



## Installing/Upgrading Midrange Dynamics MDRest4i on IBM i

This guide will take you through the installation of the iCore framework component and the SDK web application on the IBM i.

### 1 Prerequisites for IBM i

#### 1.1 Operating System

IBM i (AS/400) System with OS/400 Release V7R1M0 or higher

The current version can be checked using command WRKLICINF

#### 1.2 PTFs

None

#### 1.3 MD License Keys

In order to use the products, a valid License Key is required for the core product MDRest4i, which is based on the Serial Number of the system, and the version of the Product.

To use one of the add-ons to the core product such as the SDK Accelerator, a new key will also be required.

MDREST4i uses a license key system independent from MDCMS. So any license keys or installations for MDREST4i prior to May 21, 2020 will need to be reentered into MDRST4i using prompted command MDRST/MRLICKEY LTYP(\*INT) after the new version is installed.

Please provide Midrange Dynamics or a reseller with the serial number (obtained with command WRKLICINF or DSPSYSVAL QSRLNBR) and product version and continue with the installation once the key or keys have been provided.

If the keys are provided in file MDLICENSE.savf, include this file in the same IFS path or library as the product save files. When MDLICENSE.savf is included, the keys for the given serial number will be automatically applied to the product instance, and the keys for all other included systems will be stored in the product instance so that if a switch is made to a backup system, the backup keys will automatically be applied to the product, thus avoiding any delays.

**Note:** License keys obtained as a save file (SAVF) from the mdlicense.mdcms.ch website will sometimes have additional data in the save file name. for example: "MDLICENSE\_20220829\_160955\_411724.savf" Before running MRLICKEY to install this save file, rename it so the name of the save file is "MDLICENSE.savf"



### 1.4 User Authorization

The user performing the installation must have \*SECADM and \*ALLOBJ authority on the system.

Access to the Digital Certificate Manager (DCM) is required for using SSL for REST APIs or Consumers and SOAP Services or Consumers

### 1.5 Allow Restore of Programs with Adopted Authority

The system value **QALWOBJRST** must include the choice of \*ALL or \*ALWPGMADP so that the product programs with the adopt attribute can be restored.

### 1.6 Disk Space

The product initially requires about 175 MB of space at installation time.

MDREST4i history typically requires an additional 150 MB per year of use.

### 1.7 Exclusive Product Library Locks when Upgrading

When upgrading an existing version of the MD Products to a new build, the existing library instances for MDRST, may not be in use.

Object locks can be checked by using command `WRKOBJLCK OBJ(MDRSTxxxx) OBJTYPE(*LIB)`. Where "xxx" is the instance extension – blank if the default MDRST was used.

Please also check any http instances that use MDRST instance libraries in the ScriptAlias, ScriptAliasMatch or **SetEnv QIBM\_CGI\_LIBRARY\_LIST** setting in the service instance configuration. These server instances should be stopped until after the installation

If locks exist, you can cleanly end the jobs ahead of time, or specify parameter `END(*YES)` on the `MDREST4INS` command to automatically end all jobs locking the product libraries.



## 2 Objects created by Installation Process

### 2.1 QGPL Objects

The following commands are placed by default into library QGPL:  
MDREST4INS – The MDREST4i Product Installer

For each command, a corresponding program and panel group are also placed in QGPL.

### 2.2 Libraries

Some or all of the following libraries will be created, depending on the product:

Library	Description	Initial Size
MDRST	MDRest4i objects	225 MB

MDRST contain some site-specific data, so they should be regularly backed up.

By default, the libraries are named as stated in the table. At installation time, a 1-4 character Instance ID (ENV) can be defined which will be used as the suffix for the library names. For example, suffix X would mean that product MDRST would be stored in library MDRSTX.

This way, several instances of the MDREST4i products can reside on the same system.



### 2.3 User Profiles

A user profile is created to own the objects in the product libraries. The profile is created without the ability for users to sign on or otherwise make use of the profile. By default, the name of this user profile is MDOWNER, but can be changed at installation time by specifying a different value for MDREST4INS parameter OWN.

If the product owner profile already exists, it is left as is.

MDRST4i programs use adopted authority from the owner profile, which has \*ALLOBJ authority, so that the actual users authorized to perform functions in MDREST4i do not need to have any special system authorities to accomplish the task of making changes to your business applications.

Any programs providing access to a command line do not have adopted (\*OWNER) authority.

None of the programs have parameter "Use adopted authority" set to \*YES, ensuring that authority won't be inherited from your internal calling programs.



### 3 The Installation Steps

To determine the version you have installed use the following command:

```
DSPDTAARA MDRSTxxxx/MRVERSION
```

(xxxx is the instance name. Leave as MDRST if default instance is installed)

**Please Note:** The value of MRVERSION will be displayed as 8.2.8 for v11 of MDREST4i. This will be updated to 11.0.0 in the next ptf)

#### 3.1 Downloading and extracting the Save Files

- 1) Sign into the Midrange Dynamics Service Desk portal at <https://support.mdcms.ch/plugins/servlet/desk>

You will need to be registered to use the portal. If not yet registered, request registration from:  
<https://www.midrangedynamics.com/request-access-to-md-service-desk/>

- 2) Proceed to the Downloads section and click on the appropriate Product Package  
A package contains all prerequisite products. For example, if you wish to install MDCMS, which includes MDSEC and MDXREF, you only need to download the MDCMS package because it will contain all 3 products.

If you additionally wish to install MDOpen or MDWorkflow, those are located separately under their sections of the Downloads page and each have their own installation instructions.

- 3) Save the zip file to a local directory on your PC.
- 4) Extract the save files to a local directory on your PC.

#### 3.2 Option 1 - Installing from Save Files in IFS

- 1) Copy the save files to an IFS folder on your IBM i system.

**NOTE:** One of the easiest ways to copy the save files to an IFS folder on your IBM i is to drag and drop them using IBM's **System i Navigator**.

If you don't have **System i Navigator**, you can also use FTP. A recommended FTP client is **FileZilla**, which is available for free from the internet.

- 2) If command MDREST4INS already exists in an IBM i library on your system, and it was created since **version 8.2.5, build May 20, 2020**, skip to section 3.4

- 3) Enter command `CRTSAVF QTEMP/MDREST4INS`

- 4) Enter command  
`CPYFRMSTMF FROMSTMF('/x/mdrest4ins.savf') TOMBR('/qsys.lib/qtemp.lib/mdrest4ins.file') MBROPT(*REPLACE)`  
where x is the name of the IFS folder containing the save files

- 5) Enter command  
`RSTOBJ OBJ(*ALL) SAVLIB(QGPL) DEV(*SAVF) SAVF(QTEMP/MDREST4INS)`

The objects may be restored to a different library than QGPL, if desired. However, the CHGCMD command



will need to be used on the **MDREST4INS** command to change the library for the program and panel group.



### 3.3 Option 2 - Installing from Save Files in a Library

- 1) Copy the save files to a Library on your IBM i system.
- 2) If command MDREST4INS already exists in an IBM i library on your system, and it was created since **version 8.2.5, build May 20, 2020**, skip to section 3.4
- 3) Enter command  
**RSTOBJ OBJ(\*ALL) SAVLIB(QGPL) DEV(\*SAVF) SAVF(x/MDREST4INS)**  
 where **x** is the name of the library containing the save files

The objects may be restored to a different library than QGPL, if desired.

### 3.4 Invoke the MDREST4INS Command

The MDREST4INS command is used for both first time installs, and upgrades of MDRest4i. it also installs/updates the MDRDK save file into the MDRST library which contains the MDRest4i SDK software

Enter command **MDREST4INS** and press F4 to review command parameters and make any necessary changes (press F1 or use the parameter table on next page for more information).

Installations may occur in an interactive or batch job. Interactive is recommended for new installations for improved monitoring and prompting of the process.

If using MDREST4INS to upgrade an existing product to a newer version, the distribution and installation can occur as part of an RFP using MDCMS. In this case ensure the following in MDCMS:

- MDREST4INS should be a Post-Installation (3) attribute command attached to the \*IFS or \*FILE attribute defined with the IFS path or save file library as the target object library.
- Run for Modifications = Y
- Keep MD Libs in Libl = N
- Frequency = R
- MDREST4INS command should begin with SBMJOB so that it runs separately from the RFP
- END(\*YES) to terminate any locks
- DLY(30) to allow RFP time to finish before starting with installation
- USER for SBMJOB should be a profile with \*SECADM authority
- INLLIBL for SBMJOB should include only QTEMP and QGPL (or library where MDREST4INS command exists)

Otherwise continue as per the following example command definition:

```

Appl.....: MD                               Run for Modifications: Y   Y/N
Lvl.....: 50                                Recompiles....: N   Y/N
Attribute: INSTALL      Attribute, *RFP      Deletes.....: N   Y/N
                                           Updates.....: N   Y/N
Type.....: 3   Post-Installation             Ignore Errors.....: Y   Y/N
Sequence.: 1                                Keep MD Libs in Libl.: N   Y/N
Frequency: R   O=Object, R=RFP

Command
SBMJOB CMD(MDREST4INS PATH('##OBJLIB##') END(*YES) DLY(30)) JOB(MRINSTALL) USER(QSO)
INLLIBL(QTEMP QGPL)
  
```



The default values typically used to install MDREST4i standalone are as follows:

```

Install MDRest4i (MDREST4INS)

Type choices, press Enter.

Save File Location Type . . . . *IFS          *IFS, *LIB
IFS-Path containing Save Files  '/MDREST4i'

Library containing Save Files .  Character value
Product Instance . . . . . *DFT          *DFT, Product Library
Instance

Copy Data from Instance . . . . *SAME       *SAME, *DFT, *NONE,
Instance

Backup Library Suffix . . . . . '_BU'       Suffix for Backup Libs
Replace existing Backup Libs . . *YES        *YES, *NO
Install in ASP Device . . . . . *SYSBAS     *SYSBAS, Device Name
End Jobs locking Product Lib . . *NO         *NO, *YES
Product Object Owner . . . . . MOWNER       User Profile

Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys

```

**MDREST4INS Parameter Table**

Parameter	Label	Description
LTyp	Save File Location Type	Specifies if the product save files are in an IFS folder or in a library.  *IFS – The save files are located in an IFS folder. Specify the full path of the folder in parameter PATH  *LIB – The save files are located in a library. Specify the name of the library in parameter LIB
PATH	IFS-Path containing Save Files	Specifies the IFS path containing the save files used to install the Midrange Dynamics products. The contents of the path must contain a save file for each library of the selected Product Group.
LIB	Library containing Save Files	Specifies the Library containing the save files used to install the Midrange Dynamics products. The contents of the library must contain a save file for each library of the selected Product Group.
ENV	Product Instance	Specifies the instance ID of the product. The ID is appended to the names of the product libraries in order to allow multiple instances of the products on the same partition.  *DFT – A suffix is not appended to the library names. They will be named MDRST  The suffix to be used. Up to 4 characters are allowed and each character must be accepted as part of a library name.  Example Env= <b>T11</b> so the name of the installed product library becomes MDRST <b>T11</b>





FENV	Copy Data from Instance	<p>Specifies the location of an instance of the products, if it exists, that should be used for the copy of the data to the new version.</p> <p>*SAME – The same instance, or library suffix, that was defined in parameter ENV</p> <p>*DFT – Copy the data from the default instance, which doesn't contain a suffix</p> <p>*NONE – Do not copy any data to the new version. The new version will be a clean installation.</p> <p>Specify the product instance, or library suffix, containing the data to be copied to the new version.</p>
BSFX	Backup Library Suffix	<p>Specifies the suffix to be appended to the libraries containing the version to be replaced by this installation, if a prior version exists for the instance defined in parameter ENV.</p> <p>This way, the prior version isn't lost and can be reactivated by renaming the libraries from the backup suffix to the instance suffix.</p>
BREP	Replace existing Backup Libs	<p>Specifies if existing backup libraries using the same suffix as defined in parameter BSFX should be automatically replaced.</p> <p>*YES – Any existing libraries with the same name as the new Backup libraries will be automatically replaced.</p> <p>*NO – Libraries with the same names as the new Backup libraries will not be replaced, and the installation will not occur if any exist.</p>
ASPD	Install in ASP Device	<p>Specifies the auxiliary storage pool (ASP) device to which the product libraries should be restored.</p> <p>*SYSBAS – The product libraries will be restored to the base system ASP.</p> <p>character-value – the product libraries will be restored to the indicated ASP device.</p>
END	End Jobs locking Product Libs	<p>Specifies if all jobs that have a lock on one of the product libraries should automatically be ended immediately.</p> <p>*NO – If a lock exists for one of the libraries, the installation process will be cancelled.</p> <p>*YES – Each job that has a lock on one of the product libraries will be ended immediately. If ending fails for a job, the installation process will be cancelled.</p>
OWN	Product Object Owner	<p>Specifies the user profile to be used to own the objects in the MD product libraries and IFS folders. If the profile doesn't exist yet, the installer will create it. The profile should have *ALLOBJ, *JOBCTL, and *SPLCTL special authorities to ensure that deployments function correctly.</p>

### 3.5 Default API and Consumer logs folder

The examples provided by MDREST4i and the default generator templates store logs and uploaded files in folders on the IFS. This Folder is created automatically by the installer. the folders created are  
/MDREST4i/Logs/<instances>,  
/MDREST4i/uploads/<instances>,  
/MDREST4i/schemas/<instances>

### 3.6 MDRest4i SDK Web Application Installation/Update

The MDRest4i SDK web interface runs as a web application served by an HTTP server on IBM i. The MDREST4i SDK web application uses REST APIs (Built using MDREST4i) which are exposed via the **same instance** of this Apache HTTP server.

To install or update this run the MDRSDKINS command

To update an existing installation, first stop the MDRST server instance and any server instance created over MDRST for running your API's, and then run the MDRSDKINS command.

#### 3.6.1 Invoking the MDRSDKINS command

Addible MDRST  
Prompt MDRSDKINS

```

                                Install/Upgrade MDRest4i SDK (MDRSDKINS)

Type choices, press Enter.

HTTP Instance PORT Number . . . 4545           Character value
Start HTTP Instance . . . . . N             Character value
Authentication Profile . . . . . MDOWNER      Character value

                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys

```

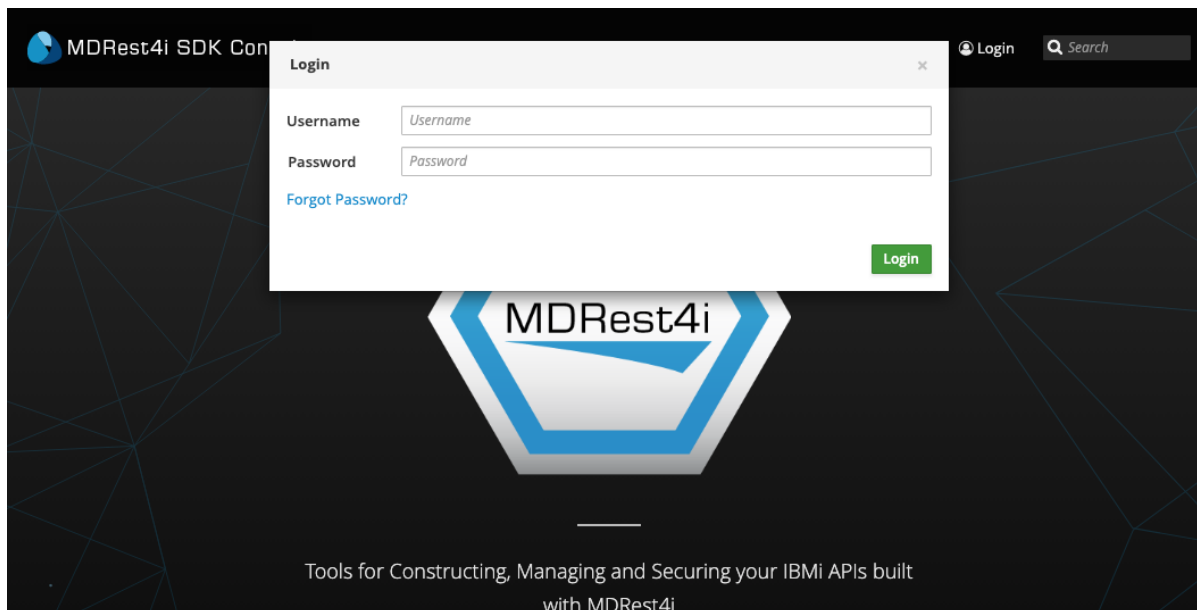
#### 3.6.2 MDRSDKINS Parameter Table

Parameter	Label	Description
PORT	HTTP Instance PORT Number	Port number the HTTP server instance for the SDK web UI runs under. 4545 is a default value and should be set as per your own port preferences on the IBM i server
STRSRV	Start HTTP Instance	Select Y to start the server automatically once command has been run.
AUTHPRF	Authentication Profile	The ServerID used to provide authority to run the REST API's used by the MDRest4i SDK web UI on the IBM i server. By Default this is set as MDOWNER which was created during the MDREST4INS installation earlier.

#### 3.6.3 Running MDRest4i Web UI

Use the following url to connect to the web UI  
HTTP://**youribmiserver:yourport**/cons/

This will bring up the following interface:



Login with *lxradmin* and *lxradmin*

Once logged in, click on any “?” in the UI to bring up the online help

## 4 Creating an HTTP Server Instance for your API's

REST APIs are exposed via an Apache server instance.

The MDRGENSRV command below will create a standard HTTP server instance on IBM i, and start it if requested in the command.

Before running this command please ensure the Admin HTTP server instance is running. To check this use:

```
WRKACTJOB SBS(QHTTPSVR) JOB(ADMIN)
```

If it is not running then use:

```
STRTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)
```

### 4.1 Quick Start Tutorial Setup

**Note:** Skip this section if you are installing a production server or your own development servers

Follow these instructions to get started on the MDRest4i Tutorial as quickly as possible, without setting up your own API libraries.

From the IBM i command line, execute the following commands:

- ADDLIB MDRST & press enter



- If installing MDREST4i iCore for the first time on the development server, with the intention to do the MDRest4i tutorials, run this command:

```
CRTL LIB (MDRTUTLIB) TEXT ('MDREST4i Tutorial Lib')
```

- Followed by **running** this command:

```
MDRGENSRV SRVNAM(mdrest4i) SRVROOT('/WWW/mdrest4i') PORTNUM(4543)
LIBNAME (MDRTUTLIB) AUTHPRF (MOWNER)
```

## 4.2 Development or Production HTTP server setup

If you are skipping the MDRest4i tutorial or have completed it and wish to setup your own HTTP instances for development or production purposes, then prompt the **MDRGENSRV** command. The following screen will appear:

```
MDR Generate Server Instance (MDRGENSRV)

Type choices, press Enter.

Server Name . . . . . yourinstname

Server Root . . . . . '/www/yourinstname'

Port Number . . . . . YOURPORT           Character value
Program ASP . . . . .                       Character value
Start TCP/IP Server . . . . . Y             Y, N
Library Name . . . . . yourapilib         haracter value
+ for more values
Library List . . . . . yourlibs          Character value
+ for more values
Authentication Profile . . . . . MOWNER      Character value

Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Parameter Definitions:

Parameter	Description
Server Name	Name of the HTTP server instance
Server Root	In Server Root parameter, you will have to set the value of IFS path used to store docs for this HTTP instance. For example, if server name is "MDRDEMO" then the value of Server Root parameter could be: '/www/mdrdemo'. It is easier to name them the same for auditing and admin purposes
Port Number	Port Number for the HTTP Server (default value is 80) Please check with your networking, infrastructure admin if allocating a port other than 80. Also check if the port you are using is not already in use on the LPAR you are hosting the server instance being setup
Program ASP	System ASP where the MDRST instance is installed



Start TCP/IP Server	Start the new HTTP server instance. This will start the instance once it is setup by the command
Library Name	Name of library to map the server instance. You can add multiple libnames here. Where <i>yourapilib</i> is where you will create/generate and run API's
Library List	Name of the library/ies which would be added in library list of server jobs. Add libraries here that are needed to execute your APIs if objects are outside the API object library.
Authentication Profile	This profile used to execute the CGI APIs and system APIs used when running REST or SOAP services. By Default this is set as MDOWNER which was created during the installation earlier.

If we set as 'Y' in Start TCP/IP Server parameter, it will start the new server automatically after the command has run. To start the server manually later use command below (Considering the Server Name as "MDREST4i") :

```
STRTCPSVR SERVER(*HTTP) HTTPSVR(MDREST4i)
```

Once the command gets executed, you can see the server instance information stored in IFS path using below command (Considering the Server Root as "/www/mdrest4i"):

```
Wrklnk '/www/mdrest4i /conf/httpd.conf'
```

To see the active jobs running for this server instance use this command on the IBM i:

```
WRKACTJOB SBS(QHTTPSVR) JOB(MDREST4i)
```

### 4.3 Post Implementation Testing

**Please Note:** if this is a first time installation, conduct these tests AFTER the license installation.

Using a web browser, test the Helloworld REST API shipped with the MDREST4i product and found in library MDRST:

- [http://\[your server ip or address\]:\[yourport\]/mdrst/helloworld?name=Smith&title=Mr](http://[your server ip or address]:[yourport]/mdrst/helloworld?name=Smith&title=Mr). You should see the following response

```
https://mddev.mdcms.ch/mdrst82/helloworld?name=Smith&title=Mr
1 {
2   "message": "Hello Mr Smith"
3 }
```

## 5 Troubleshooting the Installation

### 5.1 Token Manager configuration issue from earlier MDRest4i SDK builds/installations

Some of the earlier installation procedures for MDRest4i SDK had configuration errors, now fixed. However the update process does not change existing installations.

**Please Note:** In the two sections below, if you are using any instance name other than default for MDRest4i, MDRST should be replaced with MDRTxxxx where, xxxx is the instance name



### 5.1.1 httpd.conf

First check the `/www/mdrst/conf/httpd.conf` file (either from the HTTPAdmin console or the IFS in 5250 screens). It should look like this:

```
## MDRest4i Console Config
<Directory /www/mdrst/cons>
  <FilesMatch "index.html|startup.json|build.json">
    FileETag None
    Header Unset ETag
    Header Set Cache-Control "max-age=0, no-store, no-cache, must-revalidate"
    Header Set Pragma "no-cache"
    Header Set Expires "Thu, 1 Jan 1970 00:00:00 GMT"
  </FilesMatch>
  Header set Access-Control-Allow-Origin "*"
  Options +FollowSymLinks -MultiViews
  DirectoryIndex index.html
  RewriteEngine On
  RewriteRule mdrconsoleapp_(.*)\.js mdrconsoleapp.js
  RewriteCond %{REQUEST_FILENAME} !-f
  RewriteRule artefacts/TokenManager/tokenapp_(.*)\.js
  artefacts/TokenManager/tokenapp.js
  RewriteCond %{REQUEST_FILENAME} !-f
  RewriteRule ^ index.html [QSA,L]
  Order Deny,Allow
  Allow From all
  ServerUserID mdowner
</Directory>
```

### 5.1.2 startup.json

If TokenManager doesn't list existing tokens, check the `/www/mdrstv12t/cons/artefacts/TokenManager/startup.json` file (using wrklnk in 5250 screens). It should look like this:

```
{
  "apiHost": "",
  "apiPath": "/mdrst"
}
```