Forget about Speed, Let's focus on Lag

ORB

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Intro / History

CEO & Cofounder of Ookla (2006-2023).
The company was named after my cat.

One of the creators of Speedtest.

Led the acquisition of Ekahau.

On the board of Hamina.

Intro / History

I know enough about enterprise Wi-Fi to get into trouble.

My expertise is in the general connectivity measurement space.

As guilty as anyone for enabling the industry focus on speed.

Why the focus on Speed?

Why the focus on Speed?

Fixed broadband is primarily priced by bandwidth tier.

ISP marketing messaging has long been dominated by speed claims.

"Am I getting what I am paying for?" is a common consumer question.

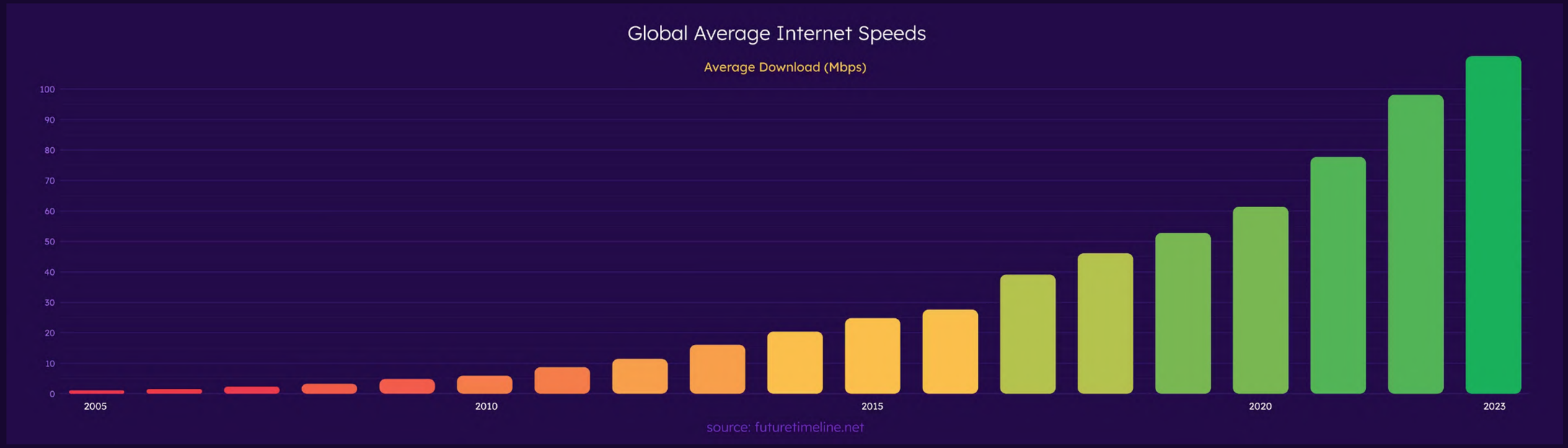
Speed tests answered this and were embraced by the industry.

Layman's version of network optimization is simply achieving max speed.

Times Have Changed

We need to evolve our thinking.

Speeds have increased 100X over the past two decades.



Times Have Changed

Bandwidth often exceeds needed throughput.

Data consumption while trying to measure modern speeds is crazy.

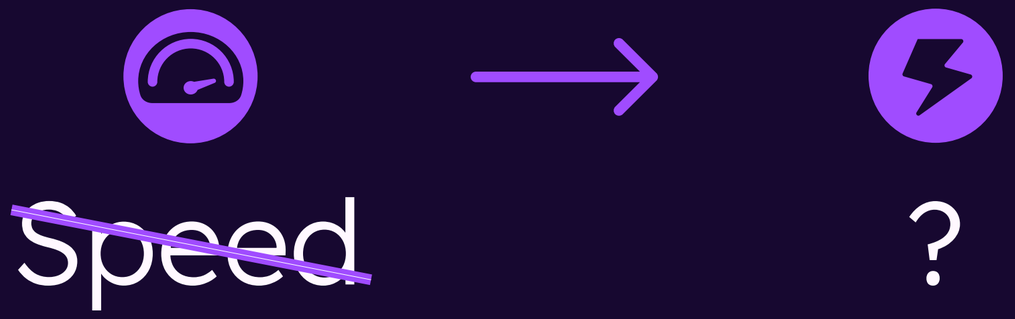
Network design based purely on speed can lead to poor experience.

So what should we focus on instead?

Something that aligns to
real internet experience,
not a top speed benchmark.

A single metric
to counter speed
in the minds of consumers.

Workshop



What are we looking for?

- ✅ Measurable
- ✅ Understandable
- ✅ Lightweight
- ✅ Experience-aligned

Let's talk about Speed

✅ Measurable

Understandable

Lightweight

Experience-aligned

Yep.
Lots of options.

Let's talk about Speed

✅ Measurable

✅ Understandable

Lightweight

Experience-aligned

Well known* by industry and consumers

*Nuance not always understood

Let's talk about Speed

✅ Measurable

✅ Understandable

⛔ Lightweight

Experience-aligned

Not so much.

Varies by approach, but heavy by definition.

Let's talk about Speed

- ✅ Measurable
- ✅ Understandable
- ⛔ Lightweight
- Experience-aligned

Let's find out.

How can we test?

Observe web page load time with varied network conditions

Disclaimers

1. This won't account for every use case.

   Some use cases have vastly different needs than web browsing.

2. LCP includes render time.

3. We're doing this live. 🤷

Setup

Let's talk about Speed

- ✅ Measurable
- ✅ Understandable
- ⛔ Lightweight
- ⛔ Experience-aligned

Not great in 2025
Let's try something else

Let's talk about Latency

✅ Measurable

Understandable

Lightweight

Experience-aligned

Yep.
Lots of options.

Let's talk about Latency

- ✅ Measurable
- ✅ Understandable
- Lightweight
- Experience-aligned

Understood by industry and nerds

Let's talk about Latency

- ✅ Measurable
- ✅ Understandable
- ✅ Lightweight
- Experience-aligned

Yep.
Packet level

Let's talk about Latency

- ✅ Measurable
- ✅ Understandable
- ✅ Lightweight
- ⚠️ Experience-aligned

Right direction,
but flawed.
Let's try something else

How about Latency & Loss?

We can measure both.
Let users figure out the correlation?

How about Latency & Loss?

It's harder than it seems.
Let's try it.

We can do better...

We need a single measure of responsiveness.

We can do better...

There's another word people use
when a network is not responsive

"Lag"

We can do better...

Lag is kinda like latency.

Packet loss causes lag.

(Very) high jitter causes lag.

Not enough bandwidth causes lag.

We can do better...

We should optimize for Lag.

To optimize for it, we need to measure it.

To measure it, we need to define it.

Here's what we've done in Orb...

We can do better...

Lag is a time measurement
from action to response

We can do better...

With what protocol?

Measuring Lag

Vanilla protocol stuff

1. Retransmit lost packets
2. Track high water mark
3. Measure Action-to-Response

We can do Lag...

Lag is a single responsiveness metric.

We can do Lag...

Lag quantifies the impacts of
latency, jitter, and loss.

We can do Lag...

When measured continuously,
Lag indicates responsiveness under
working conditions.

We can do Lag...

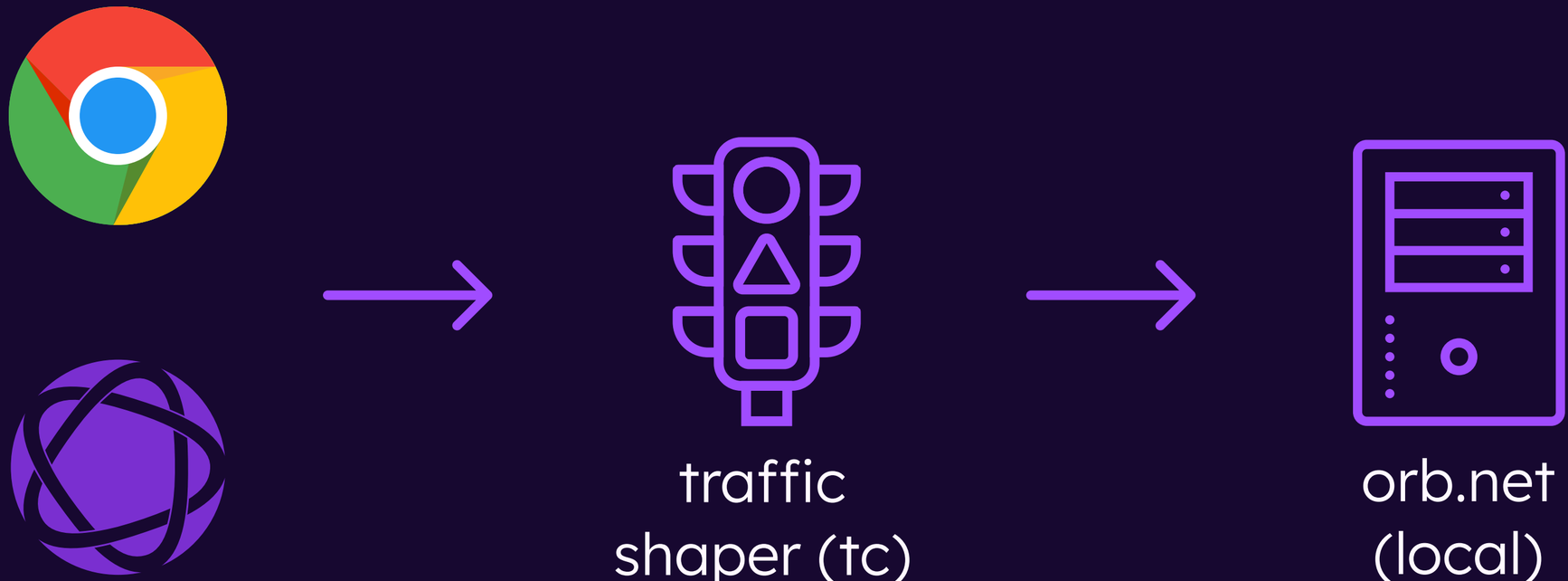
"Lag" is familiar.

We can do Lag...

Well received
by industry and **Orb** users

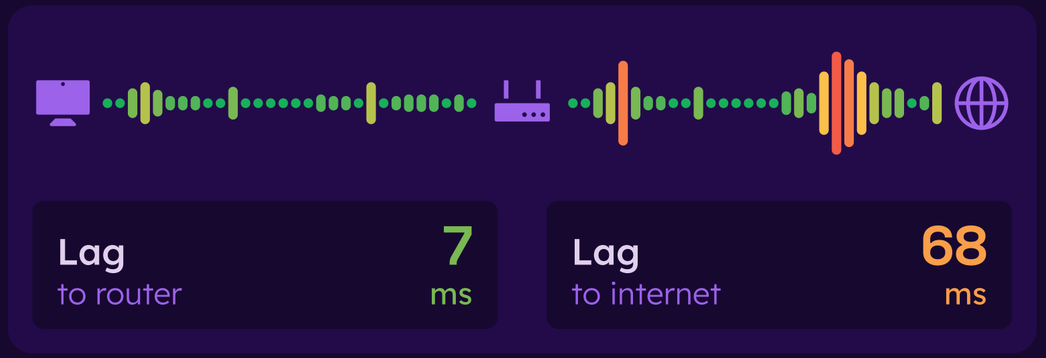
Let's check it out.

Setup



~~Speed~~

Lag



Closing

Speed tests are designed to isolate speed...

Overriding the impacts of latency, loss, and jitter.

Speed testing is too heavy to measure real working conditions.

Measuring lag is so lightweight that it can be done continuously.

Perfectly pairs with surveys to directly tie experience with network data.

Continuous measurement also enables the true assessment of reliability.

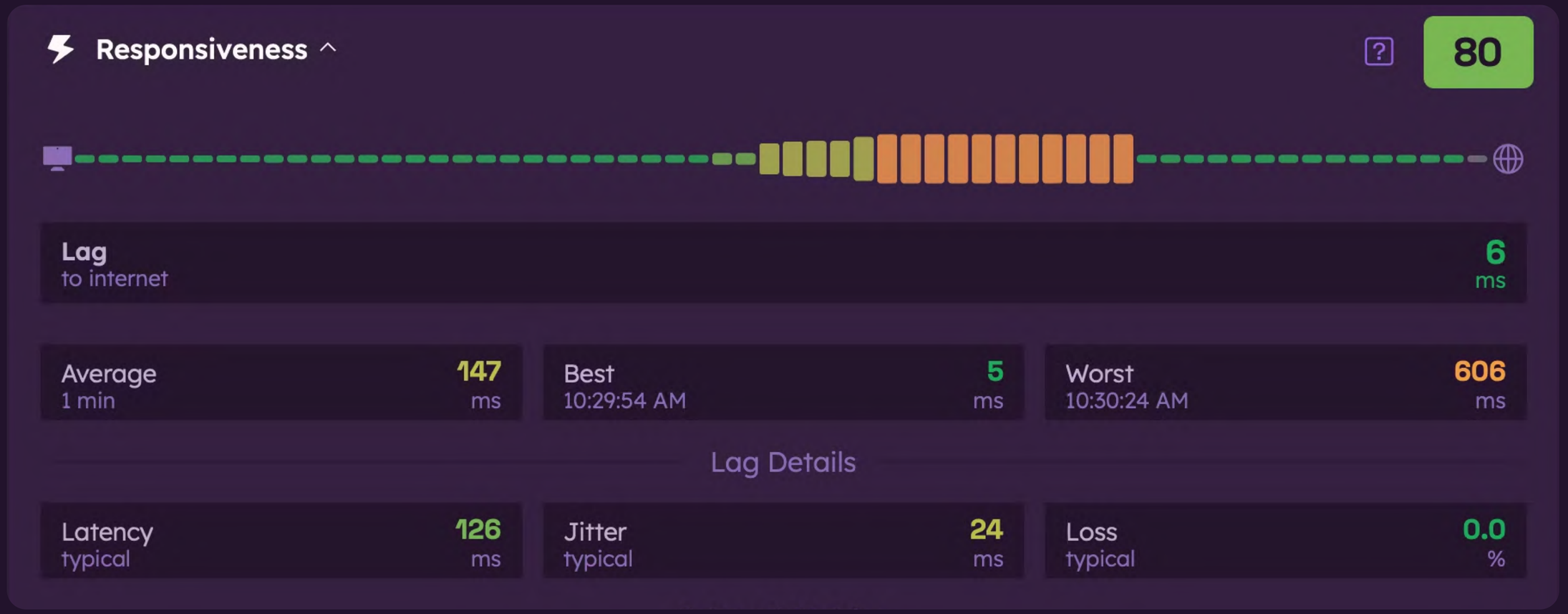
See you tonight?!

6:15 PM in Sun II

Lag Examples

With "page load" in the middle

2Mbps	0ms	0%
Bandwidth	Delay	Loss



Lag examples

1000Mbps Bandwidth

20ms Delay

3% Loss