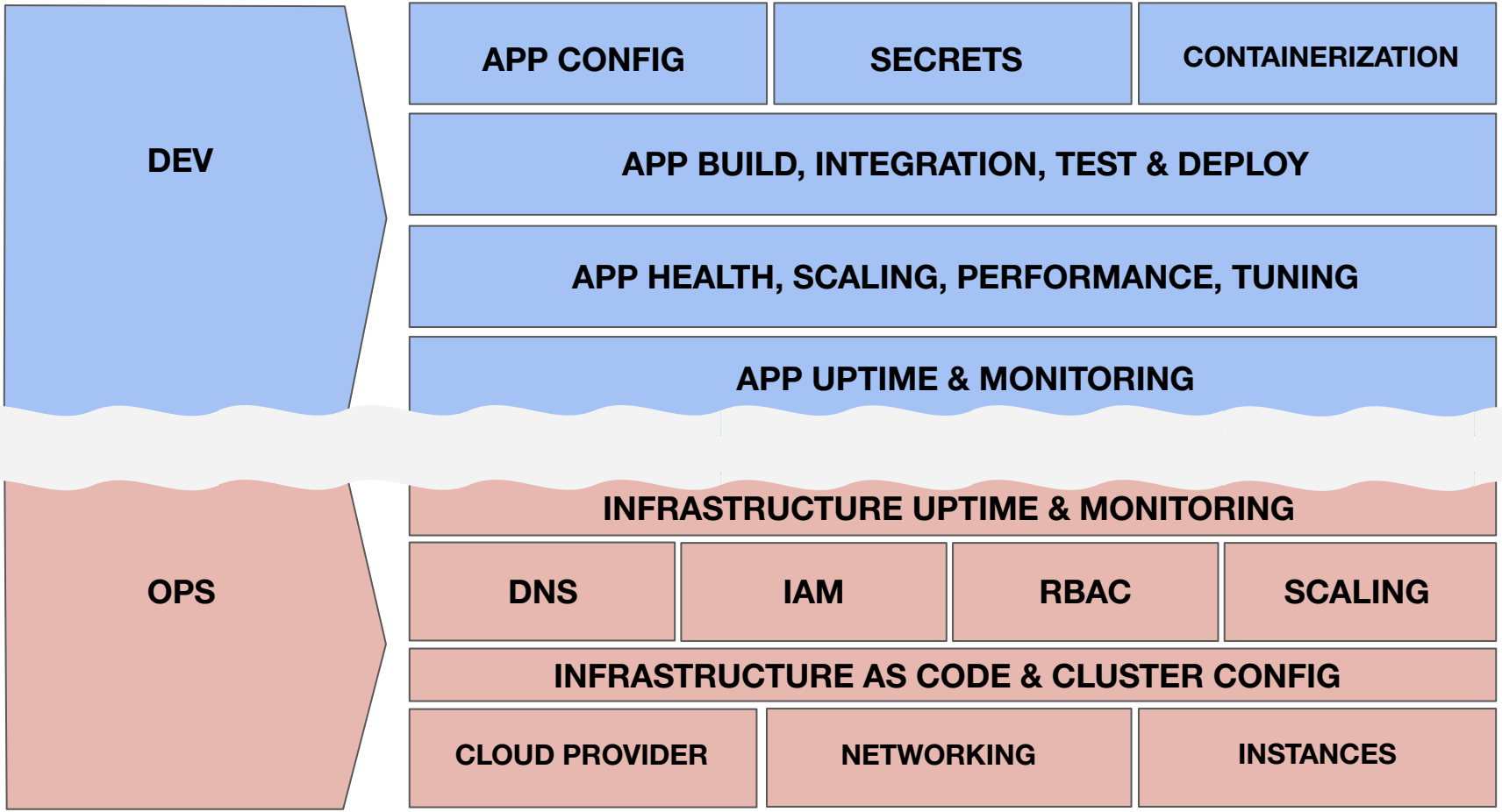
Fuzzy Lines: Aligning Teams to Monitor Your Application Ecosystem

Sarah Zelechoski and Kim Schlesinger

LISA19 - Portland


DEV
APP CONFIG
SECRETS
CONTAINERIZATION
APP BUILD, INTEGRATION, TEST & DEPLOY
APP HEALTH, SCALING, PERFORMANCE, TUNING
APP UPTIME & MONITORING
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INFRASTRUCTURE UPTIME & MONITORING
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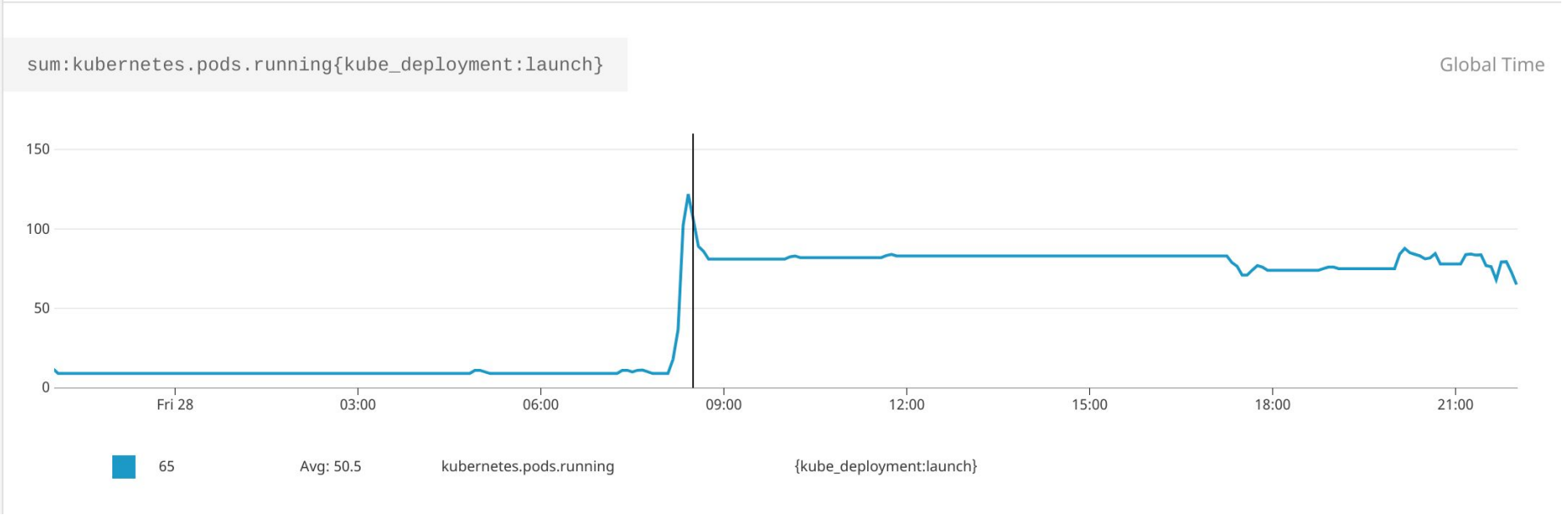
INFRASTRUCTURE AS CODE & CLUSTER CONFIG
CLOUD PROVIDER
NETWORKING
INSTANCES


sum:kubernetes.pods.running{kube_deployment:launch}
Global Time
150
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50
0
Fri 28
03:00
06:00
09:00
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15:00
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65
Avg: 50.5
kubernetes.pods.running
{kube_deployment:launch}

Separate ops and dev teams must build relationships between people, use processes to increase communication, and leverage a set of shared tools.

Fairwinds

whoami

Kim (she/her)

- Site Reliability Engineer
- Background in education and web development
- Interested in how inclusive cultures impact business outcomes

whoami

Sarah Z (she/her)

- VP of Engineering
- Lead @ Fairwinds SREs & Devs
- Background in operations
- DevOps and engineering culture enthusiast
- Focused on building strong teams

Agenda

People — Process — Tools

Agenda

People — Process — Tools

People : Desired Outcomes

- Both Dev and Ops teams are willing participants in a strong partnership
- Shared goals and direction are key to both teams' identities
- Teams are thoughtful of and accountable to each other for their actions

People: Recommendation 1

Develop a Group Narrative

Who are we?

Develop a Group Narrative

- Start with a history lesson
  - Understand existing struggles
  - Share impetus for change
- Create a relatable vision
  - Know what problems you intend to solve together
  - Envision a better future
  - Insert symbolism as reminders
- Everyone should be able to tell the story
  - Culture is learned and passed on by members

Tech Swarm

A technology working group, working alongside the CTO to affect the technical direction, decision making and consistency of implementation across the engineering organization.

Purpose

As the engineering organization scales and Pods become focused on customer s
implementations, it is important for us to ensure that our technical decisions (bo
proactive) are well well understood, well researched, well architected and applie
throughout.

We face many challenges in making this fact a reality. Some of these challenges

- Current standards and existing implementations are not well documented or
- New solutions developed during individual customer implementations are of
  for general consumption and looped back into the larger organization

Welcome New-

We're so excited to have you on the team! Welcome to Fairwinds

People: Recommendation 2

Commit to Shared Values

How do we work together?

Commit to Shared Values

- Ask yourselves challenging questions
- Focus on human interactions
  - How people should treat each other
  - Not skills or capabilities
- Keep it short & make it memorable
  - List of 3 or 4
  - Acronyms are useful
- Require commitment and active participation
  - All levels of the organization

Roll with

Respect

Inclusion

Compassion

Kindness

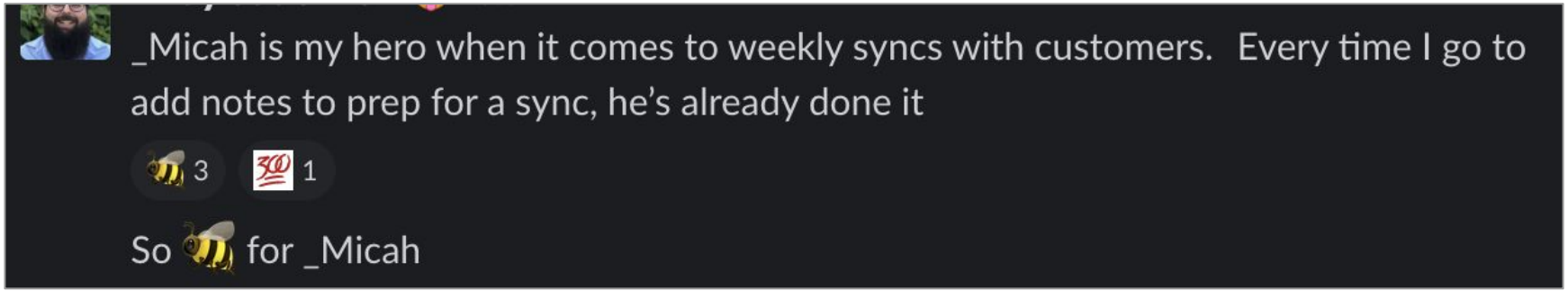
People: Recommendation 3

Self Regulation

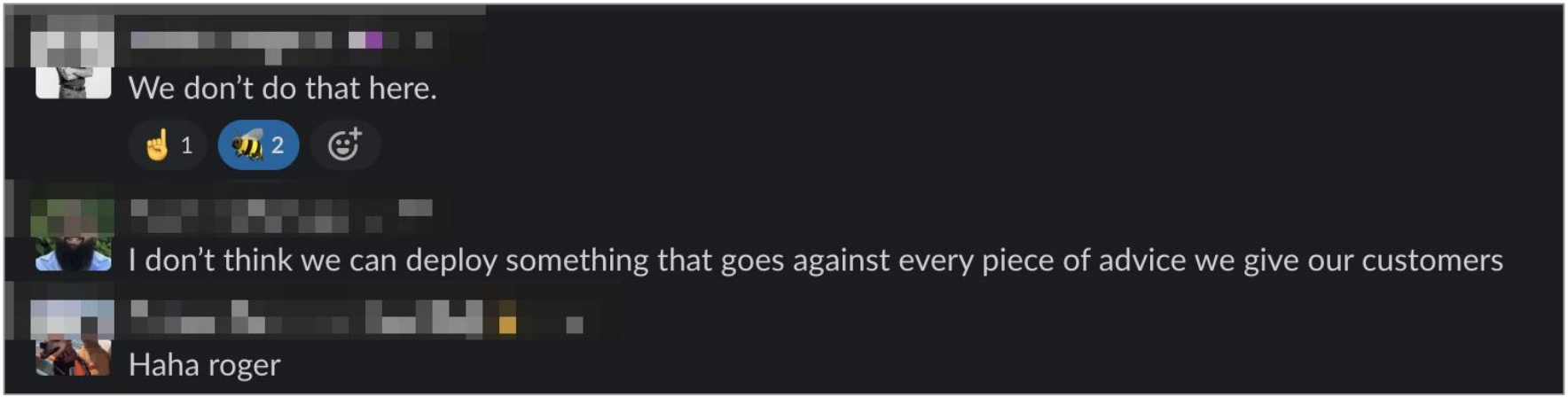
We're all in this together

Self Regulation

- Create simple prompts that allow individuals to enforce shared values
  - Grassroots
  - Frictionless, simple
- Set the expectation that feedback is welcome and necessary
  - Introspection not conflict


_Micah is my hero when it comes to weekly syncs with customers. Every time I go to add notes to prep for a sync, he's already done it
3
1
So for _Micah

We don’t do that here.


We don’t do that here.
1
2
I don’t think we can deploy something that goes against every piece of advice we give our customers
Haha roger

Agenda

People — **Process** — Tools

Process: Desired Outcomes

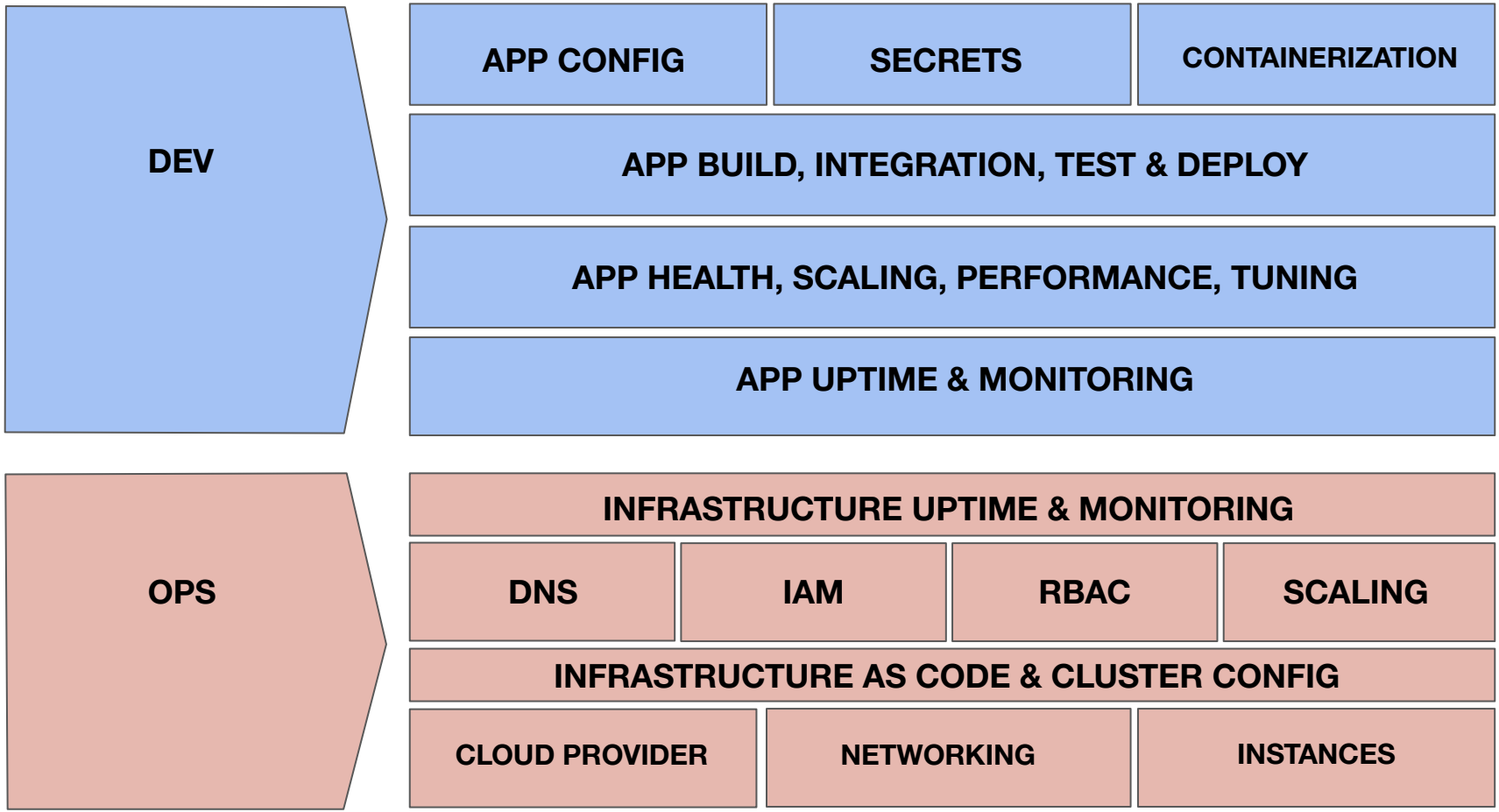
- Both teams understand and maintain their individual responsibilities, while also helping in the gray area
- Dev and Ops teams communicate openly and often
- All work happens in a transparent fashion and understanding is built through sharing context

Process: Recommendation 1

Define Shared Responsibilities

Define Shared Responsibility

- Define areas of responsibility, not tasks
  - Who is **responsible** for what vs. Who can **do** what
  - There will be a gray area
- Where lines are fuzzy, help each other
  - Make it ok to ask for assistance
  - Do your due diligence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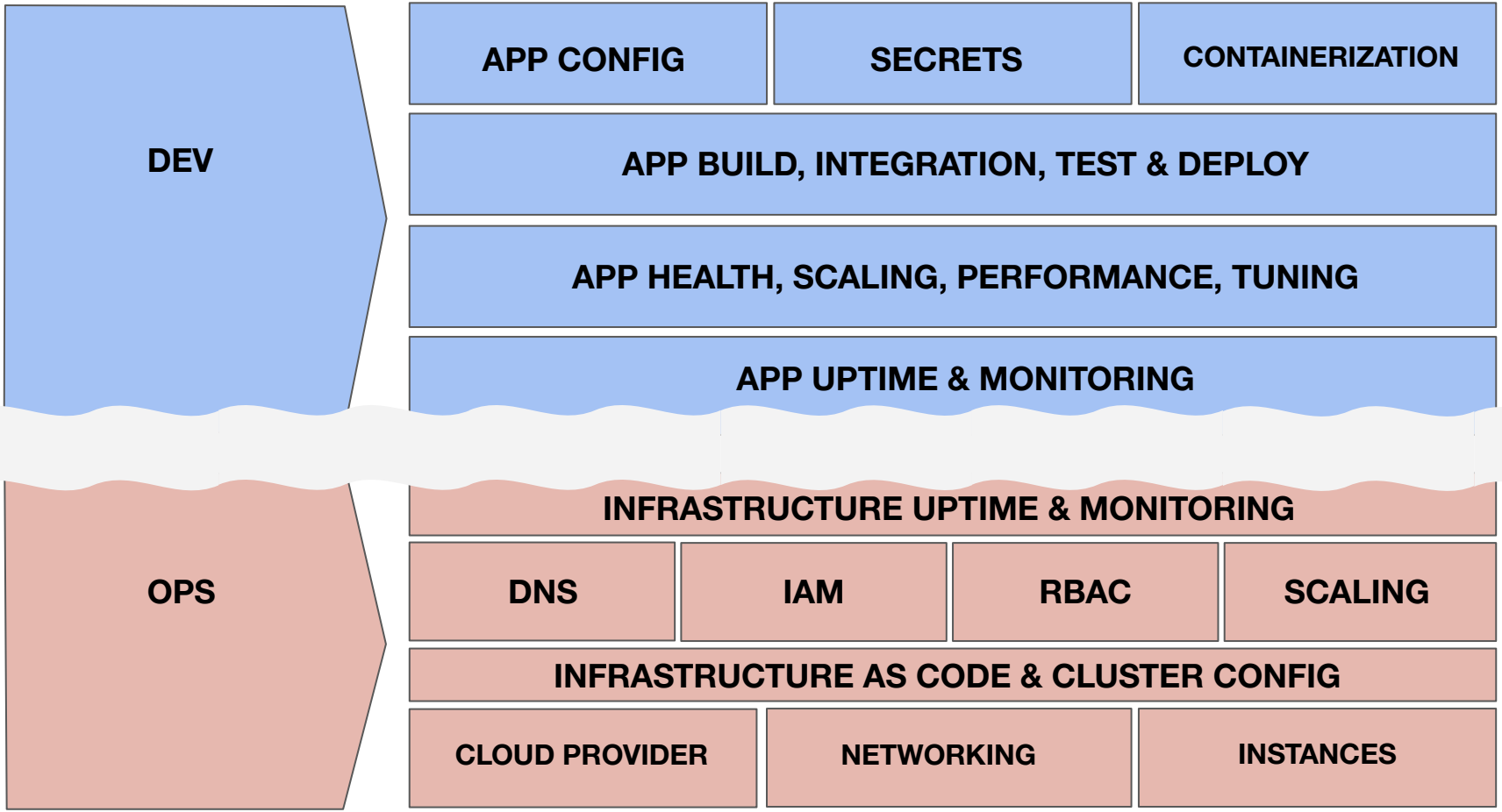
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Where lines are fuzzy, help each other

Process: Recommendation 2

Shared Slack Channels

Shared Slack Channels

- Targeted discourse and conversation
  - Paired real-time or asynchronous troubleshooting
- Being open and public
  - Opens the relationship
  - People feel like they can ask for help
  - Inherent awareness
  - Postmortems

Process: Recommendation 3

Weekly Syncs

Weekly Syncs

- Increase transparency and understanding
  - Teams are doing work that affects each other
  - Important to know what is happening outside your own bubble
  - Understand why certain work is happening; why decisions are being made
- Sync priorities across teams
  - Align to ensure collaboration
- Share the impact and value of work
  - Work for each other

Agenda

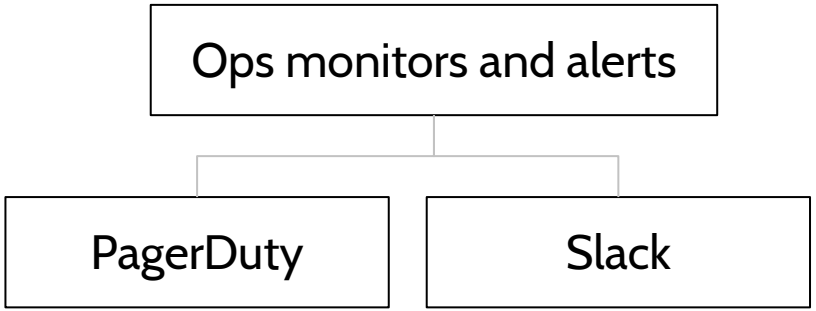
People — Process — **Tools**

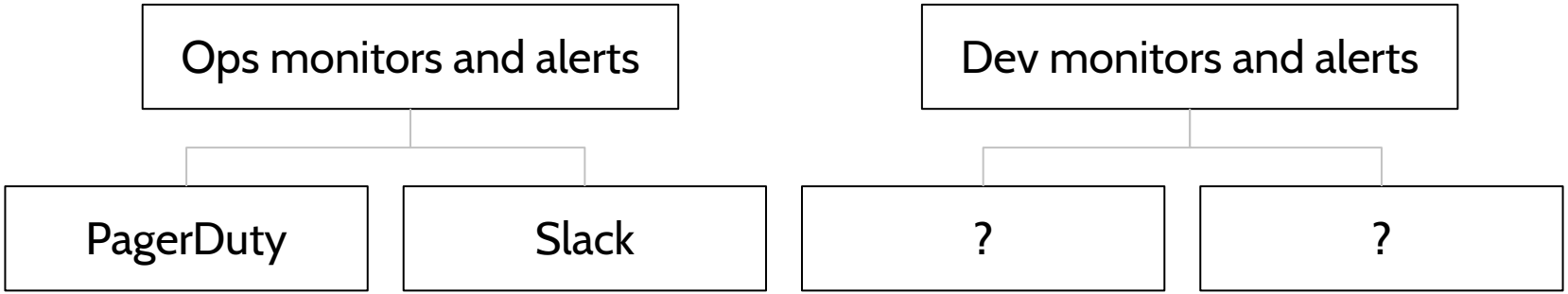
Tools: Desired Outcomes

- Monitor your infrastructure system and workloads, both ops and dev
- Increase confidence in monitoring
- Decrease time to resolution

Tools: Recommendation 1

Shared Monitoring Platform


Ops monitors and alerts
PagerDuty
Slack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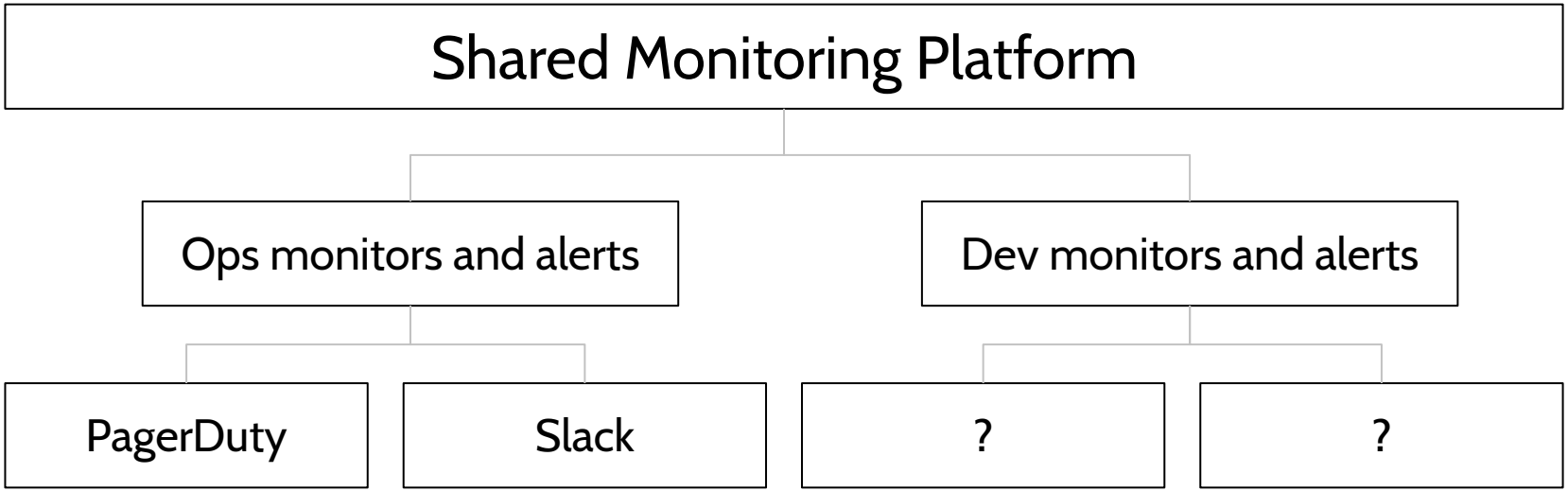
Dev monitors and alerts
?
?


Shared Monitoring Platform
Ops monitors and alerts
Dev monitors and alerts
PagerDuty
Slack
?
?


DATADOG

Kubernetes - Overview

Clone Dashboard

$scope * | $kube_namespace * | $kube_deployment * | $node * | $label * | $k8s_state_namespace * | $k8s_state_deployment *

kubernetes by Google

docker

This screenboard displays Kubernetes metrics. But you should also track and even prefer native container metrics. Here is why. Note that metrics are coming from Kubernetes-state as well. If some of your graphs are empty, make sure the agents collect those as referenced in the documentation.

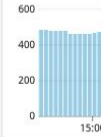
Running containers 5m

498

Stopped containers 5m

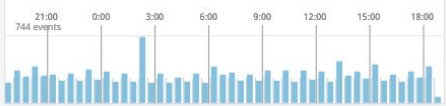
877

Running cor



Events

Number of Kubernetes events per node 1d



Events from the 1572027300-t98qm Pod
Fri Oct 25 2019 18:36:09 GMT+0000 (tz_abbr)

Events from the 1572028020-qr7c5 Pod
Fri Oct 25 2019 18:36:09 GMT+0000 (tz_abbr)

Events from the 1572028560-fdbxj Pod
Fri Oct 25 2019 18:36:06 GMT+0000 (tz_abbr)

Events from the 1572028560 Job
Fri Oct 25 2019 18:36:05 GMT+0000 (tz_abbr)

Events from the 1572028560-jf8kt Pod
Fri Oct 25 2019 18:36:04 GMT+0000 (tz_abbr)

High level

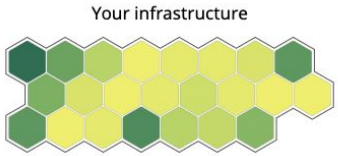
Kubelets up

18

Kubelet Ping

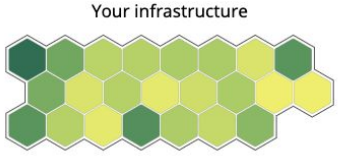
18

Number of running pods per node



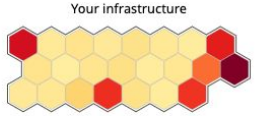
Updated < 1 min ago

Number of running containers per node



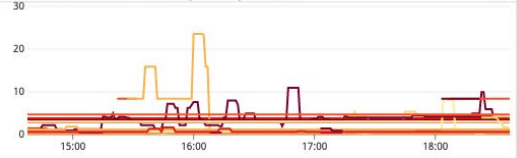
Resource u

CPU utilization per node



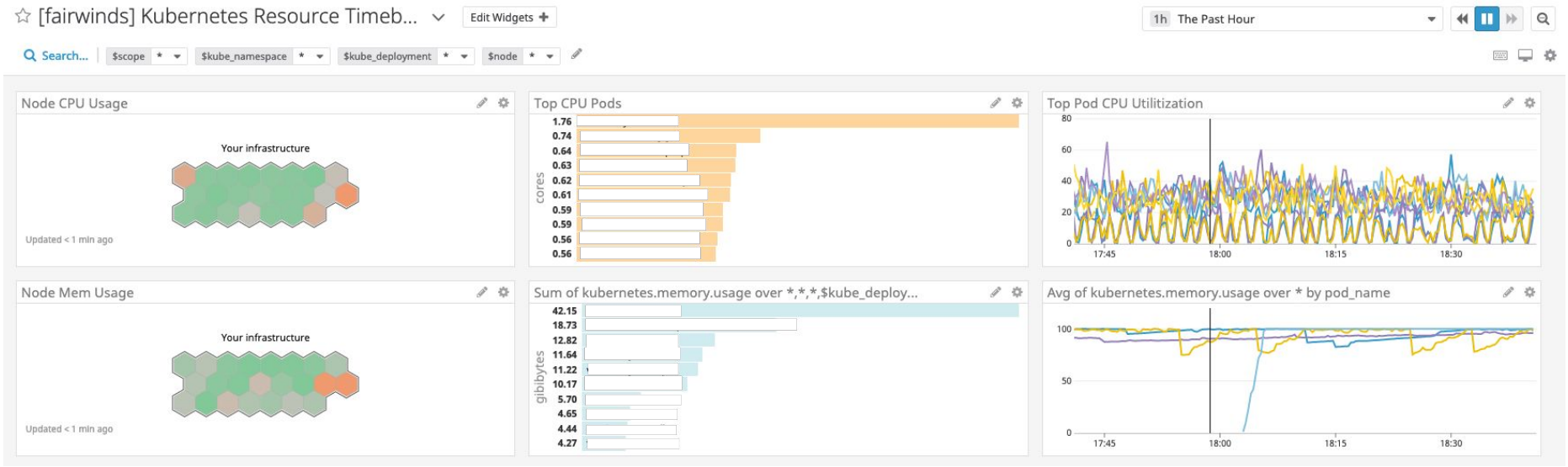
Updated < 1 min ago

Sum Kubernetes CPU requests per node 4h



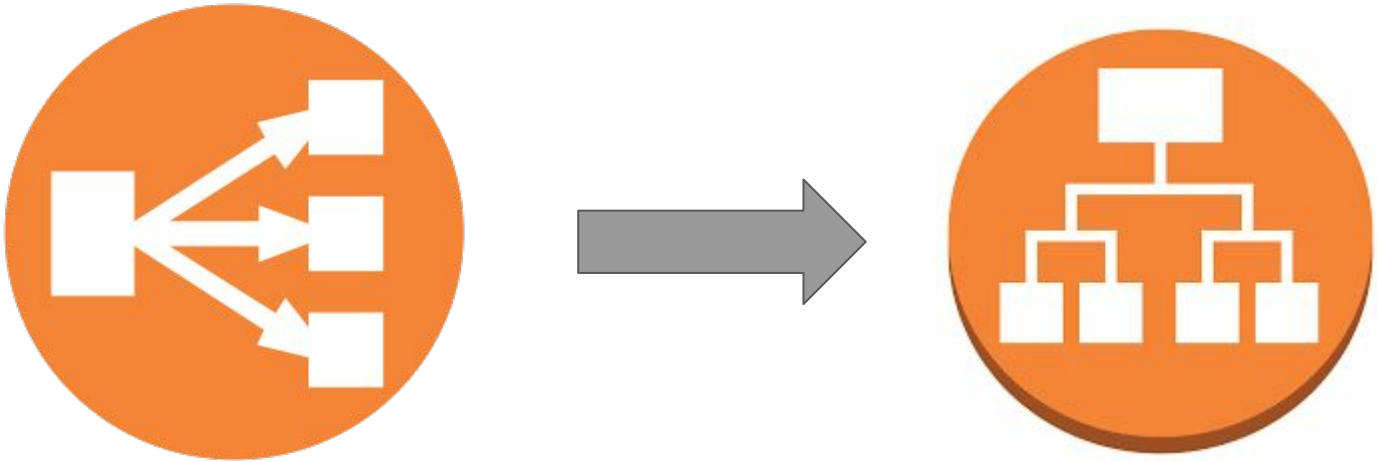
Most CPU-intensive pods 4h

5.76 51b-1572019200-6zqhs
1.58
1.41
1.35


[fairwinds] Kubernetes Resource Timeb...
Edit Widgets
1h The Past Hour
Search...
$scope *
$kube_namespace *
$kube_deployment *
$node *
Node CPU Usage
Your infrastructure
Updated < 1 min ago
Top CPU Pods
cores
1.76
0.74
0.64
0.63
0.62
0.61
0.59
0.59
0.56
0.56
Top Pod CPU Utilization
80
60
40
20
0
17:45
18:00
18:15
18:30
Node Mem Usage
Your infrastructure
Updated < 1 min ago
Sum of kubernetes.memory.usage over *,*,*,$kube_deploy...
gibibytes
42.15
18.73
12.82
11.64
11.22
10.17
5.70
4.65
4.44
4.27
Avg of kubernetes.memory.usage over * by pod_name
100
50
0
17:45
18:00
18:15
18:30


Service performance
Edit Widgets
1h The Past Hour
$apm_env production
$kubernetes_env
$kubernetes_service
$apm_service
express request duration p95
250
200
150
100
50
0
12:00
12:15
12:30
12:45
CPU % usage
100
50
0
12:00
12:15
12:30
12:45
kubernetes.pods.running
4
3
2
1
0
12:00
12:15
12:30
12:45
express requests
1.5K
1K
0.5K
0K
12:00
12:15
12:30
12:45

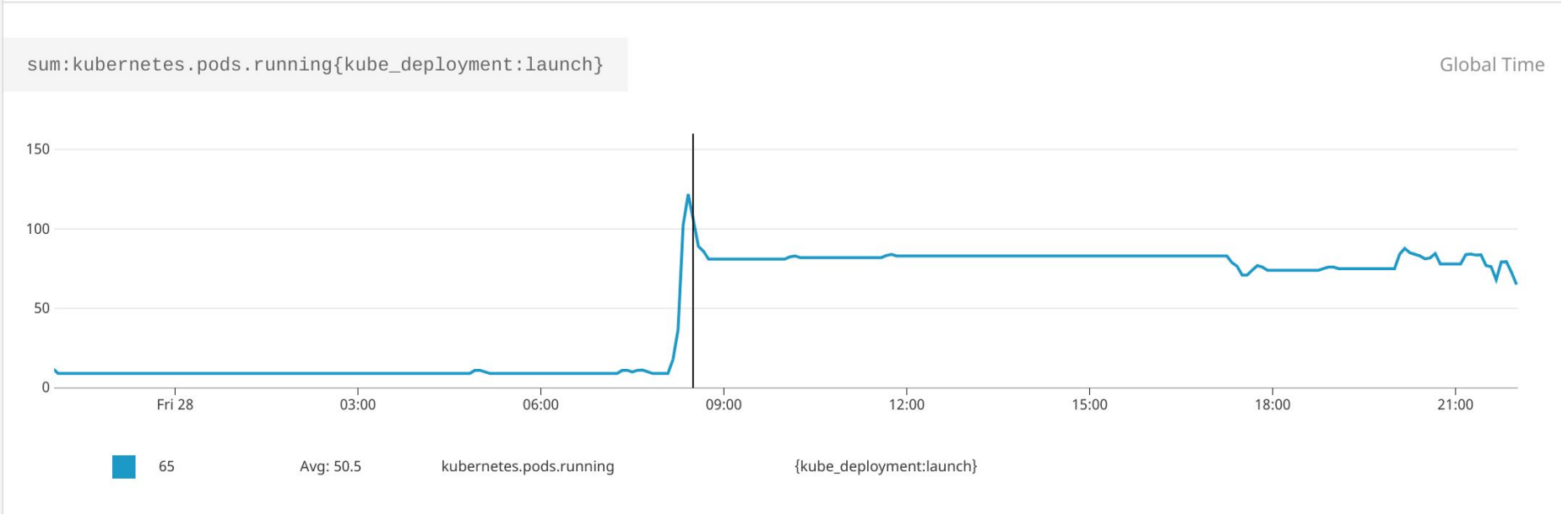
The Tale of the Phantom Scaling



Classic Elastic Load Balancer

Application Load Balancer

“something unusual going on with launch today...”


sum:kubernetes.pods.running{kube_deployment:launch}
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Avg: 50.5
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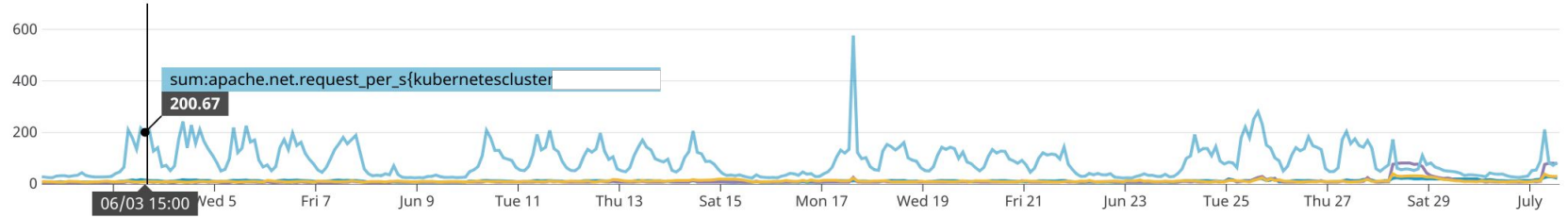
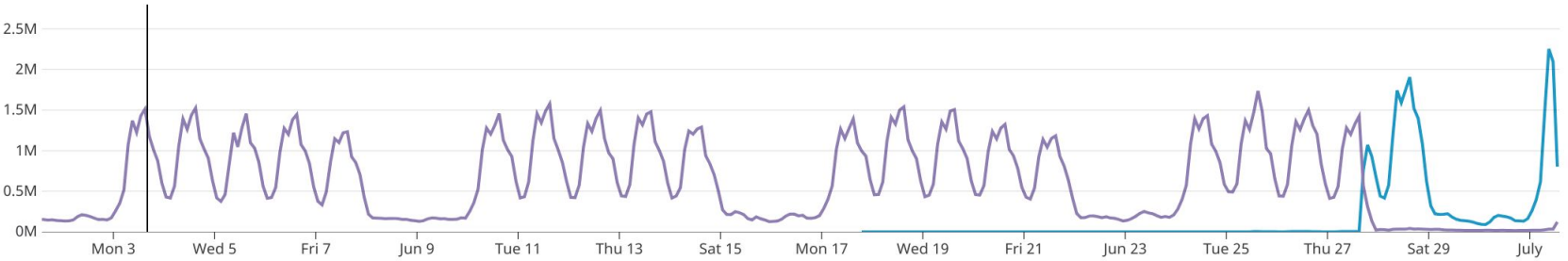
{kube_deployment:launch}

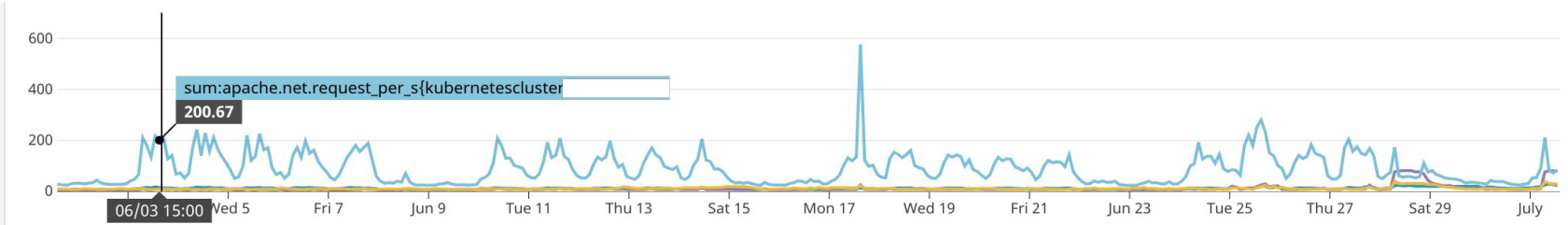


	15.44	Avg: 12	apache.performance.busy_workers	{kube_service:launch,kubernetescluster}
	9	Avg: 11.36	kubernetes.pods.running	{kube_service:launch,kubernetescluster}
	10	Avg: 11.92	aws.ec2.host_ok	{k8s.io/role/node:1,kubernetescluster}
Hide	200.67	Avg: 89.27	apache.net.request_per_s	{kubernetescluster}

```
avg:aws.applicationelb.active_connection_count{kubernetes.io/cluster/:owned,kubernetes.io/ingress-name:launch-alb}.as_count(), avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-io}.as_count()+avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-com}.as_count()+avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-net}.as_count()
```

Global Time





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dev

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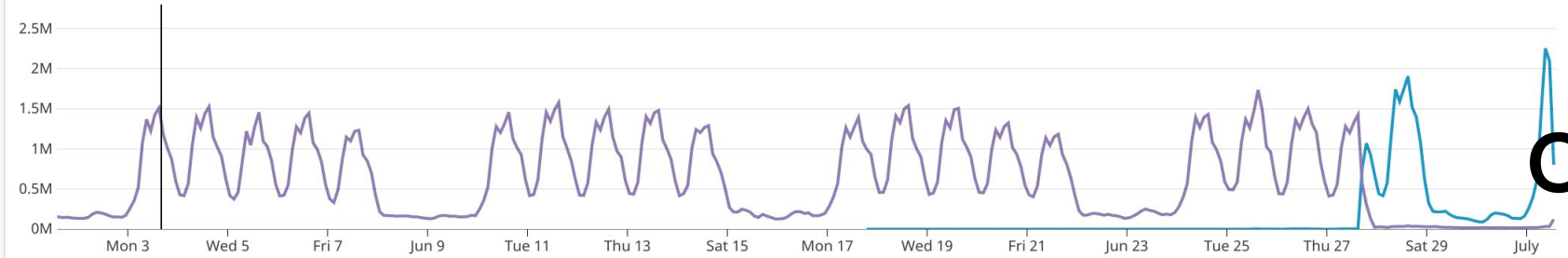
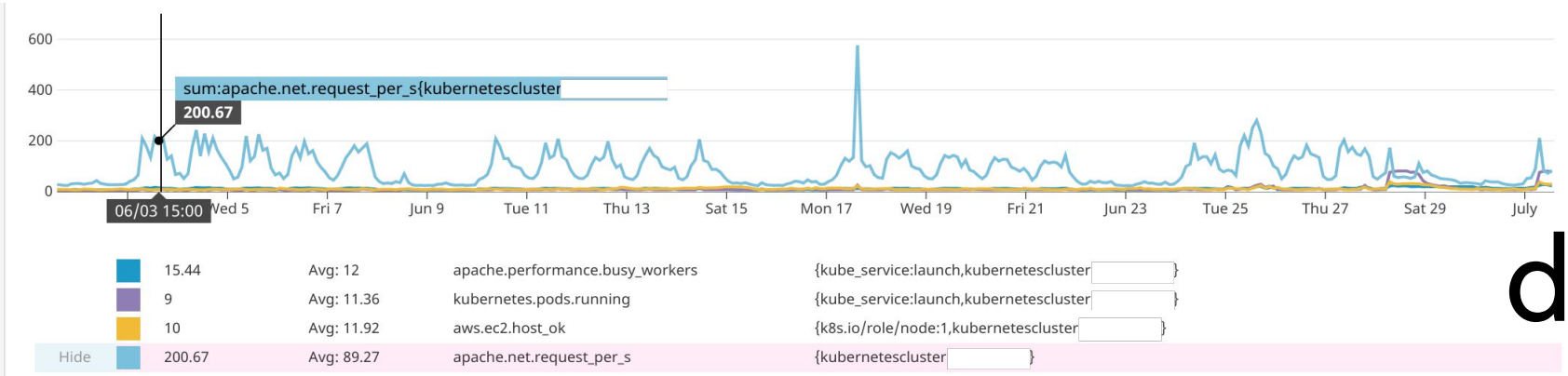
avg:aws.applicationelb.active_connection_count{kubernetes.io/cluster/:owned,kubernetes.io/ingress-name:launch-alb}.as_count(), avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-io}.as_count()+avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-com}.as_count()+avg:aws.elb.estimated_albactive_connection_count{kubernetes.io/service-name:nginx-ingress/nginx-ingress-launch-net}.as_count()
```

Global Time



ops



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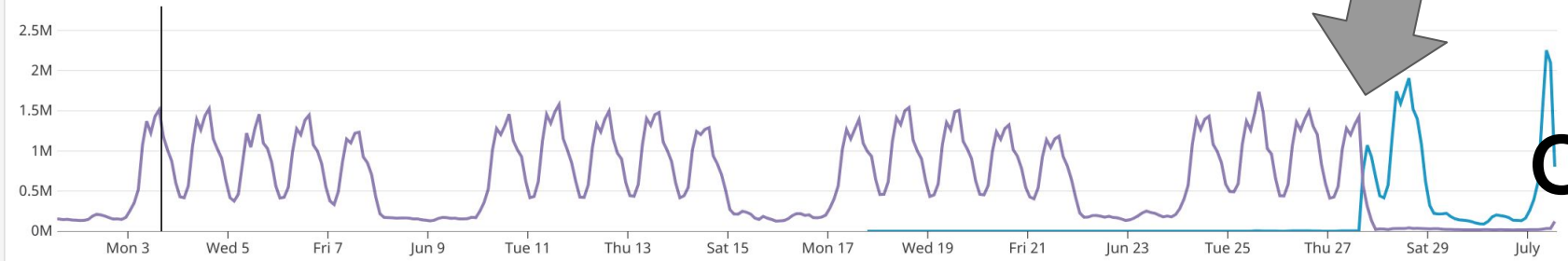


ops

Benefits of a Shared Monitoring Platform

- Supports communication in regular meetings and shared slack channels
- Single pane of glass for both teams
- Team-specific dashboards
- Decreased time to resolution for issues

Datadog Alternatives

- Honeycomb
- Sensu
- Sysdig
- New Relic

Tools: Recommendation 2

Monitors as Code

Monitor Families

- aws-quotas
- aws
- elasticsearch
- gcp-quotas
- gcp
- istio
- kubernetes
- papertrail
- rds

Kubernetes Monitors

- Cluster disk usage
- Cluster disk usage high
- Cluster memory
- Cluster network errors
- Cronjob failed to start
- Deployment replica alert
- External DNS registry errors
- External DNS source errors
- High node I/O wait time
- HPA failures
- Job failure
- Kube state metrics missing
- Kubelet health
- Nginx config reload failure
- Node not ready
- NTP off
- Pod crashes
- Pods pending
- System load average high

```
resource "datadog_monitor" "production_running_out_of_memory" {
  # Required Arguments
  name = "[production] Running out of memory"
  type = "query alert"

  message = <<EOF
  {{#is_alert}}
Running out of free memory on {{host.name}}
{{/is_alert}}
{{#is_alert_to_warning}}
Memory usage has decreased. There is about 30% free
{{/is_alert_to_warning}}
{{#is_alert_recovery}}
Memory is below treshold again
{{/is_alert_recovery}}
@pagerduty-ReactiveOps_Internal_Infrastructure

  EOF

  query = "avg(last_15m):avg:system.mem.pct_usable{kubernetescluster:production.internal.reactiveops.com} by {host} < 0.1"

  # Optional Arguments
  new_host_delay = 300

  thresholds {
    critical = 0.1
    warning  = 0.15
  }

  require_full_window = true
  tags                = ["hardware", "production", "fairwinds"]
}
```

DATADOG

- Events
- Dashboards
- Infrastructure
- Monitors
- Metrics
- Integrations
- APM
- Notebooks
- Logs
- Synthetics

- Help
- Team

OK Monitor status since 22 hours and 33 minutes ago (23 Oct, 14:06:08 MDT)

Mute

[production] Running out of memory

Metric Monitor
ID: 9724807
Created at May 2 2019 13:55
by

TAGS fairwinds, hardware, production

QUERY `avg(last_15m):avg:system.mem.pct_usable{kubernetescluster:} by {host} < 0.1`

MESSAGE 1 notified

{{#is_alert}} Running out of free memory on {{host.name}} {{/is_alert}} {{#is_alert_to_warning}} Memory usage has decreased. There is about 30% free {{/is_alert_to_warning}} {{#is_alert_recovery}} Memory is below treshold again {{/is_alert_recovery}} @pagerduty-ReactiveOps_Internal_Infrastructure

Pagerduty: ReactiveOps_Internal_Infrastructure

Filter monitor groups and their events

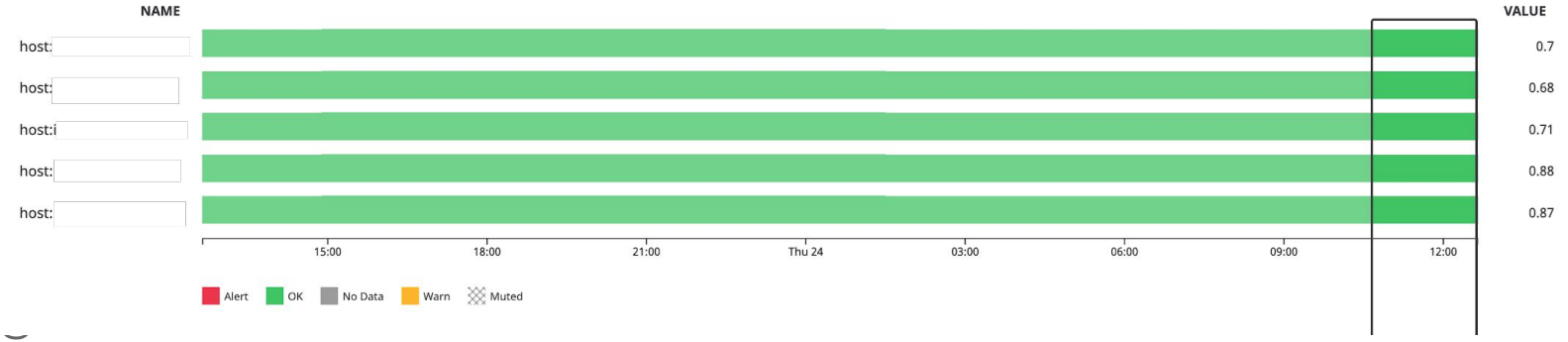
Alert 0 | Warn 0 | No Data 0 | OK 6 | **6 of 6 groups**

1d The Past Day

Status & History

GROUP STATUS

Showing 5 of 6 groups 1 2 | Sort by Triggered ↓



Benefits of Monitors as Code

- Repeatable
- Familiar
- Transparency and vulnerability by sharing work with others
- Collaboration via PRs and code reviews
- More accessible for people who use screen readers

You can navigate the fuzzy line between ops and dev by focusing on the relationship between teams.

Recap

People

Develop a Group Narrative

Commit to Shared Values

Self Regulation

Process

Define Shared Responsibilities

Shared Slack Channels

Weekly Syncs

Tools

Shared Monitoring Platform

Monitors as Code

We’re Hiring!

https://www.fairwinds.com/careers

Resources

- Fairwinds
- How to Setup a Shared Slack Channel
- Datadog
- Terraform: Datadog Monitor Resource

Thank You!

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