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Monolith to Microservices

Paradigm shifts in Observability.

Presenter Troy Partain, AppDynamics Sales Engineering Leader

Session ID: BRKAPP-2499



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How

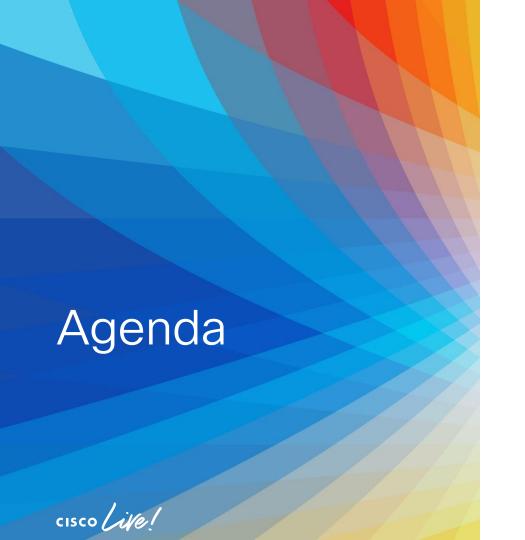
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- Introduction
- Beyond Scope
- Evolving Landscape
- Design for the Future
- Demo Comparisons
- Landmines
- End State and Takeaways
- Wrap-Up

Who is this guy?



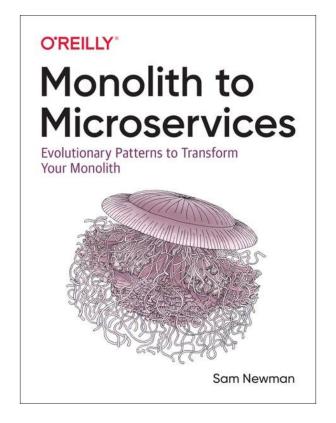
Beyond Scope



Moving to Microservices is Complicated

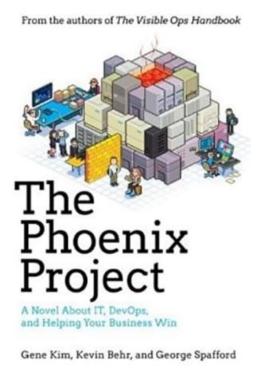
- Code and Repository Management
- CI / CD Pipelines / Jenkins / GitHub
- Setup and Configuration of underlying compute
- The specifics of individual cloud providers
- Changes in team structure
- Changes in behavior and the move to DevOps

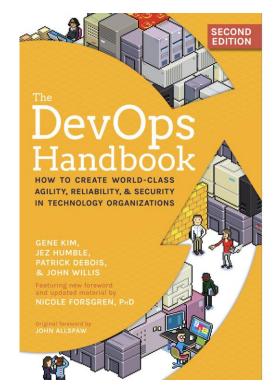




Deep Dive into how / when to migrate to microservices





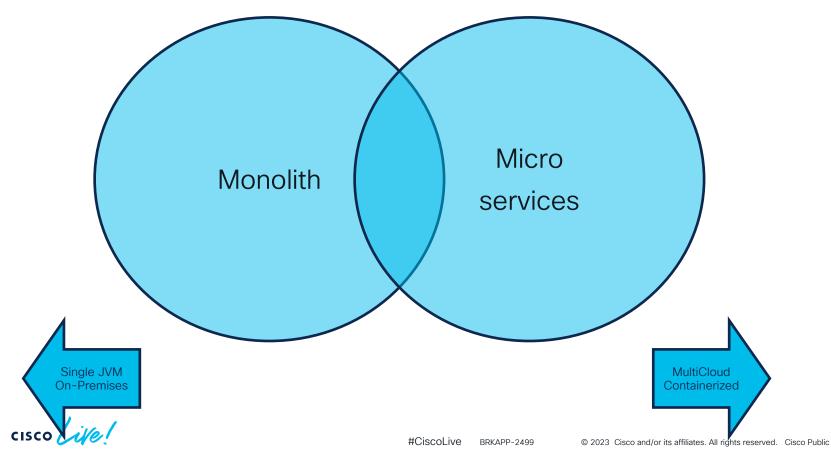


DevOps and DevOps Implementation Practices

Evolving Landscape



Similarities and Differences

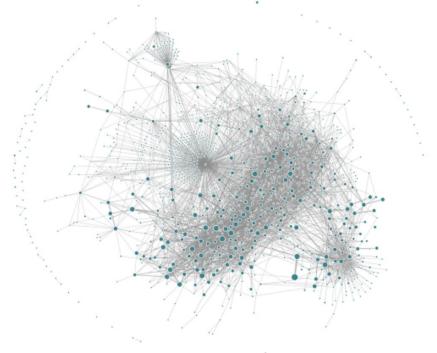


How Microservices differ from Monolith?

	Infrastructure	Data Collection	Metrics
Traditional Monolith	Traditional technologies & architectures	Language specific agents also supports OpenTelemtry data	Agents send metrics in a proprietary format for specific set of clearly defined monitors
Cloud Native Microservices	Modern, distributed cloud native applications deployed on Kubernetes within public clouds	OpenTelemetry MELT data	Ingest metrics from everywhere, Prometheus, AWS, Azure, Otel, other sources.



More Services = More Pain



Uber's Microservice Architecture Circa Mid-2018 From Jaeger Source: Uber Engineering



← Tweet



We replaced our monolith with micro services so that every outage could be more like a murder mystery.

6:10 PM · Oct 7, 2015

2,766 Retweets **78** Quotes **2,671** Likes **14** Bookmarks



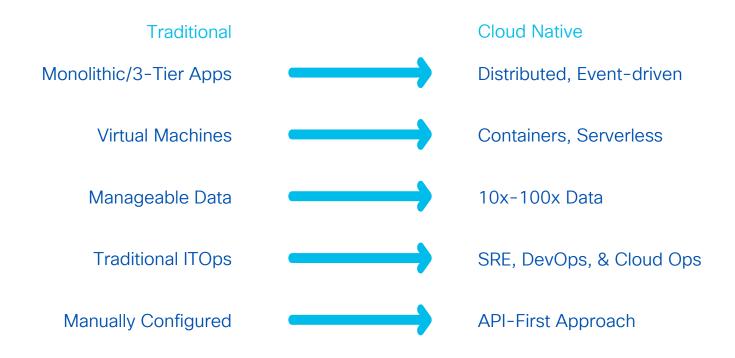
...

Observability ≠ Monitoring

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The complexity is exploding



Monitoring needs to evolve with it



You can't solve issues with more eyes on glass, or more glass on data.



The problem with "monitoring" today

Most offerings were designed years ago with a single purpose in mind and then "bolted on" new use cases.

Resulting in



Disconnected Data Silos

Forcing you to jump from tab-to-tab.



Incomplete Visibility

Business? Internet? Security?



Biased point-of-view

Log-centric? Infrastructure? APM?



"Observability lets us understand a system, by letting you ask questions about that system that you didn't even think about asking until now."



In Comes Observability

- Robustness
 - Being able to handle known points of failure
- Resilience
 - Being able to handle items which haven't been thought of
- Agent Monitoring
 - Paradigm shift
 - APM Agents
 - OpenTelemetry
- OpenTelemetry, many of the Same things, different terminology



Answering the Question Is Everything Ok?

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Visibility into all Telemetry is Critical







Events



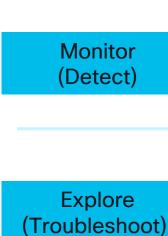
Logs

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Traces





Metrics "What is Happening?"

Traces & Events "Where is it Happening?"

Discover (Root Cause)

Logs "Why is it Happening?"



OpenTelemetry is at the heart of Observability

- OpenSource evolving Standard for monitoring being adopted everywhere
- APIs: Code instrumentation to create telemetry data
- SDKs: Gather the telemetry and send to pipeline
- Processing: Sampling, filtering, and enriching
- Exporter: Converts/translates into custom formats
- Collector: Data filtering, aggregation, batching, and communication



What OpenTelemetry is Not

- It is not APM
- It is not only code
- It is not only agents
- It is not only traces



Designing for the future



Building for Observability From the ground-up!

A whole new full-stack observability platform for modern, cloud-native applications



A new entity-centric data model for cross-domain insights



Future-proofed on a foundation of native OpenTelemetry



Built upon proven
Business Transactions,
Business Outcomes,
Runtime Security, Crossdomain AI/ML etc.

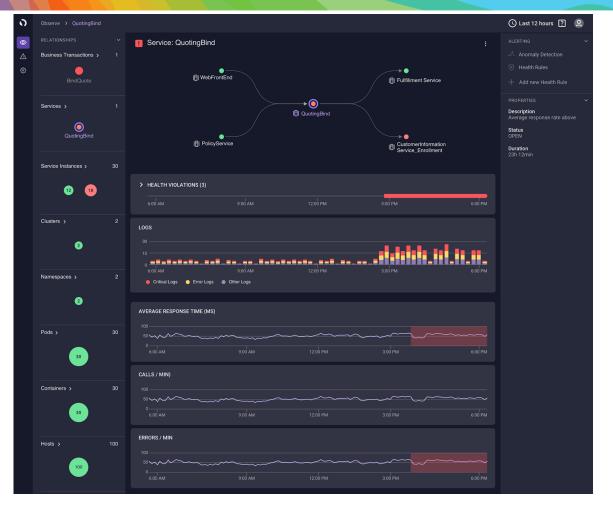


Scaled via a cloud-native architecture to support our largest customers



That's why we Built Cisco Native Application Observability

A new observability product, built from the ground up for full-stack observability





New Value Enabled by Cisco **Native Application** Observability + OTel



Application Observability

Expanding Visibility to Even More Business-Critical Applications

- In additional to traditional Languages (Java, .net, etc....), OS and Infra+
- Allows us to
 - Provide visibility into newer languages & Commercial Off the Shelf Products (COTS)
 - Ruby, GO, Rust, Swift, more...
 - OTel Compliant COTS tools
 - Infrastructure
 - Kubernetes, Containers
 - IoT Devices, Cisco devices, load balancers(F5), SAN, NAS, more...
- Future, OTel Compliant Components.

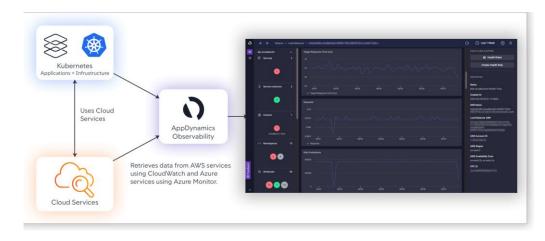


Cisco Native Application Observability is intended for organizations that:

Are using Kubernetes (k8s) in Amazon (EKS), Azure (AKS), or OpenShift

Ideally using supported AWS/Azure services

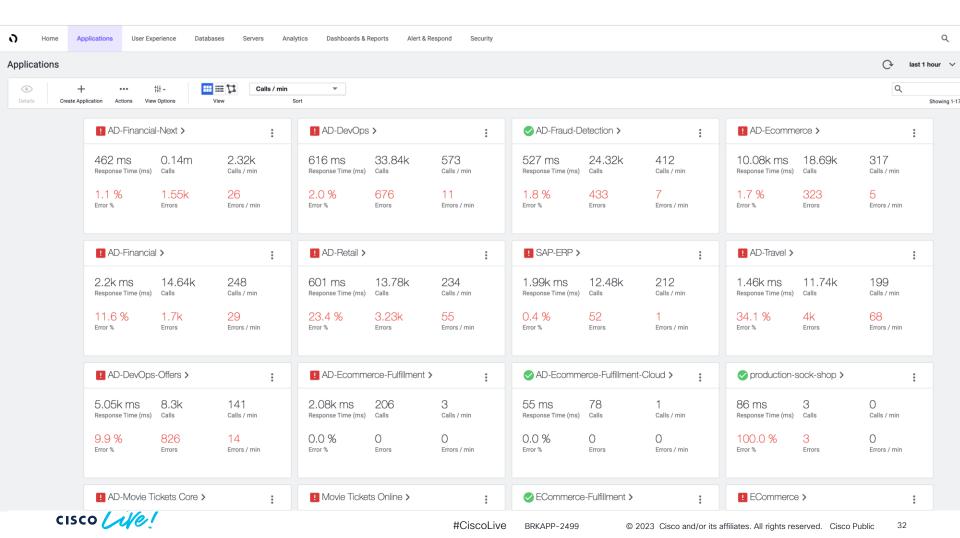
Use OpenTelemetry (hybrid agent is another option)

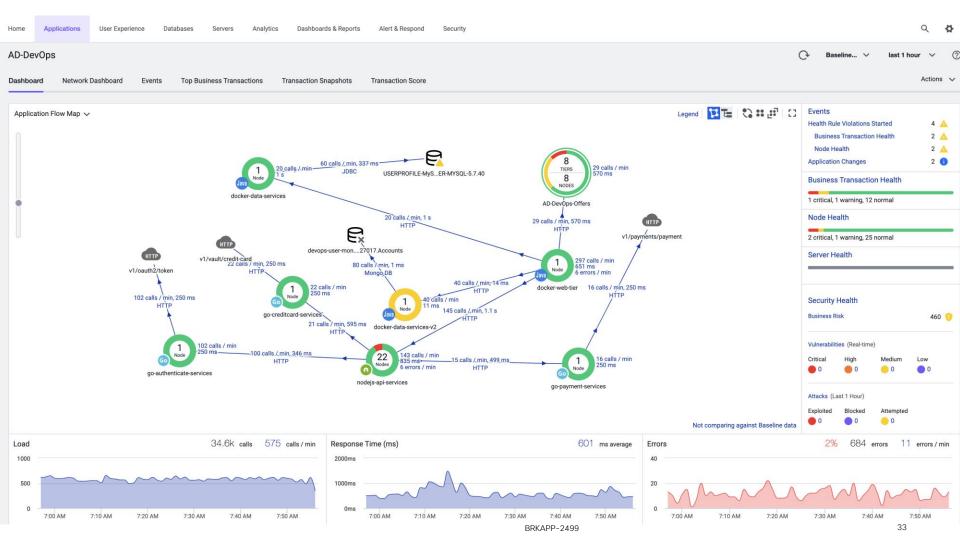




Demo Comparisons







Trace Id: 6afd125f7fd90ed7f3ce66a6dff52a55

TRACE FLOWMAP



Group By

Span

OpenShift Kubernetes

Extend your observability to hybrid-cloud applications

- Unify observability across clusters both on-premise and in the cloud
- Self-managed k8s support extends to most common enterprise container platforms
- Easy to deploy on large clusters with OOTB health rules for fast start

Just released!





Multi-Cloud Infrastructure

Public Cloud Visibility

- Troubleshoot public cloud infra and correlate to APM
- Expanding services coverage for greater breadth
- Cloud service log collection for agentless access to S3 buckets and CloudWatch log groups
- Correlated metric and log analysis to uncover root cause





Fargate

Amazon Lambda Amazon EFS

Gateway

Amazon VPC

Cloud-native Optimization

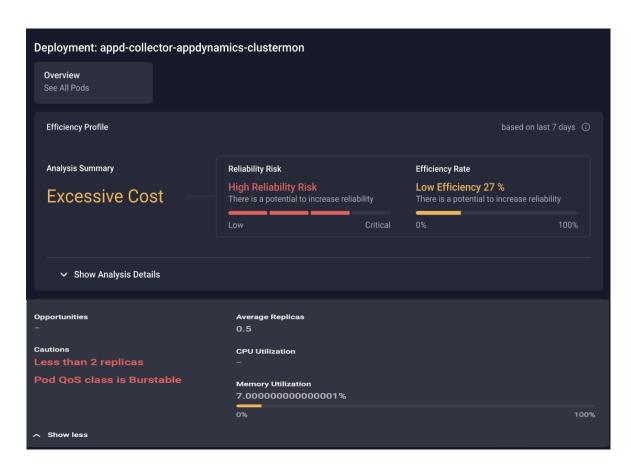
Optimize Cloud Native Workloads

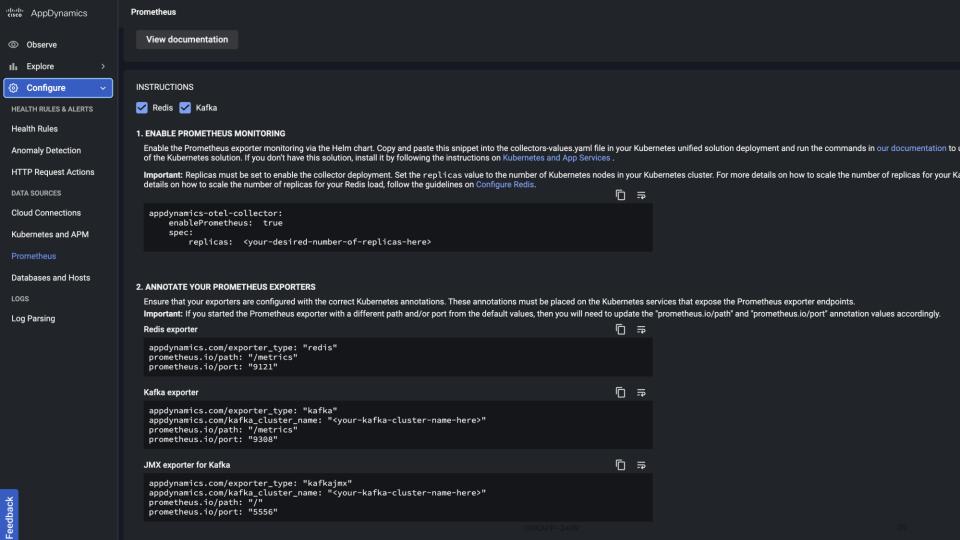
Efficiency and Risk profiler for K8s workloads

- Identify inefficient or oversubscribed k8s resource assignments
- Identify reliability and availability risks based on throttling, replicas, etc.
- Leverage existing OTel K8s collector for metrics collection

Now Available!







Ecosystem Integrations

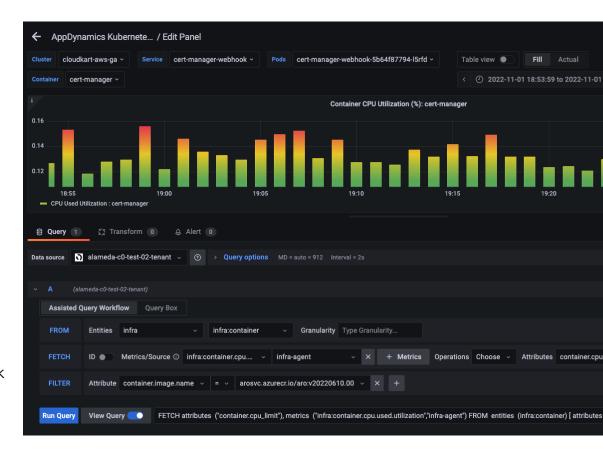
Build Dashboards in Grafana

Create custom dashboards with AppD Cloud and other sources

- Installable plugin for Grafana creates a secure connection
- Assisted query workflow enables easy widget building with UQL
- Drill-down from Grafana into AppD Cloud for deeper M.E.L.T. analysis
- Sample dashboards provides guick start reference widgets

Just released!





Landmines



Ingest Cost:

Be very careful about ingest Explosion

- Billing models are based on ingest of data
- Scaling up and down environments drive different levels of ingest
- Individuals (developers) can push whatever they want
- Bills can explode
- You must have a way to manage, limit and alert on ingest



SLA Management

All Services are GREEN and all systems are RED

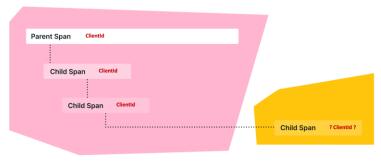
- SLA's need to evolve
- Service levels are now chained
- Each individual spec may be green while the flow is red
- Reduce MTTR: Tag, Tag, Tag





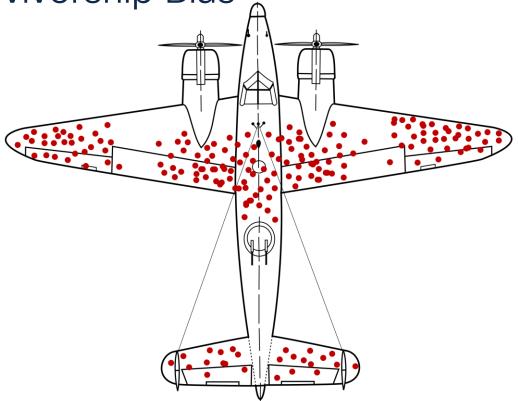
Do Not underestimate the Importance of Tags

- Provide Context
- Contextual information passed with data
- Key/value pairs
- Status: Stable
- Help Identify and Isolate Issues
- Assist in AI / ML driven correlation and troubleshooting



Service A Service B

Avoid Survivorship Bias





End-State and Takeaways



Keep End-State Goals in Focus

- 1. Revenue Protection and Customer Satisfaction
- Tune Key Business Functions to Generate additional revenue
- 3. Reduce SLA Impacts
- 4. Improve Alerting
- Reduce overall Number of Incidents and effort to restore
- 6. Reduce RCA effort
- 7. Improve End User Productivity
- 8. Increase Speed to Market Greater Release Velocity
- 9. Workload Optimization Performance and Cost
- Reporting Efficiency
- 11. Tools Consolidation
- Improve Cost and Effort of Cloud / Data Center Migration



Key Takeaways in monitoring Microservices

- Appreciate how you monitored applications yesterday will not work today with cloud native containerized apps
- Plan observability in from the very beginning of every project
- Expect Complexities, plan for unknowns and build for robustness and resilience
- The more data ingested, the more robust your capabilities are, however, the more costly your observability solution becomes
- Know your costs, manage your ingest, setup controls, get ahead of surprises



Related Sessions - Available On-Demand

Monday 5

Time: 9:30 AM

Title: Do Tell About OTel: An Introduction to OpenTelemetry and How AppDynamics is Embracing It Session Code: BRKAPP-1154

Time: 11:00 AM

Title: Monitor and Troubleshoot
Applications in AWS and Azure with
Cloud Native Application Observability
Session Code: BRKAPP-1008

Time: 3:30 PM

Title: New AppDynamics Cloud and Security Innovations
Session Code: PSOAPP-1785

Tuesday 6

Time: 10:30 AM

Title: Interactive Guide to Unlocking Observability with OpenTelemetry Session Code: IBOAPP-2980

Time: 1:00 PM

Title: Open Source Grafana monitoring for AppDynamics Cloud Session Code: BRKAPP-1510

Time: 2:30 PM

Title: Empower a new

observability ecosystem with an open and extensible Cisco FSO

Platform

Session Code: BRKAPP-1013

Wednesday

Time: 10:30 AM

Title: Cross MELT troubleshooting with AppDynamics Cloud and FSO

Platform

Session Code: BRKAPP-2915

Time: 1:00 PM

Title: Cisco FSO Platform Ecosystem fc

Developers

Session Code: BRKAPP-2006

Time: 2:30 PM

Title: Royal Caribbean elevates customer experience with NTT 360 Observability service powered by

Cisco FSO

Session Code: BRKAPP-2010



Time: 8:00 AM

Title: New AppDynamics Cloud Efficiency and Cost Optimization Capability for Kubernetes

Workloads

Session Code: BRKAPP-1916

Time: 10:30 AM

Title: The Journey of migrating Cisco IT's AlOps solution to the

Cisco FSO platform

Session Code: BRKAPP-2104

Time: 1:00 PM

Title: From Monolith to Microservices: Paradigm shifts in Observability Session Code: BRKAPP-2499



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Thank you



Cisco Live Challenge

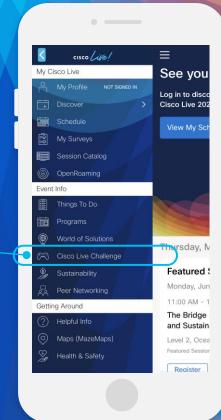
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