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ScriptForge

Scripting resources for Basic [& Python] coders

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https://gitlab.com/LibreOfficiant/scriptforge

2020

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Agenda

- “ScriptForge”, what is it, in a nutshell ?
- Is it smart to code an API in Basic ?
- Service orientation
- Extensibility, the framework
- Modules in release 1.0
- Perspectives

ScriptForge, what is it ?

A service-oriented framework

- **Data** containers
  - Arrays
  - Strings
  - A mapping class
- **Error** handling
- **Files** and folders, **text files** read & write
- **Context** information
- Localization
- Interconnection of **Basic** and **Python**
- Windows and **documents**
  - **Calc** sheets
- **Dialogs** and their controls
- **Databases**
- **… MORE TO COME ...**

An API for Basic written mainly in Basic.
Smart ?

- **Complex data structures ?**
  - Variants
  - User defined types
  - Arrays
  - Objects
  - All mixed

- **Object orientation ?**
  - Encapsulation, polymorphism
  - Class instances, attributes, methods
  - No inheritance/subtyping (can be bypassed)
  - Class instance creation inside its library
  - Basic variable types are not objects

```
Option ClassModule
```

- **Namespaces for variables ?**
  - Global, Local
  - Public, Private attributes ignored
  - Qualification to avoid homonyms

An API for Basic written mainly in Basic.
Smart ?

Namespaces for Functions/Subs ?

- Private is ignored
- Any Function present in a loaded library becomes callable from all libraries
- A library cannot be unloaded
- Only **full qualification** definitely prevents collisions

```
GlobalScope.Library.Module.Function()
```

- BUT …

```
Dim f As Object, g As Object

    Set f = GlobalScope.myLibrary.myModule
    f.myFunction(...)
    Set g = f
    g.myFunction(...)
```

Service orientation of ScriptForge

ScriptForge service: the user's point of view

```
GlobalScope.BasicLibraries.loadLibrary("ScriptForge")

Dim f
    f = CreateScriptService("FileSystem")
    f.CopyFile( … )
    f.DeleteFolder( … )

Dim arr, a
    arr = CreateScriptService("Array")
    a = arr.Sort( … )
        '   Or …
    a = SF_Array.Sort( … )
```

Reserved words: (qualification is not forbidden … :)

- **CreateScriptService**
- **SF_Array**, **SF_Exception**, **SF_String** (*because of their presumed frequent use*)

ScriptForge service: the user's point of view

- **CreateScriptService()** returns either

1) A Basic object referring to a Basic **module**

2) A Basic object referring to a Basic **class instance**
   Arguments may be passed to the constructor of the instance

RULE OF THUMB: <u>Qualify ALL methodnames</u>

Service – Behind the scenes

User script

```
Set myServ = CreateScriptService("myLibrary.myService1")
```

ScriptForge core

```
Function CreateScriptService(...) As Object
    If [not yet done] Then
        GlobalScope.BasicLibraries.loadLibrary("myLibrary")
        oModule = [FindModule]("RegisterScriptServices", "myLibrary")
        oModule.RegisterScriptServices()
    End If
    CreateScriptService = [GetService]("myLibrary.myService1")
```

myLibrary

```
Sub RegisterScriptServices()
    ScriptForge.SF_Services.RegisterService("myService1", _
        GlobalScope.myLibrary.Mod_Service1)'   passes a module
    ScriptForge.SF_Services.RegisterService("myService2", _
        "myLibrary.aModuleName.NewService2")
            '   passes as a string the function to invoke
            '   to get an instance of the service
```

Service – The framework

ScriptForge core implements

- CreateScriptService()
- RegisterService()
- RegisterEventManager()

Each associated/invited Library implements

- RegisterScriptServices()

Each module implements

- ServiceName
- Properties()
- Methods()
- _Repr()

Each class module implements

- GetProperty()
- SetProperty()

User Basic script

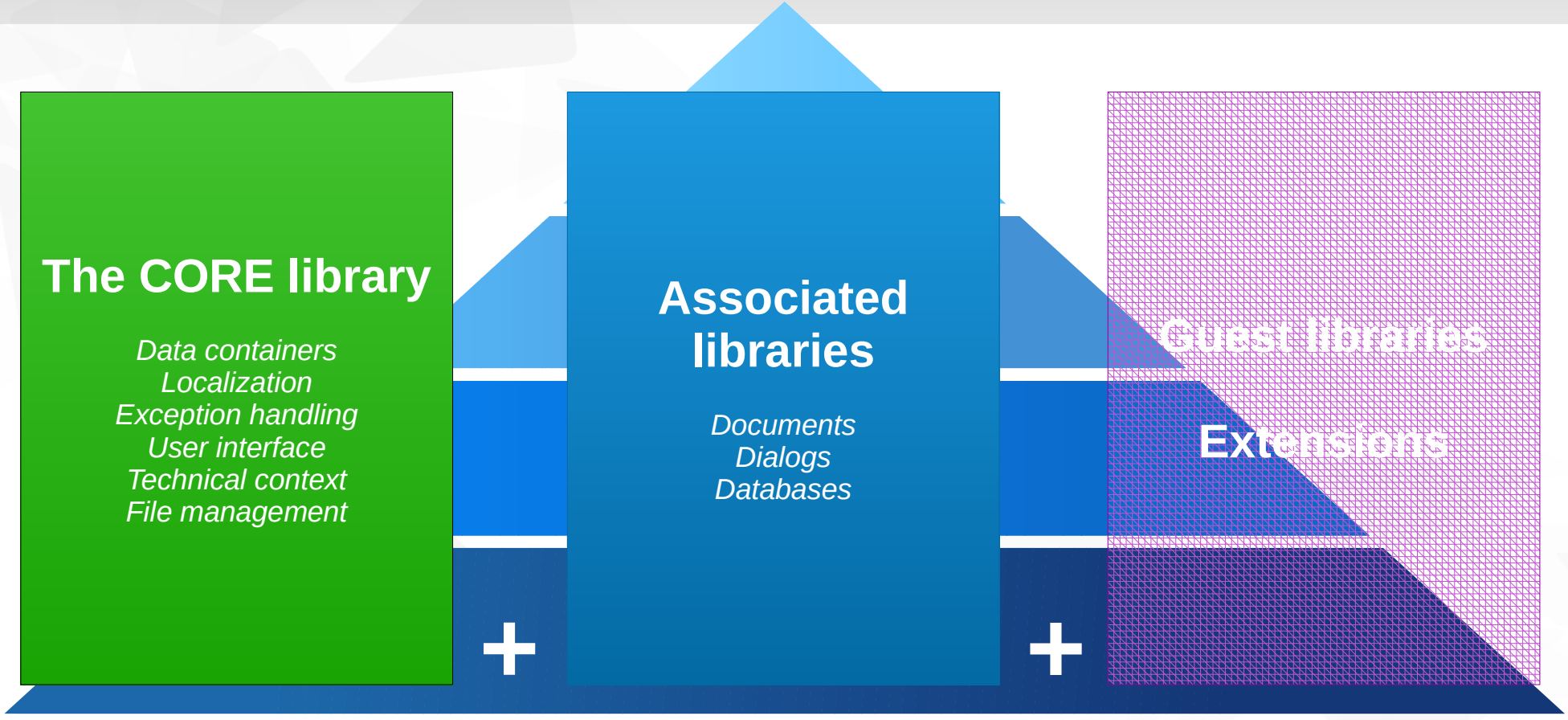
CreateScriptService()

Future

User Python script

CreateScriptService()

The framework



The individual modules

Release 1.0

ScriptForge – Release 1.0

- **Services in *ScriptForge* library**
  - Array
  - Dictionary
  - Exception
  - FileSystem
  - L10N
  - Platform
  - Session
  - String
  - TextStream
  - Timer
  - UI
- **Services in associated libraries**
  - ***SFDocuments***
    - Document
    - Calc
    - Base
  - ***SFDialogs***
    - Dialog
    - DialogControl
  - ***SFDatabases***
    - Database

Built with LO 7.1

- 4 Basic libraries + Python helper functions
- 1 Help page by service
- 1 (english) POT file

Additionally

- A complete unit-tests suite
- A coding conventions charter

Help pages

SFDatabases.Database service

The **Database service** provides for the access to databases either embedded or described in Base documents.

Each instance of the current class represents a single database, with essentially its tables, queries and data (not its forms or reports).

The exchanges with the database are done in **SQL** only.

> To make SQL statements more readable, use optionally square brackets to surround table/query/field names instead of the (RDBMS-dependent) normal surrounding character, (usually double-quote, single-quote or other).

SQL statements may be run in **direct** or **indirect mode**. In direct mode the statement is transferred literally without syntax checking nor review to the database engine.

The provided interfaces include simple tables, queries and fields lists, and access to database data.

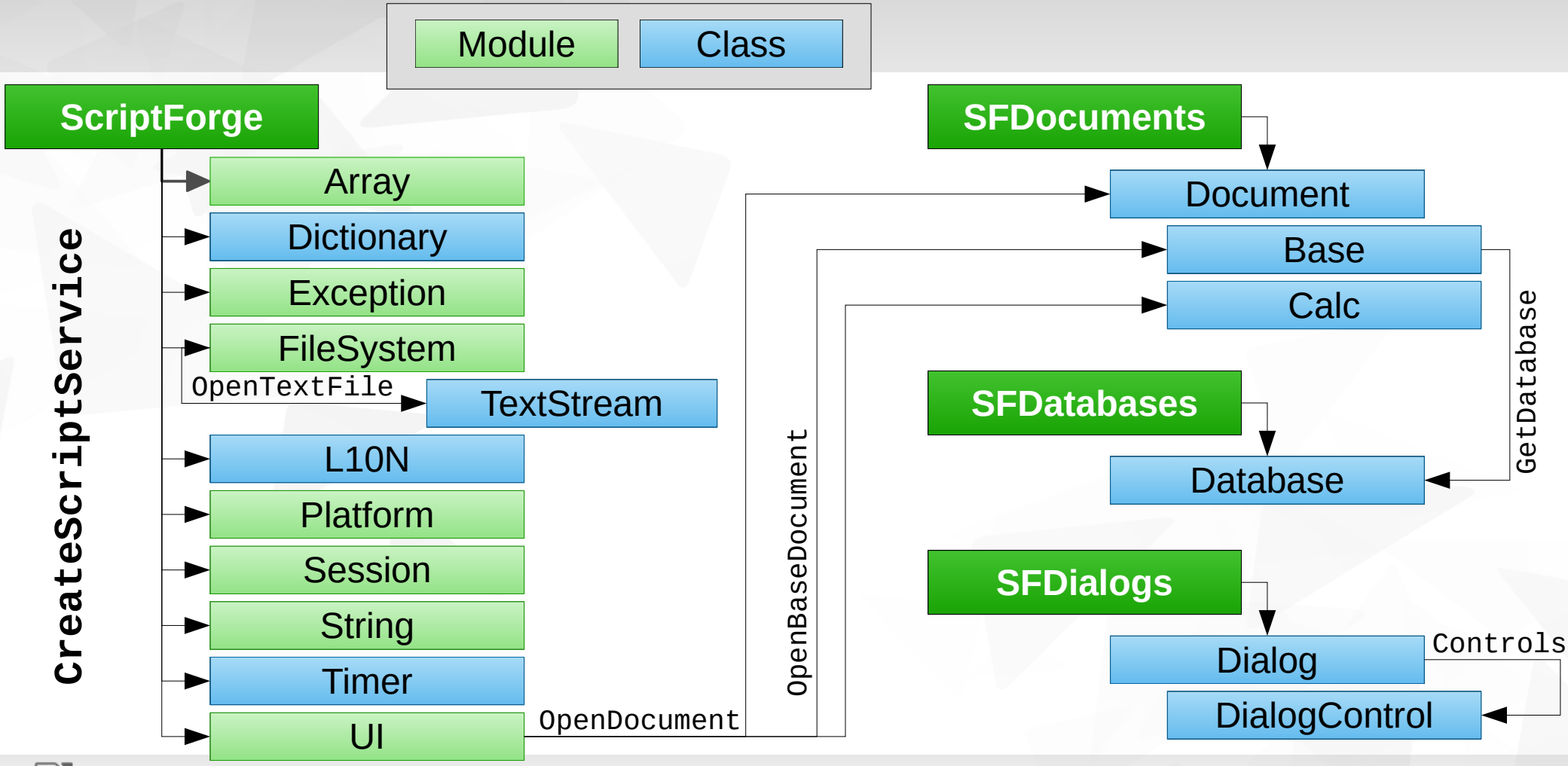
Service invocation and usage

1. To access any database at anytime

```
1  Dim myDatabase As Object
2      Set myDatabase = CreateScriptService("SFDatabases.Database", [FileName], [RegistrationName], [Re
3      '   Arguments:
4      '       FileName:   the name of the Base file compliant with the SF_FileSystem.FileNaming notati
5      '       RegistrationName: the name of a registered database (mutually exclusive with FileName)
6      '       ReadOnly:   Default = True
7      '       User, Password : additional connection arguments to the database server
8      '   ... Run queries, SQL statements, ...
9      myDatabase.CloseDatabase()
```

2. To access the database related to the current Base document

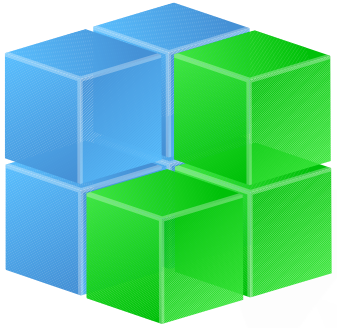
ScriptForge – Relations between services



The “Array” service

30 methods to

- **Add data**
  Append, AppendRow, AppendColumn
- **Transform**
  Flatten, Transpose, Reverse
- **Sort**
  Sort, SortRows, SortColumns, InsertSorted
- **Search**
  Contains, IndexOf
- **Operate sets**
  Unique, Intersection, Union, Difference
- **Import/Export**
  ImportFromCSVFile, ExportToTextFile, Join2D, ConvertToDictionary



Inspired by Python lists and PHP arrays

The “Dictionary” service

Benefit: enhance Collections

Any item type + keys do not need to be known in advance

```
Dim myDict
myDict = CreateScriptService(“Dictionary”)
```

- **Update data**
  Add, ReplaceKey, ReplaceItem, Remove, RemoveAll
- **Search**
  Exists, Item, Items, Keys
- **Import/Export**
  ConvertToJson, ImportFromJson,
  ConvertToPropertyValues, ImportFromPropertyValues
  ConvertToArray

As an example,
the management of services
is implemented thru
a dictionary of dictionaries.

Inspired by the VBA Dictionary class

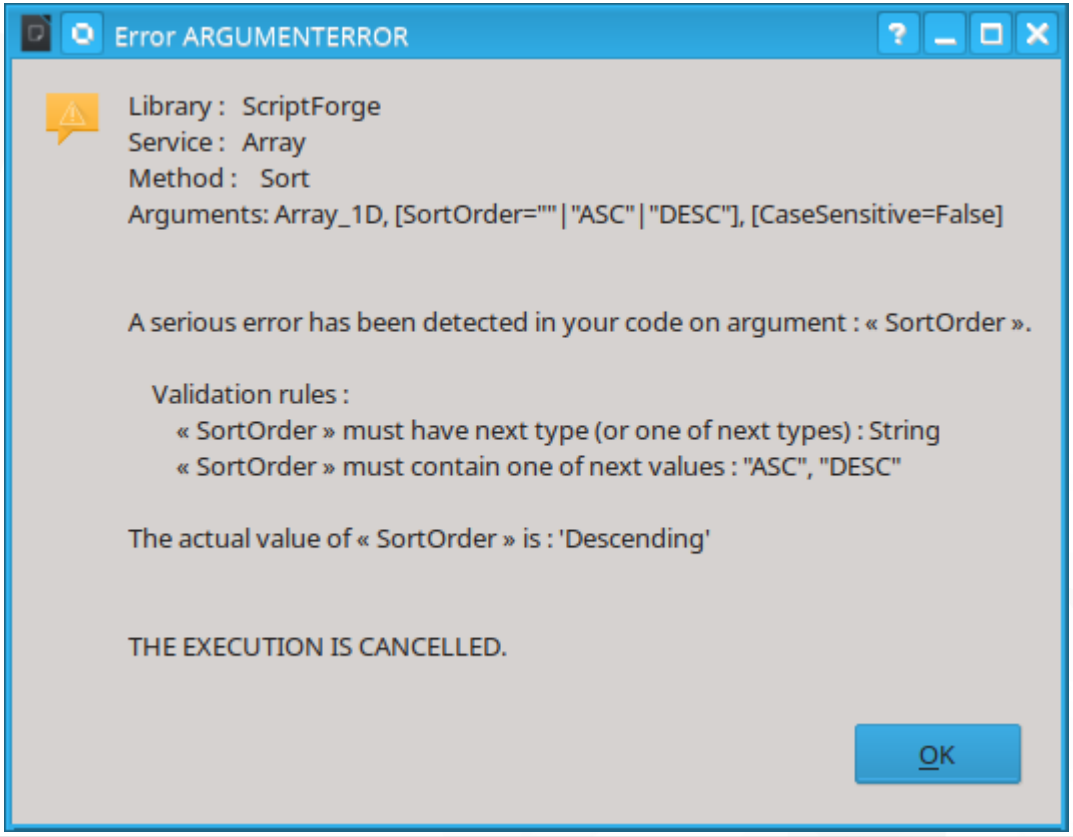
The “Exception” service (1)

- Basic runtime error in ScriptForge itself

  RaiseAbort()

- Error detected by ScriptForge

  RaiseFatal()



The “Exception” service (2)

Similar to the VBA Err object

- Basic runtime error in a user script
  Raise(), Clear()

```
Sub Example_Raise()
Dim a, b, c
On Local Error GoTo Catch
Try:
    a = 10 : b = 0
    c = a / b       ’ Error #11
    '...
    Exit Sub
Catch:
    '    Variants              =>>
End Sub
```

```
‘ Standard behaviour
Catch:
    SF_Exception.Raise()
```

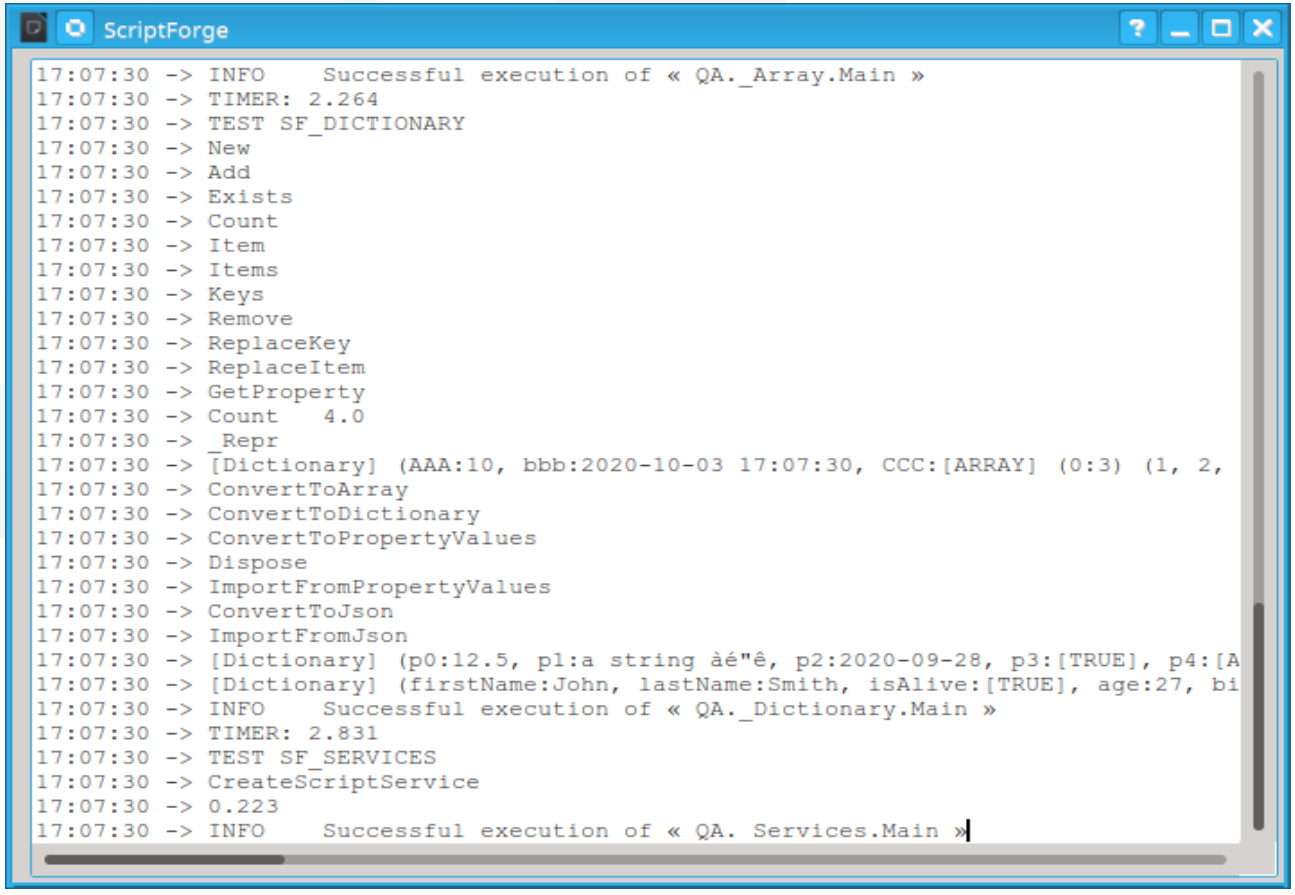
```
‘ Ignore the error
Catch:
    If SF_Exception.Number = 11
    Then SF_Exception.Clear()
```

```
‘   Simulate another error
Catch:
    SF_Exception.Raise(12)
```

```
‘ Replace the usual message
Catch:
    SF_Exception.Raise(, , “It is not a
good idea to divide by zero”)
```

- Error detected by a user script
  Raise(), RaiseWarning()

The “Exception” service (3)



- **Debugging and logging**
  DebugPrint()

- **Console management**
  Console(Modal),
  ConsoleClear(),
  ConsoleToFile()

The “FileSystem” service

8 Properties

- *FileNaming* = “ANY | URL | SYS”
- *ConfigFolder, ExtensionsFolder, InstallFolder*

25 methods to

- **Add**
  CreateFolder, CreateTextFile
- **Copy/Move/Delete** (with wildcards)
  CopyFolder, CopyFile, MoveFolder, MoveFile, DeleteFolder, DeleteFile
- **Explore**
  FolderExists, FileExists, SubFolders, Files
- **Interact**
  PickFolder, PickFile
- **Access to the “TextStream” service**
  CreateTextFile, OpenTextFile
- **Examine**
  HashFile, CompareFiles

Inspired by the VBA FileSystemObject class

The “FileSystem” service – the TextStream class

```
Dim FSO As Object, oFile As Object
    Set FSO = CreateScriptService("FileSystem")
    Set oFile = FSO.OpenTextFile("C:\Temp\ThisFile.txt",IOMode := FSO.ForReading)
```

6 Properties

- *Encoding, NewLine*
- *AtEndOfStream*

Methods to

- **Read**
  ReadLine, ReadAll, SkipLine
- **Write**
  WriteLine, WriteBlankLines
- **Close**
  CloseFile

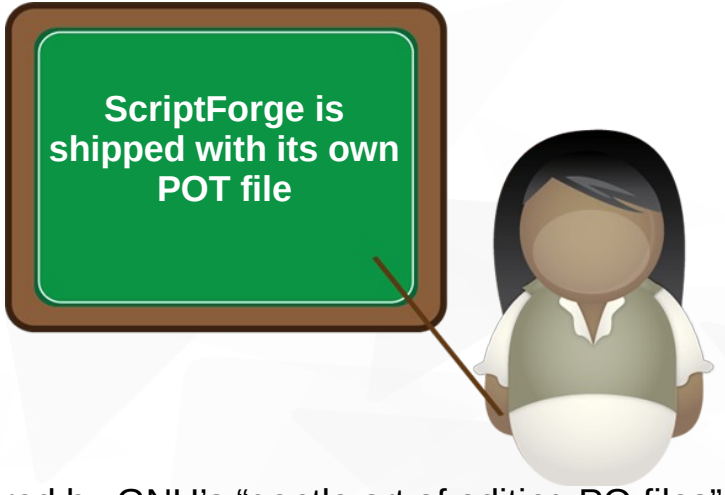
Inspired by the VBA Textstream class

The “L10N” service

PO-Files dissociate the two very different profiles involved in the process, i.e. the programmer and the translator(s)

Methods

- for the programmer to **build a set of words or sentences** in a reference language
  AddText
- To export all the above texts into a pristine POT-file
  ExportToPOTFile
  The generated file should pass successfully the "msgfmt --check" GNU command.
- **To get** at runtime the text **in the user language**
  GetText



Inspired by GNU’s “gentle art of editing PO files”

The “Platform” service

- *Architecture*
- *ComputerName*
- *CPUCount*
- *CurrentUser*
- *Machine*
- *OfficeVersion*
- *OSName*
- *OSPlatform*
- *OSRelease*
- *OSVersion*
- *Processor*

Inspired and executed by the Python platform.py standard library

The “Session” service

- **UNO objects introspection**
  UnoObjectType, HasUnoProperty, HasUnoMethod, UnoProperties, UnoMethods

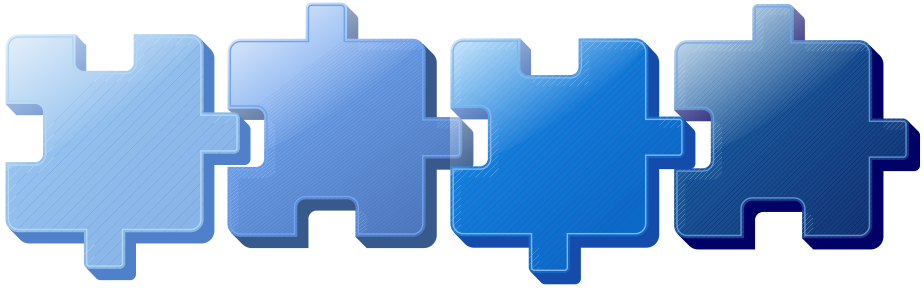
- **Send file(s)**
  SendMail

- **Execute external programs**
  ExecuteBasicScript, ExecutePythonScript, ExecuteCalcFunction RunApplication

- **Web**
  WebService, OpenUrlInBrowser

The “String” service

42 advanced methods to



- **Replace substrings**
  ReplaceStr, ReplaceChar
- **Validate input**
  IsAlpha, IsAlphanum, IsADate, IsEmail, IsFileName, IsHexDigit, IsIPV4, IsUrl, IsWhitespace, IsLike, IsRegex
- **Parse strings**
  FindRegex, ReplaceRegex, Count, SplitNotQuoted
- **Handle quotes, linebreaks and special characters**
  Quote, Unquote, Escape, Unescape, FilterNotPrintable, HtmlEncode, ExpandTabs, Wrap
- **Compare strings**
  HashStr

Inspired by Python and PHP string functions

The “Timer” service

A timer measures elapsed time (in milliseconds)

```
Dim oTimer As Object
    Set oTimer = CreateScriptService("Timer", True)
        ’   True => Starts immediately
```

Properties

- *IsStarted, IsSuspended, Duration, TotalDuration, SuspendDuration*

Methods

- *Start, Terminate, Suspend, Continue, Restart*

The “UI” service

Cfr. StarDesktop

Properties

- *ActiveWindow, Documents*

Methods

- **To manage windows**
  Activate, MaximizeWindow, MinimizeWindow, Resize, WindowExists
- **To show progress bars**
  ShowProgress, SetStatusBar
- **To get a Document instance**
  GetDocument, CreateDocument, CreateBaseDocument, OpenDocument, OpenBaseDocument

The “SFDocuments.Document” service

Generic functions for all types of documents

Properties

- *DocumentType, IsBase, IsCalc, …*
- *DocumentProperties, CustomProperties* => Dictionary
  XComponent (shortcut to UNO)

Methods

- **To save**
  Save, SaveAs, SaveCopyAs
- **To run a command**
  RunCommand
- **Other**
  Activate, CloseDocument

The “SFDocuments.Document” service, the Calc subtype

The same methods and properties as “Document” +

- **Smart range concept**

```
Dim oDocA As Object  :   Set oDocA = ui.OpenDocument("C:\FileA.ods", Hidden :=
                         True, ReadOnly := True)
Dim oDocB As Object  :   Set oDocB = ui.OpenDocument("C:\FileB.ods")
    oDocB.CopyToRange(oDocA.Range("SheetX.D4:F8"), "D2:F6")
```

Properties

- *CurrentSelection, LastCell, LastRow, LastColumn*
- *XSpreadsheet, XCellRange* (shortcuts to UNO)

Methods, a.o.

- **Sheet management**
  InsertSheet, CopySheet, CopySheetFromFile …
- **Data exchange with Basic**
  CopyToCell, CopyToRange, GetValue
- **Import data**
  ImportFromCSVFile, ImportFromDatabase
- **Modify data**
  SetArray, SetValue, SortRange

The “SFDatabases.Database” service

Easy access to database data via SQL

Properties

- *Tables, Queries*

Methods

- **Selective data**
  Dlookup, Dmax, Dmin, Dsum, DCount
- **Massive data**
  GetRows
- **Any SQL**
  RunSql
- **Shortcuts to UNO**
  XConnection, XMetadata

The “SFDialogs.Dialog” service

Run dialogs designed with the Basic IDE

Properties

- *Caption, Height, Visible, Page, Modal*
- *XDialogModel, XDialogView* => Shortcuts to UNO

Methods

- *Activate, Execute(modal As Boolean), EndExecute, Terminate*

```
Dim oDlg As Object, lButton As Long
Dim Container As String, Library As String, DialogName As String
    Set oDlg = CreateScriptService("SFDialogs.Dialog", Container,
                        Library, DialogName)
    '    ... Initialize controls ...
    lButton = oDlg.Execute()  '    Default mode = Modal
    If lButton = oDlg.OKBUTTON Then
        '    ... Process controls and do what is needed
    End If
    oDlg.Terminate()
```

- *Controls([ControlName])*

The “SFDialogs.DialogControl” service

Get / set control properties

Property names are identical (but not necessarily applicable) **whatever the control type**

E.g. *“Value”*

Properties

- **Read-only**
  ControlType, ListCount, Parent, Text
- **Updatable**
  Cancel, Caption, Default, Enabled, Format, ListIndex, Locked, MultiSelect, Page, Picture, RowSource, TipText, TripleState, Value, Visible
- **UNO shortcuts**
  XControlModel, XControView

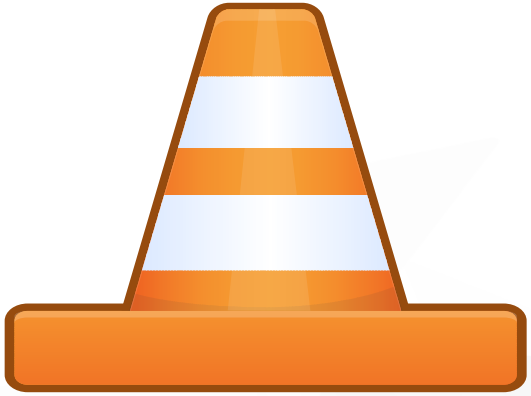
Methods

- *SetFocus, WriteLine*

Perspectives

- Data structures
  - Tree
- Dialog controls
  - Treeview, Grid
- Documents
  - Writer
  - Progress
  - Forms
    - Form controls
  - Charts
- Toolbars

- **Services for Python scripts only**
- **Services common to Python & Basic**



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- … for soon supporting ScriptForge!