

RDC
17

ROBLOX DEVELOPERS CONFERENCE

Game Engine and Tools

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Game Engine Mission

Enable developers to create
amazing 3D experiences

Our Focus



Performance



Immersion



Tools



Controls



Performance and Scale

- Run faster
- Use less memory
- Enable larger, more detailed worlds
- Performance is the foundation of everything

Relentless Memory Optimization



Everything takes less memory!

2-4x meshes

2-5x animations

1.6x part rendering data

1.1x part physics data

2x terrain physics data

2x asset caches



Live now



New Part Rendering System



Shares memory used by similar parts

Minimal cost for clones of meshes/CSG



Fully real-time property updates

“Why aren’t my parts updating?”



No recluster stalls!

“Why is resizing a part so slow?”



Live for MeshPart/CSG soon



Better Rendering Performance



Fast low-level rendering backends

Vulkan: shipping soon on Android 7

Metal: live on iOS, soon on Mac



UI rendering optimizations

2x faster SurfaceGui rendering

1.2x faster 2D UI rendering



Cached UI rendering

LayerCollector rendering cache

Later this year



Faster Lua VM



Optimized Lua↔C++ transitions

2x faster API calls

2x faster property access



Optimized Lua internals

1.2x faster garbage collection

1.5x faster userdata access



Live now



Immersive 3D Environments

- Look better
- Simulate physics in a stable and realistic manner
- Improve networking latency and smoothness

What Does Immersion Look Like?



2006

What Does Immersion Look Like?

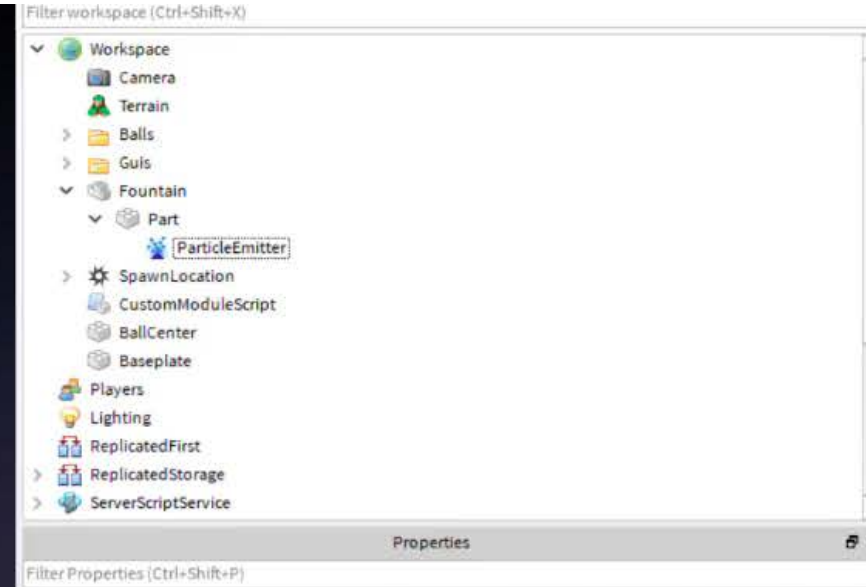
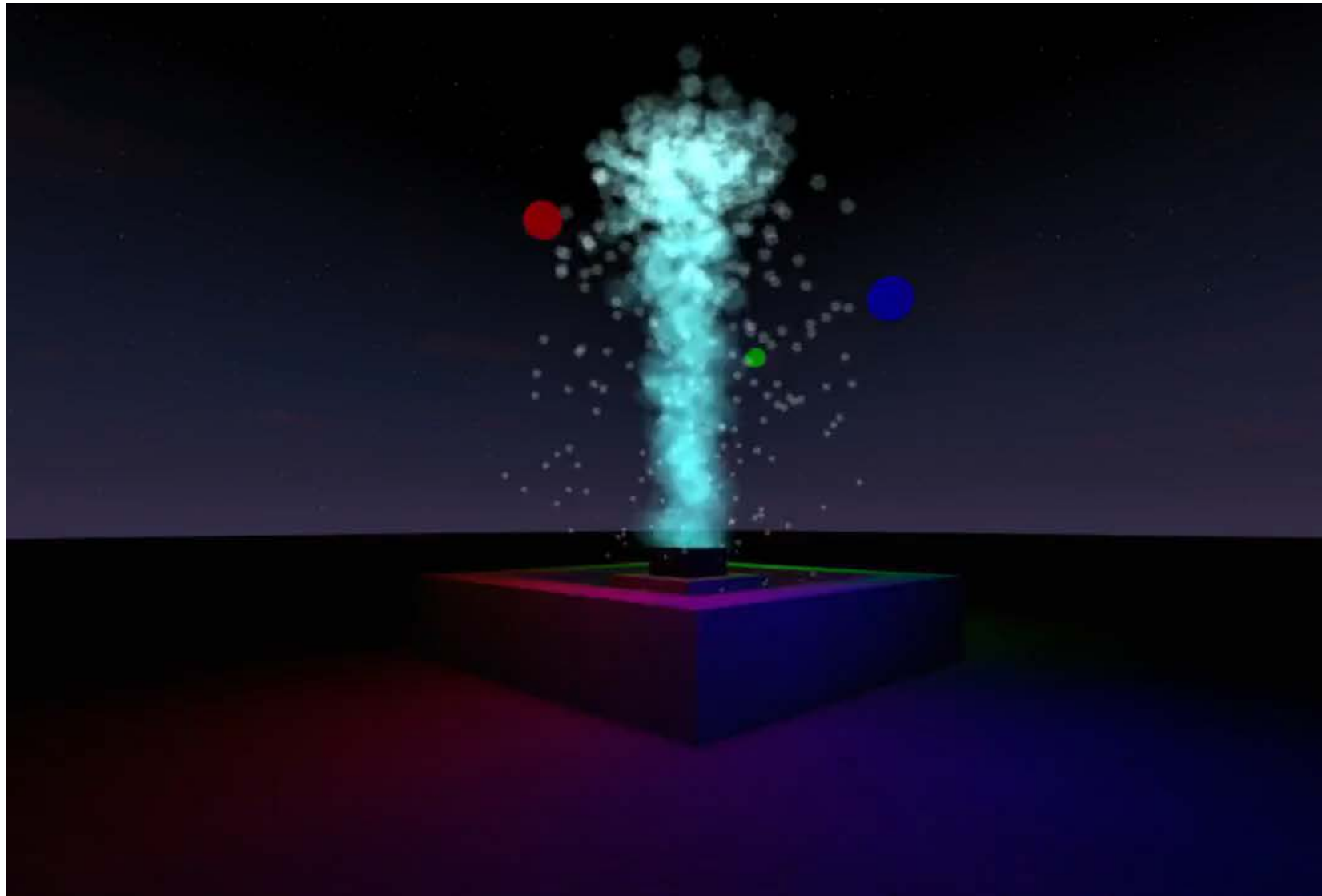


2016

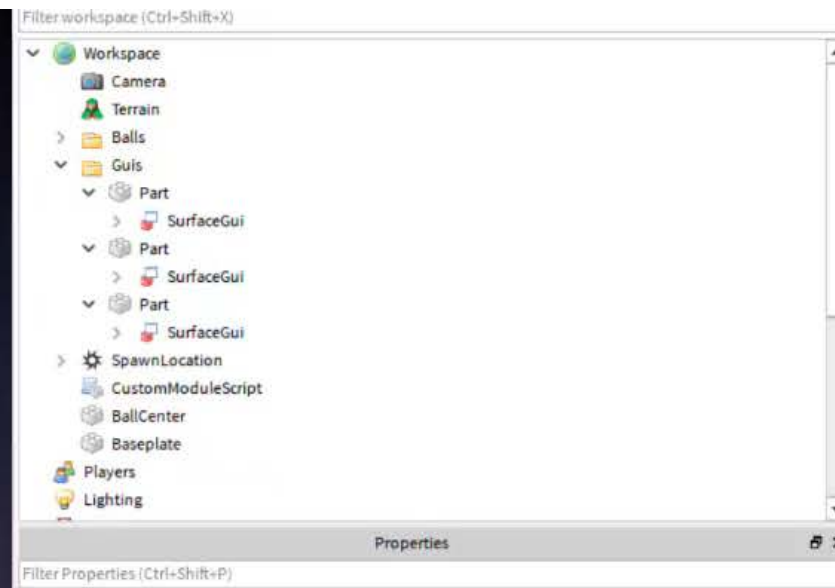
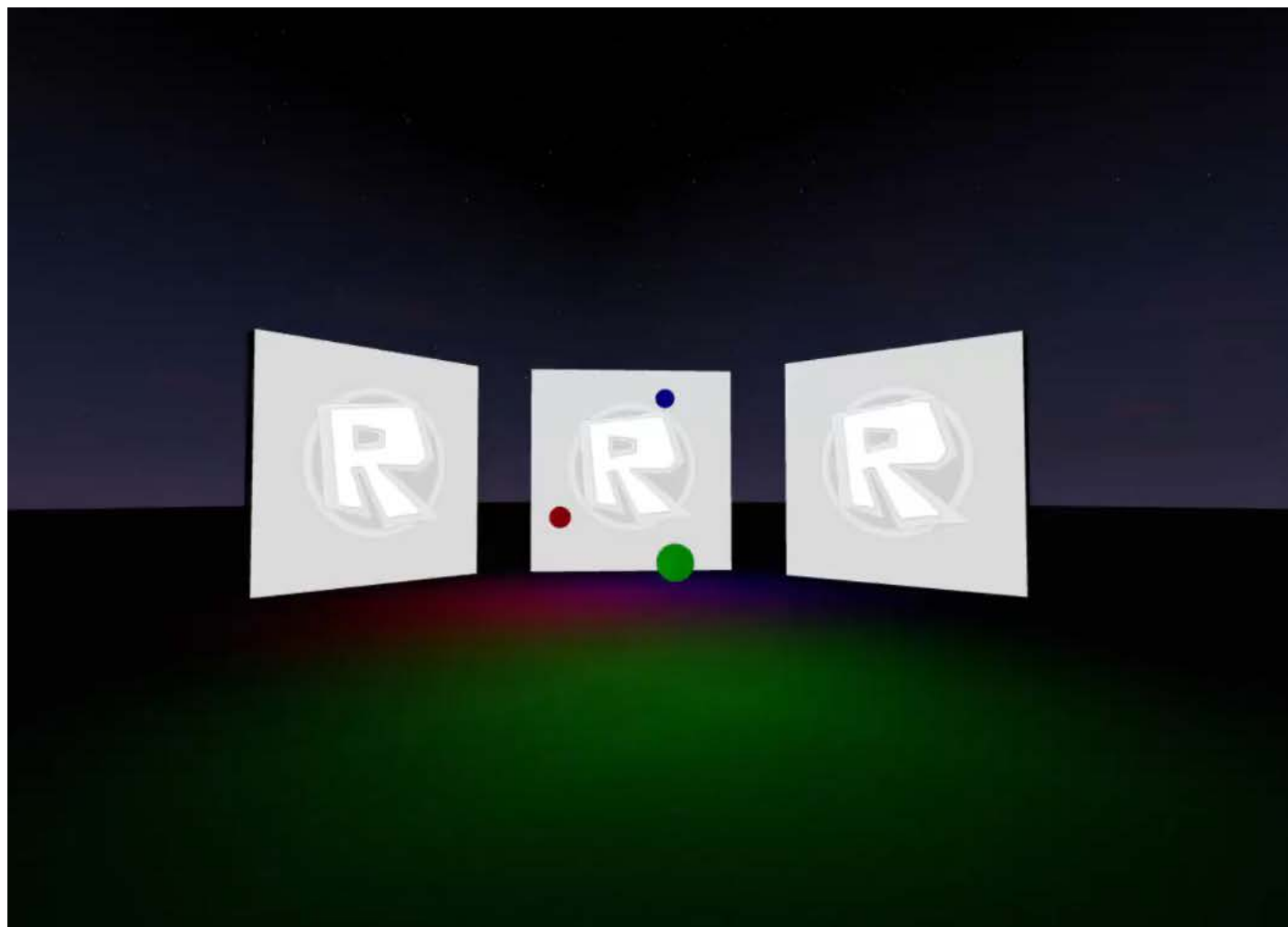
What Does Immersion Look Like?



2018?



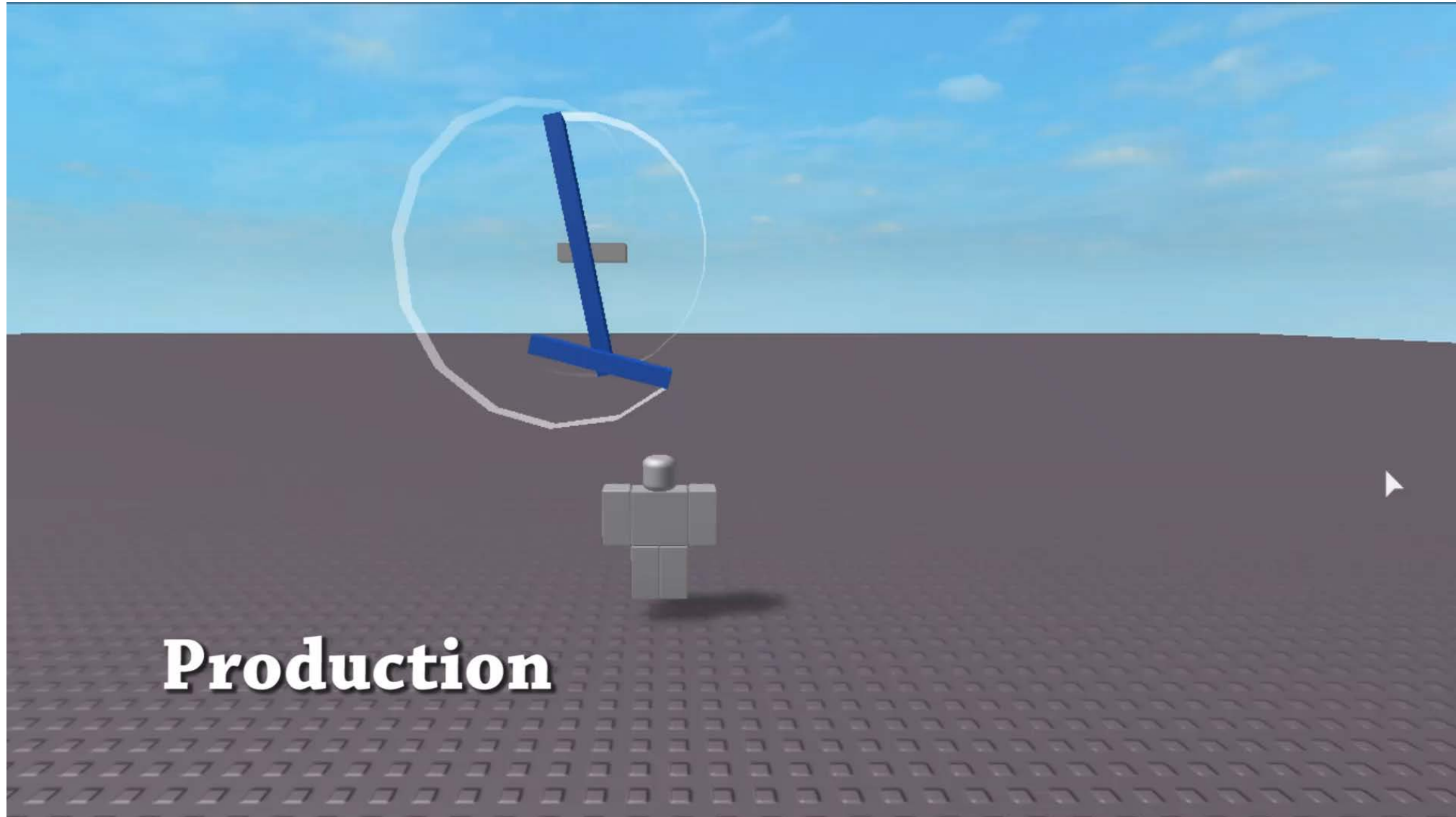
Live: Particle Lighting



Live: GUI Lighting

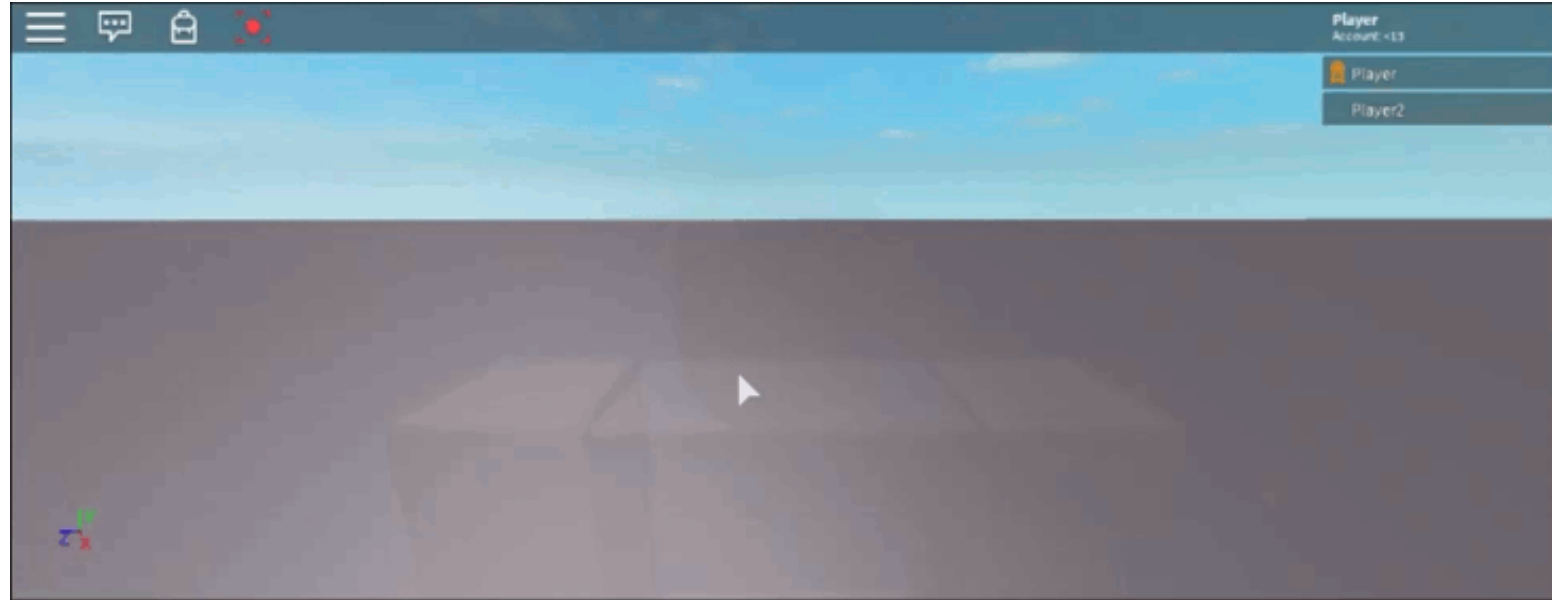


Live: Trail Effects



Coming Soon: Mechanism Interpolation

Current



New



Coming Soon: Smooth Interpolation

Focus On Stability



Humanoid Stability

“Why did I fall on my face?” (literally)
Flinging due to collisions
We’re fixing all of this!



PGS Stability

Misaligned constraints exploding
D-Physics collisions exploding
We’re fixing all of this!



Shipping this year



The Power to Create

- Pushing forward on Roblox Studio
- Game Services

New CSG Engine



100% reliable

Still has a triangle limit



Fast

Eventually: real-time



Better triangulation

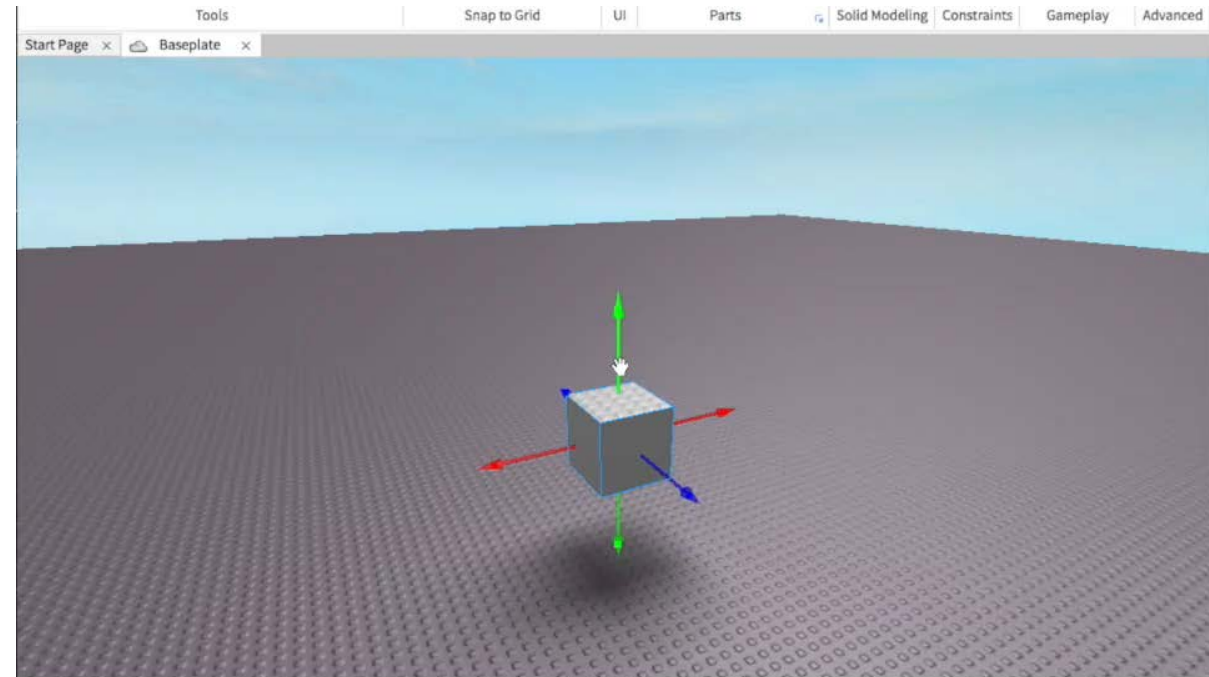
Still working on this



Beta live as an option

Please report bugs!

Settings > Physics > UseCSGv2



Better DataStores



More reliable

Fixed many internal bugs



Better error messages

You can *actually* understand them!



Transparent retries for failures

Easier to write working code



Soon: better tooling

Throttle queue in dev console
Diabolical mode



UI Editor



Edit UI in Studio

- Select elements
- Move and resize
- Change text

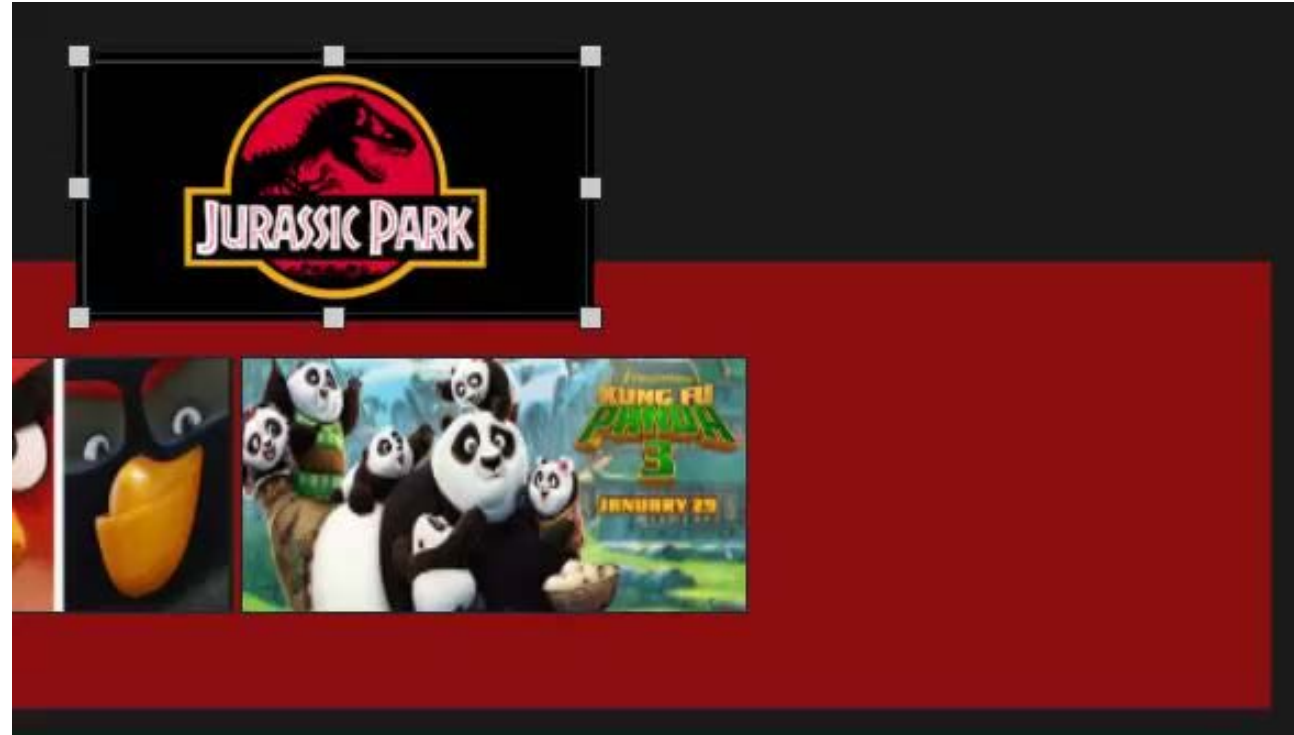


First version live!

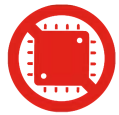


Future improvements

- Create new elements
- Rotate elements
- Move anchor point
- Layouts



Memory Analyzer



Where did all my memory go?

Memory crashes are #1 issue on mobile



Memory breakdown in dev console

Internal engine metrics per category

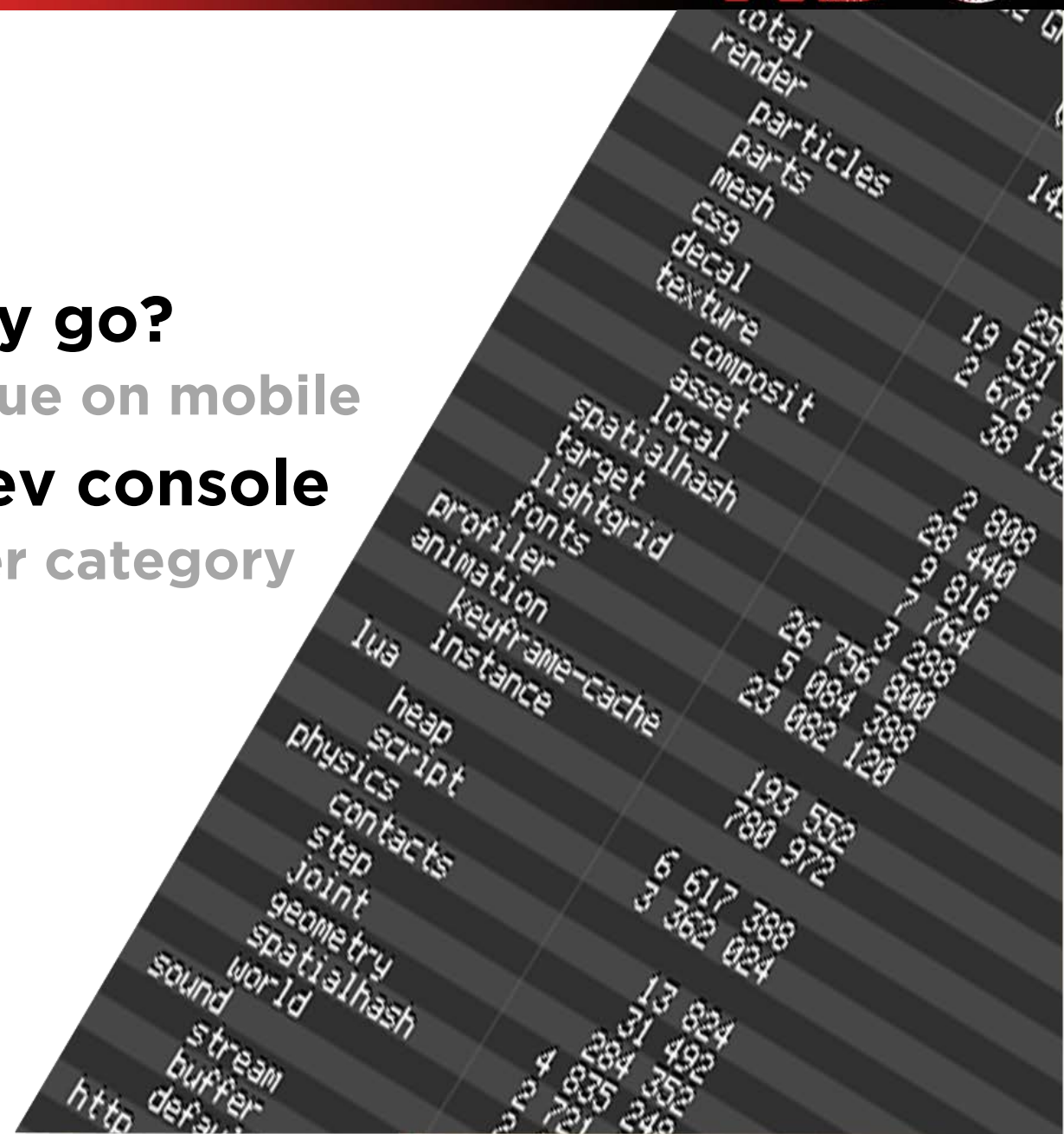
Wiki has documentation



Available everywhere

Client and Studio

Server, for place owners!



Toolbox Search Improved



Find what you want

Improved search relevance



Filter out broken junk

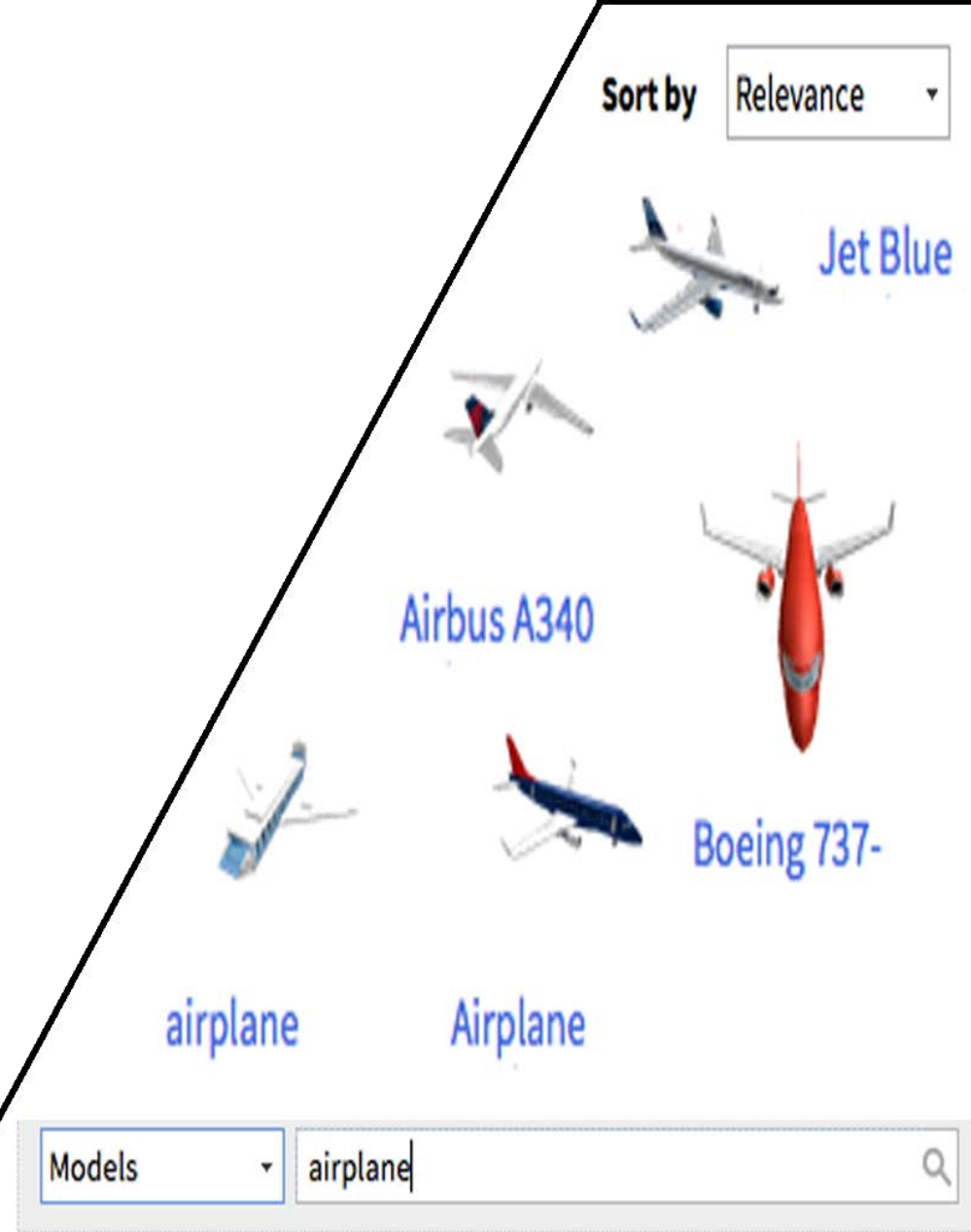
Automatic quality sorting



Live now



More improvements to come



Device Emulation



Emulate any device

- Phones, tablets, consoles
- Any resolution/screen
- Portrait mode

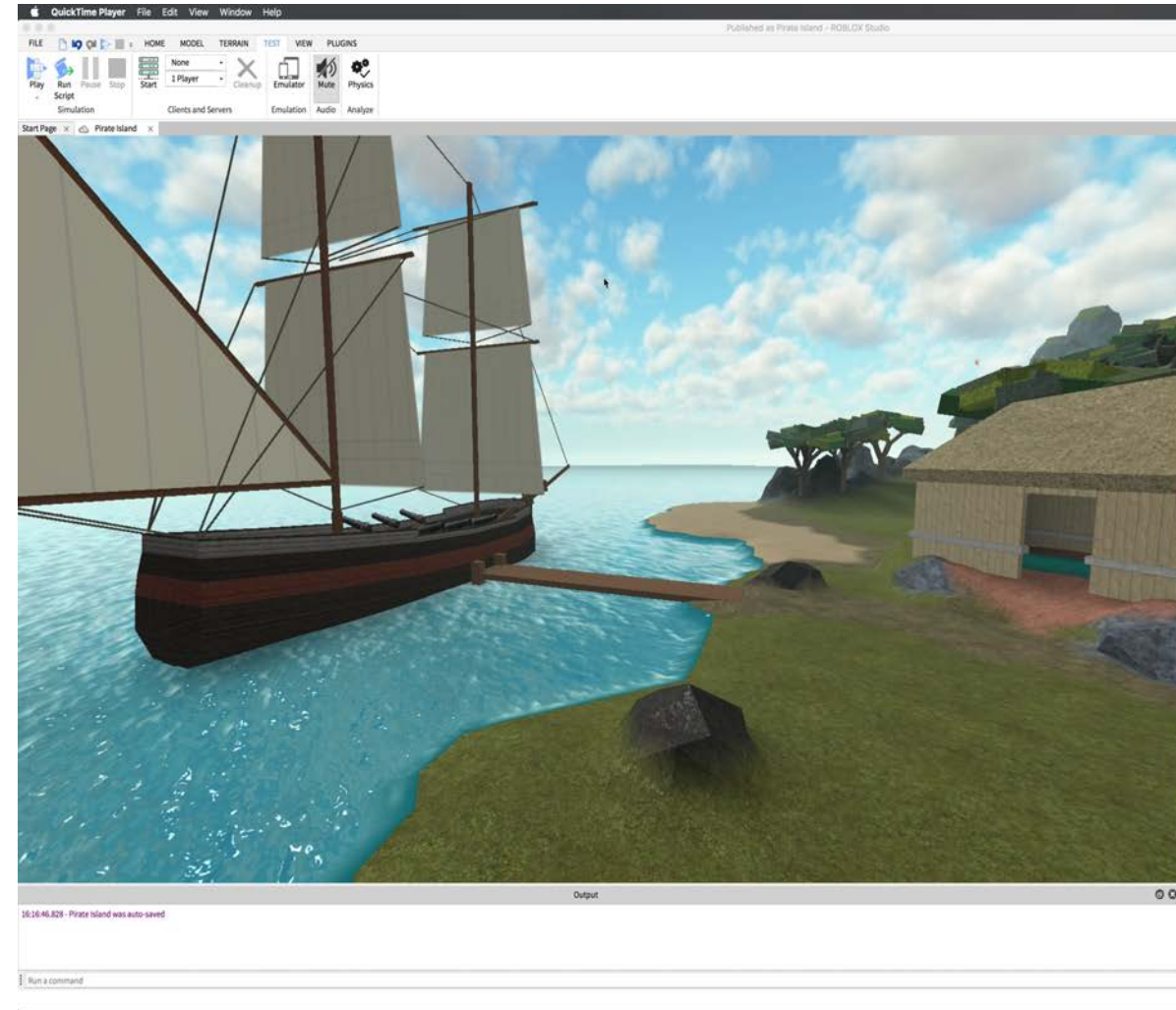


Touch input emulation

- Basic gestures available
- More to come



Live now



Control Your Game

- More power to the developers
- New features and abilities

Fine Grained Part Controls



Smaller minimum part size

0.2 → 0.05 studs



Color3 support for parts

0.2 → 0.05 studs



Collision groups

CanCollide → collision masks

Disable collision between players

Future: Studio UI



Live: Portrait Mode on Phones & Tablets

Pathfinding



Dynamic navmesh

1 stud accuracy
Terrain, parts, CSGs
Automatically updates

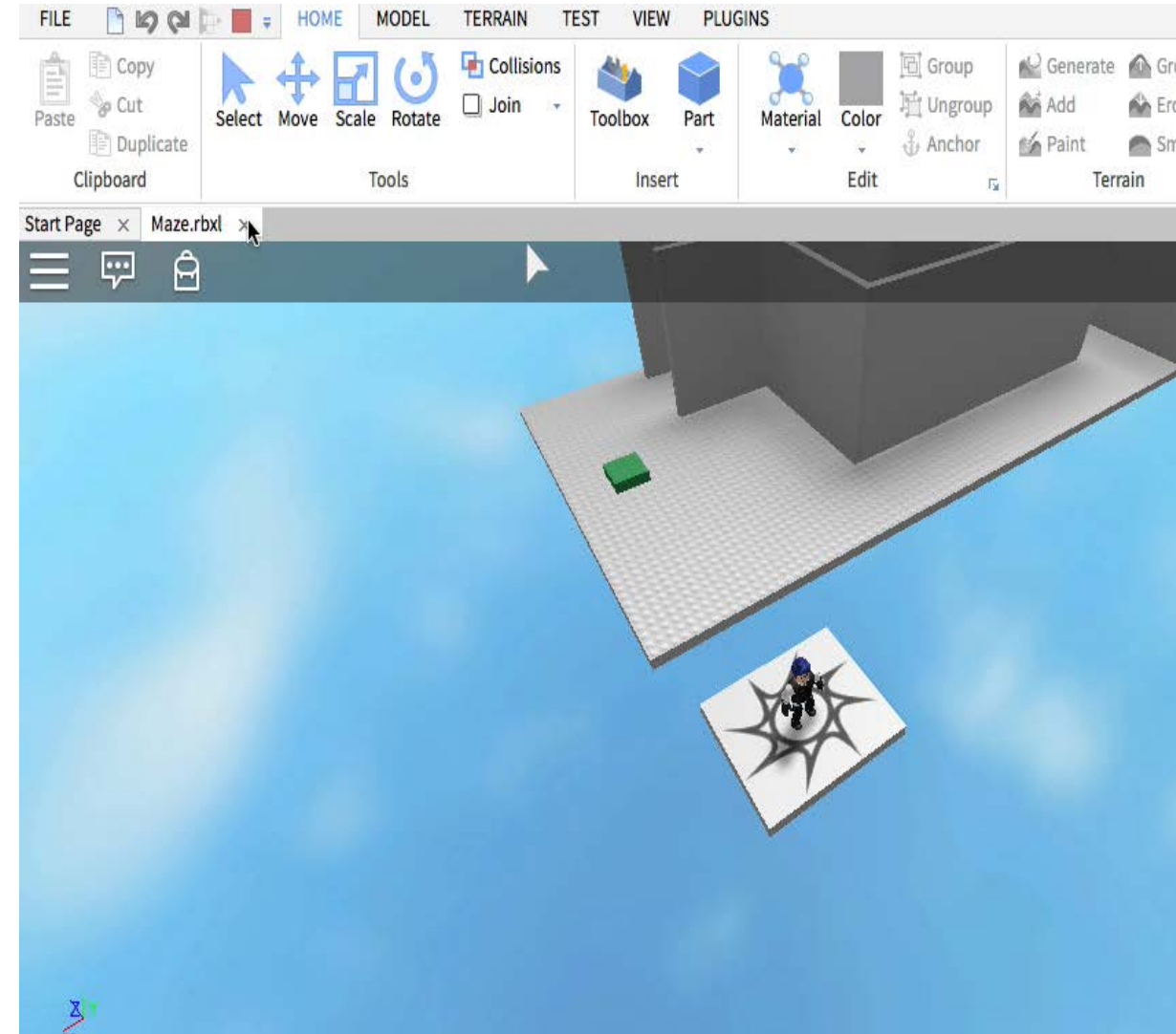


Memory efficient Better paths

Good smoothing
Intelligent jumps



Shipping soon



New Dialog System



Customizable

- Control appearance
- Scriptable actions
- Scriptable conditions



Visual editor

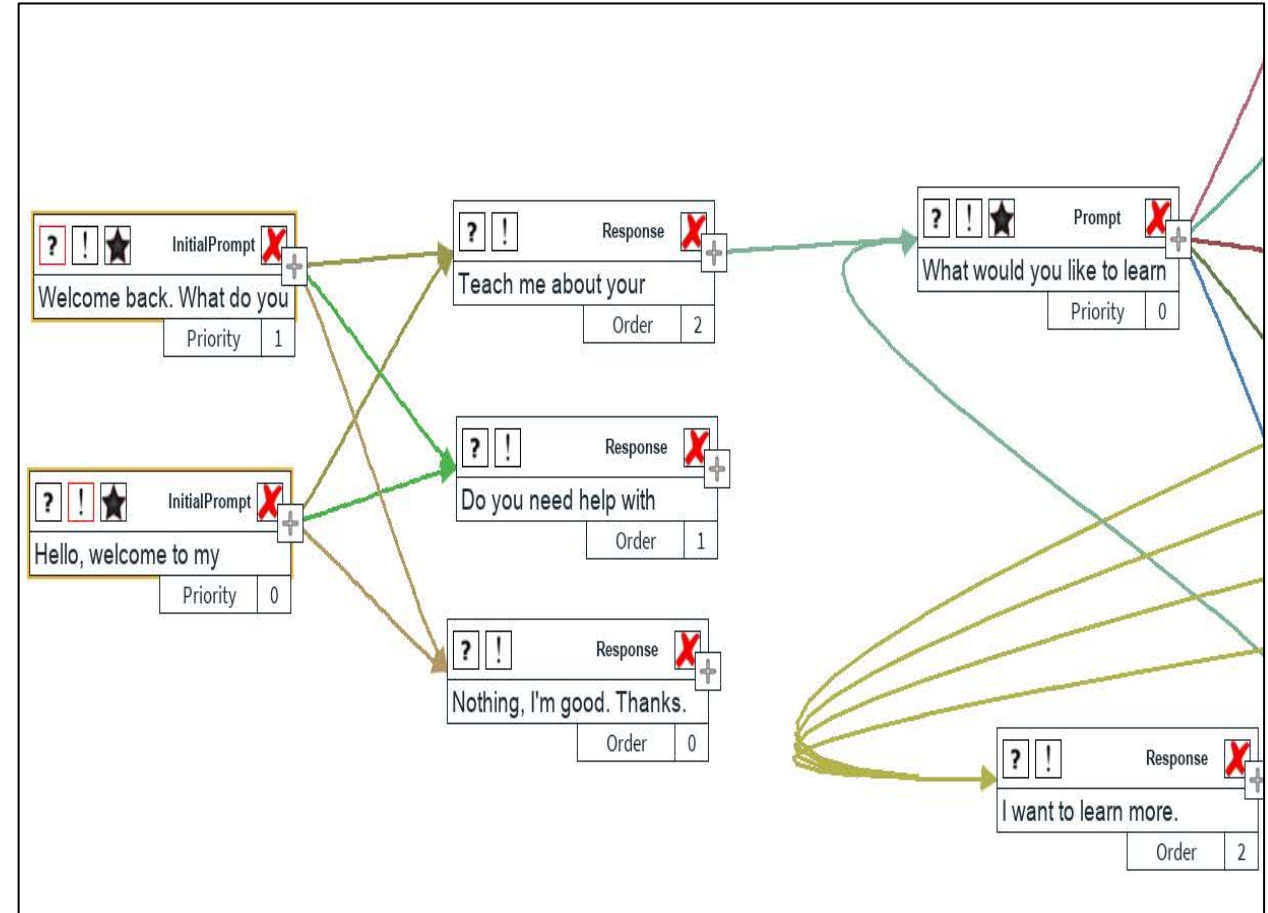


Open-source

Built as a Lua plugin



Shipping soon



New UI Layouts



Flexible responsive UI

Adapts to multiple resolutions



Convey the intent

ListLayout

TableLayout

GridLayout



Guide the layout

UI Constraints



Live now

Name	Kills	Deaths
VoraciousPigeon99	25	17
VoraciousPenguin35	16	19
VoraciousCow53	8	20
HappyPenguin34	16	19
HappyPenguin20	4	4
HappyCow96	24	15
FeistiestPigeon82	15	10
FeistiestPenguin76	17	16
FeistiestPenguin15	19	15
DestructivePigeon77	11	7
DestructivePenguin95	20	6
DestructivePenguin90	22	20

The Power of the Written(?) Word



Emoji support

Live



Full Unicode font

Shipping soon



Unicode Lua libraries

utf8 from Lua 5.3: Live

More to come



Unicode text layout

Bidirectional, ligatures, etc.

Shipping this year



Our Focus



Performance



Immersion



Tools



Controls



Future of Lighting



Currently prototyping: need your help



Zeroing in on final approach



Shipping soon™

<https://roblox.github.io/future-is-bright/>



Thank you! 🙏

