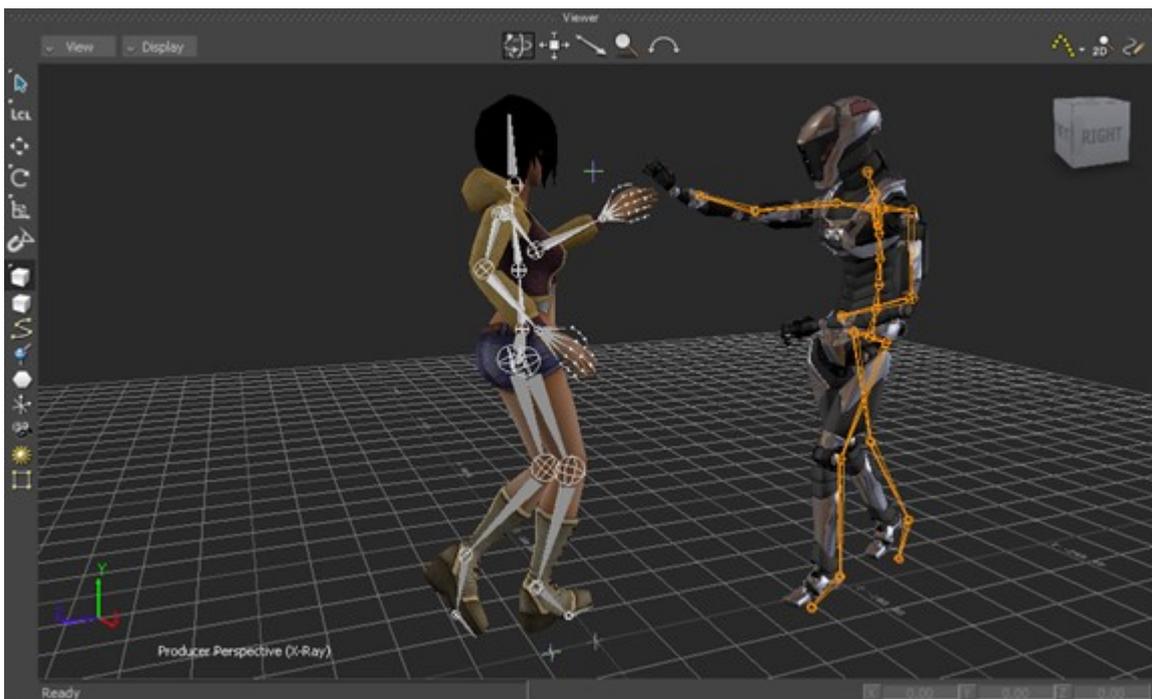




MVN MotionBuilder live plug-in

User Manual

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Revisions

Revision	Date	By	Changes
M	June 2018	JKO	Updated for 2018 plug-in

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1 Introduction

Xsens MVN Analyze/Animate, developed by **Xsens**, is the main software tool for interfacing with the MVN inertial motion capture suit. MVN Analyze/Animate allows the export of motion capture data to third party applications such as MotionBuilder, XSI, 3D Studio Max, Maya, etc. making the data available to drive rigged characters in animation and more. The data transfer to other applications is primarily file based (export) when using MVN Analyze/Animate.

However, in many scenarios it is attractive to keep the ease of use of MVN Analyze/Animate, but still being able to receive and process the motion capture data in real-time in another application, even on a another PC, possibly physically remote from the MVN system.

To this end, MVN Analyze/Animate can act as a server on a network and stream motion capture data in real-time to a client PC running a client application. This document specifically treats the use of a certain client application able to receive motion capture data in real-time, Autodesk MotionBuilder.

1.1 *What's improved in this release?*

The MVN MotionBuilder live plug-in has been updated to support the latest release of Autodesk MotionBuilder. This manual can also be used for older versions of the plug-in.

1.2 *Character tool in MotionBuilder*

The easiest way for MVN to send the complete full-body motion capture data to another application is to send the 3D positions and 3D rotations of each bone directly. MVN Analyze/Animate is able to do this in real-time streaming over the network (quaternion and Euler based rotations).

The Euler based protocol is currently used to stream to MotionBuilder. On the receiving end MotionBuilder uses a gimbal killer in real-time and applies the data onto the MVN character.

1.3 *Streaming to MotionBuilder device*

To get optimal results, the streaming settings from MVN Analyze/Animate to MotionBuilder have to be set correctly. It is recommended to set the receiving end in MotionBuilder to 60 fps.

Motion data sent by MVN Analyze/Animate is sent in real-time to MotionBuilder time wise.

However both MVN Analyze/Animate and MotionBuilder are operating on a non-real-time operating system, so timing cannot be guaranteed in the Viewer. Additionally depending on system resources MotionBuilder is not able to process all incoming data. Timing of the incoming keys is done on the basis of best effort by MotionBuilder. Timing in a recording is guaranteed, as each pose sent is time stamped.

The MVN MotionBuilder live plug-in is a good solution when real-time viewing or when recording is required. Otherwise we recommend the offline pipeline using the 'MVN_FBX_import.fbx' template to ensure optimal quality.



2 Installation

2.1 Licensing

Xsens provides a free downloadable version of the MVN MotionBuilder Live Plug-in Installer:
 mvn_mobu_plugin_2018_setup.exe

This will run an installation wizard. Just follow the steps indicated in the wizard.

2.2 Location of installed files

The installer will detect the install location of MotionBuilder and place the files in the appropriate folders. If MotionBuilder is not installed, the files will be installed in the default install location of MotionBuilder, which is:

C:\Program Files\Autodesk\MotionBuilder 2018

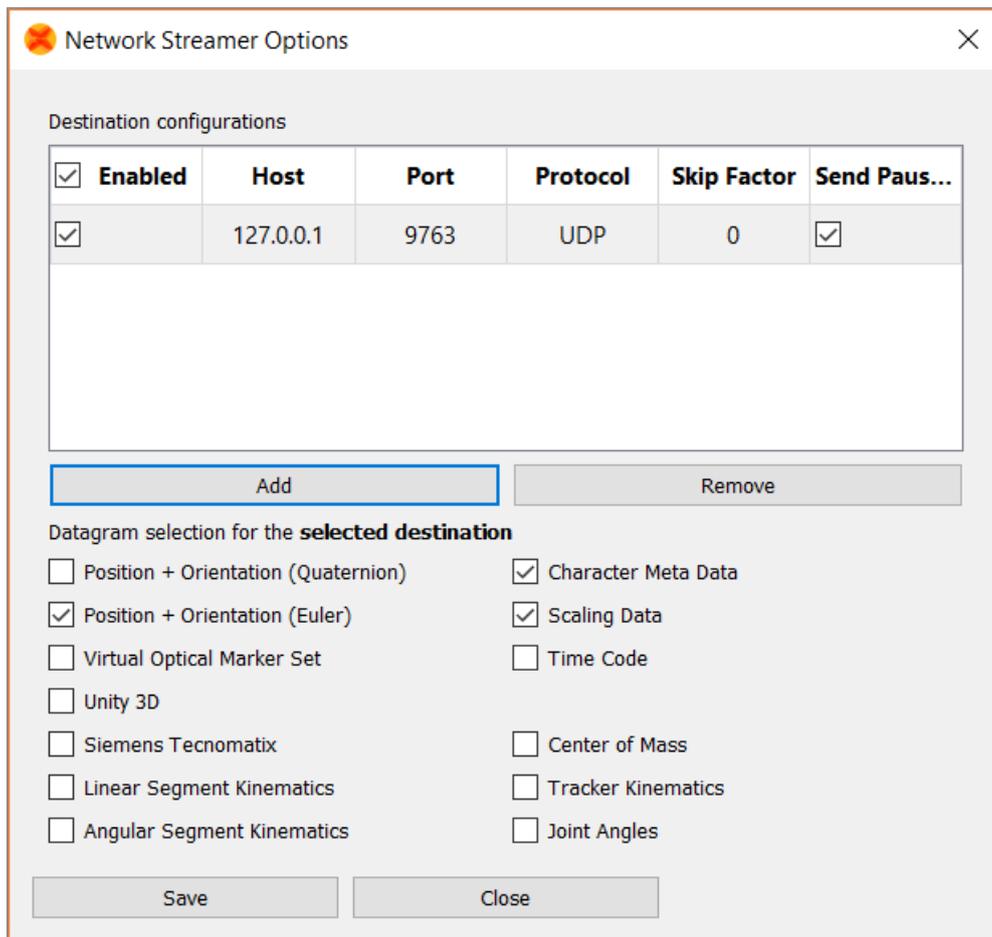
You can always manually copy the needed files to the default installation folders as indicated below.

File name	Purpose	Default Location
MVN56_Mobu2018_x64.dll	MVN MotionBuilder device plug-in	C:\Program Files\Autodesk\MotionBuilder 2018\bin\x64\plugins
MVN.TIF/MVN-I.TIF	MVN MB device icon	C:\Program Files\Autodesk\MotionBuilder 2018\bin\System
MVN_BVH_Character.fbx MVN_BVH_Character.fbxicon.tif MVN_FBX_import.fbx MVN_FBX_import.fbxicon.tif MVN_Props_FBX_import.fbx MVN_Props_FBX_import.fbxicon.tif MVNLive1_4Actors.fbx MVNLive1_4Actors.fbxicon.tif	MVN MB templates	C:\Program Files\Autodesk\MotionBuilder 2018\Templates\MVN
MKMVN01.py	FBX_import gimbal killer script	C:\ProgramData\Xsens\MVN Studio\External\MotionBuilder\Templates\MVN

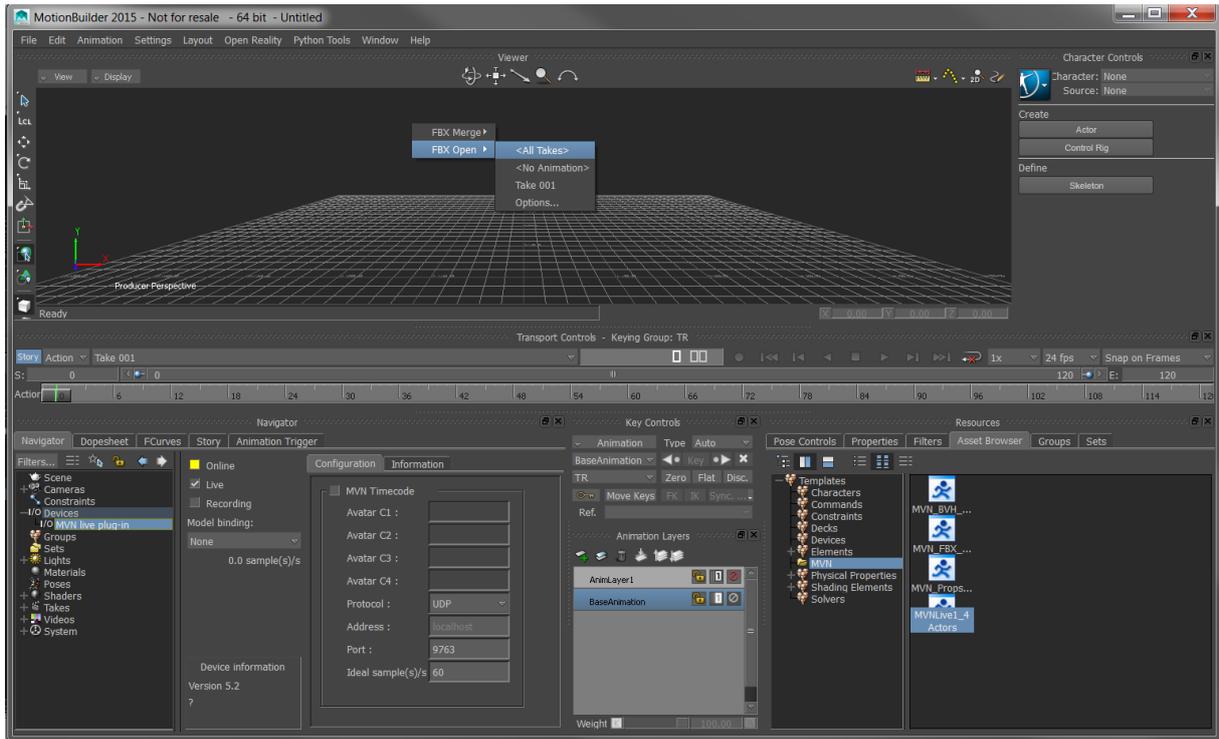
Getting Started

2.3 Setup the MVN device

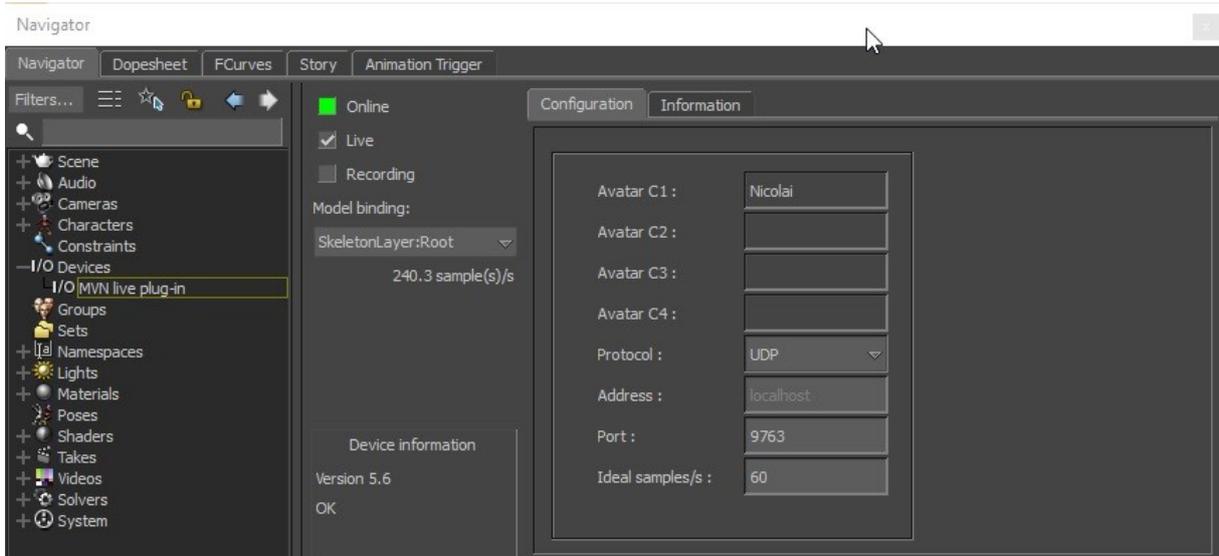
1. Open MVN Analyze/Animate
2. Open an MVN file or MVNX file or use the MVN suit in live setup
3. Go to: Options → Network Streamer



4. Add a target destination (with default values: Host 127.0.0.1, Port 9763, Protocol UDP)
5. Select a format that the MotionBuilder plug-in will interpreted properly: "Position + Orientation (Euler)".
6. When running MotionBuilder on another PC, input the IP-address of that PC in the Host field. If it is the same PC as where MVN Analyze/Animate is running, you can just leave it at the default '127.0.0.1' = localhost).
7. Open MotionBuilder
8. Drag and drop the 'MVNLive1_4Actors.fbx' from the 'MVN' folder in the Asset Browser into the viewer and choose "FBX Open" > "<All takes>".



9. Go to: Navigator → Devices → MVN live plug-in



10. If the device is Offline (red), tick 'Online' (first yellow, then green) and 'Live' box and after a while you should be receiving data from MVN Analyze/Animate, visible by an increased number of "sample(s)/s".

NOTE: A warning may appear saying:

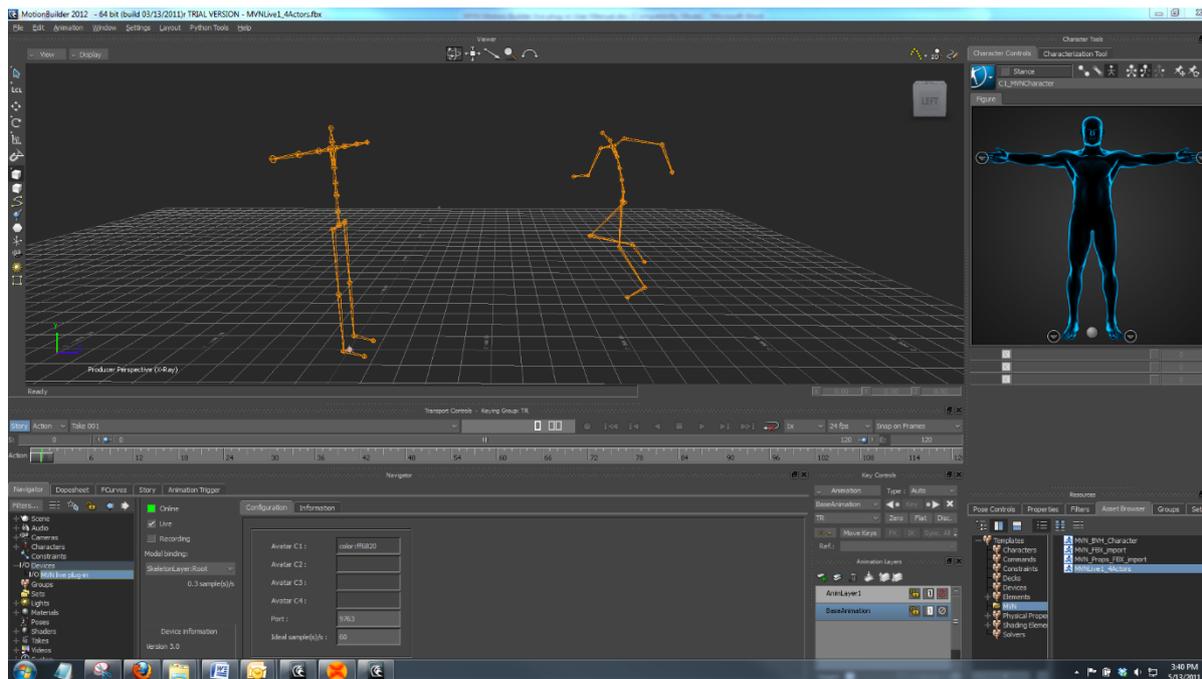


Switch in MVN Analyze/Animate in 'Options' 'Network Streamer Settings' the Protocol and data set to 'Euler-base orientation'

This is to remind you during setup that the right data set needs to be selected.

11. Set Ideal sample rate to 60
12. Change the Port number if needed, the default port number is '9763'.

You should now be able to receive motion capture data in real-time from MVN Analyze/Animate mapped onto the MVN Character defined in the template. MVN Analyze/Animate will stream from its active window that is playing. This can be an MVNX, MVN, MVNS file or a live MVN system



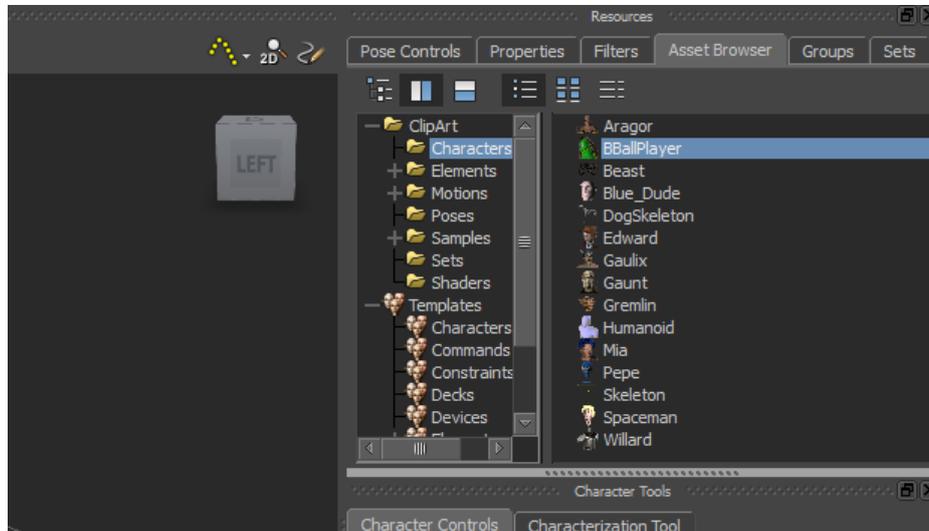
2.4 Multiple Actors

The plug-in supports the handling of up to 4 actors at once. The names of each character in MVN Analyze/Animate will be used as identifier of the corresponding Character in MotionBuilder. You can map the Characters to specific actors by selecting their "Source" in the "Character Controls"

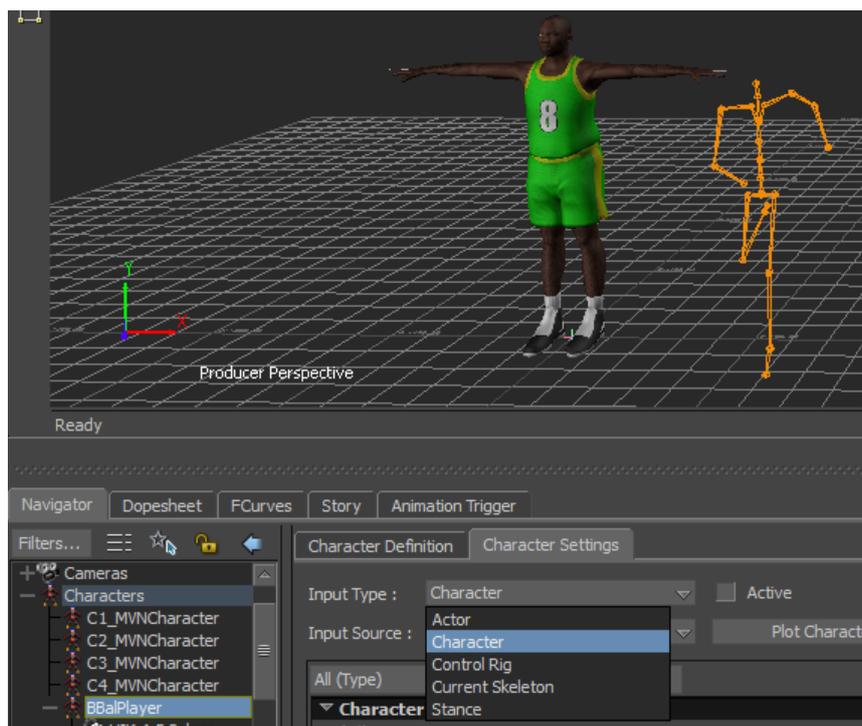
If you do not use multiple actors, you can easily hide any unused characters in MotionBuilder, in the View → Schematic view (Ctrl+W). Select the unused nodes (e.g. by dragging a rectangle around them) and click 'Display' → 'Hide Selection' (Shift+H). You return to the original view with View → Perspective (Ctrl+E), "Producer perspective".

2.5 How to map on a Character

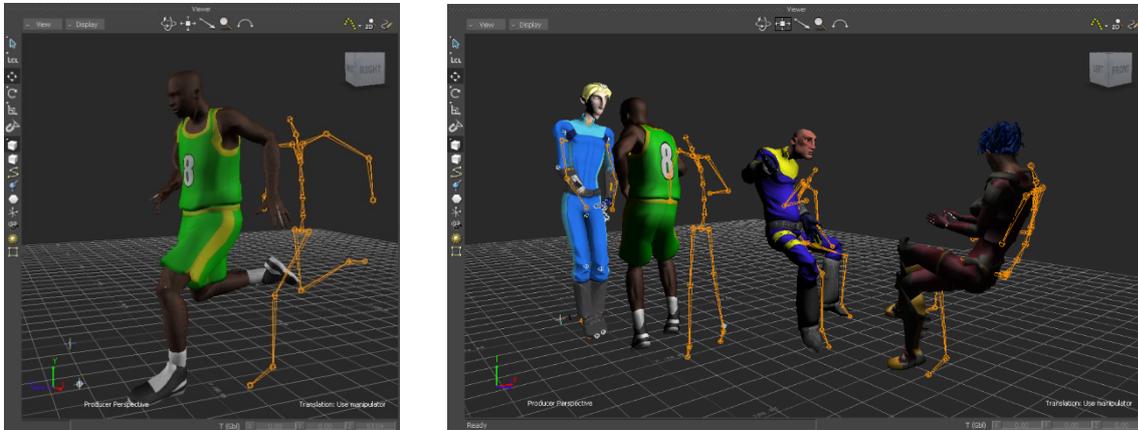
1. Choose a character e.g. by dragging one into Scene from the asset browser:



2. Choose FBX Merge → No Animation
3. Expand Characters in Navigator window → Double click your character
4. Under input type choose → Character Input
5. And tick the 'Active' box



MotionBuilder will now re-target the motion capture data received through the ‘MVN Character’ onto the character rig. This re-targeting and the settings used in the re-targeting of the motion capture data can be very advanced, as well as the character rig. This is not discussed further in this document.

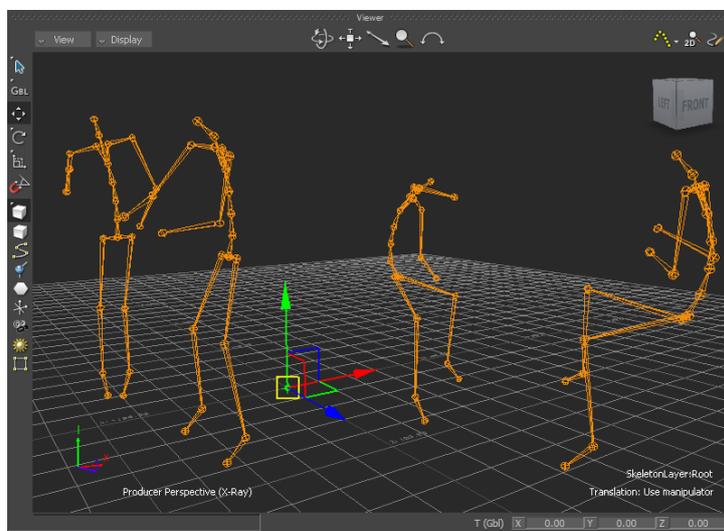


3 Advanced Features

3.1 Translate Rotate the reference node

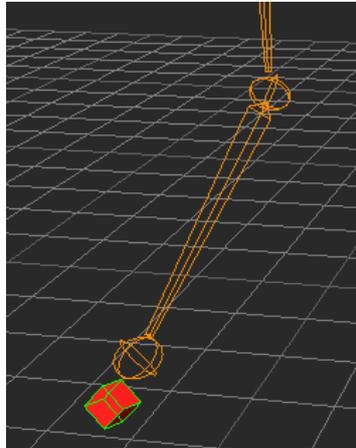
By selecting the ‘SkeletonLayer:Root’ you can move the local reference of the motion captured data inside you scene. This can be convenient when placing multiple persons/character in a single scene or for alignments with a scene.

You can also translate and rotate each individual character separately by selecting ‘SkeletonLayer:C#_Root’.



3.2 Props

When working with props you need to use the 'MVNLive1_4Actors.fbx' template file to bring in the prop data in MotionBuilder. The props are visualized by a red cube node, this can be used as an input to drive the actual prop of the final character.

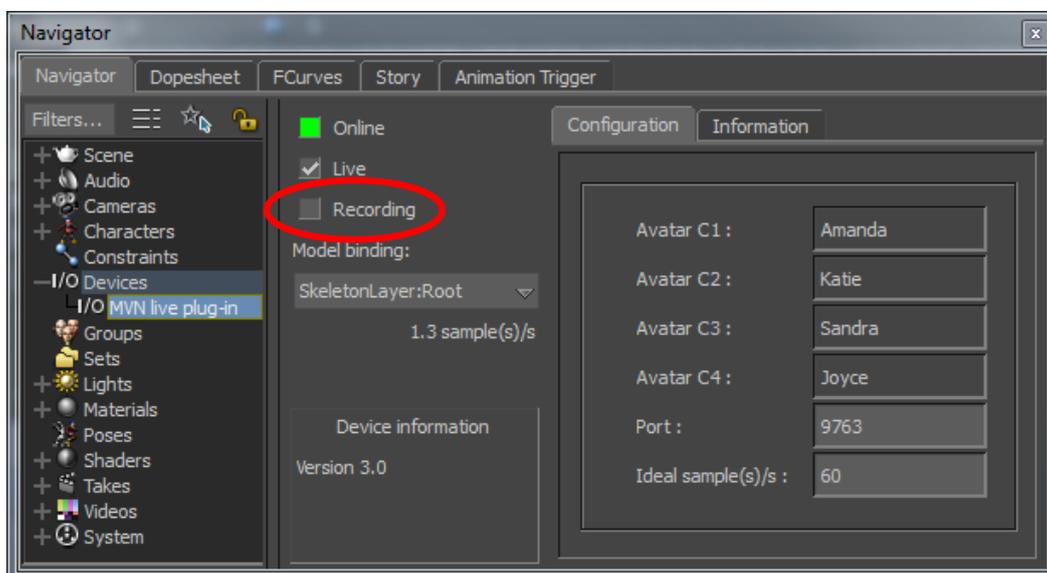


3.3 Recording

The MVN MotionBuilder live plug-in allows you to record in real-time. MVN Analyze/Animate is time stamping every frame it sends to MotionBuilder, this information is needed to place the frames precisely on the timeline.

We advise only to use this functionality when recording in MotionBuilder is required. This may be needed when you combine recording with another device or speed up the pipeline. Otherwise we recommend the offline pipeline using the 'MVN_FBX_import.fbx' template to ensure optimal quality.

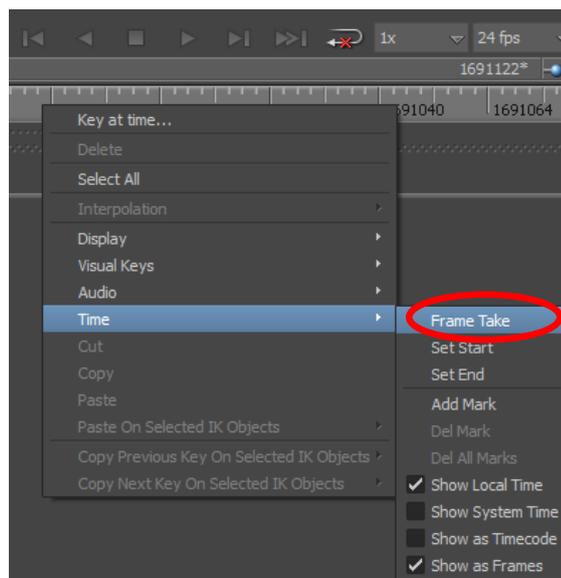
1. First you need to check the "Recording" check box in the MVN device



- Then on the time bar you have to press first the “Record” and then “Play” buttons and you will start recording

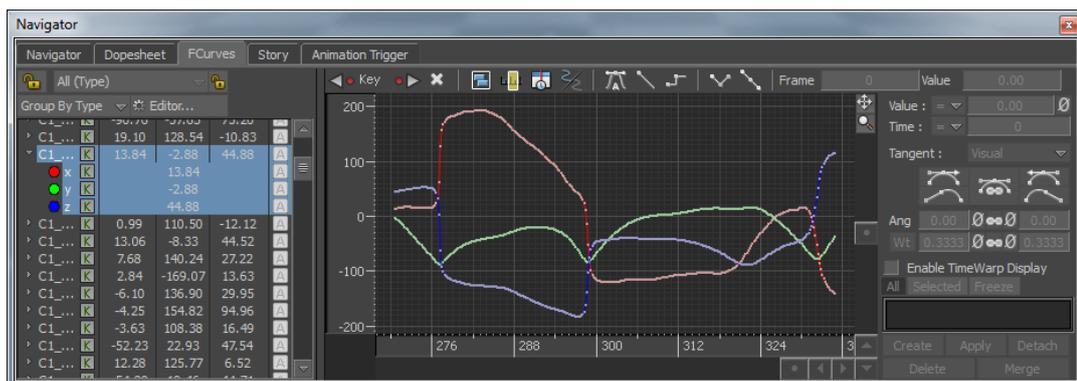


- You stop the recording by pressing the “PLAY” button again
- After you have stopped the recording you need to right click on the time bar and choose “Time>Frame Take”, which will put the beginning and end of the recording in the timeline



NOTE: you are recording on the MVN device, so if you need to see the animation curves you need to:

- Select the MVN device in the “Navigator” window and uncheck the “Live” check box (to stop the live stream)
- With the MVN device still selected go to the “FCurves” tab in Navigator and select the curve you want to view or edit





3.4 Customer Support

Xsens Technologies B.V. is glad to help you with any questions you may have about the MVN MotionBuilder live plug-in or about the use of the technology for your application. Please contact Xsens Customer Support:

- ➔ by e-mail: www.xsens.com/support
- ➔ telephone: Xsens HQ +31 88 97367 00 / Xsens US office 310-481-1800

To be able to help you, please mention the 8-digit number on the Xsens Sticker, you can find this at the handle of the Suitcase or backpack.