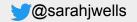
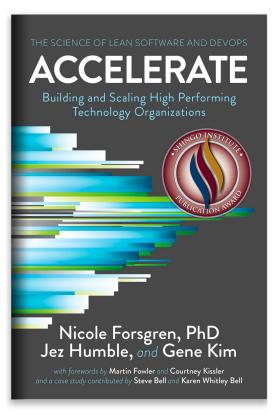
Paving the road to effective software development

**Sarah Wells** 

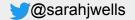




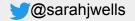




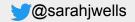
### Loosely coupled architectures



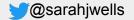
#### **Empowered teams**



Autonomy

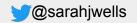


## Autonomy vs standardisation

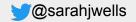


### Benefits of autonomy

- can release on demand
- can choose optimal tools
- happier teams

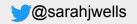


#### THE NEW YORK TIMES TOP 10 BESTSELLER Drive The Surprising **Truth About What Motivates Us 'Provocative and** fascinating' MALCOLM GLADWELL Daniel H. Pink **2 MILLION COPIES SOLD WORLDWIDE**



# Benefits of standardisation

- less complexity
- lower risk
- lower cost
- easier to move between teams



FTSE 100 +0.27%

S&P 500 -0.03% Euro/Dollar -0.12%

Pound/Dollar -0.14%

Brent Crude Oil -1.42%

10 Year US Gov +0.24%

Visit Markets Data

*my***FT** 

<u>≡</u> વ

#### FINANCIAL TIMES

HOME WORLD UK COMPANIES TECH MARKETS CLIMATE OPINION WORK & CAREERS LIFE & ARTS HTSI

**Chinese politics & policy** 

#### China rocked by protests as zero-Covid anger spreads

Tensions run into second day after vigil ends with clashes with police in Shanghai

2 HOURS AGO

Taiwan's Kuomintang boosted by local election results

**66 The FT View.** Chinese takeovers become a geopolitical frontline The editorial board



**UK public services** 

Backlog Britain: How public sector delays spiralled to record levels

Editor's picks

Portfolio Settings & Account



66 The UK government should stop doing stupid stuff

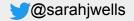


Martin Wolf

66 Industrial strategy demands a new deal with the private sector Mariana Mazzucato

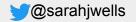
TOP STORIES

### **Paving the road**

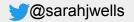


1. Our path to the paved road

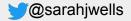
- 2. Principles for building the paved road
- 3. Going off road

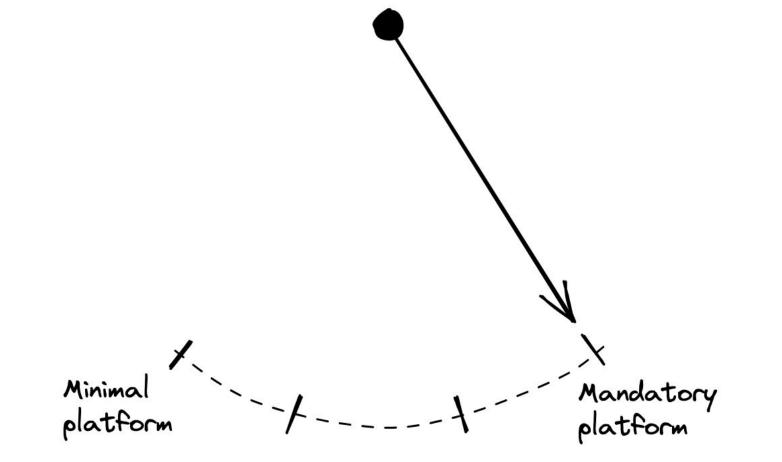


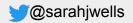
# Our path to the paved road

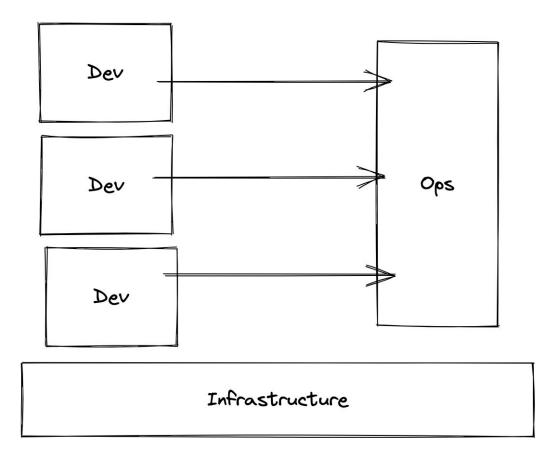


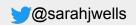
#### **Mandatory platform**

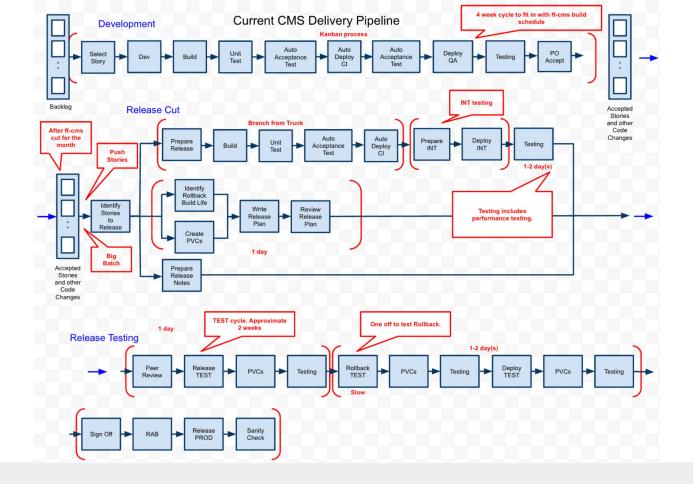


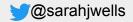


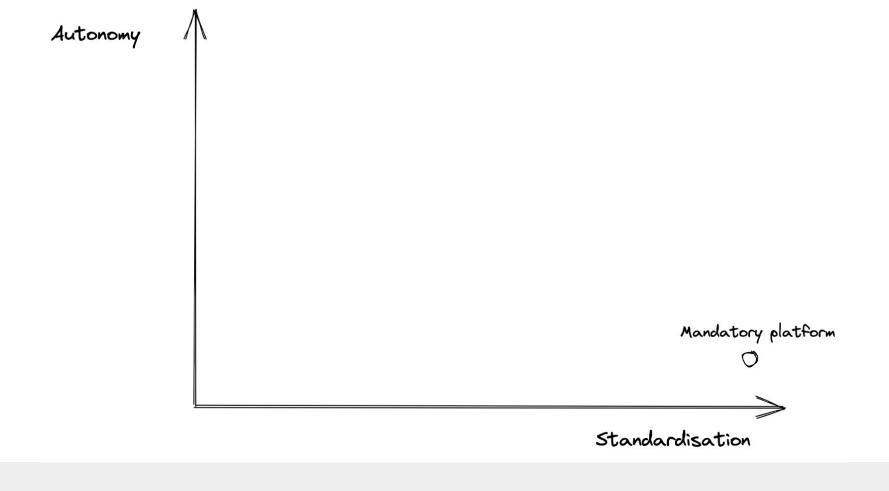


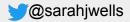




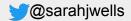


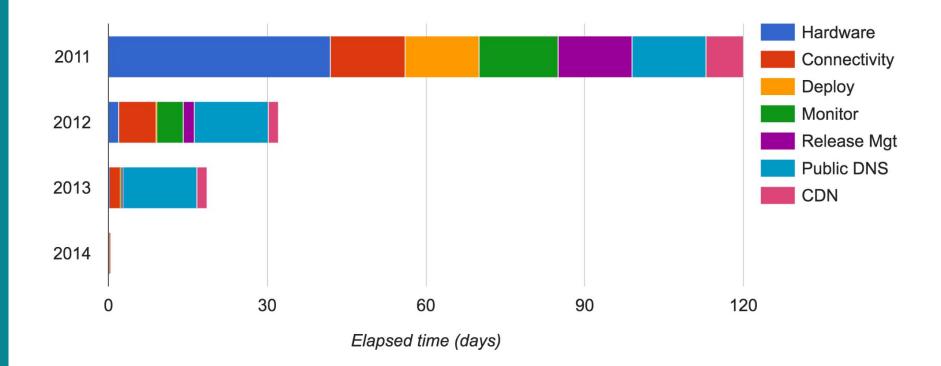


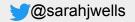


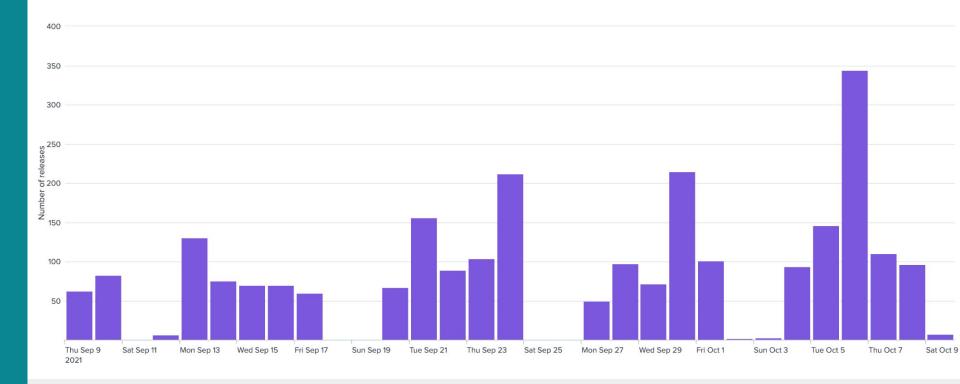


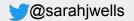
#### **FT platform**



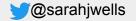


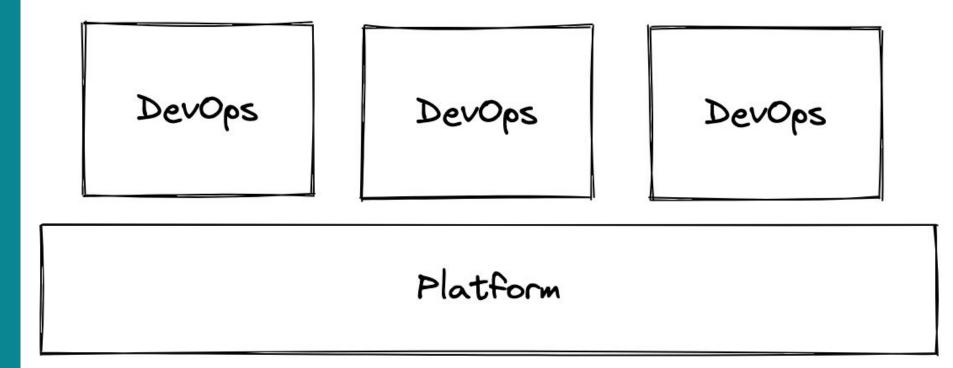


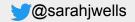


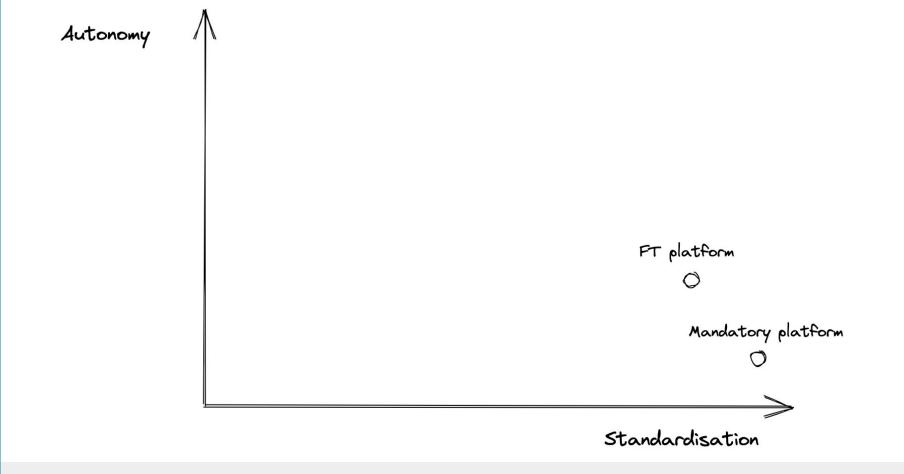


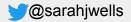
#### "You build it, you run it"



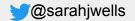




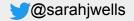




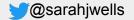
#### Lots of decisions made for you



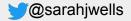
#### All or nothing

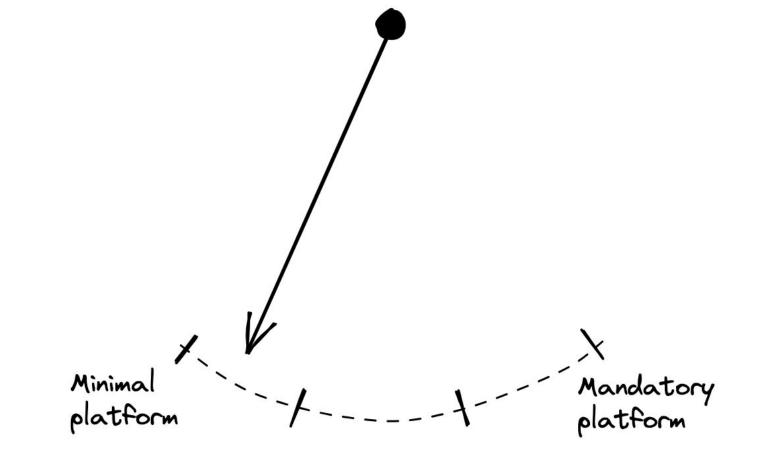


## Teams chose other options

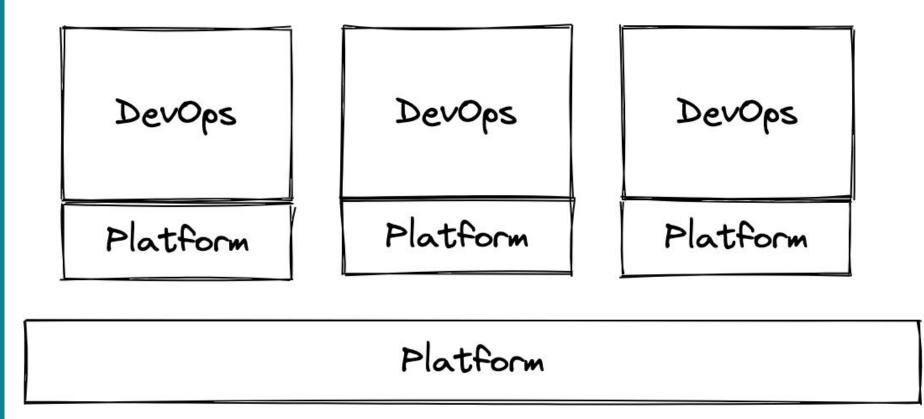


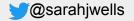
#### **Minimal platform**

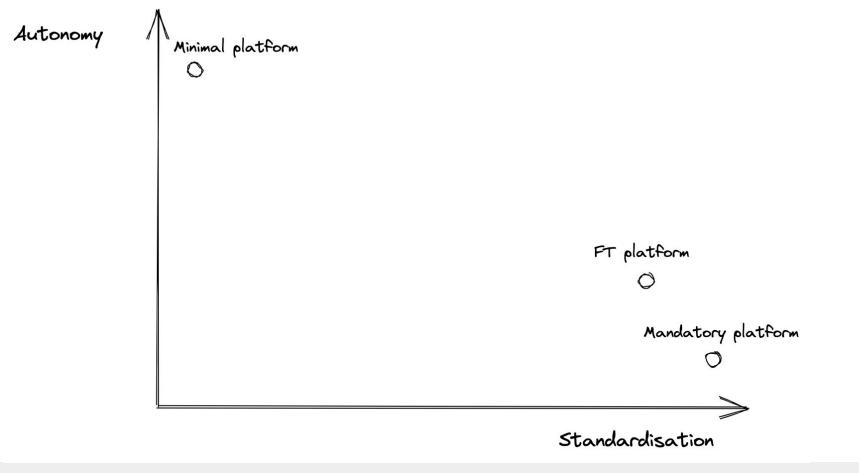


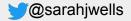




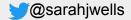




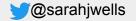




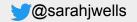




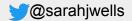
### Too much autonomy, too much risk



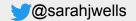
#### What about higher level goals? • Security • Cost control • Operability

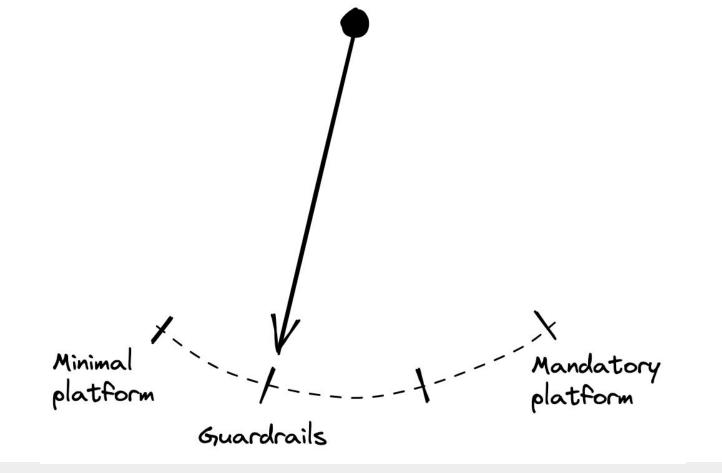


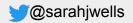
#### Guardrails

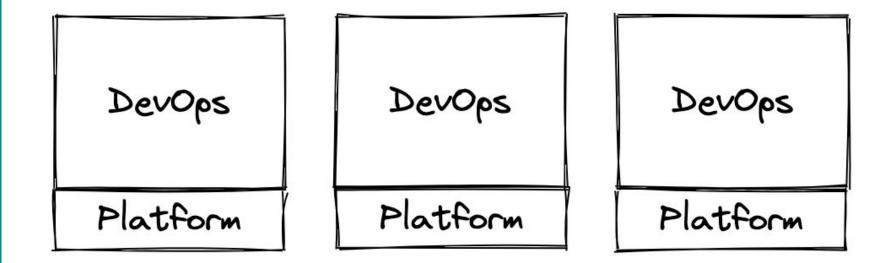


<b>1. Buy vs Build</b> Can you buy something to solve this problem rather than building it?	<b>2. Procurement</b> We need to go through a procurement process for any new relationship with a supplier, whether free or paid	3. TGG Endorsement Changes to the way the FT uses technology should be raised at the Tech Governance Group	4. Adding to Biz Ops Make sure the initial record has been created
5. Security & Privacy We need to build secure products and services	6. Accessibility & Browser Support We need to build websites that meet the needs of our customers	7. Analytics, Logs & Metrics We need to make sure we know how the things we built are used	8. Change & Release Logging All changes made at the FT must be logged
9. Healthchecks & Monitoring Make sure people can tell whether your system is up and working as expected	<b>10. Runbooks</b> Could someone else fix a problem with your service	11. Service Tier & Support Is this brand or business critical or could we wait til the morning to fix it?	<b>12. Performance</b> How would you know if performance started to tank?
13. Cost Management Are you paying over the odds for this?	<b>14. Going Live</b> How to take your system live	15. While the Service is Live Maintaining your service	16. Decommissioning How to turn your service off

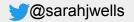




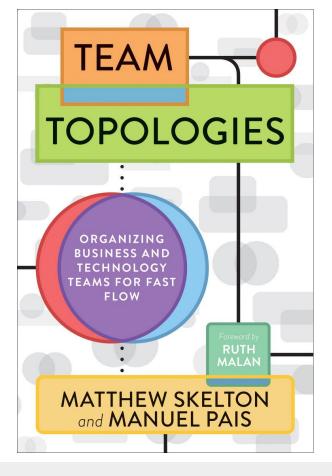


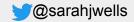




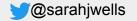


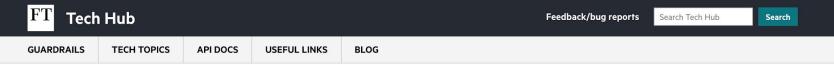
## **Types of team:** • Stream aligned • Platform • Enabling • Complicated sub-system





 Common platforms and services • Expertise • Insight



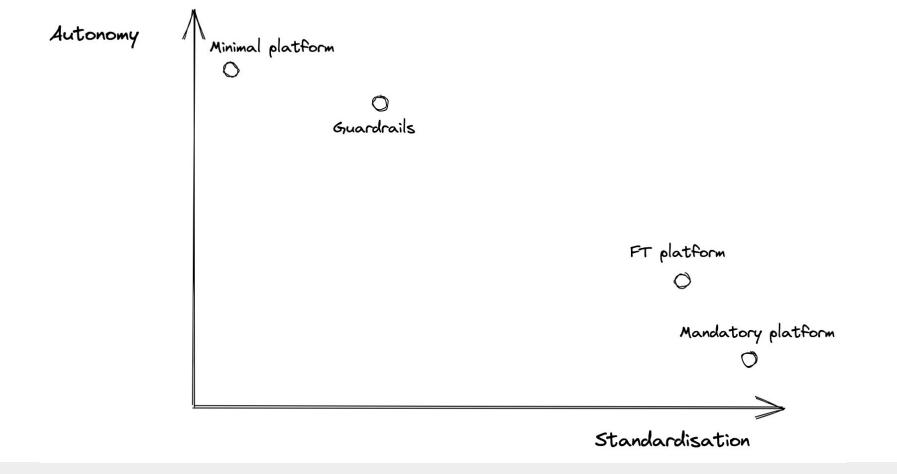


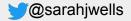
#### **Tech Topics**

Start your journey here and explore one of the topics below.

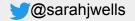
Development Tools	Continuous Delivery	Infrastructure Tools	Amazon Web Services
Hosting	Domain Names & Redirects	Authentication	Content Delivery
Secrets Management	Data & Storage	Metrics	Logging
Monitoring	Operability	Security	Incident Management

What's missing?

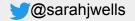




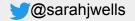
## What happens when another team has to take over a service?

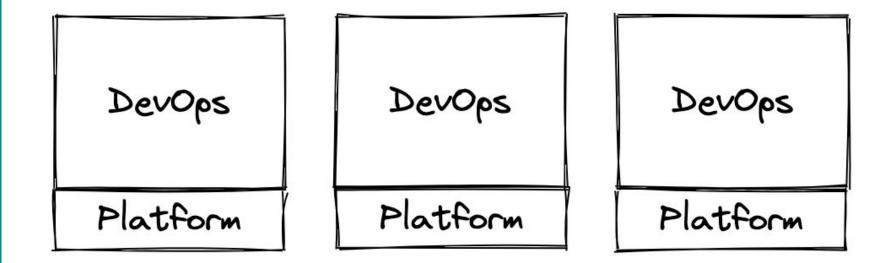


# If everyone works differently, moving people is hard

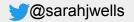


## "Full stack" has to stop somewhere

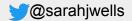






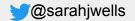


## **Paved road**

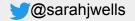




**Fully supported** 



# Not mandatory



More notes and presentations.

#### Free-market software development

#### August 2015

Enabled by thousands of software-as-a-service providers, internal teams are evermore competing against external markets for their colleague's business.

Here's some notes after a few years in working in this environment.

#### Choices, choices

The last few projects I've worked on have broadly followed the mechanics of <u>free</u>market economy, where teams are allowed and encouraged to pick the *best value* tools for the job at hand, be they things developed and supported by internal teams or external to the company.

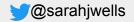
#### For example,

At <u>BBC News</u> we picked <u>GitHub</u> over the internal subversion infrastructure. We dropped the much loved jQuery in favour of a collection of <u>micro-libraries</u>.  $\begin{bmatrix} 1 \end{bmatrix}$ 

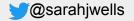
At The Guardian we picked <u>AWS hosting</u> over a nascent internally built cloud platform along with a host of supporting services (Cloudwatch, <u>Pingdom</u>, <u>PagerDuty</u> etc.) to get the project delivered efficiently.

In my <u>current role at Financial Times</u> we've thought hard about everything from <u>programming language</u>, <u>CI</u>, <u>CDNs</u>, <u>hosting</u> and all the other things a happy bit of software needs, some of which are internally sourced, some not.

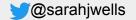
#### http://matt.chadburn.co.uk/notes/teams-as-services.html

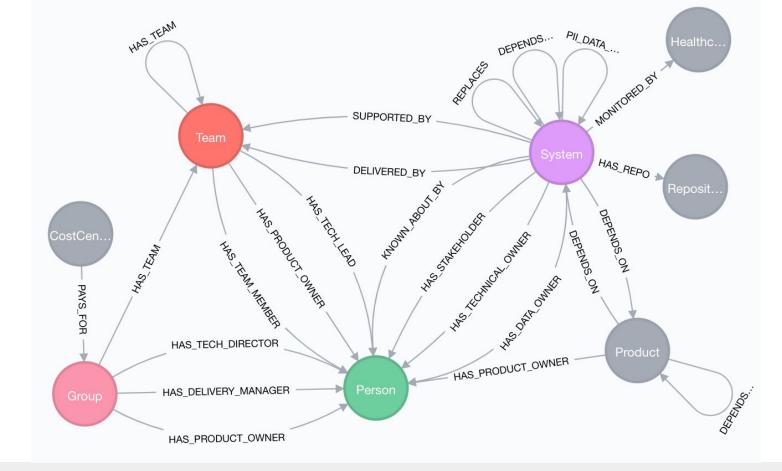


# Teams can go off road

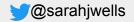


# Need to understand your estate

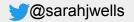




#### Biz Ops: a graph of information



• Clear ownership • Unique codes for each system • Can navigate the graph to answer interesting questions



Sy	/st	em			

A system is characterised as a technology solution which is usually provided via the internet. A system is typically also one or more of the following - delivered by the FT, a subsidiary or a contracted third party - a dependency of one of the above during development or production - commissioned or purchased by the FT from a third party - used by the FT to process personal data

Show more information ~ Create new System

#### GithubTeam

A team belonging to one of the FT organisations in Github

Creation restricted to the following systems: biz-ops-github-importer

#### Package

Create new Package

A library, component, toolkit or other group of code which can be used by systems.

#### Repository

A source code repository. Should generally not be manually created as we have a cron job that regularly syncs from github and bitbucket to Biz Ops

#### Healthcheck

The configuration used to provide monitoring/healthchecks for a system.

Creation restricted to the following systems: biz-ops-github-importer

Create new Healthcheck

HerokuTeam

A subteam created within heroku which contain a set of Heroku applications.

Creation restricted to the following systems: ce-heroku-exporter-forbizops

#### HerokuApp

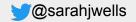
An application created within heroku, belonging to a Heroku team.

Creation restricted to the following systems: ce-heroku-exporter-forbizops

#### FastlyService

Fastly service information

Creation restricted to the following systems: fastly-stats



#### Host

An address on the internet.

#### AWSAccount

An account for Amazon Web Services.

Creation restricted to the following systems: aws-composer-resources, ce-aws-exporter-for-bizops

#### AWSRegion

AWS physical geographic location where they cluster data centers.

Creation restricted to the following systems: aws-composer-resources, ce-aws-exporter-for-bizops

#### AWSResource

A generic AWS Resource.

Creation restricted to the following systems: aws-composer-resources, ce-aws-exporter-for-bizops

#### Create new Host

#### APIGatewayKey

API Keys for FT API Gateway (api.ft.com & api-t.ft.com).

#### Incident

Incident is an event that could lead to a loss, or degradation of the company's operations, services or functions.

#### Creation restricted to the following systems: apigateway, apigatewaybifrost, apigateway-portal

Creation restricted to the following systems: response

#### DNSZone

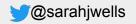
A hosted zone is an Amazon Route 53 concept. A hosted zone is analogous to a traditional DNS zone file; it represents a collection of records that can be managed together, belonging to a single parent domain name.

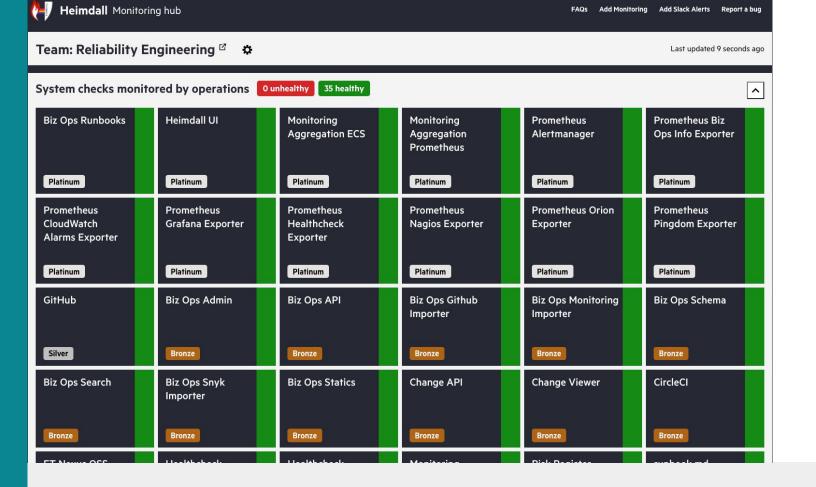
Creation restricted to the following systems: biz-ops-route53-importer

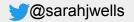
#### Technology

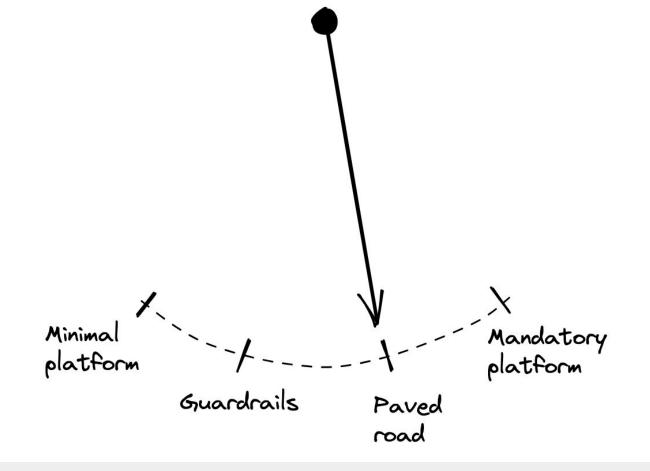
The languages and tools used by teams in the FT

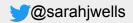
Create new Technology

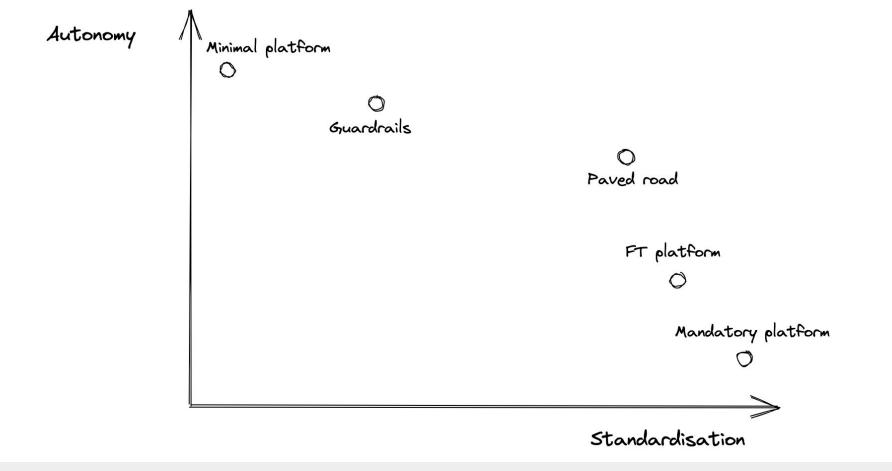


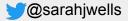












#### **CHARITY.WTF**

### SOFTWARE SPRAWL, THE GOLDEN PATH, AND SCALING TEAMS WITH AGENCY

December 2, 2018

mipsytips

culture, developers, engineering, engineers, operations, scaling, software engineering

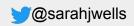


Stop me if you've heard this one before.

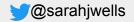
The company is growing like crazy, your engineering team keeps rising to the challenge, and you are ferociously proud of them. But some cracks are beginning to show, and frankly you're a little worried. You have always advocated for engineers to have broad latitude in technical decisions, including choosing languages and tools. This autonomy and culture of ownership is part of how you have successfully hired and retained top talent despite the siren song of the Faceboogles.

But recently you saw something terrifying that you cannot unsee: your company is using *all* the languages, *all* the environments, *all* the databases, *all* the build tools.

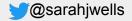
#### https://charity.wtf/2018/12/02/software-sprawl-the-golden-p ath-and-scaling-teams-with-agency/



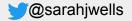
# Principles for building the paved road

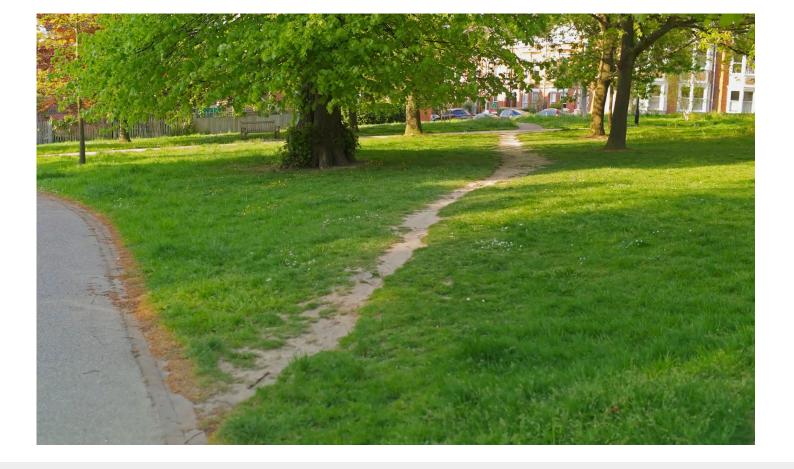


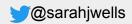
## **Build what people need**



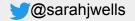
## **Valuable** Solves a problem they have







## Give them something better - and make that clear



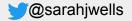
### **New Change API**

Logging the changes to our systems has a number of benefits, including helping to diagnose the cause of incidents. But few systems log changes because the existing Change Request API is too error prone.

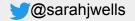
We have now released a new <u>Change API</u>, which is far more resilient and can be integrated confidently into your build pipelines... so please do. It uses FT API gateway for authentication (so you can obtain a key using the new <u>Bifrost tool</u>), can be called from any CI pipeline, including Heroku, and we now have a CircleCI orb we've been trialing with the IP-ETG team.



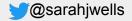
## Reduce the risk of adopting it



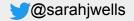
## **Owned and supported**



## Don't make people wait



## **Discoverable** Engineers can find out it exists

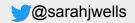


FT Tech	Hub				Feedback/bug reports	Search Tech Hub	Search	
GUARDRAILS	TECH TOPICS	API DOCS	USEFUL LINKS	BLOG				

#### **Tech Topics**

Start your journey here and explore one of the topics below.

Development Tools	Continuous Delivery	Infrastructure Tools	Amazon Web Services
Hosting	Domain Names & <u>Redirects</u>	Authentication	Content Delivery
Secrets Management	Data & Storage	Metrics	Logging
Monitoring	Operability	Security	Incident Management
What's missina?			

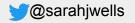




Rhys Evans 10:17 AM

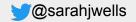
decommission.png 🔻





## Documented

**Step-by-step guides, explainers, reference docs** 



#### What is it?

How do I get access? How do I use it? Health Checks & Alarms Advantages Disadvantages Things to be aware of When should I use it? Links

External Links

#### Route53 DNS

#### What is it?

Route 53 is a DNS service provided by AWS and used by the FT. It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like <u>www.example.com</u> into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other.

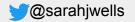
We use a modified version of OctoDNS to manage our Route53 estate via Github for most applications. Some teams support their own hosted zones using Composer for DNS-Prod. This is primarily used for edge cases where teams need dynamic API access to Route53 i.e. when there is a need to change DNS records programmatically. The standard OctoDNS method does not support modifying DNS records outside of the repo.

#### How do I get access?

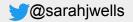
Go to this repo to make changes to our DNS real estate. You can add DNS records and change TTL's.

#### How do I use it?

- 1 Create a new branch in the DNS repo on Github.
- 2 Add or change the relevant DNS records or TTL's (time to live) in the config folder.
- 3 After pushing your branch, make sure that it passes validation on CircleCl. Look at Things to be aware of for possible validation errors mitigation.



### **Self-service** Most of the time, people don't need any help



## DNS changes are made through commits to a github repository

https://medium.com/ft-product-technology/cybernetic-meadow s-how-a-bot-helps-engineers-at-the-ft-24636f6268e3



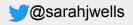
We found that a majority of pull requests got approved with no discussion — none at all. We just hit the Approve button. They were straightforward enough that there wasn't very much to discuss — they were standard DNS additions, or modifications to existing records where the intent was clear.

-	ttl: 60	8100	+	ttl: 86400
	type: CNAME	8101		type: CNAME

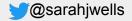
Increasing the time-to-live on a DNS record: not a controversial topic

In other words, business as usual. Wouldn't it be nice if we could have a robot to approve those types of changes, so that engineers didn't have to wait? We thought it would. So we wrote one!

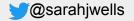
https://medium.com/ft-product-technology/cybernetic-meado ws-how-a-bot-helps-engineers-at-the-ft-24636f6268e3



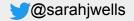
## Make things easy to use



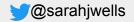
### Easy to get started



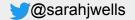
### **Consistent developer experience** If you've used other tools, this should be recognisably similar



## Allow people to extend and adapt



## Independent yet composable



#### **FT-Serverless-Blueprints**

A collection of guides and explainers for building serverless applications using the Serverless framework.

#### **Getting started with the Serverless Framework**

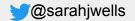
If you are new to the Serverless framework please start with the links below.

- Introduction to the Serverless framework for AWS
- Install the Serverless framework
- How do I build and deploy an AWS Lambda function using the Serverless framework? Use the serverless framework to build and deploy a lambda function that returns a simple 'Hello Serverless' message.

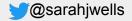
#### How-to guides

- Get a JSON object from S3 A lambda function that retrieves an object from an S3 bucket and returns its contents as JSON.
- Read an item from DynamoDB A lambda function that retrieves an item by identity from DynamoDB.
- Manage items in DynamoDB A collection of lambda functions which can create, read, update or delete items in DynamoDB.
- Perform an API Get Request An API gateway endpoint that triggers a lambda to read an item from DynamoDB.
- Implement a REST API A REST API that triggers a series of lambda functions which can create, read, update

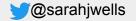
## **Automation friendly**



## Help people do the right thing



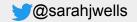
## People shouldn't need to read the guardrails



You need to create a Biz Ops record to get to production

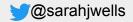
### 4. Adding to Biz Ops

Make sure the initial record has been created



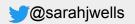
### 10. Runbooks

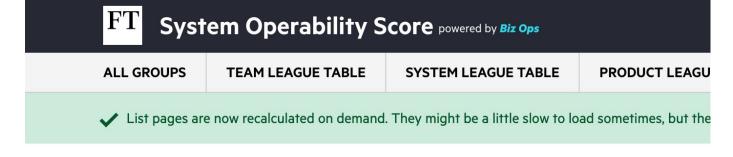
Could someone else fix a problem with your service



FT System Operability Score powered by Biz Ops						
ALL GROUPS TEAM LE	. GROUPS TEAM LEAGUE TABLE SYSTEM LEAGUE TABLE PRODUCT LEAGUE TABLE ABOUT					
ALL GROUPS > ENGINEERING ENABLEMENT > RELIABILITY ENGINEERING > PROMETHEUS-GRAFANA-EXPORTER						
System: prometheus-grafana-exporter Platinum Production						
Score: 91% Rescore Score updated: October 12021 Bear in mind that the scoring rules are a work in progress. In some cases (particularly with regard to third party systems) they won't						
always make perfect sense, so use your discretion. Not getting   100% is normal for now. Fixing all the things you know how to fix   is the main thing to aim for.						
Fix these errors in BizOps View runbook New here? Find out what to do next						
Runbook aspect 💠	Status o	Failings 🗧			Remedial actions ¢	
dependencies Error Error: Dependency on ft-grafana, which is marked as discontinued - that can't be right! Critical: Dependency on ft-grafana, of lower service tier Gold, is an operational risk. If you employ some architectural pattern to improve resilience, please add details https://github.com/Financial-Times/biz-ops- admin/blob/master/docs/dependency-details.md					-	
failover	Error	Error: FailoverDetails is not allowed to be empty				
architecture	Error	Error: Architecture is not alle Warning: Architecture is not Info: Architecture is not allow	allowed to be empty		-	
	· · ·					

moreInformation Warning Warning: MoreInformation is not allowed to be empty

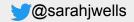




#### Average system score: 88%

Groups leaderboard - see bottom of page for detail





12:35 PM

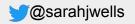
🤎 I'll just leave this here .... @sarah.wells 🙂 🍈



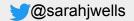
Screen Shot 2019-09-11 at 12.33.04.png 💌

All groups (14)			
Group name ¢	Position 0	Number of systems $\diamond$	Average system score ∽
Enterprise Services	1	209	94%
Operations & Reliability	2	78	92%
Scout and NAR	3	2	81%
FT Core	5	443	78%
Internal Products	4	213	78%
Customer Products	6	210	77%

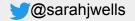




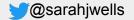
### **Safe to use** Sensible defaults, small blast radius



## **Secure and compliant** Security issues are fixed for you, policies complied with



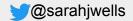
## **Reliable** The right level of availability, scalability, performance



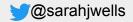
fail 537 pass

#### **☆** Settings

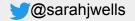
Platinum (105)	Gold (69)	Silver (31)	Bronze (325)	
SecurEnvoy Decommissioned	Acronis Files Connect(AFC) File Servers & Network Storage	Microsoft Office 365 Tenant	Next Newsletter Signup	
Platinum	Gold	Silver	Bronze	
UPP - Notifications Push Monitor	Citrix (New Farm; Methode, Financial Apps, Palms, Archimedes)	API Gateway Endpoints - Silver	Microsoft Azure Sync Services	
Platinum	Gold	Silver	Bronze	
Exponea - FT Pink	ECS Service for Grafana	Newspaper Distributors	SCCM	
Platinum	Gold	Silver	Bronze	
API Gateway Endpoints - Platinum	API Gateway Endpoints - Gold	Vault	Microsoft BitLocker Administration and Monitoring	
Platinum	Cald	Silver	Bronze	



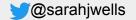
## **Going off road**



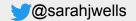
# If the capability doesn't exist



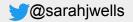
# Must comply with the guardrails



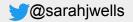
# Need a plan for the long term



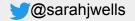
## log4shell



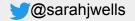
## Wrapping up



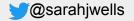
## Paving the road helps balance autonomy and standardisation



# Focus on the most important work



# Focus on the most interesting work



### "organisations want developers to spend more time coding and less time thinking about and working on infrastructure"

https://redmonk.com/jgovernor/2022/02/21/what-is-developer -experience-a-roundup-of-links-and-goodness/



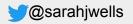
"Why would a developer put up with a poor developer experience when they can likely find a job that better aligns with their needs and preferences?"

https://redmonk.com/jgovernor/2022/02/21/what-is-developer -experience-a-roundup-of-links-and-goodness/



### **Principles for building the paved road**

- 1. Build what people need
- 2. Support them long term
- 3. Don't make people wait
- 4. Make things easy to use
- 5. Allow people to extend and adapt
- 6. Help people do the right thing







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