SETTING UP YOUR .NET DEVELOPER ENVIRONMENT

Summary

Configure your local dev environment for integrating with Salesforce using .NET.

This tipsheet describes how to set up your local environment so that you can start using Salesforce APIs, such as SOAP API or REST API.

> **Note:** If you're setting up a local environment to develop Salesforce applications using Apex and custom Metadata API components, take a look at the Force.com IDE.

This tipsheet focuses on tools and configurations you'll need to set up your local development system. It assumes you already have a working Salesforce organization with the "API Enabled" permission. API is enabled by default on Developer Edition, Enterprise Edition, Unlimited Edition, and Performance Edition organizations.

If you are not already a member of the Force.com developer community, go to `developer.salesforce.com/signup` and follow the instructions for signing up for a Developer Edition organization. Even if you already have Enterprise Edition, Unlimited Edition, or Performance Edition, use Developer Edition for developing, staging, and testing your solutions against sample data to protect your organization's live data. This is especially true for applications that insert, update, or delete data (as opposed to simply reading data).

If you have a Salesforce organization you can use for development but need to set up a sandbox for development and testing, see Developer Environments in the *Application Lifecycle Guide* for instructions on creating a developer sandbox.

Installing Microsoft Visual Studio

You'll need to install Microsoft Visual Studio to use Salesforce APIs. Visual Studio is a development environment that enables you to create robust .NET applications.

To install Microsoft Visual Studio, you'll need a Windows system with Internet access. Depending on your system, you might also need administrator-level access to install Visual Studio.

Microsoft Visual Studio provides the necessary development tools and SDKs that are required to build Windows applications. There are several versions and editions of Visual Studio, each with different features and different Windows platform requirements. See http://www.visualstudio.com/products/compare-visual-studio-products-vs to compare current editions. For this tip sheet, we use Visual Studio Express 2013 for Windows on a Windows 7 system.

1. Navigate to http://www.visualstudio.com/downloads/download-visual-studio-vs in your browser.
2. Follow the instructions to download the version of Visual Studio that fits your development needs.
3. Double-click the installer executable and follow the steps to install Visual Studio.

Picking a Path Based on Which API You Use

The next steps for setting up your development environment depend on which Salesforce API you want to use.

To use SOAP API, CRUD-based Metadata API, or any other WSDL-based Salesforce API, complete the steps in the following tasks.

- Download Developer WSDL Files (WSDL-Based APIs) on page 2
- Verify the WSDL Environment (WSDL-Based APIs) on page 2

To use REST API, Bulk API, Chatter API, or any other REST-based Salesforce APIs, complete the steps in the following tasks.

- Setting Up Connected App Access (REST-Based APIs) on page 5
- Verify the REST Environment (REST-Based APIs) on page 7

Tooling API provides SOAP and REST interfaces, so depending on your needs, you can set up your environment by using one of the paths above.

Download Developer WSDL Files (WSDL-Based APIs)

Salesforce Web Services Definition Language (WSDL) files provide API details that you use in your developer environment to make API calls.

To download WSDL files directly from your Salesforce organization:

1. Log in to your Salesforce developer organization in your browser.
2. From Setup, enter *API* in the `Quick Find` box, then select **API**.
3. Download the appropriate WSDL files for the API you want to use.
   a. If you want to use SOAP API you'll need either the Enterprise or Partner WSDL. See Choosing a WSDL in the *SOAP API Developer's Guide* to determine which WSDL to download.
   b. If you want to use Metadata API you'll need the Metadata WSDL. To login and authenticate with Salesforce you'll also need either the Enterprise or Partner WSDL.
   c. If you want to use Tooling API you'll need the Tooling WSDL. To login and authenticate with Salesforce you'll also need either the Enterprise or Partner WSDL.

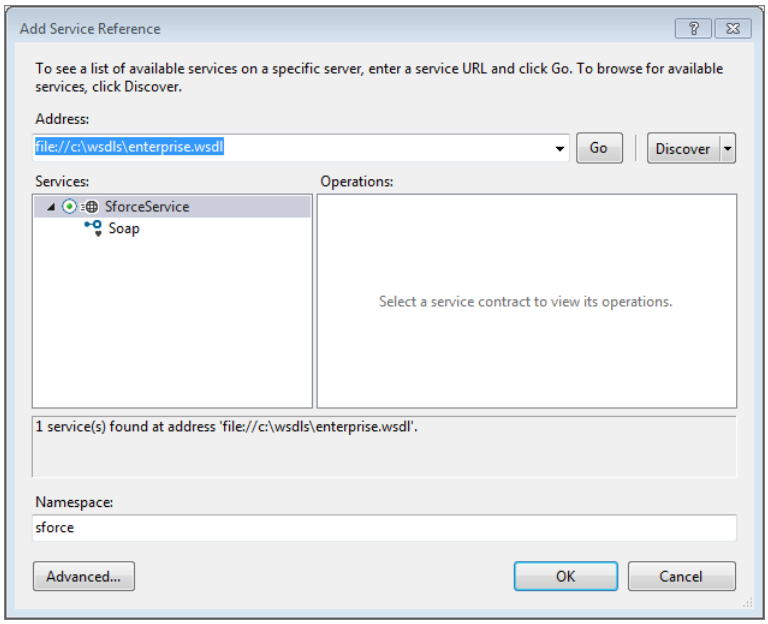
Verify the WSDL Environment (WSDL-Based APIs)

You can verify your developer environment with a simple C# test application in Visual Studio.

You should have Visual Studio installed and have the WSDL files that you need to use available. You'll need the Enterprise or Partner WSDL to follow the verification steps.

1. Start Visual Studio.
2. Click **File** > **New Project**.
3. In the New Project window, navigate to **Installed** > **Templates** > **Visual C#** > **Windows**. Select **Console Application**.
4. In the New Project window, under **Name**, name the project `VerifyWSDLTest`. Under **Solution name**, name the solution `VerifyWSDLTest`. Under **Location**, pick a file location that you'll remember. Click **Ok**. A solution is created, and `Program.cs` is opened for editing.
5. Click **Project** > **Add Service Reference**.
6. In the Add Service Reference window, under **Address**, enter the file URL path to your Enterprise or Partner WSDL file. For example, if `enterprise.wsdl` is saved in `c:\wsdls`, enter `file://c:\wsdls\enterprise.wsdl`. Click **Go**. The Services list is populated with an entry that is named SforceService.

7. Select SforceService. Under **Namespace** enter `sforce`. Your Add Service Reference window should look something like the following image.



Click **Ok**. The WSDL services are imported under the `sforce` namespace in your project.

8. Replace the code in `Program.cs` as described in the following section.

Use the following simple login example code for your Program.cs contents. Replace `YOUR DEVORG USERNAME` with your developer organization username, and replace `YOUR DEVORG PASSWORD AND SECURITY TOKEN` with your developer organization password appended with your security token. If you did not set a security token in your organization, just provide your password. A GitHub Gist of this code is available here: https://gist.github.com/anonymous/7d533cf2b4822fb29317.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.ServiceModel;
using VerifyWSDLTest.sforce;

namespace VerifyWSDLTest
{
    class Program
    {

        private static SoapClient client;
        private static LoginResult loginResult;

        private static bool login()
        {

            client = new SoapClient();
```

```
            string acctName = "YOUR DEVORG USERNAME";
           string acctPw = "YOUR DEVORG PASSWORD AND SECURITY TOKEN";

            try
            {
                loginResult = client.login(null, acctName, acctPw);
            }
            catch (Exception e)
            {
                Console.WriteLine("Unexpected login error: " +
e.Message);
                Console.WriteLine(e.StackTrace);
                return false;
            }
            return true; // success
        }

        static void Main(string[] args)
        {
            if (login())
            {
                // display some current login settings
                Console.Write("Service endpoint: " +
loginResult.serverUrl + "\n");
                Console.Write("Username: " +
loginResult.userInfo.userName + "\n");
               Console.Write("SessionId: " + loginResult.sessionId +
 "\n");
                Console.Write("Press any key to continue:\n");
                Console.ReadKey();
            }
        }
    }
}
```

The following example output shows a typical successful run of this code.

```
Service endpoint:
https://na1.salesforce.com/services/Soap/c/29.0/00DU0000000T5f0/0DFU00000008XpB
Username: myUser@my_devedition.com
SessionId:
00DU0000000L5f0!ARoAQOYUBIRHn9tDOCf...zESyoJ2JwHN2ovyY2vIP1TGjc8vn_C
Press any key to continue:
```

If the verification project runs and displays output that matches your organization, your developer environment is set up and you can start developing .NET applications that integrate with Salesforce. If you have additional WSDL files you can add them to your project via the Add Service Reference dialog as described in steps 5 and 6 above.

If you are using Microsoft Visual Studio 2010 or earlier, in step 5, Add Service Reference might be unavailable. Use Add Web Reference instead. Under **URL**, enter the file path to your WSDL, such as `file://c:\wsdls\enterprise.wsdl`. Name the web reference `sforce`, and click **Add Reference**. If you have to use a web reference, use an instance of SforceService to call `SforceService.login()` instead of `SoapClient.login()`.

Setting Up Connected App Access (REST-Based APIs)

Because Salesforce REST APIs use OAuth authentication, you'll need to create a connected app to integrate your application with Salesforce.

A connected app integrates an application with Salesforce using APIs. Connected apps use standard SAML and OAuth protocols to authenticate, provide Single Sign-On, and provide tokens for use with Salesforce APIs. In addition to standard OAuth capabilities, connected apps allow administrators to set various security policies and have explicit control over who may use the corresponding applications.

To create a connected app:

1. From Setup, enter *Apps* in the `Quick Find` box, then select **Apps**.
2. In the Connected Apps section, click **New**.

Next, specify basic information about your app.

1. Enter the `Connected App Name`. This name is displayed in the list of connected apps.

   Note: The name must be unique for the current connected apps in your organization. You can reuse the name of a deleted connected app if the connected app was created using the Spring '14 release or later. You cannot reuse the name of a deleted connected app if the connected app was created using an earlier release.

2. Enter the `API Name`, used when referring to your app from a program. It defaults to a version of the name without spaces. Only letters, numbers, and underscores are allowed, so you'll need to edit the default name if the original app name contained any other characters.
3. Provide the `Contact Email` that Salesforce should use for contacting you or your support team. This address is not provided to administrators installing the app.
4. Provide the `Contact Phone` for Salesforce to use in case we need to contact you. This number is not provided to administrators installing the app.
5. Enter a `Logo Image URL` to display your logo in the list of connected apps and on the consent page that users see when authenticating. The URL must use HTTPS. The logo image can't be larger than 125 pixels high or 200 pixels wide, and must be in the GIF, JPG, or PNG file format with a 100 KB maximum file size. The default logo is a cloud. You have several ways to add a custom logo.
   - You can upload your own logo image by clicking **Upload logo image**. Select an image from your local file system that meets the size requirements for the logo. When your upload is successful, the URL to the logo appears in the `Logo Image URL` field. Otherwise, make sure the logo meets the size requirements.
   - You can also select a logo from the samples provided by clicking **Choose one of our sample logos**. The logos available include ones for Salesforce apps, third-party apps, and standards bodies. Click the logo you want, and then copy and paste the displayed URL into the `Logo Image URL` field.
   - You can use a logo hosted publicly on Salesforce servers by uploading an image that meets the logo file requirements (125 pixels high or 200 pixels wide, maximum, and in the GIF, JPG, or PNG file format with a 100 KB maximum file size) as a document using the Documents tab. Then, view the image to get the URL, and enter the URL into the `Logo Image URL` field.
6. Enter an `Icon URL` to display a logo on the OAuth approval page that users see when they first use your app. The logo should be 16 pixels high and wide, on a white background. Sample logos are also available for icons.

You can select an icon from the samples provided by clicking **Choose one of our sample logos**. Click the icon you want, and then copy and paste the displayed URL into the `Icon URL` field.

7. If there is a Web page with more information about your app, provide a `Info URL`.
8. Enter a `Description` to be displayed in the list of connected apps.

Next, provide OAuth settings by selecting **Enable OAuth Settings** and providing the following information.

1. Enter the `Callback URL` (endpoint) that Salesforce calls back to your application during OAuth; it's the OAuth `redirect_uri`. Depending on which OAuth flow you use, this is typically the URL that a user's browser is redirected to after successful authentication. As this URL is used for some OAuth flows to pass an access token, the URL must use secure HTTP (HTTPS) or a custom URI scheme. If you enter multiple callback URLs, at run time Salesforce matches the callback URL value specified by the application with one of the values in `Callback URL`. It must match one of the values to pass validation.
2. If you're using the JWT OAuth flow, select `Use Digital Signatures`. If the app uses a certificate, click **Choose File** and select the certificate file.
3. Add all supported OAuth scopes to `Selected OAuth Scopes`. These scopes refer to permissions given by the user running the connected app, and are followed by their OAuth token name in parentheses:

   Access and manage your Chatter feed (chatter_api)
   Allows access to Chatter REST API resources only.

   Access and manage your data (api)
   Allows access to the logged-in user's account using APIs, such as REST API and Bulk API. This value also includes `chatter_api`, which allows access to Chatter REST API resources.

   Access your basic information (id, profile, email, address, phone)
   Allows access to the Identity URL service.

   Access custom permissions (custom_permissions)
   Allows access to the custom permissions in an organization associated with the connected app, and shows whether the current user has each permission enabled.

   Allow access to your unique identifier (openid)
   Allows access to the logged in user's unique identifier for OpenID Connect apps.

   Full access (full)
   Allows access to all data accessible by the logged-in user, and encompasses all other scopes. `full` does not return a refresh token. You must explicitly request the `refresh_token` scope to get a refresh token.

   Perform requests on your behalf at any time (refresh_token, offline_access)
   Allows a refresh token to be returned if you are eligible to receive one. This lets the app interact with the user's data while the user is offline. The `refresh_token` scope is synonymous with `offline_access`.

   Provide access to custom applications (visualforce)
   Allows access to Visualforce pages.

   Provide access to your data via the Web (web)
   Allows the ability to use the `access_token` on the Web. This also includes `visualforce`, allowing access to Visualforce pages.

When you've finished entering the information, click **Save** to save your new app. You can now publish your app, make further edits, or delete it. If you're using OAuth, saving your app gives you two new values the app uses to communicate with Salesforce:

- `Consumer Key`: A value used by the consumer to identify itself to Salesforce. Referred to as `client_id` in OAuth 2.0.
- `Consumer Secret`: A secret used by the consumer to establish ownership of the consumer key. Referred to as `client_secret` in OAuth 2.0.

See Creating a Connected App in the Salesforce online help for more for more information on connected apps.

Verify the REST Environment (REST-Based APIs)

You can verify your developer environment with a simple C# test application in Visual Studio.

You must have Visual Studio installed to create a C# test application.

1. Start Visual Studio.
2. Click **File** > **New Project**.
3. In the New Project window, navigate to **Installed** > **Templates** > **Visual C#** > **Windows**. Select **Console Application**.
4. In the New Project window, under **Name**, name the project `VerifyRESTTest`. Under **Solution name**, name the solution `VerifyRESTTest`. Under **Location**, pick a file location that you'll remember. Click **Ok**. A solution is created, and `Program.cs` is opened for editing.
5. Click **Project** > **Add Reference**.
6. In the Reference Manager window, navigate to **Assemblies** > **Framework**. Select **System.Runtime.Serialization**. Ensure that the checkbox is selected, and click **Ok**.
7. Replace the code in `Program.cs` as described in the following section.

Use the following simple login example code for your Program.cs file. Replace `YOUR DEVORG USERNAME` with your developer organization username, and `replace YOUR DEVORG PASSWORD + SECURITY TOKEN` with your developer organization password appended with your security token. If you did not set a security token in your organization, just provide your password. Replace `YOUR OAUTH CONSUMER KEY` with the consumer key from your development organization's connected app. Replace `YOUR OAUTH CONSUMER SECRET` with the consumer secret from your development organization's connected app. A GitHub Gist of this code is available here: https://gist.github.com/anonymous/db367194e6e24faa081b.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Net;
using System.Runtime.Serialization;
using System.Runtime.Serialization.Json;

namespace VerifyRESTTest
{
    class Program
```

```
    {
        // Class used for serializing the OAuth JSON response
        [DataContract]
        public class OAuthUsernamePasswordResponse
        {
            [DataMember]
            public string access_token { get; set; }
            [DataMember]
            public string id { get; set; }
            [DataMember]
            public string instance_url { get; set; }
            [DataMember]
            public string issued_at { get; set; }
            [DataMember]
            public string signature { get; set; }
        }

        private static string accessToken = "";
        private static string instanceUrl = "";

        private static void login()
        {
            string acctName = "YOUR DEVORG USERNAME";
           string acctPw = "YOUR DEVORG PASSWORD AND SECURITY TOKEN";

            string consumerKey = "YOUR OAUTH CONSUMER KEY";
            string consumerSecret = "YOUR OAUTH CONSUMER SECRET";

            // Just for testing the developer environment, we use the
 simple username-password OAuth flow.
           // In production environments, make sure to use a stronger
 OAuth flow, such as User-Agent
            string strContent = "grant_type=password" +
                "&client_id=" + consumerKey +
                "&client_secret=" + consumerSecret +
                "&username=" + acctName +
                "&password=" + acctPw;

            string urlStr =
"https://login.salesforce.com/services/oauth2/token?" + strContent;

            HttpWebRequest request = WebRequest.Create(urlStr) as
HttpWebRequest;
            request.Method = "POST";

            try
            {
              using (HttpWebResponse response = request.GetResponse()
 as HttpWebResponse)
                {
                    if (response.StatusCode != HttpStatusCode.OK)
                        throw new Exception(String.Format(
                            "Server error (HTTP {0}: {1}).",
                            response.StatusCode,
```

```
                            response.StatusDescription));

                    // Parse the JSON response and extract the access
 token and instance URL
                    DataContractJsonSerializer jsonSerializer = new
DataContractJsonSerializer(typeof(OAuthUsernamePasswordResponse));
                    OAuthUsernamePasswordResponse objResponse =
jsonSerializer.ReadObject(response.GetResponseStream()) as
OAuthUsernamePasswordResponse;
                    accessToken = objResponse.access_token;
                    instanceUrl = objResponse.instance_url;
                }
            }
            catch (Exception e)
            {
                Console.WriteLine("\nException Caught!");
                Console.WriteLine("Message :{0} ", e.Message);
            }
        }

        static void Main(string[] args)
        {
            login();
            if (accessToken != "")
            {
                // display some current login settings
                Console.Write("Instance URL: " + instanceUrl + "\n");

                Console.Write("Access Token: " + accessToken + "\n");

                Console.Write("Press any key to continue:\n");
                Console.ReadKey();
            }
        }
    }
}
```

The following example output shows a typical successful run of this code.

```
Instance URL: https://na1.salesforce.com
Access Token:
00DU0000000L3f0!ARoAQKl4rimMZ7kh11QpvHv....VreCvYJafmsCd2MgBM1UltPflQ
Press any key to continue:
```

If the verification C# project runs and displays output that matches your organization, your developer environment is set up and you can start developing .NET applications that integrate with Salesforce REST APIs.