

Data Modelling

Database

It is an organized collection of information.

ID	First Name	Last Name	Email	Year of Birth
1	Peter	Lee	plee@university.edu	1992
2	Jonathan	Edwards	jedwards@university.edu	1994
3	Marilyn	Johnson	mjohnson@university.edu	1993
6	Joe	Kim	jkim@university.edu	1992
12	Haley	Martinez	hmartinez@university.edu	1993
14	John	Mfume	jmfume@university.edu	1991
15	David	Letty	dletty@university.edu	1995

Table: Students

In a relational database:

- Data is stored in tables.
- Each table comprises a number of columns of particular datatype such as text, number or date.
- Information is stored in the rows of table.
- Tables can be related to other tables using the concept of primary key and foreign key.

Whereas in Salesforce:

- Database uses objects to store data.
- Each object comprises a number of fields which corresponds to column in a database.
- Data is Stored in records of objects which corresponds to rows in a database.
- Objects can be related to other objects using relationship fields.

Objects:

Objects in Force.com is represented in the form of a table and it is here referred as what an entity in a database.

There are 2 types of objects:

1. Standard Objects:

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Salesforce

By: Shrey Sharma

Plot no.8, Pratap Nagar Scheme 3, Near Glass Factory, Tonk Road, Jaipur, Rajasthan 302015

Phone: +917568697474

Website: www.shreysharma.com

These are the objects included with the Salesforce by default. Ex: Accounts, Leads and opportunities.

2. Custom Objects:

These are new objects created to store information unique to an organization. Custom objects extend the functionality that standard objects provide.

Note: Each object in Force.com has a built-in feature like user-interface, security and sharing model as much more.

App in Salesforce

App in Salesforce is little more than a container for all of the objects, tabs and other functionality.

It is a group of tabs that works as a unit to provide application's functionality.

It consists simply of a name, a logo and an ordered set of tabs. The simplest app contains only one tab i.e the home tab and a default logo.

There are basically 2 types of apps in Salesforce:

1. **Standard apps:** The apps which comes with every instance of Salesforce by default. It includes App Launcher, Call Center, Community, Content, Marketing, Sales, Salesforce Chatter and Site.com.

These apps can be customized according to the needs and requirements of an organization.

The label, description and logo of a standard app can't be changed.

2. Custom Apps :

The apps which are built to meet the specific business needs & requirements of an organization.

Custom apps can be made by grouping standard as well as custom tabs.

Logo in custom apps can be added and they can be changed after that also.

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Console Apps:

Console apps are designed and developed to provide a superior UI experience so that users can use the application in a productive manner.

It is mostly used for fast paced sales and service environments where users can use many functionalities at the same time on a single window without the need to refresh the whole page. Console app provides partial refresh which refresh the tabs updated without refreshing the whole page.

It can include LiveAgent (Chat), Softphone (call) and several other tabs including the VisualForce pages.

It provides the access to data and features frequently used by the user. Users can see records as well as items related to them on one screen. It also allows to work on multiple items simultaneously.

Tabs

Tabs help users view the information at a glance. It displays the data of objects and other web content in the application.

There are mainly 4 types of tabs:

- **Standard Object Tabs**—Standard object tabs displays data related to standard objects.
- **Custom Object Tabs**—Custom object tabs displays data related to custom objects. These tabs look and function just like standard tabs.
- **Web Tabs**— Web Tabs display any external Web-based application or Web page in a Salesforce tab.
- **Visualforce Tabs**—Visualforce Tabs display data from a Visualforce page.

Tab Visibility:

Default On: If the tab visibility is default on then it would appear on the top bar along with other visible tabs.

Default Off: If the tab visibility is default off then user will still be able to access the tab but by clicking on + symbol at the end of all visible tabs on top bar.

Tab Hidden: If the tab is hidden then it will neither be visible on top bar nor by clicking on + symbol.

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Note: However users can edit this according to their preferences.

Fields

Fields in salesforce represents what the columns represent in relational databases. Fields store data values which are required for a particular object in a record.

There are 2 types of fields:

1. Standard Fields:

There are four standard fields in every custom object that are Created By, Last Modified By, Owner and the field created at the time of creation of object. These fields cannot be deleted or edited. And they are always required.

For standard objects the fields which are present by default in them and cannot be deleted from standard objects are standard fields.

2. Custom Fields:

The fields which are added by the administrator/developer to meet the business requirements of any organization.

They may or may not be required.

Datatypes of fields:

Auto Number	Automatically assigns a unique number to each record.
Checkbox	Allows users to check a box, indicating a true or false attribute of a record.
Currency	Allows users to enter a currency amount.
Date	Allows users to enter a date or pick a date from a popup calendar.
Date/Time	Allows users to enter a date or pick a date from a popup calendar and enter a time of day. They can also add the current date and time by clicking the date and time link next to the field.
Email	Allows users to enter an email address of up to 80 characters, which is validated to ensure proper format.
Geolocation	Allows users to specify a location by its latitude and longitude.
Number	Allows users to enter any number. This is treated as a real number and any leading zeros are removed.
Percent	Allows users to enter a percentage number as a decimal
Phone	Allows users to enter any phone number. Character limit is 40.
Picklist	Allows users to select a single value from a list that you define.
Picklist (Multi-select)	Allows users to select more than one picklist value from a list that you define.
Text	Allows users to enter any combination of letters, numbers, or symbols.
Text (Encrypted)	Allows users to enter any combination of letters, numbers, or symbols that are stored in encrypted form.
Text Area	Allows users to enter characters that display on separate lines similar to a Description field.

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Datatype	Controlling	Dependent
Standard Picklist	Y	N
Custom Picklist	Y	Y
Custom Multi Picklist	N	Y
Standard check box	Y	N
Custom check box	Y	N

Text Area (Long)	Allows users to enter up to 131,072 characters that display on separate lines similar to a Description field. You can set the length of this field type to a lower limit, if desired. Any length from 256 to 131,072 characters is allowed. The default is 32,768 characters.
Text Area (Rich)	With the use of a toolbar, users can format the field content and add images and hyperlinks. The toolbar allows the user to undo, redo, bold, italicize, underline, strike-out, add a hyperlink, upload or link to an image, modify alignment, add a numbered or non-numbered list, indent, and outdent.
URL	Allows users to enter up to 255 characters of any valid website address.

Field Dependency:

These are filters that allow us to change the content of a picklist based on the value of another field (Checkbox/picklist).

There are two terms used in field dependency:

1. **Controlling Field:**
The value of this field controls the value of dependent field.
2. **Dependent Field:**
The value of this field depends on the value of controlling field.

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Global Picklist

Global Picklists can be used for sharing a single list of values across many custom picklist fields.

It is a restricted picklist. The list of values in global picklist gets locked and cannot be edited on custom picklist fields. To change the values, the global picklist should be edited.

Relationship

It is a 2 way association between 2 objects. Using relationships we can link objects with each other and we can make connection and display data about other related objects.

In relational database

- To create relationship between two tables. We use the concept of primary key and foreign key.
- Primary key resides on the table which is one in a many to one relationship.
- Foreign Key resides on the table which is many in a many to one relationship.

In Salesforce

- To create relationship between two objects we use relationship fields.
- The field is created on the many side object and it is related to the one side object.

In salesforce there are basically 2 types of relationship fields:

Master-Detail: A parent-child relationship in which the master object controls certain behaviors of the detail object.

- When a record of the master object is deleted, its related detail records are also deleted.
- The Owner field on the detail object is not available and is automatically set to the owner of its associated master record. Custom object on the detail side of a master-detail relationship cannot have sharing rules, manual sharing, or queues, as these require the Owner field.
- The detail record inherits the sharing and security settings of its master record.

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- The master-detail relationship field is required on the page layout of the detail record.
- By default, records can't be re-parented in master-detail relationships. Administrators can, however, allow child records in master-detail relationships on custom objects to be re-parented to different parent records by selecting the Allow re-parenting option in the master-detail relationship definition.
- Master-Detail relationships can be defined between custom objects or between a custom object and a standard object. However, the standard object cannot be on the detail side of a relationship with a custom object.
- The data related to the object appears on related list.
- When we undelete the master record then all its related details records also gets undeleted.

Note: Master-Detail relationship cannot be created where User or Lead objects are the master.

Lookup: This type of relationship links two objects together, but has no effect on deletion or security.

Unlike master-detail fields, lookup fields are not automatically required.

When a lookup relationship is defined, data from one object can appear as a custom related list on page layouts for the other object.

There are derived into 2 sub types:

- **Hierarchal:** A special lookup relationship available for only the **user object**. It lets users use a lookup field to associate one user with another that does not directly or indirectly refer to itself. For example, you can create a custom hierarchical relationship field to store each user's direct manager.
- **Self:** When an object has a lookup with itself, it is a self-relationship.

Many-to-many: Many-to-Many relationships can be modelled using master-details relationship between any two objects. A many-to-many relationship allows each record of one object to be linked to multiple records from another object and vice versa. To create a many-to-many relationship, simply create a custom junction object with two master-detail relationship fields, each linking to the objects need to relate.

- **Primary Relationship:** It is the relation created first with any of the two master object.

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- The object with which the relationship is created first is called the primary master object.
- The detail and edit page of junction object will use the color and any associated icon of the primary master object.
- The junction object records will inherit the value of the owner field.
- The sharing and security settings of junction object will depend on associated master record.
- Deleting a record of primary object will delete the associated records of junction object as well.
- **Secondary Relationship:** The second master detail relationship created with another master object.
 - The object with which the relationship is created first is called the secondary master object.
 - This relationship does not affect the look and feel of the junction object.
 - The security and sharing setting of the junction object depends on secondary relationship as well.
 - Deleting a record of secondary object also deletes the associated records of junction object.

Note: Junction object cannot be created a master object in a master detail relationship with another object as detail.

Validation Rules

Validation rule verifies the data a user enters in a record. The data should meet the standards specified by the organization.

A validation rule can contain a formula or expression that evaluates the data in one or more fields & returns a value true or false.

It also includes an error message to display to the user when the rule returns a value true due to an invalid value/data.

Cross Object Formula Fields

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Cross object formula fields span two related objects and reference merge fields on those objects. Cross object formulas can refer merge fields of parent objects on the child objects. It is available on both master-detail as well as lookup relationship.

Fields can be referred up to 10 relationships away.

Cross Object formulas can be used everywhere except when creating default values.

Roll-Up Summary fields

Roll-Up summary fields summarize data from a set of related detail records and automatically display the output on the master record.

These can be used to display sum, maximum, minimum value of a field in a related list, also the count of all the records listed in a related list.

Roll-Up summary fields are only available to master objects in a master detail relationship.

After creating roll-up summary field on an object, the master-detail relationship cannot be converted into a lookup relationship.

Lookup Filter

A lookup filter limits which records can be associated within an object relationship.

Lookup filters can be applied to lookup, master-detail, and hierarchical relationship fields.

Schema Builder

Schema Builder provides a dynamic environment for viewing and modifying all the objects and relationships in an app. This greatly simplifies the task of designing, implementing, and modifying the data model, or schema.

It can be used to view existing schema and interactively add new custom objects, custom fields, and relationships, simply by dragging and dropping. This eliminates the need to click from page to page to find the details of a relationship or to add a new custom field to an object in the schema.

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Schema Builder provides details such as the field values, required fields, and how objects are related by displaying lookup and master-detail relationships. The fields and relationships can be viewed for both standard and custom objects.

Schema Builder is enabled by default and lets administrators add the following to the schema:

- Custom objects
- Lookup relationships
- Master-detail relationships
- All custom fields except: Geolocation

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