

The background features a dark blue gradient on the left, transitioning into a large, abstract, curved shape on the right. This shape is composed of various shades of purple and blue, with a bright orange-yellow highlight along its bottom edge. The overall design is modern and dynamic.

aws SUMMIT

LONDON | APRIL 27TH, 2022

MA-03

But what is a modern application anyway?

Matheus Guimaraes (he/him)

Senior Developer Advocate, UK/IR

AWS



A modern application is...

ASAP

As Soon As Possible

As Scalable As Possible

As Serverless As Possible

As Secure As Possible

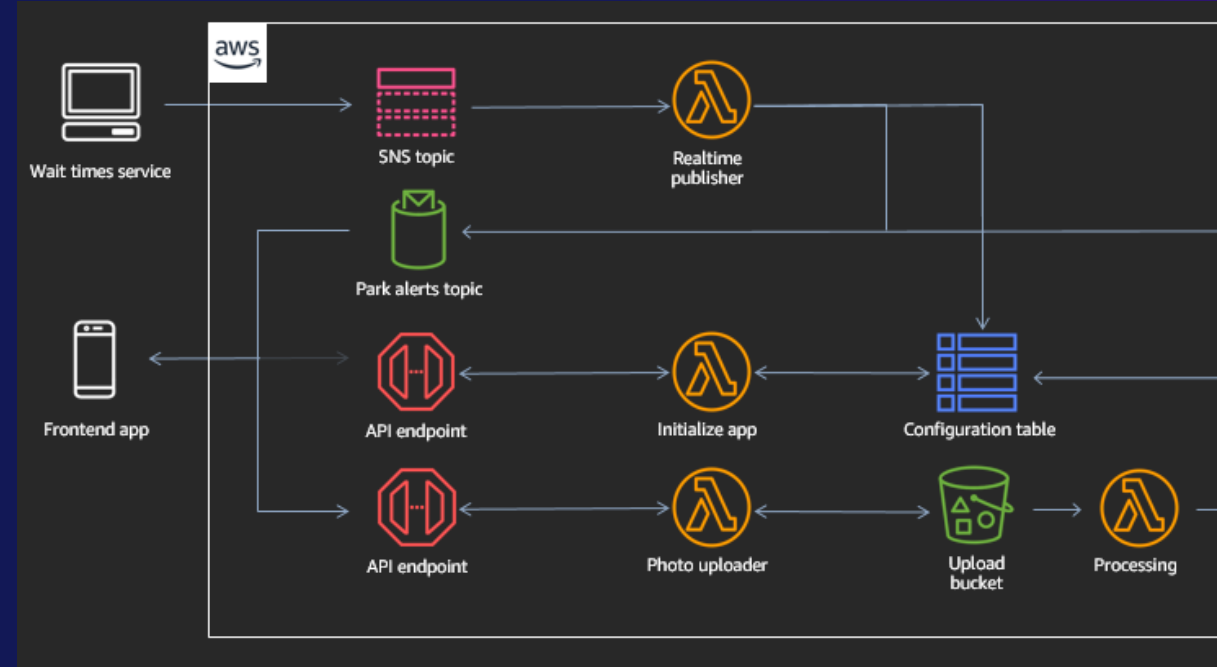
As Stingy As Possible

A modern application is...

ASAP

As Soon As Possible

A modern application is as soon as possible.

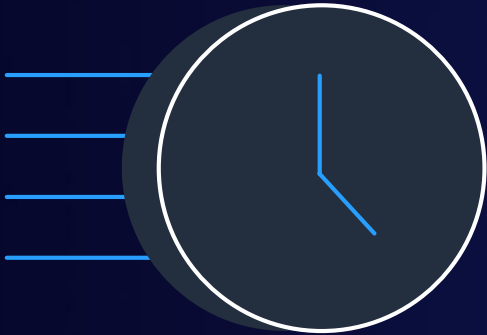


“No server is easier to manage than no server”

Dr. Werner Vogles
AWS CTO

A modern application is as soon as possible.

NoOps = Faster time to market



- Simple, managed control plane (ECS) and data plane (Fargate)
- Automated container orchestration
- Serverless compute without AMIs to patch, upgrade, secure OS



“NoOps is easier to manage than no ops”

Matheus Guimaraes...ish

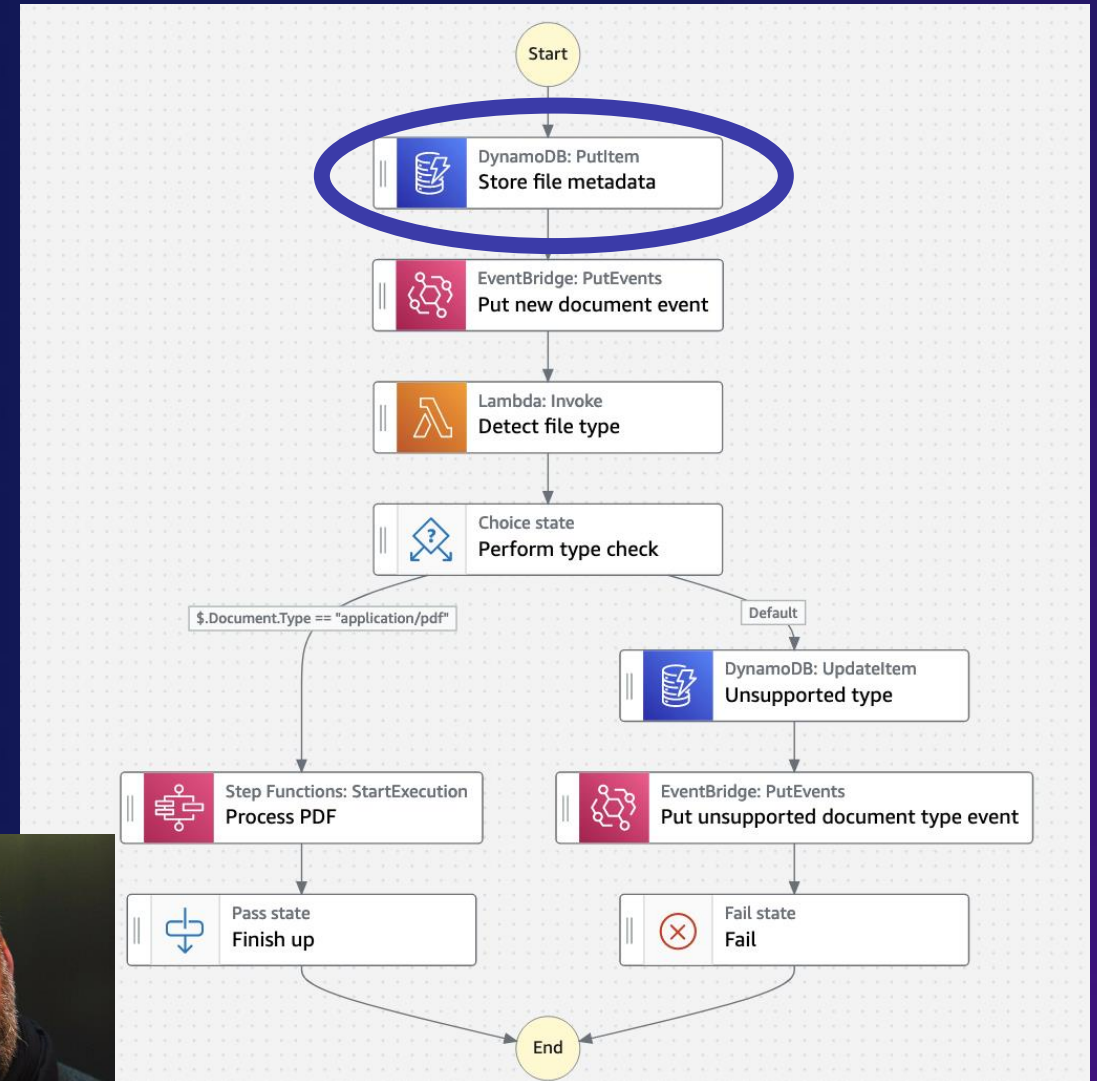
A modern application is as soon as possible.

Orchestration

Coordinate the components of distributed applications and microservices using visual workflows with AWS Step Functions.

“NoCode is easier to write than no code”

Matheus Guimaraes...ish



A modern application is...

ASAP

As Scalable As Possible

A modern application is as scalable as possible.



Web

Presentation



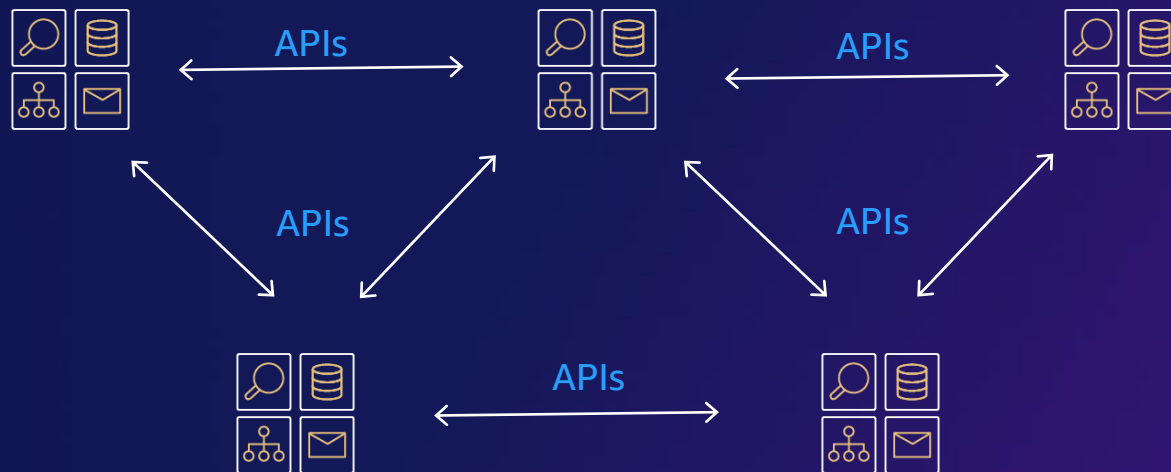
Application

Business



Database

Data



Machine
learning

Data lakes

BI +
analytics

Data
warehousing

Open formats
Central catalog

A modern application is as scalable as possible.



Web

Presentation



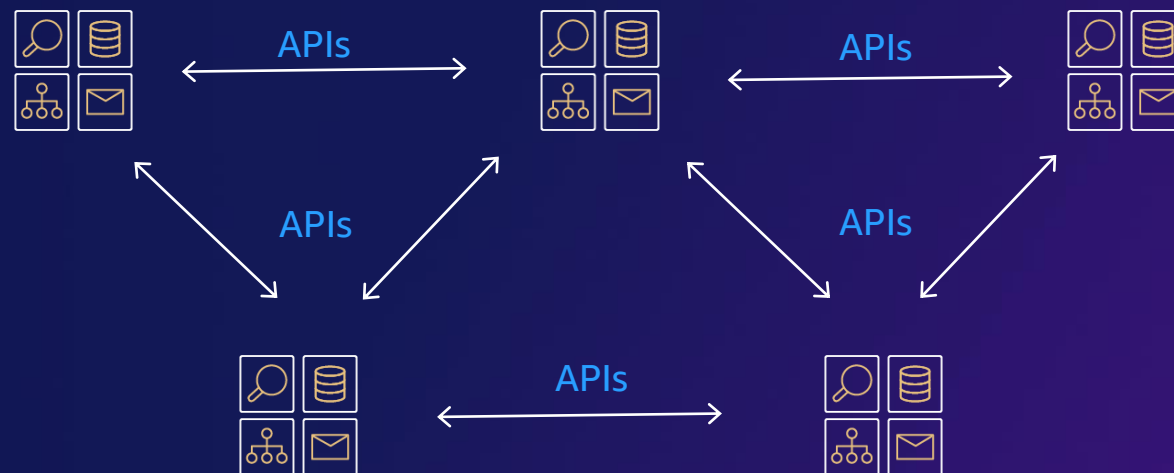
Application

Business

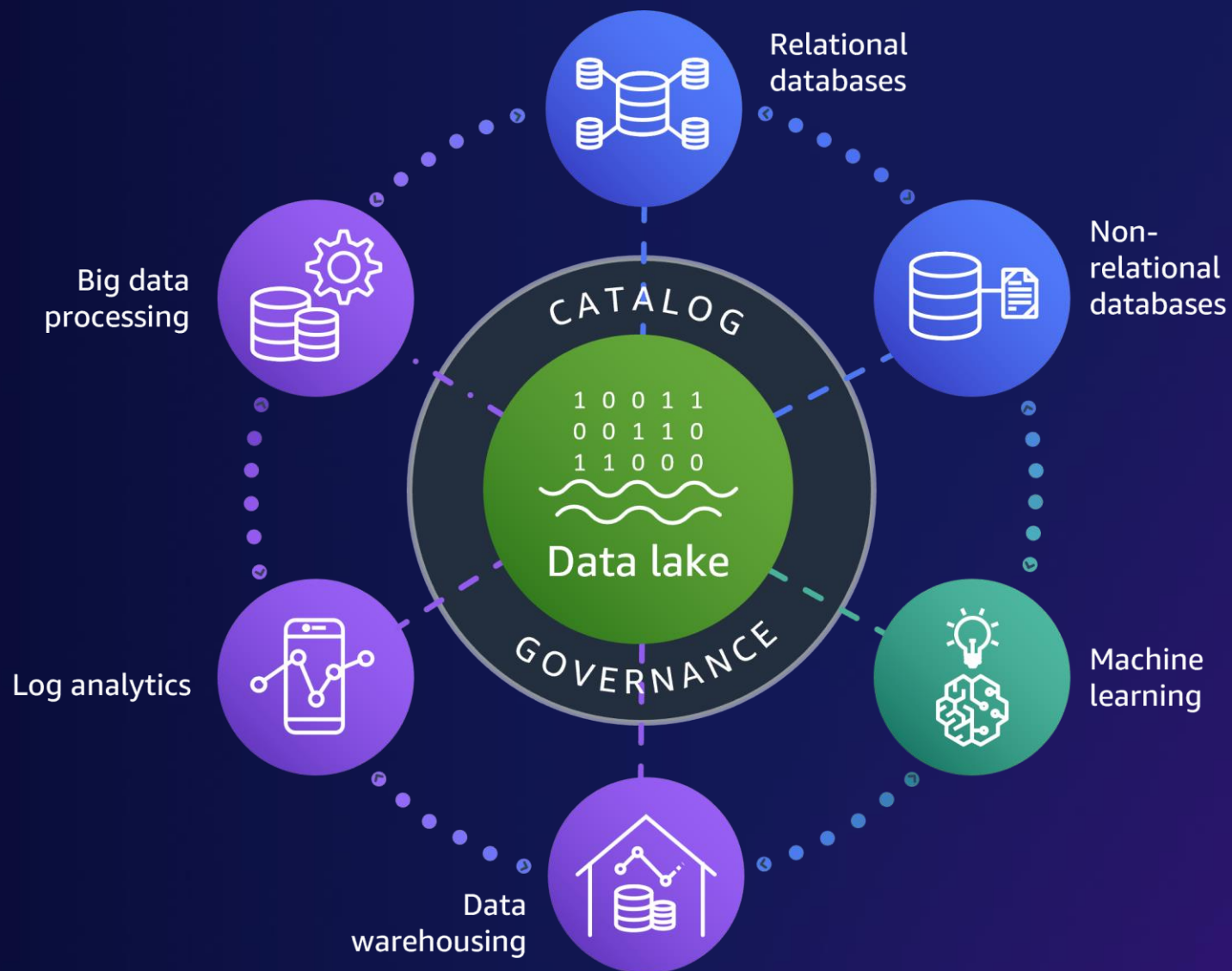


Database

Data



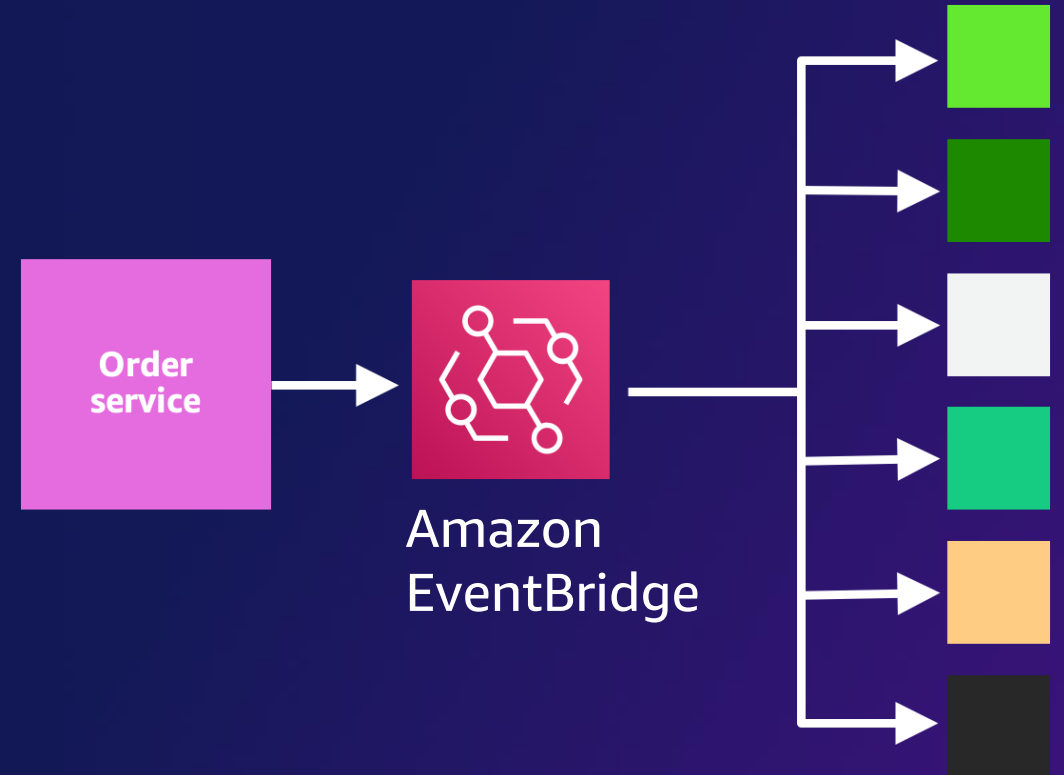
A modern application is as scalable as possible.



A modern application is as scalable as possible.

Choreography

Decouple services that publish and consumed messages using a serverless event bus such as Amazon EventBridge.



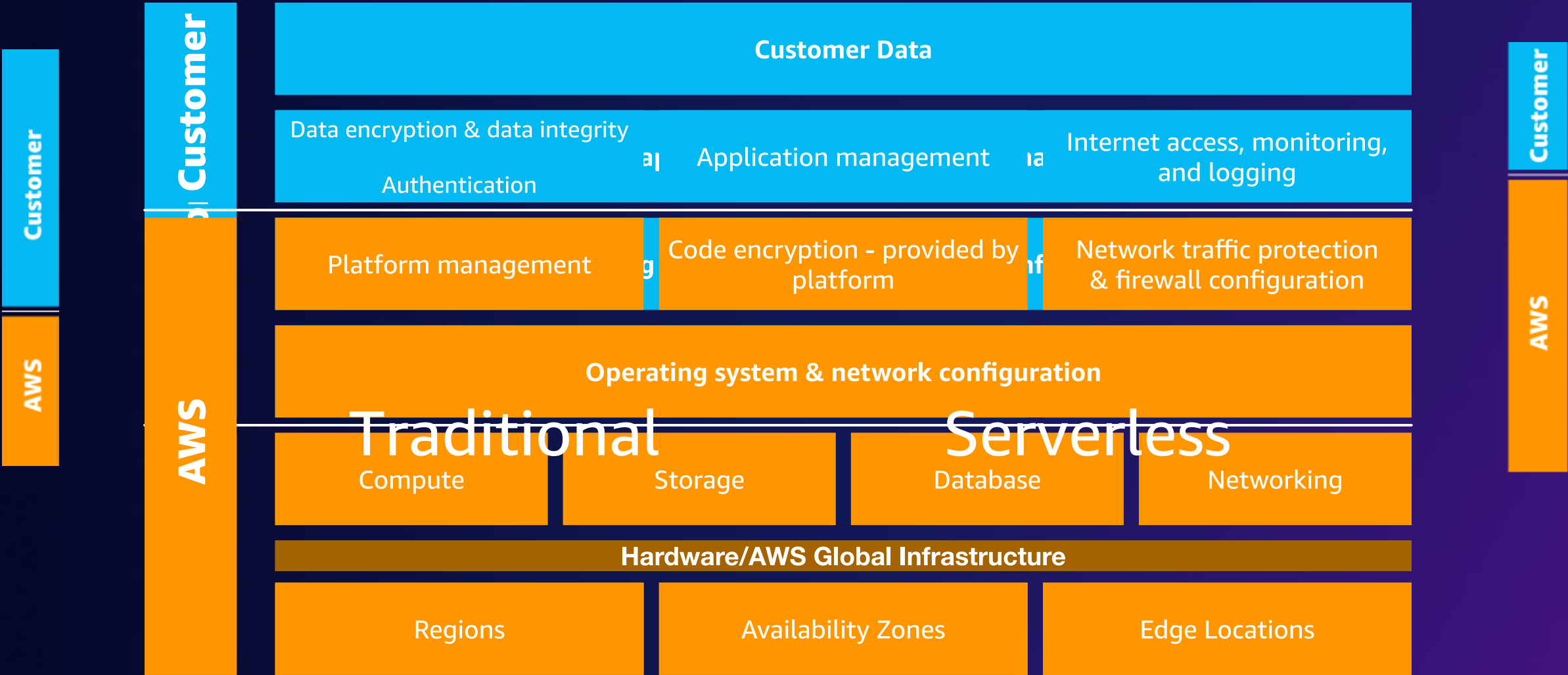
A modern application is...

ASAP

As Secure As Possible

A modern application is as secure as possible.

Shared responsibility model: Traditional



A modern application is as secure as possible.

- Secure-by-design in Fargate
- Extensive compliance certifications
- Logical clusters for managing tenancy



**Payment Card
Industry (PCI)
Security Standard**



**DOD Cloud Security
Req's Guide (SRG)
IL 2, 4, and 5**



**FedRAMP
Moderate and
High (GovCloud)**



**Criminal Justice
Information Service
Security Policy
(CJIS)**



**U.S. Health
Insurance Portability
and Accountability
Act
(HIPAA)**



**SP 800-53 (rev 4)
SP 800-171**



**Federal Information
Processing Standard
Pub (FIPS) 140-2**



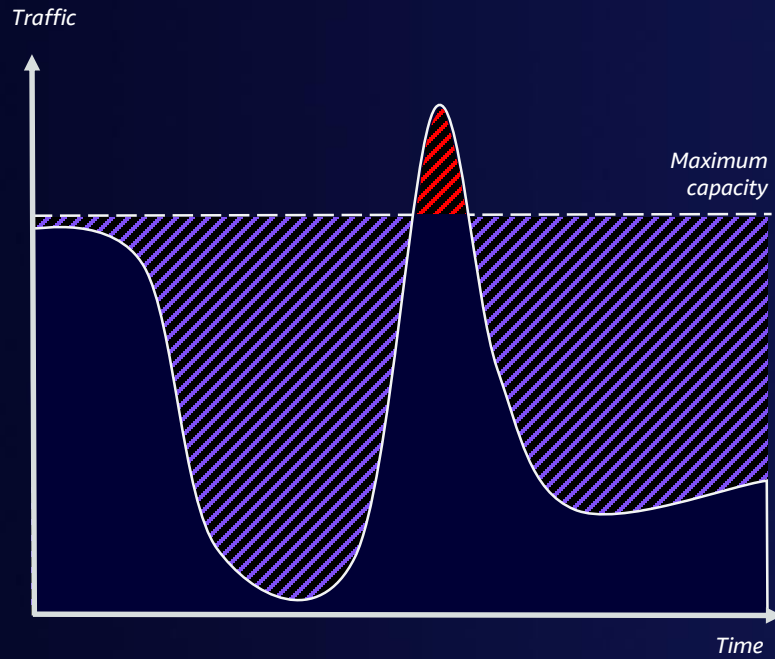
**Health Information
Trust Alliance Common
Security Framework
(HITRUST CSF)**

A modern application is...

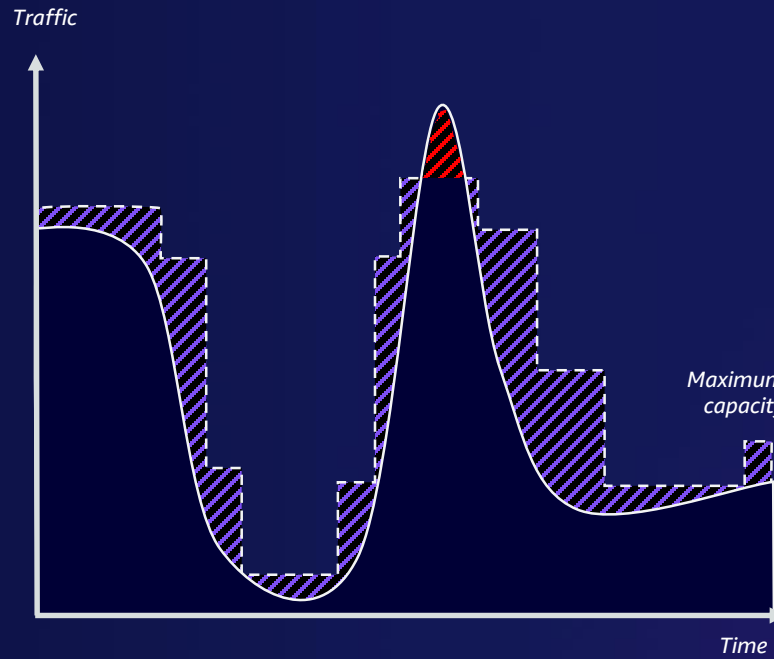
ASAP

As Stingy As Possible

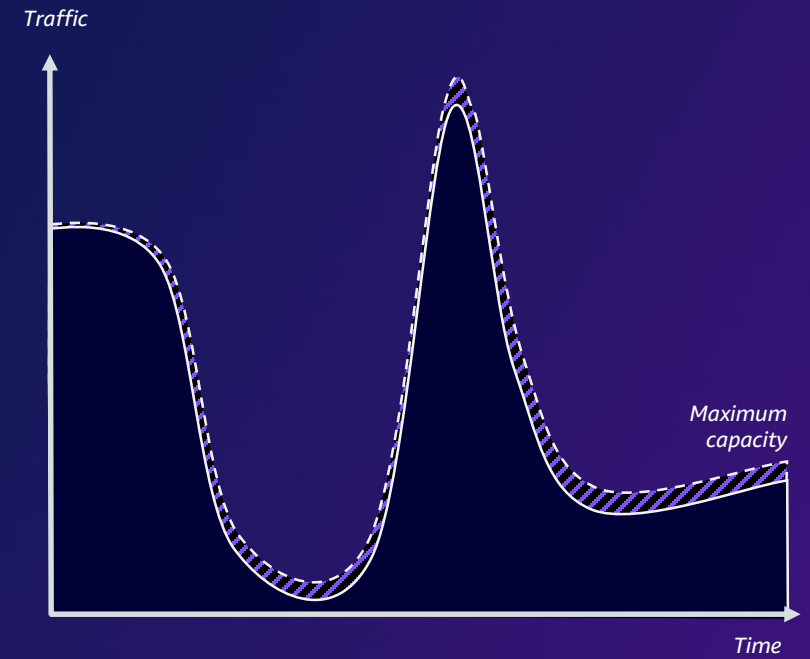
A modern application is as stingy as possible.



Traditional/on-premise



Instance-based (EC2)



AWS Serverless

 Over capacity  Under capacity

A modern application is...

RenaissanceRe

RenaissanceRe is the Leading Stand-alone P&C Reinsurer

RenaissanceRe

Operation	Value Creation	Business	Capital	Investments
29 years Track record (1993 to 2022)	\$7.5B Market capitalization	\$7.8B Gross premiums written (2021)	~\$18B Total managed capital (equity, preferred, debt + 3 rd party)	\$21.3B Managed investment portfolio
649 Employees (February 2, 2022)	\$6.2B Share buybacks + dividends (Inception – Dec. 31, 2021)	~50:50 Property vs. Casualty & Specialty mix (2021)	~\$10B Managed 3 rd party capital (excluding RenaissanceRe ownership)	1.2% Weighted average yield to maturity
11 Global offices (with RenaissanceRe Risk Sciences)	+12.3% Growth in book value plus accumulated dividends (2006 - 2021)	70% Combined ratio (Inception - 2021)	\$6.6B Shareholder's Equity	3.0 years Average portfolio duration
A+ A.M. Best / S&P Ratings	+12.7% Return on average common equity (2006 - 2021)	78% Of our premium is from clients who buy multiple lines (January 1, 2022)	6 Distinct 3 rd party capital platforms	AA \$-weighted average credit quality

Business use cases

RenaissanceRe

- Understanding our Risk Portfolio

- Portfolio Rollup

- Complex Graph of 3000+ deals & relationships
 - Monte Carlo Simulation
 - Big Data Volumes – up to 45TB processed, ~600GB produced
 - Business Appetite to run 5-10 rollups per day at peak times

Business use cases

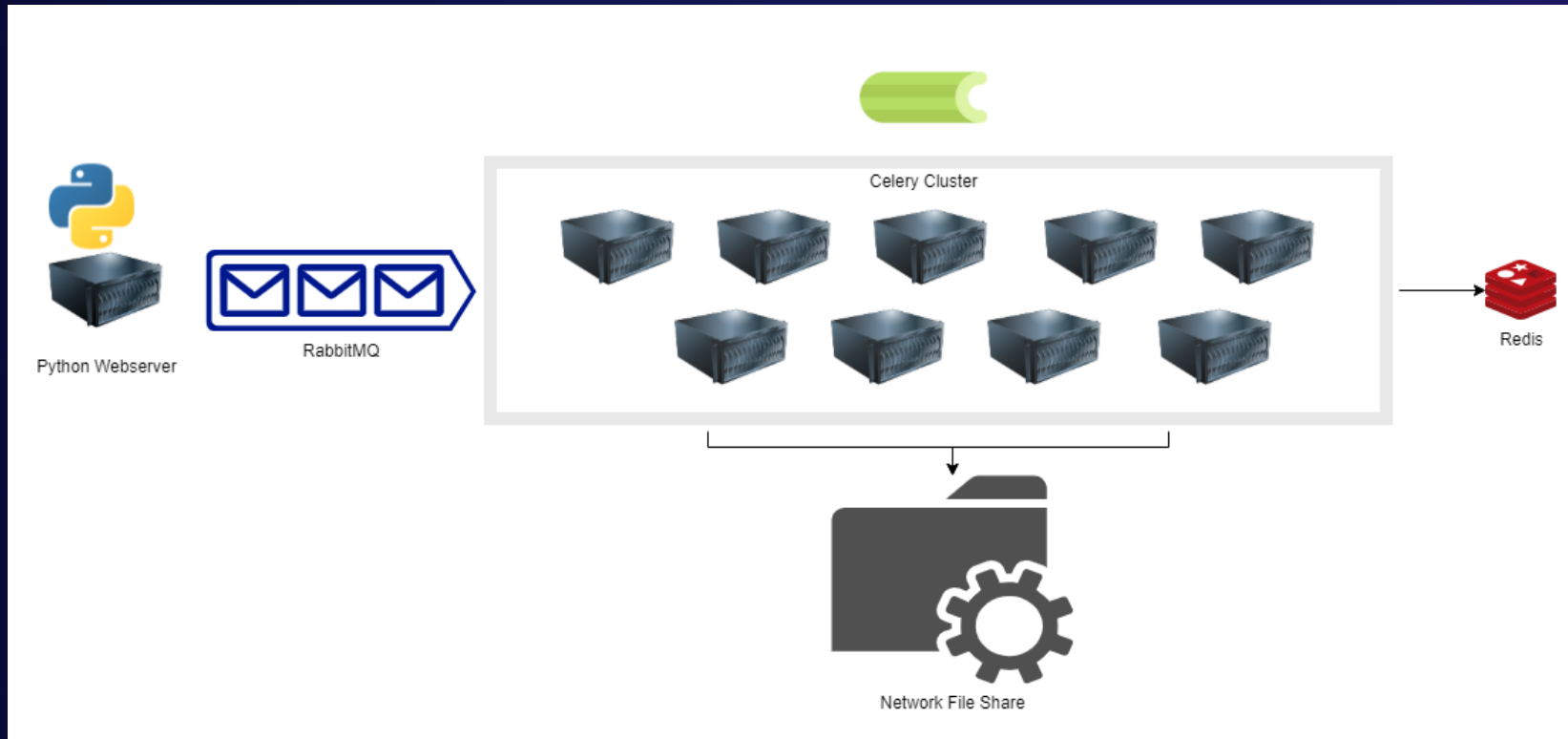
RenaissanceRe

- Understanding our Risk Portfolio
 - Deal Analytics
 - Near Real Time Deal Pricing
 - Portfolio Impact Analysis
 - High Volume of Executions – up to 1000 per day at peak times
 - Much Lower Data Volumes

Pre-AWS Solution

RenaissanceRe

- On premise -



Pre-AWS Solution

RenaissanceRe

- Limitations – Scale! Scale! Scale!
 - Long run times – 8-10 hours before raw data available for analysis
 - Max 2/3 runs per day
 - Constrains business agility
 - A lot of scheduling and prioritization
 - Competing Portfolio & Deal level workloads
 - Limited in ability to support future portfolio growth and key higher data volume generating capabilities

Key Architecture Requirements

RenaissanceRe

- No lift & shift – desire to re-imagine on Cloud
- Reduce overall execution times
- Support a higher volume of executions
- Support future business growth and new capabilities
 - Data volume up to 15x of current
- Elasticity - scale dynamically – cost will be linear
- Increase agility
- Reduce Total cost of ownership
- Support rapid innovation



 fourTheorem

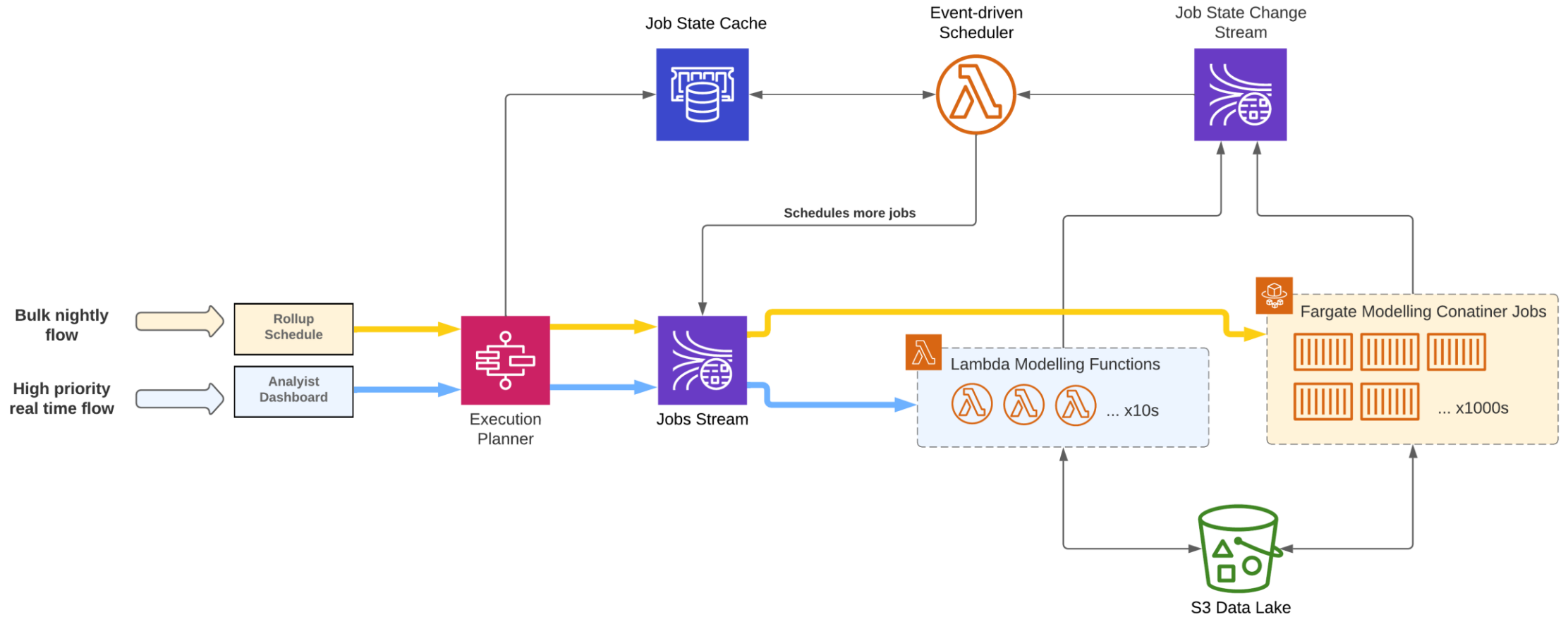
RenaissanceRe

Partner Search

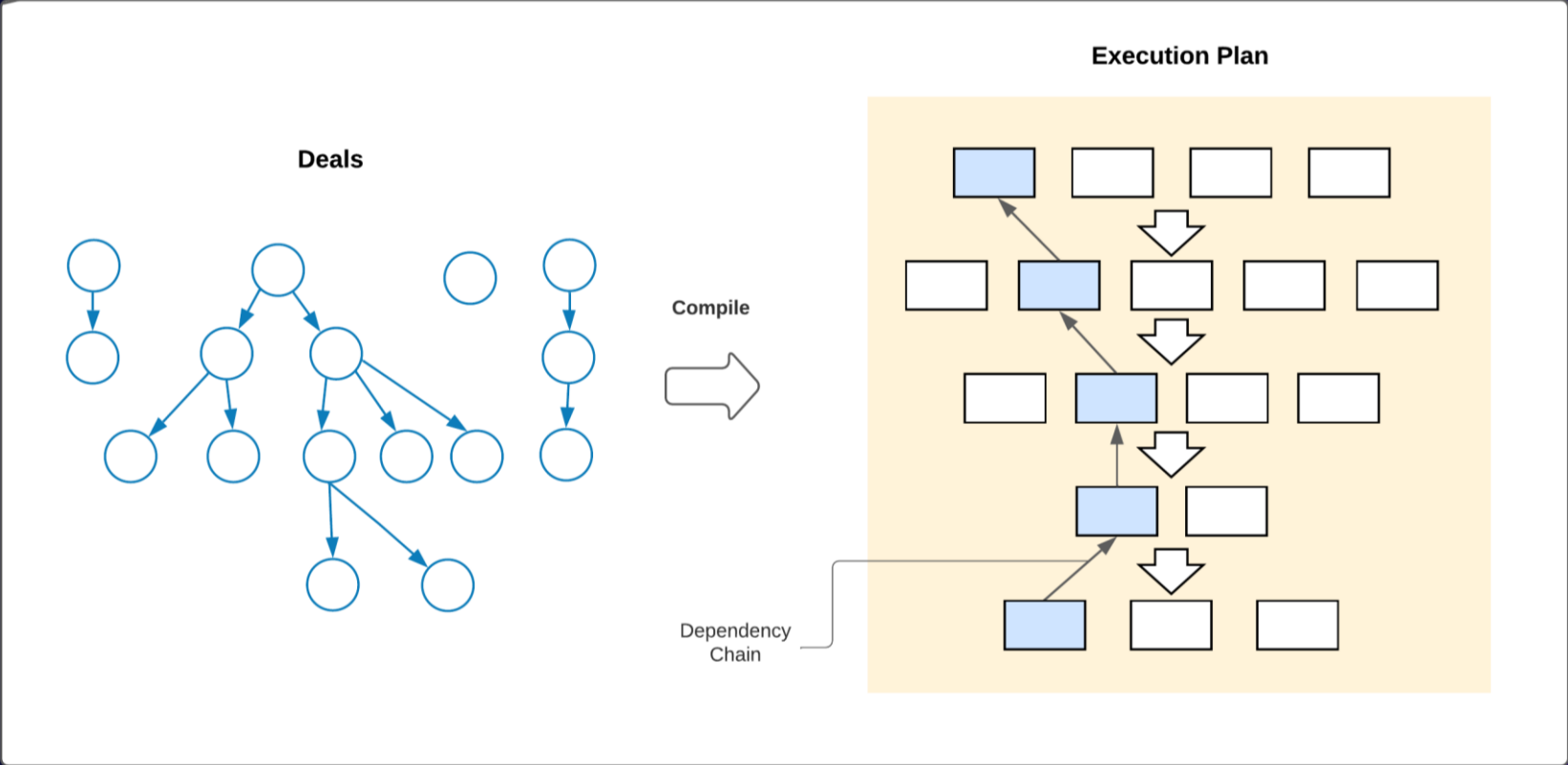
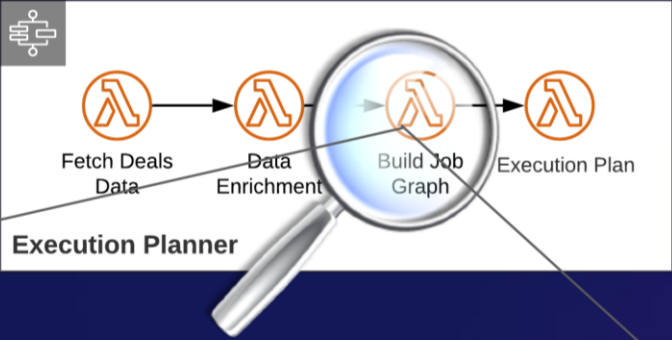


- Criteria
 - Cultural fit
 - Ability to understand our problem space
 - Understanding of technology landscape
 - Appetite for innovation
- FourTheorem
 - Boutique consultancy & AWS partner
 - Passion for Cloud and Serverless (awsbites.com)

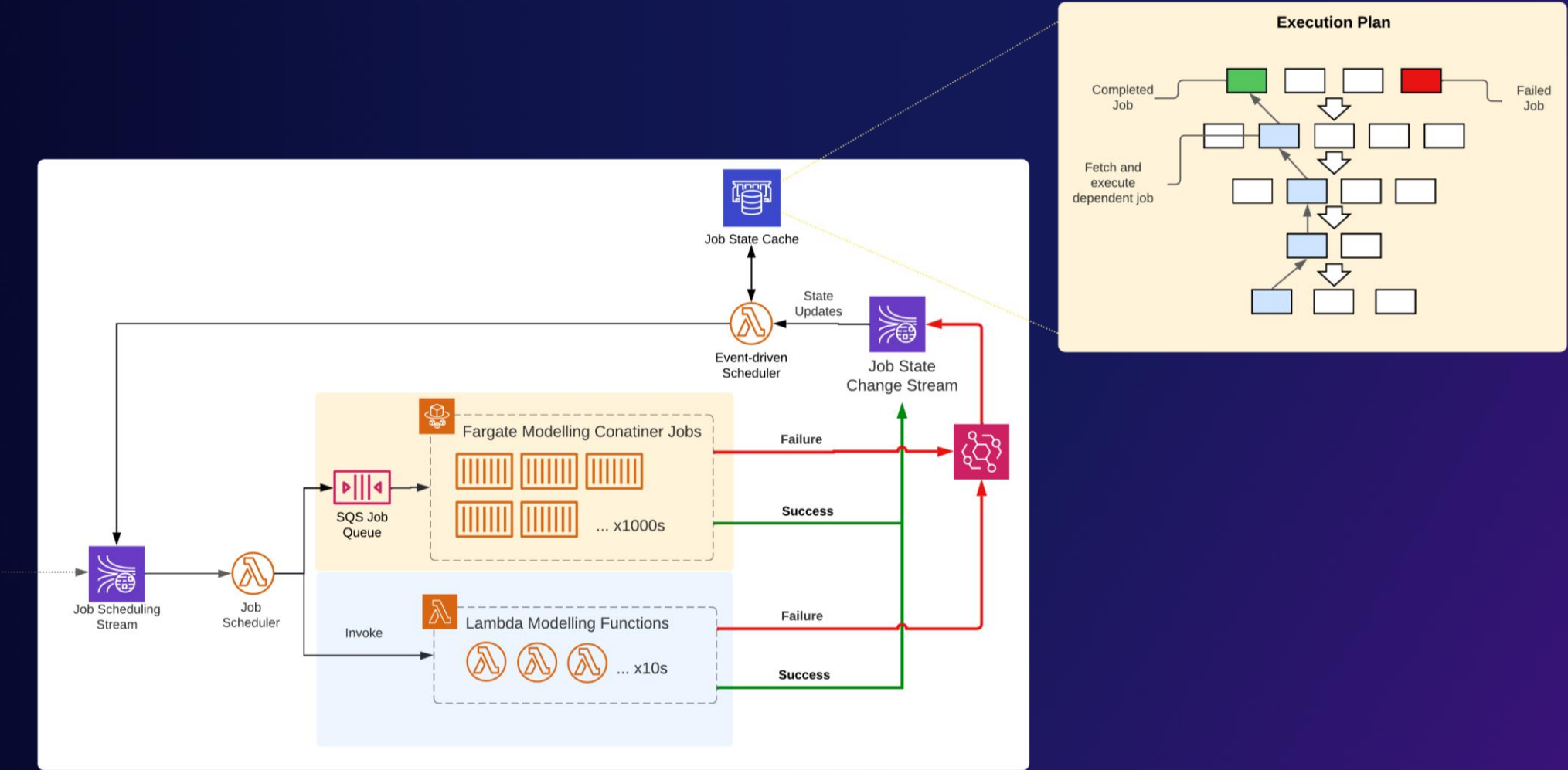
System Architecture



Execution Planner



Compute strategy and error handling



This journey wasn't without challenges

- Built finely tuned components to satisfy our requirements:
 - Fargate Scaler
 - S3 Objects cache
- Carefully designed our data storage to scale
 - S3 Partitioning
 - DynamoDB and Kinesis sharding
- Got great support from AWS



Outcomes

RenaissanceRe

- Business
 - Positioned to deliver higher data volume generating capabilities and support business growth
 - Delivering rollups on demand in less than 2 hours
 - Faster and more consistent analytics
 - Free up business to focus more on revenue generating activities
- Tech
 - Brought Serverless to HPC
 - Reduce codebase vs on-prem (~70%)
 - Lowered TCO
 - Increased agility

RenaissanceRe



RenRe
is
ASAP!

Thinking serverless



Features first

Avoid monolithic thinking



Focus on events

Loosely-coupled scalable communication



Stateless

The key to scaling effectively



Data flow

Make data decisions early on



Use the services

Don't reinvent the wheel

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Learn in-demand AWS Cloud skills



AWS Skill Builder

Access **500+ free** digital courses and Learning Plans

Explore resources with a variety of skill levels and **16+** languages to meet your learning needs

Deepen your skills with digital learning on demand



Train now



AWS Certifications

Earn an industry-recognized credential

Receive Foundational, Associate, Professional, and Specialty certifications

Join the **AWS Certified community** and get exclusive benefits



Access **new** exam guides

Thank you!

Matheus Guimaraes
@guimathed

Collum Thorne





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