

# Taming the Cost of Telemetry

How Riot Games Reined in the Cost of Observability

usenix

SRE

CON

EUROPE

MIDDLE EAST

AFRICA

AKA “Logs are Expensive!” Or “Today I Learned About Cardinality!”



**Maxfield Stewart**

**Technical Director:**

**Live Operations**

**Riot Games**



*This talk is for anyone who is interested in how a team **practically manages observability costs.***

# Who is this guy?



GAMES

gazillion





# **SRE** @ Riot



# WHO IS RIOT GAMES

Developer & Publisher of

*League of Legends*

*Valorant*

*Team Fight Tactics*

*Legends of Runeterra*

*2XKO*

*...and More!*



***"We Aspire to Make it  
Better to Be a Player"***





# Our Players



MORE THAN  
**100 MILLION**

---

**MONTHLY ACTIVE  
PLAYERS**



MORE THAN  
**20 MILLION**

---

**DAILY ACTIVE  
PLAYERS**



MORE THAN  
**2 MILLION**

---

**PEAK CONCURRENT  
PLAYERS**



# Our Infrastructure



More Than  
800 'Services'

---

Mostly Golang &  
Java Micro-Services  
with C++ Game  
Servers



Sharded Game  
Deployments

---

Over 50 Game  
"Shards"



AWS / K8S  
Deployments

---

50k+ Containers  
10's of Thousands  
of Cores

# The Problem





# The Problem



Up to 3.8PB's/mo of Metrics and Logs

60/40 Split on Logs and Metrics

40-60% of this ingest was unused on any alert or dashboard



# A Quick History Lesson

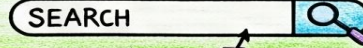
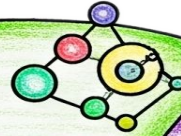
2012 - 2015

THE NAGIOS  
ZABBIX  
ERA



2016 - 2019

THE KIBANA  
ELASTIC SEARCH



2020 - 2023

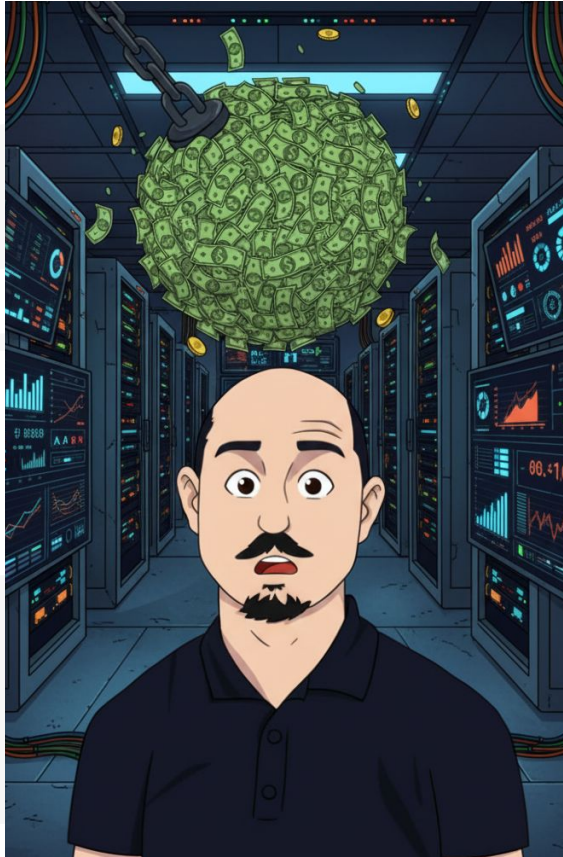
THE UNLIMITED  
USAGE  
VENDOR ERA



FREE "CANDY"  
(METRICS & LOGS)



# Back to the Problem



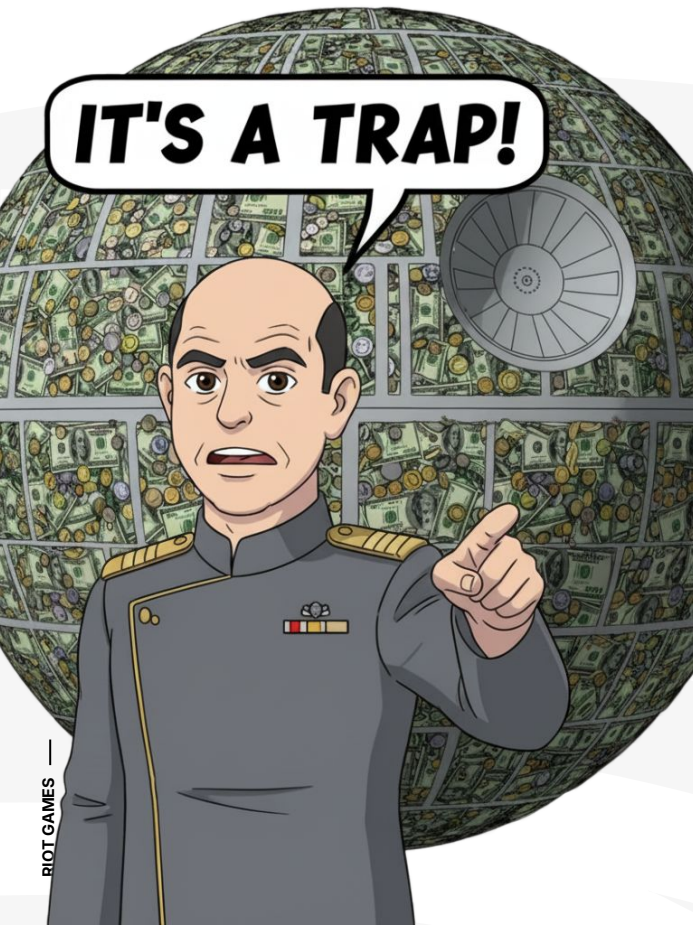
Fixed Price Unlimited Usage Deal Coming to an End

Projected increase in spend was 50-100%

We're talking 7 digit costs going to 8 digit costs

Riot was evolving its maturity around costs

# 🏠 Unlimited Usage = Bad



RIOT GAMES

01

Cost Allocation is Relative

02

Creates the Wrong Incentives: You can Do Nothing and Save Money

03

It puts your Vendor in a bad situation

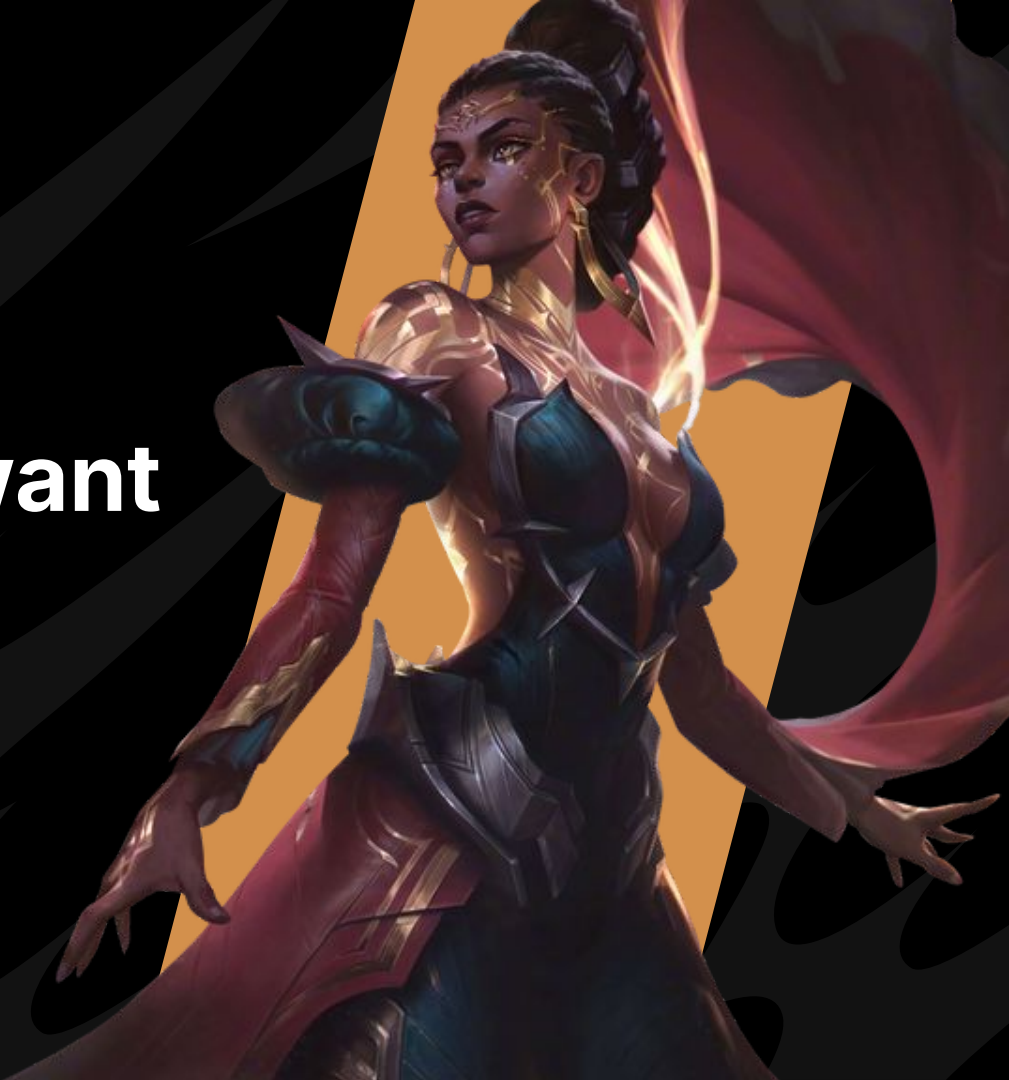
04

It's a trap!



BETA EXPERIENCE

—  
**So what do we want  
to do?**  
—



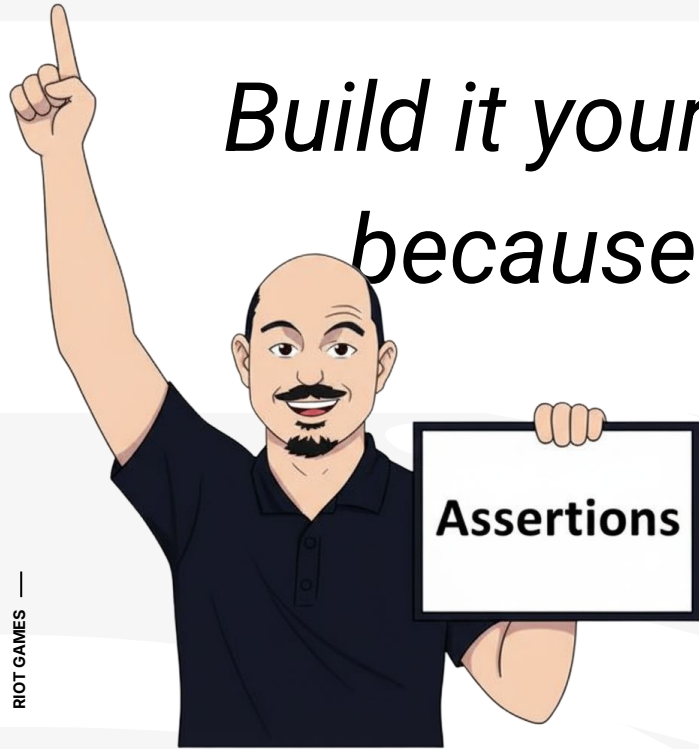
RIOT GAMES —



*Vendors aren't expensive. **We** are.*



*Build it yourself options are only cheap  
because they **aren't competitive.***



# First Principles



01

Reduce Waste

02

Improve Monitoring Capabilities

03

Stay in Budget

04

Enable Organizational  
Accountability

05

Find a Vendor Willing To Partner

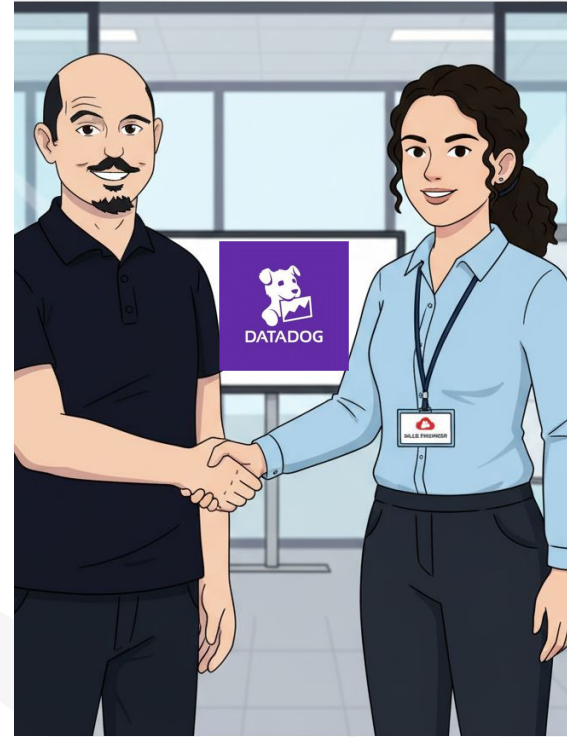


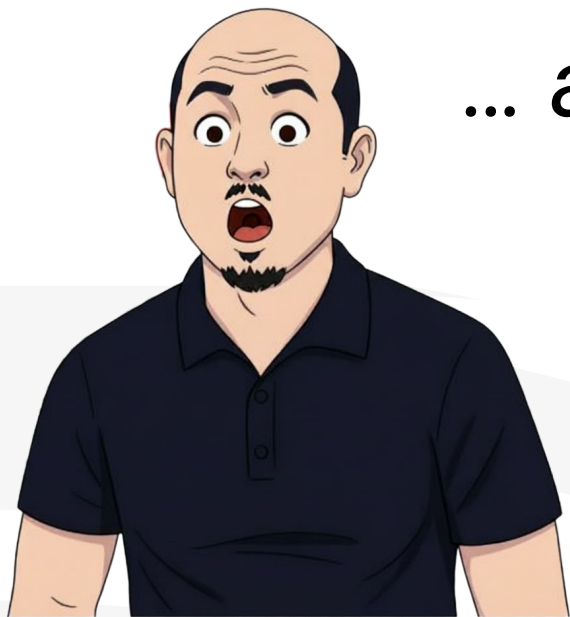
# What Did We Try?





# We *Changed Vendors*





... and **Migrated** to it **in a Year**



We **created a team** within our SRE group to **focus on** collection and **cost to value** of our metrics and logs





*We made a hard run at*  
**waste elimination**



We **created new core standards** for  
collection of metrics



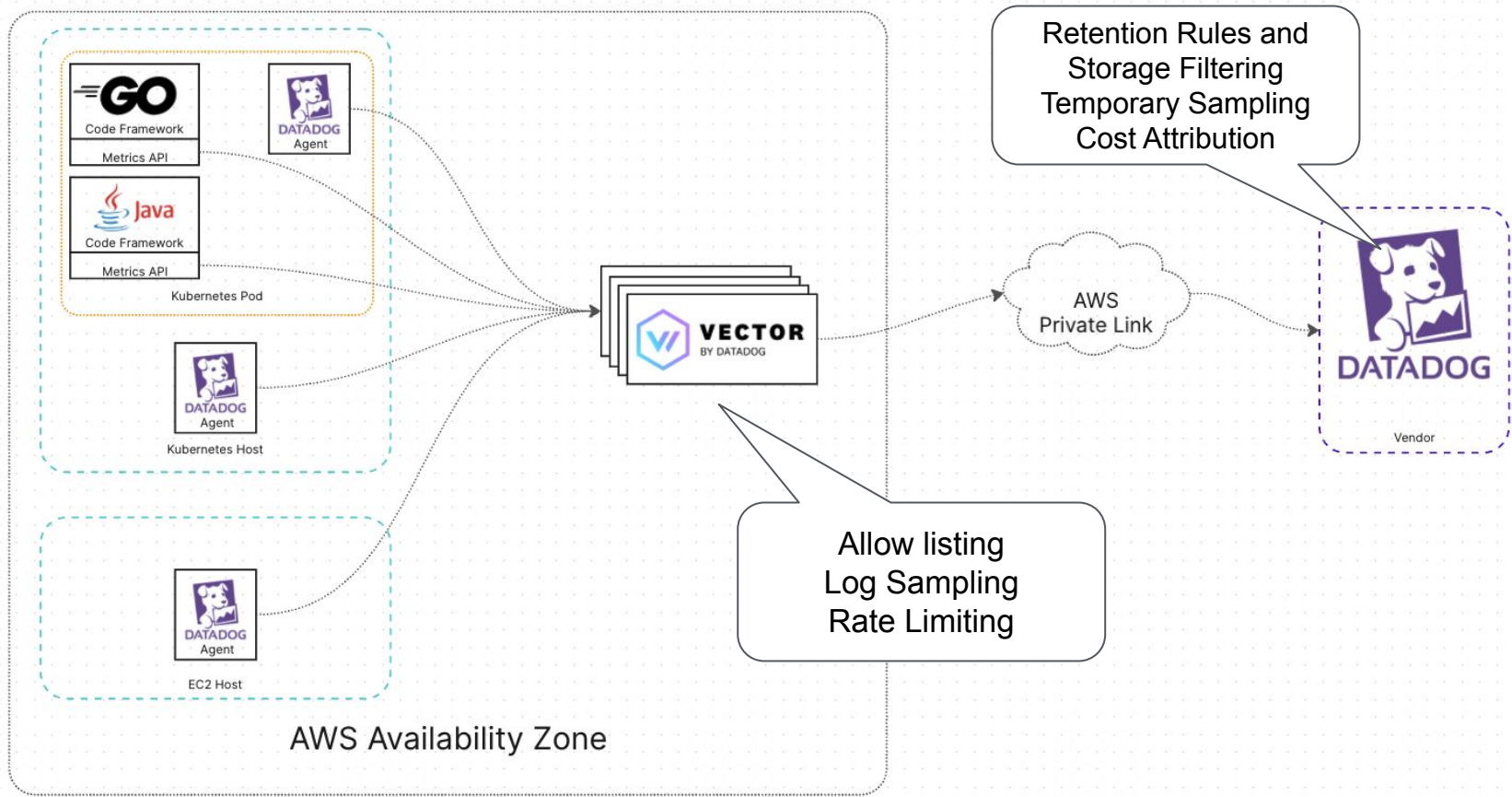


We **partnered** with our Strategic Finance Teams to **build an oversight culture**



# Eliminating Waste & Standards





Learn More from our SRECON EMEA 2024 Talk  
(<https://www.usenix.org/conference/srecon24emea/presentation/moreira>)

# Cost Controls - New Services



01

Only get eBPF Monitoring

02

Logs are sampled at the collector aggressively (1%) with limited storage

03

Custom metrics are rate limited in QA environments and blocked in Production



# Allow Listing Custom Metrics

01

Rate Limited in QA, a Pull Request Starts the Process

02

Tag and Cardinality Estimation

03

Release to Production

04

24-72 Hour Review and Adjust





# Removing Log Sampling



01

Starts with a inter team ticket for help

02

Volume and storage requirement review

03

Updated sampling rules or removing sampling

04

24-72 Hour Review and Adjust





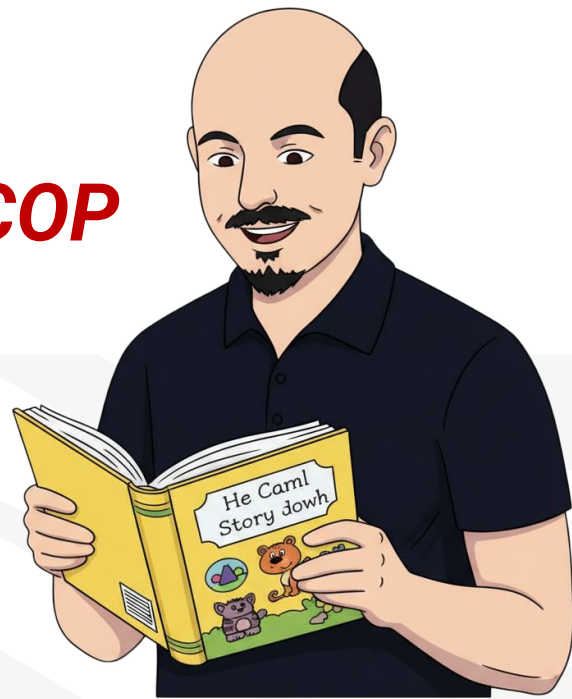
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**Story Time!**  
—





# Story Time!

## The Story of **PacketCOP**





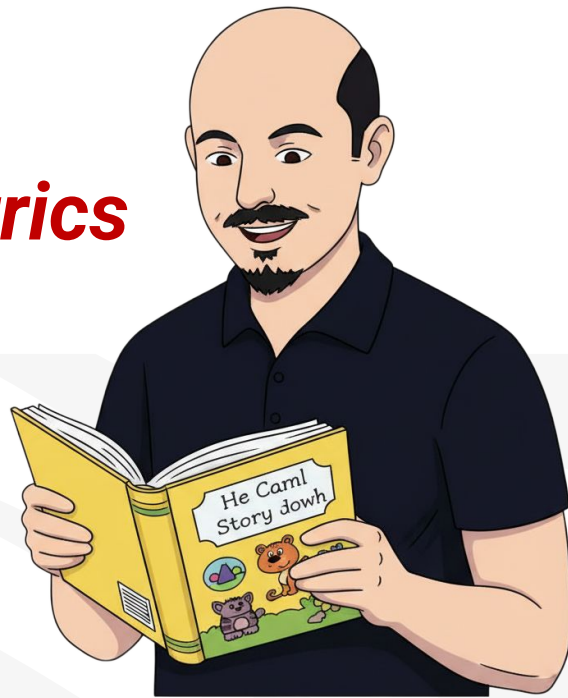
*Story Time!*  
***“We Keep Clean Logs  
We Swear!”***





# Story Time!

## ***eBPF vs Custom Metrics***





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# Accountability & Cost Attribution

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**( AWS\_ACCOUNT\_ALIAS ) + ( AWS\_ACCOUNTING ) + ( SERVICE NAME )**

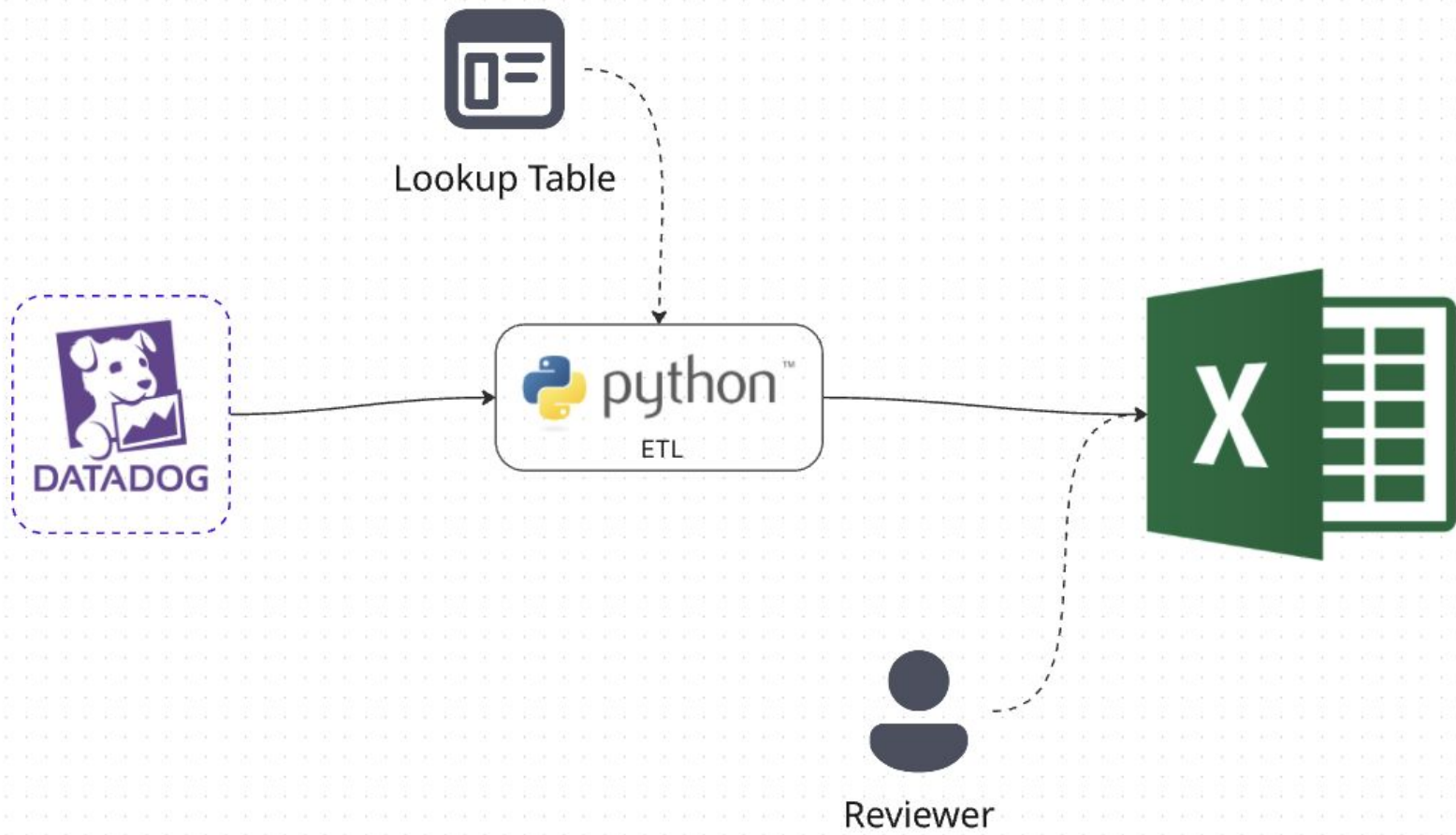




Hide Controls

Showing 1-20 rows

ORGANIZATION	ACCOUNTING	AWS_ACCOUNT_ALIAS	SERVICE	↓ INFRA HOSTS	APM HOSTS	USM HOSTS	CUSTOM METRICS	CONTAINERS	SERVERLESS WORKLOAD FUNCTIONS	SYNTHE
Riot Games	riot.tech.infr.ip.cit.rce.lol	rc3-lol-prod		2,847	938	1,910	4,885	34,553	0	
Riot Games	central.ares.aresgeneral	rc3-val-prod		2,206	16	2,179	3,378	24,241	0	
Riot Games	riot.gs.playerplat.flight.gdt	rc3-pp-prod		1,132	1,014	109	1,826	11,695	0	
Riot Games				473	43	65	42,157	1,739	4	
Riot Games	esports	rc3-esports-prod		384	191	193	753	6,943	0	
Riot Games	riot.gs.playerplat.flight.gdt	rc3-pp		306	252	54	605	4,223	0	
Riot Games	central.ares.aresgeneral	rc3-val-lt		271	8	263	255	1,709	0	
Riot Games	gs.plattec.tech.infr.liveops	rc3-liveops-prod		261	36	226	442	3,569	0	
Riot Games	riot.rnd.lion	rc3-lion-prod		251	112	139	415	3,754	0	
Riot Games	riot.gs.playerplat.flight.gdt	rc3-pp-lt		237	225	12	495	3,120	0	
Riot Games	central.valorant.build	ares		220	0	0	0	0	0	
Riot Games	gs.plattec.tech.riotdata.daas...	dataservices	ap.kafka	188	0	0	0	0	0	
Riot Games	riot.tech.infr.ip.rdx.sl	rc3-rdx-prod		184	71	114	349	3,292	0	
Riot Games	riot.wwpub.tech	rc3-riotpub-prod		159	80	79	304	2,435	0	
Riot Games	riot.tech.infr.ip.cit.rce.lol	rc3-lol		143	88	55	271	2,306	0	
Riot Games	gs.plattec.tech.riotdata.daas...	dataservices		142	93	49	0	1,728	0	
Riot Games	riot.esports.et.m3d1brb			134	16	0	22	64	0	
Riot Games	central.rpg.ejabberd	social-infrastructure	social.ejabberd	115	0	115	0	230	22	
Riot Games	riot.rnd.lion	rc3-lion-lt		114	63	51	262	1,838	0	
Riot Games	central.ares.aresgeneral	rc3-val		114	33	81	256	2,237	0	
<b>Total</b>				<b>13,372</b>	<b>4,341</b>	<b>6,772</b>	<b>3,506,426</b>	<b>178,794</b>	<b>590</b>	

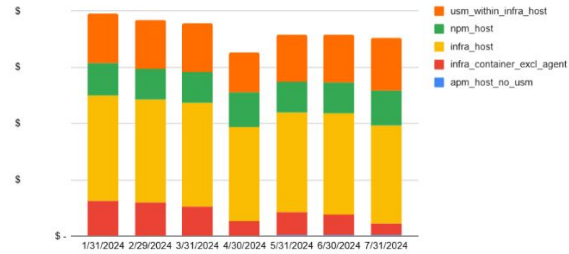




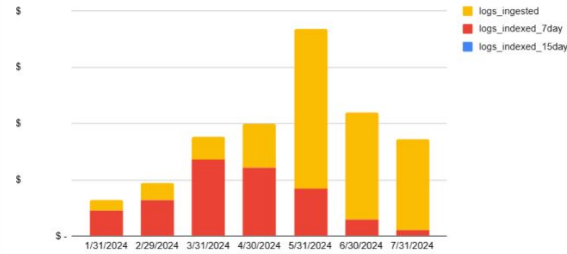
Charts

MBR Customer **Valorant**

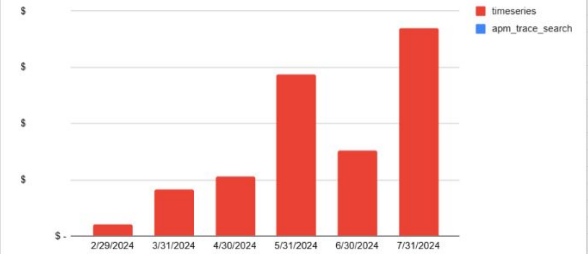
Host Costs



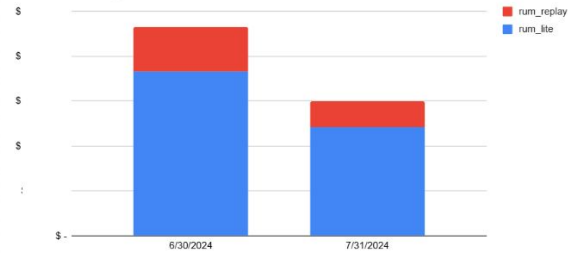
Logging Costs



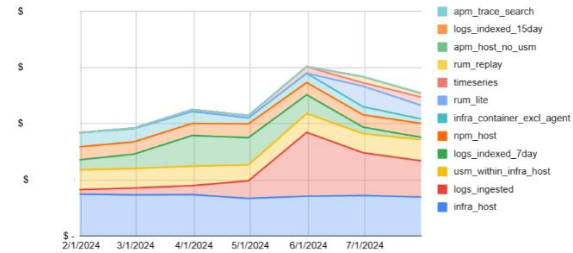
Metrics Monitoring Costs



Web Monitoring Costs



All Costs



# Prevention





# Alerting



01

Log Ingest Alerts

02

Log Event Storage Alerts

03

Cardinality Alerts

04

Unique Host Monitoring Alerts

04

Notification of new Features Enabled



# Outcomes & Lessons Learned





# Outcomes



01

Log ingest Down by 2PB/mo (from 2.3PB to 350TB)

02

Achieved a 15% lower monthly run rate before adding new capabilities

03

Cost avoided a 50-100% increase (7digits!) in monthly run rate



# Outcomes

04

Caught and prevented 10's of thousands of dollars a month in mistakes over the last year

05

Able to understand cost down to the service, log line or metric in seconds

06

Over spent our Migration year (had to run 2 Vendors in parallel for too long)



# Largest Threats



01

Auto Deploying Host Agents

02

Load Test Environment Logs

03

Success/Growth over Time

# Final Notes



# Closing Thoughts

01

Vigilance Requires Time and Focus

02

Bottom up (Education) and Top Down (Mandate) are Required


03

Trust Matters


04

SRE's being Defenders of Cost Increases their Credibility as SME's





**Thank you &  
Questions?**





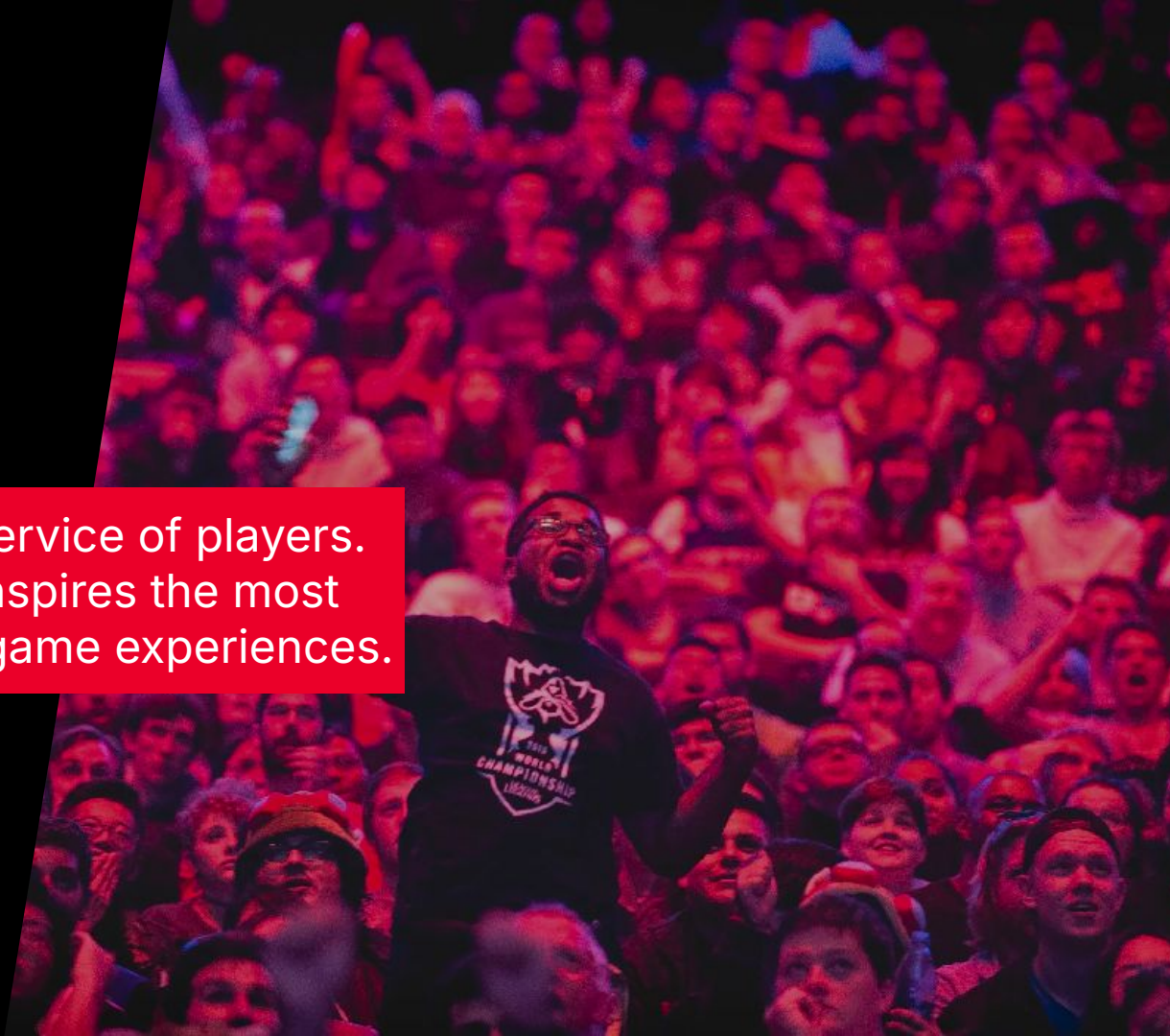
# Appendix / Slides graveyard





# PLAYER FIRST

Everything we do is in service of players. This continuous focus inspires the most meaningful and lasting game experiences.





We aspire to be the most beloved and trusted game company for the world's most passionate players.

