The Pivotal Moment of Edge Computing

The Edge

2021 - The raising of Edge Networks

2021 Sep. / Cloudflare Pages

Cloudflare Announces Cloudflare Pages, Brings Next Generation Website Development Platform to Businesses and Developers

New platform delivers the fastest and most scalable websites distributed on the edge

Cloudflare Pages - 2021 Sep.

Cloudflare Pages is the most secure and most scalable Jamstack platform to build and deploy your sites on the edge. But *how* is Pages so fast?

It comes down to three key reasons:

- Pages is built on one of the fastest networks in the world, putting us within 50 ms of 95% of the world's Internet-connected population. Delivering Pages from this network is the basis of our speed.

- Cloudflare helps define and implement next generation standards, like QUIC + HTTP/3 and Early Hints, that push Pages performance to the next level.

- Pages has a killer developer experience that makes it easy to build the fastest websites on the planet.

2021 Nov. / Shopify Hydrogen + Oxygen

EXPLORER

OPEN EDITORS
✕ ⚙ App.server.jsx src

SNOWDEVIL
> .github
> node_modules
> public
∨ src
  > components
  > pages
  ⚙ App.server.jsx
  ⚙ entry-client.jsx
  ⚙ entry-server.jsx
  favicon.svg
  # index.css
  .gitignore
  Dockerfile
  <> index.html
  {} jsconfig.json
  {} package.json

⚙ App.server.jsx ✕

src > ⚙ App.serve

```
1   > import {
6
7     export de
8       const p
9
10      return
11        <Shop
12          <De
13          <Sw
14            <DefaultRoutes
15              pages={pages}
16              serverState={serverState}
17              fallback={<NotFound />}
18            />
19          </Switch>
20        </ShopifyServerProvider>
21      );
22    }
23
24
25
26
27
```

(alias) function DefaultRoutes({ pages, serverState, fallback, }: {
    pages: ImportGlobEagerOutput;
    serverState: Record<string, any>;
    fallback?: ReactElement;
}): JSX.Element
import DefaultRoutes

Build a set of default Hydrogen routes based on the output provided by Vite's import.meta.globEager method.

@see — https://vitejs.dev/guide/features.html#glob-import

implements react router
from hydrogen we get a

2021 Oct. / Vercel Edge Functions

2021 Oct. / Vercel Edge Functions

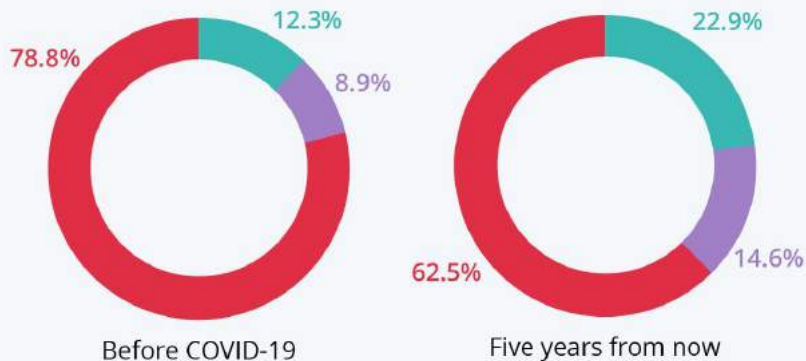# *Remote collaboration requirements growth*

~100% Growth of Remoting

Remote Work Could Double Permanently

Percentage of U.S. work teams/departments that plan to work remotely in five years, compared to pre-pandemic

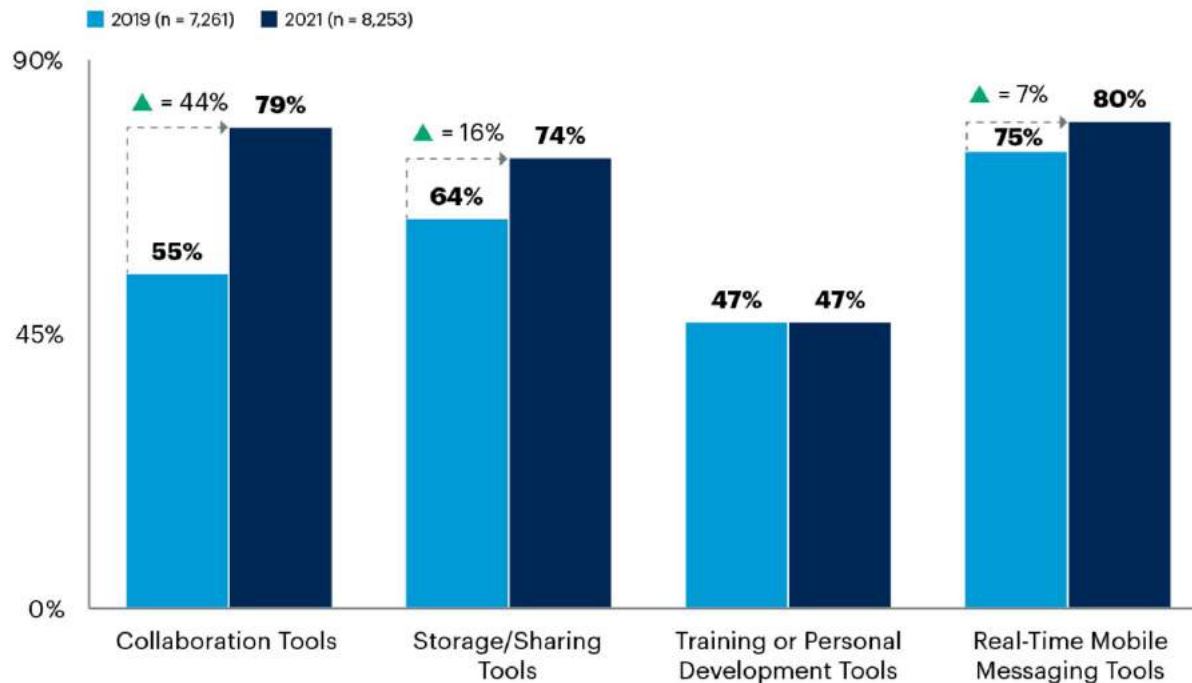● Fully remote   ● Partially remote   ● Not remote

Before COVID-19
- 12.3%
- 8.9%
- 78.8%

Five years from now
- 22.9%
- 14.6%
- 62.5%

Survey conducted between Oct. 21-Nov.7 of over 1,000 U.S. hiring managers
Source: Upwork

statista

Rethinking of Collaboration Infrastructure

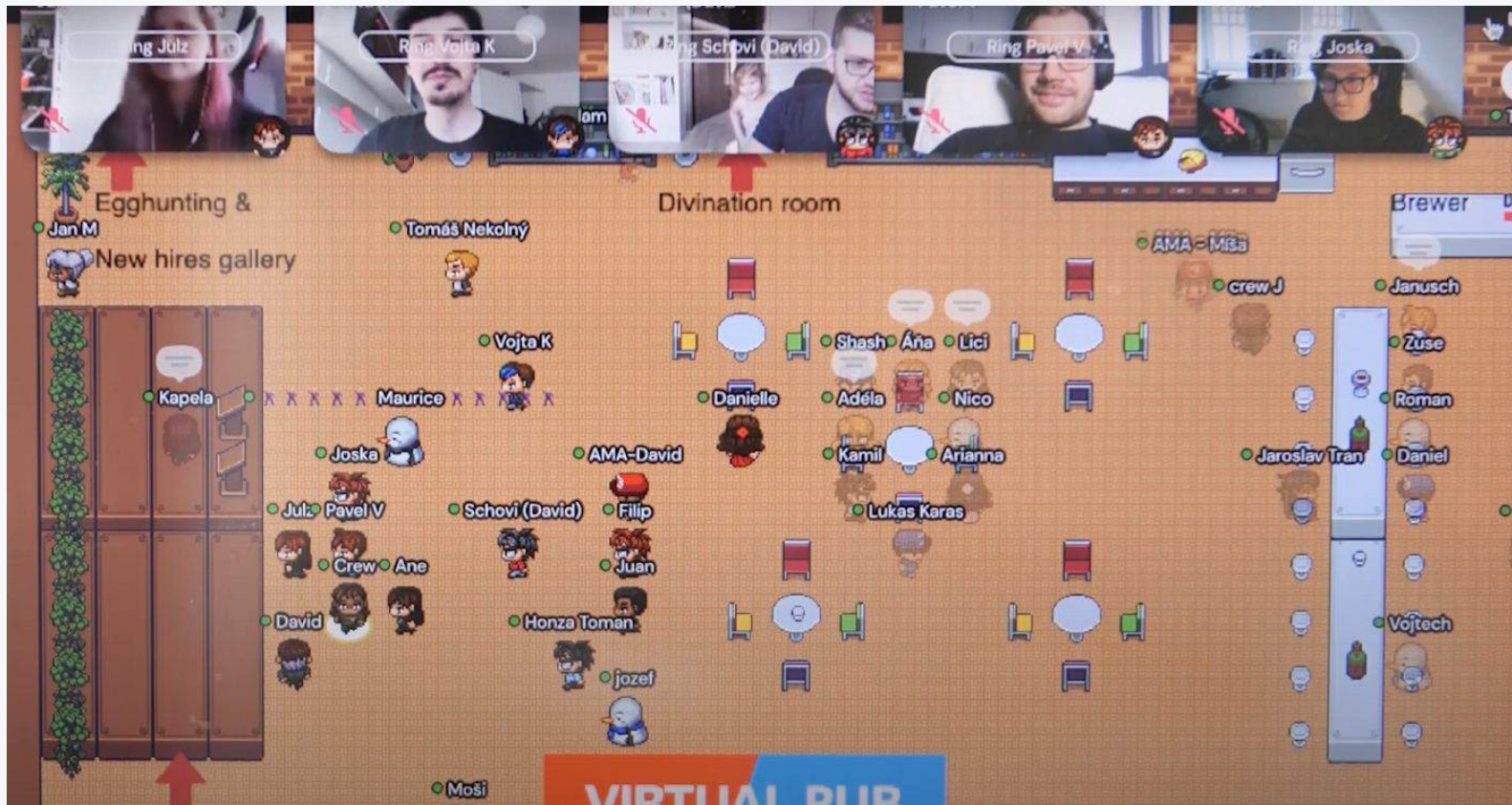Figure 1: Changes in Digital Workplace Technology Use, 2019-2021 (Percentage of Respondents)

2021 Aug. / Figma Cursor Chat

Metaverse Workplace

Metaverse Workplace

Roblox Concert
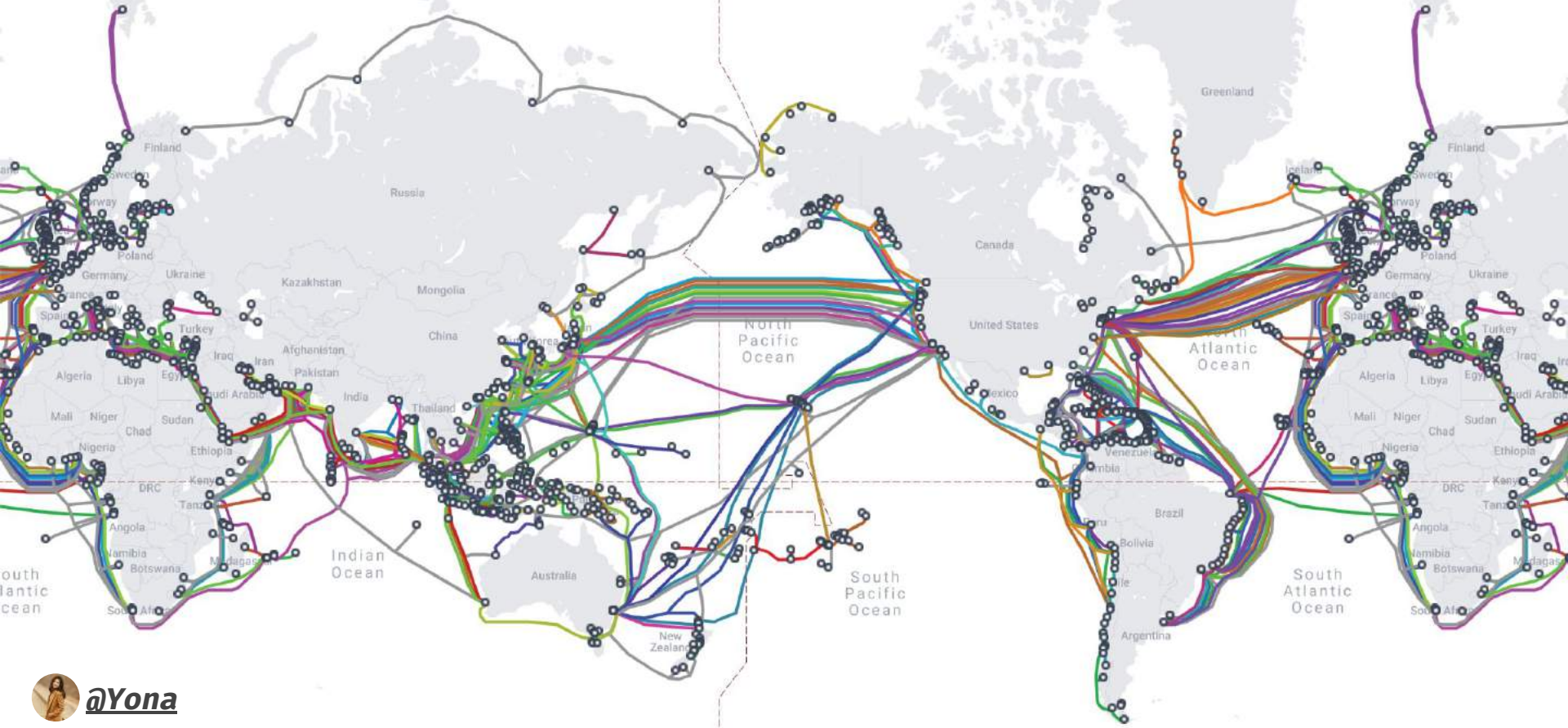
Throughput v.s. Latency

Public Cloud is far away from end user

Internet is interconnected networks

@Yona

AWS & GCE Clouds' Inter-region Ping Latency (ms)

BigBitBus

Network Speed <10ms

Radius: **986**km / **612.67**mi, RTT in vacuum: **7**ms, RTT in fiber: **10.64**ms.
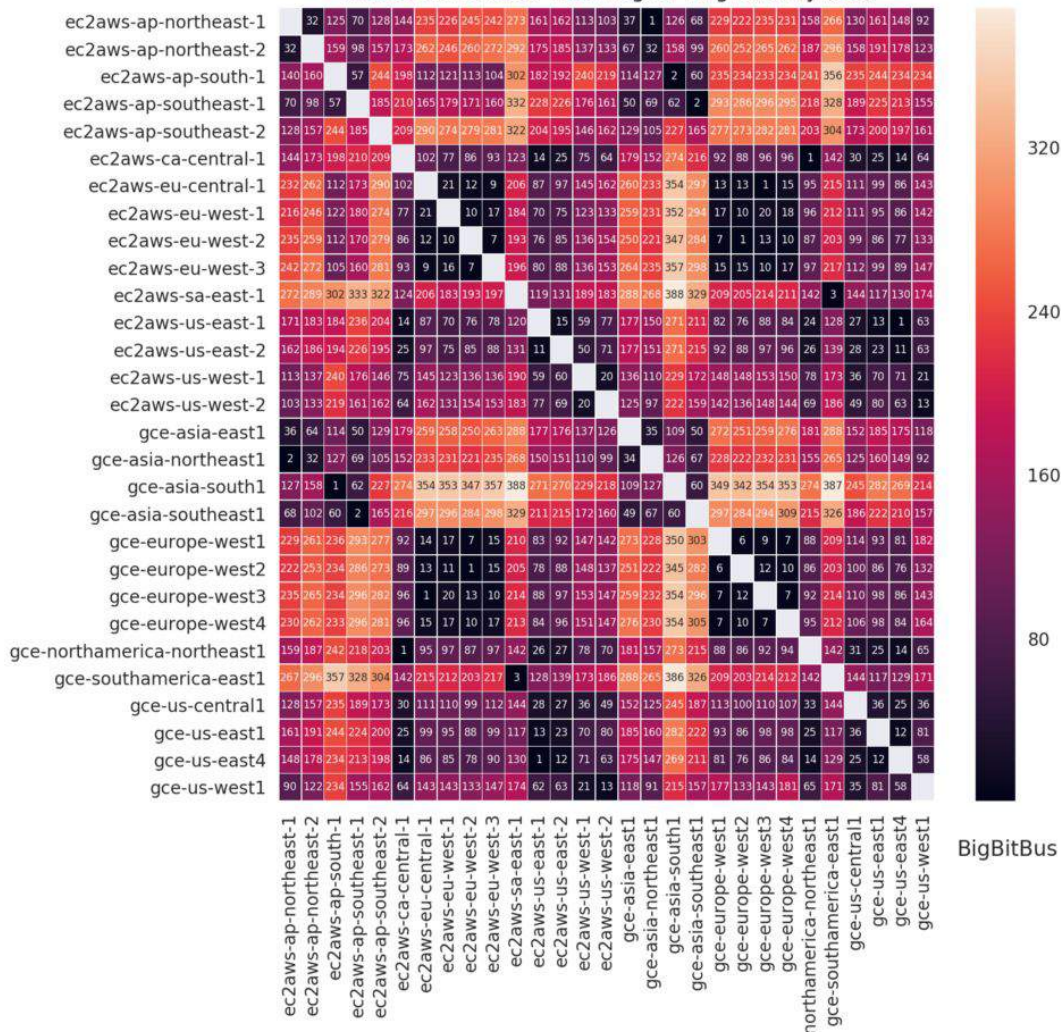
Fiber RTT: 10ms
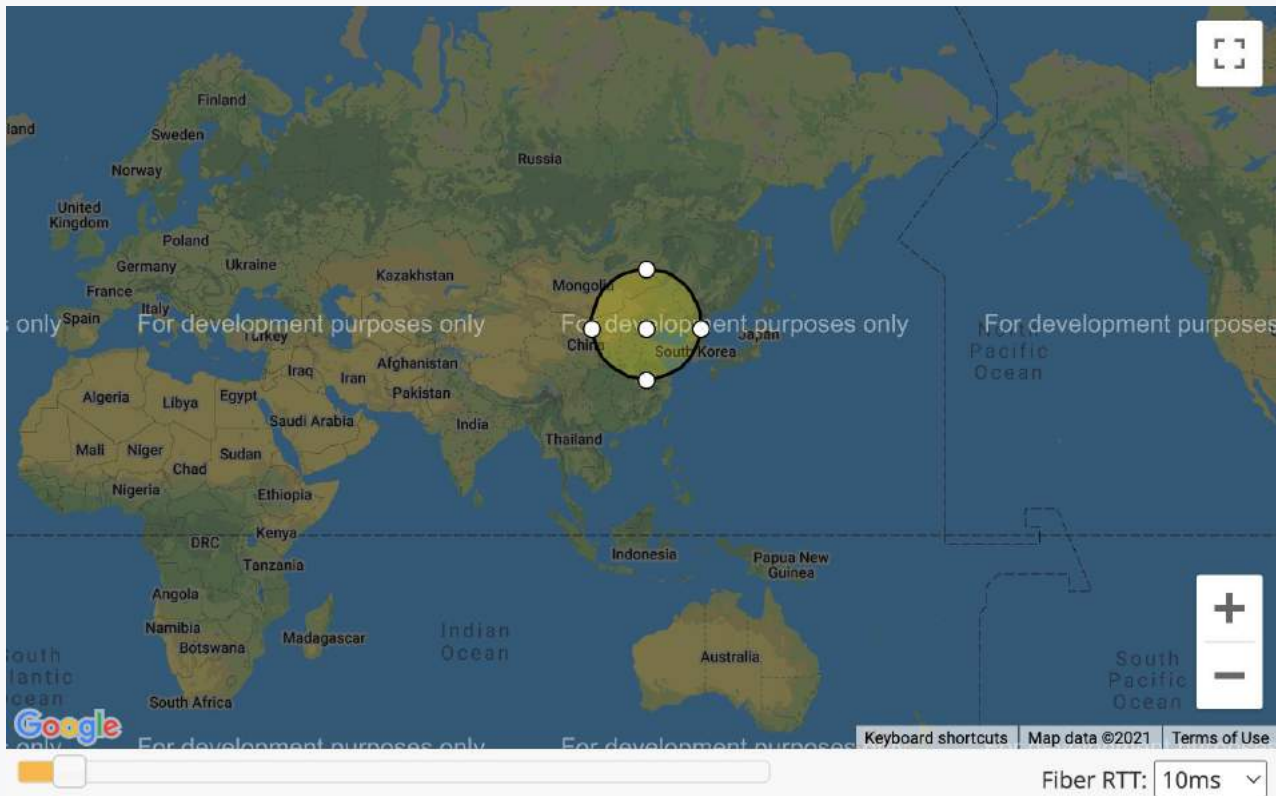
Network Speed <20ms

Network Speed <50ms

Radius: **4931**km / **3063.99**mi, RTT in vacuum: **33**ms, RTT in fiber: **50.16**ms.
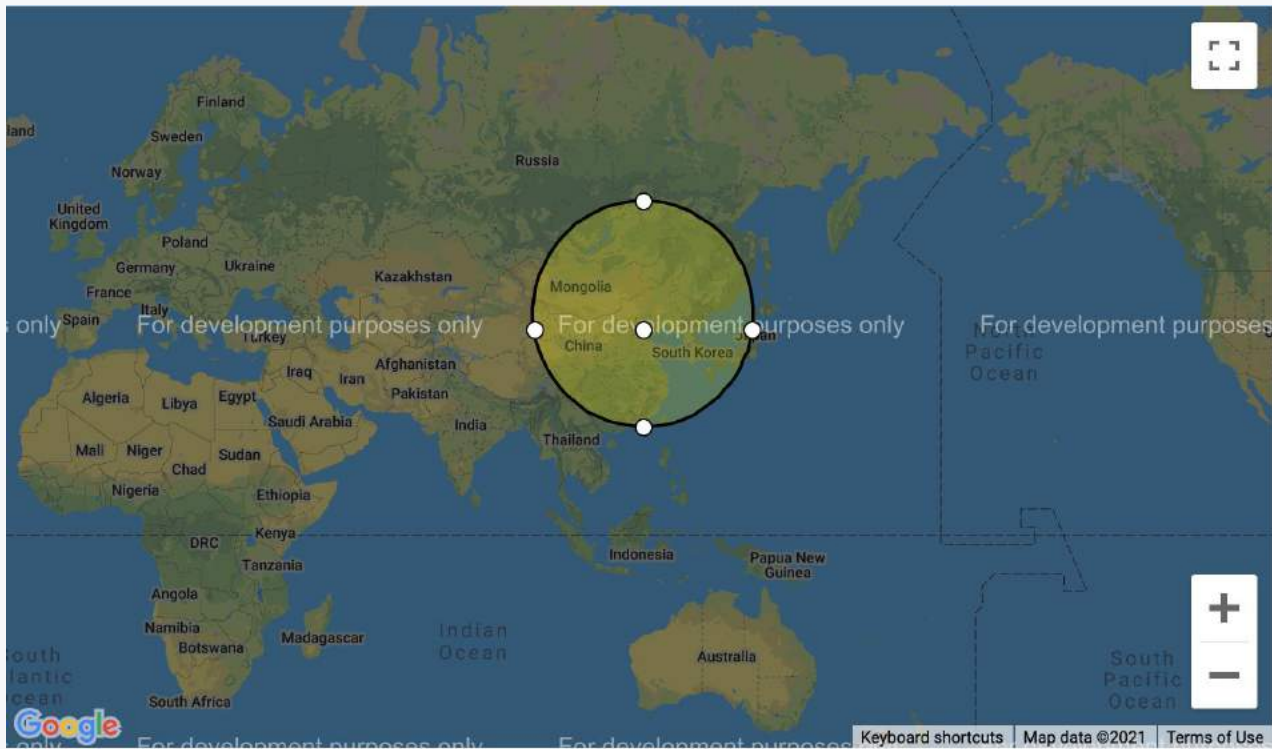
Fiber RTT: 50ms
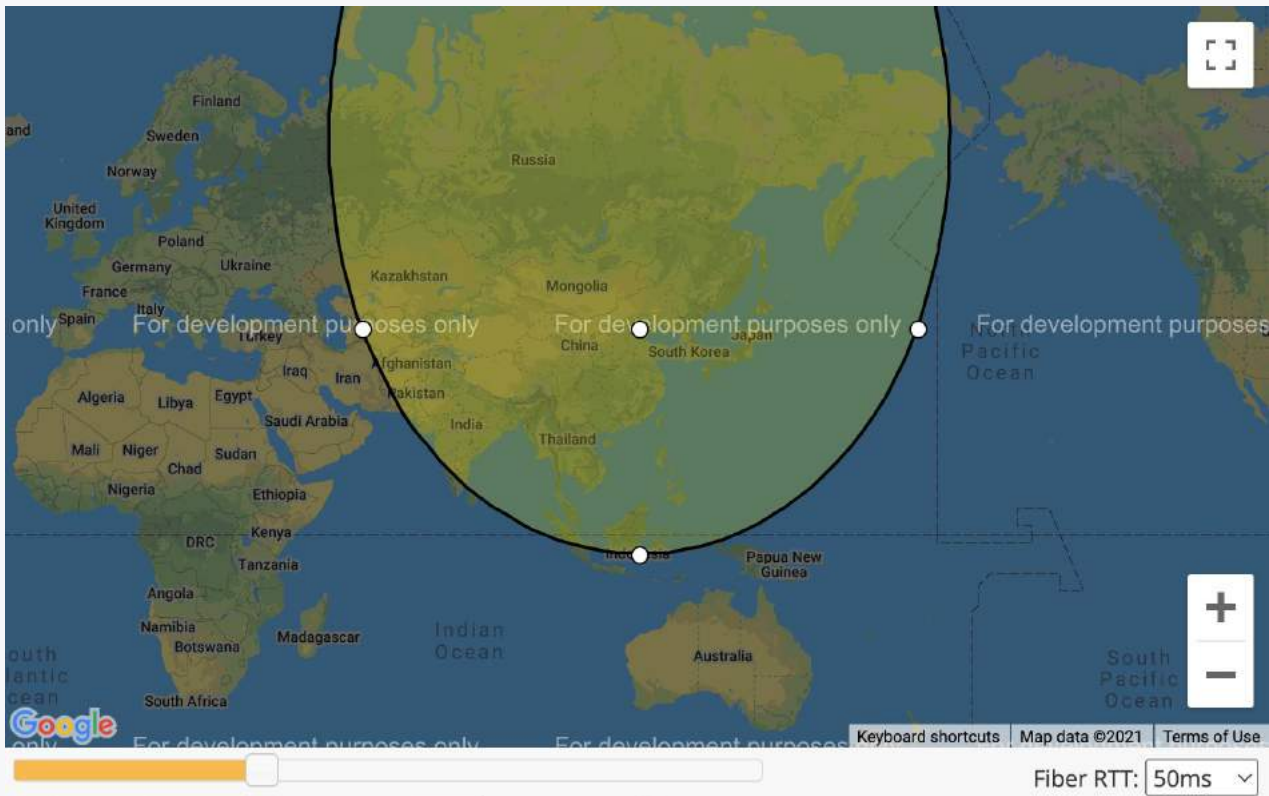
Cloud == *Distributed System* *in Single Region*

Kelsey Hightower
Principal Engineer at Google

Lee Robinson
Head of DevRel at Vercel

you know in the cloud we tend to think about
regions and zones so ideally you get as close

Rethinking: Geo-distributed System

Technologies are evolving

TCP v.s. QUIC

HTTP/1.1 over Multiple TCPs

HTTP/2 over TCP

QUIC over UDP

Data packet for a segment

Lost packet

Blocked packet

QUIC & HTTP/3
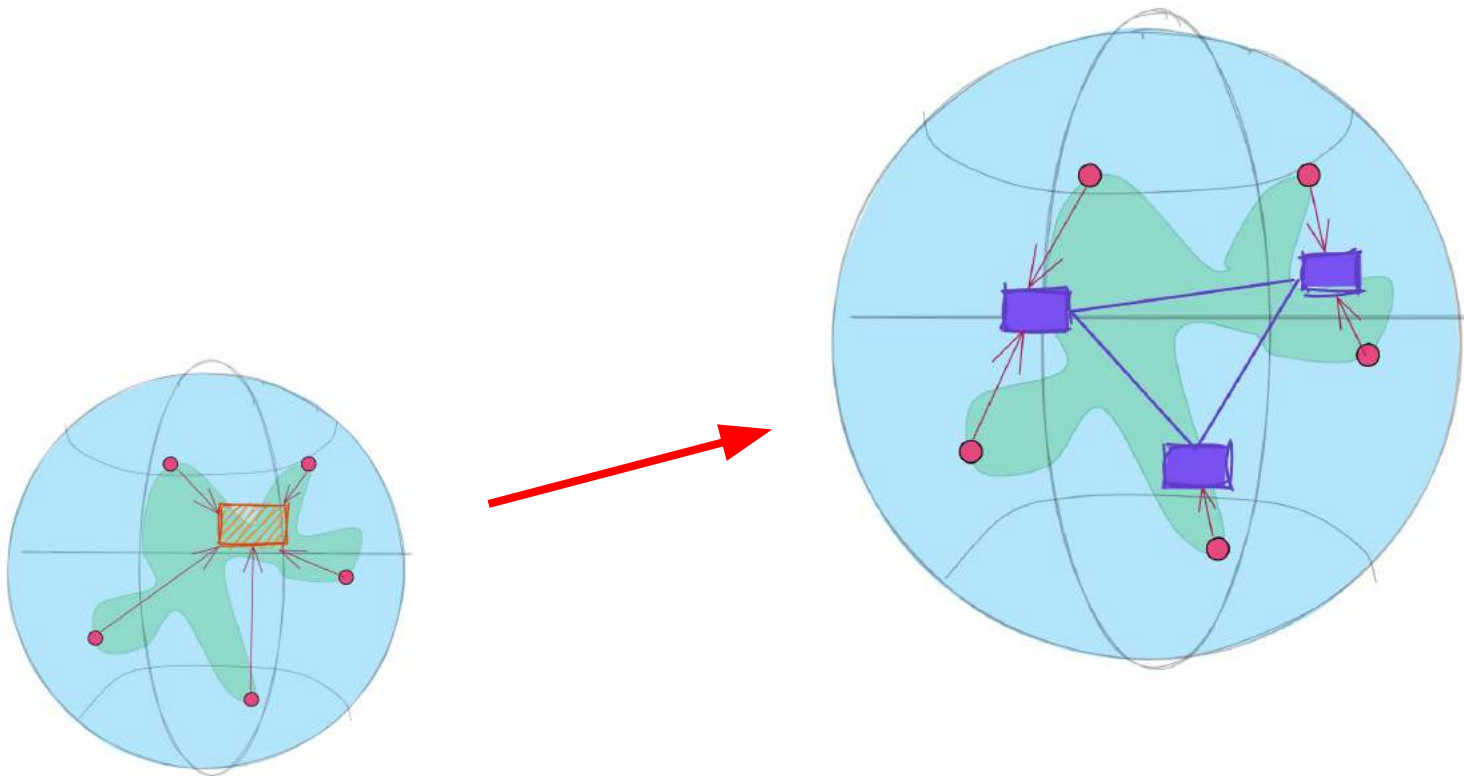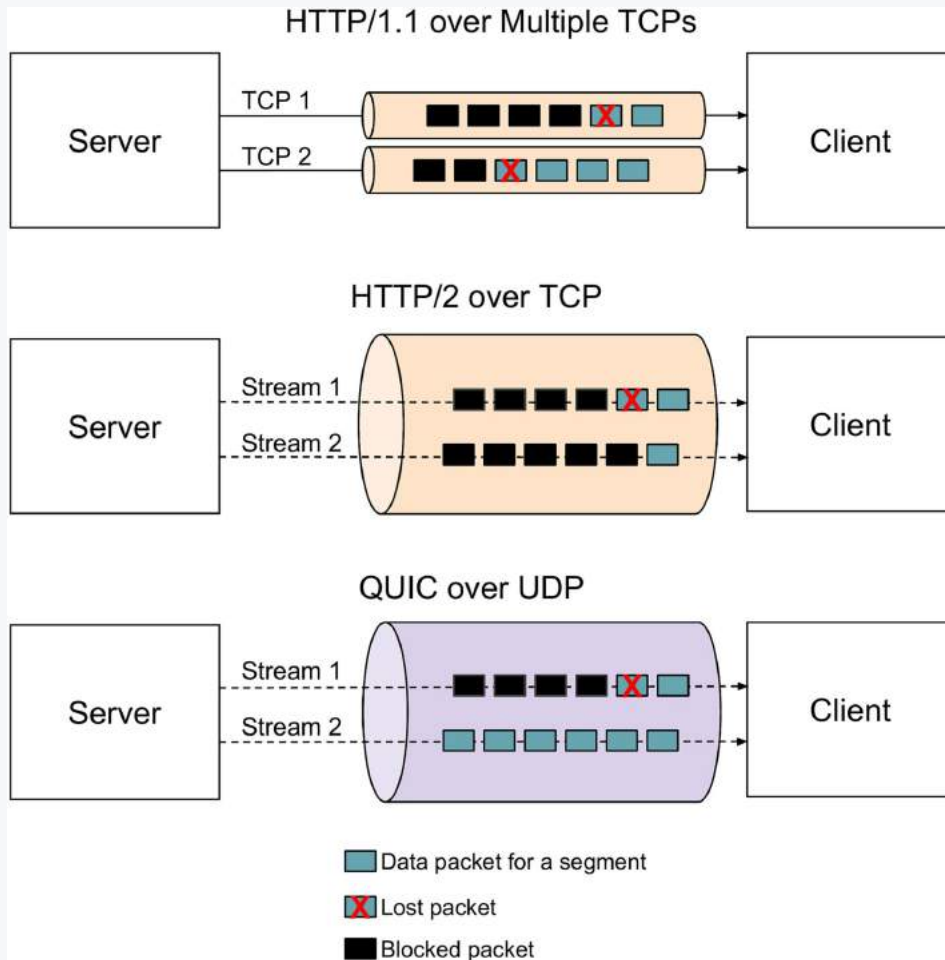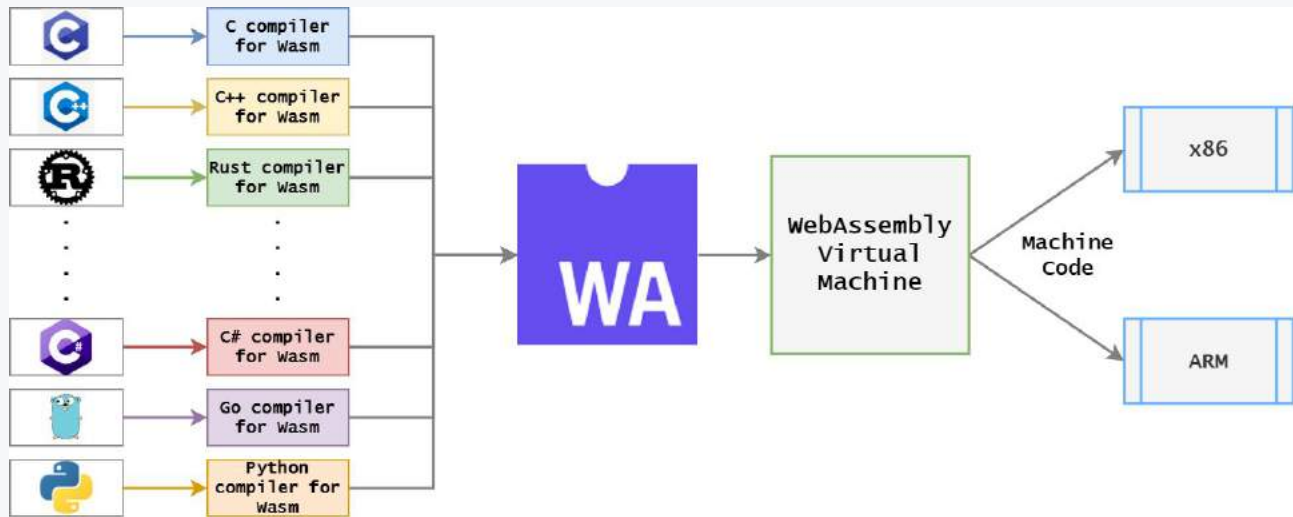
WebAssembly

Internet is changing

Centralized		Distributed		Centralized		Distributed
	→ **Software** →		→ **Internet** →		→ **Realtime** →	
1940-1970		1980-2000		2000-2020		2020 - future
Mainframe		PC		Cloud Computing		Edge Computing

IoT

Metaverse

Cloud Gaming

Autonomous Vehicle

VR/AR

Robot

......
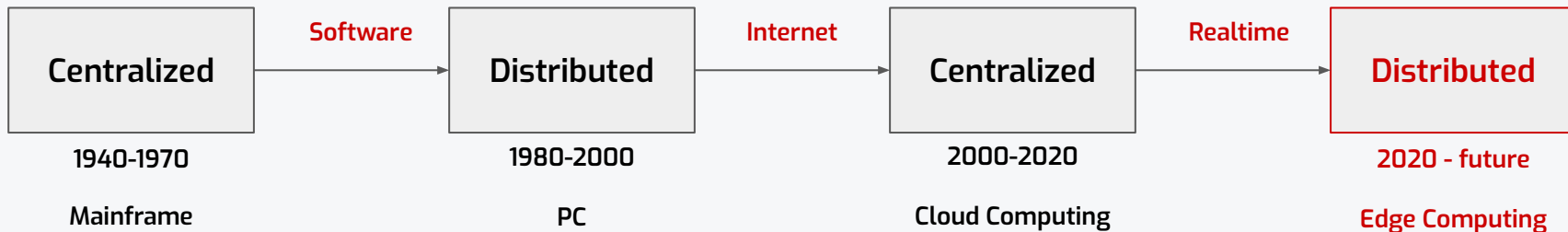
*"More than **50 percent** of enterprise generated data will be created and processed outside the data center by 2022"*
--- Gartner

Key metrics

- **Latency sensitive**
- **Security first**
- **Processing economics**

Tooling + Open-Sourcing

Developer Experiences - Serverless Streaming Function

zipper → sfn

Isolation

- CLI Rx
- WASM Rx

Isolation

Data Plane

- YCloud Handle Process
- YCloud WebAssembly
- Stream Serverless Runtime

- CLI Handle Process
- WebAssembly
- RxStream

Data Plane

Raw Serverless Runtime

Control Plane

- bytes
- bytes
- bytes

| DataFrame | HandshakeFrame | ... ... |

FrameStream - YoMo Land

QUIC - udp stream

Control Plane

🧿 *Thanks*

C.C.

ALLEGRO