The Brute-Force GI Engine

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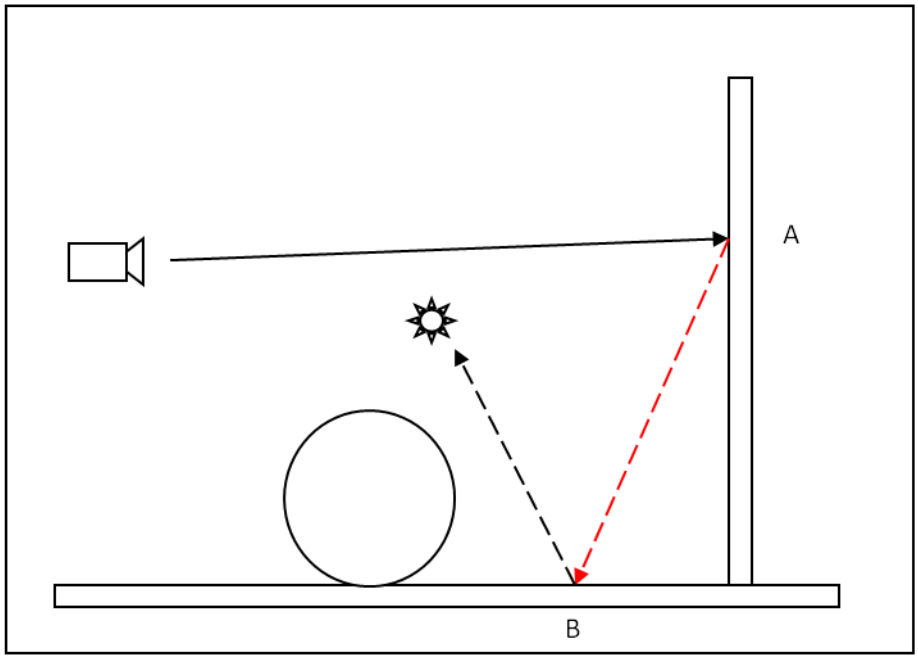
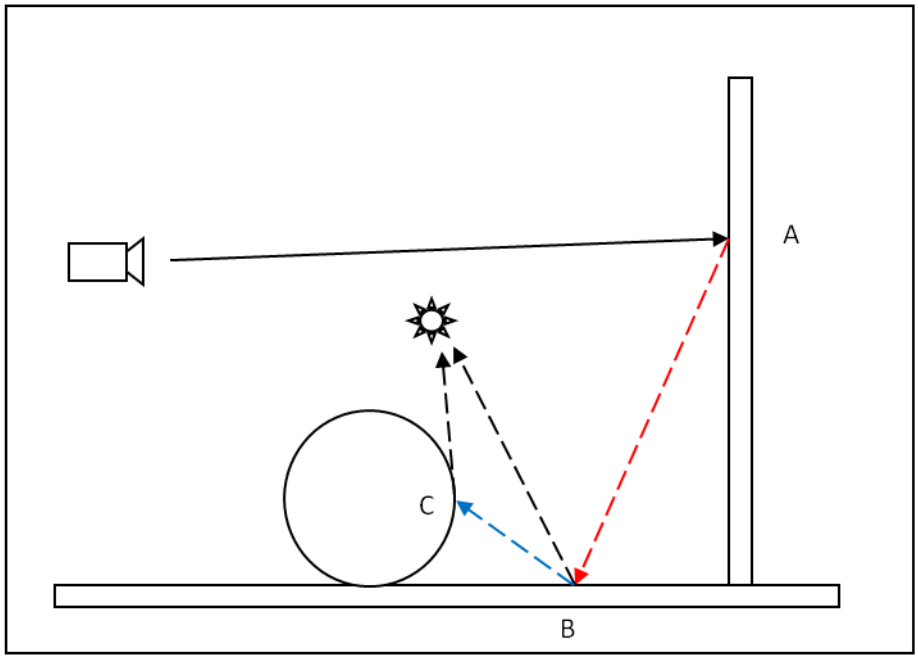
Introduction

The Brute-Force GI Engine is the most basic GI Engine. It doesn't attempt to interpolate any results and, as such, is very accurate but also the slowest.

Brute-Force can be selected as a primary or secondary GI engine. It works by simply shooting rays as shown below.



Zero GI Bounces. Camera shoots a ray and hits wall (point "A"). The primary GI engine is used and shoots another ray of which is shown in red. This way, direct lighting (black dashed line) on point "B" affects point "A".



One GI Bounce. The processing now goes a bit further. Point "B" uses the secondary GI engine to gather illumination from the sphere by shooting a single ray (shown in blue). This way, the direct lighting (black dashed line) of points "B" and "C" affects point "A".

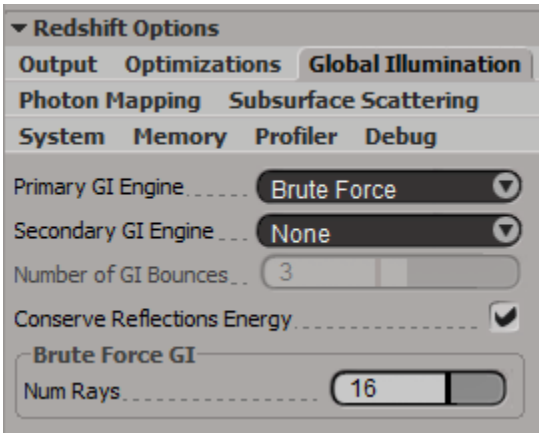
Pros

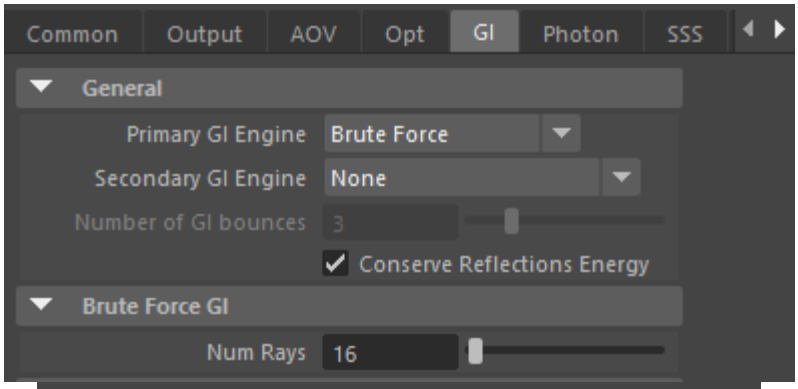
- Accurate
- No flickering in animations
- It's easy as it only has one setting to tweak ("Num Rays")
- Does not require any storage so the final image resolution and scene detail does not matter

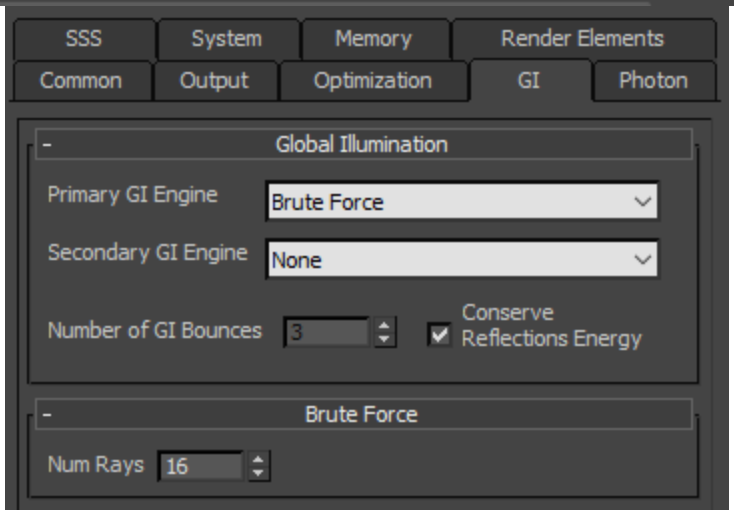
Cons

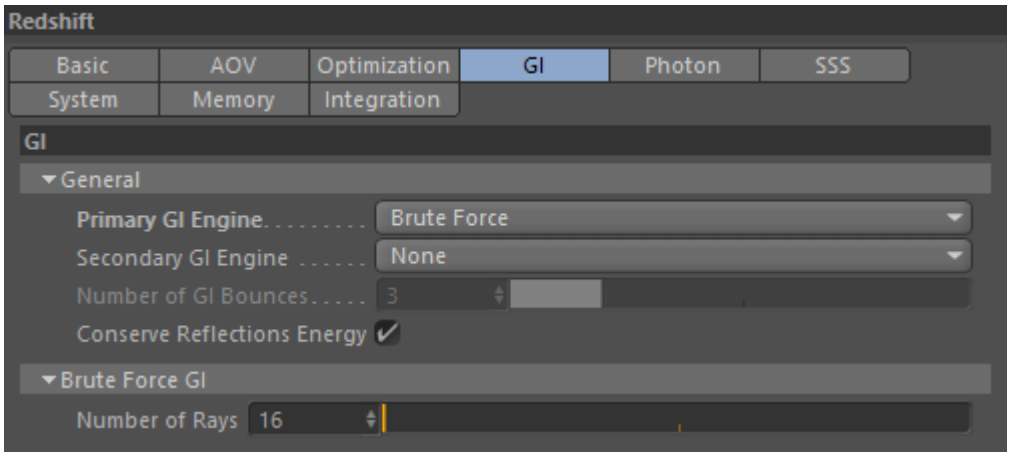
- It's the slowest technique. But due to Redshift's speed, it's more practical compared to other renderers.
- Unless many rays are shot per pixel, it can produce grainy images – especially in difficult lighting situations

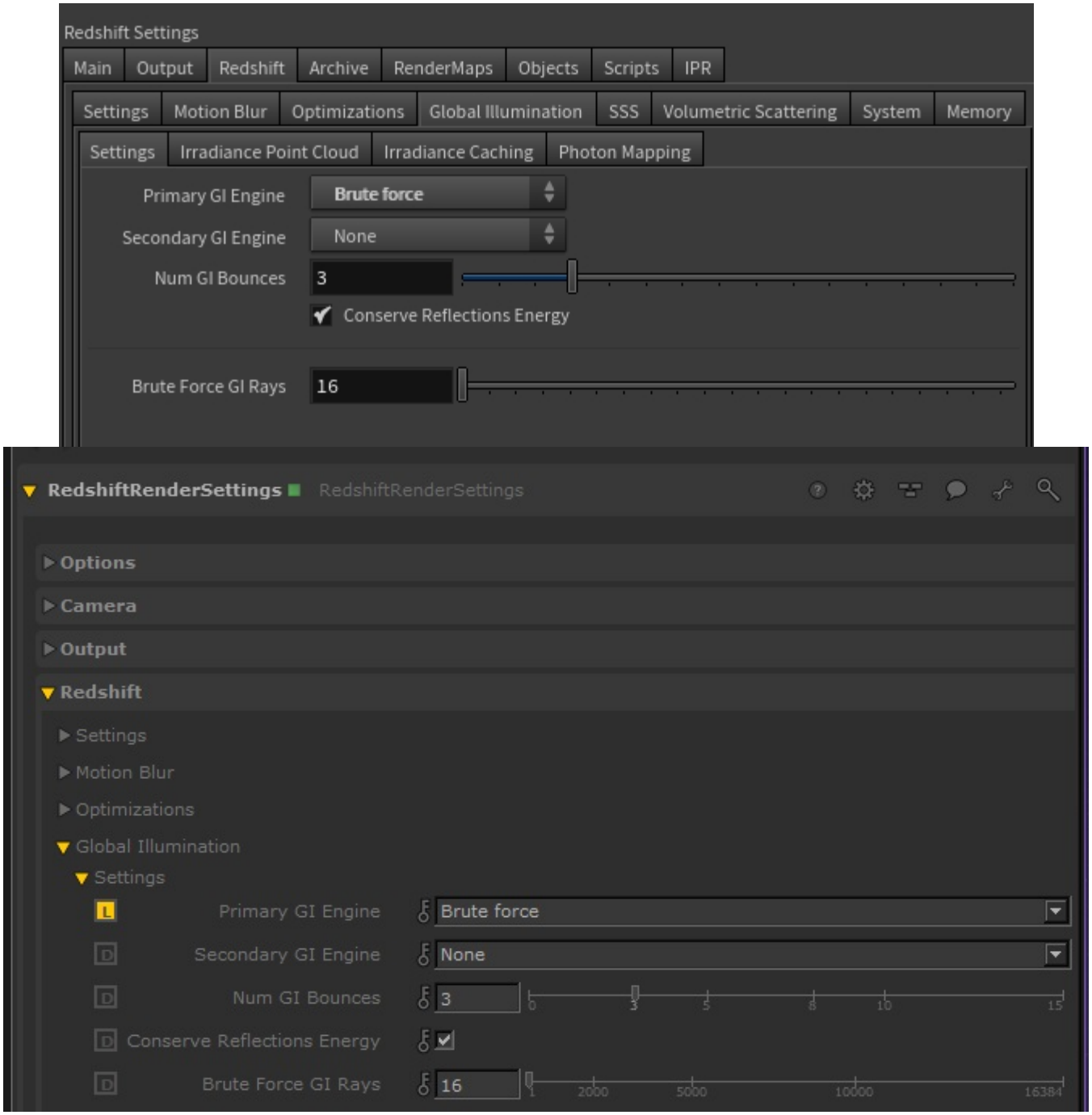
Settings




Common
Output
AOV
Opt
GI
Photon
SSS
General
Primary GI Engine
Brute Force
Secondary GI Engine
None
Number of GI bounces
3
Conserve Reflections Energy
Brute Force GI
Num Rays
16


SSS
System
Memory
Render Elements
Common
Output
Optimization
GI
Photon
Global Illumination
Primary GI Engine
Brute Force
Secondary GI Engine
None
Number of GI Bounces
3
Conserve Reflections Energy
Brute Force
Num Rays
16

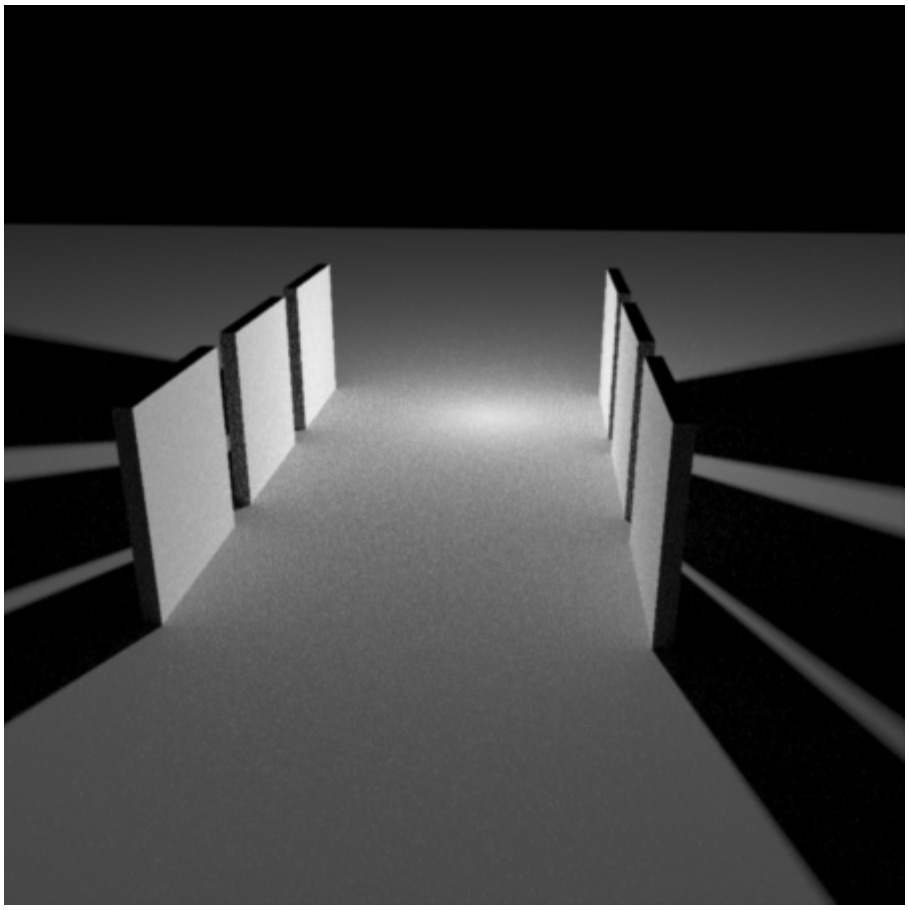

Redshift
Basic
AOV
Optimization
GI
Photon
SSS
System
Memory
Integration
GI
General
Primary GI Engine
Brute Force
Secondary GI Engine
None
Number of GI Bounces
3
Conserve Reflections Energy
Brute Force GI
Number of Rays
16



Num Rays

With Brute Force GI, each pixel on the screen has its GI computed by shooting out a number of rays. The more rays are shot, the cleaner (less "grain") the result but the longer the computation time. Scenes that have few small bright light sources might need many rays to produce grain-free results.

Below we show the effect of "Num Rays". The images are pretty self-explanatory.

	
"Num Rays" set to 16. The result is grainy.	*Now using 512 rays, which*