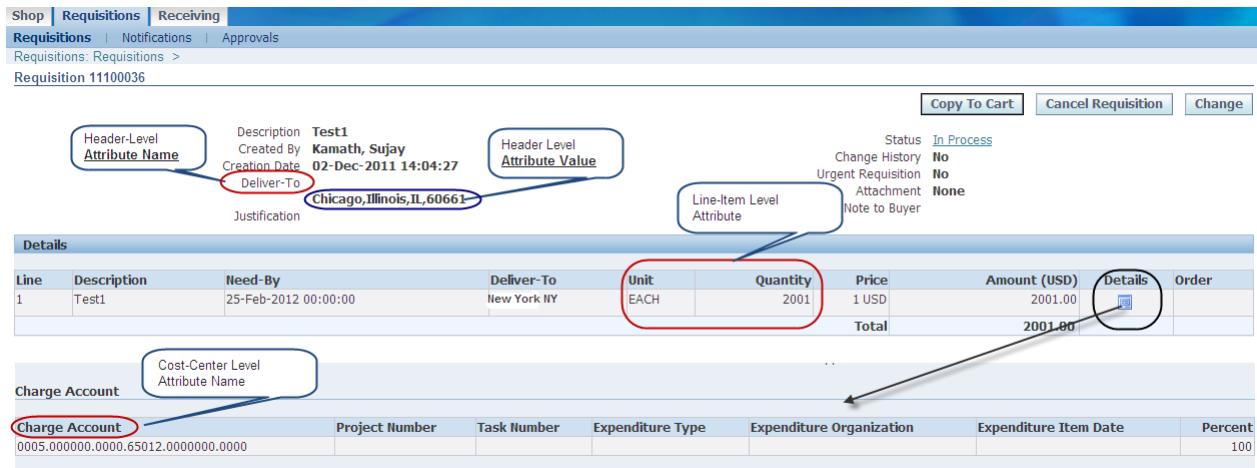


Figure 8: Picture depicting Attribute usage for a Purchase Requisition Approval

Condition

The “Condition” component is used to tell AME engine to trigger an AME rule if the result of the condition is TRUE. One or more attributes are used to define a condition. In the condition setup, an attribute is associated with a value or range of values. At runtime, the transaction type value is evaluated against the attribute value. If the value transaction type value qualifies with the attribute value, the outcome of the condition is TRUE and the AME rule is eligible to trigger. Otherwise, the condition will yield FALSE and the rule shall not apply.

Below is an example of 3 conditions defined for “Purchase Requisition Approval” transaction type.

Condition 1: “DELIVER_TO_LOCATION in (US.0219)”. At runtime, if the requisition in iProcurement has “Deliver To Location” as “US.0219”, then tell AME to enable the rule associated with this condition to fire.

Condition 2: This condition states if the Requisition Total is > 1000 and < 1999 and the currency is “USD”, then tell AME to enable the rule associated with this condition to fire.

Condition 3: This condition states if the Requisition Total is > 2000 and < 2999 and the currency is “USD”, then tell AME to enable the rule associated with this condition to fire.

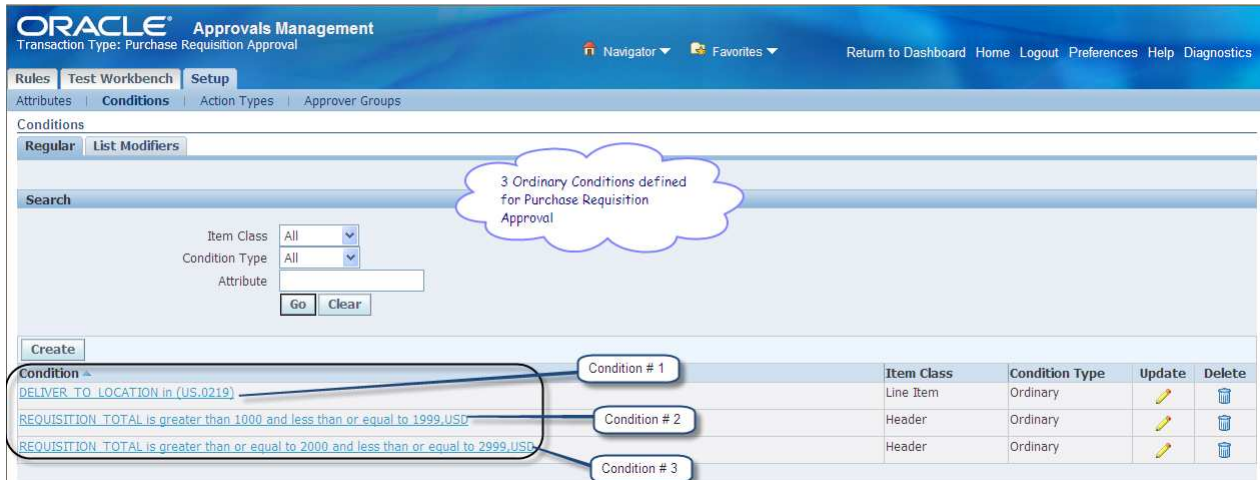


Figure 9: Conditions defined for Purchase Requisition Approval

Action Type

An Action Type is a collection of one or more Actions having similar functionality. An Action tells AME how to modify a transaction’s approval process in a certain way. As shown in *Figure 2: Structure of a Rule in AME*, a rule’s “THEN” part consists of one or more actions. AME provides several seeded action types or one may define a custom action type. The seeded Action Types available in AME can be used to ascend organization hierarchies. Seeded Actions Types available in AME cannot be used with any transaction type.

Action Types are grouped based on “Approver Types”. Following table lists the popular action types for each approver type:

Approver Type	Action Type
Job based	absolute job level
	final approver only
	manager then final approver
	relative job level
	supervisory level
HR Position based	hr position
	hr position level
Approver Group based	pre-chain-of-authority approvals
	post-chain-of-authority approvals
	approval-group chain of authority

Explanation of each Action Type is well understood with the help of an example. In the example shown below, the action type defined is “approval-group chain of authority”, which is Approver Group based. While the meaning of “Approver Group” is defined in the next topic, think of approver group where the approvers are stored. For Purchase Requisition Approval transaction type, the action type defined below tells AME to build a “chain-of-authority” (i.e., ascend the hierarchy of approvers). These approvers are derived from integrating applications (example: HRMS/Custom Table).

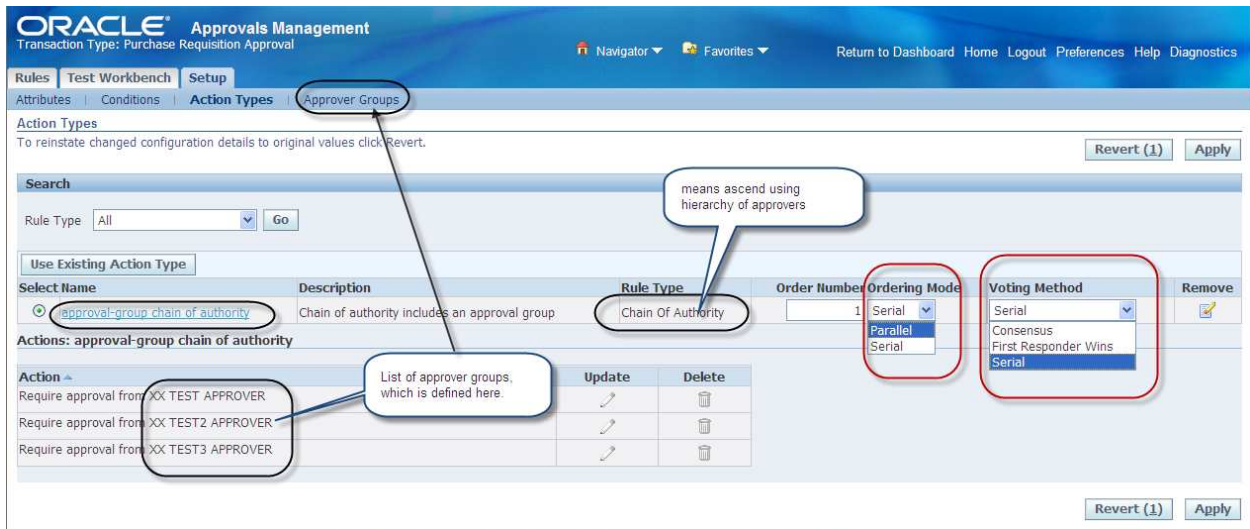


Figure 10: Action Type chosen for Purchase Requisition Approval

The “Ordering Mode” for Action Type can be either Serial or Parallel, which tells AME how to establish the notification order for approvers. If more than one Action Types are listed, then they can be assigned with an “Order Number”, which tells AME how to prioritize action types. The “Voting Method” for an action type tells AME how to treat the responses of the approvers based on the notification order.

Approver Group

Approver Group is used to fetch approvers from Oracle Applications (HRMS). They can be static or dynamic in nature. In static approver group, the approvers are constant, added at the time of Approver Group setup and will be listed as Group Members. In the case of Dynamic approver group, the approvers are generated at run time using an SQL Query in the approver group setup and are later identified as Group Members at run time. Approver Group may have a voting method assigned such as Consensus, First Responder Wins, Order Number and Serial. The voting method assigned to an approver group determines the order in which the Group Members are notified and also how the decision of the group’s approval.

ORACLE Approvals Management
Transaction Type: Purchase Requisition Approval

Rules | Test Workbench | Setup

Attributes | Conditions | Action Types | Approver Groups

Approver Groups
To reinstate changed configurations, details to original values click Revert.

Revert (1) Apply

Name	Description	Type	Order Number	Voting Method	Update	Remove
XX TEST1 APPROVER	XX TEST1 APPROVER	Static	1	Serial		
XX TEST2 APPROVER	XX TEST2 APPROVER	Static	2	Serial		
XX TEST3 APPROVER	XX TEST3 APPROVER	Static	3	Serial		

Setup: Approver Groups >

Update Approver Group :XX TEST1 APPROVER

* Indicates required field

Cancel Apply

Rules Using the Approver Group

Details

Name: XX TEST1 APPROVER
* Description: XX TEST1 APPROVER
* Order Number: 1
Voting Method: Serial
Usage Type: Static
Query:

Serial
Consensus
First Responder Wins
Order Number
Serial

Static
Dynamic
Static

If "Usage Type" is Dynamic, then an SQL Query goes in here to derive/fetch the approvers from the application.

Dynamic Approver Group requires a SQL.

Validate

Group Members

Enter members for the static approver group.

Approver Type	Approver	Order Number	Delete
HR People	HR People: Lay, John	1	

Add Another Row

Cancel Apply

Rules Test Workbench Setup Return to Dashboard Home Logout Preferences Help Diagnostics

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Figure 10: Approver Groups and its definition

Below table lists the name and meaning of each voting regime:

Voting Regime Name	Description
Serial	Members are notified one after the other; All members must approve for the group to approve.
Consensus	Members are notified in parallel; All members must approve for the group to approve.
First-Responder-Wins	Response of the first member to respond to the notification requesting approval becomes the group's approval decision. Responses of the remaining group members are stored in the AME transaction log and their responses are ignored.
Order-Number	Members are notified in the order of their order numbers. Members with same order numbers are notified in parallel.

Approver groups defined here will be automatically associated with the Action Types (see Figure 10).

Rule

A Rule (also called as “Approval Rule”) in AME is used to transform the business rules into approval rules to specify approvers in the transaction’s approval list. Rule is the last component step in AME configuration process. A rule is constructed using the following components:

1. Rule Type
2. Item Class
3. Category
4. Conditions
5. Actions

The screenshot displays the Oracle Approvals Management interface. At the top, there are navigation tabs: Rules, Test Workbench, and Setup. A cloud-shaped callout labeled 'AME Rules' points to the Rules tab. Below the navigation, there is a table of rules with columns: Name, Rule Type, Item Class, Start Date, End Date, Category, Update, Remove, and Duplicate. Three callouts point to 'Rule Type', 'Item Class', and 'Category' in the table. Below the table, there is a detailed view of a rule named 'XX TEST2'. This view includes fields for Item Class (Header), Rule Type (List Creation), Name (XX TEST2), Start Date (23-Feb-2012), and End Date (31-Dec-4712). Below these fields, there are sections for 'Other Instances of this Rule', 'Conditions', and 'Actions'. Callouts point to 'Conditions' and 'Action' in these sections.

Figure 11: Structure of AME Rule

AME provides 8 rules types. 7 out of 8 rule types generate approver list for transactions. A brief introduction of each rule type is shown in the table below:

#	Rule Type	Description of usage
1	List Creation	<p>Generate chains of authority</p> <p>Uses action types that ascend an organizational hierarchy to generate one or more chains of authority</p> <p>A required attribute typically identifies the first approver in each chain</p> <p>A specific action determines how many approvers are in each chain</p>
2	List Creation Exception	<p>Generate chains of authority</p> <p>Suppresses selected list-creation rules</p> <p>Contains at least 1 ORDINARY condition and at least 1 EXCEPTION condition</p>

3	List Modification	Modify the default chain of authority generated by all applicable “List Creation” and “List Creation Exception” rules Must have exactly 1 list-modification condition Commonly used to REDUCE and EXTEND an approver's signing authority and
4	Substitution	Delegate one approver's authority to another approver Must have exactly 1 list-modification condition
5	Pre List Approver Group	Used to add approvers BEFORE chain of authority
6	Post List Approver Group	Used to add approvers AFTER chain of authority
7	Combination	Used when several business rules apply to exactly the same business case
8	Production	In AME, the Action Type generates variable-name or value pair in the Action's parameters called “Productions”. The Production Rule's purpose is to pass those Productions (Variable Name or Value) to Oracle Purchasing application or any integrating application.

After choosing a Rule Type during Rule setup, the approver list that needs to be generated can be specified using Item Class. Item Class can be Header or Line-Item level. A rule can be activated or deactivated using Start Date and End Date. If there are multiple rules defined for a transaction type, they can be prioritized using rule priorities. Rules can also be categorized as “FYI” or “Approval”. For a rule to trigger, one or more conditions can be added and finally specify the Action using the Action Type. Conditions are optional. If no conditions are identified in the rule, the action is always executed. If one or more conditions are defined and the result is TRUE, only then the action part is executed.

AME Test Workbench

Once all AME components are defined, the business rules can be tested using the utility available in Business Analyst dashboard called “Test Workbench”. Test Workbench is an AME diagnostic utility to test and validate the approval rules setup for a given transaction type. Using this utility, business analyst or administrators can create several test cases to validate the approval rules and ensure they trigger based on the conditions and actions specified for a given transaction.

The screenshot shows the Oracle Approvals Management Test Workbench interface. The page title is "ORACLE Approvals Management" with a sub-header "Transaction Type: Purchase Requisition Approval". The navigation bar includes "Navigator", "Favorites", "Return to Dashboard", "Home", "Logout", "Preferences", "Help", and "Diagnostics". The main content area has tabs for "Rules", "Test Workbench", and "Setup". Below the tabs, there is a "Run Test Case: XX TEST GT2K LT3K" and a "View Approval Process Stages (1)" button. The transaction ID is -30. The interface displays two tables:

Applicable Rules			
Details	Description	Class	Rule Type
Show	XX TEST3	Header	List Creation
Show	XX TEST APPROVER	Line Item	List Creation

Final Processed Approver List				
Details	Order Number	Approver Type	Approver	Category
Show	1	HR People	Elliot, Mark	Approver
Show	2	HR People	Lay, John	Approver

Figure 12: AME Test Workbench

Enabling AME for a Transaction Type

Once the business rules are defined in AME using Business Analyst dashboard, it is time to connect those setups with the integrating application that wishes to implement the business rules. For this whitepaper, the example shown below how to enable AME business rules for a Purchase Requisition approval process in Oracle Purchasing application. For Purchasing Requisitions created using iProcurement, Oracle Purchasing provides a seeded document type called “Purchase Requisition”. In the definition of this document type, there is a placeholder to

specify approval transaction type. To enable AME rules for Purchase Requisitions created in iProcurement, the “Approval Transaction Type” value should be set to “PURCHASE_REQ”

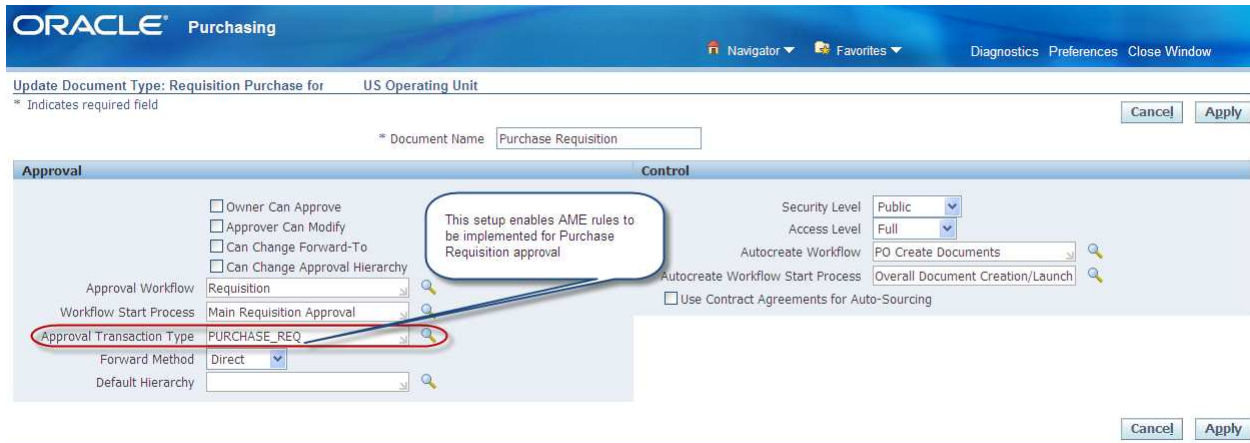


Figure 13: Enable AME for Purchase Requisition approval in iProcurement

Implementation Considerations and Tips/Techniques

Before implementing AME for any transaction type, it is very important to prepare and document a set of business cases. Each business case must clearly define the details necessary to configure the components of AME – Variables, Attributes, Conditions, Actions, Action Type, Approver Groups and Rules. Lastly, every business case document must be represented with at least one test case scenario. The business case document should be comprehensive to that extent that it should include all types of cases such as Repeated Approvers, Special Forwarding and Parallelization.

It is also important to document representation of approval rules in the form of either Approval Matrix or Decision Tree. Approvals Matrix is in the format of a table that has one row per business rule. Decision Tree has one column of nodes for each attribute with each branch leaving a node representing a set of allowed values for the attribute represented by the node. Decision Tree format are considered more flexible than Approval Matrix.

With the introduction of R12, AME patch-set level 11.AME.B has been benefited with some enhancements. Some of the key enhancements related to Requisition approval are:

- Position Hierarchy based Approvals
- Parallel Approvals
- Support for FYI Notifications

About the Author

Sujay Kamath is an experienced information technology professional. He is currently involved in implementing Procure-to-Pay (P2P) solutions using Oracle e-Business Suite R12. He has over 13 years of experience in the field of Oracle ERP and delivered end-to-end ERP solutions for numerous fortune 500 customers. He can be reached at sujayk@prisiotechnologies.com