

Rendering lightmaps in Maya or other 3d program takes care of lighting only on the static geometry of your level. You still have to set up lighting that will work on all the items in the map and on players. It goes without saying that good realtime lighting matches that on the lightmaps so that all dynamic items blend in perfectly. This isn't easy because realtime lighting has many limits that 'offline' rendering doesn't, but with some practice you can have great results. There are three basic types of light sources in the PAIN engine.

- Ambient light
- Point light
- Directional light

*Tip: In order to see the visual representation of light direction and ranges in editor click on the Edit Lights icon in the toolbar.*

Ambient and Directional light are 'master' lights that are set in level properties, but it would be tough if you were limited only to one ambient light and one directional light in your whole level. If you have a map that is a mix of outdoor and indoor geometry you will find that pretty bright ambient light is needed for sunny outdoor while rather dark ambient is necessary for indoors. In such situations you can use CEnvironment type boxes that have their own ambient and directional light settings. So if most of your level is set outdoors you can set master ambient and directional light values in level properties to reflect high ambience value from the sky and bright directional yellow sunlight, while indoors you place virtual boxes that have their own lighting parameters set. To create such a box press ctrl+o, choose CEnvironment class, type in some name and click OK. You can set whatever parameters you like in the Properties window to the right, but be sure to set Overwrite to "True" if you want the lights to work.

Point lights are simple light sources that emit light in all directions. The easiest way to create point light is to pick it from templates tab of the window on the right. Place any of the lights from \Lights\Points\ in your level and edit its properties - color, intensity, start of falloff and range. Because pointlight shines in all directions you may encounter a problem where you need to simulate a light bulb on the ceiling, but the light from your pointlight will shine through the ceiling and illuminate objects on the floor above. To fix that you can use CEnvironment in the room with your pointlight and set the pointlight as a dependent light in the properties of environment. After that your pointlight will only shine on objects within the linked CEnvironment.

Practical notes:

You should avoid overlapping more than two light sources otherwise you will see light 'popping' in and out on weapon if you move through area that has 3 or more lights. This is the only visual artifact happening if too many lights are used at the same time, but apart from that rendering speed might drop. In most situations you will be fine using one directional light (either from properties of level or from a separate CEnvironment) and one point light. Ambient light is not actually a light source (it simply means 'add a value of x,x,x in RGB to each pixel on screen') so it doesn't fall into the equation, you can set it however you like and still use two other light sources, but you should avoid having directional and two or more intersecting pointlights. It is not a disaster if you have some overlapping lights here and there but try to avoid such situations if possible.

Theoretically you can't place one CEnvironment inside of another CEnvironment, because the engine won't know which one to use, but actually it is possible: CEnvironments work in the order they were created (and saved) - so if you create a small environment, save it and then create a bigger one around it, both will work fine, if you do things in a different order, only the bigger environment will be taken into account.

Total number of light sources and environments in level is theoretically infinite and does not affect rendering speed but you should not go overboard with the lights anyway :) It's better to have

around 100 lights than to have a thousand of them.

You can set any positive number in the intensity setting of each light source but values well above 1 will cause artifacts - for example too intense yellow light might actually become greenish.

There does exist a fourth type of lights in the PAIN engine - spot lights, but they are not quite useful as they only have linear falloff (based on distance from light source) and don't have any angular falloff (so that light would gradually fade out on an object moving away from the spot light).