



## 2.09 Weather Pattern Blueprints

Version 1.0 (2008-01-25)

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## 1 Introduction

This document is intended to aid in the creation of new weather patterns in Rail Simulator, either for use in existing scenarios or in new user-created scenarios.

Weather patterns are selected in a scenario by double clicking the scenario marker and selecting a pattern from the subsequent pull down list.



Weather is important to the look and feel of a scenario. You can create generic weather patterns which can be used across many scenarios or you can make a specific weather pattern tailored to the events of one scenario.

## 2 Blueprint Creation and Structure

The Asset Editor should be used when creating or editing any blueprint. The Asset Editor is provided in the Rail Simulator Developer Tools which are available to download from [www.railsimulator.com](http://www.railsimulator.com).

Once the Developer Tools have been installed the Asset Editor can be launched from the start menu via: Programs > Rail Simulator Developer Tools > Tools > Asset Editor.

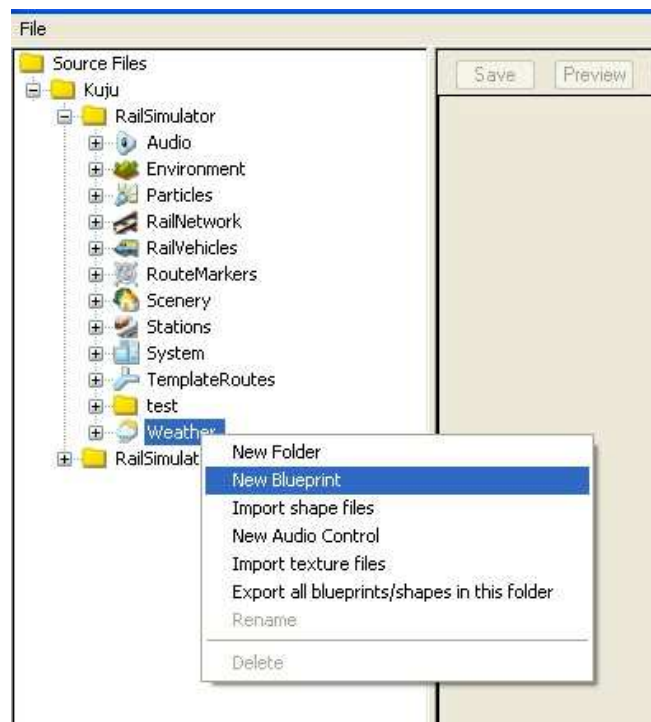
### 2.1 Blueprint Location

Weather blueprints needs to be located under the following folder structure:  
c:\Program Files\Rail Simulator\Source\<Developer>\<Addon>\ Weather

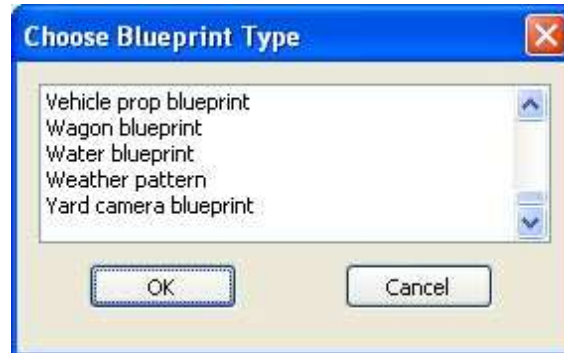
<Developer> is the folder name of the developer creating the new content and <Addon> is the product name of the new content. For the boxed version of Rail Simulator the developer is Kuju and the product is RailSimulator.

### 2.2 Blueprint Creation

In the Asset Editor navigate to the location of the weather folder described above and right click the mouse on the weather folder.



A menu appears with several options. Select the New Blueprint option to create a new weather blueprint.



A new window appears displaying a list of available blueprint types. Scroll down the list using the right hand scroll bar until you see the Weather Blueprint. Left click this option and press OK.

A new weather blueprint is then created with a default name which you change to something more memorable either now or at a later time. The main window of the Asset Editor now displays the various fields needed to set up the weather.

## 2.3 Blueprint Structure

The blueprint is quite large and can seem daunting. At its basic levels the blueprint can be seen as consisting of the following sections:

- Display Name
- Weather Type X4
  - Clear
  - Overcast
  - Rain
  - Storm
- Precipitation Type X4
  - Rain
  - Sleet
  - Hail
  - Snow
- Cloud Type X4
  - Clear
  - Overcast
  - Rain
  - Storm
- Weather Events (User defined amount)
- Audio

## 2.4 Display Name

The display name is the “friendly name” which is displayed in the scenario editor when you are picking a weather type for that scenario. It is a good idea to give a short yet descriptive name.

The display name is defined in the same way as any other blueprint, simply by entering the text into the field. If you want to localise this text for other language users then you can do so here.

## 3 Weather Types

There are four weather types in the blueprint. Each has an identical structure. These weather types are:

- Clear
- Overcast
- Rain
- Storm

Although these four weather types are given suggestive names in the blueprint there is no reason to restrict the creation of your weather types to these categories. If you wanted to have four different types of storm, for example, with subtly changing fog levels or rain density then there is nothing to stop you.

You also do not have to use all four weather types. You can use between one and four. The more weather types you set up, however, the more variation you can have using this weather blueprint in a scenario.

You cannot set up more than four weather types, but you can cycle through them in any order, any number of times, to create variation; this is done in section 6, Weather Events.

The fields in the weather type section of the blueprint are described in detail below.

### 3.1 Wind Direction

This is a value between 0 and 359 which corresponds to the degrees on the compass, where 0 is north and 90 is east and so on. Setting the wind direction has a twofold effect. Firstly it affects the direction in which the clouds move and secondly it affects the direction in which precipitation falls.

For example, if the wind direction value was set to 90 then the clouds would move east and the rain would fall diagonally to the east.

### 3.2 Wind Speed

The wind speed is a value in MPH (miles per hour) which works in conjunction with wind direction. Setting the speed will affect the rate at which clouds travel across the sky and the slant at which precipitation falls. The higher the value the faster the clouds will move and the shallower the angle at which precipitation falls. Note that the fall angle of precipitation is also controlled by the speed, described later.

### 3.3 Precipitation Type

This is a drop down list from which you can specify the type of precipitation that will fall in this weather type. The four valid precipitation types are rain, sleet, hail and snow and can be set up further down the blueprint. Setting up precipitation types are detailed in section 4 of this document.

NOTE: The fifth option "Precipitation Count" is not a valid option and should not be selected.

### 3.4 Precipitation Density

This is a value between 0 and 1 where zero is no precipitation fall and 1 is the heaviest. Setting a value greater than 0 below 1 will provide a varying heaviness of precipitation.

### 3.5 Precipitation Speed

This value works in conjunction with the wind speed to determine the speed and angle of precipitation fall. This value could be thought of as the vertical momentum of the precipitation whereas the speed is the horizontal momentum.

For example, a low speed in this field could be used for slowly falling snow. However, if the wind speed was set to a high value then this slowly falling snow will travel at speed faster horizontally than it would vertically.

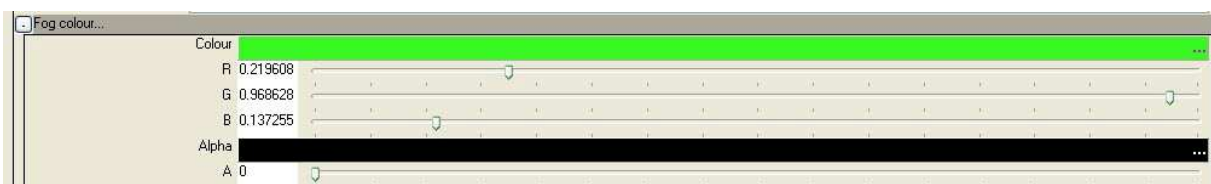
### 3.6 Fog Override

This is a true/false option which simply determines whether the default fogging is used (as set up in the time of day Sky Info Blueprint) or whether the defaults become overridden by the values set up in the section below.

If this option is set to true then the three fog settings described below will take effect rather than the default settings.

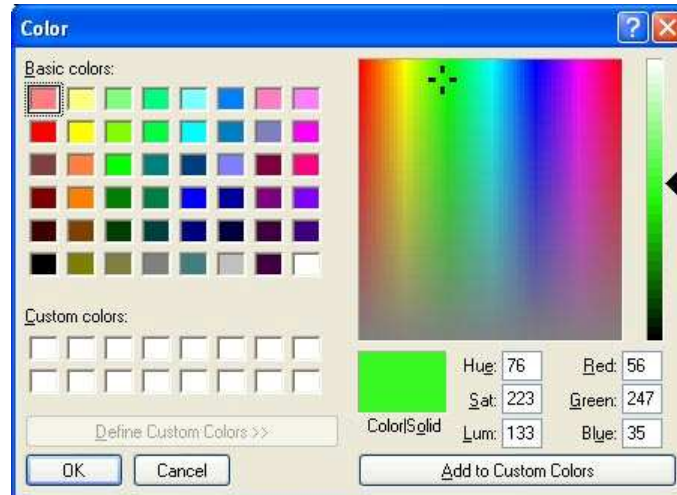
If this is set to false then the following three settings have no effect, whatever values they are set to.

### 3.7 Fog Colour





The fog colour can either be set by sliding the separate red, green and blue slider bars or by clicking the colour bar itself where a new window will appear.



NOTE: The alpha section and slider currently has no effect.

### 3.8 Fog Start

This value is in metres and determines how close to the camera the fogging effect begins.

### 3.9 Fog End

This value is also in metres and determines the point at which all objects become fully fogged out. Setting this to a relatively small value, such as 50, will mean that any objects further than 50 metres from the camera will be hidden by the fog.



### **3.10 Lightning density / Frequency**

NOTE: These values are currently inactive.

### **3.11 Blend in Time**

This is a number in minutes that it will take for this weather type to blend with the subsequent weather type. This can be set to decimal fractions of under a minute, however for more realistic weather transitions the suggested blend should be at least a minute.

### **3.12 Cloud Type**

This is a drop down list from which you can specify the type of cloud cover to be associated with this weather type. The four valid cloud types are clear, overcast, rain and storm and can be set up further down the blueprint. Setting up cloud types are detailed in section 5 of this document.

NOTE: The fifth option "Cloud Count" is not a valid option and should not be selected.

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## 4 Precipitation Types

Precipitation type is selected from a pull down list in the weather type section of the blueprint. There are four precipitation types to choose from and each has an identical structure. These precipitation types are:

- Rain
- Sleet
- Hail
- Snow

Similarly to the weather types, these are given suggestive names in the blueprint but there is no reason to restrict the creation of your precipitation types to these categories.

You also do not have to use all precipitation types if any. However, the more precipitation types you set up the more variation you can have within in a scenario.

The fields used in setting up the precipitation type section of the blueprint are described in detail below.

### 4.1 Bottom Left View Space Offset

Modifying this value adds stretch to the texture used in the precipitation. A value of 0 is unstretched.

### 4.2 Top Right View Space Offset

Modifying this value adds stretch to the texture used in the precipitation. A value of 0 is unstretched.

### 4.3 Bottom Left UV

This is a standard UV value used by artists for selecting which part of the texture is used.

### 4.4 Top Right UV

This is a standard UV value used by artists for selecting which part of the texture is used.

### 4.5 Alpha Top

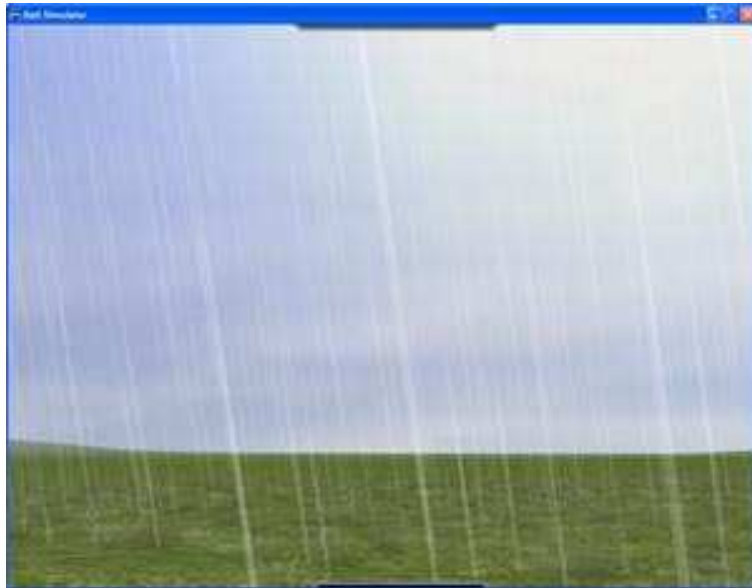
Adjusting this value sets the alpha, or opaqueness at the top of the texture.

### 4.6 Alpha Bottom

Adjusting this value sets the alpha, or opaqueness at the bottom of the texture. If the values are the same as the top then the texture will have the same opaqueness throughout.

#### 4.7 Particle Streak Modifier

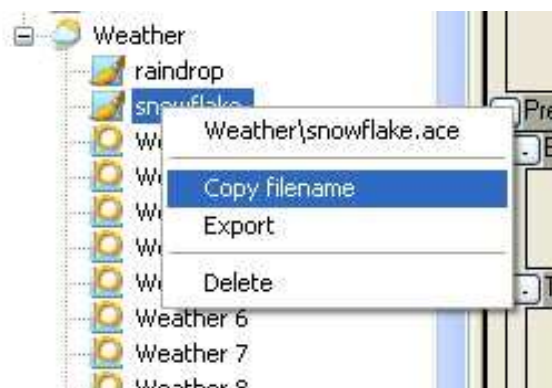
This value determines the factor by which the texture used in the precipitation type becomes elongated. By default this value is 1 which means it is not elongated. Increasing this value will turn a roughly spherical snowdrop into a streak. In the example image below a raindrop has been given a value of 10 turning the rain into a series of streaks.



#### 4.8 Texture ID

This field points to the location of the texture used for the precipitation type. The texture is in the .ace format described in document 4.01 Art Pipeline.

To reference the .ace file first have the file placed in the weather subfolder. It will show up in the Asset Editor with the texture icon. Right click the texture and select "Copy filename" then paste the result into this texture ID field using the keyboard shortcut Ctrl + V.





## 5 Cloud Types

Cloud type is selected from a pull down list in the weather type section of the blueprint. There are four cloud types to choose from and each has an identical structure. The types are:

- Clear
- Overcast
- Rain
- Storm

Similarly to the weather and precipitation types, these are given suggestive names in the blueprint but there is no reason to restrict the creation of your cloud types to these categories. You could have four variations of stormy weather if you desire.

There are three layers of cloud texture created as part of a sky dome texture. The sky dome used is specified in the Sky Info Blueprint which is described in a separate document. The cloud types are basically formed by specifying how much of each of the three cloud layers is visible at a time, plus a general sky darkening modifier.

Four fields are used in setting up each cloud type and all the values are between 0 and 1 where 0 effectively hides that texture and 1 displays the texture fully.

NOTE: These textures and the sky dome can be recreated or modified by advanced developers. The images used in this section are from the default sky dome.

### 5.1 Wispy Alpha layer

The first cloud texture layer is the wispy layer. A value of 0 in this field will hide this texture layer. When the maximum value of 1 is entered in this field and 0 in all others then the following sky texture is displayed.



### 5.2 Thick Cloud Alpha Layer

The next cloud texture layer is the thick layer. A value of 0 in this field will hide this texture layer. When the maximum value of 1 is entered in this field and 0 in all others then the following sky texture is displayed.



### 5.3 Storm Layer Alpha Layer

The next cloud texture layer is the thick layer. A value of 0 in this field will hide this texture layer. When the maximum value of 1 is entered in this field and 0 in all others then the following sky texture is displayed.



You can opt to display one layer at a time or all layers together to varying strength. With all three cloud layers set to the maximum of 1 you can see how all three co-exist:





### 5.4 Colour Darkening Intensity

The higher the value in this field the darker the base sky will become. Below are comparison images of two identical cloud types where the first colour darkening intensity is 0 and the second is set to 1.



## 6 Weather Events

Now that all the weather types you are using have been set up with their subtypes of precipitation and cloud you can now select the order and duration in which these weather types will play.

### 6.1 Creating Weather Events

Initially the weather events section is empty, meaning no “play list” has been set up. To create the first event you click the plus sign to expand the section of the blueprint and then “Insert First”.



You can then expand this first weather event instruction where you will see a type and time field, which are described below.



Additional weather event instructions can be added by clicking the button of the instruction above.

### 6.2 Type

This is a drop down list containing the four weather types that can be set up earlier in the blueprint. Selecting one of the four weather types will add it to the event list. All the events will play out in order, separated by the blend in time.

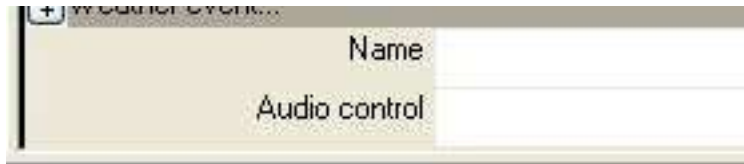
NOTE: There is a fifth option in the list "Weather Type Count" which has not been implemented and should be selected.

### **6.3 Time**

This is the duration in minutes that the selected weather type will play for before blending into the next. If this is the last weather type in the list then it will continue indefinitely

## 7 Audio Control

Audio is set up on a per blueprint basis. This section of the blueprint points to the weather audio control blueprint.



A weather audio blueprint does not need to be referenced or set up for the weather to work.

### 7.1 Name

This is an arbitrary name for the weather audio control.

### 7.2 Audio Control

This is the location where the weather audio control blueprint is located. This type of blueprint will be referenced in a later document.

## 8 Exporting the Weather Pattern Blueprint

Once the blueprint has been completed to your satisfaction you should save and export the blueprint.



Exporting the blueprint places the information contained into a game ready format. After a successful export the weather pattern will be available for selection by double clicking a scenario marker and selecting it from the pull down list.

## 9 Existing Weather Patterns

There are eight default weather patterns shipped with Rail Simulator. A description of the weather types and the sequence they appear are described below:

### 9.1 Weather Pattern 1

About 80 minutes of alternating between sunny clear weather with occasional cloud patches before fog sets in.

### 9.2 Weather Pattern 2

Sunny and clear with light clouds that threaten rain lasting approx 95 minutes, then heavy rain.

### 9.3 Weather Pattern 3

Cloudy with light rain and fog patches. A denser fog patch should happen after about an hour lasting 15 minutes.

### 9.4 Weather Pattern 4

Cloudy with heavy rain and fog patches with a specific heavy shower after 10 minutes.

### 9.5 Weather Pattern 5

Initially a clear but dark sky for 25 minutes before blending into a clear, lighter sky.

### 9.6 Weather Pattern 6

Light mist for 15 minutes then light cloud for 40 minutes then clear skies.

### 9.7 Weather Pattern 7

Light rain for 30 minutes then a mixture of overcast and clear skies.

### 9.8 Weather Pattern 8

Light snow for 40 minutes followed by heavy snow for 15 minutes before turning into clear skies.