
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

CMP309-R

AWS Graviton adoption by Honeycomb.io using Amazon EC2 and AWS Lambda

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AWS

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Director, Solutions Architecture
Honeycomb

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Agenda

Introduction to AWS Graviton

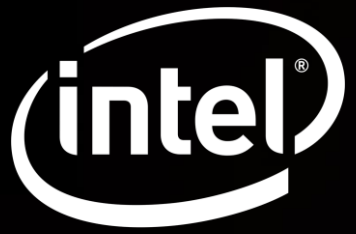
Honeycomb's migration to AWS Graviton – AWS Lambda and Amazon EC2

Best practices and lessons learned

Call to action

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Broad choice of processors



Intel® Xeon Scalable processors



AMD EPYC processors

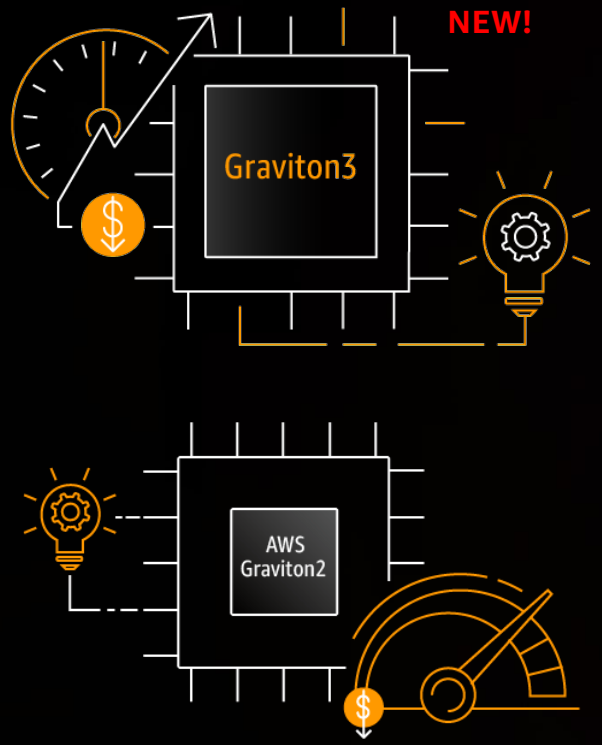


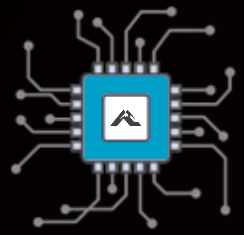
AWS Graviton processors

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AWS Graviton processors

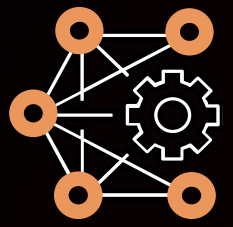




Third generation of AWS Graviton processor



Custom AWS silicon with 64-bit Arm processor cores



Targeted optimizations for cloud-centered workloads



Rapidly innovate, build, and iterate on behalf of customers

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AWS Graviton: Broad workload applicability

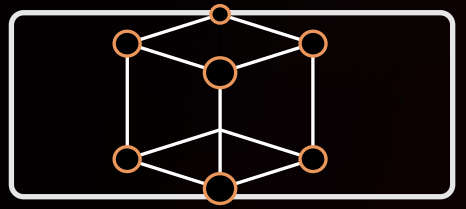
Web and gaming servers

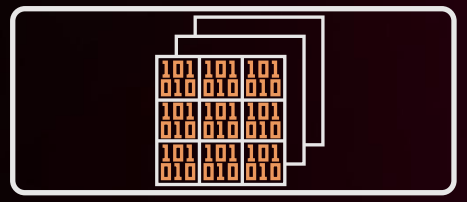




Open-source databases

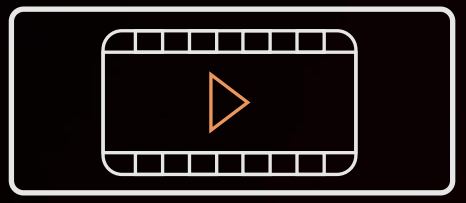
High-performance computing

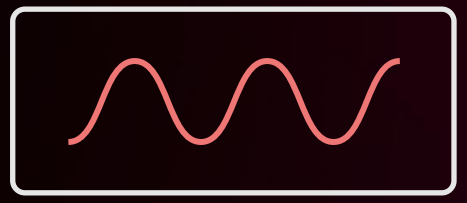




In-memory caches

Media encoding





Electronic design automation

Analytics





Microservices

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AWS managed services supporting Graviton

Easy to get started with Graviton price-performance benefits

Databases



Amazon DocumentDB



Amazon Aurora



Amazon RDS



Amazon ElastiCache



Amazon MemoryDB



Amazon Neptune

Machine Learning



NEW!

Amazon SageMaker

Analytics



Amazon OpenSearch Service



Amazon EMR

Compute and Containers



AWS Lambda



AWS Fargate



AWS Elastic Beanstalk



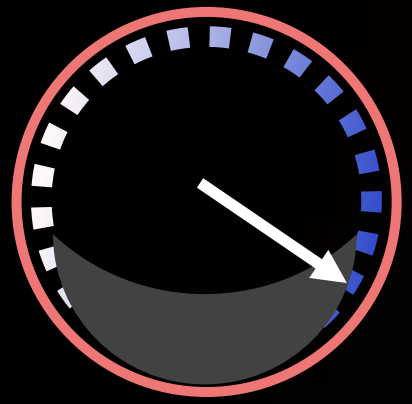
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Lower TCO with Graviton2-powered instances



High performance
in their instance families



20% lower cost*
vs. same-sized comparable fifth-generation instances



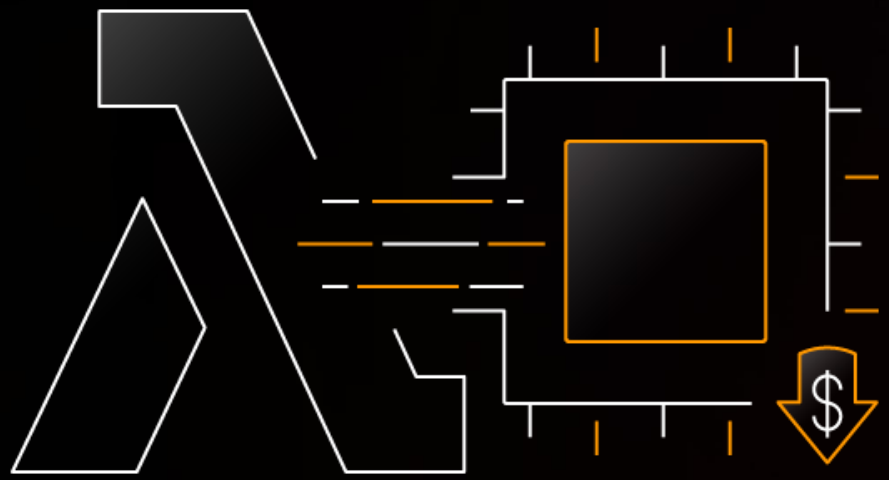
Up to 40% better price* performance
vs. comparable x86-based instances

Good price performance within their instance families

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* Based on on-demand public pricing

AWS Lambda functions powered by Graviton2



Deliver up to **34%** better price performance

Minimal changes to code

Ideal for web and mobile backends, data processing

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AWS Graviton ease of adoption

AS A RULE, THE MORE CURRENT YOUR SOFTWARE STACK THE BETTER

Difficulty	Workload	Actions
Virtually no effort	Amazon RDS, Aurora, ElastiCache, OpenSearch Service, MemoryDB, and Neptune	Upgrade to latest and enjoy
Super easy	Amazon EMR	Typically, just works
Pretty easy	AWS Lambda	Typically, just works with Lambda-managed runtimes or base images. Watch: JNI, shared objects, or Python-centered modules
Quite easy	Linux – Interpreted and JIT'd languages (e.g., Java, PHP, Node.js)	Select Arm64 AMI and Install Bonus if containerized Watch: JNI, shared objects, or Python-centered modules
More involved	Linux – Compiled languages (e.g., C/C++, Python, Go)	Select Arm64 AMI and compile Watch: Port any intrinsics, assembly, or Python-centered modules
Some work, high reward	Microsoft Windows – .NET	Migrate to Linux + .NET core on Arm64

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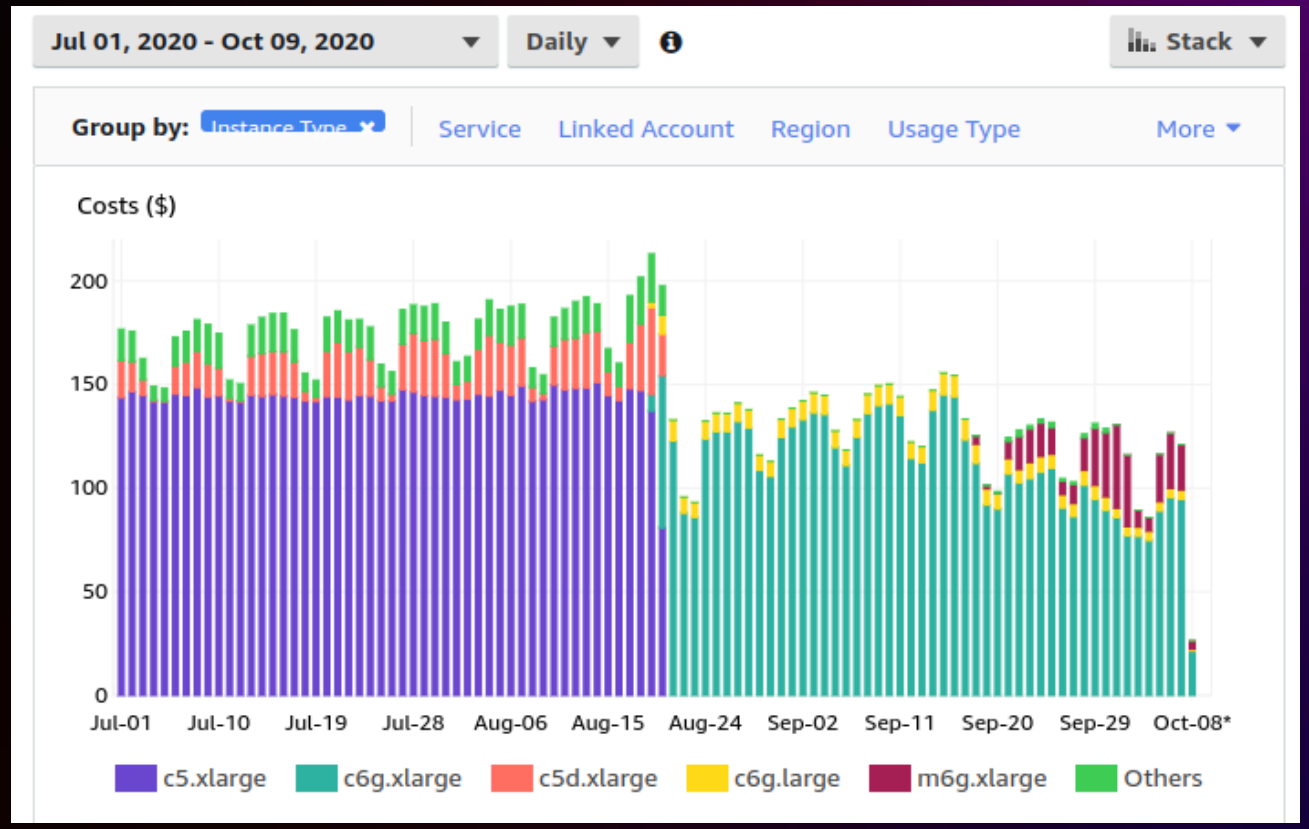
Honeycomb.io: Observations on Graviton

A year out from our initial Graviton2 dogfood experiments, we can report that 92% of vCPUs in use by Honeycomb are Arm64, spanning virtually all of our workloads and all of our environments.

"As of today, we've shifted 100% of our dogfood shepherd workload to run on C6g, using 35% fewer instances than we used with C5."

Liz Fong-Jones
Field CTO at Honeycomb.io

honeycomb.io



https://www.honeycomb.io/blog/observations-on-arm64-awss-amazon-ec2-m6g-instances
https://twitter.com/lizthegrey/status/1314618333140971521?s=20
https://www.honeycomb.io/blog/graviton2-one-year-retrospective

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Who is Honeycomb?

We help engineering teams deeply understand
their own production systems through observability.

Ingest: >3M events/sec
Query: >1B un-indexed events/sec



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Logging data

- Amazon Relational Database Service (Amazon RDS)
- AWS Elastic Load Balancing
- AWS Elastic Beanstalk
- Amazon Elastic Kubernetes Service (Amazon EKS)

Metrics data

- Host metrics
- App metrics
- Amazon CloudWatch
- Prometheus

OpenTelemetry

Trace span data

- JavaScript
- Go
- Jaeger
- Java
- Ruby
- Python
- .NET
- Front-End

OpenTelemetry

Realtime Ingest
Auth and validation

Honeycomb API
Ingestion Path: api.honeycomb.io

Refinery
User-controlled dynamic tail sampling

Unpacked into columns

Query engine

Unlimited users can store thousands of dimensions at no additional cost and query any arbitrary combinations without pre-aggregation.

Proprietary distributed computing and parallelized processing returns query results in < 3 seconds across billions of rows of data.

Columnar datastore

High-cardinality column file

Segment with time range

Amazon Simple Storage Service (Amazon S3)

Context

Column

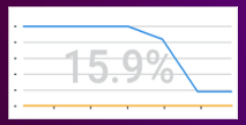
Segment

AWS Lambda

ui.honeycomb.io

ui.honeycomb.io

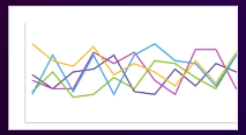
ui.honeycomb.io



Graph Rendering
Click through visuals based on granular data



Query Builder UI
Intuitive GUI with multiple group-by



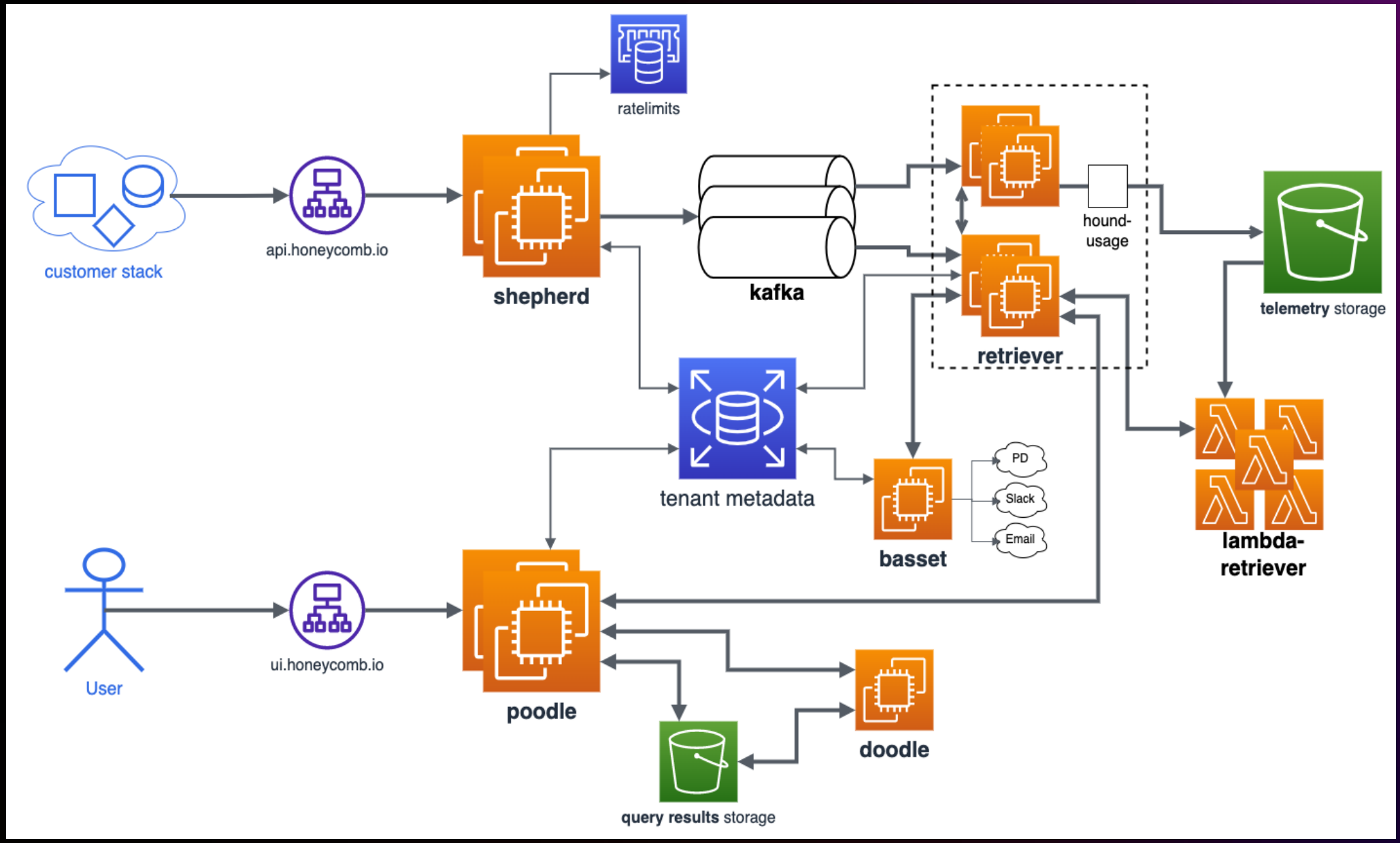
Query Result History
Shared team intelligence

Events contain many fields and distinct values

Context

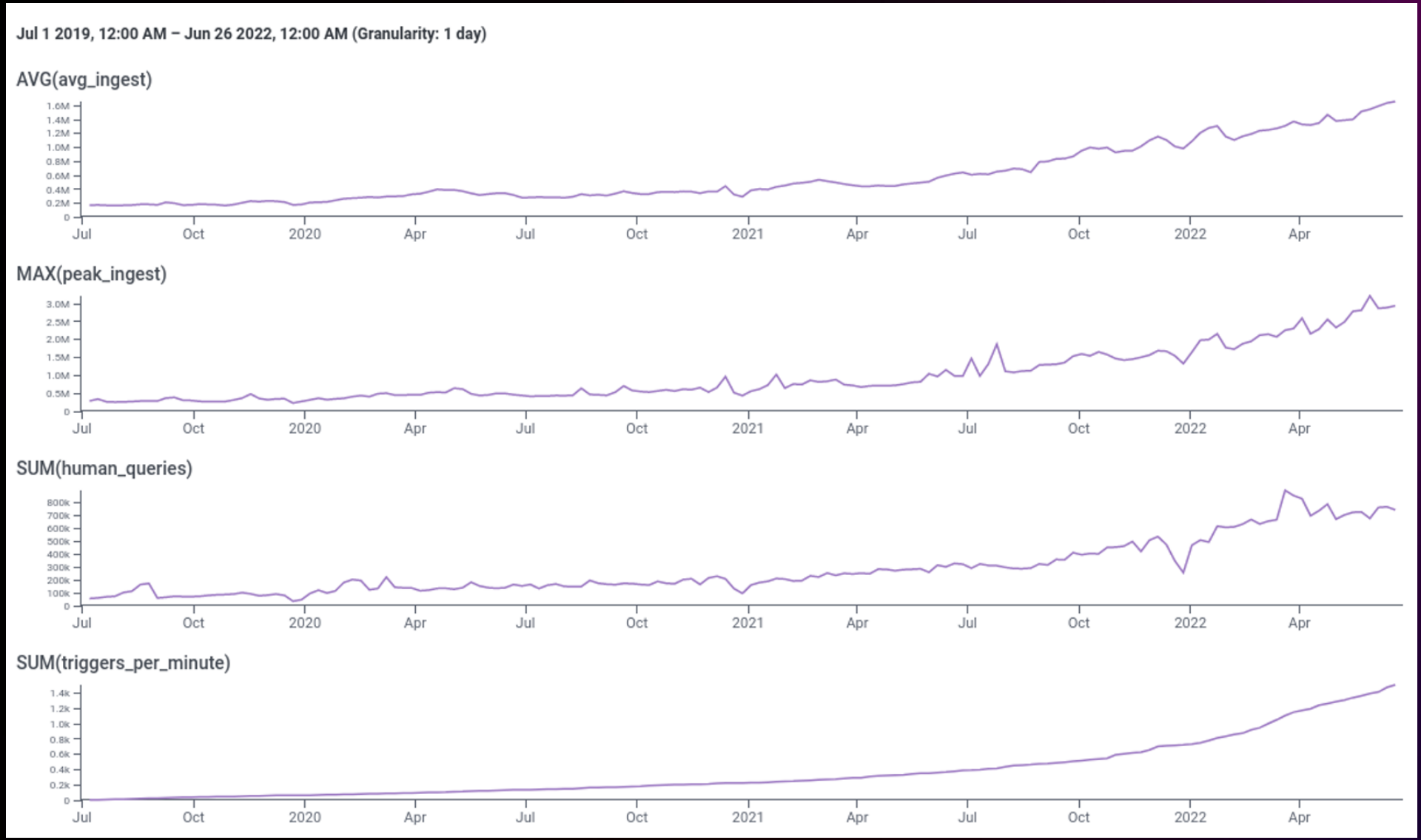
"Wide events" packed with as much context as you need for debugging

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Why was this all started?



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Two-phased approach

Instance-based workloads

Shepherd (ingest)

Retriever (query)

Poodle (UI)

Doodle (charts)

Basset (triggers/alerts)

Refinery (sampling)

Kafka (message queue)

Lambda

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It started in CI

Multi-arch builds

github.com/ko-build/ko

Carried over to external repos

```
jobs:
  build_agent:
    docker:
      - image: cimg/go:1.18
    # needed to build docker images, attach mount points, etc
    steps:
      - setup_remote_docker
      - checkout
      - run: go install github.com/ko-build/ko@latest
      - run: echo "VERSION=$(cat version.txt | tr -d '\n')" >> $BASH_ENV
      - run: ./build/build.sh
      - run: ./build/test.sh .
      - run: e2e-tests/test.sh
      - run:
          name: "Deploy on tagged master push"
          command: |
            if [ -z "${CIRCLE_PULL_REQUEST}" ] && [ -z "${CIRCLE_BRANCH}"
              echo "${DOCKER_PASSWORD}" | docker login -u "${DOCKER_USERNA
              KO_DOCKER_REPO=honeycombio ./build/build.sh
            else
              echo "skipping push. CIRCLE_PULL_REQUEST=${CIRCLE_PULL_REQU
            fi;
```

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Update the kitchen

Chef to configure infra

Things like `nokogiri` and `osquery` proved to be a little harder



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Photo by Sergei Sushchik on Unsplash

What about our code?

We write our services in Go

We do not use CGO (CGO_ENABLED=0)

It. Just. Worked.

KEEP CALM IT JUST WORKS

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Kafka

Java + Kafka + ARM had performance issues

Worked with Confluent and AWS teams to resolve

Lesson learned: **Amazon Corretto** is top in innovation for ARM



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Rolling it out

Auto-scaling groups

Slowly turned the faucet on

Telemetry was key to ensuring it was working



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Photo by Nathan Dumlao on Unsplash

Not done yet

Databases



Amazon DocumentDB



Amazon Aurora



Amazon RDS



Amazon ElastiCache



Amazon MemoryDB



Amazon Neptune

Machine Learning



NEW!

Amazon SageMaker

Analytics



Amazon OpenSearch Service



Amazon EMR

Compute and Containers



AWS Lambda



AWS Fargate



AWS Elastic Beanstalk



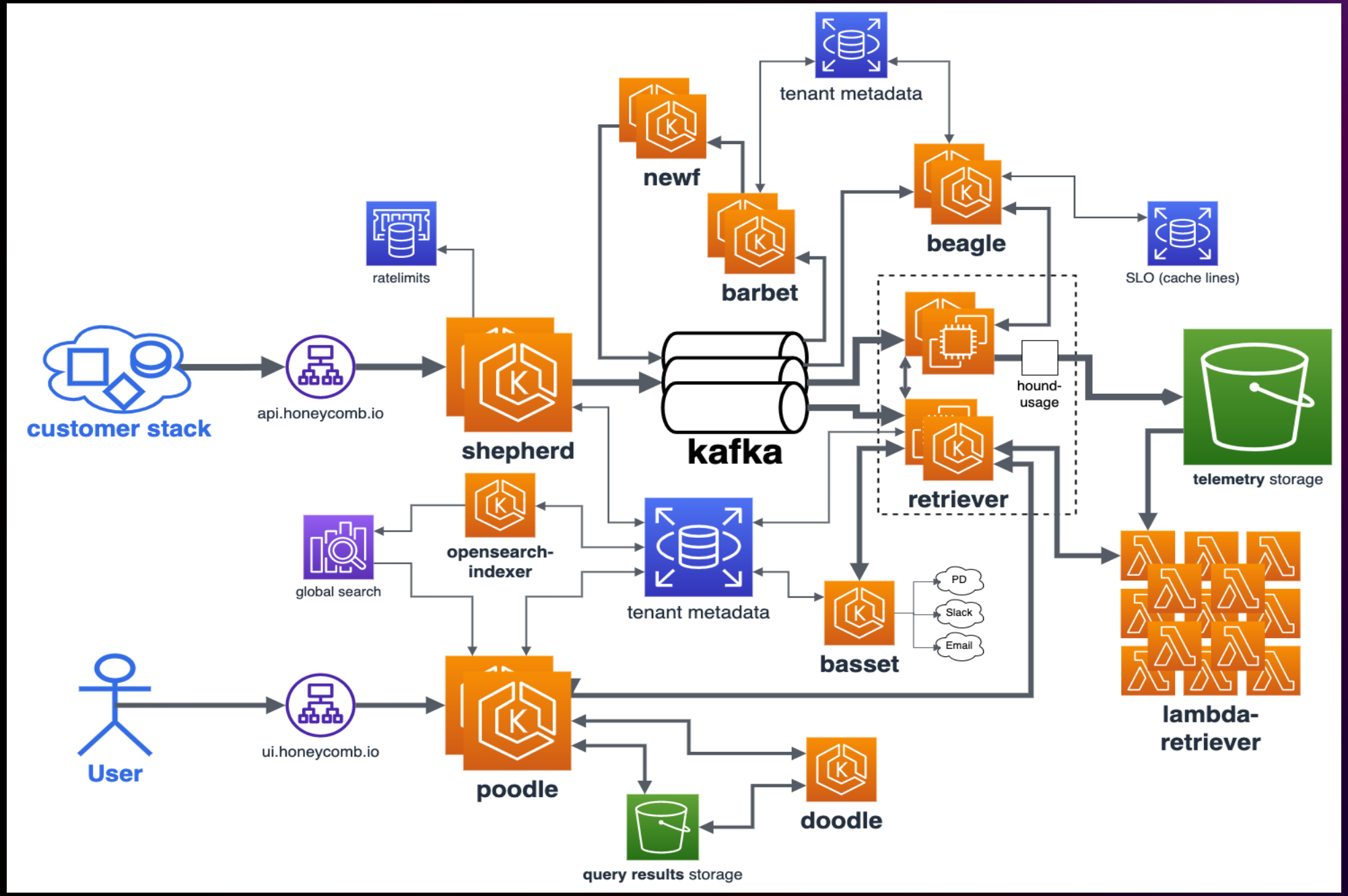
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Phase 2: Lambda

lz4 compression
(changes upstreamed)

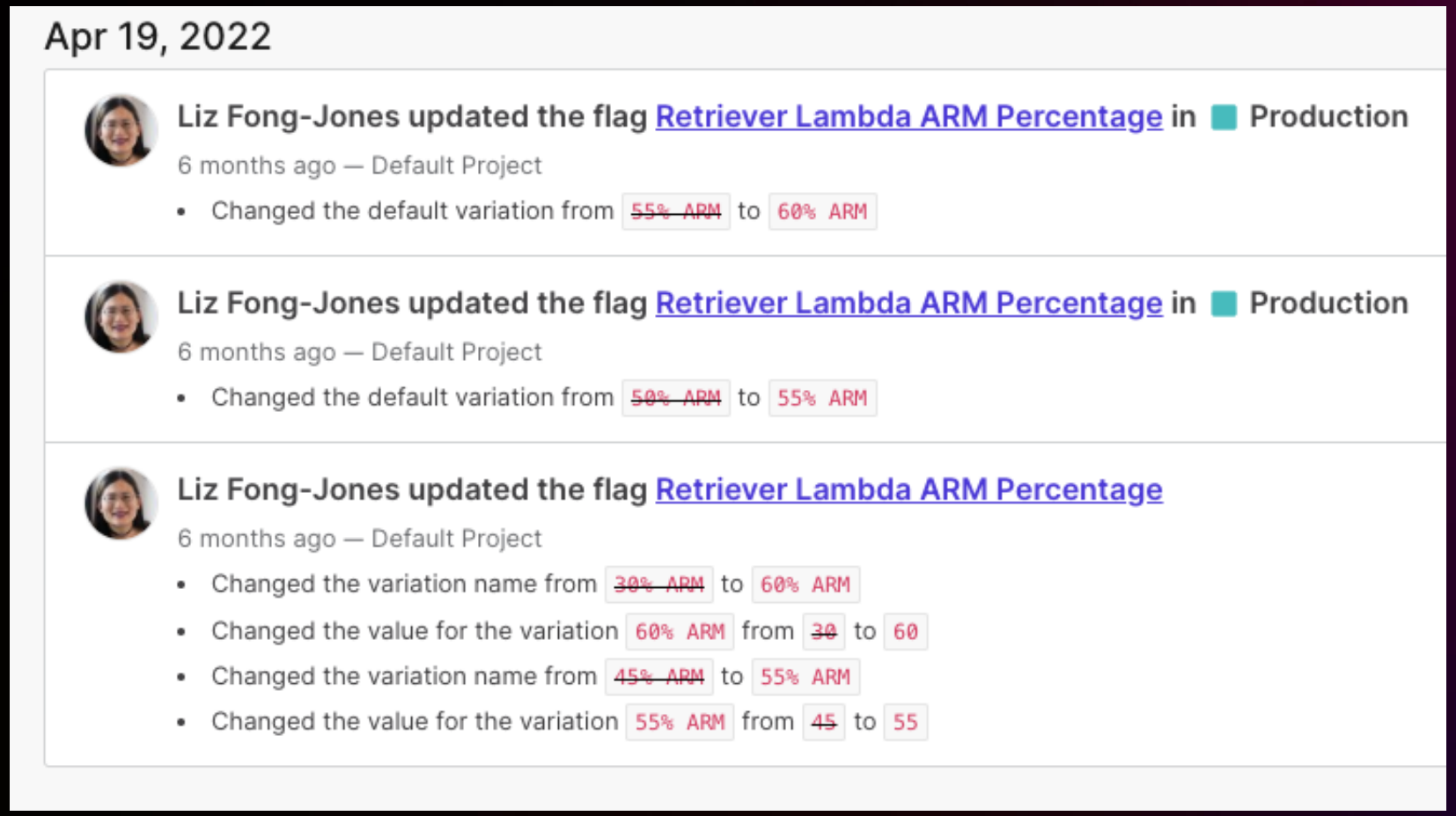
That's it! Go *almost* lives up to its promise



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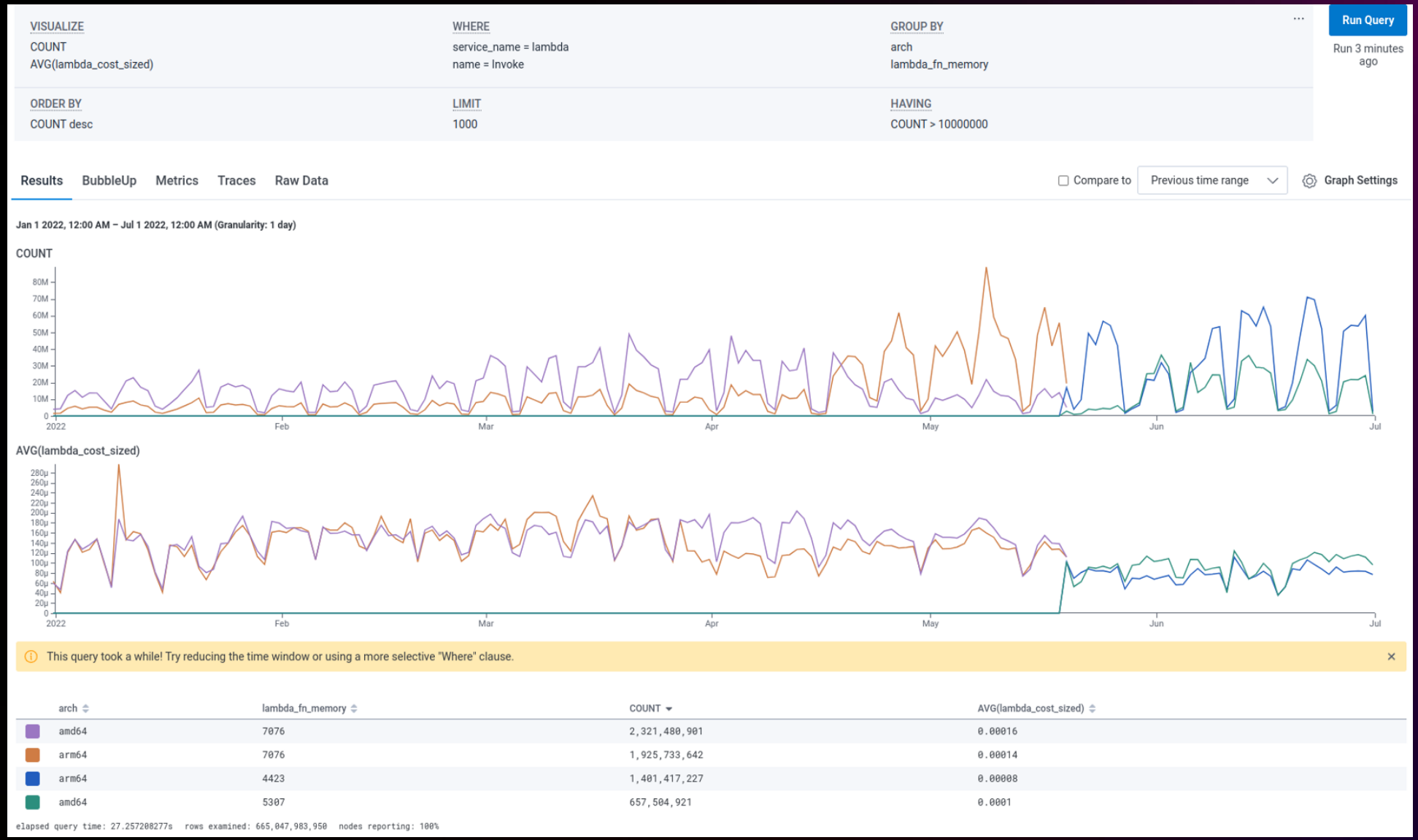
Rollout: Feature flags are your friend

10% → 30% → 45% → 60% → 70% → 85% → 95% → 99%



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Lambda on AWS Graviton lowers TCO



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Where we live



Photo by Eugene on Unsplash

Benefits of Graviton2 & Graviton3 for Honeycomb

-60%

TCO vs.
Amazon EC2 5th gen.

-60%

Emissions vs.
Amazon EC2 5th gen.

>10x

Scaling over past
3 years

SLOs and budgets
met, no sweat!

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Call to action

AWS Graviton Technical Guide

Graviton Ready Partners: Third-party software on Graviton

AWS Graviton Workshop

t4g.small instance Free trial until Dec 31, 2022

AWS Graviton sessions at re:Invent 2022

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Thank you!

Pierre Tessier

@puckpuck

@puckpuck

Sunil Ramachandra

@suramac

Honeycomb
Booth 1348



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