Modano Software Architecture

Version:	v1.6
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Contents

1. Introduction

The intended audience of this document are IT departments and technical staff who are required to assess and review the technical details for Modano software installation and architecture.

This document will cover all technical aspects of software installation and requirements as well as detailing the mechanisms of system operation for the purpose of proper installation and maintenance.

This document is not meant to be a user guide for the software itself. For details on the usage of the software please refer to the extensive online documentation available at:

https://www.modano.com/resources

2. Software Components

2.1. Overview

The Modano software solution is built as a COM Shared Add-in for Microsoft Excel, along with supplementary stand-alone executables for configuration, diagnostics, file extension management and software updates. There is also an online repository of model data that can optionally be accessed for quick model development.

2.2. Modano Add-in

The primary Modano solution is built as a managed .NET COM Shared Add-in for Microsoft Excel. This COM Add-in utilizes the IDTExtensibility2, ICustomTaskPaneConsumer and IRibbonExtensibility interfaces to automate Excel. The functionality of the Add-in is broken up between a few different DLLs to cater for 32 vs 64 bit Excel, managed code isolation SHIM, plugin and dependency DLLs.

As the Modano Add-in is a managed code solution that depends on the .NET CLR, it is wrapped in an isolating SHIM (ModanoCore.dll) to ensure that there is no potential impact to other managed executables during run-time.

There is also a Modano.xlam Excel Add-in which is included to enable users to conveniently switch the solution on/off from the Excel Add-ins dialog box.

Figure 1 - Excel Options showing Modano Add-ins
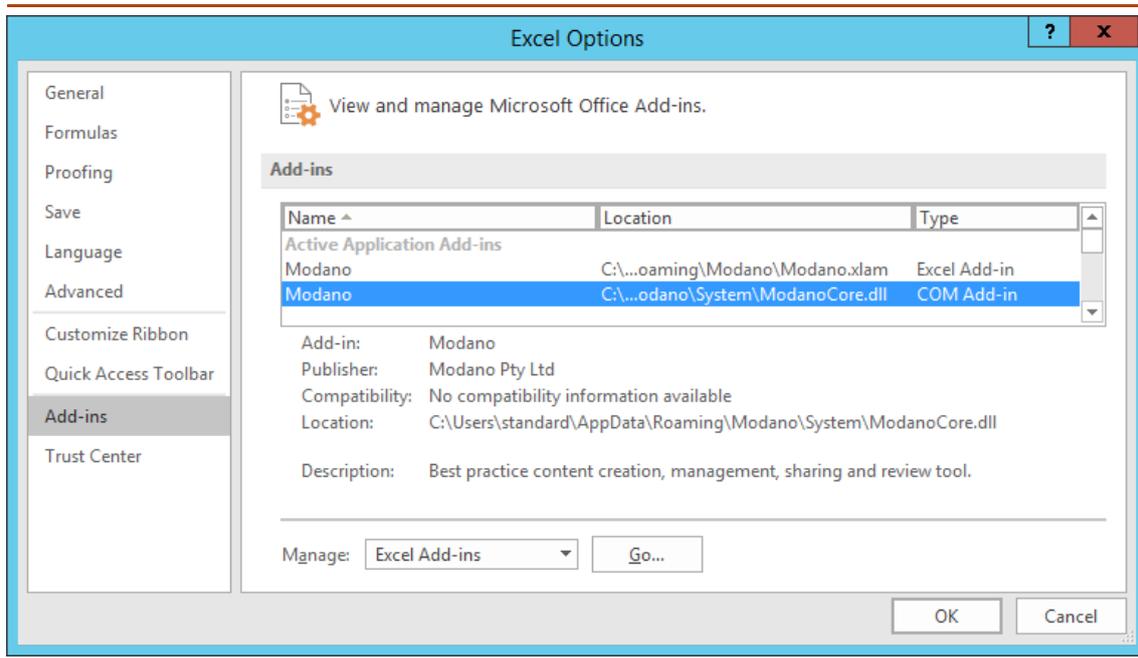
2.3. Configure

Configure is a standalone .NET executable used to control various aspects of the installation configuration.

2.4. Diagnostics

Diagnostics is a standalone .NET executable used to gather system diagnostics information that the user can send to Modano at their discretion. The tool has to be initiated by the user and does not execute without permission.

Diagnostics can also determine if the installation of Modano software was successful and report any errors to the user.

2.5. Update

Update is a standalone .NET executable used to download and execute updates for Modano software. It can be initiated by the user directly, or configured to run periodically through the software to check for updates.

Updates are downloaded from https://www.modano.com/software_updates, stored temporarily in the %TEMP%\ModanoTemp folder, and installed for the user.

2.6. OpenFile

OpenFile is a standalone .NET executable whose sole purpose is to handle file associations with custom Modano file types (listed below) and open Microsoft Excel when required.

OpenFile supports the following file types:

- Modano Project (*.modp)
- Modano Module (*.modm)
- Modano Module Area Library (*.moda)
- Modano Module Links Library (*.modl)
- Modano Module Suite (*.mods)
- Modano 7 Project (*.bpp)
- Modano 7 Module (*.bpm)
- Modano 7 Module Areas Library (*.mal)
- Modano 7 Module Links Library (*.mll)
- Modano 7 Module Suite (*.bms)

3. Requirements

3.1. System Requirements

The following hardware and software is required to properly execute the software. Any other setup is not supported.

Component	Requirement
Operating System	Windows 7, or Windows 8/8.1, or Windows 10, Windows 11, or Windows Server 2008 R2, or Windows Server 2012 / 2012 R2, or Windows Server 2016, or Windows Server 2019
Software	Excel 2007, or Excel 2010 (32-bit or 64-bit edition), or Excel 2013 (32-bit or 64-bit edition), or Excel 2016 (32-bit or 64-bit edition) or Excel 2019 (32-bit or 64-bit edition) .NET 4, or .NET 4.5, or .NET 4.51, or .NET 4.52, or .NET 4.6 Multiple versions of .NET installed side-by-side are supported.
Computer and processor	500 MHz processor or higher.
Memory	256 MB RAM or higher.
Hard Disk	100MB minimum free space (40 MB used by the installation itself, and additional required for temporary access).
Network	Internet access is required to download the software and register the license. Any speed is acceptable as there is no strict requirement.
Drive	N/A
Display	1024 x 768 or higher resolution monitor. >= 1920 x 1080 recommended.
Other	Internet functionality requires internet access.

3.2. Internet Access

Users will require an Internet connection to retrieve the initial software installer. Thereafter the software only requires an internet connection for the purposes of:

a) **License registration:**

Software license registration is performed by contacting the Modano licensing server at:

http://licensing.modano.com (standard HTTP port 80)

This communication is performed and mandatory during initial execution and license renewal.

There are optional calls during uninstallation (to free up the license) and also periodic calls every 30 days or 60 application starts (whichever comes first) to check for alterations to the license (these periodic calls are optional).

To test access, ensure that you can browse to this page from the target computer:

http://licensing.modano.com/TestConnect.html

b) **Module download and software updates:**

Module suites are downloaded by the New Project Wizard to assist with module creation. This action is user initiated and requires internet access to:

https://www.modano.com (standard HTTPS port 443)

https://warlock.modano.com (standard HTTPS port 443)

c) **Internet access check:**

The software will attempt to check if it has any internet connection, or whether the required URLs are whitelisted by testing that it has access to a common internet URL. This test is only undertaken in case of errors connecting to the above and uses:

http://www.google.com (standard HTTP port 80)

d) **Log submission:**

Users can optionally upload application log files for diagnostics. This utilizes:

https://logs.modano.com (standard HTTPS port 443)

e) **Accounting package data import:**

https://connect.modano.com (standard HTTPS port 443)

It is recommended that you whitelist the modano.com and all subdomains for HTTP and HTTPS ports, using wildcards (shown below), however if this is not feasible you can whitelist all the specific subdomains listed above.

http://*.modano.com

https://*.modano.com

4. Packaging and installation

4.1. Installer Overview

The solution is distributed using a standard Windows Installer (MSI) file. There are two variants to pick from, the Standard and Global installer. Both installers do the following common tasks:

a) Checks that system requirements are met.

b) Install software components.

c) Installs the Modano Pty Ltd code signing certificate into the Windows trusted publisher X509 certificate store.

d) Sets up the required registry keys under HKEY_CURRENT_USER (Standard installer) or HKEY_LOCAL_MACHINE (Global installer) to register the Modano COM add-in components, and custom file types (see section 2.6)

4.2. Standard Installer

The Standard installer is designed for the majority of users and installs components only for the current user. It is done this way so as to not require any elevated (administrator) permissions for installation.

The install location is [APPDATA]\Modano. AppData is the user's application data folder and typically located at C:\Users\[USERNAME]\AppData\Roaming (however this varies with different versions of Windows).

Figure 2 - Software files from Standard install.
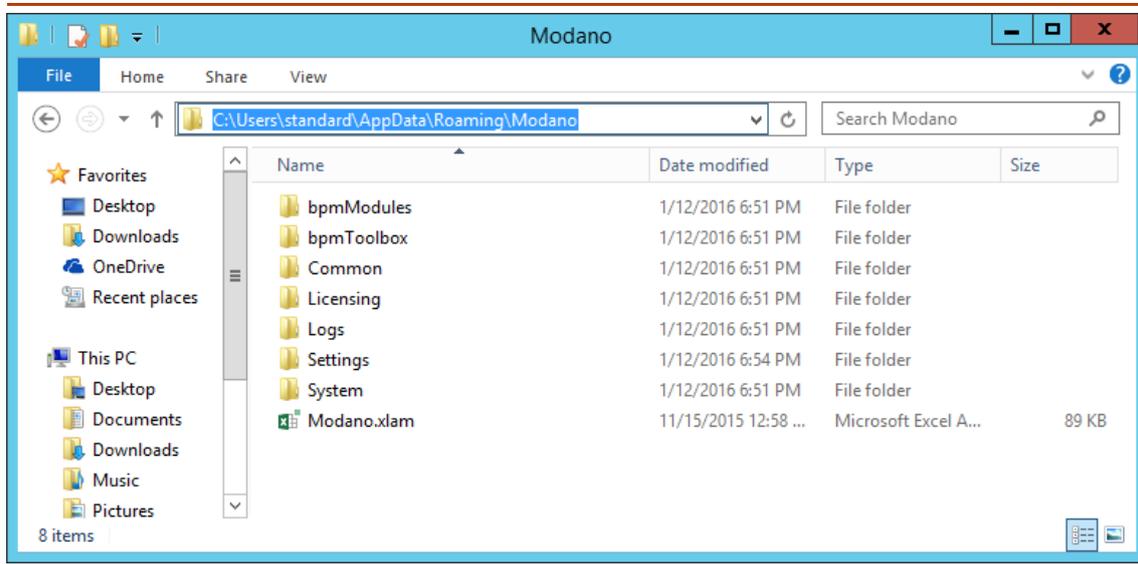
If you find that you need to install for all users on a machine, then you will want to use the Global installer instead.

4.3. Global Installer

The Global installer is designed for the corporate environment which will have different requirements and will likely be configured by an IT administrator. This installer installs the software into Program Files (or other custom location), and registers them in HKLM such that the software is available for all users of the machine. As such it requires elevated privileges to execute.

On Terminal Server based environments, where users access the software remotely via Terminal Services (or Citrix or similar), the Global installer also caters for opt-in activation. This enables you to install on a whole fleet of servers, and then selectively enable a group of users by placing the following registry key into their HKCU hive:

```
[HKEY_CURRENT_USER\Software\Modano]

"RemoteUserEnabled"=dword:00000001
```

One setup option would be to have users of the software added to a custom Active Directory (AD) group, and then have this group associated with a registry preference set up in a Group Policy object to add the "RemoteUsersEnabled" registry key. This will enable you to easily add and remove users from the AD group when the software is desired or not.

A value of 1 indicates that the user has opted-in and should see the Modano tabs in Excel. A value of 0, or a missing key, indicates that they have not-opted in. This behaviour is only present when the user is accessing the software via Terminal Services and using the Global installer.

4.4. Silent Install

The MSI installer supports silent installation and can be scripted using msiexec. An example command is shown below:

```
msiexec /quiet /norestart /i c:\path\to\Modano-Installer.msi
```

For the Global installer, you can control the installation directory by specifying the INSTALLDIR property. Here is an example where we install into c:\apps (make sure you execute this as a user with administrator privileges as the Global installer requires it):

```
msiexec /quiet /norestart /l*v output.log /i c:\path\to\Modano-
Installer.msi INSTALLDIR=c:\apps
```

5. Updates

Software updates are performed by retrieving the latest version details and installer from https://www.modano.com/. These updates are optional, but it is recommended to stay up to date with the latest release so that you benefit from product improvements.

Figure 3 - Software Updater
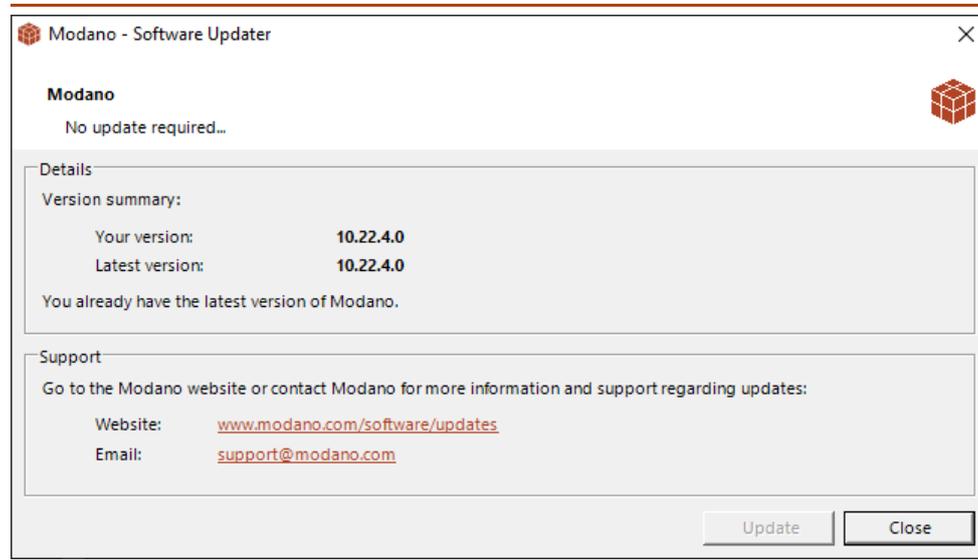
Release notes for each update can be found online at:
https://www.modano.com/software/release_notes

6.   Security

6.1. Code Signing

All elements of the Modano solution are code signed with the Modano Pty Ltd digital code signing certificate (see Appendix 8.1- Code Signing Certificate). This ensures that the solution originates from Modano and that it is recognised by Excel as a trusted Add-in.

Figure 4 - Code Signature Details
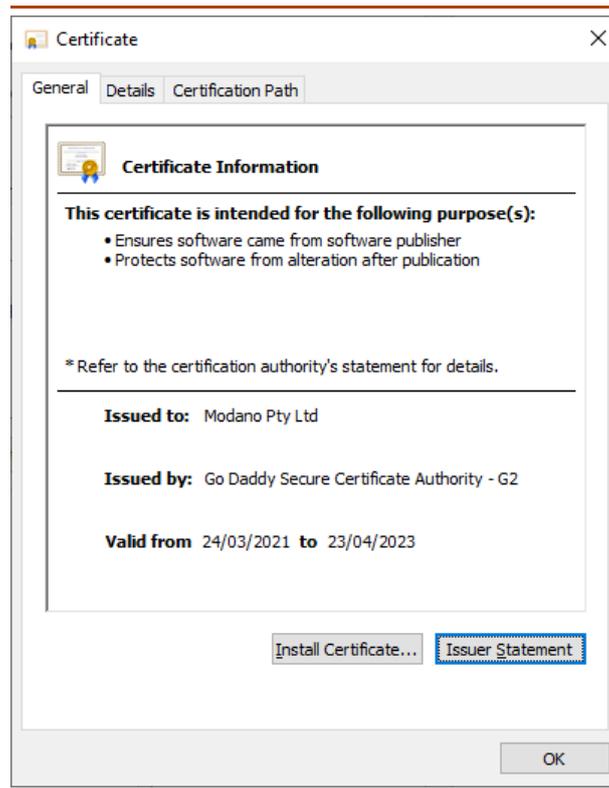
During software installation the code signing certificate is installed into the Windows Current User trusted publisher X509 certificate store. This ensures that Excel is aware of the certificate for the current user (and only the current user) and trusts the Add-in.

Figure 5 - Excel Trust Centre showing trusted publishers
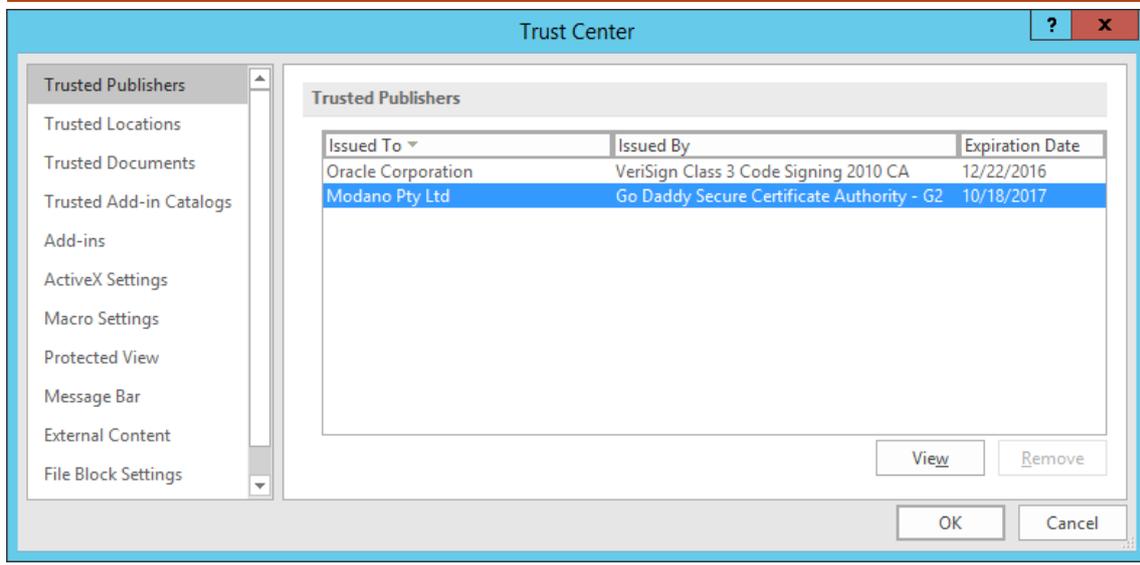
7.   Licensing

Modano software must have a valid license before it can execute. This validation is performed by obtaining a machine fingerprint (containing no personal information) and registering this against the Modano licensing server (see section 3.2- Internet Access).

Licensing is done on a per-machine basis, with the exception that if you are using the software remotely (via Terminal Services or similar), licensing then switches to per-user basis.

The licensing check must be performed during initial software execution (after install), and also during license renewal. However, it is also set up to perform periodic calls to the licensing server every 30 days or 60 starts of the software (whichever comes first). This ensures that the software periodically validates the license and any changes to it (renewals, etc.), but is set up to not be intrusive and sufficiently lenient. For example, if it can't connect after 30 days it will silently retry for 3 subsequent days, and even if it still can't get out the software will continue to function as normal until expiry.

The intermediate periodic licensing checks are there to pick up license changes and renewals, but aren't mandatory.

Software licenses can be freed up by uninstallation, and then reinstalled on a new users account (or different machine for the same user).

8. Appendix

8.1. Code Signing Certificate

```
-----BEGIN CERTIFICATE-----
MIIFGjCCBAKgAwIBAgIIOvqDCurjCtkwDQYJKoZIhvcNAQELBQAwgbQxCzAJBgNV
BAYTAlVTMRAwDgYDVQQIEwdBcml6b25hMRMwEQYDVQQHEwpTY290dHNkYWxlMRow
GAYDVQQKExFHb0RhZGR5LmNvbSwgSW5jLjEtMCsGA1UECxMkaHR0cDovL2NlcnRz
LmdvZGFkZHkuY29tL3JlcG9zaXRvcnkvMTMwMQYDVQQDEypHbyBEYWRkeSBTZWN1
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MTcxMDE4MjMxMzM4WjBmMQswCQYDVQQGEwJBVTERMA8GA1UECBMIVmljdG9yaWEx
EjAQBgNVBAcTCU1lbGJvdXJuZTEXMBUGA1UEChMOTW9kYW5vIFB0eSBMdGQxFzAV
BgNVBAMTDk1vZGFubyBQdHkgTHRkMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIB
CgKCAQEAoZXB4p+vHffi47CU5HmIx8bIkINKok/s5Dz5QVYX5PODePJFXKVKVKpl
HnP8FoB9IJEg5OsWbQg6vRZRKbUB5coU+Ni0jJzfmC0eQTBx7V+XIuYIXsoBmQV6
CaG56dpXR/U/vIOsi+HDj4gdXZ9Bxb6mrgqZrIXiAfQNOQ3Ai1IkN/9l6Wf2WUIU
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77unQ/oY2AbQqAgAYk5sOdYGdBiMHQIDAQABo4IBezCCAXcwDAYDVR0TAQH/BAIw
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LDAqoCigJoYkaHR0cDovL2NybC5nb2RhZGR5LmNvbS9nZGlnMnM1LTEuY3JsMFMG
A1UdIARMMEowSAYLYIZIAYb9bQEHFwIwOTA3BggrBgEFBQcCARYraHR0cDovL2Nl
cnRpZmljYXRlcy5nb2RhZGR5LmNvbS9yZXBvc2l0b3J5LzB2BggrBgEFBQcBAQRq
MGgwJAYIKwYBBQUHMAGGGGh0dHA6Ly9vY3NwLmdvZGFkZHkuY29tLzBABggrBgEF
BQcwAoY0aHR0cDovL2NlcnRpZmljYXRlcy5nb2RhZGR5LmNvbS9yZXBvc2l0b3J5
L2dkaWcyLmNydDAfBgNVHSMEGDAWgBRAwr0njsw0gzCiM9f7bLPwtCyAzjAdBgNV
HQ4EFgQU1IBDy31Alwzx6b88Ed3Mpskbweswx9YJKoZIhvcNAQELBQADggEBAGc7
W4LjJKoBd4YasqP8CZjvS96dIunys6AFwEaXp5hzuXN2iQGz1y51yW9OnizTjSWI
NkbmAsKKb0BIMpmwfTxPRcVsuf0XgMPu1Q919HjDdFysvtAyQaqThU0bMLPMCCWo
c4AemjFD4EObBJrrHO3M8Y+rHbui6ye3LdbbqF3qXgjM1FdOL8IkXv9W3p2oE3l+
pd7tUmqQ1YQ7hw6u/gI+iS+Uf4QKMgonjnUFiL+XKaDp2+YTtkPj4Nf1nnB4vF8S
K//yQLNl+TLsVycmCqrFO1XFxgYtBGndYR3kL41MRNONQIWZIEHRH4AkzNLpD+9p
e8F/8LsEwT4P/kQLLvE=
-----END CERTIFICATE-----
```