

Platform Engineering

Building the Foundation for Developer Excellence

What does Platform Engineering mean to you?

"Platform Engineering is the process of designing and building re-usable tools, processes and infrastructure that enables self-service capabilities for software engineering teams"

Key Goals: Stability, Developer Enablement & DevEx, Speed, Standardisation

The Problem We're Solving

- **Developer Toil:** Too much time spent on infrastructure, tooling, and deployment
- **Inconsistent Practices:** Teams solving the same problems differently
- **Slow Delivery:** Complex deployment pipelines and environment setup
- **Security & Compliance:** Manual processes lead to gaps and risks
- **Centralised Opinionated Worldview:** What does good look like?
- **Building things!**

Stability: The business cares about uptime!

Builds on the agile manifesto idea that working software comes before all else.

Developer Enablement: How do we reduce the number of "I need a..." requests

Focusses on tooling and workflows to enable developers to build the things that they need.

DevEx (Developer Experience): Make developers' lives easier!

Focus on reducing friction and cognitive load, how do we make using our platform the best it can be?

Speed: Metrics metrics and more metrics

Time to first deployment, lead time for changes, deployment frequency, pipeline duration, high velocity.

Standardisation: Consistency across teams and projects!

Establish golden paths and best practices that reduce variability and increase predictability.

Core Principles

- **Developer Self-Service** - Empower teams with autonomy
- **Golden Paths** - Opinionated, best-practice workflows
- **Abstractions** - Hide complexity, expose simplicity
- **Product Mindset** - Internal platforms as products
- **Measurement** - Data-driven platform evolution

Platform Components



Infrastructure as Code

- Terraform, Pulumi, CDK
- Standardized environments



CI/CD Pipelines

- Automated testing & deployment
- Security scanning integration

Platform Components



Observability

- Monitoring, logging, tracing
- Performance insights



Security & Compliance

- Policy as code
- Secret management
- Vulnerability scanning

Platform Components



Developer Portals

- Service catalogs
- Documentation
- Self-service workflows



Toolchain Integration

- CLI tools
- APIs

Benefits of Platform Engineering



For Developers

- **Faster Time to Production** - Minutes, not weeks
- **Reduced Cognitive Load** - Focus on business logic
- **Consistent Experience** - Same tools, same patterns

Benefits of Platform Engineering



For Organizations

- **Improved Velocity** - Faster feature delivery
- **Better Security** - Built-in best practices
- **Cost Optimization** - Efficient resource usage

The Future: AI-Native Platforms



Intelligent Automation

- AI-powered incident response
- Predictive scaling
- Automated code reviews



Next-Gen Developer Experience

- Natural language infrastructure
- AI pair programming for ops
- Intelligent troubleshooting

What Platform Engineering is *not*

ChatGPT, how do I get my app on localhost:3000 available on the internet?

Heroku

This will give you an **application available on the internet!**

What's **wrong** with this?

The commands I ran in order to get this to work are as follows:

```
heroku login  
git add .  
git commit -m "New website design"  
git push  
heroku create  
git push heroku master  
heroku ps:scale web=1  
heroku open
```

Fast or built to last?

You can get something "live" fast and easily.

Platform Engineering builds the foundation for sustainable, scalable, and reliable software delivery, how we build things in the real world.

You must think first, before you move

Understanding HLD, LLD & F/NFRs

Measure Twice, Cut Once

These artifacts help us:

- Communicate design decisions
- Ensure requirements are met
- Guide implementation
- Document for future teams

High-Level Design (HLD)

What is it?

- Bird's-eye view of the system architecture
- Focus on major components and their interactions

Key Contents:

- System architecture diagrams
- Component relationships
- Data flow
- Technology stack decisions
- Integration points

Low-Level Design (LLD)

What is it?

- Detailed technical specifications
- Implementation details for each component
- APIs, data models, algorithms

Key Contents:

- Detailed class/module designs
- Database schemas
- API specifications (endpoints, payloads)
- Sequence diagrams
- Error handling strategies

Functional Requirements (FRs)

What are they?

- Define WHAT the system must do
- Specific features and capabilities
- User-facing functionality and behaviors

Key Aspects:

-  **User Actions** - Login, deploy, configure
-  **System Behaviors** - Process requests, store data
-  **Business Rules** - Validation, workflows
-  **Integrations** - External systems, APIs

Functional Requirements (FRs)

Example FRs for a Platform:

- Users must be able to deploy applications via CLI or UI
- System must support multiple environments (dev, staging, prod)
- Platform must integrate with GitHub for source control
- Users can view deployment logs in real-time
- System must send notifications on deployment completion
- Support rollback to previous versions

Focus: WHAT features the platform provides

Non-Functional Requirements (NFRs)

What are they?

- Quality attributes and constraints
- Not about WHAT the system does, but HOW WELL it does it
- Critical for platform success

Key Categories:

-  **Performance** - Response times, throughput
-  **Scalability** - Handle growth
-  **Security** - Authentication, encryption
-  **Reliability** - Uptime, disaster recovery

What is the "Cloud"?

The Ultimate Platform

Cloud computing allows us to provision complex physical infrastructure "virtually"

What do I mean by "**cloud vendors offer the ultimate platform?**"

Azure Example

The screenshot shows the Microsoft Azure portal interface. At the top, there's a blue header bar with the 'Microsoft Azure' logo, a search bar, and various navigation icons. Below the header, the URL 'https://portal.azure.com' is visible. The main content area has a title 'Create a resource' with a back arrow. On the left, a sidebar titled 'Get Started' is highlighted in grey, showing a list of recently created resources and categories. The 'Categories' section lists various Azure services with their respective icons and 'Create' buttons. Popular services include Function App, Web App, Virtual network, Key Vault, Virtual machine, Storage account, and Data Factory.

Category	Service	Create Button
Machine Learning	Function App	Create
AI Apps and Agents	Web App	Create
Analytics	Virtual network	Create
Blockchain	Key Vault	Create
Compute	Virtual machine	Create
Containers	Storage account	Create
Databases	Data Factory	Create
Developer Tools		
DevOps		
Identity		
Integration		
Internet of Things		
IT & Management Tools		

Key Benefits:

-  **Scalability** - Scale resources up or down instantly
-  **Cost Efficiency** - Pay only for what you use
-  **Global Reach** - Deploy anywhere in the world
-  **Speed & Agility** - Provision resources in minutes

Cautions

- Security and Privacy
- Cost concerns
- Vendor lock-in
- Ownership and control
- Compatibility

Cloud Deployment Models



Public Cloud

- Infrastructure owned by cloud provider
- Resources shared across multiple organizations
- Examples: AWS, Azure, GCP
- **Best for:** Previously mentioned key benefits!

Private Cloud

- Dedicated infrastructure for single organization
- Greater control and security
- Can be on-premises or hosted
- **Best for:** Regulated industries, sensitive data



Hybrid Cloud

- Combination of public and private clouds
- Data and applications can move between environments
- **Best for:** Flexibility, compliance requirements, gradual migration

Major Cloud Vendors



Amazon Web Services (AWS)

- Market leader, launched 2006
- 200+ services, largest market share



Microsoft Azure

- Enterprise-focused, excellent Microsoft integration
- Strong hybrid cloud capabilities

Major Cloud Vendors



Google Cloud Platform (GCP)

- Data analytics and ML expertise
- Strong Kubernetes support (created K8s)



Others

- IBM Cloud, Oracle Cloud, Alibaba Cloud
- Digital Ocean, Linode (simpler, developer-focused)

Putting It All Together

Platform Engineering Workflow:

1. **Define Requirements** - NFRs, business needs
2. **Design** - Architecture, components, implementation
3. **Build** - Implement the requirements
4. **Document** - ADRs, guides, runbooks
5. **Iterate** - Continuous improvement