

Sample Solution: Dynamic Approval Process for Opportunity Discounts

This document describes the packaged dynamic approval process sample solution for opportunity discounts, and how to implement the solution in your organization. This sample solution automates an opportunity discount approval process in which there are three levels of approval, and authorized approvers are based on the opportunity owner's region and the account type associated with the opportunity.

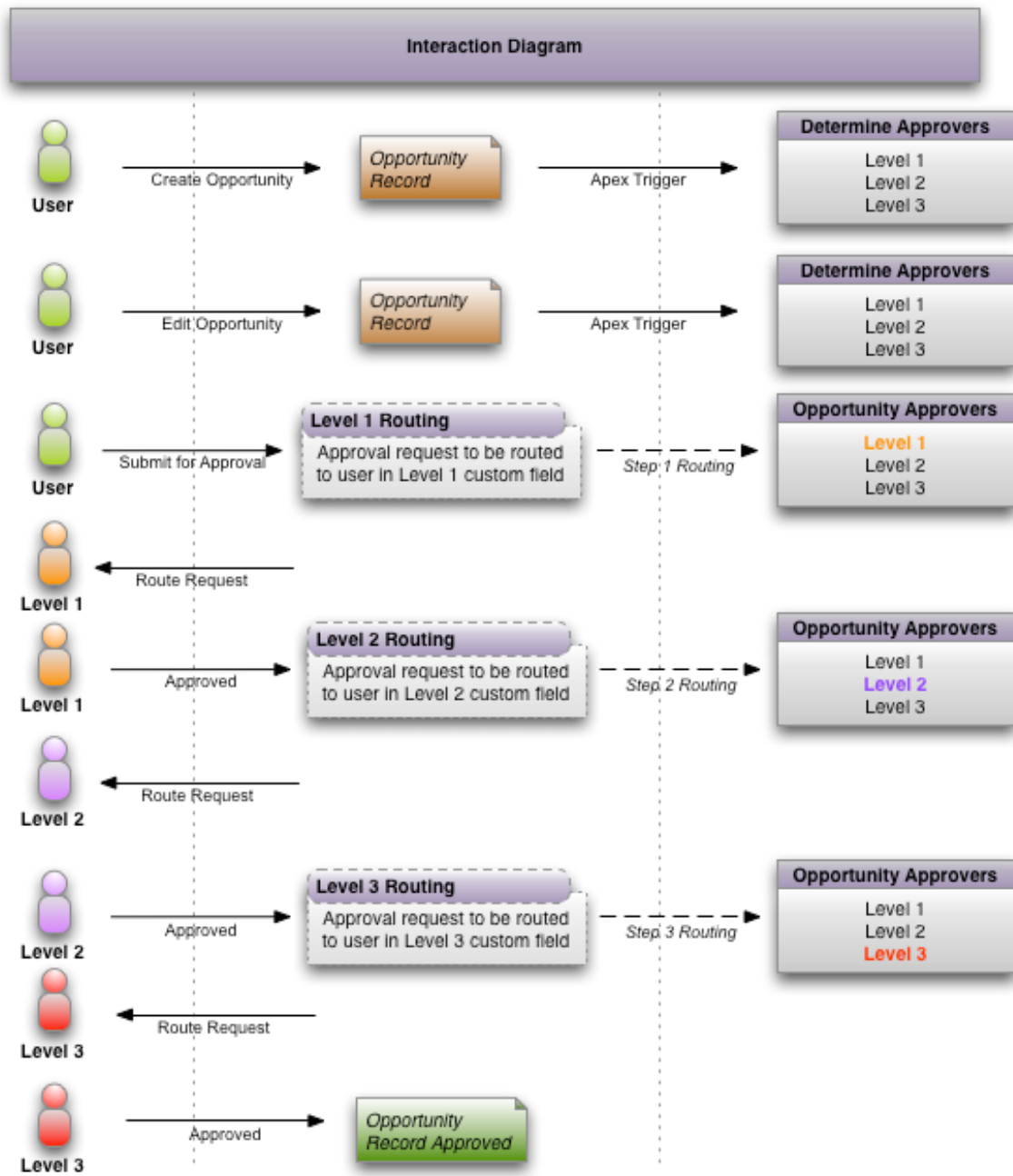
In previous Salesforce releases, implementing this solution for an organization with two account types and three regions would require six separate approval processes: one for each combination of region and account type. Such an approach would be easy to manage with limited account types and regions, but if the account types increased to ten and the regions increased to five, the number of approval processes required would jump to fifty.

In Spring '08, you can implement this solution with a single approval process that uses a matrix of routing rules to dynamically determine where to route approval requests. The following sample matrix shows routing rules for an organization with two account types (Customer Direct and Customer Channel) and three regions (NA, EMA, and JP), as well as the names of the employees responsible for approving opportunity discounts at three different levels.

Routing Rules Matrix

<i>Region</i>	<i>Account Type</i>	<i>Authorized Approvers</i>		
		<i>Level1</i>	<i>Level2</i>	<i>Level3</i>
NA	Customer – Direct	Andy	George	Emily
NA	Customer - Channel	Marc	George	Emily
EMEA	Customer – Direct	Pierre	Peter	Chris
EMEA	Customer – Channel	Peter	Scott	Chris
JP	Customer – Direct	Yoshimura	Kurasawa	Kawasaki
JP	Customer – Channel	Yuki	Nagasaki	Kawasaki

The following diagram illustrates the solution, showing the lifecycle of an opportunity record as it is created, submitted for approval, and approved.



The packaged sample solution uses the following Force.com platform features to automate the opportunity discount approval process:

- Approval process with dynamic approval routing (New in the Winter '08 release!)
- Custom object
- Validation rule
- Apex code and trigger

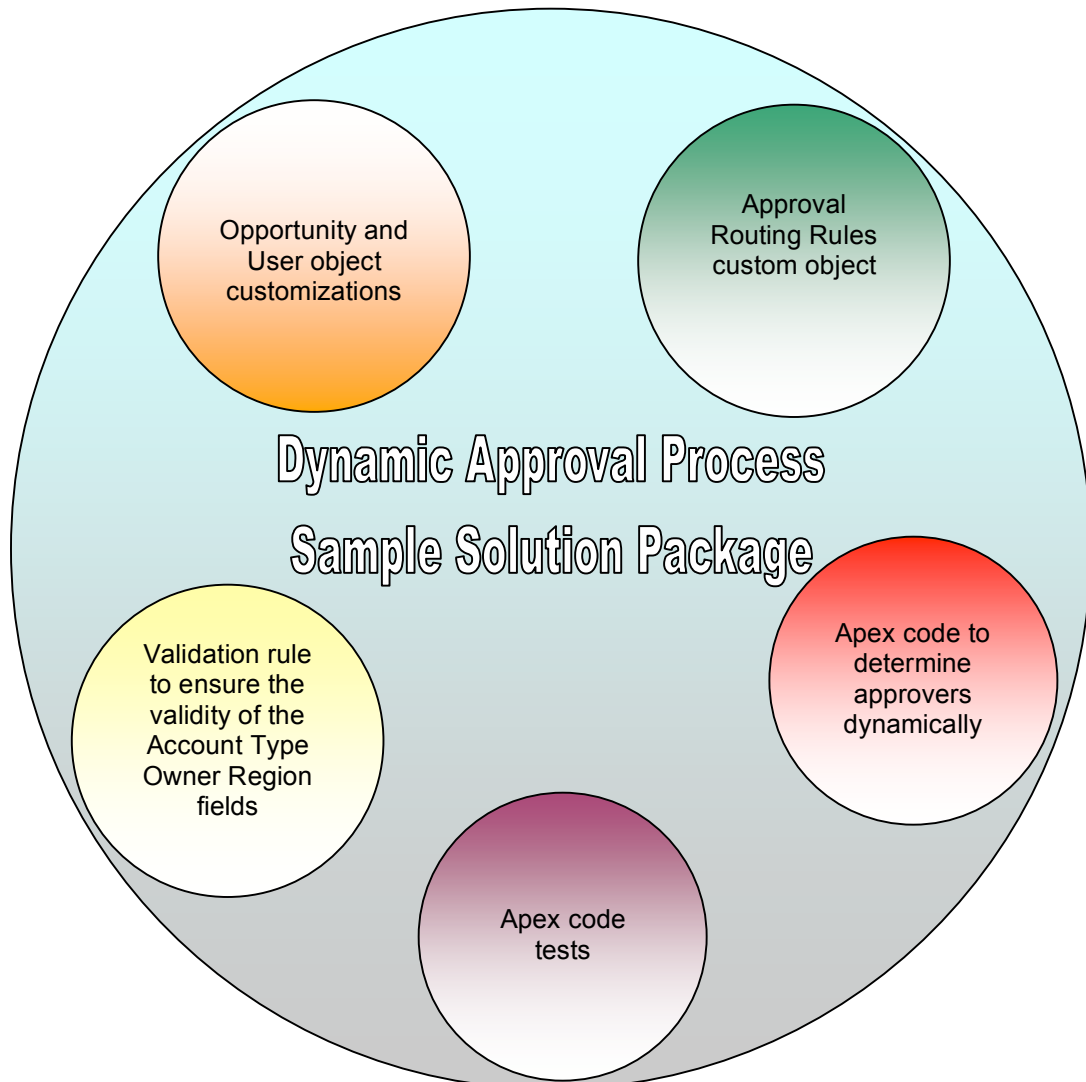
The packaged sample solution includes the custom object, validation rule, Apex code, and trigger.

Note: If your Salesforce account does not have at least three active users, uncheck the **Ignore Apex test failures** checkbox when you install the package. Otherwise, the Apex test will fail and the installation will not succeed.

After installing the packaged sample solution, create the approval process, and update the Approval Routing Rules custom object and custom picklist field on the User object with your organization's data. The Approval Routing Rules custom object can be found on the **All Tabs** tab.

Packaged Solution Components and Customizations

The following diagram illustrates the contents of the package.



The ensuing subsections describe each component and the customizations you must perform.

Opportunity and User Customizations

The packaged sample solution includes the following customizations:

- A custom picklist field on the User object to model the opportunity owner's region. Populate the field with valid values for your organization. The default values are NA, EMEA, and JP.
- Three custom user lookup fields (Level1, Level2, and Level3) on the Opportunity object to model the three levels of authorization. Optionally re-label these.

Approval Routing Rules

The packaged sample solution stores the approval routing rules in an included custom object called *Approval Routing Rule* with an API name `Approval_Routing_Rule__c`. The following table contains the details of the custom object. The *Customizations* column explains the customizations you need to perform after installing the package.

Fields	Type	Description	Customizations
Routing ID	Autonumber	Routing ID	None
Routing Key	Text (200), External ID, Unique Case Insensitive	Composite key based on the Account Type and Owner Region fields. The field is configured as external ID field with a unique constraint to ensure that the field is indexed and you have only one row for each combination of Account Type and Owner Region. When the opportunity record is saved, the approver levels for the record are determined by looking up the Approval Routing Rules custom object using this field. The format of the routing key is: Account Type:Owner Region	None
Account Type	Picklist	Opportunity account type with the same values used in the standard field on the Account object.	Update picklist values to reflect standard Account Type picklist values**
Owner Region	Picklist	Opportunity owner's region with the same values used in the custom field on the User object.	Update picklist values to reflect values used in custom field on the User object**
Level1	User Lookup	Authorized approver for level 1.	Optionally re-label field
Level2	User Lookup	Authorized approver for level 2.	Optionally re-label field
Level3	User Lookup	Authorized approver for level 3.	Optionally re-label field

** Refer to [Implementation Considerations](#) for information on picklist maintenance.

Apex Code

The packaged sample solution includes the Apex code needed to populate the Level 1, Level 2, and Level 3 custom fields on the Opportunity object by looking up the values stored in the Approval Routing Rules custom object and joining against the Routing Key field. The following table summarizes the Apex code provided with this package.

Apex Code	Object	Purpose
Class: ApprovalRoutingUtil	N/A	Helper class to look up Approval Routing Rules object and populate custom fields.
Trigger: opportunityApproverTrigger	Opportunity: before insert/update	Trigger that calls the class to determine approvers for each record.
Trigger: approvalMatrixTrigger	Approval Routing Rules: before insert/update	Trigger which constructs the Routing Key.

Validation Rule

The packaged sample solution includes a validation rule called *RequiredFields* on the Approval Routing Rule custom object to ensure the validity of the data in the Account Type and Owner Region fields, which the Apex code uses for selecting the approvers. The syntax for the validation rule is:

```
OR(  
    ISPICKVAL(Owner_Region__c, ''),  
    ISPICKVAL( Account_Type__c, '' )  
)
```

Apex Code Tests

The package includes Apex code tests that ensure that the code works as designed, and that the required code coverage numbers are met before the code is deployed into production. The following table summarizes these tests.

Test Method Name	Description
basicSingleTest	Test for the down-the-middle positive case. For example, when there is a single opportunity being saved and there is an associated account with a non-null type value and the user has a non-null region value.
basicBulkTest	A variation of the basic test that affirms the code in question is capable of handling a bulk API save operation on the Opportunity object.
validationTest	Affirms that validation rules are in place to require non-null values for the Account_Type__c and Owner_Region__c fields on Approval Routing Rule c.
routingTriggerTest	Validates the routing_key__c is set properly in the trigger on Approval Routing Rule c.

Approval Process Design

After installing the package, create a single approval process that routes approval requests to each of the approvers stored in the Level 1, Level 2, and Level 3 custom fields. The following image shows the approval process detail page for the process you must create:

Approval Process Detail

Edit

Clone

Deactivate

Process Name

Opportunity Discount Approval

Active

☒

Description

Entry Criteria

Opportunity: Closed EQUALS False

Record Editability

Administrator OR Current Approver

Next Automated Approver Determined By

Approval Assignment Email Template

Initial Submitters

Record Owner

Allow Submitters to Recall Approval Requests

☐

Created By

Varadarajan Rajaram, 2/12/2008 10:57 AM

Modified By

Varadarajan Rajaram, 2/12/2008 10:57 AM

Initial Submission Actions

Add Existing

Add New

Initial Submission Actions Help

Action Type

Description

Record Lock

Lock the record from being edited

Approval Steps

Approval Steps Help

Action

Step Number

Name

Description

Criteria

Assigned Approver

Reject Behavior

Show Actions | Edit

1

Level 1 Approval

Opportunity Level 1 Approval

Related User: Level1

Final Rejection

Show Actions | Edit

2

Level 2 Approval

Opportunity Level 2 Approval

Related User: Level2

Final Rejection

Show Actions | Edit

3

Level 3 Approval

Opportunity Level 3 Approval

Related User: Level3

Final Rejection

Final Approval Actions

Add Existing

Add New

Final Approval Actions Help

Action Type

Description

Edit

Record Lock

Lock the record from being edited

Final Rejection Actions

Add Existing

Add New

Final Rejection Actions Help

Action Type

Description

Edit

Record Lock

Unlock the record for editing

In step 3 of the approval step wizard, select the new **Related User** option and the appropriate user lookup field on the opportunity object as shown in the following image:

Approval Step Edit

Level 1 Approval

Help for this Page

Step 3. Select Assigned Approver

Step 3 of 3

Previous

Save

Cancel

Specify the user who should approve records that enter this step. Optionally, choose whether the approver's delegate is also allowed to approve these requests.

Select Approver

Assign to

Related User

Level1

☐

The approver's delegate also approve this request.

Previous

Save

Cancel

Implementation Considerations

The solution is intended as a sample reference implementation based on a simple business requirement. Consider the following when designing a dynamic approval routing process for your organization.

- Simulate the approval process to the end users before they submit the record for approval. The custom fields Level 1, Level 2 and Level 3 can be bundled in a separate section in the page layout as read-only fields and shown to the user as soon as the record is saved. This provides the end users with information on the approvers who will be notified before the record is submitted for approval, thus simulating all the approvers involved in the process.
- Routing rules can change while an opportunity record is in the approval process. To ensure that Salesforce uses the current routing table at each step in the approval process, create a field on the Opportunity object and use a field update action in the Initial Submission Actions section and at each step in the approval process to update that field. The field update triggers the Apex code to query the Approval Routing Rule custom object to determine the most up-to-date approvers at that time.
- Keep the values of the Account Type fields on the Account and Approval Routing Rule objects in sync. Similarly, keep the values of the Region fields on the User and Approval Routing Rule objects in sync.
- Avoid using the Picklist Replace feature to change existing picklist field values that are used in approval processes that use Apex. The Picklist Replace feature allows you to change the picklist values (including values on existing records) to a new value; however, it does not trigger Apex on all the records that are updated with the new value.
- Use other tools such as the data loader, Excel connector, or the API to change picklist values while ensuring that the Apex code runs and the routing key is recomputed accurately.
- Avoid changing picklist values when there are pending approval requests. Changing the values in the middle of a process can result in unexpected behavior. For example, the request may be routed to the incorrect person, or there may be an error because of inconsistencies when computing the next approver dynamically.