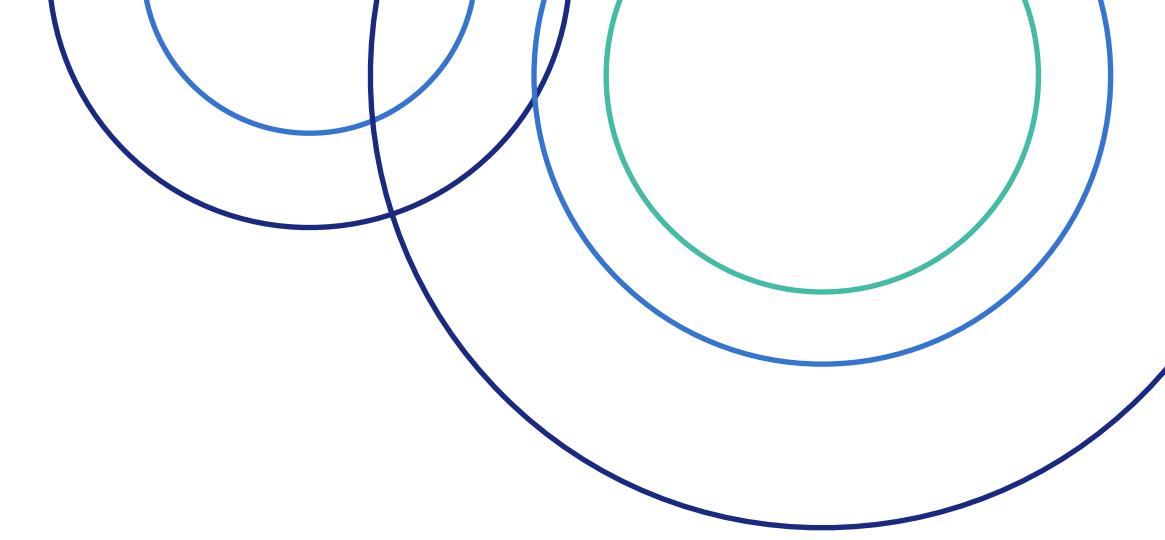




spectro cloud



Where's the Value?

What does Kubernetes have to do with DevOps?

Cornelia Davis

Technology Fellow, Spectro Cloud

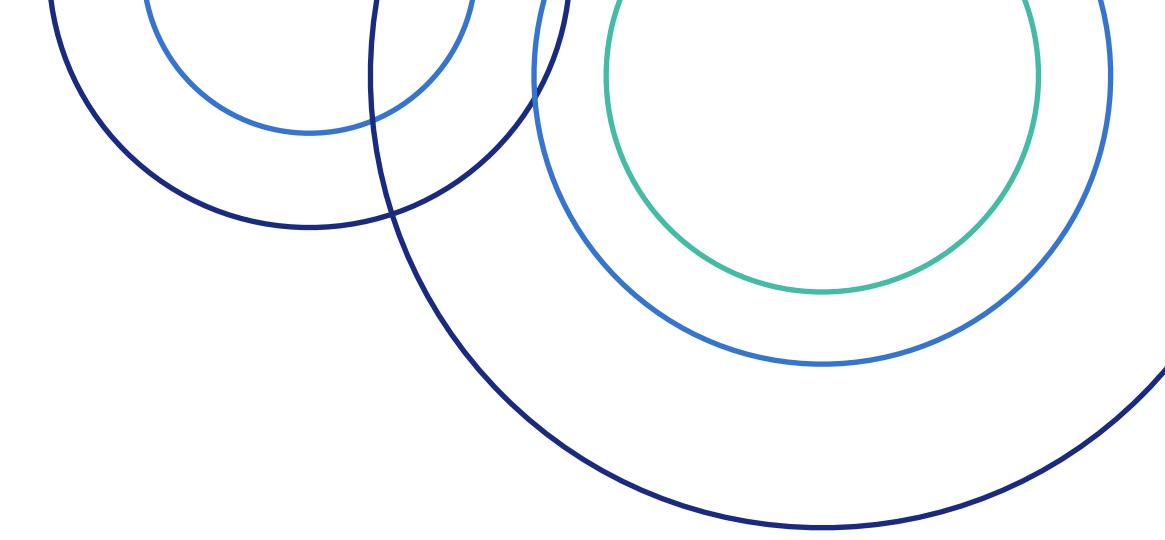
5 October 2023

Kubernetes, often abbreviated as K8s, is an open-source container orchestration platform designed to automate the deployment, scaling, and management of containerized applications. It was originally developed by Google and is now maintained by the Cloud Native Computing Foundation (CNCF), a part of the Linux Foundation. Kubernetes provides a powerful and flexible framework for managing containerized workloads, making it easier to deploy and manage applications at scale in a highly available and resilient manner.

Declarative configuration is a fundamental concept in modern infrastructure-as-code (IaC) and configuration management practices, where it plays a crucial role in managing complex systems and ensuring they remain in the desired state over time.



spectro cloud



Where's the Value?

What does Kubernetes have to do with DevOps?

Cornelia Davis

Technology Fellow, Spectro Cloud

5 October 2023

Me?

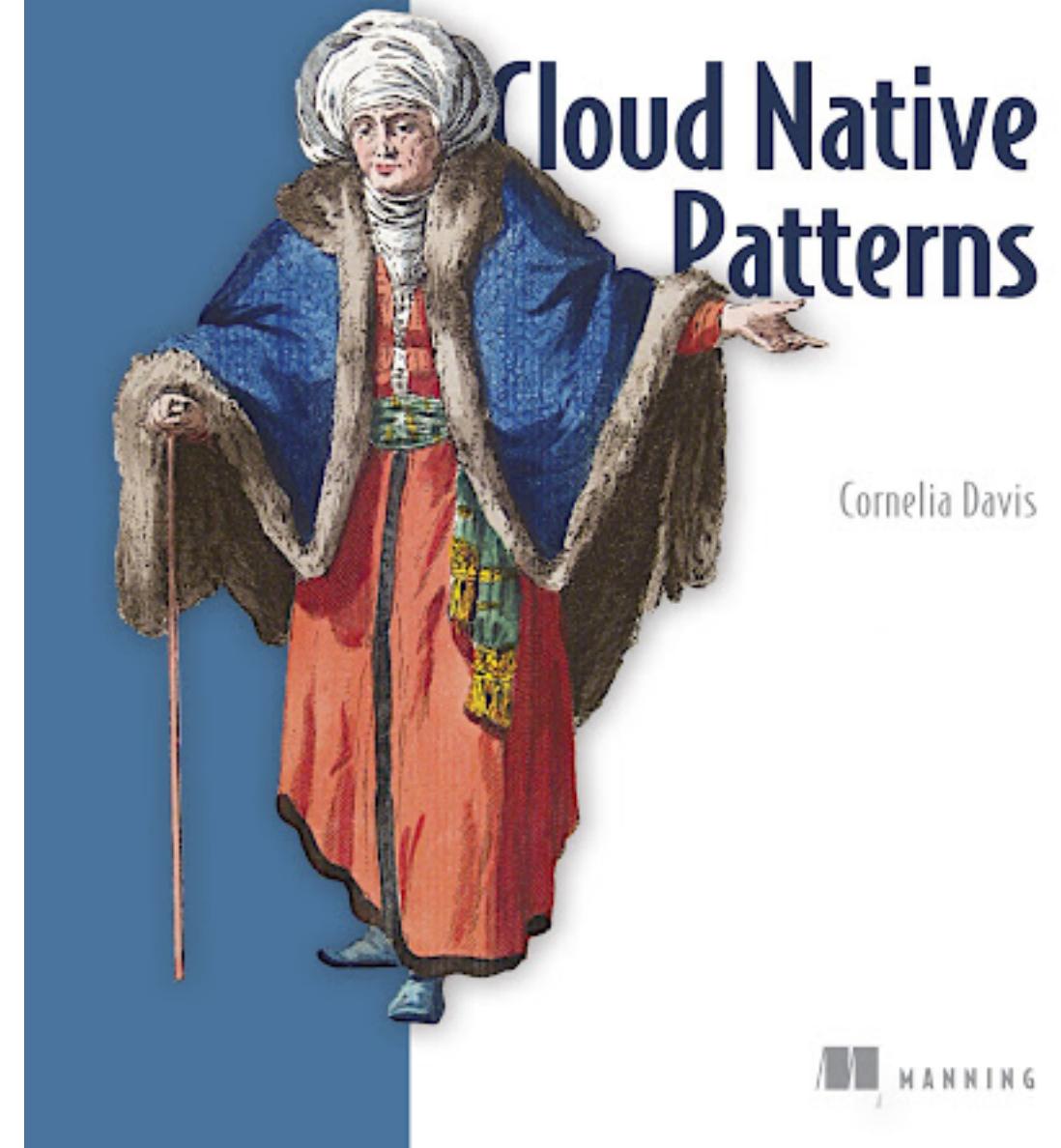
Developer (wasn't Ops)

Web architectures for ~25 years

Cloud-native for a decade

Cloud Foundry for 8+ years

K8s for more than 5



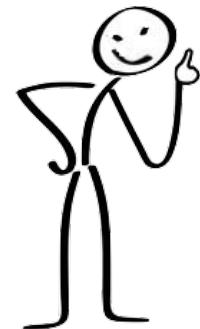
- Enable application (DevOps) teams to release more frequently, reduce lead time & operate cloud native applications more effectively



Delivers efficiencies

PLATFORM

Bakes in



- While other experts maintain security, compliance, resilience & cost management

Security

Ensure that running software and underlying infrastructure (i.e. OS) is free of vulnerabilities, that the environment has not been tampered with.

Resilience

Support zero downtime in the face of constant change coming from infrastructure changes, frequent software updates and unforeseen failures.

Fiscal Resp

Give application teams the resources they need, but keep resource and cost sprawl in check.

App DevOps

Make application teams autonomous, with self-serve access to resources & full control over application deployment and management.



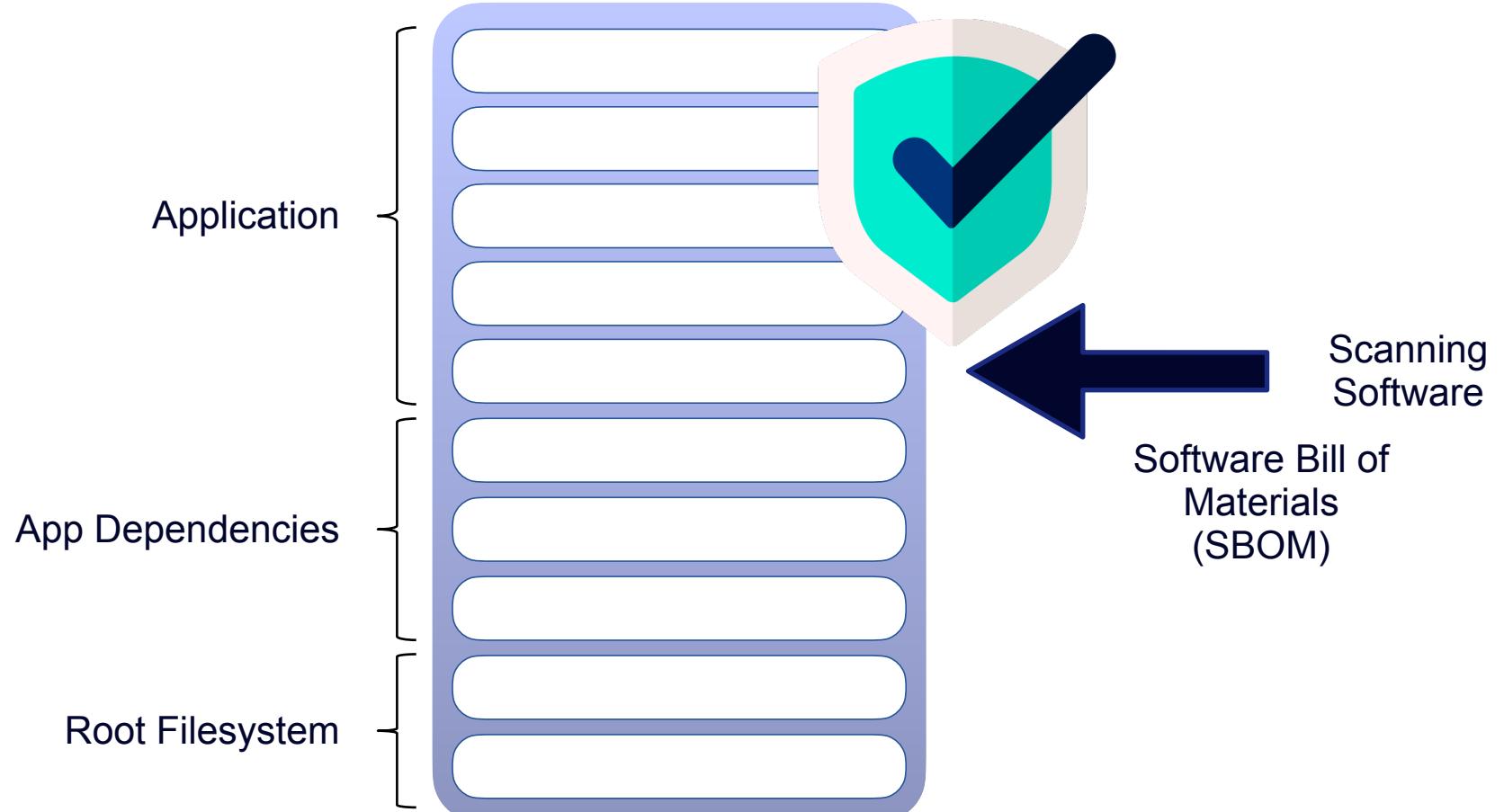
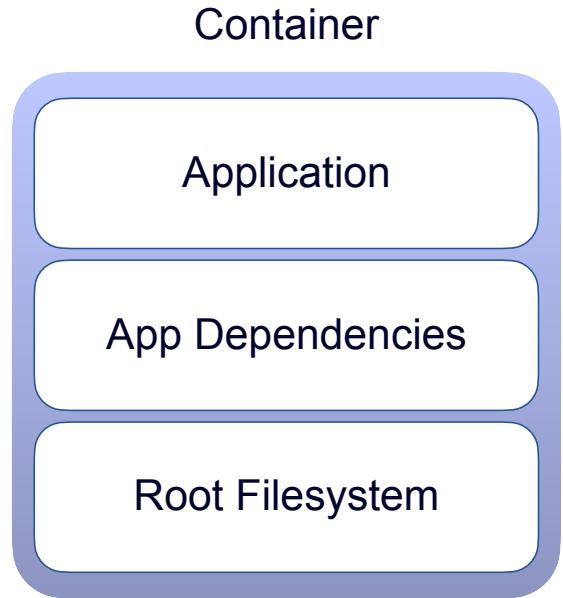
spectro cloud

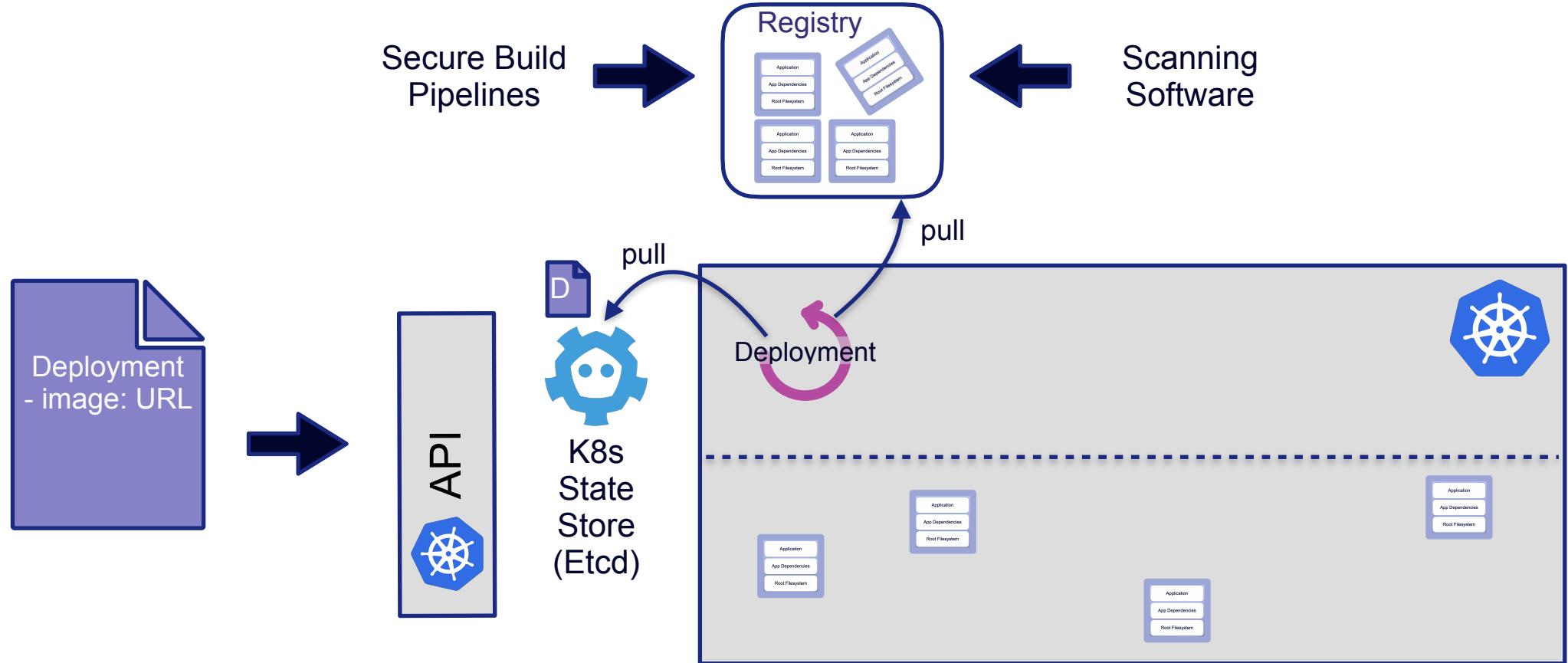
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Security

Software free of vulnerabilities









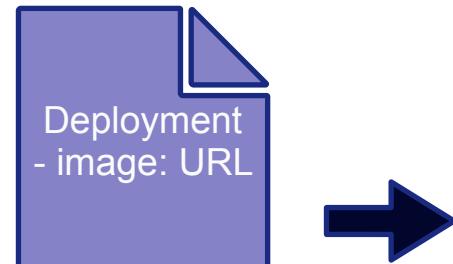
Security

Because EVERY deployed container is represented in the K8s state store, we can have an SBOM for all deployed software

Secure Build Pipelines



Scanning Software



K8s
State
Store
(Etcd)

pull

Deployment

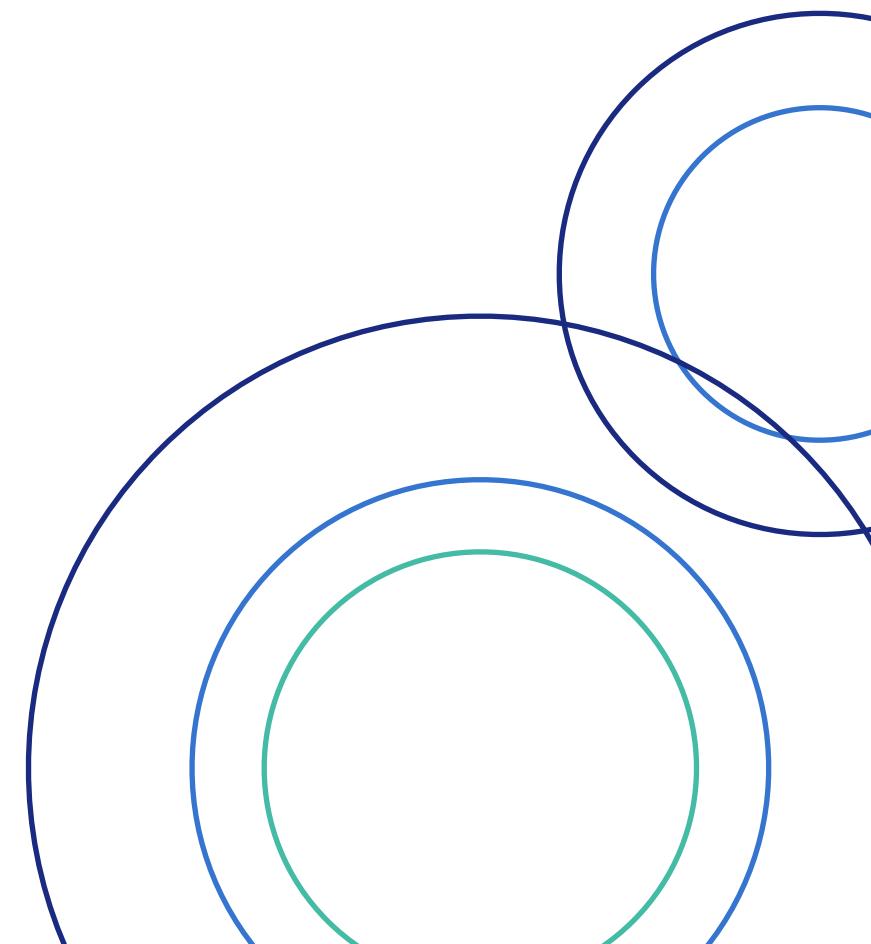


!! You should:

- * Secure your build pipelines
- * Build automation to search for CVEs in your SBOMs
- * Automate remediation

Resilience

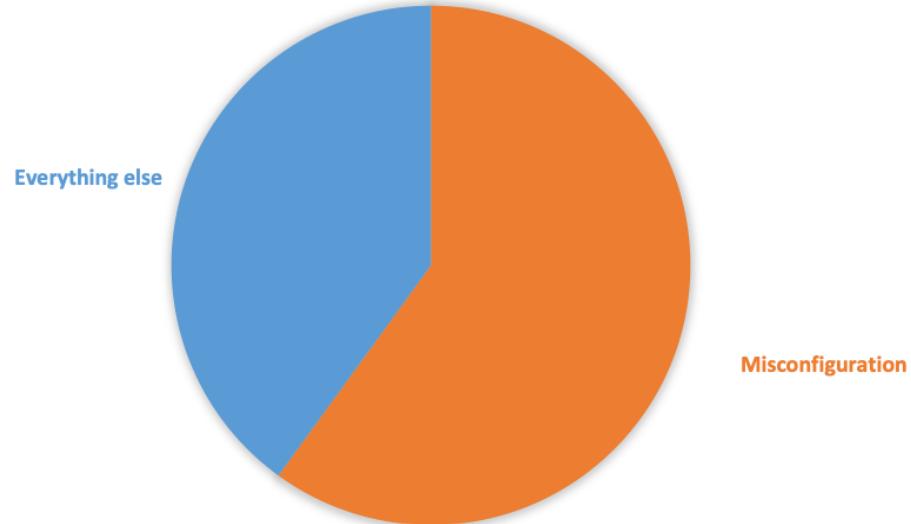
Ensure uptime



*“In theory, all software is debuggable.
However, there are lots of things that
can chip away at that beauteous goal
and make your software mathematically
less than 100% debuggable”*



<https://www.honeycomb.io/blog/llms-demand-observability-driven-development>



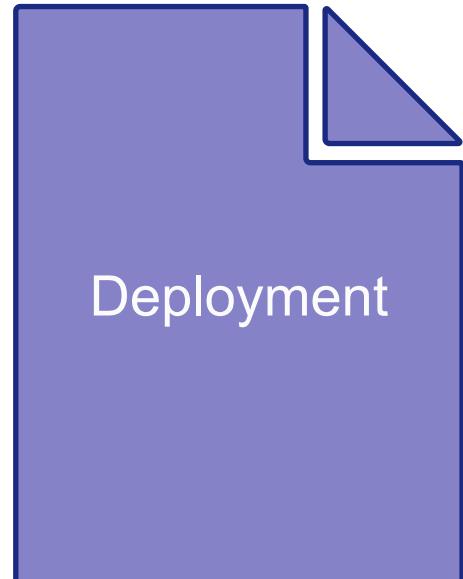
“The Enterprise Management Association reported that 60% of availability and performance errors are the result of misconfigurations.”

<https://www.evolven.com/blog/downtime-outages-and-failures-understanding-their-true-costs.html>



Declarative Configuration

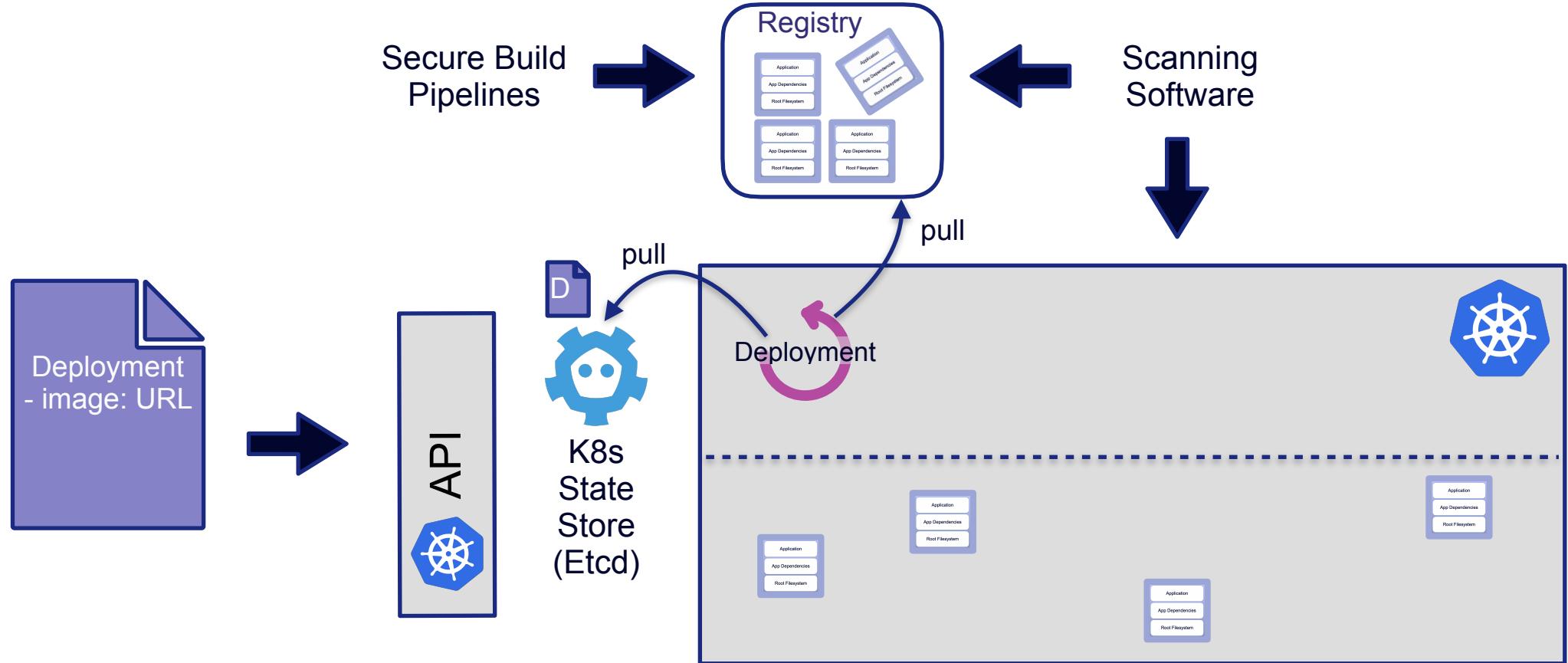
Declarative Configuration

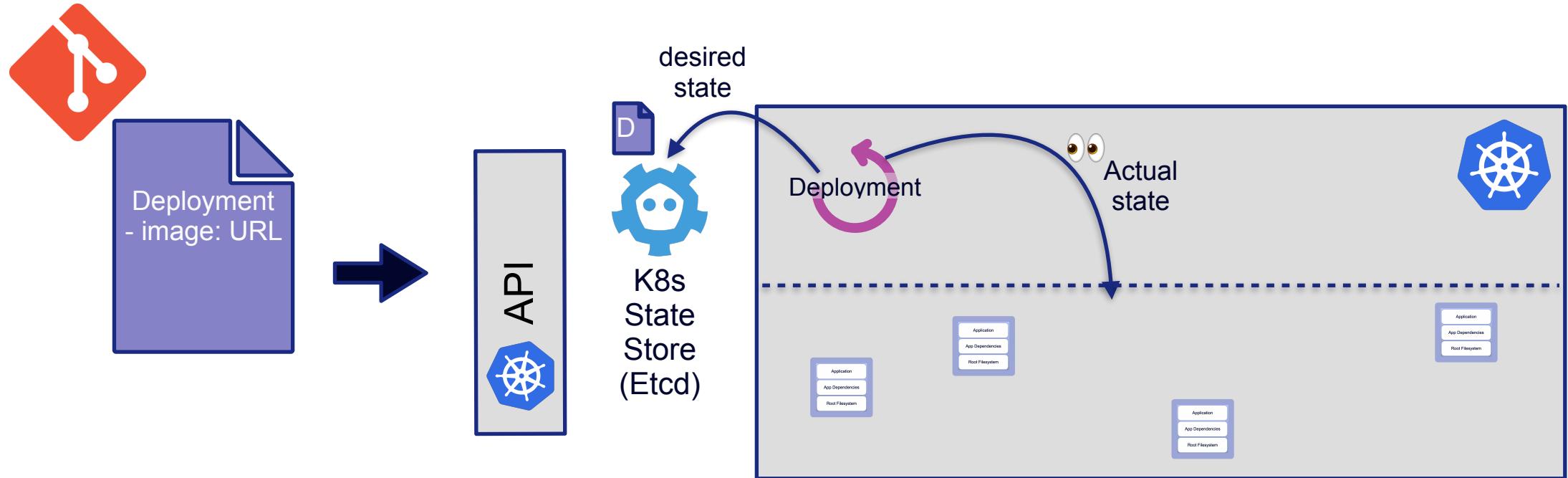


Deployment
What you want



“Make it so”
“And keep it so”



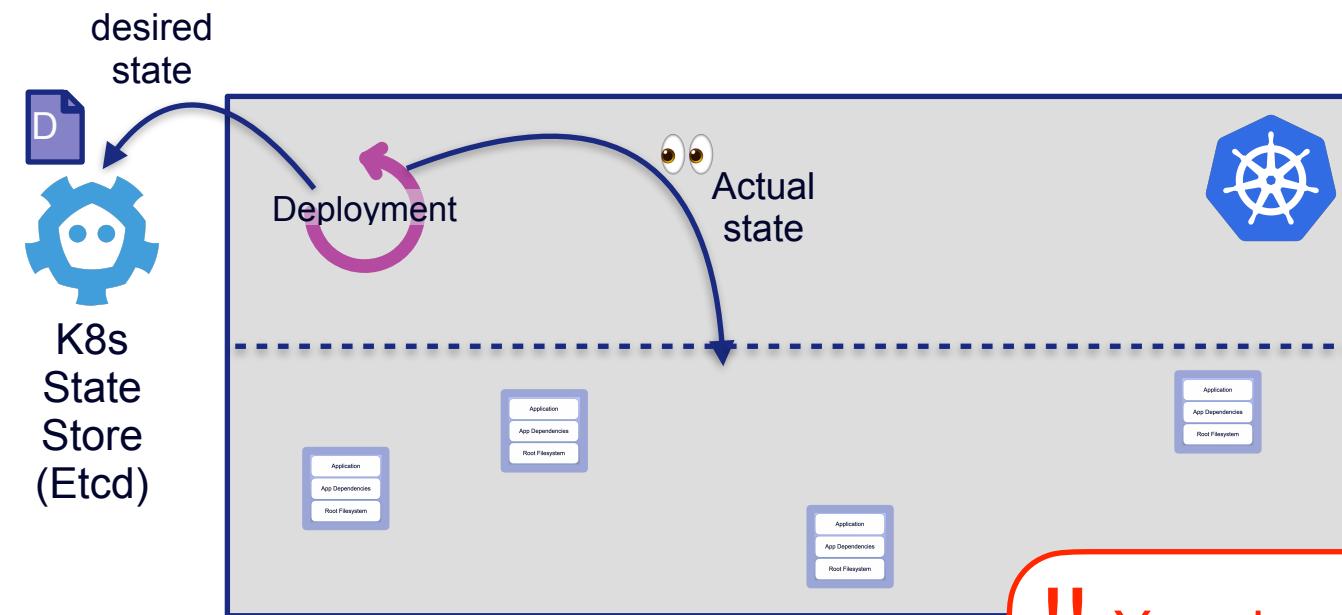




Resilience

K8s has mechanisms to assess actual state:

- * Available memory, cpu, ...
 - * Liveness probes
- GitOps operators (Flux, Argo)



!! You should:

- * Debug your code!
- * Cloud native app architecture
- * Store configurations in version control (gitops!!)
- * Implement rolling upgrades.

Fiscal Resp

App DevOps

Manage infrastructure sprawl





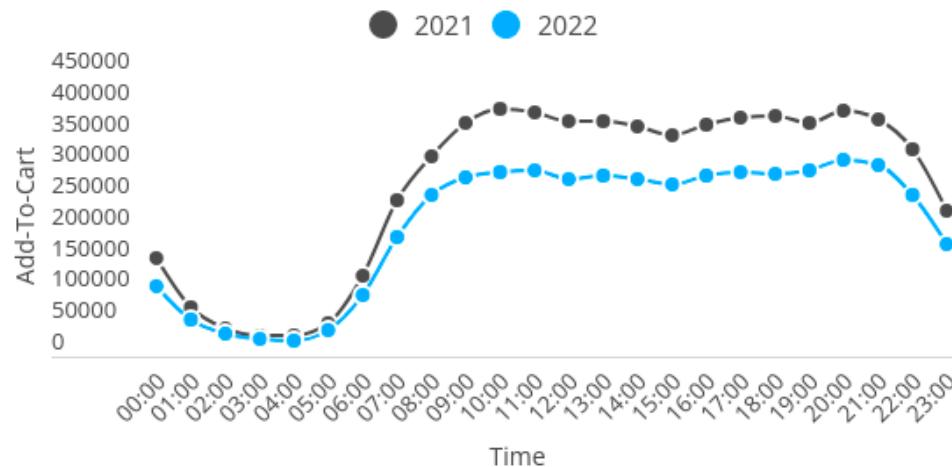
*“... almost all respondents (94%) report **avoidable** cloud spend for a variety of reasons...*

Low cloud-maturity firms, in particular, struggle with over-provisioning resources (53%) and idle or underused resources (55%)

”

<https://www.hashicorp.com/state-of-the-cloud>

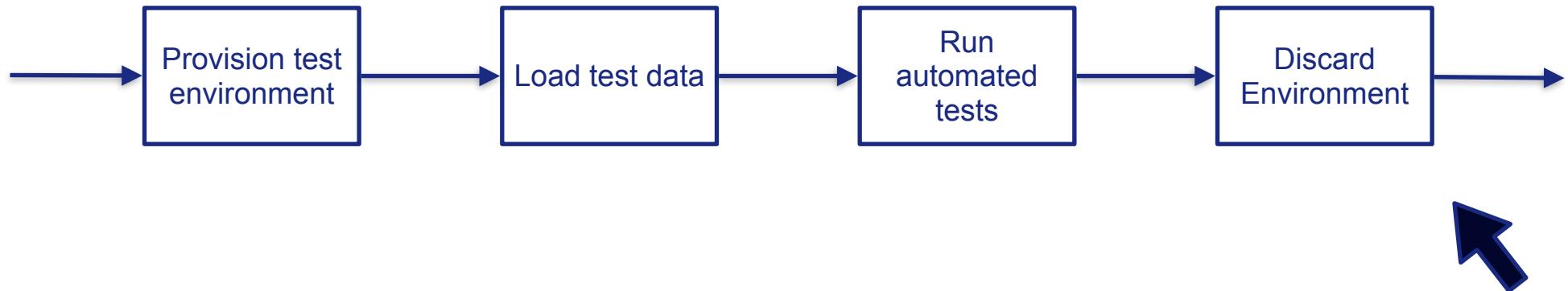
Black Friday Online Sessions 2022

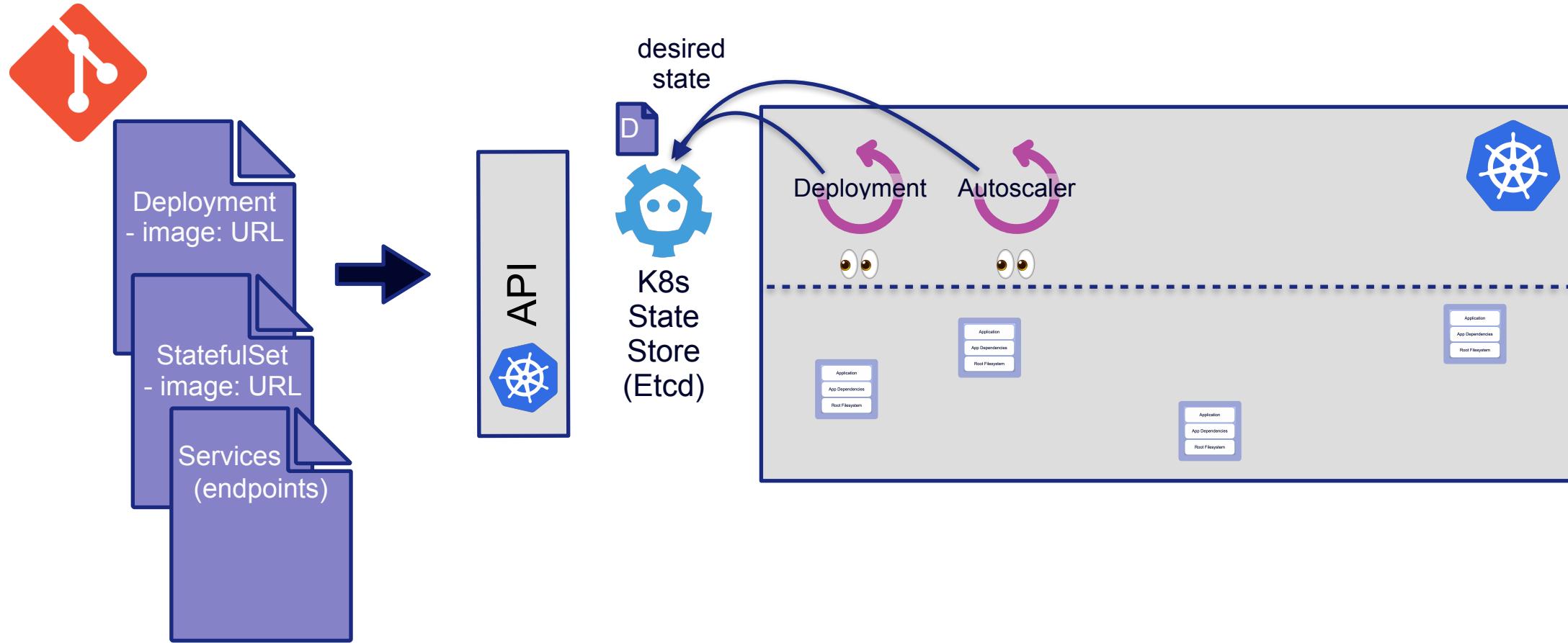


Source: SaleCycle Client Data

SaleCycle | www.SaleCycle.com

<https://www.salecycle.com/blog/featured/black-friday-live/>

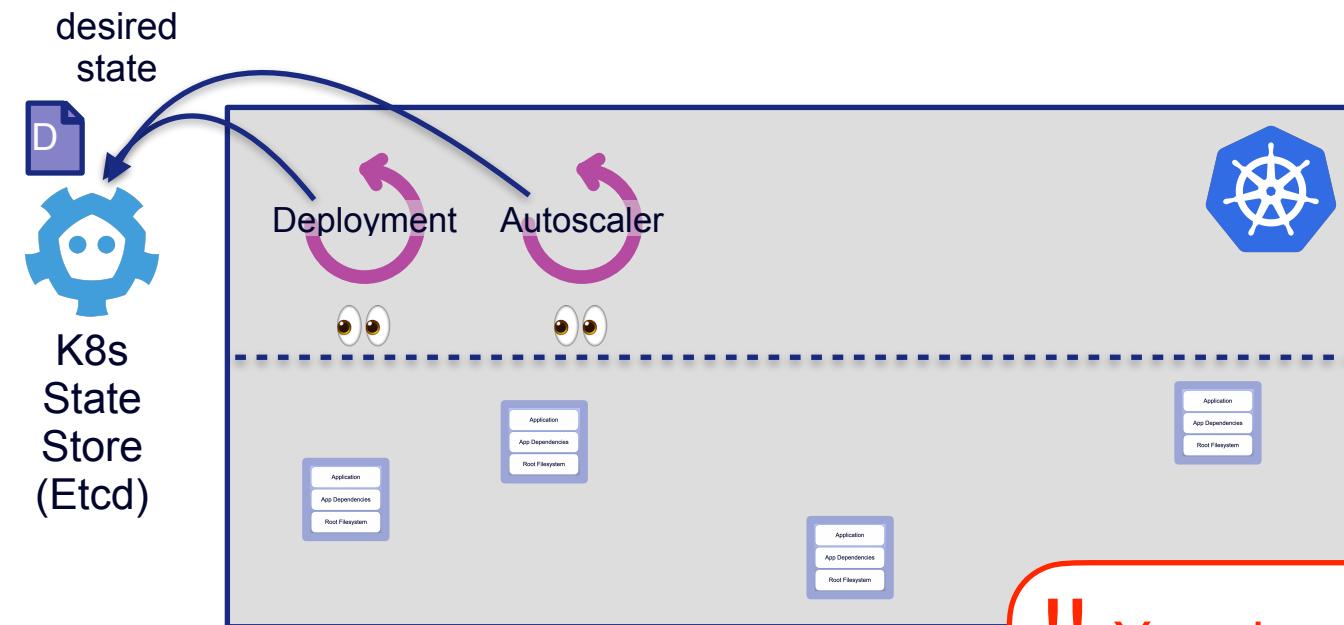
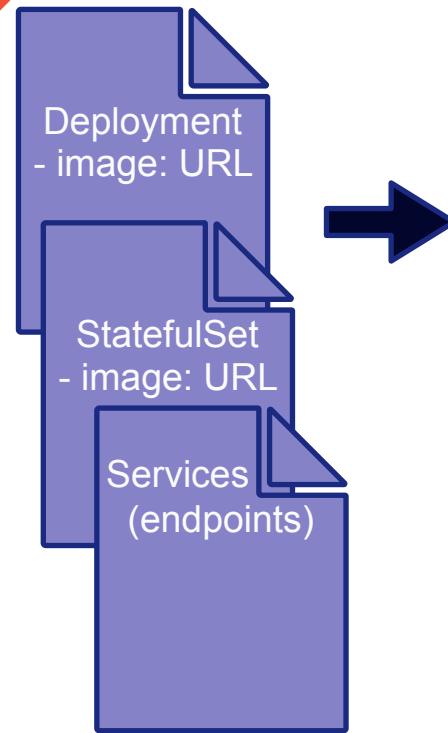






Resilience

K8s has abstractions that allow you to **declare every element** of your application deployments...
... and the reconcilers for them



!! You should:

- * Disallow ssh!!!
- * Cloud native app architecture
- * Run tests in fresh environments
- * Scale is part of desired state

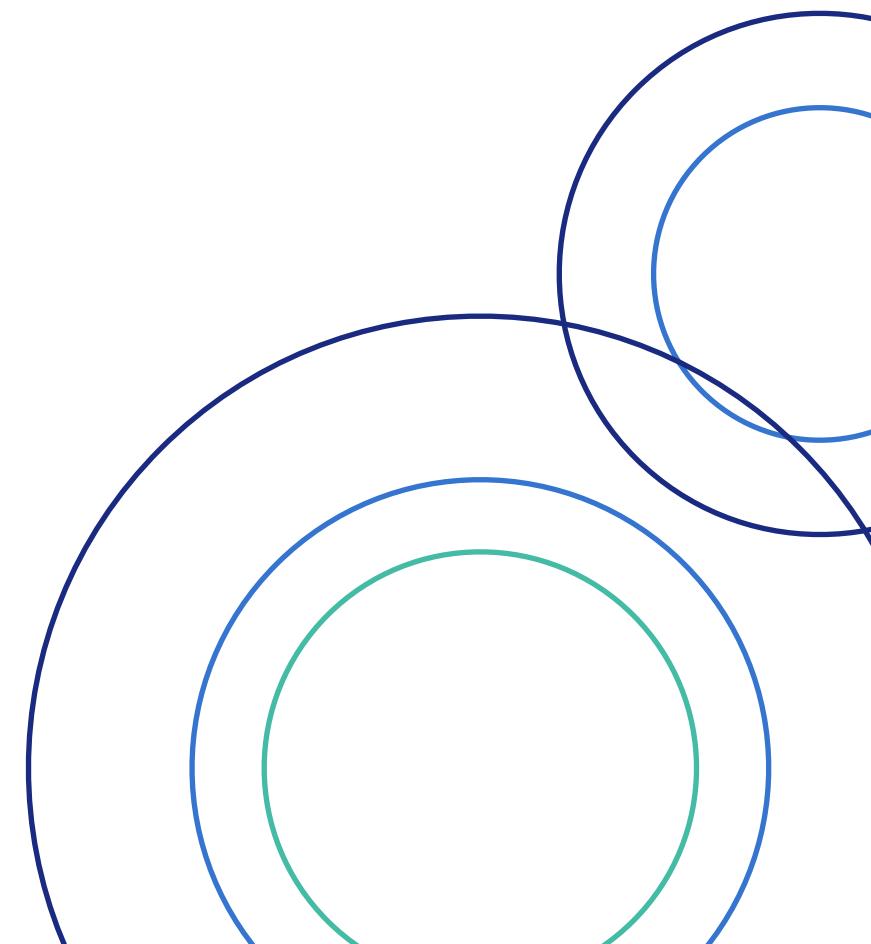


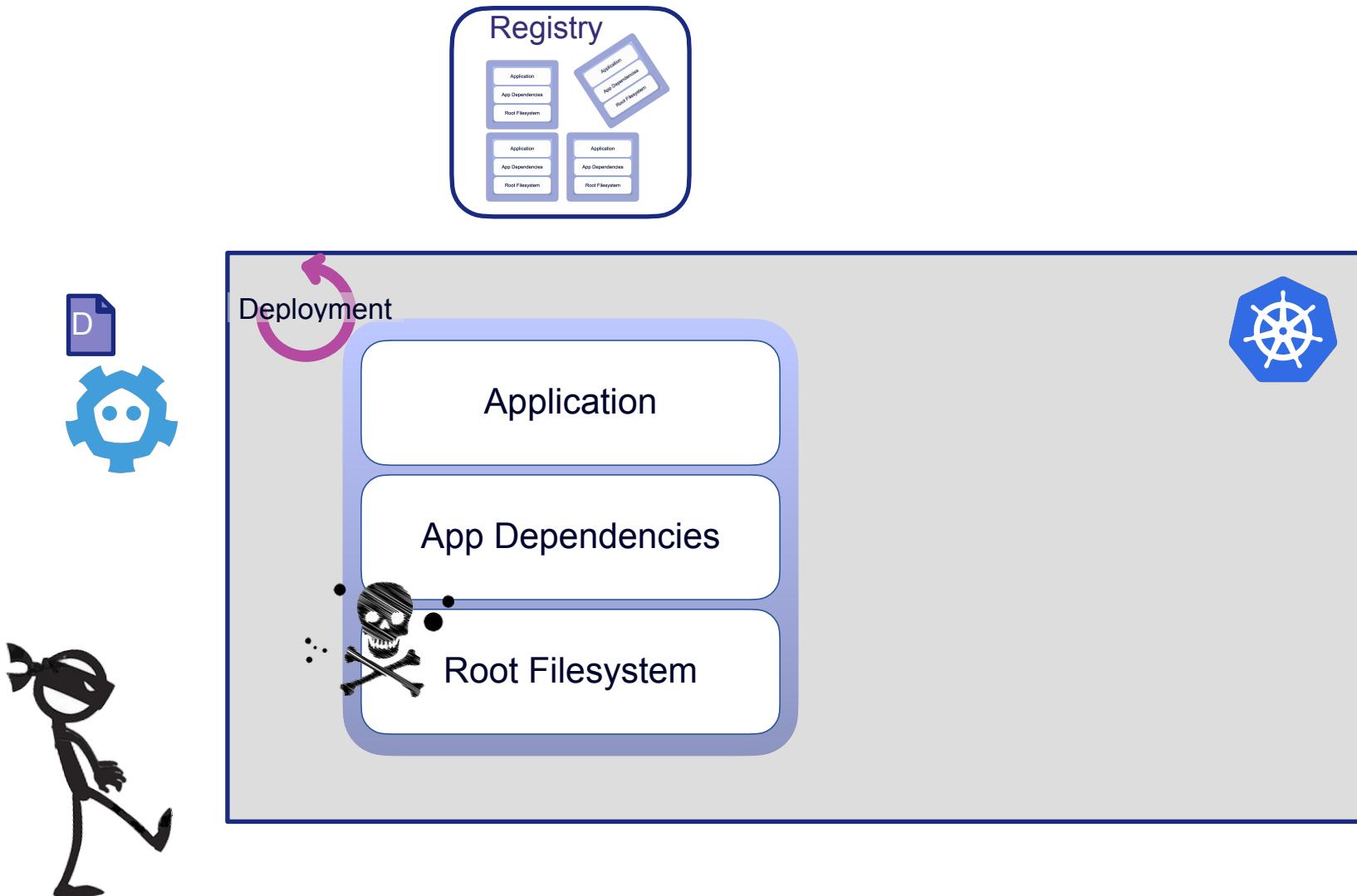
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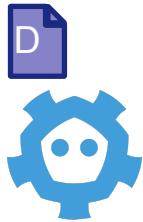
Security

Combat malware



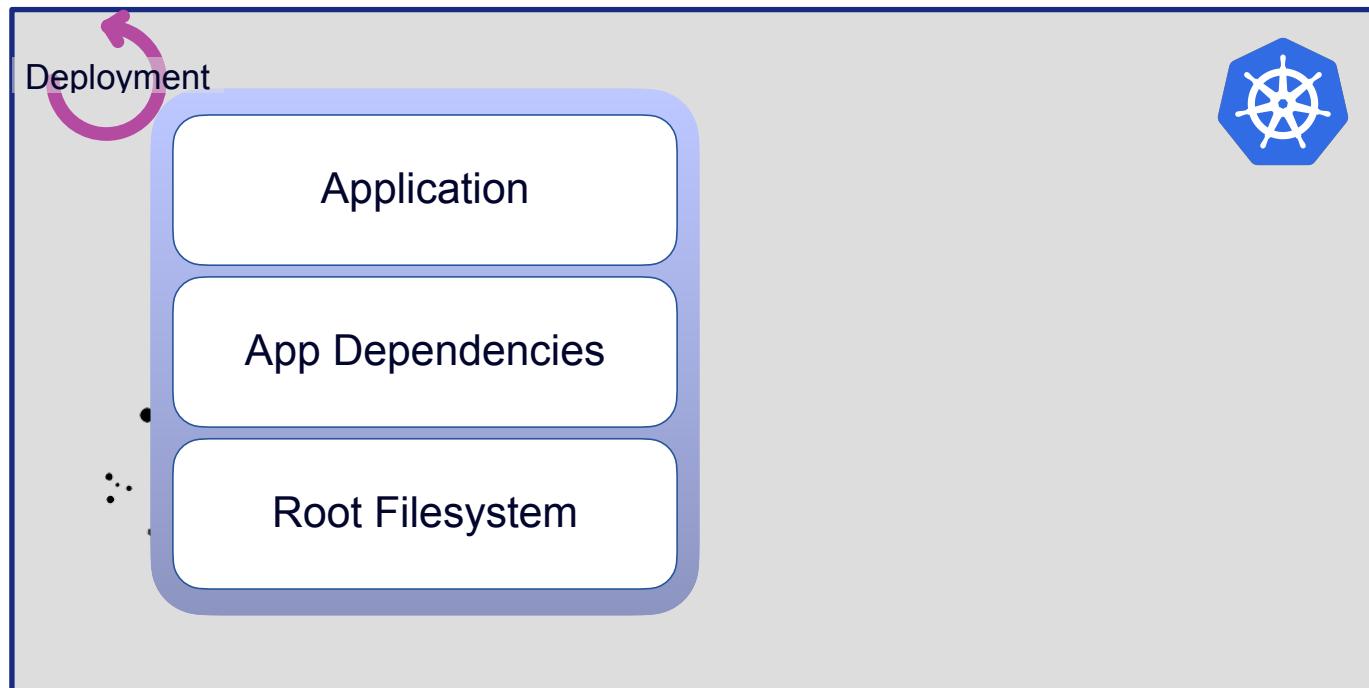
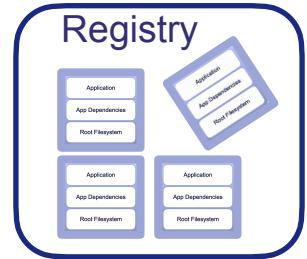


You can
Repave
the entire environment



Proactively
VERY Often!!!

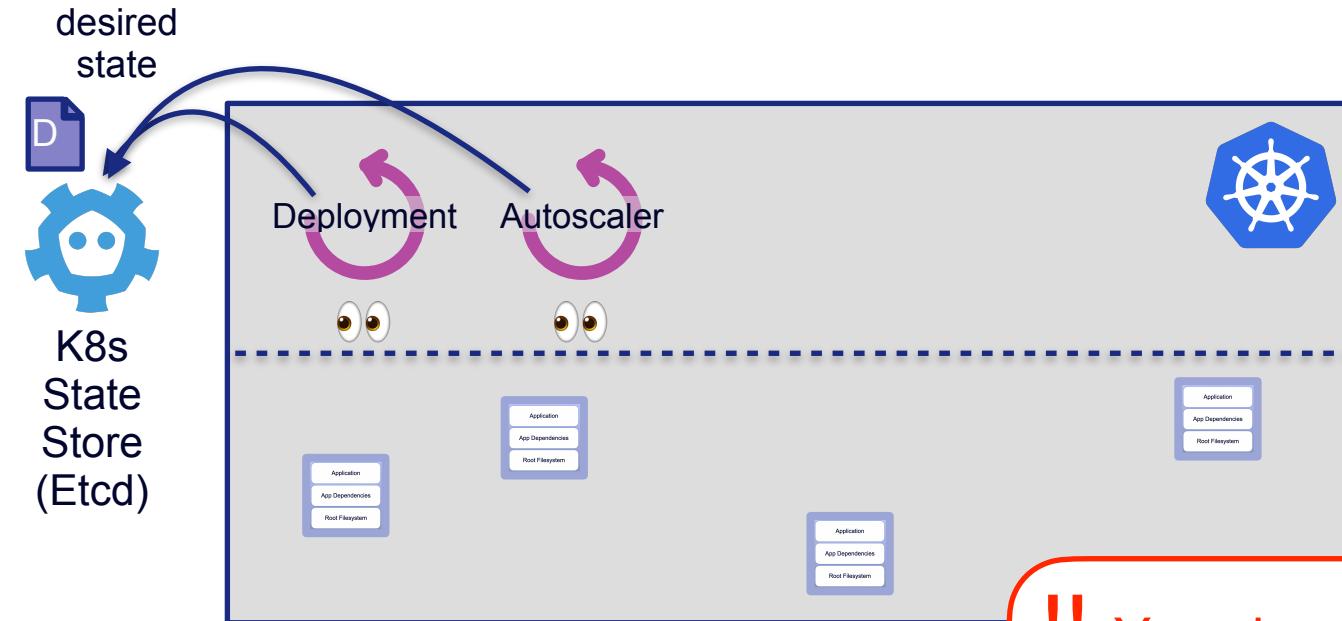
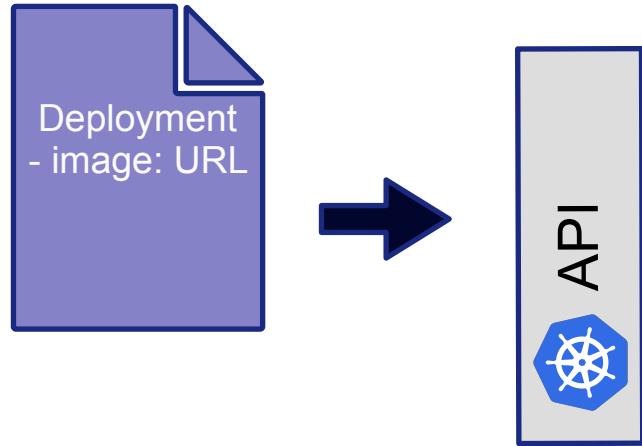
Like, every
few days
often.





Security

Declarative configuration!!

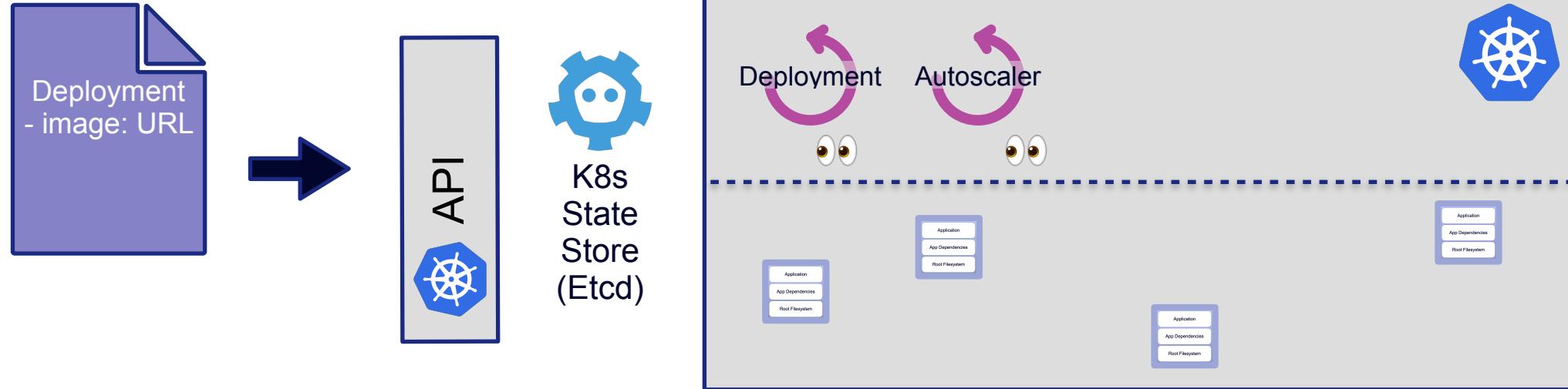


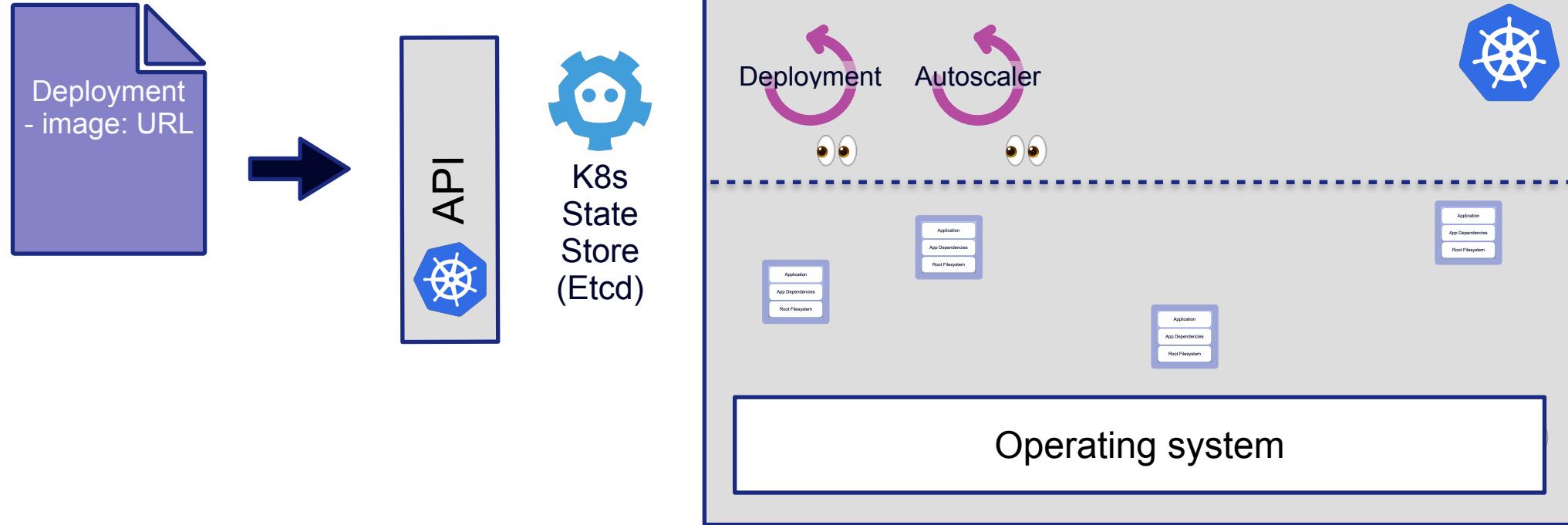
!! You should:
Absolutely
implement repaves

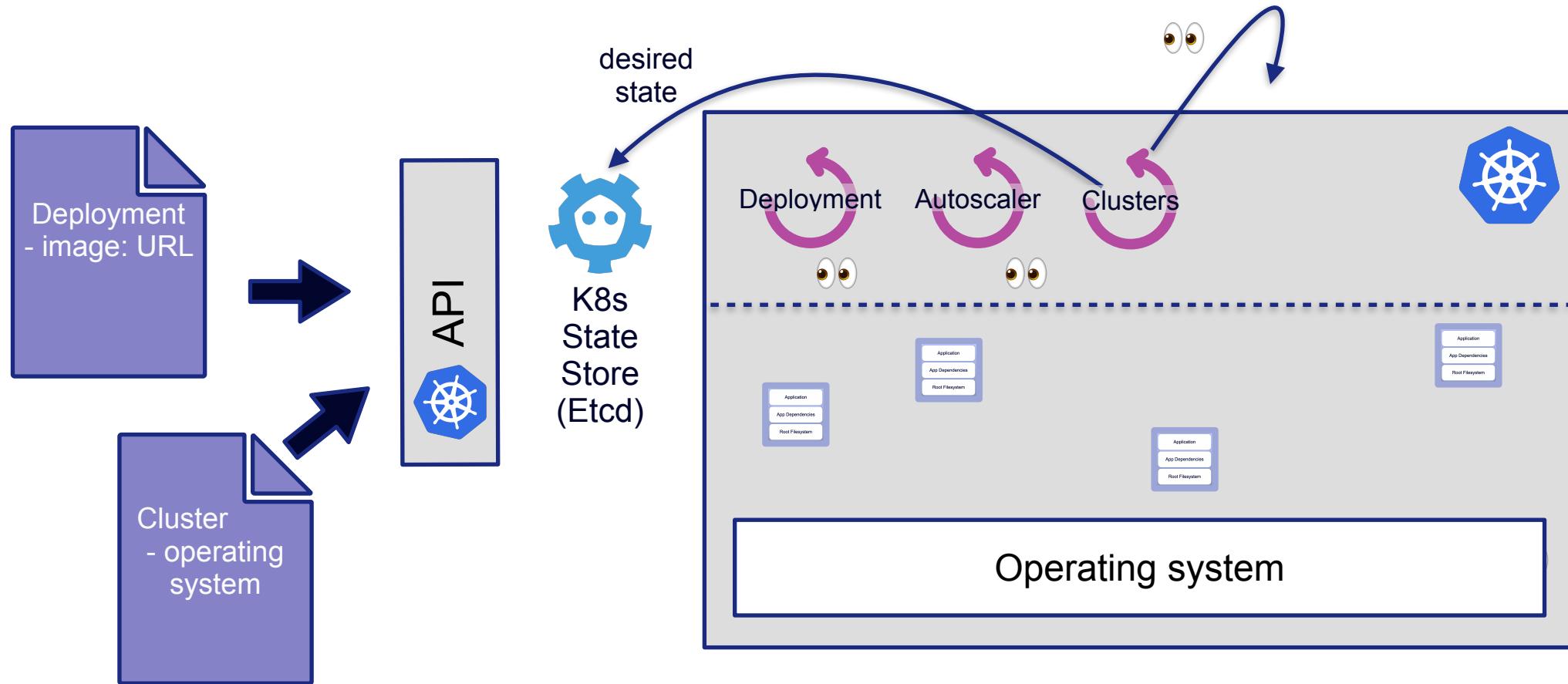
Security

Patching Operating Systems





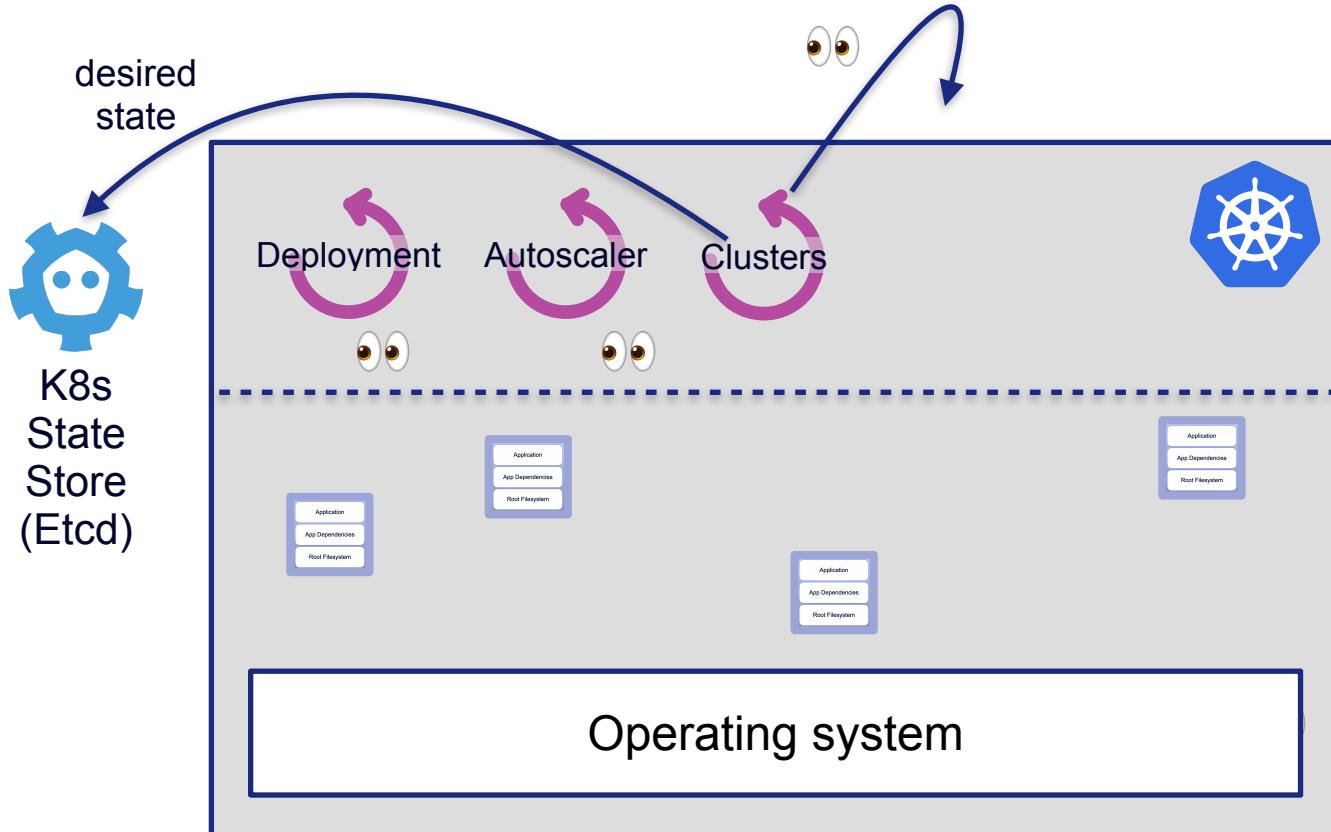
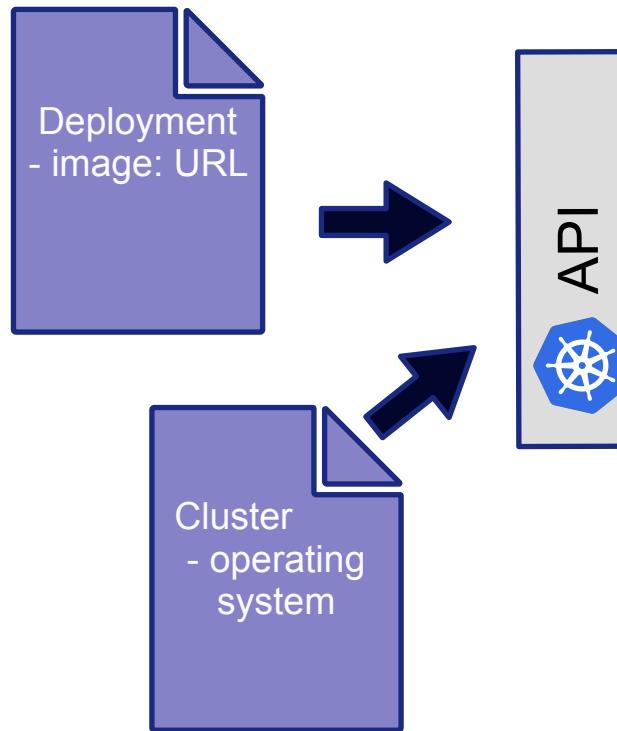






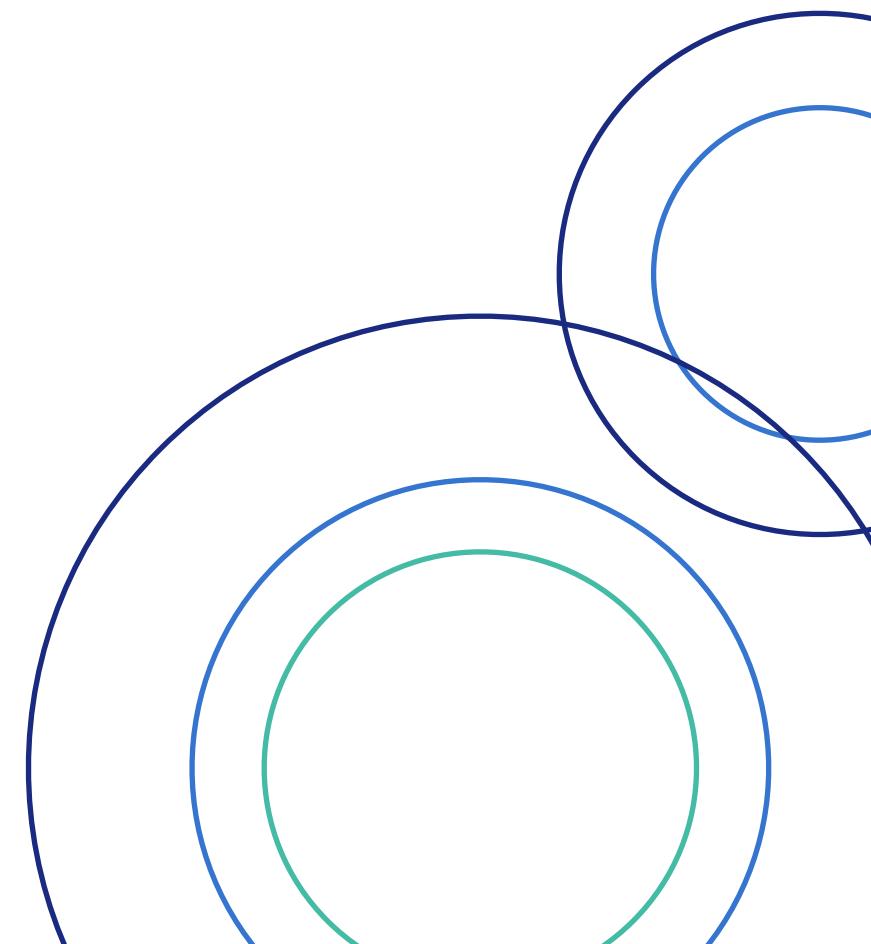
Security

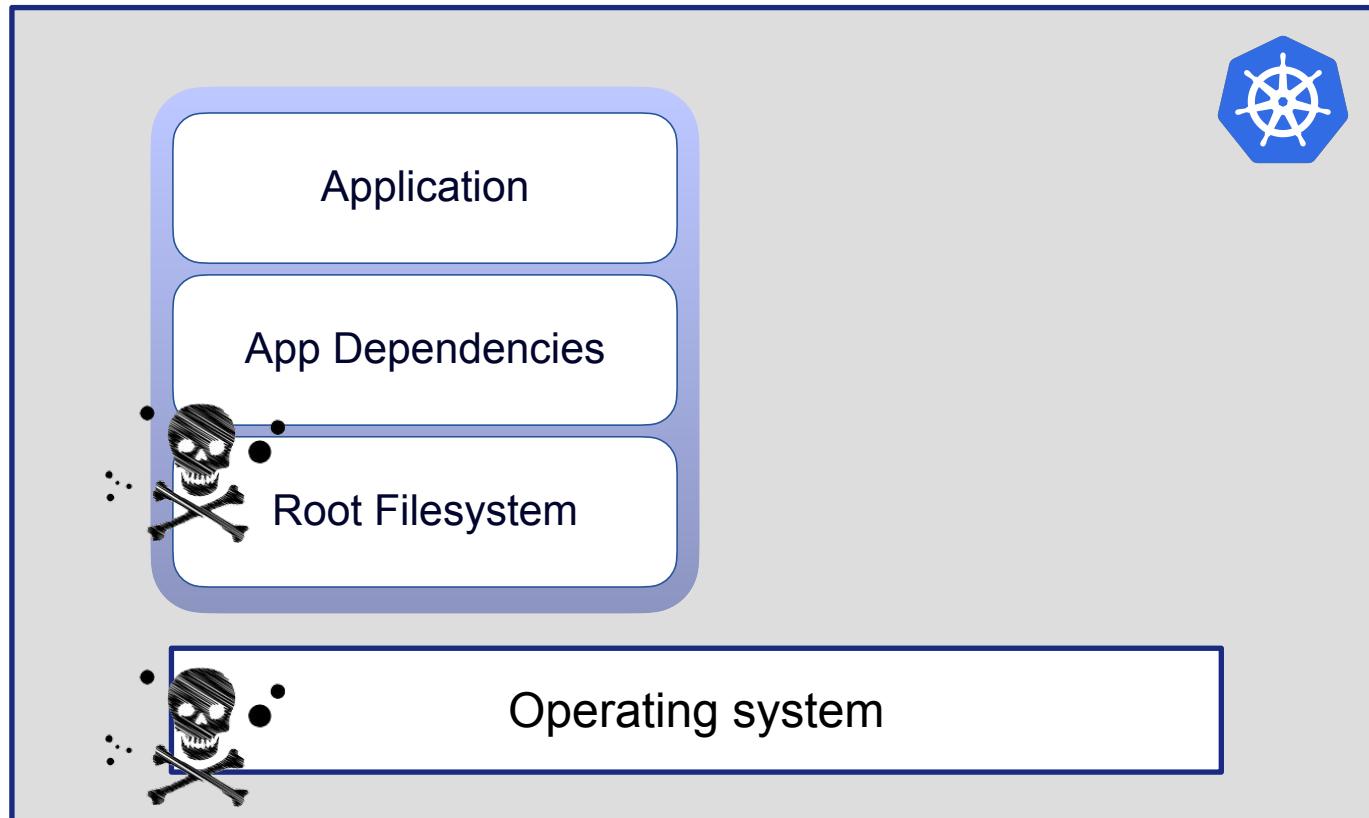
K8s has an extensible API and a very mature cluster management extension (Cluster-API or CAPI) that supports automated OS patching

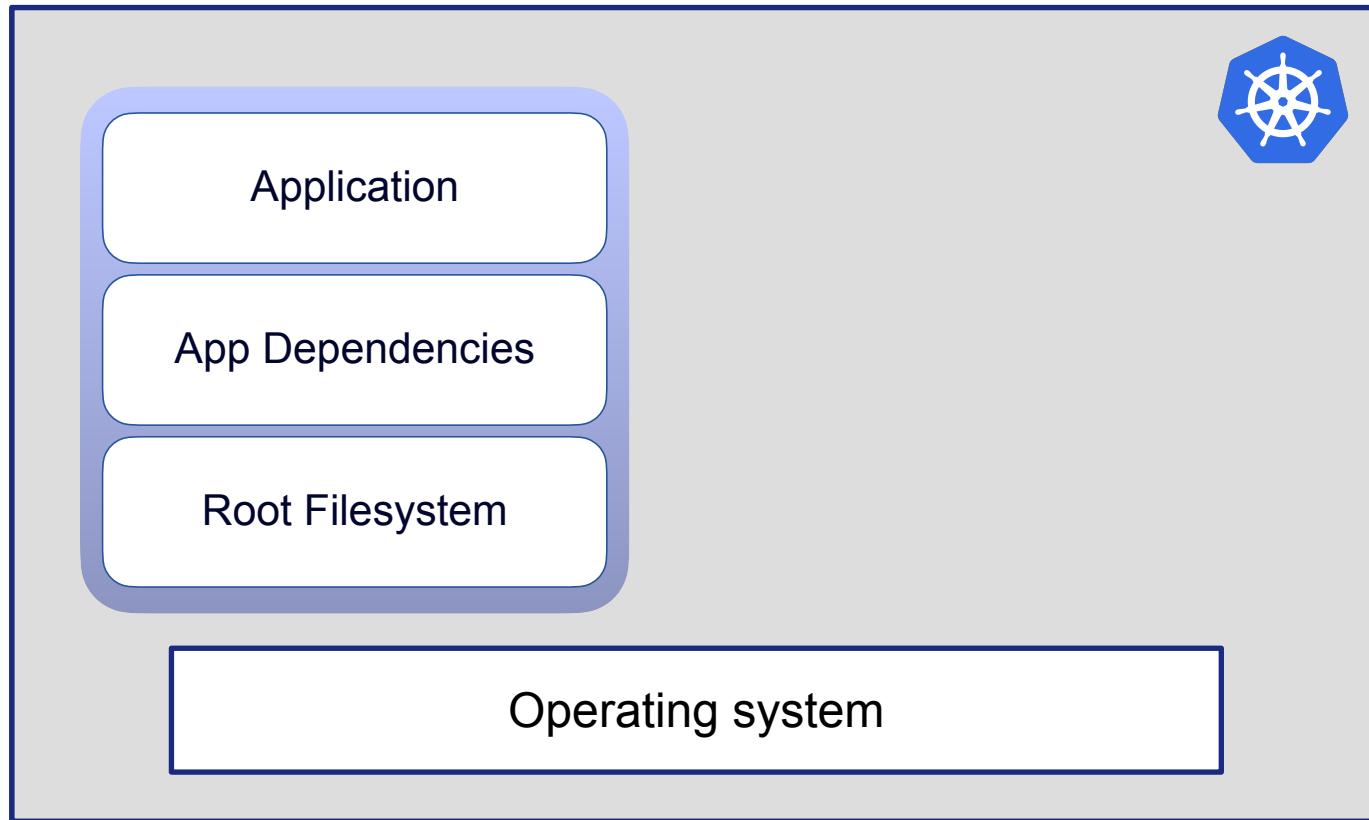


Security

Let's revisit malware







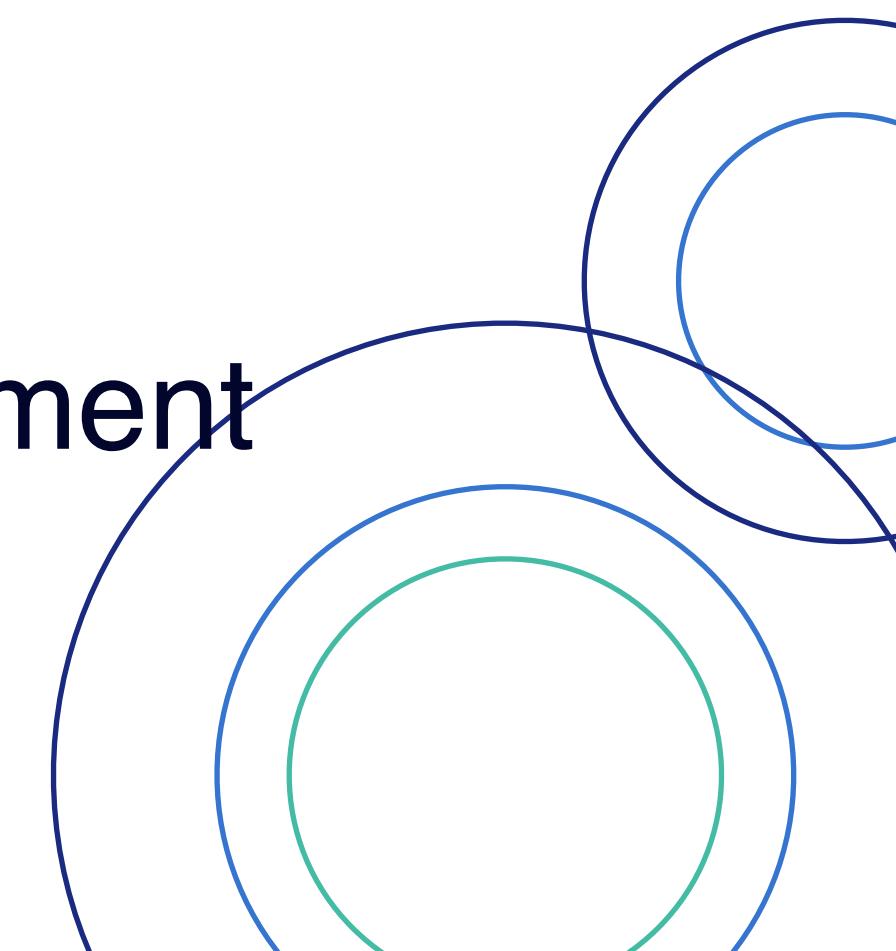
Security

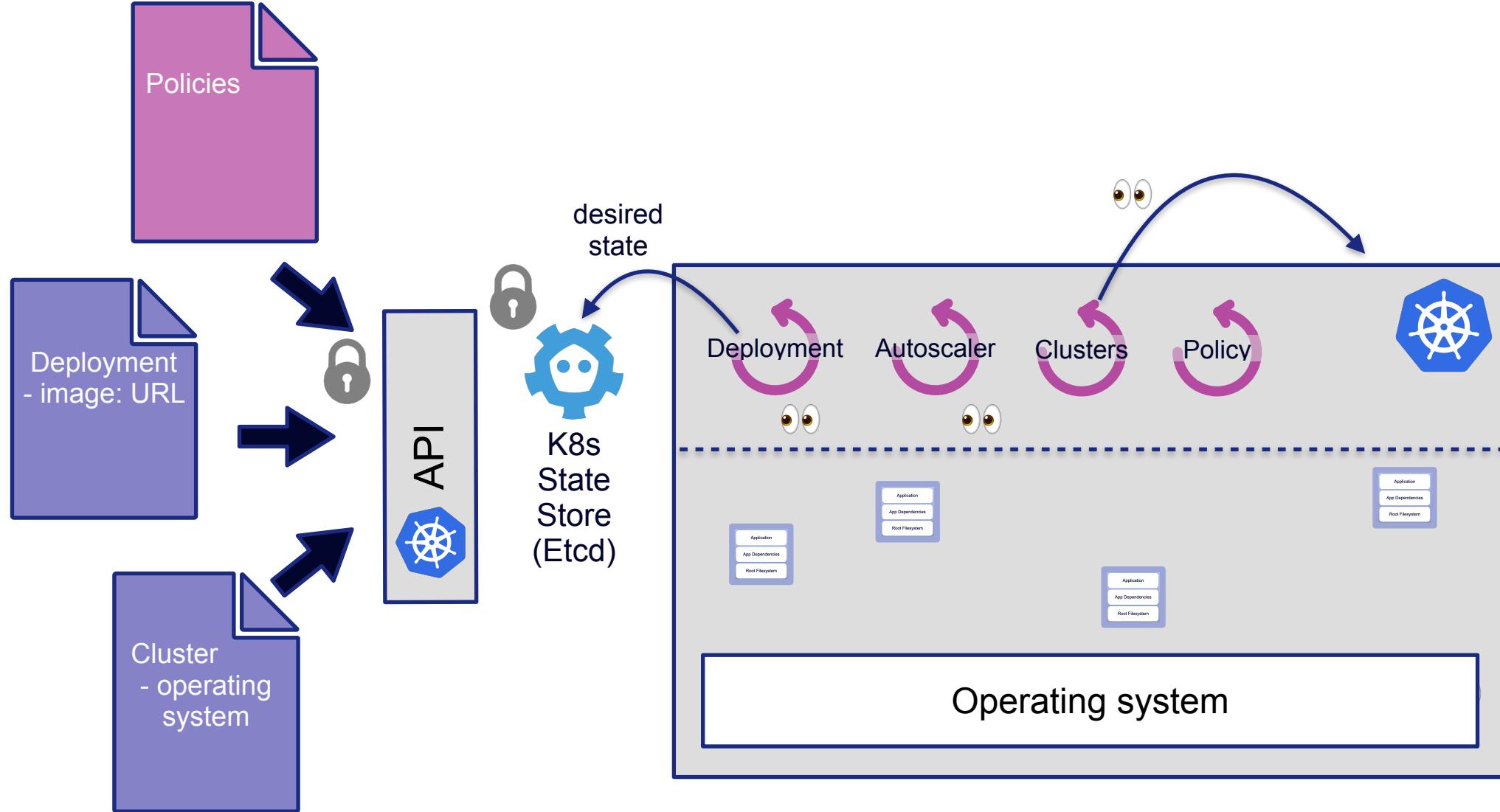
Resilience

Fiscal Resp

App DevOps

Centralized policy management





Review

Vulnerabilities and patch management (Containers & Clusters)

Security

Zero down time

Resilience

Manage infrastructure (and spending) sprawl

Fiscal Resp

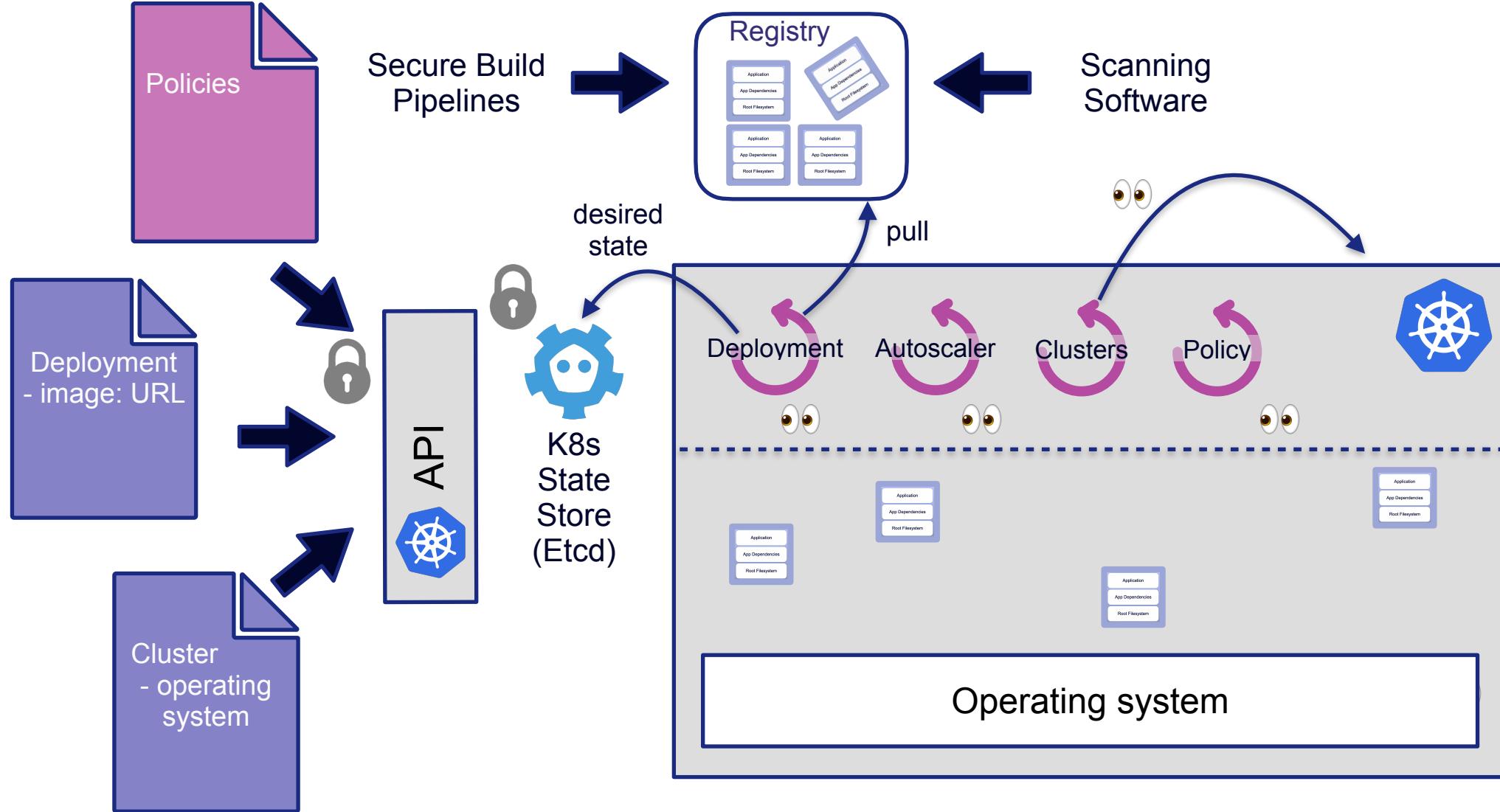
Combat malware (Containers & Hosts)

Security

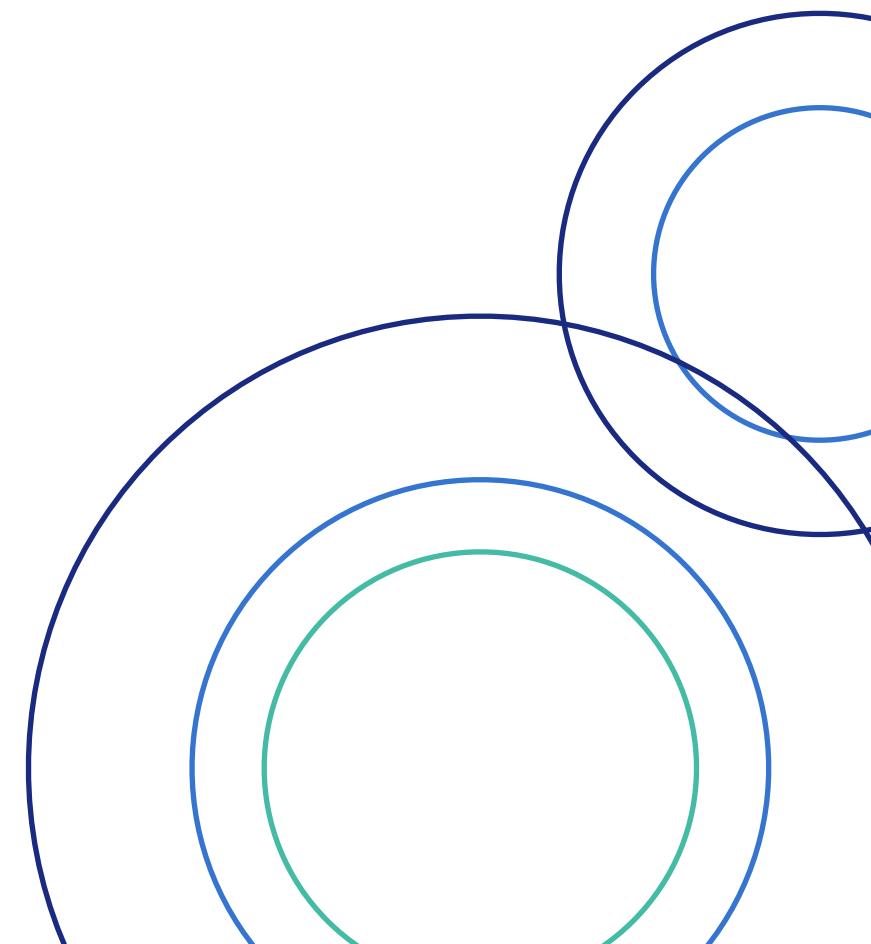
Centralized Policy Management

Security





What I need help with



I want to do more to help the app team

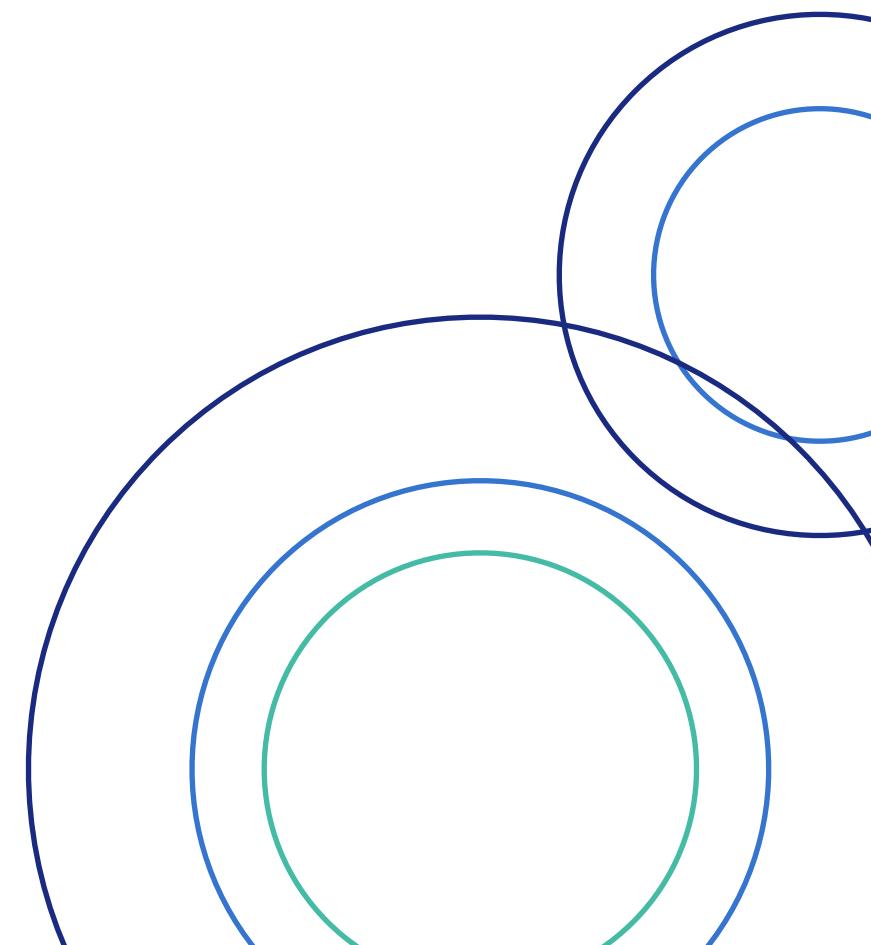
directly

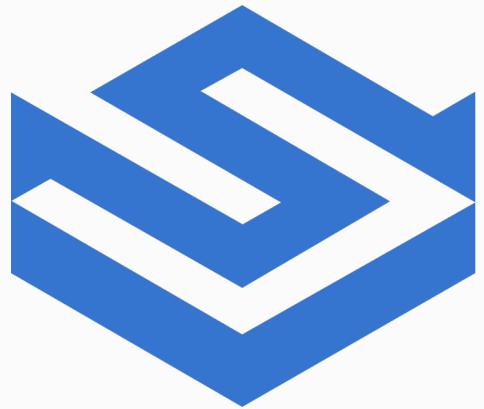


Successes, Failures, Ideas, Asks...

...I'd love to chat

Thank you!





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