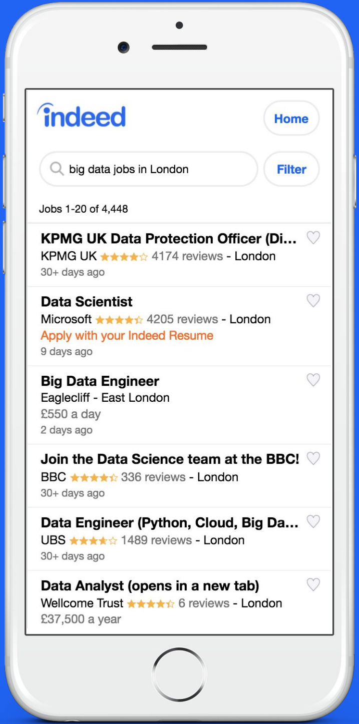
indeed

Quantifying Empathy Through Service Level Objectives

Ketan Gangatirkar

Vice President of Engineering – Job Seeker | ketan@indeed.com

I help people get jobs.



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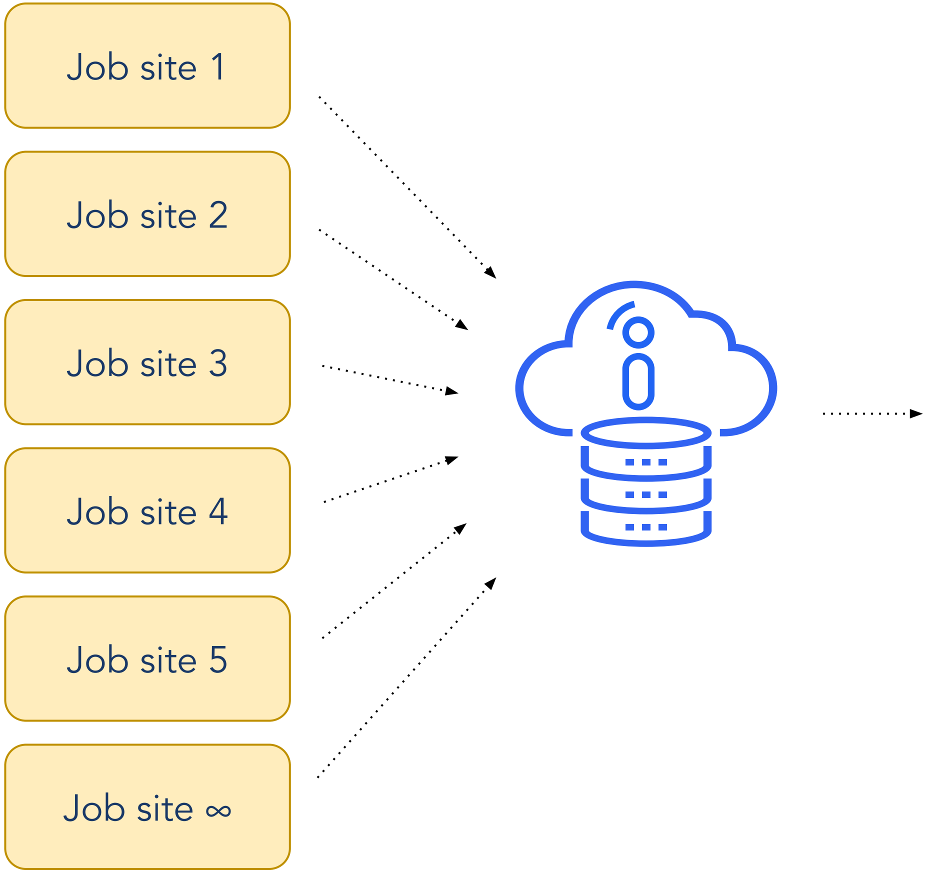
£37,500 a year

One search. All jobs.



Job site 1

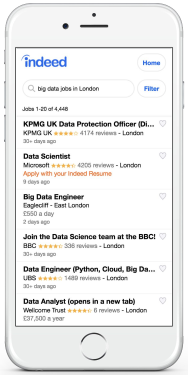
Job site 2

Job site 3

Job site 4

Job site 5

Job site ∞



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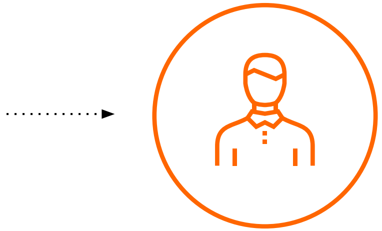

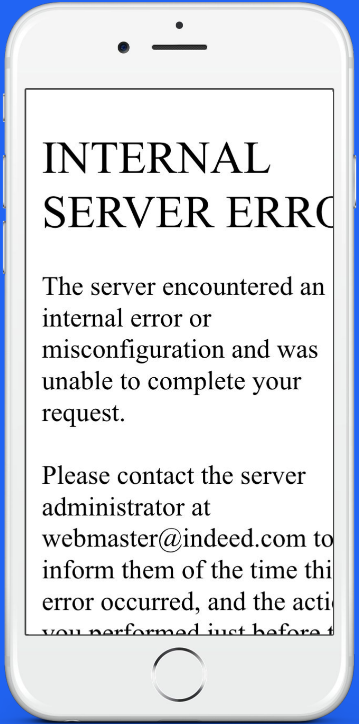

INTERNAL SERVER ERRO

The server encountered an internal error or misconfiguration and was unable to complete your request.

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No searches. No jobs.

This is why we need SLOs

SLO violation

Job Search was unavailable to users in Vietnam for 13 minutes

99.98% availability (last 90 days)
99.99% SLO

Daddy, where do SLOs come from?

The SREs define SLOs!

I don't think Daddy knows the answer.

Why shouldn't SREs define the SLOs?

Your product exists to serve users

Service Level Indicator

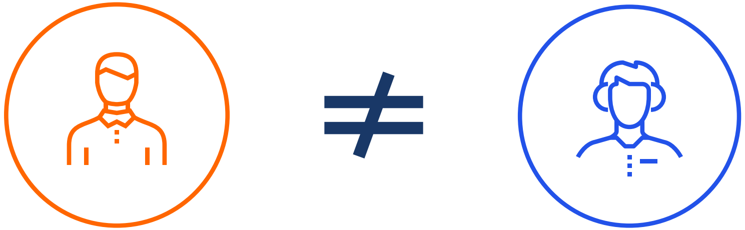
A quantifiable measure of the quality of a service

Service Level Objective

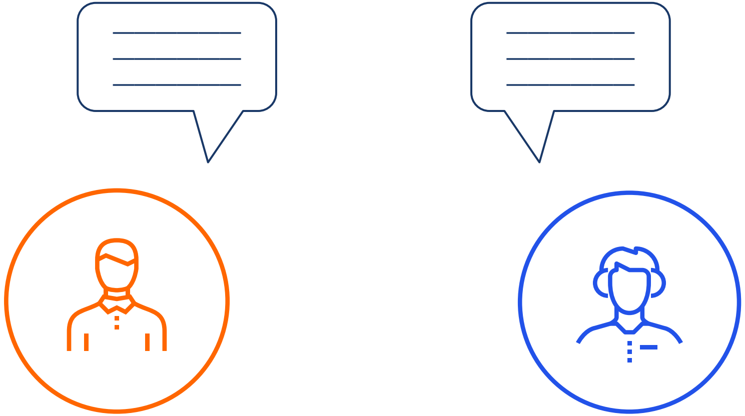
A target for a Service Level Indicator

SLOs determine user experience

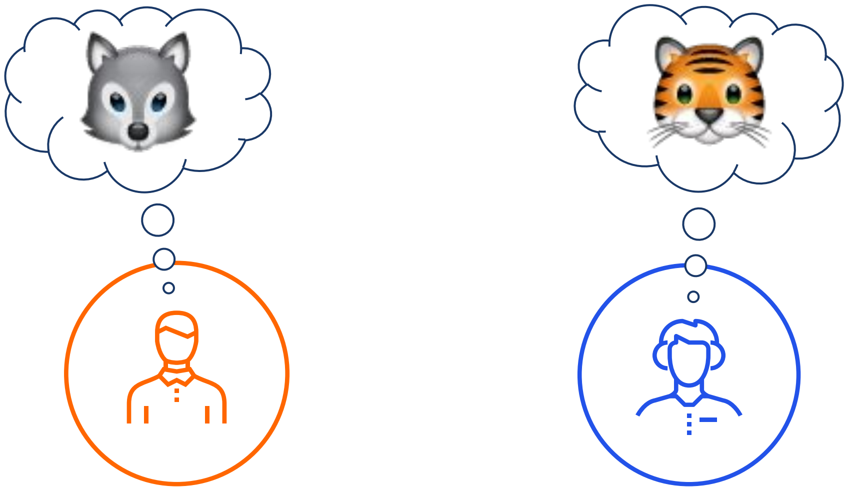
SREs determine user experience?



Your SREs aren't your users



Your SREs don't talk to your users



Your SREs don't understand your users

SLOs are

- Consistent
- Objective
- Measurable
- Explicit
- ~~Empathetic~~

SLO violation

Job Search was unavailable to users in Vietnam for 13 minutes

99.98% availability (last 90 days)
99.99% SLO

Is this an empathy?

Put empathy in your SLOs

SLOs without empathy are bad SLOs

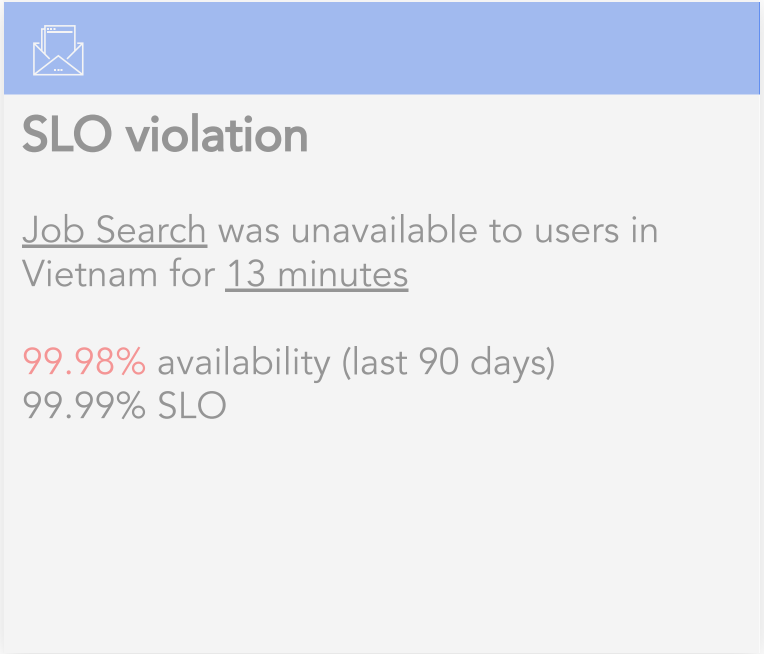
SLOs = numbers

Feelings ≠ numbers

Turn feelings into numbers

Quantify your empathy

Adding quantified empathy to SLOs



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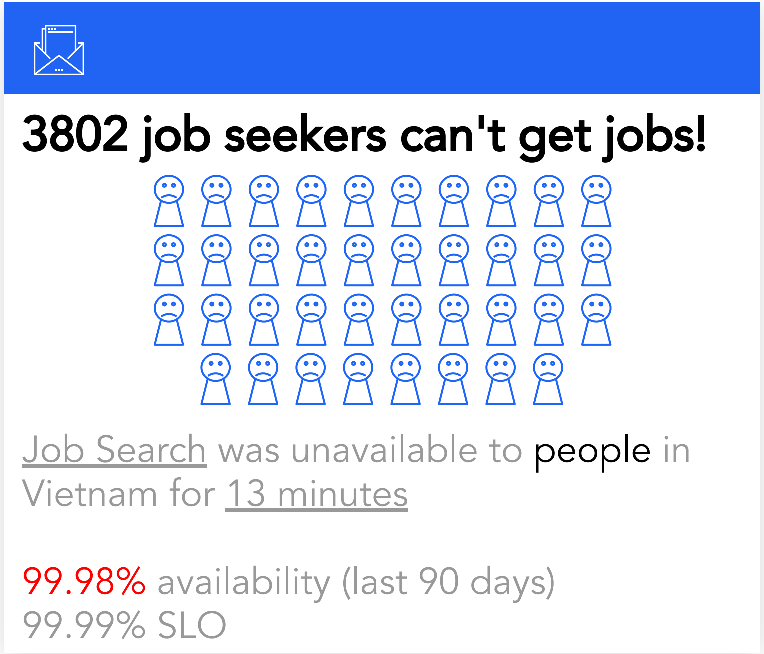
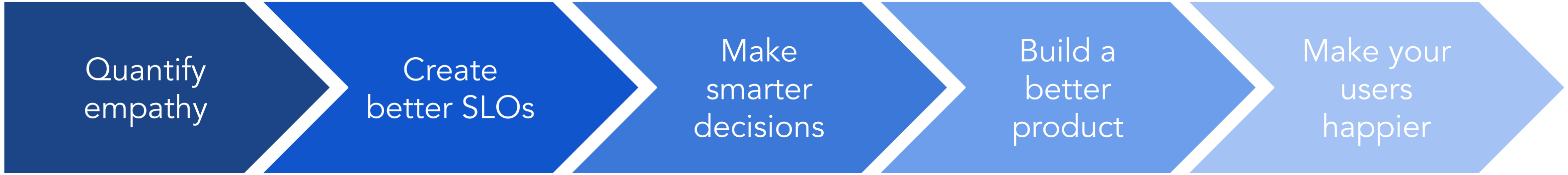


3802 job seekers can't get jobs!

Job Search was unavailable to people in Vietnam for 13 minutes

99.98% availability (last 90 days)
99.99% SLO



Quantify empathy

Create better SLOs

Make smarter decisions

Build a better product

Make your users happier

SLOs make people better

People sleep

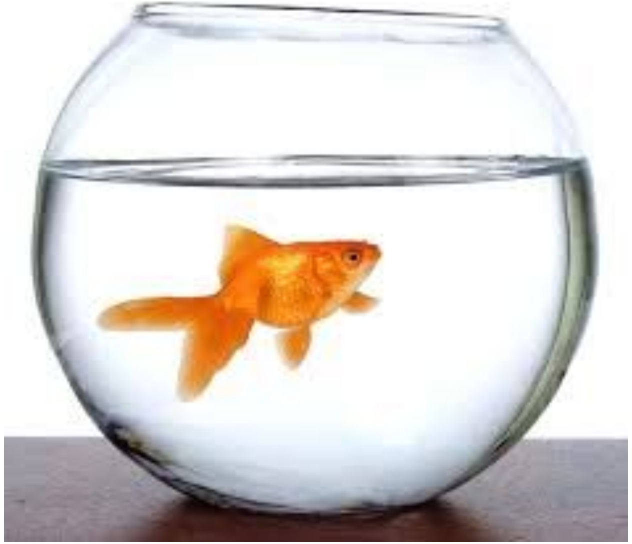
SLOs are 24x7

People go on holiday

SLOs are always working

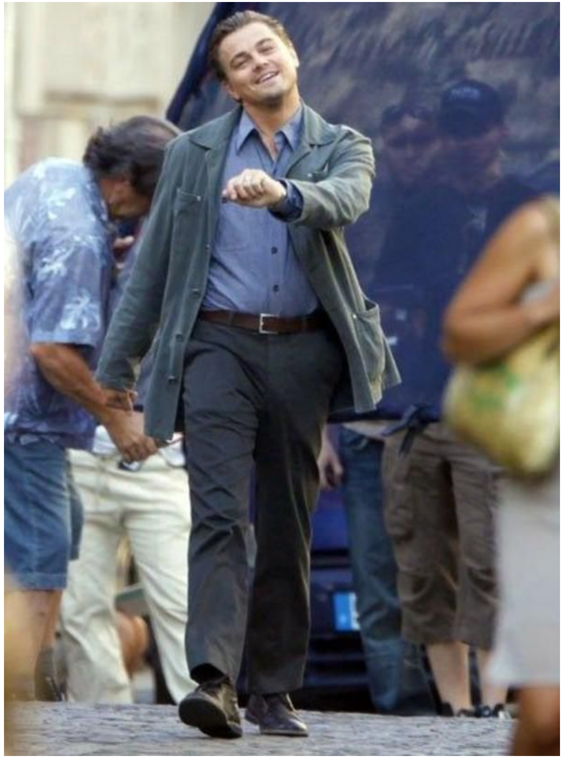
Empathy is individual

SLOs are collective



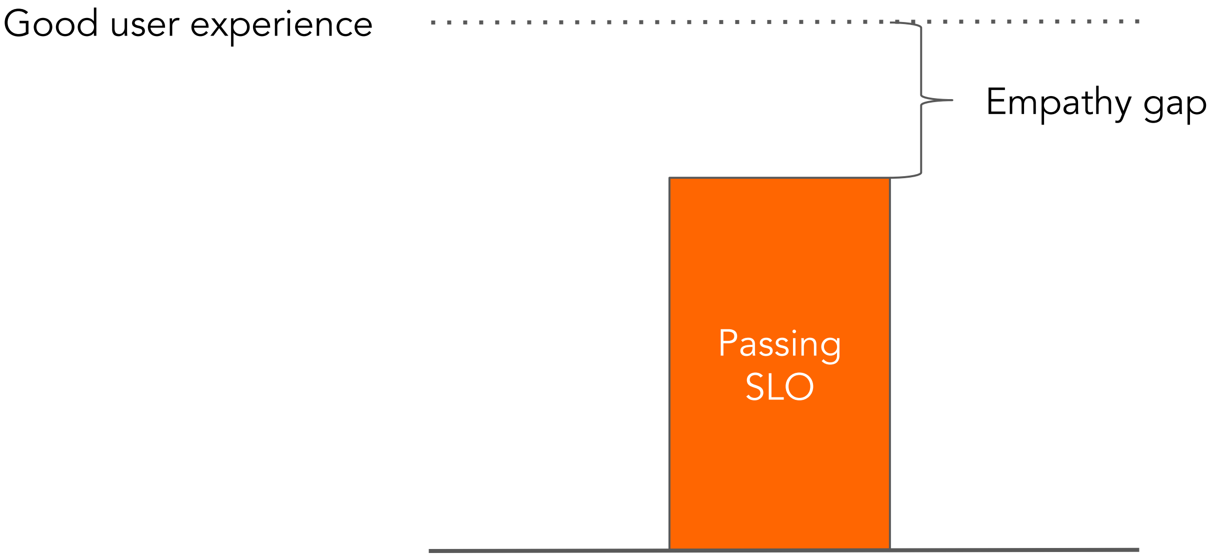
People need food, have moods

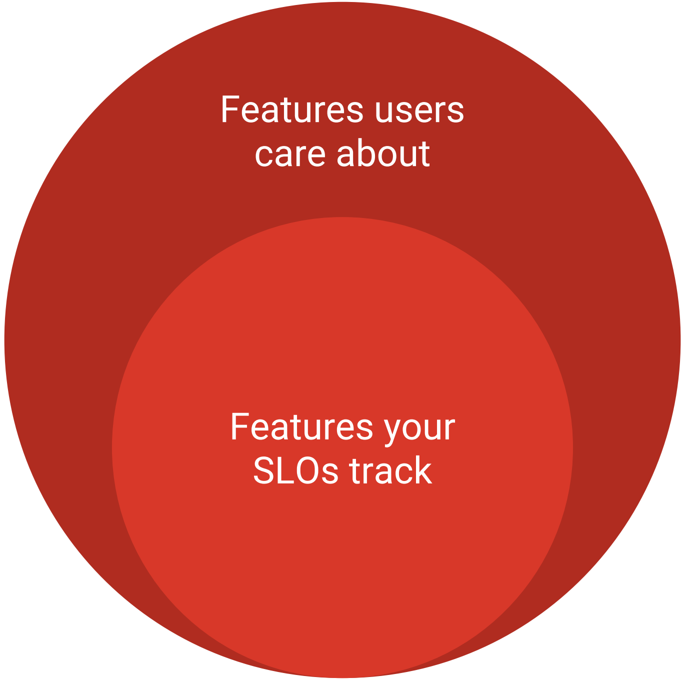
SLOs don't get hangry



Lack of empathy leads to subpar experience

Your users could be more demanding than your SLO



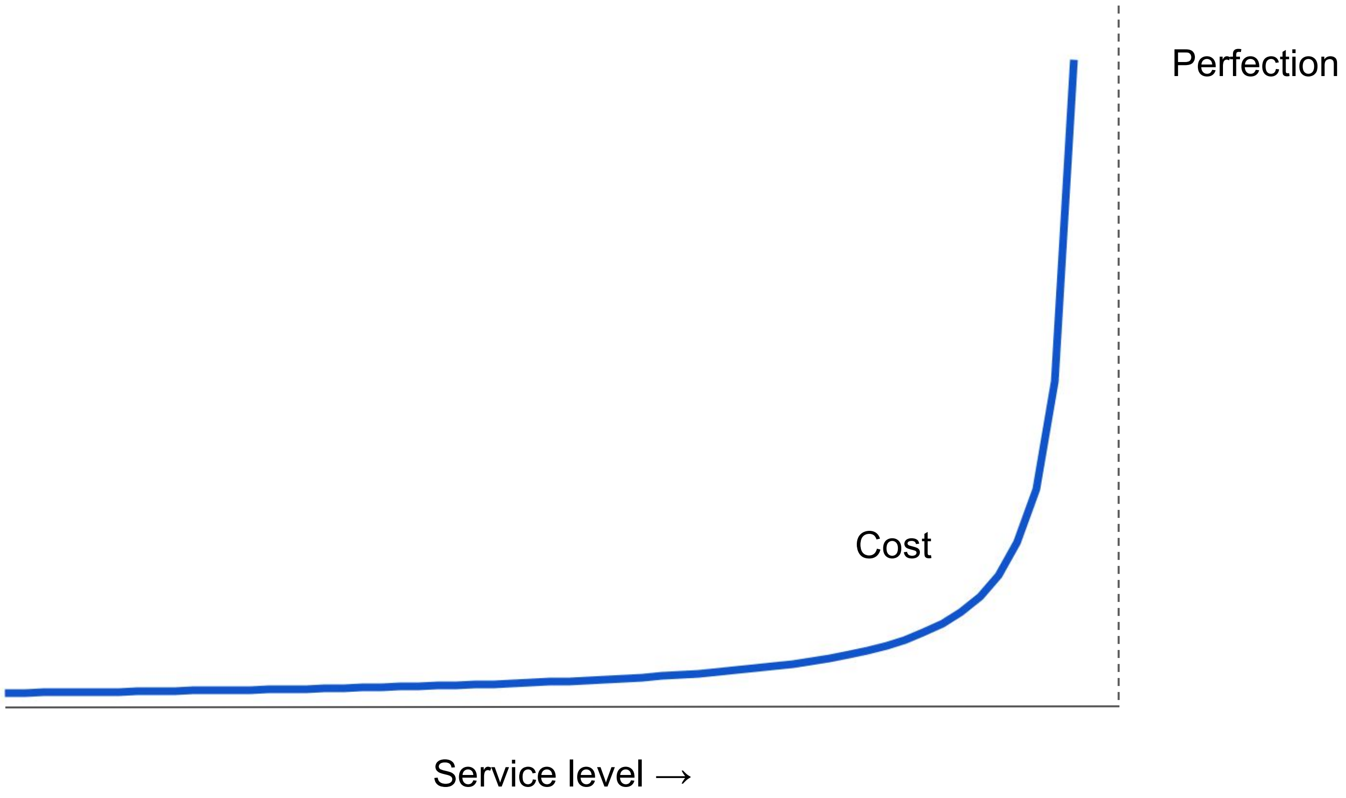


Your users may notice problems your SLO doesn't cover

Lack of empathy leads to wasted effort

harder
better
faster
stronger

Higher service level → Always better?


Perfection
Cost
Service level →

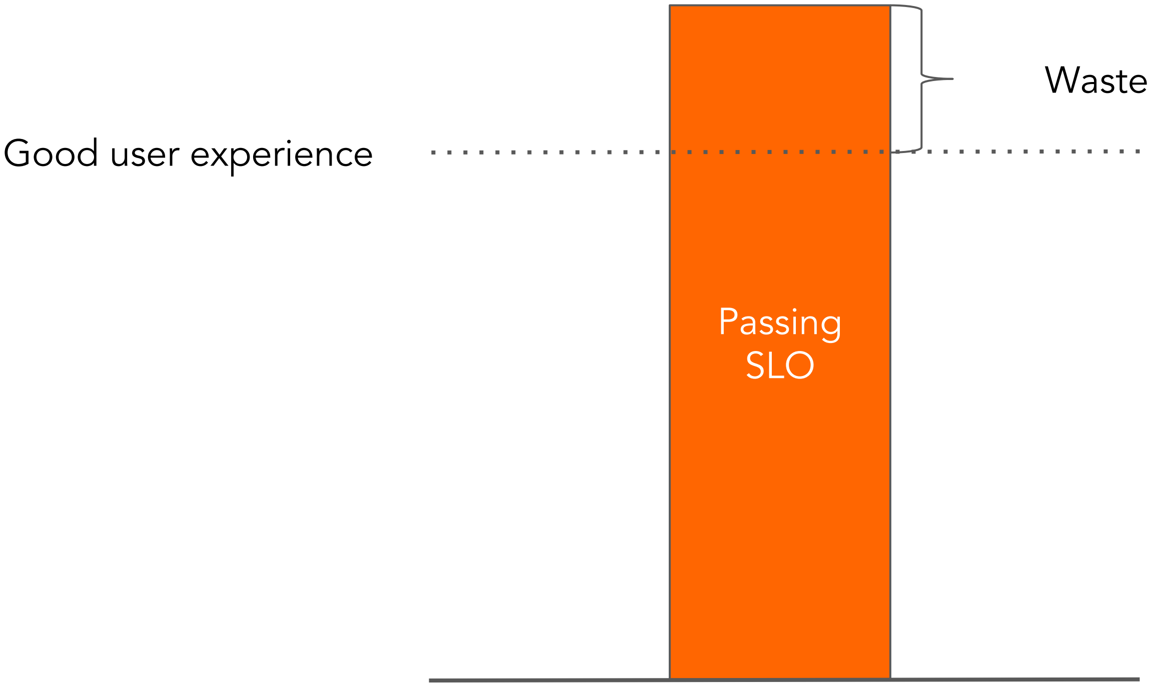
Maybe too much of a good thing?

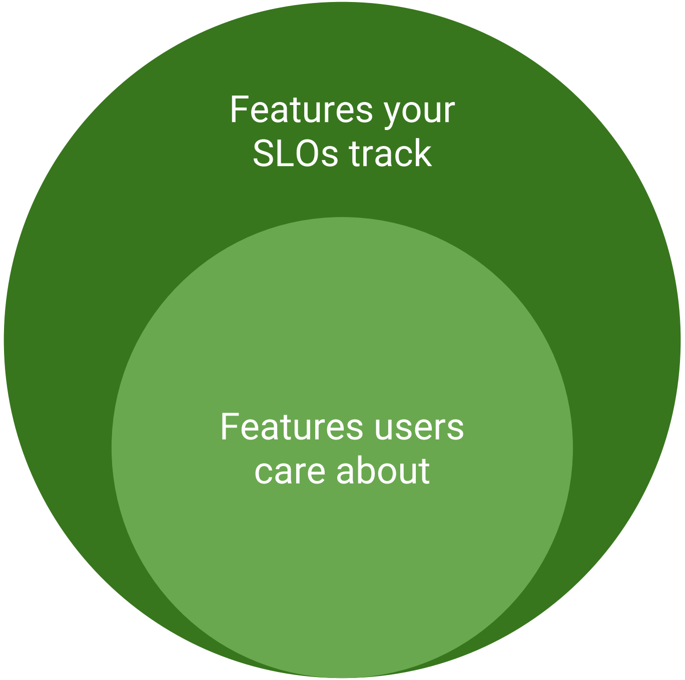
Higher service levels cost time

Higher service levels cost money

Higher service levels cost **opportunity**

Your users could be less demanding than your SLO





Your SLO may cover things your users don't care about

Pointless alerts
SRE

How good is just right?

User research and product management problems

Solved by technology teams

SRE makes product decisions

Code for accuracy or freshness?

Speed or availability?

Add new PoP or implement auto-scaling?

THE 5 WHY WHY WHY WHY WHYs

Add new PoP	vs.	Implement auto-scaling
↓		↓
Fewer network hops	WHY?$_1$ vs.	Adds capacity when needed
↓		↓
Faster page load	WHY?$_2$ vs.	More throughput
↓		↓
Lower bounce rate	WHY?$_3$ vs.	Fresher data
↓		↓
Increased engagement	WHY?$_4$ vs.	Greater utility
↓		↓
Higher revenue	WHY?$_5$ vs.	Higher retention

People will disagree

Faster pages!

Less downtime!

Increase throughput!

Reduce errors!

Marketing

CEO

SWE

SRE

People will disagree… a lot

400 ms!

Marketing

300 ms!

CEO

250 ms!

SWE

265 ms!

SRE

How do you make sure your team does it right?

One person makes all the decisions

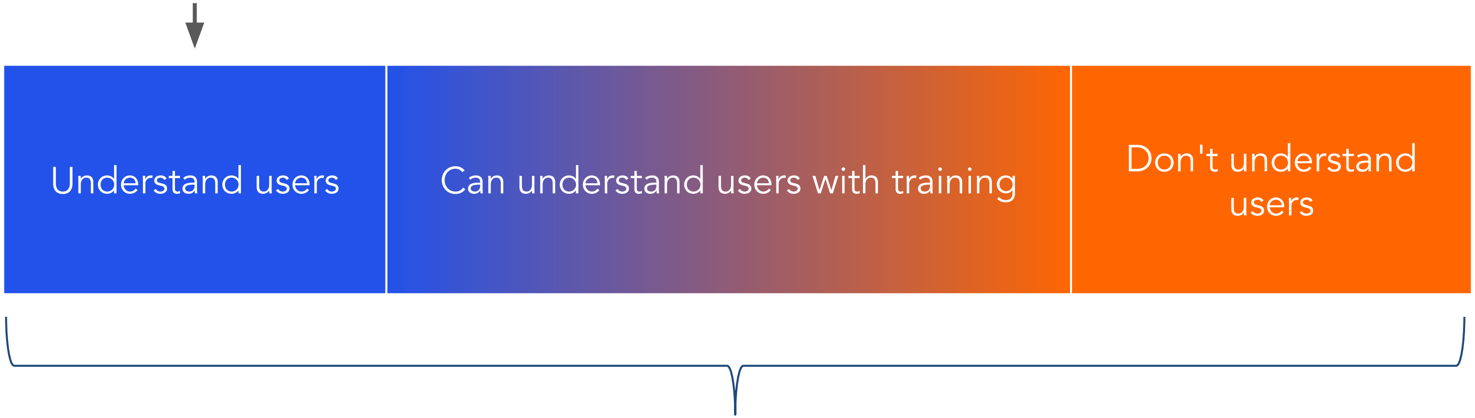
The God Object anti-pattern

It's hard for SRE to make product decisions

Expanding your hiring pool

Employee personalities vary

Can you limit your candidate pool to these people?



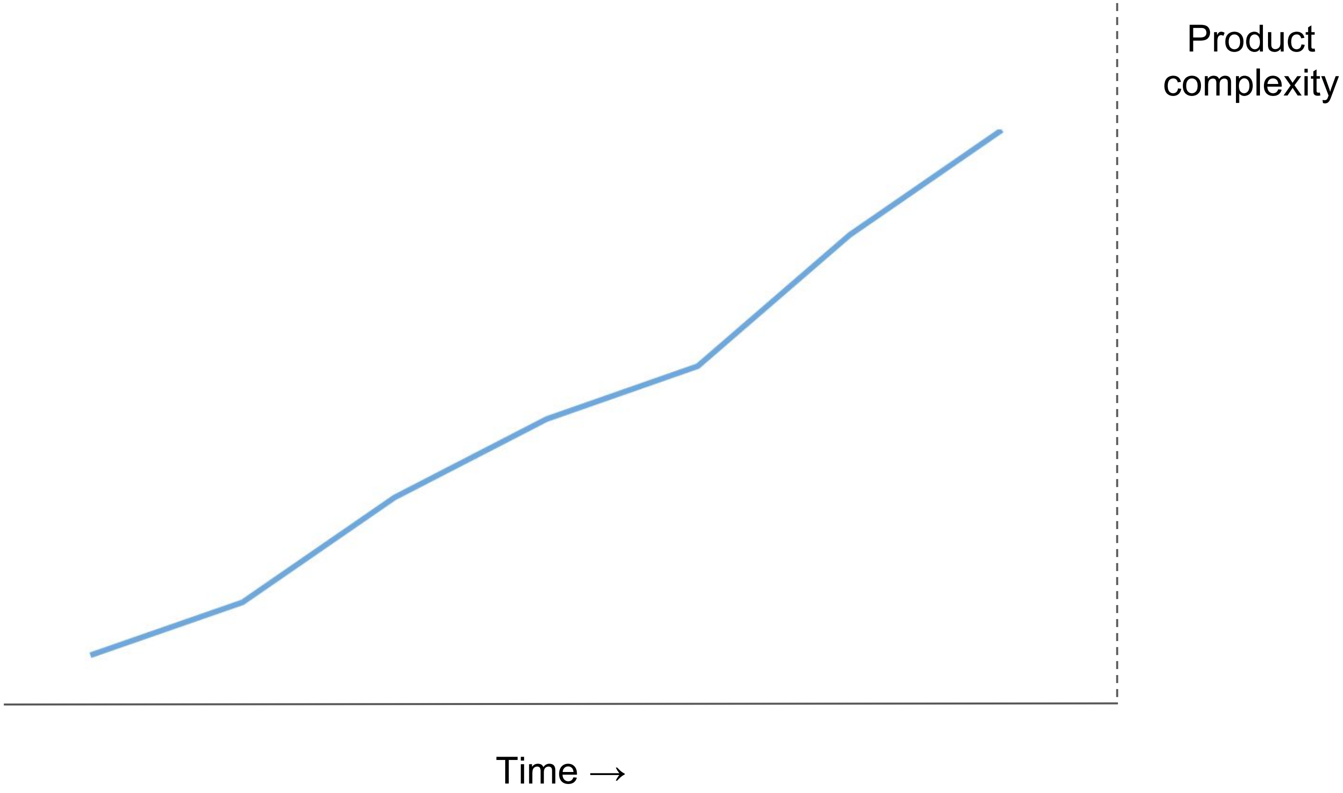
Understand users

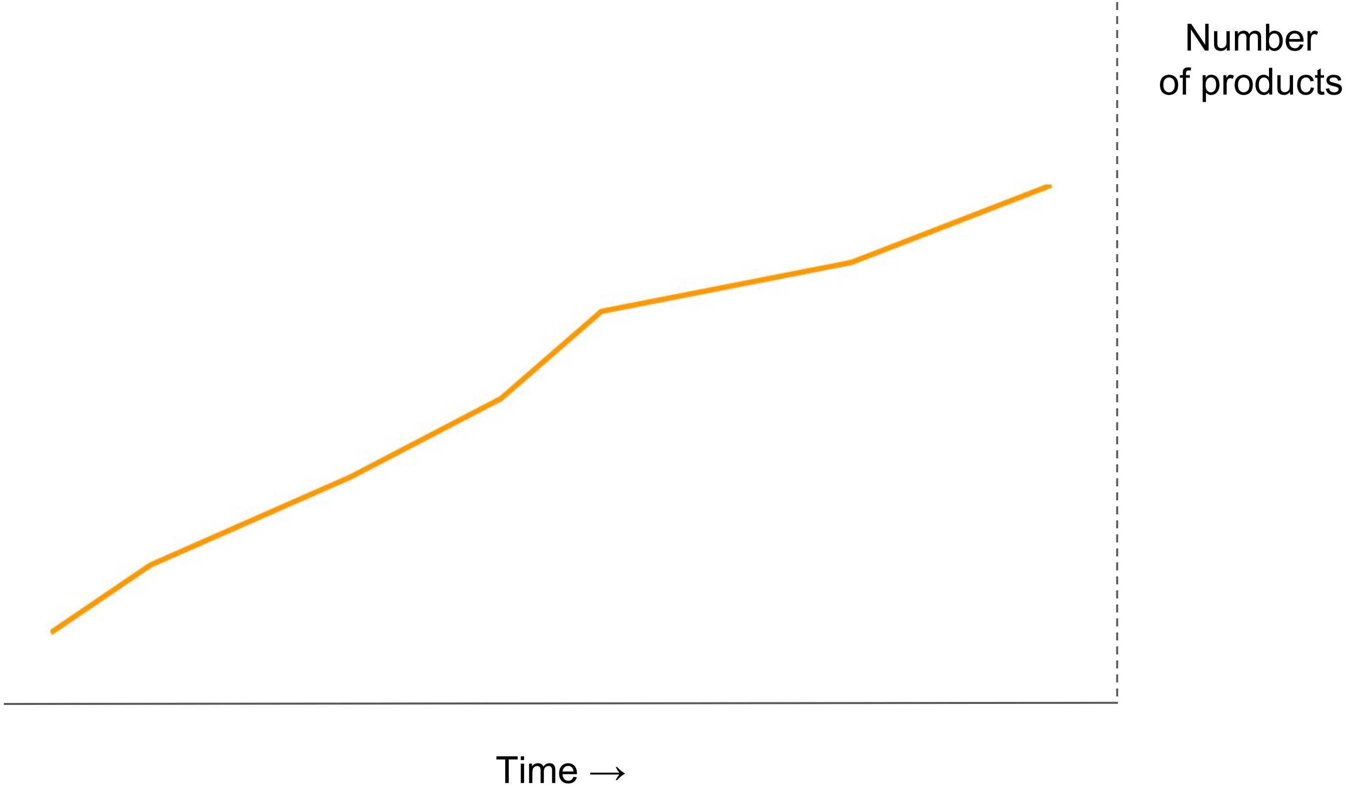
Can understand users with training

Don't understand users

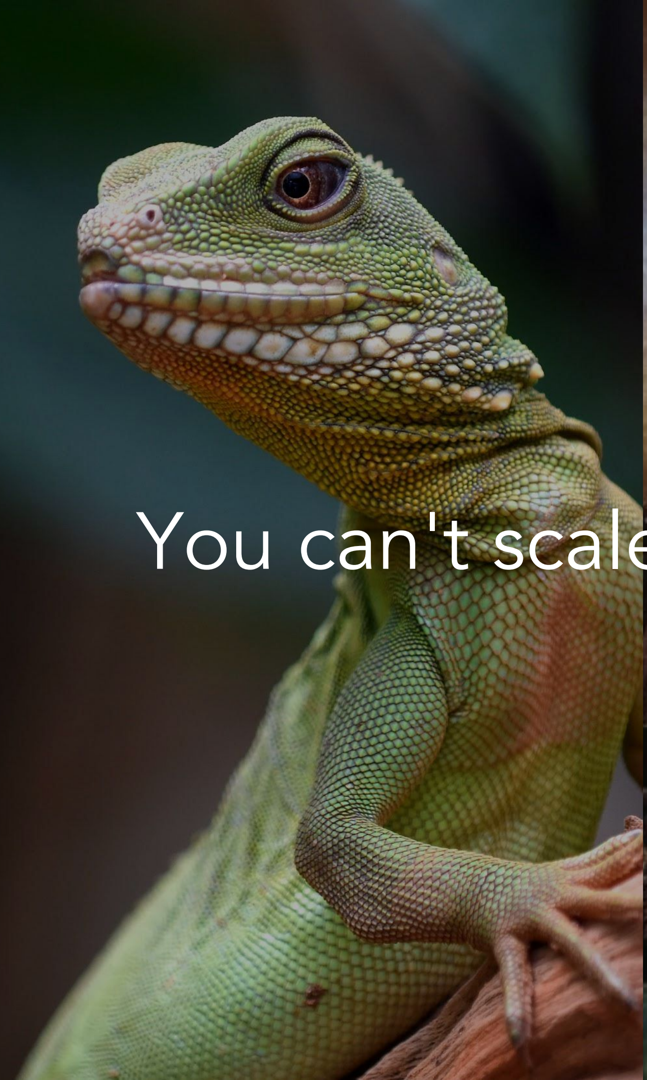
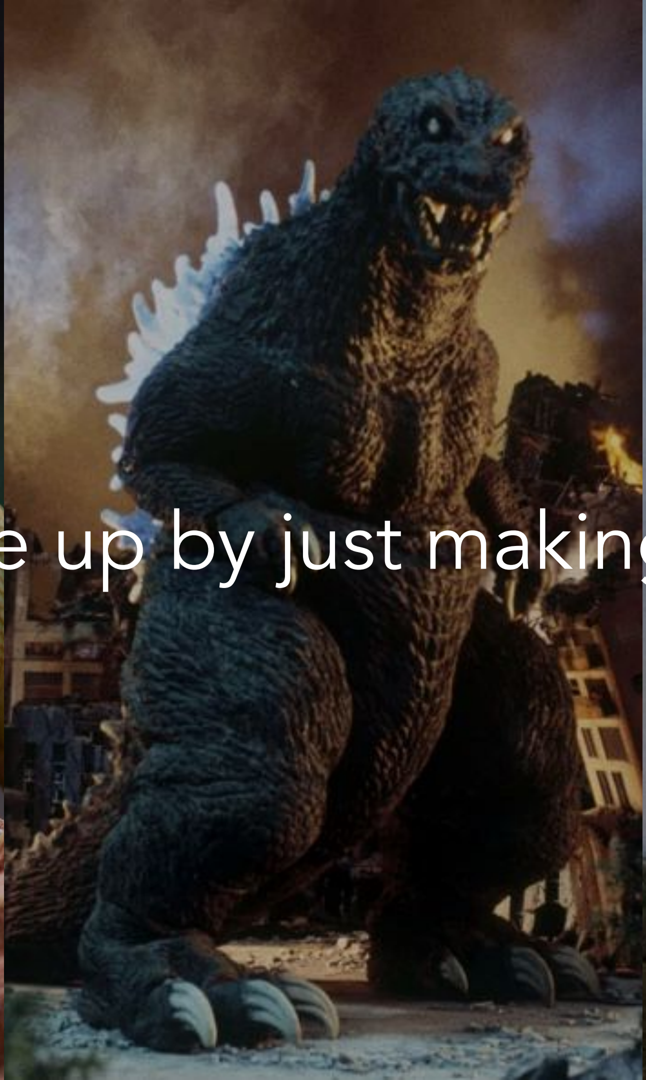
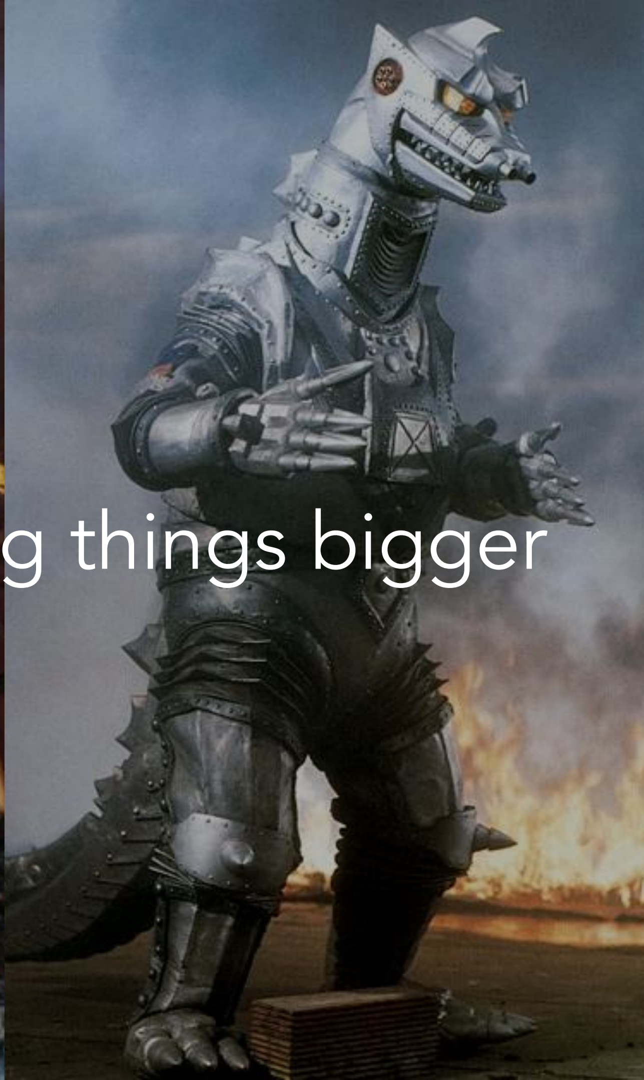
All of these can be valuable employees

Individuals don't scale


Product complexity
Time →


Number
of products
Time →

Even the best people have limits

You can't scale up by just making things bigger

How do you overcome these obstacles?

Quantify empathy

1) Get to know your users

2) Understand what your product does for them

3) Apply the 6 flavors of user happiness

4) Find the user pain in your data

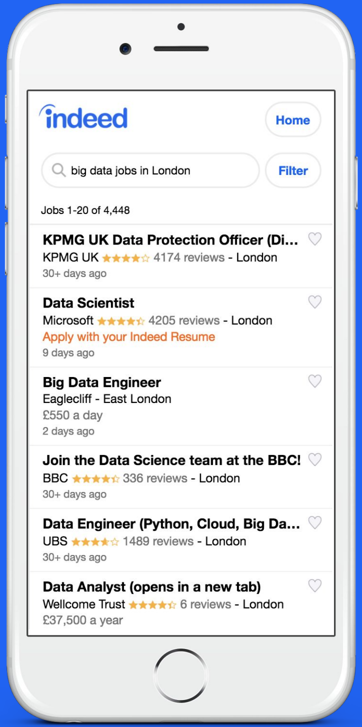
5) Set the SLOs below the pain threshold

This is everyone's job

Empathy applies to all products

Case study

Indeed



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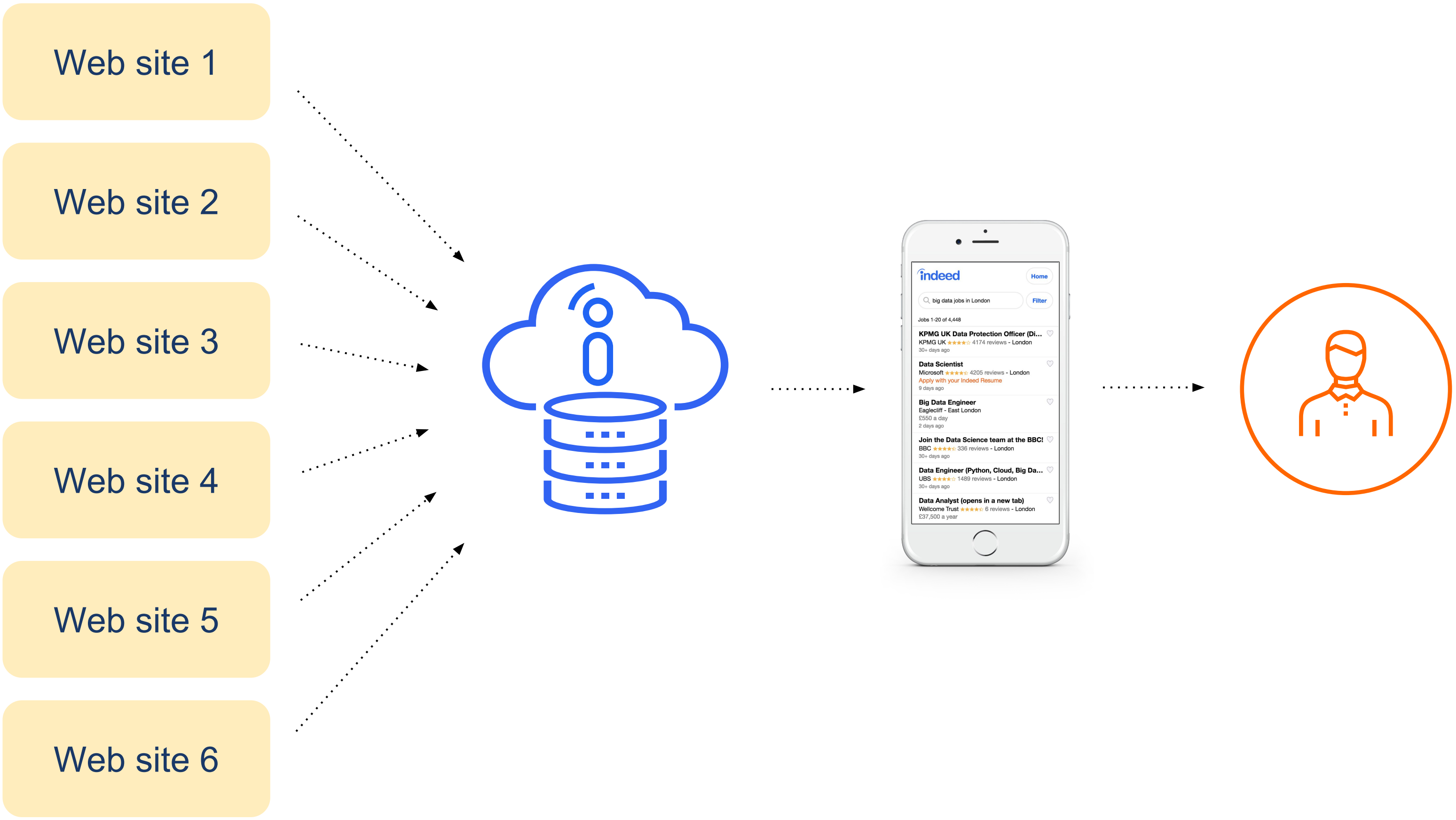

Web site 1

Web site 2

Web site 3

Web site 4

Web site 5

Web site 6

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Job seekers care about

- Fast page loads
- Getting all jobs
- Get the jobs quickly enough
- Seeing more jobs, even at risk of irrelevance

Job seekers care less about

- Perfect accuracy
- All the features
- Avoiding all irrelevant jobs

Case study

Capturing the flag

QUAKE
ARENA

8
Red Team 0
Blue Team 0
Tomarix
DIm3 Red Base Low 118 30
sevenup Red Entrance Low 124 0
MiikaH Red Entrance 115 0
viRus ZoomZo Red Entrance 137 50
129fps
18:02
99
15
viRus ZoomZoom
84
15
0

Flag capturers care about

- Lag (absence of)

Flag capturers care less about

- Availability

Case study

Customer service

#FML

Who is this guy?

#FML^2

Please hold while I find your reservation.............

tenfold

CUSTOMER

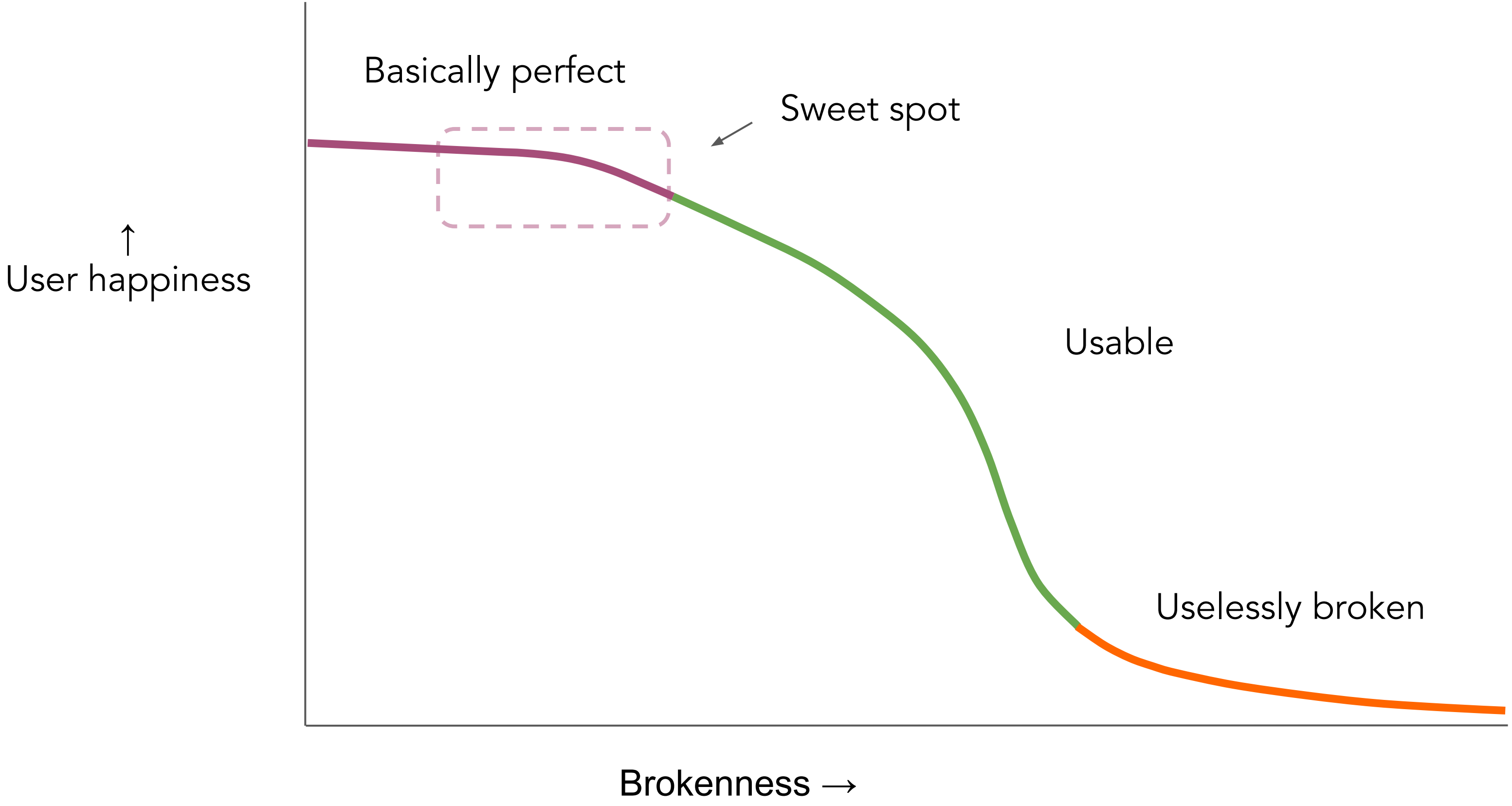
CSRs care about

- Fast enough page loads
- Availability
- Data freshness
- Accuracy

CSRs care less about

- Fastest possible page loads
- Lots of features

Empathy is an S-curve


Basically perfect
Sweet spot
↑
User happiness
Usable
Uselessly broken
Brokenness →

6 flavors of user happiness

1) Availability

2) Responsiveness

3) Freshness

4) Completeness

5) Accuracy and precision

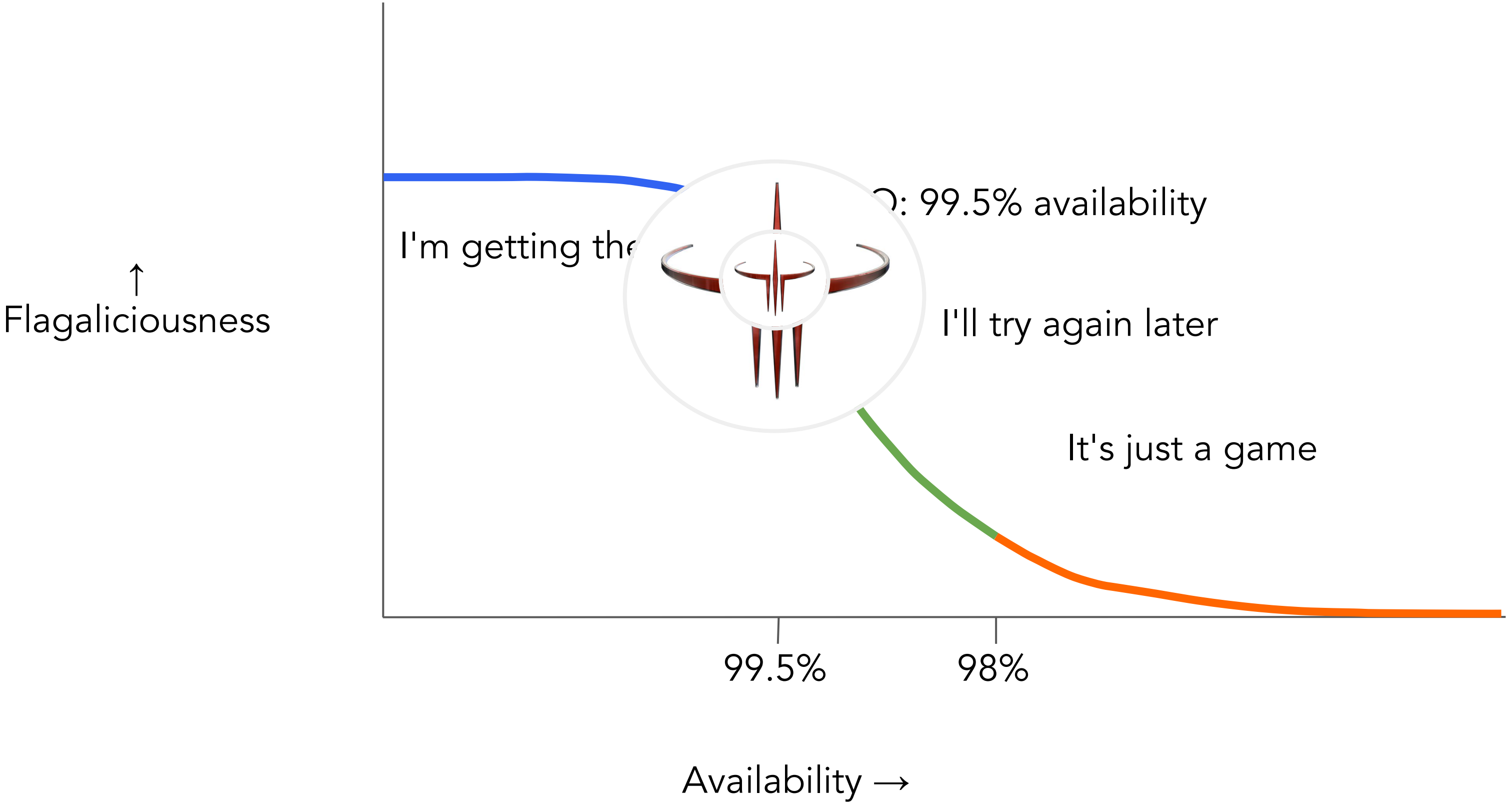
6) Breadth of functionality

#ARFCAapBof

1. Availability

Can your product perform its most basic functions?

- Finding jobs
- Capturing the flag
- Displaying customer records

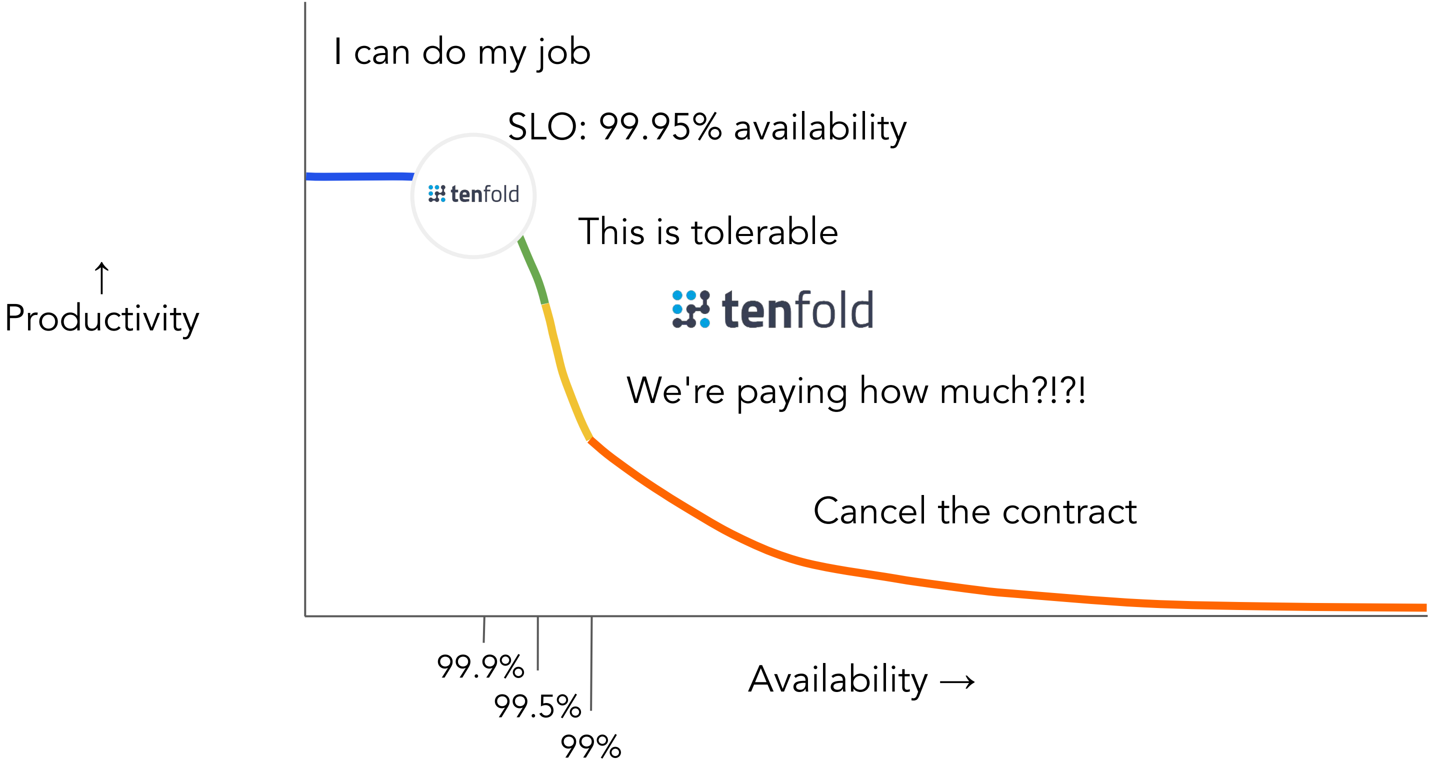


I'm getting the

O: 99.5% availability

I'll try again later

It's just a game



I can do my job

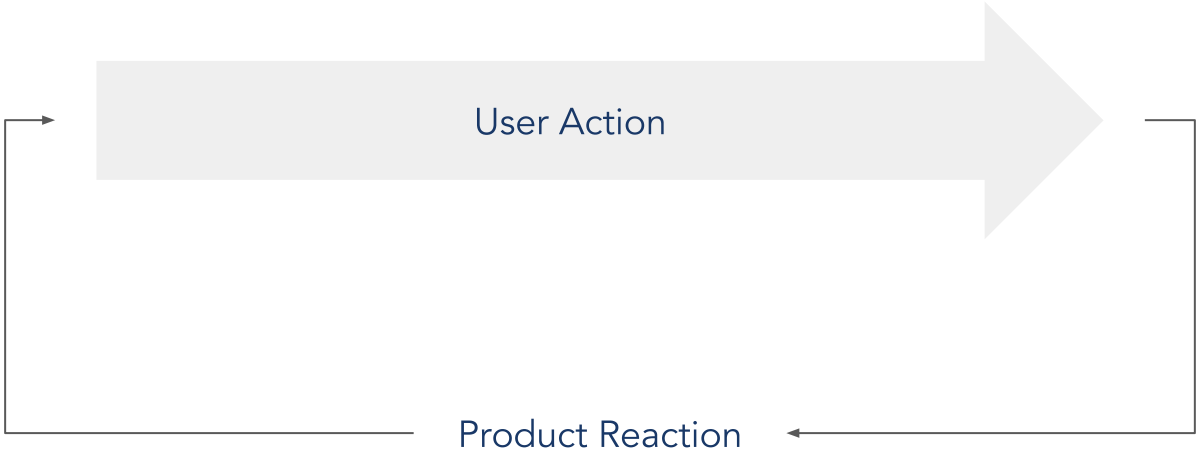
SLO: 99.95% availability

This is tolerable

We're paying how much?!?!

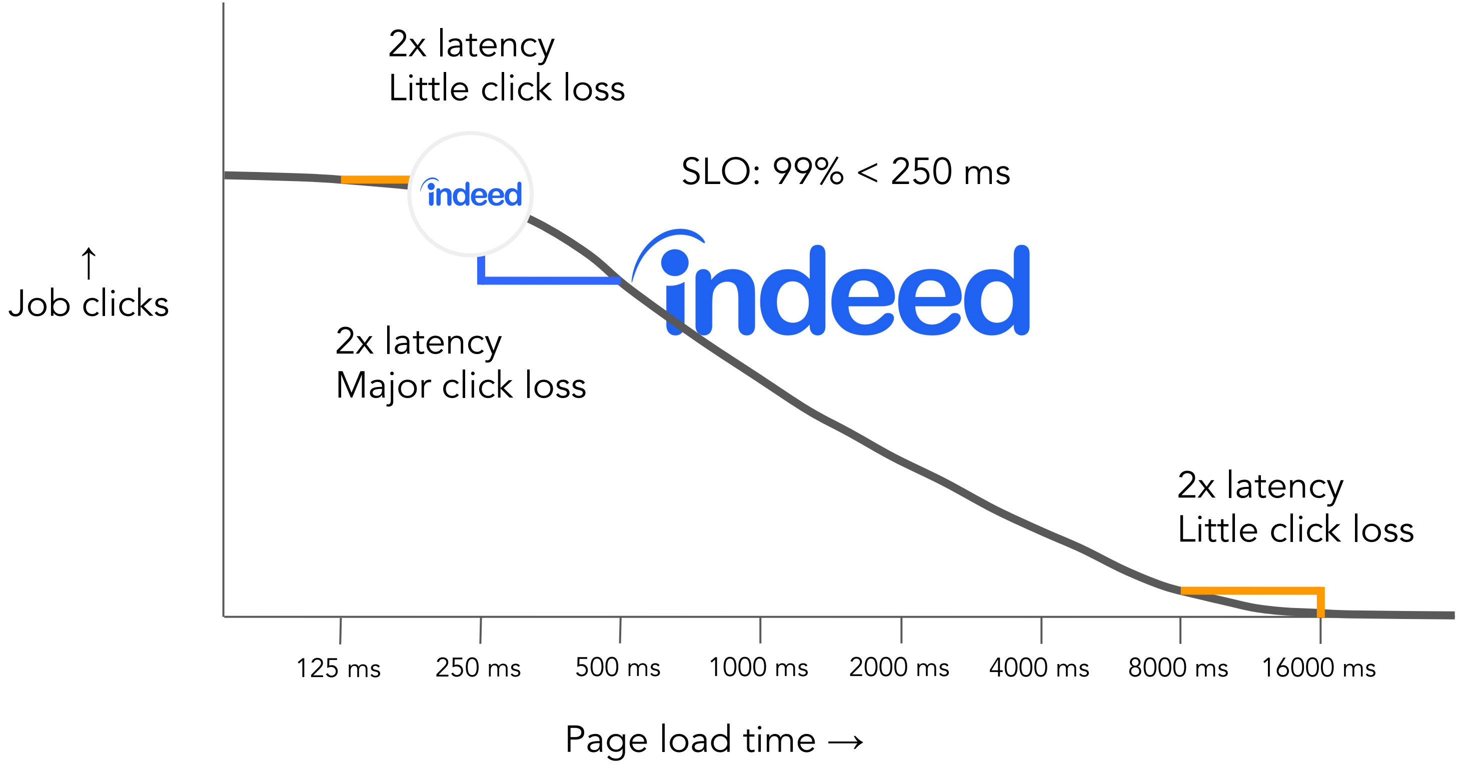
Cancel the contract

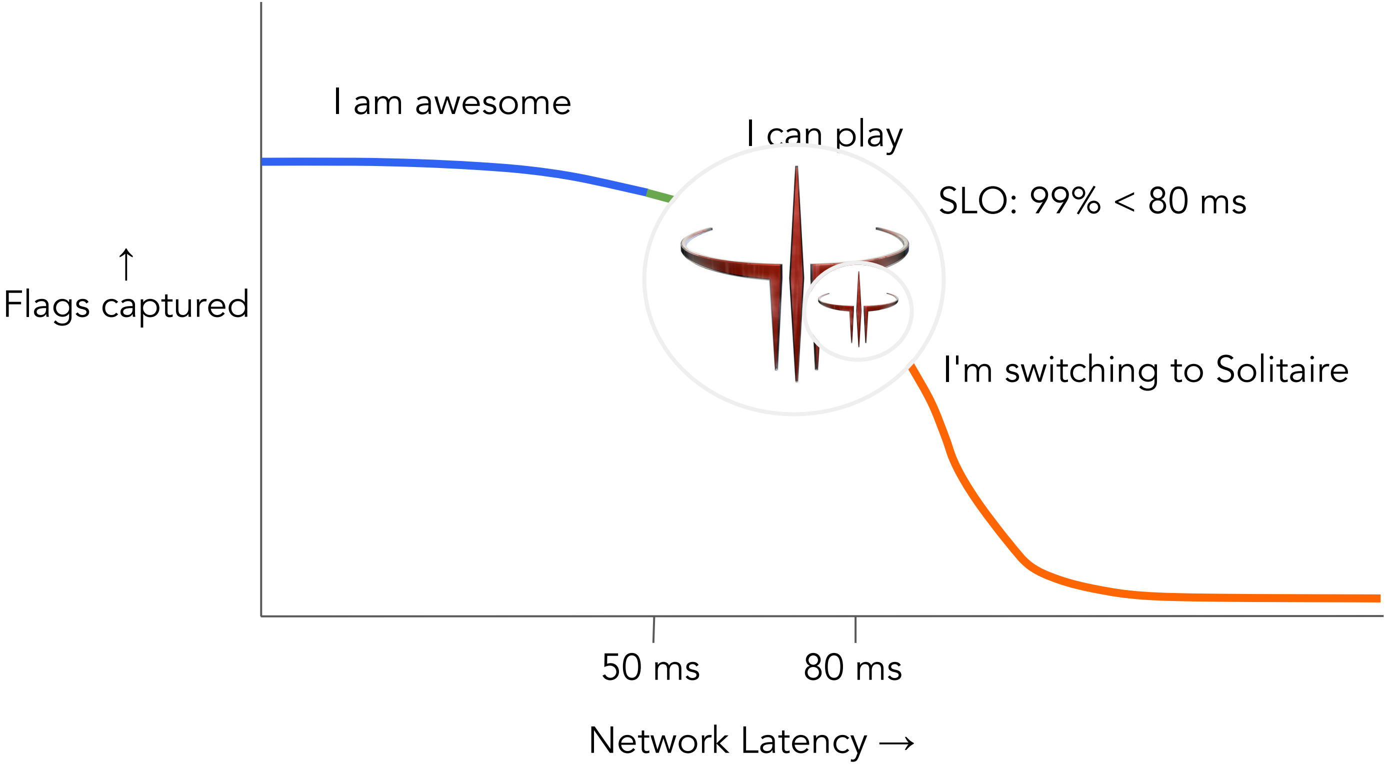
2. Responsiveness



User Action

Product Reaction

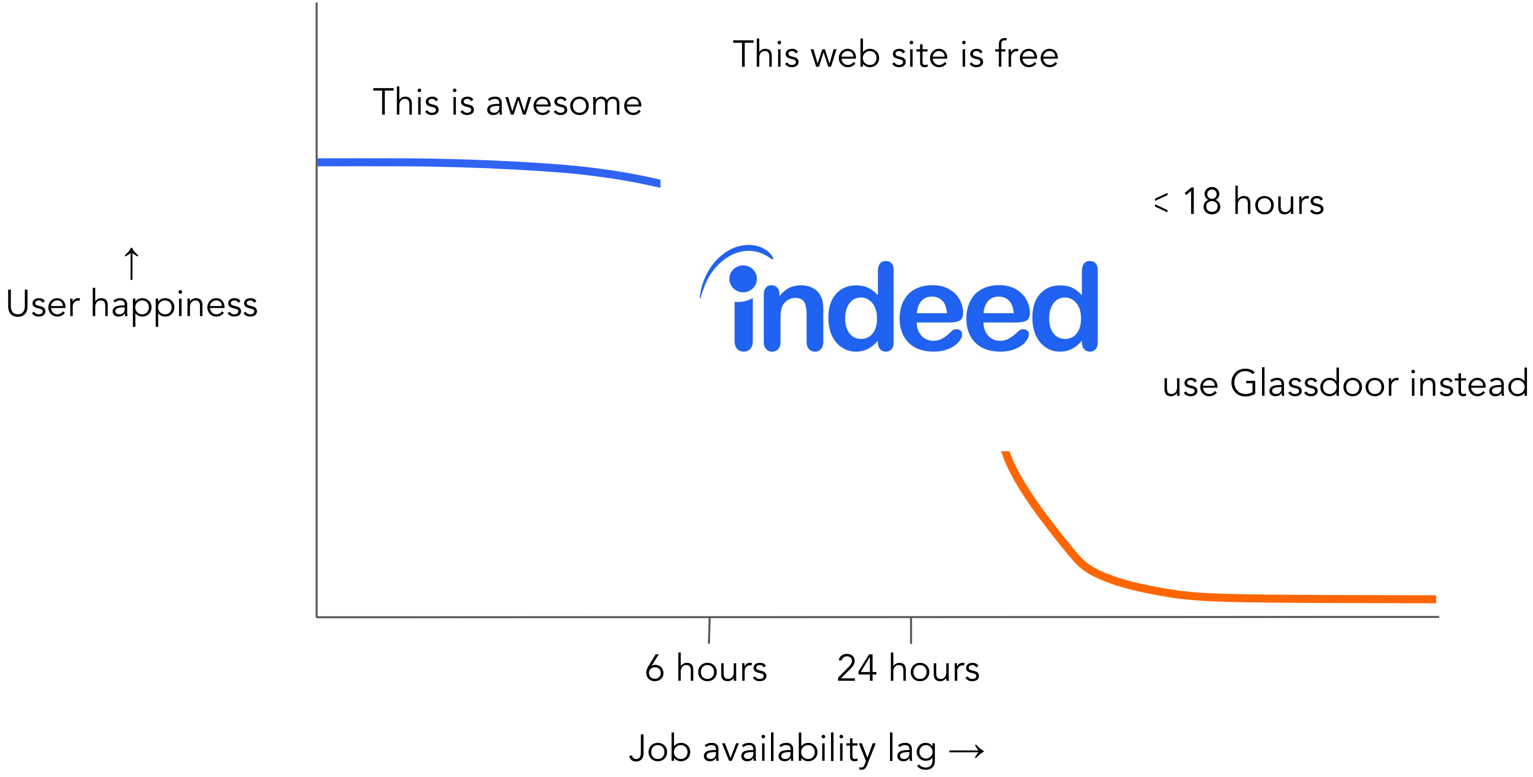

2x latency
Little click loss
SLO: 99% < 250 ms
indeed
↑
Job clicks
2x latency
Major click loss
2x latency
Little click loss
125 ms
250 ms
500 ms
1000 ms
2000 ms
4000 ms
8000 ms
16000 ms
Page load time →


I am awesome
I can play
SLO: 99% < 80 ms
I'm switching to Solitaire
↑
Flags captured
50 ms
80 ms
Network Latency →

3. Freshness

Freshness = how close to real-time the data are

How are user goals compromised by stale data?



This web site is free

This is awesome

< 18 hours

indeed

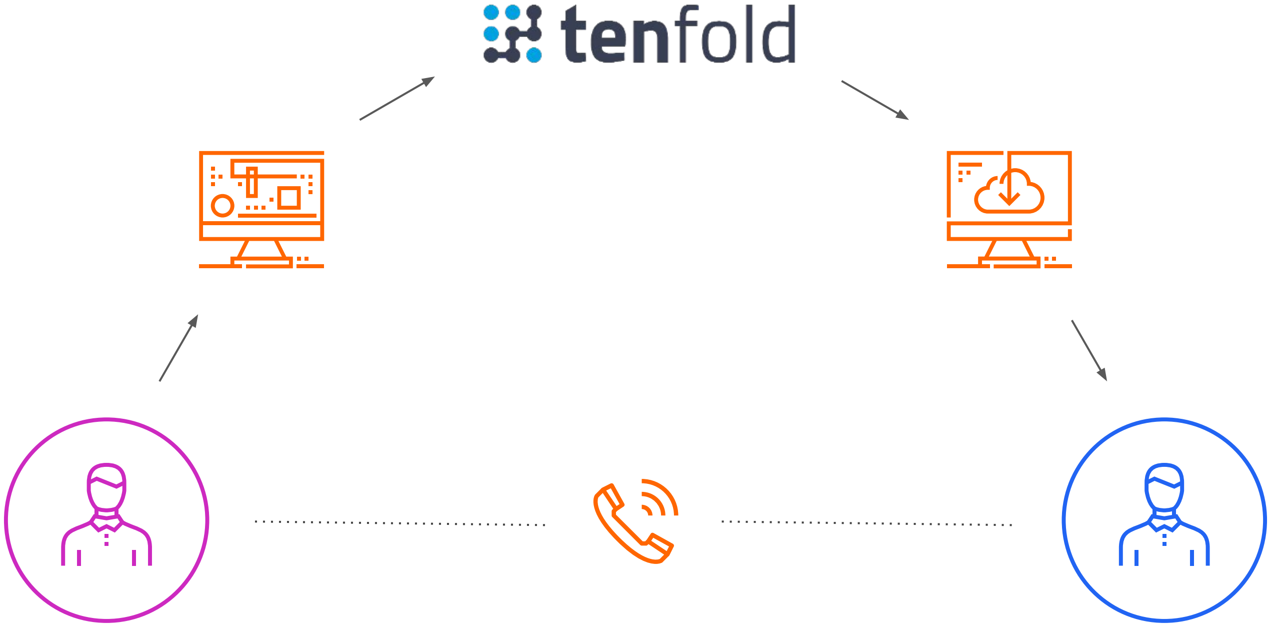
use Glassdoor instead

↑
User happiness

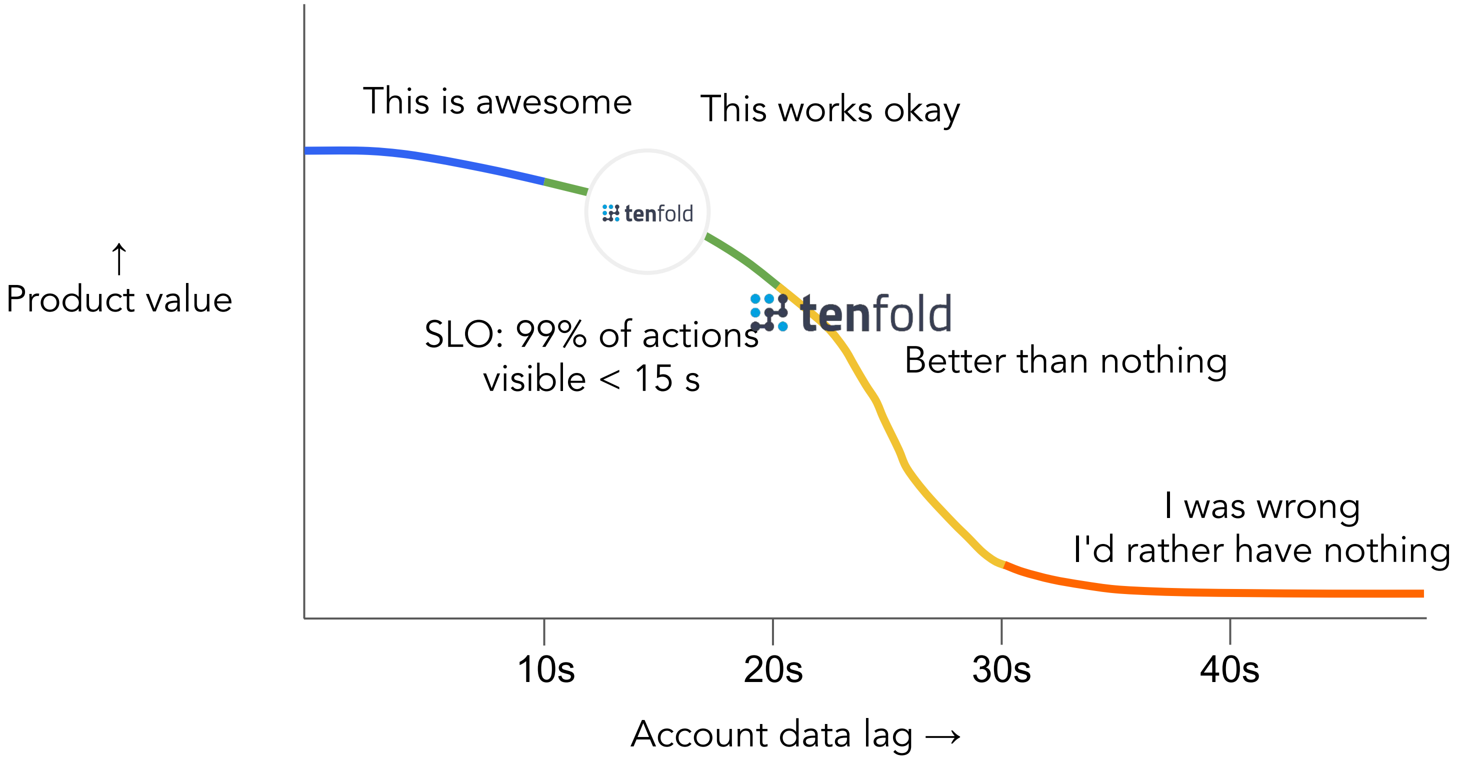
6 hours

24 hours

Job availability lag →

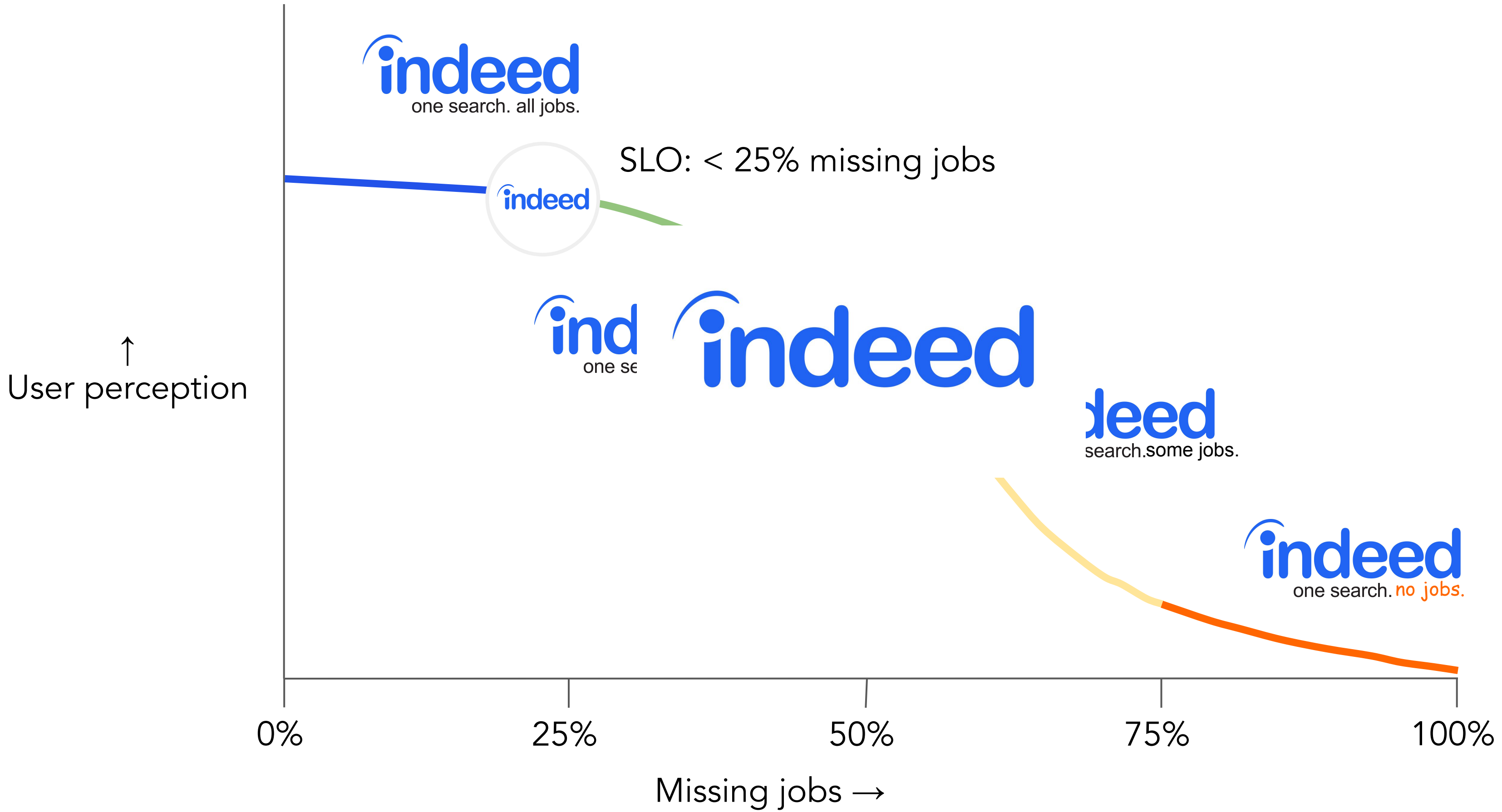


tenfold

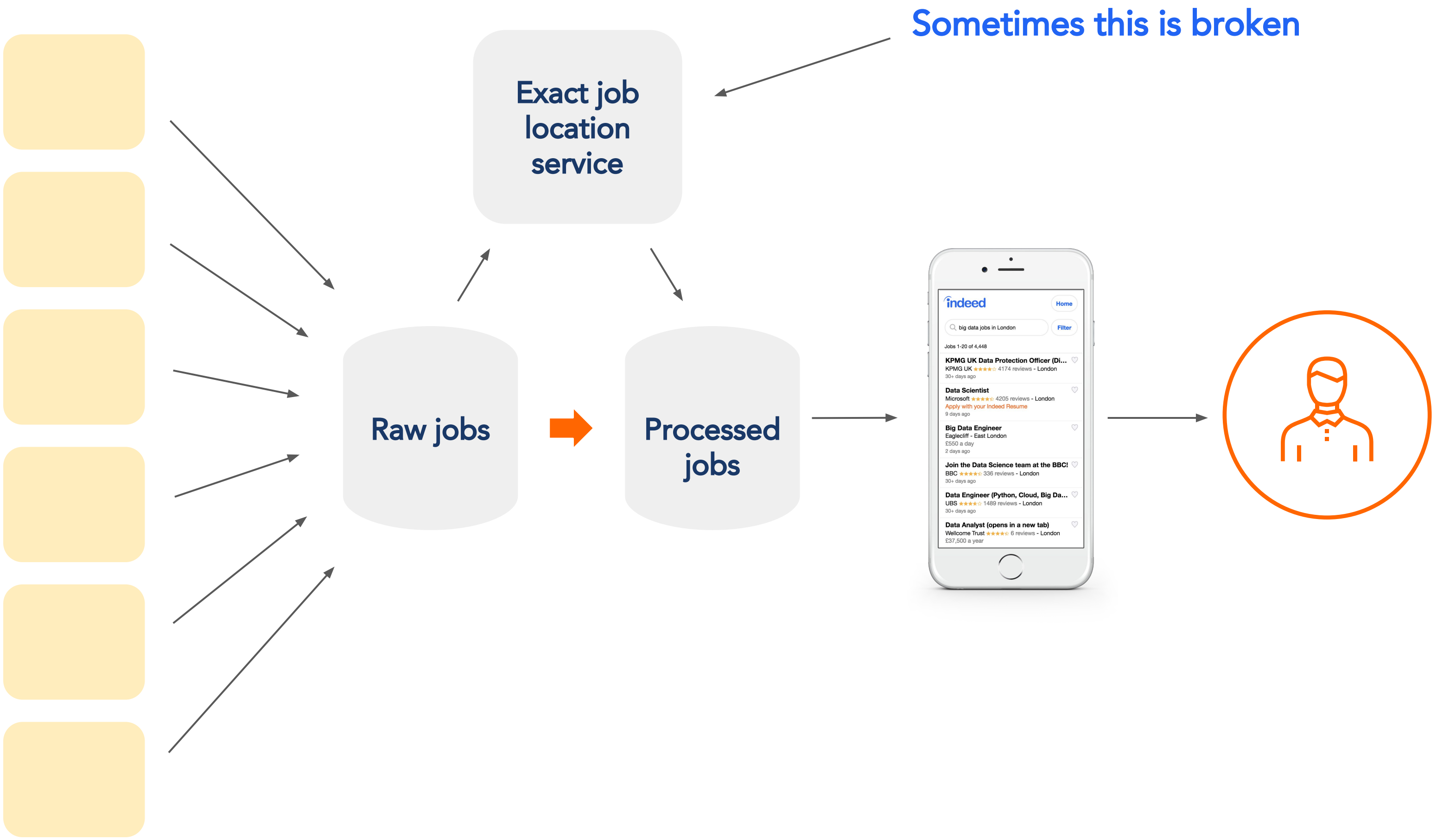

This is awesome
This works okay
tenfold
tenfold
SLO: 99% of actions visible < 15 s
Better than nothing
I was wrong
I'd rather have nothing
↑ Product value
10s
20s
30s
40s
Account data lag →

4. Completeness

Do you have all the data?


indeed
one search. all jobs.
SLO: < 25% missing jobs
indeed
ind
one se
indeed
deed
search.some jobs.
indeed
one search. no jobs.
↑
User perception
0%
25%
50%
75%
100%
Missing jobs →

5. Accuracy and precision



Sometimes this is broken

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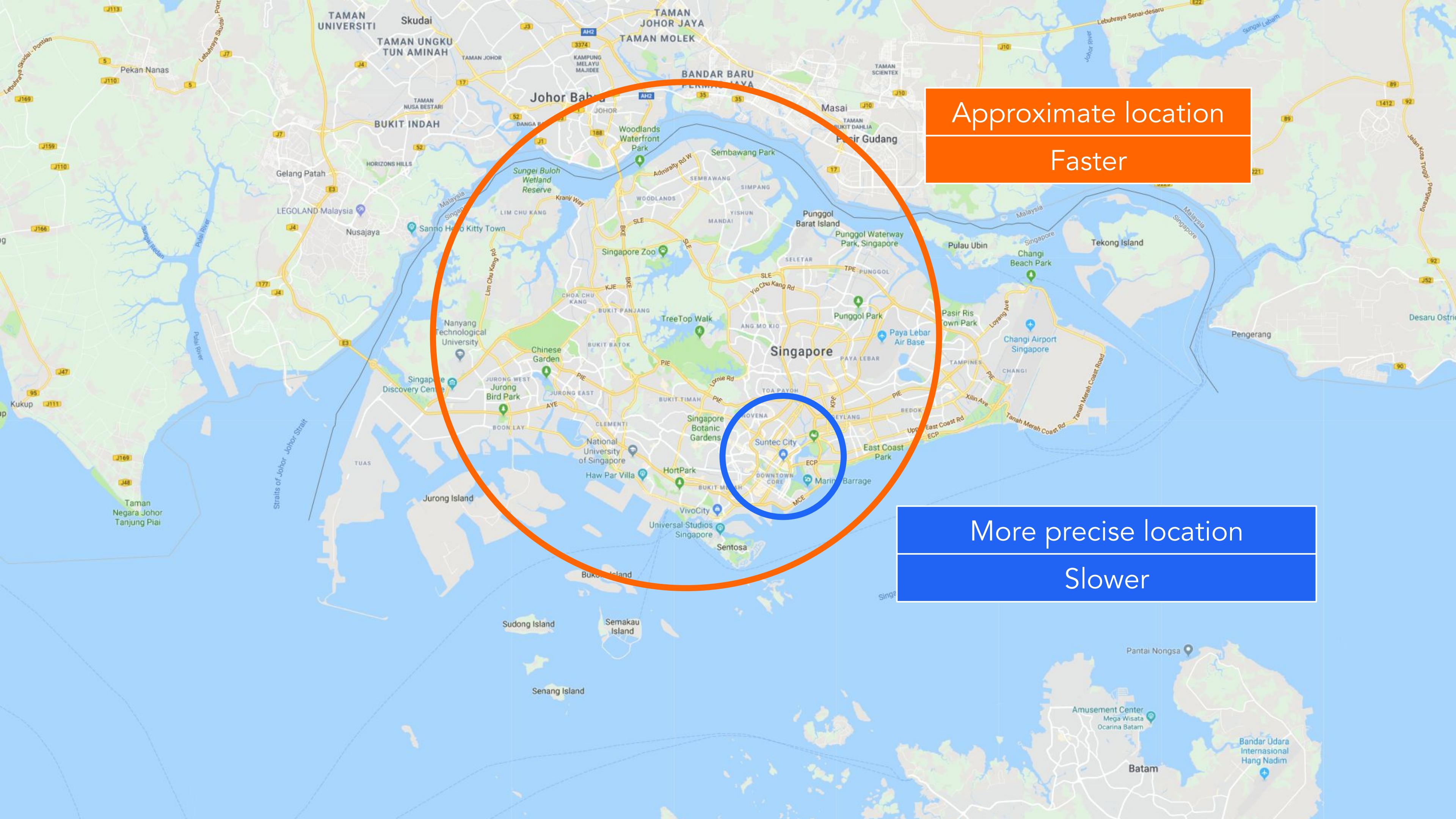


Approximate location

Faster

More precise location

Slower

Do job seekers want faster or more precise?

SLO

most exact location possible

< 30 minutes lag

6. Breadth of functionality

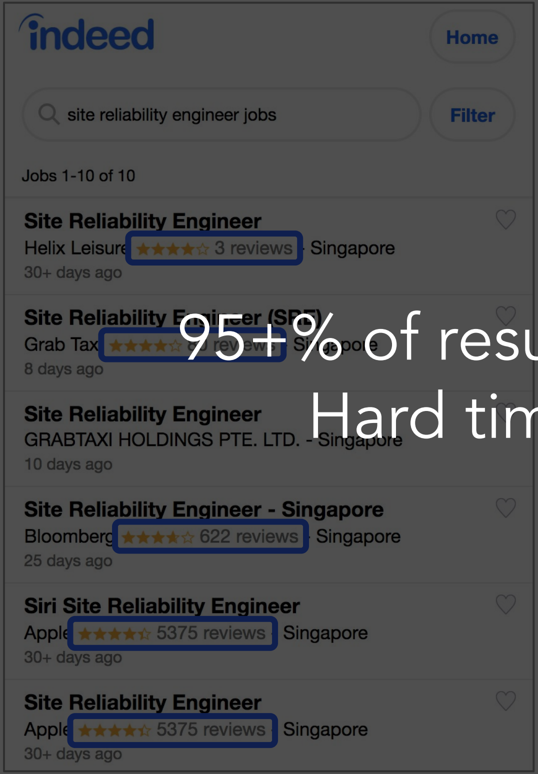
Must have vs. nice to have

How often are nice-to-have features available?

SLO

95+% of results pages have stars

Hard timeout at 100 ms



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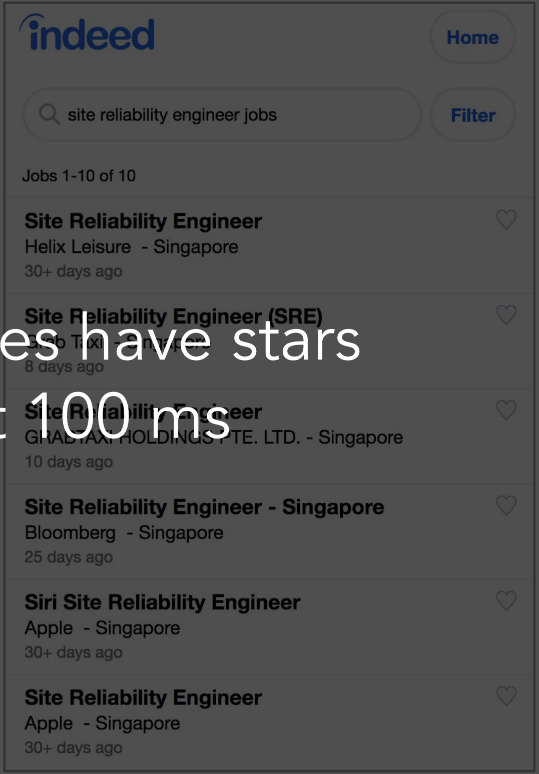
Grab Taxi ★★★★☆ [illegible] reviews - Singapore
8 days ago

Site Reliability Engineer
GRABTAXI HOLDINGS PTE. LTD. - Singapore
10 days ago

Site Reliability Engineer - Singapore
Bloomberg ★★★★☆ 622 reviews - Singapore
25 days ago

Siri Site Reliability Engineer
Apple ★★★★☆ 5375 reviews - Singapore
30+ days ago

Site Reliability Engineer
Apple ★★★★☆ 5375 reviews - Singapore
30+ days ago



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Site Reliability Engineer
GRABTAXI HOLDINGS PTE. LTD. - Singapore
10 days ago

Site Reliability Engineer - Singapore
Bloomberg - Singapore
25 days ago

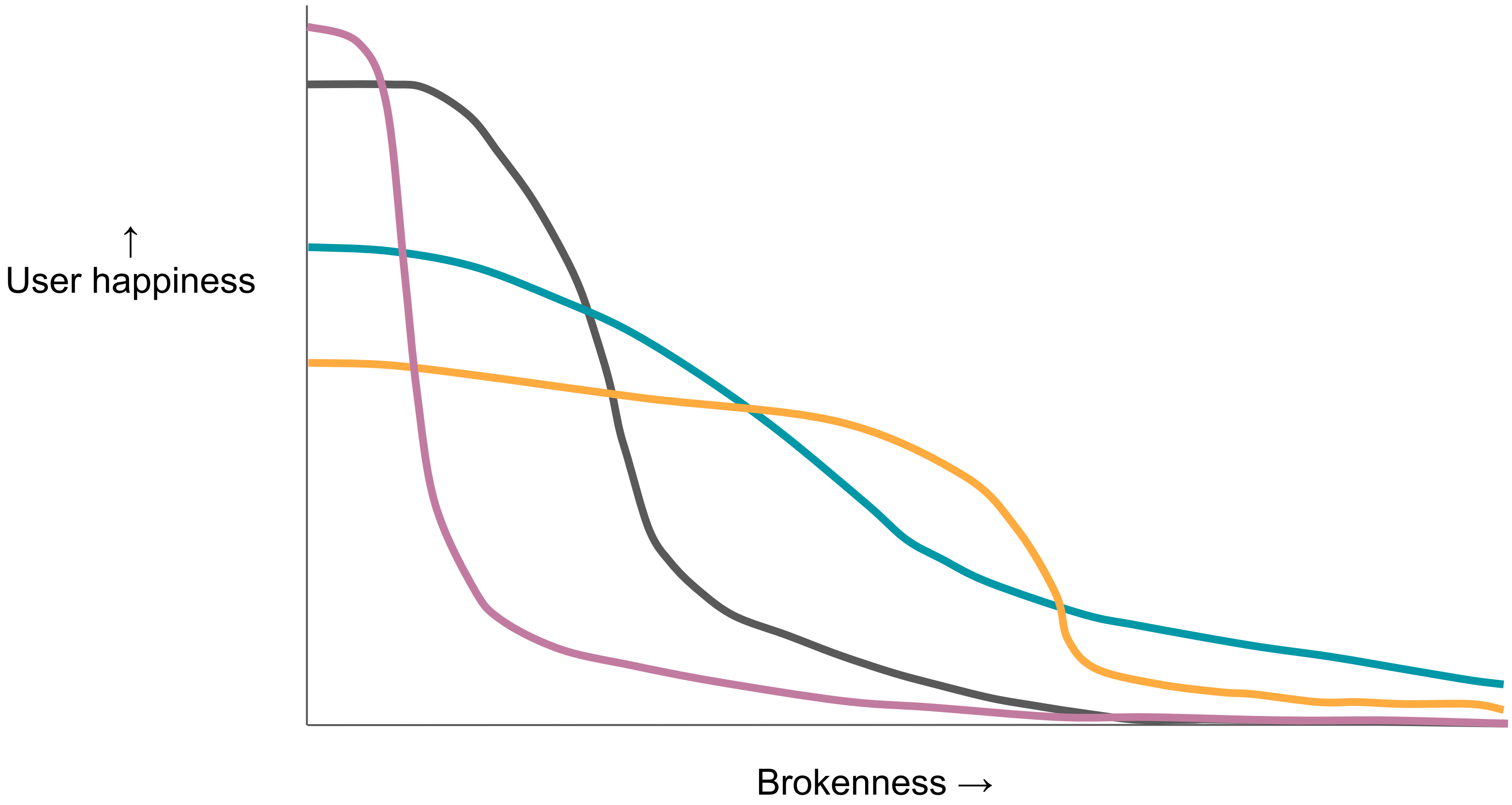
Siri Site Reliability Engineer
Apple - Singapore
30+ days ago

Site Reliability Engineer
Apple - Singapore
30+ days ago

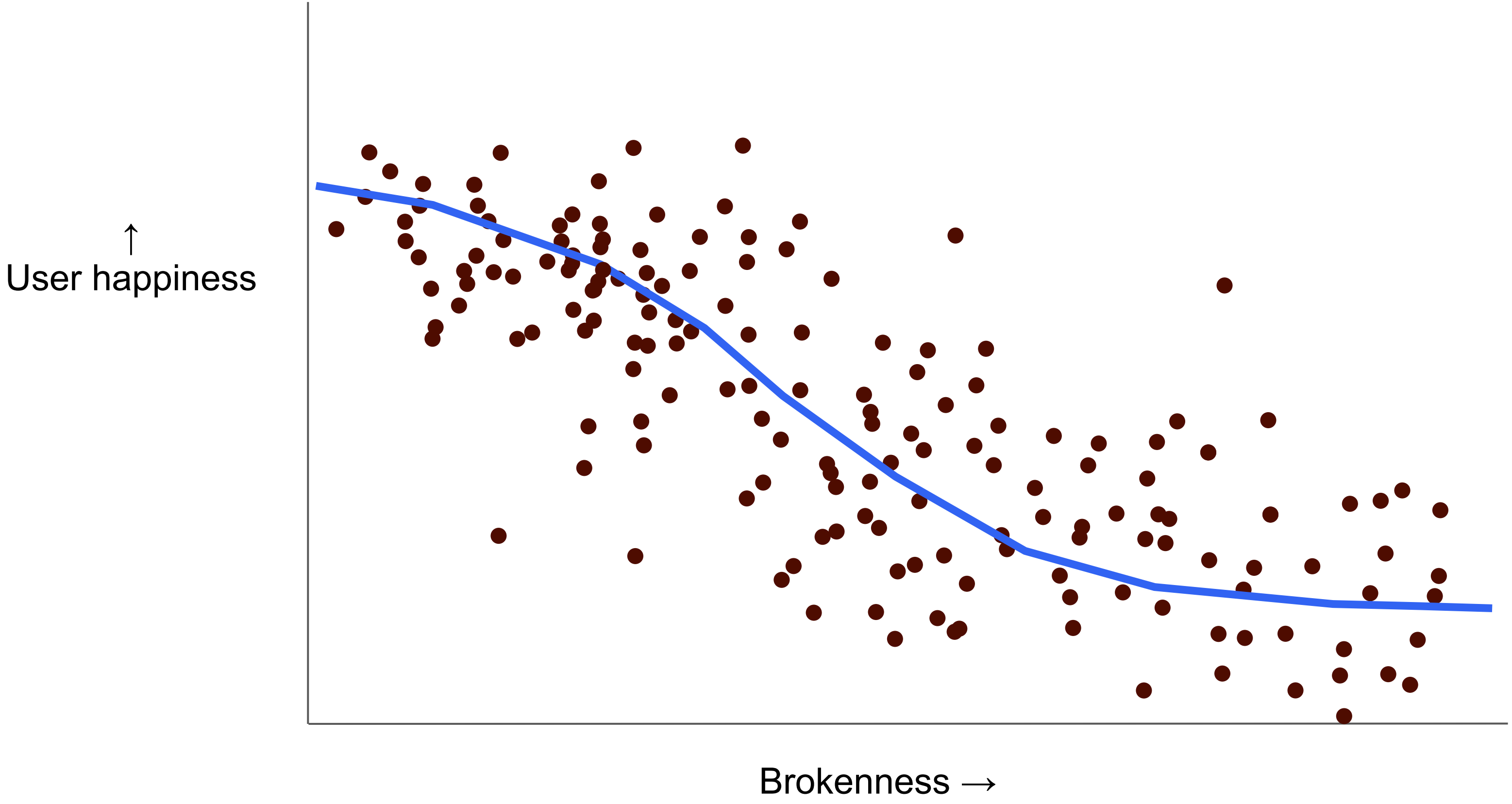
Empathy for the user

Turn implicit intuition into explicit systems

Many different ways to draw an S curve



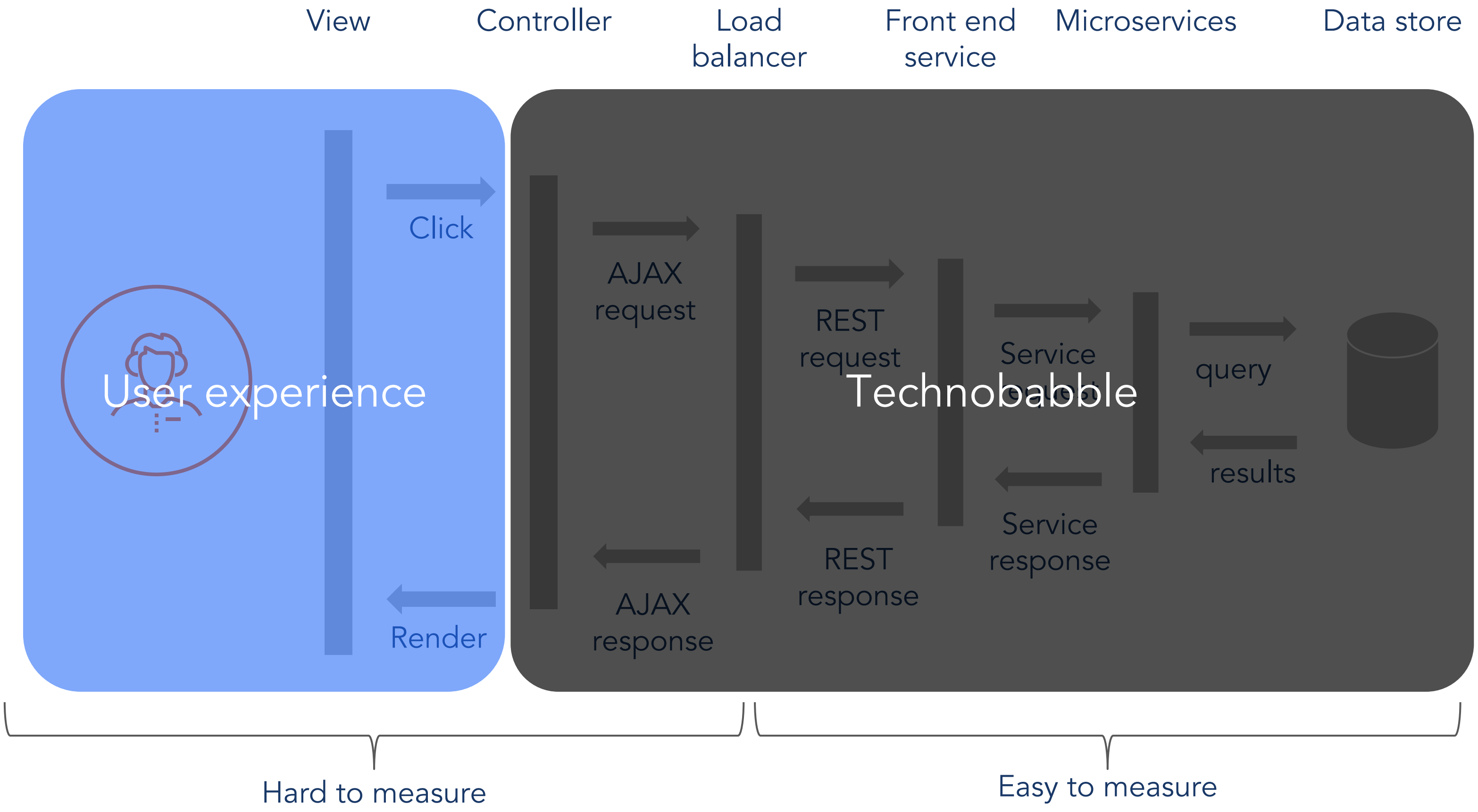
Look in your data to find your S curve



Perception is reality

Your perceptions are only part of the picture

- 💯 Server times
- 💯 Server error rates
- 😭 User experience



View

Controller

Load balancer

Front end service

Microservices

Data store

User experience

Click

Render

Technobabble

AJAX request

AJAX response

REST request

REST response

Service request

Service response

query

results

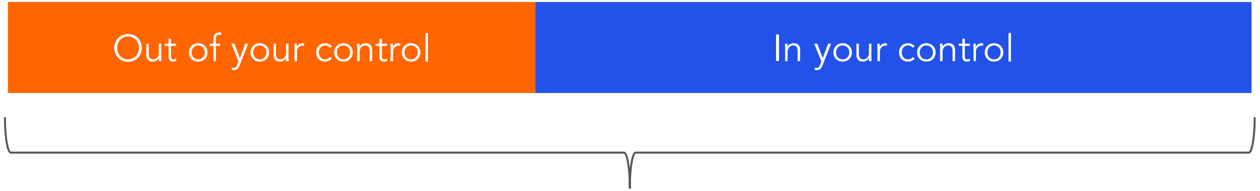
Hard to measure

Easy to measure

Simulate clients

Measure from real clients

Dealing with factors beyond your control

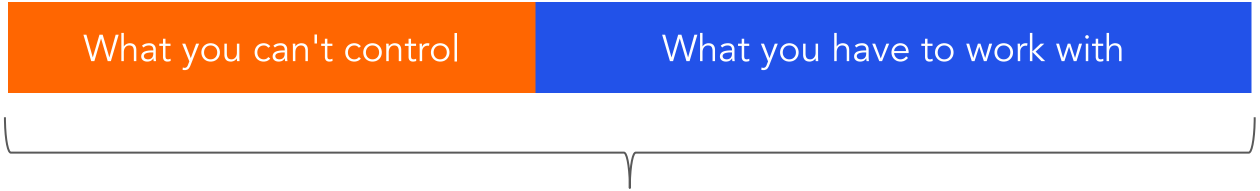


Out of your control

In your control

User experience

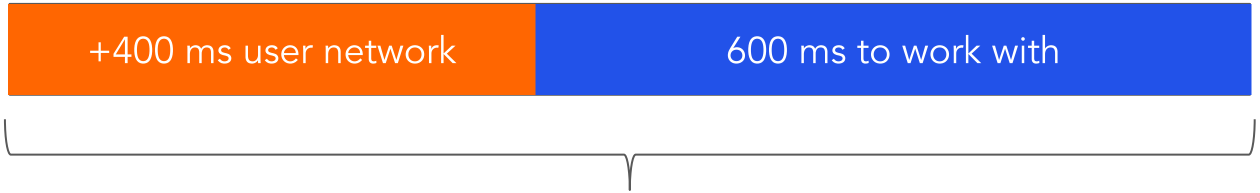
Your SLO should cover the whole user experience



What you can't control

What you have to work with

Service Level Objective



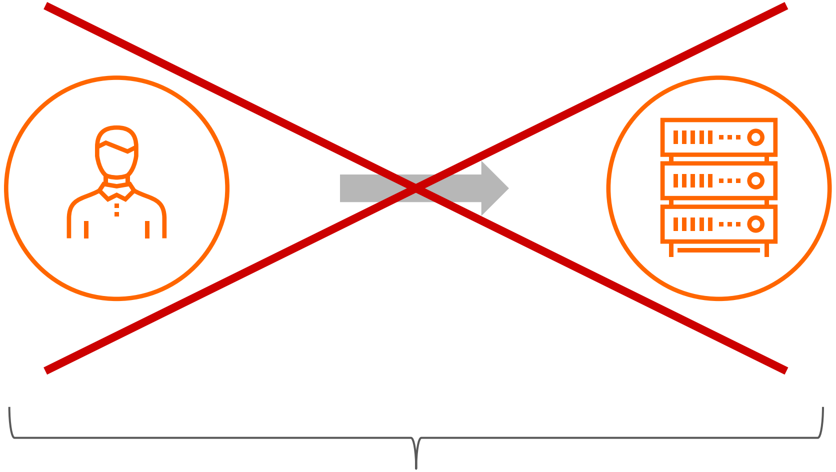
+400 ms user network

600 ms to work with

Page load < 1s

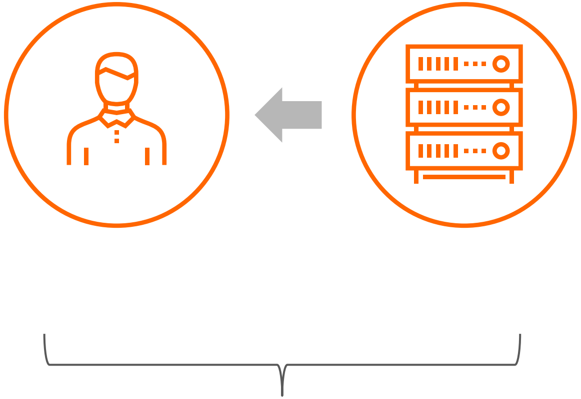
Controlling for what you can't control

Can't move users closer to your servers

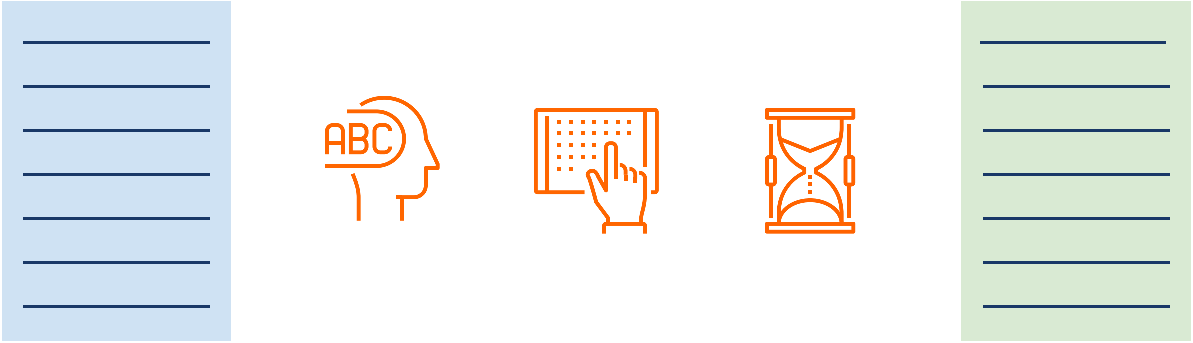


Too much latency

Can move your servers closer to users



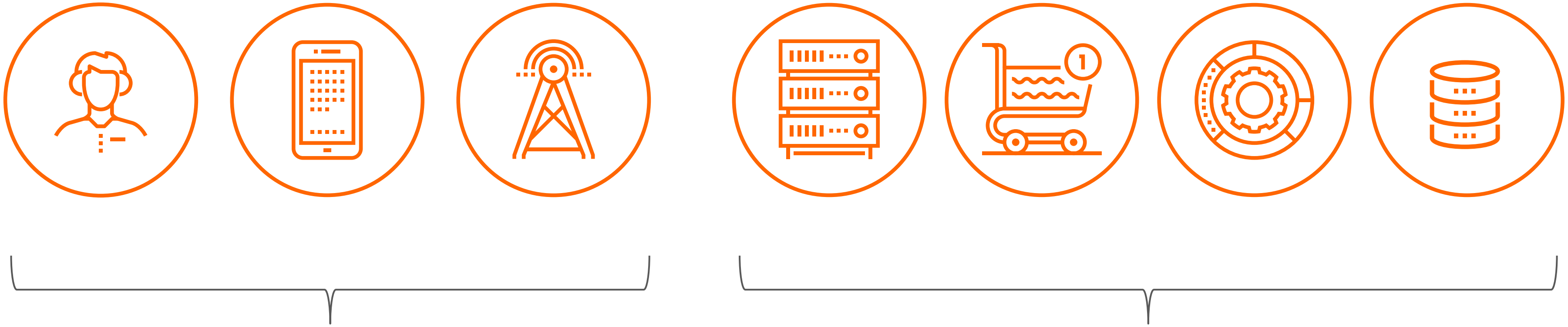
Acceptable latency


ABC

If it feels fast, it is fast

Empathy avoids overkill

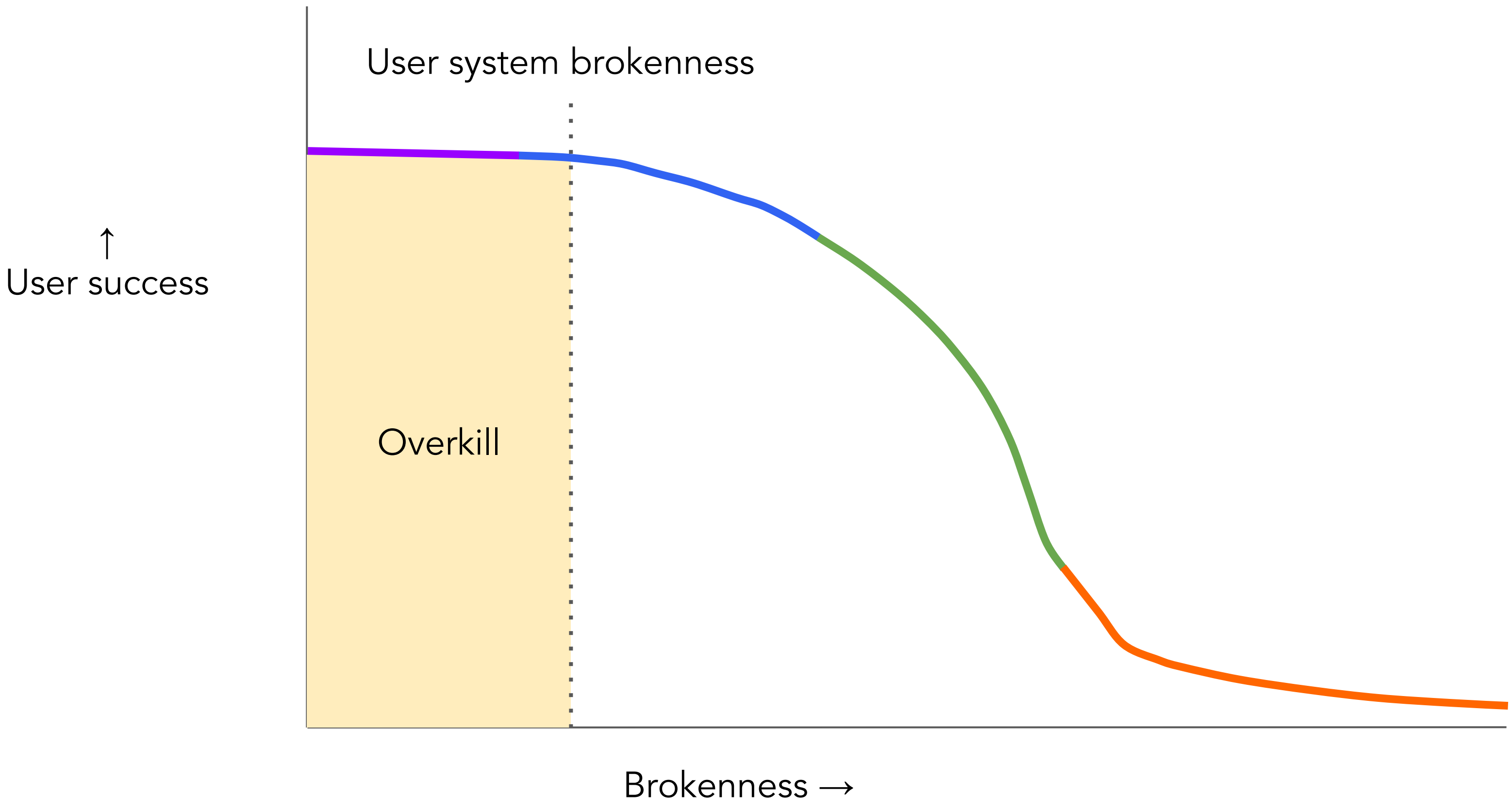
External systems + your components



99%

99.99999999999999%

16x9 = 315 nanoseconds



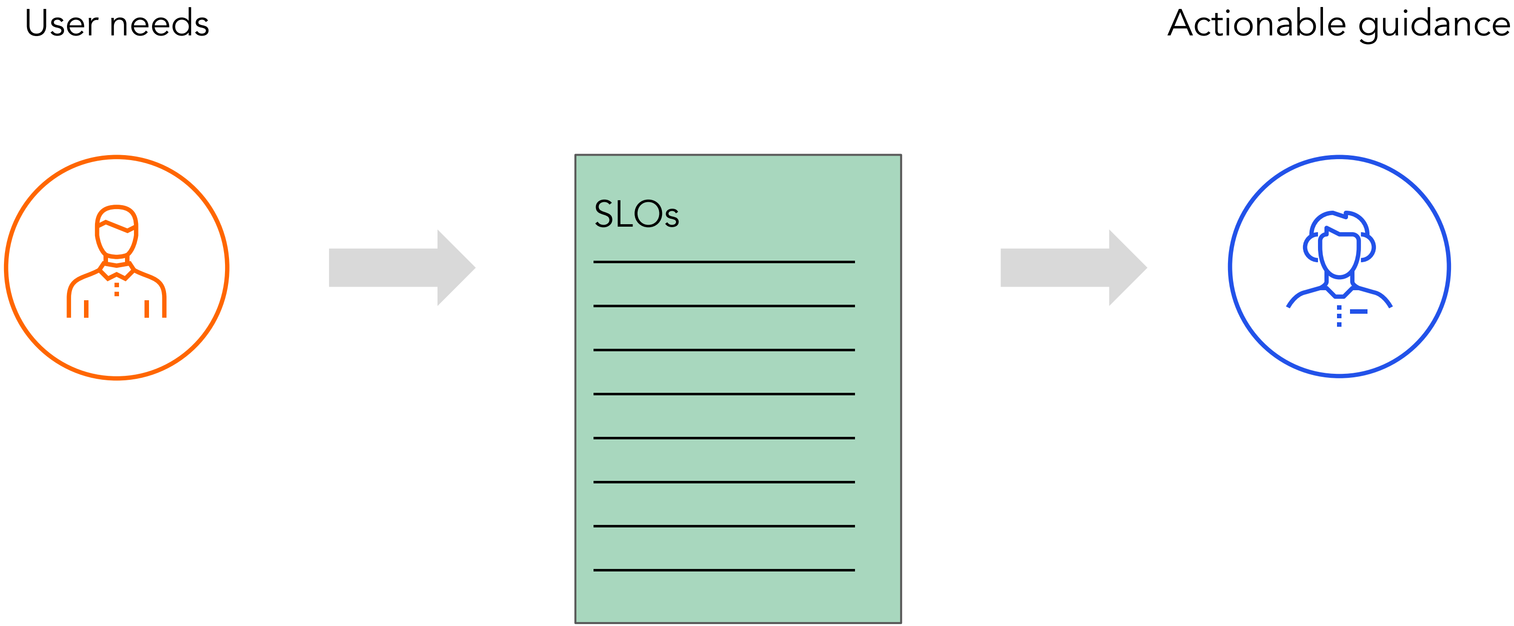
User system brokenness
↑
User success
Overkill
Brokenness →

Quantifying empathy

Empathy = I feel what you feel

Your users' perception is their reality

Your users' perception must be **your** reality



User needs

SLOs

Actionable guidance

Model the user's feelings and simulate empathy

	Failing SLO	Meeting SLO
Sad user	👍	Empathy gap
Happy user	Overkill	👍

An accurate simulation

SLOs with empathy tell me what you feel

SLOs with empathy tell me what you **will** feel **before** you feel it

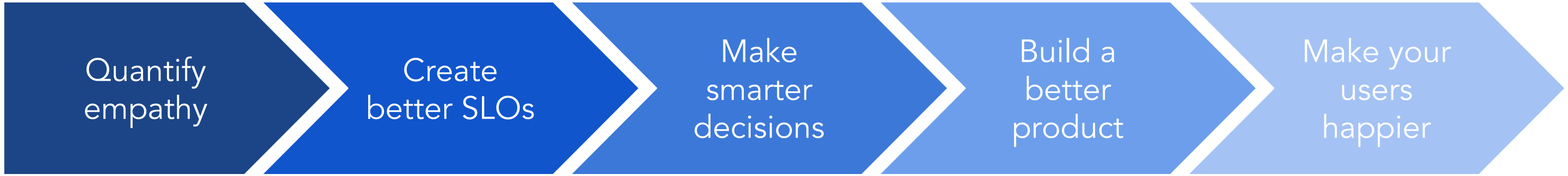
- Before the user notices
- Before the user feels pain
- Before you deploy your service

How to quantify empathy

1) Get to know your users
2) Understand what your product does for them
3) Apply the 6 flavors of user happiness
4) Find the user pain in your data
5) Set the SLOs below the pain threshold

How you benefit from quantifying empathy

1) Raise targets that allow poor user experience
2) Lower targets that don't benefit the user
3) Find gaps in features not covered by SLOs
4) Discard SLOs for features your users don't need
5) Get everyone lined up behind the same goals



Quantify empathy

Create better SLOs

Make smarter decisions

Build a better product

Make your users happier

Questions?

indeed

Quantifying Empathy
Through Service Level Objectives

Ketan Gangatirkar

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