Easy PUN setup for playmaker

[Update 0.01 – Notes on last page]

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1.Intro

2.PUN setup

To start using this example project or the prefabs we first need to setup Photon/PUN.
Klick on “window” in the toolbar menu and klick on “Photon Unity Networking”.
The Photon setup wizard will popup, klick on setup.
Here we have a couple of options, if you dont have a account yet you can submit your e-mail or go the the PUN website to register.
If you already have an account you can setup PUN using your appid or host your own server.
In this case we will setup PUN using a appid.
Klick on setup under “I am already signed up.
Let me enter my AppId” and enter your appid in the “Your AppId” inputfield.
Now chose the region you want PUN to manage your networking trough, after doing that klick save and close the window.

For every scene you want to use over the network you need to add a Playmaker photon proxy.
To do this you go back to the Photon setup wizard, we have a new button to chose.
This button will add the Playmaker photon proxy to your scene.

Now PUN has been setup and you are ready to use the prefabs I have provided you with.

(For a quick start you can use the 2 existing scenes in the project but be sure to read on about the Player to use your own player prefab and instantiate-player.Also make sure that all load level's are changed to fit your game. See Load

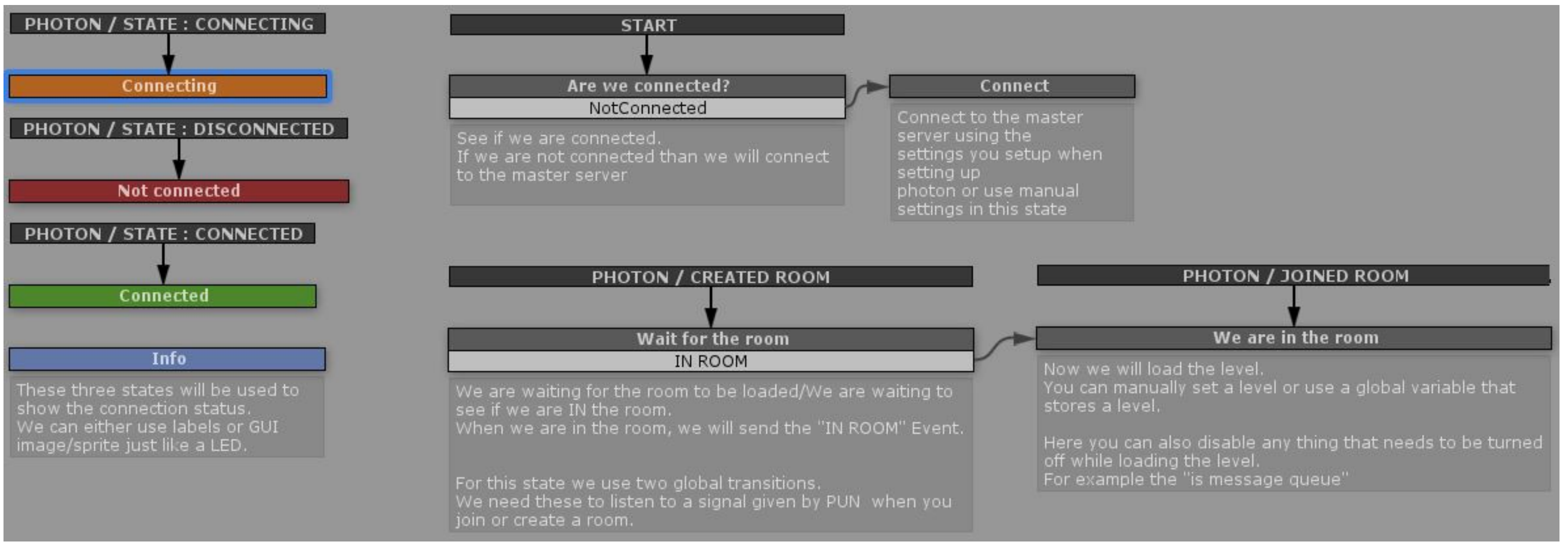
level num list for a list of states using it.)

3.1 PUNnetworkManager

Location: Your scene where you handle your multiplayer menu's.
Location demo scene: MainMenu.
Folder location: Prefabs.

This will manage your network connection and all the photon global listeners
First it wil connect to the network, while doing this PUNnetworkManager sends feedback to the user.
To give the user feedback showing the network status, we have setup 3 global events for connecting(Orange),disconnected(Red) and connected(Green).
You can use these states to show a visual representation of that state, i left these blank so add your own or just use it as an indicator for the editor.

After PUNnetworkManager has done the connecintg, it wil listen to 2 global events.
Both global events will come from Create&Join rooms Prefab.
CREATED ROOM will be started when a user creates a room in the menu.
JOINED ROOM will start when a user joins a room or after a user creates a room in the menu.
This will load the level from the room the user is joining.
We also disable "Photon Network Set Is Message Queue" or else we wont be able to see players who were already connected before the user connected.



These three states will be used to show the connection status.
We can either use labels or GUI image/sprite just like a LED.

See if we are connected.
If we are not connected than we will connect to the master server

Connect to the master server using the settings you setup when setting up photon or use manual settings in this state

We are waiting for the room to be loaded/We are waiting to see if we are IN the room.
When we are in the room, we will send the "IN ROOM" Event.

For this state we use two global transitions.
We need these to listen to a signal given by PUN when you join or create a room.

Now we will load the level.
You can manually set a level or use a global variable that stores a level.

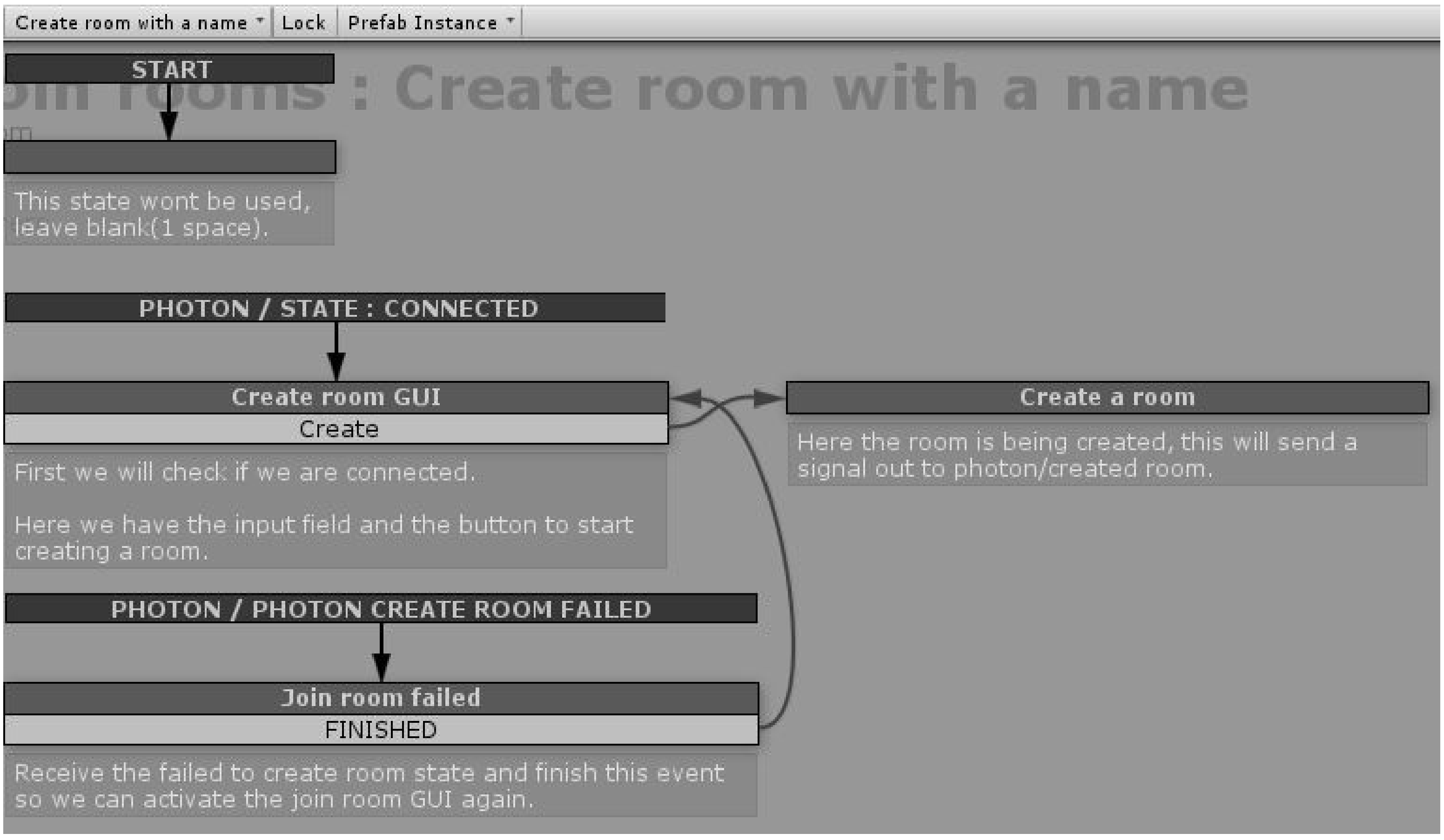
Here you can also disable any thing that needs to be turned off while loading the level.
For example the "is message queue"

3.2 Create&Join rooms

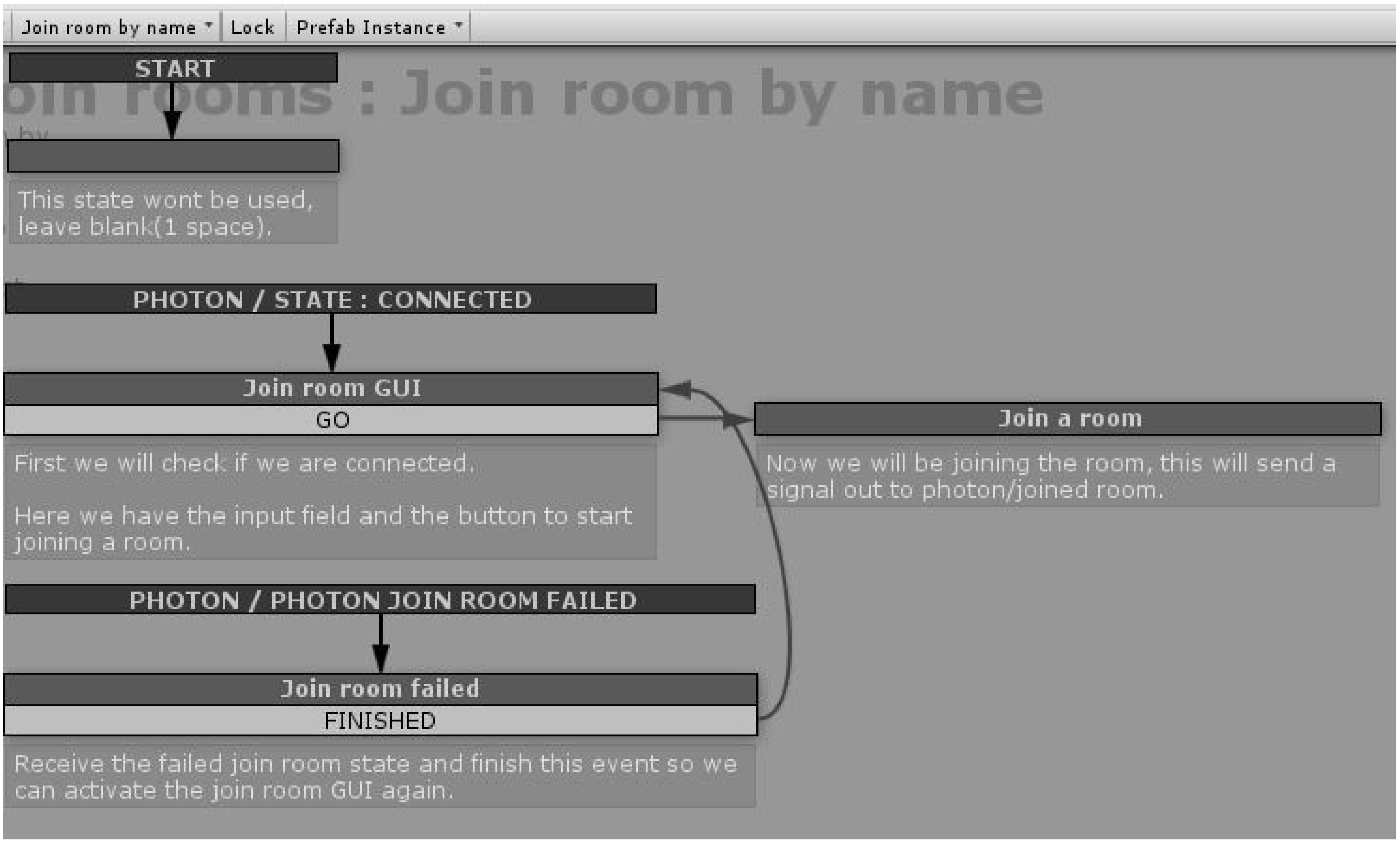
Location: Your scene where you handle your multiplayer menu's.
Location demo scene: MainMenu.
Folder location: Prefabs

This will manage your joining and creating rooms,this will also send “CREATED ROOM” and “JOINED ROOM “ global event to PUNnetworkMaager.
Create&join rooms uses 4 FSM's:

Create room with a name is used to make rooms with names.
This fsm contains a GUI inputfield and button that takes the input from the user and creates a room with it. This GUI will only show if the user is connected,to do that we use the global event “CONNECTED”. Also when a user fails to create a room the “CREATE ROOM FAILED” global event will be started. This will show a popup that creating a room failed and wil activate the create room GUI again. If we dont reactivate the create room GUI, it wil not show after failing.


Create room with a name
Lock
Prefab Instance
oin rooms : Create room with a name
START
This state wont be used, leave blank(1 space).
PHOTON / STATE : CONNECTED
Create room GUI
Create
First we will check if we are connected.
Here we have the input field and the button to start creating a room.
Create a room
Here the room is being created, this will send a signal out to photon/created room.
PHOTON / PHOTON CREATE ROOM FAILED
Join room failed
FINISHED
Receive the failed to create room state and finish this event so we can activate the join room GUI again.

Join room by name is the same as create room with a name but instead of creating a room, the user joins a room based on the name the user inputs in the inputfield.
“JOIN ROOM FAILED” will be activated after a user fails to join a room, this wil reactivate the join room GUI.



This state wont be used, leave blank(1 space).

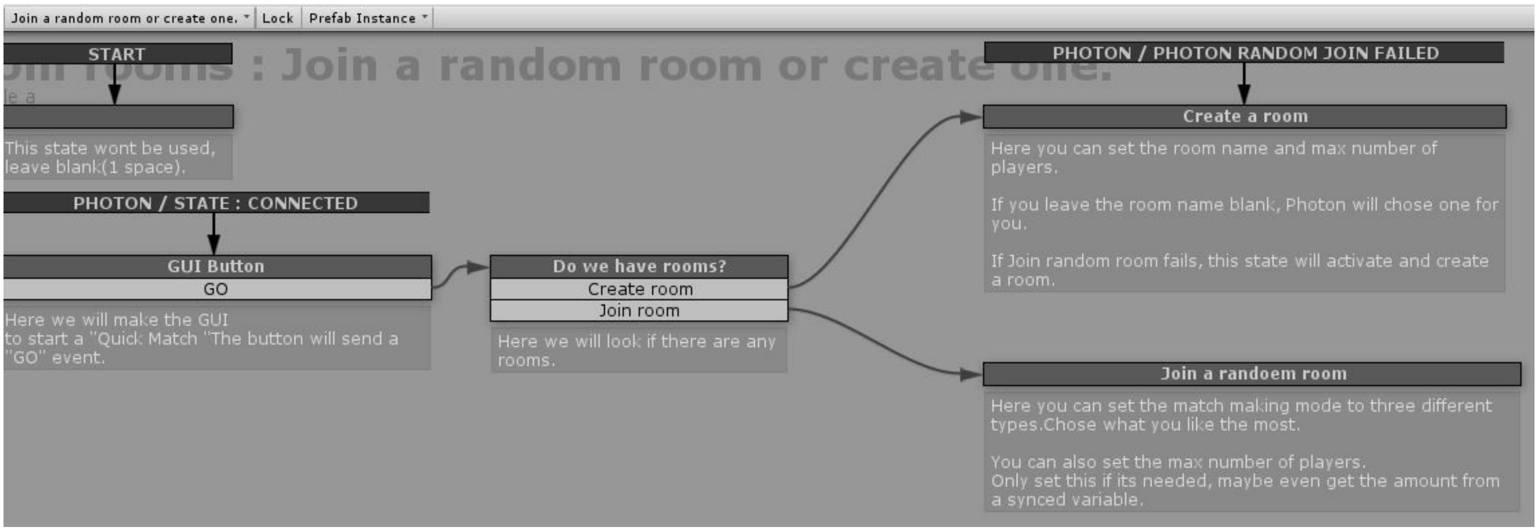
First we will check if we are connected.

Here we have the input field and the button to start joining a room.

Now we will be joining the room, this will send a signal out to photon/joined room.

Receive the failed join room state and finish this event so we can activate the join room GUI again.

Join a random room or create one is used to act as a quick match making system.
This fsm containsa GUI button that lets users join a randome room, a room wil be created if there are no rooms.


Join a random room or create one.
Lock
Prefab Instance
START
oin rooms : Join a random room or create one.
PHOTON / PHOTON RANDOM JOIN FAILED
Create a room
PHOTON / STATE : CONNECTED
GUI Button
GO
Do we have rooms?
Create room
Join room
Join a randoem room

This state wont be used, leave blank(1 space).

Here you can set the room name and max number of players.

If you leave the room name blank, Photon will chose one for you.

If Join random room fails, this state will activate and create a room.

Here we will make the GUI to start a "Quick Match "The button will send a "GO" event.

Here we will look if there are any rooms.

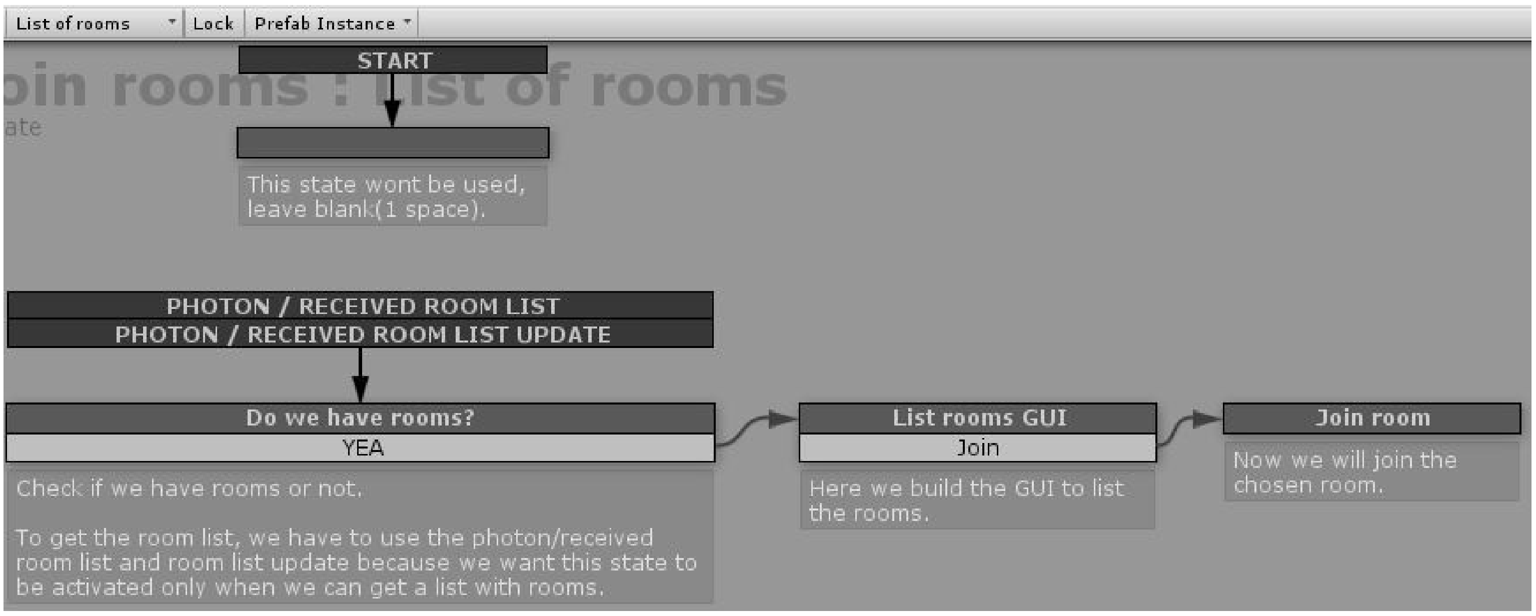
Here you can set the match making mode to three different types.Chose what you like the most.

You can also set the max number of players.
Only set this if its needed, maybe even get the amount from a synced variable.

To do this the state “do we have rooms?” will be activated after the user pushes the GUI button.
In “do we have rooms?” we will check if there are rooms or not and based on that we will preform the next state.

List of rooms is used to show a list with rooms that the player can klick on and join.
List of rooms listens to 2 global events, these are the “RECIEVED ROOM LIST” and “RECIEVED ROOM LIST UPDATE”.
These 2 are used to get the rooms and list them in the GUI and update the list when its changed.

The first state of List of rooms wil check if we have rooms, if there are rooms the state wil activate the list room GUI in the next state.



This state wont be used, leave blank(1 space).

Check if we have rooms or not.

To get the room list, we have to use the photon/received room list and room list update because we want this state to be activated only when we can get a list with rooms.

Here we build the GUI to list the rooms.

Now we will join the chosen room.

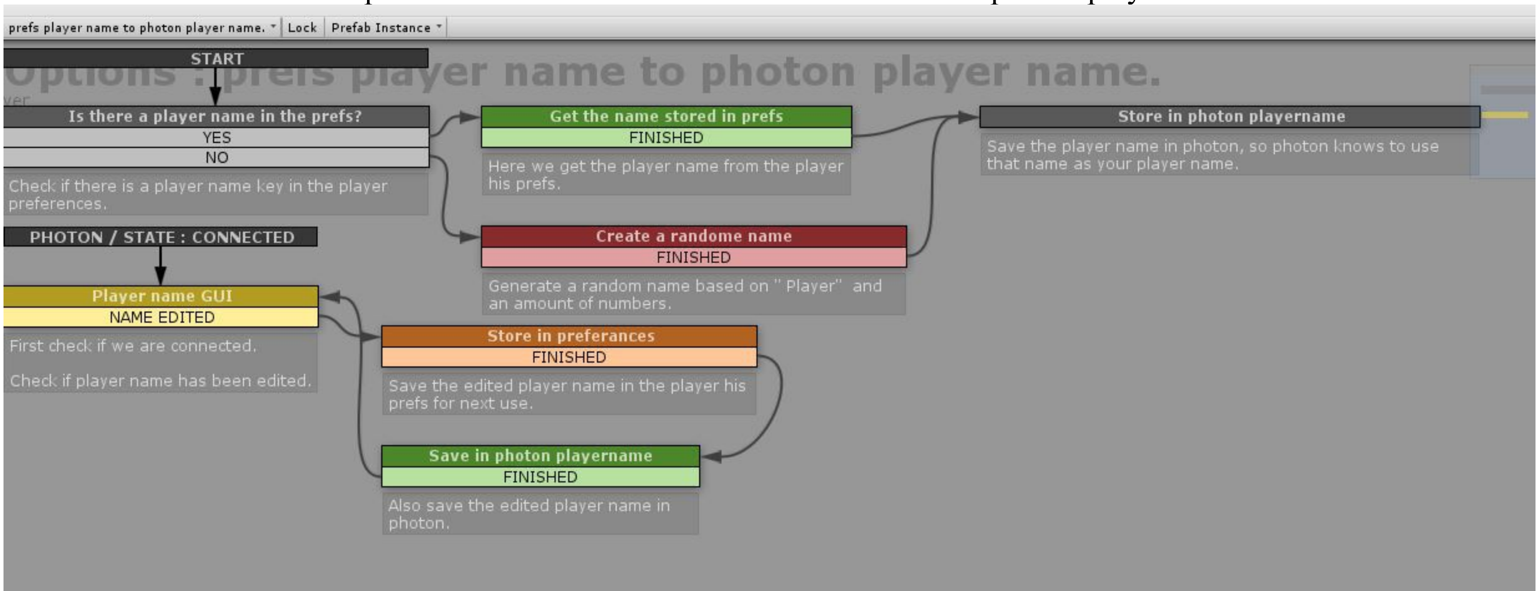
In the list rooms GUI we show the user the list of rooms with a klickable button, if a user klicks on a room the user wil join that room.

3.3 MPplayerOptions

Location: Your scene where you handle your multiplayer menu's.
Location demo scene: MainMenu.
Folder location: Prefabs

With this prefab we will handle the player names.
In the fsm there are 2 main states to look at.
The first is the starting state that looks in the playerprefs to see if there is a player name or not.
If there is a player name,it will take it and save it in PUN.
If there is no player name it will make a random name ans save that randome name in PUN.

The second is the global event “CONNECTED” that has the player name GUI.
With this the user can assign his/her own player name in the inputfield.
If the inputfield content has ben changed(using the “changed event” in GUILayout TextField) the next state will be activated, in “store in preferances” the new playername is saved in the player prefs.
When the store in preferances state is finished it will start “Save in photon playername” state to


prefs player name to photon player name.
Lock
Prefab Instance
Options : prefs player name to photon player name.
START
Is there a player name in the prefs?
YES
NO
PHOTON / STATE : CONNECTED
Player name GUI
NAME EDITED
Get the name stored in prefs
FINISHED
Create a randome name
FINISHED
Store in preferances
FINISHED
Save in photon playername
FINISHED
Store in photon playername

Check if there is a player name key in the player preferences.

First check if we are connected.

Check if player name has been edited.

Here we get the player name from the player his prefs.

Generate a random name based on " Player" and an amount of numbers.

Save the edited player name in the player his prefs for next use.

Also save the edited player name in photon.

Save the player name in photon, so photon knows to use that name as your player name.

store the new player name in PUN and loop back to Player name GUI.

3.4 Instantiate-player

Location: Every multiplayer scene/level.
Location demo scene: InGame.
Folder location: Prefabs

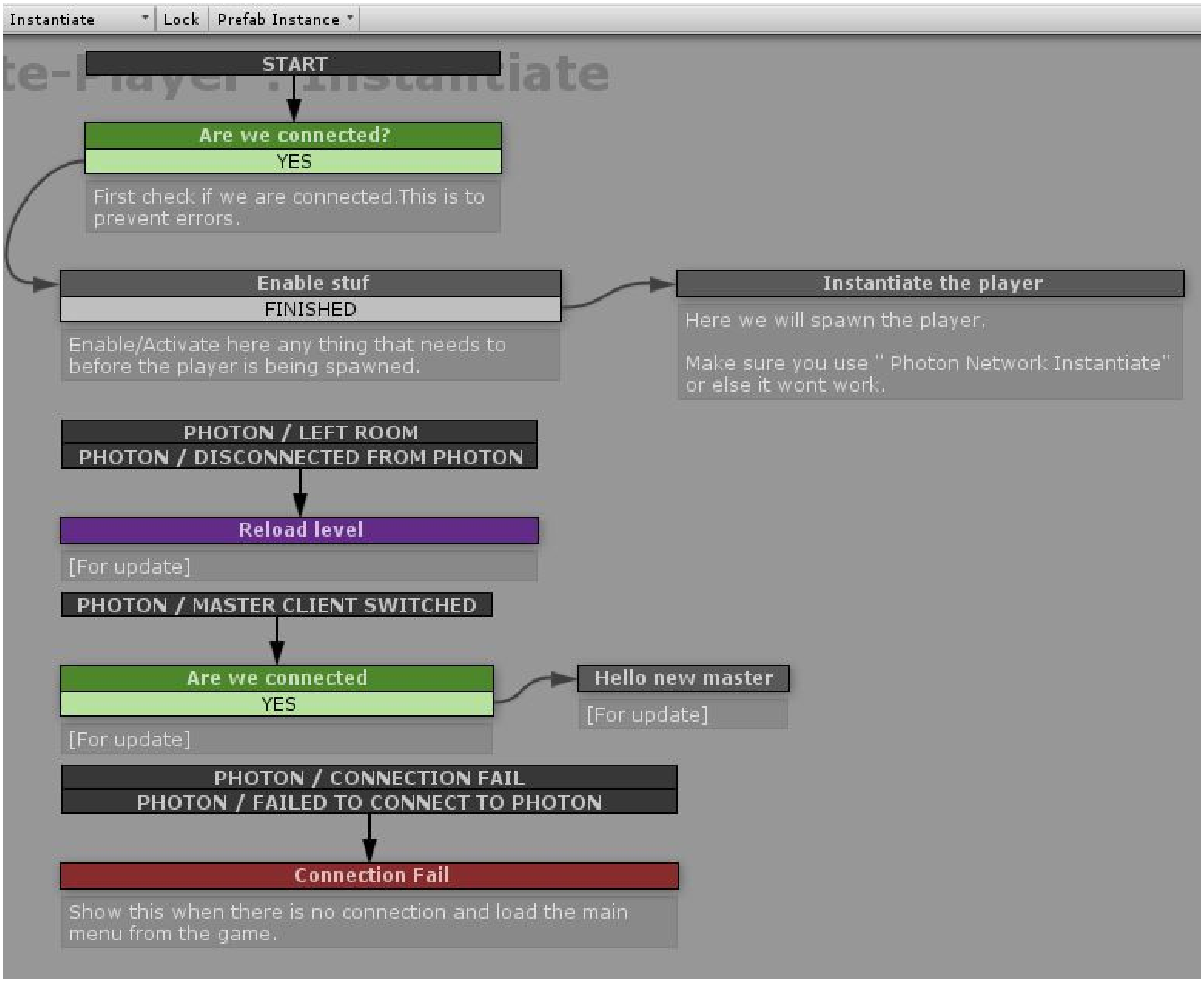
With this prefab we can instantiate our player in the multiplayer scene/level/game.
At the start of the scene we check if we are connected, we do this to prevent errors and unwanted drawcals and what not.
If we are connected we will enable stuf that has to be enabeled bevore we instantiate the player, what we enable here depends on your game apart from "Photon Network Set Is Message Queue" we always need to enable the is message quing or else we wont see players that are already connected before the user was joining.
Do not enable character related stuf, this is done in Player enabler.

Apart from the starting state we have 3 other states with global events.

"**Reload level**" will be started after the user quits the multiplayer game(left the room) or got disconected from photon, to get this information we use "LEFT ROOM" and "DISCONNECTED FROM PHOTON" global events.
If this state is started the state wil load the multiplayer scene(in the demo scene its level num 0).
To use this state in your own project, make sure you change the load level num to the level index of your multiplayer menu or use load level name instead.

"**Master are we connected**" will be activated when the game gets a new master client.
This means that when the host who created the room leaves, the game wil chose a new host(master) from the users who are connected.
If the game finds a new master the global event "MASTER CLIENT SWITCHED" will be started.
This will start "Master are we connected" so we can check if we are connected to photon.
If we are connected we will contine to the next state to display a message to let users know they got a new master, for example "Hello new master [player name]".
This state will be finished/done in the next update. You can however put your own message in it if you want.

"**Connection Fail**" will show a message to the player with "Error: No connection" and load the main menu after waiting a second.
Change the Load level num level index to your main menu or multiplayer menu, you can use load level name instead of load level num if you want.
This state will only activate/start if "CONNECTION FAIL" and "FAILED TO CONNECT TO PHOTON" global events are started/activated.


Instantiate
Lock
Prefab Instance
te-Player : Instantiate
START
Are we connected?
YES
First check if we are connected.This is to prevent errors.
Enable stuf
FINISHED
Enable/Activate here any thing that needs to before the player is being spawned.
Instantiate the player
Here we will spawn the player.
Make sure you use " Photon Network Instantiate" or else it wont work.
PHOTON / LEFT ROOM
PHOTON / DISCONNECTED FROM PHOTON
Reload level
[For update]
PHOTON / MASTER CLIENT SWITCHED
Are we connected
YES
[For update]
Hello new master
[For update]
PHOTON / CONNECTION FAIL
PHOTON / FAILED TO CONNECT TO PHOTON
Connection Fail
Show this when there is no connection and load the main menu from the game.

4.1 Player
Folder location: Resources

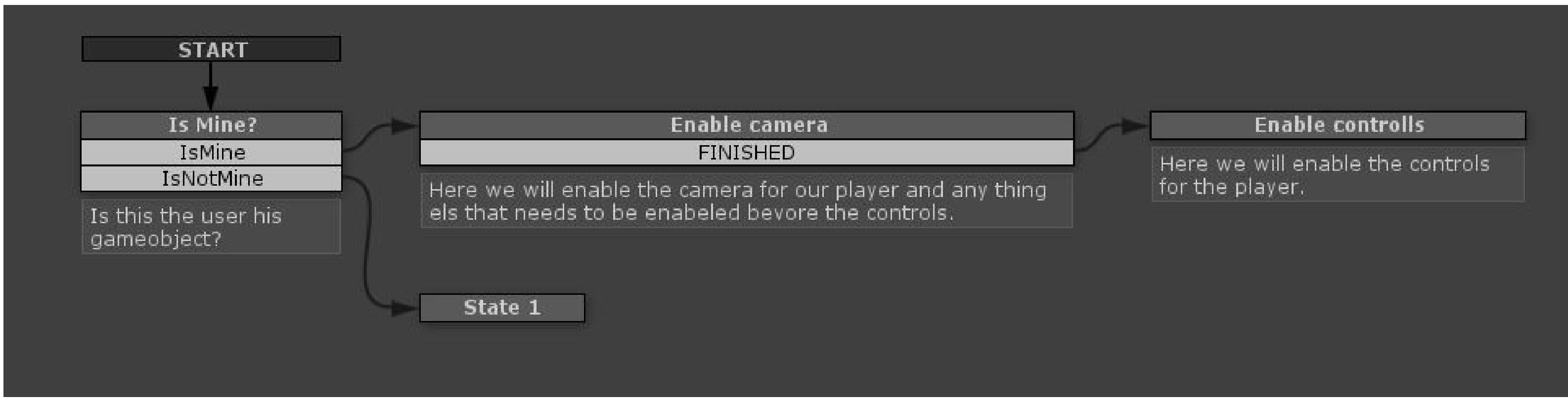
This is our player, it is important to have our player prefab in the folder resources or else photon will not be able to spawn our player.

For this documentation we will only cover multiplayer related FSMs because the controls are not important for networking and will probably be changed to how you see fit for your own project.

Player enabler is where we enable our player related stuf.
This is needed to prevent our selfs and other connected players from controling each other characters.
In this case our player prefab starts with the Lookcontrol, Controlls FSMs and camera disabled.

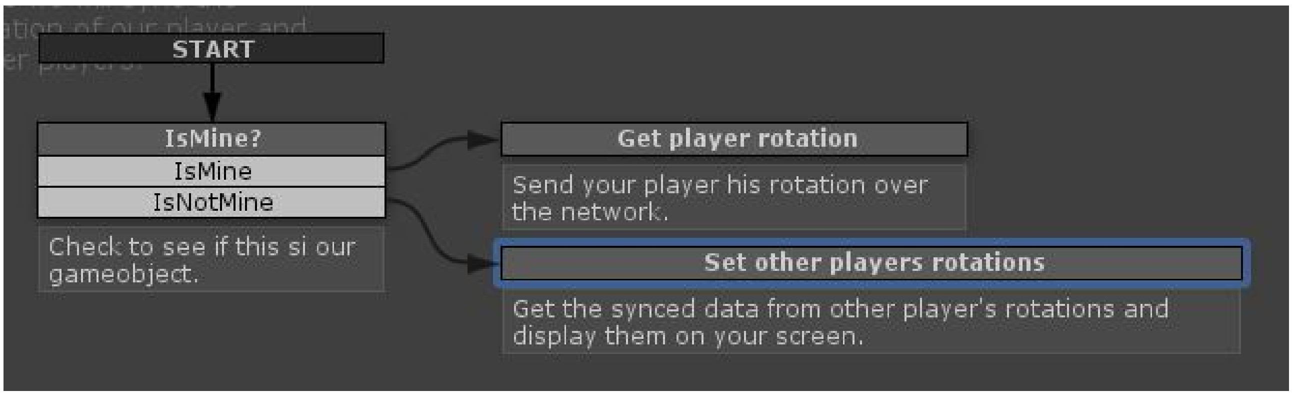
After the player has been instantiated by the " **Instantiate-player"** FSM, we check to see if this is ours in the "Is Mine?". If its not ours, we will do nothing. If it is ours we proceed to enable the camera in "Enable camera". After the camera is enabled, we will enable the controlls in "Enable controlls".

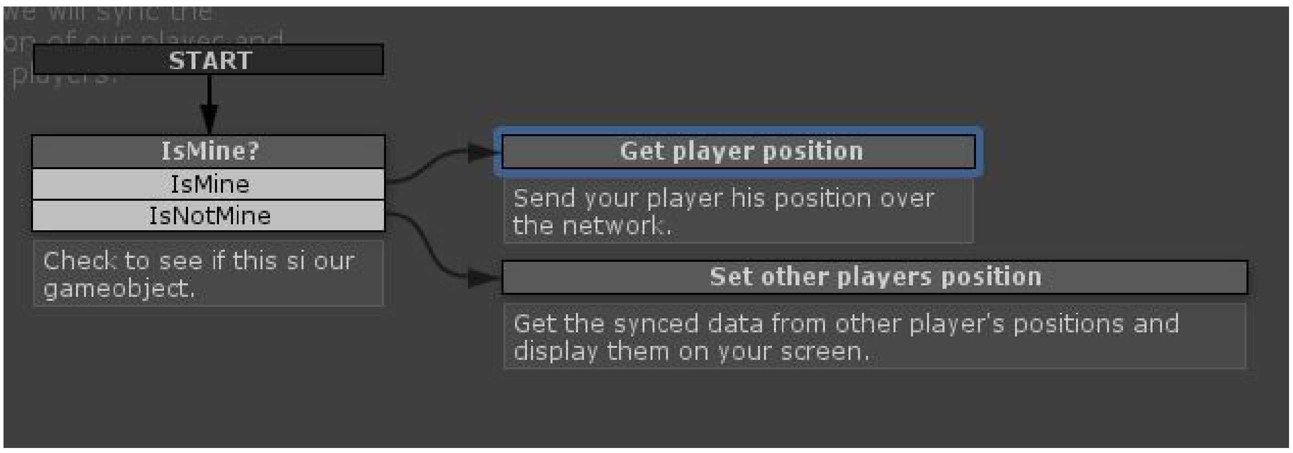
You may want to enable other stuf in these states and I recomand you put every thing camera related in its own state(in this case “Enable camera”) and all other character/player related in a second state(in this case ”Enable controlls”).


START
Is Mine?
IsMine
IsNotMine
Is this the user his gameobject?
Enable camera
FINISHED
Here we will enable the camera for our player and any thing els that needs to be enabeled bevore the controls.
Enable controlls
Here we will enable the controls for the player.
State 1

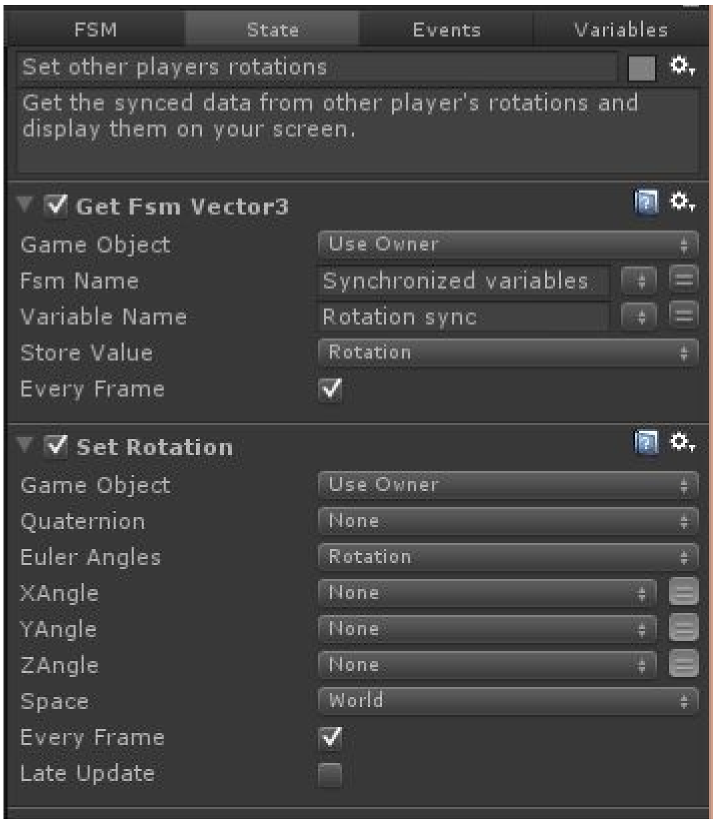
Sync Position & Sync Rotation are 2 FSMs that will syncronize the users/playsers position and rotation. We will cover this in one subect because both are basicly the same apart from one using Get Position and the other using Get Rotation.

To decide if we need to send or receive the position/rotation we first check if this is our player/character in “IsMine?”.
If this is our player/character we proceed to “Get player position”/”Get player rotation” and we will get our position/rotation and store it in a vector 3 variable with the name Position sync/ Rotation sync that we save in the “Synchronized variables” FSM.
If this is not our player/character we proceed to “Set other players position”/“Set other players rotation” where we get the vector3 variable Position sync/ Rotation sync from “Synchronized variables” FSM.


START
IsMine?
IsMine
IsNotMine
Check to see if this si our gameobject.
Get player rotation
Send your player his rotation over the network.
Set other players rotations
Get the synced data from other player's rotations and display them on your screen.


START
IsMine?
IsMine
IsNotMine
Check to see if this si our gameobject.
Get player position
Send your player his position over the network.
Set other players position
Get the synced data from other player's positions and display them on your screen.

However, there is a slight diferance between getting position and getting rotation.
For rotation we only get the variable and do a Set Rotation.
We could do this for position but than the movement wont be smooth and you will see players/users teleport from thair last know position to the new position.
To prefent this from happening we first do a Get Position to save it as Current Pos.
After that we get our vector 3 variable from “Synchronized variables” and save it as Position.
Having both current position and the new position we do a Vector 3 lerp 2 and after that we do the Set Position.


FSM | State | Events | Variables

Set other players rotations

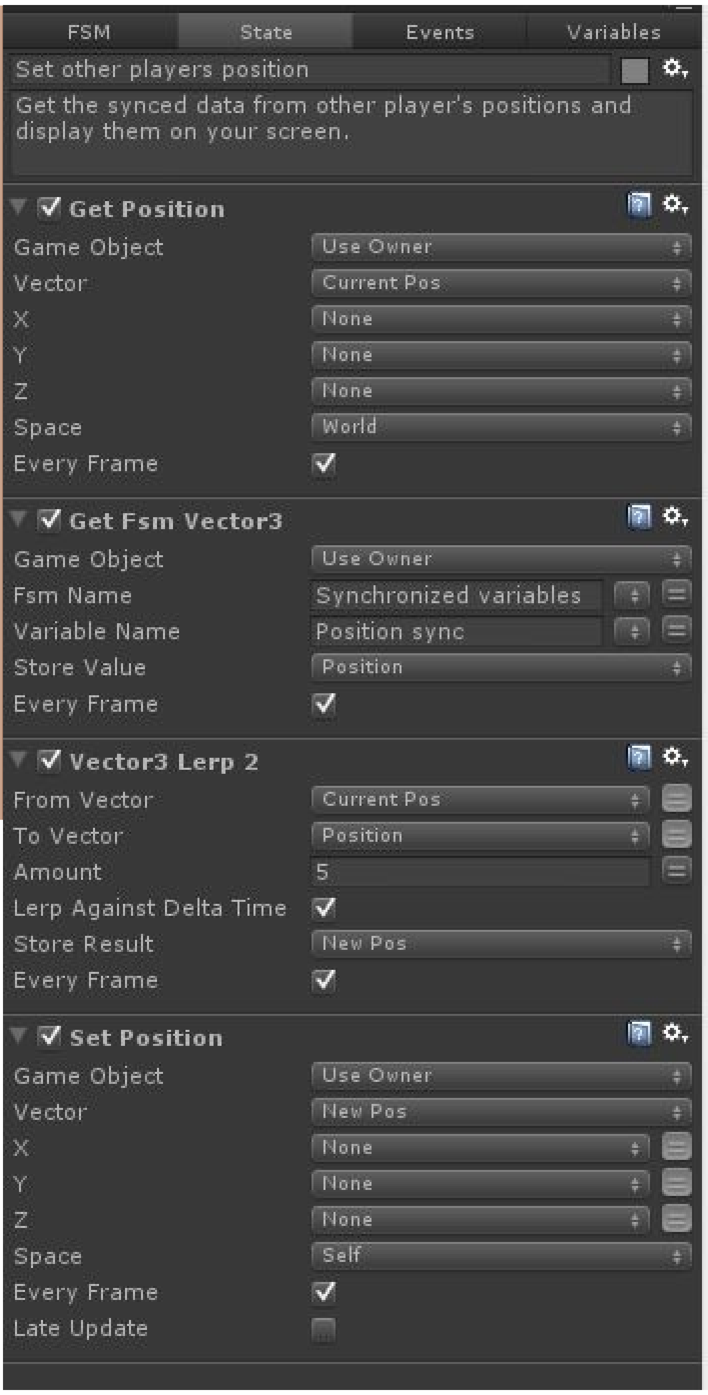
Get the synced data from other player's rotations and display them on your screen.

Get Fsm Vector3

Game Object	Use Owner
Fsm Name	Synchronized variables
Variable Name	Rotation sync
Store Value	Rotation
Every Frame	✓

Set Rotation

Game Object	Use Owner
Quaternion	None
Euler Angles	Rotation
XAngle	None
YAngle	None
ZAngle	None
Space	World
Every Frame	✓
Late Update	


FSM | State | Events | Variables

Set other players position

Get the synced data from other player's positions and display them on your screen.

Get Position

Game Object	Use Owner
Vector	Current Pos
X	None
Y	None
Z	None
Space	World
Every Frame	✓

Get Fsm Vector3

Game Object	Use Owner
Fsm Name	Synchronized variables
Variable Name	Position sync
Store Value	Position
Every Frame	✓

Vector3 Lerp 2

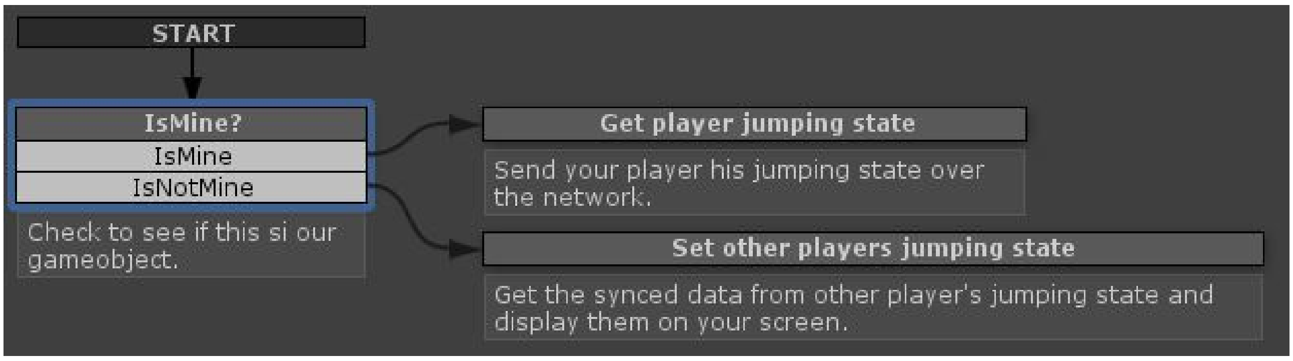
From Vector	Current Pos
To Vector	Position
Amount	5
Lerp Against Delta Time	✓
Store Result	New Pos
Every Frame	✓

Set Position

Game Object	Use Owner
Vector	New Pos
X	None
Y	None
Z	None
Space	Self
Every Frame	✓
Late Update	

In the player prefab we also sync and enable the “Head” rotation. This works the same way.

There is also a Sync Jumping state that is not being used by the prefab player.
It works the same as syncing the position and rotation and i can asure you that after reading “Sync Position & Sync Rotation” that you will understand how Sync Jumping state works and put it to use or remove it.



Check to see if this si our gameobject.

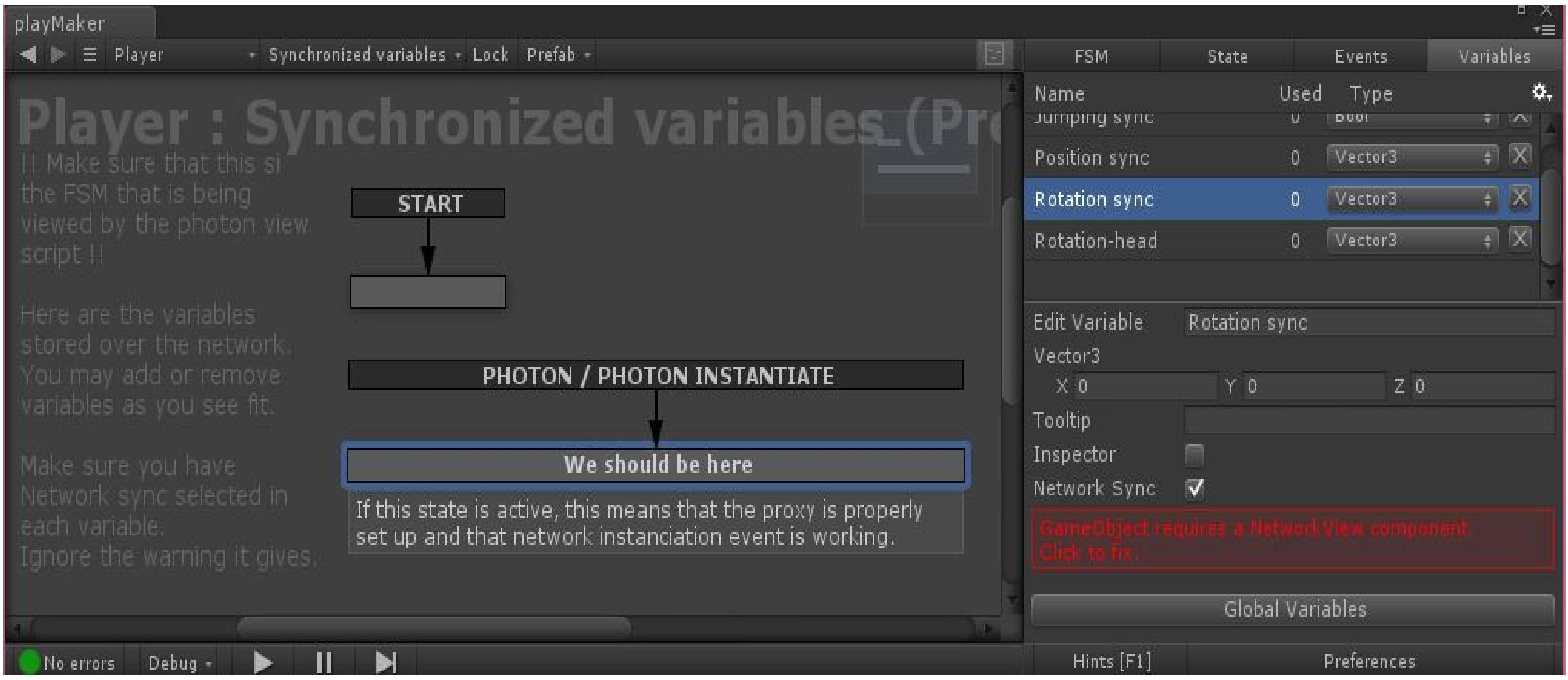
Get player jumping state

Send your player his jumping state over the network.

Set other players jumping state

Get the synced data from other player's jumping state and display them on your screen.

Synchronized variables has no actions and nothing is done here apart from storing the saved variables from other FSMs to sync over network.
To sync a variable you need to create one in the variables tab and make sure that Network Sync is checked, you can ignore the red warning because we dont use a Network view but a Photon View.



Player : Synchronized variables (Pr

!! Make sure that this si the FSM that is being viewed by the photon view script !!

Here are the variables stored over the network. You may add or remove variables as you see fit.

Make sure you have Network sync selected in each variable.
Ignore the warning it gives.

We should be here

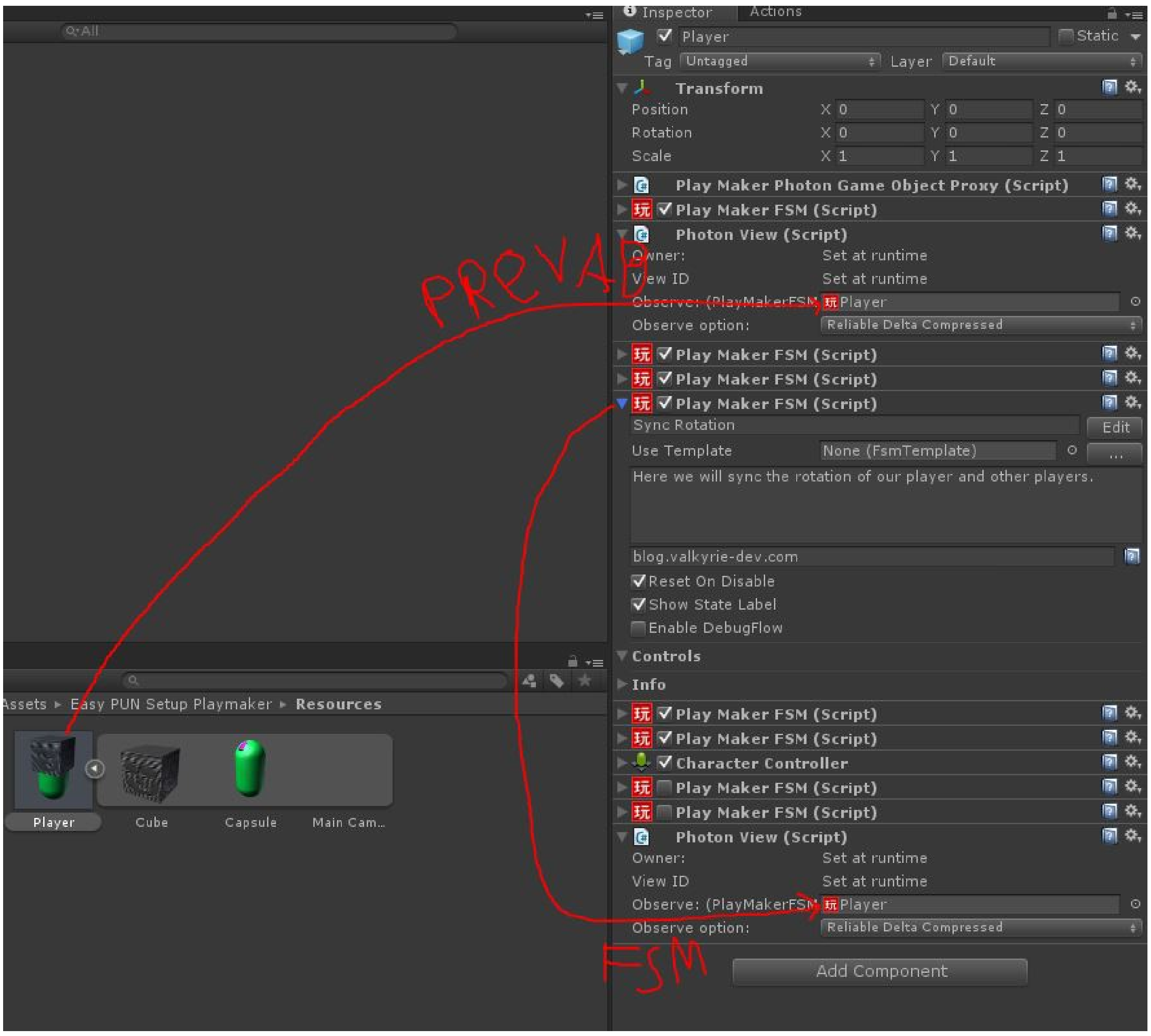
If this state is active, this means that the proxy is properly set up and that network instanciation event is working.

Name	Used	Type
Jumping sync	0	Bool
Position sync	0	Vector3
Rotation sync	0	Vector3
Rotation-head	0	Vector3

Edit Variable: Rotation sync
Vector3: X 0 Y 0 Z 0
Tooltip
Inspector: ☐
Network Sync: ✓

GameObject requires a NetworkView component.
Click to fix.

If you make your own Player prefab make sure you ad an extra Photon View component and drag this FSM into the Observe bar. If you dont do this,the Synchronized variables wont be synced over the network.
[See image on next page]



Player ☐ Static
Tag Untagged Layer Default

Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Play Maker Photon Game Object Proxy (Script)
✓ Play Maker FSM (Script)
Photon View (Script)
Owner: Set at runtime
View ID Set at runtime
Observe: (PlayMakerFSM) Player
Observe option: Reliable Delta Compressed

✓ Play Maker FSM (Script)
✓ Play Maker FSM (Script)
✓ Play Maker FSM (Script)
Sync Rotation Edit
Use Template None (FsmTemplate)
Here we will sync the rotation of our player and other players.
blog.valkyrie-dev.com
✓ Reset On Disable
✓ Show State Label
☐ Enable DebugFlow
Controls
Info

✓ Play Maker FSM (Script)
✓ Play Maker FSM (Script)
✓ Character Controller
☐ Play Maker FSM (Script)
☐ Play Maker FSM (Script)
Photon View (Script)
Owner: Set at runtime
View ID Set at runtime
Observe: (PlayMakerFSM) Player
Observe option: Reliable Delta Compressed

5.1 MainMenu

The MainMenu Scene exists out of:
Prefabs:
*OnlineStatistics
Create&Join rooms
PUNnetworkManager
MpplayerOptions
Photon:
PlayMaker Photon Proxy
Playmaker:
PlaymakerGUI
Scene:
Cube
Directional light
Main Camera
Terrain

5.2 InGame

The InGame Scene exists out of:
Prefabs:
Instantiate-Player
Photon:
PlayMaker Photon Proxy
Playmaker:
PlaymakerGUI
Scene:
Cube
Directional light
Main Camera
Terrain
Capsule
Cylinder
Quad
Sphere

6.Multiplayer setup

Seting up multiplayer is pretty simple with the prefabs in this package.

For the menu you need a scene with:
PlayMaker Photon Proxy
And the prefabs:
Create&Join rooms
PUNnetworkManager
MpplayerOptions

*OnlineStatistics is optional, it shows the player/room/game count and is a dropin solution.
If you dont have any knowladge yet on how playmaker handles GUI I recomand that you follow some tutorials so you can edit the GUI's from the prefabs.

For the Scenes holding the levels/maps you need:
PlayMaker Photon Proxy
the prefab:
Instantiate-Player
And some spawn locations.

To use more than 1 spawn location, create a empty game object with the name spawn point and give it the tag Spawn or Spawnpoint.
Place them any where you like.

Now to use these spawnpoints we need to edit the Instantiate-Player prefab.
Once in the FSM window, go to the state "Instantiate the player" and add the action Get Random Object bevore/in front of Photon Network Instantiate.
Set the tag in Get Random Object and store the result in a gameobject variable, create one and call it Spawnpoint.
Now in Photon Network Instantiate set the Spawn Point to the variable and you are done.

7.Load Level num list
These are the FSMs with the Load level num actions.
Change these to make it work with your scenes in your game.

PUNnetworkManager
	We are in the room

Instantiate-player
	Reload level
	Connection Fai

8.1.1. Practise of shooting

With this topic I want to cover a couple of ways to synchronize your shooting actions over the network.

Fast projectiles(Bullets,Lasers, ect):
The best way to do this is probably to not sync this at all.
Now this may sound strange to you but I will explain in to you.
Bullets mostly exists out of gameobjects or "......" and go really fast. For the server to sync this, it needs to sync every time a bullet is created,the way it go's, how fast ect. With a automatic rifle this could hog up the network pretty fast or players might just not get the hits they want due to lag or slow networking.

So what do we do instead? Make the local instances of players do a shoot animation and some fake rays if its at taste. So we basically only need to sync the players direction its facing and a stat that he is shooting. This will make the local instance of the player do the same on a other player his machine.

Now there is still a possibility that on one screen of both players, it never hits the target, thats why we only animate.
To solve this we have 2 options.
Either calculate the damage on the shooting side or calculate it on the target side.
Most games do the first, bullets wont do damage on target side but the damage being done on shooting side will be synced to the target side(this prevents double damage).

Slow projectiles(Rockets,NoobTubes ,ect):(Will be added later)
Guided projectiles(Controled rockets, ect):(Will be added later)

Now have some multiplayer fun.

Update 0.01:

What got updated?

Prefab Instantiate-PLayer:

1. FSM [For update] is now “Player counter&Action”.
    1. *Added descriptions and updated states.*
2. Updated FSM”Instantiate” with new descriptions.
    1. *Renamed 2 states and moved 1 global event.*