

THE
CHALLENGES
AND
SECRETS
OF THE
Realtime World



@SUPERTINO

Realtime Data!

RIDE SHARING APP

GEOLOCATION DATA

MESSAGING APP

CHAT MESSAGE

TRADING APP

FINANCIAL DATA

GAME

**PLAYER POSITION
PLAYER STATE**



REALTIME

A vertical stack of the word "PROTOCOLS" in various typographic styles. The background is a dark blue gradient with a subtle pattern of small, light blue stars or dust specks. The word "PROTOCOLS" is repeated ten times, each in a different font style, creating a visual hierarchy. From top to bottom, the styles are: a small, thin, all-caps serif font; a medium-sized, bold, all-caps serif font; a large, all-caps serif font with wide letter spacing; a very large, distressed, hand-painted style font; a large, bold, all-caps serif font; a very large, all-caps serif font with wide letter spacing; a large, bold, all-caps serif font; a very large, distressed, hand-painted style font; a large, all-caps serif font with wide letter spacing; and a medium-sized, bold, all-caps serif font. The bottom-most instance is a small, thin, all-caps serif font.

*Why do we need a
“realtime” protocol?*

ALWAYS ON

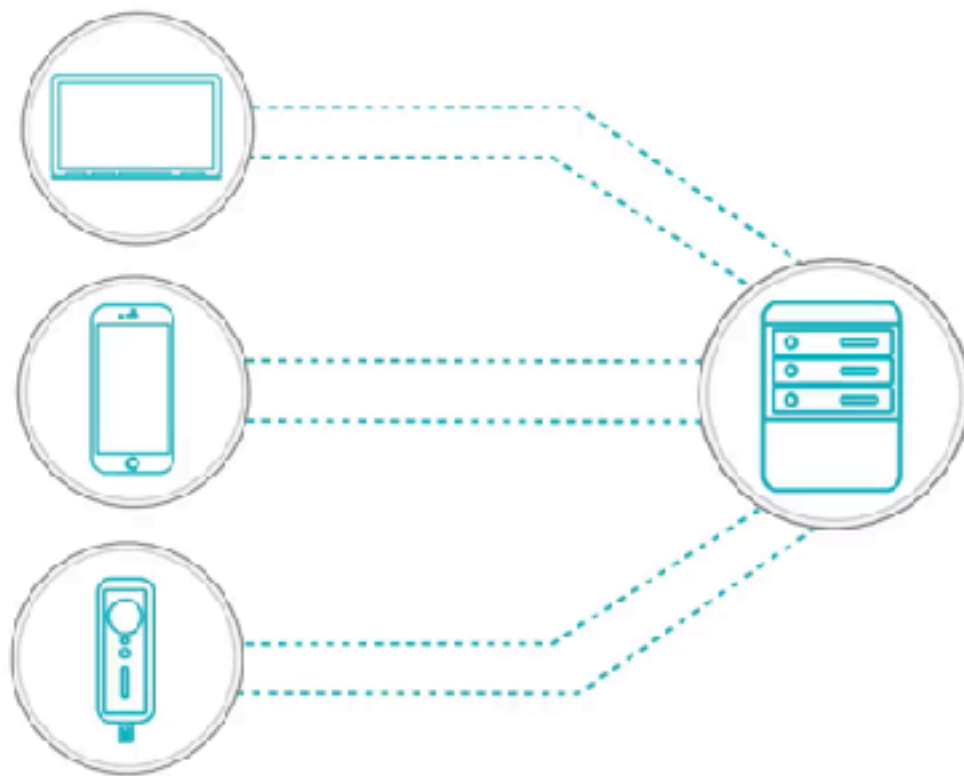
BI-DIRECTIONAL

FAST

SUPPORTED EVERYWHERE

that's all we need!

HTTP POLLING



**WHAT'S
WRONG?**

NOT REALTIME

NOT EFFICIENT

**NOT ALWAYS
ON**

**NOT
SCALABLE**

HTTP STREAMING **HTTP2**

EVENT SOURCE **XMPP**

WEBSOCKET **SOCKET.IO**

KAFKA **MQTT**

HTTP LONG POLLING

SERVER SENT EVENT

What's the best ?

HTTP STREAMING	
HTTP2	EVENT SOURCE
KAFKA	WEBSOCKET
SERVER SENT EVENT	SOCKET.IO
HTTP POLLING	MQTT
HTTP LONG POLLING	XMPP

Haha, well...

XMPP

WHAT'S APP

KAFKA

UBER

HTTP LONG POLLING

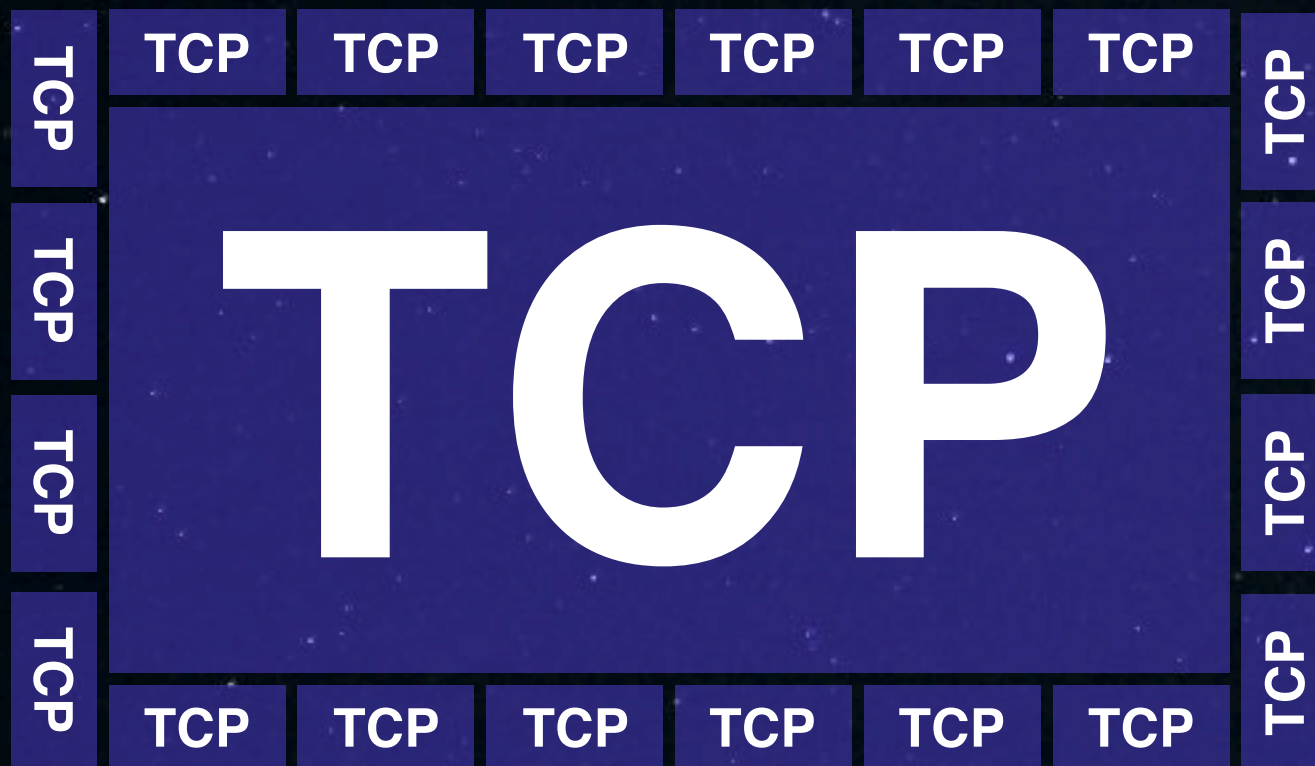
FACEBOOK

WEBSOCKET

SLACK

THEY ALL WORK

ON TOP OF



APPLICATION LAYER

PRESENTATION LAYER

SESSION LAYER

TRANSPORT LAYER

NETWORK LAYER

DATA LINK LAYER

PHYSICAL LAYER

HTTP STREAMING	
HTTP2	EVENT SOURCE
KAFKA	WEBSOCKET
SERVER SENT EVENT	SOCKET.IO
HTTP POLLING	MQTT
HTTP LONG POLLING	XMPP

TCP

UDP

THEY ARE ALL

SENDING

TCP

TCP

TCP

TCP

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TCP

TCP

TCP

TCP PACKETS

TCP

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TCP

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TCP TCP

TCP SOCKET

TCP TCP

TCP TCP TCP TCP TCP TCP TCP TCP TCP TCP TCP TCP



TCP SOCKET						
TCP	TCP	TCP	TCP	TCP	TCP	TCP
TCP	TCP	TCP	TCP	TCP	TCP	TCP



TCP SOCKET

1

DNS LOOKUP

UDP

UDP

UDP

UDP

UDP

UDP

UDP

UDP



DNS



2

TCP SOCKET

TCP HANDSHAKE

TLS HANDSHAKE

REQUEST

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

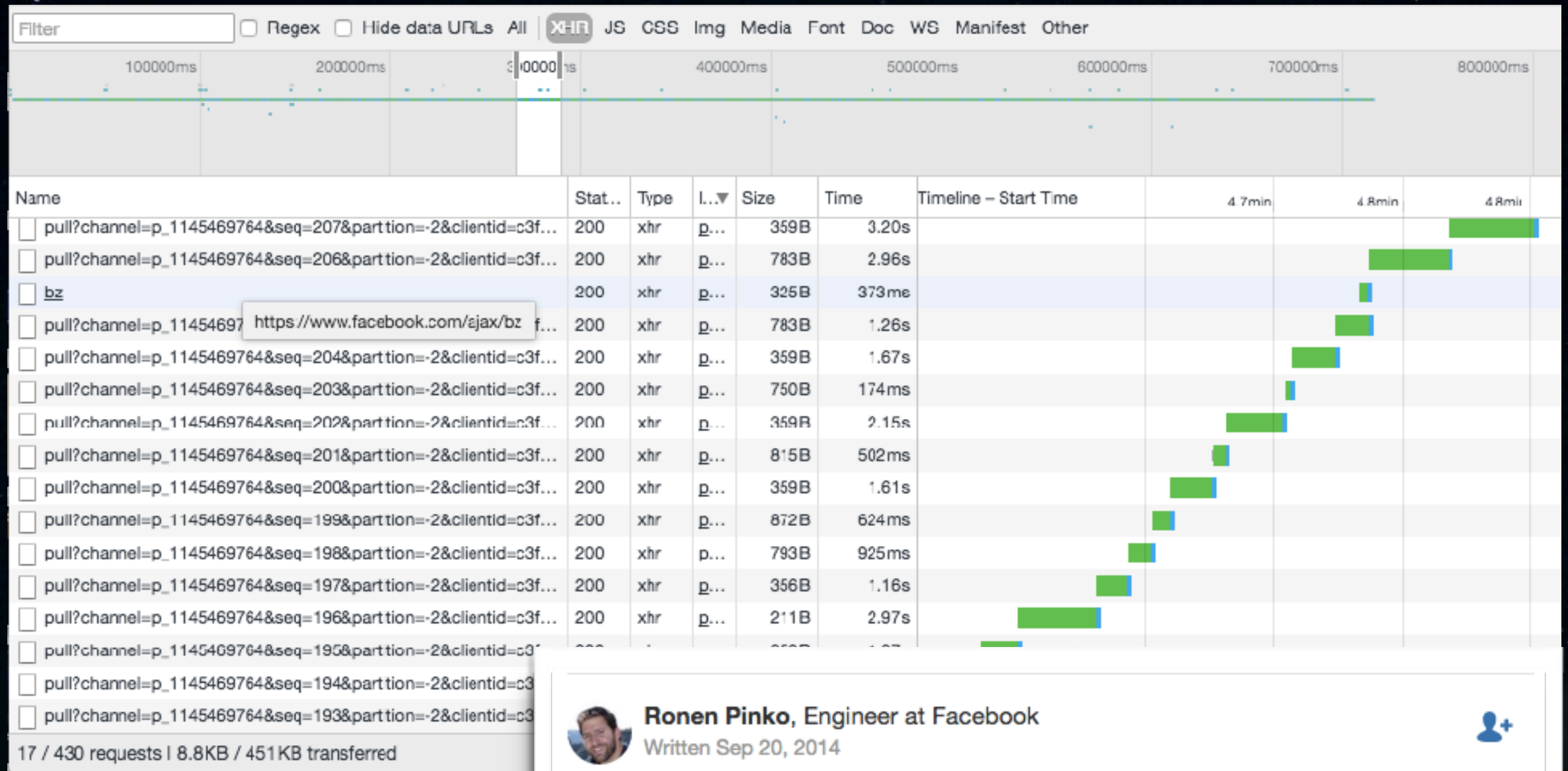
TCP

TCP



SERVER

HTTP LONG POLLING



Ronen Pinko, Engineer at Facebook

Written Sep 20, 2014



I'm the lead engineer on Facebook Realtime Infrastructure for web. The main reason is that web sockets are not widely adopted yet and long polling is working well.

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Downvote Comments 7+



TCP SOCKET

1

DNS LOOKUP

UDP

UDP

UDP

UDP

UDP

UDP

UDP

UDP



DNS



2

TCP SOCKET

TCP HANDSHAKE

TLS HANDSHAKE

REQUEST

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP

TCP



SERVER

TCP SOCKET

1

DNS LOOKUP

UDP

UDP

UDP

UDP

UDP

UDP

UDP

UDP

DNS



2

TCP SOCKET

TCP HANDSHAKE

TCP HANDSHAKE

REQUEST

TCP

TCP

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TCP

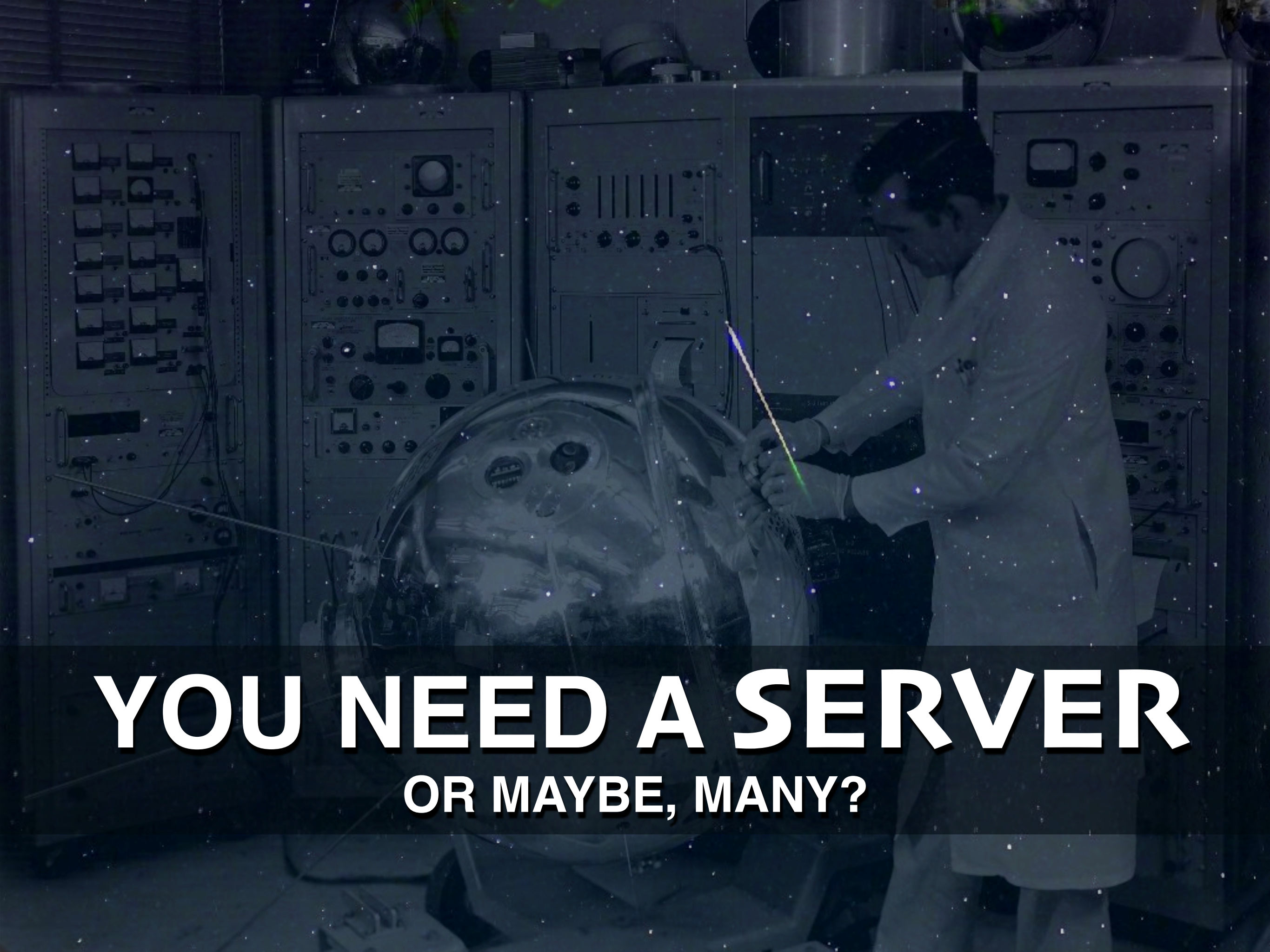
TCP

TCP

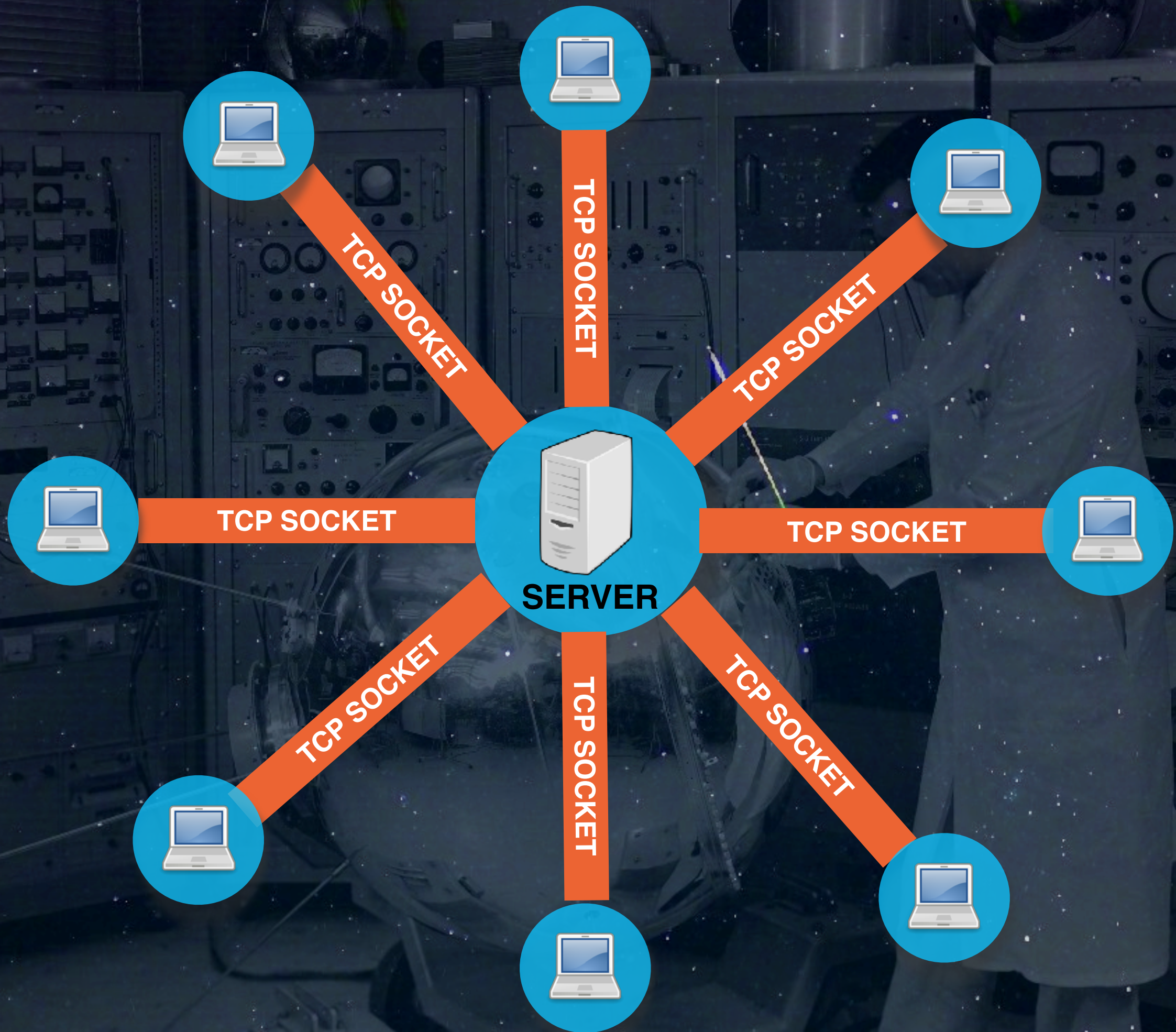
TCP

SERVER



A man in a white lab coat is working on a large, transparent, spherical object that resembles a globe or a large server component. He is using a tool that emits a bright, multi-colored light (yellow, orange, and green) to work on the object. The background is a server room with several racks of electronic equipment, including circuit boards, switches, and cables. The overall scene is dimly lit, with the primary light source being the tool the man is using. The text "YOU NEED A SERVER OR MAYBE, MANY?" is overlaid on the bottom half of the image in a large, white, sans-serif font.

YOU NEED A SERVER
OR MAYBE, MANY?





TCP SOCKET



CHANNEL 1



CHANNEL 2



CHANNEL 3



CHANNEL 4



A dark, high-contrast photograph of a vintage aircraft cockpit. The image shows the instrument panel with numerous analog gauges and dials, the central console, and the side panels. The cockpit is viewed from the pilot's perspective, looking out through the windshield. The word "SCALING" is overlaid in a large, white, serif font in the center of the image.

SCALING

A dark, high-contrast photograph of an aircraft cockpit. The image shows the instrument panel with various gauges and dials, the control yoke, and the side console with numerous buttons and switches. The lighting is dim, with some highlights on the instruments and controls. A semi-transparent dark horizontal band is overlaid across the middle of the image, containing the text.

MULTIPLEXING, IT'S MORE DATA!

Multiplexing

CHANNEL 1



CHANNEL 2



CHANNEL 3



CHANNEL 4



SERVER





HUSTON, I LOST INTERNET!

Well, let's catch up!



TIMESTAMP 

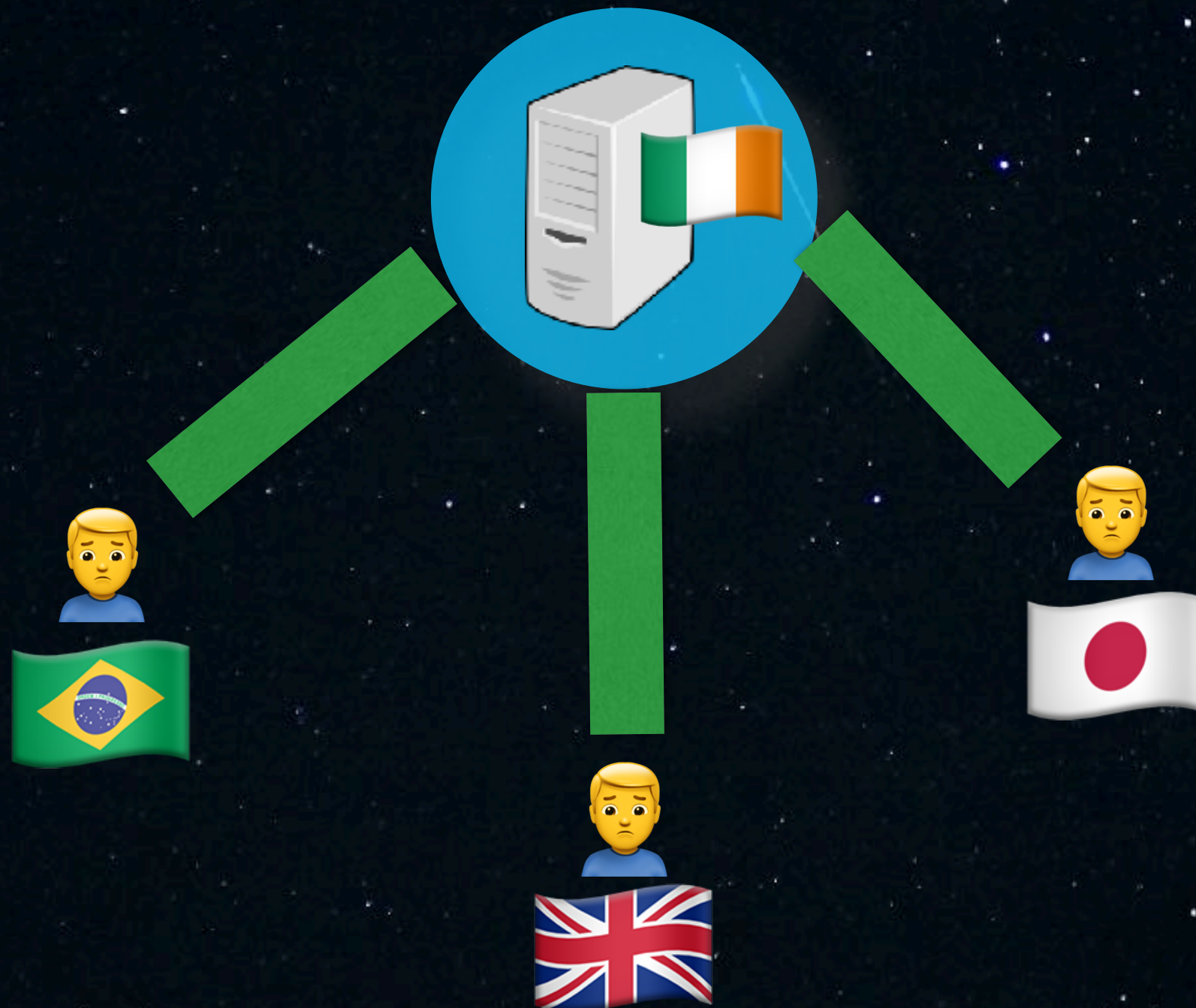


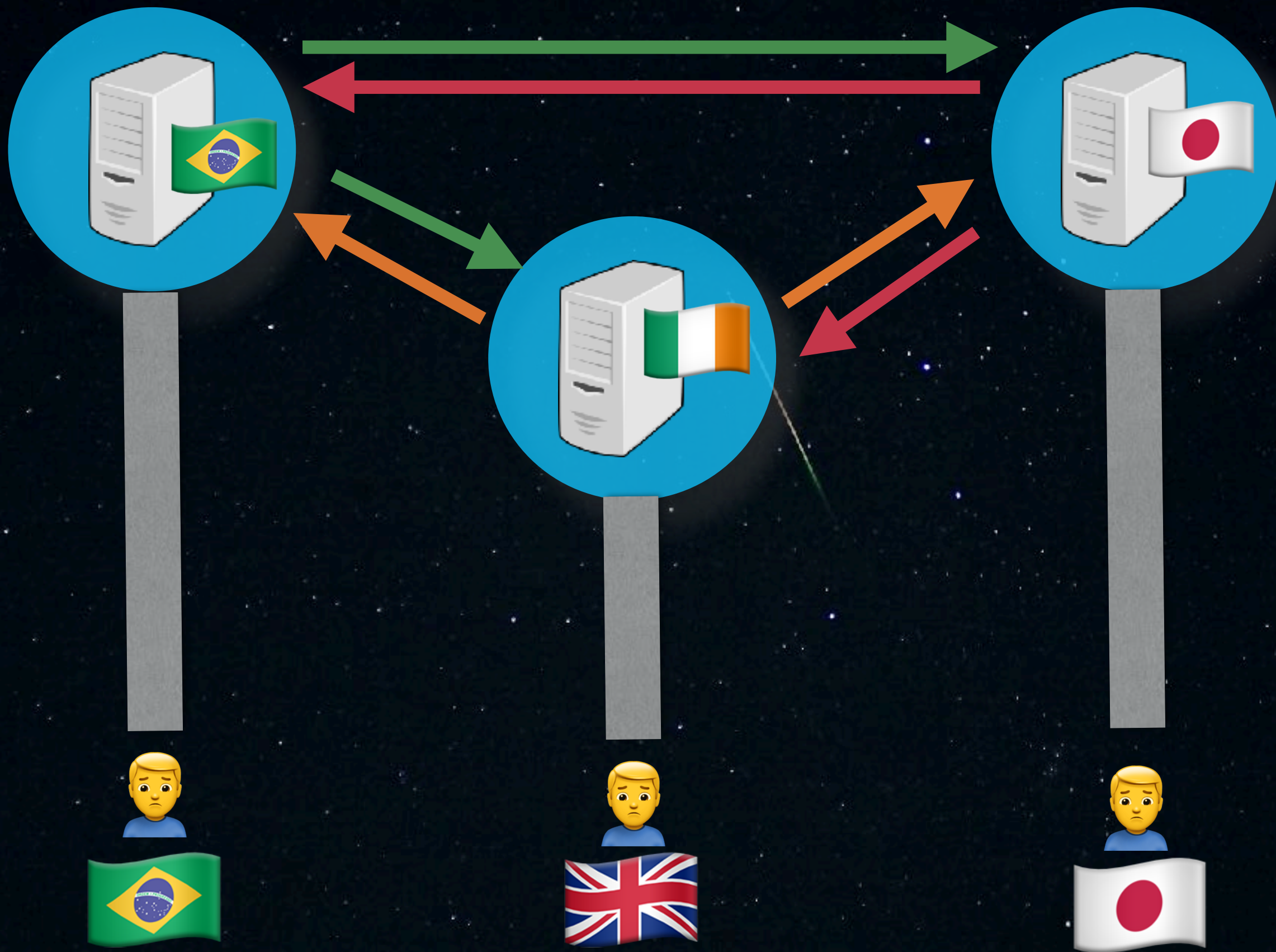
CHANNEL 1						
CHANNEL 2						
CHANNEL 3						
CHANNEL 4						

***MY USERS ARE EVERYWHERE
IN THE WORLD!***



*Publishers and subscribers
are in different regions*





Geo Dns

1



SUMMARY

REALTIME IS AWESOME!

***PROTOCOLS, THEY ARE NOT THAT DIFFERENT
THE PROTOCOL IS NOT THE ONLY THING THAT
MATTERS!***

***SCALABILITY IS A BIG CHALLENGE
MULTIPLEXING, MORE CHANNELS
INTERNET RECOVERY
GEO REDUNDANCY***

THE END



Thank you!



NETWORKING!

A COMPUTER NETWORKING ZINE! BY JULIA EVANS!

