Platform Engineering

Mathieu Benoit
Customer Engineer @ Humanitec

Agile Québec - September 7th, 2023

whoami

- (2004) Java / UNIX
- (2005) Agile/Scrum
- .NET Windows
- (2008) ASP.NET
- (2010) Azure
- DevOps
- (2016) Docker/Kubernetes
- Terraform
- Cloud Native Security
- (2020) GCP
- Platform Engineering
- AWS

Product Developer

Platform Enabler

Continuous Learner

Google Cloud Developer Expert

Agenda

Lessons learned and success criteria for your own Platform Engineering practice

What's DevOps?

What's Platform Engineering?

What makes a Platform successful?

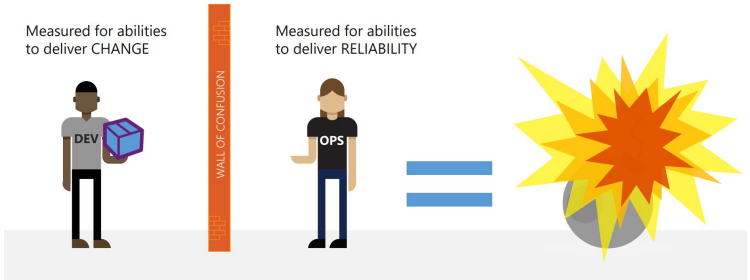
Which tools and technologies to use?

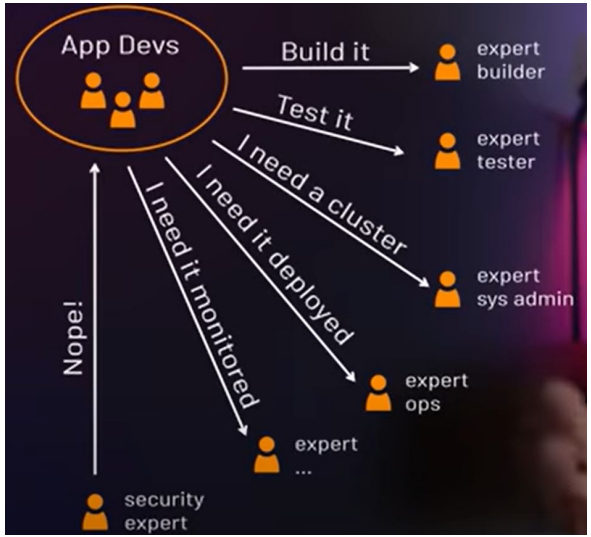
Quick demo!

Where to start?

Q&A

Where DevOps is coming from?

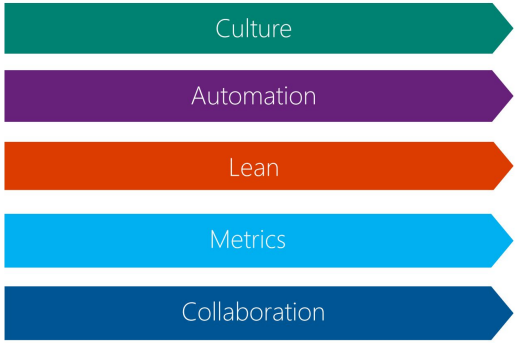


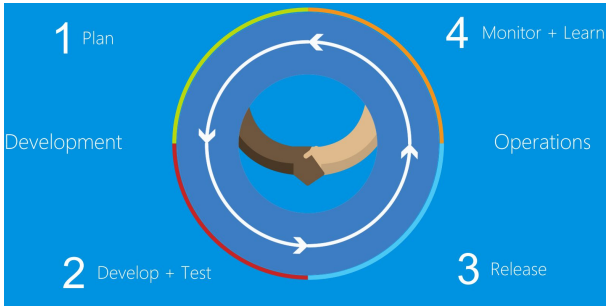


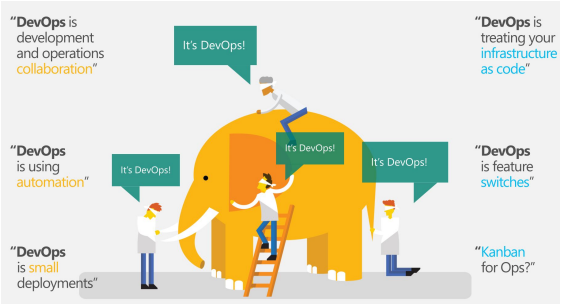
What is DevOps?

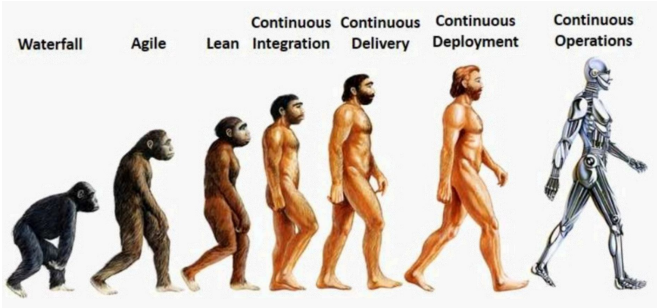
DevOps Mindset (2009): [The rise of the DevOps mindset - Stack Overflow]

5 pilars

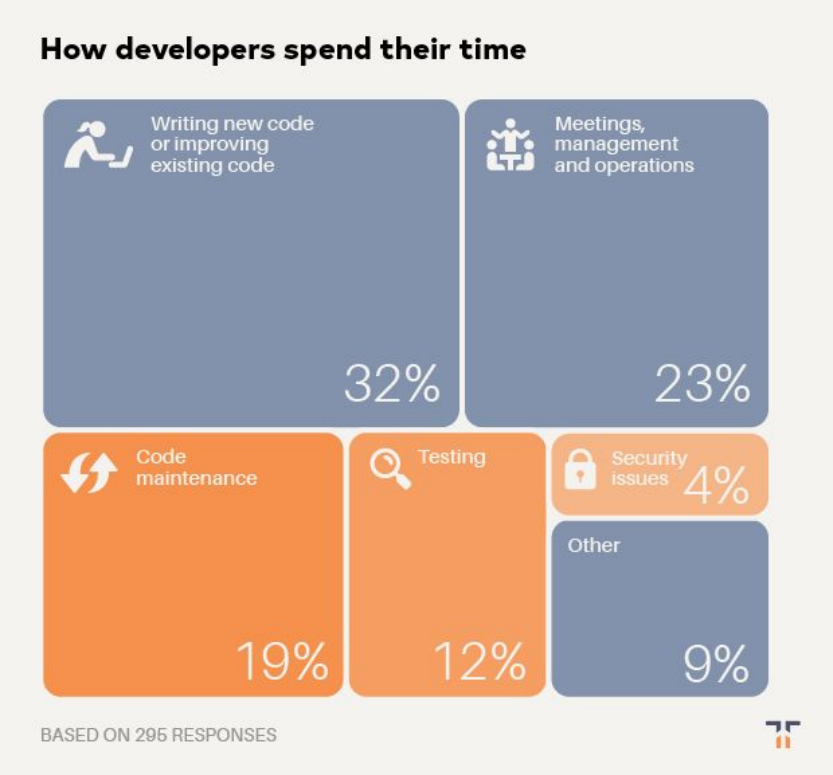


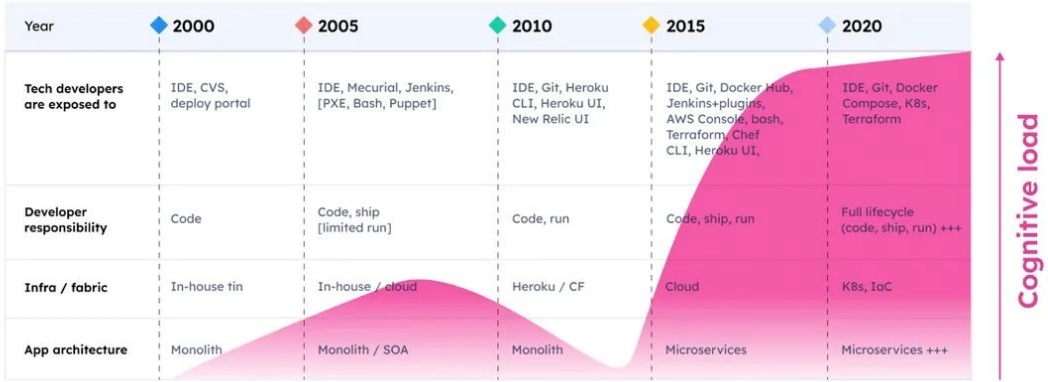






*“The DevOps movement is built around a group of people who believe that the application of a **combination** of appropriate **technology** and **attitude** can revolutionise the world of **software development and delivery**.” - Patrick Debois, 2010*

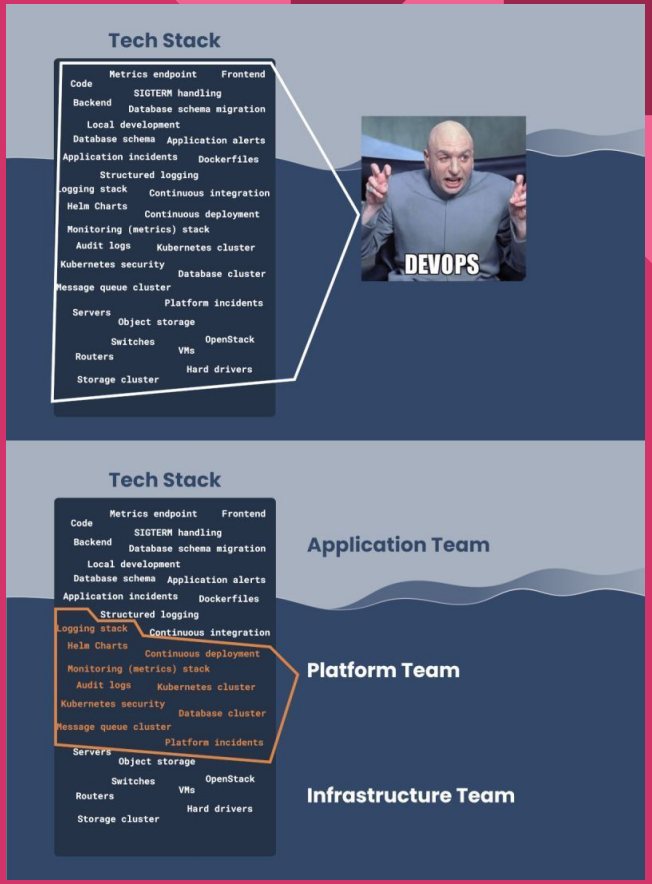




“You build it, you run it.”
- Amazon’s CTO
Werner Vogels (2006)

How Much Time Do Developers Spend Actually Writing Code? - The New Stack

DevOps is dead, long live Platform Engineering!



Platform and **Program** Teams

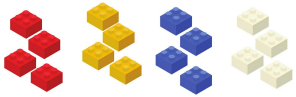
> *"**After a huge amount of data collecting, thinking and debating among many folks across the company**, we are ready to launch Programs & Platforms! (Attached to this email) you'll find out whether you're on a Program or Platform team, and where your seat will be with your new team." - Uber (2014)*

Program

long-lived, cross-functional (BE, FE, AI, etc.), external customers, focused on a business mission

Platform

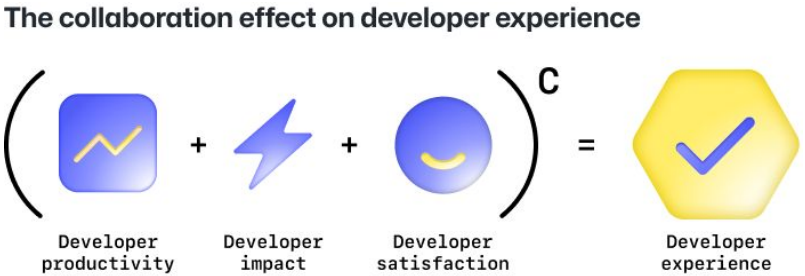
focused on a technical mission, specialized and rarely cross-functional, customers are engineering teams and are internal, consumed by multiple verticals (programs and platforms)



Developer eXperience - reducing the cognitive load

*“The cognitive load involved in a task is the **cognitive effort** (or **amount of information processing**) required by a person to **perform this task**.” (Reif, 2010)*

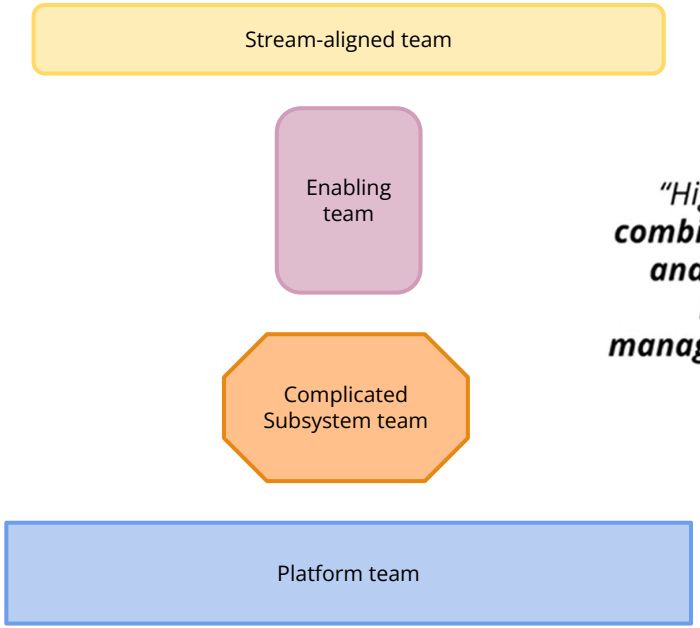
*“Developer eXperience is about creating an **environment** in which a developer can do their **best work**.” -* James Governor from Redmonk (2022)



Developer experience: What is it and why should you care? - The GitHub Blog

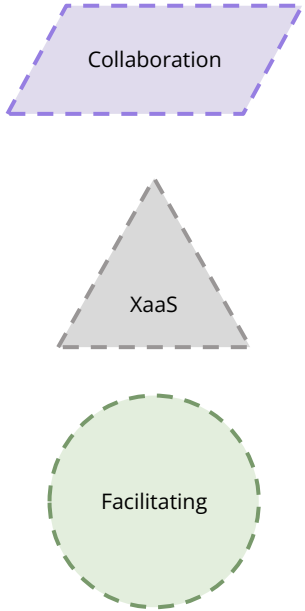
Organizing Teams for fast flow

4 Team Types



*"Highly evolved firms use a **combination of stream-aligned and platform teams** as the most effective way to **manage cognitive load at scale**"*

3 Interaction Modes



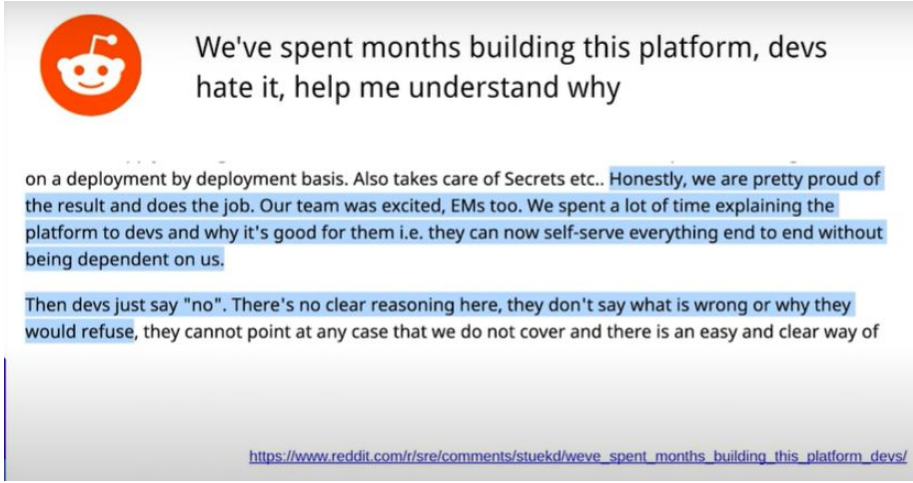
Team Topologies (2019)

What’s makes a Platform successful?

What's a Platform?

*"A digital platform is a **foundation of self-service APIs, tools, services, knowledge and support** which are arranged as a compelling internal product. **Autonomous delivery teams** can make use of the platform to **deliver product features at a higher pace, with reduced coordination**."* - Evan Bottcher

Platform as Product



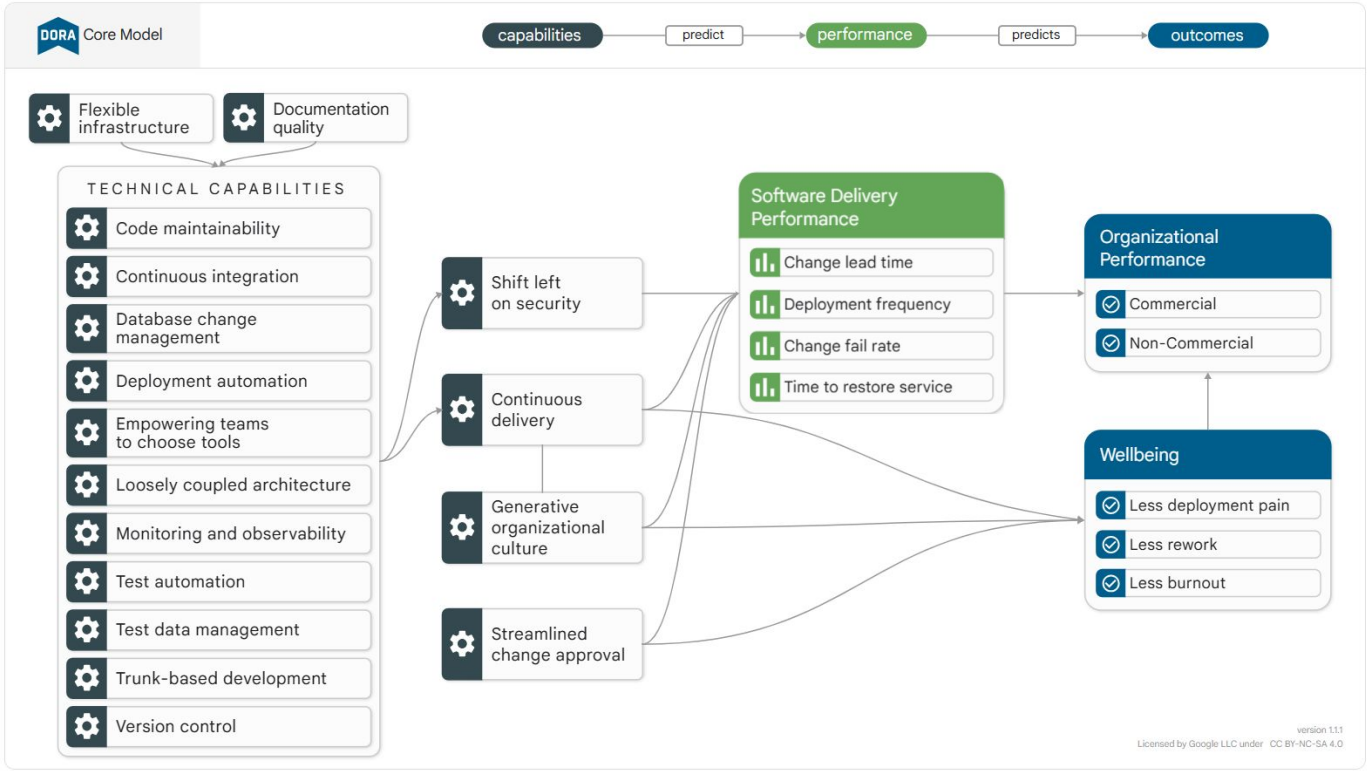
- Value proposition, Org/Company alignment
- Clear roadmap/backlog
- Ongoing attention, evolve and adapt based on developer feedback and the changing business landscape
- Product Manager/Owner
- User research (quantitative and qualitative)
- Alpha/Beta/GA features
- Support and SLOs
- Platform Advocate/Marketing - have a brand
- Mesure adoption and usage

Pave Golden Paths to drive standardization, and less frictions

- Describe opinionated and **well-supported paths** to “build something”
- Reduce set of **tools and technology preferred** to deliver values to the business
- Focus on an **engineer’s intentions**, not making engineers worry over implementation details

*The Golden Path — as we define it today — is the ‘**opinionated and supported**’ path to ‘build something’ (for example, build a backend service, put up a website, create a data pipeline). The Golden Path tutorial is a **step-by-step tutorial** that walks you through this opinionated and supported path - Spotify (2014)*

Speed, Productivity and Stability



SPACE

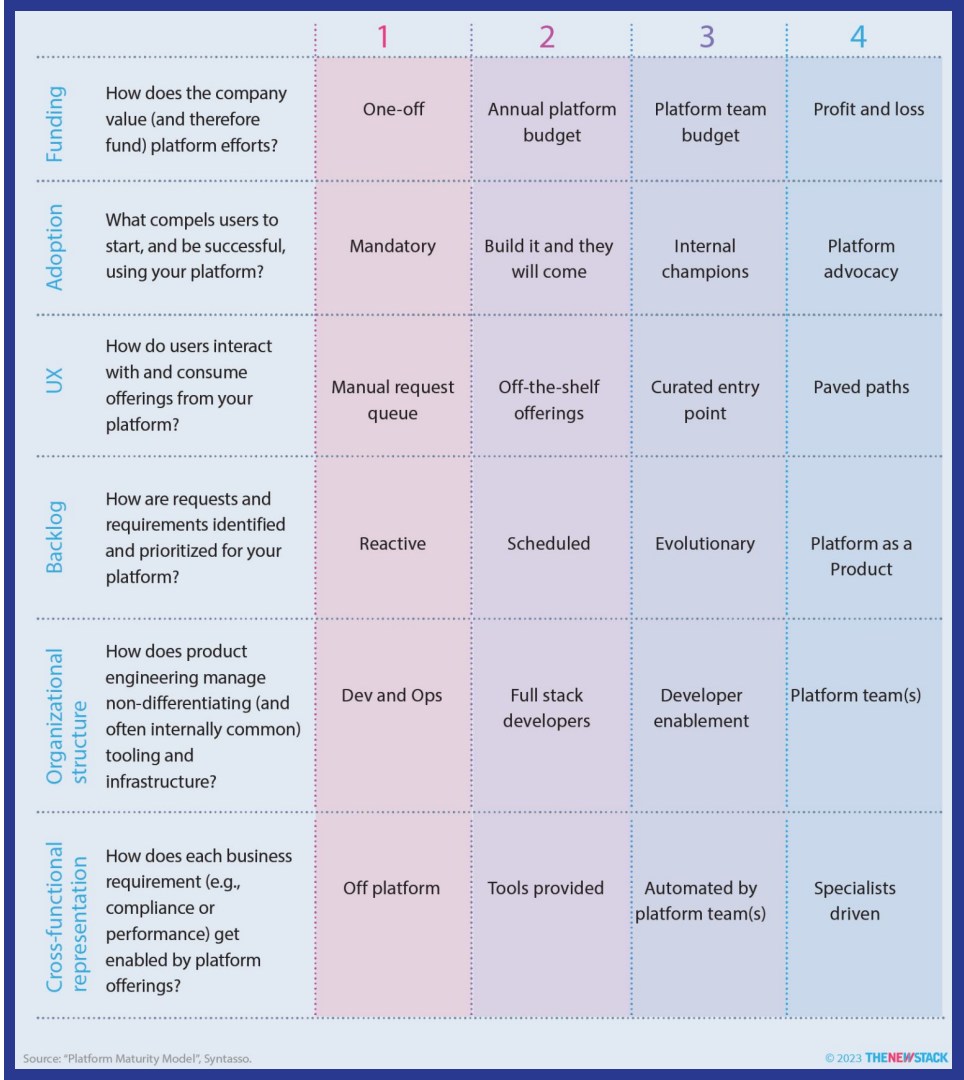
5 dimensions published in 2021:

- **S**atisfaction and wellbeing
- **P**erformance
- **A**ctivity
- **C**ommunication and collaboration
- **E**fficiency and flow

\+ Think also about: OKRs, FinOps, SLOs

The Platform Maturity Model

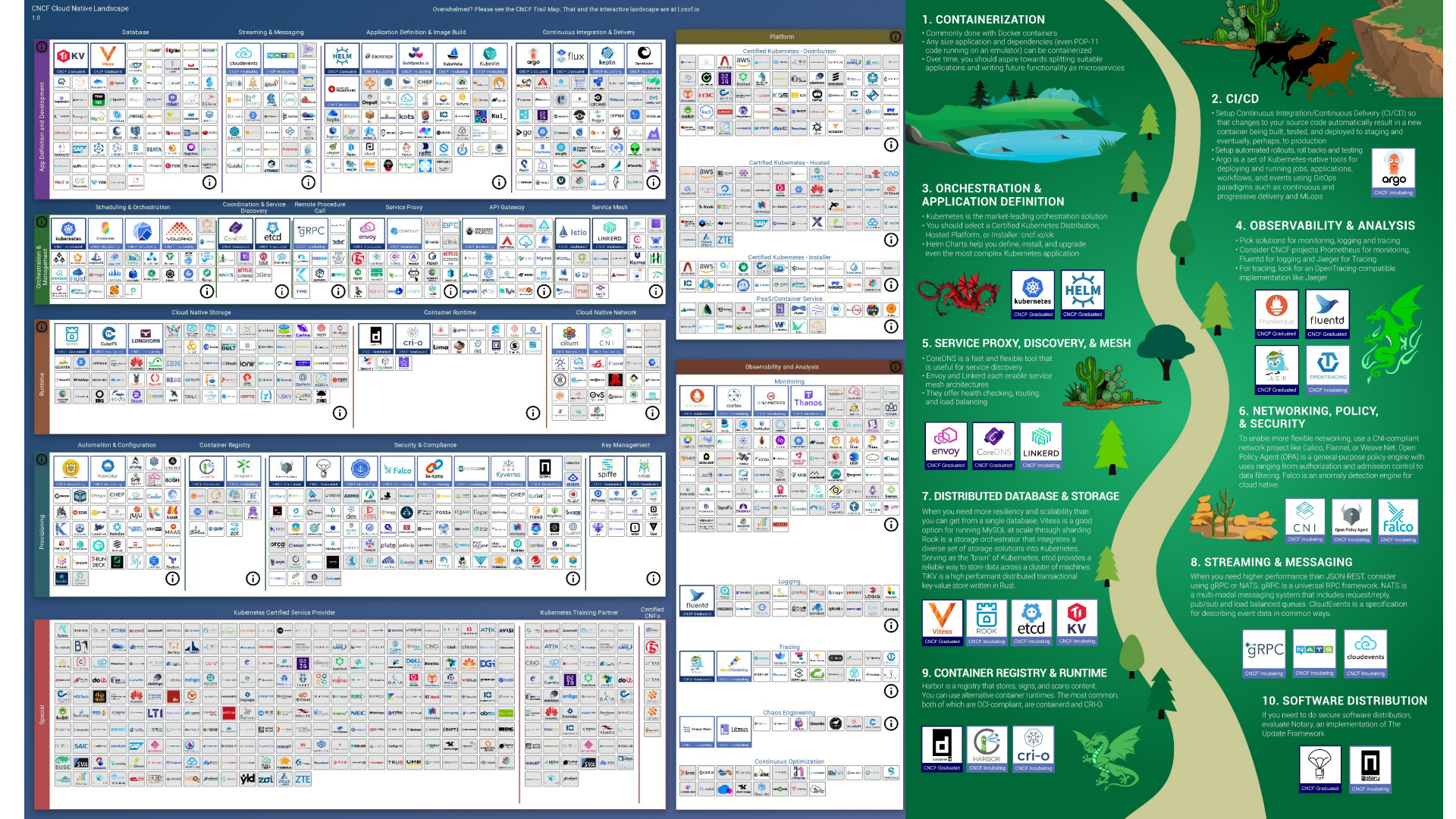
Syntasso donates first version of Platform Maturity Model to CNCF Working Group



		1	2	3	4
Funding	How does the company value (and therefore fund) platform efforts?	One-off	Annual platform budget	Platform team budget	Profit and loss
Adoption	What compels users to start, and be successful, using your platform?	Mandatory	Build it and they will come	Internal champions	Platform advocacy
UX	How do users interact with and consume offerings from your platform?	Manual request queue	Off-the-shelf offerings	Curated entry point	Paved paths
Backlog	How are requests and requirements identified and prioritized for your platform?	Reactive	Scheduled	Evolutionary	Platform as a Product
Organizational structure	How does product engineering manage non-differentiating (and often internally common) tooling and infrastructure?	Dev and Ops	Full stack developers	Developer enablement	Platform team(s)
Cross-functional representation	How does each business requirement (e.g., compliance or performance) get enabled by platform offerings?	Off platform	Tools provided	Automated by platform team(s)	Specialists driven

Source: "Platform Maturity Model", Syntasso.

Which tools and technologies to use?


CNCF Cloud Native Landscape
1.0
Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io
Database
Streaming & Messaging
Application Definition & Image Build
Continuous Integration & Delivery
App Definition and Development
Scheduling & Orchestration
Coordination & Service Discovery
Remote Procedure Call
Service Proxy
API Gateway
Service Mesh
Orchestration & Management
Cloud Native Storage
Container Runtime
Cloud Native Network
Runtime
Automation & Configuration
Container Registry
Security & Compliance
Key Management
Provisioning
Kubernetes Certified Service Provider
Kubernetes Training Partner
Certified CNFs
Special
Platform
Certified Kubernetes - Distribution
Certified Kubernetes - Hosted
Certified Kubernetes - Installer
PaaS/Container Service
Observability and Analysis
Monitoring
Logging
Tracing
Chaos Engineering
Continuous Optimization
1. CONTAINERIZATION
• Commonly done with Docker containers
• Any size application and dependencies (even PDP-11 code running on an emulator) can be containerized
• Over time, you should aspire towards splitting suitable applications and writing future functionality as microservices
2. CI/CD
• Setup Continuous Integration/Continuous Delivery (CI/CD) so that changes to your source code automatically result in a new container being built, tested, and deployed to staging and eventually, perhaps, to production
• Setup automated rollouts, roll backs and testing
• Argo is a set of Kubernetes-native tools for deploying and running jobs, applications, workflows, and events using GitOps paradigms such as continuous and progressive delivery and MLops
CNCF Incubating
3. ORCHESTRATION & APPLICATION DEFINITION
• Kubernetes is the market-leading orchestration solution
• You should select a Certified Kubernetes Distribution, Hosted Platform, or Installer: cncf.io/ck
• Helm Charts help you define, install, and upgrade even the most complex Kubernetes application
CNCF Graduated
CNCF Graduated
4. OBSERVABILITY & ANALYSIS
• Pick solutions for monitoring, logging and tracing
• Consider CNCF projects Prometheus for monitoring, Fluentd for logging and Jaeger for Tracing
• For tracing, look for an OpenTracing-compatible implementation like Jaeger
CNCF Graduated
CNCF Graduated
CNCF Graduated
CNCF Incubating
5. SERVICE PROXY, DISCOVERY, & MESH
• CoreDNS is a fast and flexible tool that is useful for service discovery
• Envoy and Linkerd each enable service mesh architectures
• They offer health checking, routing, and load balancing
CNCF Graduated
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CNCF Incubating
6. NETWORKING, POLICY, & SECURITY
To enable more flexible networking, use a CNI-compliant network project like Calico, Flannel, or Weave Net. Open Policy Agent (OPA) is a general-purpose policy engine with uses ranging from authorization and admission control to data filtering. Falco is an anomaly detection engine for cloud native.
CNCF Incubating
CNCF Incubating
CNCF Incubating
7. DISTRIBUTED DATABASE & STORAGE
When you need more resiliency and scalability than you can get from a single database, Vitess is a good option for running MySQL at scale through sharding. Rook is a storage orchestrator that integrates a diverse set of storage solutions into Kubernetes. Serving as the "brain" of Kubernetes, etcd provides a reliable way to store data across a cluster of machines. TiKV is a high performant distributed transactional key-value store written in Rust.
CNCF Graduated
CNCF Incubating
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CNCF Incubating
8. STREAMING & MESSAGING
When you need higher performance than JSON-REST, consider using gRPC or NATS. gRPC is a universal RPC framework. NATS is a multi-modal messaging system that includes request/reply, pub/sub and load balanced queues. CloudEvents is a specification for describing event data in common ways.
CNCF Incubating
CNCF Incubating
CNCF Incubating
9. CONTAINER REGISTRY & RUNTIME
Harbor is a registry that stores, signs, and scans content. You can use alternative container runtimes. The most common, both of which are OCI-compliant, are containerd and CRI-O.
CNCF Graduated
CNCF Incubating
CNCF Incubating
10. SOFTWARE DISTRIBUTION
If you need to do secure software distribution, evaluate Notary, an implementation of The Update Framework.
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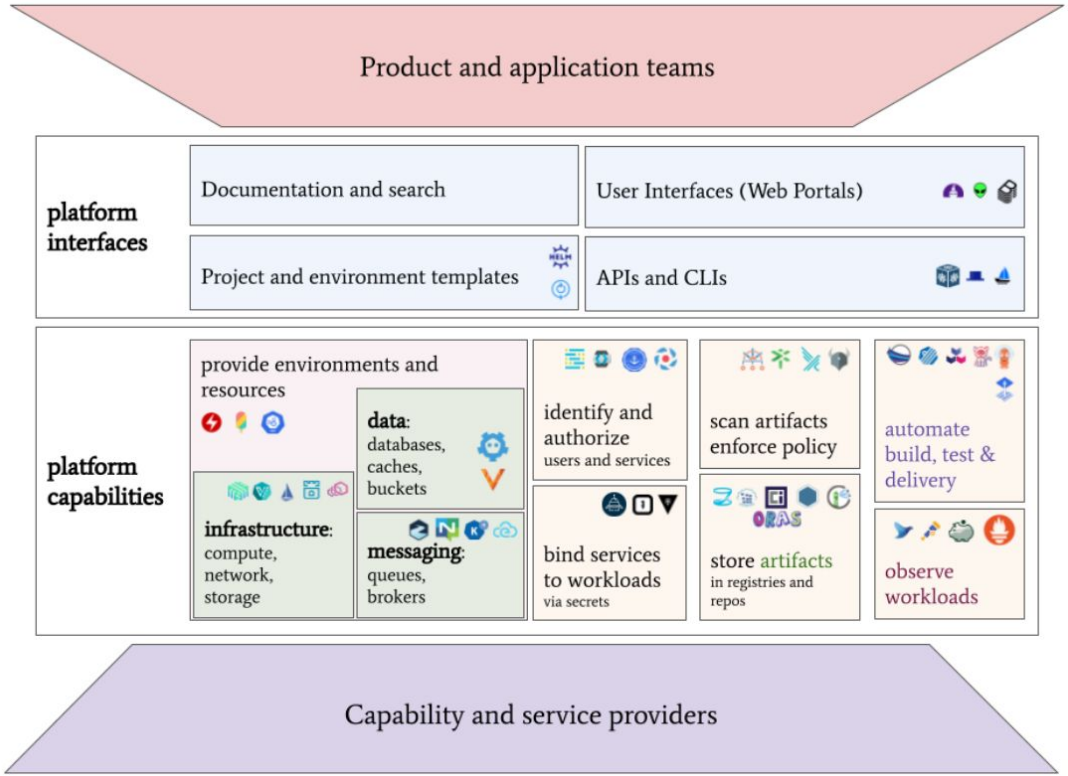
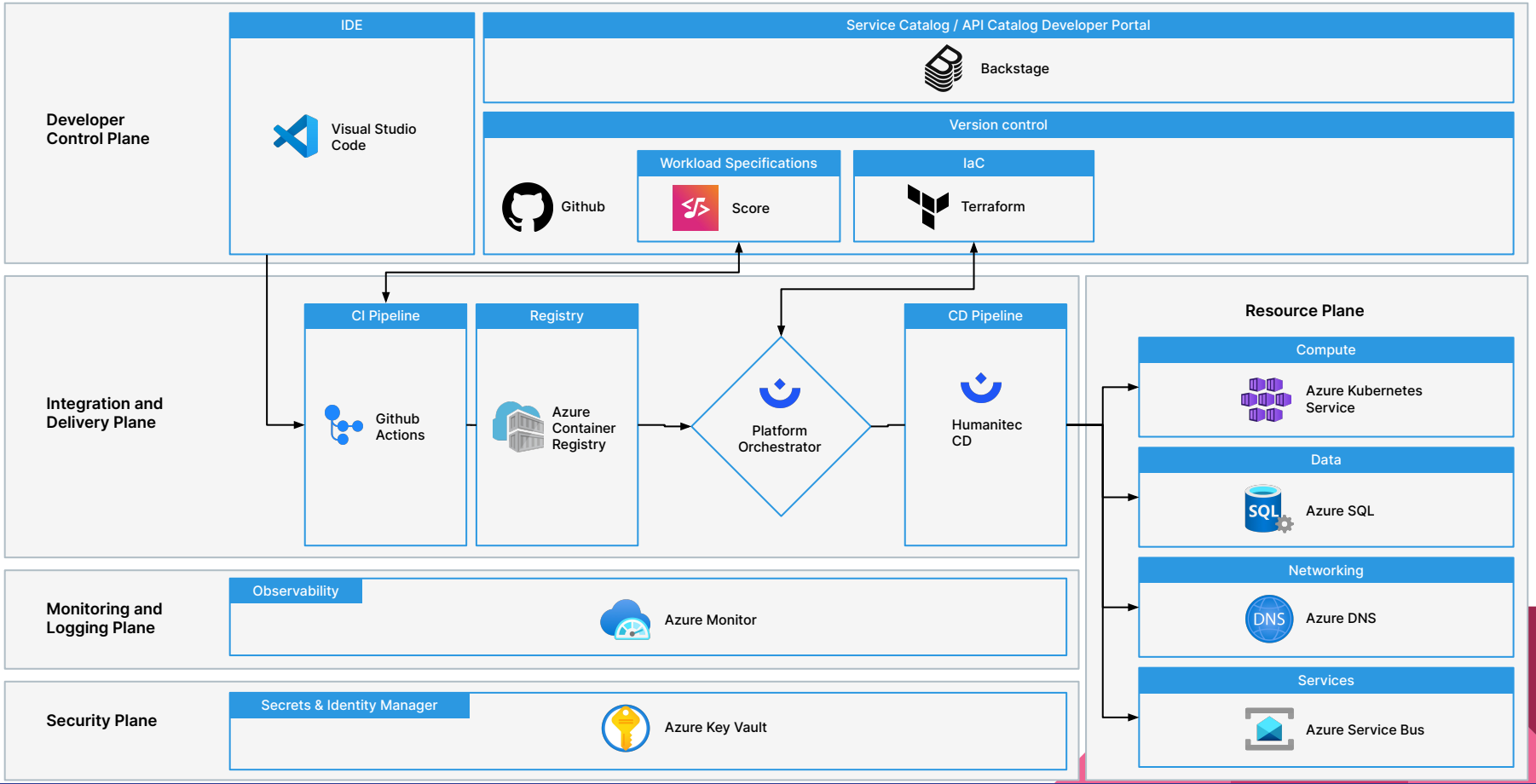
Capabilities of a Platform



CNCF Platforms White Paper | CNCF TAG App Delivery

Demo time!

Internal Developer Platform on Azure Cloud with Humanitec



Example of a Golden path: deploy to an ephemeral environment

Dev Request

score.yaml

```yaml
apiVersion: score.dev/v1b1

metadata:
  name: python-service

containers:
  python-service:
    image: python
    variables:
    CONNECTION_STRING: postgresql://${resources.db.user

  resources:
    db:
      type: postgres
    storage:
      type: s3
    dns:
      type: dns
```

context:
env=ephemeral

Humanitec Platform Orchestrator

Platform response

- ✓ **Read** workload specification
- ✓ **Match** resource definitions
- ✓ **Create** app configs, configure resources
- ✓ **Deploy**

→ AKS cluster configured
→ Kubernetes namespace created
→ Create MySQL credentials injected
→ MySQL credentials injected
→ DNS configured

That’s a wrap!

Where to start?

Set a mission and clarify goals, have success criterias

Think OKRs!

Truly know your Customers/Developers

Think about Customer User Journeys (CUJs) or Golden Paths!

Provide boundaries and abstractions to reduce the cognitive loads on teams

Adopt a Platform as Product mindset

Think OSS/Innersource projects!

UX first: Developer Experience & Product Experience

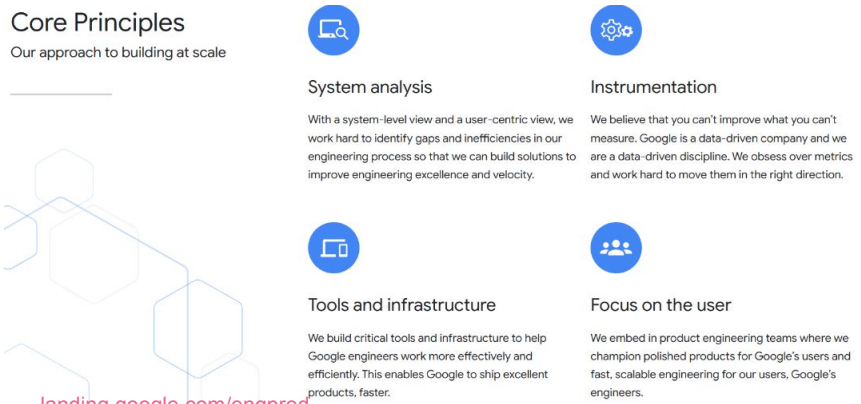
Find the first right level of abstraction, start small with high impact

Measure quality, productivity, getting feedback

Think surveys!

How Platform Engineering Works ~ chadxz.dev

- What: Velocity
- Why: Stability
- How: Product Mindset



landing.google.com/engprod

That’s not it, here are some tips!

- That may not be your concern if you are 1 team/1 person/1 product! ;)
- Tie the measurable goal to a business outcome
- Start small, don’t be afraid to fail fast (Tight feedback loops)
- Avoid too many tools or workflows
- Provide self-service
- Request for Comments (RFC)" process - A Structured RFC Process (philcalcado.com)
- Think about both:
    - onboarding/new
    - tenured employees/projects
- Communicate and celebrate
- Measure adoption and satisfaction
- Invest in your team: PM, PO, UX, SRE
- Have a brand, and stickers/t-shirts

- The success of an internal platform is defined by how many teams adopt it
- Just because you build it, does not mean that they will come. You must go to them.
- An internal developer platform should not be a catchall

platformengineering.org

platformcon.com

More resources

internaldeveloperplatform.org

Platform Engineering: What You Need to Know Now

Accelerate (2018)

How to write a talk about **Team Topologies**

How to measure and improve developer productivity

Platform engineering is just DevOps with a **product mindset**

How Spotify Achieved a Voluntary 99% Internal Platform **Adoption Rate**

DevOps is Bullshit

Beyond engineering: The future of platforms

Quantifying platform engineering impact at Wise

A conversation on platform engineering: What, how, and what's next

On growth challenges, generic helm charts and golden paths

How Platform Engineering Works

Team Topologies Distilled

Fidelity's Software Delivery Platform

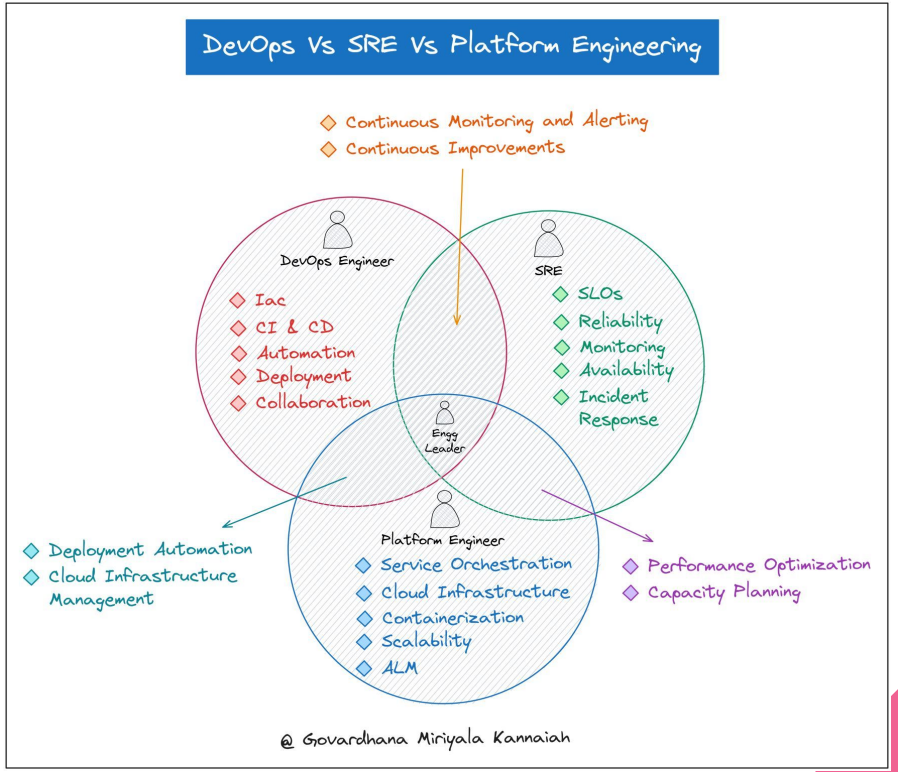
Platform as a Product Workshop

From Kubernetes to PaaS to … err, what's next?

Q&A

Merci !
Thank you!

DevOps, SRE, Platform Engineer



Engineering Experience Feedback

1. What does it feel like to build your software?
2. What does it feel like to test your software?
3. What does it feel like to release your software?
4. What does it feel like to operate your software?
5. What does it feel like to use your software?