
AWS
re:Invent

ENR202

Data transformation for reservoir characterization

Anand Malgi
Consultant, Solutions Architect
ConocoPhillips

Justo Sanchez
Data Analytics Specialist
ConocoPhillips

AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Our cloud story

Who we are

Where we were

What we built

How we built it

Where we are today

Where we go next



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

ConocoPhillips

Who we are

GLOBAL E&P

981*
THOUSAND BOE (barrel-of-oil equivalent) **PER DAY**

5.3**
BILLION BOE
PROVED RESERVES

16
COUNTRIES WITH OPERATIONS AND ACTIVITIES

9,700
EMPLOYEES WORLDWIDE

HOUSTON, TX
COMPANY HEADQUARTERS

*Excludes Libya
**At year-end 2019



ConocoPhillips

Who we are

GLOBAL E&P

981*
THOUSAND BOE
PER DAY

5.3**
BILLION BOE
PROVED RESERVES

16
COUNTRIES WITH
OPERATIONS AND
ACTIVITIES

9,700
EMPLOYEES WORLDWIDE

HOUSTON, TX
COMPANY HEADQUARTERS

*Excludes Libya
**At year-end 2019

This story is set in our . . .

Canadian Montney asset

UNCONVENTIONAL SHALE GAS
ASSET TYPE

BRITISH COLUMBIA, CANADA
LOCATION

295,000
NET ACRES

3 TO 5
HORIZONS
OR LAYERS

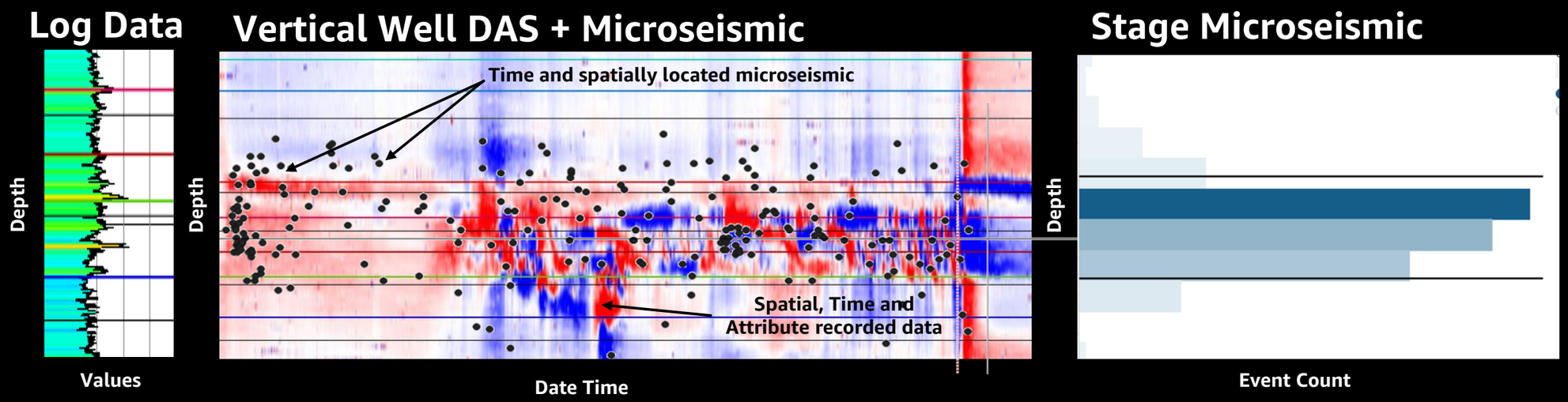
APPRAISAL
CURRENT PHASE

Where we were

Data gathered from first 14 well pad

- 7 Vendors
- +4 TB Data
- +8000 Files
- Multiple spatial location formats, time zones, time & depth resolutions, etc.

= >8 hrs. to prepare data for 1 stage interpretation



Where we were

Data gathered from first 14 well pad

- 7 Vendors
- +4 TB Data
- +8000 Files
- Multiple spatial location formats, time zones, time & depth resolutions, etc.

= >8 hrs. to prepare data for 1 stage interpretation

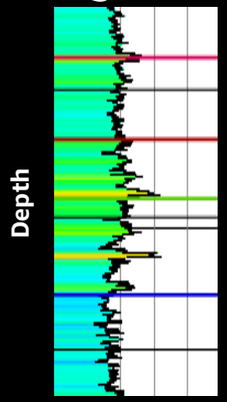
IT & Analytics Status

- New Cloud-first company strategy
- New Canadian AWS environment
- Limited in-house Cloud skills & experience

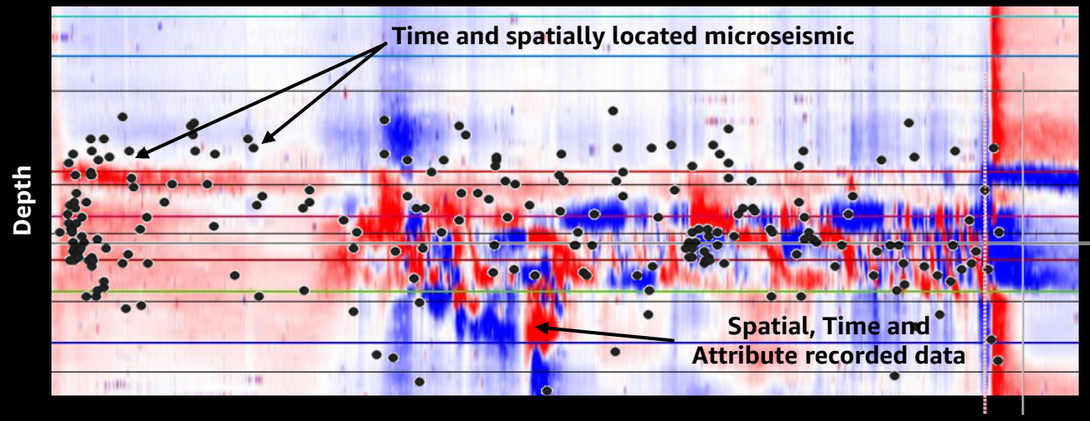
=



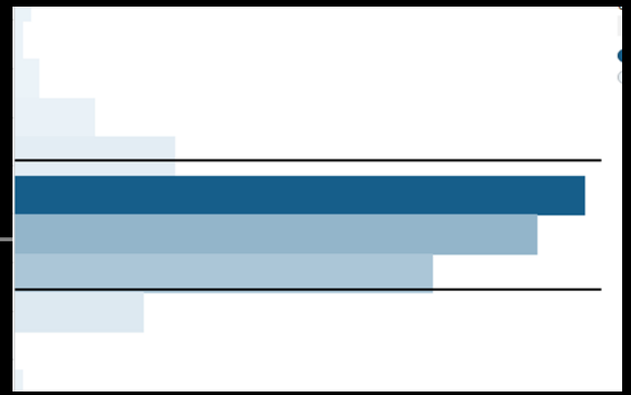
Log Data



Vertical Well DAS + Microseismic



Stage Microseismic



Our Cloud Story

Who we are

Where we were

What we built

How we built it

Where we are today

Where we are going next



AWS re:Invent

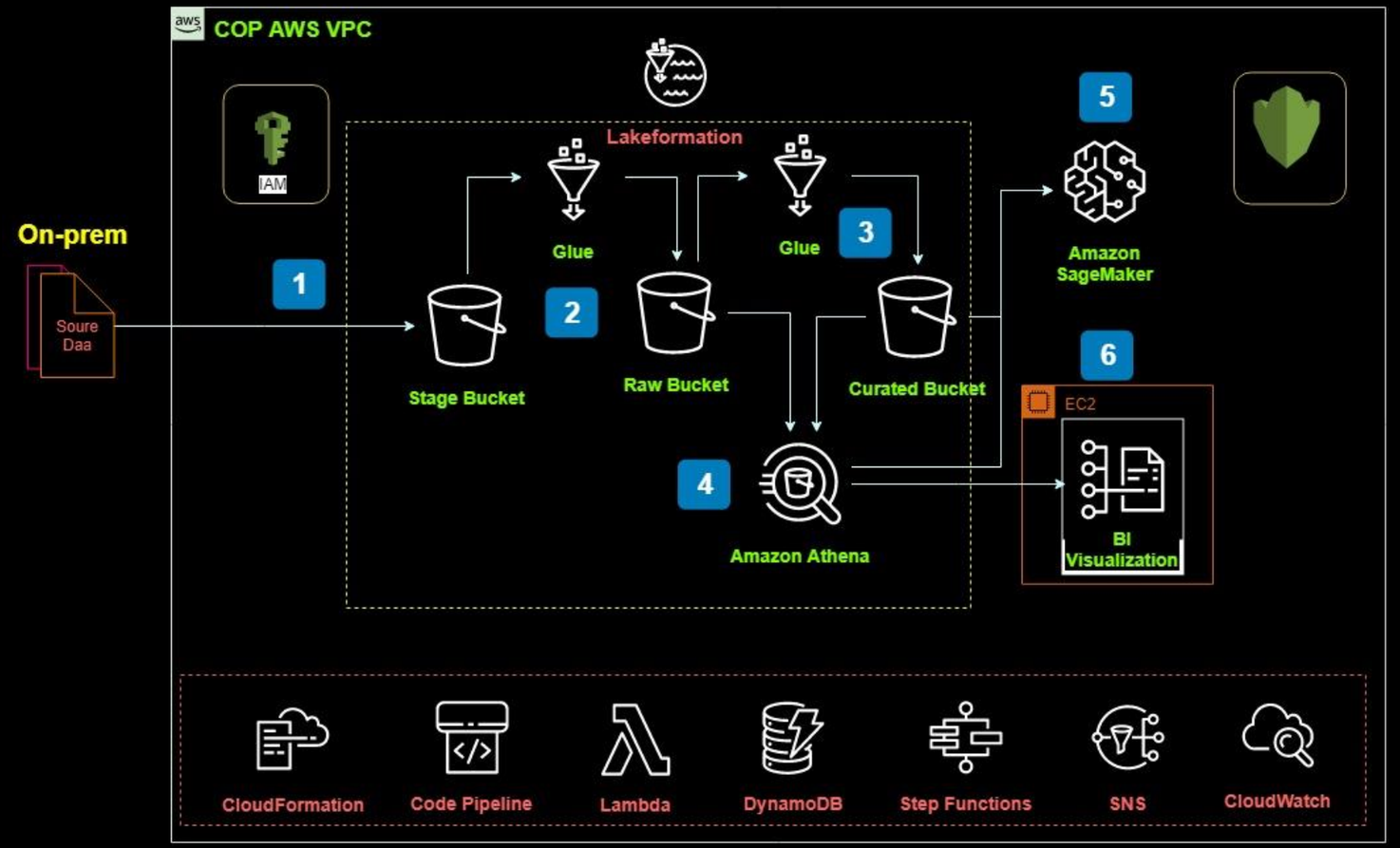
© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

What we built

Solution architecture

- Amazon S3 buckets – stage, raw, and curated
- AWS Glue – transform and load data
- Amazon Athena DB for queries
- AWS Lake Formation data lake security

Montney data analytics platform for completions



What we built

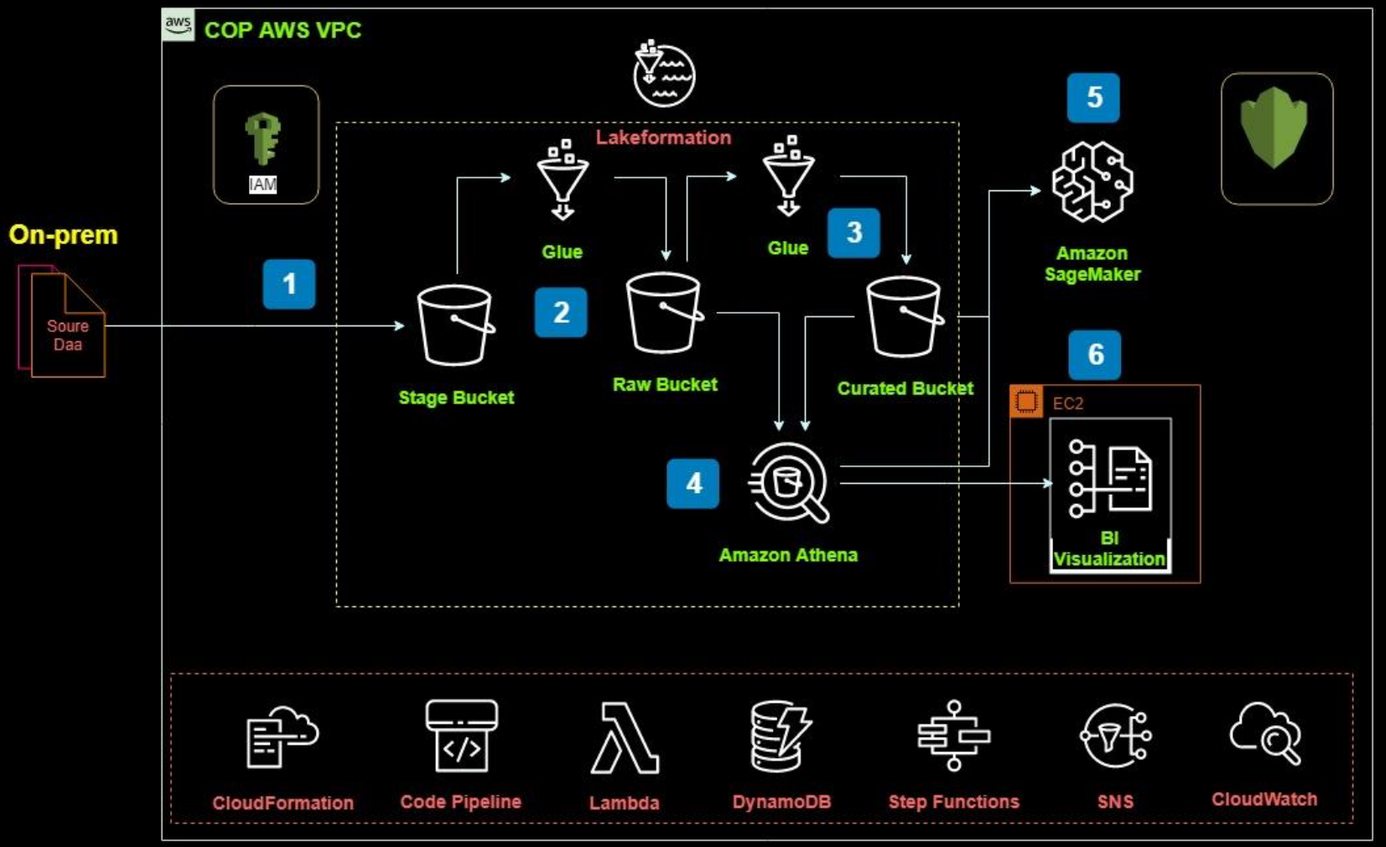
Solution architecture

- Amazon S3 buckets – stage, raw, and curated
- AWS Glue – transform and load data
- Amazon Athena DB for queries
- AWS Lake Formation data lake security

Solution considerations

- Partitions for the query performance
- Performance-monitoring metrics
- Integrate with existing enterprise BI
- Operational support automation

Montney data analytics platform for completions



~~= >8 hrs. to prepare data for interpretation~~

What we built

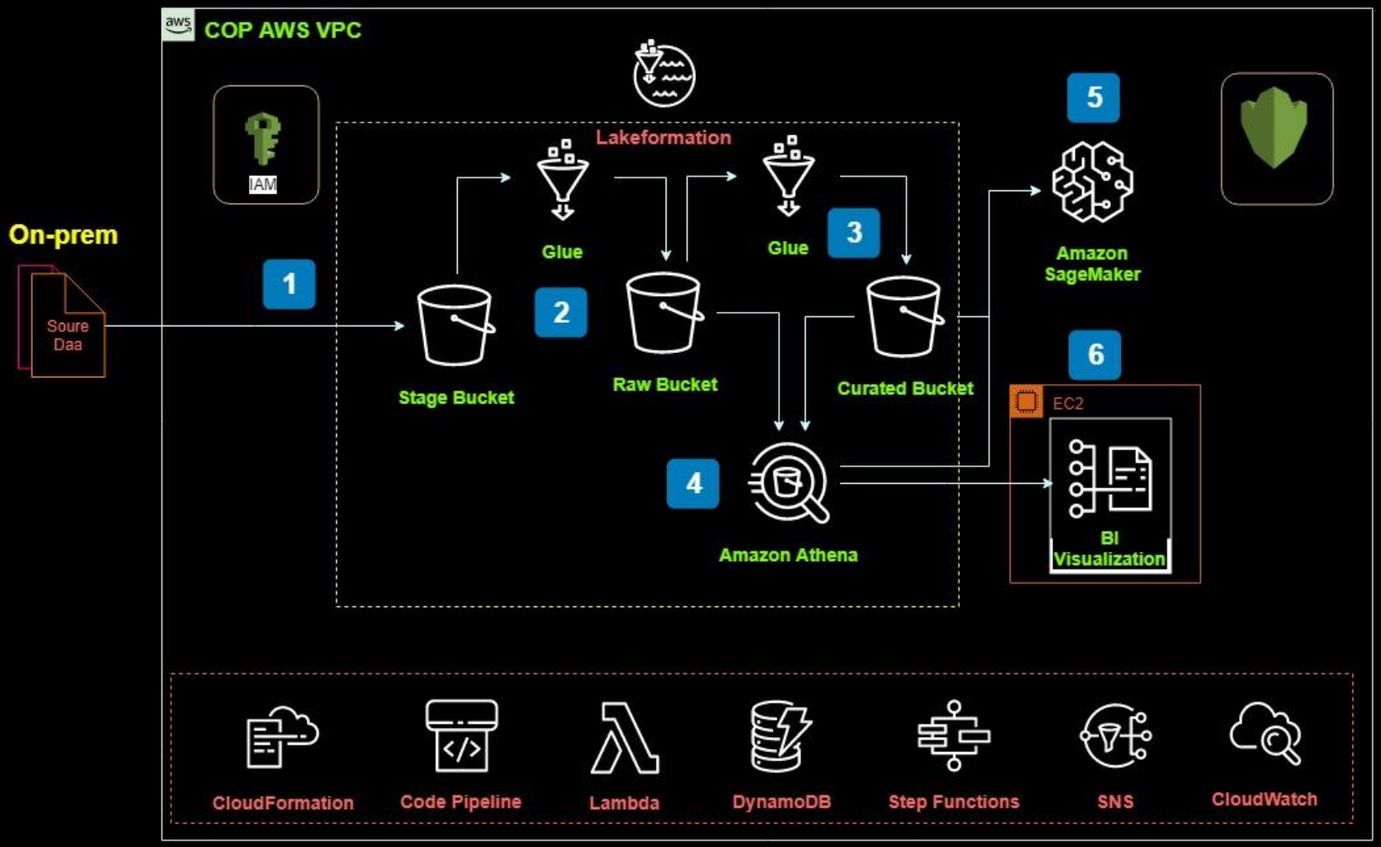
Solution architecture

- Amazon S3 buckets – stage, raw, and curated
- AWS Glue – transform and load data
- Amazon Athena DB for queries
- AWS Lake Formation data lake security

Solution considerations

- Partitions for the query performance
- Performance-monitoring metrics
- Integrate with existing enterprise BI
- Operational support automation

Montney data analytics platform for completions



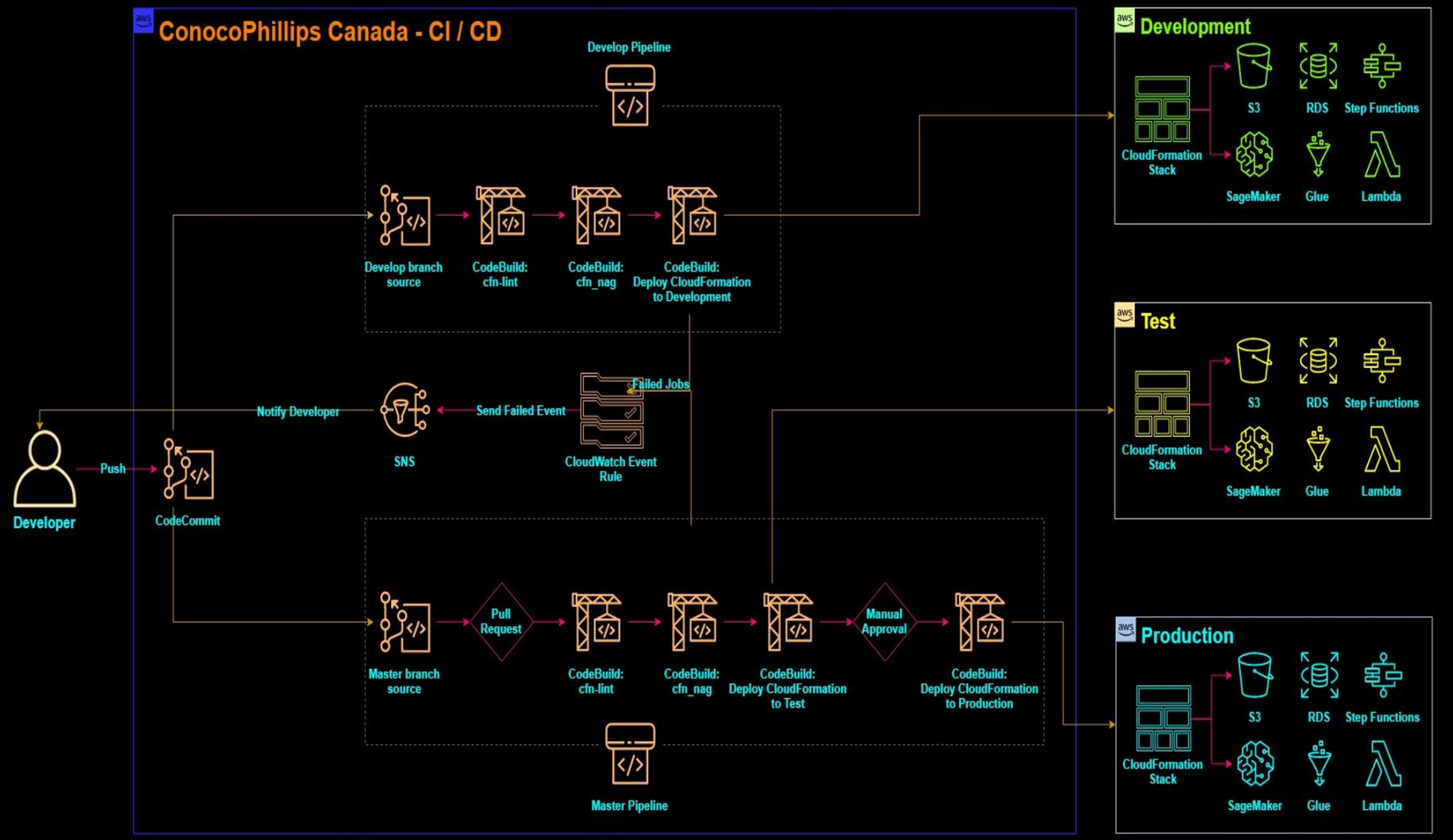
~~= >8 hrs. to prepare data for interpretation~~

= <1 min to prepare data for interpretation

What we built

Continuous integration / continuous delivery (CI / CD) and infrastructure as code

- AWS CodeCommit for repository
- AWS CodePipeline for deployment
- AWS Simple Notification Service (SNS) for pipeline approval
- AWS CloudFormation templates



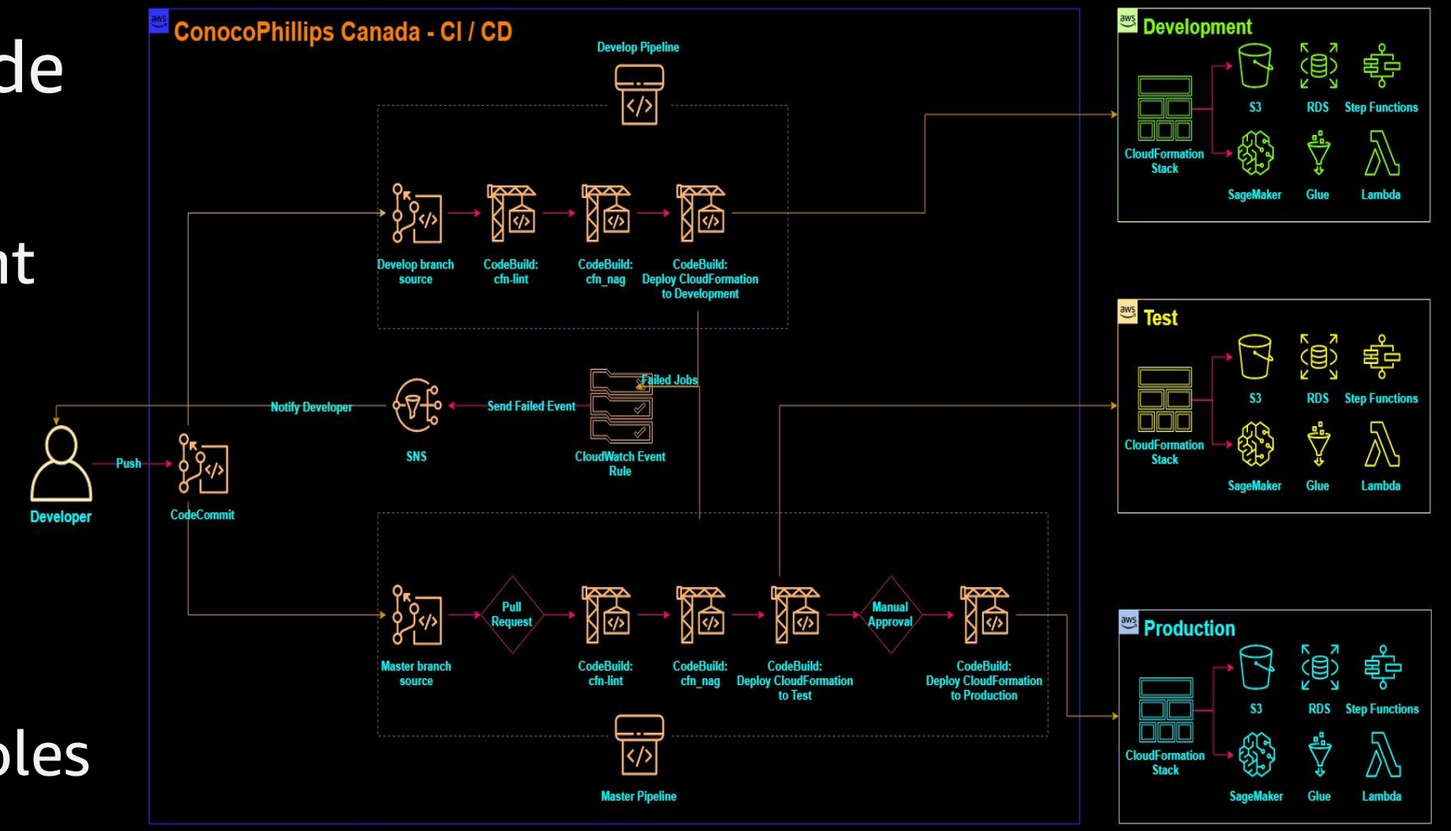
What we built

CI / CD and infrastructure as code

- AWS CodeCommit for repository
- AWS CodePipeline for deployment
- AWS SNS for pipeline approval
- AWS CloudFormation templates

Development considerations

- Cross-account CI / CD deployer roles
- Resource tagging for cost tracking
- Auditable deployment automation
- Resources meet configuration rules



“Allows us to SCALE!”

Our Cloud Story

Who we are

Where we were

What we built

How we built it

Where we are today

Where we are going next



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

How we built it

Engaged the right people:

- Canadian IT and analytics teams
- Montney development team
- Analytics and innovation CoE
- AWS Professional Services

10-week sprint

- Agile scrums
- Shared work and mentoring
- Documentation



How we built it

Engaged the right people:

- Canadian IT and analytics teams
- Montney development team
- Analytics and innovation CoE
- AWS Professional Services

+

10-week sprint

- Agile scrums
- Shared work and mentoring
- Documentation

=

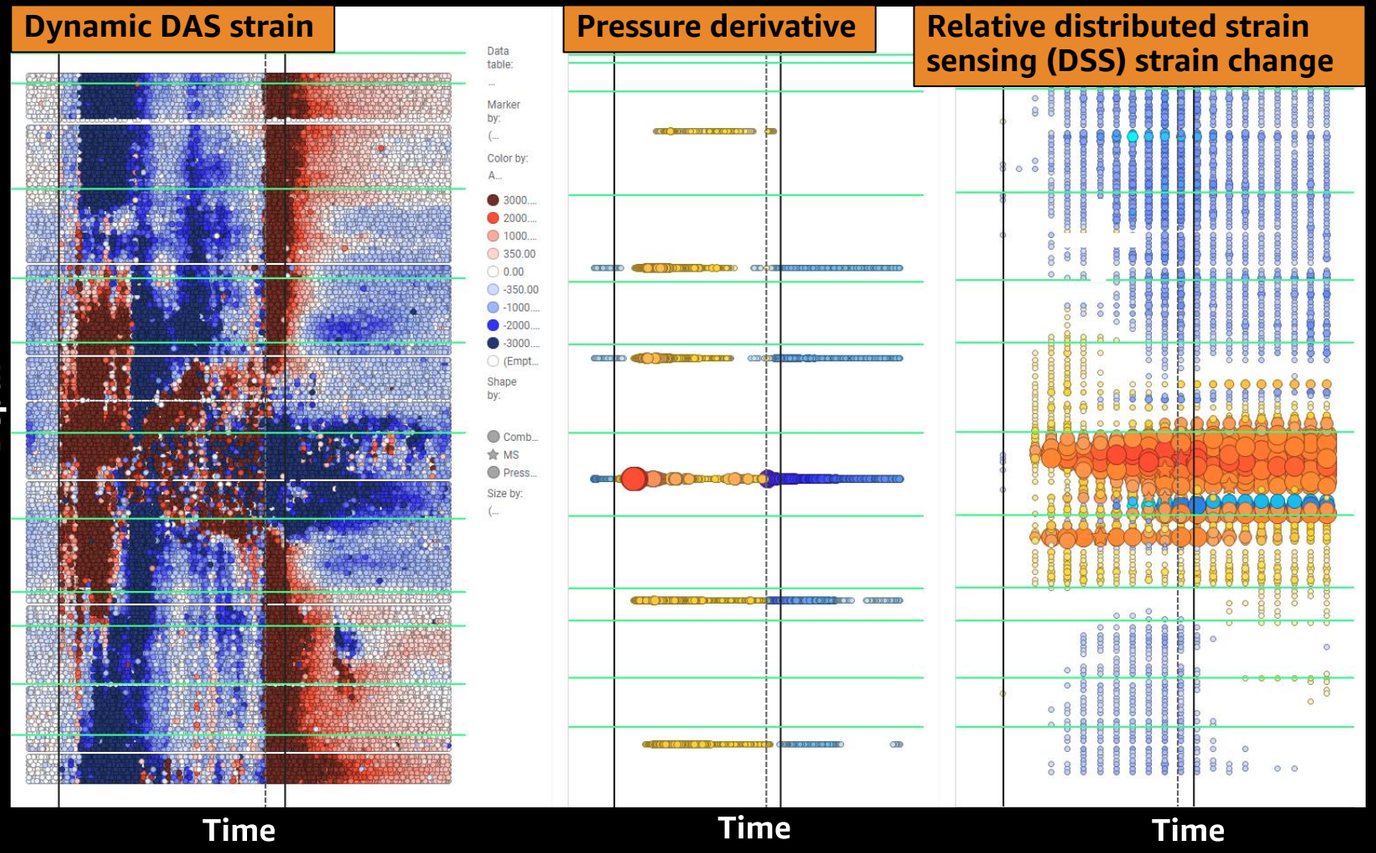
Minimum viable product

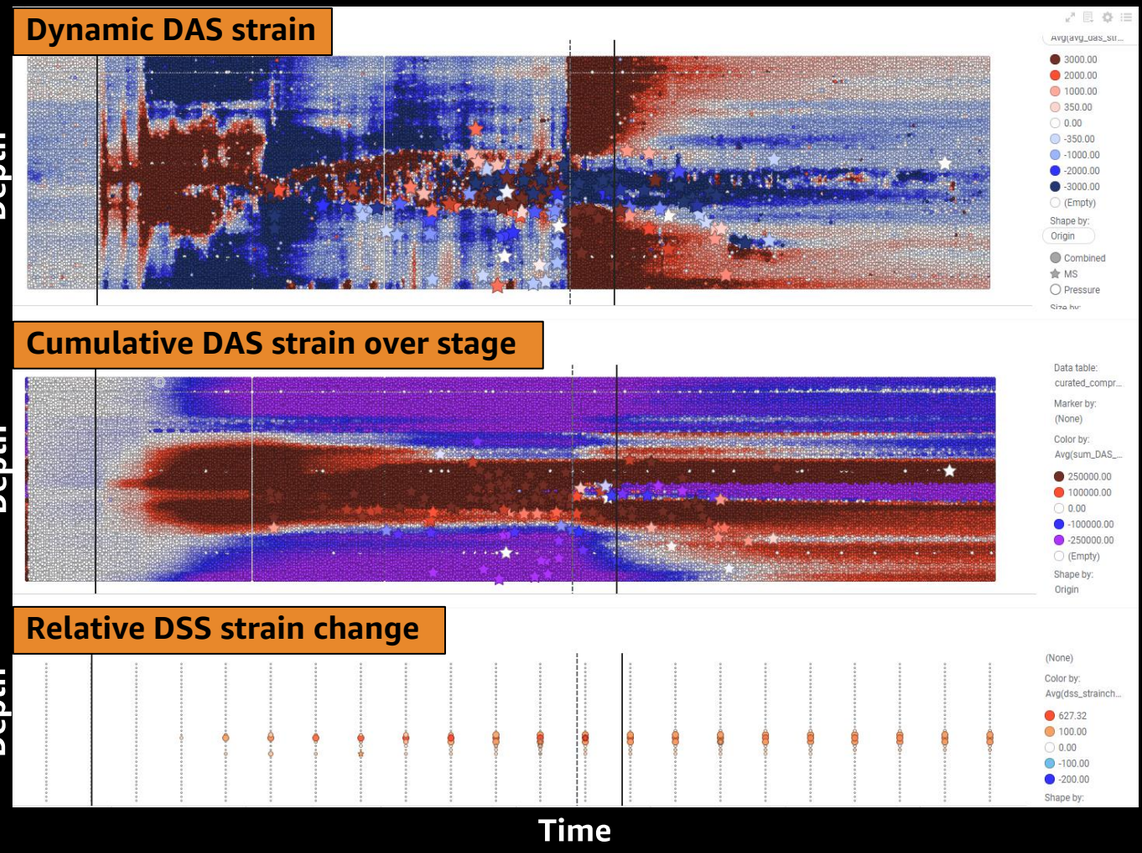
&

Skills and experience to sustain

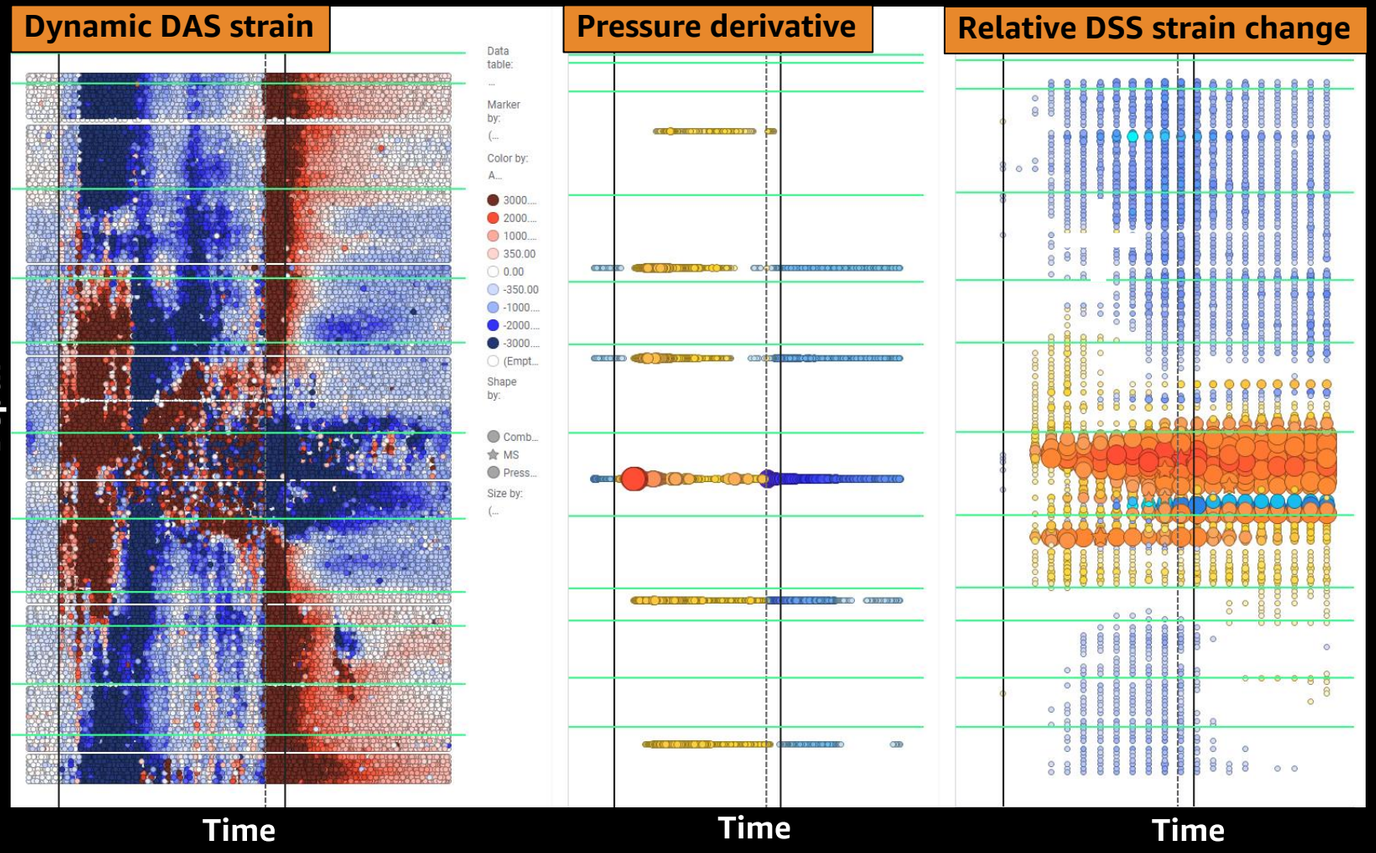


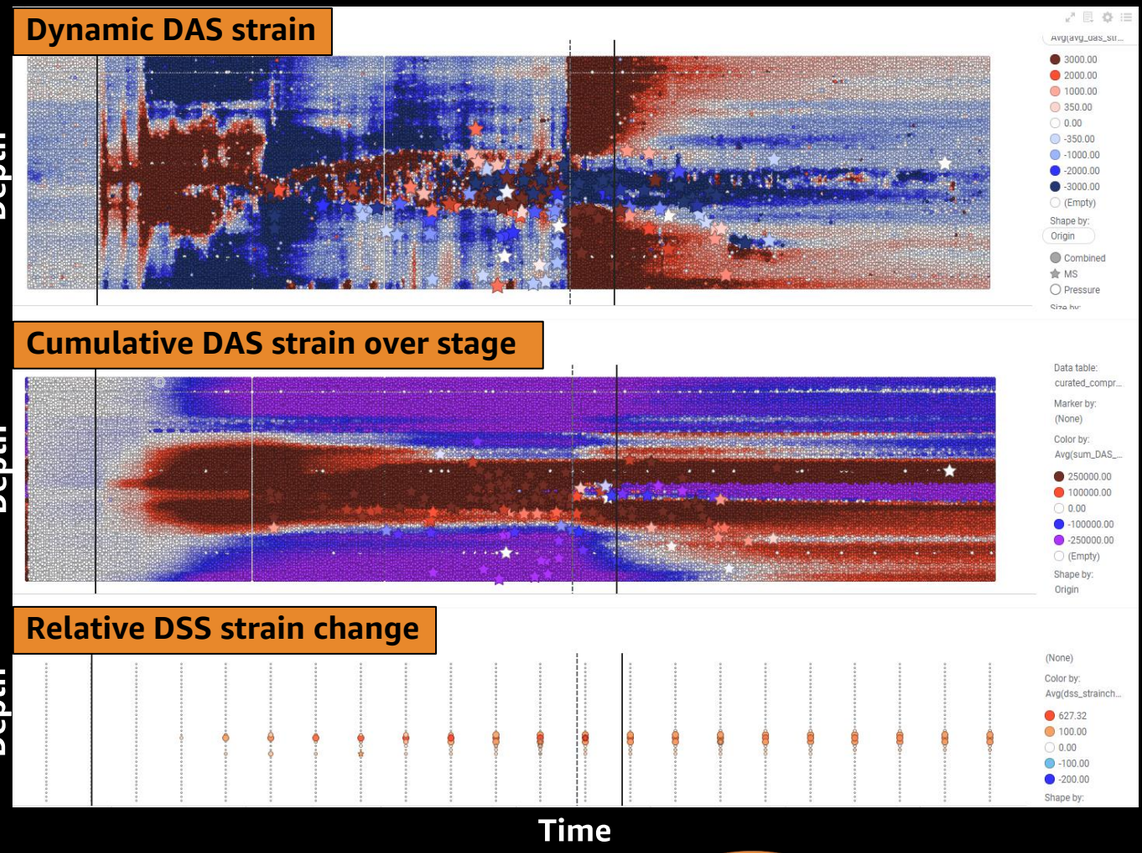
Where we are today





Where we are today





Trusted, available, integrated data + **Performant platform** + **Existing tools** =



Our Cloud Story

Who we are

Where we were

What we built

How we built it

Where we are today

Where we are going next



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Where we go next

Pilot to production

- Put the solution into production
- Establish support

Share learnings

- Architecture foundation
- Best practices, standards

Advanced analytics

Automate interpretations
Optimize frac operations
And much more

Epilogue … the end of this story

Big Data

Built Fast

Bright Future



Leadership Support

Thank you!



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Please complete the session survey

AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.