



INNOVATE2018

ONLINE CONFERENCE

Opening Keynote

Dr. Werner Vogels, CTO, AMAZON.COM

Craig Stires, Head of Big Data and Analytics, AWS, APAC





**Dr. Werner Vogels
Chief Technology Officer
Amazon.com**

Themes

1. Empowering Builders

- Who are Builders?
- Compute -> Containers
-> Serverless
- Well-architected framework & security

2. Innovation Accelerators

- AWS breadth and depth
- Pace of new releases
- Machine Learning

3. Transformative Innovation

- Modern data architectures
- Immersive customer experiences
- Culture of experimentation
- New business models

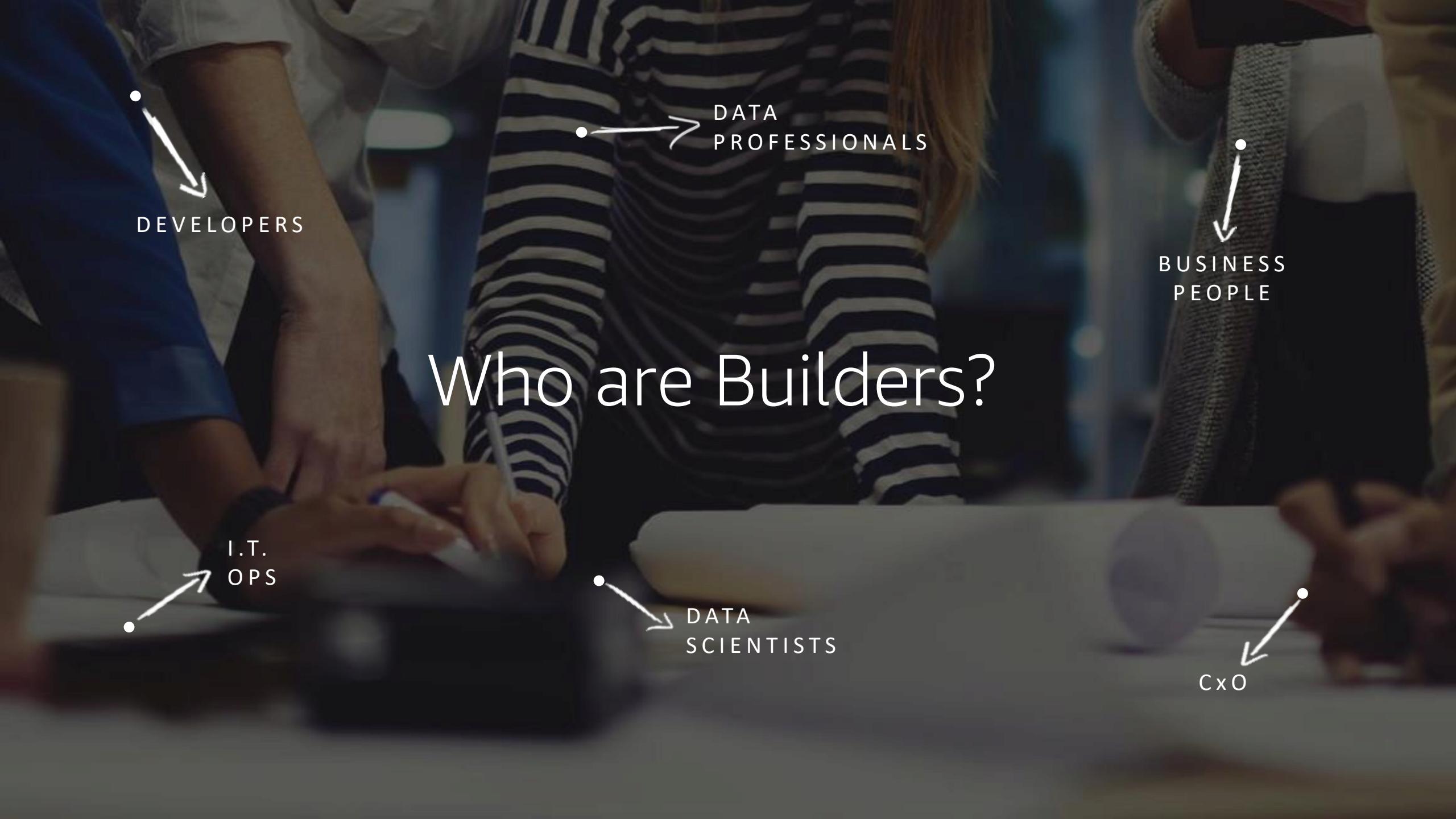


Empowering Builders



BUILD ON





DEVELOPERS

DATA
PROFESSIONALS

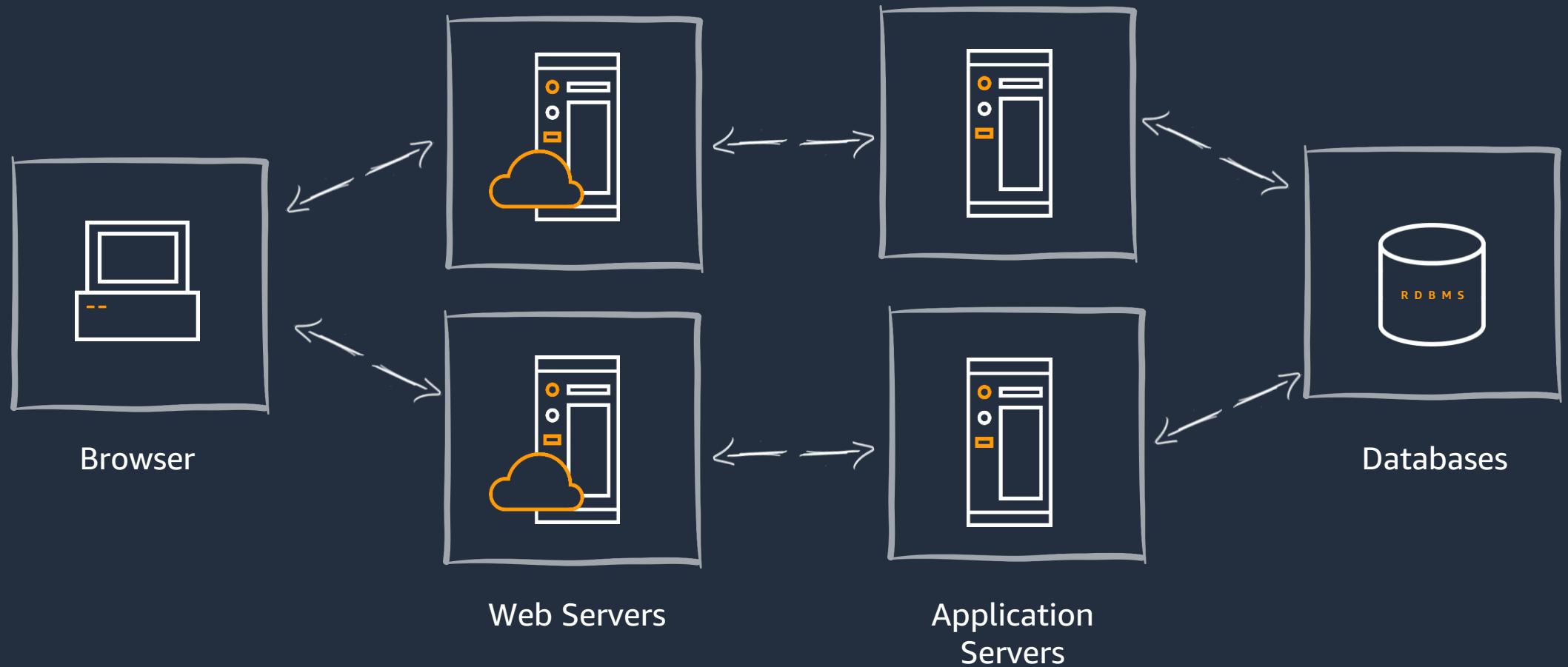
BUSINESS
PEOPLE

I.T.
OPS

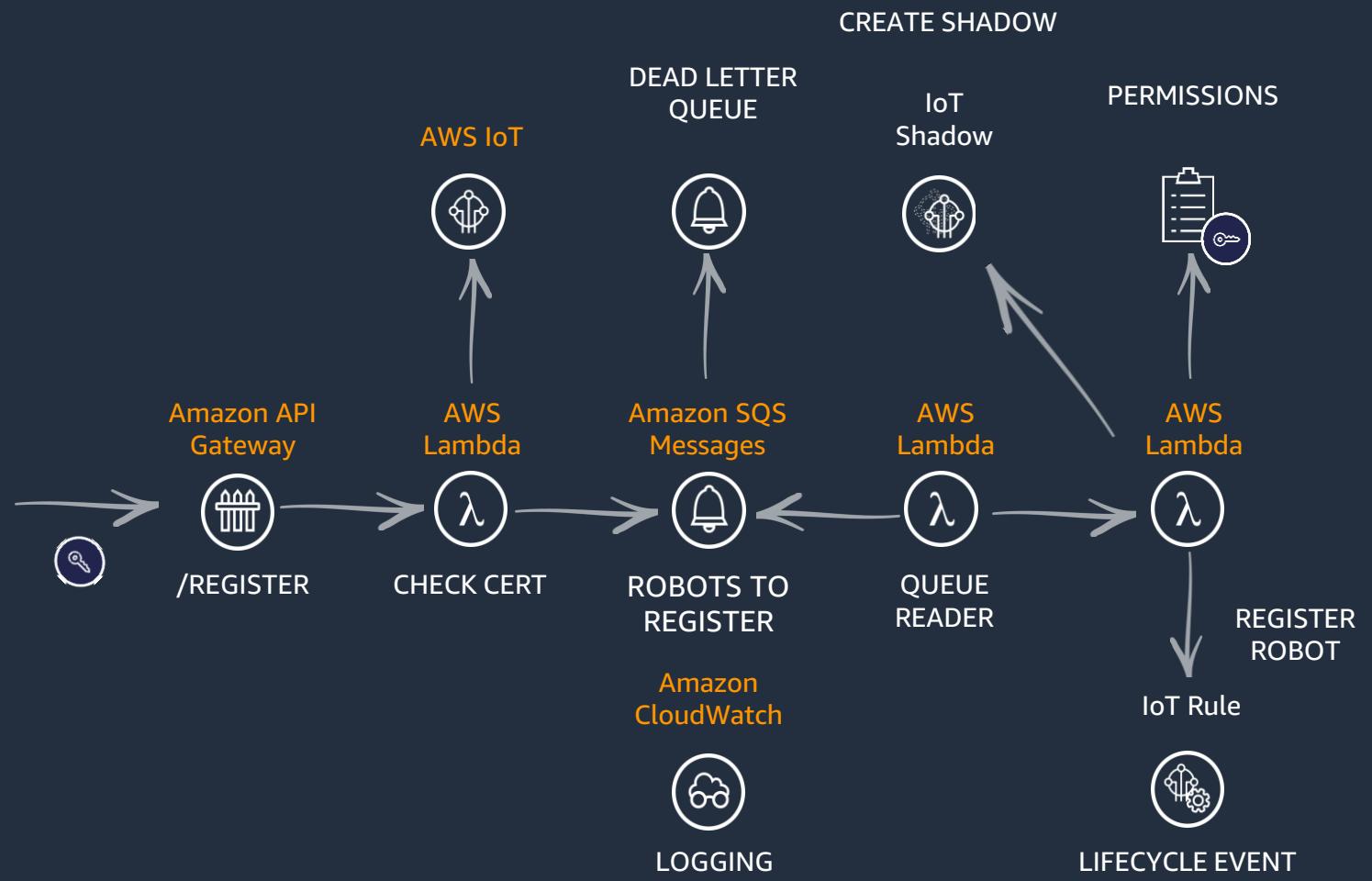
DATA
SCIENTISTS

CxO

Who are Builders?



Robot®





Login & associate

Robot registration

Firmware update

Maintenance data

Mapping

Robot settings

Push notifications

Mission history

Robot reset



AWS IoT



Amazon Cognito



Amazon SNS



Amazon SQS



Amazon API Gateway



Amazon CloudFront



Amazon S3



Amazon QuickSight



Amazon CloudWatch



AWS CloudFormation



AWS Lambda



AWS Config



AWS IAM



AWS KMS



AWS WAF



Amazon Elasticsearch Service



Amazon Kinesis



AWS CloudTrail



Amazon VPC



Amazon DynamoDB



Amazon Redshift

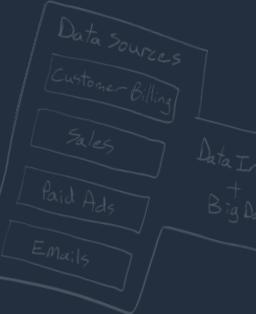


Amazon Route 53





Big Data



Rethinking Development





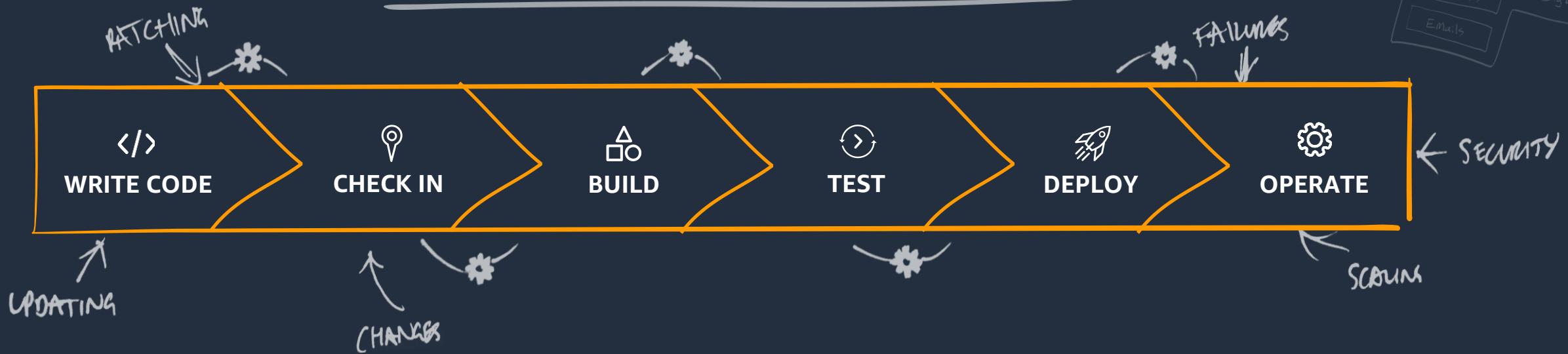
Rethinking Development

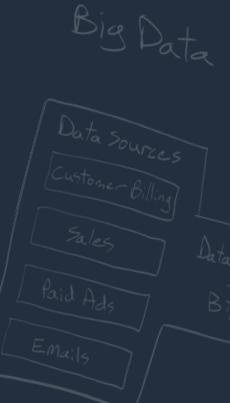
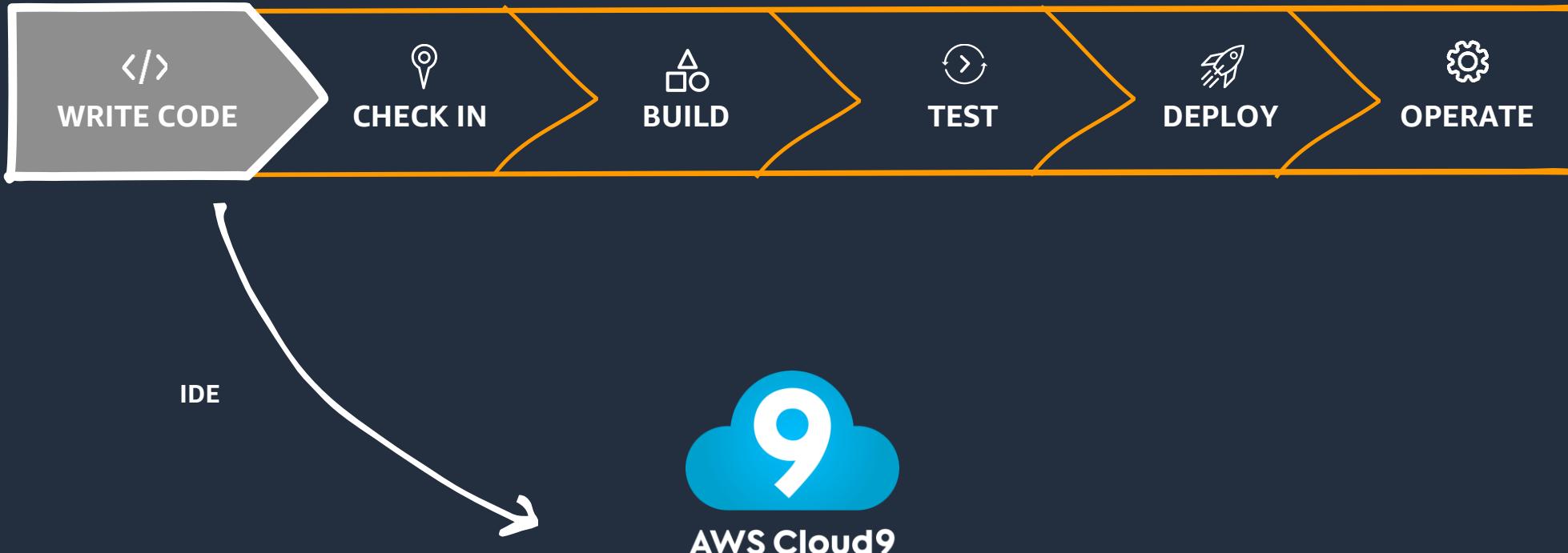




Big Data

Rethinking Development







IDE

```

AWS Cloud9 File Edit View Goto Run Tools Window Support Preview Run
Environment: claire:~/environment $ 
Lambda Code MyCodeCommitRepo2 NodeJS python1 Ruby Untitled1
MyCodeCommitRepo MyCodeCommitRepo1 PHP README.md Untitled
claire:~/environment $ aws s3 mb s3://cloud9sample3
claire:~/environment $ aws s3 cp s3://cloud9sample3
claire:~/environment $ aws s3 rb s3://cloud9sample3
remove_bucket: cloud9sample3
claire:~/environment $ git clone https://git-codecommit.us-west-2.amazonaws.com/v1/repos/MyCodeCommitRepo
Cloning into 'MyCodeCommitRepo'...
Username for 'https://git-codecommit.us-west-2.amazonaws.com': claire
Password for 'https://claire:3634b6495120git@':
claire:~/environment $ cd MyCodeCommitRepo
claire:~/environment $ ls
bin  config  node_modules  package.json  package-lock.json  public  test
claire:~/environment $ cd MyCodeCommitRepo
claire:~/environment $ git status
On branch master
Initial commit

Changes to be committed:
(use "git rm --cached <file>..." to unstage)

new file: bind.txt
new file: injects.txt
new file: repfile.txt

Changes not staged for commit:
(use "git add <file>..." to update what will be committed)
(use "git checkout -- <file>..." to discard changes in working directory)

modified: bind.txt
modified: repfile.txt

claire:~/environment/MyCodeCommitRepo (master) $ 
  
```

AWS Cloud9





AWS Cloud9

```

$ bash -c 'curl -s https://git-codecommit.us-west-2.amazonaws.com/v1/repos/MyCodeCommitRepo | python -mjson.tool'
{
  "repository": "MyCodeCommitRepo",
  "arn": "arn:aws:codecommit:us-west-2:56388640512:MyCodeCommitRepo"
}
$ git clone https://git-codecommit.us-west-2.amazonaws.com/v1/repos/MyCodeCommitRepo
Cloning into 'MyCodeCommitRepo'...
Username for 'https://git-codecommit.us-west-2.amazonaws.com': claire-at-56388640512
Password for 'https://claire-at-56388640512@github.com/claire-at-56388640512':
Cloning into 'MyCodeCommitRepo'...
remote: Cloning into empty directory.
claire:~/environment$ cd MyCodeCommitRepo
claire:~/environment$ ls
claire:~/environment$ cd MyCodeCommitRepo
claire:~/environment$ git status
On branch master
Initial commit

Changes to be committed:
  (use "git rm --cached <file>" to unstage)

    new file:  bird.txt
    new file:  insects.txt
    new file:  reptile.txt

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

    modified:   bird.txt
    modified:   insects.txt
    modified:   reptile.txt

claire:~/environment/MyCodeCommitRepo (master)$ 
  
```



AWS Cloud9

R ROB

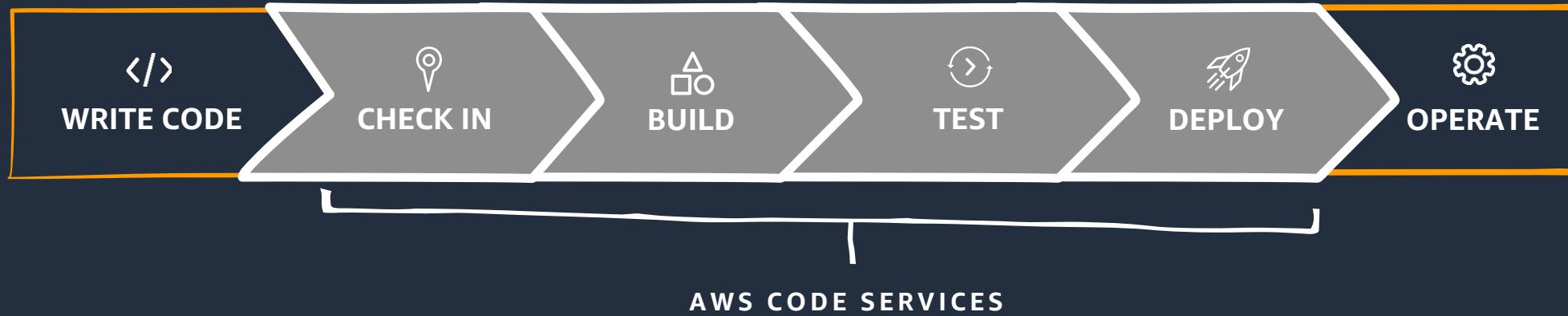
A AARON

C CLAIRE

AWS

```

$ node index.js
90
91
92 const handlersp = {
93   'LaunchRequest': function () {
94     this.emit('GetFact');
95   },
96   'GetNewIntent': function () {
97     this.emit('GetFact');
98   }
99
100 },
101 'GetFact': function () {
102   // Get a random space fact from the space facts list
103   // Use this.t to get corresponding language data
104   const factArr = this.t('FACTS');
105   const factIndex = Math.floor(Math.random() * factArr.length);
106   const randomFact = factArr[factIndex];
107
108   // Create speech output
109   const speechOutput = this.t('GET_FACT_MESSAGE') + randomFact;
110   this.emit('tellWithCard', speechOutput, this.t('SKILL_NAME'));
111
112 },
113 'AMAZON.HelpIntent': function () {
114   const speechOutput = this.t('HELP_MESSAGE');
115   const reprompt = this.t('HELP_MESSAGE');
116   this.emit('ask', speechOutput, reprompt);
117 },
  
```





AWS CODE SERVICES



AWS
CodePipeline



AWS
CodeCommit



AWS Cloud9



AWS
CodeDeploy



AWS
CodeBuild

PRODUCTION



Spec
Running
Amazon
Elastic
Map
Reduce



PRODUCTION

Operations Management

AWS CODE SERVICES



AWS
CodePipeline



AWS
CodeCommit



Amazon
CloudWatch



AWS
Systems Manager



AWS
CloudFormation



AWS
CloudTrail



AWS
Config



AWS
Managed
Services



AWS
OpsWorks



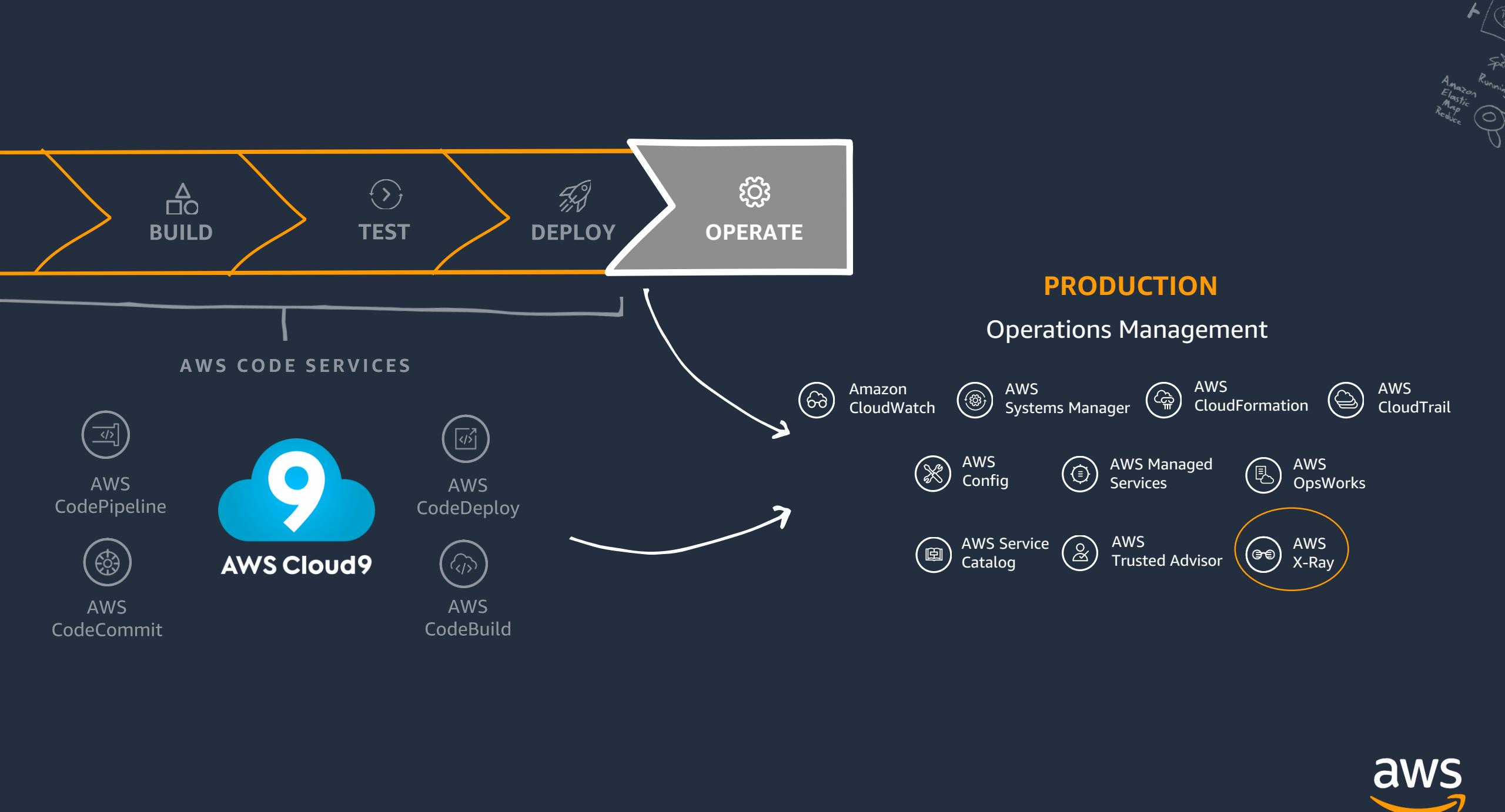
AWS
Service
Catalog



AWS
Trusted Advisor



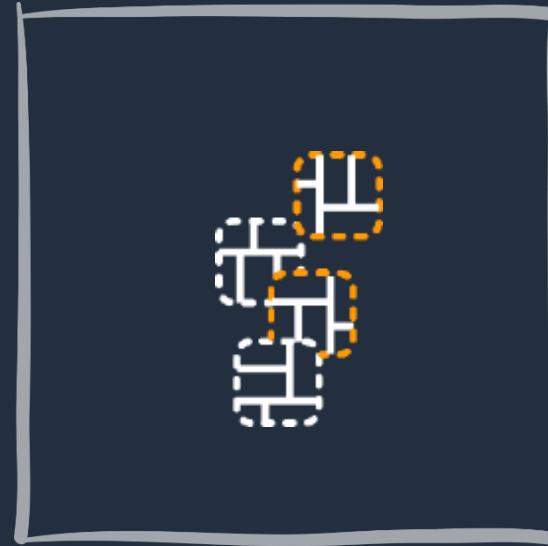
AWS
X-Ray



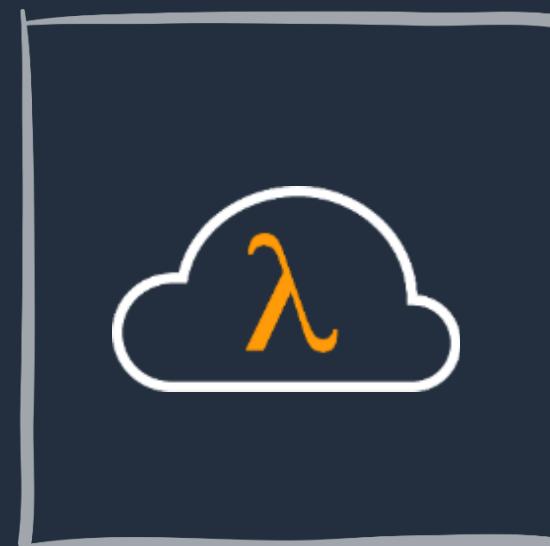
Compute - From Server to Serverless



Virtual Machines



Containers



Serverless

Compute - From Server to Serverless

Emulates physical infrastructure

Great for running existing software

Large existing footprint

Virtual Machines



Containers



Serverless

Broadest Spectrum of Compute Instances

| | | | | | | | | | | | | | |
|---|--|--|--|--|---|--|---|--|---|--|--|--|--|
|  AMAZON LIGHTSAIL |  T2 |  M5 |  D2 |  H1 |  R4 |  X1 |  X1e |  I3 |  I3m |  C5 |  G3 |  P3 |  F1 |
| Virtual Private Servers | Burstable | General Purpose | Dense Storage | Big Data Optimized | Memory Optimized | In-memory | Memory Intensive | High I/O | Bare Metal High I/O | Compute Intensive | Graphics Intensive | General Purpose GPU | FPGA |



EC2 Elastic GPUs

Graphics acceleration for EC2 instances

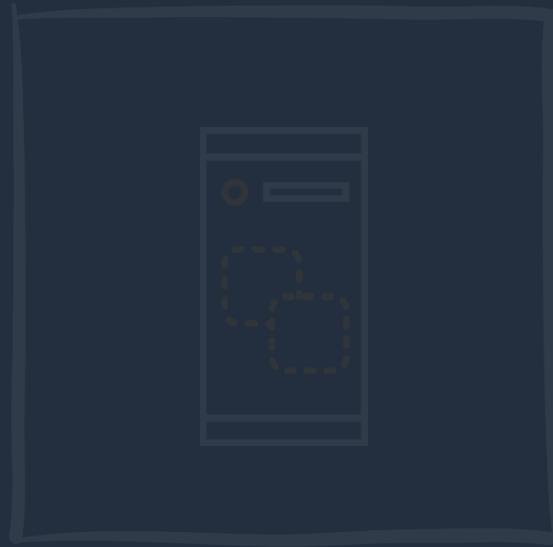


EC2 Fleet

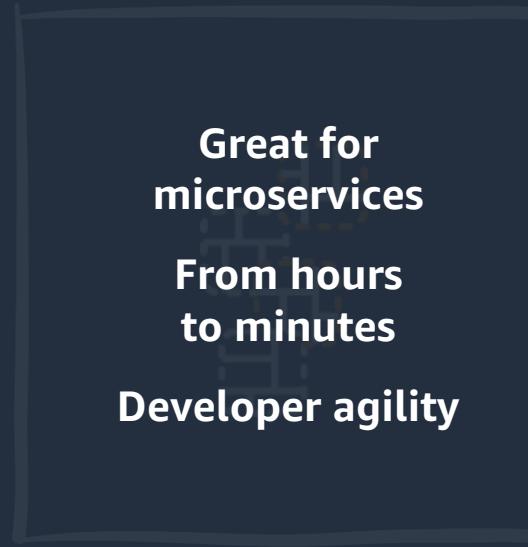
Simplified provisioning
Massive scale
Flexible capacity allocation



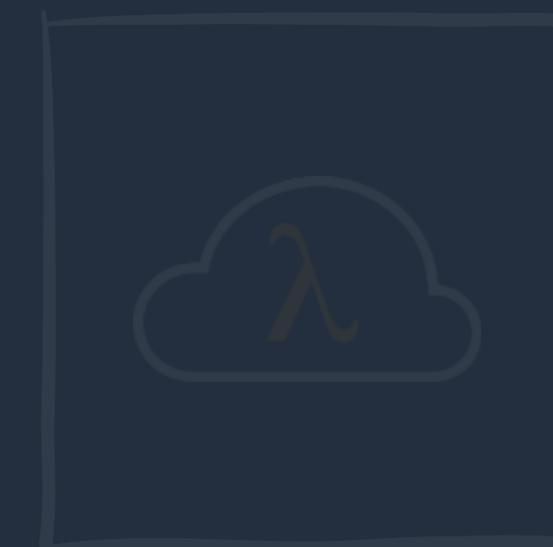
Compute - From Server to Serverless



Virtual Machines



Containers



Serverless

**Great for
microservices**
**From hours
to minutes**
Developer agility

Containers on AWS



Amazon ECS



AWS Fargate for ECS



Amazon EKS



AWS Fargate for EKS

Compute - From Server to Serverless



Virtual Machines



Containers



Serverless

Extreme developer productivity

Complete elimination of infrastructure management

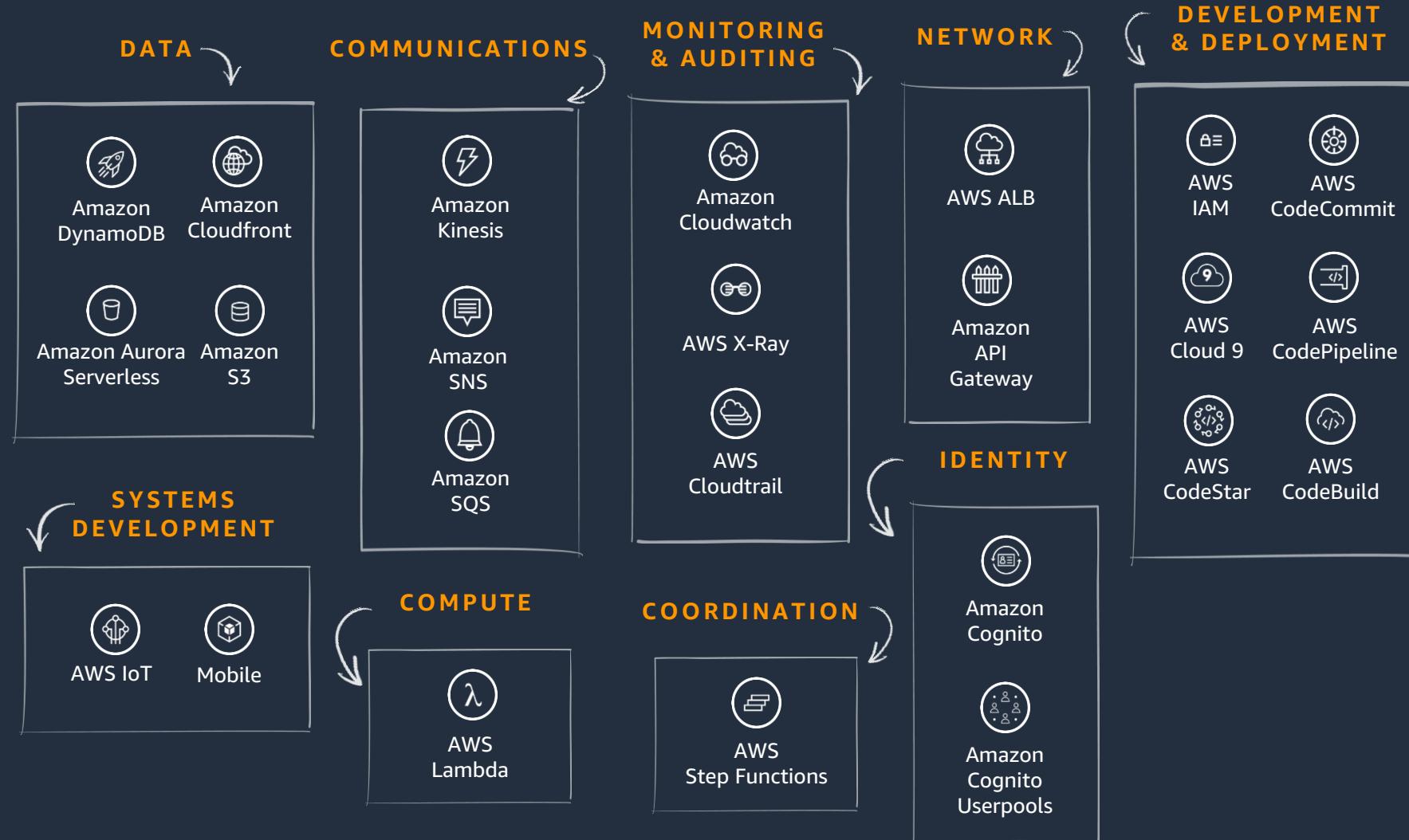
Focus more on business logic



Builders only want to build **business logic**



Serverless Application Architectures on AWS



Benefits of Serverless Applications



No server
management



Flexible
scaling



High
availability

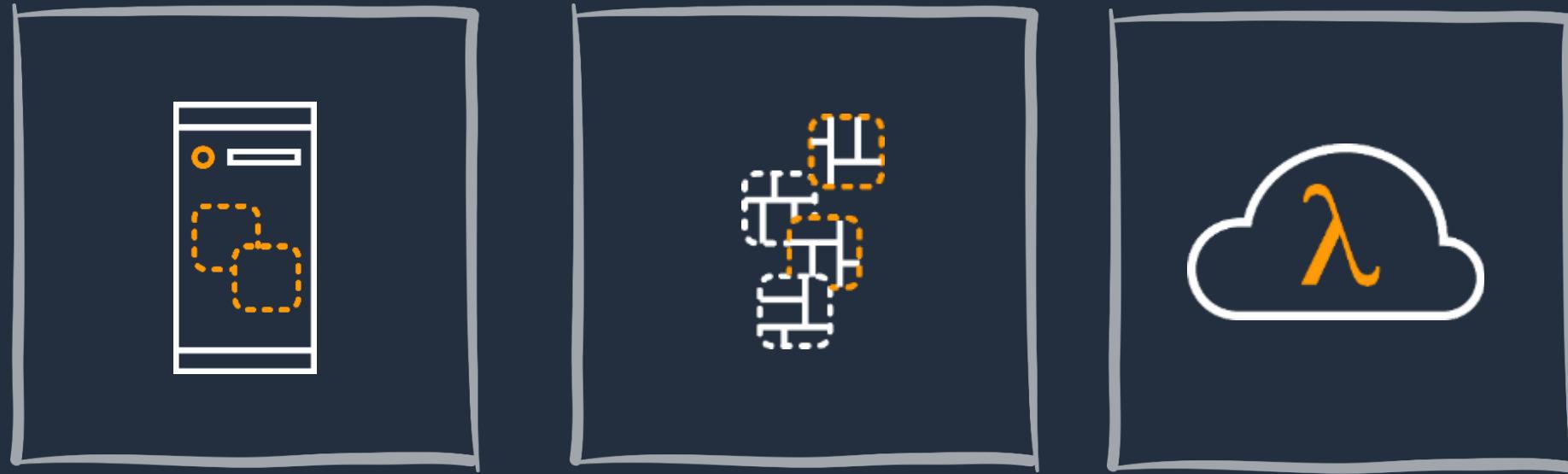


No idle
capacity

Some of the Customers Running Serverless on AWS



Compute - From Server to Serverless



Virtual Machines

Containers

Serverless



AWS Well-Architected Framework



OPERATIONAL
EXCELLENCE



SECURITY &
COMPLIANCE



RELIABILITY



PERFORMANCE
EFFICIENCY



COST
OPTIMIZATION

AWS Well-Architected Framework



- 1 Stop guessing capacity needs
- 2 Test systems at production scale
- 3 Automate to ease architectural experimentation
- 4 Allow for evolutionary architectures
- 5 Drive your architecture using data
- 6 Improve through Game Days

AWS Well-Architected Framework

WELL-
ARCHITECTED |  SECURITY

Principles of security and compliance

IDENTITY AND ACCESS
MANAGEMENT

DETECTIVE
CONTROLS

INFRASTRUCTURE
PROTECTION

DATA
PROTECTION

INCIDENT
RESPONSE



AWS Well-Architected Framework

Security best practices

Implement a strong identity foundation

Enable traceability

Apply security at all layers

Automate security best practices

Protect data in transit and rest

Prepare for security events



SECURITY & COMPLIANCE



Identity
Management



Access
Control



Monitoring
& Logs



Assessment &
Reporting



Web Application
Firewall



Configuration
Compliance



Key Management
& Storage



Account
Grouping



Resource &
Usage Auditing



DDOS
Protection



Security is everyone's job

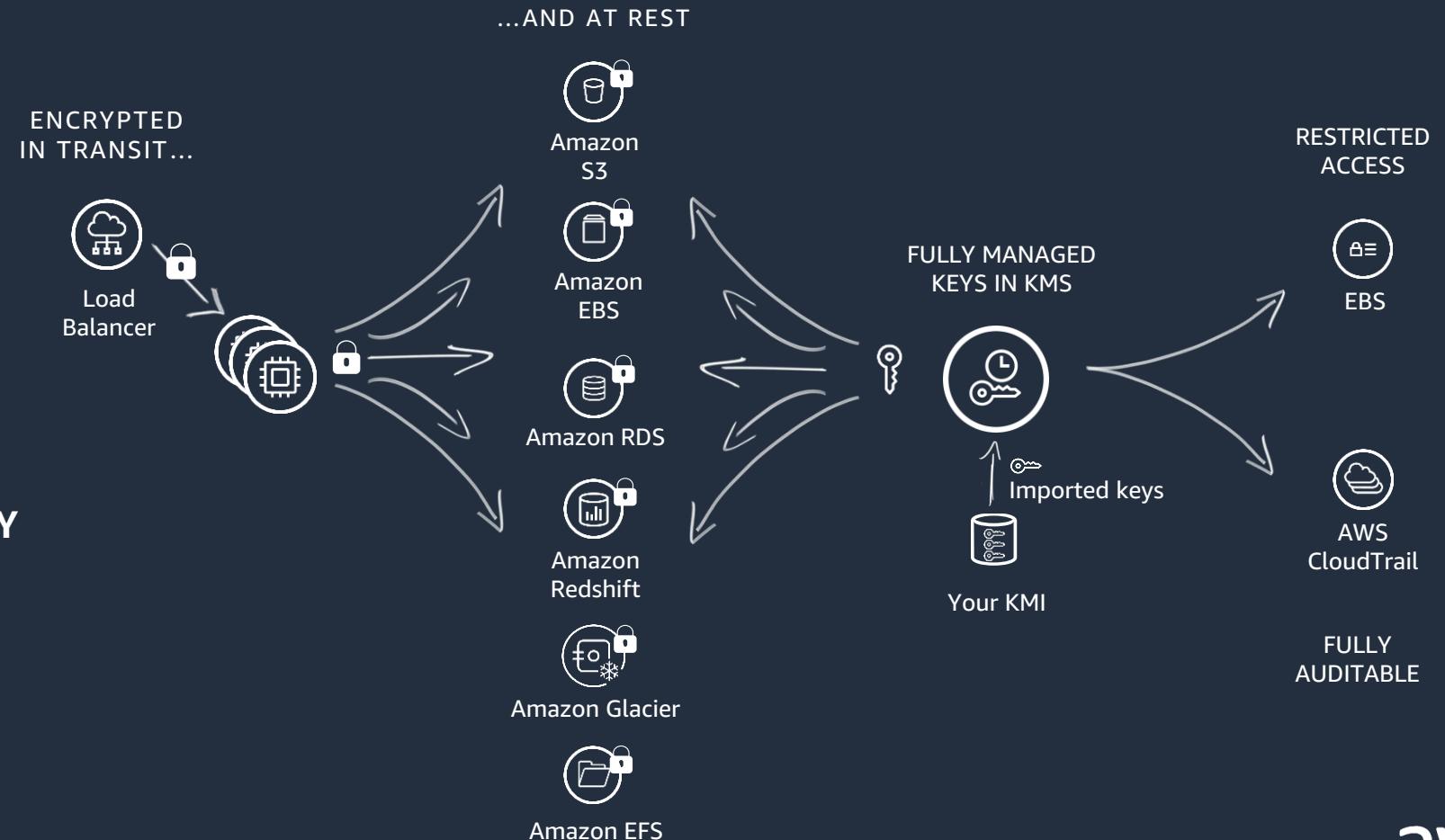


AWS Well-Architected Framework

Ubiquitous
Encryption

WELL-
ARCHITECTED

SECURITY

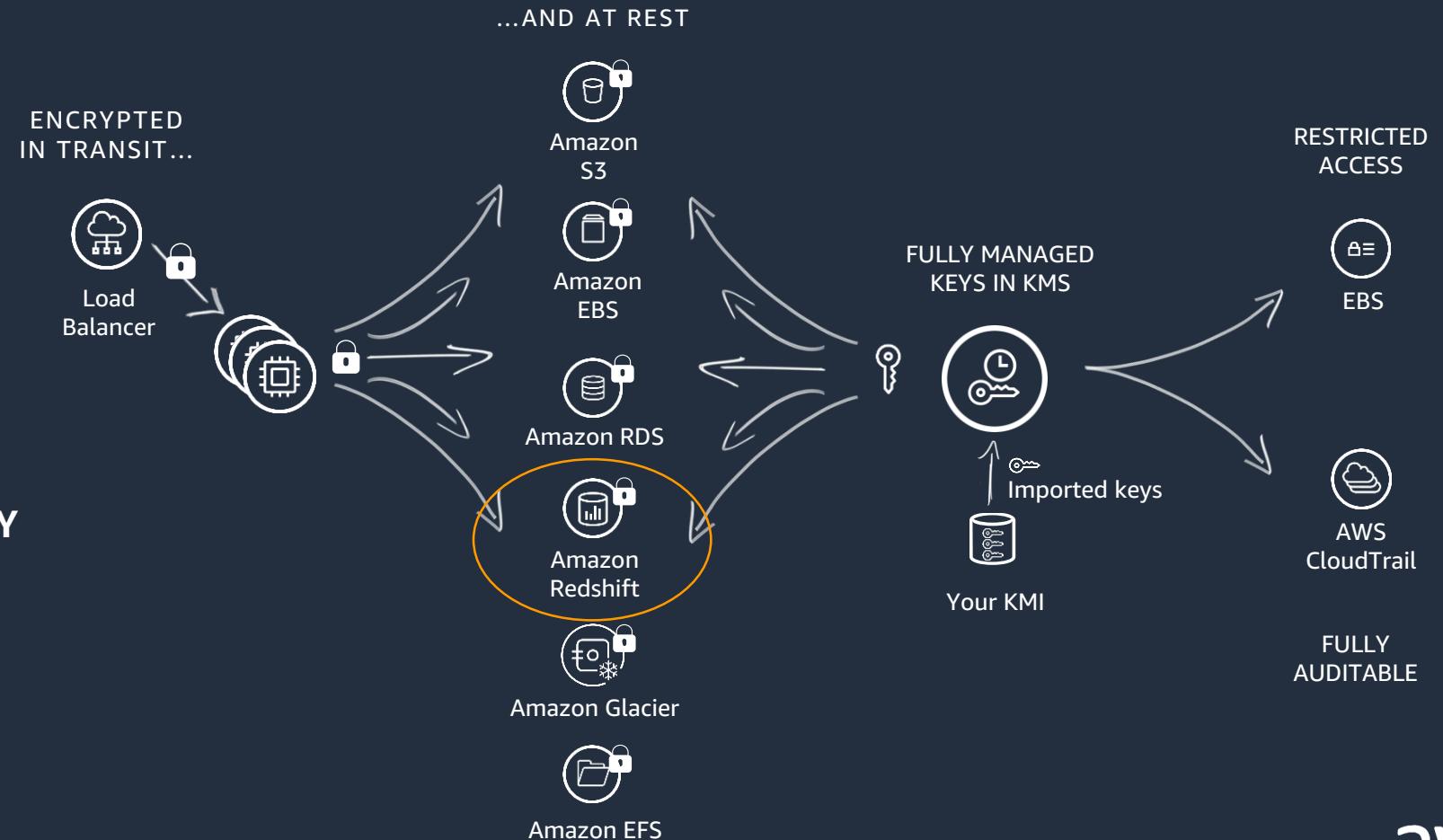


AWS Well-Architected Framework

Ubiquitous
Encryption

WELL-
ARCHITECTED

SECURITY



Innovation Accelerators



Innovation Accelerators



- 1 AWS breadth and depth
- 2 Pace of new releases
- 3 Machine Learning

TECHNICAL & BUSINESS SUPPORT

- Support
- Professional Services
- Optimization Guidance
- Partner Ecosystem
- Training & Certification
- Solutions Management
- Account Management
- Security & Billing Reports
- Personalized Dashboard

MARKETPLACE

- Business Apps
- Business Intelligence
- DevOps Tools
- Security
- Networking
- Databases
- Storage

ANALYTICS

- Data Warehouse
- Business Intelligence
- Hadoop/Spark
- Streaming Data Analysis
- Streaming Data Collection
- Elasticsearch
- Data Pipelines
- Interactive SQL Queries
- ETL
- One-click App Deployment
- Resource Templates
- Build & Test
- Application Lifecycle Management
- DevOps Resource Management
- Triggers
- Containers
- Analyze & Debug
- Patching
- API Gateway
- Single Integrated Console
- Identity
- Sync
- Mobile Analytics
- Mobile App Testing
- Targeted Push Notifications
- Rules Engine
- Device Shadows
- Device SDKs
- Device Gateway
- Registry
- Local Compute
- Face Analytics
- Text to Speech
- Video Analytics
- Sentiment Analysis
- Topic Modeling
- Speech Transcription
- Model Optimization
- Model Hosting
- ML at the Edge
- Hardware Acceleration
- Multiple Frameworks
- Hosted Notebooks
- Model Training
- Image Labeling
- Celebrity Detection
- Entity Extraction
- Natural Language Understanding
- Speech Recognition
- Translation
- Pre-trained Models

DEV/OPS

- Queuing & Notifications
- Workflow
- Search
- Email
- Transcoding

MOBILE SERVICES

- Regions
- Availability Zones
- Points of Presence
- Compute
- Storage
- Networking
- Databases
- Identity Management
- Access Control
- Monitoring & Logs
- Assessment & Reporting
- Web Application Firewall
- Manage Resources
- Service Catalogue
- Configuration Tracking

IoT

- Analytics
- Machine Learning
- Enterprise Apps
- Hybrid Architecture
- Migration

MACHINE LEARNING

- Core Services
- Security & Compliance
- Management Tools

ENTERPRISE APPS

- Infrastructure
- Core Services
- Security & Compliance
- Management Tools

CORE SERVICES

- Compute
- Storage
- Networking
- Databases
- Identity Management
- Access Control
- Monitoring & Logs
- Assessment & Reporting
- Web Application Firewall
- Manage Resources
- Service Catalogue
- Configuration Tracking

TECHNICAL & BUSINESS SUPPORT

- Support
- Professional Services
- Optimization Guidance
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- Training & Certification
- Solutions Management
- Account Management
- Security & Billing Reports
- Personalized Dashboard

MARKETPLACE



Customers who viewed this item also viewed these products



Dualit Food XL1500
Processor

\$560

Add to cart



Kenwood kMix Manual
Espresso Machine

★★★★☆

\$250

Select options



Weber One Touch Gold
Premium Charcoal
Grill-57cm

\$225

Add to cart



NoMU Salt Pepper and
Spice Grinders

\$3

View options



Home TV Shows Movies Originals Recently Added My List



Top Picks for Allison

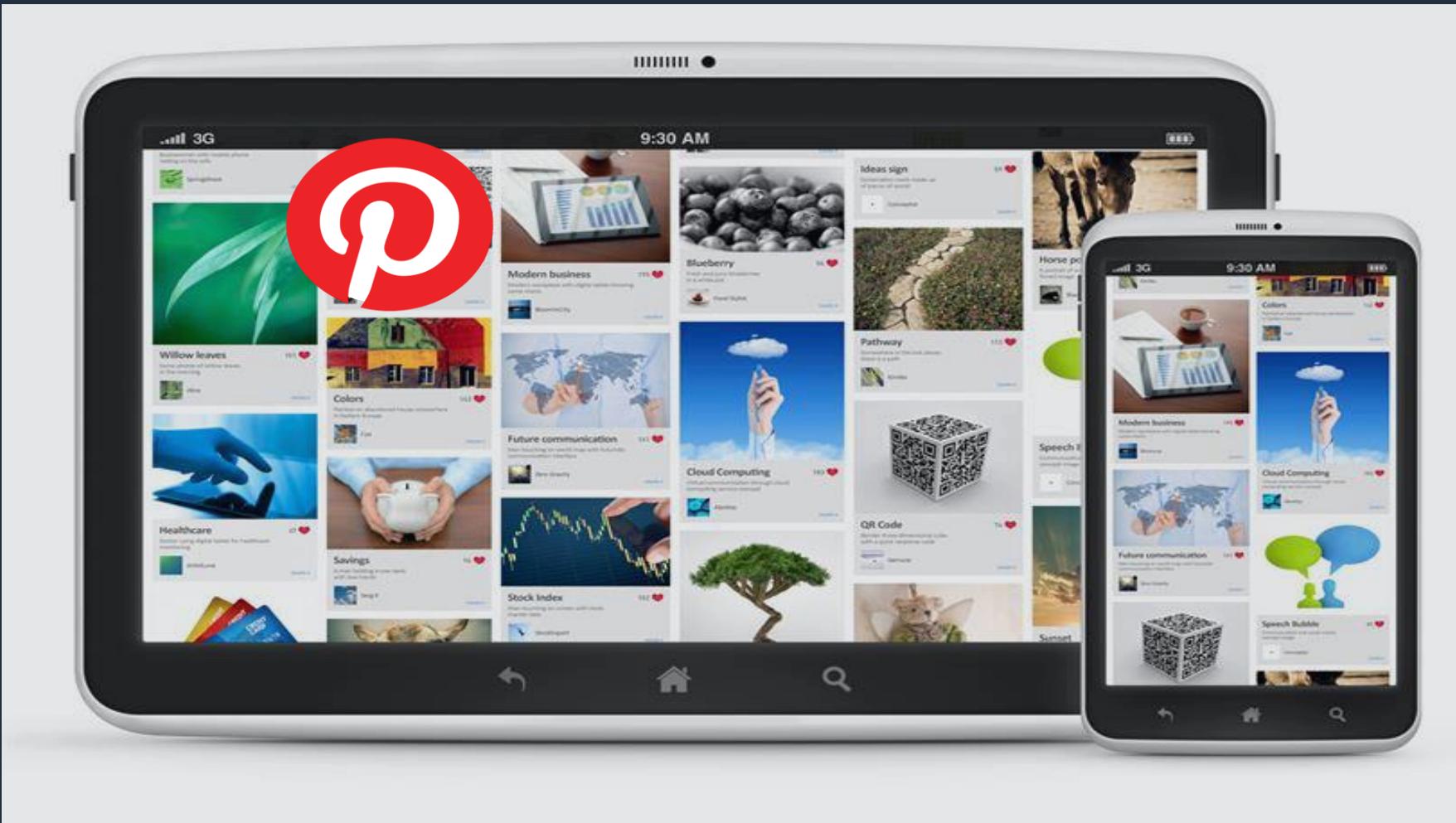


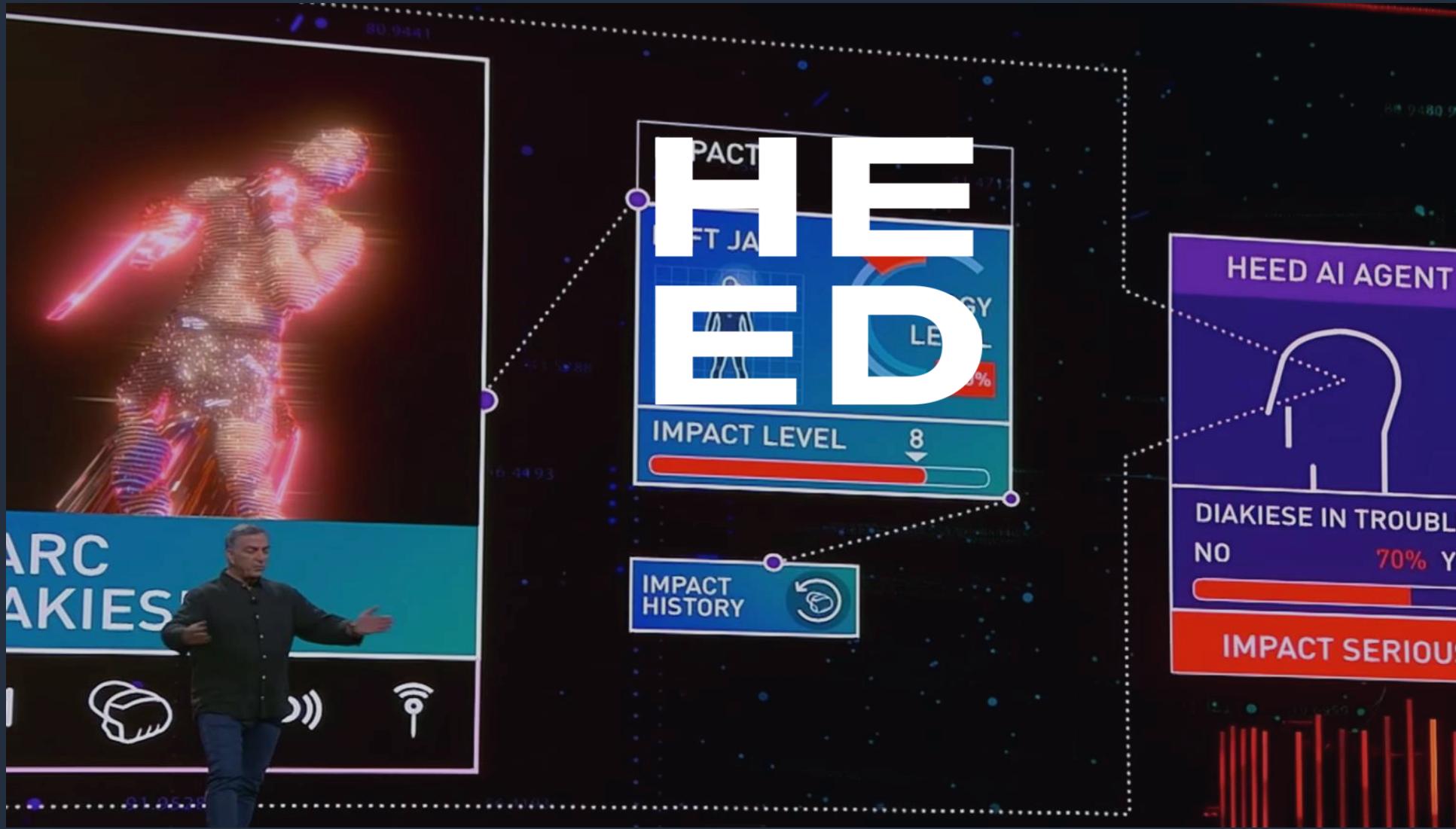
Political TV Shows



Because you watched Queer Eye



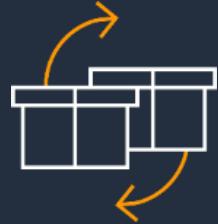




Machine Learning at Amazon: A Long Heritage



Personalized
recommendations



Fulfillment automation/
inventory management



Drones



Voice driven
interactions



Inventing entirely new
customer experiences



Machine Learning at Amazon.com

Thousands of employees across
the company **focused on AI**

| RETAIL | CUSTOMERS | SELLER | CATALOGUE | TEXT | IMAGES |
|-----------------------------|----------------------------|-----------------|----------------------|----------------------|----------------|
| Demand Forecasting | Recommendation | Fraud Detection | Browse-Node | In-Book Search | Visual Search |
| Vendor Lead Time Prediction | Product Search | Predictive Help | Classification | Named-entity | Product Image |
| Pricing | Product Ads | Seller Search & | Meta-data Validation | Extraction | Enhancement |
| Packaging | Shopping Advice | Crawling | Review Analysis | Summarization/X-ray | Brand Tracking |
| Substitute Prediction | Customer Problem Detection | | Product Matching | Plagiarism Detection | |



Tens of Thousands of Customers Running Machine Learning on AWS





So what have we learned?



Machine Learning Needs a New Stack

CLOUD SCALE

Infinite data
Hyperscale compute
Speed in all phases

EXTENSIBLE

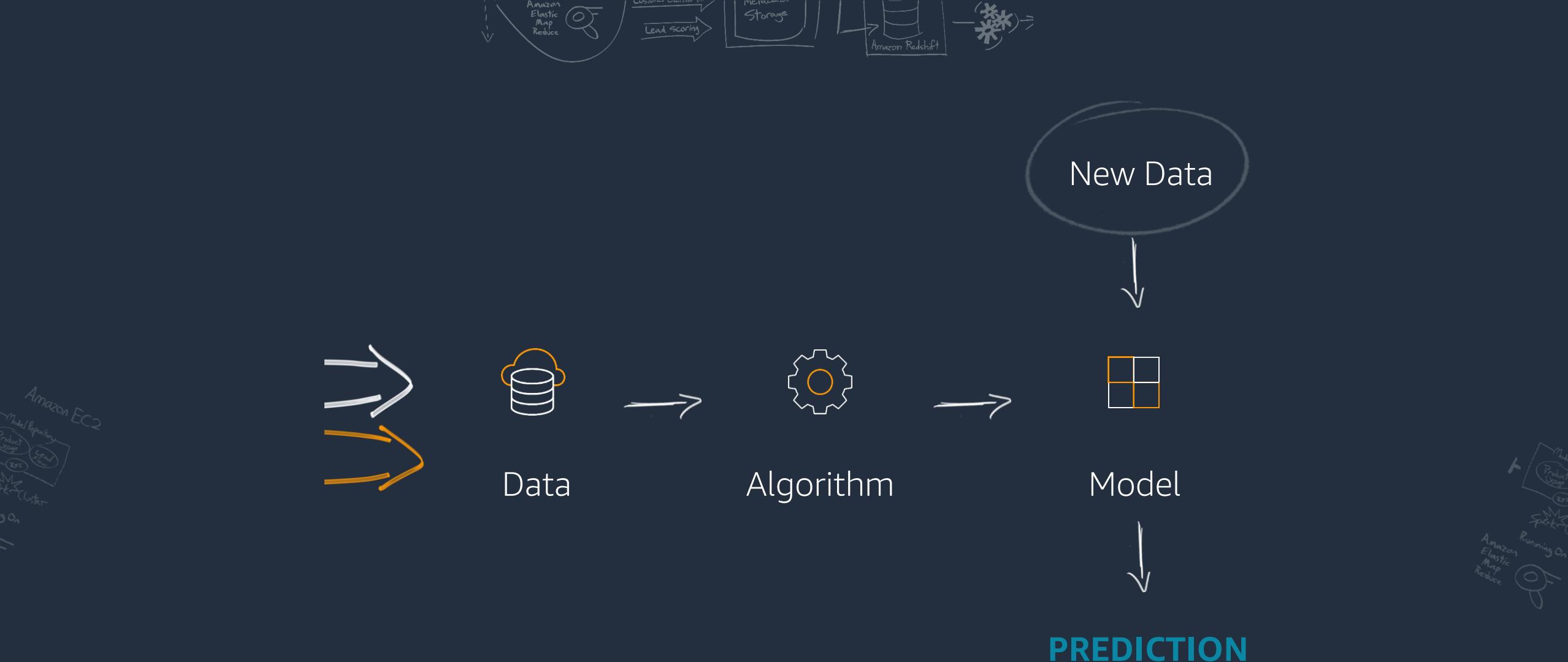
Broad framework support
Constant iteration
Training, deployment,
and operations

ACCESSIBLE

Developers
Data scientists
Analysts







ML @ AWS – Our Mission

Put machine learning in the hands of
every developer and data scientist



FRAMEWORKS



PLATFORMS



AMAZON SAGEMAKER

FRAMEWORKS



Caffe2



Microsoft
CNTK



mxnet



PYTORCH



TensorFlow



KERAS



GLUON



APPLICATION SERVICES



REKOGNITION



REKOGNITION
VIDEO



POLLY



TRANSCRIBE



TRANSLATE



COMPREHEND



LEX

PLATFORMS



AMAZON SAGEMAKER

FRAMEWORKS



Caffe2



Microsoft
CNTK



mxnet



PYTORCH



TensorFlow



KERAS



GLUON



go to *ml.aws*



aws

Themes

1. Empowering Builders

- Who are Builders?
- Compute -> Containers
-> Serverless
- Well-architected framework & security

2. Innovation Accelerators

- AWS breadth and depth
- Pace of new releases
- Machine Learning

3. Transformative Innovation

- Modern data architectures
- Immersive customer experiences
- Culture of experimentation
- New business models



Transformative Innovation



Our Customers Invest in Modern Data Platforms



Our Customers Invest in Modern Data Platforms



Immersive
experiences

Create a personalized
customer experience
without boundaries

Our Customers Invest in Modern Data Platforms



Immersive experiences

Create a personalized customer experience without boundaries



Culture of experimentation

Use machine learning / data science to model and predict events

Our Customers Invest in Modern Data Platforms



Immersive experiences

Create a personalized customer experience without boundaries



Culture of experimentation

Use machine learning / data science to model and predict events



New business models

Launch new products and services to monetize data and expertise



Transformative Innovation with Modern Data Platform



Traditionally, Analytics Used to Look Like This



- Relational data
- TBs–PBs scale
- Schema defined prior to data load
- Operational reporting and ad hoc
- Large initial CAPEX + \$10K–\$50K/TB/Year

Data Lakes Extend the Traditional Approach



- Relational and non-relational data
- TBs–EBs scale
- Diverse analytical engines
- Low-cost storage & analytics



Amazon S3 is the Most Popular Choice for Data Lakes



Unmatched durability,
availability, and scalability



Best security,
compliance, and
audit capabilities



Object-level
controls



Business insights into
your data



Most ways to
bring data in



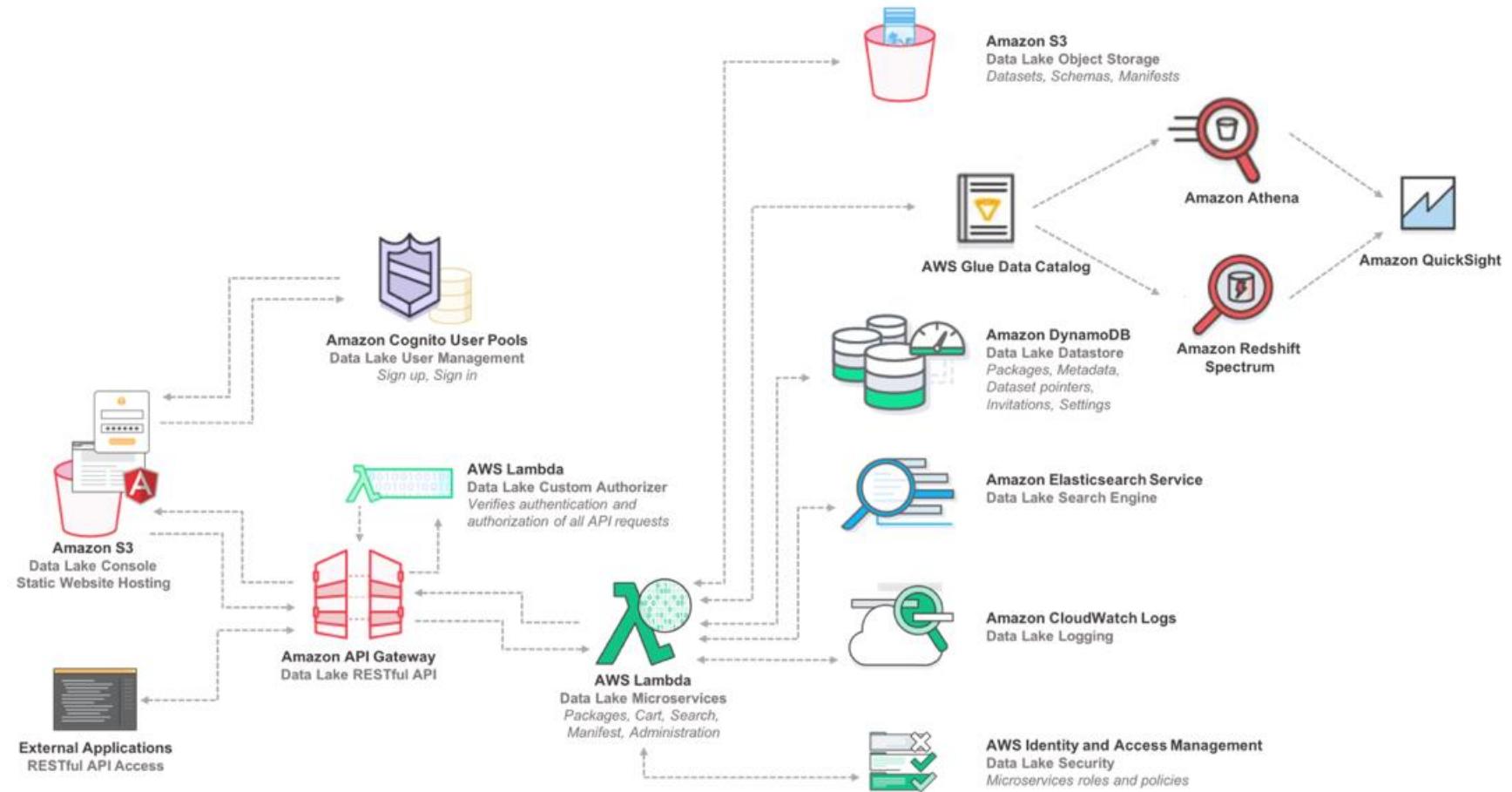
Twice as many
partner integrations

AWS Glue Helps You Get The Most Out of Your Data



AWS Solution Builder - Data Lake on AWS

- Reference Architecture deployment via CloudFormations
- Configures core services to tag, search and catalogue datasets
- Deploys a console to search and browse available datasets



<http://amzn.to/2nTVjcp>



Data Lakes on AWS



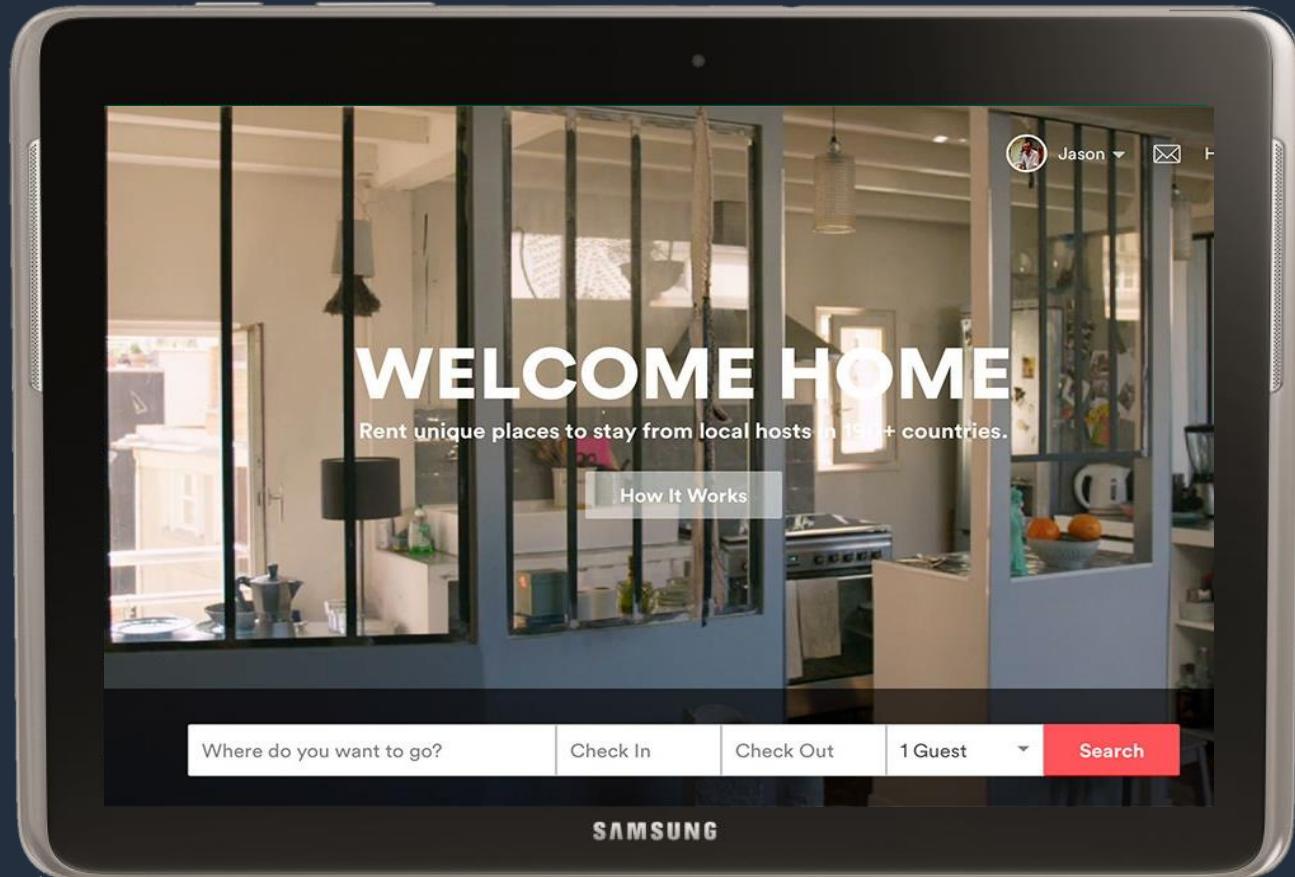
Airbnb is a community marketplace that allows property owners and travelers to connect with each other.

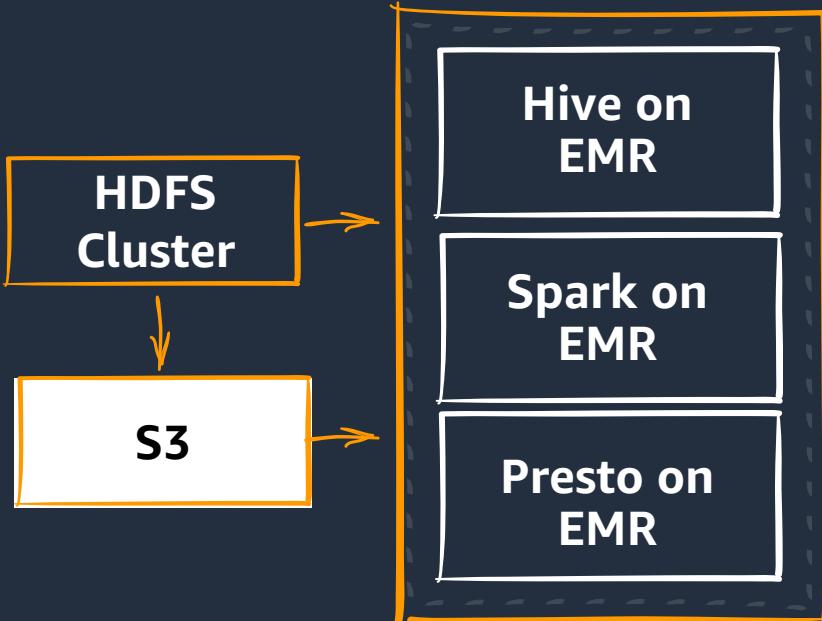
Challenge:

Grows data 3x every year with PBs of data stored. Use Hadoop/HDFS, but experienced bottlenecks in performance and high costs.

Solution:

- Created a tiered storage system: Land hot data in HDFS, and all warm/cold data in S3 data lake
- S3 provides infinite storage at lower costs





- Land hot data in HDFS
- Warm/cold data in S3
- Brings the best of both—performance, scalability, cost
- Analyze data with Hive, Presto, Spark, etc





Immersive Customer Experiences

more
than
money



Our customers want great, connected,
in the moment experiences

Invest \$1.5B
over 3 years

Become a
simpler bank

New technology
leadership

Empower our
people

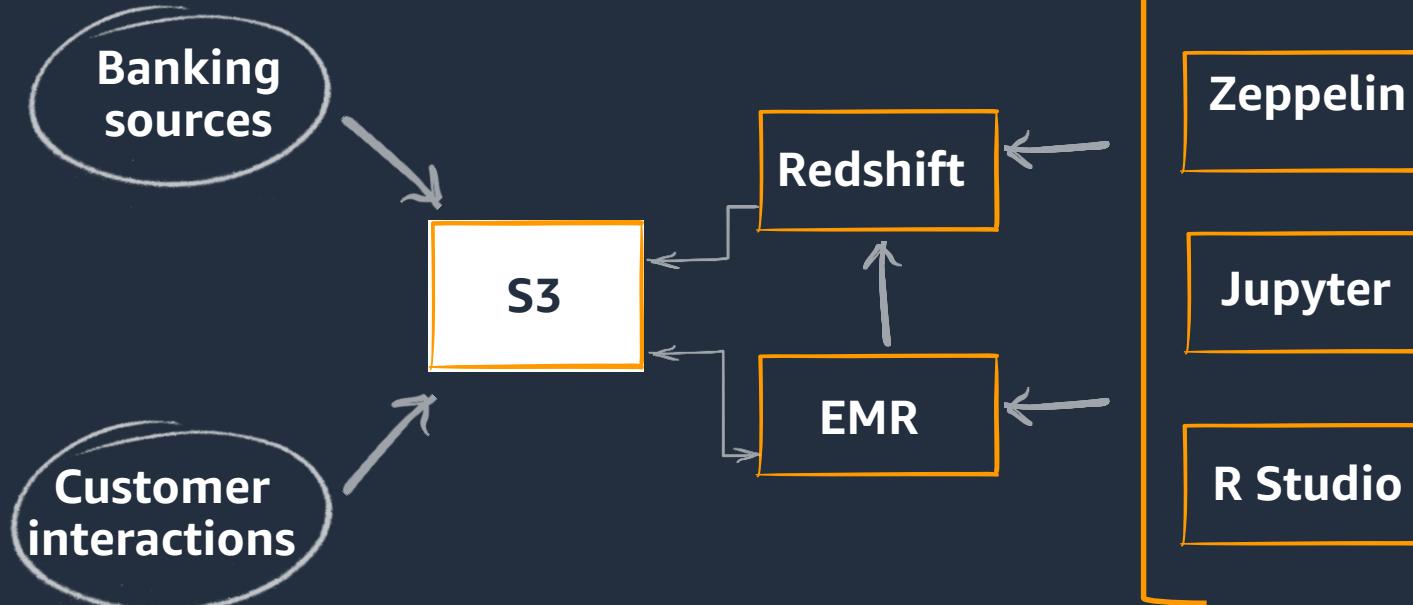


The image shows a computer monitor on the left displaying a webpage for NAB QuickBiz unsecured lending. The page features a photo of a man and a woman in a coffee shop, with the text "BORROW UP TO \$100K UNSECURED BUSINESS FINANCE with a NAB QuickBiz Loan". Below this, a large button says "BORROW UP TO \$100,000 UNSECURED". A paragraph of text follows, stating: "Expand your business, manage your cash flow or take advantage of new opportunities, with three NAB QuickBiz unsecured business finance options. We look beyond your bricks and mortar security to recognise the strength of your business – so once approved, you get the funds you need to make it happen." On the right, a callout box provides specific loan details: "NAB QuickBiz Loan from 12 .95% p.a fixed rate". It also lists three benefits with green checkmarks: "Borrow up to \$100,000", "Get a response in 60 seconds", and "Sole traders, partnerships and companies can apply". At the bottom, it says "100% confidential application".

QuickBiz® - In The Moments that Matter to Businesses



NAB Discovery Cloud



- Offers hindsight, insight, and foresight
- Platform for machine learning, analytics, and marketing ecosystems
- Designed for best in class security
- Analysts also access the data lake through Redshift Spectrum



Culture of Experimentation

Siemens is a leading automation provider, delivering mission critical operation tech, with 30M automation systems, and 75M contracted smart meters, 800K products.

Challenge:

Leverage data from millions of devices, including power generation, energy management, transportation, industrial protection, and building technology.

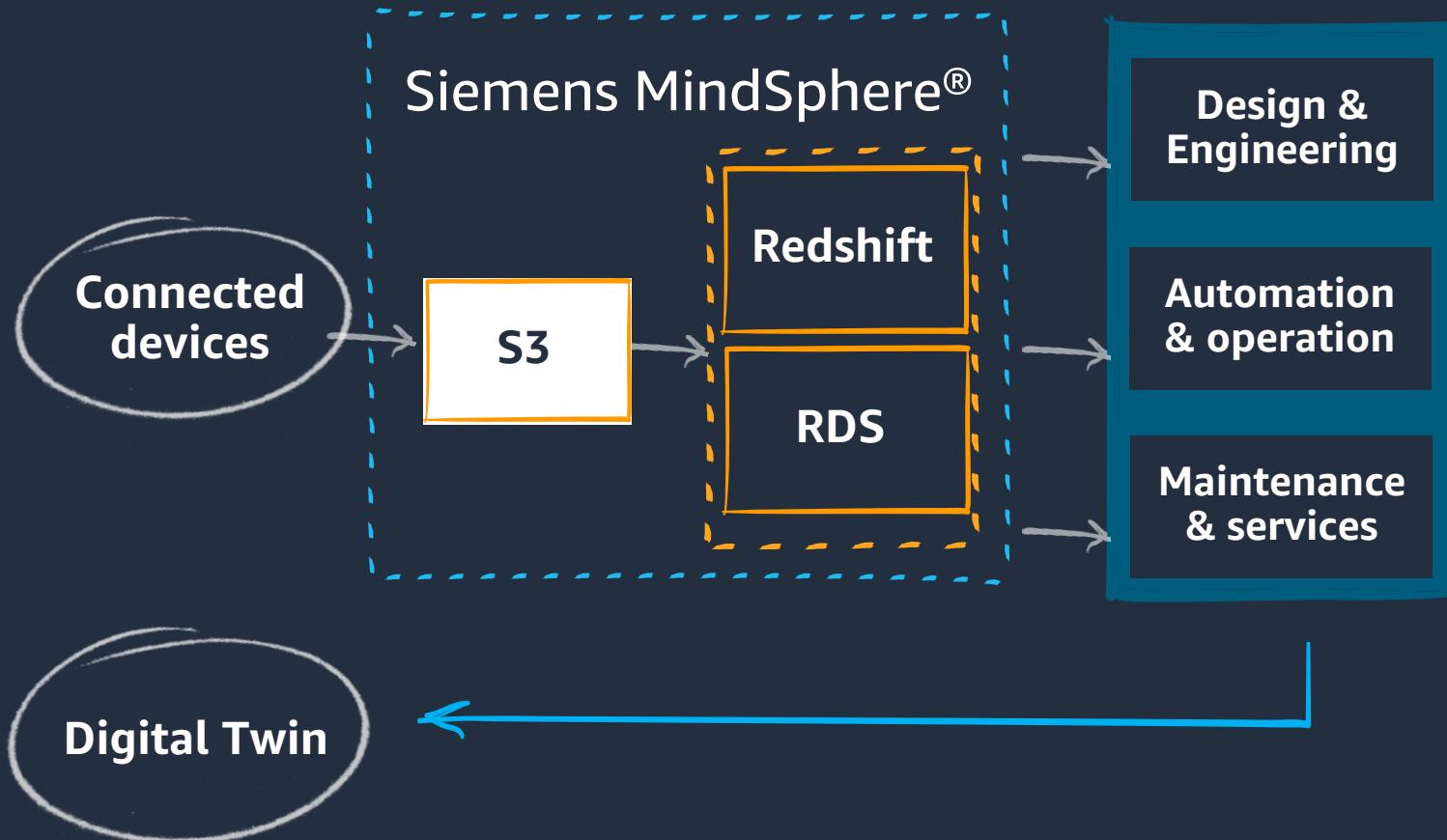
Solution:

- Offer a SaaS solution for customers to drive business outcomes from industrial data
- Offer a PaaS for the partner ecosystem to build industry-specific apps



Siemens MindSphere - SaaS on AWS

Product Lifecycle Management and Manufacturing Operations



- Enabled "closed-loop" customer innovation through Digital Twin capabilities for Product, Production, and Performance
- Powerful industry solutions with advanced analytics
- Develop robust industrial IoT solutions faster
- Open PaaS with native cloud accessibility



New Business Models



FINRA oversees > 3,000 securities firms
doing business in the United States.

Challenge:

FINRA's legacy system did not
scale well

- Up to 75 billion events per day
- Run complex surveillance queries
over 20+ PB of data

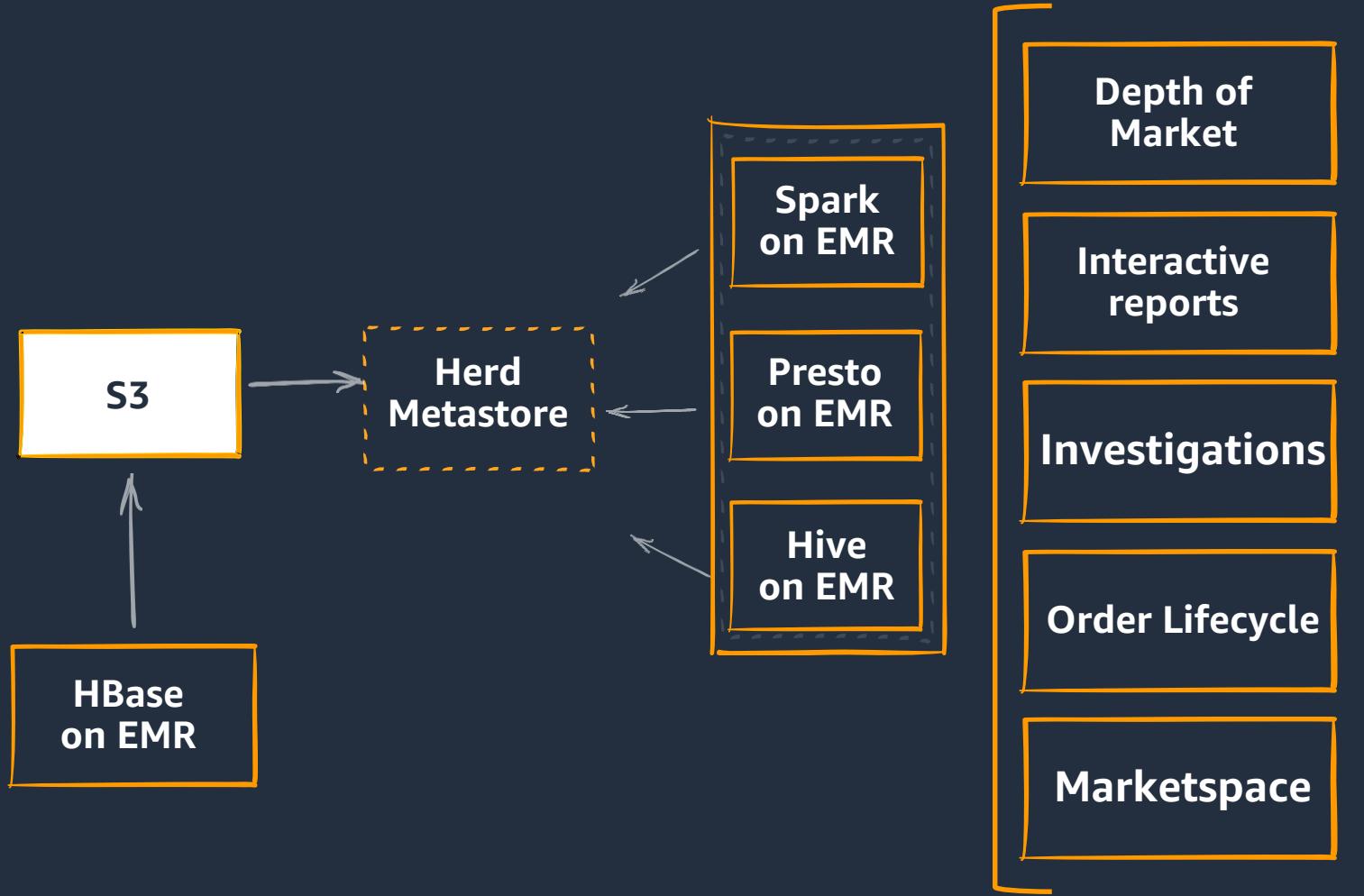
Solution:

- Migrated their big data appliance to a
S3 Data Lake and used EMR for
ingestion and processing
- Migrated to RDS and testing Aurora





FINRA Data Lake and Analytics



- Required fast access across trillions of trade records (20PB+)
- Lower costs by 60% over on-premises system
- Serving many EMR (Hadoop) users - Spark, Presto, and Hive engines to process data
- Apache HBase on Amazon EMR to store and serve data



FINRA Automated Data Delivery System® (ADDS®)



- Trade journals
- Tick size pilot firm review files
- TRACE Security Activity Report (TSAR)
- End-of-Day TRACE transaction files
- TRACE, ADF, ORF data



Themes

1. Empowering Builders

- Who are Builders?
- Compute -> Containers
-> Serverless
- Well-architected framework & security

2. Innovation Accelerators

- AWS breadth and depth
- Pace of new releases
- Machine Learning

3. Transformative Innovation

- Modern data architectures
- Immersive customer experiences
- Culture of experimentation
- New business models



Session tracks

Thank You for Attending AWS Innovate

We hope you found it interesting!
A kind reminder to complete the **poll** and **feedback**.

Let us know what you thought of today's event and how we can improve
the event experience for you in the future.

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