**AIMMS User's Guide - Deploying End-User Applications**

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# Chapter 15

# Deploying End-User Applications

*Deployment considerations*

After a successful development phase of your AIMMS application, you have to start thinking about its deployment. For the application to become a successful end-user application too, you, as the application developer, need to consider issues like *protecting your intellectual property*, *authenticating your end-users*, and *distribution* of your application. AIMMS offers various tools to help you in all of these areas.

*Application protection and authentication*

AIMMS offers several levels of protection that can be applied to your application. To protect the content of your model from being viewed by the unauthorized users, AIMMS allows you to encrypt (parts of) your model. To protect the application against unauthorized access you can encrypt your application using the public keys of all authorized users. To further arrange the appropriate level of access within an organization, you can associate a user database with your AIMMS application, which can then be used to authenticate individual users and provide their level of access to your application. Protecting your AIMMS application and authenticating its use are discussed in full detail in Chapter 19.

*Application distribution*

To be able to run an AIMMS project, your users will need a copy of the project itself. To support easy project distribution, an AIMMS project can be compacted and distributed as a single-file project. In addition, your users need to have installed AIMMS on their computer. In order to enter input data and/or run the model, end-users need a commercial license of AIMMS.

AIMMS *PRO*

A more convenient way to distribute your application to your end-users is to use the AIMMS *P*ublishing and *R*emote *O*ptimization platform. AIMMS PRO makes it possible to deploy AIMMS applications to end-users quickly and efficiently through the AIMMS PRO Portal. More importantly, the AIMMS PRO Portal assures end-users can access the latest version of these AIMMS applications (and the corresponding versions of the AIMMS software) at all times through a web browser. More information on AIMMS PRO can be found in the AIMMS PRO User's Guide.

*This chapter*

This chapter gives some background on AIMMS end-user mode, and discusses `.aimmspack` project files, which you can use to distribute your AIMMS project as a single file.

## 15.1 Running end-user applications

*Running end-user projects*

An AIMMS project can run in two different modes, *developer* mode and *end-user* mode. While the developer mode allows you to use the full functionality described in this User's Guide, the end-user mode only allows you to *access* the end-user pages of the AIMMS project that were created in developer mode.

*Disabled functionality*

The AIMMS end-user mode lacks the essential tools for creating and modifying model-based applications. More specifically, the following tools are not available in end-user mode:

- the **Model Explorer**,
- the **Identifier Selector**,
- the **Page Manager**,
- the **Template Manager**, and
- the **Menu Builder** tool.

Thus, in end-user mode, there is no way in which an end-user can modify the contents of your AIMMS-based application.

*Allowed usage*

AIMMS end-users can only perform tasks specified by you as an application developer. Such tasks must be performed through data objects, buttons and the standard, or custom, end-user menus associated with the end-user pages in your project. They include:

- modifying the input data for your model in the end-user interface,
- executing procedures within your model to read data from an external data source, or performing a computation or optimization step,
- viewing model results in the end-user interface,
- writing model results to external data sources or in the form of printed reports, and
- performing case management tasks within the given framework of case types.

Thus, an end-user of your application does not need to acquire any AIMMS-specific knowledge. The only requirement is that the interface that you have created around your application is sufficiently intuitive and clear.

*Requirements*

Before you can distribute your AIMMS project as an end-user application, two requirements have to be fulfilled:

- you must have exported your application as an *end-user project* (see Section 19.1), and
- you need to associate a *startup page* with your application which will be displayed when your application is started by an end-user.

*Assigning a startup page*

For every end-user project, you must associate a single page within the project so that it becomes the project's *startup page*. Such an association can either be made directly by selecting a page for the 'Startup Page' option in the AIMMS **Options** dialog box (see Section 20.1), or implicitly as the first opened page in the *startup procedure* of the project using a call to the `PageOpen` function.

*Role of startup page*

After opening your project in end-user mode, AIMMS will display the startup page. As all communication between the end-user and your model is conducted through end-user pages of your design, this first page and/or its menus must provide access to all the other parts of your AIMMS application that are relevant for your end-users. If all pages are closed during a session, the end-user can still re-open the startup page using the first page button on the **Project** toolbar, or via the **View-First Page** menu.

*Startup procedure*

In addition to a startup page you can also provide a startup procedure in the project-related AIMMS options. Inside the startup procedure you can perform any initializations necessary for an end-user to start working with the project. Such initializations can include setting up date or user related aspects of the project, or reading the data for particular identifiers from a database.

*Replacing the splash screen*

By default, AIMMS will display a splash screen during startup. When you are opening AIMMS with a particular project, you can replace AIMMS' own splash screen with a bitmap of your choice. If the project directory contains a bitmap (`.bmp`) file with the same name as the project file, AIMMS will display this bitmap file on the splash screen. In such a bitmap you can display, for instance, version information about your project.

## 15.2 Preparing an AIMMS application for distribution

*.aimmspack project files ...*

A complete AIMMS application consists of several files (see Section 2.5 for an overview of these files), all of which should also be distributed to the user of the application. To make the distribution of an AIMMS application easier, AIMMS offers the possibility to distribute your project as a single-file project, by packing all relevant files into a single file with the `.aimmspack` extension.

*Creating a .aimmspack file*

Turning your project into a single-file, end-user project is very straightforward. Just select the **File-Export End User Project** menu command which will open the **Select destination .aimmspack File** dialog box which allows you to specify the name and location of the file to be exported.

*Encryption*

After having specified a destination file, the **Encryption of Exported End-User Project** dialog box opens which allows you the security setting for your end-user project. Encryption is described in more detail in Section 19.1.

*The .aimmspack file contents*

By default AIMMS will select all files in the project directory to be included in the `.aimmspack` file while ignoring all files in the `Backup` and `Log` directories. All files associated with referenced library projects will also be included. The project (`.aimms`) and all source files (e.g. `.ams` and `.xml` files) for the main project and all of the library projects involved are mandatory while the settings for all other files can be changed through the **Select Files for Export** dialog box (see Figure 15.1. Note that only include files (and folders) that are contained in the main project folder and folders of library projects. If your project refers to files in other locations you must make sure that these files exist on the destination computer.

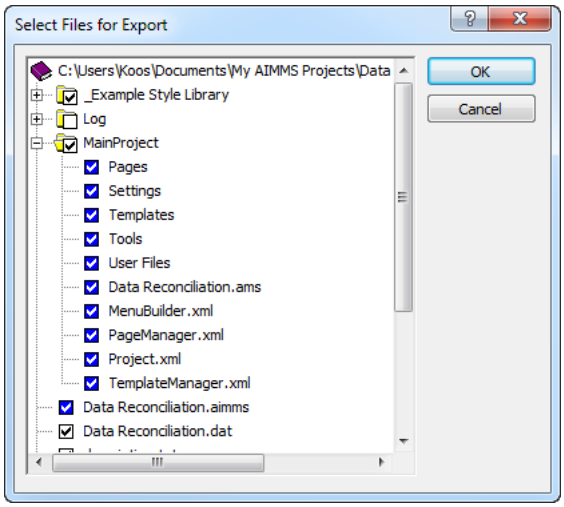


Figure 15.1: The **Select Files for Export** dialog box

*Running an .aimmspack project file*

The `.aimmspack` project files are dealt with as if they were ordinary AIMMS project files. Both the developer and end-user version of AIMMS are capable of running both `.aimms` and `.aimmspack` files.

*Unpacking an .aimmspack project file ...*

When a *developer* opens an .aimmspack project file, he will *always* be prompted for a location where to unpack to. On the other hand, when an *end-user* opens an .aimmspack project file, only the *first time*, he will be prompted for a location where to unpack to. Any subsequent time an end-user opens the .aimmspack file, AIMMS will look whether the location where the .aimmspack file was unpacked previously contains the unpacked version of the same .aimmspack file. If so, AIMMS will open the unpacked version without user interaction. Otherwise, AIMMS will prompt the end-user for a (new) location, unpack the .aimmspack project and run it with AIMMS. So, when you send your end-user an updated version of a packed project, AIMMS will notice the version change and prompt the end-user with a question whether or not to overwrite the existing project with the new version.

*... using the command line*

Alternatively, you can indicate where you want the .aimmspack file to be unpacked via the commandline argument *--unpack-folder*.

*Selecting an AIMMS version*

If multiple AIMMS versions have been installed on the computer, you can select the particular AIMMS version to use on an .aimms or .aimmspack file through the right-mouse popup menu in Windows Explorer. If you double-click an .aimms or .aimmspack the AimmsLauncher utility program will try to open the AIMMS version that most closely matches the AIMMS version that was used to create the project.