



Security and AI on Google Cloud

November 21, 2019

National Environmental Satellite, Data, and Information Service (NESDIS)

Mission:

Provide secure and timely access to global environmental data and information from satellites and other sources to both promote and protect the Nation's environment, security, economy and quality of life.

Vision:

Expand understanding of our dynamic planet as the trusted source of environmental data.

Commitment:

Keeping to cost and schedule, meeting observational and monitoring requirements for the enterprise,

Ensuring the security of the enterprise,

Maximizing the utility of data and information and promoting and developing use-inspired and innovative science with an engaged and highly skilled workforce.

How is Google is working with NOAA Today?

Productivity:

G Suite for
Government

Maps

Google Earth Engine

Google Cloud
Platform

**Built on a Google
Common
Infrastructure*

Big Data Project:

Broaden access to
NOAA's public
data.

Fostering
innovation by
bringing together
the tools necessary
to make NOAA's
data more readily
accessible.

Research Partnerships:

Google Earth with
Ocean Datasets

Google AI for
Whale Research

Google Cloud Infrastructure

Our infrastructure in numbers

20 Cloud Regions (+3 announced regions) [url](#)

61 Zones [url](#)

134 Edge POPs [url](#)

96 CDN locations [url](#)

81 Dedicated Interconnect locations [url](#)

16 Google Data Centers [url](#)

30 Renewable Energy Project Locations [url](#)

100,000s of miles of fiber optic cable [poster](#)

13 Subsea Cable Investments [poster](#)

Google Cloud in the Federal market

64

FedRAMP Moderate
Products

20

FedRAMP Regions



FIPS
140-2

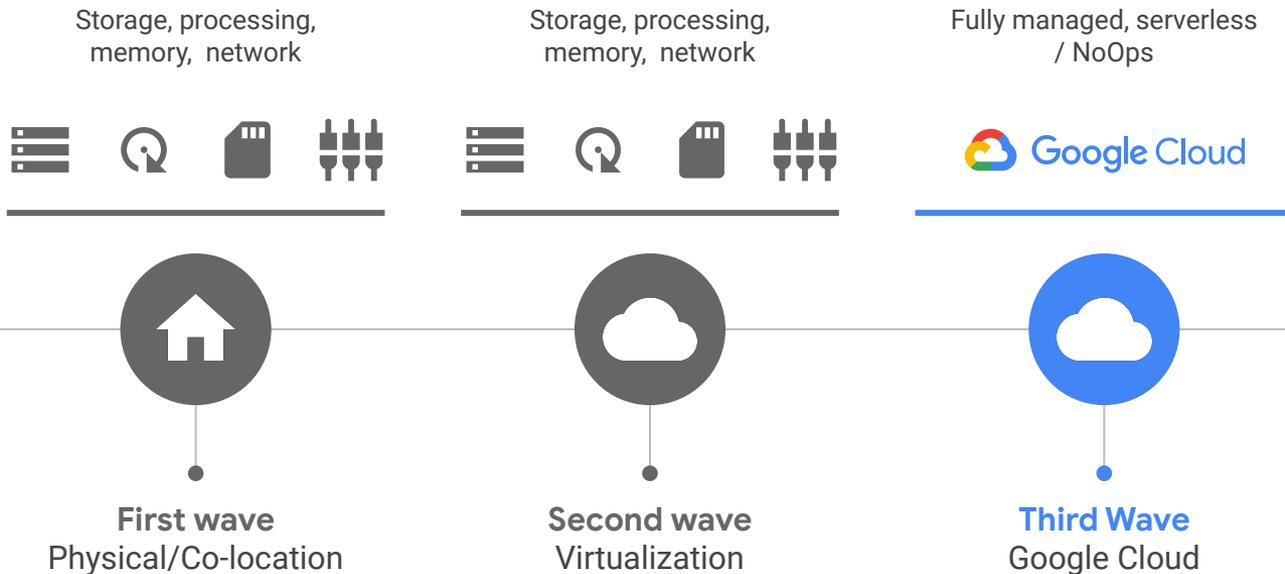
Data in transit and at rest is
automatically encrypted with
FIPS 140-2 validated crypto

High

FedRAMP High JAB “In
Process”

How you implement cloud can vary widely, with significant impacts on agility and mission

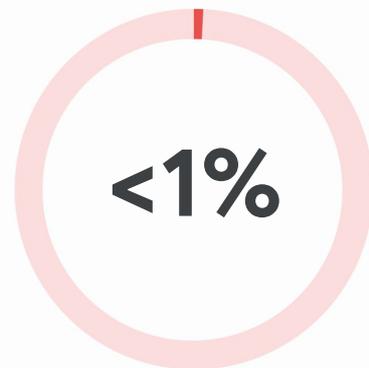
A different kind of cloud



Google Cloud capabilities in analytics and security can help NOAA solve for key performance / outcomes

- **Speed/Agility**
- **Scale/Reliability/Resilience**
- **Security**

Most organizations are under-leveraging their data, which limits their mission effectiveness



Less than 1% of unstructured data is analyzed or used at all*



Less than 50% of structured data is used to make decisions*

*Harvard Business Review magazine; May-June 2017

**If your organization
isn't good at analytics,
it's not ready for AI**

Harvard Business Review, 2017



Barriers to getting value out of data



Legacy
IT



Data silos and
fragmented
governance



Human capital
limitations



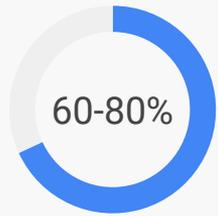
Security and
compliance
concerns



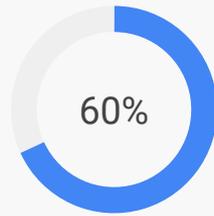
Innovation,
dynamic insights,
speed to
decision

Traditional data warehouses still form the foundation for most analytics programs

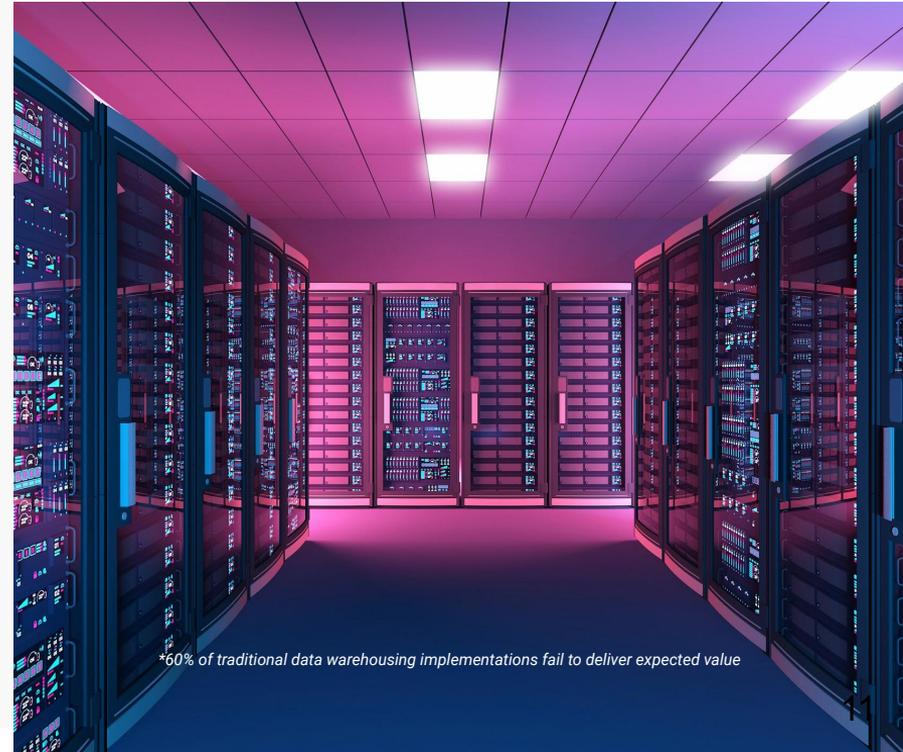
Managing volume and achieving speed in a traditional data warehouse is a significant challenge



Higher up-front, operational and maintenance costs



Higher risk of failure*

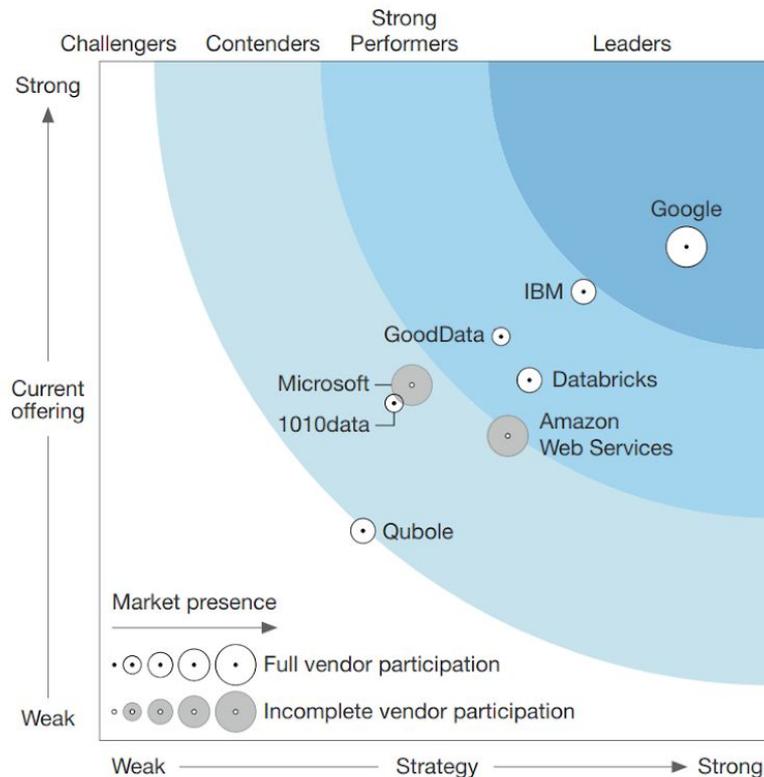


**60% of traditional data warehousing implementations fail to deliver expected value*

Cloud Analytics and ML/AI

Insights Platform-as-a-Service

“...**one vendor as a leader** based on the strength of its PaaS strategy, advanced tools for batch and real-time solutions and machine learning and AI offerings”



FORRESTER®



BigQuery: scalable data warehouse platform for analytic scale and **performance**

250+ Petabytes

Largest storage customer

5 Petabytes

Largest query (data size)

10.5 Trillion*

Largest query (rows)

4.5 Million rows/sec*

Peak ingestion rate

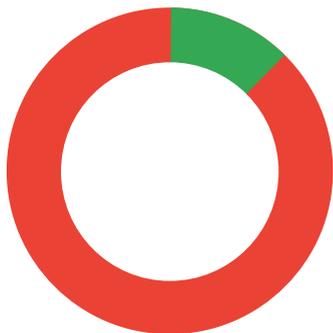
Google: serverless data & analytics

Focus on insights, not infrastructure

Typical data & analytics

■ Programming, configuration, provisioning, maintenance, monitoring, scaling, tuning

■ Analysis & Insights



- ⊗ Difficult to deploy and maintain
- ⊗ Too much time spent taking care of the system
- ⊗ Not enough time spent getting insights

Google data & analytics

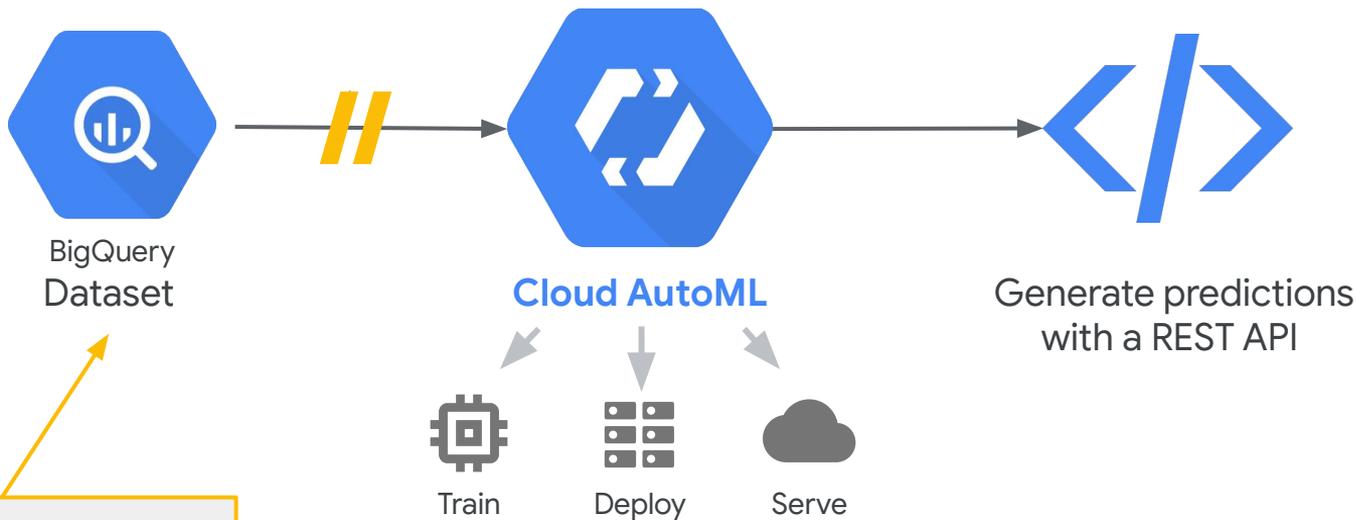
■ Analysis & Insights

■ Programming



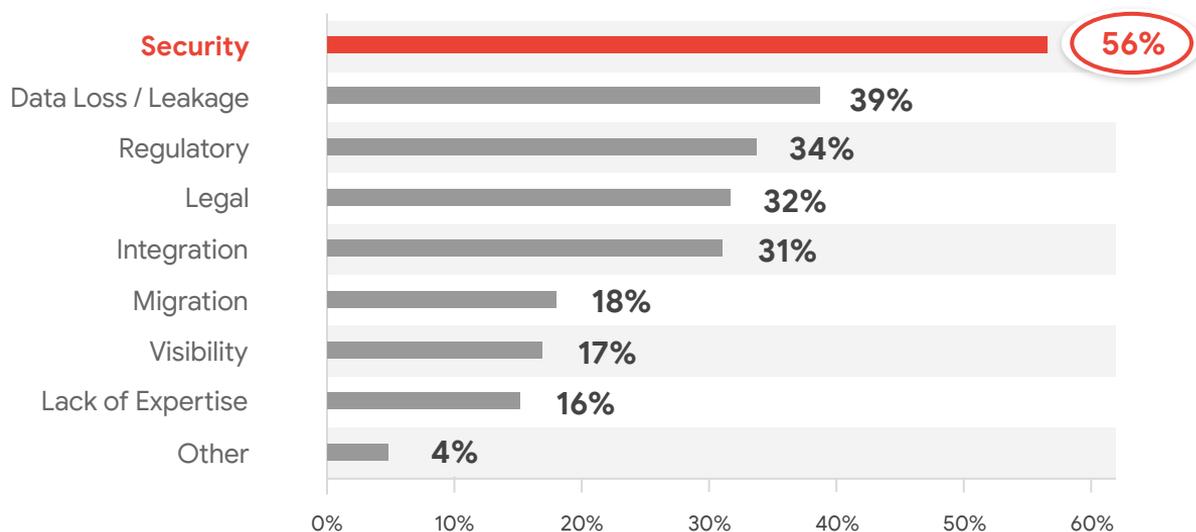
- ✓ Focus on insights not infrastructure
- ✓ From batch to streaming
- ✓ Analytics, transactions and data warehousing

As you gain scale with analytics in Google Cloud, you can increasingly leverage **ML/AI to drive innovation**



Data in the Cloud can access GCP leading AI/ML capabilities

What's holding organizations back from wider cloud adoption?



Our approach to security in two words

Trust Nothing

Use the cloud to **stop threat actors at massive scale**

91%
of cyberattacks start with a phishing email¹

We filter **10 million**
spam and malicious emails
every minute

84%
of organizations hit by a DDoS attack
in 2016
86% of those more than once²

Google has
1000x the bandwidth
of the largest DDoS attacks ever⁴

A business is hit with a
ransomware attack every
40 seconds³

We protect **3 Billion**
devices from URLs with
malicious content every day
We scan **694,000** Web pages
for harmfulness every minute

¹ Enterprise Phishing Susceptibility and Resiliency Report, 2016

² Worldwide DDoS Attacks and Cyber Insights Research Report from Neustar, 2017

³ Kaspersky Security Bulletin, 2016

⁴ Wired, 2018

Cloud and Data Security

THE FORRESTER WAVE™

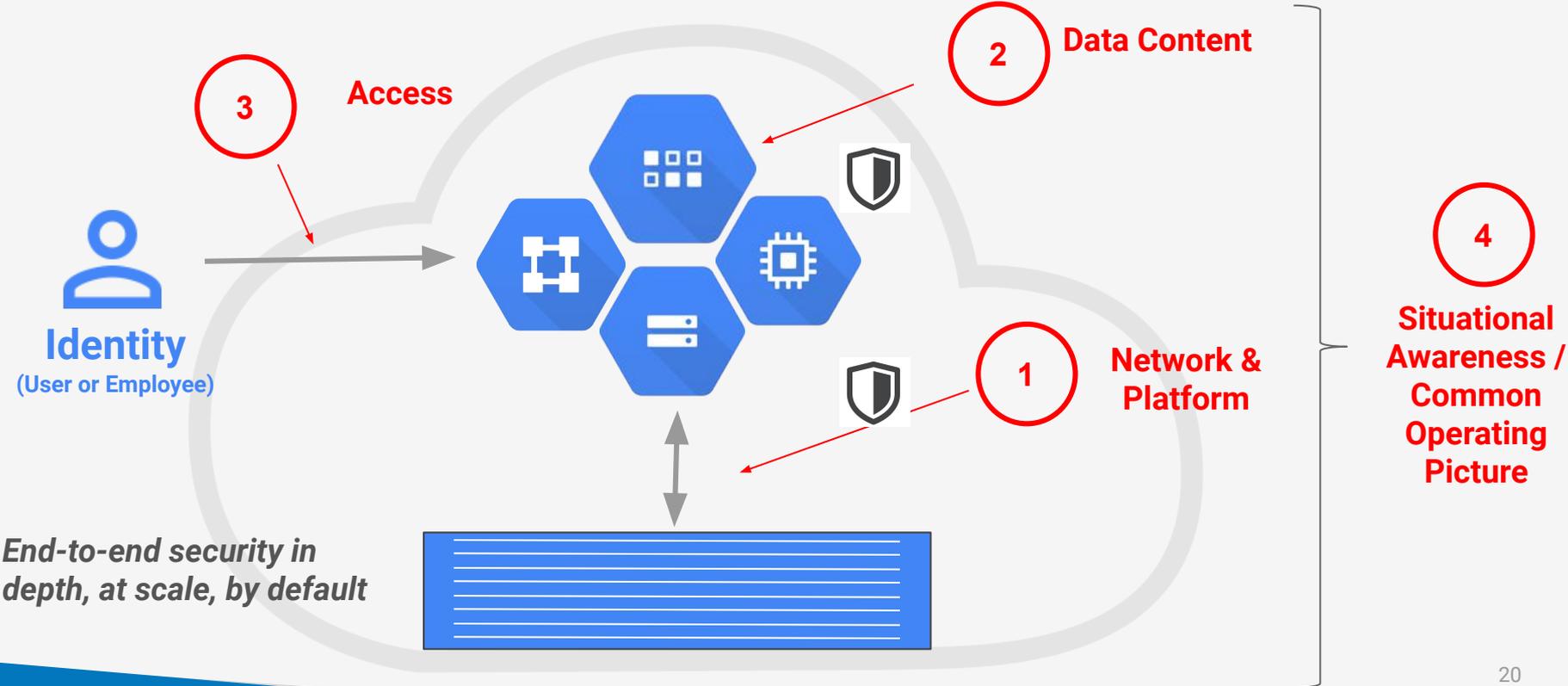
Data Security Portfolio Vendors

Q2 2019

“Google puts cloud and cloud security at the center of its strategy. Google supports a Zero Trust approach with its capabilities to identify data, map flows, encrypt, control access, and automate. Strengths include depth and granularity in access control and security data analytics. Customers appreciate Google's ease of deployment and scalability of its capabilities.”

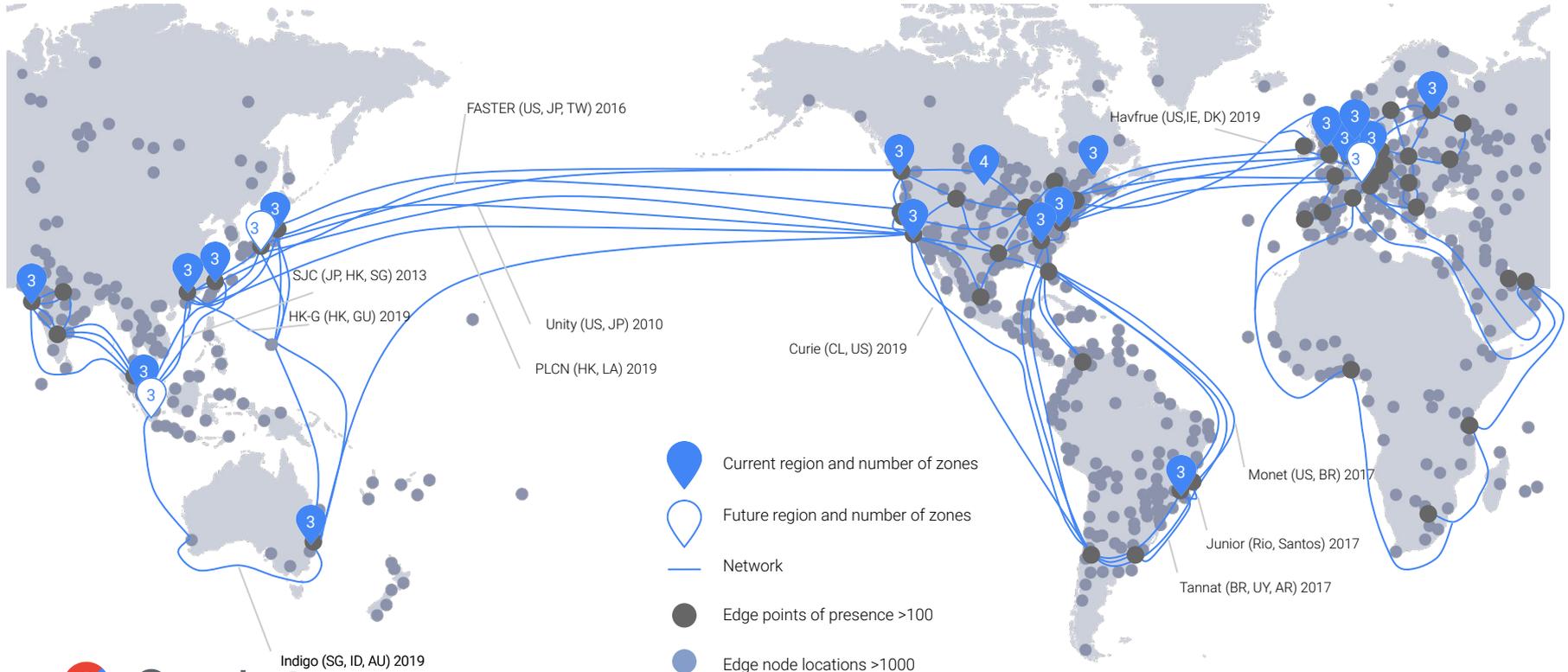


Google's Approach: Focus on 4 distinct risk areas

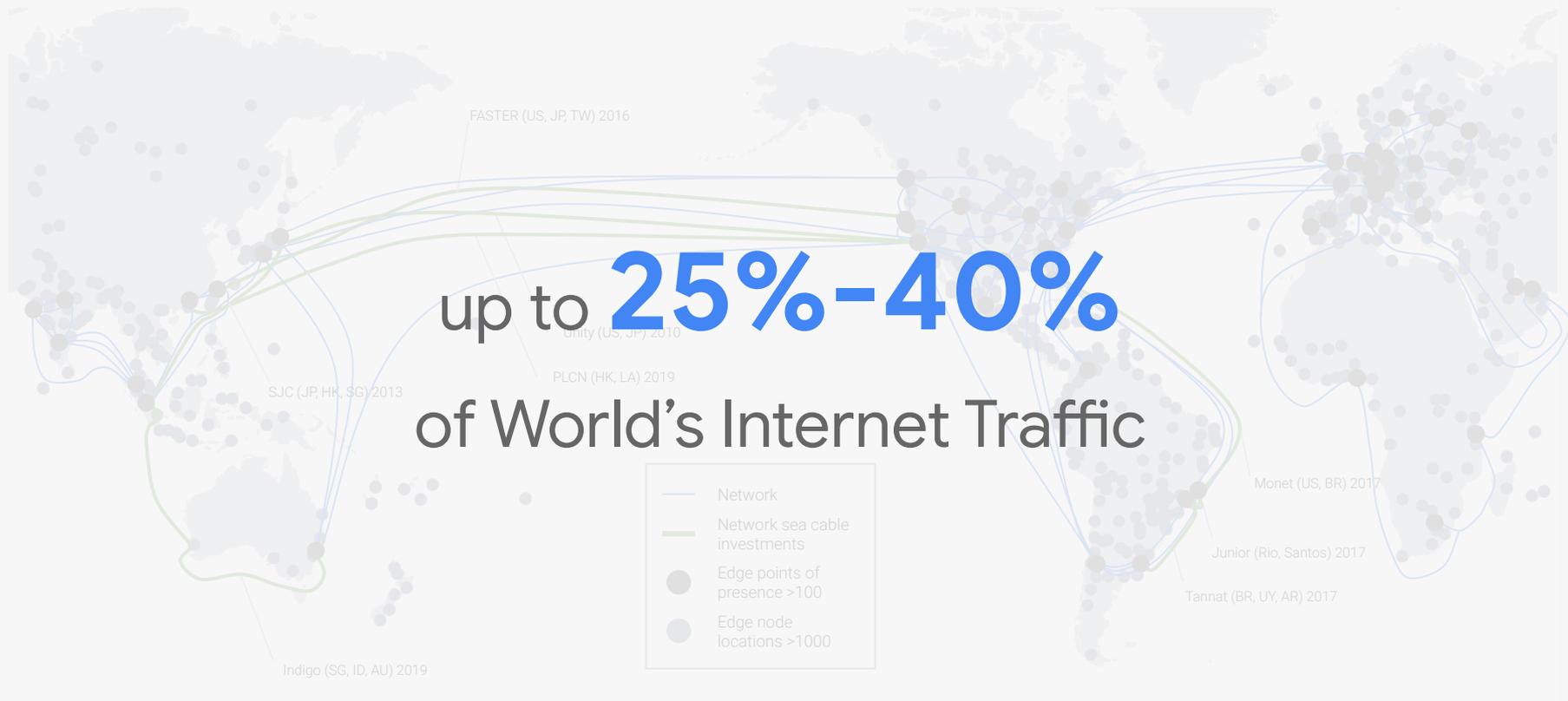


Better global network infrastructure

A privately-owned network, isolated from the public internet



Google Cloud Network



End-to-end provenance

Defense in depth at scale, by default



Purpose-built
chips



Purpose-built
servers



Purpose-built
storage



Purpose-built
network

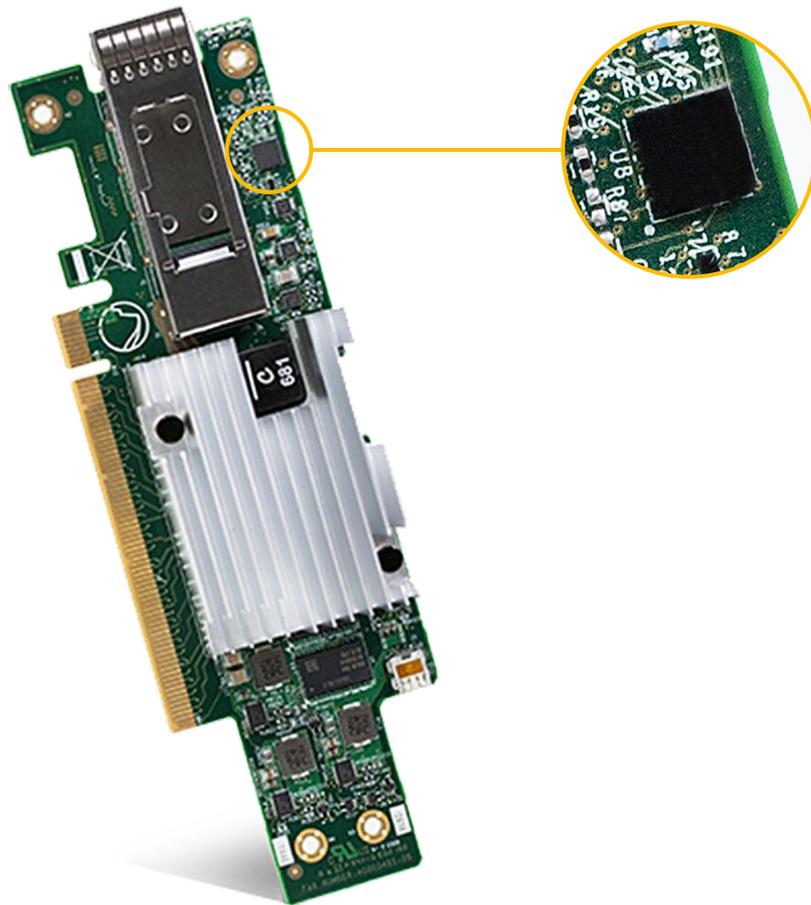


Purpose-built
data centers

Reduced “vendor in the middle” risk
Reduced exposure

Titan

Google's purpose-built chip to establish hardware root of trust for both machines and peripherals on cloud infrastructure.

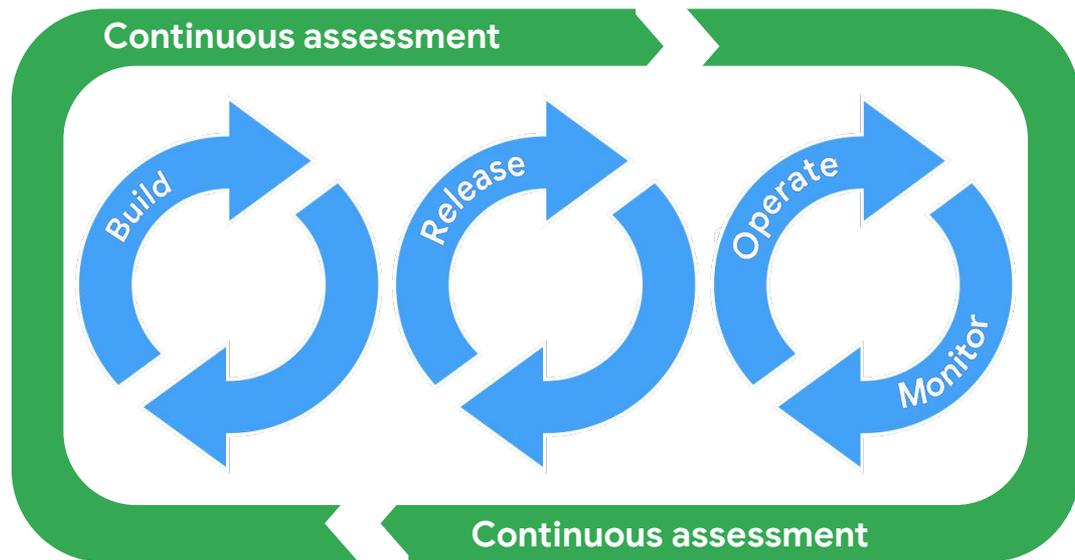




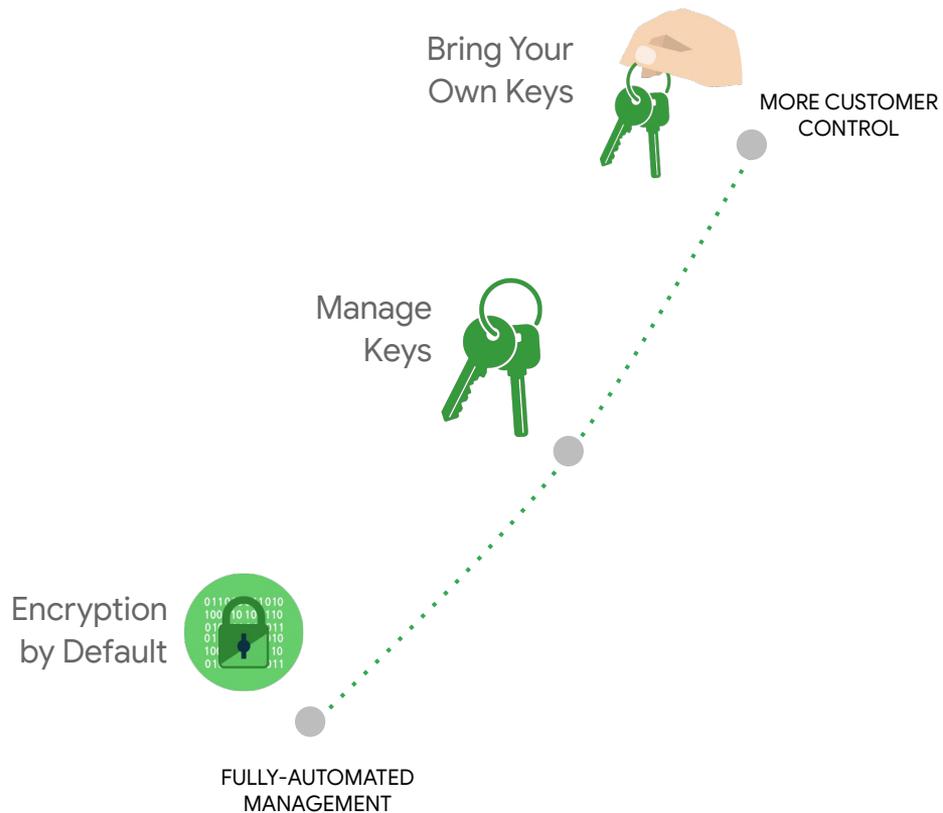
Project Zero



Update at scale,
no disruptions



Secure the Bits



59%

of companies lack an enterprise-wide encryption strategy¹

100%

of Google Cloud customers have encrypted data

¹ Ponemon Institute Global Encryption Trends Study, 2017

Encryption by default

Connections
require TLS



Data is chunked and each chunk is encrypted with its own data encryption key



Data encryption keys (DEKs) are wrapped using a key encryption key (KEK)



Encrypted chunks and wrapped encryption keys are distributed across Google's storage infrastructure

Data Loss Prevention: Discover and Classify



5/5/2015:

Jane complained about trying to place an order but it didn't go through.
They validated their credit card 4012-8888-8888-1881

Please check on why the card failed and call them back on their personal
mobile phone 555-253-0000 or email jds1995b@gmail.com

2/3/2016:

Last order was done with a PO - captured their ID SSN: 123-45-6789

Watch the DLP API filter out sensitive data

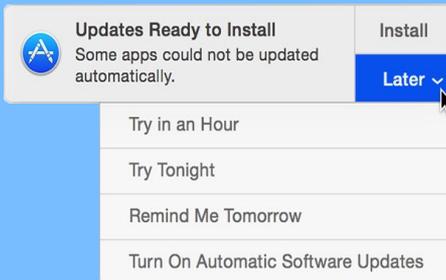
Cloud Identity as a Service (IDaaS)

Enabling BeyondCorp for organizations everywhere

- Centrally manage people, devices, apps from **one console & platform**
- Proven for years in G Suite & GCP
- Used by hundreds of thousands of customers to manage **millions of users and devices**
- Now offered **standalone**
- MFA Security Tokens



Access protections without hindering employee productivity



Security Keys
protect identities



0

G Suite account hijackings after
security key deployments



Chromebooks update
security automatically



Thank you!