Plugin Architecture for NODE

Limitations

Due to AHK's limitations, the Plugins will have to be compiled with the host application, so there is currently no known way to give NODE Plugins the authority they currently have while keeping them separate from the main exe file.

Overview

The Plugins currently work such that whether one of them is removed or added, NODE can work independently with or without that plugin's features. If an Plugin exists, certain specifically named functions are searched for, and if found NODE adds that Plugin's objects, sub-object database, actions etc. to its searchable domain.

Every plugin can either add a new Object, add new Actions or add actions to existing object.

Databases

Each plugin saves its Objects data under databases (.ndb files). The databases created must be named as PluginName1.ndb, PluginName2.ndb, PluginName3.ndb etc. (PluginName.ndb or PluginName0.ndb will not be read)
The format of the database entry is like this:
<Object=File><Plugin=Files><Scan1=Dropbox.lnk><Scan2=C:\Users\RAJAT\Desktop><Path=C:\Users\RAJAT\Desktop\Dropbox.lnk>

The Object tag will be used to identify the Object this database adds to. The Scan1, Scan2, Scan3 etc tags provide the searchable data to NODE (any other tags are not part of the searchable data).
Please note that amongst the Scan# tags, **Scan1** is the most important, as this will be used to rate results and determine its placement in the list of results. Therefore it is very important to keep Scan1 tag data as short as possible to keep performance optimal.
For the remaining Scan tags, NODE only searches whether the search terms exist in them or not. A plugin can add any number of custom tags (like Path above), if needed.

Recognized Functions

A plugin can have any number of functions that it uses internally. This is the list of function names that will be called by host, and has to be standardized across plugins. Not all functions are mandatory, and

the plugin can only contain a few, depending on the functionality it adds to NODE.

Below are the set of functions with explanation and examples.

P_PluginName_Scan()

This function, if found, will be called every time the database is to be refreshed (for example when NODE starts).
The function will save the database(s) it creates, in the NODE\db folder (more folder name details later). It must be noted that to improve search performance (and providing results with shorter search queries) it is better to break a possible larger database into a few smaller size ones.
A plugin can create a tag for its own use by any name, like the Path tag in this example. This tag will be used by this plugin itself when user selects an Object and Action and the control is transferred back to the plugin.

```
P_ControlP_Scan()
{
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)    ;get the name of
this plugin

   FileDelete,  %A_ScriptDir%\db\%OplugName%.ndb
   ;add a / at the beginning of Scan tag for top level object – this
places it higher up when searched with a /
   ;create DB with plugin's name + numbers starting with 1, else it
won't be read

   CPItems =
   (Ltrim
   Access.cpl  Accessibility properties
   Appwiz.cpl  Add-Remove Programs properties
   Desk.cpl    Display properties
   Hdwwiz.cpl  Add Hardware properties
   Inetcpl.cpl Internet properties
   Intl.cpl    Regional Settings properties
   Irprops.cpl Infrared Port properties
   Joy.cpl Joystick properties
   Main.cpl    Mouse properties
   Mmsys.cpl   Multimedia properties
   Ncpa.cpl    Network Connections properties
   Nusrmgr.cpl User Accounts properties
   Nwc.cpl Gateway Services for NetWare properties
   Odbccp32.cpl    Open Database Connectivity (ODBC) properties
   Powercfg.cpl    Power Options properties
   Sysdm.cpl   System properties
   Telephon.cpl    Phone and Modem Options properties
   Timedate.cpl    Time and Date properties
   )

   Loop, Parse, CPItems, `n
   {
       IfEqual, A_LoopField,
           continue
```

```
        StringSplit, Item, A_LoopField, `t
        IfExist, %A_WinDir%\System32\%Item1%
            FileAppend,
<Object=%OplugName%><Plugin=%OplugName%><Scan1=%Item2%><File=%Item1%>`n,
%A_ScriptDir%\db\%OplugName%1.ndb
    }
}
```

P_PluginName_RefreshTime()

This function, if it exists, simply provides the number of minutes after which the database would be refreshed by calling the P_PluginName_Scan() function.

```
P_Files_RefreshTime()
{
   Global File_conf
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)
   IniRead, P_Files_C_RefreshTime, %File_conf%, %OplugName%,
RefreshTime, 60
   Return P_Files_C_RefreshTime
}
```

P_PluginName_ConfGUI(GUI_ID)

If this plugin will have certain user configurable settings, then provide this function. This function receives the GUI_ID of the Configuration window, and a tab will be automatically created by the name of this plugin.

The plugin can add any number of controls to this tab within the below available co-ordinates:
x10 y30 w740 h415

The plugin can have global variables for various GUI controls with naming as P_PluginName_C_anything

```
;add plugin specific settings to own tab in settings
P_Files_ConfGUI(GUI_ID)
{
   Global
File_conf,P_Files_C_FolderList,P_Files_C_TypeList,P_Files_C_RefreshTime,P_Fil
es_C_Editor
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)

   Gui, %GUI_ID%:Default
   Gui, Tab, %OplugName%,, Exact

   IniRead, P_Files_C_RefreshTime, %File_conf%, %OplugName%, RefreshTime, 30
   IniRead, P_Files_C_FolderList, %File_conf%, %OplugName%, FolderList,
%A_Space%
   IniRead, P_Files_C_TypeList, %File_conf%, %OplugName%, TypeList, %A_Space%
   IniRead, P_Files_C_Editor, %File_conf%, %OplugName%, Editor,
%A_Windir%\Notepad.exe

   StringReplace, P_Files_C_FolderList, P_Files_C_FolderList, |, `n, A
   StringReplace, P_Files_C_TypeList, P_Files_C_TypeList, |, `n, A
```

```
   ;plugin's settings here
   Gui, Add, GroupBox, x10 y35 w390 h260 , Folders
   Gui, Add, Text, x20 y80 w110 h100 , Add one folder per row.`n`neg:`nD:\My
Folder`nC:\Pics`nF:\documents
   Gui, Add, Edit, x140 y65 w250 h220 vP_Files_C_FolderList,
%P_Files_C_FolderList%

   Gui, Add, GroupBox, x420 y35 w320 h260 , Extensions
   Gui, Add, Text, x430 y80 w150 h100 , Add one extension per
row.`n`neg:`njpg`npng`nahk
   Gui, Add, Edit, x600 y65 w70 h220 vP_Files_C_TypeList,
%P_Files_C_TypeList%
   Gui, Add, Text, x20 y315 w100 h30 , Refresh in minutes:
   Gui, Add, Edit, x150 y315 w30 h20 vP_Files_C_RefreshTime,
%P_Files_C_RefreshTime%
   Gui, Add, Text, x20 y355 w100 h30 , Path to Text Editor:
   Gui, Add, Edit, x150 y355 w300 h20 vP_Files_C_Editor, %P_Files_C_Editor%
   Gui, Add, Text, x480 y315 w260 h130 +Border , Help:`n`nThe Start Menu,
Desktop and My Documents folder are already being scanned.`n`nThe below
extensions are also already added.`nxls, doc, ppt, pdf, docx, xlsx, pptx,
pdf, mp3, wma, ogg
}
```

P_PluginName_ConfSave()

This function will autorun when the Configuration window's Save button is pressed. This would ideally save down all the settings in global variables that belong to this plugin.

```
P_Files_ConfSave()
{
   Global
File_Conf,P_Files_C_FolderList,P_Files_C_TypeList,P_Files_C_RefreshTime,P_Fil
es_C_Editor
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)

   StringReplace, P_Files_C_FolderList, P_Files_C_FolderList, `n, |, A
   StringReplace, P_Files_C_FolderList, P_Files_C_FolderList, ||,|, A
   StringReplace, P_Files_C_FolderList, P_Files_C_FolderList, `",, A
   StringReplace, P_Files_C_TypeList, P_Files_C_TypeList, `n, |, A
   StringReplace, P_Files_C_TypeList, P_Files_C_TypeList, ||, |, A

   IniWrite, %P_Files_C_FolderList%, %File_conf%, %OplugName%, FolderList
   IniWrite, %P_Files_C_TypeList%, %File_conf%, %OplugName%, TypeList
   IniWrite, %P_Files_C_RefreshTime%, %File_conf%, %OplugName%, RefreshTime
   IniWrite, %P_Files_C_Editor%, %File_conf%, %OplugName%, Editor
}
```

P_ PluginName _KeyWords(ByRef PlusWords, ByRef MinusWords)

This function can directly affect the internal algorithm of scoring the results. If the match contains a Plus Word, it is scored up and down for Minus Word.

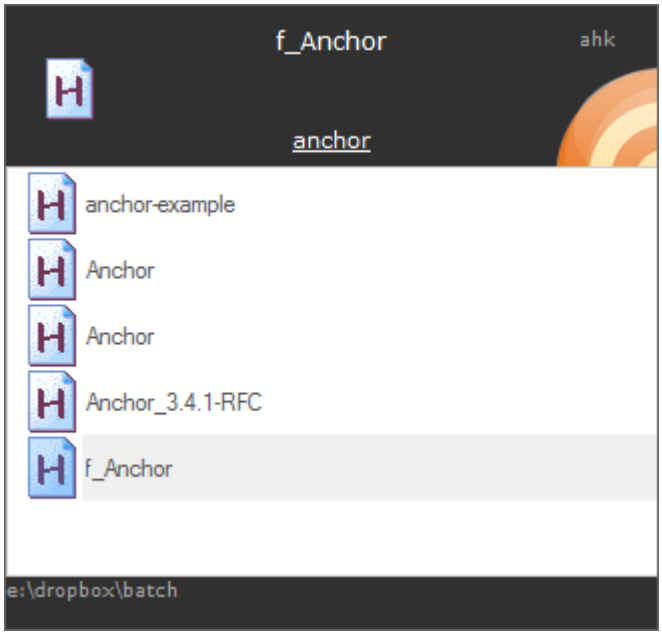
```
P_Files_KeyWords(ByRef PlusWords, ByRef MinusWords)
```

```
{
   ;This function is so that the plugin can directly affect the
internal algorithm of scoring the results
   ;if the match contains a Plus Word, it is scored up and down for
Minus Word.
   MinusWords = uninstall,help,readme,read me,setup
   PlusWords = google,bing,5ikipedia,firefox,chrome,internet
explorer,opera,office,word,excel,exe,lnk
}
```

P_Calculator_ToShow(SrchStrng, Result, ByRef LVLine, ByRef MainTxt, ByRef SubTxt, ByRef IconIdx, ByRef InfoBar)

After a search in NODE when a matching Object is found, NODE asks the plugin through this function as to how the results are to be displayed to the user.
User's Search String and the matching line from database are received by this function as input and this function returns how the results are to be shown in GUI as main and sub text and icon. Only first 3 are mandatory.

LVLine	The text to be displayed on the ListView row (f_Anchor in example Listview below)
MainTxt	The Main name of result (f_Anchor at top of GUI)
IconIdx	Index of the icon retrieved through GetIcon(FilePath) function
SubTxt	Any secondary text (ahk at top right of GUI)
InfoBar	Another row of descriptive text (path e:\dropbox\batch at bottom of GUI)



```
;The result from database is provided to this function and this
function returns
;how the results are to be shown in GUI as main and sub text and icon
P_Clipboard_ToShow(SrchStrng, Result, ByRef LVLine, ByRef MainTxt,
ByRef SubTxt, ByRef IconIdx, ByRef InfoBar)
{
   if !IconIdx
       IconIdx := Int_GetIcon(A_ScriptDir
"\res\icons\Objects\Clipboard.ico")

   MainTxt = /Clipboard
   SubTxt =
   InfoBar =
   LVLine = %MainTxt%
}
```

P_ PluginName _Objects()

This function simply returns the pipe separated list of Objects it supports . Only in rarest cases a plugin would support more than one object. Object Name has to be valid variable name.

```
P_Files_Objects()
{
   ;this function simply returns the pipe separated list of Objects
it supports
   ;only in rare cases a plugin would support more than one object

   Objects = File
   Return Objects
}
```

P_PluginName_Actions()

This function returns a list of Actions available to the selected Object. The Actions shown can depend on nature of object or any other variable, as deemed fit by the plugin.

```
P_Screen_Actions(Line)
{
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)
   ActionList =
   (LTrim Join`r`n
       <Action=%OPlugName%.Turn Off><Scan1=Turn Off>
       <Action=%OPlugName%.Run Screensaver><Scan1=Run
Screensaver>
   )

   Return ActionList
}
```

P_PluginName_Execute(Line, Action, SrchStrng)

This function is called when the user launches an Object+Action combination in NODE. The function receives the Object's result line from database, the selected Action and user's search string.

```
P_Screen_Execute(Line, Action, SrchStrng)
{
   Global Hist_DB,File_Conf
   RegExMatch(A_ThisFunc, "U)_(?<PlugName>.*)_", O)
   UpdateHistory = Y


   IfEqual, Action, %OPlugName%.Turn Off
   {
       Sleep, 500
       WinGet, hwnd, ID, Program Manager
       SendMessage, 0x112, 0xF170, 2,, ahk_id %hwnd%
   }

   IfEqual, Action, %OPlugName%.Run Screensaver
   {
       Sleep, 500
       WinGet, hwnd, ID, Program Manager
       SendMessage, 0x112, 0xF140, 2,, ahk_id %hwnd%
   }

   ;update history
   IfEqual, UpdateHistory, Y
   {
       StringReplace, Hist_DB, Hist_DB, %Line%`r`n,, A
;clear history of last occurance of same line
       NewLine := RegExReplace(Line, "iU)\<Action=.*\>")
;remove earlier action

       NewLine = %NewLine%<Action=%Action%>
       Hist_DB = %NewLine%`r`n%Hist_DB%    ;add latest item at
beginning of history
   }
}
```

P_PluginName_SearchAnalyze()

This is a special type of function for a different set of plugins. If the plugin's object can be freeform and a database can't be built which can define all the possible sub-objects that are allowed (for example if the plugin can solve mathematical expressions, or post the typed text to Facebook, or search text over internet – then this plugin can make that a recognized object and make available relevant actions.
If this function returns a Y, that means a valid input was found by it.

```
P_Calculator_SearchAnalyze(SrchStrng)
{
   ;this function basically tries to analyze the search string and understand
it if it is valid input
   ;for this plugin.
   Match = N
   If SrchStrng contains *,-
,/,+,Abs,Ceil,Exp,Floor,Log,Ln,Round,Sqrt,Sin,Cos,Tan,ASin,ACos,ATan,SGN,Fib,
fac
   If SrchStrng contains 1,2,3,4,5,6,7,8,9,0
   {
       EvalResult := Eval(SrchStrng)
       If EvalResult contains 1,2,3,4,5,6,7,8,9,0
           Match = Y
   }
   Return Match
}
```

P_PluginName_OnExit()

This is a function that is automatically called when Node exits. This would typically be used for file/memory cleanups. Please ensure that there are not time consuming operations here and no possibility of un-ending loops, which will cause the application to get stuck.

```
P_Files_OnExit()
{
   Global
   DllCall("FreeLibrary", Ptr, P_Files_Int_Storage("FFFl"))
; get search library handle from storage and free the library
   GetIcon()   ; uninitialize COM
}
```

Folders

The plugins must utilise the below folders for the along mentioned uses.

NODE\db	To save the database if the plugin creates one
NODE\res\icons\Actions\	To save any icons in 'PluginName.ActionName.ico' format
NODE\res\icons\Objects\	To save any icons in 'ObjectName.ico' format
NODE\tmp	To save any temporary working files