5

RuleSets, Rules and Actions

The opening tasks in a *Taskmaster Rules* workflow create a processing batch, scan paper, adjust and clean the resulting images, and add the images to the batch.

The remaining tasks respond to **rules** that *you* define. These rules determine how the tasks identify individual pages according to their Page Types; organize the batch into a series of documents containing pages of specific types; isolate a document's ***source*** page or pages – pages with data to be captured; locate, read, recognize and verify the data in the fields of a ***source*** page; and export the captured data to a file or database.

Chapter 5 shows you how to define a rule that is a member of a specific RuleSet Type – a **Recognize** rule, for example, or an **Export** rule. The chapter also shows you how to construct a new RuleSet Type, how to define an application's *global* rules, as well as *custom* rules that apply exclusively to the elements of a fingerprint you've chosen.

Finally, Chapter 5 looks carefully at the nature of the **actions** that make up a rule.

The contents of this chapter include:

✓ Chapter 3 of the *Rule Manager Reference* thoroughly describes all elements of the ***Rule Manager Window's*** *Rules* panel. Chapter 4 of the *Rule Manager Reference* describes each currently available action.

Introduction

Below, the revision of the chart from Chapter 3 emphasizes a fundamental *Taskmaster* dynamic.

> The rules that guide task procedures apply to objects at all four levels of a Document Hierarchy: **Batch**, **Document**, **Page** and **Field**.
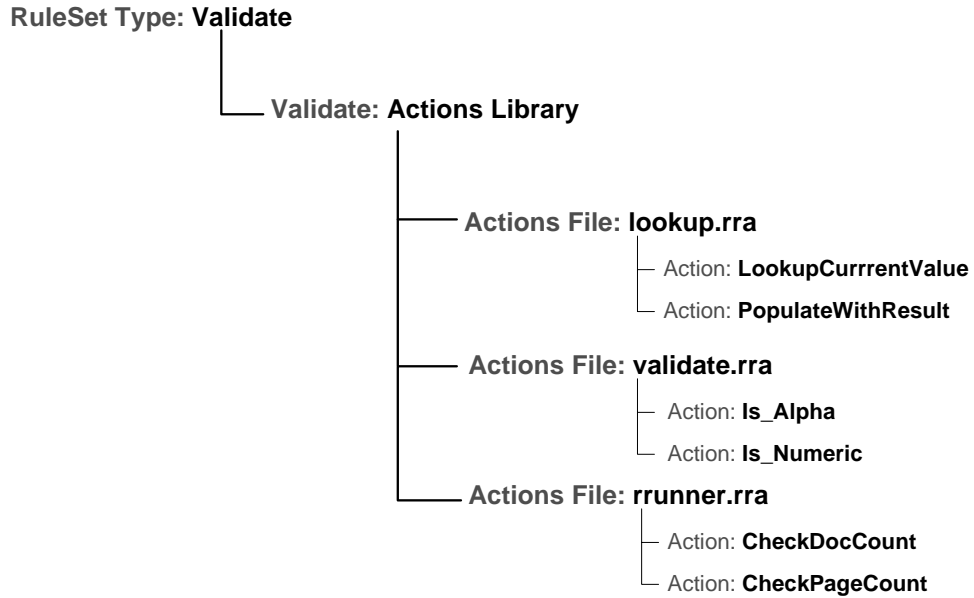
However, the rules that locate a *source* page within a document, and process the values in the fields of the page, belong to a single fingerprint. Some of these rules are *custom*: they apply only to this fingerprint. But most rules are *global*: they're available to all fingerprints and automatically apply in the absence of an overriding *custom* rule.
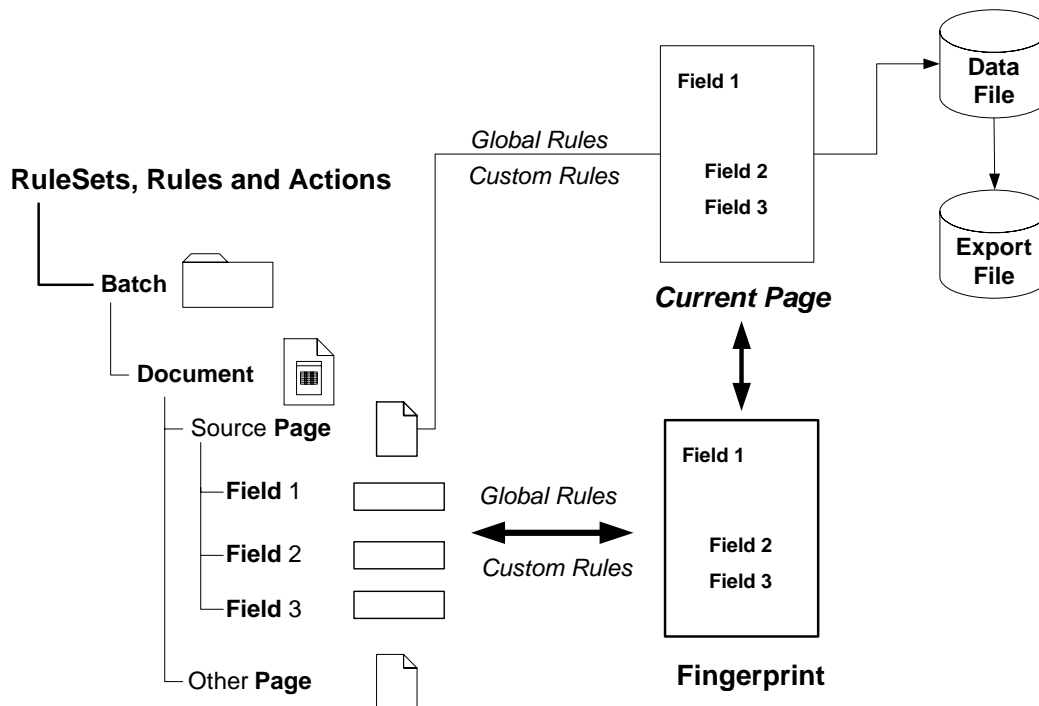
A rule itself is part of yet another hierarchy with a structure laid out on the next page.

A **RuleSet Type** is a category characterized by the *purpose* of its rules. **Locate** rules, for example, help find values on a current page. **Validate** rules check some of these values to be sure they're acceptable. *Rule Manager* comes equipped with a number of *default* RuleSet Types. You can add your own (Page 12) – and delete those you don't need.

The nature of a RuleSet Type stems from the nature of the actions in its **Actions Library**. A **Recognize** rule that reads and interprets the data in a field probably contains actions that isolate the field, link it to a Recognition engine, initiate the Recognition process and capture the results. Many of these actions are in the Recog **Actions file** (**recog.rra**). This file, and others, are in the Actions Library of the **Recognize** RuleSet Type.

RuleSet Type: Validate

    Validate: Actions Library

        Actions File: lookup.rra

            Action: **LookupCurrrentValue**

            Action: **PopulateWithResult**

        Actions File: validate.rra

            Action: **Is_Alpha**

            Action: **Is_Numeric**

        Actions File: rrunner.rra

            Action: **CheckDocCount**

            Action: **CheckPageCount**

Although all core RuleSet Types have libraries, you can add a file or remove a file without difficulty (Page 13). If you define a new RuleSet Type, you *must* provide it with an Actions Library. A rule is a member of a **RuleSet**. The RuleSet belongs to a RuleSet Type, and "binds" its rules to an object of the Document Hierarchy.

Each **rule** of the RuleSet consists of **actions** selected from files in the Actions Library of the RuleSet Type. In the illustration below, a **Validate** RuleSet has been bound to the *1040EZ* application's *TaxpayerSSN* **Field** object. The RuleSet has one rule; the rule has two actions.
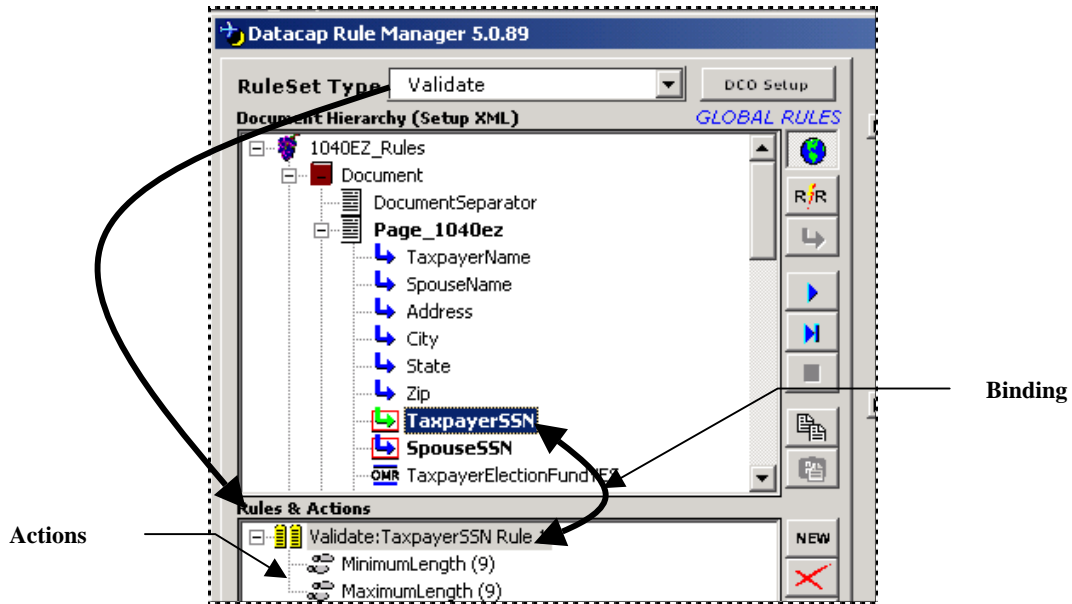

The sections which follow examine the elements of the RuleSet Hierarchy, and show you how to assemble its parts.

Rule Manager Window – Rules Panel

Chapter 4 showed you how to use the ***Rule Manager Window's*** *Fingerprints & Zones* panel to construct one or more fingerprints for your application.

✓ An application such as *Taskmaster for Invoices* adds a fingerprint whenever a new invoice form arrives: it is the responsibility of a RuleRunnerID task to match every current page representing a ***source*** page to a particular fingerprint in the fingerprint inventory. In sharp contrast, a *Health Claims capture system* needs just a few fingerprints because the formats of the standard *HCFA-1500* and *UB-92* claims are constant.

Whether the application features one fingerprint or many, you can define rules and bind them to the objects of the Document Hierarchy only ***after*** you have a fingerprint in place. It can be a *global* fingerprint or a *production* fingerprint. In the illustrations below, the *1040EZ* application lists *Global* and 1040ez as Fingerprint Classes, and a fingerprint for each class in the **Fingerprint Data** area.
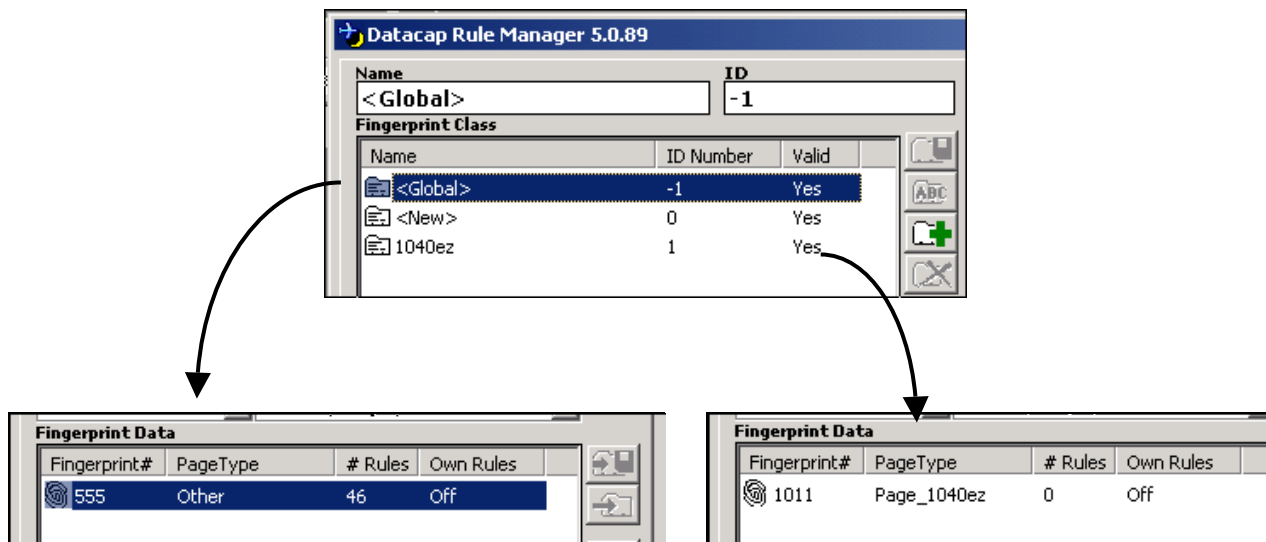
To access the *Rules* panel:

♦ Highlight the appropriate **Fingerprint Class**.

♦ Select a fingerprint from the list in the **Fingerprint Data** display.

♦ Click on the *Rules* tab at the bottom of the panel.

✓ ***Don't forget!*** The *Rule Manager Reference* describes the many components of the *Rules* panel, including its toolbars, icons and *Log Viewer*. The text is available in printed and PDF formats.

The *Rule Manager Reference* also explains, one by one, the actions in every Actions Library – and illustrates their use in easy two-line or three-line examples. In addition, explanations of the actions are in the **Actions Help** file, which is immediately available if you click on the **?** icon on the right-hand edge of the **Action Library** listings, towards the bottom of the panel.

The *Rules* panel has four principal areas.

Image Area

The **Image** area occupies the panel's right half, and displays a fingerprint's image – if there is one - or a portion of the image:
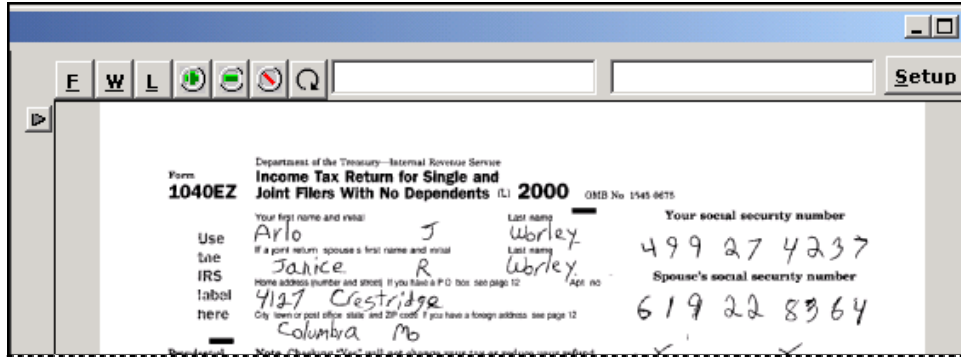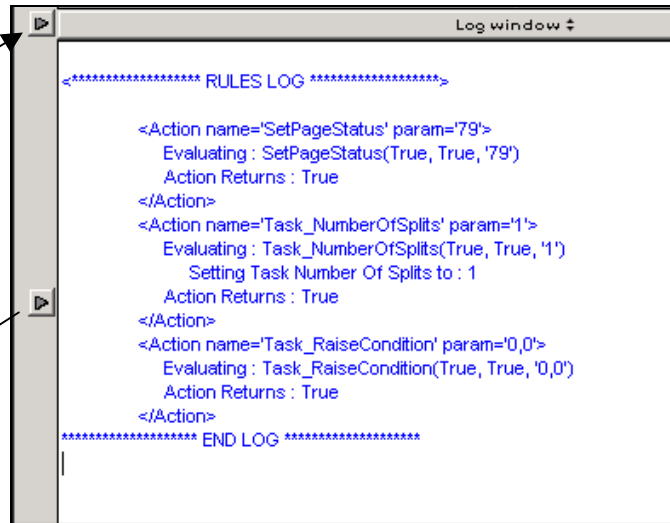

Image area – *top portion*

✔ When you are testing a rule (Page 22), you can click on a knob at the left edge to access the *Log Viewer* and the important information it contains. (To return to an image, click on a lower knob.)

Log Viewer - *Rules*

### RuleSet Type Definition and Designation

The left side of the panel is devoted to rule definition and binding.

At the top is a drop-down list of all **RuleSet Types** that are available to this *Rule Manager*.
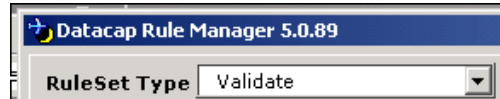
RuleSet Types

An application's **Document Hierarchy** occupies the next area. When you define a rule, you **bind** it to an object at one of the four levels of the Document Hierarchy: **Batch**, **Document**, **Page** or **Field**:
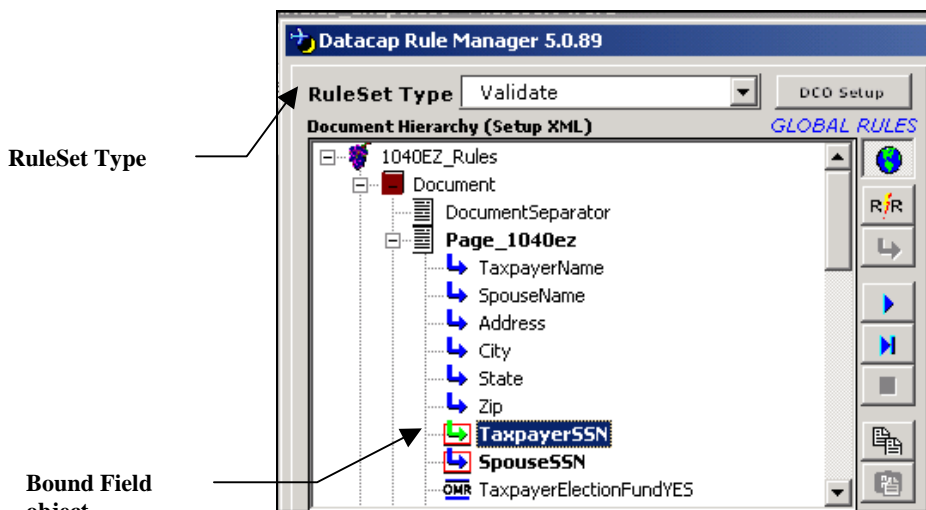

Document Hierarchy

✔ You use this version of the **Document Hierarchy** area for the *setup* procedures that link rules and their actions to specific objects of the Document Hierarchy (Chapter 3). However, when you load a "live batch" to test your rules, *Rule Manager* converts the area to a *runtime* environment that displays actual values for each object.

You'll use the **Rules & Actions** area illustrated on the next page to construct a RuleSet of a particular type, and bind it to a specific object of the Document Hierarchy. A RuleSet consists of one or more rules; each rule contains one or more actions.
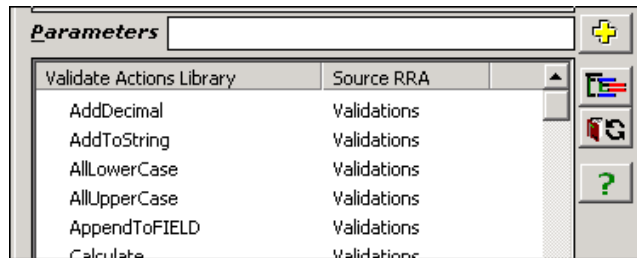
**Validate
RuleSet Type**

RuleSet, Rules and Actions
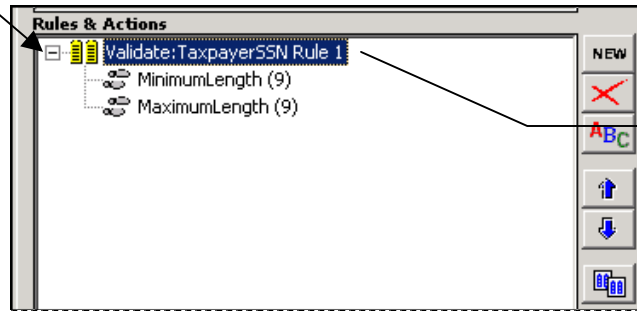
**Validate Rule #1:
TaxpayerSSN
Field object**

The area at the bottom is an alphabetical list of all actions in a RuleSet Type's Actions Library. To add one of these actions to a rule you preparing, you highlight the Action ID, enter a **Parameter** if applicable, and click on the + icon. (For details, see Page 20).

**Actions Library -
Validate RuleSet Type**

RuleSet Types

The field at the top of the *Rules* panel lists all RuleSet Types currently available to an application's *Rule Manager.*

Certain RuleSet Types – and their Actions Libraries – are default components of a new application (and are provided automatically by the Taskmaster Application Wizard!) The illustration below shows a partial list:
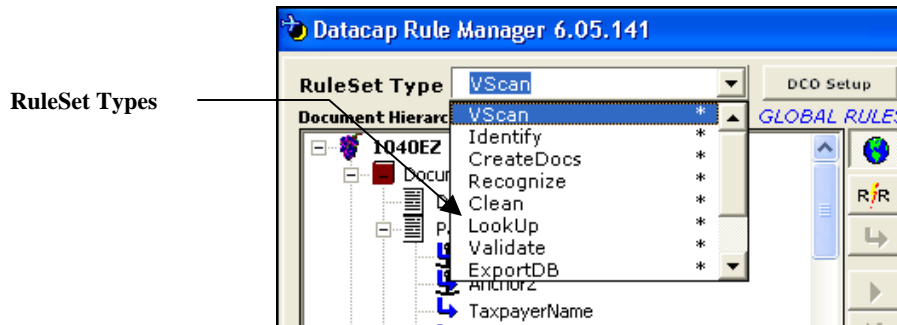
Rule Manager Window – *Rules panel*
<u>**Default RuleSet Types**</u>

✓ Note that this list is *not* alphabetical. Instead, the order of the RuleSet Types reflects the likely order in which tasks will respond to rules of various types as they create batches, and process their documents, pages and data. As a result, the **Export** and **ExportClose** RuleSet Types are towards the end of this list.

If you select a RuleSet Type such as **VScan** (in the example above)**,** the contents of its default Actions Library will appear in the **Actions Library** area at the bottom of the panel:
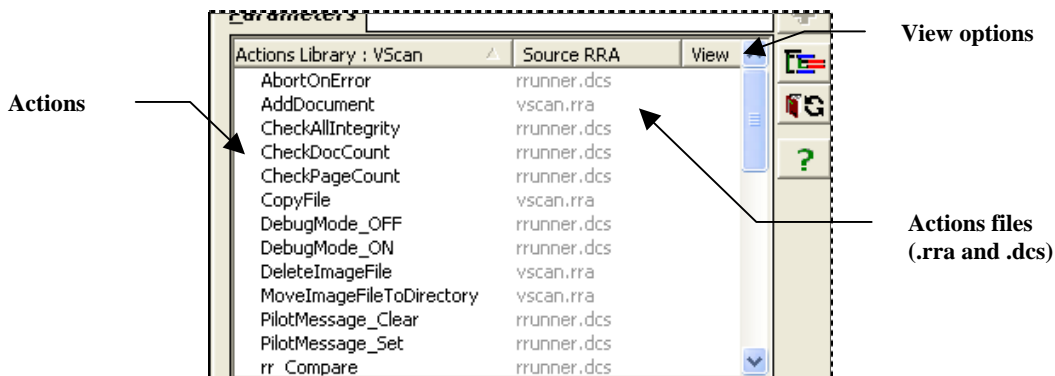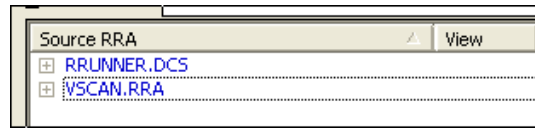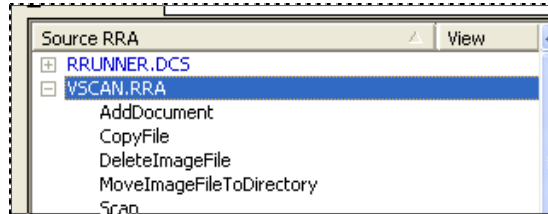

VScan Actions Library

This library is made up of actions from two files:

- Actions in **vscan.rra** are responsible for scanning images (rather than paper!)

- Actions in **rrunner.dcs** carry out fundamental rule application procedures and are automatically included in *all* Actions Libraries.
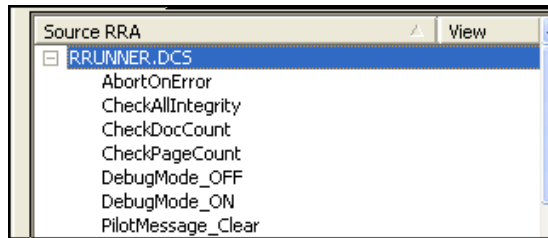

✓ Pay close attention to the **View** toggle switch in the upper right-hand corner of the **Actions Library** field. Toggling the switch lists the actions in each file; toggling it again lists all actions in the library:

Source RRA	⌿	View
⊞ RRUNNER.DCS		
⊞ VSCAN.RRA		

VScan Actions Library – *member files*

Source RRA	⌿	View
⊞ RRUNNER.DCS		
⊟ VSCAN.RRA		
AddDocument		
CopyFile		
DeleteImageFile		
MoveImageFileToDirectory		
Scan		

Actions: VSCAN.RRA

Source RRA	⌿	View
⊟ RRUNNER.DCS		
AbortOnError		
CheckAllIntegrity		
CheckDocCount		
CheckPageCount		
DebugMode_OFF		
DebugMode_ON		
PilotMessage_Clear		

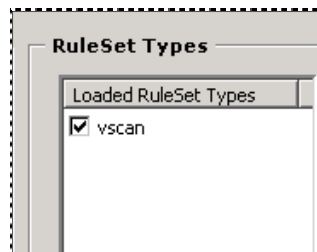**Actions: RRUNNER.DCS**

✓ RuleSet Types appear in another, highly strategic location. When you define a task that responds to rules (Chapter 6), you assign RuleSet Types to the task, in the order in which the task will apply them. In this very simple example, a VScan task will carry out only **VScan** rules:

RuleSet Types

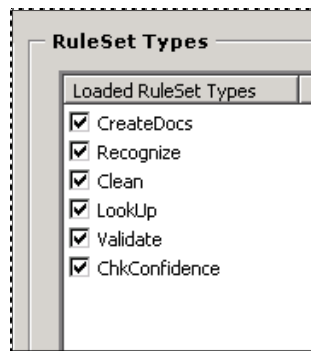| Loaded RuleSet Types |
|---|
| ☑ vscan |

VScan Task - *VScan RuleSet Type*

The *1040EZ* application has only one rule of this RuleSet Type. It is bound to the Document Hierarchy's **Batch** object (*1040EZ*): the rule's actions locate and scan four images:
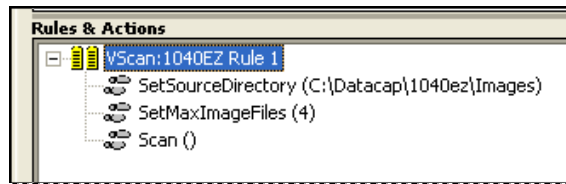

VScan Rule

The *1040EZ* application's Recognize task has a far larger scope. It applies six RuleSet Types; all are included as *Rule Manager* defaults.


Recognize Task – *RuleSet Types*

Page 12 shows you how to set up RuleSet Types for *your* application. First, however, spend a moment investigating the structure of a RuleSet Type and the nature of its Actions Library.

For a closer look at the structure of a RuleSet Type, choose a category – **Recognize**, for example – then click on the **Setup RuleSet Types and Library Files** icon on the right-hand edge of the panel's **Actions Library** area.

Click here
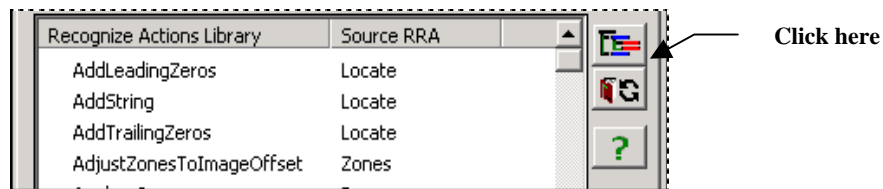
Rules panel – *Actions Library area*
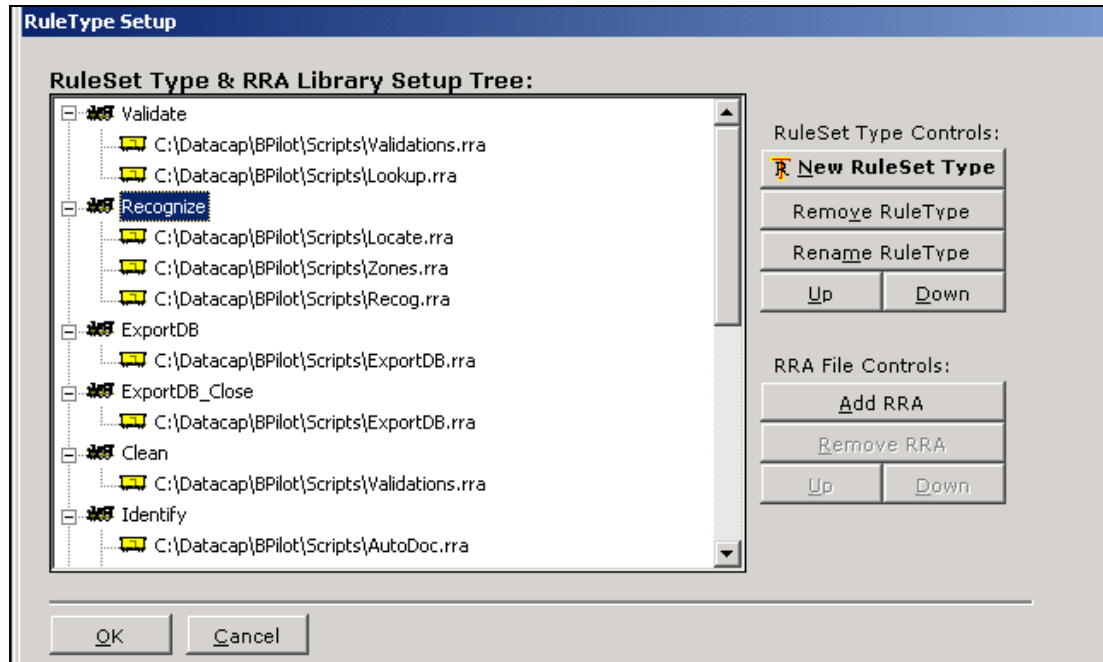
RuleSet Type Setup

The hierarchy on the left lists the RuleSet Types that you find in the drop-down list at the top of the *Rules* panel. The Actions files that make up a RuleSet Type's Actions Library are indented below the title. In the illustration above, the library of the **Recognize** RuleSet Type consists of actions from three **.rra** files *in addition to* the actions of the *RuleRunner* script file - **rrunner.dcs**, for example. (**.rra** refers to **R**ule**R**unner **A**ctions, and .**dcs** to **D**ata**c**ap **S**cripts.)

✓ *Remember!* An Actions Library automatically includes actions defined in the *RuleRunner* script file (.dcs).

✓ *Keep this mind, too.* If you use the Taskmaster Application Wizard to set up a new application, the wizard provides the application with a *Rule Manager* complete with Actions files (.rra), RuleSets Types, and Actions Libraries for each RuleSet Type.

The buttons on the right initiate procedures to establish and manage RuleSet Types and their contents. The paragraphs on the next few pages review these techniques.

How to Define a New RuleSet Type

As preliminary steps, take time to consider the purpose of the proposed RuleSet Type and to determine which Actions files contain the actions that rules of this kind can use effectively. Then…

♦   Press the New RuleSet Type button.

♦   When the *New RuleSet Type* dialog appears on your screen, enter the RuleSet Type's name, and click on the OK button.

♦   Confirm that the name appears at the bottom of the **Setup Tree** on the left – without an Actions Library.

New RuleSet Type dialog
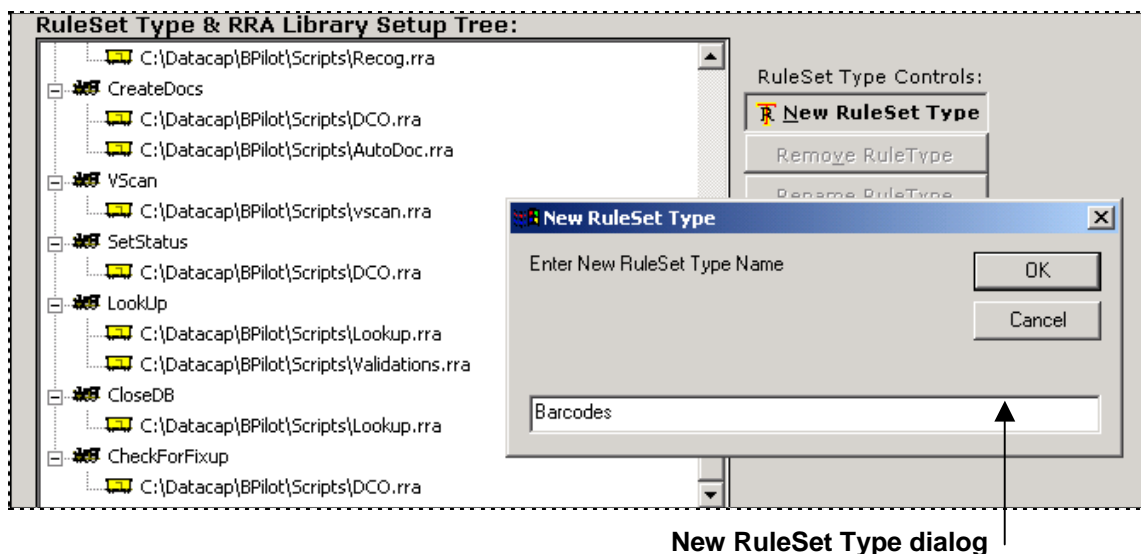
Once the new RuleSet Type is in place, you can use the other buttons in this area to:

Remove RuleSet Type: After a proper warning, deletes the RuleSet Type you've highlighted in the hierarchy on the left. *Alert!* As the warning indicates, an application's Rules database cannot completely remove the RuleSet Type until you delete all rules based on this type – and their actions.

Rename RuleSet Type: Surrounds the RuleSet Type's name with an interactive rectangle and toggles the button *Off.* To re-activate the button, remove your cursor from the rectangle.

Up and **Down:** Moves the RuleSet Type –along with its library of Actions files – to a position higher or lower in the hierarchy. *Important!* This will be this RuleSet Type's relative position in the drop-down list at the top of the *Rules* panel. You can use the Up and Down buttons to re-order the list to best meet your needs. In the illustrations at the top of the next page, the list is alphabetical.
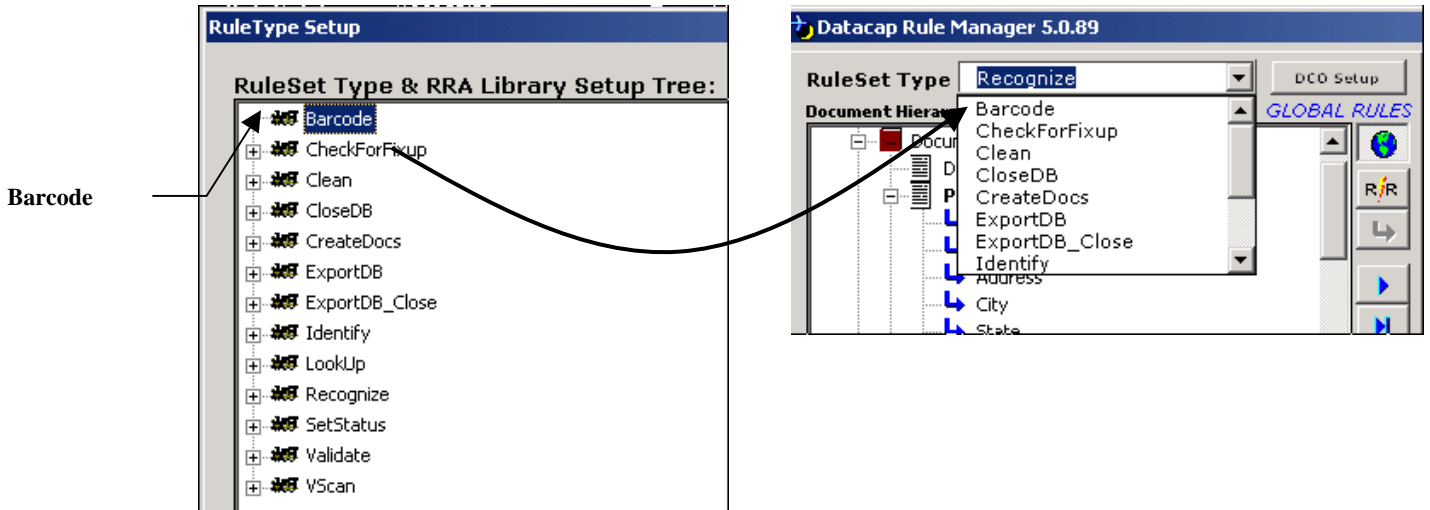
How to Assemble a RuleSet Type's Actions Library

A RuleSet consists of rules of a particular type, bound to a particular object of the Document Hierarchy

The rules, in turn, are made up of actions…actions that are available because they have been included in the Actions Library of the RuleSet Type.

The default composition of the **Recognize** RuleSet Type includes actions in three Actions files and the RuleRunner script (Page 8). But the new **Barcode** RuleSet Type illustrated above doesn't yet have a library. To solve this problem, you would take the steps below:

Step	Action
1.	Highlight the RuleSet Type's name in the **RuleSet Type Tree** on the left side of the *RuleSet Types* dialog.
2.	Press the Add RRA button in the **RRA File Controls** area on the right side.
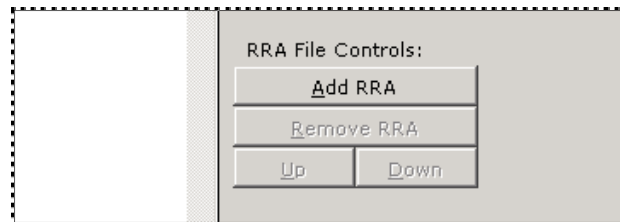
| Step	Action
3.	Use the tools of the *Add Actions Files* dialog to locate and select a file (.rra) containing actions that you want to be available for rules of this type (see the illustration on the next page.) *Alert!* The core Actions files are in the **Scripts** folder of your **Datacap** directory's **BPilot** sub-directory.
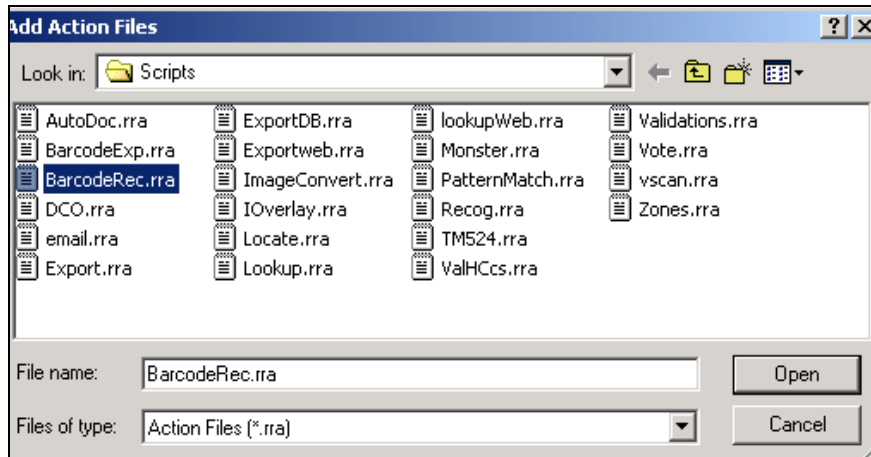
Add Actions Files dialog

To Build a RuleSet Type Actions Library (continued)

Step	Action

4. Confirm that the file has been added to the new RuleSet Type's tree.

Actions file (.rra)

5. Repeat Step #3 and Step #4 for each additional Actions file.

6. Close the *RuleSet Types* dialog.

7. Select the new RuleSet Type from the drop-down list at the top of the *Rules* panel.

8. At the bottom of the panel, review the contents of the RuleSet Type's Actions Library. *Don't forget* that *Rule Manager* automatically includes the actions of the **RuleRunner** script (.dcs) in every library.
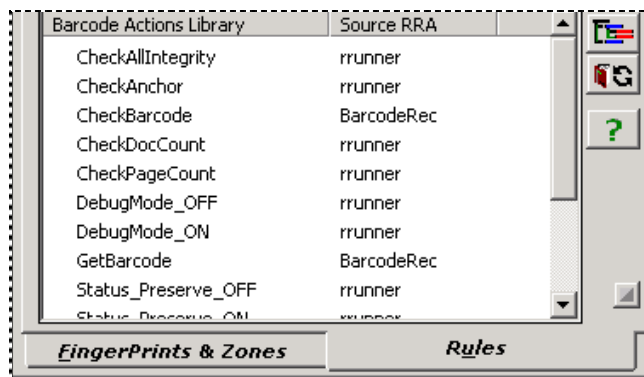
Other Considerations:

This procedure assumes that any Actions files you intend to include in a RuleSet Type Actions Library contain actions – scripted functions - that have been carefully developed. For more about these files, see Chapter 4 of the *Rule Manager Reference.*

The **Barcode** RuleSet Type in the examples, and its actions, are fictional.

RuleSets and Rules

This time, when you look at the chart below, focus on the *global* and *custom* rules that sit squarely in the middle:
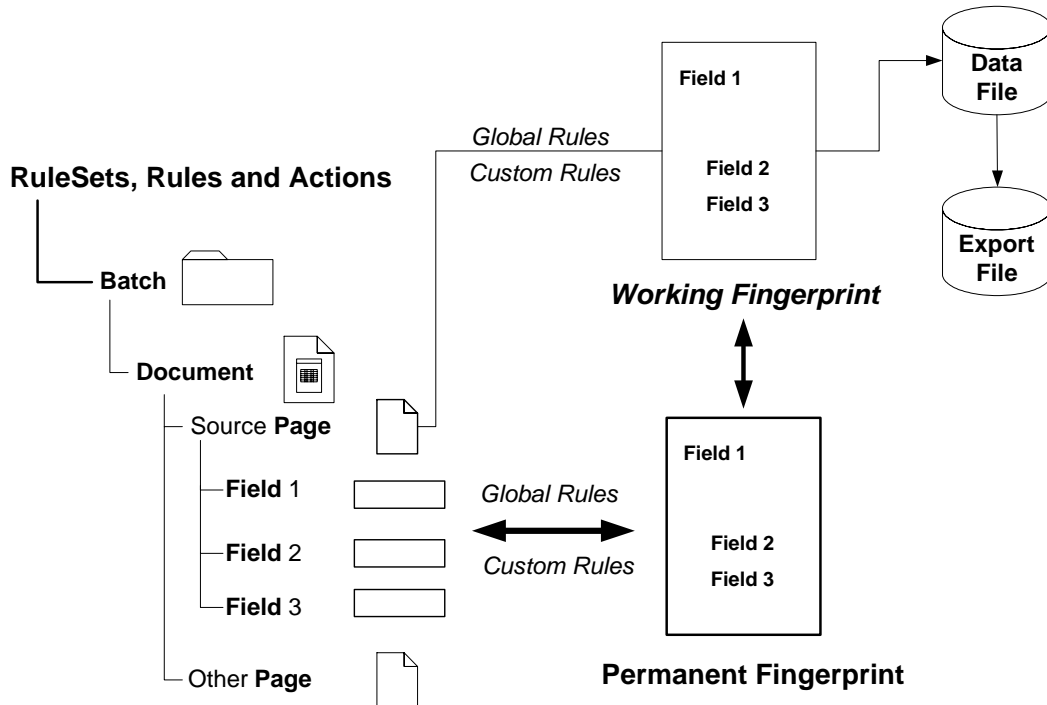
The various RuleSets you define – their rules and actions – determine how tasks that operate according to the rules will process the:

♦ Current **batch**

♦ **Documents** that make up the batch

♦ **Pages** in a document

♦ **Fields** of a *source* page –fields containing data to be recognized, verified, validated and exported.

♦ **Values** in a field.

A RuleSet you prepare has four characteristics:

It belongs to a certain RuleSet Type – **Recognize** or **Validate**, for example.

It is bound to a specific object of the Document Hierarchy.

It consists of one or more rules – each bound to the same object of the Document Hierarchy.

It is assigned to a task during the task's Setup procedures (Chapter 6).

Statistically, only a few rules in a typical application are bound to the Document Hierarchy's **Batch** object; most rules determine how tasks how find, recognize, validate and export values of **Field** objects.

A *global* rule applies to all instances of an object unless a *custom* rule intervenes. A *custom* rule applies to an object when the task is processing a current page that matches a particular fingerprint in the Fingerprint Inventory (Chapter 4).

In the case of an application such as *Taskmaster for Invoices*, with a large fingerprint inventory, each fingerprint may feature a number of *custom* rules. These rules supersede the application's *global* rules when a task processes a page that matches the fingerprint.

✓ To find out whether or not a RuleSet of any kind has been constructed and bound to an object of the Document Hierarchy:

♦ Highlight a Fingerprint listing in the **Fingerprint Data** area of the *Fingerprints & Zones* panel. Note if a value in the **# Rules** column indicates the presence of one or more *custom* rules for this fingerprint – two, in the example below.
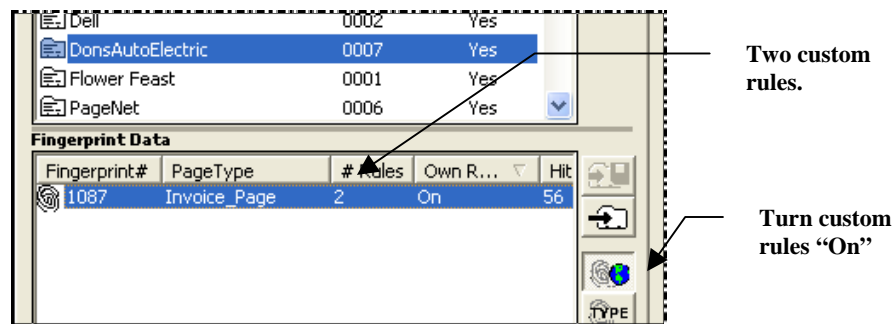

♦ Toggle the **On/Off** icon on the right-hand edge to *On*.

♦ Click on the *Rules* tab at the bottom of the *Rule Manager Window*.

♦ At the top of the *Rules* panel, click on the **Globe** icon and be sure the *GLOBAL RULES* notation appears.
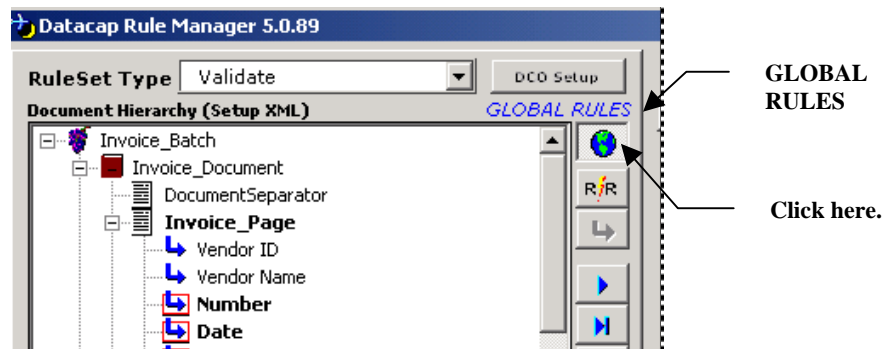
♦ Select a **RuleSet Type** you've probably used – **Validate**, for example. *Rule Manager* will automatically embolden the names of those objects of the Document Hierarchy for which *global* **Validate** rules have been defined. *Remember!* In the absence of *custom* rules, *global* rules apply.

♦ Select an object with its name in bold type – **Number**, for example.

♦ Review the rule or rules that are members of the RuleSet for the object you've selected – *Validate: Number Rule 1*, in this case.
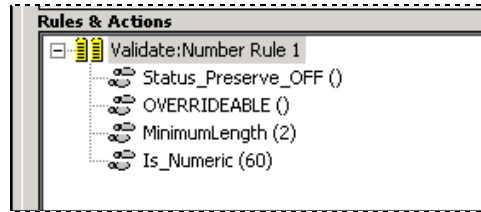

♦ If you click again on the **Globe** icon to release it, the Fingerprint ID appears along with the *CUSTOM RULES* notation.

♦ Scroll through the **RuleSet Type** list until you find a RuleSet Type marked by an asterisk (*). This indicates that the RuleSet Type includes custom rules.

♦ When you select such a **RuleSet Type**, the names of any objects of the Document Hierarchy for which you have defined *custom* rules appear in **bold** type:
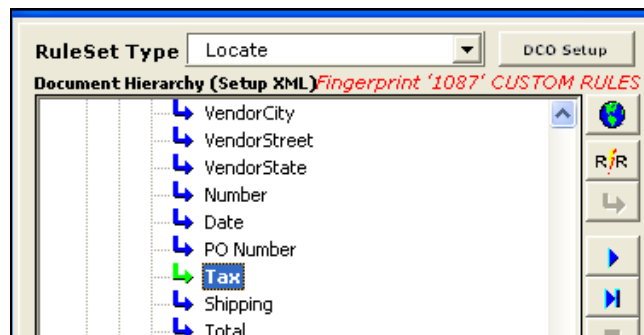
♦ When you select one of these objects, the RuleSet appears in the panel's **Rules & Actions** section:
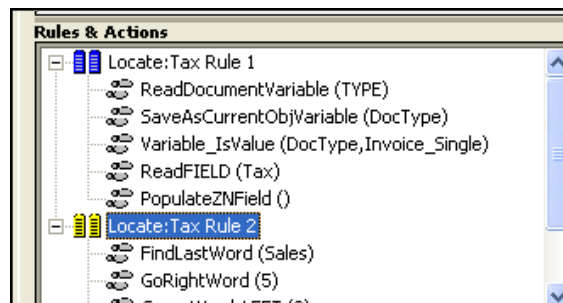
☛ The steps you take to define a RuleSet and bind it to an object of the Document Hierarchy are nearly the same for *global* and *custom* rules. The principal and ***significant*** difference lies in how you toggle the **Globe** icon when you construct the RuleSet:

> *In* produces a **global** RuleSet.

> *Out* results in a **custom** RuleSet.

How to Define a RuleSet and its Rules

To construct a RuleSet, take these steps:

Step	Action
1.	Be sure that the RuleSet Type you intend to use is in place (Page 12), and that its Actions Library contains the Action files you need (Page 13).
2.	Highlight the listing of a fingerprint in the **Fingerprint Data** area of the *Fingerprints & Zones* panel. If you are defining a *global* RuleSet, you can choose any fingerprint.
3.	Move to *Rules* panel of the ***Rule Manager Window.***
4.	Depress the **Globe** icon for a *global* RuleSet; release it for a *custom* RuleSet.
5.	Select the applicable **RuleSet Type** (*LookUp*, in the example below):
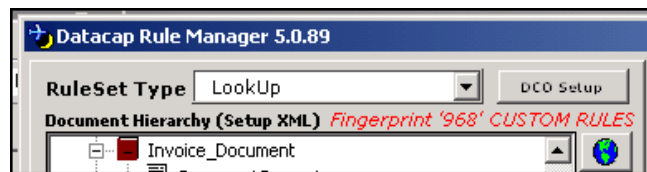
6.	Select the target object of the Document Hierarchy (*PO Number* in the example):

|	
7.	Click on the **New** icon on the right-hand edge of the **Rules & Actions** display; the RuleSet and title of its first rule will appear:

**Click here.**

## To Construct a RuleSet (continued)

Step	Action

8. Move down to the **Actions Library** display. Select the first action for the opening rule; if necessary, enter the action's parameter(s). *Do you need help with an action?* Depress the **?** icon to access Actions Help – and a full description of every action and any parameters it requires.

Click here to add an action to the rule.
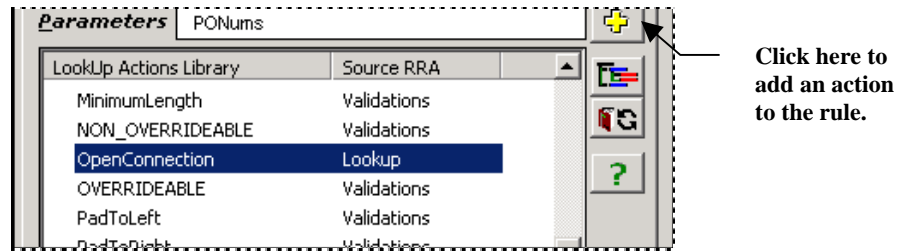
9. Click on the ✚ icon (illustrated above) to add the action to the rule.
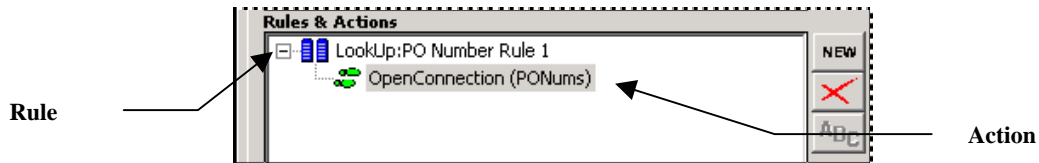
Rule

Action

10. Repeat Step #8 and Step #9 for the rule's additional actions.

These icons change the order of rules or actions.
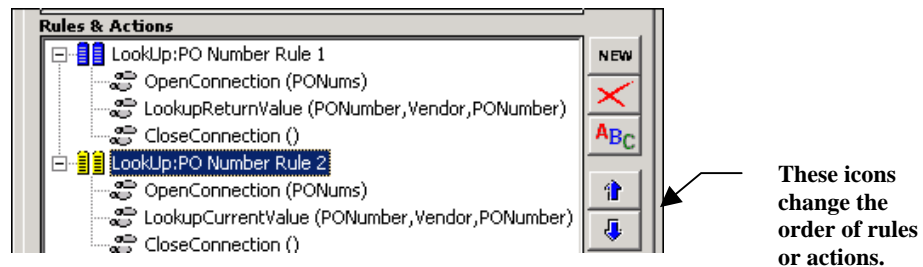
11. Click on the **New** icon to add a new rule to the RuleSet. (Use the ⬆ and ⬇ icons to move a highlighted action to a different location within a rule, or to move a rule somewhere else within the RuleSet.)

12. Use the **Testing** procedures described on the next page to evaluate the overall RuleSet – or individual rules within the RuleSet.

If you have defined a new *custom* RuleSet, be sure that the count increases in the **# Rules** column of the *Fingerprints & Zones* panel's **Fingerprint Data** display for the fingerprint you're working with.

How to Test a RuleSet

The RuleSets you define can be bound to an object at any level of the Document Hierarchy: **Batch**, **Document**, **Page** or **Field**. When you test a RuleSet, you will need a real-world sample of an object at that level.

✓ **Field** and **Page** objects are relatively easy to find: just select a fingerprint you've created from the **Fingerprint Data** section of the *Fingerprints & Zones* panel (Chapter 4). When you move to the *Rules* panel, the fingerprint – and its image –will accompany you. Below, the panel's **Image** area contains the image of the *TEK systems* invoice (just a portion of the invoice is shown.)
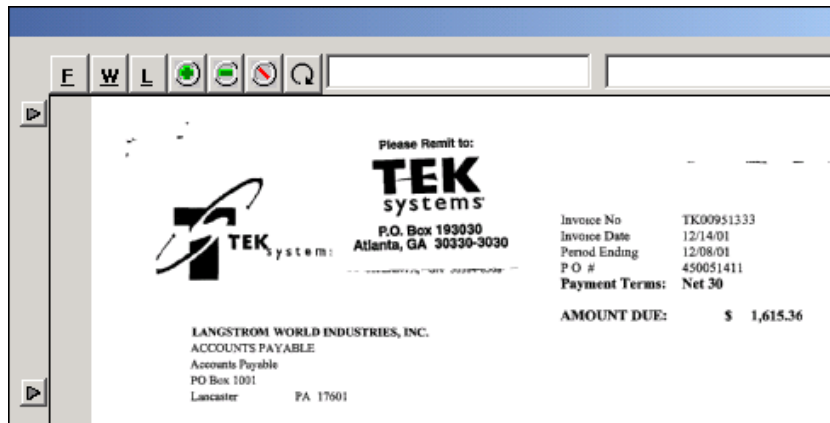
**Invoice Application Rule Manager – *Rules panel*
Image area**

✓ To test RuleSets that are bound to **Batch** and **Document** objects, you need access to a sample batch and the documents it contains:

- To generate the sample batch, set up a ***demo*** workflow that consists of a job that begins with a batch-creation task (Chapter 6). Run the task. (For practice, run the VScan task of the *Invoices* application's Demo Multi job.)

After you have defined the RuleSet, click on the **R/R** icon to open the application's **Batches** directory. Select a specific batch, and a task's Page file (**vscan.xml**, for example). You can then follow the instructions below to test the RuleSet.

1.   Select the applicable **RuleSet Type** from the drop-down list at the top of the panel.

2.   Highlight the object of the **Document Hierarchy** to which the RuleSet applies – *or* the element of the live batch.

3.   Review the rules of the RuleSet – and the rules' actions.

4.   Press the **Run All Rules at Once** icon at the right edge of the **Document Hierarchy** area – or the **Step thru and Run Each Rule** icon. (The paragraphs below explain the differences between the two.)

5.   Click on a ▶ control at the edge of the **Image** area to open some or all of the testing log.

Testing Options

Three icons on the right edge of the *Rules* panel's **Document Hierarchy** area initiate and manage a RuleSet's test:

The icon at the top runs *all* rules in the RuleSet and lists the results in the *Rules Log*. In the illustration below, clicking on the ▶ icon test the two rules of the **Validate** RuleSet applied to the *9TotalPayments* **Field** object.
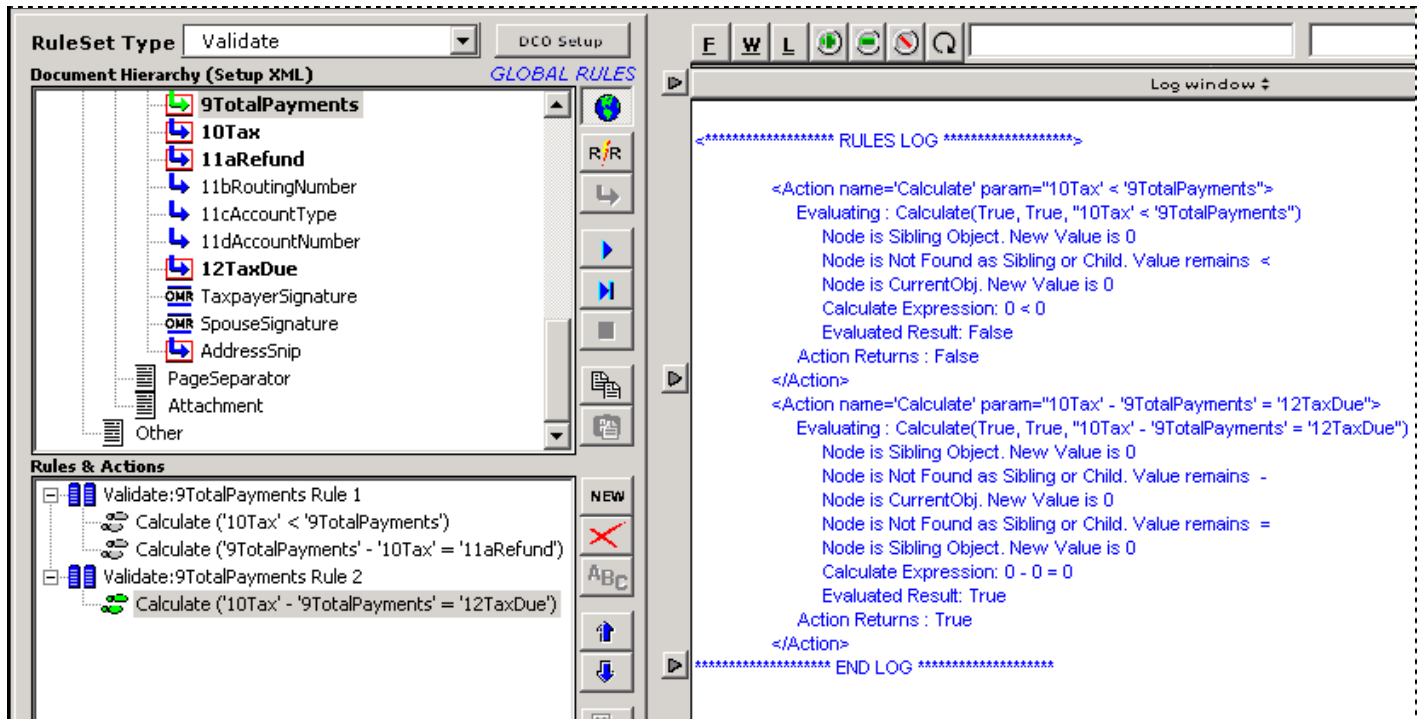
Pressing the second icon tests and reports on one rule within the RuleSet. Clicking on it again tests the next rule. When you use this icon, the third icon is active: it lets you pause the testing procedure.

Rules Log - 9TotalPayments
Validate Rule