Maker Tools In The Browser

Zero Install, Always Up To Date

FOSDEM ‘23

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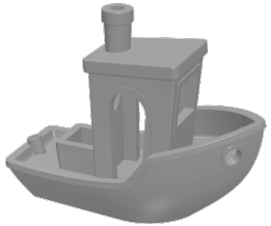
Overview

- Backstory
- Evolving Standards
- Sandbox & Limitations
- Kiri:Moto & Friends
- Technology & Performance
- Future & Roadmap

We Are All Makers



From the frivolous to the profound

Unlike any time in human history

We ***all*** have access to incredibly powerful tools for creation

Those tools range from the simple to the inexplicable

A great many are free, like our imaginations

The Way Back Web

Not since the 80's has a PC been called a Word Processor

The World Wide Web was conceived for documents (aka browsing), not Apps

Even the earliest web sites struggled with this (forms → new page → lost context)

Stumbling, CSS and other Web Standards took decades to converge on this reality

The "Browser" as an application platform has been decidedly more successful

Desktop vs Cloud vs You

Most desktop apps are inherently insecure, bloated, opaque

Most browser-based apps rely on compute resources in “the Cloud”

Both often have some form of data tie-in that limits access and portability

We need / we want / we deserve fully local, secure, highly performant apps

Browsers are the ultimate app VM that (*should*) allow write once, run everywhere

Progressive Web Apps

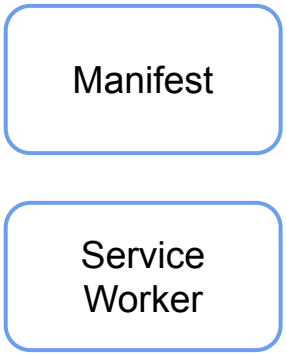
Installable On All Devices (Desktop, Mobile)

Runs Offline And Updates When Online

Does Not Require An App Store

App-Like Customization With Icons And File Associations

WebAssembly, WebBluetooth, WebUSB, WebSerial, Clipboard, and more



The Pros

Faster Development and Iteration

More Portable and Consistent UI

Easier to Inspect and Debug

Smaller Footprint, Less Code

More Secure

The Cons

Fewer 3rd Party Libraries

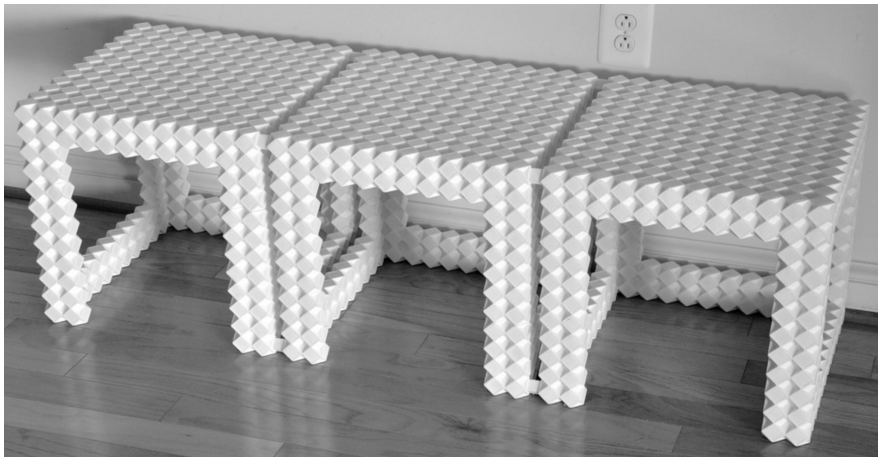
Native Networking / Local Network Access*

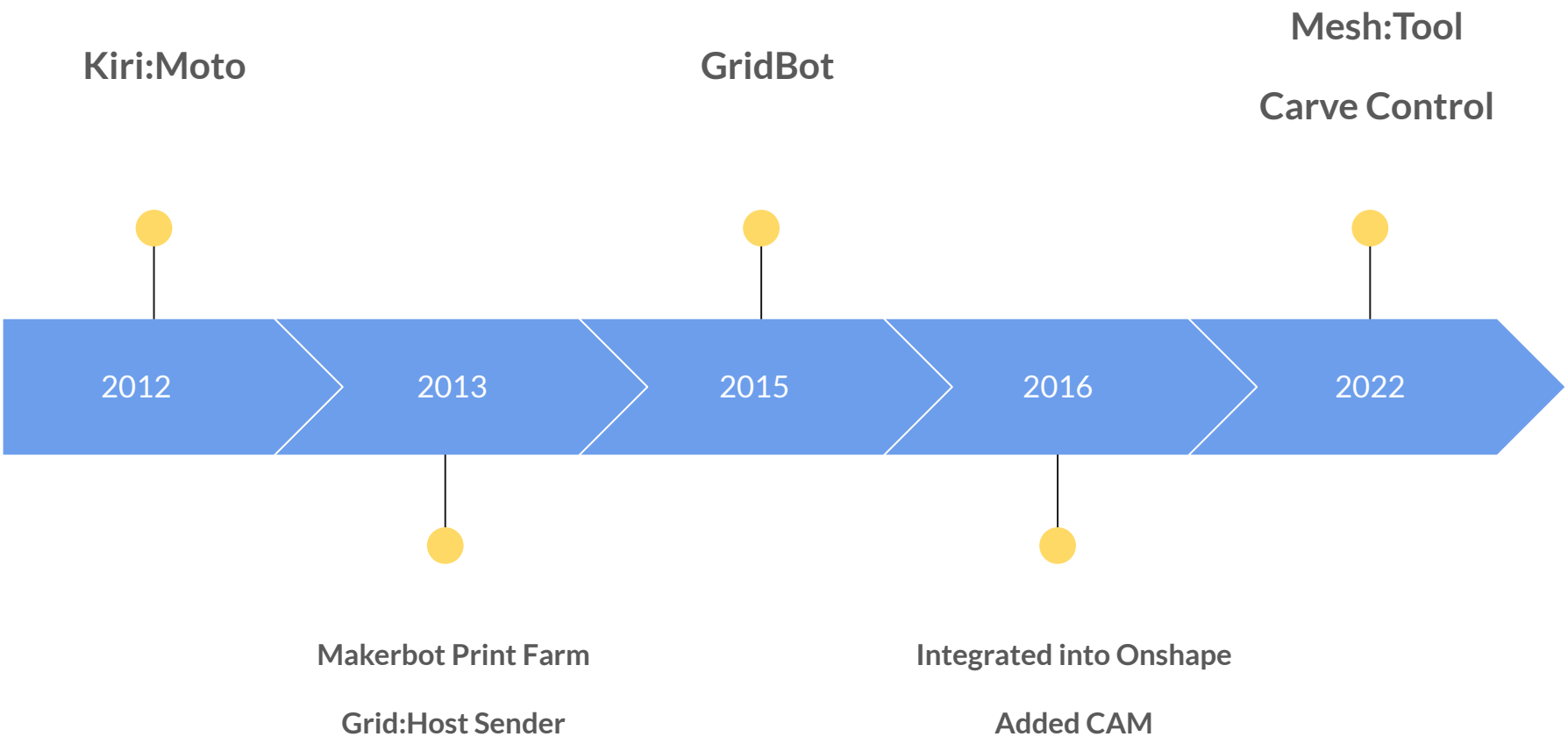
Long Term Storage / Data Persistence*

Language Diversity*

Not Suitable for HPC*

How Hard Could It Be?



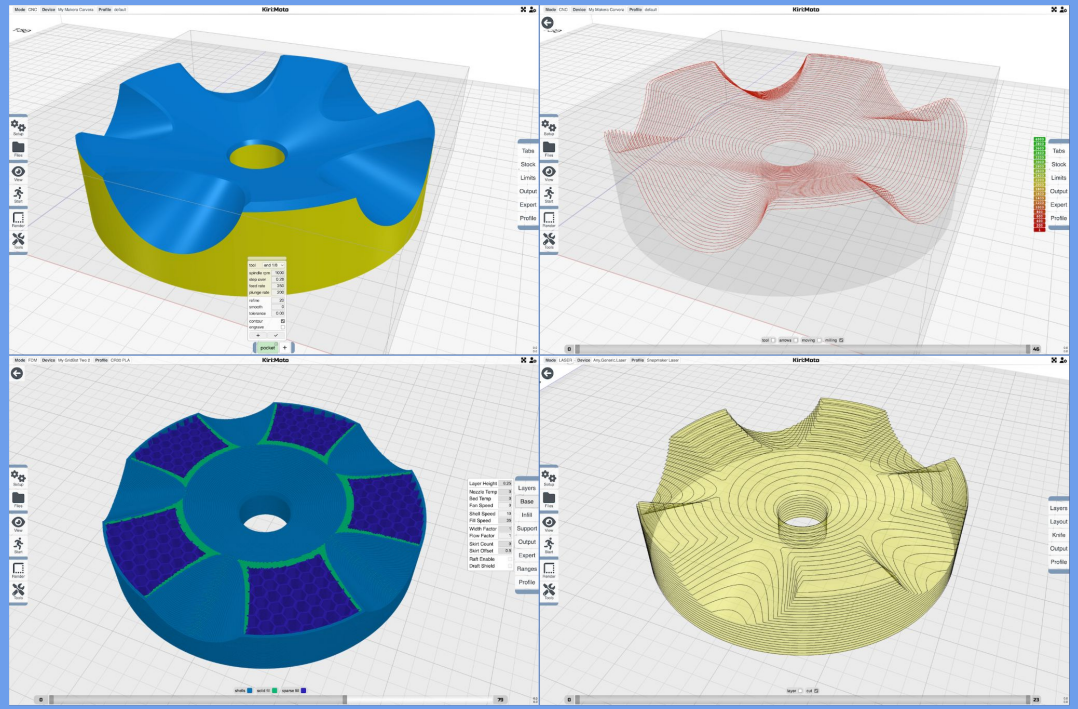

Kiri:Moto
GridBot
Mesh:Tool
Carve Control
2012
2013
2015
2016
2022
Makerbot Print Farm
Grid:Host Sender
Integrated into Onshape
Added CAM

Kiri:Moto

Kiri-e
Japanese art of paper cutting

Moto
Modeling Tool

GitHub
github.com/GridSpace/grid-apps



App Flow

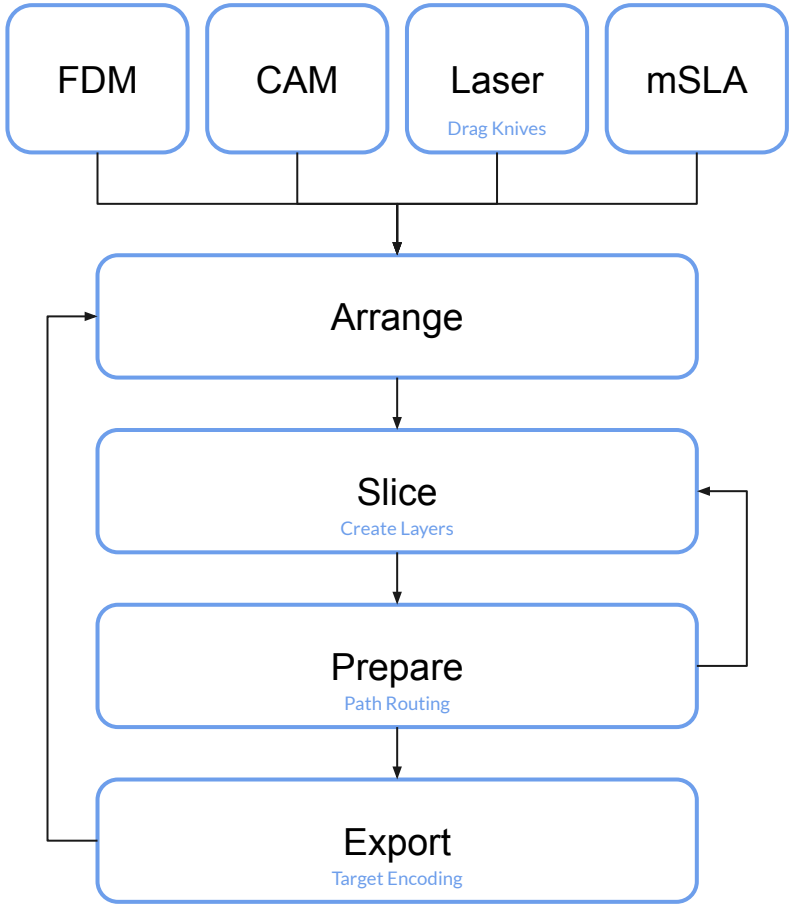
Select Device Mode (E)

Arrange (A)

Slice (S)

Prepare (P)

Export (X)



Code Structure

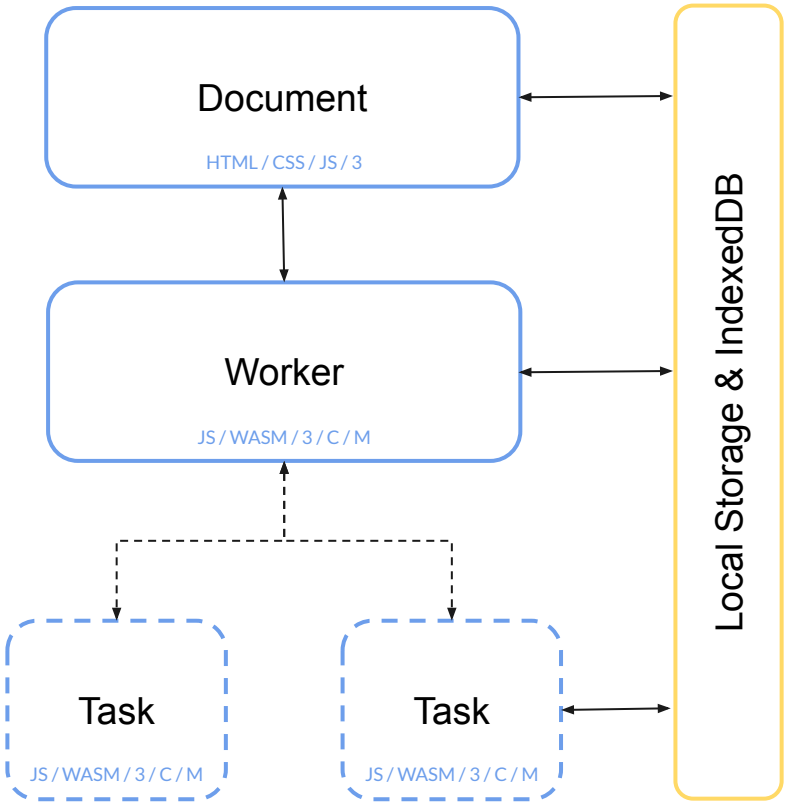
100% Browser Local

JS & WASM

ThreeJS

Clipper

Manifold*



Demo

Kiri:Moto

Engine API

Frame API

Onshape + Kiri:Moto

Future Work

More WASM, Shared Data, Parallelization

Custom Shaders in ThreeJS

5 axis FDM

2D and 5 axis CAM

Spooling to more targets

Integrated GCode sender (again)?

Mesh:Tool

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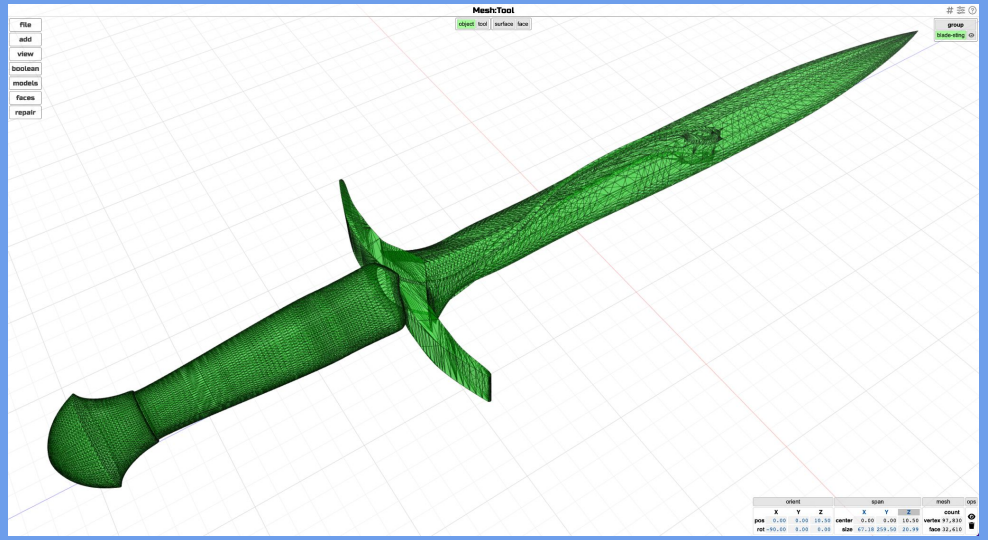
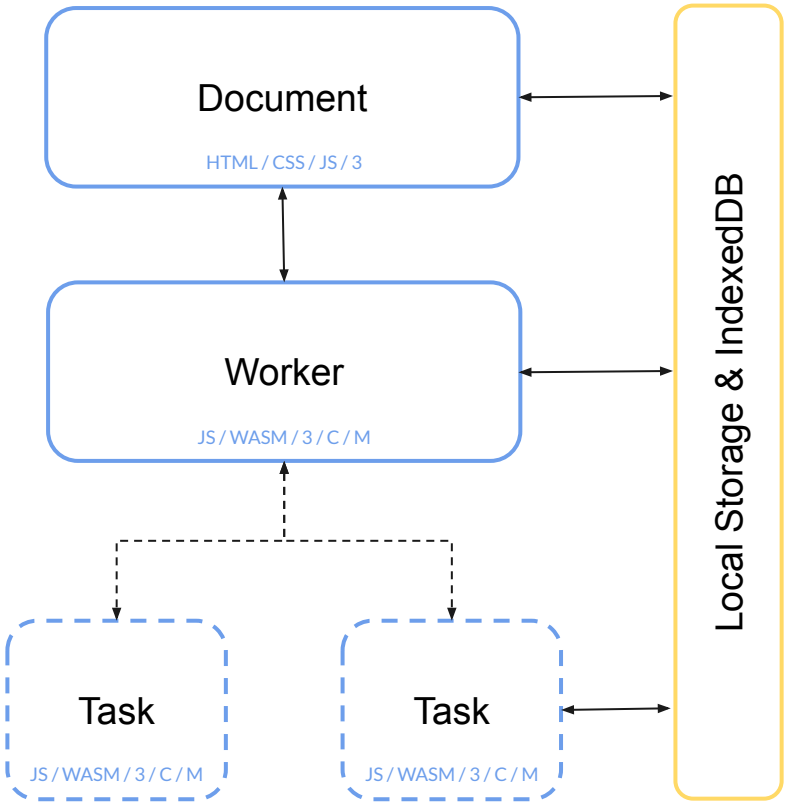
github.com/GridSpace/grid-apps



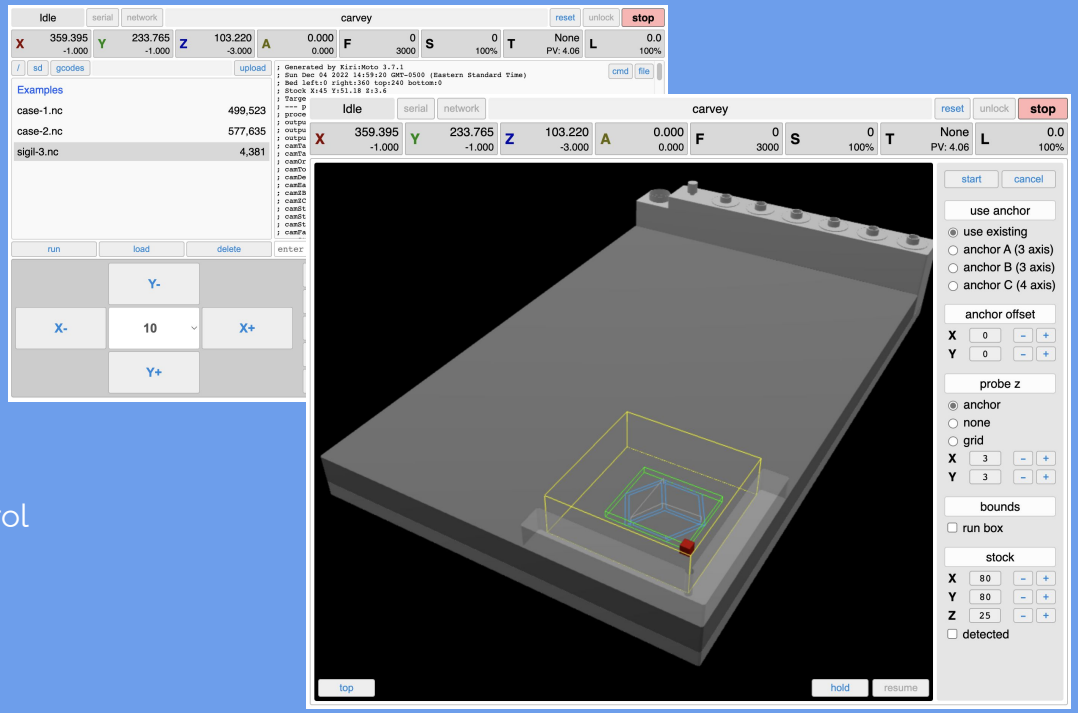
Code Structure

Mesh:Tool



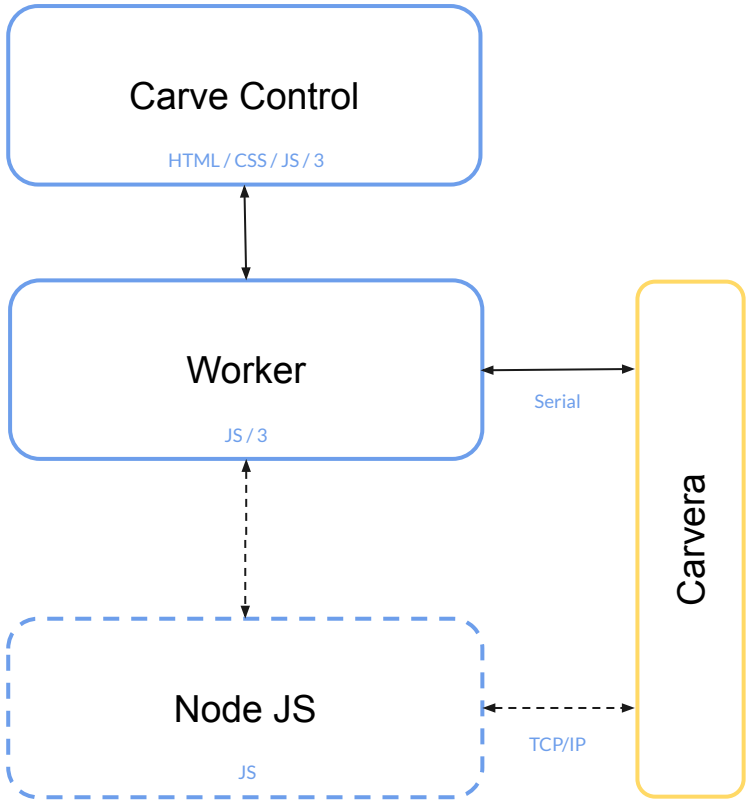
Carve Control

GitHub
github.com/GridSpace/carve-control



Code Structure

Carve Control



Thank You

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Grid Space