



Viz Arc User Guide

Version 1.8





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Vizrt does not recommend or test antivirus systems in combination with Vizrt products, as the use of such systems can potentially lead to performance losses. The decision for the use of antivirus software and thus the risk of impairments of the system is solely at the customer's own risk.

There are general best-practice solutions, these include setting the antivirus software to not scan the systems during operating hours and that the Vizrt components, as well as drives on which clips and data are stored, are excluded from their scans (as previously stated, these measures cannot be guaranteed).

Technical Support

For technical support and the latest news of upgrades, documentation, and related products, visit the Vizrt web site at www.vizrt.com.

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1 Introduction



Viz Arc integrates to Viz Engine and scenes allowing you to design your virtual studios and augmented reality elements in Viz Artist, eliminating the need for creating custom applications to control virtual studios and augmented reality elements for each production.

- A simple user interface allows you to create projects for each production.
- Easily configure action buttons that control any property, element or animation in a Vizrt Scene without any programming or expert skills. Operators can access a panel of actions that can be triggered at any time.
- Arc is an out-of-the-box solution that eliminates the need to create custom controllers for operating AR/VR elements and non-scripted shows.
- Viz Arc lets you easily configure the logic of each individual element and operate virtual studios and augmented reality or graphic elements on a non-scripted live production, while reducing the setup time and expertise required.

1.1 Related Documents

- [Viz Artist User Guide](#): Contains information on how to install Viz Engine and create graphics scenes in Viz Artist.
- [Viz Engine Administrator Guide](#): Contains information on how to install and configure Viz Artist and Engine, and supported hardware.
- [Viz Graphic Hub Administrator Guide](#): Contains information needed to configure and operate Graphic Hub.
- [Viz Tracking Hub Administrator Guide](#): Contains information required to understand Tracking Hub and Studio Manager, two important software components in the Viz Virtual Studio solution
- [Viz Pilot User Guide](#): Contains information needed to operate Viz Pilot and use the Newsroom Component to create newsroom data elements for a newsroom system playlist.

1.2 Feedback And Suggestions

We encourage feedback on our products and documentation. Please contact your local Vizrt customer support team at www.vizrt.com.

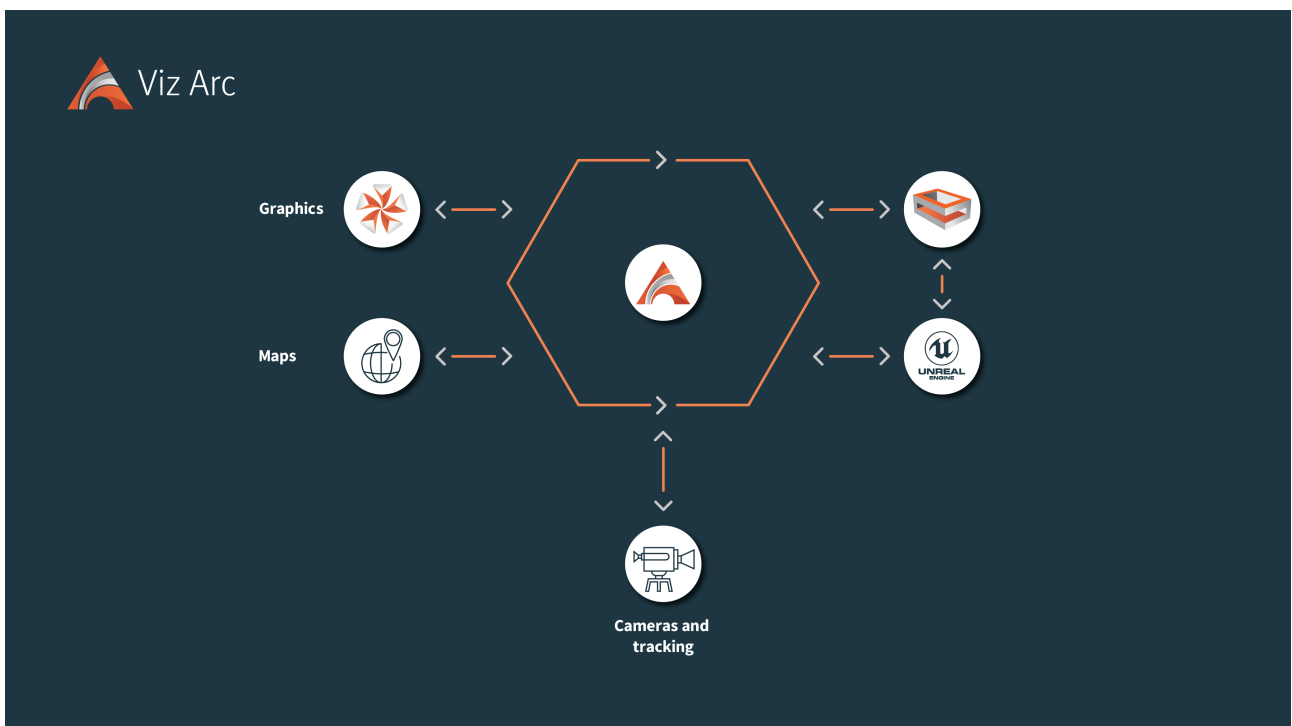
2 Getting Started

This section describes the location of the installation files, starting and shutting down Viz Arc, and logging on to a Graphic Hub.

This section covers the following topics:

- [System Overview](#)
 - [System Requirements](#)
-

2.1 System Overview



Viz Arc is a control application that can be used for one or more Viz Engines. Viz Arc uses Graphic Hub and its REST API for browsing Scenes, Images, merged Geometries and Materials.

When working with tracked cameras in a Virtual Studio environment, Viz Arc communicates with Tracking Hub to send and receive camera tracking information. One of the key features of Viz Arc is the ability to set up Augmented Reality elements in outdoor productions directly over a map. A working internet connection is required to retrieve map imagery from providers such as Bing or OSM.

2.1.1 Ports

Application	Port	Protocol
Viz Arc Web Service	Default port: 5004 Default port: 5005	HTTP HTTPS
Viz Arc REST Service (standalone service)	Default port: 9004 Default port: 9005	HTTP HTTPS
Viz Arc MQTT Broker	Default port: 1883	TCP
Vic Arc TCP Server	Default port: 9204	TCP
Viz Arc Template Script Viz Arc Main Script	Debugging port: 9222 Debugging port: 9223	TCP TCP
Viz Engine	Default ports: 6100 , 6800 Feedback port: 7476	TCP UDP
Viz Arc Feedback	Feedback port: 12050	UDP
Graphic Hub REST	REST API port: 19398	HTTP
Tracking Hub	Requests data through port: 20000 Receives data through port: 4000	TCP UDP
Media Sequencer	REST API port: 8580	HTTP
Media Service	for v4.1.0 and higher: 25506 for v2.3.3 and lower: 21099	HTTP
Pilot Data Server	REST API port: 8177	HTTP
Coder	Coder port: 8081	HTTP

Application	Port	Protocol
Unreal Engine	arcCom port: 5647	TCP
Unreal Launcher	VizArcUnrealLauncher port: 5644	TCP
Unreal Web Interface	Default port: 30010	HTTP
Unreal Web Socket	Default port: 30020	TCP
Vinten Automation Server	Vinten port: 11239	TCP
Viz One	REST API port: 80	HTTP
Viz Arena	Web API port: 40055	HTTP
Viz Object Tracker	Default port: 10005	HTTP
Art-Net Integration	Default port: 6454	TCP
Monogram Integration	Default port: 51234	UDP

2.2 System Requirements

This page describes the minimum software and hardware requirements for Viz Arc.

2.2.1 Minimum Software Requirements

The following are minimum software and version requirements for Viz Arc to function properly:

General

- Windows 10/11
- Microsoft .NET Core Framework 6.0
- CodeMeter version 6.80 and later

Vizrt Software

- Viz Engine/Artist 3.14.x: Must be installed as a Video machine and shared memory output must be configured for built-in Viz Output to function.
- Graphic Hub 3.5.0
- Graphic Hub REST 2.5.0

Note: To integrate with Viz Virtual Studio, Tracking Hub 1.1 or higher must be installed.

Epic Games Unreal Engine

- Unreal Engine 4.27 or higher is required for Unreal integration.

2.2.2 Minimum Hardware Requirements

Viz Arc runs on the following platforms:

- Windows 10/11 (64-bit only)
- Windows Server 2012 R2

For optimal performance, use the pre-installed Windows image from Vizrt. You can obtain Windows image files from your local support office.

The following prerequisites apply to all platforms. Applying the changes may require local administrator access rights, new or amended group policy entries, or modified services. Contact your local IT manager for assistance.

Please refer to the relevant [Viz Engine](#) version hardware requirements.

2.2.3 Antivirus

Vizrt does not recommend or test antivirus systems in combination with Vizrt products, as the use of such systems can potentially lead to performance losses. The decision for the use of antivirus software and thus the risk of impairments of the system is solely at the customer's own risk.

There are general best-practice solutions, these include setting the antivirus software to not scan the systems during operating hours and that the Vizrt components, as well as drives on which clips and data are stored, are excluded from their scans (as previously stated, these measures cannot be guaranteed).

Services and folders which should be excluded from scanning are:

- All the files contained in *C:\Program Files\Vizrt\Viz Arc x.x* (where x.x is the version of Viz Arc).
- All the files contained in *C:\programdata\vizrt\vizarc*.

3 Installation

Before installing the software, make sure your computer meets the [System Requirements](#) for hardware and software and that you have installed all related Vizrt software.

This section covers the following topics and procedures:

- [Installing Viz Arc](#)
- [WIBU-based Licensing System](#)
- [Launching Viz Arc](#)
- [Licensing](#)
- [Files and Folders](#)
- [Unreal Plug-in](#)
- [Unreal Loader](#)
- [Configuring Graphic Hub](#)
- [Script Debugging](#)

3.1 Installing Viz Arc

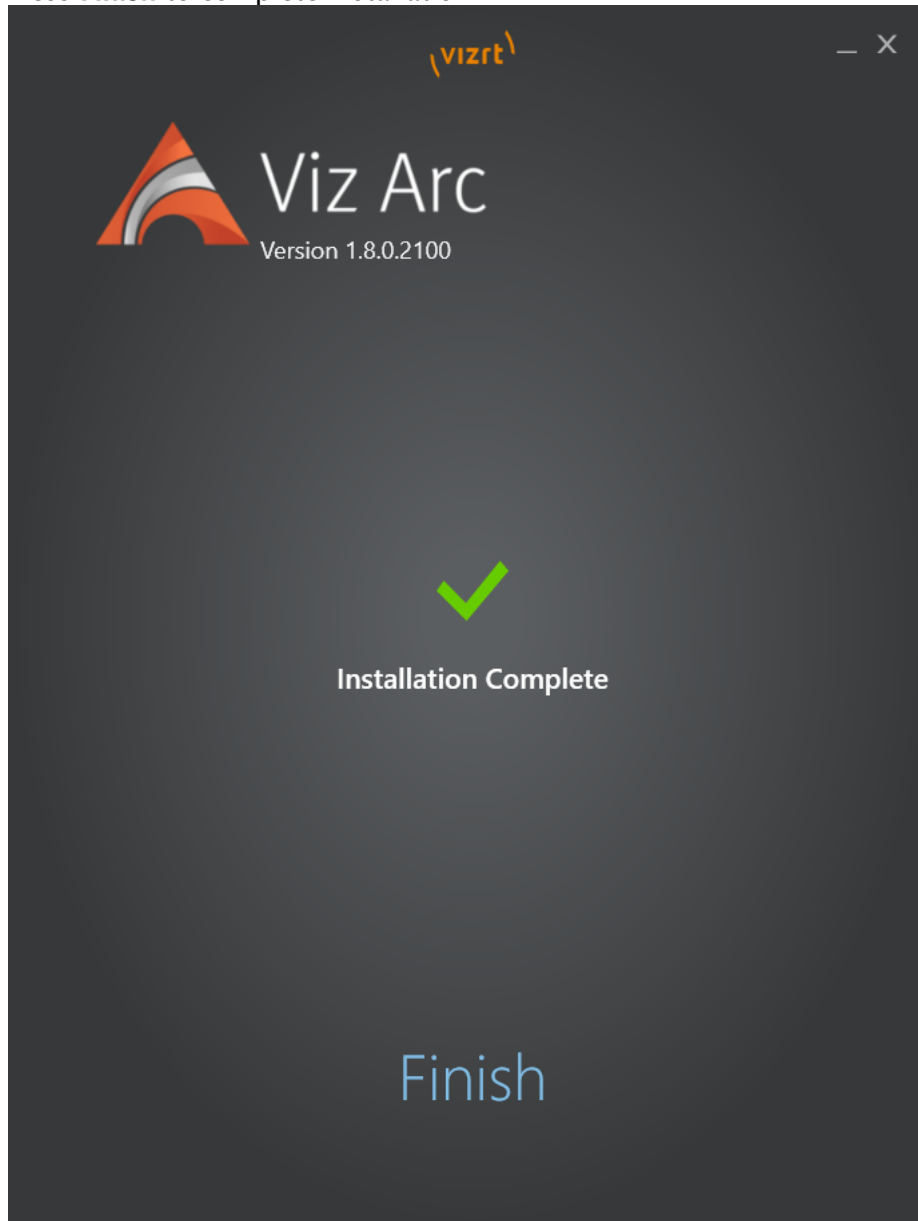
1. Uninstall any previously installed Viz Arc versions.
2. Run the installer. Depending on the target system, you might need to install the required prerequisites which are the **MS Visual C++ 2015-2022 Redist (X64)**, **Windows Desktop runtime**, **Asp.Net Core runtime** and the **Codemeter Runtime Kit**.



Select the parts you want to install on the target machine:

- a. **Viz Arc**, the main application.
- b. **Viz Arc Web Service**, required when Viz Arc actions shall be called from Viz Pilot, Pilot Edge or the MOS integration.
- c. **Viz Unreal Loader**, required on machines running an Unreal Engine which are controlled by Viz Arc. This installer contains the Viz Arc communication plugins for the Unreal Engine which can be found in `C:\ProgramData\vizrt\VizArc\Resources\unreal` after installation. When the installer detects an existing Unreal installation it offers the automatic deployment of the plugin when the respective checkbox is selected.

3. Press **Finish** to complete installation.



Note: After installation, you must first configure your system, and request and apply the license to use all of the software features.

3.2 WIBU–Based Licensing System

This chapter describes management and usage of the licensing system based on CodeMeter from [WIBU Systems](#) available in Viz Arc 1.0 and later.

Important: Any change in the license configuration requires a restart of Viz Arc.

3.2.1 Important Pre-installation Information

The WIBU licensing system requires the installation of the CodeMeter Runtime Software (included in the Bundle installer):

- 6.80 and newer

When the license should be retrieved from a dedicated license server, it must be configured in the Vizrt Licensing Service (see **Client Configuration** section of the **Vizrt Licensing Administrator Guide**) or the CodeMeter WebAdmin.

i Info: There is an auto discovery if no license server is configured in the server search list of CodeMeter.

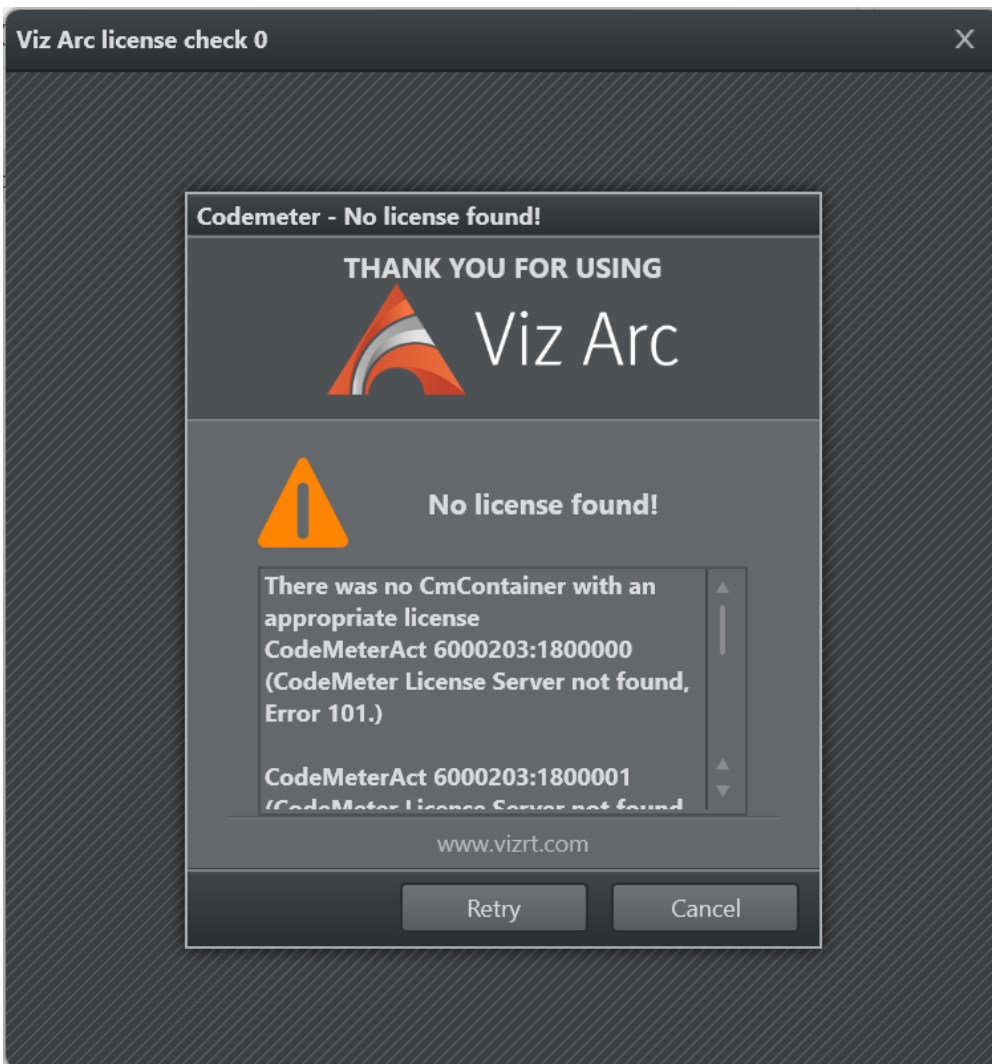
i Info: On network disconnect and reconnect, it may happen that a license is checked out twice. Should that occur, release the license manually on the CodeMeter service on the license server or restart the license server.

See Also

- [Vizrt Licensing Administrator Guide](#)
-

3.3 Launching Viz Arc

Once you've installed Viz Arc, you're ready to start using it! If you don't have a license yet, the following (or similar) message appears:



3.3.1 Command Line Arguments

The following command line switches can be used:

Switch	
<code>-o, --onair</code>	Start Viz Arc in On Air Mode.
<code>--project <i>name</i></code> <code></code>	The name of the project to be loaded at startup. Use prefix "local:" or "file:" to explicitly specify a project form the local file system or use the prefix "gh:" or "graphicHub:" to specify a project stored on Graphic Hub.

Switch	
<code>--projectgh <i>name</i></code>	The name of the project on Graphic Hub to be loaded at startup.
<code>--programdatapath <i>path</i></code>	Specify the Viz Arc ProgramData Folder (for example, C:\ProgramData\vizrt\VizArc).
<code>--noproject</code>	Force startup without any project loaded (default is to open the last opened project).
<code>-t, --tracking</code>	Start Viz Arc in Tracking Mode.
<code>-a, --arena</code>	Start Viz Arc in Arena Mode.
<code>--help</code>	Display help when started from a console.

Examples

`VizArc.exe --project gh:VirtualSetA` : Starts Viz Arc loading the project *VirtualSetA* from Graphic Hub.

`VizArc.exe --project local:ObjectTracker -t` : Starts Viz Arc loading the project *ObjectTracker* from the local file system and it starts up with the Object Tracker user interface already opened.

3.4 Licensing

There are three types of licenses available for Viz Arc:

Features	Quantity
Viz Arc Core	1
Viz Arc Freemium	1
Viz Arc Rest	1

3.4.1 Viz Arc Core

This is the standard license, allowing you to work unlimited with Viz Arc.

3.4.2 Viz Arc Freemium

This license allows you to work with Viz Arc, but does not allow you to save or load actions other than the **Chroma Key Action**. The license is intended to be used by users that need to control the internal **Precision Keyer** of the Viz Engine.

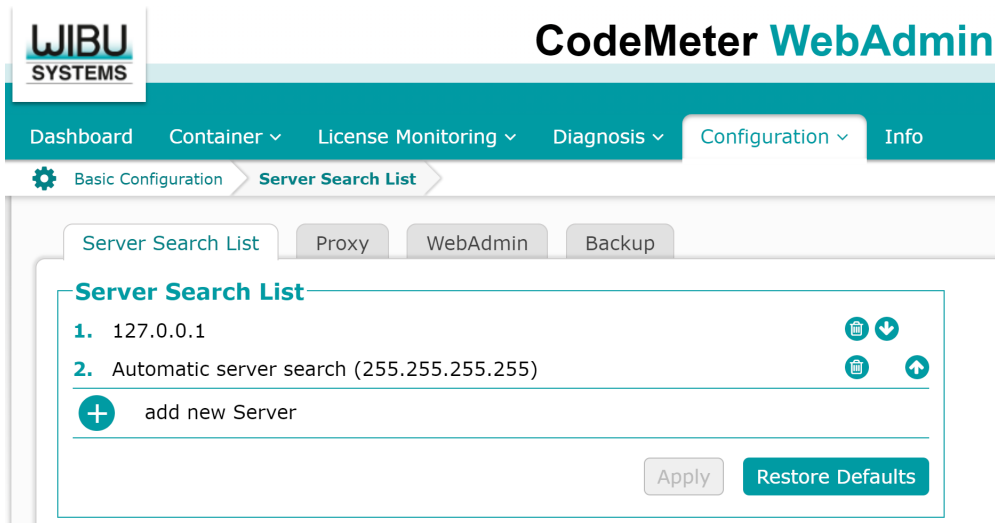
3.4.3 Viz Arc Rest

This license is not mandatory for the standard operations of Viz Arc. It is intended for users that need to trigger actions from external applications like **Viz Pilot**. It is required by the **Viz Arc Web Service** that is an additional package included in the bundle installer. The service runs independently from any opened **Viz Arc** instance and allows the user to trigger actions from any project at any time.

3.4.4 License Locations

Licenses can be either on the network, on a WIBU dongle or in a software container. The default order of priority to acquire a license is **network first** and then any **local** dongle or software container.

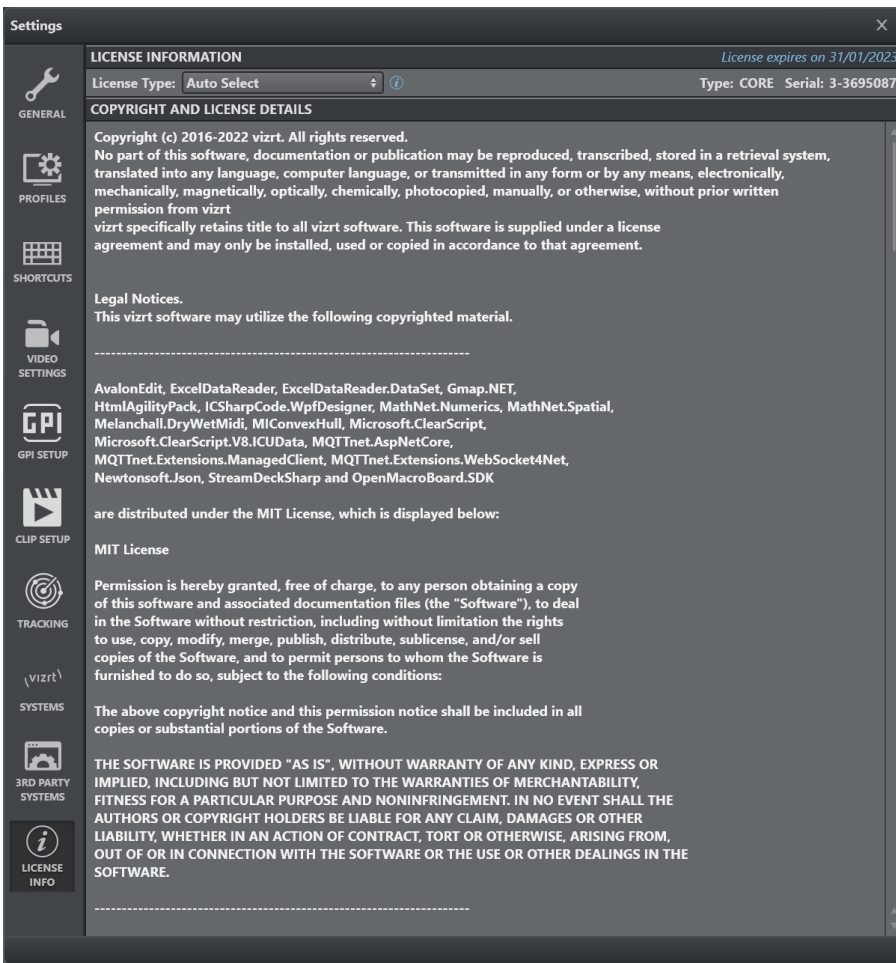
If you need to explicitly disable any network license location, you need to configure the loopback device `127.0.0.1` as your only source in the WIBU Server Search List.



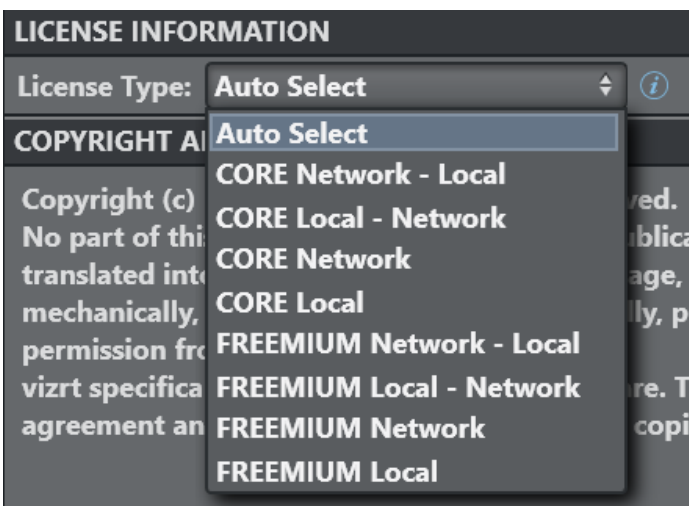
Information: This setting might impact other locally installed software packages like the **Viz Engine** that might require a network license.

3.4.5 License Configuration

The type of license to acquire can be configured in the configuration panel under **LICENSE INFO**.



Use the **License Type** dropdown to select the license type and location preference.



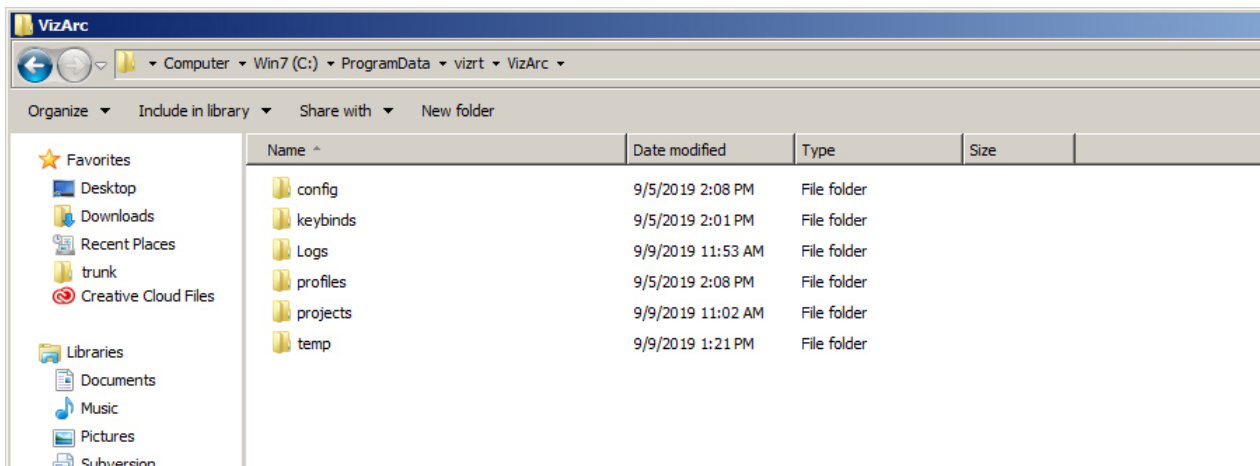
- **Auto Select:** Selects the most powerful license that can be acquired (thus first CORE and the FREEMIUM) automatically, searching first for a license on the network and then locally.
- **CORE Network - Local:** Forces the allocation of a a CORE license, searching first on the network and then locally.

- **CORE Local - Network:** Forces the allocation of a a CORE license, searching first locally and then on the network.
- **CORE Network:** Forces the allocation of a a CORE license over the network.
- **CORE Local:** Forces the allocation of a a CORE license locally.
- **FREEMIUM Network - Local:** Forces the allocation of a a FREEMIUM license, searching first on the network and then locally.
- **FREEMIUM Local - Network:** Forces the allocation of a a FREEMIUM license, searching first locally and then on the network.
- **FREEMIUM Network:** Forces the allocation of a a FREEMIUM license over the network.
- **FREEMIUM Local:** Forces the allocation of a a FREEMIUM license locally.

Please contact your local Vizrt sales representative for any additional licensing information.

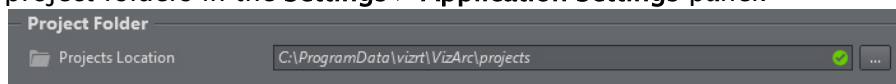
3.5 Files And Folders

Files and folders that are used or modified by Viz Arc are listed below.



Related files and folders can be found under `C:\ProgramData\vizrt\VizArc`.

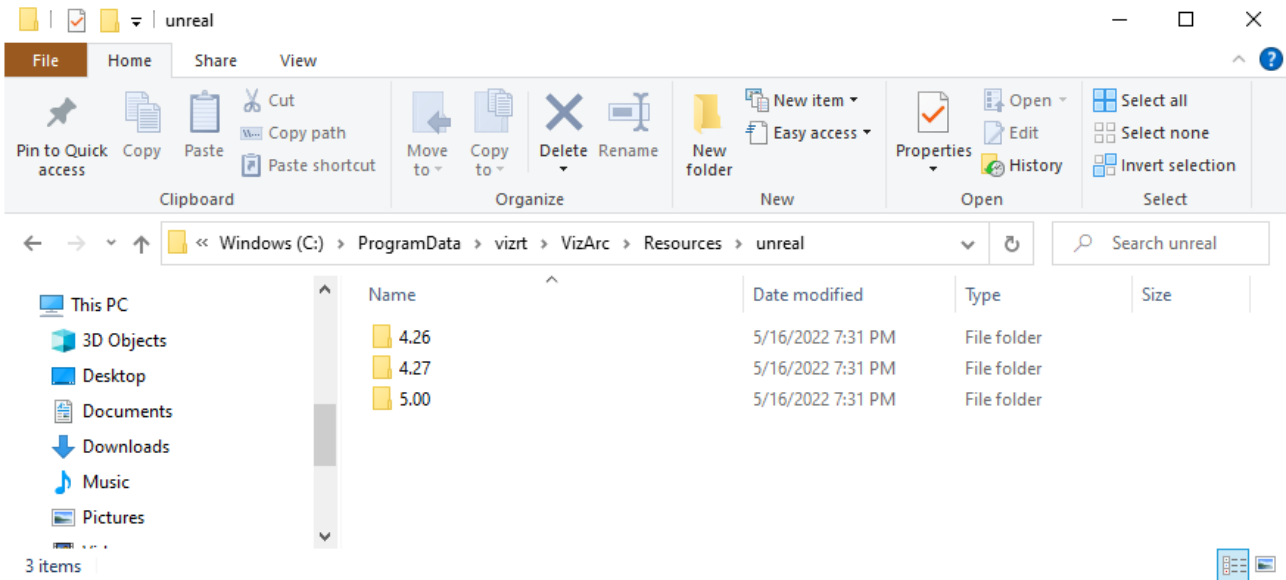
- **config:** Contains `config.json` file with all default and custom Viz Arc configuration.
- **keybinds:** Contains `keybinds.json` file used to determine system keyboard shortcuts.
- **Logs:** Contains a text log file containing every log name, date, log level and message since the first launch of the application.
- **profiles:** Contains `profiles.json` file where configured profiles and corresponding *Channels* and *Engines* are stored.
- **projects:** Contains a sub-folder and `.json` file for each saved Viz Arc project. You can change project folders in the **Settings > Application Settings** panel.



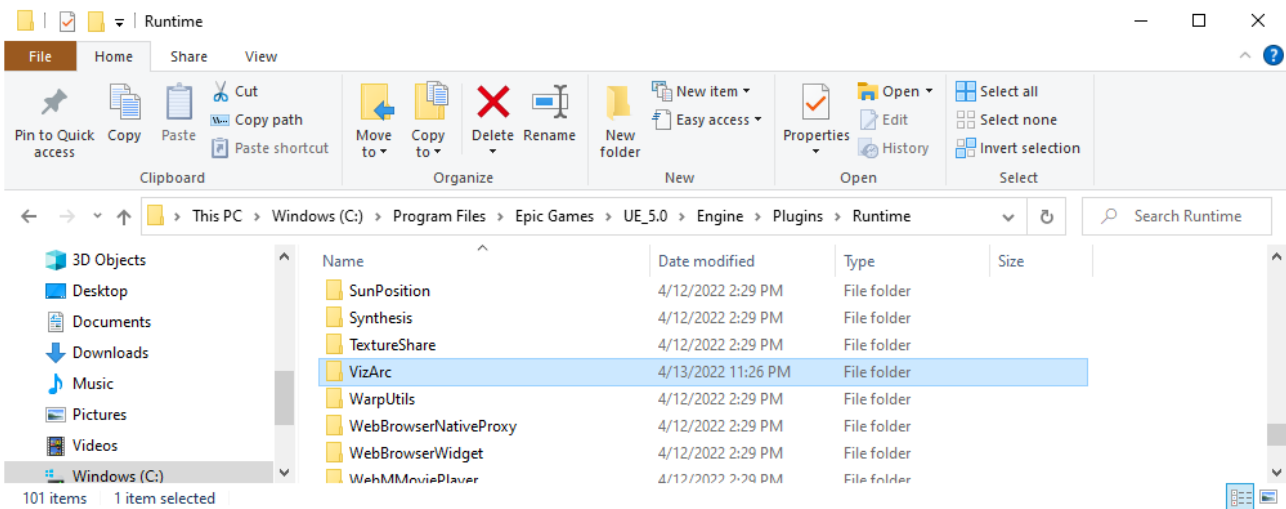
- **temp:** Contains temporary files that are automatically created and deleted in case of a software crash.

3.6 Unreal Plug-In

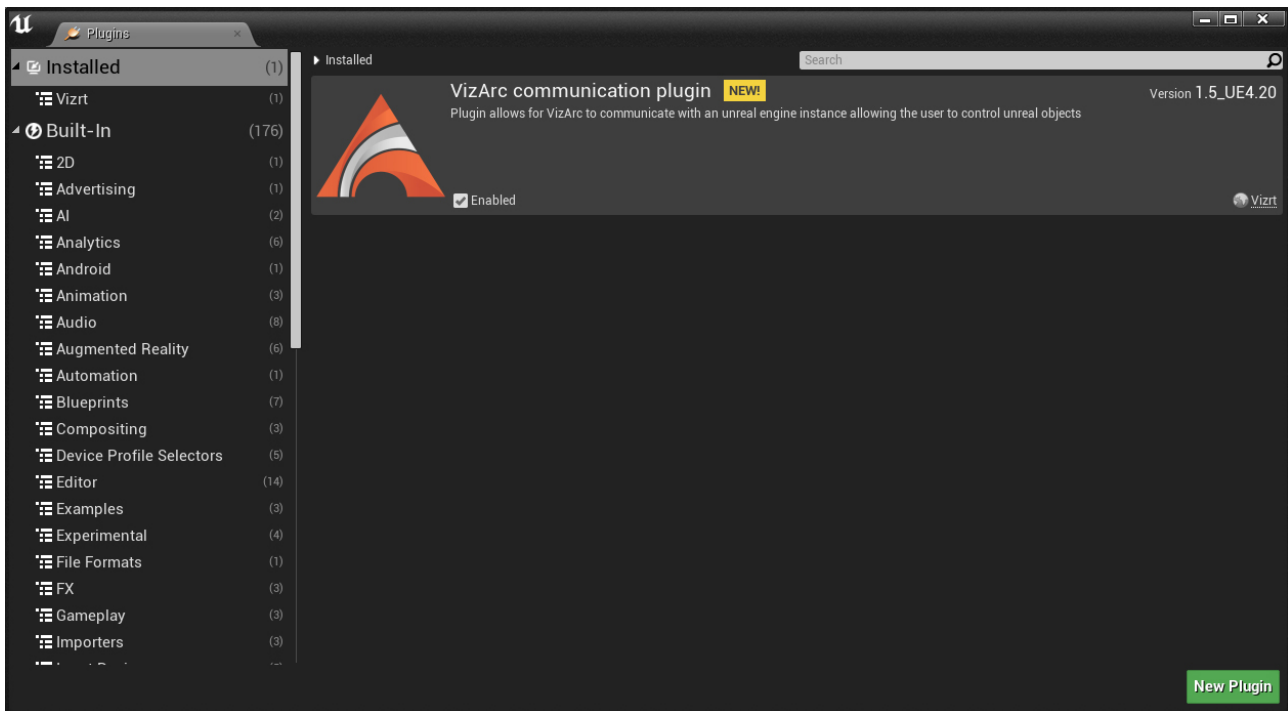
The Unreal plug-in's can be found in the program-data folder (typically in *C:\ProgramData\Vizrt\VizArc*) under *Resources\unreal*.



Navigate into the subfolder matching your Unreal version. From within the respective subfolder, copy the entire *VizArc* folder into the Unreal installation folder (for example, *C:\Program Files\Epic Games\UE4.24*) under *Engine\Plugins* or under *Engine\Plugins\Runtime*.



After copying the plug-in, restart Unreal Engine and ensure the plug-in is activated (it is active by default). To verify, open Unreal Engine and go to **Edit > Plugins**. You should find the Viz Arc plug-in by searching for **VizArc**.



The communication port that is used by this plug-in in order to receive commands from Viz Arc is by default `5647`. It can be changed by changing the registry key in `UEPluginPort` in `HKEY_LOCAL_MACHINE\SOFTWARE\vizrt\Viz Arc`.

See Also

- [Unreal Loader](#)

3.7 Unreal Loader

Unreal Loader is a scheduled task that needs to be installed on each Unreal Engine machine that is controlled by Viz Arc. Unreal Loader detects installed Unreal Engine versions, and helps launch a project and select a map within the project. It is not mandatory to install **Viz Arc** or the **Viz Arc Web Service**. The Unreal Loader needs to be installed on any machine running an Unreal Engine that is ought to be controlled by Viz Arc, which might run on a different machine.

3.7.1 Prerequisites

Make sure the **MS Visual C++ 2015-2022 Redist (x64)**, **Windows Desktop runtime** and **Asp.Net Core runtime** are installed on the target machine. The bundle installer silently installs them in case they are not present on the target machine.

3.7.2 Installation

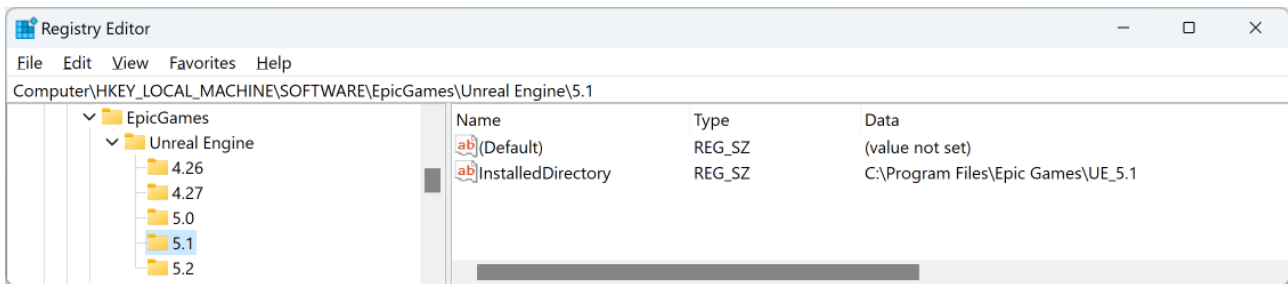
Run the Viz Arc bundle installer and select the **Viz Arc Unreal Loader**:



The installer detects any compatible **Unreal Engine** version and installs the Viz Arc plug-in to the respective Unreal installations.

The registry key used is **InstalledDirectory** and can be found in the registry under:

- Computer\HKEY_LOCAL_MACHINE\SOFTWARE\EpicGames\Unreal Engine\4.27
- Computer\HKEY_LOCAL_MACHINE\SOFTWARE\EpicGames\Unreal Engine\5.0
- Computer\HKEY_LOCAL_MACHINE\SOFTWARE\EpicGames\Unreal Engine\5.1



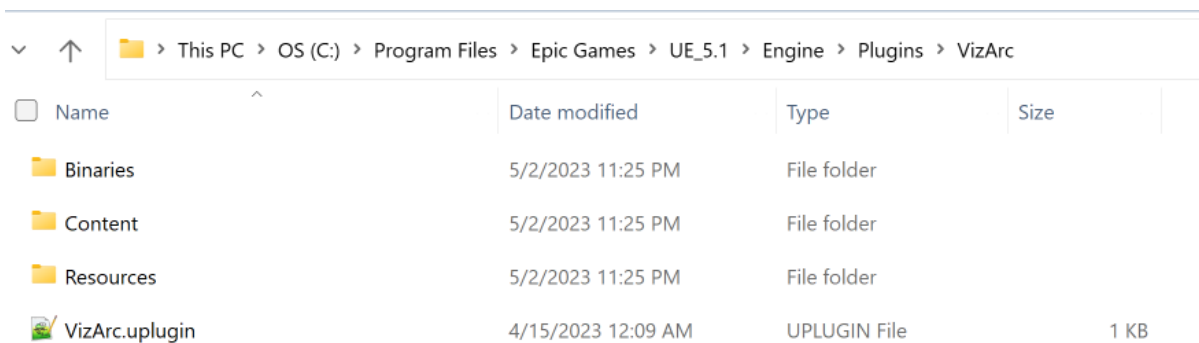
The plug-in gets installed under the subfolder **Engine\Plugins\VizArc** of the respective Unreal Engine installation (for example, *C:\Program Files\EpicGames\Unreal Engine\5.0\Engine\Plugins\VizArc*).

i Unreal Registry Entries: On some machines, the registry entries might not be present although the Unreal Engine is installed correctly. This usually occurs when the Unreal Engine installation has been executed without administrative privileges. The registry entries can either be added manually or the plug-in can be installed manually (see below).

3.7.3 Manual Installation

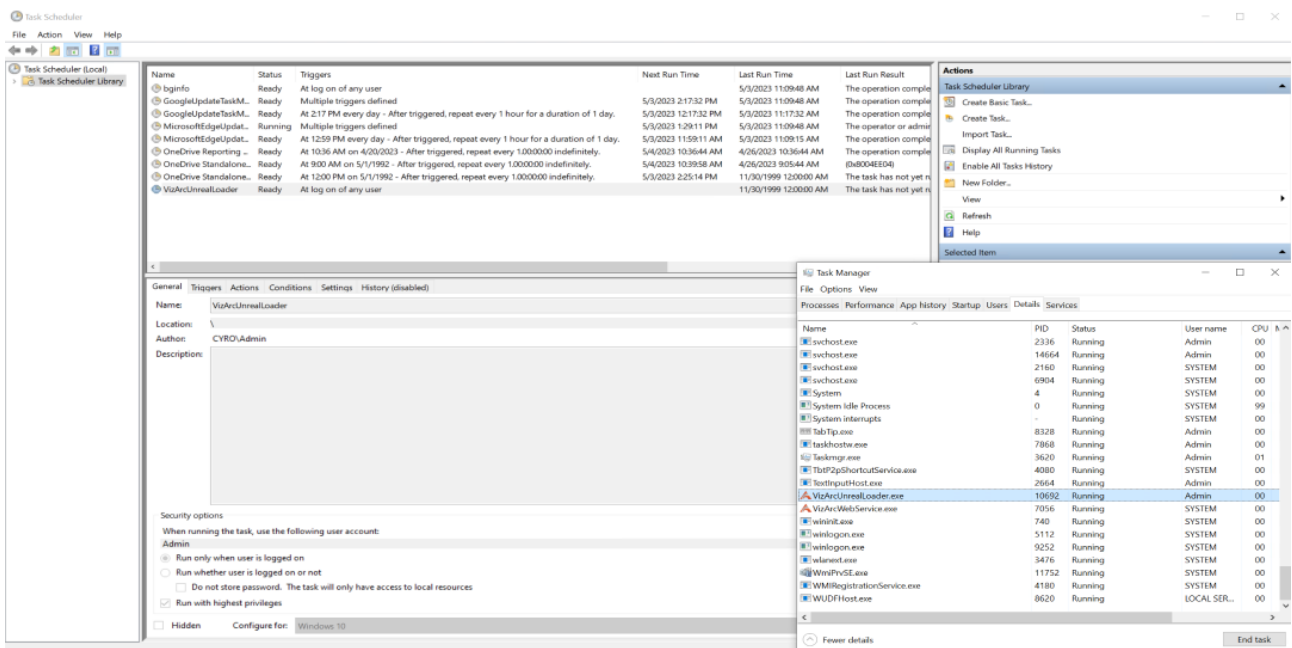
The plug-ins can be copied manually to the Unreal Engine plug-in folder. After installation of the Unreal Loader, the plug-ins can be found under the folder **C:\ProgramData\vizrt\VizArc\Resources\unreal**.

Select the version to install and copy the entire **VizArc** folder to the Unreal plug-in destination folder. For example, copy *C:\ProgramData\vizrt\VizArc\Resources\unreal\5.03\VizArc* to *C:\Program Files\EpicGames\Unreal Engine\5.0\Engine\Plugins\VizArc*.

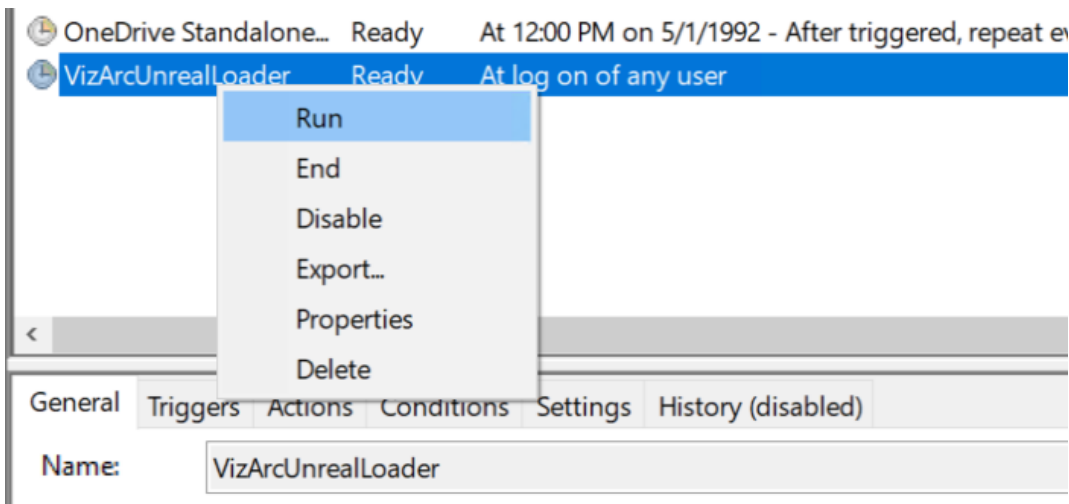


3.7.4 Starting Unreal Loader

After successful installation the Unreal Loader starts automatically and whenever a user logs on to the system it starts as a scheduled task. To see the task settings execute the windows command *taskschd.msc*.



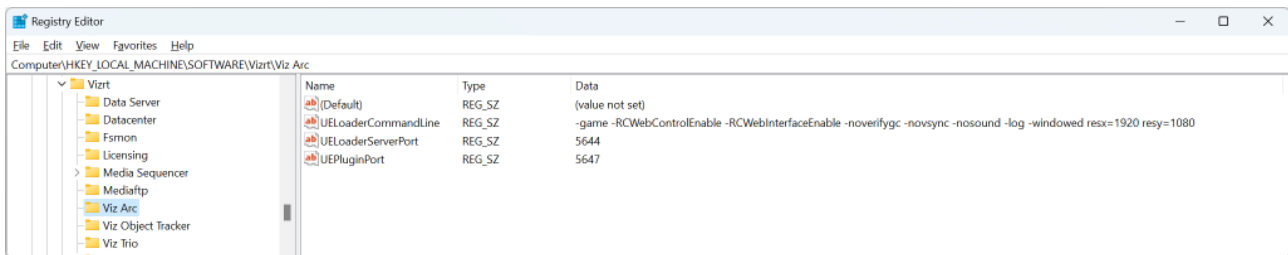
Under the name *VizArcUnrealLoader* all the settings of the scheduled task can be reviewed. Check the task manager whether the process is running. The process can be terminated and started using the context menu on the scheduled task.



Note: The service itself does not require any licenses.

3.7.5 Configuration

The first time you start the service, registry keys are generated with default values for communication ports and unreal startup parameters. The registry key can be found in *HKEY_LOCAL_MACHINE\SOFTWARE\vizrt\Viz Arc*.



The relevant keys and their default values are:

- **UELoaderServerPort:** The communication port used by Viz Arc to talk to this service. Default is `5644`.
- **UELoaderCommandLine:** The default command line suffix added on each Unreal Engine start up. Default is `-game -RCWebControlEnable -RCWebInterfaceEnable -noverifygc -novsync -nosound -log -windowed resx=1920 resy=1080`.

Note: The default `resx` and `resy` are configured to be HD format. Change this accordingly if your output format is different. Add the `log` flag to launch the engine in offscreen mode with the output console only.
Render off-screen: When used together with the Viz Engine integration, it is recommended to add the `-RenderOffScreen` switch to the command line, so the rendering takes place off screen.

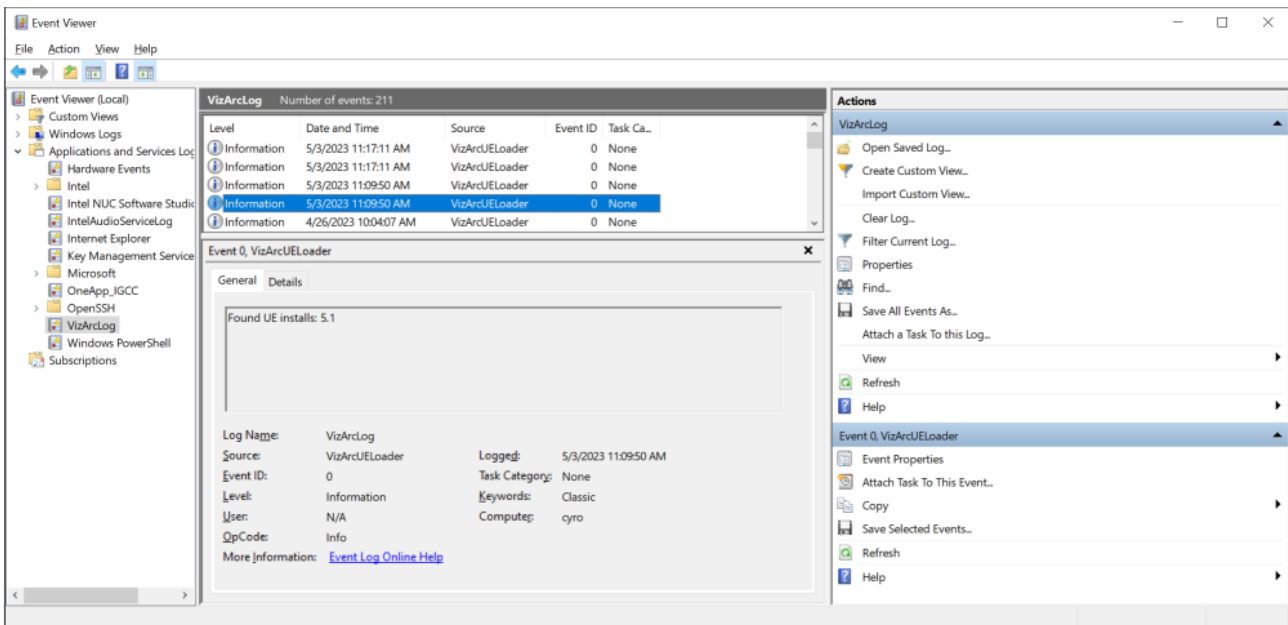
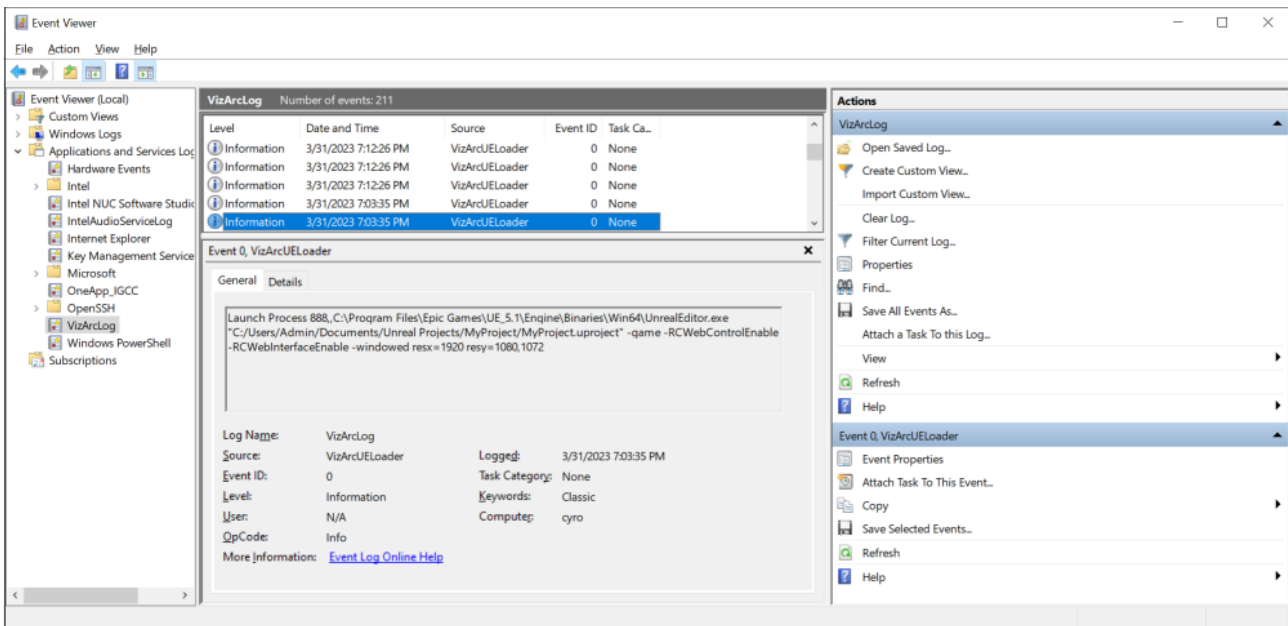
- **UEPluginPort:** The communication port to be used by Viz Arc to talk to the Viz Arc Unreal Engine Plugin. Default is `5647`.

Note: The UEPluginPort is not used directly by Unreal Loader.

3.7.6 Troubleshooting

Logging

The Windows event viewer contains some basic logging of the service. Under **Application and Services** you can find a **VizArcLog** that contains all relevant log entries:



Among other events the event viewer logs which project and map is loaded through Viz Arc and which Unreal Installations have been found after start-up. The Unreal Loader identifies the Unreal installations based on the registry keys found in *Computer\HKEY_LOCAL_MACHINE\SOFTWARE\EpicGames\Unreal Engine*.

User

The service launches the Unreal Engine with the user that is currently logged on. Make sure a user is logged in on the machine.

3.8 Configuring Graphic Hub

3.8.1 Configuring Graphic Hub for the Viz Arc Template Workflow

Note: This step is only necessary if you want to use the template based workflow or if you want to store projects on Graphic Hub and is not required for other use cases.

As there is currently no way to automatically generate and publish add-ons in Viz Graphic Hub, a few manual steps must be performed in Graphic Hub. You need to use Viz Graphic Hub Manager to connect to your Graphic Hub.

There are two ways to create the necessary **add-ons** on Graphic Hub: importing an archiving or creating them manually. This section covers the following topics:

- [Configuring Graphic Hub for the Viz Arc Template Workflow](#)
- [Import an Archive Containing Add-ons](#)
- [Manually Creating Add-ons](#)

3.8.2 Import an Archive Containing Add-ons

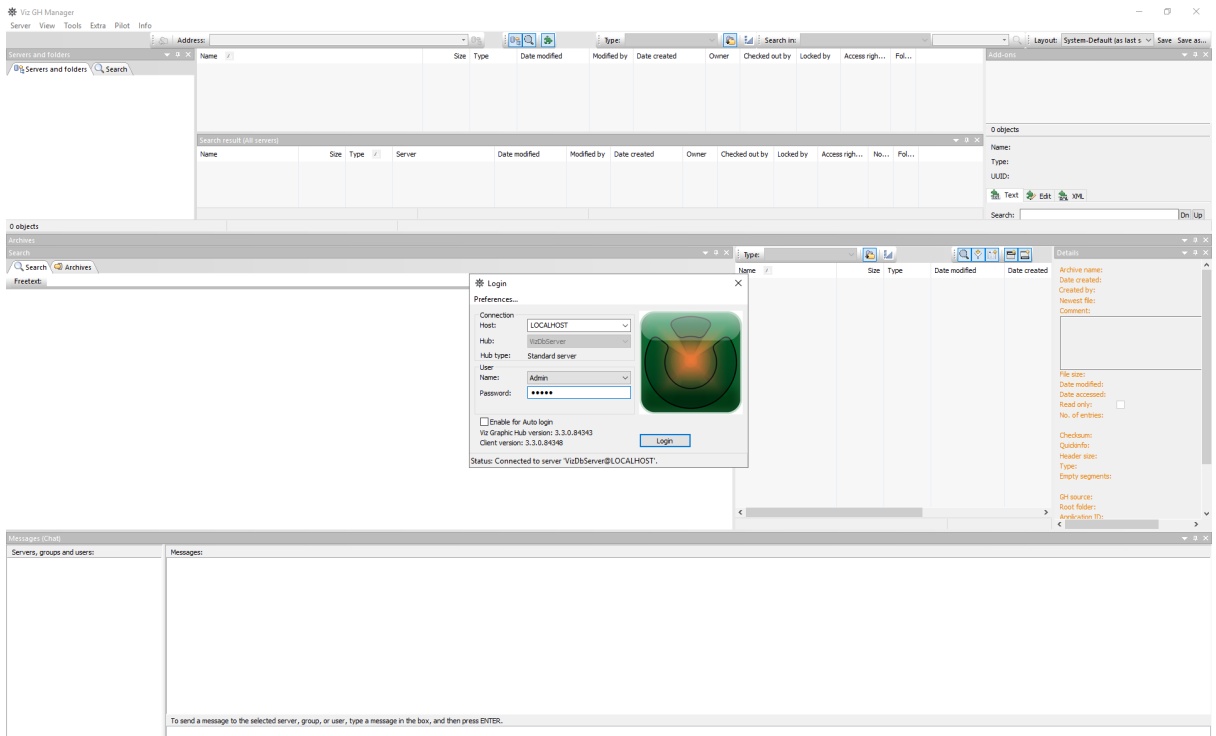
The archive to be imported anywhere on the Graphic Hub is located in the program-data folder (typically *C:\ProgramData\vizrt\VizArc*) under the *Resources\AddOns* folder and is called *VizArcAddOns.via*. It contains a dummy image with all necessary add-ons attached.

You can also import the add-ons through Viz Arc. When Viz Arc detects a missing add-on, e.g. on the template section, you can use the **Create Add-Ons** button to import the above archive automatically. After importing the archive you will be able to create and import templates and store projects on Graphic Hub.

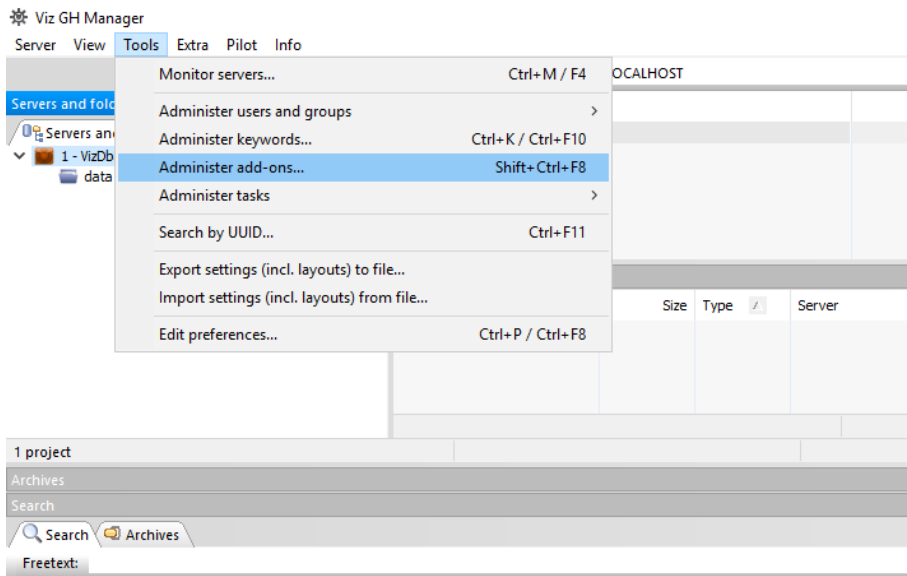


3.8.3 Manually Creating Add-ons

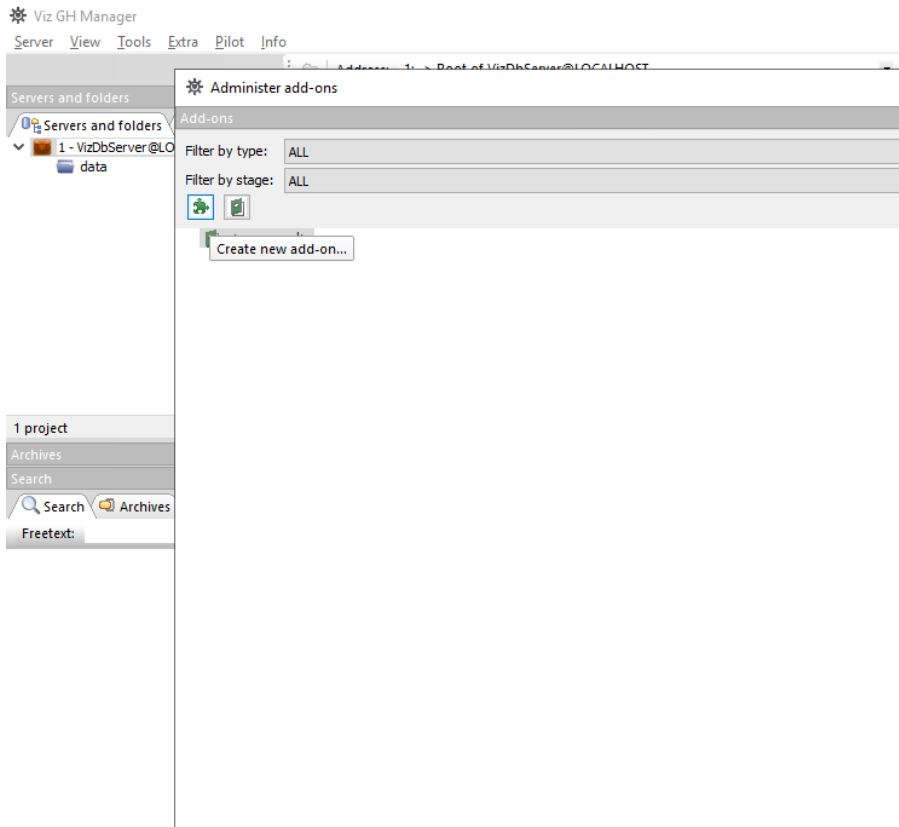
1. Log in to Graphic Hub using Graphic Hub Manager:



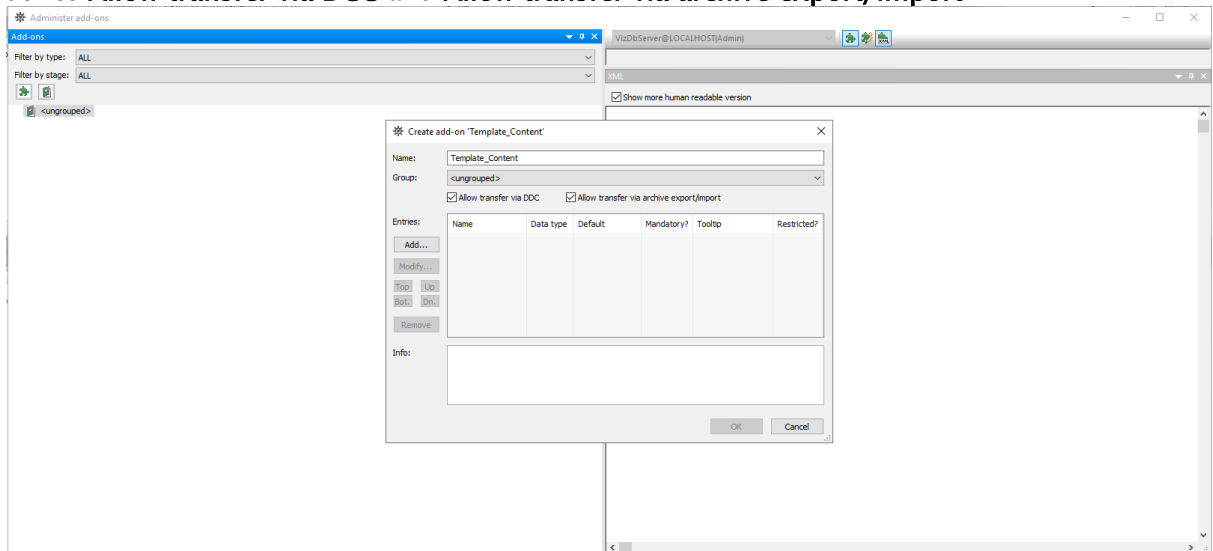
2. Go to **Tools** and select **Administer add-ons...**:



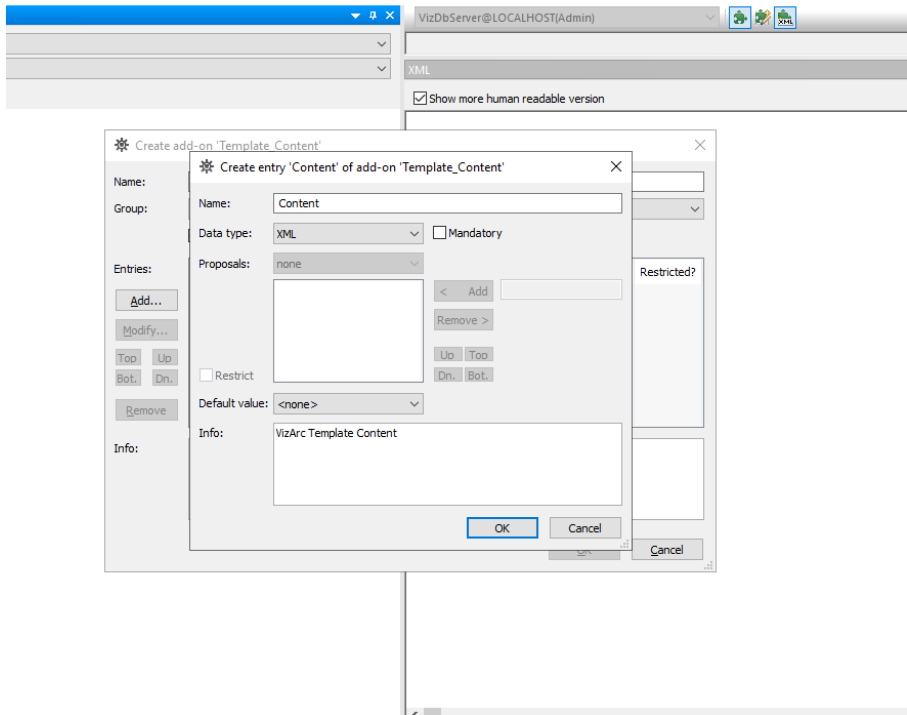
3. Create a new add-on.



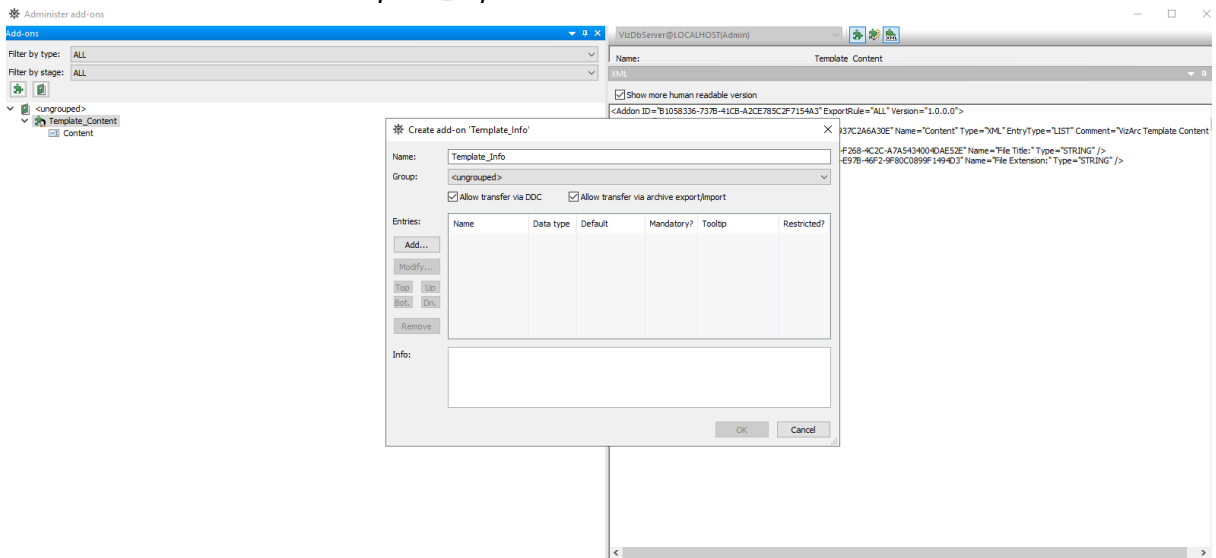
4. Name the new add-on *Template_Content*. Note that the name is case-sensitive. Tick the boxes **Allow transfer via DCC** and **Allow transfer via archive export/import**.

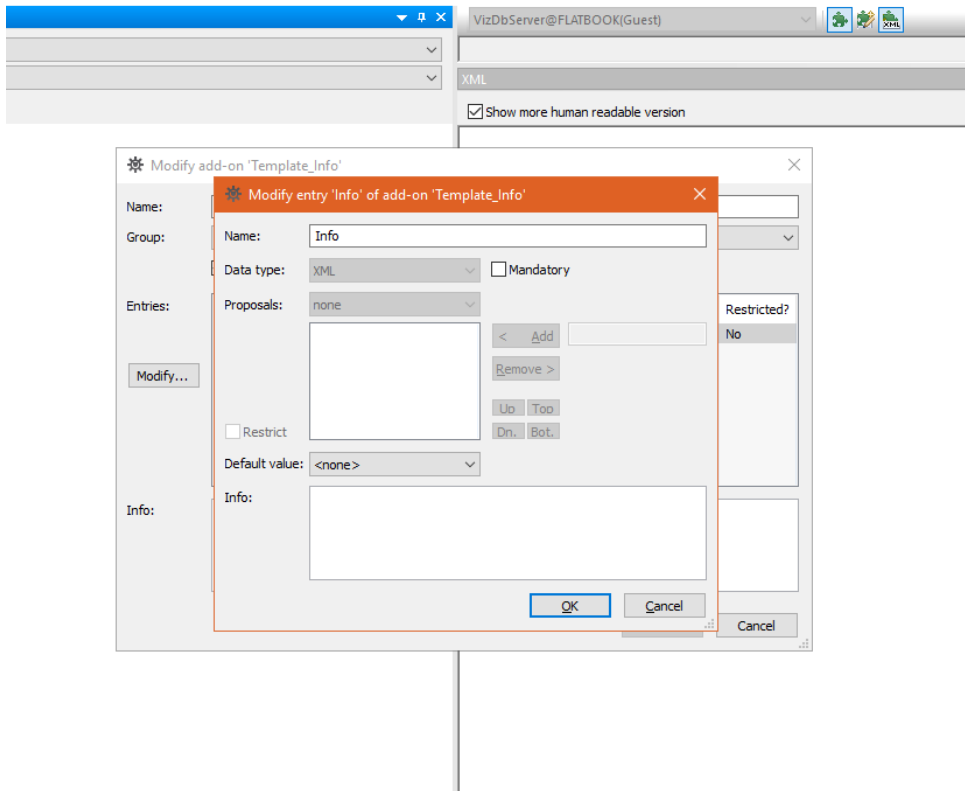


5. Click **Add...** to add an entry.
 - Call the new entry *Content*.
 - Select **XML** as data type.
 - Add something like *Viz Arc Template Content* under **Info**.

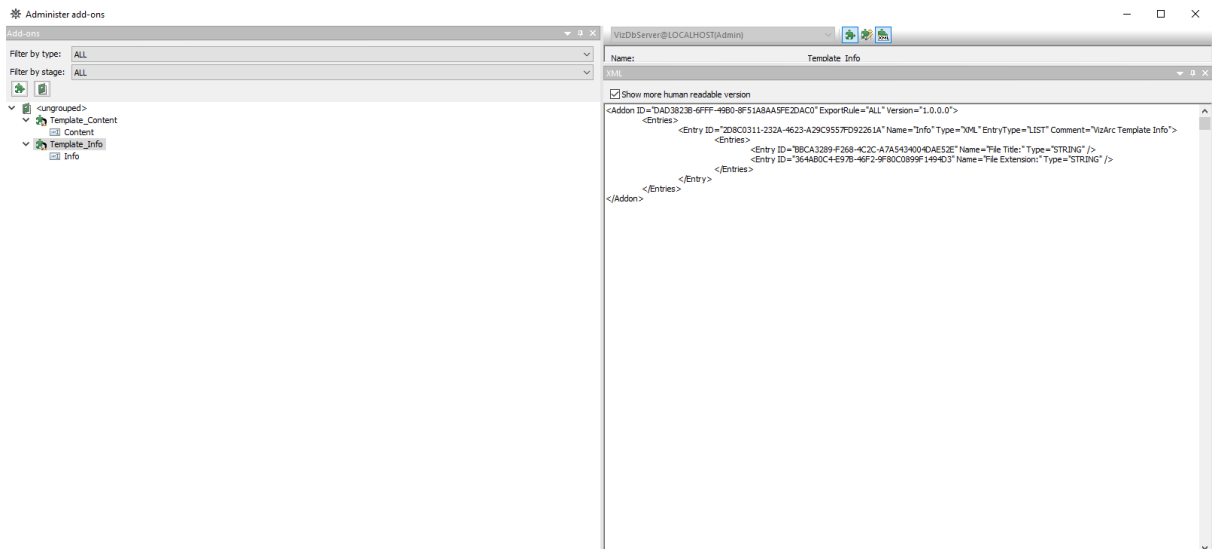


6. Return to step 3 above and add another add-on:
 - Name the add-on *Template_Info*. Bear in mind that the name is case-sensitive.





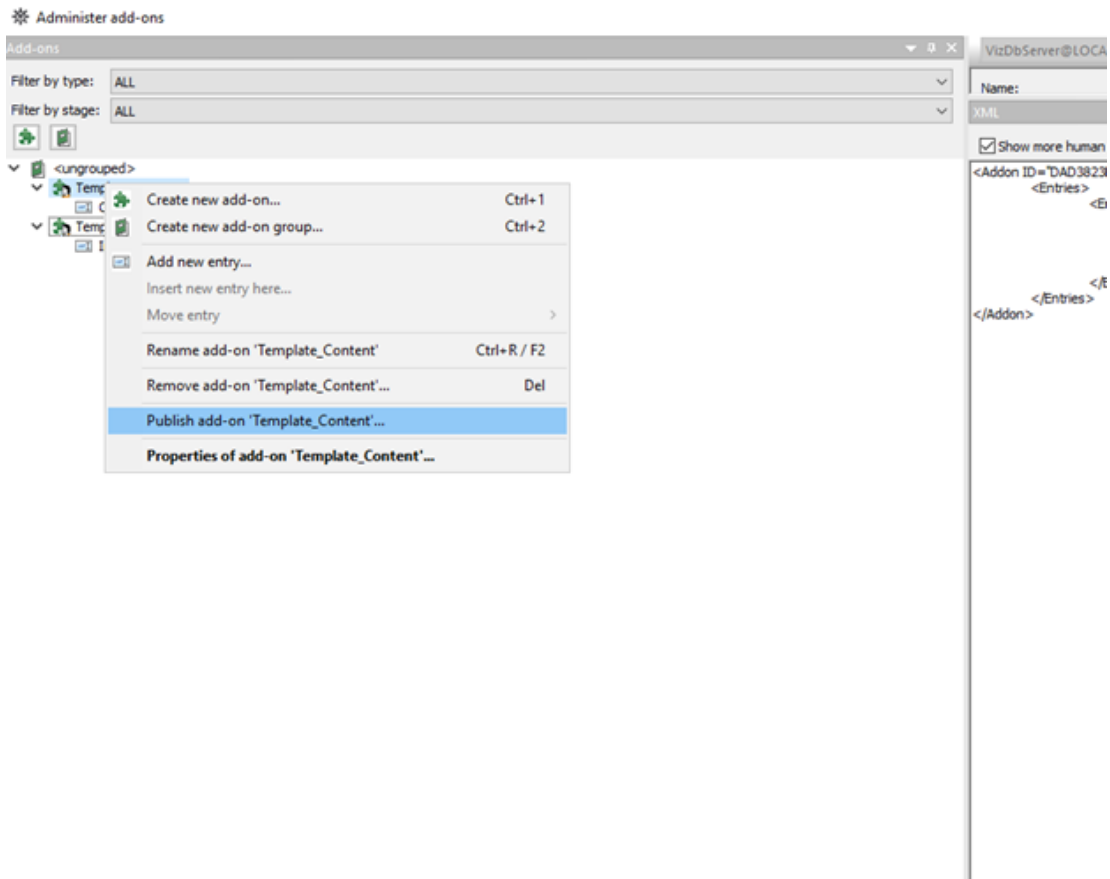
- Add an entry under **Info**, something like *Viz Arc Template Info*. The data type must be **XML**.



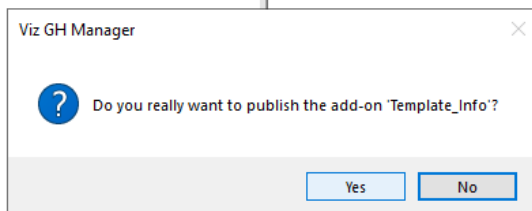
Your add-ons should now look like those in the screenshot above.

⚠ Note: You can add the add-ons to a group if you wish. Viz Arc finds them regardless of which group they belong to.

7. Publish by right-clicking the two add-ons and selecting **Publish add-on**



A warning message appears:



- Click **Yes**.
- Make sure to publish both add-ons.

Once you have restarted Viz Arc you can use the **Design** tab to create your own templates.

3.9 Script Debugging

To get useful information on the Viz Arc scripting console when errors occur, it's necessary to install a debugger on the target system.

3.9.1 How to Enable Viz Arc Script Debugger on Windows 7/8/8.1/10

Issue Details

I would like to debug my script (main or template script) in Viz Arc, but I don't get the line of the occurrence on the console output when the script runs into errors. What can I do?

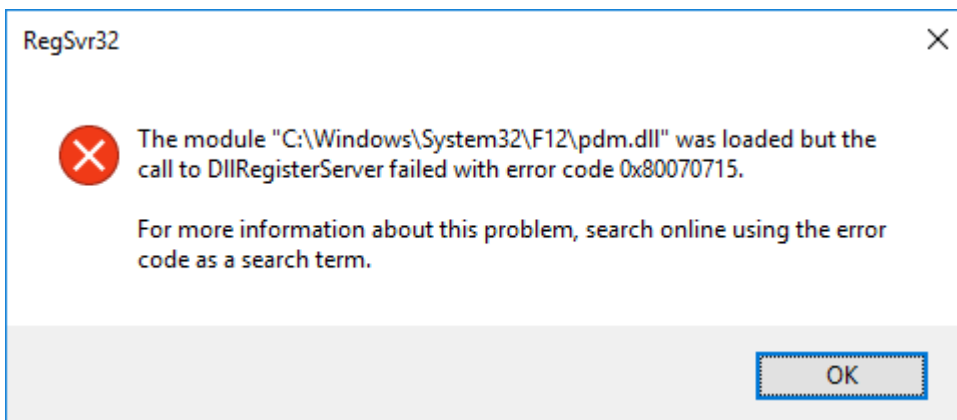
Solution

Viz Arc

The registration process of the *pdm.dll* differs depending on the version of the OS. To register the *.dll*, run cmd in admin (elevated) mode and type the command below that corresponds to your software configuration:

- **Windows 7/8/8.1:** `Regsvr32.exe "C:\Program Files\Internet Explorer\pdm.dll"`
- **Windows 10 (up to version 1511):** `Regsvr32.exe "C:\Windows\System32\F12\pdm.dll"`

With Windows 10 version 1607 and above, *pdm.dll* can no longer be registered manually, but must be automatically registered by a Microsoft product. If attempting to register manually, *RegSvr32.exe* throws error 0x80070715.



One way to automatically register the *.dll* is to install Microsoft's [Remote Tools for Visual Studio](#). Download the x64 version. This free tool will install and register the PDM. After installation, Viz Arc will automatically recognize the registered *.dll*.

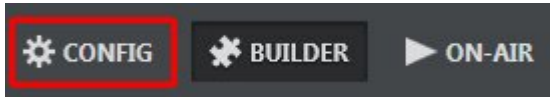
Additional Information

Viz Arc Script is based on ClearScript which relies on the Microsoft Script Debugger that was released in 1997. This tool could be used to debug Visual Basic scripts (VBScript) or Java scripts (JScript) and was a complement to products such as Internet Explorer 4.0 and Internet Information Server 4.0. Until recently, it was a tool that Microsoft provided as a separate download on their homepage. It installed a shared library called the Process Debug Manager (PDM), which Viz Arc/ClearScript uses to debug its own VBScripts/JavaScript.

With Windows 7/8/8.1/10, users do not need to install this file separately, provided they have either MS Office or Visual Studio installed. It also installs with Internet Explorer 8 and above but is not registered (see the steps for registering the *pdm.dll* above). As the PDM library is already available on these systems, you only need to make sure the active *.dll* is registered in order for Viz Arc to recognize it.

4 Configuration

To access the configuration panel, press the **CONFIG** icon on the top right of the main window or go to the main menu and select **System > Configuration**.



This section covers the following topics:

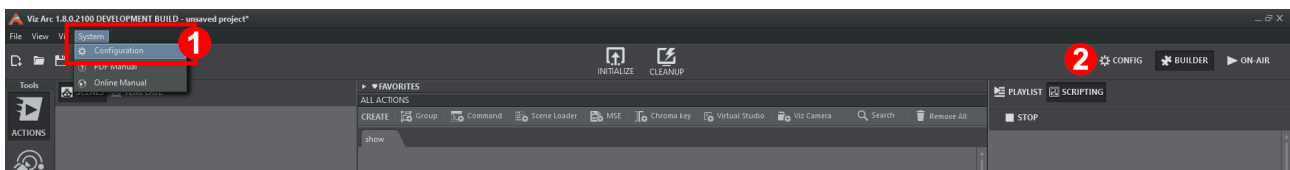
- [General Configuration](#)
- [General Settings](#)
- [Profiles](#)
- [Keyboard Shortcuts](#)
- [Video Settings](#)
- [GPI Setup](#)
- [Clip Setup](#)
- [Info](#)
- [Tracking](#)
- [Vizrt Systems](#)
- [Third Party Systems](#)
- [LoupeDeck Integration](#)

4.1 General Configuration

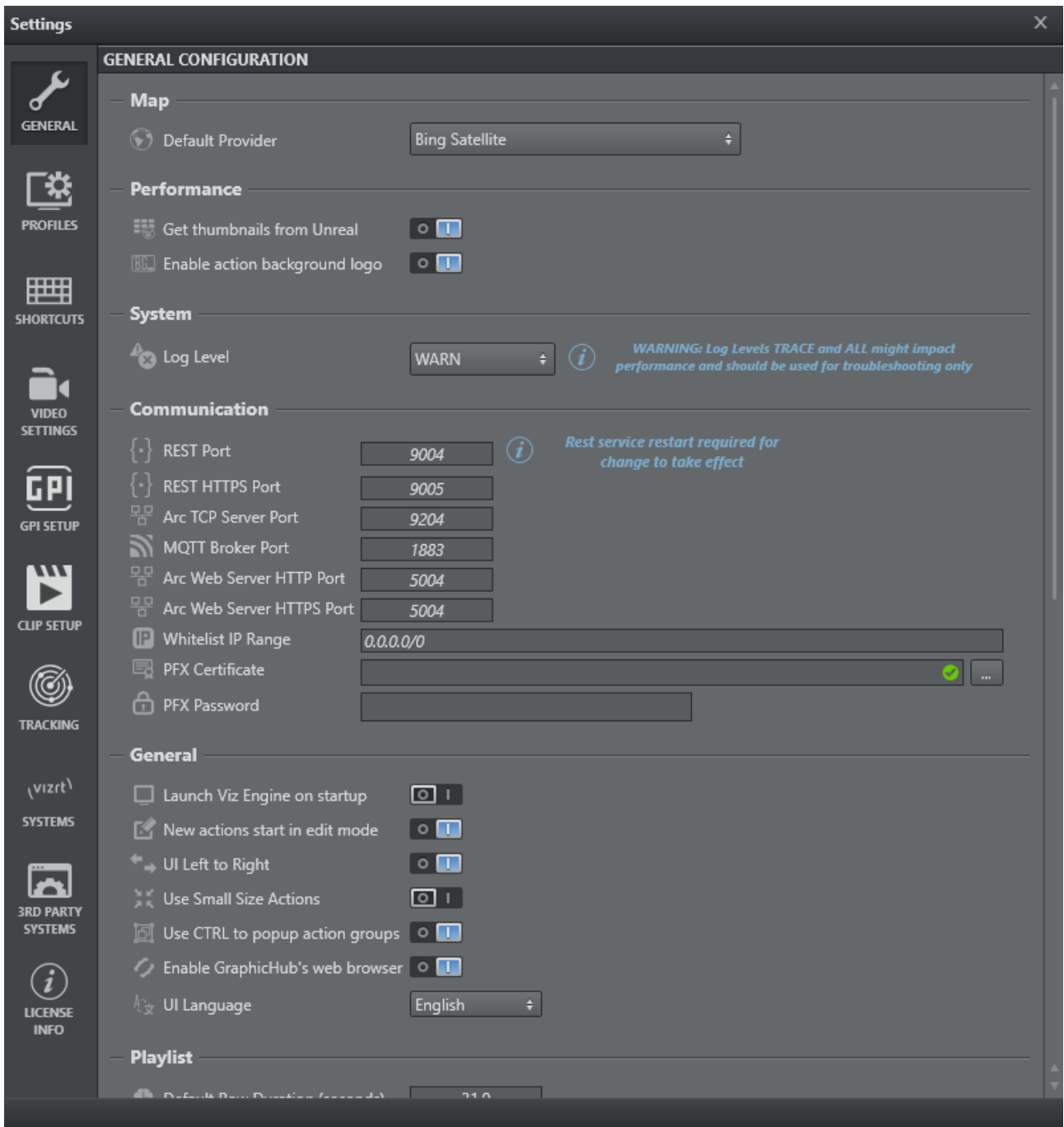
General Configuration is the main configuration window. Here, parameters that are *required* for Viz Arc to function correctly with systems like Viz Engine, Graphic Hub and Tracking Hub can be set.

To reach the Viz Arc **Configuration** there are two ways, as shown in the picture below:

1. Click on the menu bar item **System > Configuration**.
2. Click on the **CONFIG** button on the main window.



The **Settings** window looks like the following picture.



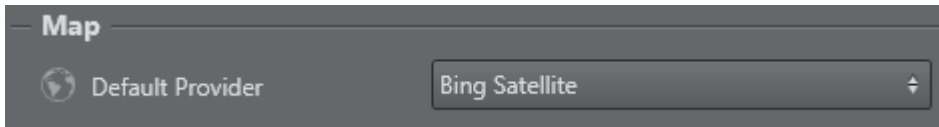
4.2 General Settings

Set application level preferences using the menu below:

4.2.1 Map

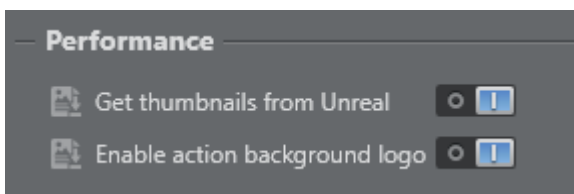
A key Viz Arc feature is the ability to set up augmented reality elements, tracked cameras and polygon masks in outdoor productions directly over a map.

Select a **Default Provider** for map imagery using the Map menu below:



- **Default Provider:** Choose the default map provider for the map section
 - **Bing** Satellite, raw satellite view.
 - **Bing** Hybrid, satellite including boundaries/places, street names and roads as overlay.
 - **Bing** Just the map view showing boundaries/places, street names and roads.

4.2.2 Performance



Use this menu to select the following **Performance** options:

- **Get thumbnails from Unreal:** Enable the retrieval of thumbnails from Unreal Engine.
- **Enable action background logo:** Enable a watermark logo to be displayed on Actions, to clearly show the type of action.

4.2.3 System

Set the **Log Level** using the System menu:



- **ALL:** Shows all level logs (below).
- **TRACE:** Shows traced code; useful for identifying errors in a function if there is a software crash. Logs all commands sent to the Engine in a separate log file.
- **DEBUG:** Shows specific technical information.
- **INFO:** Shows the main information in a log.
- **WARN:** Shows issues that may potentially cause application anomalies.
- **ERROR:** Shows any error that is fatal to the operation.
- **FATAL:** Shows only errors that force a shutdown of the application to prevent data loss.
- **OFF:** Logs are switched **Off**.

4.2.4 Communication

Communication

Rest service restart required for change to take effect

REST Port	9004
REST HTTPS Port	9005
Arc TCP Server Port	9204
MQTT Broker Port	1883
Arc Web Server HTTP Port	5004
Arc Web Server HTTPS Port	5005
Whitelist IP Range	0.0.0.0/0
PFX Certificate	<input type="text"/> <input checked="" type="checkbox"/> <input type="button" value="..."/>
PFX Password	<input type="password"/>

- **REST Port:** The REST Port used for listening to incoming requests by the Viz Arc REST server.
- **REST HTTPS Port:** Same as above, but for the HTTPS clients. Requires the setup of the PFX certificate parameter (below).
- **Arc TCP Server Port:** The TCP Server Port to be used for incoming TCP Connections.
- **MQTT Broker Port:** The internal MQTT Broker port to be used. Set to to disable the Broker.
- **Arc Web Server Port:** The Port to be used for the internal web server.
- **Whitelist IP Range:** Specify a semi-colon (;) separated list of IP addresses/ranges (in CIDR notation) allowed to access the web server.
- **PFX Certificate:** The path to the PFX certificate required to enable HTTPS for the REST service.
- **PFX Password:** The password of the PFX certificate.

All settings take effect upon restart of REST service or Viz Arc, respectively.

4.2.5 General

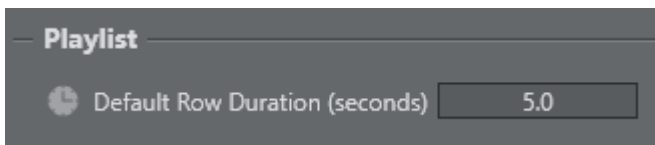
General

Launch Viz Engine on startup	<input checked="" type="checkbox"/>
New actions start in edit mode	<input type="checkbox"/>
UI Left to Right	<input type="checkbox"/>
Use Small Size Actions	<input checked="" type="checkbox"/>
Use CTRL to popup action groups	<input type="checkbox"/>
Enable GraphicHub's web browser	<input type="checkbox"/>
UI Language	English

- **Launch Viz Engine on startup:** When enabled, Viz Arc also launches Viz Engine on application startup.

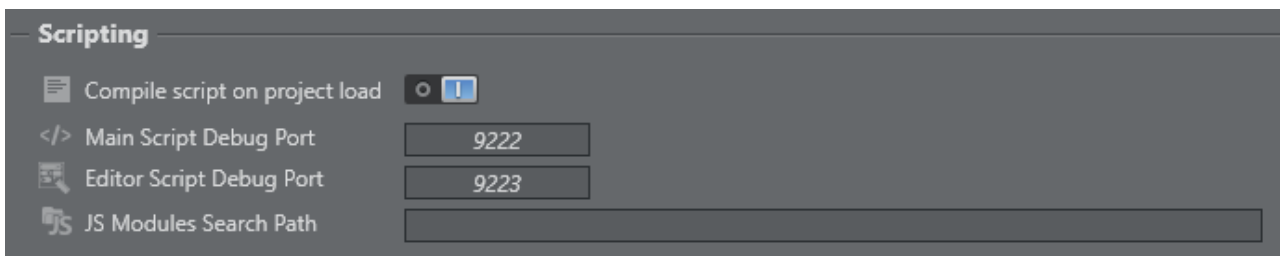
- **New actions start in edit mode:** Starts new actions in edit mode when created when set to **On**.
- **UI Left to Right:** Switches the UI to right to left mode (experimental) when set to **Off**.
- **Use Small Size Actions:** Uses smaller buttons for Actions when set to **On**.
- **Use CTRL to popup action groups:** Hold **CTRL** while left clicking on the **Expand** button of a Group Action to expand the group temporarily as a popup. Disable this option to make this the default behavior without holding the **CTRL** button.
- **Enable Graphic Hub's web browser:** Use web view based Graphic Hub browser for scene browsing.
- **UI Language:** Determines the language to be used for the UI (feature under development).

4.2.6 Playlist



- **Default Row Duration:** The default duration of a playlist row on creation.

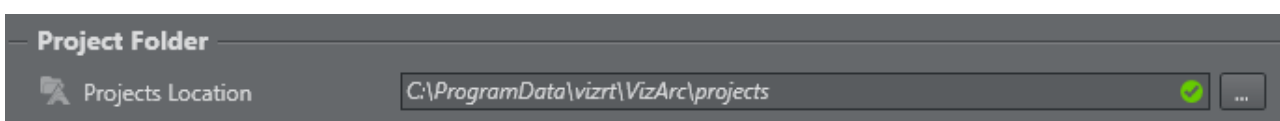
4.2.7 Scripting



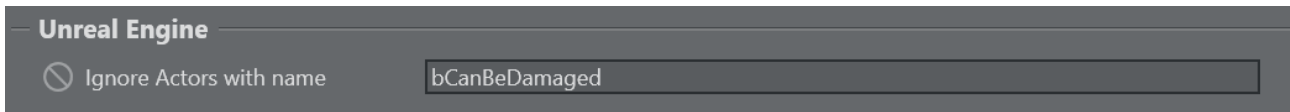
- **Compile scripts on project load:** Forces any custom script included in the project to be compiled when opening a project.
- **Main Script Debug Port:** The debug port to connect an external debugger for the main script.
- **Editor Script Debug Port:** The debug port to connect an external debugger for the script in the template designer.
- **JS Modules Search Path:** The JavaScript module path. Use a semi-colon (;) to separate multiple paths.

4.2.8 Project Folder

This menu contains the path where projects are saved. You can change the Viz Arc project folder at any time:



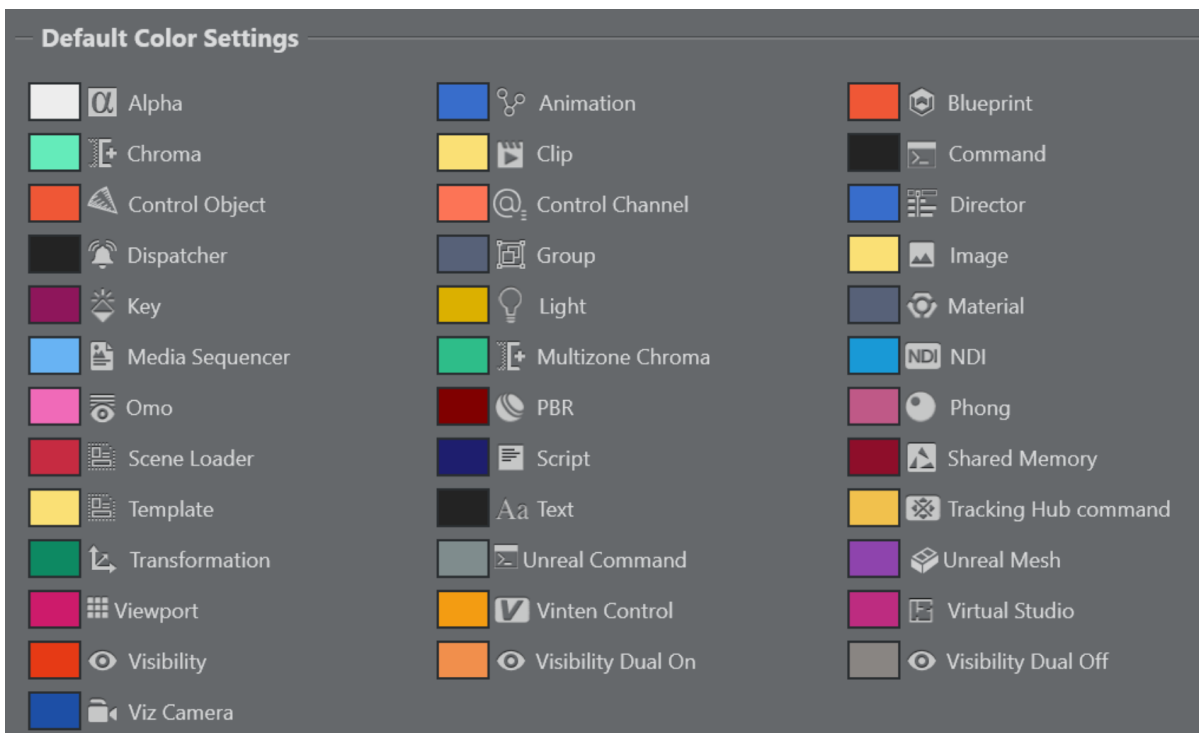
4.2.9 Unreal Engine



- Ignore Actors with name:** A regular expression (in C# syntax) that excludes Unreal Actors when parsed from a Blueprint Actor (for example, the Blueprint Action or in a Unreal Template). Leave this field empty if all Actors should be considered. Another sample could be `(^bCanBeDamaged$|^Cloud speed$)`. This regular expression would exclude all actors with the exact name `bCanBeDamaged` or `Cloud speed`. Switch the **Log Level** to at least **INFO** to see in the log which Actors got effectively ignored (for example, after creating a Blueprint action).

4.2.10 Default Color Setting

You can assign a default color for each action, such as transformation, alpha, visibility and so on. You can still assign a different color in the main area.



See Also

- [Project Action Types](#) for more information on how to execute Viz Trio pages.
- [GPI Setup](#) for more information about setting up GPI Triggers and Callbacks.
- [Video Settings](#)
- [Configuring Viz Engine](#)
- [Viz Trio User Guide](#)

- <http://www.vinten.com/>
- [Playlists](#)

4.2.11 Configuring Viz Engine

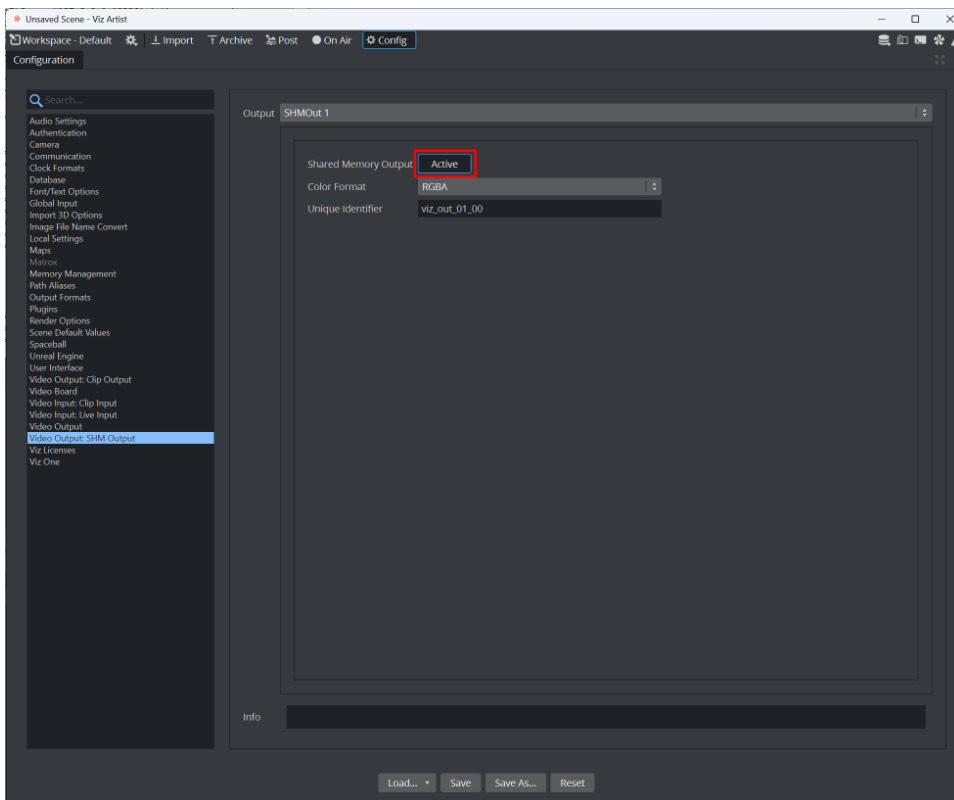
In order to see a preview in Viz Arc, the following three settings in Viz Config must be configured:

- [Video Output](#)
- [Video Board](#)

Note: Please verify that your system meets the version requirements.

In Viz Engine, go to the **Viz Configuration** tab and select:

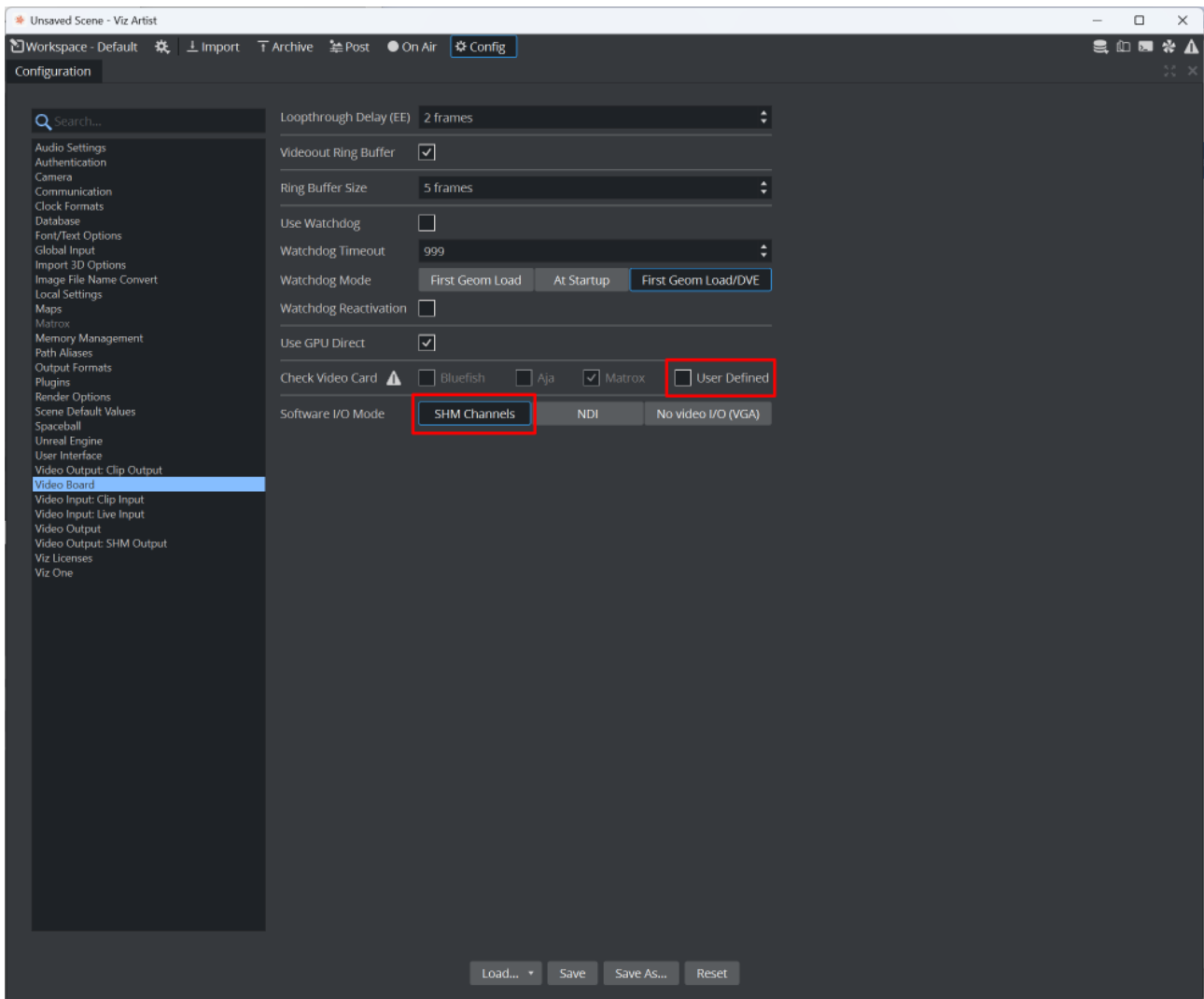
1. Video Output SHMOutput: Set Shared Memory Output option to **Active**.



2. Video Board: For non-Matrox configurations, you must configure the following:

- **Software I/O Mode:** Make sure **SHM Channels** is selected.
- **Check Video Card:** Must be set to: **User Defined**.

For Matrox systems, just check the **Matrox** check box.



See Also

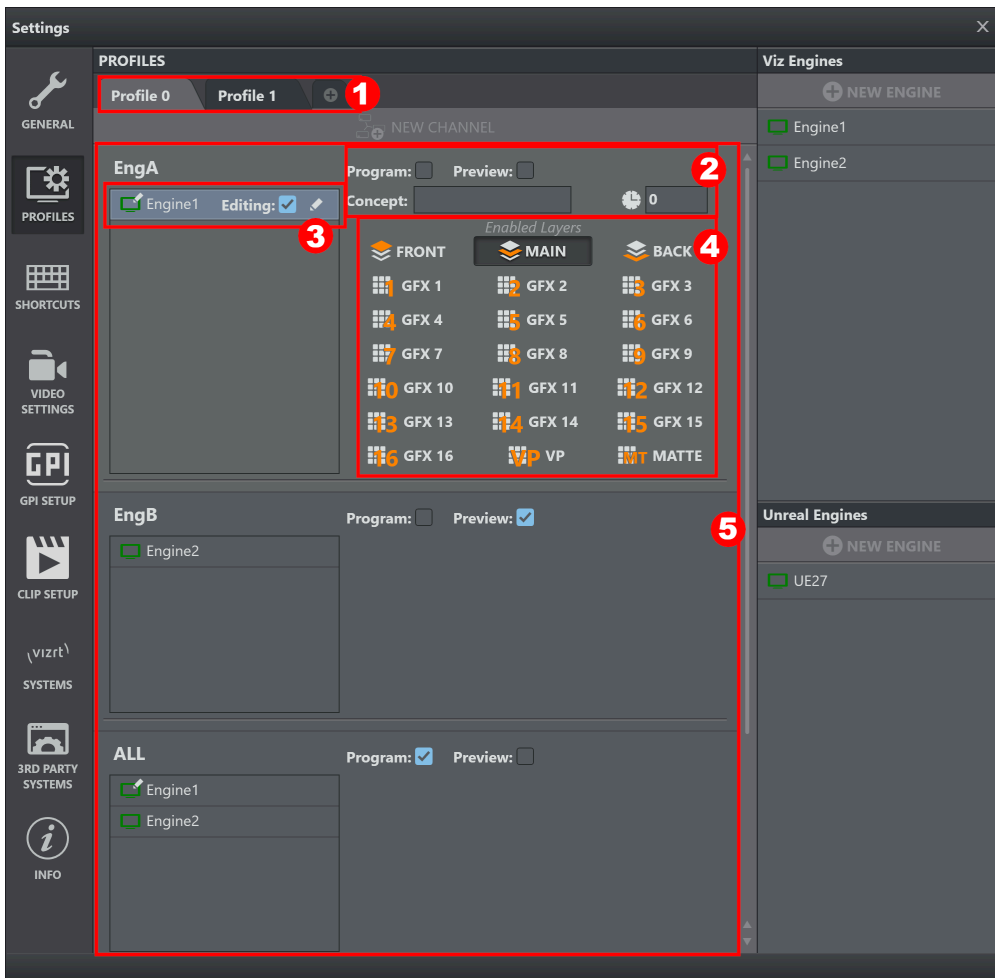
- [Viz Engine Administrator Guide](#) for more details on the different configuration options for your version of Viz Engine.

4.3 Profiles

1. **Profiles:** Used to configure the different groups of *Viz* or *Unreal Engines* available for control by the user; these groups are called **Channels**.
2. **Engine and Channel Settings:** Used to configure Program/Preview, the concept and an execution delay each Engine.
3. **Engines list:** Viz Arc is capable of controlling more than one Viz Engine at the same time. For example, when working with multiple tracked cameras. This menu contains all the Engines assigned to a given channel.
4. **Enabled Layers:** Layers enabled in the Scene Tools when selecting a channel and selecting into which layer a scene is loaded.

5. **Channels:** A channel is a group of Viz Engines (or *Unreal Engines*) that receive the same commands at the same time. For example, when executing actions or loading a scene.

To access the Profile config menu, press the **Profiles** icon on the left of the window in the **Config** panel:



This section covers the following topics:

- [Profile Configuration](#)
 - [To Add a New Profile](#)
 - [To Rename a Profile](#)
 - [To Delete a Profile](#)
- [Engine Configuration](#)
 - [Add a Viz Engine](#)
 - [To Add an Unreal Engine](#)
 - [To Rename or Edit an Engine](#)
 - [Configure and Engine settings](#)
 - [To Delete an Engine](#)
- [Channel Configuration](#)
 - [To Add a Channel](#)
 - [To Assign Engines to Channels](#)


- To Rename a Channel
- To Delete a Channel
- To Enable Available Viz Layers
- To Select Unreal Engine Version
- To Select a Profile

Note: To connect Viz Arc to an *Unreal Engine* you need to copy the *VizArc* folder to `\Epic Games\UE_4.20\Engine\Plugins`.

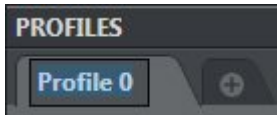
4.3.1 Profile Configuration

To Add a New Profile



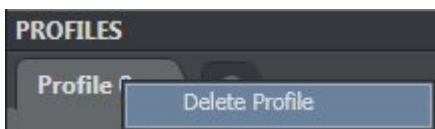
Press the **CREATE PROFILE** icon in the middle of the window or the plus icon  next to the existing profiles.

To Rename a Profile



1. Double-click on the profile name.
2. Insert the desired name.
3. Click **ENTER**.

To Delete a Profile




1. Right-click on the profile name.
2. Select **Delete Profile** in the context menu.


4.3.2 Engine Configuration

Note: The Engines List is global for *all* Profiles configured in Viz Arc.

Add a Viz Engine



1. Press the **NEW ENGINE** icon on the right of the window or the **add** icon  at the top of the Viz Engines list.
2. Enter the display name, host/IP and port in the box that appears.


Engine1 	
192.168.1.50	6100
<i>Feedback Port</i>	7476


The Feedback Port is the `command_feedback_port` as configured on the VizEngine (default 7476).

3. Press **ENTER**

To Add an Unreal Engine

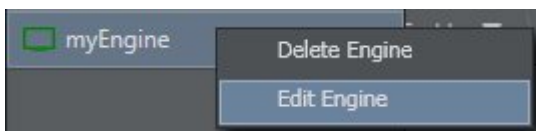



1. Press the **NEW ENGINE** icon on the right of the window or the **add** icon  at the top of the Unreal Engines list.
2. Enter the display name, host/IP and Viz Arc Unreal Engine plug-in port and the Launcher Port in the boxes that appear.


UE27 	
127.0.0.1	5647
<i>Launcher Port</i>	5644
<i>Web Interface Port</i>	30010
<i>WebSocket Port</i>	30020

3. Press **ENTER**.

To Rename or Edit an Engine



1. Right-click on the Engine name.
2. Select **Edit Engine** in the context menu or press the **Edit** icon  next to the Engine name.
3. Enter display name, host/IP and port.

myEngine 	
localhost	6100

4. Press **ENTER**.

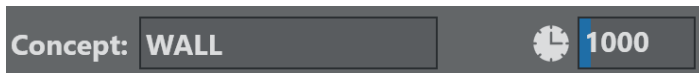
Configure and Engine settings



It's possible to assign every Engine as a **Program** or **Preview** engine.



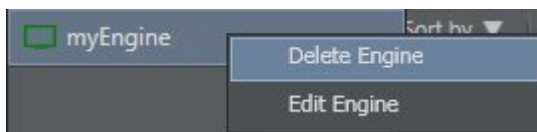
An Engine can also be set as **Editing Engine**, which means the Engine is used for a scene tree load, or to select and objectify a Transition Logic scene, for example.



The **Concept** determines which scene concept is used by the engine when a scene is loaded through the **Scene Loader Action** or a **Template Action**. The **Execution Delay** can be used to delay all commands that are sent to the engine. This can be useful for set-ups involving e.g. AR and Videowall engines where output runtimes of the various subsystems are not uniform.

Warning: Setting an Engine that is On Air into editing mode may load a scene tree while another scene is On Air.

To Delete an Engine

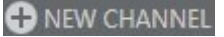


1. Right-click on the Engine name.
2. Select **Delete Engine** in the context menu.
3. Confirm by pressing **Yes**.

4.3.3 Channel Configuration

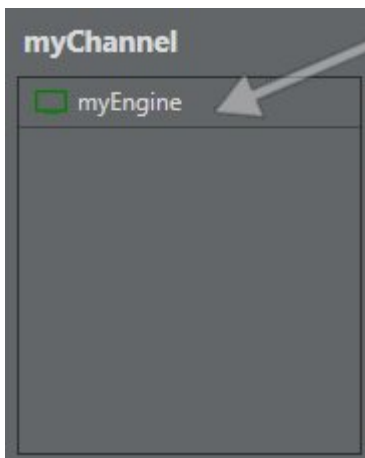
To Add a Channel



Press the **NEW CHANNEL** icon in the middle of the profiles section or the **Add** icon  at the top of the Channel's list.

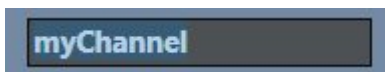
Note: It's possible to create multiple channels and assign a unique name to each channel.

To Assign Engines to Channels



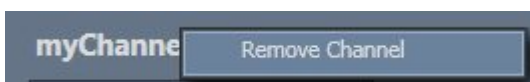
Drag and drop Engines from the Engines list (*right*).

To Rename a Channel



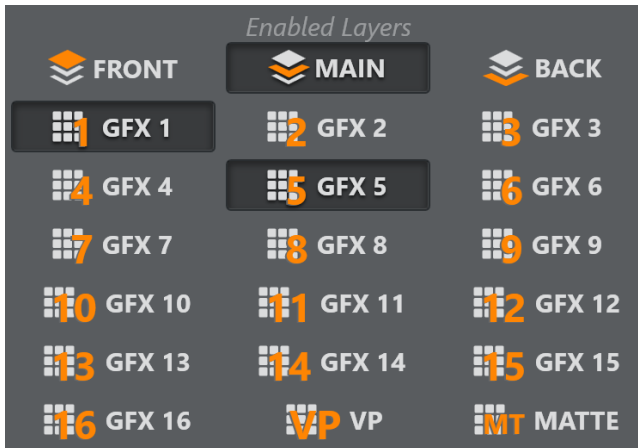
1. Double-click on the channel name.
2. Enter the desired name.
3. Press **ENTER**.

To Delete a Channel



1. Right-click on the channel name.
2. Select **Remove Channel** in the context menu.
3. Confirm by pressing **Yes**.

To Enable Available Viz Layers

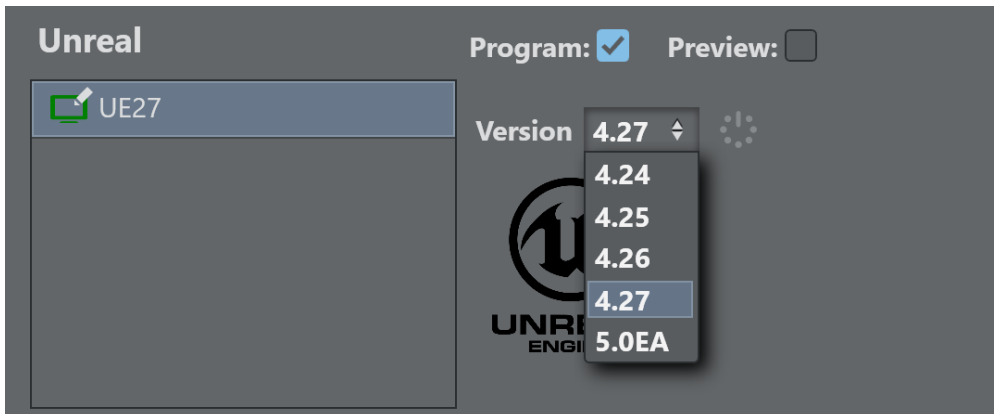


Select one or more layers by pressing them in the **Channel** menu.

Note: Layers let you send scenes and commands to different output levels within Viz Engine. The main layers are FRONT LAYER , MAIN LAYER and BACK LAYER. graphics are usually sent to the MAIN LAYER. If you want to view a graphic On Air you need to have at least one layer enabled.

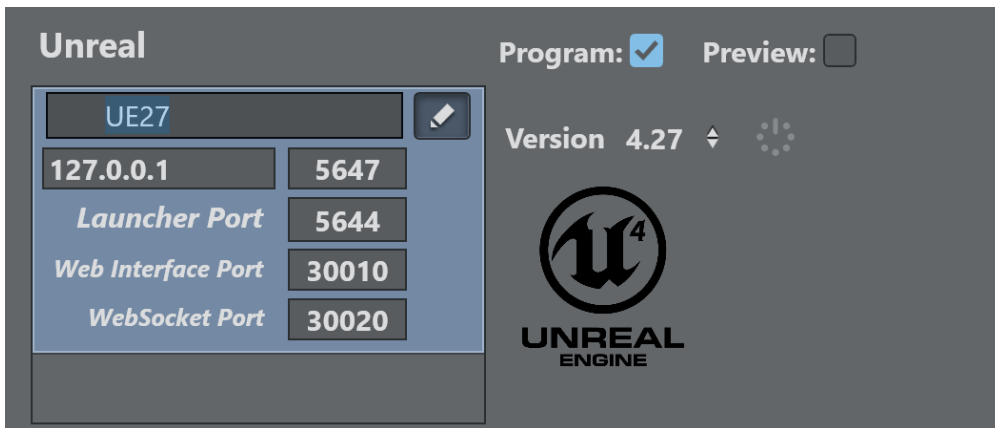
To Select Unreal Engine Version

If the channel consists of one or more Unreal Engines, the **Channel** menu looks like this:



For each Engine, select the Unreal Version to be used by selecting it from the drop down menu. The adjacent **start/restart** button starts the respective Unreal version.

Note: The **Launcher Port** must be configured properly and the Viz Arc Unreal Loader service must run on the target machine. See [Unreal Loader](#) for more on setting up and configuring Loader service.

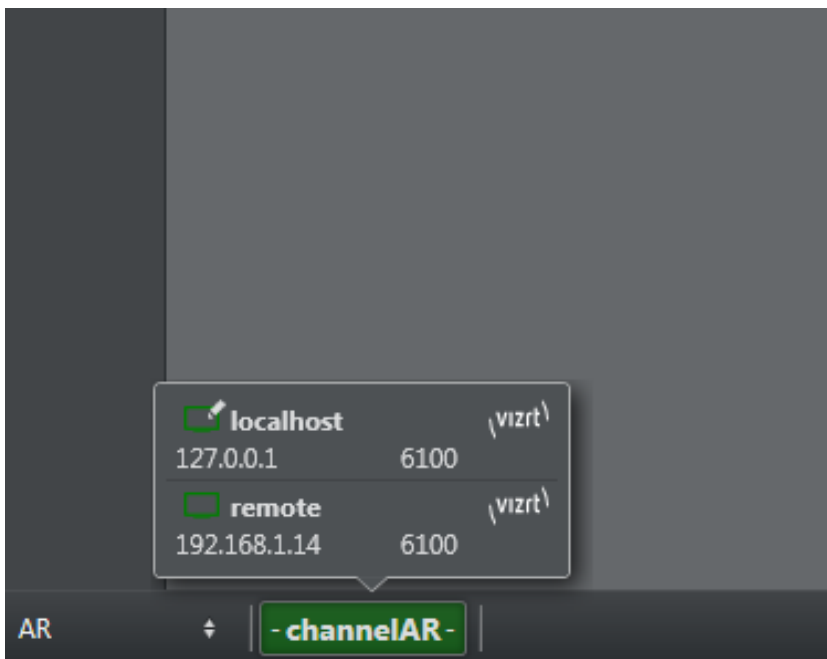


- **Host/Port:** The hostname or IP address running the Unreal Engine and the port on which the Viz Arc Unreal plug-in is configured to listen to.
- **Launcher Port:** The port used by the Viz Unreal Loader service.
- **Web Interface Port:** The port where UE exposes the [Remote Control A PI](#) (UE Version >= 4.26 only).
- **WebSocket Port:** The web socket port where UE exposes the [Remote Control Web Interface](#) (UE Version >= 4.26 only).

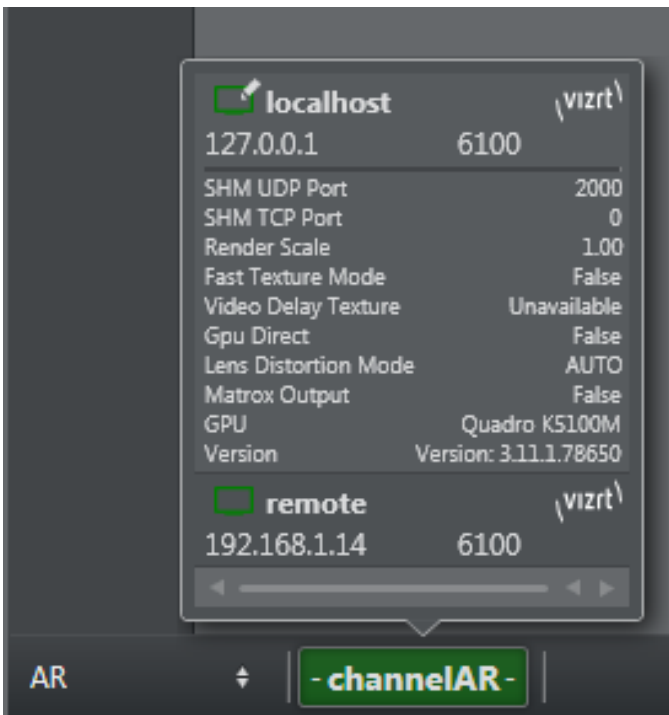
WebSocket Port and **Web Interface Port** are only relevant when the UE Preset actions are used.

To Select a Profile

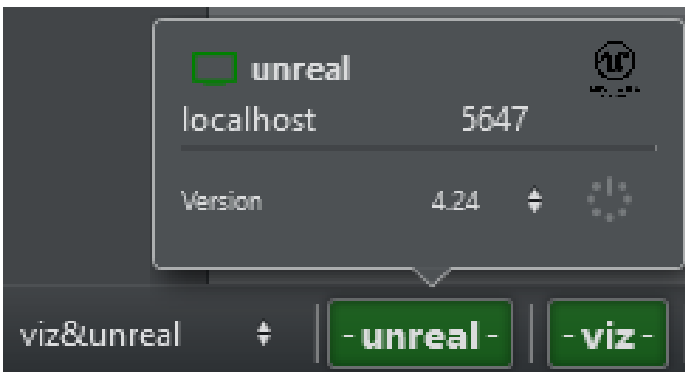
Once you have created a profile, you can select it from the drop down menu at the bottom left corner of the UI. All channels containing the selected profile are displayed on the right.



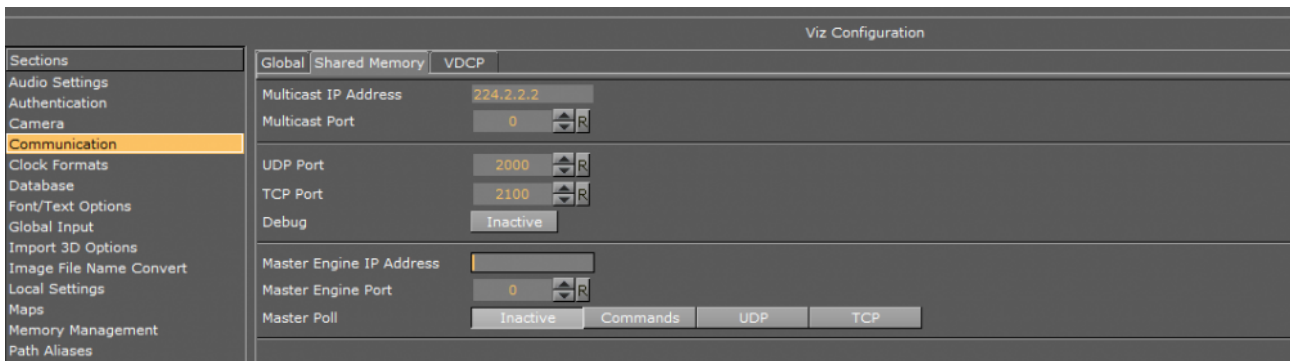
Click on a channel to see which Engines it contains.



If the channel is an Unreal channel, you can select a different version to run or start/restart the Unreal Engine.



Click on the small triangle at the right of each Engine to see more details about the current Engine configuration. The first two entries show the shared memory communication port settings, which can be used with scripting or [SHM](#). To configure the Shared Memory ports on Viz Engine, go to Viz Engine configuration under **Communication > Shared Memory** where you can configure UDP and TCP ports for Shared Memory updates.



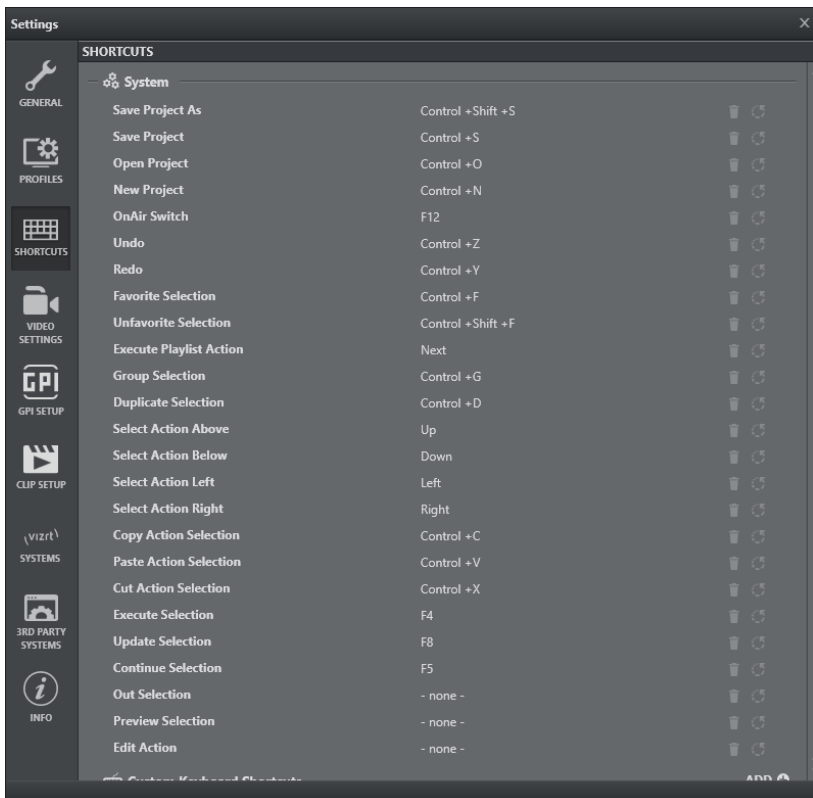
4.4 Keyboard Shortcuts

To access the **Keyboard Shortcuts** configuration menu, select the Keyboard Shortcuts icon on the left of the window in the **Config** panel.



















































4.4.1 Keyboard Shortcuts

Keyboard Shortcuts are divided into three sections:

- [System Shortcuts](#)
- [Custom Keyboard Action Shortcuts](#)
- [Custom Stream Deck Shortcuts](#)



System Shortcuts

System		
Save Project As	Control +Shift +S	 
Save Project	Control +S	 
Open Project	Control +O	 
New Project	Control +N	 
OnAir Switch	F12	 
Undo	Control +Z	 
Redo	Control +Y	 
Favorite Selection	Control +F	 
Unfavorite Selection	Control +Shift +F	 
Execute Playlist Action	Next	 
Group Selection	Control +G	 
Duplicate Selection	Control +D	 
Select Action Above	Up	 
Select Action Below	Down	 
Select Action Left	Left	 
Select Action Right	Right	 
Copy Action Selection	Control +C	 
Paste Action Selection	Control +V	 
Cut Action Selection	Control +X	 
Execute Selection	F4	 
Update Selection	F8	 
Continue Selection	F5	 
Edit Action	F2	 
Out Selection	F9	 
Preview Selection	- none -	 

System Shortcuts apply operations that are global to the Viz Arc system, such as **Open Project**, **Save**, **Undo**, **Redo**, etc. System operations that can be controlled with keyboard shortcuts are listed at the top of the window. It's possible to change the default shortcut for an existing system action, remove the shortcut, or reset it back to default.

All modified system shortcuts data is stored in the *keybinds.json* file. For more details, see [Files and Folders](#).

Custom Keyboard Action Shortcuts

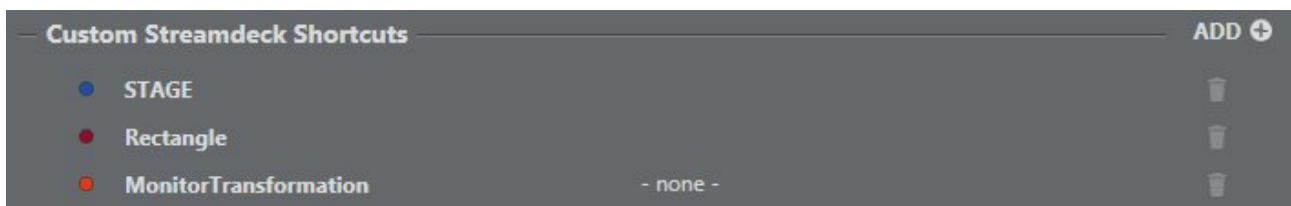


Action Shortcuts are used to assign a key or combination of keys to execute actions. This menu contains a list of all actions that have a keyboard shortcut assigned and the action box color for the action.

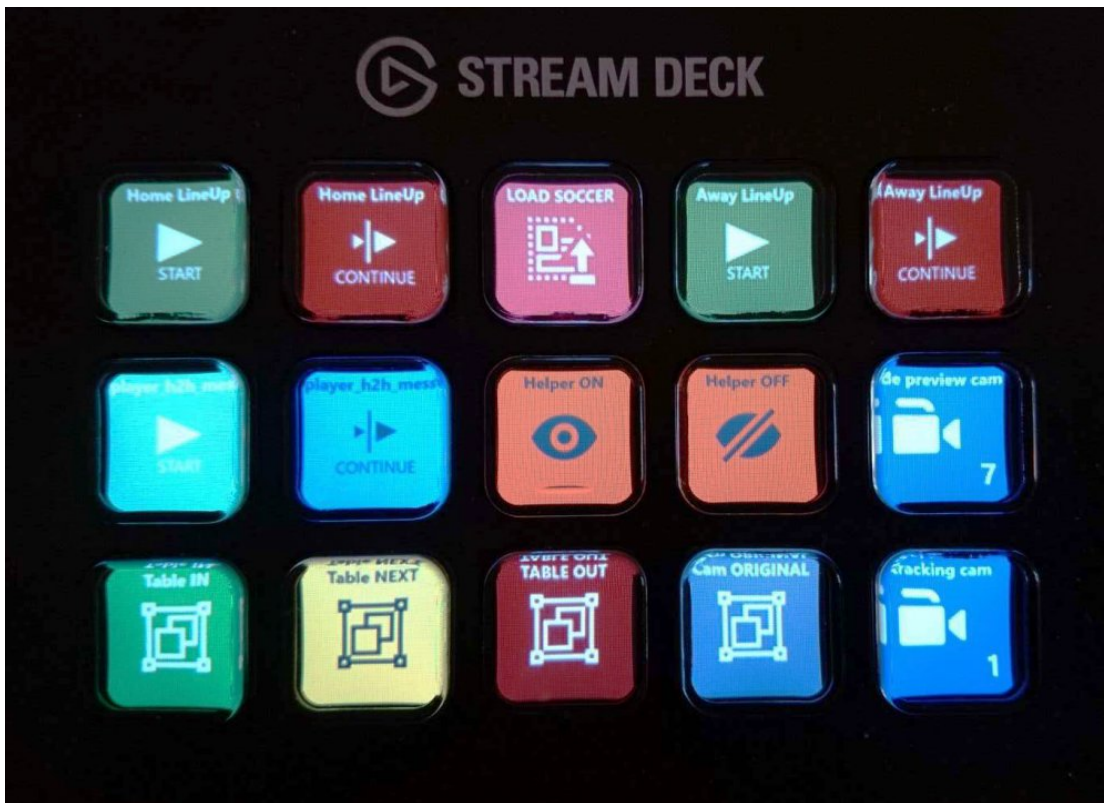
It's possible to assign keyboard shortcuts to any Action in a project and to assign the same keyboard shortcut to more than one action.

You can [add Custom Action Shortcuts](#) directly from this window.

Custom Stream Deck Shortcuts



Custom Stream Deck Shortcuts are used to assign an action (or group) to a specific Stream Deck button (if connected). This menu contains a list of all actions that have a keyboard shortcut assigned and the action box color for the action.




Note: All action shortcuts are stored as part of the *project.json* file. For more details, see [Files and Folders](#).

4.4.2 To Manage Shortcuts


Control + Shift + S

1. Click on the **Shortcut** item.
2. Enter the desired key combination on your keyboard.

To Remove Shortcuts

Press the **Trash can**  icon next to the related shortcut.

To Reset Shortcuts to Default

Press the **Reset**  icon next to the desired shortcut (*for system keyboard shortcuts only*).

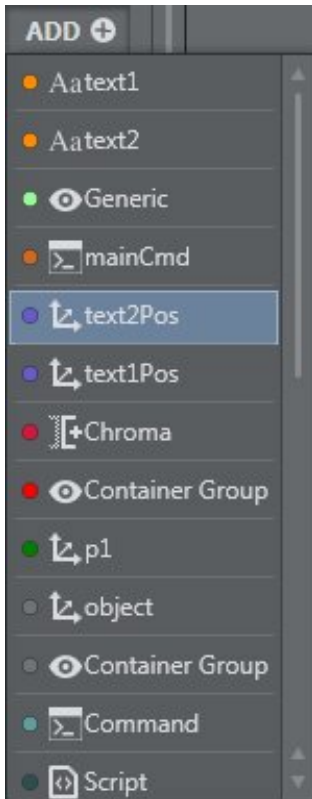
4.4.3 To Add Custom Action Shortcuts

There are two ways to add an action shortcut:

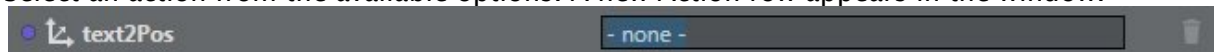
- Config Window

- Action Window

Config Window



1. Click the **Add** button in the **Config > Keyboard Shortcuts** menu.
2. Select an action from the available options. A new Action row appears in the window.



3. Click on the shortcut area and press the desired keyboard shortcut. It's possible to add both **Keyboard** and **Stream Deck** (if available) custom shortcuts.

Action Window



In the action **Edit** menu, click on the shortcut area and press the desired keyboard shortcut. It will automatically be added to the **Custom Keyboard Shortcuts** list.

See Also

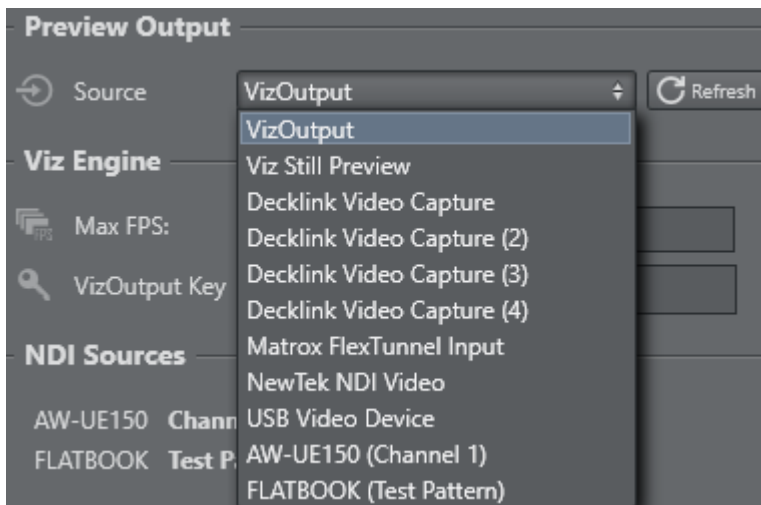
- [Actions View](#) to learn more about assigning keyboard shortcuts to actions.
- <https://www.elgato.com/en/gaming/stream-deck> for more information about Stream Deck hardware.

4.5 Video Settings

4.5.1 Preview Output

Preview Output lets you choose between the following outputs:

- [Local Viz Output](#)
- [Still Preview](#)
- [Direct Show Sources](#)
- [NDI](#)



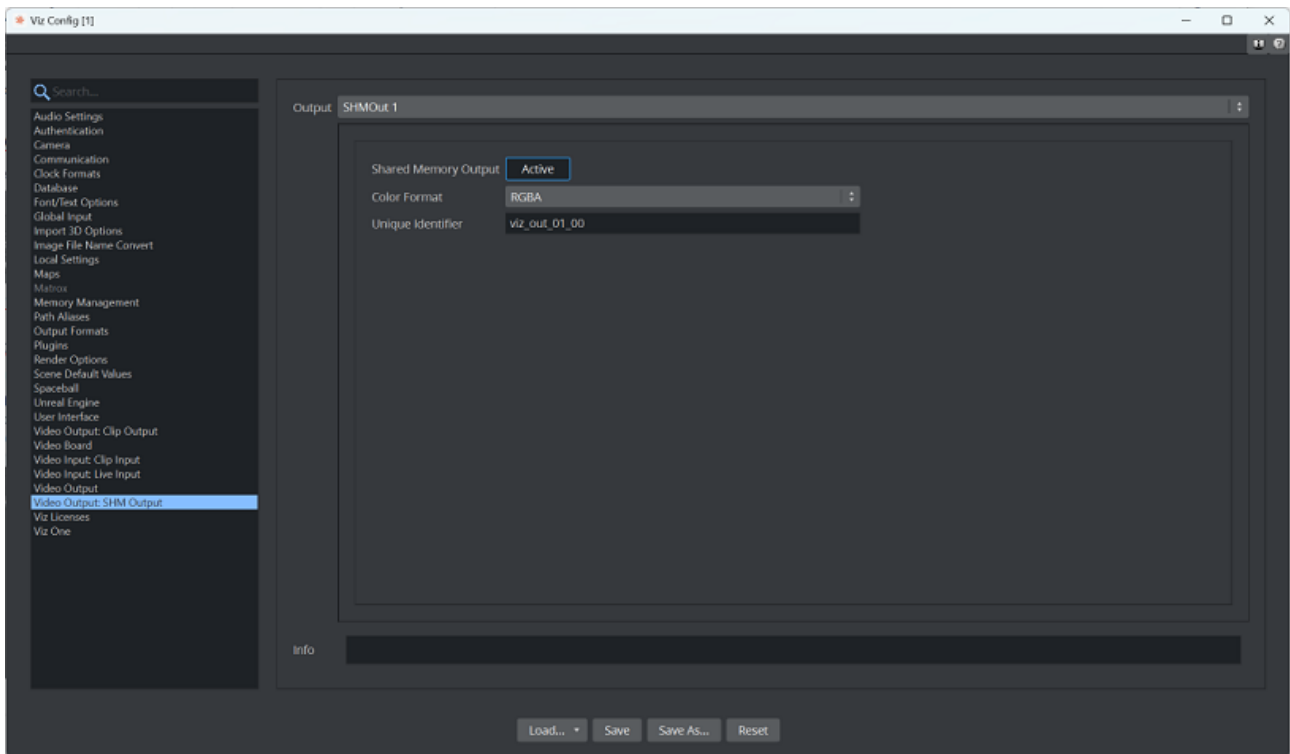
The selected source will be displayed throughout all Viz Arc interfaces. Use the **Refresh** button to force the detection of newly connected sources.

VizOutput

The Viz Arc built-in preview uses the Viz Engine's Shared Memory communication to display the output of Viz Engine.



- **Max FPS:** Limit the maximum number frames per second displayed for the Viz Output, sometimes useful when experiencing performance issues.

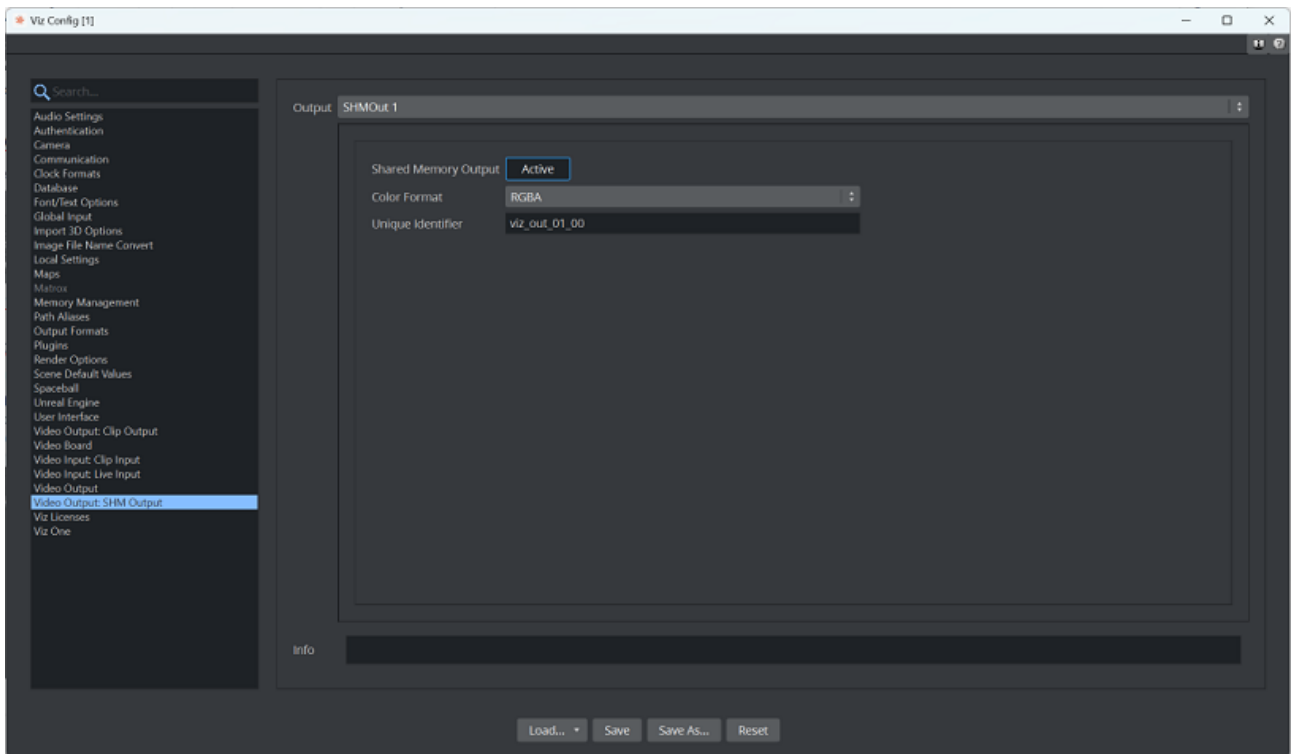


It's also possible to configure VizOutput settings for Channel 1 and Channel 2:

- **VizOutput Key:** The VizOutputKey Sync Key is used for receiving the *Viz Preview*. You must configure the desired key in the Viz Engine configuration (*default key: viz_out_01_00*).
- **Output port:** The default Viz Engine TCP communication port.
- **VizOutput Sync Key:** The value must match the **SHMSyncMasterKey** Viz Engine config setting (*default key: viz_engine_SHMsync*).

To have a working preview, you must

1. Install Viz Engine as a video machine even if you do not have video hardware installed on your system.
2. Configure VizOutput settings in Viz Arc, in the **Video Settings** section.
3. Configure your Viz Engine to also output through Shared Memory.



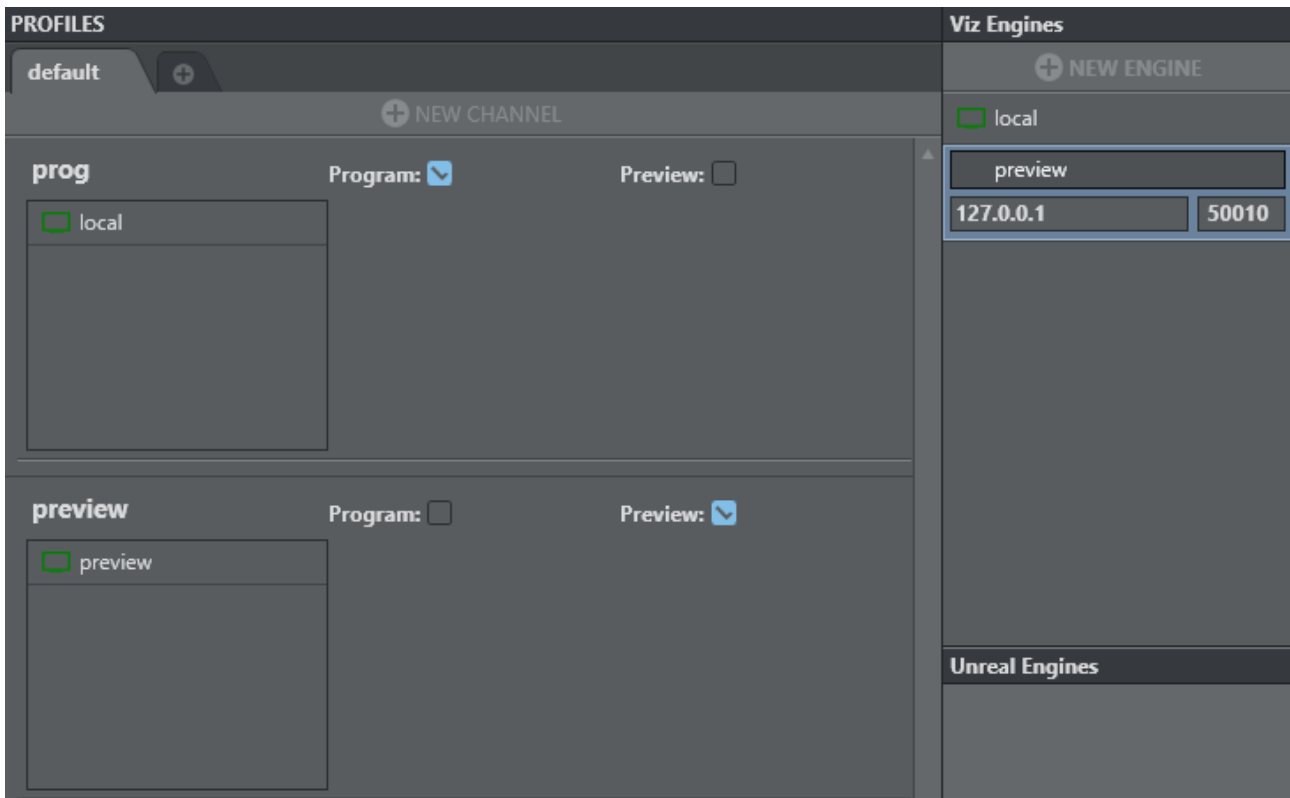
Important! You must also check your [Viz Engine Configuration](#).

For more information, see [Preview Output](#).

Viz Still Preview

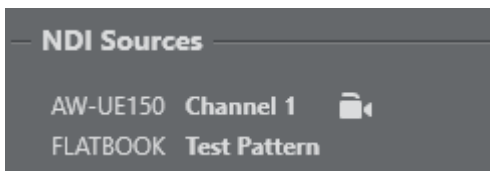
Note: This setting is intended for Viz still preview only.


To configure still preview, configure a dedicated Channel in the Profiles section and tag it as **Preview Channel**. The communication port must be configured to match the Viz Engine's still preview port, which is by default `50010`. A still preview configuration example is shown below:



The still preview is used in conjunction with the [template workflow](#) and can be generated using the **Preview Selection** keyboard shortcut.

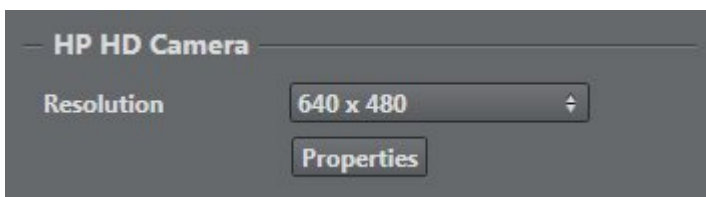
NDI



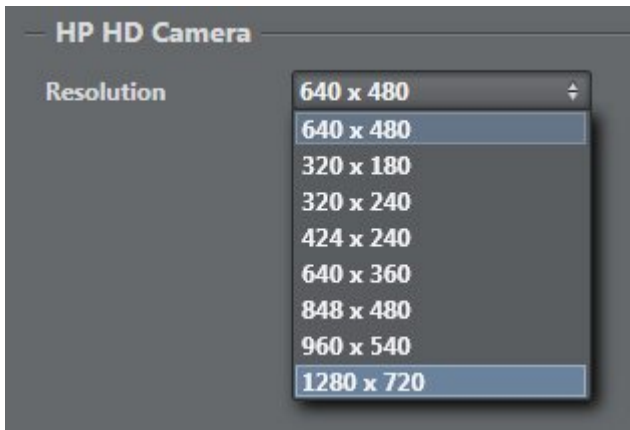
All detected NDI sources are listed here. The  icon indicates that the source is a controllable PTZ source.

Direct Show

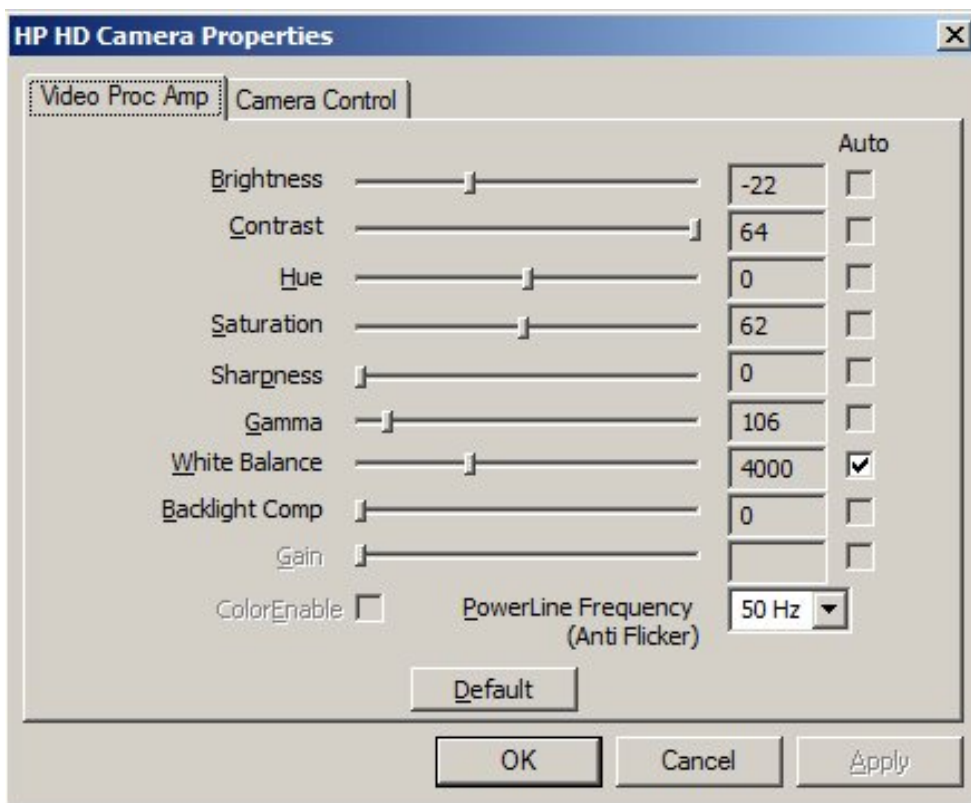
Viz Arc displays all deleted DirectShow video sources. An example of configuring an external device (HP HD Camera) connected to Viz Arc is shown below:



Having selected HP HD Camera, select the resolution required:

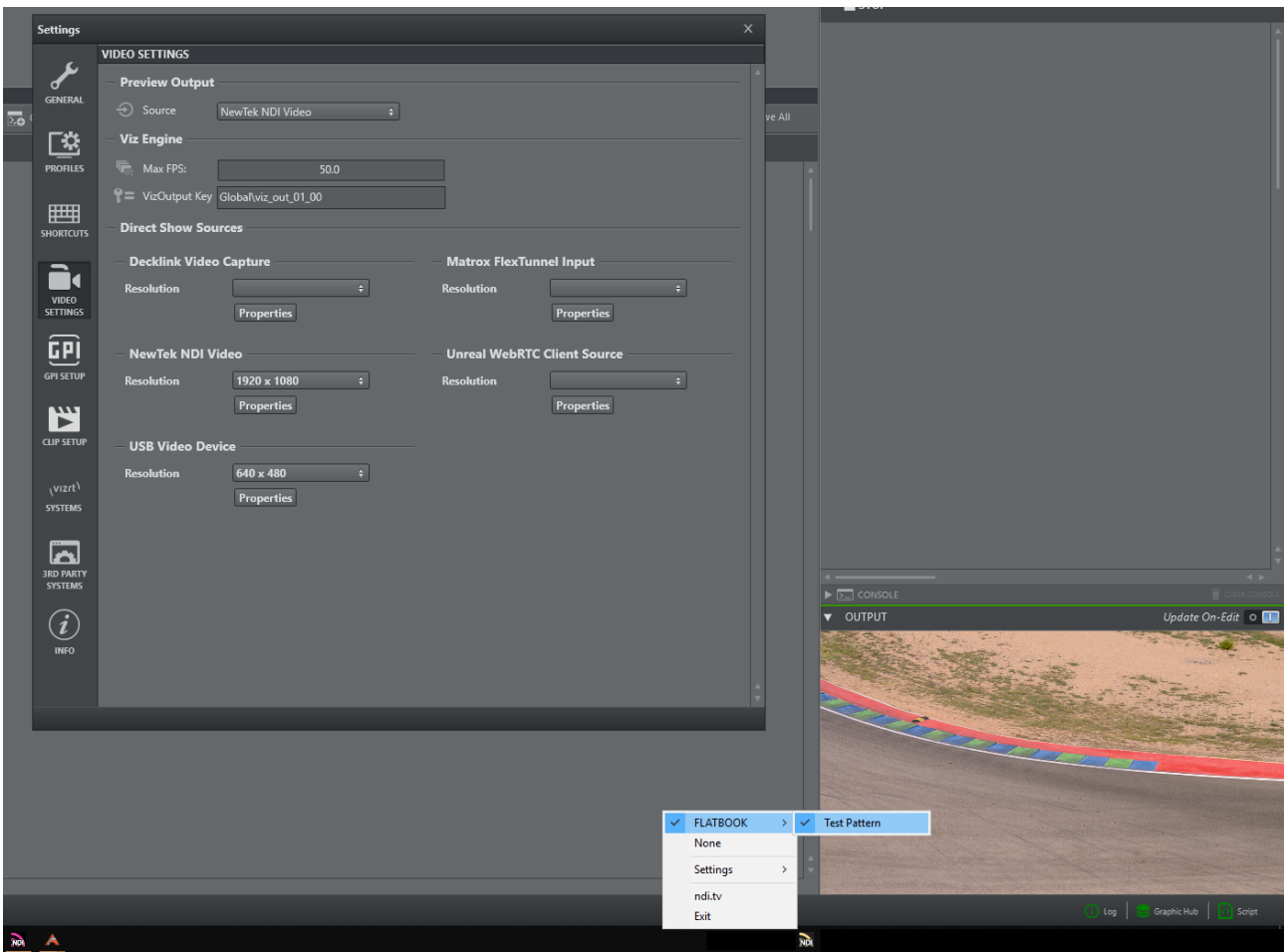


Press the **Properties** button. A popup window appears where you can customize output properties.



NDI through DirectShow

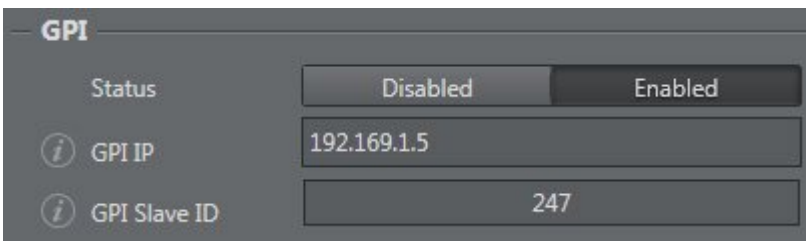
DirectShow sources lets you visualize any NDI stream within the system. The [NDI tools](#) must be installed on the system and the NDI Virtual Input needs to run. From there, select the desired NDI stream. In Viz Arc, select the **NewTek NDI Video** filter. No further configuration is required on the source filter itself.



4.6 GPI Setup

4.6.1 GPI

It's possible to trigger actions using GPI in Viz Arc. Configure settings related to GPI using the menu below:

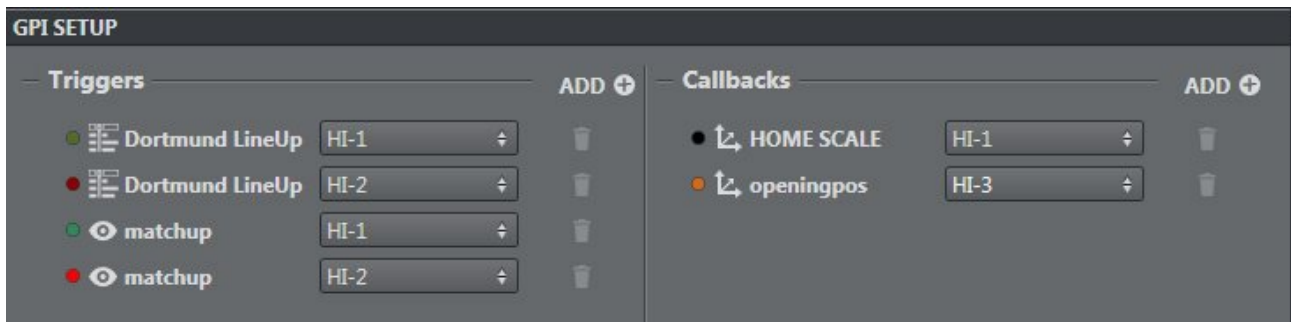


- **GPI IP:** IP port that communicates with GPI.
- **GPI Slave ID:** Defines the Slave ID of the Ethernet box.

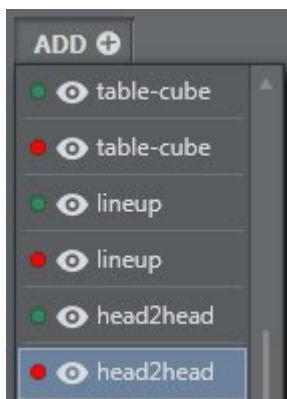
Note: Currently, only the Sealevel Seal/O-410E board is supported.

4.6.2 Triggers

All action boxes set to **Trigger** and/or **Callback**, and their related channels (*HI-0/HI-15, LO-0/LO-15*) are shown in the menu below:



It's possible to add every action box set in the main area as **Trigger** and/or **Callback**:

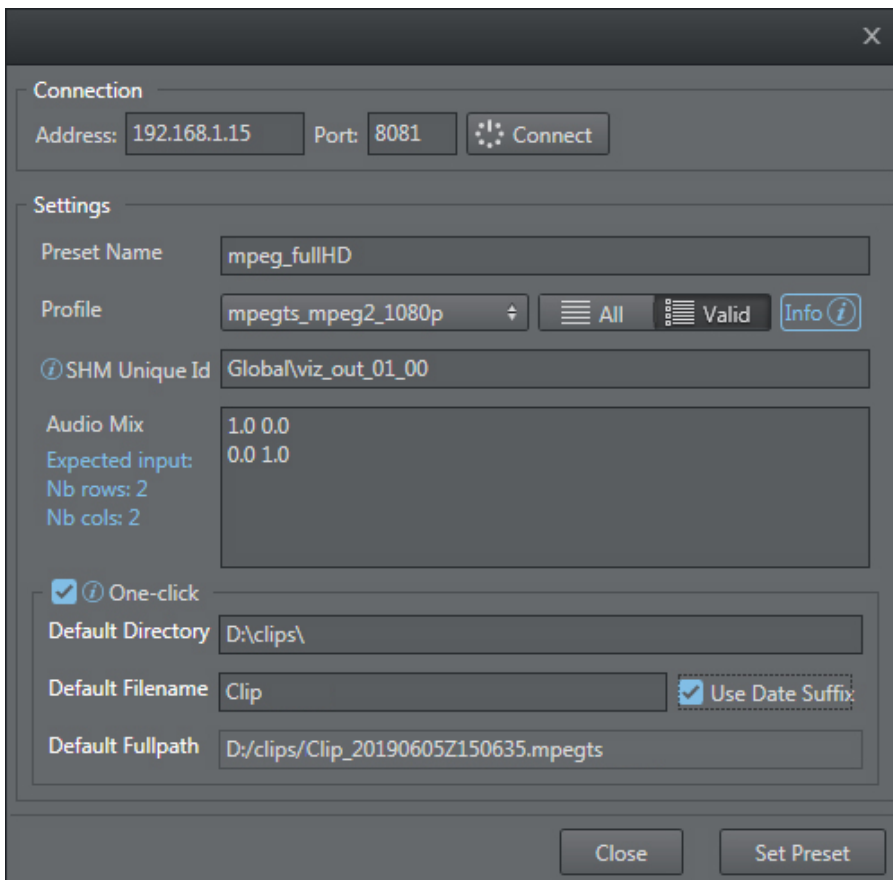


To remove an element, simply click the **trash icon** next to the element you want to delete.

4.7 Clip Setup

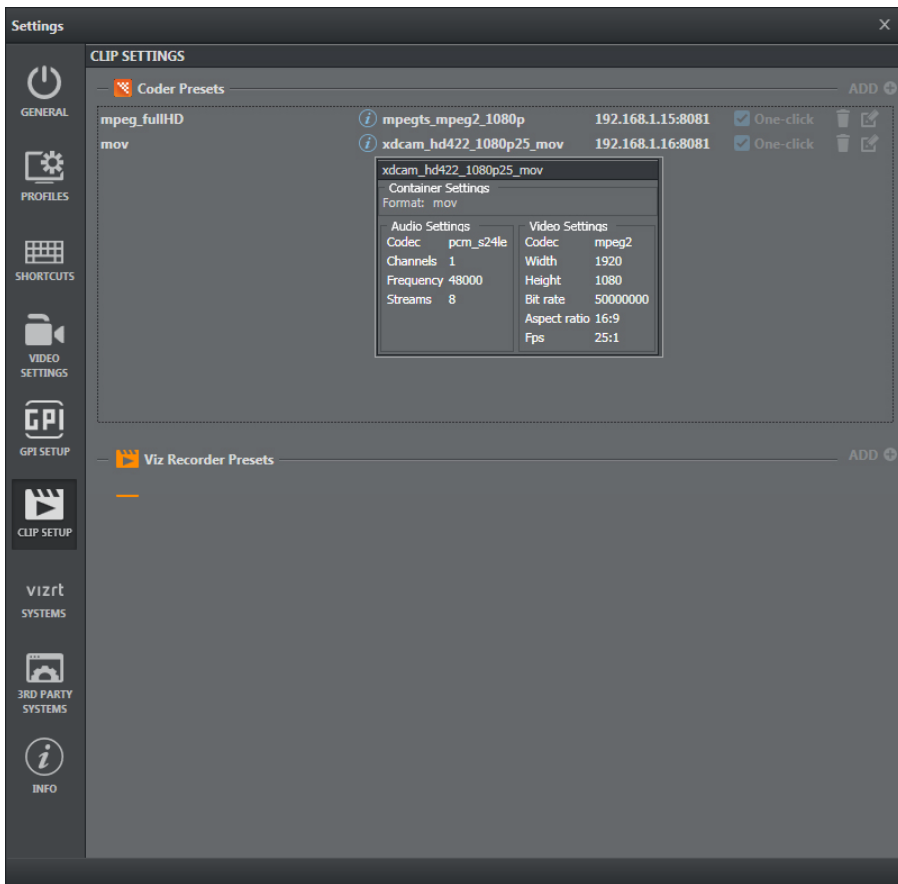
This menu lets you set up presets for Viz Coder or Clip out channel. To add a preset, click the **ADD** **ADD +** icon:

4.7.1 Coder Preset

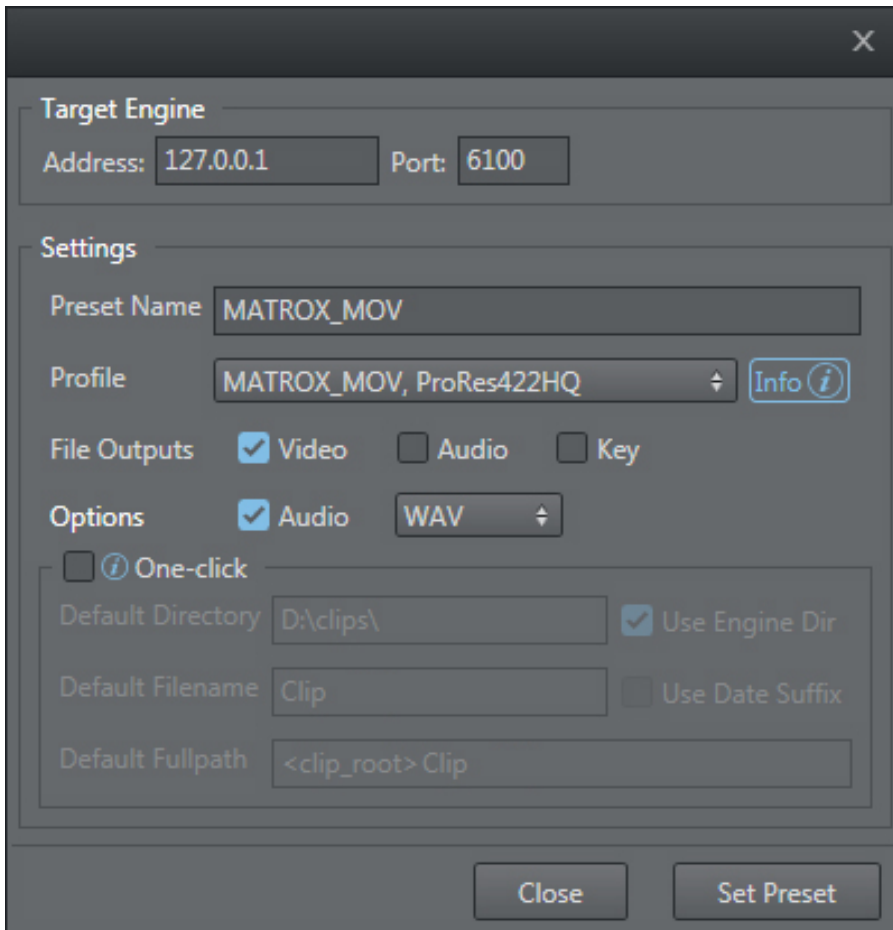


- To create a valid connection to retrieve preset profiles, insert the correct address and port and press the **Connect** button.
- Once connected, you can use settings to:
 - Insert a custom preset name (if empty, once you select a profile it automatically sets the default name).
 - Select an available profile from a list.
 - Set the SHM unique ID (the same one you configured in Viz Engine). Audio mix contains values that determine the audio settings. The expected preset values are shown on the left.
- A one-click option is available that lets you record files without inserting default settings each time (for example, directory, filename and full path name).

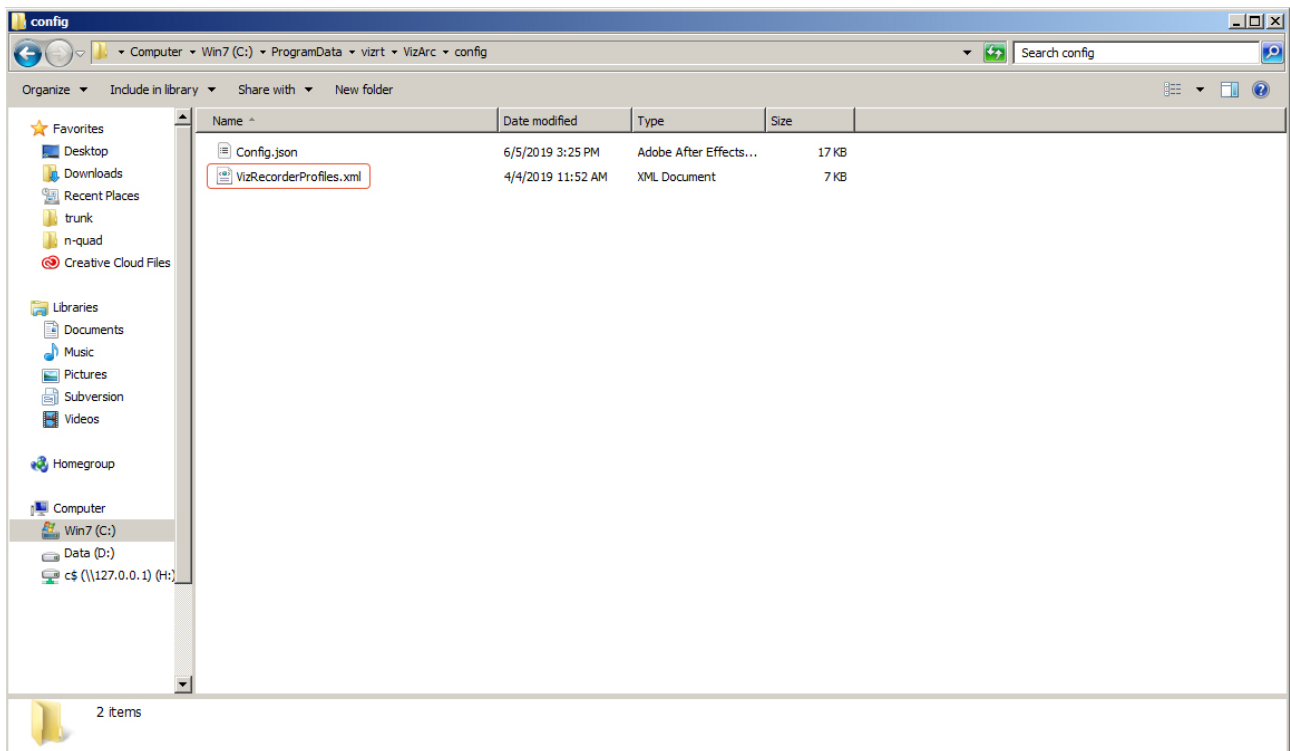
Once created, the new preset is added to the coder preset list. You can remove or modify preset parameters by pressing the respective icon next to the item.



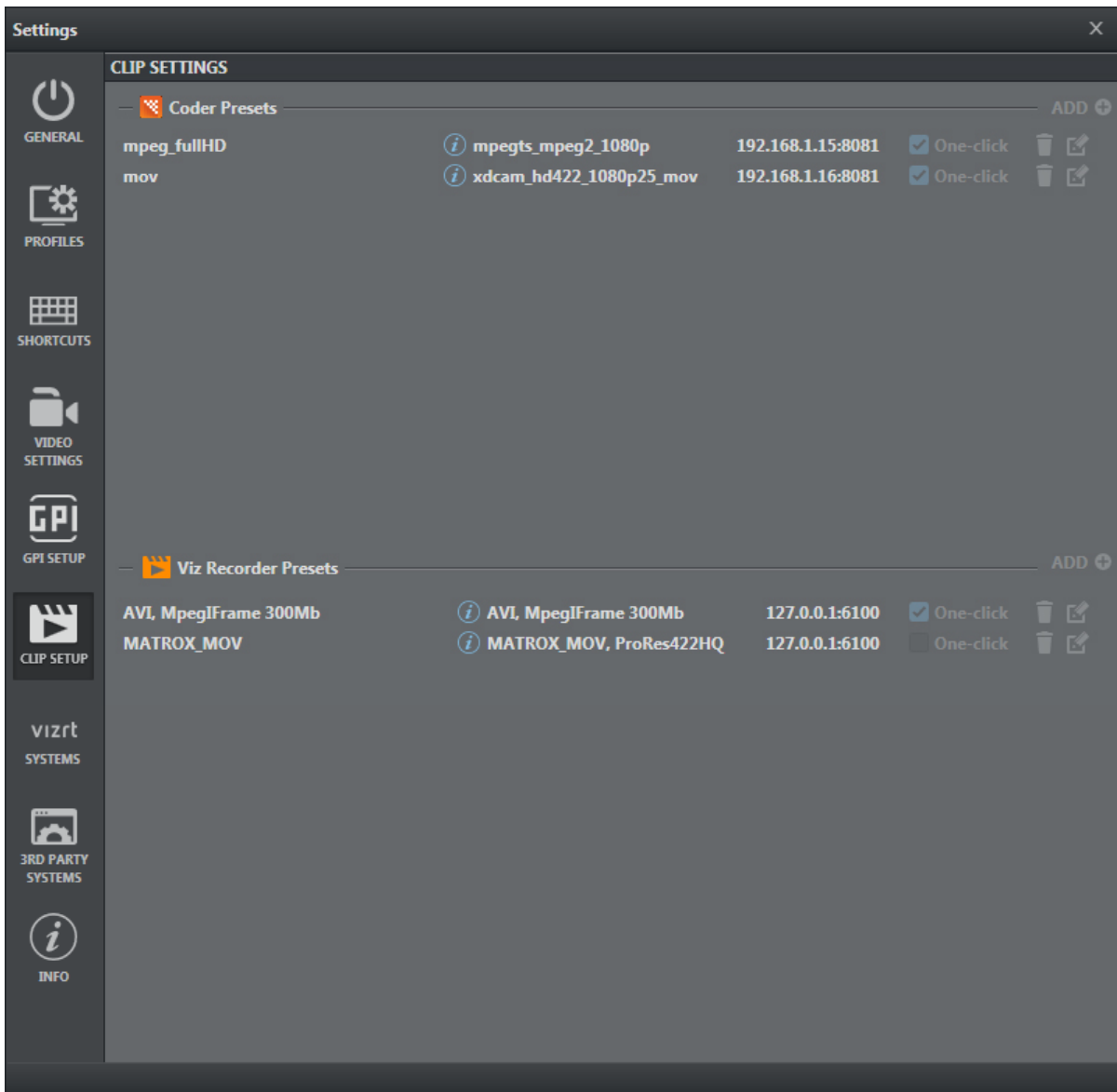
4.7.2 Viz Recorder Preset



- First, insert the correct address and port to retrieve the profile list.
- Once connected, use the settings menu to:
 - Insert a custom preset name (once you select a profile it automatically sets the default name).
 - Select an available profile from a list.
 - Choose the file type to export (video, audio and/or key). In the case of video export, you can also associate *.wav*, *.w64* or *.aiff* audio types.
 - A one-click option is available that lets you record files without inserting default settings each time (for example, directory, filename and full path name).

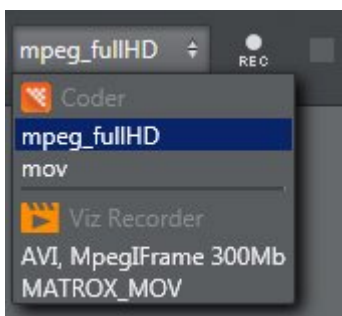


The XML file, called *VizRecorderProfiles.xml*, containing all codecs is found in a list in the *config* subfolder. Here, you can add or modify items in the list.



The newly created preset is added to the coder preset list. You can remove or modify preset parameters by pressing the respective icon next to the item.

All presets are displayed in the toolbar combo box.



See Also

- [Configuring Viz Engine](#) for more information about configuring Shared Memory.
-

4.8 Info

The Info window contains general software information:

- Viz Arc license details.
- General Software Copyright and licensing.

 **Info:** Contact your local Vizrt Support Representative or send an email to license@vizrt.com to obtain a license.

Settings
✕


GENERAL


PROFILES


SHORTCUTS


VIDEO SETTINGS


GPI SETUP


CLIP SETUP


TRACKING


SYSTEMS


3RD PARTY SYSTEMS


INFO

LICENSE INFORMATION License expires on 31/01/2023

Type: CORE Serial: 3-3695087

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APACHE 2.0

4.9 Tracking

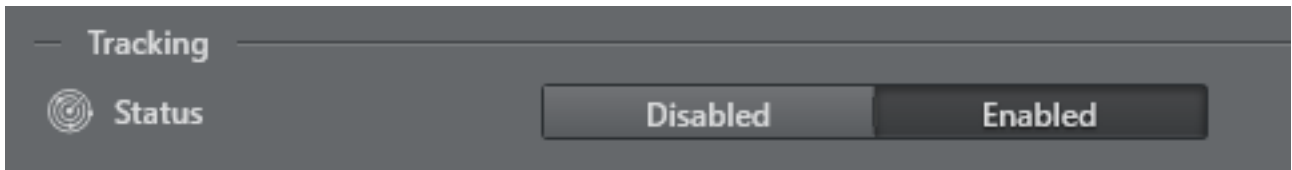
Settings [X]

TRACKING SETUP

- Tracking: Disabled Enabled
- General
 - Enabled Inputs: 1 2 3 4 5
 - Viz Engine: Engine1 *Select the VIZ Engine to use as source and where the Object Tracker is running*
 - Server Port: 10005
- SMURF Input
 - Input Key: viz_01_live1_aux *Select or modify the key that will be used to retrieve the textures*
 - Sync Key: viz_engine_SHMsync
- Delay
 - Maximum Delay [Fields]: 20
 - Texture Asset: VIDEOIN*1
- Performance
 - GPU: 0
 - Filter overlapping BB:
 - Overwrite Previous Selection: *If enabled, when you select a BB assigned to a different tracker, it will be overwritten by the current one.*
 - Cut Detection: *If enabled, when a video hard cut is detected all current trackers are lost*
- Appearance
 - Tracked Objects Alpha: 0.1
 - Show Tracked Object IDs:
 - Show Tracked Object Scores:
- Graphics
 - Pointer Offset:
 - Keep Previous Valid Offset:

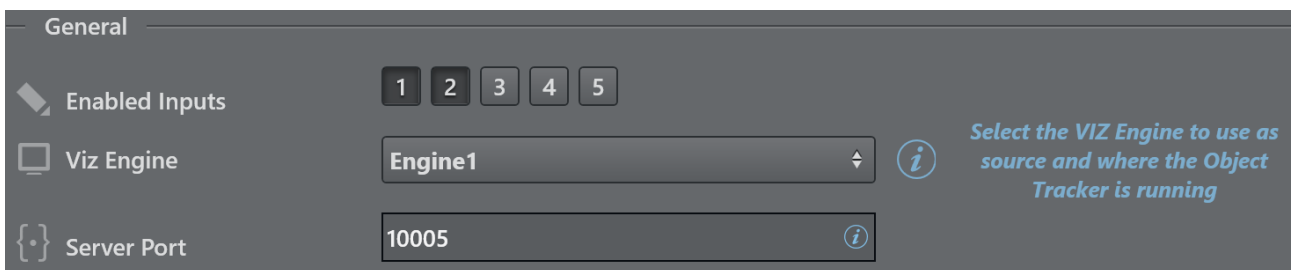
Sidebar: GENERAL, PROFILES, SHORTCUTS, VIDEO SETTINGS, GPI SETUP, CLIP SETUP, TRACKING, SYSTEMS, 3RD PARTY SYSTEMS, LICENSE INFO

4.9.1 Tracking



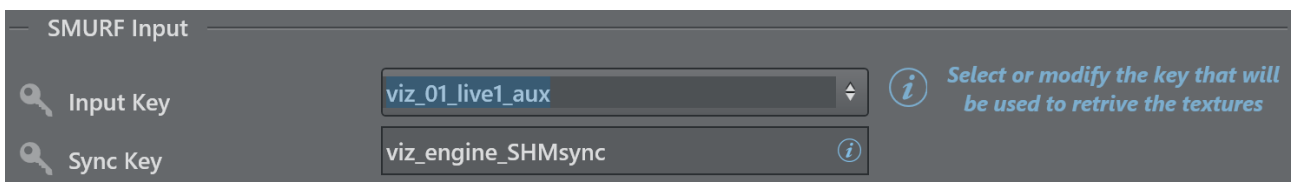
- **Status:** Enables or disables the Tracking panel.

4.9.2 General



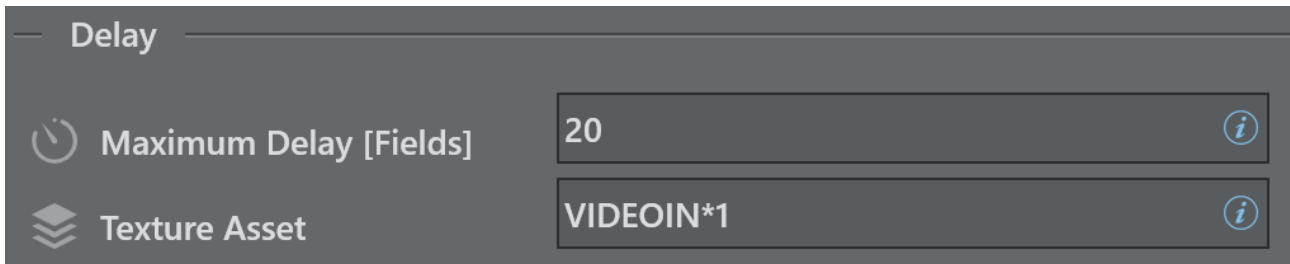
- **Enabled Inputs:** Sets the number of objects that can be tracked contemporarily.
- **Viz Engine:** Select the Viz Engine, already pre-configured in the Profiles tab, that the Object Tracker uses as source.
- **Server Port:** Sets the port where the Viz Object Tracker is listening.

4.9.3 SMURF Input



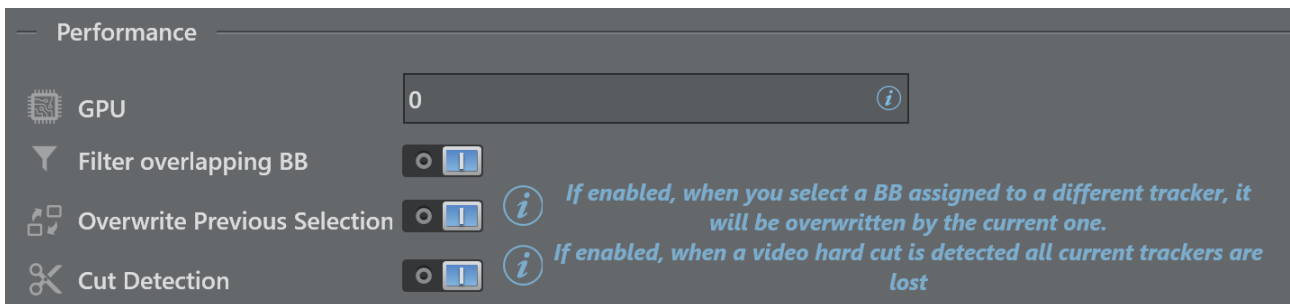
- **Input Key:** Select (from a list) or modify the key to use to retrieve the textures for the Object Tracker.
- **Sync Key:** Viz Engine's SHM master sync key. The default is `viz_engine_SHMsync`.

4.9.4 Tracking Hub



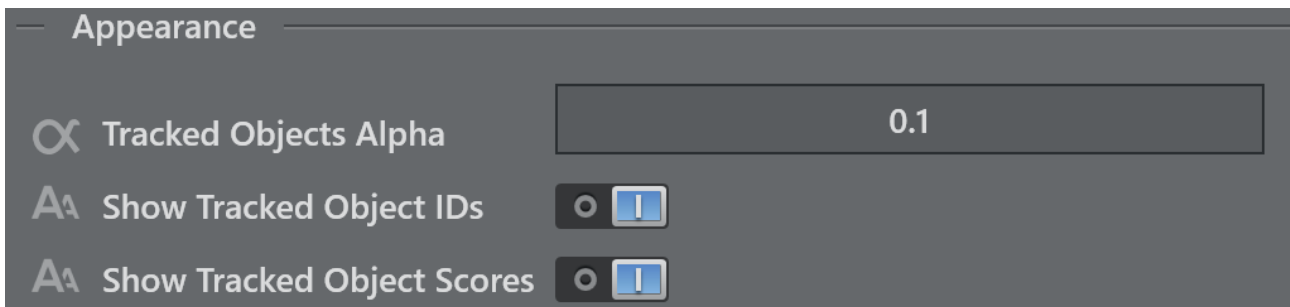
- **Maximum Delay [Fields]:** Texture delay set in the Engine, the delta fields between this value and the processing time is handled by the Object Tracker.
- **Texture Asset:** Texture to delay; this parameter is automatically filled when the Input Key is selected from the list.

4.9.5 Performance



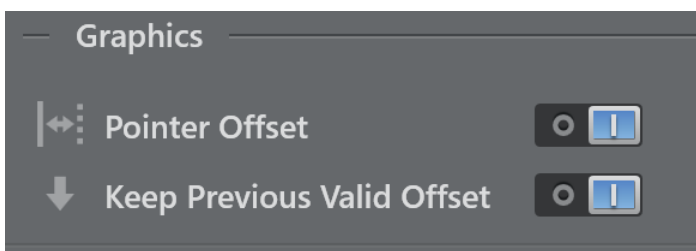
- **GPU:** Zero-based index representing GPU affinity where the Viz Object Tracker does parts of the AI computation. This applies only to multi GPU systems. **0** represents the first GPU, **1** the second etc.
- **Filter overlapping BB:** Ignores bounding boxes that overlap to a certain extent with a larger bounding box.
- **Overwrite Previous Tracking:** Overwrites the currently selected tracker when selecting a bounding box that is already assigned to a different tracker, if enabled.
- **Cut Detection:** When a hard cut is detected, all current trackers are lost.

4.9.6 Appearance



- **Tracked Objects Alpha:** Sets the transparency of the bounding boxes of the detected objects.
- **Show Tracked Objects IDs:** Hides/shows the objects IDs when the detection is running, for debug purposes.
- **Show Tracked Objects Scores:** Hides/shows the objects scores when a detection (Detection and Tracking, Face and Pose) is running, for debug purposes.

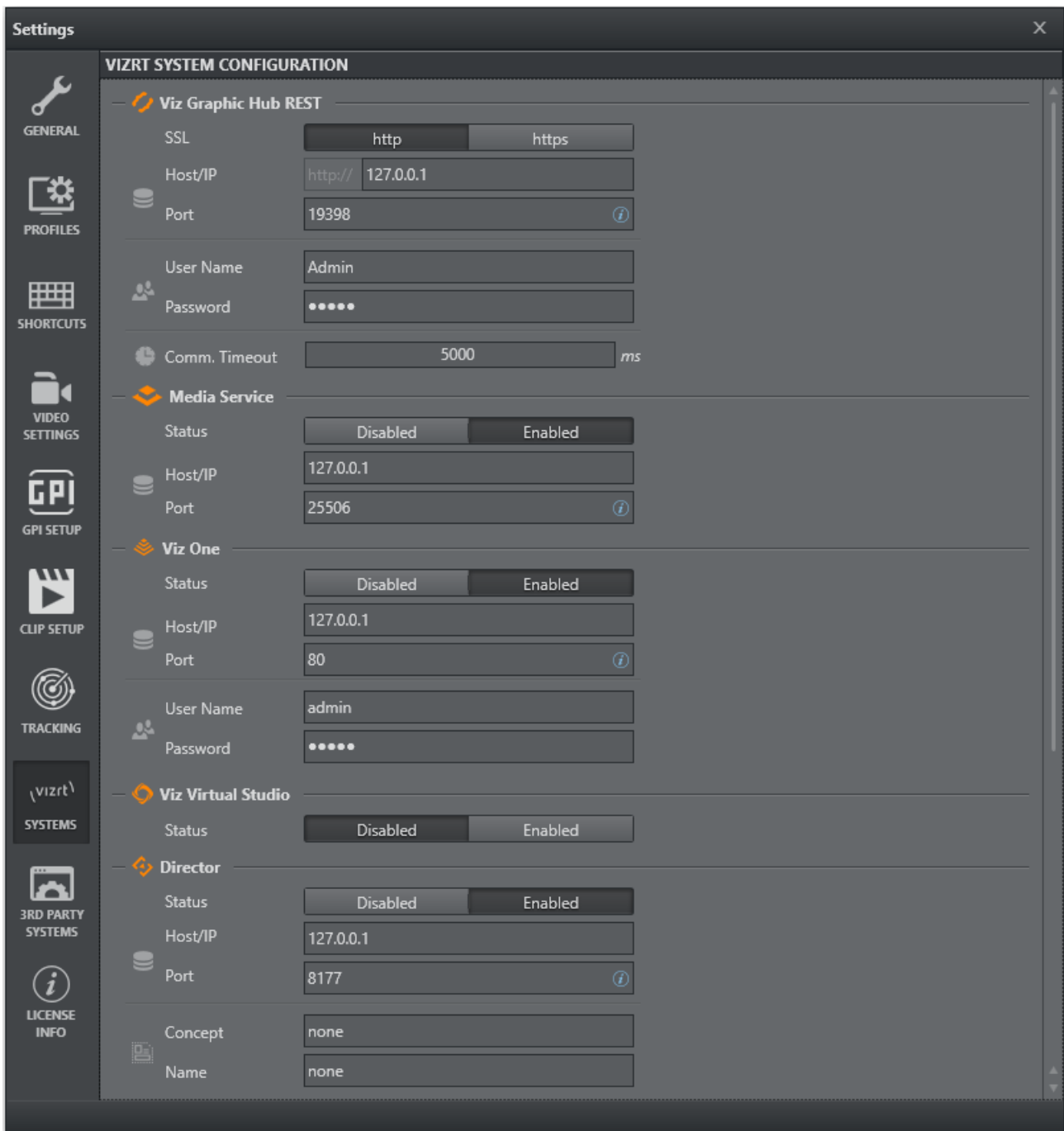
4.9.7 Graphics



- **Pointer Offset:** Enables the possibility to draw an offset to apply to the pointer.
- **Keep Previous Valid Offset:** Applies the the last valid offset each time you click on a new object when active. Otherwise, the offset you draw each time is applied.

4.10 Vizrt Systems

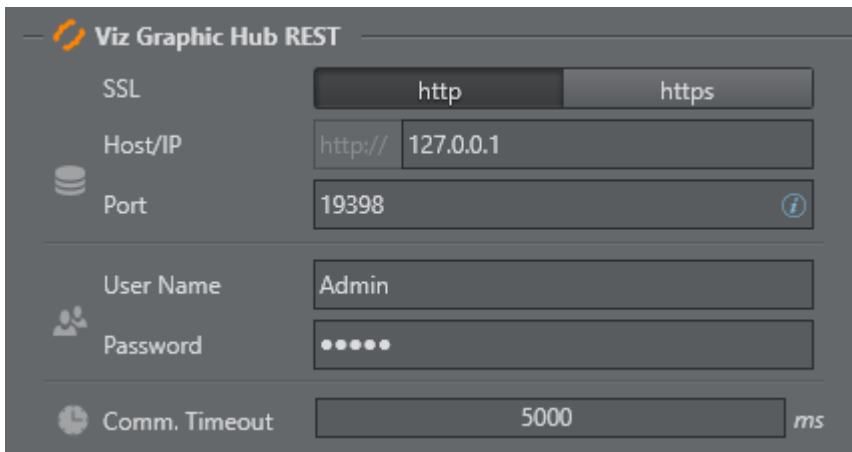
This part of the configuration groups all Vizrt related systems that connect to Viz Arc.



4.10.1 Graphic Hub REST

Viz Arc uses the Graphic Hub REST API for browsing scenes, images, merged geometries and materials.

The following settings related to Graphic Hub can be configured:



Viz Graphic Hub REST

SSL: http https

Host/IP:

Port: ⓘ

User Name:

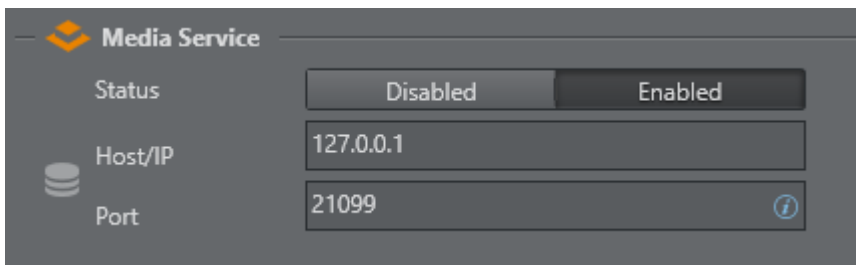
Password:

Comm. Timeout: ms

- **SSL:** Switches between HTTP or HTTPS connection to the Graphic Hub REST.
- **Host/IP:** Host or IP of the Graphic Hub REST service.
- **Port:** Connection port to be utilized. The default port is 19398 .
- **UserName & Password:** Login credentials for Graphic Hub.
- **Comm. Timeout:** The timeout in milliseconds for a REST request.

4.10.2 Media Service

Viz Arc uses Media Service for asset browsing images and clips. Media Service can also be used to record the Engine's output.



Media Service

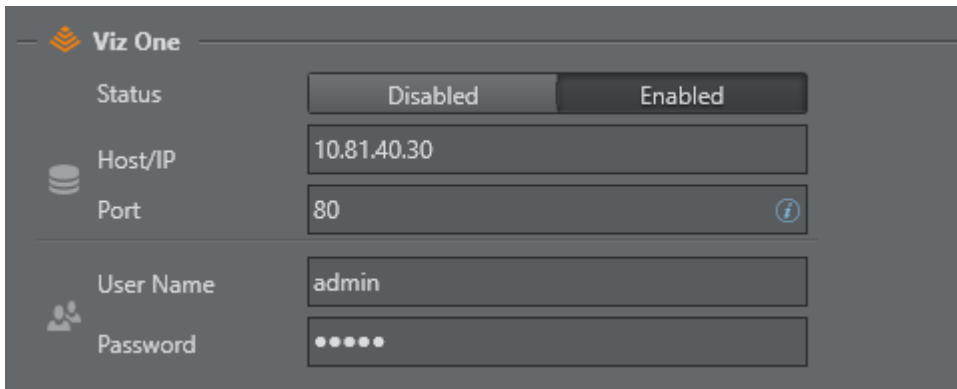
Status: Disabled Enabled

Host/IP:

Port: ⓘ

- **Status:** Enables or disables the Media Service.
- **Host/IP:** Host or IP where Media Service is installed.
- **Port:** Connection port to be utilized. The default port is 21099 .

4.10.3 Viz One



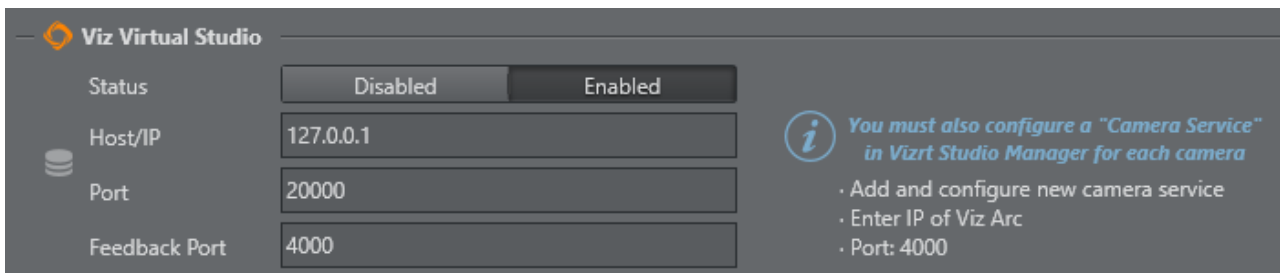
- **Host/IP:** Host or IP where Viz One server is installed.
- **Port:** Connection port to be utilized. The default port is 80.
- **User Name & Password:** Login credentials for Viz One (default admin/admin).

The Viz One server can be used as source of image assets for **Image Actions** or as source of video clips for the **Clip Action**.

4.10.4 Viz Virtual Studio

When working with tracked cameras in a Virtual Studio environment, Viz Arc communicates with Tracking Hub or VizIO to send and receive camera tracking information.

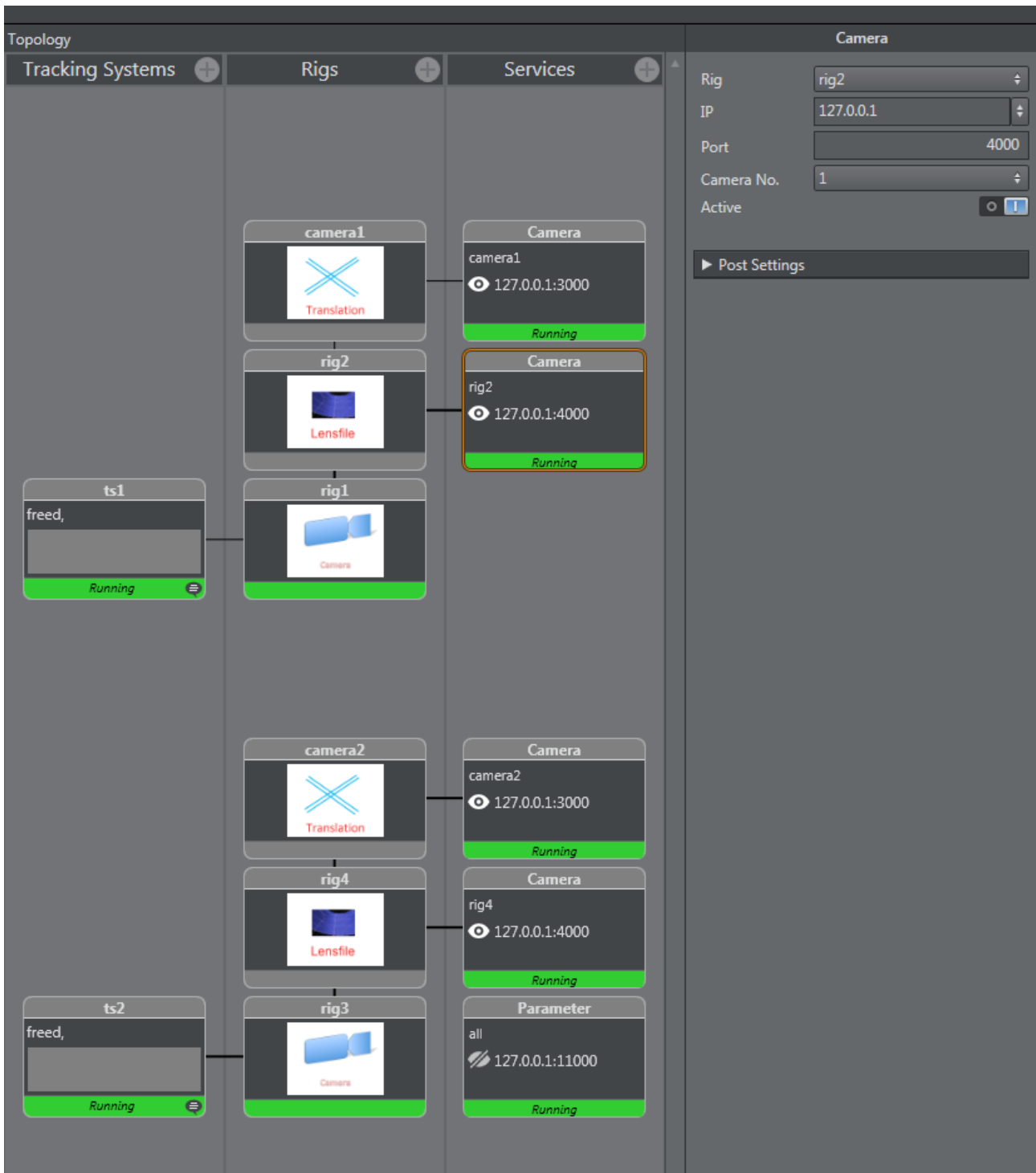
In order to receive tracking information, you must select the correct **Tracking Source**. The following settings related to Viz Virtual Studio can be configured:



- **Status:** Enables or disables the Virtual Studio.
- **Host/IP:** Host or IP of the Tracking Hub.
- **Port:** Connection port to be utilized. The default port for Tracking Hub is 2000.
- **Feedback Port:** The port on which Viz Arc listens for camera updates from the Tracking Hub.

Important! When working with Tracking Hub, you must configure a **Camera Service** in Viz Studio Manager for each camera:

- Add and configure a new camera service.
- Enter IP of Viz Arc.
- Port must match the port number specified in Feedback Port (default 4000).

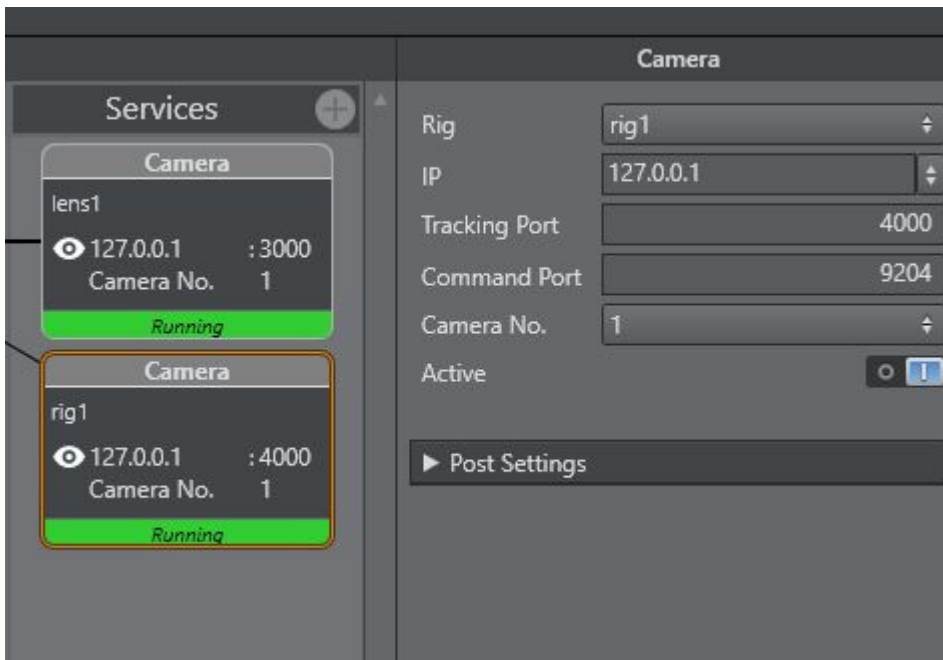


Configuring Rigs to Viz Engine and Viz Arc

In Tracking Hub, a parent translation rig cameraX (where X is the number of the tracked camera) must be created. This rig must be sent to the Viz Engine. The rig below, which contains the lens information, must be sent to Viz Arc on the port specified in **Feedback Port** (default 4000).

Note: The configuration above makes it possible to move the camera on the maps section. Viz Arc sends the camera position to the translation rig cameraX when moving the camera along the map. This kind of setup is NOT mandatory and depends on the workflow.

4.10.5 TCP Command Port



Tracking Hub might output some connection errors on the console when adding the **Camera Service** for Viz Arc. To remove those error messages, configure the **Command Port** to match the configured TCP communication port (default `9204`).

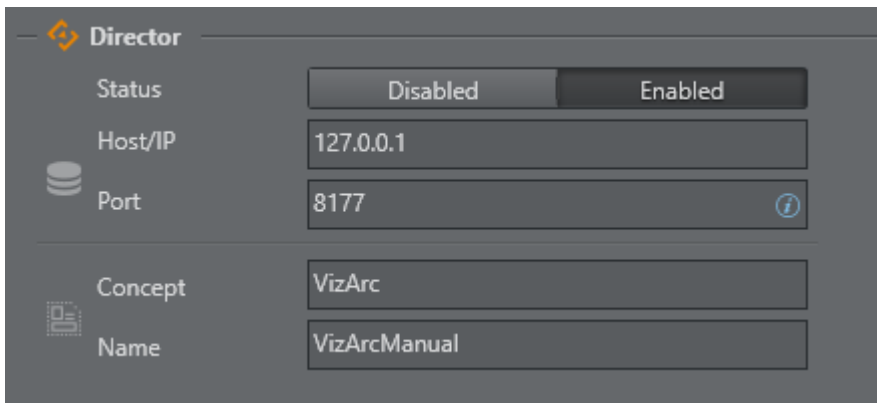
4.10.6 Director

Viz Arc can be connected to Viz Pilot, which is a program used to send graphics On Air to Viz Engine.

Note: These settings are related to Pilot Data Server, an application that acts as a server for accessing the Director database and other services.

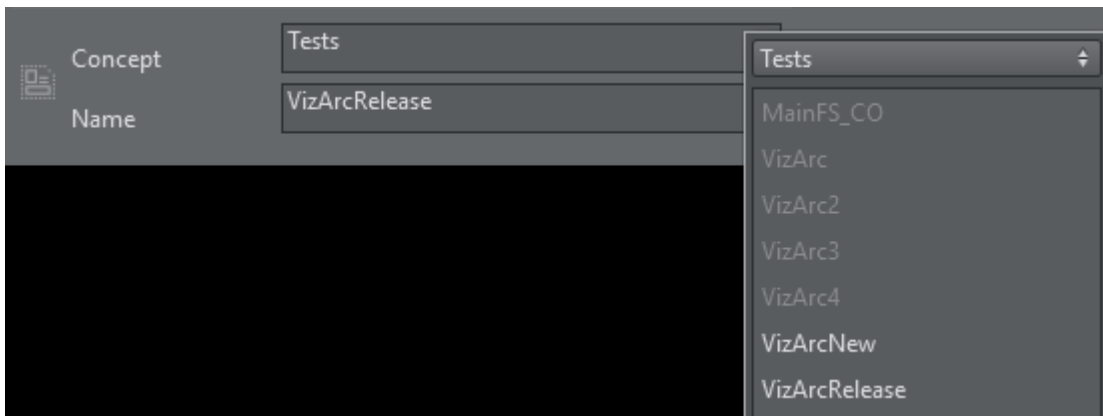
For more information about Viz Pilot, see the [Viz Pilot User Guide](#).

The following settings related to Pilot Data Server can be configured in the menu below:



- **Host/IP:** Host or IP of Pilot Data Server.
- **Port:** The default port is 8177 .

It's also possible to select the **Concept** and the template using the edit icon:

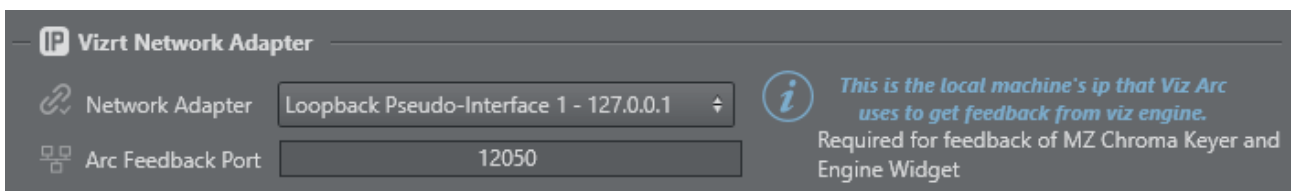


The following must be installed in order to use the interaction with Viz Director:

- [Viz Arc REST Service](#)
- [Viz Pilot Data Server](#)

Vizrt Network Adapter

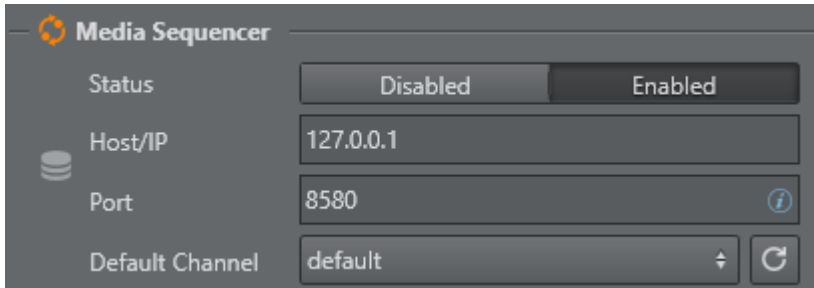
The selected Network Adapter is used to listen to feedback from the Viz Engines. This feedback is used to get information about chroma key settings and Engine status used in the Engine Status Widget.



- **Network Adapter:** The network adapter to listen on. Make sure you select the network adapter the Vizrt network is configured on.
- **Arc Feedback Port:** The Port on which Viz Arc listens for UDP feedback from the Viz Engines.

Media Sequencer

Configure the Media Sequencer to use MSE actions to **take/continue/take out** Viz Trio pages using MSE's REST service.



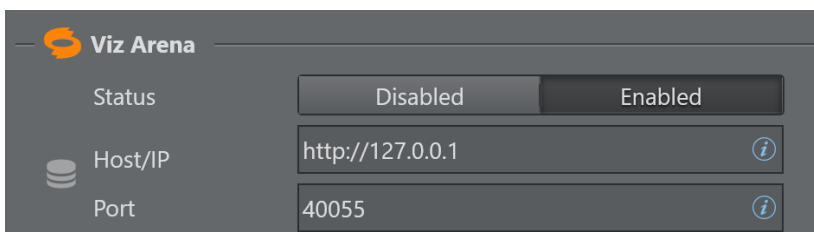
Viz Arc uses Media Sequencer (MSE) to connect to Viz Engine. Through MSE you can also retrieve saved pages in [Viz Trio](#) using the Media Sequencer REST API and import them directly into Viz Arc for execution.

The following settings related to MSE can be configured in the menu above:

- **Host/IP:** Host or IP of MSE.
- **Port:** The default port of the MSE REST service is `8580`.
- **Default Channel:** The default channel to be used on the creation of a MSE action. Use the refresh button to re-fetch a list of available output channels. The selected channel is used as default output channel when a MSE action is created.

Viz Arena

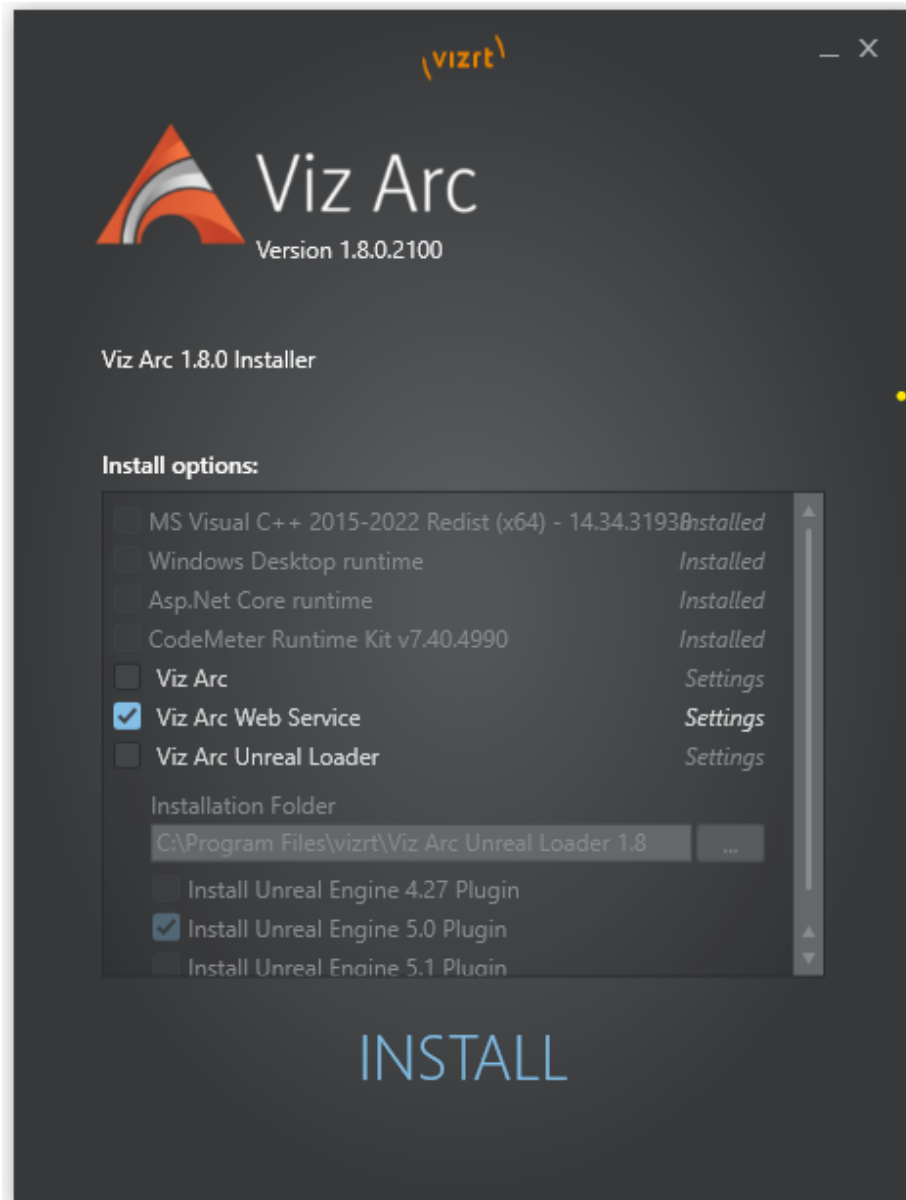
Configure the Viz Arena server for operating Viz Arena through Viz Arc.



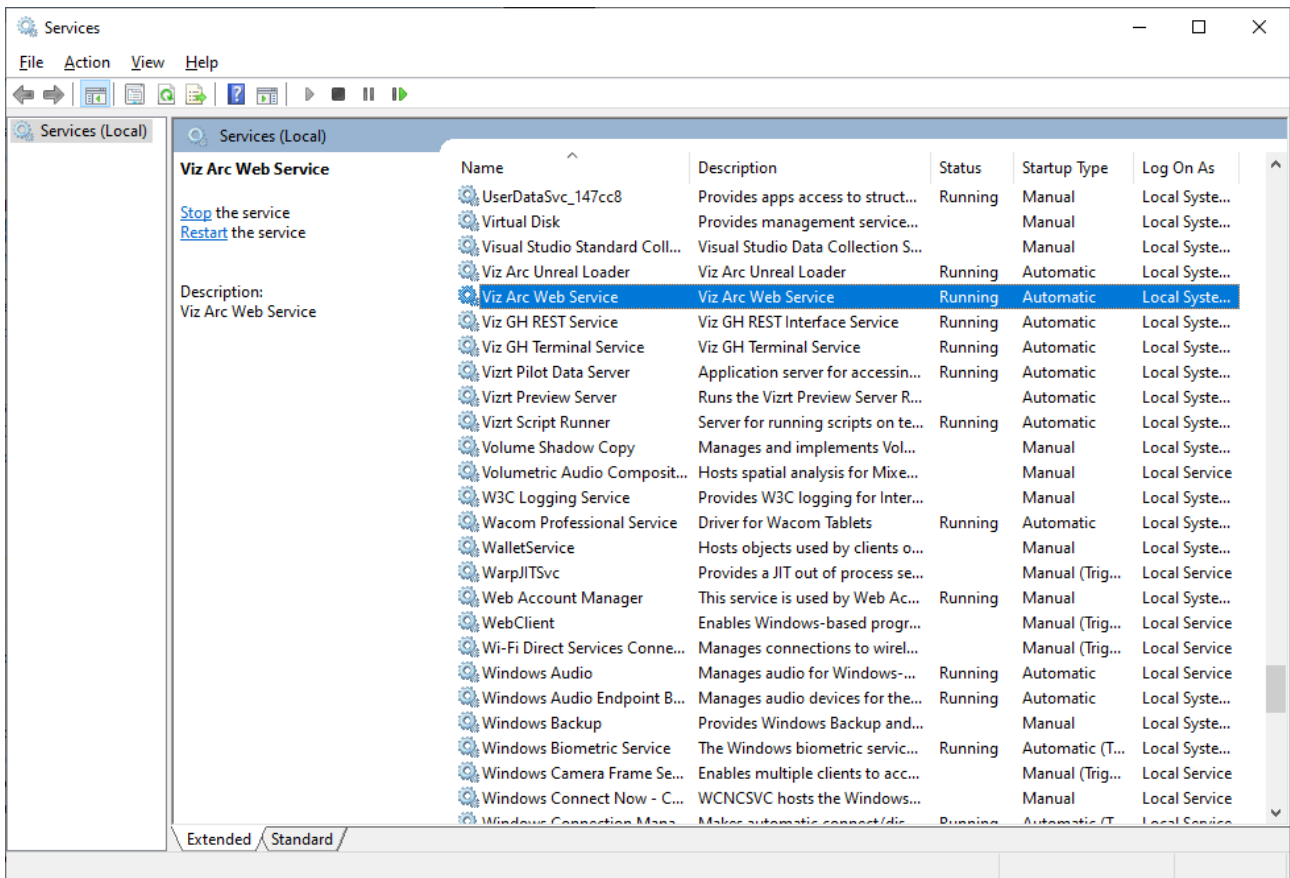
- **Status:** Enables or disables the Viz Arena integration.
- **Host/IP:** Host or IP where Viz Arena server is running.
- **Port:** Connection port to be utilized. The default port is `40055`.

Viz Arc REST Service

Install the Viz Arc REST service by checking the **Viz Arc Web Service** option in the bundle installer.

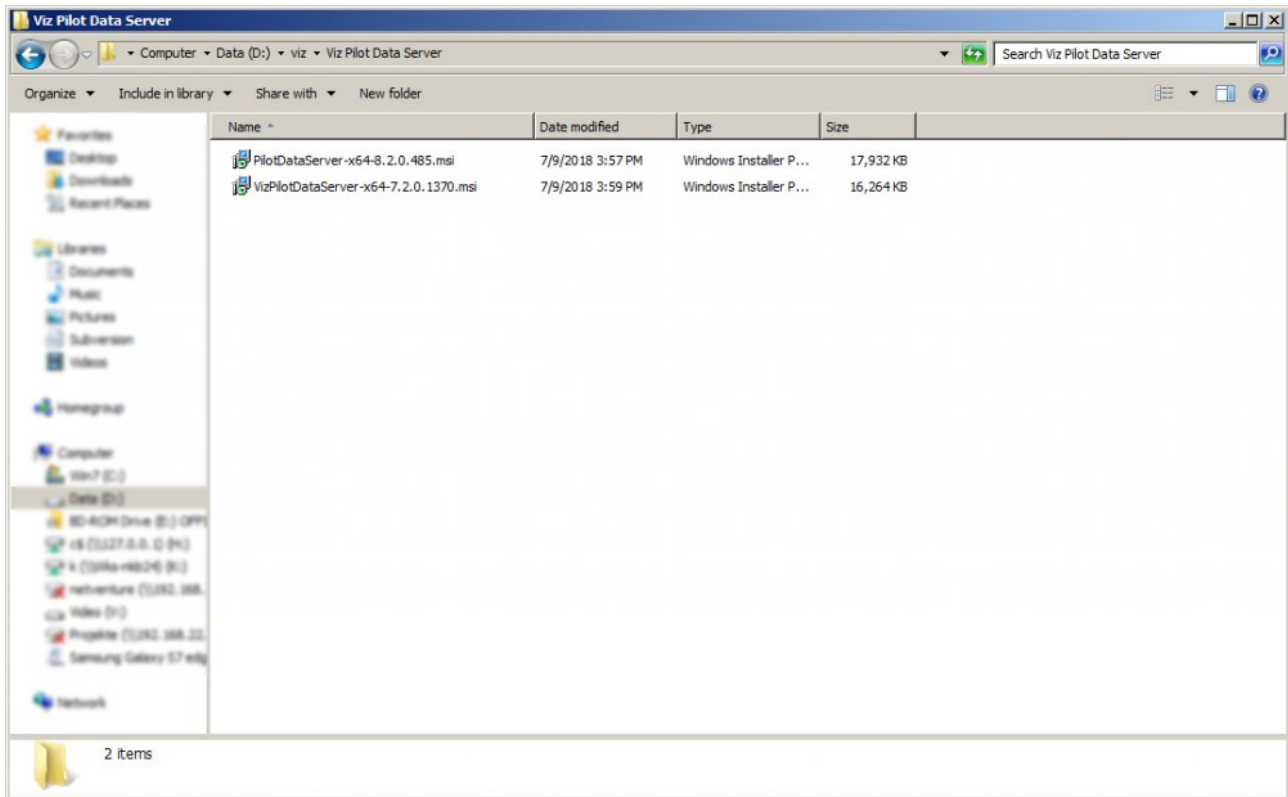


Once installed, Viz Arc Web Service, you can check if the service is running:




License: The Viz Arc Web Service requires the **Viz Arc Rest** license to be in place, otherwise the service will not start.


Viz Pilot Data Server




Open the Pilot Data Server installer and follow the instructions.

When you have finished installation, you can test if the server is up and running by entering the IP and port (default is `8177`) in the browser's address bar. You should see this page:


Documentation center Vizrt.com  Pilot Data Server

 Service Template feed Data element feed Settings Examples Documentation

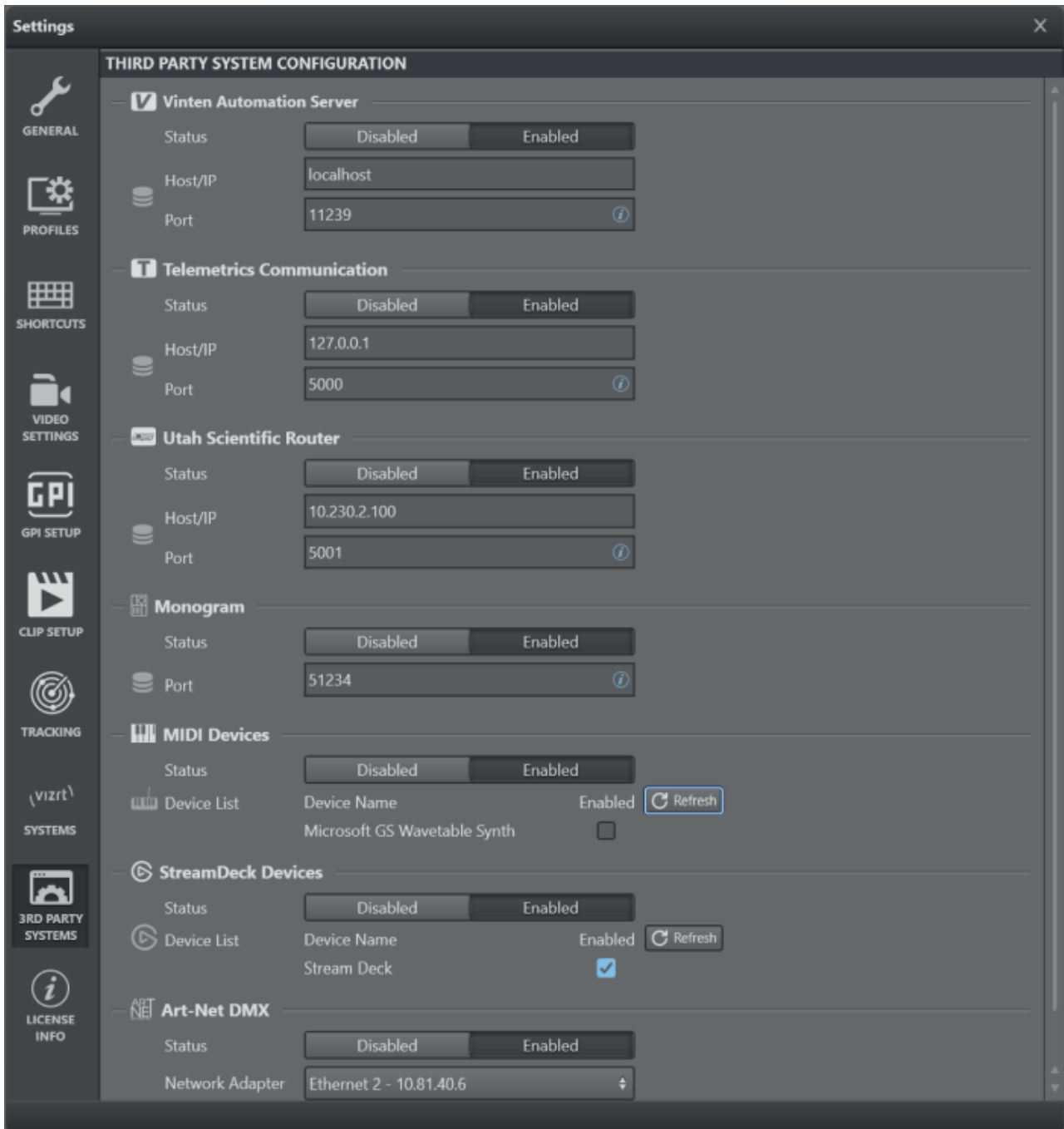
 Pilot Data Server

8.2.0.485

About
REST based service that provides feeds with templates and data elements, and access to the Viz Pilot settings stored in the database.
Data Source=<http://localhost:19398/pilot/> User Id=Guest

Third party component credits. www.vizrt.com Copyright © 2017 Vizrt AG. All rights reserved. 

4.11 Third Party Systems



4.11.1 Vinten Automation Server

Viz Arc can be connected to a Vinten Automation Server. Vinten is a supplier of manual and robotic camera support systems.

Configure settings related to Vinten using the menu below:

Vinten Automation Server

Status: Disabled | **Enabled**

Host/IP: localhost

Port: 11239 ⓘ

- **Status:** Enables or disables the server.
- **Host/IP:** Host or IP of where the Vinten server is installed.
- **Port:** The default port is 11239 .

4.11.2 Telemetry Automation Server

Viz Arc can be connected to a Telemetry Automation Server.

Configure settings related to Telemetry using the menu below:

Telemetry Communication

Status: Disabled | **Enabled**

Host/IP: 127.0.0.1

Port: 5000 ⓘ

- **Status:** Enables or disables the server.
- **Host/IP:** Host or IP of where the Telemetry server is installed.
- **Port:** The default port is 5000 .

4.11.3 Utah Scientific Router

Viz Arc can connect to a Utah Scientific Video Router.

Configure settings related to the Utah router using the menu below:

Utah Scientific Router

Status: Disabled | **Enabled**

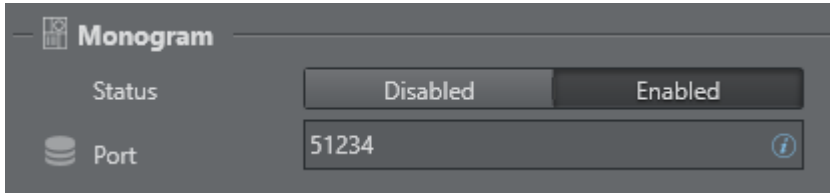
Host/IP: 10.230.2.100

Port: 5001 ⓘ

- **Status:** Enables or disables the router.
- **Host/IP:** Host or IP of where the Utah router is installed.
- **Port:** The default port is 5001 .

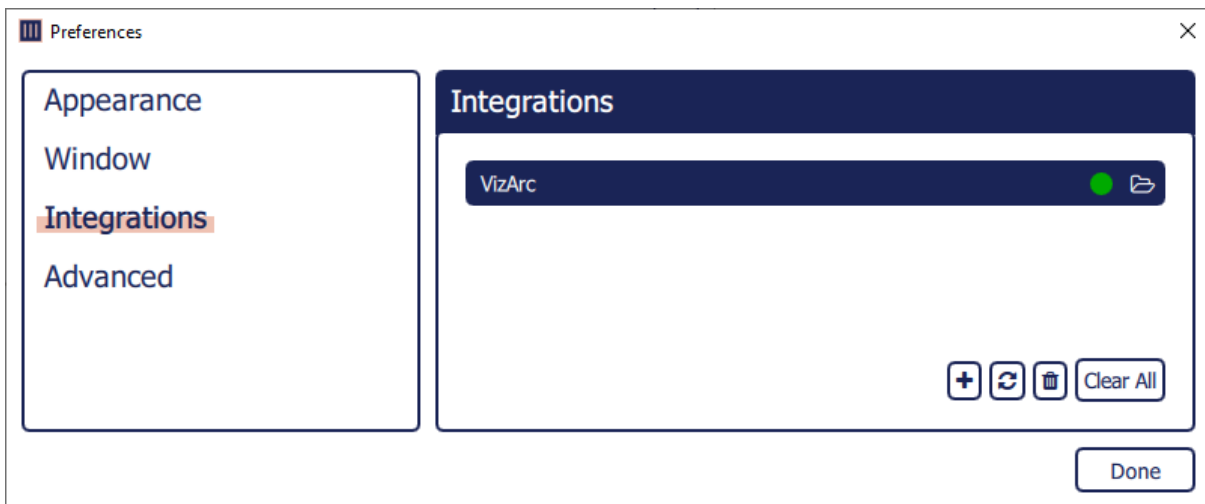
4.11.4 Monogram

Viz Arc supports **monogram** consoles.

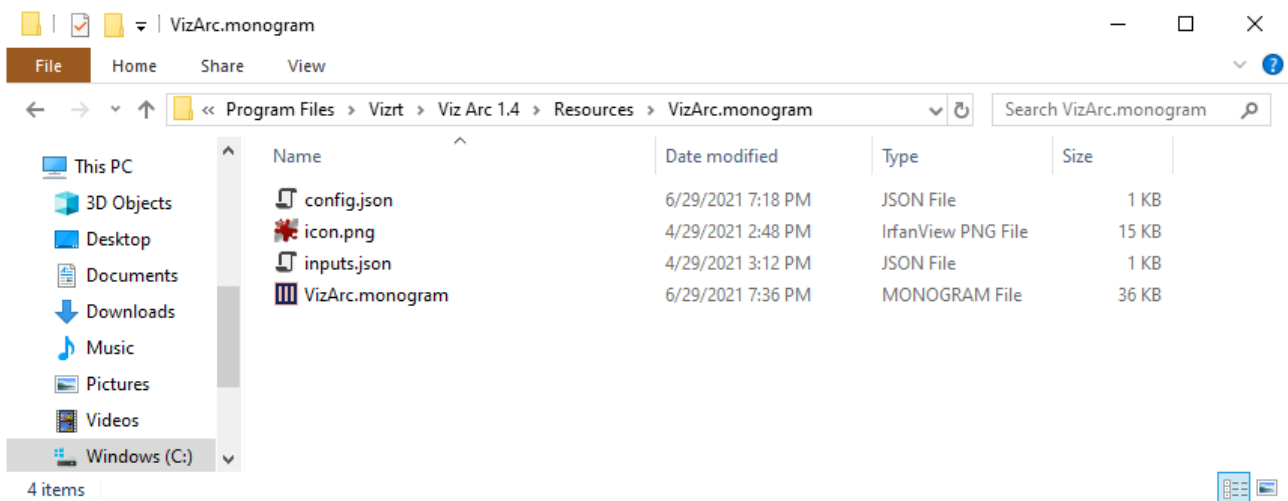


- **Status:** Enables or disables the console.
- **Port:** Sets the UDP port to listen for device input.

To configure monogram to work with Viz Arc, go to **Monogram Creator > Preferences** and add the Viz Arc integration.



A predefined integration can be found in the Viz Arc program-data folder under **Resources/VizArc.monogram**.



In the *config.json* file, the **port** can be changed to something else than the `51234` default port.

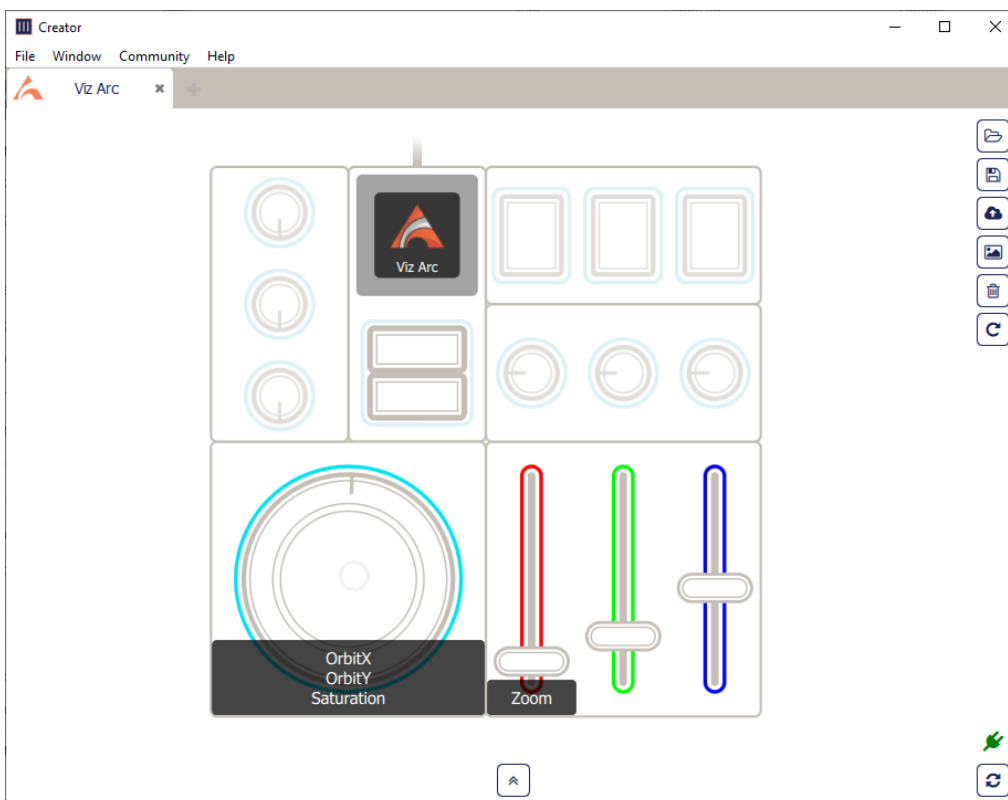
```

config.json

{
  "name": "VizArc",
  "id": "vizrt.VizArc",
  "exe": [ "VizArc.exe" ],
  "connection": [
    {
      "name": "VizArcConnection",
      "type": "udp",
      "port": 51234
    }
  ]
}

```

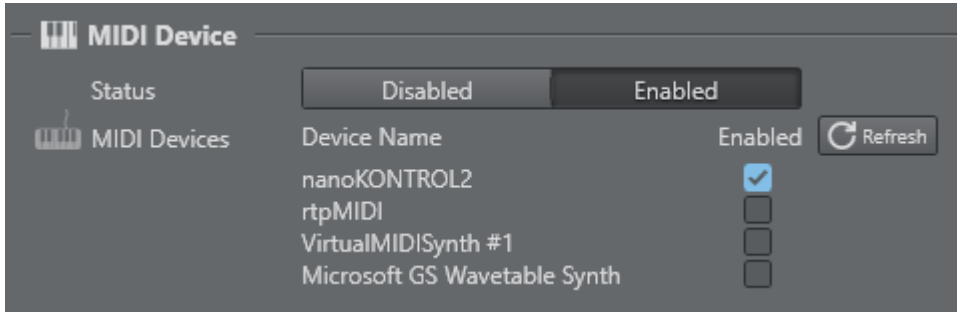
When used with an **ORBITER** module, the integration can be used to control an NDI PTZ camera using the **NDI Action**.



A sample of connected monogram modules including an **ORBITER** module.

4.11.5 MIDI Device

Viz Arc can use one or more attached MIDI devices to control certain UI elements.

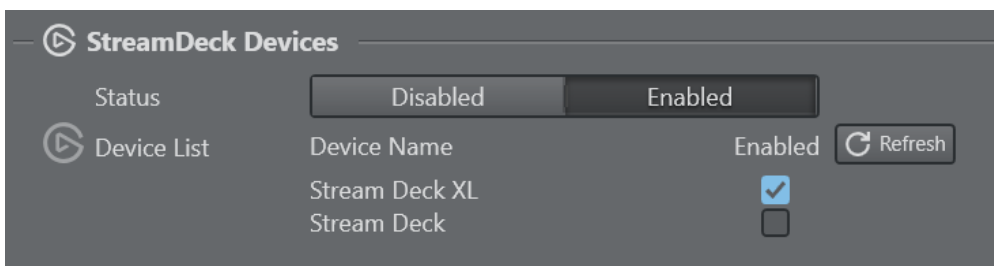


- **Status:** Enables or disables the MIDI devices.

When the configuration window is opened or the refresh button is pressed, Viz Arc scans for connected MIDI devices and displays them as a list of available devices. Check **Enabled** if you want to use a device in Viz Arc. When checked, the device can be used through scripting identified by the **Device Name**.

4.11.6 StreamDeck

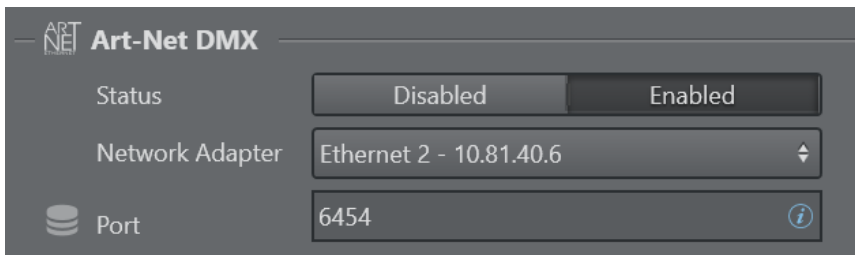
The **StreamDeck Devices** section lists all StreamDeck devices connected to the system.



- **Status:** Enables or disables StreamDeck device usage.
- **Device List:** Lists of all currently connected devices. Use the **Refresh** button to refresh the list in case a device has been connected or disconnected after starting Viz Arc. Uncheck any device you do not want to use in Viz Arc.

4.11.7 Art-Net DMX

The **Art-Net** section is used to configure the listening port and interface for Art-Net DMX lighting data.



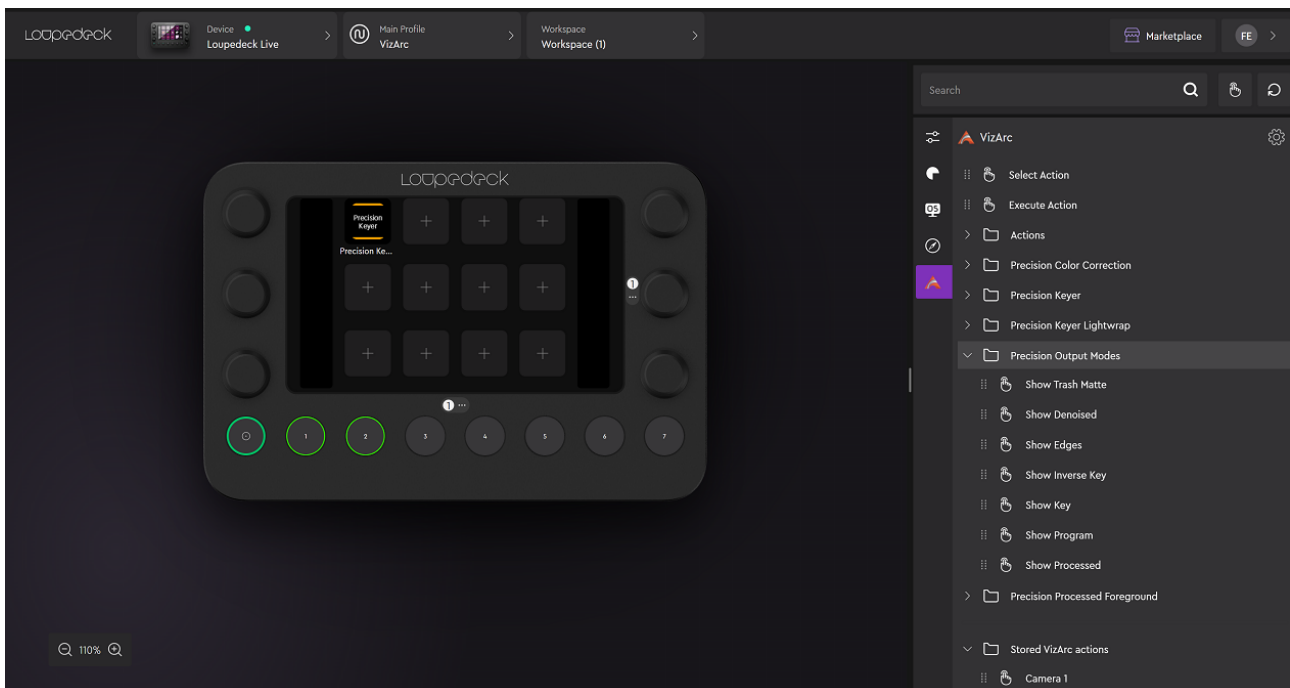
- **Status:** Enables or disables **Art-Net** listening.
- **Network Adapter:** The network interface to listen on for Art-Net messages.
- **Port:** The port to use to listen to the messages, the default port is `6454`.

See Also

- Scripting Classes for more information on how to use MIDI devices.

4.12 LoupeDeck Integration

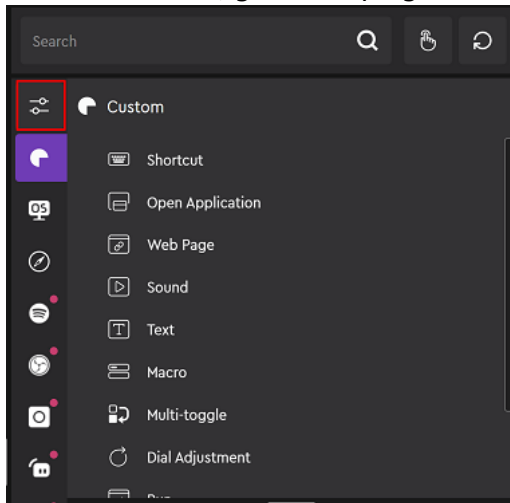
The LoupeDeck device integration allows a user do adjust the Viz Engine Precision Keyer using the hardware dials and touch buttons. It also allows you to adjust the values of any transformation action allowing for quick size/position/rotation changes of scene elements in addition to the ability to interact with the Precision Keyer action.



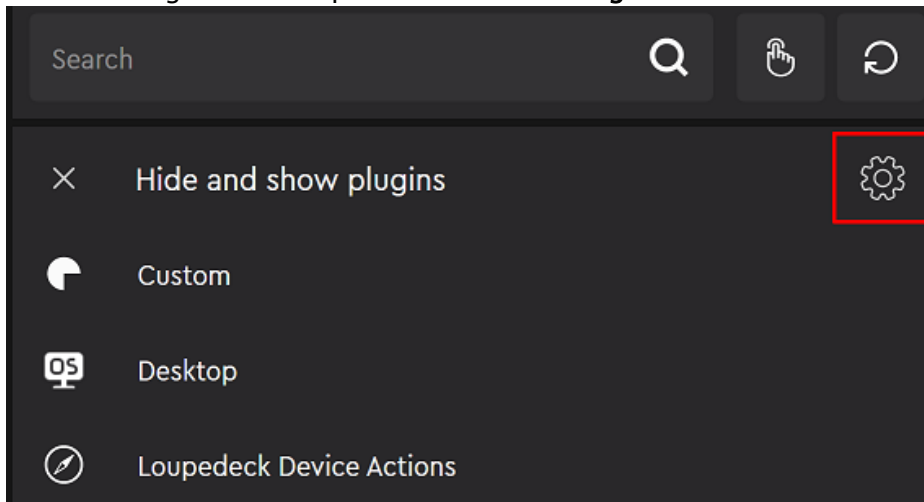
4.12.1 Installation

To use the LoupeDeck integration, download the LoupeDeck software from [here](#). The software does **not** necessarily need to be installed on the same machine as Viz Arc.

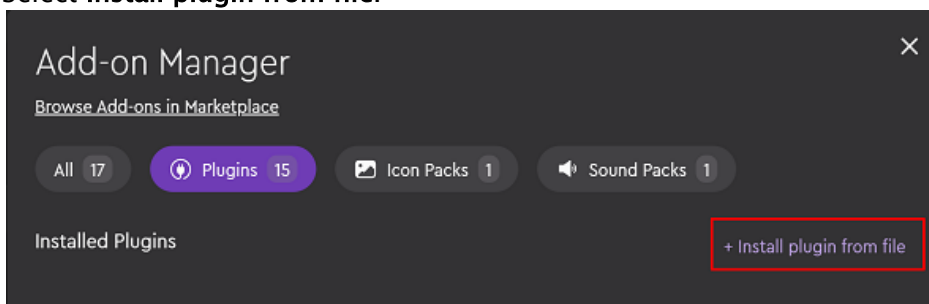
- After installation, go to the plugins setting menu.



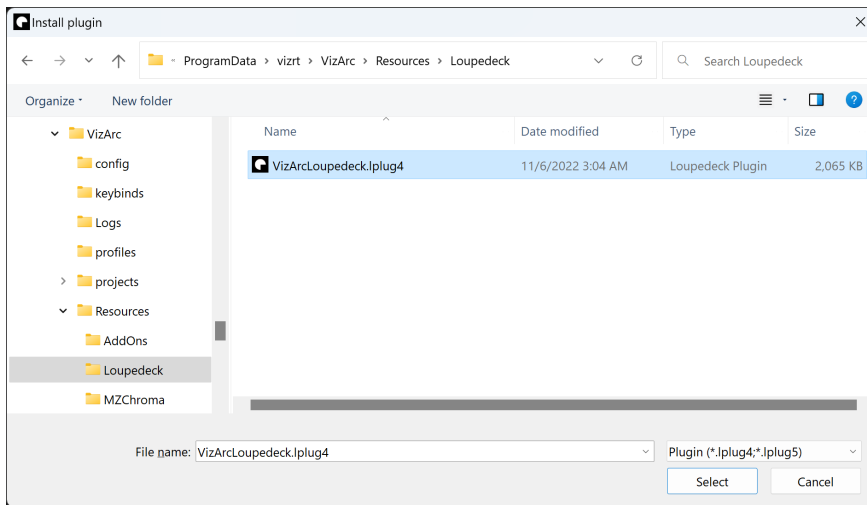
- Click on the gearbox to open the **Add-on Manager** window.



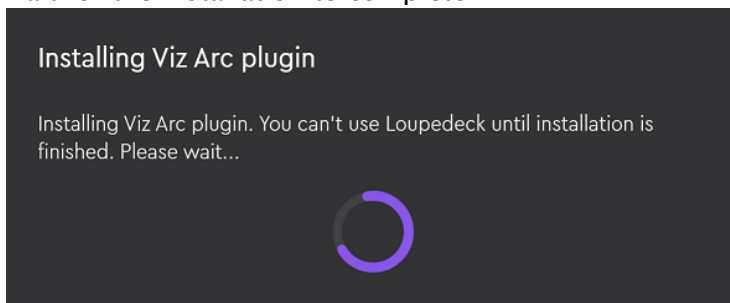
- Select **Install plugin from file**.



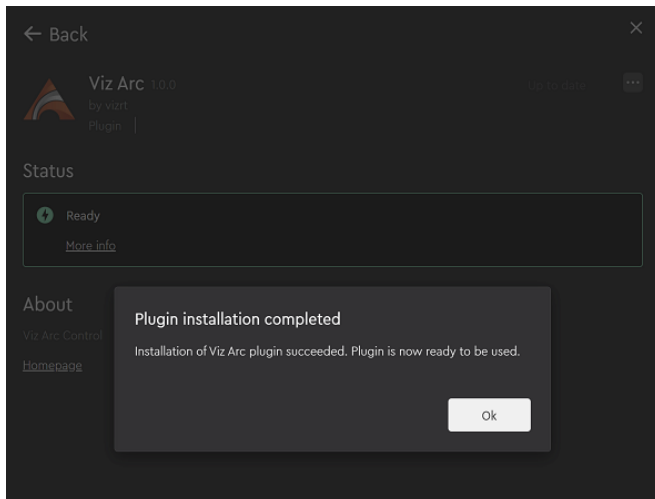
- Browse for the Viz Arc plugin contained in the file *VizArcLoupedeck.lplug4*, which can be found in *C:\ProgramData\vizrt\VizArc\Resources\Loupedeck* after Viz Arc installation.



- Wait for the installation to complete.

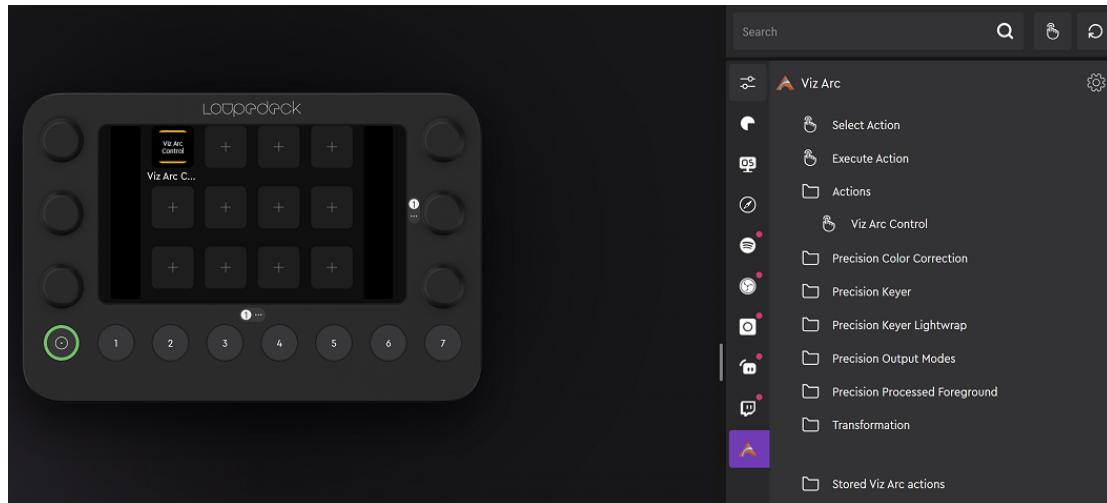


- Confirm the successful installation.



- On the main page you can now find the Viz Arc plugin. Select it and expand the **Actions** folder and drag the **Viz Arc Control** button to any of the free buttons in the LoupeDeck

device area.



Configuration

A configuration file *ArcSettings.json* can be found under *C:\Users\user\AppData\Local\Loupedeck\PluginData\VizArc* where **user** is the logged on user account name.

```
{
  "hostname": "localhost",
  "port": 5004
}
```

The file contains the host name (default: **localhost**) and the port (default:

5004

) of the running Viz Arc instance, the port must match the configured **Arc Web Server Port** in Viz Arc's general configuration. After changing values, restart the Loupedeck software to take effect.

Getting Started

Start **Viz Arc** and then either select an existing Viz Arc project or create some chroma or transformation actions. It is sufficient to **select** any of those actions to modify its content. You can also edit the action and see the values changing when changed through the Loupedeck device.



Precision Keyer

On the LoupeDeck device touch the **Viz Arc Control** button and in case a chroma action has been selected, the device will show with the first page of the chroma settings.

From here the **Hue**, **Saturation**, **Opacity** and **Transparency** can be changed using the dial buttons. The buttons on the top row change Viz Engine's preview output mode.



Touch the right arrow to get to page two where settings related to the **denoise** can be set.



Page three allows you change the **despill CMY** color and the **backing plate RGB** color.



Page four allows you enable/disable shadows and highlights and change their respective parameters.



Page five allows you to change the lightwrapping edge parameters.



Page six allows to change more lightwrap parameters.



Page seven allows you to manipulate the saturation and RGB lift.



Page eight allows you to change gain RGB and gamma RGB.



Transformations

Select a transformation action from the action canvas or from the map view.

The first page allows you to change **position** and **rotation** of the graphics element.



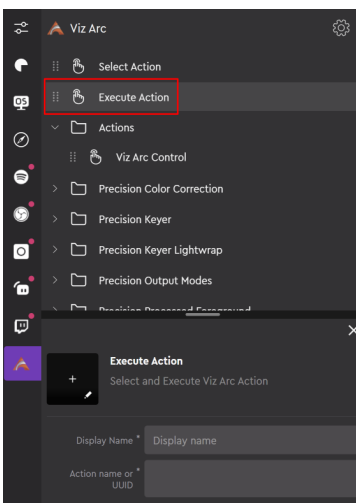
The second page allows you to **scale** the graphics object. Select **Lock**, **Single** or **Proportional** for the scaling mode.



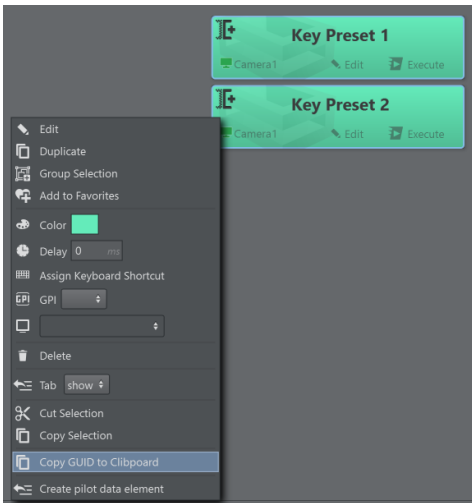
Other Functions

The **Execute Action** allows the selection and execution of a specific Viz Arc action from the LoupeDeck device and is not limited to chroma or transformation actions.

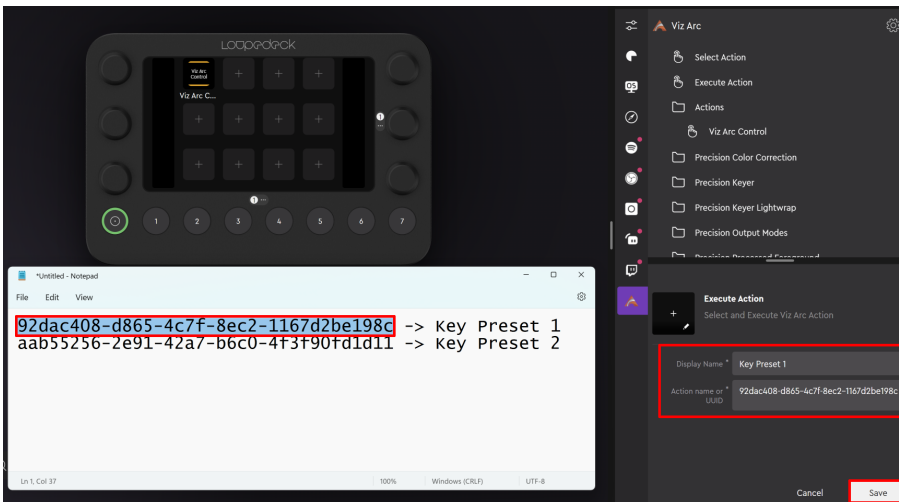
Click on the **Execute Action** item to create a new command.



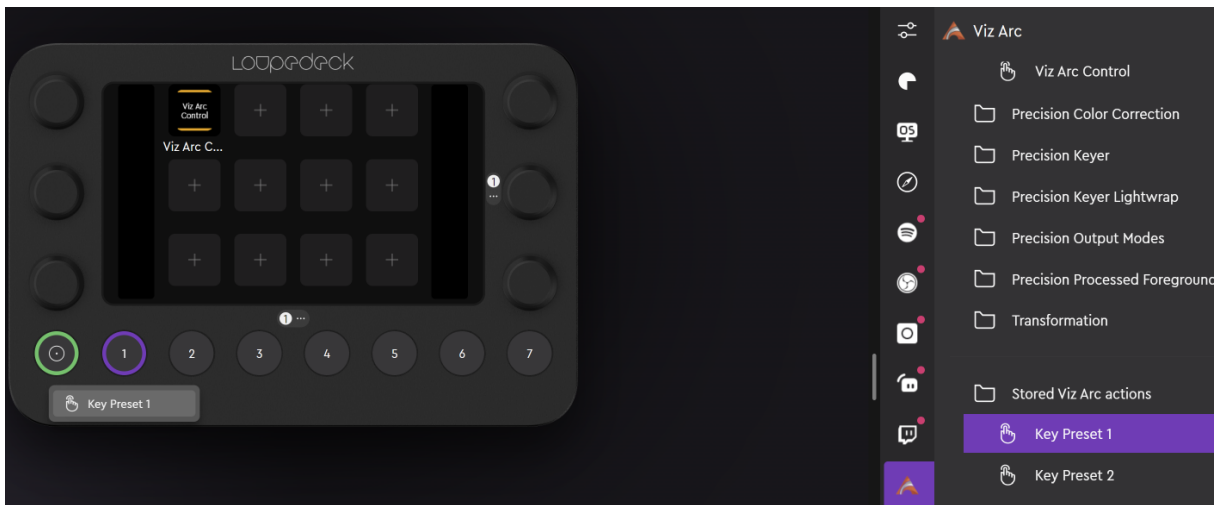
In Viz Arc, look for the actions you want to map on the LoupeDeck device, select them, right click and select **Copy GUID to Clipboard**.



Copy the GUID's and names to notepad or similar and use either the name or the GUID and copy it over to the LoupeDeck Execute Action Editor. Enter a name for the button and save the command.



Under **Stored Viz Arc actions** you can find the previously defined actions. Drag them to any of the free buttons on the LoupeDeck panel.



By touching the buttons, the action is automatically selected, highlighted and executed in Viz Arc. The action to be executed must be present on the currently opened project or the button has no effect.

Limitations

Contemporary changes of values through the LoupeDeck device and the Viz Arc action UI might result in unexpected behavior. The changes made through the Viz Arc UI are not instantly reflected on the LoupeDeck device. You need to deselect and reselect the action in Viz Arc to push changes back to the external device.

5 Working With Viz Arc

This section covers the following topics:

- [General Workflow](#)
- [User Interface](#)
- [4 Point Calibration](#)
- [Supported Action Types](#)
- [Builder Mode](#)
- [Data Integration](#)
- [Engine Status Widget](#)
- [Import and Export](#)
- [Multizone Chroma Keying](#)
- [On Air Mode](#)
- [Playlists](#)
- [Preview Window](#)
- [Program and Preview](#)
- [Projects](#)
- [Templates](#)
- [Web API](#)
- [Working with Unreal Engine](#)
- [Viz Arena](#)
- [Art-Net DMX Integration](#)
- [MOS Integration](#)

5.1 General Workflow



This section provides an overview of the general workflow in Viz Arc.


Viz Arc is based on [Projects](#). A project defines the scene or scenes to be used in any given production as well as the different buttons called Actions that control the desired scene properties, such as transformations or triggering animations.

The interface has two main modes, Builder and On Air:

- **Builder mode:** Users are able to configure and build all the needed actions for the operation.
- **On Air mode:** Users can execute and manage existing actions, but have limited functionality on creating new ones.

Creating and working with projects is simple, just follow the steps below.

- [Add a scene](#) to a project to start creating actions that control your scene.
- Actions can be created by dragging and dropping the property you wish to control such as Transformation, Text, Alpha, etc. from the Control Channels, Tree or Directors sections to the Actions Panel. For more details, see [create actions](#) and [supported action types](#).
- Optionally Configure the different tracked cameras, zero point and transformation properties of the different elements within your Virtual Studio or Augmented Reality elements by importing an AutoCAD (.dxf). For outdoor productions, configure directly over a map in the [Set](#) section of the interface.
- Go On Air and [initialize](#) your project to load all the imported scenes into the selected [Channels](#) and start executing your actions.

 **Note:** Viz Arc also lets you write your own custom Scripts.

5.2 User Interface

The Viz Arc user interface is divided into the following main sections:

- [Builder Mode](#)
 - [Actions](#)
 - [Set](#)
 - [Script](#)
- [On Air Mode](#)
- [Top Tool Bar](#)
- [Status Bar](#)

5.2.1 Builder Mode



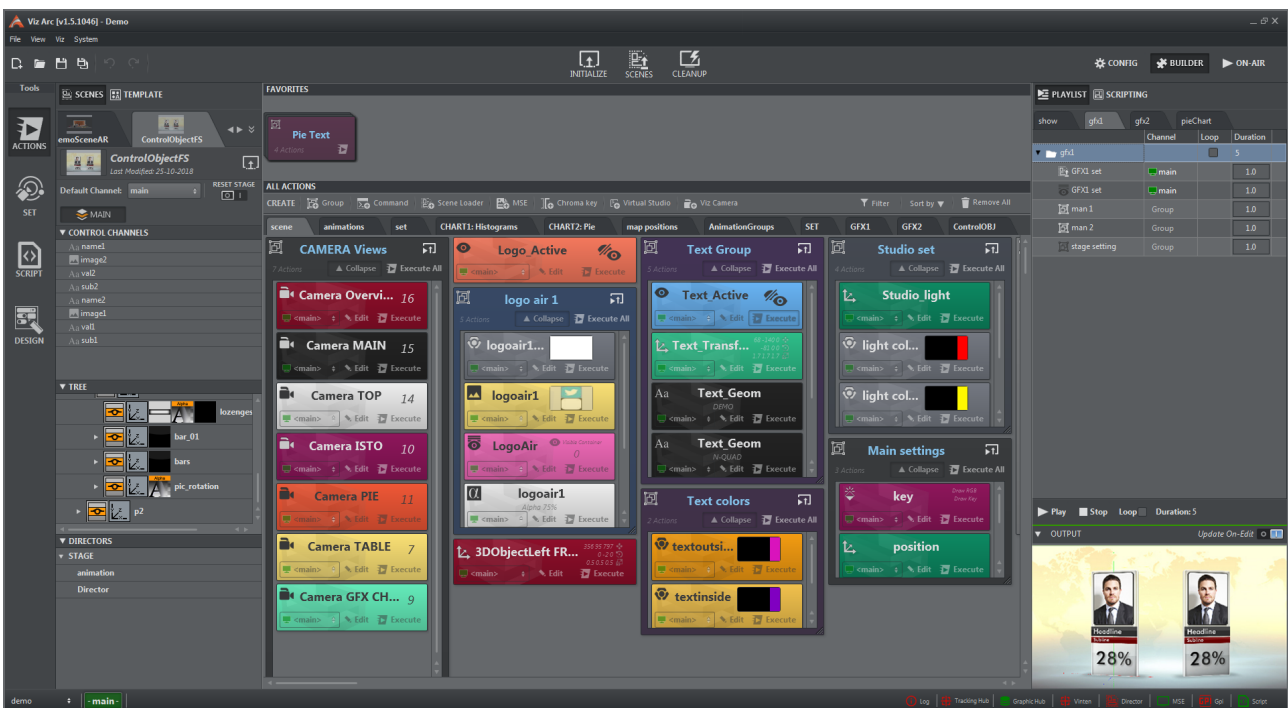
The [Operations Toolbar](#) is at the top right corner. When working in Builder mode, you can configure and build all the actions required for On Air operation.



In builder mode, three main views contain tools for creating **Projects**:

- **Actions**
- **Set**
- **Script**

Actions

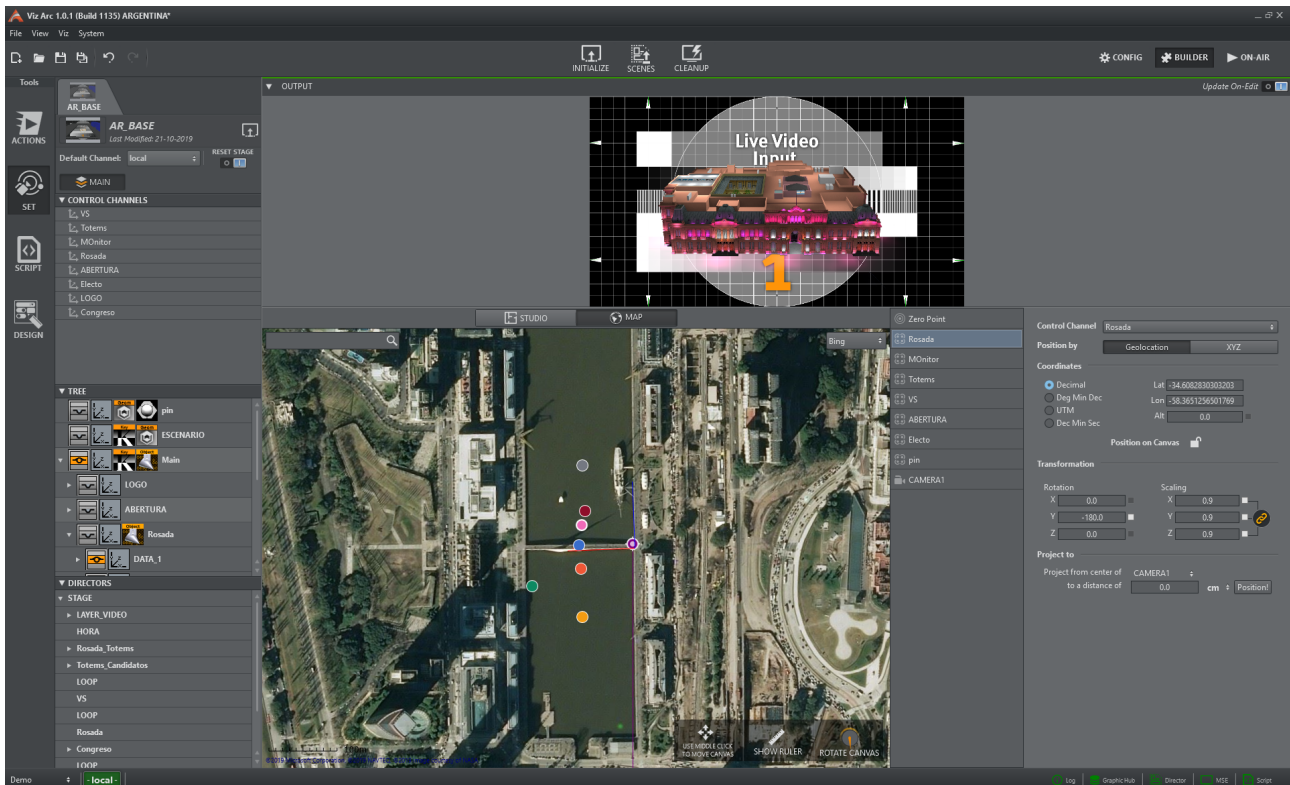


This is the part of the UI where most of the work is done when creating **Projects**. The panel contains all the tools required to:

- **Import one or more scenes** to be controlled by Viz Arc.

- **Create actions** to control properties such as position, rotation, scaling, modifying text, trigger animations, etc. of the different scene elements.

Set

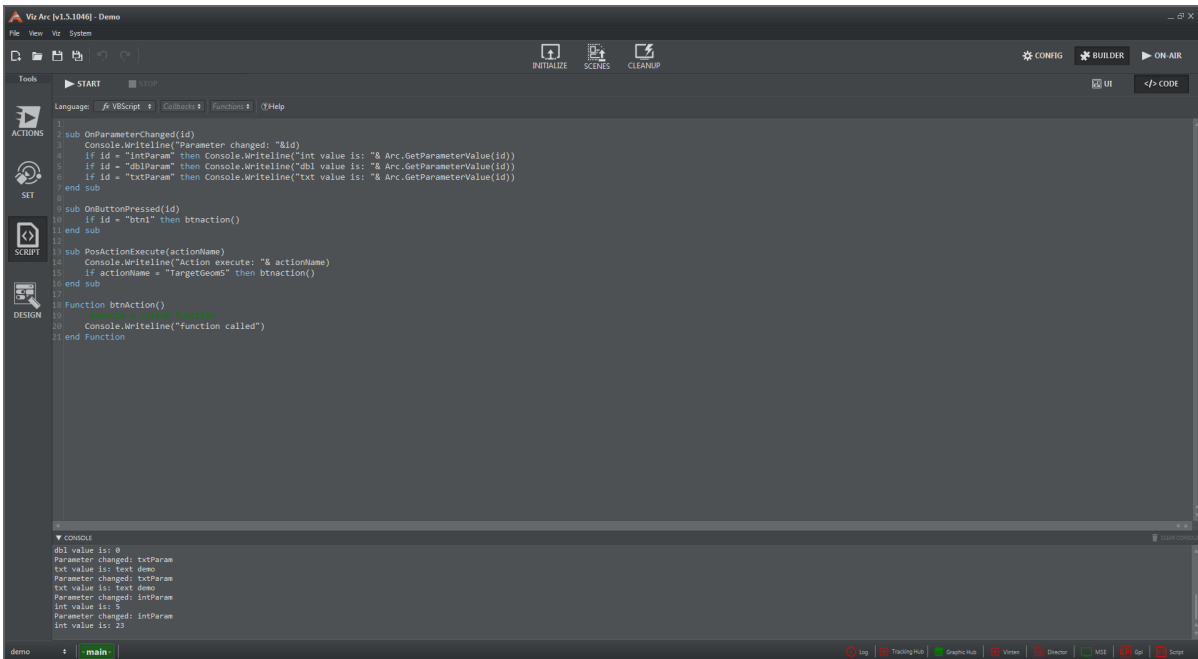


One of the key features of Viz Arc is the ability to configure all your virtual studio and augmented reality elements' positions in relation to your physical environment and tracked cameras. For indoor productions, you can import an AutoCAD project (.dxf) to set up the different elements or work over a map when outdoors.

The panel contains all the tools required to:

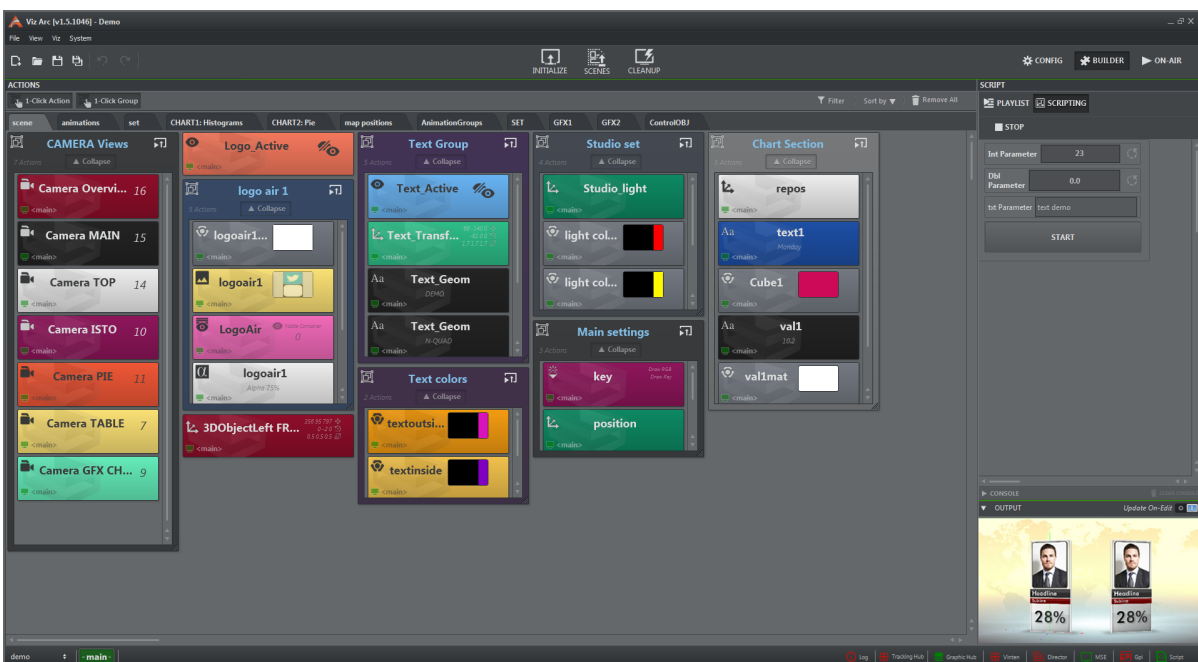
- Position, Scale and Rotate elements to fit your physical environment.
- Set the position of your zero point.
- Setup tracked cameras.
- Create chroma key polygons.

Script



Viz Arc includes a built-in scripting engine for connecting to a database or granting additional control to operators. Custom scripts can be written from this section of the interface. Scripts can include form elements such as text boxes, buttons, etc. that are available to users from the Actions panel or when working in On Air mode.

5.2.2 On Air Mode



This part of the interface is where operators work with previously created Viz Arc **Projects**. On Air mode provides a simple UI where operators can focus on controlling the live show to execute and manage existing actions. When working in On Air mode, users have limited functionality for creating new actions.

Note: On Air users can edit, execute, delete and duplicate existing actions or add general project actions such as groups, etc.

5.2.3 Top Tool Bar



Located at the top of the main window, the **File Menu** is composed of:


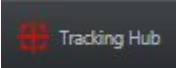



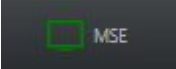


	<p>Main Menu and Project Toolbar (File, View, Viz, System)</p>
	<p>Project Tools (New, Open, Save, ..)</p>
	<p>Scenes Toolbar section (Initialize, Cleanup),</p>
	<p>Operations Toolbar section (Config, Builder, On-Air).</p>

5.2.4 Status Bar



Located at the bottom of the main window, the status section is composed of:

	<p>Profiles and Channels section (left)</p> <ul style="list-style-type: none"> • Connection Status for Channels of the selected Profile
--	--

 Log	 Tracking Hub	Connections section (right) <ul style="list-style-type: none"> · Log list · Connection status for <ul style="list-style-type: none"> · Tracking Hub · Graphic Hub · Vinten · Director · MSE · GPI Board · Compilation Status of Project Script
 Graphic Hub	 Vinten	
 Director	 MSE	
 Gpi	 Script	

See Also

- [Supported Action Types](#)

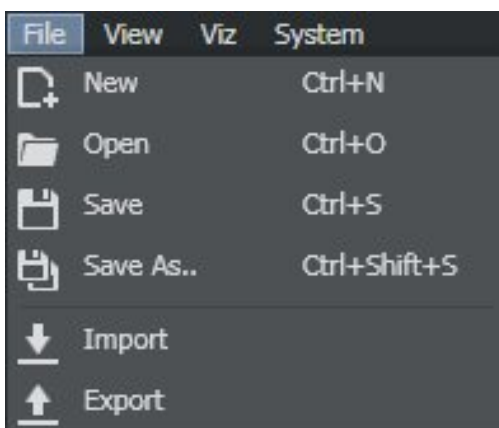
5.2.5 Main Menu and Project Toolbar

The Main menu contains the following sections:

- [File](#)
- [Projects](#)
- [View](#)
- [Viz](#)
- [System](#)

File

All [Project](#) creation and management related actions are found in this menu.



- **New (CTRL + N)**: Creates a new blank project.
- **Open (CTRL + O)**: Opens existing project.
- **Save (CTRL + S)**: Saves the current project.
- **Save As (CTRL + SHIFT + S)**: Saves project with a different name.
- **Import**: Imports a Viz Arc archive (.arc file).

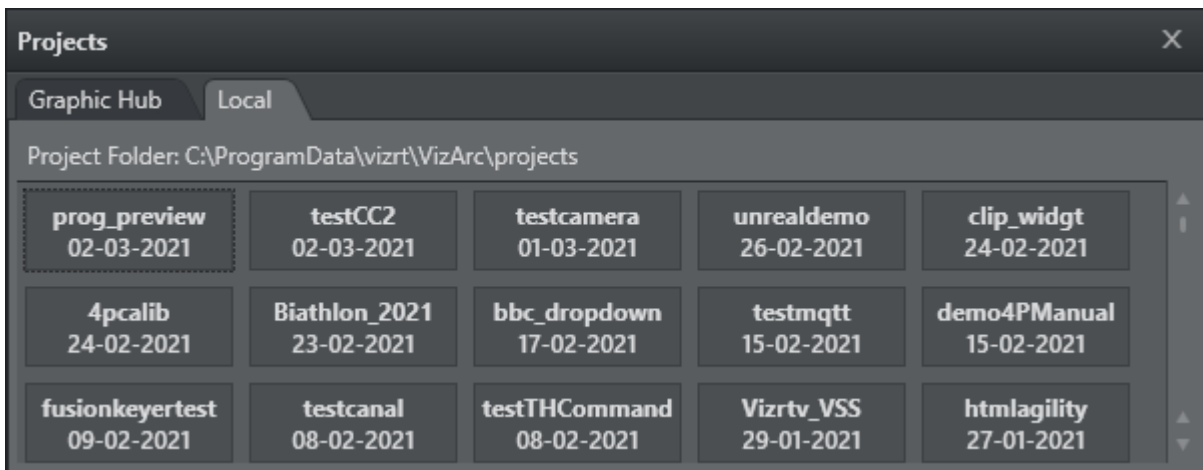
- **Export:** Exports a Viz Arc archive (.arc file).

Note: The same operations are also available from the **Project** toolbar:

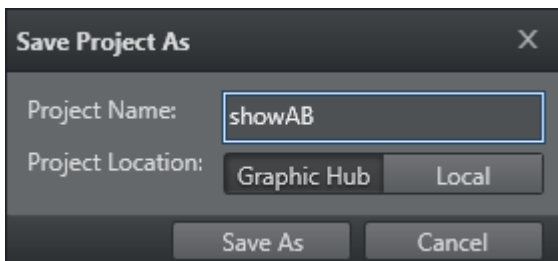


Projects

Projects can be located on the local file system or on Graphic Hub. When opening a project you can choose where to load it from, selecting from either the **Graphic Hub** tab and the **Local** tab.

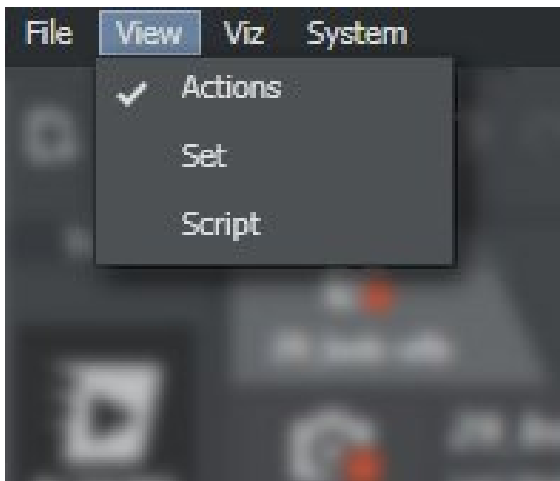


When saving a project, you can choose whether to store it locally or on Graphic Hub using the respective radio button.



View

This menu lets you switch between the three main views when working in Builder mode.



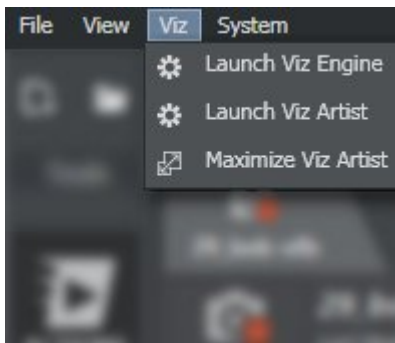
- **Actions:** Switches to the Actions view in the main window.
- **Set:** Switches to the Set view in the main window.
- **Script:** Switches to the Script view in the main window.

You can also switch between views using this toolbar:



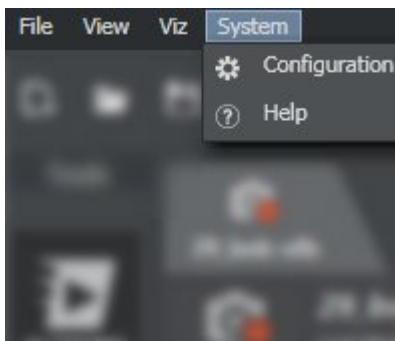
Viz

This menu contains actions relating to Viz systems.




- **Launch Viz Engine:** Launches Viz Engine.
- **Launch Viz Artist:** Launches Viz Artist (if licensed).
- **Maximize Viz Artist:** Switches to the Viz Artist window.

System

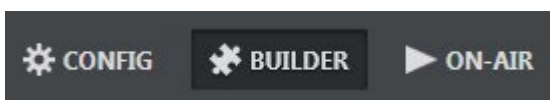


- **Configuration:** Opens the configuration section in a new window.
- **Help:** Opens the present manual.

Note: The configuration panel can also be opened by clicking  **CONFIG** at the top right.

5.2.6 Operations Toolbar

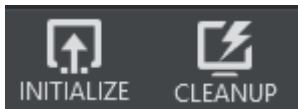
This page explains the functionality of the different actions available in the **Operations Toolbar**.



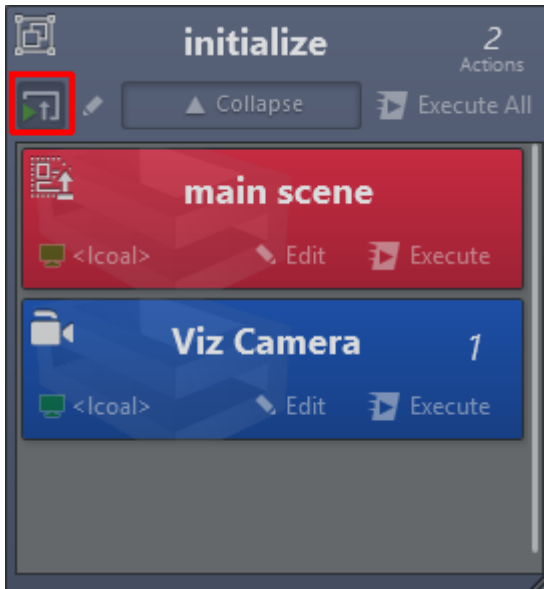
- **CONFIGURATION:** Opens the configuration window.
- **BUILDER:** Switches to the project editing mode.
- **ON-AIR:** Switches to the Live section, where some actions are limited to the live show.

5.2.7 Scenes Toolbar

This section describes actions in the **Scenes Toolbar**.



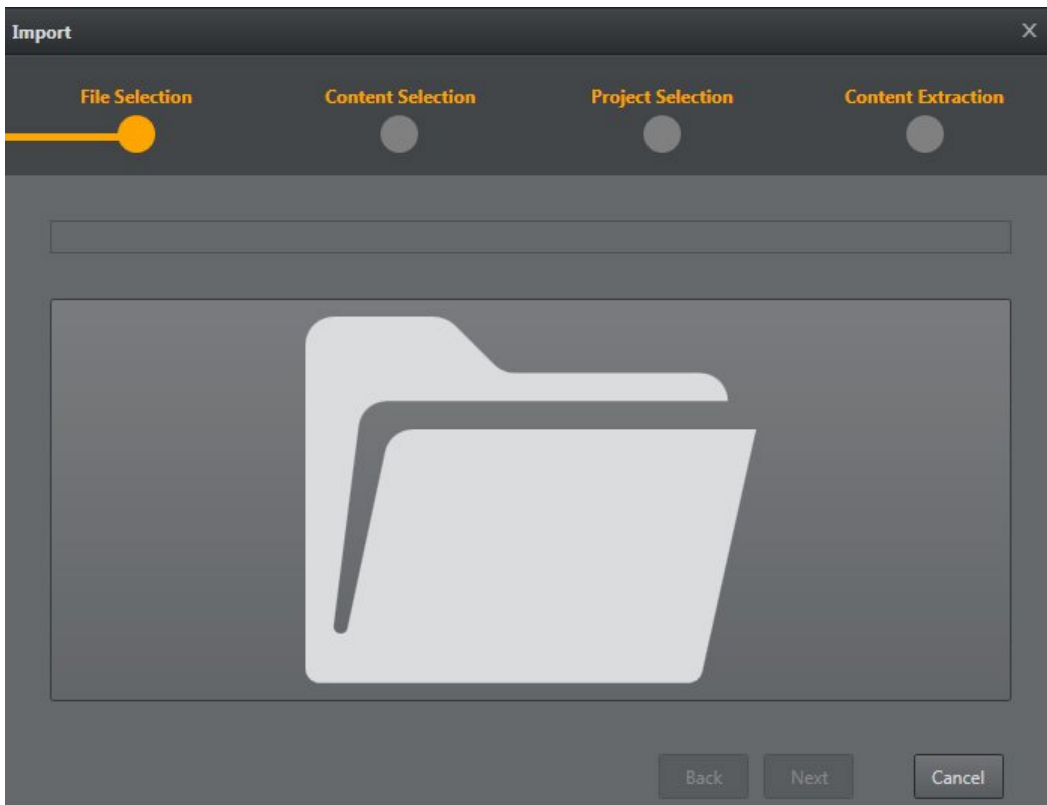
- **INITIALIZE:** Loads all scenes included in the open project to the configured **channels** and executes all groups tagged with the *Execute on Initialize* toggle.
- **CLEANUP:** Unloads any loaded scenes, images, etc. from all engines defined in all channels from the selected profile.



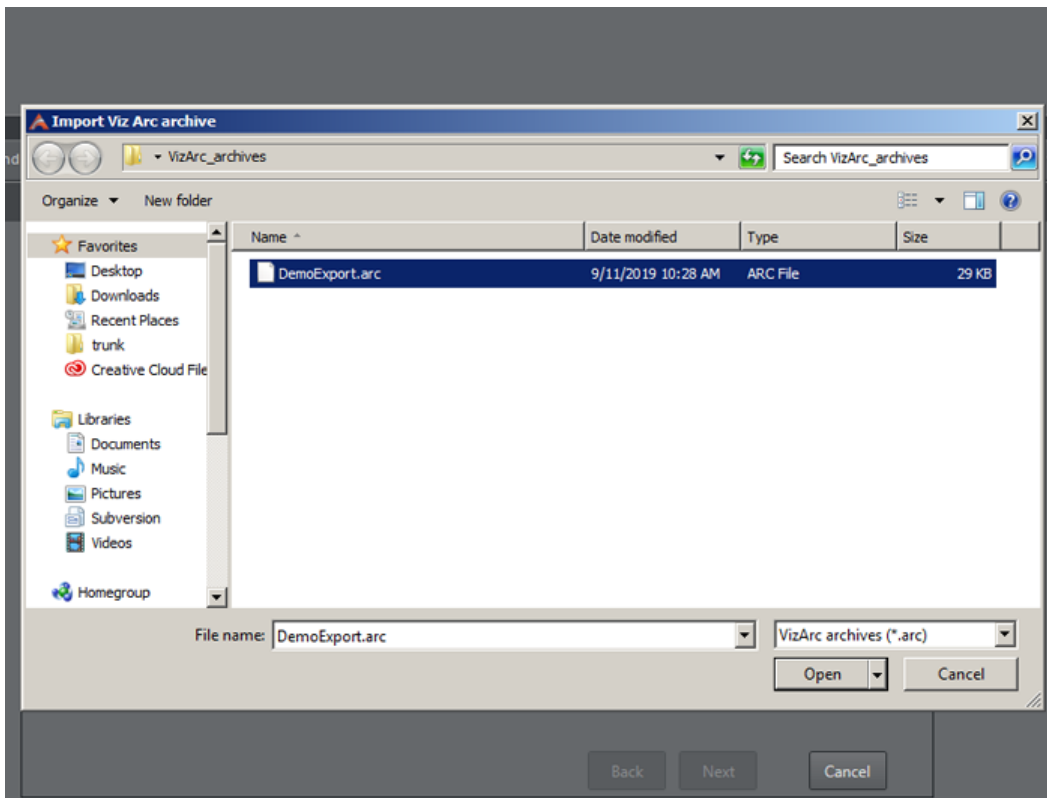
The screenshot above shows a group that is executed with the **initialize** button, since its *Execute on Initialize* toggle is active.

5.2.8 Import

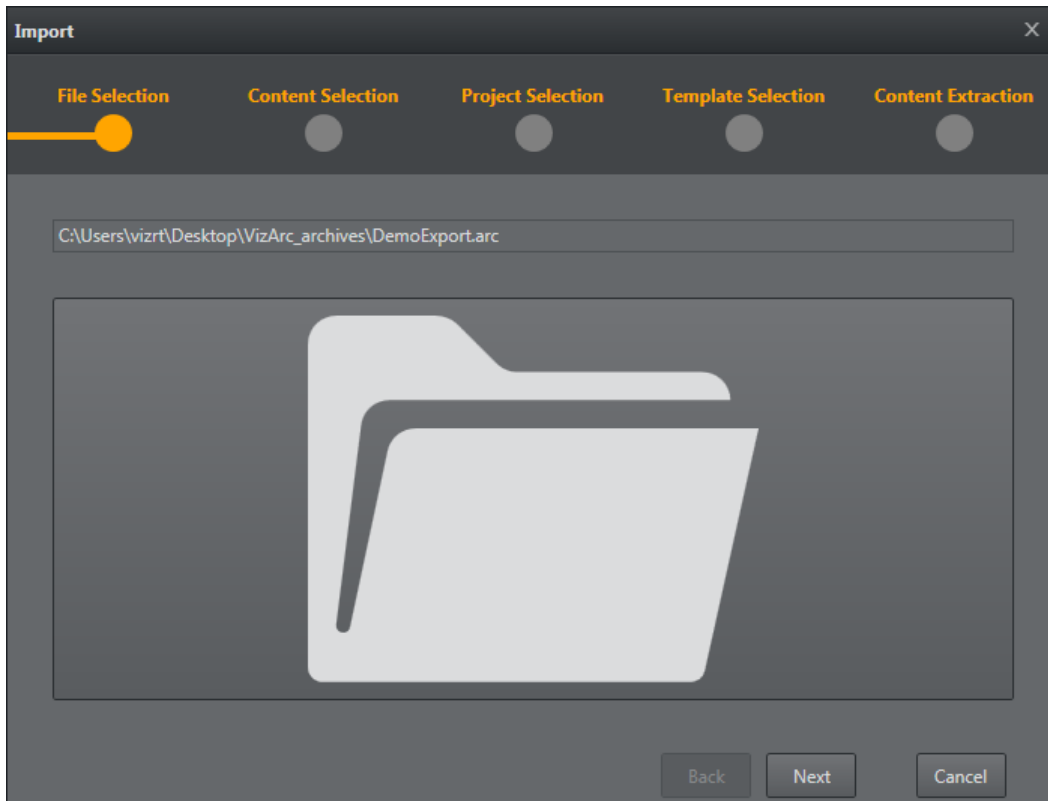
Select **File > Import** to make the window below appear:



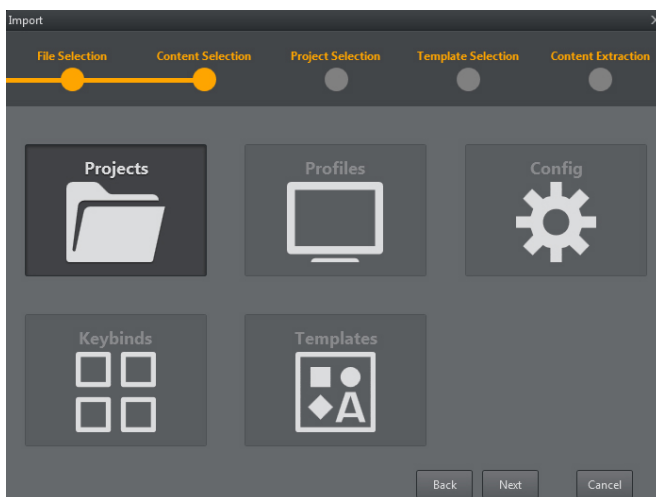
To open the selection dialog window, press the big folder icon.



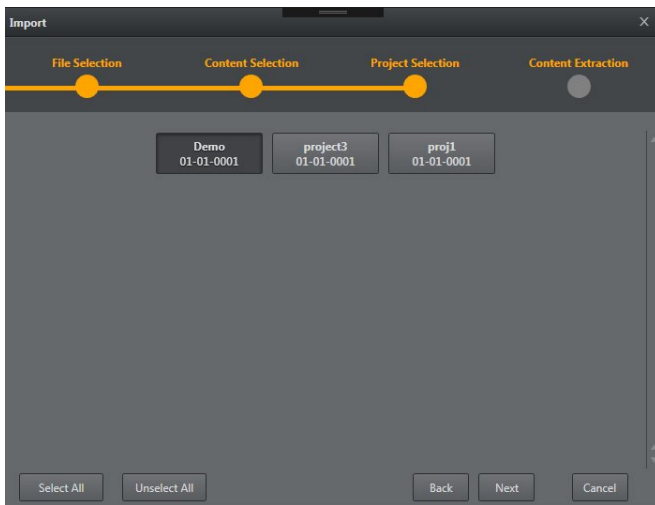
After selecting the file, you can proceed with the import steps.



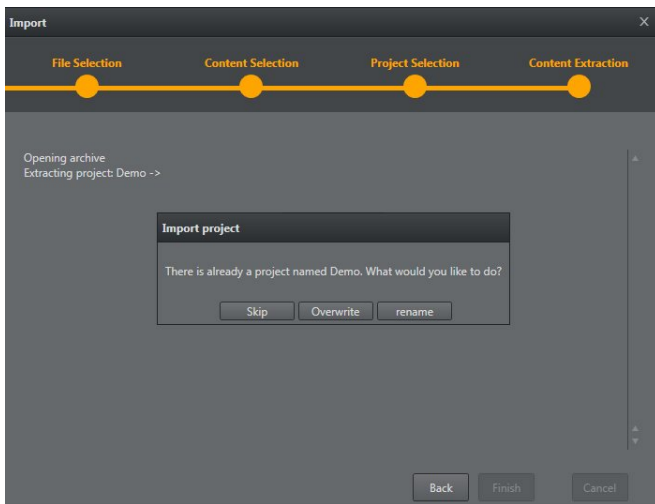
Select the elements to import (**Projects, Profiles, Config or Keybinds**) and click **Next**.



Select the file you wish to import.

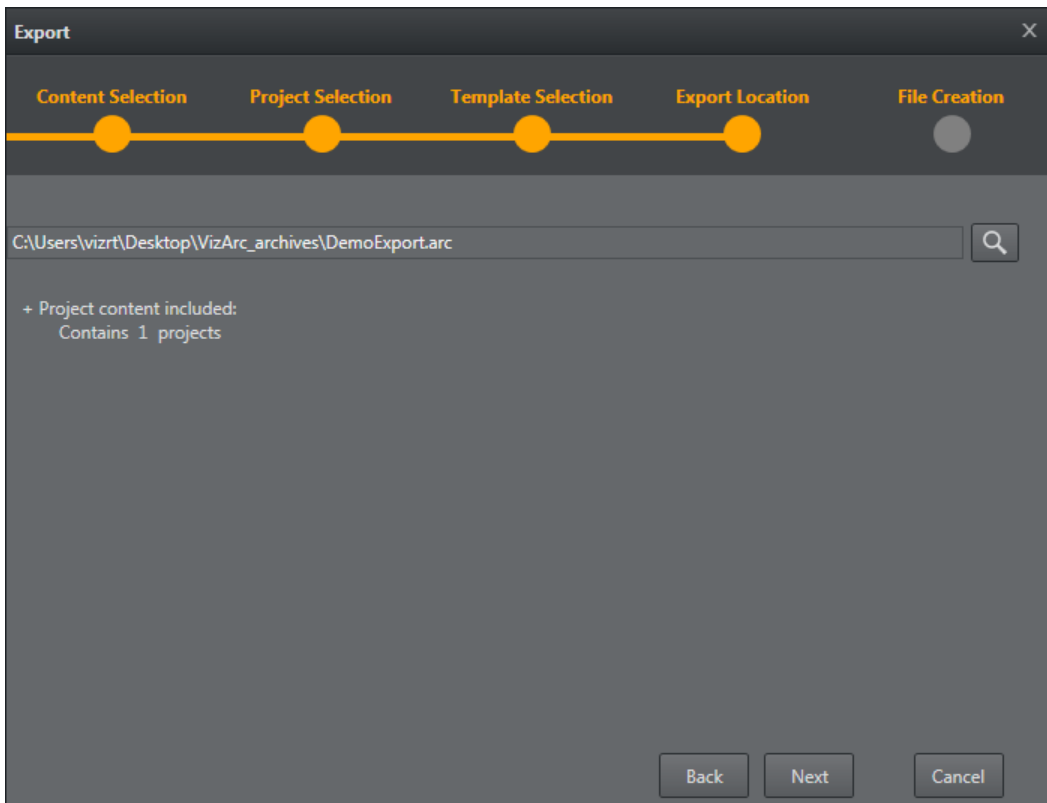


If the file already exists, you can skip the import process, rename the file or overwrite the file.

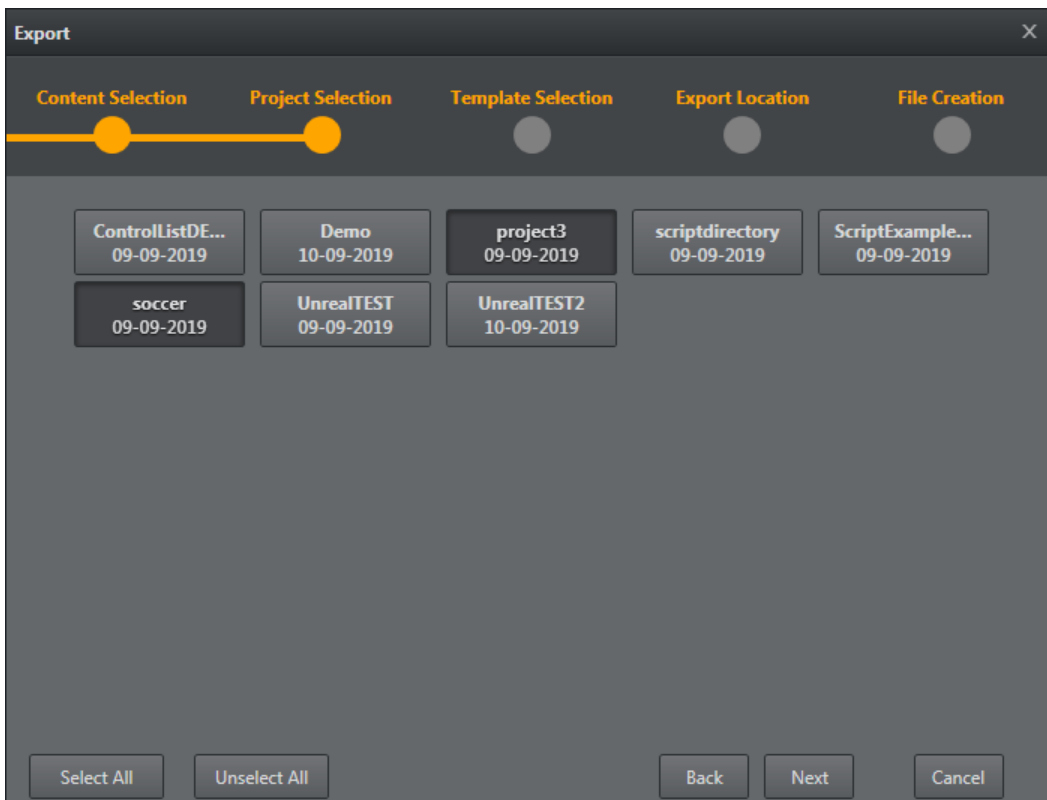


5.2.9 Export

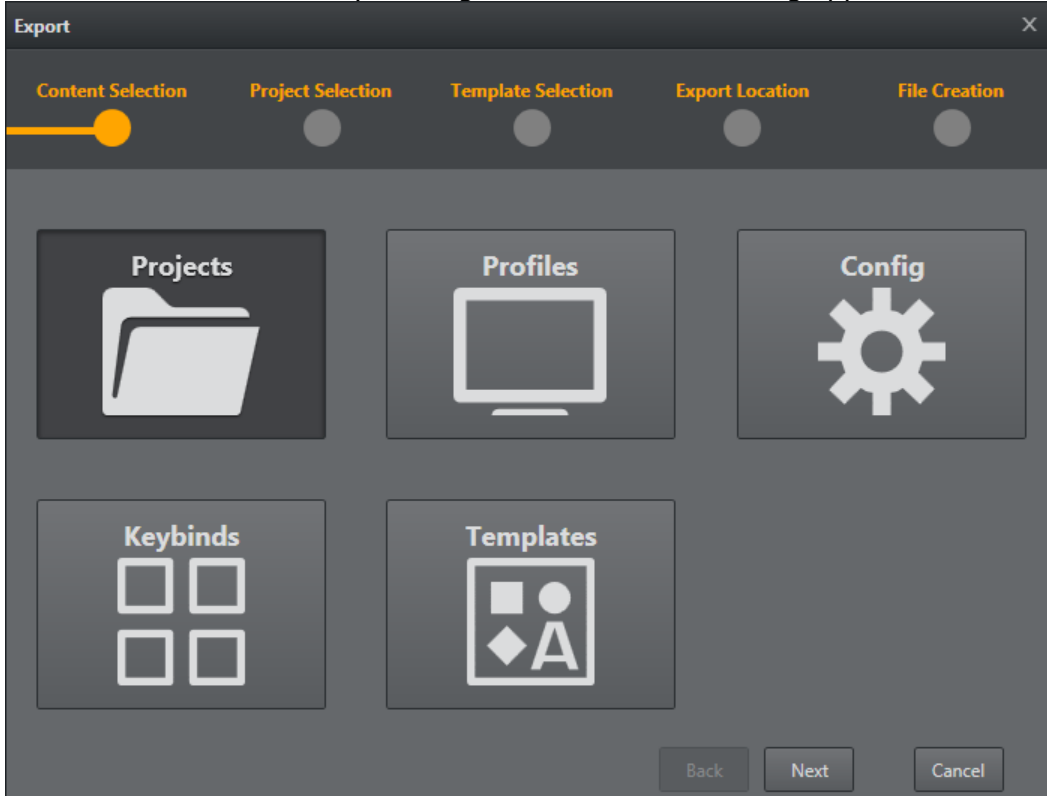
Select **File > Export** to make the window below appear. Select which kind of file you want to export - **Projects, Profiles, Config** or **Keybind** and click **Next**.



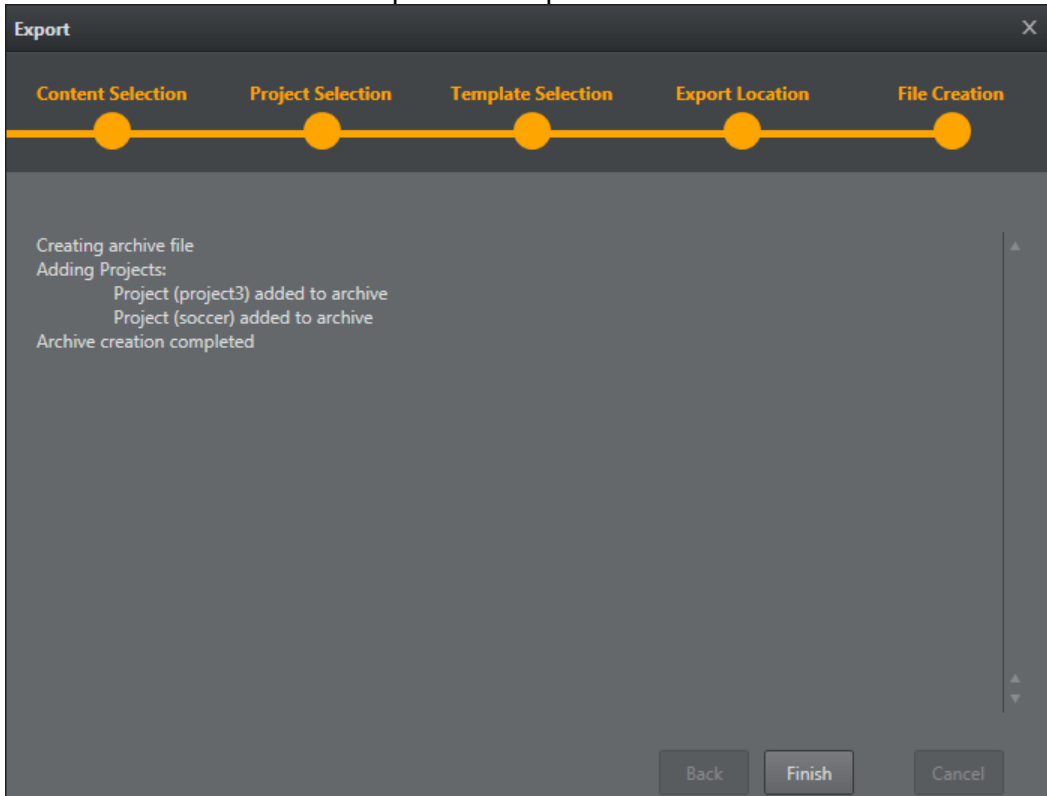
Select the file you wish to export.



Select the file destination by clicking the search icon. A dialog appears. Click **Next**.



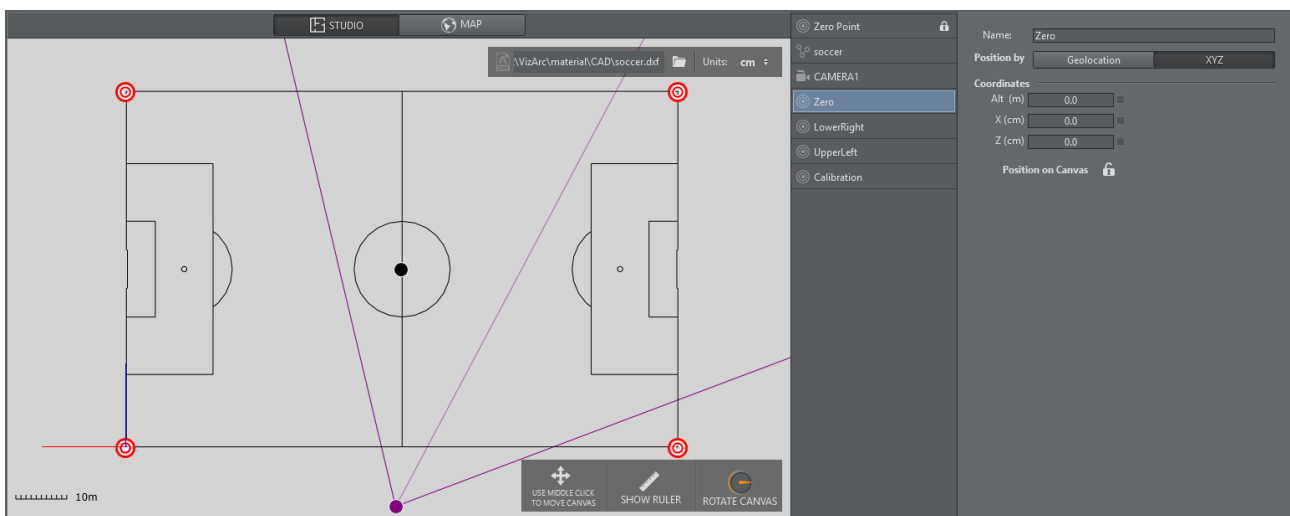
Click the **Finish** button to complete the export action.



5.3 4 Point Calibration

5.3.1 About 4 Point Calibration

4 Point Calibration can be used to calculate the position and orientation of a (typically mechanically) tracked camera. Using this type of calibration requires knowledge of at least four physical points in the domain (for example, the corners of a soccer pitch or well-known points on a horse race track).

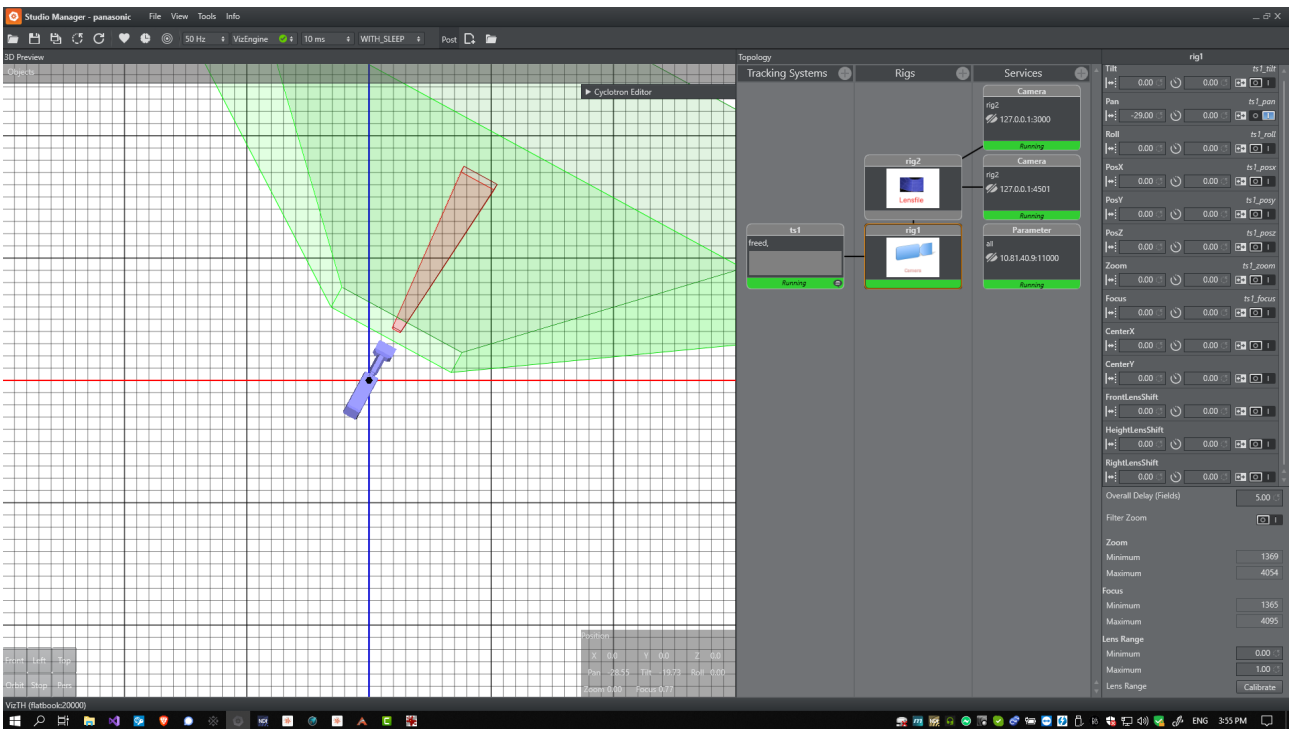


Map View showing a soccer pitch and four calibration points.

5.3.2 Prerequisites

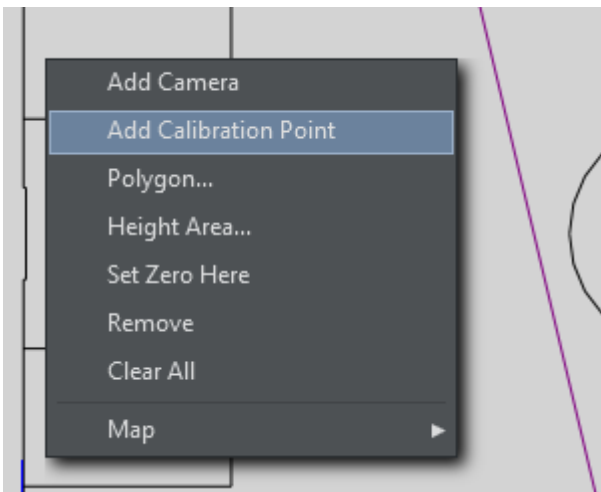
- The calibration points must all be on the XZ plane (same height).
- The camera must be on a fixed position and can't be moved in space.
- At least four points need to be measured/known on the tracking domain.
- The points must define a surface and not just a one dimensional line.
- Make sure the tracking hub sends the tracking information to Viz Arc and make sure it includes the camera lens rig containing a valid calibration.

⚠ Note: Do NOT use a parent transformation rig on top for 4 Point calibration. The translation and rotation will be handled inside the root node of the Viz Artist scene.

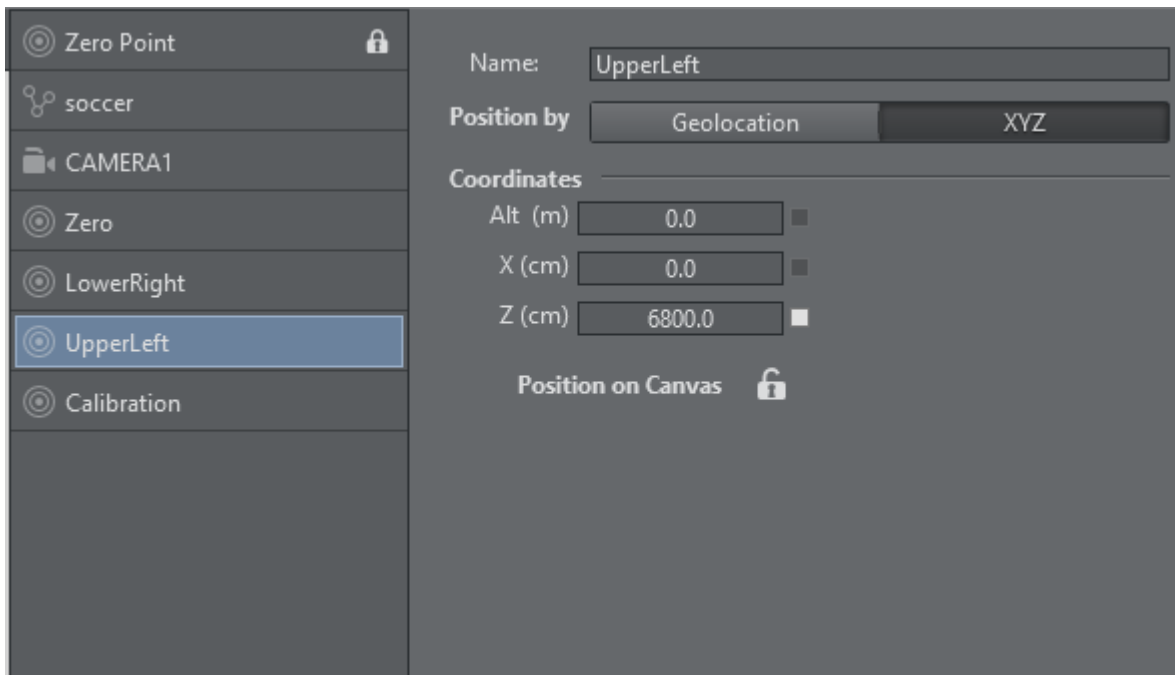


5.3.3 To Add Calibration Points

Add calibration points from the map's context menu:



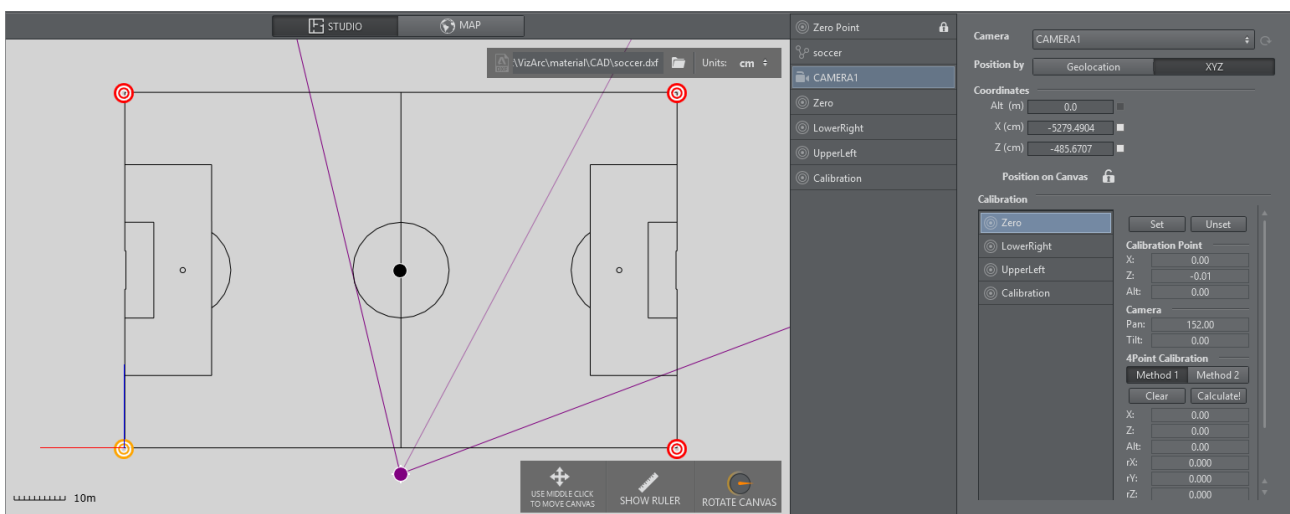
Select the calibration point you just added and move it on the map, or enter its coordinates manually:



Once all calibration points have been added and positioned, the actual calibration process may start.

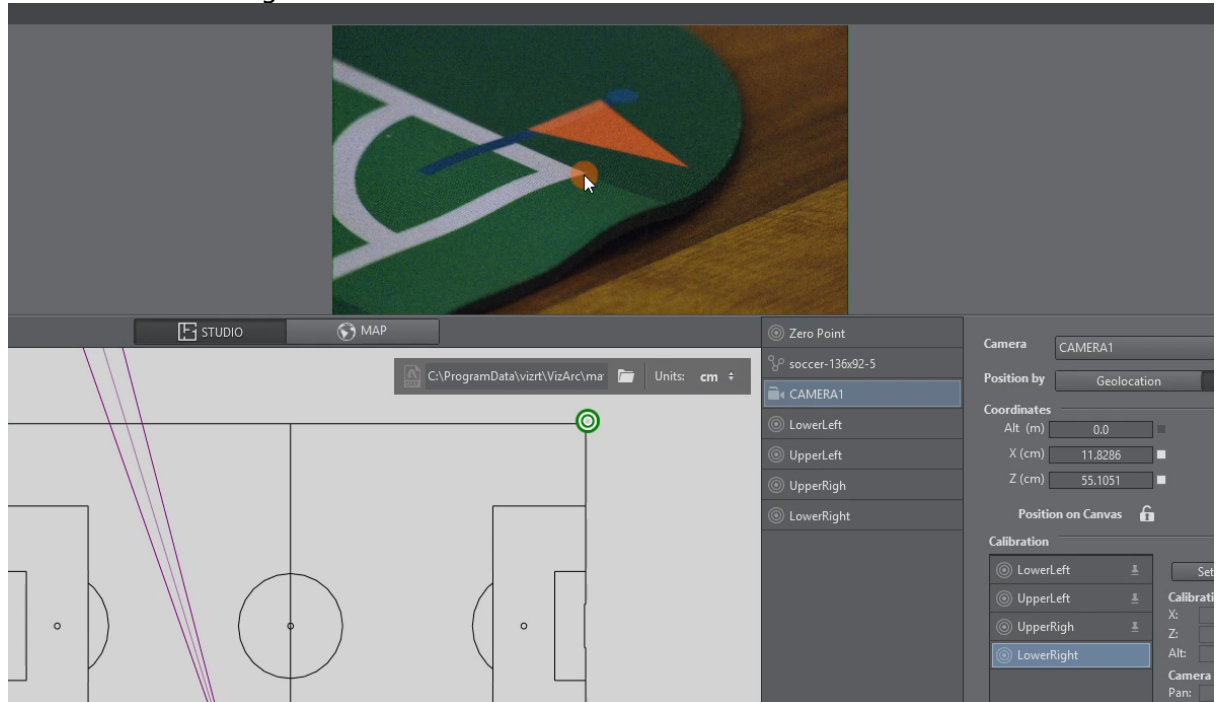
5.3.4 Calibration

Select the camera to be calibrated.



1. On the camera user interface select the marker towards which you want to point the camera. The calibration point is colored **yellow** on the map canvas.
2. The physical camera should now fully zoom into the marker and try to center it as best as possible.
3. Once the marker is centered, click the **Set** button. If your preview has been set up so that the camera is visible and you have a valid lens calibration, you can also click the position in the

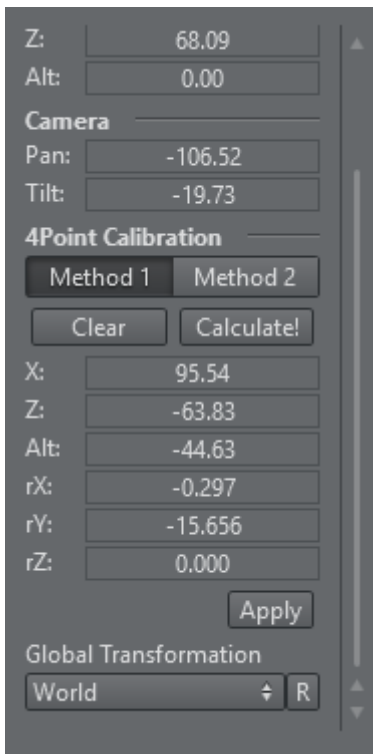
view instead of using the **Set** button.



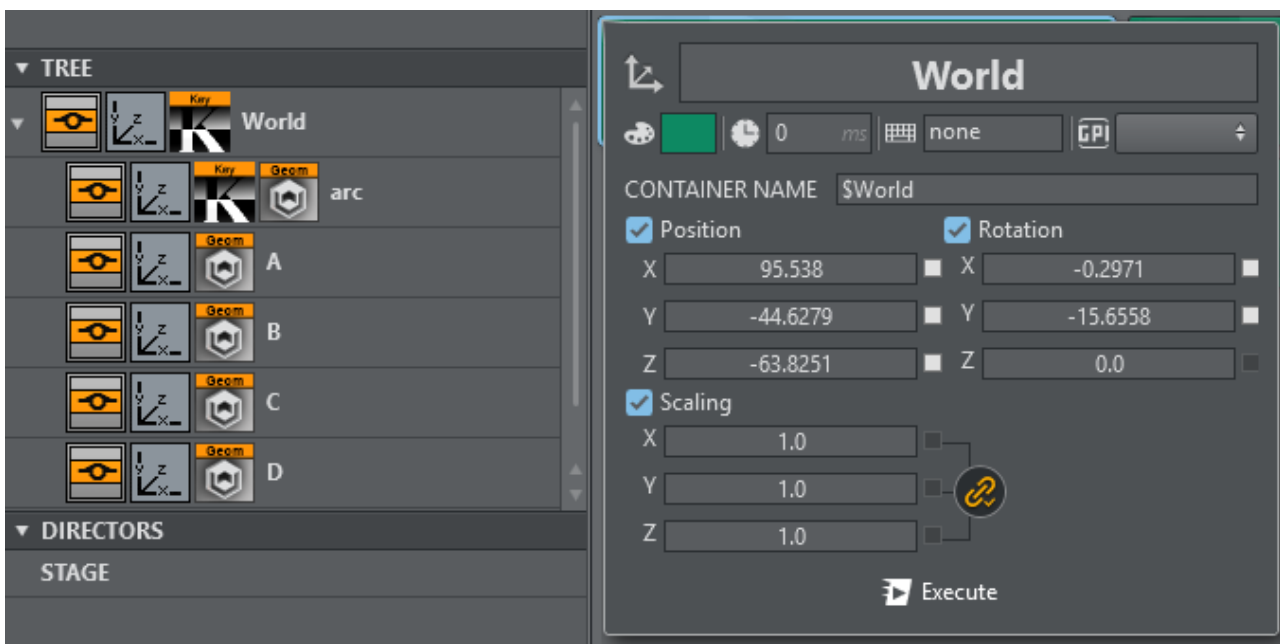
4. Continue this procedure for all or at least four calibration points.

5.3.5 Applying Calibration

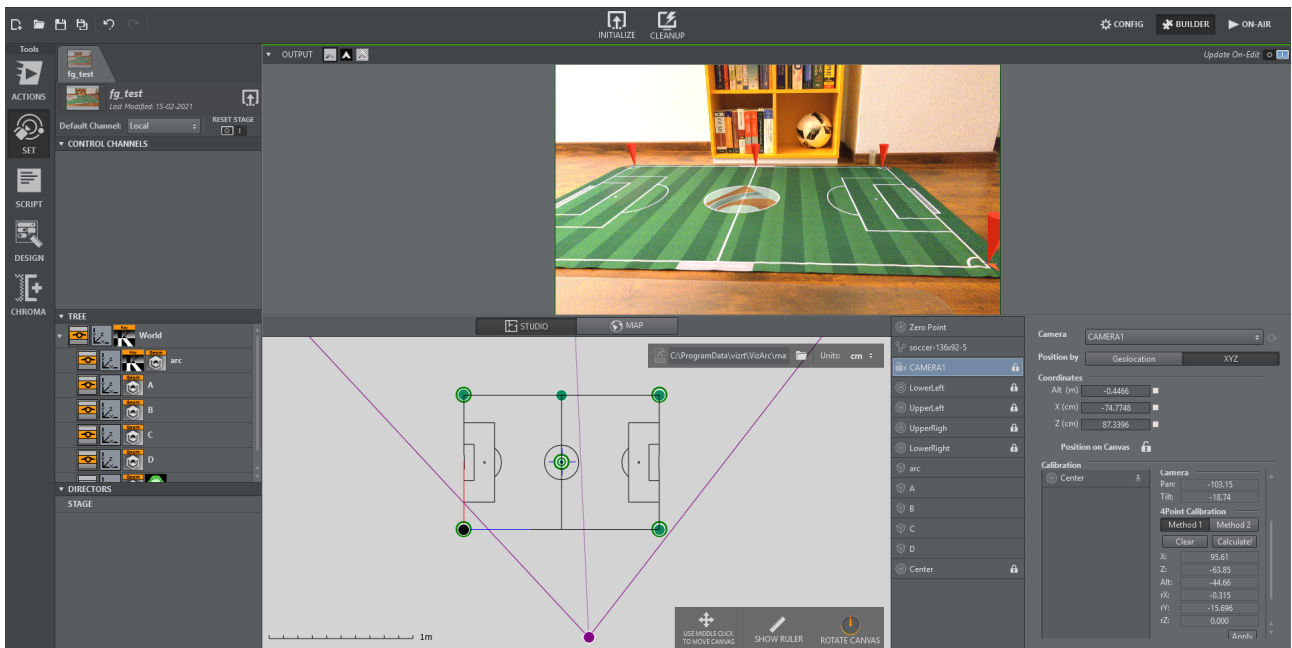
1. Once at least 4 points have been set, click the **Calculate!** button to calculate the presumed position and orientation of the camera. You can choose between **Method 1** and **Method 2**, hit **Calculate!** after switching algorithm. Generally Method 2 is more accurate but needs more and more accurate calibration points. Try both and pick the one that gives you better visual results.
2. Under the **Global Transformation** dropdown, select the transformation action holding the world transformation of the main scene (typically the root node of the AR/VR scene).
3. Click **Apply** to apply the calculated transformation and rotation.



Use the R button to refresh the list of available transformation actions.



Typically the transformation to be used is the root node of the scene.



Once calibrated you should be able to position AR graphics on your pitch.

5.4 Supported Action Types

- [Vizrt Scene Actions](#) and [Unreal Actions](#) are created by dragging and dropping properties from scenes or level tree containers, such as geometry plugin (position, rotation, scaling), hide object action, or from a tree directly into the actions area.
- [Project Actions](#) are created by right-clicking on the actions canvas.
- [Other Actions](#) are created by right-clicking on an empty space in the main area.

Vizrt Scene Actions	Unreal Actions	Project Actions	Other Actions
Alpha	Active	Action Group	NDI
ControlChannel	Animation	Command	Multizone Chroma Key
ControlObjects	Blueprint	Tracking Hub	Scene Loader
Director	Command	MSE	Vinten Control
Geometry	Dispatcher	Shared Memory	Telemetric Control
Material	Mesh	Chroma Key	Utah Router

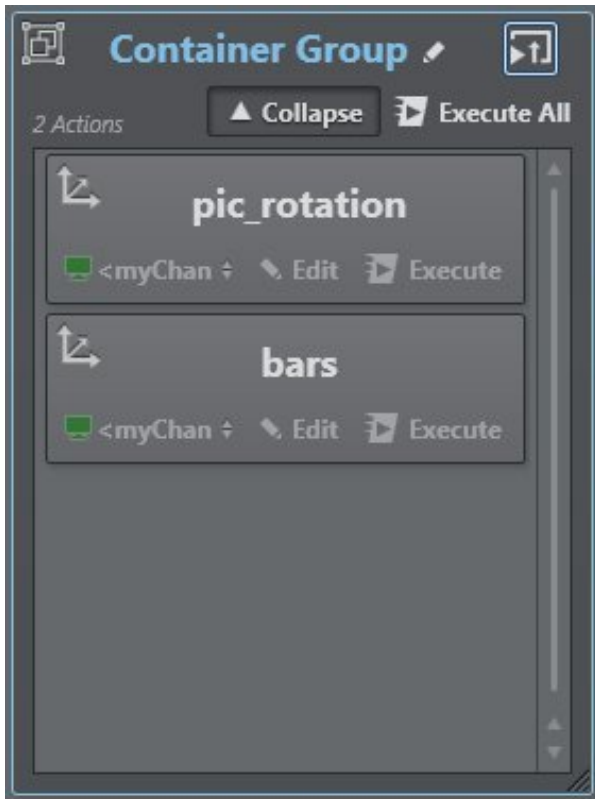
Vizrt Scene Actions	Unreal Actions	Project Actions	Other Actions
Image	Position/Rotation/Scaling	Virtual Studio	
Key	Sequence	Viz Camera	
Omo	Text		
PBR Material			
Script			
Text			
Transformation			
Viewport			
Visibility			

5.4.1 Project Action Types




- Action Group (1)
- Command (2)
- Tracking Hub (3)
- MSE (4)
- Shared Memory (5)
- Chroma Key (6)
- Virtual Studio (7)
- Viz Camera (8)


Action Group

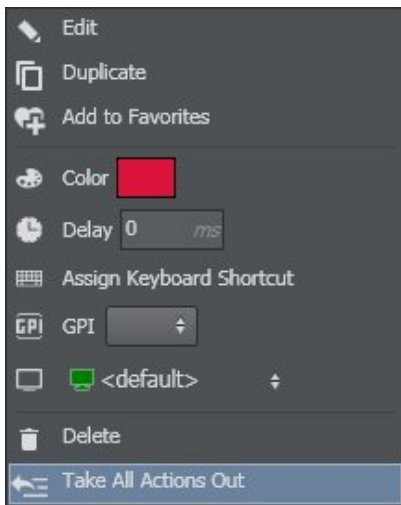


Action Group is useful for grouping several actions together, both scene and project, and executing them at the same time.

It's possible to collapse a group or expand it and insert/edit/remove action children.

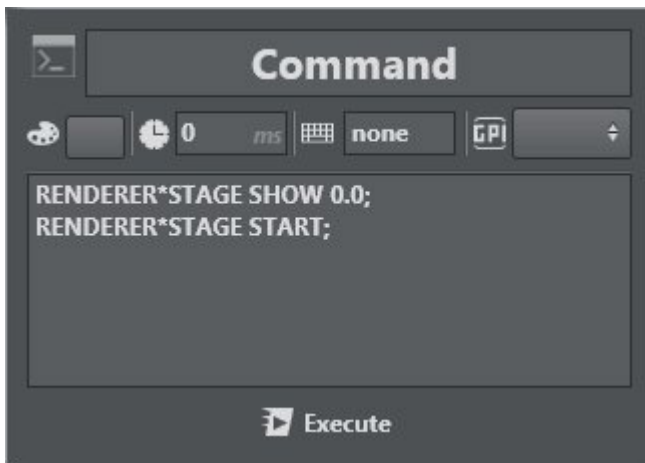
Pressing the **Edit** icon  next to the group name opens the [main tool](#), where you can edit the group name, box color, time delay in milliseconds, keyboard shortcut and GPI channel.

It's also possible to execute all action boxes included in an action group on initialize group by pressing the **Execute All** icon  at the top-right of the group box.



Remove all actions from the group by selecting **Take All Actions Out** in the Context Menu (right-click on group action).

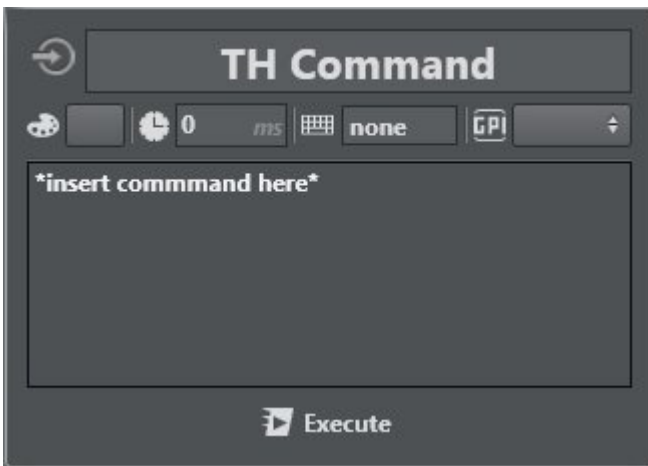
Command



The Command action lets you write custom commands to talk with Viz Engines, for example to manage stage animations or start a specific director, as shown in the example above.

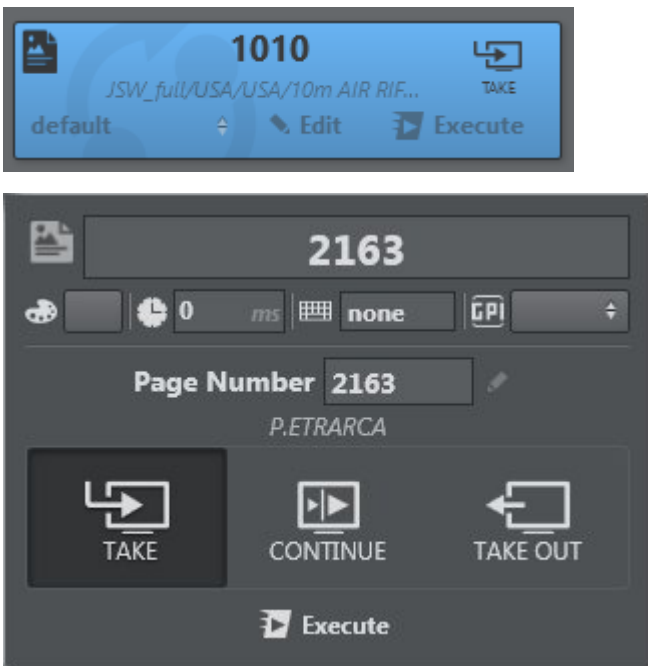
Tracking Hub

TH Command lets you write a custom command to interact with Tracking Hub.

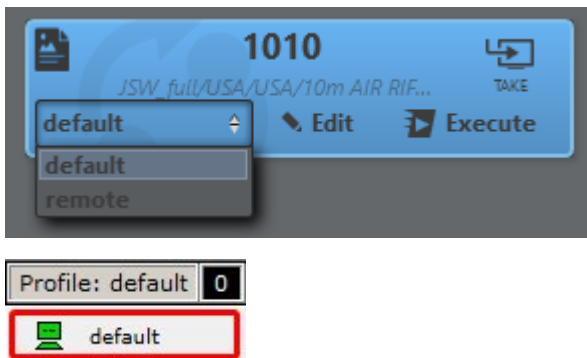


Note: Tracking Hub is a console program for Viz Virtual Studio that collects and stores data from tracking systems (cameras and objects). Viz Engine is provided with this tracking data at a configurable time or delay.

MSE



MSE lets you retrieve Viz Trio’s saved pages and import them directly into Viz Arc for execution.



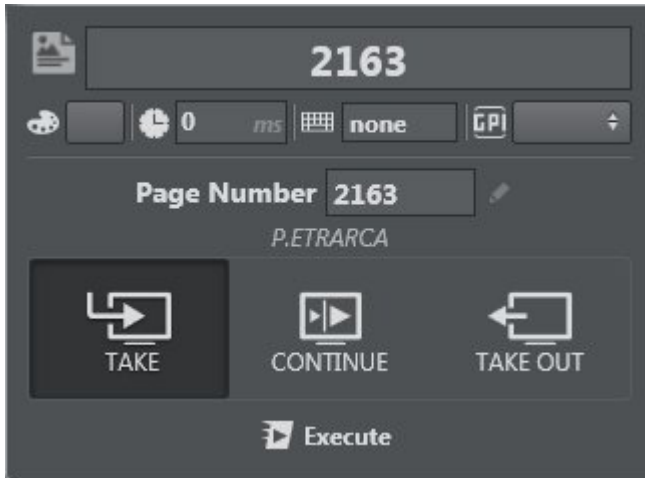
The profile used for the action is in the lower left corner of the MSE action. It contains a list of the profiles configured on your MSE.

To Import Trio Shows





This section shows you how to import Trio Saved Pages into Viz Arc:

	<p>Press the MSE icon to make a window containing a list of Trio shows appear.</p>
	<p>Select a show. A list of Trio pages is displayed. You can sort pages by page number, description and template by double-clicking on the header at the top of the list.</p>
	<p>Reload MSE pages by clicking Refresh.</p>
	<p>To import, select one or more pages and click Add Selected to add them in the actions area. To abort an operation, close the window or press the Close button.</p>
	<p>At the bottom of the MSE window, you can select Take, Continue, or Take Out, which creates a single action box for every operation.</p>

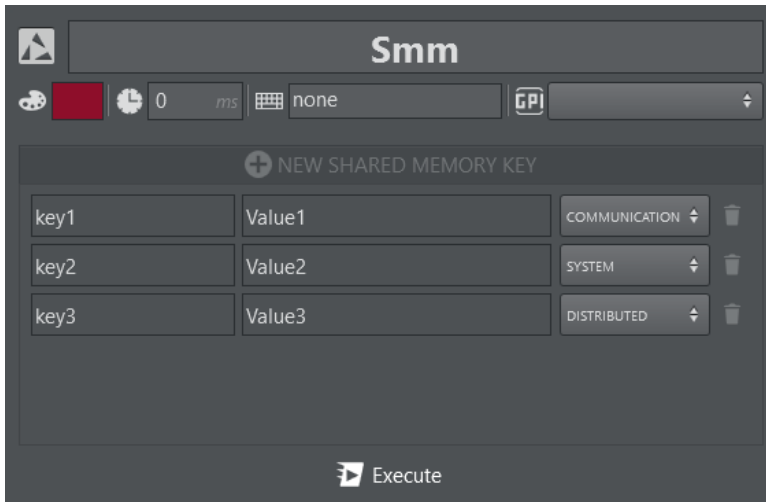
To Work with Page Animations



Once the pages are imported, you can work with Page animations:

	TAKE: start animation.
	CONTINUE: continue animation from the previous stop point to the next.
	TAKE OUT: take out the graphic.
	Execute: perform the action selected above.

Shared Memory



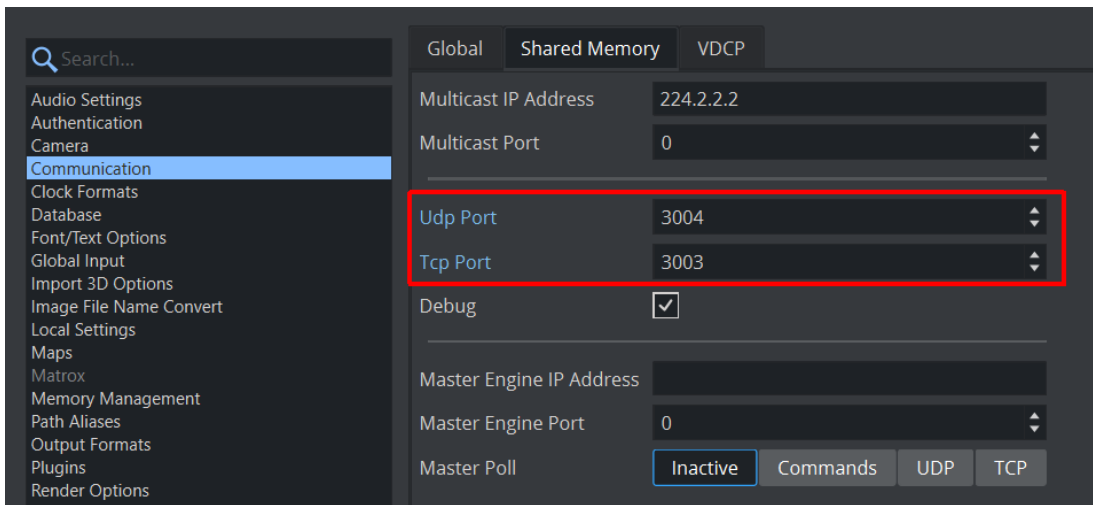
Set Shared Memory names and assign a value using Shared Memory. You can add multiple Shared Memory key/value pairs.

The value pairs can be sent to different shared memory destinations:

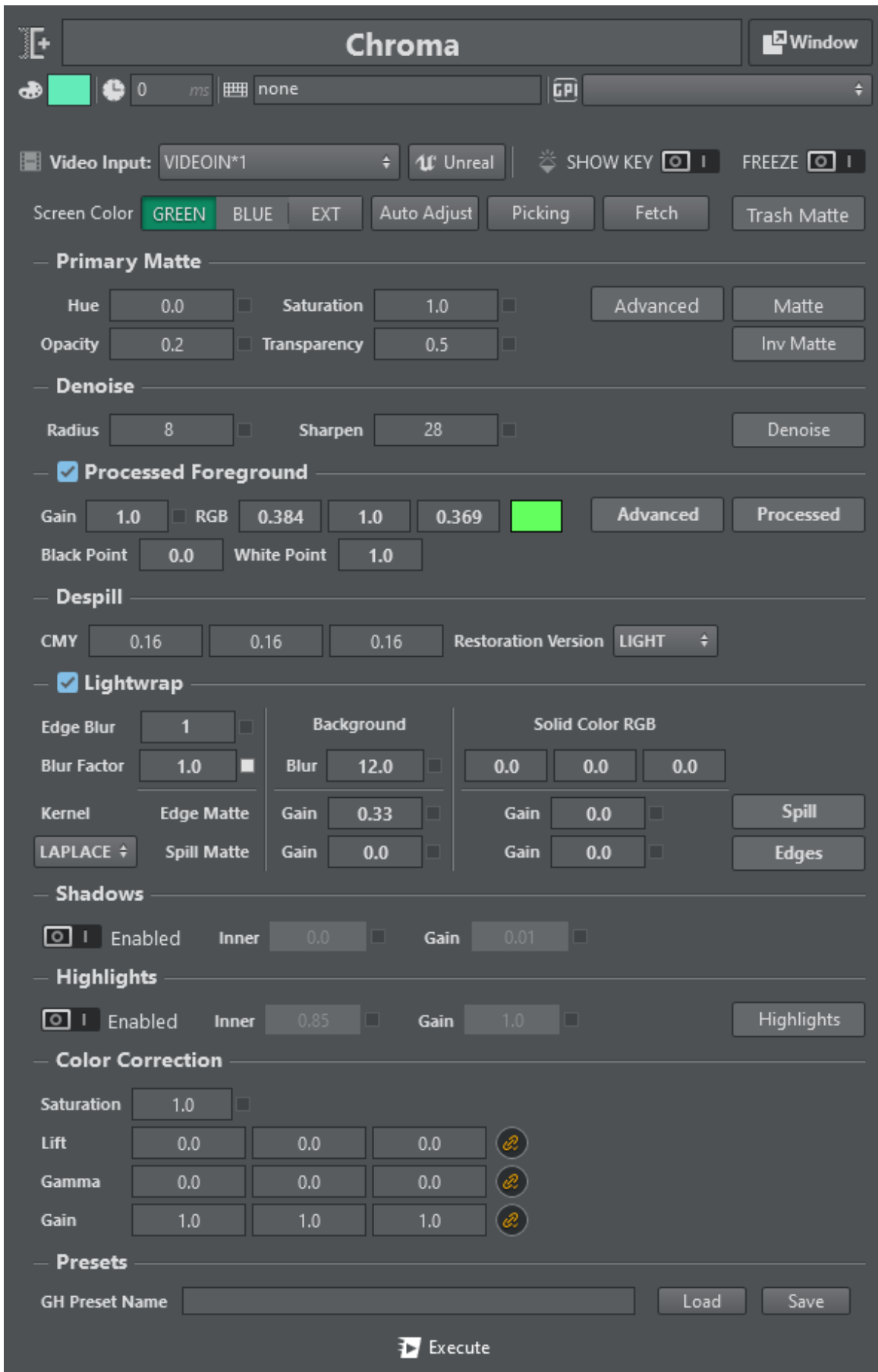
- **COMMUNICATION:** The VizCommunication map of the destination Engines is updated. Only the Engine's selected profile is updated.
- **SYSTEM:** The System map of the destination Engines is updated. Only the Engine's selected profile is updated.
- **DISTRIBUTED:** The VizCommunication map of the destination Engines is updated and all Engines connected with the same user to the Graphic Hub are updated as well.

The action works only when the destination Engine(s) have either UDP or TCP ports configured for shared memory updates. It uses the UDP port if configured other than 0, else it uses the TCP if configured other than 0.

The Viz Engine configuration, configured to receive shared memory updates via UDP on port 3004 or via TCP on port 3003.



Precision Keyer



Setting up the Precision Keyer is a sequential process where each step creates an interim result. The suggested layout follows the sequence and places the show buttons next to the items which need to be inspected. The show buttons are check boxes and can be overwritten if another checkbox got selected. If no checkbox is active the final composition is shown.

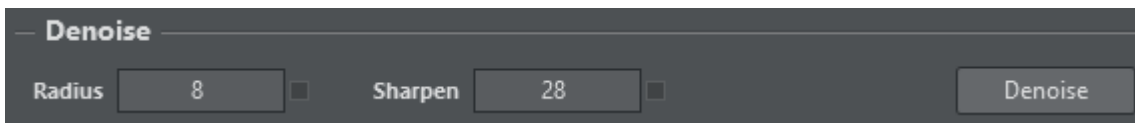
No checkbox	Shows the final and composed output of the Keyer.
Trash Matte	Shows the color coded trash matte on the output.
Matte	Shows the key output, white representing foreground and black the background.
Matte Inverse	Shows the inverse of the Matte output, foreground white, background black.
Advanced (Primary Matte)	Inks threshold values to ease setup when it is hard to distinguish between 0.9 and 1.0 (both appear "white" on monitors). Value 0.0 is mapped to green and 1.0 to red.
Denoise	Shows the output of the de-noising step.
Processed	Shows the processed output.
Advanced (Processed Foreground)	Inks threshold values to ease setup when it is hard to distinguish between 0.9 and 1.0 (both appear "white" on monitors). Value 0.0 (fully processed) is mapped to red.
Spill	Shows the spill matte.
Edges	Shows the detected edges between foreground and background.
Highlights	Shows the highlights in the foreground.

Primary Matte



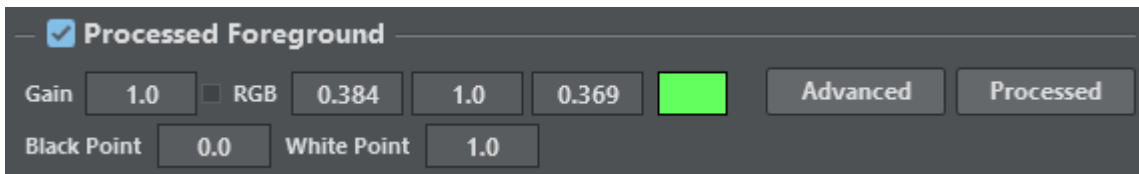
- **Hue:** Rotate the color space to move the color of the Cyclorama to the purest color chosen, green or blue. You can adjust this by looking at the matte and checking that the matte calculated on the Cyclorama approaches black.
- **Saturation:** If the video is not highly saturated you may want to adjust this to ease setting of the opacity and transparency point.
- **Opacity:** This is the point at which the primary matte value becomes 100% opaque. Equivalent to the black point on gray scale images.
- **Transparency:** This is the point at which the primary matte becomes 100% transparent. Equivalent to the white point in gray scale images.

Matte Denoise



- **Radius:** The radius of the bi-linear filter used to blur the noisy parts of the image.
- **Sharpen:** Pixels whose color differ more than this threshold from the main pixel are not included in the blurring process. This maintains detail, even if a large blur radius is applied.

Processed Foreground



- **Process Foreground:** Enables or disables the foreground processing. When disabled, it falls back to a classic alpha blending.
- **Gain:** Sets gain for the processed foreground color.
- **RGB:** Uses this backing plate color to process the foreground. This value gets subtracted from the foreground color, and the result should be black.
- **Black Point:** Scales the key value used when processing the foreground. Only affects areas where matte is > 0.0 and < 1.0 . Can be used to enlarge the talent in semi-transparent regions, increases lightness around edges.
- **White Point:** Scales the key used when processing the foreground. Only affects areas where matte is > 0.0 and < 1.0 . Can be used to shrink the talent in semi-transparent regions, decreases lightness around edges.

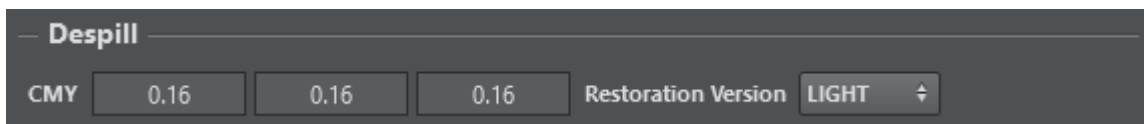
The Black Point can be used to enlarge talent, the White Point to shrink it. It only affects foreground processing and transition regions. Shrunken talent introduces darkened edges, enlarged talent enlightens edges.

i How to setup RGB values manually:

- Enabled Advanced mode, it highlights areas which are fully processed in RED (when processed - color is less than 0).

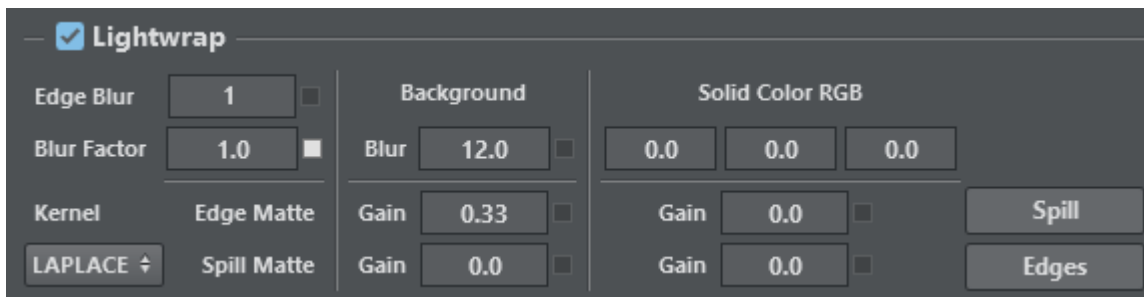
- Turn all values to 1.0, background should be fully red now, increase gain if it's not.
- Tune in B: Reduce value until the red areas start to vanish. Go back a little bit.
- Tune in G: Reduce value until the red areas start to vanish. Go back a little bit.
- Tune in R: Reduce value until the red areas start to vanish. Go back a little bit.
- Switch back to normal mode.
- Check result around edges, fine tune as necessary.

Despill



- **CMY:** Cyan, Magenta and Yellow despill gain.
- **Restoration Version:** Restores more lightness during despill when LIGHT is selected.

Lightwrap



Light wrapping: Light wrapping is a compositing technique designed to blend keyed out green screen footage with a background plate. Light wrapping is used to simulate ambient light that casts light onto your subject in the scene. Although in some circumstances (like mixed lighting) it can be better to use a different layer than your background layer for the light wrap, this all depends on your scene.

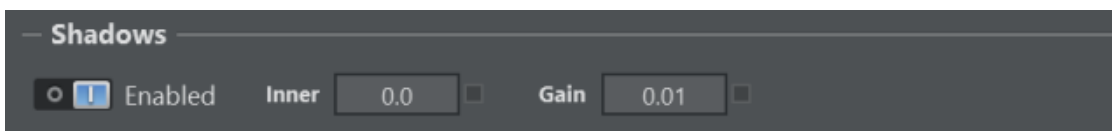
- **Lightwrap:** Enables or disables lightwrapping.
- **Edge Blur:** If this value is greater than zero, edge detection is performed and edges found are blurred by the amount set in this field. The blurred edges serve as input to brighten up the edges to overcome overshooting when going from a dark color to the Cyclorama. These edges are used for lightwrapping.
- **Edge Blur Factor:** Determines how much of the background blur is used for the edge lightwrapping. 1.0 = same blur as for spill lightwrapping, 0.0 = use unblurred background.
- **Kernel:** Choose between LAPLACE and SOBEL. LAPLACE is more fine-grained and keeps more details.
- **Blur:** The blurred background is used for lightwrapping onto the foreground together with the spill matte or the edge matte. See also Edge Blur Factor.
- **Edge Gain - Background:** Defines how strongly the lightwrap is applied to the background when using the edge matte.

- **Spill Gain - Background:** Defines how strongly the lightwrap is applied to the background when using the spill matte.
- **Solid Color RGB:** A constant color that is applied as a lightwrap on the foreground.
- **Edge Gain - Solid Color RGB:** Defines how strongly the lightwrap is applied to the foreground when using the edge matte.
- **Spill Gain - Solid Color RGB:** Defines how strongly the lightwrap is applied to the foreground when using the spill matte.

Spill: Carefully use **Spill Gain - Background** to create an ambient light effect, and increase **Edge Gain - Background** to improve edge quality. Blur level should be high to prevent transparency effects when using **Spill Gain**, while **Edge Blur Factor** can be low to reduce blur used for edge lightwrapping.

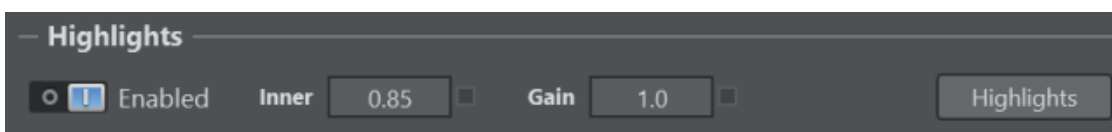
Edge Matte: Edge detection is performed on the primary matte, resulting in a grayscale image that in most cases needs to be blurred for a smoother transition.

Shadows



- **Enabled:** Toggles background shadows.
- **Inner:** Sets threshold under which shadows or dark colors are brought to the background. This feature is disabled if the value is zero.
- **Gain:** Strengthens the effect of bringing dark colors back.

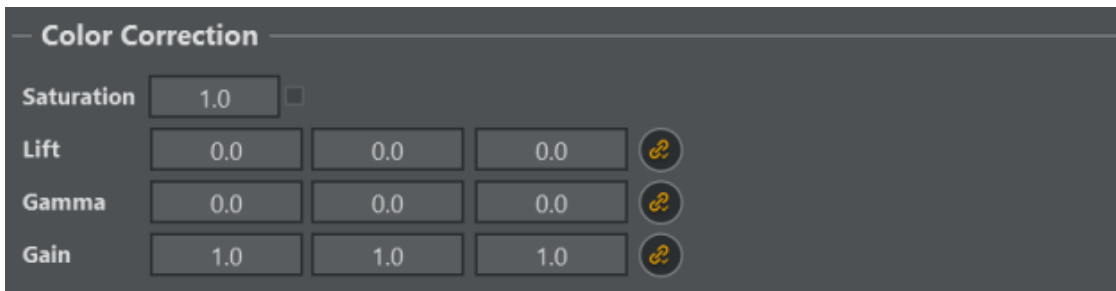
Highlights



- **Enabled:** Toggles foreground highlights.
- **Inner:** Luminescence from which highlights are added to the background.
- **Gain:** Highlight gain.

Color Correction

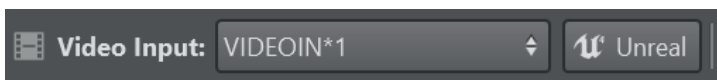
Primary color correction is applied on the already keyed foreground pixels.



- **Saturation:** Value for the overall saturation.
- **Lift:** RGB values for lift.
- **Gamma:** RGB values for gamma.
- **Gain:** RGB values for gain.

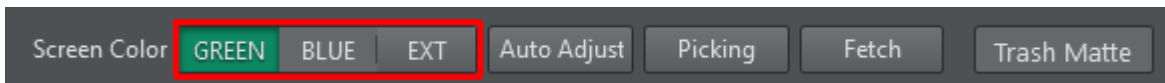
Video Input

Select the asset source to apply the keying on. Toggle the **Unreal** button to specify that keying takes place in the Unreal Engine.



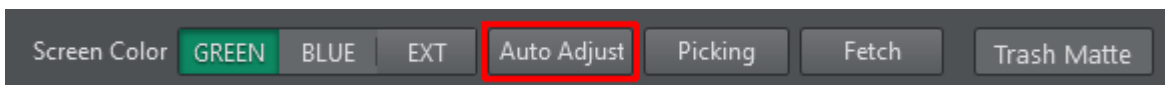
Screen Color

Select between **GREEN** and **BLUE** screen color, or **EXT** in order use key and processed foreground from external input, skips internal matte calculation and despiller.



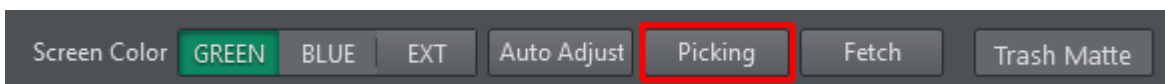
Auto Adjust

For an initial keying setup, point the camera into the green/blue box and hit the **Auto Adjust** button to get an initial key.

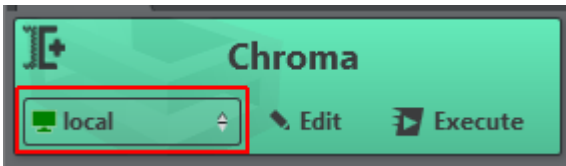


Picking

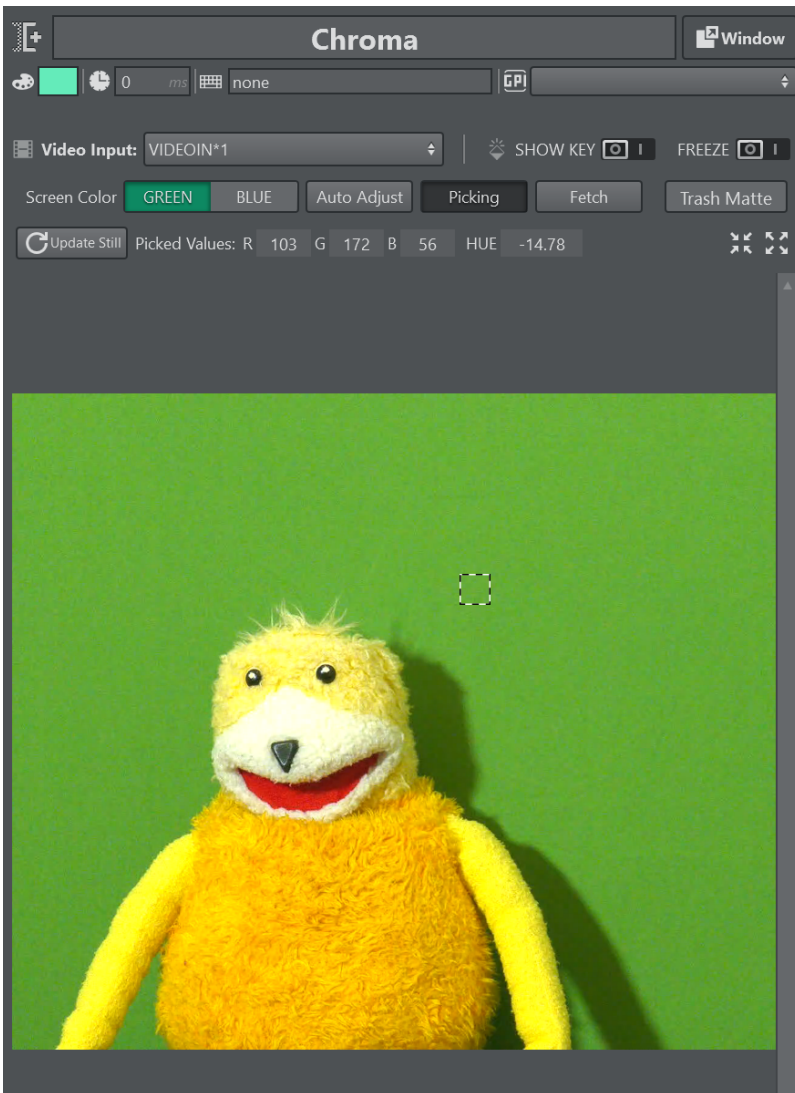
Picking lets you get a good first estimate of your Chroma/Precision Keyer. Press the **Picking** button to enter picking mode:



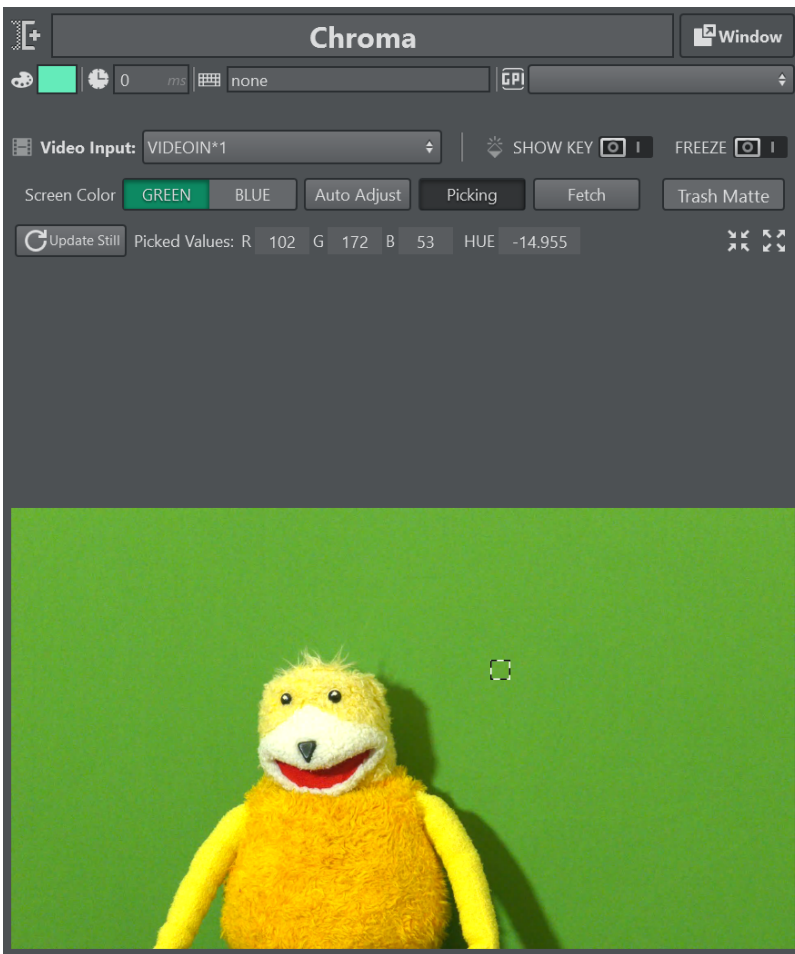
An attempt is automatically made to fetch a still frame from Viz Engine configured in the current channel selected in the chroma action.



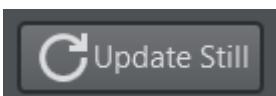
You'll now be able to scroll horizontally and vertically within the snapshot and pick an area of green. The picking area can be resized using the mouse wheel.



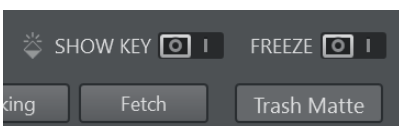
Once an area is picked, the calculated RGB values are displayed above the snapshot. The **HUE** value is only relevant if the Precision Keyer is selected. The picked values are directly applied to the Engine if *Update On-Edit* is enabled.



You can use the **Fit** and **Scroll** to view the snapshot either scaled into the view or in it's original size for more accurate picking.



To fetch a new still frame from Viz Engine for picking, press **Update Still**.



- The **Fetch** button retrieves the current keying settings from the Viz Engine. This is useful when creating a new Chroma Action that needs to be initialized with the current settings of Viz Engine.
- **FREEZE** freezes the selected video input on the Engine. Don't forget to unfreeze when you are finished adjusting the key.

- **SHOW KEY** forces the Viz Engine to output the key channel on the fill output. Deselect this when you are finished adjusting the key.

Adjusting the Keyer

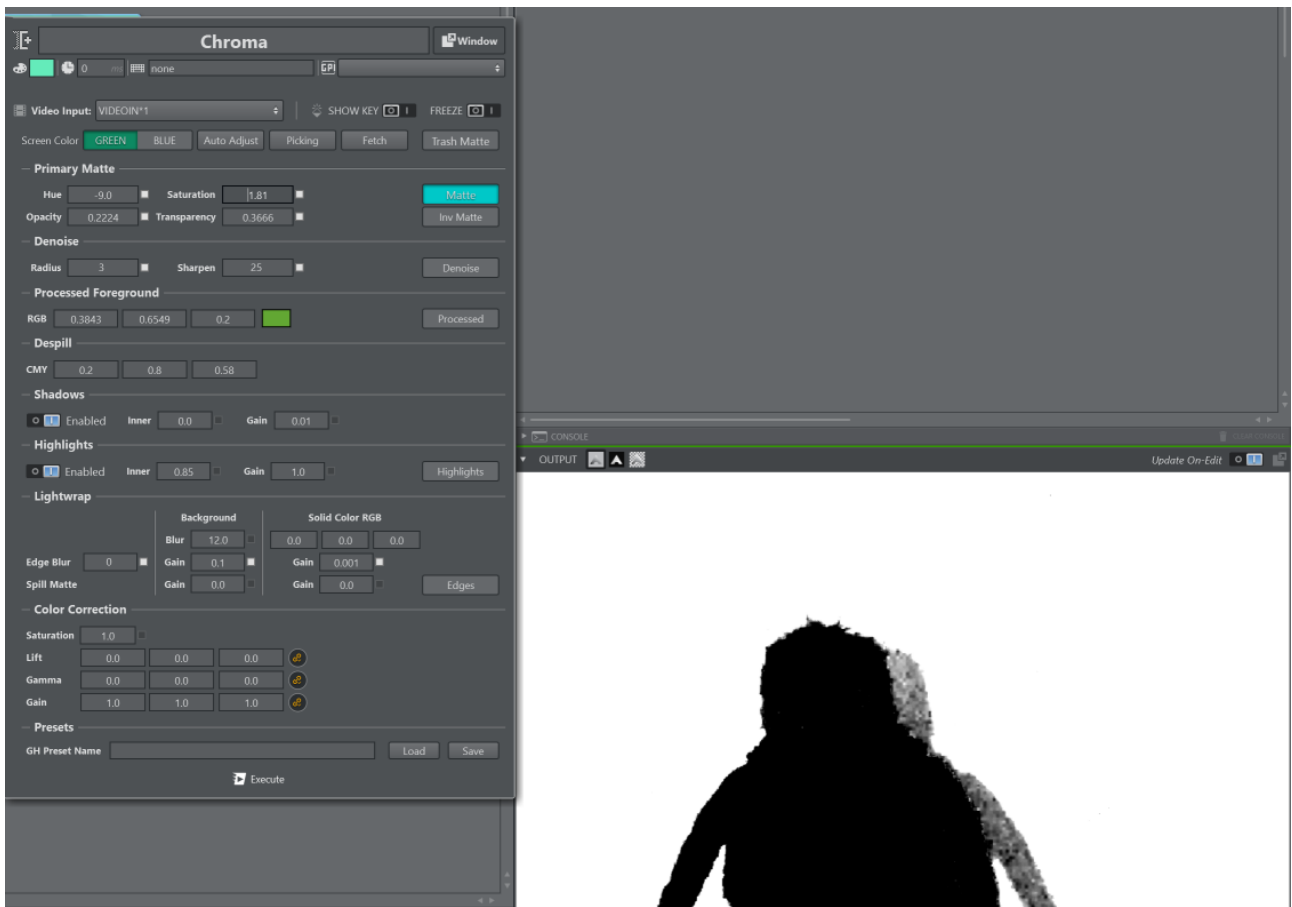
To get to a good keying result, the following steps should be followed in the described order, since the different steps depend on each other.

- Start by hitting the **Auto Adjust** key button in the Keyer control. This sets the values of the hue and saturation and ensures that the rest of the keying parameters are set to a value to optimize their influence on previous settings.
- The obtained result after hitting the **Auto Adjust** key button is the primary matte which results from the difference between the pixel colors and the primary color. The ideal hue can be found by viewing the matte and rotating the hue until the key strength is at a maximum. The brightness of the key represents the strength of the key. The saturation can be used to increase the key strength in case the signal coming from the camera is not very saturated. To adjust the limits for transparency and opacity the user can switch between the key and inverse key view. Clicking on the same button again disables the view.
- Denoising can be viewed either on the key signal or on the denoised frame which is used to calculate the key. A large radius has a performance cost. Denoising should eliminate the noise on homogenous areas, while keeping details like hair intact.
- The processed foreground is the next step. The background should be replaced by solid black. When reducing the gain, the user can check if too much or not enough red or blue is still in the processed foreground. Subtracting the wrong color results in red or blue tint in areas with semi-transparent key.
- Despilling serves two purposes: It removes the green or blue spill from the people and objects in the studio and generates a matte which can be used for light wrapping with either a solid color or blurred background. The shadows and highlights sections allow to bring back dark and bright colors. This happens after the processed foreground has been applied to the background. This should be done after adjusting the primary key and processed foreground.
- Lightwrapping helps to blend foreground and background better and should be the last step in the process of keying/compositing.
- A color correction can be applied to the processed foreground. It has no effect on any of the keying and blending methods.

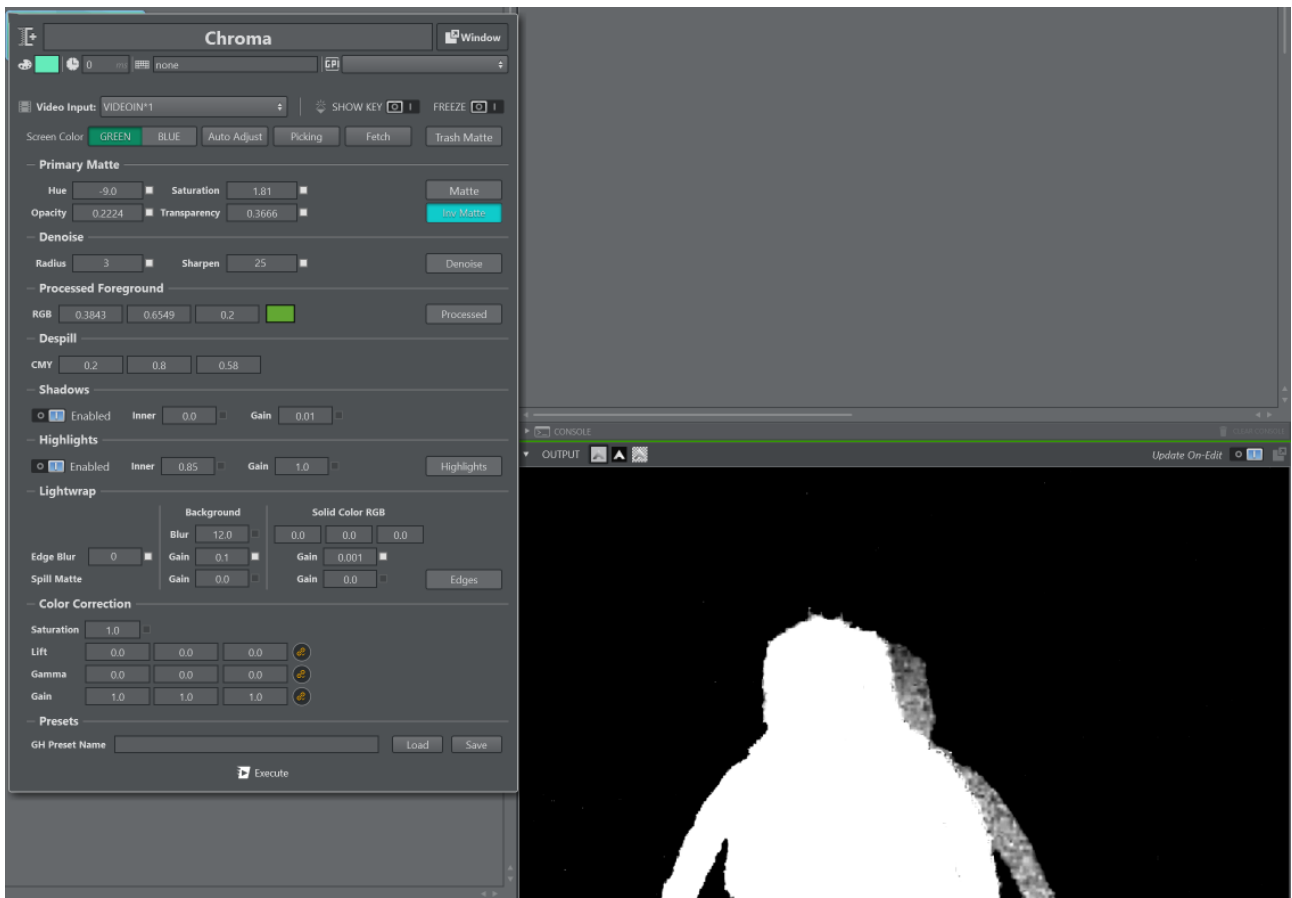
Precision Keyer Stages



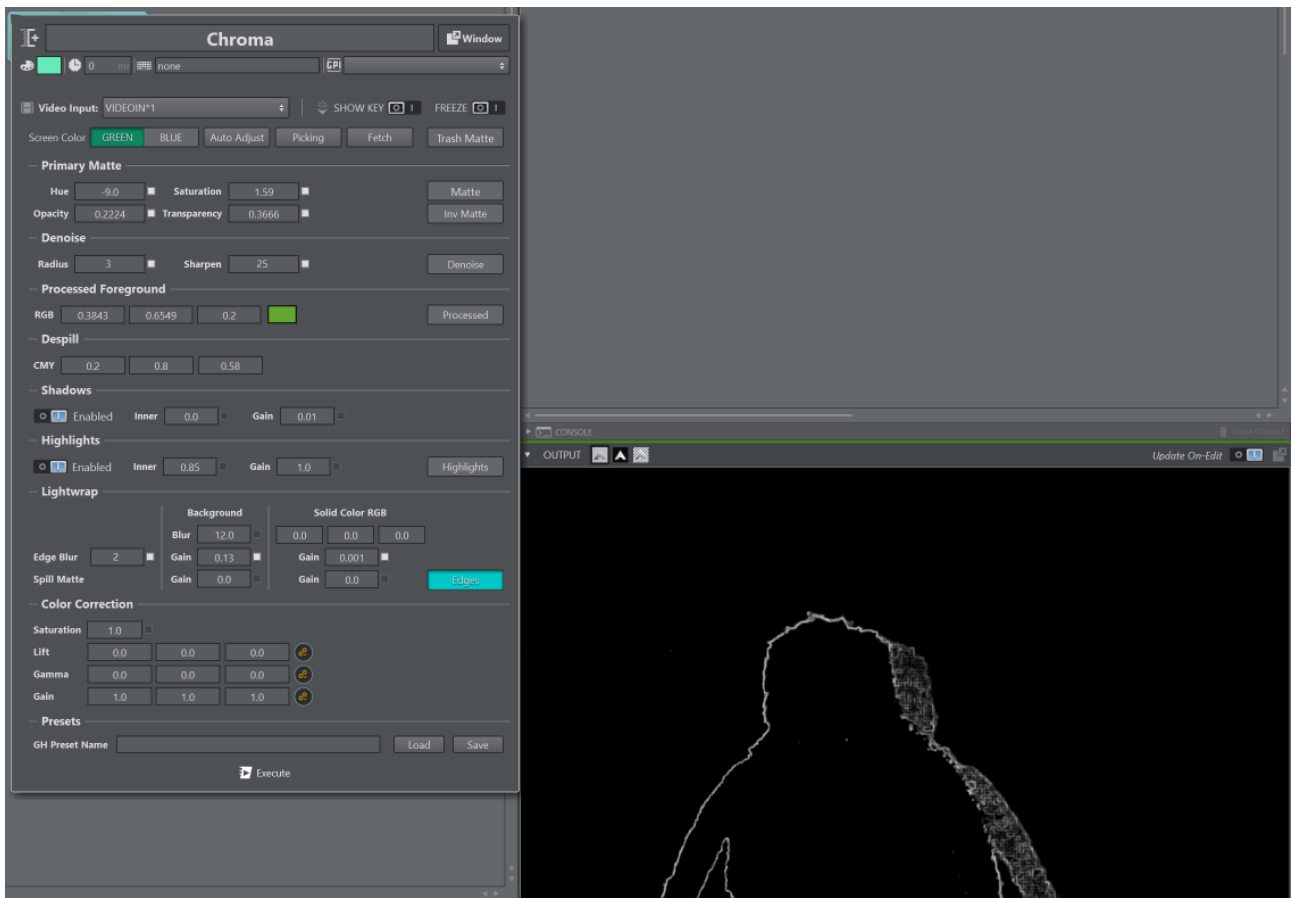
The final composited output after **Auto Adjust** has been pressed is shown above.



Output of the matte only, black representing foreground and white background, is shown above.



Output of the inverse matte only, black representing background and white the foreground, is shown above; helpful for seeing details such as hair.



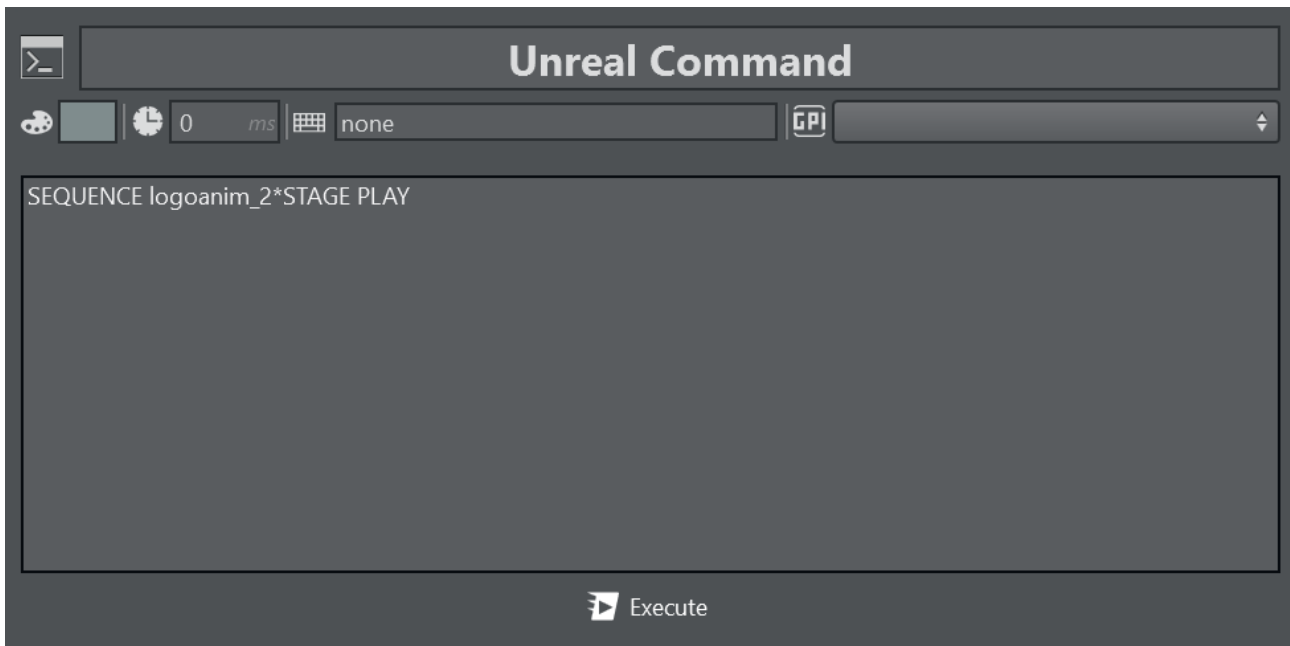
Output showing the detected and blurred edge is shown above.



Output of the processed foreground that also shows the light wrap around the talent is shown above.

Unreal Command

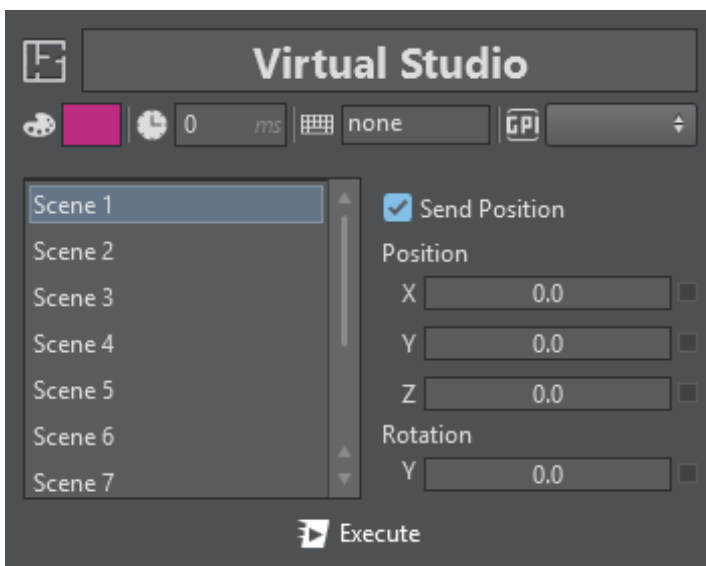
The Unreal Command action lets you write custom commands to talk to the Unreal Engine, for example to trigger a sequence. Multiple commands can be sent separating them by ; and a newline.



Native Unreal commands are also allowed such as for example:

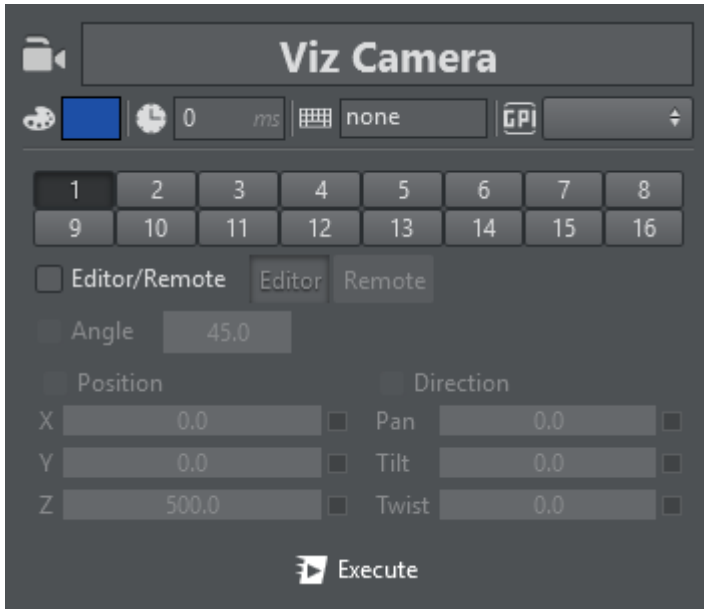
- **disableallscreenmessages:** Disables all screen messages.
- **enableallscreenmessages:** Enables all screen messages.
- **scalability 2:** Sets the render quality to *High*.
- **stat FPS:** Shows some FPS information on screen.
- **stat unit:** Shows some useful performance information on screen.
- **r.ScreenPercentage 50:** Sets the [Screen Percentage scaling resolution](#) to 50.
- **sg.ShadowQuality 0:** Reduces the [Shadow Quality](#) to 0.

Virtual Studio

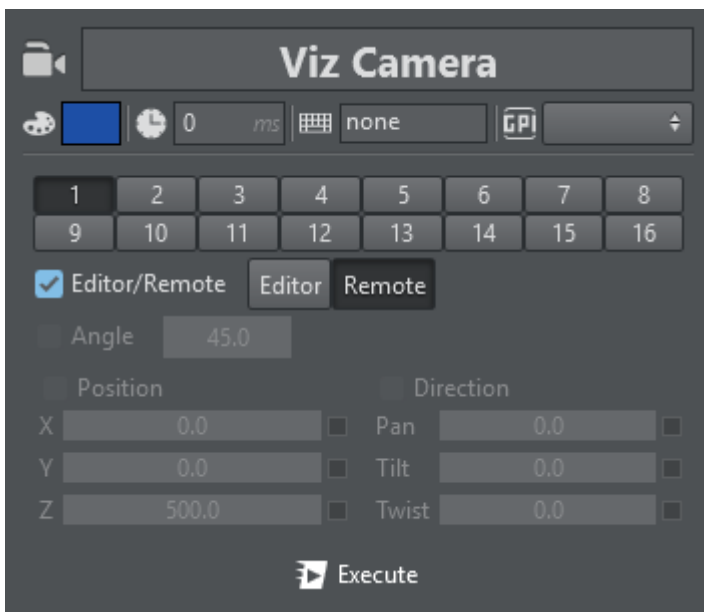


Virtual Studio lets you set up X/Y/Z positions and Y rotations of every scene listed at the left of the panel. When **Send Position** is unchecked, it only sends the scene index to be selected on the Engine(s) and uses the position and rotation stored in the current scene.

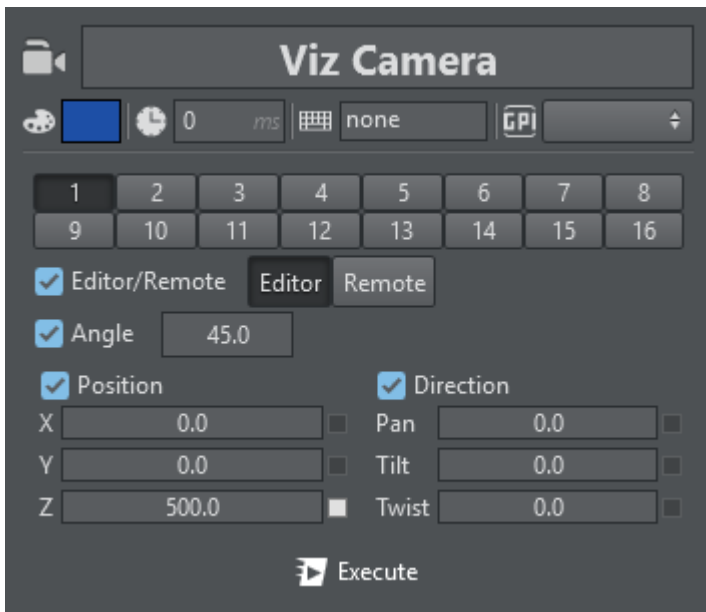
Viz Camera



In Viz Camera, you can select between every camera in Viz Engine (from 1 – main to 16). The default behavior once a Camera Action is created is to simply switch the active camera.



If the toggle **Editor/Remote** is activated you can force a camera to be in **Remote** or in **Editor** mode, for example.



When **Editor** mode is selected, you can enable all aspects of the camera such as **Angle**, **Position** and **Direction** and force the displayed values.

5.4.2 Scene Action Types

Import from a scene/stage tree and edit parameters of these supported types:

- [Alpha](#)
- [Control Channel](#)
- [Control Objects](#)
- [ControlObjects in Unreal Engine](#)
- [Director](#)
- [Geometry](#)
- [To Import a Geometry](#)
- [Light](#)
- [Material](#)
- [Image](#)
- [Key](#)
- [Omo](#)
- [PBR Material](#)
- [Phong](#)
- [Script](#)
- [Text](#)
- [Transformation](#)
- [To Create a Linked Action](#)
- [Viewport](#)
- [Visibility](#)

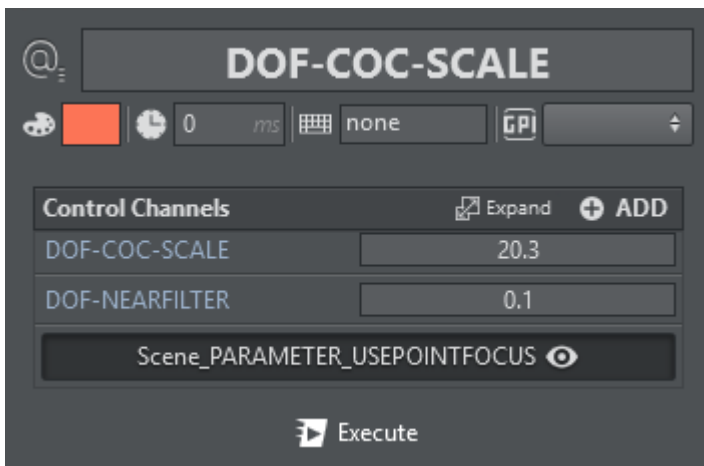
Alpha

Alpha lets you set the opacity to the referred object, from `0.0` (not visible) to `100.0` (fully visible).

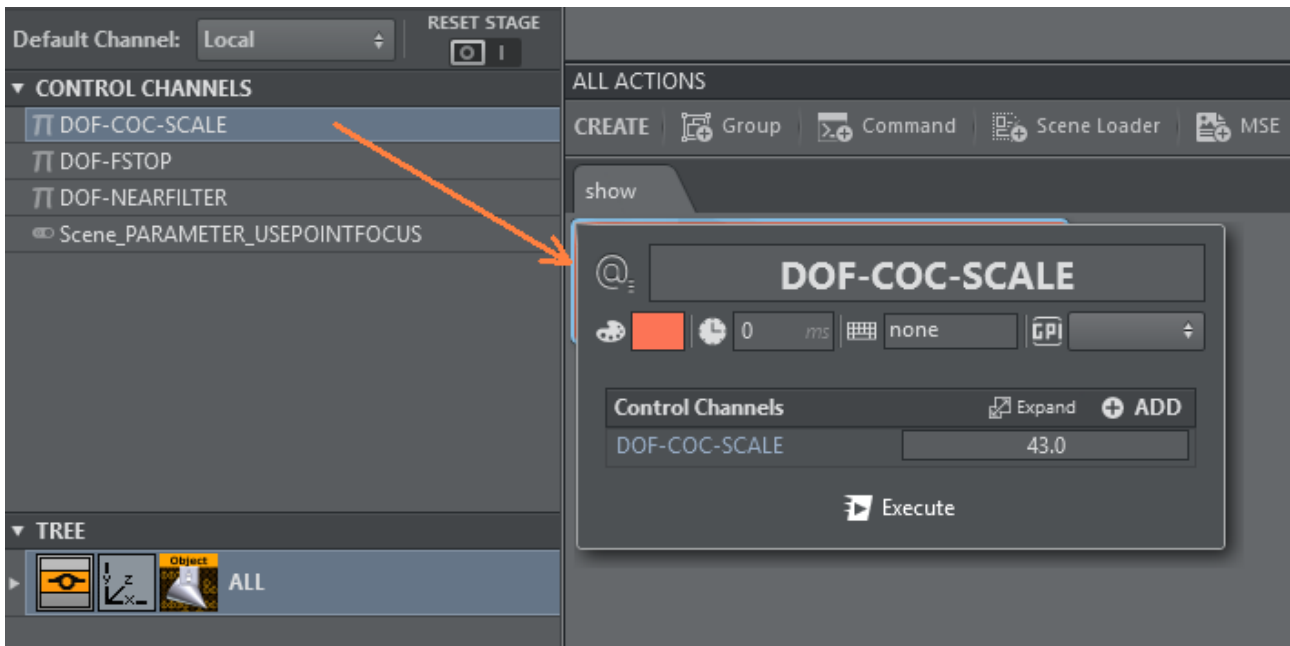


Control Channel

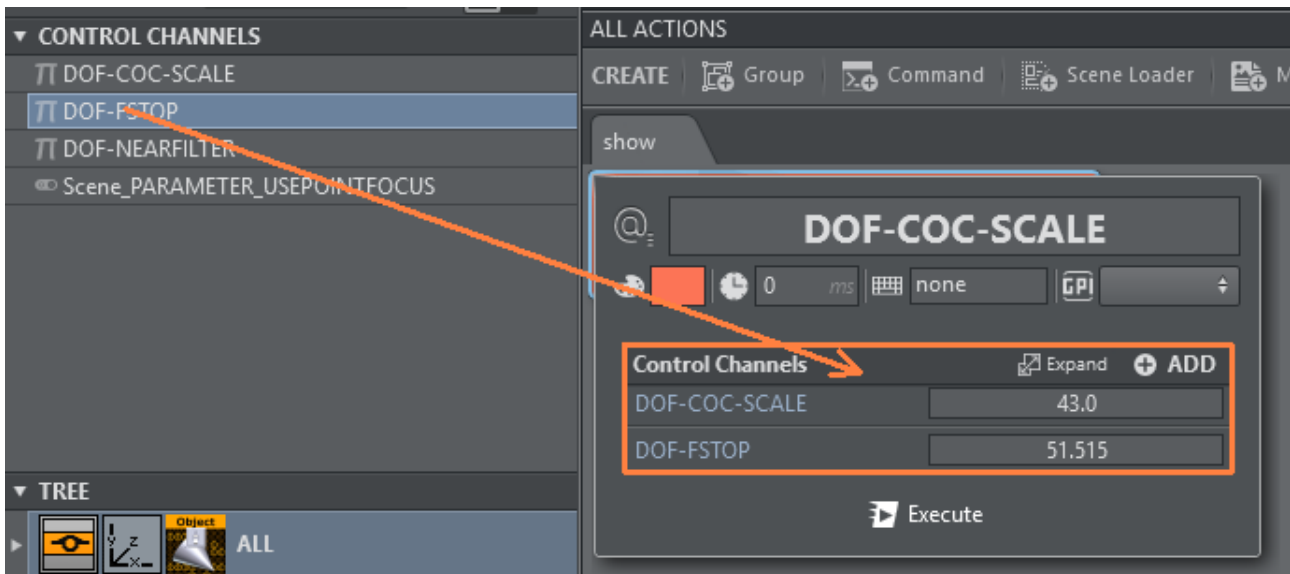
Control Channel lets you control basic Control Channel types such as floats, integers, and Boolean values. This can be particularly handy in conjunction with the Viz Engine 4 Render Graph.



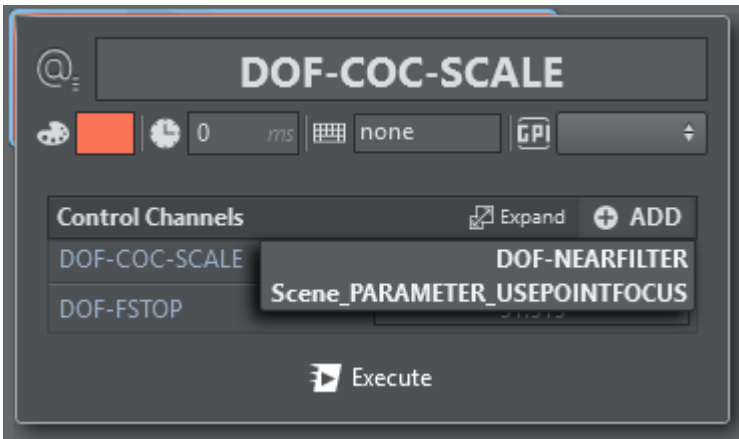
To create a Control Channel action, drag and drop a Control Channel to the action canvas:



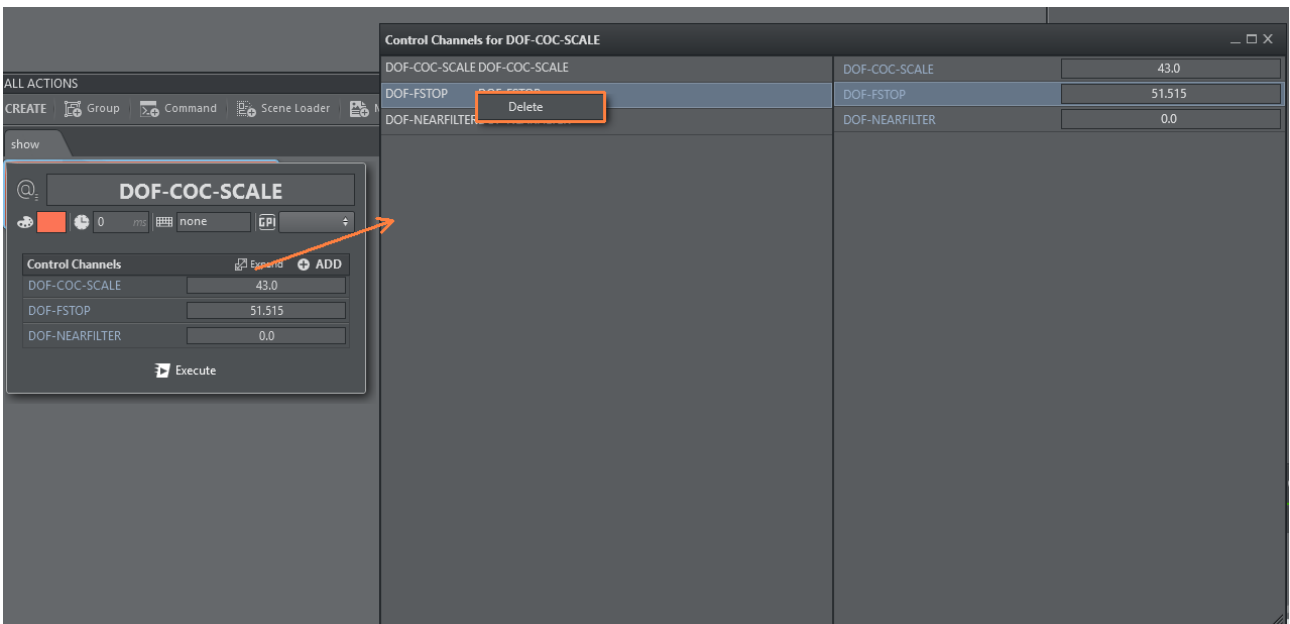
If more than one parameter needs to be controlled by the same action, edit the action and drag more parameters into the designated area:



or use the **ADD** button to select from a list of available Control Channels to be added:

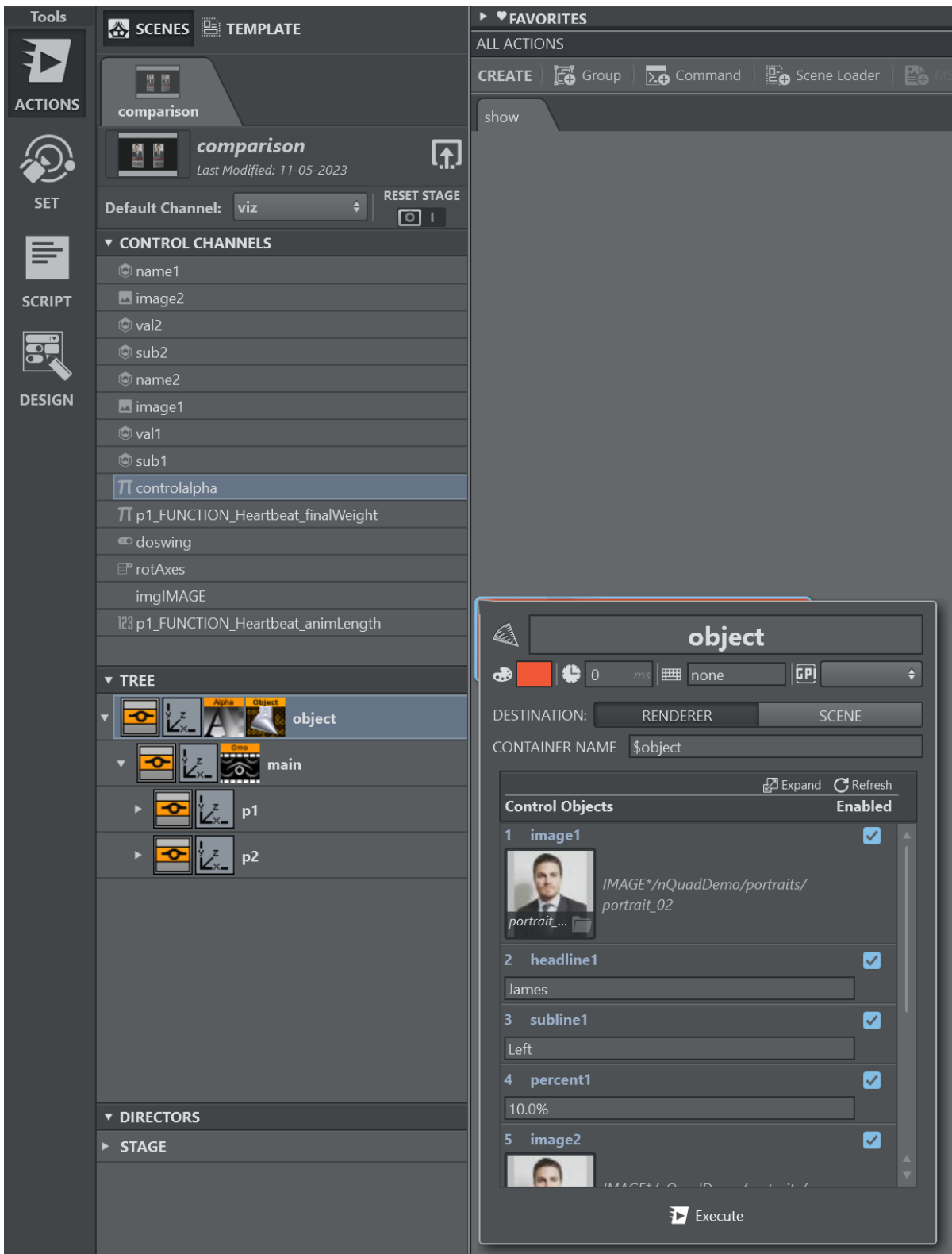


To remove Control Channels from the action, click the **Expand** button and use the context menu to delete single Control Channels in the newly opened window:

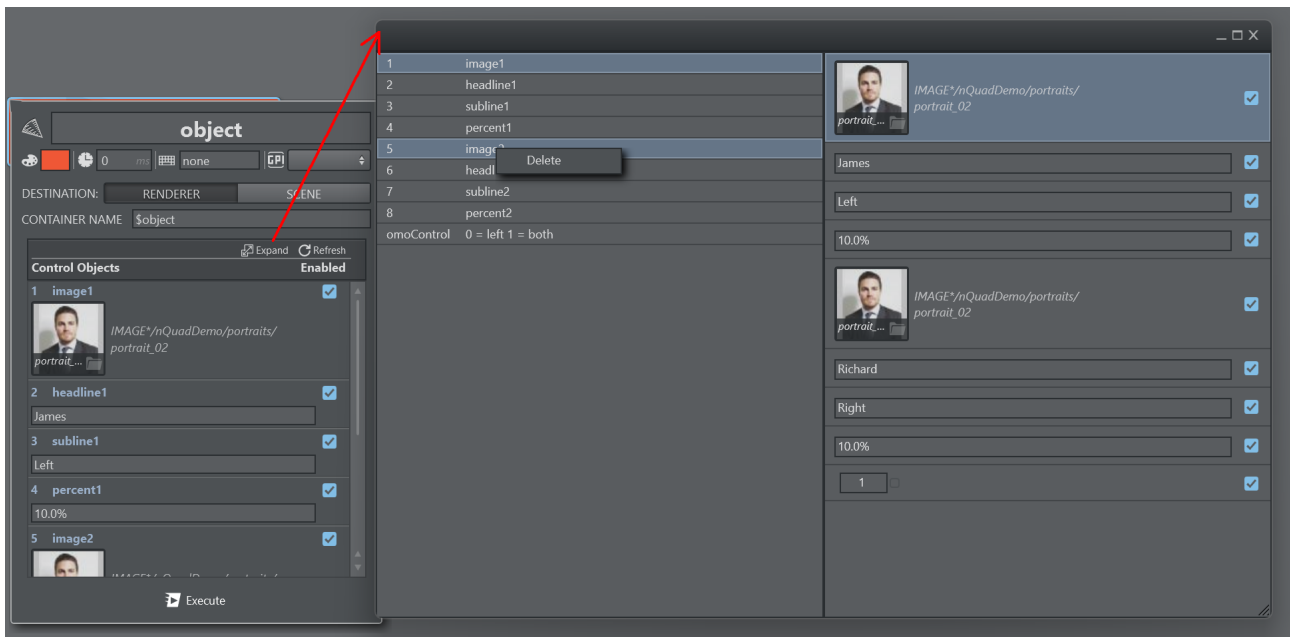


Control Objects

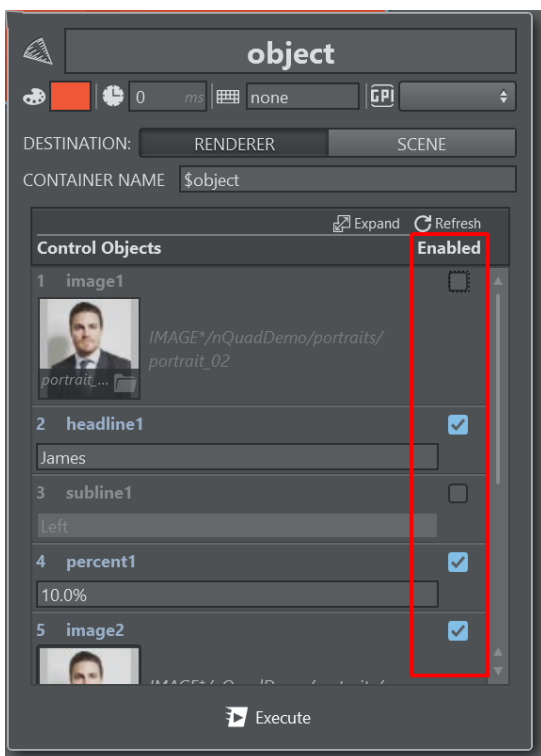
Control Object actions can be used by dragging a Control Object plug-in from the scene tree into the action canvas. It gives you a list of the Control Objects under the respective tree structure.



Expand the controls clicking the **Expand** button for a better overview and to enable deletion of single or multiple Control Objects. Select all the controls that shall not be set by this action, then select **Delete** from the context menu.



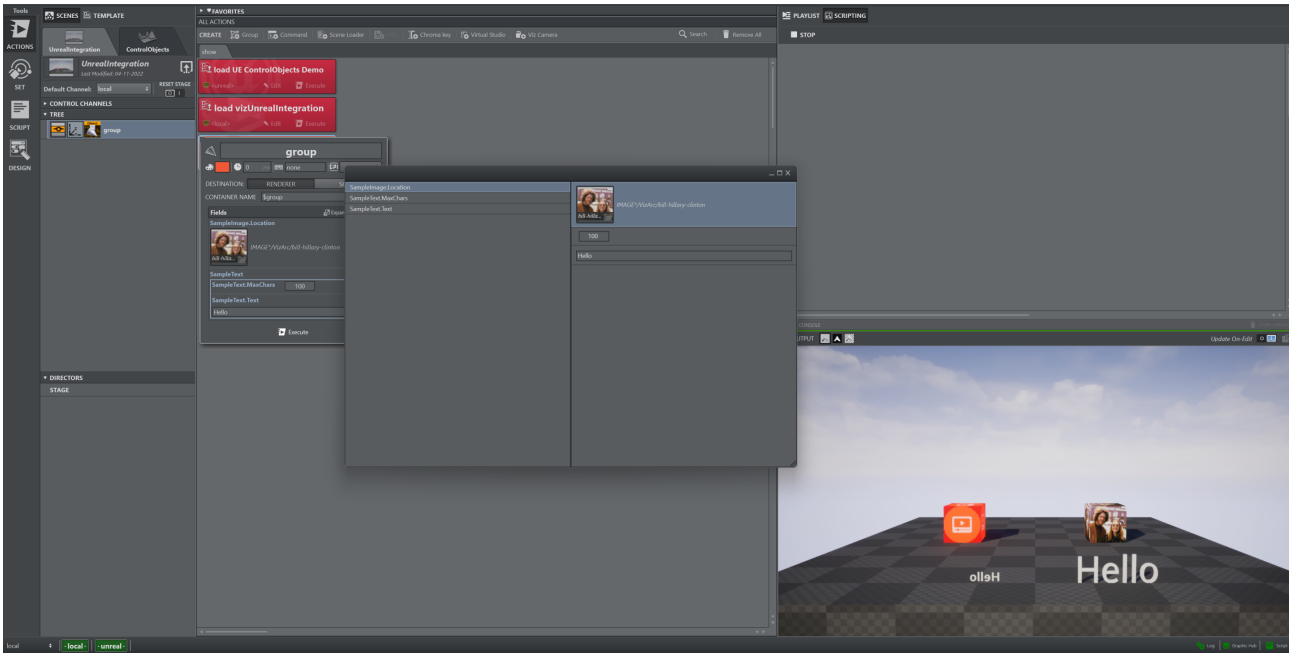
Use the **Refresh** button to update the list from the associated scene, in case the scene has been modified after the action's creation.



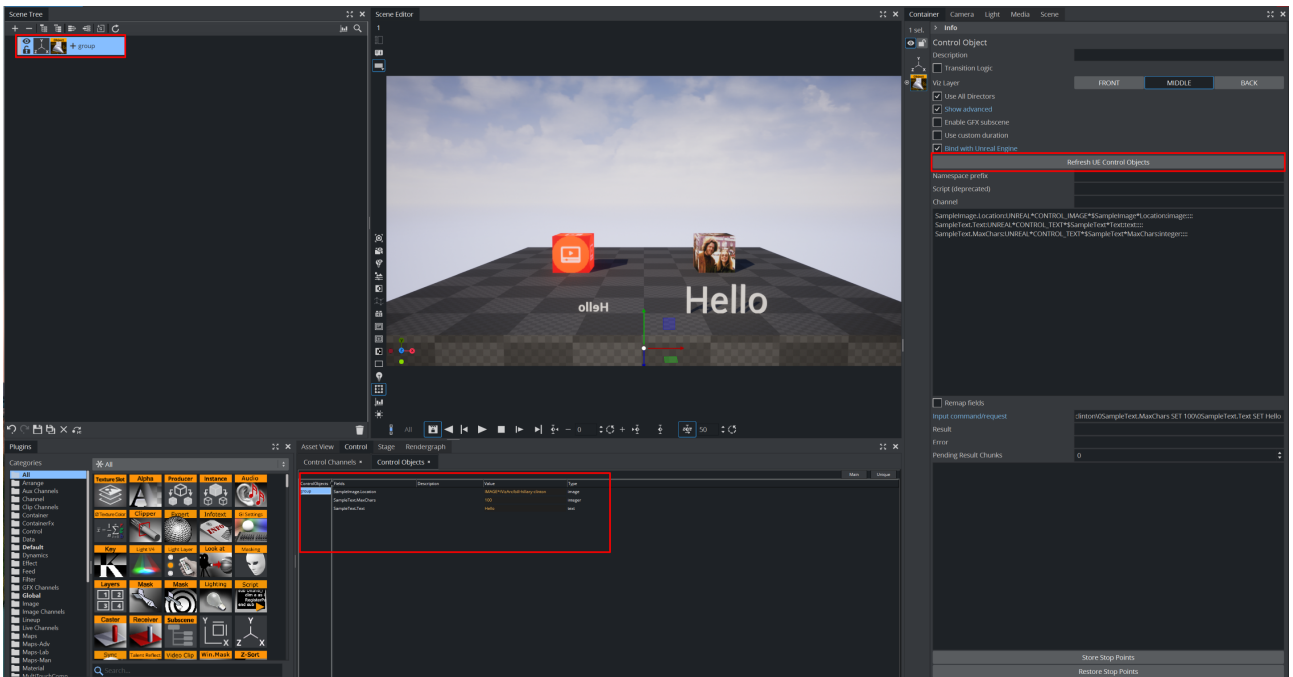
In some cases you might want to send only a subset of the entire Payload. Use the **Enabled** toggle flag for each Control Object to enable or disable setting the specific property on the Viz Engine. It behaves similar to the delete option described above, but in this case you can re-enable the disabled Control Object easily.

ControlObjects in Unreal Engine

The Viz Engine's Control Object integration allows you to control aspects of the Unreal scene using **Control Objects**. Viz Engine's Control Objects can be used to ingest images from the Graphic Hub to the Unreal Engine.

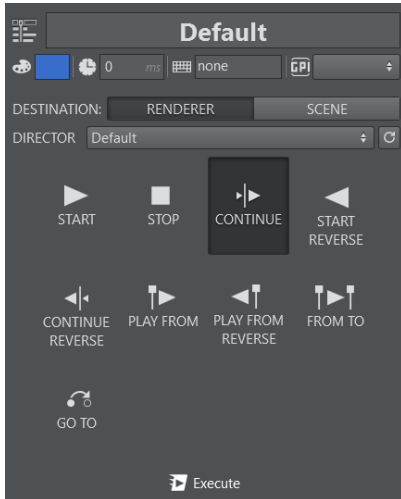


Control Objects can be refreshed within the Viz Engine by using the **Refresh UE Control Objects** fetching the exposed controls of the currently loaded Unreal Level.












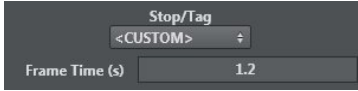
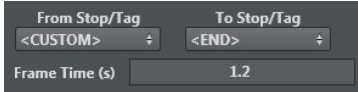
Director

Director lets you handle stage animation of a specific stage director or ALL stages.

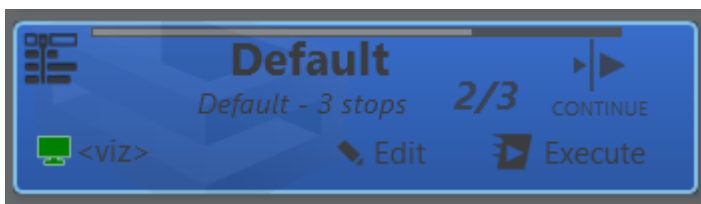


It's possible to:

	<p>START an animation.</p>
	<p>STOP an animated director.</p>
	<p>CONTINUE an animation to the next step.</p>
	<p>START in REVERSE mode.</p>
	<p>CONTINUE in REVERSE mode.</p>
	<p>PLAY FROM a specific KEYFRAME.</p>
	<p>PLAY FROM a specific keyframe in REVERSE mode.</p>

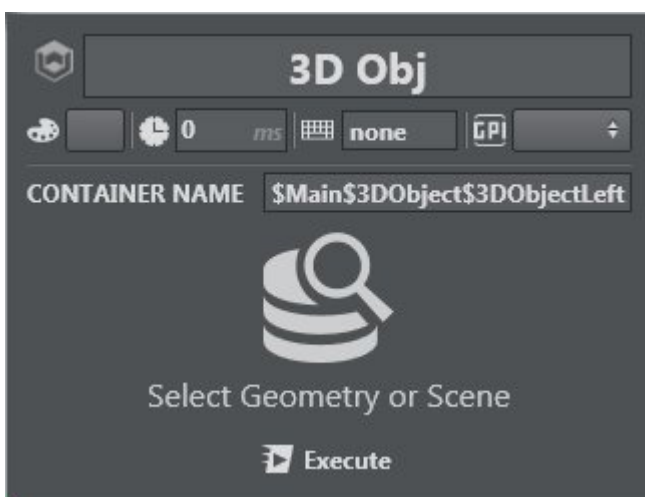
 <p>FROM TO</p>	<p>PLAY an animation FROM a specific KEYFRAME TO another.</p>
 <p>GO TO</p>	<p>SET an absolute time in seconds and jump (GO TO) tag/stop points.</p>
	<p>This menu lets you set the Stop/Tag for PLAY FROM, PLAY FROM REVERSE and GO TO options, and the Frame Time for the CUSTOM option.</p>
	<p>This menu lets you set the From stop/Tag and To Stop/Tag for PLAY FROM and GO TO options.</p>

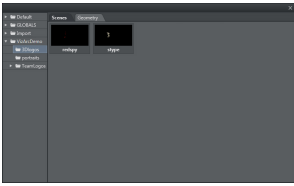
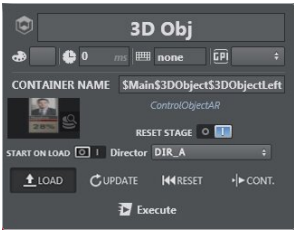
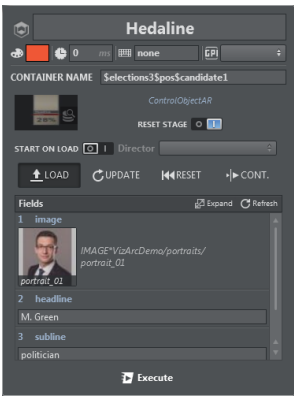
The Director Action shows the number of stop points when a specific director is selected (for example, not the <STAGE>). When the action is selected, a progress bar on top alongside with the currently reached stop point (for example, 2/3) is visualized. The number of stop points is read on the creation of the action and when the action is explicitly refreshed.



Geometry

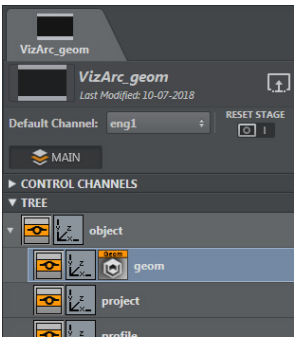
Use this menu to set an OBJ or SCENE element in a specified container.

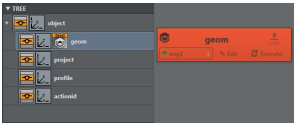

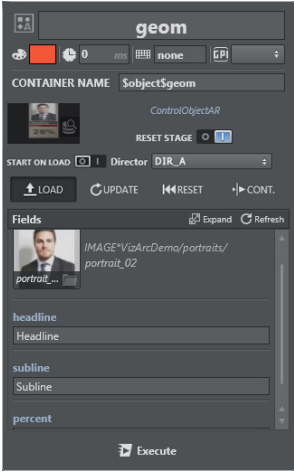
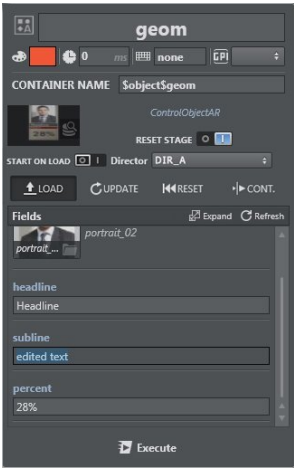


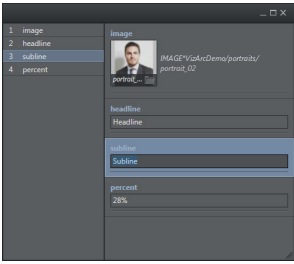

	<p>Clicking Select Geometry or Scene makes all GH trees appear in a new window, where you can select a new GEOM.</p>
	<p>Selecting OBJECT makes the relevant thumbnail appear in the action box.</p>
	<p>It's also possible to select a SCENE instead of GEOM. Once the scene is loaded in the geom plugin, a separate edit section appears where it's possible to handle <i>control object</i> (if applicable) of the selected scene.</p>

To Import a Geometry

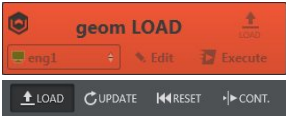


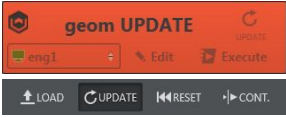
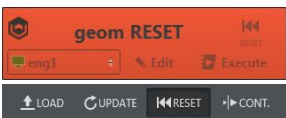
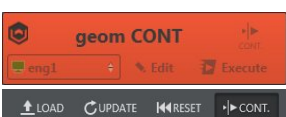
In Viz Arc, it's possible to import objectified scenes (GEOM) into another scene through the GEOMETRY element. Once the selected object is imported in the right GEOM, it's possible to load, update, refresh and continue. A step-by-step example of importing and playing an objectified scene follows below:

	<p>Load a main scene that contains at least one GEOM element.</p>
---	---

	<p>Drag the GEOM element into the main area.</p>
	<p>Press Edit and select the scene.</p>
	<p>Once you select the scene, a list of control objects appears (if applicable). You can enable the RESET STAGE option to have the scene placed on the 0.0 frame in the stage.</p>
	<p>You can edit every control object listed in the scene.</p>

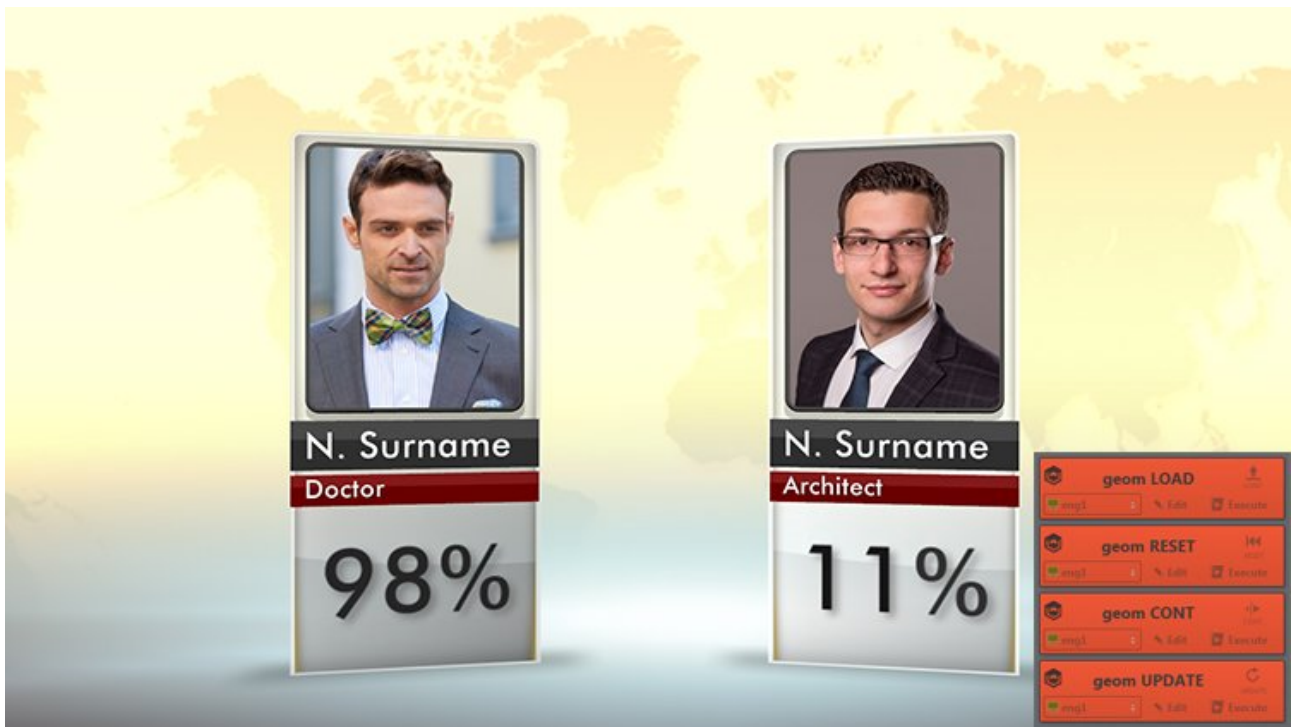
	<p>You can use the  icon to open a popup window that contains a detailed list of control objects, where you can modify each field by clicking it.</p>
---	--

Once you have created your action box, you can duplicate it by pressing **CTRL +D** and assign a different action (**LOAD**, **UPDATE**, **RESET**, **CONT**) to each box. Follow the steps below to play the GEOM scene in the main scene:

	<p>This command loads the scene/object in geom.</p> <p>If  is enabled, the scene/object is loaded with all its stage animation set to frame 0.</p> <p>If  is disabled, it works like a <i>Take command</i>, loads and start stage.</p>
	<p>This command updates all changed control objects On Air.</p>
	<p>This command initializes the stage (<i>frame 0.0</i>).</p>
	<p>This command plays the scene. If the scene has multiple animation steps, you can continue the animation by clicking it multiple times.</p>

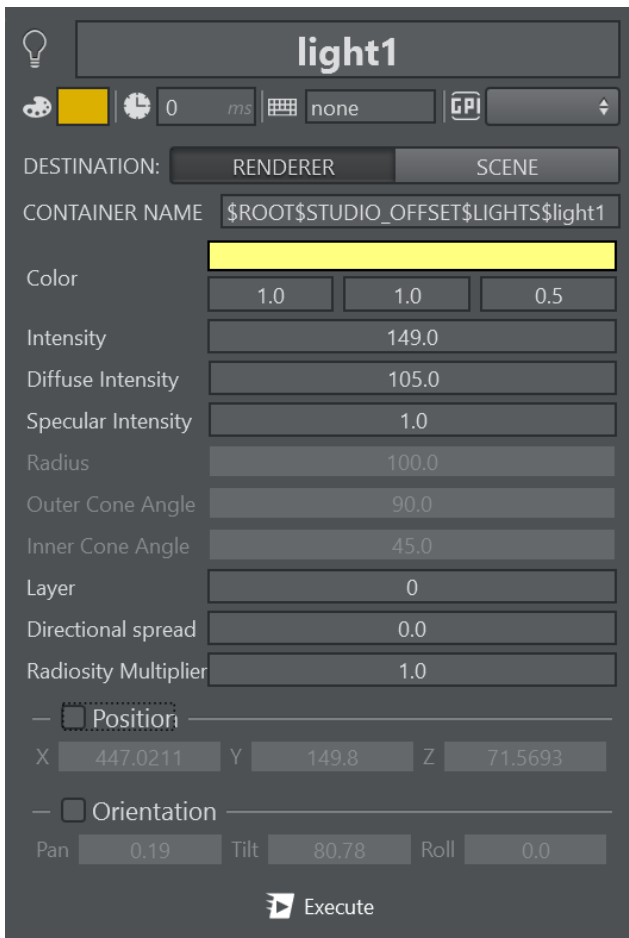
For **LOAD**, **RESET** and **CONTINUE**, you can choose a specific director instead of the full stage.





Light

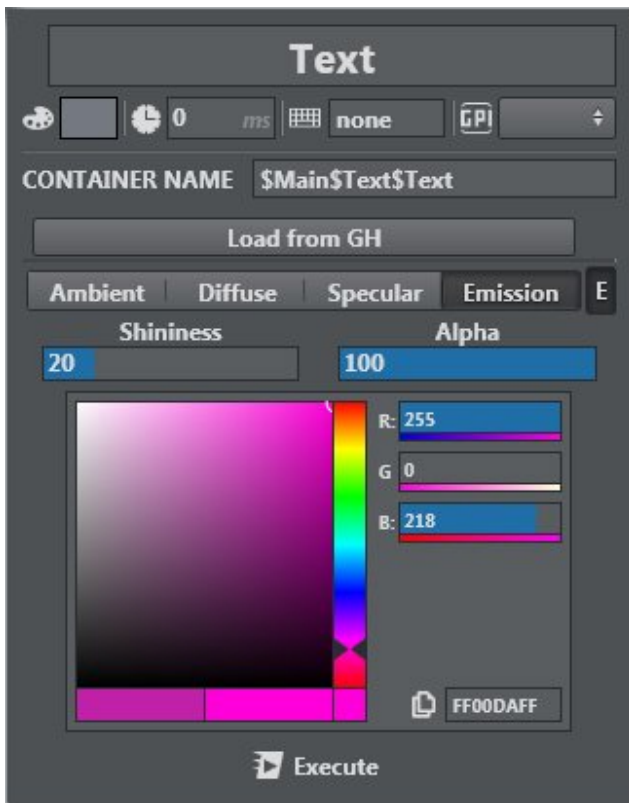
The light action works together with Viz Engine V4 lights. All light types are supported (directional, area, spot, point).



The **Position** and **Orientation** settings can be optionally set and act on the container transformation.

Material

The Material menu lets you set the material of an element and its **Shininess** and **Alpha**. Set a unique color or set every color to **Ambient**, **Diffuse**, **Specular**, **Emission** lighting by enabling/disabling the **E** button next to the lighting tabs.

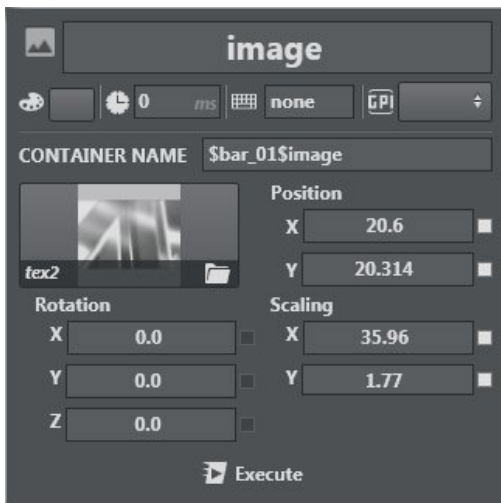



- **Ambient:** Determines the color that the object reflects when illuminated by a natural ambient light.
- **Diffuse:** Determines the real color of the object, revealed when the object is illuminated by a neutral light.
- **Specular:** Determines the color that the object has when the light meets the object surface and reflects in the camera.
- **Emissive:** Determines the self-illumination color.

You can import an existing material in GH (Graphic Hub) by pressing the **Load from GH** button.

Image

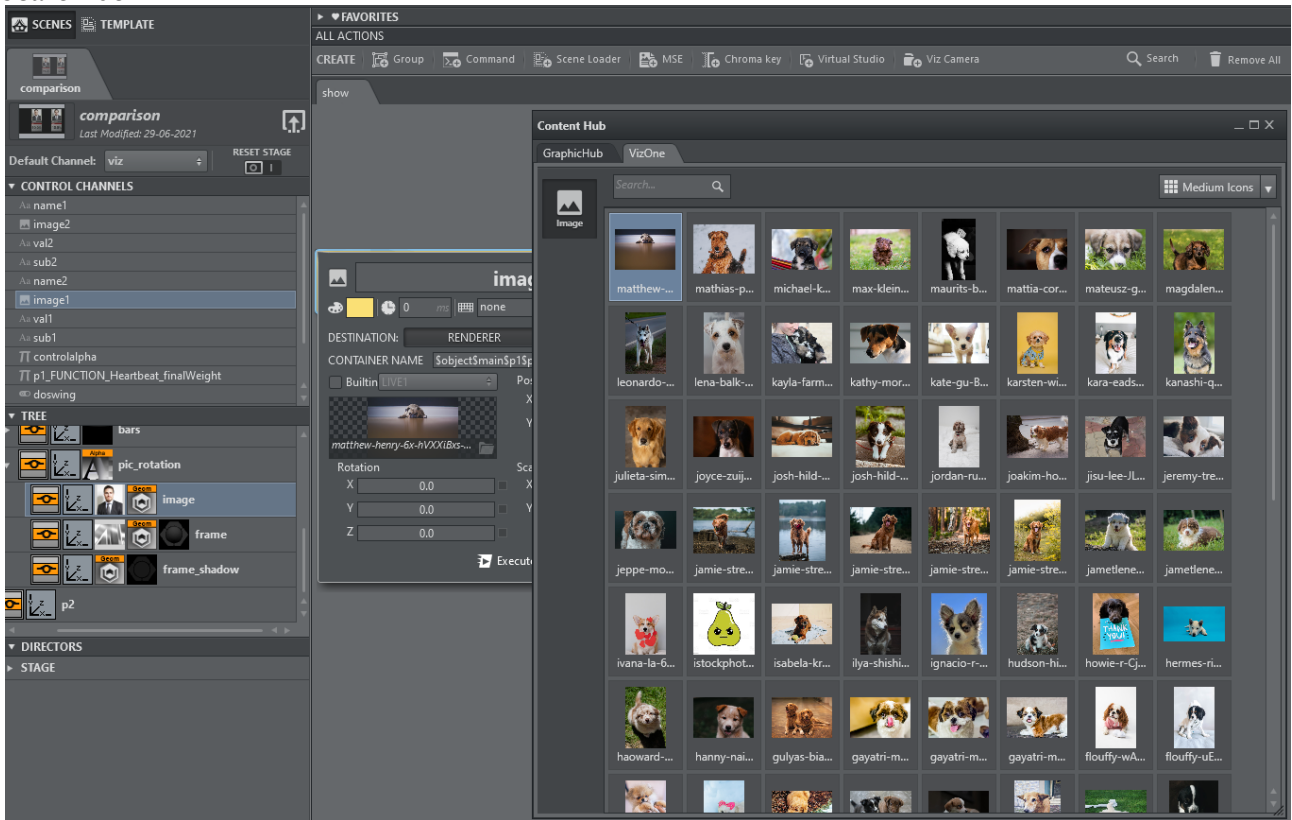
Image lets you select an image, both from GH tree and external explorer files, and set basic transformation parameters like **Position**, **Rotation**, and **Scaling** of the image texture.



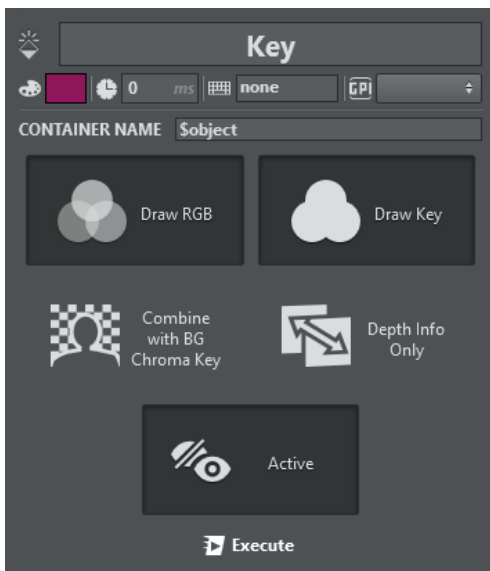
	<p>Once in edit mode, click image to browse the database and select an image from Graphic Hub.</p>
	<p>Once in edit mode, click the folder icon  at the bottom of the image box to browse the file system and select an image from your PC or device.</p>
	<p>To see the image path, hover your cursor over it.</p>

With a properly configured Viz One or Viz Media Service, assets can be picked from those sources in addition to local files or Graphic Hub. It is possible to search for assets within Viz One using the






search box.



Key



Use the Key menu to handle Key options for a container:

 Draw RGB	Draw RGB
 Draw Key	Draw Key
 Combine with BG Chroma Key	Combine with BG Chroma Key - combines the alpha of the container with the alpha of the background before blending the foreground with the background.
 Depth Info Only	Depth Info Only - depth only for occlusion rendering with Live Video.
 Active	Active - shows if the Key plugin is active or inactive. Typically used in a green screen scenario to determine whether an object should appear in front of or behind the talent.

Omo

Use this menu to adjust the Omo plug-in settings:

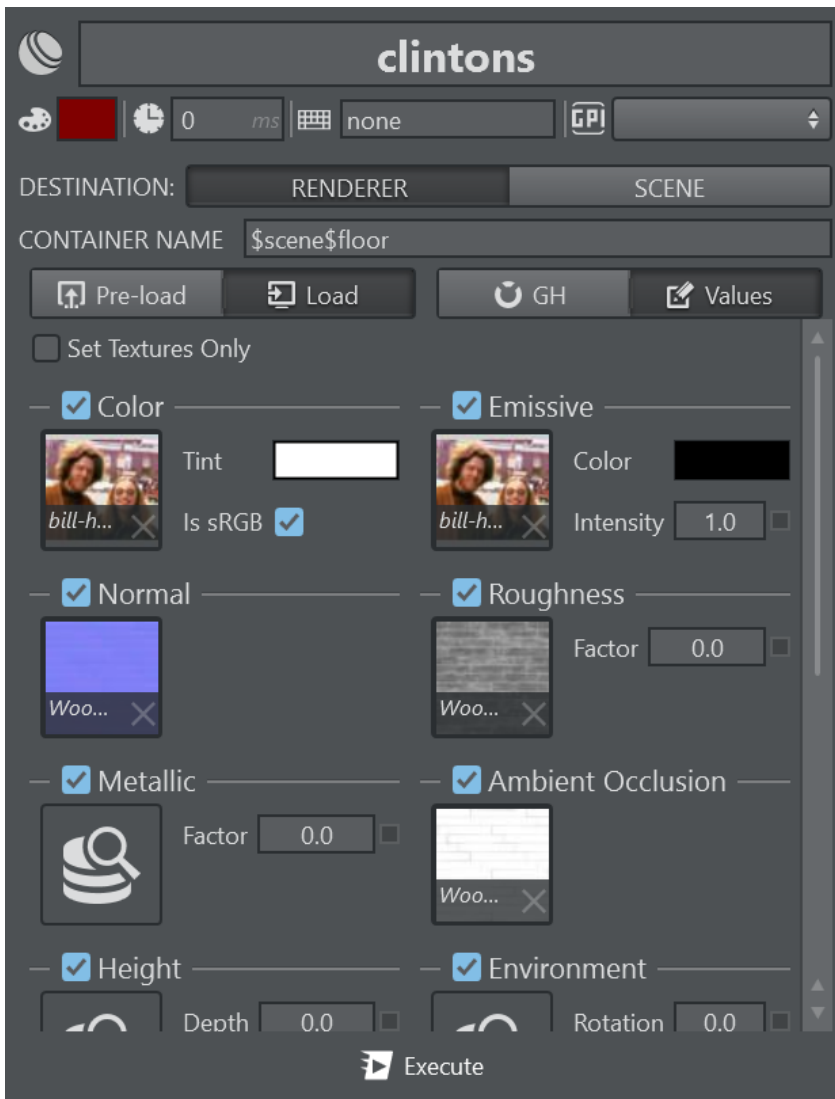


This plug-in displays all sub-containers, either one at a time or by keeping the previous container visible until the selected container appears (by enabling the **Show until** parameter). The **Visible Container** parameter determines which sub-container is displayed.

Note: For more on the Viz Omo Plug-in, see the [Viz Artist User Guide](#).

PBR Material

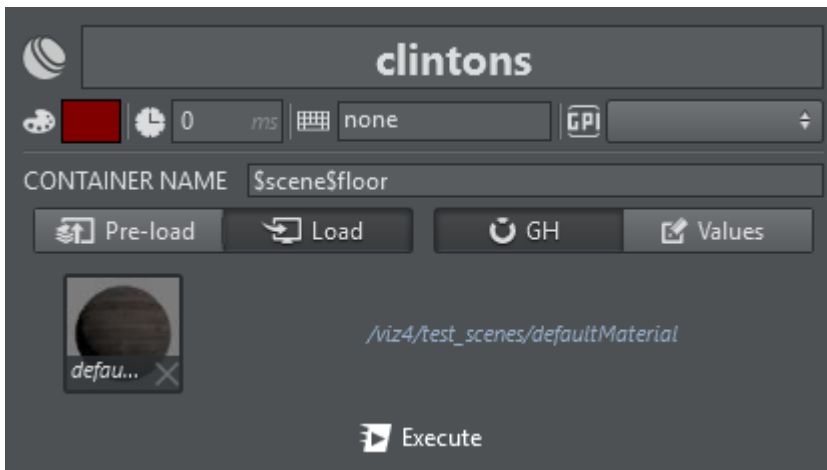
The PBR Material action works together with Viz Engine V4 materials.



The action offers a subset of Viz Artist's PBR settings, exposing only the most prominent features, such as all textures and colors defining the PBR material.

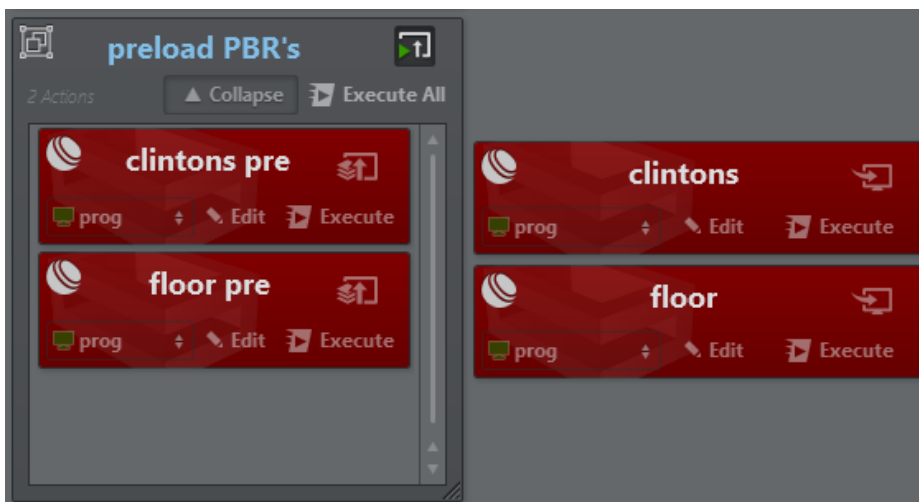
Enable the **Set Textures Only** checkbox to send texture information only, use the respective checkboxes on the various attributes to send to enable or disable them.

Use drag and drop from any image assets to copy and paste a texture asset to another slot.



When the **GH Mode** is selected, you can browse Graphic Hub for PBR materials and load them through this action.

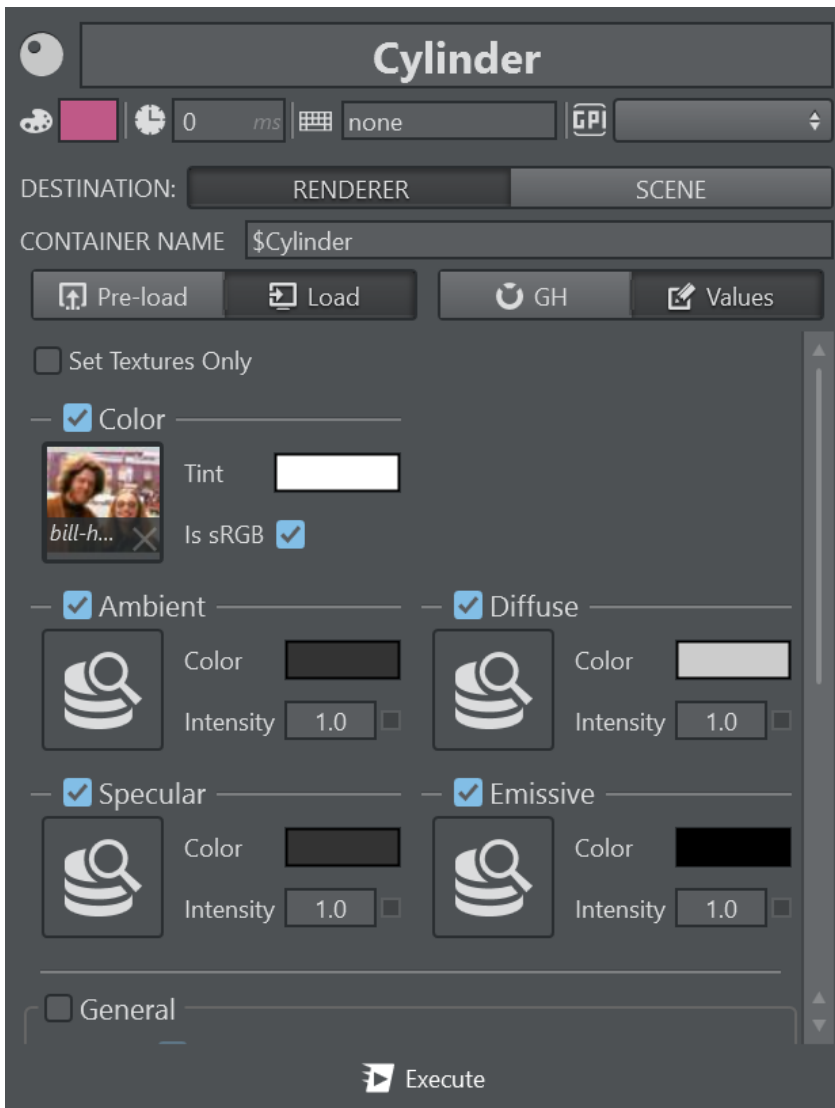
The action can be executed in two modes: **Pre-Load** or **Load**. **Pre-Load** preloads all the images present in the action on the Engine. **Load** effectively loads the PBR Material onto the Engine. Typically, you group all Pre-Load actions and execute them on Initialization, then trigger only the **Load** actions. Right clicking the **action execute** button always sends **Pre-Load** commands.



The screenshot above shows two PBR actions in an initialization group as pre-loading and the same actions on the right for loading.

Phong

The Phong Material action works together with Viz Engine 4.3 and newer.



The action offers a subset of Viz Artist's Phong material settings, exposing only the most prominent features, such as all textures and colors defining the Phong material.

When **GH Mode** is selected, you can browse Graphic Hub for Phong materials and load them through this action.

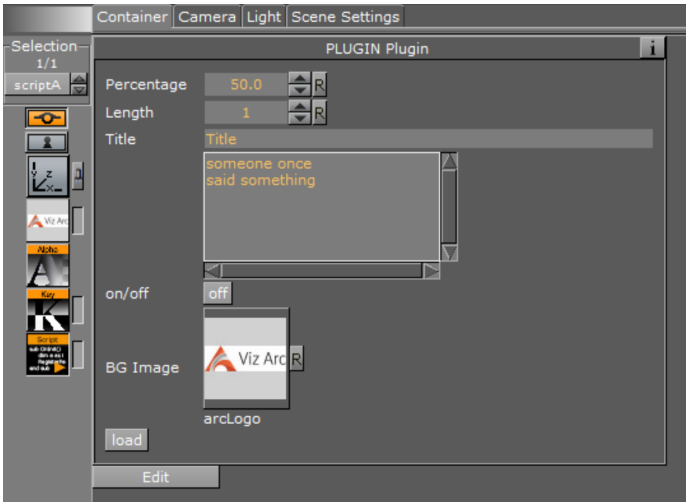
Analog to the PBR Material, the action can be executed in two modes: **Pre-Load** or **Load**. **Pre-Load** preloads all the images present in the action on the Engine. **Load** effectively loads the Phong Material onto Viz Engine. Typically, you group all Pre-Load actions and execute them on Initialization, then trigger only the **Load** actions. Right clicking the **action execute** button always sends **Pre-Load** commands.

Enable the **Set Textures Only** checkbox to send texture information only, use the respective checkboxes on the various attributes to send to enable or disable them.

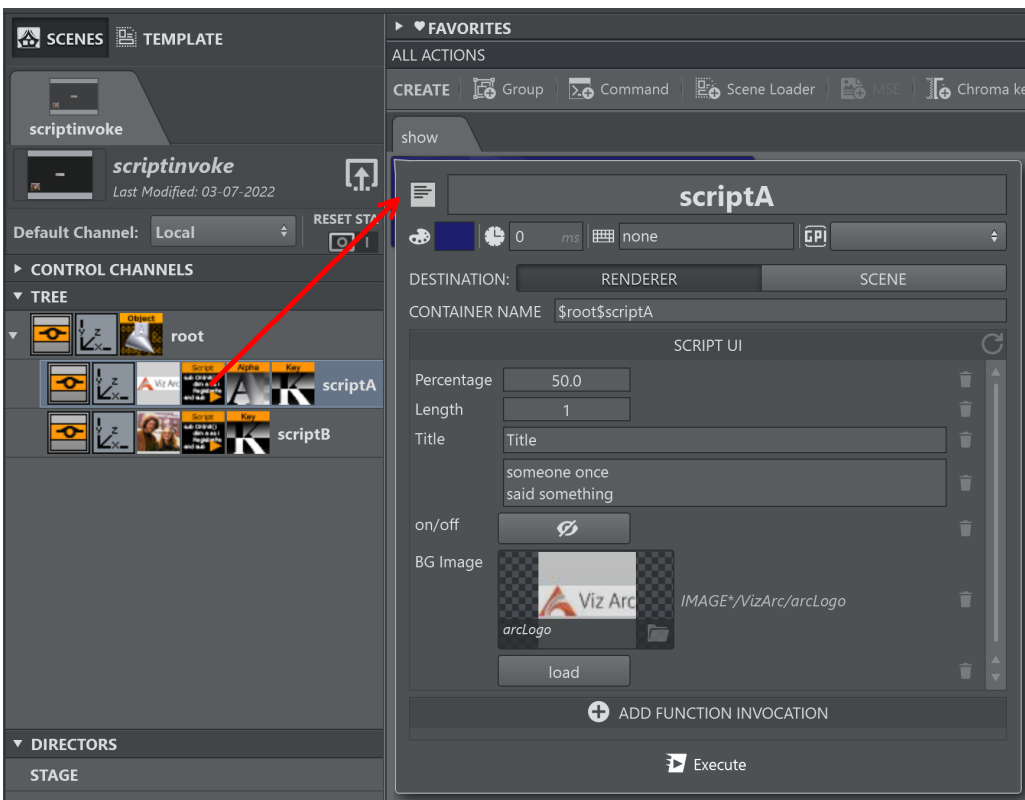
Use drag and drop from any image assets to copy and paste a texture asset to another slot.

Script

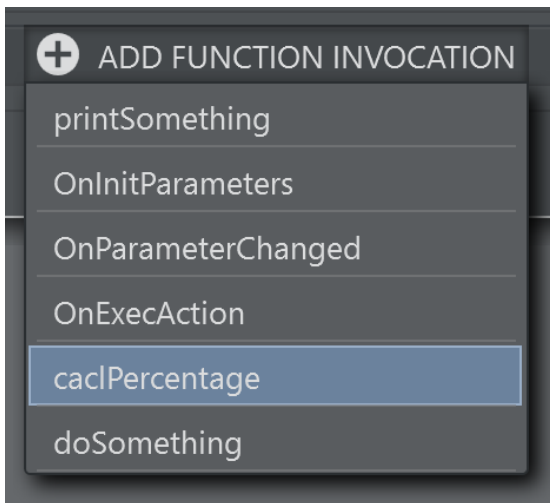
The Script action lets you modify the registered UI parameters of a Viz Engine container script. Additionally, it lets you invoke any of the script's functions with its respective parameters.



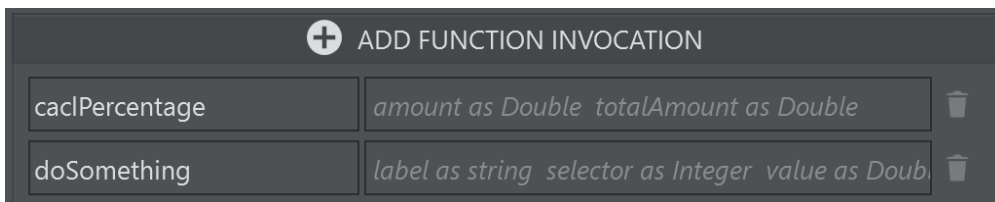
An example of a container script UI in Viz Artist.



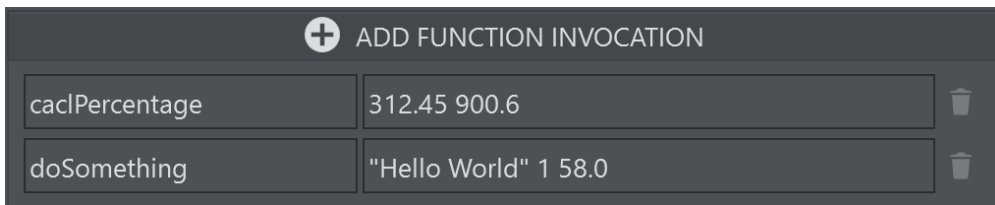
Drag and drop a Script container plug-in from the tree view into the action canvas to create a **Script Action**.



Click on the **ADD FUNCTION INVOCATION** button to add any of the script's functions to the action.

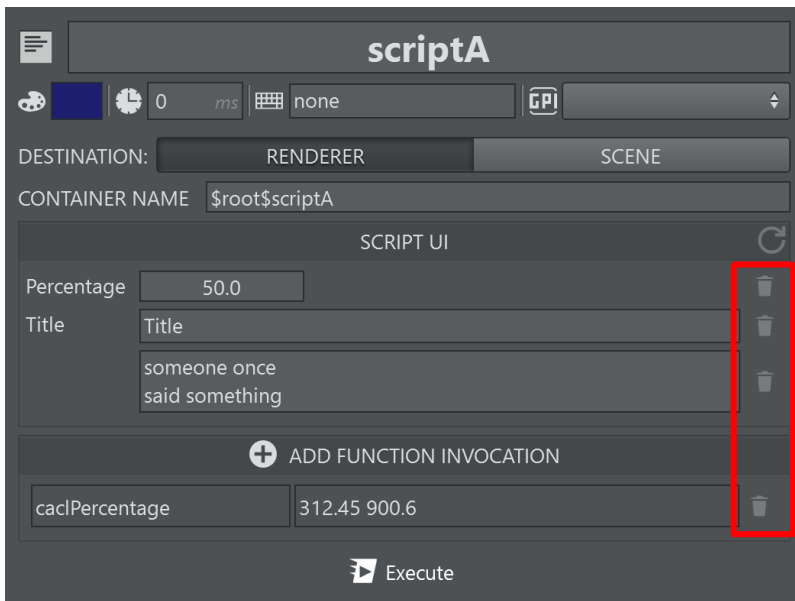


After adding the functions you wish to invoke, enter the parameters where necessary. A hint in the parameter's text box in the parameter gives you the signature of the function.



⚠ Note: Parameters need to be separated by a space character. When strings containing spaces are passed as parameters, use the quote " character as a delimiter of the string as in the "Hello World" sample above.

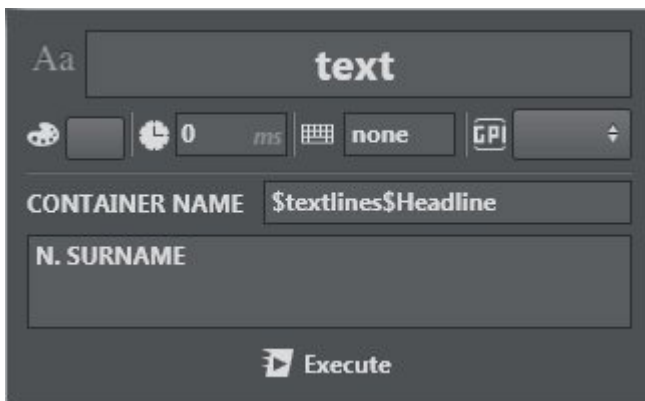
On execution of the **Script Action**, all UI parameter values and function invocations listed in the action are sent to the selected channel's Viz Engine(s).




Use the small trash icons on the right hand side of each row to remove parameters that you don't want to send to the Viz Engine. Press the refresh icon to reload the script from the Viz Engine's scene. Make sure the scene is loaded on the **Editing Engine**.

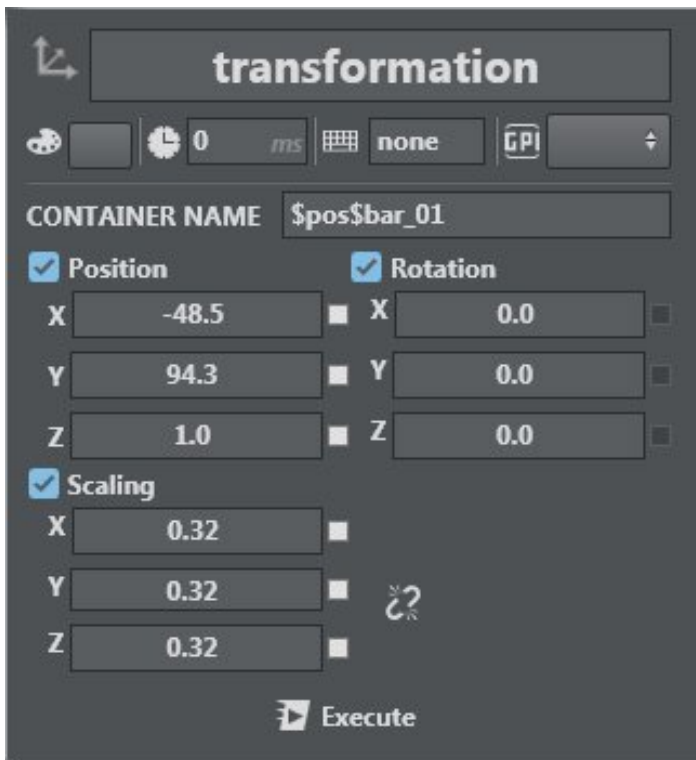
Text

This menu lets you set text in the selected container. The action supports standard text geometry as well as **Text** introduced in Viz Engine 4.3.



Transformation

Transformation lets you set position, rotation and scaling of the selected container. You can also scale in proportion by clicking the **Lock** icon  next to the scaling panel. **Position**, **Rotation** and **Scaling** can be disabled using the check boxes. When disabled, those parts are not being sent to the Engine on execution. For example, when selecting **Rotation** only, only the rotation of the target container is affected on execution.

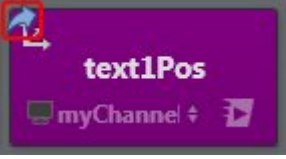
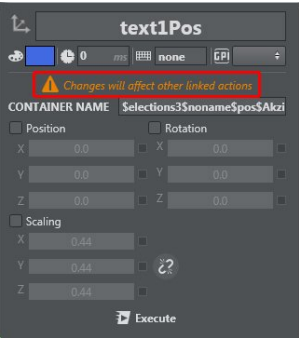


It's possible to [create a linked action](#) for TRANSFORMATION actions. This option is useful for controlling different scenes with the same tree structure, for example.

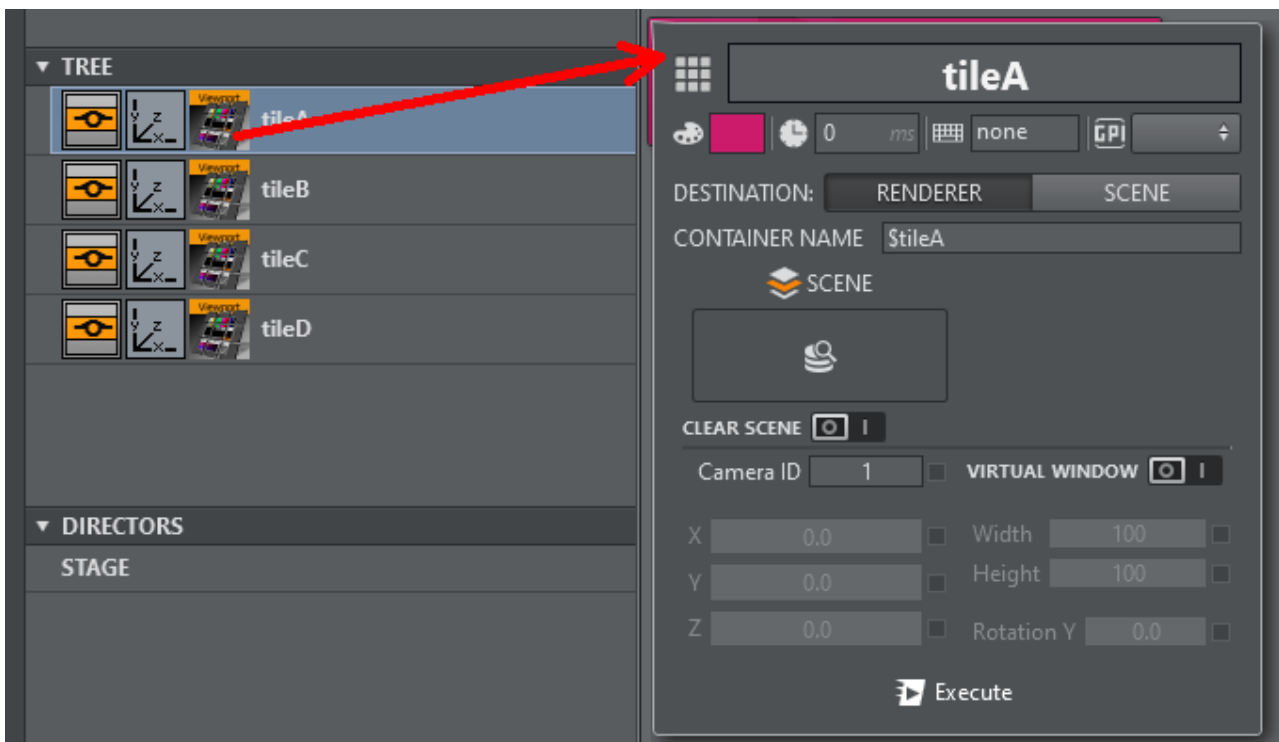
To Create a Linked Action

Linked actions are useful for controlling different scenes with the same tree structure, for example.

	<p>Right-click on the panel and select Create Linked Action (or ALT + drag on an action box).</p>
	<p>A new action box, cloned from the original one, is displayed. Both boxes have the linked icon at the top left corner.</p>

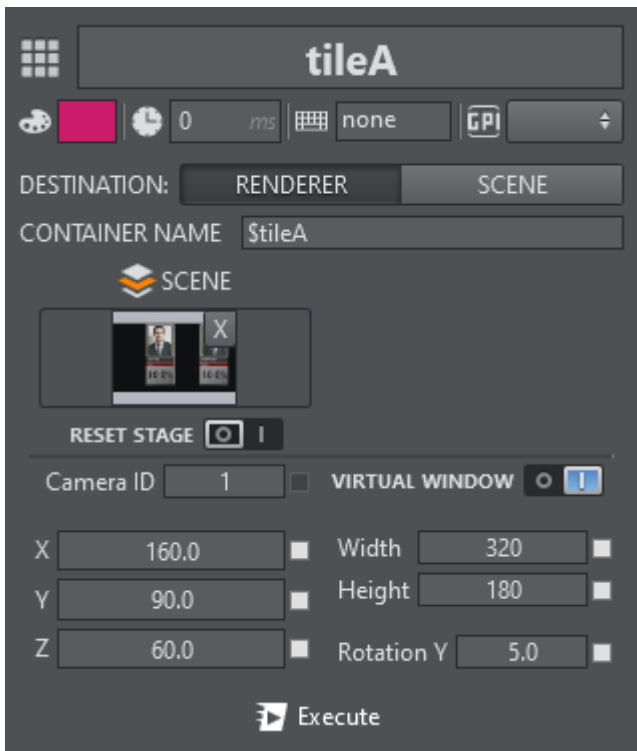
	<p>The linked icon also appears on the box saved in the favorite area, if applicable.</p>
	<p>Any changes that are now made to one of the related boxes affects them all, until the clones are removed.</p>

Viewport



The screenshot shows the 'TREE' view on the left with a 'VIEWPORT' icon. A red arrow points from this icon to the 'tileA' configuration panel on the right. The 'tileA' panel includes fields for 'DESTINATION' (RENDERER/SCENE), 'CONTAINER NAME' (StileA), 'CLEAR SCENE' (checkbox), 'Camera ID' (1), 'VIRTUAL WINDOW' (checkbox), and 'X', 'Y', 'Z', 'Width', 'Height', 'Rotation Y' settings.

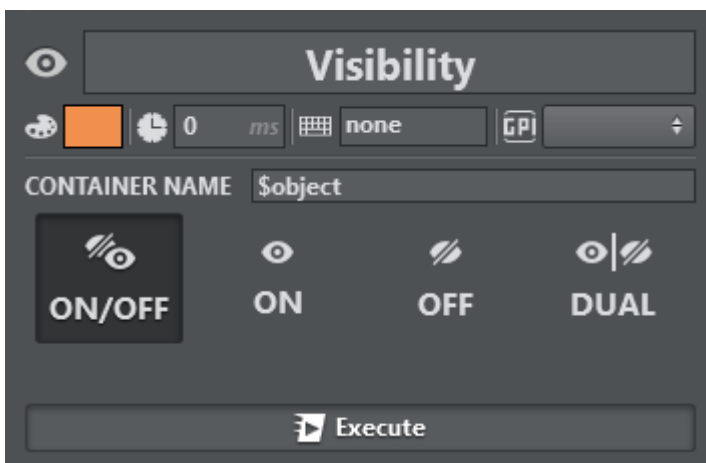
Drag and drop a Viewport container plug-in from the tree view into the action canvas to create a **Viewport Action**.



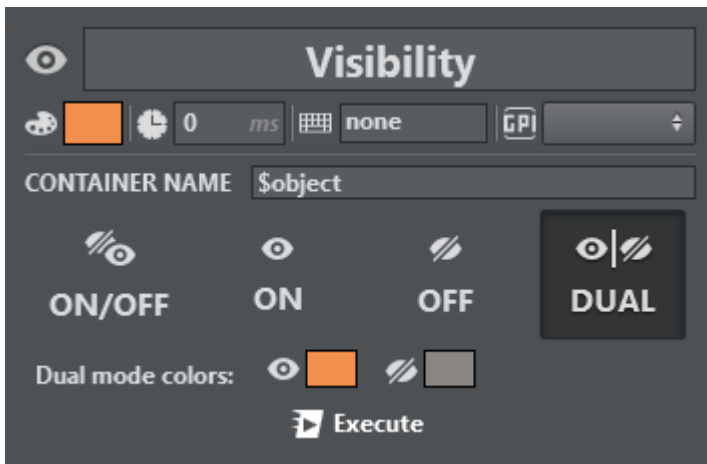
Specify the **Scene** to be loaded to be loaded into the viewport or **Clear Scene** to clear the currently loaded scene of the viewport. Select **Reset Stage** to reset the stage on scene load. **Camera ID** selects the camera to be used within the viewport scene.

When **Virtual Window** is checked the selected **position**, **rotation** and **width** and **height** are sent to the viewport plug-in.

Visibility



Use the visibility menu to toggle a container on or off. The container can be set to **ON**, **OFF**, **DUAL** or **toggled** (switched to the opposite of the current state).



When **DUAL** mode is selected, left clicking **Execute** switches the container on and right clicking switches the container off. In the **Dual mode colors** section, two distinct colors can be defined for on and off states in order to make the state of the container more visible.

See Also

- [Viz Artist User Guide](#) for more information about Scene types.

5.4.3 Other Action Types

Right-clicking in the main area makes a menu appear where you can create the following:

- [Multizone Chroma Key](#)
- [NDI](#)
- [Scene Loader](#)
- [Unreal Scene Loader](#)
 - [Using the Browser to Select a Project](#)
- [Telemetrics](#)
- [Utah](#)
- [Viz Clip](#)
- [Vinten Control](#)
- [To Import a Vinten Shot](#)

Multizone Chroma Key

+

MZoneChroma

0 *ms* none GPI

MULTIZONE NAME

Coordinates

Altitude:

Height:

SHOW KEY |

Chroma

Luminance	Blend	U	V	UV Diameter	UV Gradient
0.5	50.0	0.7	0.3	0.05	0.2

Use Ctrl key to enable Color Picker

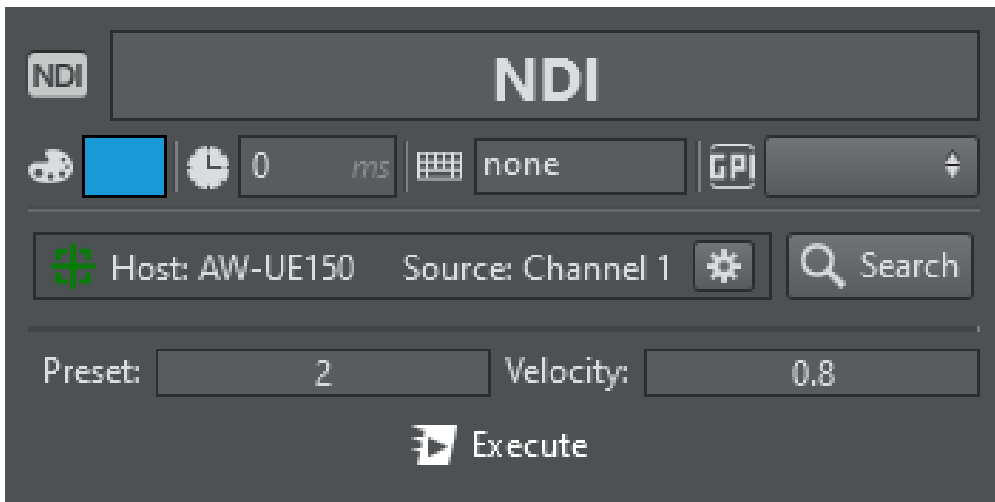
Execute

The Multi-zone Chroma key is often used in outdoor sporting event broadcasts, such as sports productions where more than one color needs to be keyed out.

Like the single [Chroma Key](#), it's also possible to set parameters such as the color of your chroma and other fine tuning parameters like **U**, **V**, **Blend** etc. in Multizone Chroma Key.

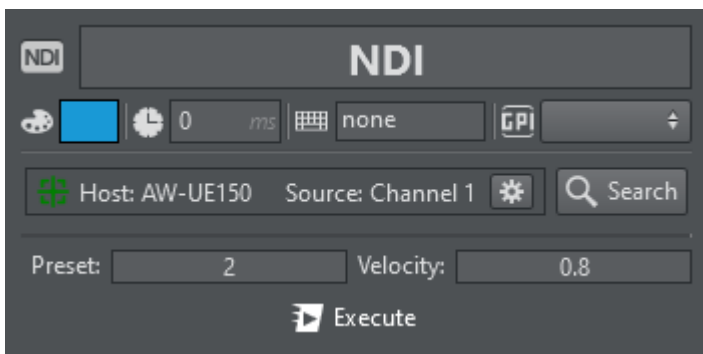
Altitude and **Height** parameters can also be set. See [Multizone Chroma Keying](#) for more information on this topic.

NDI



NDI actions allow you to command an NDI camera to go to a certain preset at a configurable velocity.

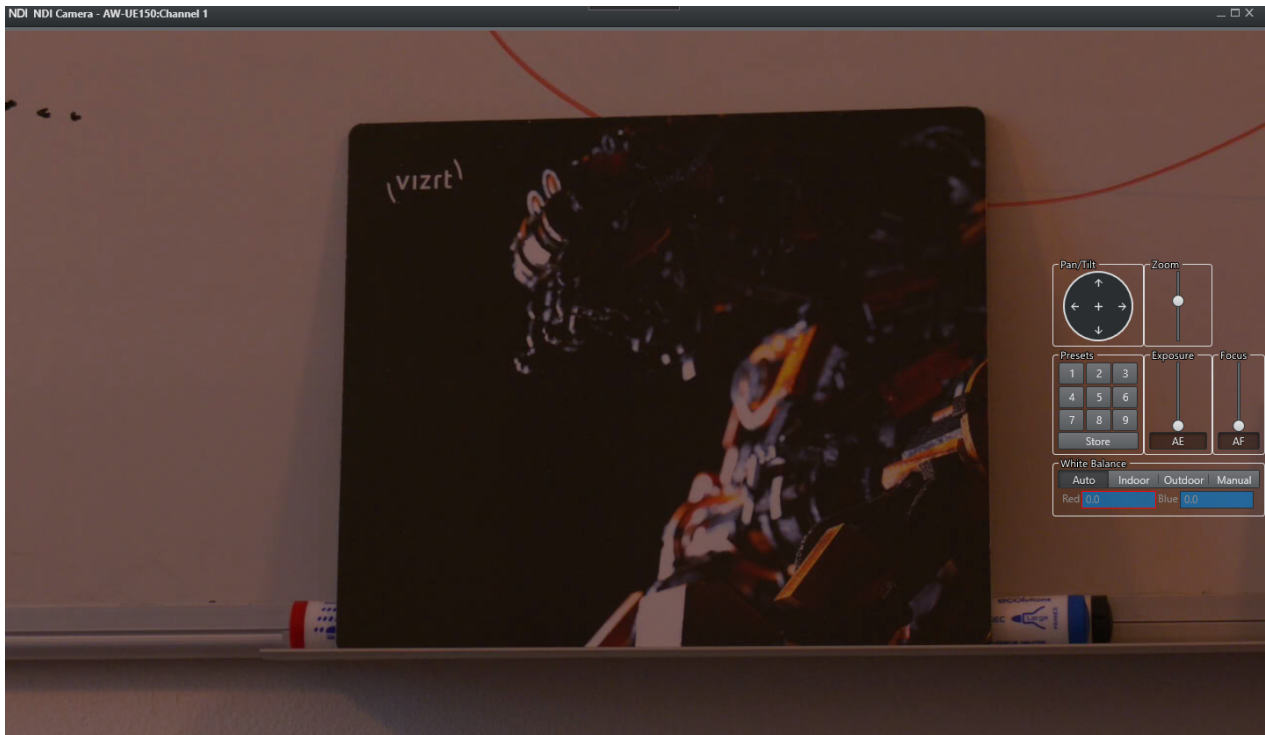
When creating an NDI action, the configurable content is blocked until an NDI source linked to a controllable camera is selected. This can be achieved by clicking the **Search** button which provides a list of all available NDI sources and let you select those that can be controlled.



Once a valid source has been selected, the configurable values are unlocked and an UI displaying the connected NDI source is shown. This new interface serves two purposes: to show the NDI source identification and its status; To allow the user to control linked camera and verify / modify its presets.

Clicking on the **Cogwheel** button next to the connected NDI Source opens up a new Window with the NDI Source output and controls that can be used to interact with the camera.

Move the camera (Pan/Tilt), change zoom, exposure (Manual or Automatic), Focus (Manual or Automatic) and white balance, and set and store presets:



When used in conjunction with [monogram's](#) ORBITER module, the camera can be operated through the orbiter.

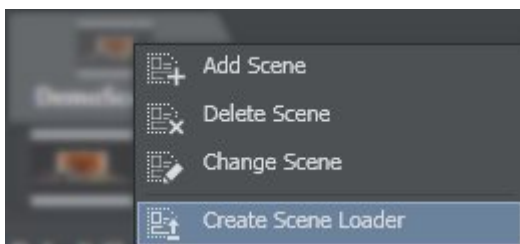
Scene Loader



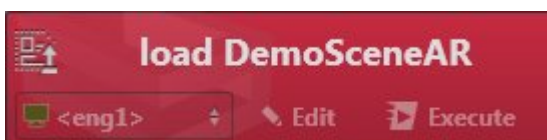
The Scene Loader lets you configure whether to load a scene in the FRONT_LAYER, MAIN_LAYER, BACK_LAYER and in one of the MATTE or GFX channels (from 1 to 16) at the same time. It's also possible to select the **RESET STAGE** option to load a scene initialized in frame 0.0 on stage. To remove a single scene, press the **X** icon at the top-right of the selected scene. Select **CLEAR LAYER** if you want to explicitly clear a specific layer. Select whether to load the scenes using the *GUID* or the *NAME*.

When a scene was selected belonging to a **Concept** and an engine in the selected channel has a different **Concept** configured, the scene loader loads the corresponding scene belonging to that concept.

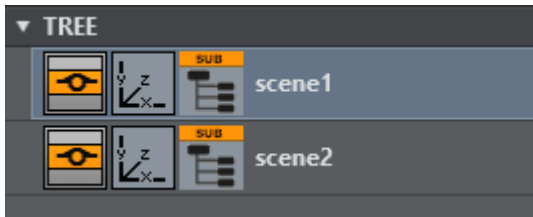
Create Scene Loader by right-clicking on the desired scene in the panel on the left:



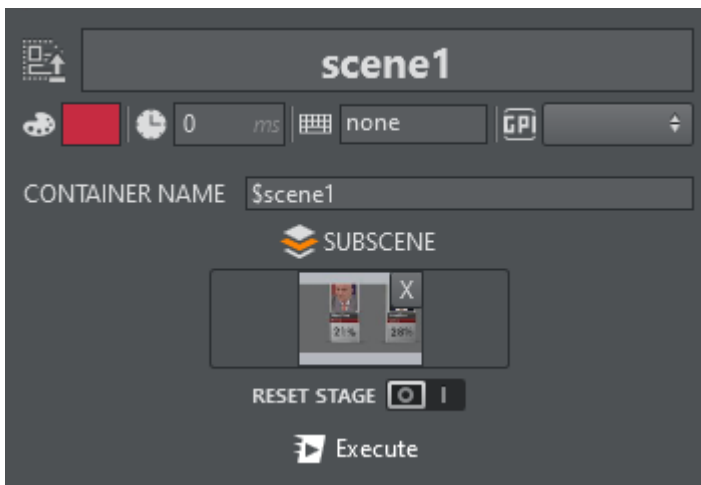
This automatically adds the action to your active action area:



Viz Engine 4 introduces the concept of **SUBSCENES** where entire scenes can be loaded into a container in the scene tree. When loading a scene containing a **SUBSCENE** plugin, it is displayed in Viz Arc's the tree view.



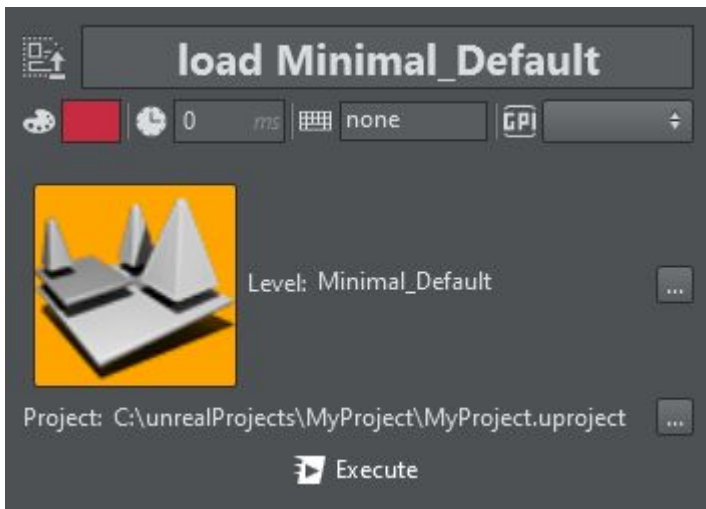
Drag and drop the subscene icon onto the action canvas to create a subscene loader action.



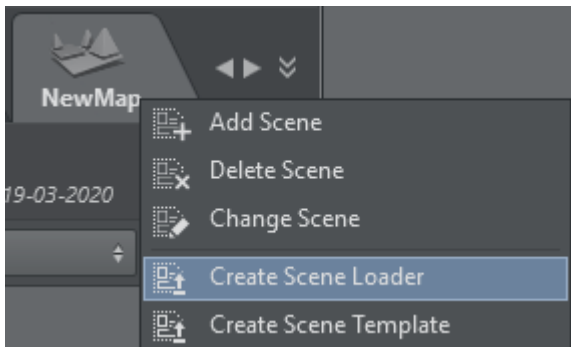
The scene loader can be used to load different scenes in the subscene, clear the scene and reset the subscene director's on load. Under **CONTAINER NAME** the container path of the subscene can be changed manually.

Unreal Scene Loader

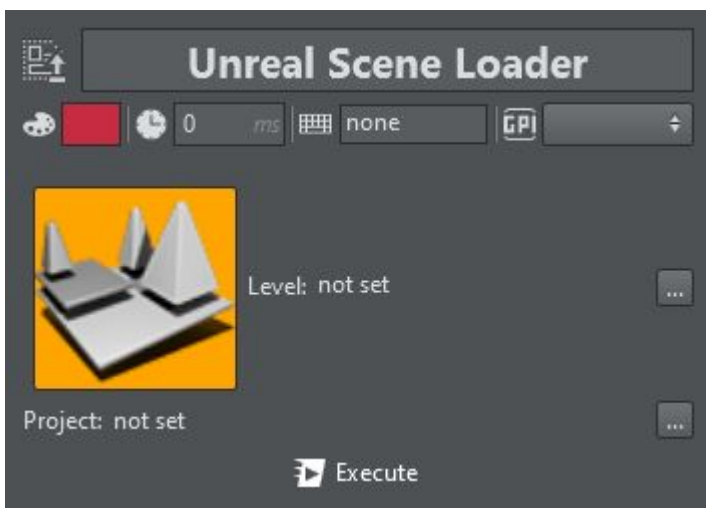
The Unreal Scene Loader allows you to load a specific unreal map in a given project. The loader can be created either by using the context menu on the action canvas or through the context menu on the scene tabs.



The label on the right hand side indicates the level to be loaded, the label on the bottom is a file system path to the project which contains the level.



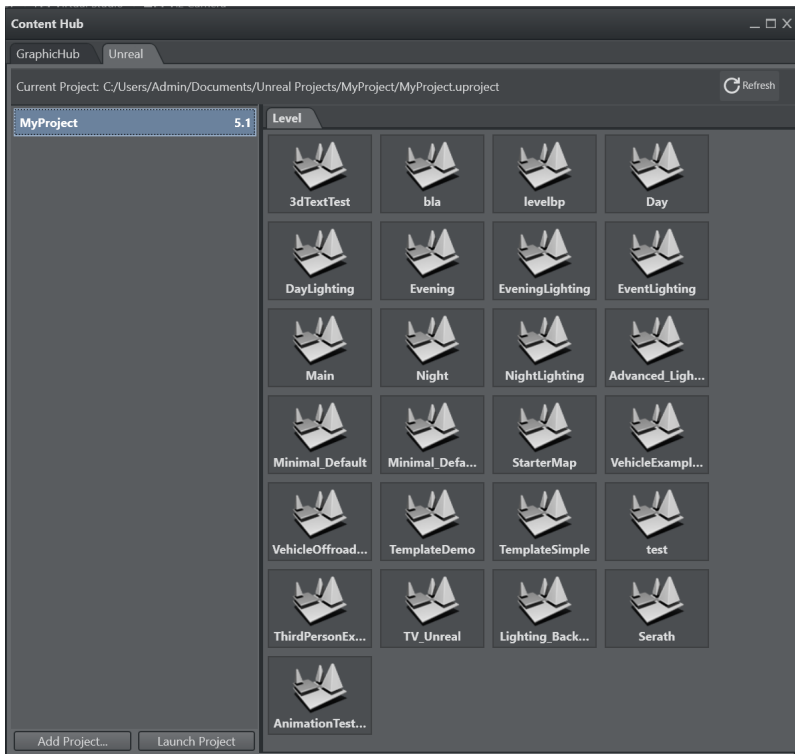
When creating a scene loader from the action canvas, click on **Select Unreal Level** to open the browser.



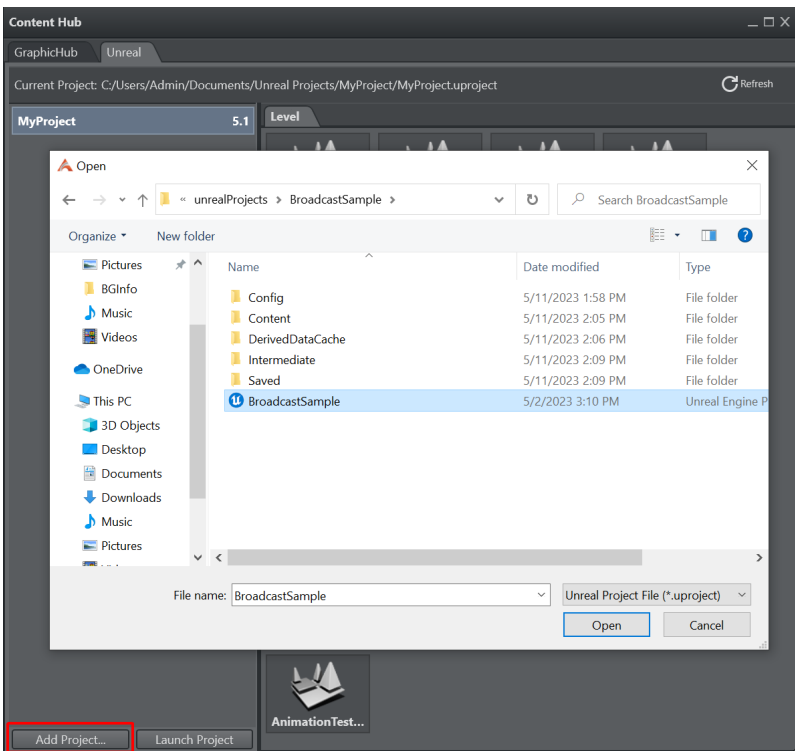
Either browse the unreal project and level browser to manually select the *.uproj* and *.umap* files or click the map icon use the Unreal browser as shown in the screenshot below. Make sure to select the project location before selecting the map level as the map is a location relative to the project.

Note: Manual selection of the project and map files implies that the project are stored on a file system that is reachable by the local machine.

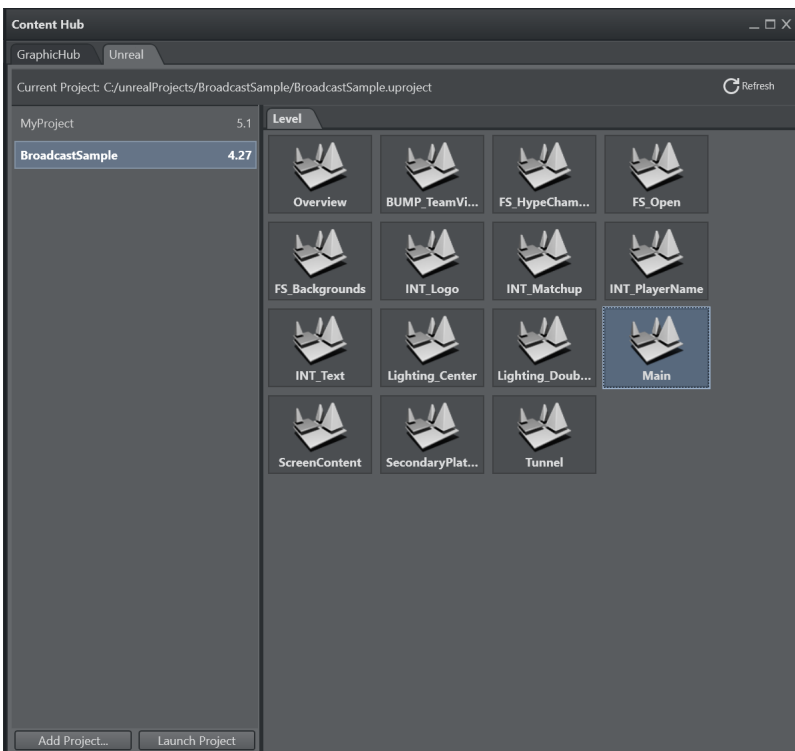
The built in browser allows you to browse the content of of the Unreal editing engine which may run on a different machine.



Use the **Add Project...** button to add a project browsing on the local filesystem. The selected project is added to the list of available projects.

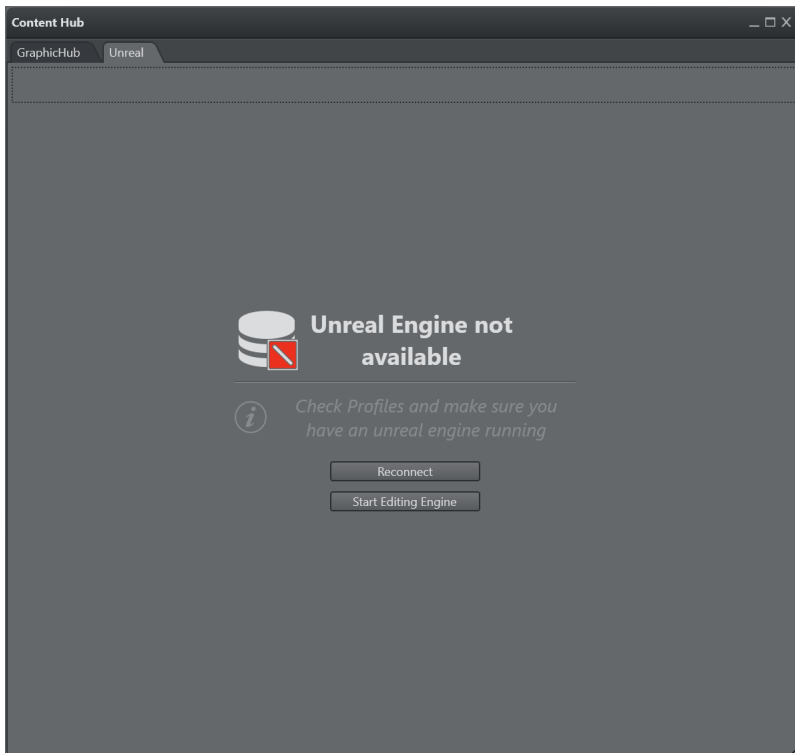


Selecting a new project loads it into the Unreal Engine and displays the available levels. This process may take some time depending on the complexity of the project.



In case the editing Unreal Engine is not running when the browser is opened, you can launch it by clicking the **Start Editing Engine**, this launches the editing engine through the Viz Unreal

Launcher. Once the engine is up and running it automatically displays the available projects and levels.



Info: The browser only works when the Unreal **Editing Engine** is in game mode.

Using the Browser to Select a Project

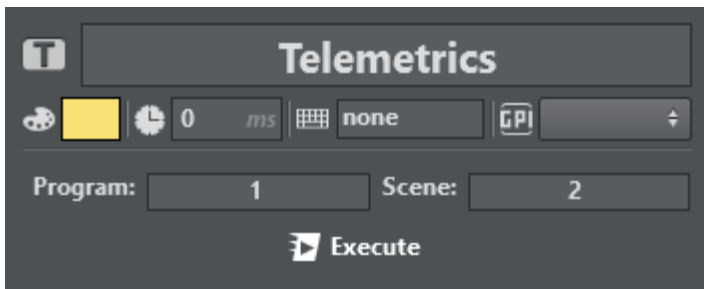
By double clicking a project, the Unreal Engine is restarted with the respective project. The browser only shows the levels of the currently loaded project.

- Click **Refresh** to refresh the layers when the Unreal Engine has been restarted with a different project.
- Double click on one of the layers to confirm the selection.

Note: The unreal scene loader requires the [Unreal Loader Service](#) to be properly installed and configured. Whenever a level is loaded that is not part of the current project, the Unreal Engine is restarted.

Telemetrics

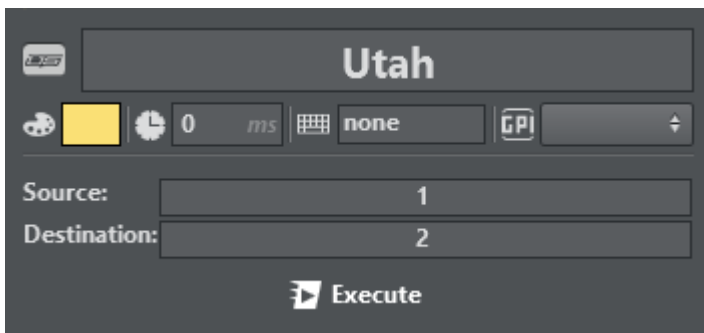
Telemetrics lets you control a robotic camera using the Telemetrics protocol.



Program and **Scene** determine the desired shot position of the robotic camera.

Utah

Utah is used to route SDI video signals through a Utah Scientific router.



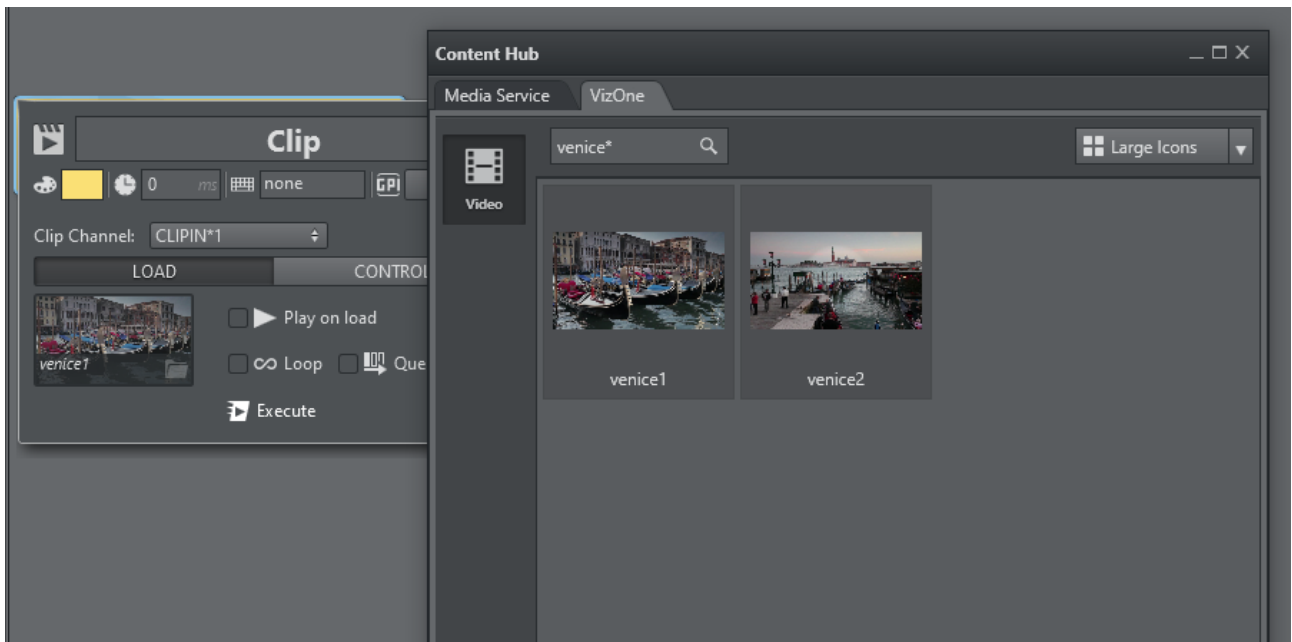
Source and **Destination** determine which source ID is to be mapped to which destination ID.

Viz Clip

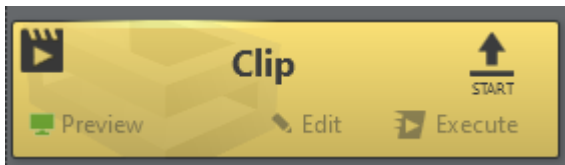
Viz Clip is used for managing Viz Engine’s ClipIn channel; it has two working modes:

	<p>In the LOAD menu, you can select which clip to play (Local file system or Media service) and play options (Play on load, Loop and Queue Clip). Queue Clip lets you set the selected clip to the pending position. It then plays as soon as the currently playing clip finishes.</p>
	<p>Use the CONTROL menu to START, STOP, CONTINUE and PAUSE the clip.</p>

If a Viz One server has been configured, the Clip Action can also browse for clips on Viz One.



The Viz Engines inside the selected channel need to be configured as Engine endpoints in Viz One in order to transfer the clips on the Engines. A progress bar on top of the action indicates the transfer progress.



Vinten Control



Vinten has its own software and service for controlling cameras. You can use the joystick to move cameras and save the **shot**. It's useful for broadcasters to have the same opening camera animation easily available on a TV program.


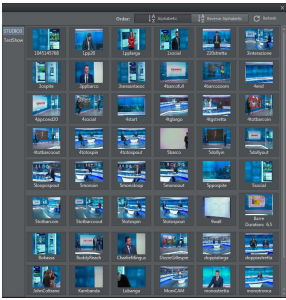



Shots are the saved camera movements in Vinten Automation Services software.

Once you have created and saved a shot in Vinten, it's possible to import it into Viz Arc using the Vinten Control menu. There are three timer controls:

- **JUMP TO:** The quickest way to switch from the selected shot to the next shot.
- **MOVE TO:** Configures a time in which it does the shot animation; if the time is too early, it does the animation in the minimum time requested.
- **STOP:** Stops the selected shot.

To Import a Vinten Shot

A step-by-step procedure for importing a Vinten Shot into your Viz Arc project follows below:

	<p>Select Create Vinten Control Action from the context menu to make the panel on the left appear. The shot list is empty.</p>
	<p>To add a Vinten shot, press the Add Shot Command button Add Shot Command. A window containing all of the shots saved in the Vinten software (<i>Vinten Automation Services</i>) is displayed. It's possible to reorder shots alphabetically or reverse and refresh by pressing the respective buttons at the top right of the window.</p>
	<p>Select your desired shot, and it is automatically added to the action box. You can now assign a time mode between JUMP or MOVE. It's possible to import multiple shots into the same action box and create a list or keep every shot in a single box.</p>
	<p>It's also possible to add a stop command by pressing the Add Stop Command button. To remove any shot or stop, press the Trash can icon  next to the desired element.</p>

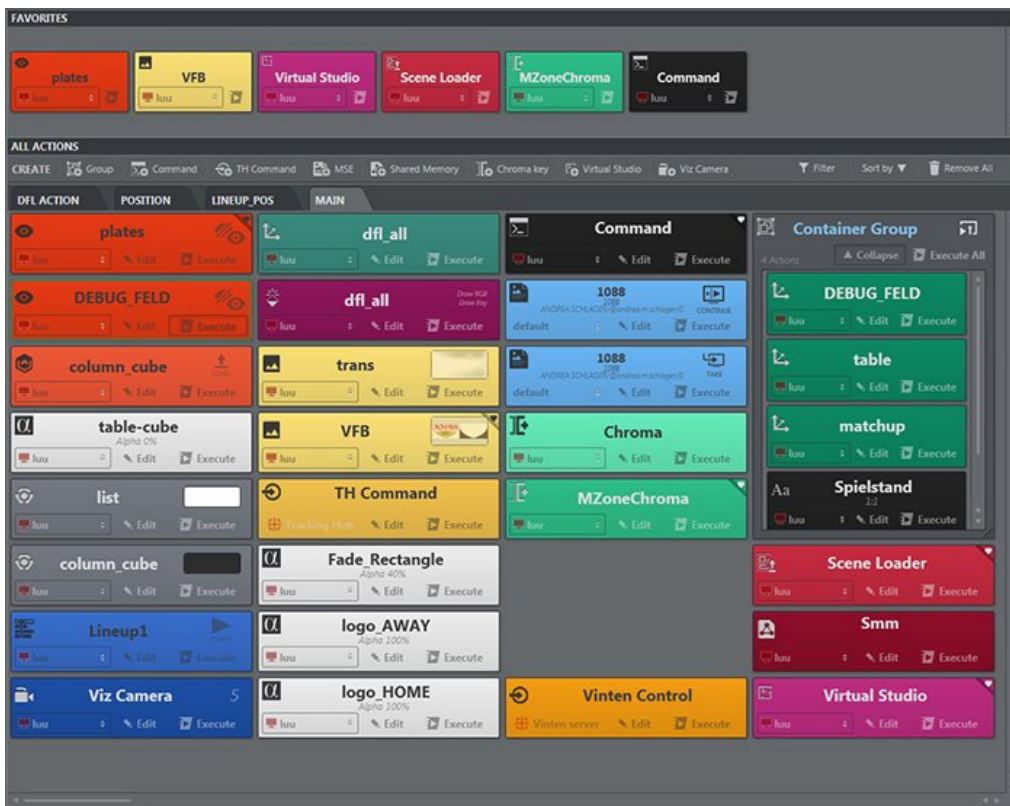
5.5 Builder Mode

Builder mode lets you build and configure all the actions required for On Air operation.

Builder mode consists of three main views containing a variety of tools for creating projects:

- [Actions View](#)
- [Set View](#)
- [Script View](#)

5.5.1 Actions View



Actions View contains all the actions that are part of your Viz Arc project.

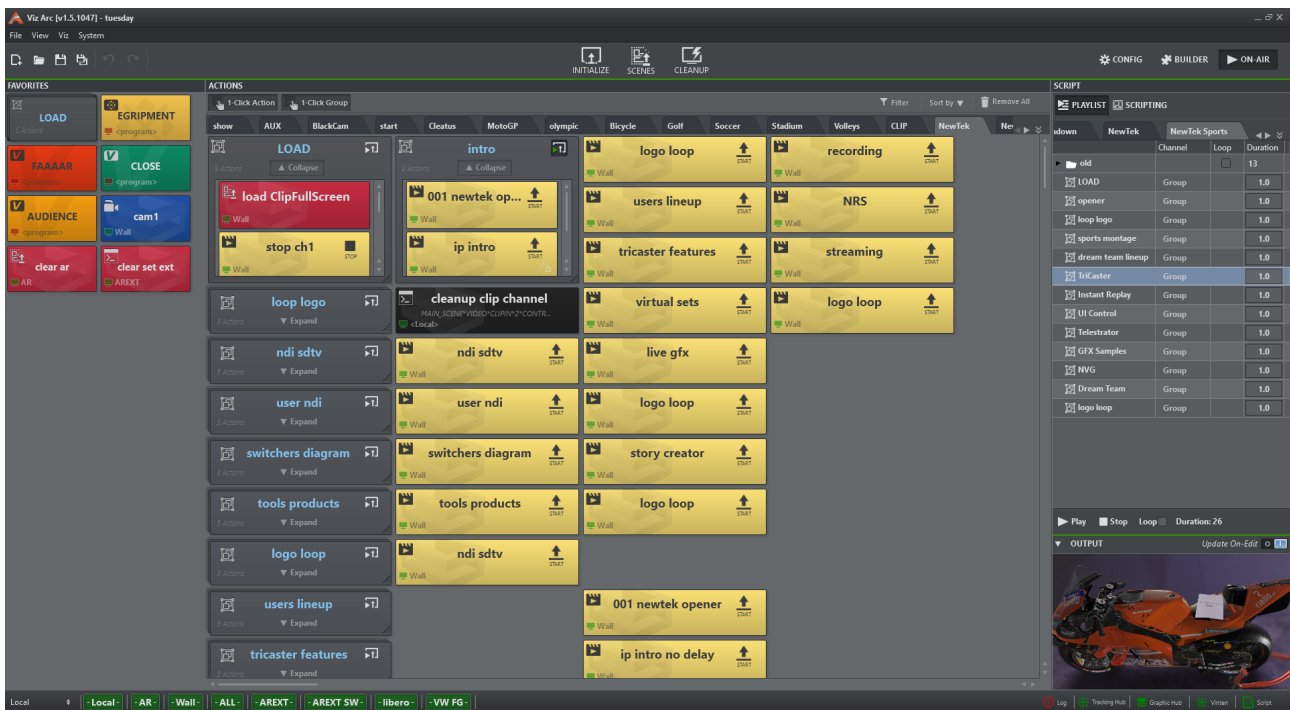
- Actions can be arranged in any way throughout the canvas.
- Easy access to the most used actions can be gained by adding them to the **Favorites Bar**.
- Actions can be filtered for quick access.

This section covers the following topics and procedures:

- [Working with Playlists](#)
 - [Creating a Playlist](#)
 - [Creating Groups](#)
 - [Loop Mode](#)
 - [Group Duration](#)
 - [Executing an Action in Playlist](#)
 - [Renaming an Action in a Playlist](#)
 - [Working with Multiple Playlists](#)
- [Creating and Editing Scene Actions](#)
 - [Scene Actions](#)
 - [Project Actions](#)
 - [To Create Project Actions](#)
 - [Editing Actions](#)
- [Common Action Tools](#)

- Channel
- Edit Mode
- Execute
- Favorites
 - To Add Actions to Favorites
 - To Remove Actions from Favorites
 - To Remove All Actions from Favorites
 - Searching, Sorting and Removing All Actions
 - Search
 - Sort By
 - Remove All
- Save Action as Data to Viz Pilot

Working with Playlists



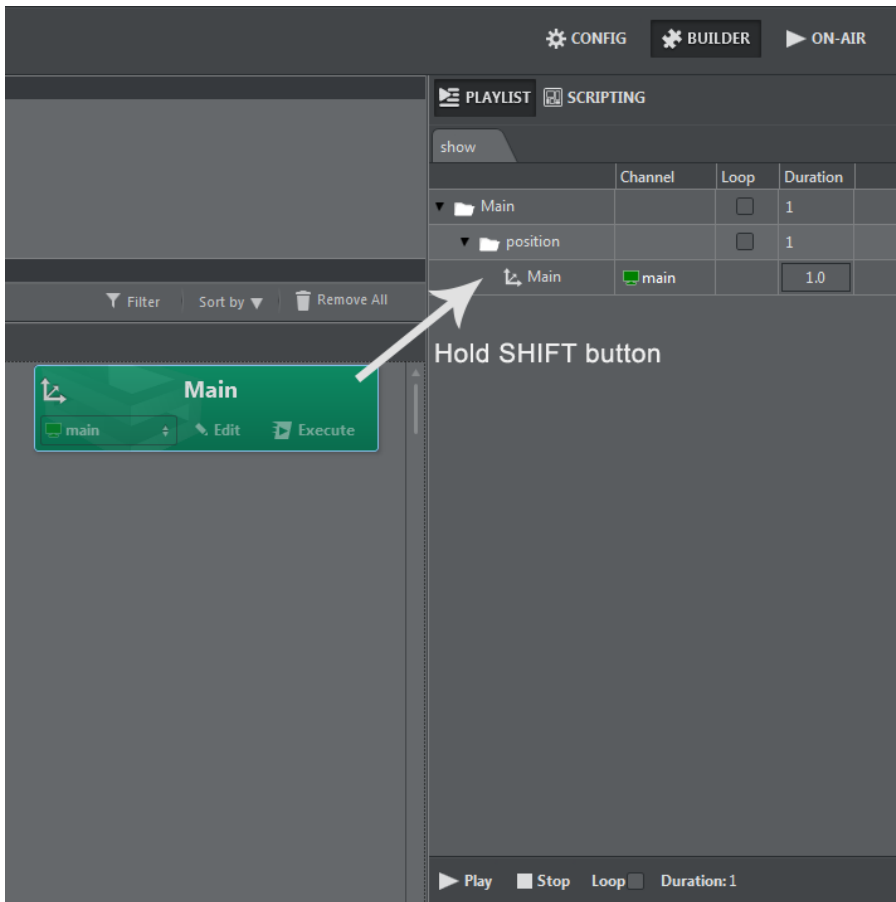
Creating a Playlist

You can create a **PLAYLIST** in the upper right section in **ACTIONS** view. Playlists are useful for arranging actions and creating a rundown.

PLAYLIST		SCRIPTING	
rundown		NewTek	NewTek Sports
	Channel	Loop	Duration
▼ init		<input type="checkbox"/>	5
set ext sw load	AREXT SW		1.0
clear wall	Wall		1.0
clear ar	AR		1.0
clear set ext	AREXT		1.0
still frame	Group		1.0
▼ Opener		<input type="checkbox"/>	1
big ar opener	Group		1.0
▼ nab scene		<input type="checkbox"/>	4
load nab	Group		1.0
start lights	Group		1.0
4 in	Group		1.0
viz4 out	AR		1.0
▼ Cleatus		<input type="checkbox"/>	2
in cleatus	Group		1.0
out cleatus	AR		1.0
▼ Ducati		<input type="checkbox"/>	3
load ducati	Group		2.0
out ducati	AR		1.0
▼ Olympic		<input type="checkbox"/>	4
LOAD olympic	Group		1.0
cue fusion clip	Wall		1.0
fusion CLIP	Group		1.0
VW	Group		1.0
▼ Bicycle		<input type="checkbox"/>	5

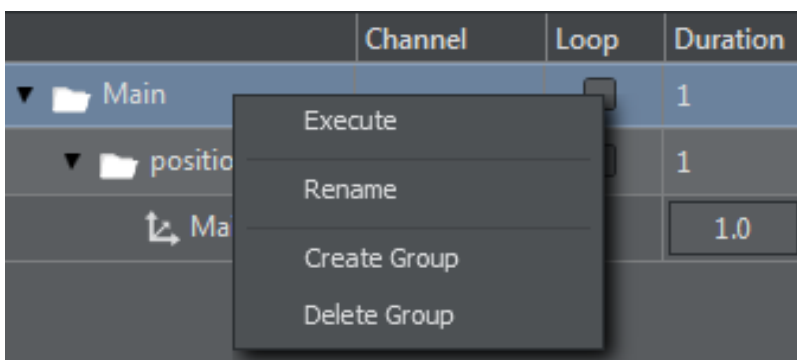
Play Stop Loop Duration: 33

Import by dragging the desired action into the playlist pane while holding in the **SHIFT** key. Release the action inside the playlist pane to include it in the playlist.



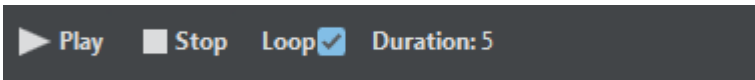
Creating Groups

Create groups and sub-groups by right-clicking **Create Group**:



Loop Mode

To set a full playlist in loop mode, simply enable the main **Loop** selection at the bottom of the playlist pane.



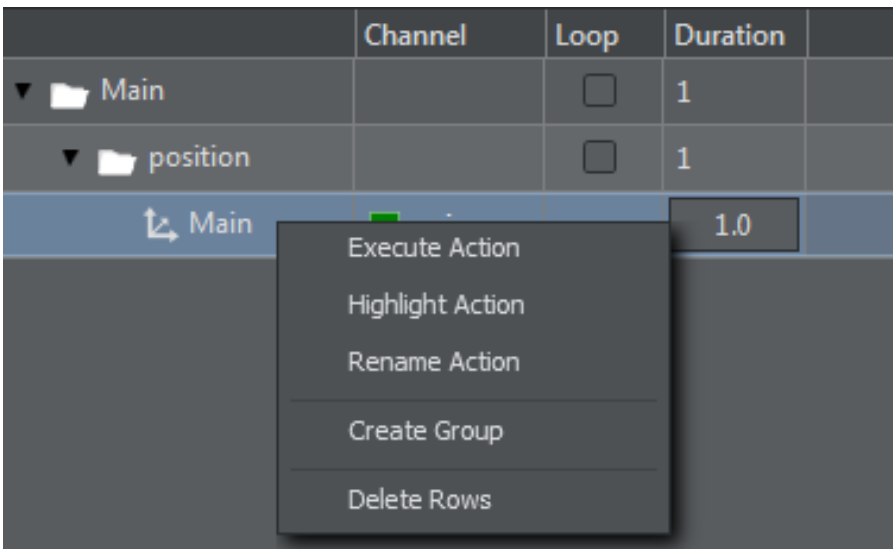
Group Duration

It's possible to specify the duration in seconds of each action (the default is one second). The group's duration is the sum of the duration of all of the actions it contains.

▼ Ducati		<input type="checkbox"/>	3
load ducati	Group		2.0
out ducati	AR		1.0
▼ Olympic		<input type="checkbox"/>	4
LOAD olympic	Group		1.0
cue fusion clip	Wall		1.0
fusion CLIP	Group		1.0
VW	Group		1.0

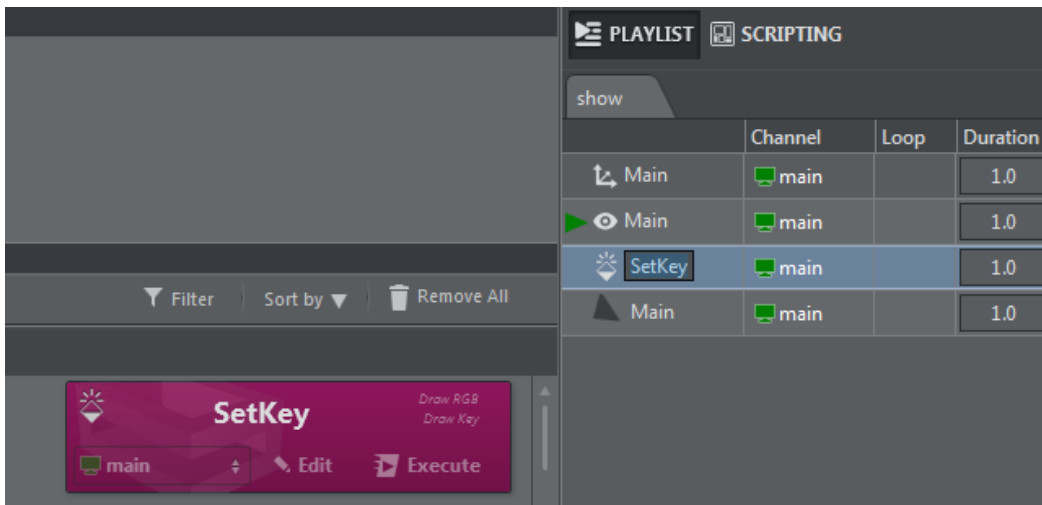
Executing an Action in Playlist

Right-click on an action and select **Execute Action** from the drop down menu:



Renaming an Action in a Playlist

To rename an action, right-click on the selected action and click **Rename Action**:



Note: The action is also renamed in **Actions** view.

All actions imported in playlist keep their associated channel, so it is possible to send actions to different engines from the same playlist rundown:

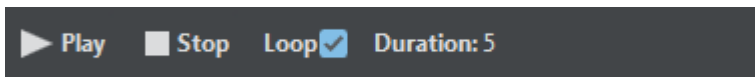
Main	main
Chart2	second
Chart2_TABLE	second
SetKey	main
Main	main

Working with Multiple Playlists

A single project can handle multiple playlists. To work with multiple playlists, right-click inside the **Tab** pane and select **Add Tab**.



Once you are finished creating playlists, you can control the rundown by pressing **PLAY**, **STOP** or **LOOP**.



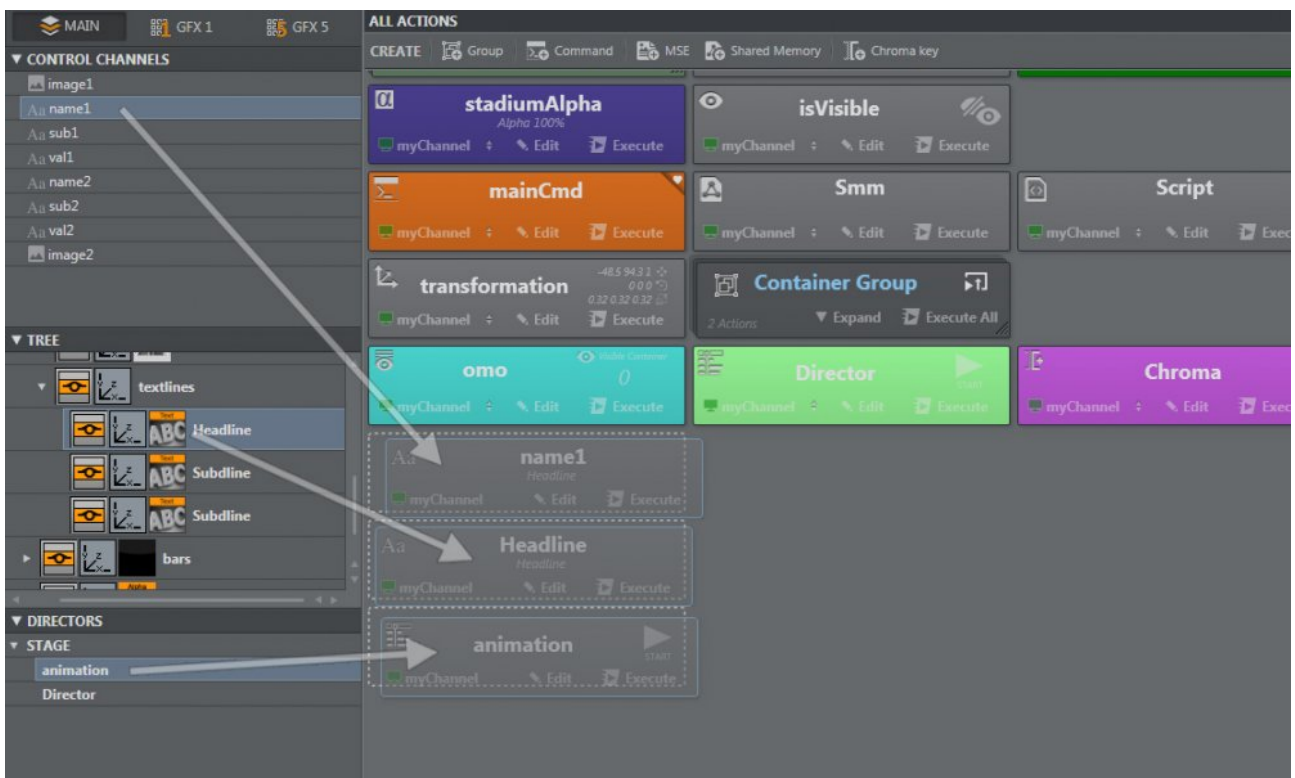
Note: The duration value is the total duration in seconds of all the elements in playlist (or the currently active playlist, if a project contains more than one playlist).

Creating and Editing Scene Actions

Note: All actions share a common set of tools and properties. For more details, see [Common Action Tools](#).

Scene Actions

Before creating scene actions, select the **scene tab** from the [scenes panel](#) and [load the scene](#) to retrieve properties.



1. Drag and drop any of the [supported properties](#) from either the [Control Channels](#), [Scene Tree](#) or [Directors](#) section in the scene panel to the actions canvas
2. Enter the desired values in the editing popup
3. Click anywhere outside the editing popup to save and close your creation

Project Actions

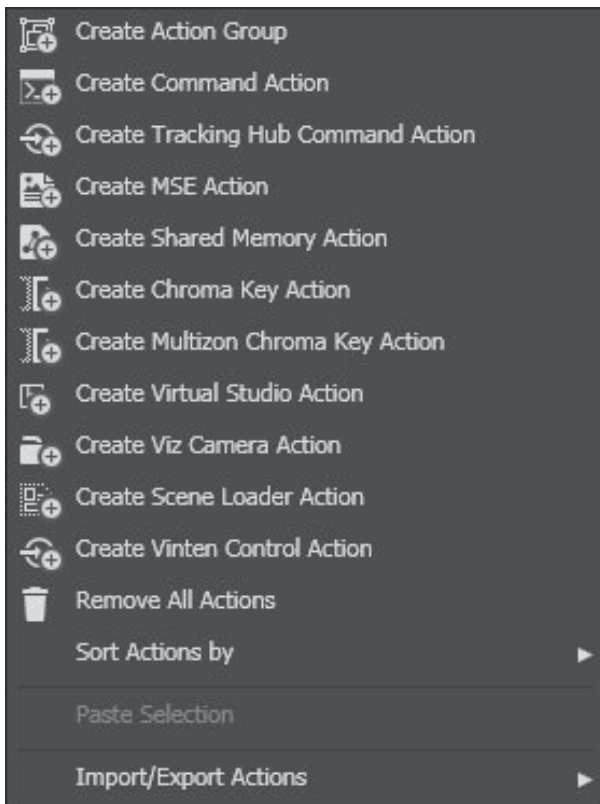
[Project Actions](#) can be created even when no scene is loaded or added into the working project. These action types are not linked to any particular container or scene and can, for example, be used to group actions together or to send viz commands to a channel.

To Create Project Actions



Click on the desired [Project Action Types](#) button on the **CREATE** toolbar

OR



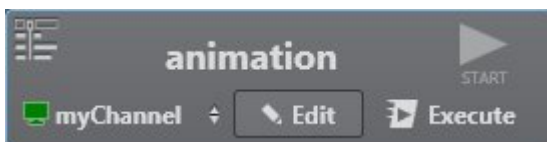
- **Right-click** on the actions canvas
- **Select** the desired [Project Action Types](#) from the context menu


Info: Other actions can be also found by right-clicking on an empty area in the project. For more information see [Other Action Types](#).

Editing Actions

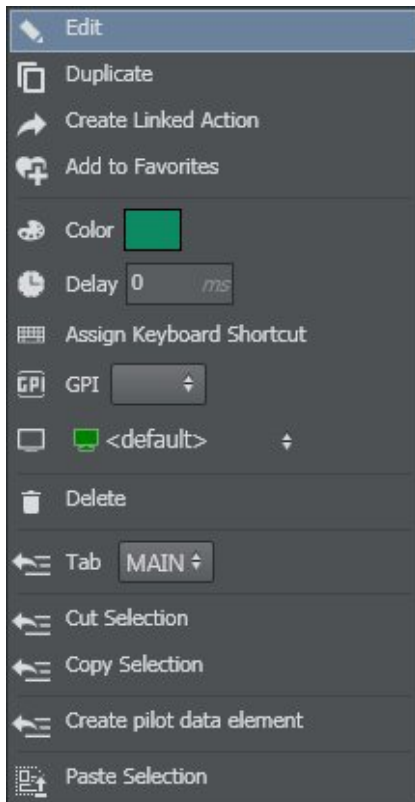
Any action in a project can be edited to change the logic of the action.

Actions can be edited either:



- By pressing the  **Edit** button on any of the actions.

OR




- By right-clicking on any action and selecting **Edit** from the context menu.

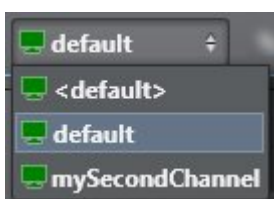
Common Action Tools

All actions created in Viz Arc share a common set of tools.



1. **Channel** : Selected channel to execute actions.
2. **Edit Mode**: Press the **Edit**  button to expand the editing box to modify general action settings.
3. **Execute**: Executes the action.

Channel



When executed, all actions send the relevant commands to Viz Engine to manipulate the scenes. These commands are sent to the Engines defined in the [selected channel](#) for each action.


Edit Mode


Press the **Edit**  button to expand the editing box to modify general action settings.

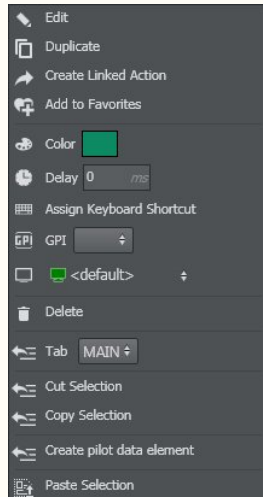


1. **Action name:** Each action includes a name that can be used to [filter actions](#).
2. **Action Color:** It's possible to assign a color to each action.
3. **Action delay:** Action delay adds an execution delay in milliseconds.
4. **Keyboard shortcut:** Assigned [keyboard shortcut](#).
5. **GPI:** GPI Channel (HI-0/HI-15, LO-0/LO-15).
6. **Control Channel/Container:** The [Control Channel](#) or [Container path](#) to which the action is linked.

Execute

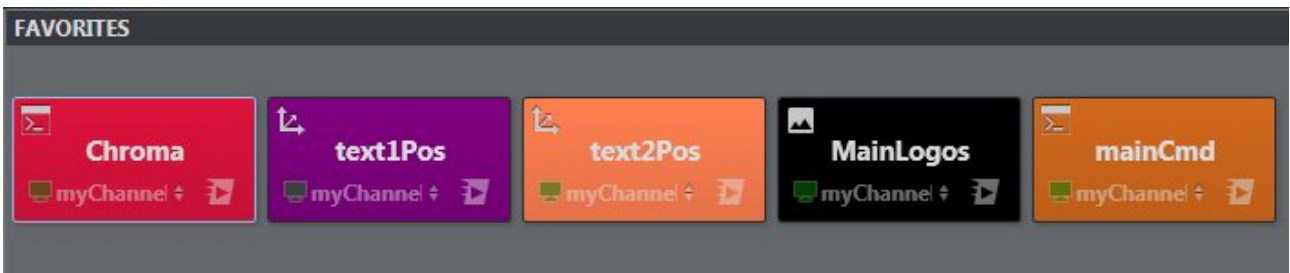
 **Execute** The **Execute** button lets you send a specific action command to the selected channel.

 **Note:** It's also possible to access common action tools through the context menu by right-click on an action box:

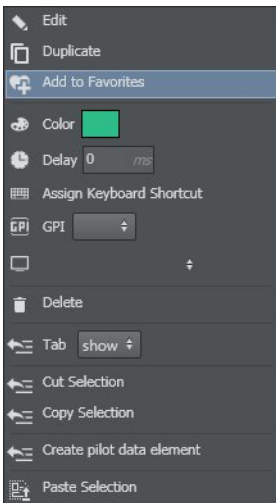


Favorites

Favorites is used for easy access to the most commonly used actions. Favorite actions appear in this section:



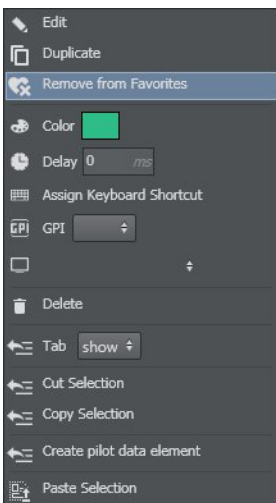
To Add Actions to Favorites



1. Right-click on the selected action or actions.
2. Select **Add to Favorites** from the context menu.

Note: It's possible to add more than one action to the favorites section at the same time. Select all the desired actions and follow the same steps as above.

To Remove Actions from Favorites



1. Right-click on the selected action or actions.
2. Select **Remove from Favorites** from the context menu.

To Remove All Actions from Favorites

It's possible to remove all favorite actions from the favorites section.

Clear All Favs

1. Right-click anywhere in the favorites section.
2. Select **Clear All Favs** from the context menu.

Searching, Sorting and Removing All Actions

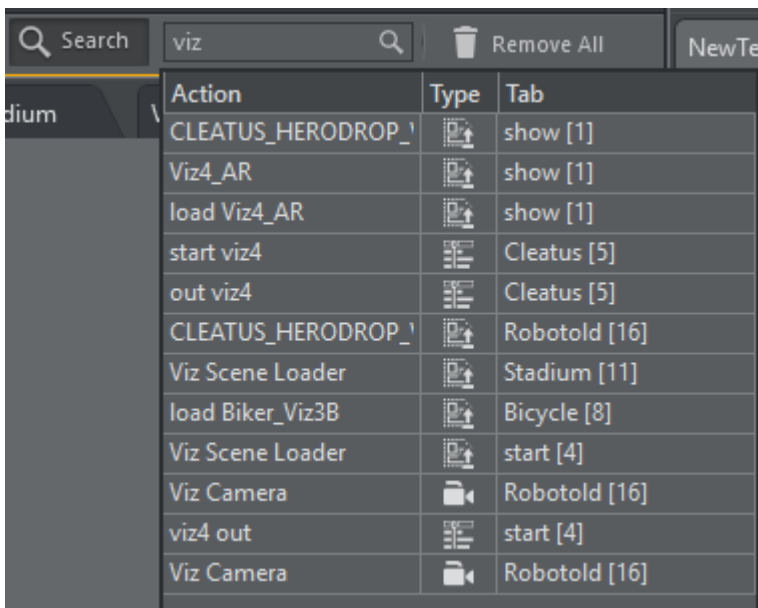
Actions can be searched by name in order to easily locate Actions in a project.

This section describes the different options in the actions tool bar.

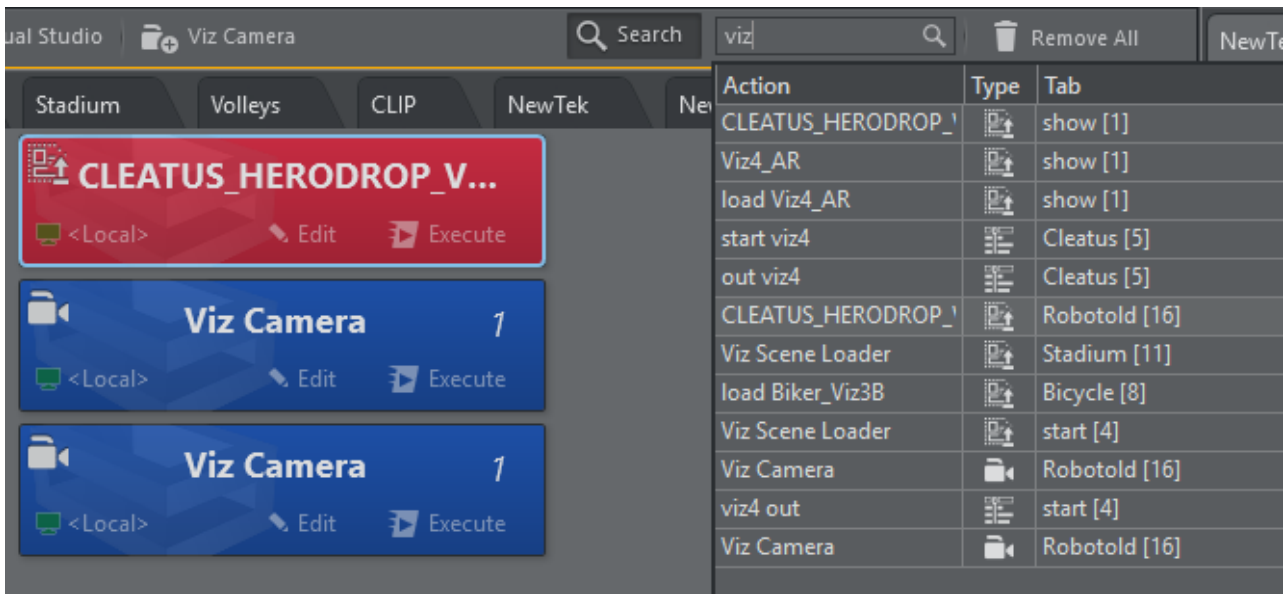


1. **Search**: Search actions by name.
2. **Remove all**: Removes all actions from the project.

Search



Click the **Search** button and a popup will initially show all available actions. Type a string to narrow down the search for an action containing the string in its name. By selecting an action it will be selected and shown on the action canvas.

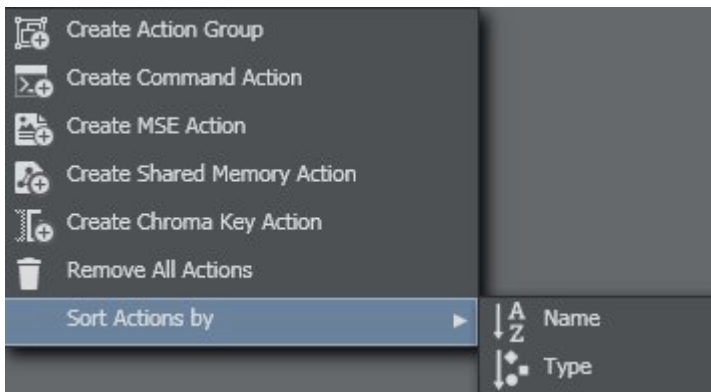


Sort By

It's possible to **sort actions** that are in the project by **name** (ascending) or **type**.



It's also possible to sort by right-clicking on an empty space in the action area.



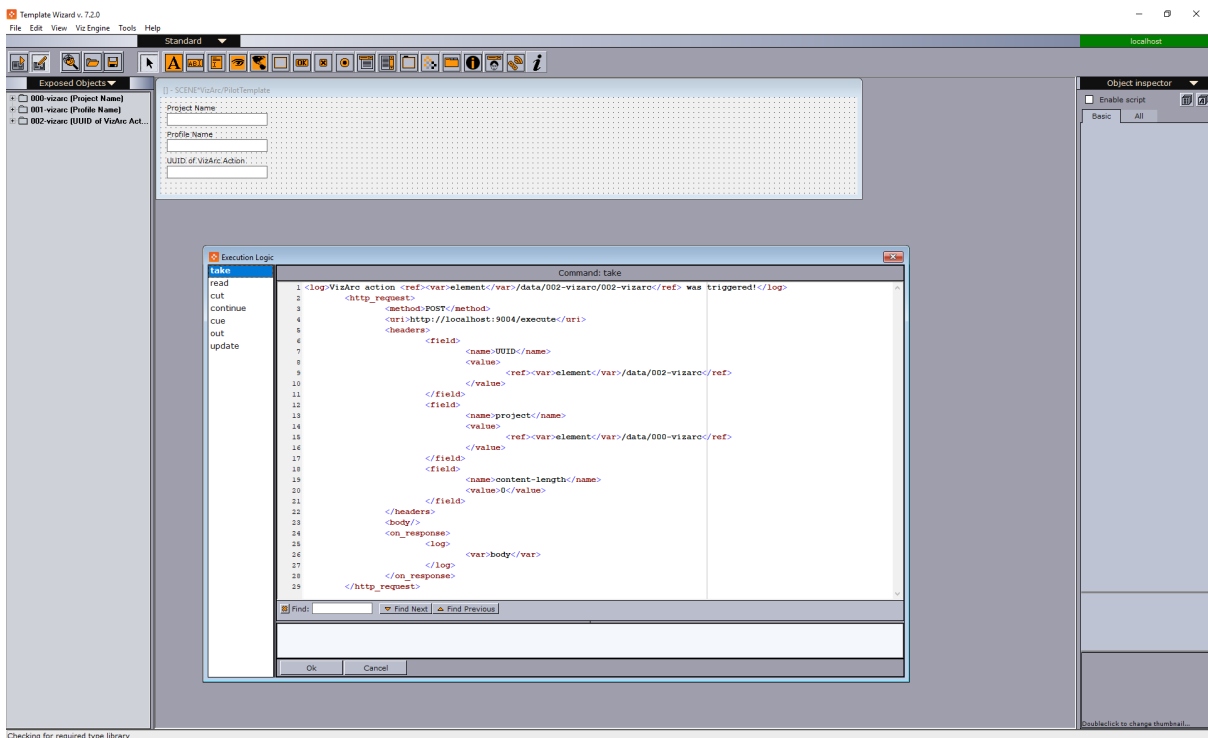
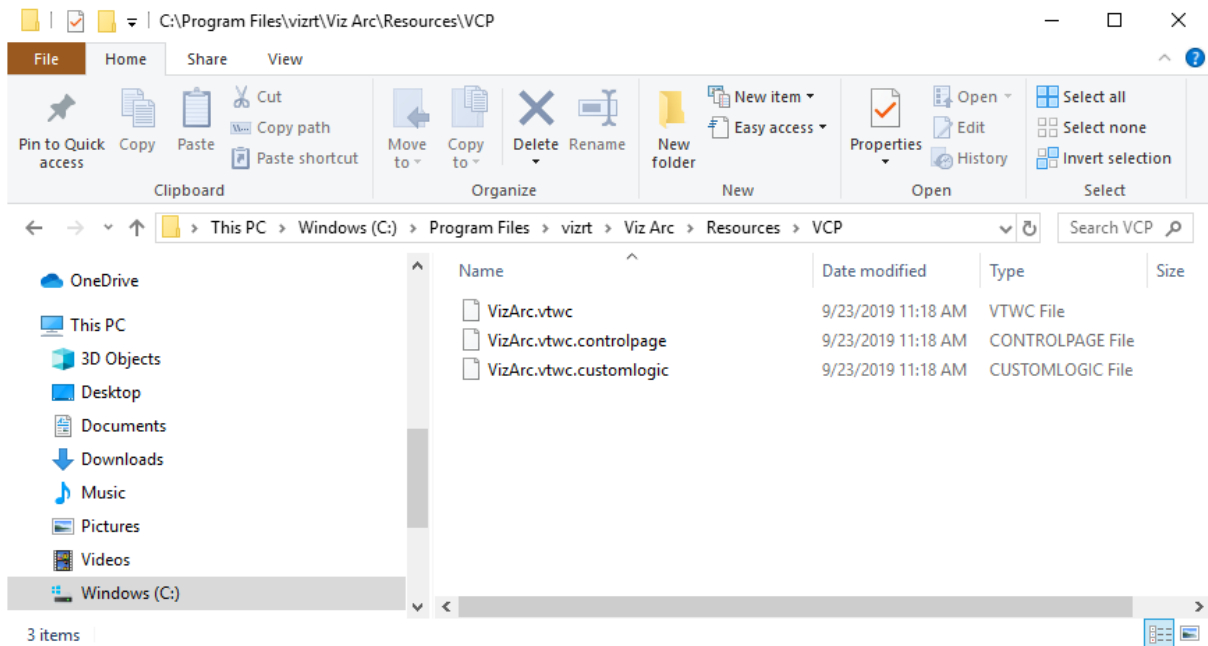
Remove All

Press the **Remove All** button to remove all actions in the project. You can undo this operation by clicking the **UNDO** icon on the [Projects Toolbar](#).

Save Action as Data to Viz Pilot

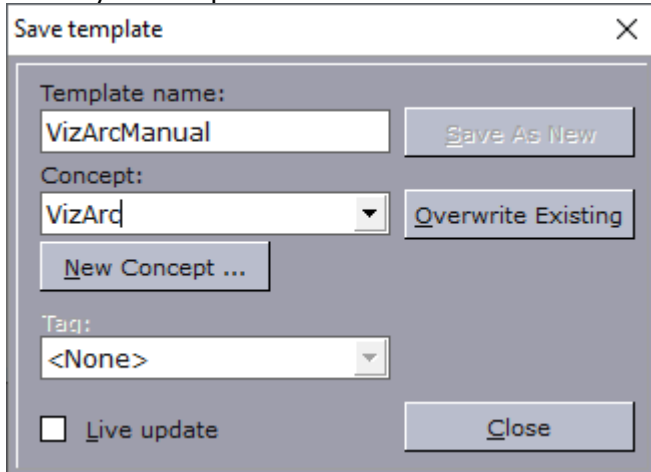
Once you have created an action in Viz Arc, you can create a Viz Pilot data element and use it in Viz Director as a normal data element.

1. First, import the Viz Arc pilot template using Pilot Template Wizard. The template can be found in the program-data directory (typically *C:\ProgramData\vizrt\VizArc*) under *Resources\VCP*.

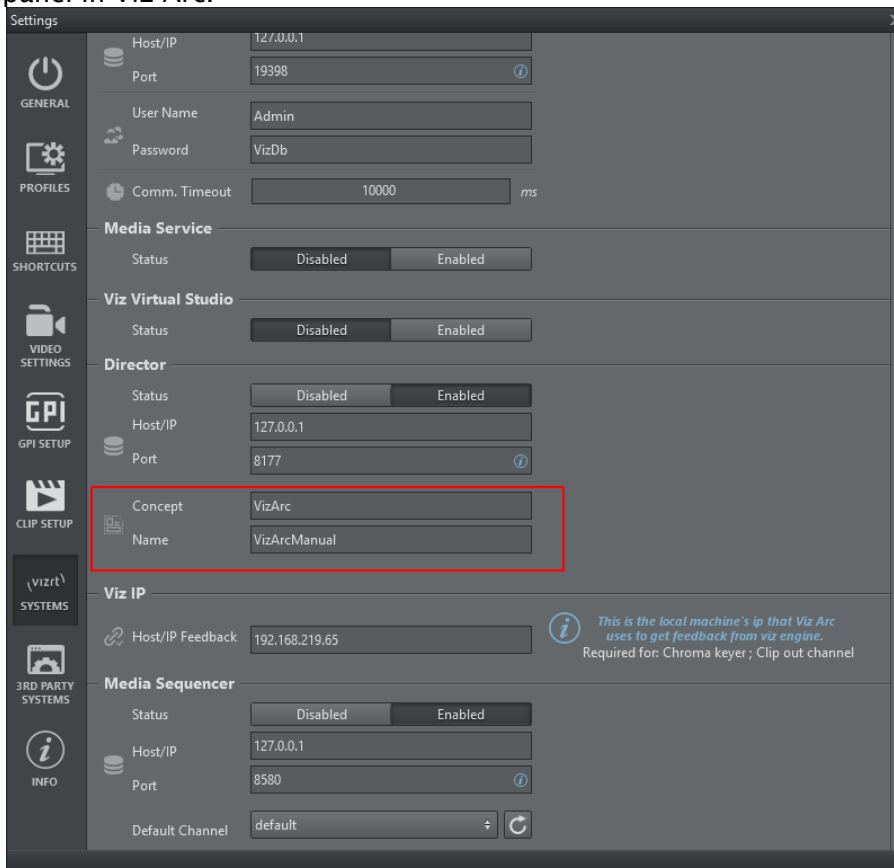


Note: The template has a custom execution logic that performs a REST call when the pilot data element or template is taken On Air.

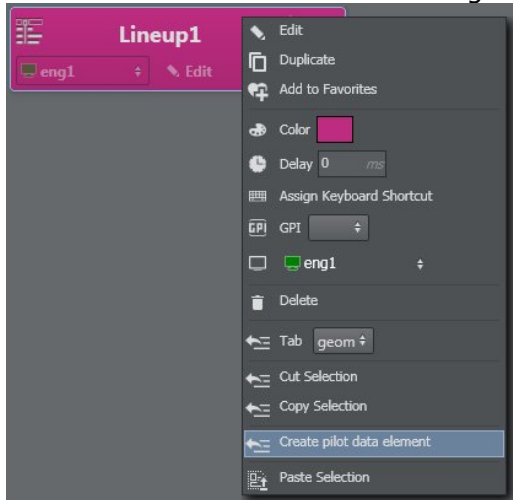
2. Create your template and save it.



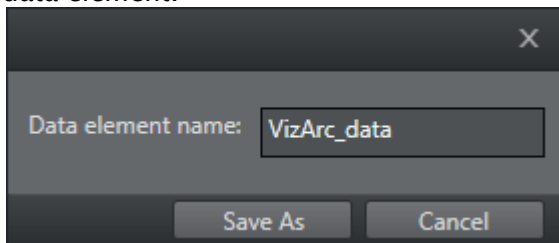
3. Once you have saved the template, you need to set up a **Concept** and template in the config panel in Viz Arc.



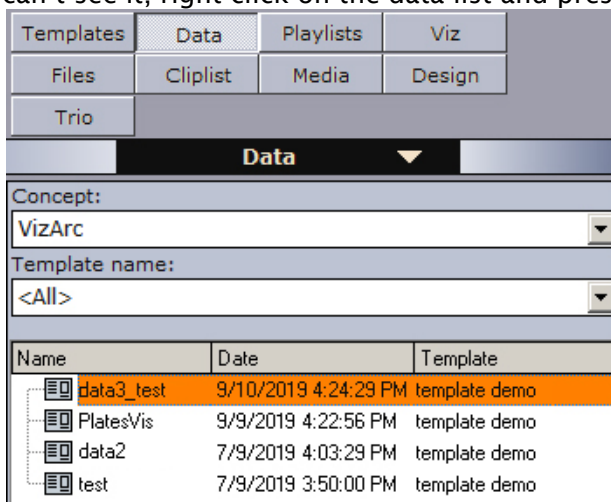
4. Create an action or select an existing action and right-click on it.



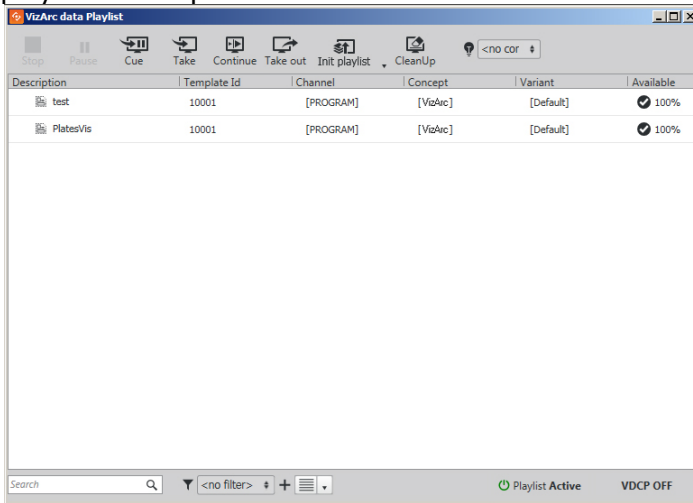
5. Select **Create Pilot data element**. The window below appears. Insert a name for the new Viz data element.



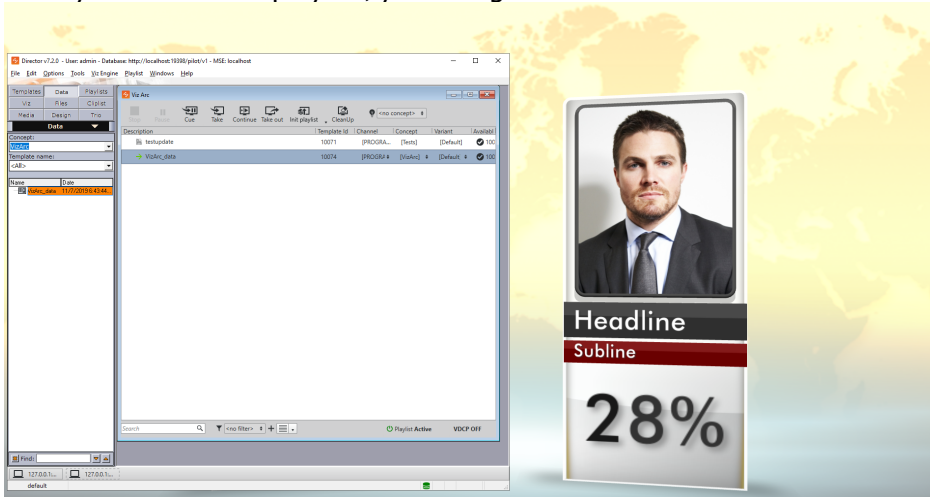
6. Now, switch to Viz Director and you should see your new data in the **Data** section. If you can't see it, right-click on the data list and press **Refresh**.



- Once this data is saved, you can operate Director like normal; for example, you can create a playlist and import all Viz Arc data.



- Once you have a full playlist, you can go **On Air** with the Director.



See Also

- [Supported Action Types](#)
- [Viz Pilot User Guide](#)

5.5.2 Set View

Viz Arc lets you work with both outdoor and indoor Augmented Reality events. You can search for a specific place in maps and set up your outdoor set or import an AutoCad project and set up the entire elements environment in the scenography.

Note: Viz Arc uses the metric system.

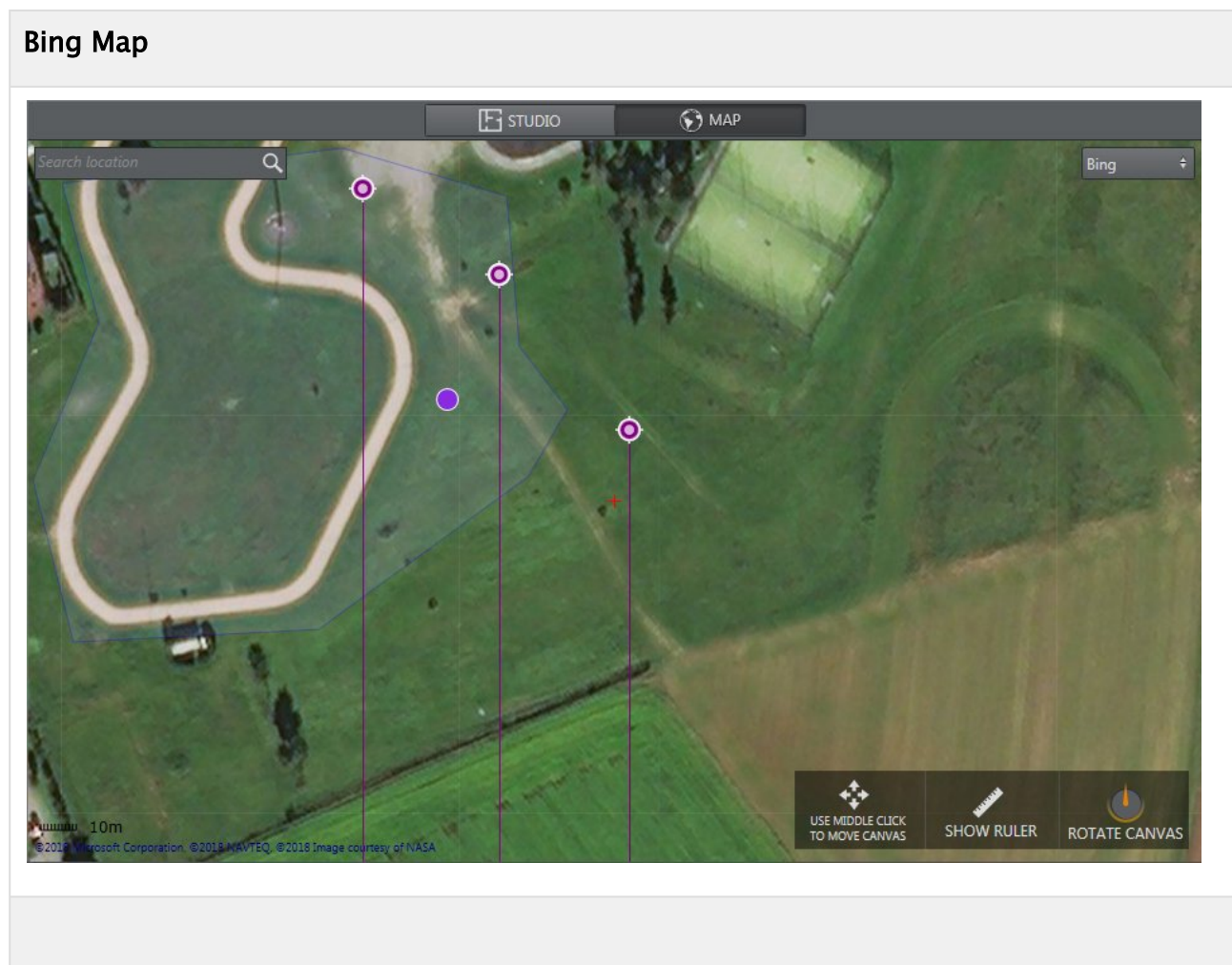
This section covers the following topics:

- [Map](#)
- [Studio](#)

- Working with Virtual Studio
 - To Position an AR Element
 - To Add a Calibration Point
 - To Set up a Camera
 - To Draw a Polygon
 - To Set up a Height Area
 - To Set a Zero Point
- 4 Point Calibration
 - Prerequisites
 - Adding Calibration Points
- Calibration
 - Applying Calibration

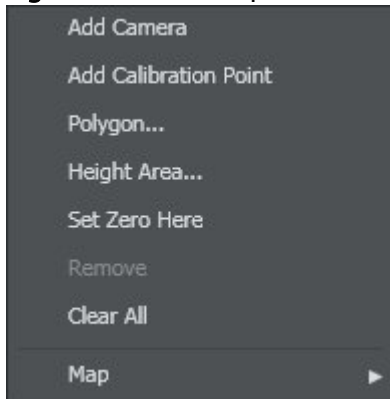
Map

Map items can retrieve map data from Bing.



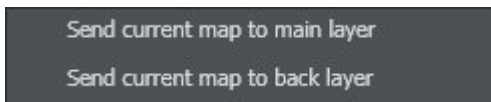
Map is used to set up an external environment. You can search for a place in the search bar and place elements directly into the map area. Map uses XYZ positions OR geolocation and transforms them into Viz Units. The map menu lets you:

- Zoom in/out with the **mouse wheel**.
- Move the map with the **center mouse button**.
- **Left-click** on an element to move it.
- **Right-click** on an element to remove it.
- **Right-click** on a map:



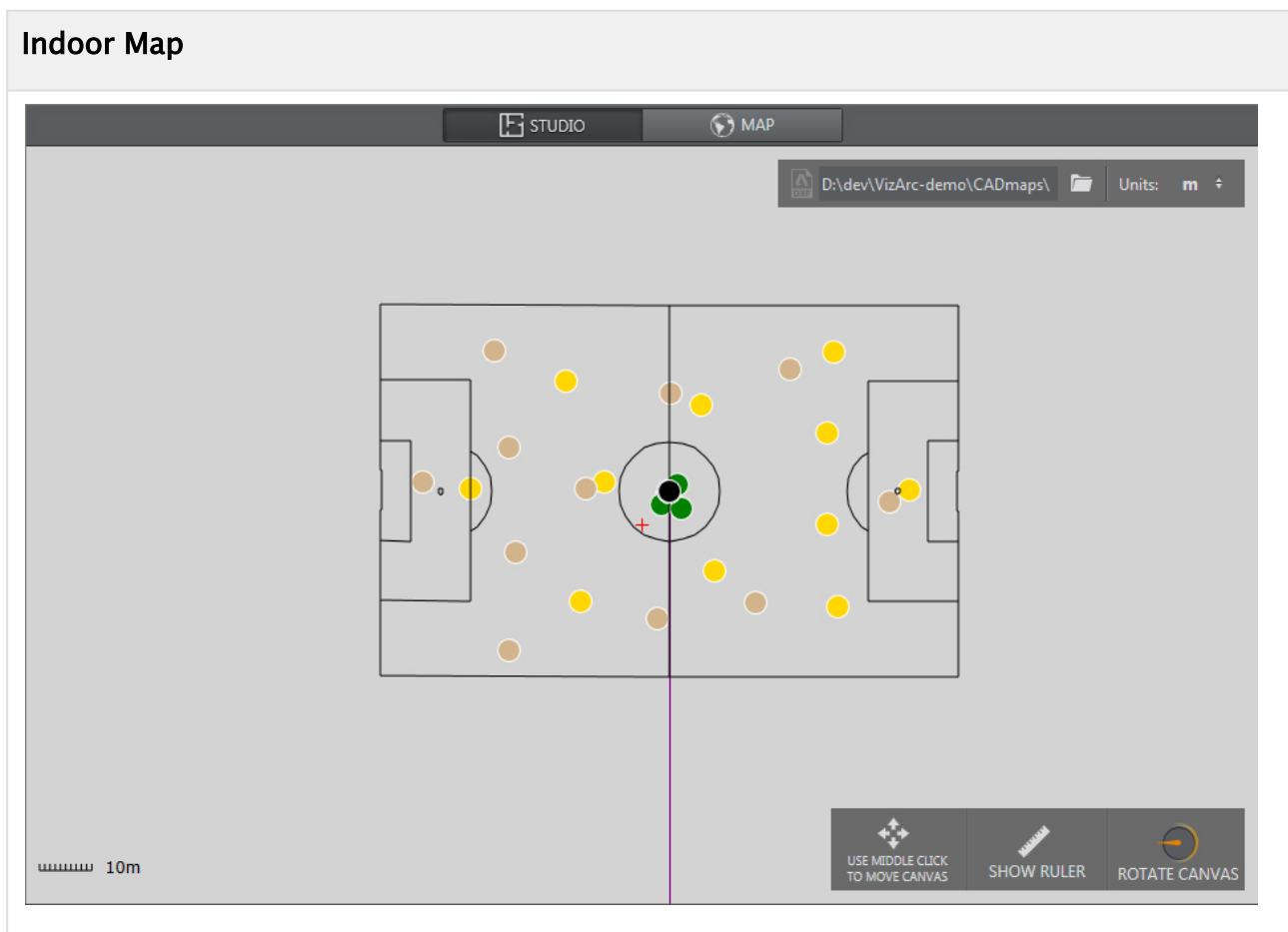
- [Set up a Camera](#)
- [Add a Calibration Point](#)
- [Draw a Polygon](#)
- [Set up a Height Area](#) to intercept the height of the object
- [Set a Zero Point](#)
- Clear All elements in map (except for the Zero Point)


By selecting a **Map** item, you can choose to send your current map to the main layer or back layer:



Studio

It's possible to import an AutoCAD project (.dxf) and set up cameras and objects directly into your custom studio using **STUDIO**.





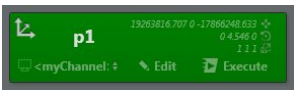
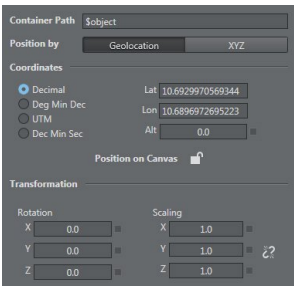


Studio is used to set up an internal environment. You can import your Studio map project using the **Browse** icon  and place elements directly into the plan area. Studio uses Viz Units only.

Working with Virtual Studio

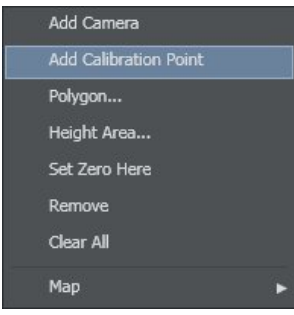

This section covers how to set up virtual studio and augmented reality elements in relation to your physical environment.

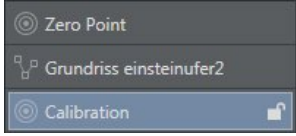
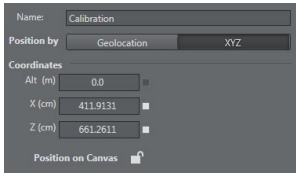

- [To Position an AR Element](#)
- [To Add a Calibration Point](#)
- [To Set up a Camera](#)
- [To Draw a Polygon](#)
- [To Set up a Height Area](#)
- [To Set a Zero Point](#)
- [Prerequisites](#)
- [Adding Calibration Points](#)
- [Applying Calibration](#)

To Position an AR Element

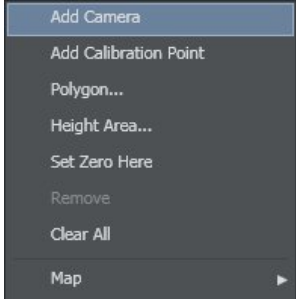

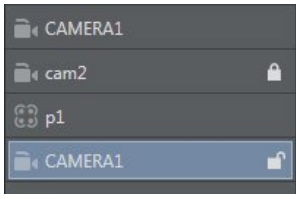
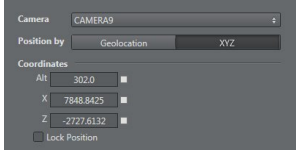
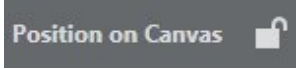
	<p>Drag and drop the desired container's plugin (only position or transformation control channel) into the map area.</p>
	<p>The green icon appears on the map.</p>
	<p>The same elements action that was just created can also be found in the action pane in the main window.</p>
	<p>Selecting the icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>This menu lets you position graphics along the camera center at a given distance.</p>
	<p>This icon lets you lock or unlock an element position on the map canvas.</p>

To Add a Calibration Point

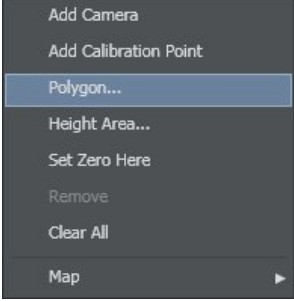


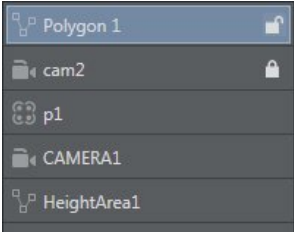
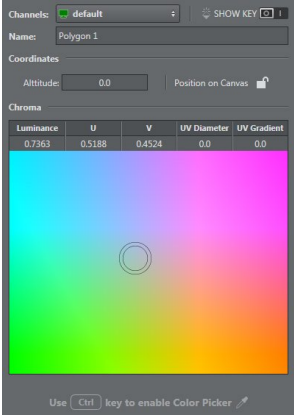

	<p>Right-click on the map OR in the studio area and select Add Calibration Point in the context menu.</p>
	<p>The target icon appears on the map.</p>

	<p>The item is also added to the element list on the right of the map/studio area.</p>
	<p>Selecting an icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>It's possible to lock or unlock a camera position on the map canvas using this command.</p>

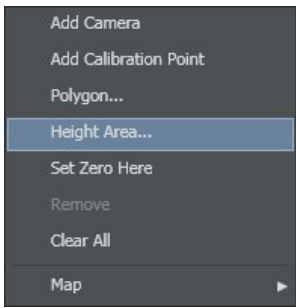

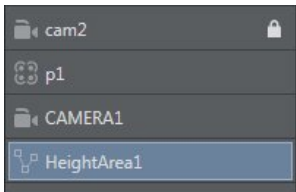
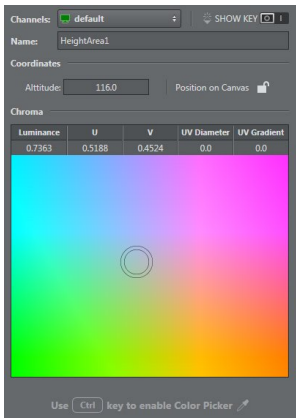

To Set up a Camera

	<p>Right-click on the map OR in the studio area and select Add Camera in the context menu.</p>
	<p>The camera icon appears on the map.</p>
	<p>The item is also added to the element list on the right of the map/studio area.</p>
	<p>Selecting an icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>It's possible to lock or unlock a camera position on the map canvas using this command.</p>

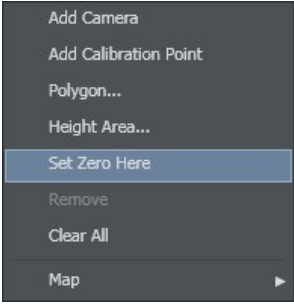

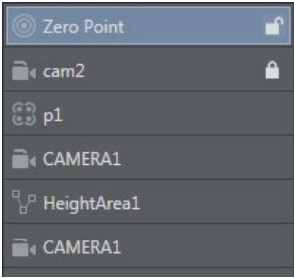
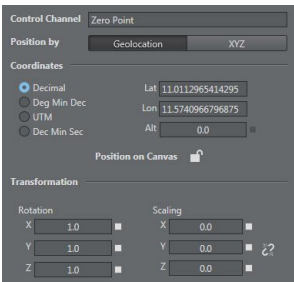

To Draw a Polygon

	<p>Right-click on the map OR in the studio area and select Polygon... in the context menu.</p>
	<p>The cursor transforms into a pen  and you can start to draw the polygon on the map. Mark as many vertices as you need.</p>
	<p>The item is also added to the element list on the right of the map/studio area.</p>
	<p>Selecting an icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>It's possible to lock or unlock a camera position on the map canvas using this command.</p>

To Set up a Height Area

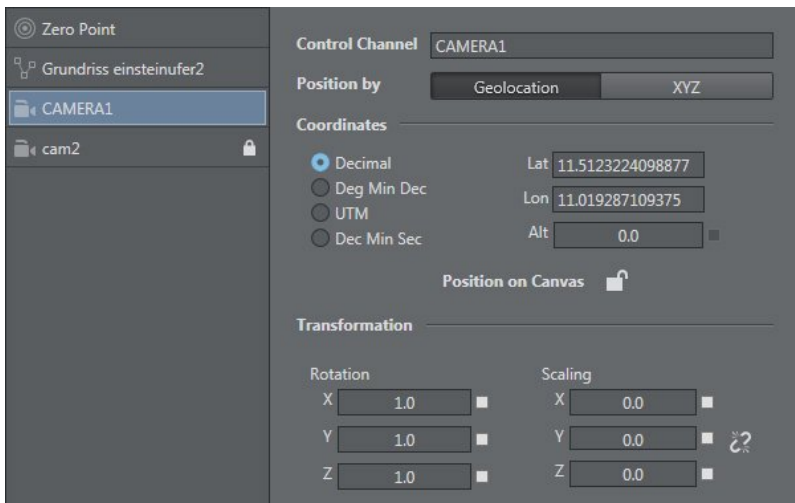
	<p>Right-click on the map OR in the studio area and select Height Area... in the context menu.</p>
	<p>Click once to set a point and click again to set the height. This icon appears on the map.</p>
	<p>The item is also added to the element list on the right of the map/studio area.</p>
	<p>Selecting an icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>It's also possible to lock or unlock the height area position on the map canvas.</p>

To Set a Zero Point

	<p>Right-click on the map OR in the studio area and select Set Zero Here in the context menu.</p>
	<p>This icon appears on the map.</p>
	<p>The item is also added to the element list on the right of the map/studio area.</p>
	<p>Selecting an icon or element in the list makes the corresponding config section appear on the right side of the SET window.</p>
	<p>It's also possible to lock or unlock a zero point position on the map canvas.</p>

Once an element (like a camera) has been added, it's possible to edit the parameters:

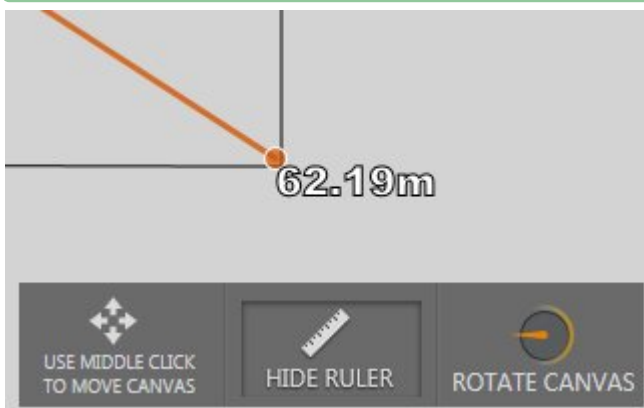
- Position – choose between
 - **geolocalization**: latitude, longitude, altitude, and type: **Decimal, Deg Min Dec, UTM, Dec Min Sec**
 - **XYZ**
- Rotation
- Scaling



You can toggle **show ruler** to make small adjustments to element positions on the map. **Rotate canvas** by holding down the left cursor button to the desired map position.



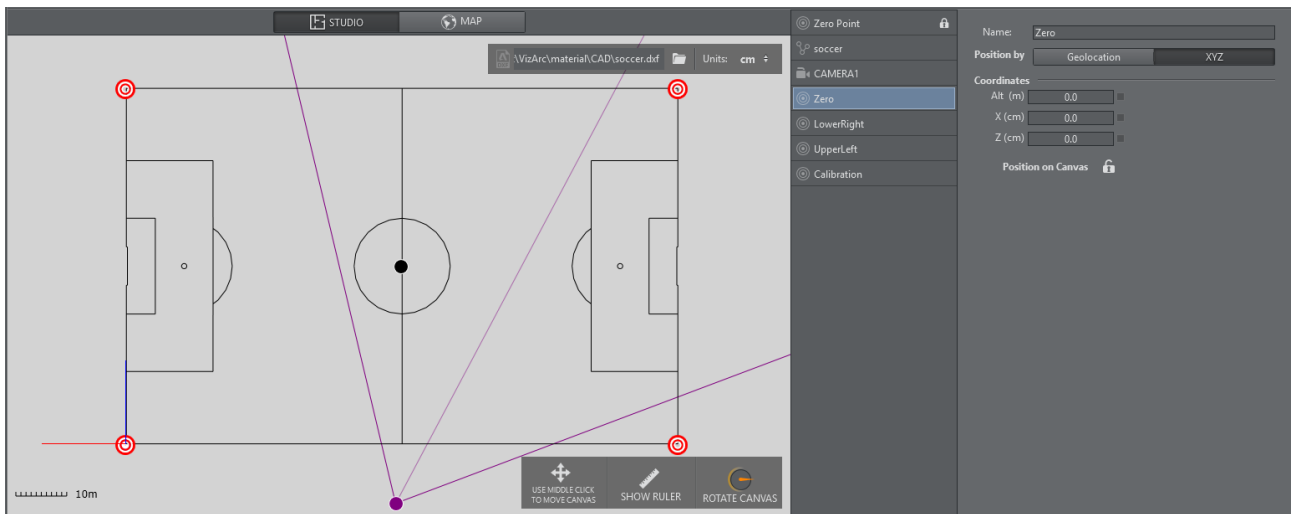
Tip: The Ruler tool is useful since it allows you to measure the distances on your area in Viz Arc in real time.



Note: It's possible to delete all elements in a map except the Zero Point.

4 Point Calibration

4 Point Calibration can be used to calculate the position and orientation of a (typically mechanically) tracked camera. Using this type of calibration requires knowledge of at least four physical points in the domain (for example, the corners of a soccer pitch or well-known points on a horse race track).

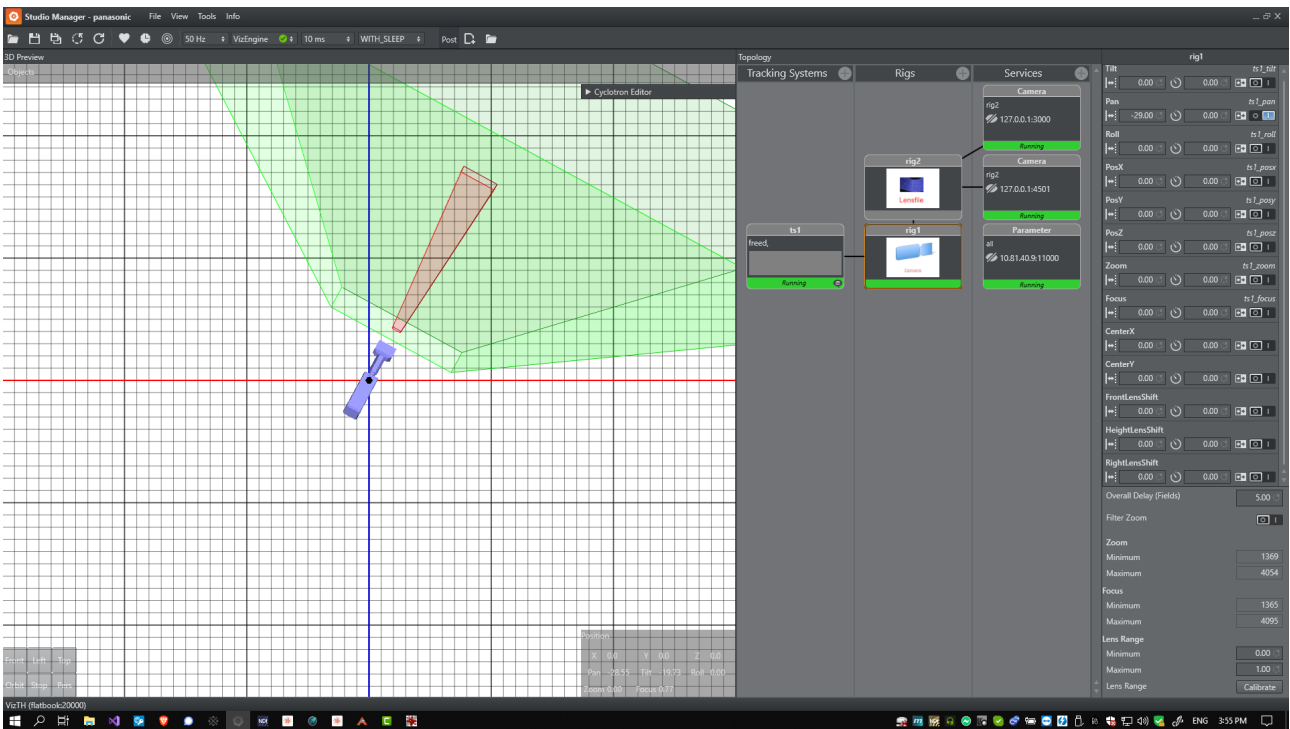


Map View showing a soccer pitch and 4 calibration points.

Prerequisites

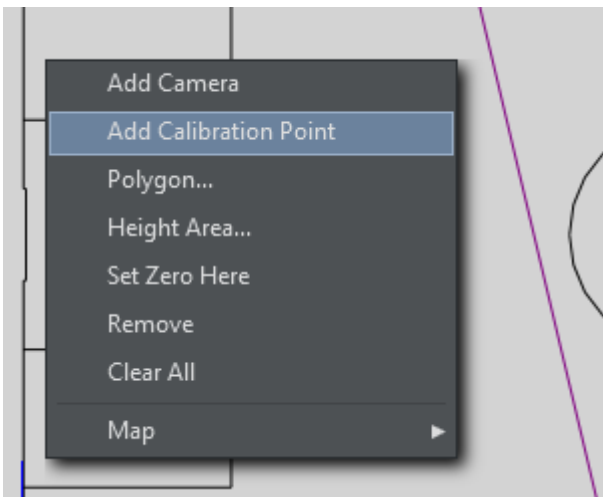
- The calibration points must all be on the XZ plane (same height).
- The camera must be on a fixed position and can't be moved in space.
- At least four points need to be measured/known on the tracking domain.
- The points must define a surface and not just a one dimensional line.
- Make sure the tracking hub sends the tracking information to Viz Arc and make sure it includes the camera lens rig containing a valid calibration.

⚠ Note: Do NOT use a parent transformation rig on top for 4 Point calibration. The translation and rotation are handled inside the root node of the Viz Artist scene.

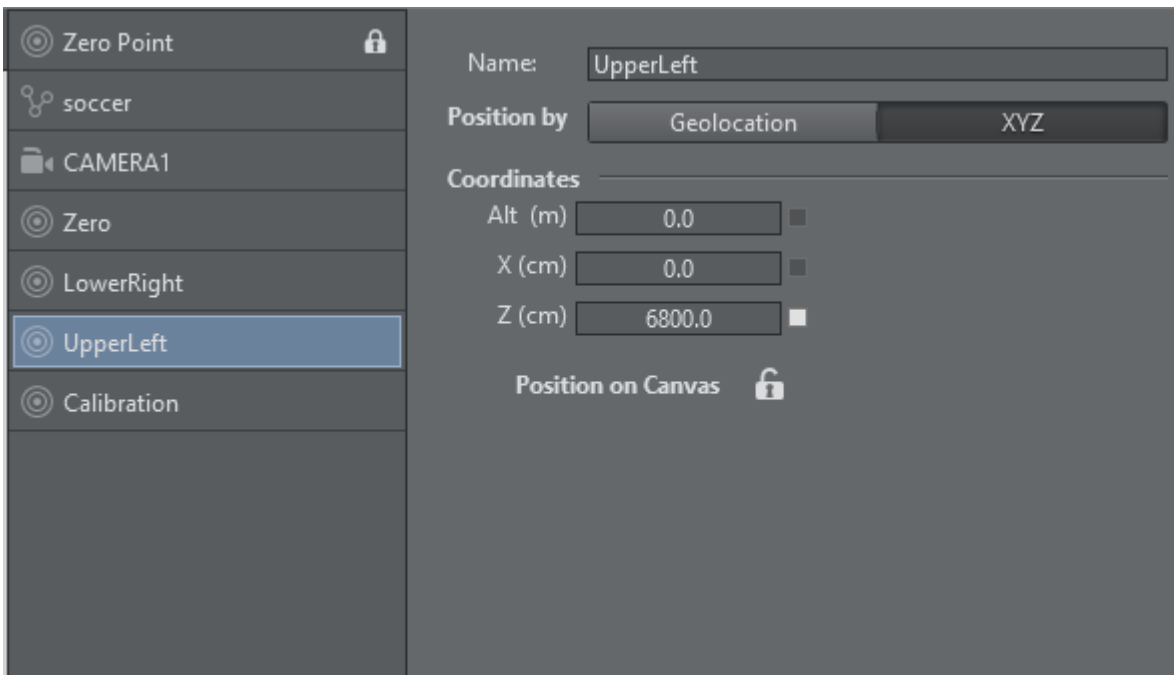


Adding Calibration Points

Add calibration points from the map's context menu:



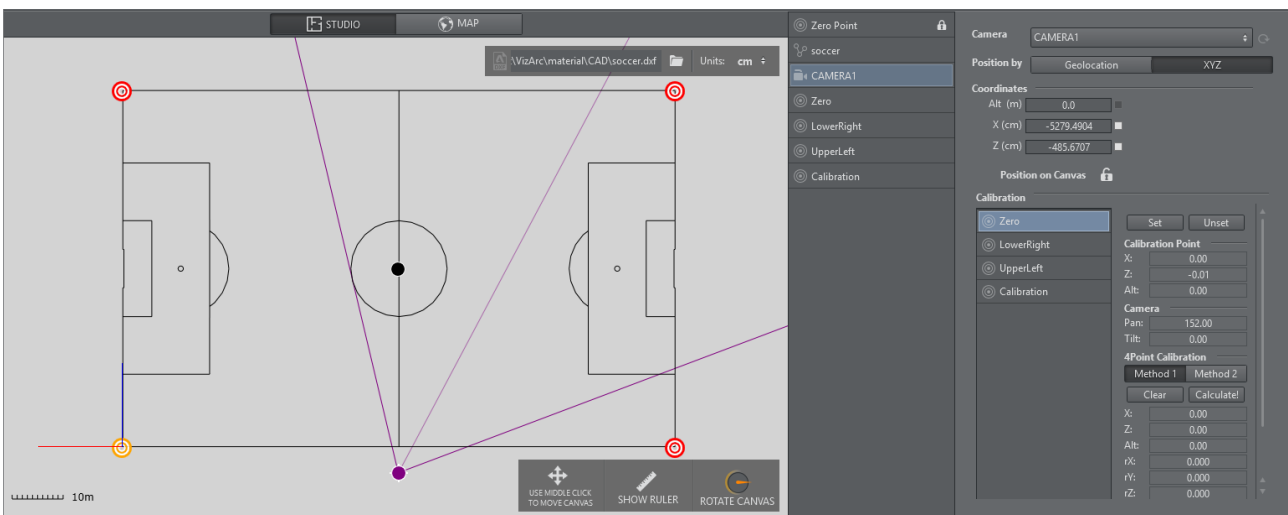
Select the calibration point you just added and move it on the map, or enter its coordinates manually:



Once all calibration points have been added and positioned, the actual calibration process may start.

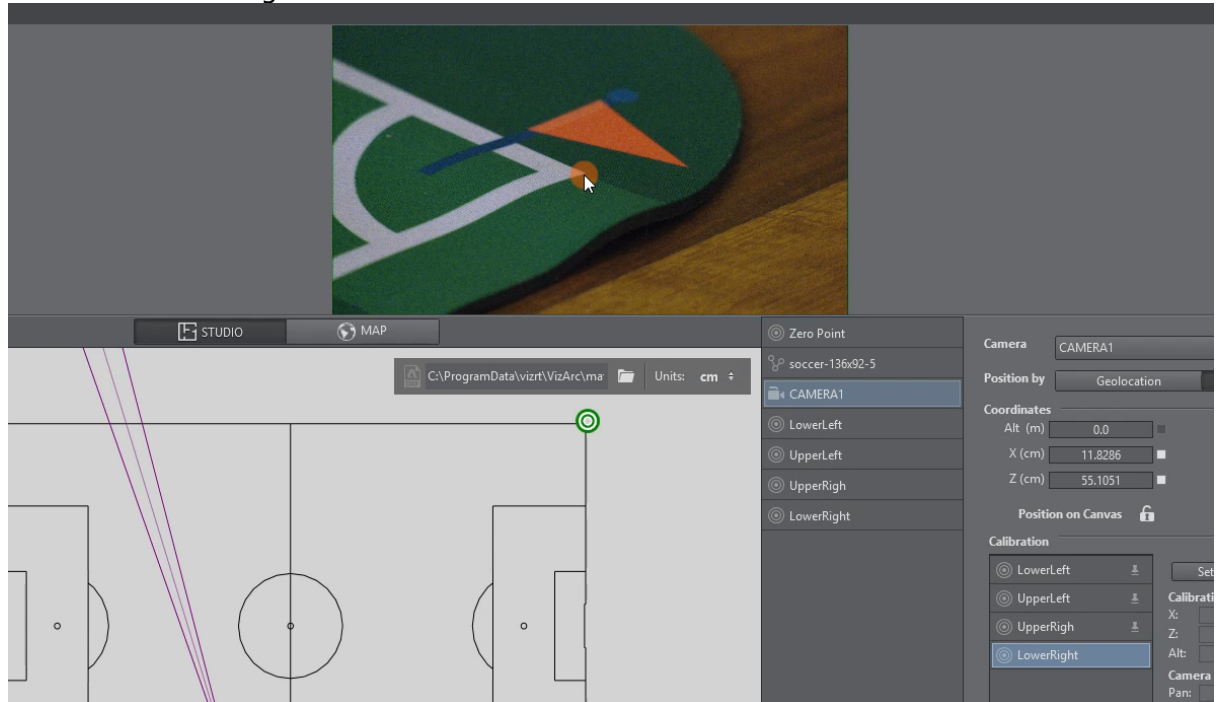
Calibration

Select the camera to be calibrated.



1. On the camera user interface select the marker towards which you want to point the camera. The calibration point is colored **yellow** on the map canvas.
2. The physical camera should now fully zoom into the marker and try to center it as best as possible.
3. Once the marker is centered, click the **Set** button. If your preview has been set up so that the camera is visible and you have a valid lens calibration, you can also click the position in the

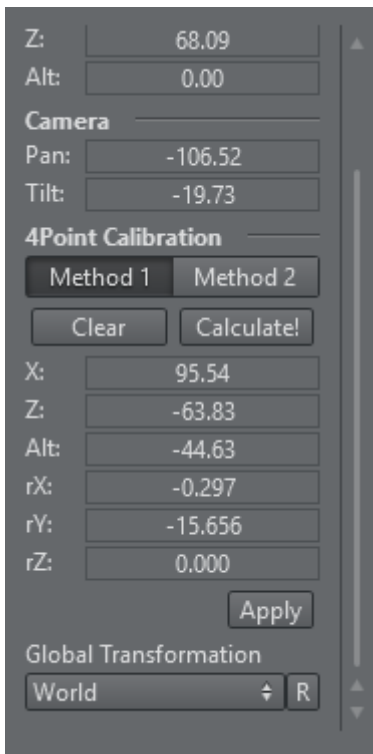
view instead of using the **Set** button.



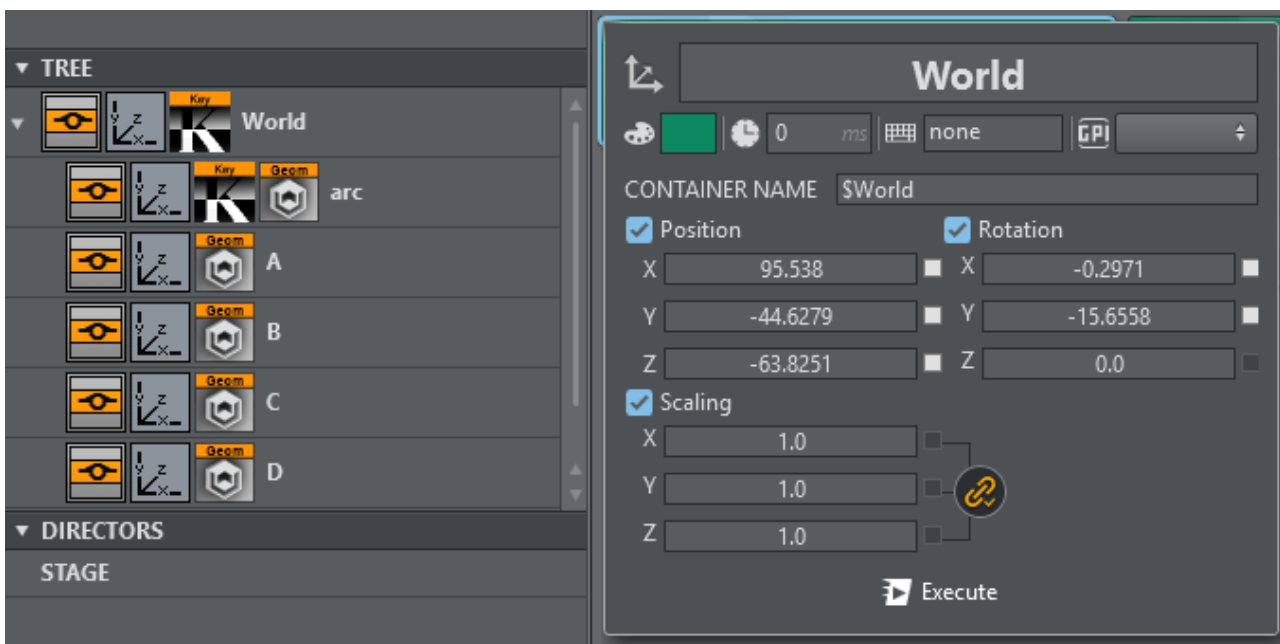
4. Continue this procedure for all or at least 4 calibration points.

Applying Calibration

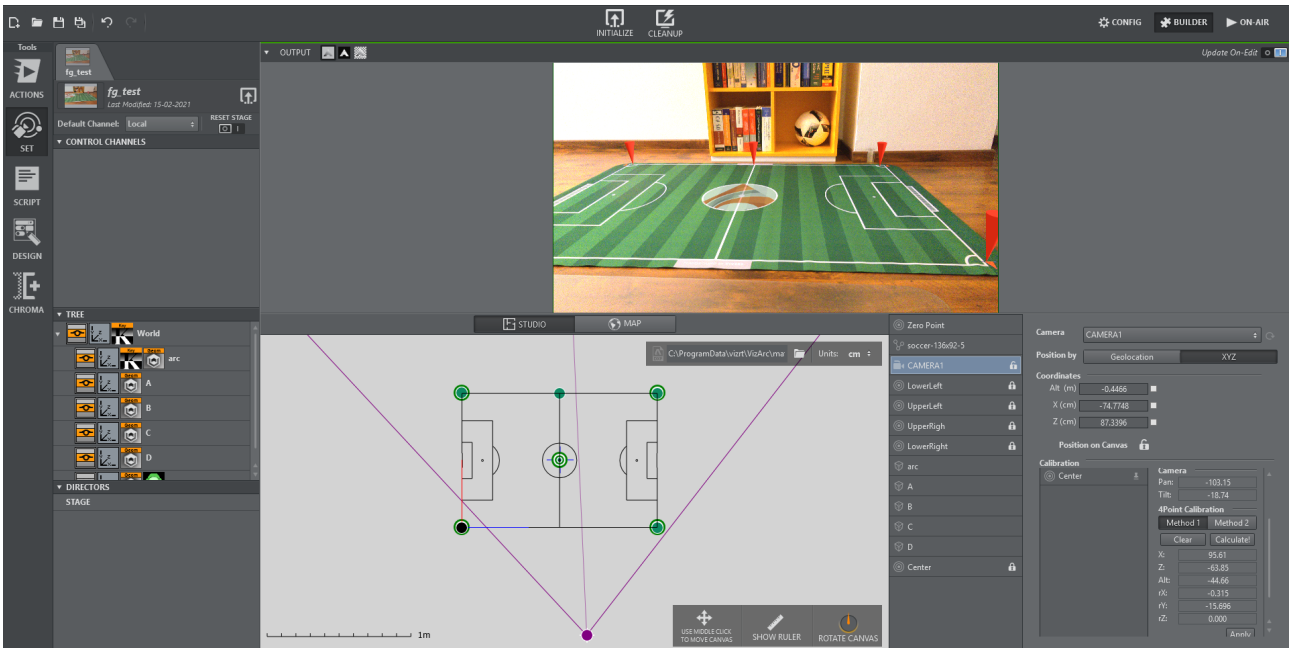
1. Once at least four points have been set, click the **Calculate!** button to calculate the presumed position and orientation of the camera. You can choose between **Method 1** and **Method 2**, hit **Calculate!** after switching algorithm. Generally, Method 2 is more accurate but needs more and more accurate calibration points. Try both and pick the one that gives you better visual results.
2. Under the **Global Transformation** dropdown, select the transformation action holding the world transformation of the main scene (typically the root node of the AR/VR scene).
3. Click **Apply** to apply the calculated transformation and rotation.



Use the R button to refresh the list of available transformation actions.



Typically the transformation to be used is the root node of the scene.

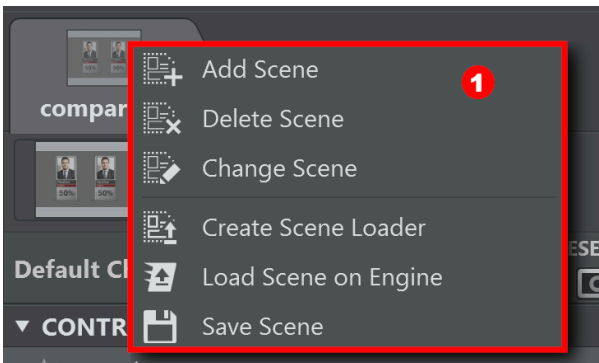


Once calibrated you should be able to position AR graphics on your pitch.

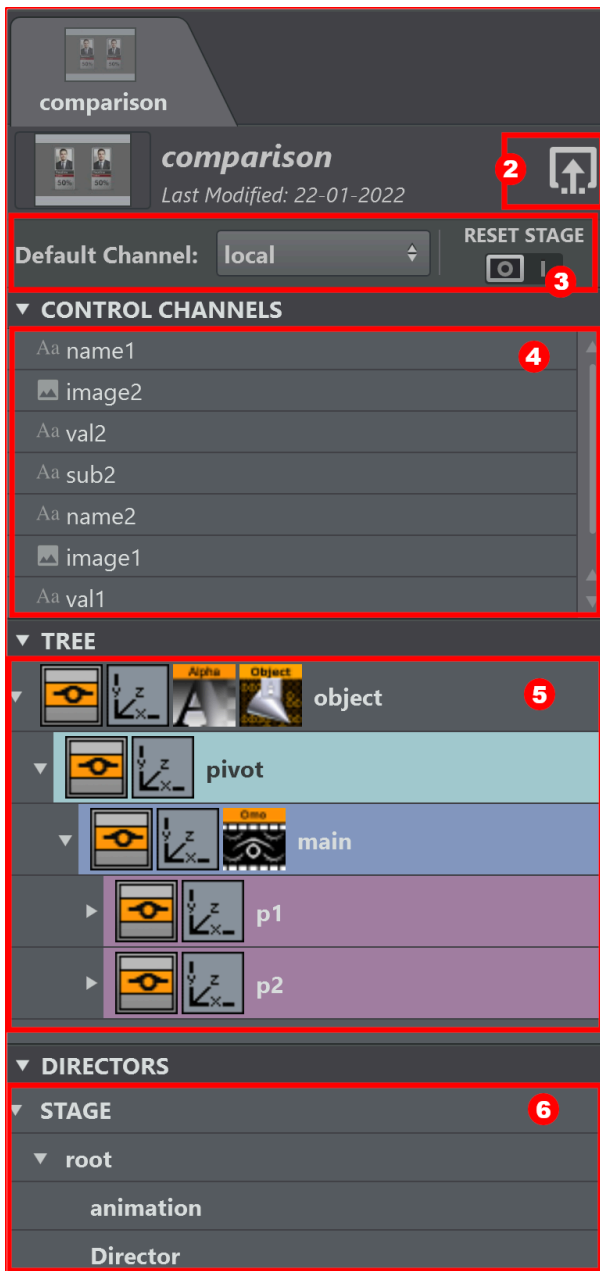
5.5.3 Scenes Panel

In Viz Arc, actions control different parameters within the Vizrt scene. The scenes panel is available in **Actions** and **Set** when working in Builder mode.

Right clicking the scene tabs or in the scene panel always gives you a context menu:



The Scenes Panel contains the following sections:



1. [Scene Panel](#)
2. [Load Scene](#)
3. [Scene Settings](#)
4. [Control Channels](#)
5. [Scene Tree](#)
6. [Stage Directors](#)

Managing Scenes

Managing the scenes in a Viz Arc [project](#) can be done from the scene details area of the Scenes Panel or from the window inside the [Scenes Toolbar](#) and existing [scene loader](#).

This section covers the following topics:

- [Add a Scene](#)
- [Change or Replace a Scene](#)
- [Delete a Scene](#)

The Scene Panel

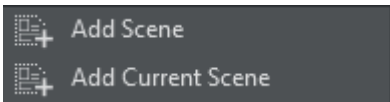
There are different ways to add a scene to a project:

When No Scene Is Added To A Project



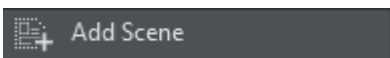
1. Click the the **ADD SCENE** button in the middle of the scene panel or inside the [Scenes Toolbar](#) window.
2. **Browse** and **double-click** the desired scene in the scenes browser.

Use The Context Menu On The Scenes Panel



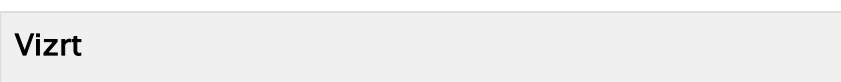
Right-click on the top area of the Scenes Panel.

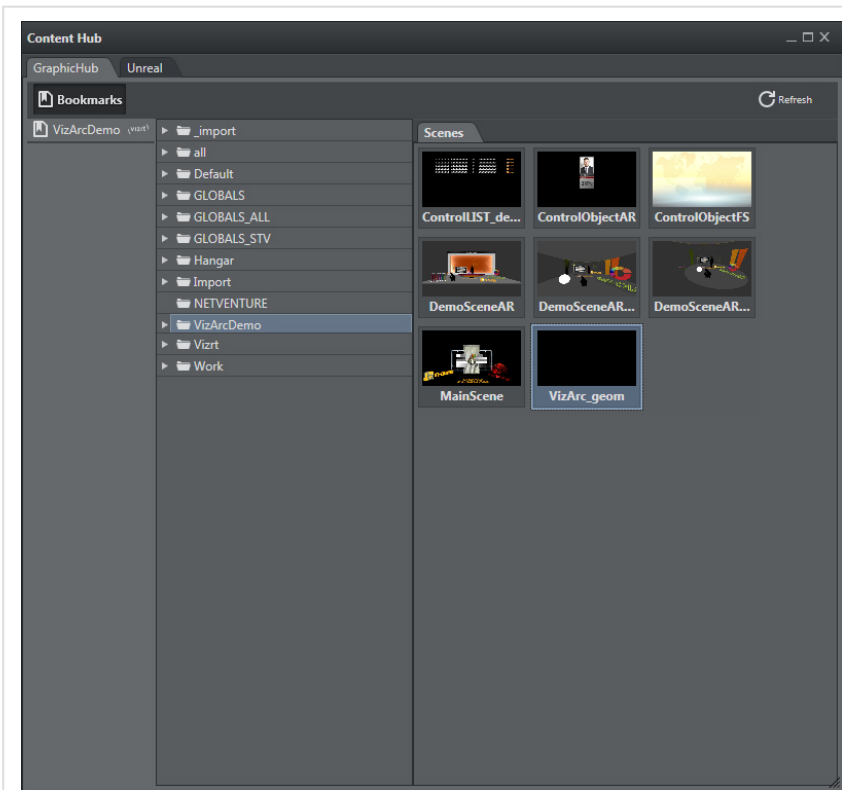
1. Select **Add Scene** from the context menu.
 1. Browse and double click the desired scene in the scenes browser.
2. Select **Add Current Scene** to add the currently loaded scene on the editing engine's main layer



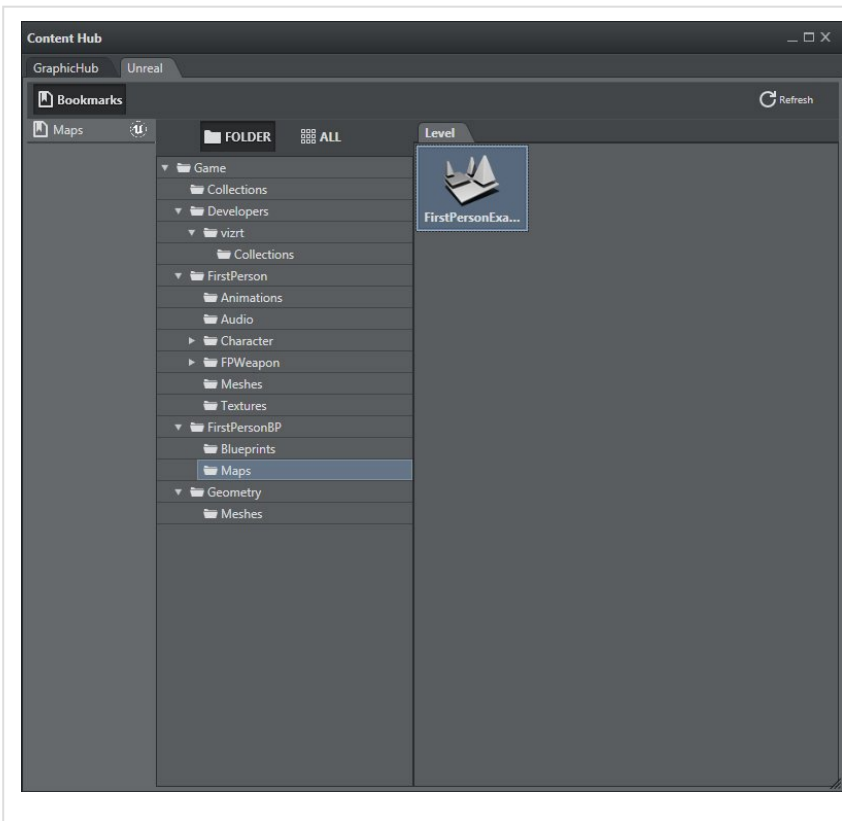
1. Click the **ADD SCENE** button at the top of the window inside the [Scenes Toolbar](#).
2. Select **Add Scene** from the context menu.
3. Browse and double-click the desired scene.

This opens the **Content Hub** window, where you can choose between Vizrt GH scenes or Unreal levels:

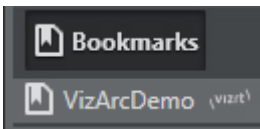




Unreal Engine




It's also possible to bookmark a specific folder in both the Vizrt and Unreal section:

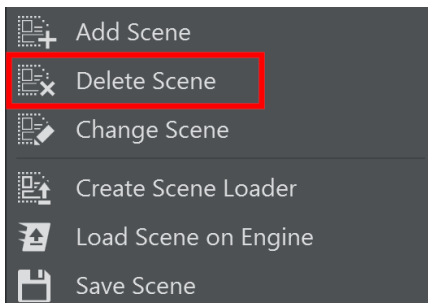


Change or Replace a Scene

After a scene has been added to a project, it can be changed and replaced with a different scene. There are three ways to open the scenes browser to select a new scene:

	<p>Right-click on the Scene tab from the scene panel, or Right-click on the scene loader from the window inside the Scenes Toolbar.</p>
	<p>Click the  icon next to the scene name.</p>
	<p>Click the scene's thumbnail.</p>

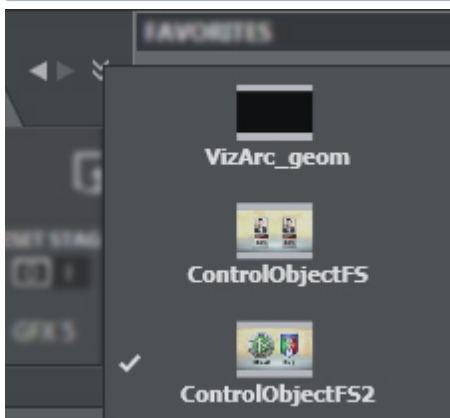
Delete a Scene





To delete a scene from a project:

1. **Right-click** the Scene tab from the scene panel, or **Right Click** the [scene loader](#) from the window inside the [Scenes Toolbar](#).
2. Select **Delete Scene** from the context menu.
3. Select **Yes** to confirm.

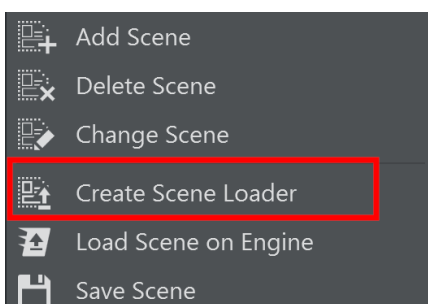
Info: Note that the scene is NOT be deleted from Graphic Hub, only from the Scene Tabs in Viz Arc.



If there are more scenes in your Viz Arc project you can easily switch between them:

- using the drop-down scene menu, by selecting this icon 
- or by clicking the left / right arrows 

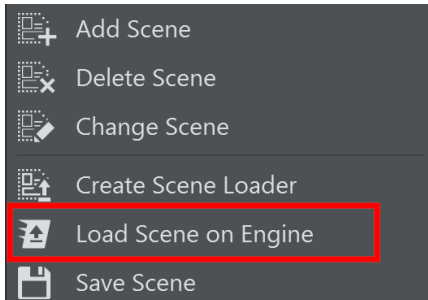
Create Scene Loader



To create a scene loader:

1. **Right-click** the Scene tab from the scene panel, or **Right Click** the [scene loader](#) from the window inside the [Scenes Toolbar](#).
2. Select **Create Scene Loader** from the context menu.

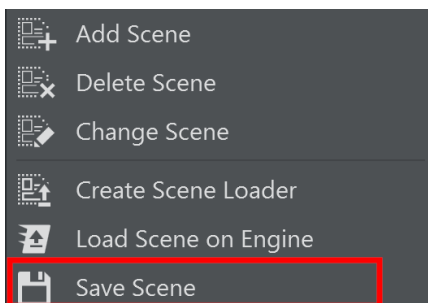
Load Scene on Engine



To load the scene on the Editing Engine:

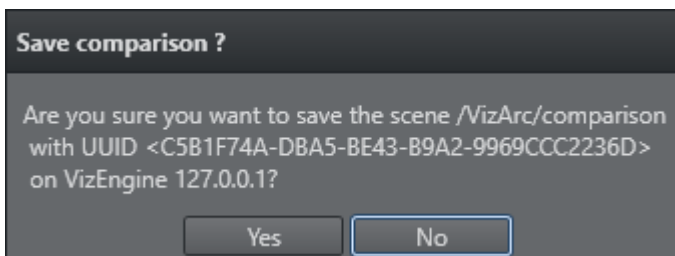
1. **Right-click** the Scene tab from the scene panel, or **Right Click** the [scene loader](#) from the window inside the [Scenes Toolbar](#).
2. Select **Load Scene on Engine** from the context menu.
This will load the engine on the scene's **Default Channel**

Save Scene



To save the scene:

1. **Right-click** the Scene tab from the scene panel, or **Right Click** the [scene loader](#) from the window inside the [Scenes Toolbar](#).
2. Select **Save Scene** from the context menu
3. Save the scene on the editing engine by clicking **Yes**:





Loading Scenes

Scenes **must** be loaded to a Viz Engine for Viz Arc to be able to retrieve all the scene properties ([Control Channels](#), [Scene Tree](#), [Directors](#)) and [create actions](#) in your project.

Note: Before loading a scene, select a default channel and layer. For more details on selecting a default channel, see [Scene Settings](#).

Scenes can be loaded in the following three ways:

	<p>Click the LOAD SCENE button in the middle of the scene panel.</p>
	<p>Click the Load button in the scene details of the selected tab in the scene panel.</p>

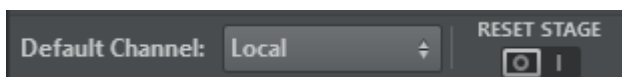
The scene will be loaded on the **Editing Engine** and will not be visible on the output. Use the context menu's **Load Scene on Engine** entry to load the scene on the **Editing Engine's** MAIN layer.

Warning: Loading the scene on the **Editing Engine** might impact the engine's performance. Make sure the engine is not used on-air when parsing the scene.

Scene Settings

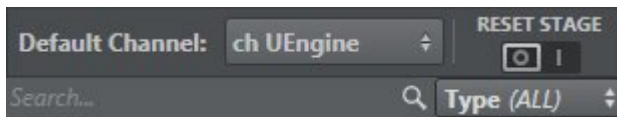
This section describes the settings that define what happens when [loading scenes](#).

Vizrt Scene Settings



- **Default Channel:** Uses the default channel to ease the live operation. All actions created from the scene properties are automatically assigned the same channel.
- **Reset Stage:** Resets all animations to frame 0 when loading the level, if enabled.

Unreal Level Settings



- **Default Channel:** Uses the default channel to ease the live operation. All actions created from the level properties are automatically assigned the same channel.
- **Reset Stage:** Resets all animations to frame 0 when loading the level, if enabled.
- **Search and Filter bar:** Searches for a specific element in the Level tree and filters actions among those available.

Note: For more details on how to configure channels, see [Profiles](#).

Control Channels

Viz Arc primarily connects an action to a scene property through **Control Channels**.

This section of the Scene Panel contains a list of all control channels available for the [loaded Scene](#).

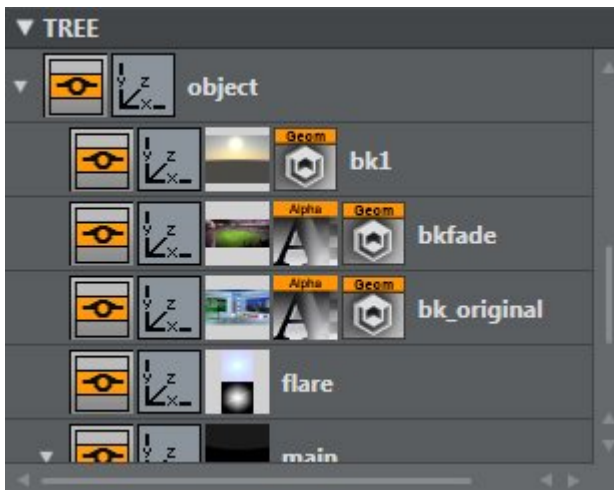


- Dragging **Control Channels** to the actions canvas is the *recommended* method for [creating actions](#) since it ensures actions do not break if the scene tree structure changes.
- Actions are created based on the **Type of Control Channel**, which is represented by an **icon**.

Note: For more details about Control Channels, see the [Viz Artist User Guide](#).

Scene Tree

This section of the Scene Panel contains a representation of the scene tree structure of the [loaded Scene](#), as well as parameters and plug-ins supported as Viz Arc actions.



Actions created by dragging a parameter or plugin from the scene tree are connected using the container path.

Example: `$ContainerName$SubContName$Sub2ContName)`

Warning: To ensure actions are executed on the correct container, make sure there are no duplicate container names in the scene hierarchy.



Stage Directors

This section of the [Scene Panel](#) contains a list of any directors and sub-directors contained in the loaded [Scene](#).



Director Actions can be created by dragging any director to the Actions Canvas.

Hovering the cursor over each stage director (or director group) shows three buttons:

- : Sends a start command to Viz Engine.
- : Sends a continue command to Viz Engine.

- : Resets the selected stage (SHOW 0.0).

See Also

- [Scene Action Types](#)
- [Viz Artist User Guide](#)
- [Viz Pilot User Guide](#)

5.6 Data Integration

When running Viz Arc, a SignalR Hub waits for incoming connections internally. The **Arc Web Server Port** can be configured, see [Communication](#) under the General Settings. The hub where the various methods can be invoked by clients is called **VizArcHub**.

Information: To use an external application running a SignalR client, please use a .NET 6.0 based project.

The server supports the following methods

- **setStringVariable** (string varName, string value)
- **setJSONVariable** (string varName, string json)

Those two methods allow clients to set simple variable names with either a string value or a JSON string. Viz Arc scripts is notified of variable changes and can process their value. The following code sample shows client setting variables in Viz Arc:

C# client sample

```
using Microsoft.AspNetCore.SignalR.Client;

// connects to VizArcHub on localhost and default port 5004
HubConnection connection = new HubConnectionBuilder()
    .WithUrl("http://127.0.0.1:5004/signalr/VizArcHub")
    .Build();

// connect
await connection.StartAsync();

// set some DataMap variable
await connection.InvokeAsync("setStringVariable", "hello", "world!");
```

In any Viz Arc script, the values above can be read, as in the following simple sample:

Viz Arc script

```
Global.OnInit = function () {
    Console.WriteLine( "data " + GetData("hello") )
```

```

Console.WriteLine( "json " + GetData("jsonData").ToString()
Console.WriteLine( "name is " + GetData("jsonData").Name.ToString()

// subscribe to all DataMap variable changes
SubscribeDataMap("")
}

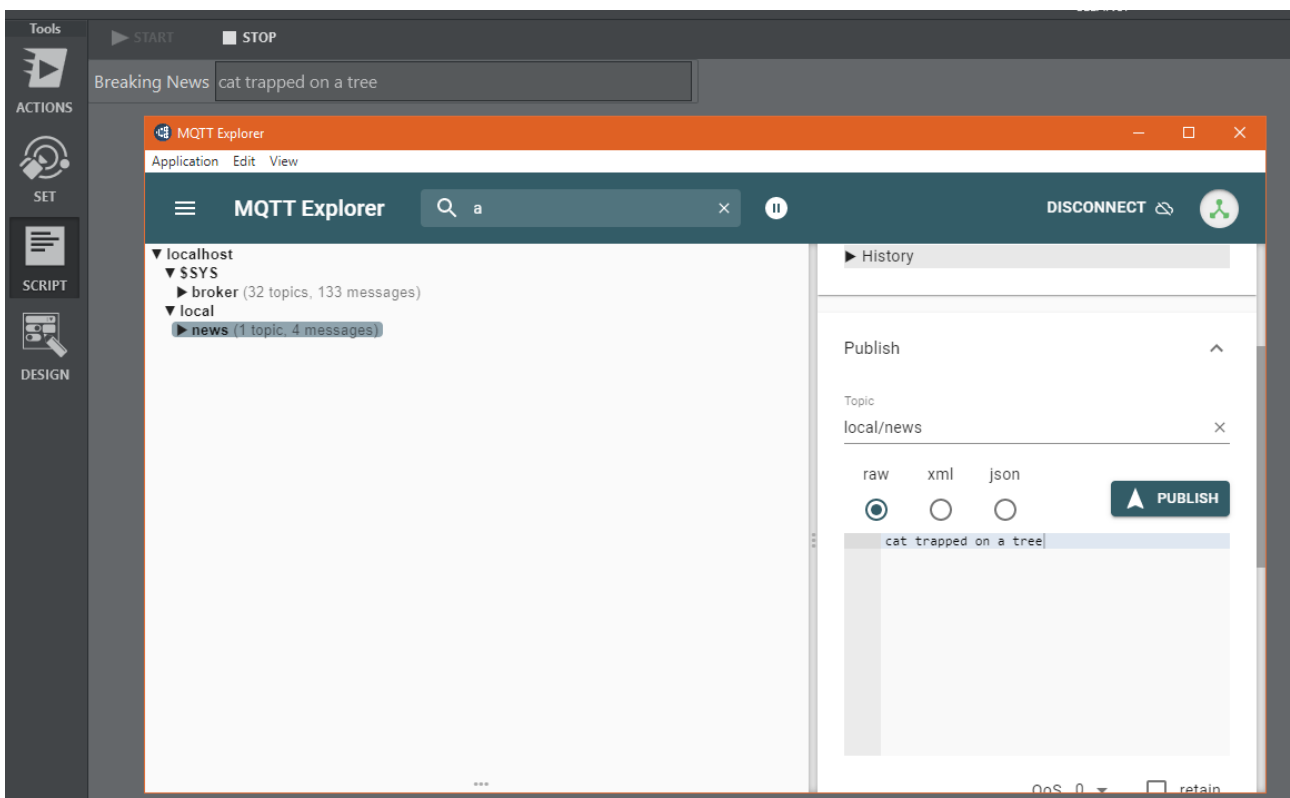
Global.OnDataMapValueChanged = function (varName) {
  Console.WriteLine( varName + " changed to "+ GetData(varName).ToString()
  if( varName == "jsonData" )
    Console.WriteLine( "name is " + GetData("jsonData").Name.ToString()
}

```

The method **GetData** returns the currently set value of the variable.

5.6.1 MQTT Broker

When the MQTT broker port is configured, an internal MQTT broker starts on Viz Arc startup. All topic changes are transmitted to the DataMap using the MQTT topic as the key and the topic's payload as value.



To test the integration you can wither use the **MQTT Explorer** (this tool can be useful to monitor Viz Arc's MQTT broker as well) or a .NET core project using the following C# code:

Sample C# snippet for publishing a MQTT topic to Viz Arc

```
// using nuget package MQTTnet.AspNetCore and MQTTnet.Extensions.ManagedClient
using MQTTnet;
using MQTTnet.Client;
using MQTTnet.Client.Options;

// ...

var factory = new MqttFactory();
IMqttClient mqttClient = factory.CreateMqttClient(); // create MQTT client

var options = new MqttClientOptionsBuilder().WithTcpServer("localhost",
1883).Build(); // create connection options
var connResult = mqttClient.ConnectAsync(options, CancellationToken.None).Result; //
connect to VizArc's MQTT broker

var message = new MqttApplicationMessageBuilder().WithAtLeastOnceQoS().WithTopic("loc
al/news/breaking").WithPayload("breaking news").Build(); // create message
var result = mqttClient.PublishAsync(message, CancellationToken.None).Result; //
publish the message
```

Viz Arc JavaScript sample to receive and read MQTT topics through the DataMap

```
var listenTopic = "local/news/breaking"

Global.OnInit = function ()
{
    SubscribeDataMap(listenTopic)
}

Global.OnDataMapValueChanged = function (varName)
{
    if( varName == listenTopic )
        news.Value = GetData(listenTopic)
}
```

The script above listens to changes on the "local/news/breaking" topic and updates a text box accordingly.

5.6.2 TCP Server

Viz Arc starts up a TCP server which can be used to set and get DataMap variables. The port of the server can be configured, see [General Settings](#).

You can set DataMap variables using a command string from a Viz Engine script:

Set DataMap

```
System.TcpSendAsync("resultSetDM", "localhost", 9204, "ARC*DATAHUB SET key|someValue 1.0 1.0 1.0", 1000)
```

The command above sets the variable *key* to the value *someValue 1.0 1.0 1.0*. The | character separates the key from the value. This value can then be further processed in Viz Arc.

To read back a value from the DataMap in Viz Arc you can use the *GET* command like in the sample below.

Get DataMap

```
Dim ret = System.TcpSend("localhost", 9204, "ARC*DATAHUB GET key", 1000)
```

The Viz Engine script variable *ret* contains the value of *key*.

You can execute an action using a command string from a Viz Engine script:

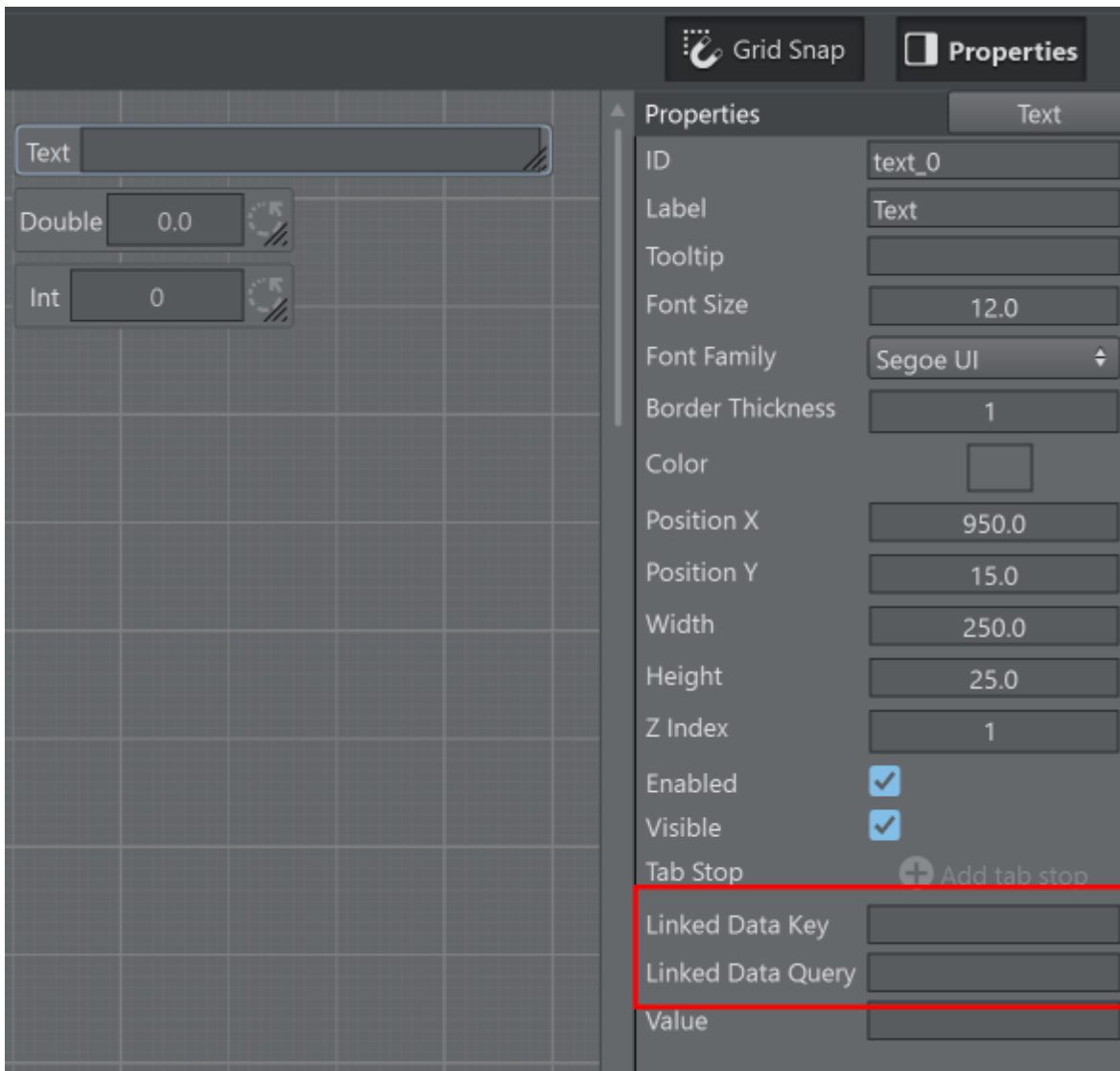
Execute Action

```
System.TcpSendAsync("resultSetActionName", "localhost", 9204, "ARC*ACTION EXECUTE loadSceneA", 1000)
System.TcpSendAsync("resultSetActionGUID", "localhost", 9204, "ARC*ACTION EXECUTE 49c525fa-0ce8-46e1-bae4-acfb4abdb629", 1000)
```

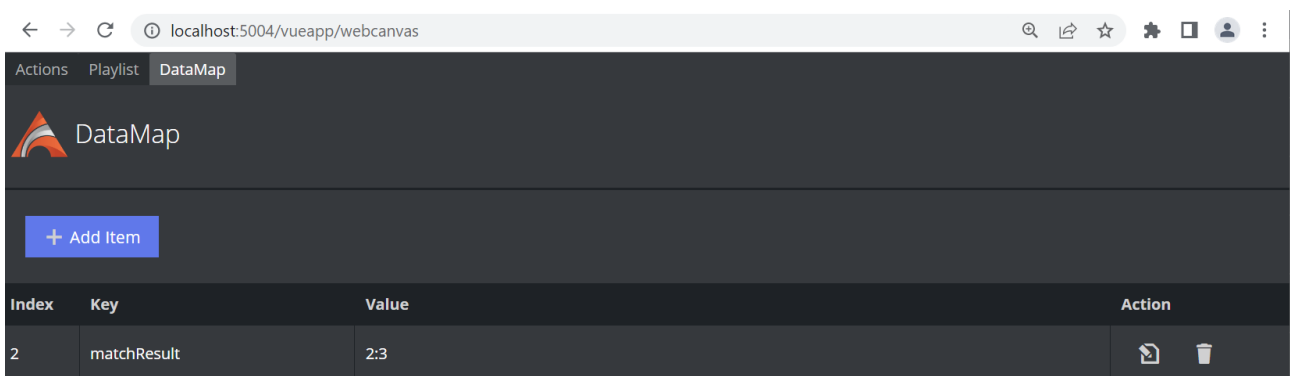
The commands above search for actions **loadSceneA** by name and **49c525fa-0ce8-46e1-bae4-acfb4abdb629** by GUID and execute them if they can be found in the current project.

5.6.3 DataMap Linking

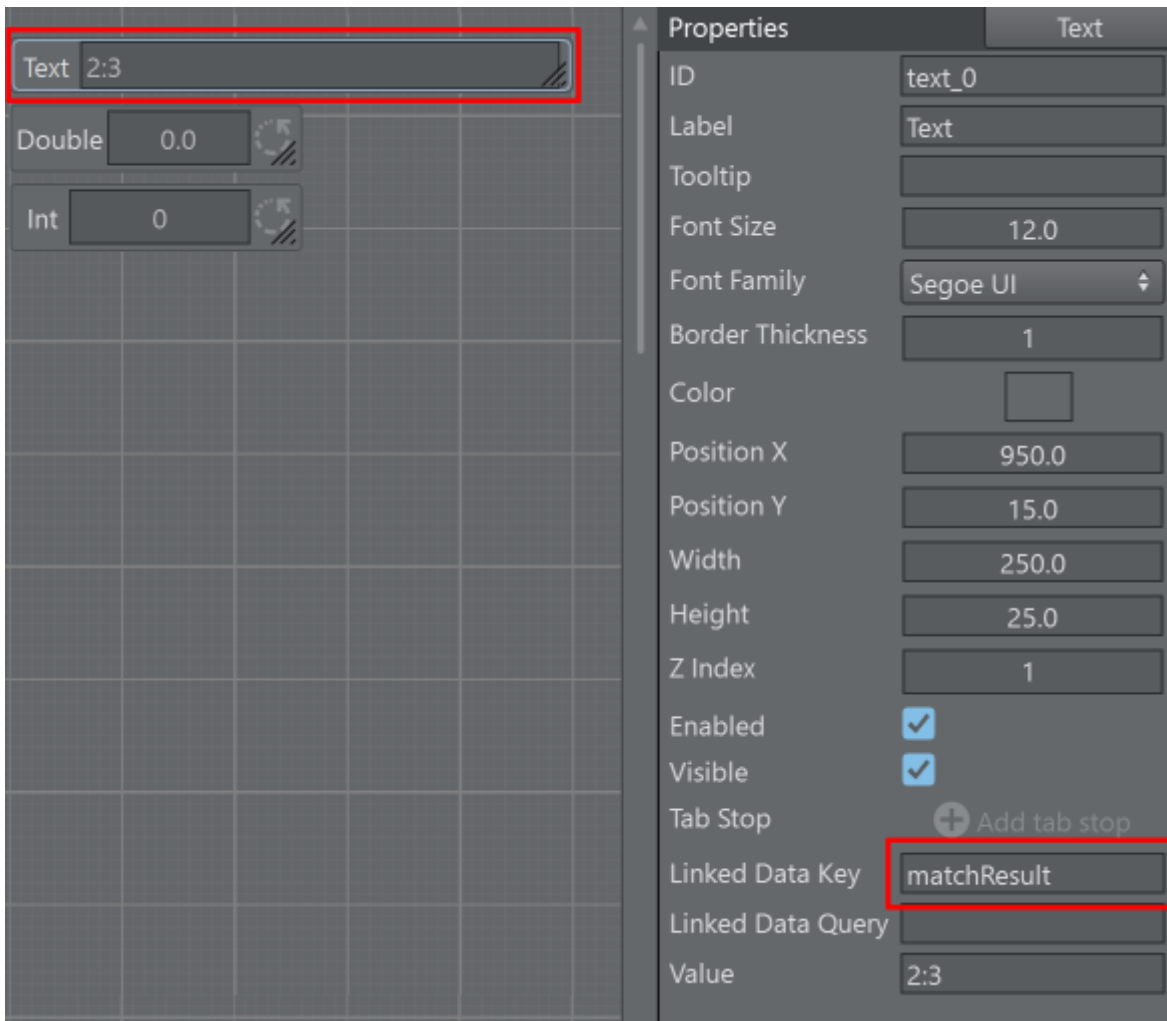
Some scripting UI components like **Text**, **Int** or **Double** have the properties **Linked Data Key** and **Linked Data Query**.



The **Data Key** entry can accept any key name used in a **DataMap** entry. As an example add a key *matchResult* using the web UI to insert key/value pairs on Viz Arc.



Enter *matchResult* as **Linekd Data Key** and the text value updates to the previously entered data.



For more complex data structures such as *.json* strings, the **Linked Data Query** can be used.

json sample data

```
[
  {
    "matchID":4242,
    "Home":"City A",
    "Away":"City B",
    "HomeScore":4,
    "AwayScore":2
  },
  {
    "matchID":4243,
    "Home":"FC A",
    "Away":"FC B",
    "HomeScore":0,
    "AwayScore":1
  }
]
```

```
}
]
```

The DataMap after adding the above *.json* using the matches key.

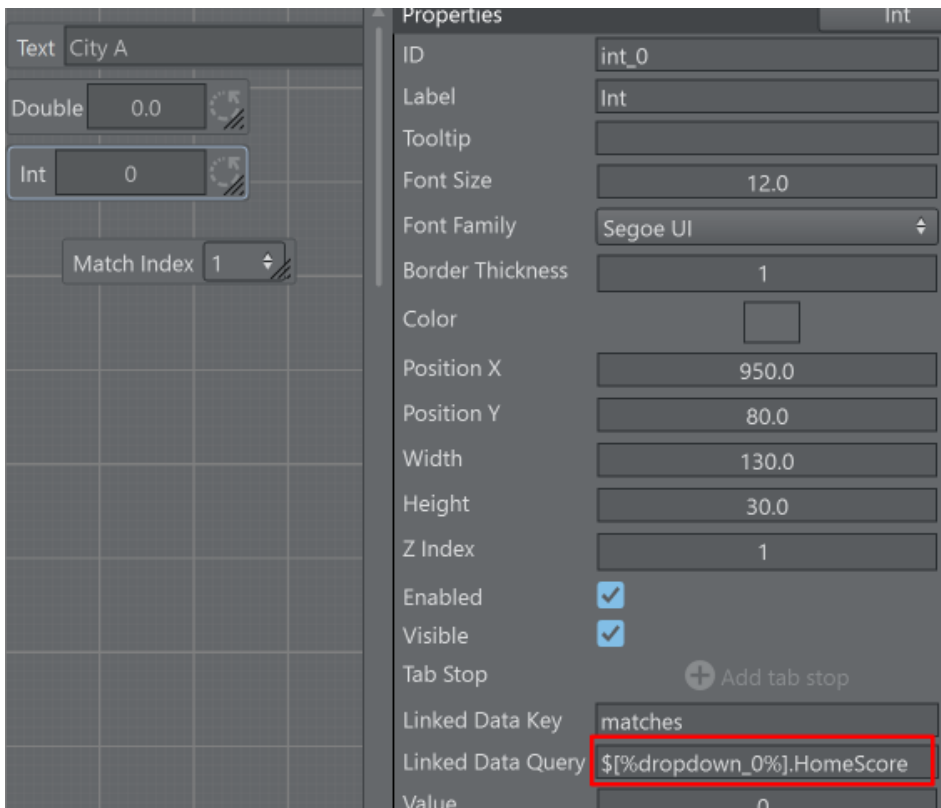
The screenshot shows the DataMap application interface. At the top, there are tabs for 'Actions', 'Playlist', and 'DataMap'. Below the tabs is a '+ Add Item' button. The main area contains a table with the following data:

Index	Key	Value	Action
2	matchResult	2:3	[Copy] [Delete]
0	matches	[{"matchID":4242, "Home":"City A", "Away":"City B", "HomeScore":4, "AwayScore":2}, {"match...	[More] [Copy] [Delete]

Enter a **JSONPath** string `$.HomeScore` to get the home score of the first *.json* array element.

The screenshot shows the DataMap application interface with a data point configuration panel. The panel has a 'Text' field with 'City A', a 'Double' field with '0.0', and an 'Int' field with '4'. The 'Int' field is highlighted with a red box. To the right is a 'Properties' panel with various settings. The 'Linked Data Key' is set to 'matches' and the 'Linked Data Query' is set to '\$[0].HomeScore'. Both the 'Linked Data Key' and 'Linked Data Query' fields are highlighted with a red box.

Instead of using constant values for indexing the *.json* array a variable can be used instead. A variable must be enclosed in % character and should be the ID of an existing scripting UI element.



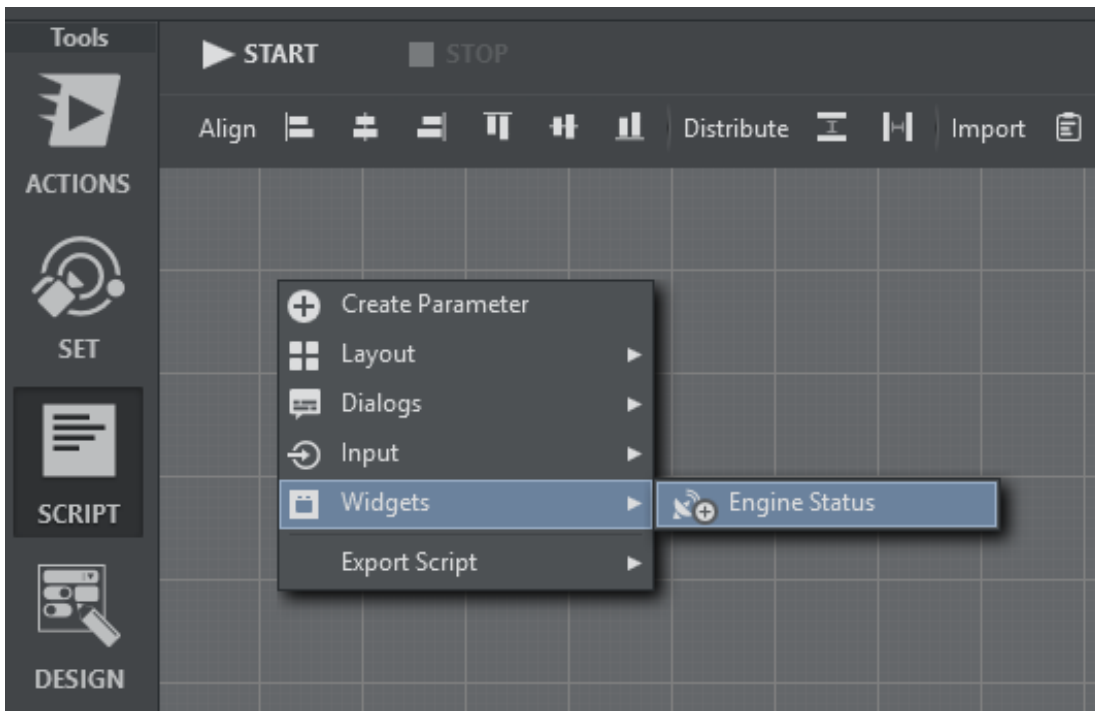
`$_dropdown_0.HomeScore` gets resolved to `$_1.HomeScore` as the dropdown value of the `dropdown_0` component is 1.

5.7 Engine Status Widget

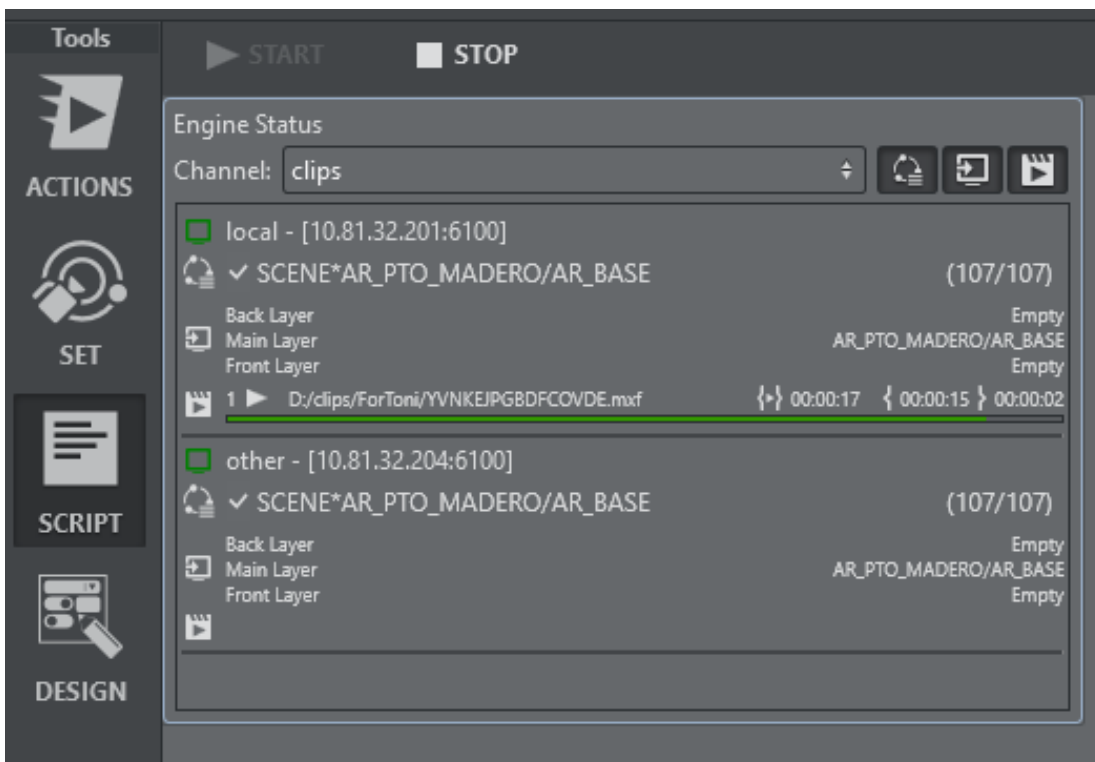
The engine status widget shows you the status of the profile's Viz Engines, including information about the currently loaded scene of an engine, what the engine is currently loading, and clip status.

5.7.1 To Add an Engine Status Widget

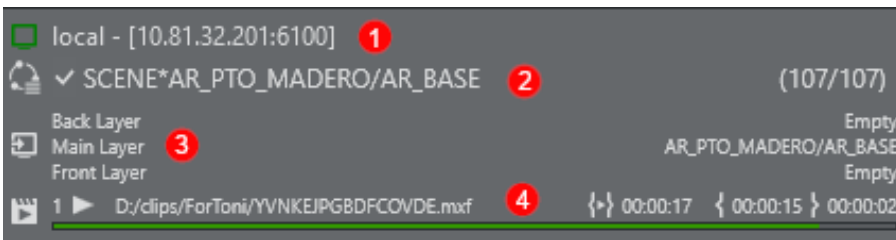
Go to the main script (or any template script), right click on the UI editor and select **Widgets > Engine Status**:




Resize and position the widget. Start the script and select a **Channel** in the drop down menu:



The widget displays a list of Viz Engines for the selected Channel:

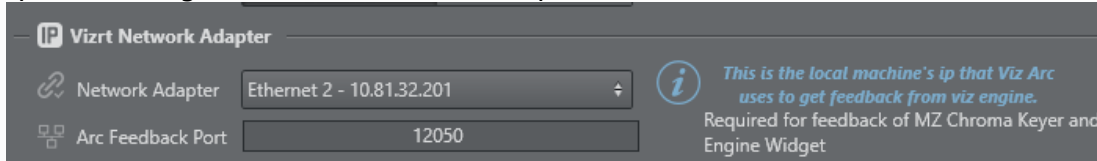


1. **Engine Status:** Shows the Viz Engine Address and Port and the status (green = On Air, orange Off Air, red = not connected).
2. **Load Status:** Shows the last loaded element on the engine. A at the beginning indicates that a scene has finished loading on the engine, while it's loading it shows a spinning circle .
3. **Layer Status:** Shows what's currently loaded on the three principal layers.
4. **Clip Status:** Shows a list currently active clip channels of Viz Engine and it's respective playback status including total time, current position and time to the end of the clip.



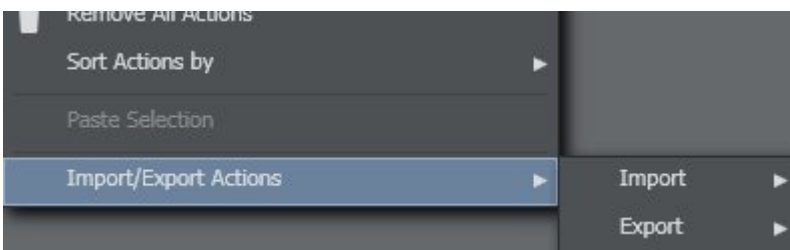
In addition to the Channel dropdown menu, you can also use the toggle buttons to hide or show **Load Status**, **Layer Status** or **Clip Status**.

Note: To function properly, an appropriate **Network Adapter** must be configured Vizrt Systems config section. This network adapter must be visible to the remote Viz Engines:

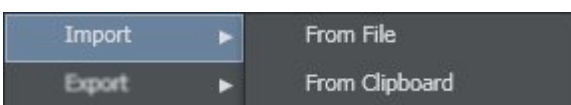


5.8 Import And Export

By right-clicking on an empty space in the main area is also possible to import and export.

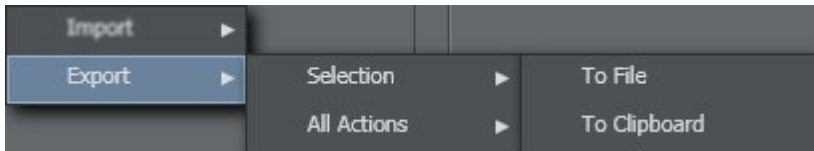


5.8.1 Import Actions



In Viz Arc, you can import action boxes directly into your active project. There are two ways to import boxes: internally (**From Clipboard**) or from an external file (creates a text file containing a *.json* structure). The boxes are imported directly into the same tab as they were located if such a tab exists, or imported into your active tab area.

5.8.2 Export Actions



You can export selected action boxes or all boxes in the opened project. You can choose to export boxes internally (**To Clipboard**) or to an external file (creates a text file containing a *.json* structure).

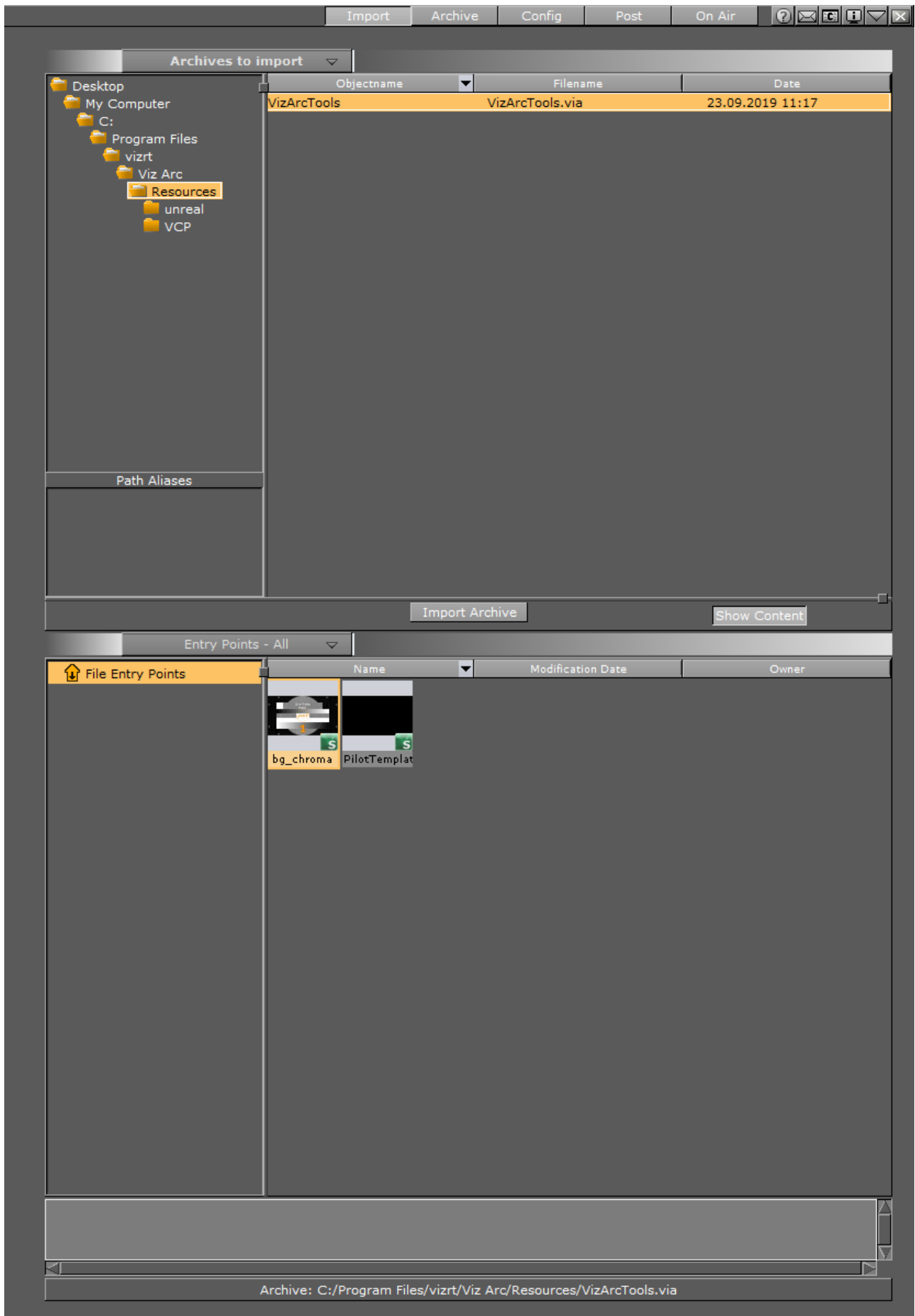
5.9 Multizone Chroma Keying

Use multizone chroma keying to define multiple chroma keying areas (or fullscreen) with different keying settings. Typical use-cases are areas with different colors or shades, such as horse racing tracks that have multiple shades of green. Multizone keying allows you to define specific zones of your tracked area where a specific key should be applied.

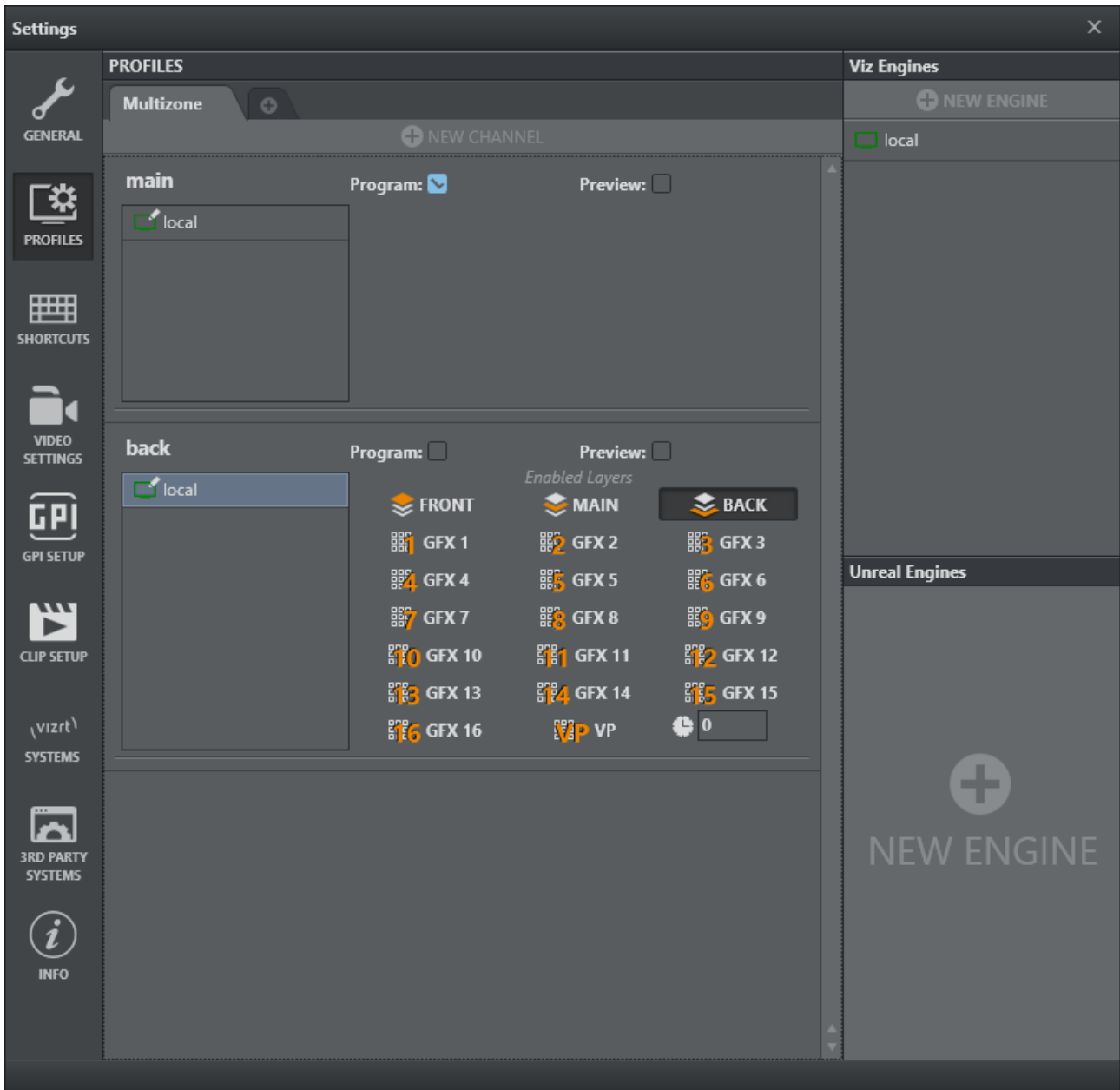
5.9.1 Configuring the Multizone Chroma Keyer

In order to make the multizone keying action work from Viz Arc you'll need to set-up a couple of things beforehand. The way the Multizone Chroma Keyer works in Viz Engine requires the Keyer to run in the back layer and the video input to be configured properly in mzone keying. Viz Arc ships with a template-based scene that you need to import into your Graphic Hub.

1. Locate the archive in the Viz Arc program-data folder (typically *C:\ProgramData\vizrt\VizArc*) under *Resources\MZChroma\VizArcTools.via*. The via file contains a scene named *bg_chroma*.
2. **Import** the *bg_chroma* scene into your Graphic Hub:



Since the scene is stored in the back layer of Viz Engine and all multizone controls are located there, you'll also need to configure a dedicated channel for the back layer in Viz Arc:

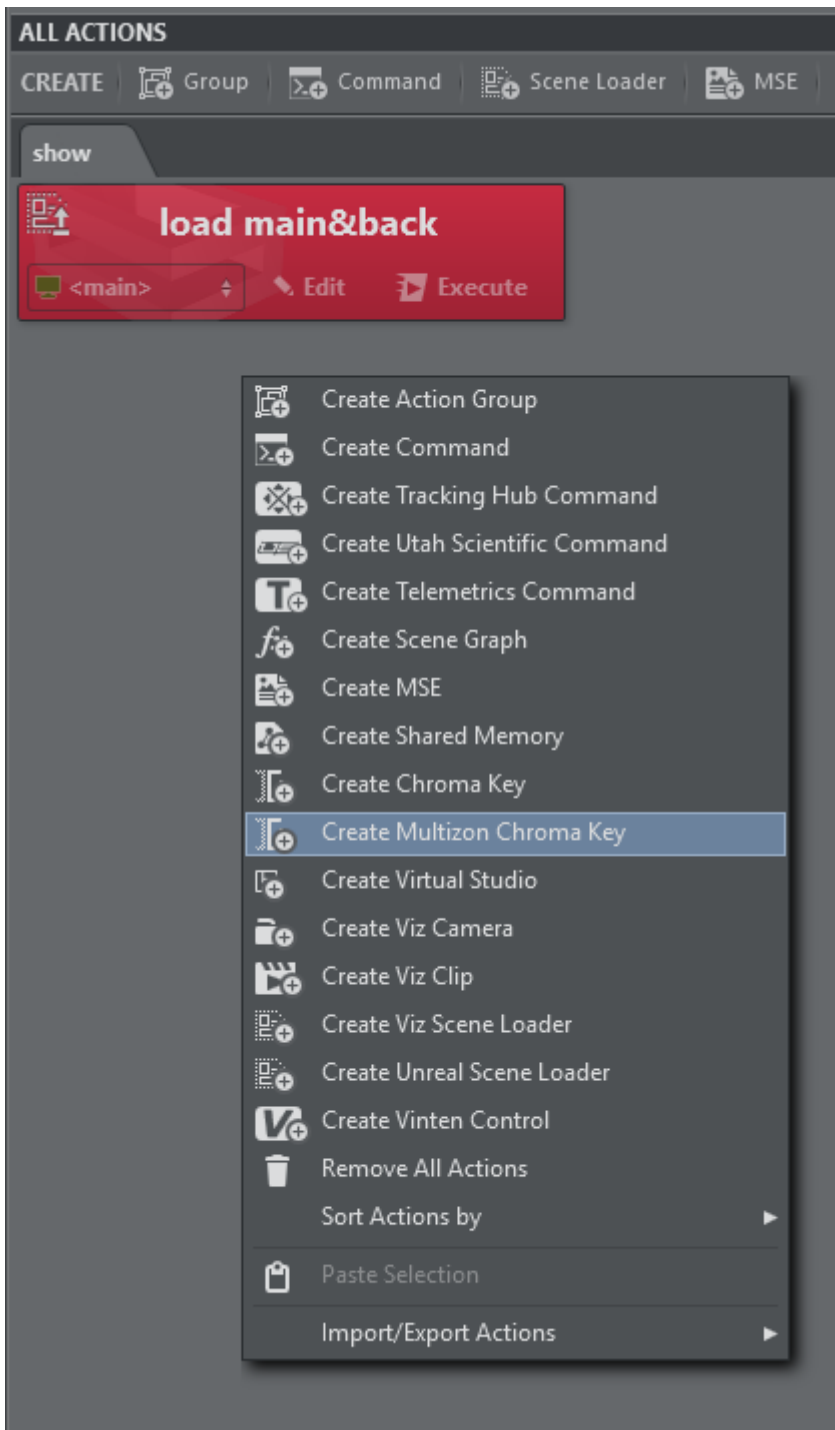


3. Add a channel to your Engine, uncheck the **MAIN** layer and check the **BACK** layer only. Give the channel a meaningful name like "back". The other channel (in this case **main**) will be used for the actual AR/VR graphics, where only the **MAIN** layer is checked (default).

4. The next step is to create a scene loader by right clicking the action canvas and selecting **Create Viz Scene Loader**. This loads the recently imported scene into the back layer. You can also load your main scene as in the same loader.



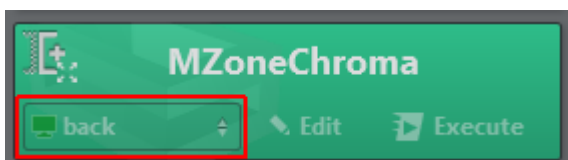
5. Once the background chroma scene has been loaded into the Viz Engine and a valid video signal has been connected, you can start adding a multizone chroma action to the Viz Arc action canvas. To do so, right click on the action canvas and select **Create Multizone Chroma Key**.



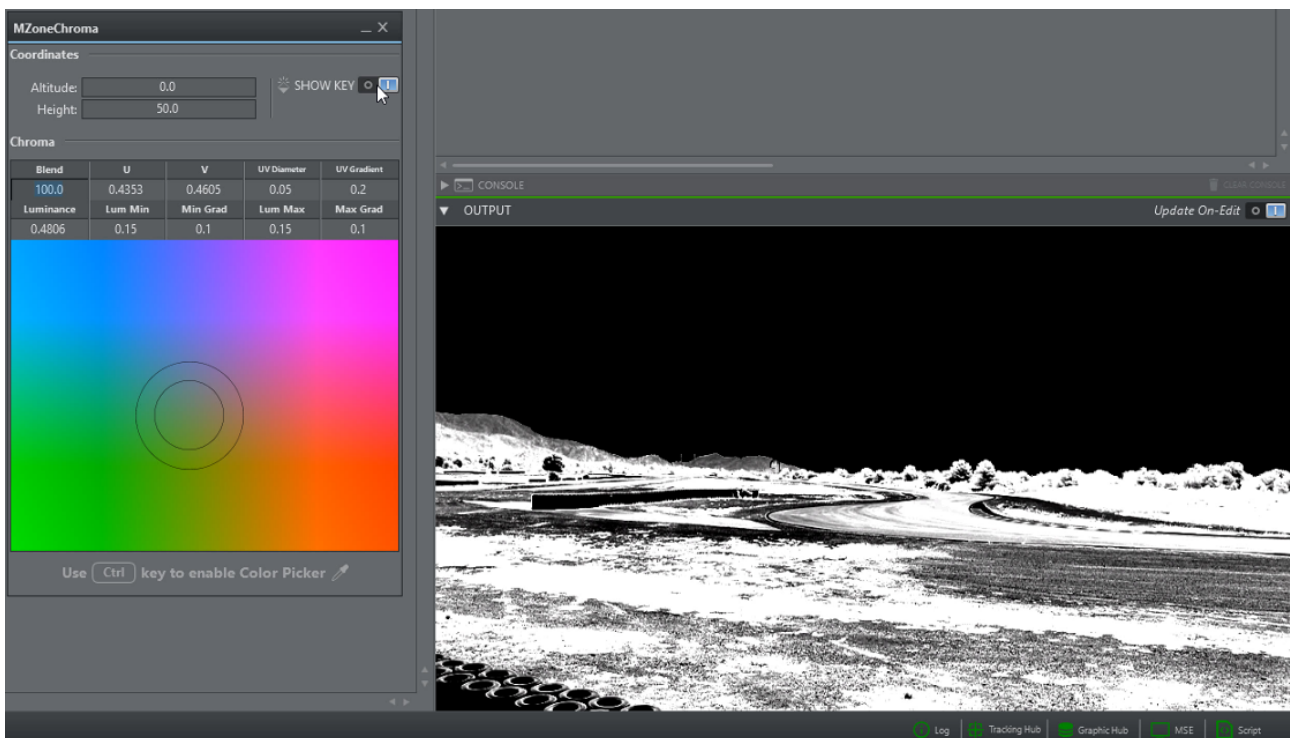
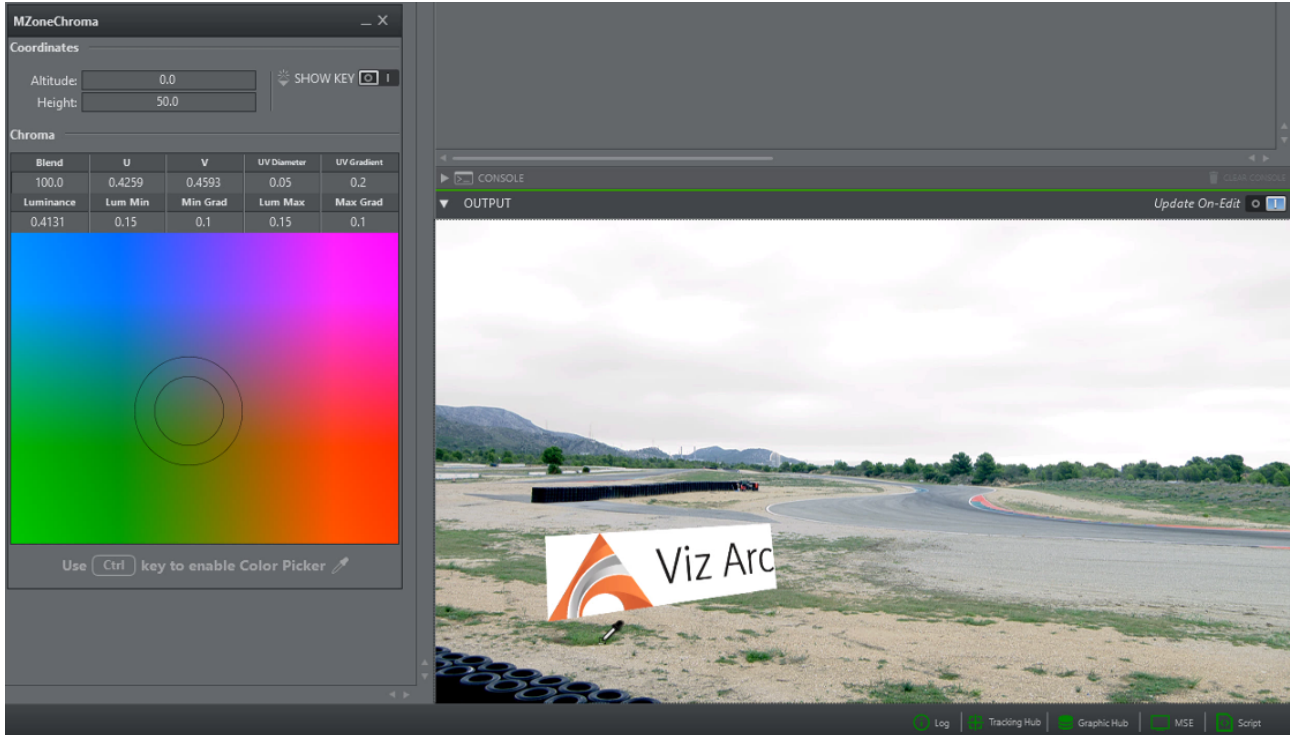
Once the action has been created you can fill in a name for a new full screen multizone, for example **fsGreen**.



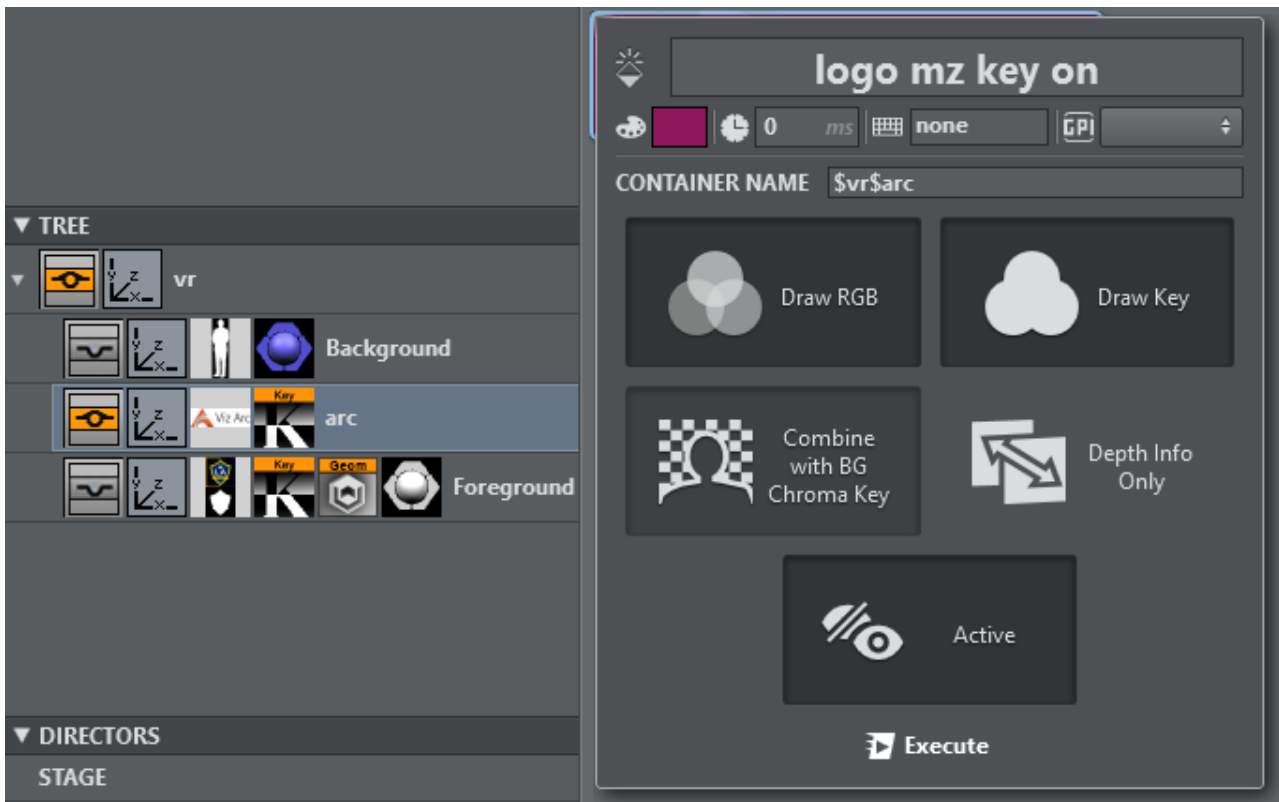
Make sure the action's channel is set to your back channel.



You can now start using the picker on your output directly or you can adjust the key manually. For picking, it's recommended to use the **Window** mode to make sure the window remains open after picking. Simply hold down **CTRL** and click on the preview output. In order to see the actual key on the output, press the **SHOW KEY** toggle.



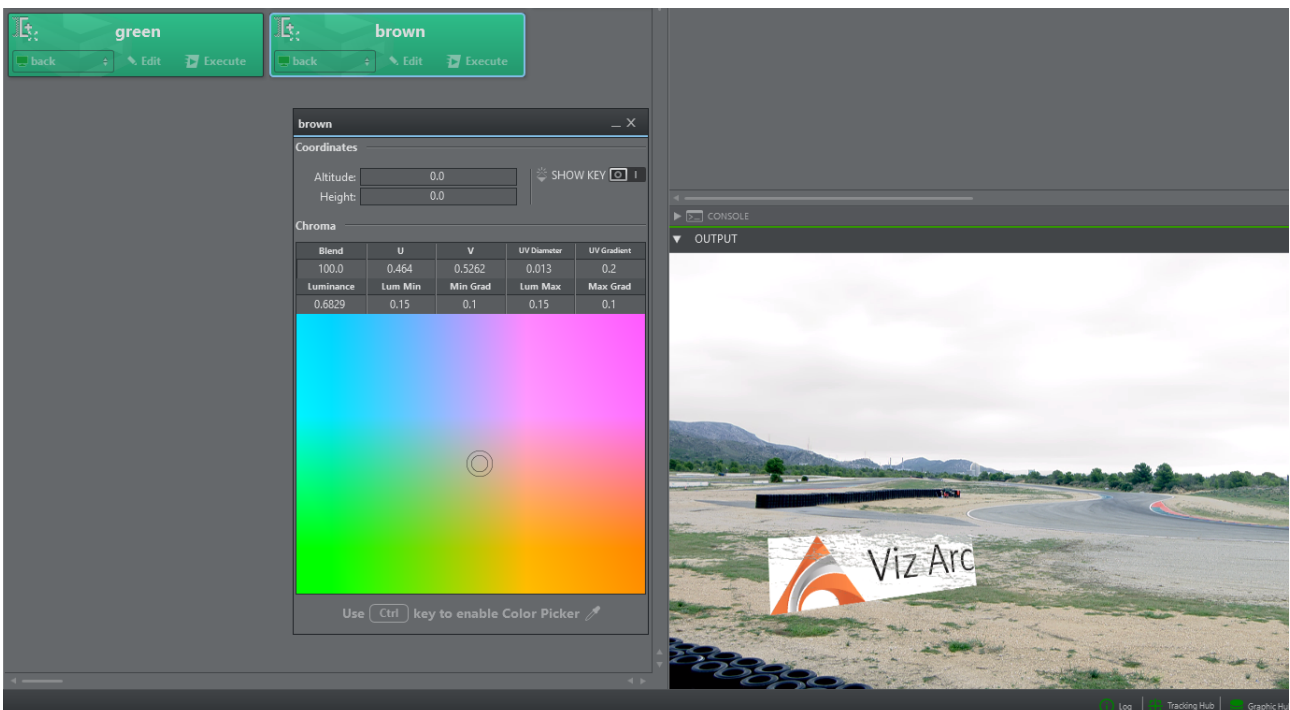
Once you have adjusted the key, you can test it with an element in your main scene. To do this, create a **Key Action** by dragging the key plugin to the action canvas. In the keying action enable **Combine with BG Chroma Key**.



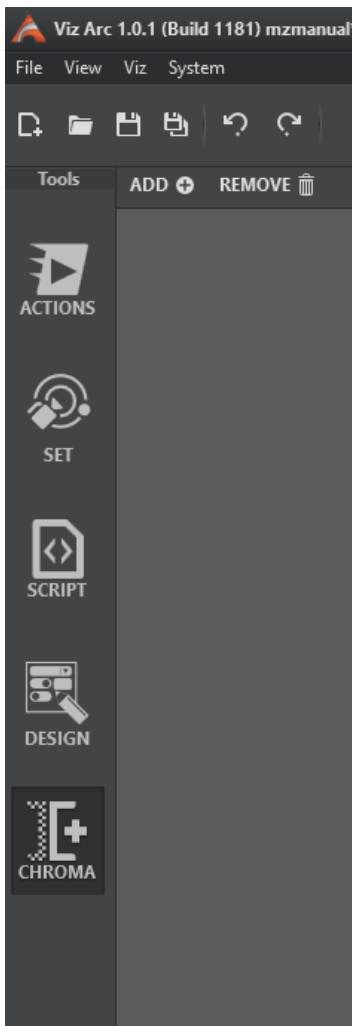
You'll now see the respective viz object keyed on the green areas in the output.



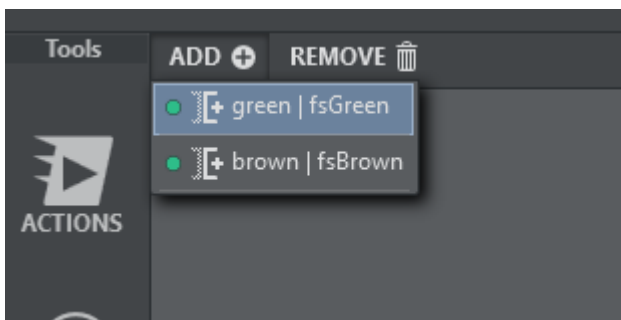
You can now add more Multizone Chroma Actions to key more colors, for example a key for the color brown.



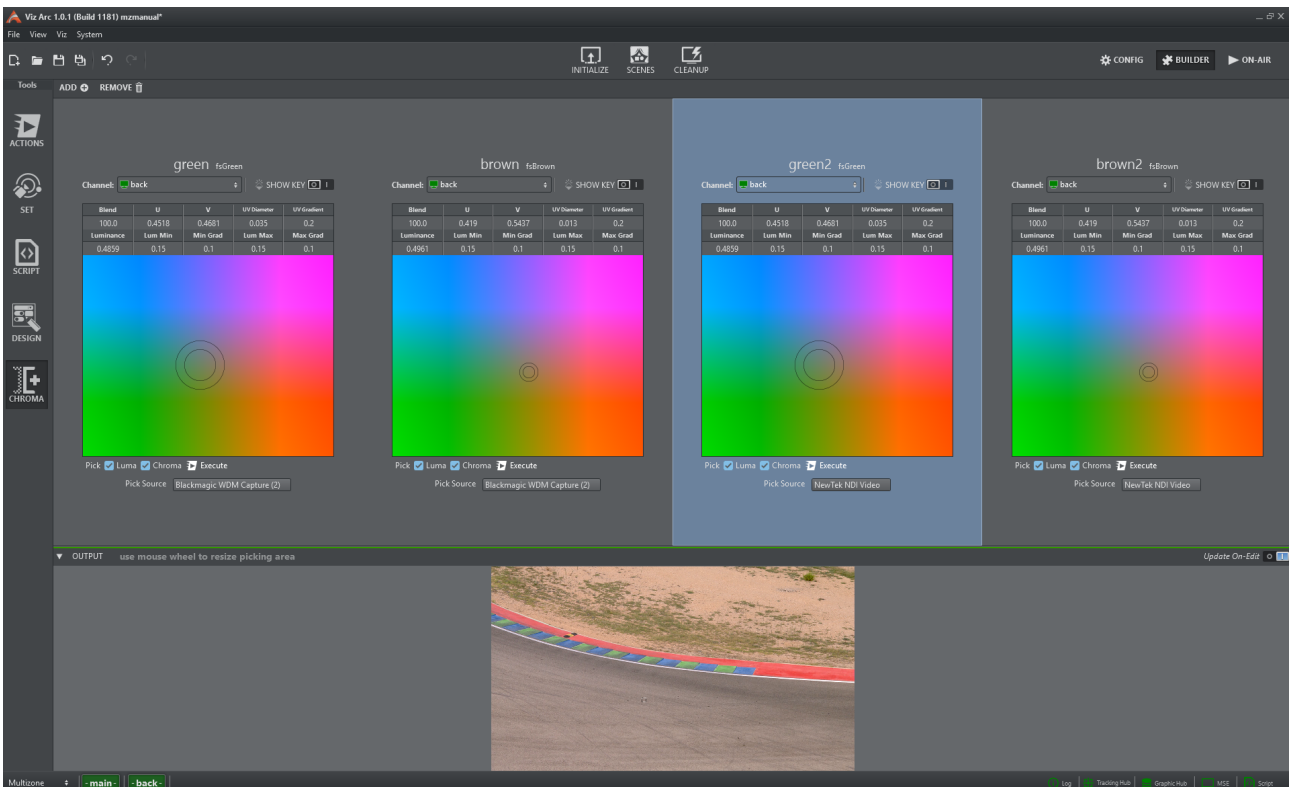
To make On Air operation more efficient, you can use the dedicated **CHROMA** view for quick operation. This button appears as soon as a multizone chroma action is present.



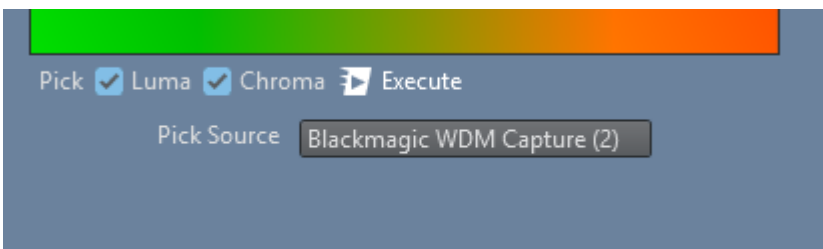
Click at the top to **ADD** or **REMOVE** specific Multizone Actions to this view.



Once you have added all relevant keys for your show, you can easily navigate through the keys using the arrow keys on your keyboard. You can directly pick in the video window where you can also adjust the picking size with the mouse wheel.



In **Pick Source** you can select the signal that is to be shown when the chroma key is selected. Both DirectShow sources and local engine output are supported. This is particularly useful for multi-camera set ups.



You can also specify what is to be evaluated during picking.

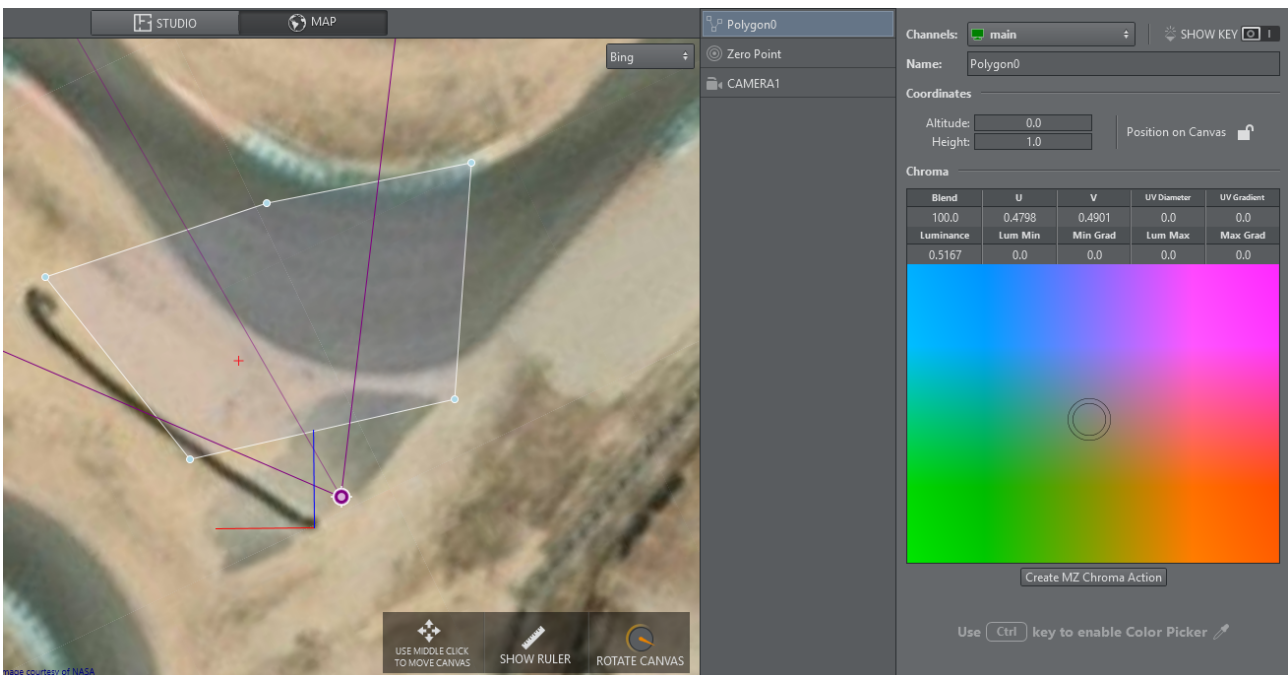
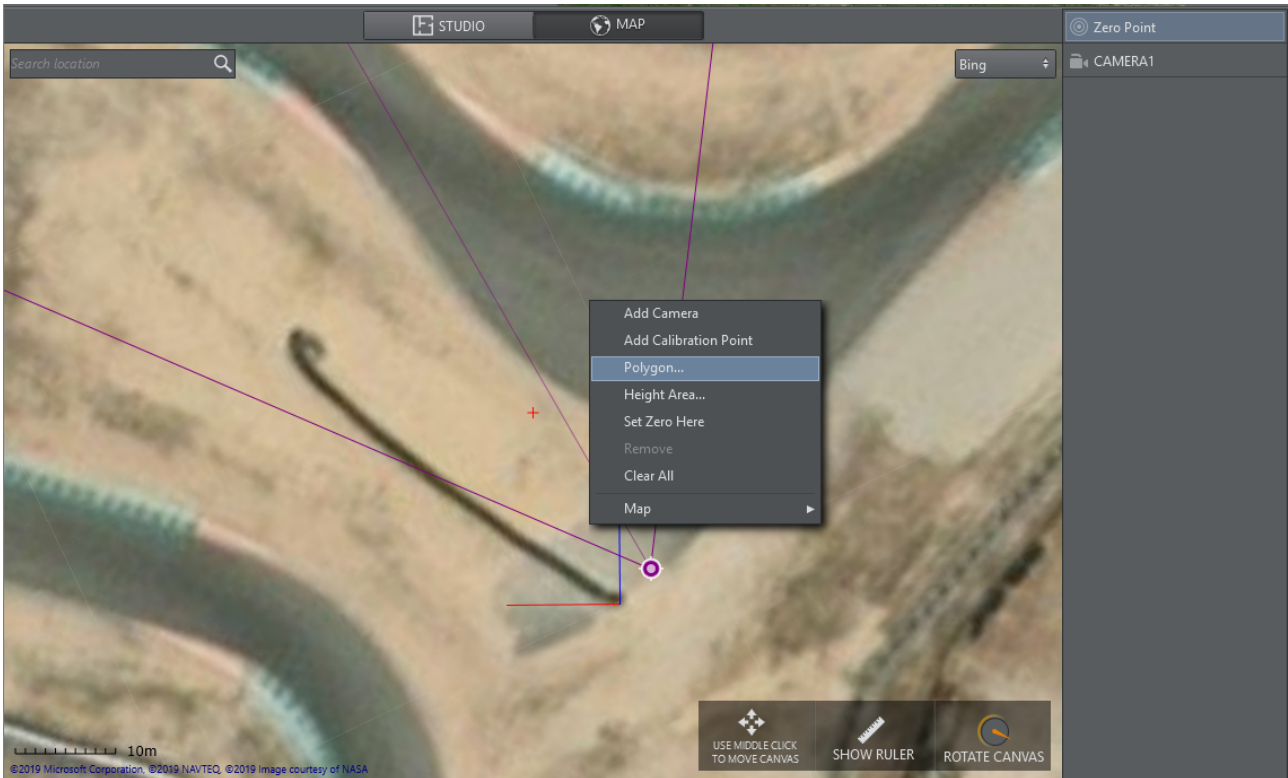
- Check **Luma** if you just want to pick the luminance (for example, if you want to react only to changes in brightness shading).
- Check **Chroma** if you want to pick the color too.
- Or check both if you want to change both of them.

The keying values will be sent to the engines directly as long **Update On-Edit** is enabled.

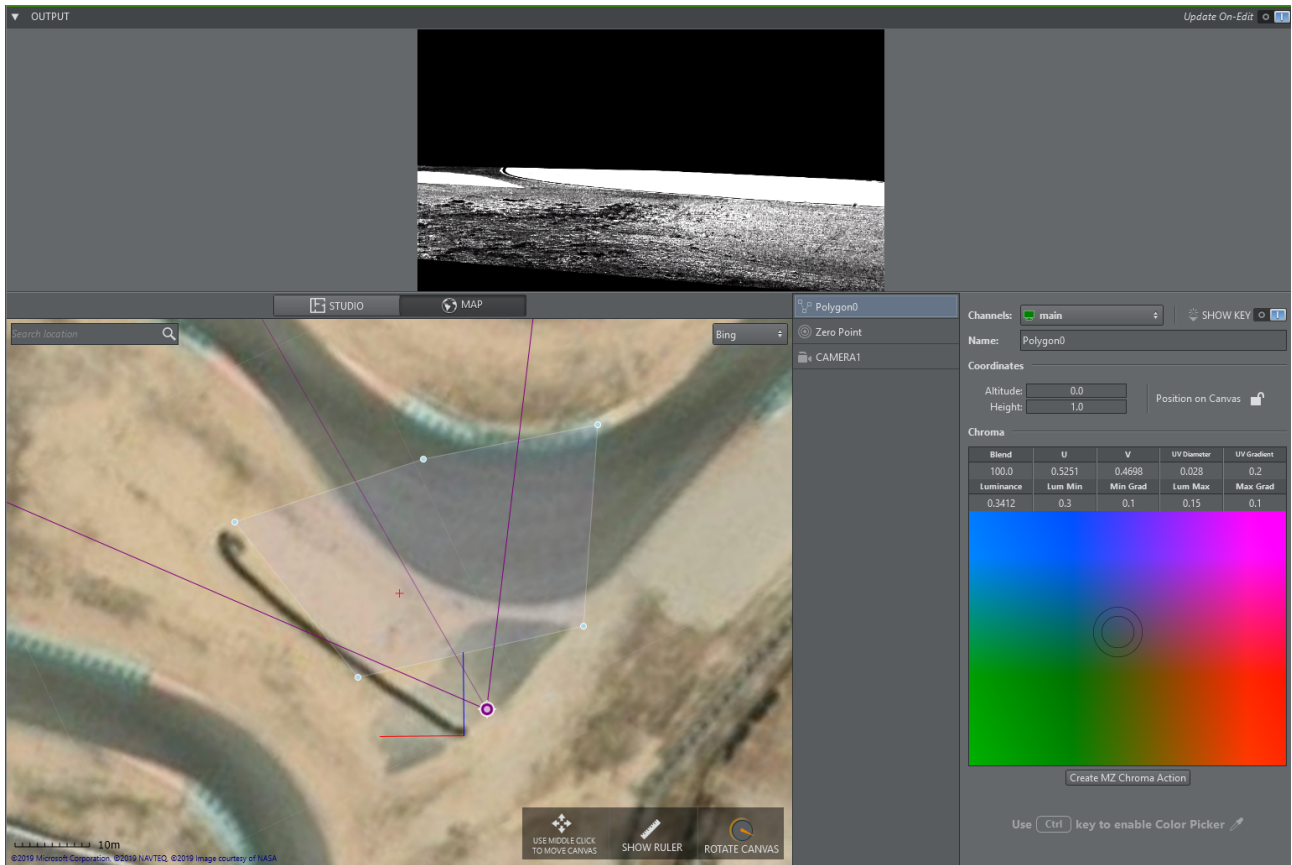
You can pick by simply clicking the **left cursor button** on the output window. The size of the picking area can be adjusted with the **mouse wheel**. The **space bar** will freeze or unfreeze the output window.

5.9.2 Working with Polygons and the Map

If you want to restrict your key to a certain area or shape, you can use polygon shapes that can be defined in the map view. Go to **MAP**, right click and select **Polygon...**

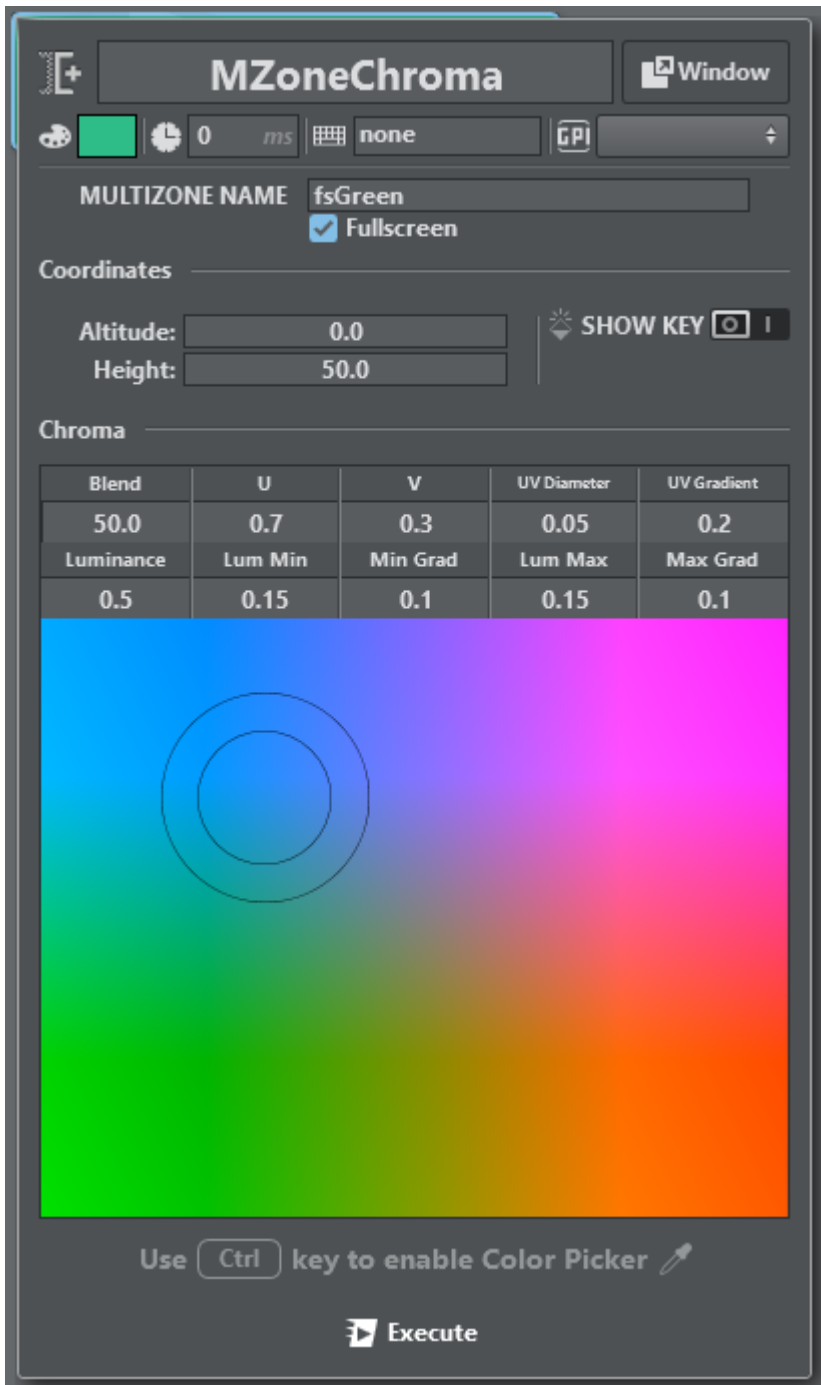


Click on the map for each vertex and finish the drawing by pressing the **ESC** key. You'll see a multizone chroma control on the right hand side. If you now click on **Create MZ Chroma Action**, a corresponding action will be inserted on the action canvas.



Viz Arc creates a polygon in the background scene that will be tracked with the tracked camera. The area that is keyed on remains fixed in the same place. Note that the polygon is flat and a flat floor is therefore assumed.

5.9.3 Multizone Chroma Key Action in Detail



Blend	Alpha of key signal, 100 is full opacity, 0 is completely transparent
U	U value for color keying

V	V value for color keying
UV Diameter	All colors between the reference UV and this diameter will be removed
UV Gradient	Gradient for fade out at diameter border (0=sharp, 1=soft)
Luminance	Luminance is defined as 0.0 for dark and 1.0 for bright
Lum Min	Lower luminance limit for keyed colors
Min Grad	Gradient for lower luminance limit (0=sharp, 1=soft)
Lum Max	Upper luminance limit for keyed colors
Max Grad	Gradient for upper luminance limit (0=sharp, 1=soft)

Note: Lum Min and Lum Max are not absolute values, but are relative to the Luminance (e.g. when Luminance is 0.5, Lum Min is 0.1 and Lum Max is 0.2, the Keyer works in the range 0.4 to 0.7).

5.10 On Air Mode


On Air mode lets you operate all the prepared actions in **Builder Mode** (ACTION, SET, SCRIPT and PLAYLISTS). Go On Air by clicking on the selected action (applies all single actions; the execute button is available on actions groups).



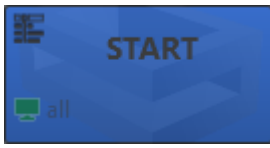
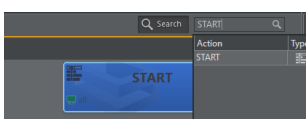
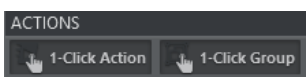
Note: It's not possible to modify any aspect of the actions, all modifications have to be done in **Builder Mode**.

The running Script Form and Playlist section is displayed on the right side of the panel.

5.10.1 To Go On Air

This section shows how to operate in On Air mode:

	Once you are ready to go on air, CLEAN UP all Viz Engines connected to the selected profile.
---	---

	<p>After cleanup, click the INITIALIZE button to load the scenes you have imported into the project.</p>
	<p>Once the scene is ready, you can easily use all the actions you have prepared in Builder mode.</p>
	<p>You can mark an action as a favorite during operation in order have it readily available.</p>
	<p>Find an action quickly by entering it in the search bar.</p>
	<p>Use the 1-Click Action button to select whether you want actions to have direct On Air buttons or an execute button for each action, by adding an execute button in each action box.</p> <p>Use the 1-Click Group button to select whether you want group actions to have direct On Air buttons or an execute button for each action, by adding an execute button in each action box.</p>

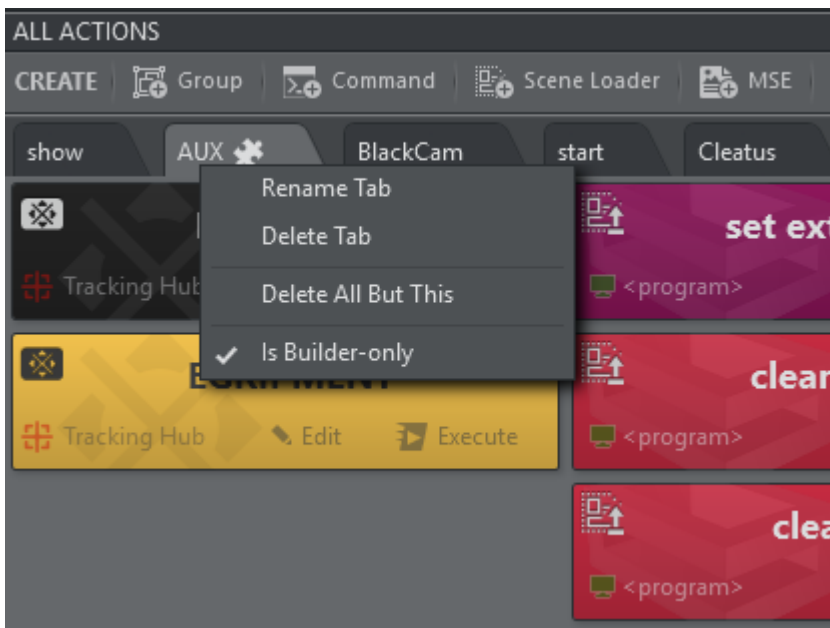
5.10.2 On Air Mode Desktop Shortcut and Command Line Switches



After installation, a desktop shortcut is created that's used to launch Viz Arc directly in On Air Mode, without the possibility of entering Builder Mode. You can use additional [command line options](#) for startup.

Note: Users can switch and *save as* projects in On Air Mode.

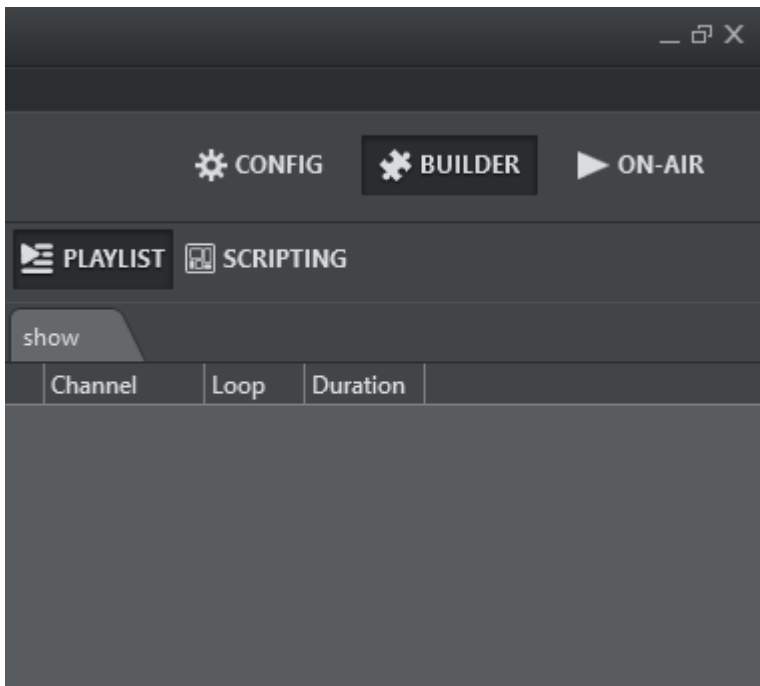
5.10.3 Builder-only Tabs



In **Builder Mode** you can right click on an action tab and select **Is Builder-only**. A small icon shows that the tab is **Builder-only**, the entire tab does not appear in **On Air Mode**. This prevents users from inadvertently executing actions that should not be used during On Air operations.

5.11 Playlists

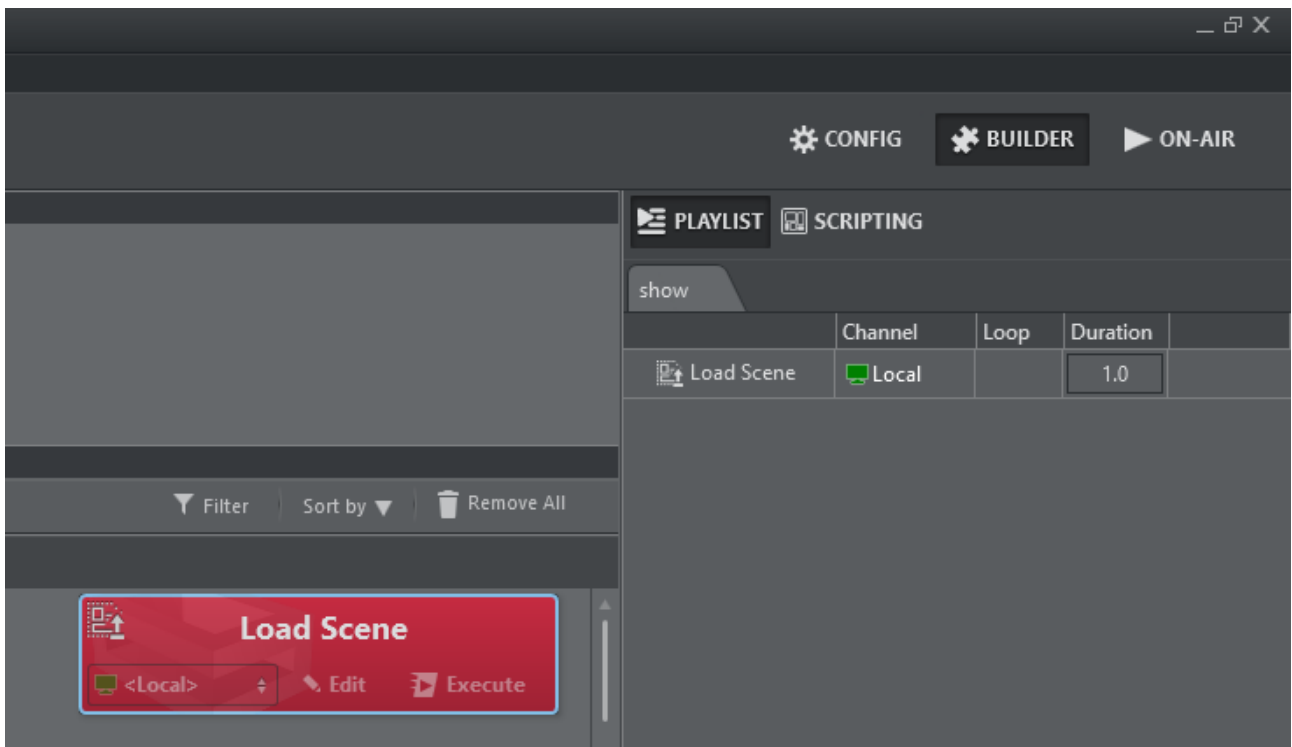
You can add individual actions in a rundown and play the rundown either manually or automatically by defining timing on single playlist elements.



The **PLAYLIST** is at the top right of the UI in both Builder and On-Air mode.

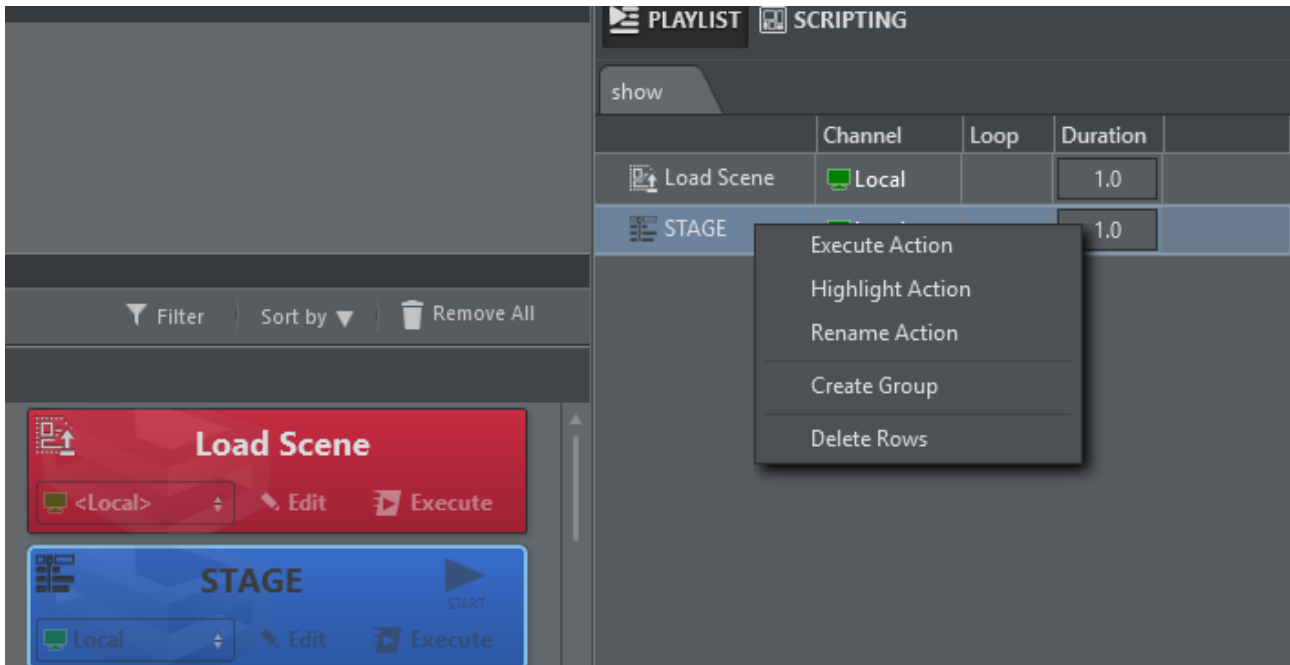
5.11.1 Adding Actions to the Playlist

To add actions to the playlist, simply drag and drop an action from the action canvas into the playlist while holding in the **SHIFT** key.



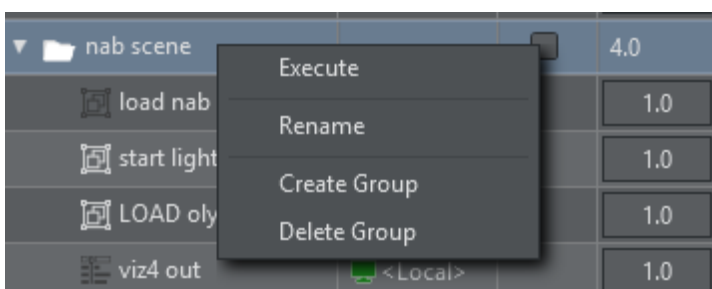
5.11.2 Working with the Playlist

Right-click on the playlist to make this context menu appear:

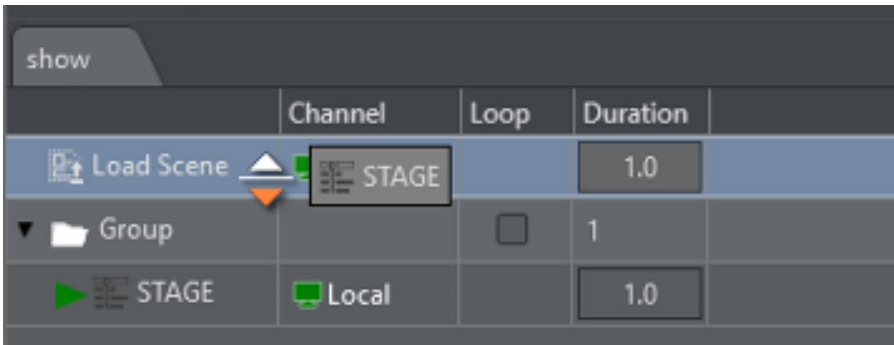


- **Execute Action:** Executes the currently selected action.
- **Highlight Action:** Highlights and brings into view the action on the action canvas.
- **Rename Action:** Renames the selected action.
- **Create Group:** Creates a logical group above the selected row.
- **Delete Rows:** Deletes the selected rows.

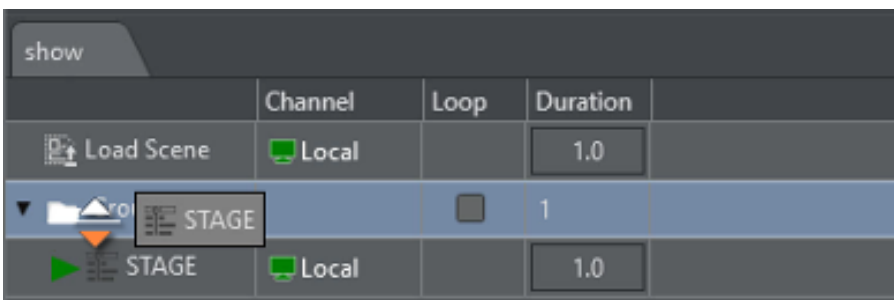
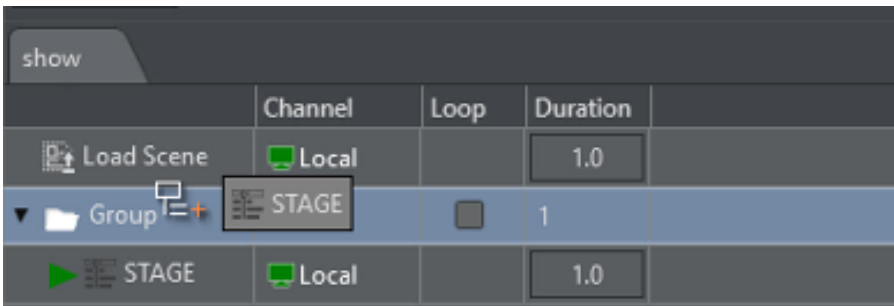
When opening the context menu on a **group** and selecting **Execute**, all children scenes are executed in order.



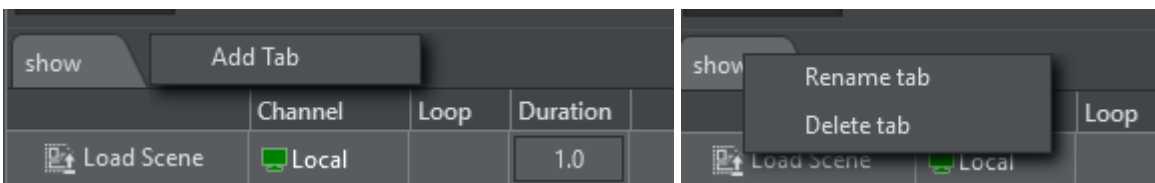
Use drag and drop to move actions around the playlist. The indicator shows if the action will be inserted before, after, or into a group.



The **orange triangle** shows where the dragged item is dropped when released.



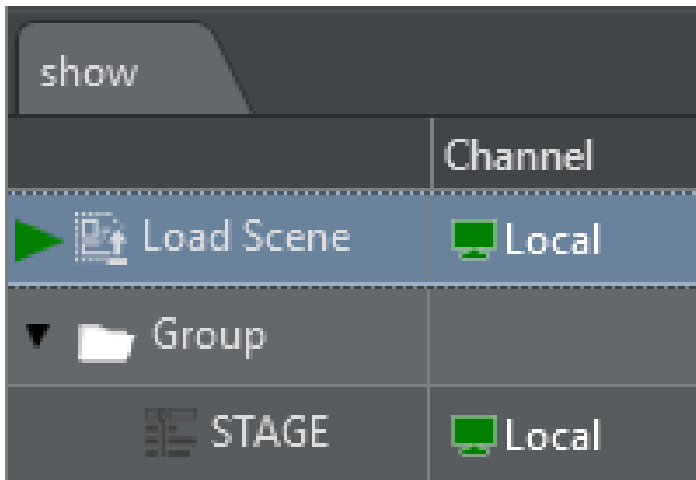
- **Drop inside a group:** When dragging over a group item, the cursor icon shows whether the item is going to be dropped inside the group.
- **Drop under or above the group:** Moving the cursor further to the left allows you to drop under or above the group.
- **Add a new playlist:** Right click on an empty space in the playlist tab area.
- **Rename or delete a tab:** Right click on an existing tab.



5.11.3 Using the Playlist

A selected playlist element can be executed using the **Execute Action** shortcut (default **F5**) or by simply double clicking the element. A separate system shortcut (default **ENTER** key) may be used


to execute the current element and advance to the next element in the playlist. A **green triangle** shows the element that was executed most recently.



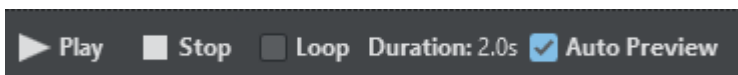
For template action items, the shortcuts for **continue**, **update**, **out** and **preview** work as well.

Duration and Loops

The very last column on a playlist element contains a duration (default 5 .0) representing the time in seconds that the playlist waits before executing the next element. The default duration can be changed under Playlist [here](#).

	Channel	Loop	Duration
 Load Scene	 Local		1.0

Use the panel at the bottom to play the playlist:



- **Play** starts the playlist from the top and **stop** interrupts playback.
- When **Loop** is checked, the playlist loops indefinitely.
- **Duration** indicates the duration of one single run.
- **Auto Preview:** If checked, any item selected on the playlist is executed on the preview channel.

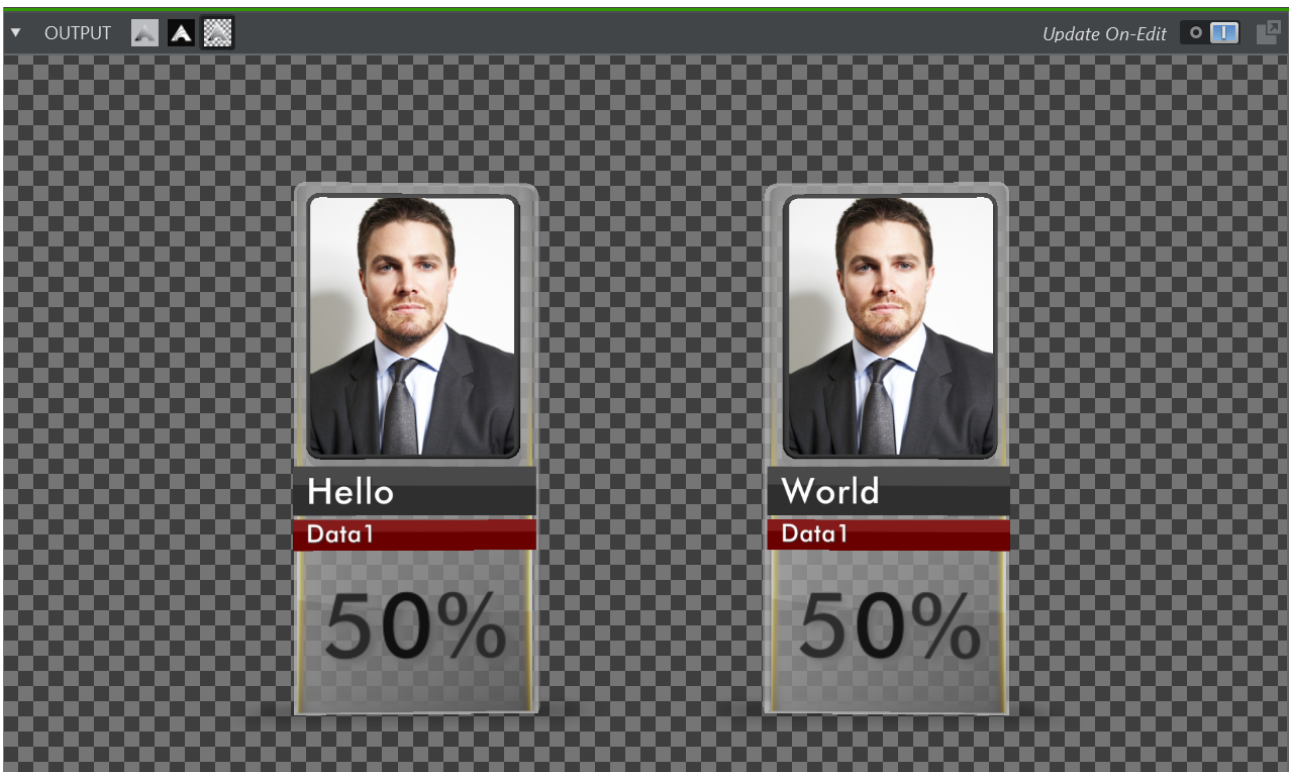
Information: When the playlist has been scheduled for automatic playback, all modifications made on the playlist are ignored for the playback. The playlist must be stopped and played again in order to reflect any changes.

Groups can also be checked for looping. The elements within the group are then executed indefinitely until the stop button is pressed.

▼ Group		<input checked="" type="checkbox"/>	16.3	
Start	Local		5.3	
Continue	Local		11.0	




5.12 Preview Window

This pane displays the Viz Engine output or any other video source configured. By enabling **Update On-Edit**, it's possible to see project changes in real-time.



Use the three icons at the top left of the preview panel to select a visualization mode for the preview.



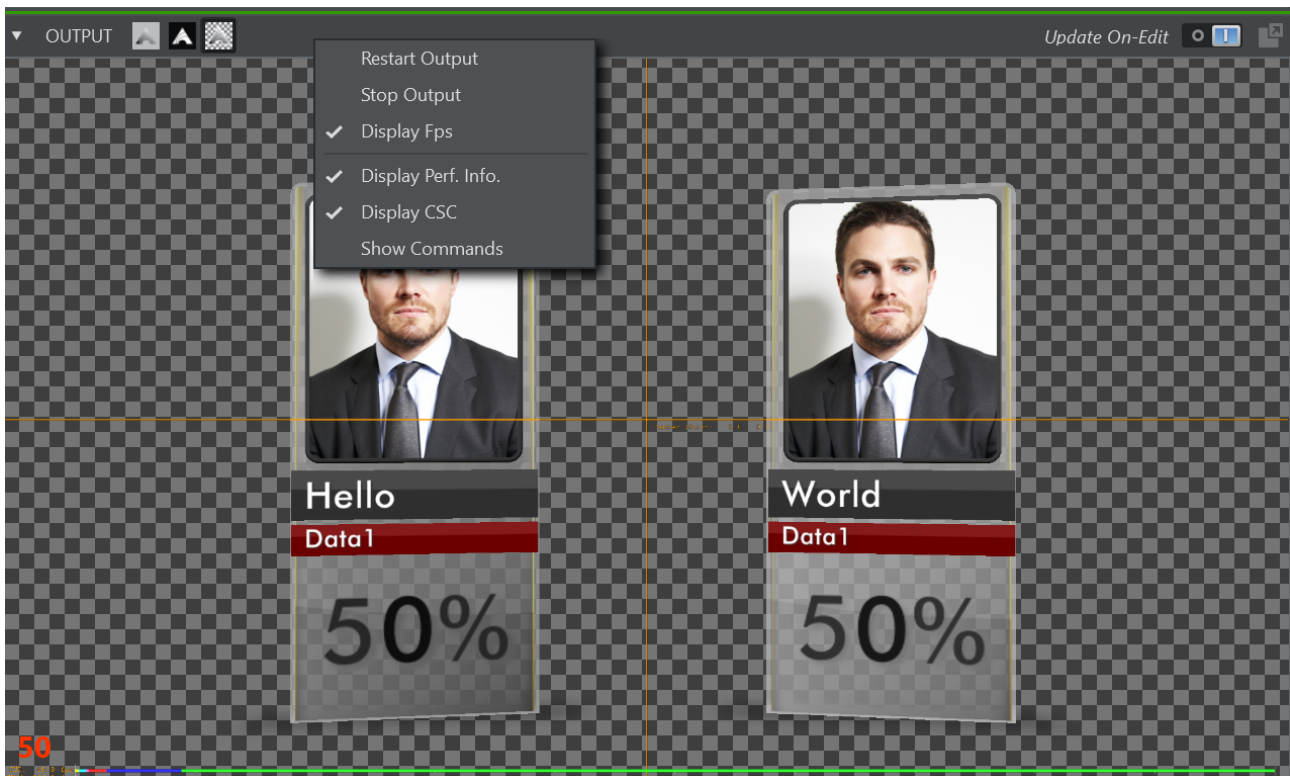
1.  Show Fill, shows only the fill channel.
2.  Show Key, shows only the key channel.
3.  Show Keyed, shows only the keyed output.

Information: Note that currently only NDI sources and the Viz Output through shared memory (starting from Viz Engine 4.x) are capable of carrying fill and key information. This feature only works on NDI and Viz Engine sources. Select **Show Fill** for any other sources.

Click the **Detach** button to pop out the preview window to a separate window. Close the window again to attach it back into the main window.



Use the top bar context menu to add additional useful overlays.



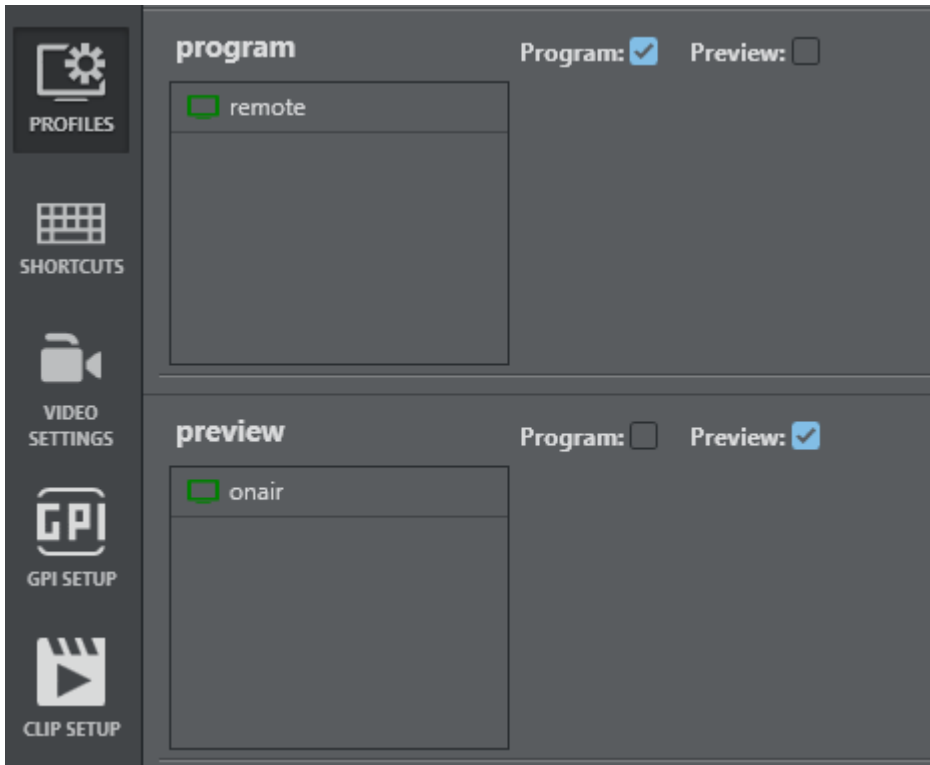
- **Restart Output:** Restarts the stream decoding process.
- **Stop Output:** Stops the output, might be used to save CPU/GPU resources.
- **Display Fps:** Displays the effective frames per second of the actual display in Viz Arc as a red number on the bottom left corner.
- **Display Perf. Info:** Shows the bottom performance bar when connected to a Viz Engine.
- **Display CSC:** Displays the center cross when connected to a Viz Engine.
- **Show Commands:** Shows commands when connected to a Viz Engine.

5.13 Program And Preview

If a preview channel is configured in the active profile, you can execute any action on the preview channel:

- [Previewing by Keyboard Shortcut](#)

- [Previewing by CTRL Modifier](#)



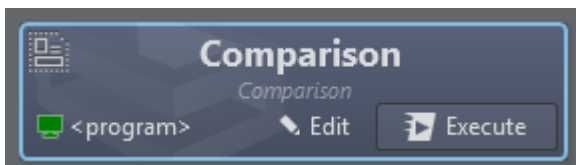
A sample profile configuration defining a program and preview channel

5.13.1 Previewing by Keyboard Shortcut

Select one or multiple actions and use the keyboard shortcut defined in the **Shortcut** section (default F9).

5.13.2 Previewing by CTRL Modifier

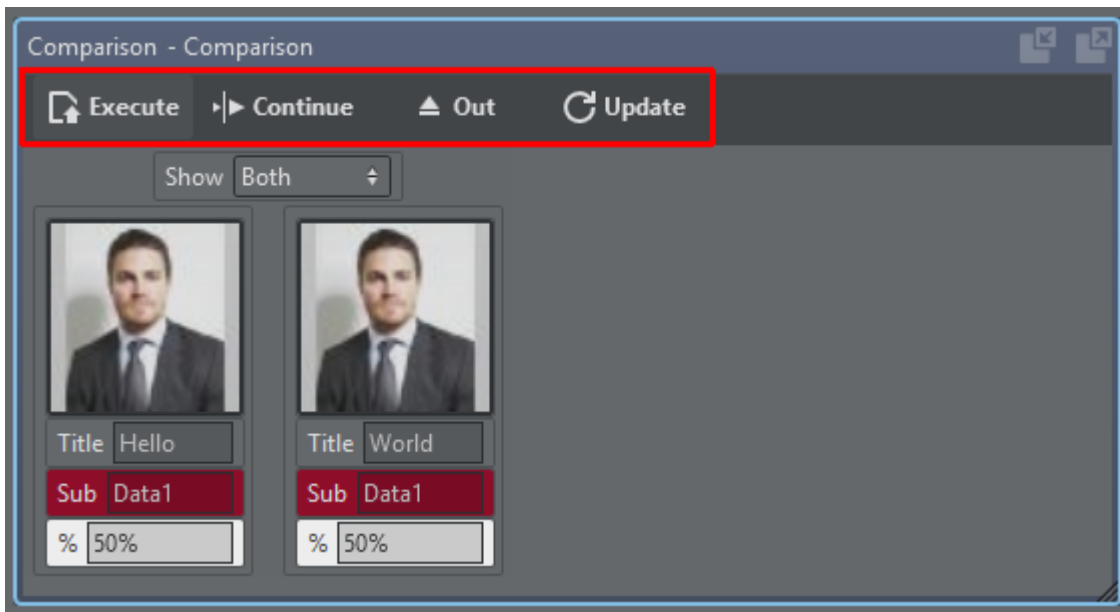
Press and hold the **CTRL** key and execute an action by clicking the **Execute** button. The action is executed on the preview channel instead of the channel defined in the action.



Either press **F9** or press and hold **CTRL** and left click the **Execute** button to execute the action on the preview channel.

5.13.3 Templates

In case of a template action, the **CTRL** modifier is extended to the entire command header:



When holding the **CTRL** key and hitting any of the header buttons, the respective commands are sent to the preview channel.

5.14 Projects

In Viz Arc, projects consist of two main elements:

- **Scenes:** The Viz Scene or Scenes the project controls.
- **Actions:** Buttons that control different parameters of any Viz Scene within a project when activated.

Optionally, a **Project** may also include:

- **Custom Script:** For more dedicated logic and controls.
- **Virtual Studio or Augmented Reality** objects configuration.

Projects can be managed (Open, Create, Save, etc.) from the [Main menu](#) or [Project toolbar](#).

Note: All projects are stored in the Projects folder, see [Files and Folders](#).

5.15 Templates

- [Creating a New Template](#)
- [Using a Template](#)
- [Adding Templates to a Master Scene](#)
- [Using Templates on a Scene Containing Multiple Top Level Control Objects](#)
- [Unreal Templates](#)

Viz Arc lets you create custom templates for both Viz Engine scenes and Unreal Engine levels. The templates are fully customizable and a script can be used for even more flexibility, including data integration and custom logic.

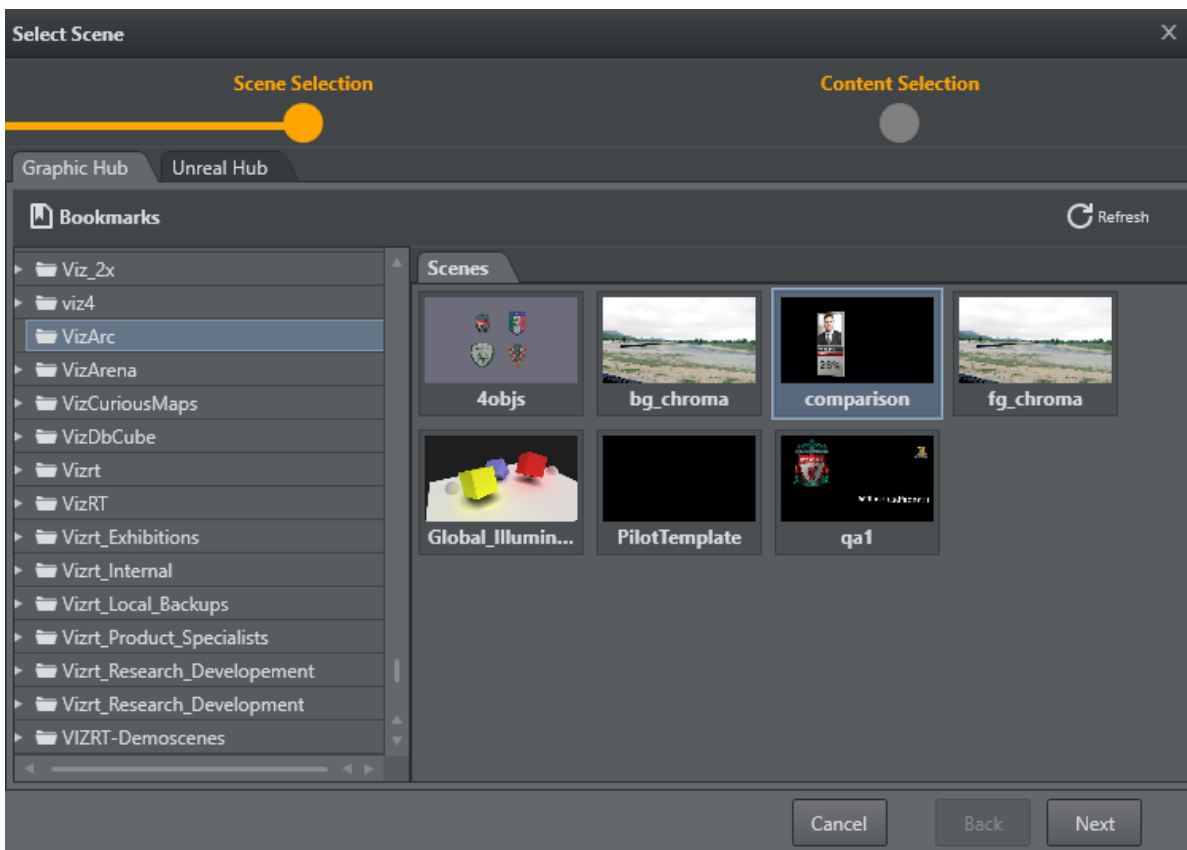
Note: Before creating a new template, you must ensure that Graphic Hub has the required Add-Ons to store the templates, see [Configuring Graphic Hub](#).

5.15.1 Creating a New Template

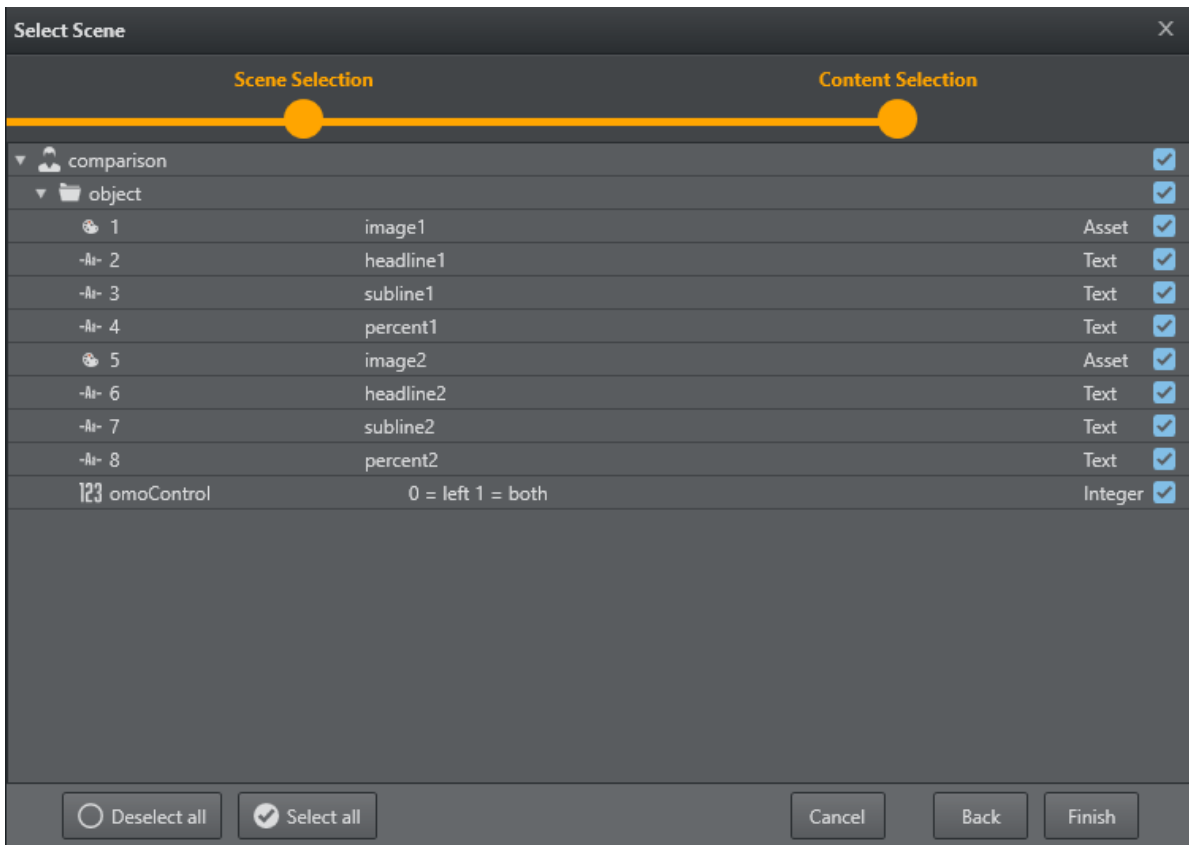
- Under the **Tools** section, select **DESIGN**.
- Next, click **Create New Template**.



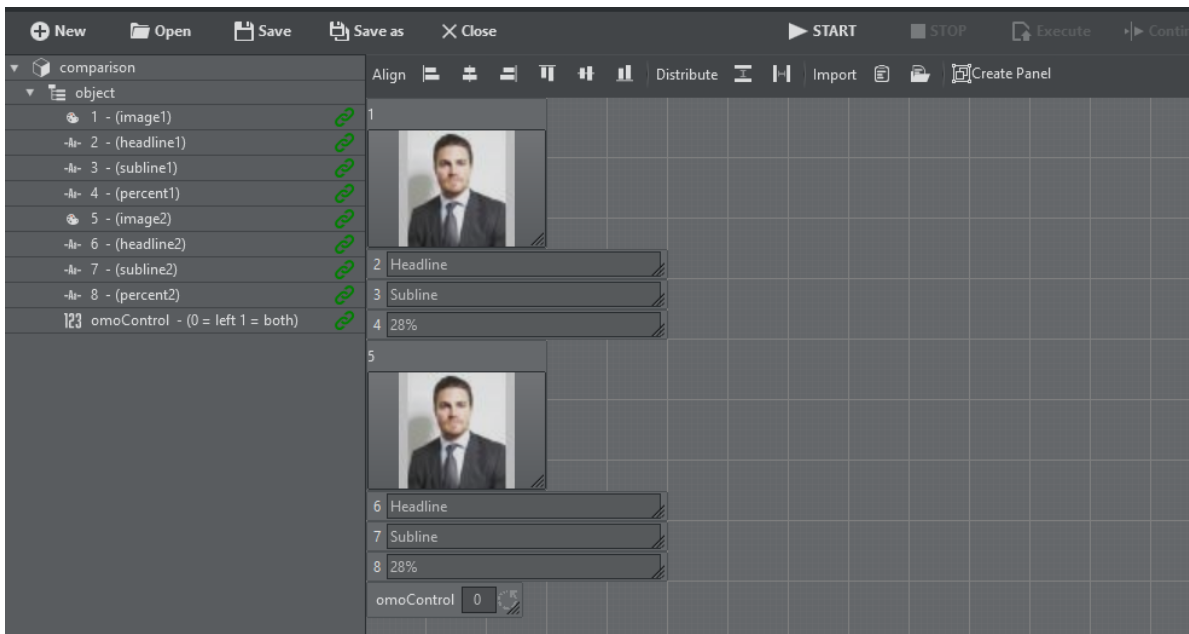
A browser window appears where you can select either a Viz or an Unreal scene:



Click **Next** to view Control Objects found within the scene. Select the Control Objects for which a default UI is to be created:



Click **Finish**. A default UI based on the selected Control Objects has now been created:



The left hand side contains a list of the Control Objects' IDs along with their description. A **green link icon** indicates whether the Control Object is linked to a UI element.

A property panel on the right shows editable properties of the selected UI element, or, in case of multi-selection, the properties that are common to the selection. A sample of a text parameter property:

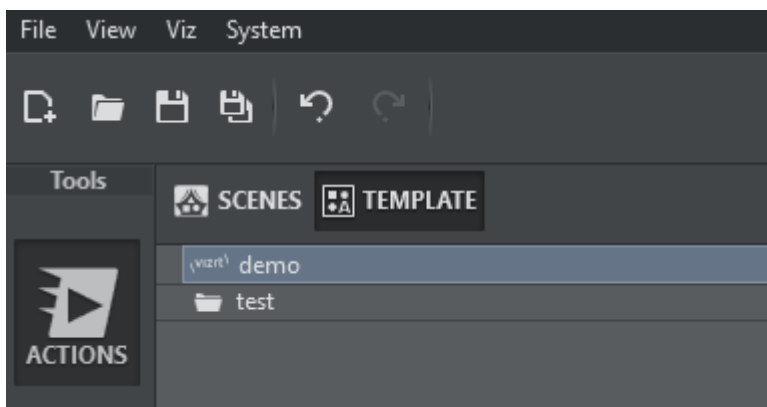
Properties	Title
ID	leftTitle
Label	Title
Tooltip	
Font Size	12.0
Font Family	Segoe UI
Border Thickness	1
Color	
Position X	5.0
Position Y	105.0
Width	100.0
Height	25.0
Z Index	1
Enabled	<input checked="" type="checkbox"/>
Visible	<input checked="" type="checkbox"/>
Tab Stop	<input type="checkbox"/> Add tab stop
Linked Object	2
Linked Data Key	
Linked Data Query	
Value	Hello

- **ID:** The unique internal ID of the parameter that can be used in the script code to reference the parameter.
- **Label:** The label of the parameter.
- **ToolTip:** An optional ToolTip.
- **Font Size:** The size of the font used in the textual parts of the component.
- **Font Family:** The font used in the textual parts of the component.
- **Border Thickness:** The border thickness of the parameter.
- **Color:** The background color of the parameter.
- **Position X:** The horizontal pixel position of the upper left corner of the parameter.
- **Position Y:** The vertical pixel position of the upper left corner of the parameter.
- **Width:** The width of the parameter.
- **Height:** The height of the parameter.
- **Z Index:** The z sort index of the parameter. In case of overlap with other parameters this value can determine whether the parameter is in front or behind the overlapping component.
- **Enabled:** Whether the parameter is usable for user interaction.
- **Visible:** Whether the parameter is visible to the user.
- **Tab Stop:** The order of the tab-stop.

- **Linked Object:** In case the parameter is linked to a ControlObject ID or a Blueprint variable.
- **Linked Data Key:** The name of the DataMap key (see [DataMap Linking](#)).
- **Linked Data Query:** The query for the DataMap value (see [DataMap Linking](#)). Can be empty for simple data mapping.
- **Value:** The actual value of the parameter.

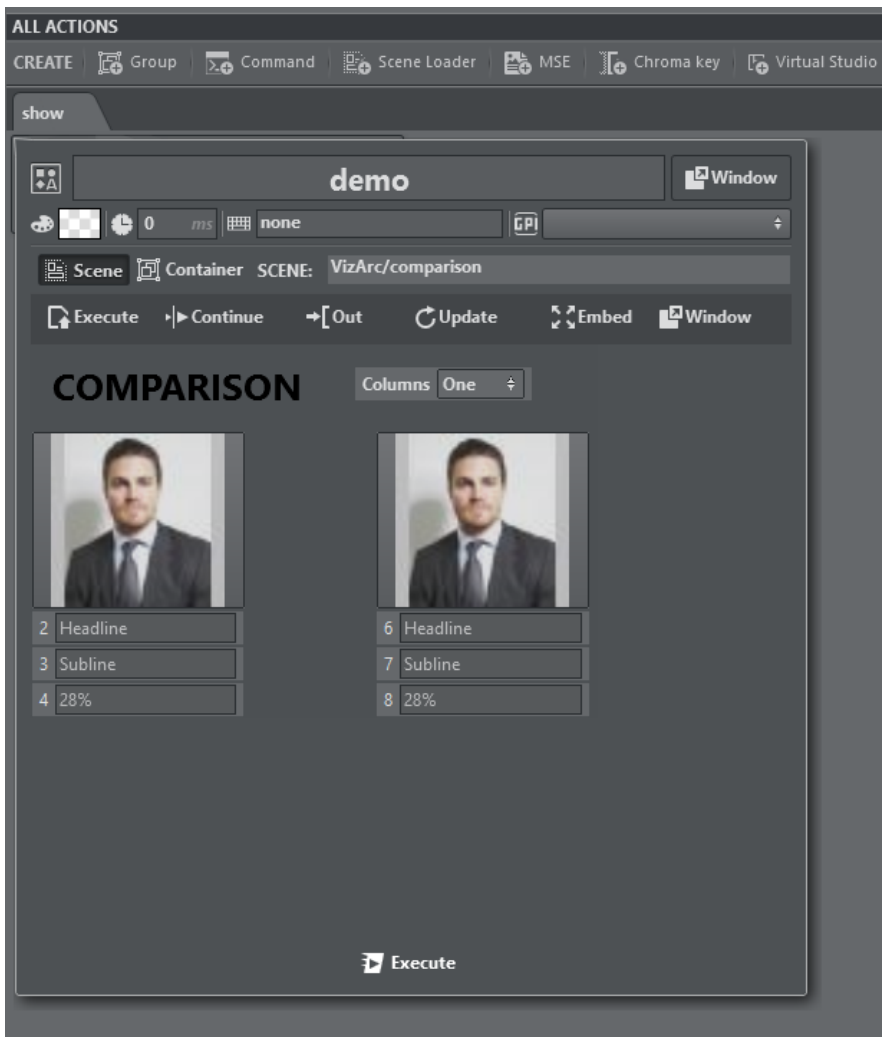
5.15.2 Using a Template


Templates are available in the action panel.

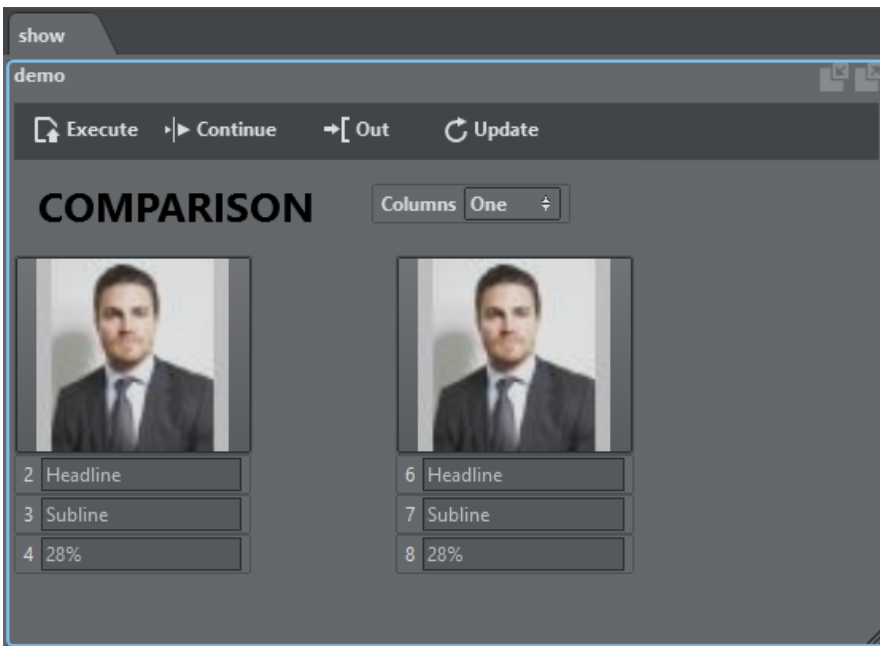


The list of templates can be refreshed by right-clicking on the template list canvas and selecting **Refresh** from the context menu.

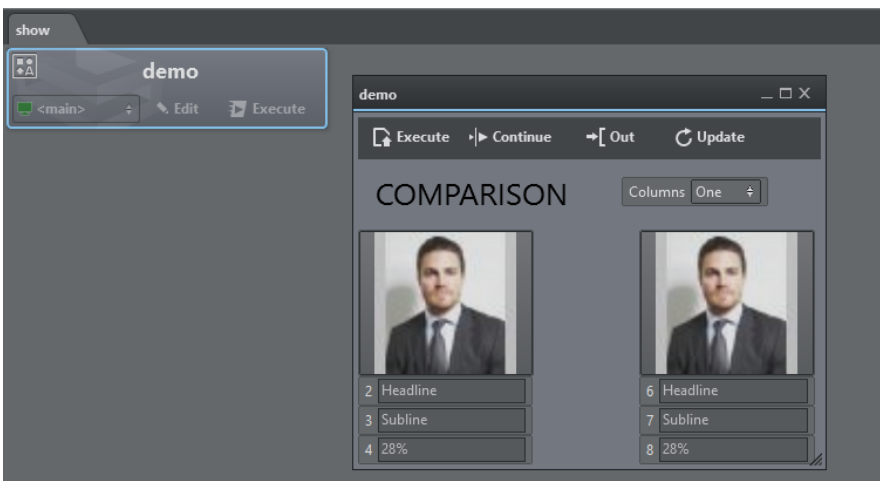
To create an instance of a template, drag and drop it to the action canvas.



The template action can be opened in the same way as all other actions in a popup window. It can be detached as a window that always stays on top, or embedded into the action canvas using the **Embed** or **Window** buttons  .

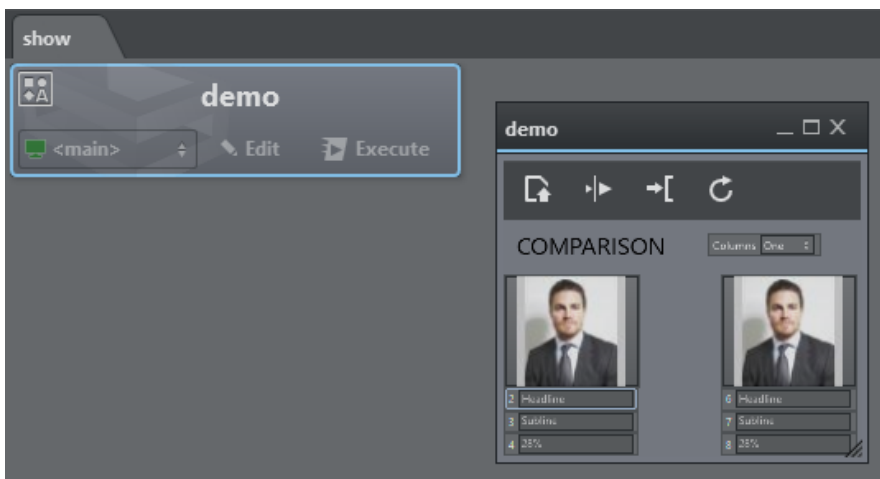


Template action as an embedded window is shown above. The embedded window can be resized by percentage or by using the resize grip in the bottom right corner of the action.



Template action as a detached window is shown above.

You can zoom in and out of each template action using the shortcuts **CTRL +** to increase size, **CTRL -** to reduce size, and **CTRL + 0** to restore the original size.



A zoomed out version of a template action window is shown above.

Global Template Properties

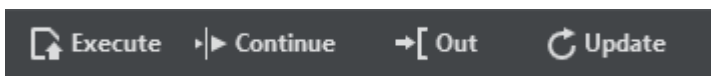
When creating or modifying a template and when in the UI editing mode, click on the background canvas to access a template's global properties:



- **Background:** Sets a default background color. When dragging the template onto the action canvas, the action color will be the background color.
- **Background Image:** Lets you choose a background image for the template either from a local file system, the GH or the Media Service. The snap button grabs the current frame of the editing Engine.
- **BG pos X:** The horizontal pixel position of the background image.
- **BG pos Y:** The vertical pixel position of the background image.
- **BG Width:** The pixel width of the background image.
- **BG Height:** The pixel height of the background image.

- **Command Header:** Whether the template will display the default command header (Execute, Continue, Update, Out).
- **Update When Focused:** When enabled, the template will receive callbacks only when the template is selected, has focus, and is opened in either embedded or window mode. Relevant callbacks are: OnTimer, OnStreamDeckKey, OnDataMapValueChanged. When disabled, the template will receive those callbacks when instantiated on the action canvas in any form (embedded, windowed or closed and without being explicitly selected).
- **Director On Execute:** This dropdown menu contains the list of directors of the scene. Select a director that should be triggered when executing and continuing the template. By default the entire Stage is animated when <STAGE> is selected.

Template Controls



Execute

A template action can be triggered using the **Execute** button above the template or through the system keyboard shortcut **Execute Selection**. When the action is collapsed, the regular **Execute** button on the action does the triggering. When executing, the scene that is associated with the template is loaded, the Control Objects are being updated and the stage is being played. In case an engine of the associated channel has a **Concept** configured, the scene in that concept is loaded.

Continue

The **Continue** button or the **Continue Selection** keyboard shortcut sends a continue command to the scene stage. When the action is collapsed, the **Execute** button executes a **Continue** when clicked with the **right mouse button**.

Out

The **Out** button or the **Out Selection** keyboard shortcut removes the scene associated to the template from the renderer, thereby causing a **hard out**.

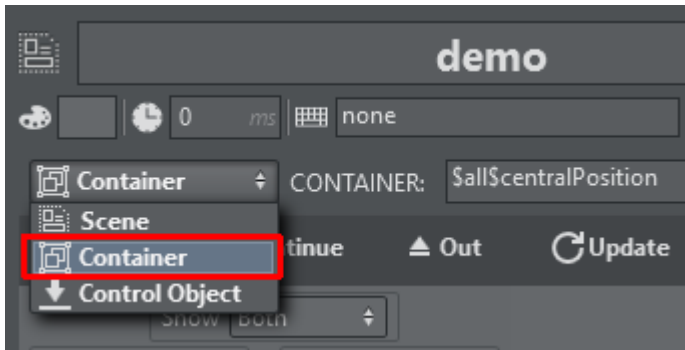
Update

The **Update** button or the **Update Selection** keyboard shortcut sends the currently set Control Objects to the renderer and update the values accordingly. This can be useful for updating live data while a scene is on-air.

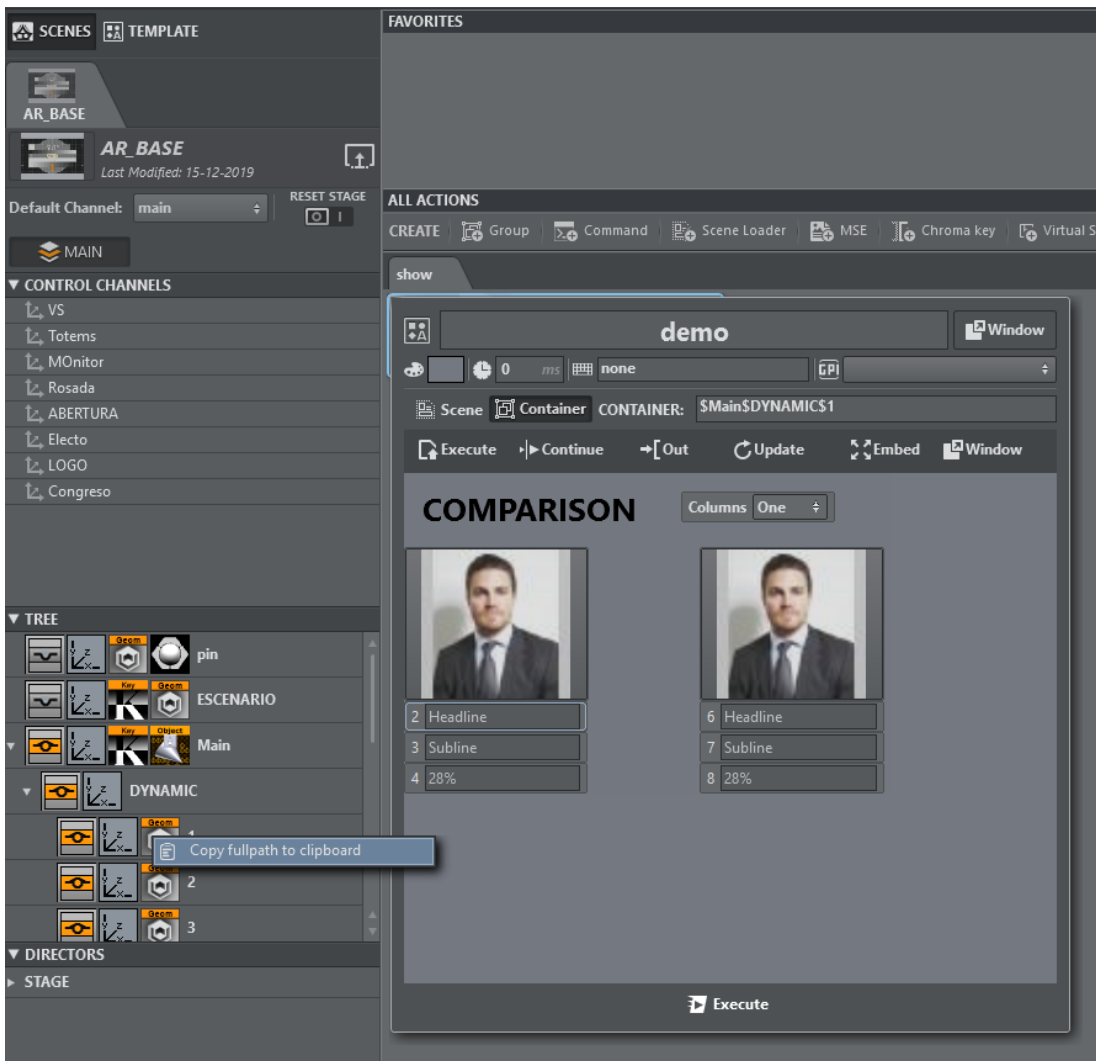
i Info: The system **Execute Selection**, **Continue Selection**, **Out Selection** and **Update Selection** shortcuts only work when a single action is selected.

5.15.3 Adding Templates to a Master Scene

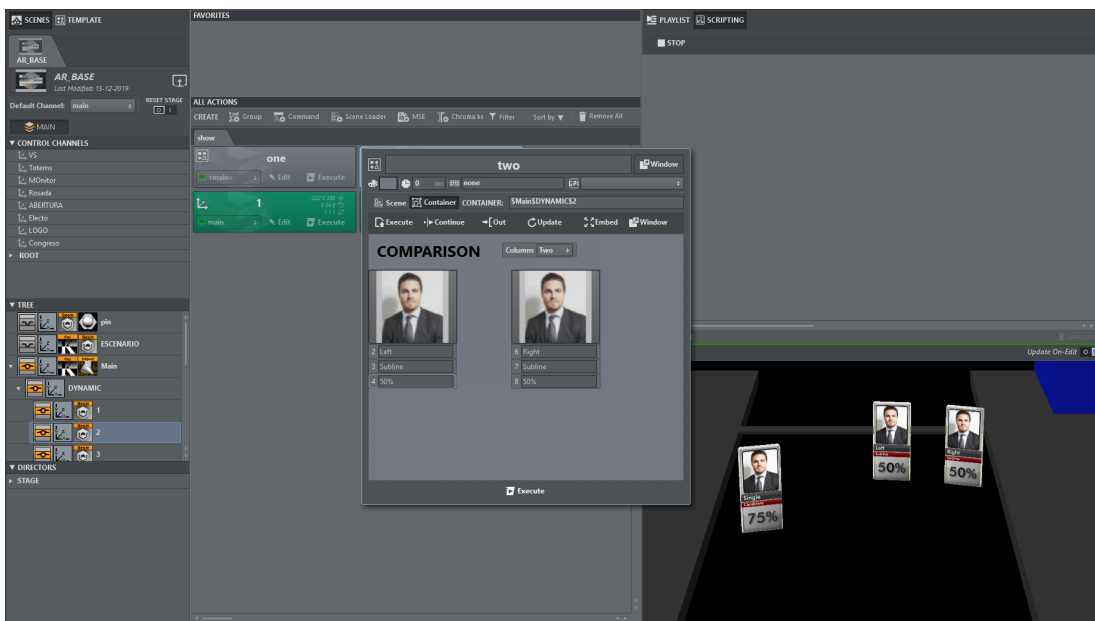
By default, a template action is triggering a stand-alone scene and is thus useful for simple lower third graphics, tables etc. When editing the template action, it's possible to toggle the destination of the template's action to a container path of another scene.



The container path can be entered manually or can be obtained from the scene tree by right clicking the desired container and selecting **Copy full path to clipboard**.

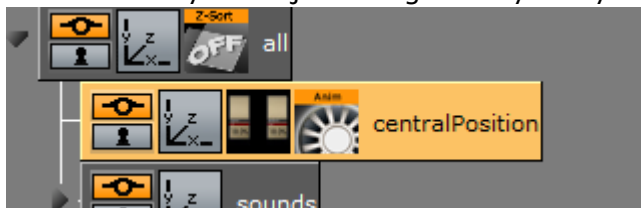


Executing those actions results in the objectified object being loaded into the destination container path and the respective Control Objects being updated.

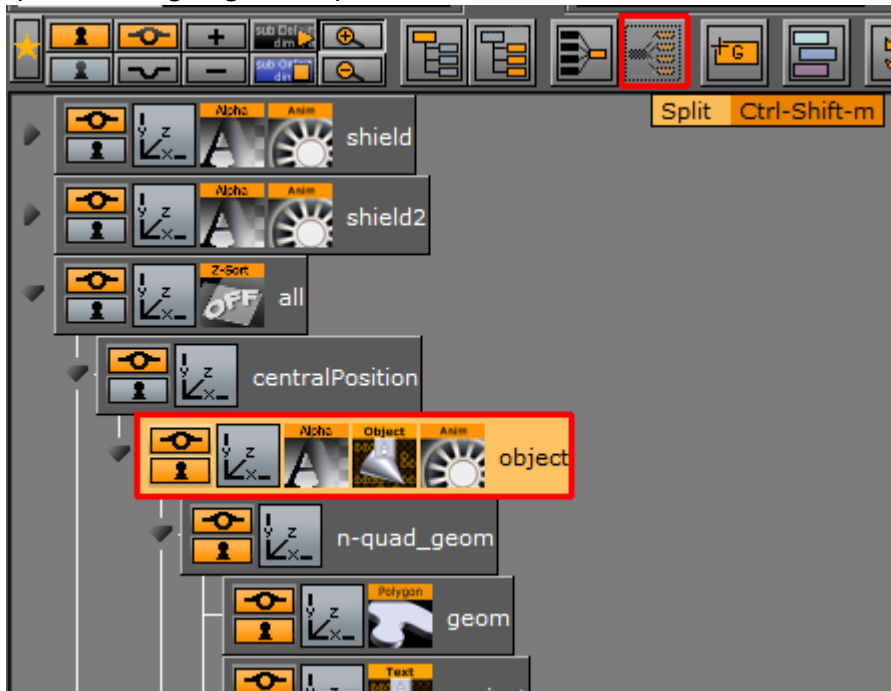


Another way to insert template scenes into a master scene is the following:

- Create your template based on a separate scene.
- Insert manually the objectified geometry into you master scene.

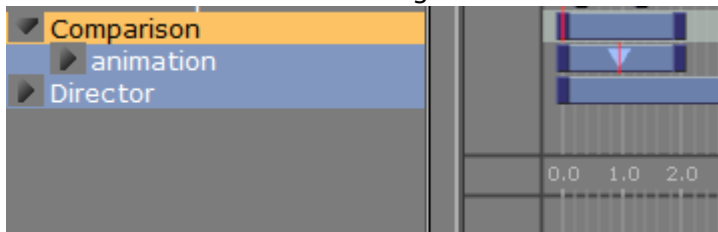


- Split the merged geometry.

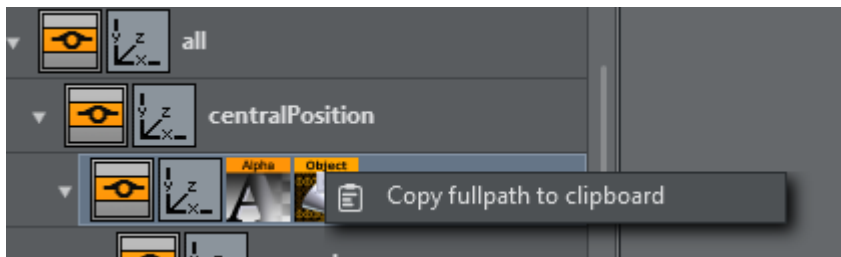


You'll obtain a container containing your top ControlObject as in the stand-alone scene.

- Locate the director and re-arrange and rename in the Viz Artist stage, if necessary.

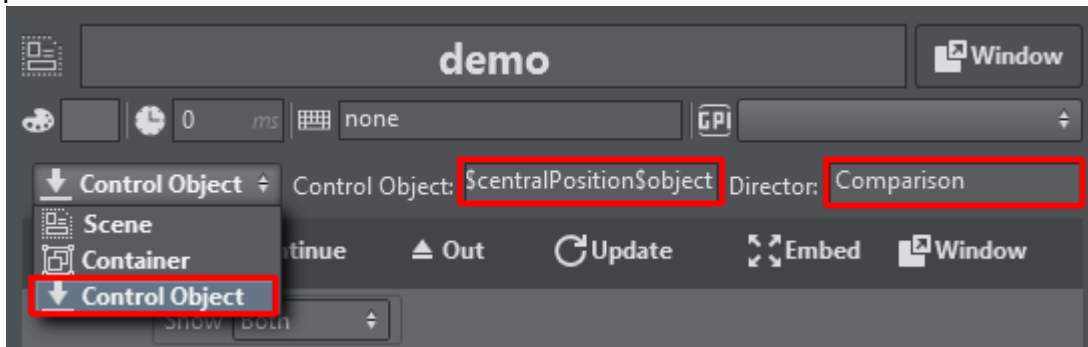


- Save the scene and reload it in Viz Arc.

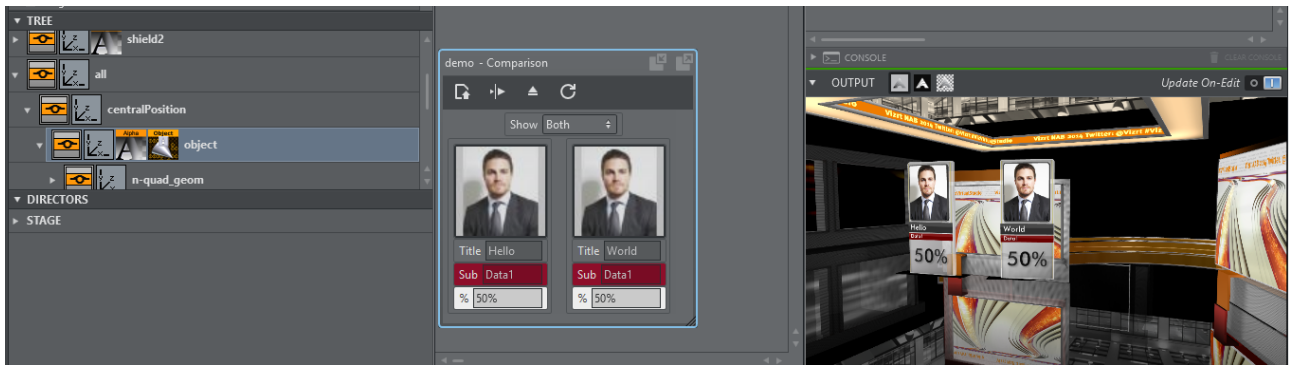


Copy the full path of the container containing the **Control Object**.

- In the template select **Control Object**, paste the container path to *Control Object* and the path to its Director to *Director*.

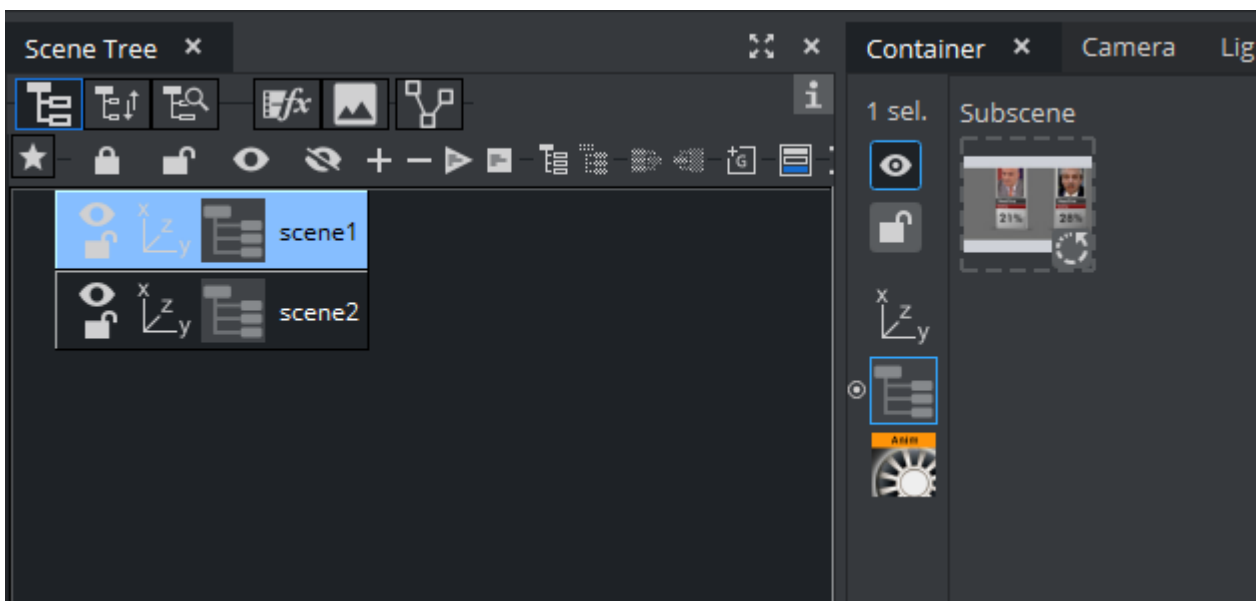


You'll be able to operate your template with execute/continue, while the scene is embedded in the AR/VR master scene.

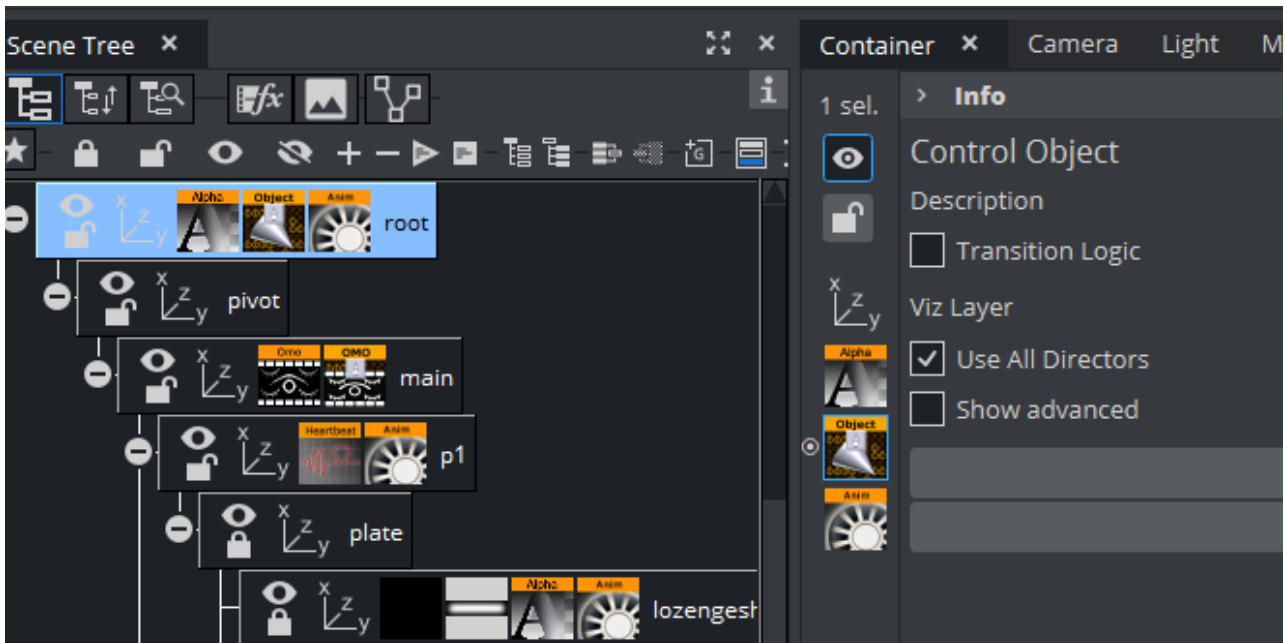


- In case a scene is loaded in the scene tree as a **SUBSCENE**, manually append the string ***SUBSCENE*TREE*\$PathToControlObject** .

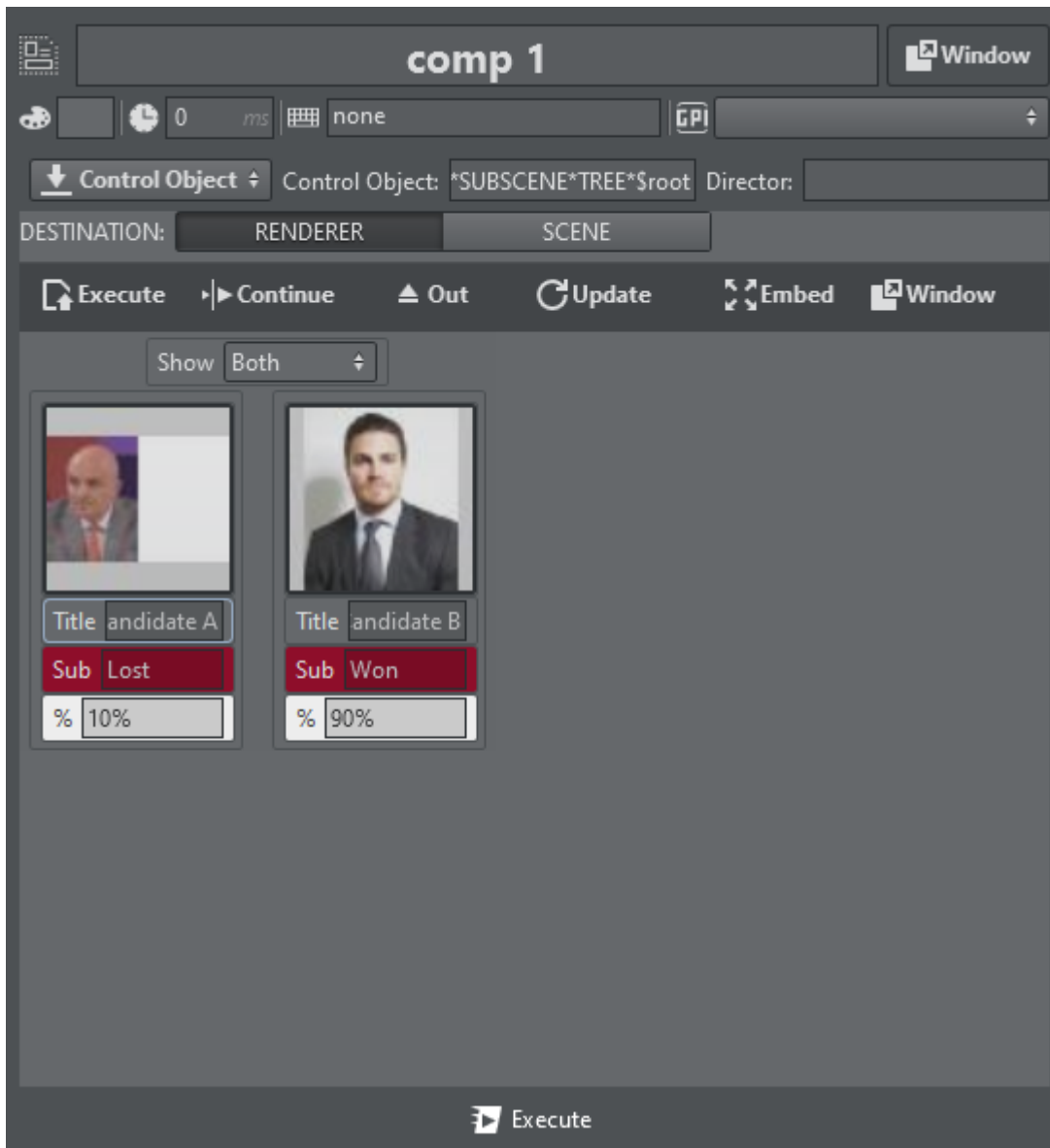
As an example, consider a scene with a container *\$scene1*.



This container contains a **SUBSCENE**, on the subsceine another scene is loaded that has a *ControlObject* on the *\$root* container.

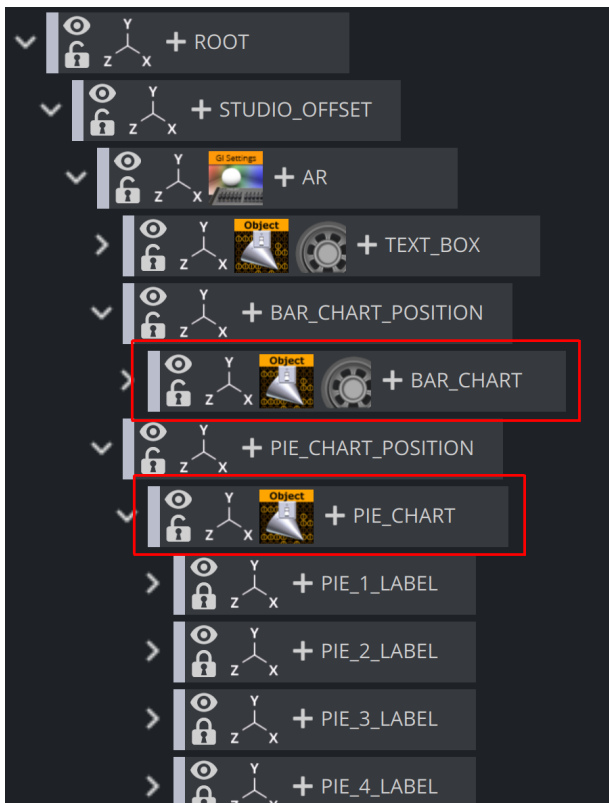


A template can now be used to control the controls of the subsceine using the path `$scene1*SUBSCENE*TREE*$root` in the *Control Object* input field.



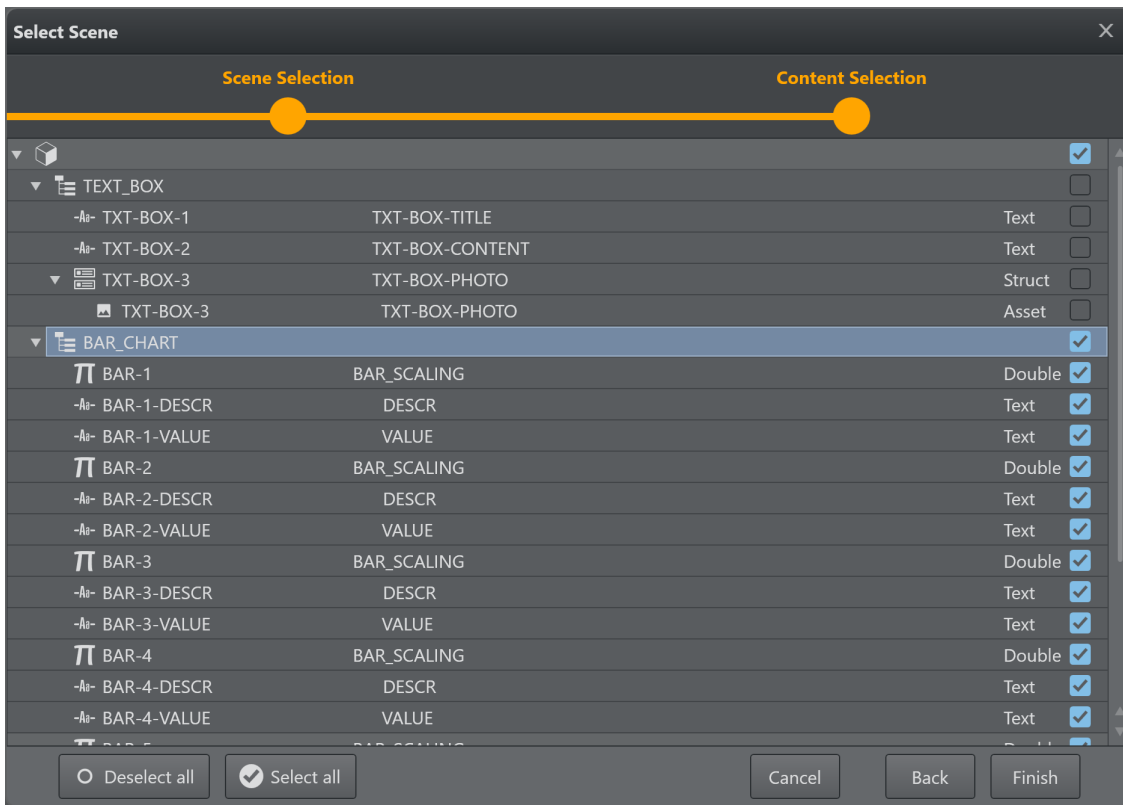
5.15.4 Using Templates on a Scene Containing Multiple Top Level Control Objects

Within a large AR scene, you might want to create subtrees separating different graphics elements. For example, a subtree containing a bar chart and another subtree containing a pie chart graphics.

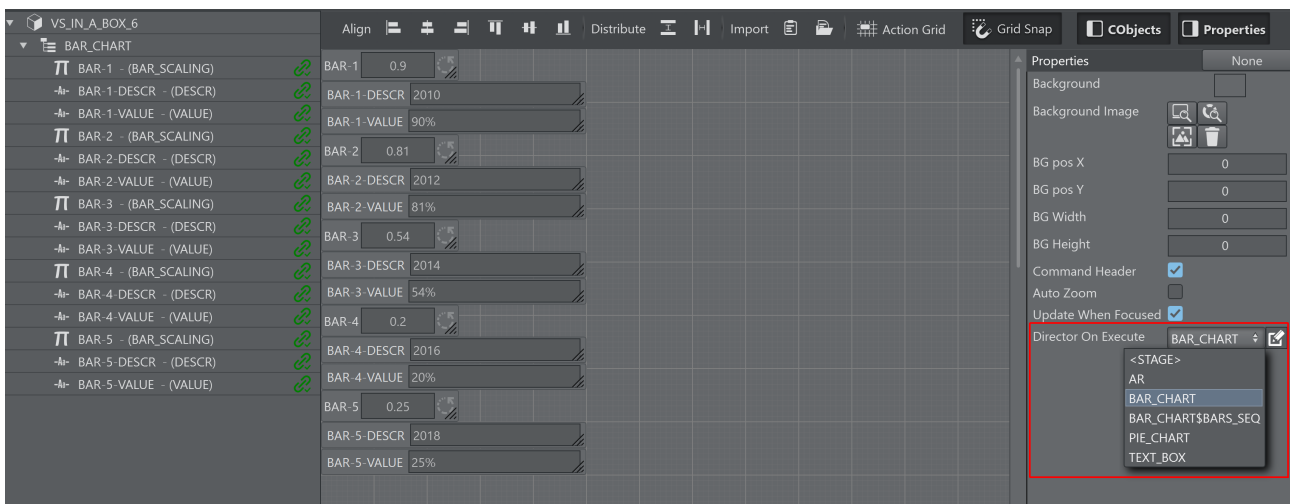


When using this kind of tree structure having Control Objects spread around the scene as sibling nodes, it is possible to directly create templates for each individual top level Control Object.

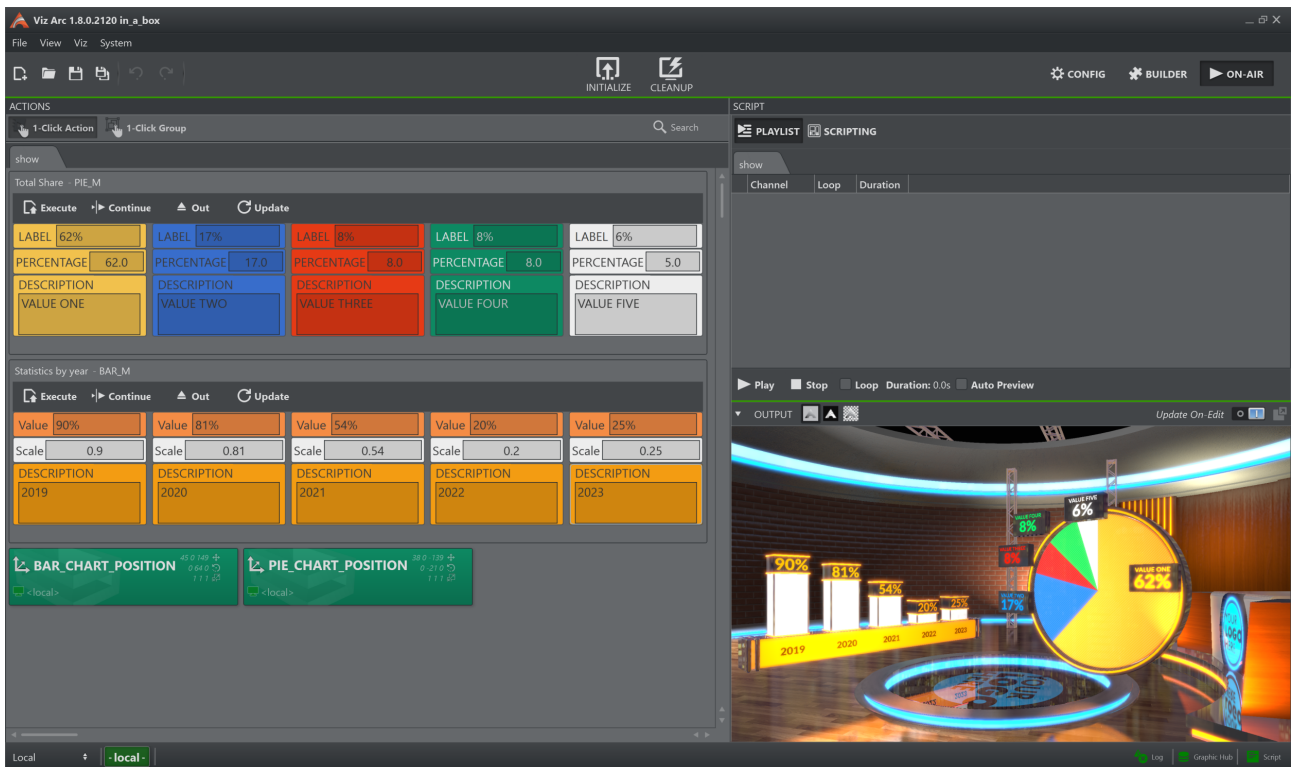
While creating a new template by selecting the scene from the Graphic Hub, you'll be able to select either one of the top level controls. You cannot control multiple top level control objects from within a *single* template.



Once a Control Object is selected for the template, choose which director should be used when executing the **Execute** and **Continue** buttons of the template. The selection can be found on the template background property when clicking any empty space on the template canvas. The subscene director has to be built in such a way that there is a stop point when the graphics are fully animated in and that a continue command animates the graphics out again.



Once the templates are finished they can be used as embedded templates on the action canvas. The operator can trigger the different elements individually.



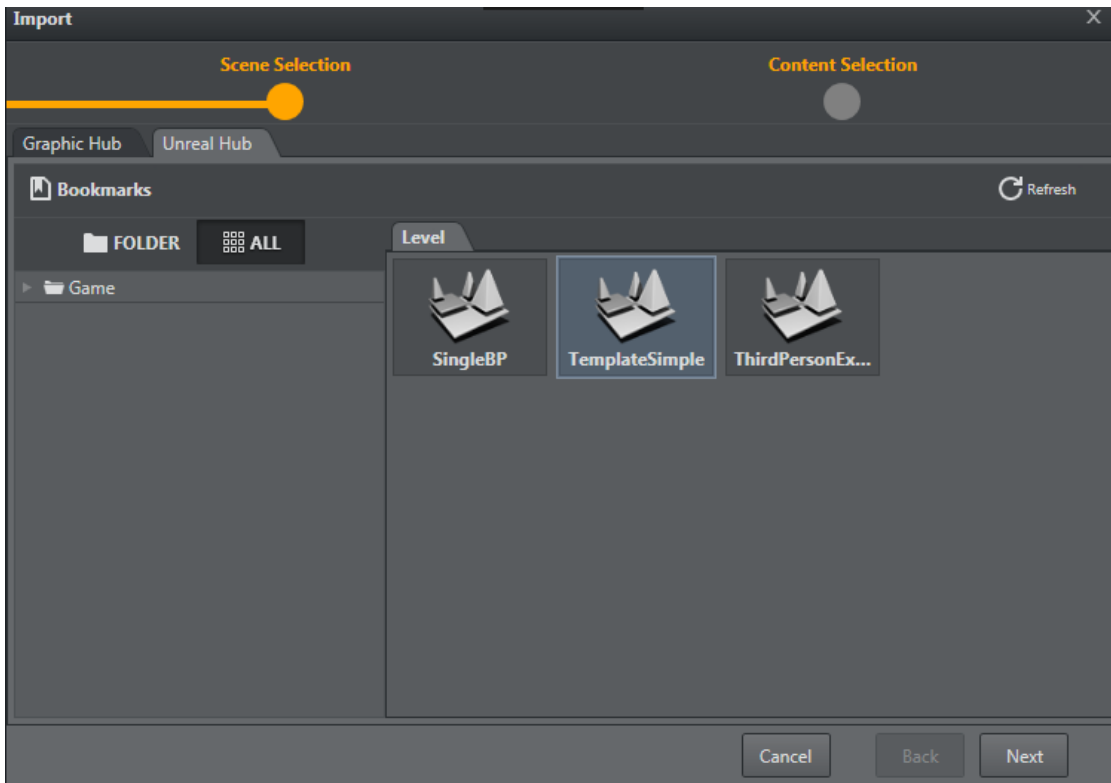
5.15.5 Unreal Templates

Creating a New Unreal Template

The process of creating an Unreal template is almost the same as that for creating Viz templates, with a few slight differences.

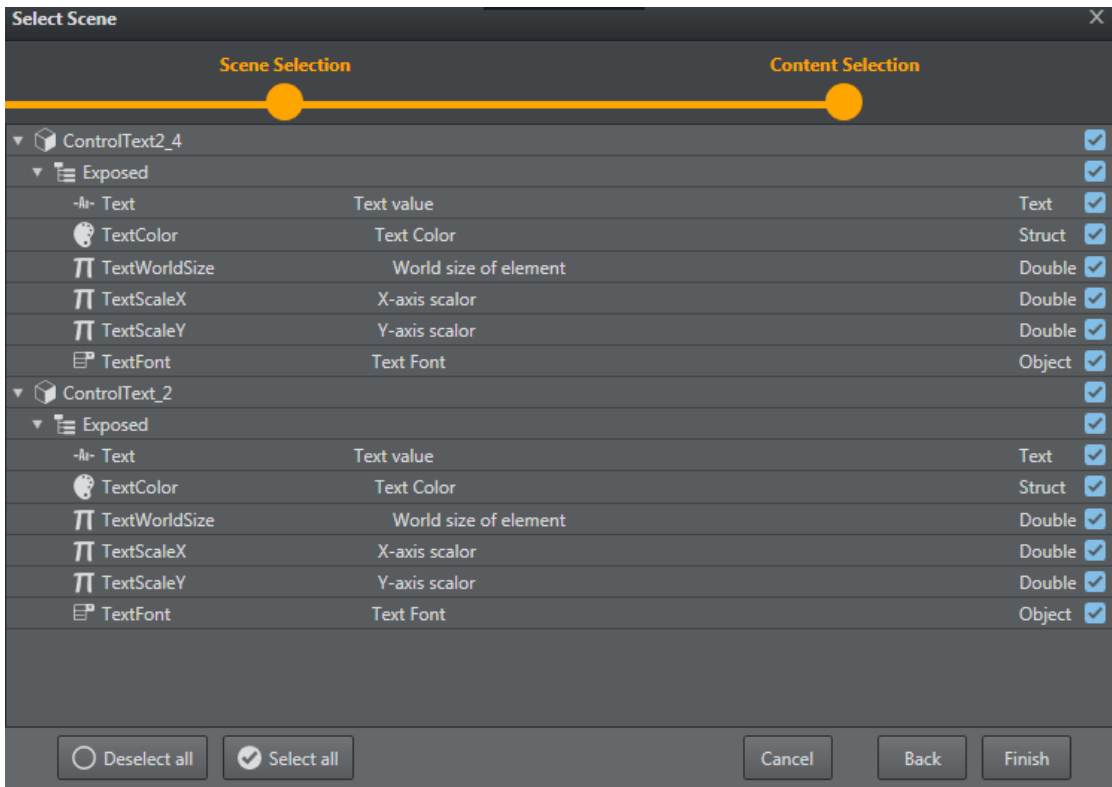
Creating an Unreal Template

- Go to the **DESIGN** section.
- Click **Create new template** to open the wizard.
- Select the **Unreal Hub** tab and select a level.

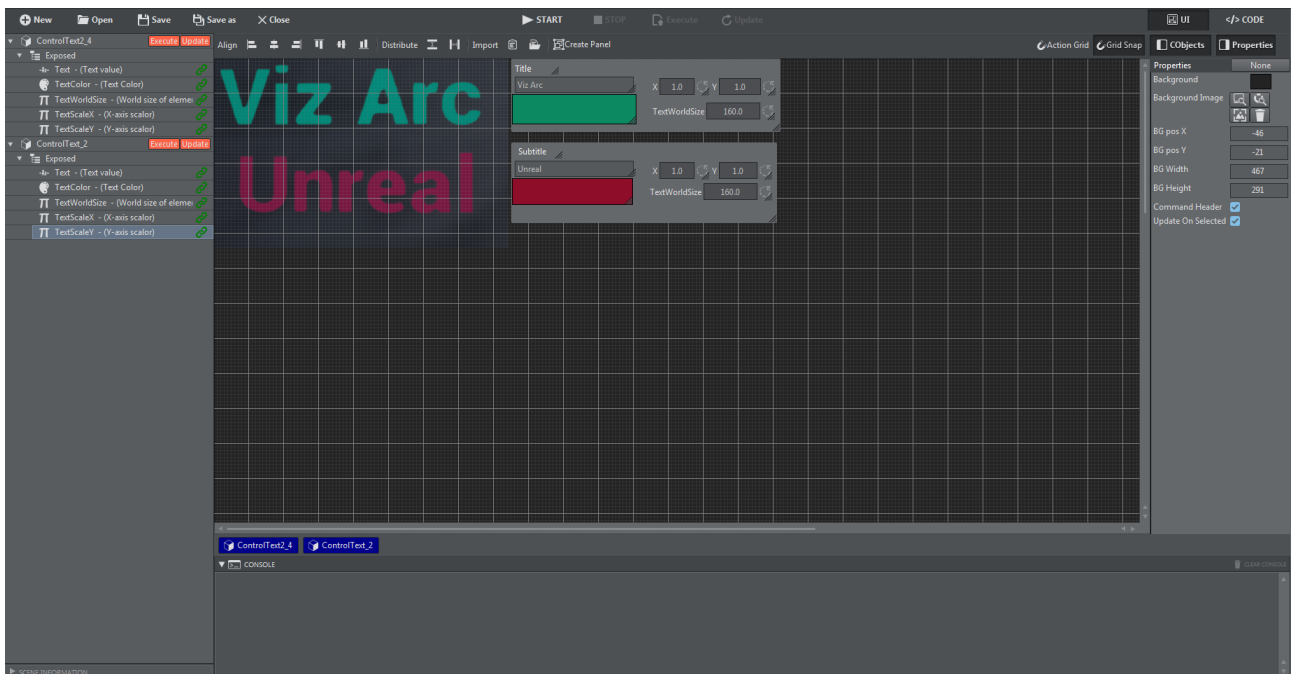


Upon selecting a level and clicking **Next**, the level is set on the configured Unreal editing Engine and all of the blueprint actors and the level blueprint are parsed and displayed on the following screen (as shown below).

The list displays all the blueprint actors found and a list of their categories and exposed objects. You can then select which are to be created when finalizing the template creation.



Unreal-specific Features



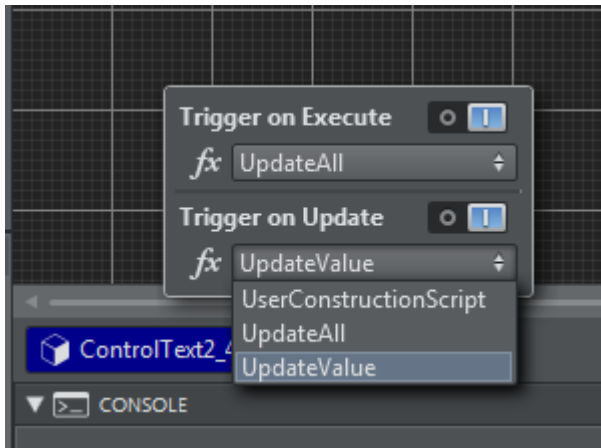
The Unreal template in the screenshot above contains the following Unreal-specific features:

Template Controls

Only **Execute** and **Update** are available for Unreal templates.

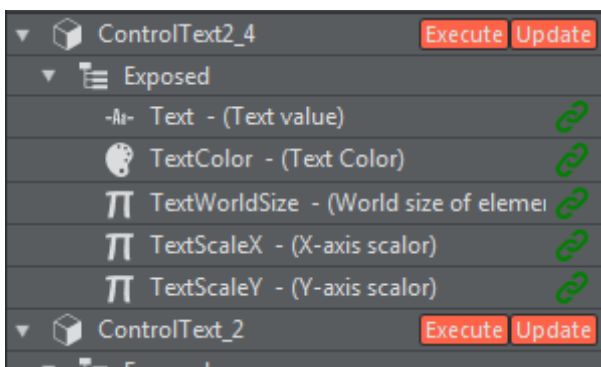
Unreal Function Integration

Under the parameter canvas, there is a horizontal bar containing all the existent blueprint actors. Clicking the bar opens a popup where you can decide if the template should call a function on Execute and/or on Update, and which function (defined on the Unreal blueprint) should be called.



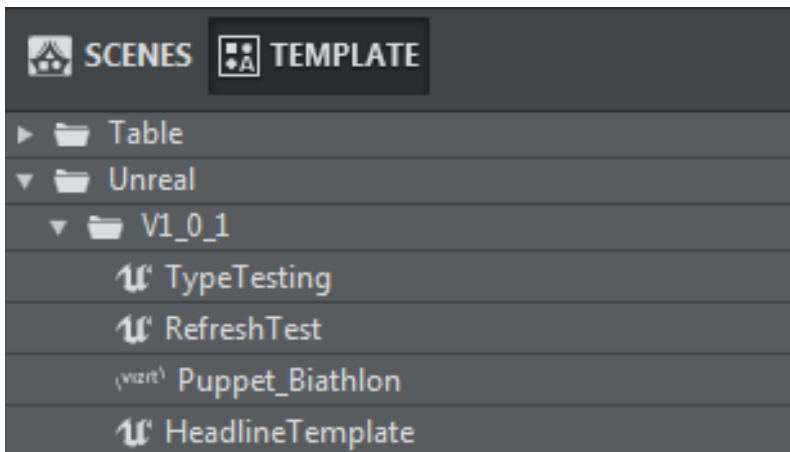
Note: The list of blueprint functions (function drop-down) will only display those functions that have no input parameters.

Blueprint actors with functions set for Execute/Update have an orange indicator after their name on the left side panel of the **DESIGN** section, as seen in the Unreal template screenshot at the beginning of this section above.

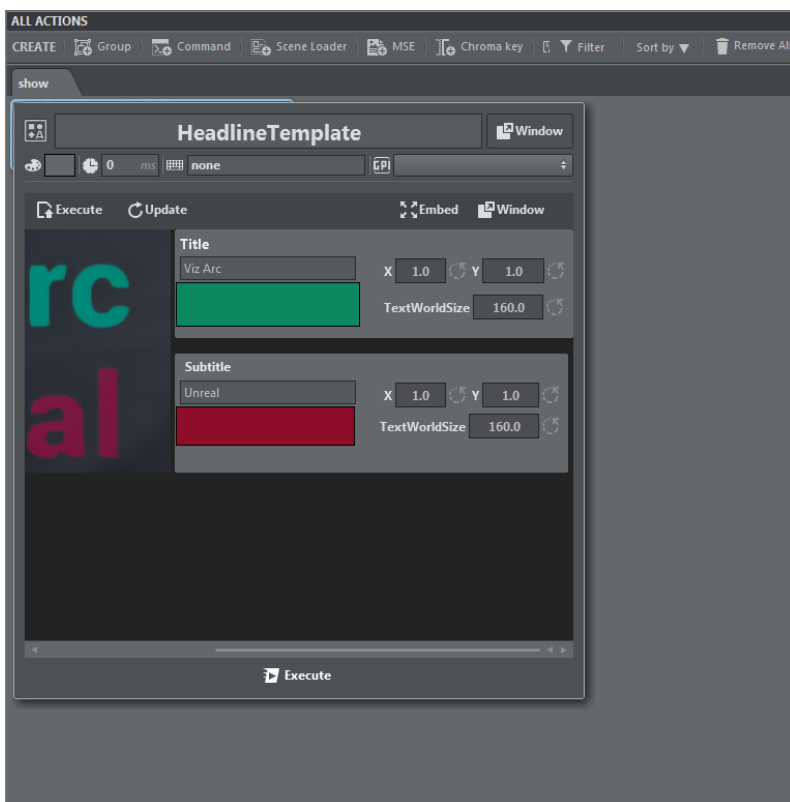


Using a Template

You can access all saved templates on the action panel. Unreal templates can be identified by the **UE4 icon** that precedes the template name.



Unlike the Viz templates, the edit popup of an Unreal template contains no option for how the template should load (Scene or Container); the available controls also differ.



5.16 Web API

Viz Arc provides a Web API that allows you to set DataMap variables, trigger specific actions or control the Playlist.

The samples below assume that Arc is running on *localhost* and the web server is configured to run on port `5004`. The web server port can be configured in the General Settings, under the

Communication section. Please note that this Web API is only accessible when the Viz Arc application is running.

A Swagger webapp that describes every API can be found at <http://localhost:5004/swagger/>.

i **Info:** The samples below use curl command line tools to demonstrate usage and python to beautify the returned JSON output. Note that these tools are not required for the Web API to function correctly.

This section contains the following examples:

- [Status](#)
- [ActionExecuter](#)
- [ActionCanvas](#)
- [DataMap](#)
- [Playlist](#)
- [PlaylistExecuter](#)
- [Projects](#)
- [Profiles](#)
- [Web API Access Control](#)
- [Web Application Sample Usage](#)

5.16.1 Status

The Status endpoint allows you to get basic information of the running Viz Arc instance, such as version and uptime.

GET `/api/v1/status`

```
curl -s -X GET http://localhost:5004/api/v1/Status | python -m json.tool
```

```
{
  "version": "Viz Arc 1.8.0.2116",
  "license": "CORE",
  "uptime": "00:59:14.8406020"
}
```

5.16.2 ActionExecuter

The ActionExecuter endpoint allows you to execute a specific action either by using its name or its ID.

GET `/api/v1/actionexecuter/{id | name}`

Executes the action specified by the *id* or *name*.

```
curl -s -X GET http://localhost:5004/api/v1/ActionExecuter/Opener | or | curl -s -X GET http://localhost:5004/api/v1/ActionExecuter/27cc7a3b-6f90-4d88-9101-a356a1668d83
```

```
200 OK
```

Using the ID variant is preferable as it uniquely identifies an action. Although the name might appear multiple times in your action collection, only the first action with the specified name is triggered.

5.16.3 ActionCanvas

The ActionCanvas endpoint allows you to retrieve all actions of a project, including information about their position, color, id etc.. An interactive demo page using this API can be found at <http://localhost:5004/>.

GET /api/v1/actioncanvas

This endpoints returns all actions of the currently loaded project. The property "actions" contains an array of all actions. The property *tabs* contains the information about the project tabs.

```
curl -s -X GET http://localhost:5004/api/v1/ActionCanvas | python -m json.tool
```

```
{
  "tabs": [
    {
      "name": "show",
      "isEditorOnly": false
    },
    {
      "name": "Startlist",
      "isEditorOnly": false
    }
  ],
  "selectedTabIndex": 0,
  "actions": [
    {
      "uuid": "a090e1c9-28ad-4c4f-976d-2727befe182d",
      "name": "Title Day 1",
      "type": "TEMPLATE",
      "actionType": null,
      "engineType": "VIZ",
      "xSector": 1,
      "ySector": 0,
      "widthSector": 1,
      "heightSector": 1,
      "tab": 0,
      "delay": 0,
    }
  ]
}
```



```

        "actionColor": "#65686B",
        "textColor": "#DBDCDD"
    },
    {
        "uuid": "95c0bc26-fb63-4ffe-becf-bd42db7ae5f8",
        "name": "Startlist",
        "type": "TEMPLATE",
        "actionType": null,
        "engineType": "VIZ",
        "xSector": 0,
        "ySector": 1,
        "widthSector": 1,
        "heightSector": 1,
        "tab": 1,
        "delay": 0,
        "actionColor": "#65686B",
        "textColor": "#DBDCDD"
    }
],
"project": "Skating"
}

```

5.16.4 DataMap

You can set, read and delete DataMap variables through the Web API. An interactive web application can be found at <http://localhost:5004/DataMap>.

GET /api/v1/datamap

Gets the list of all the key-value pairs.

```
curl -s -X GET http://localhost:5004/api/v1/DataMap | python -m json.tool
```

```

[
  {
    "key": "Hello",
    "value": "World!"
  },
  {
    "key": "WhiteListIPRanges",
    "value": "0.0.0.0/0"
  }
]

```

GET /api/v1/datamap/{key}

Gets the key-value pair identified by the specified key.

```
curl -s -X GET http://localhost:5004/api/v1/DataMap/key | python -m json.tool
```

```
{
  "key": "Hello",
  "value": "World!"
}
```

POST /api/v1/datamap

Adds a new key-value pair or an array of them to the DataMap. The payload must be sent as JSON body. If the key already exists the value will be updated.

```
curl -s -H 'Content-Type: application/json' -d '{"Key': 'Hello', 'Value': 'World!' }" -X POST http://localhost:5004/api/v1/DataMap
```

```
{
  "Key": "key",
  "Value": "hello"
}
```

DELETE /api/v1/datamap/{key}

Delete a key/value pair by sending a DELETE message, for example to delete "key2" use:

```
curl -s -X DELETE http://localhost:5004/api/v1/DataMap/key2 | python -m json.tool
```

```
200 OK
```

5.16.5 Playlist

You can read, trigger, preview and iterate through the playlist through the Web API. An interactive web application can be found at <http://localhost:5004/PlayList>.

GET /api/v1/playlist

Gets all the tabs:

```
curl -s -X GET http://localhost:5004/api/v1/PlayList | python -m json.tool
```

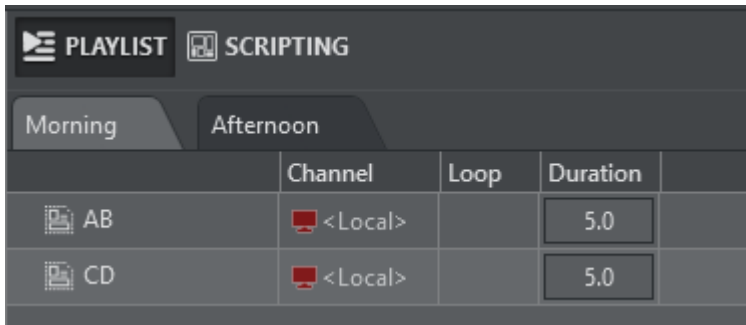
```
[
  {
```

```

"duration": 10.0,
"index": 0,
"name": "Morning",
"rows": [
  {
    "actionUUID": "b78801bd-c802-42dd-ae11-9955c53dbfe3",
    "duration": 5.0,
    "id": "aaf0b451-1bb6-4bae-b11d-3b0c5f552e36",
    "name": "AB"
  },
  {
    "actionUUID": "6dd3107a-9487-4f32-92a0-b7eb83a1328f",
    "duration": 5.0,
    "id": "58b51c71-a904-4c95-b5d8-f42184af025e",
    "name": "CD"
  }
]
},
{
  "duration": 15.0,
  "index": 1,
  "name": "Afternoon",
  "rows": [
    {
      "actionUUID": "27cc7a3b-6f90-4d88-9101-a356a1668d83",
      "duration": 5.0,
      "id": "7f284bd1-a727-4e26-aea8-f417010c5386",
      "name": "Opener"
    },
    {
      "actionUUID": "955a622a-862b-4206-9658-a48b0c9f9a7e",
      "duration": 5.0,
      "id": "f43b4470-d08c-4261-8fb2-58ef97c4db28",
      "name": "Closer"
    },
    {
      "duration": 5.0,
      "id": "483231c0-5484-478c-9bbc-74530dafa7cd",
      "loop": false,
      "name": "old",
      "rows": [
        {
          "actionUUID": "ae7d2e75-552f-40e7-8c3d-7a8ef716809a",
          "duration": 5.0,
          "id": "c542f3d4-53d3-4aa1-82d1-8e75ae86342b",
          "name": "Show Monitor"
        }
      ]
    }
  ]
}
]
}
]

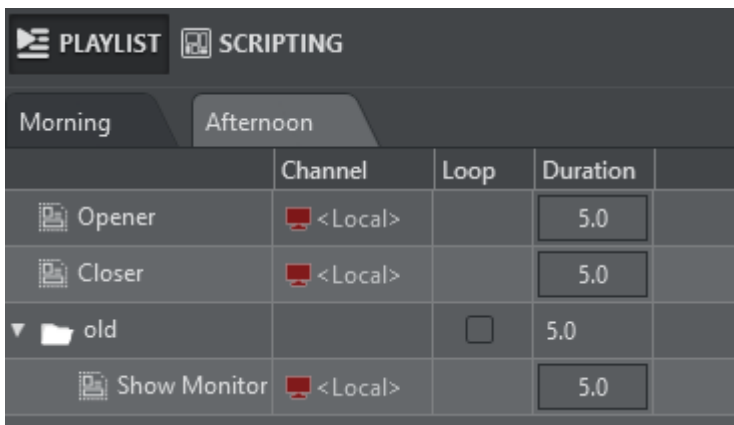
```

The GET method returns all Playlist tabs and their respective rows and folders.



	Channel	Loop	Duration
AB	<Local>		5.0
CD	<Local>		5.0

The screenshot above shows the query result for the "Morning" Playlist tab.



	Channel	Loop	Duration
Opener	<Local>		5.0
Closer	<Local>		5.0
old		<input type="checkbox"/>	5.0
Show Monitor	<Local>		5.0

The screenshot above shows the query result for the "Afternoon" Playlist tab.

GET /api/v1 /playlist/{index}

Gets the content of the playlist tab, by specifying its index:

```
curl -s -X GET http://localhost:5004/api/v1/PlayList/0 | python -m json.tool
```

```
{
  "duration": 10.0,
  "index": 0,
  "name": "Morning",
  "rows": [
    {
      "actionUUID": "b78801bd-c802-42dd-ae11-9955c53dbfe3",
      "duration": 5.0,
      "id": "17a6ee8d-8c82-4480-9bda-32e4b9447336",
      "name": "AB"
    },
    {
```

```

    "actionUUID": "6dd3107a-9487-4f32-92a0-b7eb83a1328f",
    "duration": 5.0,
    "id": "4580c837-69a9-41b4-95dc-29b05f1ae0d4",
    "name": "CD"
  }
]
}

```

Starting from index 0 this call returns a single playlist tab only.

5.16.6 PlaylistExecuter

The PlaylistExecuter endpoint allow you to execute and preview individual playlist elements identified by their id.

GET api/v1 /PlaylistExecuter/execute/{id}

Executes the playlist element identified by *id*.

```
curl -s -X GET http://localhost:5004/api/v1/PlaylistExecuter/execute/2628b63d-
e947-4ee6-9dd2-5c90525e2cf5 | python -m json.tool
```

200 OK

GET api/v1 /PlaylistExecuter/continue/{id}

Continues the playlist element identified by *id*.

```
curl -s -X GET http://localhost:5004/api/v1/PlaylistExecuter/continue/2628b63d-
e947-4ee6-9dd2-5c90525e2cf5 | python -m json.tool
```

200 OK

GET api/v1 /PlaylistExecuter/preview/{id}

Executes the playlist element identified by *id* on the preview channel.

```
curl -s -X GET http://localhost:5004/api/v1/PlaylistExecuter/preview/2628b63d-
e947-4ee6-9dd2-5c90525e2cf5 | python -m json.tool
```

200 OK

GET api/v1 /PlaylistExecuter/previewcontinue/{id}

Continues the playlist element identified by *id* on the preview channel.

```
curl -s -X GET http://localhost:5004/api/v1/PlaylistExecuter/previewContinue/2628b63d-  
e947-4ee6-9dd2-5c90525e2cf5 | python -m json.tool
```

```
200 OK
```

Playlist Controls on the Currently Selected Playlist

The following commands are invoked against the Playlist that is currently selected in Viz Arc:

GET api/v1 /playlistexecuter/executeCurrent

Executes the currently selected playlist element:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/executeCurrent
```

```
200 OK
```

GET api/v1 /playlistexecuter/continueCurrent

Continues the currently selected playlist element:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/continueCurrent | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/outCurrent

Takes out the currently selected playlist element (only for template actions):

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/outCurrent | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/previewCurrent

Executes the currently selected playlist element on the preview channel:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/previewCurrent | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/previewContinueCurrent

Continues the currently selected playlist element on the preview channel:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/previewContinueCurrent | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/previewOutCurrent

Takes out the currently selected playlist element on the preview channel (only for template actions):

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/previewOutCurrent | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/executeAndNext

Executes the currently selected playlist element and moves to the next playlist item:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/executeAndNext | python -m json.tool
```

```
200 OK
```

GET api/v1 /playlistexecuter/gotoFirst

Selects the first playlist item:

```
curl -s -X GET http://localhost:5004/api/v1/playlistexecuter/gotoFirst | python -m json.tool
```

```
200 OK
```

5.16.7 Projects

The Projects endpoint allows you to get a list of all available projects and to load a project.

GET api/v1/projects

Returns a list of all available Projects, first the projects located on the Graphic Hub, then the ones on the file system.

```
curl -s -X GET http://localhost:5004/api/v1/Projects | python -m json.tool
```

```
[
  {
    "name": "gh:Animations",
    "lastModified": "2023-05-09T13:53:32.4633996+00:00",
    "location": 1,
    "profileIndex": 0,
    "tabs": []
  },
  {
    "name": "local:Skating",
    "lastModified": "2023-05-11T07:53:51.80198+00:00",
    "location": 0,
    "profileIndex": 0,
    "tabs": []
  }
]
```

In the example above, two projects were found.

The name of the project is prefixed by the keywords "gh:" or "local:"; this prefix indicates whether the project is stored in the Graphic Hub or on the file system. Likewise, the "location" property indicates whether the project resides on Graphic Hub (value "1") or on the file system (value "0").

GET api/v1/projects/load/{name}

Loads the project with the specified *name* in Viz Arc. If the *name* does not contain the location prefix, then Viz Arc will try to retrieve the project by looking in the Graphic Hub, then the file system.

```
curl -s -X GET http://localhost:5004/api/v1/Projects/load/local:Skating | python -m json.tool
```

```
200 OK
```


GET `api/v1/projects/current`

Gets the name and location (*Local* or *GraphicHub*) of the currently loaded project.

```
curl -s -X GET http://localhost:5004/api/v1/projects/current | python -m json.tool
```

```
{
  "name": "local:Skating",
  "lastModified": "2023-05-11T07:53:51.80198+00:00",
  "location": 0,
  "profileIndex": 2,
  "tabs": [
    {
      "name": "show",
      "index": 0,
      "isEditorOnly": false,
      "actions": [
        {
          "uuid": "ff1ae771-4c69-42e4-ba8a-ad98747a5477",
          "name": "Logo",
          "type": "Template",
          "actionType": "TEMPLATE",
          "engineType": "VIZ",
          ...
        }
      ]
    }
  ]
}
```

5.16.8 Profiles

The Profiles endpoint allows you to retrieve information about the available Profiles, Channels and Engines.

GET `/api/v1/profiles`

Returns the entire list of profiles available in Viz Arc.

```
curl -s -X GET http://localhost:5004/api/v1/profiles | python -m json.tool
```

```
[
  {
    "name": "Local",
    "channels": [
      {
        "name": "Local",
        "type": 1,
        "engines": [
          {
            ...
          }
        ]
      }
    ]
  }
]
```

```

        "name": "localhost"
    }
],
"model": {
    "engineConfigTuple": [
        {
            "item1": {
                "name": "localhost",
                "ipAddress": "127.0.0.1",
                "port": 6100,
                "launcherPort": 5644,
                "webInterfacePort": 30010,
                "webSocketPort": 30020,
                ...
            }
        }
    ]
}

```

GET api/v1/profiles/{id | name}

Returns the profile specified by the *id* or *name*.

```
curl -s -X GET http://localhost:5004/api/v1/profiles/0 | python -m json.tool
```

```

{
  "name": "Local",
  "channels": [
    {
      "name": "Local",
      "type": 1,
      "engines": [
        {
          "name": "localhost"
        }
      ]
    },
    "model": {
      "engineConfigTuple": [
        {
          "item1": {
            "name": "localhost",
            "ipAddress": "127.0.0.1",
            "port": 6100,
            "launcherPort": 5644,
            "webInterfacePort": 30010,
            "webSocketPort": 30020,
            ...
          }
        }
      ]
    }
  ]
}

```

GET api/v1/profiles/current

Returns the currently selected profile.

```
curl -s -X GET http://localhost:5004/api/v1/profiles/current | python -m json.tool
```

```
{
  "name": "Local",
  "channels": [
    {
      "name": "Local",
      "type": 1,
      "engines": [
        {
          "name": "localhost"
        }
      ],
      "model": {
        "engineConfigTuple": [
          {
            "item1": {
              "name": "localhost",
              "ipAddress": "127.0.0.1",
              "port": 6100,
              "launcherPort": 5644,
              "webInterfacePort": 30010,
              "websocketPort": 30020,
              ...
            }
          }
        ]
      }
    }
  ]
}
```

5.16.9 Web API Access Control

It is possible to inhibit calls to the **PlayListExecuter** and the **ActionExecuter** APIs with the IP whitelisting

IP Whitelist

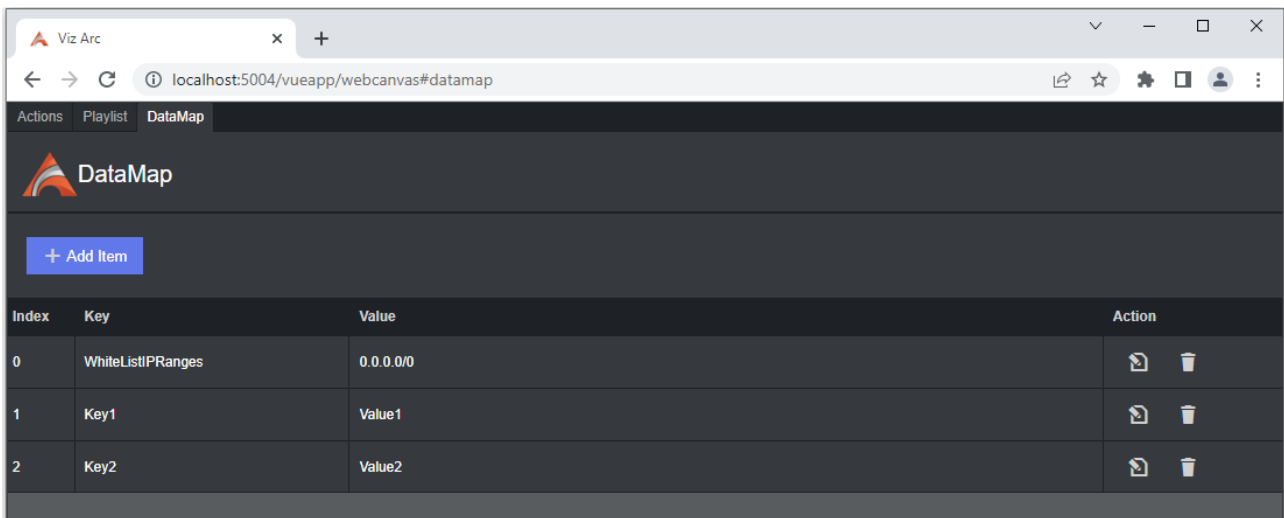
You can configure the IP addresses/ranges that are allowed to use the APIs. These have to be specified using a semi-colon (;) separated list of IP ranges (in CIDR notation). By default, the range is 0.0.0.0/0 which means all hosts can access the API.

The IP Whitelist can be configured in 3 different ways:

- Manually in the General Settings (under the [Communication](#) section)
- [Web Application](#)
- Scripting

Web Application Whitelist configuration

If you want to allow only two machines with IP addresses (e.g. *192.168.1.100* and *192.168.1.142*) you can specify them by reaching the page <http://localhost:5004/DataMap> and set the value of the **WhiteListIPRanges** key, as in the snapshot below.



Scripting Whitelist configuration

set Whitelist IP's through scripting

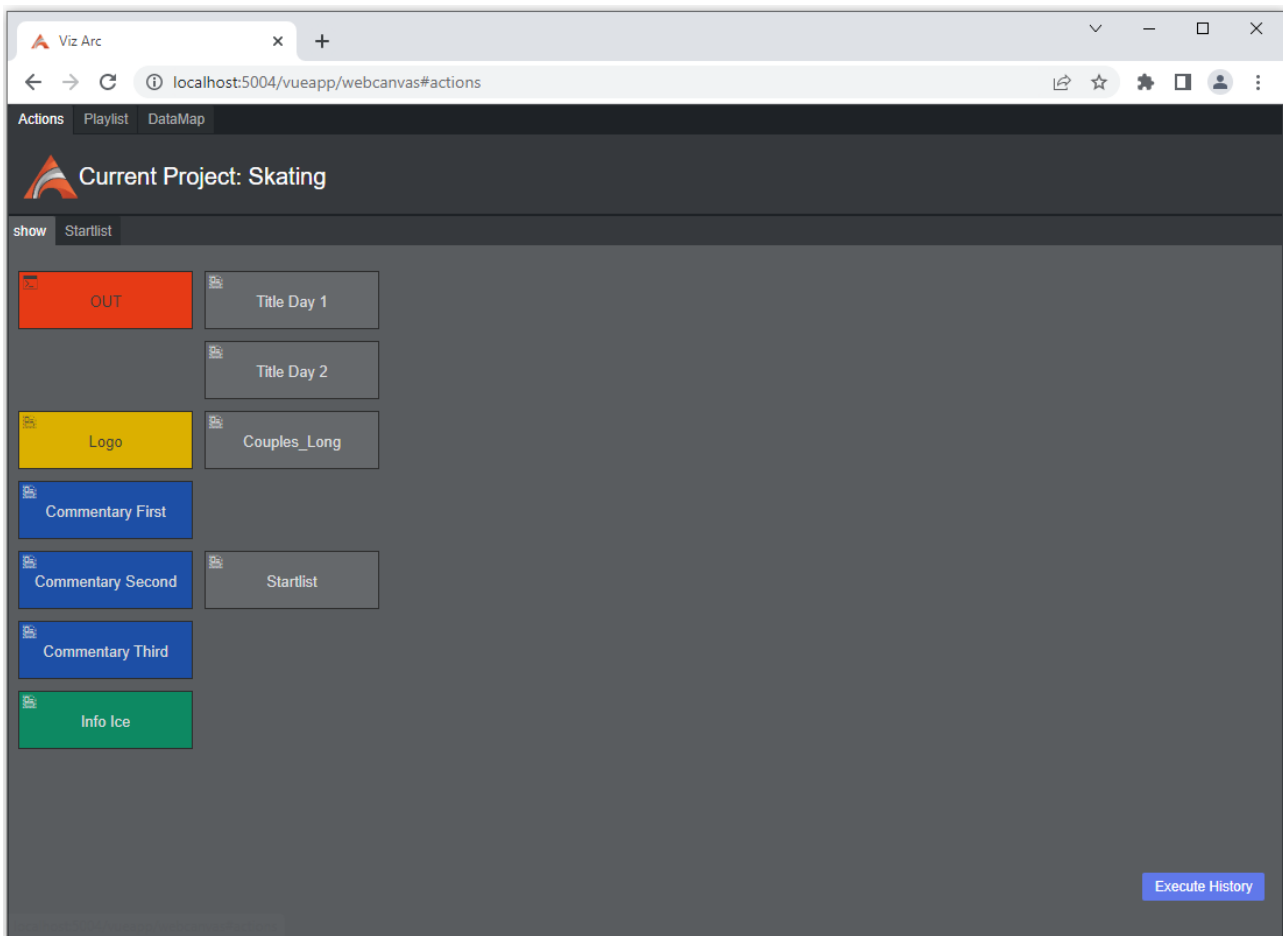
```
SetData("WhiteListIPRanges", "192.168.1.100;192.168.1.142")
```

5.16.10 Web Application Sample Usage

When Viz Arc starts up, it also launches an internal web server which host a Web Application that makes use of most of the APIs described above.

Actions

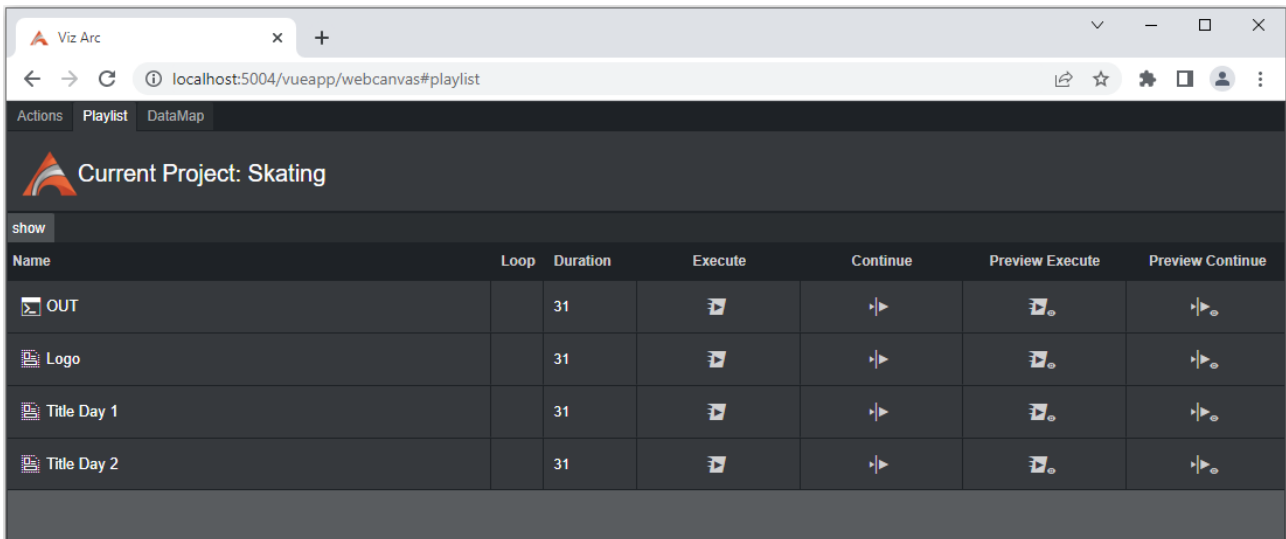
Navigate to <http://localhost:5004/> (the port can be configured in the General Settings, under the **Communication** section) to see the currently loaded project in Viz Arc. For example:



You can click any of the tabs to see a simplified version of the actions. Click any action to execute it.

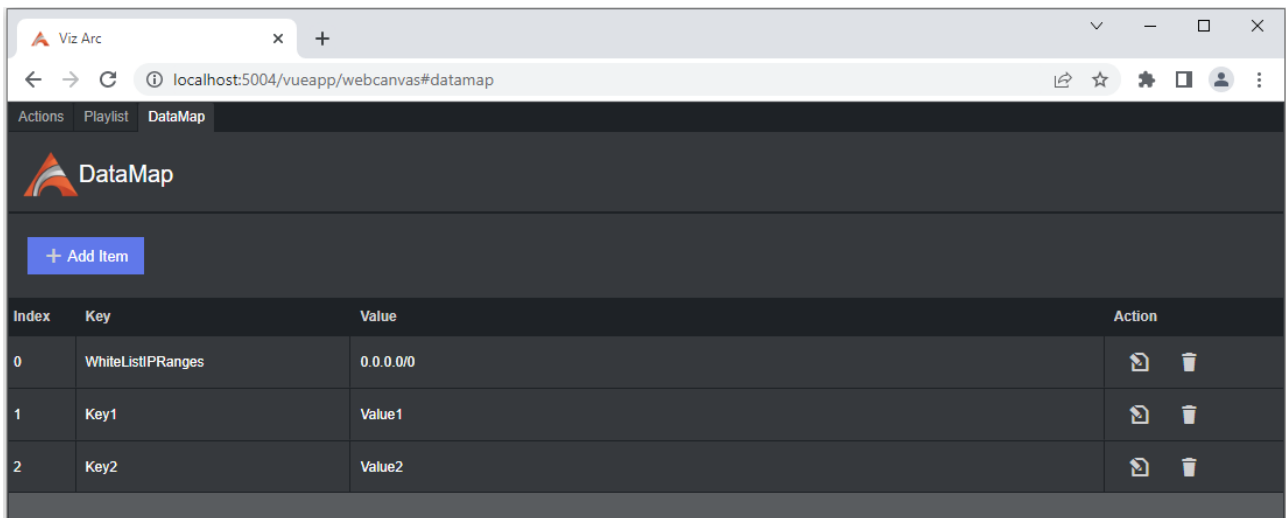
PlayList

Click the **PlayList** tab to see and trigger all available playlists and their elements:



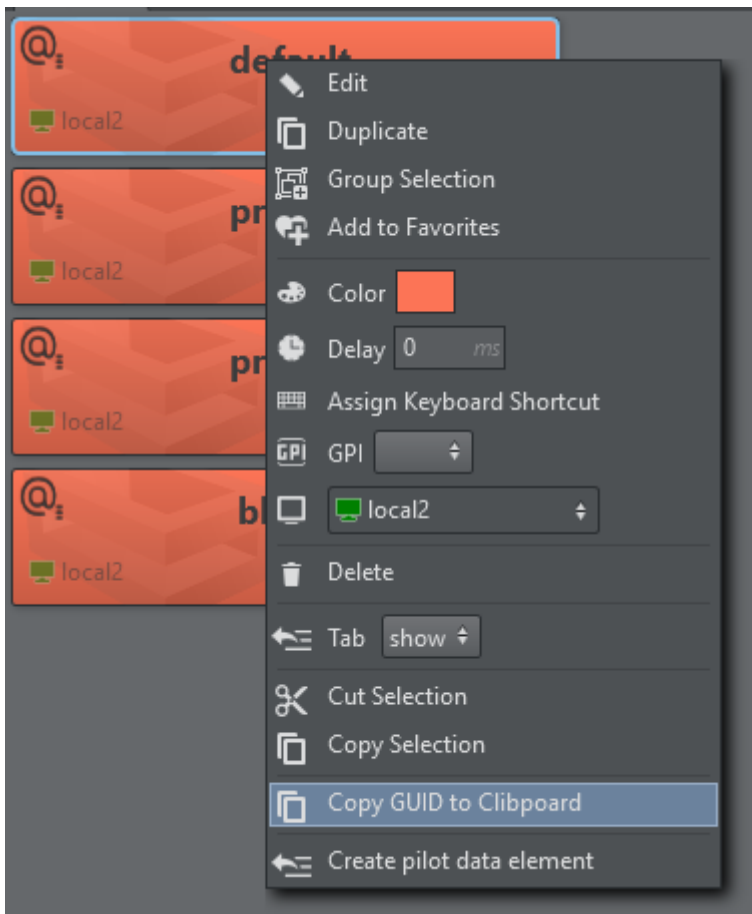
Datamap

Click the **DataMap** tab to view the current DataMap. From here you can add, delete or modify any DataMap variable.

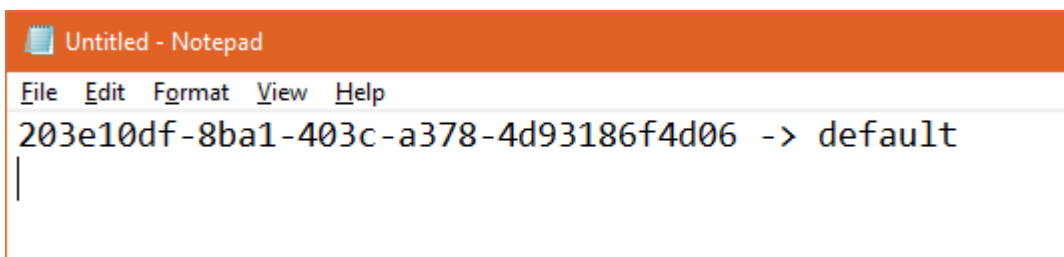


Triggering a Viz Arc Action from a Web Browser

You can easily trigger a Viz Arc action for the currently loaded project using its GUID or just its name. First, get the GUID and name from the action:



The GUID is now copied to the clipboard from where you can easily paste it anywhere else (for example, to notepad):



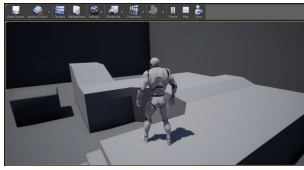
Typing <http://localhost:5004/api/v1/ActionExecuter/203e10df-8ba1-403c-a378-4d93186f4d06> or <http://localhost:5004/api/v1/ActionExecuter/default> triggers the action.

Info: Be aware that triggering only works when Viz Arc is running and when the project that contains the requested Action is open.

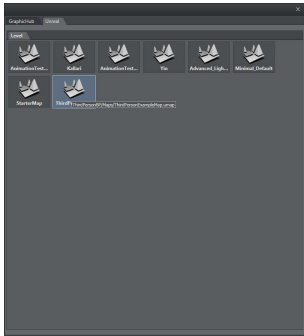
5.17 Working With Unreal Engine

Viz Arc lets you import Unreal Levels from a specific project (selected and opened manually in Unreal Engine software).

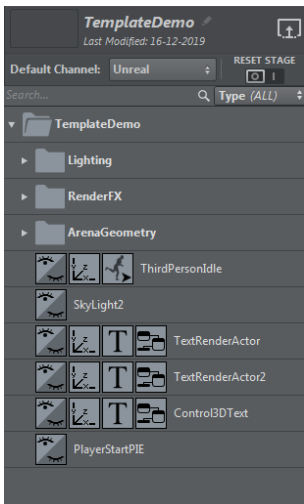
Note: Please see [Configuring Profiles](#) to correctly configure Unreal Engine in Viz Arc.



First, open the Unreal Engine software and select a project. Once the project is loaded, click the **Play** button to switch to Play mode.



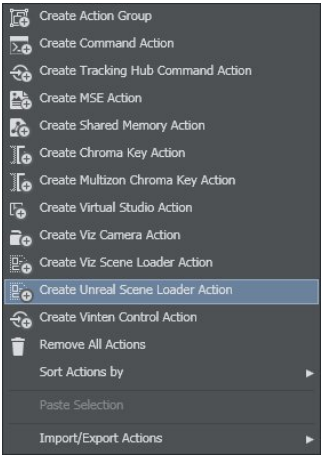
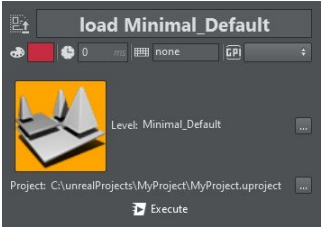
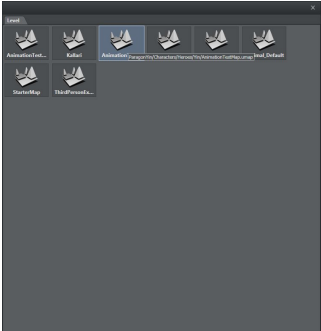
In Viz Arc, click the **ADD SCENE** icon on the left side of the window and select the Unreal panel.



Once selected, you need to load the scene by clicking the **LOAD SCENE** icon in order to retrieve details.

Double-click the **root** folder to show the list of elements.

To create an action, drag and drop available content from the tree into the actions area.

	<p>Load an Unreal scene by right-clicking on an empty space in the actions area.</p>
	<p>Once the relative action has been created, in edit mode, click Select Unreal Level to open the browse window.</p>
	<p>Select the desired level and double-click it to load.</p>

See Also

- [Supported Unreal Actions](#)

5.17.1 Supported Unreal Actions

Viz Arc recognizes the following types of Unreal actions:

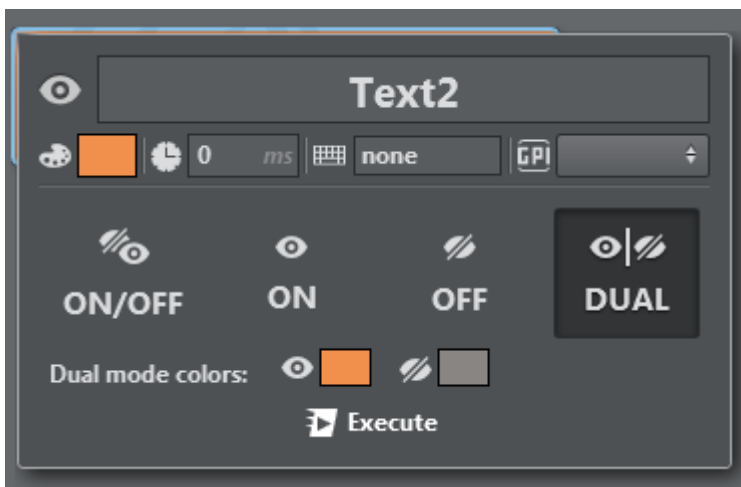
- [Scene Loader](#)
- [Active](#)
- [Position/Rotation/Scaling](#)
- [Sequence](#)
- [Animation](#)
- [Text](#)
- [Mesh](#)
- [Presets](#)

- [Blueprint](#)
- [Level Blueprint](#)
- [Dispatcher](#)

Scene Loader

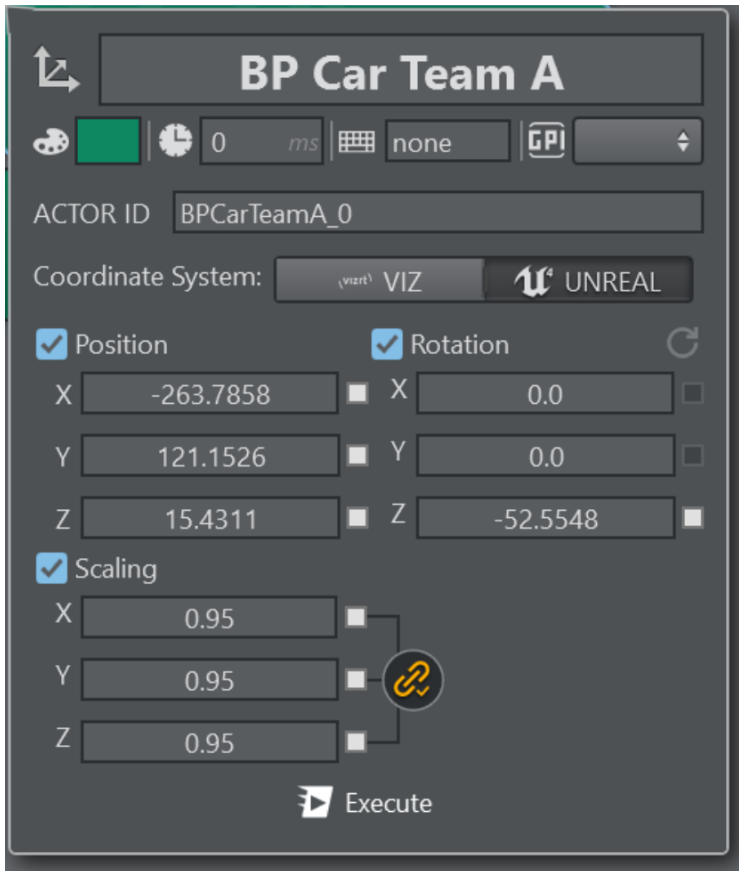
Read more about the [Unreal Scene Loader](#).


Active



Active action lets you switch a container to visible or invisible. It's possible to set the container to **ON**, **OFF** or **TOGGLE** between the two.

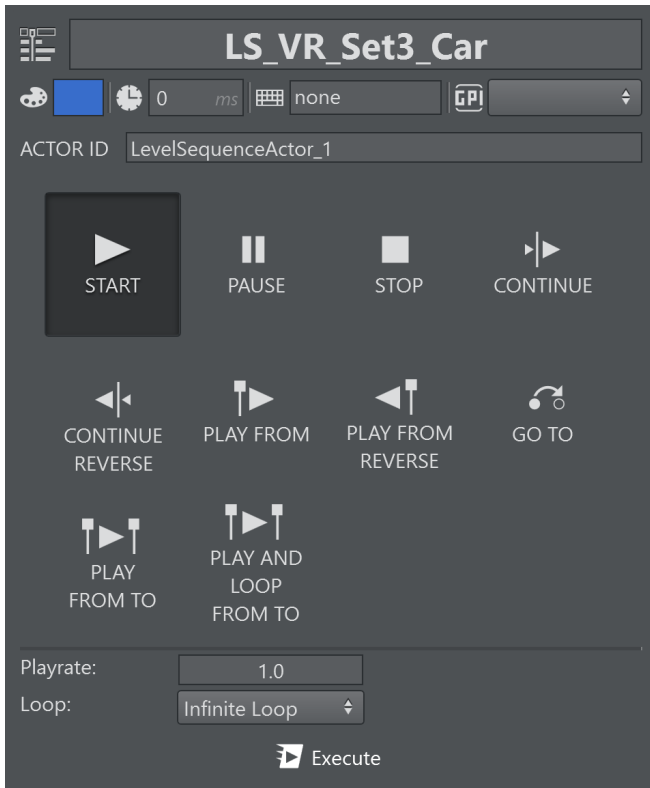
Position/Rotation/Scaling



This action lets you set the position, rotation and scaling of the selected container. It's also possible to scale proportionately by clicking the **lock** icon  next to the scaling panel.




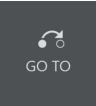


The coordinate system toggles the behavior of the positional XYZ axis, the default **UNREAL** is a Z-up left-hand system, while **VIZ** is Y-up right-hand system. It might come handy to use the Vizrt coordinate system when objects needs to be positioned relative to each other in the two engines.

Sequence

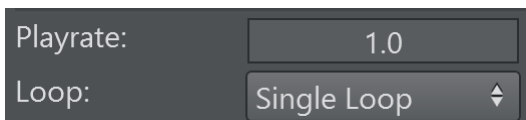


A Sequence action lets you control a sequence level created in Unreal Editor:

	<p>START animation.</p>
	<p>PAUSE an animated director.</p>
	<p>STOP an animated director.</p>
	<p>CONTINUE an animation to the next step.</p>

	CONTINUE in REVERSE mode.
	PLAY from a specific KEYFRAME .
	PLAY from a specific keyframe in REVERSE mode.
	GO directly to a specific KEYFRAME .
	PLAY from a specific keyframe to a specific keyframe.
	PLAY from a specific keyframe and then loop between two specific keyframes.

The play-rate and the number of loops can be set on any play action selected.

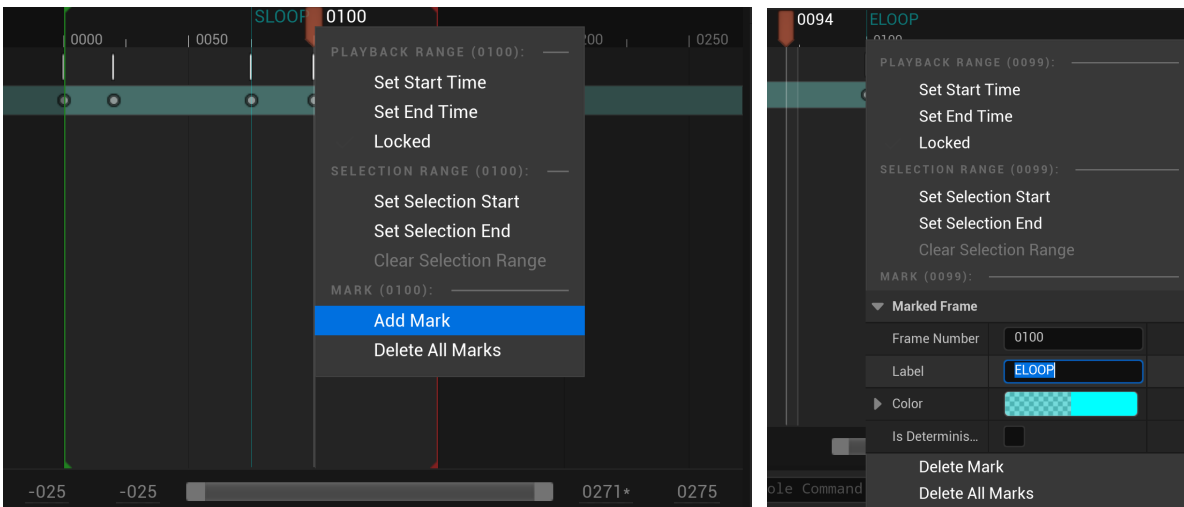


A play-rate of **1.0** represents normal playback rate while a play-rate of **2.0** means double playback speed. Select as loop mode either **Single Loop**, **Multiple Loops** (specifying the number of loops) or **Infinite Loop**.

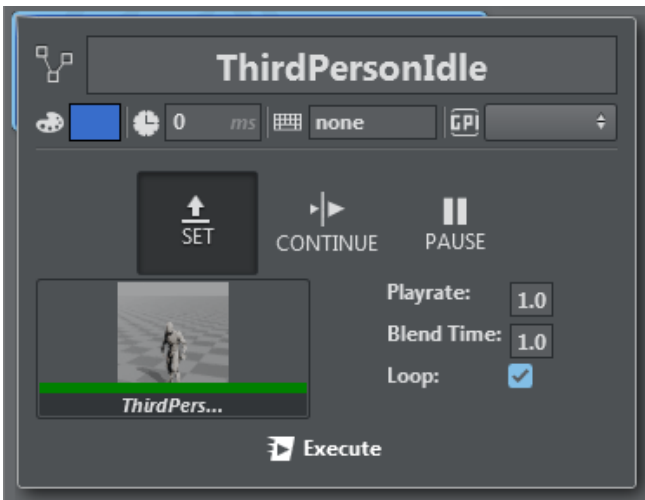
Clicking **PLAY FROM**, **PLAY FROM REVERSE**, **GO TO**, **PLAY FROM TO** or **PLAY AND LOOP FROM TO** makes a menu appear where you can set the position in **frames**, **seconds** or as a **marker**.



A **Mark** can be set on the unreal sequencer editor by right clicking the timeline and selecting **Add Mark** or in case a marker already exists, its label and position can be modified.

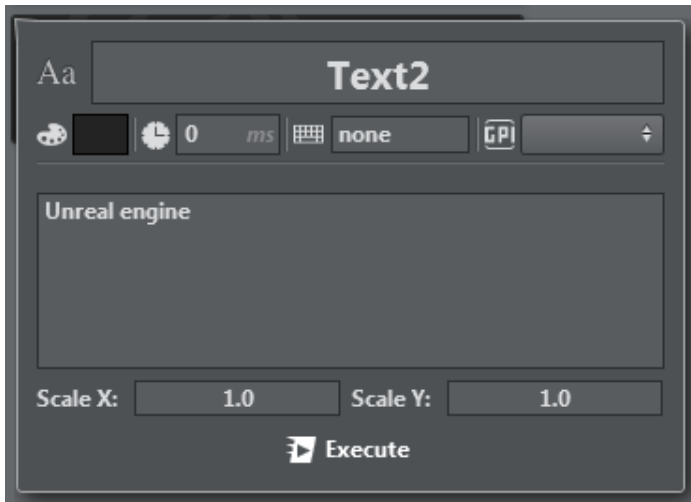


Animation



Animation action lets you assign an animation to the selected Unreal actor or browse a custom animation from those available by clicking the **Animation** icon. Animations can also be played, continued, stopped and/or looped.

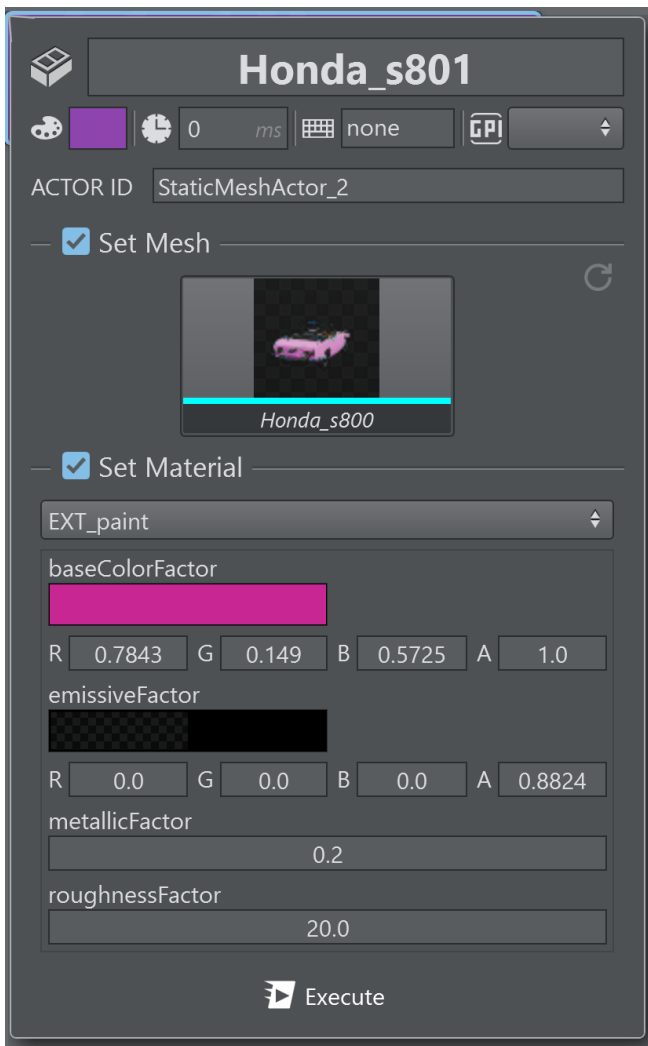
Text



Text action lets you modify a text element in an Unreal level and set X and Y scaling.

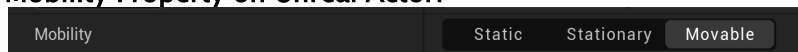
Mesh

This action lets you change the static mesh and the material properties of a **Static Mesh Actor**.



Use the checkbox **Set Mesh** when the action should set the static mesh and check the **Set Material** when the action should set any specific material property.

Mobility Property on Unreal Actor:

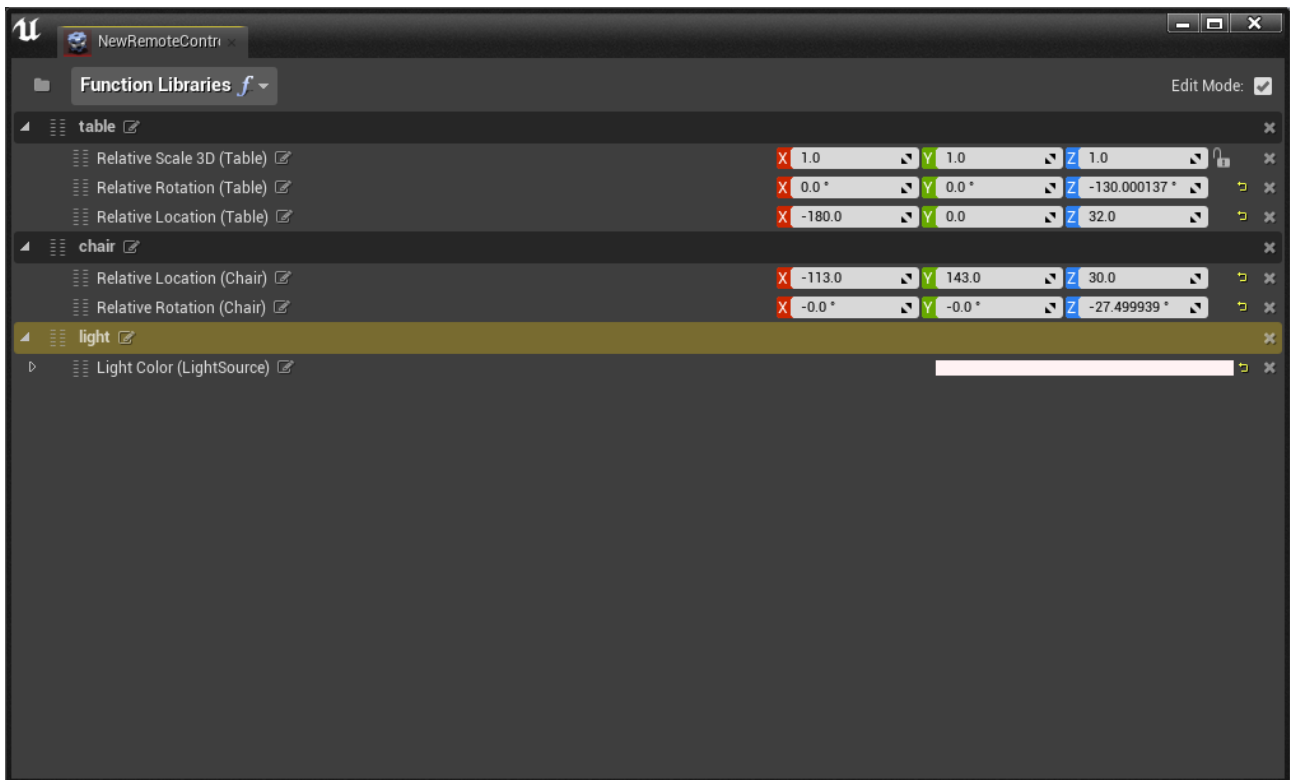


The mobility attribute on the unreal actor needs to be either **Movable** or **Stationary** to make the mesh editable.

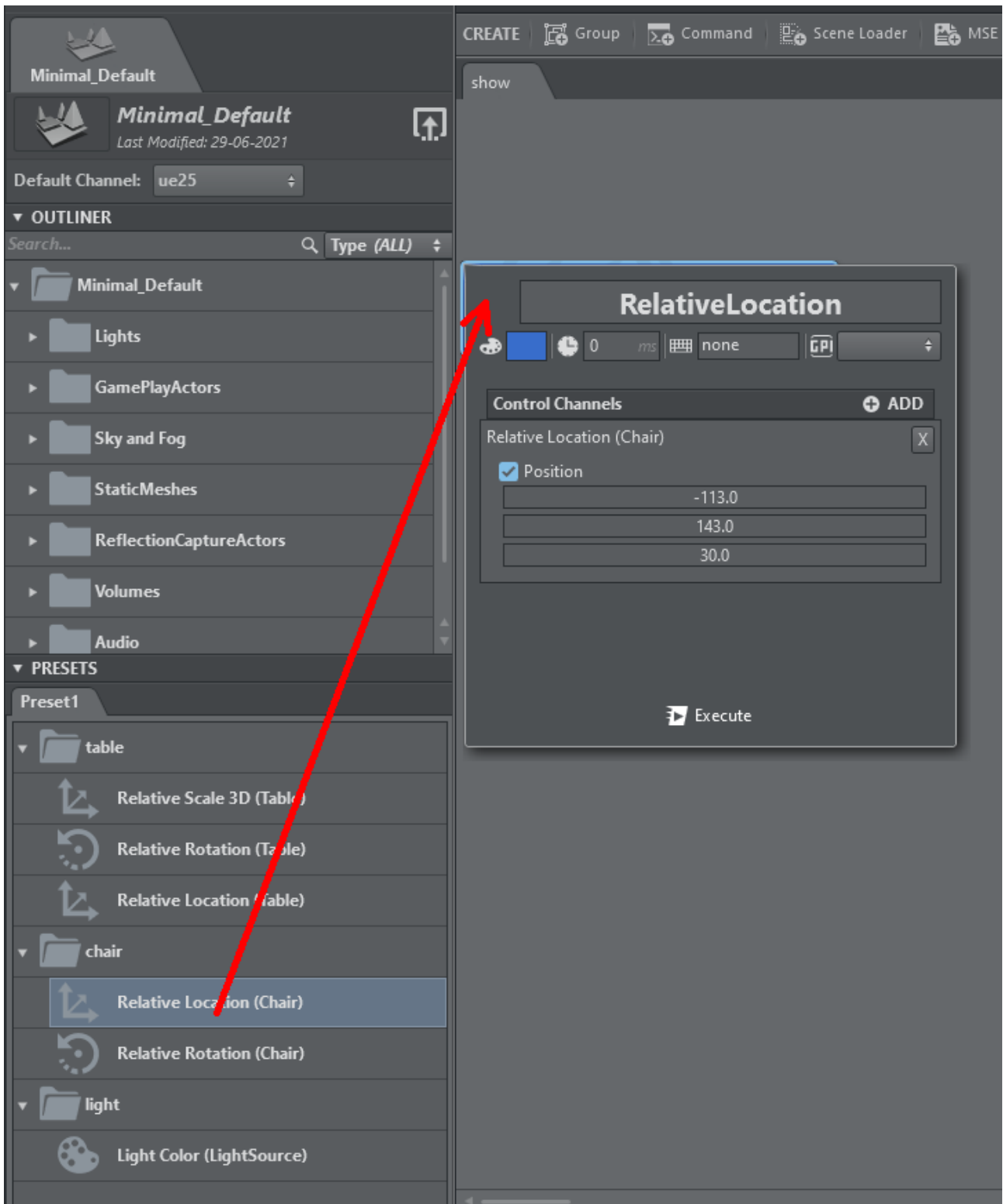
Presets

Unreal Engine Version 4.26 introduces [Remote Control Presets](#) . This allows the user to tag easily attributes on the outliner to be exposed to external control applications. Those presets can be set using a **Preset Action**.

A preset on the Unreal Engine might look like this, exposing transformations of object and a light color.



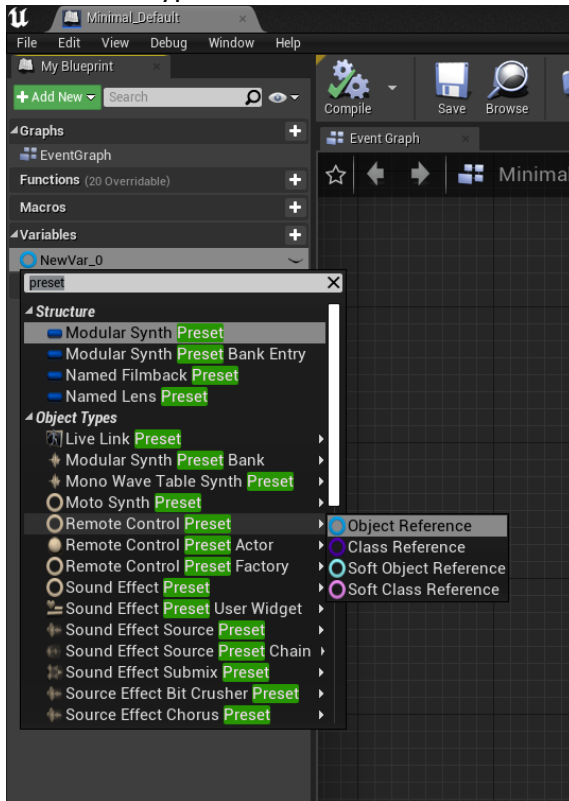
When loading a level into Viz Arc, additionally to the outliner, the presets are displayed below in the **PRESETS** panel.



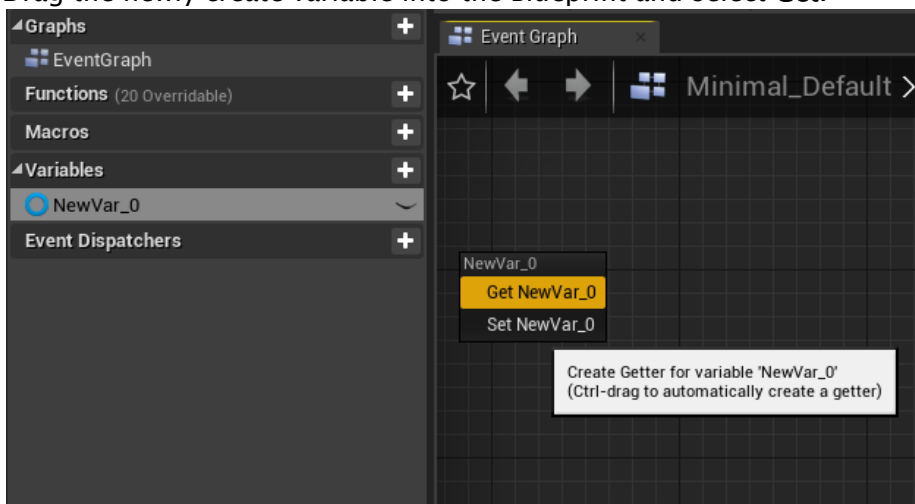
Drag any of the presets to the action canvas to create a **Preset Action**.

Presets do not work by default in game mode when not launched from the editor. Use the following steps to make sure presets are responsive and working when the Unreal Engine is launched in game mode only.

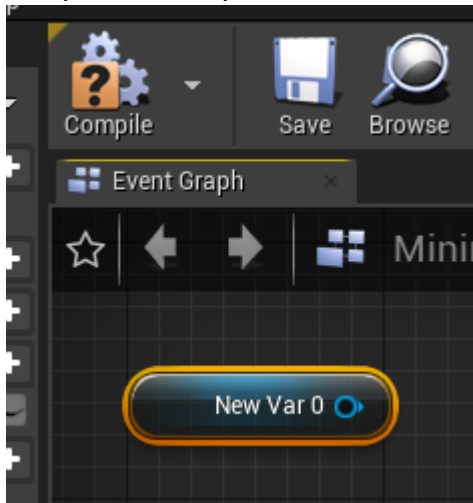
- After creating a preset, open any Blueprint (for example, the level Blueprint) and add a Variable of type **Remote Control Preset > Object Reference**.



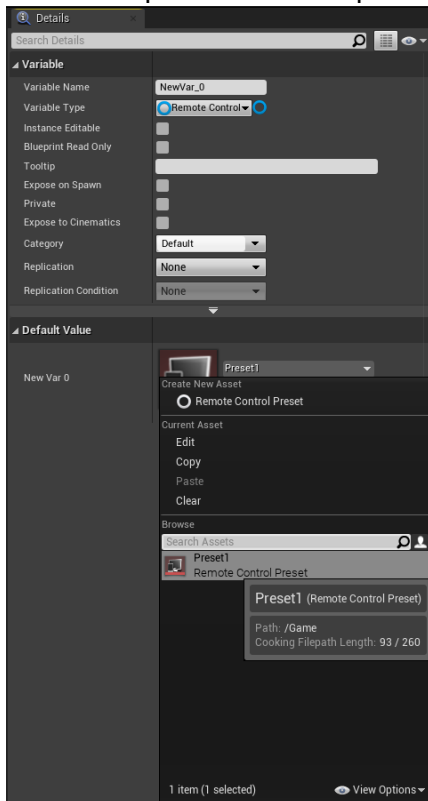
- Drag the newly create variable into the Blueprint and select **Get**.



- Compile the Blueprint.



- Create the preset in the map as a default value and save the Blueprint and level.



The map now references the preset and loads it when the engine is launched in game mode. Make sure that `-RCWebControlEnable` `-RCWebInterfaceEnable` are added to the `UELoaderCommandLine` registry variable of the Unreal launcher.

Unreal Engine's Binding Address: By default, the Unreal Engine's web interface binds to the local network interface only, such that only 127.0.0.1 or localhost addresses work with the **Preset Action**. To start the web service on all available network interfaces add this section to the *DefaultEngine.ini* of your Unreal project:

```
[HTTPServer.Listeners]
```

```
    DefaultBindAddress
```

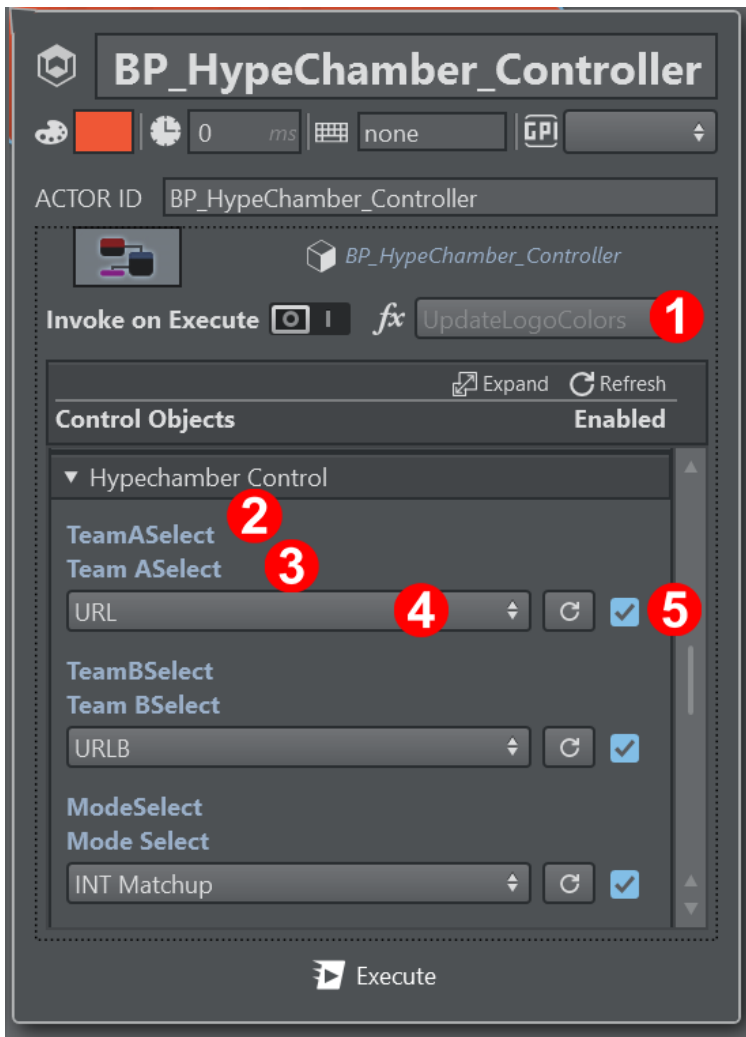
```
    =
```

```
    0.0.0.0
```

For more information, see the <https://docs.unrealengine.com/5.0/en-US/remote-control-quick-start-for-unreal-engine/>.

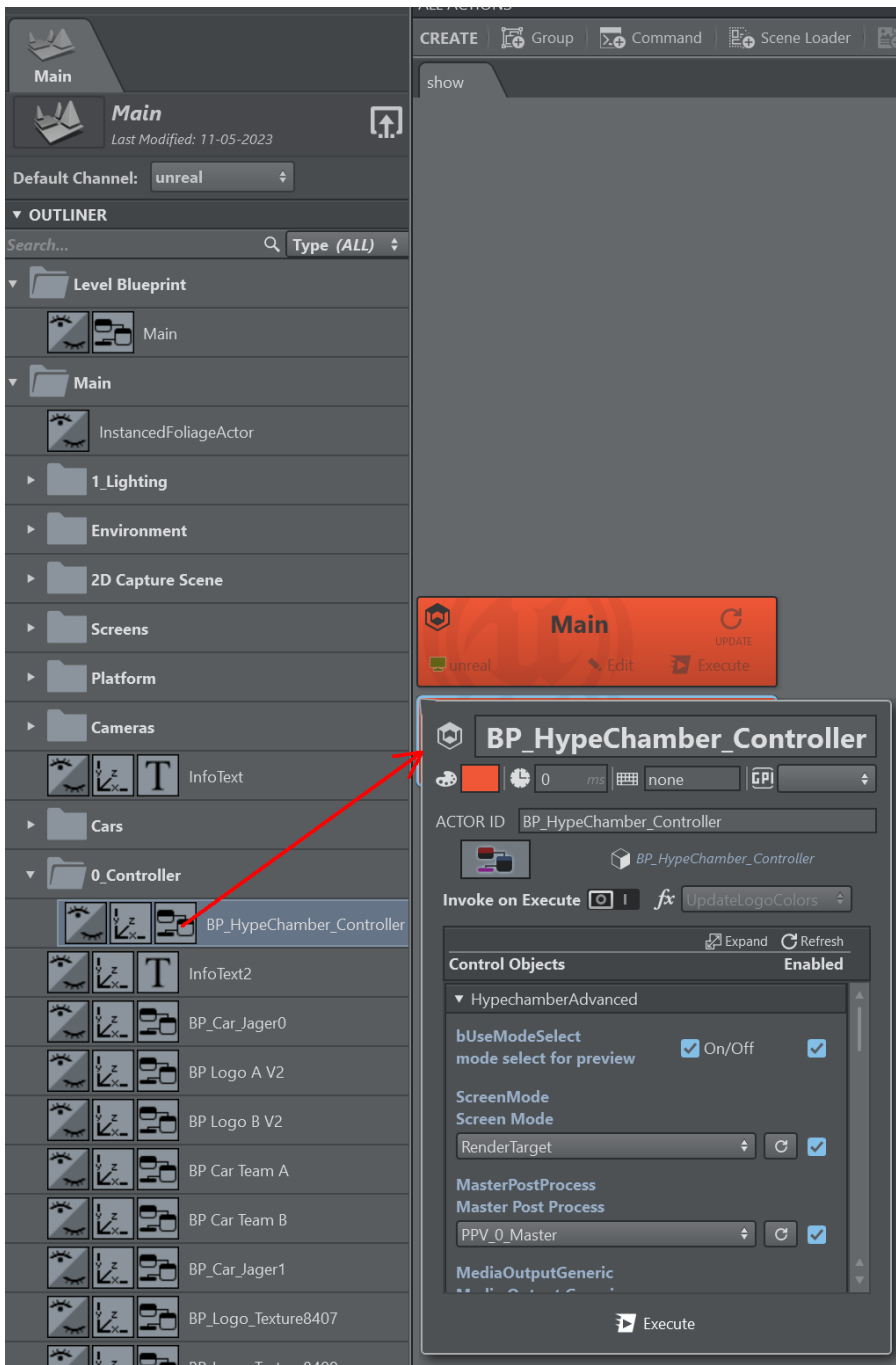
Blueprint

A Blueprint action can be used to set public Blueprint variables and invoke functions on it.

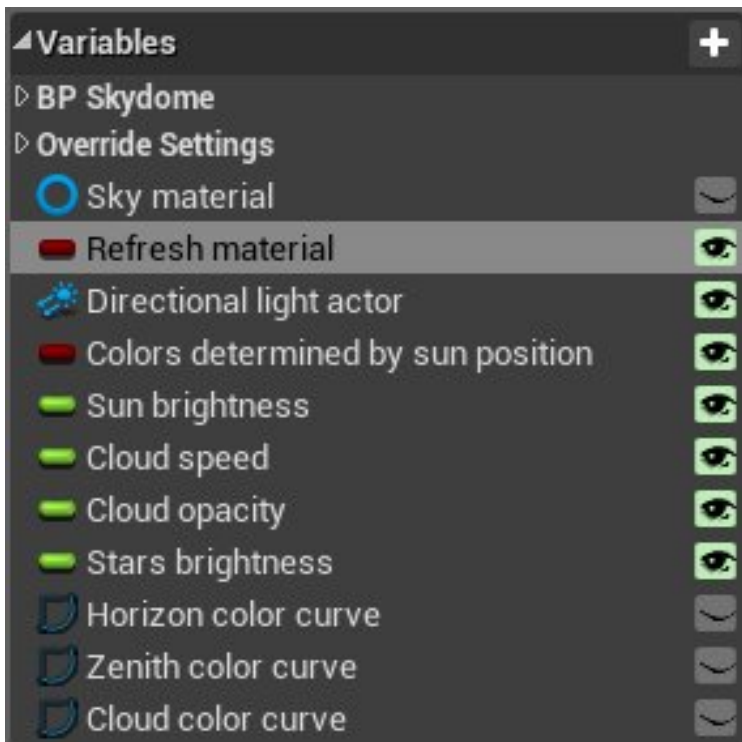


1. If enabled, the function to be called when executing this action
2. The variable name
3. The Tooltip of the variable
4. The actual value
5. Enable or disable setting this variable

A **Blueprint Action** can be created by dragging and dropping the blueprint icon from the outliner to the action canvas. The **Level Blueprint** can be found in the outliner view under the **Level Blueprint** folder.



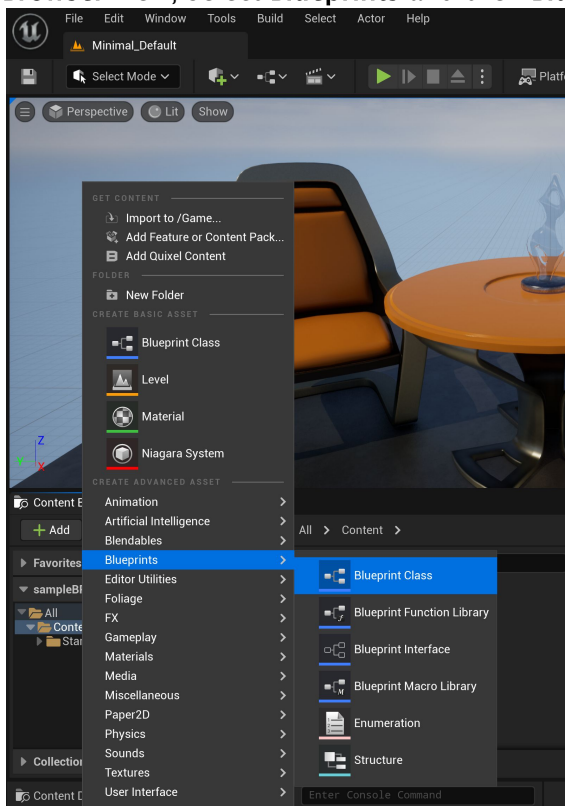
Blueprint action contains a list of visible values (set as **public** and **editable** in Unreal). To make these values visible and accessible to Viz Arc, you must activate them in the Blueprint window:



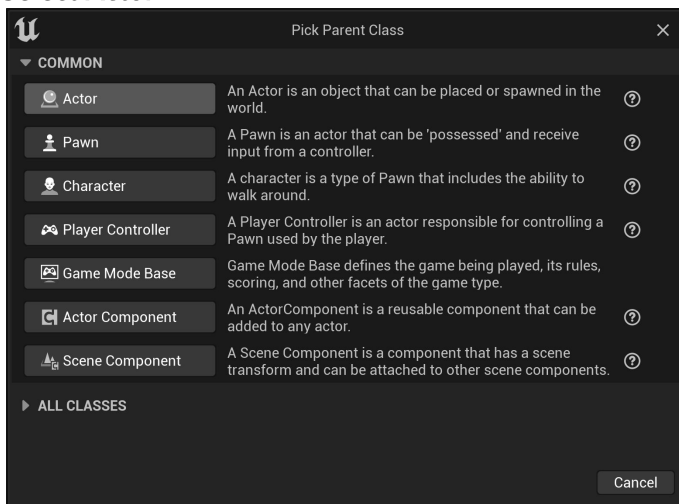
To Trigger Blueprint Values

It's possible to trigger values from Viz Arc into Unreal's Blueprint. This section describes the procedure step-by step. In this sample, an integer value is set from Viz Arc and displayed in the render output of the Unreal Engine.

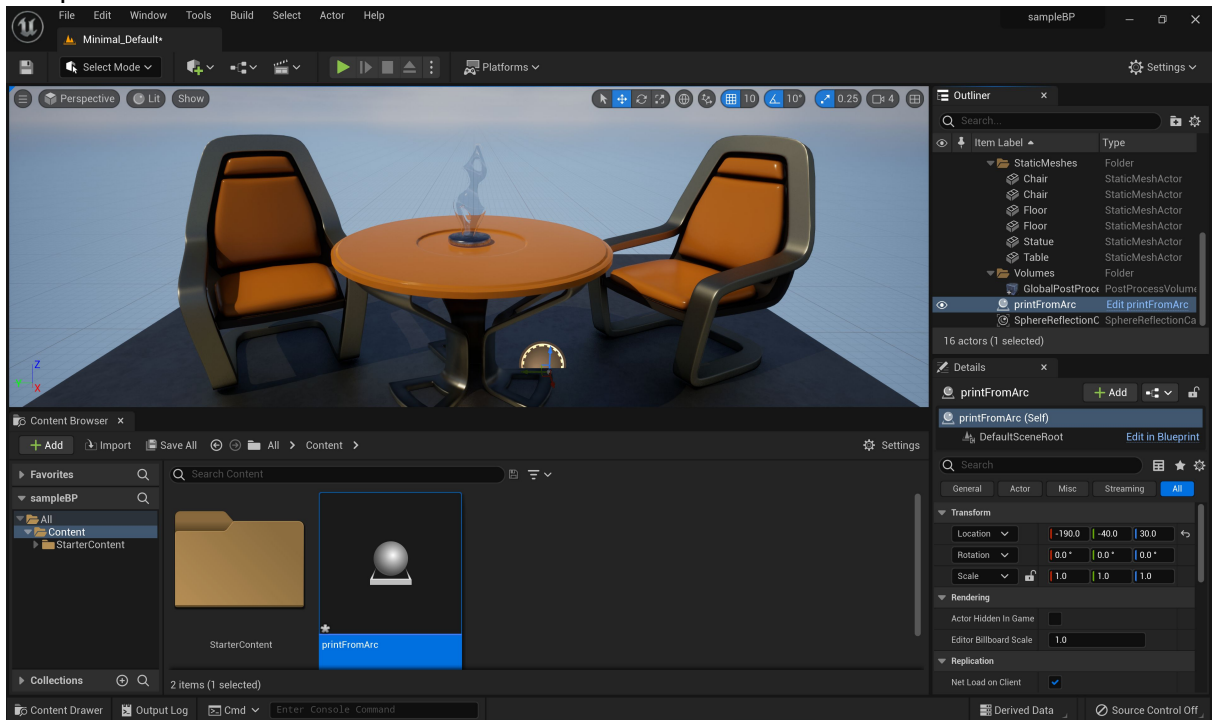
- First, add a Blueprint Class to the project content by clicking the **Add** button in the **Content Browser** view, select **Blueprints** and then **Blueprint Class**.



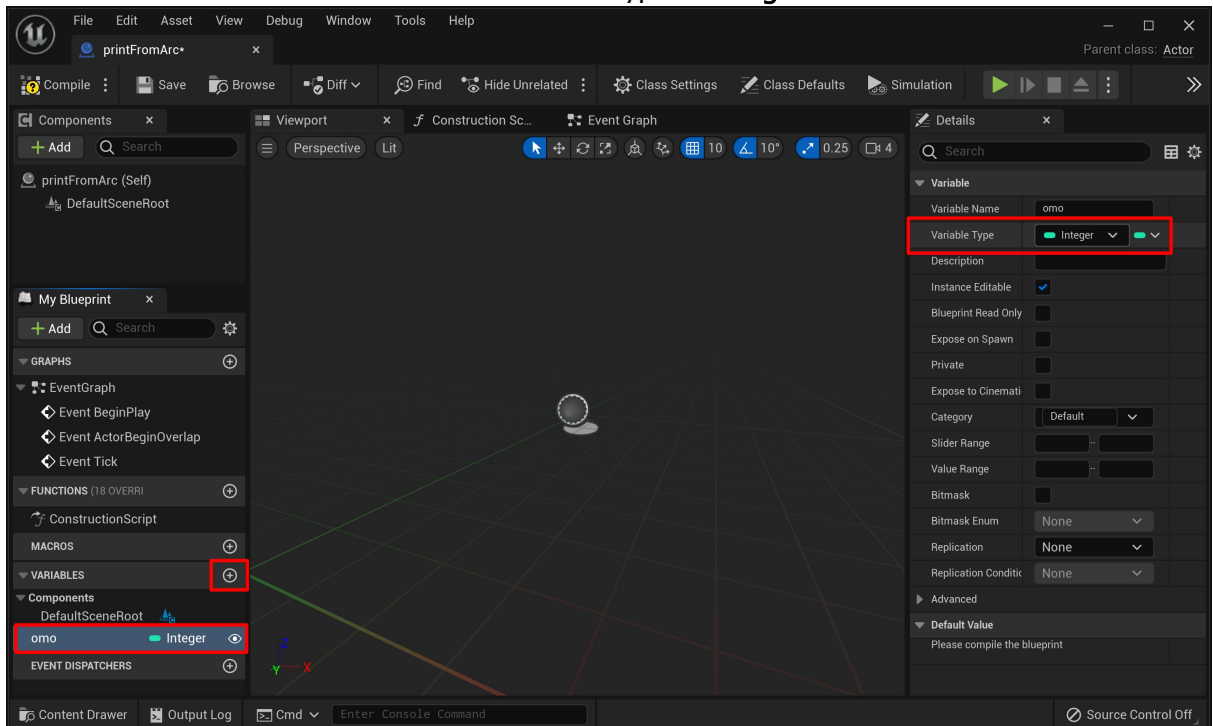
- **Select Actor.**



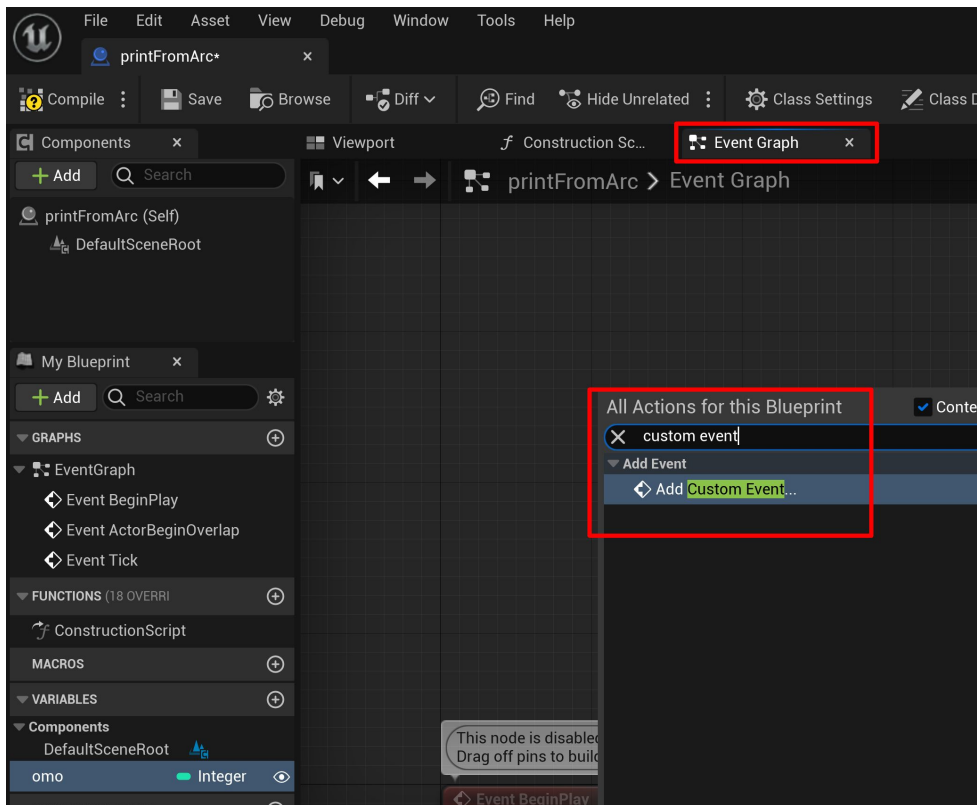
- Rename the new Blueprint (for example, *printFromArc*), then drag and drop it to the render viewport.



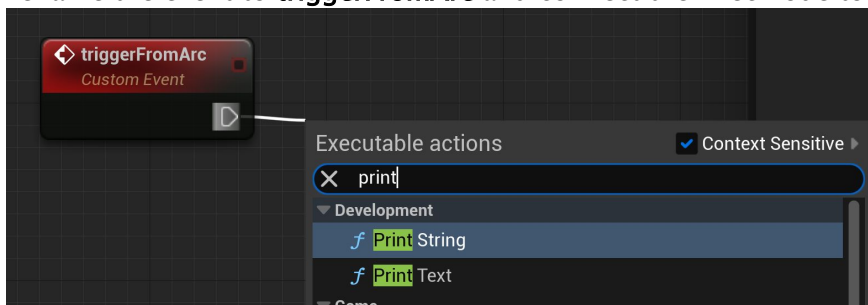
- Open the Blueprint by clicking on the **Edit printFromArc** link in the Outliner view. Create a new variable and rename it to **omo** and set the type to **Integer**.



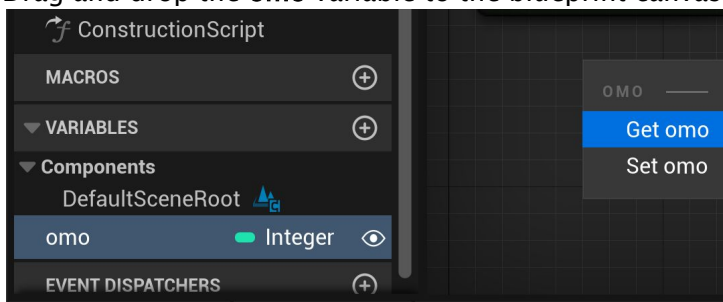
- Select the **Event Graph** tab and right click on the blueprint canvas and create a new **Custom Event**.



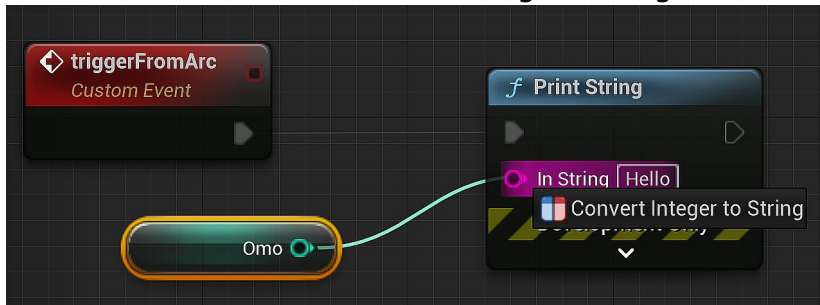
- Rename the event to **triggerFromArc** and connect the Exec node to a **Print String** node.



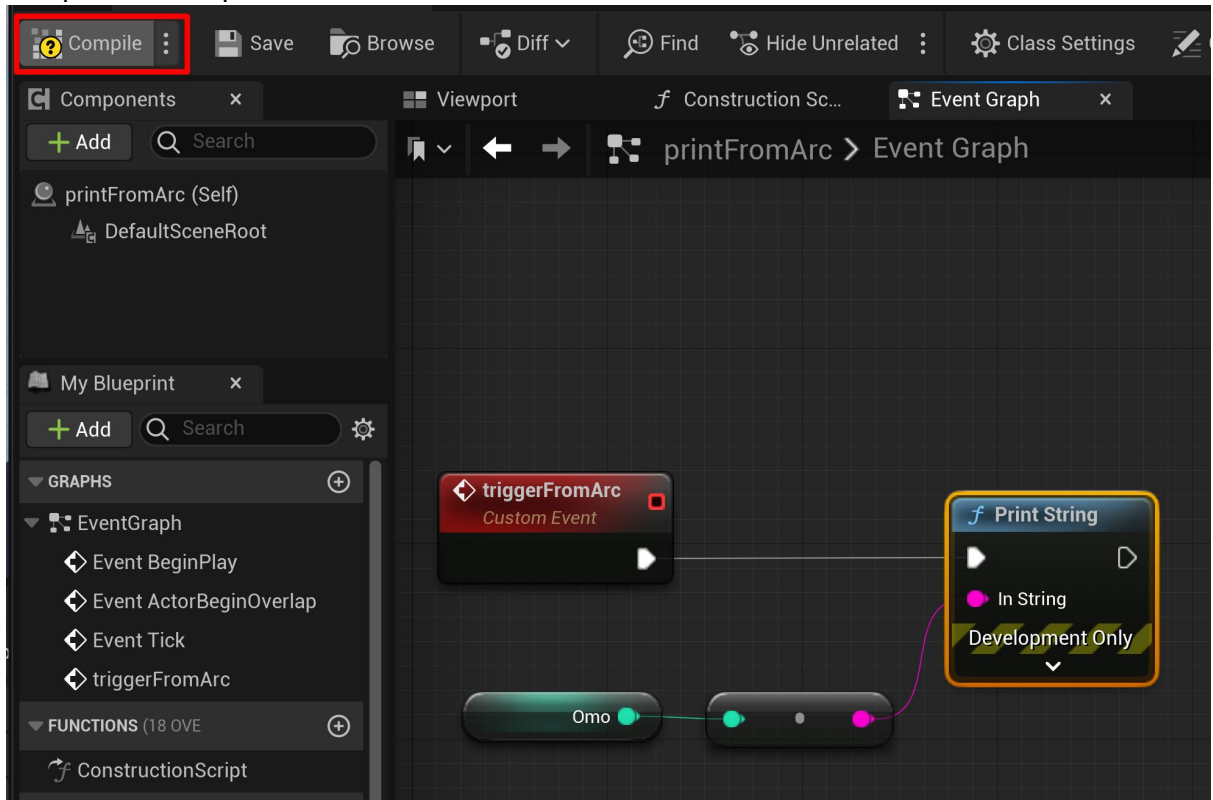
- Drag and drop the **omo** variable to the blueprint canvas and select **Get**.



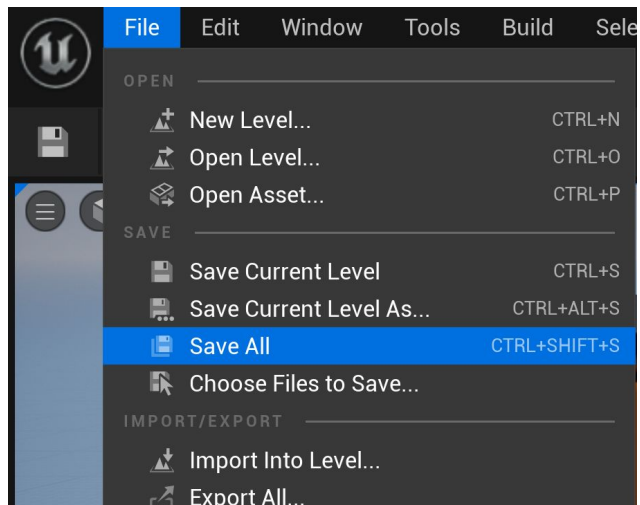
- Connect the **omo** node to the **Print String's In String** connector.



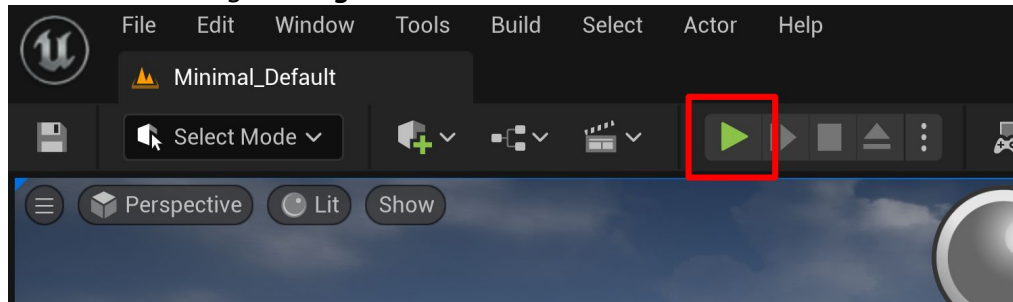
- Compile the Blueprint and close the window.



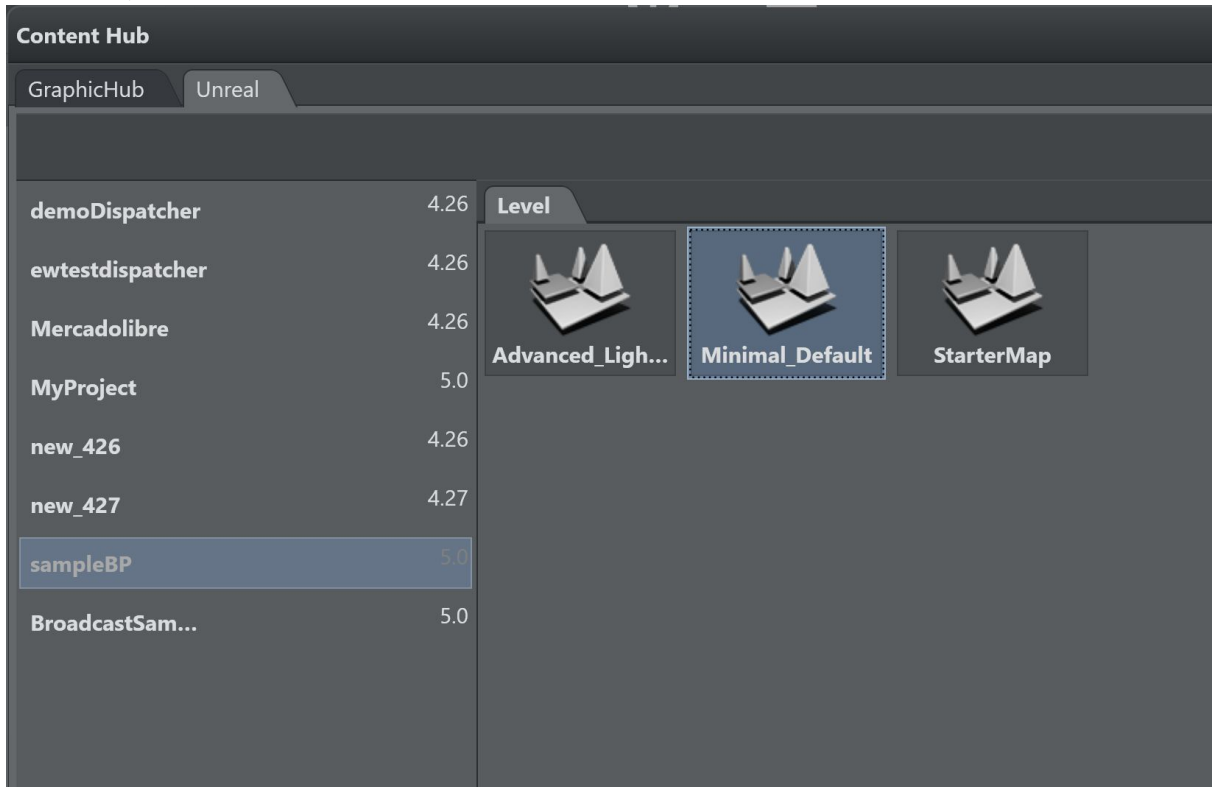
- Save the level.



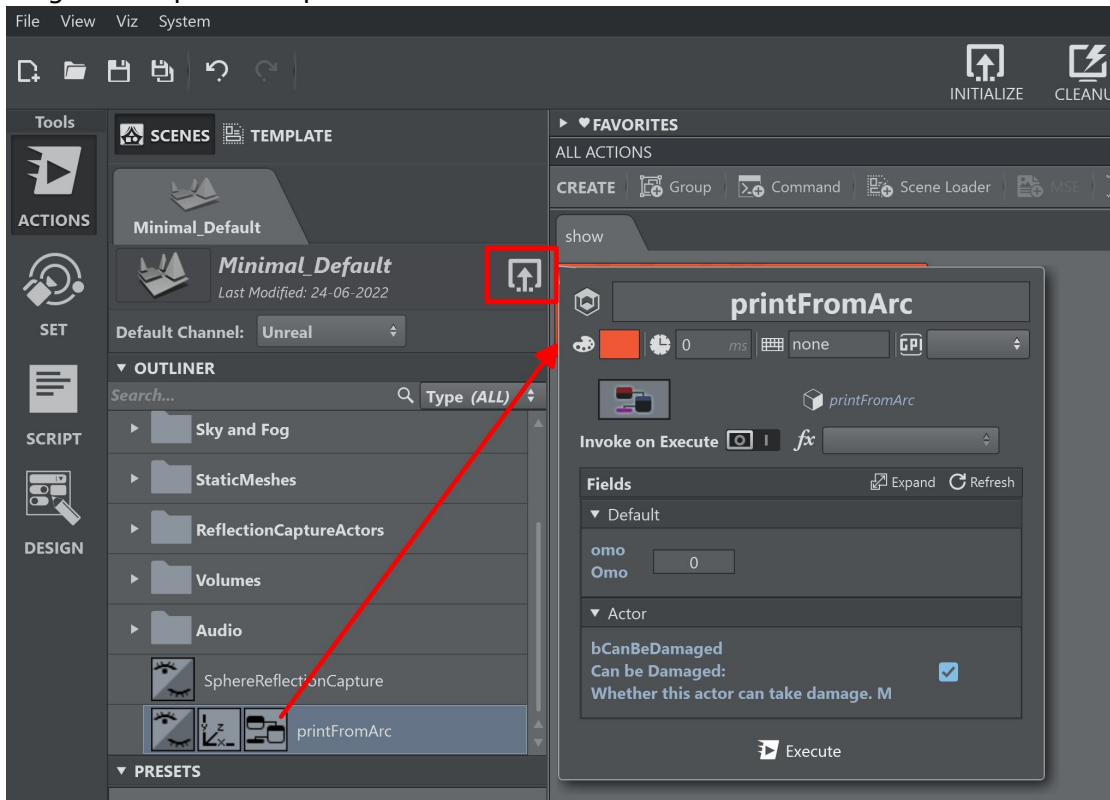
- Put the Unreal Engine into **game mode**.



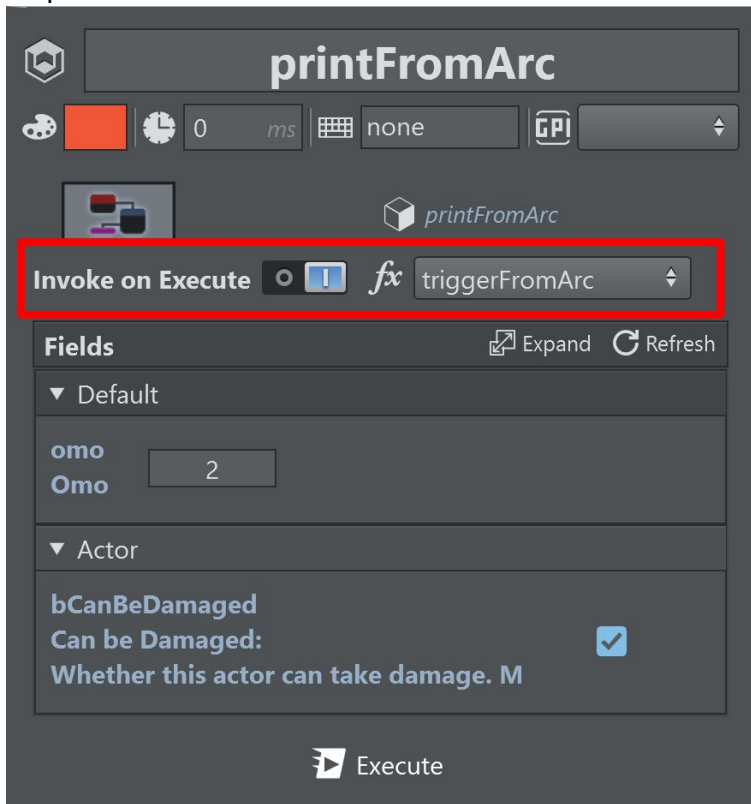
- In **Viz Arc**, select saved level and load the level outliner.



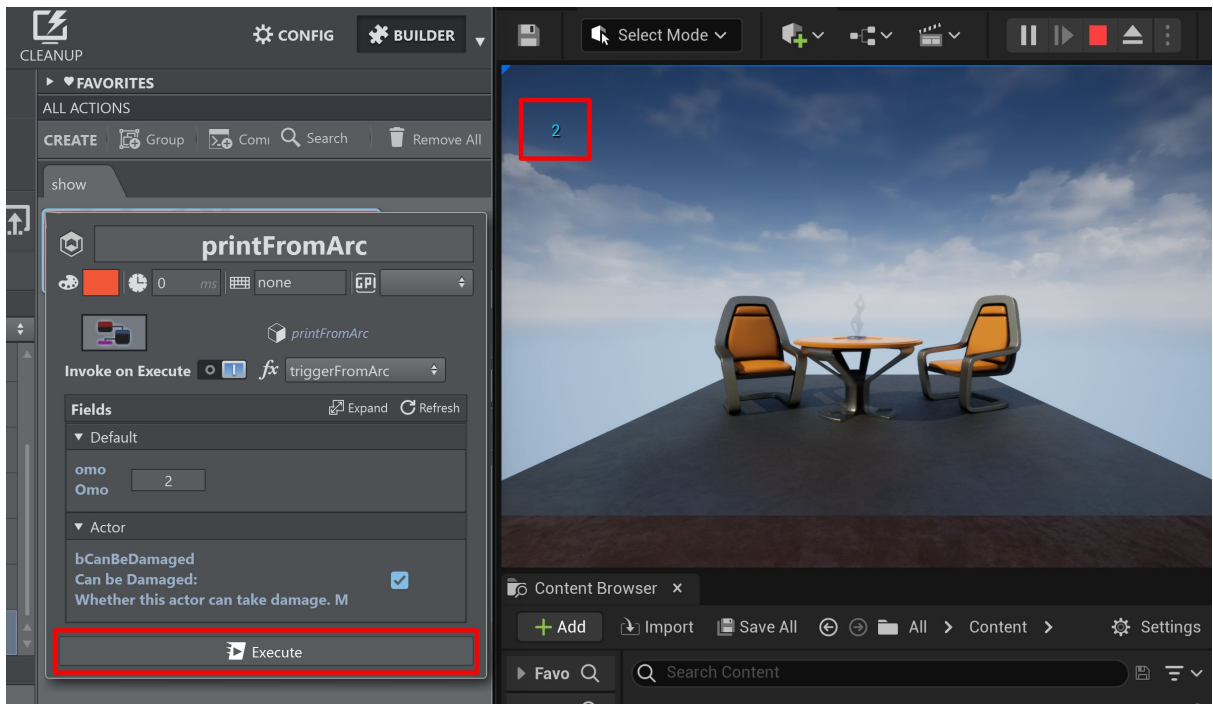
- Drag and drop the Blueprint icon from the outliner view into the action canvas.



- Check the **Invoke on Execute** checkbox and select the **triggerFromArc** event from the dropdown.



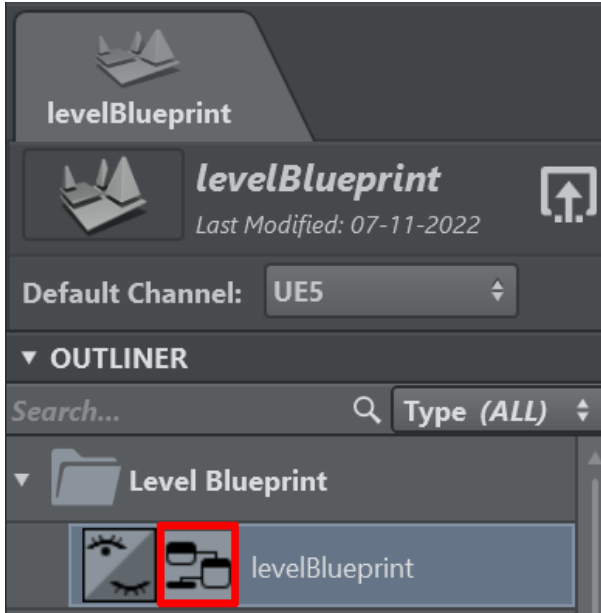
- Change the omo value to some value and execute the action. The selected number is printed on the render view.



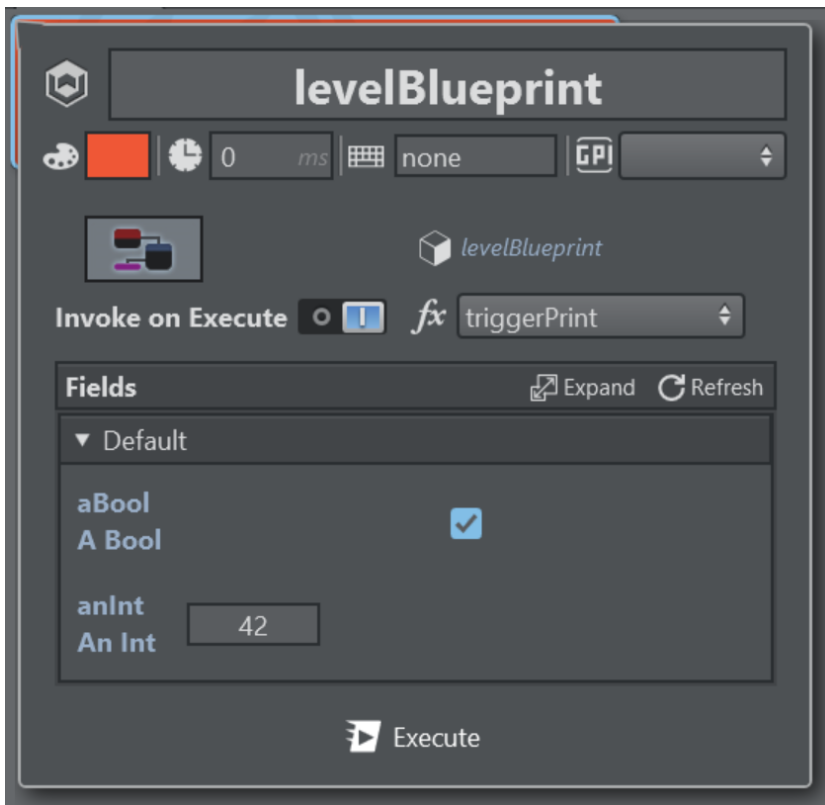
Level Blueprint

A Level Blueprint is always present on any Unreal level map. The Level Blueprint is visualized in the outliner tree view as the top element under the **Level Blueprint** folder.

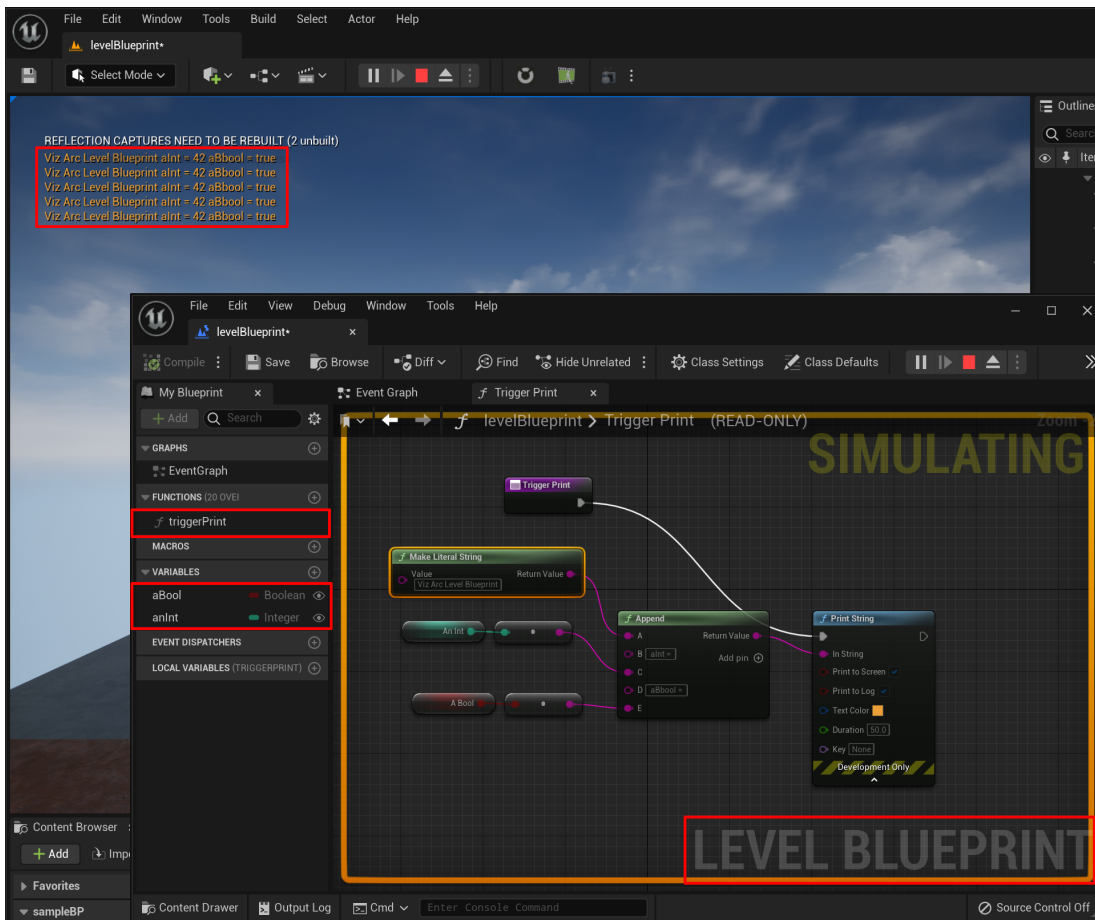
Drag the Blueprint to the action canvas to create a regular Blueprint action.



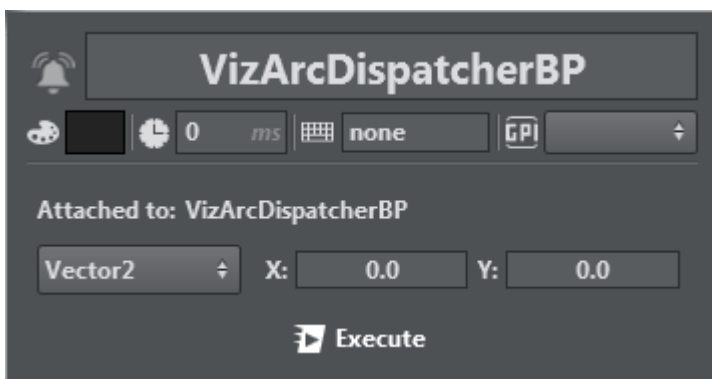
Select a function to be invoked by the Blueprint action and set some of the exposed values.



The same blueprint seen on the Unreal Engine which prints a composed string of the given values from Viz Arc.

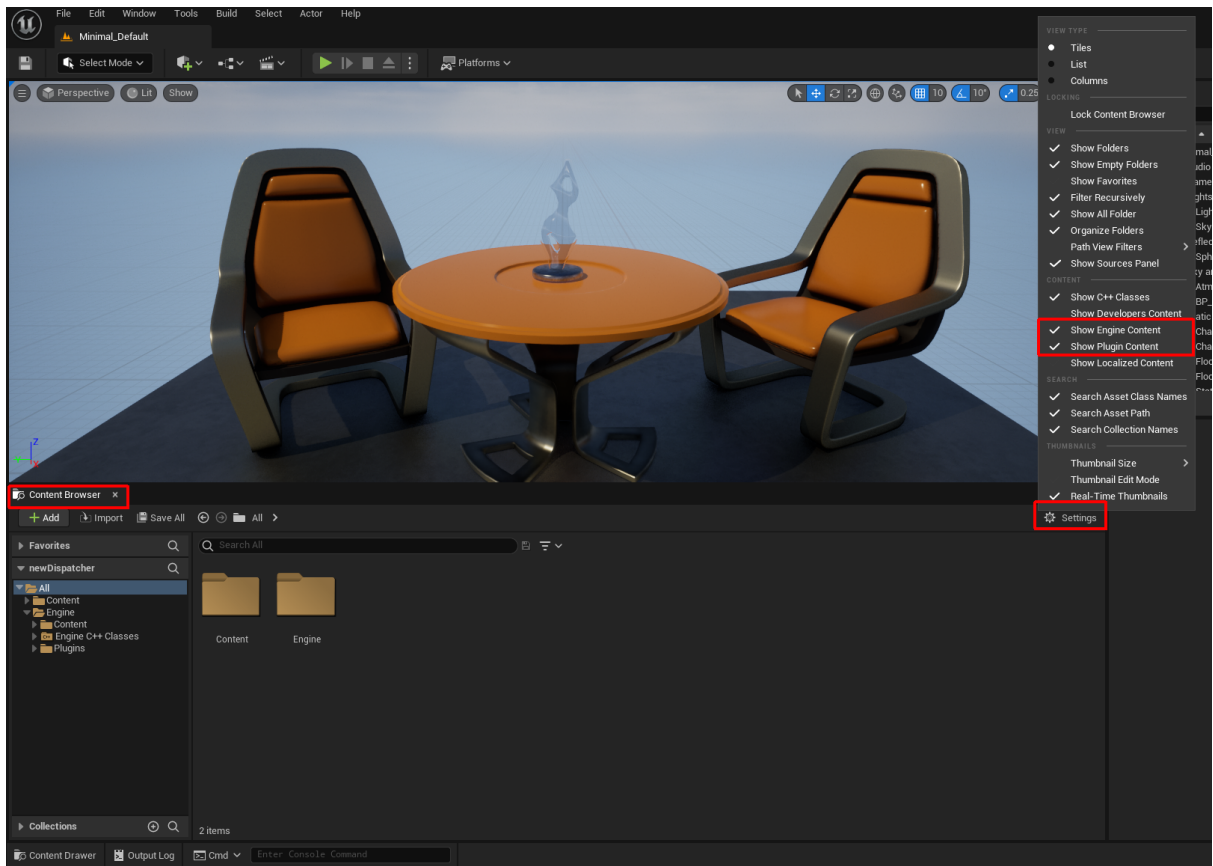


Dispatcher

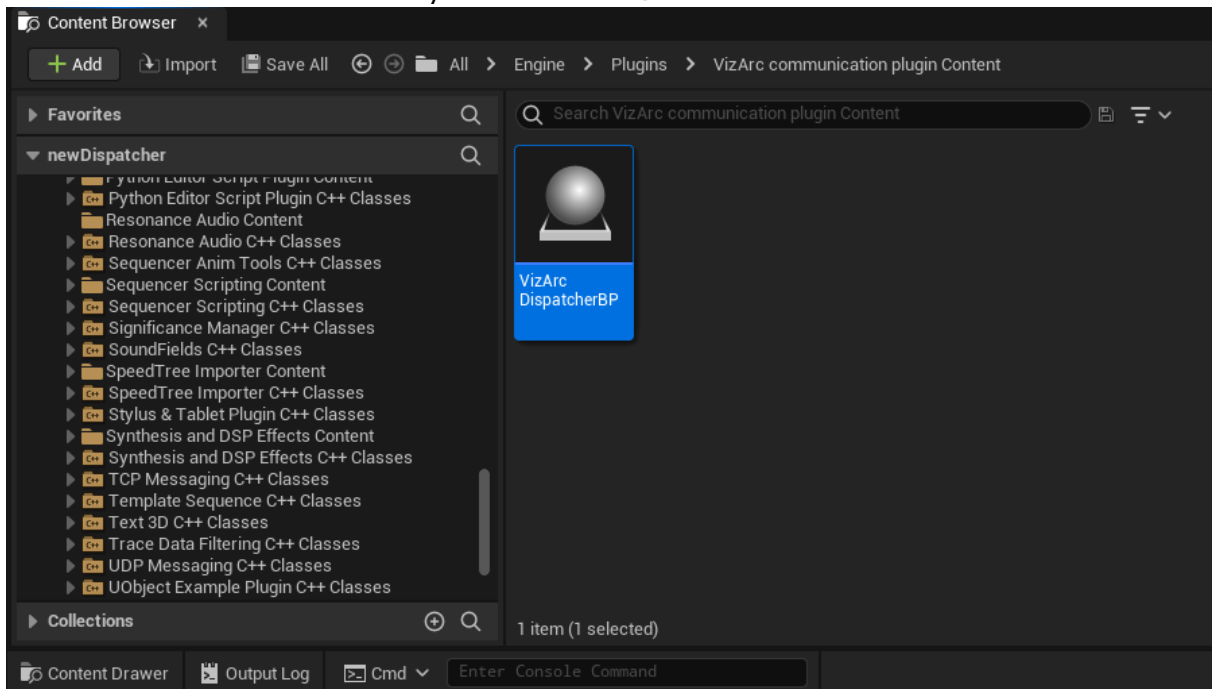


The Dispatcher action lets you create an interaction between Viz Arc and Unreal Engine by setting a value and its type to trigger from Viz Arc to Unreal Blueprint.

- Enable the **Viz Arc** plugin (if not already enabled during installation).
- Add **Viz Arc Dispatcher BP** to an Unreal level.
- On the content browser, make sure that **Show Engine Content** and **Show Plugin Content** are checked (click on the **Settings** button to open the settings panel).

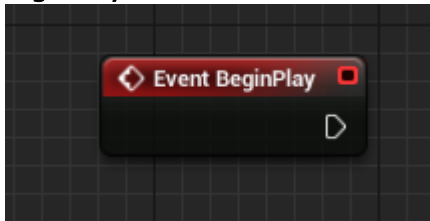


- Scroll in the folder browser until you find **VizArc Content**.



- Drag the **Viz Arc Dispatcher BP** to your level (create actor).

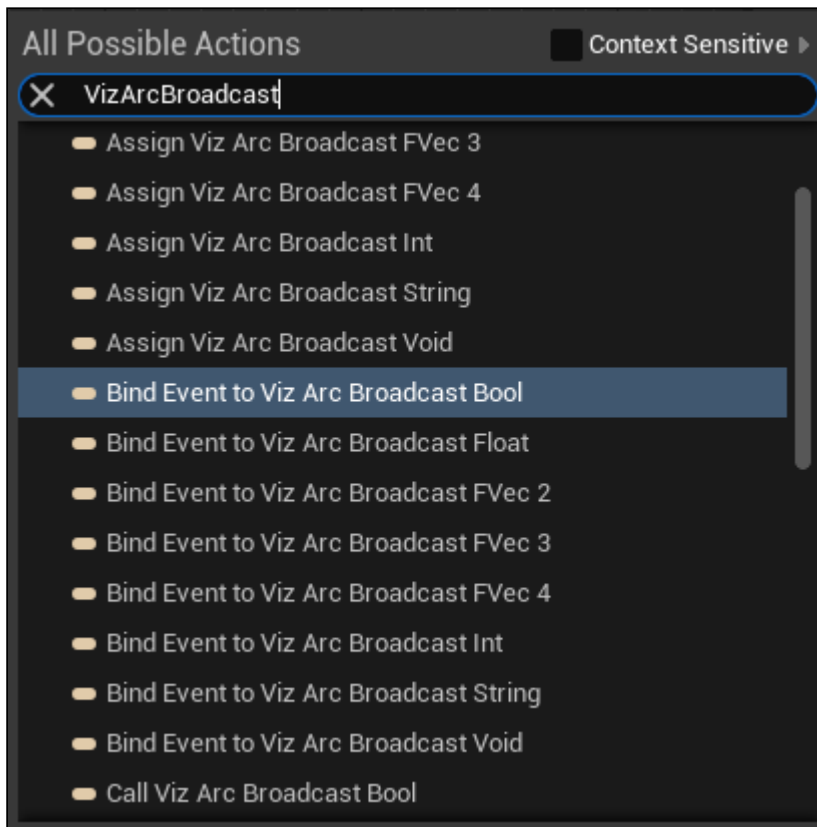
- Subscribe to the dispatcher events (**Viz Arc Dispatcher BP** events).
 - Open or create the Blueprint that is to subscribe to the Viz Arc dispatcher.
 - On the event graph, get the **Event BeginPlay**. This can be done by right-clicking on the canvas, entering `BeginPlay` in the search box and double-clicking on **Event BeginPlay**. This event is called when Unreal enters play mode.



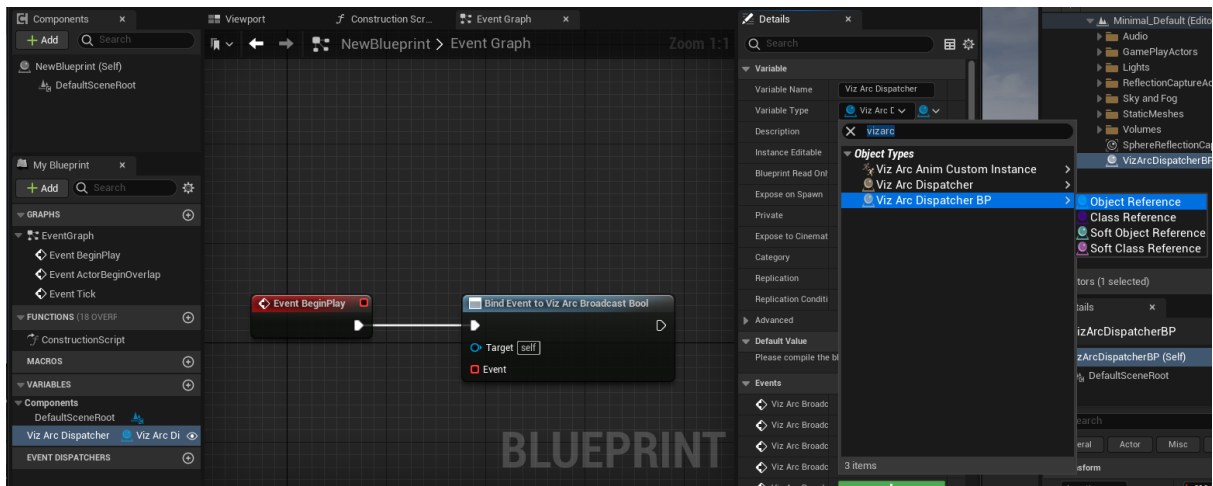
- Once the Begin Play event has been created, you must extend the execution line. Drag the white shape on the right side of the Event shown above. Once you release the left cursor button (stop dragging) the **All possible options** popup appears.

⚠ Note: To see all Viz Arc Dispatcher BP events, disable **Context Sensitive** in the popup.

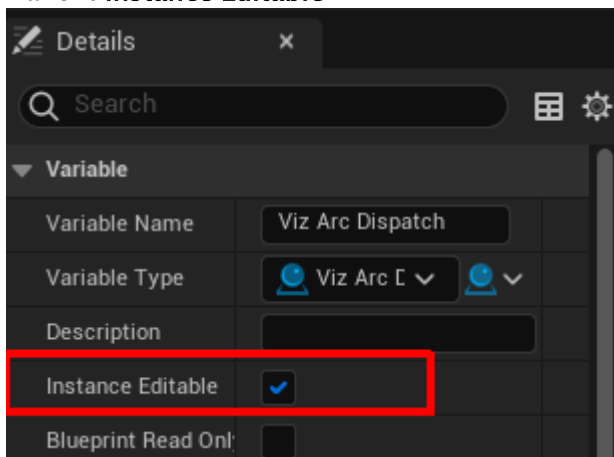
- Enter `VizArcBroadcast` in the search box to see all the functions of each available subscription type (**void, bool, int, float, string**). To subscribe to the Boolean version, double-click on **Bind Event to VizArcBroadcastBool**.



In order for Bind Event to VizArcBroadcastBool to work you need a reference to the Viz Arc Dispatcher BP that you created earlier. To do this, create a new variable of the type **Object Reference** to Viz Arc Dispatcher BP.

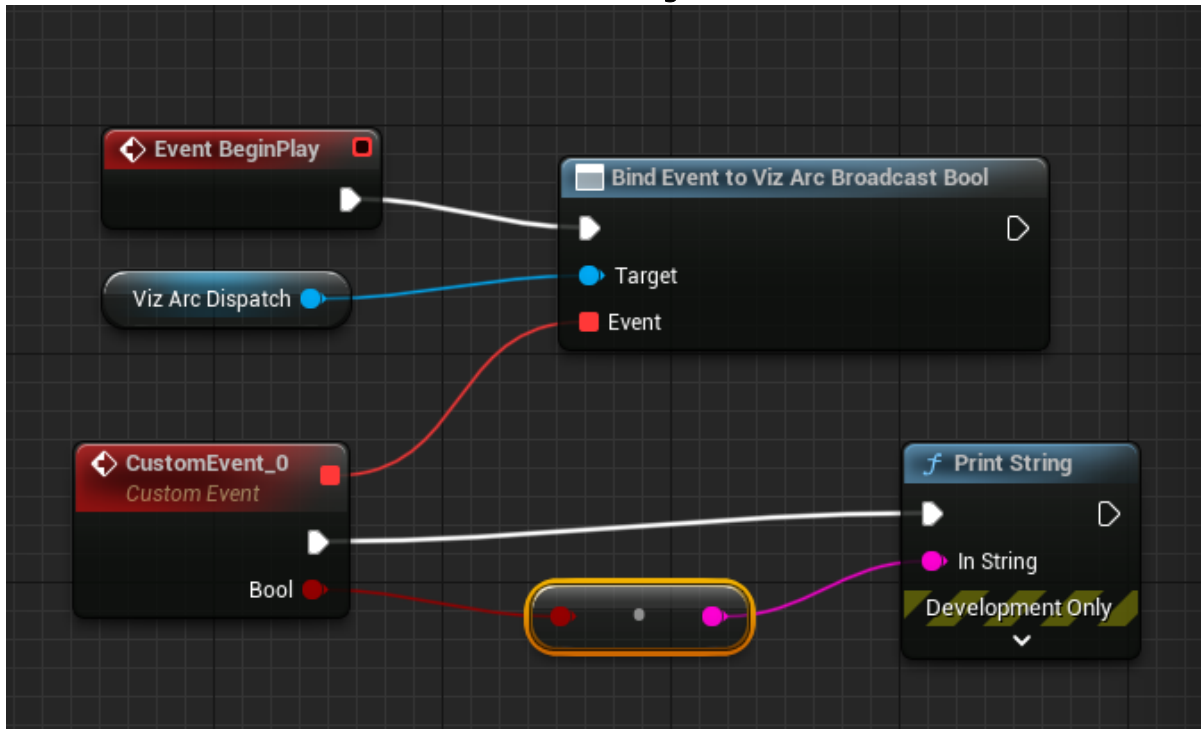


Make it Instance Editable :

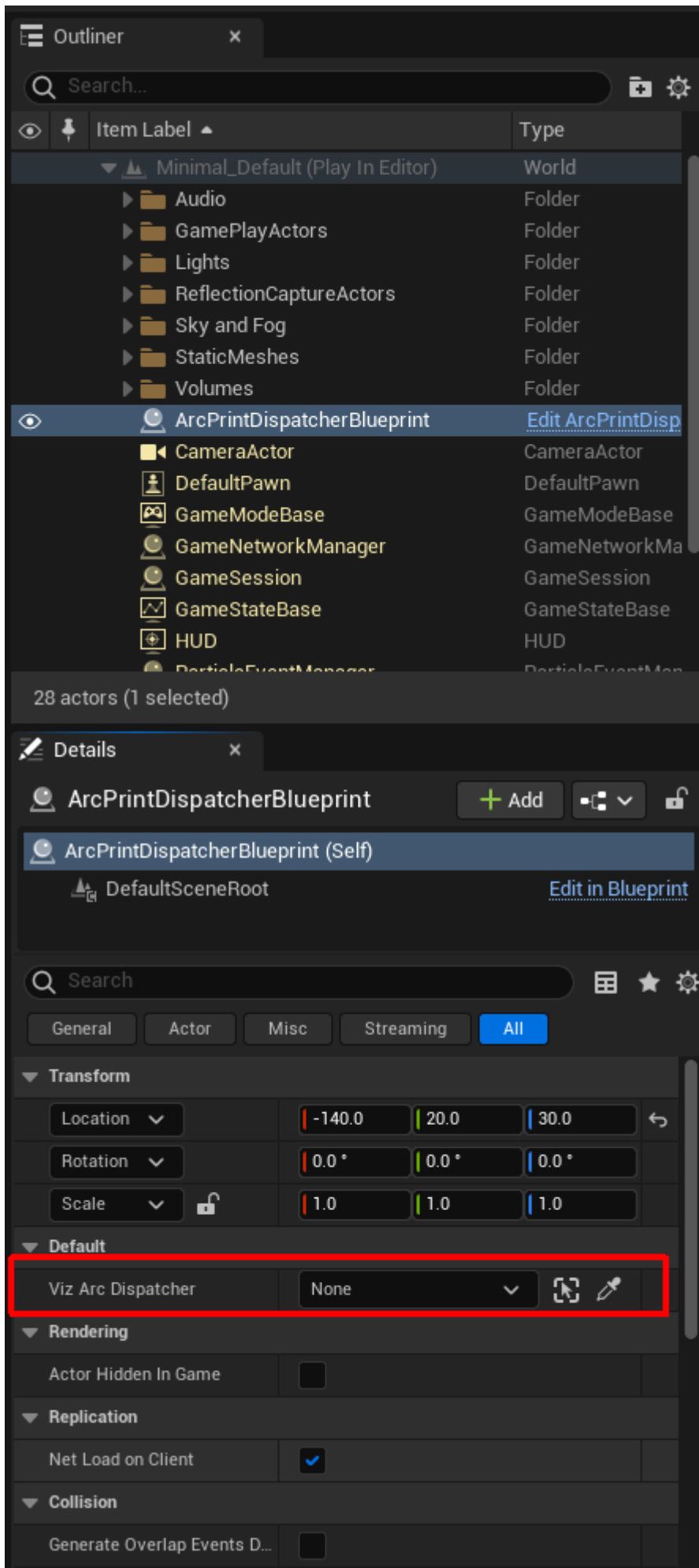


- With the variable created we can now attach it to Bind Event to VizArcBroadcastBool, so that Unreal knows which instance of the dispatcher to listen to. Drag the variable to the blueprint

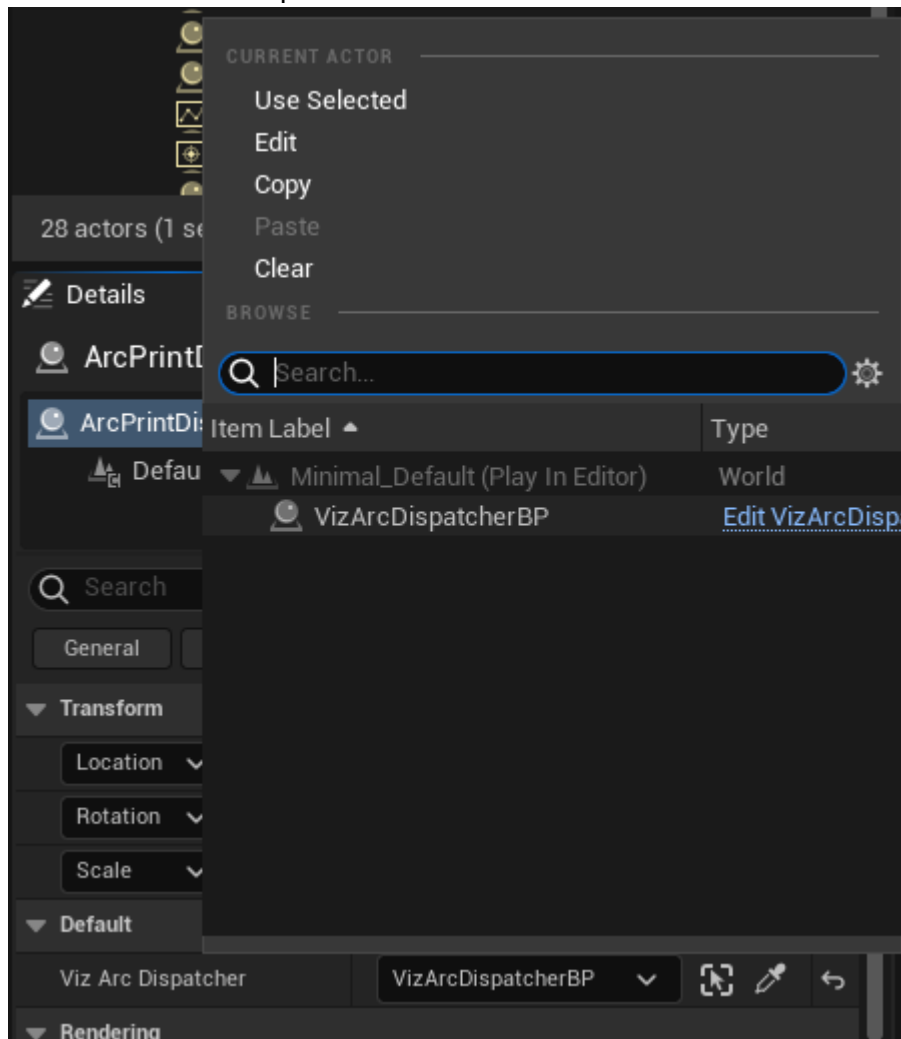
canvas and select **Get**. Connect the node to the **Target Bind Event to VizArcBroadcastBool**.



- The only parameter missing is **Event**. To create it, drag the red square on **Bind Event to VizArcBroadcastBool** inside the canvas.
- Release the left cursor button. Once the popup opens, enter **Custom Event** and select the only available option **Add Custom Event....** This creates the event that is called whenever the dispatcher fires an event of type `bool`. The bool value and event trigger can be used elsewhere in the Blueprint, in this sample just print the bool value on the render output.
- The last step is to set the **Viz Arc Dispatcher Reference**. To do this, go back to the editor, select the **Blueprint** that you were setting up, loop on the details tab for your newly created variable and select the one you want to listen to from the list of **Viz Arc Dispatchers**.

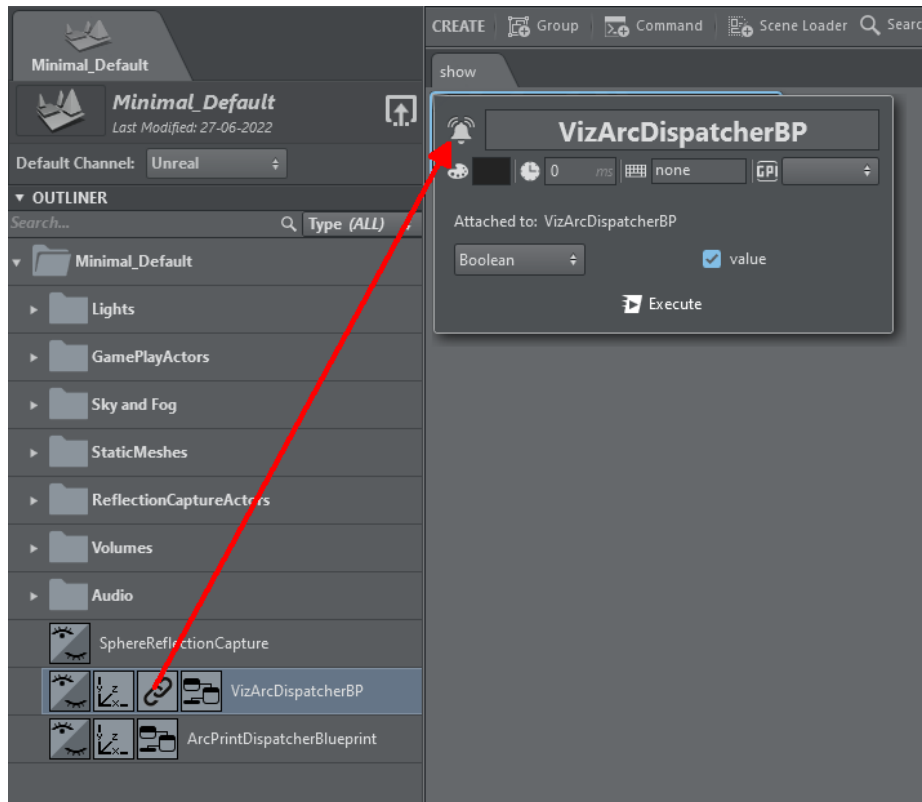


Select the Viz Arc Dispatcher.



- You are now ready to control the variable from Viz Arc.
 - Load a level containing **Viz Arc Dispatcher**.

- Create a **Viz Arc Dispatcher Action** by dragging the cursor from its icon onto the canvas.



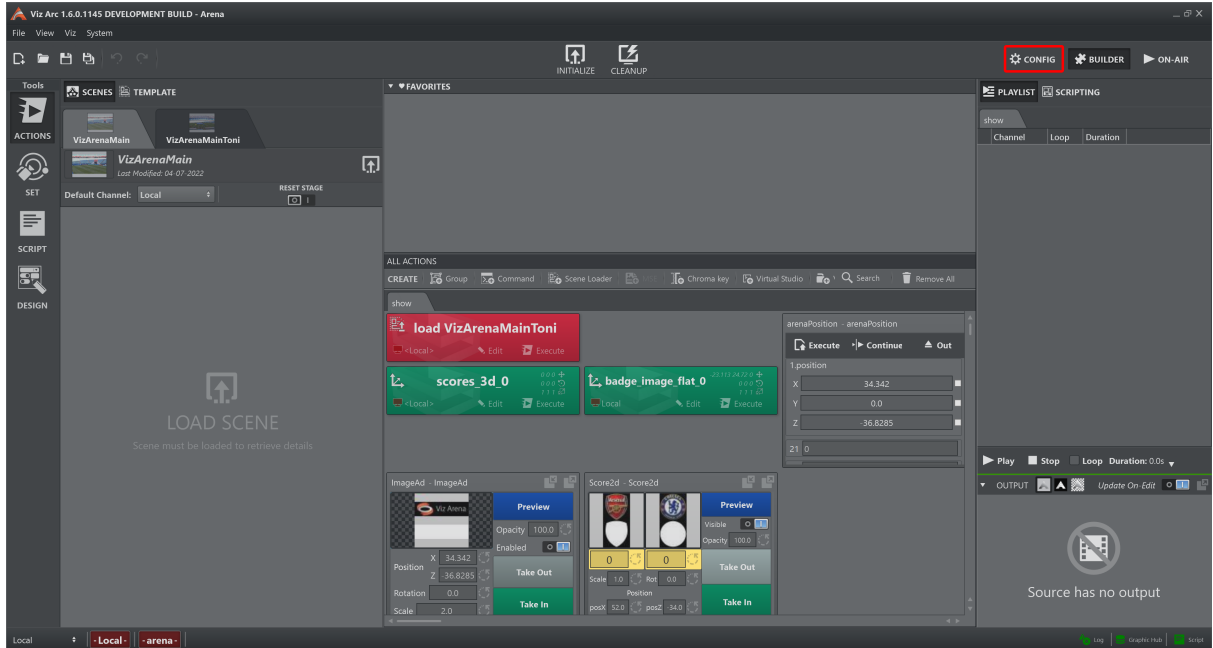
- Click the newly created action's **edit** button. You can use the drop-down to select which type of event you want to fire (**void** , **int**, **float**, **bool**, **string**). Whenever the type changes, the view changes correspondingly so that you can define the value that is sent with the event.

5.18 Viz Arena

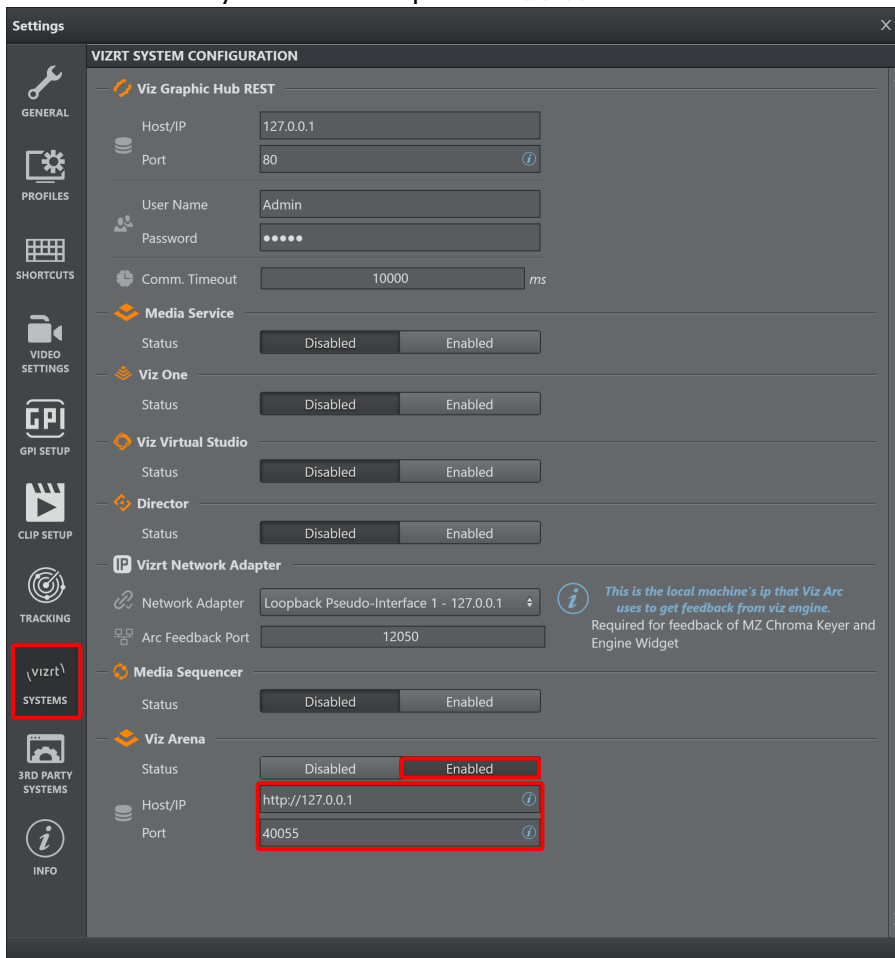
5.18.1 Configuration

First of all you have to to enable the Viz Arena panel:

- Go to the Viz Arc Configuration.



- Select the Vizrt System tab and press Enabled on Viz Arena.



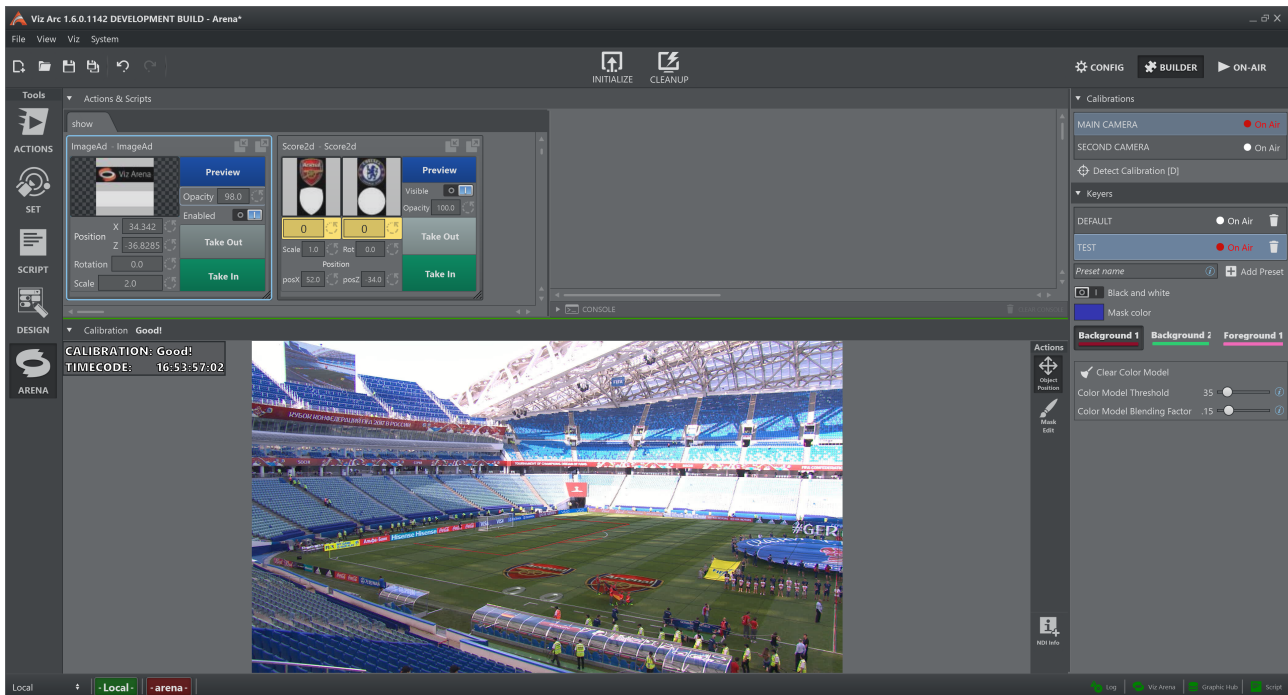
- Insert the correct IP address of the workstation where Viz Arena resides and the port of the API server.

The Viz Arena status icon is located in the status bar (on the bottom right).



It turns green after a while if the IP address and port inserted are correct, otherwise it remains red.

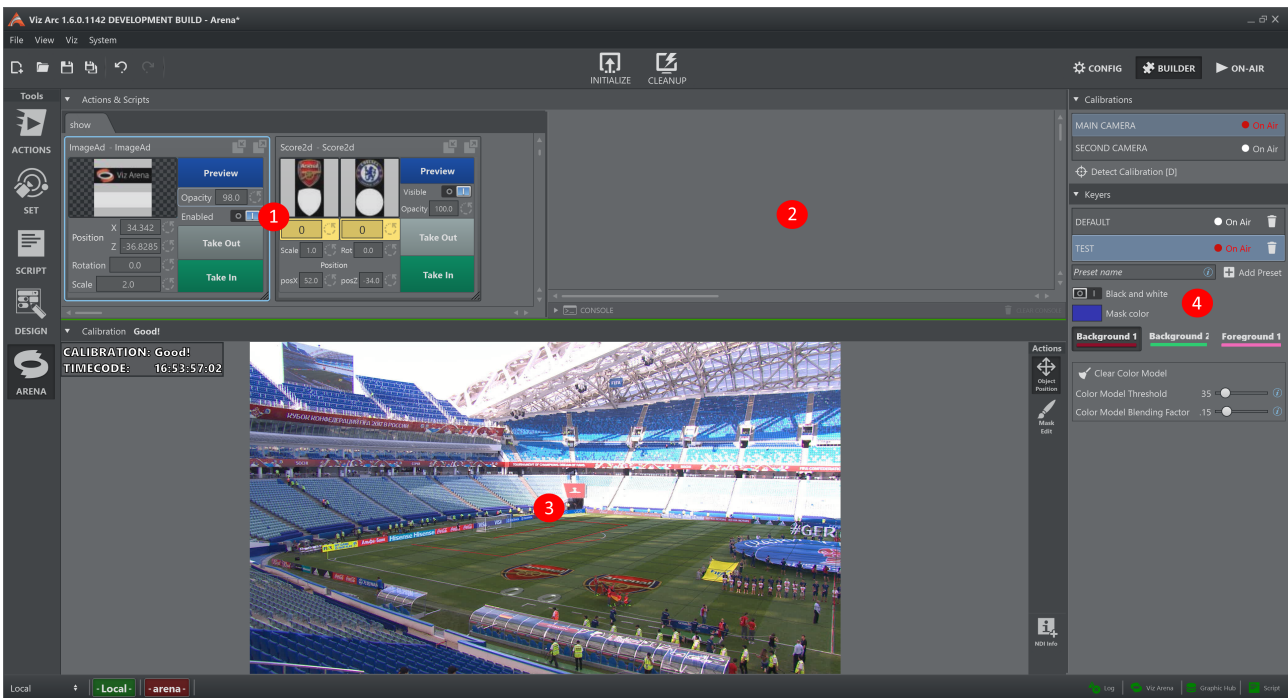
Now it is available to press the Arena button on the "Tool toolbar" (on the leftmost portion of the window), the interface looks similar to this:



5.18.2 Features

The Arena tab presents multiple features:

- Actions panel (1), see [Actions View](#) for further information
- Script panel (2), see [Script View](#) for further information
- Output view panel (3)
- Settings panel (4)



Output View

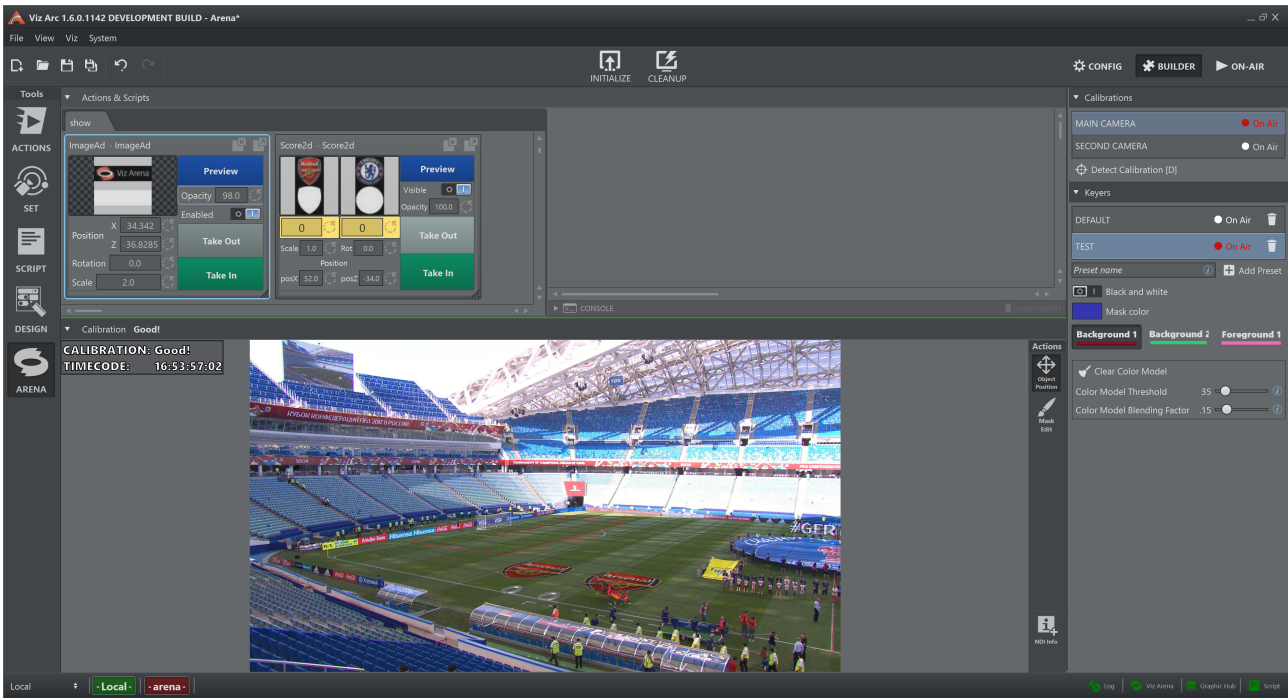
The Output View shows the NDI stream, both video and metadata, provided by Viz Arena. Since it is very important to see any changes of the calibration status, at the very top of the view there is line that show its current value:

- **Green** if the calibration is good.
- **Red** if the calibration is lost.

Actions

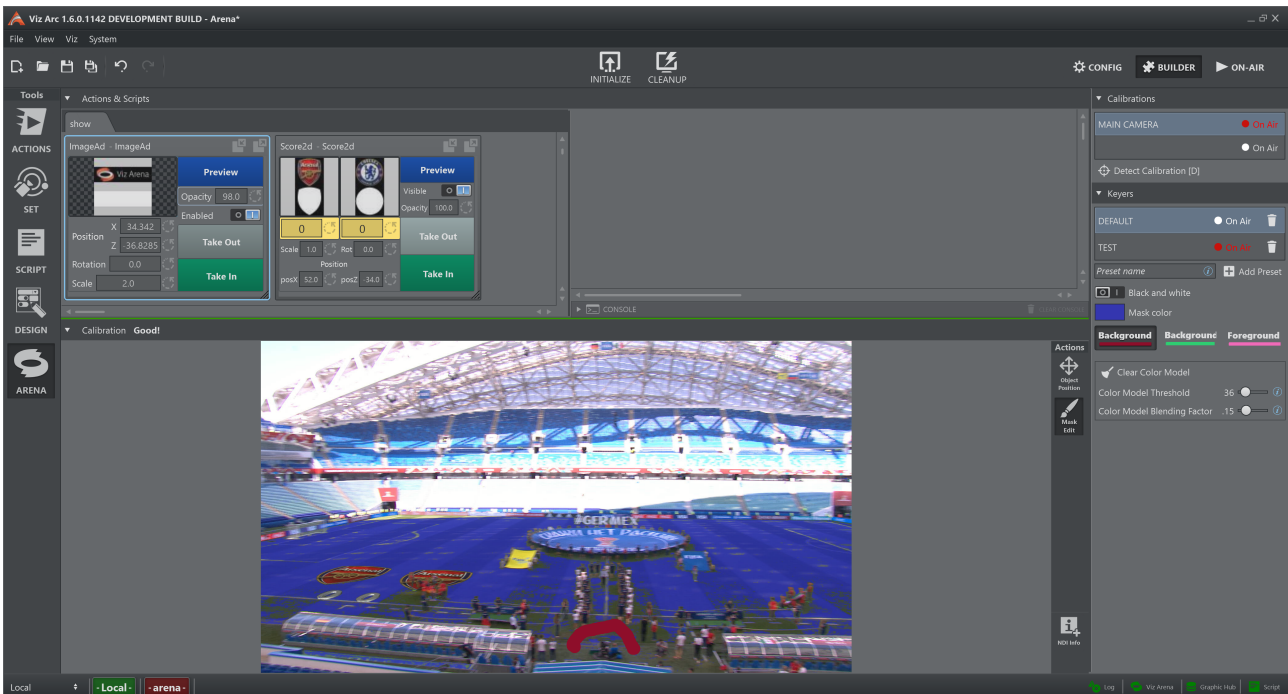
Object Position

This action enables to position any selected control object (in the Action Panel) on the field (see image above). As a visual aid, the cursor turns into a cross when over the output view.



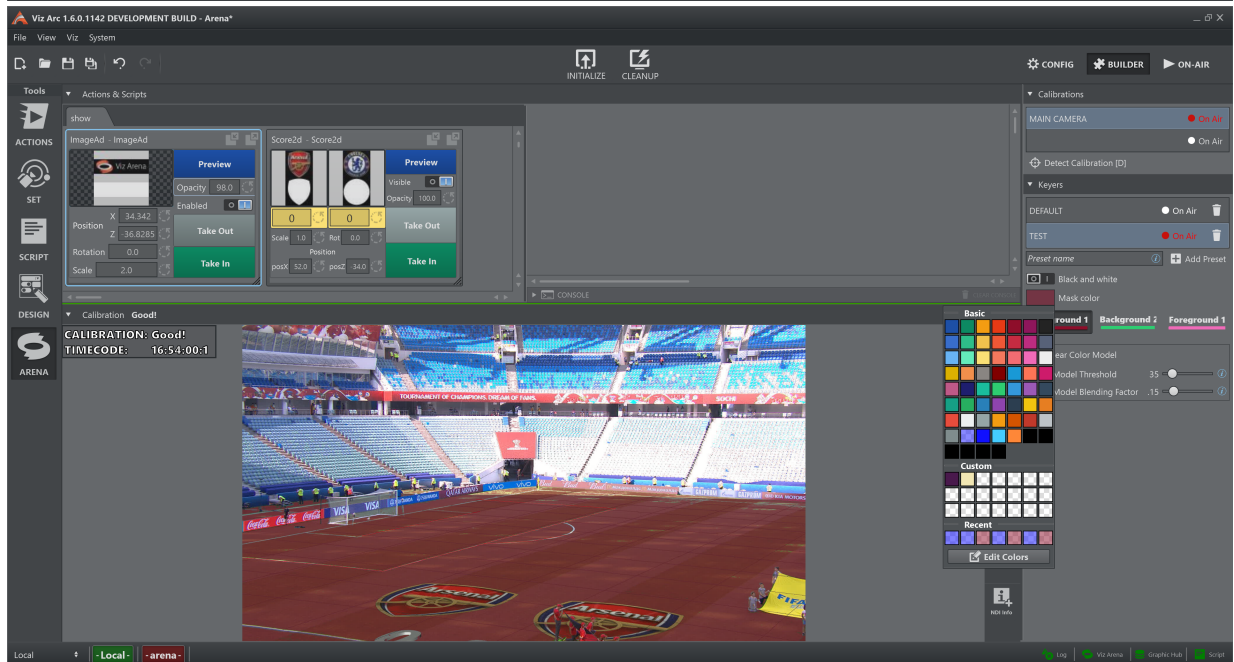
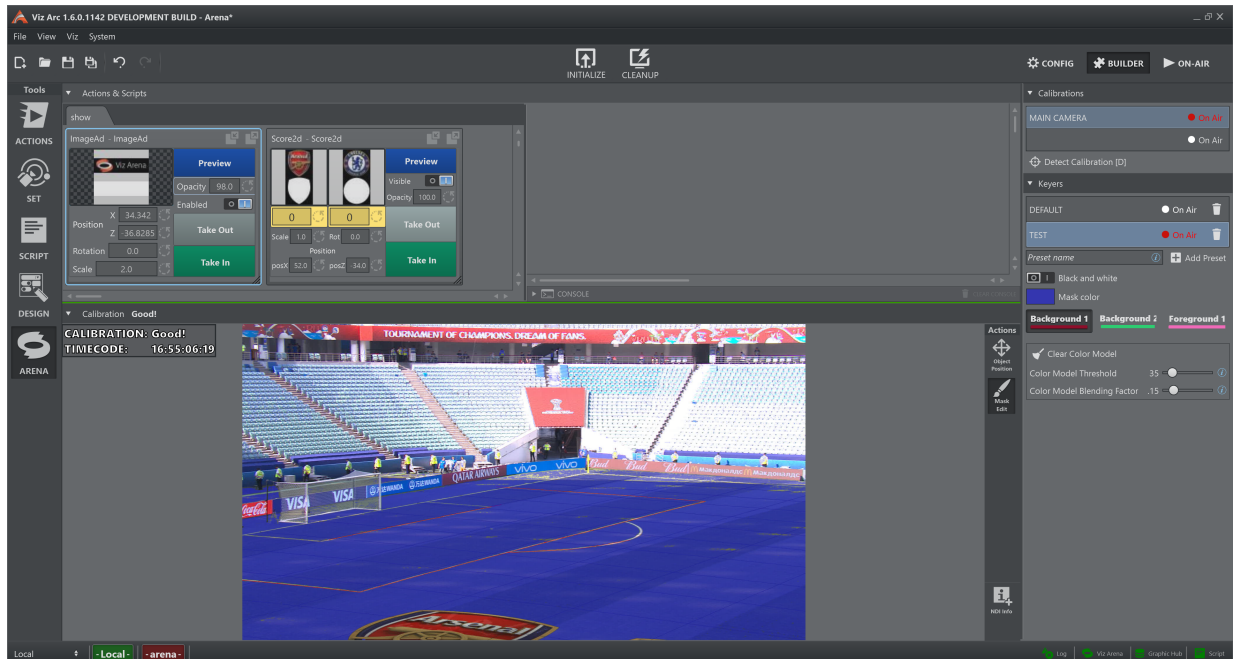
Mask Edit

This action enables to adjust the color model used for calibration and by the **Viz Engine** for keying during a live game. Add brush strokes to improve the classification of the foreground and the background to refine the color model.

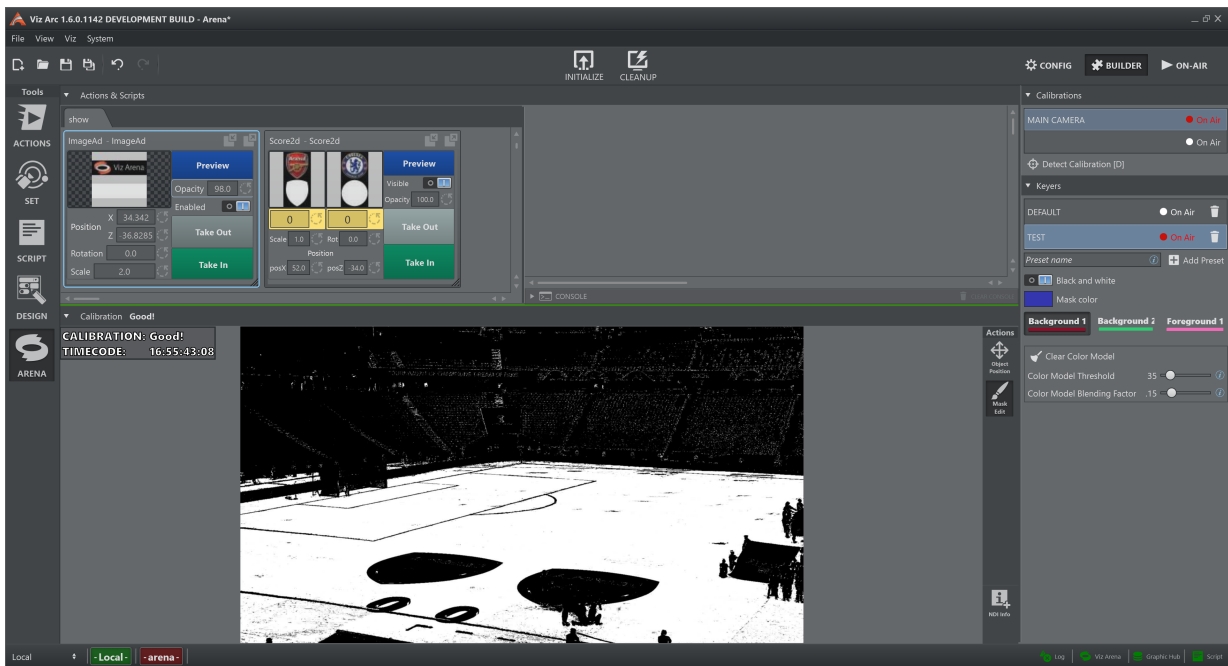


This action also turns on the visualization of the mask:

- Color mask



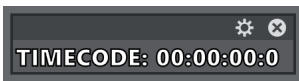
- Black and white mask




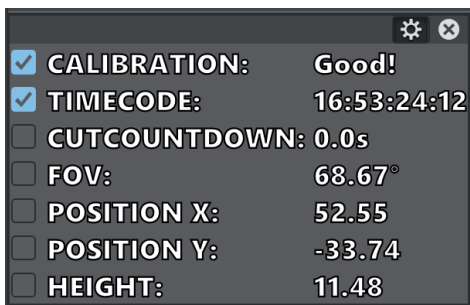
It is possible to toggle between the two modes see *Settings panel > Mask > Back and White*. During a live game, it is advised to regularly observe the output of the keying mask to ensure that the graphics are well rendered on Viz Engine and to provide the best possible tracking quality.


NDI Info


This button adds a new floating Info Panel to the interface.



- Click on the gear  and the panel expands showing all the information that can be visualized:



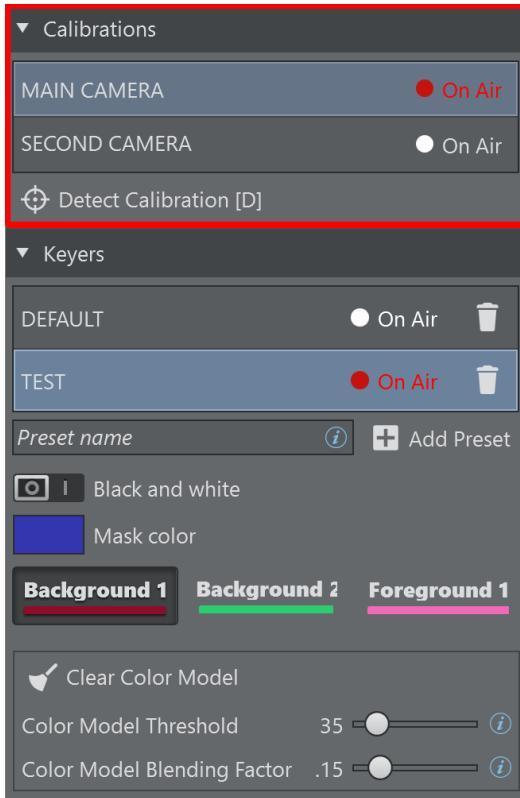
Click again on the gear  to exit from configuration mode.

- Click on the  to close the panel.
- Grab the header to move the panel around and place it anywhere.

There is no limit to the number of panels that can be added.

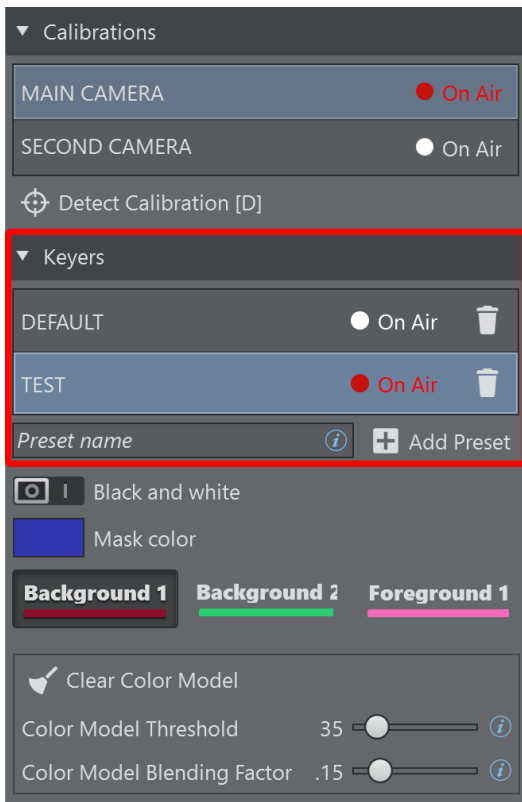
Settings Panel





Calibrations



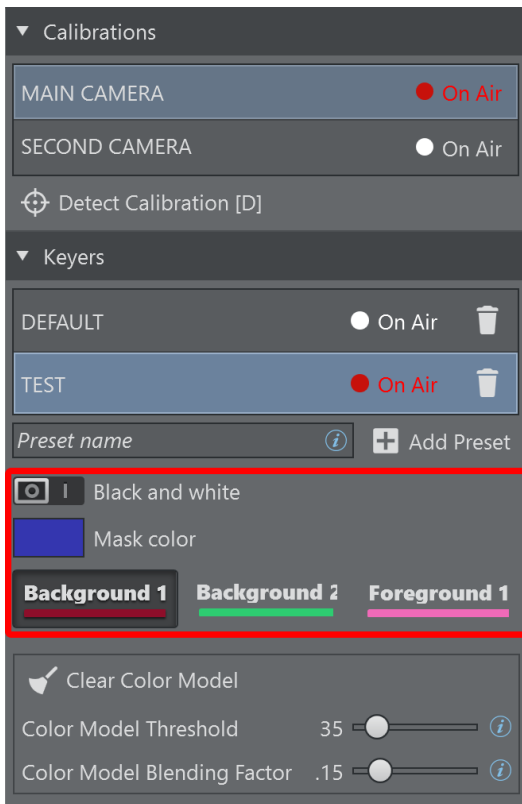
- Select a Camera/Calibration for both preview and program feed by clicking on the calibration name.
- **Detect Calibration [D]**: Detects the calibration of the current image. Click this button (or press the **D** button) if the tracked calibration is off from the actual field lines.

Keying Presets

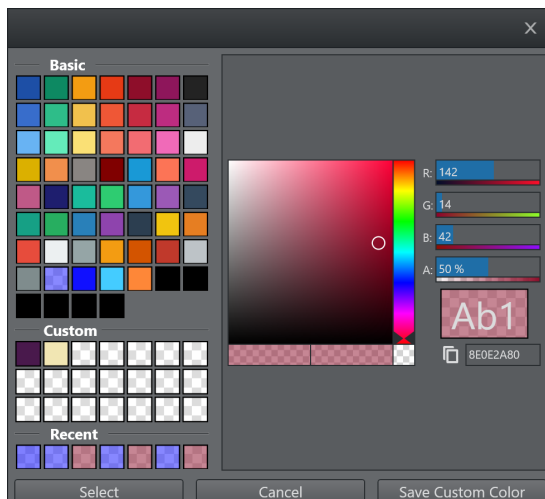


- Select a preset for preview feed by clicking on the preset name.
- The preset that is currently On Air is marked with a red **On Air** label.
- If the On Air preset has any local changes that have not yet been applied to the output rendering, they are marked with an orange exclamation mark .
- Press  to update the output rendering.
- Press  to remove the selected preset from the list. If it is the preset On Air, the button does nothing.
- Press  to add a new empty keying preset to the list. The name is the one inserted in the text box next to the button.

Mask



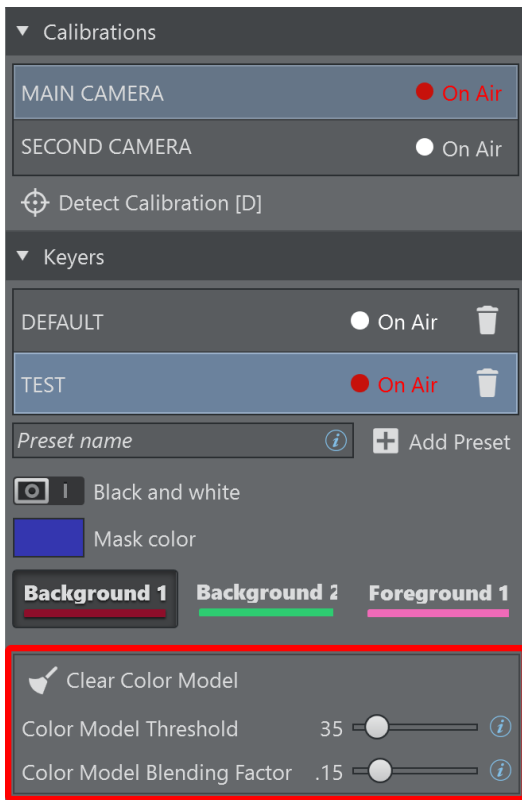
- **Black and White:** Toggles the style of the keying mask.
- **Mask Color:** Selects the background keying mask color used for rendering which is most suitable for the playing field. Click on the colored rectangle and a new panel appears. Here it is possible to choose the mask color.




- **Background 1:** Interacts with the background color model of the preset. Right click on the button and the color panel shows (see above), this changes the color of the stroke.

- **Background 2:** Interacts with the background logo color model of the preset. Right click on the button and the color panel shows (see above), this changes the color of the stroke.
- **Foreground 1:** Interacts with the foreground color model of the preset. Right click on the button and the color panel shows (see above), this changes the color of the stroke.

Controls



- For a better understanding of each control please refer to the *Viz Arena User Guide*.
- Going over  with the mouse provides a brief description of the relative control.
- **Clear Color Model [C]:** Clears the stored keying information about the current preset and starts updating the color model from scratch. Alternatively, use the shortcut **C** on the keyboard.

Startup

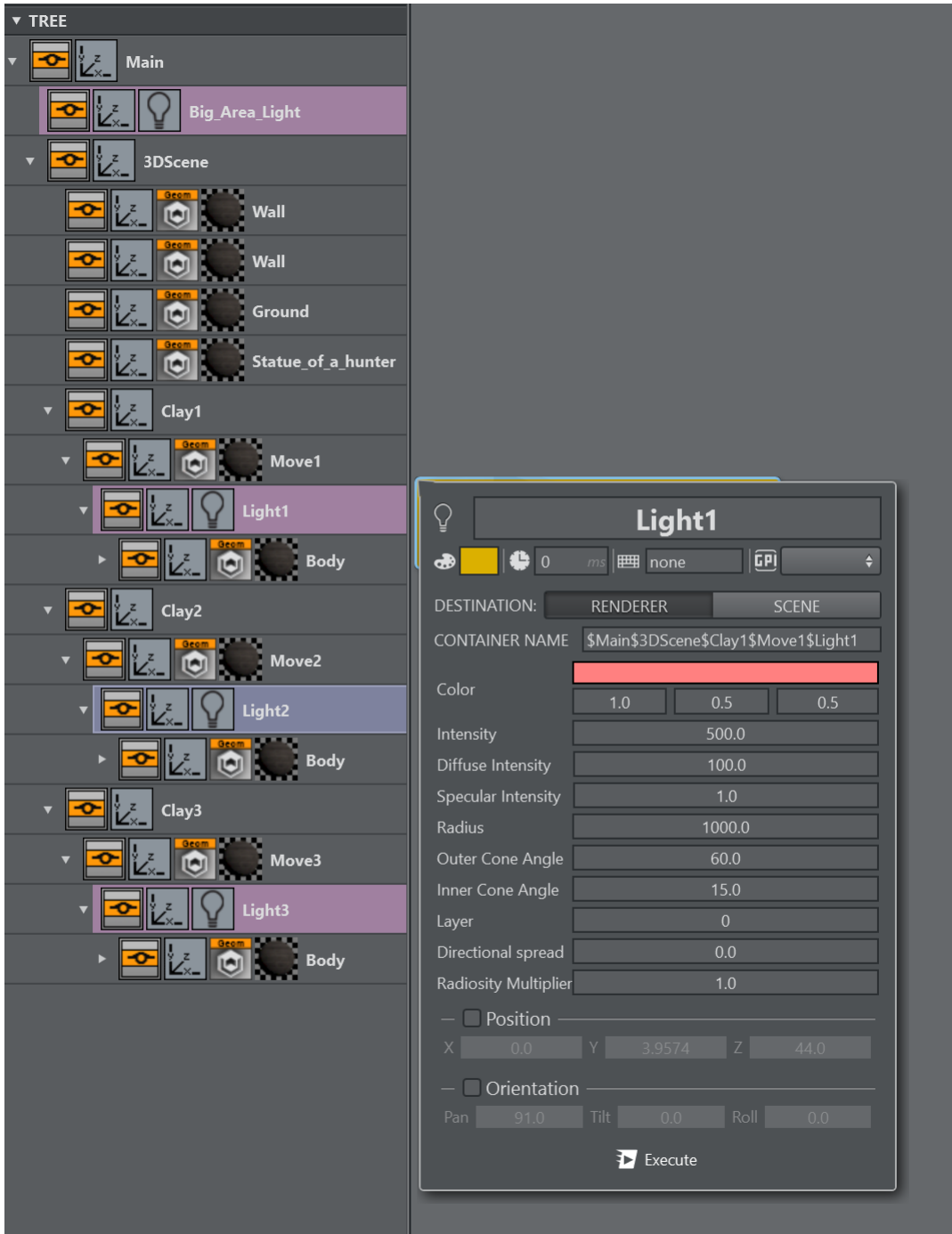
Using the command line parameter `--a` or `--arena`, it is possible to start Viz Arc directly with the Viz Arena tool visible.

5.19 Art-Net DMX Integration

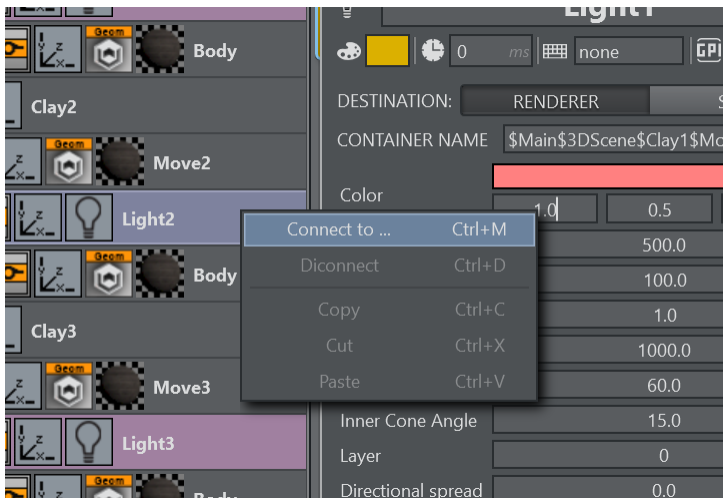
Art-Net is a data distribution protocol that allows DMX lighting data to be transported over an ethernet network.

5.19.1 Usage with Light Action

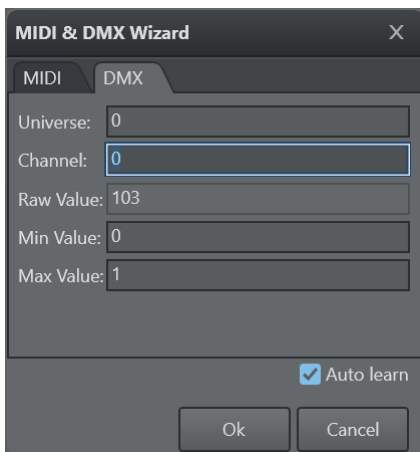
Select a scene containing viz5 based lights and load it into Viz Arc. Drag the light from the scene tree to the action canvas to create a Light Action.



Open the context menu and select the **Connect to ...** entry.



In the window that opens select the **DMX** tab.

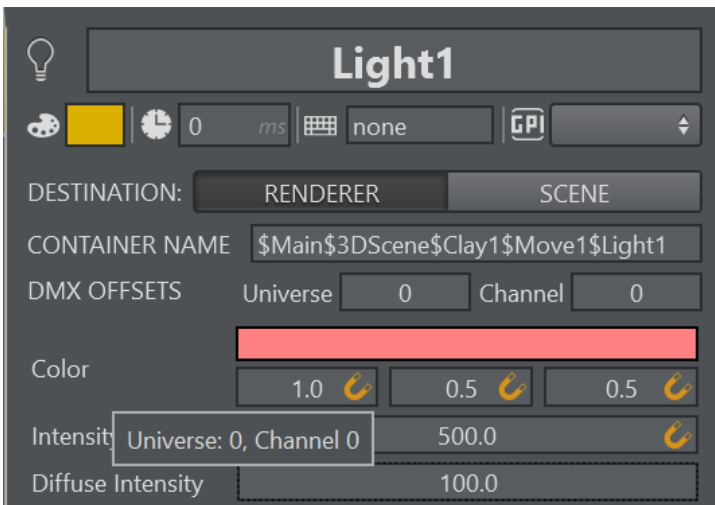


When the **Auto learn** option is enabled, the panel displays the last **Universe** and **Channel** that has changed. It can be used to easily identify a hardware slider or a knob.

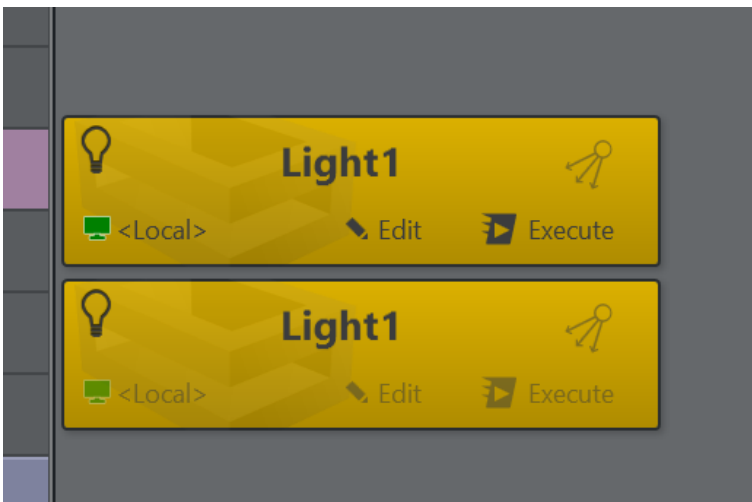
The **Raw Value** displays the received raw value in the range of [0..255]. The **Universe** and **Channel** values can be entered manually as well.

The **Min/Max Value** determine the range where this channel is to be mapped.

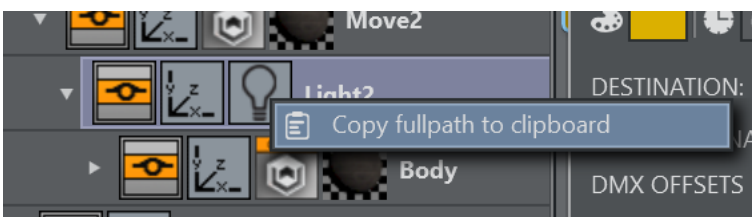
Once a property has been mapped, a small horseshoe magnet icon indicates the presence of a mapping. A tooltip shows the mapped Universe and Channel.

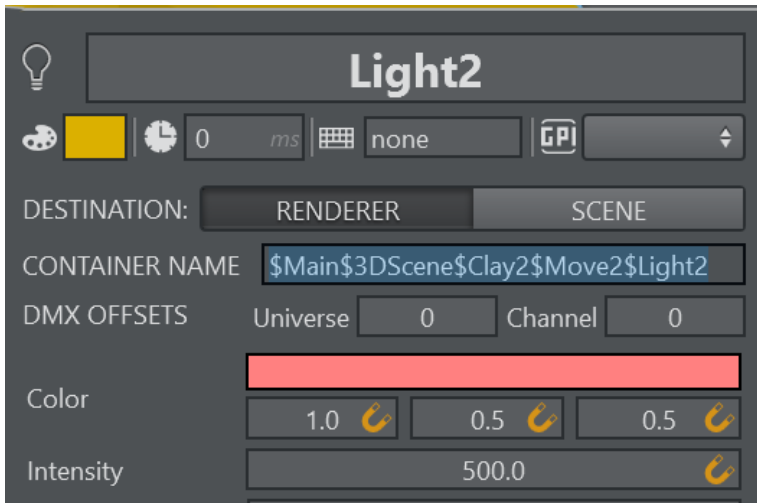


In case more light need to be mapped in a similar fashion as the first one, the easiest approach is to duplicate the action and configure DMX offsets on the duplicated action.

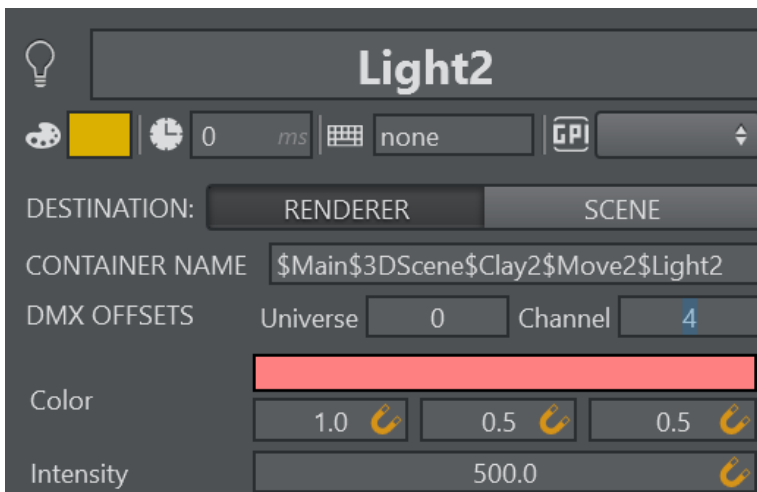


Copy the full path of the second light either by copying it from the scene tree directly or enter the tree path manually.

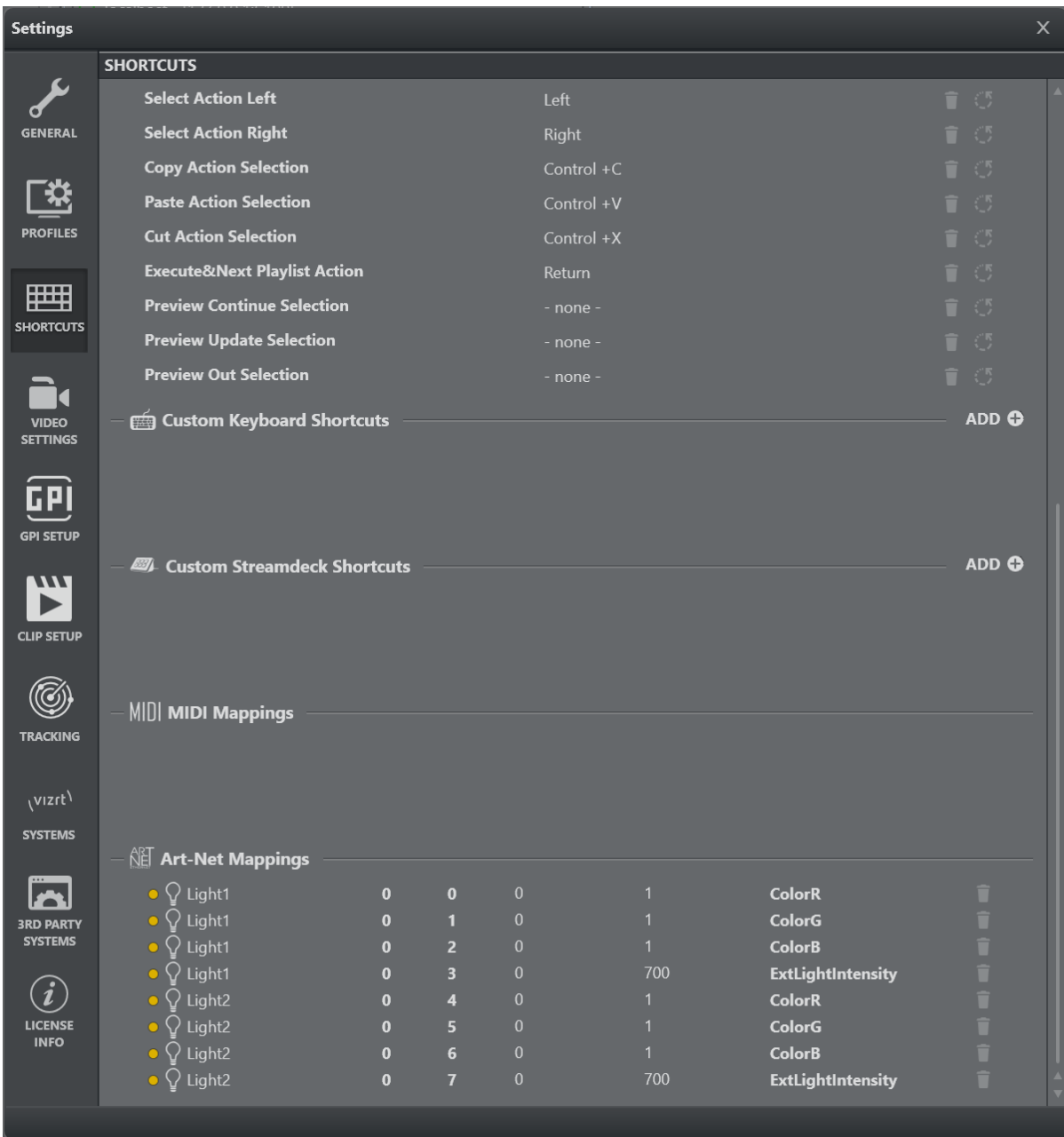




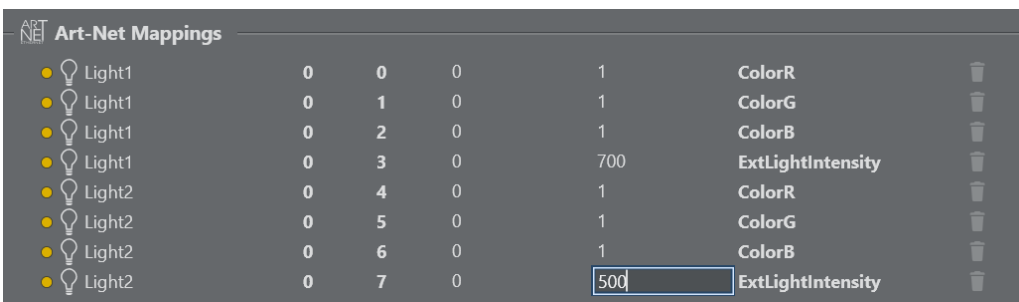
Enter an appropriate Universe/Channel offset the **DMX OFFSET** line.



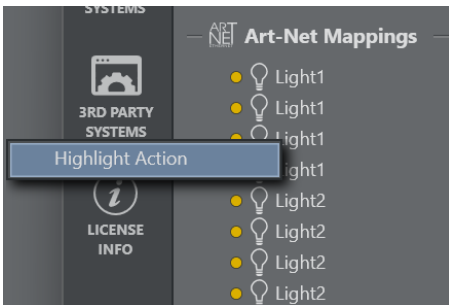
The overall DMX mapping can be viewed in the **Config Settings** panel under the **Shortcuts** section.



From here it is possible to remove a mapping and to re-adjust the minimum and maximum range mapping.



By right clicking on the action the action can be highlighted on the action canvas.



The rendered output of 2 virtual viz lights mapped through physical lights.

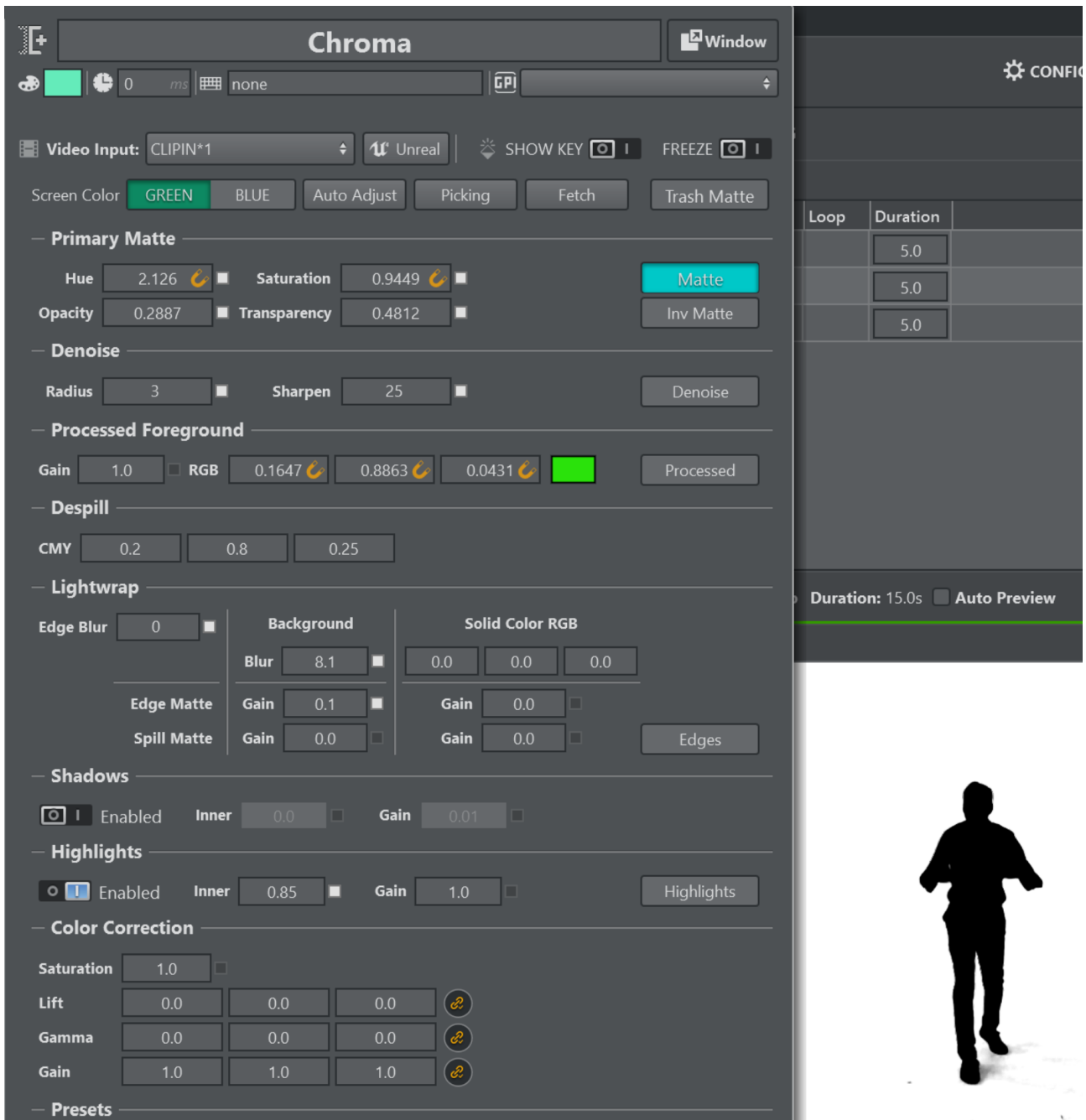


The physical lights controlled by a DMX light console where channel 0-3 are RGB of the first light, channel 4 is mapped to the intensity and with an offset of 4 channels the second light is mapped on sliders 5-9 of the console.



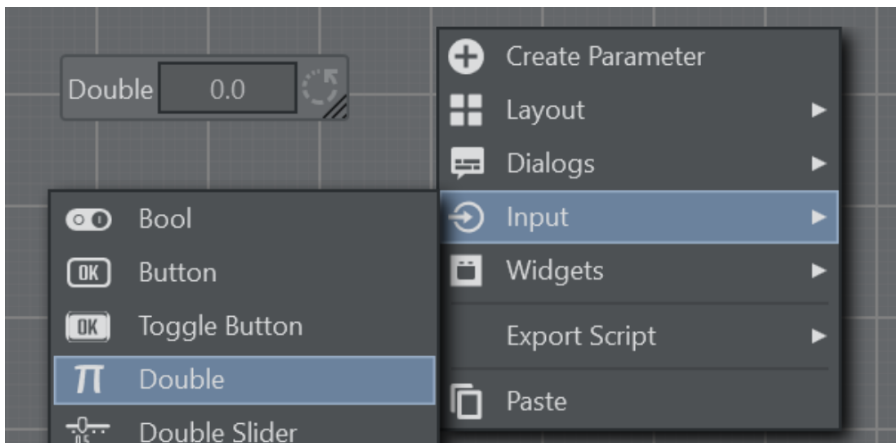
5.19.2 Usage with Precision Key Action

The same way as in the Light Action, DMX signals can be used to control any floating point value in the Precision Key Action

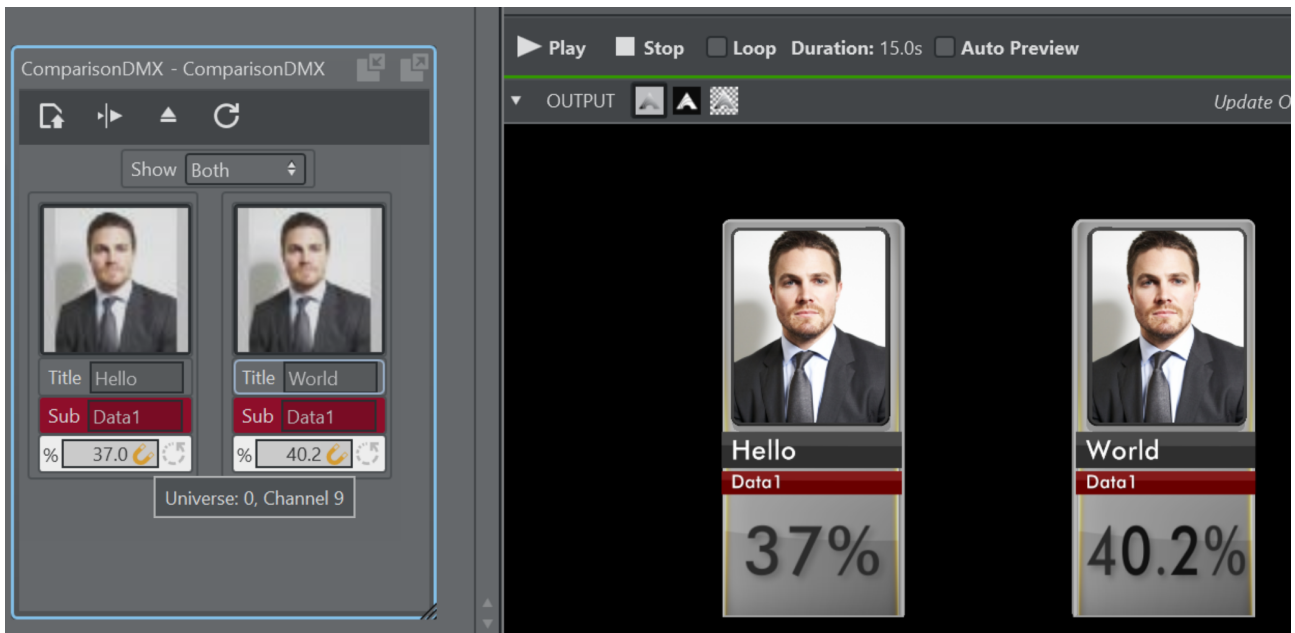


5.19.3 Usage with Template Actions

DMX signals can be used on double parameters only within Template Actions.



A sample of two double parameters representing a percentage connected to a DMX lighting control

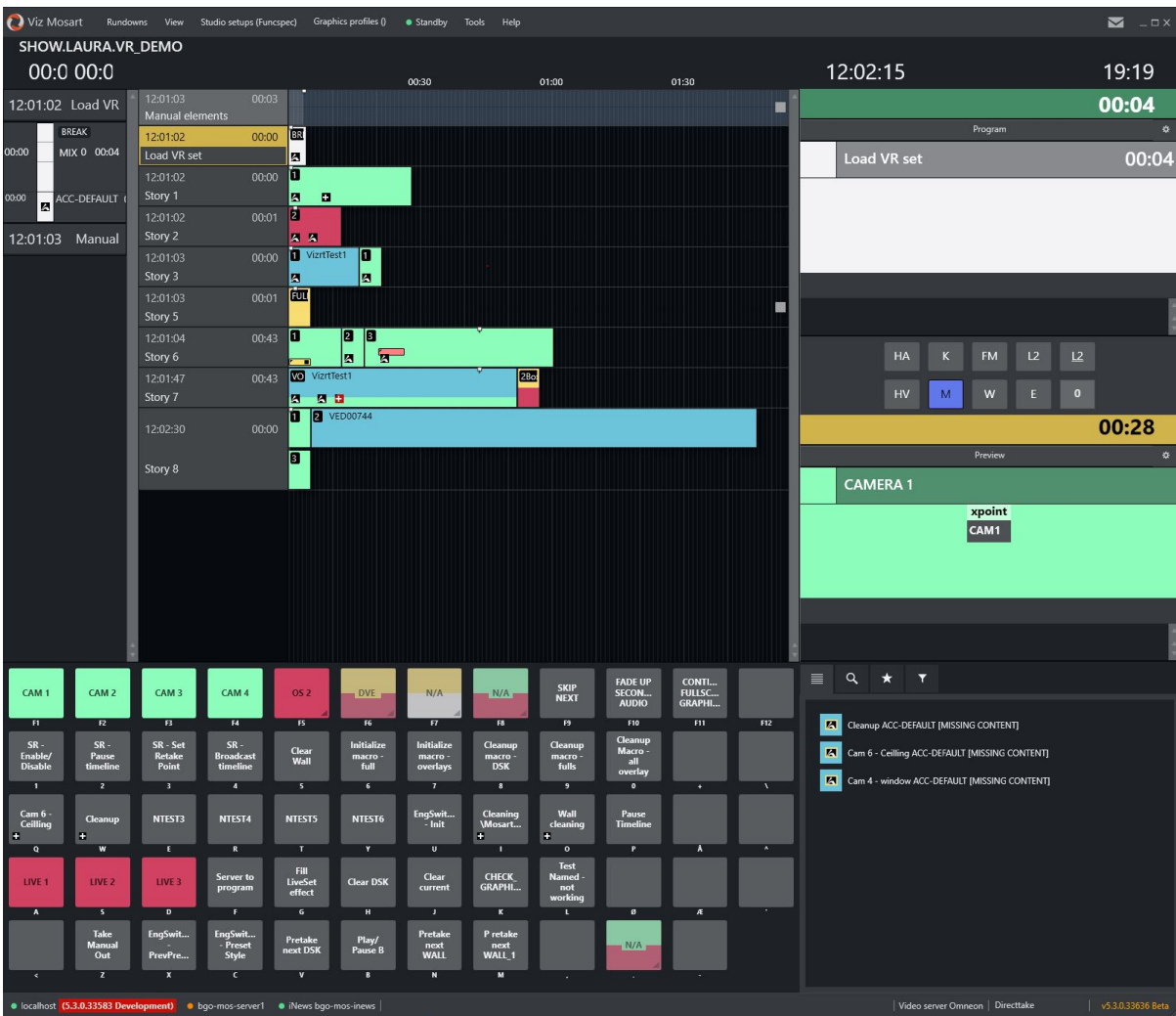


5.19.4 Scripting

All DMX events can be intercepted and processed using the **OnDMXEvent** callback method.

5.20 MOS Integration

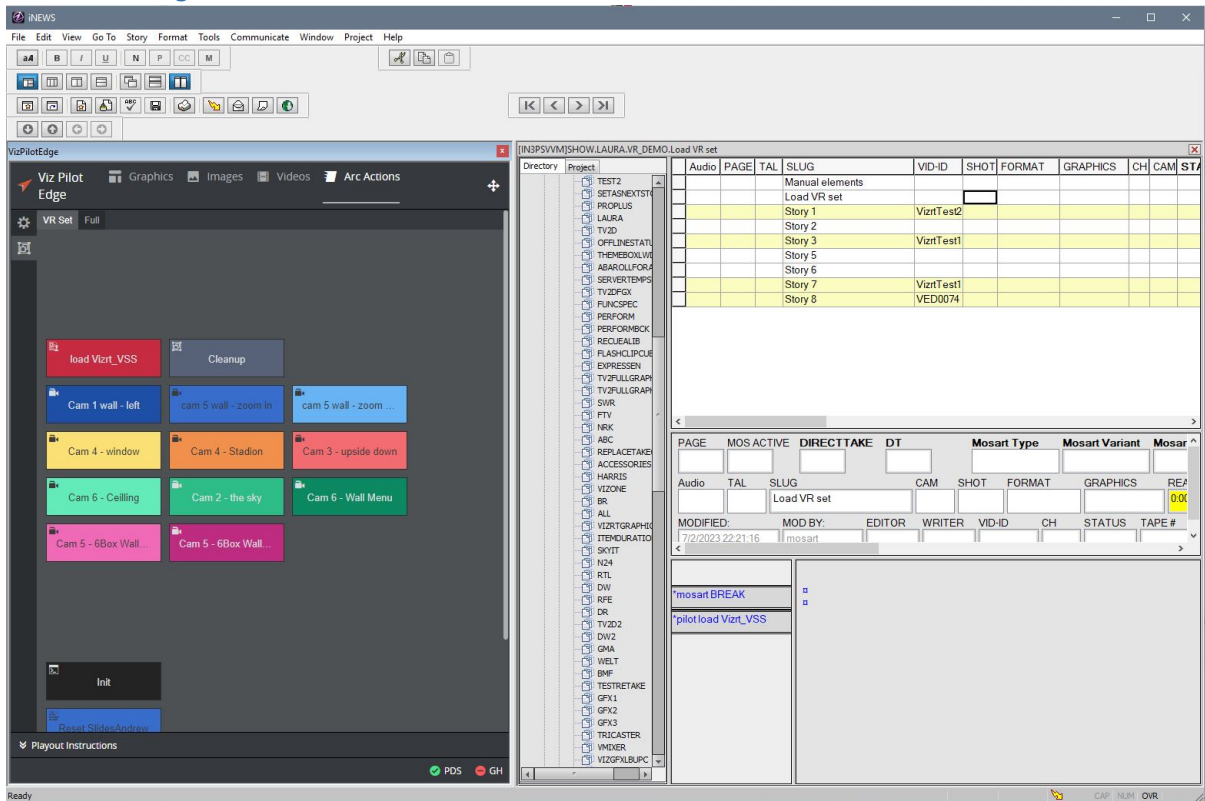
The MOS integration allows you to trigger single actions of any project from a newsroom rundown.



5.20.1 Prerequisites

- Installation of [Viz Arc Web Service](#).
- A [Viz Arc Rest](#) license.

- A Viz Pilot Edge installation.



- A newsroom system or Viz Mosart.

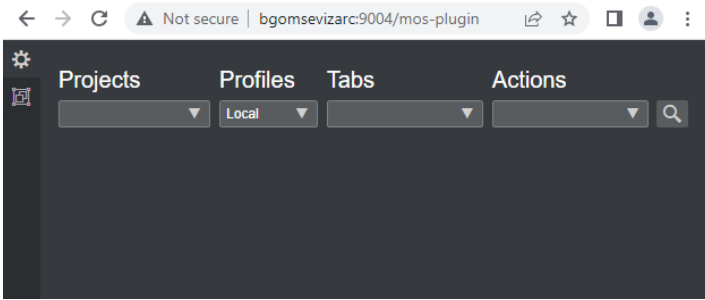
5.20.2 Check the Set-up

The Arc Web service does not need to be installed on the same machine where Viz Arc is running. If it runs on a different location it only has access to the projects stored on Graphic Hub. It is recommended to also install Viz Arc, as the configuration is done through the Viz Arc configuration panel. It is important to configure the following settings: [profiles](#), the [Graphic Hub REST](#) location and the [Viz Arc Server Ports](#).

i Test the server

Info: You can test the server by entering the host name, the configured port (default 9004 for http and 9005 for https) and the **mos-plugin** endpoint <https://bgomsevizarc.vizrt.internal:9005/mos-plugin>, or for insecure connection <http://bgomsevizarc:9004/mos-plugin>.

The server should respond as shown in the image below:

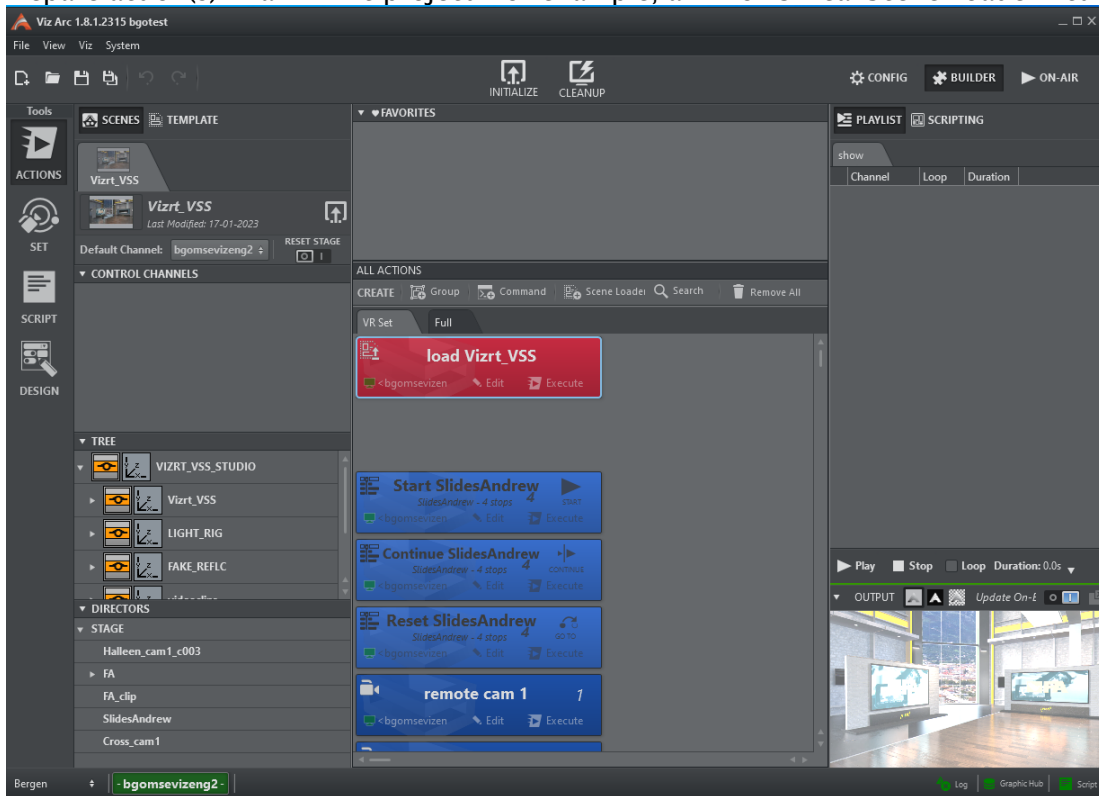


Note: Further configuration of the Database Parameters, such as *moseditor_arc_url*, *moseditor_arc_schema* and *moseditor_arc_label*, can be found in the section **Setup and Configuration > Viz Arc** of the [Pilot Edge documentation](#).

Note: Please refer to the [Viz Mosart documentation](#) for further configuration of the MSE Host for Viz Arc.

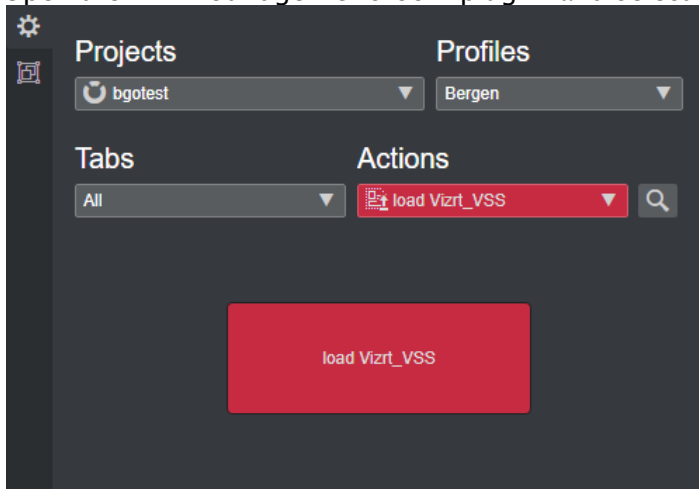
5.20.3 Usage Workflow

1. Prepare action(s) in a Viz Arc project. For example, a Viz or Unreal Scene Loader Action:

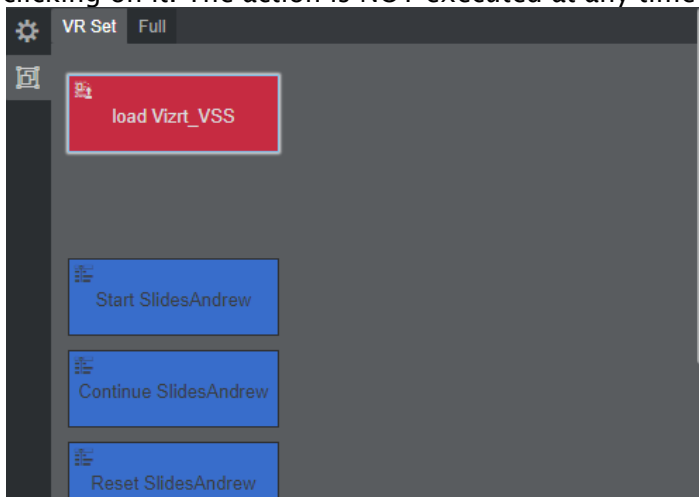


2. Save the project (preferably on Graphic Hub).

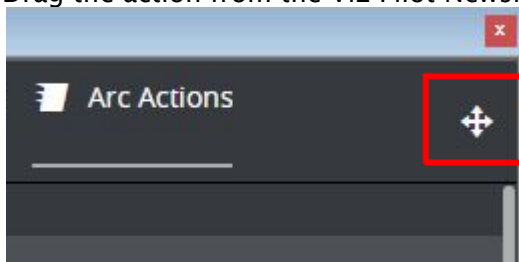
- Open the Viz Pilot Edge Newsroom plug-in and select the saved project:



- Select the project from the **Projects** dropdown, then select the profile to be used for the playout from the **Profiles** dropdown.
- Finally, select the action to be played out from the **Actions** tab. Select **All** or any specific Viz Arc Tab to filter the actions. You can also navigate the canvas view and select the action by clicking on it. The action is NOT executed at any time while navigating this panel:



- Drag the action from the Viz Pilot Newsroom plug-in into the newsroom system rundown.



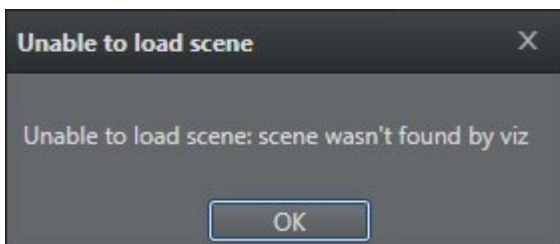
6 Troubleshooting

This page covers the following topics:

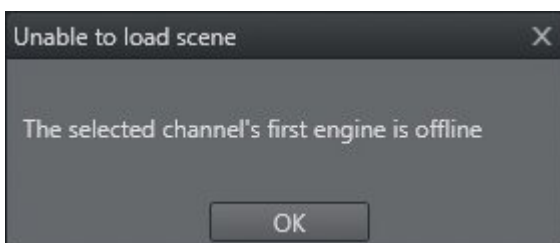
- [Vizrt Issues](#)
 - [Unable to Load Scene](#)
 - [Graphic Hub Not Connected](#)
 - [Preview Not Connected](#)
 - [Output Initialize Failed](#)
 - [Cannot Connect/Send to Viz Engine](#)
 - [Cannot Send Shared Memory Commands](#)
- [Unreal Engine](#)
 - [Unreal Engine not Available](#)
 - [Cannot Connect/Send to Unreal Engine](#)
 - [Unable to Load Unreal Level](#)
- [Support](#)

6.1 Vizrt Issues

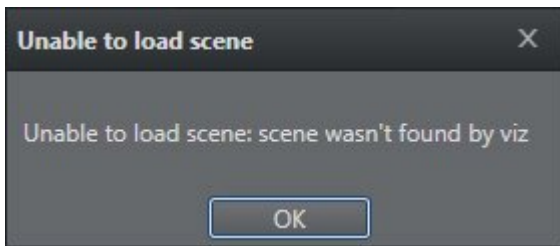
6.1.1 Unable to Load Scene



Make sure that there is a channel associated to a scene, and that you are connected to a Vizrt profile.

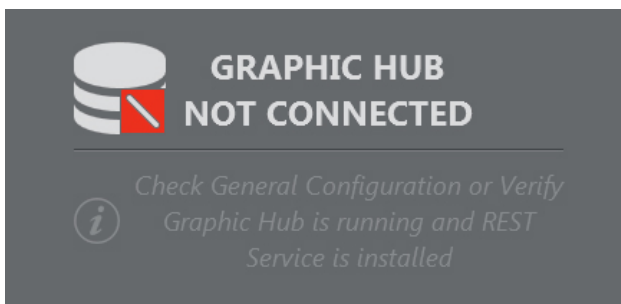


Check if Viz Engine is up and running.



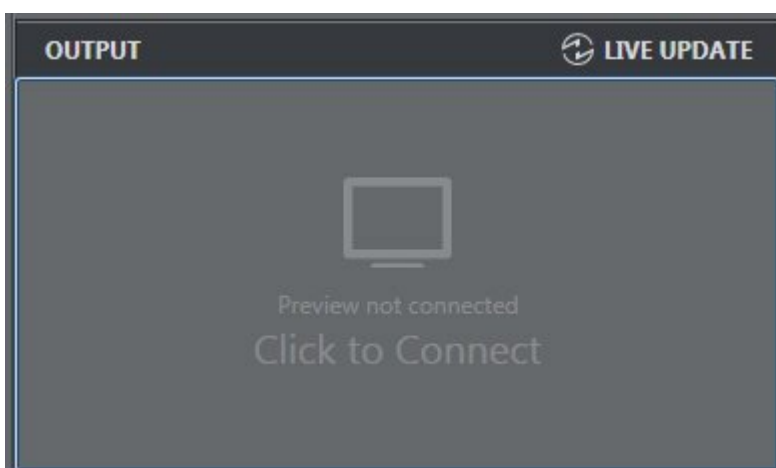
Viz Arc cannot find the selected scene. Check that you are connected to the correct Graphic Hub.

6.1.2 Graphic Hub Not Connected



- Check if Graphic Hub is up and running.
- Check in the **Config** window that the Graphic Hub REST settings are correct (Host/IP and Port, Username and password).
- Check that the machine on which Viz Arc is installed is connected to the machine containing Graphic Hub.
- Follow the procedure in [General Configuration](#) to correctly configure Graphic Hub REST in Viz Arc.

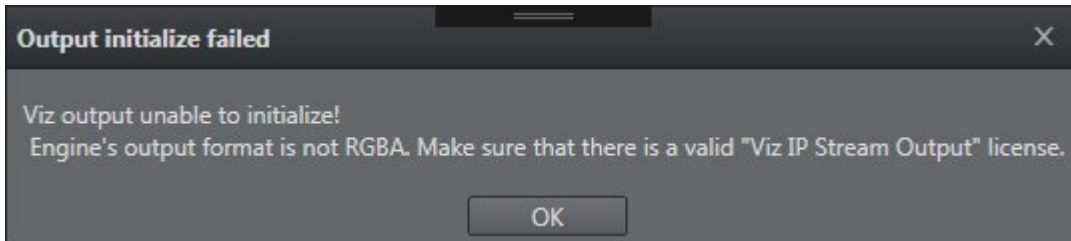
6.1.3 Preview Not Connected



- Check if Viz Engine is up and running.
- Check in the Config window that the Viz GH and MSE settings are correct (Host/IP and Port).

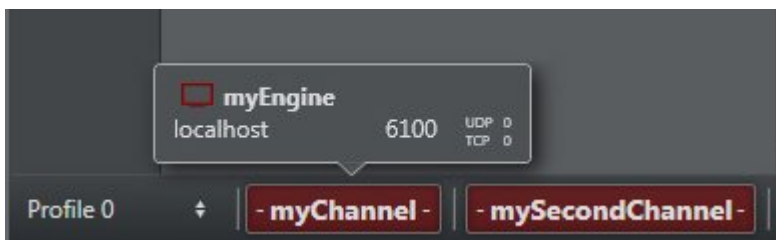
- Check that the machine on which Viz Arc is installed is connected to a Viz Engine.
- See the section [Configuring Viz Engine](#).

6.1.4 Output Initialize Failed

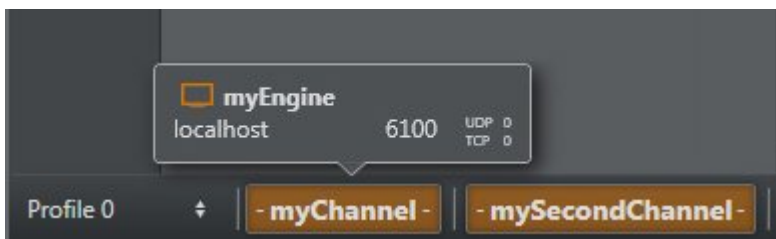


- Check that Viz Engine is configured in RGBA output format.
- Ensure that there is a valid Viz IP Stream Output license.
- Check that you are using Viz Engine 3.9 or higher.
- See the section [Configuring Viz Engine](#).

6.1.5 Cannot Connect/Send to Viz Engine



Check that Viz Engine is up and running and set in On Air mode.

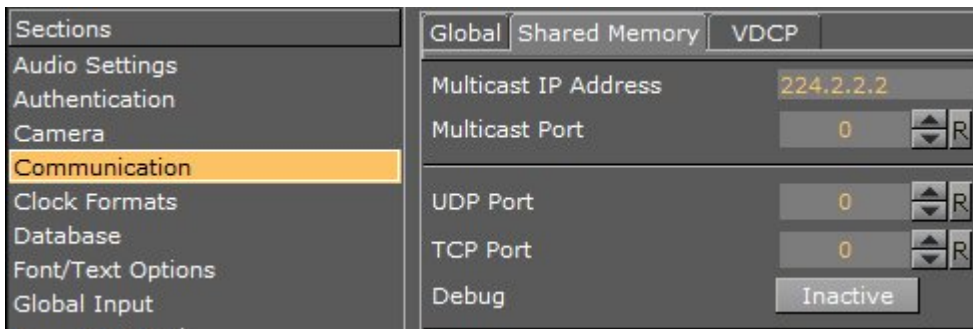


Check that Viz Engine is set in On Air mode.

6.1.6 Cannot Send Shared Memory Commands

If Viz Engine can't receive SHM commands, it's possible that the UDP and TPC ports are not configured in Viz Config.

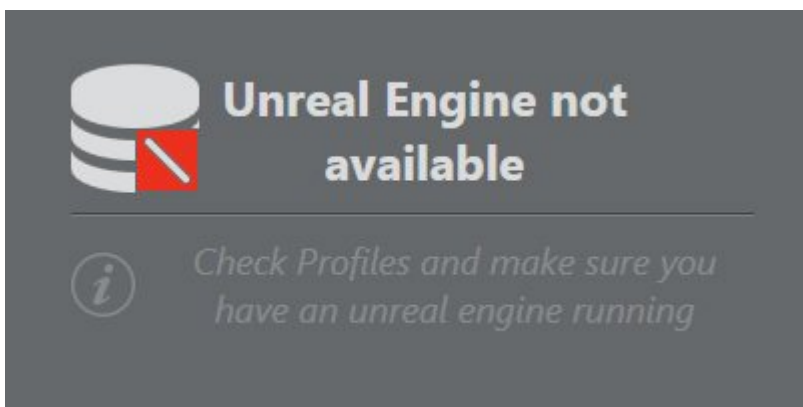
In Viz Engine, go to **Config > Communication > Shared Memory**.



For more information, see [Profiles](#).

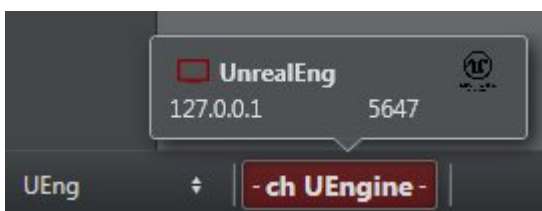
6.2 Unreal Engine

6.2.1 Unreal Engine not Available

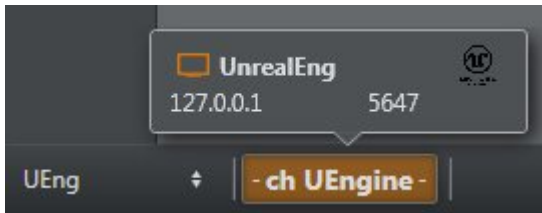


- Check that Unreal Engine is up and in Play Mode.
- Check in the Config window that the Unreal Engine settings are correct (Host/IP and Port).
- Check that the Viz Arc machine is connected to the machine containing Unreal Engine.
- Check that you have copied the *arcCom* plug-in folder to `\Epic Games\UE_4.20\Engine\Plugins`.
- See [Profiles](#) for more information on configuring Unreal Engine in Viz Arc.

6.2.2 Cannot Connect/Send to Unreal Engine

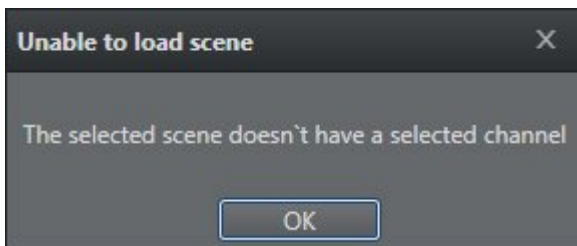


Check that Unreal Engine is up and running and set in Play mode.

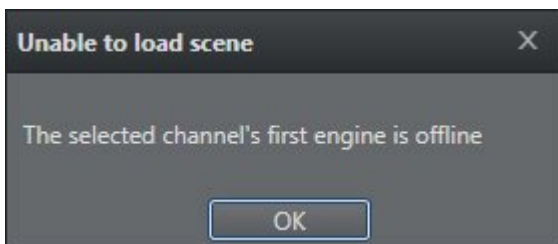


Check that Unreal Engine is set in Play mode.

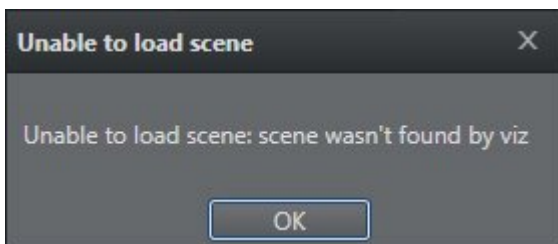
6.2.3 Unable to Load Unreal Level



Ensure that there is a channel associated to a Level, and that you are connected to an Unreal Engine profile.



Check that Unreal Engine is running and in Play mode.



Viz Arc cannot find the selected Level. Check that you are loading a Level that exists in the selected project.

6.3 Support

Support is available at the [Vizrt Support Portal](#).