APEX REFERENCE GUIDE

Apex is a strongly typed, object-oriented programming language that allows developers to execute flow and transaction control statements on the Salesforce Platform server, in conjunction with calls to the API. This reference guide includes built-in Apex classes, interfaces, enums, and exceptions, grouped by namespace. It also includes Apex DML statements to insert, update, merge, delete, and restore data in Salesforce.

For information on the Apex development process, see Apex Developer Guide.

Note: In API version 51.0 and earlier, Apex Reference information was included in the Apex Developer Guide in the **Apex Language Reference** section.

IN THIS SECTION:

Apex Release Notes

Use the Salesforce Release Notes to learn about the most recent updates and changes to Apex.

For Apex updates and changes that impact the Salesforce Platform, see the Apex Release Notes.

For new and changed Apex classes, methods, exceptions and interfaces, see Apex: New and Changed Items in the Salesforce Release Notes.

Apex DML Operations

You can perform DML operations using the Apex DML statements or the methods of the `Database` class. For lead conversion, use the `convertLead` method of the `Database` class. There is no DML counterpart for it.

SEE ALSO:

Apex Developer Guide: Working with Data in Apex

Database Class

Apex DML Statements

Use Data Manipulation Language (DML) statements to insert, update, merge, delete, and restore data in Salesforce.

The following Apex DML statements are available:

Insert Statement

The `insert` DML operation adds one or more sObjects, such as individual accounts or contacts, to your organization's data. `insert` is analogous to the INSERT statement in SQL.

Syntax

`insert` ***`sObject`***

`insert` ***`sObject[]`***

Example

The following example inserts an account named 'Acme':

```
Account newAcct = new Account(name = 'Acme');
try {
   insert newAcct;
} catch (DmlException e) {
// Process exception here
}
```

Note: For more information on processing `DmlExceptions`, see Bulk DML Exception Handling.

Update Statement

The `update` DML operation modifies one or more existing sObject records, such as individual accounts or contacts, in your organization's data. `update` is analogous to the UPDATE statement in SQL.

Syntax

`update` ***`sObject`***

`update` ***`sObject[]`***

Example

The following example updates the `BillingCity` field on a single account named 'Acme':

```
Account a = new Account(Name='Acme2');
insert(a);

Account myAcct = [SELECT Id, Name, BillingCity FROM Account WHERE Id = :a.Id];
myAcct.BillingCity = 'San Francisco';

try {
    update myAcct;
} catch (DmlException e) {
    // Process exception here
}
```

Note: For more information on processing `DmlExceptions`, see Bulk DML Exception Handling.

Upsert Statement

The `upsert` DML operation creates new records and updates sObject records within a single statement, using a specified field to determine the presence of existing objects, or the ID field if no field is specified.

Syntax

`upsert` ***`sObject`*** `[`***`opt_field`***`]`

`upsert` ***`sObject[]`*** `[`***`opt_field`***`]`

The `upsert` statement matches the sObjects with existing records by comparing values of one field. If you don't specify a field when calling this statement, the `upsert` statement uses the sObject's ID to match the sObject with existing records in Salesforce. Alternatively, you can specify a field to use for matching. For custom objects, specify a custom field marked as external ID. For standard objects, you can specify any field that has the `idLookup` attribute set to true. For example, the Email field of Contact or User has the `idLookup` attribute set. To check a field's attribute, see the Object Reference for Salesforce.

Also, you can use foreign keys to upsert sObject records if they have been set as reference fields. For more information, see Field Types in the *Object Reference for Salesforce*.

The optional field parameter, *`opt_field`*, is a field token (of type `Schema.SObjectField`). For example, to specify the MyExternalID custom field, the statement is:

```
upsert sObjectList Account.Fields.MyExternalId__c;
```

If the field used for matching doesn't have the `Unique` attribute set, the context user must have the "View All" object-level permission for the target object or the "View All Data" permission so that `upsert` doesn't accidentally insert a duplicate record.

Note: Custom field matching is case-insensitive only if the custom field has the **Unique** and **Treat "ABC" and "abc" as duplicate values (case insensitive)** attributes selected as part of the field definition. If so, "ABC123" is matched with "abc123." For more information, see "Create Custom Fields" in the Salesforce online help.

How Upsert Chooses to Insert or Update

Upsert uses the sObject record's primary key (the ID), an idLookup field, or an external ID field to determine whether it should create a record or update an existing one:

- If the key isn't matched, a new object record is created.
- If the key is matched once, the existing object record is updated.
- If the key is matched multiple times, an error is generated and the object record isn't inserted or updated.

Example

This example performs an upsert of a list of accounts.

```
List<Account> acctList = new List<Account>();
// Fill the accounts list with some accounts

try {
    upsert acctList;
} catch (DmlException e) {

}
```

This next example performs an upsert of a list of accounts using a foreign key for matching existing records, if any.

```
List<Account> acctList = new List<Account>();
// Fill the accounts list with some accounts

try {
    // Upsert using an external ID field
    upsert acctList myExtIDField__c;
} catch (DmlException e) {

}
```

Delete Statement

The `delete` DML operation deletes one or more existing sObject records, such as individual accounts or contacts, from your organization's data. `delete` is analogous to the `delete()` statement in the SOAP API.

Syntax

`delete` ***`sObject`***

`delete` ***`sObject[]`***

Example

The following example deletes all accounts that are named 'DotCom':

```
Account[] doomedAccts = [SELECT Id, Name FROM Account
                         WHERE Name = 'DotCom'];
try {
    delete doomedAccts;
} catch (DmlException e) {
    // Process exception here
}
```

Note: For more information on processing `DmlExceptions`, see Bulk DML Exception Handling.

Undelete Statement

The `undelete` DML operation restores one or more existing sObject records, such as individual accounts or contacts, from your organization's Recycle Bin. `undelete` is analogous to the UNDELETE statement in SQL.

Syntax

`undelete` ***`sObject`*** `|` ***`ID`***

`undelete` ***`sObject[]`*** `|` ***`ID[]`***

Example

The following example undeletes an account named 'Universal Containers'. The `ALL ROWS` keyword queries all rows for both top level and aggregate relationships, including deleted records and archived activities.

```
Account[] savedAccts = [SELECT Id, Name FROM Account WHERE Name = 'Universal Containers'
ALL ROWS];
try {
    undelete savedAccts;
} catch (DmlException e) {
    // Process exception here
}
```

Note: For more information on processing `DmlExceptions`, see Bulk DML Exception Handling.

Merge Statement

The `merge` statement merges up to three records of the same sObject type into one of the records, deleting the others, and re-parenting any related records.

Note: This DML operation does not have a matching Database system method.

Syntax

`merge` ***`sObject sObject`***

`merge` ***`sObject sObject[]`***

`merge` ***`sObject ID`***

`merge` ***`sObject ID[]`***

The first parameter represents the master record into which the other records are to be merged. The second parameter represents the one or two other records that should be merged and then deleted. You can pass these other records into the `merge` statement as a single sObject record or ID, or as a list of two sObject records or IDs.

Example

The following example merges two accounts named 'Acme Inc.' and 'Acme' into a single record:

```
List<Account> ls = new List<Account>{new Account(name='Acme Inc.'),new Account(name='Acme')};
insert ls;
Account masterAcct = [SELECT Id, Name FROM Account WHERE Name = 'Acme Inc.' LIMIT 1];
Account mergeAcct = [SELECT Id, Name FROM Account WHERE Name = 'Acme' LIMIT 1];
try {
    merge masterAcct mergeAcct;
} catch (DmlException e) {
    // Process exception here
}
```

Note: For more information on processing `DmlExceptions`, see Bulk DML Exception Handling.

ApexPages Namespace

The `ApexPages` namespace provides classes used in Visualforce controllers.

The following are the classes in the `ApexPages` namespace.

IN THIS SECTION:

Action Class

You can use `ApexPages.Action` to create an action method that you can use in a Visualforce custom controller or controller extension.

Namespace

ApexPages

Usage

For example, you could create a `saveOver` method on a controller extension that performs a custom save.

Instantiation

The following code snippet illustrates how to instantiate a new `ApexPages.Action` object that uses the save action:

```
ApexPages.Action saveAction = new ApexPages.Action('{!save}');
```

IN THIS SECTION:

Action Constructors

Action Methods

Action Constructors

The following are constructors for `Action`.

IN THIS SECTION:

Action(action)
Creates a new instance of the `ApexPages.Action` class using the specified action.

`Action(action)`

Creates a new instance of the `ApexPages.Action` class using the specified action.

Signature

`public Action(String action)`

Parameters

`action`
Type: String

The action.

Action Methods

The following are methods for `Action`. All are instance methods.

IN THIS SECTION:

`getExpression()`

Returns the expression that is evaluated when the action is invoked.

Signature

```
public String getExpression()
```

Return Value

Type: String

`invoke()`

Invokes the action.

Signature

```
public System.PageReference invoke()
```

Return Value

Type: System.PageReference

Component Class

Represents a dynamic Visualforce component in Apex.

Namespace

ApexPages

Dynamic Component Properties

The following are properties for `Component`.

IN THIS SECTION:

expressions
Sets the content of an attribute using the expression language notation. The notation for this is `expressions.`*`name_of_attribute`*.

facets
Sets the content of a facet to a dynamic component. The notation is `facet.`*`name_of_facet`*.

`childComponents`

Returns a reference to the child components for the component.

Signature

`public List <ApexPages.Component> childComponents {get; set;}`

Property Value

Type: List<ApexPages.Component>

Example

```
Component.Apex.PageBlock pageBlk = new Component.Apex.PageBlock();

Component.Apex.PageBlockSection pageBlkSection = new
Component.Apex.PageBlockSection(title='dummy header');

pageBlk.childComponents.add(pageBlkSection);
```

`expressions`

Sets the content of an attribute using the expression language notation. The notation for this is `expressions.`*`name_of_attribute`*.

Signature

`public String expressions {get; set;}`

Property Value

Type: String

Example

```
Component.Apex.InputField inpFld = new
Component.Apex.InputField();
inpField.expressions.value = '{!Account.Name}';
inpField.expressions.id = '{!$User.FirstName}';
```

`facets`

Sets the content of a facet to a dynamic component. The notation is `facet.`*`name_of_facet`*.

Signature

```
public String facets {get; set;}
```

Property Value

Type: String

Usage

Note: This property is only accessible by components that support facets.

Example

```
Component.Apex.DataTable myDT = new
Component.Apex.DataTable();
Component.Apex.OutputText footer = new
Component.Apex.OutputText(value='Footer Copyright');
myDT.facets.footer = footer;
```

IdeaStandardController Class

`IdeaStandardController` objects offer Ideas-specific functionality in addition to what is provided by the `StandardController`.

Namespace

ApexPages

Usage

A method in the IdeaStandardController object is called by and operated on a particular instance of an IdeaStandardController.

Note: The `IdeaStandardSetController` and `IdeaStandardController` classes are currently available through a limited release program. For information on enabling these classes for your organization, contact your Salesforce representative.

In addition to the methods listed in this class, the `IdeaStandardController` class inherits all the methods associated with the `StandardController` class.

Instantiation

An IdeaStandardController object cannot be instantiated. An instance can be obtained through a constructor of a custom extension controller when using the standard ideas controller.

Example

The following example shows how an IdeaStandardController object can be used in the constructor for a custom list controller. This example provides the framework for manipulating the comment list data before displaying it on a Visualforce page.

```
public class MyIdeaExtension {

    private final ApexPages.IdeaStandardController ideaController;

    public MyIdeaExtension(ApexPages.IdeaStandardController controller) {
        ideaController = (ApexPages.IdeaStandardController)controller;
    }

    public List<IdeaComment> getModifiedComments() {
        IdeaComment[] comments = ideaController.getCommentList();
        // modify comments here
        return comments;
    }

}
```

The following Visualforce markup shows how the IdeaStandardController example shown above can be used in a page. This page must be named `detailPage` for this example to work.

Note: For the Visualforce page to display the idea and its comments, in the following example you need to specify the ID of a specific idea (for example, `/apex/detailPage?id=<ideaID>`) whose comments you want to view.

```
<!-- page named detailPage -->
<apex:page standardController="Idea" extensions="MyIdeaExtension">
    <apex:pageBlock title="Idea Section">
        <ideas:detailOutputLink page="detailPage" ideaId="{!idea.id}">{!idea.title}
        </ideas:detailOutputLink>
        <br/><br/>
        <apex:outputText >{!idea.body}</apex:outputText>
    </apex:pageBlock>
    <apex:pageBlock title="Comments Section">
        <apex:dataList var="a" value="{!modifiedComments}" id="list">
            {!a.commentBody}
        </apex:dataList>
        <ideas:detailOutputLink page="detailPage" ideaId="{!idea.id}"
               pageOffset="-1">Prev</ideas:detailOutputLink>
        |
        <ideas:detailOutputLink page="detailPage" ideaId="{!idea.id}"
               pageOffset="1">Next</ideas:detailOutputLink>
    </apex:pageBlock>
</apex:page>
```

SEE ALSO:

StandardController Class

IdeaStandardController Methods

The following are instance methods for `IdeaStandardController`.

IN THIS SECTION:

`getCommentList()`

Returns the list of read-only comments from the current page.

Signature

`public IdeaComment[] getCommentList()`

Return Value

Type: IdeaComment[]

This method returns the following comment properties:

- `id`
- `commentBody`
- `createdDate`
- `createdBy.Id`
- `createdBy.communityNickname`

IdeaStandardSetController Class

`IdeaStandardSetController` objects offer Ideas-specific functionality in addition to what is provided by the `StandardSetController`.

Namespace

ApexPages

Usage

Note: The `IdeaStandardSetController` and `IdeaStandardController` classes are currently available through a limited release program. For information on enabling these classes for your organization, contact your Salesforce representative.

In addition to the method listed above, the `IdeaStandardSetController` class inherits the methods associated with the `StandardSetController`.

Note: The methods inherited from the `StandardSetController` cannot be used to affect the list of ideas returned by the `getIdeaList` method.

Instantiation

An IdeaStandardSetController object cannot be instantiated. An instance can be obtained through a constructor of a custom extension controller when using the standard list controller for ideas.

Example: Displaying a Profile Page

The following example shows how an IdeaStandardSetController object can be used in the constructor for a custom list controller:

```
public class MyIdeaProfileExtension {
    private final ApexPages.IdeaStandardSetController ideaSetController;

    public MyIdeaProfileExtension(ApexPages.IdeaStandardSetController controller) {
        ideaSetController = (ApexPages.IdeaStandardSetController)controller;
    }

    public List<Idea> getModifiedIdeas() {
        Idea[] ideas = ideaSetController.getIdeaList();
        // modify ideas here
        return ideas;
    }

}
```

The following Visualforce markup shows how the IdeaStandardSetController example shown above and the `<ideas:profileListOutputLink>` component can display a profile page that lists the recent replies, submitted ideas, and votes associated with a user. Because this example does not identify a specific user ID, the page automatically shows the profile page for the current logged in user. This page must be named *`profilePage`* in order for this example to work:

```
<!-- page named profilePage -->
<apex:page standardController="Idea" extensions="MyIdeaProfileExtension"
recordSetVar="ideaSetVar">
    <apex:pageBlock >
        <ideas:profileListOutputLink sort="recentReplies" page="profilePage">
          Recent Replies</ideas:profileListOutputLink>
        |
        <ideas:profileListOutputLink sort="ideas" page="profilePage">Ideas Submitted
        </ideas:profileListOutputLink>
        |
        <ideas:profileListOutputLink sort="votes" page="profilePage">Ideas Voted
        </ideas:profileListOutputLink>
    </apex:pageBlock>
    <apex:pageBlock >
        <apex:dataList value="{!modifiedIdeas}" var="ideadata">
            <ideas:detailoutputlink ideaId="{!ideadata.id}" page="viewPage">
             {!ideadata.title}</ideas:detailoutputlink>
        </apex:dataList>
    </apex:pageBlock>
</apex:page>
```

In the previous example, the `<ideas:detailoutputlink>` component links to the following Visualforce markup that displays the detail page for a specific idea. This page must be named *`viewPage`* in order for this example to work:

```
<!-- page named viewPage -->
<apex:page standardController="Idea">
    <apex:pageBlock title="Idea Section">
        <ideas:detailOutputLink page="viewPage" ideaId="{!idea.id}">{!idea.title}
        </ideas:detailOutputLink>
        <br/><br/>
        <apex:outputText>{!idea.body}</apex:outputText>
    </apex:pageBlock>
</apex:page>
```

Example: Displaying a List of Top, Recent, and Most Popular Ideas and Comments

The following example shows how an IdeaStandardSetController object can be used in the constructor for a custom list controller:

Note: You must have created at least one idea for this example to return any ideas.

```
public class MyIdeaListExtension {
    private final ApexPages.IdeaStandardSetController ideaSetController;

    public MyIdeaListExtension (ApexPages.IdeaStandardSetController controller) {
        ideaSetController = (ApexPages.IdeaStandardSetController)controller;
    }

    public List<Idea> getModifiedIdeas() {
        Idea[] ideas = ideaSetController.getIdeaList();
        // modify ideas here
        return ideas;
    }
}
```

The following Visualforce markup shows how the IdeaStandardSetController example shown above can be used with the `<ideas:listOutputLink>` component to display a list of recent, top, and most popular ideas and comments. This page must be named *`listPage`* in order for this example to work:

```
<!-- page named listPage -->
<apex:page standardController="Idea" extensions="MyIdeaListExtension"
recordSetVar="ideaSetVar">
    <apex:pageBlock >
        <ideas:listOutputLink sort="recent" page="listPage">Recent Ideas
        </ideas:listOutputLink>
        |
        <ideas:listOutputLink sort="top" page="listPage">Top Ideas
        </ideas:listOutputLink>
        |
        <ideas:listOutputLink sort="popular" page="listPage">Popular Ideas
        </ideas:listOutputLink>
        |
        <ideas:listOutputLink sort="comments" page="listPage">Recent Comments
        </ideas:listOutputLink>
    </apex:pageBlock>
    <apex:pageBlock >
        <apex:dataList value="{!modifiedIdeas}" var="ideadata">
            <ideas:detailoutputlink ideaId="{!ideadata.id}" page="viewPage">
             {!ideadata.title}</ideas:detailoutputlink>
        </apex:dataList>
    </apex:pageBlock>
</apex:page>
```

In the previous example, the `<ideas:detailoutputlink>` component links to the following Visualforce markup that displays the detail page for a specific idea. This page must be named *`viewPage`*.

```
<!-- page named viewPage -->
<apex:page standardController="Idea">
    <apex:pageBlock title="Idea Section">
        <ideas:detailOutputLink page="viewPage" ideaId="{!idea.id}">{!idea.title}
        </ideas:detailOutputLink>
        <br/><br/>
        <apex:outputText>{!idea.body}</apex:outputText>
    </apex:pageBlock>
</apex:page>
```

SEE ALSO:

StandardSetController Class

IdeaStandardSetController Methods

The following are instance methods for `IdeaStandardSetController`.

IN THIS SECTION:

getIdeaList()

Returns the list of read-only ideas in the current page set.

getIdeaList()

Returns the list of read-only ideas in the current page set.

Signature

`public Idea[] getIdeaList()`

Return Value

Type: Idea[]

Usage

You can use the `<ideas:listOutputLink>`, `<ideas:profileListOutputLink>`, and `<ideas:detailOutputLink>` components to display profile pages as well as idea list and detail pages (see the examples below). The following is a list of properties returned by this method:

- `Body`
- `Categories`
- `Category`
- `CreatedBy.CommunityNickname`
- `CreatedBy.Id`
- `CreatedDate`

- `Id`
- `LastCommentDate`
- `LastComment.Id`
- `LastComment.CommentBody`
- `LastComment.CreatedBy.CommunityNickname`
- `LastComment.CreatedBy.Id`
- `NumComments`
- `Status`
- `Title`
- `VoteTotal`

KnowledgeArticleVersionStandardController Class

`KnowledgeArticleVersionStandardController` objects offer article-specific functionality in addition to what is provided by the `StandardController`.

Namespace

ApexPages

Usage

In addition to the method listed above, the `KnowledgeArticleVersionStandardController` class inherits all the methods associated with `StandardController`.

Note: Though inherited, the `edit`, `delete`, and `save` methods don't serve a function when used with the `KnowledgeArticleVersionStandardController` class.

Example

The following example shows how a `KnowledgeArticleVersionStandardController` object can be used to create a custom extension controller. In this example, you create a class named `AgentContributionArticleController` that allows customer-support agents to see pre-populated fields on the draft articles they create while closing cases.

Prerequisites:

1. Create an article type called *`FAQ`*. For instructions, see “Create Article Types” in the Salesforce online help.
2. Create a text custom field called `Details`. For instructions, see “Add Custom Fields to Article Types” in the Salesforce online help.
3. Create a category group called *`Geography`* and assign it to a category called *`USA`*. For instructions, see “Create and Modify Category Groups” and “Add Data Categories to Category Groups” in the Salesforce online help.
4. Create a category group called *`Topics`* and assign it a category called *`Maintenance`*.

```
/** Custom extension controller for the simplified article edit page that
    appears when an article is created on the close-case page.
*/
public class AgentContributionArticleController {
    // The constructor must take a ApexPages.KnowledgeArticleVersionStandardController as
 an argument
```

```
    public AgentContributionArticleController(
        ApexPages.KnowledgeArticleVersionStandardController ctl) {
        // This is the SObject for the new article.
        //It can optionally be cast to the proper article type.
        // For example, FAQ__kav article = (FAQ__kav) ctl.getRecord();
        SObject article = ctl.getRecord();
        // This returns the ID of the case that was closed.
        String sourceId = ctl.getSourceId();
        Case c = [SELECT Subject, Description FROM Case WHERE Id=:sourceId];

        // This overrides the default behavior of pre-filling the
        // title of the article with the subject of the closed case.
        article.put('title', 'From Case: '+c.subject);
        article.put('details__c',c.description);

        // Only one category per category group can be specified.
        ctl.selectDataCategory('Geography','USA');
        ctl.selectDataCategory('Topics','Maintenance');
    }
}
```

```
/** Test class for the custom extension controller.
*/
@isTest
private class AgentContributionArticleControllerTest {
    static testMethod void testAgentContributionArticleController() {
         String caseSubject = 'my test';
         String caseDesc = 'my test description';

         Case c = new Case();
         c.subject= caseSubject;
         c.description = caseDesc;
         insert c;
         String caseId = c.id;
         System.debug('Created Case: ' + caseId);

         ApexPages.currentPage().getParameters().put('sourceId', caseId);
         ApexPages.currentPage().getParameters().put('sfdc.override', '1');

         ApexPages.KnowledgeArticleVersionStandardController ctl =
            new ApexPages.KnowledgeArticleVersionStandardController(new FAQ__kav());

         new AgentContributionArticleController(ctl);

         System.assertEquals(caseId, ctl.getSourceId());
         System.assertEquals('From Case: '+caseSubject, ctl.getRecord().get('title'));
         System.assertEquals(caseDesc, ctl.getRecord().get('details__c'));
   }
}
```

If you created the custom extension controller for the purpose described in the previous example (that is, to modify submitted-via-case articles), complete the following steps after creating the class:

1. Log into your Salesforce organization and from Setup, enter `Knowledge Settings` in the `Quick Find` box, then select **Knowledge Settings**.

2. Click **Edit**.
3. Assign the class to the `Use Apex customization` field. This associates the article type specified in the new class with the article type assigned to closed cases.
4. Click **Save**.

IN THIS SECTION:

KnowledgeArticleVersionStandardController Constructors

KnowledgeArticleVersionStandardController Methods

SEE ALSO:

StandardController Class

KnowledgeArticleVersionStandardController Constructors

The following are constructors for `KnowledgeArticleVersionStandardController`.

IN THIS SECTION:

KnowledgeArticleVersionStandardController(article)
Creates a new instance of the `ApexPages.KnowledgeArticleVersionStandardController` class using the specified knowledge article.

`KnowledgeArticleVersionStandardController(article)`

Creates a new instance of the `ApexPages.KnowledgeArticleVersionStandardController` class using the specified knowledge article.

Signature

`public KnowledgeArticleVersionStandardController(SObject article)`

Parameters

`article`
Type: SObject

The knowledge article, such as `FAQ_kav`.

KnowledgeArticleVersionStandardController Methods

The following are instance methods for `KnowledgeArticleVersionStandardController`.

IN THIS SECTION:

getSourceId()
Returns the ID for the source object record when creating a new article from another object.