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## **AIMMS Excel Add-In User's Guide - Installation and Example**

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## Chapter 2

### Installation and Example

This chapter describes in detail how to install the AIMMS Excel add-in. In addition it provides an example spreadsheet illustrating most of the features of the add-in.

*This chapter*

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#### 2.1 Installation

In order to be able to use the AIMMS Excel add-in, the add-in has to be installed in your copy of Excel. This task will be automatically performed for you if you open the example that is described in section 2.2. First, you must have a copy of the AIMMS system properly installed on your computer.

*Automatic installation*

After opening the Excel file of the example, you might be asked whether you want to enable macros. Please click on **Enable Macros**, since the automatic installation is done with an Excel macro. After clicking on this button, you should receive the message shown in figure 2.1.

*How?*

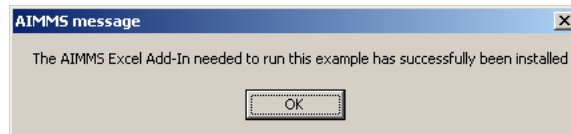


Figure 2.1: The message after a successful installation of the add-in

It's possible that the automatic installation procedure of the AIMMS Excel add-in encounters an error. This is usually the result of your AIMMS system not being properly installed. Please re-install the AIMMS application and try again. If that doesn't help, please contact Paragon Decision Technology to resolve the problem.

*Installation errors*

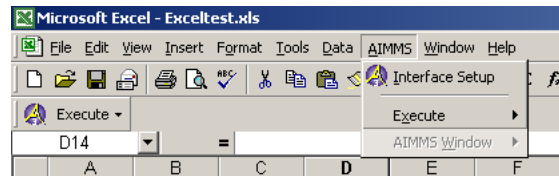


Figure 2.2: The AIMMS menu and the **Execute** toolbar item

When the installation is successful, you should notice the appearance of a new **AIMMS** menu item, an **Execute** toolbar item and a toolbar item with the AIMMS logo (see figure 2.2). They form the starting point for using the AIMMS Excel add-in.

*Changed Excel interface*

When you close the example, you're being asked whether you want to keep the AIMMS Excel add-in installed or not. If you choose to uninstall, you can always have the add-in automatically reinstalled by opening the example again.

*Uninstall*

In addition to installing the add-in by running the included example, you can of course also install and uninstall the AIMMS Excel add-in manually through the **Tools-Add Ins** menu in Excel versions previous to Excel 2007. In Excel 2007, you should:

*Manual installation*

- click the **Microsoft Office Button**
- click **Excel Options**
- click the **Add-Ins** category
- in the **Manage** box, click **Excel Add-ins**
- click **Go** to navigate to the AIMMS Excel Add-In and select it.

For further information about installing and uninstalling add-ins in this manner, you are referred to the Excel documentation.

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## 2.2 An example spreadsheet

Your AIMMS system includes an Excel spreadsheet `ExcelAddInExample.xls` that makes calls to the well-known transport model in AIMMS using the AIMMS Excel add-in. You can find it by opening the Excel `Link.aimmpack` file that can be found in the `Examples` directory of AIMMS or in the `Index of all Examples` (see link on the startpage of AIMMS). Opening the example will unpack the `.aimmpack` file after which you can access `ExcelAddInExample.xls` via the Windows explorer. As illustrated in Figure 2.3, the spreadsheet contains all relevant input- and output data of the transport model, such as the unit transport cost, the supply and demand on the input side, as well as the actual transport on the output side.

*Transport model example*

	A	B	C	D	E	F	G	H	I	J
1		<b>Customers</b>	cust-1	cust-2	cust-3	cust-4	cust-5			
2										
3	<b>Depots</b>	<b>UnitCost</b>								
4	dep-1		0.63	0.45	0.67	0.63	0.85			
5	dep-2		0.10	0.00	0.04	0.65	0.84			
6	dep-3		0.67	0.66	0.21	0.14	0.07			
7	dep-4		0.82	0.86	0.11	0.67	0.76			
8	dep-5		0.15	0.13	0.17	0.85	0.31			
9										
10		<b>Demand</b>	25	25	25	25	25			
11									<b>Supply Available</b>	<b>Supply Left</b>
12	<b>Depots</b>	<b>Transport</b>								
13	dep-1					21			27	6
14	dep-2		25		2				27	
15	dep-3					4	23		27	
16	dep-4				23				27	4
17	dep-5			25			2		27	
18										
19		<b>Total Cost</b>	24.38							

Figure 2.3: The transport example spreadsheet

To solve the model for given demand and supply, you can run the **Execute-Main** command from the AIMMS toolbar illustrated in Figure 2.4 *How to solve?*

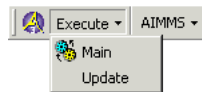


Figure 2.4: The AIMMS-Execute toolbar

When you run this command, Excel will randomize the data in the unit transport cost area of the spreadsheet, and successively call AIMMS to solve the optimal transport for the given demand, supply and unit transport cost, and store these values in the transport area of the sheet.

To discover how this interface with AIMMS is accomplished, push the AIMMS icon on the AIMMS toolbar of Figure 2.4. This will pop up the **AIMMS Interface Setup** dialog box illustrated in Figure 2.5. Through three tabs on this dialog box, you can specify *Interface setup*

- which AIMMS project the Excel sheet should connect to,
- which execution sequences are defined, and
- whether the setup dialog box should be password-protected.

Through the **Execution Sequences** tab of the **AIMMS Interface Setup** dialog box, you can define one or more *execution sequences*, which each specify a number of *actions* with respect to the selected AIMMS project. Because execution sequences can be made visible under the **Execute** menu of the AIMMS toolbar, they form the main interface for end-users of your spreadsheet to perform AIMMS-related tasks. *Execution sequences*

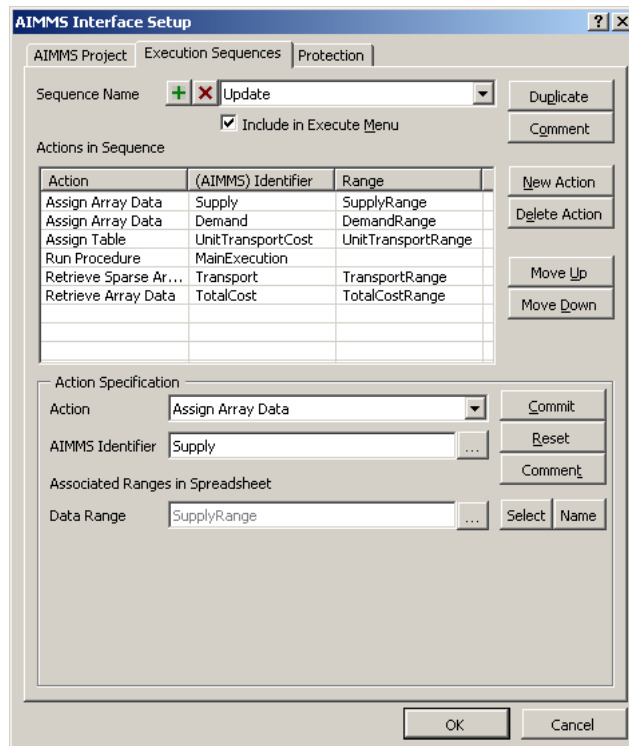


Figure 2.5: The AIMMS Interface Setup dialog box

In the **Execution Sequences** tab you can add new actions to the list of actions associated with an execution sequence, modify or delete existing actions, supply comments on the execution sequences and actions, and change the order of execution of the specified actions. When adding an action, you choose from a number of predefined actions to perform various tasks that are relevant when interfacing with an AIMMS project, such as:

*Sequence actions*

- transfer data from Excel to AIMMS and vice versa, in various formats,
- run procedures in the AIMMS model, or
- run macros in the spreadsheet.

The **AIMMS Interface Setup** dialog box of Figure 2.5 illustrates the definition of an execution sequence called Update. When this execution sequence is executed, the AIMMS Excel add-in executes a number of actions to:

*Update sequence explained*

- transfer the data in the named Excel range SupplyRange to the AIMMS identifier Supply,
- transfer the data in the named Excel range DemandRange to the AIMMS identifier Demand,
- transfer the data in the named Excel range UnitTransportRange to the AIMMS identifier UnitTransportCost,

- run the AIMMS procedure `MainExecution`,
- retrieve the data of the AIMMS identifier `Transport` and store it in the named Excel range `TransportRange`, and
- retrieve the data of the scalar AIMMS identifier `TransportCost` (the objective value) and store it in the named Excel range `TransportCostRange`.

Thus, the `Update` sequence performs the complete exchange of data with the transport model in AIMMS necessary to retrieve a new solution after an update of the input data.

In addition to the `Update` sequence, the **AIMMS Interface Setup** dialog box defines two additional (predefined) sequences `Initialization` and `Main` (see also Chapter 4). Of all defined sequences, the `Initialization` sequence is hidden in the **Execute** menu in the AIMMS toolbar.

*Other sequences*

The predefined sequence `Initialization` is called once during the start-up of every session of the associated AIMMS project. In this example it is used to initialize the sets `Depots` and `Customers` in the AIMMS model, as illustrated in Figure 2.6.

*Main and Initialization sequence*

Actions in Sequence		
Action	(AIMMS) Identifier	Range
Assign Set Data	Depots	DepotsRange
Assign Set Data	Customers	CustomersRange

Figure 2.6: The **Initialization** execution sequence of the transport example

The `Main` execution sequence of the transport model example contains two actions (see figure 2.7). The first action is a **Run Macro** action that runs an Excel macro which assigns random numbers to the **Unit Transport Range** of the sheet (initially range C4:G8). The second action is a call to the execution sequence `Update` described above.

*Main*

Actions in Sequence		
Action	(AIMMS) Identifier	Range
Run Excel Macro	AssignRandomTra...	
Run Sequence	Update	

Figure 2.7: The **Main** execution sequence of the transport example

The example uses a strict separation of data and algorithms. All data for the model is entered (or randomly assigned, in the case of the Unit Cost data) in the spreadsheet. The whole model needed to solve the problem is defined in AIMMS. The AIMMS Excel add-in is used to first transfer the data from Excel to AIMMS, solve the model and finally retrieve the AIMMS variables that have been calculated. Such a strict division of data and algorithms is highly advisable, as already pointed out in the introduction to this chapter.

*Separation of data and algorithms*