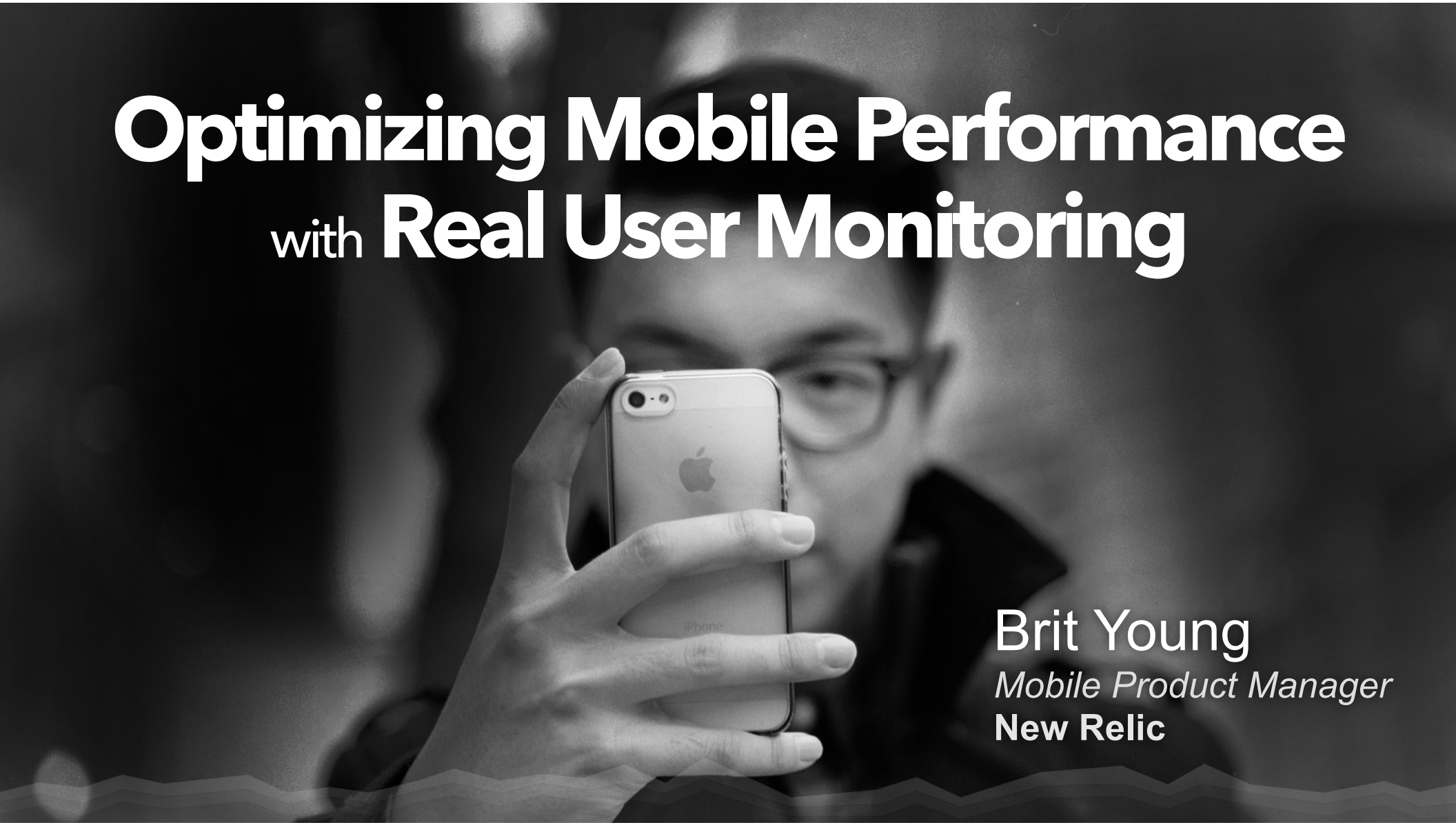
Optimizing Mobile Performance
with Real User Monitoring
Brit Young
Mobile Product Manager
New Relic

New Relic®
MOBILE™
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EVIL

What distinguishes a high performance mobile app?

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What distinguishes high performance *for your* mobile app?

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Source:**XKCD**

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Source:**XKCD**

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mAPM
Application Performance Monitoring
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what could *possibly* go wrong?

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- ★ UI Interactions
- ★ Network Requests
- ★ Third Party APIs
- ★ Database Requests
- ★ Real User Data

hardware?
os version?
carrier?
network type?
geography?
JSON data?
UI path?

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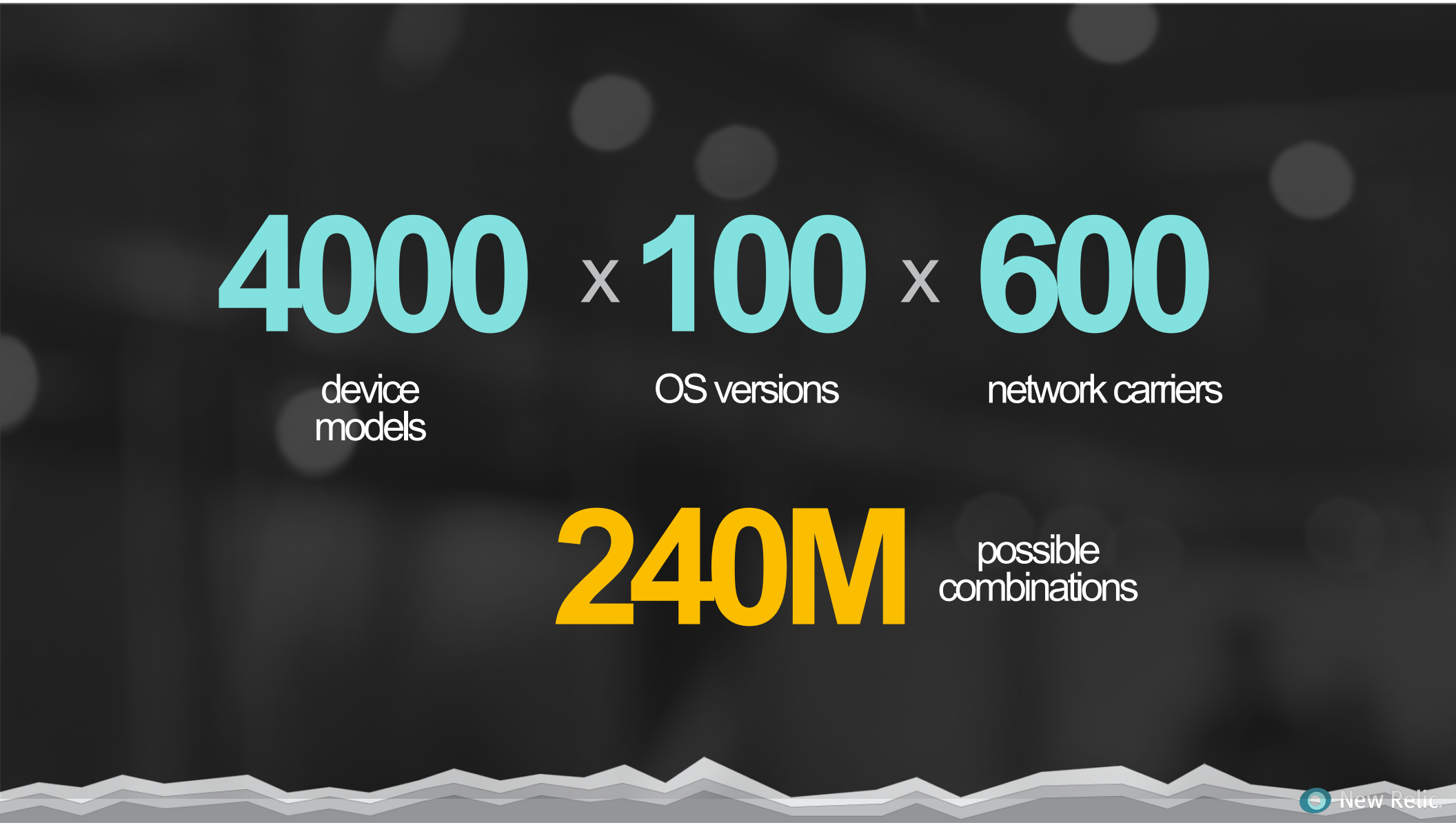
4000
device models
x
100
OS versions
x
600
network carriers
240M
possible combinations
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10 devices x 3 OS x 5 top carriers +2 (wifi) x 2 orientation x ? user specific data & settings

possible combinations

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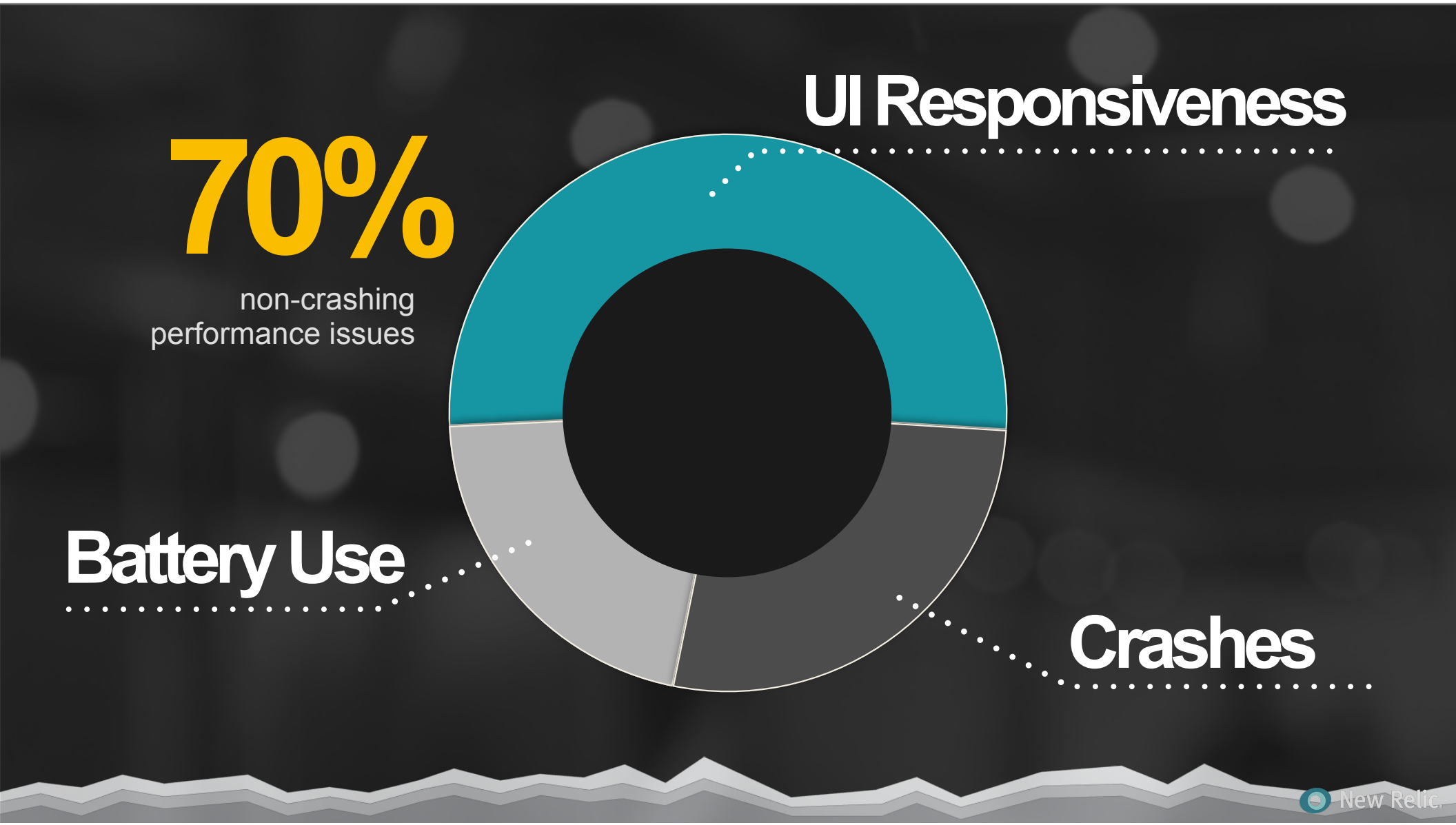
70%
non-crashing
performance issues
UI Responsiveness
Battery Use
Crashes
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average app crashes
3 - 5% of sessions

what happens in
the other 95 - 97%

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01000010010
01001001010001
1100101000110010
0101000101011101
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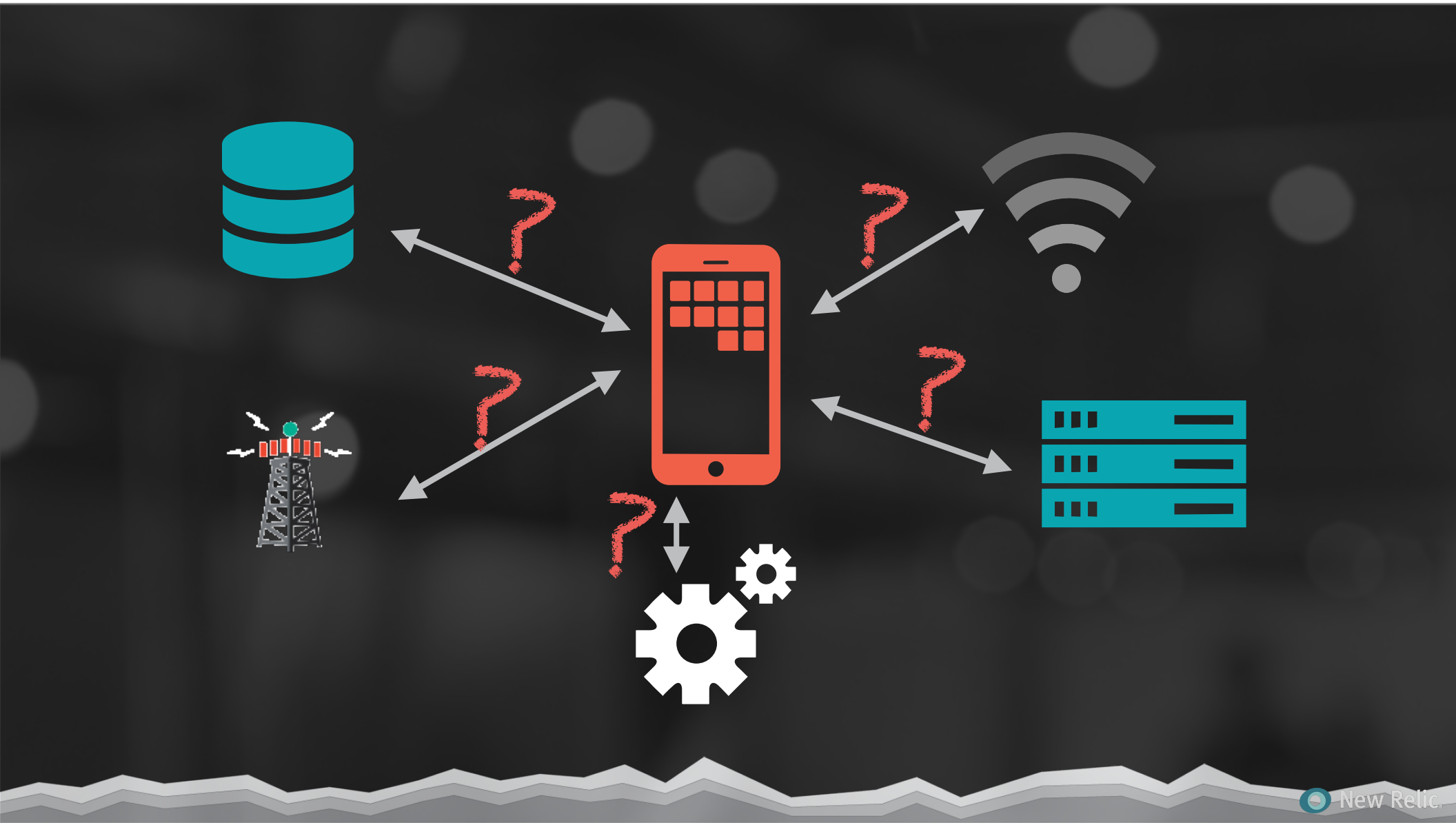
?
?
?
?
?
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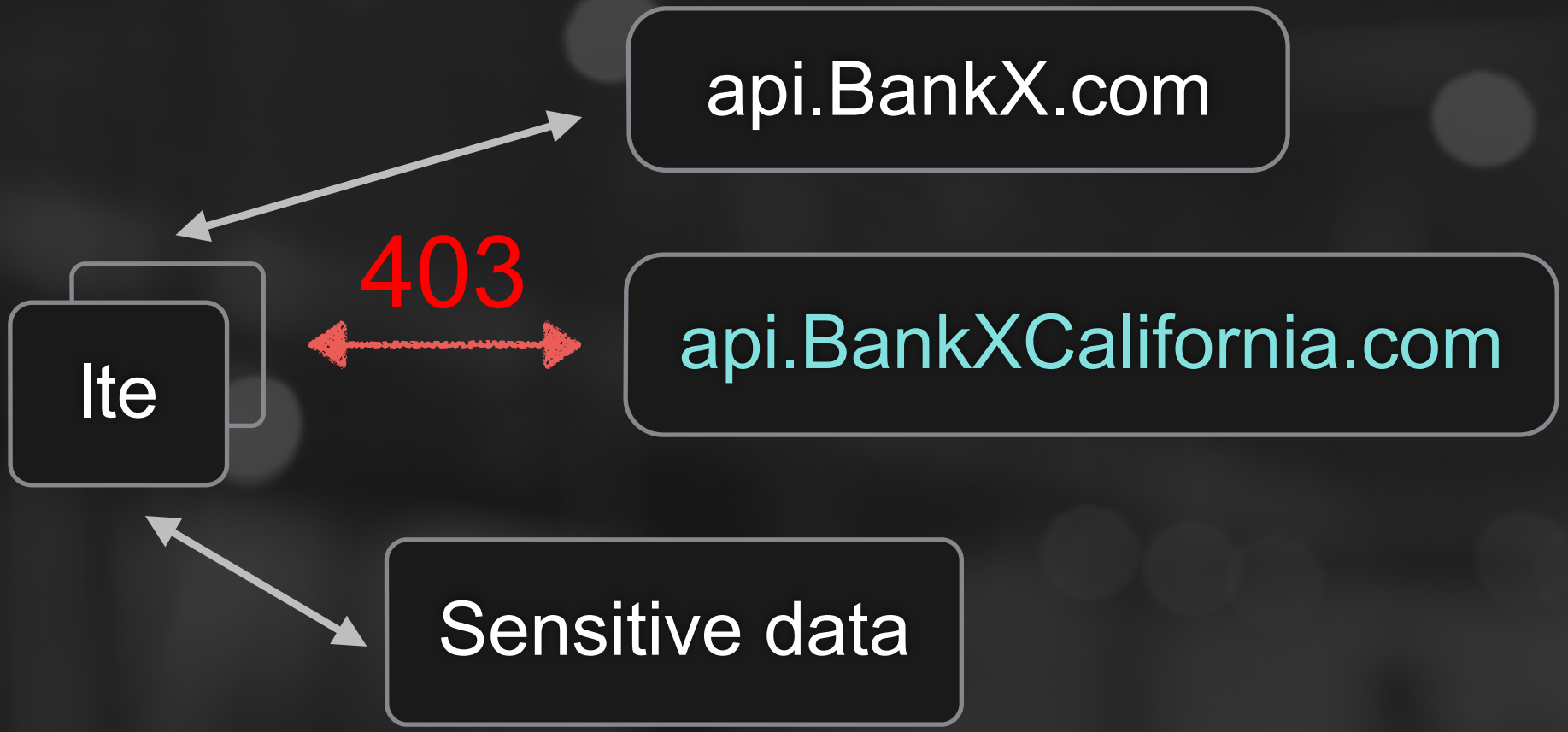
api.BankX.com
403
lte
api.BankXCalifornia.com
Sensitive data

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“The true price of anything you do is the amount of time you exchange for it.”

— Henry David Thoreau, Walden

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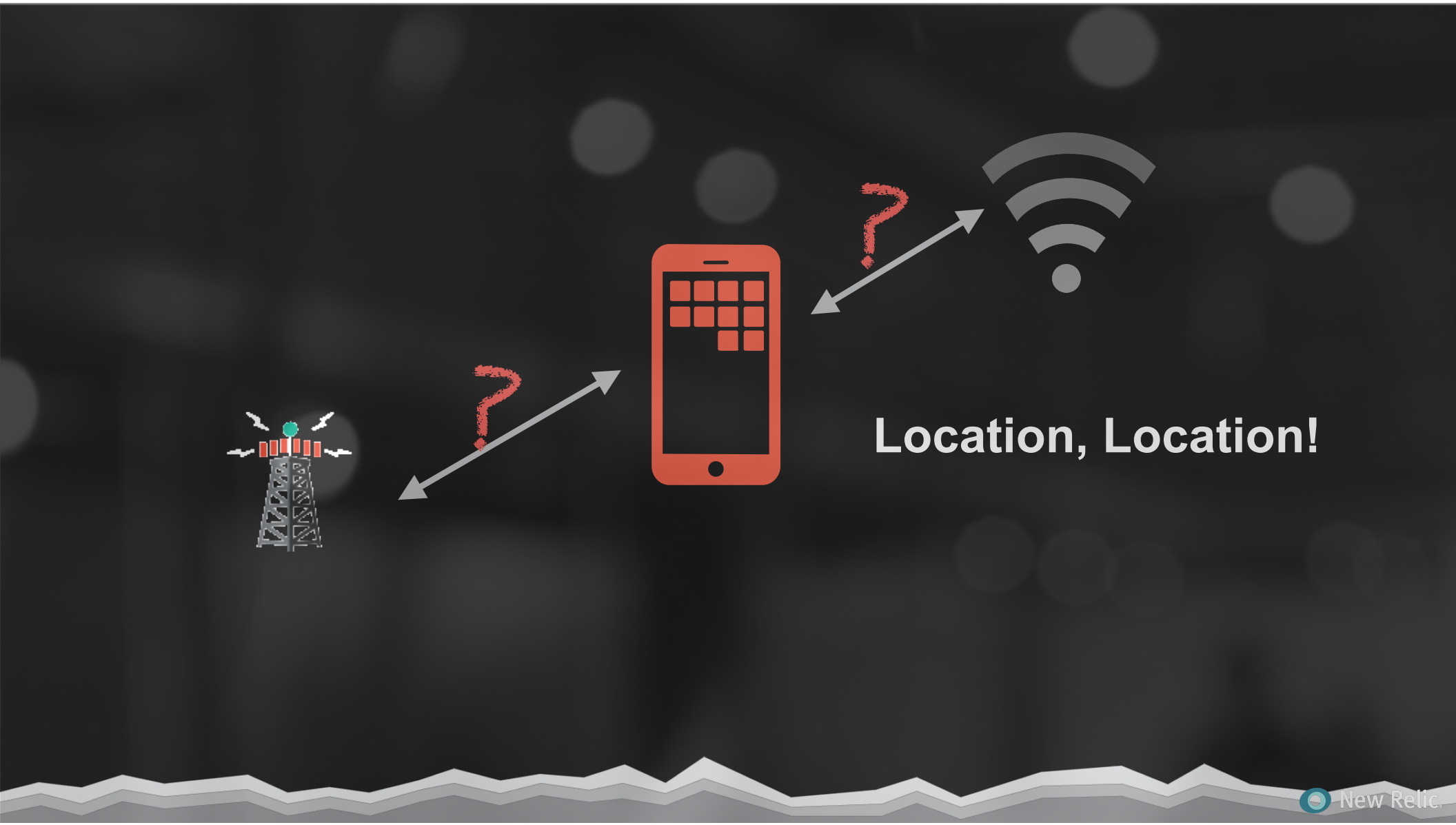
Location, Location!
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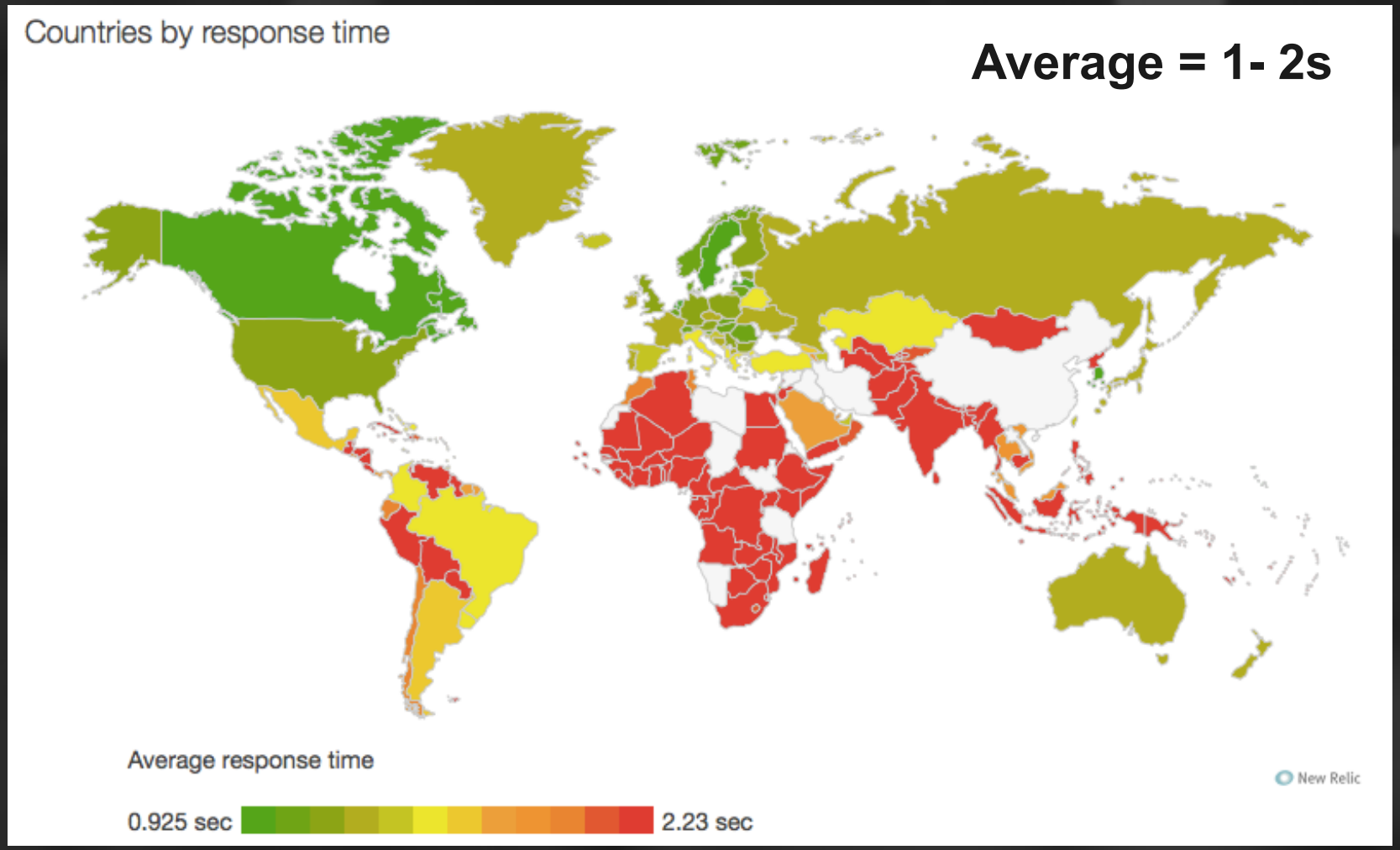
Countries by response time
Average = 1- 2s
Average response time
0.925 sec
2.23 sec
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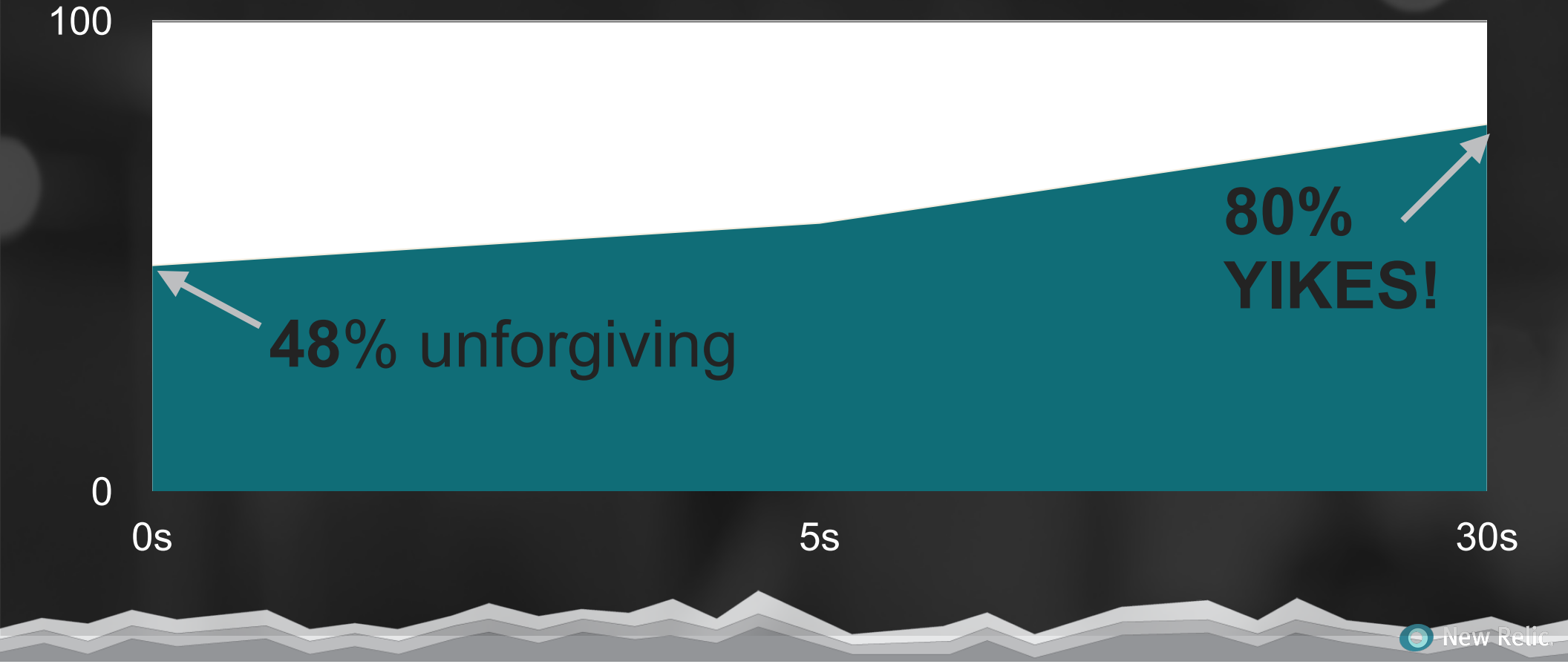
% of User Intent to Delete During Slow UI Responsiveness



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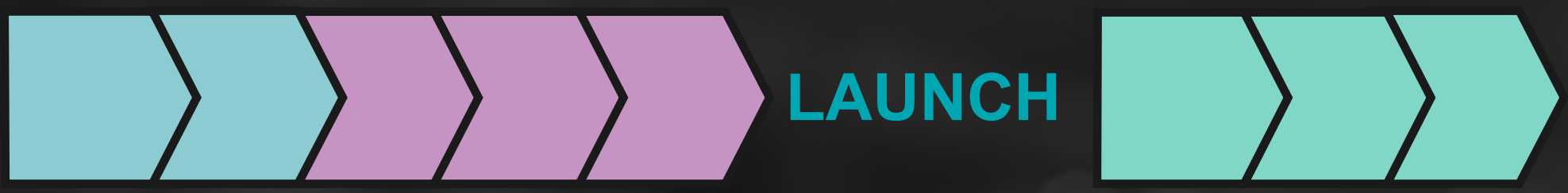
Performance Blind Spot



Test Coverage

Beta, A/B Testing

Crash/Bug Report
Troubleshooting

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RUM
Real User Monitoring
the only way to know what
normal feels like to your users
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Key Performance Categories

Network Requests

Mobile Code Execution
(UI & background work)

Back-end Services

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Network Performance

- HTTP Error Rate
- Avg ResponseTime
- Requests Per Minute
- Data Transfer Size
- Network Failure Rates

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Mobile Code Execution

- View Load Time
- Database Request Time
- JSON Parsing Speed
- Image Load Time
- % CPU Usage
- Memory Usage

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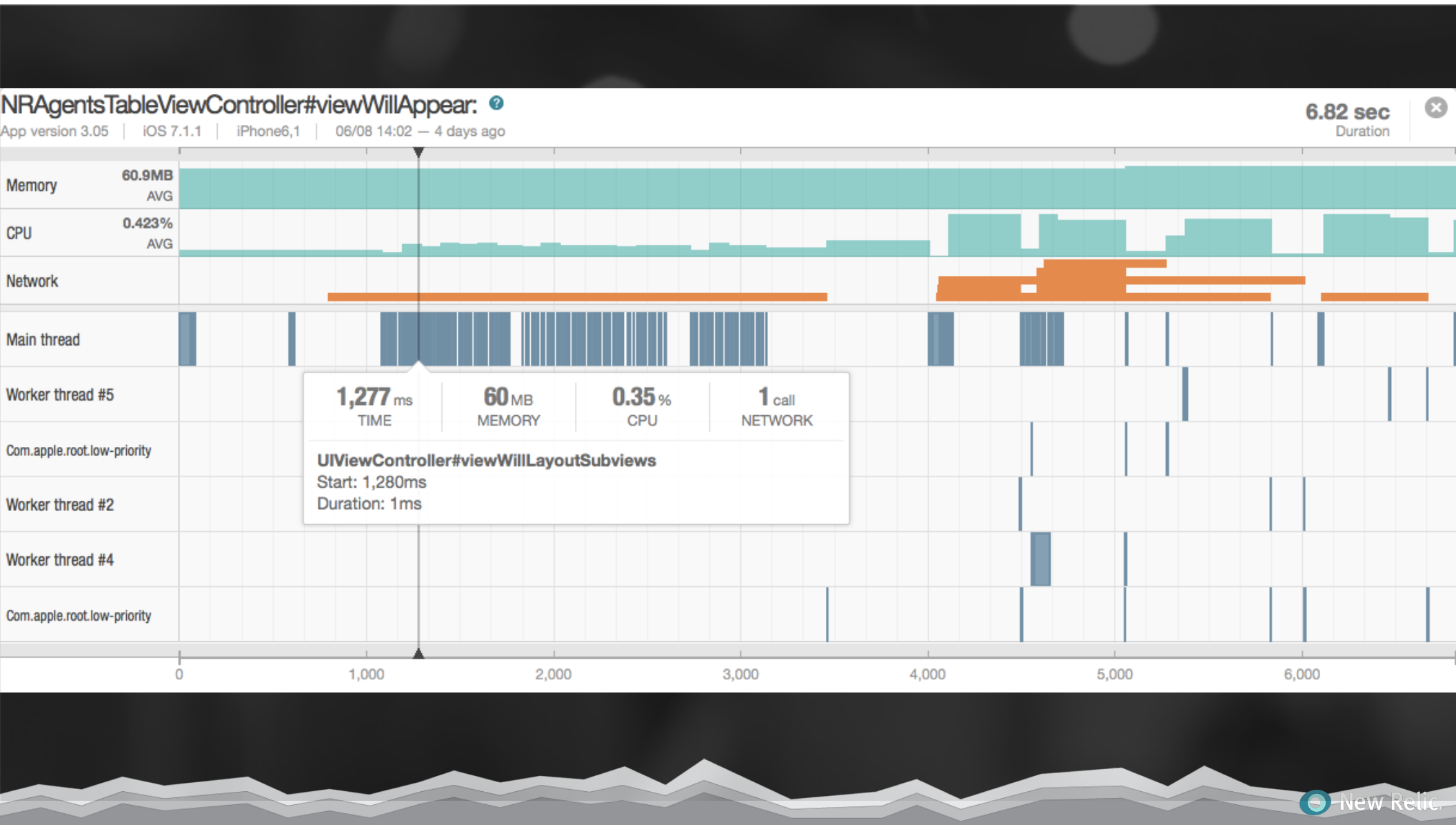
NRAgentsTableViewController#viewWillAppear:
App version 3.05 | iOS 7.1.1 | iPhone6,1 | 06/08 14:02 — 4 days ago
6.82 sec
Duration
Memory
60.9MB
AVG
CPU
0.423%
AVG
Network
Main thread
Worker thread #5
Com.apple.root.low-priority
Worker thread #2
Worker thread #4
Com.apple.root.low-priority
1,277 ms
TIME
60 MB
MEMORY
0.35 %
CPU
1 call
NETWORK
UIViewController#viewWillLayoutSubviews
Start: 1,280ms
Duration: 1ms
0
1,000
2,000
3,000
4,000
5,000
6,000
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Monitor first for a baseline, validate acceptable range through user studies

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Organize foreground and background work for seamless user experience

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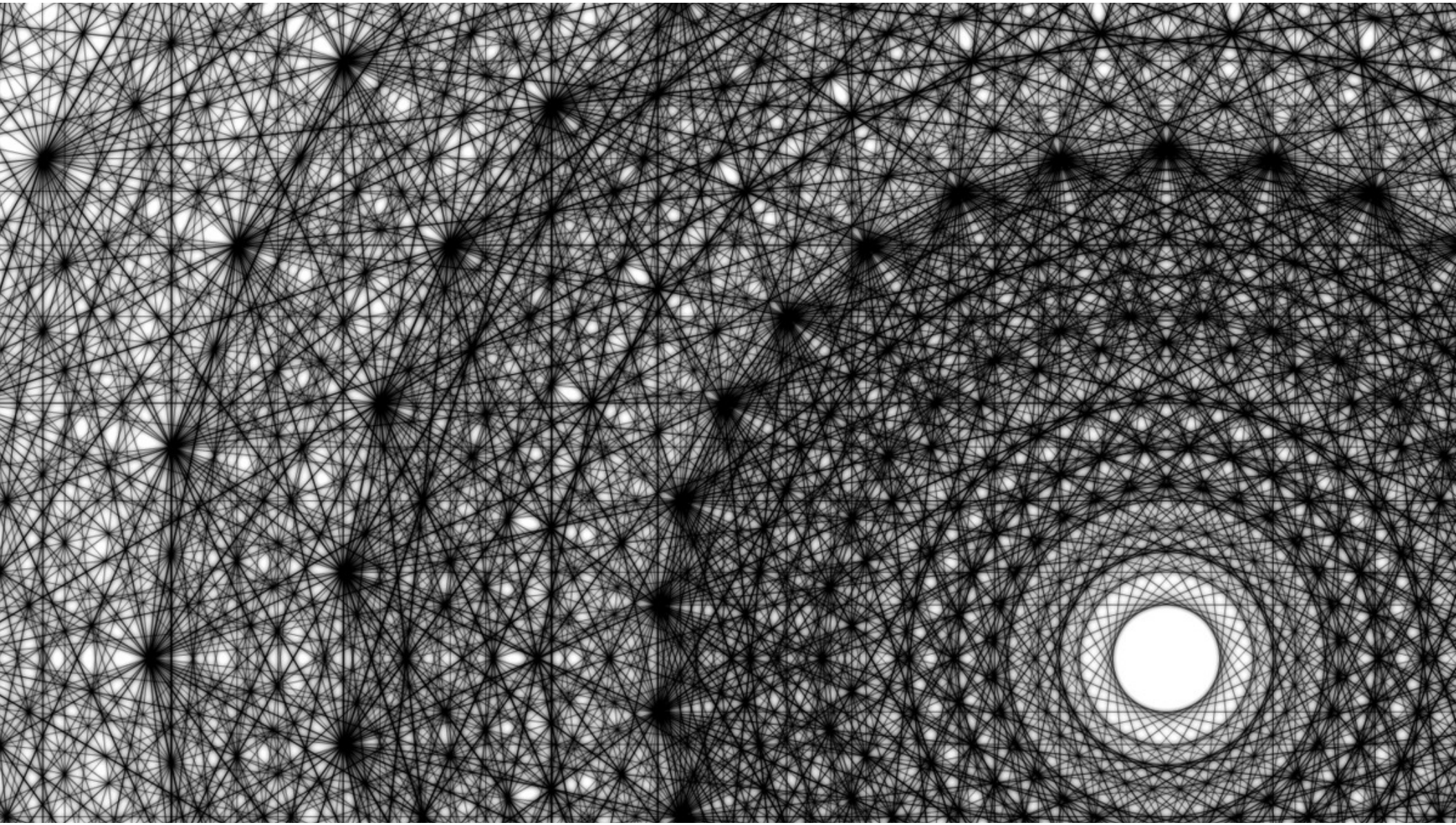

Functional patterns
Protocols and extensions on structs
Pattern matching
Concise syntax
Closures
Generics
Fast iteration
Native collections
Optional types
Operator overloading
Object orientation
Namespaces
Tuples
Type inference
Clear mutability syntax
Read-Eval-Print-Loop (REPL)
Interactive playground
Multiple return types
Compile to native code

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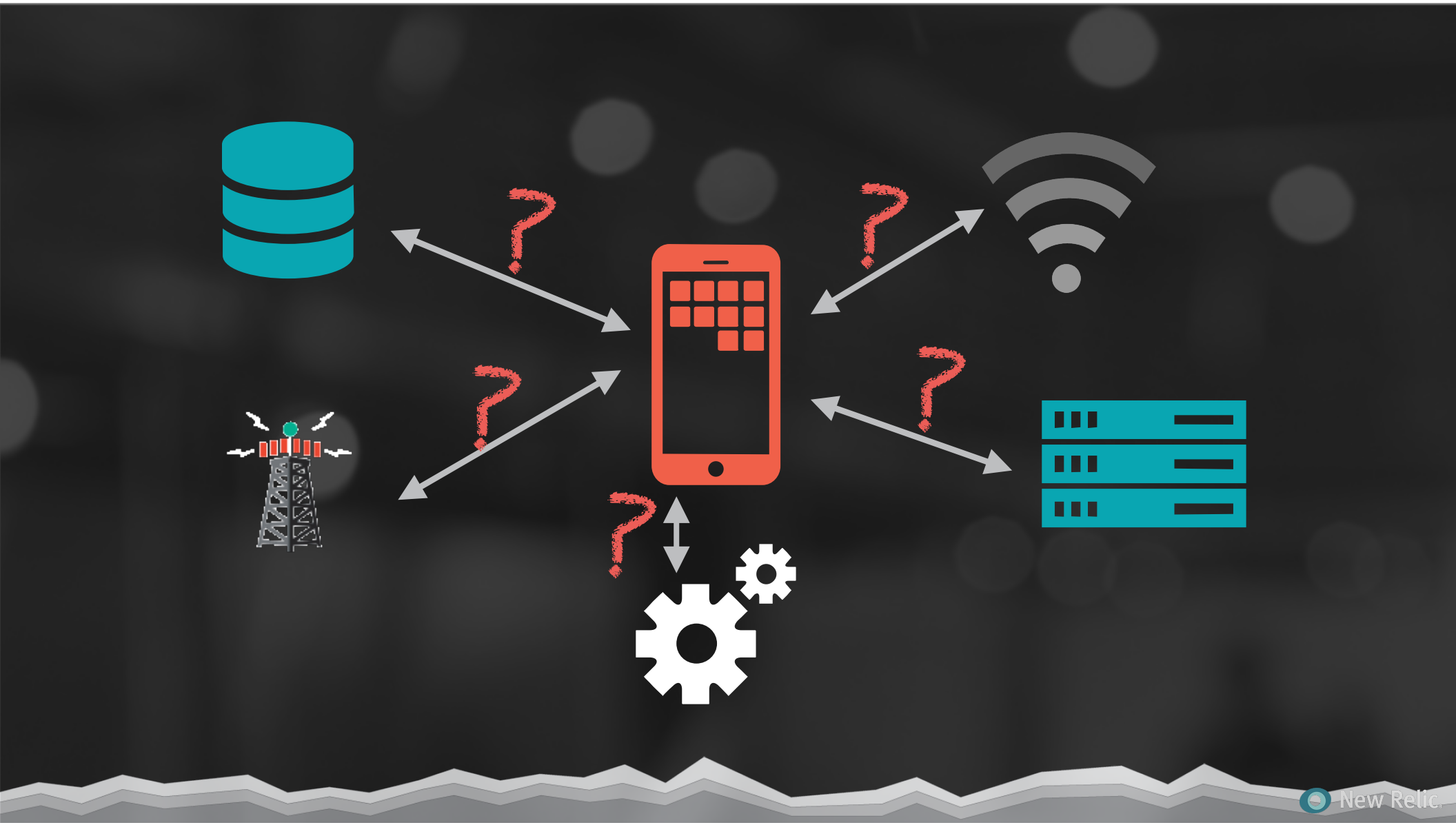
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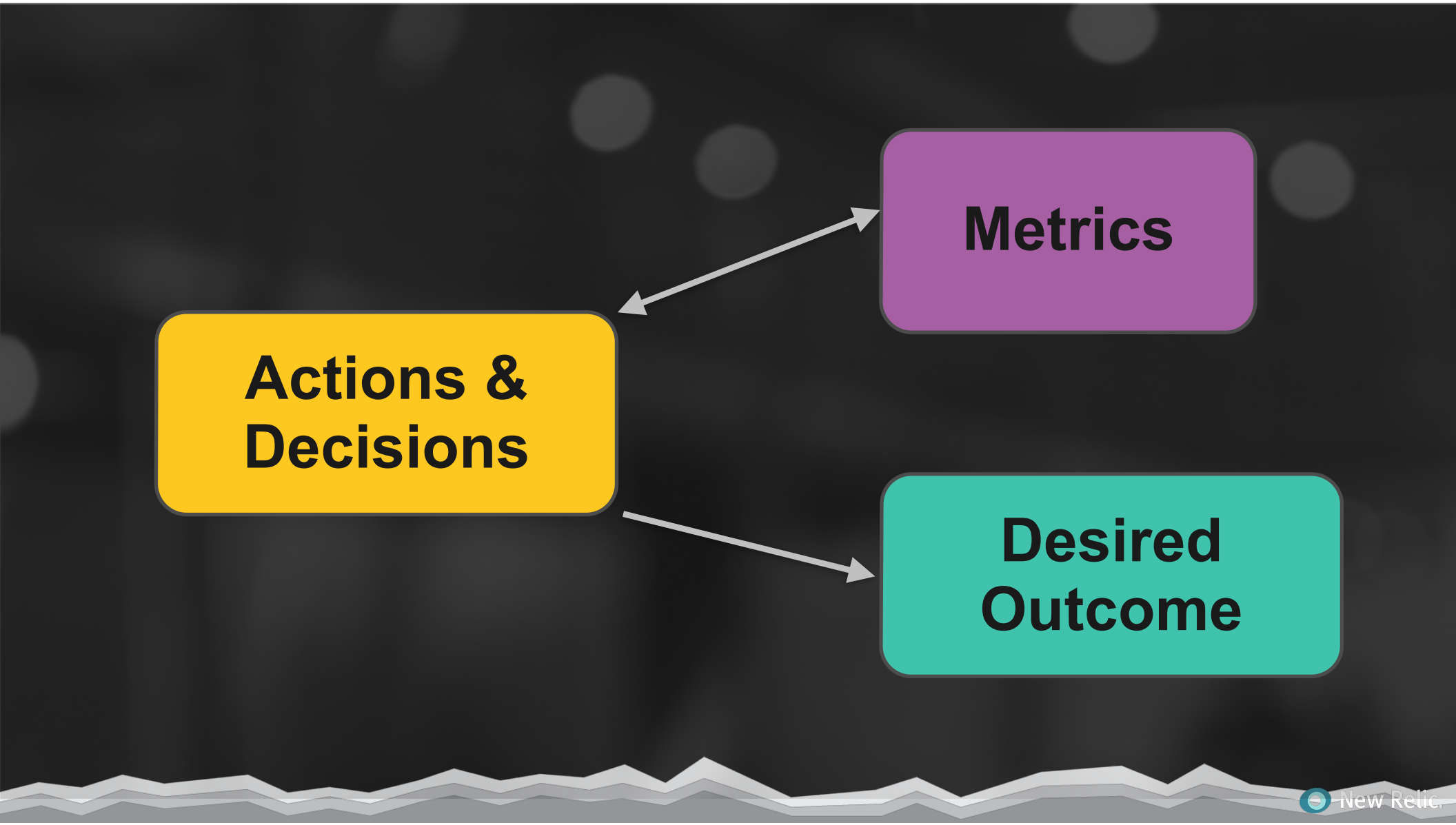
Metrics
Actions &
Decisions
Desired
Outcome
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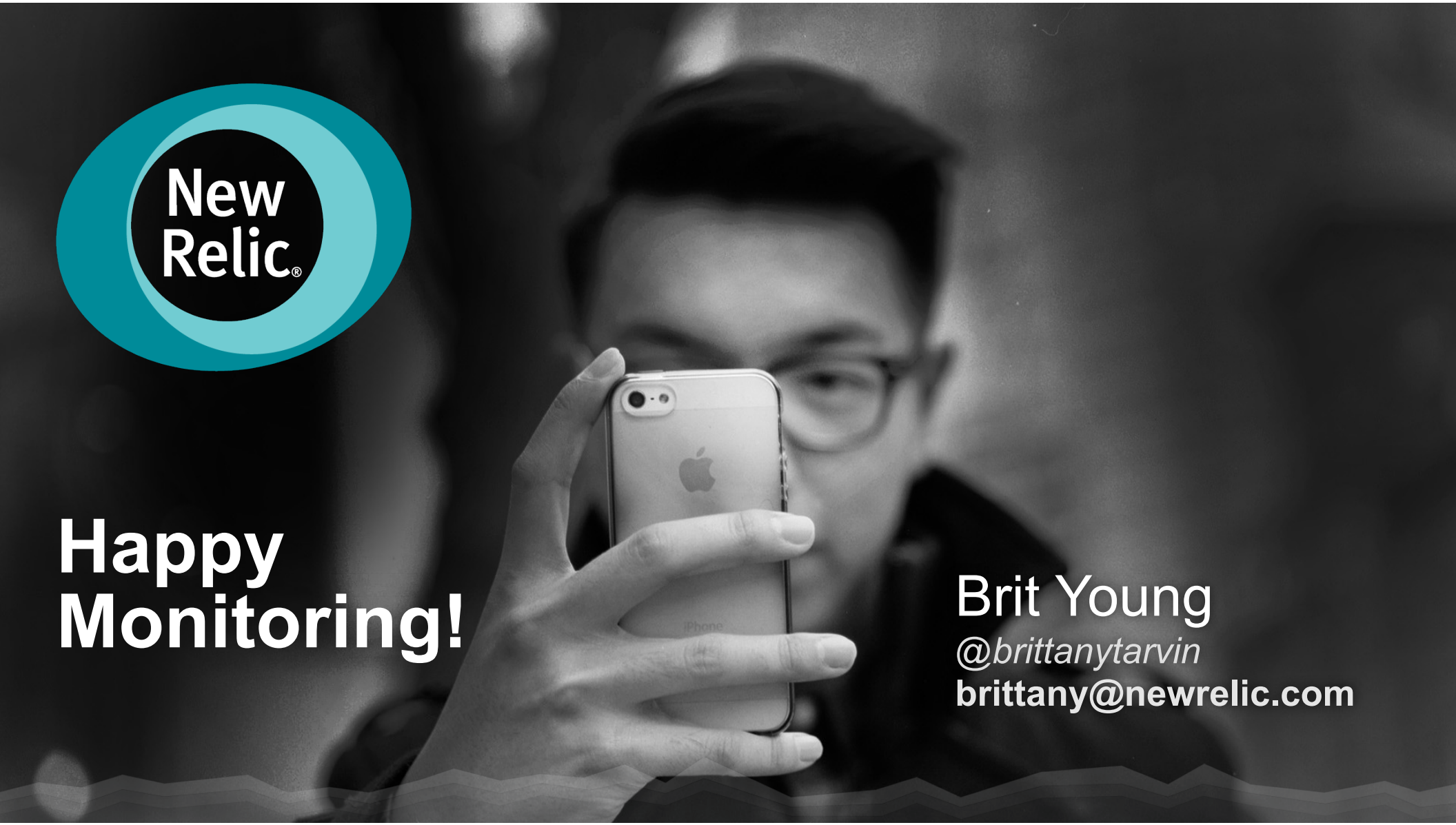
New Relic®
Happy Monitoring!
Brit Young
@brittanytarvin
brittany@newrelic.com