Kubernetes Digital Transformation

ADRIÁN DECCICO - Darumatic June / 2020

About me

Adrián Deccico

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kubernetes CERTIFIED SERVICE PROVIDER

kubernetes TRAINING PARTNER

OUR PARTNERS

redhat. amazon web services docker RANCHER

Introduction / Goals

-Part Zero:

Digital Transformation from Kubernetes perspective

-Part One Case Study:

Kubernetes applied to a big government organisation

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What Is Digital Transformation?

Use of new, fast and frequently changing digital technology to **solve problems**.

This **enables** new types of **innovation** and **creativity**, rather than simply enhance and support traditional methods.

K8s Digital Transformation

CI / CD

Stage View

	Declarative: Checkout SCM	Git Checkout	Create and push Docker Image	Clair scan	Deploy in K8s	Wait until new version is active	Email Notification
Average stage times: (Average full run time: ~14s)	1s	1s	14s	6s	1s	663ms	147ms
#185 2019/03/11 11:00:00 pm uat [master:0] **george** d5d2e97 Update Jenkinsfile 02/15 2:22:13 pm	1s	1s	1s	7s	655ms	645ms	126ms
#184 2019/03/10 11:00:00 pm uat [master:0] **george** d5d2e97 Update Jenkinsfile 02/15 2:22:13 pm	978ms	1s	979ms	7s	1s	658ms	174ms
#183 2019/03/09 11:00:00 pm uat [master:0] **george** d5d2e97 Update Jenkinsfile 02/15 2:22:13 pm	848ms	1s	1s	7s	1s	643ms	146ms
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Cloud Computing

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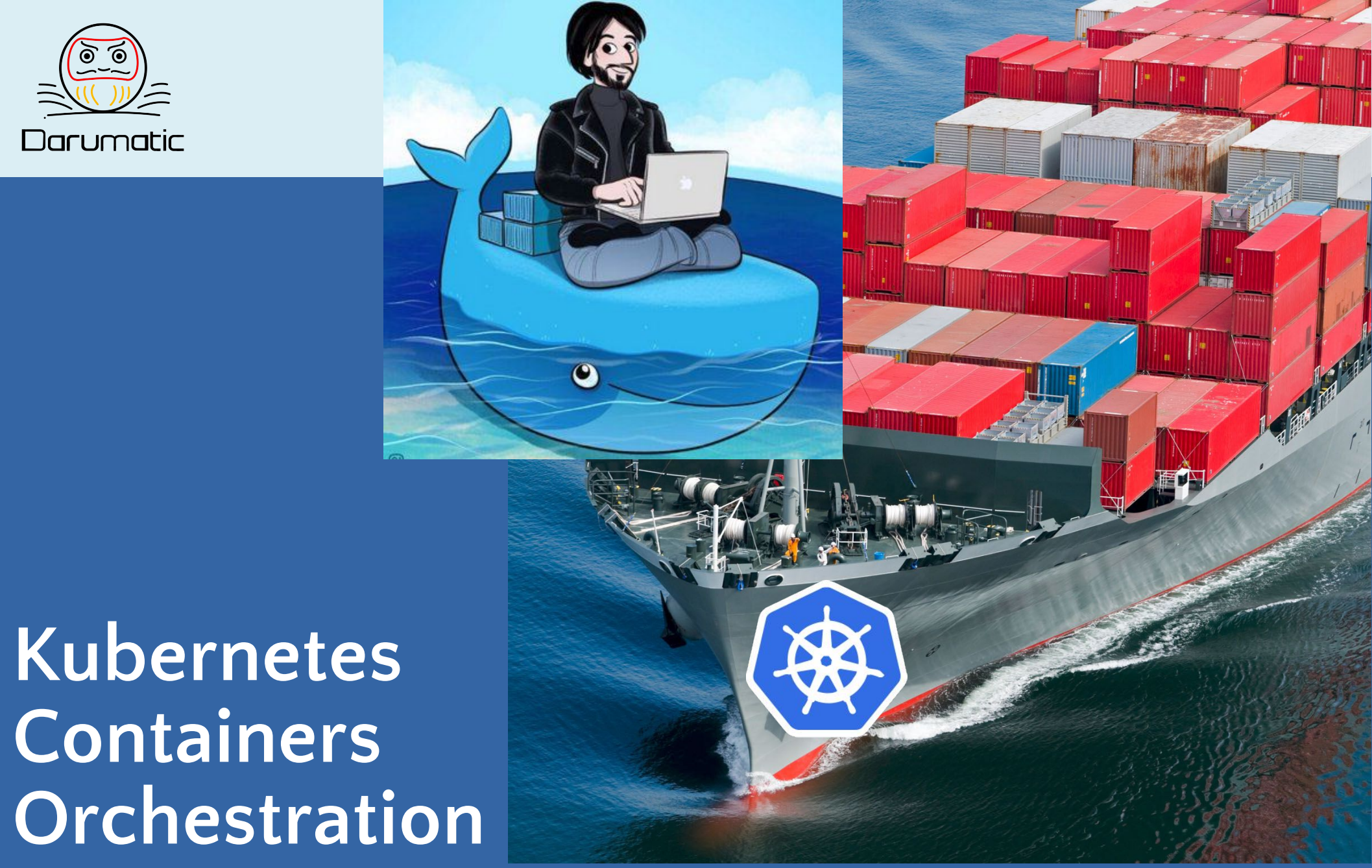
Docker Containers



Kubernetes Containers Orchestration

Part One: Case Study

Kubernetes Digital Transformation applied to big government organisation.

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Previous Status Quo

How did we change this?

Ansible GitOps

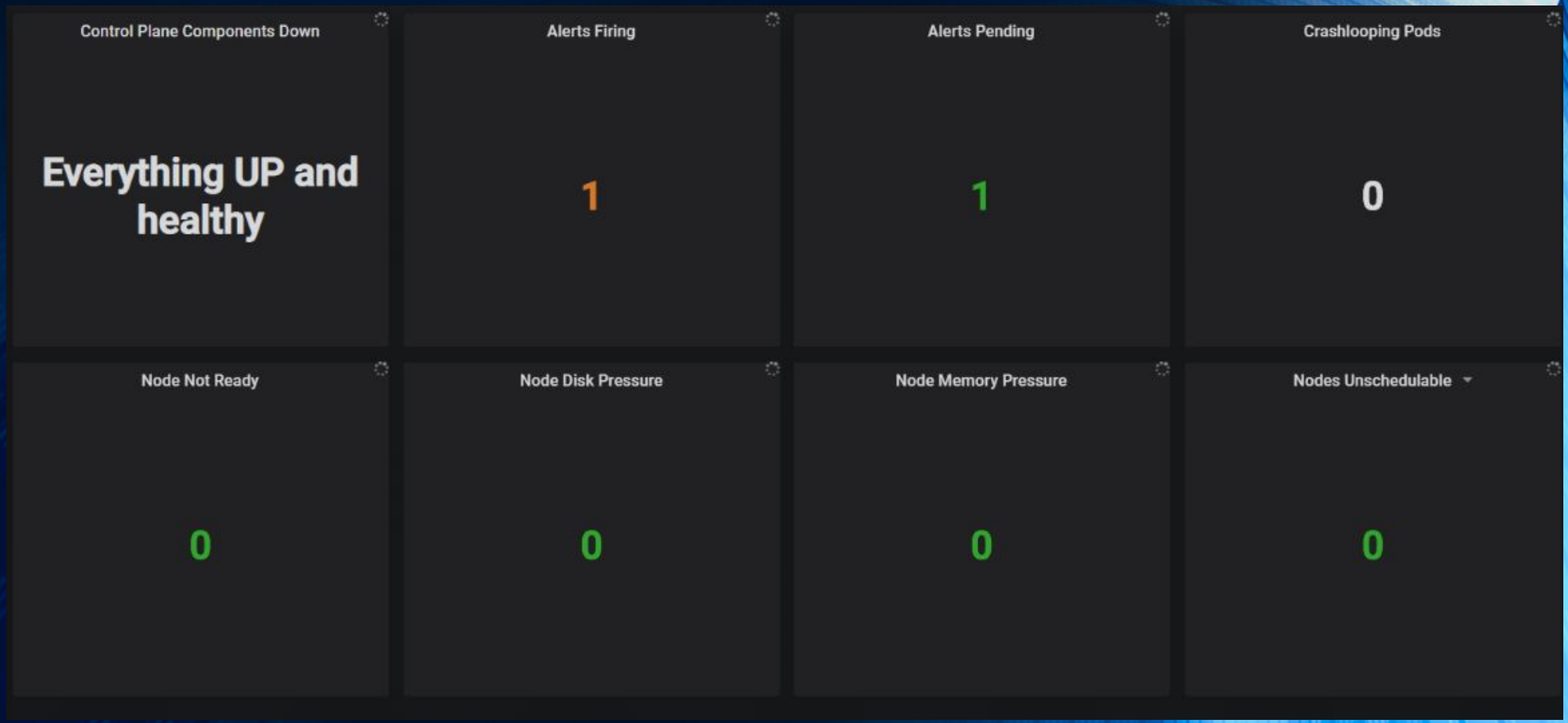
```
#Setups a non-root user with sudo rights
- hosts: all
  vars:
    ansible_user: "{{ ROOT_USER_NAME }}"
  gather_facts: False
  roles:
    - {role: cluster-defaults}
    - {role: standard-user}
  become: true

- hosts: all
  tasks:
  - debug:
      msg: "Logged in as normal user"
```

How did we change this?

Prometheus / Grafana

How did we change this?

Prometheus / Grafana



How did we change this?

Prometheus / Grafana

[FIRING:1] DeploymentReplicasNotUpdated u-onegov-npe kube-prometheus-exporter-kube-state (test kube-state-metrics 10.233.125.132:8080 kube-state sit kube-prometheus-exporter-kube-state-6cff45f5cd-nfckh monitoring/kube-prometheus-prometheus warning) Inbox ×

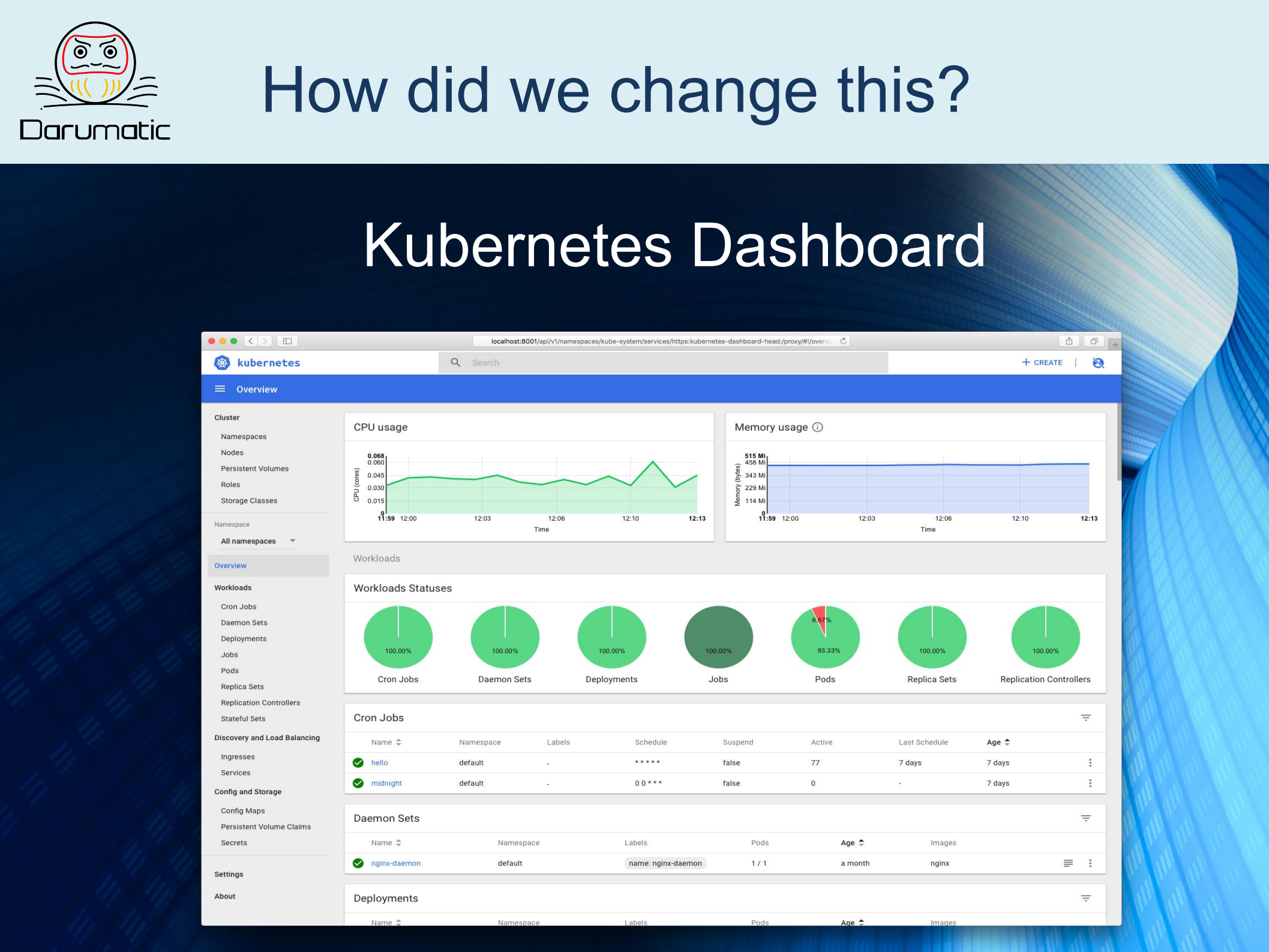
alertmanager@prometheus.gls.local Sat, Jun 20, 2:10 PM (4 days ago)
to onegov

1 alert for alertname=DeploymentReplicasNotUpdated cluster=u-onegov-npe service=kube-prometheus-exporter-kube-state

View In AlertManager

[1] Firing

Labels
alertname = DeploymentReplicasNotUpdated
cluster = u-onegov-npe
deployment = test
endpoint = kube-state-metrics
instance = 10.233.125.132:8080
job = kube-state
namespace = sit
pod = kube-prometheus-exporter-kube-state-6cff45f5cd-nfckh
prometheus = monitoring/kube-prometheus-prometheus
service = kube-prometheus-exporter-kube-state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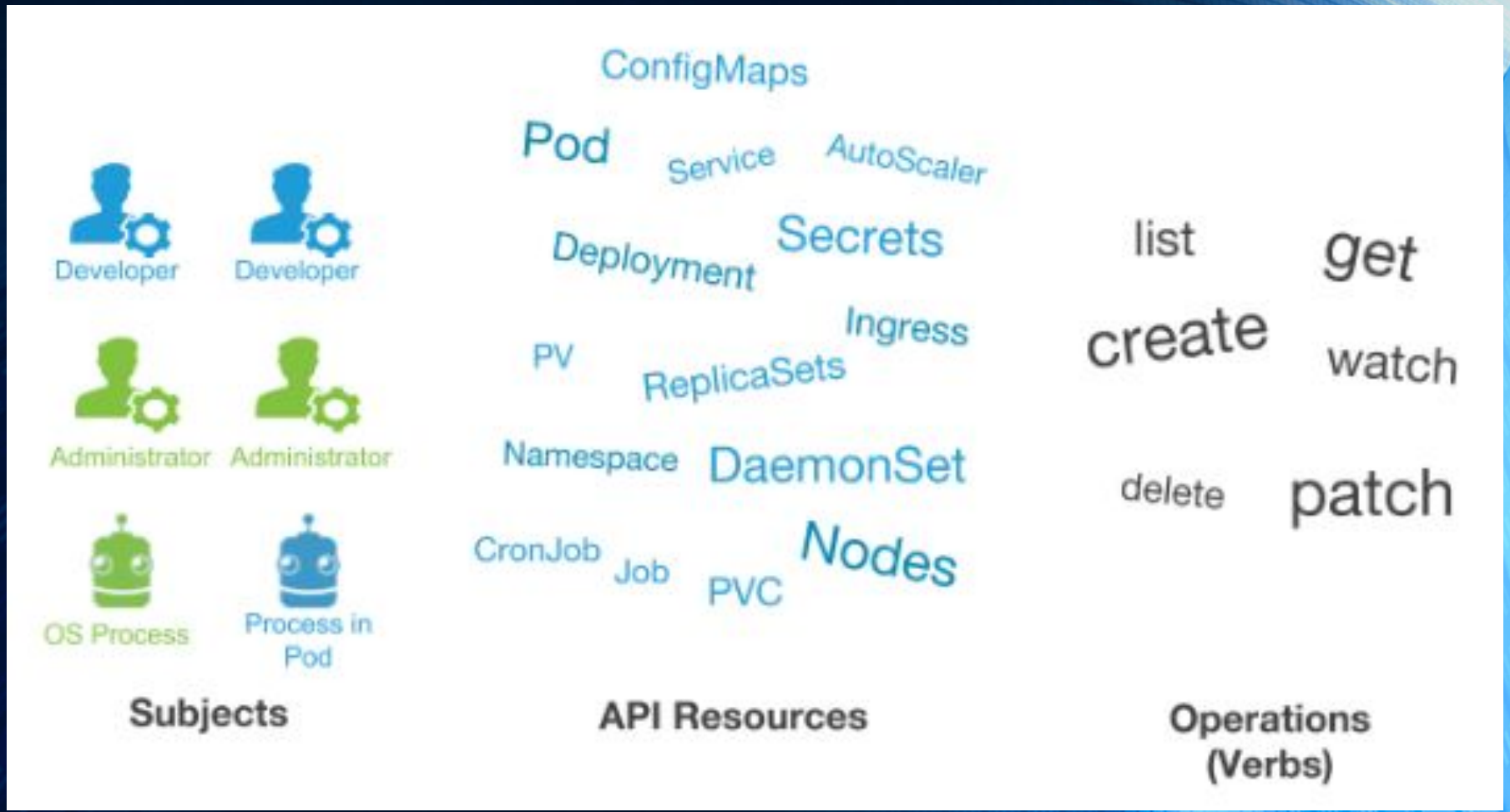
How did we change this?
Kubernetes Dashboard
localhost:8001/api/v1/namespaces/kube-system/services/https:kubernetes-dashboard-head:/proxy/#!/overv
kubernetes
Search
+ CREATE
Overview
Cluster
Namespaces
Nodes
Persistent Volumes
Roles
Storage Classes
Namespace
All namespaces
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Replication Controllers
Stateful Sets
Discovery and Load Balancing
Ingresses
Services
Config and Storage
Config Maps
Persistent Volume Claims
Secrets
Settings
About
CPU usage
CPU (cores)
0.068
0.060
0.045
0.030
0.015
0
11:59 12:00 12:03 12:06 12:10 12:13
Time
Memory usage
Memory (bytes)
515 Mi
458 Mi
343 Mi
229 Mi
114 Mi
0
11:59 12:00 12:03 12:06 12:10 12:13
Time
Workloads
Workloads Statuses
100.00%
Cron Jobs
100.00%
Daemon Sets
100.00%
Deployments
100.00%
Jobs
6.67%
93.33%
Pods
100.00%
Replica Sets
100.00%
Replication Controllers
Cron Jobs
Name
Namespace
Labels
Schedule
Suspend
Active
Last Schedule
Age
hello
default
-
* * * * *
false
77
7 days
7 days
midnight
default
-
0 0 * * *
false
0
-
7 days
Daemon Sets
Name
Namespace
Labels
Pods
Age
Images
nginx-daemon
default
name: nginx-daemon
1 / 1
a month
nginx
Deployments
Name
Namespace
Labels
Pods
Age
Images

How did we change this?

Kubernetes RBAC

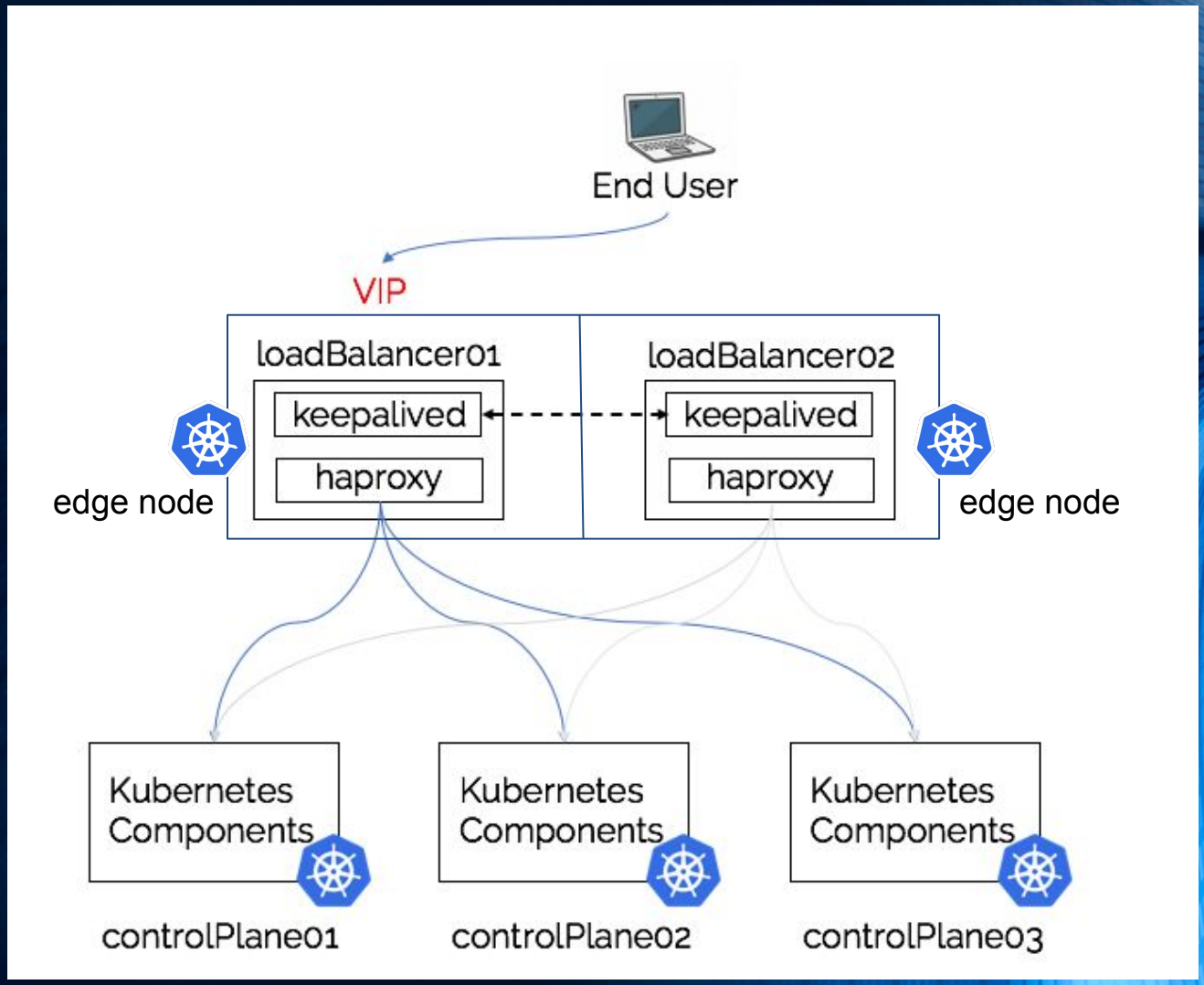


How did we change this?

Calico

How did we change this?

Keepalived as a Load Balancer



How did we change this?

Jenkins - Custom Pipeline UI

Stage View

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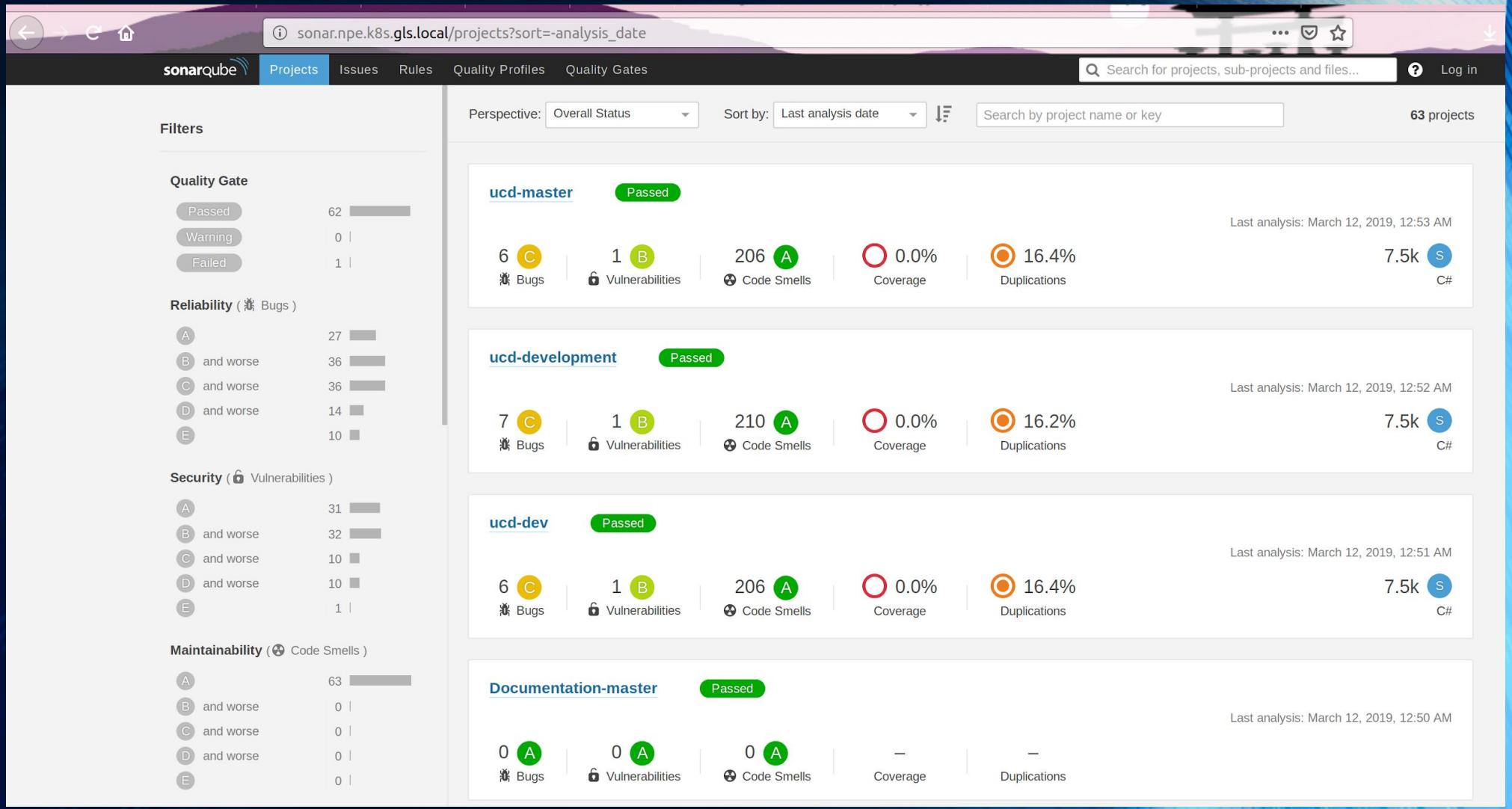
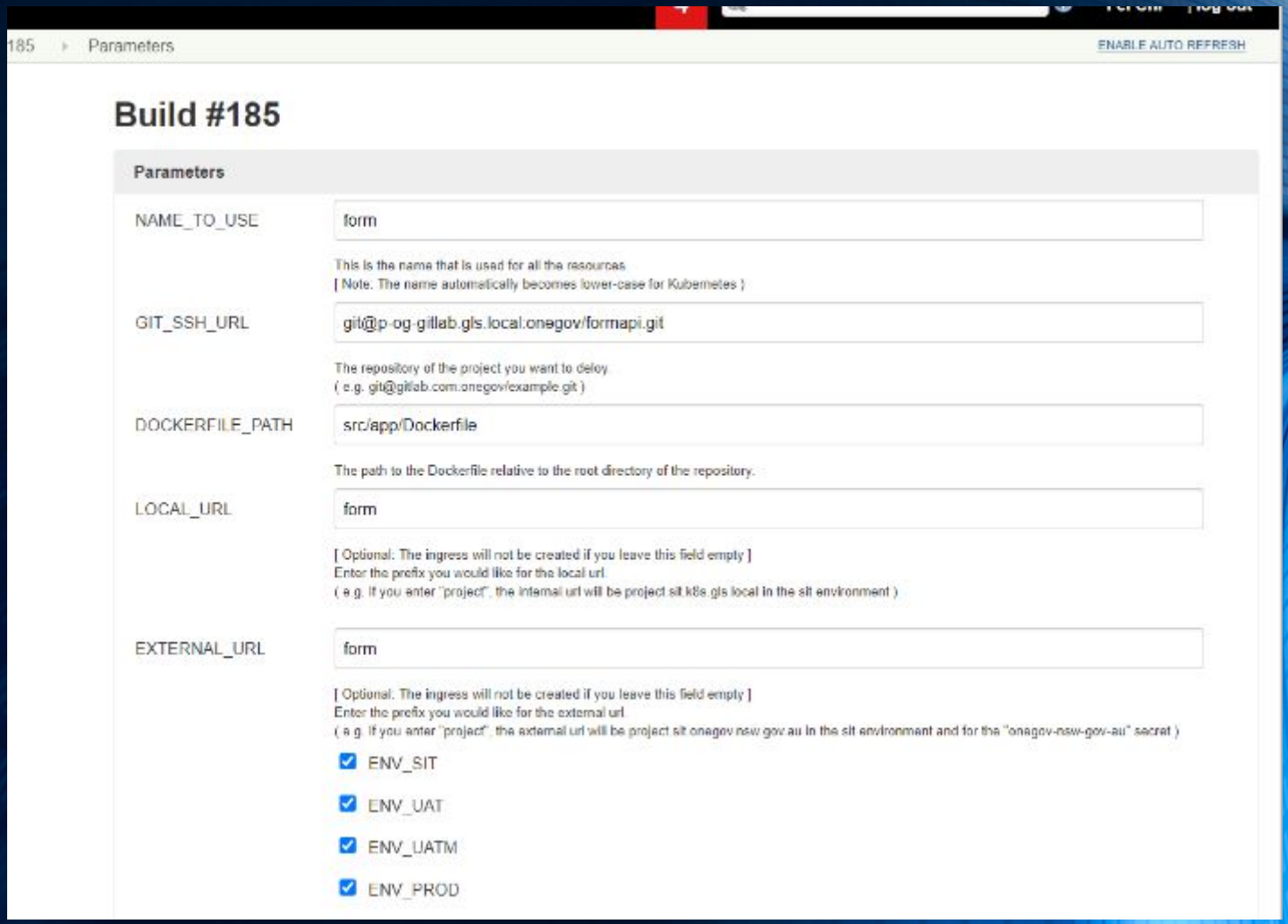
How did we change this?

SonarQube integration



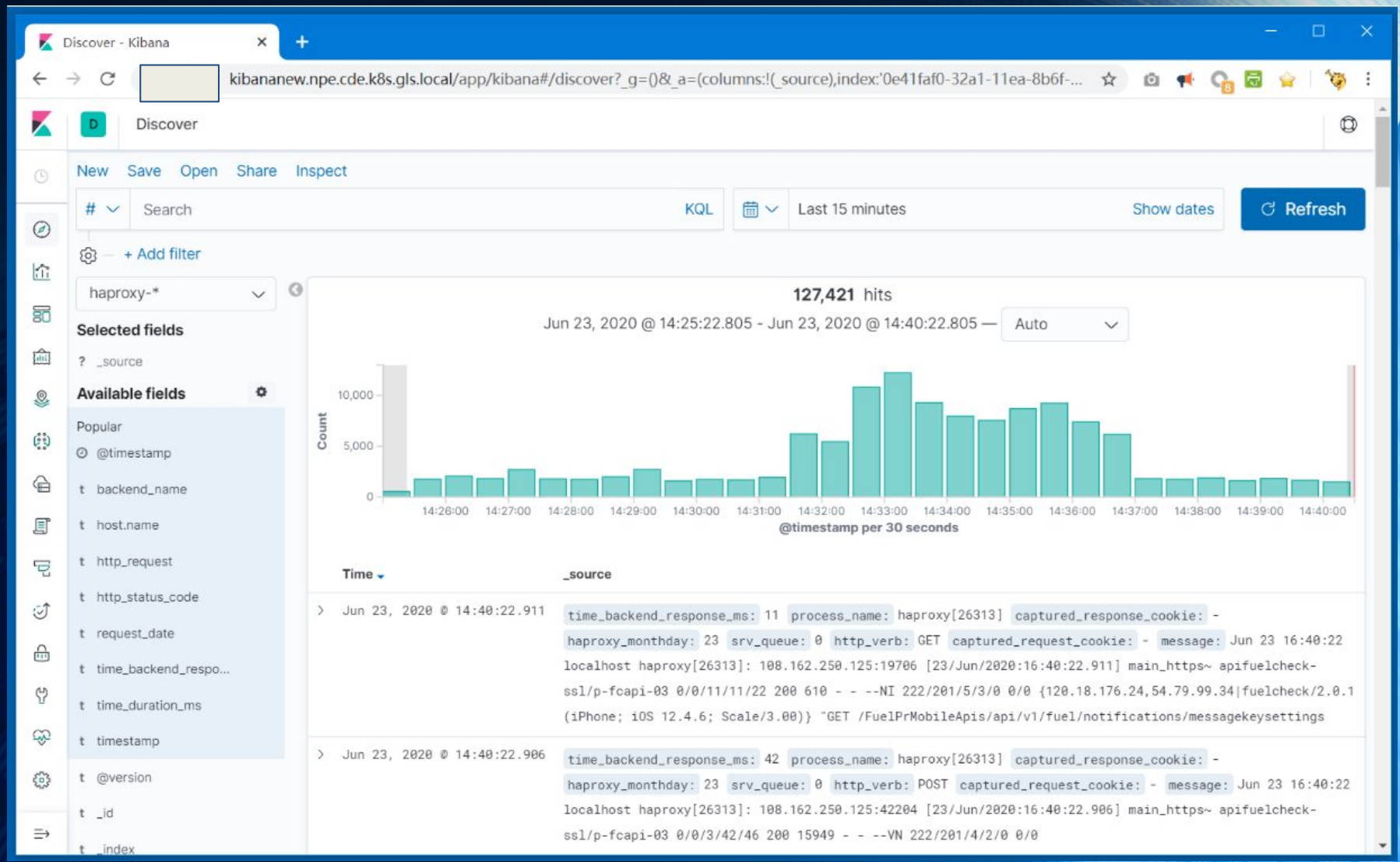
How did we change this?

Jenkins - Self Service Project Gen



How did we change this?

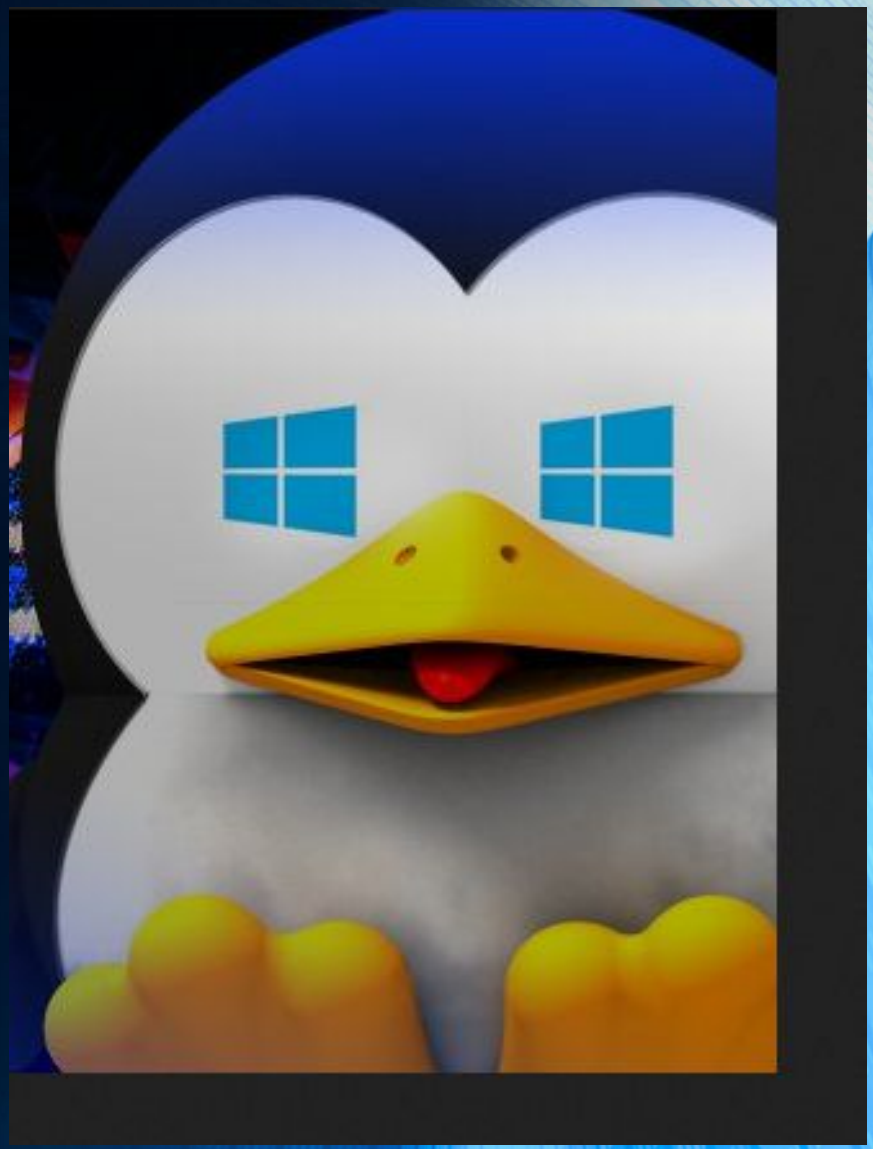
Logging with ELK Stack



How did we change this?

Windows for Development

Linux for Deployment



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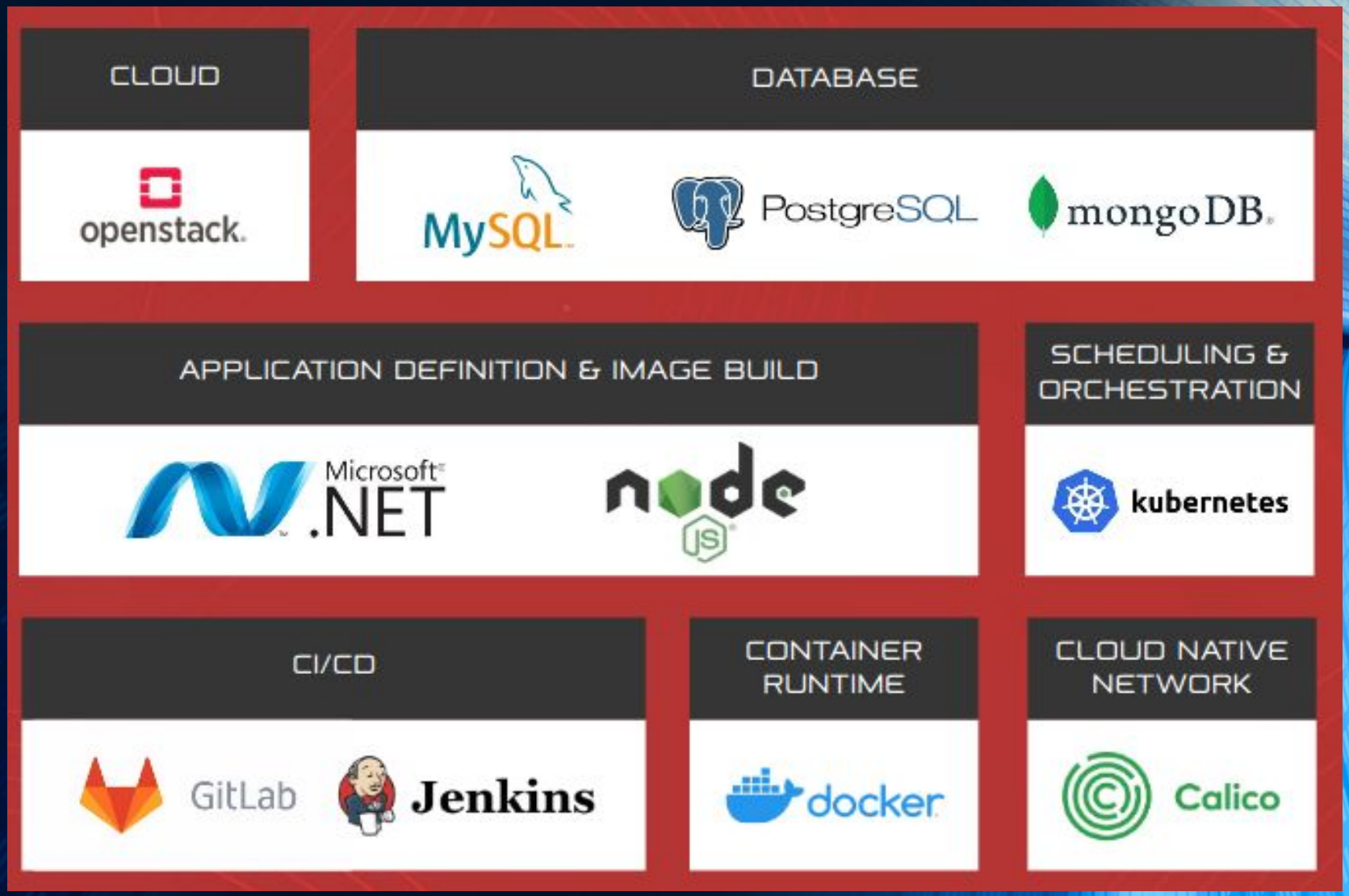
Tech Stack



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Tech Stack

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Summary

We achieved a dramatic increase in:

Developer Productivity

Production stability

Platform security

Digital Transformation with K8s

Digital Transformation with K8s

Thank you for joining!

Contact: adrian@darumatic.com
Case Study: https://darumatic.com/capabilities

References / Images

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