Motive to Unity

version 2.0
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Introduction

This tutorial gives an overview of how to stream tracking data for multiple rigid bodies from Motive Body 1.7 Beta 2 into Unity 4.3.4. The NatNet 2.7 SDK includes a UnitySample application that by default only streams data for a single rigid body; this sample has been extended slightly to allow for streaming multiple rigid bodies. UnitySample.exe streams data from Motive to Unity over UDP as an XML stream. The UnitySample Unity project code has been extended substantially to streamline the process of streaming tracking data into Unity.

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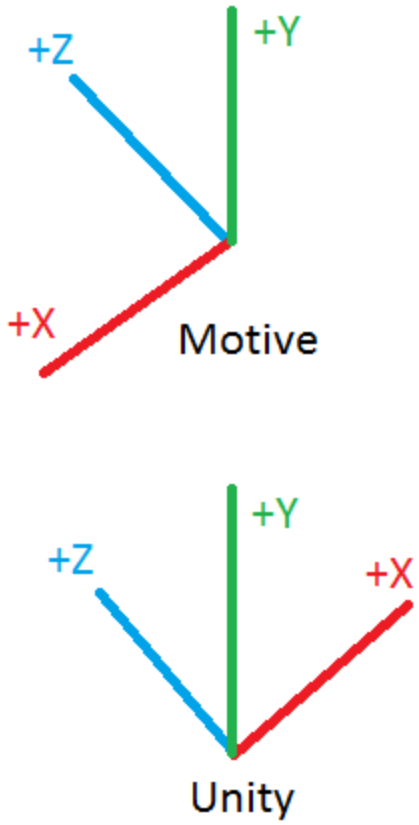
Download Code

Download the code for the UnitySample.exe and Unity package from here:
https://drive.google.com/file/d/0B_5Y8udovIdbQWxFNWVuMGF2V2s/view?usp=sharing

Rigid Bodies

1. Creating Rigid Body
    a. Start Motive
    b. Choose Layout > Create
    c. Place the object you want to track in the middle of the volume with one of the markers aligned with the center of the room as defined by the calibration square.
    d. Figure 1 below illustrates the alignment between the Right Handed Motive 1.7 Beta 2 coordinate system and the Left Handed Unity coordinate system. Refer to this alignment when creating your prefab in Unity and aligning it with the rigid body as defined in Motive. **Note: the coordinate systems changed between Motive 1.6 Beta 2 and 1.7 Beta 2. Make sure you are using Motive 1.7 Beta 2.**



(Figure 1) Coordinate System Correspondence between Motive 1.7 Beta 2 and Unity

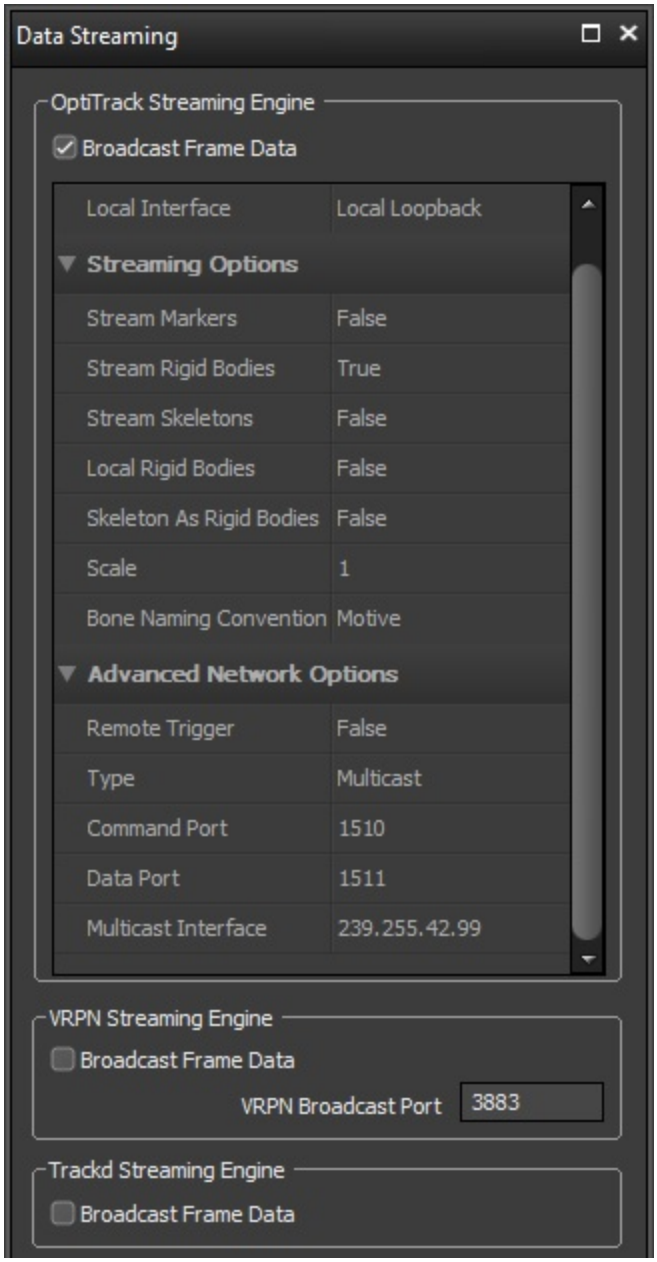
e. In Perspective View drag select the markers then right click > Rigid Body > Create from selected markers.
f. Select the Rigid Body in the Project > Assets view. Right click the Rigid Body and choose Settings
    i. Rigid Body Settings >General Properties > Name: Give the rigid body a name.
    ii. Rigid Body Settings > Advanced > User Data: Choose a unique integer value that no other rigid body in your project shares.

2. Alignment of Rigid Body Center
    a. When a rigid body is first created the center of the rigid body is automatically calculated to the be the center of mass of all the markers. **It's important to understand that this center must correspond precisely to the center pivot of the Unity object you want to control.** Any easy way to make sure this center is aligned is to offset the center in Motive to align with a specific marker and then when you create your Unity object make sure the local pivot aligns with this marker.
    b. Select the Rigid Body in the Project > Assets view. Right click the Rigid Body and choose Settings.

    c. Orientation > Pivot Point Translation: Use this tool to enter positive or negative values to offset the center of the rigid body until it aligns with the marker that aligned with the center of the room.
3. Unity Prefab Alignment with Rigid Body Center
    a. When you create your prefab object be sure to translate and rotate the object until its local pivot of the root of the prefab corresponds precisely with the center of the rigid body as defined in Motive. Refer to Figure 1 to align the rotation of the prefab with the Motive coordinate system.

Streaming Data into Unity

1. Motive
    a. View > Data Streaming > OptiTrack Streaming Engine and use the following settings:



2. In the downloaded ZIP find the NatNet_SDK_2.7_UnitySampleModifiedToEnableMultipleRigidbodies > Samples > bin folder and run UnitySample.bat to start UnitySample.exe and pass it the local IP addresses via the command line “UnitySample.exe 127.0.0.1 127.0.0.1”. This app will then begin streaming data from Motive over UDP for Unity to read.
3. Unity
    a. In the download ZIP file find MotiveToUnity_UnityProject > MotiveToUnity.unitypackage.
    b. Open your Unity project and import the package by going to Assets > Import Package > Custom Package and selecting MotiveToUnity.unitypackage.

c. Open the sample scene in the project directory Optitrack > Sample.unity to see an example configuration of tracking 2 rigid bodies.
d. SlipStream Prefab configuration
    i. The SlipStream.cs script reads the UDP XML data coming from UnitySample.exe.
    ii. Values that work with the NatNet source code are:
        1. IP: 127.0.0.1
        2. Port: 16000
e. OptitrackRigidBodyManager prefab
    i. OptitrackRigidBodyManager.cs parses the XML coming from SlipStream.cs and creates an array of rigid body data.
    ii. Origin: The Origin prefab is linked to this variable to define the point in your Unity scene that corresponds to your Motive calibration square center. This origin can be moved around your scene to offset the tracking data to be wherever you want it located.
f. Rigid Body Prefab Config
    i. Drag into your scene the prefab for the object you want to control with a rigid body.
    ii. Add the OptitrackRigidBody.cs script to the root level of your prefab and enter the ID integer that equals the Motive > Rigid Body Properties > Rigid Body Settings > Advanced > User Data field.
    iii. If you want, you can drag a different Origin transform onto the Origin Override field to override the Origin used by OptitrackRigidBodyManager.cs.
    iv. You can toggle on or off the checkboxes for Use Position or Rotation tracking.
    v. Play the scene and you should see your prefab moving when you move the rigid body.
    vi. Refer back to the section “Unity Prefab Alignment with Rigid Body Center” if your object is not tracking correctly.