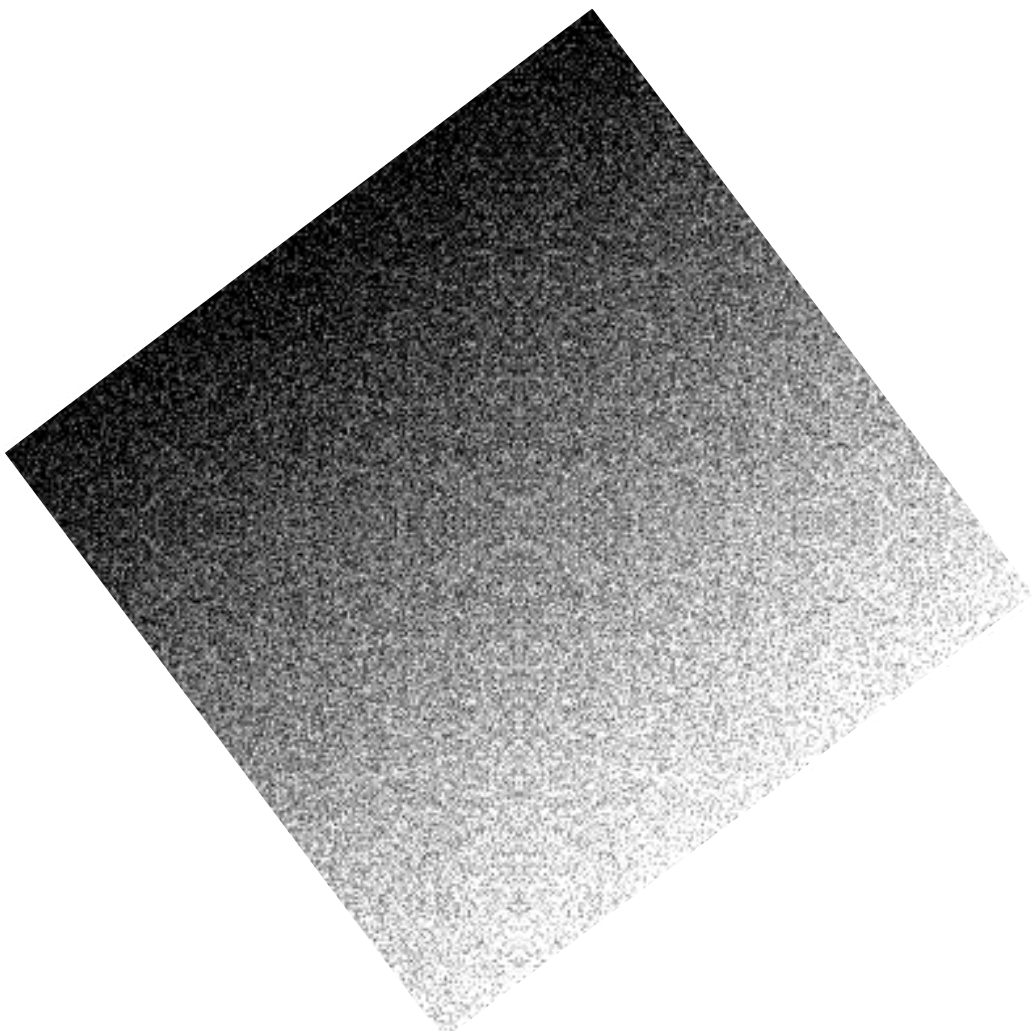
Intelligent Decision Server

IBM

Capsule User's Guide

Version 1



SC26-8906-00

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Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page vii.

First Edition (October 1996)

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About This Book

The book describes how to use the Capsule tool to build custom applications that analyze, manage, report and describe your company's data.

Who Should Read This Book

The Capsule tool can be used by all types of users to address different kinds of business problems. Capsule applications can be customized to be as complex or as simple as you choose. This guide is intended for all users who need to develop applications in the IDS environment. You should be familiar with the desktop management tools and with terminology that is basic to IDS.

Before you can build your own Capsule applications, you must be familiar with the tools that perform data analysis, data access, and desktop management functions. This user's guide describes how such tools can be used as part of a Capsule application. To get the most from this guide, you should know how to perform a database query, generate a report, format a document, and so on.

Prerequisite Reading

Many IDS tools can be incorporated into Capsule applications, and for each type of tool there is a publication. The road map shows the path you can take through a few of those publications, those describing the tools that are most often used in conjunction with the Capsule icon.

The tools you will be most likely to use in your Capsule applications are described in the following IDS publications:

Getting Started with the Intellegent Decision Server
: Develop a BASIC application and use it in conjunction with IDS tools in a Capsule window.

BASIC Tool User's Guide
: Develop a BASIC application and use it in conjunction with IDS tools in a Capsule window.

Data Entry User's Guide
: Use a Data Entry icon to set values inside a Capsule application. Note that instructions on how to build Data Entry icon are in *Forms Design User's Guide*.

Interacting with PC Applications
: Exchange data with desktop applications from within a Capsule window, using the IDS desktop Interaction tools (Clipboard, desktop Directory, and desktop Application) and desktop Data icons (desktop.RFT and desktop.RTF).

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Layout User's Guide
Receive data from other tool(s) and create a free-form report.

Plot User's Guide
Receive data from other tool(s) and present the data visually in a graph or chart.

Query User's Guide
Retrieve data from a database, analyze it, perform calculations, and pass the results to other icon(s) inside your Capsule window.

Reporter User's Guide
Retrieve data from a database (or receive data from another icon), analyze the data, and format it into a report. The results can be passed to other icon(s), including Printer, in your Capsule window.

Spreadsheet User's Guide
Calculate and analyze data received from other tools, set variables in a Capsule window, or control iterative Capsule processes.

SQL Entry User's Guide
Run SQL programs against a database and pass the results to other tool(s) within a Capsule application.

Text User's Guide
Create text documents by receiving and formatting the results (including data and images) of other tools, or by receiving data and images from other tools and software packages.

Transformers User's Guide and Reference
Manipulate data received from other tools inside a Capsule window, and pass the data on to other tool(s). Note that this manual covers the basic set of IDS transformers.

Working with the Intelligent Decision Server
Get data from a File Drawer, use a Folder icon as a container for results data, or use an Envelope, Mail Tray, or Printer icon to output results data.

IDS also offers you a way to automatically retrieve data from a host system and include it in your Capsule processing. For details on that type of application, refer to this IDS manual:

Developing Applications with Cooperative Application Services (GC26–8883)

We'd Like Your Comments

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There you'll find the Feedback Connection page where you can enter comments and send them to us.

Chapter 1. What Is a Capsule Application?

The IBM Intelligent Decision Server (IDS) furnishes tools that you can use to retrieve, analyze, and present data. The Capsule tool lets you combine these powerful capabilities; it encapsulates these processes, allowing them to automatically work together. With the Capsule tool, you can harness all the complex relational data in your company database to produce reports and generate analyses.

Like other IDS tools, the advanced capabilities of the Capsule tool are easily mastered by non-technical business professionals. No matter what your level of expertise, the Capsule tool allows you to build your own application programs using icons and windows. You do this by copying tool icons into a blank Capsule window, then specifying the data path between the icons with arrows. An application can be something as simple as a setup for creating form letters, or it can be a monthly report analysis that gathers data for presentation to several users.

For example, you can use the Query tool to retrieve data, copy the retrieved data to a spreadsheet for analysis, and finally, copy the analyzed data to a Text document for inclusion in a memo. You can finish the task by mailing the results of your data retrieval and analysis to another desktop user. By copying Query, Spreadsheet, Text, and Mail Tray icons into a Capsule window, you can perform all these tasks in one processing sequence, at the click of the **Run** button.

The Capsule tool is essentially a programming language that lets you construct reusable desktop applications using tool icons and arrows. You control the flow of data within a Capsule application by merely changing the arrow options, specifying different regions, or entering an input file name in the options window.

In addition, you can lock icons inside a Capsule window so that they cannot be moved, deleted, copied, or opened by unauthorized users. This feature ensures that complex applications can be made available to other users without compromising security.

To make the processing more convenient, the Capsule tool supports the use of user-defined variables. With this capability, you can use the same variables in different desktop tools, and change the values of those variables in one place — the Capsule controls window.

Even more powerful is the ability to put Capsule icons inside other Capsule icons. For example, you can nest specific Capsule routines inside more general Capsule applications. You can use these routines over and over again, adding new values, and generating new reports for each set of values.

After you have access to a series of prebuilt business applications, you can store such applications for general use. Using the Reference Capsule capability, you can build a library of Capsule applications that can be accessed by many different users. Furthermore, using the Reference Capsule feature lets you conserve disk space by copying commonly used applications only when you need them.

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The Capsule Summary feature provides a way to document your applications for other users. Summary reports are available for icons, arrows, and variables.

Using the Capsule Run Log lets you to create a report about a processing sequence so that you can provide documentation to other users or troubleshoot complex applications at the detail level.

Later chapters of this manual contain detailed information about the capabilities of the Capsule tool. Table 1 provides a general overview of how you can use IDS tools inside your Capsule applications.

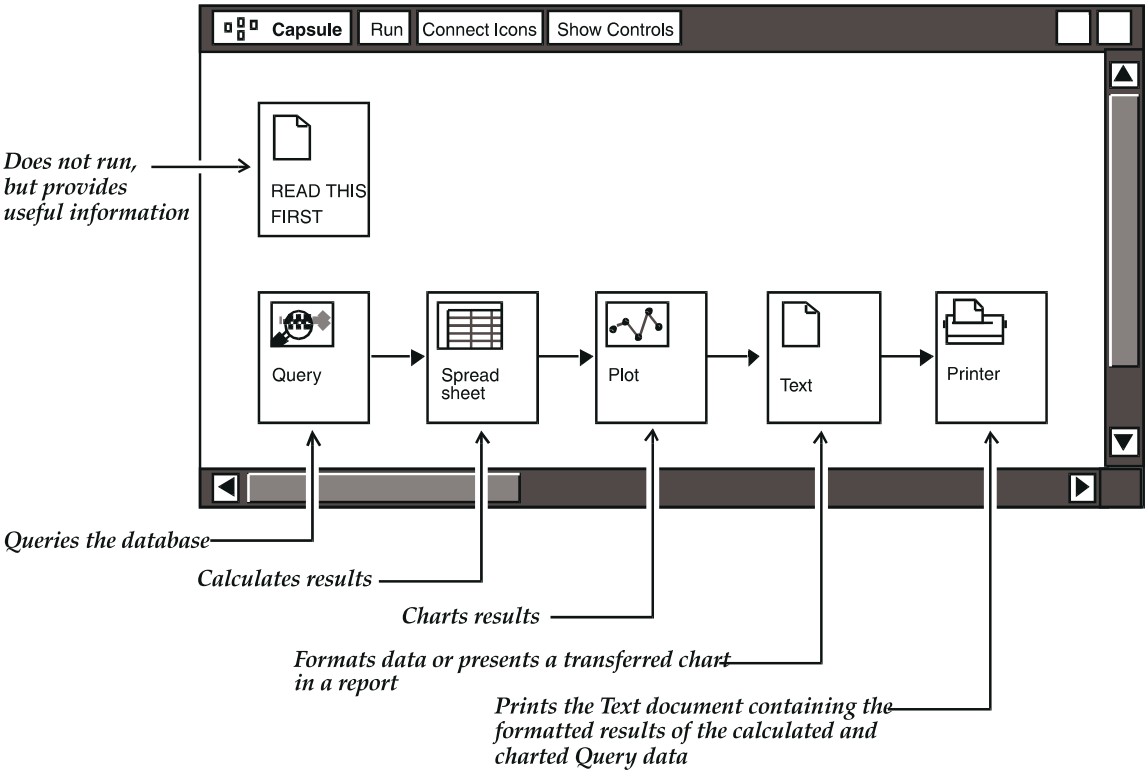
Table 1. Using IDS tools in Capsule applications

Tool	Use to
Clipboard	Transfer data between icons and desktop Application icons
Envelope	**Mail an icon automatically from inside a Capsule application, using the Mail Tray**
Data Entry	Set and change @-variable values inside complex Capsule applications and update a database
File Drawer	Contain the results of a Capsule processing sequence
Folder	Contain the results of multiple iterations in a Capsule application
Layout	Produce free-form reports using retrieved data
Mail Tray	Send and receive electronic mail by relaying it through the IDS mail service
desktop Application	Run desktop applications within Capsule applications
Plot	Create a plot of retrieved and analyzed data
Printer	Print the results of the Capsule application
Query	Perform data access, date arithmetic, and some forms of computation
Reporter	Create reports for pattern and trend analysis
Spreadsheet	Provide complex data analysis, and control iteration in nested Capsule icons
SQL Entry	Run SQL statements inside a Capsule application
Text	Format the results of other processes, then label them for display, report generation, or printing
Transformer	Perform data manipulation tasks

A sample Capsule application can include any logical combination of compatible icons that you can set up to produce a set of instructions. For example, an application that produces and automatically prints a monthly sales analysis could begin with a database query using the Query tool. Next, the information is transferred to a spreadsheet where it is sorted and perhaps calculated. Transferring the calculated columns of information to a Plot icon lets you graphically depict the results in any format that you choose. A final transfer to a Text icon places the graphic into a preformatted monthly report that is automatically sent to a local printer icon. In addition, you might find it very useful to

include a carefully-labeled Text icon that provides documentation about how the Capsule processing sequence is supposed to run.

You activate the processing sequence by clicking on a **Run** button in the Capsule window header. Such an application, including the documentation labeled **READ THIS FIRST**, might look like this:



Chapter 2. Getting Started with the Capsule Tool

This chapter presents an overview of the steps for setting up a Capsule application. Topics covered are:

- Looking at the Capsule window
- Choosing source and destination icons
- Placing icons in the Capsule window
- Connecting the icons

Remember that you must be familiar with the tools you intend to use in your Capsule application. To use tool icons inside a Capsule window, set up the tools as you would normally. Inside a Capsule window, an icon operates the same way it does when it is on the desktop. For example, opening an icon causes the icon's window to open in its last location, that is, it opens in the same location on the desktop that it occupied the last time you opened it.

Looking at the Capsule Window

To look at the Capsule window, select a new Capsule icon and open it. The Capsule window appears as shown in Figure 1. The darker area at the top is the window header (functioning identically to the headers in other tool windows) that contains command buttons and the Special button. The center of the window is where you create a graphic representation of your data flow by inserting icons and connecting them with arrows.

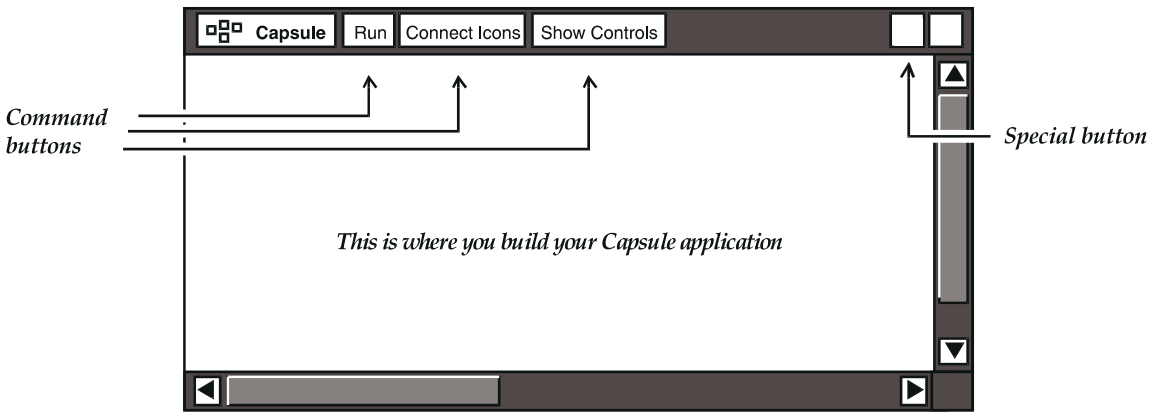


Figure 1. New, empty Capsule window

The window header buttons allow you to control Capsule functions. Table 2 on page 5 lists the function of each window header button.

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Table 2. Capsule window buttons

Button	Use to
Run	Process the Capsule application, after you have connected all of the icons inside the window. For more information, see Chapter 5, “Running the Capsule Application” on page 43.”
Connect Icons	Connect icons in the Capsule window. For more information, see Chapter 3, “Controlling the Data Flow” on page 15.”
Show Controls	Open the User Input Control window and assign @-variable values. To understand the capabilities of the User Input Control window, see Chapter 4, “Using @-Variables” on page 30.”

When you select the Special button in the Capsule window header, you see the Special menu, which lists more Capsule functions. Figure 2 shows what you can choose from the Special menu.

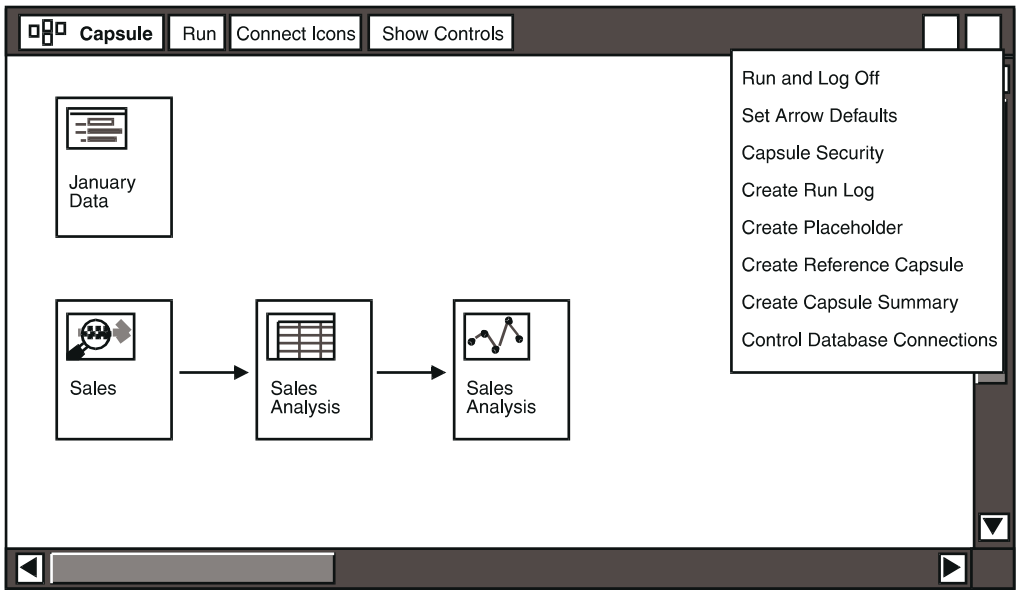


Figure 2. Special menu items

Some items in the Special menu let you create icons that monitor and control the Capsule processing sequence. Table 3 describes this menu.

Table 3 (Page 1 of 2). Special menu items

Special menu item	Use to
Run and Log Off	Run a Capsule process and include logging off as part of the process. This feature is described in detail starting on “Logging Off When Processing Is Finished” on page 44.

Table 3 (Page 2 of 2). Special menu items

Special menu item	Use to
Set Arrow Defaults	Apply default arrow settings. See the section beginning on "Setting Arrow Defaults" on page 26 for a complete description.
Capsule Security	Lock icons inside the Capsule window. This feature is explained beginning on "Securing a Capsule Application" on page 45.
Create Run Log	Open the Control Run Log window and specify which status information you want recorded about your Capsule run. This feature is described starting on "Examining a Capsule Process" on page 48.
Create Placeholder	Replace a selected icon in the Capsule window without disturbing the connections to other icons in the processing sequence. See the sections beginning on "Creating a Placeholder" on page 27 and "Detailed Steps" on page 82 for more information.
Create Reference Capsule	Create a Reference Capsule icon that lets you access prebuilt Capsule applications by referring to them from your desktop. See Chapter 8, "Using Reference Capsule Icons" on page 81," for more information.
Create Capsule Summary	Open the Capsule Summary window and create summaries of information about the Capsule application. See Chapter 7, "Creating Capsule Summaries" on page 68 for more information.
Control Database Connections	Control the connections to a database service for data access icons. See Chapter 5, "Running the Capsule Application" on page 43 for more information.

When you open a Capsule icon, the window opens to a default size and location. Like all tool windows, it can be resized and repositioned on your desktop. Depending upon how you prefer to work, you can size the window so that icons can be positioned in two vertical rows, rather than just one horizontal row. The location and size of the Capsule window can determine how you construct Capsule applications. Later sections of this chapter explain how to place icons inside a Capsule window.

Choosing Source and Destination Icons

Before you can build a Capsule sequence, you must understand the difference between source and destination icons. A *source icon* is one that can provide a source of information to be transferred. A destination icon is one that can receive transferred controls or information.

Figure 3 on page 7 shows the combinations of source and destination icons that can be connected in a Capsule window.

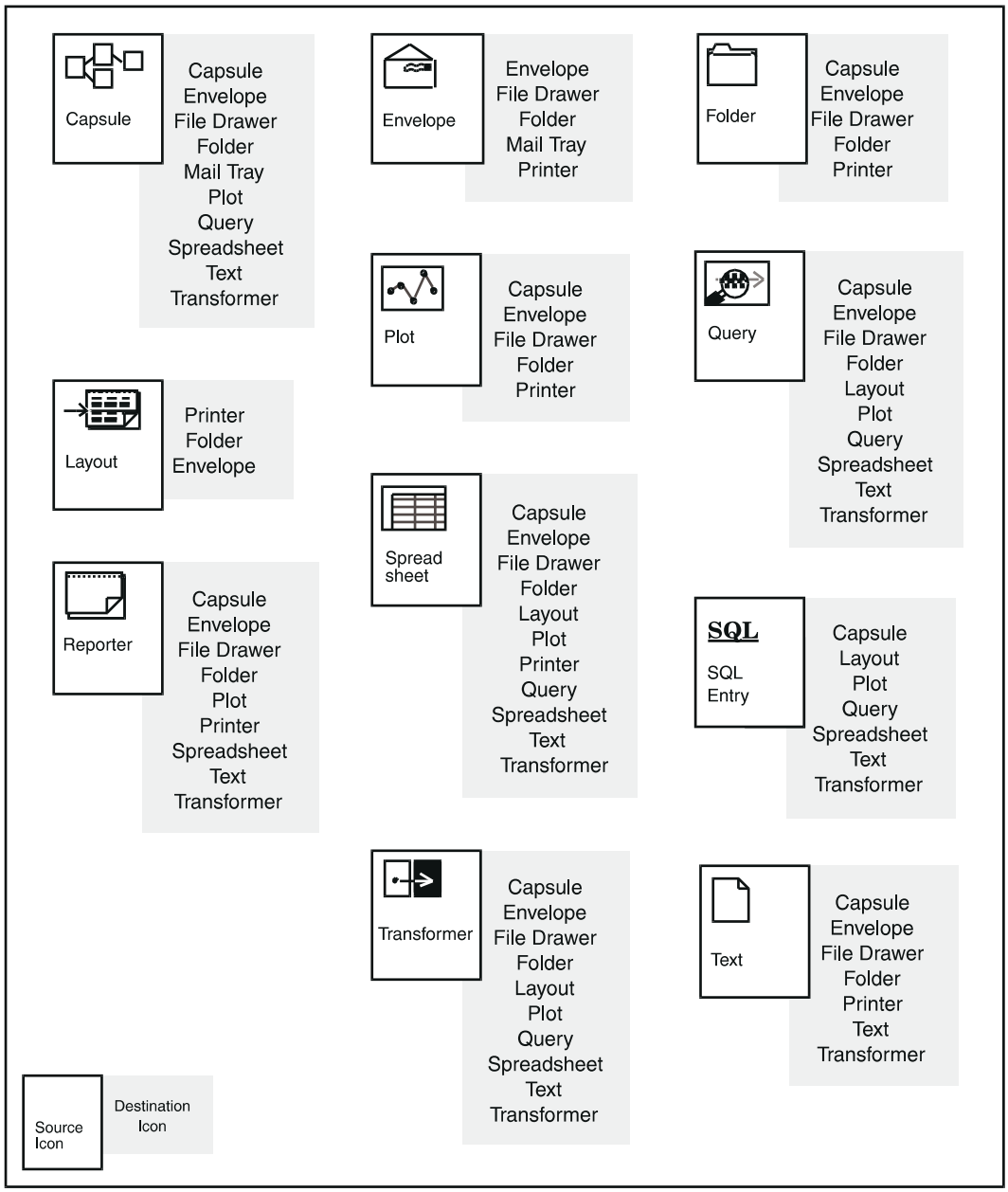


Figure 3. Icons that can be connected

All tools listed in Figure 3 can be connected together with arrows. Not shown in Figure 3 are some tools that have special uses inside Capsule applications. This group includes the SQL Entry tool, Data Entry tool, In and Out icons, Cooperative Application Services transformer, the Forms Design tool, and the BASIC tool. Although desktop

Application icons can transfer data and controls, the various combinations used might vary. For more information about tools not illustrated, see the user's guides for the individual tools.

Some icons, such as SQL Entry, either can be connected with arrows or can be used as stand-alone icons. Stand-alone icons are discussed in the section “Understanding How Icons Are Processed.”

In and Out connector icons are described in Chapter 6, “Working with Nested Capsule Icons” on page 53. For more information about calling BASIC programs from a spreadsheet within a Capsule icon, refer to *BASIC User's Guide*.

Setting Up the Tools to be Processed

Before you proceed with the instructions for moving icons into a Capsule window, you should be aware that there are two ways to work with a Capsule window. That is, you can set up your tool icons before or after you place them in a Capsule window. If you use the latter approach, then use the following guidelines.

Copy each icon to an empty location in the Capsule window. It is recommended that you arrange them from left to right and from top to bottom, in the order that you want to process them.

Open and set up each tool as required.

If the tool is intended to retrieve data, then test the process before you build the Capsule sequence. For example, in the Query tool, do the following test before you connect the Query tool to the next icon: Specify the query, set the constraints, and retrieve the data.

When you are using a transformer in a Capsule window, be aware that a transformer runs as soon as it has received input in its last input region. Therefore, you should connect inputs to transformer input regions in the order that you want the icons furnishing those inputs to run. Do not, for example, connect your first icon's input to the last input region in the transformer and your second input to the first input region. For details on working with transformers, refer to *Transformers User's Guide*.

Understanding How Icons Are Processed

All icons that are part of the Capsule processing sequence, except for Capsule icons called by Reference Capsule icons, must be inside the Capsule window. The normal processing sequence for icons in a Capsule window is from left to right and from top to bottom. Most icons are connected by arrows indicating the direction of the processing sequence. However, there are some exceptions to this rule. Icons that are not connected to other icons can be used to supply data to other icons, or they can be processed independently in the Capsule application. Such icons are called stand-alone icons. The BASIC and SQL Entry icons, for example, are used to supply data in Capsule applications. No arrow is required for them to do so. Refer to *BASIC Tool Users' Guide* and *SQL Entry User's Guide* for more information.

Some icons, such as Reporter, desktop Application, and a Capsule icon itself, can be placed inside a Capsule window as a stand-alone icon, that is, as an independent, executable module.

The Capsule tool follows a left-to-right, top-to-bottom processing order. First, the Capsule tool processes all the icons that are connected to each other by arrows. After all the connected icons have been processed, the stand-alone icons are processed from left to right and from top to bottom.

The Capsule tool provides a documenting facility that lets you create a summary of icon processing information. Refer to Chapter 7, “Creating Capsule Summaries” on page 68 for more information.

Chapter 3, “Controlling the Data Flow” on page 15 explains how to connect icons with arrows. But first, the next section describes how you put icons inside a Capsule window to create an easy-to-read application.

Placing Icons Inside the Capsule Window

After selecting the icons for your Capsule application, you place them in the Capsule window. To do this:

1. Select the icon.
2. Copy it to the Capsule window.

Continue this process with all the icons you need to run your application. The next section provides more detail about the importance of placing icons in a logical, easy-to-read order. The way you place icons inside a Capsule window can determine how useful your applications are to others. If your Capsule applications are to be used by others, you should follow the guidelines for organizing, naming, and documenting icons described in the sections that follow.

Organizing the Window for User Comprehension

Like any application program, the Capsule processing sequence follows certain rules about what tasks are completed first. As previously mentioned in the section titled “Setting Up the Tools to be Processed” on page 8, the Capsule tool follows a left-to-right, top-to-bottom processing order. With these rules in mind, you can develop your own company style and layout conventions so that users always know where to find certain applications. Establishing a standard style will ensure that your applications are easy to use and interpret. Ideally, the application user should be able to glance at a Capsule window layout, and know what kind of data is being transferred, and what results to expect. For example, in complex Capsule applications, you can set up multiple processing sequences. If one sequence is dependent upon another, be sure to place the first sequence to be processed above or to the left of the second sequence.

Whether your Capsule application is simple or complex, you can ensure easy comprehension by placing the icons in a left-to-right, top-to-bottom order, and using recognizable titles for the icons.

Documenting the Application and Naming Icons

When you are constructing complex applications that other users might have to use, you should insert an instructional Text icon in the Capsule window. This document should be clearly labeled as to its purpose, and contain a clear summary of what the tool icons are expected to produce. In complex Capsule applications, it is especially important to assign meaningful names to the icons inside the Capsule window. Your document could be called *Read Me* or *Start Here*, or some other instructional title. Whatever title you choose should be short enough to fit inside the icon window and still be readable.

Figure 4 shows a sample Capsule application. This application is fairly complex, and uses some techniques not yet discussed, such as nested Capsule icons. However, the example is included to illustrate the importance of window layout and naming conventions.

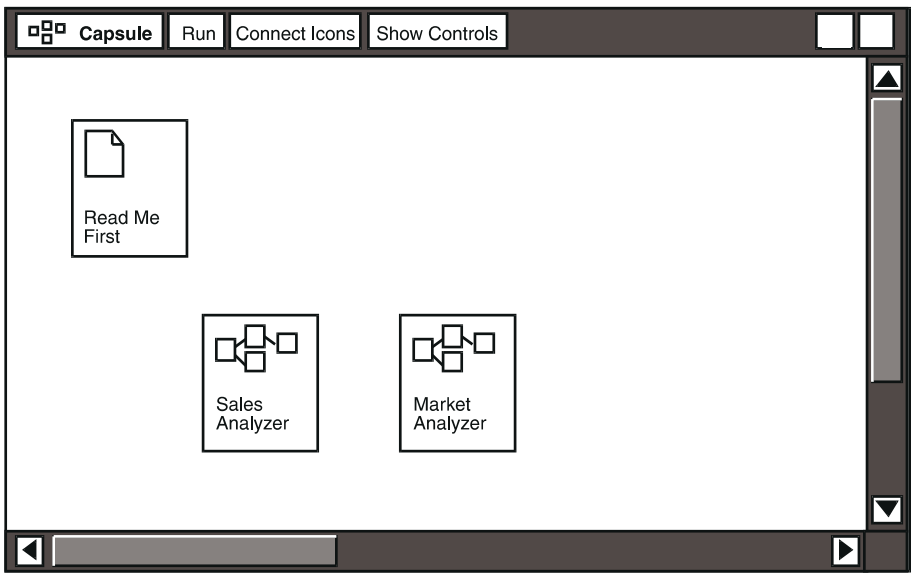


Figure 4. Capsule window showing easily identifiable icon names

The outer Capsule icon contains two inner Capsule icons, and, as their names suggest, each analyzes a different kind of data.

Notice that an instructional Text icon has been placed in the upper left corner so that users can easily find it, open it, and read about the two nested Capsule icons. Refer to Chapter 6, “Working with Nested Capsule Icons” on page 53,” for more information about using Capsule icons inside other Capsule icons.

The next section describes a Capsule feature with which you can document your Capsule applications and make sure that anyone who opens the Capsule window immediately sees your documentation.

Using an Auto Open Icon to Provide Instructions

If you document your Capsule applications according to the recommendations in this chapter, you can also ensure that whoever uses one of your applications always opens a particular tool icon before running the application. You can name an icon informatively, as suggested on Chapter 1, “What Is a Capsule Application?” on page 1; but simply naming an icon *READ THIS FIRST* does not guarantee that a user will do so. The Text document shown in Figure 4 on page 10 is not really part of the processing sequence, and is read only if the user selects and opens it.

The Auto Open feature ensures that your users see important icons immediately. When you build a Capsule application, you insert your instructions to the user in a Text icon, place the instructional Text icon in the Capsule window, and name the icon Auto Open. Whenever a user opens that Capsule icon, the Auto Open icon opens too, so that the user immediately sees your instructional text.

You must use initial capitals when you name the Auto Open icon. If you use any other combination of capitals and lowercase letters in either of the two words, the icon will not open automatically.

To rename an icon so that it opens automatically with the Capsule window:

1. Select the icon and display its options window.
2. Delete the old name and type Auto Open in the **Name** field.
3. Close the Icon Options window and deselect the Auto Open icon before you run the Capsule application.

The location of the Auto Open icon is not important. It can be placed anywhere inside the Capsule window.

Only one Auto Open icon can automatically open in a Capsule window. If a Capsule window contains two such icons, the one that occurs first in the processing order — the one closest to left-most and topmost — opens when you open the Capsule window. Delete any extra Auto Open icons.

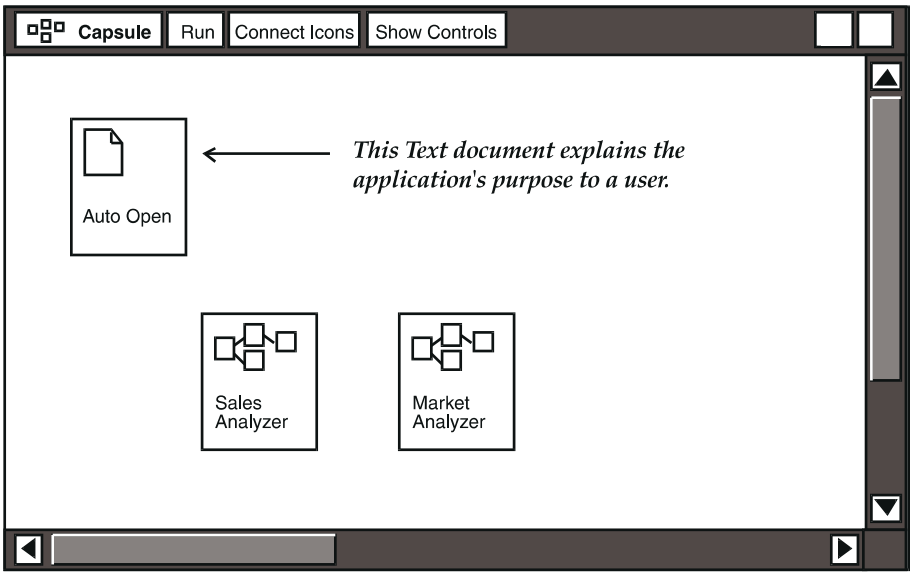
If an Auto Open icon is inside a nested Capsule application, the icon runs as it is set up to do, but the icon does not open by itself. An Auto Open icon opens automatically only when you manually open the Capsule icon in which it resides.

You can make an Auto Open icon from any icon that can be:

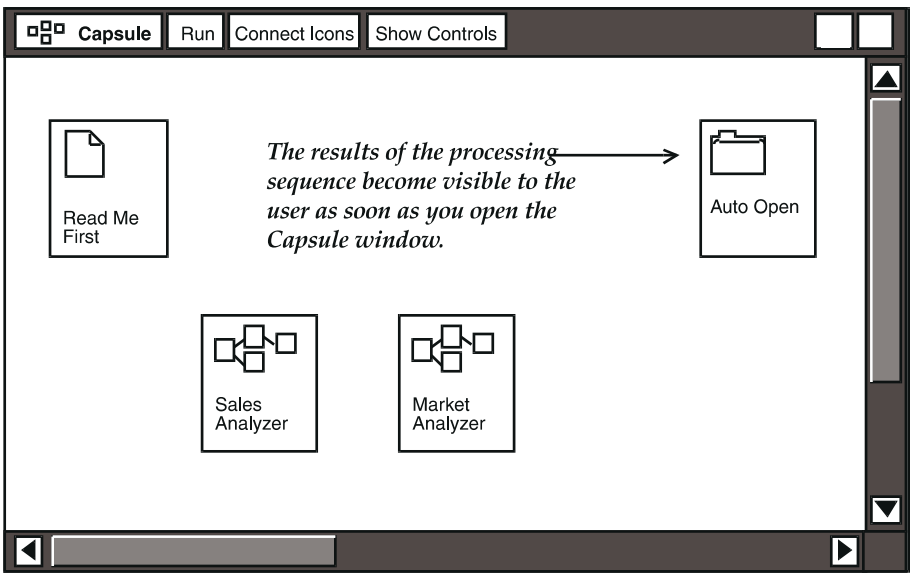
Placed inside a Capsule window

Opened and renamed

Suppose you want to alert a new user that a Folder icon contains results from the last analysis or provide instructions for running the Capsule application you have built. Inserting your instructions in an Auto Open Text icon guarantees that the new user sees them upon opening the Capsule window.



However, suppose you are building this application for an experienced Capsule user, and you want to set up the window so that the user first sees the results of the last analysis before changing processing values and rerunning the Capsule application. To set up the window like that, rename the Folder icon so that it opens automatically.



The Auto Open feature can be used for other purposes inside Capsule windows. For example, a Data Entry icon can be used to automatically set @-variables in the

Capsule controls window. This procedure is described in Chapter 4, “Using @-Variables” on page 30.

Connecting the Icons

After you have chosen your icons and placed them in the Capsule window, the next logical step in building a Capsule application is to define the Capsule processing sequence. You do this by connecting the tool icons with arrows to show how data is to be transferred, for example, Query to Spreadsheet, Spreadsheet to Plot, and so on. In the Capsule tool, the arrow permits you to control the flow of data between icons, and even to transfer selected portions of data. This concept is described in detail in Chapter 3, “Controlling the Data Flow” on page 15. Before you read about how to control the flow of data, however, you need to be familiar with some of the basic guidelines for connecting icons with arrows.

Most source icons can have multiple outgoing arrows. This allows you to define different regions in a spreadsheet, and transfer selected portions of data into each region.

One exception to this rule is the SQL Entry icon. This icon can only have one outgoing arrow, and an SQL Entry icon cannot be the destination for an arrow.

Figure 5 shows a sample Capsule application with four icons connected together.

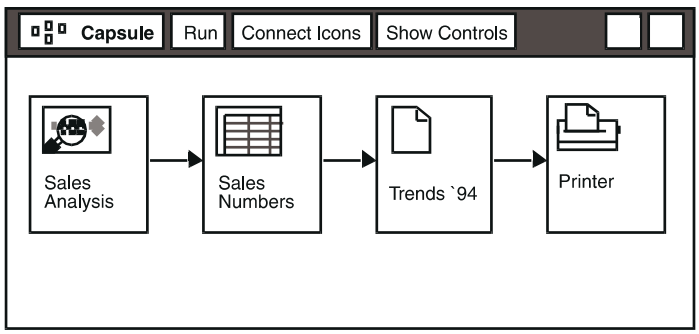


Figure 5. Sample Capsule window

Using Arrows

You connect icons with arrows by using the window header button **Connect Icons**. To do this:

1. Select the source icon.
2. Click on **Connect Icons** in the window header.
3. Select the destination icon. An arrow, shown in Figure 6 on page 14, now joins the two icons.

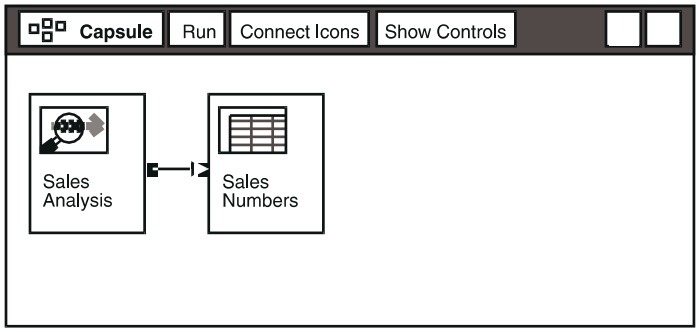


Figure 6. Connecting two icons in the Capsule window

Watching for Messages

If you are building a Capsule application, and you attempt to connect two icons that cannot be connected, a message appears in the message bar indicating that the two icons cannot be connected. Similarly, if you attempt to connect two icons in the wrong sequence, a message tells you the first icon cannot be used as a source icon. For example, a Printer icon can never be a source of data and a Reporter icon cannot receive data. If you attempt to connect icons in the wrong sequence, you are informed that the operation is not permitted.

Removing Arrows

You can remove an arrow in either of two ways:

1. Select the arrow itself and press the Delete key.

or

2. Select the icon to which the arrow is connected and press the Delete key. (This action deletes the icon and the arrow.)

Chapter 3. Controlling the Data Flow

Arrow settings let you control how the data flows between icons. You can set arrows to always transfer data, or transfer data only under certain conditions. You can also transfer data attributes (such as font, boldface, or italics) from one tool to another. This chapter explains the available options for controlling the flow of data in a Capsule application. The following subjects are discussed:

- Setting arrow options
- Using default arrows between icons
- Retaining arrow settings when you change an application

To control arrow options, you select an arrow and displaying the Arrow Options window. To set arrow defaults and retain arrow settings, you choose the appropriate selection from the Special menu of the Capsule window.

Setting Arrow Options

The Arrow Options window provides information and data control. Several settings are provided for the connecting arrows to let you control the flow of data between icons.

To open the Arrow Options window, select an arrow and display the options window (either by pressing the Options key or by pressing both mouse buttons at the same time to make the pop-up function pad appear). Figure 7 on page 16 shows the default settings for an Arrow Options window.

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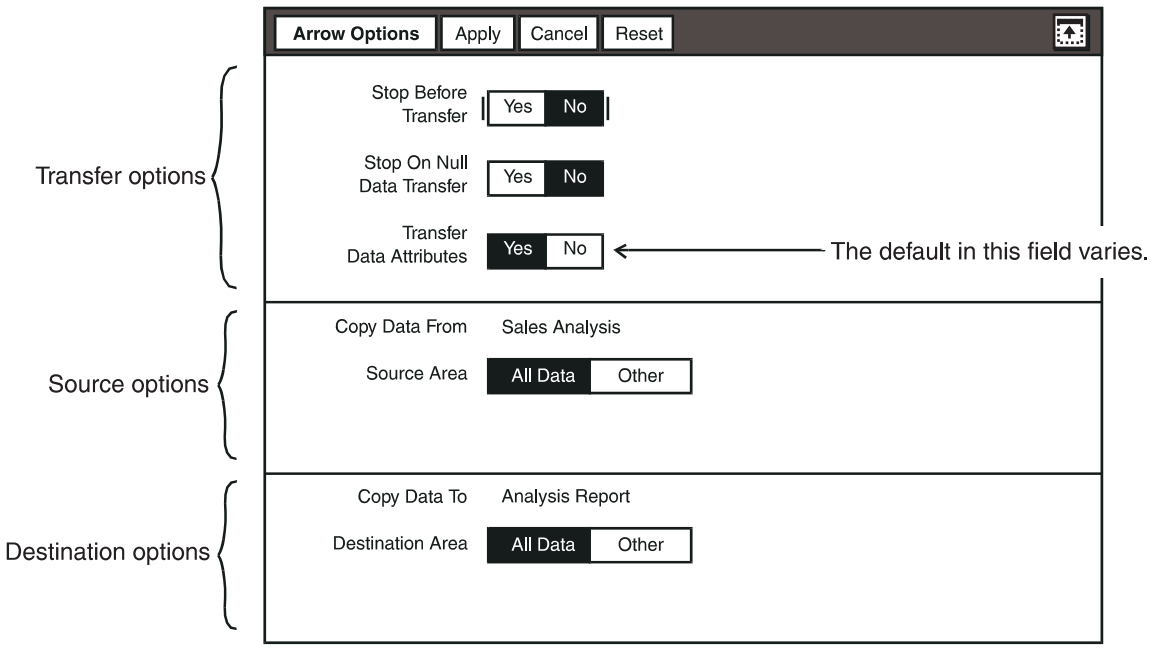

Figure 7. Arrow Options window showing the default settings

This particular options window varies according to the application, that is, it depends on the kinds of icons you connect together inside the Capsule window. In each case, the window is divided to represent the different types of control settings available. You can:

Stop the flow of data at a particular connection point, based on certain conditions

Transfer or filter data attributes (such as font, boldface, underlines, or italics) along with the data (for a discussion of filtering, see “Icons that Can Filter Data Attributes” on page 18). If your capsule application has been upgraded from a previous version of DIS, see Table 6 on page 19

Pinpoint the data's source area inside the source icon

Specify a destination area for the data inside the destination icon

Select a function for the source data

The Arrow Options window in Figure 7 shows three sections of the window. The fourth section appears blank when you first open the Arrow Options window. Its settings appear only when the destination for the data is a region in a spreadsheet. The fourth window section, labeled **Source Data Should**, is described in “Selecting a Function for the Source Data” on page 21.

The Arrow Options window looks different for different combinations of source and destination icons.

Choosing Data Transfer Options

When you build Capsule applications, you must designate source and destination icons. Within the source and destination icons, you must also specify source and destination areas. You do this by selecting individual control settings for each arrow that you use to connect icons.

Stopping the Data Flow

The first section of the Arrow Options window displays options for stopping the flow of data and choosing whether to transfer data attributes. Options for stopping the data flow are described in the next sections.

Stop Before Transfer to the Next Icon

The first data transfer option is **Stop Before Transfer**, which defaults to **No**. This setting means that after you run the Capsule process, data is transferred between icons without stopping the Capsule run.

When **Yes** is selected, the Capsule run stops when the arrow is reached (before data is transferred to the next icon). When the Capsule run stops, you can open any icon, check the contents, close the icon, and restart the Capsule process.

If you are developing a Capsule application, this feature can help you with troubleshooting: It lets you examine each Capsule component during a Capsule run. When you select **Yes**, a small circle appears in the center of the appropriate arrow to remind you that the processing will stop. Figure 8 shows the arrow between icons.

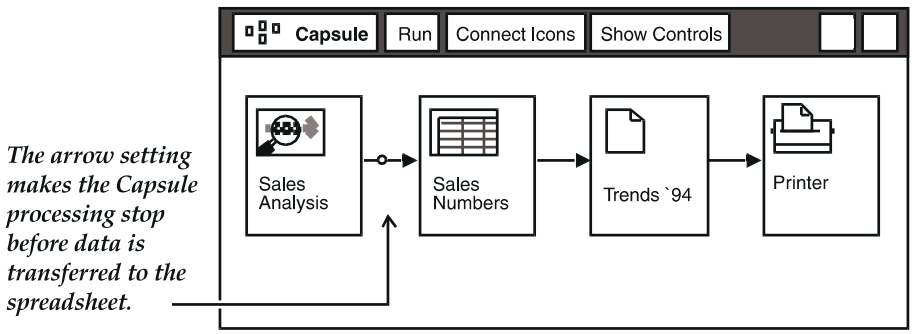

Figure 8. Arrow with stop options set

Stop If the Source is Null

This field, **Stop on Null Data Transfer**, is normally set to **No**. This means an attempt to transfer an empty data stream between icons will not cause the Capsule processing to stop.

When **Yes** is selected, an arrow stops the Capsule process if it detects null data from the source icon (for example, from a Query tool that has retrieved no data).

Transferring and Filtering Data Attributes

Suppose you have connected two icons in a Capsule window, and the first icon contains data that is formatted a certain way. In many cases, when that data is passed to the second icon, it retains its formatting characteristics, which are called data attributes. Here are just a few examples of the many kinds of data attributes used by IDS tools:

Table 4. Some of the data attributes used by IDS tools

Data attribute type	Some examples
Font attributes	Font (such as Times, Helvetica, or Palatino) Type size (8 points to 24 points) Boldface Italics Underlining
Cell format	Alignment of data within the cell Text wrapping Whether the cell displays formulas or results
Number format	Decimal precision Rounding Negative representation Thousands separator Decimal separator
Date and time format	Date and time order (which one comes first) Date order (such as *mm/dd/yy*) Hour format (such as *hh:mm:ss*) Date type (such as numeric, long, or abbreviated) Date separator

Icons that Can Send or Receive Data Attributes: Five types of icons can send or receive data attributes to or from other icons, as shown next.

Table 5. Icons that can send or receive data attributes

This icon type	Text-related attributes: Sends	Receives	Table-related attributes: Sends	Receives
Text	x	x		
Reporter	x		x	
Layout	x		x	
Spreadsheet	x		x	x
All transformers	x		x	x

In each of the tools except for the transformers, you can open an options window to see exactly which data attributes the tool handles. (Transformers pass data from one icon to another, and so they have no data attributes of their own.) For more information on each icon type and the way it handles data attributes, refer to the IDS publication for that tool.

Icons that Can Filter Data Attributes: Three icon types can filter transferred data attributes; that is, when you connect an icon to one of them, you can choose whether or not to transfer the attributes to them along with the data. This choice appears in the **Transfer Data Attributes** field of the Arrow Options window. The three icon types are:

Spreadsheet

Text

All transformers

Upgrades from Previous DIS Versions: If your Capsule application has been upgraded from a previous version of DIS, the default setting for the **Transfer Data Attributes** field in most cases is **No**. (You can change the setting if you like.) Table 6 on page 19 shows exceptions to this rule.

Table 6. Transfer Data Attributes default setting in the case of upgrades

The *Transfer Data Attributes* default setting is *Yes* when:	
The source is a:	**And the destination is a:**
Desktop Application icon	Text icon
Clipboard icon	Text icon
Desktop Directory icon	Text icon
Desktop.RFT icon	Text icon
Spreadsheet region	Spreadsheet region
Spreadsheet icon (all data)	Spreadsheet icon (all data)

When you create a new application, the default setting for the **Transfer Data Attributes** field is taken from your default arrow setting. Information on default arrow settings begins on “Using Default Arrows Between Icons” on page 26.

When the Data Source is a Transformer: Transformers handle transferred title rows according to the following rules. If the data is being sent from a transformer (that is, if the transformer is the data source), one of two things happens:

If the data is being transferred without attributes, and if the first row of data consists entirely of text, then a title row is created.

If the data is being transferred with attributes, then a title row is created, but only if the following three conditions exist:

- There is more than one row of data.
- The first row of data is all text.
- The second row of data is not all text.

Designating the Source of the Data

The next section of the Arrow Options window, shown in Figure 7 on page 16, contains information about the source of the data to be transferred. The system assigns the name of the source icon after you have connected two icons with an arrow, and the **Source Area** is set to **All Data**. This area of the window might or might not have changeable settings, depending on the type of icons that precede or follow it.

Transferring All the Data

If you build a sequence like the one shown in Figure 8 on page 17, the **Source Area** of the Arrow Options window will contain Sales Tracking in the **Copy Date From** field.

Transferring a Portion of the Data

The **Source Area** defaults to **All Data**. This means the entire contents of the source icon are transferred to the destination icon. However, when your source data comes from a Spreadsheet, Transformer, or Text icon, the window appears as shown in Figure 9, giving you the ability to transfer only a portion of the icon's data into a region.

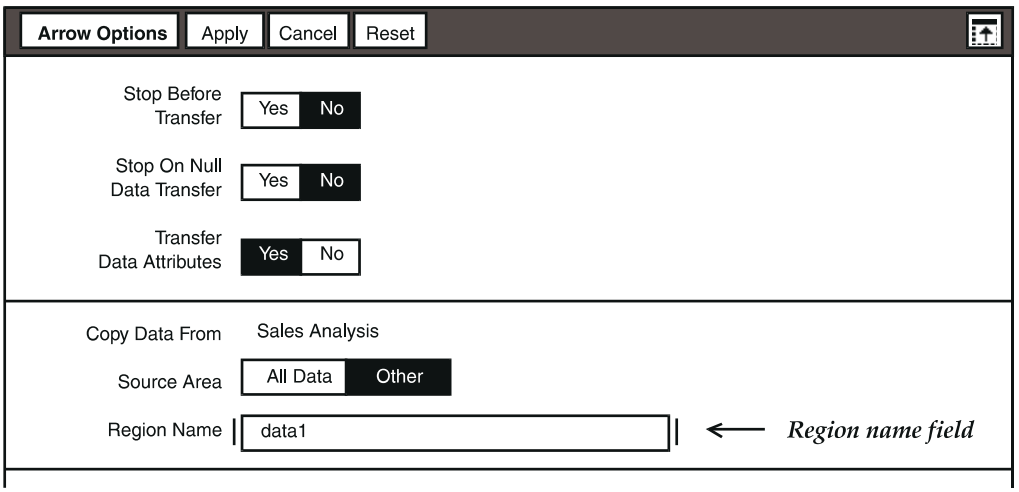

Figure 9. Specifying a region name in the source icon

When you select **Other**, a **Region Name** field appears where you can enter the name of the spreadsheet or transformer source regions, or text source fields.

If **All** is selected for the **Source Area**, the **Destination Area** must also be set to **All** or **Other**, with one region or field specified.

If **Other** is selected in the **Source Area**, its input area must have the same number of regions or fields as listed in the **Destination Area**, or only one region or field if the**Destination Area** is set to **All**.

Designating the Destination of the Data

The **Destination Area**, shown in Figure 7 on page 16, is normally set to **All Data**. This means data from the source icon affects the entire destination icon. This section of the window records the destination name and area.

You can select **Other** to transfer to a specific named portion of the data. If you select **Other**, a field is added so that you can specify a particular region or field in the **Destination Area**. Doing so lets you protect formulas, text, or other tool contents from being overwritten by incoming data.

In the **Region Name** field, you type the name of the destination region that belongs to the spreadsheet, transformer, Text, or In connector.

The number of **Source Area** and **Destination Area** regions or fields must correspond. Dependencies are as follows:

If **All** is selected for the **Destination Area**, the **Source Area** must also be set to **All** or **Other**, with one region or field specified.

If **Other** is selected in the **Destination Area**, its input area must have the same number of regions or fields as listed in the **Source Area**'s input area, or only one region or field if the **Source Area** is set to **All**.

Selecting a Function for the Source Data

The next section of the Arrow Options window contains fields that are visible only when the destination icon is a spreadsheet and when the **Destination Area** field is set to **Other**.

Figure 10 shows the part of the Arrow Options window that appears in this case.

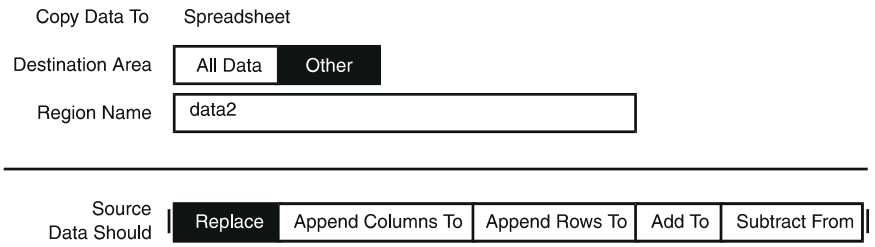

Figure 10. Arrow Options window when a spreadsheet is the destination icon

The **Source Data Should** field allows you to choose how you want to incorporate the incoming data into the specified spreadsheet region. This option is particularly useful when you are performing iterations in the Capsule application. Table 7 explains the **Source Data Should** settings.

Table 7. Options used to send data to a spreadsheet region

Function	Explanation
Replace	Replaces the existing data in the spreadsheet region
Append Columns To	Appends the incoming data as columns to the existing data in the spreadsheet region
Append Rows To	Appends the incoming data as rows to the existing data in the spreadsheet region
Add To	Adds the incoming numerical data to the numbers in the existing spreadsheet region
Subtract From	Subtracts the incoming numerical data from the numbers in the existing spreadsheet region

Remember these points when you transfer data to a spreadsheet region:

The region expands to accommodate all of the data until it reaches a cell that contains information (an occupied cell). If all of the transferred data cannot fit into the region, the following error message appears in the message area:

Destination contains an occupied cell. Only part of the selection was copied/moved.

When data is appended to a spreadsheet using **Transfer Data Attributes** set to **Yes**, the results might contain an invalid row. The append function tries to determine if the first row is a title and might display a row of text and empty cells under certain conditions. Change the **Transfer Data Attributes** to **No** to obtain the expected results.

In an iterative process, which is described later in this guide, the first "append to" always replaces the data in the destination spreadsheet region. (In the second and subsequent iterations, if you have chosen one of the "append to" options, incoming data is appended or added.)

This feature allows you to reuse your Capsule application and clear data that was transferred before. Therefore, if you have more than one source icon that is transferring data to the same region in the destination spreadsheet, on the first pass of the second spreadsheet, the incoming data overwrites the information that was transferred from the first spreadsheet.

See Chapter 6, "Working with Nested Capsule Icons" on page 53 for more information about appending data in an iterative processing sequence.

The following sections provide some sample spreadsheets illustrating how the **Source Data Should** field is used.

Replacing the Data in the Destination Region

When you transfer data from a source icon to a destination region in a spreadsheet, you can set the Arrow Options window to direct the incoming data to replace the existing data in that region. To do this, select **Replace** in the **Source Data Should** field of the Arrow Options window.

For example, a spreadsheet has a region whose coordinates are **a1:c3** and it contains the unit and dollar sales for two months in 1995, as shown here.

	A	B	C	D
1	Month	Units	Dollars	
2	January, 1995	645	64500	
3	February, 1995	733	73300	
4				
5				

If this spreadsheet receives units and dollars sales data for the next two months, and the arrow is set to replace the data in the destination region, the results will appear as shown in the next spreadsheet.

	A	B	C	D
1	Month	Units	Dollars	
2	March, 1995	567	56700	
3	April, 1995	344	34400	
4				
5				

Note that the data for March and April has replaced the data for January and February. The region coordinates did not change (that is, the region did not expand or contract) because three columns and three rows of data replaced an equal number of columns and rows in the destination region.

Appending Columns to the Destination Region

When you transfer data from a source icon to a destination region in a spreadsheet, you can set the Arrow Options window to direct the incoming columns of data to be appended to the existing columns of data in that region. To do this, select **Append Columns To** in the **Source Data Should** field of the Arrow Options window.

For example, a spreadsheet has a single cell region that contains the heading **Sales 1995**, as shown in the next example.

	A	B	C	D
1	Sales 1995			
2				
3				
4				
5				

If this spreadsheet receives 1995 sales data, and the arrow is set to **append columns to** the data in the destination region, the results will appear as shown in the next spreadsheet.

	A	B	C	D
1	Sales 1995	Month	Units	Dollars
2		Jan, 1995	645	64500
3		Feb, 1995	733	73300
4				
5				

Note that the unit and dollar sales data for the first two months of 1995 has been appended to the region. The region expanded to accommodate the new columns of data so that its coordinates are now **a1:d3**.

Appending Rows to the Destination Region

When you transfer data from a source icon to a destination region in a spreadsheet, you can set the Arrow Options window to have the incoming rows of data appended to the existing rows of data in that region. To do this, select **Append Rows To** in the **Source Data Should** field of the Arrow Options window.

When a spreadsheet is the destination for a data transfer and the arrow is set to append rows to existing data, incoming title rows are discarded, so that there is only one title row or set of title rows rather than duplicate rows. (For a discussion of title rows, see “Titles in Spreadsheet Regions” on page 100.)

Suppose a spreadsheet has a region whose coordinates are **a1:c3**, and this region contains the unit and dollar sales for two months in 1995, as shown in the next example.

	A	B	C	D
1	Month	Units	Dollars	
2	Jan, 1995	645	64500	
3	Feb, 1995	733	73300	
4				
5				

Original title row

If this spreadsheet receives an additional month of sales data, and the arrow is set to **append rows to** the data in the destination region, the results will appear as shown in the next example.

	A	B	C	D
1	Month	Units	Dollars	
2	Jan, 1995	645	64500	
3	Feb, 1995	733	73300	
4	March, 1995	567	56700	
5				

Still only one row of titles

Appended data row

Notice that the unit and dollar sales data for the next month has been appended to the region. The region has expanded to accommodate the new row of data so that its coordinates are now **a1:c4.**

Append Rows To behaves differently if you use it in an iterating Capsule application.

In a non-iterating Capsule application (that is, a Capsule application set up to run one time), selecting **Append Rows To** causes the incoming data to be appended to the existing data.

In an iterating Capsule application (that is, a Capsule application set up to run over and over until specified criteria are satisfied), selecting **Append Rows To** causes the incoming data in the first iteration to replace the existing data, and, in the second and subsequent iterations, to be appended to the data. This feature allows the old data from the previous Capsule run to be cleared.

Adding Values to the Numbers in the Destination Region

When you transfer data from a source icon to a destination region in a spreadsheet, you can set the Arrow Options window to direct the values of the incoming data to be mathematically added to the values of the existing data in that region. To do this, select **Add To** in the **Source Data Should** field of the Arrow Options window. For example, a spreadsheet has a region whose coordinates are **b2:c2** and it contains the year-to-date unit and dollar sales for the first quarter of 1995, as shown in the next example.

	A	B	C	D
1	YTD Sales	Units	Dollars	
2		1077	107700	
3				
4				
5				

If this spreadsheet receives another quarter of sales data, and the arrow is set to **add the values** to the data in the destination region, the results will appear as shown in the next spreadsheet.

	A	B	C	D
1	YTD Sales	Units	Dollars	
2		2433	243300	
3				
4				
5				

Note that the unit and dollar sales data have increased by the additional sales numbers.

Subtracting Values from the Numbers in the Destination Region

When you transfer data from a source icon to a destination region in a spreadsheet, you can set the Arrow Options window to direct the values of the incoming data to be mathematically subtracted from the values of the existing data in that region. To do this, select **Subtract From** in the **Source Data Should** field of the Arrow Options window.

For example, a spreadsheet has a region whose coordinates are **b2:c2**, and it contains the year-to-date unit and dollar sales for the first quarter of 1995, as shown in the next example.

	A	B	C	D
1	YTD Sales	Units	Dollars	
2		1077	107700	
3				
4				
5				

If this spreadsheet receives another quarter of sales data, and the arrow is set to **subtract the values** from the data in the destination region (to see the decrease in sales), the results will appear as shown in the next spreadsheet.

	A	B	C	D
1	YTD Sales	Units	Dollars	
2		(279)	(27900)	
3				
4				
5				

Note that the unit and dollar sales data indicate a decrease in sales from the first quarter to the second quarter.

Using Default Arrows Between Icons

If you want to use identical arrow options between several pairs of icons, you can establish default settings for the arrows and apply those settings anywhere in your Capsule application.

Setting Arrow Defaults

To set arrow defaults:

1. Display the Arrow Options window for the arrow whose options you want to set up as defaults.
2. Set the arrow options you want.
3. Close the Arrow Options window.
4. Select that arrow again.
5. In the Special menu, click on **Set Arrow Defaults**.

When you set arrow defaults, all arrows that you subsequently add with the **Connect Icons** button use those settings.

Copying Arrow Default Settings

To copy the default arrow settings you have specified:

1. Select the source icon.
2. Click on the **Connect Icons** button.
3. Select the destination icon.
4. Display the Arrow Options window.
5. Enter the desired settings.
6. Close the Arrow Options window.

Select **Set Arrow Defaults** in the **Special** button menu. When the Spreadsheet and Plot icons are connected, the arrow between them has the same defaults you entered in step 5.

Clearing Arrow Default Settings

To remove the arrow defaults you have set, simply turn off the **Set Arrow Defaults** button, following these steps:

1. Deselect all arrows by selecting an empty area in the Capsule window.
2. In the Special menu, click on **Set Arrow Defaults**.

The message bar displays the following message:

No arrow selected. Arrow defaults cleared.

Retaining Arrow Settings

When you build Capsule applications, you can change portions of the application without rebuilding the entire sequence. For example, you might have an application containing a spreadsheet that passes data to a Text icon. You can substitute another spreadsheet from a different application and run the Capsule application with the new icon to get different results. You can do this and still retain the arrow settings by using a placeholder. When you have obtained your new results, you can put the original icon back into the Capsule application to keep the processing sequence intact.

A placeholder lets you move or delete icons freely without having to open the Arrow Options window again to specify the data flow. You can also replace one icon with another, using the same arrow settings for each. This saves you from having to create new arrows.

Creating a Placeholder

You can create a placeholder for any icon in a Capsule window. When created, the placeholder can be moved or copied, but only inside the Capsule window.

To create a placeholder:

1. Select the icon you want to replace or delete.

2. Click on **Create Placeholder** in the Special menu.

   The cursor changes to a small icon graphic, indicating that you must now select another area on your desktop for the replaced icon.

3. Select an area of your desktop where you wish to place the icon. You can choose to store the icon in a container, such as a file drawer, a folder or an envelope. The selected icon is replaced with the placeholder and the arrow settings are retained at that location.

You can drag stand-alone icons out of the Capsule window. However, the Capsule tool will not let you remove a connected icon by dragging it.

Figure 11 shows a sample Capsule application where a placeholder retains the arrow settings for a moved icon.

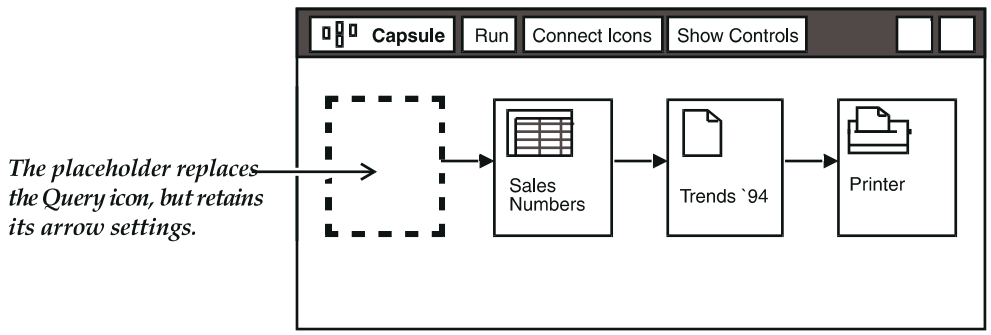

Figure 11. Placeholder inside a Capsule application

The placeholder plays an important part in creating a Reference Capsule icon. For more information, see Chapter 8, “Using Reference Capsule Icons” on page 81.

Replacing Icons in Capsule Applications

Any icon that can appear in a Capsule window can be replaced with a placeholder. When using the placeholder icon, the following restrictions must be considered:

You cannot create a placeholder to replace a locked icon. See Chapter 5, “Running the Capsule Application” on page 43 for a description of the procedures for locking a Capsule application.

You cannot run a Capsule application that contains a placeholder; first, the placeholder must have been replaced with another icon. Chapter 5, “Running the Capsule Application” on page 43 explains how to run a Capsule application.

You cannot violate the arrow restrictions on an icon. See Chapter 2, “Getting Started with the Capsule Tool” on page 4 for information about connecting icons with arrows.

You cannot fail to specify a region for the incoming and outgoing arrows if a region is required by the source and destination icons. For more information, see “Choosing Data Transfer Options” on page 17.

If you violate any of these rules when using placeholders, you receive an informative message in the message area of your desktop. For more information about error messages, refer to *Messages and Codes*.

Replacing a Placeholder

After you have inserted a placeholder in your Capsule application, you must replace the placeholder with an appropriate icon before you can run the Capsule application. The icon you use to replace the placeholder can be the one you removed, or it can be a different icon.

To replace the placeholder:

1. Select the icon you wish to put in the Capsule window.
2. Copy or move the icon on top of the placeholder.

   Because the placeholder can be created and used only inside Capsule windows, it operates differently from other icons. When you place another icon on top of it, the placeholder does not move into the Discard icon. In other words, when you replace a placeholder, it cannot be recovered. If you have replaced a placeholder and want it back, you must create another.

Chapter 4. Using @-Variables

A**n @-variable** is used to represent a value inside any tool that you can use inside a Capsule window. The “at” symbol (@) preceding the variable, which is usually a letter of the alphabet, tells the system that this variable has a specific value assigned. The same @ symbol is used to specify system-defined variables, such as **@time**, which displays the current time in hours and minutes. Variables like **@time** are called **@-keywords**. This chapter explains how to enter and use @-variables and @-keywords, and covers the following topics:

Entering @-variables

Using @-variables with other tools

Retrieving system values

Setting options

Naming icons

Labeling printed documents

Entering @-Variables

You can build flexibility into a Capsule application by using @-variables inside icons in your Capsule window. Instead of specifying repetitive parameters, such as Product Descriptions, you can easily replace each occurrence of such specific parameters with an @-variable. This way, you can change all parameters conveniently: You open just one controls window and change your variable values there, instead of opening each icon within the Capsule window and changing the values individually.

Using @-variables, you can build one Capsule application, then change the values to get different results rather than build separate applications to accommodate all the values you want to test.

Because @-variable values can be used by many other tools inside Capsule icons, it is essential that you develop and maintain a standard format for using @-variables. Remember to always assign the same values to a particular @-variable so that you, or other Capsule application users, know where to look for a particular type of information. For example, you can ensure that all product information values are found in @-variables **@A** through **@H**, and all territory information can be found in @ AA, and so on. You can construct and use Capsule applications more efficiently if you do not need to remember where to find a particular type of information.

The next section explains how to enter @-variables in the User Input Control window.

Working in the Controls Window

The main place where you enter and change @-variables is the User Input Control window. This window has 208 rows for entering @-values. Rows are grouped by range of values (**A–Z**, **AA–AZ**, **BA–BZ**, **CA–CZ**, **DA–DZ**, **EA–EZ**, **FA–FZ**, **GA–GZ**). Selecting

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a range such as **AA-AZ** causes that page of the User Input Control window to appear. The window lists all possible @-variables, followed by blank fields where you can enter descriptions of those variables, and specify their types and respective values.

To open the User Input Control window:

1. Open a Capsule window on your desktop.
2. Click on **Show Controls** in the window header.

Figure 12 shows the window without any entries.

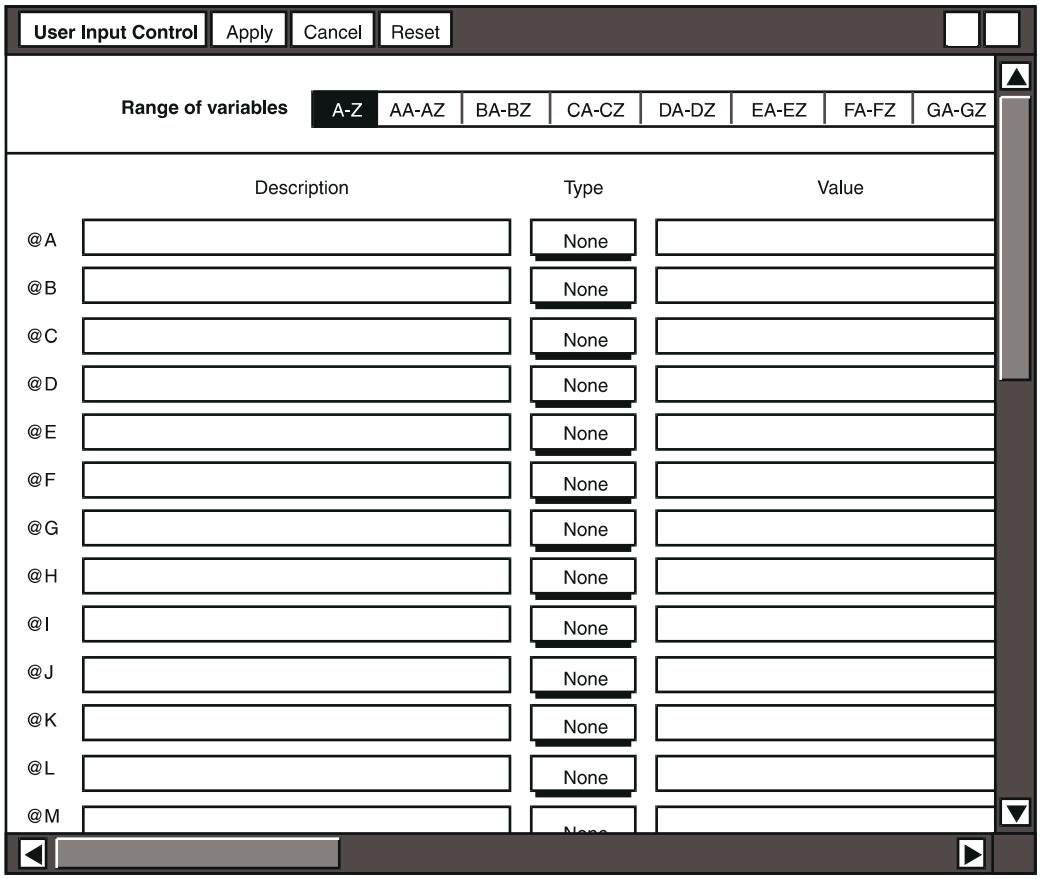


Figure 12. User Input Control window, also called the controls window

When you want an icon to look inside the Capsule window for variable values, you enter an @ symbol and the appropriate letter. For example, if **@C** is entered in a Spreadsheet cell, the Spreadsheet tool retrieves the value and data type from the row labeled **@C** in the User Input Control window.

The User Input Control window lets you enter standard values that can be used by any tool that can be placed inside a Capsule window. Each row in the User Input Control window represents one @-variable setting. You can also place system-defined @-keywords in this field.

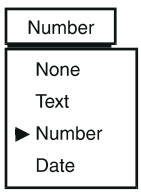
When you want to change an application easily, you simply open the User Input Control window and change the values.

Entering @-Variable Descriptions

The **Description** fields in the User Input Control window are used to enter descriptive information about the value of each variable. Information entered is only for your reference, and is not used by the Capsule icon. You can enter up to 4095 characters.

Entering Types

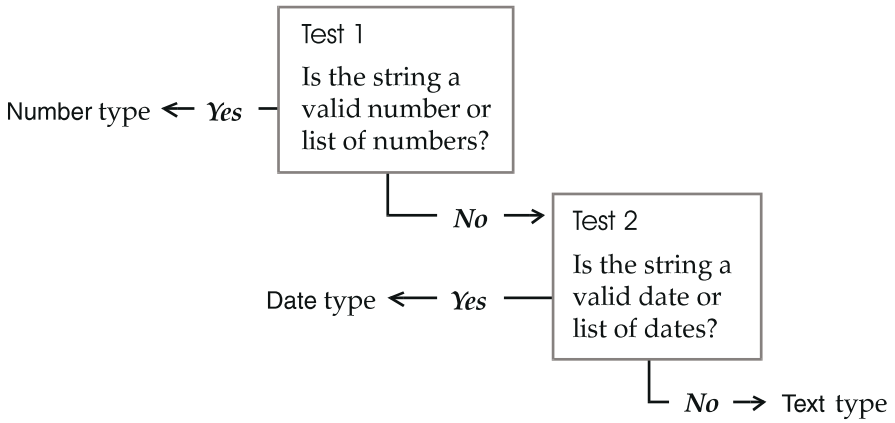
The **Type** field is used to identify the type of value you are using. This field is actually a button that displays the available type choices.



Values always start out with a data type assignment of **None**. If you enter a value in the **Value** field and choose not to specify a type, the Capsule tool selects one based on the data you entered. You can also preset the type before entering the value.

Presetting the **Type** field is useful if you want to ensure that entered values are of a specific type. For example, if you always want a date entry in the field, preset the **Type** field to **Date**. Any user who tries to enter a text string in the field is alerted that the entry is not valid.

If you do not specify a type, the Capsule tool checks the string of characters you have entered as a value, matches it against the IDS desktop format for different types of values, and assigns the string a type according to the following criteria:



If you are using a Capsule application that has been upgraded from an earlier version of IDS, the types of its variable values are set according to these criteria.

Entering Values

The **Value** fields in the User Input Control window are used to enter the value you want to pass to the tool. Information entered can include a number, a region name (for example, **Sales**), or other information from your database. You can enter up to 4095 characters in this field.

How Values are Formatted

Values are displayed according to your desktop setting. You can use most formats to enter the values, but the Capsule tool displays the value in the format you chose when you set your desktop preferences (using **Set Preferences** from the desktop Special menu, which appears when you select the Special button in the bottom right corner of your desktop). IDS also interprets your input in the format you have specified in your desktop preferences.

The **Value** field format does not transfer to other tools you might be running in your application. The specific tool determines how the value and data type are displayed. Refer to the IDS publication *Working with the Intelligent Decision Server* for more information about choosing desktop formats.

Inside an icon, the format of a value might look different from the way it appears in the User Input Control window. This is because the format has been specified either in the icons themselves (for example, in a Spreadsheet icon), or at the desktop level using **Set Preferences**.

Entering Dates

For example, if you entered the date as January 4, 1996, the Capsule tool sets the **Type** field to **Date**, then redisplays the date in the format you chose for your desktop. If you chose the format **mm/dd/yy**, the entry in the **Value** field is **01/04/96**.

Using Commas

You can enter a list of values separated by commas. You can also enter a string that includes commas, but which you wish to be interpreted as a single item. Be sure to use the right syntax.

The comma separator in IDS is a comma followed by a space, not just a comma.

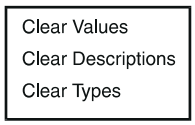
This is a properly separated list of values 121, 314, 45

This entry will be interpreted as a single number if a comma is specified as the thousands separator 121,314,45

If you want IDS to interpret an entry like **121, 314** as a single item, even though it appears separated by a comma and a space, enclose your entry in quotes (either double or single).

Clearing Fields

The User Input Control window's **Special** button menu contains three items used to remove entries in the window.



Clearing Values

Use the **Clear Values** item to remove all displayed values at one time. To delete individual values, select and delete them. Clicking on **Clear Values** clears only one page of values at a time. For example, if your window displays the @-variables **BA-BZ** and you click on **Clear Values**, only those values for the **BA-BZ** variables clear. If you switch the window to display the **AA-AZ** values, those values still appear.

Clearing Types

Click on **Clear Types** to reset all assigned data types to **None**. If there is still data in a **Value** field when you select **Apply**, its type is recalculated.

Clearing Descriptions

Use the **Clear Descriptions** item to remove all displayed variable descriptions at one time. This is useful when you are copying Capsule icons to use in building new applications.

Retrieving Cleared Entries

You can click on **Cancel** in the window header and the values, types, and descriptions that you removed reappear. However, if you click on **Apply** while you are working in the window, or if you accidently close the window, the values, types, and descriptions are permanently cleared.

Closing the User Input Control Window

Close the window by clicking on its title block, or clicking on the **Cancel** button, provided that you have first applied any new values, types, or descriptions. Remember that after you close the window, you cannot retrieve cleared values, types, and descriptions.

Using @-Variables with Other Tools

Using @-variables inside other tools allows you to streamline the Capsule run sequence because values in the User Input Control window can be used to constrain and describe parameters.

Using the Data Entry Tool to Enter @-Variables

You can use a Data Entry tool instead of entering values in the User Input Control window. Using the Data Entry tool gives you automatic prompting and Show Choices features that are not available in the Capsule controls window. Refer to *Data Entry User's Guide* for information about setting up a Data Entry form to enter @-variables.

The Data Entry tool enters values into specified @-variable fields in the User Input Control window. Any other tools within the Capsule window then use the same values that you have assigned using the Data Entry tool.

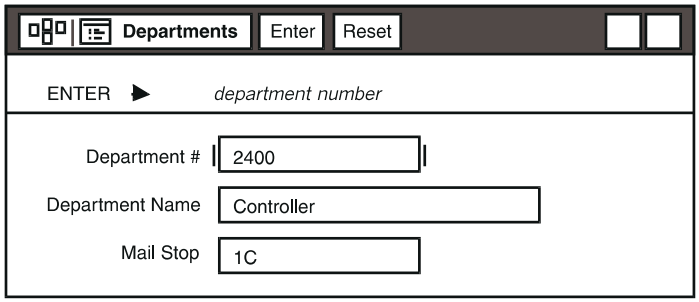
Setting Up the Data Entry Icon

When you use a Data Entry icon that has fields already set to specific @-variables, the Data Entry tool automatically enters current data into those specified @-variable fields in the User Input Control window.

To use a Data Entry icon in a Capsule window:

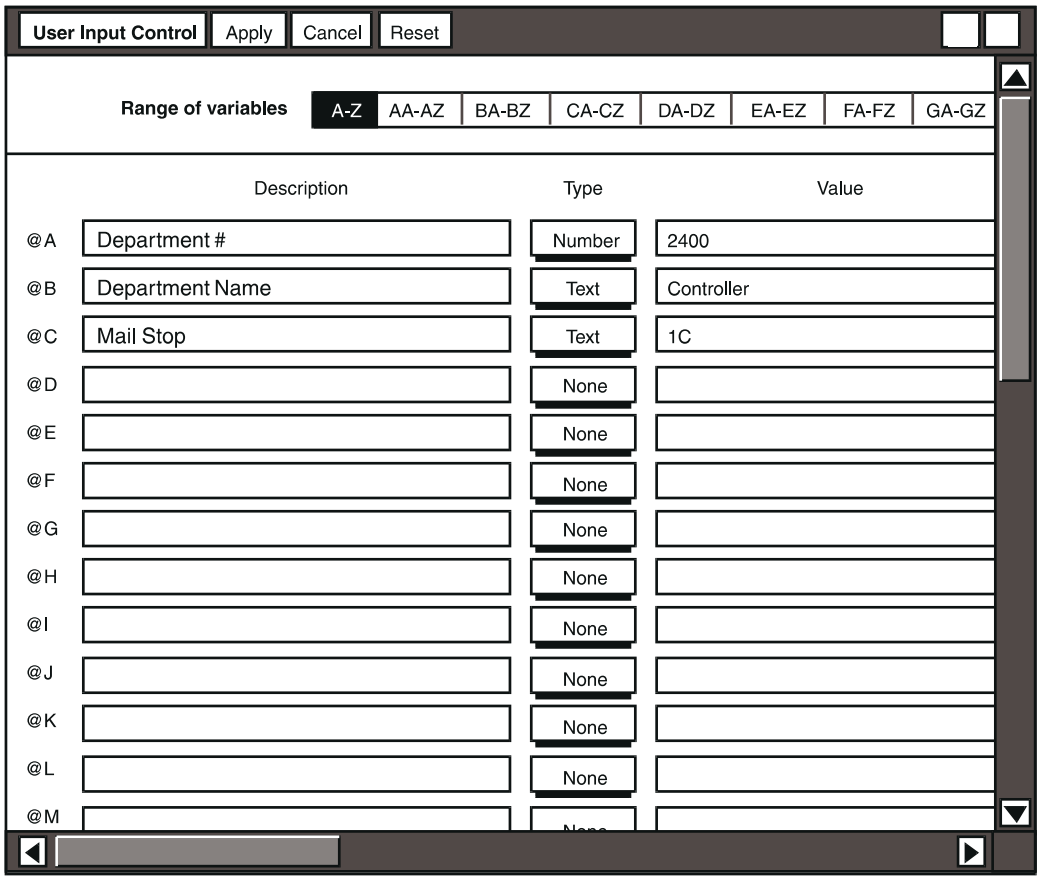
1. Open a Capsule icon.
2. Select a preconfigured Data Entry icon and move it into the Capsule window.
3. Open the Data Entry icon.

1. Enter the particular information for each field in the form.



The data you enter into the form sets the @-variable values in the User Input Control window. Any other tools in the Capsule window use the same values that you assigned to the particular @-variables. The data you enter in the Data Entry icon can be used throughout the Capsule calculations.

If you run the Capsule application, then open the User Input Control window, you should see the information you entered in the Data Entry form. If you want to run a different set of values, simply enter new data into the current form.



2. Close the User Input Control window.

   Another important benefit of using a Data Entry tool to assign @-variables is that the Data Entry icon creator can insert browse lists to help you enter correct values. With a browse list, you can select an acceptable entry instead of having to memorize precisely how values are stored.

Naming the Data Entry Icon so that It Opens Automatically

Setting @-variables in Capsule icons can be automated even further if you name your Data Entry icon Auto Open. Any icon that can be used with the Auto Open capability can be placed inside a Capsule window, and will open automatically when you open the Capsule window. If you use a preset Data Entry icon, that is, one that is set to use specific data, you can simply enter the @-variable values into the Data Entry fields.

The Auto Open capability makes it easier to change the values in a complex Capsule application. When you have a Data Entry icon named Auto Open in a Capsule application, manually opening the Capsule window causes the Data Entry icon to open immediately. Then, instead of modifying the controls windows for each tool inside the

application, you can change the values in the Data Entry window fields, and rerun the Capsule icon to get new results.

You must use initial capitals when you name the Auto Open icon. If you use any other combination of capitals and lowercase letters in either of the two words, the icon will not open automatically.

For information about using Auto Open with other tool icons, see Chapter 2, "Getting Started with the Capsule Tool" on page 4. That chapter explains how to use the Auto Open capability to provide instructions.

Using @-Variables in Layout

Use @-variables with assigned values in the User Input Control window to generate titles and headings for reports. The Layout tool automatically retrieves the @-values when data is transferred to it.

You can use @-variables in column headings in your report by entering the @-variable in the **Data Column Options** or Column Heading Options windows.

Labeling Plot Data

In the Plot tool, you use @-variables to designate labels and legends. The @-values are automatically retrieved when data is transferred to a Plot icon.

You can also enter the date as an @-variable into the **Year** field of the Plot Control window. For example, if **@A** is defined as **2Q**, and **@F** as **1990** in the User Input Control window, entering **@A**, **@F** into the **Year** field retrieves data for **2Q**, **1990**.

You can retrieve the @-values manually by clicking on the Plot tool's **Get @-Values** button in the **Special** button menu. The tool must be in the Capsule window.

Constraining Query Data

In Query, you use @-variables in constraints, computations, headings, and the **General Qualifier** field. The Query tool automatically retrieves the @-values when the Query icon is processed.

You can retrieve the @-values manually by clicking on the Query tool's **Show Data** button. The tool must be in the Capsule window.

Constraining Reporter Data

In the Reporter tool, you use @-variables in heading constraints and formulas for computed headings, and column headings. The Reporter tool automatically retrieves the @-values when the Reporter tool sends its first query.

Setting @-Variable Values from a Spreadsheet

In spreadsheets, @-variables are legal formula entries and are used to indicate a cell value or a value in a formula. The spreadsheet retrieves these values whenever it recalculates or becomes active in the Capsule window.

A spreadsheet region or a range of cells can be the source of an @-variable in the User Input Control window.

You can also retrieve values manually by clicking on **Recalculate** or by changing an entry (if **Automatic** recalculation is set). The Spreadsheet tool must be in a Capsule window to retrieve the Capsule icon's variables.

You can use spreadsheet cells to set values that take immediate effect in the User Input Control window. For example, if you want the value for the variable **@A** to equal **47**, do the following:

1. Open the Spreadsheet icon, select an entire cell, and open the Options window.
2. In the **Display** field, select **Entry**. The **Type** and **Entry** fields, as well as other fields, appear below.
3. In the **Type** field, select **Formula**.
4. Type the following into the **Entry** field:

   ```
   set @A=47
   ```

5. Close the options window, close the Spreadsheet icon, and open the Capsule icon's User Input Controls window. Notice that the value for the first @-variable has been changed to **47**.

You can also set the value based on a calculation. For example, in step 4 you could instead have entered the following if you wanted the @-variable's value to be the sum of spreadsheet cells **a1** through **a3** :

```
set @A=sum(a1:a3)
```

Refer to the IDS publication *Spreadsheet User's Guide* for more information.

Running SQL Statements

For SQL Entry tools, @-variables are entered into the SQL instructions. The SQL Entry tool automatically retrieves the @-values when the SQL program is run.

System-supplied @-keywords, such as **@Date**, cannot be used directly in SQL statements. You can, however, use one of the @-variables, such as **@B**, and define the **@B** value as **@Date** in the **Value** field of the User Input Control window.

Within a Capsule window, you can select **Show @-Values** from the SQL Entry tool's **Special** button menu to display the value that is read from the User Input Control window. The tool must be in the Capsule window.

Customizing Transformer Controls

In transformers, @-variables are entered in the Transformer Controls window for parameter values or region names. The Transformer tool retrieves the @-values automatically when the transformer program is run.

A transformer processes its input when the last input region is received. Refer to *Transformer User's Guide* for more information.

Creating Text Regions

In the Text tool, @-variables are entered into regions. The Text tool automatically retrieves the @-values when the Capsule icon first starts running. Refer to *Text User's Guide* for information about using regions.

You can retrieve the @-values manually by selecting **Get @-Values** in the Text tool's **Special** button. The tool must be in the Capsule window to retrieve variable values from the Capsule icon.

Addressing Envelopes

You can use @-variables in the address and message areas of envelopes. In fact, you can insert an @-variable in any of the address fields (that is, **To**, **From**, **Copies To**, or **Subject**), or at any point in the message area. When you run the Capsule application, the envelope gets the @-variable value from the User Input Control window.

Retrieving System Values

There are several system-defined @-keywords that you can use within a User Input Control window. Most @-keywords can be used in any tool where you can use an @-variable. One exception, mentioned earlier in this chapter, is in SQL statements. Table 8 provides a list of @-keywords.

Table 8. System-defined @-keywords

@-keyword	Displays
@time	Time in hours and minutes
@date	Date (and day of the week, if in a long format)
@timesec	Time in hours, minutes, and seconds
@icon	Name of the Capsule icon
@user	User's desktop name just as the user entered it

The displayed data takes its format from what you specified in the Set Preferences window (the Special menu, in the lower right corner of your desktop).

These @-keywords are not case-sensitive. For example, you can enter **@Date**, **@date**, or **@DATE**. The system accepts any version.

If you type **@user**, the system displays exactly what the user entered when he or she last logged on to the desktop. That is, if your desktop user ID is Jones, and you last logged on by typing your name in all capital letters, **@user** returns your most recent logon, including the capitalization. Therefore, typing **@user** would cause the system to display JONES.

When entering @-keywords, do not include a space after the @ symbol.

Setting Options

You can use @-variables to set options in the Icon Options windows of data access tools, such as Reporter, Data Entry, Query, and SQL Entry. For example, you can place a Query icon inside a Capsule window, enter **@A** in the **Database Name** field, then enter the name of the database for **@A Value** in the Capsule icon's User Input Control window. This allows you to easily change the database you want to use at the same time you change other user input controls.

Naming Icons

You can use @-variables and @-keywords to name icons. The variables are expanded when a new icon is generated during a Capsule run. When the icon has been processed, the icon name returns to the original unexpanded form so that it can be reused. If you want to keep a copy of the icon that has the expanded name, copy it to an output container, such as a folder or an envelope.

This is useful when you are performing iterations and want each final-results icon to be identifiable by the data associated with it. For example, suppose you want a single Capsule run to iterate so that it creates several spreadsheets of regional sales information, each spreadsheet containing data for a different sales region.

1. You set up the iterating Capsule icon to copy each generated Spreadsheet icon into an output folder.
2. To ensure that the output folder contains several spreadsheets with different sales regions as the icon names (instead of all the icons having the name of the original spreadsheet), you enter an @-variable as the Spreadsheet icon's name.

   With each iteration, that is, while each Spreadsheet icon is active during the Capsule run, the @-variable is expanded so that the sales region becomes the icon's name. At the end of the run, each spreadsheet in the output folder has a unique name. You can then quickly locate the report you need.

   After each icon is copied to the results folder and is therefore no longer active, the icon name returns to the unexpanded @-variable so that it is ready for the next time this iterative Capsule runs.

An icon that retrieves its name from an @-variable is never permanently renamed. Each time the icon is activated during a Capsule run, its name changes. There are exceptions to this rule: Some icons, such as the Copy Icon transformer, can be stored in output folders only under their permanently assigned names.

An advanced feature, discussed later in this manual, gives your Capsule applications access to stored libraries of Capsule applications, and also lets you name results icons by using @-variables as you specify the path names to icons in those libraries. For more information, see Chapter 8, “Using Reference Capsule Icons” on page 81.

Labeling Printed Documents

Using @-variables in headers and footers allows you to label your printed icons with @-variable information automatically. This is useful when you want to match the headers or footers with the @-variable that provides the icon name, avoiding the intermediate step of opening an options window for each icon to enter the correct information before printing it.

You can combine several @-variables and @-keywords in the header or footer fields. For example, these header field contents:

```
@h @date @d
```

might produce the following header:

```
Chicago Fri  May 22, 1987 Jones
```

In this header, the @-variable **@h** contains the value **Chicago**, the @-keyword **@date** produces the day and date, the @-variable **@d** contains the @-keyword **@user** as its value, and the user's desktop name is Jones.

When you use @-variables in the header of a Text document, the document must be inside a nested Capsule icon that also contains a printer icon. If you attempt to manually copy the icon to a printer icon outside the Capsule window, the @-variable in the header is not replaced with its value.

Chapter 5. Running the Capsule Application

This chapter explains how to run the Capsule application after you have built the sequence you need. Major topics covered are:

Running the entire application

Running part of the application

Logging off when processing is finished

Securing a Capsule icon

Stopping the Capsule process

Examining a Capsule process with the Capsule Run Log

Control database connections during a Capsule run

Running the Entire Application

After you have placed all the icons you intend to process in the Capsule window, and you have connected them with arrows, you are ready to run the Capsule application.

To run the Capsule application:

1. If any icons or arrows in the Capsule window are still selected (highlighted), deselect them by selecting in a blank area.
2. Click on **Run**.

   Clicking on the **Run** button in the Capsule window header starts the processing sequence. As soon as you do this, the pointer changes to a stopwatch, and the first icon in the sequence is highlighted. Each successive icon is highlighted, and when the process is complete, the pointer changes back to its original appearance, and the following statement appears in the message area:

   Complete. --Please continue.
3. To open the last icon processed at the conclusion of the sequence, double-click on it.

Capsule applications process information within each icon in the order indicated by the arrows. Generally, icons are processed from left to right, top to bottom. Specifically, the Capsule tool follows these rules when processing icons:

1. Run all icons connected by arrows in left-to-right, top-to-bottom order, and in the order indicated by the arrows.
2. Run any executable stand-alone icons.

Stand-alone icons that can be run as executable modules (that is, they can be run even though they are not attached by arrows to other icons inside the Capsule window) are the Capsule tool, the Reference Capsule icon, the SQL Entry tool, Reporter, and desktop Application icons.

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Running Part of the Application

Occasionally, you might need to locate problems in a Capsule application or run just one section of a large application. In such cases, you can run selected sections of your applications. To run from a specific starting point in a Capsule application, choose the icon you want to start with, select it, and then click on the **Run** button.

If you select one or more icons to start the run, the execution of the sequence begins with those icons.

From a Selected Arrow

You can also run a Capsule application while the arrow between icons is still selected. If you select an arrow and then click on **Run**, the data from the source icon is transferred to the destination icon, and then it is processed.

Open the last processed icon by selecting it while the icon is still highlighted.

From a Transformer

In most cases, you select the icon that contains the data you wish to transfer, then run the Capsule application from that point. However, if your Capsule window contains a transformer icon, and you want to start the processing sequence at that point, you must select the icon that comes before the transformer in the processing sequence — the icon that supplies input for the transformer's last input region. If you select the transformer and click on **Run**, no data is processed.

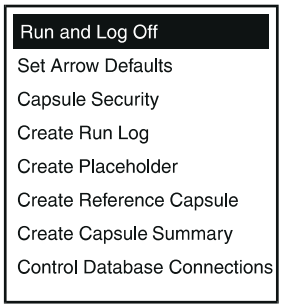
If you are troubleshooting an application and you want to run a Capsule application only from a transformer, you can follow these steps:

1. Manually copy the appropriate data into the input data region.
2. Close the transformer window and click on **Run**.

The event that makes a transformer start is the arrival of data in the transformer's last input region. You can set a transformer to discard or retain the data in any of its regions (input or output) except for its last input region. The last input region —the transformer's “starter”—receives no data until the icon before it has run, and it retains no data.

Logging Off When Processing Is Finished

When you click on **Run and Log Off** in the Special menu, the Capsule application is processed, and your desktop is automatically logged off when everything is finished. You can use this feature when your applications take a long time to process. By selecting **Run and Log Off**, you can begin the process before you leave for the day. After the Capsule application has finished processing, your desktop is put away, and no other user has access to it.



The **Run and Log Off** option is also described in Chapter 6, “Working with Nested Capsule Icons” on page 53, as a way to keep your complex processing sequences secure from tampering.

Chapter 9, “Using Capsule Services” on page 90, describes how you can run your Capsule applications in batch mode.

The next section describes another security feature, that is, the ability to lock icons inside a Capsule window.

Securing a Capsule Application

Sometimes it is necessary to protect a Capsule application so that the icons inside the Capsule window cannot be changed. The Capsule tool permits you to lock icons inside the Capsule window so that other users cannot open, move, copy, or delete any of the locked icons. Arrows pointing to and from a locked icon are also secured and cannot accidently be deleted.

After you secure an icon, anyone can run the Capsule application, but its locked contents are protected. Before you proceed with the steps for securing a Capsule application, be sure to read the next section.

Using Capsule Security Wisely

Bear in mind that the password you assign to an individual Capsule window does not relate in any way to other Capsule icons, or to your user ID. The password you select is assigned only to the Capsule window that is active when you select **Capsule Security**. This means that if you wish to lock the same Query icon inside several Capsule windows, you must repeat the process described here for each individual Capsule window. In this case, you should try to use the same password for each one to avoid confusion.

It is also very important to note that locked icons cannot be unlocked without the correct password. If you lock Capsule icons, then forget the password, your work cannot be accessed. Be sure to record the password that you assign to each Capsule application, and keep the recorded password where you can easily retrieve it.

Opening the Capsule Security Window

To open the Capsule Security window:

1. Display the Special menu in the Capsule window header, as shown in Figure 13.

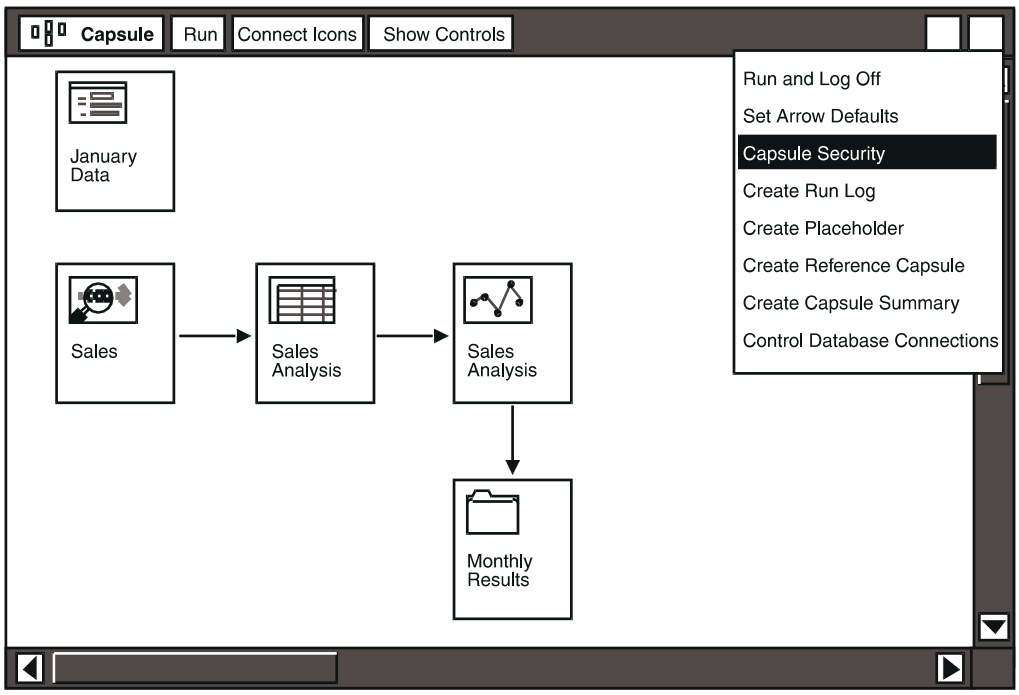


Figure 13. Capsule Security in the Special menu

2. Select **Capsule Security**.

You now see the window shown in Figure 14. By assigning a password, you can secure any or all icons inside your Capsule application. The next section tells you how to do so.

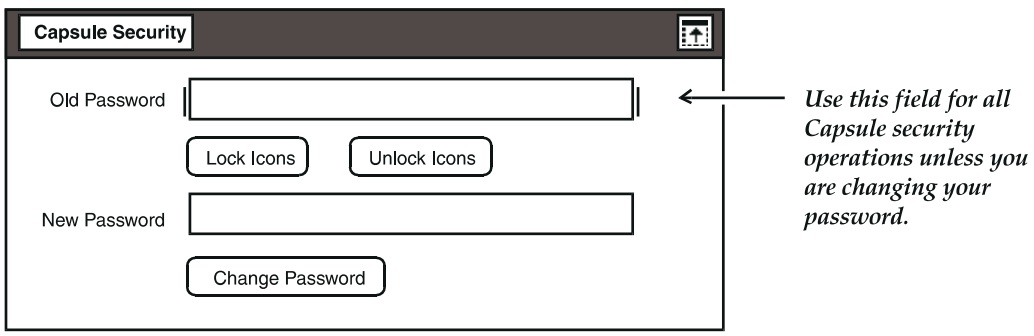


Figure 14. Capsule Security window

Locking the Icons in Your Capsule Window

To lock one or several icons inside a Capsule window:

1. In the Capsule Security window, enter a password from 1 to 12 characters long in the **Old Password** field.

   The password you enter becomes the password for locking all icons currently inside the Capsule window, and for any icons that you place there later.

   Locked icons cannot be unlocked without a valid password. If you do not use your password often, you might want to write it down and keep it in a safe place.

2. In the Capsule window, select the icon or icons you want to lock.
3. In the Capsule Security window, click on the **Lock Icons** button.
4. Close the Capsule Security window.

   When an icon is locked, its border is darkened to show that it is locked. You cannot move, copy, open or delete a locked icon or any of its associated arrows. Furthermore, you cannot connect a locked icon to anything else in the Capsule window.

   The icons you selected will remain locked regardless of the status of other icons inside the Capsule window. If you add more icons to the Capsule process later and wish to lock them, you must enter the same password you established initially.

Unlocking the Icons

To unlock icons inside a Capsule window:

1. In the Capsule Security window, enter the correct password for the icon or group of icons that you wish to unlock. The password must be the same as the one you used to lock the icon.
2. Select the icon or icons you want to unlock.
3. Click on the **Unlock Icons** button.
4. Close the Capsule Security window.

Remember that only the icon you selected in step 3 is unlocked. Other icons in the Capsule window remain locked unless you specifically selected them. If you unlock all icons in a Capsule window, the password field is cleared and a message appears notifying you that this has been done. The Capsule tool does not retain the previous password, so subsequent lock operations require you to repeat the steps described in "Locking the Icons in Your Capsule Window."

Changing a Password

An additional feature of Capsule security is the ability to change a password. You cannot change a password unless you know the old password. To change a password:

1. In the Capsule Security window, enter the correct password for the Capsule window whose password you want to change.
2. Select inside the **New Password** field and enter the new password.

The password you enter must be from 1 to 12 characters in length.

3. Click on the **Change Password** button. The new password appears inside the **Password** field, and the **New Password** field again becomes blank.
4. Close the Capsule Security window by selecting its title block.

Stopping the Capsule Process

You can stop the Capsule process at any time by pressing the Stop key on your keyboard. You might do this if you have started a particularly complex Capsule application, and change your mind about running it. Or, you might want to stop the processing sequence to add or delete a component from the Capsule window. Whenever you stop a Capsule run this way, be sure that you start over and run it again after you have made your corrections. Do not attempt to guess where the application stopped processing data because any information retrieved before you stopped the process might be incomplete.

Examining a Capsule Process

In some cases, your Capsule run might halt, and the results will be incomplete. One way to check status information for the processing sequence is to create a Capsule Run Log, as described in the next section.

Creating a Capsule Run Log

To turn on the Capsule logging feature, do as follows:

1. Select **Create Run Log** from the Special menu in the Capsule window header. The **Control Run Log** window appears, as shown in Figure 15.

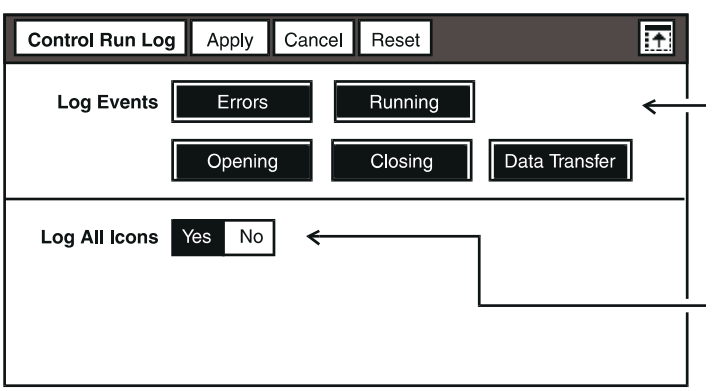


Figure 15. Control Run Log window set to log all icons

2. Select all the types of events you want to log (the choices opposite **Log Events**). The different types of events are explained in Table 9 on page 49.

Table 9. Types of log events and their meanings

Log Event	What It Means
Errors	The time a problem or error occurred during the run, and any information available about the cause of the error. This includes all stops, whether automatic or manual.
Running	The time each logged icon began running.
Opening	The time each logged icon was opened. For most icons, this means reading in the stored data and preparing the icon to run. For data access icons, this includes establishing a connection to a database.
Closing	The time each logged icon was closed and information obtained from the icon was filed. For data access icons, this includes disconnecting from the database.
Data Transfer	The time data transfer between icons started.

3. Choose whether or not to **Log All Icons**.

   If you choose **Yes**, the run events associated with each icon in your Capsule are logged.

   If you choose **No**, the Control Run Log window changes as shown in Figure 16.

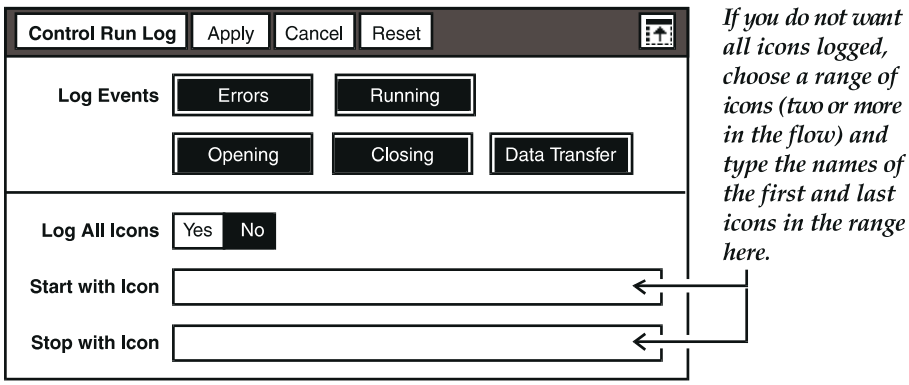


Figure 16. Control Run Log window set for logging selected icons

4. Close the Control Run Log window. Now a document called the **Capsule Run Log** is created and is placed in the Capsule window. The icon representing a **Capsule Run Log** is shown next.

If you open the **Capsule Run Log** icon after the Capsule processing is finished, you might see a status report like the one shown in Figure 17 on page 50.

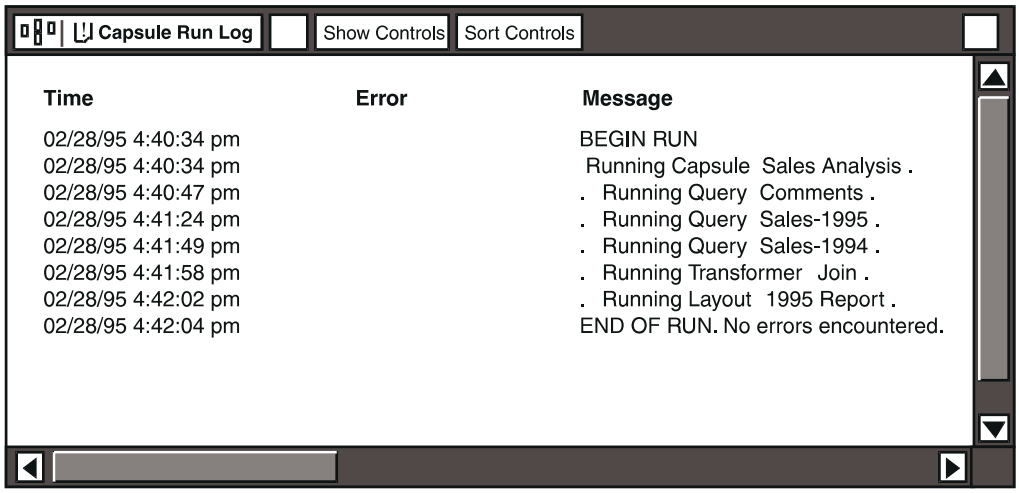


Figure 17. Capsule Run Log window

The **Capsule Run Log** is automatically reused (that is, new information is written over old information) each time the Capsule is run. You must close the document before you can read new information.

Remember to deselect the **Capsule Run Log** icon before you try to run the Capsule application. Otherwise, the Capsule tool attempts to process the run log itself, and you receive an error message indicating that the run was incomplete.

Using the Capsule Run Log

If you want to save the **Capsule Run Log** before it is overwritten:

Copy it to your desktop or to another icon.

Copy it to another location within the same Capsule window, and rename the copy. (Make sure that the Capsule window still contains a run log icon named **Capsule Run Log**, or the next run will not be logged.)

To disable the logging function, simply delete the **Capsule Run Log** icon.

To print the contents of a Capsule Run Log, you must copy the contents to a Spreadsheet or Text icon, then print that icon. Use the Select All button in the Capsule Run Log window header to select all entries for copying.

If you copy the contents of a Capsule Run Log to a Text icon, the row's format is not transferred. To keep your selection's columnar format, you can copy your selection to a Spreadsheet icon, which maintains the tabular format. Or, if you use a Text icon, you can go to the Text Options window and format your transferred selection there.

If you are building a complex Capsule application using nested Capsule icons, create a Capsule Run Log so that you can record and examine each test run as you go. Information captured in the Capsule Run Log window can help you isolate a problem quickly, and eliminates the need to test each individual Capsule component. If a system problem occurs during a Capsule run, that information is also recorded in the Capsule Run Log window, so that you know where the error occurred in the processing sequence.

Do not use the **Capsule Run Log** with extremely large or long-running Capsule applications; the resulting information can be voluminous.

For more information about using the **Capsule Run Log** to investigate problems in Capsule applications, see Chapter 10, “Troubleshooting” on page 97.

Controlling Database Connections

Many Capsule applications contain at least one data access tool, so a failed connection to a database service can prevent a processing sequence from completing. You can control the connections to a database service based on the requirements of your Capsule application. Two types of database connection are available.

Reuse connections. This type of connection is a major benefit for applications that require repeated connections to the same database.

If you want to reuse a database connection, make sure the icon options information is identical for all data access icons in the application.

Retry connections. This type of connection prevents applications from terminating when a database connection is busy.

Setting Database Connections

To set database connections, select **Control Database Connections** in the Special menu of the Capsule window.

The default setting for **Connection Options** is to use the options defined in the outer Capsule window if the application is nested inside another. If you select **Specified Here**, you can change the default setting for the nested capsule object.

The default setting for **Reuse Connections** is **No**. This setting means that each data access icon establishes a database connection and releases it when the icon finishes running. The default setting for **Retry Connections** is **No**.

Reusing Connections

If you decide not to reuse connections, the connections to a database service are not kept open to be used by other data access tools. If you decide to reuse connections, select **Yes**.

Database connections are then left open when a tool has finished with the database, and the connections can be used by other tools connecting to the same database. As soon as the Capsule run finishes, the connections are freed.

Retrying Connections

The default setting for **Retry Connections** is **No**. This setting means that if the first attempt to connect to the database fails, the Capsule run halts at that data access icon. If you decide to retry connections, select **Yes**. This option means that the Capsule tool tries to connect after the first failure. You can also limit the number of retries or, if you set the choice to **No**, continue retrying indefinitely.

If you choose to limit the number of retries, a field is provided so that you can enter the desired number of attempts to connect. After the specified number of attempts is reached, the Capsule application stops.

Chapter 6. Working with Nested Capsule Icons

You can nest Capsule icons inside other Capsule icons, either as independent applications containing icons, or as part of the actual processing sequence. These capabilities let you use the Capsule tool to perform a range of complex business analyses. For example, you can use a spreadsheet inside a nested Capsule icon to perform iteration and sensitivity analysis, or you can format the spreadsheet to provide conditional processing of tool icons.

In this chapter, two types of nested Capsule icons are described: nested Capsule icons that are part of a processing sequence, and independent (stand-alone) nested Capsule icons that are not.

This chapter provides instructions for using nested Capsule icons, and covers the following specific topics:

Understanding the processing sequence

Using spreadsheets to control nested Capsule icons

Controlling the processing sequence

Using queries to control nested Capsule icons

Transferring data between nested Capsule icons and other icons

The Processing Sequence

Before you can build and test complex applications, you need to fully understand the Capsule processing sequence. This section explains the order in which icons are processed during a normal run. It also describes how to interpret the User Input Control window for a nested Capsule icon, and how creating a **Capsule Run Log** can help you to record each process and identify the reason for any failure.

Looking at the Processing Order

The priority for running nested Capsule icons that are not part of a processing sequence is as follows:

Selected icons run in the order they were selected, and so the first icon you select begins the process.

Connected fragments run. In a Capsule window, a fragment can be two or more icons that are connected to each other with arrows, but not connected to any other icons in the Capsule application. If you have more than one fragment, the fragments follow the left-to-right, top-to-bottom processing order.

Remaining stand-alone icons, such as inner Capsule icons and SQL Entry icons, run in a left-to-right and top-to-bottom order within the outer Capsule icon. Other icons must be part of a processing sequence to run.

Certain transformers, like Copy Icon and Clear Contents, must be placed in specific positions in the processing sequence. For more information about using the Copy

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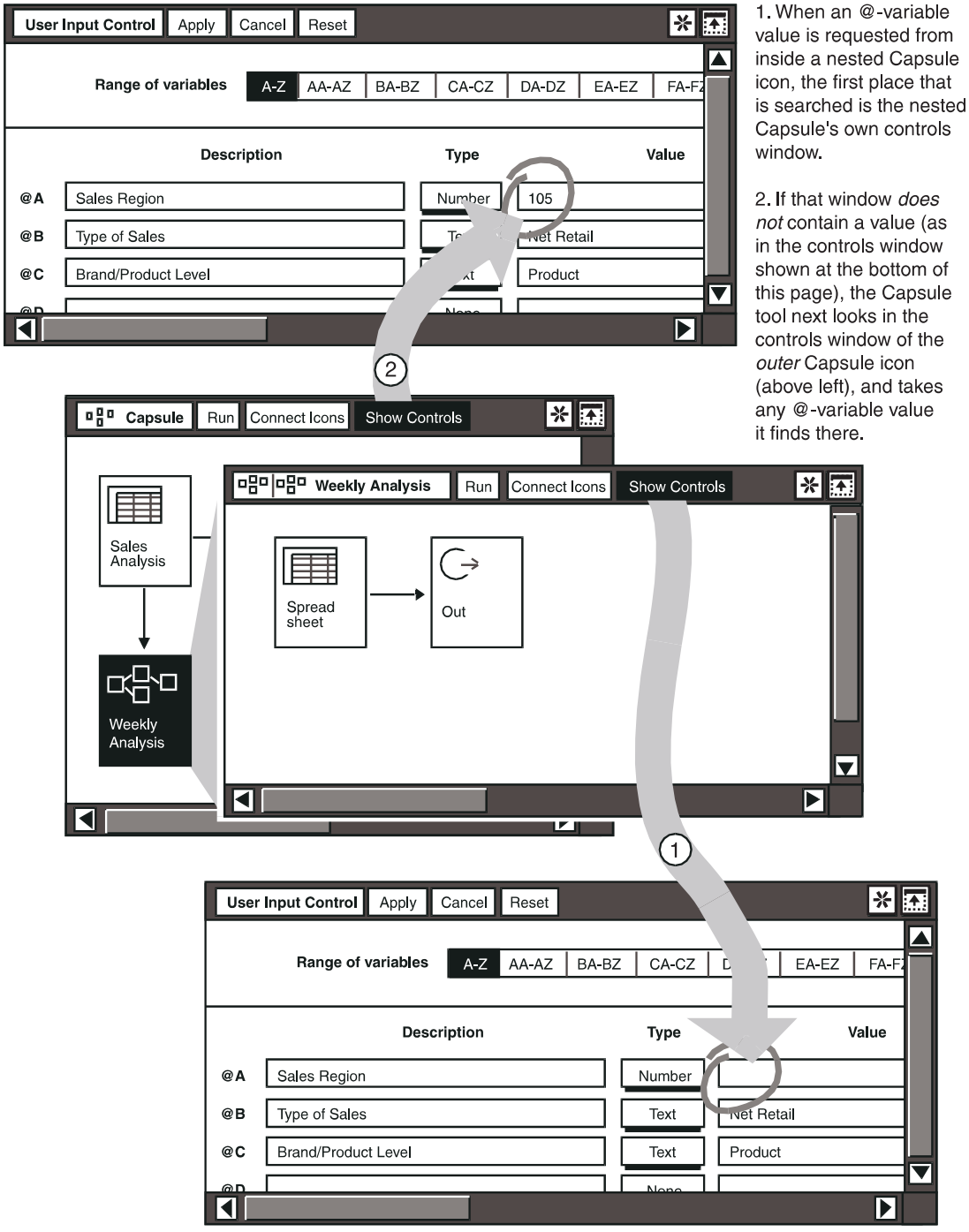
Icon and Clear Contents transformers, refer to the IDS publication *Transformers User's Guide*.

To be sure about the processing order of icons, use the Capsule Summary feature, described in Chapter 7, “Creating Capsule Summaries” on page 68.

@-Variable Access from Nested Capsule Icons

A nested Capsule application gets and uses @-variable values according to the rules illustrated in Figure 18 on page 55.



1. When an @-variable value is requested from inside a nested Capsule icon, the first place that is searched is the nested Capsule's own controls window.

2. If that window *does not* contain a value (as in the controls window shown at the bottom of this page), the Capsule tool next looks in the controls window of the *outer* Capsule icon (above left), and takes any @-variable value it finds there.

Figure 18. How a nested Capsule icon finds its variable values

If you want a nested Capsule icon to use the same values as its outer Capsule icon, you can enter the values in the outer Capsule controls window and leave the nested Capsule's controls window blank. The nested Capsule icon picks up the outer Capsule icon's values automatically.

Using Spreadsheets to Control Nested Capsule Icons

You can use a spreadsheet in an outer Capsule icon to control the processing of a nested Capsule icon. You enter control information, consisting of keywords and @-variables, in the spreadsheet. (If you are controlling more than one nested Capsule icon with the spreadsheet, you name a corresponding number of regions in the spreadsheet, and you enter control information in those regions.) You connect the spreadsheet to the nested Capsule icon. When you run the outer Capsule application, the control information you have entered is automatically transferred from the spreadsheet, or from any regions you have named, to the nested Capsule icon's controls, of which the User Input Control window is part.

The control information you enter in the spreadsheet decides the method of Capsule processing. You can specify four types of processes:

Iteration

Goal seeking

Sensitivity analysis

Conditional processing

The first row of the controlling spreadsheet usually contains a keyword that indicates the process name, followed by the @-variables to be affected. For a conditional processing application, three keywords can be inserted in the first column of the spreadsheet to indicate the conditions for the Capsule run.

The following sections describe how to use a spreadsheet to create these Capsule applications.

Iteration with a Spreadsheet

Iterating Capsule applications are meant to be run repeatedly to obtain a desired result in a processing sequence. You can choose one of three settings:

ITERATION

ITERATE UNTIL

ITERATE TO

These are described in the following sections.

Using Iteration

ITERATION causes sets of values to be processed sequentially. This is the same as if you manually run a Capsule icon with one set of @-values, then change the @-values, and run the Capsule icon again. The process continues until all values are used. By

connecting a controlling spreadsheet to a nested Capsule icon, you can automate the process.

The first row in each column lists the process name and the @-variables represented by the column. Each subsequent row contains the values to be used, as shown in Figure 19.

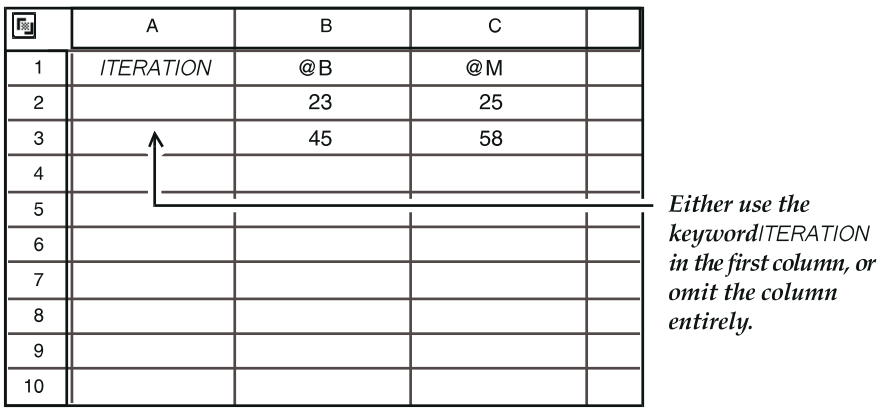


Figure 19. A spreadsheet prepared for ITERATION

In the example in Figure 19, there are three columns and three rows.

The keyword **ITERATION** in italicized text is helpful for reading the table, but it is not required. If you do not type the keyword, you must begin typing your @-variables in the first spreadsheet column (**A**). Do not leave the first column blank, or your Capsule application will not run properly.

The example shown in Figure 19 tells the Capsule application to perform the following instructions:

1. Run the nested Capsule application to which this controlling spreadsheet is connected, using **23** for **@B**'s value and **25** for **@M** 's value.
2. Then run the application again, this time using **45** for **@B** 's value and **58** for **@M**'s value.
3. Stop when there are no more rows in the controlling spreadsheet.

If, in the example shown in Figure 19, **@B** 's column contained only one value (**23** in row **2**), then that value would be repeated in the second iteration (that is, in the second iteration, **@M** would use **58** and **@B** would still use **23**).

Iteration and Appending Data: Suppose that, inside a nested Capsule icon, you have connected two icons and have chosen one of the “append to” options in the Arrow Options window so that incoming data will be appended to existing data in the destination icon. Be aware that the append function, which is described in more detail starting on “Appending Columns to the Destination Region” on page 23, is designed this way:

On the first iteration, destination values are always replaced, no matter what setting is used in the Arrow Options window. This automatically clears old data from your previous run.

On the second and subsequent iterations, if you have chosen one of the “append to” options in the Arrow Options window, that option takes over and the incoming data is appended to the data from the first iteration.

If you have two source icons connected to the same destination icon, both using “append to” options, you will not get the results you expected. The second source icon will replace all the data that came from the first source icon. To avoid this problem, you can use the Append transformer. For detailed information, please refer to the IDS publication *Transformers User's Guide*.

Using Iterate Until

ITERATE UNTIL causes processing to continue until a specified @-value stays within a given range. A sample spreadsheet setup with two columns and four rows is shown in Figure 20.

	A	B	C	D
1	ITERATE UNTIL	@B		
2	*initial value*	20		
3	*changes by =*	0.3		
4	*max # of iterations*	8		
5				

Figure 20. A spreadsheet prepared to ITERATE UNTIL

The keywords **ITERATE UNTIL** are required. The italicized text in spreadsheet cells **a2** through **a4** is helpful for reading the table, but is not required. However, the Capsule tool assumes that the values you enter in cells **b2** and below correspond to the meanings in cells **a2** and below, even if you do not type initial value, changes by =, and so on. Do not skip rows or columns when setting up your spreadsheet for iteration.

The example shown in Figure 20 tells the Capsule icon to perform the following instructions:

1. Run the nested Capsule icon to which this spreadsheet has a connecting arrow, giving **@B** an initial value of **20**.
2. Stop when **@B** 's value does not change by more than **0.3**, or when 8 iterations have occurred, whichever comes first.

If no iteration setting is provided, 10 iterations is the default.

Using Iterate To

ITERATE TO causes processing to continue until a specified @-value is achieved within a given delta (range). A sample spreadsheet is shown in Figure 21 on page 59.

	A	B	C	D
1	ITERATE TO	@B		
2	*initial value*	20		
3	*goal value*	30		
4	*data*	0.10		
5	*max # of iterations*	8		
6				

Figure 21. A spreadsheet prepared to ITERATE TO

The keywords **ITERATE TO** are required. The italicized text in spreadsheet cells **a2** through **a4** is helpful for reading the table, but is not required. However, the Capsule tool assumes that the values you enter in cells **b2** and below correspond to the meanings in cells **a2** and below, even if you do not type initial value, goal value, and so on. Do not skip rows or columns when setting up your spreadsheet for iteration.

The example shown in Figure 21 tells the Capsule icon to perform the following instructions:

1. Run the nested Capsule icon to which this spreadsheet has a connecting arrow, giving **@B** an initial value of **20**.
2. Stop when **@B** 's value reaches **30**, plus or minus **0.10**, or when 8 iterations have occurred, whichever comes first.

If no iteration setting is provided, 10 iterations is the default.

Goal Seeking with a Spreadsheet

GOAL SEEKING causes processing to continue until a specified value is achieved. A sample spreadsheet setup is shown in Figure 22.

	A	B	C	D
1	GOAL SEEKING	@B		@M
2	*initial value*	23	*goal value*	43
3	*initial delta*	3	*goal delta*	0.5
4	*max # of iterations*	8		
5				

named region

Figure 22. A spreadsheet prepared for GOAL SEEKING

The keywords **GOAL SEEKING** are required. The italicized text in spreadsheet cells **a2** through **a4** is helpful for reading the table, but is not required. However, the Capsule tool assumes that the values you enter in cells **b2** through **b4** correspond to the meanings in cells **a2** through **a4**, even if you do not type initial value, initial delta, and so on. Do not skip rows or columns when setting up your spreadsheet for goal seeking iteration.

The example shown in Figure 22 instructs the Capsule icon to do the following steps:

1. Run the nested Capsule icon to which this spreadsheet has a connecting arrow, starting **@B** with a value of **23** and running until **@M** is set to a value of **43** (plus or minus **.5**).
2. If after the first run, **@M** does not equal **43** (plus or minus **.5**), then add **3** to **@B** 's value and run again.
3. If after the second run, **@M** still does not equal **43** (plus or minus **.5**), then calculate the next value for **@B** and run again.
4. Continue until the goal of **43** (plus or minus **.5**) is achieved or for 8 iterations, whichever comes first.

If no iteration setting is provided, 10 iterations is the default.

Sensitivity Analysis with a Spreadsheet

Sensitivity analysis provides the ability to have processing continue as one @-value changes while others are held constant. A sample spreadsheet setup is shown in Figure 23.

	A	B	C	D
1	SENSITIVITY	@A	@B	@X
2	*normal*	2.00	3.00	1.00
3	*low*	0.00	1.00	0.50
4	*high*	3.00	4.00	5.00
5				

Figure 23. A spreadsheet prepared for sensitivity analysis

The keyword **SENSITIVITY** is required (do not type the word “analysis”). The italicized text in spreadsheet cells **a2** through **a4** is helpful for reading the table, but is not required. However, the Capsule tool assumes that the values you enter in cells **b2** through **b4** and so on correspond to the meanings in cells **a2** through **a4**, even if you do not type normal, low, and so on. Do not skip rows or columns when setting up your spreadsheet for sensitivity analysis.

The example shown in Figure 23 tells the Capsule icon to run the nested Capsule icon to which this spreadsheet has a connecting arrow, using the sequence described next.

1. For the first run, **@A = 2.00, @B = 3.00,** and **@X = 1.00**
2. For the second run, **@A = 0.00, @B = 3.00,** and **@X = 1.00**
3. For the third run, **@A = 3.00, @B = 3.00,** and **@X = 1.00**

   As the sensitivity analysis process continues, the results (not shown in Figure 23) would look like the following:

   For the fourth run, **@A = 2.00, @B = 1.00,** and **@X = 1.00**

   For the fifth run, **@A = 2.00, @B = 4.00,** and **@X = 1.00**

For the sixth run, **@A = 2.00, @B = 3.00,** and **@X = 0.50**

For the seventh run, **@A = 2.00, @B = 3.00,** and **@X = 5.00**

Using Keywords to Perform Conditional Processing

With the conditional-processing feature, you can build a complex, nested Capsule application and decide which parts of the sequence should be run under certain conditions. You can insert any of three keywords —**RUN**, **SKIP**, or **CLEAR** — in corresponding regions of a spreadsheet column to control the generation of reports.

The keywords must be entered using uppercase letters. A sample spreadsheet setup is shown in Figure 24.

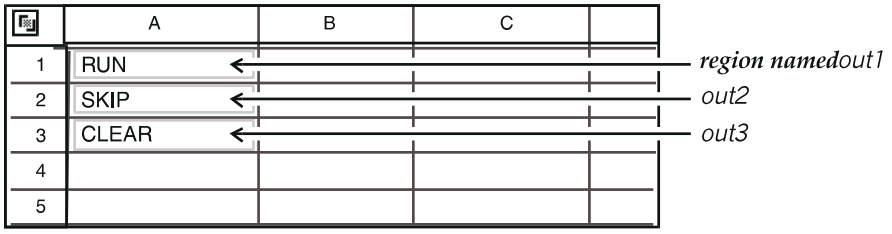


Figure 24. Three spreadsheet regions prepared for conditional processing

In the spreadsheet shown in Figure 24, three keywords are being passed to the **controls** of three nested Capsule icons inside a Capsule application. In the controlling spreadsheet, each keyword must appear in its own respective region.

These keywords have the following effects:

RUN causes the receiving Capsule icon to run normally.

SKIP causes the receiving Capsule icon to skip execution and output.

CLEAR causes the receiving Capsule icon to skip execution and produce empty output.

In the example shown in Figure 25 on page 62, the Capsule icon labeled **Weekly Analysis** receives the **RUN** keyword (which is in control region **out1**), the Capsule icon labeled **Monthly Analysis** receives the **SKIP** keyword (which is in control region **out2**), and the Capsule icon labeled **Quarterly Analysis** receives the **CLEAR** keyword (which is in control region **out3**). Notice that each Capsule icon uses an Out connector icon to transfer data to the Text icon, labeled **Results**, in the outer Capsule window. (The procedure for using In and Out connectors is described on "Transferring Data Between Icons and Nested Capsule Icons" on page 65, in the section titled "Transferring Data Between Icons and Nested Capsule Icons" on page 65.)

If you opened the other two Capsule icons, their windows would look like the Quarterly Analysis window shown in Figure 25 on page 62. Each nested Capsule icon would contain a Spreadsheet icon connected to an Out connector icon.

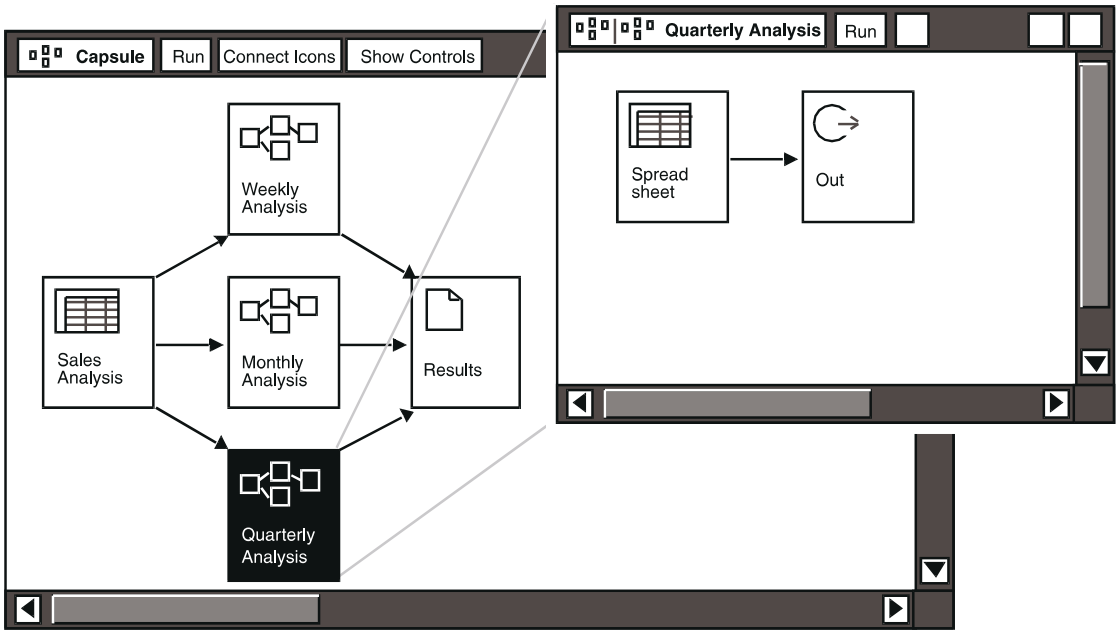


Figure 25. Nested Capsule icon opened to show controlling spreadsheet and Out icon

Figure 26 on page 63 shows the Arrow Options window for the arrow that sends the **SKIP** keyword from the spreadsheet control region called **out2** to the first nested Capsule icon's **controls** region.

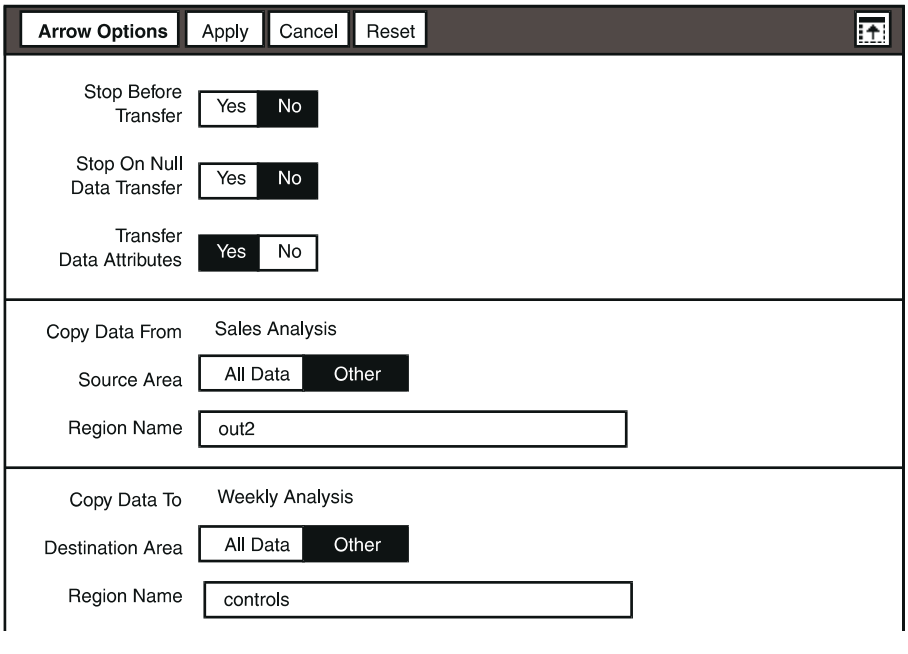


Figure 26. Arrow Options window for the SKIP keyword

Connecting a Controlling Spreadsheet to a Nested Capsule Icon

After you have set up a spreadsheet for the processing you want, you must connect the controlling spreadsheet to one or more nested Capsule icons. When you transfer values to a nested Capsule icon, that data normally replaces any data that is already in the Capsule controls window. To make this happen, do the following:

1. Set up the spreadsheet for the type of process you want to perform, as follows:
2. Name as many regions as you are using keywords.
3. Insert a keyword in each region. Bear in mind which nested Capsule icon you want each keyword to affect.
4. Use the **Connect Icons** button to connect the spreadsheet to each nested Capsule icon. For each connection, do the following steps in the Arrow Options window:
5. Enter the name of the source area, which is the region you named in the spreadsheet.
6. Select **Other** in the **Destination Area** field, and type controls as the region name.

When the nested Capsule icon is processed, its @-variables are controlled according to the instructions in the spreadsheet. If there is an @-variable value in both the User Input Control window and the spreadsheet, the spreadsheet's instruction takes preced-

ence. If a spreadsheet does not have an entry for a given @-variable, but one is present in the User Input Control window, the controls window s entry is used.

A nested Capsule icon might have only one incoming arrow in which **controls** is specified as the destination region.

Using Queries to Control Nested Capsule Icons

Instead of a spreadsheet, you can connect a Query tool to a nested Capsule icon for the iteration process. This means you can create nested Capsule routines that are dynamically controlled by the results of a query.

Using Queries to Set Controls in Capsule Applications

The Query tool can be used in a Capsule application to set @ variables in the User Input Control window, and to control nested Capsule applications. The sections that follow describe these procedures.

Getting @-Values from the Database

You can use a combination of the Query and Spreadsheet icons to automatically retrieve certain values from your database. This is useful if you are running applications and want to take advantage of frequent database updates.

Controlling Nested Capsule Applications

Instead of a spreadsheet, you can connect a Query tool to a nested Capsule icon for the iteration process. This means you can create nested Capsule routines that are dynamically controlled by the results of a query.

Setting Up a Query

In the section of this chapter titled “Using Spreadsheets to Control Nested Capsule Icons” on page 56 you saw how spreadsheets can be used to control iterative processes in Capsule icons. A controlling spreadsheet's iteration setup looks like the one shown in Figure 27.

	A	B	C	D
1	*ITERATION*	@B	@M	
2		23	25	
3		45	58	
4				
5				

Figure 27. Spreadsheet's iteration setup

To use a Query tool instead of a spreadsheet, set up the results area so it looks like Figure 28 on page 65 when the data is retrieved. Notice that the Query tool's column headings must be used to indicate the @-value designation.

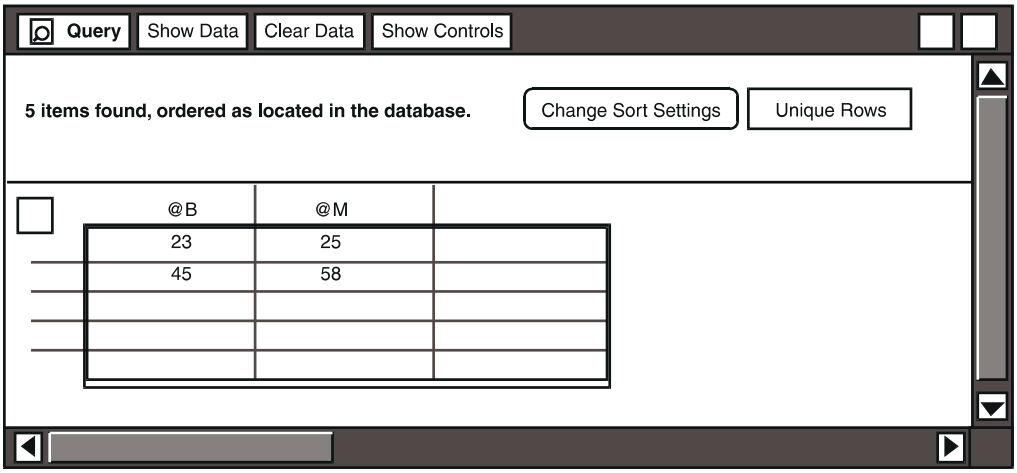


Figure 28. Query tool's iteration setup

Connecting a Query to a Nested Capsule Icon

To connect a Query icon to a nested Capsule icon:

1. Connect the query to the nested Capsule icon by clicking on **Connect Icons**.
2. In the Arrow Options window, type ***controls*** as the name of the destination area.

Transferring Data Between Icons and Nested Capsule Icons

In many cases, a Capsule application might contain a series of nested Capsule icons that are not connected to one another. Running the outer Capsule icon would cause each nested Capsule icon to run in a left-to-right, top-to-bottom order. But an individual icon inside a nested Capsule icon might have data to exchange with icons outside the nested Capsule icon. To accommodate this, connector icons are provided. Connector icons are actually pointers between two icons. They are not processed and they cannot hold data. Furthermore, connector icons have no impact on the processing order of a Capsule icon. But they do permit you to connect icons that are nested inside other Capsule icons.

There are two types of connector icons: an **In connector** passes the data from the outer nested Capsule icon, and an **Out connector** passes data from inside the nested Capsule icon. Both connector icons can be used inside the nested Capsule icon.

Using an Out connector to pass data from a nested Capsule icon to the outer Capsule icon makes your application more convenient, because it means that the application user does not have to open the nested Capsule icon to see the results of that particular processing sequence.

Finding Connector Icons

Connector icons can be found in the **New Icons** file drawer. If you cannot find them, ask your system administrator. Both connector icons are shown in Figure 29.

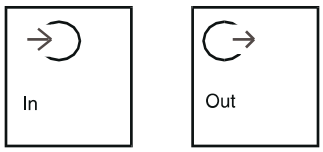


Figure 29. In and Out connector icons

Getting Data into a Nested Capsule Icon

Suppose you have two Capsule icons, and one is inside the other. The outer Capsule icon has a spreadsheet that needs to pass data to a spreadsheet that is inside the nested Capsule icon.

1. Connect the spreadsheet in the outer Capsule icon to the nested Capsule icon.
2. Select the arrow between them and display the Arrow Options window.
3. In the Arrow Options window, type In in the **Region Name** field for the **Destination Area**.

   In this step, you are entering the actual name of the In connector.

   You can change the name of the connector icon if you wish. However, if you do so, you must also rename the icon in its Icon Options window, and enter the identical name in the **Region Name** field. The name can be in upper- or lowercase, or any combination of the two.
4. Open the nested Capsule icon and copy an In connector inside it.
5. Connect the In connector to the destination icon (a spreadsheet, for example).
6. Display the Arrow Options window for the new arrow and enter the name of any destination region.

When transferring data from two or more icons to a transformer using an In Connector, the transformer might run before it receives all the necessary information from all icons. When data is transferred to an In Connector, it transfers data to the icon it is pointing. If the destination icon is a transformer and the arrow is defined as the **last input region**, the transformer runs immediately upon receiving the partial data from the In Connector and might not contain data from the second icon. To ensure that data from all icons are transferred to the transformer, place a spreadsheet between the transformer and the In Connector.

Getting Data Out of a Nested Capsule Icon

If you want data to be transferred out of a nested Capsule icon to another icon:

1. Copy an Out connector icon into the nested Capsule icon.
2. Connect the source icon inside the nested Capsule icon to the Out connector.

3. Close the nested Capsule icon.
4. Connect the nested Capsule icon to a destination icon (a spreadsheet, for example).
5. Open the Arrow Options window for the new arrow and enter the name of the Out connector in the **Region Name** field.
6. If you do not want all the data in your destination icon to be overwritten, enter the name of a region inside your destination icon (in this example, you would name a range in the spreadsheet).

Remember that if you want to save data from a nested Capsule application, you must connect the icon in the inner Capsule application to a destination icon that files data, such as a spreadsheet. The connector icons do not hold data.

Chapter 7. Creating Capsule Summaries

The Capsule Summary feature provides documentation for Capsule applications. When you create a Capsule Summary, you can choose the level of detail that suits your needs. This capability helps the application developer deconstruct applications, and, when used with the Capsule Run Log, allows either a user or a developer to trouble-shoot problems.

You can create a Capsule Summary any time you like; this feature does not depend on a Capsule run taking place. Capsule Summary reports give you detailed information about the individual icons in your processing sequence. (By contrast, the Capsule Run Log tells you about events both successful and unsuccessful that took place during a specific run of your Capsule application. Detailed information on the Capsule Run Log starts on “Examining a Capsule Process” on page 48.)

Capsule Summary reports can be created for any or all of the following categories. Besides error messages associated with each icon, the reports give:

- Icon information (the names, types, creation and last-modification dates, and sizes of individual icons)
- Icon access (owner's name, access levels, and security status of each icon)
- Icon execution (processing order and database connection settings for each icon)
- Arrows (source and destination icons for each arrow, regions, transfer types, and stop settings)
- @-variables (**User Input Control** fields used in the Capsule application)

This chapter explains how to specify your Capsule Summary and read the contents of the reports.

Setting Up Your Capsule Summary Reports

To set up the reports in your Capsule Summary, you choose from one to five report categories, and then select from various options for each category.

Choosing from Five Report Categories

To display the **Capsule Summary Controls** window, select **Create Capsule Summary** in the **Special** menu.

If you select **Yes** in one of the report-type choice fields, the **Capsule Level** field appears.

- If you choose **Current** in the **Capsule Level** field, you will receive that category of report for only the icons visible in this Capsule window.
- If you select **All**, you will also receive reports for all the icons that are inside nested Capsule icons within this Capsule window. It is not necessary for you to open nested Capsule icons individually to generate Capsule Summaries for them.

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If you select **Yes** in all fields, you see the full window, as shown next.

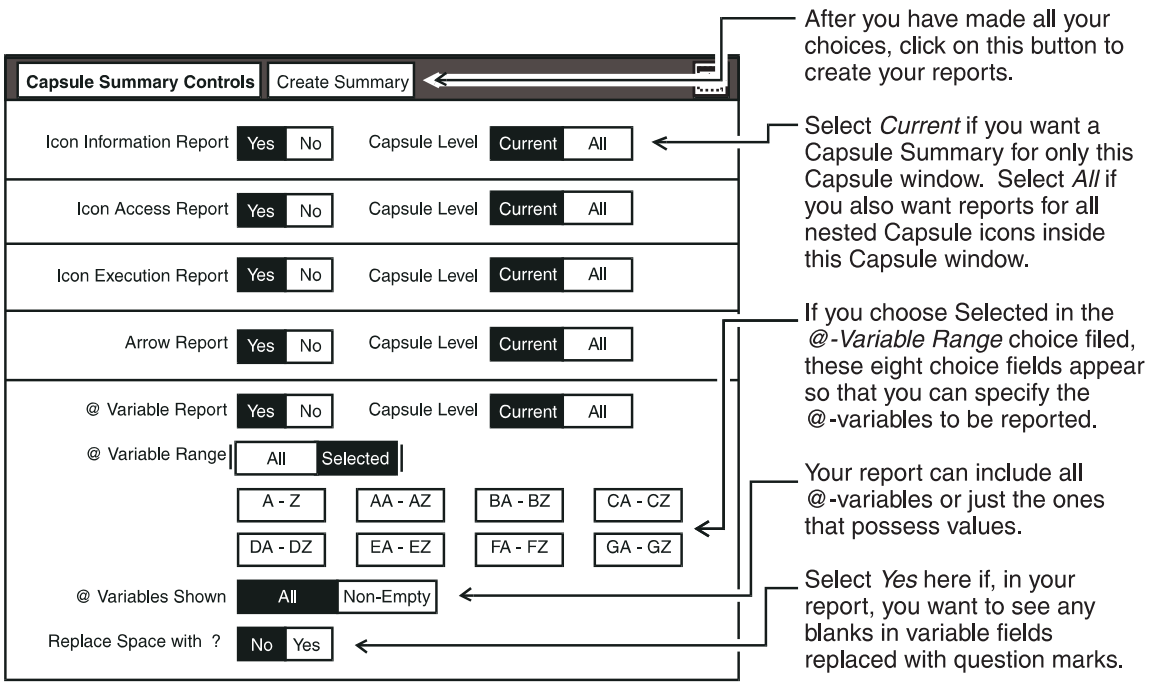


Figure 30. Capsule Summary Controls window with everything selected

Each part of this window permits you to create a separate report for the icons in the Capsule processing sequence. After choosing the reports you want to create, you click on **Create Summary**, which produces a folder containing your reports.

To create a Capsule Summary folder and the reports you want, do as follows:

1. Select **Yes** for each report category you want to create.
2. Choose the **Capsule Level** and any other options available for each category.
3. Click on **Create Summary** in the window header. A Capsule Summary folder appears in the Capsule window.

If you accidentally close the window before doing this last step, the Capsule tool does not create a Summary folder. If this happens, open the window and again select the categories you want to see. (The settings in this window are not saved.)

Working with Capsule Summary Folders

The Capsule Summary folder contains individual Capsule Summary reports, housed in icons and listed by category. When you open a report icon, the report window shows information about specific icons and connections in your application. Details on individual report categories begin on “Icon Access Information Summary” on page 72.

Each time you select **Create Capsule Summary** in the Special menu, a new folder is created in the Capsule window. If you want to keep multiple folders, either you can look at the date each folder icon was created, or you can rename each folder so you can tell one from the other. Choose a name that represents the type of information summarized or use a date to represent when the Capsule Summary was created.

To remove a folder, you must manually delete it. The Capsule tool does not overwrite old Summary folders.

A **Capsule Summary** folder can contain a report for each one of the five possible categories in the controls window. When you click on a report icon, the window looks like the ones shown in the following sections.

Reading Your Capsule Summary Reports

Four of the reports in the Capsule Summary start with a column listing the names of the icons in the Capsule window. (In the report on @-variables, that column is used for a different purpose.) You will notice that the icon names appear in run order, that is, in the order in which the Capsule application processes them.

Each report is described in full, starting on “Icon Information Summary” on page 71.

In addition, each of the reports ends with an **Error** column. This column is described in the next section.

You can delete certain columns from each report by clicking on the **Show Controls** button and selecting column names. For more information, see “Modifying a Capsule Summary Report” on page 77.

The Error Column

At the far right side of each category of Capsule Summary report is a column headed **Error**. In this column are listed any errors that the Capsule tool encountered while generating the Capsule Summary. (This column reflects nothing of the types of error that might occur during a Capsule run. To troubleshoot those errors, you need the Capsule Run Log; see “Examining a Capsule Process” on page 48 for details.)

Here are two examples of the many kinds of errors that might be recorded in a Capsule Summary report's **Error** column:

The Capsule tool tried to retrieve information about an icon (one that was not in your desktop's memory), but the file service was unavailable.

The Capsule tool found a Reference Capsule icon that was pointing to a missing icon.

Explanations of the individual report types are next.

Icon Information Summary

The Icon Information report displays information about the individual icons within your Capsule window: each icon's name, type, dates created and last modified, size, and associated errors.

In order for this report to be useful to you, the icons in your Capsule window must have unique names. If several different icons have the same name, then a report sorted by icon name would not help you to identify problems.

This report appears in the Icon Information Summary window, as shown in Figure 31 on page 72.

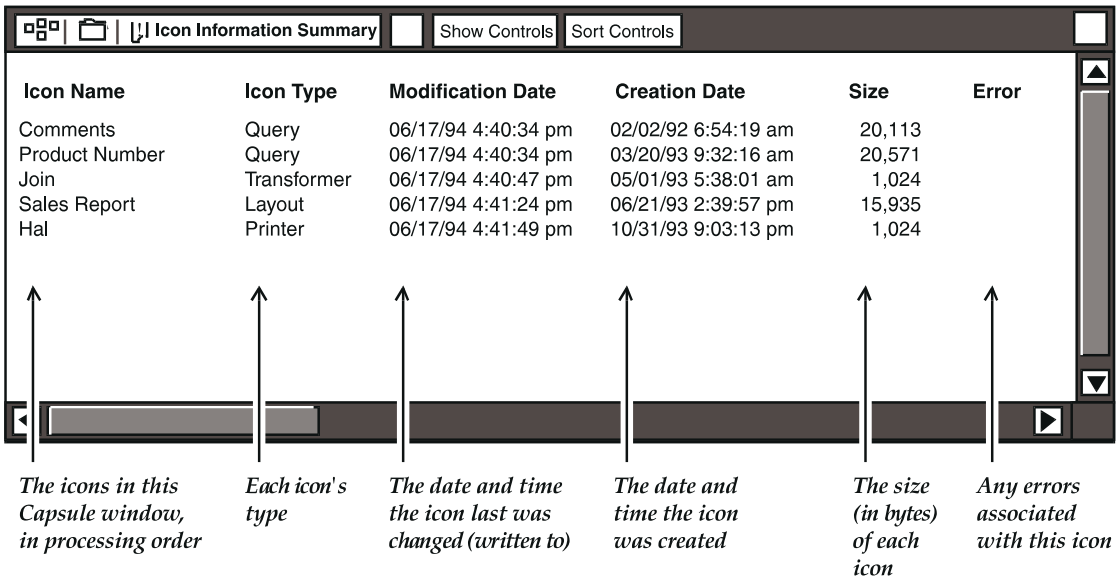


Figure 31. Icon Information Summary window

Icon Access Information Summary

The Icon Access Information report provides information about the security aspects of each icon in your Capsule window.

This report appears in the **Icon Access Information Summary** window, as shown in Figure 32 on page 73.

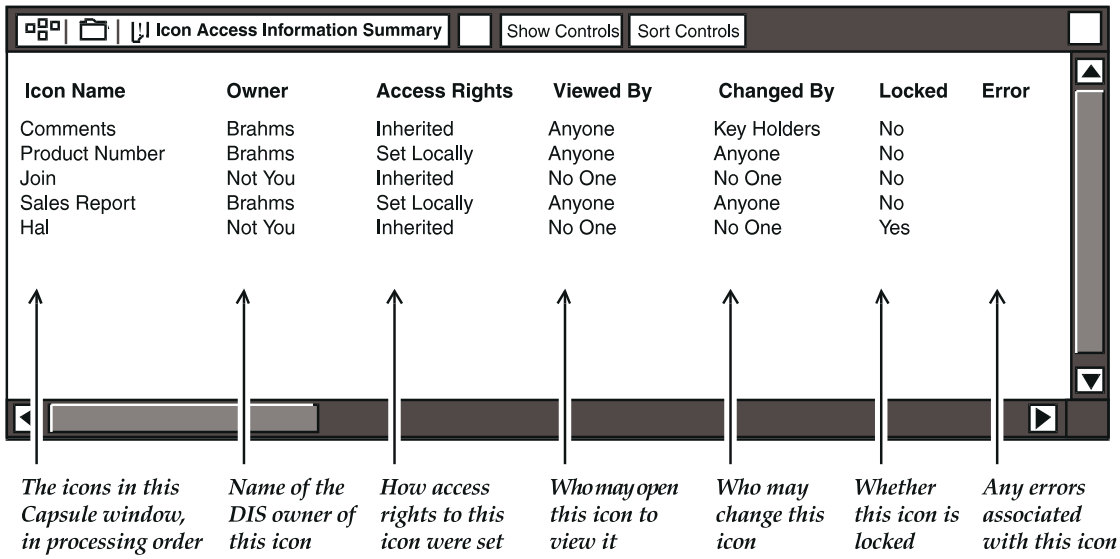
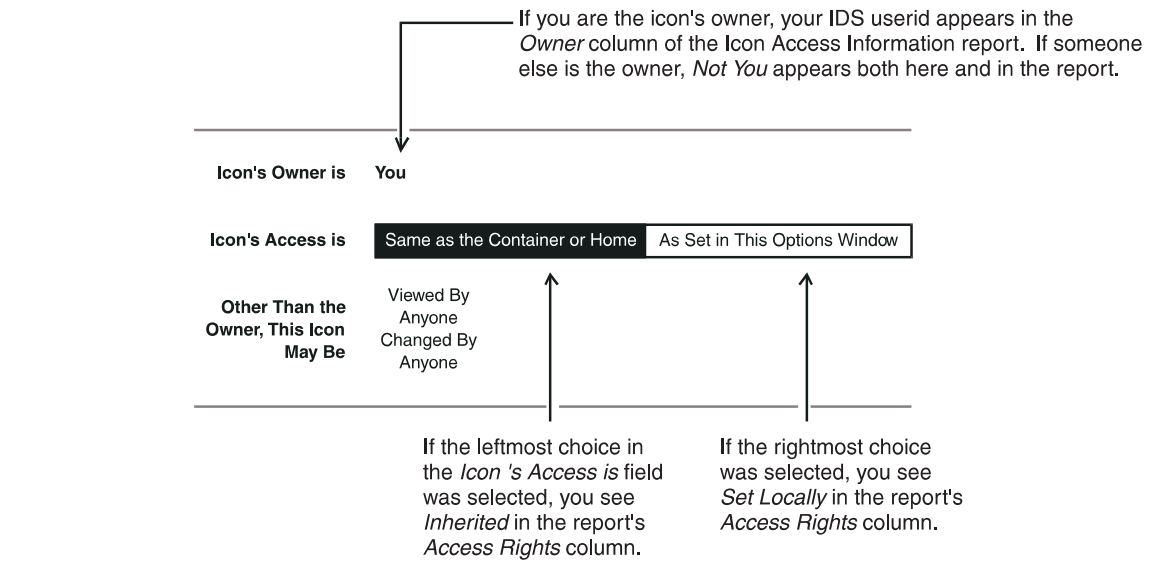


Figure 32. Icon Access Information Summary window

For more information on locking an icon, see “Securing a Capsule Application” on page 45.

The information in four of this report's columns is related directly to data in the Icon Options window for each icon, as demonstrated in Figure 33 on page 74.



Below, you see how the IconOptions window changes if the rightmost choice, As Set in This Options Window, is selected.

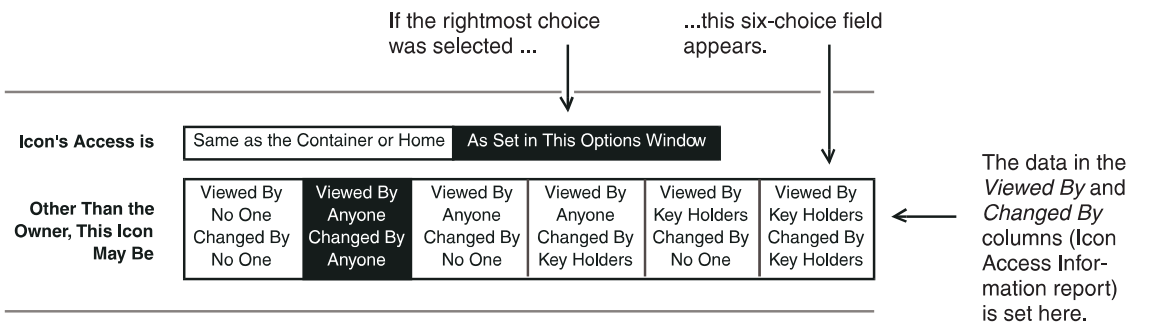


Figure 33. How Icon Options information relates to the Icon Access Information Summary report

Icon Execution Summary

The Icon Execution report shows certain processing criteria of individual icons in your Capsule window.

This report appears in the **Icon Execution Summary** window, as shown in Figure 34 on page 75.

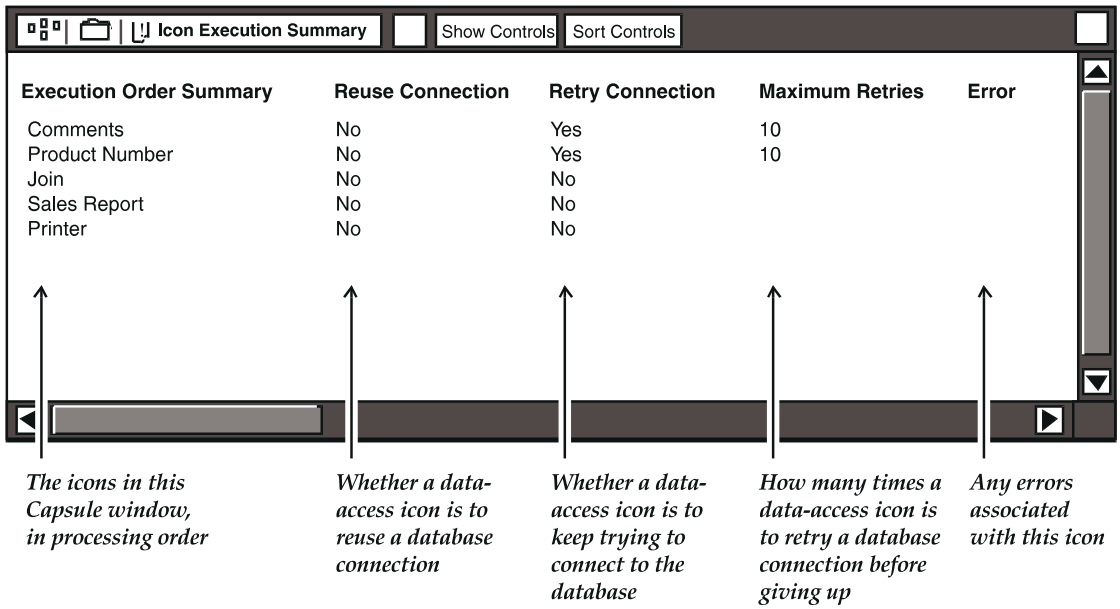


Figure 34. Icon Execution Summary window

For more information on the meaning of these columns:

Reuse Connection, see "Reusing Connections" on page 51.

Retry Connection and **Maximum Retries**, see "Retrying Connections" on page 52.

Note that in the **Reuse Connection** and **Retry Connection** columns, a **No** entry for an icon can mean either of these things:

This icon has been set up not to reuse or retry the connection.

This is not a database-access icon.

To be sure what type an icon is, check an Icon Information Summary (described on "Icon Information Summary" on page 71) for your Capsule application.

Arrow Summary

The Arrow report describes every connection between icons in your Capsule window, and shows the arrow and data transfer options that have been selected for each connection.

This report appears in the **Arrow Summary** window, as shown in Figure 35 on page 76.

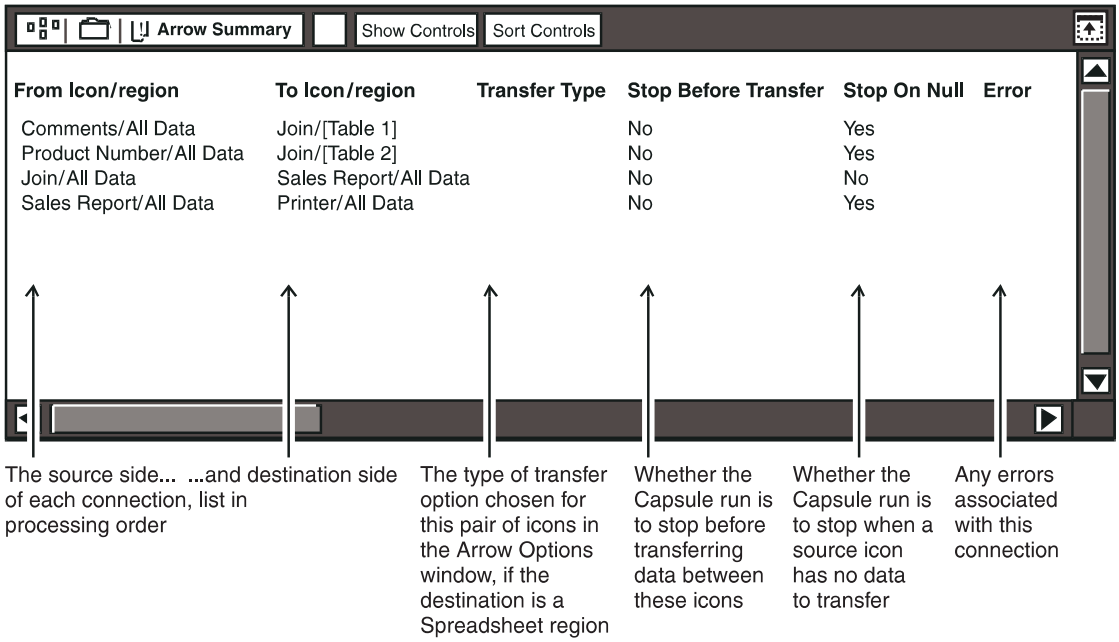


Figure 35. Arrow Summary window

You can find information on connecting icons in Chapter 2, “Getting Started with the Capsule Tool” on page 4.

Details on different transfer options begin on “Choosing Data Transfer Options” on page 17. One of the following values might appear in the **Transfer Type** column when the destination is a Spreadsheet region:

Replace
Append Columns To
Append Rows To
Add To
Subtract From

In all other cases, the **Transfer Type** column displays no value.

Instructions for making your Capsule run stop before transferring data start on “Stop Before Transfer to the Next Icon” on page 17.

Directions for making your Capsule run stop when it finds a “null data transfer” (a source icon that has no data to transfer to its destination icon) begin on “Stop If the Source is Null” on page 17.

@-Variable Summary

The @-Variable report displays information about the @-variables used by your Capsule application. This report appears in the **@-Variable Summary** window, as shown in Figure 36 on page 77.

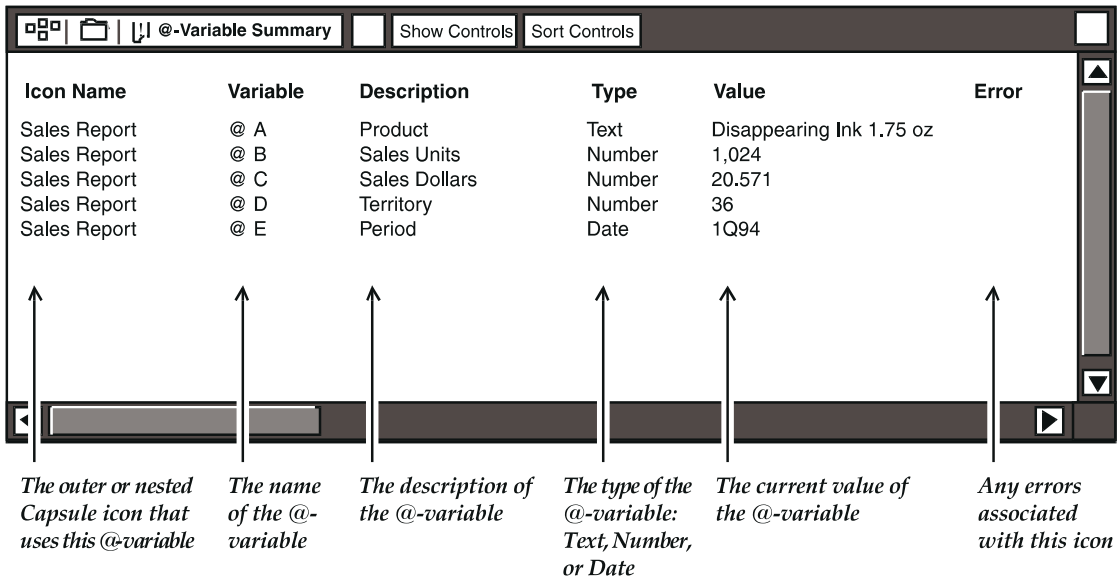
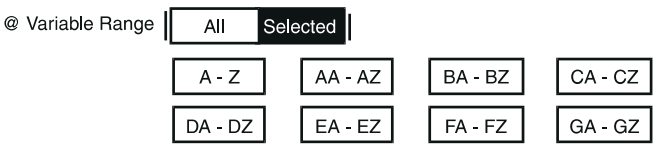


Figure 36. @-Variable Summary window

The **Capsule Summary Controls** window (the full view of which is shown on Figure 30 on page 69) gives you several choices for this report:

You can display all @-variables (from the first, which is named **A**, to the 208th, which is named **GZ**), or you can select one or more ranges of variables (**A** –**Z**, **AA** –**AZ**, and so forth) to display.



You can show all of the @-variables in each range chosen, or you can narrow down the selection so that you see only @-variables that currently have data in their **Value** fields.

You can choose to have all blank spaces (not nulls) in the **Value** field replaced with the **?** character.

Modifying a Capsule Summary Report

In each summary window header, you will notice two command buttons: **Show Controls** and **Sort Controls**.

When you click on **Show Controls**, a window like the one in Figure 37 on page 78 appears:

Figure 37. Capsule Summary window from Show Controls button

In this window, you can choose whether or not to display certain columns in that particular report. Each of these windows is customized to its report. Table 10 lists the columns that you can choose to display.

Table 10. Columns that are optional in Capsule Summary reports

Report type	Columns you can display or hide
Icon Information Summary	**Icon Type**, **Last Changed**, **First Created**, **Size**, **Error**
Icon Access Information Summary	**Owner**, **Access Rights**, **Viewed By**, **Changed By**, **Locked**, **Error**
Icon Execution Summary	**Error**
Arrow Summary	**Transfer Type**, **Stop Before Transfer**, **Stop On Null**, **Error**
@-Variable Summary	**Type**, **Error**

When you click on **Sort Controls**, a window like the one in Figure 38 appears.

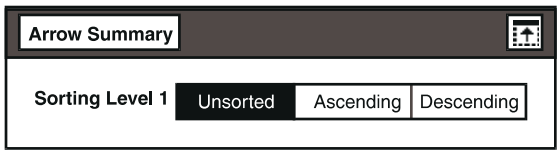
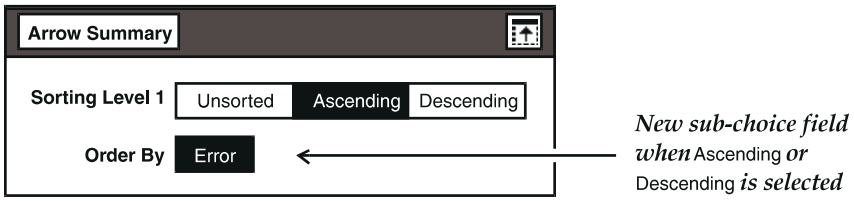


Figure 38. Capsule Summary window from Sort Controls button

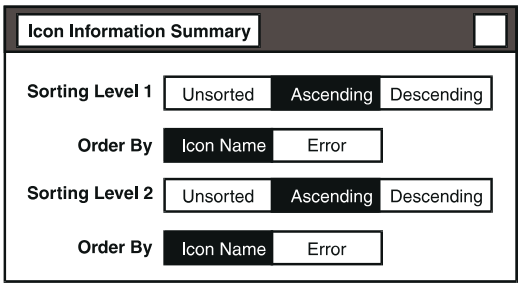
The Capsule Summary default is to list icons in the order in which they are processed by their Capsule application. However, you can change that order by using the sort controls window. The first-level sort, shown in Figure 38, is the same in all the sort control windows.

Selecting **Ascending** or **Descending** in this window brings up other choices. For example, if you choose **Ascending** or **Descending** in the **Arrow Summary** sort control window, you see the following additional choice.

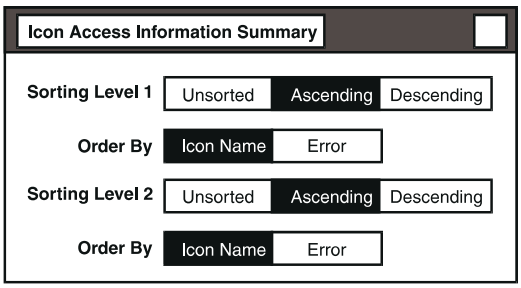


Again, these sub-choices are customized for each type of report. Figure 39 shows all of the sorting sub-choices for each type.

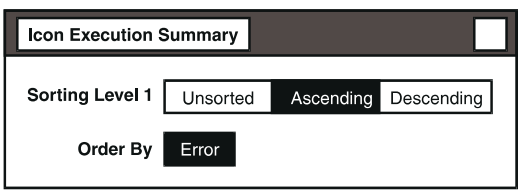
Icon Information Summary



Icon Access Information Summary

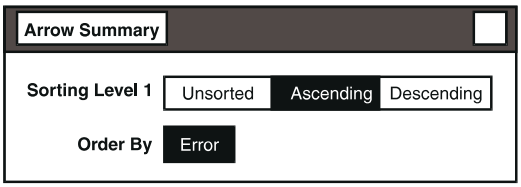


Icon Execution Summary



NOTE: The Order By *choice field appears when you select either* Ascending *or* Descending.

Arrow Summary



@-Variable Summary

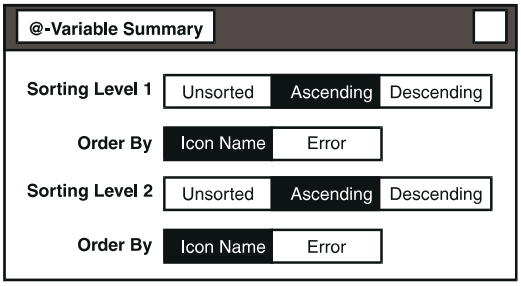


Figure 39. Choices available in sort control windows of Capsule Summary reports

Printing a Capsule Summary Report

If you want to print a Capsule Summary report, follow these steps:

1. Open the report.
2. Select one or more rows to copy. You can:

   Select a single row

   Select different rows (they do not have to be next to each other)

   Use the Select All button in the window header
3. Copy your selection to a Spreadsheet icon or a Text icon.

The format of a row is not transferred when you copy it to a Text icon. If you want to keep your selection's columnar format, either copy your selection to a Spreadsheet icon, which maintains tabular format, or use the Text Options window to format your transferred selection within the Text icon.

Chapter 8. Using Reference Capsule Icons

Using Reference Capsule icons saves you disk space and streamlines the building, processing, and maintenance of Capsule applications. A Reference Capsule icon refers to another Capsule icon for its contents, and allows you to point anywhere that the master Capsule icon actually resides. In a normal production environment, the Capsule application you refer to is copied from its home library, the copy is processed, and then the copy is deleted. Thus you can work with large applications without exceeding your disk space quota.

Here is one example of how useful this Reference Capsule feature can be: The master Capsule icon, to which your Reference Capsule icon points, can reside in a file drawer that houses a centralized library of prebuilt applications. Given the proper authorization, many application developers can use such a library. A centralized applications library also makes it simpler for an organization to update and maintain its large applications: For each Capsule application, there is only the master icon, instead of individual copies of that icon taking up space on many desktops.

The Reference Capsule capability is intended mainly to be used by experienced application developers in large production environments. Before you begin creating Reference Capsule icons, you must be familiar with the techniques and guidelines presented in previous chapters of this manual.

This chapter covers the following topics:

- Creating a Reference Capsule icon
- Working in the Reference Capsule window
- Running a Reference Capsule application
- Developing applications for Reference Capsule libraries

Any nested Capsule icon can be replaced by a Reference Capsule icon. There are two ways to get started with this capability:

- Get a copy of a blank Reference Capsule icon from the * Blank Icons file drawer.
- Create a Reference Capsule icon, using a fast method that lets you refer to other Capsule applications while you are working in a specific Capsule window. Detailed instructions follow.

Creating a Reference Capsule Icon

To create a Reference Capsule icon while you are in a Capsule window, select **Create Reference Capsule** in the Special menu. Typically, you replace a nested Capsule icon with a Reference Capsule icon, and create a placeholder to retain the arrow settings for the icon you are replacing. The placeholder is described in detail in Chapter 3, “Controlling the Data Flow” on page 15. Here you can see how a placeholder is actually used to retain the arrow settings for a Capsule icon being replaced by a Reference Capsule icon.

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These instructions assume that you are creating a Reference Capsule icon to point to a prebuilt application located somewhere on your desktop.

Overview of the Main Steps

To create a Reference Capsule icon, you take four main steps. Here is a brief overview of those steps (detailed instructions follow in the next few pages):

Use an original Capsule icon as a master to create a Reference Capsule icon.

Use the master Capsule icon again, this time to create a placeholder in the Capsule window.

Move the master Capsule icon out of the Capsule to its new place.

Back in the Capsule window, move the Reference Capsule on top of the placeholder.

After those four steps, you will need to specify the path name of the master Capsule icon so that the Reference Capsule icon can find it. (This step is covered in the next section.)

Detailed Steps

Here are the detailed instructions for creating a Reference Capsule icon:

1. Open a prebuilt Capsule application in which there is a Capsule icon that you want to replace with a Reference Capsule icon.
2. Select the master Capsule icon (the Capsule icon you want to replace; in the example used here, it is the **Sales Reports** Capsule icon).
3. Select **Create Reference Capsule in** the Special menu, as shown in Figure 40 on page 83.

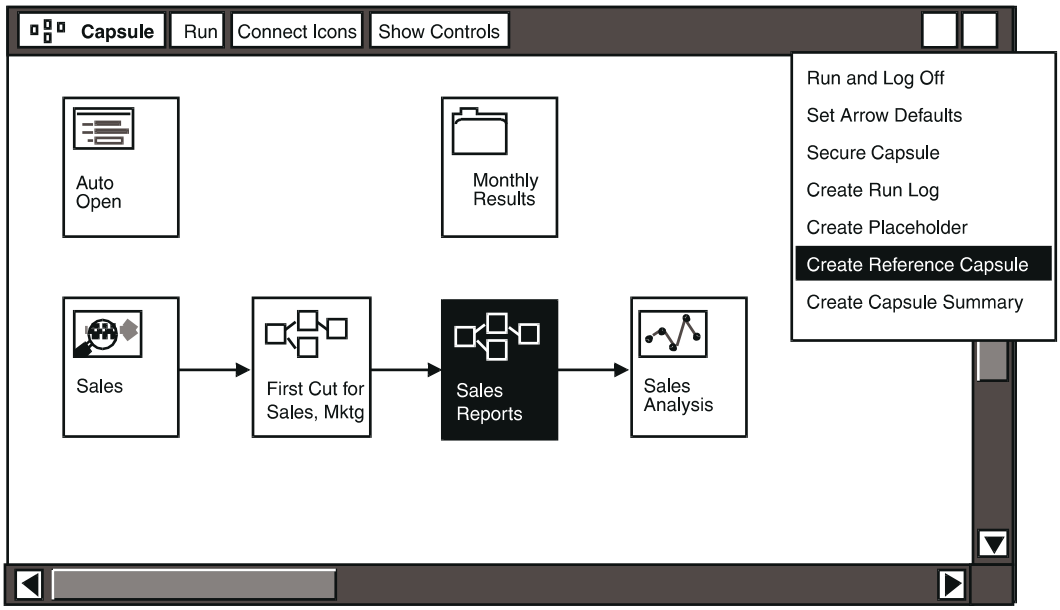
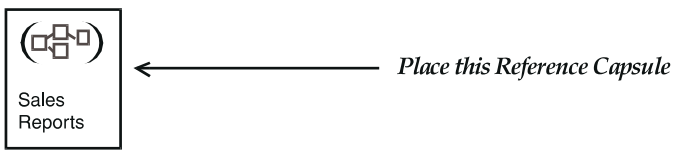


Figure 40. Creating a Reference Capsule icon

After you select **Create Reference Capsule**, the cursor changes to represent a small Reference Capsule icon.

4. Place the Reference Capsule icon in an empty area of the Capsule window, near the Capsule icon being replaced. Notice that, in the Reference Capsule icon, the Capsule graphic is enclosed in parentheses.



You have now used your master Capsule icon to create a Reference Capsule icon. The next steps tell you how to create a placeholder and move the master Capsule icon out of your Capsule window.

5. Select the master Capsule icon, the one that you are replacing, then select **Create Placeholder** in the Special menu.

   The cursor changes to represent a small Capsule icon, because the placeholder you are creating is going to replace a Capsule icon.

6. Move the cursor out to your desktop or to a container icon (such as a file drawer, a folder, or an envelope) and click on the destination. You have now moved the master Capsule icon out of the Capsule window to its new place.

   Remember that wherever you move the master Capsule icon, you must point to it precisely when you specify the path name (instructions are on “Entering a Path Name for the Reference Capsule Icon” on page 85) so that your Reference Capsule icon can find it.

7. Select the Reference Capsule icon and move it on top of your placeholder. The Reference Capsule icon now replaces the placeholder.

   Because the placeholder can be created and used only inside Capsule windows, it operates differently from other icons. When you place another icon on top of it, the placeholder does not move into the Discard icon. In other words, after you replace a placeholder, it is not recoverable.

8. Select and open the Reference Capsule icon. The window appears as shown in Figure 41.

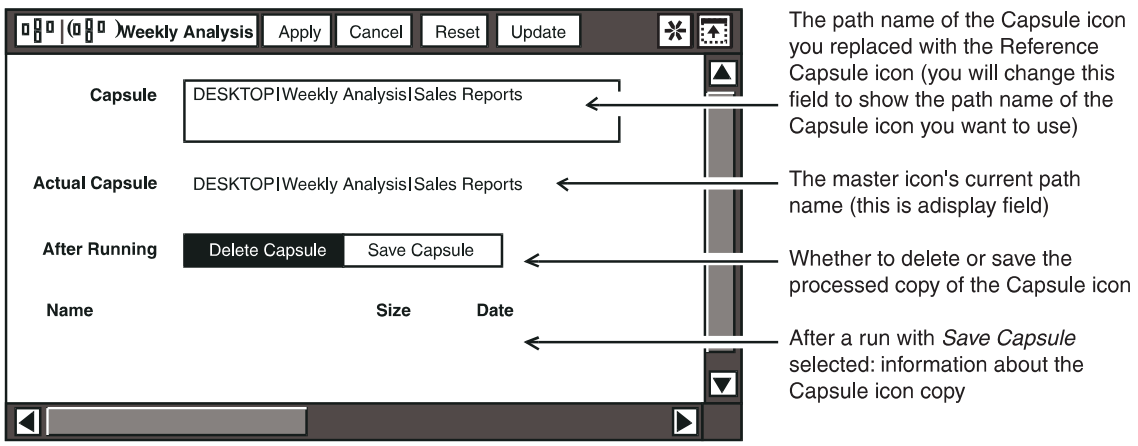


Figure 41. Reference Capsule window before the new path name is specified

Now you can specify the path name to the Capsule application to which you want access. The next section explains how to work in the Reference Capsule window.

Working in the Reference Capsule Window

The **Reference Capsule** window is like a container window. In the window header, the title block shows the standard nested-icons graphic, and the standard buttons appear. In the **Reference Capsule** window, these buttons perform the functions described in Table 11.

Table 11. Buttons in the Reference Capsule window

Button	Function
Apply	Click on this button to save the Reference Capsule icon's path name. You should also select **Apply** whenever you change the **After Running** option.
Cancel	Click on this button to cancel any changes to the settings and close the Reference Capsule window.
Reset	Click on this button to return to the original values.
Update	Click on this button to retrieve @-variable values from the User Input Control window and to update the path name when you enter changes in the **Capsule** field.

The **Capsule** field is where you enter the path name of the Capsule icon you want to use. The **Actual Capsule** line, located just below the **Capsule** field, shows the path name to the referenced Capsule icon, and reflects any changes you make to @-variable values in the User Input Control window. The **After Running** option lets you choose whether to delete the Reference Capsule copy of the master Capsule icon after it has finished processing, or to save a copy for debugging.

These options are described on “Saving the Capsule Icon for Troubleshooting” on page 86.

Entering a Path Name for the Reference Capsule Icon

You specify the path name for a Reference Capsule icon the same way you specify a path name for the Copy Icon transformer or the Clear Contents transformer (both of which are described in the IDS publication *Transformers User's Guide and Reference*). Each level of the directory tree must be separated by a vertical bar. The process goes as follows.

The path name search begins in the Capsule application where the Reference Capsule icon resides, and the following keyword methodology is used.

If the first word in the path name is **PARENT**, the search begins with the parent of the Capsule window that holds the Reference Capsule icon.

If the first word in the path name is **DESKTOP**, then the search begins at the desktop level. This means that the Capsule icon being referenced is inside a container on the desktop.

If you do not specify either **PARENT** or **DESKTOP**, the current level is the default. The current level means that the search begins inside the Capsule window that you have open, where you see the Reference Capsule icon.

The path name for a Reference Capsule icon can be specified using @-variables as the Capsule icon's name. Follow these steps:

1. Open the User Input Control window for the Capsule window in which you are working.
2. Choose an @-variable and enter the name of the Capsule icon as the value.
3. Reopen the Reference Capsule window and click on the **Update** button in the window header.

If the Reference Capsule icon is not inside a Capsule window, all @-variables used in the path name have null values.

Updating the Path Name

The **Update** button in the Reference Capsule window header is used to ensure that any changes in the path name of the referenced Capsule icon are updated. Changes, if there are any, appear in the **Actual Capsule** line after you click on the **Update** button. Use this button when you have made changes to the path name, or when you have changed @-variable values in the **User Input Control** window. You can also use **Update** if you believe another developer has made changes to the Capsule icon you are modifying. However, remember that the **Update** button does not save anything.

Always use unique names when naming Capsule applications. When you specify a path name, only one Capsule icon can be located, and a unique name is the only way to ensure that you have created a reference to the correct Capsule icon.

Copying the Capsule Icon

When you are building or modifying applications, you can look at the Capsule contents before you specify that it should be used as a Reference Capsule icon. In this case, you need to copy the actual Capsule icon to your desktop so that you can open it and check its contents.

To copy the actual Capsule icon:

1. Open the Reference Capsule window.
2. Select **Copy Actual Capsule** in the Special menu.

You can now open the Capsule icon and check its contents. Remember to delete the copy when you are finished.

Saving the Capsule Icon for Troubleshooting

In a normal production environment, you want the system to delete a large Capsule icon after it has finished processing. This prevents you from accumulating large applications that you have duplicated from a library elsewhere. For this reason, **Delete Capsule** is the default selection in the **After Running** field in the Reference Capsule window. However, if you are building new applications, you can set the **After Running** field to **Save Capsule** after the running has finished. Doing so permits you to retain a copy of the referenced Capsule icon for later debugging. When you save a referenced

Capsule icon, the Reference Capsule window lists information on the saved Capsule icon, as shown in Figure 42 on page 87.

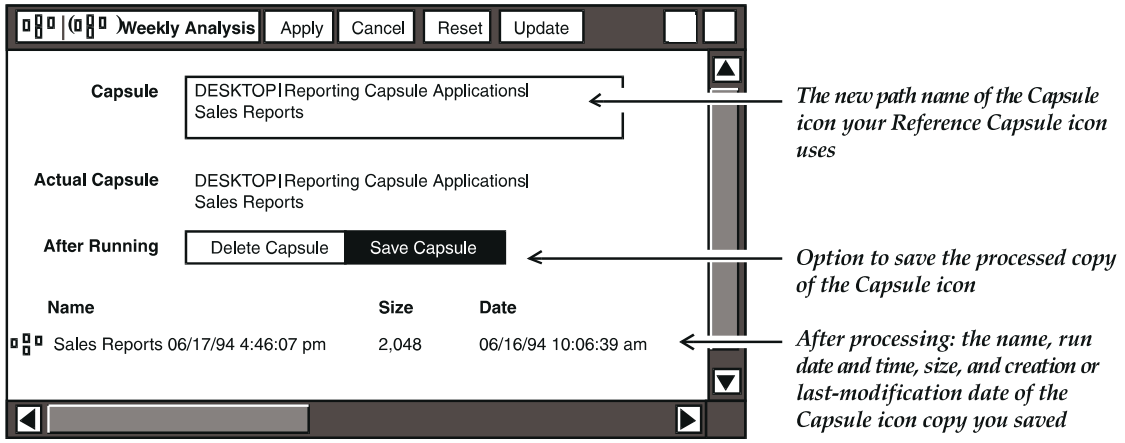


Figure 42. Reference Capsule window set to Save Capsule after running

The name of the saved Capsule icon is followed by the date and time it finished running. The date listed beneath the word **Date** is the actual date that the Capsule icon was created or last modified.

If your Reference Capsule icon refers to a locked master Capsule icon, you cannot save the Capsule icon copy. Attempting to do so produces an error message.

Like standard nested Capsule icons, Reference Capsule icons can be used for iteration. If you set the **After Running** field to **Save Capsule**, the completed Capsule icon is listed in the lower half of the Reference Capsule window.

The list of saved Capsule icons appearing beneath **Name** in the Reference Capsule window can be selected, copied, opened or deleted. If you move or copy the Reference Capsule icon, the saved Capsule icons are also moved or copied. However, when you reset the **After Running** field to delete Capsule icons, this list of saved Capsule icons is cleared the first time you run the Reference Capsule icon.

If a serious system error causes your desktop to reboot in the middle of a Capsule run, a copy of the Capsule icon is retained in the lower half of the Reference Capsule window so that you can open the window and see what the Capsule icon was doing when the problem occurred. The next time you click on **Run**, this emergency copy is deleted.

Running a Reference Capsule Icon

When you run a Capsule application containing one or more Reference Capsule icons, the execution of the Reference Capsule icon is different from that of a regular Capsule

icon. The following steps outline the processing sequence for a Reference Capsule icon:

1. All @-variables are replaced by their actual values.
2. The Capsule icon referred to is copied into the Reference Capsule icon.
3. The copied Capsule application is executed as it replaces the Reference Capsule icon.
4. The copied Capsule icon is then deleted, unless you have changed the default setting and selected **Save Capsule**.

Because the copied Capsule icon is deleted in a normal production environment, special care must be taken to export the results from the copied Capsule icon. See the section of this chapter titled “Saving the Results” on page 89 for more information.

Developing Applications for Reference Capsule Libraries

This section offers some guidelines for developing Capsule icons for a reference library. Since the primary purpose of the Reference Capsule capability is to save disk space, the following housekeeping hints are offered to help ensure that this capability is used to its full advantage.

Deleting Capsule Icons After Running

When you have finished debugging or modifying a Capsule application, remember to reset the **After Running** option to the default setting, **Delete Capsule**. This will prevent the accidental accumulation and storage of multiple copies of your Capsule icon.

Removing Large Data Blocks from Tools

The master Capsule icon should be cleared out before it is inserted in the Reference Capsule file drawer. Leaving large amounts of retrieved data in tools that comprise Capsule applications will reduce available disk space and degrade performance for other users of those shared applications.

Building Modular Applications

Large Capsule applications should always be broken into easily manageable modules to reduce the size of the Capsule applications being copied. For example, if your application specifies a conditional processing sequence, you could use an individual Reference Capsule icon for each execution path choice. This technique provides an alternative to using conditional processing keywords as described in Chapter 6, “Working with Nested Capsule Icons” on page 53.

Securing Your Application

The only way to prevent an end user from modifying a Reference Capsule icon is to secure the entire Capsule application in the library. For example, you can place your Reference Capsule icons in a Folder and then set the access permissions to exclude unauthorized users. You can also use the Capsule Security capability described in Chapter 5, “Running the Capsule Application” on page 43 to lock Capsule icons.

Saving the Results

When you run a Reference Capsule icon in a normal production environment, you set the **After Running** option to delete Capsule icons as soon as they are finished processing. Therefore, you must always provide a destination for the results of running your referenced Capsule icon. To do this, you can:

Pass the data to an Out connector. See Chapter 6, “Working with Nested Capsule Icons” on page 53for instructions on getting data out of a nested Capsule icon.

Insert a Printer icon in your application so that results are automatically printed.

Copy the data out, using the Copy Icon transformer. Refer to the IDS publication *Transformers User's Guide* for instructions on using Copy Icon.

Transfer the data using desktop Directory. Refer to the IDS publication Interacting with desktop Applications for more detailed information.

Mail the resulting data to another user.

Mailing Reference Capsule Icons

If you mail to another developer a Capsule application that contains a Reference Capsule icon, you must be sure that you and the recipient are on the same network. You must always remember that a Reference Capsule icon is just a pointer to an application, and is therefore not transferable between networks. For example, the path name in a Reference Capsule icon might contain a reference to a specific File Drawer, and if that File Drawer is not available to the recipient, the Reference Capsule icon cannot work.

Chapter 9. Using Capsule Services

The Capsule Service tool lets you run applications in batch mode on a service designated for that purpose. You can schedule concurrent Capsule jobs to run on the service, thereby freeing your desktop for other tasks. Using the tool as a desktop interface to Capsule Services, you can also specify that your Capsule jobs run at night, or when your workday is over.

You schedule Capsule jobs by copying them to a Capsule Service icon and then setting timing options in a standard options window. Real-time scheduling is performed by your system administrator who assigns priorities to your submitted jobs, and monitors all activities of the Capsule Services.

This chapter describes the following procedures:

Using the Capsule Service icon

Submitting a job to the service

Using the Capsule Service Icon

The Capsule Service icon is like the Mail Tray icon in functionality. It displays one of two states: full or empty. A full icon indicates that it already contains completed applications. In either state, the icon can accept copied Capsule icons, and that is how you submit jobs to run on the Capsule Service.

If you regularly run Capsule applications, or if you wish to take advantage of background Capsule processing, you should keep a preconfigured icon on your desktop, just as you would a Printer icon. Both representations of the Capsule Service icon are shown in Figure 43.

Figure 43. Capsule Service icon, empty and full

Getting a Preconfigured Capsule Service Icon

Like IDS data access tools, the Capsule Service tool must be configured for access to a particular service. Your system administrator configures the icons and places them in the * Capsule Services file drawer, which is inside the New Icons file drawer. Refer to the IDS *System Administration* for more information about configuring Capsule Service icons.

If you keep more than one Capsule Service icon on your desktop, try to use icons that are configured for access to different services. Although you can use duplicate icons

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configured to one service, you might find it difficult to tell when your Capsule jobs have finished.

The Icon Options window for the Capsule Service tool lets you specify the scheduling options. Figure 44 shows the **Other Data** page of the Icon Options window for a Capsule Service icon named **CapServ1** that is set for access to a particular service.

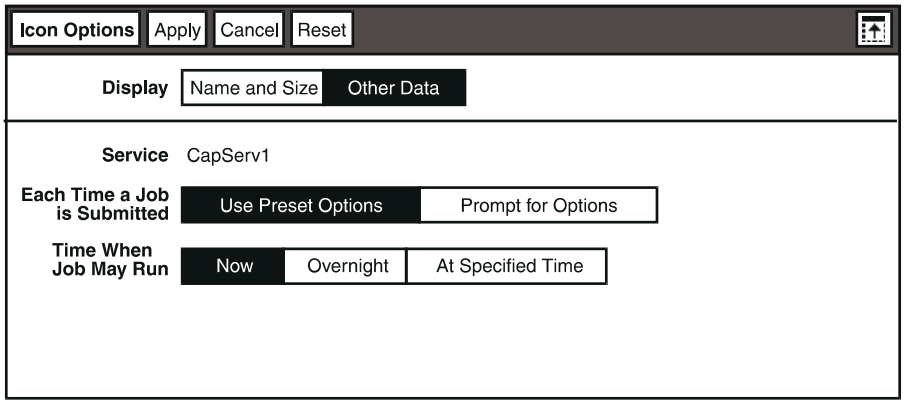

Figure 44. Default options for submitting a Capsule job

The name of the Capsule service you are connected to is displayed in the **Service** field. The settings shown in Figure 44 are the default choices for running a Capsule job. If you want to be prompted for options each time you copy a Capsule icon to a Capsule Service tool, you can select **Prompt for Options**. This choice is described in "Choosing Different Timing Options" on page 96.

Understanding the Timing Choices

Capsule jobs are scheduled to run on the service according to the available resources and the number of jobs in the queue. When you first open the Capsule Service window**,** the tool is set up so that all jobs copied to the icon run now. However, a Capsule job scheduled to run "now" does not necessarily run immediately. Any job submitted to the queue must wait until an execution resource is available. Furthermore, the system administrator can assign priorities to Capsule jobs, and jobs with the highest priority numbers run first.

The system administrator can also override timing settings or place a job on hold, thereby affecting the order of execution of Capsule jobs. For example, you might occasionally wish to hold a Capsule job that is normally run each night pending receipt of new data. To do this, you need to inform the system administrator. After a job has been placed on hold, it appears in the Queue window with the appropriate status icon beside it.

When you copy a Capsule job to a Capsule Service icon that has been configured so that jobs are run overnight, your job is placed in a queue with other jobs scheduled to run overnight. This selection is subject to the same restrictions as **Now**. Resource availability and assigned priority can determine when your Capsule job actually runs.

The last choice in the **Time When Job May Run** field is **At Specified Time**. When you select this, you can designate an actual date and time when the job can be started. Table 12 on page 92 describes the timing choices and their meanings.

Table 12. Timing choices

Choice	Means the Capsule job is eligible to run
Now	immediately (but the job will actually run at a time that is dependent on resource availability).
Overnight	tonight, at a time specified by the system administrator when the service was initialized.
At Specified Time	at a time set by the user. All acceptable direct-entry date formats can be used, including such keywords as **TODAY**.

Requesting Specific Times

If you wish to specify a time to run the job each time you copy a Capsule job to the Capsule Service tool, select **At Specified Time**, and a field appears in the window. Notice that the field always appears with a sample of the time format already entered. Change this time to your desired date and time, and close the Icon Options window. If more than one Capsule job is set to run at the same specific time, the first one in the queue runs first, unless the system administrator assigns a higher priority to the second job.

Entering the Correct Date and Time

The **Date and Time** field accepts any format that can be used in the IDS desktop tools, including keywords like **TODAY**. You can delete the entry that appears when the Icon Options window opens, and insert the time you wish to specify.

You can also submit your Capsule job using the time that appears when you display this field. If you do so, the job will be submitted to run immediately.

The date and time should always have a space between them. You can use any combination of the samples shown in Table 13.

Table 13. Sample date and time entries

Sample date formats	Sample time formats
sep 15, 95	5:00 pm
sep 15 95	05:00 pm
Sep 15, 95	17:00
SEP 15 95	5:00 PM
September 15, 95	5 pm

If you enter an unrecognizable date and time and click on the **Apply** button, a message appears to alert you that you must correct your entry.

The section that follows describes how to submit a Capsule job to the service using the Capsule Service tool.

Submitting a Job to the Service

The Icon Options window for the Capsule Service tool allows you to set specific options, or you can ask to be prompted for options each time you open the window. Remember that when you submit a job to the service, you are specifying the time when the job should be eligible to run. The time you specify is not necessarily the actual time that the Capsule job will run.

To submit a Capsule job:

1. Copy a Capsule Service icon from the * Capsule Services file drawer, which is inside the New Icons file drawer.
2. Open the Icon Options window for the Capsule Service tool and select **Other Data**.
3. To specify when the Capsule job can be run, choose one of the following options:

   To run your job as soon as possible, leave the default settings as they are so that the Capsule job is set to run now.

   To delay processing until your workday is over, select **Overnight** as the time when the job should be run.

   To set a specific time, select **At Specified Time**, then enter the date and time format in the field that appears.
4. Close the Icon Options window.

   The timing selection you choose in step 3 is used for every subsequent job you submit until you open the Icon Options window and reset the options.
5. Copy the Capsule icon to the Capsule Service icon. A confirmation message appears in the message area of your desktop telling you that the job has been submitted to the queue. Depending upon availability of resources in your environment, it might be some time before you see this confirmation message.

You can see the actual queue containing all the jobs you have run. The next section explains how to look at completed Capsule jobs.

Looking at Completed Capsule Jobs

Completed jobs are listed in the Capsule Service tool window. If a Capsule Service icon contains any completed jobs, it looks like the one shown in Figure 45.

Figure 45. Full Capsule Service icon

To display the list of completed jobs in the Capsule Service tool window:

1. Select and open the Capsule Service icon.

   The window looks like any open container icon; it contains a list of all the Capsule jobs that have finished running.

You can move or copy any of the Capsule icons displayed in the Capsule Service window to your desktop or to another container. You can also open or display the options for any of these icons. However, you cannot move or copy a Capsule job into this window. An icon appears in the Capsule Service window if it has been submitted to the service and has finished running, or if it has been cancelled by the submitter. See "Cancelling Capsule Jobs" on page 95 for more information.

Be sure to remove old Capsule jobs when you are finished with them. The completed jobs accumulate and take up space on your disk.

Whenever you submit a Capsule job to the service, a Capsule Run Log is automatically created in the Capsule window if the log does not already exist. Check the Capsule Run Log if you encounter any problems running Capsule jobs. See "Submitting Jobs Containing desktop Applications" on page 96 for more information about messages related to running Capsule applications on the Capsule Service.

Looking at the Capsule Service Queue

The Queue window opens whenever you open the Capsule Service window for the first time. The top part of the window displays information about resource and job status. The **Show** field provides a choice that allows you to display only jobs that you have submitted, or all jobs in the queue. To the right of the **Show** field is the button that lets you cancel any jobs you have submitted. If you closed the Queue window separately before, you must click on **Show Queue** in the window header to look at the queue. The Queue window is shown in Figure 46 on page 95.

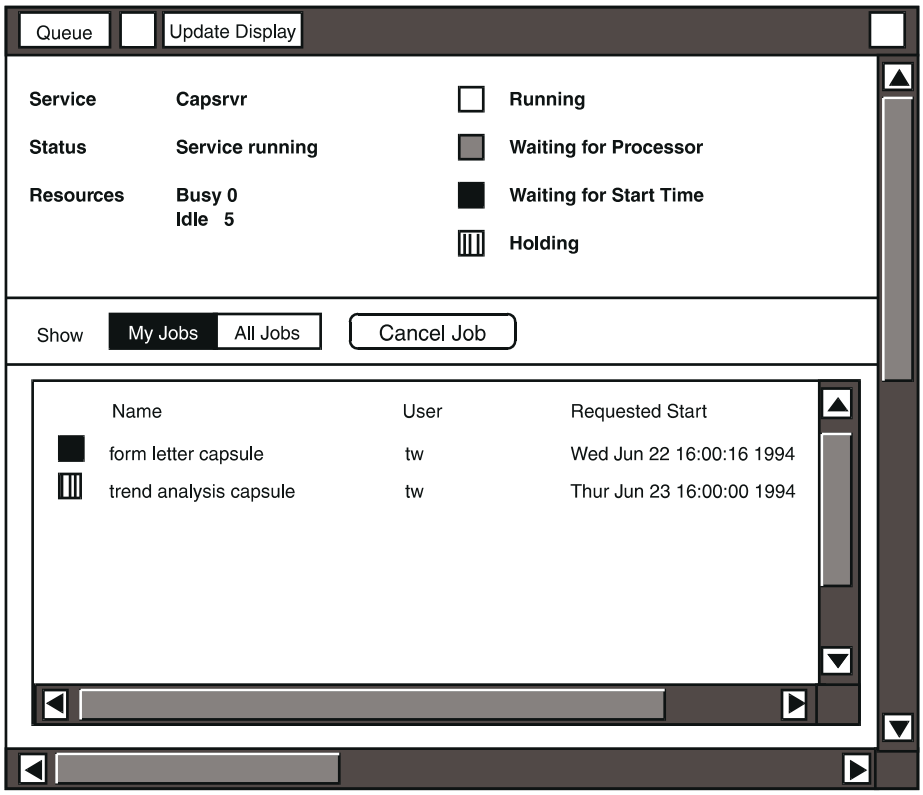

Figure 46. Queue window

The Queue window in Figure 46 shows two jobs submitted by the same desktop user. One job is waiting to start and the second is on hold. Each job is listed with a graphic indication of its status in the queue. An explanation of the status descriptions is located in the upper right area of the window.

You close the Queue window by selecting its title block. However, if you would like to see the Queue window whenever you open the Capsule Service icon, select the Capsule Service window's title block instead. Next time you open the Capsule Service icon, both windows appear.

Cancelling Capsule Jobs

When a Capsule job has finished processing, it remains in the Queue window's listing until you update the display. You can cancel your own jobs at any time by selecting them individually, or by using the **Select Everything** button in the window header.

1. Select the job or jobs you want to remove from the queue listing.
2. Click on the **Cancel Job** button.

Each cancelled job is placed in the Capsule Service window just like any other completed job. Before you close the window, you can delete any old or cancelled jobs.

Choosing Different Timing Options

The Icon Options window for the Capsule Service tool allows you to ask to be prompted for options each time you copy a Capsule application to the Capsule Service icon. To submit a Capsule job and ensure that you are always prompted to choose options:

1. Copy a Capsule Service icon from the * Capsule Services file drawer.
2. Open the icon and select **Other Data** in the Icon Options window.
3. Select **Prompt for Options**.
4. Close the Icon Options window.
5. Copy the Capsule icon to the Capsule Service icon. The abbreviated options window permits you to make the same timing selections as you would in the Icon Options window for the Capsule Service tool. The service name appears as static text, matching the name that appears in the Icon Options window.
6. Choose an option from the **Time When Job May Run** field, then close the Job Options window by selecting its title block.

Submitting Jobs Containing desktop Applications

Capsule applications containing desktop Application and desktop Directory icons can be submitted to the job queue but might pose a security risk. For this reason, the ability to run such icons might have been disabled in your environment. If your Capsule application uses either of these icons, ask your system administrator whether they can run. If the capability has been disabled, an error message is placed in the **Capsule Run Log** when a Capsule window containing these icons is submitted to the service.

You cannot use Capsule Services to run a Capsule application containing a Clipboard icon.

Chapter 10. Troubleshooting

A Capsule Run Log can be invaluable in isolating errors and debugging an application. A Capsule Summary can tell you many things about individual icons, connections, access levels, and so forth, and can even help you deconstruct an application. This chapter provides some hints and performance advice to supplement the Capsule Summary, which is described in Chapter 7, “Creating Capsule Summaries” on page 68, and the Capsule Run Log, which is covered in Chapter 5, “Running the Capsule Application” on page 43.

This chapter covers the following topics:

- Approaches to organizing and naming—some general hints for building applications
- Maximizing performance—getting the most out of the Capsule tool in your environment
- Investigating specific problems, and checking specific parts of the Capsule tool's software
- Troubleshooting iterative processes

Organizing and Naming Applications

Using a modular approach when building applications can make the applications easier to maintain and understand. Naming icons clearly and inserting documentation or instructions for other users adds even more value to a Capsule application that you intend to reuse.

Naming Icons

Insert a Text icon that describes your application for other users. Name the icon to be sure that its purpose is obvious. You might call the icon “Read Me” or “Start Here.”

Organize icons in an easy-to-read, logical arrangement. Place icons in the order you expect them to be processed.

If an icon contains important information that you want others to see before they run the application, name the icon “Auto Open” icon so that it opens as soon as the Capsule window is opened.

Organizing Icons

Make arrow connections visually clear. Avoid arrows that cross other arrows or those that overlay existing arrows.

Avoid building dense applications containing many layers of nested applications. Use a modular approach and keep similar functions in separate nested applications. Label separate modules to indicate the tasks they perform.

Place destination icons in an obvious location, usually at the far right or bottom of the Capsule window. Name the icon so that users recognize its function.

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Maximizing Performance

Use the following guidelines to maximize your Capsule processing performance:

In the Arrow Options window, leave the **Transfer Data Attributes** field set to **No** whenever possible.

Set spreadsheet rows to the **Fixed Row** height. Use an adjustable row height only if you really need that setting.

Avoid using the text-wrap capability on spreadsheet cells.

In the Reporter tool, use the following options:

- In the **Data Transfer** field: **No Blank Rows**
- In the **Row Headings** field: **Compress**
- In the **Column Headings** field: **Compress**
- In the **Do Not Show or Transfer If** field: **Rows, Column Contents Are Only N/As and/or Zeros**

If data access icons take longer than expected to retrieve data, check the constraints or @-variables for incorrect values.

If several data-access icons connect to the same database, set **Reuse Connections** to **Yes** in the Database Connection Controls window.

Do not save data in transformer regions. In the Region Controls window, select **No** in the **Save Input Data** and **Save Output Data** fields.

If a transformer is connected to an Out icon, data is automatically saved in all output regions.

For details on working with transformers, see the IDS publication *Transformers User's Guide*.

Bring your Capsule applications and the icons within them up to the current version of IDS. This is especially important if you have an old but useful Capsule application in a centralized library, and that application is called by several Reference Capsule icons.

To “uprev” any IDS icon (that is, to bring the icon up to the current version of IDS), you can follow either of these procedures:

- Open the Capsule icon. Open and then close each icon within the Capsule window, and open each nested icon at every level (not only Capsule icons, but also Folders). Finally, close the outer Capsule window. When you have finished, the entire Capsule application will have been uprevved.
- Run the Uprev transformer program against all of your old referenced Capsule icons. (You can ask your system administrator where to obtain a copy of the Uprev transformer.)

Create a Reference Capsule icon to replace a nested Capsule icon that is used over and over in an application. (This saves disk space, but increases Capsule run time.)

Clear out your master Capsule icon of unnecessary material, such as large amounts of retrieved data or unneeded processes, before you place it where others might have access to it.

Specific Problems

This section describes some specific problems that might occur with certain areas of the Capsule tool. If a Capsule process is incomplete, you receive a message. In such cases, you can try to isolate the problem to one of the areas described in this section, or see the section “Troubleshooting an Incomplete Run” on page 100.

Arrow Options: Incomplete Processing

Since there are several stop settings in the Arrow Options window, this is a good place to look for errors. Some possible causes of incomplete Capsule processes are as follows:

An arrow has been set to **Yes** in its **Stop Before Transfer** field.

Null data is encountered, and an arrow has been set to **Yes** in the **Stop On Null Data** field.

An illegal region name was entered in the Arrow Options window. This can mean that you misspelled the region name.

The user clicked on the **Run** button before deselecting all icons in the Capsule window.

@-Variables: Capsule Controls

If your application includes Query or Reporter tools that use @-variables to constrain data, make sure your constraints match the values in the User Input Control window. If you add an @-variable constraint and the corresponding value field in the Capsule controls window is left blank, the tools will retrieve all data just as if you left the tables unconstrained.

The data type of each variable shown in the User Input Control window is determined automatically (as explained on “Entering @-Variables” on page 30) if you have not specified a type, or if your Capsule application was built using an earlier version of IDS. In the latter case, the format of a value might be different from what you expect, depending on the format settings at the desktop level and in the tool (such as Spreadsheet).

Have you exceeded the **Value** field character limitation, which is 4095 characters per **Value** field? If you suspect this is the case, check the User Input Control window and delete some characters.

Capsule Service Tool

The Queue window sometimes lists some Capsule applications by showing the internal identification numbers instead of the application names.

This problem can occur if you open and close the Capsule Service icon repeatedly. The job name will appear within a few moments; you do not have to do anything.

Database Connections

If your application contains database access icons, you can set the database connection options so that the application continues to run even if a first attempt to connect to the database fails. For details, see the section beginning on “Setting Database Connections” on page 51.

Capsule Run Log

Although the Capsule Run Log provides an excellent source of error tracking, you should not keep one in your application unless you really need to do so. Information that accumulates in the run log can take up space on your disk. Be sure to turn off logging unless you really need it.

Titles in Spreadsheet Regions

When a spreadsheet region is the destination for a data transfer and the Capsule arrow is set to append to rows, only the data rows are appended. Titles are discarded. The Capsule tool assumes that the row is a title if the following circumstances exist:

1. The data coming into the region contains more than one row.
2. The first row contains only text cells.
3. The second row does not contain text cells only, but includes entries of mixed types (such as a combination of text, numbers, and/or dates); or, the second row is completely empty.

If, in the arrow connecting any icon to a spreadsheet, an append option has been selected, and if the spreadsheet is used in an iterating Capsule application, the following happens: On the first iteration, the incoming data replaces the existing data. On the second and subsequent iterations, the incoming data is appended.

Troubleshooting a Capsule Run Sequence

In some cases, your capsule run might halt, and the results will be incomplete. You might also find that expected results are not produced. There are several possible causes. This section explains some general causes for an incomplete capsule run and also provides some hints for troubleshooting capsule applications that generate iterative sequences.

Troubleshooting an Incomplete Run

There are several possible causes for an incomplete Capsule run. The Capsule processing stops automatically when any of the following circumstances occur:

A tool encounters an unusable @-value (that is, an @-value that does not apply).

Reference is made to an icon that is not available. For example:

- A Capsule icon that was replaced by a Reference Capsule icon that now is unavailable because it is not in the specified library.
- Your Capsule application refers to a File Drawer icon, but the File Drawer's path name has now been changed, or the File Drawer has been deleted.

A BASIC or SQL program cannot be run.

An arrow has been set to **Yes** in its **Stop Before Transfer** field.

Null data is encountered, and an arrow has been set to **Yes** in its **Stop On Null Data** field.

There is a mismatch between a region name and what was specified in the Arrow Options window. This could mean either that an illegal region name was entered (for example, you might have misspelled the name) or that the region was unnamed or renamed after the arrow was set.

A spreadsheet region is too small, so that data overflows into a formula or some other kind of occupied cell. To fix this problem, you must make your spreadsheet region larger, then attempt to rerun the capsule application.

If you suspect any of these problems, use the following suggestions for detecting the cause:

Check the icons inside your Capsule window to see if you have the correct setup.

Check to make sure that any SQL Entry icon has only one arrow leading from it.

Open the User Input Control window to see if @-variables are correctly specified.

Open the Arrow Options window for each arrow to see if the Capsule application was instructed to stop at some specific point.

Make a note of any error messages you see in the message area. A message appears to alert you whenever a Capsule processing sequence is interrupted.

Check the Message Log window, accessible from the lower right corner of your desktop.

In a nested Capsule application that is set to perform iteration, only the final results are stored in the destination icon. If you want to be able to see the results of each iteration, you can store each set of results inside a folder. The folder lets you keep an exact record of the process and is useful for troubleshooting your applications. You can also use an envelope as a container icon to contain the results of a Capsule processing sequence. If you do this, be aware that the Folder and Envelope icons do not perform identically. Use an Envelope when you wish to see only the results of the last iteration; the Envelope tool clears out old results.

To troubleshoot a Capsule application that appends data by columns or rows, or one that adds or subtracts data from existing values in a spreadsheet:

1. Connect the calculating spreadsheet to a folder icon.
2. Connect the accumulating spreadsheet to a second folder icon.
3. Run the Capsule application.

When the processing sequence finishes, the two folders will each contain spreadsheets showing the data at each iteration.

When you use one folder to accumulate the output of a nested Capsule application, be sure to delete the contents of the folder before running the Capsule process again. If you neglect to do so, the Capsule application will append data, and results will accumulate in the folder with every Capsule run.

Glossary

All Jobs. In the **Show** field of the Capsule Service tool's **Queue** window, the choice that causes the job queue to display all jobs that have been submitted. **See also** job.

Append Columns To. In the **Source Data Should** field of the **Arrow Options** window, the choice that appends incoming data as columns to the existing data in a spreadsheet region.

Append Rows To. In the **Source Data Should** field of **the Arrow Options** window, the choice that appends incoming data as rows to the existing data in a spreadsheet region.

arrow. A symbol that connects icons within Capsule applications and directs the flow of data. The arrow can be selected or deleted, and its settings can be changed in the **Arrow Options** window.

Arrow Options. The window in which the user can set options for directing and controlling the flow of data between icons in a Capsule application. **See also** arrow.

@date. A system-defined @-keyword that returns the day and time.

@icon. A system-defined @-keyword that returns the name of a Capsule icon.

@-keyword. A system-defined variable that returns current values within a Capsule application, or within the headers and footers of a printable icon. Examples are @date, @icon, and @time.

At Specified Time. In the **Time When Job May Run** field of the Capsule Service tool's **Icon Options** and **Job Options** windows, the choice that opens the **Time and Date** field, where the user can specify a preference for when the job should be sent to the service for processing. **See also** job.

@time. A system-defined @-keyword that returns the time in hours and minutes.

@timesec. A system-defined keyword that returns the time in hours, minutes, and seconds.

@user. A system-defined @-keyword that returns the user ID of the user executing a Capsule application.

@-value. The value assigned to an @-variable in the Capsule's **User Input Control** window. **See also** @-variable, **Values**.

@-variable. A control variable used to represent a value in any tool that can be run inside a Capsule application. **See also** @-value.

At Specified Time. A field in the **Icon Options** window for the Capsule Service tool that, when selected, displays an input field where you can enter the date and time you want the Capsule to run.

Auto Open. The name assigned to an icon in the Capsule window to ensure that the icon opens automatically as soon as the Capsule icon is opened manually.

Background. In the **Execution Data** page of the**Icon Options** window, the choice in the **Execution Mode** field that causes the application to run in the background (that is, as a process off the desktop), thus enabling the user to perform other tasks on the IDS desktop while the application is running. **Contrast with Foreground**.

browse list. A list showing one or more columns of values from a database**.** A browse list usually contains possible entries for a particular field, along with other useful columns of data that help users navigate through the entries. The user can select values from the list instead of typing them into the field.

button. An object, in a window or window header, that contains graphics or text and is used to open other windows, open a menu, perform an action, or set a condition.

Cancel Job. In the Capsule Service tool's **Queue** window, the button that cancels a selected job that the user has submitted. **See also** job.

Capsule Run Log. The window that displays the beginning and ending times for each icon processed, each icon name, error messages, system messages, all stops (whether automatic or manual), and the completion time for the entire process with an indication of success or failure.

Capsule Security. The Capsule tool's window in which the user can specify security settings for a Capsule application, such as a password and the use of that password to lock or unlock icons.**See also Lock Icons, Unlock Icons.**

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Capsule Services. A tool that allows scheduled, batch execution of Capsule applications as an alternative to running the application directly on the desktop.

Capsule Service. The window that displays the name, size, and execution date of a Capsule application that has been submitted to the Capsule Service program for processing.

Capsule tool. A tool for building an automated processing sequence using icons that represent IDS tools and desktop applications.

choices window. A window that displays a list of all unique values in a particular database column. The user can select values from the list instead of typing them into a field. **Contrast with** browse list.

clipboard. A temporary storage location used by desktop applications to share data. On the IDS desktop, you can copy or replace the data stored in the clipboard by using the Clipboard tool.

Clipboard. A tool used to exchange data between IDS tools and the clipboard used by desktop applications.

Compress. The transformer that combines or deletes two or more columns or rows of data.

conditional processing. Capsule processing that produces different results depending on which keyword is entered in a control spreadsheet. **See also** control spreadsheet.

Connect Icons. The Capsule tool's window header button that connects icons together with arrows.

connector icon. An icon used to transfer data between icons in embedded Capsules. The two connector icons are named In and Out. **See also** nested Capsule.

constraint. A limitation on the range or values of data retrieved from the database to reduce the amount of data that is returned. For example, the user might constrain data based on territory and period so that only data relevant to New York during March, 1992 is retrieved.

container. An icon, such as the Folder and File Drawer icons, that can hold other icons. In a Capsule processing sequence, container icons can be used to hold the results of an iterative process.

Control Database Connections. A selection in the Special menu that displays the **Database Connection Controls** window. In this window, the user can specify the number of database connection attempts during a Capsule run.

control spreadsheet. A spreadsheet that is used to transfer information to a nested Capsule's **User Input Controls** window, thereby affecting the Capsule's processing. **See also** nested Capsule.

controls window. A window that displays settings that you can view or modify. Usually, to open a controls window, the user clicks on a button (often named **Show Controls**) or selects a choice from a menu. See also **User Input Control** window.

Cooperative Application Services. . A combination of desktop software (a Cooperative Application Services transformer that runs within a Capsule window), a Cooperative Application Services gateway, and Host Services software running on an MVS host system. These three components allow IDS users to execute command scripts (such as those written in REXX)on the host and retrieve the results for further processing on their desktops.

Create Placeholder. The choice in the Special menu that enables the user to remove a selected icon from the processing sequence while retaining the arrow settings. The removed icon is replaced in the Capsule window by a dashed-line outline of the icon.

Create Run Log. The choice in the Special menu that creates an icon that is used to record Capsule processing information in the Capsule Run Log. **See also Capsule Run Log**.

data attributes. Properties of data such as font, type size, boldface, underlines, or italics. In certain situations, you can use the **Arrow Options** window to specify the transfer of data attributes along with the data itself; in other situations, the attributes are automatically stripped from the data as it is transferred.

database administrator (DBA). The person who issues administrative instructions to a database service. The DBA defines the data tables used by data access tools, monitors database performance, and assigns user access.

Data Entry. The tool that is used to enter, retrieve, delete, and update data on a database server, or to set @-variables in the **User Input Controls** window of a Capsule icon.

desktop. The screen space occupied by IDS; an electronic representation of the supplies and equipment in a typical office.

DESKTOP. A IDS keyword that causes a search for an icon to begin at the level of the desktop rather than in the Capsule. Used in Capsule applications to specify IDS path names. See also **PARENT**.

Destination Area. The field of choices in the **Arrow Options** window where the user can specify the destination for the data being transferred. The choices in this field are **All Data** and **Other**. See also **Source Area.**

destination icon. An icon that can receive information from other tool icons inside a Capsule window.

Each Time a Job Is Submitted. In the **Other Data** page of the Capsule Service tool's **Icon Options** window, the field where the user can choose either to be prompted for options or to have the Capsule Service tool use preset options for submitted jobs. The choices are **Use Preset Options** and **Prompt for Options**.

field. An area in a window where the user enters information.

entry form. A form used to enter information into a database table or a Capsule application.

executable file. A desktop file that contains computer-readable code used to start and run an application (program). Executable file names have one of the following extensions:**EXE**, **COM**, **BAT**, or **CMD**. **See also** file.

Executable File. In the **Execution** page of the **Icon Options** window, the choice in the **Application Type** field specifying that the icon is to be used to start an executable file (as opposed to an icon on the OS/2 desktop).

Field Options window. A Text options window used to insert named regions or @-variables.

file. A collection of information stored as a unit on a disk or other storage media.

file drawer. A container, created or renamed by the system administrator, that might be shared among desktops. A file drawer typically contains folders. **See also** folder.

file service. In IDS, a software process that manages disk storage of the system software and user data.

folder. An organizing container that resides on a single desktop and is used to store icons and other folders. Folders are represented on the IDS desktop by the Folder icon, on which a file folder is depicted. **See also** file drawer.

Foreground. A choice in the **Capsule** options of desktop application tool**Icon Options** window. When you select**Foreground** in the **Execution in** field, the application takes over the screen when it runs. **Contrast with Background**.

form. A component of the Data Entry tool used to enter, retrieve, delete, or update information in a database, or to supply values to the **User Input Controls** window of a Capsule application.

forms designer. A person who uses the Forms Design tool to create Data Entry icons.

goal seeking. A Capsule process where a sequence of icons continues to run until a result is within a specified range.

heading row. One or more rows at the top of a transformer's input data table that are designated as column titles in the output data.

Holding. In the Capsule Service tool's **Queue** window, a label that identifies the symbol (a square containing horizontal stripes) used to signify that a Capsule job is currently being held before submission to the queue.

icon. A graphic representation of a tool or service. An icon usually consists of a picture (called the **icon graphic**) and a label on a rectangular background.

icon graphic. The small picture in the title block of a tool window header and in the tool icon. The icon graphic usually depicts a tool's function, so a tool window or icon can be easily identified.

Important Message. A window that displays a message that requires an acknowledgment from the user. An important message can be generated by a tool or service, or by the system administrator.

In. An icon used to transfer data from an outer Capsule to an inner Capsule. **Contrast with** Out.

Input File Name. In the **Execution Data** page of the **Icon Options** window, the field where the user specifies a file name if the desktop Application icon is to receive data from an icon in a Capsule application.

Input File Type. In the **Execution Data** page of the**Icon Options** window, the field of choices that enables the user to specify the file type (such as TXT or DIF) for the input file.

input region. (1) A storage area in a tool, for data transferred from elsewhere. Data can either be copied directly into an input region or, in a Capsule application, transferred to the input region by means of an arrow. (2) A range of cells in a spreadsheet that contains input data from another source or from another region in the spreadsheet.

iterate to. The Capsule process of processing values sequentially until a specified @-value is reached. See also iteration.

iterate until. The Capsule process of processing values sequentially until a specified @-value stays within a given range. See also iteration.

iteration. The process of repeatedly running a set of computer instructions until some condition is satisfied. In a Capsule application, an iteration is a process where a sequence of @-variable values in one or more columns of a spreadsheet are used one row at a time until every row has been processed.

job. An application in the Capsule Service queue and its associated execution information as specified by the user or the system administrator.

Job Options. The Capsule Service window in which the user can specify a preferred time for running the job. See also **Prompt for Options**.

job queue. A listing of Capsule jobs and their status in relation to other jobs that have been submitted to the Capsule Service queue.

Lock Icons. In the **Capsule Security** window, the button that prevents unauthorized use of selected icons. Users cannot open, move, copy, or delete locked icons without entering the correct password in the **Capsule Security** window and then clicking on **Unlock Icons**.

message area. The area at the bottom of your desktop that displays instructions or system messages.

My Job. In the **Show** field of the Capsule Service tool's **Queue** window, the choice that causes the job queue to display only those jobs that were submitted by the user.

nested Capsule. A Capsule that is placed inside another Capsule.

New Password. In the **Capsule Security** window, the field where the user can type a password to replace a previously specified password.

Now. A choice in the **Use Preset Options** page of the Capsule Service**Icon Options** window. This choice, when selected, causes a submitted Capsule job to be eligible for immediate execution, that is, to be processed at the next available time with respect to its place in the queue.

options window. Any window that the user can open by using the Options key or the options function on the pop-up function pad. Options windows enable the user to view and modify the properties of the selected object.

Out. An icon used to transfer data from an inner Capsule to an outer Capsule. Contrast with In.

Output File Name. The name you specify in the **Capsule** options of desktop Application tool**Icon Options** window when the desktop Application icon is the source of Capsule arrow operations.

Output File Type. A choice in the **Capsule** options of desktop application tool**Icon Options** window where you select the data type for the output file.

Overnight. A choice in the **Use Preset Options** page of the Capsule Service**Icon Options** window. This choice, when selected, makes the submitted Capsule eligible for execution after normal business hours.

page. (1) In a window, an alternate view that provides a different set of options for setting controls and defining the behavior of an icon. (2) In a window, the amount of information that can be displayed at one time.

PARENT. A IDS keyword that causes a search for an icon to begin at a level above the current level Used in Capsule applications to specify IDS path names. For example, if the user is inside a nested Capsule, **PARENT** causes the search to begin in the outer Capsule window. See also **DESKTOP.**

path name. A designation for the location of a file or icon.

desktop application. An OS/2, DOS, or Windows computer program. The terms **application** and **program** are often used interchangeably.

desktop Application. A tool used to start OS/2, DOS, and Windows programs directly from the IDS desktop or to use such programs in an IDS Capsule application.

placeholder. An icon that lets you retain arrow settings in a Capsule application. See also **Create Placeholder**.

plot. A graphical representation of one row or column of data that illustrates a set of numerical values.

Plot. A tool used to create line, bar, text, and pie graphs.

Printer. An icon that represents a printer to which the user can copy an icon for printing.

print name. The name of a database item (such as a column or table) that is used in IDS windows instead of the more cryptic name by which the data item is identified in the database. Print names are identified in the Workstation Tools Data Dictionary (WTDD) and are converted during data retrieval to internal names that can be understood by the database.

processing sequence. The order in which the icons in a Capsule application are processed or run.

Prompt for Options. In the **Other Data** page of the Capsule Service tool's **Icon Options** window, the choice in the **Each Time a Job Is Submitted** field that causes the **Job Options** window to open every time the user submits a job to the service. **Contrast with Use Preset Options**.

pushbutton Capsule. A prebuilt Capsule application designed so that, usually, the only user interaction required is selecting **Run**.

query. A request for data from a database, based on specified conditions.

Query. A tool used to retrieve data from a database, based on specified conditions.

Queue. The Capsule Service window that displays a list of Capsule jobs in the current queue, and in which the user can cancel a submitted job. The window shows Capsule jobs and their status in relation to other jobs in the queue.

Reference Capsule. An icon that enables the user to access a library of prebuilt Capsule applications.

Replace. In the **Source Data Should** field of **the Arrow Options** window, the choice that replaces existing data with new data in a spreadsheet region.

Run. A Capsule tool window header button that starts a process or program.

Run and Log Off. The choice in the Special menu that enables the user to start a Capsule processing sequence and automatically log off IDS upon completion.

Running. In the Capsule Service tool's **Queue** window, a label that identifies the symbol (an empty square) used to signify that a Capsule job is currently being processed.

scroll. To move the image in a window up, down, left, or right to view information that is not otherwise visible within the boundaries of the window.

secure. To restrict access to.

Secure Capsule. The choice in the Capsule tool's Special menu that opens the **Capsule Security** window, in which the user can lock or unlock selected icons in a Capsule window to prevent their unauthorized use.

Select. The transformer that sends specified data columns from one input region to as many as 10 output regions.

sensitivity analysis. A Capsule process that lets one @-variable value change while the others are held constant.

Set Arrow Defaults. The choice in the Capsule tool's Special menu that applies arrow settings from the selected arrow to all other arrows in the window.

set@. In the **Entry** page of the **Spreadsheet Options** window, the function in the **Operators** menu that sets the value of the specified @-variable in a Capsule application's **User Input Controls** window to the value entered or to the value of the specified cell or formula.

Show Queue. The Capsule Service window header button that opens the **Queue** window, in which the user can view a list of Capsule jobs in the current queue.

Sort. The transformer that rearranges data in alphabetic, numeric, or chronological order.

Source Area. In the **Arrow Options** window, the field of choices where the user can specify the source of the data being transferred**.** The choices in this field are **All Data** and **Other Data**. See also **Destination Area**.

Source Data Should. In the **Arrow Options** window, the field of choices that enables the user to specify how incoming data will be incorporated into the destination spreadsheet. The choices in this field are **Replace, Append Columns To, Append Rows To, Add To,** and **Subtract From.**

source icon. An icon that can be used to pass information to other tool icons inside a Capsule window.

Spreadsheet. A IDS tool used to perform calculations and analyses, schedule projects, and perform iteration in embedded Capsules.

SQL. Structured Query Language, a command language for use with relational databases. The language consists of statements to insert, update, delete, query, and protect data. IDS tools use SQL to communicate with database servers.

SQL Entry tool. A tool used to run Structured Query Language (SQL) programs.

stand-alone icon. An icon that is placed inside a Capsule window, but is not connected by arrows to any other icon.

Status. In the Capsule Service tool's **Queue** window, the read-only field that provides the status of the service.

Stop. A function key used to stop an operation in progress, such as querying a database.

Stop Before Transfer. In the **Arrow Options** window, the field that enables the user to specify whether the application is to stop before transferring data to the next icon.

Stop On Null Data Transfer. In the **Arrow Options** window, the field where the user can specify whether the application is to stop if null data is being transferred from the source icon.

stopwatch pointer. A graphic representation of a stopwatch that replaces the pointer to inform the user to wait until a process has been completed. When you run a Capsule application, the pointer changes to a stopwatch graphic, indicating that you must wait until the Capsule application has finished running.

string. A sequence of characters.

Subtract From. In the **Source Data Should** field of **the Arrow Options** window, the choice that subtracts data from an existing spreadsheet region.

Time When Job May Run. The field in the Capsule Service tool's **Job Options** and **Icon Options** windows where the user specifies a preferred time for the submitted job to be run.

title block. A window header button that contains the icon graphic and the window title. The user can click on the title block to close the window.

Transfer In Capsule. In the **Region** page of the **Spreadsheet Options** window, the field where the user specifies the characteristics of the spreadsheet to be transferred when the spreadsheet is used in a Capsule application.

transformer. A IDS tool that can be used to perform various types of data manipulation either interactively or in a Capsule application.

Transformer Controls. The transformer window in which the user specifies the function of the transformer, the region names, and the data to be manipulated.

type. A data designation assigned to an @-variable and displayed in the **User Input Control** window. Possible types are **Text**, **Number**, and **Date**.

Unlock Icons. In the **Capsule Security** window, the button that enables the user to reverse the status of previously locked icons so that they can be opened, moved, copied, or deleted. **See also Lock Icons.**

Use Preset Options. In the **Other Data** page of the Capsule Service tool's **Icon Options** window, the choice in the **Each Time a Job Is Submitted** field that enables the user to set the preferred time for running jobs submitted to the server. When **Use Preset Options** is selected, the **Job Options** window does not open when the user submits a job to the server. **Contrast with Prompt for Options**.

User Input Controls. The window in which the user can set or view @-variables, their descriptions, and their type designations. See also controls window.

Values. A character field that appears in the **User Input Control** window where you specify the values for @-variables.

vertical bar. The character (|) used to separate parameters in an IDS path name.

Waiting for Processor. In the Capsule Service tool's **Queue** window, a label that identifies the symbol (a darkly colored square) used to signify that a Capsule job is waiting until an execution engine is available. This can happen if many jobs are in the queue and all execution engines are being used.

IDS Publications

This section lists IDS publications, including order numbers. To order copies of the books listed here, or to get more information about a book, see your IBM representative.

General Publications

Getting Started with the Intelligent Decision Server (SC26-8892)

Working with the Intelligent Decision Server (SC26-8893)

Installation, Configuration, and Administration Publications

Installing IDS LAN Components (GC26-8877)

System Administration Guide and Reference (SC26-8890)

Messages and Codes (GC26-8878)

Database Gateway Services Publications

Installing Database Gateway Services for UNIX Environments (GC26-8884)

Configuring and Administering Database Gateway Services (GC26-8885)

Administering Databases with IDS (SC26-8891)

Host Services Publications

Planning MVS Host-to-LAN Connectivity (GC26-8880)

Installing Host Services and Configuring Host-to-LAN Communications for MVS (GC26-8881)

Administering Host Services for MVS: DB2 and Cooperative Application Services (GC26-8882)

Developing Applications with Cooperative Application Services (GC26-8883)

Configuring and Administering Mail Gateway Services (GC26-8923)

Open Data Access Service Publications

Developing Applications with Open Data Access Service (SC26-8888)

Data Access Tools Publications

Browser User's Guide (SC26-8900)

Data Entry User's Guide (SC26-8897)

DBA Tool User's Guide (SC26-8894)

SQL Entry User's Guide (SC26-8898)

Data Analysis Tools Publications

BASIC Tool User's Guide (SC26-8908)

Query User's Guide (SC26-8901)

Spreadsheet User's Guide (SC26-8904)

Presentation Tools Publications

Layout User's Guide (SC26-8902)

Plot User's Guide (SC26-8905)

Reporter User's Guide (SC26-8903)

Text User's Guide (SC26-8896)

Application Development Tools Publications

Transformers Guide (SC26-8907)

Capsule User's Guide (SC26-8906)

Forms Design User's Guide (SC26-8899)

Interacting with PC Applications (SC26-8895)

Installing and Configuring IDS Open Clients (GC26-8889)

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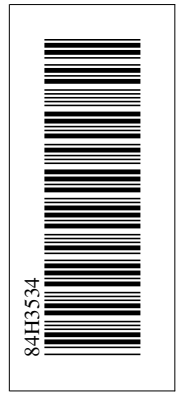

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IBM Intelligent Decision Server Capsule User's Guide *Version 1*