Overview

TMS Scripter is a set of Delphi/C++Builder components that add scripting capabilities to your applications. With TMS Scripter your end-user can write his own scripts using visual tools and then execute the scripts with scripter component. Main components available are:

- **TatScripter**: Non-visual component with cross-language support. Executes scripts in both Pascal and Basic syntax.
- **TatPascalScripter**: Non-visual component that executes scripts written in Pascal syntax.
- **TatBasicScripter**: Non-visual component that executes scripts written in Basic syntax.
- **TScrMemo**: Lightweight syntax highlight memo, that can be used to edit scripts at run-time.

TatScripter, *TatPascalScripter*, *TatBasicScripter* and *TIDEScripter* (in this document, all of these componentes are just called *Scripter*) descend from **TatCustomScripter** component, which has common properties and methods for scripting execution. The scripter has the following main features:

- Run-time Pascal and Basic language interpreter;
- Access any Delphi object in script, including properties and methods;
- Supports `try..except` and `try..finally` blocks in script;
- Allows reading/writing of Delphi variables and reading constants in script;
- Allows access (reading/writing) script variables from Delphi code;
- You can build (from Delphi code) your own classes, with properties and methods, to be used in script;
- Most of Delphi system procedures (conversion, date, formatting, string-manipulation) are already included (IntToStr, FormatDateTime, Copy, Delete, etc.);
- You can save/load compiled code, so you don't need to recompile source code every time you want to execute it;
- Debugging capabilities (breakpoint, step into, run to cursor, pause, halt, and so on);
- Thread-safe;
- COM (Microsoft Common Object Model) Support;
- DLL functions calls.

In addition to the scripting engine, a full Integrated Development Environment (IDE) is to edit scripts, design forms, debugging, and many other operations with Delphi/Visual Studio look and feel for both creating and running script projects. The following features are present in the IDE:

- Full IDE environment dialog;
- Visual form designer;
- Component palette and palette buttons with Delphi 2007 style;
- Integrated syntax memo with built-in code completion and breakpoint features.

Rebuilding Packages

If for any reason you want to rebuild source code, you should do it using the "Packages Rebuild Tool" utility that is installed. There is an icon for it in the Start Menu.

Just run the utility, select the Delphi versions you want the packages to be rebuilt for, and click "Install".

If you are using Delphi XE and up, you can also rebuild the packages manually by opening the dpk/dproj file in Delphi/Rad Studio IDE.

Do NOT manually recompile packages if you use Delphi 2010 or lower. In this case always use the rebuild tool.

Use in Firemonkey applications

TMS Scripter engine can now be used in Firemonkey applications. You can execute scripts in FM applications even with forms.

But note that several VCL components don't have Firemonkey equivalents yet, especially the visual ones, so the scripter IDE (form designer, syntax memo, object inspector, etc.) are not available for Firemonkey applications.

All you need to do in your Firemonkey application is add unit `FMX.ScripterInit` to your project or the uses clause of any unit. Then you can use the scripter component normally just as you would do with in VCL (see chapter Working with Scripter).

There are several demos in TMS Scripter distributing showing how to use it with Firemonkey application, including manual debugging.

In this section:

Integrated Development Environment

The ready-to-use IDE for writing scripts and designing forms, available for VCL applications.

Language Features

Topics about supported languages, features, syntax, constructors, etc.

Pascal syntax

Basic syntax

Calling DLL functions

Working with scripter

Using scripter component in your application: how to run, debug, access Delphi objects and other tasks.

The syntax highlighting memo

Using the TAdvMemo control that provides syntax highlighting for Pascal and Basic scripts.

C++Builder Examples

C++Builder examples equivalent to every Delphi example in this guide.

Integrated Development Environment

TMS Scripter includes a ready-to-use IDE for writing scripts and designing forms. This chapter covers how to use that IDE and how to use additional components to build your own IDE. The IDE is only available for VCL applications.

Specific IDE components

TMS Scripter is a full scripting package for editing, debugging and running scripts and forms in Delphi and C++ Builder environment.

Basic concepts

TMS Scripter provides a set of components for scripting and designing. In summary, we can separate the usage in **runtime** and **design time**.

Runtime

For runtime execution, the main component to use is *TIDEScripter*. This component descends from TatScripter which descends from TatCustomScripter, so it has all functionalities of other scripter components present in previous versions and editions of TMS Scripter.

TIDEScripter is the scripter engine which runs scripts. So, basically, it holds a collection of one or more scripts that can be executed. To see all tasks that can be done with TIDEScripter component, please refer to Working with scripter topic. To see a reference about the languages supported in script, and the syntax of each language, please refer to Language Features.

Design time

TMS Scripter provides several components that will allow your end-user to write and design scripts and script projects. Basically you can provide an Integrated Development Environment for your end-user to build script projects, create forms, and write scripts. Please refer to the Integrated Development Environment chapter.

Component overview

TIDEScripter

This component is the non-visual component for running/debugging scripts. Check the topic "The TIDEScripter component" for more information.

TIDEEngine

This is the core engine component for the IDE. Check the topic "The TIDEEngine component" for more information.

TIDEDialog

This is the wrapper for the IDE window. Use this component to show the IDE. Check the topic "Running the IDE: TIDEDialog component" for more information.

Custom IDE components

- **TIDEPaletteToolbar**
- **TIDEInspector**
- **TIDEMemo**
- **TIDEFormDesignControl**
- **TIDEComponentComboBox**
- **TIDEPaletteButtons**
- **TIDEWatchListView**

The components above are used to build your own custom IDE. Check the section "Building your own IDE" for more information.

The TIDEScripter component

The TIDEScripter component is a non-visual component used to execute scripts. It descends from TatCustomScripter and is fully compatible with other scripter components like TatPascalScripter and TatBasicScripter.

The chapters "Language Features" and "Working with scripter" describes how to use the scripter component to execute scripts, access Delphi objects, integrate the scripter with your application, and also know the valid syntax and languages available.

Running the IDE: TIDEDialog component

The *TIDEDialog* component provides quick access to the ready-to-use IDE. It is a wrapper for a IDE form which already contains the memo, object inspector, among others. To invoke the IDE:

1. Drop a **TIDEScripter** component in the form.
2. Drop a **TIDEEngine** component in the form.
3. Drop a **TIDEDialog** component in the form.

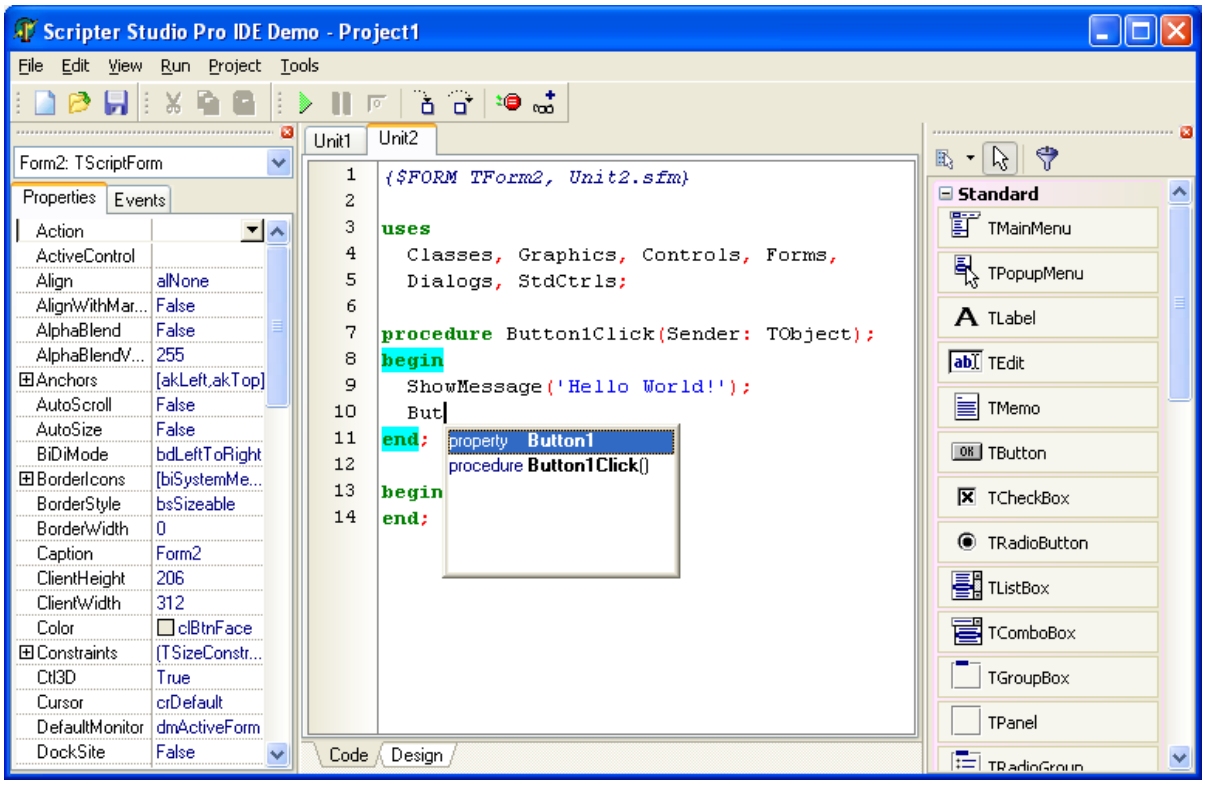
4. Link the *TIDEScripter* component to the *TIDEEngine* component through the **TIDEEngine.Scripter** property.
5. Link the *TIDEEngine* component to the *TIDEDialog* component through the **TIDEDialog.Engine** property.
6. Call **TIDEDialog.Execute** method:

```
IDEDialog1.Execute;
```

This will open the IDE window.

Overview of the IDE

This is a screenshot of the TMS Scripter IDE:



It's very similar to a Delphi or Visual Studio IDE. The object inspector is at the left, the syntax code editor memo is in center, menus and toolbars at the top, and the tool palette is at right. Please not that the tool palette is only available from Delphi 2005 and up. For previous versions of Delphi, a toolbar is available with Delphi 7 style (at the top of the IDE).

Shortcuts are available for most used actions, you can see the shortcuts available in the main menu of the IDE.

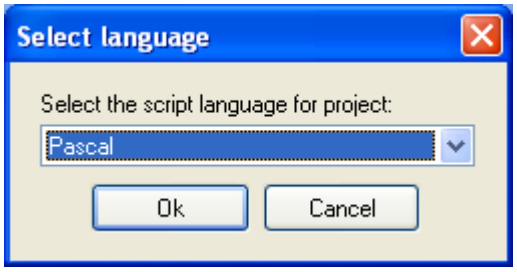
Managing projects and files

Project concept and structure
A project in TMS Scripter is a collection of scripts (files), and each file can be a unit (a single script file) or a form (a script file and a form file). A project file is just a list of the script files belonging to that project and the information of which script is the main script.

Mixing languages
You can mix scripts with different languages, i.e., in a project you can have a Basic script which creates and executes a Pascal form.

Main script
Each project has a "main" script. The main script is the script which will be executed when you press F9 or click the "Run" button (or menu option).

Creating a new project
To create a new project, choose "File | New Project" menu option. This dialog will be displayed:



Keep in mind that here you are choosing the language for the units that will be created automatically by the IDE. It's not the language of the "project" itself, since such concept doesn't exist. It's the language of the main units.

After you choose the language of the main units, the IDE will create a main unit and a form unit. This is the basic project and if you execute it right away you will have a running blank form in your screen.

NOTE
Before running this simple example, you must add the following units to your Delphi/C++Builder uses/include clause: `ap_Classes`, `ap_Controls`, `ap_Forms`, `ap_Dialogs`, `ap_Graphics` and `ap_StdCtrls`.

Creating/adding units/forms to the project
You can create or add existing units/forms to the project by choosing the "File | New unit", "File | New Form" and "File | Open (add to project)" menu options. If you are creating a new one, you will be prompted with the same dialog as above, to choose the language of the new unit. If you're adding an existing unit, then the IDE will detect the script language based on the file extension.

Editing the script in code editor

The IDE provides you with a code editor with full syntax highlight for the script language.

The main features of code editor are:

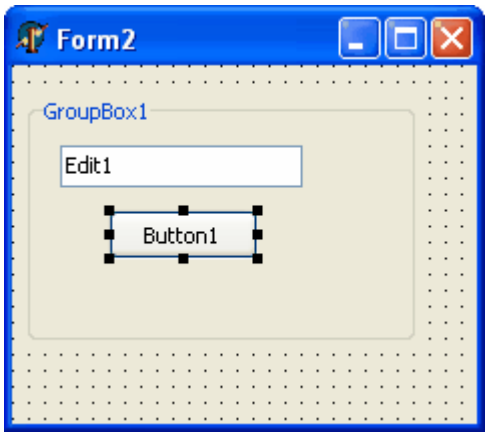
- code completion (pressing Ctrl+Space);
- syntax highlight;
- line numbering;
- clipboard operations;
- automatic identation;
- among other features.

```
1  {$FORM TForm2, Unit2.sfm}
2
3  uses
4    Classes, Graphics, Controls, Forms,
5    Dialogs, StdCtrls;
6
7  procedure Button1Click(Sender: TObject);
8  begin
9    ShowMessage('Hello World!');
10   But
11 end;
12
13 begin
14 end;
```

Designing forms

When you're dealing with units that are forms, then you have two parts: the script and the form. You can switch between script and form using F12 key or by pressing the "Code" and "Design" tabs at the bottom of the screen.

The form editor looks like the picture below:

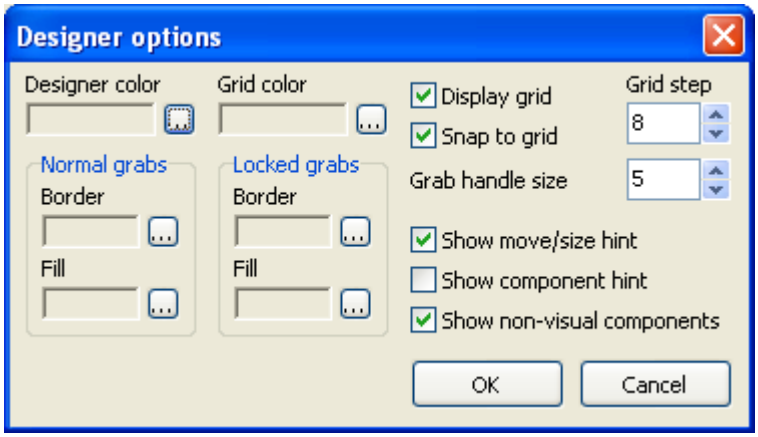


Designing forms is a similar task as designing forms in Delphi or Visual Studio. You can use the tool palette the choose a component to drop on the form, position the component using the mouse or keyboard (resize, move, etc.) and change the properties using the object inspector.

The main features of the form designer are:

- Multi-selection;
- Clipboard operations;
- Alignment palette (menu "Edit | Align");
- Bring to front / Send to back;
- Tab order dialog;
- Size dialog;
- Locking/unlocking controls;
- Grid and Snap to Grid;
- among other features.

You can change some properties of the form designer by opening the Designer Options dialog. This is available under the menu "Tools | Designer options":



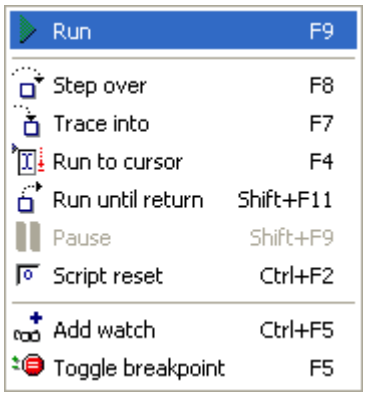
You can customize the look and feel of the designer choosing colors, hints and grid options.

Running and debugging scripts

You can run and debug scripts from the TMS Scripter IDE. The main features of the debugger are:

- Breakpoints;
- Watches;
- Step over/Trace into;
- Run to cursor/Run until return;
- Pause/Reset;
- and more...

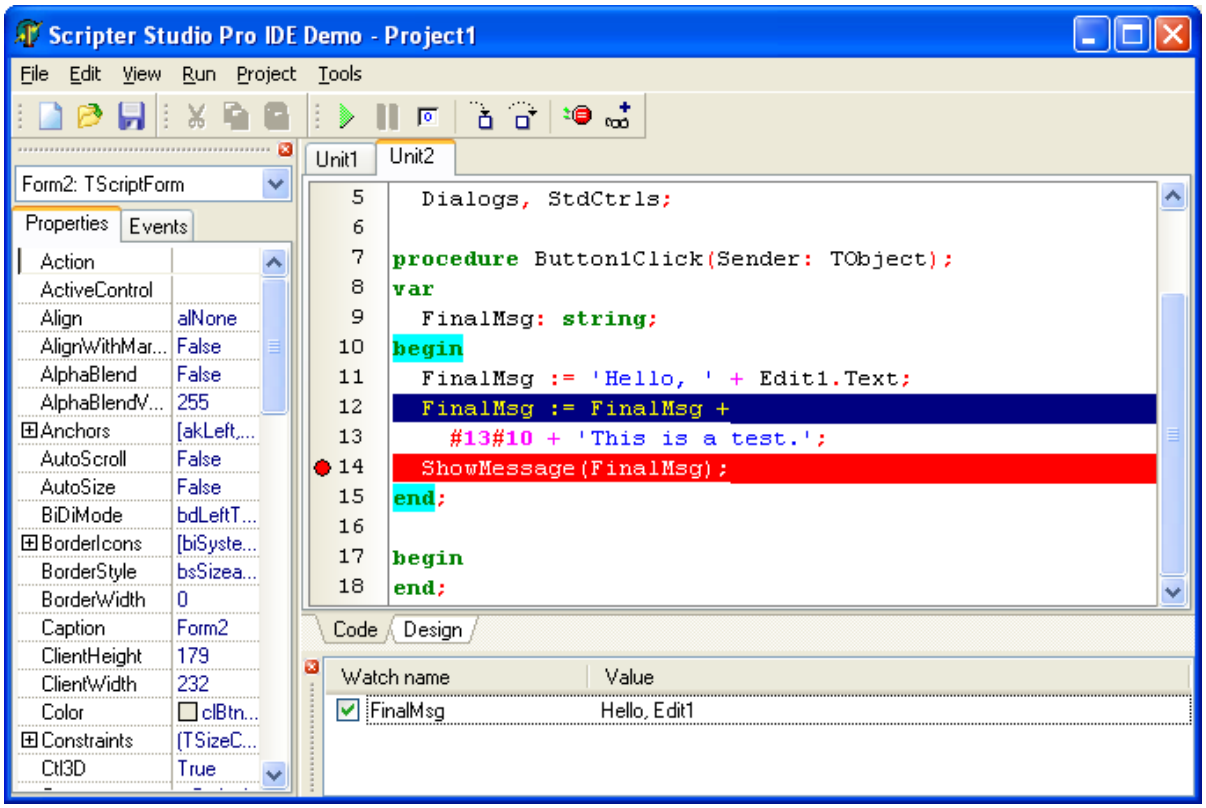
The image below shows the options under the menu item "Run":



You can use the shortcuts above or use the menu/toolbar buttons to perform running/debugging actions, like run, pause, step over, trace into, etc..

You can also toggle a breakpoint on/off by clicking on the left gutter in the code editor.

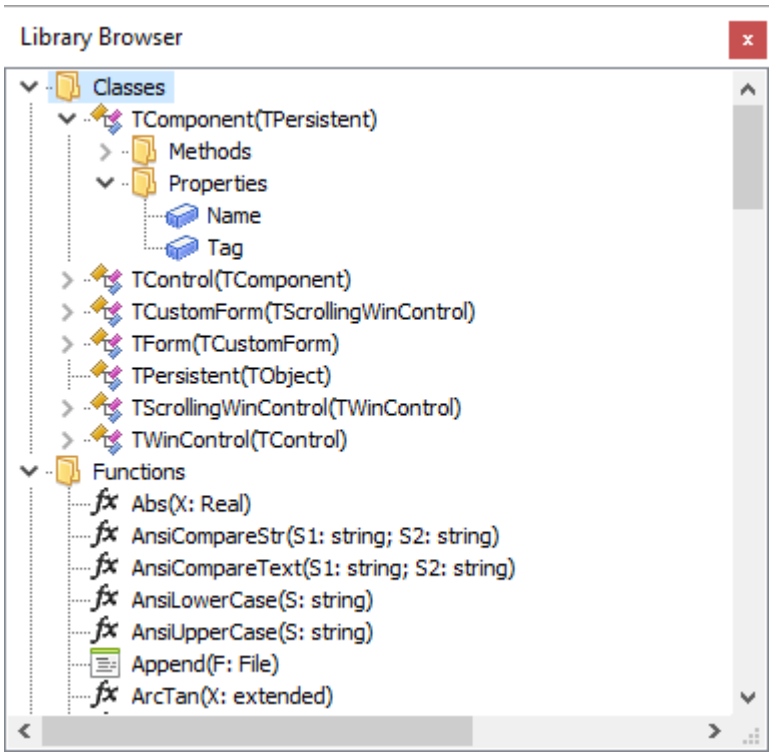
The image below shows a script being debugged in the IDE. A watch has been added in this example to inspect the value of variable "FinalMsg".



Library Browser

The IDE provides the library browser dialog accessible from menu **View > Library Browser**.

It allows your end-user too see all the classes, functions, methods, constants, procedures, etc., that are registered in the scripting system and available to be used. It works as kind of full reference/documentation for the IDE.



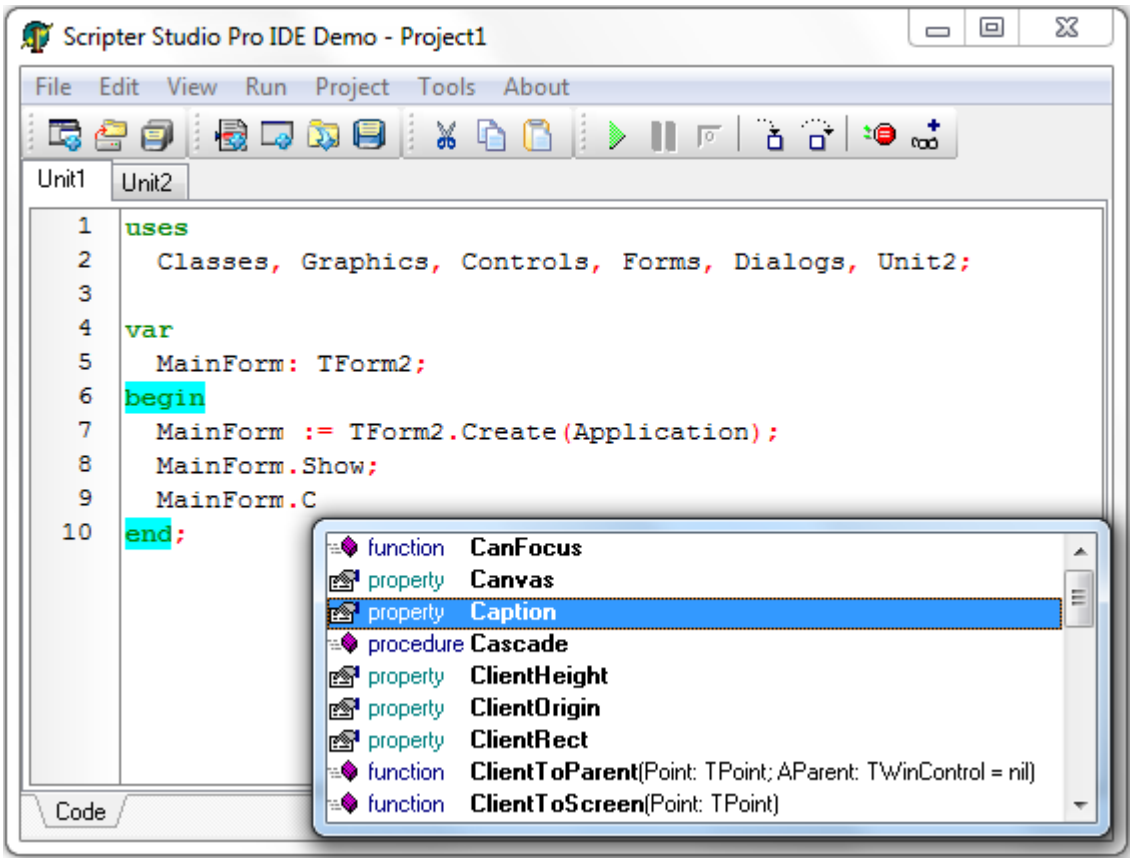
Code Insight features

TMS Scripter comes with code insight features, meaning that in the IDE editor you can have fully automatic code completion and parameter hints.

Code Completion

Code completion is a feature activated by Ctrl+<Space> or when you type an identifier name followed by a "." (dot).

A list appears at the cursor position, displaying all the available options (methods, properties, functions, variables) for the given context.



Smart code completion

When a code completion list appears, it will automatically preselect the item which was previously chosen by you. The item selected is specific to the context.

For example, you might be dealing with a *TDataset* and retrieving several field values from it, using *FieldByName* method. You follow this steps to use code completion for the first line:

1. Invoke code completion by typing Ctrl+<Space>.
2. Start type the naming of your *TDataset* object, for example, type "Dat" and then you get the "Dataset1" item selected in the completion list.
3. Press "." to insert "Dataset1." text in the editor.
4. A new code completion list will appear listing the methods and properties of the dataset.
5. You start typing "FieldB" to select the item "FieldByName" from the completion list.
6. Press "(" to insert "FieldByName(", type the name of field, type ")." to close the parameters and invoke the list again.
7. Type "AsStr" to find *AsString* property and then press ";" to finally complete the line.

Now, you want to start a second line with the same code for another field. Smart code completion will remember your last options, and this is what you would need to type:

1. Invoke code completion by typing Ctrl+<Space>.
2. "Dataset1" will come preselected in the list. Just press "." to insert text and invoke a new list for Dataset1 members.

3. "FieldByName" will come preselected in the list. Just press "(" to insert text and type the field name.
4. When close FieldByName parameters and press "." again, "AsString" will also come preselected, and you can just type ";" to finish typing.

Easy navigation
When you have the desired item selected in code completion list, you can click Enter to make the selection be typed in the text editor, so you don't have to type it.

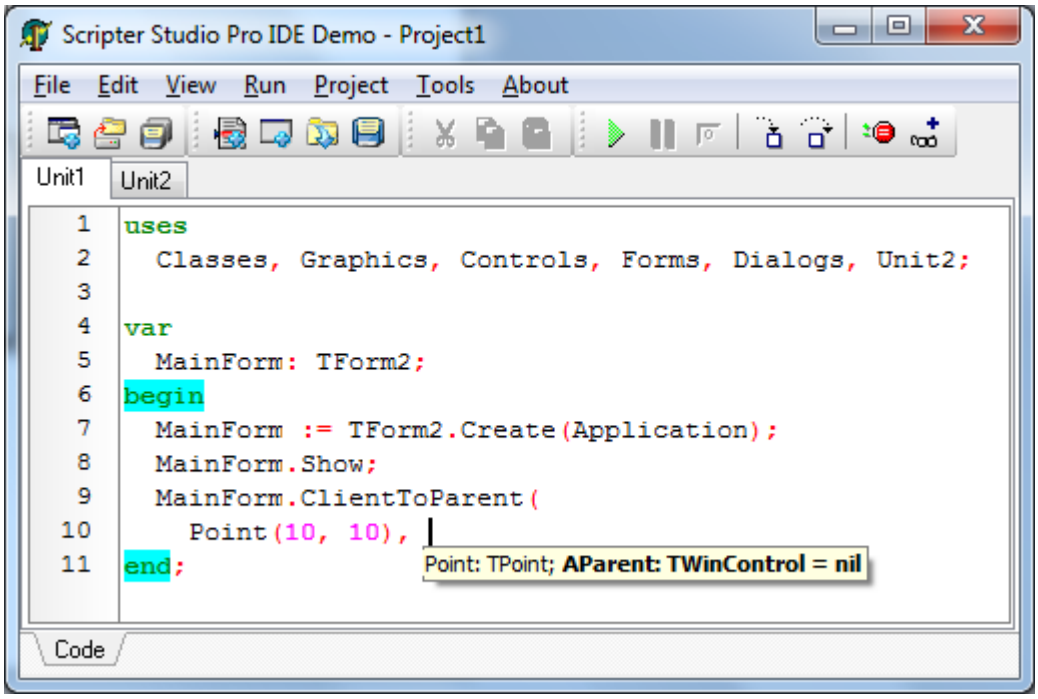
You can type other keyboard keys in order to complete the text and also insert the character. For example, if you press "." (dot), the selected item will be inserted in the text, followed by a dot, and a new completion list will be displayed for the selected context.

Parameter Hints

Parameter hints is a feature activated by Ctrl+Shift+<Space>, or when you type a method/ function name followed by "(".

This will display the list of parameters for the specified method, so you can properly type the parameters.

The current parameter being typed is highlighted in the hint.



Enabling parameter hints
Parameter hints feature is enabled by default, but you have to provide info to it. For each method, you must provide the names and types of parameters so scripter can show them. This is done with *UpdateParameterHints* method of *TatMethod* object. You would usually do this when you register a new method in scripter.

You can use *DefineMethod* method and pass it as the last parameter:

```
DefineClass(TSomeClass).DefineMethod(
  'MyMethod', 2, TkInteger, nil, MyMethodProc, true, 0,
  'Name:string;Value:integer');
```

or you can just call *UpdateParameterHints*:

```
with DefineMethod('MyMethod', 2, TkInteger, nil, MyMethodProc) do
  UpdateParameterHints('Name:string;Value:integer');
```

Parameter hint syntax
The parameter hint has a very simple and specific syntax, which is:

```
ParamName[:ParamType][=DefaultValue]
```

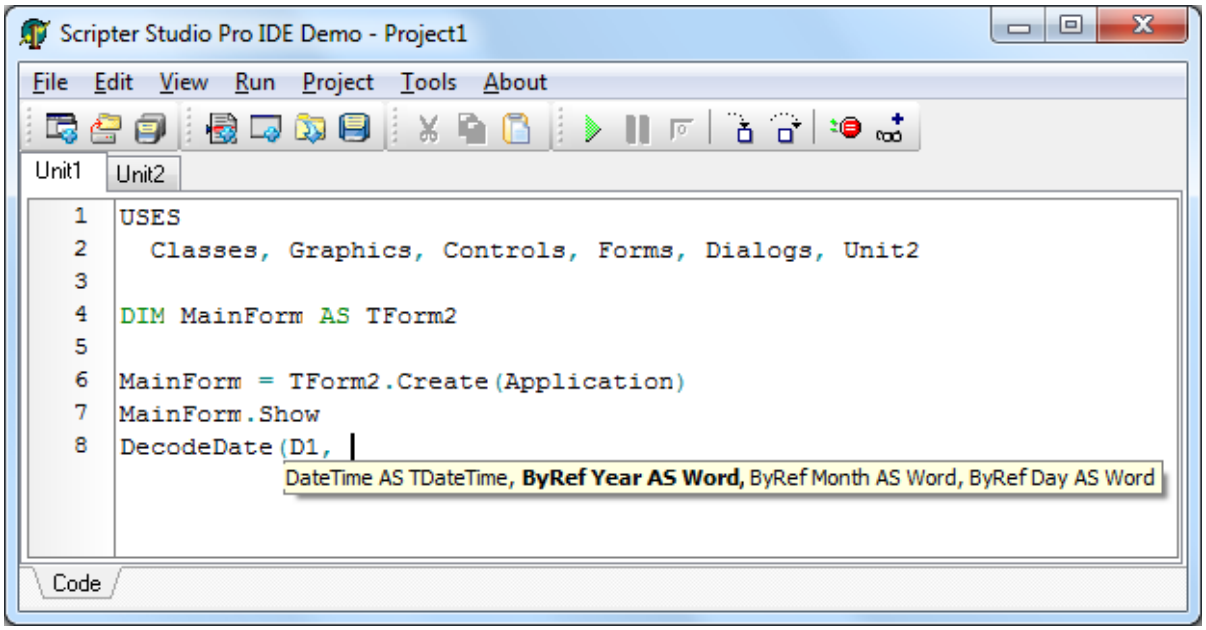
Parts between brackets are optional. If there are more than one parameter, you must separate then with semicommas (;). Some examples:

```
'Param1:String;Param2:Integer'
'Param1; Param2; Param3 = 0'
'Param1; Param2: TButton; Param3: boolean = false'
```

You can have spaces between the characters, and you must not include any parameter modifier (var, const, etc.), this will be used automatically by the scripter.

Also be aware that the parameter hints do NOT affect any information in the registered method itself. For example, if you build the hint with a different number of parameters than the specified for the method, the remaining parameters will be ignored. This is also valid for default values and param types, they are only used for hinting purposes.

Cross-language parameter hints
Scripter will automatically translate the parameter hints to the proper script language, so you don't need to register a parameter hint for each language syntax. The hint will be displayed according to the current script syntax. Even if you use script-based libraries, written in Pascal language, for example, when you call those methods from a Basic script, parameter hints will be displayed in Basic syntax.



Import tool
The scripter import tool properly generates the *DefineMethod* call including the correct parameter hint for the method being registered.

Enchanced RTTI
If you use Delphi 2010 and up, and register your classes using the new enchanced RTTI, parameter hint are retrieved automatically with the RTTI and are available in the editor with no need for extra code.

Building your own IDE

TMS Scripter provides you several components to make it easy to build your own IDE. All elements in the IDE like the code editor, object inspector, tool palette, etc., are available for stand-alone or integrated use.

And more, you don't need to use all components, you can use only three, two, or even one single component!

The "magic" here is that all components are grouped together under a *TIDEEngine*. If you want one component to work in sync with another one, just use a TIDEEngine component to group them. The following sections will provide more information about the available components and the engine.

IDE Components available

The "pieces" of the IDE available as componentes are:

TIDEMemo

Stand-alone syntax-highlighting memo for editing script source code. It is inherited from *TAdvMemo* component.

TIDEFormDesignControl

Stand-alone form designer control to allow designing forms and its child controls.

TIDEPaletteToolbar and TIDEPaletteButtons

Component palette controls. The *TIDEPaletteToolbar* is a Delphi7-like component toolbar, while *TIDEPaletteButtons* is a tool palette which looks like the Delphi 2005-2007 component palette. The TIDEPaletteButtons component is not available for Delphi 7 and previous versions.

TIDEInspector

Stand-alone object inspector for viewing/changing properties of components.

TIDEComponentComboBox

A combo box which lists all the components available in the form, and selects the control when the user chooses an item from the combo box. To be used in conjunction with *TIDEFormDesignControl*.

TIDEWatchListView

A stand-alone list view which shows the watches defined in the IDE, for debugging purposes.

The TIDEEngine component

The *TIDEEngine* component is the code behind the IDE. In other words, it has all the code which makes the IDE work and integrates all IDE components together. All IDE components provide feedback to the engine in order to synchronize other components. For example, when a component is selected in the form designer, the form designer notifies the TIDEEngine so that the engine can notify the inspector to update itself and show the properties of the selected component.

All IDE components have an *Engine* property which points to a TIDEEngine component. And the TIDEEngine component also have properties which points to the component pieces that builds an IDE. The Engine property in the components are public, and the properties in the TIDEEngine are published, so at design-time you use the TIDEEngine component properties to link everything together. The key properties of the TIDEEngine component are:

Scripter
Points to an *TIDEScripter* component. The scripter is used to hold the scripts belonging to a project, to retrieve the name of the available event handlers, to refactor, among other functions.

ComponentCombo
Points to a *TIDEComponentComboBox* component. This component is optional, but if you associated it to the engine, then the engine will update the combo automatically and no extra code is needed to make it work.

DesignControl
Points to a *TIDEFormDesignControl* component. This component is used to design the form components. The engine synchronizes this component with the inspector, the component combo and the component palette toolbar (or buttons).

Inspector
Points to a *TIDEInspector* component. This component is used to inspect the properties and events of the component(s) selected in the designer. The engine synchronizes the inspector and the designer accordingly.

Memo
Points to a *TIDEMemo* component. The engine automatically updates the memo source code with the currently selected unit in the project, and also automatically provides code completion and other features.

PaletteToolbar or **PaletteButtons**
Points to a *TIDEPaletteToolbar* or *TIDEPaletteButtons* (from Delphi 2005 or above) component. They display at runtime all the components that are available to be dropped in the form designer. Several components are already available, and you can register more components in the IDE if you want to. The engine synchronizes the component palette and the designer, so that a component selected in the toolbar can be dropped in the designer.

TabControl
Points to a regular *TTabControl* component. This component is used to display the available units in the project, and also to select the desired unit when the end-user clicks a tab.

WatchList
Points to a *TIDEWatchListView* component. This component shows all active watches in the debugging environment, and the engine automatically updates the watches while debugging.

Basic steps to build a custom IDE

The following steps are a quick start guide to build a custom IDE. With these basic steps you can get a custom IDE running with minimum functionality.

1. Drop a *TIDEEngine* component in the form.
2. Drop a *TIDEScripter* component in the form.

3. Drop a *TTabControl* component in the form.
4. Drop a *TIDEMemo* component in the TTabControl. You can set *Align* property to *alClient* to make it look better.
5. Drop a *TIDEFormDesignControl* component in the TTabControl. You can set *Align* property to *alClient* to make it look better.
6. Drop a *TIDEInspector* component in the form.
7. Drop a *TIDEPaletteToolbar* (or *TIDEPaletteButtons*) component in the form.
8. Select the TIDEEngine component and set the following properties, pointing to the respective components:
    - Scripter (link to the TIDEScripter component);
    - DesignControl (link to the TIDEFormDesignControl component);
    - Inspector (link to TIDEInspector component);
    - Memo (link to the TIDEMemo component);
    - PaletteToolbar (or PaletteButtons, linking to the TIDEPaletteToolbar or TIDEPaletteButtons component); and
    - TabControl (link to the TTabControl component).

That's it, you have the IDE running already. Of course, you need to add several actions to create unit, create form, save, load, etc., and you do that by using the TIDEDialog component programatically.

So, as an example, you can perform these extra 9 and 10 steps here to have a project running:

9. Drop a *TButton* in the form, change the *Caption* property to "Start" and in the *OnClick* event add the following code:

```
IDEEngine1.CreateMainUnits(slPascal);
```

10. Drop a *TButton* in the form, change the *Caption* property to "Run" and in the *OnClick* event add the following code:

```
IDEEngine.RunProject;
```

Using ready-to-use inspector and palette forms

As an alternative to using *TIDEInspector* and *TIDEPaletteButtons* component, you can use some already built forms which contain those components. The advantage of using the forms is that they add some extra functionality (for example, the inspector form has the tabset which displays the tabs "properties" and "events", while the palette buttons form adds filtering functionality).

TfmObjectInspector form

The form with the inspector is available in the `fObjectInspector.pas` unit. Just create an instance of the *TfmObjectInspector* form and set its *Engine* property to a valid TIDEEngine component.

TfmToolPalette form
The form with the palette buttons is available in the `fToolPalette.pas` unit. Just create an instance of the *TfmToolPalette* form and set its *Engine* property to a valid TIDEEngine component.

Using ready-to-use actions

TMS Scripter also provides a TDataModule which contains several actions that can be used in your custom IDE.

Just add the `dIDEActions.pas` unit to your project. Link your IDE form to this unit by adding it to the uses clause, create an instance of the *TdmIDEActions* data module and use the actions as you want. These actions are used by the default IDE provided by the TIDEDialog component, so you don't need to add extra code to perform basic operations like new project, open project, save file, create unit, copy to clipboard, etc..

Using TIDEEngine component programatically

The TIDEEngine component is the core component of an IDE in TMS Scripter. It provides several methods and properties to work with the IDE programatically. This topic shows some basic operations you can do with the component in either situation, and in all examples the name of the TIDEEngine component will be *IDEEngine1*.

Creating a new project

Use *NewProject* method. This will clear all existing files in the project and creating a new blank project:

```
IDEEngine1.NewProject;
```

Optionally, you can ask the engine to create the main units for a very basic project. This would be a blank form, and a separated unit (which will be the main unit) that creates an instance of the form and show it. To do that, call this method (you must pass the language used to create the units):

```
IDEEngine1.CreateMainUnits(slPascal);
```

Adding/removing units (scripts and forms) to the project

You can add new blank units and forms to the project using these methods:

```
var
  ANewUnit: TIDEProjectFile;
  ANewForm: TIDEProjectFile;
begin
  {Creates a blank unit in Basic}
  ANewUnit := IDEEngine1.NewUnit(slBasic);

  {Creates a blank form in Pascal}
  ANewForm := IDEEngine1.NewFormUnit(slPascal);
end;
```

To remove a unit from the project, just destroy the *TIDEProjectFile* object inside the collection:

```
//Remove Unit1 from project
var
  AUnit: TIDEProjectFile;
begin
  AUnit := IDEEngine1.Files.FindByUnitName('Unit1');
  if AUnit <> nil then
    AUnit.Free;
end;
```

C++Builder example

Executing a project programatically

The example below creates a new project, add a unit with a script source code, and execute it.

```
procedure TForm1.RunSampleProject;
var
  AUnit: TIDEProjectFile;
  AEngine: TIDEEngine;
  AScripter: TIDEScripter;
begin
  AEngine := TIDEEngine.Create(nil);
  AScripter := TIDEScripter.Create(nil);
  AEngine.Scripter := AScripter;
  AEngine.NewProject;
  AUnit := AEngine.NewUnit(slPascal);
  AUnit.Script.SourceCode.Text := 'ShowMessage(''Hello world!'');';
  AEngine.RunProject;
  AEngine.Free;
  AScripter.Free;
end;
```

This example does the same, but instead of executing the code, it opens the IDE with the current unit:

```
procedure TForm1.ShowIDEWithSimpleUnit;
var
  AUnit: TIDEProjectFile;
  ADialog: TIDEDialog;
  AEngine: TIDEEngine;
  AScripter: TIDEScripter;
begin
  ADialog := TIDEDialog.Create(nil);
  AEngine := TIDEEngine.Create(nil);
  AScripter := TIDEScripter.Create(nil);
  ADialog.Engine := AEngine;
  AEngine.Scripter := AScripter;
  AEngine.NewProject;
  AUnit := AEngine.NewUnit(slPascal);
  AUnit.Script.SourceCode.Text := 'ShowMessage(''Hello world!'');';
  ADialog.Execute;
  ADialog.Free;
  AEngine.Free;
  AScripter.Free;
end;
```

C++Builder example

Managing units and changing its properties

All units in a project are kept in a collection named Files (IDEEngine1.Files). Each unit (file) is a *TIDEProjectFile* object. So, for example, to iterate through all units in a project:

```
var
  AUnit: TIDEProjectFile;
begin
  for c := 0 to IDEEngine1.Files.Count - 1 do
  begin
    AUnit := IDEEngine1.Files[c];
    //Do something with AUnit
  end;
end;
```

C++Builder example

The *TIDEProjectFile* class has several properties and we list here the main ones (see full component reference for all properties):

Script
Points to the *TatScript* object inside the scripter component. When a unit is created, it also creates a TatScript object in the Scripter component. They are in sync (the file and the script). Use this to change source code, for example:

```
AUnit.Script.SourceCode.Text := 'ShowMessage(''Hello world!'')';
```

IsForm
Use this function to check if the unit has a form associated with it:

```
HasForm := AUnit.IsForm;
```

Setting the active unit in the IDE

Use *ActiveFile* property to specify which file is the one selected in the IDE:

```
AMyUnit := IDEEngine1.Files.FindByUnitName('Unit1');
IDEEngine1.ActiveFile := AMyUnit;
```

C++Builder example

Running and debugging a project

To run a project, use *RunProject* method:

```
IDEEngine1.RunProject;
```

the main unit will be executed. The main unit is the unit specified by IDEEngine1.MainUnit property. There are several methods for debugging the script, and all of them start with "Debug" in method name.

C++Builder example

Here is a list with the main methods:

```
{Pauses the script execution, for IDE debugging purposes}
procedure DebugPause;

{Perform debug step over action in the current active script}
procedure DebugStepOver(RunMode: TIDERunMode = rmMainUnit);

{Perform debug step into action in the current active script}
procedure DebugTraceInto(RunMode: TIDERunMode = rmMainUnit);

{Perform debug action "run to line": run the active script until the selected
line in memo}
procedure DebugRunToLine(RunMode: TIDERunMode = rmMainUnit);

{Perform debug action "run until return": run the active script until the routine
exists}
procedure DebugUntilReturn;

{Halts script execution}
procedure DebugReset;

{Toggle breakpoint on/off in the memo and script.
 If ALine is -1 then current line in memo will be toggled for breakpoint}
procedure DebugToggleBreak(ALine: integer = -1);
```

Methods for end-user interaction - open, save dialogs, etc.

The *TIDEEngine* component provides several high-level methods for user interaction. All of those methods begin with "Dlg" in the method name, and are used to open/save project and units, closing units, etc.. The difference from the regular methods for saving/loading (or removing units) is that they perform more higher level operations, like displaying the open/save dialogs, checking if the file was saved or not, asking for saving if the file was modified, checking if the unit name exist, etc.. These are the main methods:

```
{Creates a new project. Returns true if the new project is created sucessfully.}
function DlgNewProject: boolean;

{DlgProjectFile opens a dialog for choosing a project file and then open the
project
 file, clearing all units and loading the units belonging to that project.
 It returns true if the project is opened successfully.}
function DlgOpenProject: boolean;

{Call DlgOpenFile to open an existing file in the IDE interface.
 It will open a dialog for choosing the file, and if confirmed, the new file will
be
 added to the project and opened in the IDE.
 This method returns the newly created TIDEProjectFile which contains the opened
file.}
function DlgOpenFile: TIDEProjectFile;
```

```
{Call DlgSaveFile method to save the file specified by AFile. It automatically
 opens the "Save as..." dialog if the file was not yet saved for the first time.
 This method returns true if the file was saved succesfully.}
function DlgSaveFile(AFile: TIDEProjectFile): boolean;

{Same for DlgSaveFile method, except it automatically saves the
 currently active file in the project.
 This method returns true if the file was saved succesfully.}
function DlgSaveActiveFile: boolean;

{Open the "Save as..." dialog for saving an unit.
 It performs extra operations like checking if the unit name already exists,
 and update the script source code (directive "$FORM") with the correct file
name,
 in case the file name was changed.
 This method returns true if the file was saved succesfully.}
function DlgSaveFileAs(AFile: TIDEProjectFile): boolean;

{Same as DlgSaveFileAs, except that it automatically saves the currently active
file.
 This method returns true if the file was saved succesfully.}
function DlgSaveActiveFileAs: boolean;

{Save all files in the project at once.
 For each file, if the file is not saved, it opens a "Save as..." dialog.
 If the dialog is canceled at some point, the remaining files will not be saved.
 This function returns true if  all files were saved sucessfully.}
function DlgSaveAll: boolean;

{Closes the file specified by AFile. If the file was already saved,
 then it is not removed from project, just made invisible in the IDE.
 If the file is a new file that was not saved yet, then it's removed.
 If the file was modified, the engine asks the user if the file  must be saved or
not.
 The result of the closing operation is returned in the TIDECloseFileResult.}
function DlgCloseFile(AFile: TIDEProjectFile): TIDECloseFileResult;

{Same as DlgCloseFile, except that it automatically closes the currently active
file.}
function DlgCloseActiveFile: TIDECloseFileResult;

{Close all files in the project. It calls DlgCloseFile for each file in the
project.
 It returns true if all files were closed succesfully.}
function DlgCloseAll: boolean;

{Same as DlgRemoveFile, except it removes the currently active file.}
function DlgRemoveActiveFile: boolean;

{Remove the file specified by AFile from the project.
 If the file was not saved, it asks for saving it.
```

```
 The method returns true if the file was successfully removed.}
function DlgRemoveFile(AFile: TIDEProjectFile): boolean;

{Opens a save dialog to save the project. Returns true if the project was saved
sucessfully.}
function DlgSaveProjectAs: boolean;

{Save the current project. If the project was not saved yet, it calls
 DlgSaveProjectAs to choose the file name for the project.}
function DlgSaveProject: boolean;

{Calls the Add Watch dialog to add a new watch while debugging.
 Returns nil if no watch is added, otherwise returns the newly created
TatDebugWatch object.
 There is no need to destroy this object later, the engine takes care of it
automatically.}
function DlgAddWatch: TatDebugWatch;
```

Registering components in the IDE

This topic covers some tasks that you can do to register (or unregister) components in the IDE system.

Retrieving existing registered components

All the components already registered in the IDE system are available in the *TIDEEngine.RegisteredComps* property. It is a collection of *TIDERegisteredComp* objects which holds information for each registered component. As an example, the code below retrieves information about all registered components:

```
var
  ARegComp: TIDERegisteredComp;
  c: integer;
  ACompClass: TComponentClass;
  AUnits: string;
  APage: string;
begin
  for c := 0 to IDEEngine1.RegisteredComps.Count - 1 do
  begin
    ARegComp := IDEEngine1.RegisteredComps[c];

    {Contains the class registered, for example, TButton}
    ACompClass := ARegComp.CompClass;

    {Contains the name of units (separated by commas) that will be
     added to the script when the component is dropped in a form.
     For example, 'ComCtrls,ExtCtrls'}
    AUnits := ARegComp.Units;

    {Contains the name of the page (category, tab) where the
     component will be displayed. For example, 'Standard'}
    APage := ARegComp.Page;
  end;
end;
```

C++Builder example

Registering/Unregistering standard tabs

The *TIDEEngine* component provides some methods which register/unregister automatically some components that are commonly used. The methods available are:

```
{Register the following components in the tab "Standard":
 TMainMenu, TPopupMenu, TLabel, TEdit, TMemo, TButton, TCheckBox,
 TRadioButton, TListBox, TComboBox, TGroupBox, TPanel, TRadioGroup}
procedure RegisterStandardTab;

{Register the following components in the tab "Additional":
 TBitBtn, TSpeedButton, TMaskEdit, TImage, TShape, TBevel, TStaticText,
TSplitter}
procedure RegisterAdditionalTab;

{Register the following components in the tab "Dialogs":
 TOpenDialog, TSaveDialog, TFontDialog, TColorDialog, TPrintDialog,
TPrinterSetupDialog}
procedure RegisterDialogsTab;

{Register the following components in the tab "Win32":
 TTabControl, TPageControl, TProgressBar, TTreeView, TListView, TDateTimePicker}
procedure RegisterWin32Tab;
```

To unregister a tab from the palette, just call *UnregisterTab* method. Example:

```
IDEEngine1.UnregisterTab('Win32');
```

C++Builder example

Register new components

To register a new component in the component palette, just call *RegisterComponent* method. For example:

```
{Register the new component TMyComponent in the tab "Custom".
 When the user drops this component in the form, the units ComCtrls,
 ExtCtrls and MyComponentUnit are added to the script.
 These units must be registered in scripter in order to give access to
 them in the script environment. This registration can be done manually
 (check "Accessing Delphi objects" chapter) or using the ImportTool.}
IDEEngine1.RegisterComponent('Custom', TMyComponent, 'ComCtrls,ExtCtrls,MyCompone
ntUnit');
```

C++Builder example

To set the image used to display the component in the palette, use the *TIDEEngine.OnGetComponentImage* event.

Storing units in a database (alternative to files)

By default the IDE in TMS Scripter saves projects and units to regular files. It displays open/save dialogs and then open/save the files. But you can also change this behaviour and make the IDE save/load the files in the place you want. The most common use for it is databases. You can also replace the open/save dialogs to display your own dialogs for the end-user to choose the available files to open, or choose the file name to be saved.

To do that, you must add code to some special events of *TIDEDialog* component. This topic covers those events and how to use them.

Replacing save/load operations

You must add event handler code to two events: *OnLoadFile* and *OnSaveFile*.

Declaration:

```
type
  TIDELoadFileEvent = procedure(Sender: TObject; IDEFileType: TIDEFileType; AFile
Name: string;
    var AContent: string; AFile: TIDEProjectFile; var Handled: boolean) of
object;
  TIDESaveFileEvent = procedure(Sender: TObject; IDEFileType: TIDEFileType; AFile
Name: string;
    AContent: string; AFile: TIDEProjectFile; var Handled: boolean) of object;

property OnLoadFile: TIDELoadFileEvent read FOnLoadFile write FOnLoadFile;
property OnSaveFile: TIDESaveFileEvent read FOnSaveFile write FOnSaveFile;
```

Example:

```
procedure TForm1.IDEEngine1SaveFile(Sender: TObject;
  IDEFileType: TIDEFileType; AFileName, AContent: String;
  AFile: TIDEProjectFile; var Handled: Boolean);
begin
  {The IDEFileType parameter tells you if the file to be saved is a project file,
   a script file, or a form file.
   Valid values are: iftScript, iftProject, iftForm}


{The AFileName string contains the name of the file that was chosed in the save
dialog.
   Remember that you can replace the save dialog by your own, so the AFileName
will
   depend on the value returned by the save dialog}

  {The AContent parameter contains the file content in string format}

  {The AFile parameter points to the TIDEProjectFile object that is being saved.
   You will probably not need to use this parameter, it's passed only in case
   you need additional information for the file}

  {If you save the file yourself, you need to set Handled parameter to true.
   If Handled is false, then the IDE engine will try to save the file normally}

  {So, as an example, the code below saves the file in a table which contains the
   fields FileName and Content. Remember that AContent string might be a big
string,
   since it has all the content of the file (specially for form files)}

  MyTable.Close;
  case IDEFileType of
    iftScript: MyTable.TableName := 'CustomScripts';
    iftForm: MyTable.TableName := 'CustomForms';
    iftProject: MyTable.TableName := 'CustomProjects';
  end;
  MyTable.Open;
  if MyTable.Locate('FileName', AFileName, [loCaseInsensitive]) then
```

```
    MyTable.Edit
  else
  begin
    MyTable.Append;
    MyTable.FieldByName('FileName').AsString := AFileName;
  end;
  MyTable.FieldByName('Content').AsString := AContent;
  MyTable.Post;
  Handled := true;
end;
```

Sample code for loading the file:

```
procedure TForm1.IDEEngine1LoadFile(Sender: TObject;
  IDEFileType: TIDEFileType; AFileName: String; var AContent: String;
  AFile: TIDEProjectFile; var Handled: Boolean);
begin
  {The IDEFileType parameter tells you if the file to be loaded is a project
file,
   a script file, or a form file.
   Valid values are: iftScript, iftProject, iftForm}


{The AFileName string contains the name of the file that was chosed in the open
dialog.
   Remember that you can replace the open dialog by your own, so the AFileName
will
   depend on the value returned by the open dialog}

  {The AContent parameter contains the file content in string format.
   You must return the content in this parameter}

  {The AFile parameter points to the TIDEProjectFile object that is being loaded.
   You will probably not need to use this parameter, it's passed only in case
   you need additional information for the file}

  {If you load the file yourself, you need to set Handled parameter to true.
   If Handled is false, then the IDE engine will try to load the file normally}

  {So, as an example, the code below loads the file from a table which contains
the
   fields FileName and Content. Remember that AContent string might be a big
string,
   since it has all the content of the file (specially for form files)}

  MyTable.Close;
  case IDEFileType of
    iftScript: MyTable.TableName := 'CustomScripts';
```

```
    iftForm: MyTable.TableName := 'CustomForms';
    iftProject: MyTable.TableName := 'CustomProjects';
  end;
  MyTable.Open;
  if MyTable.Locate('FileName', AFileName, [loCaseInsensitive]) then
    AContent := MyTable.FieldByName('Content').AsString
  else
    raise Exception.Create(Format('File %s not found!', [AFileName]));
  Handled := true;
end;
```

C++Builder example

Replacing open/save dialogs

You must add event handler code to two events: *OnOpenDialog* and *OnSaveDialog*. The parameters are similar to the *OnLoadFile* and *OnSaveFile*. You must build your own windows to replace the default ones. Remember that in *FileName* parameter you can also return a path structure like '\MyFiles\MyFileName.psc'. Then you must handle this structure yourself in the OnLoadFile and OnSaveFile events.

Declaration:

```
type
  TIDEOpenDialogEvent = procedure(Sender: TObject; IDEFileType: TIDEFileType;
    var AFileName: string; var ResultOk, Handled: boolean) of object;
  TIDESaveDialogEvent = procedure(Sender: TObject; IDEFileType: TIDEFileType;
    var AFileName: string; AFile: TIDEProjectFile; var ResultOk, Handled:
boolean) of object;

property OnSaveDialog: TIDESaveDialogEvent read FOnSaveDialog write
FOnSaveDialog;
property OnOpenDialog: TIDEOpenDialogEvent read FOnOpenDialog write
FOnOpenDialog;
```

Example:

```
procedure TForm1.IDEEngine1SaveDialog(Sender: TObject;
  IDEFileType: TIDEFileType; var AFileName: String; AFile: TIDEProjectFile;
  var ResultOk, Handled: Boolean);
begin
  {The IDEFileType parameter tells you if the file to be saved is a project file,
   a script file, or a form file.
   Valid values are: iftScript, iftProject. itForm is not used for open/save
dialogs}


{The AFileName string contains the name of the file that was chosed in the save
dialog.
   You must return the name of the file to be saved here}

  {The AFile parameter points to the TIDEProjectFile object that is being saved.
   You will probably not need to use this parameter, it's passed only in case
   you need additional information for the file}

  {You must set ResultOk to true if the end-user effectively has chosen a file
name.
   If the end-user canceled the operation, set ResultOk to false
   so that save process is canceled}

  {If you display the save dialog yourself, you need to set Handled parameter to
true.
   If Handled is false, then the IDE engine will open the default save dialog}

  {So, as an example, the code below shows a very rudimentar save dialog
(InputQuery) in
   replacement to the regular save dialog. Note that this example doesn't check
if the
   file is a project or a script. You must consider this parameter in your
application}

  AResultOk := InputQuery('Save unit', 'Choose a file name', AFileName);
  Handled := true;
end;
```

Sample code for replacing open dialog:

```
procedure TForm1.IDEEngine1OpenDialog(Sender: TObject;
  IDEFileType: TIDEFileType; var AFileName: String; var ResultOk,
  Handled: Boolean);
var
  AMyOpenDlg: TMyOpenDlgForm;
begin
  {The IDEFileType parameter tells you if the file to be loaded is a project
file,
   a script file, or a form file.
   Valid values are: iftScript and iftProject. itForm is not used for open/save
dialogs}


{The AFileName string contains the name of the file that was chosed in the open
dialog.
   You must return the name of the file to be loaded here}

  {You must set ResultOk to true if the end-user effectively has chosen a file
name.
   If the end-user canceled the operation, set ResultOk to false
   so that open process is canceled}

  {If you display the open dialog yourself, you need to set Handled parameter to
true.
   If Handled is false, then the IDE engine will open the default open dialog}

  {So, as an example, the code below shows an open dialog in replacement to the
regular
   open dialog. It considers that the form TMyOpenDlgForm lists all available
units from
   a database table or something similar. Note that this example doesn't check if
the file
   is a project or a script. You must consider this parameter in your
application}

  AMyOpenDlg := TMyOpenDlgForm.Create(Application);
  AResultOk := (AMyOpenDlg.ShowModal = mrOk);
  if AResultOk then
    AFileName := AMyOpenDlg.ChosenFileName;
  AMyOpenDlg.Free;
  Handled := true;
end;
```

C++Builder example

Checking if a file name is valid

Another event that must have code attached is the *OnCheckValidFile* event. This event is called just after an open dialog is called, and before the file is opened. It is used to check if the file name provided by the open dialog is a valid file name, before effectively opening the file.

IMPORTANT

This event is also important for the engine to know if there is a form file associated with a script. When using regular files, the engine tests if the file "UnitName.XFM" exists in order to know if the script has a form or not. So, you must return the correct information for the event so everything works fine.

```
type
  TCheckValidFileEvent = procedure(Sender: TObject; AFileName: string;
    var AValid: boolean) of object;

property OnCheckValidFile: TCheckValidFileEvent read FOnCheckValidFile write FOnC
heckValidFile;


procedure TForm1.IDEEngine1CheckValidFile(Sender: TObject; IDEFileType: TIDEFileT
ype;
  AFileName: String; var AValid: Boolean);
begin
  {The IDEFileType parameter tells you if the file to be checked is a form,
script or project.
   Valid values are: iftScript, iftProject}

  {The AFileName is the file name to be tested}

  {the AValid parameter must be set to true if the file name is valid.}

  {The code below is an example of how to use this event}
  MyTable.Close;
  case IDEFileType of
    iftScript: MyTable.TableName := 'CustomScripts';
    iftForm: MyTable.TableName := 'CustomForms';
    iftProject: MyTable.TableName := 'CustomProjects';
  end;
  MyTable.Open;
  AValid := MyTable.Locate('FileName', AFileName, [loCaseInsensitive]);
end;
```

C++Builder example

Language Features

This chapter covers all the languages you can use to write scripts, and which language features you can use, language syntax, constructors, etc.

- Pascal Syntax
- Basic Syntax
- Calling DLL functions

Pascal syntax

Overview

TatPascalScripter component executes scripts written in Pascal syntax. Current Pascal syntax supports:

- `begin .. end` constructor
- `procedure` and `function` declarations
- `if .. then .. else` constructor
- `for .. to .. do .. step` constructor
- `while .. do` constructor
- `repeat .. until` constructor
- `try .. except` and `try .. finally` blocks
- `case` statements
- *array* constructors (`x := [ 1, 2, 3 ];`)
- `^`, `*`, `/`, `and`, `+`, `-`, `or`, `<>`, `>=`, `<=`, `=`, `>`, `<`, `div`, `mod`, `xor`, `shl`, `shr` operators
- access to object properties and methods (`ObjectName.SubObject.Property`)

Script structure

Script structure is made of two major blocks: (a) procedure and function declarations and (b) main block. Both are optional, but at least one should be present in script. There is no need for main block to be inside `begin..end`. It could be a single statement. Some examples:

SCRIPT 1:

```
procedure DoSomething;
begin
  CallSomething;
end;

begin
  CallSomethingElse;
end;
```

SCRIPT 2:

```
begin
  CallSomethingElse;
end;
```

SCRIPT 3:

```
function MyFunction;
begin
  result := 'Ok!';
end;
```

SCRIPT 4:

```
CallSomethingElse;
```

Like in Pascal, statements should be terminated by ";" character. `begin..end` blocks are allowed to group statements.

Identifiers

Identifier names in script (variable names, function and procedure names, etc.) follow the most common rules in Pascal: should begin with a character (a..z or A..Z), or '_', and can be followed by alphanumeric chars or '_' char. Cannot contain any other character or spaces.

Valid identifiers:

```
VarName
_Some
V1A2
_____Some____
```

Invalid identifiers:

```
2Var
My Name
Some-more
This,is,not,valid
```

Assign statements

Just like in Pascal, assign statements (assign a value or expression result to a variable or object property) are built using ":=". Examples:

```
MyVar := 2;
Button.Caption := 'This ' + 'is ok.';
```

Character strings

Strings (sequence of characters) are declared in Pascal using single quote (') character. Double quotes (") are not used. You can also use #nn to declare a character inside a string. There is no need to use '+' operator to add a character to a string. Some examples:

```
A := 'This is a text';
Str := 'Text '+'concat';
B := 'String with CR and LF char at the end'#13#10;
C := 'String with '#33#34' characters in the middle';
```

Comments

Comments can be inserted inside script. You can use **//** chars or **(* *)** or **{ }** blocks. Using **//** char the comment will finish at the end of line.

```
//This is a comment before ShowMessage
ShowMessage('Ok');

(* This is another comment *)
ShowMessage('More ok!');

{ And this is a comment
  with two lines }
ShowMessage('End of okays');
```

Variables

There is no need to declare variable types in script, even though you can put any type in it. Thus, you declare variable just using `var` directive and its name. There is no need to declare variables if scripter property *OptionExplicit* is set to false. In this case, variables are implicit declared. If you want to have more control over the script, set *OptionExplicit* property to true. This will raise a compile error if variable is used but not declared in script. Examples:

SCRIPT 1:

```
procedure Msg;
var S;
begin
  S := 'Hello world!';
  ShowMessage(S);
end;
```

SCRIPT 2:

```
var A;
begin
  A := 0;
  A := A + 1;
end;
```

SCRIPT 3:

```
var S: string;
begin
  S := 'Hello World!';
  ShowMessage(S);
end;
```

Note that if script property *OptionExplicit* is set to false, then `var` declarations are not necessary in any of scripts above.

Array type

Even though variable type is not required and in most cases it will be ignored, there are some special types that have meaning.

You can declare a variable as an array and the variable will be automatically initialized as a variant array of that type, instead of null. For example:

```
var Arr: array[0..10] of string;
begin
  Arr[1] := 'first';
end;
```

Type of array items and the low index are optional. These are also valid declarations and result in same array type:

```
var
  Arr1: array[0..10] of string;
  Arr2: array[10] of string;
  Arr3: array[0..10];
  Arr4: array[10];
```

Script arrays are always 0-based and indicating a different number for low bound will cause a compilation error:

```
var
  Arr: array[1..10] of string; // Invalid declaration
```

Indexes

Strings, arrays and array properties can be indexed using "[" and "]" chars. For example, if *Str* is a string variable, the expression *Str[3]* returns the third character in the string denoted by *Str*, while *Str[I + 1]* returns the character immediately after the one indexed by *I*. More examples:

```
MyChar := MyStr[2];
MyStr[1] := 'A';
MyArray[1,2] := 1530;
Lines.Strings[2] := 'Some text';
```

Arrays

Script support array constructors and support to variant arrays. To construct an array, use "[" and "]" chars. You can construct multi-index array nesting array constructors. You can then access arrays using indexes. If array is multi-index, separate indexes using ",".

If variable is a variant array, script automatically support indexing in that variable. A variable is a variant array is it was assigned using an array constructor, if it is a direct reference to a Delphi variable which is a variant array (see Delphi integration later) or if it was created using *VarArrayCreate* procedure.

Arrays in script are 0-based index. Some examples:

```
NewArray := [2, 4, 6, 8];
Num := NewArray[1]; // Num receives "4"
MultiArray := [ ['green','red','blue'] , ['apple','orange','lemon'] ];
Str := MultiArray[0,2]; // Str receives 'blue'
MultiArray[1,1] := 'new orange';
```

If statements

There are two forms of *if* statement: `if...then` and the `if...then...else`. Like normal Pascal, if the if expression is true, the statement (or block) is executed. If there is else part and expression is false, statement (or block) after else is execute. Examples:

```
if J <> 0 then Result := I/J;
if J = 0 then Exit else Result := I/J;
if J <> 0 then
begin
  Result := I/J;
  Count := Count + 1;
end
else
  Done := True;
```

while statements

A *while* statement is used to repeat a statement or a block, while a control condition (expression) is evaluated as true. The control condition is evaluated before the statement. Hence, if the control condition is false at first iteration, the statement sequence is never executed. The while statement executes its constituent statement (or block) repeatedly, testing expression before each iteration. As long as expression returns True, execution continues. Examples:

```
while Data[I] <> X do I := I + 1;
while I > 0 do
begin
  if Odd(I) then Z := Z * X;
  I := I div 2;
  X := Sqr(X);
end;

while not Eof(InputFile) do
begin
  Readln(InputFile, Line);
  Process(Line);
end;
```

repeat statements

The syntax of a *repeat* statement is `repeat statement1; ...; statementn; until expression` where expression returns a Boolean value. The repeat statement executes its sequence of constituent statements continually, testing expression after each iteration. When expression returns True, the repeat statement terminates. The sequence is always executed at least once because expression is not evaluated until after the first iteration. Examples:

```
repeat
  K := I mod J;
  I := J;
  J := K;
until J = 0;

repeat
  Write('Enter a value (0..9): ');
  Readln(I);
until (I >= 0) and (I <= 9);
```

for statements

Scripter support *for* statements with the following syntax:
`for counter := initialValue to finalValue do statement`.

The for statement set *counter* to *initialValue*, repeats execution of statement (or block) and increment value of counter until counter reachs *finalValue*. Examples:

SCRIPT 1:

```
for c := 1 to 10 do
  a := a + c;
```

SCRIPT 2:

```
for i := a to b do
begin
  j := i^2;
  sum := sum+j;
end;
```

case statements

Scripter support *case* statements with following syntax:

```
case selectorExpression of
  caseexpr1: statement1;
  ...
  caseexprn: statementn;
else
  elsestatement;
end
```

If *selectorExpression* matches the result of one of *caseexprn* expressions, the respective statement (or block) will be execute. Otherwise, *elsestatement* will be execute. Else part of case statement is optional. Different from Delphi, case statement in script doesn't need to use only ordinal values. You can use expressions of any type in both selector expression and case expression. Example:

```
case UpperCase(Fruit) of
  'lime': ShowMessage('green');
  'orange': ShowMessage('orange');
  'apple': ShowMessage('red');
else
  ShowMessage('black');
end;
```

function and procedure declaration

Declaration of functions and procedures are similar to Object Pascal in Delphi, with the difference you don't specify variable types. Just like OP, to return function values, use implicited declared *result* variable. Parameters by reference can also be used, with the restriction mentioned: no need to specify variable types. Some examples:

```
procedure HelloWord;
begin
  ShowMessage('Hello world!');
end;

procedure UpcaseMessage(Msg);
begin
  ShowMessage(UpperCase(Msg));
end;

function TodayAsString;
begin
  result := DateToStr(Date);
end;

function Max(A,B);
begin
  if A > B then
    result := A
  else
    result := B;
end;

procedure SwapValues(var A, B);
var Temp;
begin
  Temp := A;
  A := B;
  B := Temp;
end;
```

Basic syntax

Overview

TatBasicScripter component executes scripts written in Basic syntax. Current Basic syntax supports:

- `sub .. end` and `function .. end` declarations
- `byref` and `dim` directives
- `if .. then .. else .. end` constructor
- `for .. to .. step .. next` constructor
- `do .. while .. loop` and `do .. loop .. while` constructors
- `do .. until .. loop` and `do .. loop .. until` constructors
- `^`, `*`, `/`, `and`, `+`, `-`, `or`, `<>`, `>=`, `<=`, `=`, `>`, `<`, `div`, `mod`, `xor`, `shl`, `shr` operators
- `try .. except` and `try .. finally` blocks
- `try .. catch .. end try` and `try .. finally .. end try` blocks
- `select case .. end select` constructor
- *array* constructors (`x = [ 1, 2, 3 ]`)
- `exit` statement
- access to object properties and methods (`ObjectName.SubObject.Property`)

Script structure

Script structure is made of two major blocks: (a) function and sub declarations and (b) main block. Both are optional, but at least one should be present in script. Some examples:

SCRIPT 1:

```
SUB DoSomething
   CallSomething
END SUB

CallSomethingElse
```

SCRIPT 2:

```
CallSomethingElse
```

SCRIPT 3:

```
FUNCTION MyFunction
   MyFunction = "Ok!"
END FUNCTION
```

Like in normal Basic, statements in a single line can be separated by ":" character.

Identifiers

Identifier names in script (variable names, function and procedure names, etc.) follow the most common rules in Basic: should begin with a character (a..z or A..Z), or '_', and can be followed by alphanumeric chars or '_' char. Cannot contain any other character os spaces.

Valid identifiers:

```
VarName
_Some
V1A2
_____Some____
```

Invalid identifiers:

```
2Var
My Name
Some-more
This,is,not,valid
```

Assign statements

Assign statements (assign a value or expression result to a variable or object property) are built using "=". Examples:

```
MyVar = 2
Button.Caption = "This " + "is ok."
```

New statement

TMS Scripter provides the "new" statement for Basic syntax. Since you don't provide the method name in this statement, scripter looks for a method named "Create" in the specified class. If the method doesn't exist, the statement fails. Example:

```
MyLabel = new TLabel(Form1)
MyFont = new TFont
```

In the above examples, a method named "Create" for *TLabel* and *TFont* class will be called. The method must be registered. If the method receives parameters, you can pass the parameters in parenthesis, like the TLabel example above.

Character strings

Strings (sequence of characters) are declared in Basic using double quote (") character. Some examples:

```
A = "This is a text"
Str = "Text "+"concat"
```

Comments

Comments can be inserted inside script. You can use **'** chars or **REM**. Comment will finish at the end of line. Examples:

```
' This is a comment before ShowMessage
ShowMessage("Ok")

REM This is another comment
ShowMessage("More ok!")

' And this is a comment
' with two lines
ShowMessage("End of okays")
```

Variables

There is no need to declare variable types in script. Thus, you declare variable just using `DIM` directive and its name. There is no need to declare variables if scripter property *OptionExplicit* is set to false. In this case, variables are implicit declared. If you want to have more control over the script, set *OptionExplicit* property to true. This will raise a compile error if variable is used but not declared in script. Examples:

SCRIPT 1:

```
SUB Msg
   DIM S
   S = "Hello world!"
   ShowMessage(S)
END SUB
```

SCRIPT 2:

```
DIM A
A = 0
A = A+1
ShowMessage(A)
```

Note that if script property *OptionExplicit* is set to false, then variable declarations are not necessary in any of scripts above.

You can also declare global variables as private or public using the following syntax:

SCRIPT 3:

```
PRIVATE A
PUBLIC B
B = 0
A = B + 1
ShowMessage(A)
```

Variable declared with `DIM` statement are public by default. Private variables are not acessible from other scripts.

Variables can be default initialized with the following syntax:

```
DIM A = "Hello world"
DIM B As Integer = 5
```

Indexes

Strings, arrays and array properties can be indexed using "[" and "]" chars. For example, if *Str* is a string variable, the expression *Str[3]* returns the third character in the string denoted by *Str*, while *Str[I + 1]* returns the character immediately after the one indexed by *I*. More examples:

```
MyChar = MyStr[2]
MyStr[1] = "A"
MyArray[1,2] = 1530
Lines.Strings[2] = "Some text"
```

Arrays

Script support array constructors and support to variant arrays. To construct an array, use "[" and "]" chars. You can construct multi-index array nesting array constructors. You can then access arrays using indexes. If array is multi-index, separate indexes using ",".

If variable is a variant array, script automatically support indexing in that variable. A variable is a variant array is it was assigned using an array constructor, if it is a direct reference to a Delphi variable which is a variant array (see Delphi integration later) or if it was created using *VarArrayCreate* procedure.

Arrays in script are 0-based index. Some examples:

```
NewArray = [ 2,4,6,8 ]
Num = NewArray[1] 'Num receives "4"
MultiArray = [ ["green","red","blue"] , ["apple","orange","lemon"] ]
Str = MultiArray[0,2] 'Str receives 'blue'
MultiArray[1,1] = "new orange"
```

If statements

There are two forms of *if* statement: `if...then..end if` and the `if...then...else..end if`. Like normal Basic, if the if expression is true, the statements are executed. If there is else part and expression is false, statements after else are executed. Examples:

```
FUNCTION Test(I, J)

  IF J <> 0 THEN Result = I/J END IF
  IF J = 0 THEN Exit Function ELSE Result = I/J END IF
  IF J <> 0 THEN
    Exit Function
  ELSE
    Result = I/J
  END IF

END FUNCTION
```

If the `IF` statement is in a single line, you don't need to finish it with `END IF`:

```
IF J <> 0 THEN Result = I/J
IF J = 0 THEN Exit ELSE Result = I/J
```

while statements

A *while* statement is used to repeat statements, while a control condition (expression) is evaluated as true. The control condition is evaluated before the statements. Hence, if the control condition is false at first iteration, the statement sequence is never executed. The while statement executes its constituent statement repeatedly, testing expression before each iteration. As long as expression returns True, execution continues. Examples:

```
WHILE (Data[I] <> X) I = I + 1 END WHILE
WHILE (I > 0)
   IF Odd(I) THEN Z = Z * X END IF
   X = Sqr(X)
END WHILE

WHILE (not Eof(InputFile))
   Readln(InputFile, Line)
   Process(Line)
END WHILE
```

loop statements

Scripter support *loop* statements. The possible syntax are:

```
DO WHILE expr statements LOOP
DO UNTIL expr statements LOOP
DO statements LOOP WHILE expr
DO statement LOOP UNTIL expr
```

Statements will be execute WHILE *expr* is true, or UNTIL *expr* is true. If *expr* is before statements, then the control condition will be tested before iteration. Otherwise, control condition will be tested after iteration. Examples:

```
DO
   K = I mod J
   I = J
   J = K
LOOP UNTIL J = 0

DO UNTIL I >= 0
   Write("Enter a value (0..9): ")
   Readln(I)
LOOP

DO
   K = I mod J
   I = J
   J = K
LOOP WHILE J <> 0

DO WHILE I < 0
   Write("Enter a value (0..9): ")
   Readln(I)
LOOP
```

for statements

Scripter support *for* statements with the following syntax:
`FOR counter = initialValue TO finalValue STEP stepValue statements NEXT`.

The for statement set *counter* to *initialValue*, repeats execution of statement until "next" and increment value of counter by *stepValue*, until counter reachs *finalValue*. Step part is optional, and if omitted stepValue is considered 1. Examples:

SCRIPT 1:

```
FOR c = 1 TO 10 STEP 2
   a = a + c
NEXT
```

SCRIPT 2:

```
FOR I = a TO b
   j = i ^ 2
   sum = sum + j
NEXT
```

select case statements

Scripter support *select case* statements with following syntax:

```
SELECT CASE selectorExpression
 CASE caseexpr1
    statement1
 ...
 CASE caseexprn
    statementn
CASE ELSE
  elsestatement
END SELECT
```

If *selectorExpression* matches the result of one of *caseexprn* expressions, the respective statements will be executed. Otherwise, *elsestatement* will be executed. Else part of case statement is optional. Example:

```
SELECT CASE uppercase(Fruit)
   CASE "lime" ShowMessage("green")
   CASE "orange"
      ShowMessage("orange")
   CASE "apple" ShowMessage("red")
CASE ELSE
   ShowMessage("black")
END SELECT
```

function and sub declaration

Declaration of functions and subs are similar to Basic. In functions to return function values, use implicited declared variable which has the same name of the function, or use *Return* statement. Parameters by reference can also be used, using `BYREF` directive. Some examples:

```
SUB HelloWord
   ShowMessage("Hello world!")
END SUB

SUB UpcaseMessage(Msg)
   ShowMessage(Uppercase(Msg))
END SUB

FUNCTION TodayAsString
   TodayAsString = DateToStr(Date)
END FUNCTION

FUNCTION Max(A,B)
   IF A>B THEN
      MAX = A
   ELSE
      MAX = B
   END IF
END FUNCTION

SUB SwapValues(BYREF A, B)
   DIM TEMP
   TEMP = A
   A = B
   B = TEMP
END SUB
```

You can also declare subs and functions as private or public using the following syntax:

```
PRIVATE SUB Hello
END SUB

PUBLIC FUNCTION Hello
END FUNCTION
```

Subs and functions are public by default. Private subs and functions are not acessible from other scripts.

You can use *Return* statement to exit subs and functions. For functions, you can also return a valid value. Examples:

```
SUB UpcaseMessage(Msg)
   ShowMessage(Uppercase(Msg))
   Return
   'This line will be never reached
   ShowMessage("never displayed")
END SUB

FUNCTION TodayAsString
   Return DateToStr(Date)
END FUNCTION
```

Calling DLL functions

Overview

Scripter allows importing and calling external DLL functions, by inserting special directives on declaration of script routines, indicating library name and, optionally, the calling convention, beyond the function signature.

External libraries are loaded by Scripter on demand, before function calls, if not loaded yet (dynamically or statically). To load and unload libraries explicitly, functions *LoadLibary* and *FreeLibrary* from unit `Windows` can be used.

> **NOTE**
> To enable DLL function calls, you must set *AllowDLLCalls* property to true.

Pascal syntax

```
function functionName(arguments): resultType; [callingConvention];
  external 'libName.dll' [name ExternalFunctionName];
```

For example, the following declaration:

```
function MyFunction(arg: integer): integer; external 'CustomLib.dll';
```

imports a function called *MyFunction* from "CustomLib.dll". Default calling convention, if not specified, is *register*. Scripter also allows to declare a different calling convention (*stdcall*, *register*, *pascal*, *cdecl* or *safecall*) and to use a different name for DLL function, like the following declaration:

```
function MessageBox(hwnd: pointer; text, caption: string; msgtype: integer): inte
ger;
  stdcall; external 'User32.dll' name 'MessageBoxW';
```

that imports *MessageBoxW* function from "User32.dll" (Windows API library), named "MessageBox" to be used in script.

Declaration above can be used to functions and procedures (routines without result value).

Basic syntax

```
function lib "libName.dll" [alias ExternalFunctionName] [callingConvention]
  functionName(arguments) as resultType
```

For example, the following declaration:

```
function lib "CustomLib.dll" MyFunction(arg as integer) as integer
```

imports a function called *MyFunction* from "CustomLib.dll". Default calling convention, if not specified, is *stdcall*. Scripter also allows to declare a different calling convention (*stdcall*, *register*, *pascal*, *cdecl* or *safecall*) and to use a different name for DLL function, like the following declaration:

```
function MessageBox lib "User32.dll" alias "MessageBoxA" stdcall
  (hwnd as pointer, text as string, caption as string, msgtype as integer) as int
eger
```

that imports *MessageBoxA* function from "User32.dll" (Windows API library), named "MessageBox" to be used in script.

Declaration above can be used to functions and subs (routines without result value).

Supported types

Scripter support following basic data types on arguments and result of external functions:

- *Integer*
- *Boolean*
- *Char*
- *Extended*
- *String*
- *Pointer*
- *PChar*
- *Object*
- *Class*
- *WideChar*
- *PWideChar*
- *AnsiString*
- *Currency*
- *Variant*
- *Interface*
- *WideString*
- *Longint*
- *Cardinal*
- *Longword*
- *Single*
- *Byte*
- *Shortint*
- *Word*
- *Smallint*
- *Double*
- *Real*
- *DateTime*
- *TObject* descendants (class must be registered in scripter with *DefineClass*)

Others types (records, arrays, etc.) are not supported yet. Arguments of above types can be passed by reference, by adding `var` (Pascal) or `byref` (Basic) in param declaration of function.

Working with scripter

This chapter provides information about how to use the scripter component in your application. How to run scripts, how to integrate Delphi objects with the script, and other tasks are covered here.

Getting started

To start using scripter, you just need to know one property (*SourceCode*) and one method (*Execute*). Thus, to start using scripter to execute a simple script, drop it on a form and use the following code (in a button click event, for example):

```
Scripter.SourceCode.Text := 'ShowMessage(''Hello world!'');';
Scripter.Execute;
```

And you will get a "Hello world!" message after calling *Execute* method. That's it. From now, you can start executing scripts. To make it more interesting and easy, drop a *TAdvMemo* component in form and change code to:

```
Scripter.SourceCode := AdvMemo1.Lines;
Scripter.Execute;
```

C++Builder example

Now you can just type scripts at runtime and execute them.

From this point, any reference to scripter object (methods, properties, events) refers to *TatCustomScripter* object and can be applied to *TatPascalScripter* and *TatBasicScripter* - except when explicit indicated. The script examples will be given in Pascal syntax.

Cross-language feature: TatScripter and TIDEScripter

TMS Scripter provides a single scripter component that allows cross-language and cross-platform scripting: *TatScripter*.

Replacing old *TatPascalScripter* and *TatBasicScripter* by the new *TatScripter* is simple and straightforward. It's full compatible with the previous one, and the cross-language works smoothly. There only two things that are **not backward compatible by default**, but you can change it using properties. The differences are:

1. **OptionExplicit property now is "true" by default**
   The new TIDEScripter component requires that all variables are declared in script, different from TatPascalScripter or TatBasicScripter. So, if you want to keep the old default functionality, you must set *OptionExplicit* property to false.

2. **ShortBooleanEval property now is "true" by default**
   The new TIDEScripter component automatically uses short boolean evaluation when evaluation boolean expressions. If you want to keep the old default functionality, set *ShortBooleanEval* to false.

In addition to the changes above, the new *TatScripter* and *TIDEScripter* includes the following properties and methods:

New DefaultLanguage property

```
TScriptLanguage = (slPascal, slBasic);
property DefaultLanguage: TScriptLanguage;
```

TatScripter and descendants add the new property *DefaultLanguage* which is the default language of the scripts created in the scripter component using the old way (Scripter.Scripts.Add). Whenever a script object is created, the language of this new script will be specified by DefaultLanguage. The default value is *slPascal*. So, to emulate a TatBasicScripter component with TatScripter, just set DefaultLanguage to *slBasic*. If you want to use Pascal language, it's already set for that.

New AddScript method

```
function AddScript(ALanguage: TScriptLanguage): TatScript;
```

If you create a script using old Scripts.Add method, the language of the script being created will be specified by DefaultLanguage. But as an alternative you can just call *AddScript* method, which will create a new TatScript object in the Scripts collection, but the language of the script will be specified by *ALanguage* parameter. So, for example, to create a Pascal and a Basic script in the TatScripter component:

```
MyPascalScript := atScripter1.AddScript(slPascal);
MyBasicScript := atScripter1.AddScript(slBasic);
```

C++Builder example

Using cross-language feature

There is not much you need to do to be able to use both Basic and Pascal scripts. It's just transparent, from a Basic script you can call a Pascal procedure and vice-versa.

Common tasks

Calling a subroutine in script

If the script has one or more functions or procedures declared, than you can directly call them using *ExecuteSubRoutine* method:

Pascal script:

```
procedure DisplayHelloWorld;
begin
  ShowMessage('Hello world!');
end;

procedure DisplayByeWorld;
begin
  ShowMessage('Bye world!');
end;
```

Basic script:

```
sub DisplayHelloWorld
   ShowMessage("Hello world!")
end sub

sub DisplayByeWorld
   ShowMessage("Bye world!")
end sub
```

CODE:

```
Scripter.ExecuteSubRoutine('DisplayHelloWorld');
Scripter.ExecuteSubRoutine('DisplayByeWorld');
```

C++Builder example

This will display "Hello word!" and "Bye world!" message dialogs.

Returning a value from script

Execute method is a function, which result type is Variant. Thus, if script returns a value, then it can be read from Delphi code. For example, calling a script function "Calculate":

Pascal script:

```
function Calculate;
begin
  result := (10+6)/4;
end;
```

Basic script:

```
function Calculate
   Calculate = (10+6)/4
end function
```

CODE:

```
FunctionValue := Scripter.ExecuteSubRoutine('Calculate');
```

FunctionValue will receive a value of *4*. Note that you don't need to declare a function in order to return a value to script. Your script and code could be just:

Pascal script:

```
result := (10+6)/4;
```

CODE:

```
FunctionValue := Scripter.Execute;
```

C++Builder example

TIP
In Basic syntax, to return a function value you must use "FunctionName = Value" syntax. You can also return values in Basic without declaring a function. In this case, use the reserved word "MAIN": `MAIN = (10+6)/4`.

Passing parameters to script

Another common task is to pass values of variables to script as parameters, in order to script to use them. To do this, just use same *Execute* and *ExecuteSubRoutine* methods, with a different usage (they are overloaded methods). Note that parameters are Variant types:

Pascal script:

```
function Double(Num);
begin
  result := Num*2;
end;
```

Basic script:

```
function Double(Num)
  Double = Num*2
End function
```

CODE:

```
FunctionValue := Scripter.ExecuteSubRoutine('Double', 5);
```

FunctionValue will receive *10*. If you want to pass more than one parameter, use a Variant array or an array of const:

Pascal script:

```
function MaxValue(A,B);
begin
  if A > B then
    result := A
  else
    result := B;
end;

procedure Increase(var C; AInc);
begin
  C := C + AInc;
end;
```

CODE:

```
var
  MyVar: Variant;
begin
  FunctionValue := Scripter.ExecuteSubRoutine('MaxValue', VarArrayOf([5,8]));
  Scripter.ExecuteSubRoutine('Increase', [MyVar, 3]);
end;
```

C++Builder example

NOTE
To use parameter by reference when calling script subroutines, the variables must be declared as variants. In the example above, the Delphi variable *MyVar* must be of Variant type, otherwise the script will not update the value of MyVar.

NOTE
Script doesn't need parameter types, you just need to declare their names.

Accessing Delphi objects

Registering Delphi components

One powerful feature of scripter is to access Delphi objects. This way you can make reference to objects in script, change its properties, call its methods, and so on. However, every object must be registered in scripter so you can access it. For example, suppose you want to change caption of form (named *Form1*). If you try to execute this script:

SCRIPT:

```
Form1.Caption := 'New caption';
```

you will get "Unknown identifier or variable not declared: Form1". To make scripter work, use *AddComponent* method:

CODE:

```
Scripter.AddComponent(Form1);
```

C++Builder example

Now scripter will work and form's caption will be changed.

Access to published properties

After a component is added, you have access to its published properties. That's why the caption property of the form could be changed. Otherwise you would need to register property as well. Actually, published properties are registered, but scripter does it for you.

Class registering structure

Scripter can call methods and properties of objects. But this methods and properties must be registered in scripter. The key property for this is *TatCustomScripter.Classes* property. This property holds a collection of registered classes (*TatClass* object), which in turn holds its collection of registered properties and methods (*TatClass.Methods* and *TatClass.Properties*). Each registered method and property holds a name and the wrapper method (the Delphi written code that will handle method and property).

When you registered *Form1* component in the previous example, scripter automatically registered *TForm* class in Classes property, and registered all published properties inside it. To access methods and public properties, you must registered them, as showed in the following topics.

Calling methods

To call an object method, you need to register it. For instance, if you want to call *ShowModal* method of a newly created form named Form2. So we must add the form it to scripter using *AddComponent* method, and then register ShowModal method:

CODE:

```
procedure Tform1.ShowModalProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(TCustomForm(CurrentObject).ShowModal);
end;

procedure TForm1.PrepareScript;
begin
  Scripter.AddComponent(Form2);
  with Scripter.DefineClass(TCustomForm) do
  begin
    DefineMethod('ShowModal', 0, tkInteger, nil, ShowModalProc);
  end;
end;
```

C++Builder example

SCRIPT:

```
ShowResult := Form2.ShowModal;
```

This example has a lot of new concepts. First, component is added with *AddComponent* method. Then, *DefineClass* method was called to register TCustomForm class. *DefineClass* method automatically check if TCustomForm class is already registered or not, so you don't need to do test it.

After that, ShowModal is registered, using *DefineMethod* method. Declaration of DefineMethod is:

```
function DefineMethod(AName: string; AArgCount: integer; AResultDataType: TatType
Kind;
  AResultClass: TClass; AProc: TMachineProc; AIsClassMethod: boolean=false): TatM
ethod;
```

- **AName** receives 'ShowModal' - it's the name of method to be used in script.
- **AArgCount** receives *0* - number of input arguments for the method (none, in the case of ShowModal).
- **AResultDataType** receives *tkInteger* - it's the data type of method result. ShowModal returns an integer. If method is not a function but a procedure, AResultDataType should receive *tkNone*.
- **AResultClass** receives *nil* - if method returns an object (not this case), then AResultClass must contain the object class. For example, *TField*.
- **AProc** receives *ShowModalProc* - the method written by the user that works as ShowModal wrapper.

And, finally, there is *ShowModalProc* method. It is a method that works as the wrapper: it implements a call to ShowModal. In this case, it uses some useful methods and properties of *TatVirtualMachine* class:

- property **CurrentObject** – contains the instance of object where the method belongs to. So, it contains the instance of a specified *TCustomForm*.
- method **ReturnOutputArg** – it returns a function result to scripter. In this case, returns the value returned by *TCustomForm.ShowModal* method.

You can also register the parameter hint for the method using *UpdateParameterHints* method.

More method calling examples

In addition to previous example, this one illustrates how to register and call methods that receive parameters and return classes. In this example, *FieldByName*:

SCRIPT:

```
AField := Table1.FieldByName('CustNo');
ShowMessage(AField.DisplayLabel);
```

CODE:

```
procedure TForm1.FieldByNameProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(integer(TDataset(CurrentObject).FieldByName(GetInputArgAsStri
ng(0))));
end;

procedure TForm1.PrepareScript;
begin
  Scripter.AddComponent(Table1);
  with Scripter.DefineClass(TDataset) do
  begin
    DefineMethod('FieldByName', 1, tkClass, TField, FieldByNameProc);
  end;
end;
```

C++Builder example

Very similar to Calling methods example. Some comments:

- *FieldByName* method is registered in *TDataset* class. This allows use of FieldByName method by any TDataset descendant inside script. If FieldByName was registered in a *TTable* class, script would not recognize the method if component was a *TQuery*.
- *DefineMethod* call defined that FieldByName receives one parameter, its result type is *tkClass*, and class result is *TField*.
- Inside *FieldByNameProc*, *GetInputArgAsString* method is called in order to get input parameters. The 0 index indicates that we want the first parameter. For methods that receive 2 or more parameters, use *GetInputArg(1)*, *GetInputArg(2)*, and so on.
- To use *ReturnOutputArg* in this case, we need to cast resulting TField as *integer*. This must be done to return any object. This is because ReturnOutputArg receives a Variant type, and objects must then be cast to integer.

Accessing non-published properties

Just like methods, properties that are not published must be registered. The mechanism is very similar to method registering, with the difference we must indicate one wrapper to get property value and another one to set property value. In the following example, the "Value" property of TField class is registered:

SCRIPT:

```
AField := Table1.FieldByName('Company');
ShowMessage(AField.Value);
```

CODE:

```
procedure TForm1.GetFieldValueProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(TField(CurrentObject).Value);
end;

procedure TForm1.SetFieldValueProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    TField(CurrentObject).Value := GetInputArg(0);
end;

procedure TForm1.PrepareScript;
begin
  with Scripter.DefineClass(TField) do
  begin
    DefineProp('Value', tkVariant, GetFieldValueProc, SetFieldValueProc);
  end;
end;
```

C++Builder example

DefineProp is called passing a *tkVariant* indicating that *Value* property is Variant type, and then passing two methods *GetFieldValueProc* and *SetFieldValueProc*, which, in turn, read and write value property of a TField object. Note that in SetFieldValueProc method was used *GetInputArg* (instead of *GetInputArgAsString*). This is because GetInputArg returns a variant.

Registering indexed properties

A property can be indexed, specially when it is a *TCollection* descendant. This applies to dataset fields, grid columns, string items, and so on. So, the code below illustrates how to register indexed properties. In this example, *Strings* property of *TStrings* object is added in other to change memo content:

SCRIPT:

```
ShowMessage(Memo1.Lines.Strings[3]);
Memo1.Lines.Strings[3] := Memo1.Lines.Strings[3] + ' with more text added';
```

CODE:

```
procedure TForm1.GetStringsProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(TStrings(CurrentObject).Strings[GetArrayIndex(0)]);
end;

procedure TForm1.SetStringsProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    TStrings(CurrentObject).Strings[GetArrayIndex(0)] := GetInputArgAsString(0);
end;

procedure TForm1.PrepareScript;
begin
  Scripter.AddComponent(Memo1);
  with Scripter.DefineClass(TStrings) do
  begin
    DefineProp('Strings', tkString, GetStringsProc, SetStringsProc, nil, false,
1);
  end;
end;
```

C++Builder example

Some comments:

- *DefineProp* receives three more parameters than *DefineMethod*:
  - **nil** (class type of property. It's nil because property is string type);
  - **false** (indicating the property is not a class property); and
  - **1** (indicating that property is indexed by 1 parameter. This is the key param. For example, to register *Cells* property of the grid, this parameter should be 2, since Cells depends on Row and Col).
- In *GetStringsProc* and *SetStringsProc*, *GetArrayIndex* method is used to get the index value passed by script. The *0* param indicates that it is the first index (in the case of Strings property, the only one).
- To define an indexed property as the default property of a class, set the property *TatClass.DefaultProperty* after defining the property in Scripter. In above script example (*Memo1.Lines.Strings[i]*), if the 'Strings' is set as the default property of TStrings class, the string lines of the memo can be accessed by "Memo1.Lines[i]".

Code example (defining TStrings class with Strings default property):

```
procedure TForm1.PrepareScript;
begin
  Scripter.AddComponent(Memo1);
  with Scripter.DefineClass(TStrings) do
  begin
    DefaultProperty := DefineProp('Strings', tkString,
      GetStringsProc, SetStringsProc, nil, false, 1);
  end;
end;
```

Retrieving name of called method or property

You can register the same wrapper for more than one method or property. In this case, you might need to know which property or method was called. In this case, you can use *CurrentPropertyName* or *CurrentMethodName*. The following example illustrates this usage.

```
procedure TForm1.GenericMessageProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    if CurrentMethodName = 'MessageHello' then
      ShowMessage('Hello')
    else if CurrentMethodName = 'MessageWorld' then
      ShowMessage('World');
end;

procedure TForm1.PrepareScript;
begin
  with Scripter do
  begin
    DefineMethod('MessageHello', 1, tkNone, nil, GenericMessageProc);
    DefineMethod('MessageWorld', 1, tkNone, nil, GenericMessageProc);
  end;
end;
```

C++Builder example

Registering methods with default parameters

You can also register methods which have default parameters in scripter. To do that, you must pass the number of default parameters in the *DefineMethod* method. Then, when implementing the method wrapper, you need to check the number of parameters passed from the script, and then call the Delphi method with the correct number of parameters. For example, let's say you have the following procedure declared in Delphi:

```
function SumNumbers(A, B: double; C: double = 0; D: double = 0; E: double = 0): d
ouble;
```

To register that procedure in scripter, you use DefineMethod below. Note that the number of parameters is 5 (five), and the number of default parameters is 3 (three):

```
Scripter.DefineMethod('SumNumbers', 5 {number of total parameters},
  tkFloat, nil, SumNumbersProc, false, 3 {number of default parameters});
```

Then, in the implementation of *SumNumbersProc*, just check the number of input parameters and call the function properly:

```
procedure TForm1.SumNumbersProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
  begin
    case InputArgCount of
      2: ReturnOutputArg(SumNumbers(GetInputArgAsFloat(0), GetInputArgAsFloat(1))
);
      3: ReturnOutputArg(SumNumbers(GetInputArgAsFloat(0), GetInputArgAsFloat(1),
           GetInputArgAsFloat(2)));
      4: ReturnOutputArg(SumNumbers(GetInputArgAsFloat(0), GetInputArgAsFloat(1),
           GetInputArgAsFloat(2), GetInputArgAsFloat(3)));
      5: ReturnOutputArg(SumNumbers(GetInputArgAsFloat(0), GetInputArgAsFloat(1),
           GetInputArgAsFloat(2), GetInputArgAsFloat(3), GetInputArgAsFloat(4)));
    end;
  end;
end;
```

C++Builder example

Delphi 2010 and up - Registering using new RTTI

Taking advantage of new features related to RTTI and available from Delphi 2010, TMS Scripter implements methods to make easier the registration of classes, letting them available for use in scripts. So far we need to manually define each method/property of a class (except published properties) - at least there's a nice utility program named "ImportTool" - but from now we can register almost all members of a class automatically and with minimum effort, as seen below.

Registering a class in scripter

To register a class in Scripter, usually we use *TatCustomScripter.DefineClass* method to define the class, and helper methods to define each class member, and also we need to implement wrapper methods to make the calls for class methods, as well as getters and setters for properties. Example:

```
with Scripter.DefineClass(TMyClass) do
begin
  DefineMethod('Create', 0, tkClass, TMyClass, __TMyClassCreate, true);
  DefineMethod('MyMethod', tkNone, nil, __TMyClassMyMethod);
  (...)
  DefineProp('MyProp', tkInteger, __GetTMyClassMyProp, __SetTMyClassMyProp);
  (...)
end;
```

With new features, just call *TatCustomScripter.DefineClassByRTTI* method to register the class in scripter, and automatically all their methods and properties:

```
Scripter.DefineClassByRTTI(TMyClass);
```

This method has additional parameters that allow you to specify exactly what will be published in scripter:

```
procedure TatCustomScripter.DefineClassByRTTI(
  AClass: TClass;
  AClassName: string = '';
  AVisibilityFilter: TMemberVisibilitySet = [mvPublic, mvPublished];
  ARecursive: boolean = False);
```

- *AClass*: class to be registered in scripter;
- *AClassName*: custom name for registered class, the original class name is used if empty;
- *AVisibilityFilter*: register only members whose visibility is in this set, by default only public and published members are registered, but you can register also private and protected members;
- *ARecursive*: if true, scripter will also register other types (classes, records, enumerated types) which are used by methods and properties of class being defined. These types are recursively defined using same option specified in visibility filter.

Registering a record in scripter

Since scripter does not provide support for records yet, our recommended solution is to use wrapper classes (inherited from *TatRecordWrapper*) to emulate a record structure by implementing each record field as a class property. Example:

```
TRectWrapper = class(TatRecordWrapper)
  (...)
published
  property Left: Longint read FLeft write FLeft;
  property Top: Longint read FTop write FTop;
  property Right: Longint read FRight write FRight;
  property Bottom: Longint read FBottom write FBottom;
end;
```

While scripter still remains using classes to emulated records, is no longer necessary to implement an exclusive wrapper class for each record, because now scripter implements a generic wrapper. Thus a record (and automatically all its fields) can be registered into scripter by *TatCustomScripter.DefineRecordByRTTI* method, as in example below:

```
Scripter.DefineRecordByRTTI(TypeInfo(TRect));
```

The method only receives a pointer parameter to record type definition:

```
procedure TatCustomScripter.DefineRecordByRTTI(ATypeInfo: Pointer);
```

Records registered in scripter will work as class and therefore need to be instantiated before use in your scripts (except when methods or properties return records, in this case scripter instantiates automatically). Example:

```
var
  R: TRect;
begin
  R := TRect.Create;
  try
    R.Left := 100;
    // do something with R
  finally
    R.Free;
  end;
end;
```

What is not supported

Due to Delphi RTTI and/or scripter limitations, some features are not supported yet and you may need some workaround for certain operations.

- Scripter automatically registers only methods declared in public and published clauses of a class, since methods declared as private or protected are not accessible via RTTI. When defining a class with private and protected in visibility filter, scripter will only define fields and properties declared in these clauses.
- If a class method has overloads, scripter will register only the first method overload declared in that class.
- Methods having parameters with default values, when automatically defined in scripter, are registered with all parameters required. To define method with default parameters, use *DefineMethod* method, passing number of default arguments in *ADefArgCount* parameter, and implement the method handler (*TMachineProc*) to check the number of arguments passed to method by using *TatVirtualMachine.InputArgCount* function.
- Event handlers are not automatically defined by scripter. You must implement a *TatEventDispatcher* descendant class and use *DefineEventAdapter* method.
- Some methods having parameters of "uncommon" types (such as arrays and others) are not defined in scripter, since Delphi does not provide enough information about these methods.

Accessing Delphi functions, variables and constants

In addition to access Delphi objects, scripter allows integration with regular procedures and functions, global variables and global constants. The mechanism is very similar to accessing Delphi objects. In fact, scripter internally consider regular procedures and functions as methods, and global variables and constants are props.

Registering global constants

Registering a constant is a simple task in scripter: use *AddConstant* method to add the constant and the name it will be known in scripter:

CODE:

```
Scripter.AddConstant('MaxInt', MaxInt);
Scripter.AddConstant('Pi', pi);
Scripter.AddConstant('MyBirthday', EncodeDate(1992,5,30));
```

C++Builder example

SCRIPT:

```
ShowMessage('Max integer is ' + IntToStr(MaxInt));
ShowMessage('Value of pi is ' + FloatToStr(pi));
ShowMessage('I was born on ' + DateToStr(MyBirthday));
```

Access the constants in script just like you do in Delphi code.

Acessing global variables

To register a variable in scripter, you must use *AddVariable* method. Variables can be added in a similar way to constants: passing the variable name and the variable itself. In addition, you can also add variable in the way you do with properties: use a wrapper method to get variable value and set variable value:

CODE:

```
var
  MyVar: Variant;
  ZipCode: string[15];

procedure TForm1.GetZipCodeProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(ZipCode);
end;

procedure TForm1.SetZipCodeProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ZipCode := GetInputArgAsString(0);
end;

procedure TForm1.PrepareScript;
begin
  Scripter.AddVariable('ShortDateFormat', ShortDateFormat);
  Scripter.AddVariable('MyVar', MyVar);
  Scripter.DefineProp('ZipCode', tkString, GetZipCodeProc, SetZipCodeProc);
  Scripter.AddObject('Application', Application);
end;

procedure TForm1.Run1Click(Sender: TObject);
begin
  PrepareScript;
  MyVar := 'Old value';
  ZipCode := '987654321';
  Application.Tag := 10;
  Scripter.SourceCode := Memo1.Lines;
  Scripter.Execute;
  ShowMessage('Value of MyVar variable in Delphi is ' + VarToStr(MyVar));
  ShowMessage('Value of ZipCode variable in Delphi is ' + VarToStr(ZipCode));
end;
```

C++Builder example

SCRIPT:

```
ShowMessage('Today is ' + DateToStr(Date) + ' in old short date format');
ShortDateFormat := 'dd-mmmm-yyyy';
ShowMessage('Now today is ' + DateToStr(Date) + ' in new short date format');

ShowMessage('My var value was "' + MyVar + '"');
MyVar := 'My new var value';

ShowMessage('Old Zip code is ' + ZipCode);
ZipCode := '109020';

ShowMessage('Application tag is ' + IntToStr(Application.Tag));
```

Calling regular functions and procedures

In scripter, regular functions and procedures are added like methods. The difference is that you don't add the procedure in any class, but in scripter itself, using *DefineMethod* method. The example below illustrates how to add *QuotedStr* and *StringOfChar* methods:

SCRIPT:

```
ShowMessage(QuotedStr(StringOfChar('+', 3)));
```

CODE:

```
{ TSomeLibrary }
procedure TSomeLibrary.Init;
begin
  Scripter.DefineMethod('QuotedStr', 1, tkString, nil, QuotedStrProc);
  Scripter.DefineMethod('StringOfChar', 2, tkString, nil, StringOfCharProc);
end;

procedure TSomeLibrary.QuotedStrProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(QuotedStr(GetInputArgAsString(0)));
end;

procedure TSomeLibrary.StringOfCharProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(StringOfChar(GetInputArgAsString(0)[1],
GetInputArgAsInteger(1)));
end;

procedure TForm1.Run1Click(Sender: TObject);
begin
  Scripter.AddLibrary(TSomeLibrary);
  Scripter.SourceCode := Memo1.Lines;
  Scripter.Execute;
end;
```

C++Builder example

Since there is no big difference from defining methods, the example above introduces an extra concept: *libraries*. Note that the way methods are defined didn't change (a call to *DefineMethod*) and neither the way wrapper are implemented (*QuotedStrProc* and *StringOfCharProc*). The only difference is the way they are located: instead of TForm1 class, they belong to a different class named *TSomeLibrary*. The following topic covers the use of libraries.

Script-based libraries

Script-based library is the concept where a script can "use" other script (to call procedures/ functions, get/set global variables, etc.).

Take, for example, the following scripts:

```
// Script1
uses Script2;

begin
  Script2GlobalVar := 'Hello world!';
  ShowScript2Var;
end;
```

```
// Script2
var
  Script2GlobalVar: string;

procedure ShowScript2Var;
begin
  ShowMessage(Script2GlobalVar);
end;
```

When you execute the first script, it "uses" Script2, and then it is able to read/write global variables and call procedures from Script2.

The only issue here is that script 1 must "know" where to find Script2.

When the compiler reaches a identifier in the uses clause, for example:

```
uses Classes, Forms, Script2;
```

Then it tries to "load" the library in several ways. This is the what the compiler tries to do, in that order:

1. Tries to find a registered Delphi-based library with that name
In other words, any library that was registered with *RegisterScripterLibrary*. This is the case for the imported VCL that is provided with Scripter Studo, and also for classes imported by the import tool. This is the case for `Classes`, `Forms`, and other units.

2. Tries to find a script in Scripts collection where UnitName matches the library name
Each *TatScript* object in the *Scripter.Scripts* collection has a *UnitName* property. You can manually set that property so that the script object is treated as a library in this situations. In the example above, you could add a script object, set its *SourceCode* property to the script 2 code, and then set UnitName to 'Script2'. This way, the script1 could find the script2 as a library and use its variables and functions.

3. Tries to find a file which name matches the library name (if *LibOptions.UseScriptFiles* is set to true)
If *LibOptions.UseScriptFiles* is set to true, then the scripter tries to find the library in files. For example, if the script has `uses Script2;`, it looks for files named "Script2.psc". There are several sub-options for this search, and *LibOptions* property controls this options:

- *LibOptions.SearchPath:*
  It is a TStrings object which contains file paths where the scripter must search for the file. It accepts two constants: "$(CURDIR)" (which contains the current directory) and "$(APPDIR)" (which contains the application path).
- *LibOptions.SourceFileExt:*
  Default file extension for source files. So, for example, if SourceFileExt is ".psc", the scripter will look for a file named 'Script2.psc'. The scripter looks first for compiled files, then source files.
- *LibOptions.CompileFileExt:*
  Default file extension for compiled files. So, for example, if CompileFileExt is ".pcu", the scripter will look for a file name 'Script2.pcu'. The scripter looks first for compiled files, then source files.
- *LibOptions.UseScriptFiles:*
  Turns on/off the support for script files. If UseScriptFiles is false, then the scripter will not look for files.

Declaring forms in script

A powerful feature in scripter is the ability to declare forms and use DFM files to load form resources. With this feature you can declare a form to use it in a similar way than Delphi: you create an instance of the form and use it.

Take the folowing scripts as an example:

```
// Main script
uses
  Classes, Forms, MyFormUnit;

var
  MyForm: TMyForm;
begin
  {Create instances of the forms}
  MyForm := TMyForm.Create(Application);

  {Initialize all forms calling its Init method}
  MyForm.Init;

  {Set a form variable. Each instance has its own variables}
  MyForm.PascalFormGlobalVar := 'my instance';
```

```
  {Call a form "method". You declare the methods in the form script like
procedures}
  MyForm.ChangeButtonCaption('Another click');

  {Accessing form properties and components}
  MyForm.Edit1.Text := 'Default text';

  MyForm.Show;
end;
```

```
// My form script
{$FORM TMyForm, myform.dfm}

var
  MyFormGlobalVar: string;

procedure Button1Click(Sender: TObject);
begin
  ShowMessage('The text typed in Edit1 is ' + Edit1.Text +
    #13#10 + 'And the value of global var is ' + MyFormGlobalVar);
end;

procedure Init;
begin
  MyFormGlobalVar := 'null';
  Button1.OnClick := 'Button1Click';
end;

procedure ChangeButtonCaption(ANewCaption: string);
begin
  Button1.Caption := ANewCaption;
end;
```

The sample scripts above show how to declare forms, create instances, and use their "methods" and variables. The second script is treated as a regular script-based library, so it follows the same concept of registering and using. See the related topic for more info.

The *$FORM* directive is the main piece of code in the form script. This directive tells the compiler that the current script should be treated as a form class that can be instantiated, and all its variables and procedures should be treated as form methods and properties. The directive should be in the format *{$FORM FormClass, FormFileName}*, where *FormClass* is the name of the form class (used to create instances, take the main script example above) and *FormFileName* is the name of a DFM form which should be loaded when the form is instantiated. The DFM form file is searched the same way that other script-based libraries, in other words, it uses *LibOptions.SearchPath* to search for the file.

As an option to load DFM files, you can set the form resource through *TatScript.DesignFormResource* string property. So, in the TatScript object which holds the form script source code, you can set DesignFormResource to a string which contains the dfm-file content in *binary* format. If this property is not empty, then the compiler will ignore the DFM file declared in *$FORM* directive, and will use the DesignFormResource string to load the form.

The DFM file is a regular Delphi-DFM file format, in text format. You cannot have event handlers define in the DFM file, otherwise a error will raise when loading the DFM.

Another thing you must be aware of is that all existing components in the DFM form must be previously registered. So, for example, if the DFM file contains a TEdit and a TButton, you must add this piece of code in your application (only once) before loading the form:

```
RegisterClasses([TEdit, TButton]);
```

Otherwise, a "class not registered" error will raise when the form is instantiated.

Declaring classes in script (script-based classes)

It's now possible to declare classes in a script. With this feature you can declare a class to use it in a similar way than Delphi: you create an instance of the class and reuse it.

Declaring the class
Each class must be declared in a separated script, in other words, you need to have a script for each class you want to declare.

You turn the script into a "class script" by adding the *$CLASS* directive in the beginning of the script, followed by the class name:

```
// Turn this script into a class script for TSomeClass
{$CLASS TSomeClass}
```

Methods and properties
Each global variable declared in a class script actually becomes a property of the class. Each procedure/function in script becomes a class method.

The main routine of the script is always executed when a new instance of the class is created, so it can be used as a class initializer and you can set some properties to default value and do some proper class initialization.

```
// My class script
{$CLASS TMyClass}
uses Dialogs;

var
  MyProperty: string;

procedure SomeMethod;
begin
  ShowMessage('Hello, world!');
end;

// class initializer
begin
  MyProperty := 'Default Value';
end;
```

Using the classes
You can use the class from other scripts just by creating a new instance of the named class:

```
uses MyClassScript;
var
  MyClass: TMyClass;
begin
  MyClass := TMyClass.Create;
  MyClass.MyProperty := 'test';
  MyClass.SomeMethod;
end;
```

Implementation details
The classes declared in script are "pseudo" classes. This means that no new Delphi classes are created, so for example although in the sample above you call *TMyClass.Create*, the "TMyClass" name is just meaning to the scripting system, there is no Delphi class named TMyClass. All objects created as script-based classes are actually instances of the class *TScriptBaseObject*. You can change this behavior to make instances of another class, but this new class must inherit from TScriptBaseObject class. You define the base class for all "pseudo"-classes objects in scripter property *ScriptBaseObjectClass*.

Memory management
Although you can call *Free* method in scripts to release memory associated with instances of script-based classes, you don't need to do that.

All objects created in script that are based on script classes are eventually destroyed by the scripter component.

Limitations
Since scripter doesn't create new real Delphi classes, there are some limitations about what you can do with it. The main one is that inheritance is not supported. Since all classes in script are actually the same Delphi class, you can't create classes that inherit from any other Delphi class except the one declared in TScriptBaseObject class.

Using the Refactor

Every TatScript object in Scritper.Scripts collection has its own refactor object, accessible through *Refactor* property. The Refactor object is just a collection of methods to make it easy and safe to change source code. As long as new versions of TMS Scripter are released, some new refactoring methods might be added. For now, these are the current available methods:

```
procedure UpdateFormHeader(AFormClass, AFileName: string); virtual;
```

Create (or update) the FORM directive in the script giving the *AFormClass* (form class name) and *AFileName* (form file name). For example, the code below:

```
UpdateFormHeader('TMyForm', 'myform.dfm');
```

will create (or update) the form directive in the script as following (in this case, the example is in Basic syntax):

```
#FORM TMyForm, myform.dfm
```

```
function DeclareRoutine(ProcName: string): integer; overload;
```

Declare a routine named *ProcName* in source code, and return the line number of the declared routine. The line number returned is not the line where the routine is declared, but the line with the first statement. For example, in Pascal, it returns the line after the "begin" of the procedure.

```
function DeclareRoutine(AInfo: TatRoutineInfo): integer; overload; virtual;
```

Declare a routine in source code, and return the line number of the declared routine. The line number returned is not the line where the routine is declared, but the line with the first statement. For example, in Pascal, it returns the line after the "begin" of the procedure.

This method uses the *AInfo* property to retrieve information about the procedure to be declared. Basicaly is uses *AInfo.Name* as the name of routine to be declared, and also uses *AInfo.Variables* to declare the parameters. This is a small example:

```
AInfo.Name := 'MyRoutine';
 AInfo.IsFunction := true;
 AInfo.ResultTypeDecl := 'string';
 with AInfo.Variables.Add do
 begin
   VarName := 'MyParameter';
   Modifier := moVar;
   TypeDecl := 'integer';
 end;
 with AInfo.Variables.Add do
 begin
   VarName := 'SecondPar';
   Modifier := moNone;
   TypeDecl := 'TObject';
 end;
 ALine := Script.DeclareRoutine(AInfo);
```

The script above will declare the following routine (in Pascal):

```
function MyRoutine(var MyParameter: integer; SecondPar: TObject): string;
```

```
procedure AddUsedUnit(AUnitName: string); virtual;
```

Add the unit named *AUnitName* to the list of used units in the uses clause. If the unit is already used, nothing is done. If the uses clause is not present in the script, it is included. Example:

```
AddUsedUnit('Classes');
```

Using libraries

Libraries are just a concept of extending scripter by adding more components, methods, properties, classes to be available from script. You can do that by manually registering a single component, class or method. A library is just a way of doing that in a more organized way.

Delphi-based libraries

In script, you can use libraries for registered methods and properties. Look at the two codes below, the first one uses libraries and the second use the mechanism used in this doc until now:

CODE 1:

```
type
  TExampleLibrary = class(TatScripterLibrary)
  protected
    procedure CurrToStrProc(AMachine: TatVirtualMachine);
    procedure Init; override;
    class function LibraryName: string; override;
  end;

class function TExampleLibrary.LibraryName: string;
begin
  result := 'Example';
end;

procedure TExampleLibrary.Init;
begin
  Scripter.DefineMethod('CurrToStr', 1, tkInteger, nil, CurrToStrProc);
end;

procedure TExampleLibrary.CurrToStrProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(CurrToStr(GetInputArgAsFloat(0)));
end;

procedure TForm1.Button1Click(Sender: TObject);
begin
  Scripter.AddLibrary(TExampleLibrary);
  Scripter.SourceCode := Memo1.Lines;
  Scripter.Execute;
end;
```

CODE 2:

```
procedure TForm1.PrepareScript;
begin
  Scripter.DefineMethod('CurrToStr', 1, tkInteger, nil, CurrToStrProc);
end;

procedure TForm1.CurrToStrProc(AMachine: TatVirtualMachine);
begin
  with AMachine do
    ReturnOutputArg(CurrToStr(GetInputArgAsFloat(0)));
end;

procedure TForm1.Button1Click(Sender: TObject);
begin
  PrepareScript;
  Scripter.SourceCode := Memo1.Lines;
  Scripter.Execute;
end;
```

C++Builder example

Both codes do the same: add *CurrToStr* procedure to script. Note that scripter initialization method (*Init* in Code 1 and *PrepareScript* in Code 2) is the same in both codes. And so is *CurrToStrProc* method - no difference. The two differences between the code are:

- The class where the methods belong to. In Code 1, methods belong to a special class named *TExampleLibrary*, which descends from *TatScripterLibrary*. In Code 2, the belong to the current form (*TForm1*).
- In Code 1, scripter preparation is done adding *TExampleLibrary* class to scripter, using *AddLibrary* method. In Code 2, *PrepareScript* method is called directly.

So when to use one way or another? There is no rule - use the way you feel more confortable. Here are pros and cons of each:

Declaring wrapper and preparing methods in an existing class and object

- Pros: More convenient. Just create a method inside form, or datamodule, or any object.
- Cons: When running script, you must be sure that object is instantiated. It's more difficult to reuse code (wrapper and preparation methods).

Using libraries, declaring wrapper and preparing methods in a TatScripterLibrary class descendant

- Pros: No need to check if class is instantiated - scripter does it automatically. It is easy to port code - all methods are inside a class library, so you can add it in any scripter you want, put it in a separate unit, etc..
- Cons: Just the extra work of declaring the new class.

In addition to using AddLibrary method, you can use *RegisterScripterLibrary* procedure. For example:

```
RegisterScripterLibrary(TExampleLibrary);
RegisterScripterLibrary(TAnotherLibrary, True);
```

RegisterScripterLibrary is a global procedure that registers the library in a global list, so all scripter components are aware of that library. The second parameter of RegisterScripterLibrary indicates if the library is load automatically or not. In the example above, *TAnotherLibrary* is called with Explicit Load (True), while *TExampleLibrary* is called with Explicit Load false (default is false).

When explicit load is false (case of TExampleLibrary), every scripter that is instantiated in application will automatically load the library.

When explicit load is true (case of TAnotherLibrary), user can load the library dinamically by using uses directive:

SCRIPT:

```
uses Another;
// Do something with objects and procedures register by TatAnotherLibrary
```

Note that "Another" name is informed by *TatAnotherLibrary.LibraryName* class method.

The TatSystemLibrary library

There is a library that is added by default to all scripter components, it is the *TatSystemLibrary*. This library is declared in the `uSystemLibrary` unit. It adds commonly used routines and functions to scripter, such like *ShowMessage* and *IntToStr*.

Functions added by TatSystemLibrary

The following functions are added by the TatSystemLibrary (refer to Delphi documentation for an explanation of each function):

- Abs
- AnsiCompareStr
- AnsiCompareText
- AnsiLowerCase
- AnsiUpperCase
- Append
- ArcTan
- Assigned
- AssignFile
- Beep
- Chdir
- Chr
- CloseFile
- CompareStr
- CompareText
- Copy
- Cos
- CreateOleObject
- Date
- DateTimeToStr
- DateToStr
- DayOfWeek
- Dec
- DecodeDate
- DecodeTime
- Delete
- EncodeDate
- EncodeTime
- EOF
- Exp
- FilePos
- FileSize
- FloatToStr
- Format
- FormatDateTime
- FormatFloat
- Frac
- GetActiveOleObject
- High

- Inc
- IncMonth
- InputQuery
- Insert
- Int
- Interpret (*)
- IntToHex
- IntToStr
- IsLeapYear
- IsValidIdent
- Length
- Ln
- Low
- LowerCase
- Machine (*)
- Now
- Odd
- Ord
- Pos
- Raise
- Random
- ReadLn
- Reset
- Rewrite
- Round
- Scripter (*)
- SetOf (*)
- ShowMessage
- Sin
- Sqr
- Sqrt
- StrToDate
- StrToDateTime
- StrToFloat
- StrToInt
- StrToIntDef
- StrToTime
- Time
- TimeToStr
- Trim
- TrimLeft
- TrimRight
- Trunc
- UpperCase
- VarArrayCreate
- VarArrayHighBound
- VarArrayLowBound
- VarIsNull

- VarToStr
- Write
- WriteLn

All functions/procedures added are similar to the Delphi ones, with the exception of those marked with a "*", explained below:

```
procedure Interpret(AScript: string);
```

Executes the script source code specified by *AScript* parameter.

```
function Machine: TatVirtualMachine;
```

Returns the current virtual machine executing the script.

```
function Scripter: TatCustomScripter;
```

Returns the current scripter component.

```
function SetOf(array): integer;
```

Returns a set from the array passed. For example:

```
MyFontStyle := SetOf([fsBold, fsItalic]);
```

Removing functions from the System library

To remove a function from the system library, avoiding the end-user to use the function from the script, you just need to destroy the associated method object in the SystemLibrary class:

```
MyScripter.SystemLibrary.MethodByName('ShowMessage').Free;
```

C++Builder example

The TatVBScriptLibrary library

The *TatVBScriptLibrary* adds many VBScript-compatible functions. It's useful to give to your end-user access to the most common functions used in VBScript, making it easy to write Basic scripts for those who are already used to VBScript.

How to use TatVBScriptLibrary
Unlike to TatSystemLibrary, the TatVBScriptLibrary is not automatically added to scripter components. To add the library to scripter and thus make use of the functions, you just follow the regular steps described in the section Delphi-based libraries, which are described here again:

a. First, you must use the `uVBScriptLibrary` unit in your Delphi code:

```
uses uVBScriptLibrary;
```

b. Then you just add the library to the scripter component, from Delphi code:

```
atBasicScripter1.AddLibrary(TatVBScriptLibrary);
```

or, enable the VBScript libraries from the script code itself, by adding VBScript in the uses clause:

```
'My Basic Script
uses VBScript
```

Functions added by TatVBScriptLibrary

The following functions are added by the TatVBScriptLibrary (refer to MSDN documentation for the explanation of each function):

- Asc
- Atn
- CBool
- CByte
- CCur
- CDate
- CDbl
- Cint
- CLng
- CreateObject
- CSng
- CStr
- DatePart
- DateSerial
- DateValue
- Day
- Fix
- FormatCurrency
- FormatDateTime
- FormatNumber
- Hex
- Hour
- InputBox
- InStr
- Int
- IsArray
- IsDate
- IsEmpty
- IsNull
- IsNumeric
- LBound
- LCase
- Left
- Len
- Log
- LTrim
- Mid

- Minute
- Month
- MonthName
- MsgBox
- Replace
- Right
- Rnd
- RTrim
- Second
- Sgn
- Space
- StrComp
- String
- Timer
- TimeSerial
- TimeValue
- UBound
- UCase
- Weekday
- WeekdayName
- Year

Debugging scripts

TMS Scripter contains components and methods to allow run-time script debugging. There are two major ways to debug scripts: using scripter component methods and properties, or using debug components. Use of methods and properties gives more flexibility to programmer, and you can use them to create your own debug environment. Use of components is a more high-level debugging, where in most of case all you need to do is drop a component and call a method to start debugging.

Using methods and properties for debugging

Scripter component has several properties and methods that allows script debugging. You can use them inside Delphi code as you want. They are listed here:

```
property Running: boolean;
```

Read/write property. While script is being executed, *Running* is true. Note that the script might be paused but still running. Set Running to true is equivalent to call *Execute* method.

```
property Paused: boolean read GetPaused write SetPaused;
```

Read/write property. Use it to pause script execution, or get script back to execution.

```
procedure DebugTraceIntoLine;
```

Executes only current line. If the line contains a call to a subroutine, execution point goes to first line of subroutine. Similar to Trace Into option in Delphi.

```
procedure DebugStepOverLine;
```

Executes only current line and execution point goes to next line in code. If the current line contains a call to a subroutine, it executes the whole subroutine. Similar to Step Over option in Delphi.

```
procedure DebugRunUntilReturn;
```

Executes code until the current subroutine (procedure, function or script main block) is finished. Execution point stops one line after the line which called the subroutine.

```
procedure DebugRunToLine(ALine: integer);
```

Executes script until line specified by ALine. Similar to Run to Cursor option in Delphi.

```
function DebugToggleBreakLine(ALine: integer): pSimplifiedCode;
```

Enable/disable a breakpoint at the line specified by ALine. Execution stops at lines which have breakpoints set to true.

```
function DebugExecutionLine: integer;
```

Return the line number which will be executed.

```
procedure Halt;
```

Stops script execution, regardless the execution point.

```
property Halted: boolean read GetHalted;
```

This property is true in the short time period after a call to Halt method and before script is effectively terminated.

```
property BreakPoints: TatScriptBreakPoints read GetBreakPoints;
```

Contains a list of breakpoints set in script. You can access breakpoints using *Items[Index]* property, or using method *BreakPointByLine(ALine: integer)*. Once you access the breakpoint, you can set properties *Enabled* (which indicates if breakpoint is active or not) and *PassCount* (which indicates how many times the execution flow will pass through breakpoint until execution is stopped).

```
property OnDebugHook: TNotifyEvent read GetOnDebugHook write SetOnDebugHook;
```

During debugging (step over, step into, etc.) *OnDebugHook* event is called for every step executed.

```
property OnPauseChanged: TNotifyEvent read GetOnPauseChanged write SetOnPauseChan
ged;
property OnRunningChanged: TNotifyEvent read GetOnRunningChanged write SetOnRunni
ngChanged;
```

These events are called whenever *Paused* or *Running* properties change.

Using debug components

TMS Scripter has specific component for debugging (only for VCL applications). It is *TatScriptDebugDlg*. Its usage is very simple: drop it on a form and assign its *Scripter* property to an existing script component. Call *Execute* method and a debug dialog will appear, displaying script source code and with a toolbar at the top of window. You can then use tool buttons or shortcut keys to perform debug actions (run, pause, step over, and so on). Shortcut keys are the same used in Delphi:

- **F4**: Run to cursor
- **F5**: Toggle breakpoint
- **F7**: Step into
- **F8**: Step Over
- **F9**: Run
- **Shift+F9**: Pause
- **Ctrl+F2**: Reset
- **Shift+F11**: Run until return

Form-aware scripters - TatPascalFormScripter and TatBasicFormScripter

TatPascalFormScripter and *TatBasicFormScripter* are scripters that descend from *TatPascalScripter* and *TatBasicScripter* respectively. They have the same functionality of their ancestor, but in addition they already have registered the components that are owned by the form where scripter component belongs to.

So, if you want to use scripter to access components in the form, like buttons, edits, etc., you can use form-aware scripter without needing to register form components.

C++ Builder issues

Since TMS Scripter works with objects and classes types and typecasting, it might be some tricky issues to do some tasks in C++ Builder. This section provides useful information on how to write C++ code to perform some common tasks with TMS Scripter.

Registering a class method for an object

Let's say you have created a class named *testclass*, inherited from TObject:

[in .h file]

```
class testclass : public Tobject
{
  public:
    AnsiString name;
    int number;
    virtual __fastcall testclass();
};
```

[in .cpp file]

```
__fastcall testclass::testclass()
: Tobject()
{
  this->name = "test";
  this->number = 10;
  ShowMessage("In constructor");
}
```

If you want to add a class method "Create" which will construct a *testclass* from script and also call the *testclass()* method, you must register the class in script registration system:

```
scr->DefineMethod("create", 0, Typinfo::tkClass, __classid(testclass),
constProc, true);
```

Now you must implement *constProc* method which will implement the constructor method itself:

```
void __fastcall TForm1::constProc(TatVirtualMachine* avm)
{
  testclass *l_tc;

  l_tc = (testclass *) avm->CurrentObject;
  l_tc = new testclass;
  avm->ReturnOutputArg((long)(l_tc));
}
```

The syntax highlighting memo

Using the memo

TAdvMemo provides syntax highlighting for your Pascal or Basic scripts. To start using the memo component, drop the memo component on the form together with either an *AdvPascalMemoStyler* or an *AdvBasicMemoStyler* component. Assign the AdvPascalMemoStyler or the AdvBasicMemoStyler to the *TAdvMemo.SyntaxStyles* property. Upon assigning, the text in the memo will be rendered with the syntax highlighting chosen. You can also programmatically switch the syntax highlighting by assigning at runtime a memo styler components:

```
AvdMemo1.SyntaxStyles := AdvPascalMemoStyler;
```

To change the colors of the syntax highlighting, the various properties of the language elements are kept in the *TAdvPascalMemoStyler* or *TAdvBasicMemoStyler*. Text and background colors and font can be set for comments, numbers in the *MemoStyler* properties or for keywords, symbols or values between brackets in the *AllStyles* properties.

TAdvPascalMemoStyler or TAdvBasicMemoStyler have predefined keywords for the Pascal language or Basic language. If colors need to be changed for custom introduced keywords in the scripter, this can be easily done by adding a *TElementStyle* in the AllStyles property. Set the styletype to *stKeyword* and add the keywords to the *Keywords* stringlist.

TAdvMemo has a gutter that displays the line numbers of the source code. In addition it can also display executable code, breakpoints and active source code line. This is done automatically in the *TatScriptDebugDlg* component that uses the TAdvMemo for displaying the source code. It can be done separately through following public properties:

```
TAdvMemo.ActiveLine: Integer;
```

Sets the active source code line. This line will be displayed in active line colors.

```
TAdvMemo.BreakPoints[RowIndex]: Boolean;
```

When true, the line in source code has a breakpoint. Only executable lines can have breakpoints. It is through the scripter engine debug interfaces that you can retrieve whether a line is executable or not. A breakpoint is displayed as a red line with white font.

```
TAdvMemo.Executable[RowIndex]: Boolean;
```

When true, a marker is displayed in the gutter that the line is executable.

Using the memo with scripter is as easy as assigning the AdvMemo lines to the scripter *SourceCode* property and execute the code:

```
atPascalScripter.SourceCode.Assign(AdvMemo.Lines);
atPascalScripter.Execute;
```

C++Builder Examples

This section contains C++Builder examples equivalent to every Delphi example in this manual. Each example provides a link to the related topic, and vice versa.

Integrated Development Environment

Using TIDEEngine component programatically

Adding/removing units (scripts and forms) to the project

```
TIDEProjectFile *ANewUnit, *ANewForm;

// Creates a blank unit in Basic
ANewUnit = IDEEngine1->NewUnit(slBasic);

// Creates a blank form in Pascal
ANewForm = IDEEngine1->NewFormUnit(slPascal);

// Remove Unit1 from project
TIDEProjectFile *AUnit = IDEEngine1->Files->FindByUnitName("Unit1");
if(AUnit != NULL)
  delete AUnit;
```

Original topic

Executing a project programatically

```
void __fastcall TForm1::RunSampleProject()
{
  TIDEProjectFile *AUnit;
  TIDEEngine *AEngine;
  TIDEScripter *AScripter;

  AEngine = new TIDEEngine(NULL);
  AScripter = new TIDEScripter(NULL);

  AEngine->Scripter = AScripter;
  AEngine->NewProject();
  AUnit = AEngine->NewUnit(slPascal);
  AUnit->Script->SourceCode->Text = "ShowMessage('Hello world!');";

  AEngine->RunProject();
  delete AEngine;
  delete AScripter;
}
```

```
void __fastcall TForm1::ShowIDEWithSimpleUnit()
{
  TIDEProjectFile *AUnit;
  TIDEDialog *ADialog;
  TIDEEngine *AEngine;
  TIDEScripter *AScripter;

  ADialog = new TIDEDialog(NULL);
  AEngine = new TIDEEngine(NULL);
  AScripter = new TIDEScripter(NULL);

  ADialog->Engine = AEngine;
  AEngine->Scripter = AScripter;
  AEngine->NewProject();
  AUnit = AEngine->NewUnit(slPascal);
  AUnit->Script->SourceCode->Text = "ShowMessage('Hello world!');";
  ADialog->Execute();
  delete ADialog;
  delete AEngine;
  delete AScripter;
}
```

Original topic

Managing units and changing its properties

```
TIDEProjectFile *AUnit;

for(int c = 0; c < IDEEngine1->Files->Count; c++)
{
  AUnit = IDEEngine1->Files->Items[c];
  // Do something with AUnit
}
```

Original topic

Setting the active unit in the IDE

```
TIDEProjectFile *AMyUnit;

AMyUnit = IDEEngine1->Files->FindByUnitName("Unit1");
IDEEngine1->ActiveFile = AMyUnit;
```

Original topic

Running and debugging a project

```
IDEEngine1->RunProject();
```

Original topic

Registering components in the IDE

Retrieving existing registered components

```
TIDERegisteredComp *ARegComp;
TComponentClass ACompClass;
AnsiString AUnits, APage;

for(int c = 0; c < IDEEngine1->RegisteredComps->Count; c++)
{
  ARegComp = IDEEngine1->RegisteredComps->Items[c];

  // Contains the class registered, for example, TButton
  ACompClass = ARegComp->CompClass;

  // Contains the name of units (separated by commas) that will be
  // added to the script when the component is dropped in a form.
  // For example, 'ComCtrls,ExtCtrls'
  AUnits = ARegComp->Units;

  // Contains the name of the page (category, tab) where the component
  // will be displayed. For example, 'Standard'
  APage = ARegComp->Page;
}
```

Original topic

Registering/Unregistering standard tabs

```
IDEEngine1->UnregisterTab("Win32");
```

Original topic

Register new components

```
// Register the new component TMyComponent in the tab "Custom". When the user
// drops this component in the form, the units ComCtrls, ExtCtrls and
// MyComponentUnit are added to the script.
// These units must be registered in scripter in order to give access to them in
// the script environment.
// This registration can be done manually (check "Accessing Delphi objects"
// chapter) or using the ImportTool.
IDEEngine1->RegisterComponent("Custom", __classid(TMyComponent),
  "ComCtrls,ExtCtrls,MyComponentUnit");
```

Original topic

Storing units in a database (alternative to files)

Replacing save/load operations

```
void __fastcall TForm1::IDEEngine1SaveFile(TObject *Sender,
  TIDEFileType IDEFileType, AnsiString AFileName, AnsiString AContent,
  TIDEProjectFile *AFile, bool &Handled)
{
  // The IDEFileType parameter tells you if the file to be saved is a project
  // file, a script file, or a form file.
  // Valid values are: iftScript, iftProject, iftForm}

  // The AFileName string contains the name of the file that was chosed in the
  // save dialog.
  // Remember that you can replace the save dialog by your own, so the AFileName
  // will depend on the value returned by the save dialog

  // The AContent parameter contains the file content in string format

  // The AFile parameter points to the TIDEProjectFile object that is being
  // saved. You will probably not need to use this parameter, it's passed only
  // in case you need additional information for the file

  // If you save the file yourself, you need to set Handled parameter to true.
  // If Handled is false, then the IDE engine will try to save the file normally

  // So, as an example, the code below saves the file in a table which contains
  // the fields FileName and Content. Remember that AContent string might be a
  // big string, since it has all the content of the file (specially for form
  // files)

  MyTable->Close();
  switch(IDEFileType)
  {
    case iftScript:
      MyTable->TableName = "CustomScripts";
      break;
    case iftForm:
      MyTable->TableName = "CustomForms";
      break;
    case iftProject:
      MyTable->TableName = "CustomProjects";
      break;
  }
  MyTable->Open();
  if(MyTable->Locate("FileName",AFileName, TLocateOptions()<<loCaseInsensitive))
    MyTable->Edit();
  else
  {
    MyTable->Append();
    MyTable->FieldByName("FileName")->AsString = AFileName;
```

```
  }
  MyTable->FieldByName("Content")->AsString = AContent;
  MyTable->Post();
  Handled = true;
}

void __fastcall TForm1::IDEEngine1LoadFile(TObject *Sender,
  TIDEFileType IDEFileType, AnsiString AFileName, AnsiString &AContent,
  TIDEProjectFile *AFile, bool &Handled)
{
  // The IDEFileType parameter tells you if the file to be saved is a project
  // file, a script file, or a form file.
  // Valid values are: iftScript, iftProject, iftForm

  // The AFileName string contains the name of the file that was chosed in the
  // save dialog. Remember that you can replace the save dialog by your own, so
  // the AFileName will depend on the value returned by the save dialog

  // The AContent parameter contains the file content in string format. You must
  // return the content in this parameter

  // The AFile parameter points to the TIDEProjectFile object that is being
  // saved. You will probably not need to use this parameter, it's passed only
  // in case you need additional information for the file

  // If you save the file yourself, you need to set Handled parameter to true.
  // If Handled is false, then the IDE engine will try to save the file normally

  // So, as an example, the code below saves the file in a table which contains
  // the fields FileName and Content. Remember that AContent string might be a
  // big string, since it has all the content of the file (specially for form
  // files)
  MyTable->Close();
  switch(IDEFileType)
  {
    case iftScript:
      MyTable->TableName = "CustomScripts";
      break;
    case iftForm:
      MyTable->TableName = "CustomForms";
      break;
    case iftProject:
      MyTable->TableName = "CustomProjects";
```

```
      break;
  }
  MyTable->Open();
  if(MyTable->Locate("FileName",AFileName, TLocateOptions()<<loCaseInsensitive))
    AContent = MyTable->FieldByName("Content")->AsString;
  else
    throw Exception(Format("File %s not found!",
      OPENARRAY(TVarRec, (AFileName))));
  Handled = true;
}
```

Original topic

Replacing open/save dialogs

```
void __fastcall TForm1::IDEEngine1SaveDialog(TObject *Sender,
  TIDEFileType IDEFileType, AnsiString &AFileName,
  TIDEProjectFile *AFile, bool &ResultOk, bool &Handled)
{
  // The IDEFileType parameter tells you if the file to be saved is a project
  // file, a script file, or a form file.
  // Valid values are: iftScript, iftProject. itForm is not used for open/save
  // dialogs

  // The AFileName string contains the name of the file that was chosed in the
  // save dialog. You must return the name of the file to be saved here
  // The AFile parameter points to the TIDEProjectFile object that is being
  // saved. You will probably not need to use this parameter, it's passed only
  // in case you need additional information for the file
  // You must set ResultOk to true if the end-user effectively has chosen a file
  // name. If the end-user canceled the operation, set ResultOk to false so that
  // save process is canceled
  // If you display the save dialog yourself, you need to set Handled parameter
  // to true. If Handled is false, then the IDE engine will open the default
  // save dialog

  // So, as an example, the code below shows a very rudimentar save dialog
  // (InputQuery) in replacement to the regular save dialog. Note that this
  // example doesn't check if the file is a project or a script. You must
  // consider this parameter in your application

  ResultOk = InputQuery("Save unit", "Choose a file name", AFileName);
  Handled = true;
}

void __fastcall TForm1::IDEEngine1OpenDialog(TObject *Sender,
  TIDEFileType IDEFileType, AnsiString &AFileName, bool &ResultOk,
  bool &Handled)
{
  // The IDEFileType parameter tells you if the file to be saved is a project
  // file, a script file, or a form file.
```

```
  // Valid values are: iftScript and iftProject. itForm is not used for
  // open/save dialogs

  // The AFileName string contains the name of the file that was chosed in the
  // save dialog. You must return the name of the file to be saved here
  // You must set ResultOk to true if the end-user effectively has chosen a file
  // name. If the end-user canceled the operation, set ResultOk to false so that
  // save process is canceled
  // If you display the save dialog yourself, you need to set Handled parameter
  // to true. If Handled is false, then the IDE engine will open the default
  // save dialog

  // So, as an example, the code below shows an open dialog in replacement to
  // the regular save dialog. It considers that the form TMyOpenDlgForm lists
  // all available units from a database table or something similar. Note that
  // this example doesn't check if the file is a project or a script. You must
  // consider this parameter in your application

  TMyOpenDlgForm *AMyOpenDlg;

  AMyOpenDlg = new TMyOpenDlgForm(Application);
  ResultOk = AMyOpenDlg->ShowModal() == mrOk;
  if(ResultOk)
    AFileName = AMyOpenDlg->ChosenFileName;
  delete AMyOpenDlg;
  Handled = true;
}
```

Original topic

Checking if a file name is valid

```
void __fastcall TForm1::IDEEngine1CheckValidFile(TObject *Sender,
  TIDEFileType IDEFileType, AnsiString AFileName, bool &AValid)
{
  // The IDEFileType parameter tells you if the file to be checked is a form,
  // script or project.
  // Valid values are: iftScript, iftProject

  // The AFileName is the file name to be tested

  // The AValid parameter must be set to true if the file name is valid.

  // The code below is an example of how to use this event

  MyTable->Close();
  switch(IDEFileType)
  {
    case iftScript:
      MyTable->TableName = "CustomScripts";
      break;
```

```
    case iftForm:
      MyTable->TableName = "CustomForms";
      break;
    case iftProject:
      MyTable->TableName = "CustomProjects";
      break;
  }
  MyTable->Open();
  AValid = MyTable->Locate("FileName", AFileName,
    TLocateOptions() << loCaseInsensitive);
}
```

Original topic

Working with scripter

Getting started

```
Scripter->SourceCode->Text = "ShowMessage('Hello world!');";
Scripter->Execute();

Scripter->SourceCode->Text = AdvMemo1->Lines->Text;
Scripter->Execute();
```

Original topic

Cross-language feature: TatScripter and TIDEScripter

```
TatScript *MyPascalScript, *MyBasicScript;

MyPascalScript = atScripter1->AddScript(slPascal);
MyBasicScript = atScripter1->AddScript(slBasic);
```

Original topic

Common tasks

Calling a subroutine in script

```
Scripter->ExecuteSubroutine("DisplayHelloWorld");
Scripter->ExecuteSubroutine("DisplayByeWorld");
```

Original topic

Returning a value from script

```
Variant FunctionValue;

FunctionValue = Scripter->ExecuteSubroutine("Calculate");

FunctionValue = Scripter->Execute();
```

Original topic

Passing parameters to script

```
Variant FunctionValue;

FunctionValue = Scripter->ExecuteSubroutine("Double", 5);

Variant MyVar;

FunctionValue = Scripter->ExecuteSubroutine("MaxValue",
  VarArrayOf(OPENARRAY(Variant, (5, 8))));
Scripter->ExecuteSubroutine("Increase", VarArrayOf(
  OPENARRAY(Variant, (MyVar, 3))));
```

Original topic

Accessing Delphi objects

Registering Delphi components

```
Scripter->AddComponent(Form1);
```

Original topic

Calling methods

```
void __fastcall TForm1::ShowModalProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(((TCustomForm*)
  AMachine->CurrentObject)->ShowModal());
}

void __fastcall TForm1::PrepareScript()
{
  Scripter->AddComponent(Form2);
  TatClass *customFormClass = Scripter->DefineClass(__classid(TCustomForm));
  customFormClass->DefineMethod("ShowModal", 0, Atscript::tkInteger, NULL,
    ShowModalProc);
}
```

Original topic

More method calling examples

```
void __fastcall TForm1::FieldByNameProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg((long) ((TDataSet*)
  AMachine->CurrentObject)->FieldByName(AMachine->GetInputArgAsString(0)));
}

void __fastcall TForm1::PrepareScript()
{
  Scripter->AddComponent(Table1);
  TatClass *datasetClass = Scripter->DefineClass(__classid(TDataSet));
  datasetClass->DefineMethod("FieldByName", 1, Atscript::tkClass,
    __classid(TField), FieldByNameProc);
}
```

Original topic

Acessing non-published properties

```
void __fastcall TForm1::GetFieldValueProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(((TField*) AMachine->CurrentObject)->Value);
}

void __fastcall TForm1::SetFieldValueProc(TatVirtualMachine *AMachine)
{
  ((TField*) AMachine->CurrentObject)->Value = AMachine->GetInputArg(0);
}

void __fastcall TForm1::PrepareScript()
{
  TatClass *fieldClass = Scripter->DefineClass(__classid(TField));
  fieldClass->DefineProp("Value", Atscript::tkVariant, GetFieldValueProc,
    SetFieldValueProc);
}
```

Original topic

Registering indexed properties

```
void __fastcall TForm1::GetStringsProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(((TStrings*)
  AMachine->CurrentObject)->Strings[AMachine->GetArrayIndex(0)]);
}

void __fastcall TForm1::SetStringsProc(TatVirtualMachine *AMachine)
{
  ((TStrings*) AMachine->CurrentObject)->Strings[AMachine->GetArrayIndex(0)] =
  AMachine->GetInputArgAsString(0);
}

void __fastcall TForm1::PrepareScript()
{
  Scripter->AddComponent(Memo1);
  TatClass *stringsClass = Scripter->DefineClass(__classid(TStrings));
  stringsClass->DefineProp("Strings", Atscript::tkString, GetStringsProc,
    SetStringsProc, NULL, false, 1);
}
```

Original topic

Retrieving name of called method or property

```
void __fastcall TForm1::GenericMessageProc(TatVirtualMachine *AMachine)
{
  if(AMachine->CurrentMethodName() == "MessageHello")
    ShowMessage("Hello");
  else if(AMachine->CurrentMethodName() == "MessageWorld")
    ShowMessage("World");
}

void __fastcall TForm1::PrepareScript()
{
  Scripter->DefineMethod("MessageHello", 1, tkNone, NULL, GenericMessageProc);
  Scripter->DefineMethod("MessageWorld", 1, tkNone, NULL, GenericMessageProc);
}
```

Original topic

Registering methods with default parameters

```
float SumNumbers(float a, float b, float c = 0, float d = 0, float e = 0);

Scripter->DefineMethod("SumNumbers",
  5 /*number of total parameters*/,
  Atscript::tkFloat, NULL, SumNumbersProc, false,
  3 /*number of default parameters*/);

void __fastcall TForm1::SumNumbersProc(TatVirtualMachine *AMachine)
{
  switch(AMachine->InputArgCount())
  {
    case 2:
      AMachine->ReturnOutputArg(SumNumbers(AMachine->GetInputArgAsFloat(0),
        AMachine->GetInputArgAsFloat(1)));
      break;
    case 3:
      AMachine->ReturnOutputArg(SumNumbers(AMachine->GetInputArgAsFloat(0),
        AMachine->GetInputArgAsFloat(1), AMachine->GetInputArgAsFloat(2)));
      break;
    case 4:
      AMachine->ReturnOutputArg(SumNumbers(AMachine->GetInputArgAsFloat(0),
        AMachine->GetInputArgAsFloat(1), AMachine->GetInputArgAsFloat(2),
        AMachine->GetInputArgAsFloat(3)));
      break;
    case 5:
      AMachine->ReturnOutputArg(SumNumbers(AMachine->GetInputArgAsFloat(0),
        AMachine->GetInputArgAsFloat(1), AMachine->GetInputArgAsFloat(2),
        AMachine->GetInputArgAsFloat(3), AMachine->GetInputArgAsFloat(4)));
      break;
  }
}
```

Original topic

Accessing Delphi functions, variables and constans

Registering global constants

```
Scripter->AddConstant("MaxInt", MaxInt);
Scripter->AddConstant("Pi", M_PI);
Scripter->AddConstant("MyBirthday", EncodeDate(1992, 5, 30));
```

Original topic

Acessing global variables

```
Variant MyVar;
AnsiString ZipCode;

void __fastcall TForm1::GetZipCodeProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(ZipCode);
}

void __fastcall TForm1::SetZipCodeProc(TatVirtualMachine *AMachine)
{
  ZipCode = AMachine->GetInputArgAsString(0);
}

void __fastcall TForm1::PrepareScript()
{
  Scripter->AddVariable("ShortDateFormat", ShortDateFormat);
  Scripter->AddVariable("MyVar", MyVar);
  Scripter->DefineProp("ZipCode", Atscript::tkString, GetZipCodeProc,
    SetZipCodeProc);
  Scripter->AddObject("Application", Application);
}

void __fastcall TForm1::Run1Click(TObject *Sender)
{
  PrepareScript();
  MyVar = "Old value";
  ZipCode = "987654321";
  Application->Tag = 10;
  Scripter->SourceCode = Memo1->Lines;
  Scripter->Execute();
  ShowMessage("Value of MyVar variable in C++ Builder is " + VarToStr(MyVar));
  ShowMessage("Value of ZipCode variable in C++ Builder is " +
    VarToStr(ZipCode));
}
```

Original topic

Calling regular functions and procedures

```
void __fastcall TSomeLibrary::Init()
{
  Scripter->DefineMethod("QuotedStr", 1, Atscript::tkString, NULL,
    QuotedStrProc);
  Scripter->DefineMethod("StringOfChar", 2, Atscript::tkString, NULL,
    StringOfCharProc);
}

void __fastcall TSomeLibrary::QuotedStrProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(QuotedStr(AMachine->GetInputArgAsString(0)));
}

void __fastcall TSomeLibrary::StringOfCharProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(StringOfChar(AMachine->GetInputArgAsString(0)[1],
    AMachine->GetInputArgAsInteger(1)));
}

void __fastcall TForm1::Run1Click(TObject *Sender)
{
  Scripter->AddLibrary(__classid(TSomeLibrary));
  Scripter->SourceCode = Memo1->Lines;
  Scripter->Execute();
}
```

Original topic

Using libraries

Delphi-based libraries

CODE 1:

```
class TExampleLibrary: public TatScripterLibrary
{
  protected:
    void __fastcall CurrToStrProc(TatVirtualMachine *AMachine);
    virtual void __fastcall Init();
    virtual AnsiString __fastcall LibraryName();
};

AnsiString __fastcall TExampleLibrary::LibraryName()
{
  return "Example";
}

void __fastcall TExampleLibrary::Init()
{
```

```
  Scripter->DefineMethod("CurrToStr", 1, Atscript::tkInteger, NULL,
    CurrToStrProc);
}

void __fastcall TExampleLibrary::CurrToStrProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(CurrToStr(AMachine->GetInputArgAsFloat(0)));
}

void __fastcall TForm1::Button1Click(TObject *Sender)
{
  Scripter->AddLibrary(__classid(TExampleLibrary));
  Scripter->SourceCode = Memo1->Lines;
  Scripter->Execute();
}
```

CODE 2:

```
void __fastcall TForm1::PrepareScript()
{
  Scripter->DefineMethod("CurrToStr", 1, Atscript::tkInteger, NULL,
    CurrToStrProc);
}

void __fastcall TForm1::CurrToStrProc(TatVirtualMachine *AMachine)
{
  AMachine->ReturnOutputArg(CurrToStr(AMachine->GetInputArgAsFloat(0)));
}

void __fastcall TForm1::Button1Click(TObject *Sender)
{
  PrepareScript();
  Scripter->SourceCode = Memo1->Lines;
  Scripter->Execute();
}
```

Original topic

Removing functions from the System library

```
delete MyScripter->SystemLibrary()->MethodByName("ShowMessage");
```

Original topic

About

This documentation is for TMS Scripter.

In this section:

Copyright Notice

What's New

Former Scripter Studio History

Former Scripter Studio Pro History

Getting Support

Breaking Changes

Licensing and Copyright Notice

TMS Scripter components trial version are free for use in non-commercial applications, that is any software that is not being sold in one or another way or that does not generate income in any way by the use of the application.

For use in commercial applications, you must purchase a single license or a site license of TMS Scripter. A site license allows an unlimited number of developers within the company holding the license to use the components for commercial application development and to obtain free updates for a full version cycle and priority email support. A single developer license allows ONE developer within a company to use the components for commercial application development, to obtain free updates and priority email support. A single developer license is NOT transferable to another developer within the company or to a developer from another company. Both licenses allow royalty free use of the components when used in binary compiled applications.

The component cannot be distributed in any other way except through free accessible Internet Web pages or ftp servers. The component can only be distributed on CD-ROM or other media with written autorization of the author.

Online registration for TMS Scripter is available at https://www.tmssoftware.com/site/orders.asp. Source code & license is sent immediately upon receipt of check or registration by email.

What's New

Version 7.36 (Apr-2025)

- **New**: Support for 64-bit IDE.
- **Improved**: Grid step and grab size editors in Designer Options dialog could not be edited directly, only with spin buttons. Ticket #24243
- **Fixed:** `TField.AsLargeInt` property was not being correctly read and written for values higher than the 32-bit range.
- **Fixed:** `FreeAndNil` method not working correctly in old Delphi versions (below XE7).

Version 7.35 (Oct-2024)

- **New:** Support for Windows 64-bit (Modern) platform

Version 7.34 (Sep-2024)

- **Improved:** Updated TScrMemo, including some performance improvements.
- **Fixed:** Generic getter/setter for properties were not working correctly with Int64 values. Ticket #23713.
- **Fixed:** DLL import documentation updated. Ticket #22855.
- **Fixed:** AV when saving file in IDE and "with" statement was syntatically incorrect.

Version 7.33 (Mar-2024)

- **Fixed**: Inline directives for several functions were not being applied due to wrong compiler directive name. Ticket #22456.
- **Fixed**: Range function was not accepting integer parameter. Ticket #13541.

Version 7.32 (Jan-2024)

- **New**: Installation now available via TMS Smart Setup.
- **Fixed:** code completion list not showing if invoked in an empty line. Ticket #22286.
- **Fixed:** Range function was not accepting integer parameter. Ticket #13541.

Version 7.31 (Nov-2023)

- **New: Delphi 12 Support.**

Version 7.30 (Oct-2023)

- **Fixed:** Access Violation when using record wrappers in Win64 platform. Ticket #21773.

Version 7.29 (Oct-2023)

- **Improved**: Import tool updated to load settings from Delphi Sydney and Delphi 11.
- **Fixed**: `TatScripter` component not available for platforms other than Win32/Win64. Ticket #21759.

Version 7.28 (Jan-2023)

- **Improved**: When opening projects, it was trying to load settings from local files even when scripts were supposed to be loaded from database. Ticket #19756.
- **Fixed**: `Refactor.AddUsedUnit` was not including the uses clause when the script was not a `{$FORM}` or `{$CLASS}` script. Ticket #19477.
- **Fixed**: Parser failing to recognize some identifiers in Czech language. Ticket #19776.
- **Fixed**: Content of `DefaultProperty` was not being propagated to descendant classes.

Version 7.27 (Mar-2022)

- **Improved**: Syntax highlight memo updated with bug fixes and improvements.
- **Fixed:** `ap_RichEdit` was not compiling in Delphi 11.

Version 7.26 (Feb-2022)

- **New: TSourceExplorer.UpdateInterval property** allows defining the update time for source explorer after source is modified.
- **Fixed:** Workaround Delphi Access Violation issue when using TMS Scripter IDE from a dll.
- **Fixed:** Enter key not working in TIDEMemo when Default property of a button in script form was set to true.

Version 7.25 (Sep-2021)

- **New:** Delphi 11 / Rad Studio 11 support.
- **New:** Scripter IDE autocompletes a `begin..end` block with the `end` keyword after `begin<Enter>` is typed.
- **Fixed:** Access Violation when reopening the IDE in Win64 platform.
- **Fixed:** Sporadic "List index out of bounds" error when closing TMS Scripter IDE.

- **Fixed:** AV when setting `IDEEngine.AutoStyler` to `False`, setting the custom syntax styler directly in the `TIDEMemo` component.
- **Fixed:** Pascal syntax was accepting `ifproc` as a valid `if` statements (without space after the `if`).

Version 7.24 (Mar-2021)

- **Improved:** Better block highlight (`begin`..`end`) in syntax memo.
- **Fixed:** `TSourceExplorer` and `TatMemoInterface` not working, depending on the order used to set the source code of the memo (regression).

Version 7.23.1 (Mar-2021)

- **Fixed:** Access Violation after closing and reopening a project in Scripter IDE (regression).
- **Fixed:** Access Violation when using code completion and parameter insight in some places of the code (regression).

Version 7.23 (Mar-2021)

- **Improved:** Text selection in code editor is now preserved when switching between project files in Scripter IDE.
- **Improved:** `Round` and `Trunc` methods now return `Int64` values.
- **Improved:** `Random` function now accepts the parameter for the range.
- **Improved:** Updated syntax highlighting memo.
- **Fixed:** Undo problems in multiple files. The undo stack for one file in project was being mixed with other files. See support request.
- **Fixed:** Paste into code editor from clipboard was inserting text in wrong position after switching between project files in Scripter IDE. See support request.
- **Fixed:** Fixed behavior of some Int64 functions from imported libraries, which were only handling Integer (32-bit) values. Functions affected: `TReader.ReadInt64` (ap_Classes), `StrToInt64`, `StrToInt64Def`, `TryStrToInt64` (ap_SysUtils), `SetInt64Prop`, `GetInt64Prop` (ap_TypInfo), `TRttiInt64Type.MinValue`, `TRttiInt64Type.MasValue` (ap_Rtti).
- **Fixed:** `WideChar` values could not be passed as parameter to scripter functions via `ExecuteSubRoutine`.
- **Fixed:** Rare Access Violation when filtering components in the component palette and the name of filtered component was not entirely visible.

Version 7.22 (Aug-2020)

- **Fixed:** Sporadic error with ARM 64 compilers (iOSDevice64 and Android64).

Version 7.21 (Jun-2020)

- **New: Support for RAD Studio 10.4 Sydney.**
- **Improved:** Latest TAdvMemo features applied to TScrMemo/TIDEMemo.
- **Fixed:** Closing a modified filed in IDE without saving would keep using the modified content when running the project.

Version 7.20 (May-2020)

- **Fixed:** Automatic event handler creating in the source code (upon double-clicking object inspector or the component) was creating the procedure signature with wrong parameters for the event.
- **Fixed:** Syntax memo updated to mirror TAdvMemo latest features and fixes. Copy/paste issue (pasting text in wrong position) is one of them.

Version 7.19 (Feb-2020)

- **Improved:** Project group file updated with all TMS Scripter sample projects..
- **Fixed:** Length function returns wrong value for variant arrays.
- **Fixed:** GetInputArgAsString returning error if an uninitialized script variable were passed to the method/procedure.
- **Fixed:** Comments right after a number constant is not allowed but was not raising a compilation error. Now it is. Example: const A = 3.14//comment.

Version 7.18 (Nov-2019)

- **New: Support for Android 64-bit platform (Delphi 10.3.3 Rio).**
- **Improved:** Copy function now accepts two parameters (third paramater, the character count, is optional, just like in Delphi).
- **Fixed:** Error when using form scripts in macOS 64 (function GetInfoFromRoutineName).

Version 7.17 (Jul-2019)

- **New: macOS 64 support in Delphi Rio 10.3.2.**
- **Improved:** Declaring UInt64 literal constants is now supported.
- **Improved:** TatVirtualMachine.GetInputArgAsUInt64 method to retrieve parameters as UInt64.

- **Fixed:** Syntax now accepts statements ending with multiple semi-colon.
- **Fixed:** Argument out of range when running scripter on iOS/Mac OS using Dutch language.
- **Fixed:** Sporadic Access Violation when expanding properties with subproperties (like Font, for example).
- **Fixed:** Syntax error when using method without result values (procedures) with name starting with "Try".
- **Fixed:** const section declared after var section was causing syntax error.

Version 7.16 (Mar-2019)

- **Improved:** Syntax memo updates.
- **Improved:** Object inspector is now fully updated when a property changes. This fixes an issue when a property changes the type of another property (for example, TPersistent with different subproperties).

Version 7.15 (Dec-2018)

- **New: Support for Delphi/C++Builder 10.3 Rio.**
- **Fixed:** Could not change value of "Name" property when using TIDEInspector component in a custom IDE.

Version 7.14 (Oct-2018)

- **New: TDBGrid context popup menu with option "Add all fields" in scripter IDE.** Allows creating columns from the fields of the associated dataset.
- **Fixed:** Access Violation when invoking code completion from uses classes and a few other parts of the code.
- **Fixed:** Passing WideString parameter as reference to dll functions was not properly working.
- **Fixed:** Error when accessing properties/methods of script-based objects that return another script-based object. For example, suppose a script-based class TMyClass that has a property/method returning another object of type TMyClass. Access properties of that second object would cause errors.

  ```
  MyObject.AnotherMyObject.SomeMethod();
  ```

- **Fixed:** Range check error when reading/setting RootKey property of TRegistry objects.

Version 7.13 (Jul-2018)

- **New: Array declaration automatically initializes variable array.** You can now declare variables with type "array[0..10]" and the variable will be automatically initialized as a variant array.
- **Improved:** Length function now works for arrays in addition to strings.
- **Fixed:** AV when accessing indexed default properties registered with RTTI and accessed via variable reference (e.g., LocalVar[Index] := Value;).

Version 7.12 (May-2018)

- **Improved:** Trial and registered installers now offers option to install to Linux platform.
- **Fixed:** Copy/Paste operation in form designer was losing event handlers of pasted child controls.

Version 7.11 (Mar-2018)

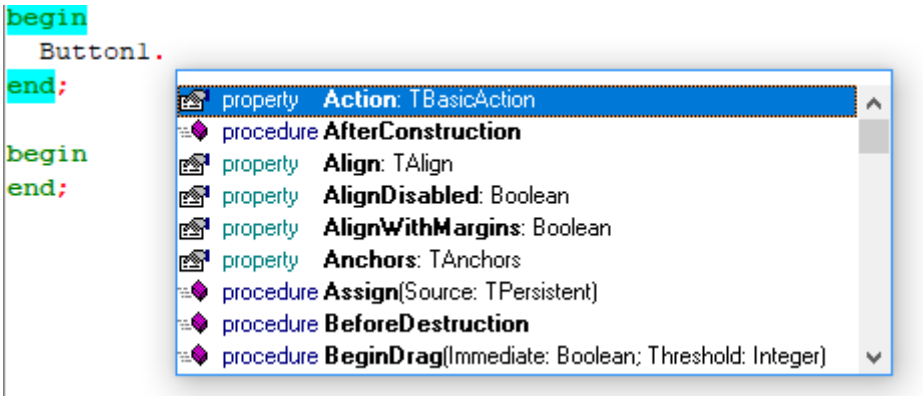
- **Improved:** Compilation is now significantly faster in some situations, especially with big scripts.

Version 7.10 (Nov-2017)

- **New:** Linux support for the core scripter engine.
- **Improved:** Scripter IDE (TIDEDialog) modernized with new icons, modern color theme and flat style.
- **Improved:** Better performance when debugging using component TatScriptDebug.
- **Fixed:** Copy/paste a TListBox with Visible property set to False would cause an Access Violation.
- **Fixed:** Executing TIDEDialog was causing a "property does not exist" error in Delphi 7 (regression).

Version 7.9 (Oct-2017)

- **Improved:** Code completion now shows types of properties, variables and method/function results, when available.



- **Improved:** Code completion has better retrieval of local variables and parameters.
- **Fixed:** Argument out of range when adding code completion list for identifier "fo".
- **Fixed:** "Cannot focus control" error message when creating new unit in TIDEEngine and form is not yet visible.
- **Fixed:** Rare AV when trying to use code completion in a part of the code that is inside a case statement.
- **Fixed:** DelphiFormEditing demo: double clicking a control would turn object inspector blank.
- **Fixed:** Sporadic Access Violation when using TSourceExplorer component.
- **Fixed:** Rare "out of memory" error when displaying parameter hints (code insight)

Version 7.8 (Jul-2017)

- **Fixed:** "Invalid class type" when passing a TClass parameter to a method that was registered using DefineClassByRTTI.
- **Fixed:** Invalid type cast when reading set properties of classes declared with DefineClassByRTTI.
- **Fixed:** TObject methods being declared as regular functions/procedures when using DefineClassByRTTI using redefine as overwrite.
- **Fixed:** Memory leak in some situations when using dll calls in a script-based library.

Previous Versions

Version 7.7 (Mar-2017)

- New: RAD Studio 10.2 Tokyo Support.

Version 7.6 (Mar-2017)

- Fixed: Wrong behavior when accessing default indexed properties of objects declared as global variables in a script library.

- Fixed: Access Violation when unsetting events for components that have been already destroyed.

Version 7.5 (Jan-2017)

- Fixed: Library browser not showing types of properties and method parameters when they were added using new RTTI.
- Fixed: IF statements in Basic syntax were not accepting "END IF" at the end of statement if it was in the same line.
- Fixed: Format function not working correctly on next gen compiler.
- Fixed: Import tool failing when parsing types which name starts with "string"
- Fixed: Comparing object values in mobile compiler was causing invalid type cast error.
- Fixed: Invalid class type cast when registering controls with properties of type TBehaviorBoolean.
- Fixed: Invalid Type Cast when setting a boolean property defined with RTTI from an expression.
- Fixed: AV when destroying a control with an event handler set from scripter, in Mac OS X.

Version 7.4 (Aug-2016)

- New: Support for record methods when using DefineRecordByRTTI.
- Improved: Library browser now displays property types.
- Improved: While debugging it's now possible to see source code of units that are not the active unit.
- Improved: Significant performance increase when modifying arrays.
- Improved: Code completion not showing up in some situations when script contained declared routines.
- Fixed: Boolean value comparison failing in some situations when invoking methods defined by new RTTI.
- Fixed: TatScriptDebugger component was removing OnSingleDebugHook event from scripter component after executing the dialog.

Version 7.3 (Jun-2016)

- New: TatScripter.AutoLoadClassUsingRTTI property uses complete RTTI to automatic loading of classes when TatScript.DeferObjectResolution is True.
- Fixed: Typing dot (.) in scripter memo in some situations was not opening the code completion window.
- Fixed: TatScripter.OnRunningChange event not being called while scripter IDE was open.

- Fixed: Design Options Dialog not showing selected colors when VCL style/theme is enabled.

Version 7.2 (Apr-2016)

- New: Support for Delphi/C++Builder 10.1 Berlin.
- Fixed: "List Index Out Of Bounds" error when acessing default properties.

Version 7.1.1 (Mar-2016)

- New: TIDEEngine.OnConfirmSaveFile gives more control over the confirmation message "Save Changes?" when file was modified.
- Fixed: Code completion not working for methods with string parameters - like FieldByName('Field').

Version 7.1 (Feb-2016)

- New: Library Browser dialog provides to your end-user a full reference of available classes, methods, functions, constants, etc. available to be used in scripts.
- Improved: Added *.png in the default filter for the picture editor in IDE designer.
- Fixed: Event handlers receiving Int64 parameters were not working properly.
- Fixed: Error when accessing components in a script form in mobile applications
- Fixed: Parameter hints in IDE not showing when the parameter contains a string literal.
- Fixed: Closing the IDE with modified files and then canceling closing upon confirmation dialog was turning some IDE icons into disabled state.
- Fixed: Sporadic AV when using IDE and launching several non-modal script forms multiple times.
- Fixed: TatScripter component disabled in component palette when targeting Android/iOS/Mac platforms.

Version 7.0 (Jan-2016)

- New: iOS and Android support - TMS Scripter is now fully cross-platform supporting all supported Delphi platforms.
- Improved: Code completion optimized for better speed.
- Fixed: DefineClassByRTTI was assigning a wrong property as the default indexed property of the class.
- Fixed: Memory leak in FindFirst, FindClose and FindNext methods.
- Fixed: Import tool not reparsing some files that were previously parsed with errors.
- Fixed: Wrong result values when calling dll functions that return Int64 values on Windows 32.

Version 6.5.4 (Sep-2015)

- New: RAD Studio 10 Seattle support.

Version 6.5.3 (Aug-2015)

- Fixed: TFormDesigner.OnCreateComponentClass event type signature changed to work around issue in C++.

Version 6.5.2 (Jul-2015)

- New: Support for set properties when registering classes using new RTTI (DefineClassByRTTI).
- New: LastExceptionLine and LastExceptionCol functions available from script.
- New: TAdvFormDesigner.OnCreateComponentClass event provides an opportunity to manually create an instance of a component needed by the designer.
- New: TatCustomScripter.RemoveProperty method.
- Improved: Import tool updated with XE8 support.
- Fixed: Published properties of type Int64 were not being automatically registered when registering a class.
- Fixed: "True" and "False" constants had wrong types (integer instead of boolean) in Variant types (regression).

Version 6.5.1 (Apr-2015)

- New: Delphi/C++Builder XE8 support.
- New: LastExceptionLine and LastExceptionCol properties provide info about the source code position where last exception was raised.
- New: TCustomFormDesigner.GridStepPixel property sets the number of pixels to move/resize controls when using Ctrl+Arrow keys.
- Fixed: Application hanging when registering some specific classes/components using RTTI.
- Fixed: Scripter IDE wrongly considering source was changed even though it was not modified.
- Fixed: Sporadic "Index out of bounds" when executing compiled code previously saved.

Version 6.5 (Mar-2015)

- New: Packages structure changed. Now it allows using runtime packages with 64-bit applications. It's a breaking change.
- Improved: A breaking change was added for Delphi XE and lower, requiring you to add `Vcl.ScriptInit` unit to your project.

- Improved: TScrMemo replaces TAdvMemo as the syntax memo class. It's a breaking change.
- Improved: DefineClassByRTTI sets default indexed property automatically.
- Improved: TIDEEngine.PrepareXXXXDialog methods (Save/Load/SaveProject/Loadproject) made virtual protected.
- Improved: TIDEPaletteToolbar.UpdatePalette now virtual.
- Fixed: Format function giving wrong results when formatting multiple string values.
- Fixed: Setting indexed elements of array parameters passed by reference were not changing the array in Basic language.
- Fixed: Import tool generating importing code that might fail in 64-bit applications.
- Fixed: Assigned function could fail in 64-bit applications.
- Fixed: Pascal syntax now accepts spaces before and after dot for accessing object members (<Variable>.<Member>).
- Fixed: "Cannot Focus Disable Windows" error message when right-clicking some third-party components in form designer.
- Fixed: Method calls in with clauses had lower precedence than global properties.
- Fixed: Margins were incorrect with anchored controls in forms using bsSingle border style.
- Fixed: Memory leak when copying components in form designer.
- Fixed: TatMethod and TatProperty assign now properly assign event properties.

Version 6.4 (Sep-2014)

- New: Rad Studio XE7 support.
- New: TIDEEngine.ProjectExt property allows specifying a project extension name different than '.ssproj'.
- Fixed: Syntax memo incorrectly displaying commented code.
- Fixed: AV when accessing default indexed properties with more than one index.
- Fixed: Setting default indexed properties for untyped variable objects.
- Fixed: Ord function not working for non-string values.
- Fixed: Import tool incorrectly creating event adapter for events that returned a value (functions).
- Fixed: OnSingleDebugHook event not being fired in TIDEScripter component.

Version 6.3.1 (May-2014)

- New: Rad Studio XE6 support.

- New: LibInstance property in TatClass, TatMethod, TatProperty classes indicates the library which registered them.
- Improved: Deprecated methods: TatCustomScripter.AddClass, TatClasses.Add, TatClasses.AddDelphiClass. All must be replaced by DefineClass method.
- Fixed: Icon for non-visual components in form designer were not being affected by OnGetComponentImage event.
- Fixed: Insufficient RTTI Information when trying to import indexed TBytes property. Now the property is ignored (Delphi limitation).
- Fixed: AV violation while destroying TIDEEngine in some rare situations.
- Fixed: Some unicode characters being displayed incorrectly in object inspector.
- Fixed: "Canvas does not allow drawing" error when using form designer in an styled VCL application.
- Fixed: Rare Access Violation when closing all forms in scripter IDE.
- Fixed: Controls not being displayed in some situations, after loading a project, when controls had their Visible property set to false.
- Fixed: Setting object properties failing in some situations in 64-bit applications.
- Fixed: Error when forcing varLongWord variants to integer values.
- Fixed: "SSImport_Icon not found" error when compiling ImportTool project in some Delphi versions.

Version 6.3 (Feb-2014)

- New: Automatic registration via RTTI now supports indexed properties (Delphi XE2 and up).
- Improved: Code completion for local variables.
- Improved: New TPaletteButton.ToolClass property allows checking what is the component class associated with a palette button.
- Fixed: Error when calling methods such as Outer.InnerClass.HelloWorld and both Outer and InnerClass return script-based classes.
- Fixed: Issue with component palette icons when compiling to 64-bit.
- Fixed: Access Violation when reading record properties declared using RTTI.
- Fixed: Setting ScriptFormClass property had no effect when creating forms from script.
- Fixed: Access Violation when using code completion in some situations.
- Fixed: Losing event handlers when renaming a component which name is contained by another component's name.
- Fixed: Copy/paste operations were not copying event handlers properly.

Version 6.2 (Oct-2013)

- New: TIDEDialog.Show method now allows IDE to be displayed as non-modal.
- New: Rad Studio XE5 support.
- Improved: TatScript.FileName property made public.
- Fixed: Pascal single-line comments (starting with "//") not working on Mac.
- Fixed: Error when trying to pass EmptyParam to OLE servers.
- Fixed: AV when setting TIDEEngine.PaletteButtons at design-time.
- Fixed: Issue with DebugStepOverLine and DebugUntilReturn methods when scripter is running in threads.
- Fixed: Breakpoints were not being displayed after file was saved in IDE.
- Fixed: Small glitch when selecting controls in form designer with fast mouse movement.
- Fixed: Custom glyph grab handles not being displayed on graphical controls.
- Fixed: MDI child script forms being displayed twice.
- Fixed: Anchoring not properly working when creating forms with Position = poScreenCenter.

Version 6.1.1 (May-2013)

- New: Rad Studio XE4 support.
- Fixed: AV when trying to insert a component from component palette using keyboard and no form visible.
- Fixed: Flickering when filtering components in component palette.
- Fixed: IsDate function in VBLibrary now checks strings for valid dates.
- Fixed: Memory leak when using Int64 values in Format function.

Version 6.1 (Mar-2013)

- New: Latest AdvMemo 3.1.1 improvements.
- Improved: Components now available at design-time for 64-bit applications.
- Fixed: Loading forms now opens file in shareable mode to avoid problems with multiple projects accessing same form file.
- Fixed: Events in very specific components like TvrTimer were not being set when form loads.
- Fixed: Issues when compiling scripter with assertions off.
- Fixed: Wrong line/column debug information when running pre-compiled code.
- Fixed: Msg parameter not being passed as reference in DoCompileError method.

- Fixed: Access violation when registering components in an specific order.
- Fixed: Setting TatCustomScripter.ScriptFormClass property raised an incorrect exception.
- Fixed: Wrong atScript.hpp header file in C++ Builder 2007.
- Fixed: Designer handles not being updated when selected control was resized automatically after a form resize.

Version 6.0 (Sep-2012)

- New: Support for executing scripts in Firemonkey applications.
- New: Delphi XE3 and C++ Builder XE3 support.
- Improved: DefineRecordByRTTI method now returns the generated class.
- Improved: Better performance in import tool by using .spu files if .pas file was not changed.
- Fixed: Duplicated entries in code completion window.
- Fixed: Import tool parameter hints with default string values were being exported with single quotes causing syntax error in imported files.
- Fixed: Issue when clearing some scripts between first and second project execution (implicit class references).
- Fixed: Missing component names when loading forms at low level using TFDReader (without using designer component).
- Fixed: Access Violation when closing main form custom IDE's.
- Fixed: Access Violation when placing a component over a grab handle in form designer.
- Fixed: Support for int64 values in Format function.
- New: Dropped support for Delphi 5, 6, 2005, 2006 and C++Builder 6, 2006.

NOTE

TMS Scripter 6 is a merge of former *Scripter Studio* and *Scripter Studio Pro*. You can check version history of such products at the following links.

Scripter Studio version history

Scripter Studio Pro version history

Former Scripter Studio History

Version 5.2 (Apr-2012)

- New: 64-bit support in Rad Studio XE2.
- New: All new features of TAdvMemo 3.0 included.
- New: Support to declare 64-bit integer (Int64) literal values in script. Better handling of Int64 arithmetic operations (Delphi 6 and up only).
- Improved: Import tool: Better handling of subtypes. It was ignoring properties/methods declared after subtype declaration.
- Improved: All imported files for VCL updated for 64-bit support and some missing methods like TList.Count in Delphi XE and up.
- Fixed: Several Issue with default properties (using With clause, expression in indexes, global objects).
- Fixed: TatScriptDebugger issue when settings breakpoints in a second execution.
- Fixed: Calling class functions using object references (eg. Button1.ClassName) failing in some situations.
- Fixed: Issue with code completion in TatScriptDebugger and TatMemoInterface components.
- Fixed: Import Tool issue with WideChar parameters.
- Fixed: Issue with WideString parameters when defining classes using new RTTI.
- Fixed: Import tool now splits string constants when they are longer than 255 chars.

Version 5.1 (Sep-2011)

- New: Delphi/C++Builder XE2 Support.
- New: Delphi XE2 support in import tool.
- Improved: Class registration using new RTTI - now also import classes not registered with RegisterClass.
- Fixed: Issue with combined indexed default properties.
- Fixed: Minor bug when saving compiled code.
- Fixed: Import tool now importing published methods.

Version 5.0 (Apr-2011)

- New: Support for creating script-based classes.

- New: New code insight class supporting parameter hints and improved code completion (to be used in custom IDE's).
- New: Updated import tool to also import parameter hints of methods.
- New: Updated imported VCL units for all Delphi versions, now including parameter hints.
- New: Additional parameter in DefineMethod allowing to specify the parameter hint for that method.
- Improved: Several other improvements added from TAdvMemo 2.3 version (see AdvMemo.pas source code for more info).
- Fixed: Relative paths for script files not working with $(APPDIR) and $(CURDIR).

Version 4.7.1 (Dec-2010)

- Fixed: Registered version installer not working properly with TMS VCL Subscription Manager.

Version 4.7 (Dec-2010)

- New: Updated imported VCL units for all Delphi versions, now including indexed properties, default parameters and other minor tweaks.
- Fixed: Issue with getter of boolean properties using DefineClassByRTTI.
- Fixed: Issue with TStringList.Create in Delphi XE imported Classes library.
- Fixed: Functions with "out" parameters not working in ap_DateUtils.
- Fixed: Install conflict between Scripter and other TMS packages.
- Fixed: Instructions to return values for "out" parameters not generated by ImportTool.
- Fixed: Issue with enumerated types in ImportTool.

Version 4.6.0.1 (Oct-2010)

- Improved: Information about CurrentClass in Context parameter for OnUnknownElementEvent event.
- Fixed: Issue with InStr function in VB Script Library.
- Fixed: Issues installing Scripter Studio on RAD Studio XE.

Version 4.6 (Sep-2010)

- New: RAD Studio XE Support.
- New: Support for default indexed properties in script syntax (e.g. Lines[i] instead of Lines.Strings[i]).
- Improved: C++ Builder source code examples included in Scripter manual.

- Improved: Import Tool parser is now recognizing most of new Delphi syntax features and provides RAD Studio XE support.
- Improved: Options in DefineClassByRTTI method to redefine an already defined class in scripter.
- Fixed: Issue with getter of boolean properties.
- Fixed: Issue with script executed step by step while watching a variable.
- Fixed: Issues with DefineClassByRTTI method (registering of constructor overloads, return of var/out method parameters).
- Fixed: Issue with record declarations in units imported by ImportTool using enhanced RTTI.
- Fixed: Issues with code completion (up to Delphi 2005).
- Fixed: Find and Replace in memo didn't work with Match Whole Word Only.

Version 4.5 (Jul-2010)

- New: Automatic classes, methods and properties registration using new enhanced RTTI (Delphi 2010 and later).
- New: Extensive help component reference.
- New: Fully documented source code.
- Fixed: Error compiling some imported units in Delphi 2010.
- Fixed: Issue with SaveCodeToFile when using form components of a non-registered class.
- Fixed: Memory leak when using some rare syntax constructions in script.

Version 4.4.6 (Jan-2010)

- New: TatCustomScripter.LoadFormEvents property allows setting event handlers when loading form dfm files saved in Delphi.
- Improved: Char constants now accept hexadecimals (#$0D as an alternative to #13).
- Fixed: VB function MsgBox was displaying incorrect window caption.
- Fixed: VB function Timer was performing wrong calculation with miliseconds.
- Fixed: Issue with OnRuntimeError not providing correct source code row and col of error.

Version 4.4.5 (Sep-2009)

- New: Delphi/C++ Builder 2010 support.
- New: Array properties supported in COM objects.
- Improved: Pascal syntax allows "end." (end dot) in main script block.
- Improved: AdvMemo files updated to latest versions.

- Fixed: Issue with `try..except` and `try..finally` blocks.

Version 4.4 (May-2009)

- New: "Private" and "Public" keywords allow defining private global variables, private subs and private functions (not visible from other scripts) in Basic scripts.
- New: Variable initialization in Basic scripts (e.g., Dim A as String = "Hello").
- New: Return statement in Basic scripts.
- New: `If..Then..` statements without "End If" for single line statements (in Basic scripts).
- New: `Try..Catch..End` Try syntax in addition to `Try..Except..End` (in Basic scripts).
- New: TCustomScripter.ScriptFormClass allows providing a different class (derived from TScriptForm) for forms created from script.
- Improved: When scripter don't find a library, a compile error is raised (instead of an exception).

Version 4.3 (Feb-2009)

- New: "new" clause in Basic script. e.g "MyVar = new TLabel(Self)".
- New: const declaration in Basic script.
- New: VBScript functions Redim, RedimPreserve, Split, Join, StrReverse and Randomize.
- New: TatCustomScripter methods BeginRefactor and EndRefactor to allow changing in source code without clearing events.
- Improved: Better load/save compiled code engine.
- Improved: Exposed TAdvMemo.VisiblePosCount as public property.
- Improved: Scrolling in memo when ActiveLine property is set.
- Improved: VBScript functions LBound, UBound, MsgBox now have default parameters.
- Fixed: Memory leak in memo using word wrap.
- Fixed: Small issue with cursor position handling for wordwrapped memo.
- Fixed: Issue with backspace & selection in memo.
- Fixed: Issue with input of unicode characters in memo.
- Fixed: Issue with paste after delete in specific circumstances in memo.
- Fixed: Issue with horiz. scrollbar updating in memo.
- Fixed: AV in some scripts accessing indexed properties.
- Fixed: AV when setting breakpoint in begin clause.

Version 4.2 (Oct-2008)

- New: Delphi 2009/C++Builder 2009 support.
- Fixed: Issue with AssignFile procedure.
- Fixed: Issue when removing attached events.
- Fixed: Issue while using debug watches for global variables.

Version 4.1 (Jul-2008)

- New: Method TAdvMemo.SaveToRTFStream.
- New: Property TatCustomScripter.Watches (TatScripterWatches class) with the concept of watches for the whole scripter, not only the current script being executed.
- Improved: Memo syntax highlighting with pascal syntax.
- Improved: Autocompletion list updating while typing.
- Improved: Local variables are now initialized to NULL.
- Fixed: Runtime error message was not displaying correct line and number of error.
- Fixed: Issue with parameters passed by value to subroutines behaving like by reference.
- Fixed: Issue with paste on non expanded line in TAdvMemo.
- Fixed: Issue with repainting after RemoveAllCodeFolding in TAdvMemo.
- Fixed: Issue with pasting into an empty memo in TAdvMemo.
- Fixed: Issue with TrimTrailingSpaces = false in TAdvMemo.
- Fixed: Issue in Delphi 5 with inserting lines in TAdvMemo.
- Fixed: Issue with scrollbar animation on Windows Vista in TAdvMemo.
- Fixed: Gutter painting update when setting Modified = false programmatically in TAdvMemo.

Version 4.0 (Apr-2008)

- New: TatScripter component supporting cross-language scripts (both Pascal and Basic), allowing to replace TatPascalScripter and TatBasicScripter by a single component.
- New: Forms support. You can now declare forms and instantiate them from scripts. You can create form methods and load forms from dfm files.
- New: TatScript.Refactor property retrieves a TatScriptRefactor object with methods for refactoring source code, like "DeclareRoutine" and "AddUsedUnit".
- New: Debugger now allows tracing into script-based function calls.
- New: TatScript.UnitName property allows a script library to be registered using "uses MyLibrary" syntax without needing MyLibrary to be in a file.

- New: Script-level breakpoints allow better control of breakpoints for debugging, instead of VirtualMachine-level breakpointsNew: Basic syntax allows declaring the variable type.
- New: OnBreakpointStop event in scripter component is called whenever the script execution stops at a breakpoint.
- New: OnSingleDebugHook event allows better performance for debugging than OnDebugHook.
- New: Demo project which shows how to use forms with scripter.
- Fixed: Scripter meta info (ScriptInfo): TatVariableInfo.TypeDecl value now has the correct value (it was empty).
- Fixed: Some variable values were not being displayed when using TatWebScripter.
- Fixed: Minor bugs.

Version 3.3 (Oct-2007)

- New: TSourceExplorer component. Shows the script structure in a Delphi-like source explorer tree.
- New: C++ to Pascal converter demo shows the capabilities of TatSyntaxParser component.
- Improved: Scripter Studio Manual includes a "getting started" section for TatSyntaxParser and TSourceExplorer components.
- Improved: More accurated value in TatVariableInfo.DeclarationSourcePos property.
- Improved: Small optimizations in parser.
- Improved: Many warnings removed.
- Fixed: Wrong event name in object inspector in Greatis integration demo.

Version 3.2 (Jul-2007)

- New: Delphi 2007 support.
- New: Improved Code Completion - now it retrieves methods and properties at multiple levels for declared global/local script variables (e.g. "var Form: TMyForm"), and retrieves local script functions and procedures.
- New: Improved compilation speed.
- New: Improved event handling. Now it allows multiple scripts in a single scripter to handle component events. It's possible to declare a script event handler from script code (e.g. MyObject.Event = 'MyScriptEventHandler'), even if the scripter component has multiple script objects.
- New: Improved import tool for better importing: size of sets and record parameters by reference.
- New: New OnUnknownElement event allows defining methods and properties on the fly during compilation when a unknown method or property is found by the compiler.

- New: Fixed problem with AV in watch viewer.
- New: Updated VCL import files.
- Import tool: Support for Delphi 2007 in import tool.

Version 3.1 (Sep-2006)

- New: Support for calling DLL functions from script, allowing even more flexibility for scripts. This feature is enabled by AllowDLLCalls property.
- New: Support for registering methods with default parameters.
- New: OnRuntimeError event.
- New: "call dll functions" demo. Includes pascal and basic syntax, and also source code for CustomLib.dll (used by the demos).
- New: "methods with default parameters" demo for Pascal and Basic.
- New: "simple demo" which creates the components at runtime.
- New: Turbo Delphi compatible.
- Updated Scripter Studio manual with the new features and in a new format (chm).

Version 3.0.1 (Jul-2006)

- New: TatCustomScripter.AddDataModule method.
- New: AName parameter in TatScript.SelfUnregisterAsLibrary method.
- Fixed: Form events where not being saved by TSSEventSaver components.
- Fixed: Memory leak in some specific cases when an event handler was removed from dispatcher.

Version 3.0 (Mar-2006)

- New: Syntax highlighting memo with codefolding support added.
- New: Delphi 2006 & C++Builder 2006 support added.
- New: Registered versions comes with VCL ImportTool and full source code for ImportTool.

Version 2.9 (May-2005)

- New: TatVBScriptLibrary library which adds several function compatible with the available ones in VBScript. Functions added: Asc, Atn, CBool, CByte, CCur, CDate, CDbl, CInt, CLng, CreateObject, CSng, CStr, DatePart, DateSerial, DateValue, Day, Hex, Hour, InStr, Int, Fix, FormatCurrency, FormatDateTime, FormatNumber, InputBox, IsArray, IsDate, IsEmpty, IsNull, IsNumeric, LBound, LCase, Left, Len, Log, LTrim, RTrim, Mid, Minute, Month, MonthName, MsgBox, Replace, Right, Rnd, Second, Sgn, Space, StrComp, String, Timer, TimeSerial, TimeValue, UBound, UCase, Weekday, WeekdayName, Year.

- New: OnExecHook event for callback while executing script. CallExecHookEvent property must be set to true to activate the event.
- Updated: Manual with list of available functions in system library and vbscript library.
- Fixed: A couple of bugs in Basic - REM, DO statements, and others.
- Fixed: Greatis demo - component properties were not listing components in the form.
- Fixed: Wrong example in manual for Basic Syntax in Exit.
- Fixed: D6 errors in imports.

Version 2.8 (Feb-2005)

- New: Script file libraries system: now it's possible to use other script files by declaring the files in the uses clause. This feature is enabled by LibOptions.UseScriptFiles property.
- New: Script file libraries works with source files and p-compiled files.
- New: LibOptions property allow settings of script file libraries system. Search path can be defined, as well the default extensions for the source files and compiled files.
- New: Added a samples subdirectory in "ide" demo with "newversion.psc" which shows ilustrates script file libraries usage.
- New: Form scripters are now aware of components of the form (not only the controls).
- Fixed: Script IDE demo - showing duplicated messages.
- Fixed: Problems with Greatis integration and Greatis + Scripter Studio demo.
- Fixed: Minor bug fixes & improvements.

Version 2.7.1 (Oct-2004)

- New: Delphi 2005 support added.

Version 2.7.0 (Oct-2004)

- New: TSSInspector and TSSEventSaver components for smooth integration with Greatis Runtime Fusion components.
- New: "downto" support in for loops (Pascal syntax).
- New: Added Widestring support in AddVariable method and GetInputArgAsWideString function.
- New: New TAdvMemo v1.6 integration.
- Fixed: OnCompileError was retrieving wrong line/row error when compiling script-based library.
- Fixed: Bug when destroying Scripter Studio at design-time.

Version 2.6.4 (Aug-2004)

- New: Script-based libraries can be used from different scripter components and even different languages (see updated "script-based libraries" demo).
- Fixed: Parameter with names starting with "Var" was considered as by reference.
- Fixed: MessageDlg call was not working in Delphi 5.
- Fixed: It's now possible to Halt all running scripts.
- Fixed: Errors with Create method expecting 0 parameters (important! current users see AScript.INC file).

Version 2.6.3 (Jun-2004)

- Improved: Debugger speed.
- Fixed: Syntax Error with WriteLn in webscripter.
- Fixed: missing `begin..end` block in webscripter demo.
- Fixed: TypeCast was not working in calls. Example: `TStringList(S).Add('Hello');`.
- Fixed: SaveCodeToFile and LoadCodeFromFile were failing in some situations.

Version 2.6.2 (May-2004)

- New: ShortBooleanEval property to control optional short-circuit boolean evaluation.

Version 2.6.1 (Apr-2004)

- Improved: More overloaded AddVariable methods.
- Improved: RangeChecks off directive in ascript.inc.
- Fixed: Bug with script libraries.
- Improved: TAdvMemo syntax highlighting memo.

Version 2.6.0 (Apr-2004)

- New: Script-based libraries. It's now possible to call routines/set global variables from other scripts. See new "script-based libraries" demo to see how it works.
- New: File-manipulation routines added: AssignFile, Reset, Rewrite, Append, CloseFile, Write, WriteLn, ReadLn, EOF, FilePos, FileSize (thanks to Keen Ronald).
- New: More system functions added: Abs, ArcTan, ChDir, Chr, Exp, Frac, Int, Ln, Odd, Ord, Sqr, Sqrt.
- New: Support to ElseIf constructor in Basic scripter.
- New: Support to Uses and Imports declaration in Basic scripter (thanks to Dean Franks).

- New: Code editor with Drag & drop support.
- New: AdvCodeList component.
- New: Code editor with wordwrap support (no wordwrap, wordwrap on memo width, wordwrap on right margin).
- New: Code editor with Code block start/end highlighting while typing.
- New: Code editor with properties ActiveLineColor, ActiveLineTextColor properties added.
- New: Code editor with BreakpointColor, BreakpointTextColor.
- New: Code editor with Actions for most common editor actions.
- Improved: Could not use events or call subroutines on precompiled scripts (loaded from stream/file).
- Improved: CASE and SELECT CASE statements not working properly.
- Improved: FOR statements with negative step not working properly.
- Improved: Changing CanClose parameter in OnClose event has no effect.
- Improved: Basic double double-quotes in strings not working properly.
- Improved: Unknown variable error in FOR statements when OptionExplicit = true.

Version 2.5.3 (Mar-2004)

- Fixed: Small fixes and improvements.

Version 2.5.2

- New: Debugging can start from any script subroutine, not only main block.
- New: Properties in TatScriptDebugger component: RoutineName, UpdateSourceCode and MemoReadOnly.
- Improved: TatScripterDebugger.Execute method now works even if script is already running.
- Improved: Values of global variables keep their values between scripter executions.
- Fixed: Bug with variant arrays.
- Fixed: Bug with `try..except` blocks while debugging.

Version 2.5.1

- Fixed: Several bug fixes and stability improvements.

Version 2.5

- New: WITH clause language construct.

- New: Type casting.
- New: IS/AS operators (only between object and class).
- New: Typed variable declarations, e.g, `var Table: TTable;`. It will only take effect for object variables.
- New: Global variables.
- New: Watches.
- New: Forward directives.
- New: Integrated autocompletion in IDE and debugger.
- New: Integrated hint for evaluation of variables during debug.
- New: Syntax memo with bookmark support.
- New: IDE demo app.
- Improved: WebScripter & PageProducer component for creating Pascal based ASP-like web applications.
- Improved: Multi-thread support.

Version 2.4.6

- Improved: WebScripter component.
- New: PageProducer component to be used with WebScripter.

Version 2.4.5

- New: WebScripter component (written by and provided by Don Wibier) and Page producer component that parses Pascal or Basic ASP-like files and produces HTML files.
- New: Basic Scripter: "Set" word supported. Example: `Set A = 10`.
- New: Basic Scripter: "&" operator supported. Example: `MyFullName = MyFirstName & \" \" & MyLastName`.
- New: Pascal Scripter: function declaration accepts result type (which is ignored): `function MyFunction: string;`.
- New: Pascal Scripter: const section supported: `const MyStr = 'This is a string';`.
- New: AdvMemo insert & overwrite mode.
- Improved: AdvMemo numeric highlighting.

Version 2.4

- New: AdvMemo with parameter hinting.
- New: AdvMemo with code completion.

- New: AdvMemo with error marking.
- Improved: Various smaller scripter engine improvements.
- New: DynaForms demo added.

Version 2.3.5

- New: Support for hexadecimal integers ($10 in Pascal, 0x10 in Basic).
- New: Allow spaces between function names and parameters, eg.: `ShowMessage ('Hello world!');`.
- New: Uses clause (to use import libraries), eg.: `uses Classes; {Load Classes library if TatClassesLibrary was previous registered}`.
- New: From Delphi function, it is possible to know name of method or property called, using CurrentPropertyName and CurrentMethodName functions from TatVirtualMachine object.
- New: No need to assign OnDebugHook event to debug script.
- New: Use of params by reference when calling script procedures from Delphi.
- New: Changed class name of internal library, from TatSytemLibrary to TatInternalLibrary.
- New: Minor bug fixes (array property).

Version 2.3

- New: Support for Pascal & Basic script engines for Kylix 2,3.

Version 2.2

- Improved: Syntax highlighting memo, with improved speed, SaveToHTML function, Print.
- Improved: Design time script property editor.
- Improved: Debugger control.

Version 2.1

- New: Seamless and powerful Delphi component event handling allows event handling chaining between Delphi and Scripter in any sequence allows setting component event handling from Delphi or from Scripter or from both.
- New: 4 sample applications for Pascal and Basic scripter that shows the new powerful event handling

Version 2.0

- First release as Scripter Studio, suite of scripter tools for applications.

- New: Run-time Pascal and Basic language interpreter.
- New: Design-time and run-time debugger.
- New: Pascal and Basic syntax highlighting memo with integrated debugging facilities.
- New: FormScript, form-aware descendant scripter components for Basic and Pascal.
- New: Scripter Studio developers guide.
- New: Run-time script debugger dialog.
- New: Arguments passed by reference on local procedures/function and on object methods capability added.
- New: Safe multiprocessing/multi-threading features with new method signature and source code rearrengement.
- New: Automatic variable declaration, now is controlled by OptionExplicit property.
- New: Array properties, variant array constructor and string as array support was introduced.
- New: Class methods and properties support and class references (allow to implement, for example, `Txxxx.Create(...);`).
- New: Additional system library usefull routines: Inc, Dec, Format, VarArrayHighBound, High, VarArrayLowBound, Low, TObject.Create, TObject.Free, VarToStr.
- New: Extendable architecture open to add support for other languages in future updates.
- Improved: Object Pascal syntax compatibility (not, xor, shl, shr, \, div, mod, break, continue, exit, null, true, false, var, case, function).

Version 1.5

- TatPascalScripter release.

Former Scripter Studio Pro History

Version 2.2 (Apr-2012)

- New: 64-bit support in Rad Studio XE2.
- New: All new features of TAdvMemo 3.0 included.
- New: Support to declare 64-bit integer (Int64) literal values in script. Better handling of Int64 arithmetic operations (Delphi 6 and up only).
- New: TIDEDialog.PaletteStyle property allows use old-style Delphi 7 palette in newer Delphis.
- New: If palette glyph is not available for a registered component, uses glyph from ancestor instead of using TComponent glyph.
- Improved: Import tool: Better handling of subtypes. It was ignoring properties/methods declared after subtype declaration.
- Improved: All imported files for VCL updated for 64-bit support and some missing methods like TList.Count in Delphi XE and up.
- Fixed: Several Issue with default properties (using With clause, expression in indexes, global objects).
- Fixed: TatScriptDebugger issue when settings breakpoints in a second execution.
- Fixed: Calling class functions using object references (eg. Button1.ClassName) failing in some situations.
- Fixed: Issue with TatDebugWatch.
- Fixed: Files in Scripter IDE were being marked as modified even when no modifications were being done to project.
- Fixed: Issue with code completion in TatScriptDebugger and TatMemoInterface components.
- Fixed: Import Tool issue with WideChar parameters.
- Fixed: Multi selection in form designer was being lost when controls were moved/resized.
- Fixed: Issue with WideString parameters when defining classes using new RTTI.
- Fixed: Small issue with form header being renamed twice when form unit is project main unit.
- Fixed: Import tool now splits string constants when they are longer than 255 chars.

Version 2.1 (Sep-2011)

- New: Delphi/C++Builder XE2 Support.

- New: Undo/Redo operations in IDE form designer.
- New: TIDEEngine.UndoLevel property to control the level form designer undo operations.
- New: ButtonHints property in Palette Toolbar component allows custom hints.
- New: Delphi XE2 support in import tool.
- Improved: Class registration using new RTTI - now also import classes not registered with RegisterClass.
- Fixed: Issue with combined indexed default properties.
- Fixed: Minor bug when saving compiled code.
- Fixed: Import tool now importing published methods.

Version 2.0 (Apr-2011)

- New: Full support for parameter hints in syntax memo editor.
- New: Smart code completion automatically suggests last choices made by user.
- New: Support for creating script-based classes.
- New: Updated import tool to also import parameter hints of methods.
- New: Updated imported VCL units for all Delphi versions, now including parameter hints.
- New: Additional parameter in DefineMethod allowing to specify the parameter hint for that method.
- Improved: Overall improved code completion experience with several issues fixed and better keyboard support for completion.
- Improved: Several other improvements added from TAdvMemo 2.3 version (see AdvMemo.pas source code for more info).
- Fixed: Relative paths for script files not working with $(APPDIR) and $(CURDIR).
- Fixed: Issues with on dataset fields editor.

Version 1.7.1 (Dec-2010)

- Fixed: Registered version installer not working properly with TMS VCL Subscription Manager.

Version 1.7 (Dec-2010)

- New: Updated imported VCL units for all Delphi versions, now including indexed properties, default parameters and other minor tweaks.
- New: Visual editor for TWideStringList properties in object inspector.
- New: Event on TIDEEngine for component selection in form designer.

- Fixed: Issue with getter of boolean properties using DefineClassByRTTI.
- Fixed: Issue with TStringList.Create in Delphi XE imported Classes library.
- Fixed: Functions with "out" parameters not working in ap_DateUtils.
- Fixed: Install conflict between Scripter and other TMS packages.
- Fixed: Instructions to return values for "out" parameters not generated by ImportTool.
- Fixed: Issue with enumerated types in ImportTool.

Version 1.6.0.1 (Oct-2010)

- Improved: Information about CurrentClass in Context parameter for OnUnknownElementEvent event.
- Fixed: Issue with InStr function in VB Script Library.
- Fixed: Issues installing Scripter Studio on RAD Studio XE.

Version 1.6 (Sep-2010)

- New: RAD Studio XE Support.
- New: Support for default indexed properties in script syntax (e.g. Lines[i] instead of Lines.Strings[i]).
- New: Fields Editor for TDataset components in the IDE.
- New: Combobox editor for FieldName and TableName properties in Object Inspector.
- Improved: C++ Builder source code examples included in Scripter manual.
- Improved: Import Tool parser is now recognizing most of new Delphi syntax features and provides RAD Studio XE support.
- Improved: Options in DefineClassByRTTI method to redefine an already defined class in scripter.
- Improved: Added property Modified (read only) in TIDEProjectFile.
- Fixed: Issue with getter of boolean properties.
- Fixed: Issue with script executed step by step while watching a variable.
- Fixed: Issues with DefineClassByRTTI method (registering of constructor overloads, return of var/out method parameters).
- Fixed: Issue with record declarations in units imported by ImportTool using enhanced RTTI.
- Fixed: Issues with code completion (up to Delphi 2005).
- Fixed: Find and Replace in memo didn't work with Match Whole Word Only.
- Fixed: Cursor position was not restoring in source code when toggling form/unit.
- Fixed: Unit ap_Mask missing at DB palette registering.

Version 1.5 (Jul-2010)

- New: Automatic classes, methods and properties registration using new enhanced RTTI (Delphi 2010 and later).
- New: Extensive help component reference.
- New: Fully documented source code.
- New: TIDEEngine.PreventDefaultEventCreation property.
- Fixed: Access Violation on Items property of TMainMenu and TPopupMenu.
- Fixed: Error compiling some imported units in Delphi 2010.
- Fixed: Issue with SaveCodeToFile when using form components of a non-registered class..
- Fixed: Paste to editor was not pasting in correct position.
- Fixed: Issue with scrollbars in form editor.
- Fixed: Issue with tab set in Themed IDE.
- Fixed: Memory leak when using some rare syntax constructions in script.

Version 1.4.6 (Jan-2010)

- New: TatCustomScripter.LoadFormEvents property allows setting event handlers when loading form dfm files saved in Delphi.
- Improved: Char constants now accept hexadecimals (#$0D as an alternative to #13).
- Fixed: Component icons in toolbar were missing when compiling application with packages.
- Fixed: VB function MsgBox was displaying incorrect window caption.
- Fixed: VB function Timer was performing wrong calculation with miliseconds.
- Fixed: Issue with OnRuntimeError not providing correct source code row and col of error.
- Fixed: Issue with F9 key not being trapped by script forms.
- Fixed: Editor not becoming invisible when closing a file in the ide (with THEMED_IDE directive defined).

Version 1.4.5 (Sep-2009)

- New: Delphi/C++ Builder 2010 support.
- New: Design-time image list editor.
- New: Array properties supported in COM objects.
- Improved: Pascal syntax allows "end." (end dot) in main script block.
- Improved: AdvMemo files updated to latest versions.

- Fixed: Issue with `try..except` and `try..finally` blocks.
- Fixed: Issue with component placing in form designer.
- Fixed: Incompatibility when Greatis components are installed together with scripter pro.

Version 1.4 (May-2009)

- New: Themed IDE. By defining directive THEMED_IDE in AScript.INC file you can compile scripter package with TMS Component Pack and have your IDE in Office style (Luna, Olive, etc.).
- New: "Private" and "Public" keywords allow defining private global variables, private subs and private functions (not visible from other scripts) in Basic scripts.
- New: Variable initialization in Basic scripts (e.g., Dim A as String = "Hello").
- New: Return statement in Basic scripts.
- New: `If..Then..` statements without "End If" for single line statements (in Basic scripts).
- New: `Try..Catch..End` Try syntax in addition to `Try..Except..End` (in Basic scripts).
- New: TIDEDialog.AppStyler property allows setting the theme style of the whole IDE (requires TMS Component Pack).
- New: TIDEEngine.UnregisterComponent method.
- New: TIDEEngine.OnGetComponentImage event allows providing an image for component icon (in toolbar and form designer) without needing to include resources.
- New: TIDEEngine.OnComponentPlaced event is fired whenever a new component in placed in form designer.
- New: TIDEPaletteButtons.CategoryColor and CategoryColorTo properties allow settings a background color for all categories in the control.
- New: TCustomScripter.ScriptFormClass allows providing a different class (derived from TScriptForm) for the IDE forms.
- Improved: Included packages for specific compilation in C++Builder-only environments.
- Improved: When scripter don't find a library, a compile error is raised (instead of an exception).
- Improved: In IDE, current file name is displayed in save dialogs.
- Improved: IDE now uses default component icon for new components registered in IDE that don't have specific icon.
- Fixed: Issue with menu option "Compile" in scripter IDE.
- Fixed: Issue when double clicking the form's caption in form designer.
- Fixed: Issue when using arrow keys to move between controls in form designer.
- Fixed: In IDE form designer, form was disappearing in Windows Vista when BorderStyle was set to bsNone.

- Fixed: Undesired behaviour when using Close Project menu option.
- Fixed: Issue with clipboard error in scripter IDE.
- Fixed: Issue with popup menu in object inspector when mouse buttons are swapped.
- Fixed: "Select Unit" and "Watch Properties" windows are now dialogs (not sizeable, not minimizable).
- Fixed: AV in form designer when cutting controls to clipboard.

Version 1.3 (Feb-2009)

- New: "new" clause in Basic script. e.g "MyVar = new TLabel(Self)".
- New: const declaration in Basic script.
- New: Redo menu option in IDE.
- New: Compile menu option in IDE.
- New: VBScript functions Redim, RedimPreserve, Split, Join, StrReverse and Randomize.
- New: Public method/property TIDEEngine.VisibleFileCount and TIDEEngine.VisibleFiles.
- New: Property TIDEEngine.AutoStyler allows avoiding the engine to set an automatic syntax styler for the memo.
- New: TatCustomScripter methods BeginRefactor and EndRefactor to allow changing in source code without notifying the IDE.
- Improved: Better load/save compiled code engine.
- Improved: Cursor position in memo is preserved when switching units and/or running the script.
- Improved: Clipboard operations now working in designer, memo and inspector.
- Improved: Exposed TAdvMemo.VisiblePosCount as public property.
- Improved: Scrolling in memo when ActiveLine property is set.
- Improved: VBScript functions LBound, UBound, MsgBox now have default parameters.
- Improved: Active line indicator now is hidden after script finished execution.
- Improved: Better performance in designer when using big scripts.
- Improved: Position of non-visual componentes being saved now.
- Improved: Default popup menu (copy, paste, etc.) in object inspector.
- Fixed: Issue with KeyPreview property in inspector.
- Fixed: Issue with wide string properties in Delphi 2009.
- Fixed: Issue with PasswordChar and other properties of type Char.
- Fixed: Issue with inspector becoming blank when using scroll bars.
- Fixed: Watches not being updated properly in some situations.

- Fixed: Losing form events in some situations.
- Fixed: Designer handles not appearing after paste operation.
- Fixed: Engine not recognizing basic syntax file extension in some situations.
- Fixed: Visual issues in form designer in Windows Vista.
- Fixed: Non-visual components appearing behind visual components in designer.
- Fixed: Duplicated "save as" dialog when using menu option "Save Project As".
- Fixed: Memory leak in memo using word wrap.
- Fixed: Small issue with cursor position handling for wordwrapped memo.
- Fixed: Issue with backspace & selection in memo.
- Fixed: Issue with input of unicode characters in memo.
- Fixed: Issue with paste after delete in specific circumstances in memo.
- Fixed: Issue with horiz. scrollbar updating in memo.
- Fixed: AV in some scripts accessing indexed properties.
- Fixed: AV when setting breakpoint in begin clause.

Version 1.2 (Oct-2008)

- New: Delphi 2009/C++Builder 2009 support.
- Fixed: Issue with AssignFile procedure.
- Fixed: Issue when removing attached events.
- Fixed: Issue while using debug watches for global variables.

Version 1.1 (Jul-2008)

- New: Non-modal menu editor in the IDE allows better integration with the IDE while editing a menu.
- New: Undo menu option in IDE Dialog.
- New: "Find" and "Find and Replace" menu options in IDE Dialog.
- New: TIDEProjectFile.SaveFormToString method.
- New: TIDEProjectFile.FormResource property.
- New: Method TAdvMemo.SaveToRTFStream.
- New: Property TatCustomScripter.Watches (TatScripterWatches class) with the concept of watches for the whole scripter, not only the current script being executed.
- New: AddNotifier and RemoveNotifier in TIDEEngine allows to receive notifications about changed in the IDE.

- New: TIDEEngine.ActiveFileModified allows notify the IDE that the current file was updated.
- New: Read/write TIDEEngine.SelectedComponent property identifies which is the current component selected in the ide form designer.
- Improved: Scroll bars now appear in the form designer when the form is bigger than client editor area.
- Improved: Clicking on caption bar now selects the form being designed.
- Improved: Renaming internal classes for compatibility with other 3rd party tools (Greatis, ReportBuilder).
- Improved: Memo syntax highlighting with Pascal syntax.
- Improved: Autocompletion list updating while typing.
- Improved: Local variables are now initialized to NULL.
- Fixed: Center in window option in alignment tool was not working properly.
- Fixed: Issue with editing TForm.WindowMenu property.
- Fixed: Issue with editing TForm.ActiveControl property.
- Fixed: Menu items now can be selected in the object inspector and component combobox.
- Fixed: Runtime error message was not displaying correct line and number of error.
- Fixed: Issue with watches not being updated or disappearing while debugging.
- Fixed: Issue with parameters passed by value to subroutines behaving like by reference.
- Fixed: Issue with paste on non expanded line in TAdvMemo.
- Fixed: Issue with repainting after RemoveAllCodeFolding in TAdvMemo.
- Fixed: Issue with pasting into an empty memo in TAdvMemo.
- Fixed: Issue with TrimTrailingSpaces = false in TAdvMemo.
- Fixed: Issue in Delphi 5 with inserting lines in TAdvMemo.
- Fixed: Issue with scrollbar animation on Windows Vista in TAdvMemo.
- Fixed: Gutter painting update when setting Modified = false programmatically in TAdvMemo.

Version 1.0 (Apr-2008)

- First release, based on Scripter Studio 4.0.

Getting Support

General notes

Before contacting support:

- Make sure to read the tips, faq and readme.txt or install.txt files in component distributions.
- Make sure you have the latest version of the component(s).

When contacting support:

- Specify with which component you have a problem.
- Specify which Delphi or C++Builder version you're using and preferably also on which OS.
- In case of IntraWeb or ASP.NET components, specify with which browser the issue occurs.
- For registered users, use the special priority support email address (mentioned in registration email) & provide your registration email & code. This will guarantee the fastest route to a solution.

Send email from an email account that

1. allows to receive replies sent from our server;
2. allows to receive ZIP file attachements;
3. has a properly specified & working reply address.

Getting support

For general information: info@tmssoftware.com

Fax: +32-56-359696

For all questions, comments, problems and feature request for VCL components : help@tmssoftware.com.

To improve efficiency and speed of help, refer to the version of Delphi, C++Builder, Visual Studio .NET you are using as well as the version of the component. In case of problems, always try to use the latest version available first.

Breaking Changes

List of changes in each version that breaks backward compatibility.

Version 6.5

- There was a big package restructuration in version 6.5. More info in the dedicated topic.
- Now you are required to add `Vcl.ScripterInit` unit to your project if you are using Delphi XE or lower, otherwise an error message will appear when you try to use the scripter components:

```
uses
  Vcl.ScripterInit;
```

Version 6.0

- Changes in package structure to support Firemonkey. More info here.

Version 6.5 - Package Restructuration

TMS Scripter packages have been restructured. The packages are now separated into runtime and design-time packages, and into several smaller ones allowing a better usage of them in an application using runtime packages (allows it to work with 64-bit applications using runtime packages, for example). Also, Libsuffix option is now being used so the dcp files are generated with the same name for all Delphi versions. Here is an overview of what's changed:

Before version 6.5, packages were last restructured in version 6.0. You can check the topic about Version 6.0 Breaking Changes to see how it was.

From version 6.5 and on, there are twelve packages:

- *TMSScripter.dpk* (Core Package)
- *TMSScripter_Memo.dpk* (Syntax Highlight Memo)
- *TMSScripter_Imports_RTL.dpk* (Imports for RTL Units)
- *TMSScripter_Imports_VCL.dpk* (Imports for VCL Components)
- *TMSScripter_Imports_DB.dpk* (Imports for DB Components)
- *TMSScripter_Imports_ADODB.dpk* (Imports for ADODB Components)
- *TMSScripter_FMX.dpk* (Units to Support Scripter in Firemonkey Applications)
- *TMSScripter_VCL.dpk* (Units to Support Scripter in VCL Applications)
- *TMSScripter_IDE.dpk* (TMS Scripter IDE Components)
- *TMSScripter_Legacy.dpk* (Legacy TMS Scripter Components)
- *dclTMSScripter.dpk* (Design-Time Core Package)
- *dclTMSScripter_Memo.dpk* (Design-Time Memo Package)

DCP files are generated with same name, and only BPL files are generated with the suffix indicating the Delphi version. The suffix, however, is the same used by the IDE packages (numeric one indicating IDE version: 160, 170, etc.). The new package structure is as following (note that when 6.5 was released, latest Delphi version was XE7. Packages for newer versions will follow the same structure):

Version	Package File Name	BPL File Name	DCP File Name
Delphi 7	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter70.bpl TMSScripter_Memo70.bpl TMSScripter_Imports_RTL70.bpl TMSScripter_Imports_VCL70.bpl TMSScripter_Imports_DB70.bpl TMSScripter_Imports_ADODB70.bpl TMSScripter_FMX70.bpl TMSScripter_VCL70.bpl TMSScripter_IDE70.bpl TMSScripter_Legacy70.bpl dclTMSScripter70.bpl dclTMSScripter_Memo70.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi 2007	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter100.bpl TMSScripter_Memo100.bpl TMSScripter_Imports_RTL100.bpl TMSScripter_Imports_VCL100.bpl TMSScripter_Imports_DB100.bpl TMSScripter_Imports_ADODB100.bpl TMSScripter_FMX100.bpl TMSScripter_VCL100.bpl TMSScripter_IDE100.bpl TMSScripter_Legacy100.bpl dclTMSScripter100.bpl dclTMSScripter_Memo100.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi 2009	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter120.bpl TMSScripter_Memo120.bpl TMSScripter_Imports_RTL120.bpl TMSScripter_Imports_VCL120.bpl TMSScripter_Imports_DB120.bpl TMSScripter_Imports_ADODB120.bpl TMSScripter_FMX120.bpl TMSScripter_VCL120.bpl TMSScripter_IDE120.bpl TMSScripter_Legacy120.bpl dclTMSScripter120.bpl dclTMSScripter_Memo120.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp

Version	Package File Name	BPL File Name	DCP File Name
Delphi 2010	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter140.bpl TMSScripter_Memo140.bpl TMSScripter_Imports_RTL140.bpl TMSScripter_Imports_VCL140.bpl TMSScripter_Imports_DB140.bpl TMSScripter_Imports_ADODB140.bpl TMSScripter_FMX140.bpl TMSScripter_VCL140.bpl TMSScripter_IDE140.bpl TMSScripter_Legacy140.bpl dclTMSScripter140.bpl dclTMSScripter_Memo140.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi XE	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter150.bpl TMSScripter_Memo150.bpl TMSScripter_Imports_RTL150.bpl TMSScripter_Imports_VCL150.bpl TMSScripter_Imports_DB150.bpl TMSScripter_Imports_ADODB150.bpl TMSScripter_FMX150.bpl TMSScripter_VCL150.bpl TMSScripter_IDE150.bpl TMSScripter_Legacy150.bpl dclTMSScripter150.bpl dclTMSScripter_Memo150.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi XE2	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter160.bpl TMSScripter_Memo160.bpl TMSScripter_Imports_RTL160.bpl TMSScripter_Imports_VCL160.bpl TMSScripter_Imports_DB160.bpl TMSScripter_Imports_ADODB160.bpl TMSScripter_FMX160.bpl TMSScripter_VCL160.bpl TMSScripter_IDE160.bpl TMSScripter_Legacy160.bpl dclTMSScripter160.bpl dclTMSScripter_Memo160.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp

Version	Package File Name	BPL File Name	DCP File Name
Delphi XE3	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter170.bpl TMSScripter_Memo170.bpl TMSScripter_Imports_RTL170.bpl TMSScripter_Imports_VCL170.bpl TMSScripter_Imports_DB170.bpl TMSScripter_Imports_ADODB170.bpl TMSScripter_FMX170.bpl TMSScripter_VCL170.bpl TMSScripter_IDE170.bpl TMSScripter_Legacy170.bpl dclTMSScripter170.bpl dclTMSScripter_Memo170.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi XE4	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter180.bpl TMSScripter_Memo180.bpl TMSScripter_Imports_RTL180.bpl TMSScripter_Imports_VCL180.bpl TMSScripter_Imports_DB180.bpl TMSScripter_Imports_ADODB180.bpl TMSScripter_FMX180.bpl TMSScripter_VCL180.bpl TMSScripter_IDE180.bpl TMSScripter_Legacy180.bpl dclTMSScripter180.bpl dclTMSScripter_Memo180.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi XE5	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter190.bpl TMSScripter_Memo190.bpl TMSScripter_Imports_RTL190.bpl TMSScripter_Imports_VCL190.bpl TMSScripter_Imports_DB190.bpl TMSScripter_Imports_ADODB190.bpl TMSScripter_FMX190.bpl TMSScripter_VCL190.bpl TMSScripter_IDE190.bpl TMSScripter_Legacy190.bpl dclTMSScripter190.bpl dclTMSScripter_Memo190.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp

Version	Package File Name	BPL File Name	DCP File Name
Delphi XE6	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter200.bpl TMSScripter_Memo200.bpl TMSScripter_Imports_RTL200.bpl TMSScripter_Imports_VCL200.bpl TMSScripter_Imports_DB200.bpl TMSScripter_Imports_ADODB200.bpl TMSScripter_FMX200.bpl TMSScripter_VCL200.bpl TMSScripter_IDE200.bpl TMSScripter_Legacy200.bpl dclTMSScripter200.bpl dclTMSScripter_Memo200.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp
Delphi XE7	TMSScripter.dpk TMSScripter_Memo.dpk TMSScripter_Imports_RTL.dpk TMSScripter_Imports_VCL.dpk TMSScripter_Imports_DB.dpk TMSScripter_Imports_ADODB.dpk TMSScripter_FMX.dpk TMSScripter_VCL.dpk TMSScripter_IDE.dpk TMSScripter_Legacy.dpk dclTMSScripter.dpk dclTMSScripter_Memo.dpk	TMSScripter210.bpl TMSScripter_Memo210.bpl TMSScripter_Imports_RTL210.bpl TMSScripter_Imports_VCL210.bpl TMSScripter_Imports_DB210.bpl TMSScripter_Imports_ADODB210.bpl TMSScripter_FMX210.bpl TMSScripter_VCL210.bpl TMSScripter_IDE210.bpl TMSScripter_Legacy210.bpl dclTMSScripter210.bpl dclTMSScripter_Memo210.bpl	TMSScripter.dcp TMSScripter_Memo.dcp TMSScripter_Imports_RTL.d TMSScripter_Imports_VCL.d TMSScripter_Imports_DB.dc TMSScripter_Imports_ADOI TMSScripter_FMX.dcp TMSScripter_VCL.dcp TMSScripter_IDE.dcp TMSScripter_Legacy.dcp dclTMSScripter.dcp dclTMSScripter_Memo.dcp

Version 6.5 - TScrMemo replaces TAdvMemo

As of TMS Scripter 6.5, *TAdvMemo* component is no longer available. This doesn't mean there is no syntax highlight memo component anymore - it was just renamed to *TScrMemo*.

This was done to get rid of dependency and conflict with TMS Component Pack. Both products have a TAdvMemo component and although registered versions of both products could be installed together, it was not an ideal setup.

For most TMS Scripter users, this will be a transparent change. If you use *TIDEMemo*, it's still there. If you use *TIDEDialog* component to show the TMS Scripter IDE, it will still work. If you have TMS Component Pack installed, you will also have no problems.

The only issue that might appear is if you have TAdvMemo components in your application forms and you don't have TMS Component Pack installed. In this case, Delphi IDE will complain that a TAdvMemo component does not exist, and you will have to manually edit your dfm/pas file and replace any *TAdvMemo* reference by a *TScrMemo* reference.

Version 6.0 - Breaking Changes

1. Packages changed

For Delphi XE2 and up, packages were restructured. Package *ascriptproxe2.dpk* doesn't exist anymore, and was split into the following packages:

- **tmsscripter_xe2**: Runtime package with core/non-visual classes and scripting engine.
- **tmsscriptervcl_xe2**: Runtime package with VCL components and imported VCL.
- **tmsscripterreg_xe2**: Design-time package.
- **tmsscripterfmx_xe2**: Runtime package with Firemonkey components.

2. Existing applications need a small change

For Delphi XE2 and up, since the scripter engine can work with either VCL or Firemonkey, you must specify which framework you are using in your application, by adding a proper unit to the uses clause of any unit in your project.

To use scripter with VCL, add unit `Vcl.ScripterInit`:

```
uses
  Vcl.ScripterInit;
```

To use scripter with Firemonkey add unit `FMX.ScripterInit`:

```
uses
  FMX.ScripterInit;
```

3. Firemonkey compatibility

TMS Scripter engine is now is compatible with Firemonkey. It means you can execute scripts in Firemonkey applications, even with forms. But note that several VCL components don't have Firemonkey equivalents yet, especially the visual ones, so the scripter IDE (form designer, syntax memo, object inspector, etc.) are not available for Firemonkey applications.