Mi−Enterprise Middleware User Manual

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1 Introduction

The Mi−Enterprise Middleware is designed to interact with the Mi−Enterprise Middleware Designer and Mi−Enterprise Middleware Client enabling remote session processing and workflow.

This documentation assumes knowledge of the Mi−Enterprise Middleware system. If you are unfamiliar with the concept of templates and sessions, please refer to other Mi−Enterprise Middleware documentation.

1.1 Concepts

There are a few key concepts that should be understood before attempting to configure and administrate a Mi−Enterprise Middleware. These concepts are defined below:

1.1.1 Global Administrator

Each instance of Mi−Enterprise Middleware must have at least one global administrator. Global administrators have the ability to administrate settings that affect the server as a whole, such as server licenses, logging and other system specifics.

1.1.2 Customers

Each instance of the Mi−Enterprise Middleware can host one or more customers. For instance, if you are an IT company, you might have several client companies that need to use the server. However, each client company needs its own set of users and forms. The Mi−Enterprise Middleware handles this through the concept of customers. Each customer is independent of all others and can have its own set of users, forms, etc.

1.1.3 Users

Each customer can have one or more users. These users represent actual people who are going to either publish form templates or fill out forms. Each user can belong to one or more groups, and each user has their own queue.

1.1.4 Groups

Each customer can have as many groups as it needs, and each user can belong to one or more groups. Form templates are assigned on a group−level, which means that all users in a specific group will have access to all form templates assigned to that group.

1.1.5 Privileges

Each group has a set of privileges associated with it. These allow members of that group to be normal users, publish form templates, or be administrative users. All members of a group have all privileges associated with that group.

1.1.6 Form Templates

Form templates are essentially blank forms that can be filled. They are assigned to groups such that all members of that group have access to all templates assigned to a group. When a new version of a form template is uploaded to the server, its revision is updated. Users may only download the latest revision of a form template, but may upload sessions created from older revisions of a form template.

1.1.7 Queues

Queues are holding pens into which sessions are placed. Every user and every group has a queue. Throughout a session's life cycle it can temporarily be held by many queues, although only 1 queue at any given moment. Users have access to all sessions in their own queue and queues for groups of which they are a member.

1.1.8 Sessions

Sessions are essentially filled out forms. When a user starts a form, enters some data and then uploads it to the server, this is a session. That session is placed into the appropriate queue based upon form script code, and then data may be exported from the session. Additionally, users may download, lock, and add data to any session in their own queue or a queue of a group of which they are a member. A locked session will be read−only for any other user.

1.2 What's New

1.2.1 Version 12.3

- Added data source provisioning to group configuration

1.2.2 Version 12.2

- Now supports form template visibility

1.2.3 Version 12.1

- Added support for inline grids

1.2.4 Version 12.0

- Added support for Data Connections
- Added support for Maps

1.2.5 Version 11.9

- Added support for Customer Branding
- Improved client sync performance

1.2.6 Version 11.8

- Data Replication Services can now function in an x64 enabled app pool. If this is the initial installation of the server, then the app pool will already be created as such. If this is an upgraded instance of the server, you may wish to change the "DRS" app pool by disabling "Enable 32−bit applications" checkbox under its advanced settings.
- Data source files may now be downloaded from their administration page

1.2.7 Version 11.7

- No significant server changes have been made, but the new web resource field type requires this server version to work properly.

1.2.8 Version 11.6

- Updated how data sources work in relation to CSV files. Note that previously configured data sources will still function, but all new CSV data sources require the new methodology.

1.2.9 Version 11.5

- Added support for script references
- Updated how reset password functions

1.2.10 Version 11.4

- PDFs created from NextGen Designer forms now output grid data
- Added support for product component based licensing

1.2.11 Version 11.3

- Added Power User permission for groups

1.2.12 Version 11.2

- Added Data Replication Update Service
- Added Data Sources

1.2.13 Version 11.1

- Added Download Center
- Added Mail Service
- Added Azure Storage Support
- Added Azure Application Insights Support

1.2.14 Version 11.0

- Added support for Mi−Apps
- Added Data Replication Server
- Moved to .NET Framework 4.5.2

1.2.15 Version 10.5

- Added Data Exchange Dashboard
- Moved to .NET Framework 4.5.1

1.2.16 Version 10.0

- Added support for Mi−Enterprise Apps
    - Licensing
    - Apps Management
    - Data Bundles Management
    - Configuration Options
- Simplifed installation
- Moved to .NET Framework 4.5

1.2.17 Version 9.0

- Moved to .NET Framework 4.0
- Added support for Designer &Client 9.0

1.2.18 Version 8.8

- Support for new licensing level model

1.2.19 Version 8.7

- Support for iPad &Android native applications − The native client applications launched on these platforms require version 8.7 of the server.
- Group Permission "Template Filler" − To accommodate users logging into the Server for mobile web form filling but that do not resume previously saved forms, a new group permission named "Template Filler" has been added. For further details, please see Group Administration.

1.2.20 Version 8.6

- Mobile Web Form Filling − Offline filling of mobile web form forms has been enabled.

1.2.21 Version 8.5

- Mobile Web Form Filling − A new feature has been added that allows forms to be formatted for mobile web connected devices such as iOS, Android and WebOS slates. Details of the user interface for filling these forms may be found in the document "Filling Mobile Web Forms with Mi−Enterprise Middleware".
- Group Permission "Form Filler" − To accommodate users logging into the Server for mobile web form filling, a new group permission named "Form Filler" has been added. For further details, please see Group Administration .

1.2.22 Version 8.0

- New Installation Requirement − Microsoft .Net Framework v3.5
- Licensing Change − Server Licenses may now limit the number of allowable customers and users.
- Reporting − Global administrators may now run reports that detail the server's usage over a given time period.
- Web form filling − Users may now fill forms in a web browser.
- Session error handling − Session processing now uses new configuration directives to aid in error handling:
    - sessionprocessor.internalerrormax
    - sessionprocessor.internalerrorwait
    - sessionprocessor.mailonerror
- Session error handling in script − A new scripting event is available to handle errors in form script
- New communications protocol − While the previously established client/server communication protocol remains intact, a new more versatile protocol has been implemented.

1.2.23 Version 7.0

- New Installation Requirement − Microsoft Windows XP Tablet PC Edition 2005 Recognizer Pack − Please see the Installation Prerequisites section for details
- Active Directory Authentication − Customers can now use existing Active Directory servers for authentication. Please see the Active Directory Authentication Considerations section for details.
- Licensing Change − In previous installations, licenses were required for all ways in which the server was to be accessed (e.g. hostname, DNS name, IP address). Now, a single license that matches the machine's hostname will suffice.
- Agent Configuration − The server can now be configured to distribute Agent configuration files. Please see the Manage Agent Configuration section for details.
- Related Files − The server can now added related files to a form template. Please see the Modifying an Existing Form Template section for details.
- Searching for Sessions − The server's session web administration pages now allow searching for sessions across queues. Please see the Searching for Sessions section for details.
- Uploading a Session − Uploading a session via web service now requires a confirmation web service request. Please see the Uploading a Session section for details.
- The following web.config directives have been obsoleted:
    - mf.sessions.render.thumbnail
    - mf.sessions.render.dpi
    - mf.sessions.render.allink
    - mf.sessions.render.cleanink
    - mf.sessions.render.fieldvalues
    - mf.sessions.image_displaytype

2 Installation

The Mi−Enterprise Middleware should be installed on a dedicated physical or virtual system. As session processing is a CPU and memory intensive task, installing it on a system that is already performing other tasks can lead to slowdowns in both applications.

Installation is a multi−step process. Please read each of the following sections:

- Prerequisites
- Server Installation
- Post Installation Steps

2.1 Prerequisites

2.1.1 Supported Operating Systems

You may install Mi−Enterprise Middleware on one of the following operating systems:

- Microsoft Windows Server 2008 R2 (x64)
- Microsoft Windows Server 2012 (x64)
- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Microsoft Windows Server 2019

The latest service packs and security updates should be applied before installation.

In all cases, the installer will enable Windows Features. It is not necessary for you to enable them prior to installation. The list below details which features will be enabled automatically.

2.1.1.1 Windows Server 2008 R2 (x64)

Server Features

- Ink Support
    - Desktop Experience
    - Handwriting Recognition
- Internet Information Services
    - Web Management Tools
        - IIS Management Console
        - IIS Management Scripts and Tools
        - IIS Management Service
    - World Wide Web Services
        - Application Development Features
            - .NET Extensibility
            - ASP
            - ASP.NET
            - ISAPI Extensions
            - ISAPI Filters
        - Common HTTP Features
            - Default Document

· HTTP Errors
· HTTP Redirection
· Static Content

◊ Performance Features

· Dynamic Content Compression
· Static Content Compression

◊ Security

· Basic Authentication
· Request Filtering
· Windows Authentication

- Microsoft .NET Framework 3.5.1

2.1.1.2 Windows Server 2012, 2016 &2019

The following Server Roles and Features must be enabled **Server Features**

- .NET Framework 3.5 Features
  - ♦ .NET Framework 3.5 (includes .NET 2.0 and 3.0)
- .NET Framework 4.5 Features
  - ♦ .NET Framework 4.5
    - ◊ ASP.NET 4.5
    - ◊ WCF Services
      - · HTTP Activastion
      - · Message Queueing (MSMQ) Activation
      - · Named Pipe Activation
      - · TCP Activation
      - · TCP Port Sharing
- Ink and Handwriting Services
  - ♦ Desktop Experience
- Internet Information Services
  - ♦ Web Management Tools
    - ◊ IIS Management Console
    - ◊ IIS Management Scripts and Tools
    - ◊ IIS Management Service
  - ♦ World Wide Web Services
    - ◊ Application Development Features
      - · .NET Extensibility 3.5
      - · .NET Extensibility 4.5
      - · ASP
      - · ASP.NET 3.5
      - · ASP.NET 4.5
      - · ISAPI Extensions
      - · ISAPI Filters
    - ◊ Common HTTP Features
      - · Default Document
      - · HTTP Errors
      - · HTTP Redirection
      - · Static Content
    - ◊ Performance Features
      - · Dynamic Content Compression
      - · Static Content Compression
    - ◊ Security

            · Basic Authentication
            · Request Filtering
            · Windows Authentication
- Media Foundation
- Message Queueing
    - ♦ Message Queueing Services
        - ◊ Microsoft Message Queue (MSMQ) Server
- Microsoft Windows ServerCore WOW64
- Windows PowerShell
    - ♦ Windows PowerShell
- Windows Process Activation Service
    - ♦ .NET Environment 3.5
    - ♦ Configuration APIs
    - ♦ Process Model

2.1.2 Other Prerequisites

Other prerequisites may be identified by the installer and their installation may occur automatically. It is not necessary to pre−install any other software.

2.2 Server Installation

Installing the Mi−Enterprise Middleware is designed to be as easy and as standard as possible. Your media should contain a .exe file. Be sure you are logged into your server machine as an administrator. Then double−click on this file to begin installation.

2.3 Prerequisites Wizard(s)

If the setup determines that your environment is missing one or more prerequisites, it will present wizards along the way to install them. Please follow all prompts to install these.

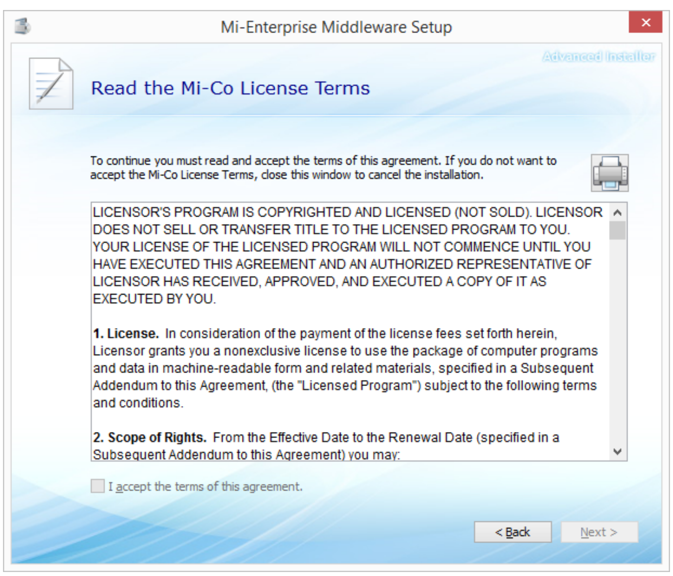
2.4 Splash Screen

Once prerequisite installation has been completed or if no prerequisites were required, a splash screen will be displayed:

Press "Next" when presented with the splash screen.

2.5 License Agreement

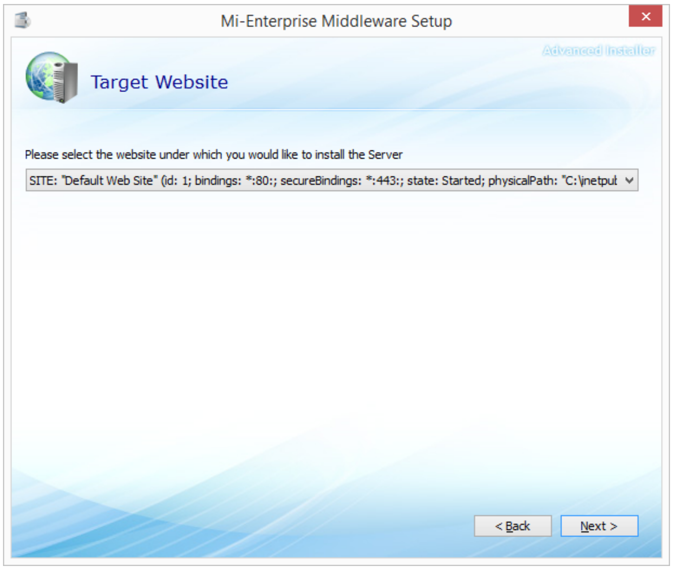
A license agreement screen will be presented



Scroll to the bottom, check the "I accept the terms of this agreement" checkbox and then click the "Next" button.

2.6 Installation Address

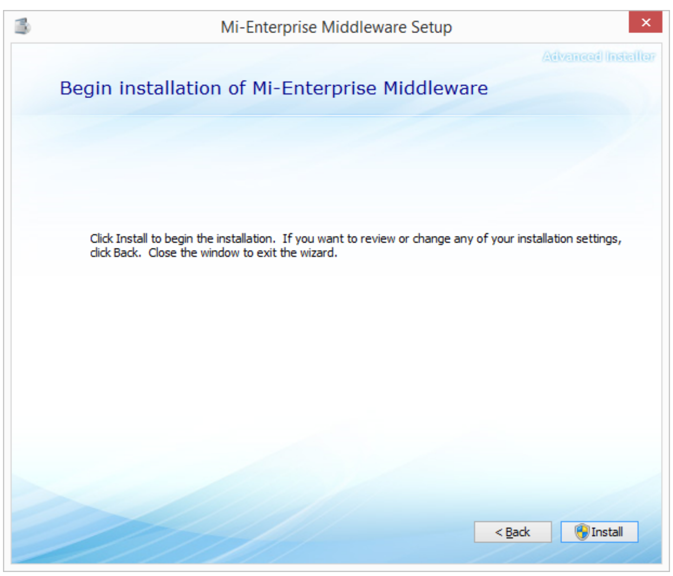
The installer will present a list of websites configured on the server as shown below:



Select the website you wish to install to in the drop−down and click "Next".

2.7 Confirm Installation

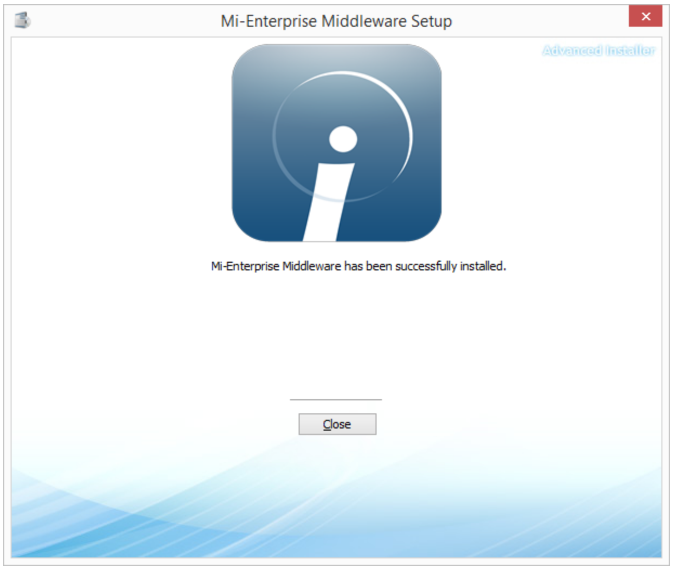
A confirmation of installation will be presented:



When you are ready for the installation to proceed, click "Install".

2.8 Installation Complete

Installation will then take place. This may take some time if a number of Windows features need to be enabled. At the end of the install, the following dialog will be presented:



After installation has completed, you will be notified of a successful install. If installation failed, see the Troubleshooting section of this manual.

2.9 Post Installation Steps

There should be no need to perform any post−installation steps. However, if a number of Windows features were installed, you may need to restart the server to allow those features to be completed.

If you are upgrading from a previous version of the server, please see the upgrade instructions.

2.10 Upgrading From Previous Versions

Upgrading the Mi−Enterprise Middleware consists of the following steps:

1. Backup Configuration Files
2. Uninstall Previous Version of Mi−Enterprise Middleware
3. Install Current Version of Mi−Enterprise Middleware
4. Restore Configuration Files
5. Update Configuration Files with New Directives
6. Upgrade Customers

2.10.1 Backup Configuration Files

There are up to 5 configuration files that must be backed up. If you are upgrading from an older server version that did not yet have one of these configuration files, you may skip that backup. The files to backup are as follows:

Identifier	File Name	Default Location
Main Site Configuration	web.config	c:\inetpub\wwwroot\mfs
Data Replication	web.config	c:\inetpub\wwwroot\drs

Configuration		
Download Center Configuration	web.config	c:\inetpub\wwwroot\dc
Mail Service Configuration	MiCo.MiApp.Server.MailService.exe.config	c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\MailService
Data Replication Import Service Configuration	MiCo.MiApp.Server.DRSImportService.exe.config	c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\DRSImportService

2.10.2 Uninstalling Previous Version of Mi−Enterprise Middleware

Using your system's control panel, locate the Mi−Enterprise Middleware as shown in the screen below and use the Uninstall button and follow prompts:

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2.10.3 Installing Current Version of Mi−Enterprise Middleware

Using the provided installer, install the current version. Detailed instructions may be found here

2.10.4 Restoring Configuration Files

For all files backed up in the step above, restore them to the location they were backed up from. If you are upgrading from older versions that did not have the file to backup, then no action is needed for that file.

2.10.5 Update Configuration Files with New Directives

As new versions of Mi−Enterprise Middleware are released, new configuration directives are added or replaced. The tables below provides guidance on where to insert or update these configuration directives and in which files.

The version column indicates whether you need to make the change. If you are upgrading from a version prior to the version listed, then you must make the chnage. For instance, if you are upgrading from version 11.5 to version 12.0 then you must perform all changes listed for versions 11.6, 11.7, 11.8, 11.9, and 12.0.

The Location column indicates where within the configuration file the value should be added or replaced. If, for instance the location is listed as <MFS> then locate the XML element "MFS" within the configuration file and insert it within that XML element.

Version	File	Action	Location	Value
12.0	Main web.config	Insert	MFS	<!−− Map storage module setup−−> <add key="mfms.module.assembly"

				value="MiCo.MiApp.Server.FileStorageMod.dll" /> <add key="mfms.module.class" value="MiCo.MiApp.Server.ServerMapStorageMod" /> <add key="mfms.basedir" value="c:\\mfs\\storage\\maps\\" />

Version	**File**	**Action**	**Location**	**Value**
12.0	Main web.config	Insert	configuration	<location path="MapDownload.ashx"> <system.web> <pages theme="DefaultTheme" /> <authorization> <allow users="*" /> </authorization> </system.web> </location>

Version	**File**	**Action**	**Location**	**Value**
11.8	Main web.config	Insert	MEA	<add key="drs.webusers.basedir" value="C:\mfs\storage\drs\" />

Version	**File**	**Action**	**Location**	**Value**
11.6	Main web.config	Insert	MFS	<!−− Data source storage module setup−−> <add key="mfds.module.assembly" value="MiCo.MiApp.Server.FileStorageMod.dll" /> <add key="mfds.module.class" value="MiCo.MiApp.Server.DataSourceStorageMod" /> <add key="mfds.basedir" value="c:\\mfs\\storage\\data sources\\" />

Version	**File**	**Action**	**Location**	**Value**
11.5	Main web.config	Insert	configuration	<location path="RecoverPasswordConfirm.aspx"> <system.web> <pages theme="DefaultTheme" /> <authorization> <allow users="*" /> </authorization> </system.web> </location>

Version	**File**	**Action**	**Location**	**Value**
11.5	Main web.config	Insert	MFS	<!−−Script reference storage module setup−−> <add key="mfsr.module.assembly" value="MiCo.MiApp.Server.FileStorageMod.dll" /> <add key="mfsr.module.class" value="MiCo.MiApp.Server.ScriptReferenceStorageMod" /> <add key="mfsr.basedir" value="c:\\mfs\\storage\\script references\\" />

Version	File	Action	Location	Value
11.2	Main web.config	Insert	MEA	<!−− Data Replication Server status dashboard −−> <add key="drs.url" value="/DRS/dashboard.html" />

Version	File	Action	Location	Value
11.2	Main web.config	Insert	MEA	<add key="drs.endpoint" value="http://localhost/DRS/"/>

Version	File	Action	Location	Value
11.2	Main web.config	Replace	First line of file	**Replace:** <configuration xmlns="http://schemas.microsoft.com/.NetConfiguration/v2.0"> **With:** <configuration>

Version	File	Action	Location	Value
11.2	Main web.config	Replace	runtime	**Replace:** <assemblyBinding xmlns="urn:schemas−microsoft−com:asm.v1"> <dependentAssembly> <assemblyIdentity name="Newtonsoft.Json" publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" /> <bindingRedirect oldVersion="0.0.0.0−6.0.0.0" newVersion="6.0.0.0" /> </dependentAssembly> ng> **With:** <assemblyBinding xmlns="urn:schemas−microsoft−com:asm.v1"> <dependentAssembly> <assemblyIdentity name="Newtonsoft.Json" publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" /> <bindingRedirect oldVersion="0.0.0.0−10.0.0.0" newVersion="10.0.0.0" /> </dependentAssembly> ng>

Version	File	Action	Location	Value
11.2	DRS web.config	Insert	appSettings	<add key="MiFormDataServices" value="http://localhost/MFS/Services/DataServices.asmx"/>

Version	File	Action	Location	Value
11.2	DRS web.config	Insert	assemblyBinding	<dependentAssembly> <assemblyIdentity name="System.Net.Http.Formatting" publicKeyToken="31bf3856ad364e35" culture="neutral" /> <bindingRedirect oldVersion="0.0.0.0−5.2.3.0"

				newVersion="5.2.3.0" /> </dependentAssembly>

Version	File	Action	Location	Value
11.2	DRS web.config	Replace	assemblyBinding	**Replace:** <dependentAssembly> <assemblyIdentity name="Newtonsoft.Json" publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" /> <bindingRedirect oldVersion="0.0.0.0−6.0.0.0" newVersion="6.0.0.0" /> </dependentAssembly> **With:** <dependentAssembly> <assemblyIdentity name="Newtonsoft.Json" publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" /> <bindingRedirect oldVersion="0.0.0.0−10.0.0.0" newVersion="10.0.0.0" /> </dependentAssembly>

Version	File	Action	Location	Value
11.2	Mail Service Config	Replace	configSections	**Replace:** <section name="MEMSection" type="MiCo.MiApp.Server.Mail.MEMConfigSection, MiCo.MiApp.Server.Mail,Version=1.0.0.0, Culture=neutral,PublicKeyToken=null"/> **With:** <section name="MEMSection" type="MiCo.MiApp.Server.Config.MEMConfigSection, MiCo.MiApp.Server.Config,Version=1.0.0.0, Culture=neutral,PublicKeyToken=null" />

Version	File	Action	Location	Value
11.1	Main web.config	Insert	configSections	<section name="DC" type="System.Configuration.NameValueSectionHandler, System, Version=1.0.5000.0,Culture=neutral, PublicKeyToken=b77a5c561934e089" /> <section name="Azure" type="System.Configuration.NameValueSectionHandler, System, Version=1.0.5000.0,Culture=neutral, PublicKeyToken=b77a5c561934e089" /> <section name="Apple" type="System.Configuration.NameValueSectionHandler, System, Version=1.0.5000.0,Culture=neutral, PublicKeyToken=b77a5c561934e089" /> <section name="Android" type="System.Configuration.NameValueSectionHandler, System, Version=1.0.5000.0,Culture=neutral,

				PublicKeyToken=b77a5c561934e089" />

Version	File	Action	Location	Value
11.1	Main web.config	Insert	MFS	<add key="smtp.server.ssl" value="false" /> <add key="smtp.server.user" value="" /> <add key="smtp.server.password" value="" />

Version	File	Action	Location	Value
11.1	Main web.config	Insert	MFS	<!−− Attachment storage module setup −−> <add key="mfas.module.assembly" value="MiCo.MiApp.Server.FileStorageMod.dll" /> <add key="mfas.module.class" value="MiCo.MiApp.Server.AttachmentStorageMod" />

Version	File	Action	Location	Value
11.1	Main web.config	Insert	End of file directly before </configuration>	<DC> <!−− Set to the folder that should be used to store Download Center exports −−> <add key="rootFolder" value="c:\\mfs\\dc\\" /> <!−− If set to true, Azure storage (as defined in the Azure section) will be used for Download Center exports in place of disk storage −−> <add key="useAzureStorage" value="false" /> </DC> <Azure> <add key="appinsights.servertelemetry" value="false" /> <add key="appinsights.serverkey" value="ENTER YOUR KEY HERE" /> <add key="storage.account" value="ENTER YOUR ACCOUNT NAME" /> <add key="storage.key" value="ENTER YOUR ACCOUNT KEY" /> <!−− Optionally set an endpoint below if needed −−> <!−−<add key="storage.endpoint" value="https://centblob.blob.core.windows.net/"/>−−> </Azure> <Apple> <add key="receipt.endpoint.production" value="https://buy.itunes.apple.com/verifyReceipt" /> <add key="receipt.endpoint.sandbox" value="https://sandbox.itunes.apple.com/verifyReceipt" /> <add key="receipt.useSandbox" vale="false" /> </Apple> <Android> <add key="app.name" value="YOUR APP" /> <add key="server.creds.p12.filePath" value="YOUR P12 FILEPATH" /> <add key="server.creds.p12.privatePwd"

				value="YOUR P12 PASSWORD" /> <add key="server.creds.serviceAccount.email" value="YOUR SERVICE ACCOUNT" /> </Android>

Version	File	Action	Location	Value
11.0	Main web.config	Replace	MFS	**Replace:** <add key="reco.resourcedir" value="C:\\Program Files (x86)\\Mi−Co\\Mi−Enterprise Apps & Mi−Forms Server\\res"/> **With:** <add key="reco.resourcedir" value="C:\\Program Files (x86)\\Mi−Co\\Mi−Enterprise Middleware\\res"/>

2.10.6 Upgrade Customers

Due to changes in the database structure, before placing a server back into production, you must upgrade customers from version your previous version to the current version. This can be achieved from the Global Administration server administration page as follows:

a. **Log into the Global Administration web administration interface** − In a web browser, navigate to the URL: *http://[Server]/MFS/Setup.aspx*

b. **Navigate to the Modify Customers web administration page** − You should see a page that looks similar to the following:

c. Click the "Update ..." button for each customer. When you finish, each customer should have its "Edit Users" and "Login" link activated and the "Update ..." button will be disabled as shown below:


Mi-Enterprise Middlewar
localhost/mfs/Setup.aspx?View=ModifyCustomers
Enterprise Middleware
Mi-Enterprise Middleware Setup
Setup | Log Out
Customer Name
Active
Database Connection String
Level
Database Version
Example
Active
Data Source=(local);Initial Catalog=MEMDB_Example;Integrated Security=SSPI
Enterprise
Edit Users
Login
12.2
Update to 12.2
There is no restriction on the number of customers that can be created.
Add New Customer...
Mi-Enterprise Middleware Version: 12.2.1.1

3 Configuration

Configuring the Mi−Enterprise Middleware is a multi−step process. Refer to the sections below to perform various configuration tasks:

- Global Administrator Tasks
- Logging Configuration
- Advanced Configuration
- Clustering

3.1 Global Administrator Configuration

The global administrator has the ability to configure the database administrator, configure customers, and setup other global administrators.

- Logging Into the Global Administration Interface
- Specifying a local administrator
- Manage Server Licenses
- Modifying Customers
- Modifying Global Administration Users
- Running Reports
- Checking the status of the Data Replication Server

3.1.1 Global Administration − Login

The global administration interface is available via the following URL:
http://*[Server]*/MFS/Setup.aspx
Where [Server] should be replaced as appropriate.

The default credentials are as follows:
Username: Administrator
Password: welcome

It is recommended that one of the first tasks you perform as a global administrator is change the global administrator's password. The combination "Administrator" / "welcome" is not secure and is the same across Mi−Enterprise Middleware installations.

Once logged in you will be presented with a page that looks like the following:

3.1.2 Global Administration − local administrator

Clicking on the "Specify a local administrator" link will take you to a page that looks like this:

In order to successfully create new customers, the Mi−Enterprise Middleware needs to be provided with Windows User credentials to access your SQL database and perform other necessary functions. The credentials you provide must be able to create new databases, new tables, and grant permissions on existing databases to other users on the system. This user must also have full permissions on the system for modifying the registry and files (typically in c:\inetpub\wwwroot\ and c:\MFS\).

It is highly recommended that this user is a local Windows user and a member of the local Administrators group. Administrative domain users are not recommended and may not adequately have privileges to perform all necessary tasks on the Setup.aspx page.

While stored in the web.config file, the password is encrypted.

Specify the username and password, then click the "Test these credentials" button. You should be prompted with a success message. If you see a message such as "Authentication Unsuccessful", please check the login and password.

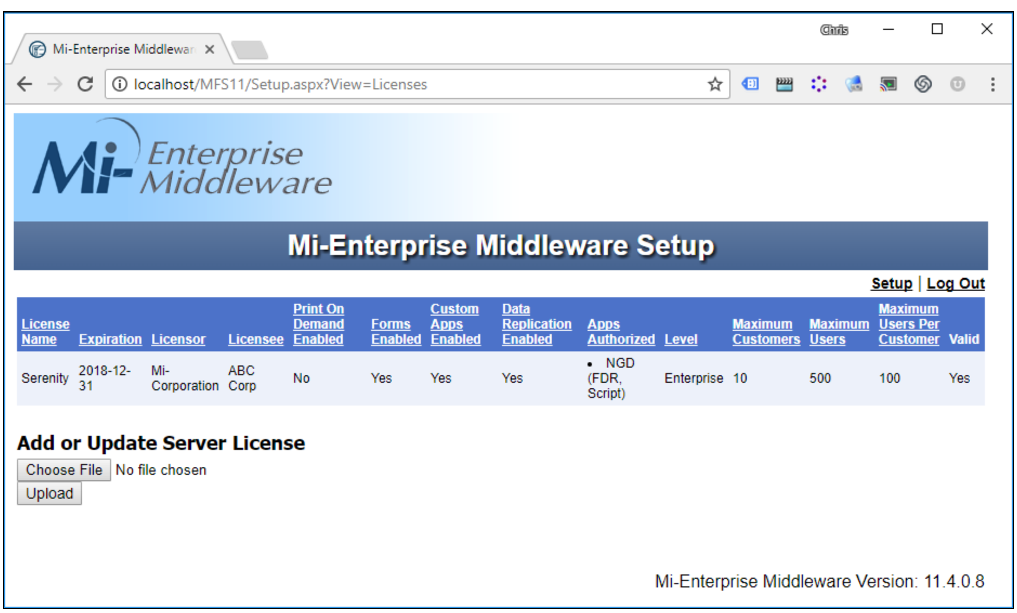
Note: A successful authentication does not indicate that the Windows User has the proper authorization and privileges to perform the necessary tasks while using Mi−Enterprise Middleware Setup.aspx pages.

Once you have provided these credentials and tested them successfully, click "Save" and you will be returned to the global administration page.

3.1.3 Global Administration − Managing Server Licenses

The Mi−Enterprise Middleware needs a license in order to successfully process form templates and sessions. Mi−Corporation has supplied you with one or more license .xml files for your server. Each license file corresponds to a DNS name or IP address at which your server can be accessed.

Clicking on the "Manage Server Licenses" link will take you to a page that looks like this:



Click the browse button and locate the license .xml file that you were provided. Then click the Upload button. The list of licenses above will change to reflect the new license you have installed.

You may replace an existing license in the same way. If Mi−Corporation provides you with a new license file, all you need to do is browse for it and upload it in the same way and it will replace the old license that is already installed.

The columns on this page are as follows:

- **License Name** − The name of the server this license applies to. This name must match the server's hostname as determined by running "hostname" from a command line.
- **Expiration** − The date and time on which the license will expire or specifies "No Expiration" if this is a perpetual license. When a license expires, the server will still allow template downloads and session uploads, but will not process workflow and exports of uploaded sessions.
- **Licensor** − The organization that has provided the license.
- **Licensee** − The organization that the license was provided to.
- **Print on Demand Enabled** − If set to Yes, then print on demand functionality is enabled, otherwise it is not.
- **Forms Enabled** − If set to Yes, then form template and session capability is enabled, otherwise it is not.
- **Custom Apps Enabled** − If set to Yes, then app management, deployment and app data bundle functionality is enabled, otherwise it is not.
- **Data Replication Enabled** − If set to Yes, then data replication is enabled, otherwise it is not.
- **Apps Authorized** − If the server is authorizing other apps (such as NextGen Designer) to authenticate then this section will show the app name(s) and if applicable the feautres enabled within the app. In the example screenshot the NextGen Designer is authorized as are script editing and frictionless data replication.
- **Level** − The server's license level. Customers may not be created with a license level above that of the server's global license level.
- **Maximum Customers** − The maximum number of customers that can be configured.
- **Maximum Users** − The maximum number of users (totaled across all customers) that can be setup.
- **Maximum Users Per Customer** − The maximum number of users that can be configured in any given customer.
- **Valid** − Indicates whether this license is valid for the server and unexpired.

3.1.4 Global Administration − Modifying Customers

Clicking on the "Modify Customers" link will take you to a page that looks like this:

At a minimum you must configure at least one customer. The customer need not have a name, but creating the customer sets up the backed database necessary for server operations. Typically each server will have a single customer.

However, in the case of an ASP model, multiple customers might be necessary. Each customer manages their users, form templates, sessions, and access logging information in a separate database and customers do not interact with each other.

Note that even if you are not using the server in an ASP model, you **must** setup one customer. The customer need not have a name, but creating the customer sets up the backed database necessary for server operations.

The columns on this page are as follows:

- **Customer Name**
  The name of the customer.
- **Active**
  The active status of the customer account. The status is either 'active' or 'inactive'.
- **Database connection string**
  The database connection string used by Mi−Enterprise Middleware to connect with the database for this customer account.
- **Level**
  The licensing level at which the customer is operating.
- **Edit Users**
  A web link to quickly add and remove users from the customer account.
- **Database Version**
  The current database version of the customer account. If the database cannot be reached by the Mi−Enterprise Middleware, a warning message will appear here.
- **Update to ...**
  If available, the current database version is not compatible with the current Mi−Enterprise Middleware version and must be updated. Backing up the database before proceeding is recommended.
  Click this button to update the database. Unexpected results may occur if this update is not performed and customer account activity continues.

If the currently installed server license limits the number of customers that can be configured, this limit is displayed below the customer list, just above the "Add New Customer..." link.

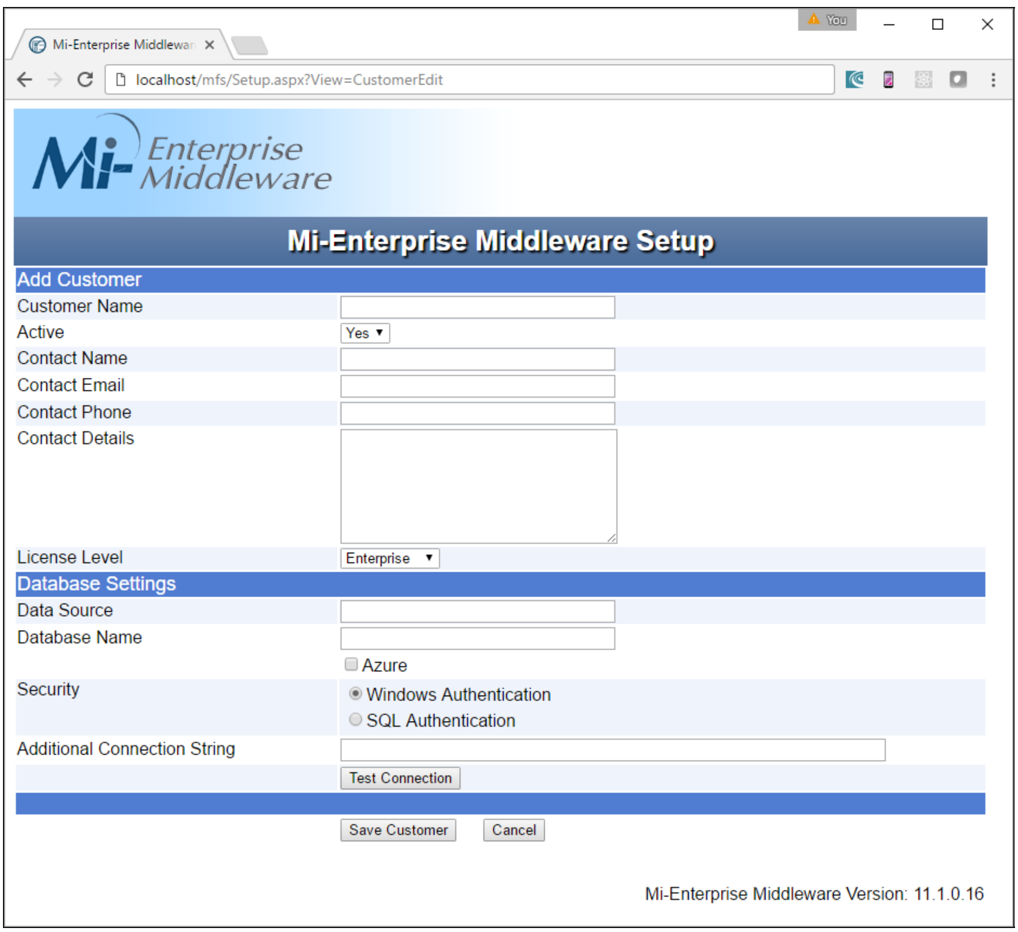
From this page you can perform the following tasks:

- Adding a customer
- Modifying an existing customer
- Modifying a customer's users

Note: all customer account settings are persisted for each customer account in the server's configuration file called web.config, typically in this location on a default Mi−Enterprise Middleware install: c:\inetpub\wwwroot\MFS

3.1.4.1 Global Administration − Adding a New Customer

Clicking the "Add a New Customer" link will take you to the following page:



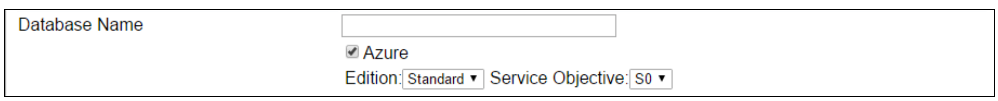
The fields of this page are:

- **Status** − Leave set to "Active". Set to "Inactive" to prohibit any activity for this customer account.
- **Customer Name** − Set to the desired name of the customer. Note that the client must be configured to use this name, so it is advisable to avoid names that are long or could be commonly misspelled. If you are not running the server in an ASP model and are just creating the default customer, leave this field set to "< No Customer Name Defined >"

- **Contact Name** − The name of the contact responsible for this customer
- **Contact Email** − The email address of the contact responsible for this customer
- **Contact Phone** − The phone number of the contact responsible for this customer
- **Contact Details** − Any other details you wish to specify about this contact
- **Level** − The licensing level at which the customer will operate
    - Enterprise − All features are enabled
    - Department − Active Directory synchronization is disabled
    - Basic − Active Directory synchronization is disabled. Workflow is disabled.
- **Data Source** − The name of the SQL Server instance you are using. If you are using SQL on the local machine, it most likely should be set as "(local)".

  If connecting to a database on a remote machine, replace "(local)" with the name of the machine, ie. "MTBAKER" or if using SQL Express, this will typically be "MTBAKER\SQLEXPRESS".
- **Database Name** − The name of the database to use on the given server instance. **This database will be created.**

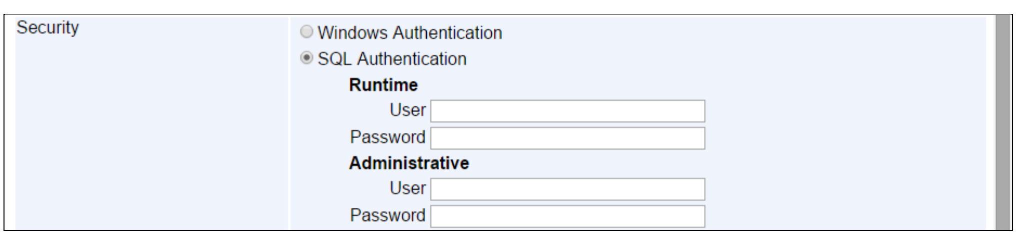
    - **Azure** − Check this box to indicate that you are using an Azure SQL DB. When this box is checked, additional options will appear below the checkbox:

      The database will be provisioned with the edition and service objective specified. Note that editions and service objectives have a bearing on the cost and performance of the database, so please choose properly.
- **Security** − Specify whether to use Windows authentication (default) or SQL authentication.

  If using Windows Authentication, the server's application pool identity will be used for normal operatin of the system. The user specified as the local administrator will be used for database creation and update.

  If *"Use SQL Authentication"* is checked then the connection to the datasource will use SQL authentication and screen will be updated as shown below:

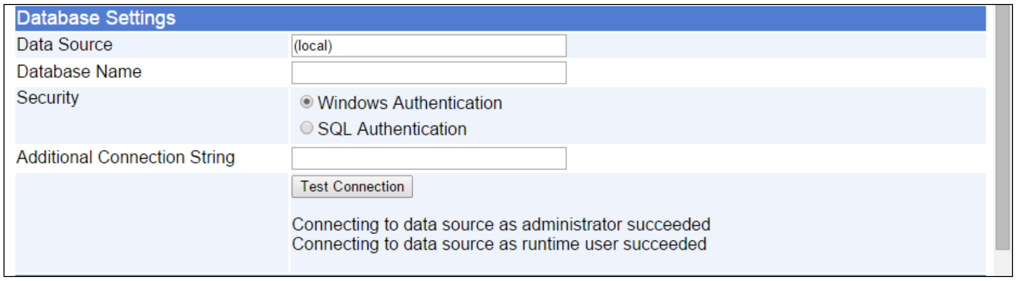
  

  The runtime username and password will be used for normal operation of the system.

  The administrative username and password will be used when the database is created or updated.

  If connecting to a remote database location, it is recommended to use SQL authentication and configure the SQL Server instance to accept remote connections. The sql credentials above must have enough privileges to create databases and read/write data. Once the database is created, you may wish to reconfigure privileges to allow read/write data only.

- **Additional Connection String** − Specify any other connection string details you may need. It is not necessary to specify integrated security or SQL authentication credentials here.
- **Test Connection** − This button will test the current data source connections as shown below:



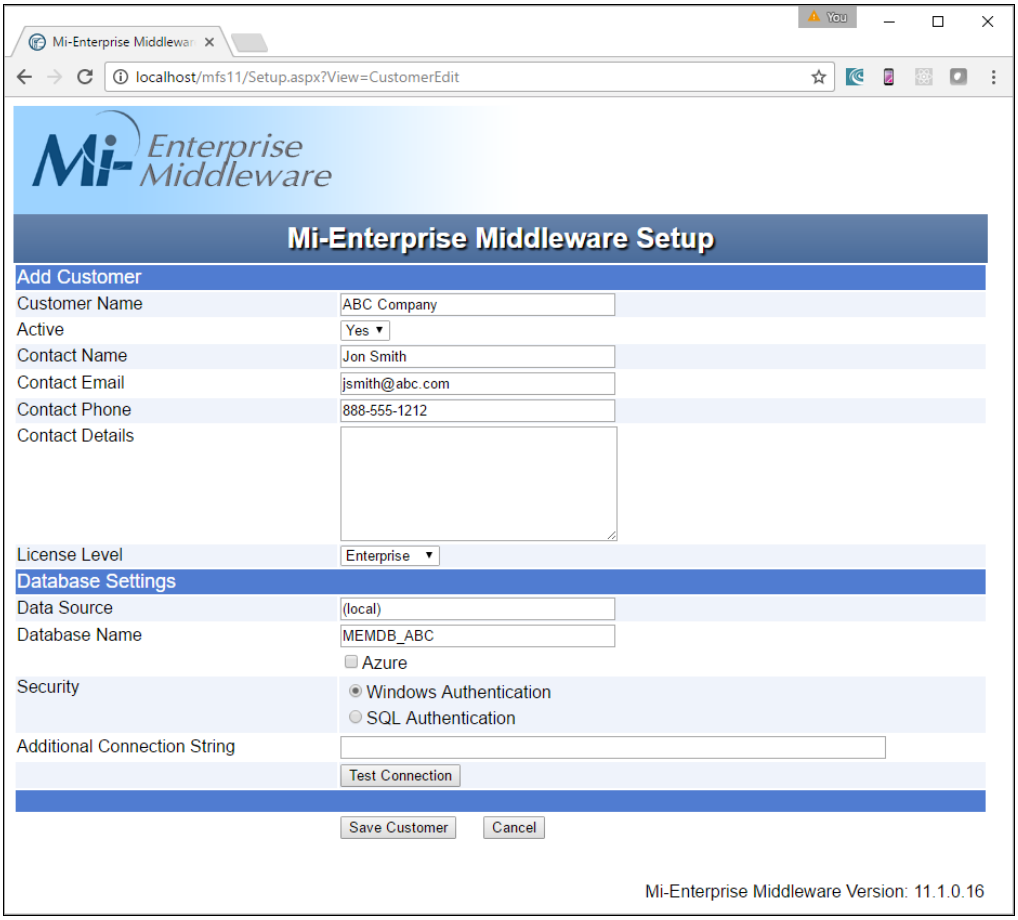
If an error is displayed, it should be resolved before attempting to add the customer.

Once finished, click the **"Save Customer" button** and the database will be created within your server and the server will be configured with the new customer.

Note: Please verify that the Database Administrator credentials are set correctly. It is highly recommended that this user is a local Windows user and a member of the local Administrators group. Administrative domain users are not recommended and may not adequately have privileges to perform all necessary tasks on the Setup.aspx page.

3.1.4.2 Global Administration − Modifying an existing Customer

Clicking the name of an existing customer will display the following page.



The fields of this page are:

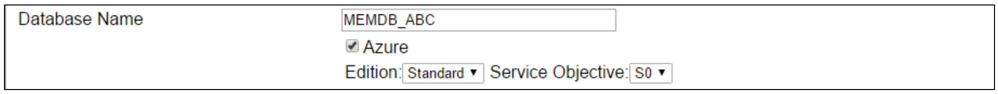
- **Status** − Leave set to "Active". Set to "Inactive" to prohibit any activity for this customer account.
- **Customer Name** − Name of the customer. Note that the client must be configured to use this name, so it is advisable to avoid names that are long or could be commonly misspelled. If you are not running the server in an ASP model and are just creating the default customer, leave this field set to "< No Customer Name Defined >"
- **Contact Name** − The name of the contact responsible for this customer
- **Contact Email** − The email address of the contact responsible for this customer
- **Contact Phone** − The phone number of the contact responsible for this customer
- **Contact Details** − Any other details you wish to specify about this contact
- **Level** − The licensing level at which the customer will operate. Licensing levels are defined as follows:
    - Enterprise − All features are enabled
    - Department − Active Directory synchronization is disabled
    - Basic − Active Directory synchronization is disabled. Workflow is disabled.
- **Data Source** − The name of the SQL Server instance you are using. If you are using SQL on the local machine, it most likely should be set as "(local)".

  If connecting to a database on a remote machine, replace "(local)" with the name of the machine, ie. "MTBAKER" or if using SQL Express, this will typically be "MTBAKER\SQLEXPRESS".

Note that clicking "Test Datasource..." will attempt to verify that the datasource location is valid.

- **Database Name** − The name of the database to use on the given server instance.

    - ♦ **Azure** − Check this box to indicate that you are using an Azure SQL DB. When this box is checked, additional options will appear below the checkbox:

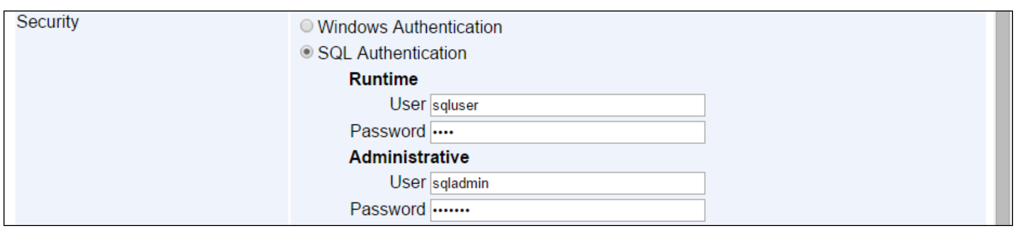


    The database will be provisioned with the edition and service objective specified. Note that editions and service objectives have a bearing on the cost and performance of the database, so please choose properly.

- **Security** − Specify whether to use Windows authentication (default) or SQL authentication.

  If using Windows Authentication, the server's application pool identity will be used for normal operatin of the system. The user specified as the local administrator will be used for database creation and update.

  If *"Use SQL Authentication"* is checked then the connection to the datasource will use SQL authentication and screen will be updated as shown below:

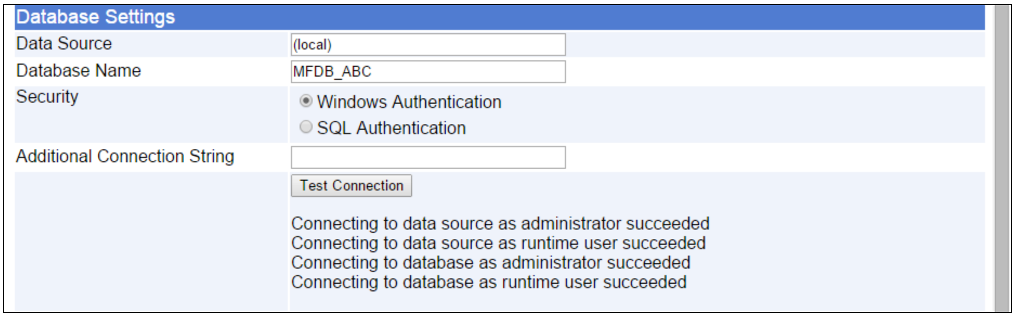


  The runtime username and password will be used for normal operation of the system.

  The administrative username and password will be used when the database is created or updated.

  If connecting to a remote database location, it is recommended to use SQL authentication and configure the SQL Server instance to accept remote connections. The sql credentials above must have enough privileges to create databases and read/write data. Once the database is created, you may wish to reconfigure privileges to allow read/write data only.

- **Additional Connection String** − Specify any other connection string details you may need. It is not necessary to specify integrated security or SQL authentication credentials here.
- **Test Connection** − This button will test the current data source connections as shown below:



If an error is displayed, it should be resolved before attempting to modify the customer.

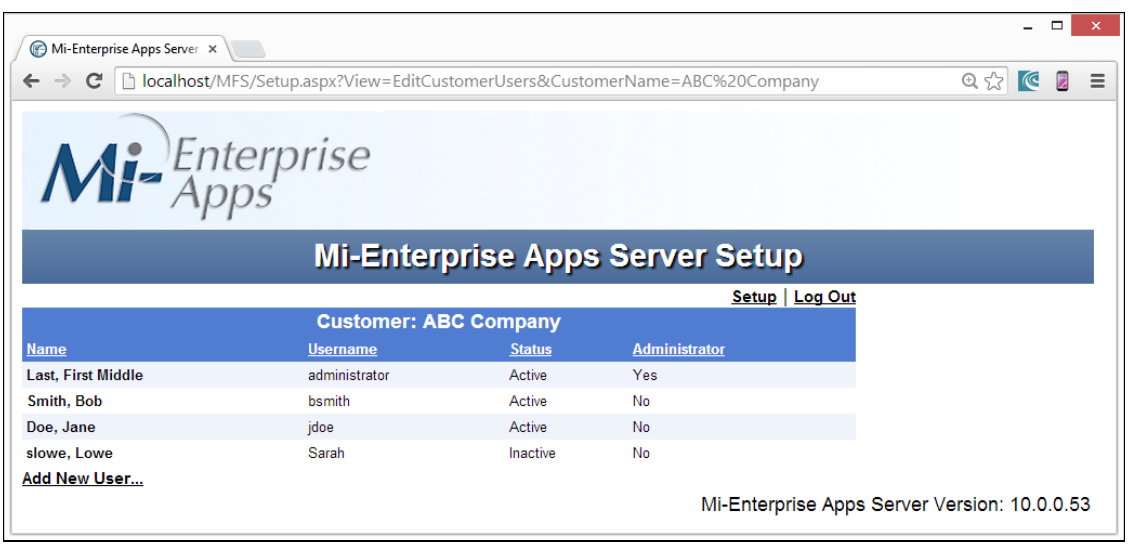
Click the **"Save Customer" button** and the customer account settings will be saved.

Note: Please verify that the Database Administrator credentials are set correctly. It is highly recommended that this user is a local Windows user and a member of the local Administrators group. Administrative domain users are not recommended and may not adequately have privileges to perform all necessary tasks on the Setup.aspx page.

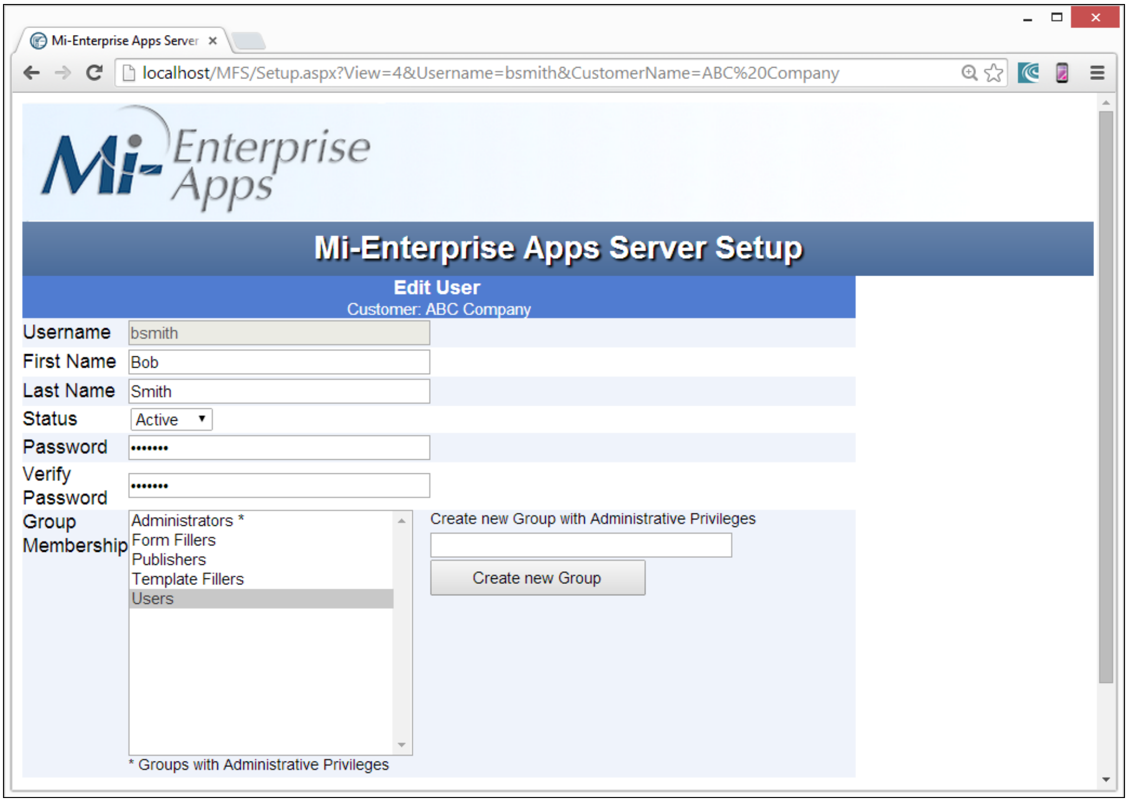
3.1.4.3 Global Administration − Modifying a Customer's Users

It is sometimes necessary for the global administrator to modify a specific customer's users. For instance, if the customer administrator has forgotten their password, it may be necessary for the global administrator to reset it.

Clicking the "Edit Users" link for a given customer in the customer list will present a list of all users for the selected customer as shown below:



Clicking on an existing user will allow you to change that user's name, password, and associated groups (this is a multi−select field; you can select multiple groups by holding down control and clicking on a group) as shown below:



Note that you can also create new groups that have administrative privileges if needed.

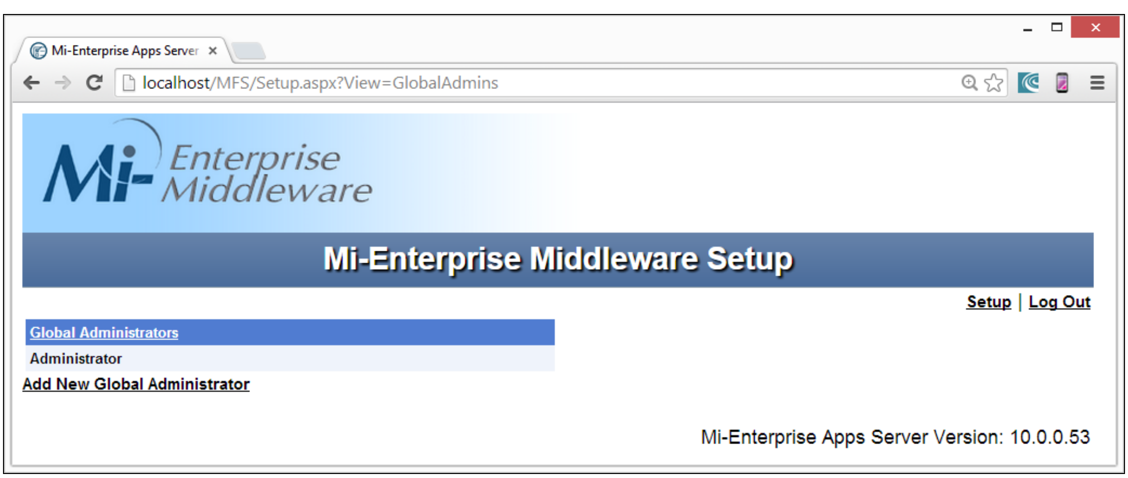
Clicking "Save" will save the changes to this user, while clicking "Cancel" will discard any changes.

Similarly, if you click "Add New User ...", the same form will present itself and allow you to add a new user to the customer. Again, you can specify the user's name, password, and group membership.

Note that when a customer is configured to use Active Directory, editing users created from Active Directory may be limited. Please refer to the section Active Directory Configuration Considerations

3.1.5 Global Administration − Modifying Global Administration Users

Clicking on the "Modify Global Administrators" link will display a page that looks like this:



It is recommended that one of the first tasks you perform as a global administrator is change the global administrator's password. The combination "Administrator" / "welcome" is not secure and is the same across Mi−Enterprise Middleware installations.

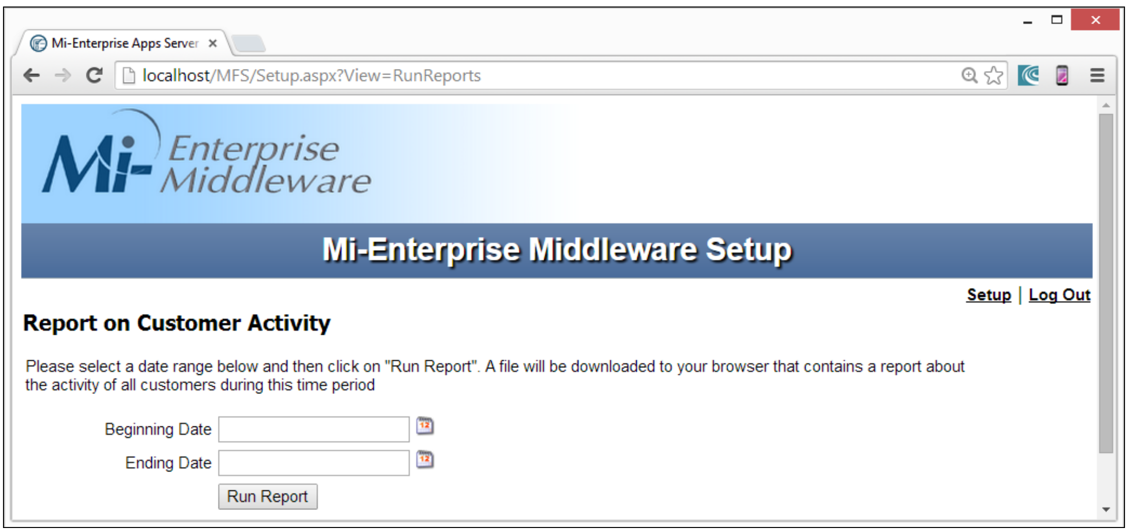
Clicking on a user will allow you to change the global administrator's username and password combo.

You can also add other global administrators by clicking the "Add New Global Administrator..." link.

3.1.6 Global Administration − Running Reports

It is possible for global administrators to run reports about usage over given time periods.

Clicking on the "Run Reports" link will take you to a page that looks like this:



Enter a valid date for the beginning and ending dates for which you wish to report on activity. Once these dates are properly specified, click the "Run Report" button.

You will be prompted to download a .zip file that is named for the hostname of the server. For instance, if the server is called "forms1", then the file download will be called "forms1.zip". This .zip file will be password protected with the password "xyzzy".

Inside this .zip file will be a .csv file for each configured customer for activity during the specified time period. This .csv file will have columns as follows:

- **Session ID** − The server assigned unique session ID.
- **Active/Inactive/Deleted** − The status of the session. Note that even sessions that have been removed by inactive session deletion will be reported upon.
- **Descriptor** − The session's descriptor value.
- **Form Template Name** − The name of the form template used to create the session.
- **Form Template Revision** − The revision of the form template used to create the session.
- **Initial Upload Time** − The time at which the session was initially uploaded to the server.
- **Initial Uploader** − The username of the initial uploading user.
- **Most Recent Upload Time** − The time at which the session was most recently uploaded to the server.
- **Most Recent Uploader** − The username of the last uploading user.

- **Number of Uploads** − The number of times the session has been uploaded.

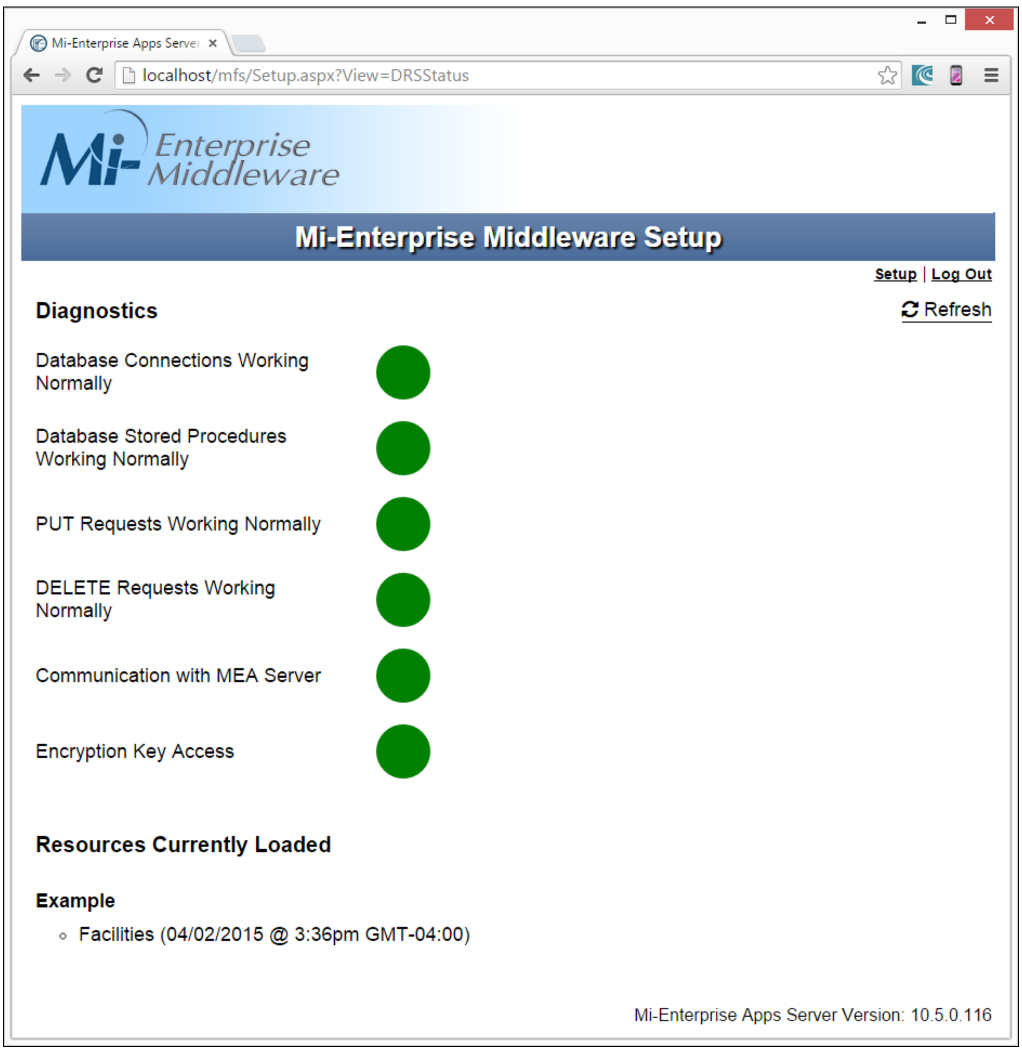
Each row below the first header row corresponds to a session that has been uploaded during the time period.

The last two rows of the file are for verification purposes only and do not correspond to session uploads. These are necessary such that Mi−Corporation may authenticate the validity of a report.

3.1.7 Global Administration − Data Replication Server Status

A global administrator may determine the current status of the Data Replication Server in order to ensure its proper function.

Clicking on the "DRS Status" link will take you to a page that looks like this:



A simple to understand red light / green light dashboard is displayed that indicates whether the Data Replication Server is functioning properly. If there is a red light next to any of the items, it will indicate that the DRS is not functioning properly and an action needs to be taken to resolve the issue.

3.1.7.1 Status Checks

Each item that is checked is described in more detail below:

3.1.7.1.1 Database Connections Working Normally

This checks to be sure that all configured customers inside the DRS are connectable. A failure here may indicate that a database connection string was specified improperly or that the identity used to connect to the database(s) does not have proper permissions.

3.1.7.1.2 Database Stored Procedures Working Normally

This checks to be sure that all stored procedures that DRS is dependent on are functioning properly. A failure here may indicate that the identity used to connect to the database(s) does not have proper permissions.

3.1.7.1.3 PUT Requests Working Normally

This checks to be sure that the PUT REST services that DRS is dependent on are functioning properly. A failure here may indicate that IIS is configured to disallow PUT requests or that WebDav is enabled on the IIS server. WebDav must be disabled either globally for IIS or locally for the DRS web application.

3.1.7.1.4 DELETE Requests Working Normally

This checks to be sure that the PUT REST services that DRS is dependent on are functioning properly. A failure here may indicate that IIS is configured to disallow DELETE requests or that WebDav is enabled on the IIS server. WebDav must be disabled either globally for IIS or locally for the DRS web application.

3.1.7.1.5 Communication with MEA Server

This checks to be sure that the DRS instance is communicating properly with the Mi−Enterprise Middleware. A failure here may indicate that the DRS web.config is not properly setup to communicate with the Mi−Enterprise Middleware.

3.1.7.1.6 Encryption Key Access

This checks to be sure a public/private encryption keypair has been generated by the DRS. A failure here may indicate an installation issue with DRS. Please contact support resources for more help.

3.1.7.1.7 Resources Currently Loaded

In this section, all resources currently loaded to the DRS will be displayed along with the time of their most recent update. They are grouped by customer. In the screenshot above, a single resource named "Facilities" has been loaded to the customer named "Example".

3.1.7.2 Note

This status check accesses a resource provided by the DRS itself. By default, it will check the URL /DRS/dashboard.html at the same hostname where Mi−Enterprise Middleware is configured.

For example, if the Mi−Enterprise Middleware is being accessed at:
http://server/MFS/Setup.aspx

Then the dashboard will be checked at:
http://server/DRS/dashboard.html

However, if the DRS is configured on a different server or at a different URL, this check may be changed by modifying the *drs.url* configuration parameter in the MEA Configuration parameters section of web.config. This is described further in the Advanced Server Configuration section.

3.1.7.3 Refresh

Using the Refresh link in the top right will refresh the status of the checks.

3.2 Logging Configuration

While most server configuration tasks can be accomplished via the global administrator pages, logging is configured in the server's configuration file. The file that contains logging configuration directives is called **web.config** and is found in the install directory of your server (typically c:\inetpub\wwwroot\MFS).

3.2.1 Configuring the Log Location

Locate the configuration directive that looks like:
<appender name="MFSLog" type="log4net.Appender.RollingFileAppender">

The next line will read something like:
<file value="c:\\MFS\\Logs\\MiFormsServer.log"/>

Change the value to the directory and filename you would like the logfile to be created as. Note you need to use two backslashes ("\\") to separate directory levels and filenames.

3.2.2 Configuring the Log Size and History

Locate the configuration directive that looks like:
<appender name="MFSLog" type="log4net.Appender.RollingFileAppender">

Two lines below, a line will read something like:
<maximumFileSize value="1MB"/>

Change the value from 1MB to another size as necessary. This is the maximum size of any logfile. Note that when this file size is exceeded, it will rollover. Depending on the next setting you may or may not keep a log history.

Locate the configuration directive that looks like:
<maxSizeRollBackups value="5"/>

By default, 5 log histories will be kept. So for instance, if you called your logfile c:\\MFS\\Logs\\MiFormsServer.log then over time you would see the following files in c:\\MFS\\Logs\\
MiFormsServer.log

MiFormsServer.log.1
MiFormsServer.log.2
MiFormsServer.log.3
MiFormsServer.log.4
MiFormsServer.log.5

Each would be of the size listed in the previous logging directive. The oldest logging information would be in the file MiFormsServer.log.5, while the newest would be in MiFormsServer.log. By changing this directive, more or fewer log history files will be kept.

3.2.3 Configuring Log Detail Level

Locate the configuration directive that looks like:
<logger name="MFS" additivity="false">

The next line will look something like this: **<level value="INFO"/>**

Change the value "INFO" to one of the following:

- "FATAL" − Only logs errors that prevent the server from operating
- "ERROR" − Logs all of above as well as unexpected, non−fatal errors
- "INFO" − Logs all of above as well as general server use information
- "DEBUG" − Extremely verbose logging that is only necessary when working with Mi−Corporation to diagnose a problem

3.3 Advanced Server Configuration

While most server configuration tasks can be accomplished via the global administrator pages, some advanced configuration options are only available by directly modifying the server's configuration files. The file that contains these configuration directives is called **web.config** and is found in the install directory of your server (typically c:\inetpub\wwwroot\MFS). The configuration directives are split between a section titled **<MFS>** and **<MEA>**. You can use a standard text editor to modify this file, and each advanced configuration option is discussed below:

3.3.1 MFS Configuration Parameters

auth.module.assembly
Values: <*The name of a .dll file that implements authentication*>
Defaut: MiCo.MiApp.Server.AuthMod.dll
Description: Specifies the name of the DLL that is used to provide authentication for the server. This should typically not be changed without consulting with Mi−Corporation.

auth.module.class
Values: <*The name of the class in the authentication dll that handles authentication*>
Default: MiCo.MiApp.Server.AuthMod
Description: Specifies the name of the class in the above DLL that is used to provide authentication for the server. This should typically not be changed without consulting with Mi−Corporation.

auth.groups.demographics
Values: <*Demographic Name 1;Demographic Description 1;[true|false],Demographic Name 2;Demographic Description 2;[true|false],...*>

Default: <Empty String>
Description: Specifies what demographics are kept for each group. Note that this should only be changed if the authentication module is able to handle demographics different than what is typically stored. This should typically not be changed without consulting with Mi−Corporation.

auth.users.demographics
Values: <*Demographic Name 1;Demographic Description 1;[true|false],Demographic Name 2;Demographic Description 2;[true|false],...*>
Default: email;E−mail Address;true
Description: Specifies what demographics are kept for each user. Note that this should only be changed if the authentication module is able to handle demographics different than what is typically stored. This should typically not be changed without consulting with Mi−Corporation.

branding.productfamily
Values: <*Any text string*>
Default: Mi−Enterprise Middleware
Description: Specifies the name of the product family and is used in messages where this product family is displayed in the server's UI if the server is not configured to allow apps.

branding.productname
Values: <*Any text string*>
Default: Mi−Enterprise Middleware
Description: Specifies the name of the product and is used in messages where this name is displayed in the server's UI if the server is not configured to allow apps.

mf.client.update.directory
Values: <*Any valid path name*>
Default: c:\\mfs\\clientupdate\\
Description: Specifies the directory where Mi−Enterprise Middleware client updates will be stored if a customer enables client updates. Note that all directories should be separated with doubled backslashes ("\\").

mf.license.update.directory
Values: <*Any valid path name*>
Default: c:\\mfs\\licenseupdate\\
Description: Specifies the directory where Mi−Enterprise Middleware client license updates will be stored if a customer enables client license updates. Note that all directories should be separated with doubled backslashes ("\\").

mfas.module.assembly
Values: <*The name of a .dll file that implements attachment storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides session storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfas.module.class
Values: <*The name of the class in the attachment storage dll that handles storage*>
Default: MiCo.MiApp.Server.AttachmentStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide session storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfds.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\data sources\\
Description: Specifies the directory in which the server should store data source files. Note that all directories should be separated with doubled backslashes ("\\").

mfds.module.assembly
Values: <*The name of a .dll file that implements data source file storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides data source file storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfds.module.class
Values: <*The name of the class in the data source file storage dll that handles storage*>
Default: MiCo.MiApp.Server.DataSourceStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide data source file storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfms.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\maps\\
Description: Specifies the directory in which the server should store map files. Note that all directories should be separated with doubled backslashes ("\\").

mfms.module.assembly
Values: <*The name of a .dll file that implements map file storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides map file storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfms.module.class
Values: <*The name of the class in the map file storage dll that handles storage*>
Default: MiCo.MiApp.Server.ServerMapStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide map file storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfsr.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\script references\\
Description: Specifies the directory in which the server should store script references. Note that all directories should be separated with doubled backslashes ("\\").

mfsr.module.assembly
Values: <*The name of a .dll file that implements script reference storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides script reference storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfsr.module.class
Values: <*The name of the class in the script reference storage dll that handles storage*>

Default: MiCo.MiApp.Server.ScriptReferenceStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide script reference storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfss.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\sessions\\
Description: Specifies the directory in which the server should store form sessions. Note that all directories should be separated with doubled backslashes ("\\").

mfss.module.assembly
Values: <*The name of a .dll file that implements session storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides session storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfss.module.class
Values: <*The name of the class in the session storage dll that handles storage*>
Default: MiCo.MiApp.Server.SessionStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide session storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfts.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\templates\\
Description: Specifies the directory in which the server should store form templates. Note that all directories should be separated with doubled backslashes ("\\").

mfts.module.assembly
Values: <*The name of a .dll file that implements form template storage*>
Default: MiCo.MiApp.Server.FileStorageMod.dll
Description: Specifies the name of the DLL that provides template storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mfts.module.class
Values: <*The name of the class in the form template storage dll that handles storage*>
Default: MiCo.MiApp.Server.FormTemplateStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide template storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

reco.resourcedir
Values: <*Any valid path name*>
Default: C:\\Program Files\\Mi−Co\\Mi−Forms Server 6\\res\\
Description: Specifies the location of the recognition resource files used during session processing. There is no real reason to change this, but if you do, be sure to move the files at the same time, and be sure that the user running your ASP.Net applications (typically ASPNET) can read the directory. Note that all directories should be separated with doubled backslashes ("\\").

sessionprocessor.internalerrormax
Values: <*Any positive integer*>
Default: 5
Description: Specifies the number of times to retry to process a session that has failed to process due to internal server errors. If the internal error count is reached, the session will be moved to an error queue.

sessionprocessor.internalerrorwait
Values: <*Any positive integer*>
Default: 30
Description: Specifies the number of seconds to wait between retried to process a session that has failed to process due to an internal server error.

sessionprocessor.mailonerror
Values: *yes* | *no*
Default: yes
Description: Specifies whether or not an email should be sent to the customer contact in the event that a session fails to process.

sessionprocessor.threadcount
Values: <*Any positive integer*>
Default: 1
Description: Specifies the number of threads to use per customer to process sessions. Session processing and data export can be memory and CPU intensive, so sessions are not processed immediately upon upload. Instead each session processor thread checks to see if sessions need to be processed every 1/2 second. In general, this can be left at its default "1", but if your server hardware has more than a single processor, you may see performance gains by upping this number as session processing scales well per processor.

smtp.server.name
Values: <*Hostname of a SMTP server*>
Default: <Empty String>
Description: Specifies the name of your SMTP server used to send mail (server operational errors, form mail notifications).

smtp.server.password
Values: *Empty String* | *The password of the user that should be used to connect to your SMTP server*
Default: <Empty String>
Description: The password for the user that is specified

smtp.server.port
Values: <*Any positive integer*>
Default: 25
Description: Specifies the port of your SMTP server used to send mail.

smtp.server.ssl
Values: *true* | *false*
Default: false
Description: Specifies whether a secure (SSL) connection should be used to connect to your SMTP server.

smtp.server.user
Values: *Empty String | The username of the user that should be used to connect to your SMTP server*
Default: <Empty String>
Description: Specifies the username that will be used to connect to the SMTP server. If this is left empty then a non−authenticated connection will be attempted. Some servers may accept this.

user.prefs.autologouttime
Values: <*Any positive integer*>
Default: 20
Description: Specifies the default auto−logout timeout (in minutes) for a server user. Note that this is only the default and can be changed by each user.

user.prefs.datasources.datasourcefilesperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of data sources files listed in the grid on the DataSources.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.datasources.datasourcesperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of data sources listed in the grid on the DataSources.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.dir
Values: <*Any valid path name*>
Default: c:\\mfs\\userprefs\\
Description: Specifies the location where server user preferences should be saved. Note that all directories should be separated with doubled backslashes ("\\").

user.prefs.groups.groupsperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of groups listed in the grid on the Groups.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.sessions.historyeventsperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of session history events listed in the grid on the Sessions.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.sessions.queuesperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of queues listed in the grid on the Queues.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.sessions.sessionsperpage
Values: <*Any positive integer*>
Default: 10

Description: Specifies the default number of sessions listed in the grid on the Sessions.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.templates.templatesperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of templates listed in the grid on the Templates.aspx page. Note that this is only the default and can be changed by each user.

user.prefs.users.usersperpage
Values: <*Any positive integer*>
Default: 10
Description: Specifies the default number of users listed in the grid on the Users.aspx page. Note that this is only the default and can be changed by each user.

3.3.2 MEA Configuration Parameters

branding.productfamily
Values: <*Any text string*>
Default: Mi−Enterprise Middleware
Description: Specifies the name of the product family and is used in messages where this product family is displayed in the server's UI if the server is configured to allow apps.

branding.productname
Values: <*Any text string*>
Default: Mi−Enterprise Middleware
Description: Specifies the name of the product and is used in messages where this name is displayed in the server's UI if the server is configured to allow apps.

drs.endpoint
Values: <*Any valid URL*>
Default: DRS
Description: Specifies the URL where the DRS application is located for the given installed instance.

drs.url
Values: <*Any valid URL*>
Default: /DRS/dashboard.html
Description: Specifies the URL where the DRS dasbhoard is located for the given installed instance.

drs.webusers.basedir
Values: <*Any valid path name*>
Default: c:\mfs\storage\drs\
Description: Specifies the location where DRS data caches will be stored when users access the client via the web

mias.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\apps\\
Description: Specifies the directory in which the server should store apps. Note that all directories should be separated with doubled backslashes ("\\").

mias.module.assembly
Values: <*The name of a .dll file that implements app storage*>
Default: MiCo.MiApp.Server.AppStorageMod.dll
Description: Specifies the name of the DLL that provides app storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mias.module.class
Values: <*The name of the class in the app storage dll that handles storage*>
Default: MiCo.MiApp.Server.AppStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide app storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mids.basedir
Values: <*Any valid path name*>
Default: c:\\mfs\\storage\\appdata\\
Description: Specifies the directory in which the server should store app data bundles. Note that all directories should be separated with doubled backslashes ("\\").

mids.module.assembly
Values: <*The name of a .dll file that implements app data bundle storage*>
Default: MiCo.MiApp.Server.AppDataStorageMod.dll
Description: Specifies the name of the DLL that provides app data bundle storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

mids.module.class
Values: <*The name of the class in the app data bundle storage dll that handles storage*>
Default: MiCo.MiApp.Server.AppDataStorageMod
Description: Specifies the name of the class in the above DLL that is used to provide app data bundle storage management for the server. This should typically not be changed without consulting with Mi−Corporation.

3.3.3 DC Configuration Parameters

rootFolder
Values: <*Any valid path name*>
Default: c:\\mfs\\dc\\
Specifies the location where data exports from forms should be exported in order for them to be handled by the Download Center. This shoul dmatch the rootFolder set in the Download Center configuration.

useAzure
Values: *true* | *false*
Default: false
If set to true data exports from forms sent to the Download Center will be sent to Azure storage instead as configured in the Azure configuration section.

3.3.4 Azure Configuration Parameters

appinsights.serverkey
Values: *A valid Azure App Insights appkey*
Default: ENTER YOUR KEY HERE
If server telemetry will be sent to Azure App Insights, this is the key that will be used to do so

appinsights.servertelemetry
Values: *true* | *false*
Default: false
If set to true, server telemetry (e.g. usage stats and timings) will be sent to an Azure App Insights account

storage.account
Values: *A valid Azure Storage Account name*
Default: ENTER YOUR ACCOUNT NAME
If any storage module is configured to use Azure Storage, this is the storage account that will be used

storage.endpoint
Values: *A valid Azure Storage Endpoint URL*
Default: https://centblob.blob.core.windows.net/
If any storage module is configured to use Azure Storage, this is the storage endpoint that will be used. This may usually be left out or as default. The exception is typically for Azure Government.

storage.key
Values: *A valid Azure Storage API Key*
Default: ENTER YOUR ACCOUNT KEY
If any storage module is configured to use Azure Storage, this is the storage API key that will be used

3.3.5 Apple Configuration Parameters

receipt.endpoint.production
Values: *A valid Apple Receipt verification Endpoint URL*
Default: https://buy.itunes.apple.com/verifyReceipt
If Mi−Enterprise Middleware will be used with an in−app purchase applications, this is the URL that will be used to verify purchase receipts in production

receipt.endpoint.sandbox
Values: *A valid Apple Receipt verification Endpoint URL*
Default: https://sandbox.itunes.apple.com/verifyReceipt
If Mi−Enterprise Middleware will be used with an in−app purchase applications, this is the URL that will be used to verify purchase receipts in Apple's sandbox

receipt.useSandbox
Values: *true* | *false*
Default: false
If Mi−Enterprise Middleware will be used with in−app purchase applications, set to true the Apple sandbox receipt verification URL will be used, otherwise the production URL will be used

3.3.6 Android Configuration Parameters

app.name
Values: *Your application's app name*
Default: YOUR APP
If Mi−Enterprise Middleware will be used with an in−app purchase application, set to the name of your app

server.creds.p12.filePath
Values: *A valid file path*
Default: YOUR P12 FILEPATH
If Mi−Enterprise Middleware will be used with an in−app purchase application, set to the file location of your P12 file on the server

server.creds.p12.privatePwd
Values: *A valid password*
Default: YOUR P12 PASSWORD
If Mi−Enterprise Middleware will be used with an in−app purchase application, set to the password of your P12 file

server.creds.p12.serviceAccount.email
Values: *A valid email address*
Default: YOUR SERVICE ACCOUNT
If Mi−Enterprise Middleware will be used with an in−app purchase application, set to the email address of the service account setup with Google Play

3.4 Active Directory Configuration Considerations

Each Mi−Enterprise Middleware Customer configuration may include Active Directory settings to create Mi−Enterprise Middleware groups from AD security groups and Mi−Enterprise Middleware users from members of these AD security groups. Here are a couple of items to keep in mind:

- **Configuration** − Information to keep in mind while configuring Mi−Enterprise Middleware customers with an Active Directory domain.
    - **Security groups** − Once Active Directory settings are entered and "Get groups from Active Directory" is clicked, Mi−Enterprise Middleware will list only Active Directory security groups, not "organizational units".
    - **Editing an Active Directory group** − Once a group is created from Active Directory, the privileges and allowable form templates for the group may be set. (User memberships may only be changed if the user was not created from Active Directory.)
    - **Editing an Active Directory user** − User settings for a user created from Active Directory will be disabled. (Group membership may only be changed if the group was not created from Active Directory.)
    - **Local Mi−Enterprise Middleware Groups and Users** − If Active Directory synchronization creates groups and users for a customer, it is still possible to create Mi−Enterprise Middleware groups and users for a customer by the normal means. These groups and users will have no synchronization or authentication attempts with the Active Directory, since they were created from Mi−Enterprise Middleware and not Active Directory.

- **Local user memberships** − Local users, not created from Active Directory users, may become members of groups created from Active Directory.
- **Active Directory user memberships** − Active Directory users may become members of local groups, not created from Active Directory.
- **Active Directory memberships** − It will not be possible to rearrange memberships between Active Directory users and Active Directory groups within Mi−Enterprise Middleware. To accomplish this, rearrange memberships within Active Directory and allow the Mi−Enterprise Middleware to synchronize these changes.
- **Default administrator user** − If during synchronization an Active Directory user with the username of 'administrator' is synchronized, this user will assume the default customer 'administrator' user and continue to authenticate with Active Directory.
- **Search Limits** − When Mi−Enterprise Middleware queries the Active Directory for groups or for users in a group, the following search parameters defined by the .NET DirectorySearcher Class are configurable:

  PageSize
  ServerPageTimeLimit
  SizeLimit
  ServerTimeLimit

  When Mi−Enterprise Middleware queries for multiple objects, the PageSize and ServerPageTimeLimit parameters are used. When querying for 1 object, the SizeLimit and ServerTimeLimit parameters are applied. Configuring the PageSize and ServerPageTimeLimit parameters will be beneficial to larger enterprises where there are thousands of results expected from a single query. See Active Directory Customer Settings.

- **"Synchronization"** − Once Active Directory is configured and a customer is created, Mi−Enterprise Middleware will begin the process of "Synchronizing" with Active Directory to create groups and users. Here's a list of items to note:

  - **One−Way** − Mi−Enterprise Middleware groups and users will be created and maintained based on their membership status from Active Directory. Changes made to Mi−Enterprise Middleware groups or users who were created from Active Directory will not be synchronized back to Active Directory (most settings for these users and groups will be disabled anyway within Mi−Enterprise Middleware).
  - **Every 5 minutes** − By default, Mi−Enterprise Middleware will be configured to synchronize with Active Directory every 5 minutes. To change the frequency of the synchronization process, please see mf.Active.Directory.Sleep.Timespan.
  - **Direct and indirect group members** − While "synchronizing" with Active Directory, Mi−Enterprise Middleware will include users who are indirect members of a selected group. For instance, if UserA is a member of GroupA and GroupA is a member of GroupB, and GroupB is selected but GroupA is not, UserA will be considered as an indirect member of GroupB.
  - **Groups and Users not deleted** − If a group or user was created by Active Directory synchronization and then later inactivated or not found in Active Directory, the group or user in the Mi−Enterprise Middleware will be inactivated, not deleted or removed.
  - **Active Directory passwords not cached nor retrieved** − During synchronization, only the name and an identifying object id of the group or user is retrieved from Active Directory. Mi−Enterprise Middleware does not store passwords for users created from Active Directory.

- **Authentication and Security** − For all authentication attempts by a Mi−Enterprise Middleware user created from Active Directory, Mi−Enterprise Middleware will authenticate with the Active Directory domain.
    - **User security settings** − All user security settings, including password expiration, etc... will be handled by Active Directory, not by Mi−Enterprise Middleware. These settings are not configurable from Mi−Enterprise Middleware.
    - **Change Password** − Use Active Directory to change a user's password. Mi−Enterprise Middleware will not handle Active Directory password changes.
    - **Forgot Password** − Forgotten Active Directory passwords will not be sent via email from the Login − Forgot Password web page.
- **Active Directory Object Properties** − All communication to the Active Directory server involve authentication requests or object queries. There are no attempted changes, inserts, updates, etc... to the Active Directory server (although failed authentication requests may lead to locking a user account but this is expected.) During an object query, depending upon the type of Active Directory object queried, the following object properties are requested from each object type (for efficiency, not all properties of an object are queried):
    - **Group objects** are filtered by "objectCategory=group".
        - **sAMAccountName** − or the Pre−Windows 2000 group name will be used as the "name" of the group. This is not to be confused with the group object property "Name" which may or may not be the same as "sAMAccountName". In some Active Directory instances, the "Name" property may not exist whereas the "sAMAccountName" is always required.
        - **objectGuid** − a unique identifier for each Active Directory object.
        - **groupType** − an enumeration specifying the types of groups. Specifically, Mi−Enterprise Middleware filters this for the enumerator "ADS_GROUP_TYPE_SECURITY_ENABLED".
        - **member** − list of group members. AttributeScopeQuery will be attempted for efficiency on recent Active Directory servers.
    - **User objects** are filtered by "sAMAccountType=805306368".
        - **distinguishedName** − the unique hierarchical path to an LDAP object. Specifically, Mi−Enterprise Middleware requires this when expanding group membership.
        - **sAMAccountName** − or User logon name (Pre−Windows 2000) will be used as the username.
        - **givenName** − will be used as the user's first name, if exists.
        - **sn** − will be used as the user's last name, if exists.
        - **mail** − will be used as the user's email address, if exists.
        - **userAccountControl** − an enumeration specifying different user account properties. Specifically, Mi−Enterprise Middleware does not create accounts that are disabled.
        - **TokenGroups** − attribute to determine a user's full group membership status − including nested group memberships.

Note: Although Active Directory may be configured for all customers, any customer not running at the Enterprise licensing level will not synchronize with your Active Directory server.

3.5 Download Center Configuration

The Mi−Enterprise Middleware includes a storage repository called the Download Center. This is meant to be used as a simple storage mechanism for files exported from forms.

3.5.1 Download Center Configuration

By default, the Download Center is installed under the "DC" folder of the website under which the Mi−Enterprise Middleware was installed. This is most typically the folder **c:\inetpub\wwwroot\dc**. Inside this folder there is a file named web.config that will need to be updated. Open this file with Notepad or other similar text editor.

1. Locate the <appSettings> section as shown below:

```
<appSettings>
  <!-- Set these to values used to communicate with the authentication server -->
  <add key="MFS.hostname" value="localhost"/>
  <add key="MFS.port" value="80"/>
  <add key="MFS.ssl" value="false"/>
  <add key="MFS.URL" value="MFS"/>

  <!-- Set to the location where default data exports are set to be saved -->
  <add key="BaseDir" value="c:\\mfs\\dc\\"/>

  <!-- Set to a list of privileges that will allow download of
          all customer files (separate with commas) -->
  <add key="Download_Customer_Privilege" value="Downloader - Customer,Admin"/>
  <!-- Set to a list of privileges that will allow download of a
          user's files (separate with commas) -->
  <add key="Download_User_Privilege" value="Downloader - User"/>
  <!-- This demographic will be used to override the user's typical base folder -->
  <add key="BaseDirectory_Override_Demographic" value="dcbase"/>

  <!-- If the Azure storage details below are set, Azure storage will be used
          and the BaseDir configuration above will be ignored -->
  <add key="AzureStorage_Account" value=""/>
  <add key="AzureStorage_Key" value=""/>
  <!-- Optionally set an endpoint below if needed -->
  <!--<add key="AzureStorage_Endpoint"
               value="https://centblob.blob.core.windows.net/"/>-->

  <!-- If the Azure AppInsight key is set below then telemetry will be sent
          to AppInsights automatically -->
  <add key="AzureAppInsights_Key" value=""/>
</appSettings>
```

2. Edit these settings based on their definition below editing the value of each as needed:

   - MFS.hostname − Set to the IP or hostname of the Mi−Enterprise Middleware server
   - MFS.port − Set to the HTTP(S) port of the Mi−Enterprise Middleware server
   - MFS.ssl − Set to true if HTTPS should be used to communicate with the Mi−Enterprise Middleware server or false otherwise
   - MFS.URL − Set to the URL prefix of the Mi−Enterprise Middleware server (typically MFS)
   - BaseDir − Set to the location where the Mi−Enterprise Middleware server is configured to save exported files from forms (rootFolder in the DC section, see below)

- ♦ Download_Customer_Privilege − Set to a list of privileges (comma separated) that allows a user to download all files located within the BaseDir\Customer folder
- ♦ Download_User_Privilege − Set to a list of privileges (comma separated) that allows a user to download all files located within their person folder within BaseDir\Customer*user*
- ♦ BaseDirectory_Override_Demographic − The demographic on a user that will be used to override the BaseDir folder if present
- ♦ AzureStorage_Account − If set, this will cause the Download Center to use Azure Storage instead of local storage. This must be set the same as configured within the Mi−Enterprise Middleware.
- ♦ AzureStorage_Key − The Azure Storage key to use to access the Azure Storage account. This must be set the same as configured within the Mi−Enterprise Middleware.
- ♦ AzureStorage_Endpoint − Option Azure Storage endpoint to use to access the Azure Storage account (typically not needed). This must be set the same as configured within the Mi−Enterprise Middleware.
- ♦ AzureAppInsights_Key − If set to a non−empty string, analytics will be provided to the Azure Application Insights account

3. Save the web.config file and restart the web server

3.5.2 Mi−Enterprise Middleware Configuration

The Mi−Enterprise Middleware must also be configured for proper Download Center operation. To configure the server, take the following steps:

1. Edit the web.config file associated with Mi−Enterprise Middleware (typically c:\inetpub\wwwroot\mfs\) as follows:
   a. Near the end of the file locate the <!−− DC −−> section:

```
<DC>
  <!-- Set to the folder that should be used to
          store Download Center exports -->
  <add key="rootFolder" value="c:\\mfs\\dc\\"/>
  <!-- If set to true, Azure storage (as defined in the Azure section) will be
          used for Download Center exports in place of disk storage -->
  <add key="useAzureStorage" value="false"/>
</DC>
```

   b. Edit it if needed as follows:
      - ◊ rootFolder − Set to a different folder as needed. This must match the BaseDir specified in the Download Center configuration above.
      - ◊ useAzureStorage − Set to "true" if the server should save exported files to Azure Storage instead of locally. Note that the Azure Storage account used will be the same one configured within the Azure Storage configuration.
2. Save the web.config file and restart the web server

3.6 Data Replication Server Configuration

The Mi−Enterprise Middleware includes the Data Replication Server. This is a server that allows for the synchronization of backend data to mobile devices across all platforms. It is enabled for all customers at the Enterprise level of licensing or higher. In order to successfully use this feature, the Data Replication Server must be configured at a global level and then on a per−customer basis as shown below.

3.6.1 Data Replication Server Global Configuration

By default, the Data Replication Server is installed under the "DRS" folder of the website under which the Mi−Enterprise Middleware was installed. This is most typically the folder **c:\inetpub\wwwroot\drs**. Inside this folder there is a file named web.config that may need to be updated. Open this file with Notepad or other similar text editor.

Search for the section that looks similar to that below:

```
<appSettings>
  <add key="MiFormAuthServices" value="http://localhost/MFS/Services/AuthServices.asmx" />
  <add key="MiFormDataExchangeServices"
  value="http://localhost/MFS/Services/DataExchangeServices.asmx" />
  <add key="Certificate_PrivateKey"
  value="<RSAKeyValue><Modulus>...</Modulus><Exponent>AQAB</Exponent><P>...</P><Q>...</Q><
  DP>...</DP><DQ>...</DQ><InverseQ>...</InverseQ><D>...</D></RSAKeyValue>" />
  <add key="Certificate_PublicKey"
  value="..." />
</appSettings>
```

By default the Data Replication Server is configured to find the Mi−Enterprise Middleware on the same machine. This is the most typical setup. However, if this is different within your environment, you will need to edit the *MiFormAuthServices* and *MiFormDataExchangeServices* values to point to the appropriate service provider URLs.

The *Certificate_PrivateKey* and *Certificate_PublicKey* values should be filled and should not need to be edited. However, if those lines are not present, please contact support resources.

3.6.2 Data Replication Server per Customer Configuration

When a customer configured within Mi−Enterprise Middleware is configured and you wish to use the Data Replication Server with that customer, you must edit the web.config file of the Data Replication Server. This file is located under the "DRS" folder of the website under which the Mi−Enterprise Middleware was installed. This is most typically the folder **c:\inetpub\wwwroot\drs**. Open this file with Notepad or other similar text editor.

Search for the section that looks similar to that below:

```
<connectionStrings>
  <!−− Pattern for connection string names is "db.customer.{CustomerName}" where
  {CustomerName} is the raw customer name −−>
</connectionStrings>
```

You will need to add an entry for each customer that will use the Data Replication Server. The pattern for doing so is to match the customer name exactly as configured in the Mi−Enterprise Middleware as the key and then to set the connection string to a valid database. For example, if you were to configure a customer named "Example" to use a database on the datbase server named "DBServer" and to use the database name "RS_Example" with SQL authentication then it may look something like this:

```
<connectionStrings>
  <!−− Pattern for connection string names is "db.customer.{CustomerName}"
  where {CustomerName} is the raw customer name −−>
  <add name="db.customer.Example" connectionString="Data Source=DBServer;
          Initial Catalog=RS_Example;
```

```
          User=username;Password=pass;MultipleActiveResultSets=True"
          providerName="System.Data.SqlClient" />
</connectionStrings>
```

3.6.2.1 Important Notes

- The database specified here must not be the same database used when configuring the customer in Mi−Enterprise Middleware.
- The database specified here will automatically be created the first time it is accessed.
- The identity of the database user must have permission to create and modify the database structure of the database specified. If using Windows authentication, this user will be the low privileged app pool identity.

3.7 Mail Service Configuration

The Mi−Enterprise Middleware includes a Mail Service used to send mail notifications both from the Mi−Enterprise Middleware itself and from forms that request mail to be sent. This service runs outside the context of the web server and must be configured properly in order to send messages.

3.7.1 Mail Service Activation

Though the Mail Service is installed on the target server at Mi−Enterprise Middleware installation time, it must be activated after the install. To do so, take the following steps:

1. Open an administrative command prompt
2. Change into the c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\MailService folder
3. Run the command *InstallUtil.exe MiCo.MiApp.Server.MailService.exe* − Note you should see output in this window that ends with:

   ```
   The Commit phase completed successfully.

   The transacted install has completed.
   ```
4. Open up the Services control panel for the server such as by runing *services.msc* from a Start−−>Run prompt
5. Locate the service named Mi−Enterprise Middleware Mail Service right click on it and select Properties
6. Change the Startup type to "Automatic"
7. In the Log On panel, change the account that will have permissions to read the web.config file of all Mi−Enterprise Middleware instances and that will be able to connect to customer databases directly if you intend to use Windows Authentication. Depending on your configuration, the best choice may be to use an administrative account with a non−expiring password.
8. Start the service

3.7.2 Mail Service Configuration

The Mail Service is installed in the folder c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\MailService. By default it is configured to process all customers configured in the defautlt Mi−Enterprise Middleware instance installed to c:\inetpub\wwwroot\mfs. If needed, the service may be configured to process mail for multiple Mi−Enterprise Middleware instances installed on the same server. To do so follow the following steps:

1. Navigate to the folder c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\MailService in Windows Explorer
2. Open the file MiCo.MiApp.Server.MailService.exe.config in a text editor
3. Locate the <MEMCollection> section:

```
<MEMSection>
  <MEMCollection>
    <add name="Default" webConfig="c:\inetpub\wwwroot\mfs\web.config"/>
  </MEMCollection>
</MEMSection>
```

4. Add an additional line after the "Default" server. For instance if you have a second instace of Mi−Enterprise Middleware installed in the folder c:\inetpub\secondserver\mfs then the configuration would look like this:

```
<MEMSection>
  <MEMCollection>
    <add name="Default" webConfig="c:\inetpub\wwwroot\mfs\web.config"/>
    <add name="Second" webConfig="c:\inetpub\second\mfs\web.config"/>
  </MEMCollection>
</MEMSection>
```

   Note that the name of each server must be unique, but may be named per your convention. This name will appear within the logfiles for the mail service, but are not visible beyond that.
5. By default the service logs to the file c:\mfs\logs\memmail.log. If you wish to change this, locate this line within the configuration file:

```
    <file value="c:\mfs\logs\memmail.log"/>
```

   And change the value as needed.
6. By default the service logs at the information (INFO) level. If you wish to change this, locate this line within the configuratin file:

```
    <level value="INFO"/>
```

   And change it to another valid level such as: ERROR, WARN, or DEBUG
7. Save the configuration file and then restart the Mi−Enterprise Middleware mail service via the Services control panel

3.7.3 Configure Mi−Enterprise Middleware SMTP settings

In order for the Mi−Enterprise Middleware Mail Service to properly send mail, you must configure the Mi−Enterprise Middleware SMTP settings for each Mi−Enterprise Middleware instance the Mail Service is servicing. To do so, edit the web.config file of each Mi−Enterprise Middleware instance in a text editor and locate the following lines:

```
<!−− SMTP Server setup −−>
<add key="smtp.server.name" value="localhost"/>
<add key="smtp.server.port" value="25"/>
<add key="smtp.server.ssl" value="false" />
<add key="smtp.server.user" value="" />
<add key="smtp.server.password" value="" />
```

The Mail Service will use this server to send all mail. Each key is described below:

smtp.server.name − The name or IP address of the SMTP server through which to send mail
smtp.server.port − The port of the SMTP server to connect to
smtp.server.ssl − Set to true if a secure (SSL) connection should be used to communicate with the server
smtp.server.user − The username that will be used to connect to the SMTP server. If this is left empty then a non−authenticated connection will be attempted. Some servers may accept this.
smtp.server.password − The password for the user that is specified

As an example, if you are using Office 365 as your mail provider, the SMTP settings should be setup similarly to those below:

```
<!-- SMTP Server setup -->
<add key="smtp.server.name" value="smtp.office365.com" />
<add key="smtp.server.port" value="25" />
<add key="smtp.server.ssl" value="true" />
<add key="smtp.server.user" value="you@yourcompany.com" />
<add key="smtp.server.password" value="Yourpassword" />
```

After editing these settings, save the web.config file. It is not necessary to restart Mi−Enterprise Middleware Mail Service if these settings are updated as the configuration file is periodically reread to ensure the Mail Service is up to date.

3.7.4 Important Notes

- If you are using a username and password to send mail, ensure the password of the user specified either never expires or that you update the SMTP settings when the password is changed.

3.8 Data Replication Update Service Configuration

The Mi−Enterprise Middleware includes a Data Replication Update Service used to update all data sources configured for all customers. This service runs outside the context of the web server and must be configured properly in order to update the sources.

3.8.1 Data Replication Update Service Activation

Though the Data Replication Update Service is installed on the target server at Mi−Enterprise Middleware installation time, it must be activated after the install. To do so, take the following steps:

1. Open an administrative command prompt
2. Change into the c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\DRSImportService folder
3. Run the command *InstallUtil.exe MiCo.MiApp.Server.DRSImportService.exe* − Note you should see output in this window that ends with:

   ```
   The Commit phase completed successfully.

   The transacted install has completed.
   ```
4. Open up the Services control panel for the server such as by runing *services.msc* from a Start−−>Run prompt
5. Locate the service named Mi−Enterprise Middleware Data Replication Import Service right click on it and select Properties

6. Change the Startup type to "Automatic"
7. In the Log On panel, change the account that will have permissions to read the web.config file of all Mi−Enterprise Middleware instances and that will be able to connect to customer databases directly if you intend to use Windows Authentication. Depending on your configuration, the best choice may be to use an administrative account with a non−expiring password.
8. Start the service

3.8.2 Data Replication Update Service Configuration

The Data Replication Update Service is installed in the folder c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\DRSImportService. By default it is configured to process all customers configured in the defautlt Mi−Enterprise Middleware instance installed to c:\inetpub\wwwroot\mfs. If needed, the service may be configured to process mail for multiple Mi−Enterprise Middleware instances installed on the same server. To do so follow the following steps:

1. Navigate to the folder c:\Program Files (x86)\Mi−Corporation\Mi−Enterprise Middleware\DRSImportService in Windows Explorer
2. Open the file MiCo.MiApp.Server.DRSImportService.exe.config in a text editor
3. Locate the <MEMCollection> section:

```
<MEMSection>
  <MEMCollection>
    <add name="Default" webConfig="c:\inetpub\wwwroot\mfs\web.config"/>
  </MEMCollection>
</MEMSection>
```

4. Add an additional line after the "Default" server. For instance if you have a second instace of Mi−Enterprise Middleware installed in the folder c:\inetpub\secondserver\mfs then the configuration would look like this:

```
<MEMSection>
  <MEMCollection>
    <add name="Default" webConfig="c:\inetpub\wwwroot\mfs\web.config"/>
    <add name="Second" webConfig="c:\inetpub\second\mfs\web.config"/>
  </MEMCollection>
</MEMSection>
```

   Note that the name of each server must be unique, but may be named per your convention. This name will appear within the logfiles for the import service, but are not visible beyond that.
5. By default the service logs to the file c:\mfs\logs\drsimport.log. If you wish to change this, locate this line within the configuration file:

```
    <file value="c:\mfs\logs\drsimport.log"/>
```

   And change the value as needed.
6. By default the service logs at the information (INFO) level. If you wish to change this, locate this line within the configuratin file:

```
    <level value="INFO"/>
```

   And change it to another valid level such as: ERROR, WARN, or DEBUG

7. Save the configuration file and then restart the Mi−Enterprise Middleware import service via the Services control panel

3.9 Azure Storage Configuration

The Mi−Enterprise Middleware may be configured to use Azure Blob Storage to store form templates and sessions instead of using local disk storage. This can be useful in hosted environments for cost and maintenance reasons.

3.9.1 Azure Blob Storage Provisioning

In order to use Azure Blob Storage within Mi−Enterprise Middleware it must first be provisioned within Microsoft Azure. While this document does not cover all possible configurations, it does provide details on provisioning requirements. To provision an appropriate account, take the following steps:

1. Create a new Storage Account
   a. The name may be set to anything you like, but remember this name as it will be required to configure Mi−Enterprise Middleware
   b. Set the Deployment model to Resource manager
   c. Set the Account kind to Blob storage (if you do not do this, Mi−Enterprise Middleware will not work with this setup)
   d. Set Replication, Access tier, and Storage service encryption as required for your needs

2. After deployment of the account succeeds, retrieve one of the Access keys associated with the account

3.9.2 Mi−Enterprise Middleware Configuration

Once you have created an Azure blob storage account, you must configure the Mi−Enterprise Middleware to use that account for storage. **Note that performing this action will set the storage usage for ALL customers configured. It is important this action be performed before any form templates or sessions are published.** To configure the server, take the following steps:

1. Edit the web.config file associated with Mi−Enterprise Middleware (typically c:\inetpub\wwwroot\mfs\) as follows:

   a. Near the middle of the file locate the <!−− Template storage module setup −−> section:

```
<!-- Template storage module setup -->
<add key="mfts.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfts.module.class"
        value="MiCo.MiApp.Server.FormTemplateStorageMod" />
```

   b. Edit it to read:

```
<!-- Template storage module setup -->
<add key="mfts.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
<add key="mfts.module.class"
        value="MiCo.MiApp.Server.FormTemplateStorageMod" />
```

c. Near the middle of the file locate the <!−− Session storage module setup −−> section:

```
<!-- Session storage module setup -->
<add key="mfss.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfss.module.class"
        value="MiCo.MiApp.Server.SessionStorageMod" />
```

d. Edit it to read:

```
<!-- Session storage module setup -->
<add key="mfss.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
<add key="mfss.module.class"
        value="MiCo.MiApp.Server.SessionStorageMod" />
```

e. Near the middle of the file locate the <!−− Attachment storage module setup −−> section:

```
<!-- Attachment storage module setup -->
<add key="mfas.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfas.module.class"
        value="MiCo.MiApp.Server.AttachmentStorageMod" />
```

f. Edit it to read:

```
<!-- Attachment storage module setup -->
<add key="mfas.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
<add key="mfas.module.class"
        value="MiCo.MiApp.Server.AttachmentStorageMod" />
```

g. Near the middle of the file locate the <!−− Script reference storage module setup −−> section:

```
<!-- Script reference storage module setup -->
<add key="mfsr.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfsr.module.class"
        value="MiCo.MiApp.Server.ScriptReferenceStorageMod" />
```

h. Edit it to read:

```
<!-- Script reference storage module setup -->
<add key="mfsr.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
<add key="mfsr.module.class"
        value="MiCo.MiApp.Server.ScriptReferenceStorageMod" />
```

i. Near the middle of the file locate the <!−− Data source storage module setup −−> section:

```
<!-- Data source storage module setup -->
<add key="mfds.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfds.module.class"
        value="MiCo.MiApp.Server.DataSourceStorageMod" />
```

j. Edit it to read:

```
<!-- Data source storage module setup -->
<add key="mfds.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
```

```
<add key="mfsr.module.class"
        value="MiCo.MiApp.Server.DataSourceStorageMod" />
```

k. Near the middle of the file locate the <!−− Map source storage module setup −−> section:

```
<!-- Data source storage module setup -->
<add key="mfms.module.assembly"
        value="MiCo.MiApp.Server.FileStorageMod.dll" />
<add key="mfms.module.class"
        value="MiCo.MiApp.Server.ServerMapStorageMod" />
```

l. Edit it to read:

```
<!-- Map source storage module setup -->
<add key="mfms.module.assembly"
        value="MiCo.MiApp.Server.AzureStorageMod.dll" />
<add key="mfms.module.class"
        value="MiCo.MiApp.Server.ServerMapStorageMod" />
```

m. Near the end of the file locate the <!−− Azure −−> section:

```
    <add key="storage.account" value="ENTER YOUR ACCOUNT NAME"/>
    <add key="storage.key" value="ENTER YOUR ACCOUNT KEY"/>
    <!-- Optionally set an endpoint below if needed -->
    <!--<add key="storage.endpoint"
                  value="https://centblob.blob.core.windows.net/"/>-->
  </Azure>
```

n. Edit the storage.account value to be the same as the name used for the blob storage account. Edit the key value storage.key value to be the same as the key recorded above. If needed, edit the storage endpoint. This should only be needed for non−standard Azure configurations (e.g. Azure Government). The section should look something like this when done:

```
    <add key="storage.account" value="blobaccountname"/>
    <add key="storage.key"
            value="C0us8u41nnPE8QJx29..."/>
    <!-- Optionally set an endpoint below if needed -->
    <!--<add key="storage.endpoint"
                  value="https://centblob.blob.core.windows.net/"/>-->
  </Azure>
```

2. Save the web.config file and restart the web server

3.9.3 Important Notes

- Files will not be migrated from local storage to Azure if this change is made after forms and sessions are published and uploaded. Ensure this configuration is performed before doing so.

3.10 Azure Application Insights Configuration

The Mi−Enterprise Middleware may be configured to communicate with Azure Application Insights in order to provide visibility to the usage of the server in regards to pages visited, services consumed and so on.

3.10.1 Azure Application Insights Provisioning

In order to use Azure Blob Storage within Mi−Enterprise Middleware it must first be provisioned within Microsoft Azure. While this document does not cover all possible configurations, it does provide details on provisioning requirements. To provision an appropriate account, take the following steps:

1. Create a new Application Insights
    a. The name may be set to anything you like
2. After deployment of the account succeeds, retrieve its Instrumentation Key

3.10.2 Mi−Enterprise Middleware Configuration

Once you have created an Azure Application Ingishts, you must configure the Mi−Enterprise Middleware to use it. To configure the server, take the following steps:

1. Edit the web.config file associated with Mi−Enterprise Middleware (typically c:\inetpub\wwwroot\mfs\) as follows:
    a. Near the end of the file locate the <!−− Azure −−> section:

```
<Azure>
  <add key="appinsights.servertelemetry" value="false"/>
  <add key="appinsights.serverkey" value="ENTER YOUR KEY HERE" />
```

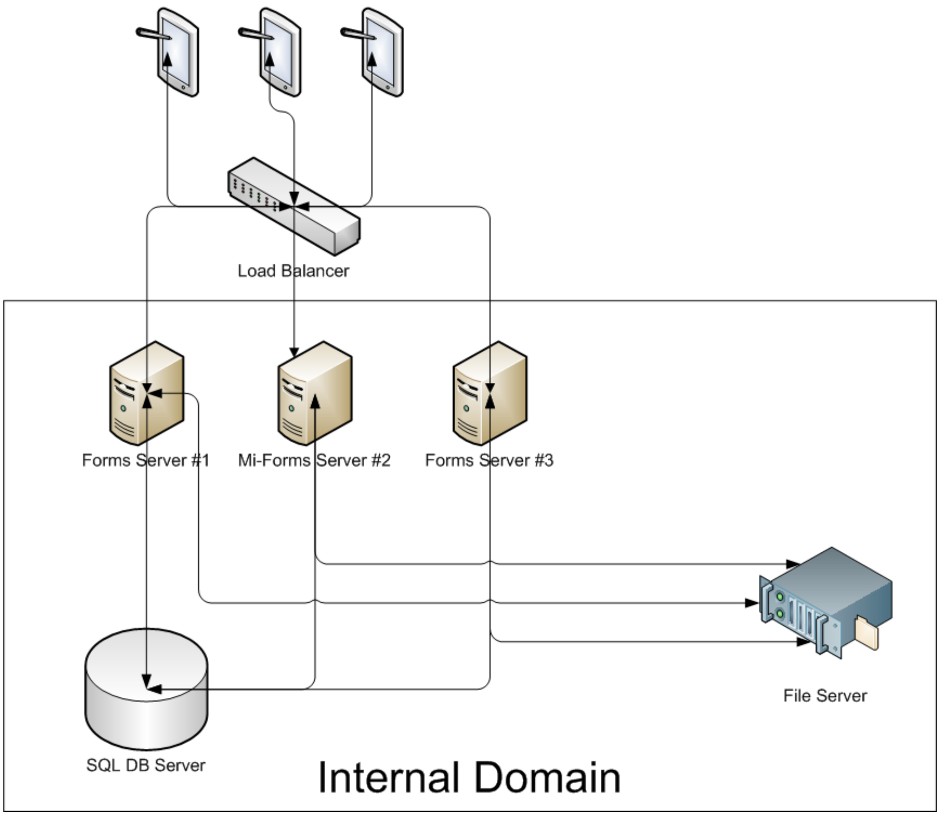
    b. Update the servertelemtry value to be "true" and the serverkey value to the Instrumentation Key such that it looks similar to the below:

```
<Azure>
  <add key="appinsights.servertelemetry" value="true"/>
  <add key="appinsights.serverkey"
  value="aabbccdd−0011−2233−4455−aabbccddeeff" />
```

2. Save the web.config file and restart the web server

3.11 Clustering

The server is able to be clustered such that multiple physical machines may process form sessions for a given organization. The diagram below shows the flow diagram for how this may look from an organizational structure:



This setup requires hardware as follows:

- A load balancer or balancing application
- 2 or more forms servers
- A SQL DB server
- A file server

Note: The SQL DB server and file server may be the same physical server but it is not necessary.

3.11.1 Configuring Permissions

It is assumed that all of the forms servers, the DB server, and the file server all exist within the same domain. With this being the case, it is fairly easy to configure permissions across your setup.

Configure file server permissions

First, create a file share on your file server that will act as the storage repository for session and template files. Enable file sharing on this directory and give full permissions to the two form server machines. Note it is important to give permisisons based on machines rather than users.

Configure database permissions

On the domain controller, create a new group that contains the two form server machines. Then create a new login in your SQL server instance that corresponds to this group using Windows authentication. Give this login permission to create databases.

3.11.2 Creating a customer

Next, login to one of the form servers and Add a new customer as usual, specifying the SQL instance of the DB server as the data source. This will create the database that will be shared across the form servers. Once this is done, again on the SQL database, add permissions to the datbase created for the SQL login created above. This login must have db_datareader and db_datawriter permissions.

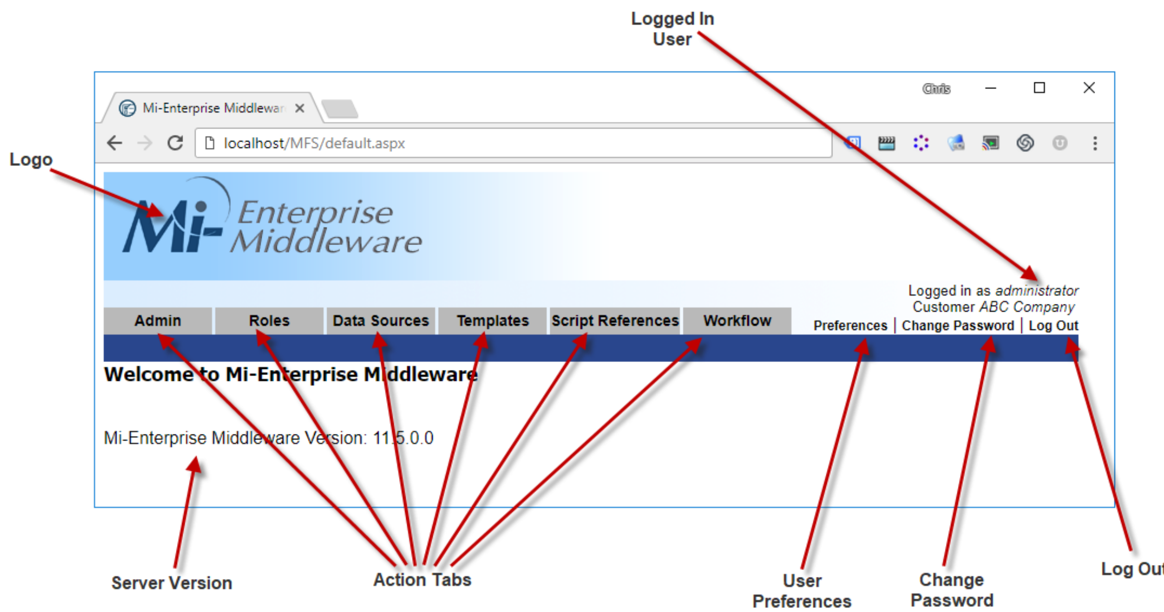
On the other form servers, independently create the customer, but instead of creating a new database, look at existing data sources and fine the one created in the step above.

3.11.3 Testing the system

Once the above configuration is setup, all forms servers should be able to share customer data and process sessions. Be sure to login to each forms server and verify configuration of each. Send a number of test sessions to the servers to ensure session processing occurs.

4 The Web Interface

Administrative tasks are performed through the web interface. This can be accessed by all users, but different tasks are available depending on the user's privileges. The image below shows the typical user interface and a description of each piece follows:



- **Logo** − Displays the logo for Mi−Enterprise Middleware
- **Customer Name** − Displays the customer name for the currently logged in user
- **Logged in User** − Displays the username for the currently logged in user
- **Action Tabs** − Clickable user interface tabs that allow the user to perform actions in the user interface. These actions are described in later sections.
- **User Preferences** − Allows the logged in user to change display preferences
- **Change Password** − Allows the logged in user to change their password
- **Log Out** − Logs out the currently logged in user

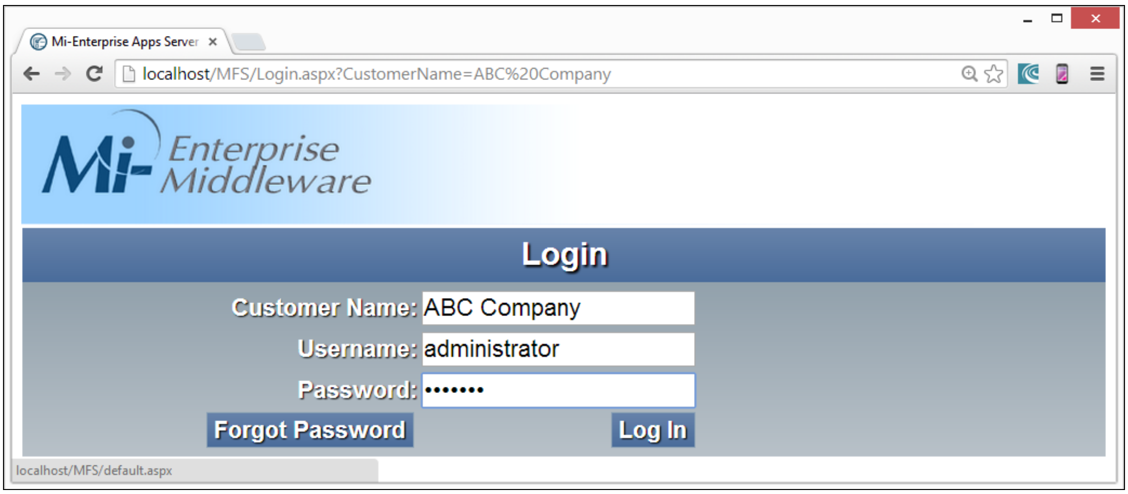
The tasks you can perform in the web interface are as follows:

- Logging Into a Customer Account
- Customer Administration
- Roles − User Management
- Roles − Group Management
- Data Source Management
- Script Reference Management
- Template Management
- Workflow − Session Management
- Workflow − Data Exchange Management
- User Preferences
- Change Password
- Logging Out

4.1 Logging Into a Customer Account

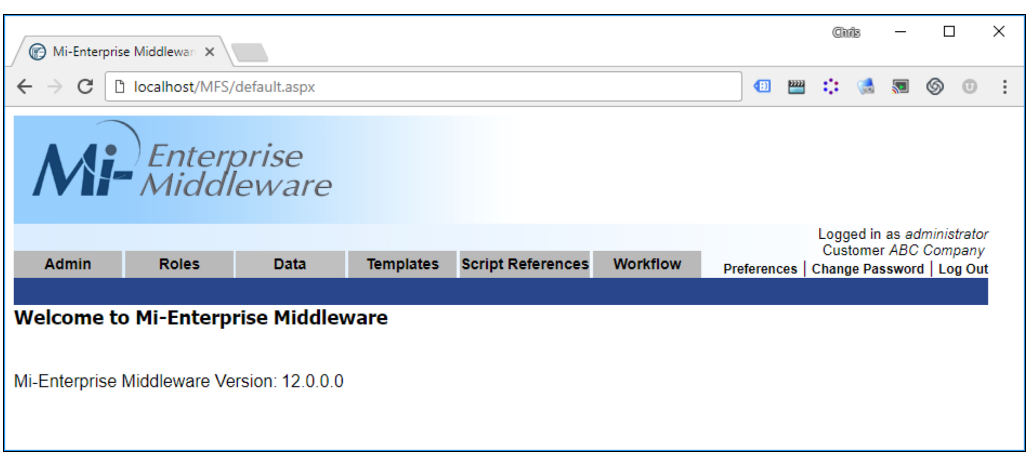
Once a customer has been setup and a user created for that customer, it is possible to login to that customer account. Assuming the server has been configured to use "MFS" as its location, the login URL is as follows:

http://[SERVER]/MFS/Login.aspx
Where:
[SERVER] is the name of your server



You will be prompted for a customer name, username, and password to login to the customer account. If you are logging into the default customer, that is the customer without a specific name, leave that field blank. Otherwise fill it with the customer's name. Then enter the correct username and password and click the "Login" link. If you have forgotten your password, click the "Forgot Password" link and follow the instructions for having your password mailed to you.

Once logged in, you will see a page similar to the following. Note that depending on the privileges of the user you are logging in as, the tabs may not look exactly the same, indicating that not all tasks are available to that user:

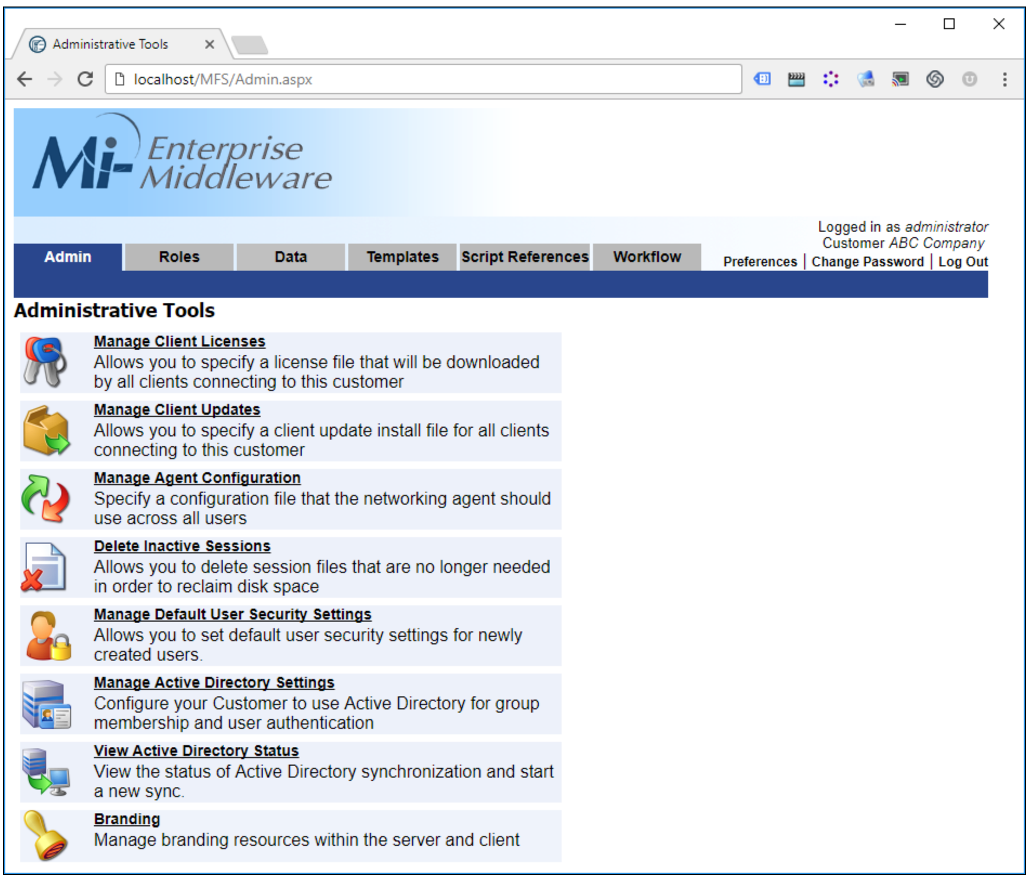


4.2 Customer Administration

To access administration tasks for a specific customer, click the "Admin" tab or go directly to the URL:
http://[SERVER]/MFS/Admin.aspx?CustomerName=[CUSTOMERNAME]
Where:
[SERVER] is the name of your server
[CUSTOMERNAME] is the name of the customer (which can be left blank)

Note that you must login as a user with Administrator privileges to access this page.

You will be presented with a screen that looks like this:

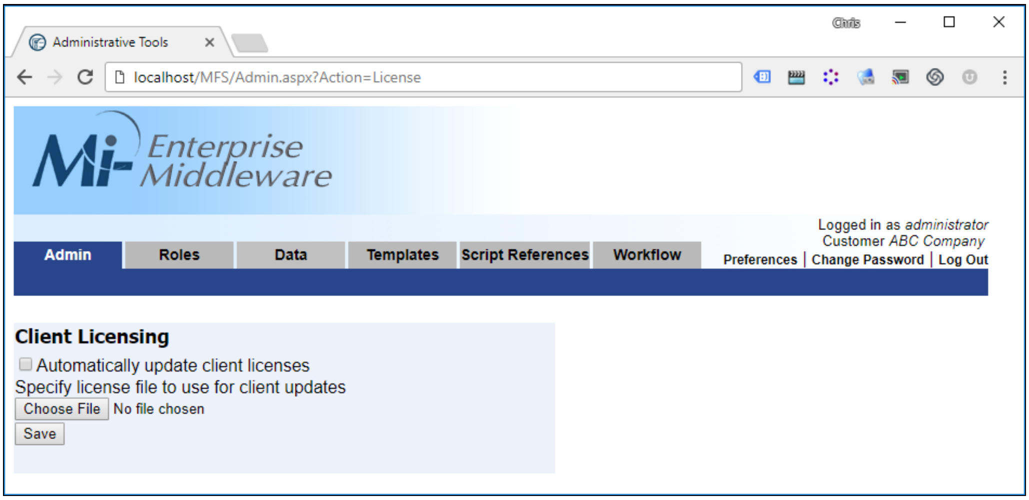


From this page you can perform the following tasks:

- Manage Client Licenses
- Manage Client Updates
- Manage Agent Configuration
- Delete Inactive Sessions
- Manage Default User Security Settings
- Manage Active Directory Settings
- View Active Directory Status
- Manage Branding Resources

4.2.1 Manage Client Licenses

Mi−Enterprise Middleware has the ability to distribute updated licenses to client applications that connect with it. When you follow the link for managing client licenses, you will see a page that looks like this:

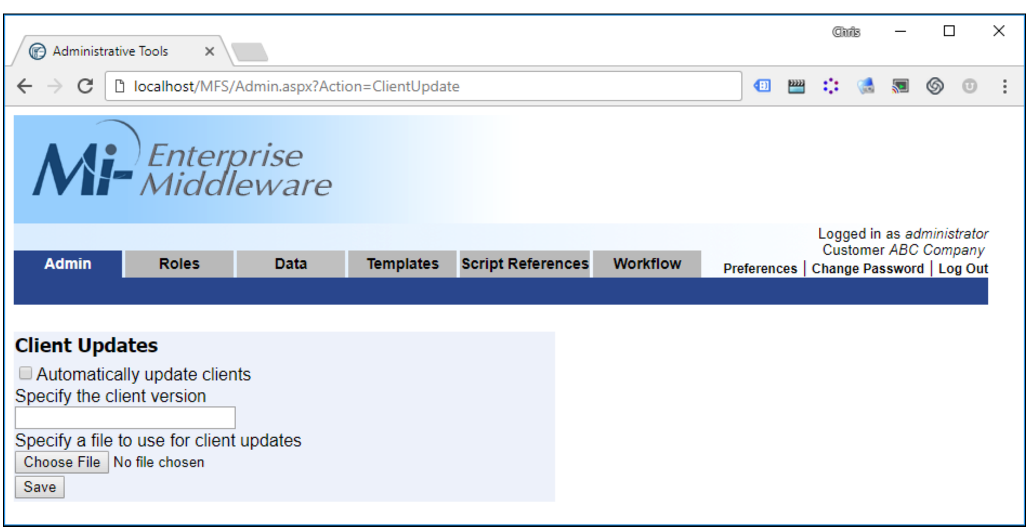


You may enable or disable license updates for customer users by checking or unchecking the box labeled "Automatically update client licenses". If you enable license updating you must then browse for a client license .xml file. Remember, this is the license that will be distributed to client applications, not the license that is in use by the server.

Click the "Save" button to apply changes made on this page.

4.2.2 Manage Client Updates

Mi−Enterprise Middleware has the ability to distribute updated client application installers to clients that connect with it. When you follow the link for manage client updates, you will see a page that looks like this:



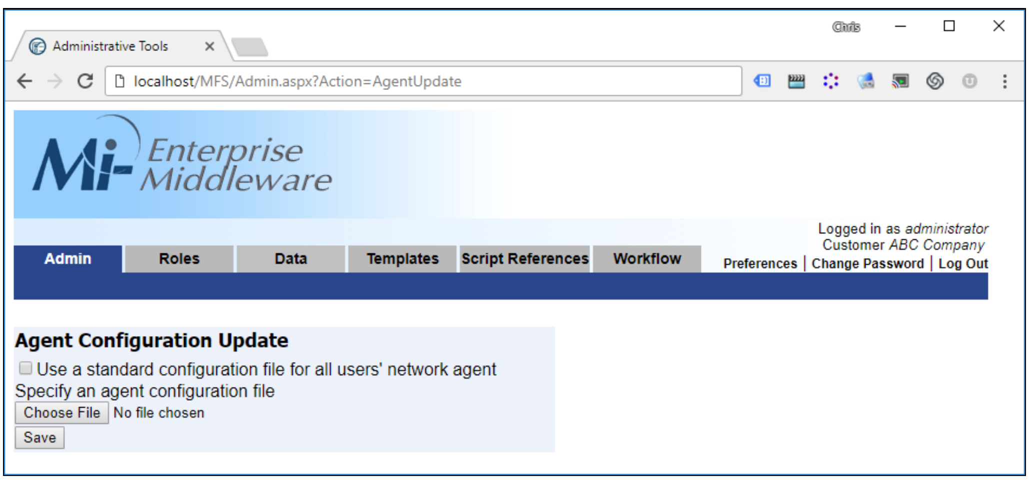
You can enable or disable client updates for a customer by checking or unchecking the box marked "Automatically update clients". If this is enabled you must specify a client version number (any format is acceptable) and then browse for a client installer file and click save. When a client application connects to the server it will first compare its version to the one specified on this page. If it is different than what is specified, then it will download the new installer and run it. Note that it will download the installer based on any difference, not just on a "newer" version. Also note that the default Mi−Enterprise Middleware client installer requires administrative privileges on the client machine, so be sure that your users will be able to install any updates posted.

For example, if you specify version 7.0.2 on this page, a client with version 7.0.1 will download the update. But if for some reason, someone had a client labeled 7.0.3 it would also download the 7.0.2 version.

Click the "Save" button to apply changes made on this page.

4.2.3 Manage Agent Configuration

Mi−Enterprise Middleware has the ability to distribute configuration files used by the Mi−Enterprise Middleware Agent. When you follow the link for managing Agent configuration, you will see a page that looks like this:



You may enable or disable license updates for customer users by checking or unchecking the box labeled "Use a standard configuration file for all users' network agent". If you enable agent configuration updating you must then browse for an agent configuration .xml file.

Note that there is no utility to automatically build an Agent configuration file. It is recommended that administrators configure the Agent on a specific machine the way in which they wish it to be configured across all machines and then use that Agent configuration file with this feature. The Agent configuration file is located as follows on client machines:

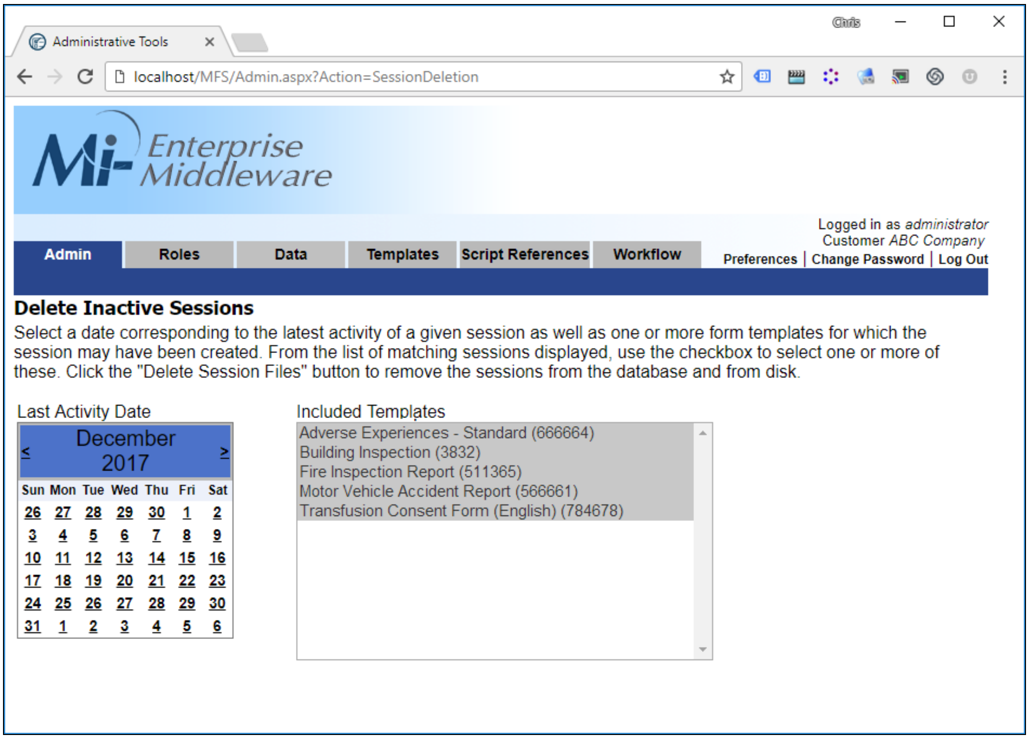
Windows XP
User's Application Data Directory\Mi−Corporation\Mi−Enterprise Middleware\agent.xml

Windows Vista / Windows 7
User's Application Data Directory\Roaming\Mi−Corporation\Mi−Enterprise Middleware\agent.xml

Click the "Save" button to apply changes made on this page.

4.2.4 Deleting Inactive Sessions

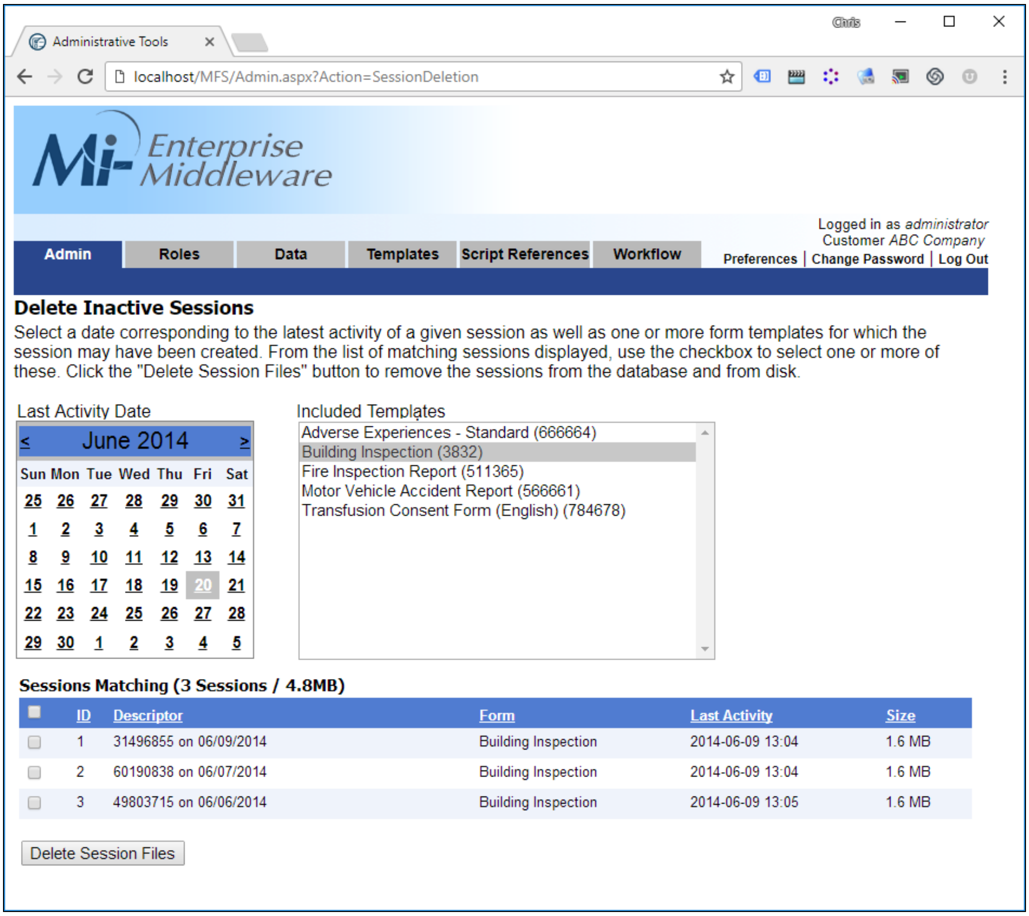
When all data exports have been run for a session, it is marked Inactive and is moved to the _Finished queue. For audit history reasons, the session still exists in the server's database and on the server's disk. If you wish to actually remove these sessions from the server permanently, follow the link marked "Delete Inactive Sessions". You will see a page that looks like the following:



First, select the date in the "Last Activitate Date" calendar corresponding to the last update that should be used to find session files to delete. This date corresponds to any action being taken on the session. For instance, if a session was uploaded on December 15th, and then moved to a different queue on December 20th, the date of December 20th would apply when searching for sessions to delete. Note that the date is not inclusive. Thus if you wanted sessions with activity on December 20th removed, you should select December 21st.

Optionally, select one or more sessions in the "Included Templates" list. Only sessions corresponding to selected form templates will be displayed for potential deletion. By default all templates are selected when navigating to this page.

Once a date and template(s) are selected, sessions that match these criteria will be displayed as shown:



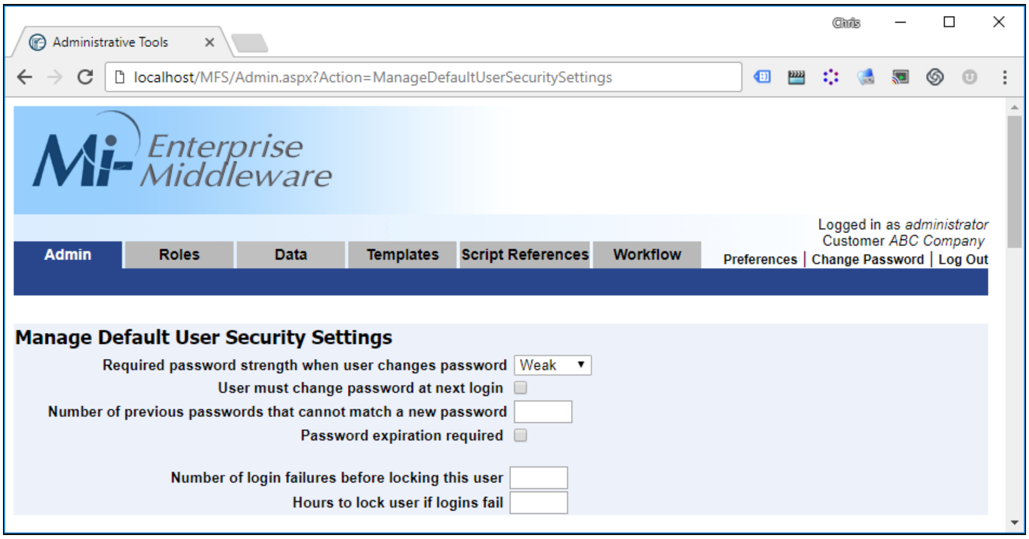
Review the session list to determine which session(s) you want to delete. Only sessions that have their row checked will be deleted. You may (un)check all sessions by (un)checking the checkbox in the header row.

Once you have made selections as appropriate, press the "Delete Session Files" button. This will prompt you for confirmation of your deletion. Press "Ok" and the sessions will be removed from the server's database as well as on disk. Any exports from the session's datapaths will not be deleted. Note that this action may take a long time depending on the number of session files being deleted.

Note: Active sessions will never be deleted via this interface no matter what date and templates you specify.

4.2.5 Manage Default User Security Settings

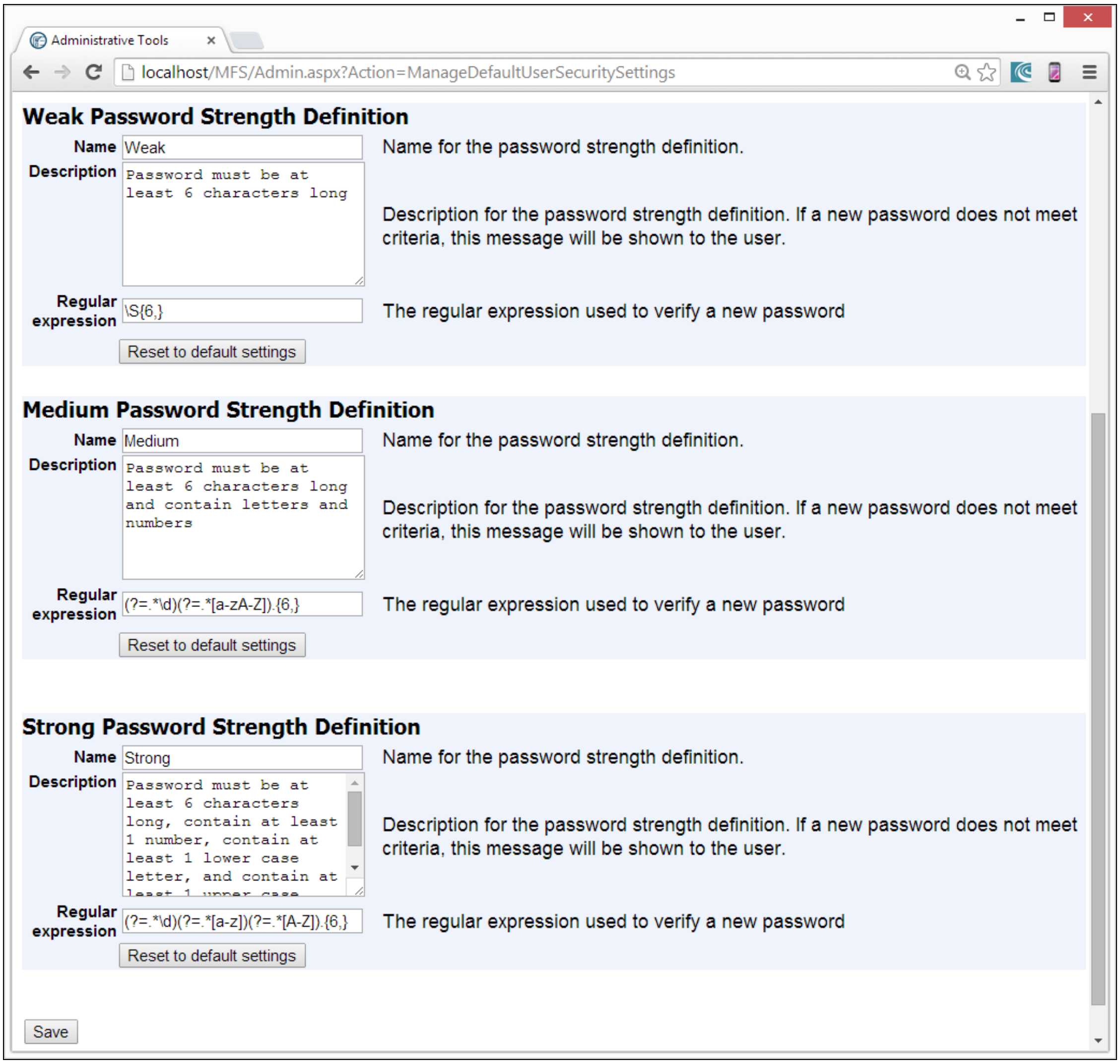
Use this section to set default settings for any new users that will be created in the customer account.



- ***Required password strength when user changes password***
  Choose the default password strength definition for a new user account. This does not apply when an administrator changes a user's password.
- ***User must change password at next login***
  Indicates whether the user must change their password the next time they attempt to login to Mi−Enterprise Middleware.
- ***Number of previous passwords that cannot match a new password***
  When the user attempts to change their password, the new password must not match any previous passwords − up to this specified number of previous passwords.
- ***Password Expiration Required***
  When a user changes their password, the new password will have an expiration date and time after which they must change their password again. Enabling "Password Expiration Required" will enable "Days until password expires".
- ***Days until password expires***
  The number of days that a new password can be used by a user until it expires, at which time the user must change their password. "Days until password expires" is enabled if "Password Expiration Required" is checked.
- ***Number of login failures before locking this user***
  If this number of failed login attempts is exceeded, the user's account will be locked.
- ***Hours to lock if logins fail***
  When a user's account is locked because of failed logins, the user's account will be locked for the specified amount of time in hours. This field will accept decimals to signify minutes (ie. 1.5 = 1 hour and 30 minutes).

4.2.6 Password Strength Definitions (Weak, Medium, and Strong)

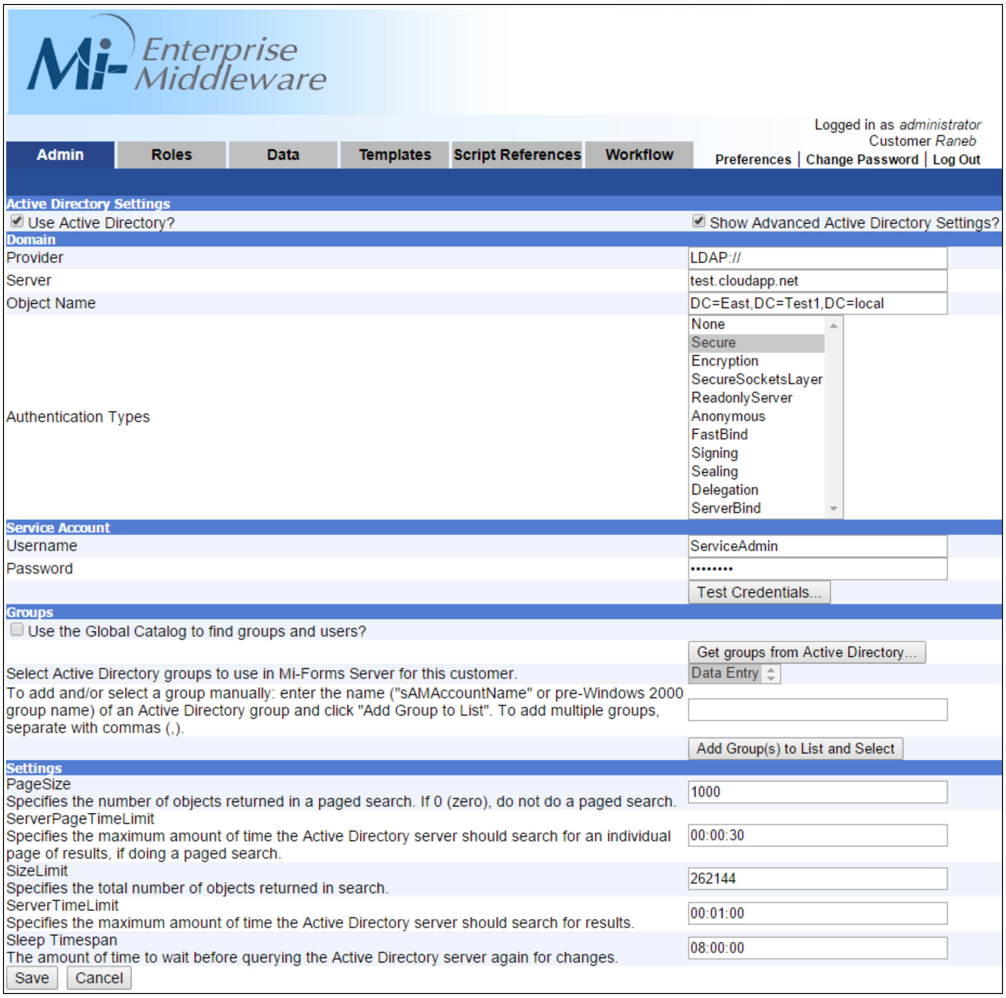
Use this section to set the Weak, Medium, and Strong Password Strength definitions. Each definition is separate − ie, if the user's required password strength is "Strong", only the strong password strength definition criteria is required. It will not require the "Weak", "Medium" and "Strong" password definitions.



- ***Name***
  Set the name of the password strength definition.
- ***Description***
  Set the description of the password strength definition. This description will be shown to the user while changing passwords if the new password does not meet the password strength criteria.
- ***Regular Expression***
  Set the regular expression that will evaluate a new password. For more specific information on regular expressions, please refer to Microsoft .NET 2.0 Framework "System.Text.RegularExpressions".
- ***Reset to default settings***
  When clicked, all settings for the current password strength definition will be set to their default values.

4.2.7 Manage Active Directory Settings

Use this section to configure Active Directory for the customer account.



Active Directory Settings

- ***Use Active Directory?***
  Select whether or not to use Active Directory for the customer account. If selected, the other Active Directory settings will become visible. Depending upon the Mi−Enterprise Middleware License Level, changing this setting may indicate that a different License Level is required and may or may not allow this setting to be checked.
- ***Show Advanced Active Directory Settings***
  Toggling this will hide and show Active Directory Settings fields that are usually not configured in a typical Active Directory configuration.

Domain

- ***Provider***
  The Active Directory Server Interface provider syntax, typically "LDAP://" although "GC://" may also be specified to indicate using the Global Catalog. Note that this field is case sensitive.
- ***Server***
  The name of the Active Directory server, which supports DNS style names, NetBIOS names, IP addresses, and no server for "server−less" bindings. A port may also be specified.
- ***Object Name***
  The reference object in the Active Directory from where to begin searching for groups.
- ***Authentication Types***
  Authentication mechanisms employed by the Server to authenticate Active Directory users.

By default "Secure" is chosen and recommended. Before making changes to the authentication types, please be sure to research the implications of each selection. Some selection items are not secure and some do not return enough information for Mi−Enterprise Middleware, ie. FastBind.

Service Account

- ***Username***
  The username of a Service Account user who is capable of querying for groups and group memberships on the Active Directory server.
- ***Password***
  The password of this user.
- ***Test Credentials...***
  Click this button to test the Service Account credentials and Active Directory settings. A label at the bottom of the page will indicate results.

Groups

- ***Get Groups from Active Directory***
  Click this button to retrieve a list of Security Groups from the Active Directory Server. The list will be displayed in the list box below.
- ***Use the Global Catalog to find groups and users?***
  Check this to use the Active Directory domain's "Global Catalog" for returning potential Security Groups below after clicking the "Get groups from Active Directory" button.
- ***Select Active Directory groups...*** Select Active Directory Security Groups that will be created as Mi−Enterprise Middleware groups and whose members will be created as Mi−Enterprise Middleware users. Active Directory memberships will be reflected in the Mi−Enterprise Middleware groups and users that are created by this method. To select and unselect multiple group names, hold down the button and click items with the mouse. Creation of groups and users from Active Directory will not be immediate but starts every 5 minutes, by default.
- ***To add and/or select a group manually...*** Type in the name or names of groups, separated by commas (e.g. "Data Collectors, Developers, Verifiers"), and click the "Add Group(s) to List and Select..." button. The "Select Active Directory groups..." list will now contain these groups and select (highlight) them. If any groups are already in the list, the items will be selected.
- ***Add Group(s) to List and Select...*** The "Select Active Directory groups..." list will contain the specified groups and select (highlight) them. If any groups are already in the list, the items will also be selected.

Settings

- ***PageSize*** Specifies the number of objects returned in a paged search. If 0 (zero), do not do a paged search. See .NET Framework documentation on the DirectorySearcher.PageSize property. Value must be parseable as an integer.
- ***ServerPageTimeLimit*** Specifies the maximum amount of time the Active Directory server should search for an individual page of results, if doing a paged search. See .NET Framework documentation on the DirectorySearcher.ServerPageTimeLimit property. Value must be parseable as a TimeSpan.
- ***SizeLimit*** Specifies the total number of objects returned in search. See .NET Framework documentation on the DirectorySearcher.SizeLimit property. Value must be parseable as an integer.

- ***PageSize*** Specifies the number of objects returned in a paged search. If 0 (zero), do not do a paged search. See .NET Framework documentation on the DirectorySearcher.PageSize property. Value must be parseable as an integer.
- ***ServerTimeLimit*** Specifies the maximum amount of time the Active Directory server should search for results. See .NET Framework documentation on the DirectorySearcher.ServerTimeLimit property. Value must be parseable as a TimeSpan.
- ***Sleep Timespan*** Specifies the amount of time to wait before Mi−Enterprise Middleware will query the Active Directory server again for any changes to groups. Value must be parseable as a TimeSpan.

4.2.8 View Active Directory Status

Use this section to view Active Directory status for the customer account.

Entry Date	Action	Description
11/23/2014 8:13:35 PM	Start	Last Active Directory scan expired. Attempting new AD Scan...
11/23/2014 8:13:35 PM	Start	Starting a new Active Directory scan now...
11/23/2014 8:13:35 PM	Retrieving Group	Retrieving AD group Data Entry(3a85bc6f-4053-4a8e-a86c-669b743ad696) from local Server.
11/23/2014 8:13:35 PM	Find local Server Group	Group Data Entry was found.
11/23/2014 8:13:35 PM	Group Membership	Retrieving list of members for group Data Entry.
11/23/2014 8:13:36 PM	Group Membership	Found AD User CN=Mary Lucado,CN=Users,DC=East,DC=SierraCreek1,DC=local
11/23/2014 8:13:36 PM	Group Membership	Found AD User CN=Jake S. Montagne,CN=Users,DC=East,DC=SierraCreek1,DC=local
11/23/2014 8:13:36 PM	Local Users	Retrieving local users...
11/23/2014 8:13:36 PM	Local Users	Found 3 users.
11/23/2014 8:13:36 PM	Find AD User	Searching for user GUID by DN CN=Mary Lucado,CN=Users,DC=East,DC=SierraCreek1,DC=local...
11/23/2014 8:13:37 PM	Find AD User	Found user GUID (11729400-e189-4045-b31e-41712a3f0010).
11/23/2014 8:13:37 PM	Find AD User	Searching for AD user by GUID 11729400-e189-4045-b31e-41712a3f0010...
11/23/2014 8:13:37 PM	Find AD User	Found AD user mlucado
11/23/2014 8:13:37 PM	Find AD User	AD User matches current user mlucado.
11/23/2014 8:13:37 PM	Update AD User	User mlucado already exists. Looking for changes...
11/23/2014 8:13:37 PM	Group Membership	Checking on user mlucado membership with group Data Entry.
11/23/2014 8:13:37 PM	Group Membership	User mlucado is already a member of group Data Entry
11/23/2014 8:13:37 PM	Find AD User	Searching for user GUID by DN CN=Jake S. Montagne,CN=Users,DC=East,DC=SierraCreek1,DC=local...
11/23/2014 8:13:37 PM	Find AD User	Found user GUID (087129f9-470d-4191-a523-263c7615554d).
11/23/2014 8:13:37 PM	Find AD User	Searching for AD user by GUID 087129f9-470d-4191-a523-263c7615554d...
11/23/2014 8:13:37 PM	Find AD User	Found AD user jake_montagne
11/23/2014 8:13:37 PM	Find AD User	AD User matches current user jake_montagne.
11/23/2014 8:13:37 PM	Update AD User	User jake_montagne already exists. Looking for changes...
11/23/2014 8:13:37 PM	Group Membership	Checking on user jake_montagne membership with group Data Entry.
11/23/2014 8:13:37 PM	Group Membership	User jake_montagne is already a member of group Data Entry
11/23/2014 8:13:37 PM	Group Membership	Checking on users who are no longer members of group Data Entry.
11/23/2014 8:13:37 PM	No group membership	Checking on users who are no longer members of any Active Directory group.
11/23/2014 8:13:37 PM	No group membership	Completed checking on users who are no longer members of any Active Directory group.
11/23/2014 8:13:37 PM	AD Sync Complete	Active Directory scan complete. Sleeping until next attempt at scan... (00:00:10)

Active Directory Status

- ***Refresh Active Directory Status table...***
  Click to retrieve the latest Active Directory log information regarding the results of the last Active Directory sync attempt.
- ***Start date &time of last Active Directory sync attempt***
  Displays the date and time for the last Active Directory sync attempt start.
- ***Start date &time of next Active Directory sync attempt***

Displays the date and time for the next scheduled Active Directory sync attempt. This is dependent upon the Active Directory Setting "Sleep Timespan" and the date and time of the last Active Directory sync attempt (above). When this date and time has passed, an Active Directory sync attempt will start again.

- ***Active Directory Sync Table***
  Displays the results since the last Active Directory sync attempt.
- ***Sync Now...***
  Resets the last Active Directory sync date and time as expired so that the Mi−Enterprise Middleware will attempt to sync Active Directory on the next check for expiration.

4.2.9 Active Directory Synchronization Background Info

Please note that the Active Directory feature of the Mi−Enterprise Middleware will periodically (every 10 seconds) determine the following:

- The Customer is active
- Use Active Directory is enabled
- The Mi−Enterprise Middleware License Level supports Active Directory synchronization
- The time since the last Active Directory synchronization has expired

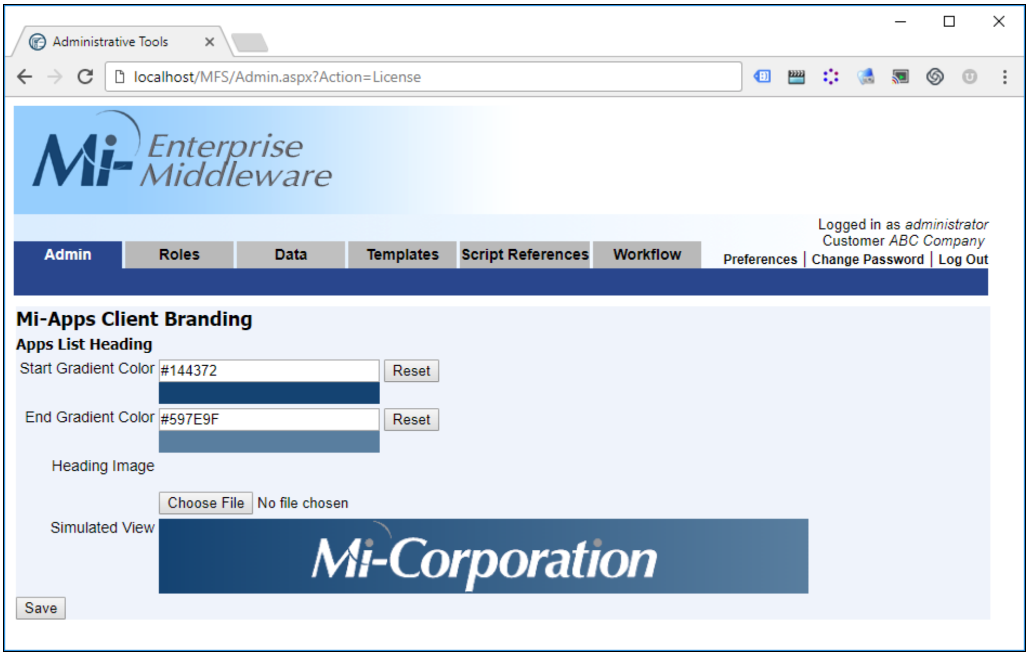
If the above conditions are met, then the Active Directory synchronization process will begin.

4.2.10 Manage Branding Resources

Please note that this functionality may not be available to you. If you receive a message indicating that your license does not support branding, please contact your vendor.

Mi−Enterprise Middleware has the ability to rebrand the top header that users will see above their available apps. The area affected within the client is shown below:

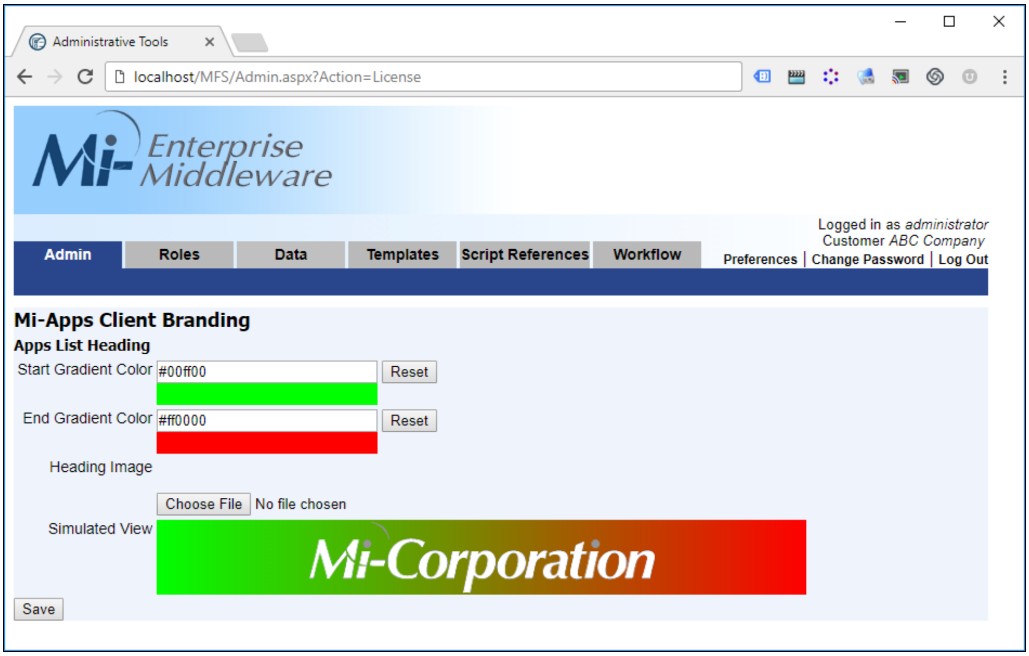
Using the Manage Branding Resources link within customer administration will display a page that looks similar to this:



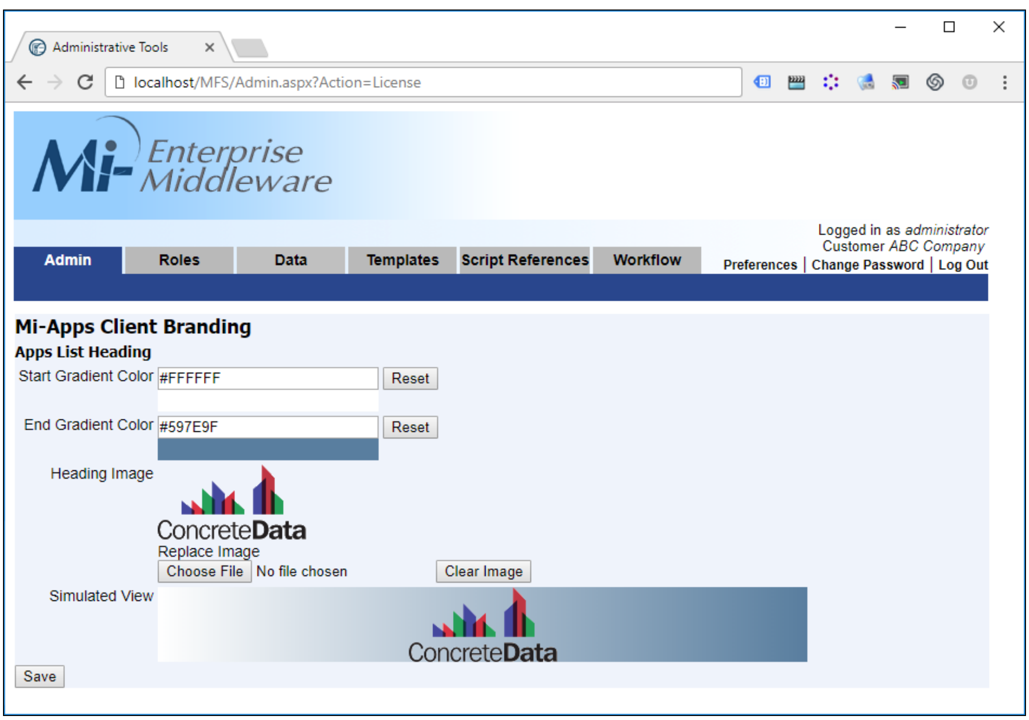
The fields are as follows:

- **Start Gradient Color** – The color (defaults to #144372) that is used at the left side of the banner
- **End Gradient Color** – The color (defaults to #597E9F) that is used at the right side of the banner. Note that this may be set to the same value as the start gradient color if a solid color is preferred.
- **Heading Image** – The image that has been selected (defaults to none) that will be displayed within the middle of the banner. Note that if no image is selected, the default heading image will be used.
- **Simulated View** – A simulation of what the header will look like within the client. Note that device size and orientation will play roles in the actual appearance of the banner, and therefore this is intended to provide an example only.

The gradient colors are hex color values as used within most web applications. Changing these will also change the simulated view in real time. In the example below, the start gradient has been set to green and end gradient to red:



The heading image's "Choose File" may be used to change the image to any other .png or .jpg. Note that the expected height of the image is 69 pixels and a target width should be 321 pixels. Images that are of different sizes than 321x69 may not appear as desired. Please note that the image used should provide a transparent background such that the gradient colors can be seen throught. In the example below, the image has been changed to a different one:



The "Reset" buttons by the start and end gradient fields will reset these to default values. The "Clear Image" button will clear the image and revert it to using the default image.

Click the "Save" button to apply changes made on this page.

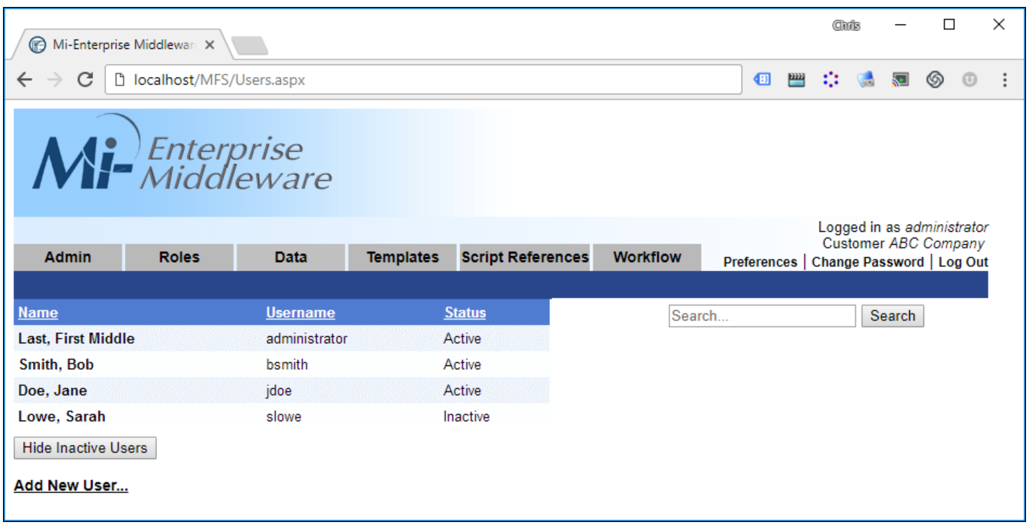
4.3 User Administration

Each customer can have one or more users assigned to it. Each user corresponds to an actual worker in your organization, such as a form filler or form designer. In order to make use of the server, the user must have an account created for them under the appropriate customer.

To access user administration for a specific customer, click on the "Roles" tab, then click on the "Users" link or go directly to the URL:
http://[SERVER]/MFS/Users.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users who are members of a Group with the Administrator privilege.

You will be presented with a screen that looks like this:



The columns displayed on this page are as follows:

- **Name** − The user's real name (last name, first name)
- **Username** − The ID that the user uses to login to the server
- **Status** − An active/inactive/locked value that indicates whether or not the user is currently active.
  A user that is inactive may not login to the server or take any action such as downloading form templates or uploading sessions.
  A user that is locked may not login to the server or take any action until the unlock date and time are reached.

You may sort the list of users by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

Typing into the "Search" box and clicking the **"Search"** button will filter the user list to those matching the search criteria (either by username or real name). After clicking "Search" a **"Clear"** button will appear to remove the filter.

Clicking the **"Hide Inactive Users"** button will hide all users that are currently marked inactive. The button will then change to **"Show Inactive Users"** which will once again show inactive users.

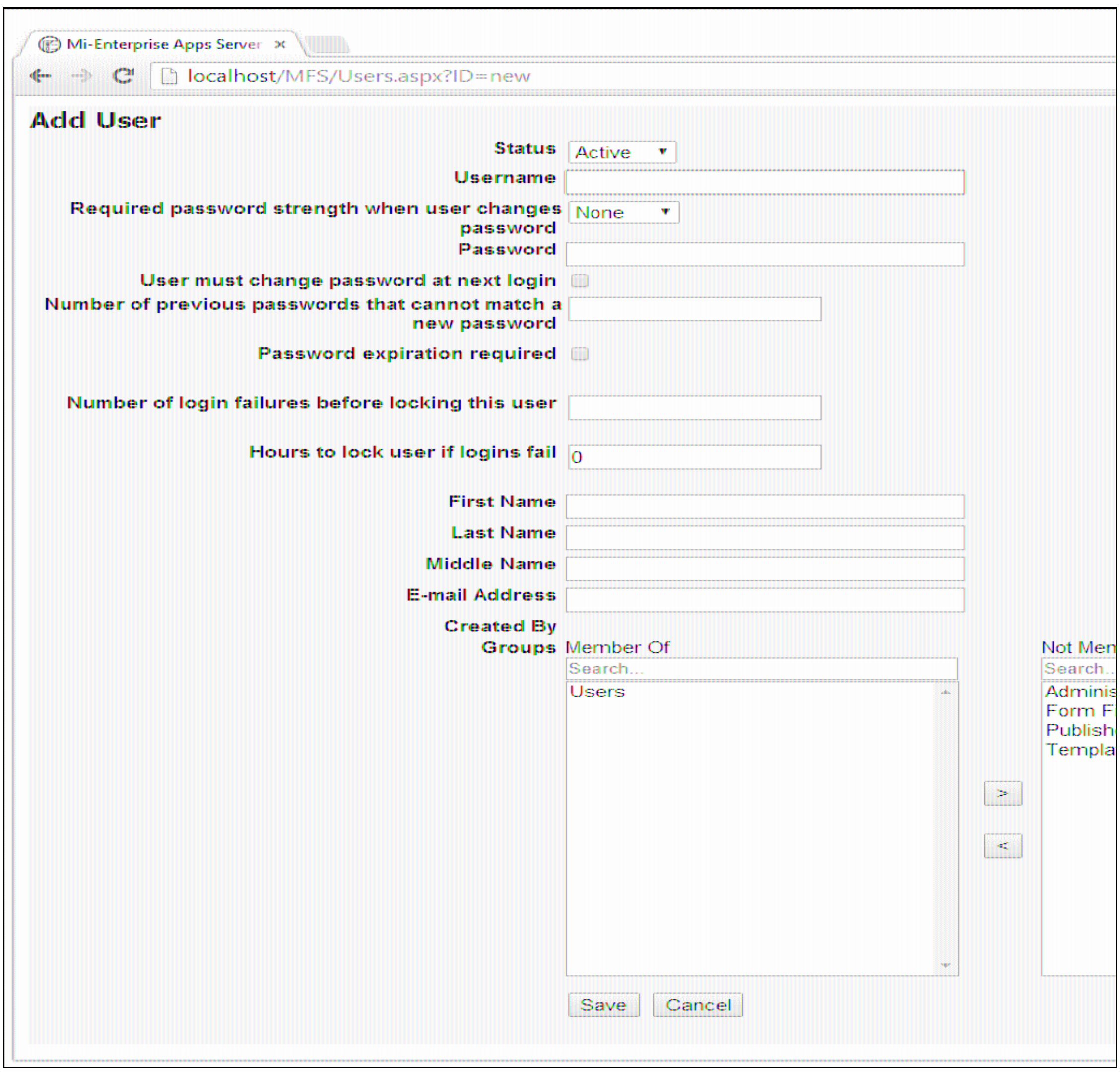
From this page you can perform the following tasks:

- Add a New User
- Modify an Existing User

Note that user administration may be affected if you use Active Directory authentication for a customer. Please see the Active Directory Configuration Considerations for details.

4.3.1 Adding a New User

Clicking the "Add New User..." link from the users administration page will present you with a screen that looks like this:



You must then fill all fields for the user you wish to add as described below:

- **Status**
  Whether or not the user is "active", "inactive", or "locked". An "inactive" or "locked" user

cannot login or perform any other server operations, so when adding a new user, you will typically want to keep the user marked "active".

- **Username**
  While the server does not force any convention, a typical username might be the user's first initial and last name, (ex. John Smith becomes jsmith). Each user must have a unique username, but the same usernames may exist across different customers.
- **Required password strength when user changes password**
  When the user attempts to change their password, this password strength criteria must be passed.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Password**
  The initial password for the user.
- **User must change password at next login**
  When the user logs in next, they will be required to change their password.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Number of previous passwords that cannot match a new password**
  When the user attempts to change their password, the new password must not match this many previous passwords.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Password expiration required**
  When a new password is set, required this password to expire.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Password expires on**
  A date and time to indicate when the password will expire, after which the user is required to change their password.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Number of login failures before locking this user**
  The user account will be locked if failed attempts to login reach this number.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Hours to lock user if logins fail**
  The number of hours that a user account will be locked if the "number of login failures before locking this user" is exceeded. This value may be a decimal number, ie. 1.25 = 1 hour 15 minutes.
  Default value is setup on the "Administrative Tools", "Manage Default User Security Settings".
- **Demographic Information**
  Depending on the server's configuration, other demographics about the user will be collected such as First Name, Last Name, Email, etc. Fill these fields accurately so that you have a correct record of all users.
  Note: Email address entry will be used for sending forgotten passwords from the Login page, if needed.
- **Groups**
  Each user can be the member of zero or more groups. Groups listed in the "Member Of" listbox indicate groups to which this user belongs. Groups listed in the "Not Member Of" listbox indicate groups that are available, but of which this user is not a member. You may assign users to and remove users from groups by using the "<" and ">" buttons after

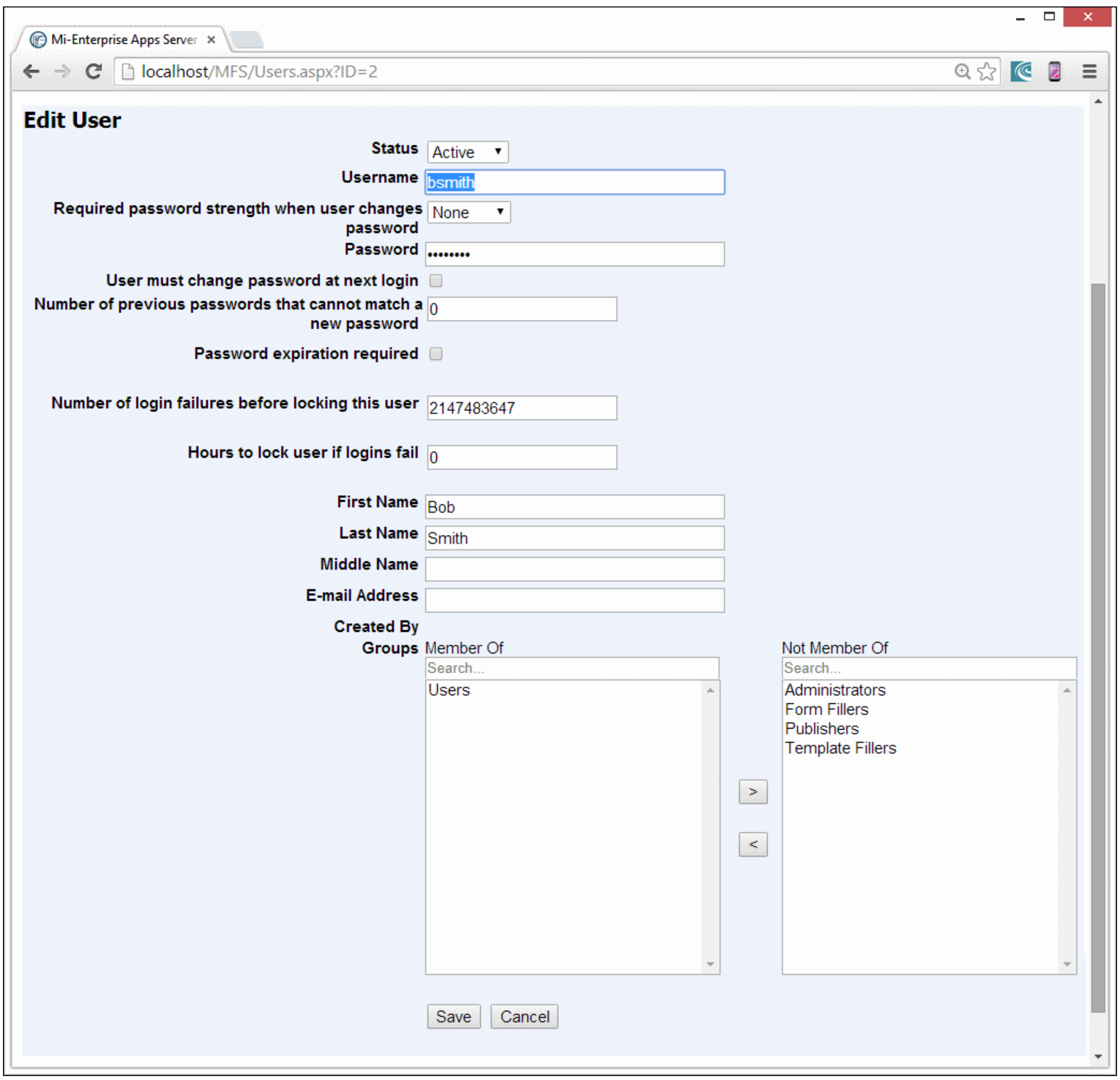
selecting a group in one of the listboxes. Note that the "Search" boxes may be used to filter the group lists. Groups will be discussed in more detail in the section Group Administration.

To create the user, click "Save". If an error occurs creating the user, you will be prompted to take an action to fix it. Otherwise you will be redirected back to the User Administration page.

To cancel creating the user, click "Cancel". You will be redirected back to the User Administration page.

4.3.2 Modifying an Existing User

Clicking on the name of any of the displayed users will let you modify that user by taking you to a page that looks like this:



All of the user's information should already be filled in from when the user was first created, but this page allows you to change any information you wish. The fields displayed are as follows:

- **Status**
  Whether or not the user is "active", "inactive", or "locked". An "inactive" or "locked" user cannot login or perform any other server operations, so when adding a new user, you will

typically want to keep the user marked "active".

- **Username**
  While the server does not force any convention, a typical username might be the user's first initial and last name, (ex. John Smith becomes jsmith). Each user must have a unique username, but the same usernames may exist across different customers.
- **Required password strength when user changes password**
  When the user attempts to change their password, this password strength criteria must be passed.
- **Password**
  The initial password for the user.
- **User must change password at next login**
  When the user logs in next, they will be required to change their password.
- **Number of previous passwords that cannot match a new password**
  When the user attempts to change their password, the new password must not match this many previous passwords.
- **Password expiration required**
  When a new password is set, required this password to expire.
- **Password expires on**
  A date and time to indicate when the password will expire, after which the user is required to change their password.
- **Number of login failures before locking this user**
  The user account will be locked if failed attempts to login reach this number.
- **Hours to lock user if logins fail**
  The number of hours that a user account will be locked if the "number of login failures before locking this user" is exceeded. This value may be a decimal number, ie. 1.25 = 1 hour 15 minutes.
- **Demographic Information**
  Depending on the server's configuration, other demographics about the user will be collected such as First Name, Last Name, Email, etc. Fill these fields accurately so that you have a correct record of all users.
  Note: Email address entry will be used for sending forgotten passwords from the Login page, if needed.
- **Created By**
  Specifies which user created this user.
- **Groups**
  Each user can be the member of zero or more groups. Groups listed in the "Member Of" listbox indicate groups to which this user belongs. Groups listed in the "Not Member Of" listbox indicate groups that are available, but of which this user is not a member. You may assign users to and remove users from groups by using the "<" and ">" buttons after selecting a group in one of the listboxes. Note that the "Search" boxes may be used to filter the group lists. Groups will be discussed in more detail in the section Group Administration.

To modify the user, click "Save". If an error occurs, you will be prompted to take an action to fix it. Otherwise you will be redirected back to the User Administration page.

To cancel modifying the user, click "Cancel". You will be redirected back to the User Administration page.

Note that when a customer is configured to use Active Directory, editing users created from Active Directory may be limited. Please refer to the section Active Directory Configuration Considerations

4.4 Group Administration

Each customer can have one or more groups. Each group has privileges and form templates assigned to it, and each group can contain one or more users (note that users can belong to multiple groups). Each user in a group inherits access to all of its form templates as well as its privilege permissions.

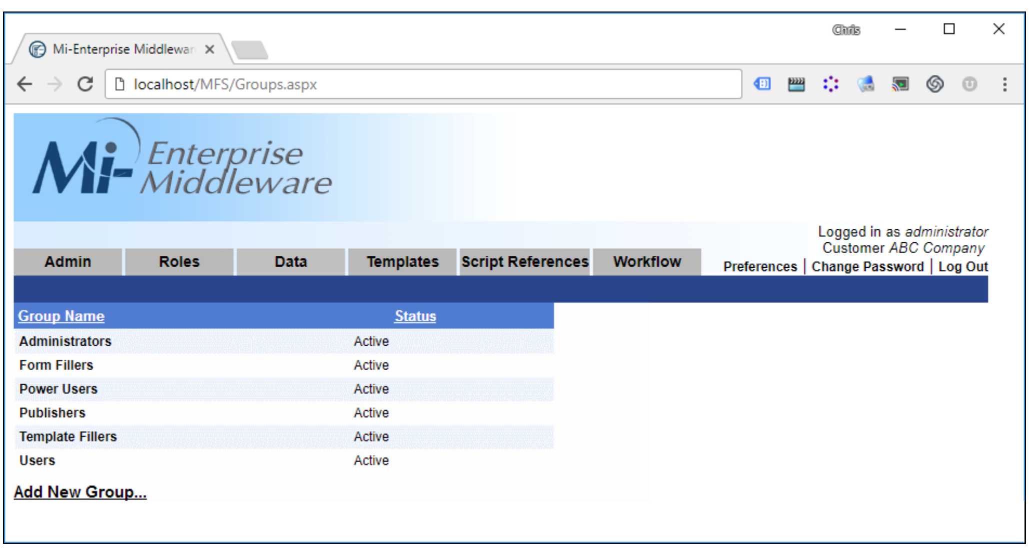
By default, five groups are automatically created for each customer:

- **Administrators** − A group that has administrative privileges assigned to it
- **Form Fillers** − A group that allows users to fill web based forms
- **Power Users** − A group that has power user privileges assigned to it
- **Publishers** − A group that is allowed to upload new form templates to the server
- **Template Fillers** − A group that allows users to fill web based form templates
- **Users** − A group that has no special privileges, but can be used as needed

To access group administration for a specific customer, click on the "Roles" tab, then click on the "Groups" link or go directly to the URL:
http://[SERVER]/MFS/Groups.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator privilege.

You will be presented with a screen that looks like this:



The columns displayed on this page are as follows:

- **Group Name** − The name used to identify the group
- **Status** − Indicates whether the group is "Active" or "Inactive". An inactive group does not propagate its form template permissions and privileges to users that are members of that group.

You may sort the list of groups by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

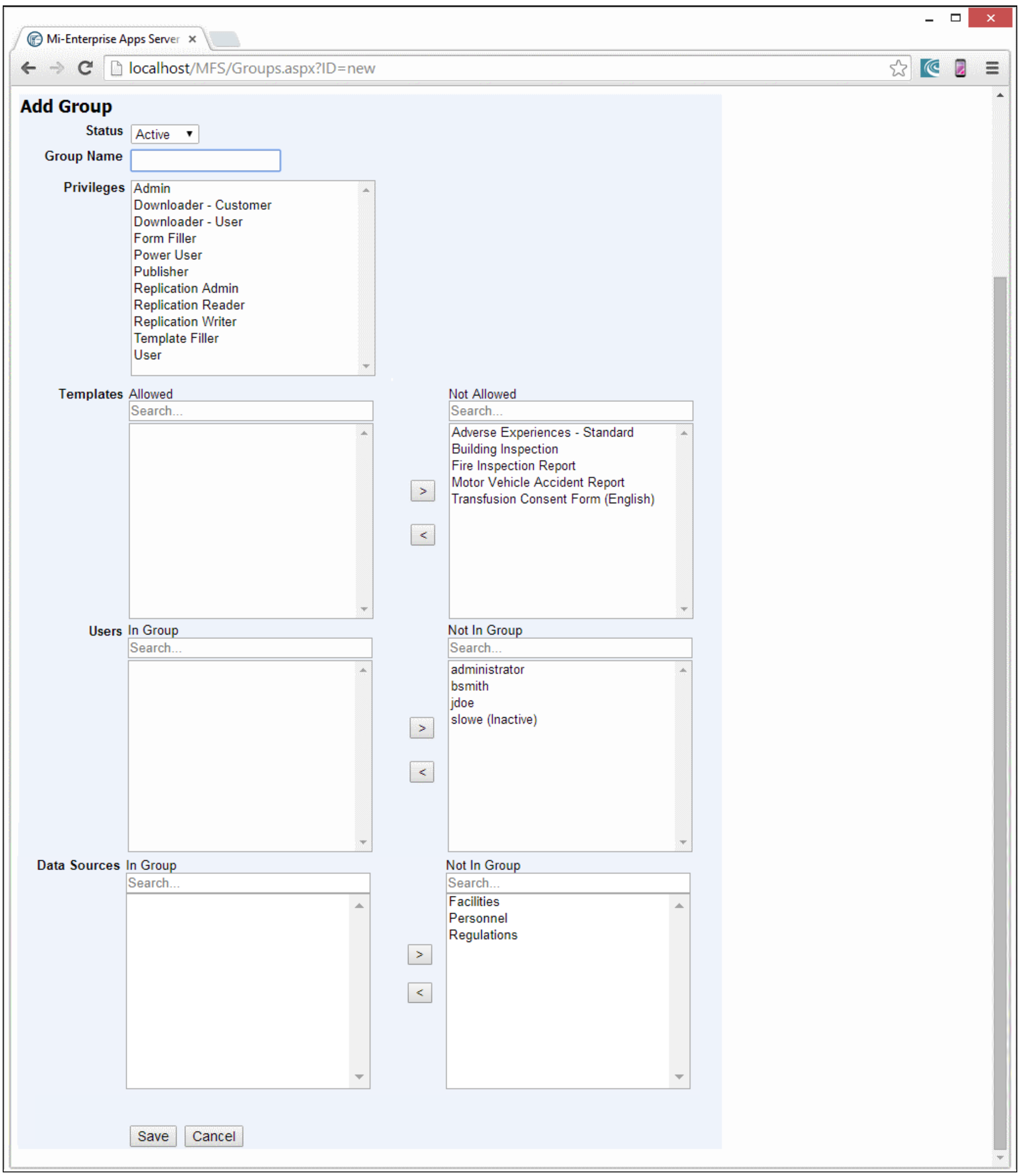
From this page you can perform the following tasks:

- Add a New Group
- Modify an Existing Group

Note that user administration may be affected if you use Active Directory authentication for a customer. Please see the Active Directory Configuration Considerations for details.

4.4.1 Adding a New Group

Clicking the "Add New Group..." link from the groups administration page will present you with a screen that looks like this:



You must then fill all fields for the group you wish to add as described below:

- **Status** − A group can be marked as "Active" or "Inactive". Inactive groups do not propagate template permissions and privileges to users in that group.
- **Group Name** − A name that identifies the group. Each group name must be unique within the customer it is created in, but can be the same as groups in a different customer.
- **Privileges*** − The privileges a specific group imparts to its users as defined below:
    - *Admin* − The ability to login to the administrative interface and modify users, groups, and other customer specific administrative items. Also the ability to see all templates published for a given customer.
    - *Downloader − Customer* − The ability to download all exports for all users from the Download Center
    - *Downloader − User* − The ability to download exports for from the Download Center
    - *Form Filler* − This specifies that when the user logins in to the web interface they will be directed to a list of templates they are allowed to fill in a mobile web interface rather than taken to the traditional web administration pages. For more details about the mobile web interface, please see the document "Filling Mobile Web Forms with Mi−Enterprise Middleware" for further details.
    - *Power User* − The ability to configure users, groups, form templates, and data sources, but not general server administration settings
    - *Publisher* − The ability to upload templates to the server and modify that template from the web interface
    - *Replication Admin* − The ability to publish and delete resources on the Data Replication Server
    - *Replication Reader* − The ability to subscribe to and synchronize resources from the Data Replication Server
    - *Replication Writer* − The ability to push data to the Data Replication Server
    - *Template Filler* − This permission is similar to the Form Filler permission, but does not allow the user to see any filled templates no matter what queue those templates are in. They may only fill new templates.
    - *User* − The ability to login to the server interface to view sessions and synchronize templates and sessions from a client application.
- **Templates*** − Each group can be allowed to see as many templates as is needed. Templates listed in the "Allowed" listbox will be downloaded to users that are a member of this group, while templates listed in the "Not Allowed" listbox will not be downloaded to members of the this group. Templates can be moved from Allowed to Not Allowed and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the template lists.
- **Users*** − Each group can have as many users assigned to it as is needed. Users listed in the "In Group" listbox are members of the group, while users listed in the "Not In Group" listbox are not members. Users can be moved from In Group to Not In Group and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the user lists.
- **Data Sources*** − Each group can be allowed to access as many data sources as is needed. Data Sources listed in the "Allowed" listbox will be available to users that are a member of this group, while Data Sources listed in the "Not Allowed" listbox will not be available. Data Sources can be moved from Allowed to Not Allowed and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the Data Source lists.

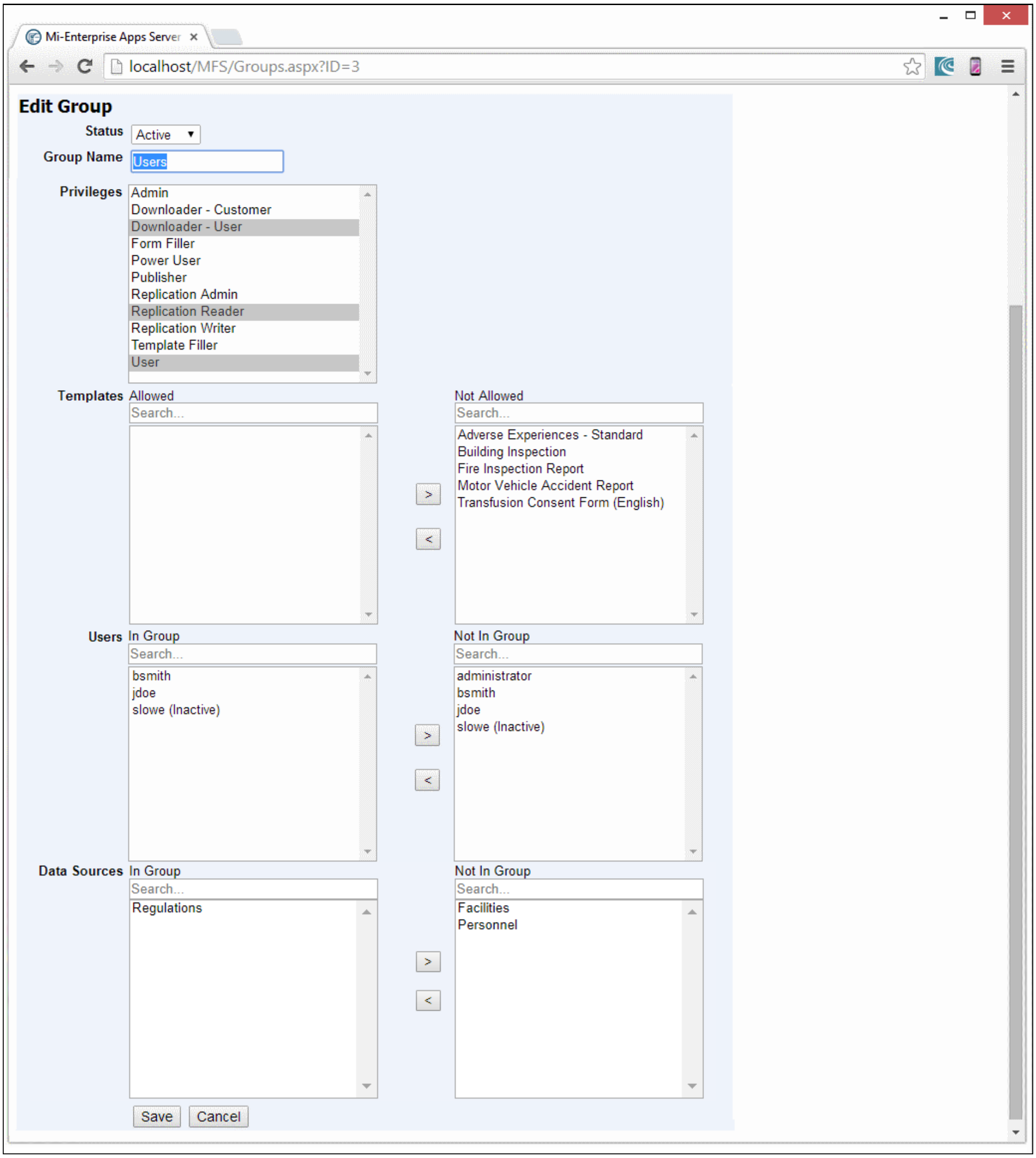
  * To select multiple items, hold down the Ctrl key while selecting each item.

To create the group, click "Save". If an error occurs creating the group, you will be prompted to take an action to fix it. Otherwise you will be redirected back to the Group Administration page.

To cancel creating the group, click "Cancel". You will be redirected back to the Group Administration page.

4.4.2 Modifying an Existing Group

Clicking on the name of any of the displayed groups will let you modify that group by taking you to a page that looks like this:



You can then change the fields for the group as necessary:

- **Status** − A group can be marked as "Active" or "Inactive". Inactive groups do not propagate template permissions and privileges to users in that group.
- **Group Name** − A name that identifies the group. Each group name must be unique within the customer it is created in, but can be the same as groups in a different customer.
- **Privileges*** − The privileges a specific group imparts to its users as defined below:

- *Admin* − The ability to login to the administrative interface and modify users, groups, and other customer specific administrative items. Also the ability to see all templates published for a given customer.
- *Downloader − Customer* − The ability to download all exports for all users from the Download Center
- *Downloader − User* − The ability to download exports for from the Download Center
- *Form Filler* − This specifies that when the user logins in to the web interface they will be directed to a list of templates they are allowed to fill in a mobile web interface rather than taken to the traditional web administration pages. For more details about the mobile web interface, please see the document "Filling Mobile Web Forms with Mi−Enterprise Middleware" for further details.
- *Power User* − The ability to configure users, groups, form templates, and data sources, but not general server administration settings
- *Publisher* − The ability to upload templates to the server and modify that template from the web interface
- *Replication Admin* − The ability to publish and delete resources on the Data Replication Server
- *Replication Reader* − The ability to subscribe to and synchronize resources from the Data Replication Server
- *Replication Writer* − The ability to push data to the Data Replication Server
- *Template Filler* − This permission is similar to the Form Filler permission, but does not allow the user to see any filled templates no matter what queue those templates are in. They may only fill new templates.
- *User* − The ability to login to the server interface to view sessions and synchronize templates and sessions from a client application.

- **Templates*** − Each group can be allowed to see as many templates as is needed. Templates listed in the "Allowed" listbox will be downloaded to users that are a member of this group, while templates listed in the "Not Allowed" listbox will not be downloaded to members of the this group. Templates can be moved from Allowed to Not Allowed and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the template lists.
- **Users*** − Each group can have as many users assigned to it as is needed. Users listed in the "In Group" listbox are members of the group, while users listed in the "Not In Group" listbox are not members. Users can be moved from In Group to Not In Group and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the user lists.
- **Data Sources*** − Each group can be allowed to access as many data sources as is needed. Data Sources listed in the "Allowed" listbox will be available to users that are a member of this group, while Data Sources listed in the "Not Allowed" listbox will not be available. Data Sources can be moved from Allowed to Not Allowed and vice versa by selecting them and then using the "<" and ">" buttons. Note that the "Search" boxes may be used to filter the Data Source lists.

  * To select multiple items, hold down the Ctrl key while selecting each item.

To modify the group, click "Save". If an error occurs, you will be prompted to take an action to fix it. Otherwise you will be redirected back to the Group Administration page.

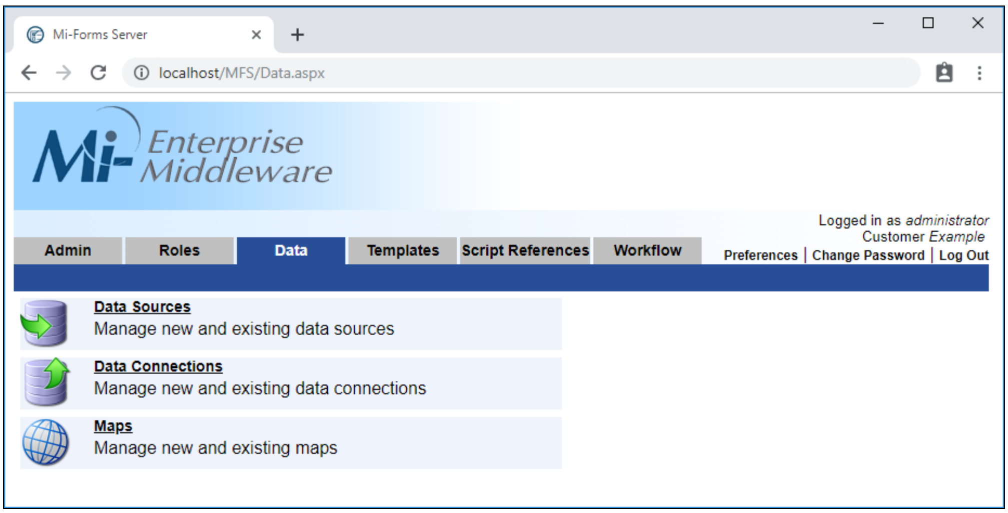
To cancel modifying the group, click "Cancel". You will be redirected back to the Group Administration page.

4.5 Data Management

To access data tasks for a specific customer, click the "Data" tab or go directly to the URL:
http://[SERVER]/MFS/Data.aspx?CustomerName=[CUSTOMERNAME]
Where:
[SERVER] is the name of your server
[CUSTOMERNAME] is the name of the customer (which can be left blank)

Note that you must login as a user with Administrator privileges to access this page.

You will be presented with a screen that looks like this:



From this page you can perform the following tasks:

- Data Source Management
- Data Connection Management
- Map Management

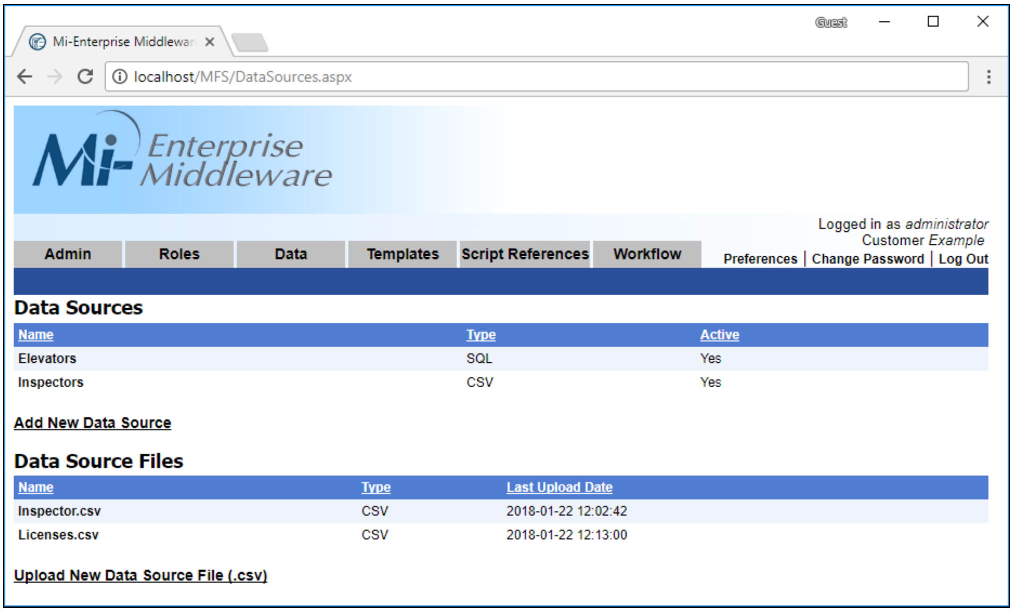
4.5.1 Data Source Management

Data Sources are collections of relational data that is periodically synchornized and made available to templates. The administration screen allows for the configuration of new data sources and the configuring of previously existing data sources. It also allows for the configuration of data source files used by CSV data sources.

To access data source administration for a specific customer, click on the "Data Sources" tab or go directly to the URL:
http://[SERVER]/MFS/DataSources.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator or Data Replication Administrator privilege.

You will be presented with a screen that looks like this:



Data sources are listed at the top. The columns displayed for all data sources are as follows:

- **Name** − The unique name of the data source
- **Type** − The type of the data source
    - *CSV* − The data source is backed by 1 or more CSV files
    - *SQL* − The data source is backed by a SQL database
    - *Other* − The data source is configured in another way and is not automatically updated
- **Active** − A yes/no value that indicates whether or not the data source is currently in use. If a data source is no longer to be used, it is marked inactive, but is kept on the server for audit history purposes.

You may sort the list of data sources by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this section of the page you can perform the following tasks:

- Add a New Data Source
- Modify an Existing Data Source

Data source files are listed at the bottom. The columns displayed for all data source files are as follows:

- **Name** − The name of the data source file
- **Type** − The type of the data source file
- **Last Uplaod Date** − The date and time the data source was last uploaded

You may sort the list of data sources by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

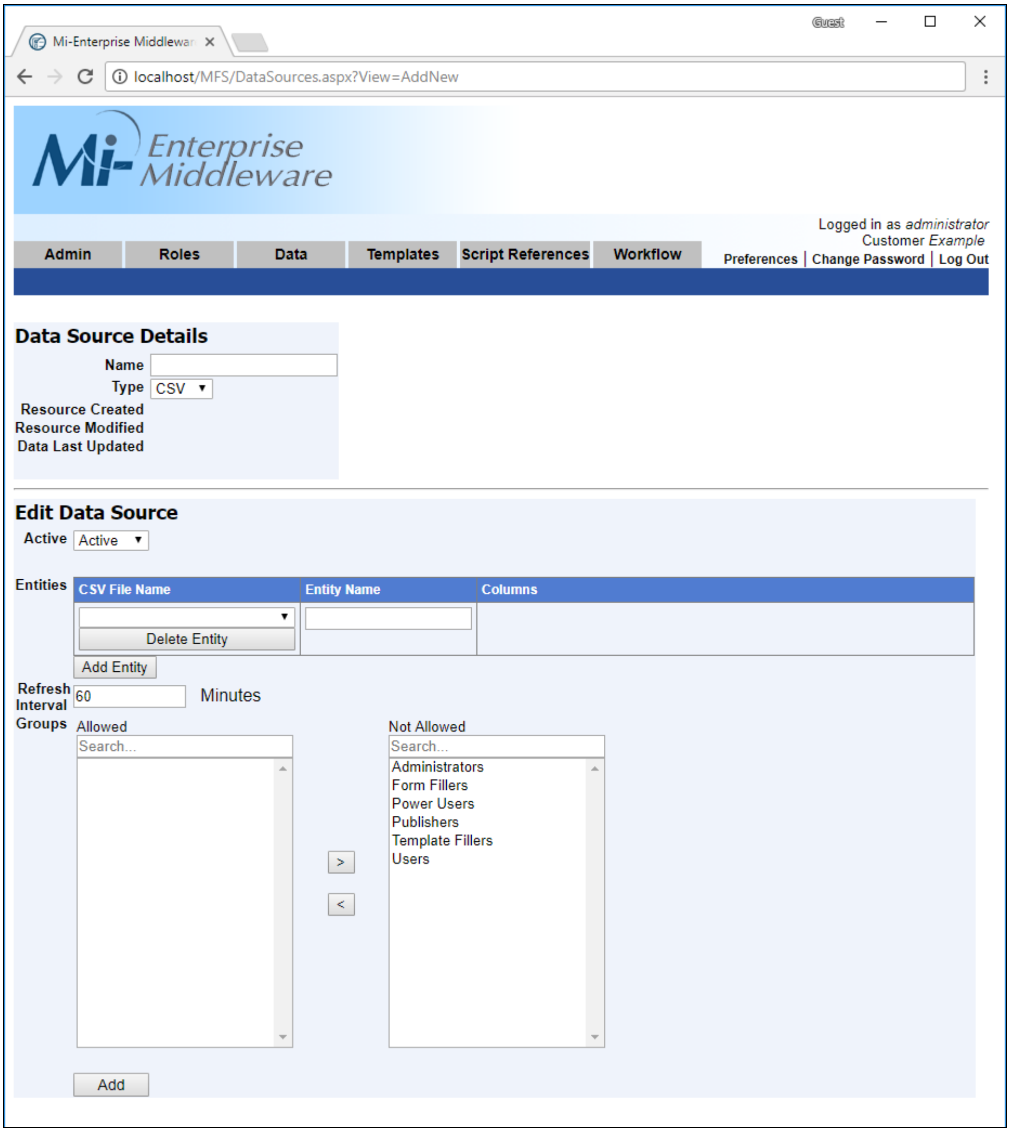
From this section of the page you can perform the following tasks:

- Add a New Data Source File

- Modify an Existing Data Source File

4.5.1.1 Adding a New Data Source

Clicking the "Add New Data Source" link from the data source administration page will present you with a screen that looks like this:



4.5.1.1.1 Data Source Details

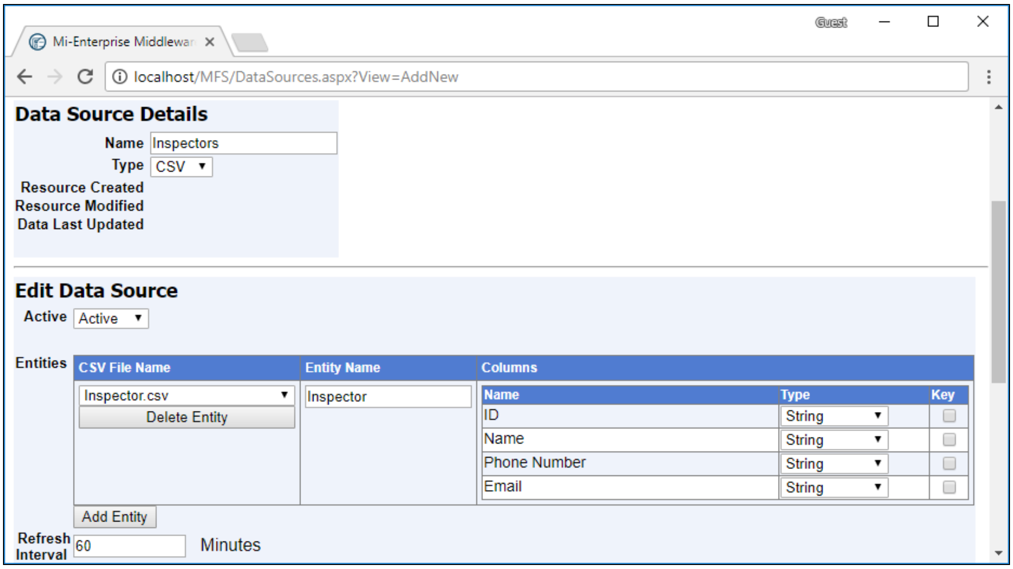
All data sources must have a unique name such that forms may subscribe to them. Specify a name at the top of the page.

Data sources types may be specified as CSV, SQL, or Other. Adding each type of data source is described below.

When adding a new data source, the Resource Created, Resource Modified, and Data Last Updated fields will always be blank.

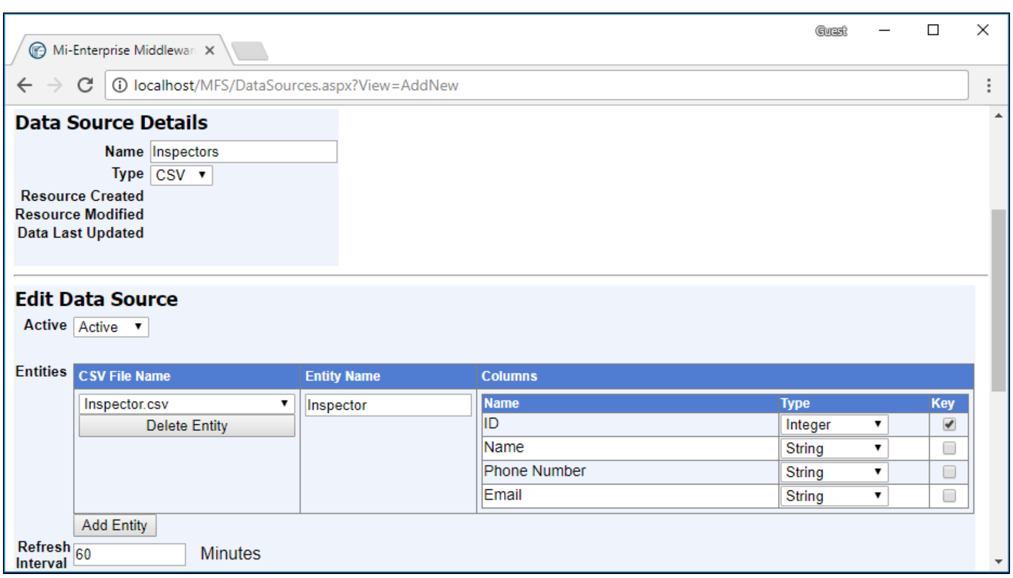
4.5.1.1.2 Adding a CSV Data Source

A CSV data source corresponds to 1 or more CSV files located on the server that will provide updated data to the data source. Each CSV file can be thought of as a data table. To begin adding a CSV data source, select the data source file that has been previously uploaded. The image below shows the UI after a single CSV file has been selected:

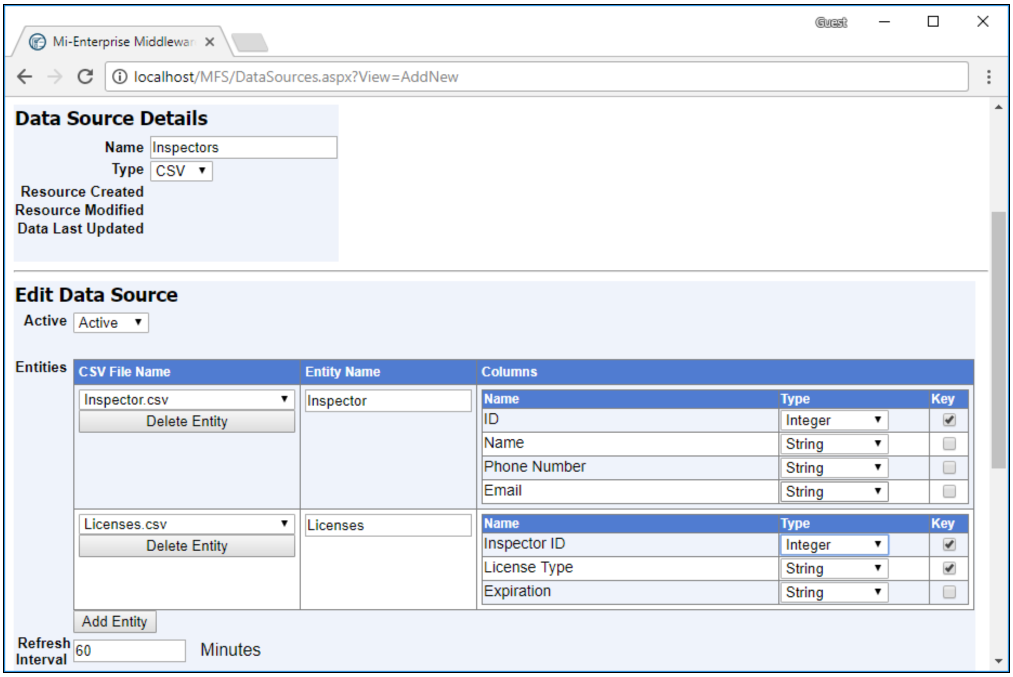


The CSV file is parsed when the data source file it is selected. The Entity Name will be set to the name of the CSV file without its extension. This may be changed if you need to do so.

Note that because CSV files do not provide column typing information, all types will initially be set to String. Also note that no column(s) will be identified as keys. In order for the data source to be properly setup, at least one field must be specified as a key. The image below shows a possible configuration of this CSV file data source based upon known typing and key information:



If the data source will be made up of more than 1 CSV, click the Add Entity button and configure an additional CSV the same way by first loading it and then updating its typing and key information. The image below shows a second CSV added to this data resource including the use of a compound (more than 1 column) key:

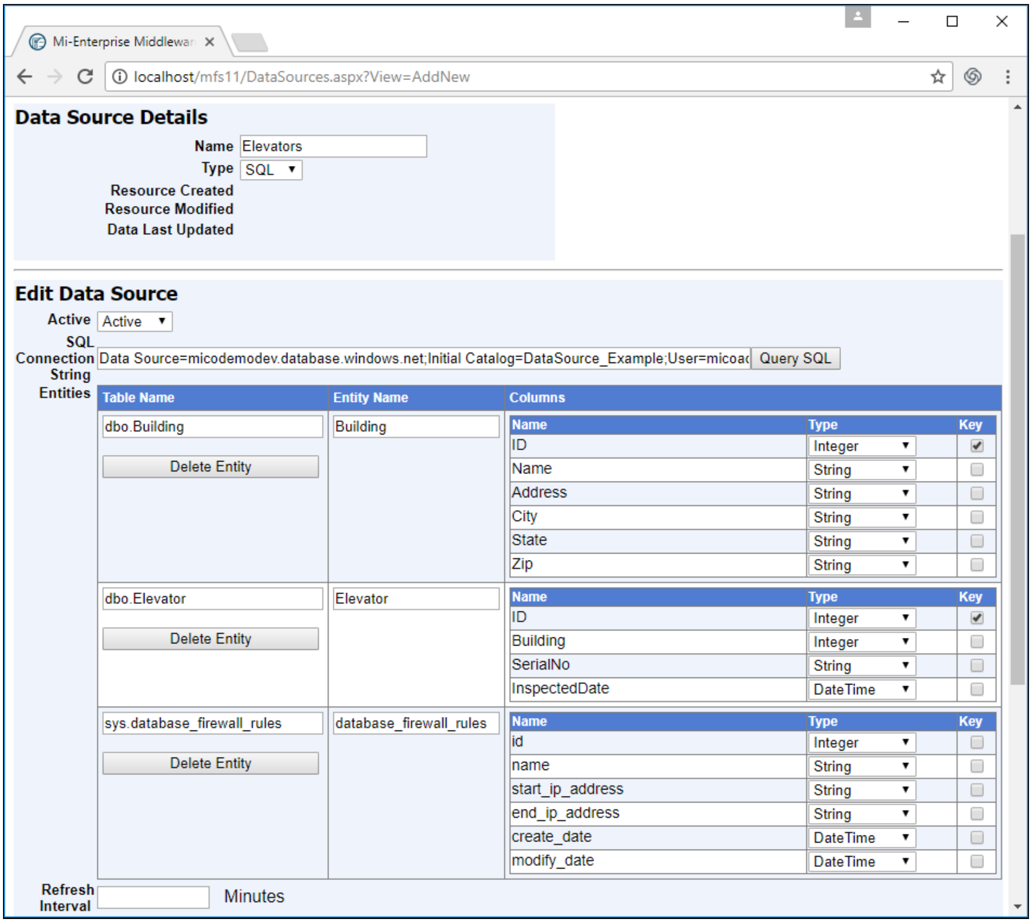


If you wish to remove a CSV file from the data source, click the Delete Entity button.

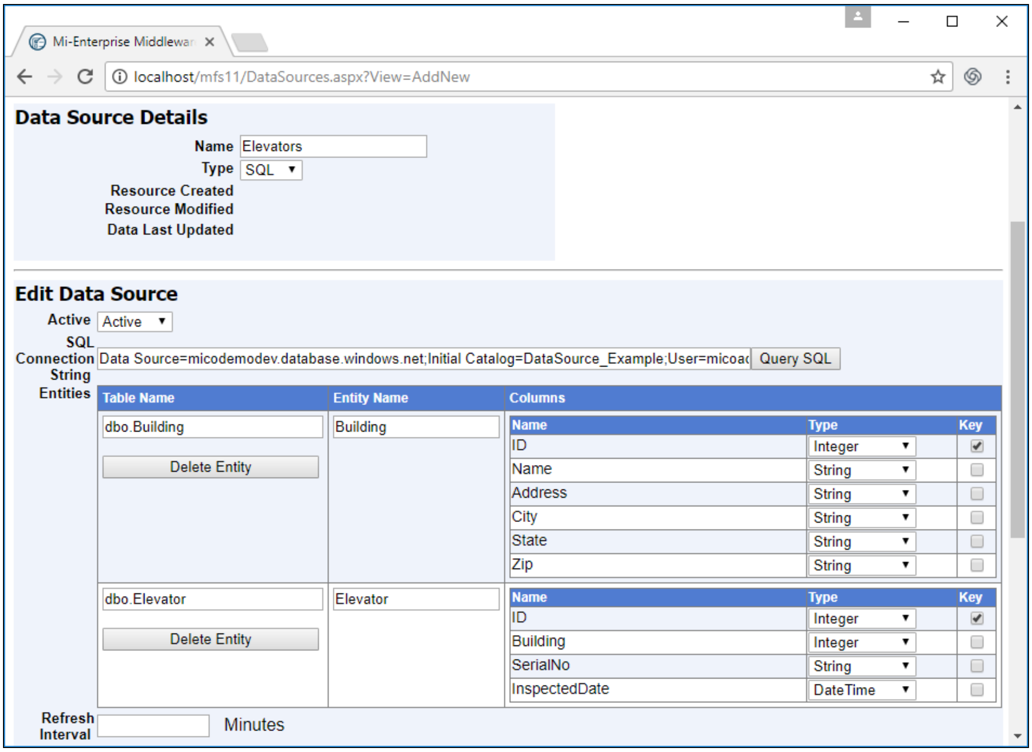
Refresh Interval and Group Permissions are discussed below.

4.5.1.1.3 Adding a SQL Data Source

A CSV data source corresponds to a single SQL database to which the server can connect. To begin adding a SQL data source, enter the SQL connection string and click the Query SQL button. The image below shows the UI after SQL has been queried:



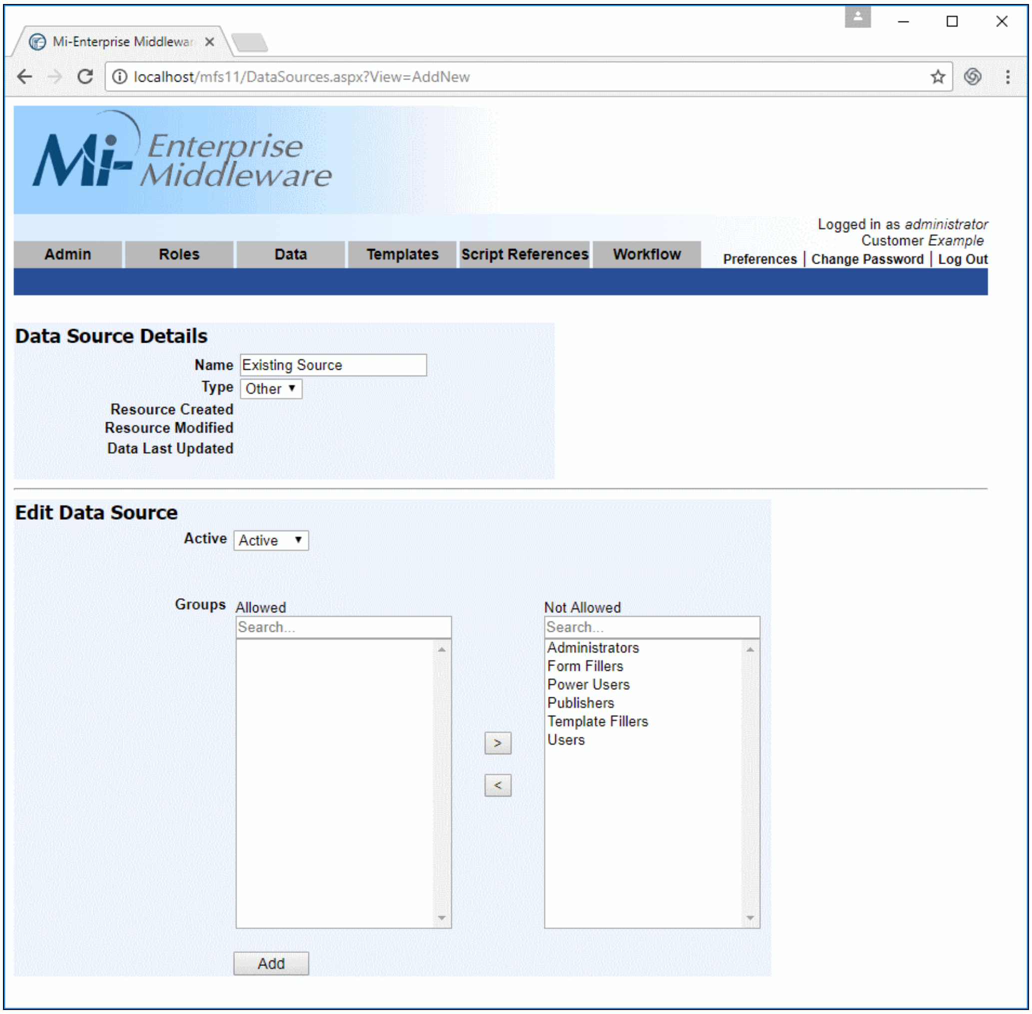
The SQL database is queried when the Query SQL button is pressed and each table is brought in as an entity with its column types and keys specified. While it is possible to change these column types and keys, you are unlikely to need to do so for a SQL data source. However, it is possible that you may not wish to include every table in your data source. For example, in the image below, we have removed the database_firewall_rules table because it is not necessary to the data the form needs:



Refresh Interval and Group Permissions are discussed below.

4.5.1.1.4 Adding an Other Data Source

The permissions model of the Data Replication Services has changed in version 11.2. In order to keep backward compatibility for data sources that may have been configured in earlier versions of the server, it is necessary to add an "Other" data source. The name of this data source must correspond exactly to to the name that was used previously. The image below shows an example of adding an "Other" data source:



No entity information is provided for "Other" data sources and they will not be updated automatically by the server. However, permissions to the data source must be configured as described below.

4.5.1.1.5 Refresh Interval &Group Permissions

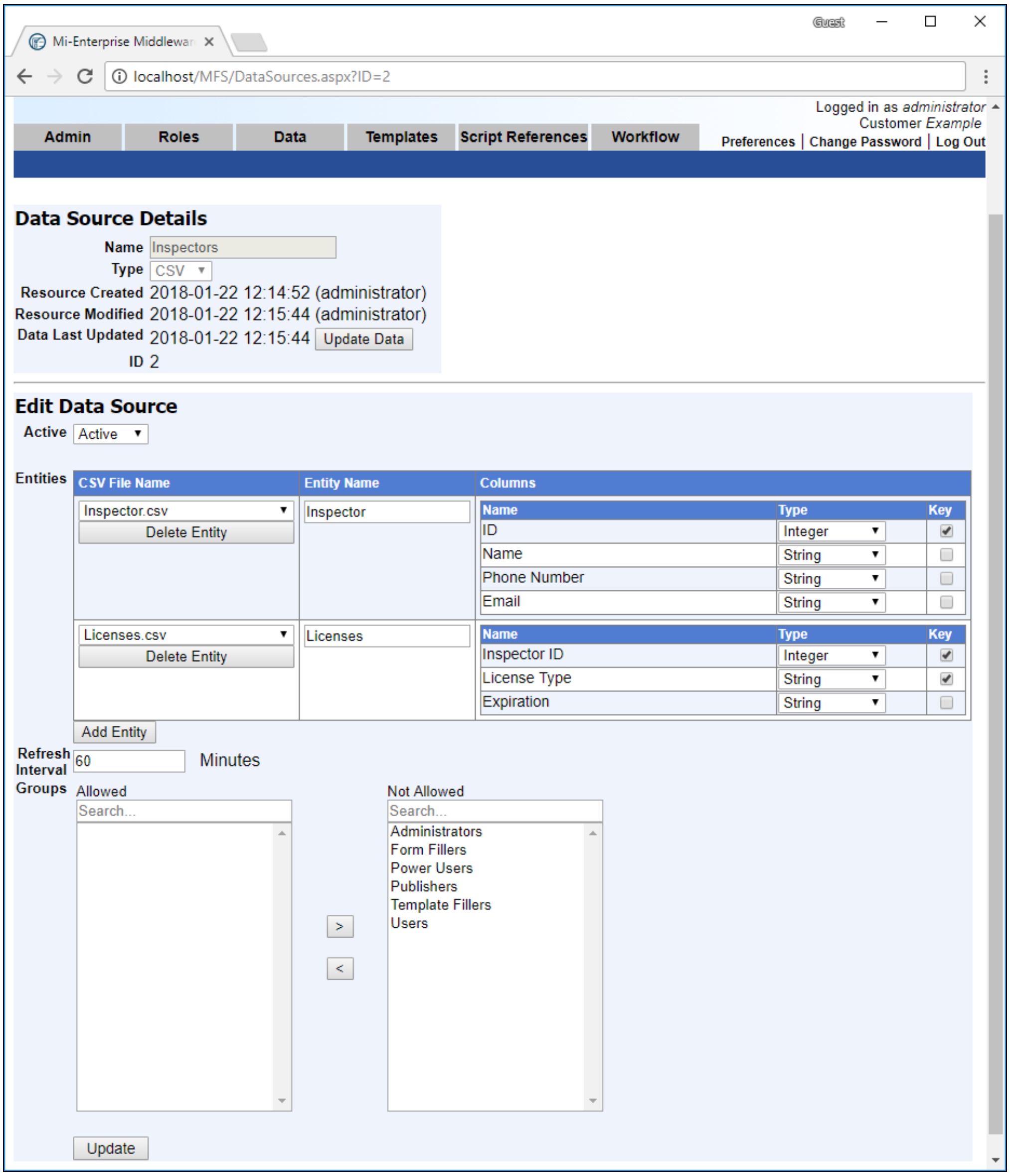
When adding a data source, a refresh interval must be specified. This interval is used by the Data Replication Update Service in order to periodically refresh the data within the the data source. For CSV and SQL data sources, the CSV file(s) and SQL database will be queried at this interval to ensure fresh data.

Groups listed in the Allowed listbox will have access to the data source while groups listed in the Not Allowed listbox will not have access to the data source. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox. Note that the permissions to the data source will correspond to the privileges associated with the group(s) allowed for the data source. For instance, groups with only "Replication Reader" permission will be able to query data from the data source, but not update it.

Click the Add button once the data source is configured as needed. This will setup the data source structure and initial data within the Data Replication Server.

4.5.1.2 Modifying an Existing Data Source

Clicking on the name of any of the displayed data source will let you modify that data source by taking you to a page that looks like this:



4.5.1.2.1 Data Source Details

This area of the page displays non−modifiable details about the data source as follows:

- **Name** − The unique name of the data source
- **Type** − The type of the data source
- **Resource Created** − The date and time on which the data source was created and the user who created it
- **Resource Modified** − The date and time on which the data source was last modified (schema changed) and the user who modified it
- **Data Last Updated** − The date and time on which the data was last updated
- **ID** − An internal ID of the data source used for diagnostics

Clicking the Update Data button will attempt to update the data source's data and if successful will update the Data Last Updated date.

4.5.1.2.2 Edit Data Source

Active
The active drop−down allows you to mark the data source active or inactive. If a data source is marked inactive, client applications may no longer download the data within that data source.

Entities
The entites corresponding to the data source are shown and configurable. Note that if you make any changes to the entities then the data resource will be dropped and recreated. This will mean that all client devices will synchronize the entire data resource the next time they sync rather than a minimum change set.

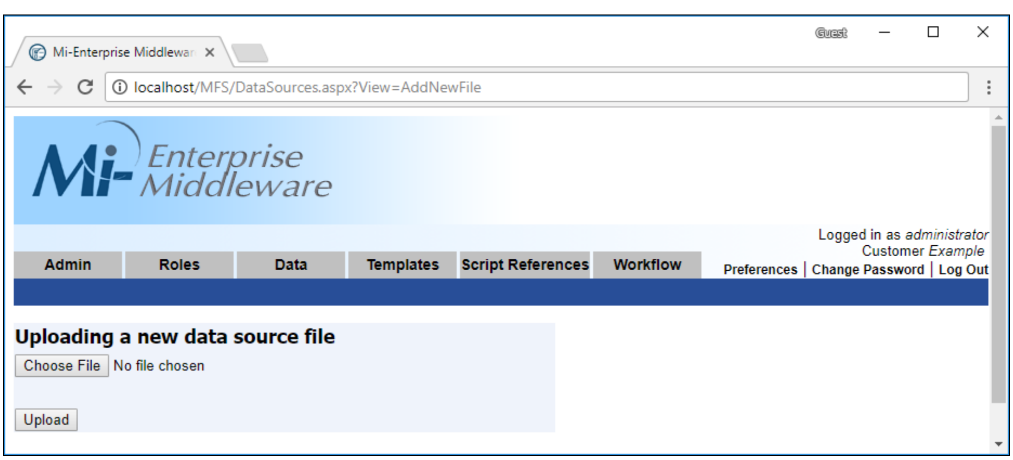
Refresh Interval
This interval is used by the Data Replication Update Service in order to periodically refresh the data within the the data source. For CSV and SQL data sources, the CSV file(s) and SQL database will be queried at this interval to ensure fresh data.

Groups
Groups listed in the Allowed listbox will have access to the data source while groups listed in the Not Allowed listbox will not have access to the data source. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox. Note that the permissions to the data source will correspond to the privileges associated with the group(s) allowed for the data source. For instance, groups with only "Replication Reader" permission will be able to query data from the data source, but not update it. Note that the "Search" boxes may be used to filter the group lists.

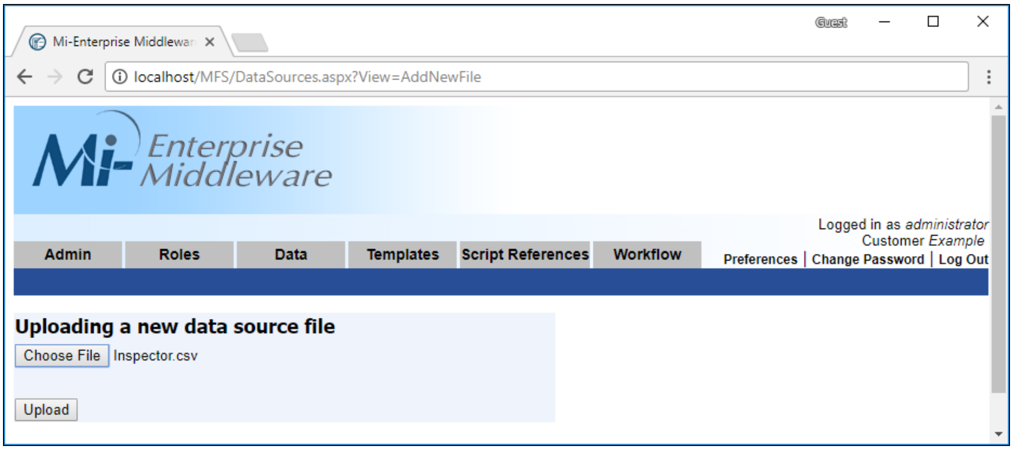
Update Button
Click the Update button once the data source is configured as needed. This will update its settings and drop/readd it as needed.

4.5.1.3 Adding a New Data Source File

Clicking the "Upload New Data Source File" link from the data source administration page will present you with a screen that looks like this:



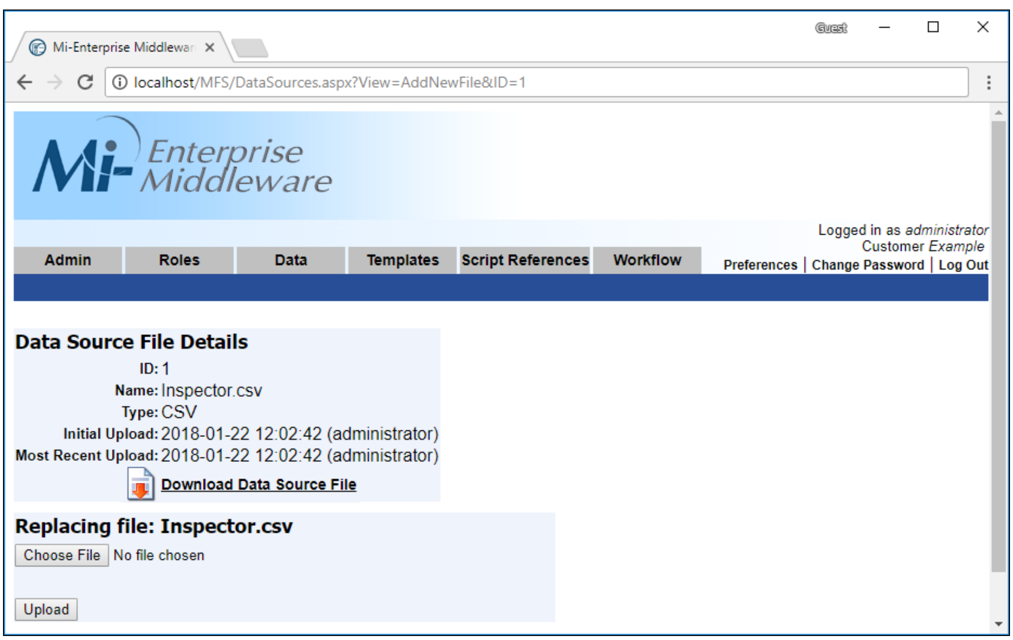
Select a file from your file system and the page will look similar to this:



Click the upload button to complete the process.

4.5.1.4 Modifying an Existing Data Source File

Clicking on the name of any of the displayed data source files will let you modify that data source file by taking you to a page that looks like this:



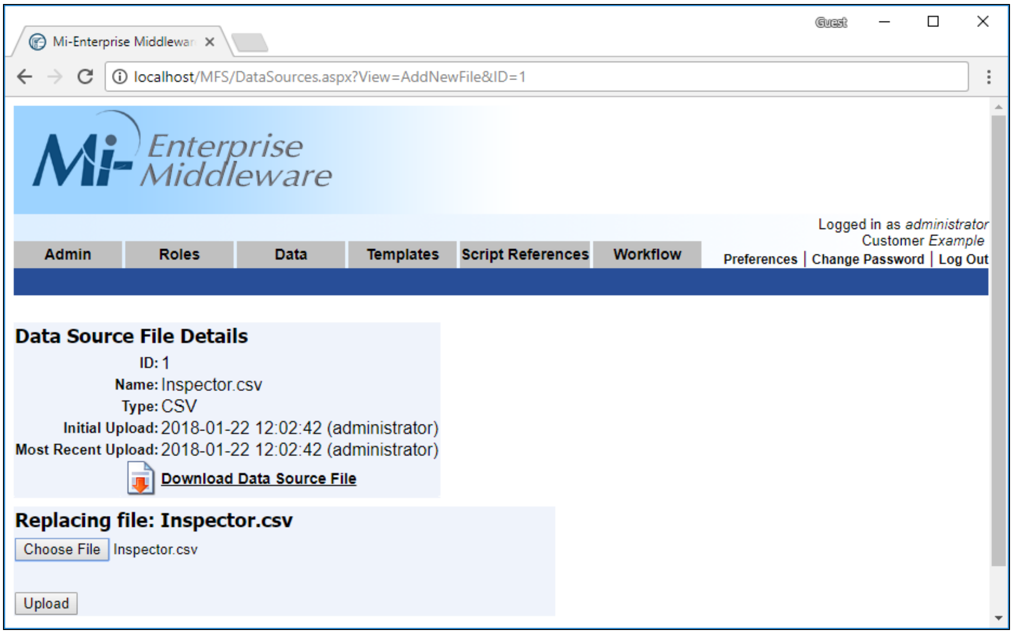
4.5.1.4.1 Data Source File Details

This area of the page displays non−modifiable details about the data source as follows:

- **Name** − The name of the data source file
- **Type** − The type of the data source file
- **Initial Upload** − The date and time on which the data source file was initially uploaded and the user who created it
- **Most Recent Upload** − The date and time on which the data source file was most recently uploaded and the user who created it

- **Download Data Source File −** Clicking this link will download the data source file locally

To upload a new version of the file, click the "Choose File" button and you will see a page similar to this:



Click the "Upload" button to complete the replacement.

4.5.2 Data Connection Management

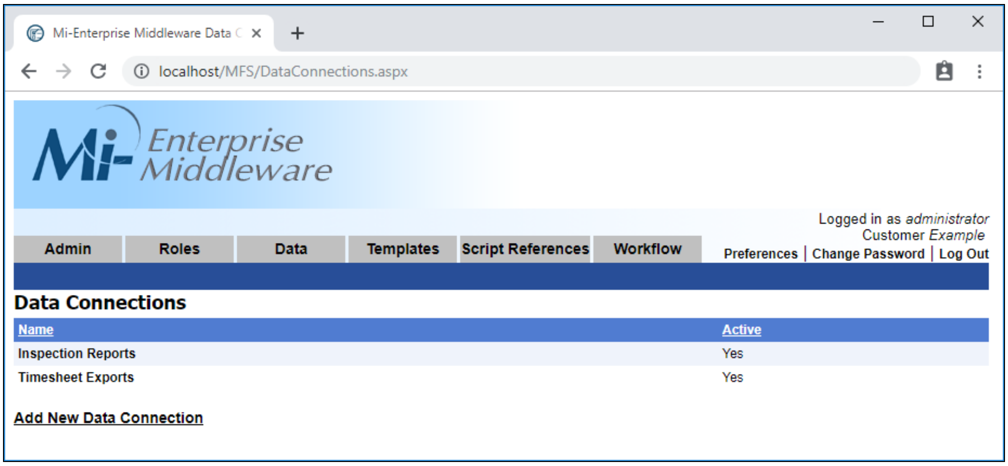
Please note that this functionality may not be available to you. If you receive a message indicating that your license does not support data connections, please contact your vendor.

Data Connections are outbound SQL data connection strings that can be used for exporting form data. Rather than define a SQL connection string directly within a form, a data connection is named such that it may point to a different SQL endpoint in different environments.

To access data connection administration for a specific customer, click on the "Data" tab or go directly to the URL:
http://[SERVER]/MFS/DataConnections.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator or Data Replication Administrator privilege.

You will be presented with a screen that looks like this:



Data connections are listed at the top. The columns displayed for all data connections are as follows:

- **Name** − The unique name of the data connection
- **Active** − A yes/no value that indicates whether or not the data connection is currently in use. If a data connection is no longer to be used, it is marked inactive, but is kept on the server for audit history purposes.

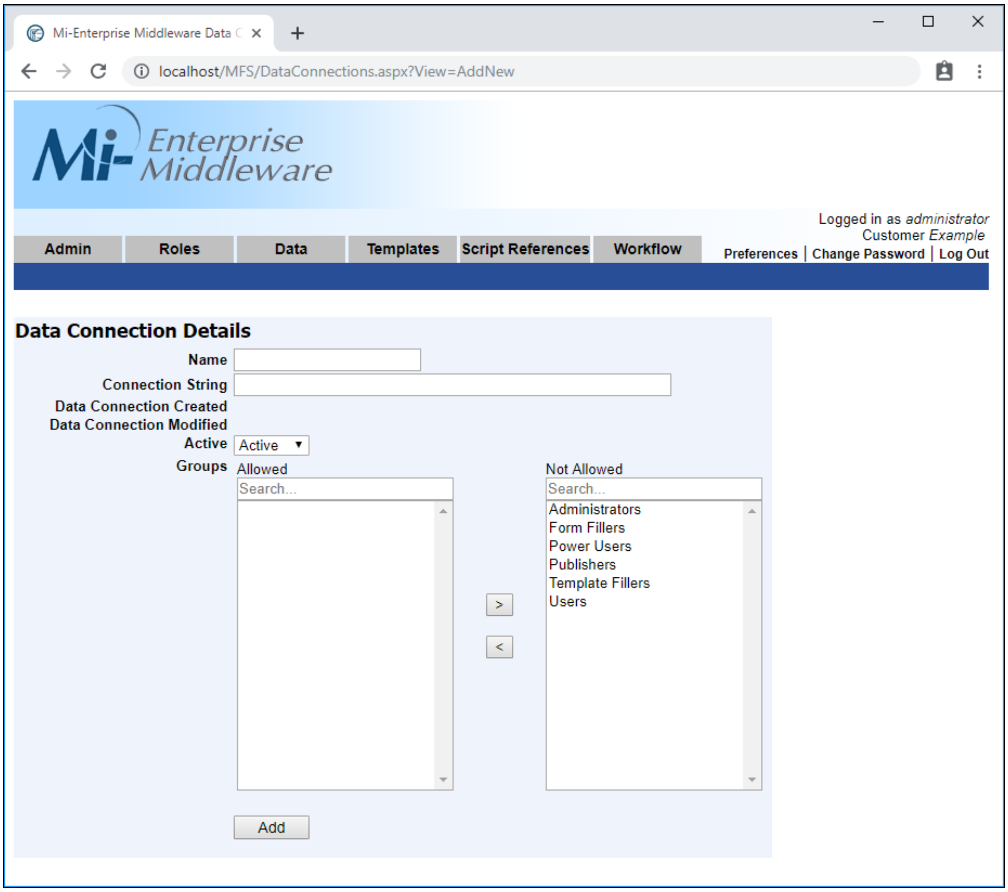
You may sort the list of data connections by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this section of the page you can perform the following tasks:

- Add a New Data Connection
- Modify an Existing Data Connection

4.5.2.1 Adding a New Data Connection

Clicking the "Add New Data Connection" link from the data connection administration page will present you with a screen that looks like this:



4.5.2.1.1 Data Connection Details

All data connections must have a unique name such that forms may subscribe to them. Specify a name at the top of the page.

Data connections must have a valid SQL connection string such that data can be exported from forms. Note that it is not required that any pre−existing tables or other structure be created within this database, but the specified credentials must have permissions to create and modify tables.

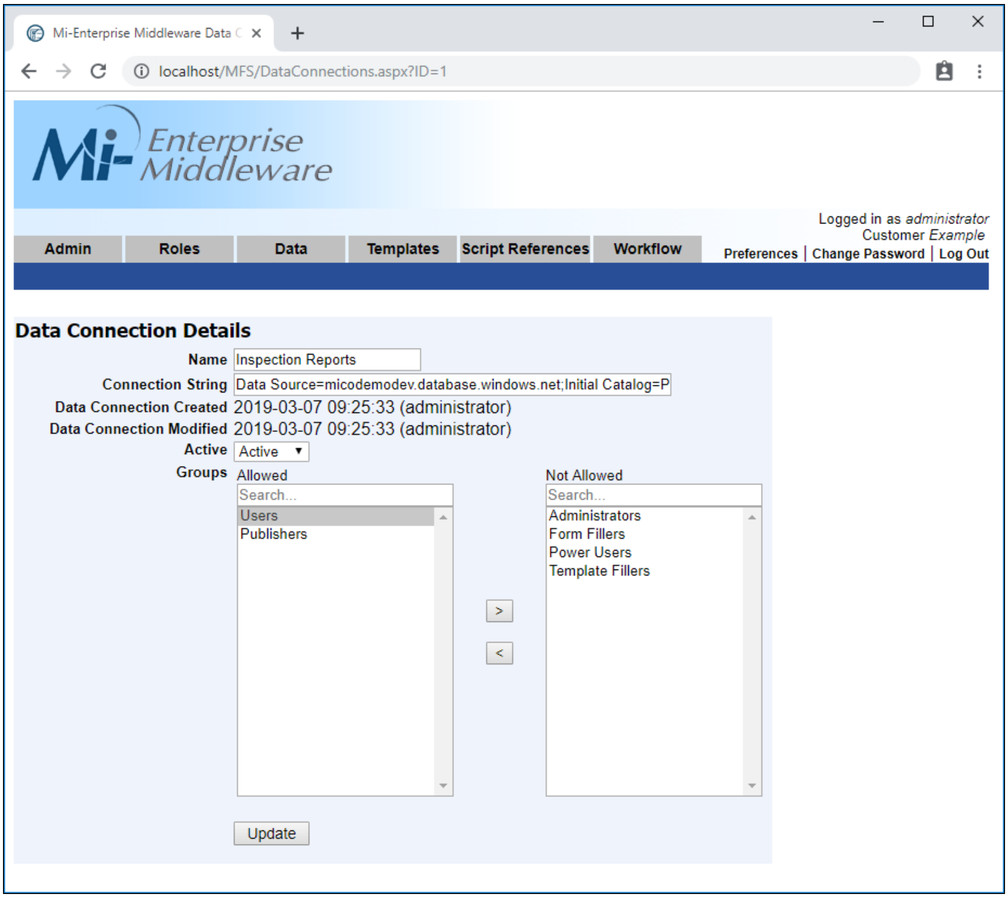
4.5.2.1.2 Group Permissions

Groups listed in the Allowed listbox will have access to the data connection while groups listed in the Not Allowed listbox will not have access to the data connection. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox.

Click the Add button once the data connection is configured as needed.

4.5.2.2 Modifying an Existing Data Connection

Clicking on the name of any of the displayed data connection will let you modify that data connection by taking you to a page that looks like this:



4.5.2.2.1 Data Connection Details

This area of the page displays details about the data connection as follows:

- **Name** − The unique name of the data connnection
- **Connection String** − The SQL connection string of the data connection
- **Data Connection Created** − The date and time on which the data connection was created and the user who created it
- **Data Connection Modified** − The date and time on which the data connection was last modified and the user who modified it
- **Active** − The active drop−down allows you to mark the data connection active or inactive. If a data connection is marked inactive, designers may no longer use it when designing forms.

Groups
Groups listed in the Allowed listbox will have access to the data connection while groups listed in the Not Allowed listbox will not have access to the data connection. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox.

Update Button
Click the Update button once the data connection is configured as needed.

4.5.3 Map Management

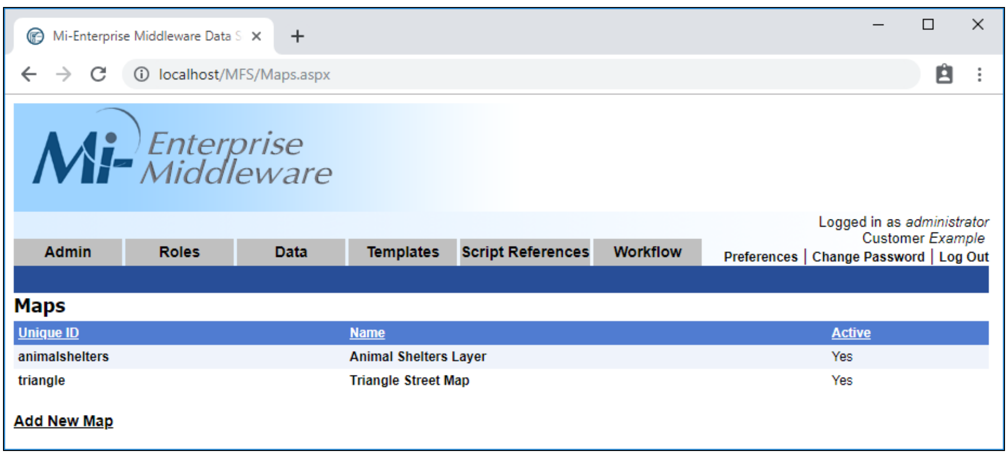
Please note that this functionality may not be available to you. If you receive a message indicating that your license does not support maps, please contact your vendor.

Maps are collections of GIS data that allow client forms to use mapping data both online and offline. Map content is managed on the server and made available to form designers.

To access map administration for a specific customer, click on the "Data" tab or go directly to the URL:
http://[SERVER]/MFS/Maps.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator privilege.

You will be presented with a screen that looks like this:



Mapos are listed at the top. The columns displayed for all maps are as follows:

- **Unique ID** − The unique identifier of the map (used internally by client apps)
- **Name** − The friendly name of the map
- **Active** − A yes/no value that indicates whether or not the map is currently in use. If a map is no longer to be used, it is marked inactive, but is kept on the server for audit history purposes.

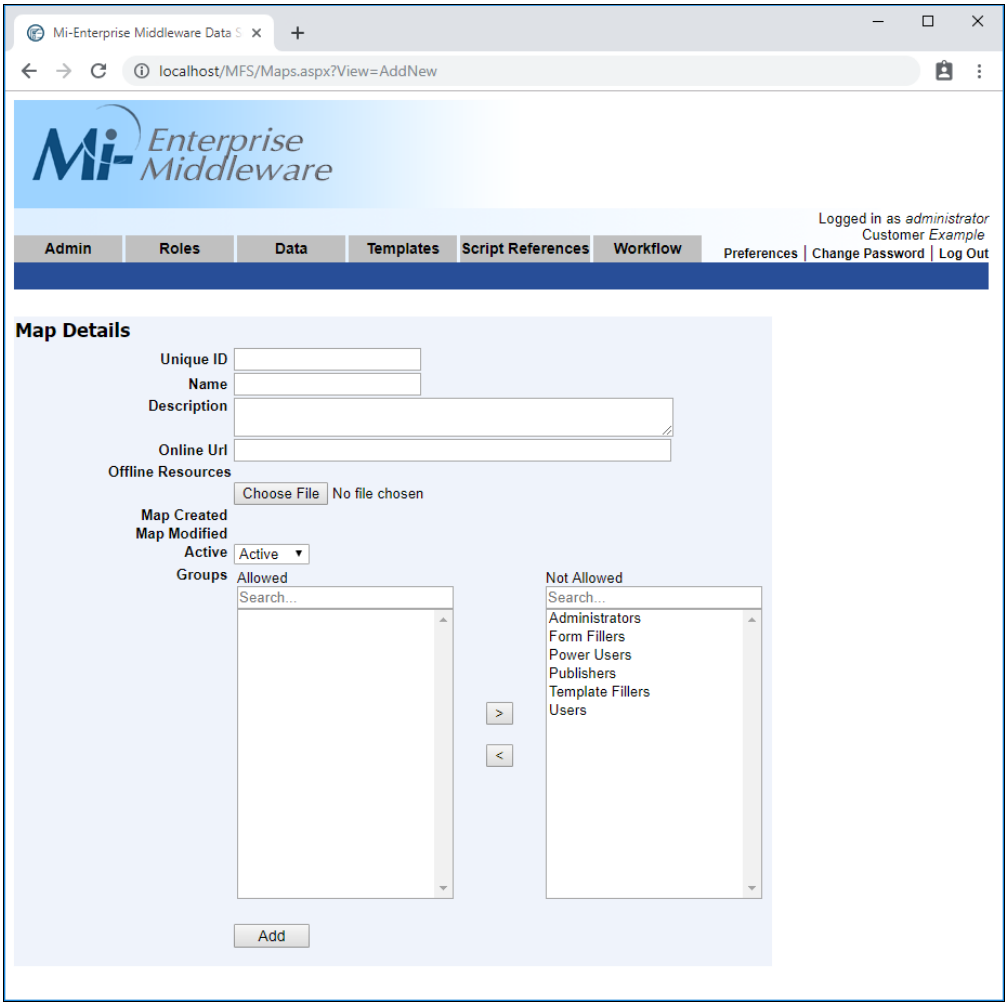
You may sort the list of maps by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this section of the page you can perform the following tasks:

- Add a New Map
- Modify an Existing Map

4.5.3.1 Adding a Map

Clicking the "Add New Map" link from the map administration page will present you with a screen that looks like this:



4.5.3.1.1 Map Details

All maps must have a unique ID such that forms may subscribe to them. Specify this ID at the top of the page.

Maps must also have a friendly name that is used for the purpose of design. Specify this below the ID.

A map description is not required, but can be useful to other administrators in describing the purpose of the map and what detail layers it adds.

The online URL specifies where map content should be downloaded from when online (connected).

If the map is intended for offline (disconnected) use, select an .mbtiles file to upload that contains the map content.

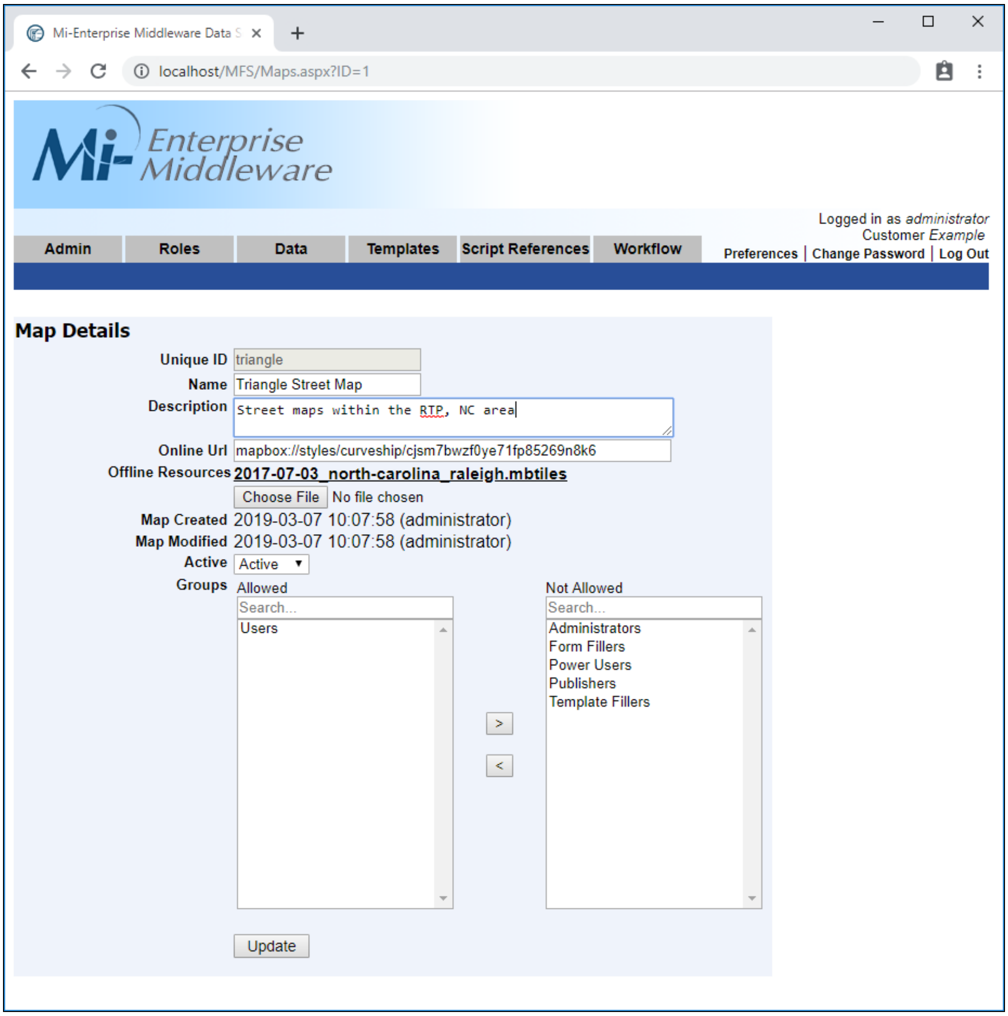
4.5.3.1.2 Group Permissions

Groups listed in the Allowed listbox will have access to the map while groups listed in the Not Allowed listbox will not have access to the map. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox.

Click the Add button once the map is configured as needed.

4.5.3.2 Modifying an Existing Map

Clicking on the name of any of the displayed map will let you modify that map by taking you to a page that looks like this:



4.5.3.2.1 Map Details

This area of the page displays details about the map as follows:

- **Unique ID** − The unique identifier of the map (not editable)
- **Name** − The fiendly name of the data connnection
- **Description** − A detailed description of the map, used to inform other administrators as to the map's content
- **Online URL** − Where map content should be downloaded from when a device is online (connected)
- **Offline Resources** − The map content that should be downloaded to devices for offline (disconnected) use (clicking on this URL will download the resource)
- **Map Created** − The date and time on which the map was created and the user who created it

- **Map Modified** − The date and time on which the map was last modified and the user who modified it
- **Active** − The active drop−down allows you to mark the map active or inactive. If a map is marked inactive, designers may no longer use it when designing forms.

Groups
Groups listed in the Allowed listbox will have access to the map while groups listed in the Not Allowed listbox will not have access to the map. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox.

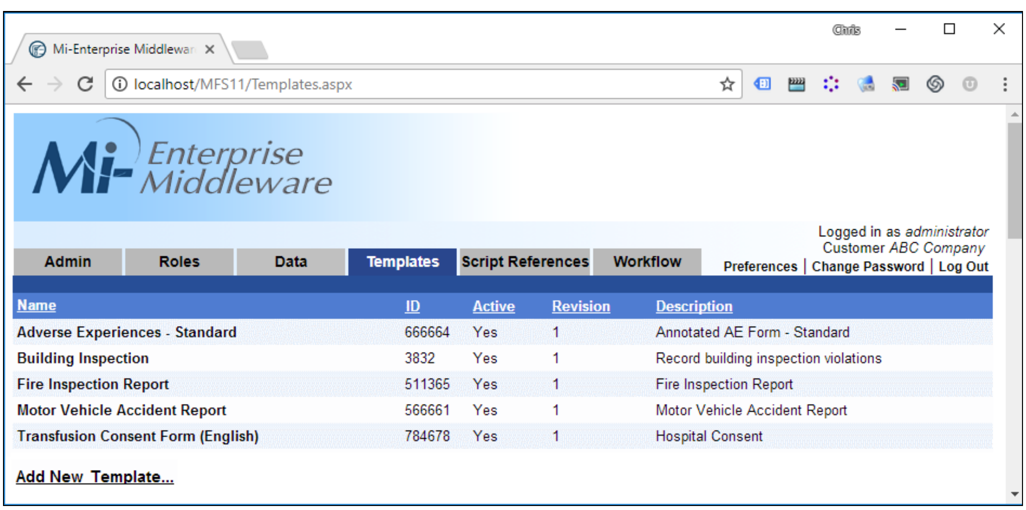
Update Button
Click the Update button once the map is configured as needed.

4.6 Template Management

To access template administration for a specific customer, click on the "Templates" tab or go directly to the URL:
http://[SERVER]/MFS/Templates.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator or Publisher privilege. If the user has Administrator privilege they will see (and be able to modify) all templates published on the server for the given customer. If they have the Publisher privilege, they will only see forms that are accessible by groups of which they are a member.

You will be presented with a screen that looks like this:



The columns displayed on this page are as follows:

- **Name** − The name of the template
- **ID** − The unique number representing the template
- **Active** − A yes/no value that indicates whether or not the template is currently in use. If a template is no longer to be used, it is marked inactive, but is kept on the server for audit history purposes.

- **Revision** − Every time a template is updated, its revision count is increased by one. This column indicates the current revision number of the template.
- **Description** − A text description of the template
- **Fill** − Link to fill this template as a webform

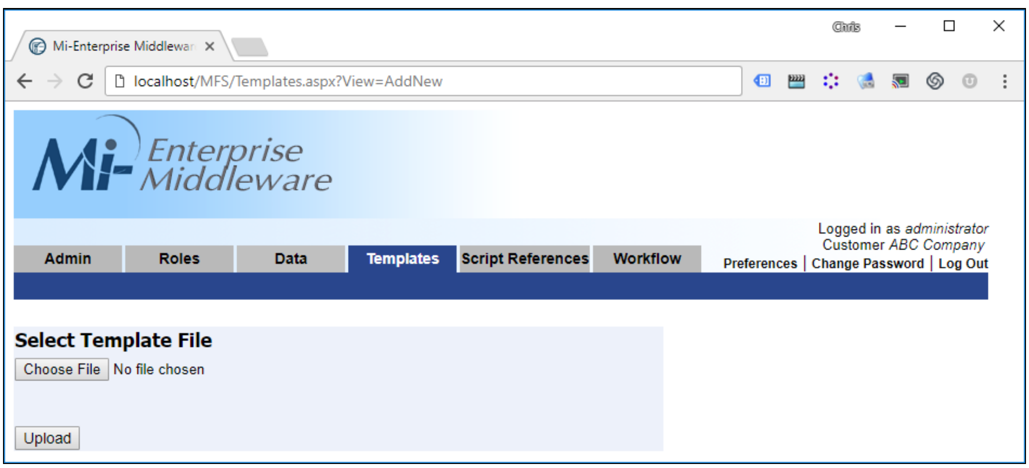
You may sort the list of templates by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this page you can perform the following tasks:

- Add a New Template
- Modify an Existing Template

4.6.1 Adding a New Template

Clicking the "Add Template..." button from the templates administration page will present you with a screen that looks like this:



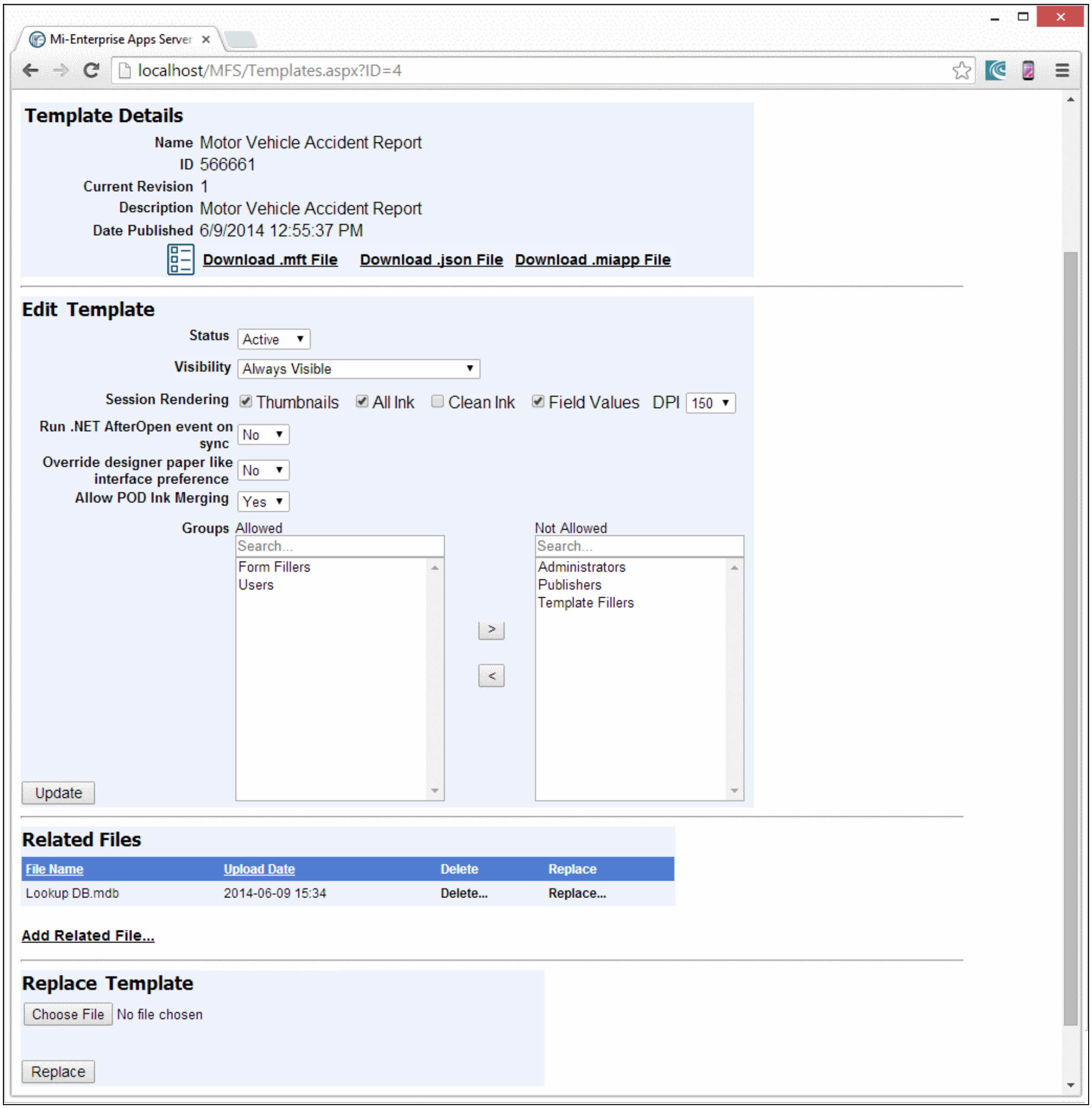
Select the template you would like to upload to the server by clicking the "Browse..." button and finding the template file you wish to upload. Then click the "Upload" button to upload the template to the server.

Note: Adding a template is usually accomplished from the Designer where the revision number will be automatically recorded for both Mi−Enterprise Middleware and Designer.

If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the template administration page.

4.6.2 Modifying an Existing Template

Clicking on the name of any of the displayed templates will let you modify that template by taking you to a page that looks like this:



4.6.3 Template Details

This area of the page displays non−modifiable details about the template for reference, including the date on which the template was published to the server.

Three links are also provided to download the template file. The .mft download link is provided for compatibility with older client applications. The .json download link is provided for diagnostic purposes (such as if requested by support). The .miapp download link is suitable to use to move the template from one environment to another through the use of NextGen Designer.

4.6.4 Edit Template

4.6.4.1 Status

The status drop−down allows you to mark the template active or inactive. When a template is published it is automatically marked active, which means it is available to client applications to download. If a template is marked inactive, client applications may no longer download the template. (Any sessions that were previously started from an active template will be allowed to run its life cycle.)

4.6.4.2 Visibility

Controls the visibility of a form template to the client application as follows:

- **Always Visible** − The template will always be shown to users in their form list
- **Always Hidden** − The template will never be shown to users in their form list. This is primarily used when one form is to be launched from another form, but never directly launched by the user.
- **Visible When Sessions are Present** − The template will only be shown to users in their form list if a session exists either on the local device or within one of their workflow queues.

4.6.4.3 Session Rendering

These checkboxes and dropdown lists allow configuration of what images will be automatically rendered when a session created from this template revision is uploaded. They operate as follows:

- **Thumbnails** − If checked, small thumbnails are rendered that will be displayed in a client's Remote Sessions dialog. Note that thumbnails are always rendered in Field Value mode.
- **All Ink** − If checked, an All Ink render of the template will be created
- **Clean Ink** − If checked, a Clean Ink render of the template will be created
- **Field Values** − If checked, a Field Values render of the template will be created
- **DPI** − All images will be rendered at this resolution (300, 150, or 72 DPI)

Note that when a template is replaced, its previous render sendings are preserved. When a new template is uploaded, Thumbnails, All Ink and Field Values renders are automatically enabled at 150 DPI.

4.6.4.4 Run .NET AfterOpen event on Sync

If set to "Yes", this will cause the .NET AfterOpen event to be triggered when devices sync with the server to retrieve a template revision. This allows for a designer to preload a template with lookup data.

4.6.4.5 Override designer paper like interface prefernce

If set to "Yes", this template will always be presented in the non−paper−like layout format regardless of the designer's intention.

4.6.4.6 Allow POD Ink Merging

If checked, when a session that contains pattern corresponding to an already uploaded session created from this template revision, ink will be merged into the existing session. If unchcked, a new session will be created.

4.6.4.7 Groups

Groups listed in the Allowed listbox will have access to the template while groups listed in the Not Allowed listbox will not have access to the template. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox. Note that the "Search" boxes may be used to filter the group lists.

Click the "Update" button to save any changes made to the template's status or the groups to which it has been assigned.

4.6.5 Related Files

It is sometimes useful to associate files with a template without actually embedding the files in the template. The related files list shows details about files that have been associated with this revision of the template. To Add, Modify, or Delete related files, please see the sections below:

- Adding a New Related File to a Template
- Replacing a Related File
- Deleting a Related File

Note that when a template is updated, all related files associated with the most current revision of the template will be associated with the newly uploaded revision.

4.6.6 Replace Template

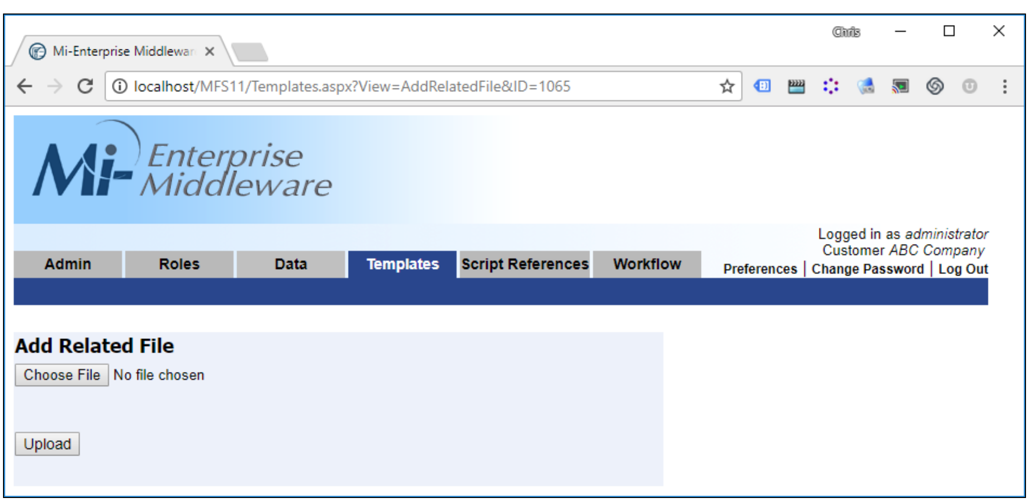
If you wish to replace the template with a different one you have on your local machine, you can click the "Browse" button, locate your template file, and then click "Replace" to upload the new version.

Note: Replacing or updating a template is usually accomplished from the Designer where the revision number will be automatically recorded for both Mi−Enterprise Middleware and Designer.

If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the template administration page.

4.6.6.1 Adding a New Related File to a Template

Clicking the "Add Related File..." link from the modify template page will present you with a screen that looks like this:

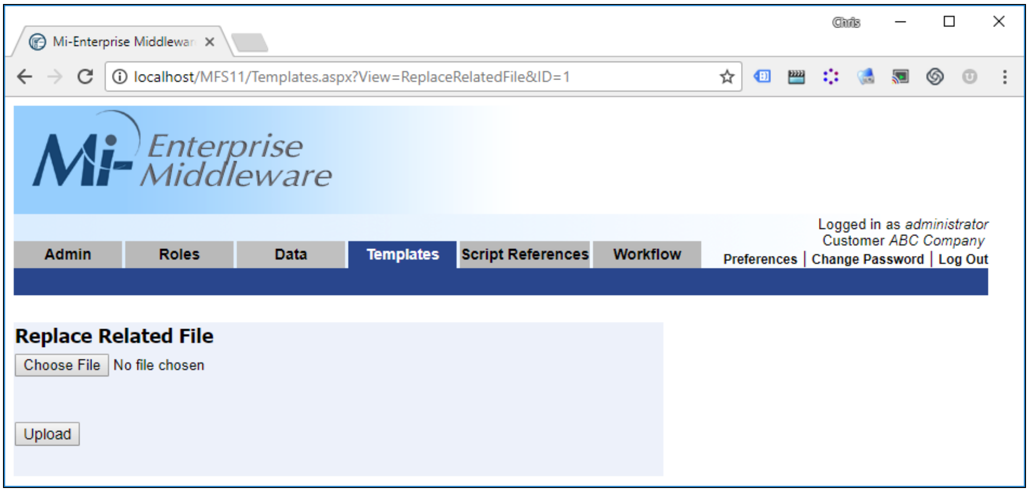


Select the file you would like to upload to the server by clicking the "Browse..." button and finding the file file you wish to upload. Then click the "Upload" button to upload the related file to the server and associate it with this template.

If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the modify template page.

4.6.6.2 Replacing a Related File

To replace a related file, click on the link "Replace..." on the same line as the related file you wish to replace. You will be presented with a screen that looks like this:

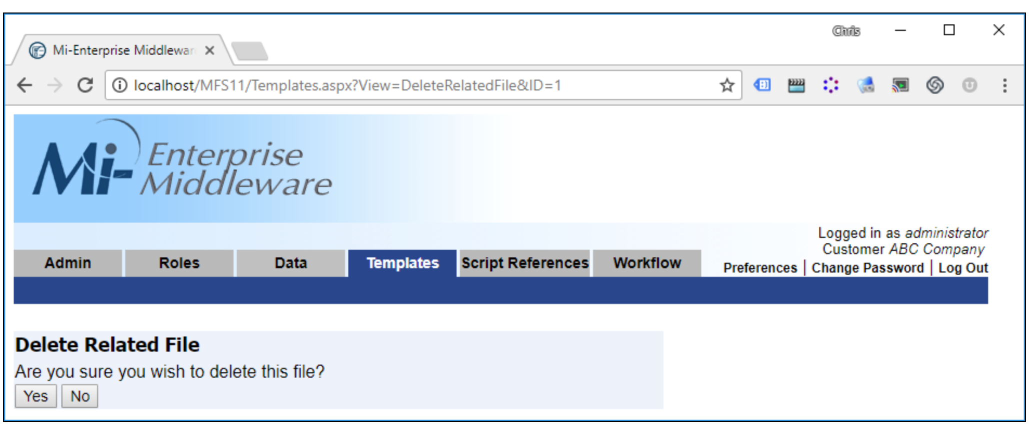


Select the file you would like to upload to the server by clicking the "Browse..." button and finding the file file you wish to upload. Then click the "Upload" button to upload the related file to the server and associate it with this template, replacing the previous file. It is not necessary that the name of the file be the same as the previous one uploaded.

If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the modify template page.

4.6.6.3 Deleting a Related File

To delete a related file, click on the link "Delete..." on the same line as the related file you wish to delete. You will be presented with a screen that looks like this:



To confirm this deletion, click on the "Yes" button. If you change your mind, click on the "No" button. Upon deletion you will be redirected back to the modify template page.

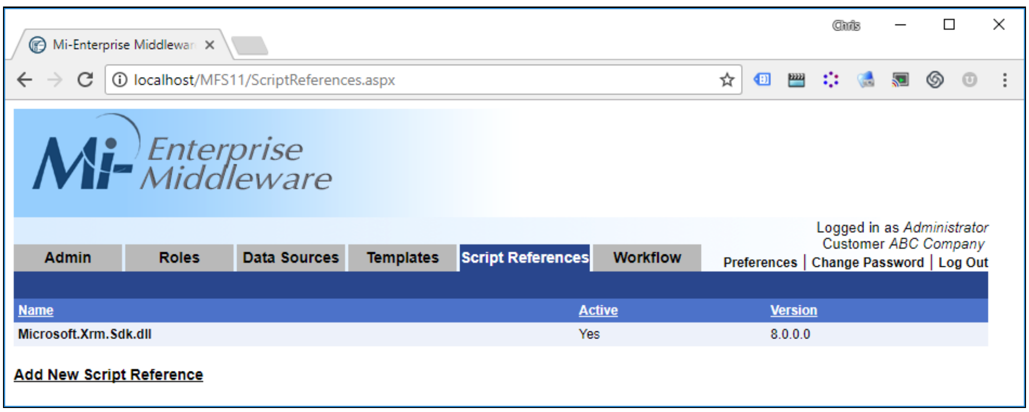
4.7 Script Reference Management

Script References are .NET assemblies (.dlls) that are provided to the designer and form processing engine as needed. The administration screen allows for the configuration of new script references and the configuring of previously existing script references.

To access script reference administration for a specific customer, click on the "Script References" tab or go directly to the URL:
http://[SERVER]/MFS/ScriptReferences.aspx
Where:
[SERVER] is the name of your server

Note that this page is only accessible to users with the Administrator privilege.

You will be presented with a screen that looks like this:



The columns displayed on this page are as follows:

- **Name** − The unique name of the script reference
- **Active** − A yes/no value that indicates whether or not the script reference is available for use by the Designer and processing engine
- **Version** − The version of the script reference

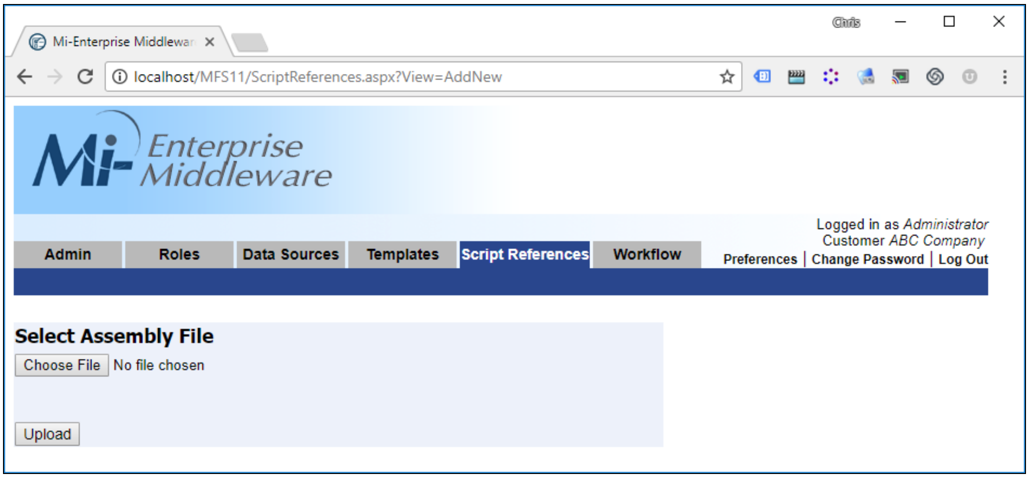
You may sort the list of script references by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this page you can perform the following tasks:

- Add a New Script Reference
- Modify an Existing Script Reference

4.7.1 Adding a Script Reference

Clicking the "Add New Script Reference..." button from the script reference administration page will present you with a screen that looks like this:

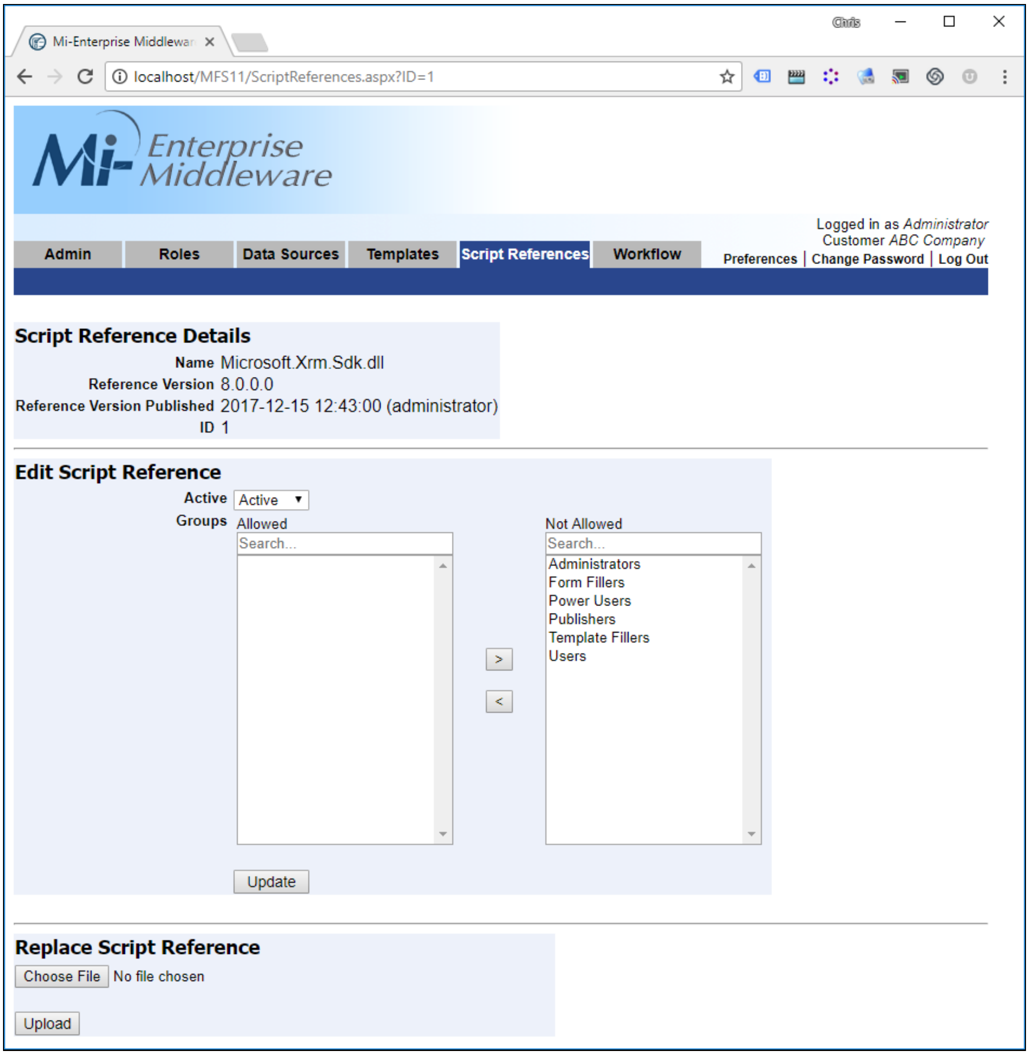


Select the template you would like to upload to the server by clicking the "Browse..." button and finding the assembly file (.dll) you wish to upload. Then click the "Upload" button to upload the script reference to the server.

If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the script reference administration page.

4.7.2 Modifying an Existing Script Reference

Clicking on the name of any of the displayed script reference will let you modify that script reference by taking you to a page that looks like this:



4.7.2.1 Script Reference Details

This area of the page displays non−modifiable details about the data source as follows:

- **Name** − The unique name of the script reference
- **Reference Version** − The version of the script reference
- **Reference Version Published** − The date and time on which the script reference was uploaded and who uploaded it
- **ID** − An internal ID of the script reference used for diagnostics

Groups
Groups listed in the Allowed listbox will have access to the data source while groups listed in the Not Allowed listbox will not have access to the data source. To move a group from one listbox to the other, select it and then use the "<" and ">" buttons. Hold the Ctrl key to select multiple groups in either listbox. Note that the permissions to the data source will correspond to the privileges associated with the group(s) allowed for the data source. For instance, groups with only "Replication Reader" permission will be able to query data from the data source, but not update it. Note that the "Search" boxes may be used to filter the group lists.

Replace Script Reference

If you wish to replace the script reference with a different one you have on your local machine, you can click the "Browse" button, locate your template file, and then click "Replace" to upload the new version.

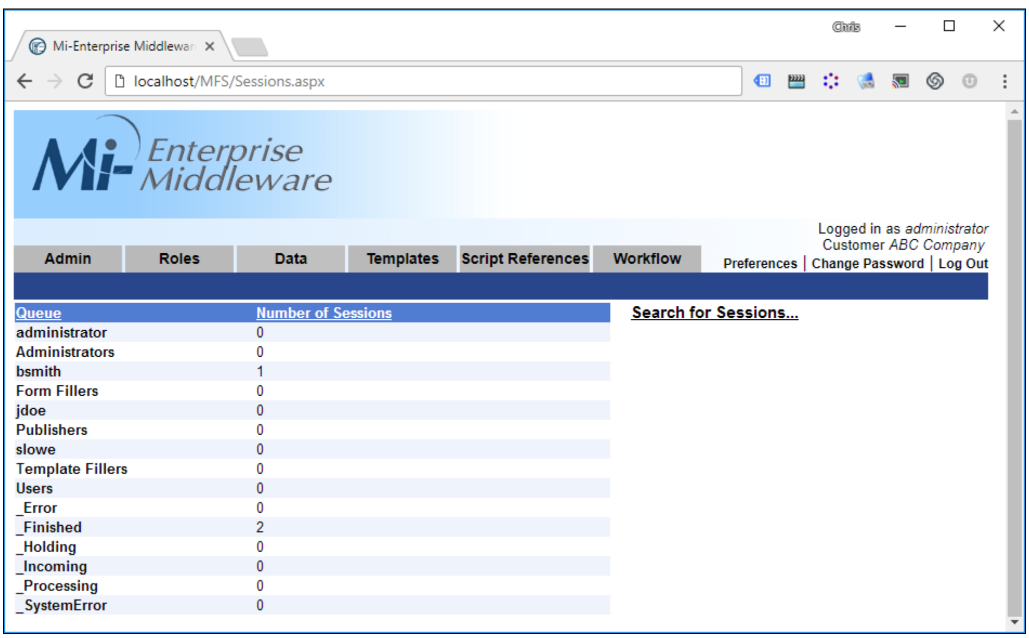
If any errors occur during upload, you will be prompted on this page. Otherwise, you will be redirected back to the script reference administration page.

4.8 Session Management

To access session administration for a specific customer, click on the "Workflow" tab, then click on the "Sessions" link or go directly to the URL:
http://[SERVER]/MFS/Sessions.aspx
Where:
[SERVER] is the name of your server

Note that while this page is accessible to all users, the information displayed will be different depending on what groups the user is assigned to and what privileges those groups have been given.

You will be presented with a page that looks like this:



The columns displayed on this page are as follows:

- **Queue** − The name of the queue
- **Number of Sessions** − The number of sessions currently residing in that queue

Each user and each group has a queue. A given session may exist only inside of a single queue. For a user without administrative privileges, the queues displayed correspond to the groups that user is a member of, as well as the user's own queue, and the System queues below. Users with the administrator privilege will see all queues for all groups and all users belonging to this customer.

Note, users will also see a few other system queues. These all begin with a "_" and do not correspond to a group or a user. These are as follows:

- **_Error** − Contains sessions that have encountered an error such as export failure during processing
- **_Finished** − Contains inactive sessions for which all data has been exported
- **_Holding** − Contains sessions that have been uploaded, but for which the upload has not been confirmed by the client
- **_Incoming** − Contains sessions that have been uploaded, but have yet to be processed by the server
- **_Processing** − Contains sessions that are currently being processed by the server
- **_SystemError** − Contains sessions that have encountered internal system errors during processing

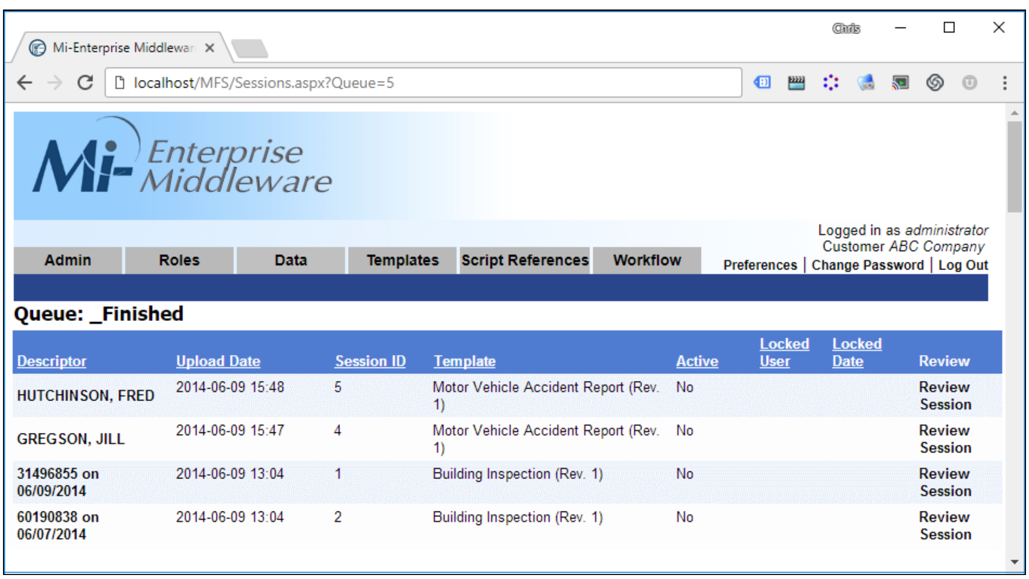
You may sort the list of queues by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this page you can perform the following task:

- View Sessions in a Specific Queue
- Searching for Sessions

4.8.1 View Sessions in a Specific Queue

Clicking on a queue name in the list of queues will let you view the sessions that currently reside in that queue. When you do so, you will see a page that looks like this:



The columns displayed on this page are as follows:

- **Descriptor** − The session's descriptor value as setup by the designer and the data entered
- **Upload Date** − The most recent date on which the session was uploaded to the server
- **Session ID** − A number that uniquely identifies the session
- **Template** − The template name and revision the session corresponds to
- **Active** − A Yes/No value indicating whether the session is active. A session is marked Inactive after its data has been exported.

- **Locked User** − If a user is going to make changes to a session on their client, they will lock it. This means that only they can upload changes to the session. If the session is locked, the username of the user that locked it will appear here, otherwise it will be blank.
- **Locked Date** − The date on which the session was locked by the Locked User
- **Wait to process until** − The _Incoming and _Processing queues will have this column. Wait to process until indicates the date and time after which the session will begin processing if it is in the _Incoming queue. If it is in the _Processing queue, this value indicates when it started processing.
- **Review** − The "Review Session" link will start a download of an "MFR" (Mi−Enterprise Middleware Read−Only) session file which can be opened but not modified in the Mi−Enterprise Middleware Client.
- **Edit Data** − The "Edit Data" link will allow a user to edit data in this session as a webform

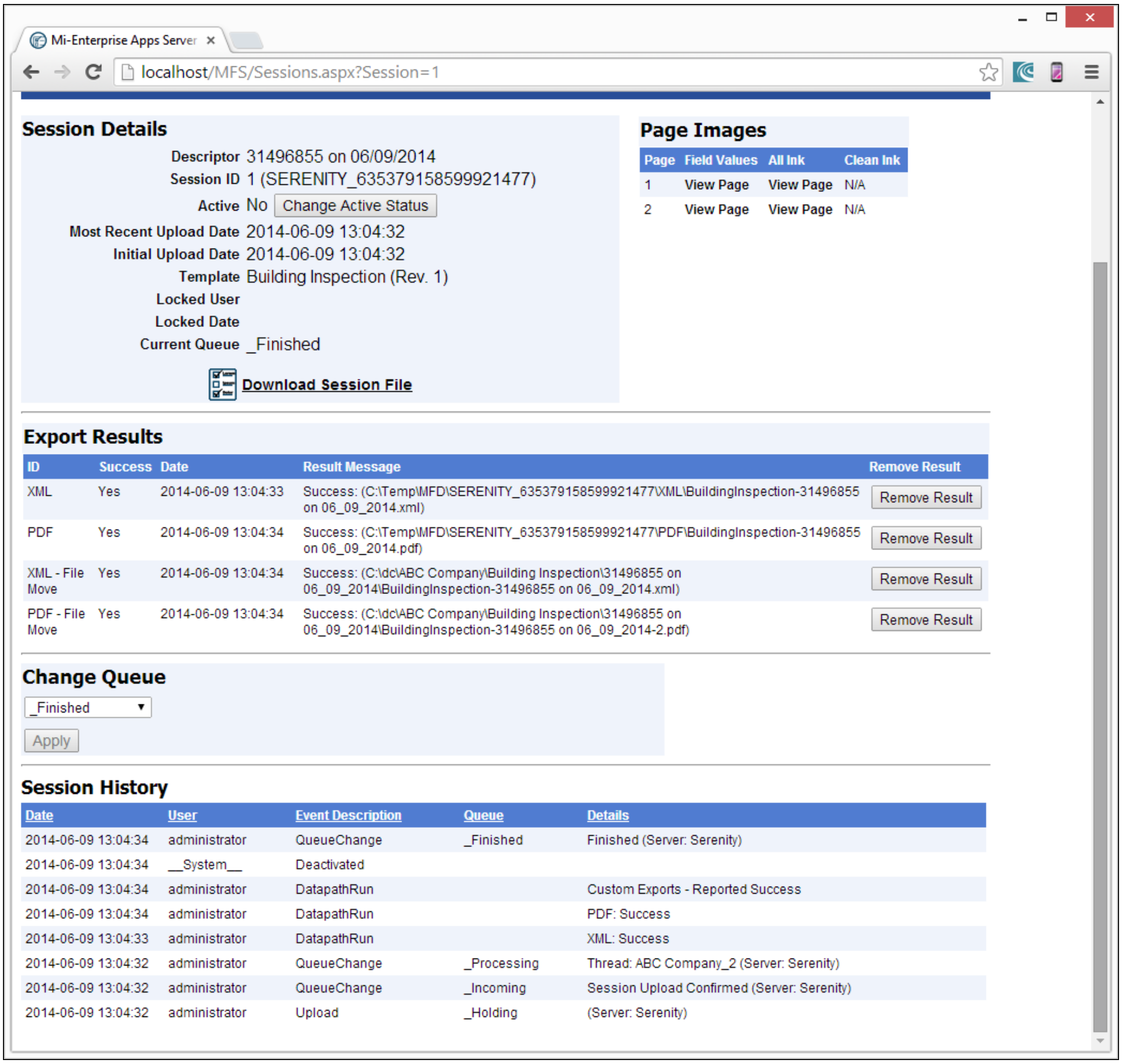
You may sort the list of sessions by clicking on any of the column headers. Clicking on the same column a second time will reverse the sort order.

From this page you can perform the following task:

- View a Specific Session

4.8.1.1 View a Session

Clicking on a session's descriptor in the list of sessions will let you view and modify that session. When you do so, you will see a page that looks like this:



4.8.1.2 Session Details

The Session Details section displays information about the session. The fields displayed are as follows:

- **Descriptor** − The session's descriptor value as setup by the designer and the data entered
- **Session ID** − A number that uniquely identifies the session followed by a string in parentheses that identifies the session to client applications.
- **Active** − A Yes/No string that indicates if the session is active. Users with administrative privileges will also see a button labeled "Change Active Status". Clicking this button allows an administrative user to indicate that the data exports on this session are no longer needed and mark it inactive. Alternatively, if the data needs to be re−exported, the user can mark an Inactive session as Active. Note that these are not tasks that are commonly needed and should be used only when required.
- **Most Recent Upload Date** − The date the session was most recently updated to the server
- **Initial Upload Date** − The date the session was first uploaded to the server
- **Template** − The template name and revision the session corresponds to
- **Locked User** − If a user is going to make changes to a session on their client, they will lock it. This means that only they can upload changes to the session. If the session is locked, the username of the user that locked it will appear here, otherwise it will be blank. Users with

administrative privileges will also see a button labeled "Force Unlock". Clicking this button will force a session to no longer be locked by a specific user and will allow other users to upload changes to the session. Note that this should only be used if the locked user can no longer upload their changes to this session for some reason.
- **Locked Data** − The date on which the session was locked by the Locked User
- **Current Queue** − The queue in which the session currently resides

Below these fields, there is a link "Download Session File" that allows you to download a read−only version of the session. This can then be viewed in another application that is capable of viewing session files.

4.8.1.3 Page Images

This section provides links to images of all pages. The grid displays a row per page in the template and either has a link entitled "View Page" if the specific rendered view is available, or else the text "N/A" if it is not. Please see the section below for details about viewing a specific page image:

- Viewing a Page Image

4.8.1.4 Export Results

This section provides details about exports that have taken place for the session since it was uploaded to the server. The columns are as follows:

- **ID** − The ID of the export. If the export was the result of a datapath, this will be set to the name of the datapath. If it was a customer export, it will be the ID used to record the export result in script.
- **Success** − Set to yes if the export was successful, no otherwise
- **Date** − The date the export was attempted
- **Result Message** − The result of the export. If there was a failure, this result will indicate failure details. If there was a success, the exported filename(s) may appear here.
- **Remove Result** − If the logged in user is an administrator, each row will have a "Remove Result" button. Clicking this button will reset the export result such that the session may be reprocessed and run this export again.

4.8.1.5 Change Queue

The change queue section allows you to manually change the queue in which the session resides. Only queues that belong to groups of which you are a member as well as your own queue will be visible in the list of available queues. Note that, users with administrative privileges will see all available queues.
If Change Queue is set to "_Incoming", a "Wait to process until" date and time will become available.

Once you have chosen a new queue, click the "Apply" button to move the session.

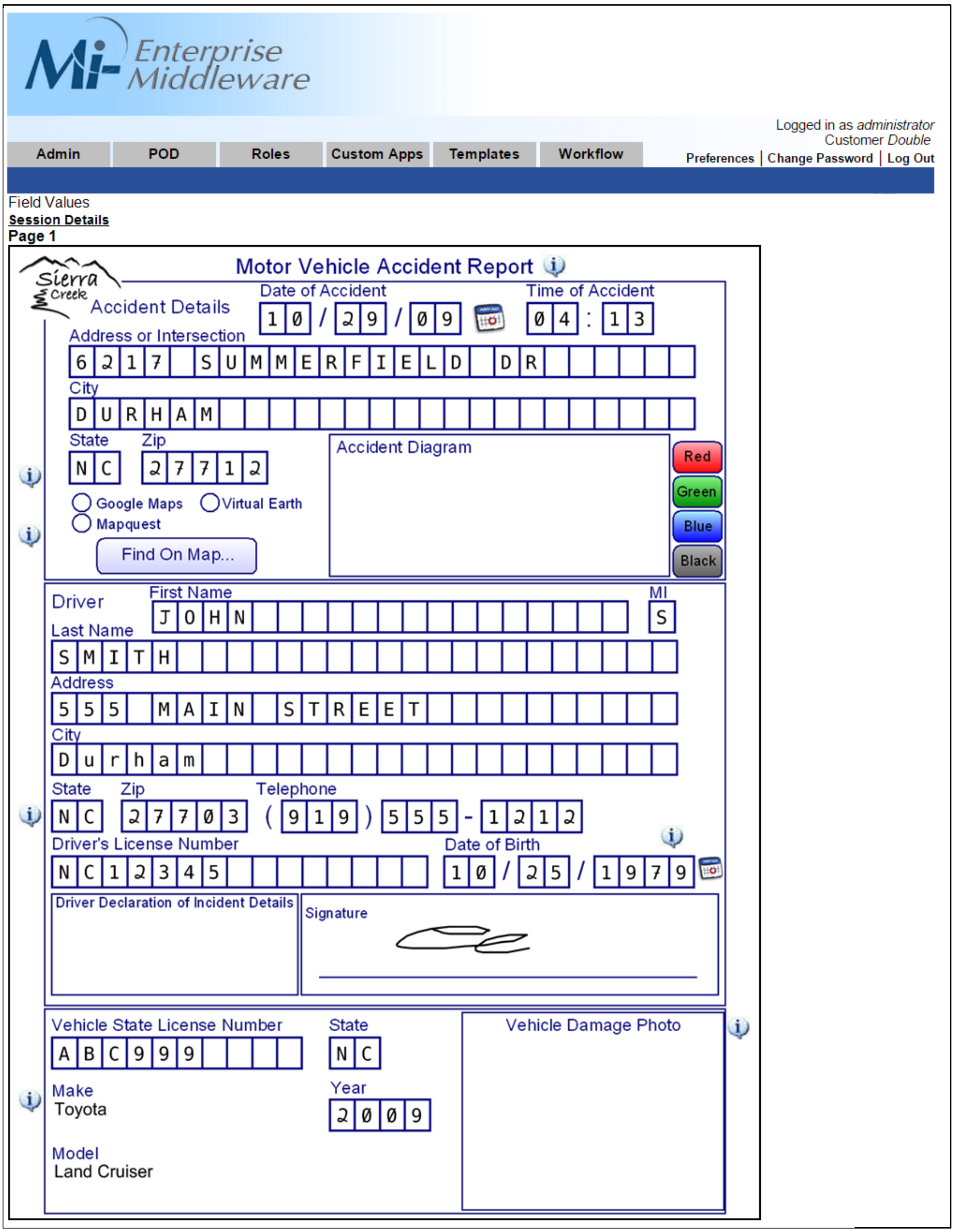
4.8.1.6 Session History

The session history section allows you to see a detailed history of events that have happened to this session as it has traveled through the server. Events include session uploads, queue changes, data exports, and errors. The fields displayed for each history event are as follows:

- **Date** − The date on which the event occurred
- **User** − The user that triggered the event
- **Event Description** − A short description of what the event was
- **Queue** − If applicable, the queue in which the session was in when the event occurred
- **Details** − Extra information applicable to the event

4.8.1.7 Viewing a Session's Page Image

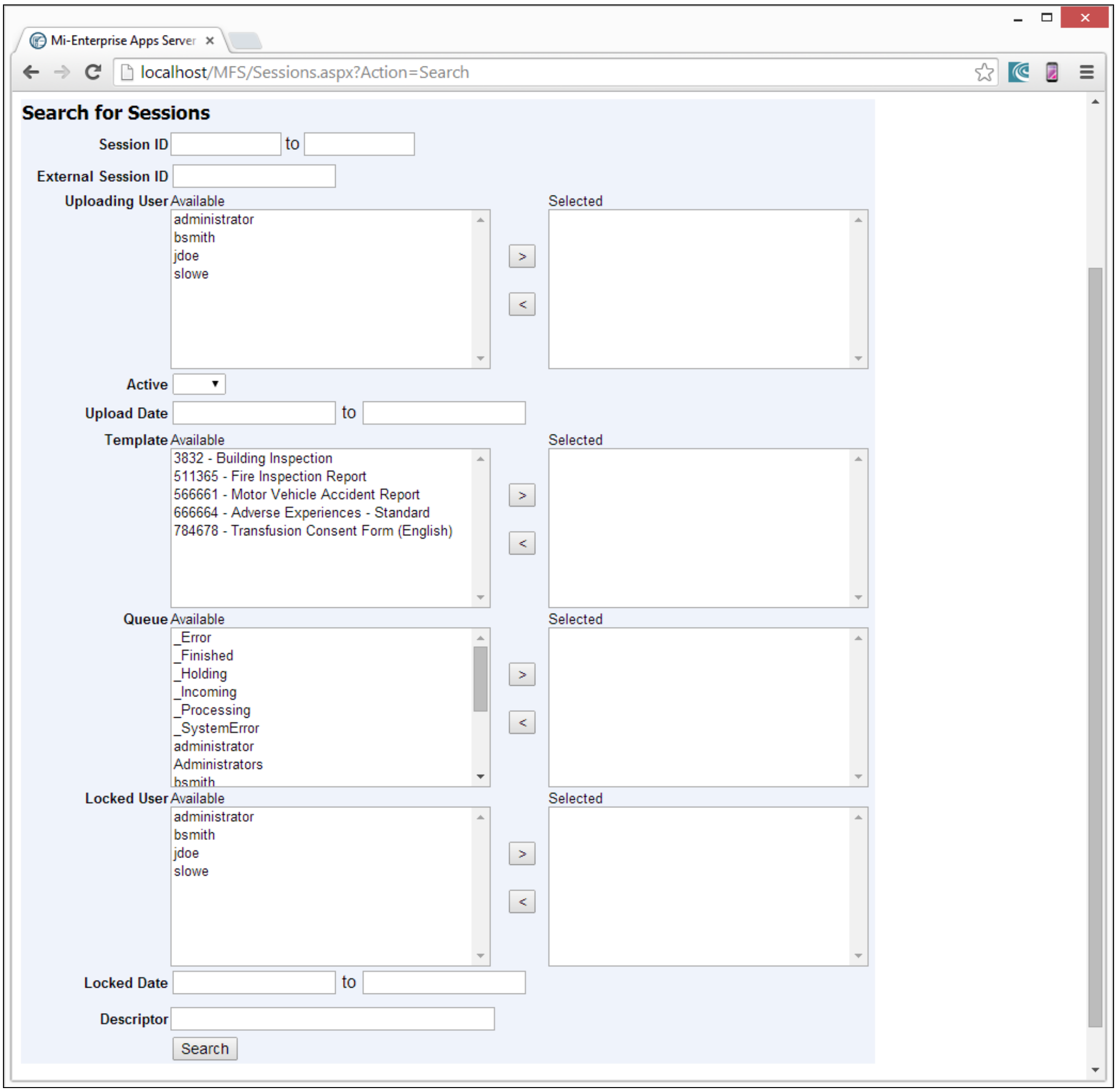
Clicking on the "View Image" link for a specific page of a specific session will let you view that image rendering by displaying a page that looks like this:



Across the top links exist that will return you to the session's details or take you to another page's image.

4.8.2 Searching for Sessions

Clicking on the "Search for Sessions..." link will display a page that looks like this:

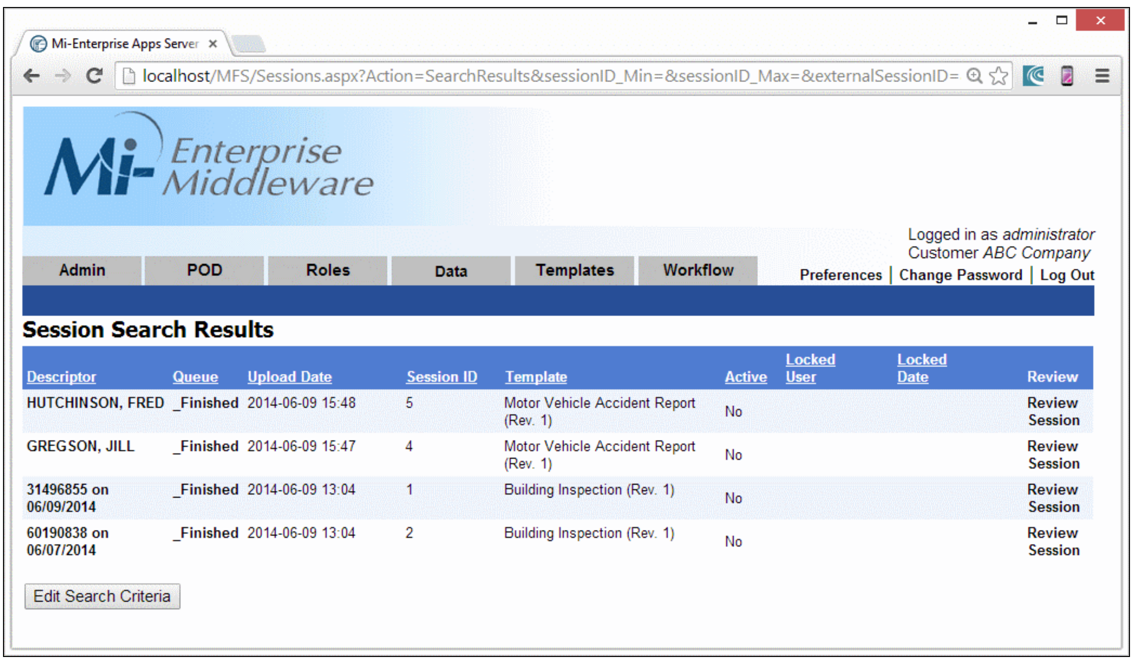


In each field, specify the criteria of sessions you wish to search for. The critiera are "anded" together, such that only sessions matching all of the specified search criteria will be displayed. Any field left blank will not affect the search results. The fields operate as follows:

- **Session ID** − Specify a range of server−based numeric session IDs. The first number must be less than the second number or you will be prompted with an error.
- **External Session ID** − Specify an external session ID. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all sessions with an external session ID beginning with "ABC"
- **Uploading User** − Sessions uploaded by users in the "Selected" listbox will be found. Select a user in either listbox and then use the "<" and ">" buttons to move them.
- **Active** − Choose "Yes" to search for only active sessions or "No" for only inactive sessions.

- **Upload Date** − Specify a date range for the session's initial upload. The date in the first box must be chronologically less than the date in the second box or an error will appear.
- **Template** − Sessions created from templates in the "Selected" listbox will be found. Select a template in either listbox and then use the "<" and ">" buttons to move them.
- **Queue** − Sessions currently in the "Selected" listbox will be found. Select a queue in either listbox and then use the "<" and ">" buttons to move them.
- **Locked User** − Sessions currently locked by users in the "Selected" listbox will be found. Select a user in either listbox and then use the "<" and ">" buttons to move them.
- **Locked Date** − Specify a date range for the session's lock. The date in the first box must be chronologically less than the date in the second box or an error will appear.
- **Descriptor** − Specify a descriptor. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all sessions with a descriptor beginning with "ABC".

After specifying search critera, press the "Search" button. If any sessions match the criteria specified, a list of them will appear such as shown below:



Clicking on the descriptor of any listed session will display its details. Clicking on the queue of any listed session will display all sessions in that queue.

Clicking on the "Edit Search Criteria" button will return you to the search screen with the previously entered criteria pre−filled.

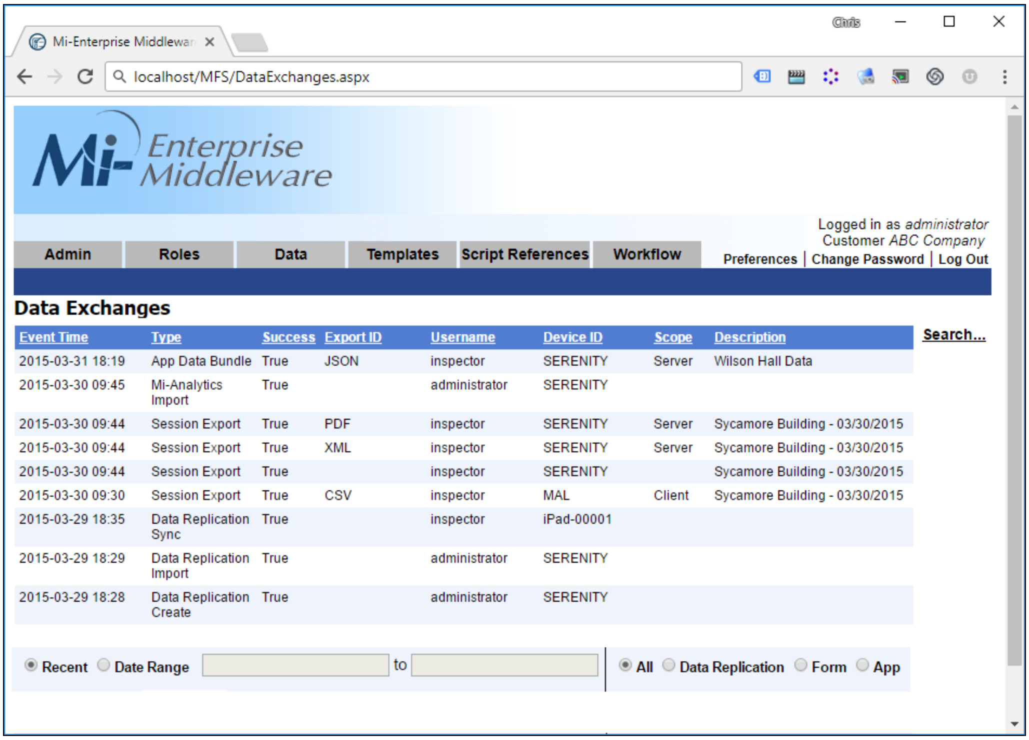
4.9 Data Exchange Dashboard

A data exchange is the movement of data from one system to another through the Mi−Enterprise Middleware. The data exchange dashboard is a place where customer administrators may quickly determine how data has been flowing through the system and may search for specific exchanges of data.

To access data exchange dashboard for a specific customer, click on the "Workflow" tab, then click on the "Data Exchanges" link or go directly to the URL:
http://[SERVER]/MFS/DataExchanges.aspx

Where:
[SERVER] is the name of your server

You will be presented with a page that looks like this:



The columns displayed on this page are as follows:

- **Event Time** − The date &time a data exchange occurred
- **Type** − The type of data exchange that occurred
- **Success** − Whether the data exchange was successful or not
- **Export ID** − The ID of the export if applicable
- **Username** − The user that triggered the data exchange
- **Device ID** − The ID of the device performing the data exchange
- **Scope** − The scope of the data exchange if applicable
- **Description** − The descriptor of the session or the description of the app data bundle related to the data exchange

Each row in the dashboard indicates the flow of data from one system to another through Mi−Enterprise Middleware. The most common exchanges are likely to be Session Exports and Data Replication related, but a complete list of supported data exchange events is as follows:

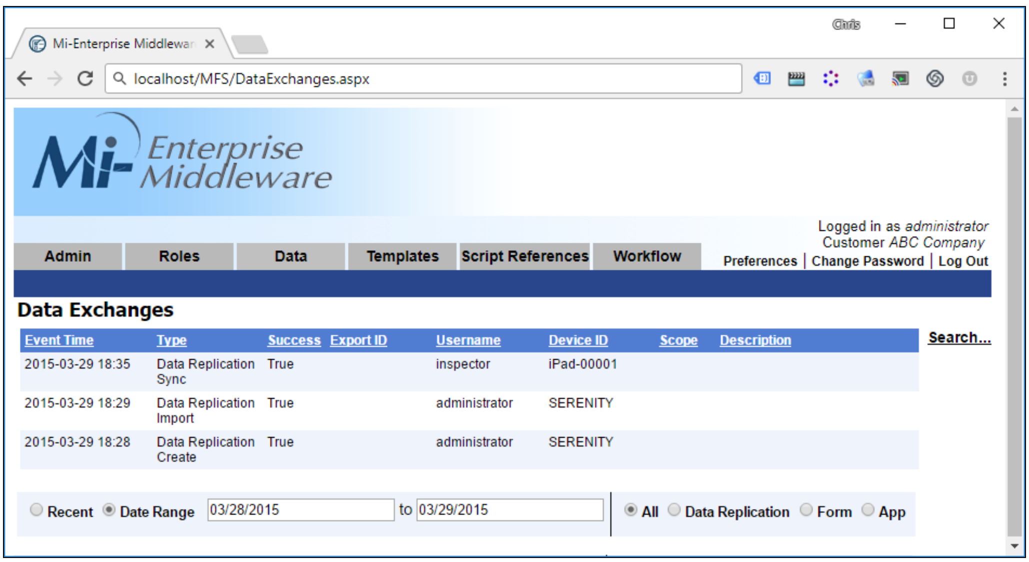
- **Session Export** − The export of data from a form session either on the client or server
- **App Data Bundle** − The export of data from an app data bundle to another system
- **Data Replication Create** − A resource was created on the DRS instance
- **Data Replication Import** − A resource's data was updated on the DRS instance
- **Data Replication Sync** − A client device synchronized a resource from the DRS instance
- **Data Replication Delete** − A resource was deleted on the DRS instance
- **Mi−Analytics Import** − Mi−Analytics imported data exported from Mi−Enterprise Middleware

4.9.1 Filtering

By default the most recent data exchanges are displayed. The number of data exchanges that are considered recent is configurable in the User Preferences interface. To change this, use the filter at the bottom as follows:

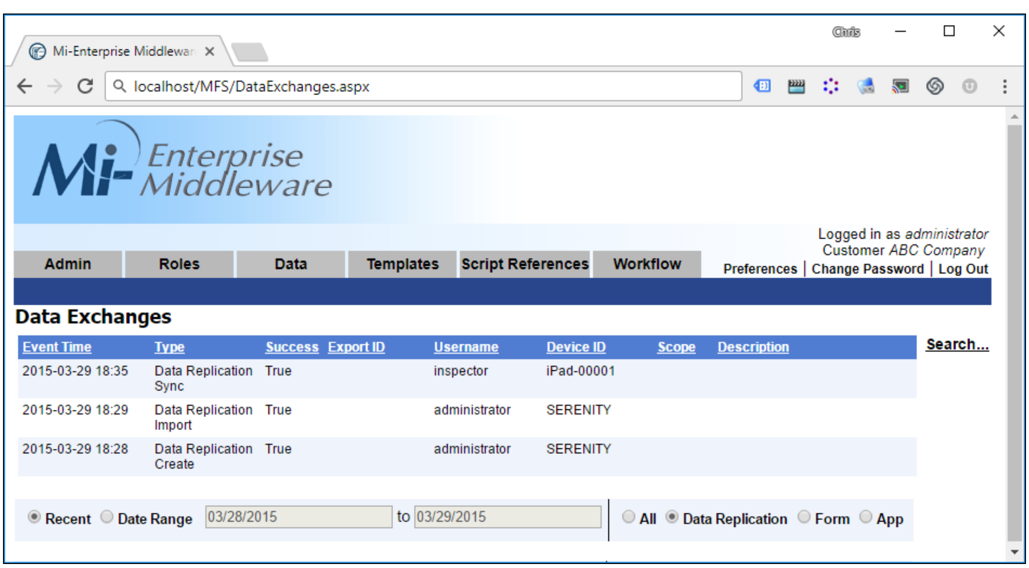
4.9.1.1 Date Range

If dates are specified in the date range filter, then only data exchanges that occurred between that range will be shown as seen below:



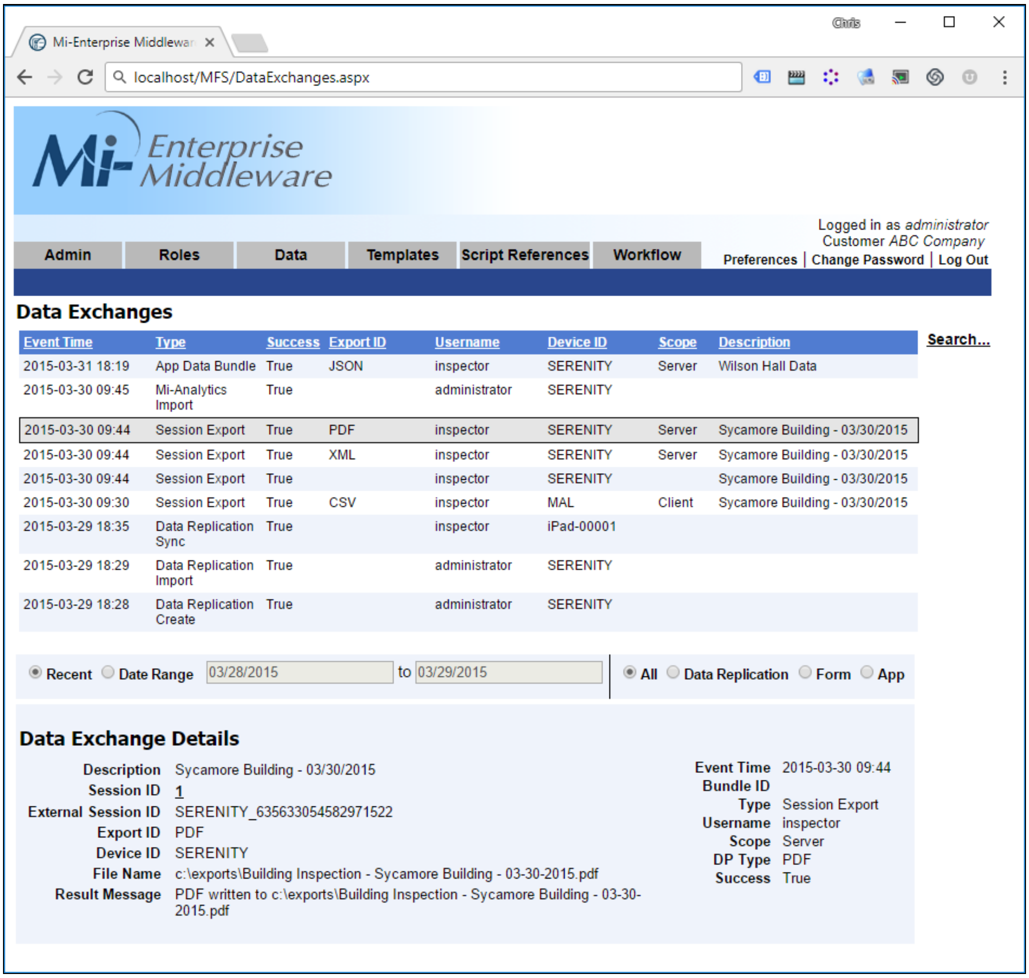
4.9.1.2 Exchange Type

If the radio button to the right of the date range is used, only specific data exchange types will be visible. The screenshot below shows a filter for only Data Replication events as an example:



4.9.2 Data Exchange Details

Clicking on a data exchange row will provide a details panel for that exchange as shown below:



The fields listed in the details of each data exchange are as follow:

- **Description** − The descriptor of the session or the description of the app data bundle related to the data exchange
- **Session ID** − The ID (as a link) to the session that produced the data exchange if applicable
- **External Session ID** − The ID of the session generated on the client device if applicable
- **Export ID** − The ID of the export if applicable
- **Device ID** − The ID of the device performing the data exchange
- **File Name** − The name of the file that was imported or exported in the case of a session export or app data bundle export, or the name of the resource that was created, updated or deleted in the case of a data replication data exchange
- **Result Message** − A message that was recorded at the time of data exchange if applicable
- **Event Time** − The date &time a data exchange occurred
- **Bundle ID** − The ID (as a link) to the app data bundle that produced the data exchange if applicable
- **Type** − The type of data exchange that occurred
- **Username** − The user that triggered the data exchange
- **Scope** − The scope of the data exchange if applicable

- **DP Type** − The type of datapath that was exported if the data exchange corresponds to a session datapath export
- **Success** − Whether the data exchange was successful or not

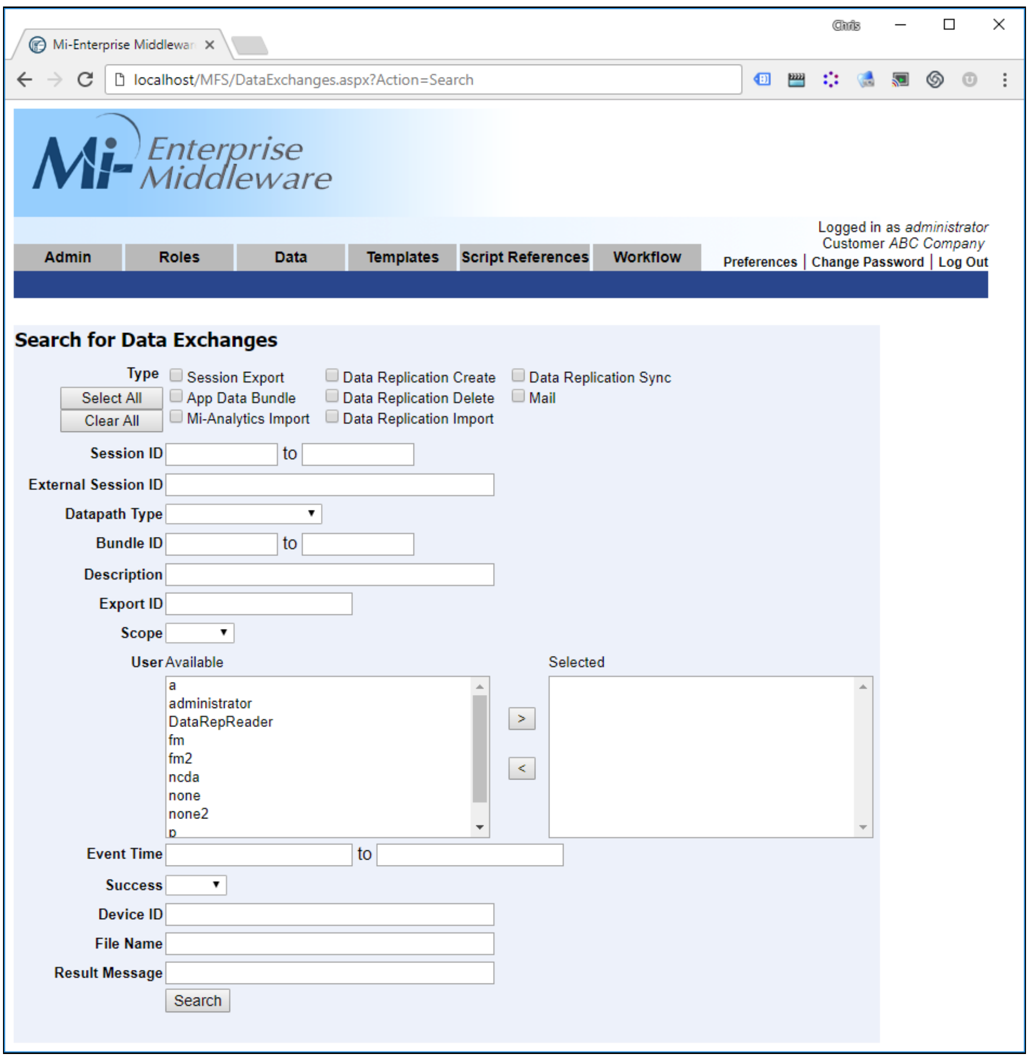
4.9.2.1 Additional Actions

From this page you can perform the following task:

- Searching for Data Exchange Events

4.9.3 Searching for Data Exchange Events

Clicking on the "Search..." link will display a page that looks like this:

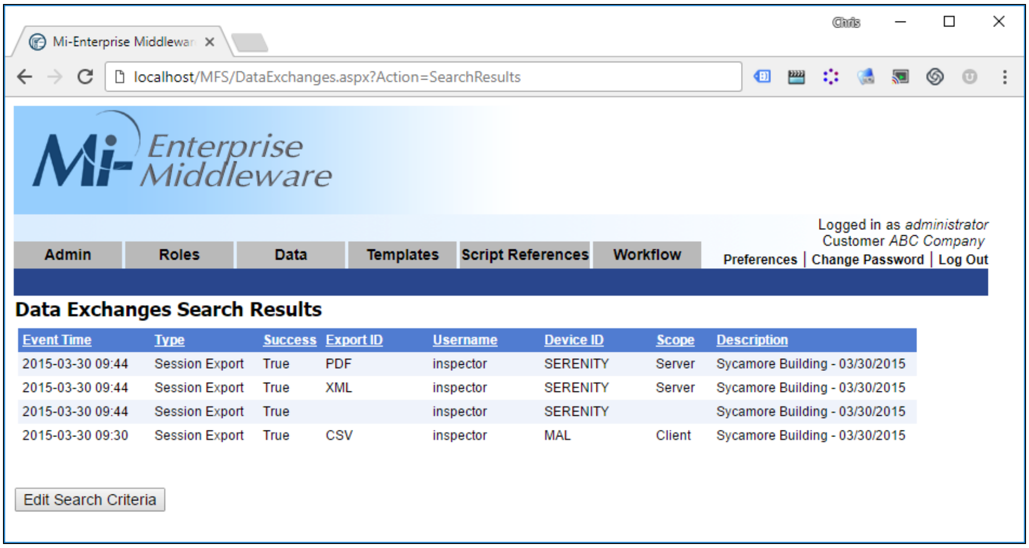


In each field, specify the criteria of data exchange events you wish to search for. The critiera are "anded" together, such that only sessions matching all of the specified search criteria will be displayed. Any field left blank will not affect the search results. The fields operate as follows:

- **Type** − Specifies which type(s) of data exchange events you wish to find. Selecting items in this list will enable or disable other potential search critieria depending on whether the criteria are applicable for a given exchange type. Using the "Select All" and "Clear All" buttons will either select or clear all types respectively.

- **Session ID** − If searching for data exchanges associated with a session, specify a range of server−based numeric session IDs. The first number must be less than the second number or you will be prompted with an error.
- **External Session ID** − Specify an external session ID. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all sessions with an external session ID beginning with "ABC"
- **Datapath Type** − If searching for data exchanges associated with data export from a datapath, specify a type of datapath for which to search.
- **Bundle ID** − If searching for data exchanges associated with an app data bundle, specify a range of server−based numeric session IDs. The first number must be less than the second number or you will be prompted with an error.
- **Description** − If searching for a data exchange associated with a session or an app data bundle, specify a description that corresponds to the session's descriptor or the bundle's description. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all sessions with a descriptor beginning with "ABC".
- **Export ID** − If searching for data exchanges associated with a session or app data bundle, specify arange of server−based numeric session IDs. The first number must be less than the second number or you will be prompted with an error. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all data exchanges with an export ID beginning with "ABC".
- **Scope** − Specifies the scope of the data exchange (Client or Server)
- **User** − Specifies the user that triggered the data exchange. Exchanges caused by users in the "Selected" listbox will be found. Select a user in either listbox and then use the "<" and ">" buttons to move them.
- **Event Time** − Specify a date range for the data echange. The date in the first box must be chronologically less than the date in the second box or an error will appear.
- **Sucess** − Specifies whether the data exchange was successful
- **Device ID** − Specifes the ID of the device causing the data exchange. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all data exchange events with a device ID beginning with "ABC".
- **File Name** − Specifes the file name of the data exchange. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all data exchange events with a file name beginning with "ABC". Note that this field is used by Data Replication events for the resource name.
- **Result Message** − Specifes the result message of the data exchange. You may use SQL wild card syntax in this field, so for instance "ABC%" will match all data exchange events with a result message beginning with "ABC".

After specifying search critera, press the "Search" button. If any data exchange events match the criteria specified, a list of them will appear such as shown below:

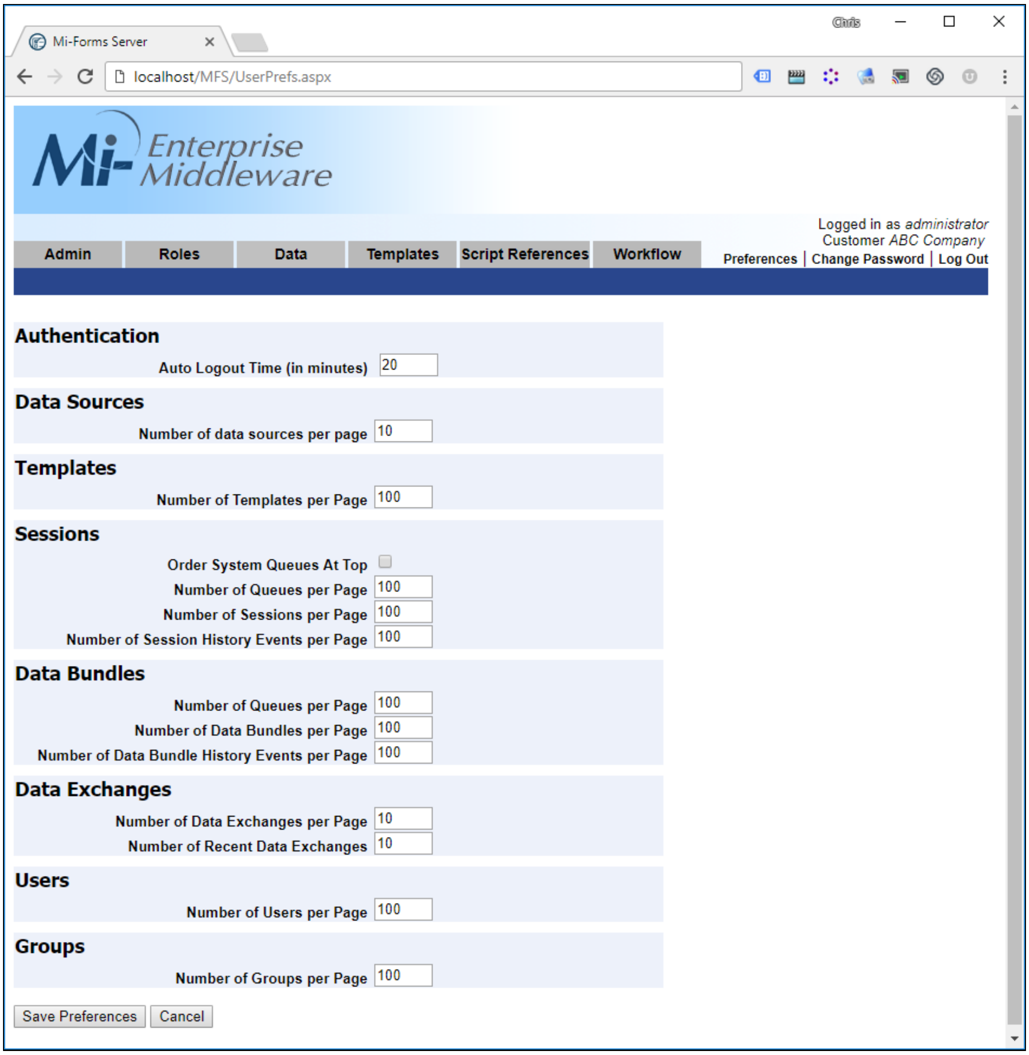


Clicking on the "Edit Search Criteria" button will return you to the search screen with the previously entered criteria pre−filled.

4.10 User Preferences

To access user preferences for a specific customer, click on the "Preferences" link or go directly to the URL:
http://[SERVER]/MFS/UserPrefs.aspx
Where:
[SERVER] is the name of your server

Each user has a set of preferences stored on the server that customizes their web interface experience. This page will look similar to the following although some items may be disabled depending upon the user's group privileges:



From here, these preferences can be setup as needed. The description of each is listed below:

4.10.1 Authentication

- **Auto Logout** − The amount of time (in minutes) before the user is logged out of the web interface and redirected to the login screen. Note that this is an inactivity timeout, meaning that the user will only be logged out if they stop taking actions in the web interface.

4.10.2 Data Sources

- **Number of Data Sources per Page** − When viewing a list of data sources, only this number are displayed at a time. If more data sources are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.10.3 Templates

- **Number of Templates per Page** − When viewing a list of templates, only this number are displayed at a time. If more templates are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.10.4 Sessions

- **Order System Queues At Top** − If checked, all system queues (queues with names beginning with "_") will be ordered at the top of lists, otherwise they will be ordered at the bottom of lists.
- **Number of Queues per Page** − When viewing a list of queues, only this number are displayed at a time. If more queues are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.
- **Number of Sessions per Page** − When viewing a list of sessions, only this number are displayed at a time. If more sessions are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.
- **Number of Session History Events per Page** − When viewing a session's history, only this number of events are displayed at a time. If more events are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.10.5 Data Bundles

- **Number of Queues per Page** − When viewing a list of queues, only this number are displayed at a time. If more queues are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.
- **Number of Data Bundles per Page** − When viewing a list of sessions, only this number are displayed at a time. If more sessions are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.
- **Number of Session History Events per Page** − When viewing a session's history, only this number of events are displayed at a time. If more events are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.10.6 Data Exchanges

- **Number of Data Exchanges per Page** − When viewing a list of data exchanges, only this number are displayed at a time. If more data sources are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.
- **Number of Recent Data Exchanges** − The number of recent data exchanges displayed when viewing the data exchange page without needing to search.

4.10.7 Users

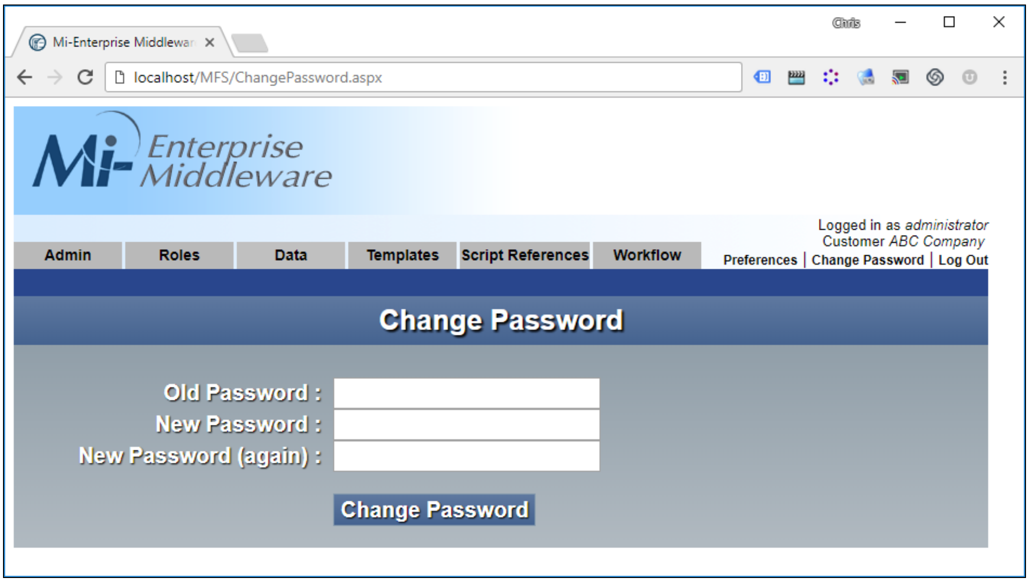
- **Number of Users per Page** When viewing a list of users, only this number are displayed at a time. If more users are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.10.8 Groups

- **Number of Groups per Page** When viewing a list of groups, only this number are displayed at a time. If more groups are available than can fit on the screen at once, then the user must click "Next" and "Previous" icons to see more than this number.

4.11 Change Password

To access form template administration for a specific customer, click on the "Change Password" link or go directly to the URL:
http://[SERVER]/MFS/ChangePassword.aspx
Where:
[SERVER] is the name of your server



This page allows the currently logged in user to change their password. You must enter your current password, and then your new password twice and then click the "Change Password" button.

4.12 Logging Out

Clicking the "Logout" link will immediately log out the currently logged in user and redirect the web browser to the login page.

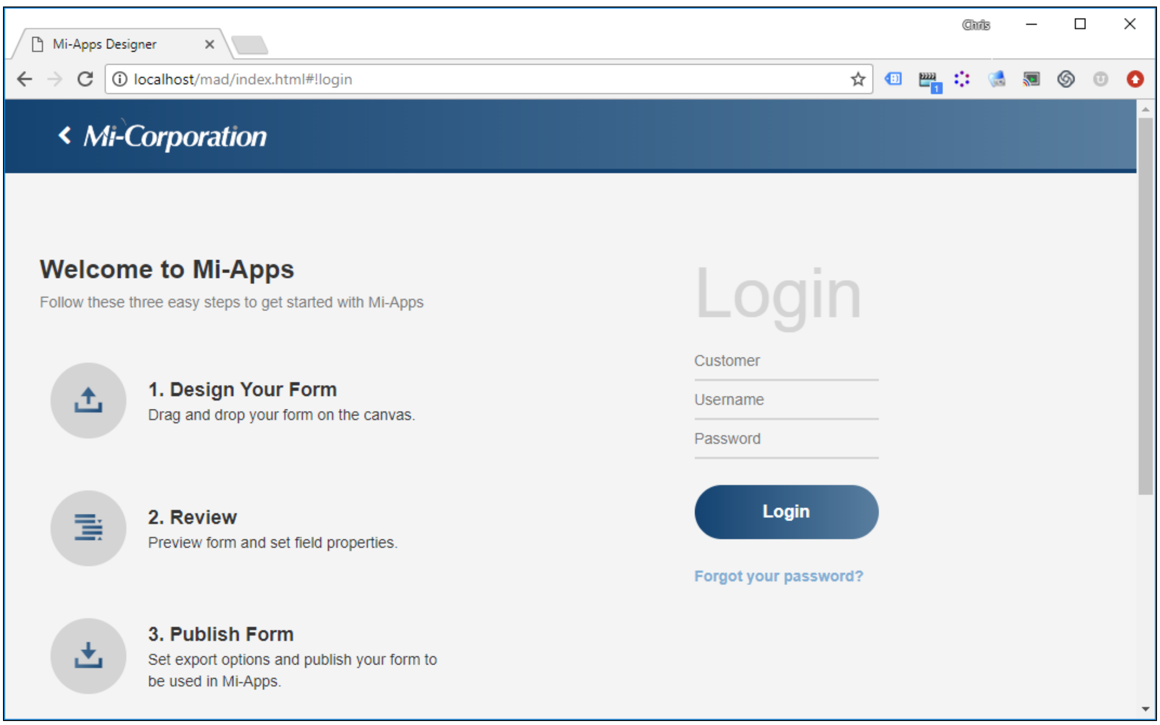
5 Next Generation Designer

The Next Generation Designer provides an interface to design apps.

5.1 Logging Into Next Generation Designer

Once a customer has been setup and a user created for that customer, it is possible to login to the Next Generation Designer. Assuming the Next Generation Designer has been configured to use "MAD" as its location, the login URL is as follows:

http://[SERVER]/MAD/start.html
Where:
[SERVER] is the name of your server



You will be prompted for a customer ID, username, and password to login to the customer account. Note that you can provide a link to users that skips the need for them to enter the Customer ID as follows:

http://[SERVER]/MAD/start.html?cust==[Customer ID]
Where:
[SERVER] is the name of your server and [Customer ID] is the name of a configured customer

Once logged in, you will see a list of apps. For full Next Generation Designer instructions, click on the "?" at the top right of the interface.

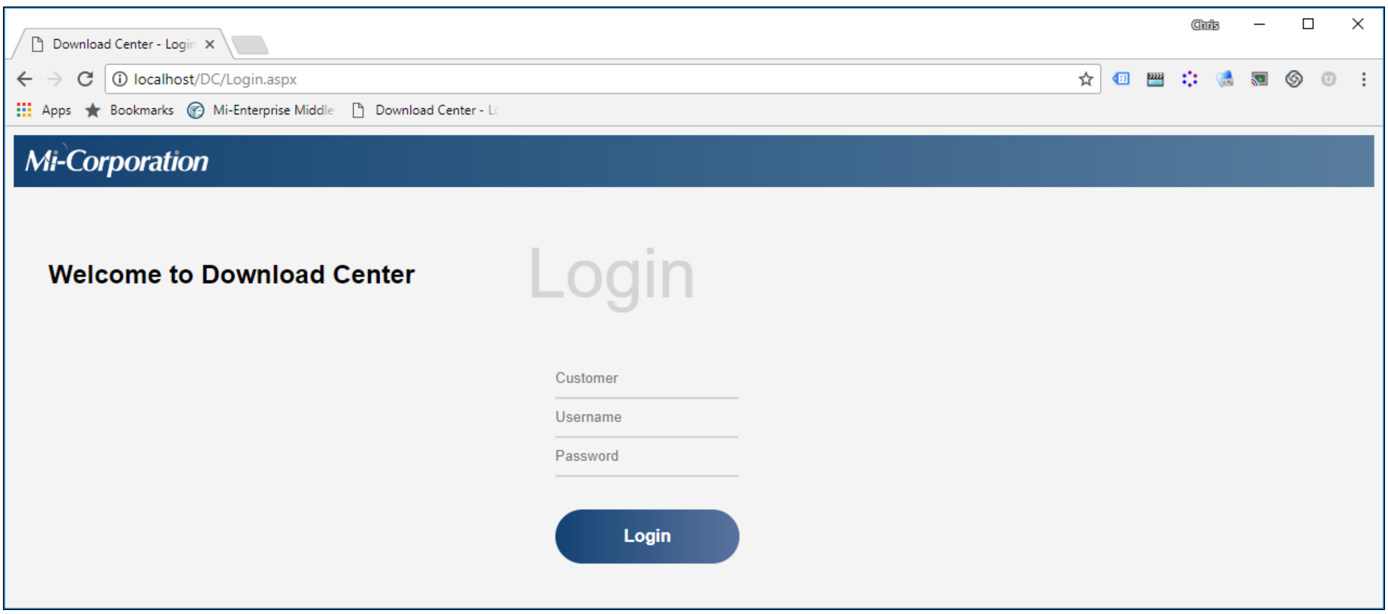
6 The Download Center

The Download Center provides an interface to locate and download files exported by forms.

6.1 Logging Into the Download Center

Once a customer has been setup and a user created for that customer, it is possible to login to the Download Center. Assuming the Download Center has been configured to use "DC" as its location, the login URL is as follows:

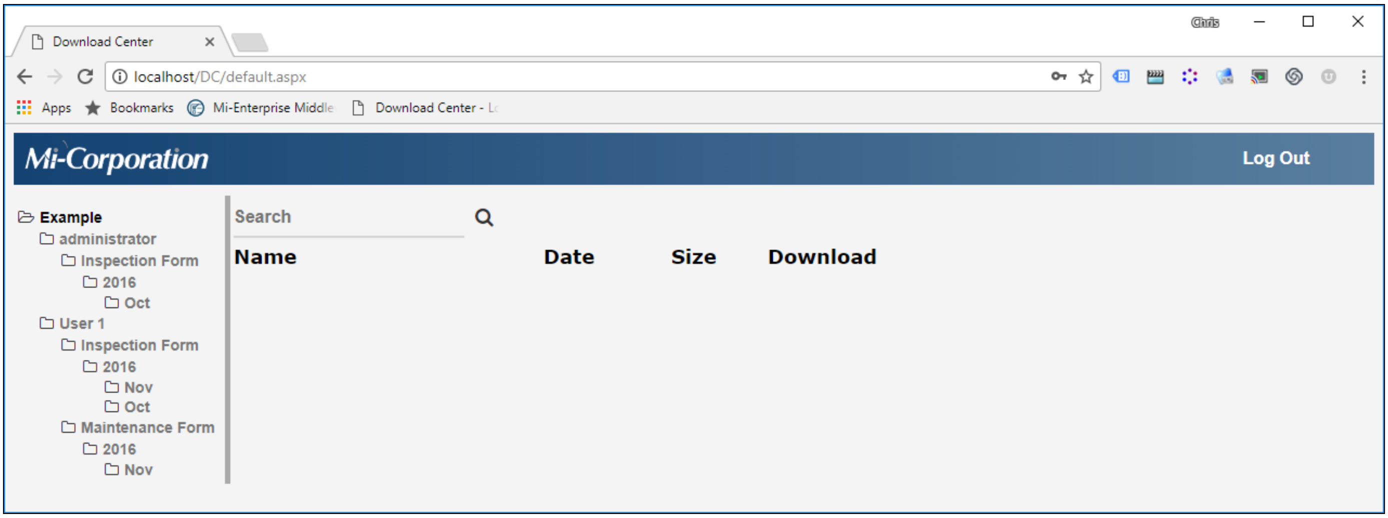
http://[SERVER]/DC/Login.aspx
Where:
[SERVER] is the name of your server



You will be prompted for a customer ID, username, and password to login to the customer account. Note that you can provide a link to users that skips the need for them to enter the Customer ID as follows:

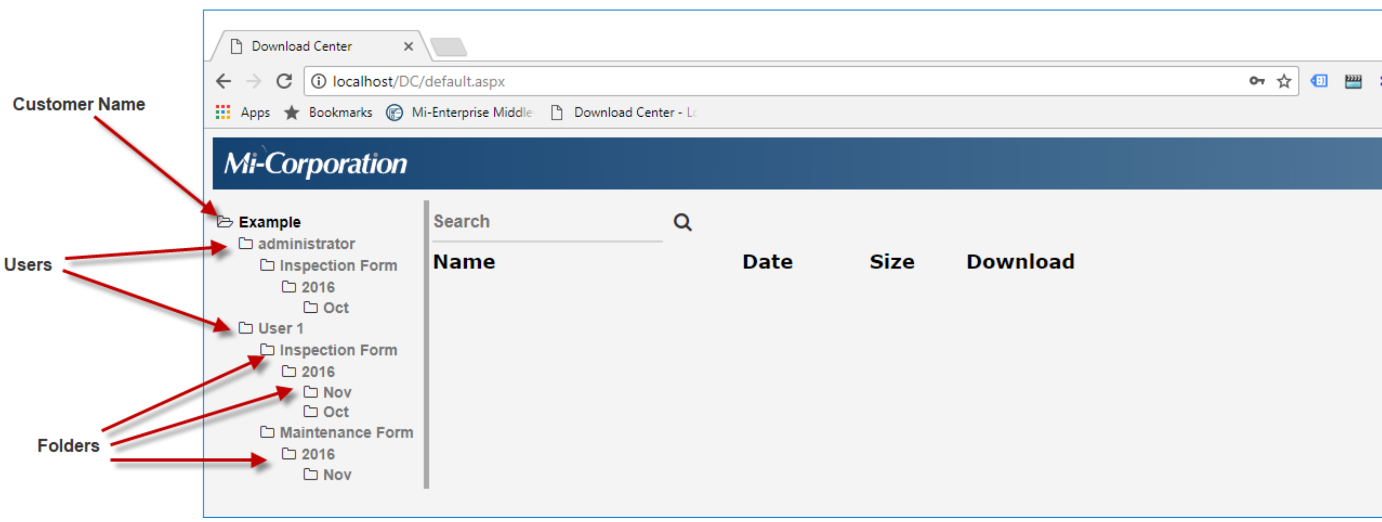
http://[SERVER]/DC/Login.aspx?Cust=[Customer ID]
Where:
[SERVER] is the name of your server and [Customer ID] is the name of a configured customer

Once logged in, you will see a page similar to the following. Note that depending on the privileges of the user you are logging in as:



6.2 Download Center Interface

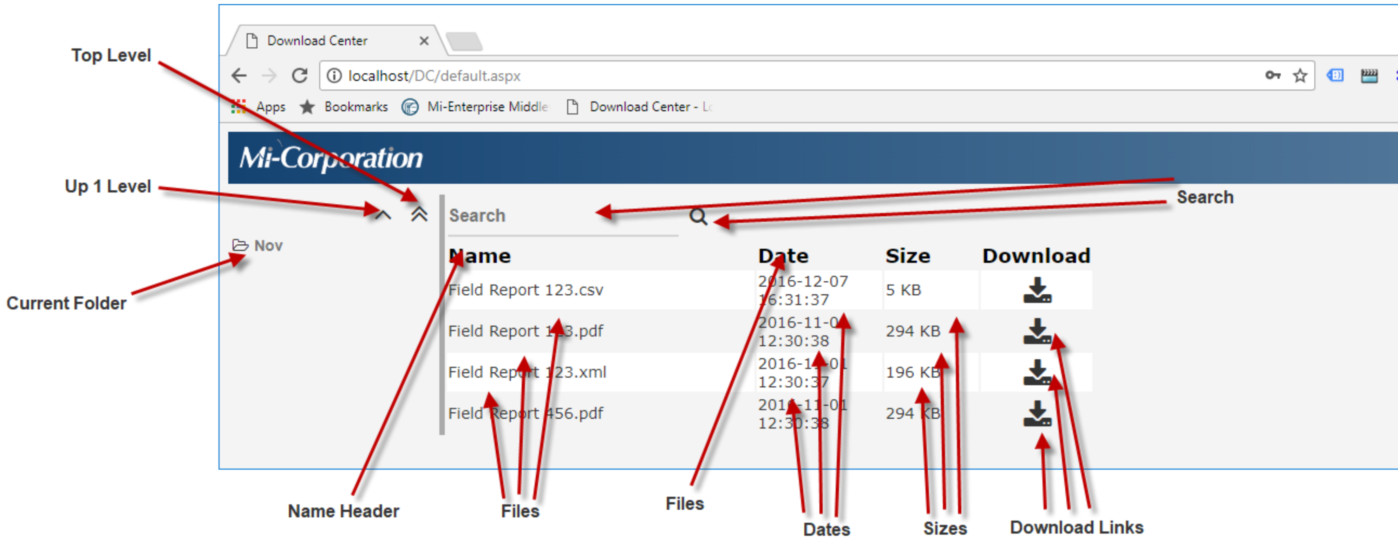
The Download Center provides an interface to download files exported from forms. This can be accessed all users, but permissions associated with each user may provide access to different files.



The initial interface provides links to folders underneath the base export path at the left and a logout link near the top right. Each interface element is described further below:

- **Customer Name** − Displays the root folder (customer name)
- **Users** − Exports are organized by user (by default, can be changed via form configuration)
- **Folders** − Folder structure of exports from forms
- **Logout** − Logs out the currently logged in user

Once a folder is clicked at the left, the interface will change to show files within the selected folder:



The interface provides folder navigateion at the left and file searching and information at right. Each interface element is described further below:

- **Top Level** − Navigates back to the top level folder
- **Up 1 Level** − Navigates one folder up
- **Current Folder** − Shows the currently selected folder
- **Search** − If text is entered into the Search textbox and the Search icon is clicked, then only files matching the search text will be shown (note that the search will match both upper and lowercase letters and will provide partial matches)
- **Name Header** − Clicking the Name header will sort the files listed by name (and will reverse the sort order if clicked again)
- **Files** − A list of file names within the folder
- **Date Header** − Click the Date header will sort files by modified date (and will reverse the sort order if clikcked again)
- **Dates** − A list of last modified dates associated with each file
- **Sizes** − A list of sizes associated with each file
- **Download Links** − Clicking the download link for a file will start a download of the file

7 Developing for the Server

This section will touch on developing forms to take advantage of the server's workflow capabilities as well as how to use its web service interface to communicate directly with it from a custom developed application:

- Embedding Server Pages in Web Applications
- Form Script
- Standalone Application

7.1 Embedding Server Pages in Web Applications

It is possible to use IFrames to embed Mi−Enterprise Middleware server pages inside a web application. Several examples are shown below.

7.1.1 Disabling Menu &Logo

It is often useful to disable the menu and logo that appear by default at the top of the page. To do so, you may append the following URL parameters to any URL:

- **NoLogo=1** − Disables the product logo at the top of the page
- **NoMenu=1** − Disables the menu items at the top of the page

Note that if one of these parameters is set the user's session will remember the parameter and it is not needed in subsequent page requests.

To re−enable the logo or menu items, append URL parameters as follows:

- **NoLogo=0** − Enables the product logo at the top of the page
- **NoMenu=0** − Enables the menu items at the top of the page

7.1.2 Viewing Templates

To show all available templates to a user, set an IFrame to point to the page "Templates.aspx". For instance, your HTML may look something like this:

```
<html>
  <head>
    <title>Example</title>
  </head>
  <body>
    <H2>Your Company's Logo Here</H2>
    <p>
    <iframe src="http://server/MFS/Templates.aspx?NoLogo=1width="950" height="800">
        Alternative text for browsers that do not understand IFrames.
    </iframe>
   </body>
</html>
```

7.1.3 Filling a Specific Template

You must know the server−assigned ID of the form you wish the user to fill. This can be determined by navigating to the Templates list, and hovering over the link for details about the template. You should see a link that begins with Template.aspx and with a URL parameter of ID=123 where "123" is replaced by something else. Record this number and use it in code as follows:

```
<html>
  <head>
    <title>Example</title>
  </head>
  <body>
    <H2>Your Company's Logo Here</H2>
    <p>
    <iframe src="http://server/MFS/Webform.aspx?Template=1231" width="950" height="800">
        Alternative text for browsers that do not understand IFrames.
    </iframe>
   </body>
</html>
```

7.1.4 Editing a Specific Session

You must know the server−assigned ID of the session you wish the user to edit. This can be determined by navigating to the Sessions list, and hovering over the link for details about the session. You should see a link that begins with Template.aspx and with a URL parameter of Session=456 where "456" is replaced by something else. Record this number and use it in code as follows:

```
<html>
  <head>
    <title>Example</title>
  </head>
  <body>
    <H2>Your Company's Logo Here</H2>
    <p>
    <iframe src="http://server/MFS/Webform.aspx?Session=4561" width="950" height="800">
        Alternative text for browsers that do not understand IFrames.
    </iframe>
   </body>
</html>
```

7.2 Form Script

It is possible to interact with the server through script code. The most common uses for server−side scripting are to take advantage of its workflow capabilities and to perform custom exports. Each of these is addressed in its own section:

- Workflow
- Error Handling
- Custom Exports
- Impersonation

7.2.1 Workflow

The server provides a basic workflow framework for sessions. Every user and every group on the server has an associated queue. Sessions that are in these queues can be downloaded by users with permissions to access these queues. These users can then add more data to a session and re−upload it to the server. This process can repeat until the form script in the session is satisfied that all the required data has been collected.

When a session is processed by the server the first thing that happens is that it queries the form script in that session to see if it should be moved to another queue. It does this by calling the code in the session's ServerQueuing Event.

When it calls this function, it will pass an object of type ServerQueuingEventArgs. This object contains the following:

- **Groups**
  List<string> of all active groups.
- **GroupMembers**
  List<List<string>> of users who are members of each group.
  The first item in the inner **List<string>** is always a group name. All subsequent items in the list are user names who are members of the group.
  The outer **List<**List<string>**>** contains each "inner list" − one for every group.
- **PreviousQueues**
  List<string> of previous queues that contained this session with the first entry as the most recent in chronological order.
- **Queues**
  List<string> of all active queues.
- **ServerSessionID**
  The server assigned ID of the session being processed.
- **TriggeringUser**
  Username of the user who caused the session to be processed on the server.
- **Users**
  List<string> of all active users.

- **NewQueue**
  Set to the next desired queue name. If not set, session server−side datapaths and then custom exports will be started next.
- **NewQueueDetails**
  Set to a narrative explanation for why the session was moved to the NewQueue. These details will show up in the server's web interface when someone views the session's history.
- **WaitToProcessUntil**
  Set the System.DateTime after which a session that is placed into the _incoming queue will be processed.

The example below takes a hypothetical form that has a text field and two freeforms. In its workflow, a form filler fills out the text field and must sign the field called "FillerSignature". It then must go to a manager, who must sign the field called "ManagerSignature". The event handler checks to see what state the form is in and then proceeds appropriately:

```
<MiCode(FormScriptEventType.ServerQueuing)> _
Public Sub Form_ServerQueuing(ByVal e As ServerQueuingEventArgs)
  ' First, check to see if the text field is empty
```

```
  If _TextField.Value = "" Then
     ' Yes, it is empty, so it needs more data entry, but we can
     ' send it to any filler as they are all capable of entering this data
     e.NewQueue = "Fillers"
     e.NewQueueDetails = "Text field is empty -- returning to fillers"
     Return
  End If

  ' Now check to see if the filler signed the form
  If _FillerSignature.HasInk() = False Then
     ' No, they didn't sign it, so it needs to go back to the last
     ' filler who operated on the form
     e.NewQueue = e.TriggeringUser
     e.NewQueueDetails = "Filler did not sign -- returning to user"
     Return
  End If

  ' Now check to see if the manager has signed the form
  If _ManagerSignature.HasInk() = False Then
     ' No, the manager has not signed it, so it needs to go to a manager
     e.NewQueue = "Managers"
     e.NewQueueDetails = "Manager needs to sign -- sending to managers"
     Return
  End If

  ' The data was filled, and all required signatures are present, so
  ' we will not set the NewQueue property to anything. This will allow
  ' the server to export data.

  ' Before proceeding, a remote database needs to be available. If it is
  ' not available, wait for 15 minutes and look for the database again. Use
  ' the value of a hidden field to count the number of remote database
  ' attempts.
  If ( Not FindRemoteDatabase() ) Then
        Dim iCounter as Integer = Convert.ToInt32(_hdCounter.Value)
        If ( iCounter < 12) Then
                e.NewQueue = "_incoming"
                e.NewQueueDetails = "Could not find remote database."
                e.WaitToProcessUntil = DateTime.Now + TimeSpan.AddMinutes(15)
                _hdCounter.Value = (iCounter + 1).ToString
        Else
                e.NewQueue = "_error"
                e.NewQueueDetails = "Could not find remote database after 12 attempts."
        End If
  End If
End Sub
```

Note: Setting e.NewQueue = "_Finished" will move a session to the _Finished queue however no datapaths will be run and the session will still be marked as "Active".

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.2.2 Error Handling

The server provides a mechanism for handling errors. When a session is processed and an error is encountered it triggers form script to allow error handling to occur. It does this by calling the code in the session's ServerError event.

When it calls this function, it will pass an object of type ServerErrorEventArgs. This object contains the following:

- **ErrorDetails**
  String containing text details of the error that has occurred.
- **ExportError**
  Boolean indicating whether the error took place during an export.
- **Groups**
  List<string> of all active groups.
- **GroupMembers**
  List<List<string>> of users who are members of each group.
  The first item in the inner **List<string>** is always a group name. All subsequent items in the list are user names who are members of the group.
  The outer **List<**List<string>**>** contains each "inner list" − one for every group.
- **PreviousQueues**
  List<string> of previous queues that contained this session with the first entry as the most recent in chronological order.
- **Queues**
  List<string> of all active queues.
- **ServerSessionID**
  The server assigned ID of the session being processed.
- **SystemError**
  Boolean indicating whether the error was a system level unexpected error.
- **TriggeringUser**
  Username of the user who caused the session to be processed on the server.
- **Users**
  List<string> of all active users.

- **Reprocess**
  Set to true if the server should attempt to reprocess the session, false otherwise. It will be placed back in the _Incoming queue if set to true.
- **WaitToProcessUntil**
  Set the System.DateTime after which a session that is placed into the _Incoming queue will be processed.

The example below instructs the server to attempt to reprocess the session again in an hour if an export has taken place. This may be suitable for a situation where a database is temporarily offline, etc:

```
<MiCode(FormScriptEventType.ServerError)> _
Public Sub Form_ServerError(ByVal e As ServerErrorEventArgs)

  If e.ExportError = True Then
    e.Reprocess = True
    e.WaitToProcessUntil = DateTime.Now.AddHours(1)
  End If

End Sub
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.2.3 Custom Exports

If a session's workflow processing does not instruct it to change queues, then the server will export data from the session as follows:

First, the server will run all DataPaths (standard data exports) that are scoped to run on the server.

Next, the server will execute the session's AfterDatapathsRun Event. This is the appropriate place to perform server side custom data exports.

When executing the AfterDataPathsRun event handler, it will pass an object of type AfterDataPathsRunEventArgs. This object contains the following:

- **Scope**
  Gets the current scope of the event − either DatapathScope.Client or DatapathScope.Server.
- **CustomExportFailure**
  Set to true if your custom export fails.
- **CustomExportDetails**
  Set to a description for the custom export failure.
- **WaitToProcessUntil**
  Set to a System.DateTime after which the session will be processed after having been placed back into the _incoming queue if the CustomExportFailure is set to true. If not set, a session with a CustomExportFailure set to true will be placed into the _error queue.

If any of the DataPaths fail, or if your script code indicates a failure, the session will be moved to the _Error queue, unless the e.WaitToProcessUntil argument is set. Otherwise, it will be deactivated and moved to the _Finished queue.

The example below shows how to perform a custom export on the server side:

```
<MiCode(FormScriptEventType.AfterDataPathsRun)> _
Public Sub Form_AfterDataPathsRun(ByVal e As AfterDataPathsRunEventArgs)
  Dim success As Boolean = True

  ' First check to make sure we're running on the server
  If e.Scope = DataPathScope.Server Then
     ' Then we need to check to see if we already ran this custom
     ' export some time in the past. This is possible if a datapath
     ' had failed, but our custom export had succeeded, and now the
     ' session is being reprocessed after being moved out of the
     ' _Failure queue by an administrator
     For Each result As ExportResult In _form.Validator.ExportResults
         If result.ID = "CustomExport" And result.Success = True Then
            ' Yes, we have already run this export and recorded a
            ' successful export
            Return
         End If
     Next

     ' This is a call to a function elsewhere in our script code that
     ' exports the data. We assume it returns true on a success or
     ' false on a failure
     success = ExportData()

     ' Now we record the export result. If we had already had a previous export
```

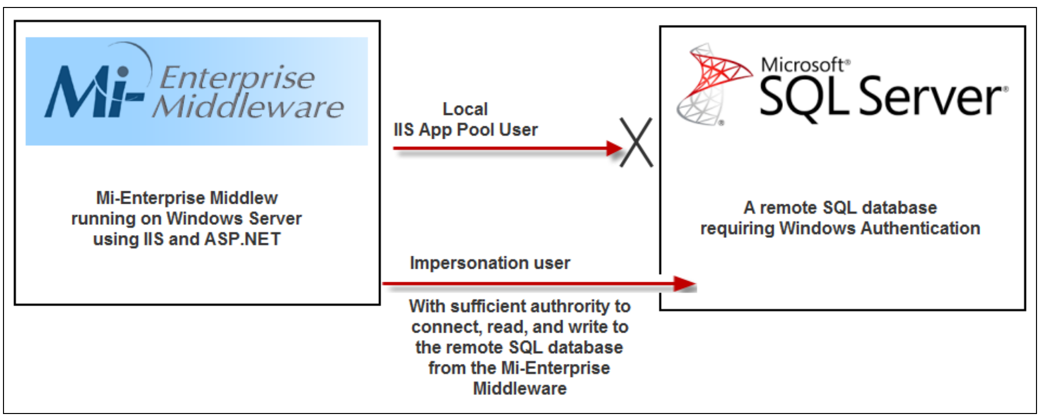
```
    ' result from our custom export, this will replace the existing one
    RecordExportResult("CustomExport", _
                       success, _
                       "Export Failure", _
                       "Custom data export failed", _
                       "")
  End If

  ' Finally, we need to set the CustomExportFailure property of
  ' our event arguments to indicate whether we succeeded or not
  e.CustomExportFailure = Not success
End Sub
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.2.4 Impersonation

There may be scenarios where it is necessary to impersonate a different Windows Authentication user while performing a certain task on the server.
By default on the server, server−side scripting will be conducted as the local ASPNET user which has limited authority. This is in compliance with the Windows Server security model for IIS 7+ and ASP.NET 4.0. For instance, if you are have a remote SQL Server instance in Windows Authentication mode and cannot grant ASPNET permission to export to that database, use impersonation to accomplish this task. See illustration below...



Add this Imports statement to make your coding easier:

```
Imports System.Security.Principal
```

Declare this COM object and a WindowsImpersonationContext within the FormBehavior class of your form script:

```
  Private Declare Auto Function LogonUser Lib "advapi32.dll" (ByVal lpszUsername As [String], _
    ByVal lpszDomain As [String], ByVal lpszPassword As [String], _
    ByVal dwLogonType As Integer, ByVal dwLogonProvider As Integer, _
    ByRef phToken As IntPtr) As Boolean

  Private wic As WindowsImpersonationContext
```

Include the following two functions, startImpersonate and stopImpersonate, into your FormBehavior class as well:

```
' Function for starting impersonation
Function startImpersonate(ByVal username As String, _
  ByVal domain As String, _
  ByVal password As String, _
  ByRef strMessage As String) _
  As Boolean

  Try
    Dim accountToken As System.IntPtr = New System.IntPtr(0)
    Dim bLogon As Boolean = LogonUser(username, domain, password, 2, 0, accountToken)

    If ( bLogon ) Then
      Dim userId As WindowsIdentity = New WindowsIdentity(accountToken)
      wic = userId.Impersonate()
    End If

    Return bLogon
  Catch ex As System.Exception
    strMessage = ex.Message
  End Try
End Function

' Function for stopping impersonation
Function stopImpersonate() As Boolean
  Try
    wic.Undo()
    Return True
  Catch
    Return False
  End Try
End Function
```

The following example utilizes the two functions above to impersonate a different user while connecting to a sql server database:

```
<MiCode(FormScriptEventType.AfterDataPathsRun)> _
Public Sub Form_AfterDataPathsRun(ByVal e As AfterDataPathsRunEventArgs)

  ' Check to see if this AfterDatapathsRun event is occurring on the Mi−Forms Server...
  If (e.Scope = MiCo.MiForms.DataPathScope.Server)

    ' Get the Windows Authentication user credentials...
    Dim username As String = "some username"
    Dim domain As String = "some domain"
    Dim password As String = "some password"
    ' Note: it is highly recommended that you do not enter username/password values here
    ' but rather read them from a file that exists on the Mi−Forms Server, or read them
    ' from an assembly, etc and then continue...

    ' Start impersonating the following user:
    Dim strMessage As String = String.Empty
    If (Not startImpersonate(username, domain, password, strMessage)) Then
      ' Impersonation failed ...
      e.CustomExportFailure = True
      e.CustomExportDetails = "Error − could not impersonate: " & strMessage
    End If

    ' Connect to database here...
    strMessage = String.Empty
    If (ConnectViaODBC(strMessage)) ' This function will require impersonation
      e.CustomExportFailure = False
```

```
        e.CustomExportDetails = "Success! Impersonation and ODBC connection succeeded."
        myConnection.Close()
      Else
        e.CustomExportFailure = True
        e.CustomExportDetails = "Error: " & strMessage
        myConnection.Close()
      End If

      ' Stop impersonating here...
      stopImpersonate()

    End If
  End Sub

  Dim myConnection As System.Data.Odbc.OdbcConnection
  Const CXN_STRING As String = "DSN=TestDSN"

  Function ConnectViaODBC(ByRef strMessage As String) As Boolean
    LogMessage("[ConnectViaODBC]...")
    Try
      myConnection = New System.Data.Odbc.OdbcConnection(CXN_STRING)
      If (myConnection Is Nothing) Then
        strMessage = "failed to open database '" & CXN_STRING & "'"
        Return False
      End If
      myConnection.Open()
      LogMessage("[ConnectViaODBC] succeeded.")
      Catch ex As System.Exception
        strMessage = ex.Message
        LogMessage("[ConnectViaODBC] failed." & strMessage)
        Return False
       End Try
      Return True
  End Function
```

Note: Using impersonation in the server−side script code will NOT affect standard datapaths since these are executed in a different app domain than server−side scripting. Standard datapaths are defined in the designer's form properties "Datapaths" dialog. (Starting impersonation in the "ServerQueuing" event handler and stopping impersonation in the AfterDatapathsRun event handler will NOT impersonate exporting standard datapaths which occurs between these two event handlers.) Impersonation in server−side script code will only affect custom datapaths that are defined in the script code.

7.3 Standalone Application

It is possible for a stand alone application to communicate with a server in order to authenticate logins, download form templates, upload session files and perform other server−based tasks.

The client application and the server communicate via web services, but it is not necessary to import these web services directly. Instead, it is possible to reference the MiCo.MiForms.Server.ServerInterface.dll assembly and use the MiCo.MiForms.Server namespace to call methods in the WebserviceInterfaceEx class.

The topics below give examples of how to perform common server−based tasks.

- Initializing a WebserviceInterfaceEx Object
- The ServerResponse Object

- Authenticating a User
- Downloading Form Templates
- Uploading a Session
- Locking and Downloading a Session

7.3.1 Initializing a WebserviceInterfaceEx Object

In order to communicate with a server, you must create a WebserviceInterfaceEx object. This object exposes methods to perform server tasks, but it must first be configured to know which server to talk with, the customer name to reference, and the username/password credentials of a user that can perform the task in question. All of these can be accessed via properties it publicly exposes.

For the example below, let's assume the following:

- The server's hostname is "www.myserver.com"
- The port to use for the server is "80"
- The server's interface is exposed under virtual directory "MFS"
- The customer name in question is "Sierra Creek"
- The username of the user performing the server operations is "bsmith"
- bsmith's password is "password"

The code below, written in C# shows how to create an object, and initialize it such that it can be used for further server operations:

```
using MiCo.MiForms.Server;

private void InitializeServerInterface(ref WebserviceInterfaceEx wsi)
{
  wsi = new WebserviceInterfaceEx();
  wsi.NetworkSettings.Server = "www.myserver.com";
  wsi.NetworkSettings.Port = 80;
  wsi.NetworkSettings.URLPrefix = "MFS";
  wsi.Credentials.CustomerName = "Sierra Creek";
  wsi.Credentials.User = "bsmith";
  wsi.Credentials.Password = "password";
}
```

Once the code above is executed, the "wsi" object can be used to make requests to the server.

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.3.2 The ServerResponse Object

All communication with the server should be made through the previously described WebserviceInterfaceEx object. Each one of these communication methods returns a packaged object of type ServerResponse. This object encapsulates both return values from the server as well as any errors encountered during processing the communication request.

The important properties of a ServerResponse object are as follows:

- **Success** − Always set to true or false corresponding to whether the communication request succeeded or failed

- **ResponseTime** − The date/time the server responded to the communication request
- **BinaryData, BinaryDataArray, BoolData, DateTimeData, Demographics, FormTemplates, IntegerData, ServerCredentials, ServerFeatures, Sessions, StringData, StringDataArray** − One or more of these properties will be filled with data relevent to the communication request. Each request fills a different set of these properties, so see the Mi−Enterprise Middleware Object Model Reference documentation for further details.

If an error occurs in communication with the server, then the Success property of the object will be set to false and the Error property will be non−null. If this is the case, then the Error property may be of one of the following types:

AuthenticationError
Indicates that an authentication error has occurred with the server. This may be either a simple username/password or it may indicate invalid permissions. The important properties of this type of error are as follows:

- **AccountInactive** − If set to true ,indicates that the specified user account is set inactive
- **AccountLocked** − If set to true, indicates that the specified user account is locked
- **CustomerNotFound** − If set to true, indicates that the specified customer was not found
- **NotAdmin** − If set to true, indicates that the specified communication request requires a user with administrative privileges and the specified user does not have them
- **NotAuthorized** − If set to true, indicates that the specified user is not authorized to perform the specified communications request
- **PasswordChangeRequired** − If set to true, indicates that the password for the specified user must be changed
- **PasswordExpired** − Indicates that the password for the specified user is expired
- **UsernamePasswordFailure** − If set to true either the password is incorrect for the user or the user does not exist.

ExpectedError
Indicates that the communication request failed due to an error that is expected. As an example, trying to add a user with the same username as one that already exists is considered an expected error. The important properties of this type of error are as follows:

- **Details** − A text string containing details of the error

InternalError
Indicates that the server encountered an internal unexpected problem. There are no explicit properties of this class, but developers should examine the Exception property as described below.

NetworkError
Indicates that there was a network level error, for instance if a communication channel could not be established. The important properties of this type of error are as follows:

- **Status** − A status object indicating the possible reason for the network error.

In all cases of error, the Exception property of the ServerError object may be populated. If so, it will be of type ServerException. Its properties may help provide further details as to the cause of the error.

Note that unlike previous server communication protocols, no call will exception.

7.3.3 Authenticating a User

In order to authenticate a user, it is a good idea to verify the server exists (which also verifies the customer specified exists), and then verify the user's credentials. To do so, first call the VerifyServer method and then call the VerifyLogin method. The example below relies on an already initialized WebserviceInterfaceEx object.

```
using MiCo.MiForms.Server;

private bool AuthenticateUser(WebserviceInterfaceEx wsi)
{
  ServerResponse sr;
  sr = wsi.VerifyServer();
  if (!sr.Success || !sr.BoolData)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return false;
  }

  sr = wsi.VerifyLogin();
  if (sr.Success &sr.BoolData)
  {
    // Note that the ServerCredentials property of sr will provide further credential details
    // about the user being verified
    return true;
  }

  // Note that the Error property of sr will provide details on the error encountered
  return false;
}
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.3.4 Downloading Templates

The server can provide a list of templates that a given user is permitted to access. It can then allow the client application to download the templates. The example below shows how to list templates authorized for a given user and then downloads each template. It relies on an already initialized WebserviceInterfaceEx object. Note, you might not actually want to retrieve all templates every time you connect to the server as it can take some time if there are a lot of templates to retrieve. It is left as an exercise to the reader to compare the templates available on the server with existing templates on the client device.

```
using MiCo.MiForms.Server;

private void DownloadTemplates(WebserviceInterfaceEx wsi)
{
  // The server will provide us with an array of FormTemplateDescription objects,
  // each of which describes a template the user is authorized to access.
  ServerResponse sr;
  sr = wsi.GetFormTemplatesForUser();
  if (!sr.Success)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return;
  }
```

```
FormTemplateDescription[] formTemplates = sr.FormTemplates;

// We will now iterate through this array and retrieve the actual form template XML
// and the background images for each form template
for each (FormTemplateDescription form in formTemplates)
{

  // First we download the form template XML
  sr = wsi.GetFormTemplateRevision(form.FormID, form.Revision)
  if (!sr.Success)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return;
  }
  string formXML = sr.StringData;

  // Then we download the image for each page, and keep them in a list
  System.Collections.Generic.List<string> imageList = new System.Collections.Generic.List<str
  for (int nPage = 1; nPage <= form.Pages; nPage++)
  {
    // First we'll figure out what the highest resolution background image
    // the server has stored for this template
    double highestRes = 0.0;
    foreach (double d in form.ImageResolutions)
    {
        if (d > highestRes)
        {
            highestRes = d;
        }
    }

    // Then we'll actually get the image data
    sr = server.GetFormTemplatePageBackgroundImage(form.FormID, form.Revision, nPageNum, high
    if (!sr.Success)
    {
    // Note that the Error property of sr will provide details on the error encountered
      return;
    }
    byte[] imageData = sr.BinaryData;

    // Save it to disk for safe keeping
    string strFilename = "form_" + form.FormID + "_" + form.Revision + "_" + nPage + ".png";
    System.IO.FileStream xStr = System.IO.File.Create(strFilename);
    xStr.Write(image, 0, image.Length);
    xStr.Close();
    imageList.Add(strFilename);
  }

  // Now download related files as necessary
  foreach (RelatedFileDescription rfd in form.RelatedFiles)
  {
    sr = server.GetRelatedFile(rfd.ID);
    if (!sr.Success)
    {
      // Note that the Error property of sr will provide details on the error encountered
      return false;
    }
    byte[] b = sr.BinaryData;
    SaveRelatedFile(b);
  }

  // The code below presumes you have a function that can save a template
```

```
    // from its XML format and a list of images
    SaveForm(formXML, imageList);
}
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.3.5 Uploading a Session

After a user has completed work on a form, it may be necessary to send the completed session back to a server. The example below shows how to do so. It relies on an already initialized WebserviceInterfaceEx object..

```
using MiCo.MiForms;
using MiCo.MiForms.Server;

private bool UploadForm(WebserviceInterfaceEx wsi, Form session)
{
  string sessionXML = "";
  if (!session.BuildXMLString(ref sessionXML))
  {
    return false;
  }

  ServerResponse sr;
  sr = wsi.UploadSession(sessionXML);
  if (!sr.Success)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return false;
  }
  string sessionID = sr.StringData;

  sr = wsi.ConfirmUploadedSession(sessionID);
  if (!sr.Success || !sr.BoolData)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return false;
  }

  return true;
}
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

7.3.6 Locking and Downloading a Session

Sessions that have not been exported on the server reside in queues awaiting to be completed by a user that has permission to take action on the session. Each user can see sessions in their own personal queue as well as in queues of groups for which they are a member. The example below shows how to download a list of sessions a user is authorized to take action on, lock a session so that they may work on it, and then download the session file. It relies on an already initialized WebserviceInterfaceEx object.

```
using MiCo.MiForms;
using MiCo.MiForms.Server;

private string DownloadSessionXML(WebserviceInterfaceEx wsi)
{
  // First we'll get an array of SessionDescription objects, each of which
  // describes a session that the user is able to lock and download
  ServerResponse sr;
  sr = wsi.GetActiveSessionsForUser();
  if (!sr.Success)
  {
    // Note that the Error property of sr will provide details on the error encountered
    return "";
  }
  SessionDescription[] sessions = sr.Sessions;
  if (sessions.Count > 0)
  {
    SessionDescription session = null;
    // The line below presumes you have a function that asks the user to choose a session
    // to work on and returns the SessionDescription object of the session chosen
    session = AskUserWhichSessionToDownload(sessions);
    if (session != null)
    {
      if (!session.Locked)
      {
        // Now we'll actually download the session XML. Note that this XML will not include
        // background images. If you need to retrieve those, you should refer to how this
        // was accomplished when downloading form templates.
        sr = wsi.LockSession(session.SessionID);
        if (!sr.Success)
        {
          // Note that the Error property of sr will provide details on the error encountered
          return "";
        }
        sr = wsi.GetSession(session.SessionID);
        if (!sr.Success)
        {
          // Note that the Error property of sr will provide details on the error encountered
          return "";
        }
        string sessionXML = sr.StringData;
        return sessionXML;
      }
      else
      {
        // Display some sort of error here. If the session is already locked to someone
        // else, then this user cannot download it.
                return "";
      }
    }
  }
}
```

For further details, please see the Mi−Enterprise Middleware Object Model Reference documentation.

8 Server Maintenance

- **Database backup and restore**
  Customer databases are SQL Server 2005 or newer databases. We highly recommend routinely backing these databases up. Running backups may adversely affect Mi−Enterprise Middleware performance so it is advisable to run the backup during non−peak hours.
- **File System backup and restore**
  Form templates, sessions, and app data bundles are stored on disk (by default on c:\mfs\). It is recommended that these files be backed up periodically. Running backups may adversly affect Mi−Enterprise Middleware performance so it is advisable to run the backup during non−peak hours. Additionally, it is recommended that the web.config files from both the MFS (default c:\inetpub\wwwroot\mfs\) and DRS (default c:\inetput\wwwroot\drs) folders be backed up periodically.
- **Anti−Virus Software**
  Running anti−virus software on the same machine as Mi−Enterprise Middleware may adversely affect performance. Anti−virus configurations may be modified to enhance performance while maintaining a secure environment. Please refer to the following Microsoft Knowledge Base Article 309422: "Guidelines for choosing antivirus software to run on the computers that are running SQL Server"

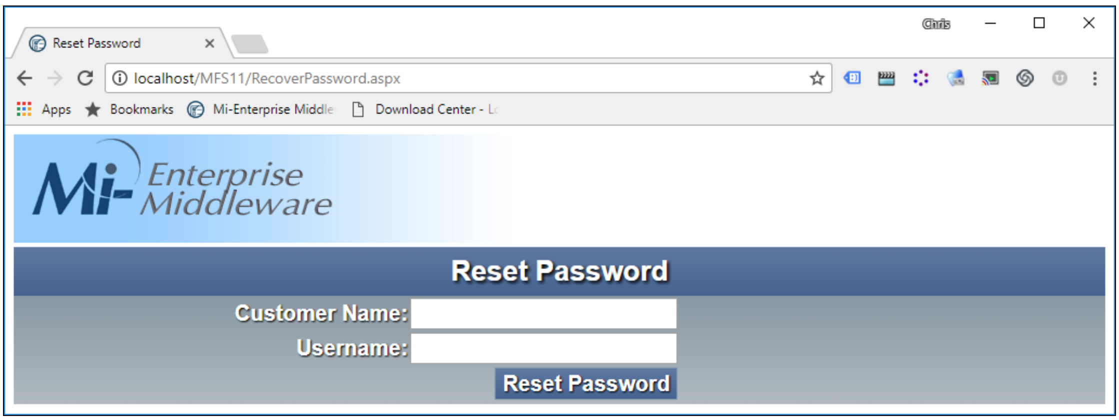
9 Troubleshooting

- Reset Passwords
- Performance

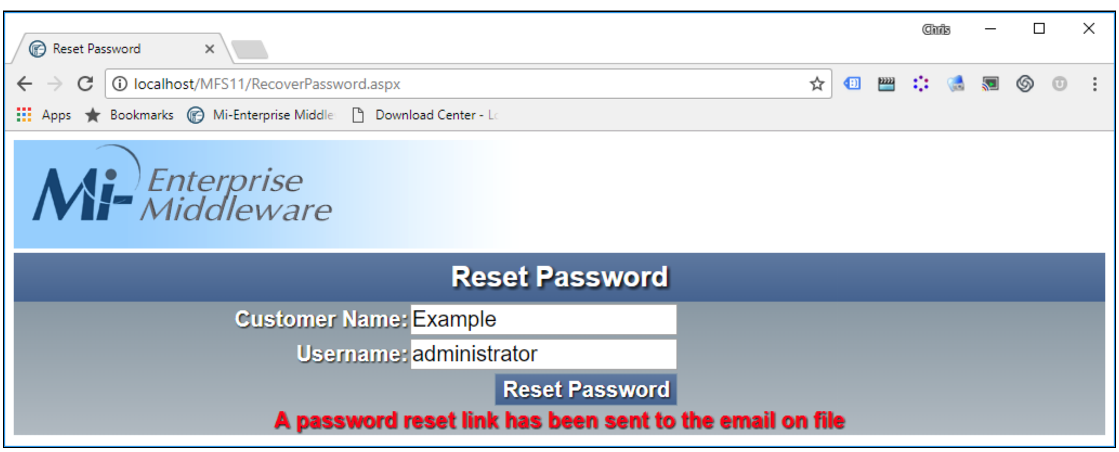
9.1 Reset Passwords

To reset a password, use the "Forgot Password" button on the main login page or navigate directly to: **http://[SERVER]/MFS/RecoverPassword.aspx**

A screen similar to the one below will be provided:

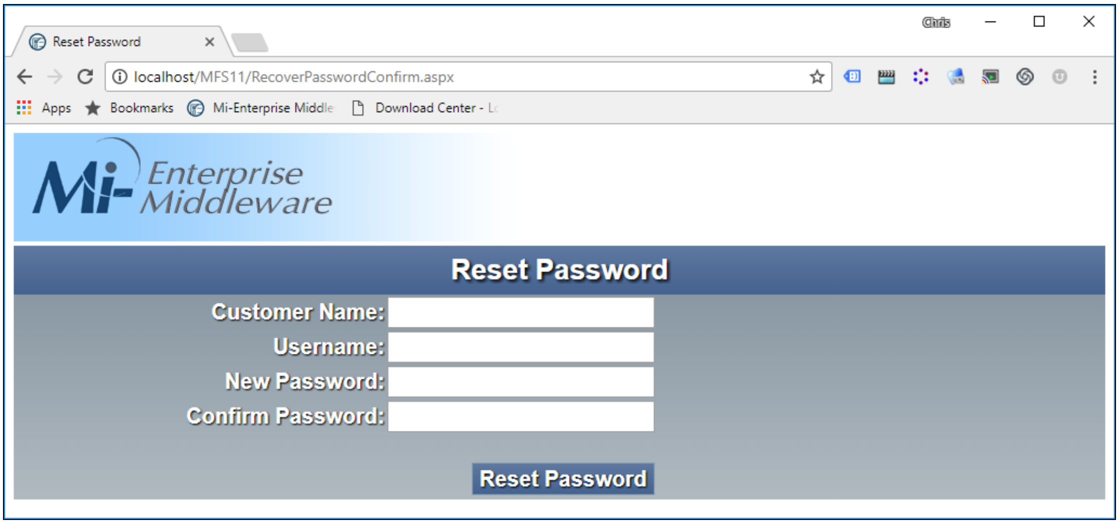


After entering a valid customer and user name, you will see a message similar to this:

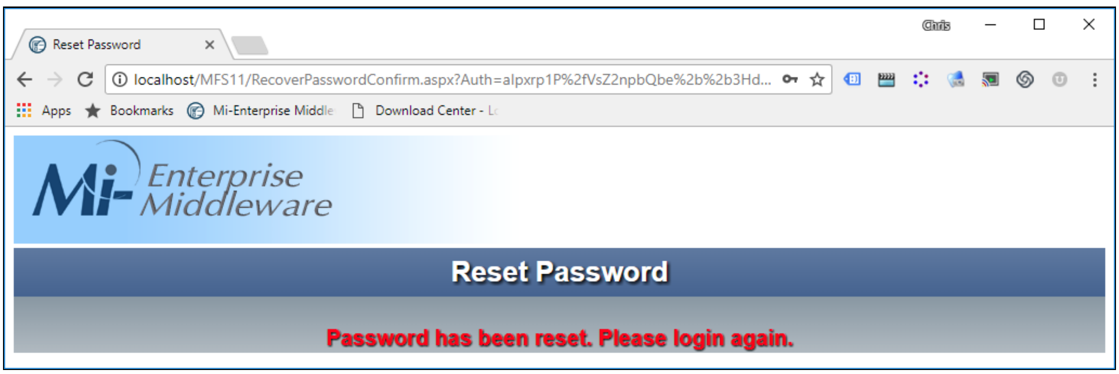


Note that the user who's password is being reset must have a valid email address setup via the user configuration page.

After receiving on the link received in email, a screen similar to the following will be displayed:



After entering a valid customer, user, and password the reset will be confirmed as shown below:



9.1.1 Resetting a Password as an Administrator

An administrator may also reset a user's password via the Modify User administration page.

9.2 Performance

There are a number of possible sources for adverse server performance. Use the following list as a guideline for improvements:

- **Hardware**
  Less than optimal hardware components may cause bottlenecks in performance. If the database is remote, hardware improvements for the database hosting machine and improved networking will also improve performance.
- **Anti−Virus Software**
  Please refer to Server Maintenance for information on anti−virus software.
- **Other CPU / memory / disk / networking intensive applications or servers**
  Running other applications on the server will affect server performance. Carefully consider each application by testing performance before and after installing each application.
- **Backup/Restore Operations**
  Depending upon the server's and sql server's backup and restore settings, these operations may affect performance.

- **Database optimizations**
  Optimize the SQL Server databases for each customer. Please refer to SQL Server Developer Center for tips.
- **Optimize application settings**
  Depending upon the hardware configuration, the Mi−Enterprise Middleware may be optimized for performance. Please refer to Advanced Server Configuration, specifically "sessionprocessor.threadcount" if server has multiple cpu's.
- **Mi−Enterprise Middleware logs**
  Periodically skim through the Mi−Enterprise Middleware logs for "ERROR" or "FATAL" messages.
- **Change datapaths and custom exports**
  Each form has the ability to export data either from server−side datapaths or by form scripting. Optimize each datapath and custom export for better server performance.