



**Tutorial: Mobile Business Object  
Development**

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**SAP Mobile Platform 2.3 SP02**

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Sybase, Inc., One Sybase Drive, Dublin, CA 94568.

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# SAP Mobile Platform Tutorials

The SAP® tutorials demonstrate how to develop, deploy, and test mobile business objects, device applications, online mobile applications (native OData and REST services based), and Hybrid App packages. You can also use the tutorials to demonstrate system functionality and train users.

- Learn mobile business object (MBO) basics, and use this tutorial as a foundation for the Object API application development tutorials:

- *Tutorial: Mobile Business Object Development*

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**Note:** For all Object API tutorials, if you opt to use the Mobile Business Object example project instead of performing the Mobile Business Object Tutorial, you must deploy the mobile application project to SAP Mobile Server as a prerequisite.

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- Create native Object API mobile device applications:
  - *Tutorial: Android Object API Application Development*
  - *Tutorial: BlackBerry Object API Application Development*
  - *Tutorial: iOS Object API Application Development*
  - *Tutorial: Windows Object API Application Development*
  - *Tutorial: Windows Mobile Object API Application Development*
- Create a mobile business object, then develop a hybrid app package that uses it:
  - *Tutorial: Hybrid App Package Development*
- Create an OData mobile application with REST Services
  - *Tutorial: Android OData Application Development with REST Services*
  - *Tutorial: iOS OData Application Development with REST Services*



# Getting Started with SAP Mobile Platform (On-Premise)

Install and learn about SAP Mobile Platform and its associated components.

Complete the following tasks for all tutorials, but you need to perform them only once.

**1. *Installing SAP Mobile Platform***

Install SAP Mobile SDK and SAP Mobile Platform Runtime.

**2. *Starting SAP Mobile Platform Services***

Start SAP Mobile Server, SAP Control Center, the sample database, the cache database (CDB), and other essential services.

**3. *Starting SAP Mobile WorkSpace***

Start the development environment, where you can create mobile business objects (MBOs), create connection profiles and manage SAP Mobile Server connections, develop Hybrid Apps, and generate Object API code.

**4. *Connecting to SAP Control Center***

Open SAP Control Center to manage SAP Mobile Server and its components.

**5. *Learning SAP Mobile WorkSpace Basics***

SAP Mobile WorkSpace features are well integrated in the Eclipse IDE. If you are unfamiliar with Eclipse, you can quickly learn the basic layout of SAP Mobile WorkSpace and the location of online help.

## Installing SAP Mobile Platform

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Install SAP Mobile SDK and SAP Mobile Platform Runtime.

Before starting this tutorial, install all the requisite SAP Mobile Platform components. See the SAP Mobile Platform documentation at <http://sybooks.sybase.com/sybooks/sybooks.xhtml?id=1289&c=firsttab&a=0&p=categories>.

- *Release Bulletin*
- *Installation Guide for SAP Mobile SDK*
- *Installation Guide for Runtime*

**1. Install these SAP Mobile Platform Runtime components:**

- Data Tier (included with single-server installation)
- SAP Mobile Server

**2. Install SAP Mobile SDK, which includes:**

- Development support for native Object API and OData SDK applications, as well as HTML5/JS Hybrid Apps.
- SAP Mobile WorkSpace, the Eclipse-based development environment for MBOs and Hybrid Apps.

## Starting SAP Mobile Platform Services

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Start SAP Mobile Server, SAP Control Center, the sample database, the cache database (CDB), and other essential services.

The way in which you start SAP Mobile Platform Services depends on the options you selected during installation. You may need to manually start SAP Mobile Platform Services. Select **Start > (All) Programs > SAP > Mobile Platform > Start SAP Mobile Platform Services**.

The following services will be started:

- SAP Control Center <Version>
- SAP Mobile Platform Cache DB
- SAP Mobile Platform SampleDB
- SAP Mobile Server

SAP Mobile Platform Services enable you to access the SAP Mobile Platform runtime components and resources.

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**Note:** The SAP Mobile Platform installer creates the Windows service (SAP Mobile Platform Sample DB) that runs the `sampledb` server only when you install SAP Mobile Server with a Personal or Enterprise Development license. If you installed SAP Mobile Server with an Enterprise Server (production) license, you must create this service using the `sampledb.bat` command line utility. See *Create or Remove the Windows Service for `sampledb` Server (`sampledb`) Utility* in *System Administration* for more information about using this command line utility.

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## Starting SAP Mobile WorkSpace

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Start the development environment, where you can create mobile business objects (MBOs), create connection profiles and manage SAP Mobile Server connections, develop Hybrid Apps, and generate Object API code.

Select **Start > (All) Programs > SAP > Mobile Platform > Mobile WorkSpace 2.3**.

The SAP Mobile WorkSpace opens in the Mobile Development perspective. The Welcome page displays links to the product and information.

### Next

To read more about SAP Mobile WorkSpace concepts and tasks, select **Help > Help Contents**.



## Connecting to SAP Control Center

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Open SAP Control Center to manage SAP Mobile Server and its components.

From SAP Control Center, you can:

- View servers and their status
- Start and stop a server
- View server logs
- Deploy a mobile application package
- Register application connections
- Set role mappings
- Assign/Unassign a hybrid application to a device

For information on configuring, managing, and monitoring SAP Mobile Server, click **Help > Help Contents**.

1. Select **Start > (All) Programs > SAP > SAP Control Center**.

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**Note:** If SAP Control Center does not launch, make sure that the SAP Control Center service is started in the Windows Services dialog.

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2. Log in by entering the credentials set during installation.

SAP Control Center gives you access to the SAP Mobile Platform administration features that you are authorized to use.

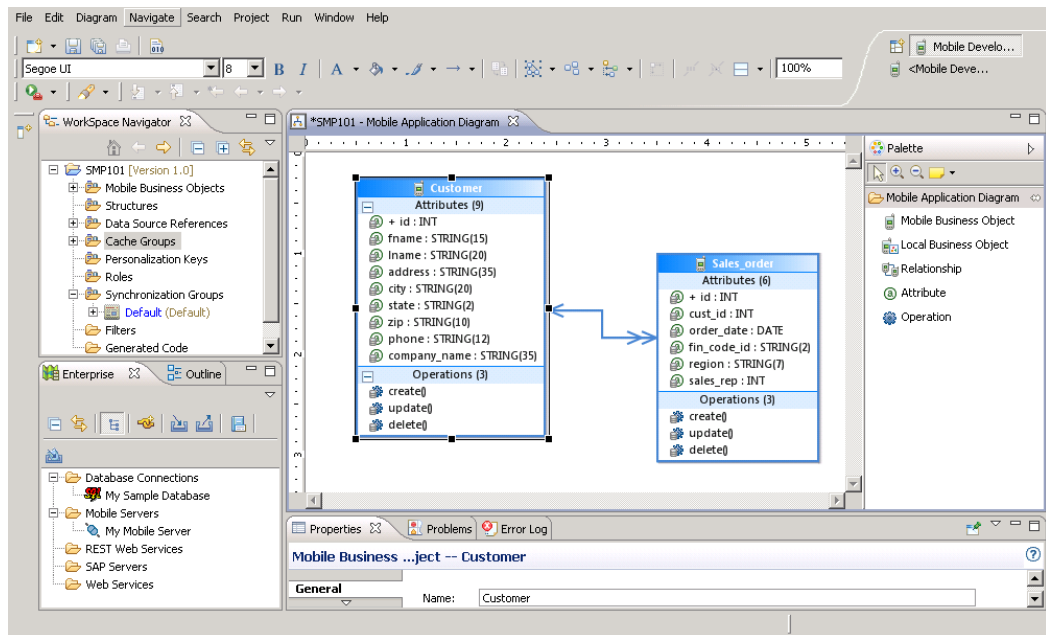
## Learning SAP Mobile WorkSpace Basics

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SAP Mobile WorkSpace features are well integrated in the Eclipse IDE. If you are unfamiliar with Eclipse, you can quickly learn the basic layout of SAP Mobile WorkSpace and the location of online help.

- To access the online help, select **Help > Help Contents**. Some documents are for SAP Mobile WorkSpace, while others are for the Eclipse development environment.
- The Welcome page provides links to useful information to get you started.
  - To close the Welcome page, click **X** in the upper right corner of the page.
  - Reopen the Welcome page by selecting **Help > Welcome**.
  - To learn about tasks you must perform, select the **Development Process** icon.
- In SAP Mobile WorkSpace, look at the area (window or view) that you will use to access, create, define, and update mobile business objects (MBOs).

## Getting Started with SAP Mobile Platform (On-Premise)



| Window                   | Description   |
|--------------------------|---|
| WorkSpace Navigator view | <p>Use this view to create Mobile Application projects, and review and modify MBO-related properties.</p> <p>This view displays mobile application project folders, each of which contains all project-related resources in subfolders, including MBOs, datasource references to which the MBOs are bound, personalization keys, and so on.</p> |
| Enterprise Explorer view | <p>A view that provides functionality to connect to various enterprise information systems (EIS), such as database servers, SAP® back ends, and SAP Mobile Server.</p>  |

| Window                     | Description   |
|----------------------------|---|
| Mobile Application Diagram | <p>The Mobile Application Diagram is a graphical editor where you create and define mobile business objects.</p> <p>Use the Mobile Application Diagram to create MBOs (including attributes and operations), then define relationships with other MBOs. You can:</p> <ul style="list-style-type: none"> <li>• Create MBOs in the Mobile Application Diagram using Palette icons and menu selections – either bind or defer binding to a datasource, when creating an MBO. For example, you may want to model your MBOs before creating the datasources to which they bind. This MBO development method is sometimes referred to as the top-down approach.</li> <li>• Drag and drop items from Enterprise Explorer to the Mobile Application Diagram to create the MBO – quickly creates the operations and attributes automatically based on the datasource artifact being dropped on the Mobile Application Diagram.</li> </ul> <p>Each new mobile application project generates an associated mobile application diagram.</p> |
| Palette                    | <p>The Palette is accessed from the Mobile Application Diagram and provides controls, such as the ability to create MBOs, add attributes and operations, and define relationships, by dragging and dropping the corresponding icon onto the Mobile Application Diagram or existing MBO.</p>   |
| Properties view            | <p>Select an object in the Mobile Application Diagram to display and edit its properties in the Properties view. While you cannot create an MBO from the Properties view, most development and configuration is performed here.</p>   |
| Outline view               | <p>Displays an outline of the active file and lists structural elements. The contents are editor-specific.</p>  |

| Window         | Description  |
|----------------|--|
| Problems view  | Displays validation errors or warnings that you may encounter in addition to errors in the Diagram editor and Properties view. Follow warning and error messages to adjust MBO properties and configurations to avoid problems, and use as a valuable source for collecting troubleshooting information when reporting issues to Customer Service and Support. |
| Error Log view | Displays error log information. This is a valuable source for collecting troubleshooting information.  |

# Developing Database Mobile Business Objects

Develop two samples of mobile business objects to see how they form the business logic for mobile applications. Create two mobile business objects, each using a database as its datasource, create a relationship between the two MBOs, and deploy them to SAP Mobile Server. Use the deployed project in the Object API application development tutorials.

## Prerequisites

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**Note:** This tutorial was created using SAP Mobile Platform 2.3. If you are using a version of SAP Mobile Platform other than 2.3, the steps and results in this tutorial may vary.

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- Complete the tasks in *Getting Started with SAP Mobile Platform*.
- (Optional) To use as a reference and copy source code when completing this tutorial, download the MBO SMP101 example project (complete project files) for the MBO tutorial from the SAP® Community Network: <http://scn.sap.com/docs/DOC-8803>

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**Important:** When you complete this tutorial, save the MBO project; you need it to complete the Object API tutorials.

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## Task

Develop the database mobile business objects by completing the following tasks, in order. Each task has its own section with descriptions and detailed steps for you to create and deploy a project.

### 1. *Connecting to the Sample Database*

Use the default database connection profile to test and connect to the sample database.

### 2. *Creating the SMP101 Mobile Application Project*

Create a mobile application project to store the mobile business objects and resources you are developing.

### 3. *Creating Database Mobile Business Objects*

Create two mobile business objects from the sampledbs datasource.

### 4. *Creating a Relationship Between Mobile Business Objects*

Create a relationship between mobile business objects to associate related data and maintain data synchronization on the application device.

### 5. *Deploying the Database Mobile Business Objects*

Deploy the project that contains the database mobile business objects to the SAP Mobile Server.

## Connecting to the Sample Database

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Use the default database connection profile to test and connect to the sample database.

### Prerequisites

Start SAP Mobile WorkSpace.

### Task





The SAP Mobile Platform installation includes a sample database, `sampledb`, which you can use to create and test mobile business objects (MBOs). A default connection profile (My Sample Database), also included in the installation, is configured to access the sample database (`sampledb`).

Starting SAP Mobile Platform Services normally starts the sample database automatically; however, if you are running the Deployment Edition or Personal Edition, you must start the database manually.

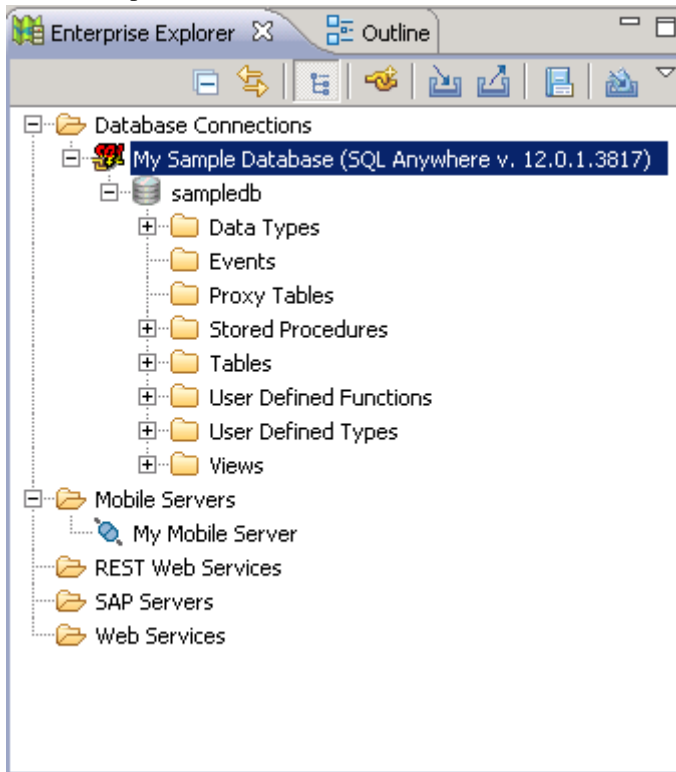
In this task, you start the database, if necessary, then connect to the sample database using the default connection profile. This task is required for all tutorials, but you need to perform it only once.

1. In Enterprise Explorer, expand **Database Connections**.
2. Right-click **My Sample Database** and select **Ping** to confirm that the connection profile can connect to the sample database.
  - If the ping succeeds, click **OK** and go to step 4.
  - If the ping fails, go to step 3.
3. If the ping fails, verify that SAP Mobile Platform Services, including the SAP Mobile Platform SampleDB, are running:
  - a) On your Windows desktop, open the Services window.  
For example (using the Windows XP Classic View), select **Start > Settings > Control Panel**. In the Control Panel, double-click **Administrative Tools**, then double-click **Services**.

Your installation options (for example, license type, whether or not you installed a cluster, and so on) determine which SAP services are running.

| Name   | Description                             | Status  | Startup Type |
|--|---|---------|--------------|
|  SAP Control Center 3.2.7     | Provides the capability to administe... | Started | Automatic    |
|  SAP Mobile Platform CacheDB  | SAP Mobile Platform CacheDB             | Started | Automatic    |
|  SAP Mobile Platform SampleDB | SAP Mobile Platform SampleDB            | Started | Automatic    |
|  SAP Mobile Server            | Manages SAP Mobile Platform servic...   | Started | Automatic    |

- b) In the Services window, check the Status column of the SAP Mobile Platform SampleDB service. If the status is not Started, right-click the service and select **Start**.
- c) Return to step 2.
4. Right-click **My Sample Database** and select **Connect**.  
In Enterprise Explorer, the `sampledb` database appears under the My Sample Database connection profile.



5. Expand the `sampledb` database folder.

## Creating the SMP101 Mobile Application Project

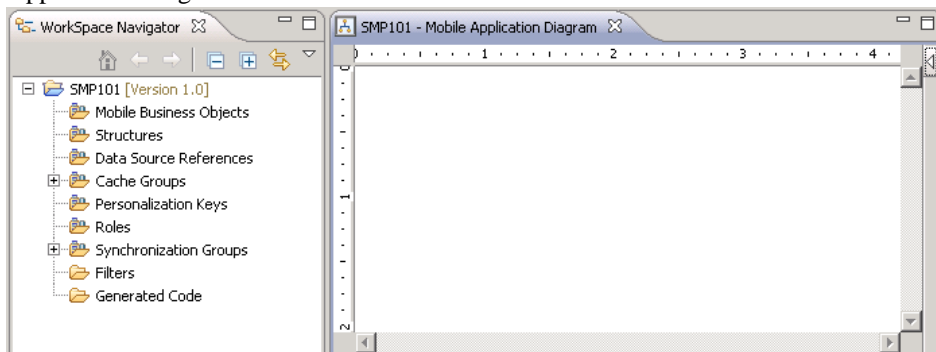
Create a mobile application project to store the mobile business objects and resources you are developing.

Several of the Object API application development tutorials use the objects created in this SMP101 mobile application project.

1. Select **File > New > Mobile Application Project** to create the project.

2. In the New Mobile Application Project wizard, enter `SMP101` as the Project Name and click **Finish**.

The SMP101 project is added to the WorkSpace Navigator and opens in the Mobile Application Diagram.



3. Right-click in the Mobile Application Diagram and verify the Switch Developer Profile is set to Advanced (the default). If the profile is set to Basic, select **Advanced** and click **Yes**.

SAP Mobile WorkSpace provides two developer profiles: Basic and Advanced. The Basic profile provides most of the development features you need access to; however, the tutorial requires additional features, such as configuring code generation, that the Advanced profile provides.

## Creating Database Mobile Business Objects

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Create two mobile business objects from the `sampledb` datasource.

### Prerequisites

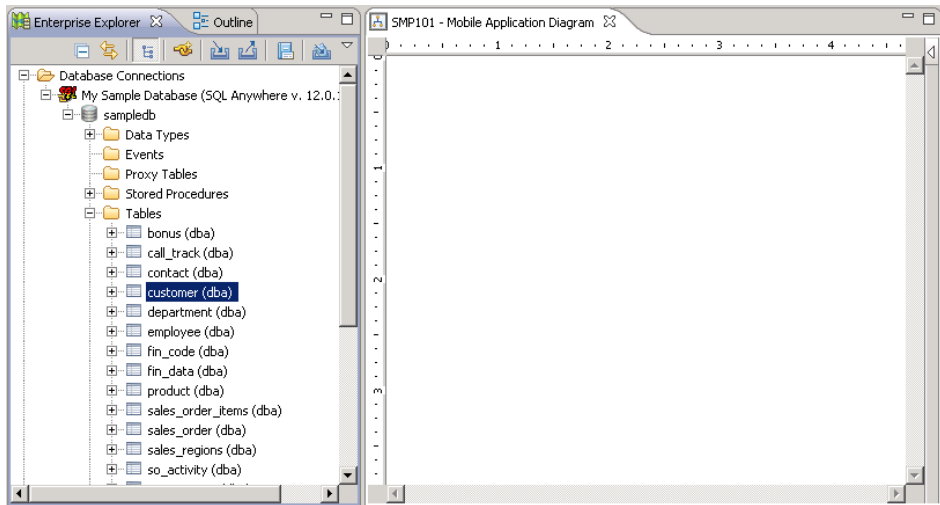
- *Connecting to the Sample Database* on page 10
- *Creating the SMP101 Mobile Application Project* on page 11

### Task

1. Open the SMP101 mobile application project if it is not already open:  
In WorkSpace Navigator, right-click the `SMP101` folder and select **Open in Diagram Editor**.
2. In Enterprise Explorer, expand **Database Connections > My Sample Database**. If **My Sample Database** is not connected, right-click **My Sample Database** and select **Connect**. Enter `SQL` as the password if prompted.
3. Expand **sampledb > Tables**.

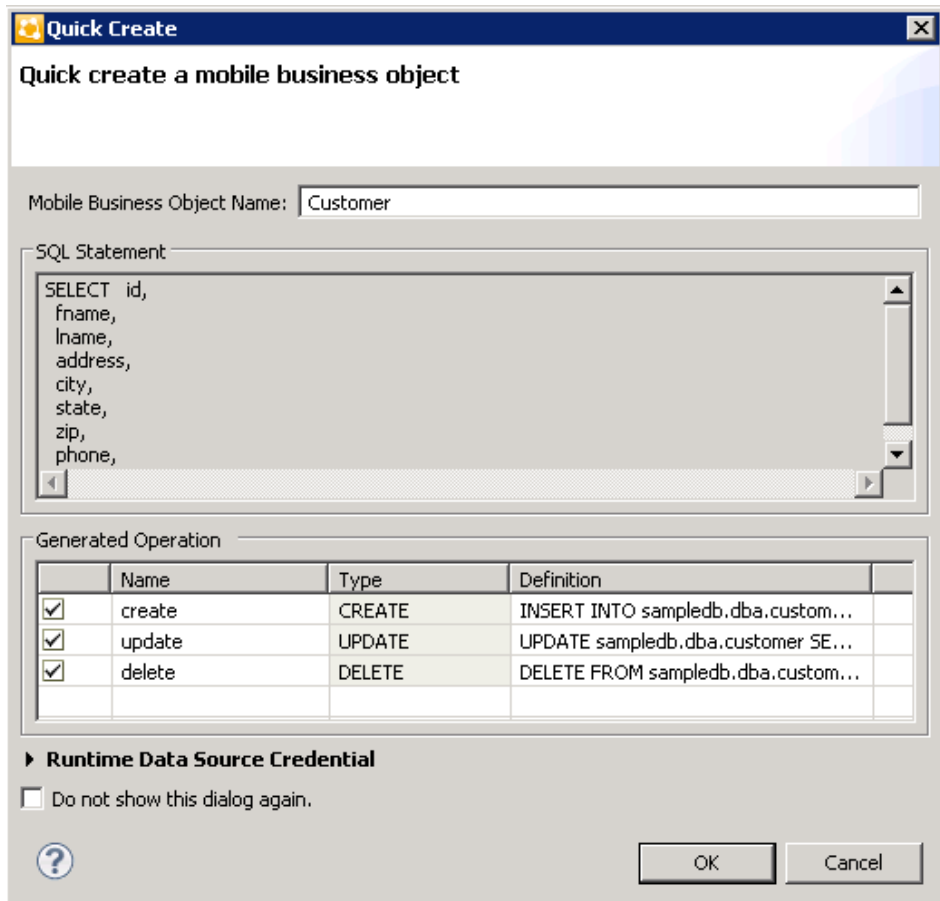


4. Drag the `customer` table from the Enterprise Explorer to the Mobile Application Diagram.



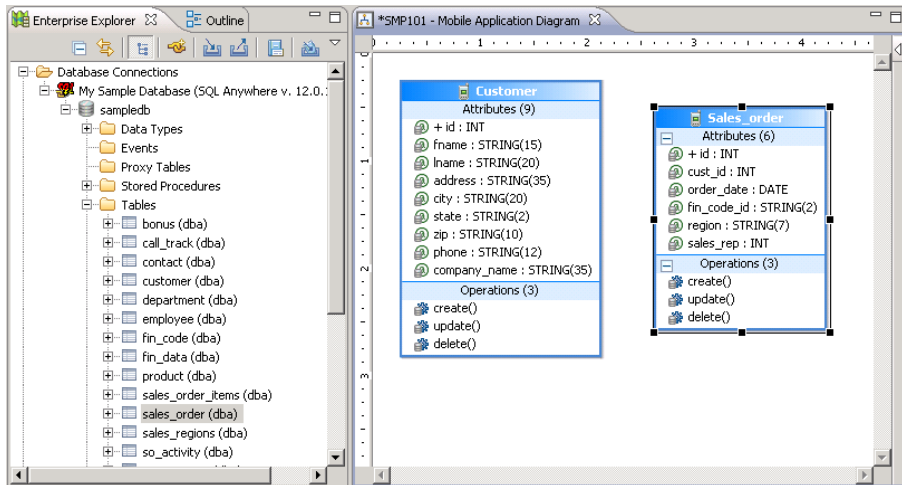
Dragging and dropping the data source onto the Mobile Application Diagram creates the MBO and opens the Quick Create wizard.

5. The Quick Create wizard automatically defines attributes and adds default CREATE, UPDATE, and DELETE operations from the sample.db to the MBO. Accept these default settings and click **OK**.



6. Create another MBO from the `sales_order` table:
  - a) Drag the `sales_order` table from Enterprise Explorer to the Mobile Application Diagram.
  - b) In the Quick Create wizard, accept the default attributes and operations and click **OK**.

The Mobile Application Diagram displays the Customer and Sales\_order MBOs.



7. Select **File > Save**.

## Creating a Relationship Between Mobile Business Objects

Create a relationship between mobile business objects to associate related data and maintain data synchronization on the application device.

### **Prerequisites**

*Creating Database Mobile Business Objects* on page 12

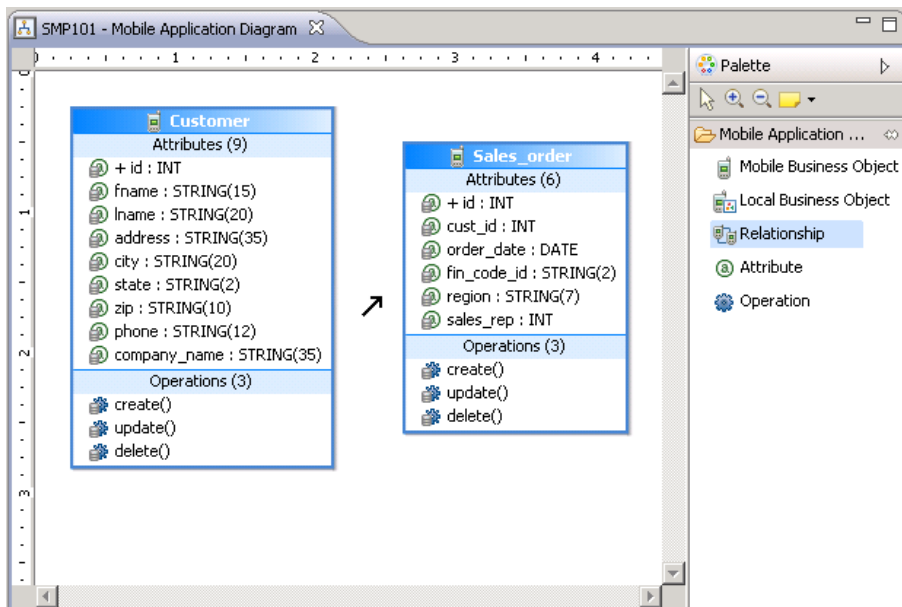
### **Task**

Create a relationship between the Customer and Sales\_order MBOs.

1. Create a link between the two MBOs:

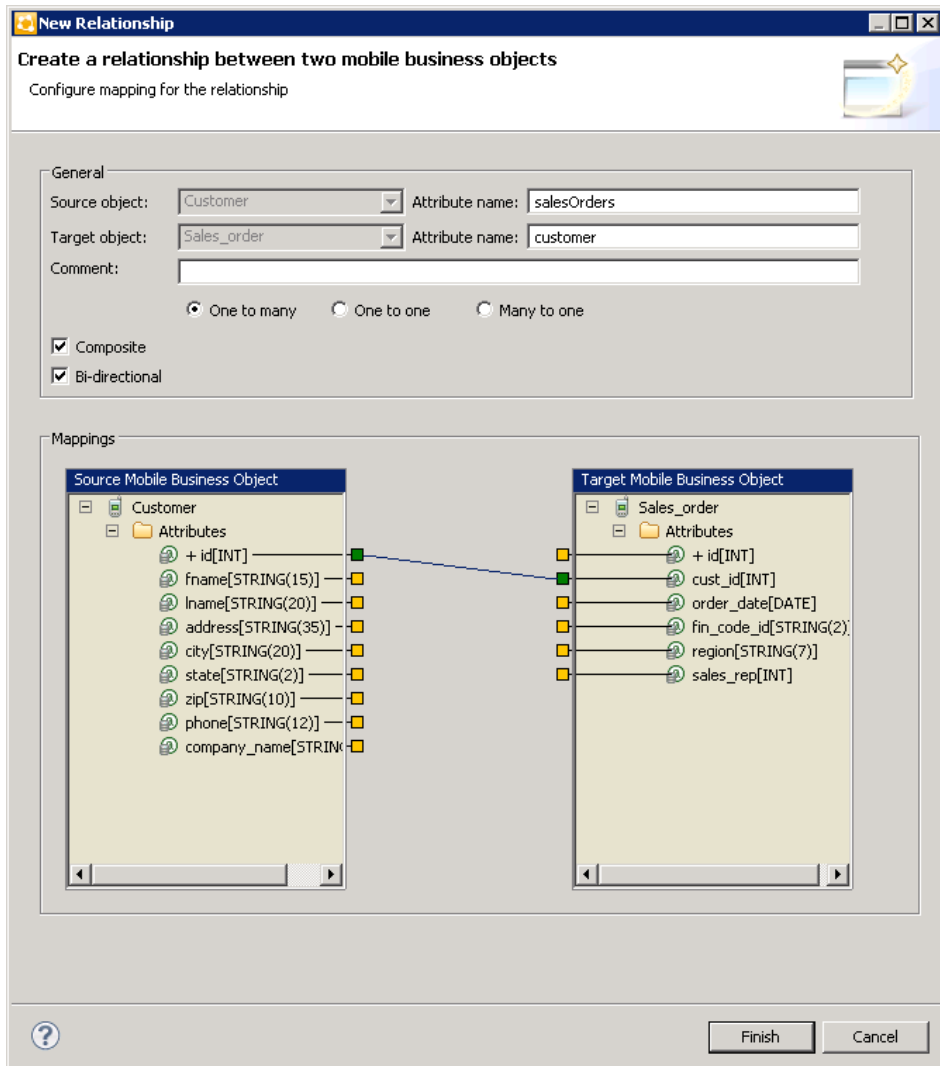
a) In the Palette, select **Relationship**.

When you hover over any part of the Mobile Application Diagram, the cursor changes to a relationship arrow.



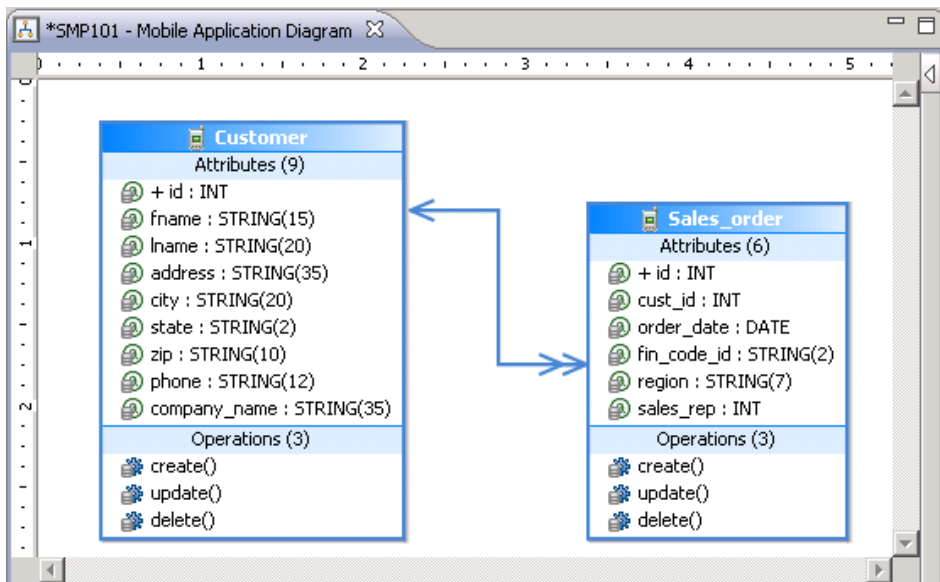
- b) In the Mobile Application Diagram, drag the mouse from any part of the Customer MBO to any part of the Sales\_order MBO to draw a relationship link.
2. In the New Relationship wizard, define the relationship between the MBOs:
  - a) In the General section, the default settings are for a bi-directional one-to-many relationship between the Customer MBO (the Source Object) and the Sales\_order MBO (the Target Object). Accept these default settings and select **Composite** to further define the data flow for the relationship.
  - b) In the Mappings section, drag the mouse to draw a line from the **id** attribute in the Source Mobile Business Object to the **cust\_id** attribute in the Target Mobile Business Object.

Alternatively, click the small, yellow box to the right of the **id** attribute in the Source Mobile Business Object, and then click the small, yellow box to the left of the **cust\_id** attribute in the Target Mobile Business Object to draw the line.



3. Click **Finish** to close the New Relationship wizard.

In the Mobile Application Diagram, a line connects the Customer and Sales\_order MBOs to show they are related objects. Different types of arrows show different relationship types, in this case, one-to-many and bidirectional relationships. You can click the objects and select the **Attributes** tab to see the Attributes in the Properties view.



4. Select **File > Save**.

## Deploying the Database Mobile Business Objects

Deploy the project that contains the database mobile business objects to the SAP Mobile Server.

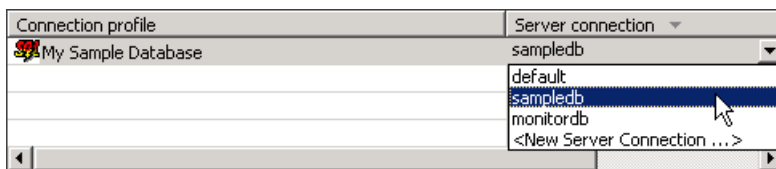
### Prerequisites

- Verify that SAP Mobile Server and related services are started and running. If they are not, see *Starting SAP Mobile Platform Services*.
- *Creating Database Mobile Business Objects* on page 12.
- *Creating a Relationship Between Mobile Business Objects* on page 15.

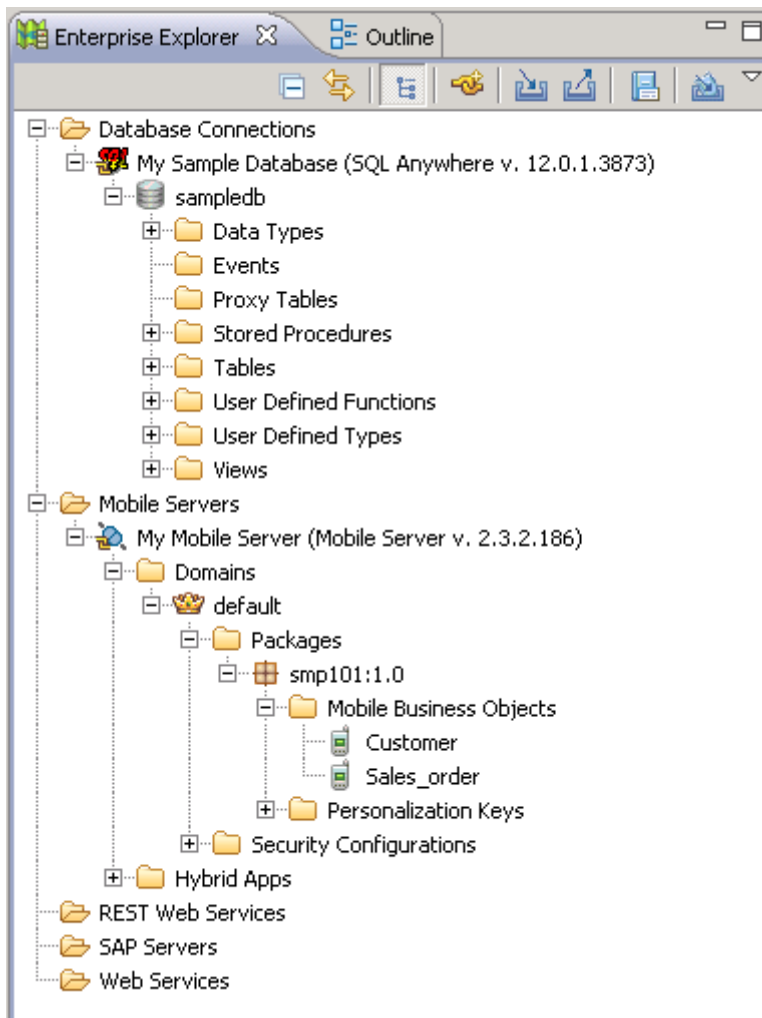
### Task

1. Right-click in the SMP101 Mobile Application Diagram and select **Deploy Project**.
2. The Deploy Mobile Application Project wizard prepopulates default values to Update the target package with the current project version and location of the project. Accept these default settings and click **Next**.
3. In the Contents page, verify that the Customer and Sales\_order MBOs are selected. Click **Next**.

4. The Package User-Defined Classes page allows you to deploy custom classes to SAP Mobile Server. For this project, there are no custom classes to deploy, so click **Next** to skip this step.
5. In the Target Server page, select **My Mobile Server** from the list of available servers, and if not already connected, click **Connect**.
6. Accept the default Domain and Security configuration settings, and click **Next**.  
The default Domain and admin Security configuration settings are the default target server properties that are set when SAP Mobile Server is installed. Once you connect to the target server, these properties are automatically populated for you. If you have multiple domains or security configurations, you will see these as selectable options in the fields provided.
7. In the Assign Package to Applications page, accept the default application ID and click **Next**.
8. In the Server Connection Mapping page, choose a Server connection for the My Sample Database Connection profile:
  - If the runtime database connection is on your local machine, select **My Sample Database** then **sampledb**.
  - If the runtime database connection is on a remote machine, select **My Sample Database** then **New Server Connection**, which allows you to create a connection from an existing template.



9. Click **Finish**.  
The Executing Deployment window closes when the deployment finishes.
10. In the Deployment Status dialog, click **OK**.  
If the deployment is not successful, an error will be displayed. See *Troubleshooting > Troubleshoot Mobile Business Object Development > Deployment Errors* for more information about problems you may encounter while deploying your MBO project.
11. In Enterprise Explorer, you can see the deployed project in **Mobile Servers > My Mobile Server > Domains > default > Packages > smp101:1.0**. The two MBOs you deployed are in the Mobile Business Objects subfolder.



The MBOs are now available for access by device applications. You will use this project in other Object API application development tutorials.



# Learn More About SAP Mobile Platform

Once you have finished, try some of the other samples or tutorials, or refer to other development documents in the SAP Mobile Platform documentation set.

Check the Product Documentation Web site regularly for updates: <http://sybooks.sybase.com/sybooks/sybooks.xhtml?id=1289&c=firsttab&a=0&p=categories>, then navigate to the most current version.

## *Tutorials*

Try out some of the other getting started tutorials available on the Product Documentation Web site to get a broad view of the development tools available to you.

## *Example Projects*

An example project contains source code for its associated tutorial. It does not contain the completed tutorial project. Download example projects from the SAP® Community Network (SCN) at <http://scn.sap.com/docs/DOC-8803>.

## *Samples*

Sample applications are fully developed, working applications that demonstrate the features and capabilities of SAP Mobile Platform.

Check the SAP® Development Network (SDN) Web site regularly for new and updated samples: <https://cw.sdn.sap.com/cw/groups/sup-apps>.

## *Online Help*

See the online help that is installed with the product, or available from the Product Documentation Web site.

## *Developer Guides*

Learn best practices for architecting and building device applications:

- *Mobile Data Models: Using Data Orchestration Engine* – provides information about using SAP Mobile Platform features to create DOE-based applications.
- *Mobile Data Models: Using Mobile Business Objects* – provides information about developing mobile business objects (MBOs) to fully maximize their potential.
- *SAP Mobile WorkSpace: Mobile Business Object Development* – provides information about using SAP Mobile Platform to develop MBOs and generate Object API code that can be used to create native device applications and Hybrid Apps.

Use the appropriate API to create device applications:

- *Developer Guide: Android Object API Applications*
- *Developer Guide: BlackBerry Object API Applications*

## Learn More About SAP Mobile Platform

- *Developer Guide: iOS Object API Applications*
- *Developer Guide: Windows and Windows Mobile Object API Applications*
- *Developer Guide: Hybrid Apps*
- *Developer Guide: OData SDK*
- *Developer Guide: REST API Applications*

Customize and automate:

- *Developer Guide: SAP Mobile Server Runtime > Management API* – customize and automate system administration features.

Javadoc and HeaderDoc are also available in the installation directory.

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