Qt DOCUMENTATION

Search

Topics >

Qt Design Studio Manual > Lights

Lights

Light components are the primary source of lighting in a Qt Design Studio scene. As a secondary light source, you can use image-based lighting.

To add a light component to your UI, do one of the following:

> Drag a light component from **Components** > **Qt Quick 3D** to the 3D view or to Navigator > **View3D** > **Scene**.

> Right-click in the **3D** view and select **Create** > **Lights** from the context menu.

If you cannot find the light components in **Components**, add the **Qt Quick 3D** module to your project as instructed in Adding and Removing Modules.

> **Note:** If you select **Qt 5** as the **Target Qt Version** when creating your project, the available light components and their properties will be slightly different. The properties may also be situated differently in the **Properties** view.

By default, all imported scenes are created with one directional light. You can use the following components to add lights:

Icon	Name	Qt 5 Only	More Information
	Directional Light		Light Directional
	Point Light		Light Point
	Spot Light		Light Spot
	Area Light	✔	Light Area

> **Note:** Each additional light negatively effects the rendering performance of your scene. Keep scenes as simple as possible and use lights sparingly. Use a Scene Environment component to apply image-based lighting that can produce soft and subtle lighting.

To edit light properties, select a light component in the **Navigator** or **3D** view, and then adjust its properties in the

specifies which component, with its children, is illuminated by the light. Set the Color property to specify the color applied to models illuminated by a light. Set the **Ambient color** property to specify the ambient color applied to materials before being illuminated by the light.

You can animate light properties in the Timeline view.

Directional Light

A directional light emits light in one direction from an unidentifiable source located infinitely far away. This is similar to sunlight.

Use the **Brightness** handle of the light gizmo (1) to adjust the **Brightness** property of any of the light components.
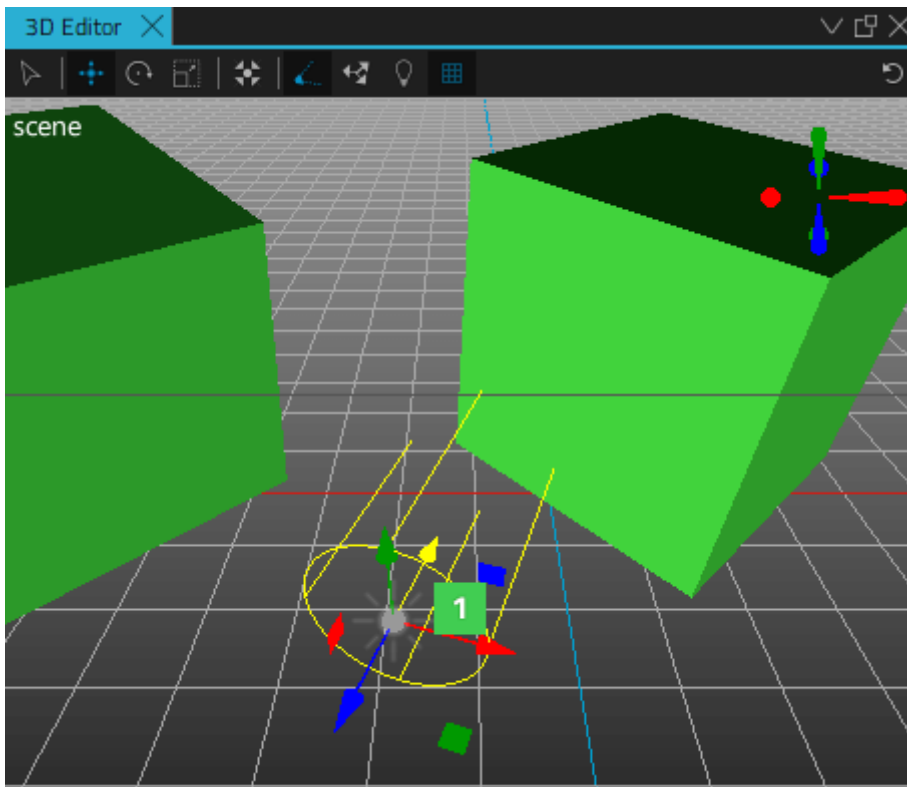
If the **Casts shadow** property is enabled, shadows are positioned parallel to the light direction. A directional light has infinite range and does not diminish.
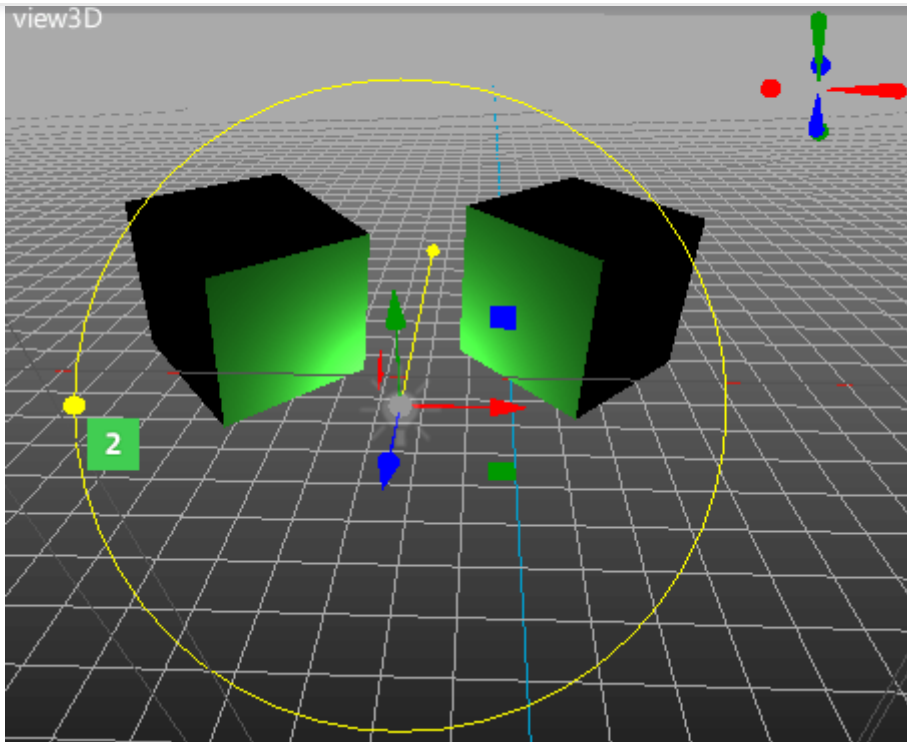
Moving a directional light does not have any effect. The light will always be emitted in the direction of the light's z axis. Rotating the light along its x or y axis will change the direction in which the light is emitted.

Scaling a directional light will only have an effect in the following cases:

> If the z scale is set to a negative number, the light will be emitted in the opposite direction.

> If the scale of any axis is set to 0, the light will be emitted along the world's z axis. Rotating the light has no effect.

Point Light

A point light can be described as a sphere that emits light with equal strength in all directions from the center of the light. This is similar to the way a light bulb emits light.

Lighting is applied outwards from the center of a point light, becoming increasingly dim away from the center. Moving a point light changes the position from where the light is emitted. Rotating or scaling a point light does not have any effect.

To control the fade-off and range of a point light, set the **Constant fade**, **Linear fade**, and **Quadratic fade** properties. Constant fade is the constant factor of the *attenuation* term of the light. Attenuation refers to the reduction in the intensity of light as it travels through a medium due to absorption or scattering of photons.

Turn up the linear fade value to increase the rate at which the lighting effect dims the light in proportion to the distance to the light. The value 0.0 means that the light doesn't have linear fade.

Turn up the quadratic fade to increase the rate at which the lighting effect dims on surfaces that are far away from the light. The value 1.0 means that the point light fade exactly follows the inverse square law. For example, when the distance to a component doubles, the light intensity decreases to one fourth. Adjust the **Quadratic fade** in the Properties view, or by using the light gizmo handle (2).

Aside from fade, a point light has the same properties as a directional light.

Spot Light

A spot light emits light towards one direction in a cone shape. The light intensity diminishes when approaching the value of the **Cone angle** property. The angle at which the light intensity starts to diminish is defined by the **Inner cone angle** property. Both angles are defined in degrees in the **Properties** view. Use the Properties view or the light gizmo handles to adjust the **Cone angle** (3), **Inner cone angle** (4), and **Quadratic fade** (5) properties.
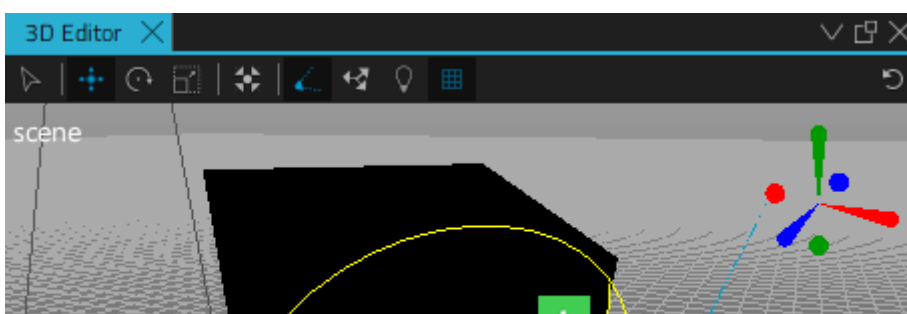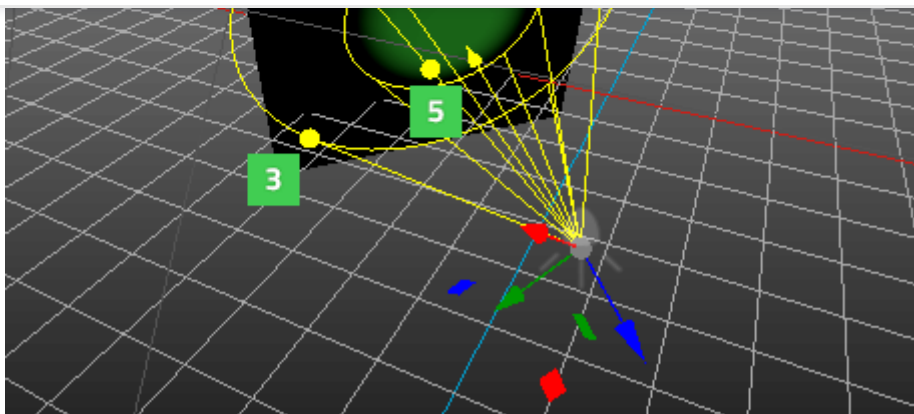
Inside the inner cone angle, the spot light behaves similarly to the point light. There the light intensity diminishes according to inverse-square-law. However, the fade-off (and range) can be controlled with the **Constant fade**, **Linear fade**, and **Quadratic fade** properties.

Area Light

> **Note:** The **Area Light** component is only available in Qt 5.

An area light is similar to the directional light. However, instead of emitting an equally bright light across the whole scene, the area light emits directional light from a rectangle shaped component. Use the light gizmo or the **Properties** view to set the **Width** (6) and **Height** (7) properties to determine the size of the area light.
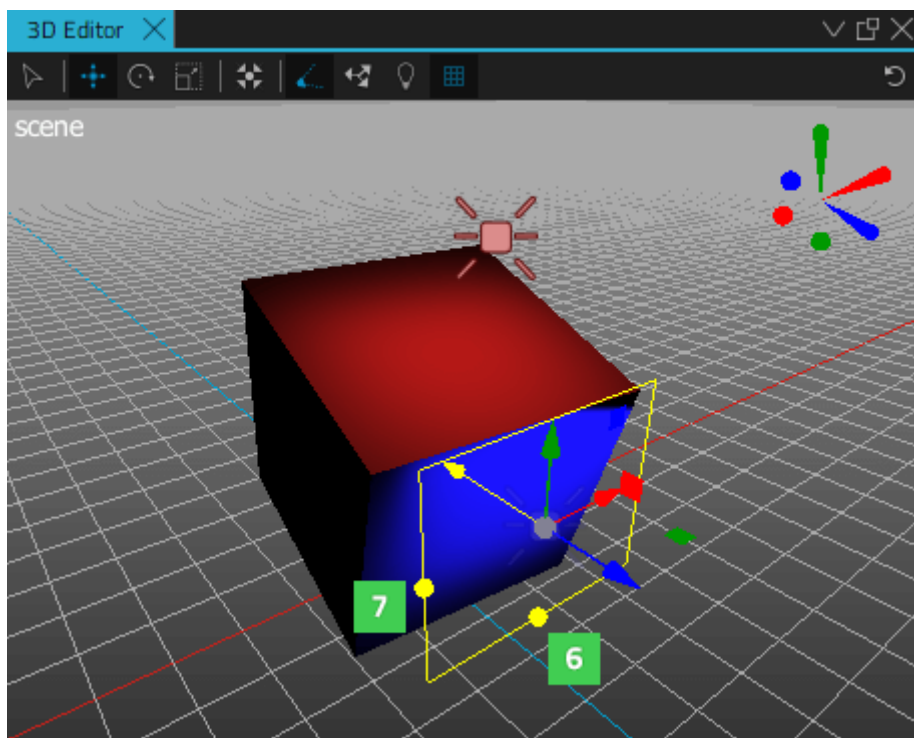
Aside from the size, an area light has the same properties as a directional light.

The image below shows an example on how to light a component with different colors using two different area lights.

You can rotate, scale, and move area lights.

 DOCUMENTATION

To simulate shadows using this light, enable the **Cast shadows** check box. Cast shadows work best with area or point lights.

To specify the darkness of the shadows, set the **Shadow factor** property. The value 0 means no shadows are cast.

To specify the amount of blur applied to the shadows, set the **Shadow filter** property.

Tweak the **Shadow bias** property value by small amounts if you see components casting shadows on themselves.

To specify the quality of the shadow map created for shadow rendering, set the **Shadow map quality** property. Lower quality uses less resources, but produces lower quality shadows, while higher quality uses more resources to produce better quality shadows.

To specify the maximum distance for the shadow map, set the **Shadow map far** property value. Using smaller values may improve the precision and effects of the map.

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