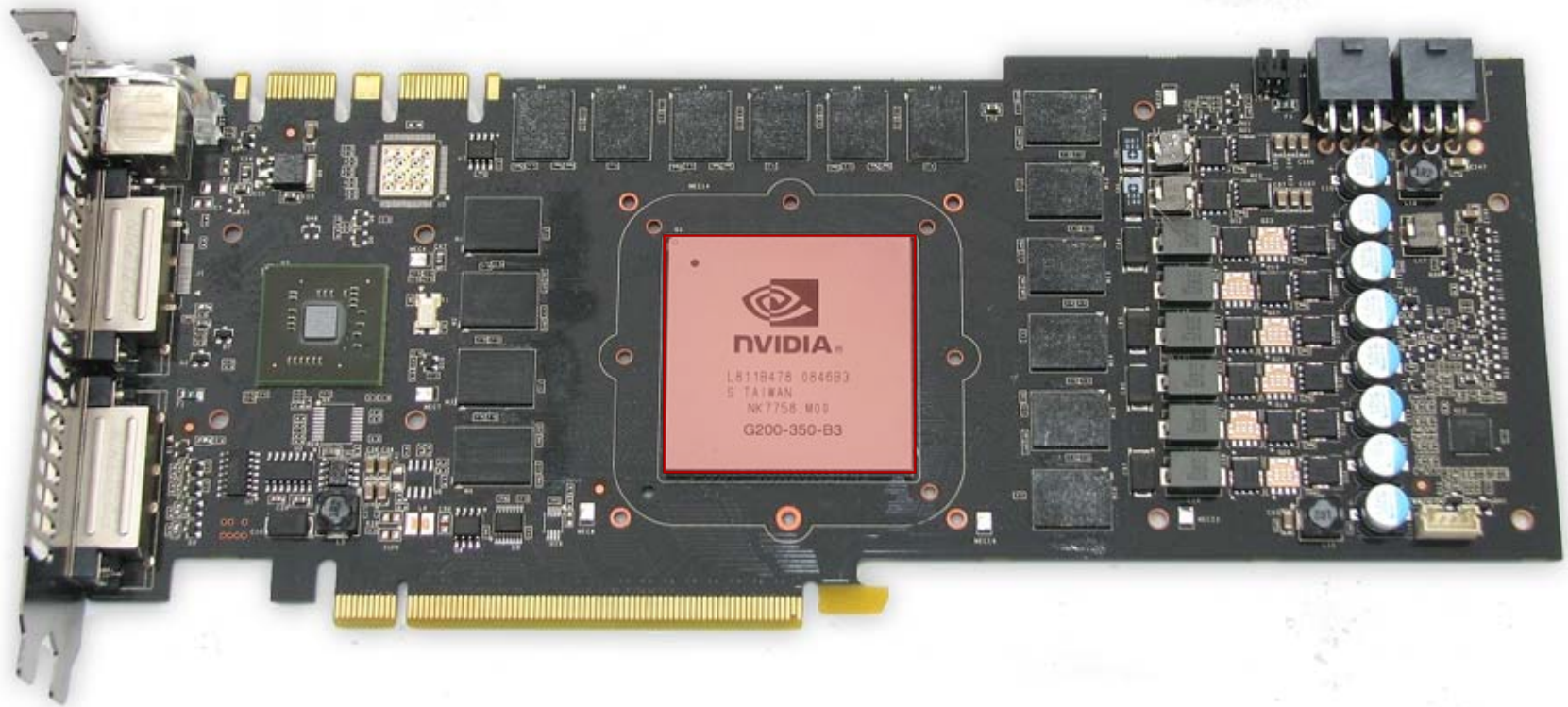




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Realtime LIGHTING

behind the scenes





Host

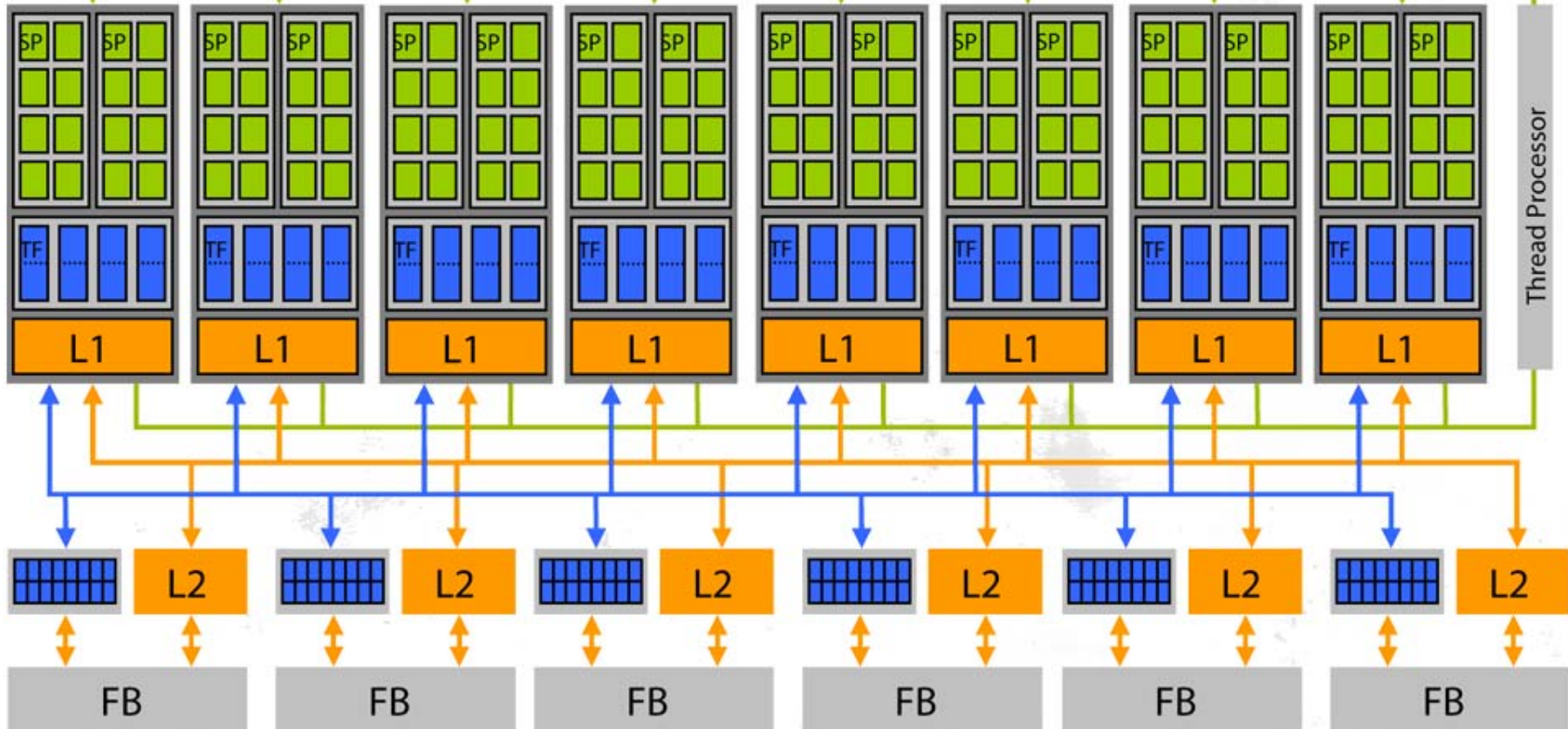
Input Assembler

Vtx Thread Issue

Geom Thread Issue

Setup / Rstr / ZCull

Pixel Thread Issue



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dynamic branching

```
if (color.r < 0.5f)
{
    // huge code block
    ...
}
else
{
    // small code block
}
```

what's the problem?



questions

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let's start...



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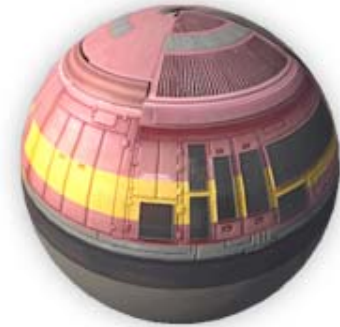
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Geometry



Light



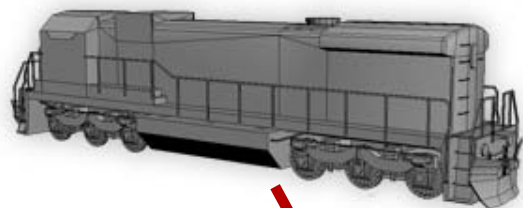
Material

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forward shading / rendering



vs

rasterizer

ps

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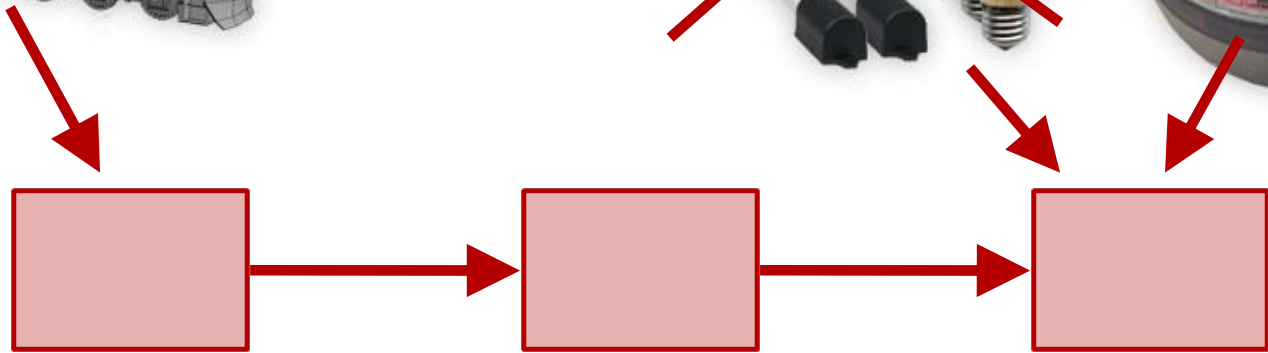
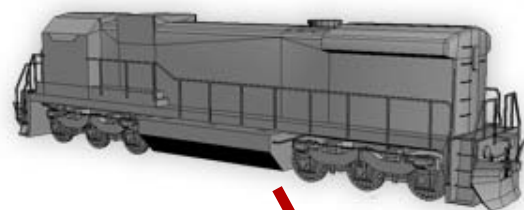


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problems?



vs

rasterizer

ps

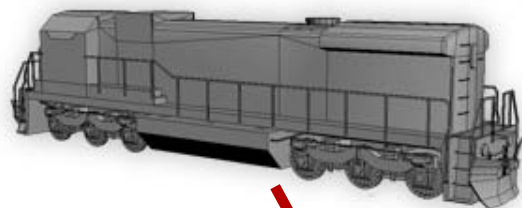
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problems?

4...8



vs

rasterizer

ps

+

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what about different light types?



```
if (light_type == POINT)
{
...
}
else if (light_type == SPOT)
{
...
}
```

one large shader

```
#ifdef POINT_LIGHT
...
#elif defined (SPOT_LIGHT)
...
#endif
```

many small shader



problems?

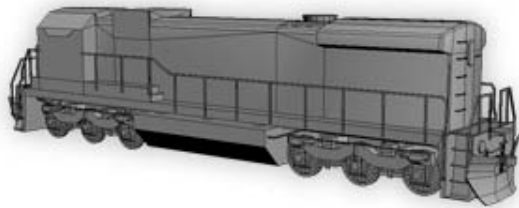
geometry overhead

complexity $O(G*L)$

material-light combinations

unpredictable performance

deferred shading / rendering



pass 1:
geometry



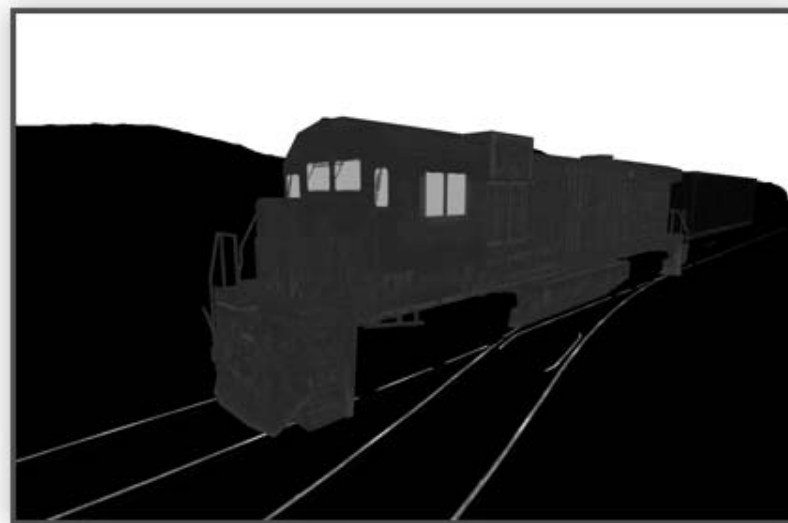
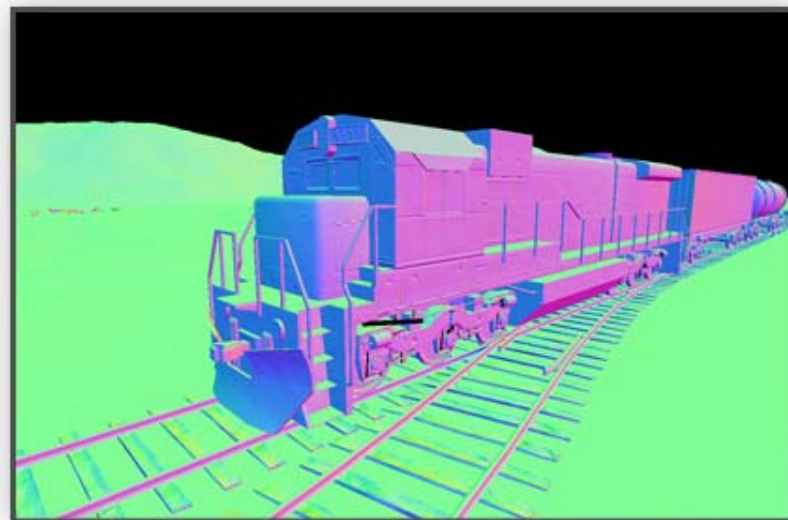
pass 2:
light

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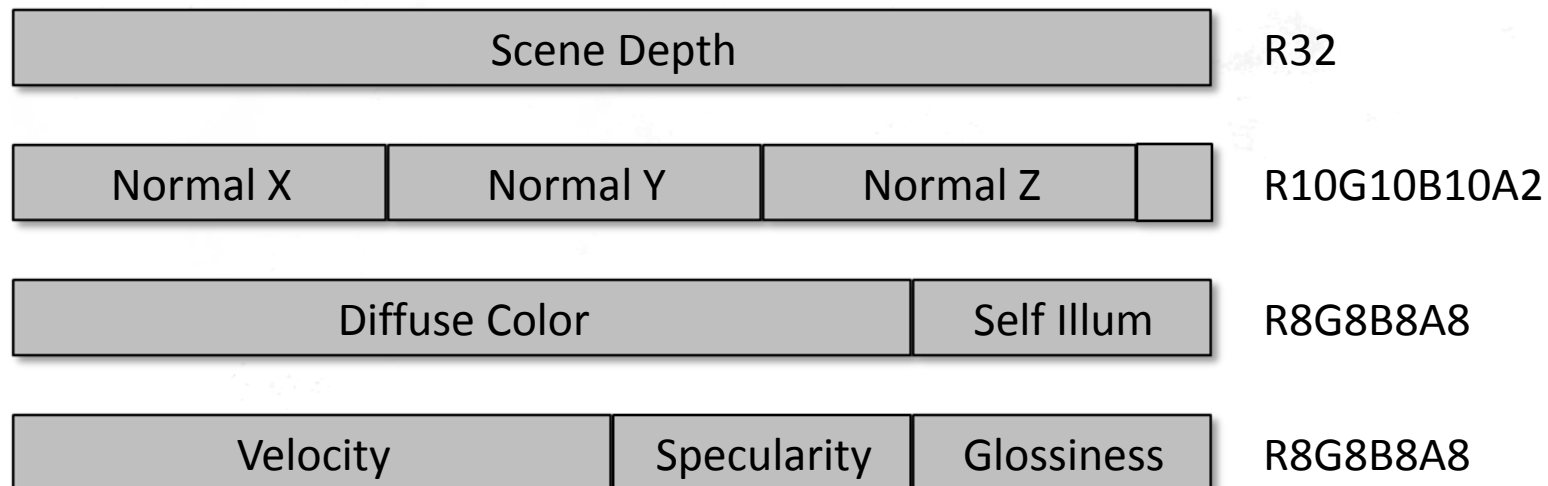


G-Buffer





G-Buffer





advantage

no geometry overhead

no need for “ubershader”

complexity $O(G+L)$

who is using it?



Stalker



Killzone 2

... Starcraft 2, Vision, Vergence

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disadvantage

high memory bandwidth

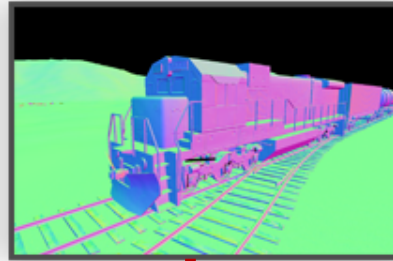
no transparent geometry

no native anti-aliasing

**what about different
shading-types**

light prepass rendering

pass 1:



pass 2:



pass 3:



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advantage

less memory bandwidth

any possible shading-type

native anti-aliasing



disadvantage

render geometry twice

again no transparent geometry

who is using it?



GTA 4



CryEngine 3



questions

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VERGENCE 00

demo

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