
AWS
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FSI317

Trading up: Fidelity Investments takes trading to the cloud

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Fidelity Investments

Jeremiah O'Connor

Principal Solutions Architect
AWS

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Agenda

Fidelity order management systems

Roadmap and challenges

Technology components

Platform resiliency

Fidelity cloud platforms

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Fidelity's Tech Journey

1946 Fidelity Management & Research Company founded

1965 Fidelity purchases first computer



1995 Fidelity becomes an internet pioneer as first mutual fund to create a home page



2016
Fidelity's first product application deployed to the cloud

2019 Fidelity launches multi-cloud hybrid strategy

Today
5,700+ applications on public cloud

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Fidelity order management systems

JOURNEY TO THE CLOUD



- Migration from legacy to public cloud
  - Capacity constraints
  - Modern technologies
  - Architecture changes for horizontal scaling
  - Trading landscape
- Cultural journey from legacy to public cloud

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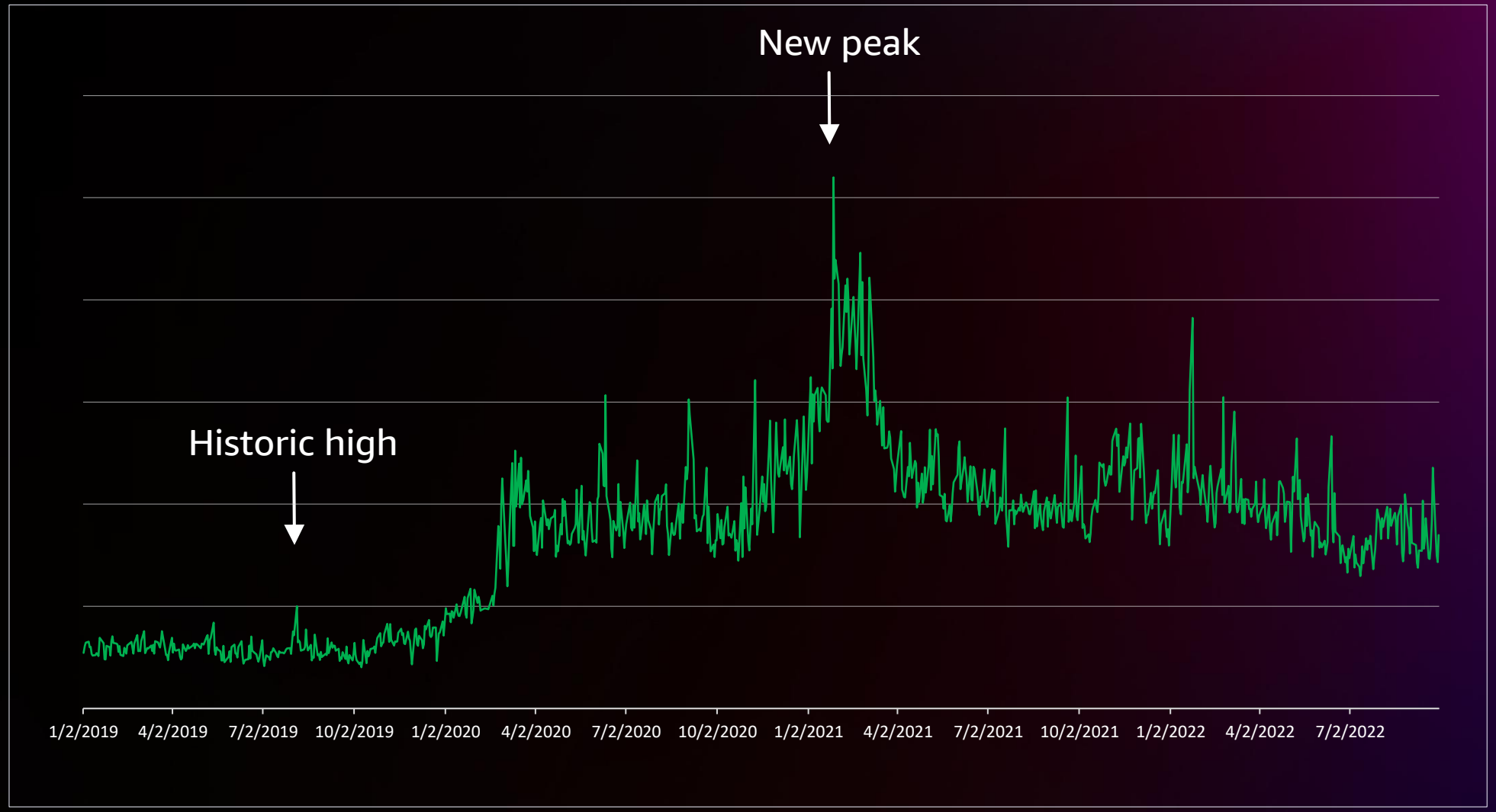
Catalyst for cloud migration

- Speed to market
- Legacy costs
  - Hardware and licensing
  - Real estate
  - Power
  - Staffing
- Scalability to support volume fluctuation



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Retail order volumes



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Evolving the culture

Development team

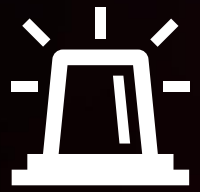


Cloud certifications and training paths

Software-defined scaling

Shorter release cycles, smaller builds

Chaos testing



Hypothesis-first designs

Prediction and observation

Software resiliency

CI/CD



Security verification,
testing, and initial validation

Low-touch deployments

Rapid deployment

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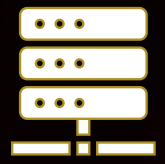
Challenges

Legacy technology in 2020s

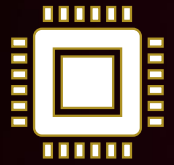


Transition between public cloud and legacy





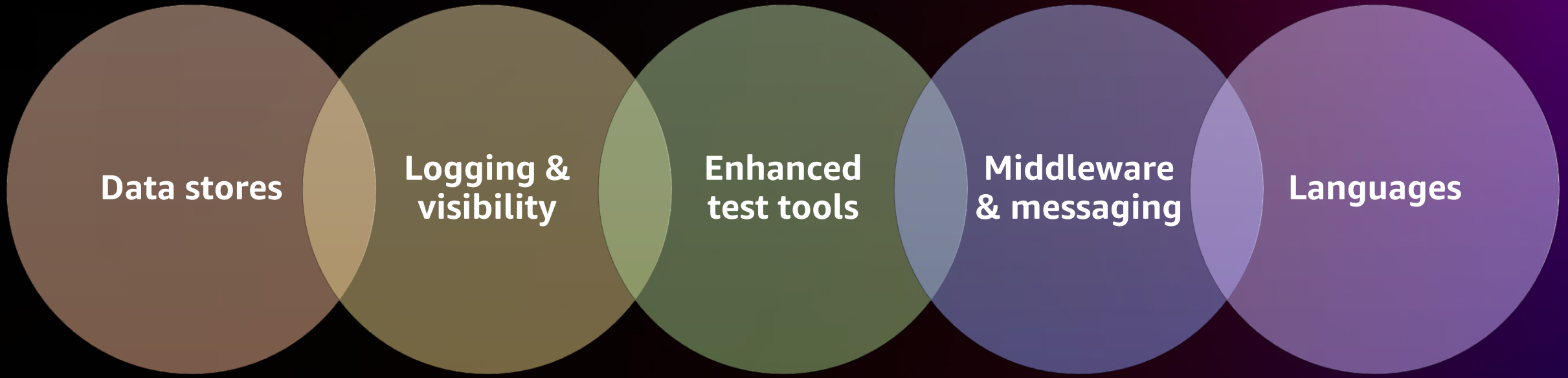
Multi-Region



Loss of control of hardware changes

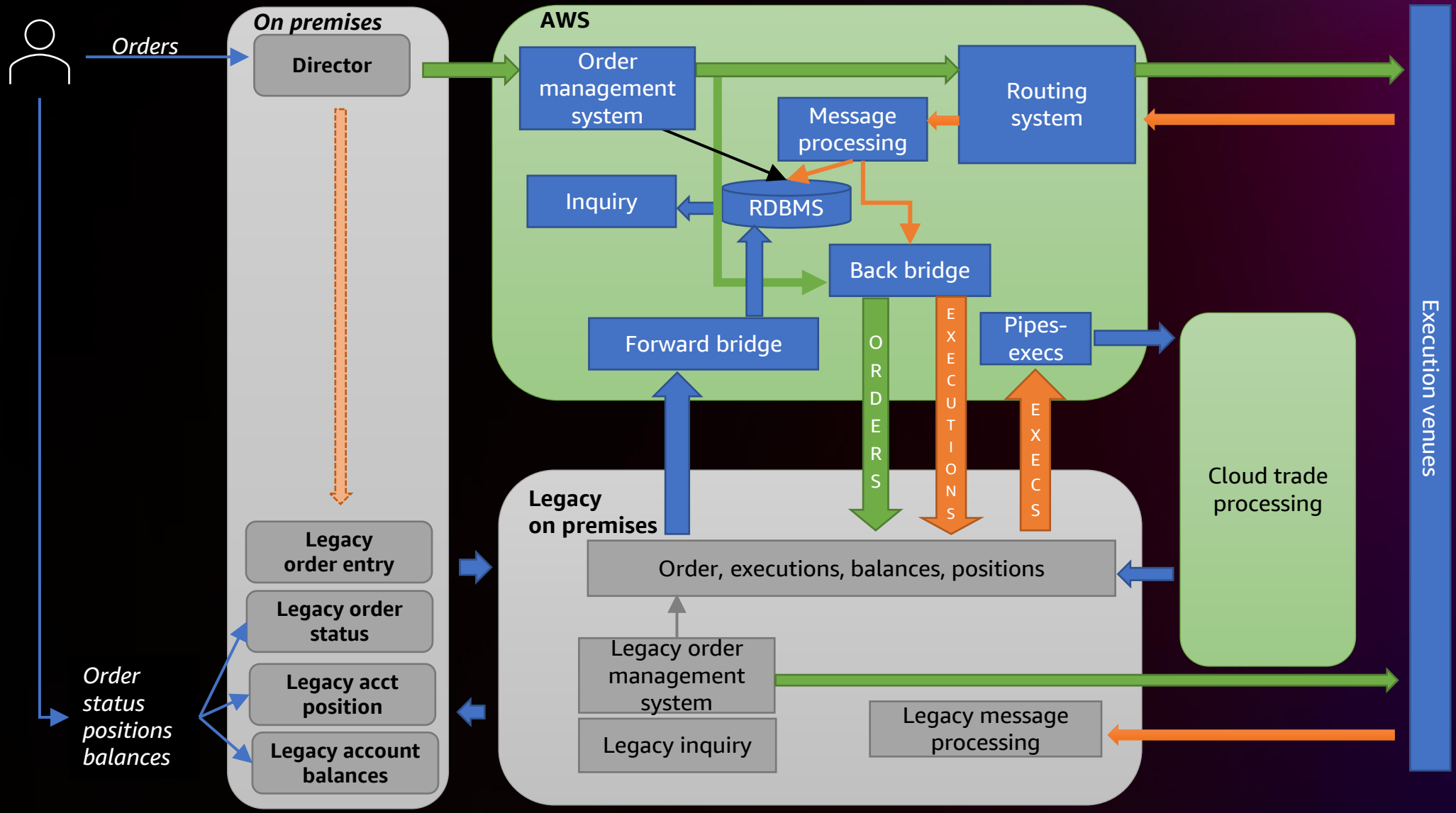
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Technology components



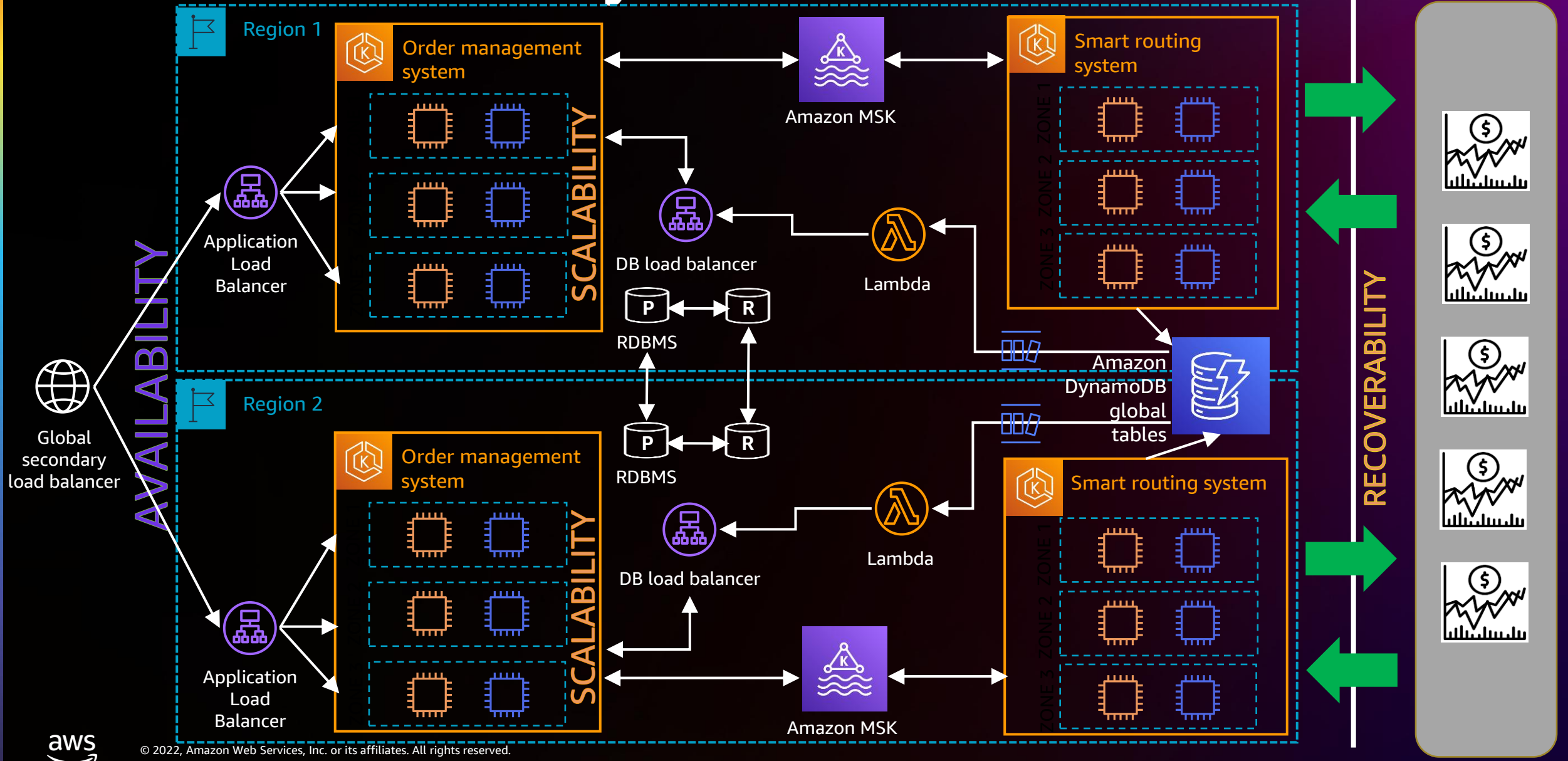
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Order high-level architecture



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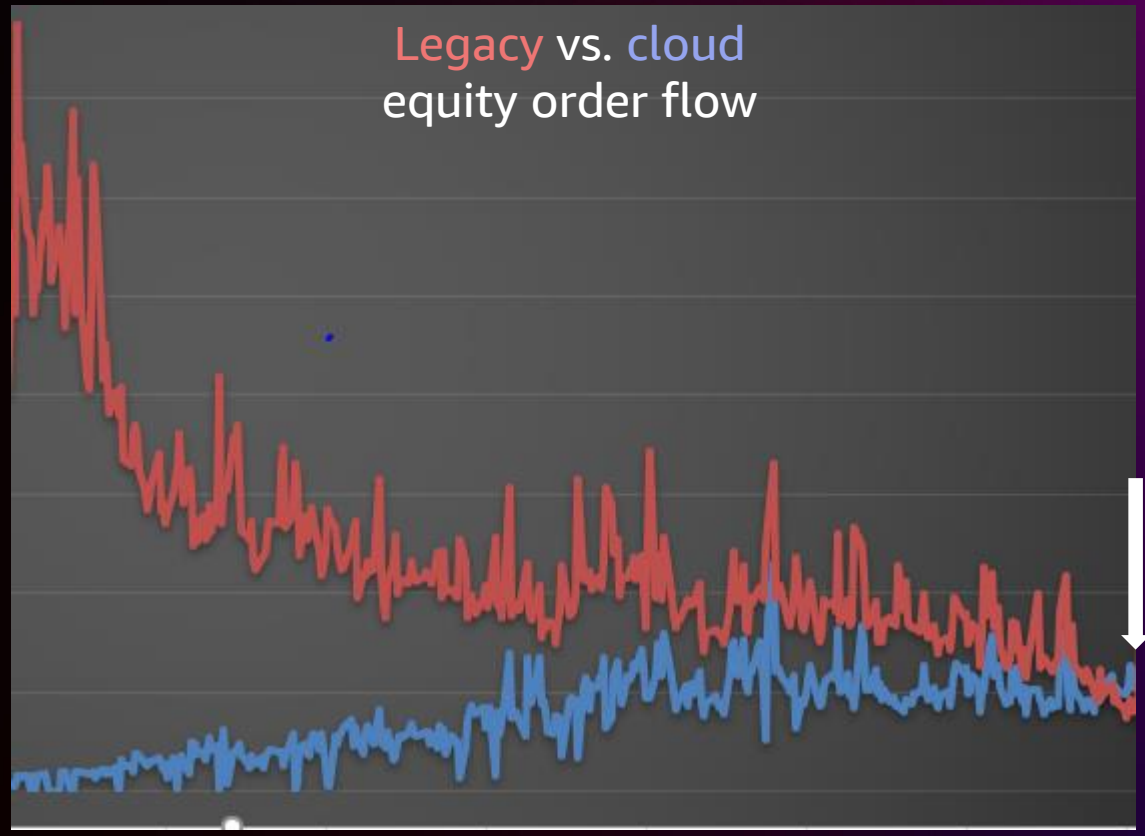
Platform resiliency architecture



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Legacy to AWS comparison

- Legacy versus cloud since production go live
- Cloud is taking a significant amount of retail equity order flow away from legacy systems



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Cloud platforms at Fidelity

1946 Fidelity Management & Research Company founded

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1995 Fidelity becomes an internet pioneer as first mutual fund to create a home page



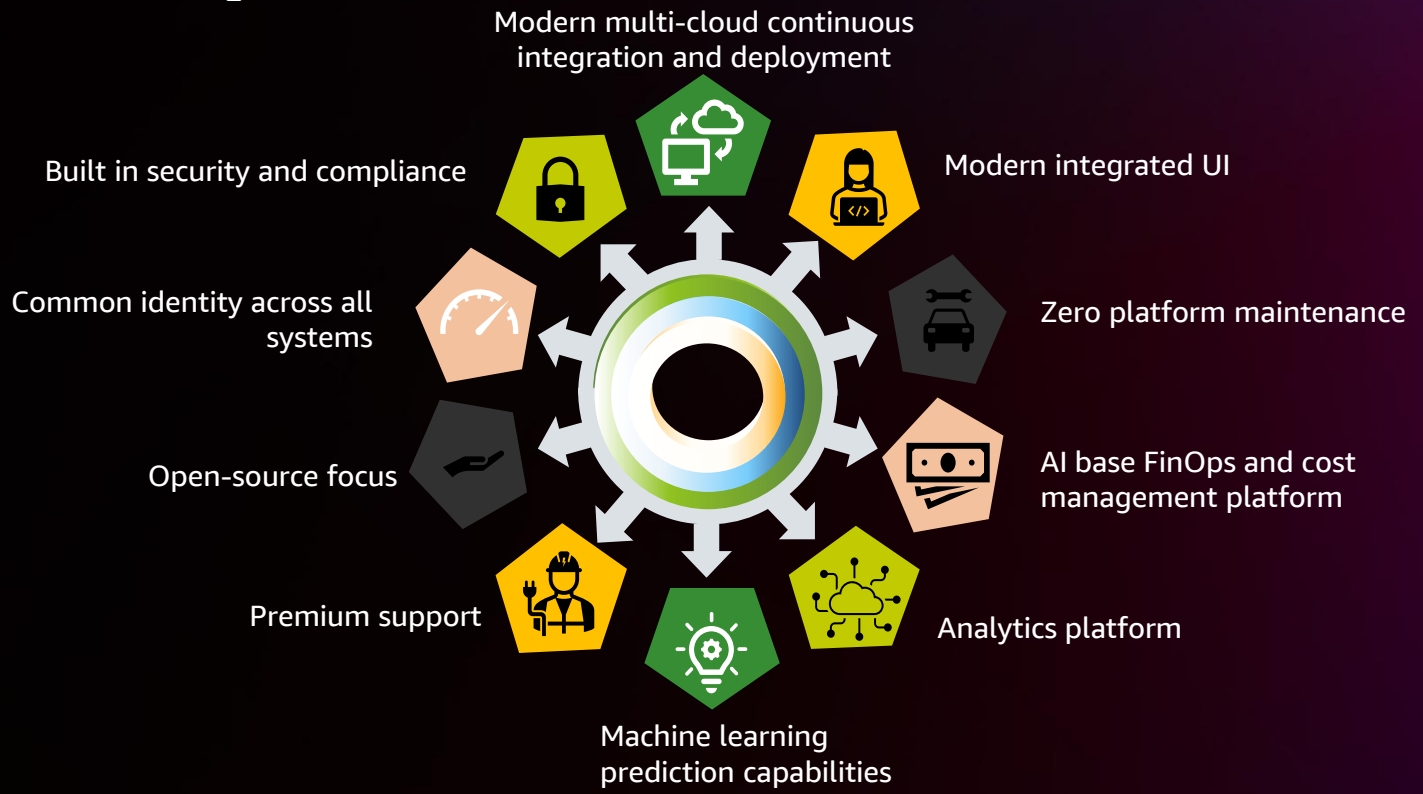
2016 Fidelity's first product application deployed to the cloud

2019 Fidelity launches multi-cloud hybrid strategy

Today 5,700+ applications on public cloud

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Fidelity's cloud platform



APPLICATION	FOUNDATION	FINANCIAL	EXPERIENCE	TALENT
Enable coherent view of application, its interfaces, and data managed	Develop and execute platform foundation around standards, security, compliance, engineering, and operation policies	Drive financial accountability through robust FinOps practice, usage of open source and cloud standards	Enhance developer experience through common self-service automation, APIs, and pipelines (Open source)	Optimize and unify the workforce through training and upskilling to future modern technology roles

Fidelity platform

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The platform of platforms

Business platforms

Trade | Mobile | Fid.com | NetBenefits | Crypto | Others | Many others

Core and common platforms

API | Event streaming | Observability | Low code | Developer experience | Software delivery pipelines | Customer authentication

Identity frameworks/ management | Cloud native databases | Caching | Chaos engineering | ML/data | Application management platforms

Fidelity Kubernetes program

Platform management | Cloud resource optimization | Cloud resources FinOps | Tenancy management

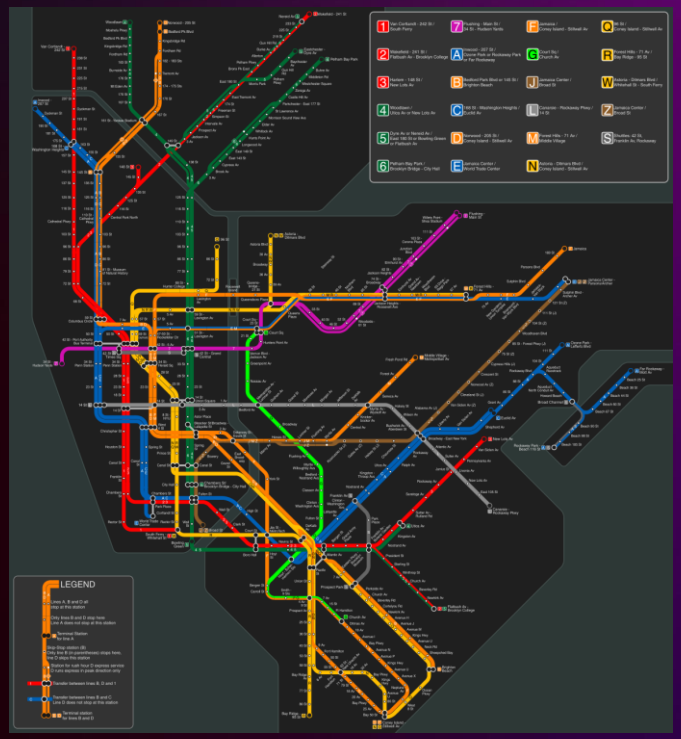
Application management | Integrated security and compliance | Routing and discovery | Continuance delivery

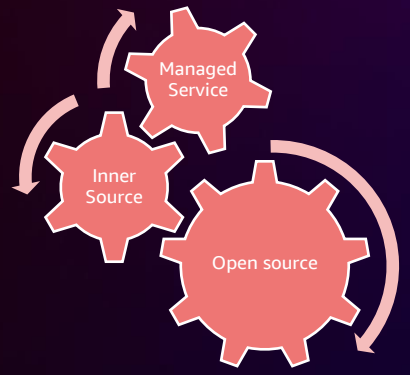
Cloud services integration | Backend services integration | Observability | Open/inner sources culture

Access control | Capability manager | Automated SRE | App onboarding | Operations | CI/CD

Amazon Elastic Kubernetes Service (Amazon EKS)

AWS Managed Services (AMS)





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Fidelity open-source container program

Connect → Automate → Manage

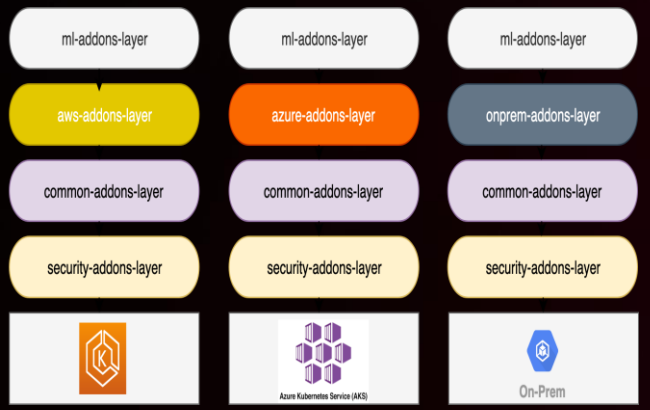
KConnect

https://github.com/fidelity/kconnect



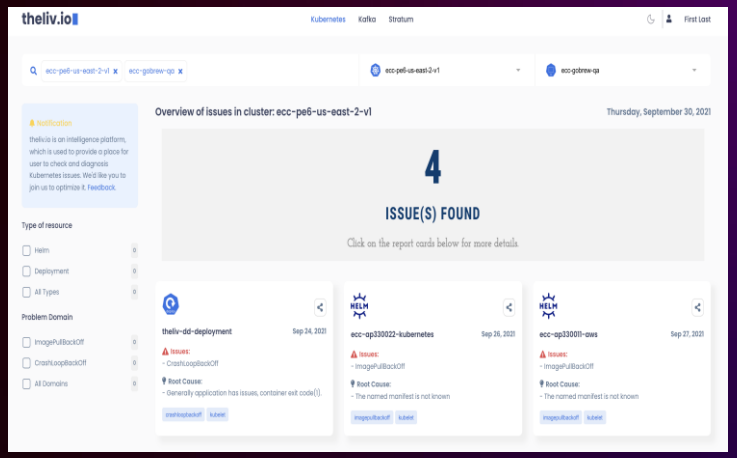
Kraan

https://github.com/fidelity/kraan



Theliv

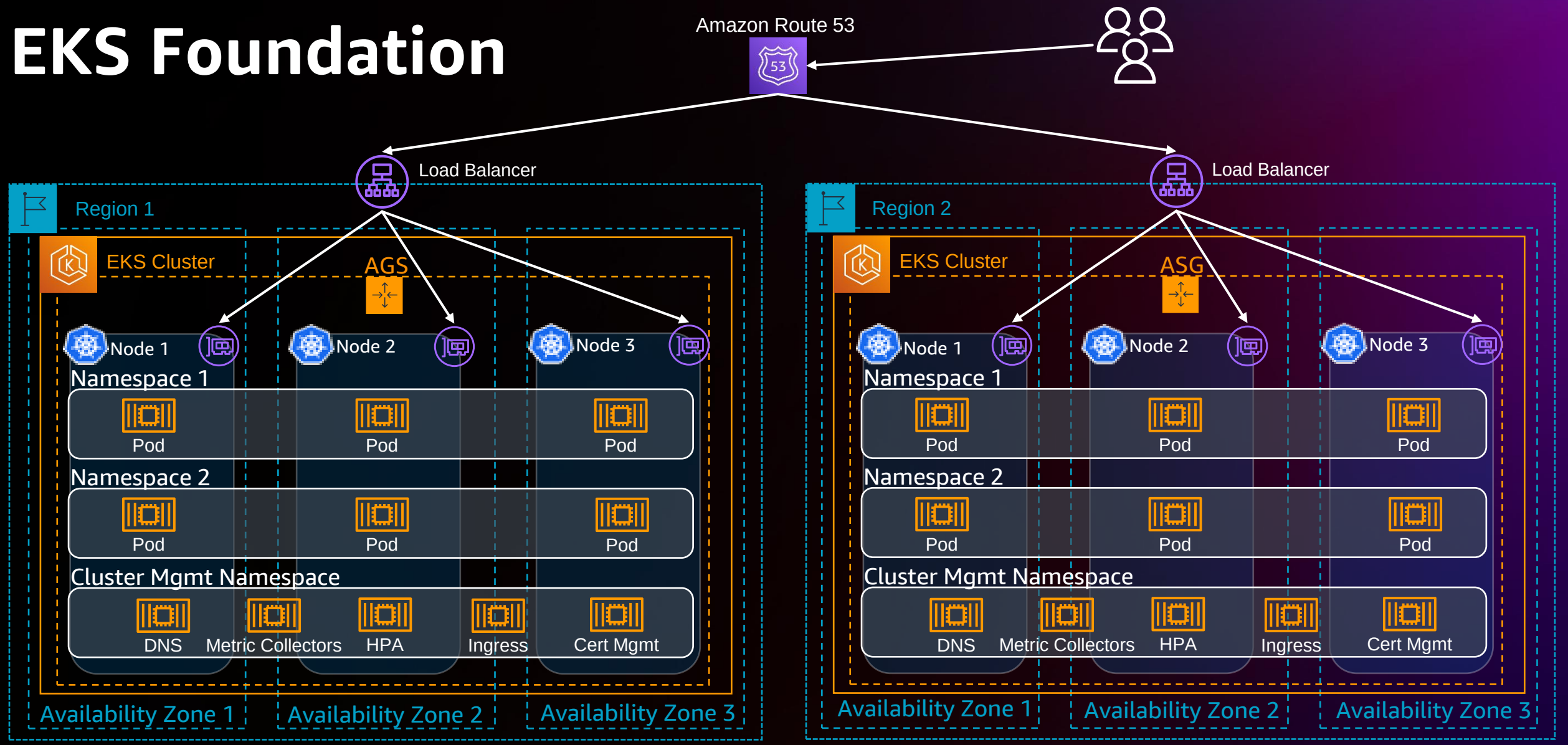
https://github.com/fidelity/theliv/



Fleet management	SRE	Application management	Application experience
•Provision •Upgrades/rehydration •Operator hub •Security	•Automation •Observability •Chaos	•Onboarding •Multi-tenancy •FinOps	•Secret •Certificate •Routing

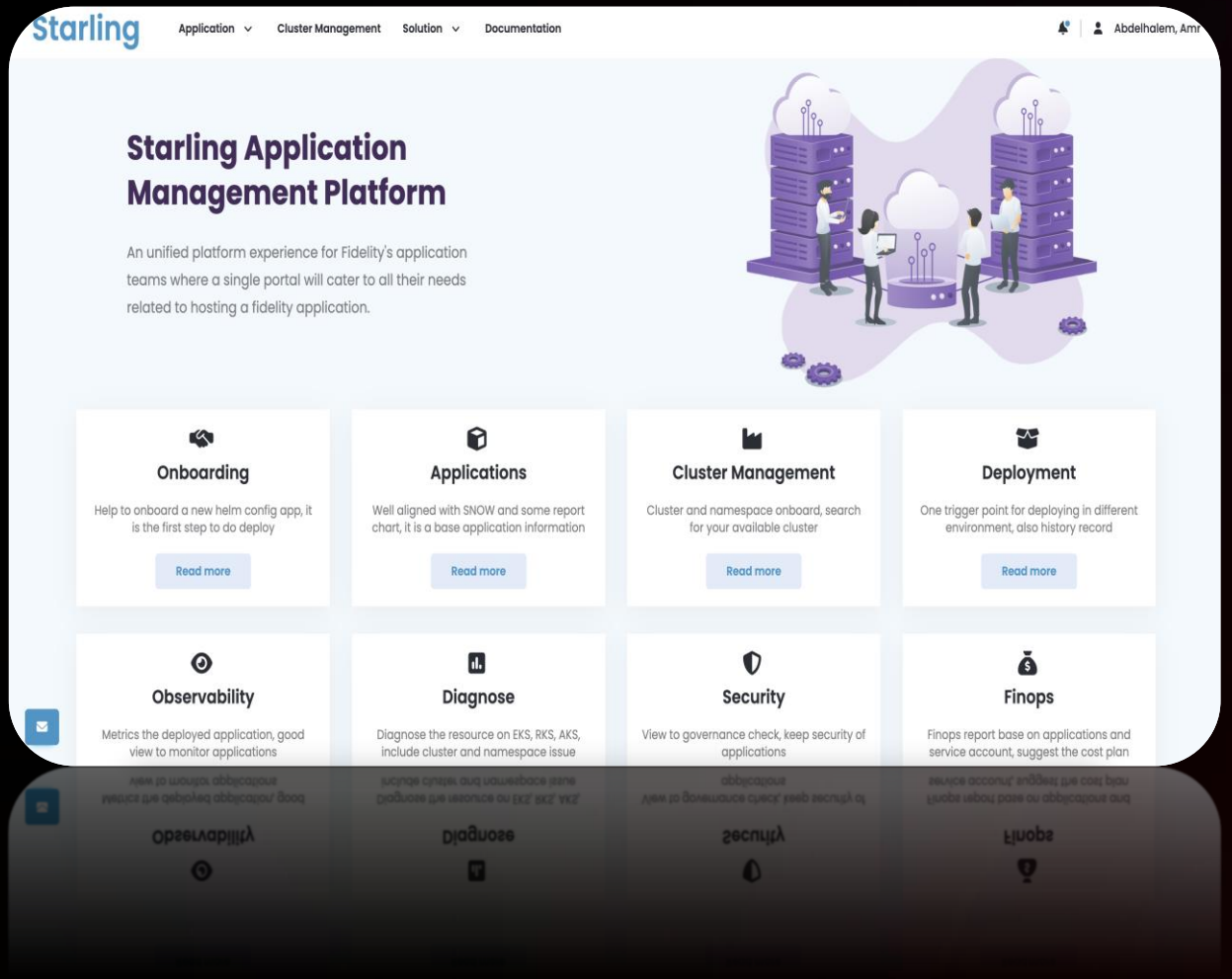
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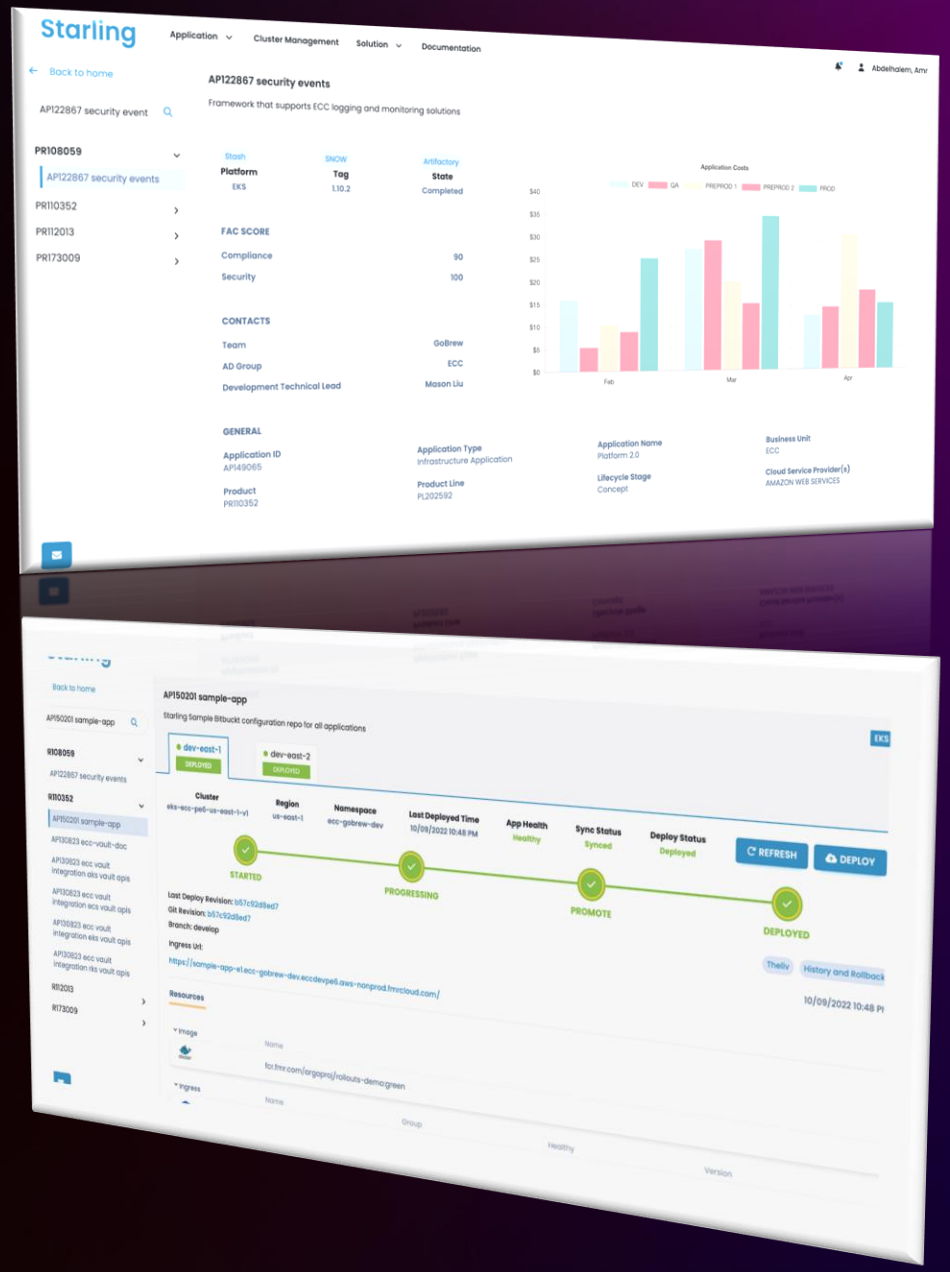
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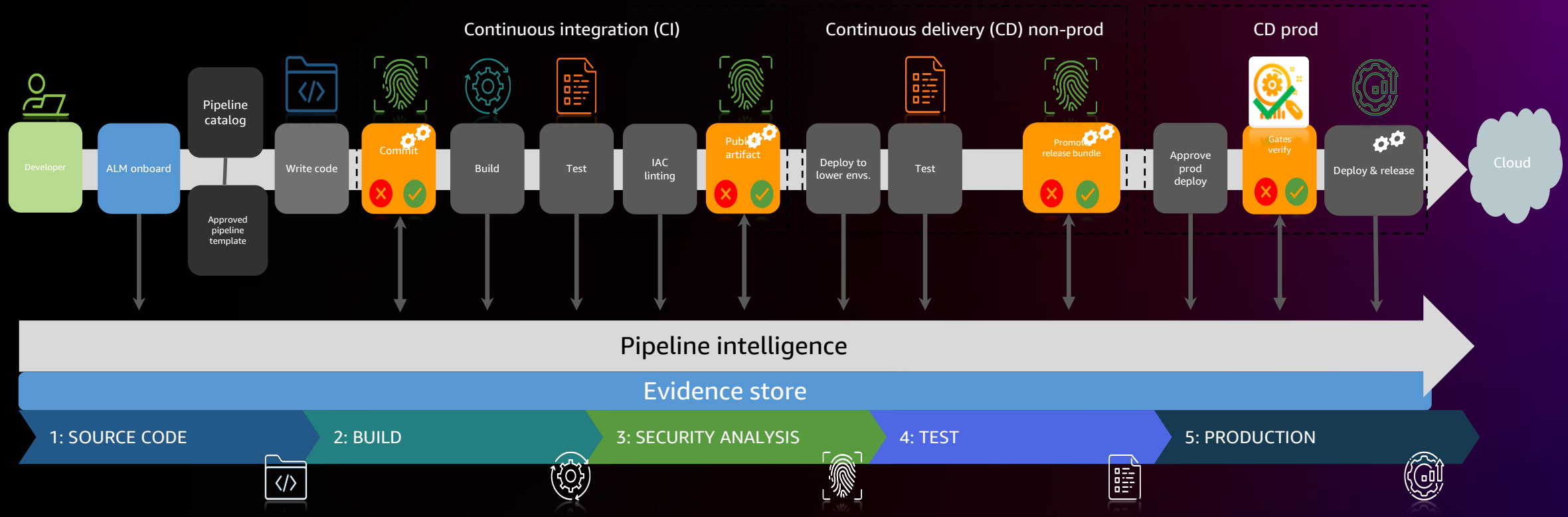
Developer experience





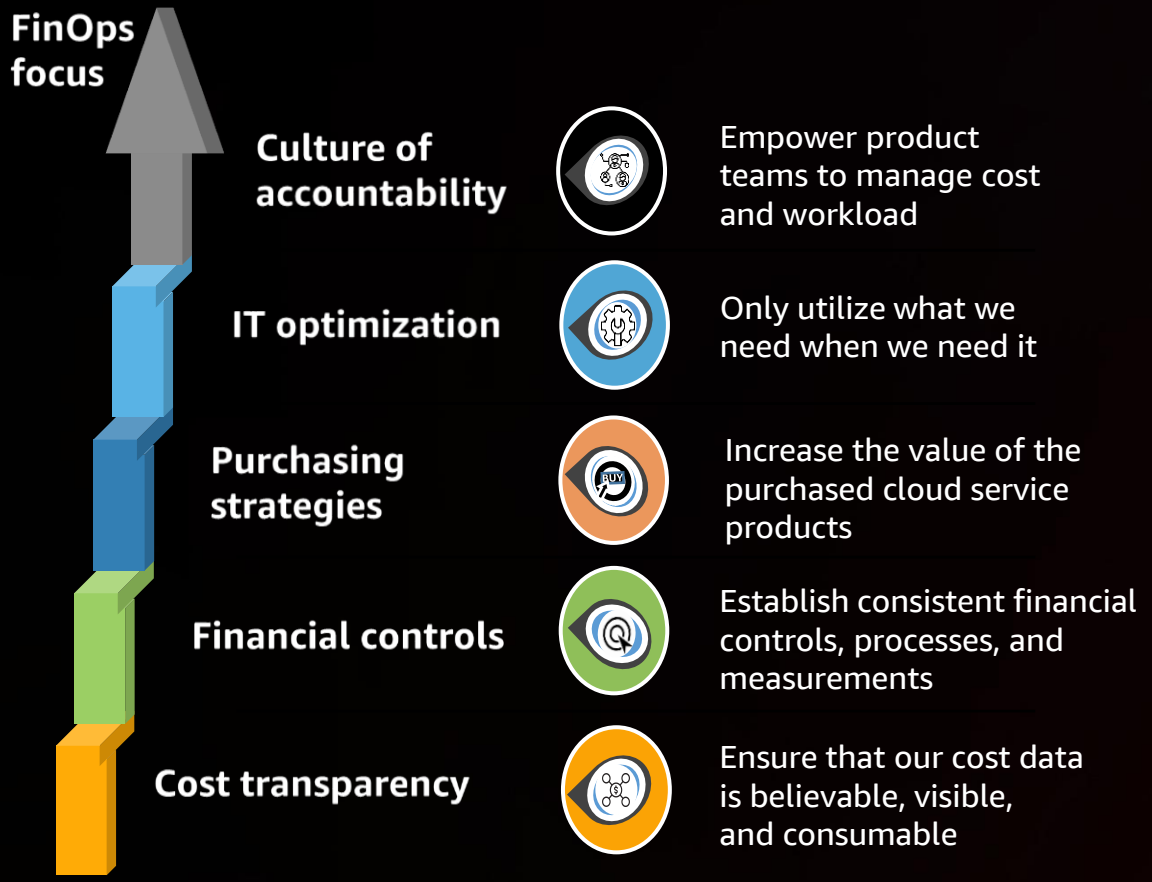
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Modern software development cycle



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FinOps practice

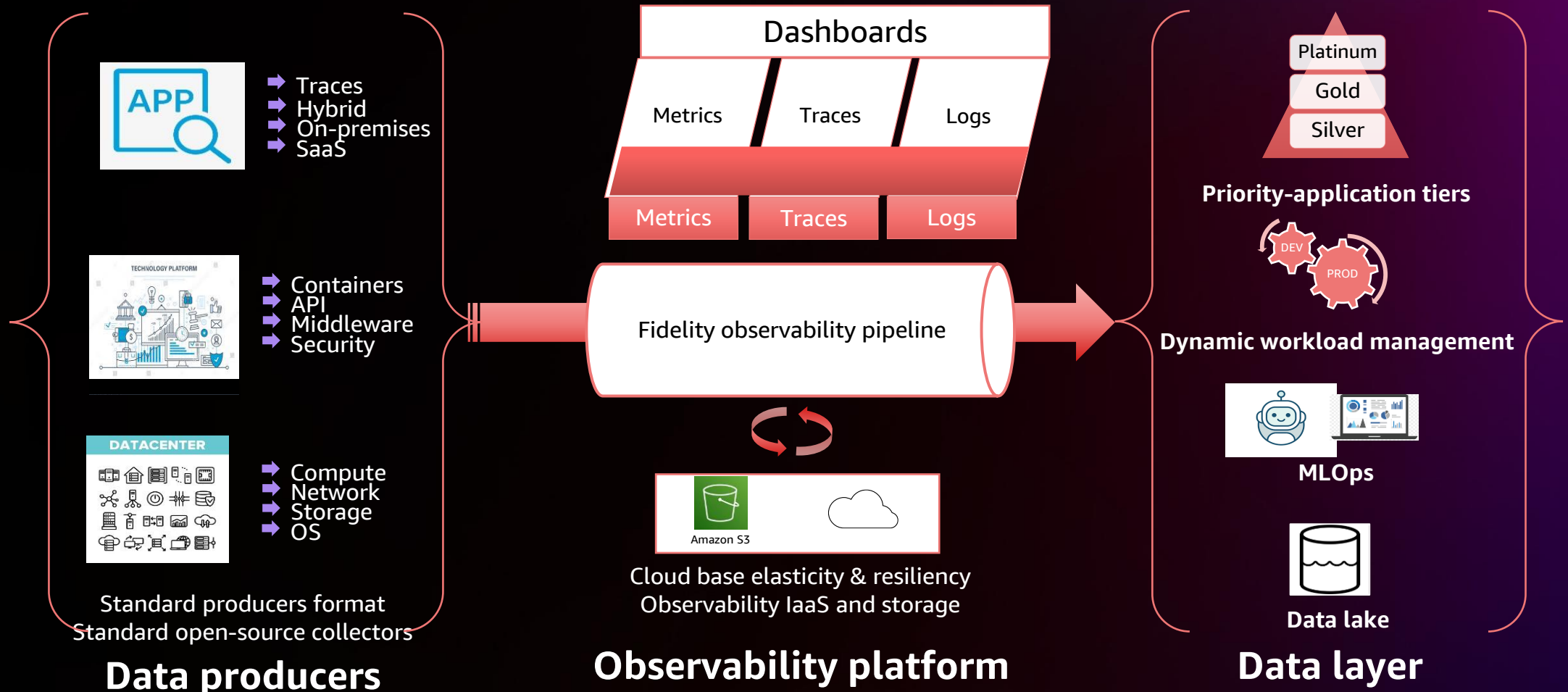




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GEO023 – Building a cost-effective & scalable autonomous driving application

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Observability, modernization, and scale

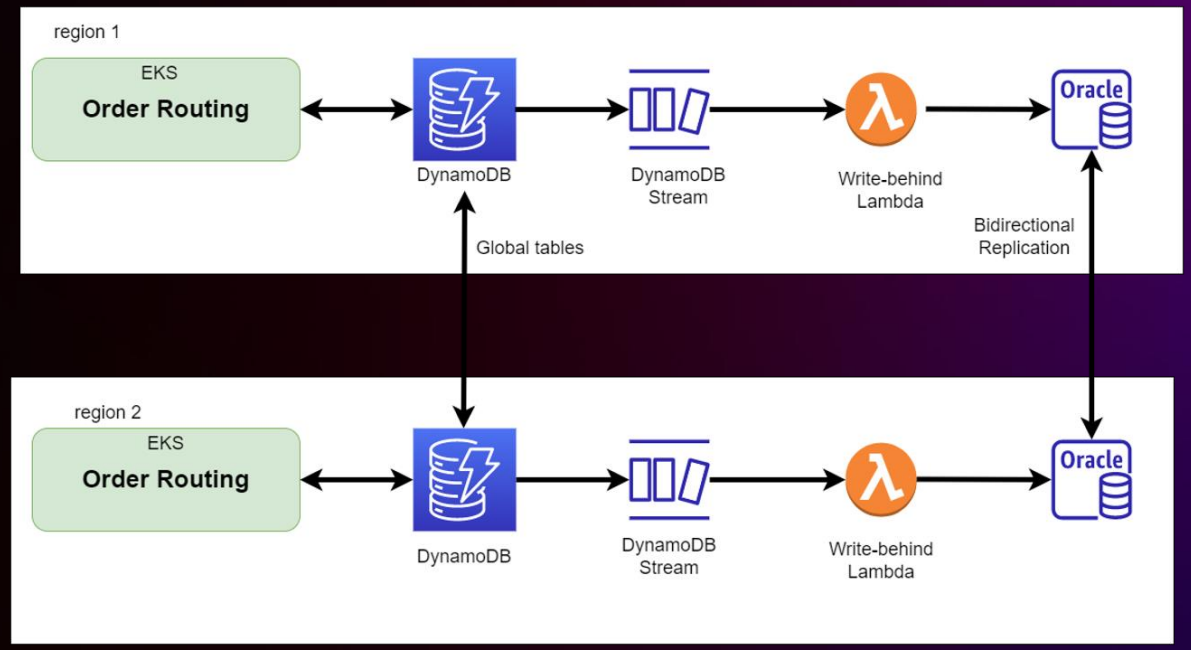


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COP212 – **Leadership panel discussion: Monitoring and observability on AWS**
AIM205 – **Fidelity elevates developer operations with ML-powered insights**

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Cloud native data patterns

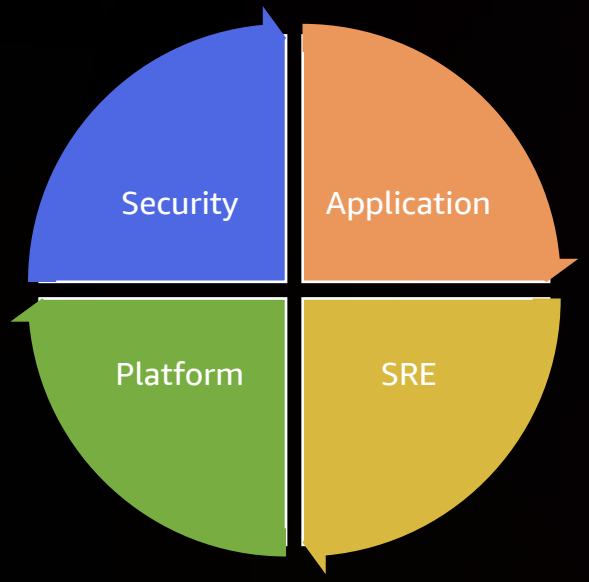
- RDBMS
  - Stood up our custom database
  - For static data and reporting
- Dynamo DB
  - Global replication and hot-hot
  - Allowed apps to scale to many multiples of order volume
  - Increased throughput while keeping latencies constant
  - Write-behind all trading data to RDBMS



Related re:Invent session
DAT213 – How Fidelity Investments and Reltio modernized with Amazon DynamoDB

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Work together!





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Thank you!

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