
The IBM Interactive Ray Tracer (iRT)

Version

This is iRT version 1.0, the initial release to IBM Alphaworks.

What is the iRT?

The iRT is a real-time scalable [ray-tracing](#) engine for the [Cell processor](#). It has been designed to efficiently use the Cell's [SPE](#) vector engines. The iRT uses both software overlays and software caches to free the programming team from having to manage issues like explicitly managing [SPE](#) local store and DMAs related to both code fetch and data input/output. The iRT only uses the compute power of the [Cell processor](#), no [graphics processing units \(GPU\)](#) are leveraged.

This demonstration version can either run on a Linux [Sony PS3](#) or an [IBM QS20 Cell blade](#). The scalable nature of the engine allows the iRT to take advantage of as many [SPEs](#) as are found on the system. Given that the [IBM QS20 blade](#) has two Cell processors and 16 [SPEs](#), it can render 2.6 times faster than the 6 [SPEs](#) available for use in the [Sony PS3](#).

This demo version differs from the full iRT in several ways. The full version scales across clusters of network attached [IBM QS20 Cell blades](#) using advanced load balancing techniques. This allows very complex scenes to be ray-traced in real-time. The full version also supports real-time compression and delivery of the images to remote [thin clients](#). [Thin clients](#) can then tap into the rendering power of remote Cell blades to achieve interactive photorealistic views of complex models.

Installing iRT

Install the iRT-1.0 and iRT-scene-1.0 RPMs. The application and scene data will be located in /opt/ibm/iRT. Documentation and the license is located in /usr/share/doc/iRT.

Software Requirements

- IBM Cell SDK 2.0
- PS3
 - Yellow Dog 5.0.2 with Cell SDK 2.0 or 2.1
- QS20 Blade
 - Fedora Core 6.0 with Cell SDK 2.0 or 2.1

Setting the PS3 Resolution

The iRT is a full screen application that will adjust to the PS3's current video mode.

Higher resolutions will result in lower frame rates. To change the resolution on the blade, change `imgHeight` and `imgWidth` in `$HOME/.irt_init`.

To set or change the video mode, run the following:

```
480p: Run 'ps3videomode -v 2'
720p: Run 'ps3videomode -v 3'
1080p: Run 'ps3videomode -v 5'
```

Running iRT

Requirements PS3:

- Need to be root
- iRT must be run from a virtual text console (i.e. Ctrl-Alt-F2)

Starting iRT:

```
as root, do the following:
cd /opt/ibm/iRT
./iRT
```

iRT Keyboard controls:

While the iRT is running the following key board and controller options are available:

Key	Option
q	Quit
r	Reflections and Refractions on/off
s	Shadows on/off
a	Ambient occlusion on/off (be patient, slow framerate)
x	Metallic ambient occlusion on/off (be patient, slow framerate)
1	Adaptive supersampling off
2	Adaptive supersampling level 1
3	Adaptive supersampling level 2
4	Adaptive supersampling level 3
	(If reflections are enabled)
8	One reflective bounce
9	Two reflective bounces
0	Four reflective bounces
d	Progressive refinement on/off when stopped
f	Flash light mode on/off
v	Colorize areas that are being adaptively supersampled
b	Colorize areas that are taking more time to render (Darker = longer)
p	Write out .irt_init file, captures current state for the next run
w	Write out a ppm image file for each frame

