



## Many-to-Many Fields

This screen features a *many-to-many* field, named *Territories*. You can see that multiple territories are comma-separated in a *Territories* column, and these territories represent every single territory assigned to the employee.

Employees										
This is a list of employees.										
Quick Find										
New Employees Actions Report										
View: Employees										
Last Name	First Name	Title	Title Of Courtesy	Birth Date	Hire Date	Address	City	Region	Postal Code	Territories
Davolio	Nancy	Sales Representative	Ms.	12/8/1948	5/1/1992	507 - 20th Ave. E.Apt. 2A	Seattle	WA	98122	Georgetown, Neward, Wilton
Fuller	Andrew	Vice President, Sales	Dr.	2/19/1952	8/14/1992	908 W. Capital Way	Tacoma	WA	98401	Bedford, Boston, Cambridge, Georgetown, Louisville, Westboro
Leverling	Janet	Sales Representative	Ms.	8/30/1963	4/1/1992	722 Moss Bay Blvd.	Kirkland	WA	98033	Atlanta, Orlando, Savannah, Tampa
Peacock	Margaret	Sales Representative	Mrs.	9/19/1937	5/3/1993	4110 Old Redmond Rd.	Redmond	WA	98052	Cambridge, Greensboro, Rockville
Buchanan	Steven	Sales Manager	Mr.	3/4/1955	10/17/1993	14 Garrett Hill	London	n/a	SW1 8JR	Edison, Fairport, Melville, Morristown, New York, New York, Providence
Suyama	Michael	Sales Representative	Mr.	7/2/1963	10/17/1993	Coventry HouseMiner Rd.	London	n/a	EC2 7JR	Bellevue, Phoenix, Redmond, Scottsdale, Seattle
King	Robert	Sales Representative	Mr.	5/29/1960	1/2/1994	Edgeham HollowWinchester Way	London	n/a	RG1 9SP	Campbell, Chicago, Colorado Springs, Denver, Menlo Park, San Francisco, Santa Clara, Santa Cruz
Callahan	Laura	Inside Sales Coordinator	Ms.	1/9/1958	3/5/1994	4726 - 11th Ave. N.E.	Seattle	WA	98105	Beachwood, Findlay, Philadelphia, Racine
Dodsworth	Anne	Sales Representative	Ms.	1/27/1966	11/15/1994	7 Houndstooth Rd.	London	n/a	WG2 7LT	Bloomfield Hills, Hollis, Minneapolis, Portsmouth, Roseville, Southfield, Troy
Showing 1-9 of 9 items   Refresh										

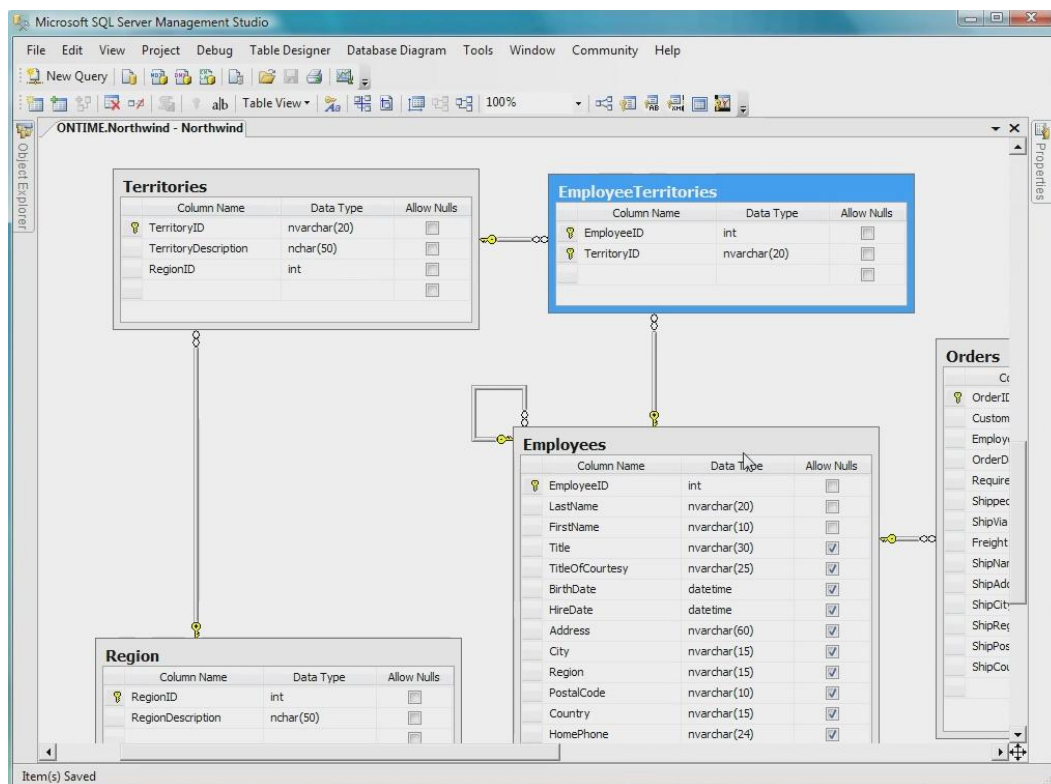
If you go to detail view of a particular employee by clicking on the name of the employee in the list, you can see the associated territories. If you press the *Edit* button, you can see a checkbox list of all territories available.

If you check several territories by clicking on the checkbox next to their respective names, and press the *Ok* button to save, *Employee Territories* field will immediately reflect your changes. Click on the *Employee Territories* tab inside of the *Employees* page to view the changed territories as list.



If you were to delete the records by clicking on the dropdown next to the *Territory* name and pressing the *Delete* button, and go back to the *Employees* tab by pressing *Employees* tab inside the *Employees* page, and refresh by pressing the *Refresh* button in the bottom right corner, then you would see that the deleted *Territories* have been removed from the edited employee.

The database diagram is shown below. We were looking at *Employees* record. *EmployeeTerritories* links *Territories* to *Employees*. *Territories* were listed in the checkbox list. Any given territory may have many employees assigned to it, and any employee may be responsible for many territories, a *many-to-many* relationship.



We start with the *Employees* screen freshly generated by *Code OnTime Generator* with the *Web Site Factory* premium project. This screen may be accessed by pressing the *Employees* tab near the top of the screen. In the list, we can select a record by clicking on its respective row. Then, click on the *Employee Territories* tab inside of the *Employees* page to view the *Employee Territories* associated with your selected *Employee*. You can see the selected *Employee* in the box on the left side of the screen.

Home > Employees

## Employees

Employees Employees Orders **Employee Territories**

This is a list of employee territories.

Quick Find New Actions Report View: Employee Territories

Territory Description	Territory Region Description
Westboro	Eastern
Bedford	Eastern
Georgetown	Eastern
Boston	Eastern
Cambridge	Eastern
Louisville	Eastern

Showing 1-6 of 6 items | Refresh

This approach works well, but sometimes it may be more convenient to have *Employee Territories* embedded into the *Employees* form. If we click on an *Employee* name in the list, we get taken to detail view of the *Employee*. We will see a long list of fields.

Employees Employees Orders **Employee Territories**

Please review employees information below. Click Edit to change this record, click Delete to delete the record, or click Cancel/Close to return back.

New Employees Actions Report View: Review Employees

Edit Delete Close

### Employees

These are the fields of the employees record that can be edited.

Last Name  
Fuller

First Name  
Andrew

Title  
Vice President, Sales

Title Of Courtesy  
Dr.

Birth Date  
2/19/1952

Hire Date  
8/14/1992

Address  
908 W. Capital Way

City  
Tacoma

Region  
WA

Postal Code  
98401

Country

What we want to do is place an additional field that will represent *Employee Territories* as a list of checkboxes, and will allow us to select territories that the employee is responsible for. Also, we will make this form more compact so that it will look better when editing, and requires less scrolling.

Click on the *Code OnTime* link on your desktop to run the code generator. Click on the project name you wish to edit. Press the *Design* button near the bottom of the page to bring up the *Designer*. In the *Controller* tab, select *Employees* controller by clicking on its name. At the top of the screen, click on the *Fields* tab.

**Project Designer** Close

Home > Controller: Employees

Controller Commands **Fields** Views Categories Data Fields Action Groups

This is a list of fields.

Quick Find New Preview View: Fields

Name	Type	Allow Nulls	Is Primary Key	Read Only	Label
EmployeeID	Integer	No	Yes	Yes	Employee #
LastName	2 String	No	No	No	Last Name
FirstName	3 String	No	No	No	First Name
Title	4 String	No	No	No	Title
TitleOfCourtesy	5 String	No	No	No	Title Of Courtesy
BirthDate	6 DateTime	No	No	No	Birth Date
HireDate	7 DateTime	No	No	No	Hire Date
Address	8 String	No	No	No	Address
City	9 String	No	No	No	City
Region	10 String	No	No	No	Region

« Previous | Page: 1 2 | Next » Items per page: 10, 25, 50, 100 | Showing 1-10 of 19 items | Refresh

We need to create a new field to place *Employee Territories* in the *Employees* detail view. This field will not be a real field in the database, but a virtual representation of the list of territories assigned to the employee. On the action bar, Press *New | New Field*. In the *Name* box, type in *Territories*. Check the box next to “*Allow Null Values*” and “*The Value of this Field is computed at run-time.*” Leave the *SQL Formula* textbox that appears underneath blank, to insure that null value is automatically inserted into *Select* statement whenever an employee record is retrieved from the database.

**New Field**

Specify field name, type, and data properties of the field.

*Server Default* is a SQL expression used as a field value when no value is provided for the field in INSERT and UPDATE statement.

Indicate that the field is *computed* if the field is not physically present in the dataset produced by controller's command. Computed field requires a mandatory *formula* that must be defined as a valid SQL expression. This expression is automatically inserted in SELECT statements when needed.

The field must be marked as *on-demand* if the field is a large binary object (BLOB) or text to speed up record retrieval.

*Code Default* is an expression written in the programming language of your project. The expression is evaluated in an automatically created business rule to produce a default value for the field before it is presented in the user interface.

Name \*  
Territories

Type \*  
String

☒ Allow null values.

Server Default  
[Empty text box]

☒ The value of this field is computed at run-time.

SQL Formula  
[Empty text box]

☐ Value is retrieved on demand

Code Default  
[Empty text box]

Type the text “Territories” in the “Label” box. In the *Lookup* section, set *Items Style* dropdown to *Check Box List*. For *Items Data Controller*, press the *(select)* link to bring up a list, and select *Territories* by clicking on its name in the list. You may need to page to reach it. For *Data Value Field*, press *(select)* and select *TerritoryID*. For *Data Text Field*, press *(select)* and click on *TerritoryDescription*. For *Target Controller*, which receives the list of territories, press *(select)* and choose *EmployeeTerritories*. Press the *OK* button at the bottom of the page to save the new field.

**Lookup**

Lookup settings can be based on another data controller or defined as static items. Follow the link to learn more about [lookup item styles](#).

You can list static lookup items on the *Items* tab.

Property *Copy* specifies the fields that must be copied from the lookup data row when a lookup value is selected. Specify one copy source per line in format *FieldName=LookupFieldName*.

Items style *Check Box List* allows to configure the field as many-to-many if you set the data type to *String*, indicate that the value of the field is *computed at runtime* and select a *Target Controller*.

Items Style: **Check Box List**

Items Data Controller: **Territories**

Data Value Field: **TerritoryID**

Data Text Field: **TerritoryDescription**

Target Controller: **EmployeeTerritories**

The next step is to insert this field into the views. Click on the *Views* tab at the top of the screen. Click on *createForm1*, and select the *Data Fields* tab at the top. On the action bar, press *New | New Data Field*. For *Field Name*, press *(select)* and select *Territories*, found on the second page of the lookup. For *Category*, press *(select)* and choose *New Employees*. Press the *OK* button to save the data field.

**Project Designer** Close

Home > Controller: Employees > View: createForm1

View Categories Styles **Data Fields**

Please fill this form and click OK button to create a new data field record. Click Cancel to return to the previous screen.

View: **New Data Field**

\* - indicates a required field

**New Data Field**

Complete the form. Make sure to enter all required fields.

Field Name \*: **Territories**

Category: **New Employees**

Alias: **(select)**

OK Cancel

We’ll do the same for *editForm1*. Press the *Back* icon to navigate back to *Views*. Click on *editForm1* in the list. On the action bar, press *New | New Data Field*. For *Field Name*, press *(select)* and choose *Territories*. For *Category*, press *(select)* and click on *Employees*. Press the *OK* button to save this data field.



**Project Designer** Close

Home > Controller: Employees > View: editForm1

View Categories Styles **Data Fields**

Please fill this form and click OK button to create a new data field record. Click Cancel to return to the previous screen.

View: **New Data Field**

\* - indicates a required field

**New Data Field**  
Complete the form. Make sure to enter all required fields.

Field Name \*  
Territories

Category  
Employees

Alias  
(select)

OK Cancel

Go back to *Views* and click on *grid1*. Click on the *Data Fields* tab at the top. On the action bar, press *New | New Field*. For this one, we only need to set *Field Name*. Click on *(select)* and select *Territories*. Press the *OK* button to save this field.

**Project Designer** Close

Home > Controller: Employees > View: grid1

View Categories Styles **Data Fields**

Please fill this form and click OK button to create a new data field record. Click Cancel to return to the previous screen.

View: **New Data Field**

\* - indicates a required field

**New Data Field**  
Complete the form. Make sure to enter all required fields.

Field Name \*  
Territories

Category  
(select)

Alias  
(select)

OK Cancel

Let's give it a try. On the action bar, press *Preview*. A web page should open that only displays *Employees*. Let's select the employee with the least number of territories, Margaret Peacock. Click on her last name in the list to view her detail view. Click on the *Edit* button. When we do this, a long list of territories is presented as checkboxes, and you can see that there are currently only three territories checked.

Now it's time to modify the user interface design of the form that we generated. Switch back to *Code OnTime Designer* and press the *Back* icon to go back to the list of *Views*. Click on the *Categories* tab, next to the *Views* tab.

Territories

- ☐ Atlanta
- ☐ Austin
- ☐ Beachwood
- ☐ Bedford
- ☐ Bellevue
- ☐ Bentonville
- ☐ Bloomfield Hills
- ☐ Boston
- ☐ Braintree
- ☐ Cambridge
- ☐ Campbell
- ☒ Cary
- ☐ Chicago
- ☐ Colorado Springs
- ☐ Columbia
- ☐ Dallas
- ☐ Denver
- ☐ Edison
- ☐ Fairport
- ☐ Findlay
- ☐ Georgetown
- ☒ Greensboro
- ☐ Hoffman Estates
- ☐ Hollis
- ☐ Louisville
- ☐ Melville
- ☐ Menlo Park
- ☐ Minneapolis

Click on the dropdown next to *New Employees* in the list, and press the *Edit* button. Change the *New Column* field to *Yes*. Change *Floating* field to *Yes* as well. Save changes by pressing the *Save* button. Do the same changes to *Employees* record.

Header Text	View	Description	New Column	Tab	Floating
New Employees	createForm1	Complete the form. Make sure to enter all required fields.	Yes	n/a	Yes
Employees	editForm1	These are the fields of the employees record that can be edited.	Yes		Yes

Showing 1-2 of 2 items | Refresh

Next, go back to *Views* by pressing on the *Views* tab. Click on *grid1* record. In the *Data Fields* tab, click on the dropdown and press the *Edit* button. Change *Read Only* to *Yes*. Press the *Save* button underneath the record to save. We need to do this to prevent *Territories* being displayed as a long list when users edit records in-place in the grid.

Field Name	Category	Read Only	Cols	Rows	Data Type	Alias	Hidden
Territories	n/a	Yes			String	(select)	

Items per page: 10, 25, 50, 100 | Showing 11-11 of 11 items | Refresh

Return to the list of fields by pressing the *Back* icon in the upper left corner. Click on *Territories* field in the list. Click on *Data Fields* tab at the top. Click on the dropdown next to *New Employees* and press the *Edit* button. Change *Columns* cell to "5". Press the *Save* button underneath the record to save. Do the same thing for *Employees* data field.

Category	View	Read Only	Cols	Rows	Data Type	Alias	Hidden
New Employees	createForm1	Default	5	n/a	String	n/a	No
Employees	editForm1	Default	5		String	(select)	
n/a	grid1	Yes	n/a	n/a	String	n/a	No

Showing 1-3 of 3 items | Refresh


Now press the *Close* link in the upper right side of the screen, press the *Next* button, and then press *Generate* to start generation of the web application. When finished, a web page will open with the generated application. Click on *Employees* tab at the top of the screen to go to *Employees*. You can see the *Territories* column displayed at the very right of the list. If you click on a dropdown and press the

*Edit* button, the territories remain read only and do not create a giant checkbox list. The inline editing of a row is much more comfortable.

Employees										
This is a list of employees.										
Quick Find <input type="text"/> Record <span>▼</span> View: <b>Employees</b> <span>▼</span>										
Last Name	First Name	Title	Title Of Courtesy	Birth Date	Hire Date	Address	City	Region	Postal Code	Territories
Davolio	Nancy	Sales Represen	Ms.	12/8/1948	5/1/1992	507 - 20th Ave. E	Seattle	WA	98122	Atlanta , Cary , Georgetown , Hoffman Estates , Neward , Philadelphia , Santa Monica , Wilton
<input type="button" value="Save"/> <input type="button" value="Cancel"/>										
Fuller	Andrew	Vice President, Sales	Dr.	2/19/1952	8/14/1992	908 W. Capital Way	Tacoma	WA	98401	Bedford , Boston , Cambridge , Georgetown , Louisville , Westboro
Leverling	Janet	Sales Representative	Ms.	8/30/1963	4/1/1992	722 Moss Bay Blvd.	Kirkland	WA	98033	Atlanta , Orlando , Savannah , Tampa
Peacock	Margaret	Sales Representative	Mrs.	9/19/1937	5/3/1993	4110 Old Redmond Rd.	Redmond	WA	98052	Cary , Greensboro , Rockville
Buchanan	Steven	Sales Manager	Mr.	3/4/1955	10/17/1993	14 Garrett Hill	London	n/a	SW1 8JR	Edison , Fairport , Melville , Morristown , New York , New York , Providence
Suyama	Michael	Sales Representative	Mr.	7/2/1963	10/17/1993	Coventry HouseMiner Rd.	London	n/a	EC2 7JR	Bellevue , Phoenix , Redmond , Scottsdale , Seattle
King	Robert	Sales Representative	Mr.	5/29/1960	1/2/1994	Edgeham HollowWinchester Way	London	n/a	RG1 9SP	Campbell , Chicago , Colorado Springs , Denver , Menlo Park , San Francisco , Santa

If you click on an employee name in the list, you get taken to the detail view. You can see that the fields are arranged differently. If you press the *Edit* button underneath the action bar, the fields will reconfigure their position, and at the bottom you can see a five column checkbox list of all the territories.

**Summary**  
Last Name  
Davolio  
First Name  
Nancy  
Title  
Sales Representative  
Title Of Courtesy  
Ms.  
Birth Date  
12/8/1948  
**About**  
This page allows employees management.  
**See Also**  
Employee Territories

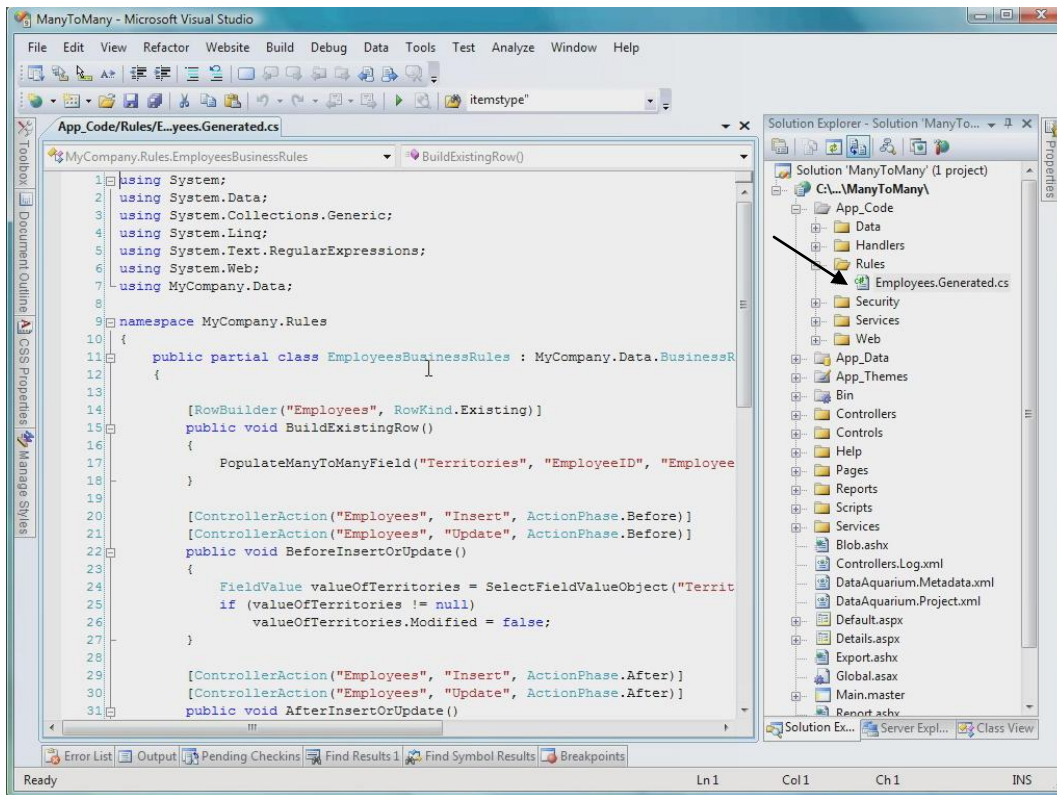
Birth Date  
12/8/1948  
Hire Date  
5/1/1992  
Address  
507 - 20th Ave. E Apt. 2A  
City  
Seattle  
Region  
WA  
Postal Code  
98122  
Country  
USA  
Home Phone  
(206) 555-9857  
Extension  
5467  
Photo  
  
Click [here](#) to upload employees photo file.  
Notes  
Education includes a BA in psychology from Colorado State University in 1970. She also completed "The Art of the Cold Call." Nancy is a member of Toastmasters International.  
Reports To Last Name  
Fuller  
Photo Path  
http://accweb/ememployees/davolio.bmp  
Territories  
☒ Atlanta ☒ Cary ☒ Hoffman Estates ☒ Philadelphia ☒ Santa Monica  
☐ Austin ☐ Chicago ☐ Hollis ☐ Phoenix ☐ Savannah  
☐ Beachwood ☐ Colorado Springs ☐ Louisville ☐ Portsmouth ☐ Scottsdale  
☐ Bedford ☐ Columbia ☐ Menlo Park ☐ Providence ☐ Seattle  
☐ Bellevue ☐ Dallas ☐ Racine ☐ Southfield  
☐ Bentonville ☐ Denver ☐ Minneapolis ☐ Redmond ☐ Troy  
☐ Bloomfield Hills ☐ Edison ☐ Morristown ☐ Rockville ☐ Westboro  
☐ Boston ☐ Fairport ☐ New York ☐ Roseville ☐ Wilton  
☐ Braintree\* ☐ Findlay ☐ New York ☐ San Francisco ☒ Santa Clara  
☐ Cambridge ☒ Georgetown ☒ Neward ☐ Santa Clara  
☐ Campbell ☐ Greensboro ☐ Orlando ☐ Santa Cruz  

\* - indicates a required field

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This functionality comes from the business rules classes generated by *Code OnTime* to support the *Employees* data controller. The class is stored in the file *Employees.generated.cs*. The name of the class is *EmployeesBusinessRules*.





There are several methods adorned with *RowBuilder* and *ControllerAction* attributes. The first builds existing row, and populates *Many to Many* field *Territories*.

The second method is executed just before a record is about to be inserted or updated, and its purpose is to indicate that the field is not changed. The *Territories* field is a virtual field, and an attempt to update it will raise an exception.

The actual insertion is performed in *AfterInsertOrUpdate*, *UpdateManyToManyField* inherited from business rule class will do the trick.

*BeforeDelete* method is executed just before the *Delete* operation is attempted, and it eliminates *Territories* field associated with *Employees*.

Code OnTime LLC

<http://www.codeontime.com>