

Preventing Wallhacks

With Information Theory and Ray Casts

Topics

The Problem

Current Solutions

Our Solution

Future Work



The Problem

- Wallhacks provide information
 - Reaction time and tactics
 - Blatant or subtle
- Input/output
 - Wireframe: graphics → graphics
 - Raindrops: sound → graphics
 - Sound cue: graphics/sound → sound



Exhibit A

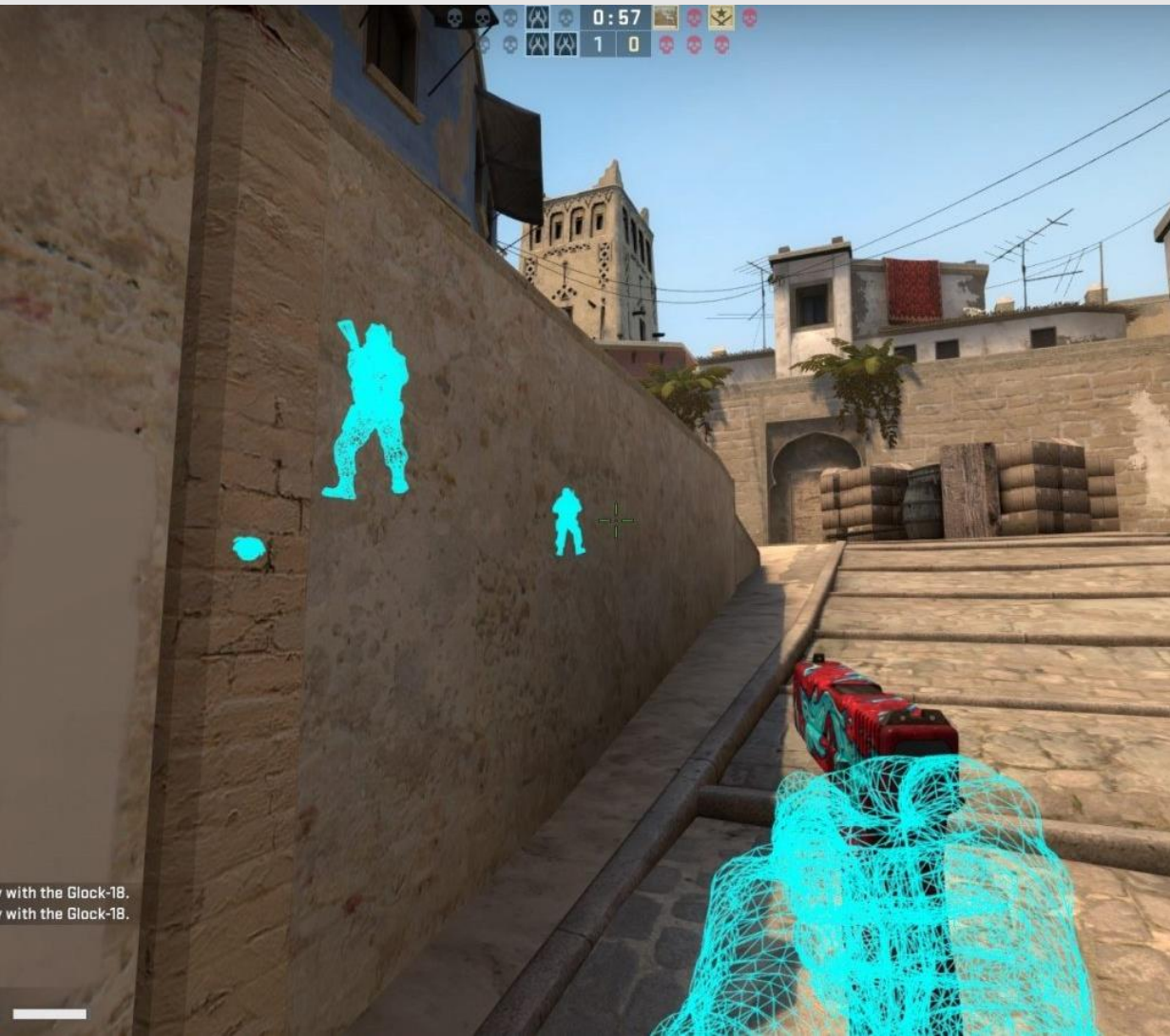


Exhibit B



Exhibit C



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Detection



132 fps on maps\de_dust2.bsp

COUNTER-TERRORISTS 1 1:34 Round 6/30 4 TERRORISTS

\$1900 EQUIPMENT VALUE \$24100

Diamond Sparrow

100 Hurricane Toucan

100 Iceberg

23 Diamond

100 Eclipse

\$5350

100810P

The Suspect 100

Sparrow

Vortex 100

Iguana 100

Cyclone 100

Demolition: 100% (1/4) (1/2)

Time: 10:10 (10:10)

1st 2nd

K A D ADR SK 4K 5K HS% OBJ

1st 8 1 2 131 1 - - 50% 2

2nd

[X] X-Ray [F] Overview [G] Graphs

10 / 30

Detection

AI Training



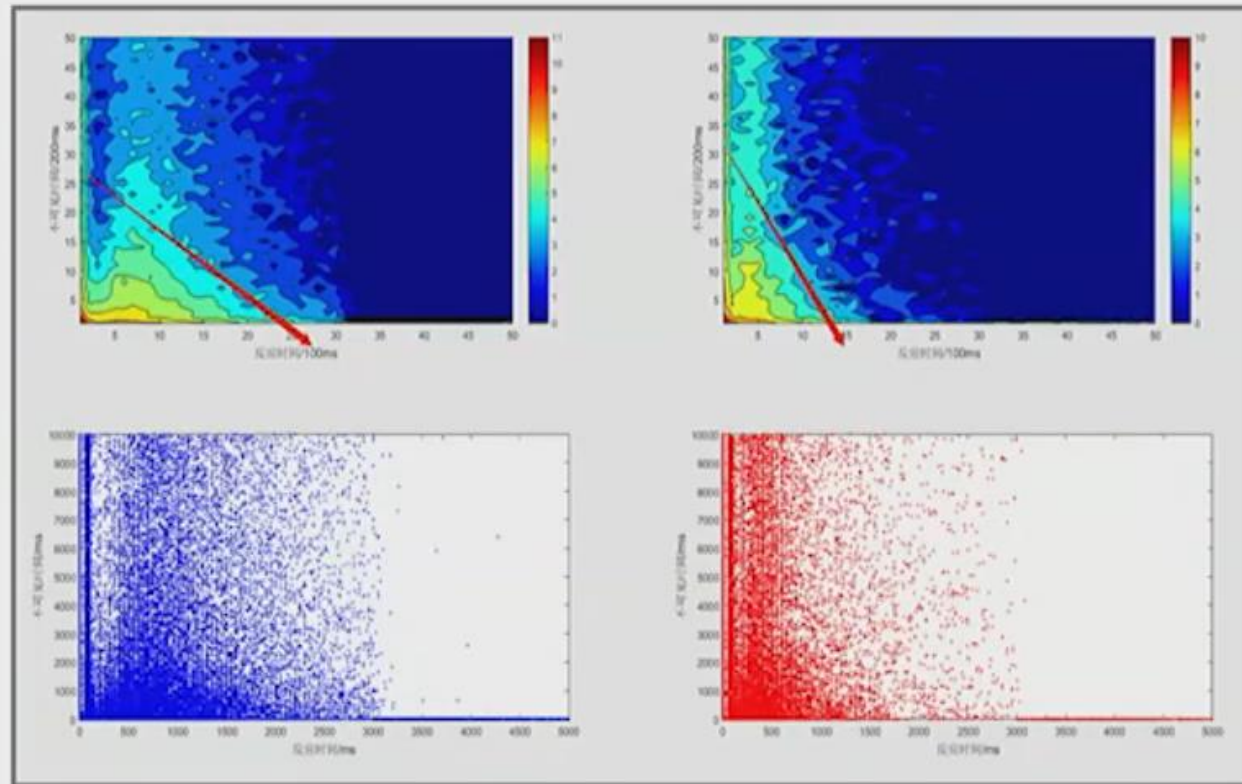
Restore raw data
through analyzing
replay file



Create feature
engineering



Machine
learning

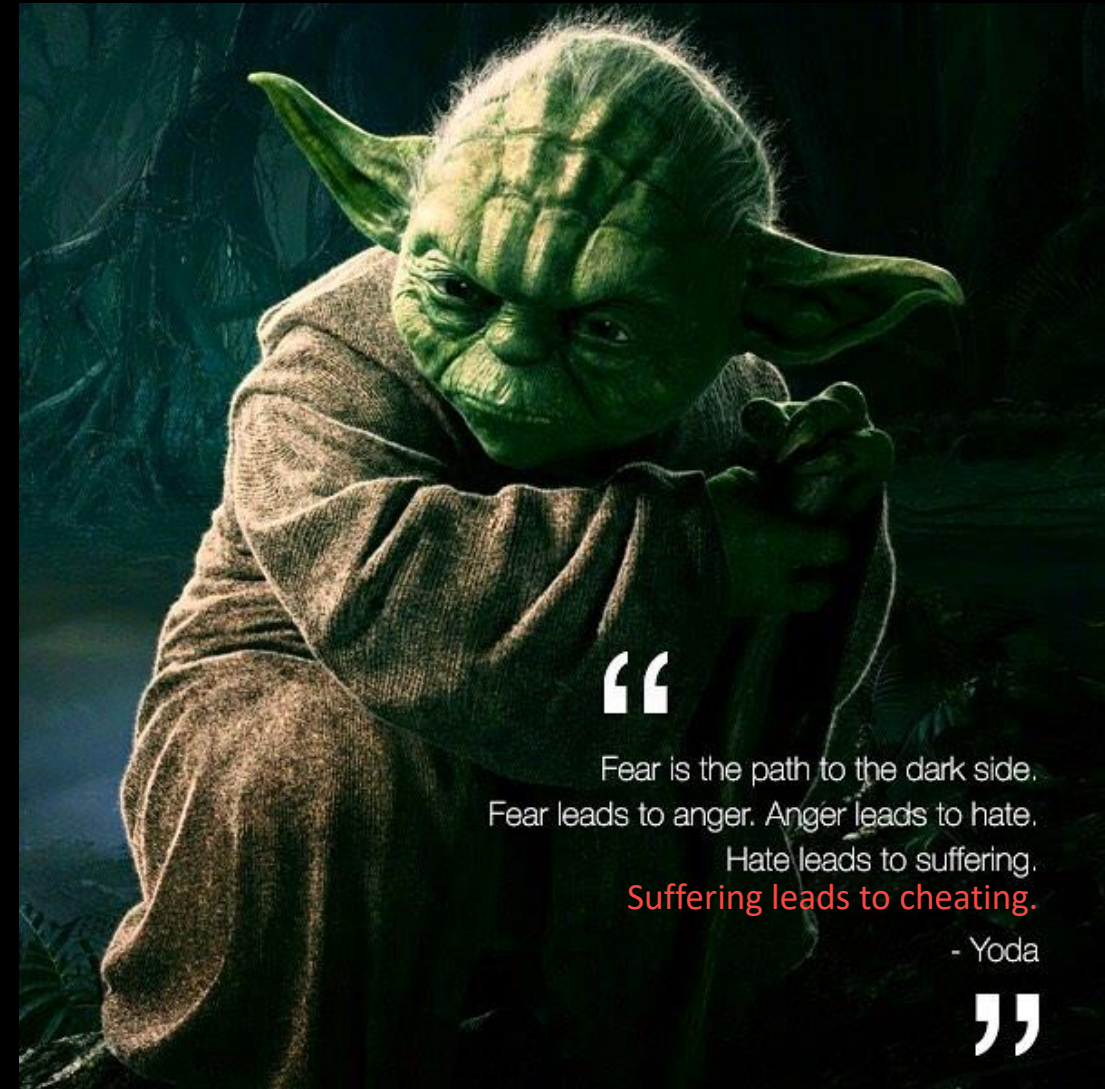


Normal Players

Cheating Players

Detection: Shortcomings

- Hard to be certain
- Psychological stress:
 - Uncertainty: “Hacks! Yes! No! Yes?”
 - Fear: Maybe everyone is hacking.
 - Darkness: I should too.



“

Fear is the path to the dark side.
Fear leads to anger. Anger leads to hate.
Hate leads to suffering.
Suffering leads to cheating.

- Yoda

”

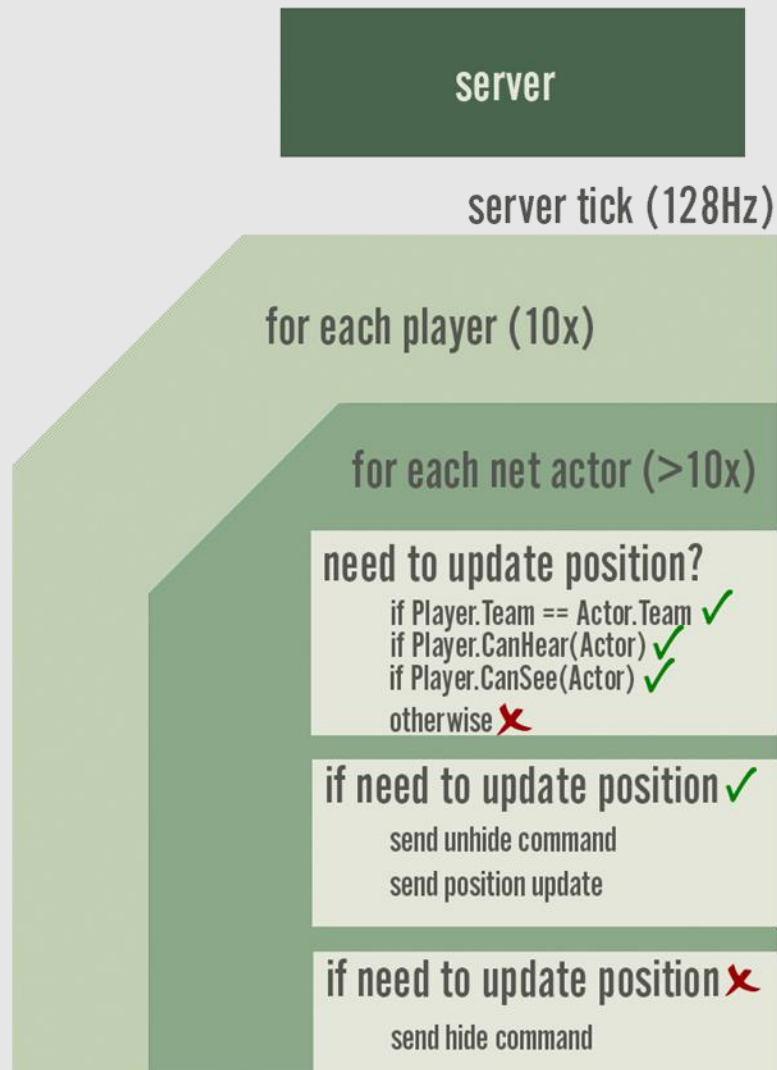
Prevention: Client



easyTM
ANTI-CHEAT



Prevention: Server



unhide command

position update

OR

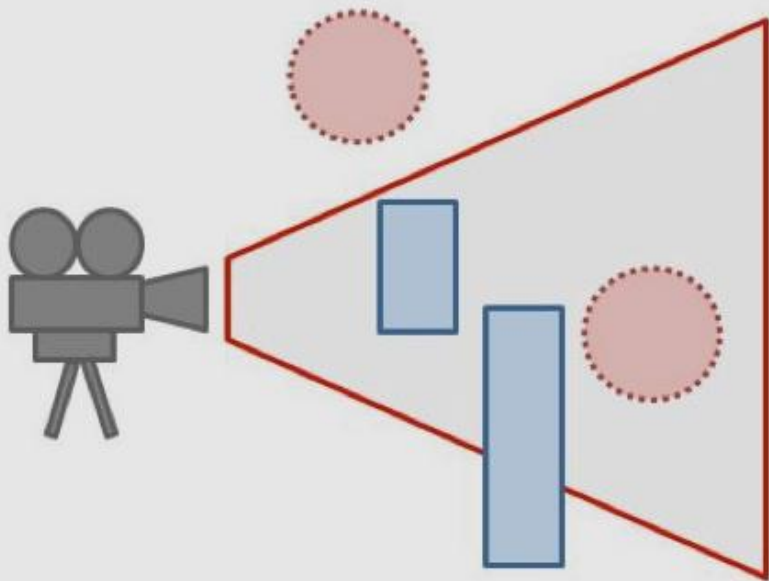
hide command

skip position update

client

Paul Chamberlain,
Riot Games Tech Blog

Occlusion Culling



Without occlusion culling

Player's camera

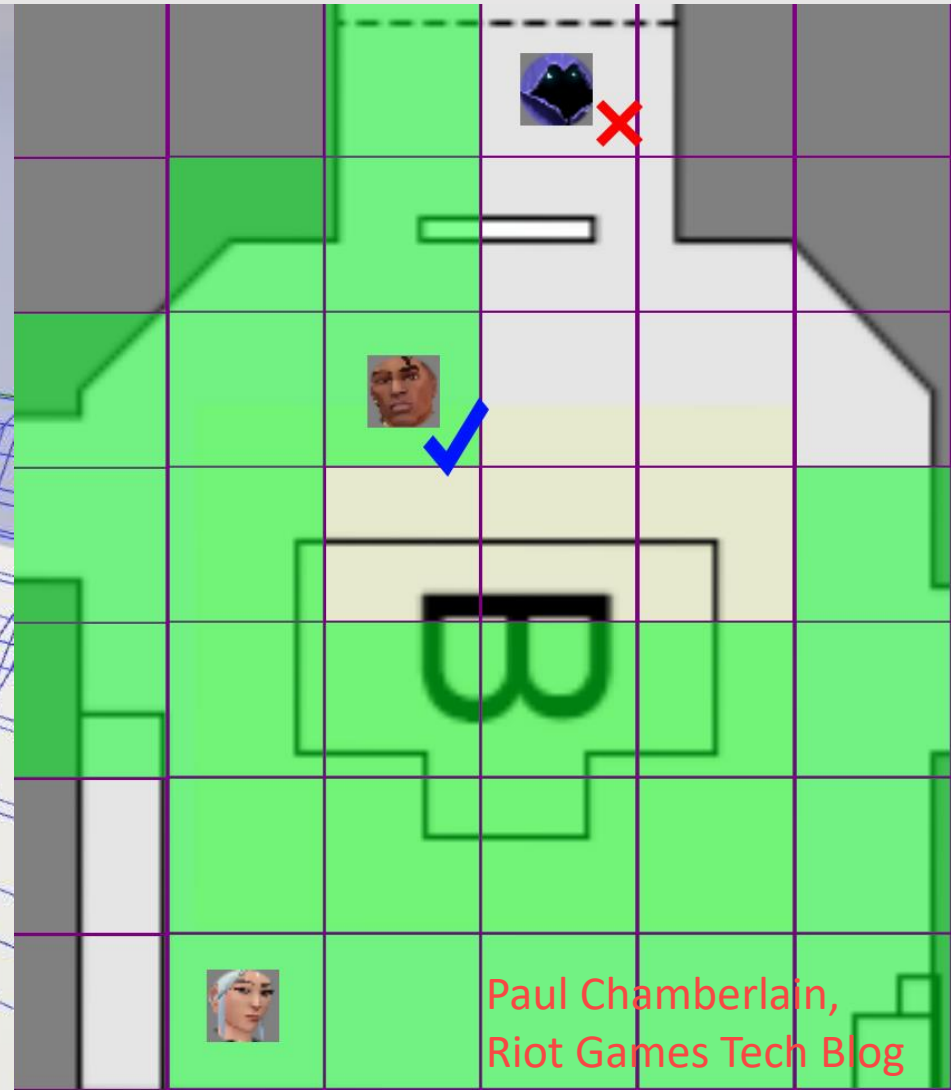
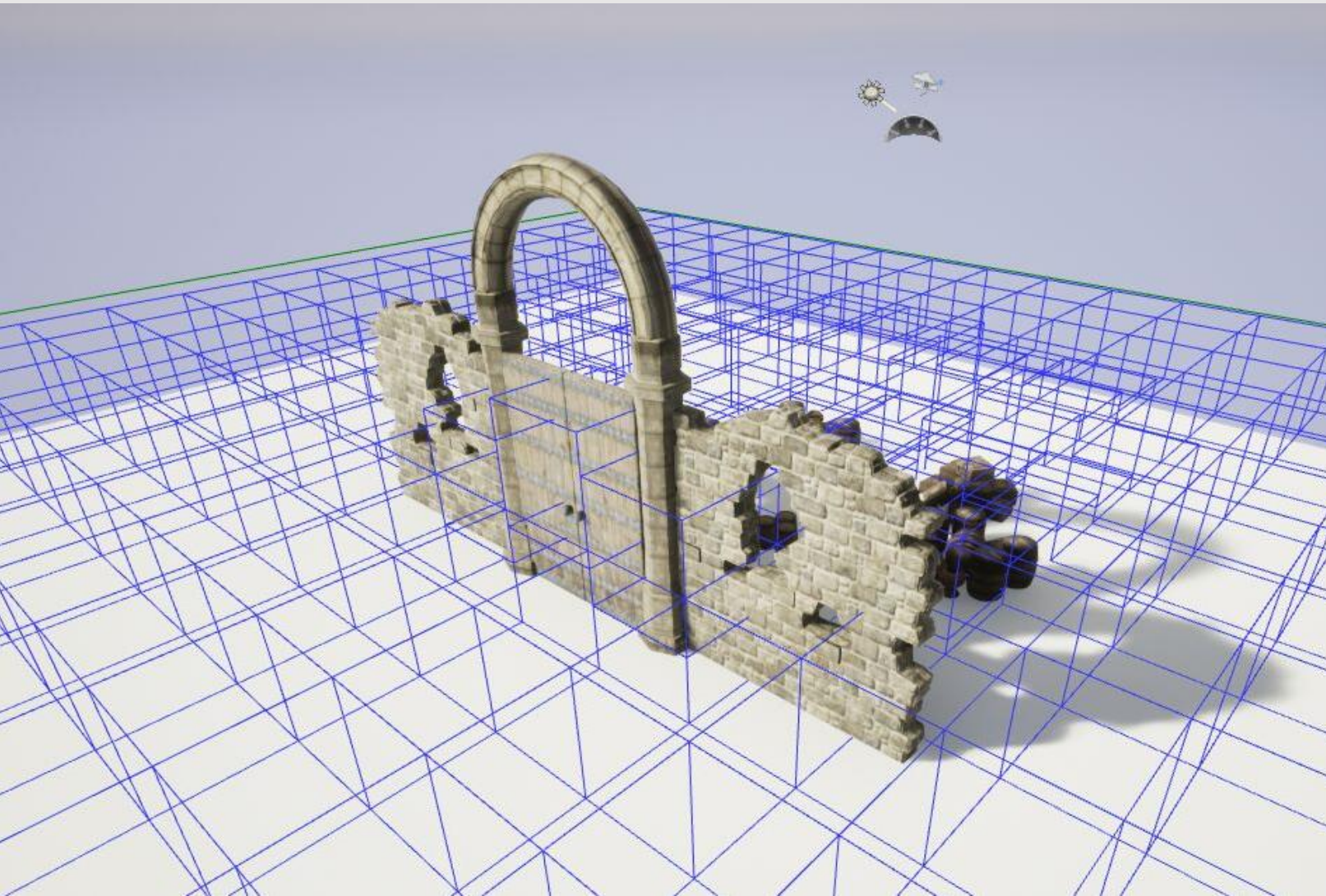
LOS

Hidden blocks rendered, CPU time wasted

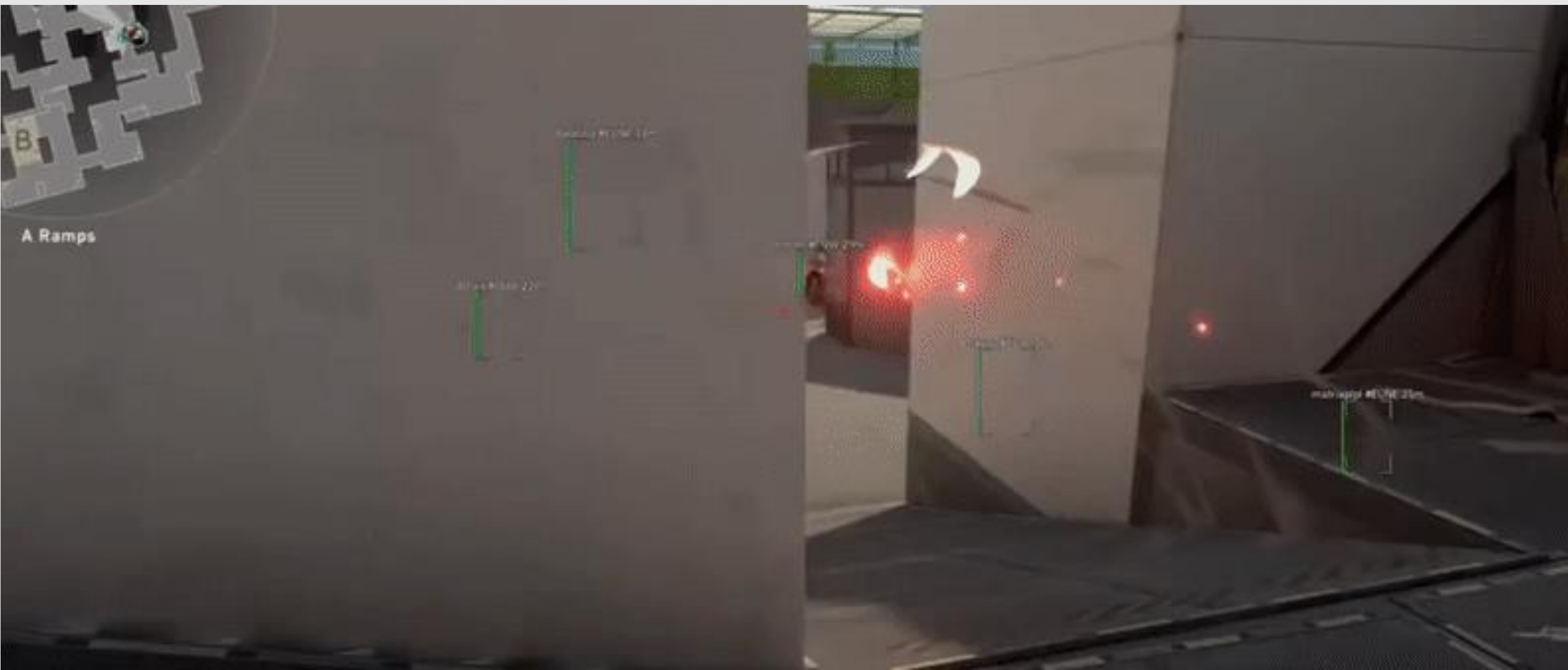
With occlusion culling

Hidden blocks not rendered, CPU time saved

Potentially Visible Sets



Accuracy

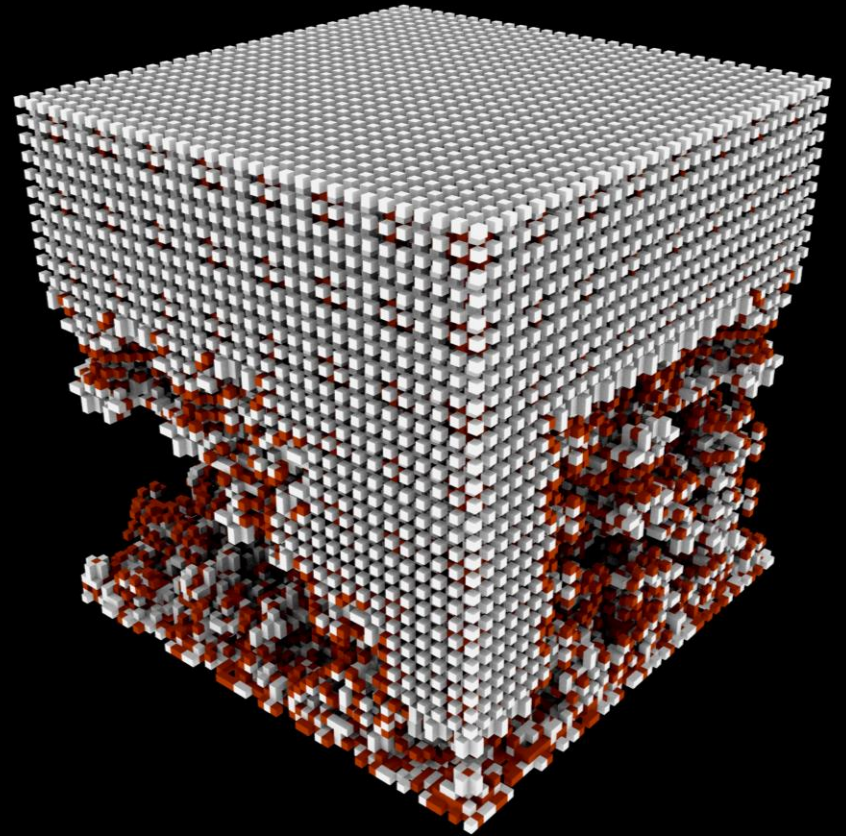


Dynamic Occluders



PVS Analysis

- Accuracy: Sometimes
 - (2000 x 2000 x 10) grid
 - ~2 TB disk
 - $\sim 10^{14}$ ray casts naively
 - Be smart about cache
- Dynamic occluders
- Useful for acceleration



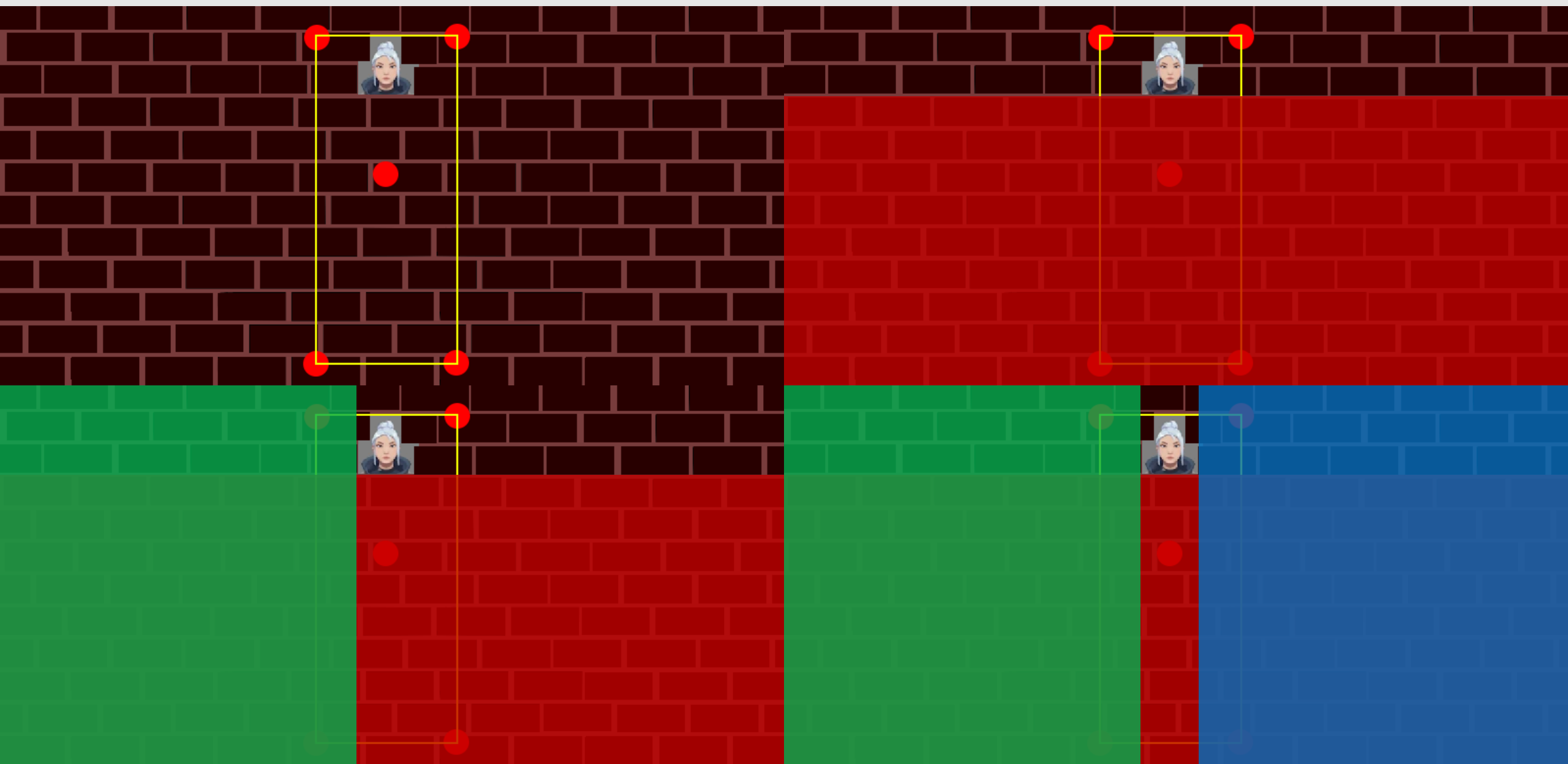
Topics

The Problem

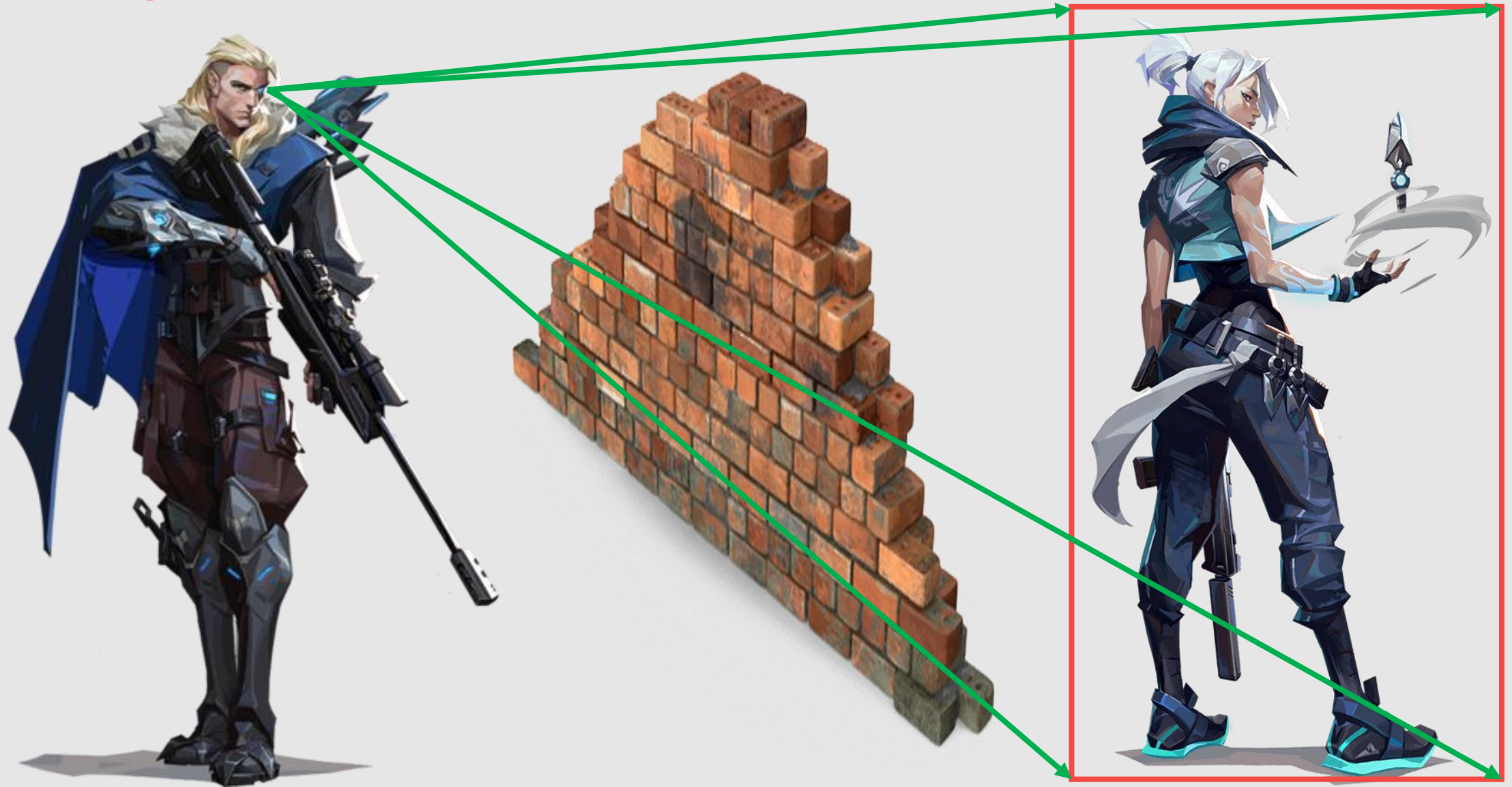
Current Solutions

Our Solution

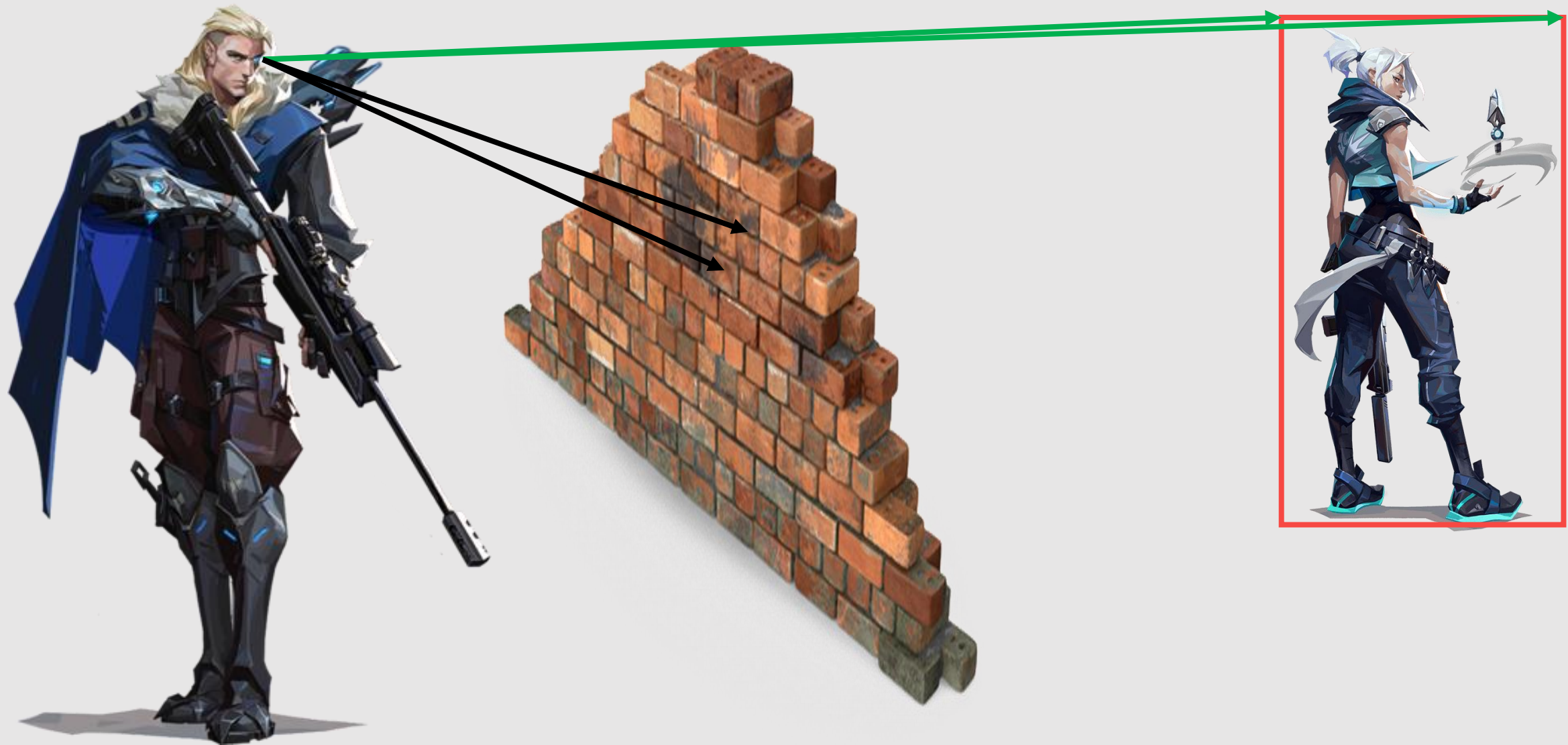
Future Work



Ray Casts



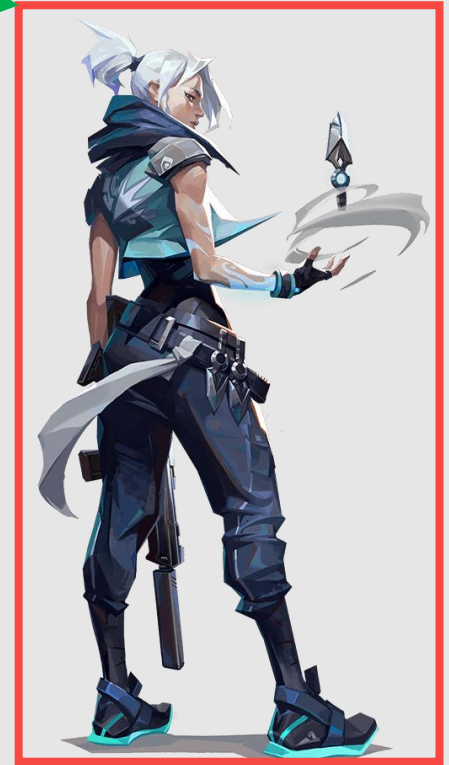
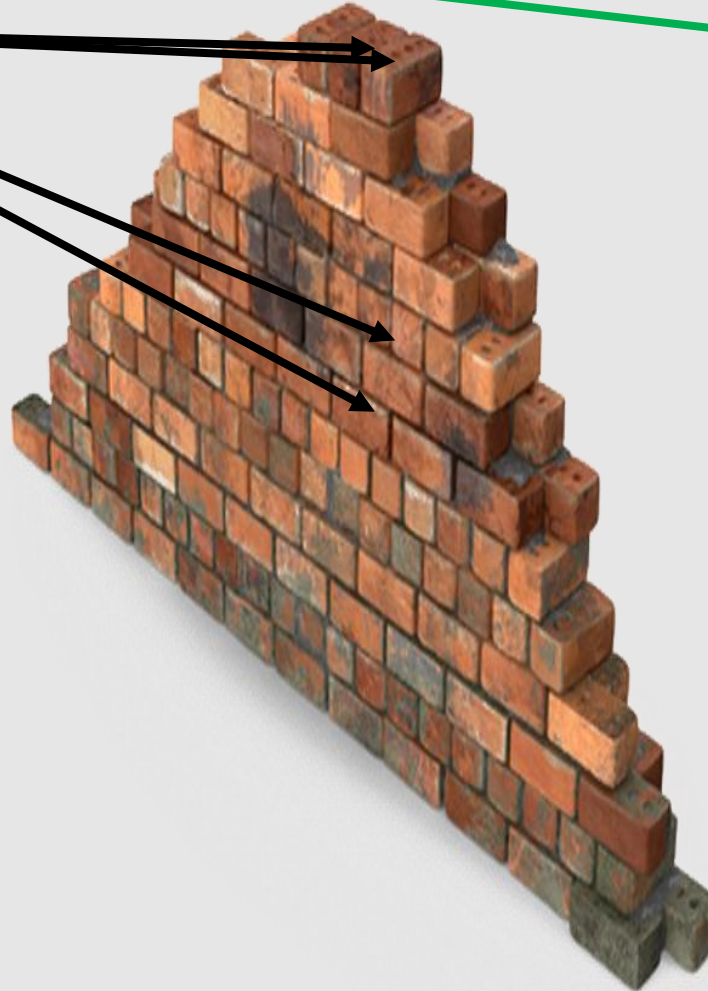
Ray Casts



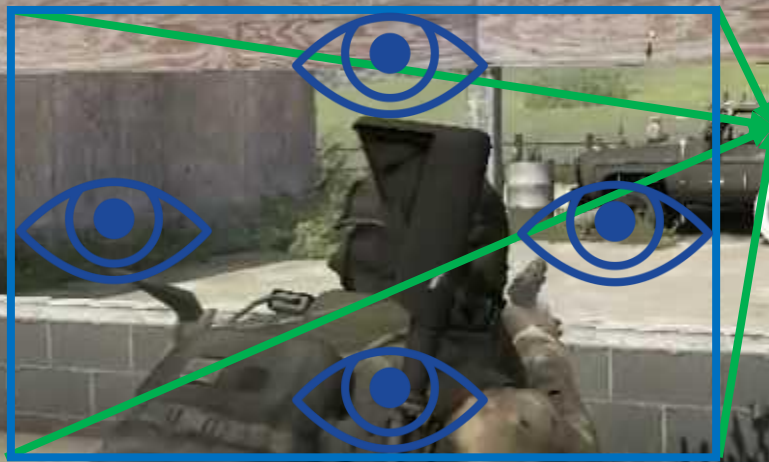
Ray Casts



Ray Casts with Latency



Outside

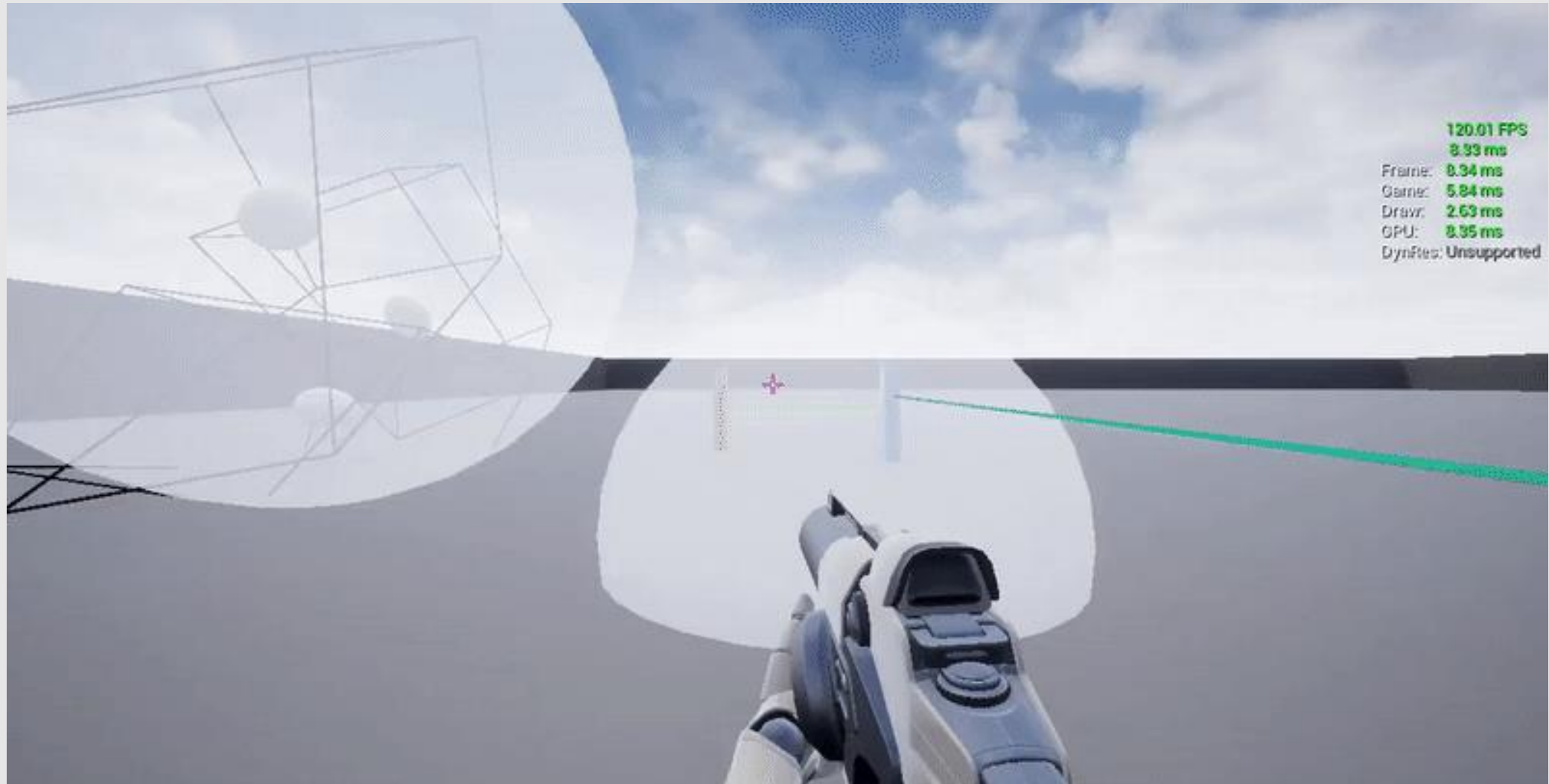


100 0

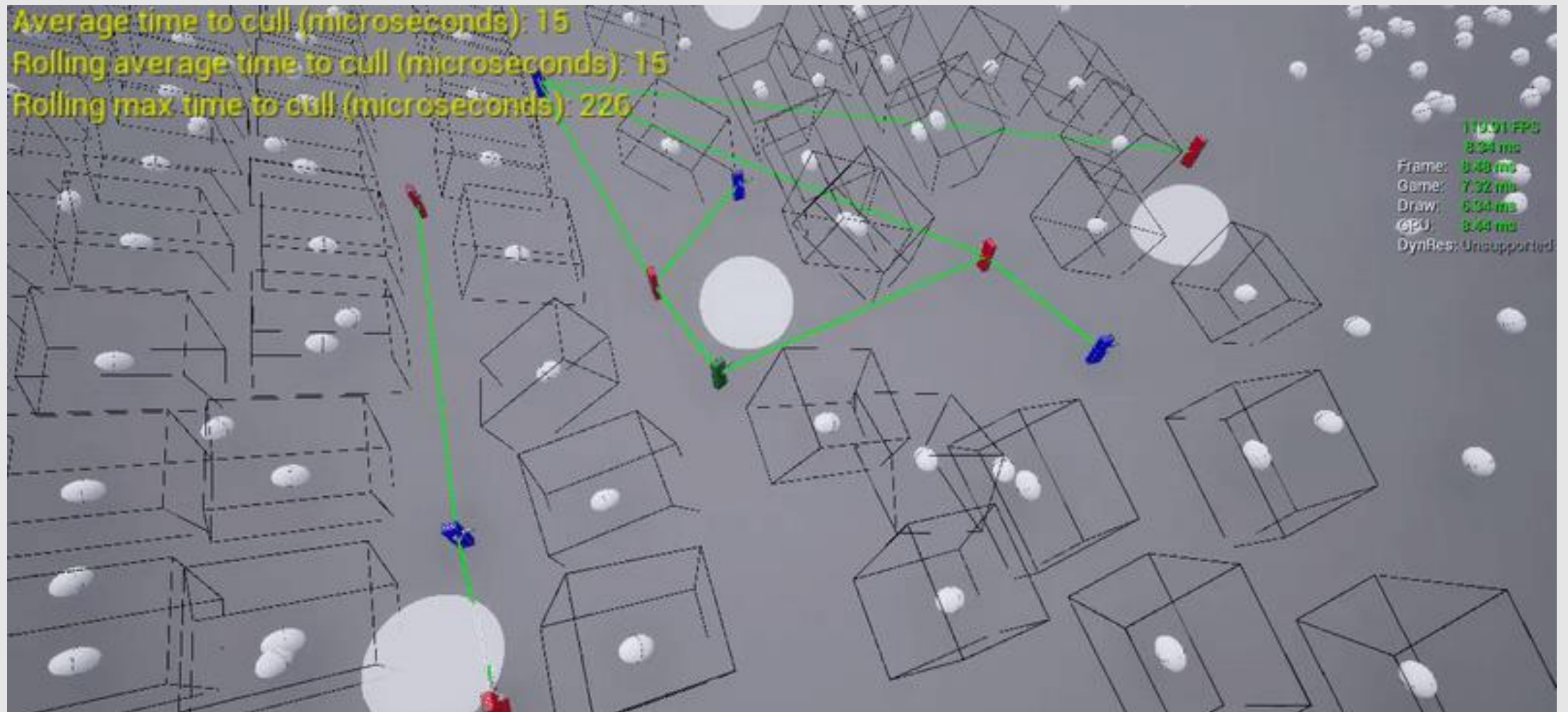
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Five-Sev

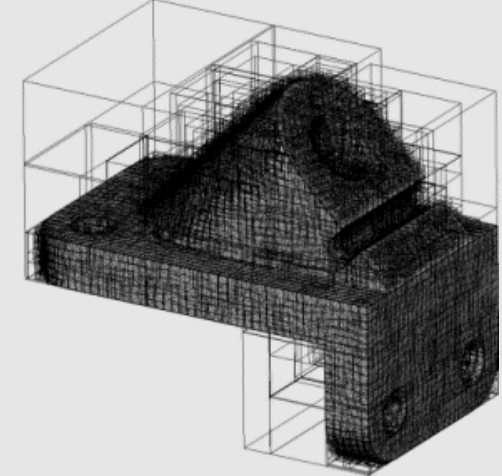
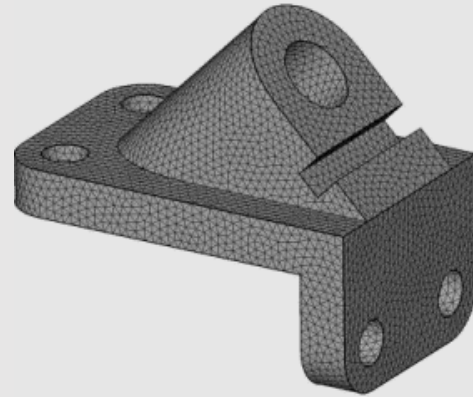
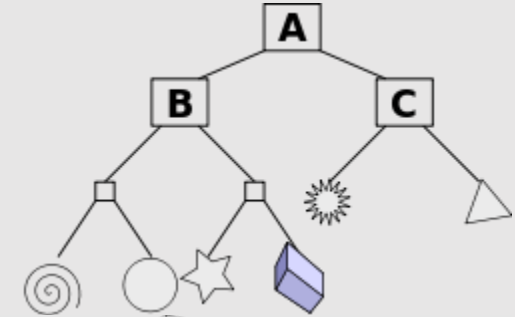
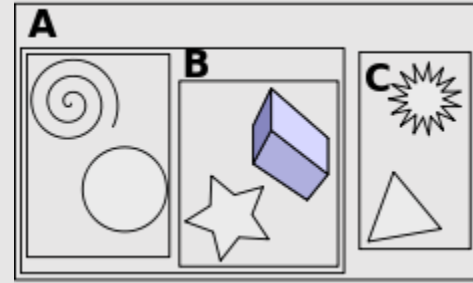
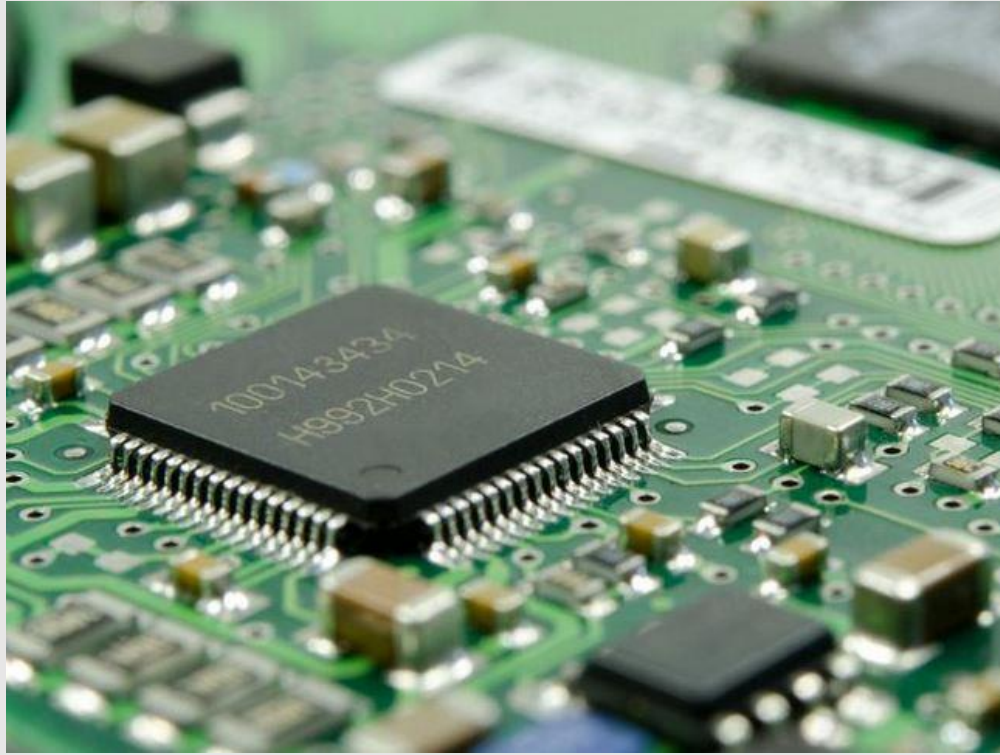
Accuracy



Performance



Performance Optimizations



Topics

The Problem

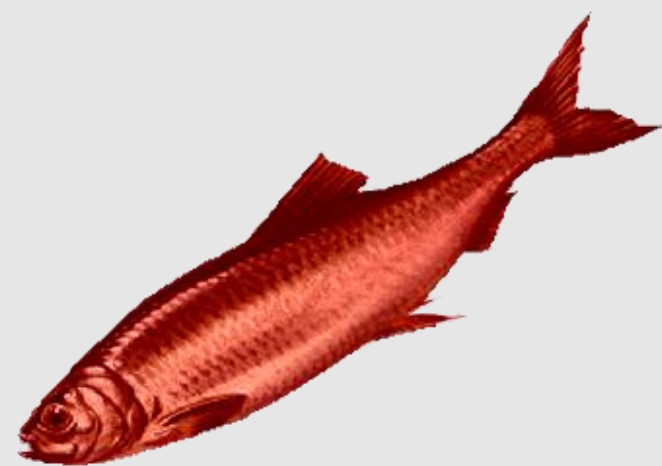
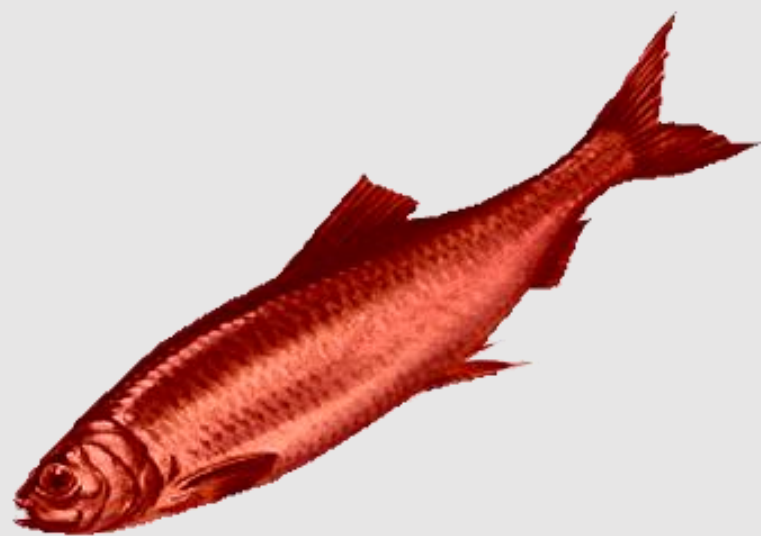
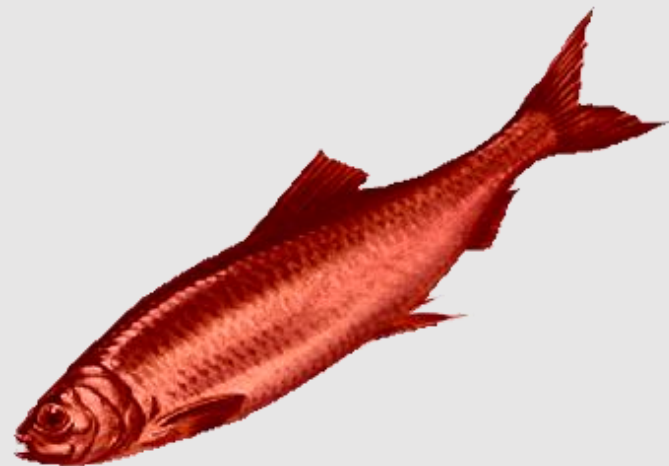
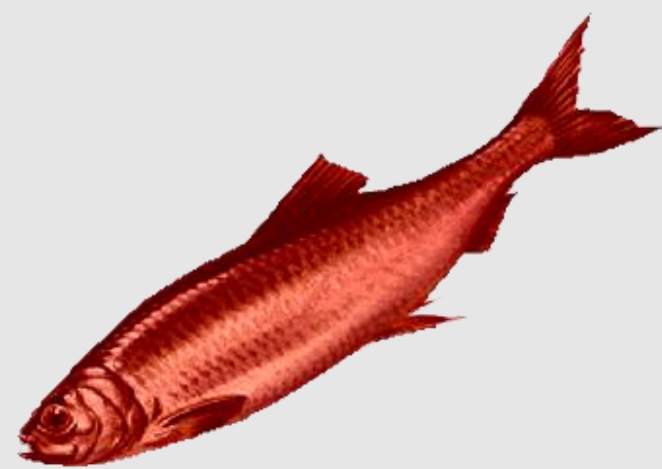
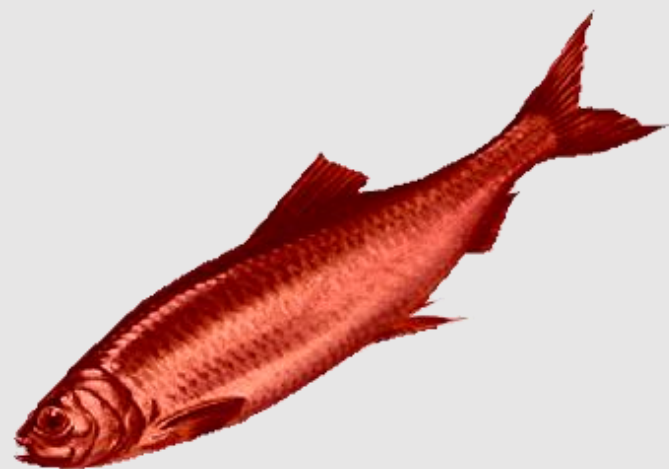
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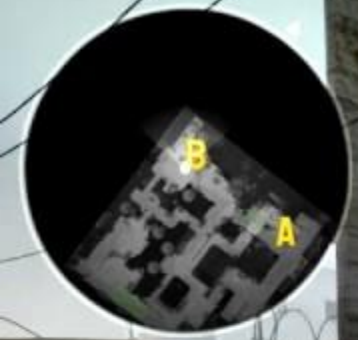
Future Work

- Sound system
- Location prediction
- Partial occlusion
- Automated mapping
- Red herrings



BombSite B

0:00
0 0



\$1000



PLAY | DazzyJ @ Mid Doors [RADIO]: Smoke Out!

100 100

Smoke Grenade



Thank you!

