Simple Traffic System
V 1.0.15

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Please consider leaving a review to let me know how I'm doing, it means a lot to me.

The asset is still being improved, if you have any feedback or questions please join the discussion forum:
https://forum.unity.com/threads/simple-traffic-system.794268/

Introduction & Project Setup

Simple Traffic System is an easy to use traffic system with editor helper tools that allow for quick creation of waypoint based routes that can be interconnected to create road networks in your scenes. The primary logic is highly optimized using the new C# Job System and Burst Compiler, allowing you to use more of your performance budget for other content.

AI traffic logic is handled by a single **AI Traffic Controller** that **AI Traffic Cars** register to. This is a data oriented logic structure and allows the AI logic to run in parallel jobs spread across all available cores to reduce CPU usage on the main thread.

After project setup, it's recommended to watch and follow all video tutorials so you will have a good idea how to use the various systems included with STS before starting to configure your own road network.

Project Setup

This package uses the new C# Job System and Burst Compiler, configure the following project settings to use this asset.

1. Open the Player Settings (Edit -> Project Settings -> Player), set API Compatibility Level .Net 4.x

2. Open the Package Manager (Window -> Package Manager), install Burst (1.2.3)

3. To use the burst compiler in standalone builds, install the Windows SDK and VC++ toolkit from the Visual Studio Installer.

Quick Start Instructions

In short summary, this asset uses **AI Traffic Waypoint Routes** which are made of **AI Traffic Waypoints**, the routes spawn **AI Traffic Car** prefabs on scene start, which get registered to an **AI Traffic Controller**. The idea is to create multiple routes and waypoints and link them together to create a road network, then add **AI Traffic Light Managers** to sequence groups of **AI Traffic Lights** that are used to control when a car can exit the assigned **AI Traffic Waypoint Route**.

Select **Tools ~> Simple Traffic System ~> STS Tools Window** from the Unity menu bar to open the Simple Traffic System Tools window. This window contains a variety of editor tools that can be used to create your simulation.

To begin, add an **AI Traffic Controller** to the scene, then add an **AI Traffic Waypoint Route** to the scene using the **Spawn** buttons in **STS Tools** window. Next, add **AI Traffic Waypoints** to the route by selecting the **AI Traffic Waypoint Route** that was created in the Hierarchy and using **Shift+LeftClick** to add new points to the route. You can use **Shift+Ctrl+LeftClick** to insert a new waypoint between points.

Once you've created your first route with some waypoints, assign an **AI Traffic Car** prefab to the **Spawn Traffic Vehicles** array on the **AI Traffic Waypoint Route**. Select the **AI Traffic Waypoints** to view their inspector options, here you can set how fast the car is allowed to drive after reaching each point to make the car speed up or slow down. Press play to watch the AI car spawn onto the route, drive to the end and stop. From here, you can continue adding more **AI Traffic Waypoint Routes**, and interconnect the routes by assigning the **New Route Point** array index on the final waypoint of a route to the first waypoint of another route.

Primary System Objects

This section will explain where the required objects are located, and details about how they are used. A list of tutorial videos is also available to explain in greater detail, and provide a visual demonstration of how to use the systems in this package.

AI Traffic Car

The base car prefab used by the traffic system. Duplicate this prefab and replace the mesh with your own to create new vehicles. The prefab is located at: **Assets\TurnTheGameOn\SimpleTrafficSystem\Prefabs**

AI Traffic Controller

This is the primary logic controller for AI cars. There must be only one in the scene (it's a singleton) for AI cars to register to. The prefab is located at: **Assets\TurnTheGameOn\SimpleTrafficSystem\Resources\AITrafficController**

AI Traffic Waypoint Route

These are the core building blocks used to create road networks. The demo scene has about 100 interconnected AI Traffic Waypoint Routes. The prefab is located at: **Assets\TurnTheGameOn\SimpleTrafficSystem\Resources\AITrafficWaypointRoute**

AI Traffic Waypoint

These are used and spawned by **AI Traffic Waypoint Routes** by pressing **Shift+LeftClick** in the scene view on a collider. Set the speed limit for each point to control how fast you want traffic to travel. Interconnect routes by assigning the **New Route Point** array index on the final waypoint of a route to the first waypoint of another route. The prefab is located at: **Assets\TurnTheGameOn\SimpleTrafficSystem\Resources\AITrafficWaypoint**

AI Traffic Light Manager

These control groups of **AI Traffic Lights** by sequencing **Traffic Light Cycles** based on timers set for each sequence. Each Traffic light cycle holds an array of **Traffic Lights** which hold a reference to **AI Traffic Waypoint Routes**. Once a route is assigned to a traffic light, the light will control if the car at the final waypoint is allowed to proceed through the intersection to the next connected waypoint route. The prefab is located at: **Assets\TurnTheGameOn\SimpleTrafficSystem\Resources\AITrafficLightManager**

STS Editor Helper Tools Window

Some simple but powerful editor tools have been added to help automate and reduce some of the work that's required when configuring routes for larger road sections or networks; the goal for the tools is to reduce the need to manually select waypoints in the scene hierarchy to make configurations.

Select **Tools ~> Simple Traffic System ~> STS Tools Window** from the Unity menu bar to open the Simple Traffic System Tools window. This window contains a variety of editor tools that can be used to create your simulation. *Note: The asset can be used without the tools window by manually assigning the relevant references to AITrafficWaypoints, however the window enables you to use a variety of editor scene tools to make creating and customizing your waypoint routes and waypoint connections much easier.*

STS Tools Spawn Buttons

These buttons will instantiate the named object into the scene.

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Spline Route Creator
This tool can generate multiple **AI Traffic Waypoint Routes** and their **Waypoints** along a spline.

STS Tools Configure Modes

Switch between SceneView tools.

Lane Connector

Used to connect waypoint routes for lane changing. Select **Load Routes** to load all routes from the scene into the editor. Use the scene view handles to select 2 adjacent “Routes“, handle buttons are located above the final route point. Press **Setup Lane Change Points** to create a connection.

Route Connector

Select **Load Routes** to load all routes from the scene into the editor. Use the scene view handle to select “From and To points”, handle buttons are located above each waypoint. Press **Connect Route Points** to create a connection.

Route Editor

Used to more-easily view and modify all waypoints from the selected route in a single window. Select **Load Routes** to load all routes from the scene into the editor. Use the scene view handle buttons to select a route, handle buttons are located above the final route point.

Signal Connector

Select **Load Lights & Routes** to load all traffic lights and routes from the scene into the editor. Use the scene view handle to select “From Light and To Route points”, handle buttons are located above the final route point and traffic signal. Press **Connect Light to Route** to assign a connection. This window is also useful to visually debug which traffic light signal is connected to which route.

Spawn Points

Used to configure spawn points for a more randomized spawning pattern, this is required by the traffic pooling system. Select **Load Routes** to load all routes from the scene into the editor. Select **Align Route Waypoints** to have each waypoint’s transform orientation set to face the next waypoint in the route. When routes are loaded, a scene handle button named **S** is placed above each waypoint in the scene. Press this button to load an **AITrafficSpawnPoint** into the scene as a child of that point.

Yield Triggers

Allows a box collider to be used as a trigger zone that detect vehicles in or approaching an intersection from a waypoint route. Any waypoint can be setup to yield while this trigger is active. This is useful if a route intersects with another route when traffic signal lights are not used, a good example is intersection turning lanes. Select **Load Routes** to load all routes from the scene into the editor. Use the scene view handle to select a “R” handle button located above the final route point to select a route for editing. Select the “WP” handle button above the route waypoints to configure the waypoint to yield for a yield trigger. Select the “Y” handle button above the final waypoint on the route yield triggers are connected to. Select an AITrafficWaypointRoute from the scene and Shit + Right click in the scene view to auto spawn and assign the trigger to the route’s AITrafficWaypointRouteInfo script.

Tutorial Videos

1. **Getting Started:** https://youtu.be/RB8_frmyyDI

2. **Connecting Routes:** https://youtu.be/AfQXogWckz0

3. **Traffic Lights:** https://youtu.be/NwbV2y_WoIc

4. **Spline Route Creator:** https://youtu.be/ak6IOTmXlbw

5. **Spawn points:** https://youtu.be/-tNje4W2xo0

6. **Lane Changing:** https://youtu.be/PSe_TI3Jbc0

7. **Traffic Pooling:** https://youtu.be/PzH3D7gaEUM

8. **Change Car Model:** https://youtu.be/F2o5lsN8pdM

9. **Route Editor:** https://youtu.be/I-dKXQz_OfI

10. **Deleting Waypoints:** https://youtu.be/_8AWaJFTOxI

11. **Deleting and Setting Up Random:** https://youtu.be/yWBCRyFeow4

12. **Yield Triggers:** https://youtu.be/JffeAGZNcIM

Integration Videos

1. **IK Avatar Driver: https://youtu.be/_HaOGVF9wKk**

2. **Stylized Vehicle Pack: https://youtu.be/7-_8EZcdT7c**