Thinking Architecturally

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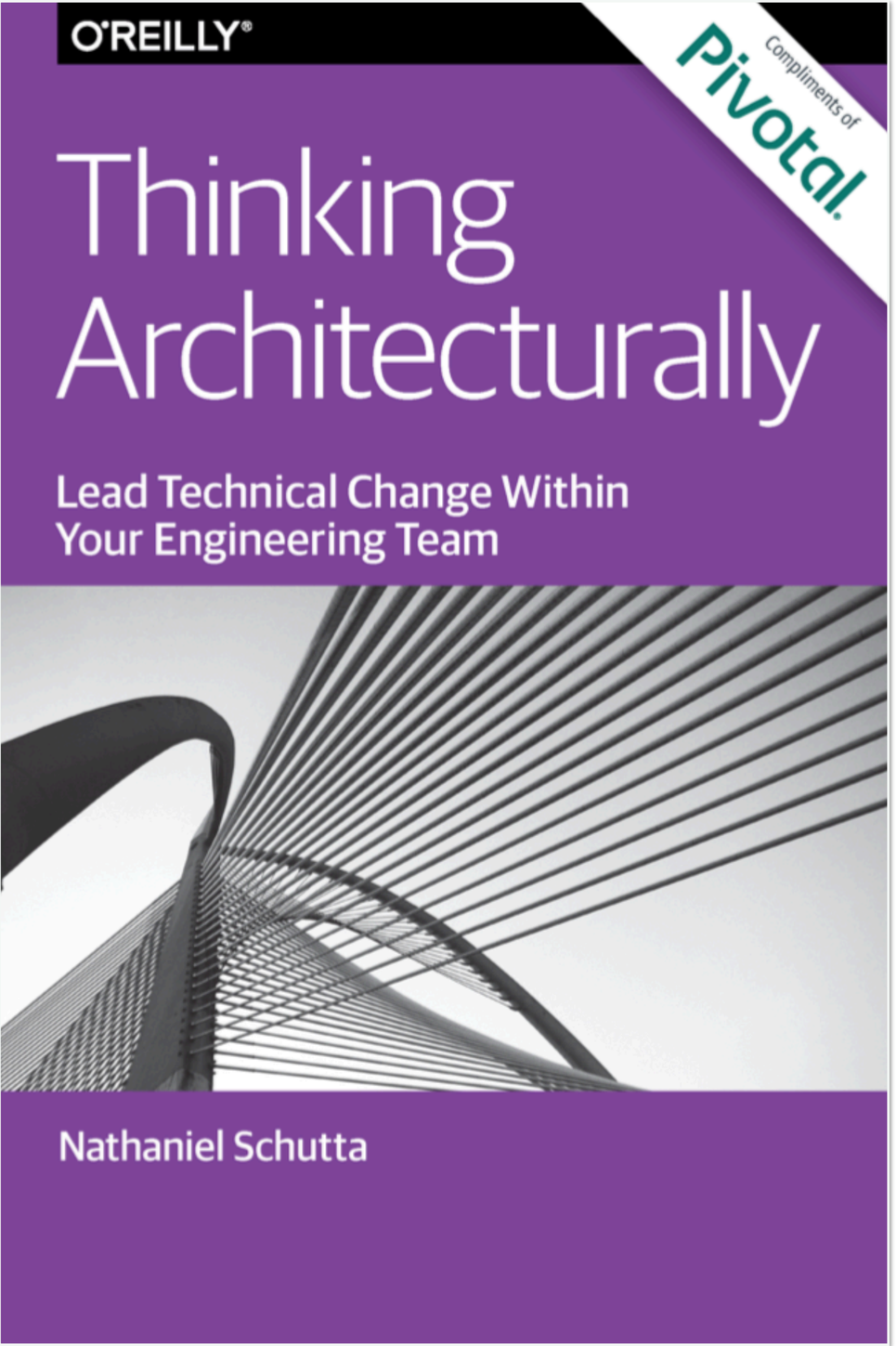


https://content.pivotal.io/ebooks/thinking-architecturally

Architecting is hard…

Many competing agendas.

Technology changes.

Constantly.

Feature not a bug.

Keeps things interesting…

We want to avoid legacy platforms.

But we can’t change
things every few months.

“Our app has 4 different UI frameworks…”

Developers kept chasing the new hotness.

How do we avoid that?

How do we evaluate new technology?

I have no idea what language/ framework/platform is “next”.

No one does.

But I can guarantee you this much:

It will be different than
what we use today.

Five years from now we will be using something that isn’t invented yet.

Chasing the new thing.

Technology changes.

Constantly.

Tempting to always
chase the “new hotness”.

Bleeding edge.

It’s fun!

Part of being in this industry.

Our understanding constantly evolves.

Twitter, Inc.

Thread

Benedict Evans
@BenedictEvans

There are things you understand well enough to have strong opinions on, things you know just well enough to know what others' opinions are, and things where you can have no opinion. The complication in tech is that things move between these categories all the time.

1:42 PM · Dec 30, 2017

70 Retweets **218** Likes

Benedict Evans @BenedictEvans · Dec 30
Replying to @BenedictEvans
In tech, there are:
Things you're starting to learn about
Things you know well
Things you're no longer following
Things you were an expert on but moved on from years ago and half-forgot

In tech, the point that you really understand something is the point it's becoming irrelevant

5 79 193

Benedict Evans @BenedictEvans · Dec 30
For example, I used to know all about radio networks, mobile networks and the Japanese mobile market iMode! IAppli! PHS!). Now, none of that matters. Most questions about smartphones are now moving rapidly down the list as well. On to new questions.

13 2 50

@FemiAbodunde · Dec 30
Replying to @BenedictEvans
🔥🔥🔥🔥The speed of the feed.

Let’s be honest…

Developers have opinions!

Often *very* strong opinions.

Maybe we fear old things?

Twitter, Inc.

Thread

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

It's said that "senior" developers tend to be afraid of learning new things. This has always struck me as absurd, because who hasn't learned a ton of new things over the course of 10+ years of programming? Almost impossible not to.

4 5 18

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

It almost feels as though less experienced developers are projecting their own fears onto others with more experience.

1 1 8

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

I get the sense that many programmers are afraid to learn *old* things. As if the older things are impossibly arcane and complex, compared to the supposed simplicity and elegance of new tech.

1 6 18

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

They have a strong preference for the new. They'd rather use unfinished, buggy, unproven technology than older, refined, stable, tested tech. Even if it reinvents or indeed breaks the wheel.

2 7 15

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

So now there's a of excitement about a "UnicornKit" that combined UIKit and AppKit into one. But do people realize that unless UnicornKit is simply UIKit, you're going to have to learn something else anyway?

1 3 9

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

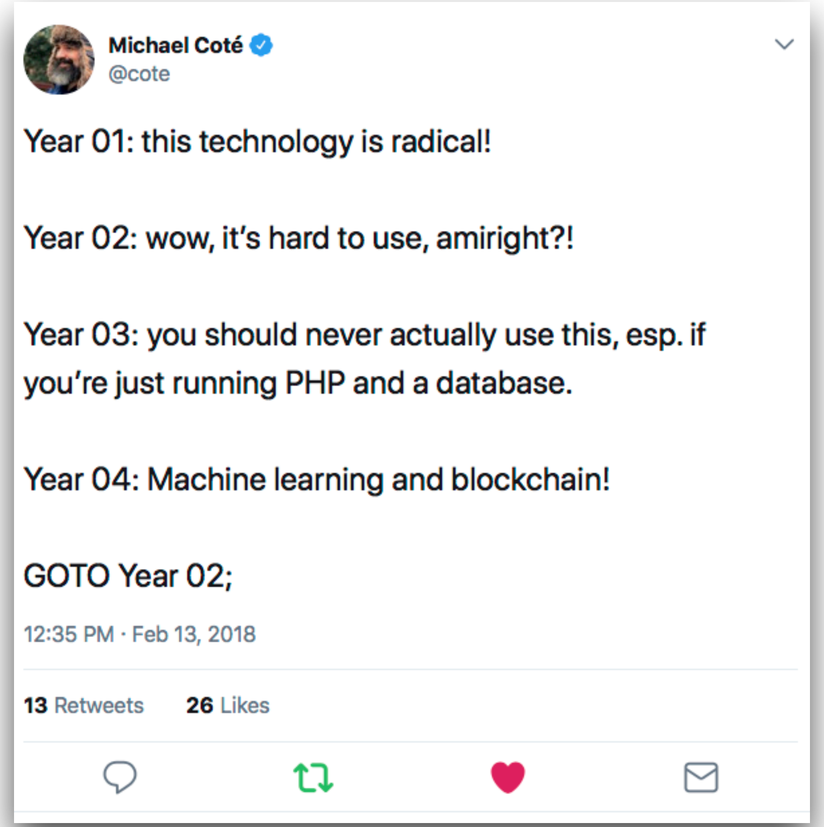
Why is learning UnicornKit harder than learning AppKit? Many developers have successfully written both Mac and iOS apps. It's not as hard as you may think if you have no experience with AppKit.

2 3 8

Jeff Johnson (Mac/iOS developer for hire) @lapcats... · Dec 21

Also, any new technology is going to be chock full of bugs. AppKit has its bugs, yes, but it's assuredly vastly more reliable and stable than UnicornKit.

Predictable hype cycle.



https://mobile.twitter.com/cote/status/963481741171265537

How do we know where **not** to use a technology?

Trial and error.

Developers tend to get bored quickly.

Learning keeps it fresh.

But we have to deliver business value.

Can’t do that if we’re always experimenting.

Have to commit at some point.

Develop some expertise.

Bleeding edge…
means you will bleed!

Joe Armstrong
@joeerl

Dear <redacted>

Thank you for the latest version of your wonderful program with many new features.

Breaking my old code that worked in your previous version is a great idea and will provide me with many hours of fun searching for a work around.

Tearing out my hair
@joeerl

6:28 AM · Nov 15, 2017

73 Retweets **221** Likes

https://mobile.twitter.com/joeerl/status/930774515512201216

Pioneers…the ones with arrows in their backs.

What is your strategy?

How do we avoid dead platforms?

Without constantly changing direction?

Strategy.

Hope is not a strategy!

But it is what rebellions are built on.

We need to be deliberate.

There are a lot of bits out there…

New languages, techniques, approaches.

How do you keep up?

Blogs? Books? Twitter?
Podcasts? Conferences?

Develop a routine.

Block out Friday afternoon.
Tuesday over lunch. Whatever fits.

Consider “morning coffee”.

Take 15-30 minutes in the morning to peruse the tech news.

Before the day gets away from you…

Attention is precious.

"Attention is a bit like real estate, in that they're not making any more of it. Unlike real estate, though, it keeps going up in value."

— Seth Godin

http://sethgodin.typepad.com/seths_blog/2011/07/paying-attention-to-the-attention-economy.html

Don’t waste it.

Be selective.

Can’t read it all.

In fact, you'll miss almost everything.

http://www.npr.org/blogs/monkeysee/2011/04/21/135508305/the-sad-beautiful-fact-that-were-all-going-to-miss-almost-everything

We cannot adopt every new thing.

How do we know where to invest our time?

Hacker's Radar?

http://www.paulgraham.com/javacover.html

“I have a hunch that [Java] won't be a very successful language.”

Never written a line of Java,
glanced at some books.

Need more than just a hunch.

“Judging Covers” can be a useful filter.

But beware bias.

Where is the community?

Are you skating to
where the puck *was* ?

Technology Radar.

https://www.thoughtworks.com/radar

thoughtworks.com

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THEMES FOR THIS EDITION

Sticky Clouds

Once engaged with a cloud provider, customers may find that their relationship becomes stickier over time because of custom features and opticing

Lingering Enterprise Antipatterns

No matter how fast technology changes, the same problems persist: organizations find it

Enduring Engineering Practices

Enduring engineering practices provide the best long term strategy to incorporate the variety

Pace = Distance / Time

The pace of technology innovation continues to increase and is reflected in how long blips remain on our Radar. We modified the Radar creation

Remember Google's 20% time?

Fallen out of favor in some circles…

Innovation Fridays.

Could you carve out Friday afternoons?

How about Tuesday Tech Talks?

Architectural Briefings.

https://github.com/stuarthalloway/presentations/wiki/Architectural-Briefings

One person does some research, presents to the team.

And no, you don’t need to be an architect to present!

Why should we use X?

What do you need to know to answer the “why”?

What do you need to know in order to use X?

Keep it short - 45 minutes.

Not a how to.

Beyond the initial documentation.

These are participatory events!

Attendees should be taking notes.

Asking questions.

Using their own experiences.

Do you agree? Why or why not?

By the way, you are up next week…

Pass the briefing filter?

Hands on time.

Workshop it.

Couple of hours.

A few exercises.

Focus on how to, simple setup.

Pass the hands on filter?

Time to trial it in the organization.

Real project work that is a good fit.

Probably not a “bet the company” project though!

The new hotness is not our only concern though.

Need to stay current on the things we are using day in day out.

heartbleed.com

The Heartbleed Bug

The Heartbleed Bug is a serious vulnerability in the popular OpenSSL cryptographic software library. This weakness allows stealing the information protected, under normal conditions, by the SSL/TLS encryption used to secure the Internet. SSL/TLS provides communication security and privacy over the Internet for applications such as web, email, instant messaging (IM) and some virtual private networks (VPNs).

The Heartbleed bug allows anyone on the Internet to read the memory of the systems protected by the vulnerable versions of the OpenSSL software. This compromises the secret keys used to identify the service providers and to encrypt the traffic, the names and passwords of the users and the actual content. This allows attackers to eavesdrop on communications, steal data directly from the services and users and to impersonate services and users.

What leaks in practice?

We have tested some of our own services from attacker's perspective. We attacked ourselves from outside, without leaving a trace. Without using any privileged information or credentials we were able steal from ourselves the secret keys used for our X.509 certificates, user names and passwords, instant messages, emails and business critical documents and communication.

How to stop the leak?

As long as the vulnerable version of OpenSSL is in use it can be abused. Fixed OpenSSL has been released and now it has to be deployed. Operating system vendors and distribution, appliance vendors, independent software vendors have to adopt the fix and notify their users. Service providers and users have to install the fix as it becomes available for the operating systems, networked appliances and software they use.

BUSINESS
SEP 14 2017, 3:21 PM ET

Equifax Hackers Exploited Months-Old Flaw

by BEN POPKEN

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Equifax announced late Wednesday that the source of the hole in its defenses that enabled hackers to plunder its databases was a massive server bug first revealed in March.

For the rest of the IT world, fixing that flaw was a "hair on fire moment," a security expert said, as companies raced to install patches and secure their servers. But at Equifax, criminals were able to pilfer data from mid-May to July, when the credit bureau says it finally stopped the intrusion.

Equifax, Software Company Blame Each Other for Security Breach 1:52

"We know that criminals exploited a U.S. website application vulnerability," Equifax said in an update on its website Wednesday night. "The vulnerability was Apache Struts CVE-2017-5638." Equifax said it was working with a leading cybersecurity firm, reported to be Mandiant, to investigate the breach. Mandiant declined an NBC News request for comment.

Related: The One Move to Make After Equifax Breach

The Apache Software Foundation, which oversees the Apache Struts project, said in a press release Thursday that a software update to patch the flaw was

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Kelley Blue Book

by Taboola

MORE FROM NBC NEWS

techcrunch.com

Most of the Fortune 100 still use flawed software that led to the Equifax breach

Zack Whittaker

@zackwhittaker / 1 week ago

Almost two years after Equifax's massive hack, the majority of Fortune 100 companies still aren't learning the lessons of using vulnerable software.

In the last six months of 2018, two-thirds of the Fortune 100 companies downloaded a vulnerable version of Apache Struts, the same vulnerable server software that was used by hackers to steal the personal data on close to 150 million consumers, according to data shared by Sonatype, an open-source automation firm.

That's despite almost two years' worth of patched Struts versions being released since the attack.

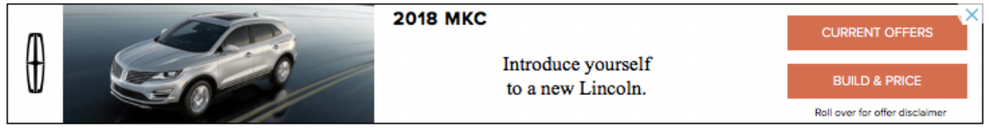
Sonatype wouldn't name the Fortune 100 firms that had downloaded the

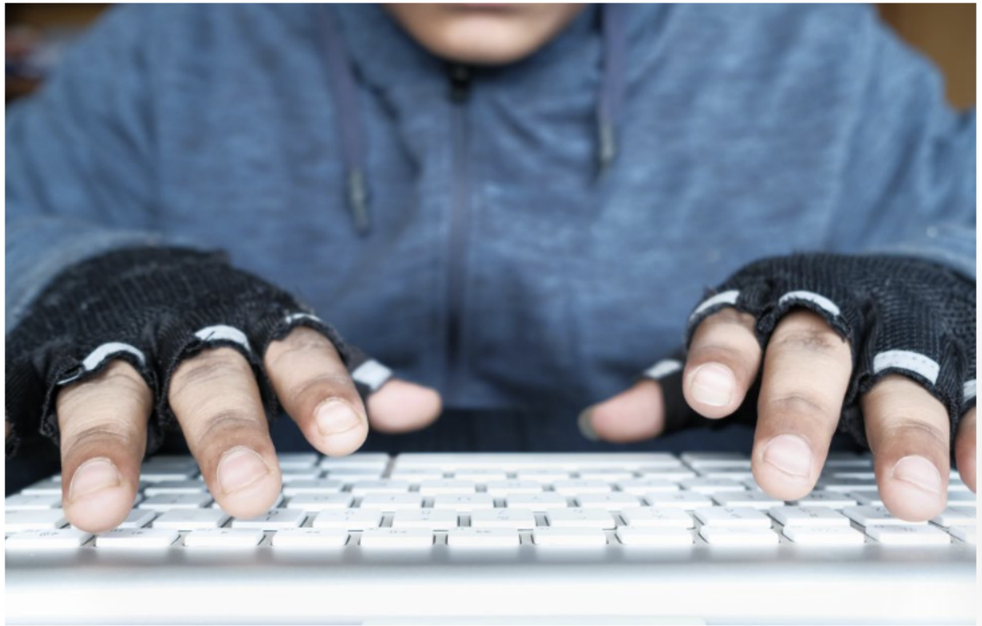
SECURITY / LEER EN ESPAÑOL

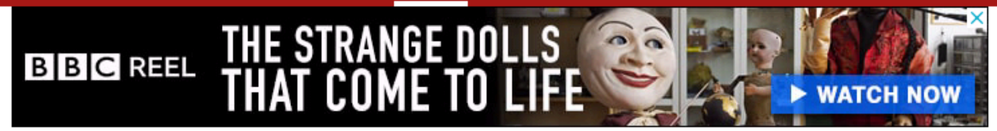
Exactis said to have exposed 340 million records, more than Equifax breach

We hadn't heard of the firm either, but it had data on hundreds of millions of Americans and businesses and leaked it, according to Wired.

BY ABRAR AL-HEETI / JUNE 28, 2018 10:14 AM PDT







Technology

Marriott hack hits 500 million Starwood guests

30 November 2018

Share

Sheraton is one of Marriott's brands

The records of 500 million customers of the hotel group Marriott International have been involved in a data breach.

The hotel chain said the guest reservation database of its Starwood division had been compromised by an unauthorised party.

It said an internal investigation found an attacker had been able to access the

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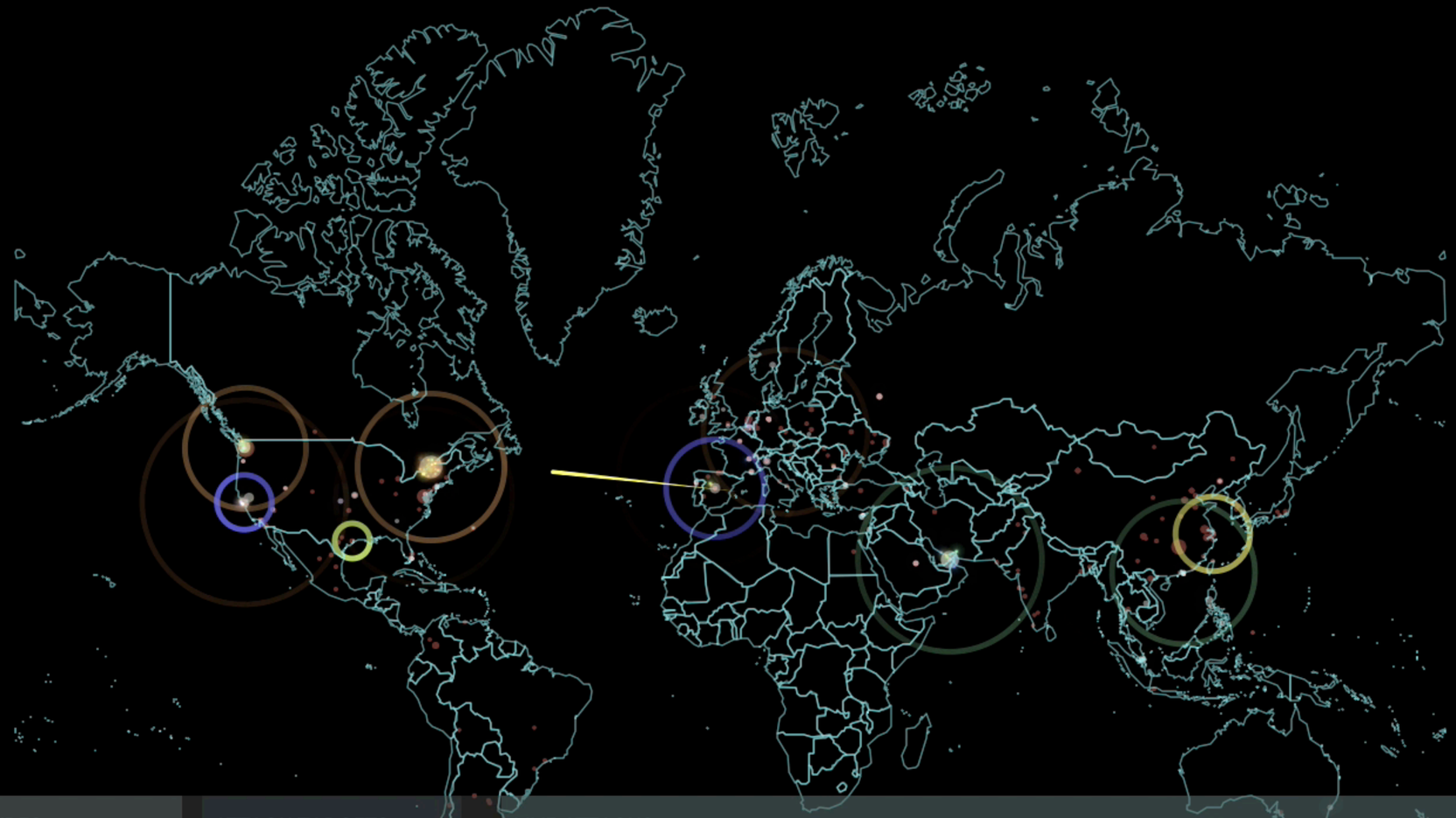
Features

Oops.

Don’t think you’re a target?

map.norsecorp.com

NORSE



ATTACK ORIGINS

#	COUNTRY
525	United States
381	China
34	Ukraine
31	Netherlands
22	South Korea
21	Colombia
18	Switzerland
14	France
13	Vietnam
13	Turkey

ATTACK TYPES

#	PORT	SERVICE TYPE
418	25	smtp
205	23	telnet
192	8080	http-alt
59	3389	ms-wbt-server
41	5900	rfb
35	445	microsoft-ds
31	50864	xsan-filesystem
25	3306	mysql
21	53413	netis-router
18	123	ntp

ATTACK TARGETS

#	COUNTRY
746	United States
278	United Arab Emirates
62	Spain
26	Singapore
25	Italy
17	Philippines
16	France
11	Norway
10	Russia
9	Belgium

LIVE ATTACKS

TIMESTAMP	ATTACKER	ATTACKER IP	ATTACKER GEO	TARGET GEO	ATTACK TYPE	PORT
17:39:01.311	Chinanet Shanghai Province Network	180.168.28.12	Shanghai, CN	Montreal, CA	ctdb	4379
17:39:01.061	Telefonica De Espana	83.52.142.84	Madrid, ES	San Francisco, US	x11	6000
17:39:00.765	Microsoft Corporation	157.56.111.251	Redmond, US	De Kalb Junctio...	smtp	25
17:39:00.414	An Internet Service Provider In Hong Kong.	203.132.205.97	Kowloon, HK	Dubai, AE	ms-wbt-server	3389
17:38:59.932	Xdsl Network-Adsl	90.178.246.150	Louny, CZ	San Francisco, US	telnet	23
17:38:59.485	Microsoft Corporation	65.55.169.248	Washington, US	De Kalb Junctio...	smtp	25
17:38:59.346	Retecal Sociedad Operadora De Telecomunicacio...	81.172.32.177	Leon, ES	De Kalb Junctio...	telnet	23
17:38:58.928	Chinanet Guangxi Province Network	171.107.91.55	Nanning, CN	Madrid, ES	telnet	23
17:38:58.712	This Ip Network Is Used For Internet Security Res...	185.35.62.37	Geneve, CH	Madrid, ES	ntp	123

HOME

EXPLORE

WHY NORSE?

Justin Smith Follow
Identity and Security Geek
Apr 19, 2016 · 8 min read

The Three Rs of Enterprise Security: Rotate, Repave, and Repair

At high velocity, the three Rs starve attacks of the resources they need to grow. It's a complete 180-degree change from the traditional careful aversion to change to mitigate risk. Go fast to stay safer – in other words, speed reduces risk.

—Justin Smith

What is your patching strategy?

What version of X are you on?

Some organizations have a policy of N or N-1.

Do they measure it? Do they enforce it?

What needs to change in your culture to stay at N?

What hurts more? Changing your patching strategy?

Or being on the receiving end of the latest “largest hack ever”?

Pros and Cons.

Every technical choice involves tradeoffs.

When we find ourselves presented with technology that promises to offer us drastic improvements, we need to look for the trade-offs.

— Susan J. Fowler
Production-Ready Microservices

Essence of design.

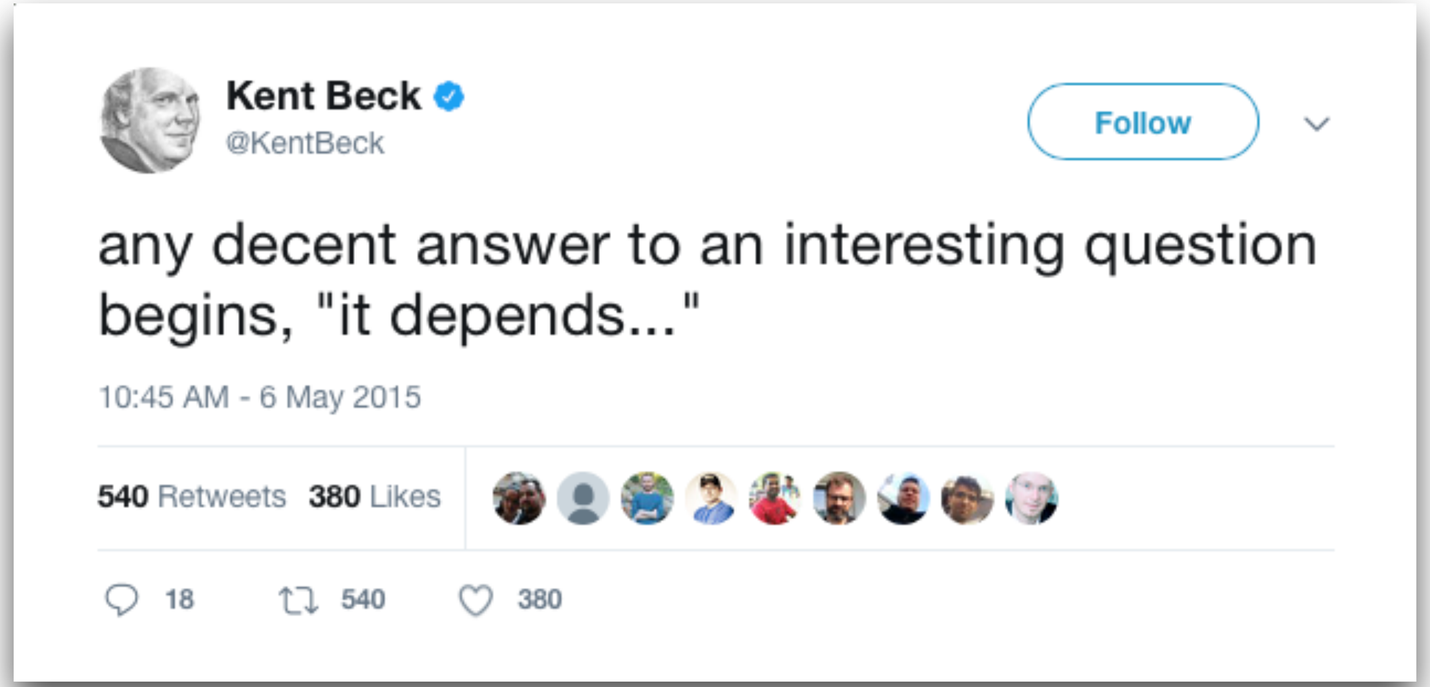
To paraphrase Harry Truman…

Give me a one handed technologist.

Should we use React or Angular?

Should we refactor to microservices?

Should we be on prem
or public cloud?



https://twitter.com/KentBeck/status/596007846887628801

In many cases?

年年 ! !!

Balancing those opposing forces is the art of architecture.

No tech is perfect, don’t pretend it is.

Acknowledge the negatives.

What do you like about it?

What don’t you like about it?

What would you add?

What would you remove?

King of Java for a day…

https://mobile.twitter.com/kelseyhightower/status/963428093292457984

How does it stack up to alternatives?

The spreadsheet approach.

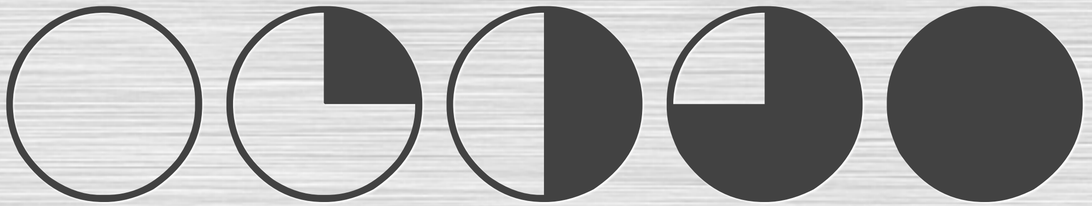
Options across the top.

Criteria down the left.

Criteria can be weighted.

Harvey balls.

http://en.wikipedia.org/wiki/Harvey_Balls



How closely does does it map to the criteria?

Very effective...

	Angular	React
Documentation	●	◕
Community	●	◕
Committer diversity	●	●
Codebase	●	●
Testability	●	●
Update history	◔	◔
Maturity	●	◕

	Angular	React
Stability	●	◕
Extensibility	●	●
Support	●	●
Training	●	●
Hiring	●	◕
Corporate fit	?	?
Usage	●	●

What criteria should you use?

How should they be weighted?

Up to you.

You can tip the scales…

Usually backfires.

Establish principles.

We can’t be everywhere…

We can’t be involved with every decision.

We can establish principles.

Guard rails.

Guide posts.

North stars.

Create the environment within which our projects can thrive.

But how do we know if projects are following our principles?

Fitness functions.

We're all familiar with the second law of thermodynamics…

Otherwise known as a teenagers bedroom.

The universe really
wants to be disordered.

Software is not immune from this!

We go through the thoughtful effort to establish an architecture…

How do we maintain it?

We can’t spend every minute of every day on every project.

How do we ensure teams continue to make good decisions?

We cannot predict the future.

That’s not entirely true.

One constant - change.

Architecture is often defined as the decisions that are hard to change.

Or the decisions we wish we got right.

But we *know* things will change!

Isn’t this approach anti agile?

Contributing factor to the “we’re agile, we don’t have architects” theory.

You definitely have people making architectural decisions!

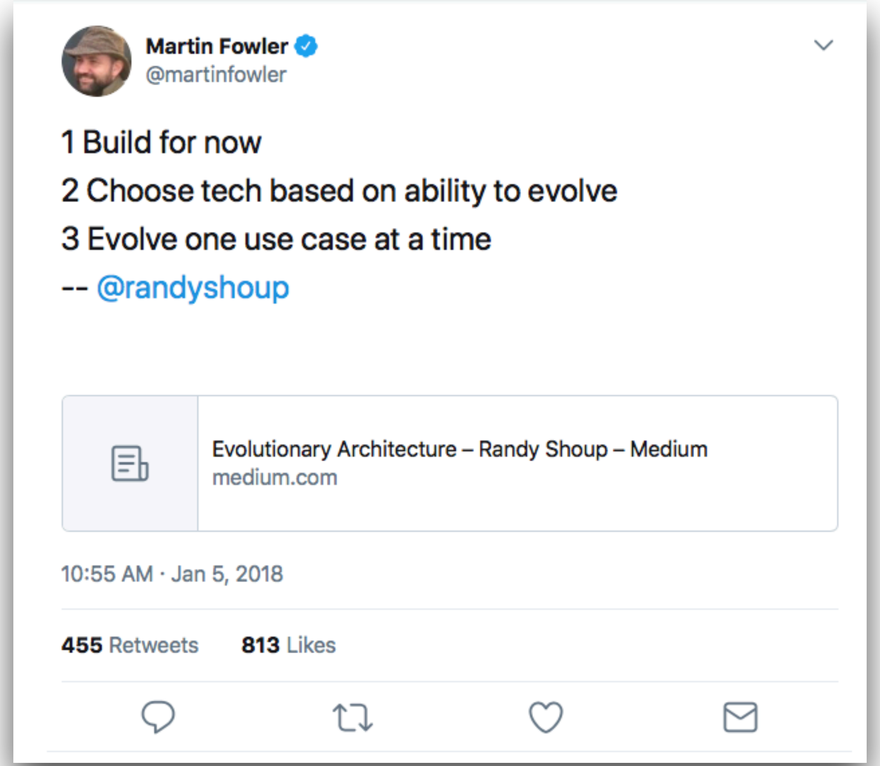
Sure hope they are making good ones…

You’ll know in a year or two.

“Our app has 4 different UI frameworks…”

What do we do about that?

Maybe we should change our assumptions.



https://mobile.twitter.com/martinfowler/status/949323421619548161

Randy Shoup Follow
Jan 4 · 5 min read

Image Source

Evolutionary Architecture

At the GOTO 2014 conferences in Copenhagen and Aarhus, I had the opportunity to have an extended set of conversations with Martin Fowler about an idea he had been turning over recently in his head—"Sacrificial Architectures". Every technology architecture is of necessity temporary, and we should both get comfortable with, and take advantage of, that reality. Coincidentally, I'd also been thinking along similar lines—that it is far more a privilege than a burden to get to rewrite a system you have outgrown. So I was inspired to write down a few thoughts about evolutionary architecture.

Why Are Architectures Temporary?

There is no one perfect architecture for all products and all scales. Any architecture meets a particular set of goals or range of requirements

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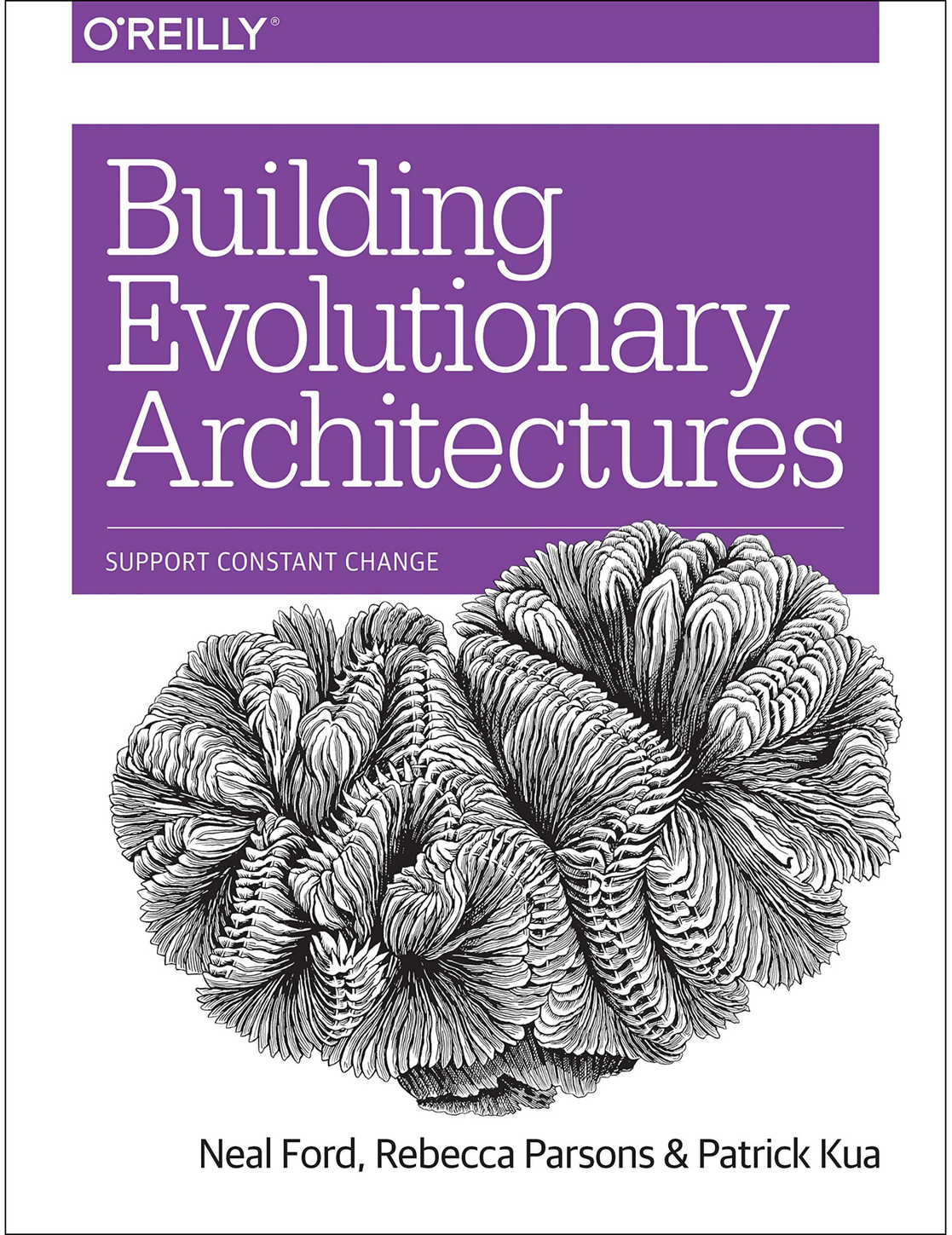
What if our architectures expected to change?

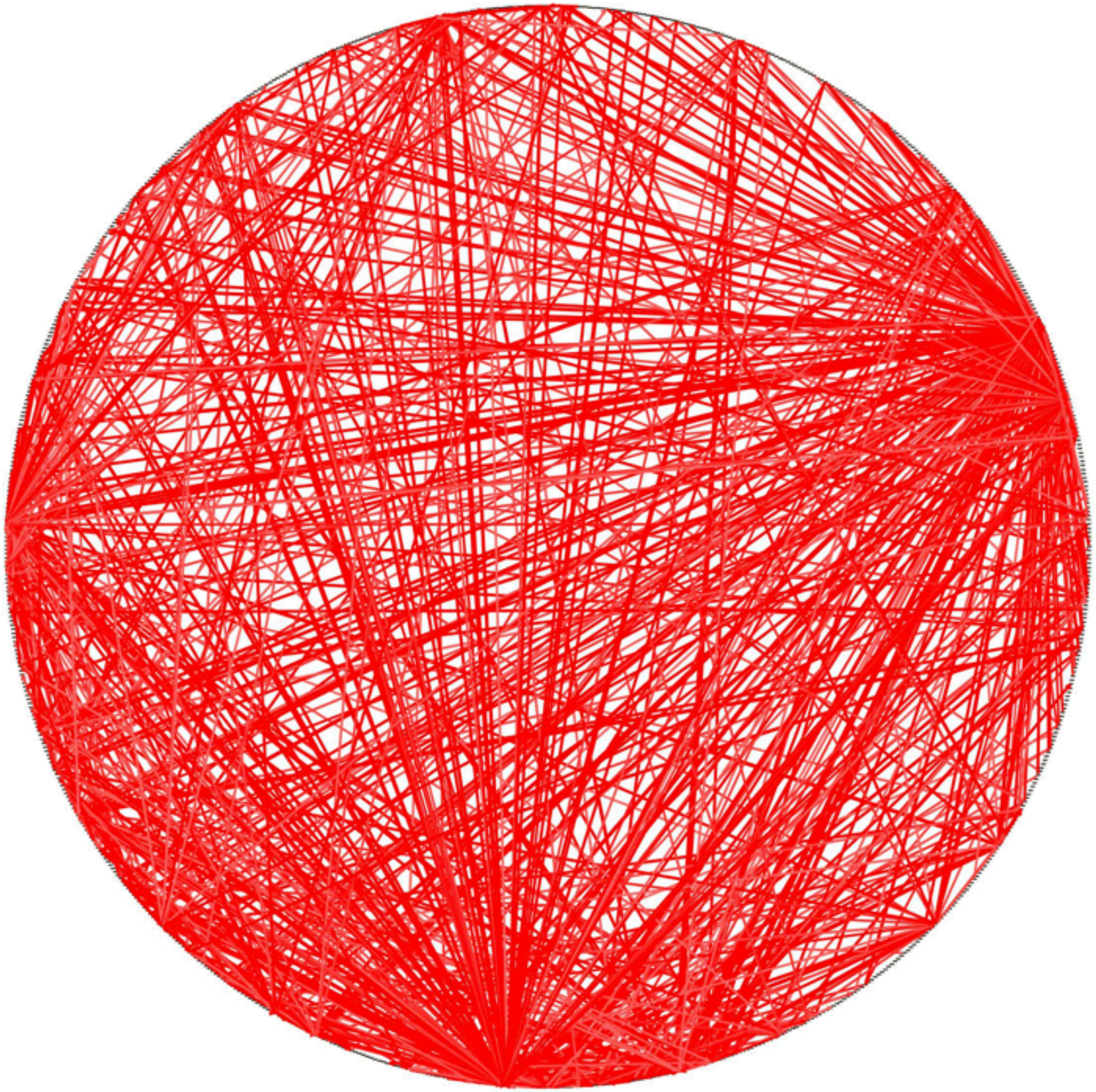


http://evolutionaryarchitecture.com

An evolutionary architecture supports guided, incremental change across multiple dimensions.

— Building Evolutionary Architectures

Some architectures are more evolvable than others…



http://evolutionaryarchitecture.com

Components are deployed,
features are enabled via toggles.

Allows us to change incrementally.

Also perform hypothesis driven development!

But how do we ensure the architecture still meets our needs?

How do we know if a solution violates part of the architecture?

Fitness functions!

Concept comes from evolutionary computing.

Is this mutation a success?

Are we closer to or further from our goal?

For architecture, it is all about protecting the ilities.

And balancing the tradeoffs.

We want to capture and preserve the key architectural characteristics.

First, we need to identify those key measures for project success.

Service Level Indicators if you will.

What can we measure?

Sometimes we let what we can measure dictate too much…

Just because we can measure it doesn’t mean it matters!

Lines of code anyone?

Once we have our metrics,
we can set some goals.

Service Level Objectives.

SLO !== SLA!

Now we can create a fitness function!

Basically, a set of tests we execute to validate our architecture.

How close does this particular design get us to our objectives?

Ideally, all automated. But we may need some manual verifications.

For example…

All service calls must respond within 100 ms.

Cyclomatic complexity shall not exceed X.

Hard failure of an application will spin up a new instance.

NETFLIX

SIMIAN ARMY

https://github.com/Netflix/SimianArmy

Chaos Engineering.

https://medium.com/production-ready/chaos-monkey-for-fun-and-profit-87e2f343db31

Fitness functions remind us what is important in our architecture.

Informs our thinking about tradeoffs.

Different categories of fitness functions.

Atomic vs. Holistic.

Some characteristics must be tested in isolation…others cannot.

Holistic fitness functions test combined features.

We can’t test every possible combination!

Must be selective, driven by the value of the architectural characteristic.

Triggered vs. Continual.

Must consider frequency of execution.

Fitness functions can be triggered by something - checkin, QA pass…

Continual tests are just that.

Monitoring Driven Development!

http://benjiweber.co.uk/blog/2015/03/02/monitoring-check-smells/

Static vs. Dynamic.

Static tests have a fixed result - they either pass or they fail.

Nearly any test based on a metric.

Other fitness functions have a shifting definition of success.

Generally defined within a range of acceptable outcomes.

Automated vs. Manual.

Automation is good!

Ideally most of our fitness functions will live in our deployment pipeline.

Not everything is amenable to automation though…

Legal.

Existing projects.

Temporal fitness functions.

Essentially a reminder.

Check for an upgrade of library X.

Break upon upgrade tests.

Clearly we want to identify fitness functions as early as we can.

The discussion about the tradeoffs is invaluable to our understanding.

Help us prioritize features.

May lead us to break a system up to isolate certain features.

We can’t know everything up front.

Fitness functions will emerge as the system changes.

But we should strive to identify as many as we can up front.

We can also classify fitness functions.

Key - critical decisions.

Relevant - considered but unlikely to influence the architecture.

Not Relevant - won’t impact our decisions.

Can still be very useful to identify the non relevant dimensions!

Keep fitness functions visible!

Need to review the fitness functions.

Are they still relevant?

Are there new dimensions we need to track?

Are there better ways of measuring/ testing our current fitness functions?

Aim for at least an annual review.

Architecting is hard…

We have a lot to juggle!

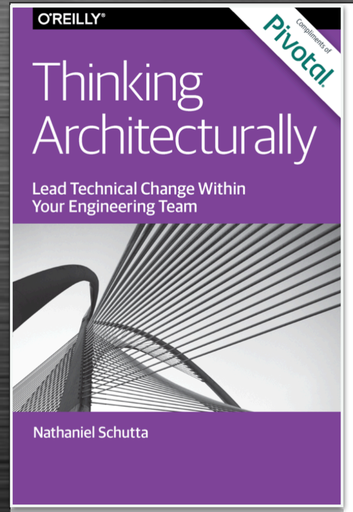
Important that we thing strategically.

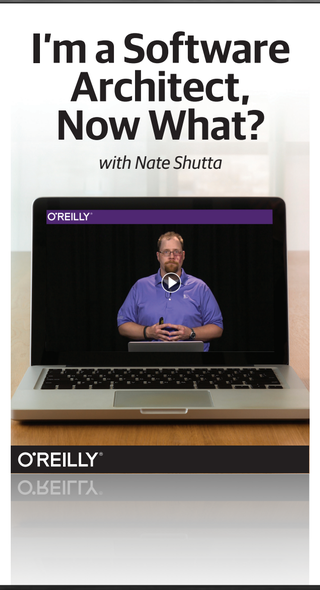
We can’t afford
Resume Driven Design.

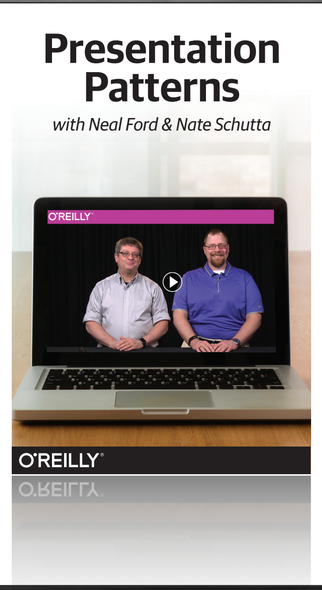
Good luck!

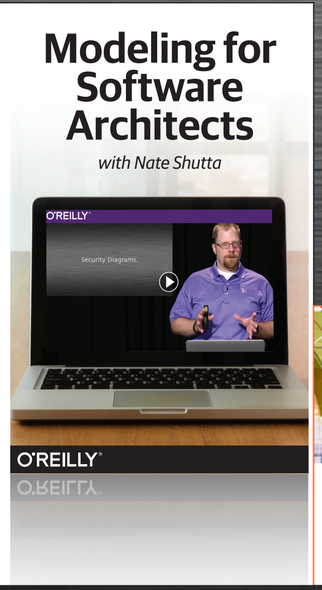
Questions?

Thanks!









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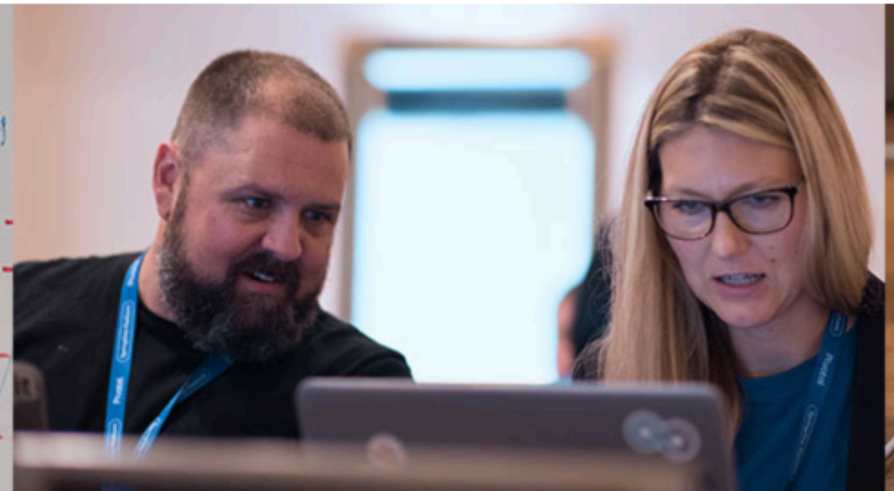

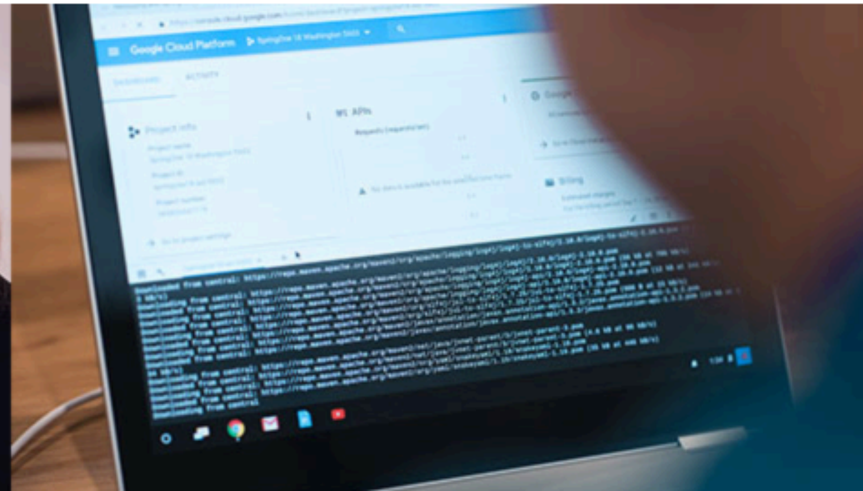

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