SERVICELESS

INTRODUCTION

Bartosz Sypytkowski

- @horusiath
- b.sypytkowski@gmail.com
- bartoszsypytkowski.com

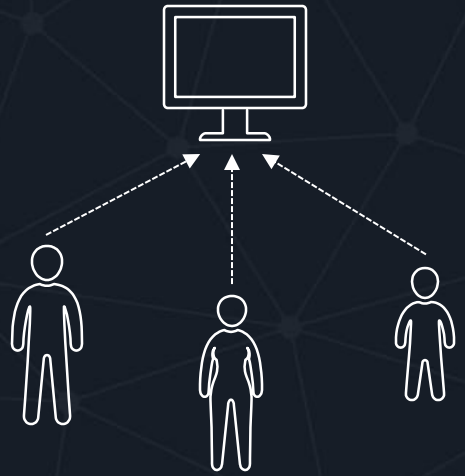
AGENDA

- What do we need services for?
- Economy of service/-less apps
- How can we build a commodity software?

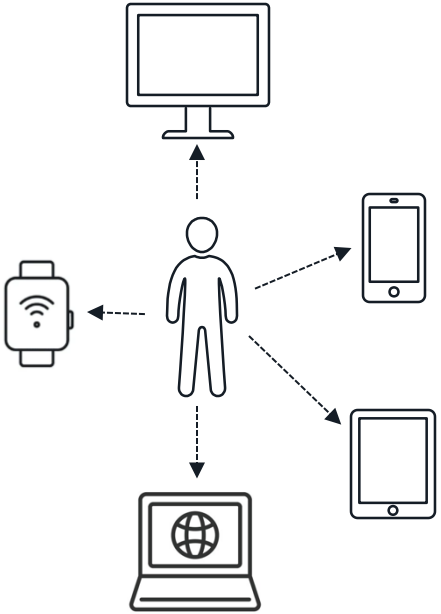
WHY SERVICES?

HOW EXPECTATIONS HAVE CHANGED

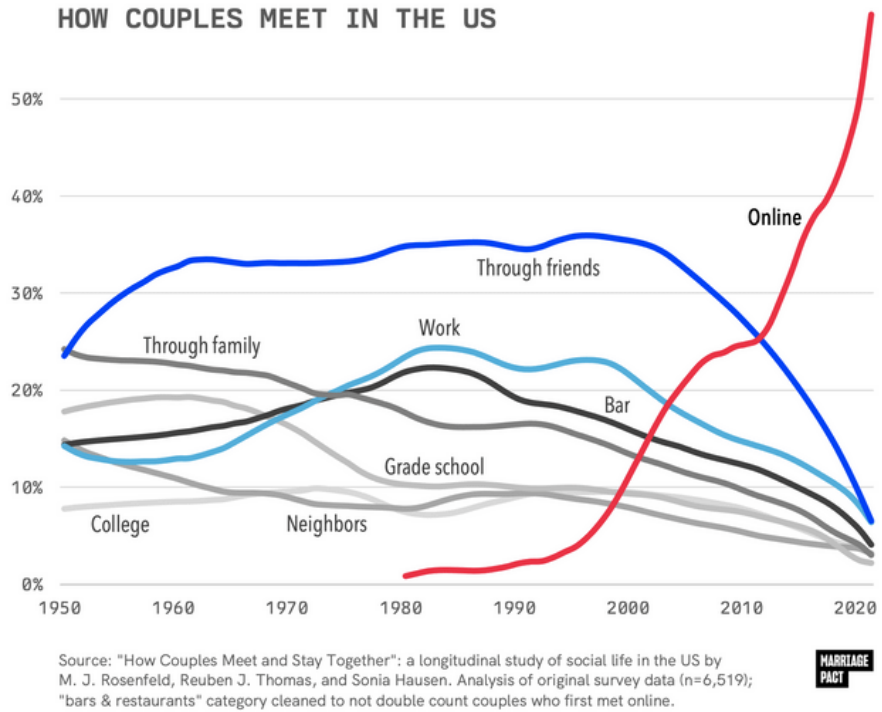
THEN



NOW



WEB CHANGED HOW SOCIETY FUNCTIONS



ECONOMY OF SERVICE MODEL

SUFFERING FROM SUCCESS

David C. • 2nd
Co-Founder at Viddyoze
8h •

+ Follow

8.31am. I got a call.

We ran up a $65,345 AWS bill without realising.

I remember the day vividly.

I got woken up by my phone ringing.

'Hello?'

It was someone from Amazon. Our card on account had been declined.

I knew there was money in the bank, so I said I'd check.

I asked for clarification on the amount.

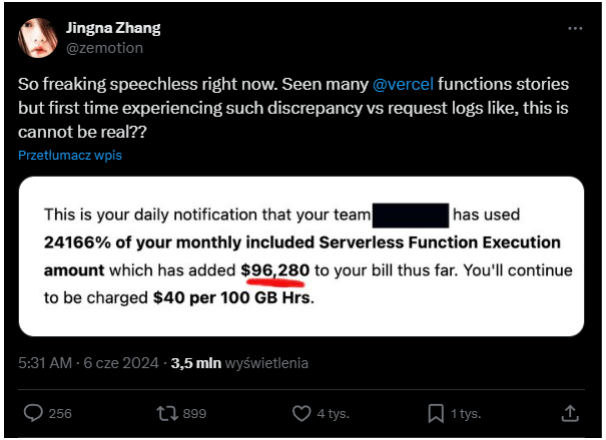
'$65,345', they said.

My heart sank. Stomach turned. I felt a wave of panic flush over my entire body.

I didn't know what to do, so I said let me look into it, and hung up.

First I called my Co-Founders, told them to sit down, and let them know the situation.

Next, I called our head of engineering at the time, and tried to figure what the hell had happened.



Moving Forward
Elliott King

Elliott King

React, Python, NodeJS, and the fun technology that comes with full-stack. I hope I don't run out of space for my

I Followed the Official AWS Amplify Guide and was Charged $1,100

October 31, 2024 • 6 minute read

SaaS CAN BE PRICEY

Data Egress Pricing (Monthly)

Cloud Provider	Free Allocation	Monthly Cost (1TB)
Hetzner	First 20 TB free	$1.11
Linode	---	$5
Digital Ocean	First 500 GB free	$10
Vultr	First 2TB free	$10
Google Cloud	First 200 GB free	$85
Azure	First 100 GB free	$87
AWS	First 100 GB free	$90
Railway	---	$100
Vercel	---	$150
Netlify	---	$550

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(Network cost alone)

KILLED BY VENTURE CAPITAL

r/Entrepreneur • 1 yr. ago
johnrushx

90% of VC-Funded Startups I Knew Went Bankrupt in 2023

90% of all VC-backed startups from my network are out of business now.

Closed down during 2023.

- 8% have laid off all employees and kept only founders.
- 2% are doing fine but also cutting the costs

https://www.reddit.com/r/Entrepreneur/comments/19d5yey/90_of_vcfunded_startups_i_knew_went_bankrupt_in/

BUILD SOFWARE THAT LASTS

https://ourincrediblejourney.tumblr.com/

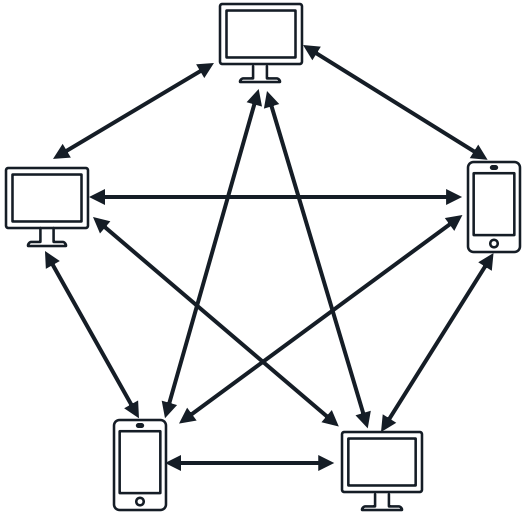
MOTIVATION: HOW MUCH COSTS CAN BE MOVED AWAY?

SOURCES OF COST

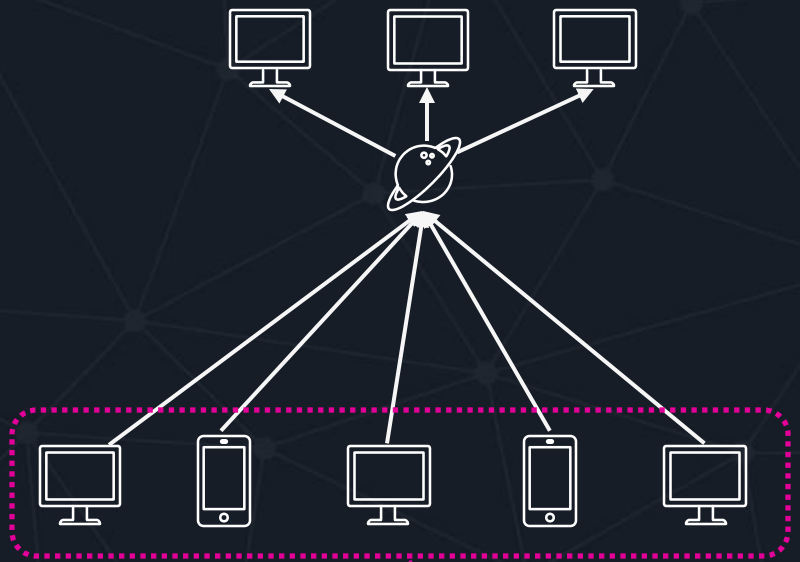
1. Network: hosting
2. Distribution: browser
3. Data storage: cloud storage
4. Data management: databases
5. Discoverability: DNS

CLIENT / SERVER

PEER TO PEER

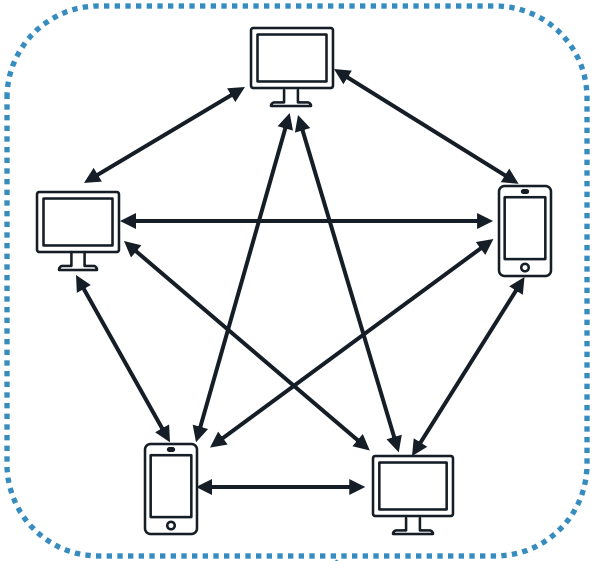


CLIENT / SERVER



Usage scales with this

PEER TO PEER



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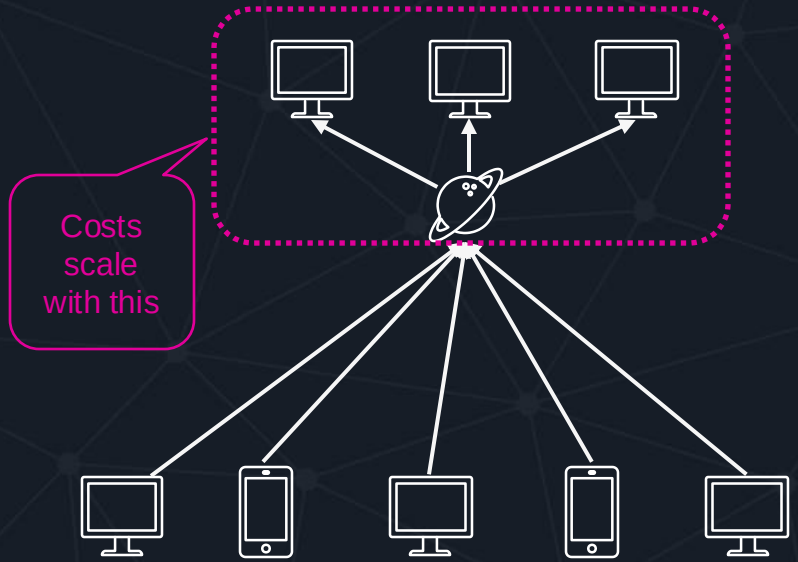

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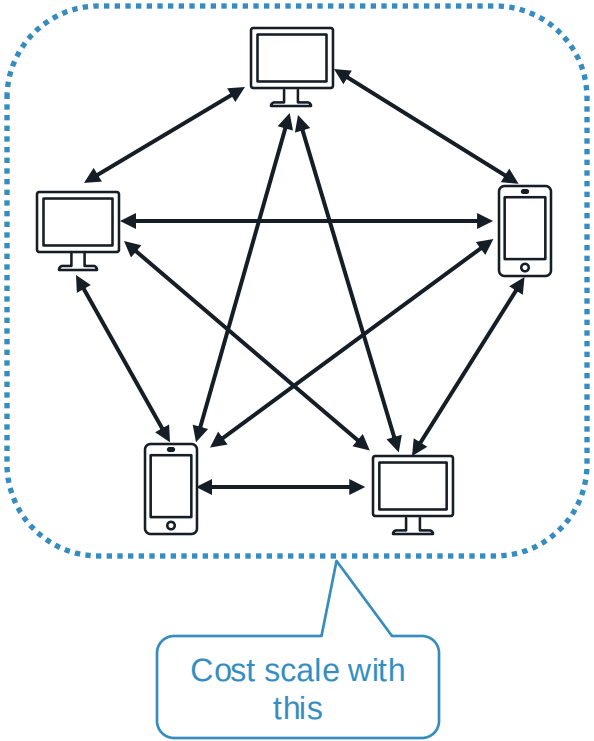
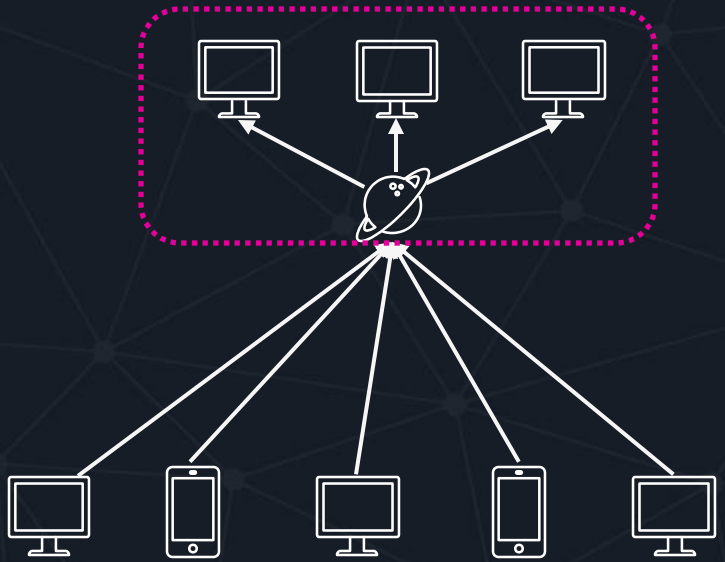
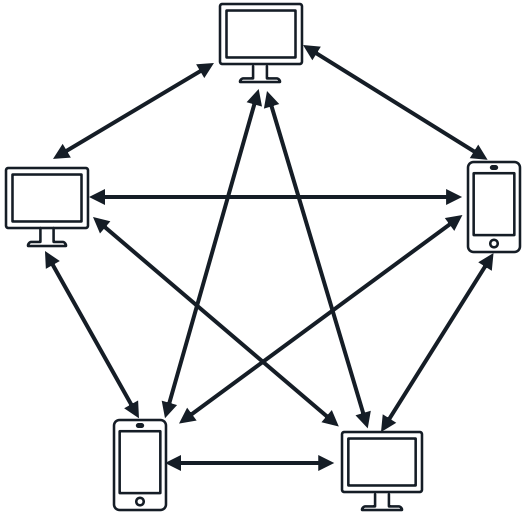


CLIENT / SERVER

You pay for this



PEER TO PEER



You don’t pay for anything on this diagram

DISTRIBUTION MODEL

HOW CAN WE PUBLISH APPS WITHOUT SERVICES

3rd PARTY DISTRIBUTION

DATA SHARING & BACKUP

PUBLISH AND EXCHANGE DATA WITH OTHERS

There’s no such thing as ~~Server~~less.
It’s just somebody else’s ~~servers~~.

Service
services

PRICE PER 1TB

LET'S INCLUDE USER COSTS

OneDrive — $69.99 / year

Google Drive — $43.20 / year

Dropbox — $66.32 / year

\+ IPFS + nØ + >_ SSH — $9.93

The size of the current version of all Wikipedia articles compressed is about 24.09 GB without media

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… OR $0.25 IN HDD PRICE

NEED TO CONNECT TWO DEVICES? TRY A

DUMB PIPE

Easy, direct connections that punch through NATs & stay connected as network conditions change.

https://www.dumbpipe.dev/

NEW TO SEND FILES? TRY

SENDME

Free. No account required.

https://www.iroh.computer/sendme

COLLABORATION

WORK ON THE SAME DATA TOGETHER

COLLABORATION LIBRARIES

Conflict-free Replicated Data Types

Automerge

Loro

COLLABORATION LIBRARIES

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Loro

electric

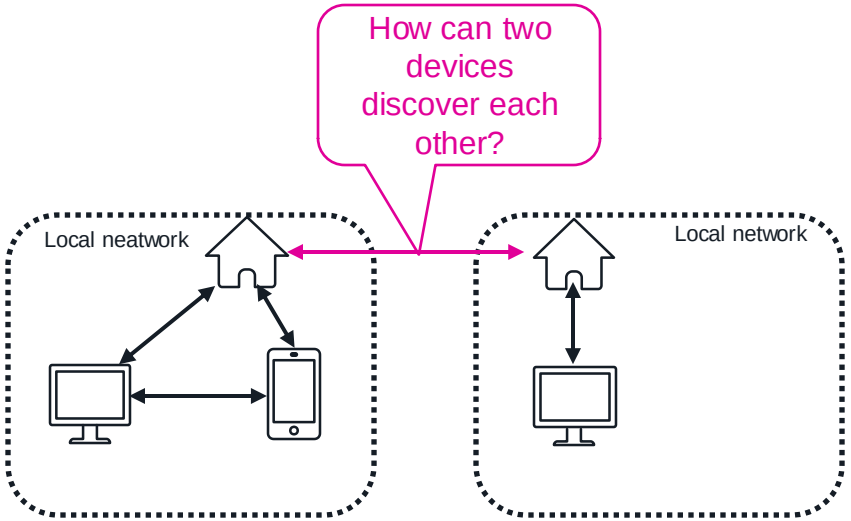
Version Control Systems

SERVICELESS COMMUNICATION

CAN WE COMMUNICATE WITHOUT HOSTED SERVICES?

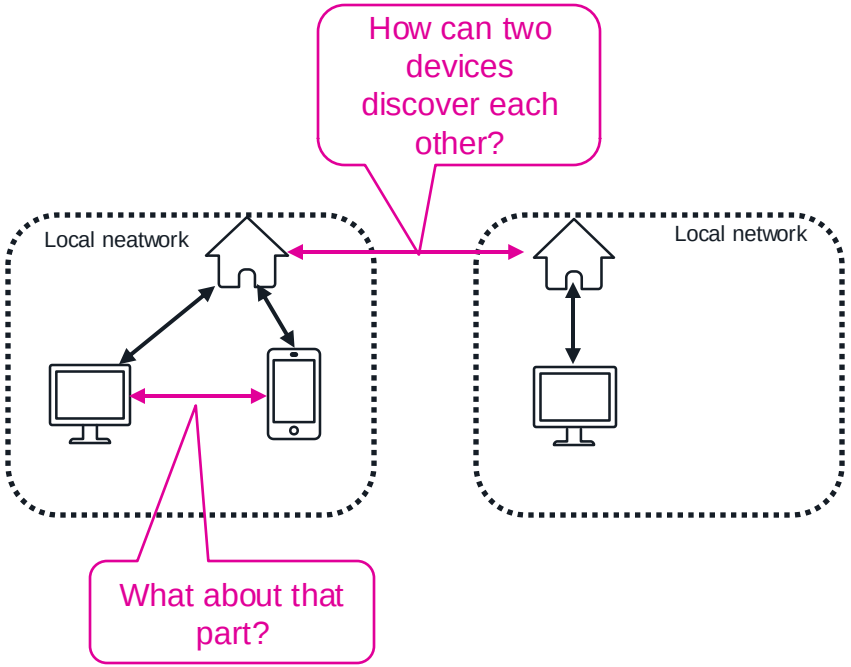
SERVICE DISCOVERY

The root of all problems



SERVICE DISCOVERY

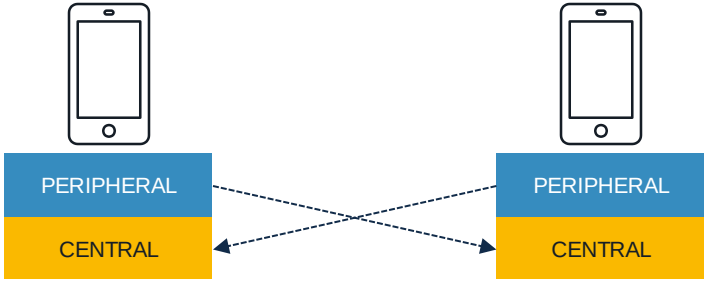
The root of all problems



LAN

BLUETOOTH

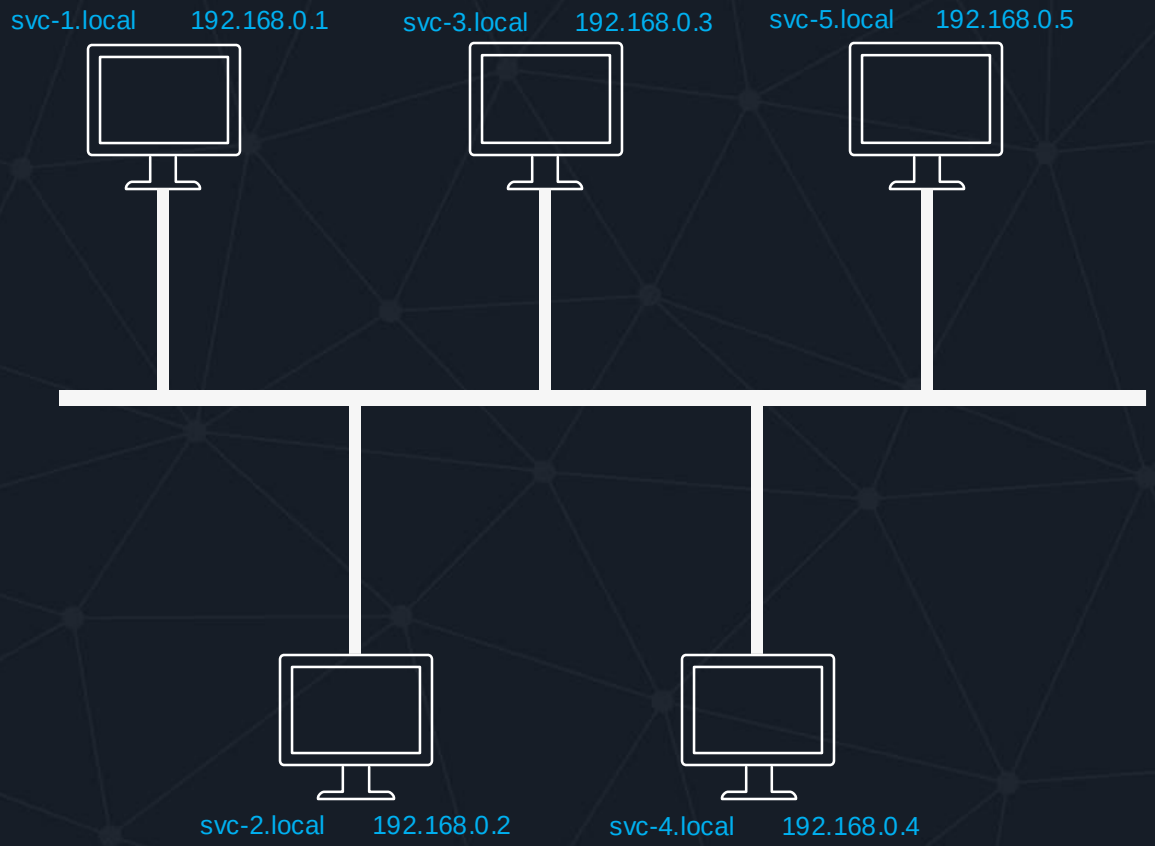
- Pairing
- Central vs. Peripheral
- GATT vs. L2CAP
- OS-specific stacks
- Concurrent connections limit
- Transfer limits



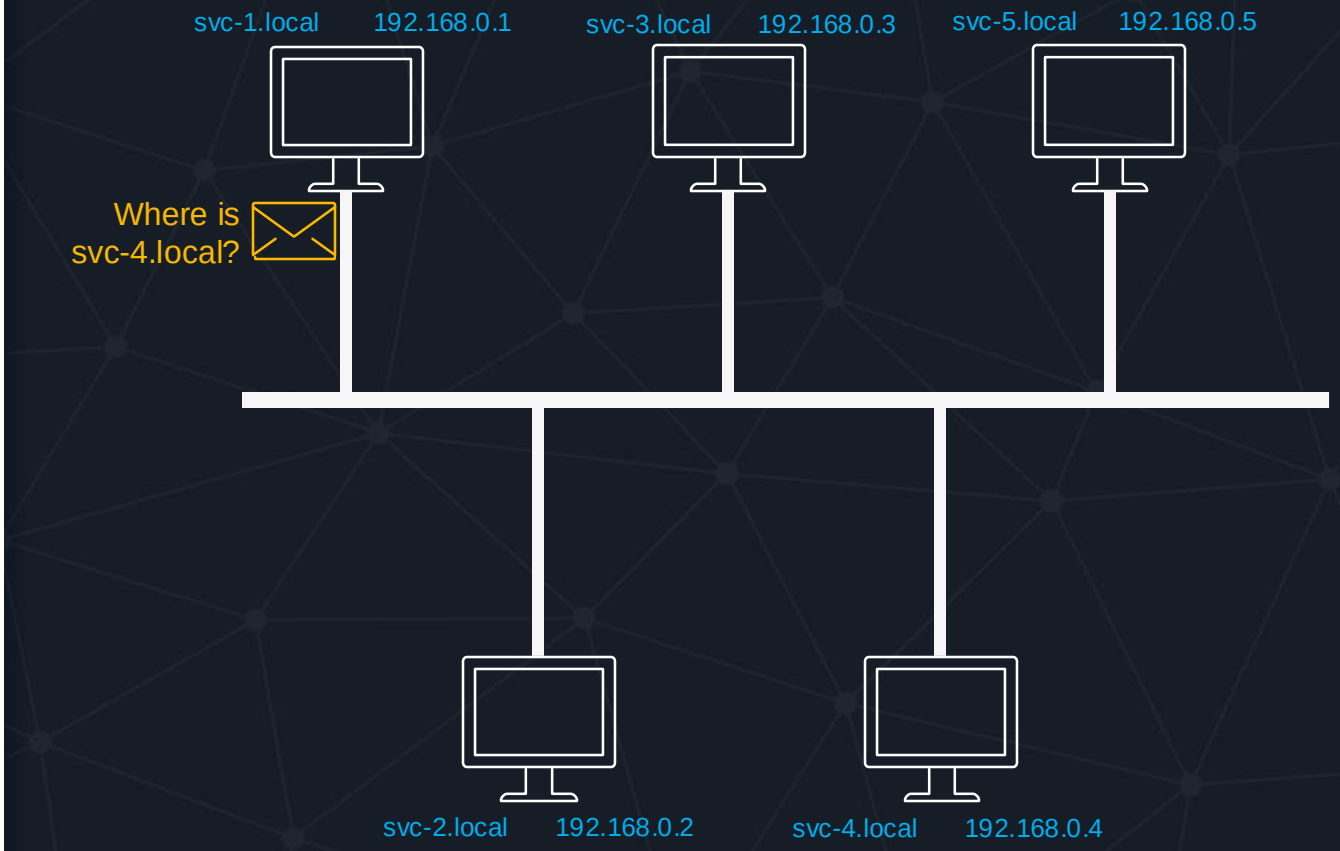
WiFi DIRECT

POINT-TO-POINT WIFI

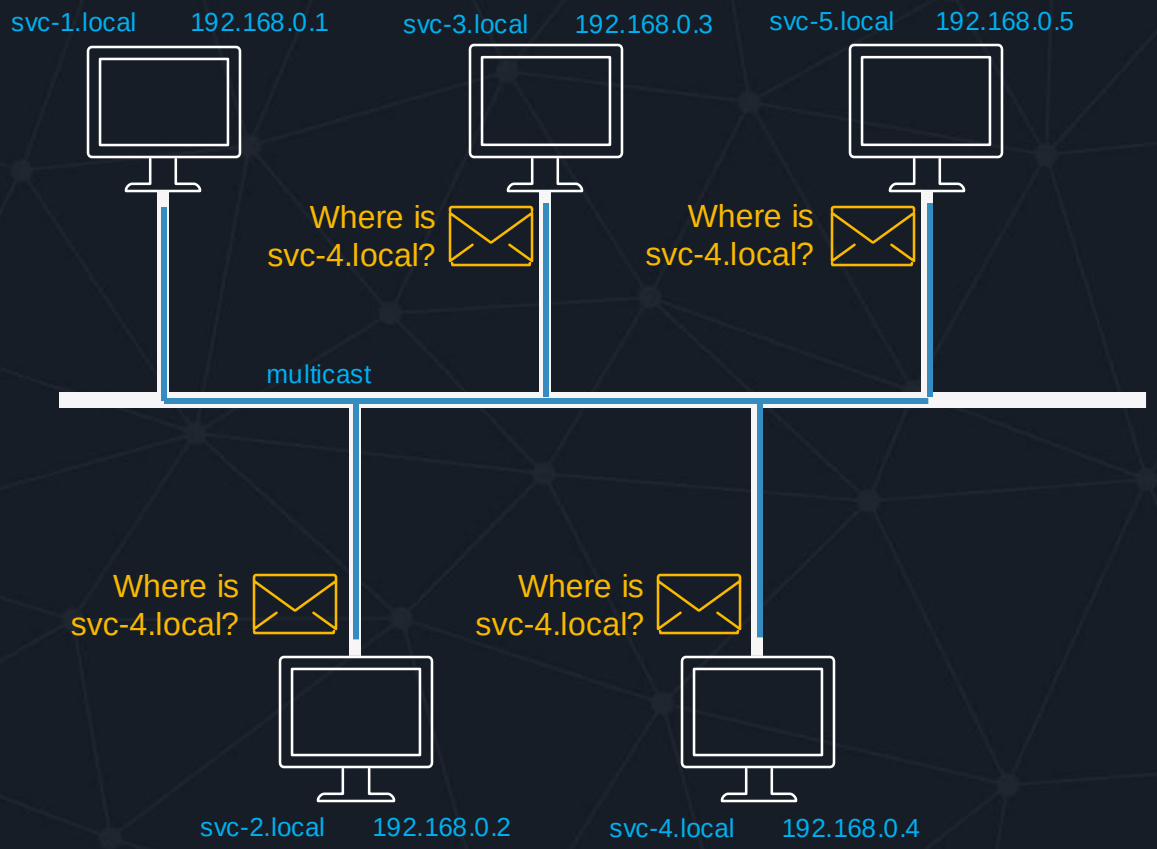
mDNS


svc-1.local
192.168.0.1
svc-3.local
192.168.0.3
svc-5.local
192.168.0.5
svc-2.local
192.168.0.2
svc-4.local
192.168.0.4

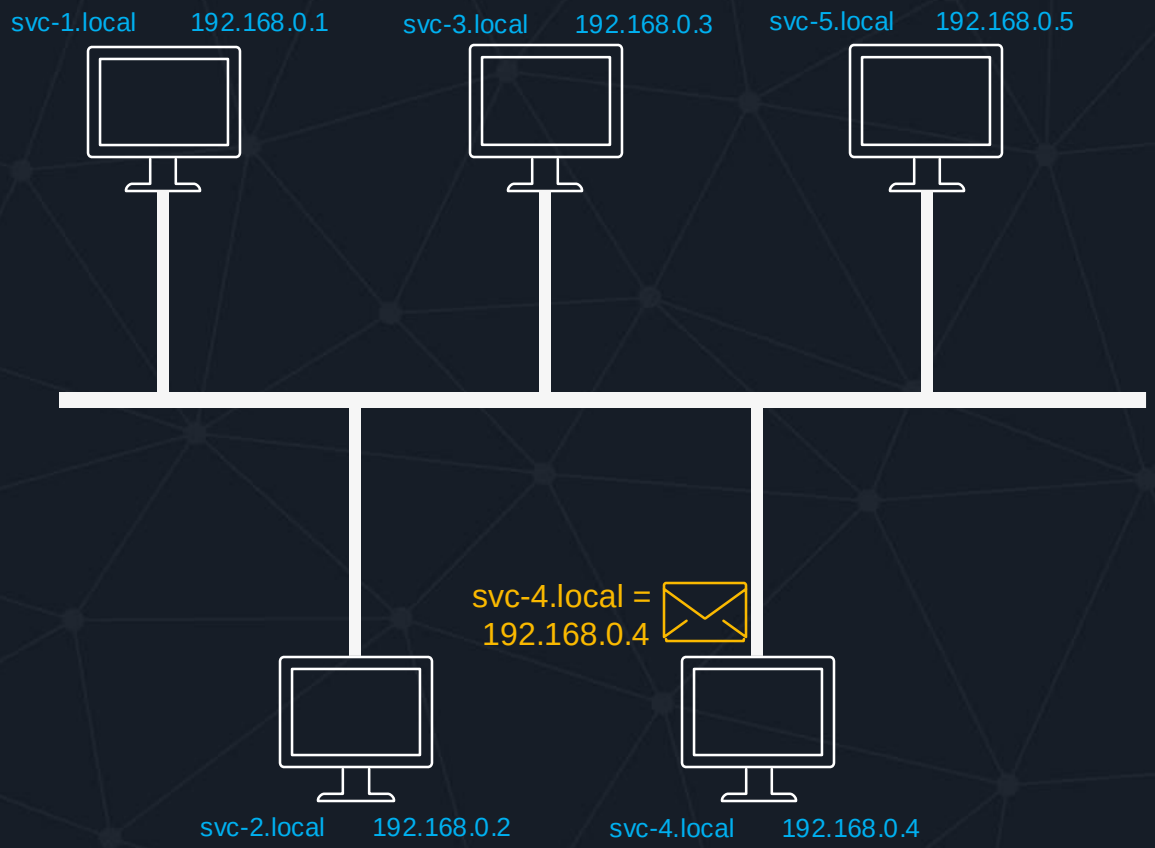
mDNS


svc-1.local
192.168.0.1
svc-3.local
192.168.0.3
svc-5.local
192.168.0.5
Where is
svc-4.local?
svc-2.local
192.168.0.2
svc-4.local
192.168.0.4

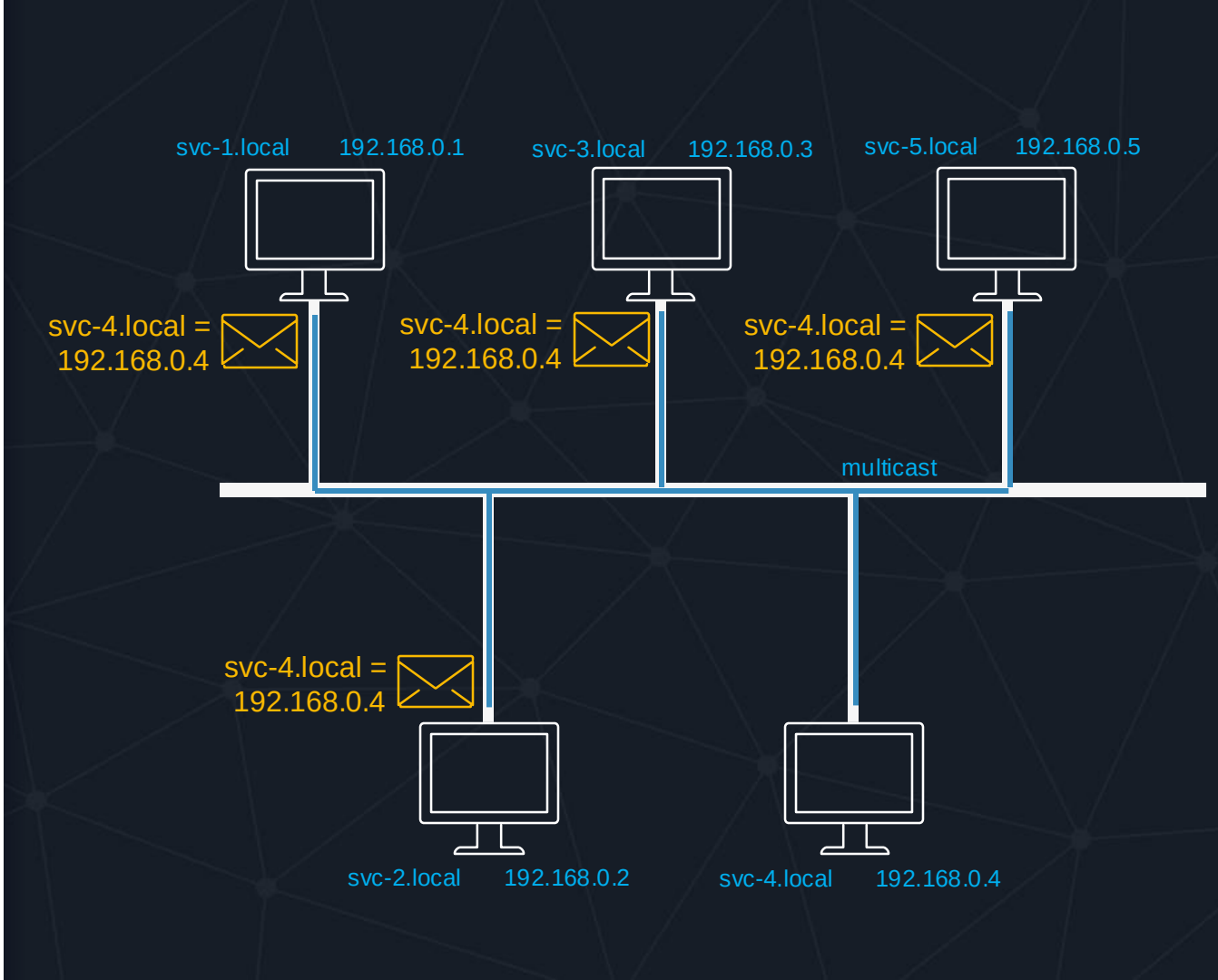
mDNS


svc-1.local
192.168.0.1
svc-3.local
192.168.0.3
svc-5.local
192.168.0.5
Where is svc-4.local?
Where is svc-4.local?
multicast
Where is svc-4.local?
Where is svc-4.local?
svc-2.local
192.168.0.2
svc-4.local
192.168.0.4

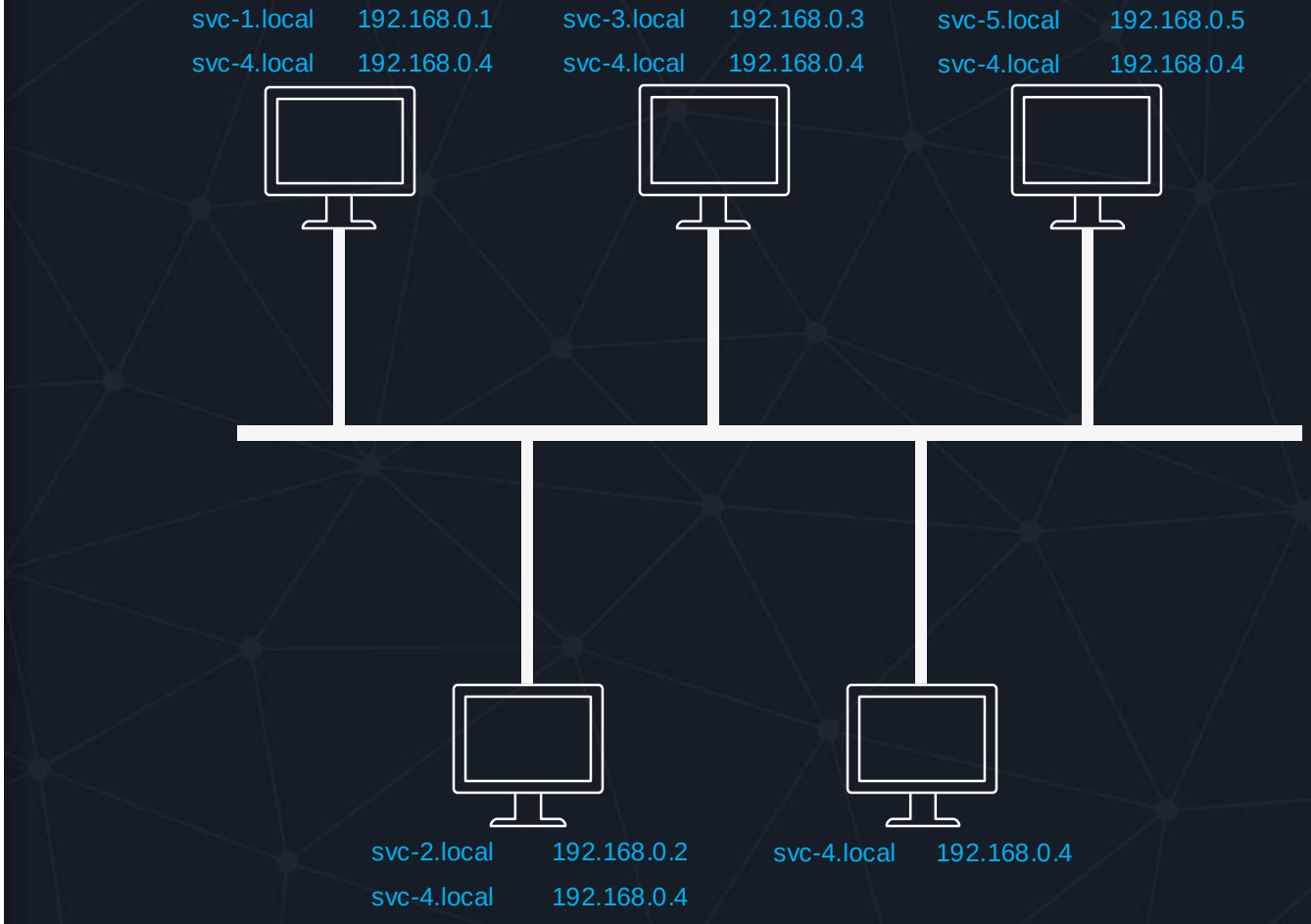
mDNS


svc-1.local
192.168.0.1
svc-3.local
192.168.0.3
svc-5.local
192.168.0.5
svc-4.local =
192.168.0.4
svc-2.local
192.168.0.2
svc-4.local
192.168.0.4

mDNS


svc-1.local
192.168.0.1
svc-3.local
192.168.0.3
svc-5.local
192.168.0.5
svc-4.local =
192.168.0.4
svc-4.local =
192.168.0.4
svc-4.local =
192.168.0.4
multicast
svc-4.local =
192.168.0.4
svc-2.local
192.168.0.2
svc-4.local
192.168.0.4

mDNS

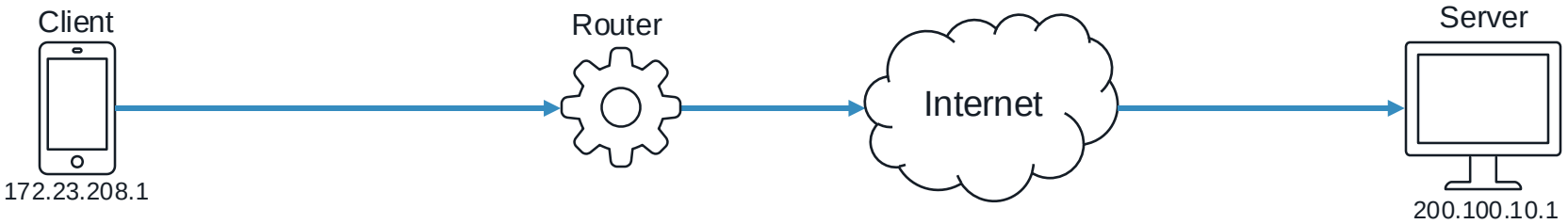

svc-1.local 192.168.0.1
svc-4.local 192.168.0.4
svc-3.local 192.168.0.3
svc-4.local 192.168.0.4
svc-5.local 192.168.0.5
svc-4.local 192.168.0.4
svc-2.local 192.168.0.2
svc-4.local 192.168.0.4
svc-4.local 192.168.0.4

mDNS

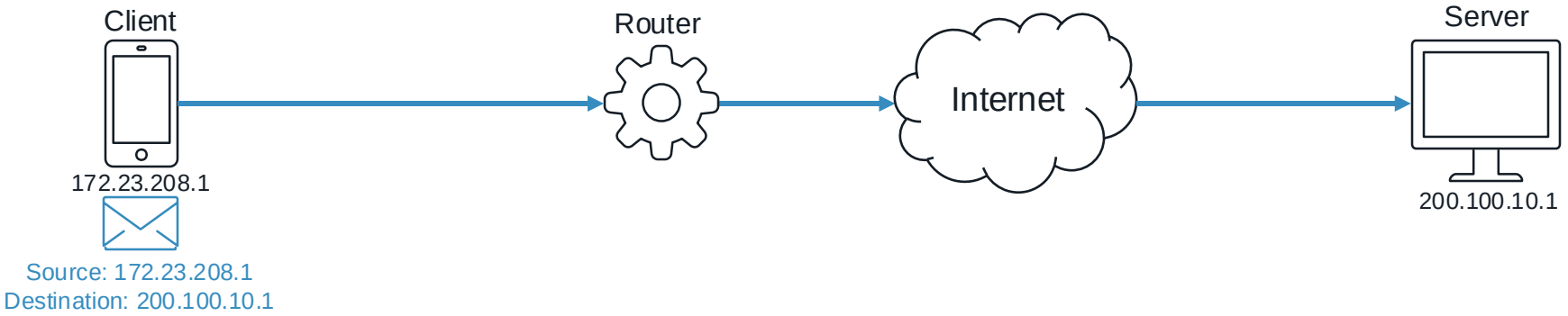
```
const mdns = require('mdns')

// advertise service svc-1 at port 9999 via TCP
const service = mdns.createAdvertisement(mdns.tcp(), 9999, {
  name: 'svc-1'
})
service.start()

// discover services
const browser = mdns.createBrowser(mdns.tcp())
browser.on('ready', () => browser.discover())
browser.on('update', (data) => {
  console.log(data);
  // {
  //   interfaceIndex: 4,
  //   name: svc-1',
  //   networkInterface: 'en0',
  //   type: {name: '', protocol: 'tcp', subtypes: []},
  //   replyDomain: 'local.',
  //   fullname: 'svc-1._tcp.local.',
  //   host: 'svc-1.local.',
  //   port: 9999,
  //   addresses: [ '10.1.1.50', 'fe80::21f:5bff:fecd:ce64' ]
  // }
})
```

WAN

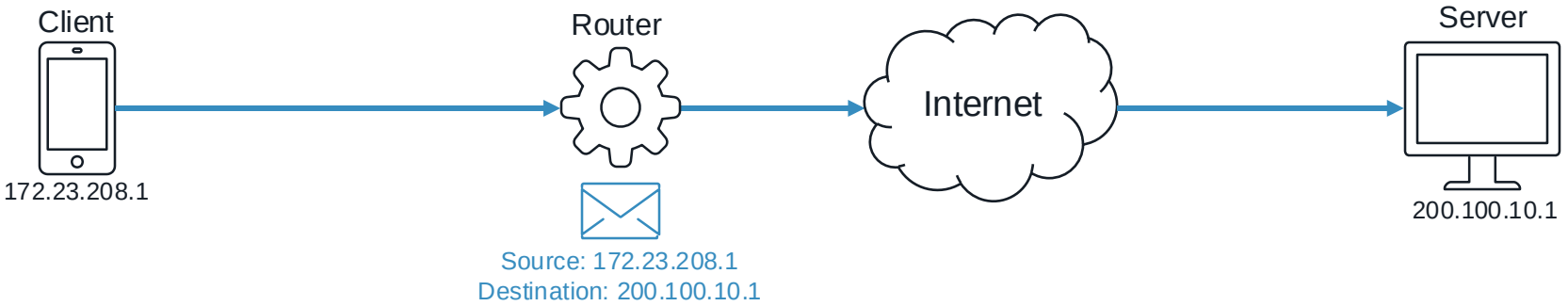
NETWORK ADDRESS TRANSLATION



NETWORK ADDRESS TRANSLATION



NETWORK ADDRESS TRANSLATION



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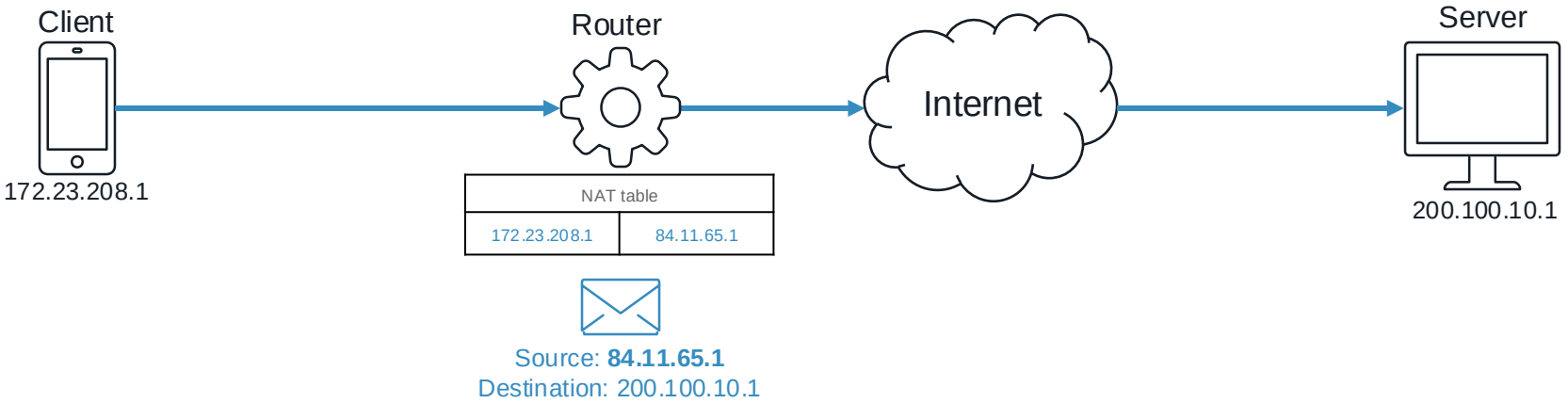
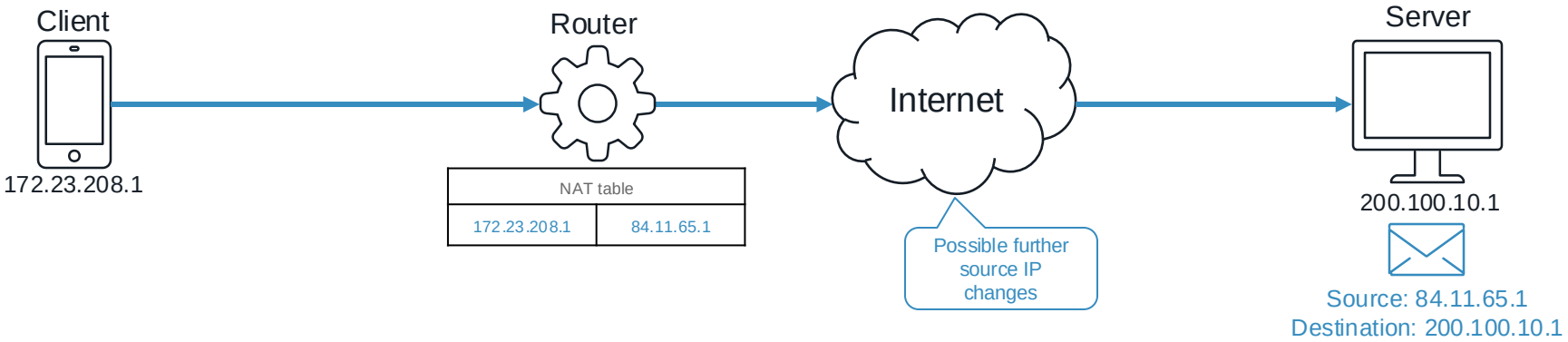


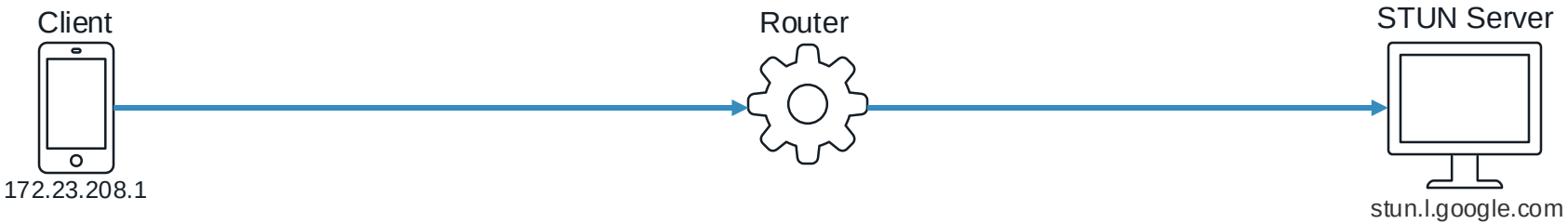
NETWORK ADDRESS TRANSLATION



HOW DO WE KNOW THE IP ADDRESS OF THE RECIPIENT?

STUN

DISCOVERING PUBLIC IP



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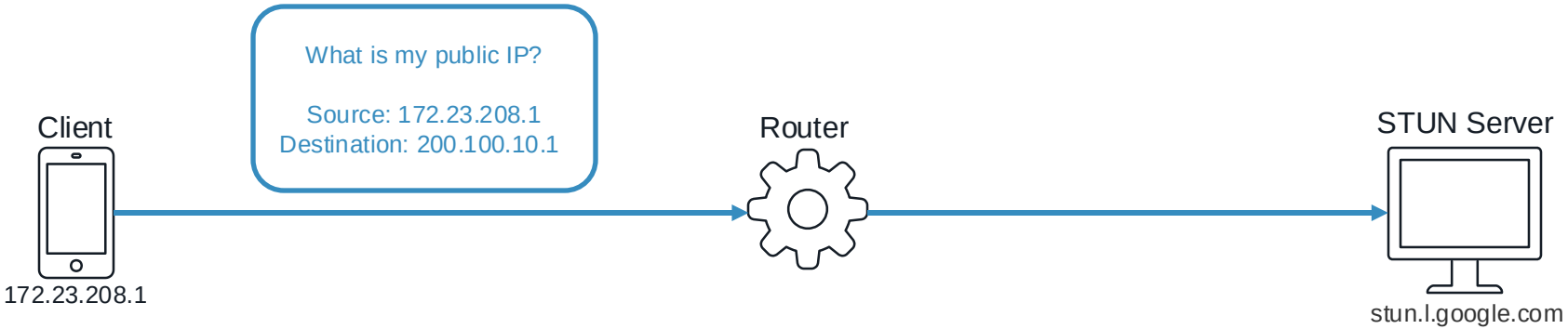

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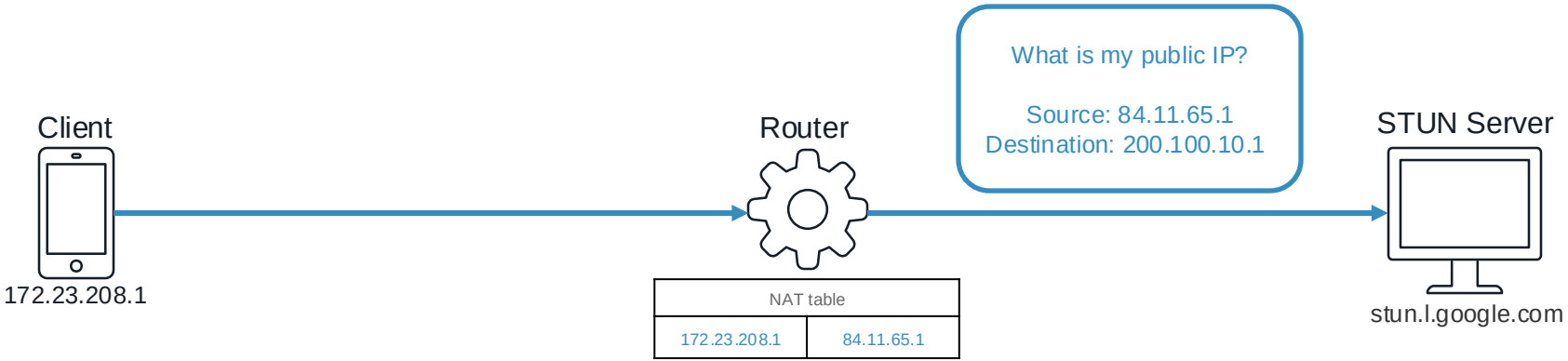

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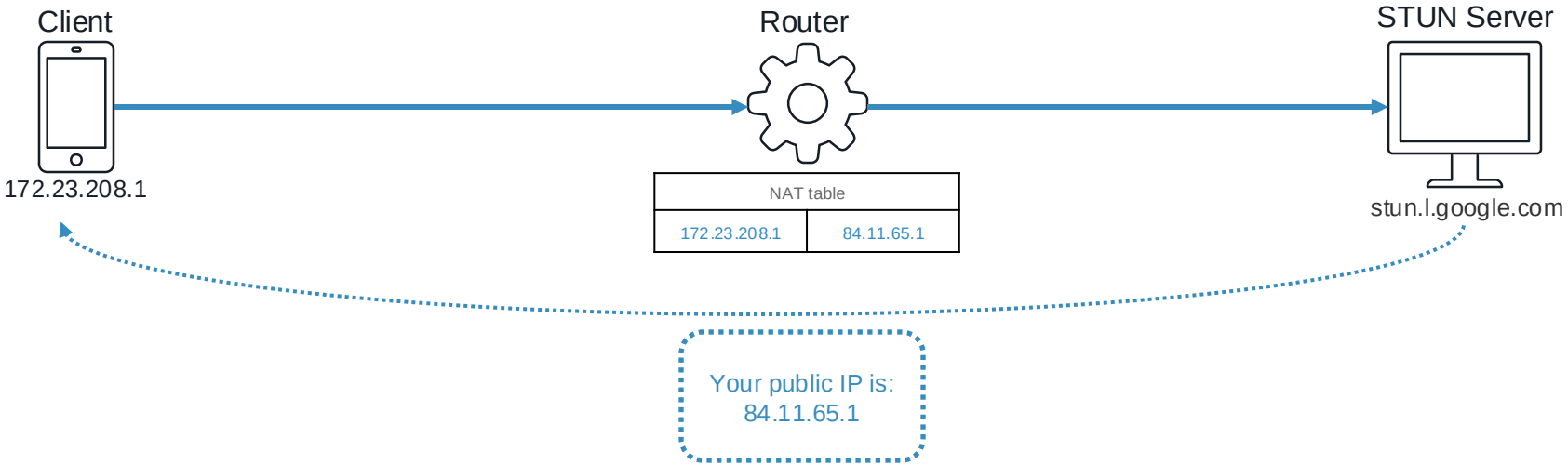

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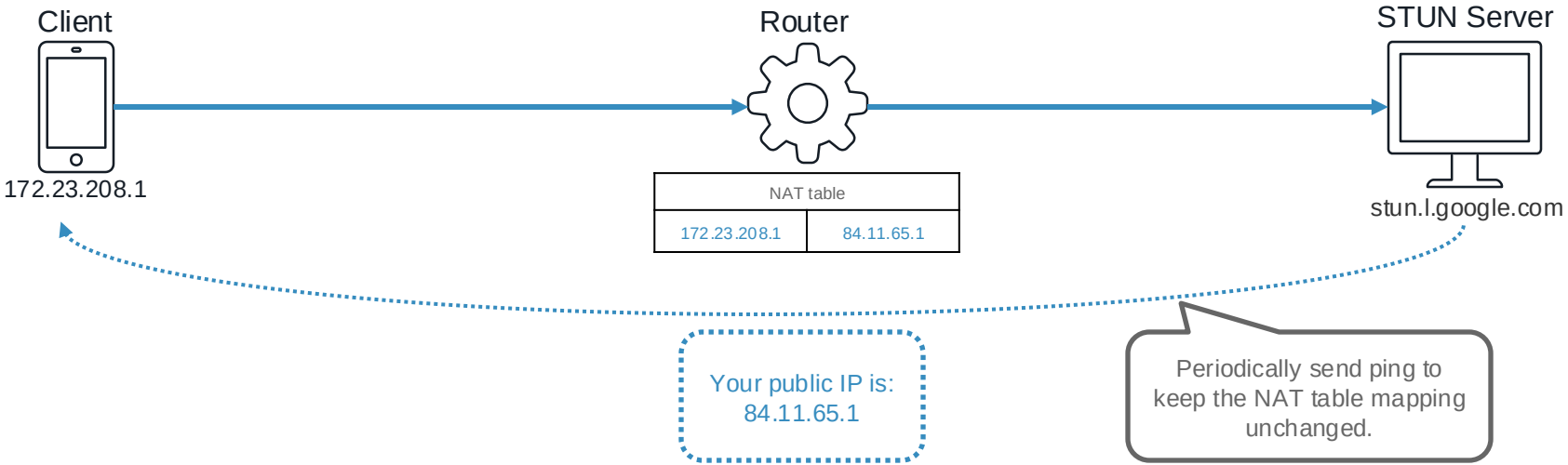

MAKING SERVICE DISCOVERY FEASIBLE

1. Make it configurable
2. Make it open
3. Make if efficient: tracker/bootstrap servers
4. Make it easy to publish: magnet links, QR codes

SUMMARY

REFERENCES

- The past, present and future of local-first: https://www.youtube.com/watch?v=NMq0vncHJvU
- File exchange: https://www.iroh.computer/
- Modular, composable network stacks: https://libp2p.io/
- SQLite CRDT extension: https://vlcn.io/docs/cr-sqlite/intro

THANK YOU