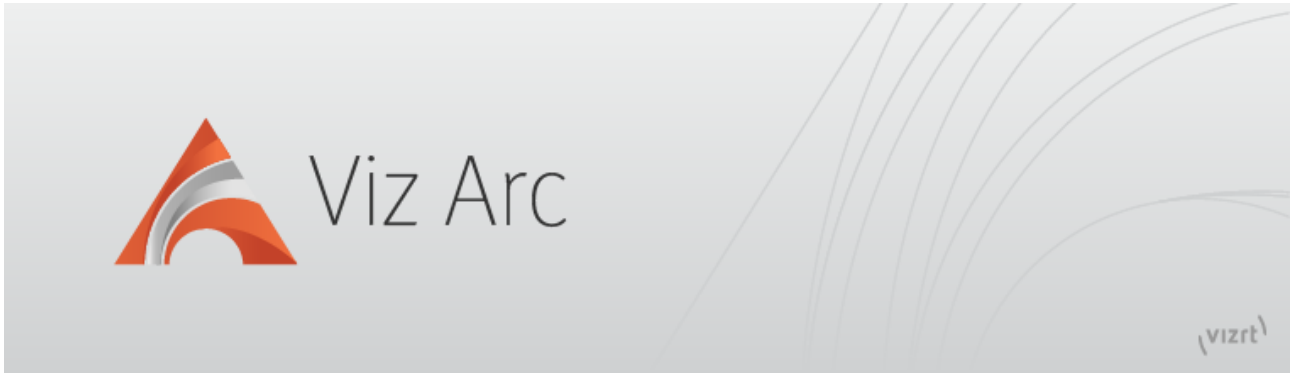




Viz Arc Script Guide

Version 1.4





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Created on

2022/02/08

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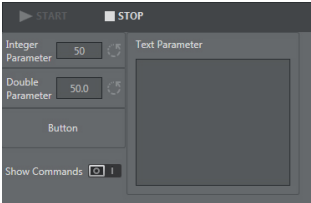

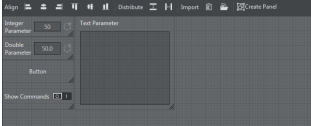

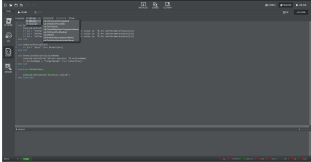

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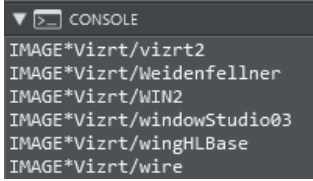

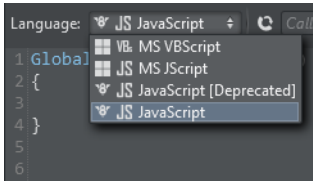
1 Script View

In Script View, you can write your own custom script in JavaScript language through Google's **V8** or Microsoft's **JScript** (ECMAScript3) or in **VBScript** language, as in the following example:

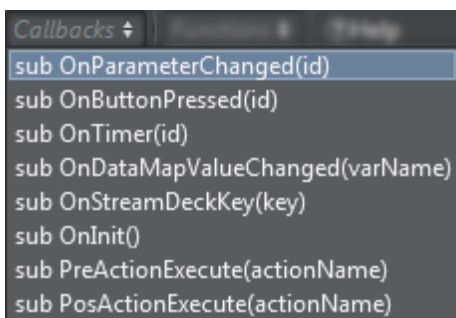
```
Language: JS JavaScript | Callbacks | Functions
1 function OnInit()
2 {
3     var profile = GetSelectedProfile();
4     var eng = profile.VizEditingEngine;
5
6     if( eng != null ){
7         var images = eng.QueryEngine("IMAGE*/Vizrt GET");
8         Console.WriteLine(images);
9
10        var splitImgs = images.split(" " );
11
12        for(var i = 0; i < splitImgs.length; ++i)
13            Console.WriteLine(splitImgs[i]);
14    }
15 }
16
17
```

It's possible to create custom forms and components, such as text boxes and buttons.

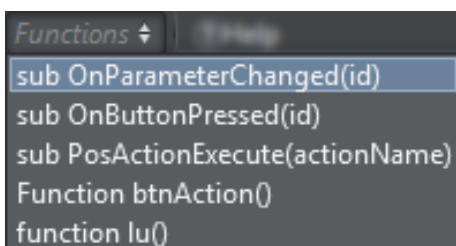
	<p>To run the script, select the Start button  on the top left of the window.</p>
	<p>Form Design can be edited by selecting the UI button . Every element can be selected and moved, aligned and distributed on the main form.</p> <p>To go back to code editing, select the CODE button.</p>
	<p>To edit a script, press the Stop button  on the top of the script main window.</p>

	Console logs and debugs are displayed in the CONSOLE pane.
	Import code internally from the clipboard or an external text file in the script pane.
	Use the Language menu to select a scripting language.

In edit mode, **Script Callbacks** can be selected from the list and added:



You can locate a custom function by selecting it from the **Functions** list:



See Also

- [Scripting Classes](#)

1.1 Action Properties

All Actions in the project can be accessed and modified via scripting. Use the **GetAction** function to get a reference to the action:

- BaseAction **GetAction**(string actionName)

Note: It's possible for a project to contain multiple actions that have the same name. If that is the case for your project, the first Action created with a name is returned. Make sure to use unique names when accessing actions through scripting.

Every Action type has these generic properties:

Action type	Description
string Name	The title of the action.
string Description	By default this is the type of action (e.g. "Key", "Chroma", "Image" etc.). When assigned to a TransformationAction and visible on the SET view, this field is used as a tooltip when the mouse hovers over the element.
int ExecutionDelay	Expressed in milliseconds, minimum delay is 0 (default), maximum delay is 10000 (10 seconds).

Every Action type has these generic methods:

- void **Execute()**: Executes the action.
- void **QueryState()**: Queries the current state of the action from the **Editing Engine**. For example, if the action is a transformation action, it retrieves the current transformation from the editing engine's scene tree and updates the UI accordingly.

The example below shows how to set the alpha value to 75% of an Alpha Action called *AlphaText* and execute the action from scripting:

Sample

```
var alphaAction = GetAction("AlphaText");
alphaAction.Alpha = 75.0;
alphaAction.Execute();
```

There are specific properties/functions for each action type:

- [Alpha](#)
- [Chroma](#)
- [Command](#)
- [ControlObject](#)
- [Director](#)
- [Group](#)
- [Image](#)
- [Light](#)
- [Key](#)

- Material
- MSE
- Multizone Chroma Key
- NDI
- Omo
- PBR
- Phong
- Scene Loader
- Shared Memory
- Telemetrics
- Text
- Tracking Hub Command
- Transformation
- Utah Router
- Unreal Animation
- Unreal Blueprint
- Unreal Dispatcher
- Unreal Scene Loader
- Unreal Sequencer
- Unreal Text
- Vinten
- Virtual Studio
- Visibility
- Viz Camera
- Viz Clip
- Viz PBR Material

1.1.1 Alpha

Properties:

- double **Alpha**

1.1.2 Chroma

Properties:

- ChromaFusionContent **Fusion**
 - double **hueAdjust**
 - double **saturationAdjust**
 - int **edgeBlur**
 - double **despillScale**
 - double **backingPlateR**
 - double **backingPlateR**
 - double **backingPlateR**
 - double **yellowGain**

- double **cyanGain**
- int **denoiseRadius**
- int **denoiseSharpen**
- double **opacityPoint**
- double **transparencyPoint**
- double **bgEdgeGain**
- double **bgSpillGain**
- double **bgLWBlur**
- double **colorEdgeGain**
- double **colorSpillGain**
- double **colorLightwrapR**
- double **colorLightwrapG**
- double **colorLightwrapB**
- bool **addShadows**
- double **innerShadows**
- double **shadowsGain**
- bool **addHighlights**
- double **innerHighlights**
- double **highlightsGain**
- double **masterLiftR**
- double **masterLiftG**
- double **masterLiftB**
- double **masterGammaR**
- double **masterGammaG**
- double **masterGammaB**
- double **masterGainR**
- double **masterGainG**
- double **masterGainB**
- double **masterSaturation**

Sample

```
var action = GetAction("Chroma");
// sample for setting some fusion keyer settings
action.Fusion.hueAdjust = -1140;
action.Fusion.saturationAdjust = 2.0;
```

1.1.3 Command

Properties:

- string **Command**

1.1.4 ControlObject

See [Control Object Classes](#).

1.1.5 Director

Properties:

- string **DirectorType**
possible values: START, STOP, CONTINUE, CONTINUE_REVERSE, PLAY_FROM, PLAY_FROM_REVERSE, FROM_TO, GO_TO, PAUSE

1.1.6 Group

This action has no additional public properties.

1.1.7 Image

Properties:

- string **Image**
 - Value should be a GH path that starts with "IMAGE*"
- bool **IsBuiltin**
- string **Builtin** possible values: LIVE1, LIVE2, CLIP1, etc.
- double **PosX**
- double **PosY**
- double **RotX**
- double **RotY**
- double **RotZ**
- double **ScaX**
- double **ScaY**

The Image parameter can be assigned to a GraphicHub path when the string starts with "IMAGE*"; when it starts with "http" it will be assumed to be a web link (or a MediaService link), otherwise it will be interpreted as a local file path, see the samples below:

Sample

```
var imageAction = GetAction("Image");
imageAction.Image = "IMAGE*/VizArc/arcLogo";
// or
imageAction.Image = "http://127.0.0.1:21099/serve/original/AR_03.jpg";
// or
imageAction.Image = "C:/Users/admin/Desktop/CAKE.jpg";
```

1.1.8 Light

Properties:

- string **LightType** [read only]
possible values: NONE, SPOTLIGHT, DIRECTIONAL, AREA, POINT
- string **LightColor**
- double **LightIntensity**
- double **DiffuseIntensity**
- double **SpecularIntensity**
- double **LightRadius**
- double **OuterConeAngle**
- double **InnerConeAngle**
- int **LightLayer**
- double **DirectionalSpread**
- double **RadiosityMultiplier**

1.1.9 Key

Properties:

- bool **KeyEnabled**
- bool **CombineBackground**
- bool **DepthInfoOnly**
- bool **DrawKey**
- bool **DrawRGB**

1.1.10 Material

Properties:

- string **ColorHex** [#RRGGBB]
- string **Diffuse** [#RRGGBB]
- string **Emission** [#RRGGBB]
- string **Specular** [#RRGGBB]
- string **Ambient** [#RRGGBB]
- double **Alpha** [0...100]
- double **Shiniess** [0...100]
- bool **UseSimpleColor**

Functions:

- SetColorRBG(int r, int g, int b)

1.1.11 MSE

Properties:

- string **Page**
- string **DirectorType**
possible values: TAKE, CONTINUE, TAKE_OUT

1.1.12 Multizone Chroma Key

Properties:

- string **ZoneName**
- double **Height**
- double **Altitude**
- double **Luminance**
- double **MinLuminance**
- double **MinGrad**
- double **MaxLuminance**
- double **MaxGrad**
- double **Blend**
- double **U**
- double **V**
- double **UVDiameter**
- double **UVGradient**
- bool **IsFullscreen**
- bool **PickLuma**
- bool **PickChroma**
- bool **PickInViz**

1.1.13 NDI

Properties:

- int **Preset**
 - value must be between 0 and 99
- float **Velocity**
 - value must be between 0 and 1

1.1.14 Omo

Properties:

- int **ElementIndex**
- bool **ShowUntil**

1.1.15 PBR

Properties:

- Modes

- bool **IsPreload**
- bool **IsGHMode**
- GH Mode
 - string **PhongMaterialAsset**
 - Value should be a GH path that starts with "MATERIAL_DEFINITION*"
- Values Mode
 - Material Settings
 - string **ColorTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - |string **ColorTint**
 - bool **ColorIsSRGB**
 - string **EmissiveTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **EmissiveColor**
 - double **EmissiveIntensity**
 - string **NormalTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **RoughnessTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - double **RoughnessFactor**
 - string **MetallicTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - double **MetallicFactor**
 - string **AmbientOcclusionTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **HeightTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - double **HeightDepth**
 - string **EnvironmentTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - double **EnvironmentRotation**
 - Texture Settings
 - double **TilingU**
 - double **TilingV**
 - double **UvAngle**
 - double **UvScaleU**
 - double **UvScaleV**
 - double **UvOffsetU**
 - double **UvOffsetV**

1.1.16 Phong

Properties:

- Modes
 - bool **IsPreload**

- bool **IsGHMode**
- GH Mode
 - string **PbrMaterialAsset**
 - Value should be a GH path that starts with "MATERIAL_DEFINITION*"
- Values Mode
 - Material Settings
 - string **ColorTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - |string **ColorTint**
 - bool **ColorIsSRGB**
 - string **AmbientTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **AmbientColor**
 - e.g.: "#FF00A0"
 - double **AmbientIntensity**
 - string **DiffuseTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **DiffuseColor**
 - e.g.: "#FF00A0"
 - double **DiffuseIntensity**
 - string **SpecularTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **SpecularColor**
 - e.g.: "#FF00A0"
 - double **SpecularIntensity**
 - string **EmissiveTexture**
 - Value should be a GH path that starts with "IMAGE*"
 - string **EmissiveColor**
 - e.g.: "#FF00A0"
 - double **EmissiveIntensity**
 - double **Shininess**
 - bool **Lit**
 - whether the material should be lit or not
- Texture Settings
 - double **UvAngle**
 - double **UvScaleU**
 - double **UvScaleV**
 - double **UvOffsetU**
 - double **UvOffsetV**

1.1.17 Scene Loader

Properties:

- bool **UseGUID**
- string **FrontUUID**

- string **MainUUID**
- string **BackUUID**
- string **GfxUUID**
- string **SubSceneUUID**
- bool **FrontClear**
- bool **MainClear**
- bool **BackClear**
- bool **GfxClear**
- bool **SubSceneClear**
- bool **FrontResetStage**
- bool **MainResetStage**
- bool **BackResetStage**
- bool **GfxResetStage**
- int **GfxLayerNumber** [0,...,17]
- bool **SubSceneResetStage**

1.1.18 Shared Memory

Functions:

- String[] **GetKeys**()
- String[] **GetValues**()
- Void **AddKeyValue** (string key, string value)
- Void **InsertKeyValue** (int index, string key, string value)
- Bool **Remove** (string key)
- Void **RemoveAt** (int index)

1.1.19 Telemetry

Properties:

- int **Program**
- int **Scene**

1.1.20 Text

Properties:

- string **Text**

1.1.21 Tracking Hub Command

Properties:

- string **Command**

1.1.22 Transformation

Properties:

- double **PosX**
- double **PosY**
- double **PosZ**
- bool **PosEnabled**
- double **RotX**
- double **RotY**
- double **RotZ**
- bool **RotEnabled**
- double **ScaX**
- double **ScaY**
- double **ScaZ**
- bool **ScaEnabled**

1.1.23 Utah Router

Properties:

- int **Source**
- int **Desitnation**

1.1.24 Unreal Animation

Properties:

- string **AnimationMode**
possible values: LOAD, CONTINUE, PAUSE
- bool **IsLooping**
- double **PlayRate**
- double **BlendTime**
- string **SelectedAnimation**

1.1.25 Unreal Blueprint

See [Control Object Classes](#).

1.1.26 Unreal Dispatcher

This action has no additional public properties.

1.1.27 Unreal Scene Loader

This action has no additional public properties.

1.1.28 Unreal Sequencer

Properties:

- string **DirectorType**
possible values: START, STOP, CONTINUE, START_REVERSE, CONTINUE_REVERSE, PLAY_FROM, PLAY_FROM_REVERSE, GO_TO, PAUSE
- int **LoopCount**
- double **PlayRate**

1.1.29 Unreal Text

Properties:

- string **Text**
- double **ScaleX**
- double **ScaleY**

1.1.30 Vinten

This action has no additional public properties.

1.1.31 Virtual Studio

Properties:

- int **SelectedSceneIndex**
- bool **SendPosition**
- string **SetName**
- double **PosX**
- double **PosY**
- double **PosZ**
- double **RotY**

1.1.32 Visibility

Properties:

- bool **Visibility**
- string **VisibilityMode**
possible values: ON, OFF, ONOFF, DUAL_MODE

1.1.33 Viz Camera

Properties:

- int **SelectedCamera**

- bool **RemoteEnabled**
- bool **IsRemote**
- bool **AngleEnabled**
- double **Angle**
- bool **PosEnabled**
- double **PosX**
- double **PosY**
- double **PosZ**
- bool **DirEnabled**
- double **Pan**
- double **Tilt**
- double **Twist**

1.1.34 Viz Clip

Properties:

- string **ClipName**
- bool **IsLoader**
- string **ControlType**
possible values: **START, STOP, CONTINUE, PAUSE**
- string **SelectedClipChannel**
- bool **PlayOnLoad**
- bool **HasLoop**
- bool **ShouldQueue**

1.1.35 Viz PBR Material

Properties:

- bool **IsPreLoad**
- bool **IsGHMode**
- string **PbrMaterialAsset**
- string **ColorTexture**
- string **ColorTint**
 - e.g.: "#FF00A0"
- bool **ColorIsSRGB**
- string **EmissiveTexture**
- string **EmissiveColor**
 - e.g.: "#FF00A0"
- double **EmissiveIntensity**
- string **NormalTexture**
- string **RoughnessTexture**
- double **RoughnessFactor**
- string **MetallicTexture**
- double **MetallicFactor**

- string **AmbientOcclusionTexture**
 - string **HeightTexture**
 - double **HeightDepth**
 - string **EnvironmentTexture**
 - double **EnvironmentRotation**
 - double **TilingU**
 - double **TilingV**
 - double **UvAngle**
 - double **UvScaleU**
 - double **UvScaleV**
 - double **UvOffsetU**
 - double **UvOffsetV**
-

1.2 Control Object Classes

After having accessed the action holding the list of ControlObjects through the **GetAction** method, the single ControlObjects can be retrieved using the global method

- BaseControlObject **GetcontrolObject**(BaseAction action, string ControlObjectID);

Most Control Object types have the following generic properties:

- **Text** (String)
 - This property adapts to all objects (execute string)
 - IntControl.Text = "5"
 - ImageControl.Text = "IMAGE*FolderA/SubfolderB/ImageName"
- **ID** (String)
 - Returns ObjectID
- **Description**
 - Returns the object description

Each Control Object type has specific properties:

- [Control Container](#)
- [Control Image](#)
- [Control Material](#)
- [Control Omo](#)
- [Control Text](#)
- [Control List](#)
 - [Single Cells Properties](#)
- [Control Integer](#)
- [Control Double](#)
- [Control Boolean](#)

1.2.1 Control Container

Properties:

- Visibility
- Position
 - posX (double)
 - posY (double)
 - posZ(double)
- Rotation
 - rotX (double)
 - rotY (double)
 - rotZ (double)
- Scaling
 - scaX (double)
 - scaY (double)
 - scaZ (double)

This type doesn't have the Text property.

1.2.2 Control Image

Properties:

- Path (string)
- Position
 - posX (double)
 - posY (double)
- Scaling
 - scaX (double)
 - scaY (double)

1.2.3 Control Material

Properties:

- Path (string)

1.2.4 Control Omo

Properties:

- Value (integer)

1.2.5 Control Text

Properties:

- Value (string)

1.2.6 Control List

Example:

```
sub OnInit()
    'declare variables
    dim objAction, table, cell
    dim output1, output2, output3
    'get table obj action
    objAction = arc.GetAction("object")
    table = arc.GetControlObject (objAction, "controlObj_ID")
    Console.WriteLine("Table name: " & table.Text)
    'set values in single cells inside the table
    table(0,0).value = false
    table(0,1).value = 5
    table(2,5).x = 12
    table(3,6).value = "IMAGE*/Default/GER"
    'assign values to a variable and show in debug console
    output1 = table(0,0).Text
    output2 = table(0,1).Text
    output3 = table(0,2).Text
    Console.WriteLine("cell - " & output1 & " | " & output2 & " | " & output3)
end sub
```

Properties:

- Accessor
 - table[int row, int col]
returns a cell
 - nbcolumns (integer)
number of columns
 - nbrows (integer)
numbers of rows

Single Cells Properties

Cell	Type	Additional Information	Example
BaseCell	Text (string)	Sets or gets value as string. Common to every cell type.	table(0,5).x= 12 (intCell) table(0,5).text = "12" (intCell)
BoolCell	Value (boolean)		table(0,5).active= true

Cell	Type	Additional Information	Example
Double Cell	Value (double)		<code>table(0,5).x= 12.8</code>
Duplet Cell	X (double) Y (double)		<code>table(0,5).text = "0.55 0.2"</code>
GeomCell	Value (string)		<code>table(0,5).value = "GEOM*/folder/geometry"</code>
ImageCell	Value (string)		<code>table(0,5).value = "IMAGE*/folder/image"</code>
IntCell	Value (integer)		
MaterialCell	Value (string)		<code>table(0,5).value = "MATERIAL*/folder/material"</code>
TextCell	Value (string)		
Triplet Cell	X (double) Y (double) Z (double)		<code>table(0,5).text = "0.55 0.23 1.23"</code>

1.2.7 Control Integer

Properties:

- Value (integer)

1.2.8 Control Double

Properties:

- Value (double)

1.2.9 Control Boolean

Properties:

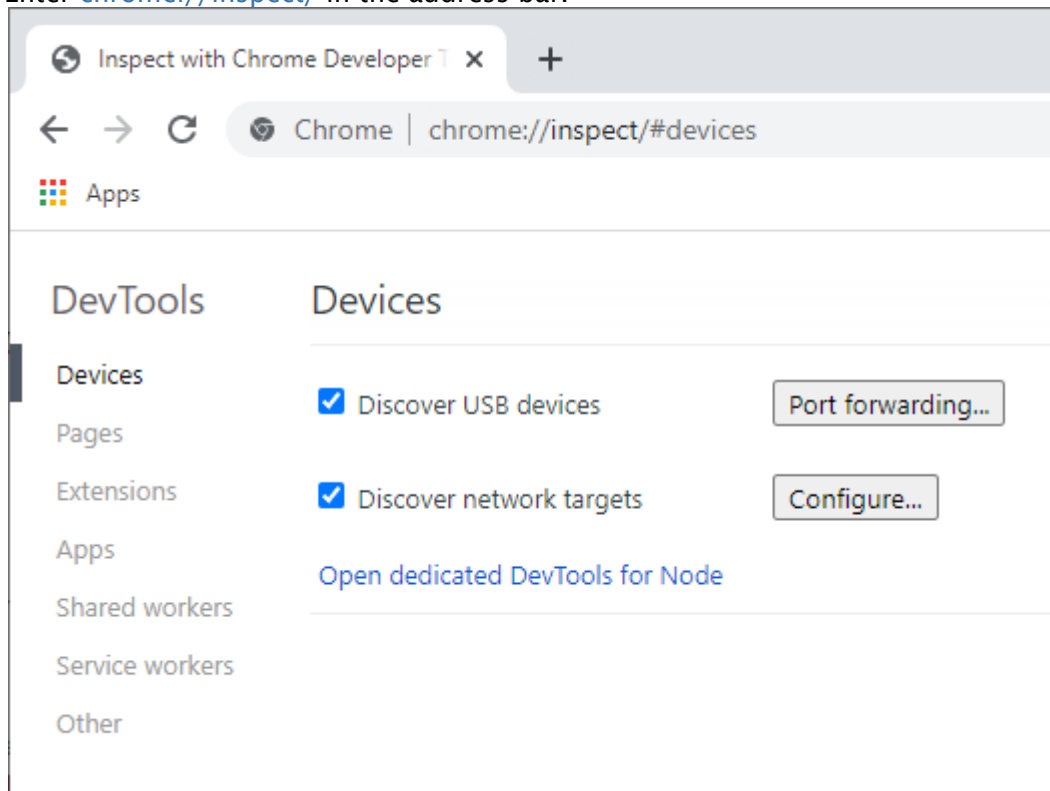
- Value (boolean)

1.3 Debugging

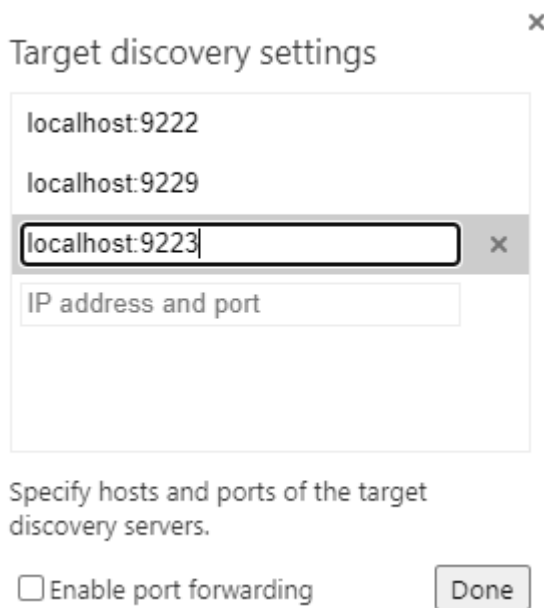
1.3.1 DevTools

You can use any chrome based web browser (for example, Google Chrome or Microsoft Edge) to step through Viz Arc scripts.

1. Open your browser.
2. Enter <chrome://inspect/> in the address bar.

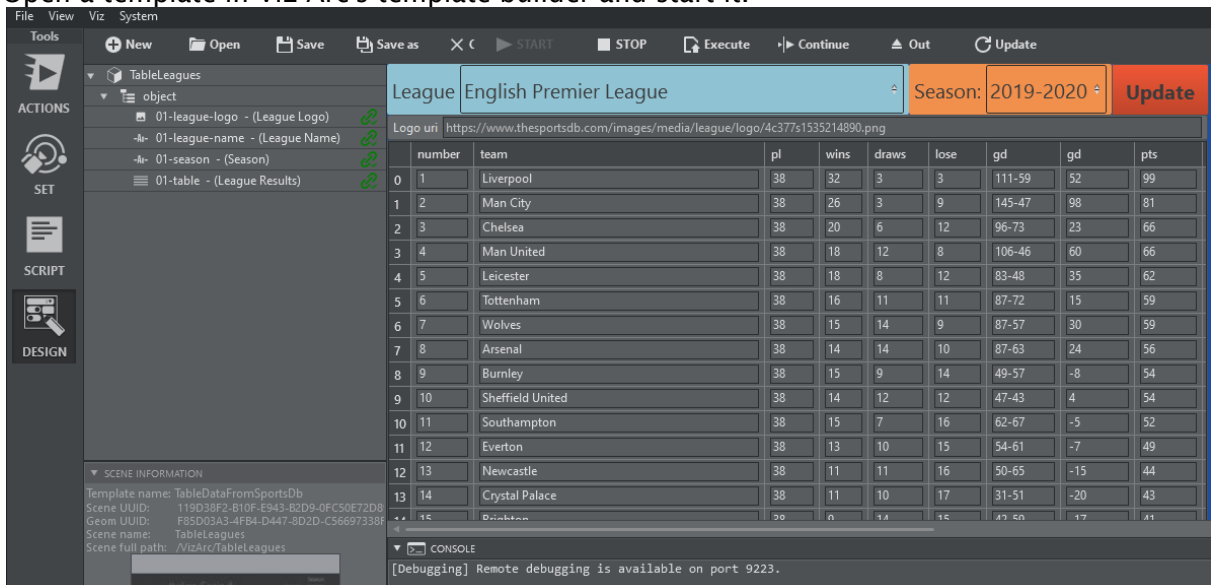


3. Click **Configure...**

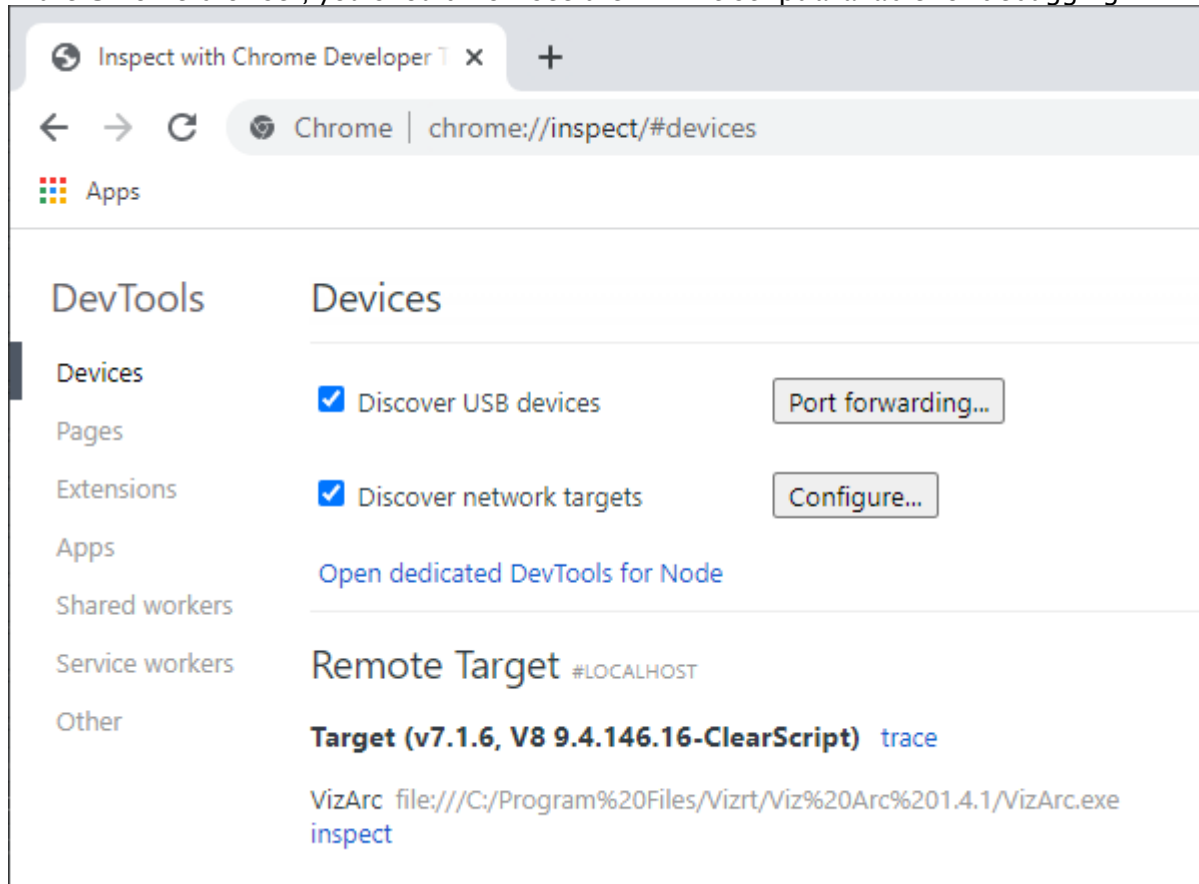


Add the host name where Viz Arc is running and specify the debug script port (by default, port 9222 for the global script and port 9223 for the template builder script). Confirm by clicking the **Done** button.

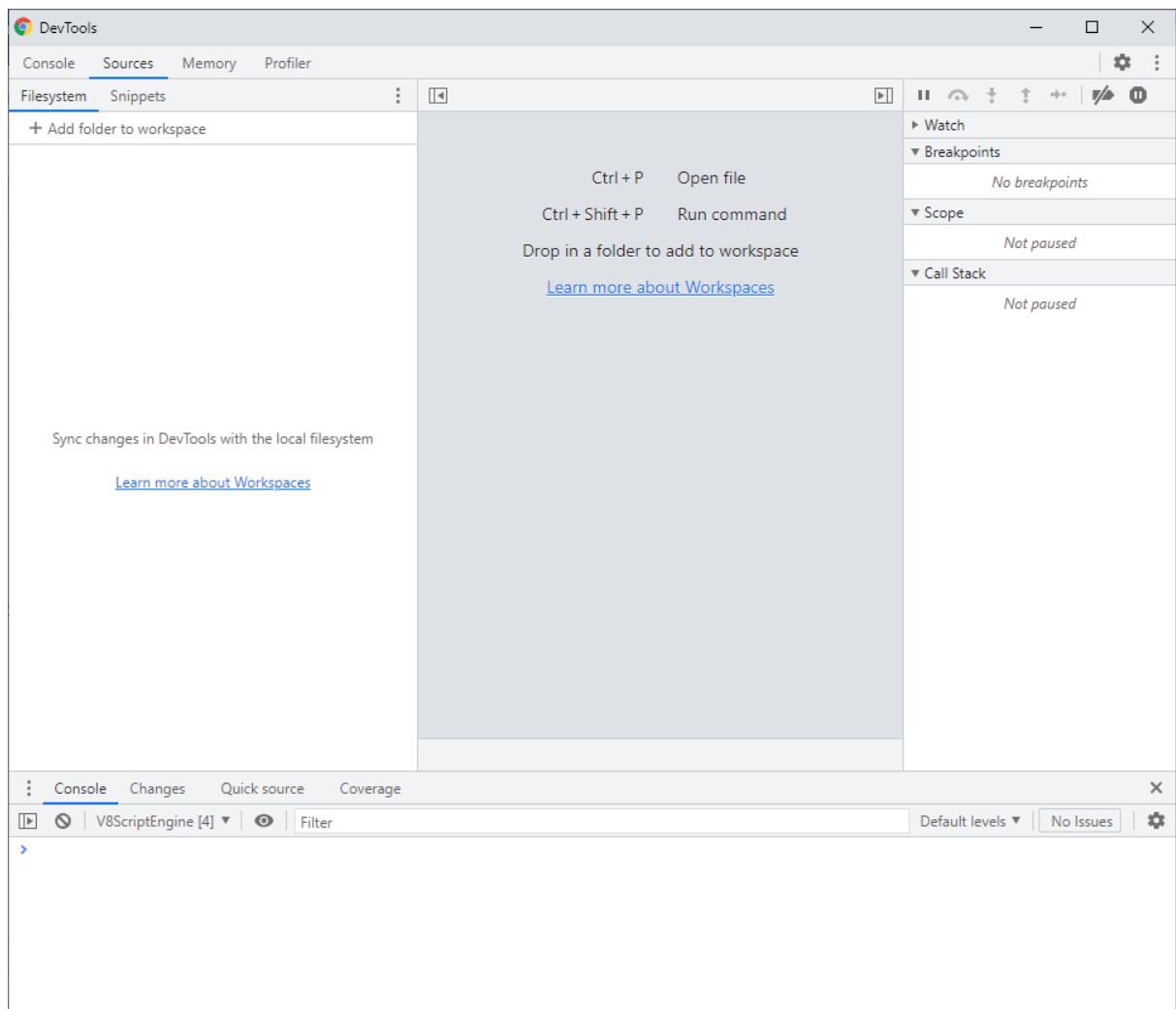
4. Open a template in Viz Arc's template builder and start it.



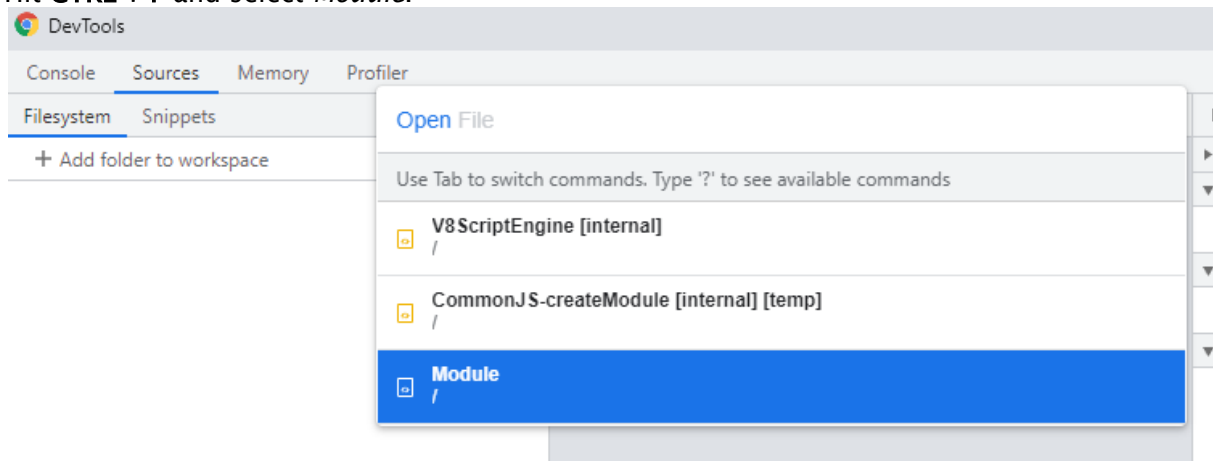
5. In the Chrome browser, you should now see the Viz Arc script available for debugging.



6. Click the **inspect** link to open the debugger. The first time you open the debugger it does not show any code.



Hit **CTRL + P** and select *Module*.



You'll now be able to set breakpoints and see the code.

The screenshot shows the DevTools interface with the following components:

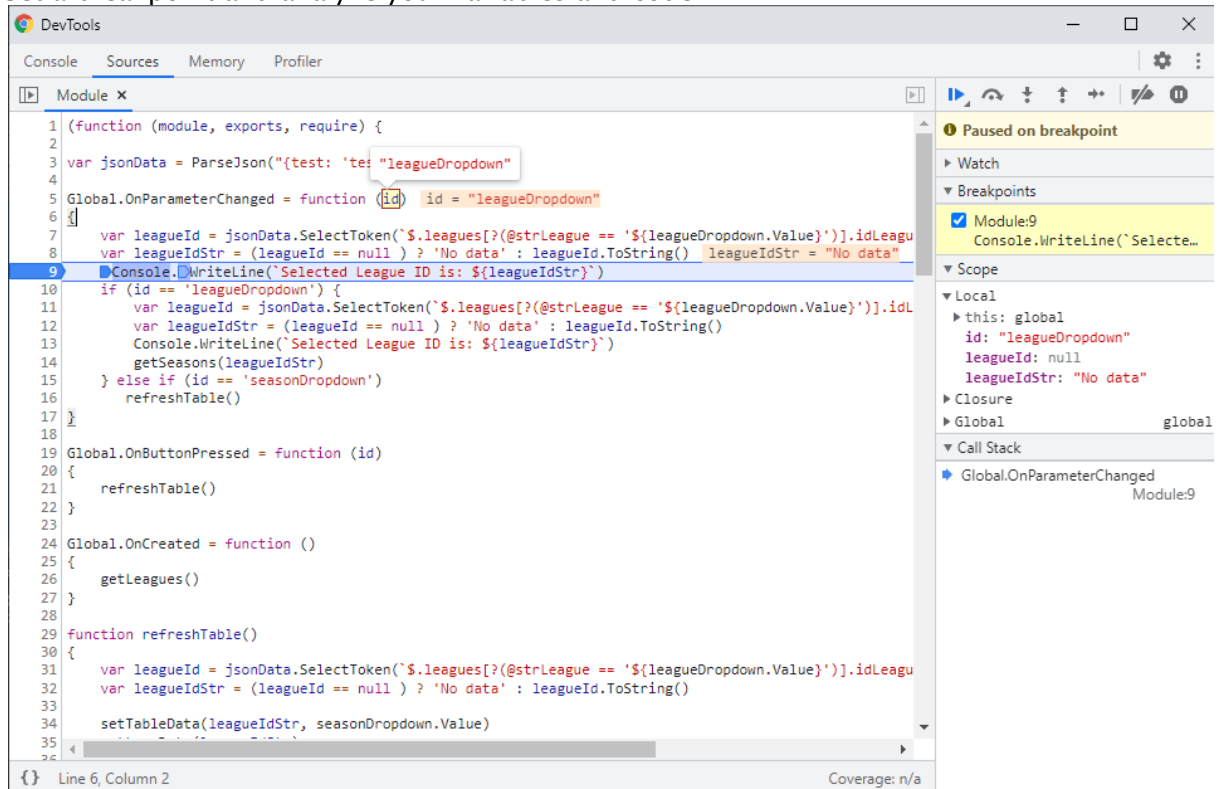
- Top Panel:** Console, Sources, Memory, Profiler. The Sources tab is active, showing a file named "Module x".
- Left Panel:** Filesystem view with "Add folder to workspace" and "Sync changes in DevTools with the local filesystem" (with a link to "Learn more about Workspaces").
- Code Editor:** Contains JavaScript code with a breakpoint (red dot) at line 35. The code includes functions for handling parameter changes, button presses, and table refreshes.
- Right Panel:** Watch, Breakpoints (showing "No breakpoints"), Scope (showing "Not paused"), and Call Stack (showing "Not paused").
- Bottom Panel:** Console, Changes, Quick source, Coverage. The Console shows "V8ScriptEngine [4]" and "Filter".

```

1 (function (module, exports, require) {
2
3 var jsonData = ParseJson("{\"test: 'test'}")
4
5 Global.OnParameterChanged = function (id)
6 {
7   var leagueId = jsonData.SelectToken("$.leagues[
8   var leagueIdStr = (leagueId == null) ? 'No dat
9   Console.WriteLine("Selected League ID is: ${lea
10  if (id == 'leagueDropdown') {
11    var leagueId = jsonData.SelectToken("$.leag
12    var leagueIdStr = (leagueId == null) ? 'No
13    Console.WriteLine("Selected League ID is: $
14    getSeasons(leagueIdStr)
15  } else if (id == 'seasonDropdown')
16    refreshTable()
17  }
18
19 Global.OnButtonPressed = function (id)
20 {
21   refreshTable()
22 }
23
24 Global.OnCreated = function ()
25 {
26   getLeagues()
27 }
28
29 function refreshTable()
30 {
31   var leagueId = jsonData.SelectToken("$.leagues[
32   var leagueIdStr = (leagueId == null) ? 'No dat
33
34   setTableData(leagueIdStr, seasonDropdown.Value)
35
36

```

7. Set a breakpoint and analyze your variables and code.



1.3.2 Visual Studio Code

You can debug scripts with [Visual Studio Code](#) when using V8 JavaScript in the global script or in any scripted template.

1. Install and launch [Visual Studio Code](#).
2. Set up one or more Viz Arc V8 debug configurations:
 - a. Click **File > Preferences > Settings** to open your user settings.
 - b. Locate or search for the **Launch** configuration and click **Edit in settings.json**.
 - c. Add the following section to the file:

```
{
  "debug.javascript.usePreview": false,
  "launch": {
    "version": "1.2.0",
    "configurations": [
      {
        "name": "Attach to Viz Arc Global Script on port 9222",
        "type": "node",
        "request": "attach",
        "protocol": "inspector",
        "address": "localhost",
        "port": 9222
      }
    ]
  }
}
```

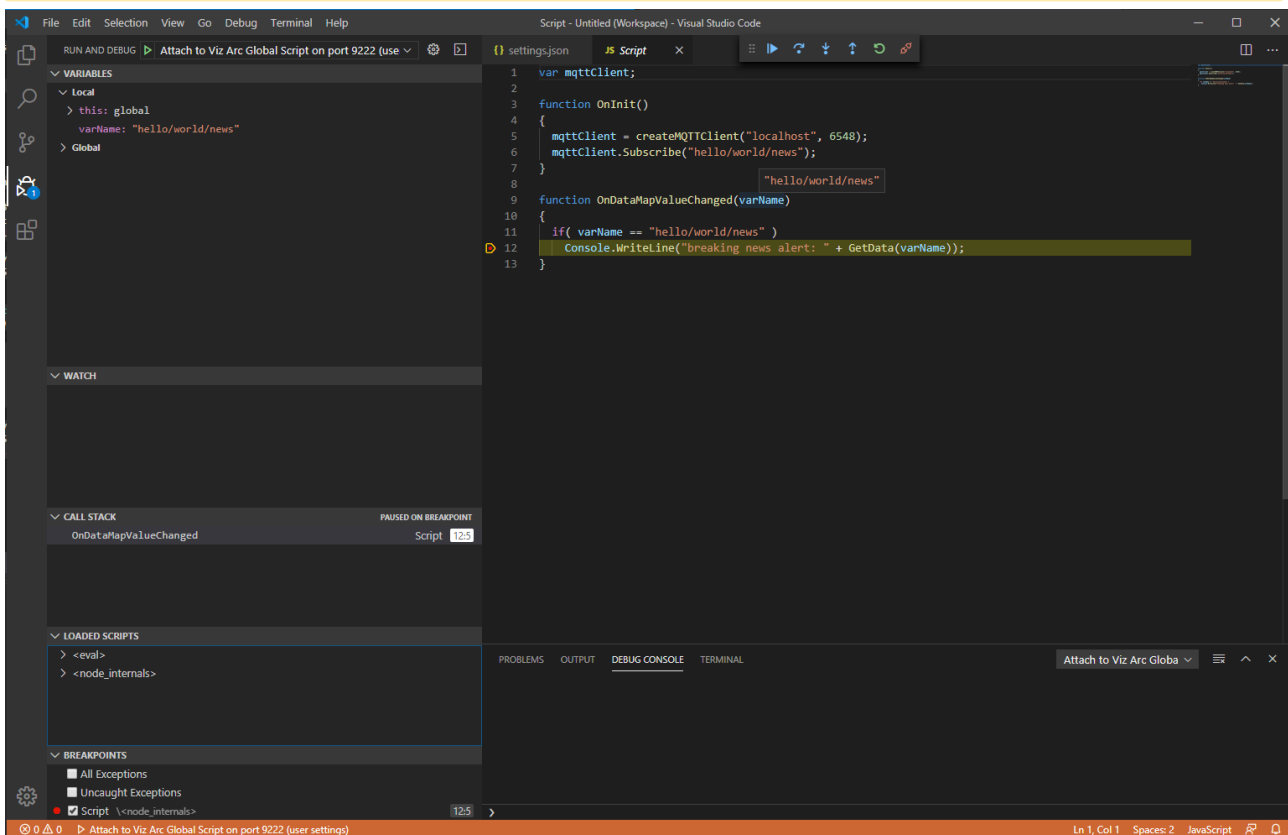
```

    {
      "name": "Attach to Viz Arc Template Scrip on port 9223",
      "type": "node",
      "request": "attach",
      "protocol": "inspector",
      "address": "localhost",
      "port": 9223
    }
  ]
}
}

```

- d. You can specify additional configurations for different hosts, port numbers, and other options. See [Node.js debugging in VS Code](#) for more information.
- e. Click **File > Save**.
3. If you'd like to debug your application remotely, you must also make sure that your firewall allows incoming connections to your TCP port.
4. Attach the Visual Studio Code debugger to your application:
 - a. Click **View > Debug** to bring up the Debug view.
 - b. Select the appropriate debug configuration at the top of the Debug Side Bar.
 - c. Click **Debug > Start Debugging**.

Note: There are two different ports in use: One for the global script (default 9222) and one for template scripts (default 9223). Template scripts can be debugged only when running in the designer. The ports can be configured in the global configuration settings.



The screenshot above shows a global script being stopped at a breakpoint.

See Also

- [Node.js debugging in VS Code](#)

1.4 Profiles Classes

This section contains a list of properties and functions grouped by type that are useful for communicating with Profile, Channel, and Engine (Viz and Unreal).

- [Scripting Profile](#)
- [Scripting Channel](#)
- [Scripting Engine](#)

1.4.1 Scripting Profile

- string **Name** [Get]
 - Returns the profile's name
- int **NumChannels** [Get]
 - Returns the number of channels
- ScriptingChannel **VizEditingEngine** [Get]
 - Returns the configured Viz Editing Engine of the profile
- ScriptingChannel **UnrealEditingEngine** [Get]
 - Returns the configured Unreal Editing Engine of the profile
- ScriptingChannel **Accessor** [int index] [Get]
 - Returns the *index*-indexed Scripting Channel
- ScriptingChannel **GetChannel** (int index)
 - Returns the *index*-indexed Scripting Channel
- ScriptingChannel **GetChannel** (string channelName)
 - Returns the first channel found with name *channelName*

1.4.2 Scripting Channel

- string **Name** [Get]
 - Returns the channel's name
- int **NumChannels** [Get]
 - Returns numbers of Engines in the channel
- ScriptingChannel **Accessor** [int index] [Get]
 - Returns the *index*-indexed Scripting Engine Class
- void **SendSingleCommand** (string command)
 - Sends the command to all the Engines in the channel
- ScriptingEngine **GetEngineByName** (string name)
 - Return the first Engine found with name

1.4.3 Scripting Engine

- void **SendSingleCommand** (string command)
 - Sends the command to the Engine
 - string **QueryEngine** (string command)
 - Queries the Engine with command
-

1.5 Scripting Classes

This section covers the following topics:

- General
- Action
- Playlist
- Control Object
- MIDI
- MQTT
- Parameter
- Channel
- Viz/Unreal Engine Communication
- Tracking Hub Command
- SMM Handling
- GPI
- Timer
- StreamDeck
- DataMap
- NDI
- File Handling
- JSON
- Excel
- Parameter Callbacks
- Exposed Objects
 - Console
 - MessageBox
 - XmlDocument
 - XMLHttpRequest
 - xlAppType
 - FSO
- xHost
- SQLite Sample
- Main Script-only
 - Canvas Tabs Handling
 - Action Template Handling

- Callbacks
- Template Script-only
 - Action/Designer Handling
 - Control Object Handling
 - Template Channels Handling
 - ScriptingChannel
 - Properties
 - Methods
 - Template Scene Handling
 - Template Action Configuration
 - Callbacks
- Parameters
 - Base Parameters Functionality
 - Layout
 - Panel
 - Tabs
 - Info
 - Label
 - Dialogs
 - Color
 - Directory
 - File
 - Asset
 - WebView
 - Input
 - Bool
 - Button
 - Double / Double Slider
 - Dropdown / Radio
 - Int / Int Slider
 - MultiText / Text
 - Triplet
 - Table
 - Properties
 - Methods
 - Cell Handling
 - Columns Handling
 - Rows Handling

1.5.1 General

Viz Arc's scripting has many classes and types that are exposed and accessible via code. The script's main class is called **arc** and it exposes all the functions that are capable of interacting with the remaining parts of Viz Arc as well as many helper functions. All of **arc**'s functions can be


accessed via scripting by calling them directly, since they are all exposed directly to the global script, or via the **arc** keyword.

The following samples and codes snippets are all written using the **V8 JavaScript** syntax:

Accessing arc functions

```
// Getting a reference to an action called VersusTemplate
var versus = arc.GetAction("VersusTemplate");
var versus = GetAction("VersusTemplate");
```



Note: You can also find this section in Viz Arc by selecting the **Help** button  in the script section when in edit mode.

1.5.2 Action

All actions in the current project can be accessed using the **GetAction** method, whose content can be manipulated. See [Action Properties](#) for more details.

- BaseAction **GetAction** (string actionNameOrGUID)
 - Returns the first action found with the name provided. When a valid GUID is provided as a string, it returns the action found with the provided GUID.
- BaseAction **GetAction** (string actionName, string tabName)
 - Returns the first action found with the name provided inside the action tab named tabName.
- BaseAction **GetActionByName** (string actionName)
 - Returns the first action found with the name provided.
- BaseAction **GetActionByName** (string actionName, string tabName)
 - Returns the first action found with the name provided inside the action tab named tabName.
- BaseAction **GetActionByUUID** (Guid actionUUID)
 - Returns the first action found with the provided GUID.
- BaseAction[] **GetSelectedActions**()
 - Returns an array containing all the actions that are selected on the action canvas
- BaseAction[] **GetActionsOfTab**(string tabName, string actionType = "ALL")
 - Returns an array with all the actions inside the tab named tabName of type equal to the one provided in actionType input. Default value ("ALL") includes all actions found.

GetAction example

```
// Getting a reference to an action explicitly by its name "VersusTemplate"
var versus = GetActionByName("VersusTemplate");
```

```
// Getting a reference using a GUID
var versus = GetAction("e87a8031-a86b-4997-a169-c6f791920449");

// Getting a reference to an action called VersusTemplate
var versus = GetAction("VersusTemplate");
```

1.5.3 Playlist

arc provides an alternative way of getting a [BaseControlObject](#) from a [ControlObject/Blueprint](#) action.

- void **ExecuteSelectedPlaylistRow()**
 - Executes the selected row on the playlist.
- void **ExecuteSelectedPlaylistRowAndNext()**
 - Executes the selected row on the playlist and changes selection to the next row.
- void **PreviewSelectedPlaylistRow()**
 - Previews the selected row on the playlist.
- BaseAction **GetSelectedPlaylistRowAction()**
 - Returns the action that's attached to the selected row on the playlist.
- void **SetSelectedPlaylistRow(params string[] path)**
 - Tries to find the row at path (path should contain a string per depth level) and makes it the selected row.

Playlist example

```
// Selects the row at "StatsDisplayGroup/AwayTeam/Show" and then previews and
executes it.
SetSelectedPlaylistRow("StatsDisplayGroup", "AwayTeam", "Show");
PreviewSelectedPlaylistRow();
ExecuteSelectedPlaylistRowAndNext();
```

1.5.4 Control Object

arc provides an alternative way of getting a [BaseControlObject](#) from a [ControlObject/Blueprint](#) action.

- BaseControlObject **GetControlObject** (ControlObjectAction action, string id)
 - Returns the control object with a specific ID from ControlObject action.

Getting a specific ControlObject from a ControlObjectAction

```
// Get the ControlObject Action
var MatchDayAction = GetAction("MatchdayTable");
// Get Title ControlObject (ControlText) and change its value
GetControlObject(Co, "Title").Value = "Sunday Fixtures";
```

```
// Get the Blueprint Action
var HeadlineBp = GetAction("HeadlineBp");
// Get Title ControlObject (String Variable) and change its value
GetControlObject(HeadlineBp , "Title").Value = "Lorem Ipsum";
```

1.5.5 MIDI

Attached and configured MIDI devices can be used to receive MIDI events using the **OnMIDIEvent** callback. It's also possible to send MIDI events to an attached device using the following methods:

- bool **SendMIDIControlMessage**(string DeviceName, int Channel, int Number, int Value)
 - Sends a MIDI control message to a the device named DeviceName, using Channel, Number and Value
- bool **SendMIDINoteMessage**(string DeviceName, bool On, int Channel, int Note, int Velocity)
 - Sends a MIDI note message to a the device named DeviceName, using Channel, Note and Velocity. The parameter **On** determines whether the event is a note on or note off event.

⚠ Note: Both of the methods above return true on successful completion and false if not successful.

MIDI Sample

```
function OnButtonPressed(id)
{
    SendMIDIControlMessage("Midi Fighter Twister", 1, 1, 127); // send control message
to Midi Fighter Twister on channel 1, number 1, value 127
    SendMIDINoteMessage("nanoPAD2", true, 1, 5, 100); // send note down event to
nanoPAD2 device
}

function OnMIDIEvent(midiEvent)
{
    // just print the midi event on the console
    Console.WriteLine("midi event |" + midiEvent.DeviceName + "| " +
midiEvent.EventType + "\n" + midiEvent.ToString());
}
```

1.5.6 MQTT

Message Queuing Telemetry Transport is supported through the possibility to instantiate a MQTT client and send/receive messages

- ArcMqttClient **createMQTTClient**(string server, int port)Creates a MQTT client connected using server and port

The returned client ArcMqttClient supports the following methods

- void **Subscribe**(string topic, int qos = 1)
Subscribe the client to the given topic with the specified quality of service (default 1)
- void **Unsubscribe**(string topic)
Unsubscribe the client from the given topic
- void **sendMessage**(string topic, string payload)
Send a message payloadto topic
- void **Dispose**()
disconects and deletes the client

Whenever a message is received from a topic a client has subscribed to, the new data is set to the global DataMap using the topic as key and the payload as value. Payload data in json format is passed as a json object, anything else is passed as a string object.

mqtt sample

```
var mqttClient;

function OnInit()
{
    mqttClient = createMQTTClient("localhost", 6548);
    mqttClient.Subscribe("hello/world/news");
}

function OnDataMapValueChanged(varName)
{
    if( varName == "hello/world/news" )
        Console.WriteLine("breaking news alert: " + GetData(varName));
}
```

A sample server written in C# illustrating the server side code using the MQTTnet library.

MQTT server saple

```
using MQTTnet;
using MQTTnet.Extensions.ManagedClient;
using MQTTnet.Server;
using System;
using System.Threading;

namespace testmqtt
{
    class Program
    {
```

```

static void Main(string[] args)
{
    var optionsBuilder = new MqttServerOptionsBuilder()
        .WithConnectionBacklog(100)
        .WithDefaultEndpointPort(6548);

    var mqttServer = new MqttFactory().CreateMqttServer();
    mqttServer.StartAsync(optionsBuilder.Build());

    int i = 0;
    MqttApplicationMessage message = null;
    while (true)
    {
        message = new MqttApplicationMessageBuilder()
            .WithTopic("hello/world/news")
            .WithPayload("Temperatures below " + i + " !")
            .WithExactlyOnceQoS()
            .Build();

        mqttServer.PublishAsync(message);
        Thread.Sleep(1000);
        Console.WriteLine(i + "");
        i--;
    }
}
}
}

```

1.5.7 Parameter

All parameters are exposed to the global script and can be accessed via their unique ID.

arc provides an alternative way of getting them.

- BaseParameter **GetParameter**(string id)
 - Gets the parameter identified by the unique id that was input.

It's also possible to get and set a parameter's value directly from **arc**.

- dynamic **GetParameterValue**(string id)
 - Gets the value of the parameter identified by the unique id that was input.
 - [dynamic] The returned value's type depends on the parameter type
- void **SetParameterValue** (string id, dynamic value)
 - Sets the value of the parameter identified by the unique id that was input.
 - [dynamic] Input variable value can be of any type, see parameters for valid types.

In case you don't want the callback function **OnParameterChanged** to be triggered when changing a value using **SetParameterValue**, you can use **SetParameterRawValue**. This method does not trigger any calls to **OnParameterChanged**.

- void **SetParameterRawValue** (string id, dynamic value)
 - Sets the value of the parameter identified by the unique id that was input.
 - [dynamic] Input variable value can be of any type, see parameters for valid types.

Buttons are a special case in the sense that they don't hold a value, and therefore have a separate method for triggering their *click*.

- void **PushParameterButton** (string id)
 - Triggers a pressed event on the button identified by the unique id that was input.

Note: Button presses trigger the global script's callback **OnButtonPressed**

Note: Parameter value changes trigger the global script's callback **OnParameterChanged**

Parameter examples

```
// Setting the value of a bool parameter (id = ShowHighlights) to false
// direct assignment
ShowHighlights.Value = false;
// Get parameter via arc and then assign to Value
GetParameter("ShowHighlights").Value = false;
// Set Parameter value via arc without interacting with the actual parameter
SetParameterValue("ShowHighlights", false);

// Getting the value of a bool parameter (id = ShowHighlights)
var highlightState = GetParameterValue("ShowHighlights");

// Push LoadFixtures button
PushParameterButton("LoadFixtures");
```

1.5.8 Channel

arc grants access to Viz Arc profiles. This is useful whenever more precise control is required for communicating with the Engines.

- ScriptingProfile **GetSelectedProfile** ()
 - Returns the currently selected profile.
- int **GetChannelCount** ()
 - Returns the number of channels on the currently selected profile.
- ScriptingChannel **GetChannel** (int index)
 - Returns the channel at the *index* position on the currently selected profile.
- ScriptingChannel **GetChannel** (string channelName)
 - Returns the channel named *channelName* on the currently selected profile.
- ScriptingChannel **GetPreviewChannel**();
 - Returns the preview channel.

Channel handling examples

```
// Clear main layer on all channels using GetChannelCount() and GetChannel(int)
```

```

for (var i = 0; i < GetChannelCount(); i++) {
    GetChannel(i).SendSingleCommand("RENDERER*MAIN_LAYER SET_OBJECT");
}

// Send message to VideoWallchannel via GetSelectedProfile () and GetChannel(string)
GetChannel("VideoWall").SendSingleCommand("RENDERER*MAIN_LAYER SET_OBJECT");
GetSelectedProfile().GetChannel("VideoWall").SendSingleCommand("RENDERER*MAIN_LAYER
SET_OBJECT");

```

1.5.9 Viz/Unreal Engine Communication

arc provides quick access functions for sending messages to specific channels/Engines.

- void **SendSingleCommand** (string command, string channelName)
 - Sends *command* to all the Engines in the specified channel *channelName*
- void **SendMultipleCommands** (string[] commands, string channelName)
 - Sends all the input *commands* to all the Engines in the specified channel *channelName*
- string **GetFromEngine** (string command, string channelName)
 - Sends *command* to all the Engines in the specified channel *channelName*
 - Returns the answer to the sent *command*
- string **GetFromEngine** (string command, string channelName)
 - Sends *command* to all the Engines in the specified channel *channelName*
 - Returns the answer to the sent *command*
- string **GetFromVizEngine** (string command)
 - Sends command to the currently selected profile's viz editing Engine
 - Returns the answer to the sent *command*
- string **GetFromUnrealEngine** (string command)
 - Sends command to the currently selected profile's unreal editing engine
 - Returns the answer to the sent *command*

Engine communication

```

// Get scene from parameter and set it to viz engine main layer
SendSingleCommand(GetParameterValue("MainSceneSelector"), "Main");

// Clear Main, Back and Front layers on channel
var CleanCommands = ["RENDERER*MAIN_LAYER SET_OBJECT", "RENDERER*BACK_LAYER
SET_OBJECT", "RENDERER*FRONT_LAYER SET_OBJECT"];
SendMultipleCommands(CleanCommands, "Viz");

// Query viz channel and viz editing engine for the currently loaded scene
GetFromEngine("SCENE SCENE*SCENE GET", "Viz");
GetFromVizEngine("SCENE SCENE*SCENE GET");

```


1.5.10 Tracking Hub Command

arc provides quick access functions for sending messages the configured Tracking Hub.

- void **SendSingleTHCommand** (string command)
 - Sends *command* to the tracking hub (if configured and connected)

1.5.11 SMM Handling

- void **SendToSMM** (string key, string value, bool doEscape)
 - Sends key-value pair to Shared Memory to the first channel of the current profile. doEscape specifies whether the value string is escaped.
- void **SendToSMM** (string key, string value, bool doEscape, string channel)
 - Sends key-value pair to Shared Memory to all Engines contains in *channel*. doEscape specifies whether the value string is escaped.

The shared memory updates are sent to the UDP or TCP port configured on the target Engine; if both are configured, it is sent to the UDP port. The Viz Communication Shared Memory map is therefore utilized. You can read more on Shared Memory configuration in the Profiles section in the *Viz Arc User Guide*.

SMM example

```
// Send to Viz Channel SMM the variable "Target1" with the value from TargetState
// (Bool parameter)
SendToSMM("Target1", TargetState.Value, false, "Viz");
```

1.5.12 GPI

The connected GPI state can be changed via the **arc** functionalities:

- void **SignalGpiChannel** (int channelIndex, bool signalHigh)
 - Signals set the GPI channel at *channelIndex* to either high or low.

The following snippet presents a function that loads a scene to the "Main" channel and signals the GPI:

GetAction example

```
function LoadScene()
{
  // Get scene from parameter and set it to viz engine main layer
  SendSingleCommand(GetParameterValue("MainSceneSelector"), "Main");
  // Set gpi channel 2 to High
  SignalGpiChannel(2, true);
}
```

}

Note: GPI must be enabled on the config.

1.5.13 Timer

- void **CreateTimer** (string id)
 - Creates a timer that can be accessed via its unique *id*.
- void **CreateTimer** (string id, int ms)
 - Starts a timer that can be accessed via its unique *id* and has a tick interval of *ms*.
- void **StartTimer** (string id, int ms)
 - Gets the timer identified by *id*, sets the tick interval to *ms* and starts it.
- void **StopTimer** (string id)
 - Gets the timer identified by *id* and stops it.

The following example creates a timer on the OnInit callback, makes use of two buttons to start/stop the timer and writes to the console whenever the timer ticks:

Timer example

```
// Timer id
var heartBeatTimerId = "HeartBeat";

function OnInit()
{
    // Create timer with id heartBeatTimerId
    CreateTimer(heartBeatTimerId);
}

function OnButtonPressed(id)
{
    if(id == "TimerStart")
        StartTimer(heartBeatTimerId, 1000);
    else if(id == "TimerStop")
        StopTimer(heartBeatTimerId);
}

// Script callback for timer ticks
function OnTimer(id)
{
    Console.WriteLine("Timer Tick " + id);
}
```

Note: Whenever a timer ticks the global script's callback **OnTimer** is called.

1.5.14 StreamDeck

Any connected StreamDeck can have its buttons customized via **arc** using one of the following methods:

- void **SetStreamdeckKey** (int key, string label, int fontSize)
 - Baseline version, sets streamdeck key at *key index* image to a black square with *label* text of *fontSize* size
- void **SetStreamdeckKey** (int key, string label, int fontSize, string imageFullPath)
 - Same as the baseline version but instead of a black block it sets a local image (at *imageFullPath*) as background
- void **SetStreamdeckKey** (int key, string label, int fontSize, int r, int g, int b)
 - Same as the baseline version but instead of black it uses an RGB color as background

Any key can have its contents cleared with the following method:

- void **ClearStreamdeckKey** (int key)
 - Clears the content of the Streamdeck key at *key index*

StreamDeck key configuration example

```
function SetupStreamDeck()
{
    // Key 0: Black background, size 20 "Clear" text
    SetStreamdeckKey(0, "Clear", 20);
    // Key 1: Image background, size 20 "Load AR" text
    SetStreamdeckKey(1, "Load AR", 20, "D:/Soccer/Images/ARThumbnail.png");
    // Key 2: Blue background, size 20 "Continue" text
    SetStreamdeckKey(2, "Continue", 20, 0, 0, 255);
}

function OnInit()
{
    // Clean first 3 keys
    ClearStreamdeckKey(0);
    ClearStreamdeckKey(1);
    ClearStreamdeckKey(2);
}
```

1.5.15 DataMap

arc provides a simple interface (get and set) for interacting with Viz Arc's DataMap:


- dynamic **GetData** (string varName)
 - Returns the value belonging to the variable named *varName*
 - [dynamic] Returned value depends on what was set to *varName*
- void **SetData** (string varName, dynamic value)
 - Inserts (or overwrites if *varName* already exists) *the key:value* pair into Arc's DataMap

- [dynamic] Input *value* can be of any type
- void **SubscribeDataMap**(string variableName)
 - Subscribes to a specific key (Empty string subscribes to all changes). The subbed variables feedback triggers the script callback "OnDataMapValueChanged".
- void **UnsubscribeDataMap**(string variableName)
 - Unsubscribes from a specific key (Empty string unsubscribes to all changes).

DataMap example

```
// Callback for DataMap changes
function OnDataMapVaLueChanged (varName)
{
    // Process results whenever "ShooterResults" is updated
    if(varName == "ShooterResults")
        UpdateResults(GetData(varName));
}

// Example of setting a DataMap variable
SetData("ShooterResults", "1 0 1 1 0");
```

 **Note:** Whenever a DataMap variable changes the global script's callback **OnDataMapValueChanged** is called.

1.5.16 NDI

arc provides an interface to handle metadata feedback from ndi sources

- string[] **GetNDISourceList**()
 - Returns an array with all the names of the available ndi sources.
- void **SubscribeNdiSourceMetadata**(string source)
 - Subscribes to the metadata feedback on the ndi source identified by the provided source input. The feedback is sent to the datamap with key equal to the source name.
- void **UnsubscribeNdiSourceMetadata**(string source)
 - Unsubscribes the ndi feedback.

DataMap example

```
// Get All ndi sources
var sources = GetNDISourceList();

SubscribeNdiSourceMetadata("CameraPtz");
```

⚠ Note: Whenever a DataMap variable changes the global script's callback `OnDataMapValueChanged` is called.

1.5.17 File Handling

- string **ReadTextFile** (string filename, string encoding = "UTF8")
 - Returns a *encoding* encoded string containing the whole content of the text file.
- bool **WriteTextFile** (string FullPath, string data, string encoding = "UTF8")
 - Writes a file at *FullPath* with its content equal to the encoded inputed *data*

⚠ Valid encodings: "UTF8" , "ASCII", "BigEndianUnicode", "Default" [System defined encoding], "UTF32", "UTF7"

File handling example

```
// Get the StartList file content from the directory defined by the Directory
parameter "WorkingDir"
ReadTextFile( WorkingDir.Value + "\\StartList.json");

// Write the results to the directory defined by the Directory parameter "WorkingDir"
WriteTextFile( WorkingDir.Value + "\\RaceResults.json", results);
```

1.5.18 JSON

- dynamic **ParseJson** (string data)
 - Deserializes the input *data* and returns a json object if successful

On the returned json object you can access the members directly using their name. Use the "ToString()" method on any of the objects to convert them to strings.

```
var json = ParseJson("{\"time: '1994-11-05T13:15:30Z', title: 'Viz Arc', subtitle: 'Vizrt', messageId: 1}");

Console.WriteLine("the whole json " + json.ToString());

Console.WriteLine("the title is " + json.title.ToString());
```

1.5.19 Excel

- bool **convertXLSToCSV**(string excelFilePath, string csvOutputFile, string separator = "\t", int worksheetNumber = 1)

- Converts an existing xls file *excelFilePath* to a comma separated CSV file *csvOutputFile* using *separator* (default tab separator) and using worksheet number *worksheetNumber* (1 default being the first worksheet in the excel file)
- On successful conversion the function returns true

```
// convert excel to CSV file
convertXLSToCSV("c:/tmp/someexcel.xlsx", "c:/tmp/somecsv.csv")
// read the whole csv file into a string
var fileContent = ReadTextFile("c:/tmp/somecsv.csv")
var EntryArr = fileContent.split("\n");

// First line is for the headers, ignore it
for(i = 1; i < EntryArr.length; i++)
{
    // split the row
    var spl = EntryArr[i].split("\t")
    if( spl.length <= 1 )
        continue;

    Console.WriteLine("row " + i + ":")

    // print columns one by one separated by a whitespace
    for( entry of spl )
        Console.Write( entry.trim() + " " )

    Console.WriteLine("")
}
}
```

1.5.20 Parameter Callbacks

- **OnParameterChanged** (string parameterID)
 - Called whenever a parameter (except button and table) changes.
 - *parameterID* is the ID of the parameter that triggered the callback
- **OnButtonPressed** (string buttonName)
 - Called when a parameter button is pressed.
 - *buttonName* is the ID of the button that triggered the callback
- **OnMiddleButtonPressed** (string buttonName)
 - Called when a button is pressed with the middle mouse button
 - *buttonName* is the ID of the button that triggered the callback
- **OnRightButtonPressed** (string buttonName)
 - Called when a button is pressed with the middle mouse button
 - *buttonName* is the ID of the button that triggered the callback
- **OnTimer** (string timerID)
 - Called when a timer ticks (completes a cycle).
 - *timerID* is the ID of the timer that triggered the callback
- **OnDataMapValueChanged** (string varName)
 - Called whenever a DataMap variable changes

- *varName* is the ID of the variable that was changed
- **OnStreamDeckKey** (string key)
 - Called whenever a StreamDeck button is pressed
 - *key* indicates the index of the pressed button
- **OnMidiEvent** (midiEvent)
 - Called whenever a midi event is registered on one of the attached and configured midi devices
 - midiEvent contains the following fields
 - string DeviceName (the name of the device triggering the midi event;
 - string EventType (either "ControlChange", "NoteOn" or "NoteOff")
 - int Channel (the control channel of the event)
 - int Number (the control number of the event)
 - int Value (the value of the event, in the range [0..127])
 - int Note (the note of the event in case EventType is NoteOn or NoteOff)
 - int Velocity (the velocity of note event in case EventType is NoteOn or NoteOff)
- **Table Callbacks**
 - **OnTableColumnsChanged** (string tableID)
 - Called whenever a table parameter's columns change in number
 - *tableID* is the ID of the table that triggered the callback
 - **OnTableRowsChanged** (string tableID)
 - Called whenever a table parameter's rows change in number
 - *tableID* is the ID of the table that triggered the callback
 - **OnTableCellValueChanged** (string tableID, int row, int column, BaseBlock cell)
 - Called whenever a table parameter's cell changes value
 - *tableID* is the ID of the table that triggered the callback
 - *row* and *column* indicate the position of the cell within the caller table parameter
 - *cell* is the cell object that was changed. Users can interact directly with it

1.5.21 Exposed Objects

Console

- void Write (string message)
 - Writes the message to the scripting console
- void WriteLine (string message)
 - Writes the message to the scripting console followed by a new line

MessageBox

- void **Show** (string message)
 - Shows a message box with its content equal to *message*
- void **Show** (string message, string title)
 - Shows a message box with titled *title* and with its content equal to *message*

File handling example

```
// Log an error and show a message to the user
Console.WriteLine("Unable to load data");
MessageBox.Show("Unable to load data", "Load Error");
```

XmlDocument

XmlDocument allows you to read XML files or strings and aggregate data using XPath.

```
// create XmlDocument and load a xml from disc
xmlDoc = new XmlDocument();
xmlDoc.Load("D:/somedata.xml");
Console.WriteLine("nodes " + xmlDoc.ChildNodes.Count);

// create namespace manager
nsmgr = new XmlNamespaceManager(xmlDoc.NameTable);
// add namespace
nsmgr.AddNamespace("x", "http://www.vizrt.com/types");

// search for x:model
root = xmlDoc.DocumentElement;
nodeList=root.SelectNodes("//x:model");
Console.WriteLine("nodesList " + nodeList.Count);
```

XMLHttpRequest

With the XMLHttpRequest class you can fetch data from a remote server. Below is a sample that fetches asynchronously json data from a server.

```
var request = new XMLHttpRequest();

request.onreadystatechange = function() {
if (request.readyState == 4 && request.status == 200 ) {
    Console.WriteLine("here");
    var json = ParseJson(request.responseText);

    Console.WriteLine(json.ToString());

    for (elem of json)
        Console.WriteLine(elem.name.ToString());

    // alternative way of iteration
    //for( var elem = json.First; elem != null; elem = elem.Next)
```



```

    // Console.WriteLine(elem.name.ToString());
  }
}
request.open("GET", "https://jsonplaceholder.typicode.com/users", true);
request.send();

```

xlAppType

This type allows you to read excel sheets directly.

⚠ Note: This object only works if there is a local Excel installation on the same machine where Viz Arc is running.

FSO

The FSO object allows you to read, create and write files.

- **OpenTextFile** (*filename*, [*iomode*, [*create*, [*format*]]])
iomode can be one of the following: IOMode.ForReading, IOMode.ForWriting, IOMode.ForAppending
format can be of the following: TriState.TriStateUseDefault (system default), TriState.TriStateTrue (Unicode), TriState.TriStateFalse (ASCII)

reading a UTF8 encoded text file

```

var file = new FSO();
var stream = file.OpenTextFile("d:/testexport.txt");
// or
var stream = file.OpenTextFile("d:/testexport.txt", IOMode.ForReading, false,
TriState.TriStateTrue);

Console.WriteLine(stream.ReadAll());

```

1.5.22 xHost

The xHost object gives you access to virtually any .NET resource.

V8 script sample

```

var List = xHost.type('System.Collections.Generic.List');
var DayOfWeek = xHost.type('System.DayOfWeek');
var week = xHost.newObj(List(DayOfWeek), 7);
week.Add(DayOfWeek.Sunday);

```

You can even import entire assemblies:

V8 enumerate files in directory

```
var clr = xHost.lib('mscorlib', 'System', 'System.Core', 'System.IO');
dropdown_0.Clear();
var dir = clr.System.IO.Directory;
dropdown_0.SetItems(dir.GetFiles('c:\\tmp'));
```

In the example above, a UI dropdown element named *dropdown_0* is populated with a file list contained in *c:\tmp* using .NET **System.IO.Directory** class instance.

If you know the assembly name of a specific type, you can instantiate it using `xHost.type(name, assemblyName)` method.

SQL sample

```
var queryString = "SELECT * FROM someTable"
var connectionString = "Data Source=someSource;Initial Catalog=Testdb;User
ID=testUser;Password=test123"

// get types using xHost.type
var SqlConnection = xHost.type('System.Data.SqlClient.SqlConnection',
'System.Data.SqlClient')
var SqlCommand = xHost.type('System.Data.SqlClient.SqlCommand',
'System.Data.SqlClient')
var SqlDataReader = xHost.type('System.Data.SqlClient.SqlDataReader',
'System.Data.SqlClient')

connection = new SqlConnection(connectionString)
connection.Open()
var command = new SqlCommand(queryString, connection)
var reader = command.ExecuteReader()
// do something with the data
connection.Close()
```

1.5.23 SQLite Sample

Another sample that uses the `xHost.type` function is the usage of a simple SQLite database. It is required that the SQLite libraries/DLLs are in the search path of the system or in the same directory as the Viz Arc executable.

SQLite sample

```
var SQLiteConnection = xHost.type('System.Data.SQLite.SQLiteConnection',
'System.Data.SQLite')
// those two below are not needed for this sample as they dont get instantiated
explicitly
```

```

var SQLiteDataReader = xHost.type('System.Data.SQLite.SQLiteDataReader',
'System.Data.SQLite')
var SQLiteCommand = xHost.type('System.Data.SQLite.SQLiteCommand',
'System.Data.SQLite')

function ReadData(conn)
{
    // create q query
    sqlite_cmd = conn.CreateCommand()
    sqlite_cmd.CommandText = "SELECT Name FROM Artist LIMIT 10;" // read first 10
    artists of the table

    // execute the query
    sqlite_datareader = sqlite_cmd.ExecuteReader();
    while (sqlite_datareader.Read())
    {
        // iterate over the result and print the result on the console
        Console.WriteLine(sqlite_datareader.GetString(0));
    }
}

function testSQLiteDB()
{
    // create a new connection specifying the database file name and the version
    // sample database can be found here https://github.com/lerocha/chinook-database
    conn = new SQLiteConnection("Data Source=C:\\tmp\\Chinook.db;Version=3;");
    try
    {
        // Open the connection:
        conn.Open();

        // read some data
        ReadData(conn);

        // close the connection
        conn.Close();
    }
    catch (ex)
    {
        Console.WriteLine("error in SQLite query " + ex)
    }
}

Global.OnInit = function ()
{
    testSQLiteDB()
}

```

1.5.24 Main Script-only

There are functionalities that are specific to Viz Arc's main script:


Canvas Tabs Handling

- void **SetActionsSelectedTab** (string *tabName*)
 - Looks for a tab named *tabName* and sets it as active
- void **SetActionsSelectedTab** (int *tabIndex*)
 - Sets the Action selected tab to the tab at *tabIndex* index
- string **GetActionsSelectedTabName** ()
 - Returns the currently selected tab's name
- string[] **GetActionsTabs** ()
 - Returns a string array with all tab names

Action Template Handling

Arc's main scripts allows the user to interact with template actions on the action canvas.

- void **PreviewSelectedTemplate** ()
 - Previews the currently selected template action
- void **ExecuteSelectedTemplate** ()
 - Executes the currently selected template action
- void **UpdateSelectedTemplate** ()
 - Updates the currently selected template action
- void **ContinueSelectedTemplate** ()
 - Continues the currently selected template action

 **Note:** The method presented only works when one and only one action (template action) is selected on the action canvas.

Callbacks

- **PreActionExecute** (string *actionName*)
 - Called whenever an is executed and before the actual execution occurs
 - *actionName* is the name of the action that is being executed
- **PosActionExecute** (string *actionName*)
 - Called whenever an is executed and after the actual execution occurs
 - *actionName* is the name of the action that is being executed
- **OnInit** ()
 - Called when the main script is started (User clicks on the **Start** button)

1.5.25 Template Script-only

The template script is a specific version that is used on the template designer and on the template action.


Action/Designer Handling

- void **ExecuteTemplate()**
 - Execute the owner template action or loaded template in the designer.
- void **ContinueTemplate()**
 - Continues the owner template action or loaded template in the designer.
- void **OutTemplate()**
 - Takes out the owner template action or loaded template in the designer.
- void **UpdateTemplate()**
 - Updates the owner template action or loaded template in the designer.
- void **UpdateTemplate(string COs = null)**
 - Updates the owner template action or loaded template in the designer.
The parameter COs is a space separated list of Control Object ID's that shall be updated. For large templates containing a big amount of ControlObjects this is a very efficient alternative whenever only a small part in the scene needs to be updated. For example, UpdateTemplate("currentScore totalScore") updates only the two ControlObjects with id "currentScore" and "totalScore".
- void **PreviewTemplate()**
 - Previews the owner template action or loaded template in the designer.
- void **PreviewExecuteTemplate()**
 - Executes the owner template action or loaded template in the designer to the preview channel.
- void **PreviewContinueTemplate()**
 - Executes the owner template action or loaded template in the designer to the preview channel.
- void **PreviewOutTemplate()**
 - Executes the owner template action or loaded template in the designer to the preview channel.
- void **PreviewUpdateTemplate(string COs = null)**
 - Updates the owner template action or loaded template in the designer to the preview channel.
The parameter COs is a space separated list of Control Object ID's that shall be updated. For large templates containing a big amount of ControlObjects this is a very efficient alternative whenever only a small part in the scene needs to be updated. E.g. UpdateTemplate("currentScore totalScore") updates only the two ControlObjects with id "currentScore" and "totalScore".

Control Object Handling

The template script allows the user to interact with the template's control objects.

- void **SetControlObject** (string objectID, dynamic value)
 - Sets the control object with id equal to *objectID*'s value to *value*
 - The set object's value is sent on template execute/update

 **Note:** SetControlObject only works on control objects that aren't already linked to parameters

Template Channels Handling

The template script allows the user to change the program output channel.

- void **SetSelectedChannel**(string name)
 - Sets the selected program output channel to *name*
- ScriptingChannel **GetSelectedChannel**()
 - returns the currently selected program channel of the template action

ScriptingChannel

The ScriptingChannel class is used for finer control on the Engines contained in the channel.

Properties

- **Name**
 - The channel's name
- **Count**
 - The number of Engines in the channel

Methods

- void **SendSingleCommand** (string command)
 - Sends *command* to all the Engines in the channel
- void **SendCommands**(string[] commands)
 - Sends all the input *commands* to all the Engines in the channel

Template Scene Handling

The template script allows the user to set the scene that should be loaded when executing.

- void **SetSceneFullpath**(string fullpath = null)
 - The input fullpath is the value that is sent to the Engine when executing the template. When no full path is provided the user config value is removed and the original attached scene is used.

Template Action Configuration

- bool **IsCommandHeaderVisible**

- Indicates whether the CommandHeader should be visible on not on the template action
- **bool UpdateOnSelected**
 - When this flag is set, the script callbacks are only triggered when the template action is selected on the action canvas (blue border)

Callbacks

- **OnCreated ()**
 - Called when the template script is executed, i.e. when the template action is created and when the template opened on the designer is started
- **OnShow ()**
 - Called when the template is shown, i.e. when the template action's pop-up is opened, when the action becomes embedded and when the template opened on the designer is started
- **OnExecute ()**
 - Called when the template is executed
- **OnPreviewExecute ()**
 - Called when the template is executed to the preview channel
- **OnContinue ()**
 - Called when the template is continued
- **OnPreviewContinue ()**
 - Called when the template is continued to the preview channel
- **OnUpdate ()**
 - Called when the template is updated
- **OnPreviewUpdate ()**
 - Called when the template is updated to the preview channel
- **OnOut ()**
 - Called when the template is taken out
- **OnPreview ()**
 - Called when the template is previewed

1.5.26 Parameters

Parameters are the base components of Viz Arc's scripting. A list of all existing parameters types and their associated properties is presented below.

Base Parameters Functionality

The following properties and methods are shared among all parameters

- string **Label** [Get , Set]
 - Gets/Sets the label that is displayed on the UI
- bool **IsEnabled** [Get , Set]
 - Gets/Sets the enabled status of the parameter

- Disabled parameters can be interacted with
- bool **IsVisible** [Get , Set]
 - Whether the parameter is visible or not
 - Invisible parameters are visible (displayed as grayed out) only while editing, i.e. script not running
- double **X** [Get , Set]
 - Gets/Sets the horizontal position of the parameter on the canvas
- double **Y** [Get , Set]
 - Gets/Sets the vertical position of the parameter on the canvas
- double **Width** [Get , Set]
 - Gets/Sets the width of the parameter
- double **Height** [Get , Set]
 - Gets/Sets the height of the parameter
- void **SetColor** (byte r, byte g, byte b, byte a = 255)
 - Sets the parameter's color to the input RGBA color

Layout

The layout parameters allow the user to organize and improve the usability of a script/template.

Panel

- BaseParameter[] **Children** [Get]
 - Returns an array with all of the panel's children
- BaseParameter **GetParameter** (string parameterID)
 - Tries to find a child with id equal to *parameterID*. Returns it if successful

Tabs

- string **Value** [Get , Set]
 - Set: Tries to find a tab with its name equal to the input. If found sets it as selected tab
 - Get: Returns the name of the selected tab
- BaseParameter[] **Children** [Get]
 - Returns an array with all of the panel's children
- BaseParameter **GetParameter** (string parameterID)
 - Tries to find a child with id equal to *parameterID*. Returns it if successful.
- bool **AllowReordering**
 - Whether or not the user can reorder the tabs
- int **SelectedIndex** [Get , Set]
 - Gets/Sets the index of the selected tab

Info

- string **Value** [Get , Set]
 - Gets/Sets the info text that displays on the parameter

Label

The label parameter doesn't have any type-specific functionalities.

Dialogs

Color

- string **Value** [Get , Set]
 - Gets/Sets the parameter's selected color in Hex format, e.g. #FF0A0A8C (#RRGGBBAA)

Directory


- string **Value** [Get , Set]
 - Gets/Sets the selected directories fullpath.
 - Set: The input value must be a valid directory in the file system

File

- string **Value** [Get , Set]
 - Gets/Sets the selected file's fullpath.

Asset


- string **Value** [Get , Set]
 - Gets/Sets the selected asset's fullpath.
 - Set: The input path needs to be valid.

 **Note:** Valid input values are: Graphic Hub items (Image, Geom, Material), Media service links (http://...) or local file system files.

WebView

This component lets you view a web page.

- string **Value** [Get, Set]
 - Gets/Sets the URL of the web page to be visualized.

 The browser used for rendering is based on CEF. It might not play all video codecs.

Input

Bool

- bool **Value** [Get , Set]

- Gets/Sets the parameter's bool value

Button

- void **Click** ()
 - Trigger a click event on the button parameter

Double / Double Slider

- double **Value** [Get , Set]
 - Gets/Sets the parameter's double value
- double **MinValue** [Get , Set]
 - Gets/Sets the parameter's minimum double value
 - Input value needs to be lower than the current MaxValue
- double **MaxValue** [Get , Set]
 - Gets/Sets the parameter's maximum double value
 - Input value needs to be higher than the current MinValue

Dropdown / Radio

- string **Value** [Get , Set]
 - Gets/Sets the selected entry on the dropdown
- int **SelectedIndex** [Get , Set]
 - Gets/Sets the selected index of the dropdown
- int **Count** [Get]
 - Gets the number of entries on the dropdown
- int **IndexOf** (string option)
 - Looks for an entry equal to *option*. Returns its index if found, -1 otherwise
- void **Insert** (int index, string option)
 - Inserts an entry with value *option* at *index* position
 - *index* needs to be between 0 and Count.
- void **Add**(string option)
 - Adds an entry with value *option* at the end of the entry list
- void **Remove**(string option)
 - Looks for an entry equal to *option*. Removes it if found
- void **RemoveAt**(int index)
 - Removes the entry at position *index*.
 - *index* needs to be between 0 and Count
- void **SetItems** (string[] entries)
 - Sets the dropdown's entry list to the input *entries*
- string **Get** (int index)
 - Returns the entry located at *index* position
 - *index* needs to be between 0 and Count
- string parameter[int index]
 - Array accessor for entries
 - Returns the entry located at *index* position

- void **Clear** ()
 - Removes all entries from the dropdown

Int / Int Slider

- int **Value** [Get , Set]
 - Gets/Sets the parameter's int value
- int **MinValue** [Get , Set]
 - Gets/Sets the parameter's minimum int value
 - Input value needs to be lower than the current MaxValue
- int **MaxValue** [Get , Set]
 - Gets/Sets the parameter's maximum int value
 - Input value needs to be higher than the current MinValue

MultiText / Text

- string **Value** [Get , Set]
 - Gets/Sets the parameter's text value

Triplet

- double **X**[Get , Set]
 - Gets/Sets the parameter's X double value
- double **Y** [Get , Set]
 - Gets/Sets the parameter's Y double value
- double **Z** [Get , Set]
 - Gets/Sets the parameter's Z double value
- bool **XEnabled**[Get , Set]
 - Gets/Sets the enabled status of the X value
- bool **YEnabled** [Get , Set]
 - Gets/Sets the enabled status of the Y value
- bool **Z Enabled** [Get , Set]
 - Gets/Sets the enabled status of the Z value
- bool **AllowProportional** [Get , Set]
 - Gets/Sets whether the user can toggle the proportional lock
- bool **IsProportional** [Get , Set]
 - Gets/Sets the state of the proportional lock

Table

Properties

- string **Value** [Get]
 - Gets an string containing the table content in a XML format (much like ControlList)
- int **MinimumRows** [Get , Set]
 - Gets/Sets the parameter's minimum number of rows

- Input value needs to be lower than the current `MaximumRows`
- int **MaximumRows** [Get , Set]
 - Gets/Sets the parameter's maximum number of rows
 - Input value needs to be higher than the current `MinimumRows`
- int **MinimumColumns** [Get , Set]
 - Gets/Sets the parameter's minimum number of columns
 - Input value needs to be lower than the current `MaximumColumns`
- int **MaximumColumns** [Get , Set]
 - Gets/Sets the parameter's maximum number of columns
 - Input value needs to be higher than the current `MinimumColumns`
- int **RowCount** [Get]
 - Gets the current number of rows on the table
- int **ColumnCount** [Get]
 - Gets the current number of columns on the table

Methods

Cell Handling

- BaseCell **Accessor**[int row, int column] [Get]
 - Gets the cell located at *row*-indexed row and *column*-indexed column
- BaseCell **GetCell** (int row, int column)
 - Gets the cell located at *row*-indexed row and *column*-indexed column
- void **SetCellValue** (int row, int col, dynamic value)
 - Sets the cell's value (located at [row, column]) to *value*
 - [dynamic] *value* can either be a string or have a type that is compatible with the target cell
- string **GetCellValue** (int row, int col)
 - Gets the cell's (located at [row, column]) string value representation
- void **ClearColumnValues**(int columnIndex)
 - Resets all the cell's values in *columnIndex* column
- void **ClearRowValues** (int rowIndex)
 - Resets all the cell's values in *rowIndex* row
- void **ClearAllValues** ()
 - Resets all the cell's values
- void **Clear** ()
 - Removes all the content, i.e. all columns and rows are deleted

Columns Handling

Inserting a column from code requires the user to specify the type of column that needs to be created, the valid column types are:

- **bool**: Column with BoolCell
- **string**: Column with StringCell
- **int**: Column with IntCell
- **ivec2**: Column with IntDupletCell
- **ivec3**: Column with IntTripletCell
- **double**: Column with DoubleCell
- **dvec2**: Column with DoubleDupletCell

- **dvec3**: Column with DoubleTripletCell
- **asset**: Column with AssetCell

All column interactions take into consideration the maximum and minimum number of columns of the table

- void **AddColumn** (string *columnType*)
- void **AddColumn** (string *columnType*, string *name*)
 - Add a column of type *columnType* named *name* if specified, otherwise the default will be used
- void **AddMultipleColumn** (int *count*, string *columnType*)
 - Add *count* columns of *columnType* type
- void **InsertColumn** (int *index*, string *columnType*)
- void **InsertColumn** (int *index*, string *columnType* , string *name*)
 - Inserts a column at *index* index of *columnType* type named *name* if specified, otherwise the default will be used
- void **InsertMultipleColumn** (int *index*, string *columnType*, int *count*)
 - Inserts *count* columns at *index* index of *columnType* type
- void **RemoveColumnAt** (int *index*)
 - Removes column at *index* index
- void **MoveColumn** (int *targetIndex*, int *newPosition*)
 - Moves column from *targetIndex* position to *newPosition*
- void **ClearColumns**()
 - Removes all columns

Rows Handling

All row interactions take into consideration the maximum and minimum number of rows of the table

- void **SetNumberRows** (int *count*)
 - Adds/removes rows until the table's RowCount is equal to *count*
- void **AddRow** ()
 - Adds a Row to the table
- void **AddMultipleRow** (int *count*)
 - Adds *count* rows to the table
- void **InsertRow** (int *index*)
 - Inserts a row at *index* position to the table
- void **InsertMultipleRow** (int *index*, int *count*)
 - Inserts *count* rows at *index* position to the table
- void **RemoveRowAt** (int *index*)
 - Removes row at *index* position
- void **MoveRow** (int *targetIndex*, int *newPosition*)
 - Moves row from *targetIndex* position to *newPosition*
- void **ClearRows** ()
 - Removes all rows

Table parameter example

```

// Open the cvs file with the starters, parse the content and add all riders to the
RaceTable (TableParameter)
function LoadRaceTable()
{
    // Setup columns from UI, Comment if already done manually
    //RaceTable.Clear();
    //RaceTable.AddColumn( "string", "Horse");
    //RaceTable.AddColumn( "string", "Trainer");
    //RaceTable.AddColumn( "string", "Jockey");
    //RaceTable.AddColumn( "string", "Owner");
    //RaceTable.AddColumn( "string", "Colors");
    //RaceTable.AddColumn( "string", "Horse CN");

    // Clear rows
    RaceTable.ClearRows();

    var i = 0;
    var FileContent = arc.ReadTextFile("D:/Horses/Starter.csv");
    var EntryArr = FileContent.split("\n");

    // First line is for the headers, ignore it
    for(i = 1; i < EntryArr.length; i++)
    {
        // Split the rider content
        var splitContent = EntryArr[i].split(",");

        // CVS file has great amount of data but we only want to display certain
stuff
        RaceTable.AddRow();
        RaceTable.GetCell(i-1 , 0).Value = splitContent [19];
        RaceTable.GetCell(i-1 , 1).Value = splitContent [22];
        RaceTable.GetCell(i-1 , 2).Value = splitContent [25];
        RaceTable.GetCell(i-1 , 3).Value = splitContent [27];
        RaceTable.GetCell(i-1 , 4).Value = splitContent [34];
        RaceTable.GetCell(i-1 , 5).Value = splitContent [20];
    }
}

```