

CMG云计算-弹性可扩展的数值模拟工作环境

0-60: Leveraging the Cloud for your Dynamic Work Environment



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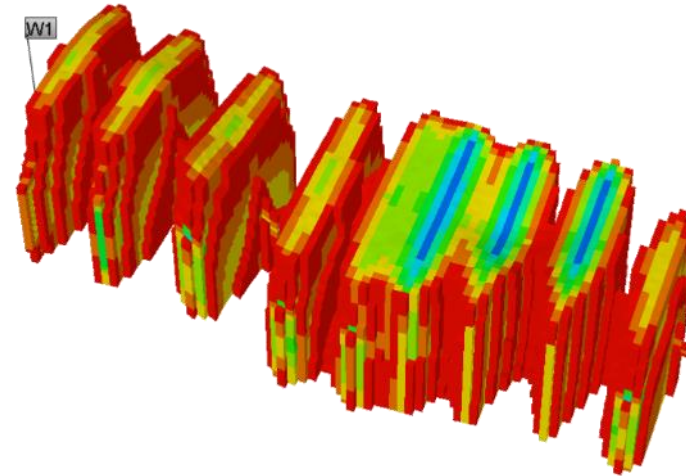
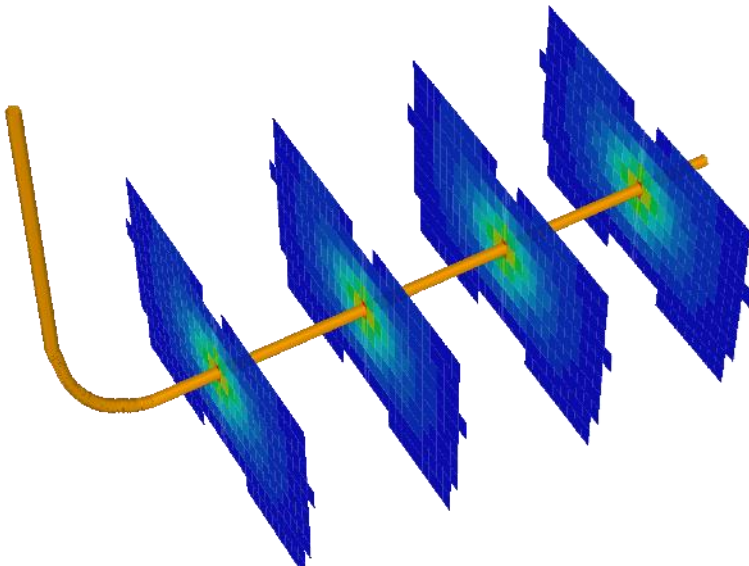


Steve Snyder
Sr Partner Development
Manager, AWS



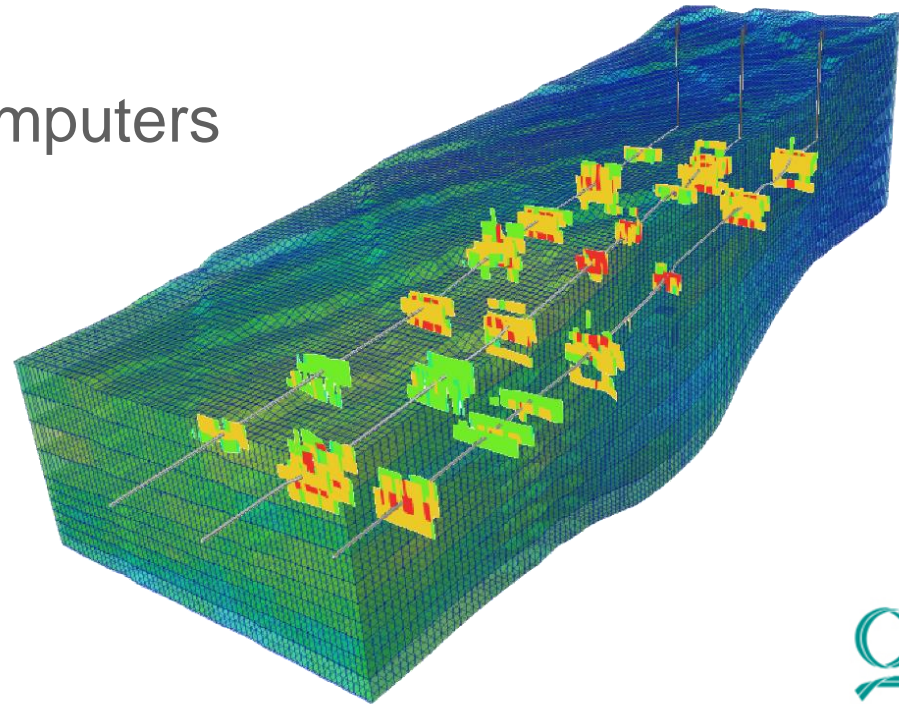
Current Simulation Trends

- Typical Unconventional Simulation workflow
- Phase 1: Single Well models
 - Small, quick to run, require large number of runs
 - Ideal hardware set up: multiple 4 or 8 cores computer



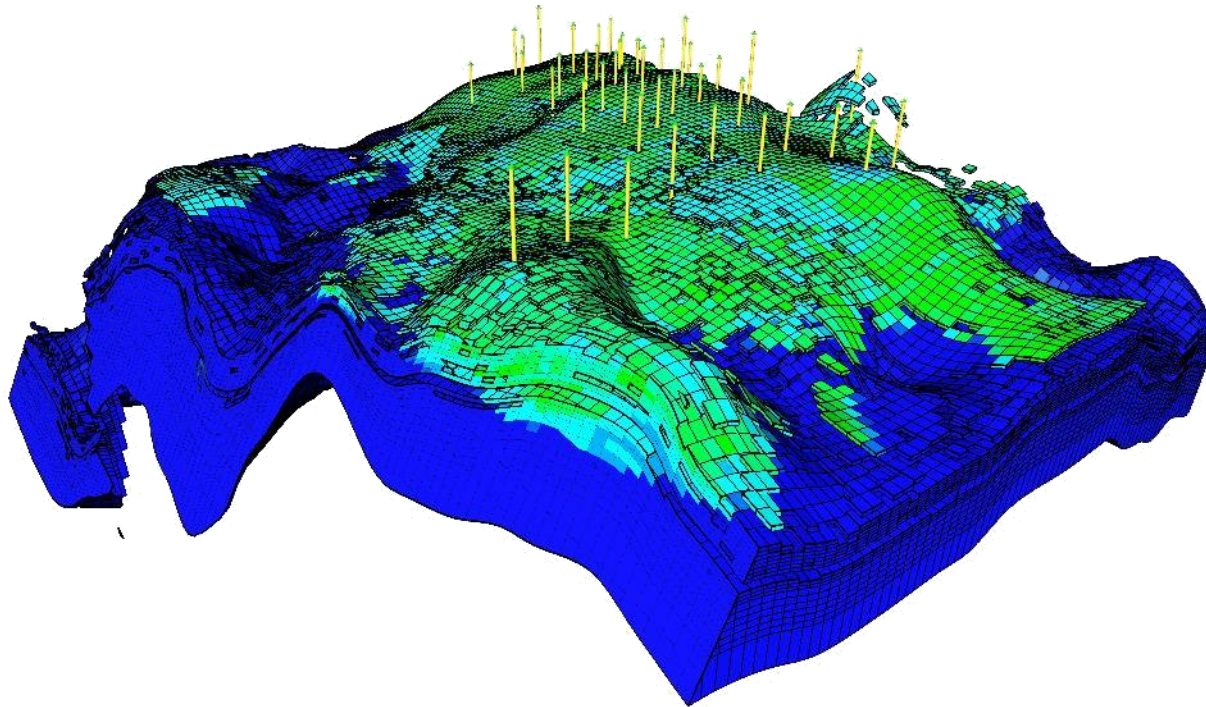
Current Simulation Trends

- Typical Unconventional Simulation workflow
- Phase 2: Multiple Wells or Single Pad models
 - Larger, more complex geology, takes longer to run
 - Ideal hardware set up: multiple 8 or 16 cores computers



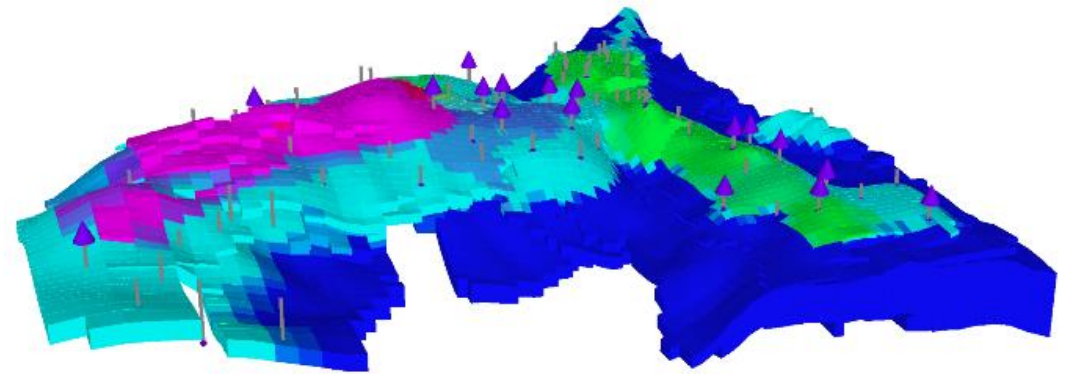
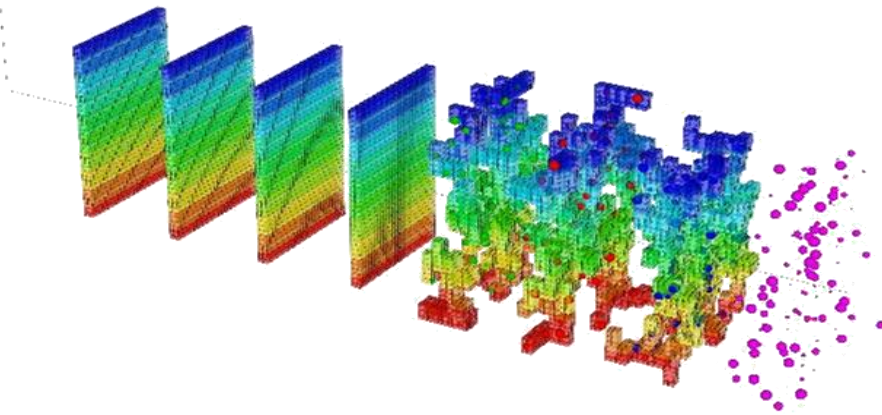
Current Simulation Trends

- Typical Unconventional Simulation workflow
- Phase 3: Multiple Pads or Full Field models
 - Even larger and more complex geology, very time consuming
 - Ideal hardware set up: a few 36+ cores computers



Current Simulation Trends

- Varying fidelities of models within the same project
- Varying numbers of simulation runs required
- On-demand availability for usage spikes
- Cost efficiency



Existing Hardware Solutions



Standalone Workstations



Centralized Compute
Nodes/Clusters

Current Trends

Current Trends

- Varying fidelities of models within the same project
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Existing Hardware

- Type and capacity are static
- Upgrades are time consuming
- Limited capacity for usage spike
- Hardware maintenance can be expensive, hardware becomes obsolete quickly

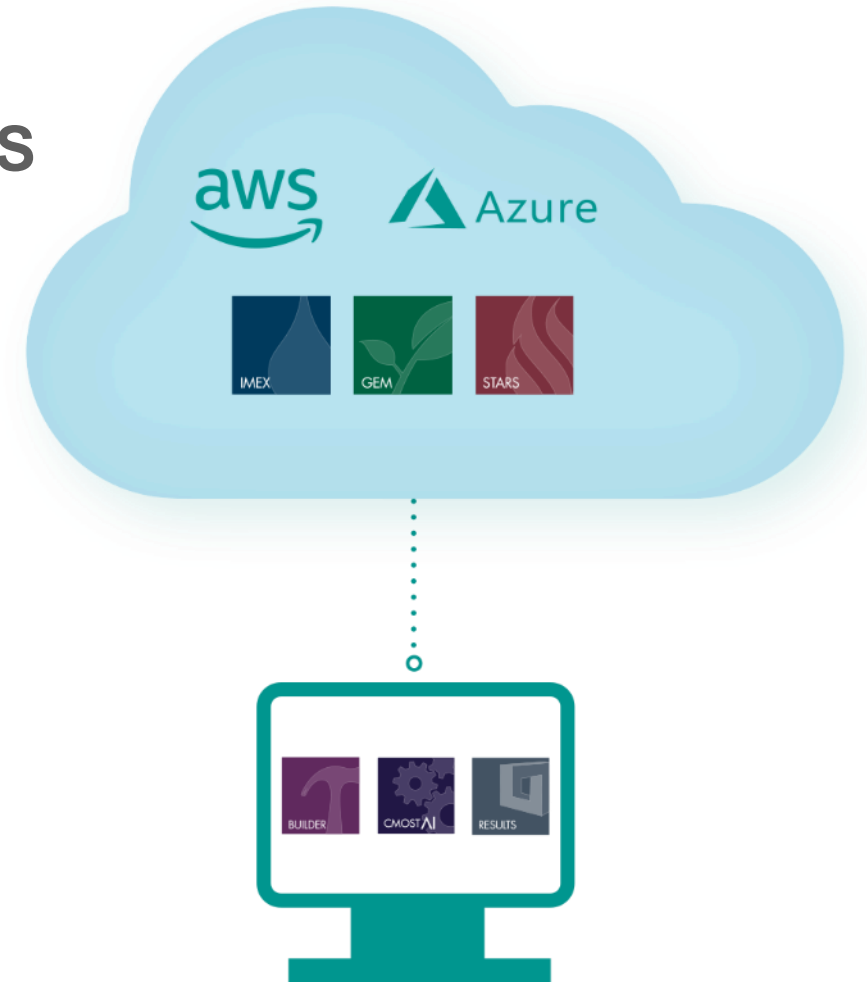


The Cloud



CMG Cloud Solutions

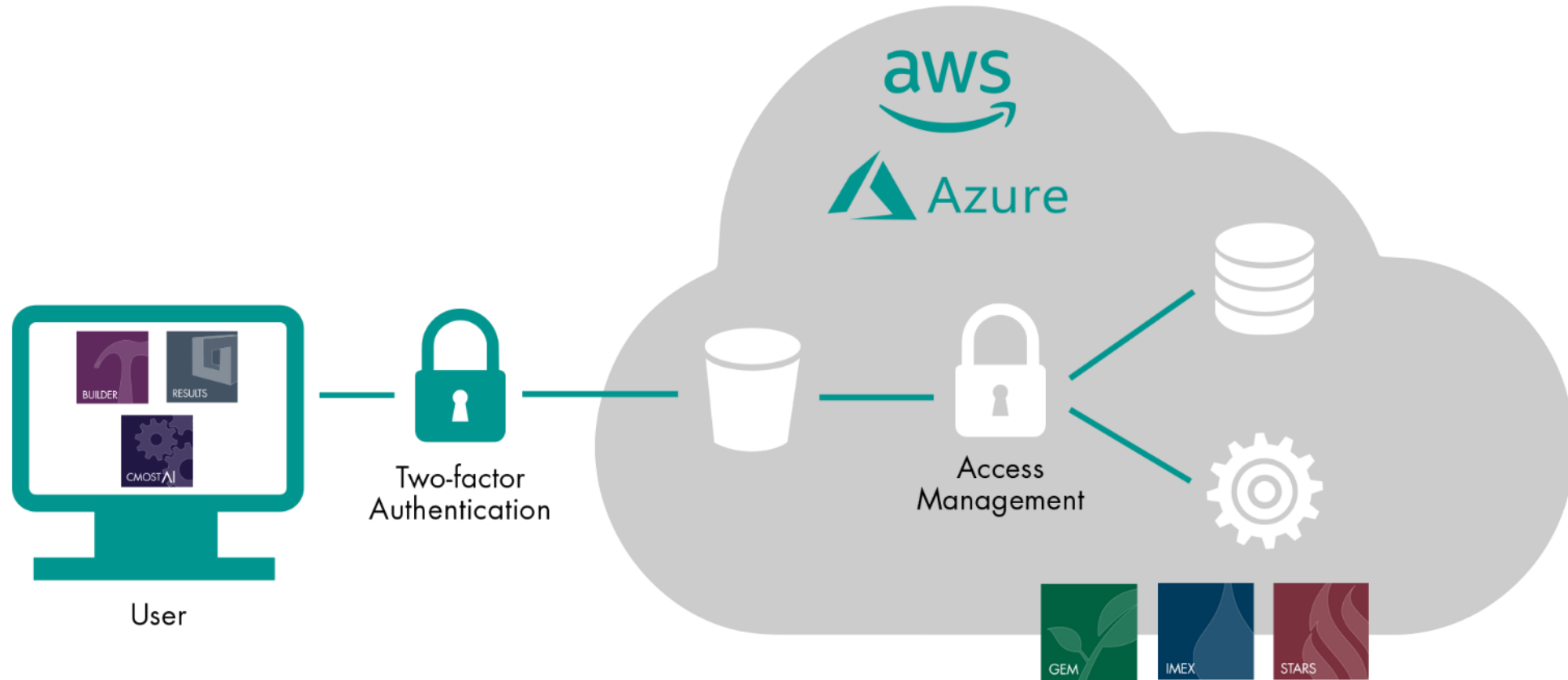
- **CMG Private Cloud, MS Azure & Amazon AWS**
 - Data Centers located through out the world
 - Almost infinite capacity and configurations
 - Secure & instantaneous access at anytime, from anywhere
 - Simple & easy to use interface
 - Seamless integration with CMOST AI



Global Network of Data Centers



Secure Data Transfer





The **Digital** Transformation, Cloud Computing and innovation in Oil & Gas.

Steve Snyder
Senior Partner Development Manager
December 2018

What have NYC 1900 & O&G Cloud Computing in Common ?

Easter morning 1900: 5th Ave, New York City.
Spot the car

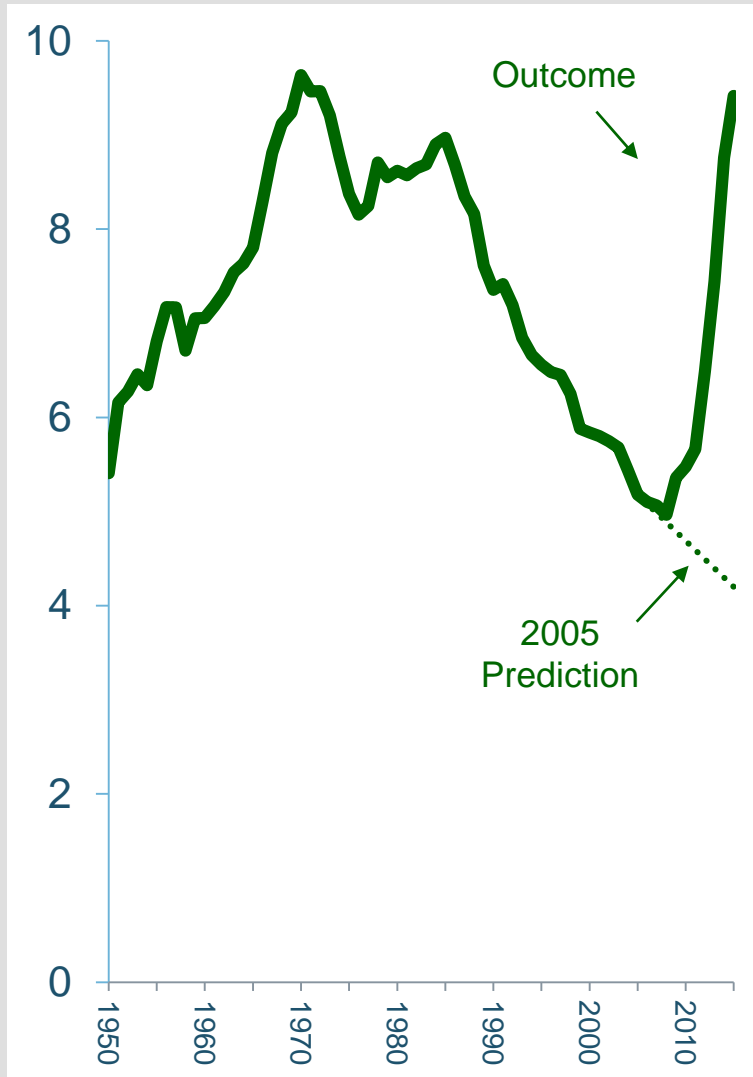


Easter morning 1913: 5th Ave, New York City.
Spot the horse

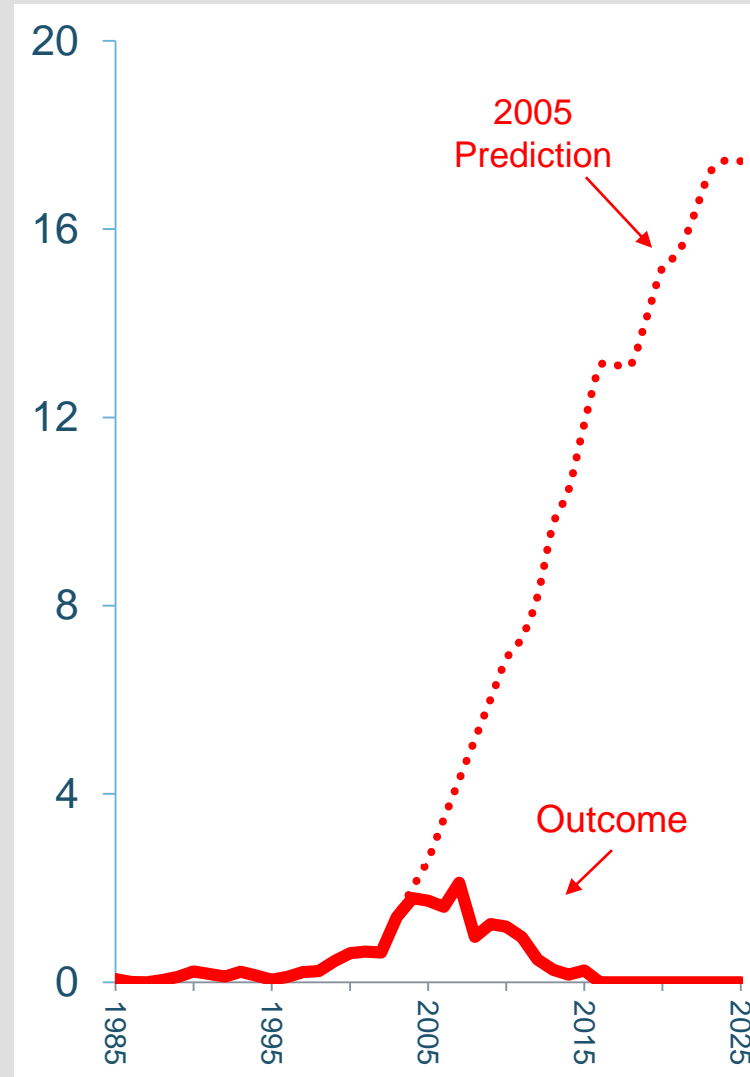


Unconventional Revolution Vastly Improved America's Energy Future

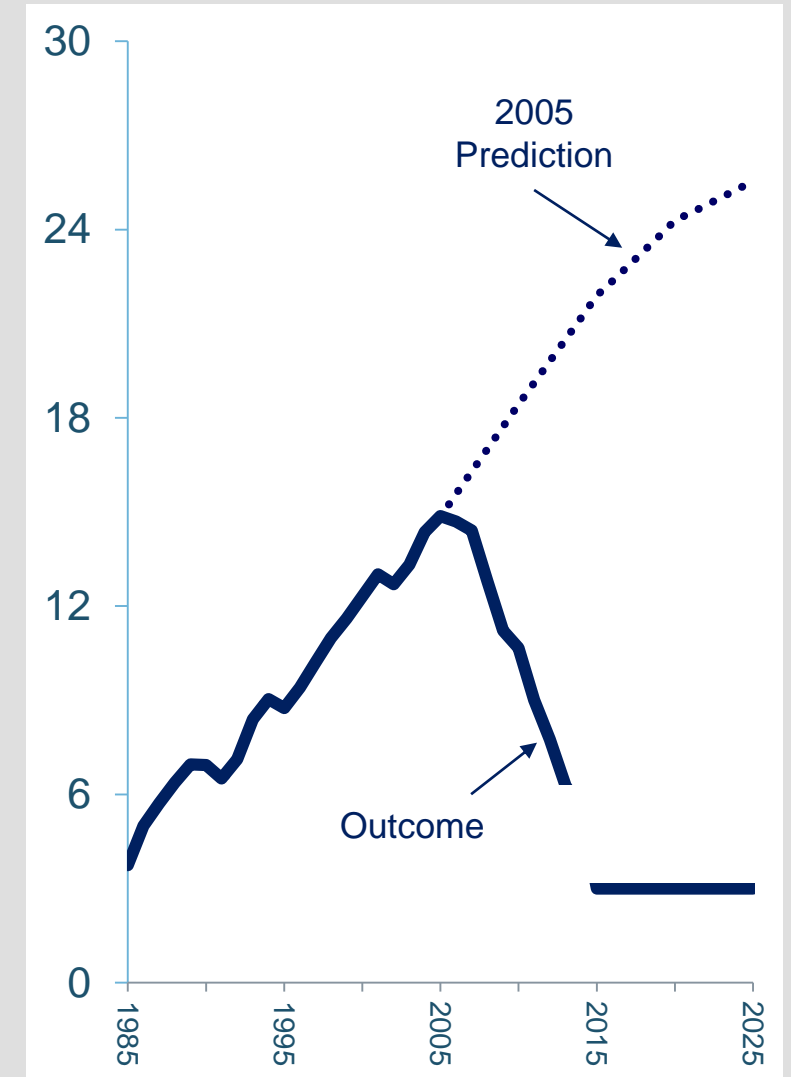
U.S. Oil Production
(millions of barrels per day)



Liquefied Natural Gas Imports
(bcf per day)



U.S. Net Energy Imports
(millions of BOE per day)



The Digital Transformation; a Paradigm Shift

- We are at the dawn of a **new era**. Only at the dawn of using new tools: ML, exascale compute, IOT and digital integration. New solutions and offerings require a new way of working.
- The new world requires agility, flexibility and a platform to leverage these abilities and innovations. It will be digital. Cloud is the **new normal**. Enabling you to Evolve and Innovate your business
- Emergence of **New Business models** driven by the integration of technologies and capabilities not imagined before. **Network Orchestrators** – challenging our long held tenets about data – creating value for all participants.
- New forms of collaboration, changing how we work. The onset of a **New Eco-system** of Cloud Native companies

Amazon Web Services



1994	○	Founded
1995	○	Amazon.com
1998	○	Added CDs & DVDs
2006	○	Amazon Web Services
2007	○	Kindle
2011	○	Video
2012	○	Groceries
2014	○	Alexa/Echo
2015	○	Bookstores
2017	○	Go

The AWS Cloud

Cloud Computing has become the new normal



Eliminate costly technical debt and reallocate resources



Innovate faster and solidify your competitive advantage



Reduce risk by focusing resources dedicated to security, compliance & availability

"AWS is our trusted partner that is going to run our company for the next 140 years."

Jim Fowler
CIO, General Electric

AWS By The Numbers

\$6.68B

Q3 '18 Billed Revenue, 46% YoY

67

Price Reductions (since '06).
Last Aug 2018

\$2.08B

Q3 '18 Operating Income

1,430

New Services and Features
introduced in FY 17

56%

Amazon total operating
earnings

10.000+

New Partners added to APN
in 2017

AWS Global Infrastructure

19 Regions – 57 Availability Zones – 127 Edge Locations

63 cities across 29 countries incl US, CAN, Europe, Asia, Australia
and South America

Region & Number of Availability Zones

US East

N. Virginia (6),
Ohio (3)

China

Beijing (2),
Ningxia (3)

US West

N. California (3),
Oregon (3)

Europe

Frankfurt (3),
Ireland (3),
London (3),
Paris (3)

Asia Pacific

Mumbai (2),
Seoul (2),
Singapore (3),
Sydney (3),
Tokyo (4),

South America

São Paulo (3)

GovCloud (US)

US-East (3),
US-West (3)

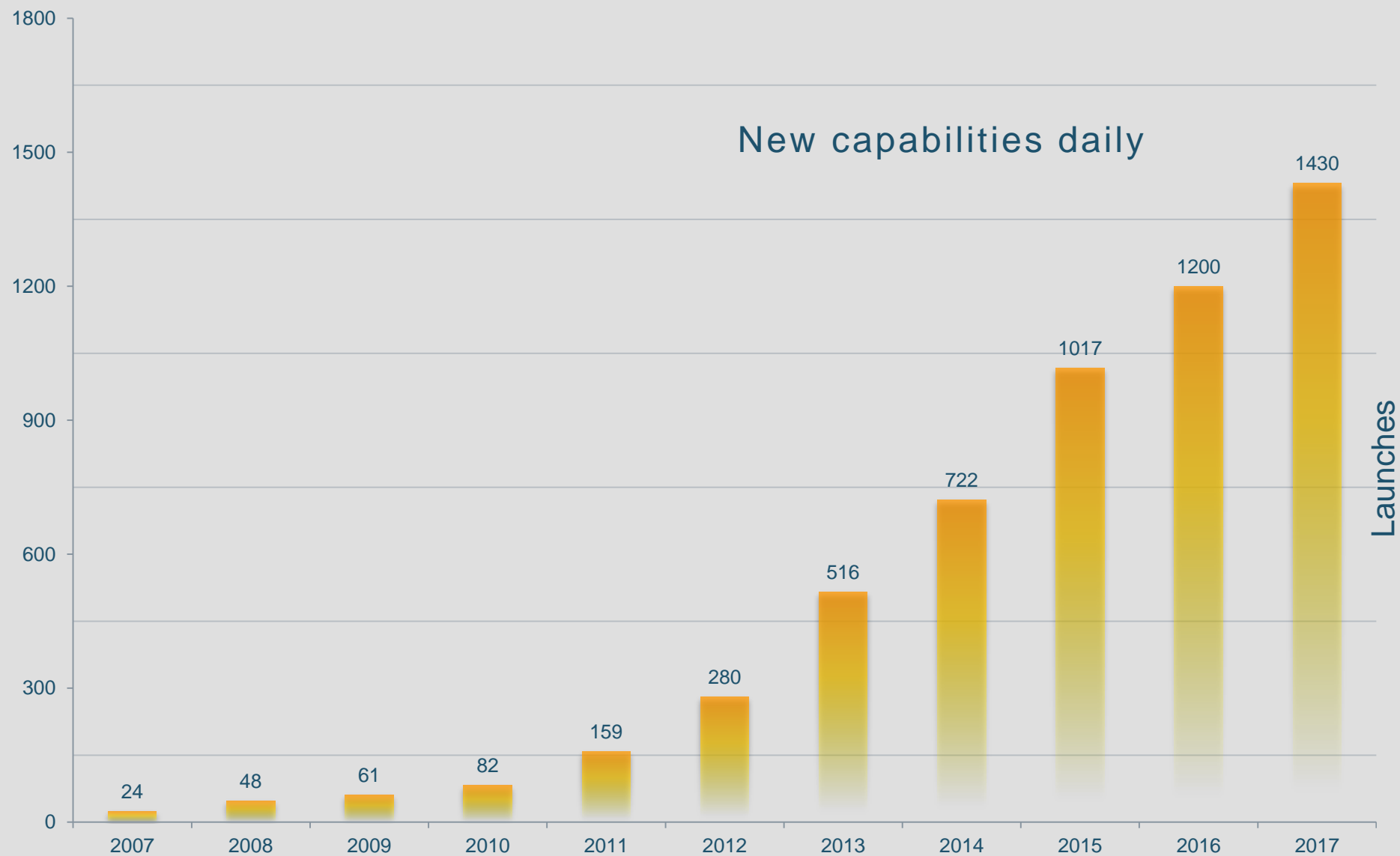
Canada

Central (2)

FIVE (5) Announced Regions

Milan, Bahrain, Cape Town, Hong Kong SAR, Sweden

PACE OF INNOVATION



Strengthen your security posture



"In the last four years as we transitioned to the cloud, I have come to realize that as a relatively small organization, we can be far more secure in the cloud and achieve a higher level of assurance at a much lower cost, in terms of effort and dollars invested. We determined that security in AWS is superior to our on-premises data center across several dimensions, including patching, encryption, auditing and logging, entitlements, and compliance.

John Brady
FINRA CISO

"The financial service industry attracts some of the worst cyber criminals. We work closely with AWS to develop a security model, which we believe enables us to operate more securely in the public cloud than we can in our own data centers."

Rob Alexander
Capital One CIO

AWS for Oil & Gas

Cloud computing to enable digital transformation and fuel innovation in Oil and Gas



Find Oil Faster



Recover More Oil



Reduce cost per
barrel



Reduce Risk &
Ensure Compliance



OIL & GAS INDUSTRY USE CASES

SUBSURFACE DATA LAKES

Derive deep insights from a broad set of structured and unstructured data

SEISMIC PROCESSING & INTERPRETATION

Improve real-time collaboration and data visualization with HPC

AUTONOMOUS SURVEILLANCE

Monitor facility conditions to detect equipment failure, corrosion, or security breaches.

PRODUCTION MONITORING AND OPTIMIZATION

Improve production monitoring and optimization with IoT solutions

PREDICTIVE MAINTENANCE AND REFINERY OPTIMIZATION

Improve operations and system uptime

CAPITAL PROJECTS

Digital twins for complex scenario modeling to improve decision making

OFFSHORE

TRANSPORTATION

STORAGE

REFINEMENT

RESERVOIR SIMULATION

Accelerate simulations and iterate and fine-tune models faster

TRANSPORTATION

HEALTH, SAFETY, AND THE ENVIRONMENT (HSE)

Remote training and maintenance with AR/VR to improve worker safety

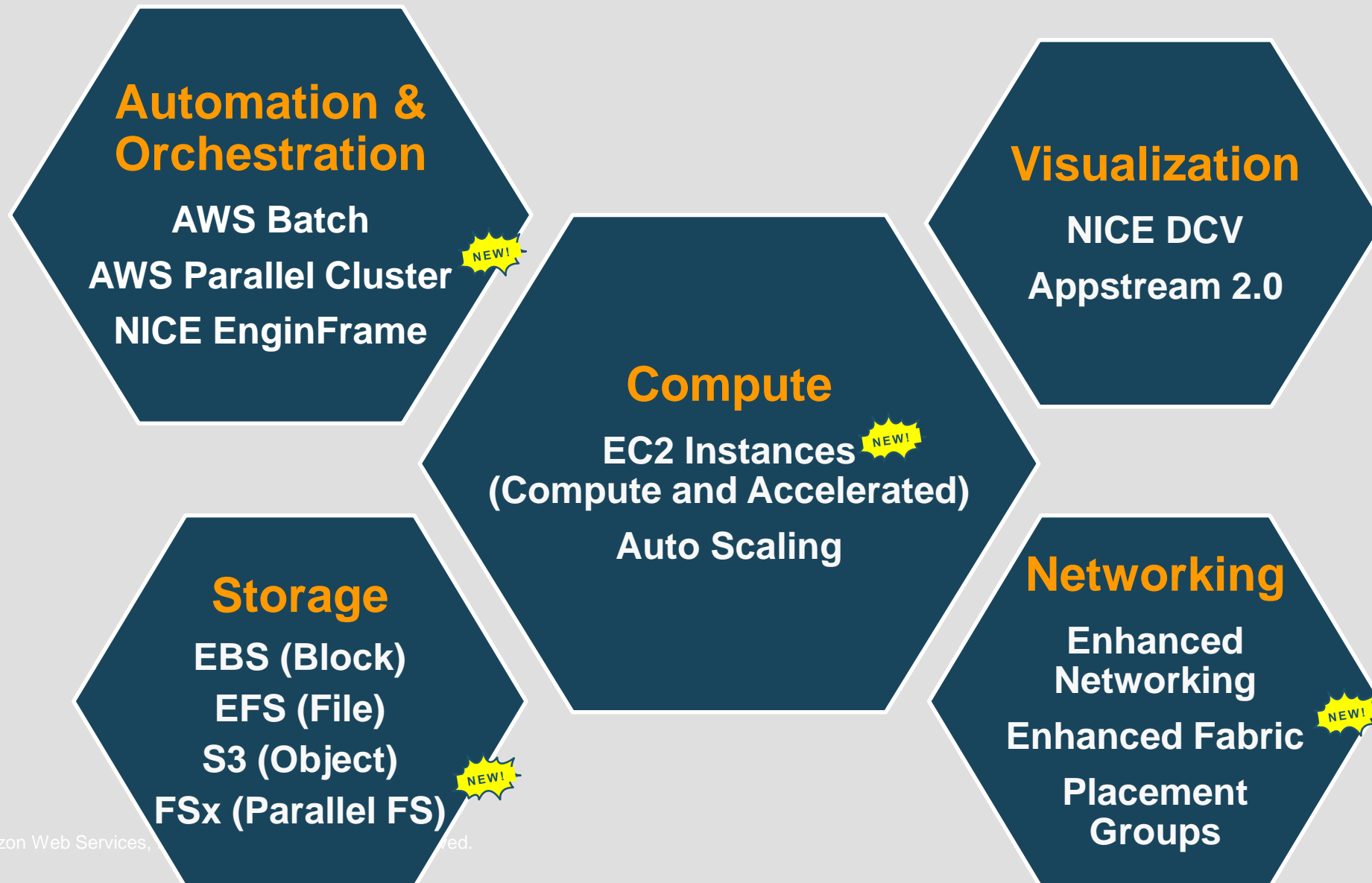
RETAIL

Enhance customer experience with frictionless purchase

WORKFORCE

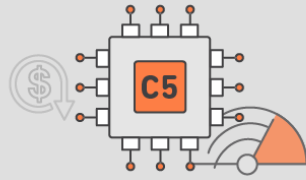
DISTRIBUTION

AWS HPC Solution Components

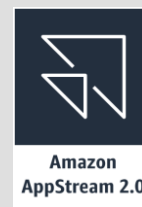
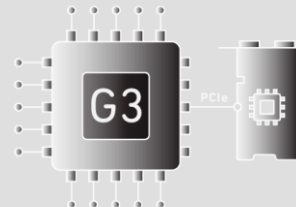


Why AWS for CMG Cloud Reservoir Simulation?

Best of breed silicon + Optimized services = Fast and secure results on-demand



Elastic network adapter



Custom AWS compute optimized Intel Skylake processors offer 25% price/performance improvement

Fabric offload frees 100% of CPU cycles for computationally intensive workloads for no additional cost and with greater security

Application streaming allows for interactive as well as batch job visualization in real time

An Expansive Ecosystem

Thousands of the world's largest technology and consulting companies



For APN Partners

The AWS Partner Network (APN) is the global partner program focused on helping APN Technology and Consulting Partners build a successful AWS-based business by providing valuable business, technical, and marketing support.



For AWS Customers

The APN further enables AWS Customers to identify high-quality APN Partners who deliver value-added services and solutions on AWS through specific APN Partner Programs and go-to-market (GTM) opportunities.



Partner Innovation: APN Network



Advanced
Technology
Partner



Data Ingestion at Seismic Scale

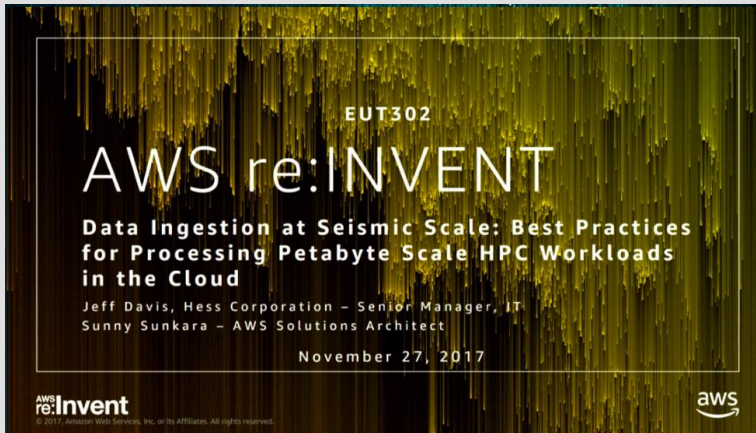


- *Functionally all applications tested worked as expected*
 - *Reduction of co-located datacenter size by 50%*
 - *Reduce data center power from 653KW to 311KW/mo*
 - *Reduction of physical server inventory by 400 high end servers and 3200 GPUs*
 - *400TB archived to cloud and growing*
 - *No additional storage growth budgeted for 2018*

“We found the performance of jobs using both CPUs and GPUs comparable between cloud and on-premise”

— Jeff Davis

Hess Corporation – Senior Manager IT



Innovating at scale



AWS
SUMMIT
sydney



Woodside and Innovation

- Woodside is an Australian oil and gas company with a global presence, recognised for its world-class capabilities – as an explorer, developer, producer and supplier.
- We are Australia's most experienced LNG operator and largest independent oil and gas company.
- Our mission is to deliver superior shareholder returns through realising our vision of becoming a global leader in upstream oil and gas.

Business driven problems that make a difference

Test quickly and learn

Capture advantage

"Think Big" → "Prototype Small" → "Scale Fast"

28th April 2016

Woodside, Innovation and Cloud Computing

amazon web services

Shaun Gregory, SVP & CTO of Woodside

- Woodside deploys IoT for LNG facilities
- developed algorithms to identify signs of "foaming" and prevent these catastrophic events from LNG facility shutdown.
- 6 weeks to pilot.
- Scale plant wide & Scale business wide



Choose the Cloud



Current Trends

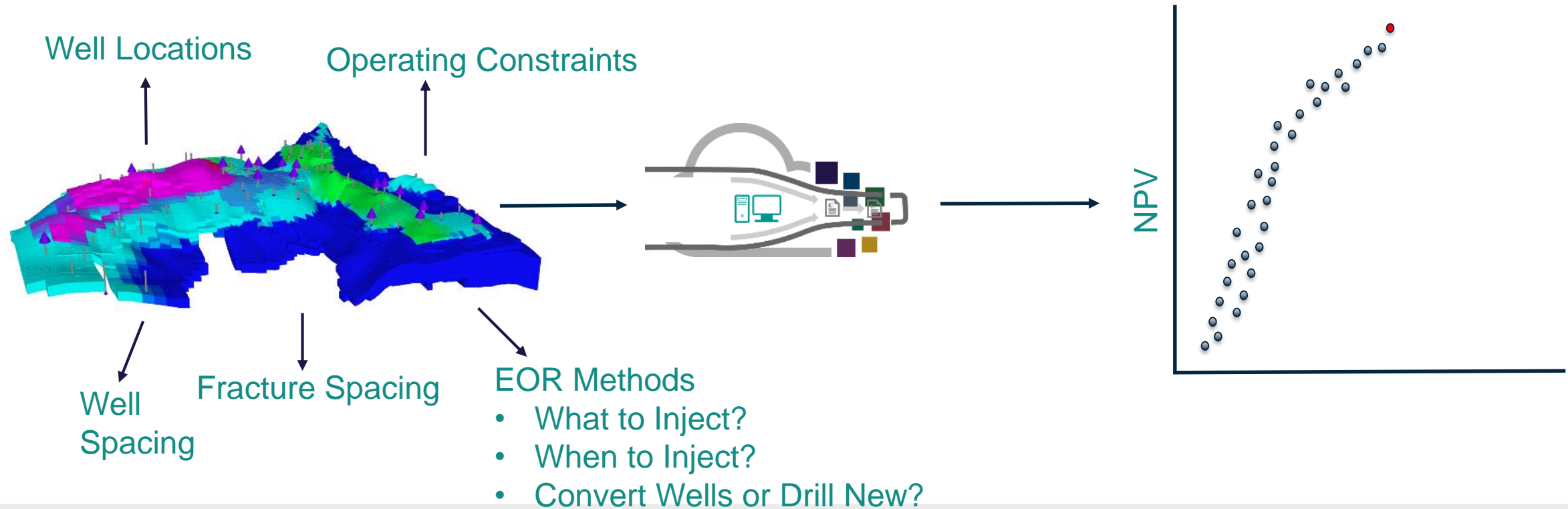
- Varying fidelities of models within the same project
- Varying numbers of simulation runs required
- On-demand availability for usage spikes
- Cost efficiency

Cloud Capabilities

- Instantly scalable and flexible hardware and software options
- Almost infinite capacity and configurations, no queuing required
- Instantaneous access, 24/7 to meet project deadlines
- Pay-as-you-go, access to latest hardware and software



Remove the Bottleneck with Cloud!



CMG Cloud Solutions



Improve project delivery with instantly scalable and flexible options based on project needs



Access latest CMG software releases, and industry's best hardware



Securely access anywhere in the world, 24/7



Improve usage efficiency with pay-per-use hardware and software



Seamless integration with CMOST AI

