Google Cloud

Customer Voices 2019

At Google Cloud, we take every opportunity to listen and learn from our customers. Google Cloud customers are innovators, using our products and services to advance healthcare, financial services, retail, media and entertainment, manufacturing, and government. As each industry addresses its own unique set of challenges and its own cycle of disruption and transformation, businesses are turning to cloud technology to gain advantages in increasingly competitive markets.

We truly value our collaboration with customers and work hard to understand their journeys to cloud—where they are now, where they want to go, and how we can innovate together. In the following pages, Google Cloud customers share their insights and successes from modernizing infrastructure, better managing data, gleaning insights with smart analytics, developing new applications, and collaborating in the cloud.

Thank you to all of our customers and partners. It is our privilege to build the future together with you.

Best,

Alison Wagonfeld

Alison Wagonfeld

CMO, Google Cloud

Google Cloud

Google Cloud

Financial Services

Google Cloud

Stuart Breslow

Managing Director, Technology
and Policy, Google Cloud

Financial services firms partner with Google to drive today's digital economy

Technology is changing the way financial services firms do business worldwide. Cloud-based technologies have found a home in the sector, enabling new business strategies in response to rapidly evolving requirements.

From electronic trading to everyday banking, financial services are being enhanced for the digital economy on Google Cloud. The customer voices presented in this book demonstrate that fact.

Real-world capital markets firms are converting ideas into profitable strategies, using Google Cloud high-performance computing resources for risk calculation—without building server farms.

Retail banks are adopting customer-centric attitudes and transforming everyday banking experiences so their teams can collaborate more effectively, and their customers get better offerings.

Large online payment companies are continuing to democratize financial services and provide innovative services to their customers around the globe, all on Google Cloud.

And insurance companies are leveraging Google solutions, such as Maps to provide homeowners with a better

> "Retail banks are adopting customer-centric attitudes and transforming everyday banking experiences so their teams can collaborate more effectively, and their customers get better offerings."

understanding of their property statistics, risks, and insurance options.

The financial services industry's future will continue to evolve as more players adopt and adapt cloud and next-gen technology to improve their businesses and accelerate innovation. Just as the technology sector evolved its software development methods to foster and govern innovation a decade ago, so too will capital markets firms, retail banks, and insurance companies continue to improve business processes and refocus core resources on new products, service enhancements, and business growth. It's an exciting time to be in the financial services sector—and Google Cloud is delighted to be a part of it.

Google Cloud

Diagnosing risks and generating actionable insights

Allstate envisioned a tool (GoodHome) that any homeowner could use, one that would be interactive and visualize useful property statistics and tips in a way that informed and compelled users.

Enter

Google Maps Platform for familiarity, ease of use, and comprehensive features.

Outcome

* Increases likelihood of insurance quote requests by 350% with 6 to 7 minute GoodHome site visit average

* 40% of people who use the tool type more than one address into the map

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We looked at everything from customization capabilities and the ability to draw layers to street-view access and point-of-view manipulation, and Google Maps met our every need. The alternatives didn't come up to par, so it was a no-brainer.

Elizabeth Schreier, Director of Digital and Social Engagement, Allstate Insurance

Google Cloud

Creating an open banking strategy

With an eye on improving customer services and experiences, ANZ Bank created an open banking strategy to provide customers with easier access to all of their banking information. The leading financial institution also wanted to accelerate delivery of data-driven business insights to its institutional customers.

Enter

BigQuery and **Cloud ML Engine** to significantly improve data orchestration and management and to provide business intelligence to employees and customers.

Outcome

✳ Increases speed of internal processes and enables agility as an institution

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> Google Cloud improves how we serve our customers and how we process and use data internally, providing the technology and expertise to help us execute on our open banking strategy. There's a genuine sense of collaboration in solving our unique challenges and positioning ANZ Bank and our customers for success today and in the future.

Emma Gray, Chief Data Officer, ANZ Bank

Google Cloud

ATB Financial

A customer-centric attitude and a mandate to transform banking

ATB had a bold vision: reimagine the way banking products and services are delivered. To succeed, the bank needed to equip its distributed workforce with cloud-based productivity tools. ATB also wanted to simplify employee communication and collaboration.

Enter

G Suite to drive innovation, optimize workflows and business processes, and enable more positive customer interactions in the highly competitive financial services space.

Outcome

* Migrates 35 TB of data—including 340 million email messages, calendar items, and contacts— to G Suite seamlessly and without disruption to employees or customers

* Reduces strategic planning, consolidation, and reporting time by 50%

In collaboration with Partner

Onix

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Google is revolutionizing collaboration and individual productivity through AI, making it easier for our team members to streamline their workflows using features such as the Explore button in Google Docs. Employees can focus more on creating value for our customers and less on mundane tasks.

Barry Hensch, VP, Technology Enablement, ATB Financial

Google Cloud

HSBC

Extracting insights from massive datasets

HSBC is a major multinational financial institution, one of the largest in the world. The company needed to extract meaningful insight from more than 100 PB of data and billions of transactions to run risk simulations on a regular basis and better detect money laundering. It also wanted to overcome technology limitations to improve customer service and accelerate time to market for services.

Enter

GCP to provide a managed cloud environment that improves security, governance, and regulatory posture and reduces the complexity and costs of big data analytics while empowering the company's data analysts and scientists.

Outcome

* Identifies and averts financial crime using ML models
* Enhances global risk management with a better understanding of trading positions and risks
* Responds faster to customer demands

"

Migrating our workloads and big data capabilities to Google Cloud Platform has resulted in both technical and financial returns and has helped us spur innovation within our large globally dispersed institution. We also have peace of mind knowing that Google Cloud takes security and regulatory compliance very seriously.

Darryl West, Group CIO, HSBC

Google Cloud

PayPal

Adding innovation and simplicity to a complex development platform

With its commitment to democratizing financial services and a belief that having access to financial services creates opportunity that empowers people and global businesses, PayPal provides an open digital payments platform. The company had a complex development environment running on a private cloud. It needed the infrastructure to rapidly innovate and develop new applications that could be delivered worldwide on a scalable, highly secure platform.

Enter

Compute Engine to help provide a hybrid, private-public cloud infrastructure that better supports growth and **Virtual Private Cloud** to run thousands of virtual machines at a global scale.

Outcome

- Provides a single, more secure development platform to serve all of PayPal
- Removes the need to buy servers and provision virtual machines
- Reduces time to deploy new builds and improves scalability, quickly spinning up clusters of virtual machines on demand

> We turned to Google as our cloud provider because it has the fastest network in terms of throughput, bandwidth, and latency. Its global backbone is also vital for us because we operate in hundreds of countries around the world. As a financial company, security capabilities are critical. We knew we would be able to build a variety of services on top of the products Google offers.

Sri Shivananda, SVP, CTO, PayPal

Google Cloud

Healthcare & Life Sciences

Google Cloud

Polly Israni
Head of Provider Marketing,
Google Cloud

Sara Kuethe
Head of Life Sciences and
Medical Device Marketing,
Google Cloud

Healthcare problems are data problems

Healthcare organizations spanning from providers and payers to pharmaceutical companies and beyond are undergoing drastic changes to their business models, and success is dependent on solving problems that involve data on a massive scale.

Life sciences organizations around the globe are scrambling to successfully leverage new data and technology opportunities to handle mounting pressure to accelerate R&D lifecycles and focus on specialty products, complex country-specific supply chain requirements, and consumer demand for digital convenience and value.

Similarly, healthcare organizations are under incredible amounts of pressure. For hospitals, there is pressure to improve patient care with limited resources and tight margins, and for payers, there is pressure to improve member experiences while decreasing costs.

Cloud-based technology is already playing a pivotal role in transforming healthcare and life sciences systems and processes—empowering employees, care teams, and patients with modern, collaborative, and secure tools.

Google Cloud helps healthcare organizations turn data into a valuable tool to provide better care and more streamlined operations. Google Cloud recently introduced a set of application programming interfaces (APIs) and data stores that can be used to enable healthcare data analysis and machine learning applications, data-level integration of healthcare systems, and secure storage and retrieval of various types of electronic healthcare and life sciences data.

For example, the Cloud Healthcare API provides a managed solution for storing and accessing healthcare data in Google Cloud Platform. The Cloud Healthcare API provides a critical bridge between existing care systems and applications hosted on Google Cloud. Using the API, healthcare and life sciences institutions can unlock data and develop new insights through data analysis, machine learning, and application development. These insights can help healthcare and life sciences organizations stay competitive, launch life-saving drugs and medical devices into the market faster, and improve patient care.

Over the past year, we've enhanced Google Cloud offerings with healthcare in mind, expanded our compliance coverage, and welcomed new customers and partners.

Google Cloud

Evolving cancer research with machine learning

The Cancer Prevention Study II (CPS-II) Nutrition cohort provides researchers with valuable information that illustrates how risk factors can affect cancer etiology and prognosis. The team obtained de-identified medical records and tissue samples from surgical specimens for approximately 1,700 CPS-II participants diagnosed with breast cancer. However, analyzing the high-resolution tissue images was a challenge because of their uncompressed, proprietary format, large number, and the need to consistently characterize image patterns.

Enter

Slalom and **GCP** to build an end-to-end ML pipeline that applies ML to the digital images, including **Cloud ML Engine** to build ML models, **Cloud Storage** to store images, and **Compute Engine** to orchestrate image conversion and kick off Cloud ML Engine jobs in the correct sequence.

Outcome

* Speeds image analysis 12x, 1,700 tissue samples in 3 months versus 3 years
* Enhances quality of image analysis by removing human limitations, fatigue, and bias
* Protects valuable tissue samples by backing up image data to the cloud
* Provides a reliable and scalable platform for future image analysis

In collaboration with Partner

slalom
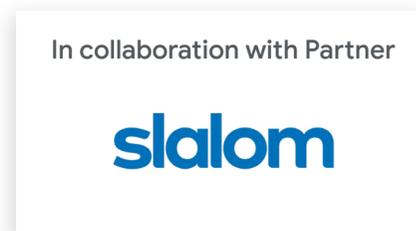
> If we hadn't taken a machine learning approach (with Google Cloud), it would have taken us three years instead of three months to analyze 1,700 tissue samples, even with a team of dedicated pathologists. We're also achieving better consistency and quality. Using Google Cloud Platform to perform image analysis via deep learning for epidemiologic studies of breast cancer represents a huge leap forward.

Mia M. Gaudet, PhD, Scientific Director of Epidemiology Research, American Cancer Society

Google Cloud

BROAD INSTITUTE

Helping to protect genome data in the cloud

Broad Institute generates roughly 25 TB of sequence data daily. It needed a more secure cloud infrastructure that would allow it to scale at the rate of genomic data production without delays or interruptions to its pioneering research.

Enter

Cloud Storage to scale capacity on the fly and accommodate spikes in resource demands, **Pipelines API in Google Genomics** to queue incoming data, and **Compute Engine** for processing and analysis.

Outcome

* Analyzes genomes 400% faster with Google Cloud
* Protects genomic data by governing privacy, data access, and use

❝

As the genome data that we study to potentially save lives grows at a massive scale–with our institute alone generating roughly 12 terabytes of data daily–human genomics is becoming increasingly reliant on the technology tools we use for computation and storage. Google Cloud allows us to conduct transformative research more rapidly and securely. This speed and security are foundational for scientific discovery today.

Bill Mayo, CIO, Broad Institute

Google Cloud

CardinalHealth

Migrating to the cloud to drive down healthcare costs

Cardinal Health is instrumental in helping people stay healthy by providing healthcare professionals with the tools they need to help patients stay well or get better. The company believes that the healthcare system should help providers be effective in serving patients, and do so affordably. Cardinal Health realized that it needed technology and innovation to drive down healthcare costs.

Enter

GCP to migrate existing systems to the cloud, enhance security and data protection, and deliver capabilities much faster and more affordably while offering the flexibility and agility that enable business-enhancing risk-taking.

Outcome

- ✱ Allows teams to tap exceptional engineering talent and technical support
- ✱ Gains technical speed and capabilities that far exceed expectations
- ✱ Plans to transform many aspects of the business with AI

"

I've worked in healthcare for over 20 years, and it's been relatively static. There have been advances, but it's been an evolution. The cloud, if you do it right, can be a revolution. It can be transformational. Google Cloud has been exemplary in the "how can we help you" approach, with understanding what we want to do, and how to make what we want happen.

Jon Latshaw, VP, Cloud Services, Cardinal Health

Google Cloud

Cleveland Clinic

Intervening quickly: Providing better care with API management

Cleveland Clinic's VitalScout Enhanced Early Warning System offers key patient data to clinicians, enabling them to identify patient issues and intervene quickly. The system is built on APIs that are secured and monitored by the Apigee API Platform.

Enter

Apigee API Platform to create a platform for more securely accessing and building APIs with standard API calls.

Outcome

* Decreases by 33% the time patients spend at high-risk levels
* Decreases by 47% time to patient reassessment after an alert
* Up to 3 million API calls per day
* Uses over 4,000 Vital Scout devices
* 75,000 Vital Scout app launches per day

"

In healthcare, we're behind. Our physicians are missing out on opportunities to discover new ways to deliver the best possible care. We use APIs to surface data back to clinicians in a way that's actionable and relevant for providing the best possible and quickest care, and we leverage Apigee to make sure that the platform that is sitting on top of our use of APIs is part of our security model.

Beth Meese, Executive Director, Technology & Innovations, Cleveland Clinic

Google Cloud

MCKESSON

Propelling transformation with data

In an increasingly digital healthcare environment, cloud computing has changed how providers deliver quality, secure, frictionless, and affordable services to their patients. McKesson is looking to capture greater insights from its extensive data assets through enhanced analytics and increase its ability to scale quickly while extending its capabilities with ML and AI to create next-generation healthcare solutions.

Enter

SAP on **GCP**, **Cloud Healthcare API**, and **Google Cloud Professional Services** to usher in a comprehensive data center migration and transformation mapped to aggressive goals.

Outcome

- ✱ Faster deployment timelines for platform automation and performance
- ✱ Helps provide enhanced data insights and healthcare analytics

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> The healthcare industry is in a state of unprecedented change, and Google Cloud Platform is the catalyst that will help spark innovation and power the next stage of digital healthcare that keeps us a step ahead.

Andy Zitney, SVP and CTO, McKesson Technology

Google Cloud

Manufacturing & Industrial

Google Cloud

Michael Leppitsch

Global Lead, Industry Marketing for Energy, Automotive, and Manufacturing, Google Cloud

Invigorating the future of manufacturing and industrial companies

Manufacturing and industrial enterprises are facing unprecedented changes caused by evolving technologies, decentralization of manufacturing and process data, the bridging of physical and digital environments, and the continuing race of new customer demands for specialized products and services. This complex environment presents both challenges and opportunities—the challenge of adapting to these enormous disruptive shifts, the complexity of automation to improve productivity, and the opportunity to raise efficiency, precision, and safety across the product lifecycle.

With growing adoption by industrial enterprises large and small, Google Cloud now plays an increasing role in shaping the future of manufacturing, transportation, and energy.

Future of manufacturing

The current fourth industrial revolution is driven by new technologies that largely intertwine physical, digital, and biological worlds, changing the landscape for manufacturers and creating new challenges for them to overcome. The Industry 4.0 initiative led by industrialists, researchers, and government leaders, as well as similar projects around the world, help manufacturers address

"Besides the usual categories, Google Cloud's manufacturing segment includes the transport, heavy industry, and resource industries, a vast landscape of large and small enterprises responsible for much of the global economic activity."

these hurdles and take advantage of new technology-driven opportunities that advance supply chains, product engineering, and work on manufacturing floors.

Google Cloud offerings are a strong fit for manufacturers by natural extension of Google Cloud's leadership in capabilities that power the Smart Factory: smart data analytics and business intelligence capabilities, new forms of human-machine interactions, massive compute and data processing power, and digital networks and ecosystems extending into the physical and economic world.

Google Cloud

Google Cloud helps manufacturers increase operational efficiency and transparency across organizations with better monitoring, more precise and timely interventions, better quality control, more innovative products, and accelerated engineering and product development cycles that span thousands of suppliers sourcing millions of parts. Manufacturers use Google Cloud solutions to collect and analyze contextualized factory floor and IoT data across global facilities to improve quality and throughput of manufacturing processes, raise productivity with predictive maintenance and asset management, analyze BOM and supplier data to reduce costs, improve efficiency with smart batching and routing in logistics and delivery, and unlock new revenue by innovating product service enhancements for customers.

Future of transportation

The emergence of electric, connected, and autonomous vehicles poses new challenges for global automotive OEMs and their suppliers. Swift changes in how cars are designed, manufactured, marketed, sold, and used add to evolving demands. Digital capabilities power all of these changes, but many automotive companies still struggle to identify the best strategies for their specific brands and vehicles.

Collecting, storing, and processing massive amounts of real-time data as part of an embedded machine learning solution is imperative for enabling fully autonomous vehicles and new modes of transportation in the future. Millions of simulated scenarios in the cloud drive improvements in navigation systems and safety, and cloud-based machine learning applications advance capabilities for fleets, rail, air, and shipping.

Google Cloud's connected car solutions combine extensive geospatial and navigational data with machine learning and IoT capabilities to enable autonomous guidance, digital transformation, insurance telematics, and shared mobility—with application development enabling many different mobility use cases and business models—as well as fleet maintenance, and supervised driving scenarios. These solutions also help transportation businesses improve operations across global facilities and sprawling supply chains. Separately, Google Cloud offers the marketing analytics for OEMs to collect and analyze advertising data and web and application traffic to gain insights and adapt sales to the emerging automotive retail revolution.

Future of energy

As utility companies begin to use Google Cloud to help more securely digitize power plants and grids, oil and gas companies rapidly adopt the use of subsurface scientific computation and operational sensors, and equipment manufacturers scale the use of special purpose analytics like CFD (computational fluid dynamics), the amount of data generated in the energy sector grows at breakneck speed. Google Cloud technology operates at the scale that meets these demands, unlocking enterprise transformation opportunities.

Across the energy industries, intelligent data insights help companies create precise geological models, drive more accurate demand forecasting and load predictions, and speed decisions that help field operations improve uptimes. Google Cloud data analytics and management enable rapid advancements in these areas by providing the compute power required to scale scientific computation across many engineering disciplines, while also upgrading day-to-day business functions like asset management. Google Cloud security combined with open standards and an open source culture allow enterprises to fuel innovation in the most secure fashion possible.

Google Cloud

Automating inspections of valuable energy assets

AES Corporation has developed multiple innovative drone and robotics solutions to advance safety in inspection of energy assets, including wind turbines as tall as 450 feet with blades 220 feet long. Prior to the use of drones, staff had to climb these turbines to identify hard-to-detect defects. The leading power company worked with Measure, a drones-as-a-service company, to help scale their drone program. Since Measure's drone inspections produce thousands of images for each asset, manual analysis to detect cracks and other defects that require repair would take weeks.

Enter

Advanced Solutions Lab to train AES staff and create an end-to-end solution leveraging **Cloud AutoML Vision**, **Cloud Storage**, **App Engine**, **Cloud SQL**, **Cloud IAM**, **Cloud Functions**, and **Data Labeling Service**. AutoML Vision deploys a high-quality custom image model that automatically identifies defects and reduces the amount of images requiring human review.

Outcome

- Improves speed and accuracy of wind turbine inspections
- Improves employee safety
- Drives employee talent development

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With the expertise and broad technology that Google Cloud brings to the table, including advanced visual intelligence with Cloud AutoML Vision, we're adding safety, efficiency, and accuracy to our asset inspections by way of smarter drone use.

Andrés Gluski, President and CEO, AES Corporation

Google Cloud

AIRBUS

Charting new territory

Since its founding more than three decades ago, Airbus Intelligence has expanded its roster of clients from governmental security to include other entities such as environmental companies and oil and gas firms that benefit from high quality imagery, elevation data, and other geo-intelligence services. To stay ahead of the curve, the company was keen to build its OneAtlas Platform, which provides customers with images, data, and services that customers need as quickly as possible without compromising quality or range of coverage.

Enter

Cloud Storage to hold petabytes of data and imagery accessible in the cloud, **TensorFlow** to train deep learning algorithms to recognize cloud cover, **Google Kubernetes Engine** to scale compute power up and down on demand, **Cloud Pub/Sub** for messaging, **Cloud Datastore** for easy scalability of data, and **G Suite** to strengthen internal communications.

Outcome

- Reduces time to access satellite imagery from hours to less than half a second
- Delivers a scalable, cloud-based platform for satellite images, large-scale processing, and analytic services with no limits on size or users

"

Google Cloud Platform gives us access to much more compute power than we had in the past, so we can do so much more than we used to. Before, we worked on projects. Now, the whole world is our playground.

Laurent Gabet, Optical R&D Manager, Airbus

Google Cloud

Leveraging massive data for a leading E&P company

As the world's leading digital exploration and production (E&P) company, Aker BP is widely recognized for sharing data. Each asset operated by Aker BP has up to 100,000 equipment tags generating enormous amounts of data from industrial sensors, combined with a wide range of other data sources, including seismic readings, industry databases, 3D models, processes, documents, drawings, reports, and images. Aker BP is collaborating with Cognite to make industrial data a strategic resource and to use data-driven insights to digitize the E&P value chain and make operations safer for people and the environment.

Enter

Cognite to leverage **GCP** offerings to develop an industrial IoT data platform managing data at massive scale and provide Aker BP staff and partners with access to real-time insights, ML capabilities, and more secure data sharing.

Outcome

* Streams 1M+ time-series events per second and handles millions of documents
* Disrupts business models and shifts company to a data-driven strategy that improves decisions, processes, and safety

In collaboration with Partner

Cognite

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Cognite Data Platform powered by Google Cloud makes it possible to monitor more than a million time-series values streaming from our assets in the North Sea every second. And it can scale to 10 times that with ease. We are liberating industrial data at scale and challenging how we work and collaborate.

Kjartan Nesse, Digital Crew Lead, Aker BP

Google Cloud

lyft

Accelerating vehicle innovation with deep learning

As the popularity of ride-share services rises in increasingly connected, smarter cities, innovation with practices such as deep learning will set one brand apart from the next. Lyft saw an opportunity to use deep learning to consistently improve software in self-driving cars. The transportation services company also needed more stable production operations to keep up with the fast pace of innovation.

Enter

Cloud TPUs to quickly incorporate the latest navigation-related data from vehicles with the latest algorithmic advances from the research community and **Cloud Spanner** to provide massive scalability for production operations.

Outcome

* Increases pace of deep learning acceleration from days to hours
* Provides a massively scalable, resilient datastore for high-availability production operations

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Since working with Google Cloud TPUs, we've been extremely impressed with their speed—what could normally take days can now take hours. Deep learning is fast becoming the backbone of the software running self-driving cars. Cloud TPUs help us move quickly by incorporating the latest navigation-related data from our fleet of vehicles and the latest algorithmic advances from the research community.

Anantha Kancherla, Head of Software, Self-Driving Level 5, Lyft

Google Cloud

Public Sector & Education

Google Cloud

Google Cloud

Shannon Sullivan
Acting Head of Government,
Google Cloud

Government leaders are feeling the pressure to transform how they operate. With expensive, legacy IT systems in place, agency leaders cannot capitalize on the wealth of data now available to fulfill mission objectives and meet the rising citizen expectations of a "digital government." Time and money are spent on maintaining the status quo, leaving agencies without the technological capabilities they need to be effective. And with data left exposed in disparate, outdated systems, the public sector's defenses against the growing number of cyberattacks are becoming too difficult to manage. In order to operate as a secure, data-driven, and efficient digital enterprise, the public sector is moving to the cloud.

Agency leaders are partnering with Google Cloud to modernize their IT systems with a centralized platform that drives insights at speed and scale. In carrying more than 25 percent of the world's internet traffic, the public sector can count on Google Cloud to provide a trusted, reliable, and more secure infrastructure. Government agencies are embracing Google Cloud's zero-trust policy and comprehensive security approach to protect their

"As we look toward the future, we believe multi-cloud will be critical to cloud success in the public sector. Google Cloud will continue to be the open source partner the government needs to operate in a multi-cloud world."

data in depth, from infrastructure to software, and the government can update its infrastructure at scale to aid fear of vulnerabilities like Spectre or Meltdown. In 2017, Google's Project Zero security team was the first to discover these computer chip vulnerabilities and was able to install the fix at scale.

Google Cloud

Since data security is paramount in the public sector, agency leaders are gravitating toward hybrid and multi-cloud models that provide control where data resides. But in order for agencies to derive value from the cloud in these operating models, they need cloud partners who are interoperable and open. Google Cloud is a leader in the open source movement—last year alone, Google contributed to over 28,700 open source projects. We are committed to giving governments the flexibility they need to work across multiple cloud and on-premises environments with ease. With a long-standing commitment to open source through projects like Kubernetes and Hadoop, Google has been guiding the industry on how to leverage big data for more than

a decade. In a multi-cloud world, Google Cloud's open source capabilities allow developers to take advantage of the best open source technology.

Government transformation extends beyond infrastructure in Google Cloud. Developers can deliver better citizen experiences by building modern applications that can scale up to the heaviest of volumes (and scale down to the smallest). Using the Google Cloud analytics platform, researchers can identify patterns, detect anomalies, or make discoveries that could advance their mission in entirely new ways. Leaders can take advantage of Google Cloud's machine learning capabilities to automate task-based processes so talented employees can focus on work that matters.

As we look toward the future, we believe multi-cloud will be critical to cloud success in the public sector. Google Cloud will continue to be the open source partner the government needs to operate in a multi-cloud world. Our cloud methodology allows the public sector to maximize their investments across cloud and on-premises environments, with the ability to operate freely. Now and in the future, Google Cloud will help the public sector deliver the best mission outcomes and citizen experiences through our open, intelligent, and highly secure platform.

Google Cloud

Advancing IT for millions of state residents

The Arizona Department of Administration Technology (ADOA-ASET), which establishes the technology, security, privacy, and communication policies for the State of Arizona, set a far-reaching goal: transform Arizona into a nationwide leader in advanced IT strategies, methodologies, services, and business processes that add innovation, efficiency, and sustainability to systems and processes. Overseeing high-risk technology projects across all state agencies, programs, and initiatives, including Digital Government, the Health Information Exchange, 911, and disaster recovery for more than 7 million state residents, ADOA-ASET takes its choice of technology solutions very seriously.

Enter

G Suite and **Chrome** to significantly improve and empower collaboration for 36,000 state employees and contractors.

Outcome

✳ Unifies all departments, agencies, and 30,000+ employees onto one directory and email platform, consolidating 30+ systems into one

In collaboration with Partners

okta

SADA systems

ⓥ virtru

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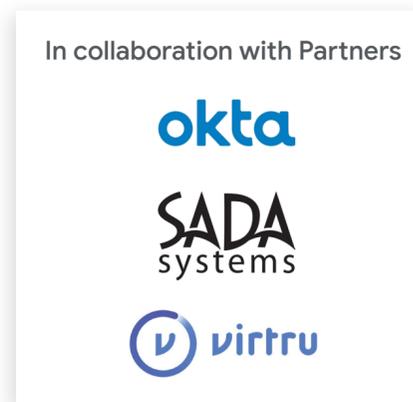
G Suite offers the security we need while also providing collaboration and productivity tools that have changed the way we work for the better. We expect that if we can get to a G Suite adoption rate of 80% across the entire state, Arizona could save a significant amount of money in just a few years.

Morgan Reed, State CIO, State of Arizona

Google Cloud

Community-wide collaboration and more modern data storage

Brown University wanted to free students and faculty from having to constantly clean out inboxes and delete large attachments—all while avoiding a costly upgrade to the on-premises email server.

Enter

G Suite for seamless collaboration tools, large storage capacity, security protection, easy internal troubleshooting, and steady feature upgrades.

Outcome

- ❋ Realizes $800,000 annual savings over 5 years
- ❋ Creates stronger alumni ties when graduating students take their email, calendars, and files with them

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I can't remember what collaborating with teams was like before Google.

Hong Chau, Instructional Designer, Brown University

Google Cloud

Taking a massive school district digital with community support

Charlotte-Mecklenburg Schools (CMS) is one of the 20 largest school districts in the U.S. and one of the largest school districts to deploy digital learning initiatives for widespread use. While implementing the largest single deployment of Chromebooks in the world, the district needed community buy-in to give students access to technology in the classroom.

Enter

Chromebooks to help increase graduation rate by 20 percent over seven years and empower students to take ownership of their learning by creating weekly action plans.

Outcome

* Provides low-cost, easy-to-deploy computers for 150,000 students
* Frees teachers to create open-ended lessons, giving students more freedom and creativity
* Allows students to update their own dashboards on their Chromebooks
* Speeds digital assessments by teachers

In collaboration with Partner

hp

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We talk about student engagement. Some people call it student agency. We've all had kids who are at the back of the class, heads down, not engaged. With Chromebooks, all of our students are paying attention and are able to be curious anytime they want.

Valerie Truesdale, Assistant Superintendent, Charlotte-Mecklenburg School District

Google Cloud

ITA LA

Better serving citizens and employees

Having the best systems in place is critical to helping ensure the safety and well-being of residents during a local or nationwide emergency. The City of Los Angeles wanted to provide better, clearer, and more visually compelling information to residents during a crisis. It also saw an opportunity to modernize and empower its workforce through modern productivity and collaboration tools.

Enter

Google Maps Platform to deliver information visually, with a familiar interface, for close to 4 million residents and to develop and rapidly post emergency evacuations and resources with information-rich maps, **G Suite** to provide anytime, anywhere access to workplace collaboration tools and 25x more email storage.

Outcome

* Helps the city respond to emergencies much more rapidly, in most cases within an hour

* Saves millions of dollars, including server electricity costs, and frees up nearly 100 servers by moving to Gmail

In collaboration with Partner

SADA systems

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Google Maps provided a highly consumable resource for L.A.'s residents and businesses during a crisis. Last year's fires required evacuation for more than 150,000 residents. With over 3.5 million views in the first 36 hours, Google Maps effectively delivered the message when citizens needed it most.

Ted Ross, CIO, City of Los Angeles Information Technology Agency

Google Cloud

Expanding information access for all residents with ML translation

Considered "the melting pot of the world," one in four residents of Hawaii speak a language other than English at home. With real and constant threat from natural disasters, the state took on a mandate to make government information available to the public in the various languages spoken by residents. But manual translations would cost millions of dollars.

Enter

BigQuery to ingest state legislative data and **Cloud Translation** to translate information fed from BigQuery into 80 different languages.

Outcome

* Saves significant costs and time on manual translation
* Provides access to state safety and legislative information to a multilingual constituent base

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Working with Google Cloud has given us the ability to transform the way we deliver information and services to our non-English-speaking residents. The translation application has helped us break barriers and better connect with our community.

Douglas Murdock, CIO, State of Hawaii

Google Cloud

Retail & Consumer Goods

Google Cloud

Google Cloud

Pravin Pillai

Global Lead, Industry Solutions,
Retail, Google Cloud

Challenging times for retailers

Retailers today are facing some of the toughest headwinds the industry has ever seen. Retail executives have to deal with rapidly rising customer expectations, increased competition from non-traditional retail business models and formats, rapid technological shifts, and continued pressure on margins. Solving these challenges collectively can be a daunting task, and we have seen some of the most storied brands in retail struggle.

Businesses that are not set up to adapt, and that do not have agility in their DNA, or that tend to have their data in silos or use inflexible IT and systems and innovate without addressing the full retail value chain are less primed to meet customers where they are today.

Transformation powered by technology

Today, more than ever, the answer to the challenges faced by the industry is a technology-driven transformation strategy. Technology innovations, including cloud computing, can infuse agility into an organization and enable the organization to extract the most value from its data, systems, and people. Technology can positively impact all parts of the retail value chain across

"Today, more than ever, the answer to the challenges faced by the industry is a technology-driven transformation strategy."

customer acquisition, product lifecycle management, merchandising and assortment, omnichannel experience, store operations, logistics, supply chain, and delivery. From helping retailers understand their customers more deeply and developing more compelling product recommendations to gaining insights from data across the ecosystem and producing more accurate demand forecasting, technology is delivering on the promise for retailers around the world.

Partnering with Google Cloud

Over the last 20 years, Google has built a world-class data and technology infrastructure that powers Google's 1B+ user products including Google Search, YouTube, Chrome, Android, Gmail, and Maps. Google Cloud externalizes

Google Cloud

this platform, products, and services for enterprises around the world to leverage in their own transformation journeys. We are now seeing different types of retailers from all around the world turn to Google Cloud and our ecosystem of Technology and Services Partners to help them transform their business in the following ways:

• Infuse IT agility: Retailers can now build on Google's $30B+ of investment made to date to develop a global, premium network with flexible pricing, world-class security, and support for open source standards and hybrid and multi-cloud architectures.

• Unify data in their ecosystem and extract meaningful insights: Retailers can leverage Google Cloud products including BigQuery, Cloud Dataproc, and Google Data Studio to unify consumer data, shopping data, ads data, transaction data, and web analytics data to build a true

Customer 360 view for their business. This unified layer of data can in turn allow retailers to deliver the right products to the right customers at the right time.

• Make predictions with AI: Once large datasets become available, retailers have the ability to not only analyze, but also predict business outcomes and personalize customer experiences using machine learning tools, such as Cloud AutoML Vision AI, Translation AI, and Video AI, which can be used with internal datasets and don't require advanced ML expertise. Retailers with in-house data science skills can build and train their own ML models on proprietary data using Cloud ML Engine.

• Build dynamic customer experiences: Retailers can leverage products including App Engine, Cloud Datastore, Cloud Storage, and Chrome-based devices to build custom apps and power dynamic kiosks/signage

enabling them to improve customer engagement and influence in-aisle purchase and point-of-sale decisions.

• Transform the workforce: G Suite and highly secure devices including Android and Chromebooks can empower retailers to transform how their sales associates work. Google Cloud also enables retailers to provide these tools at scale with affordability that is unparalleled.

We are incredibly honored to be a partner to retailers around the world who have chosen Google Cloud to help power their business transformation. The retail industry continues to be an important sector for economies around the world, and we look forward to seeing retailers innovate on our platform and drive compelling consumer experiences for all of us.

Google Cloud

BROWN-FORMAN

Supporting global operations at iconic whiskey label

The long-established Kentucky-based manufacturer of spirits and wines has had nearly 150 years of success making its own barrels and managing and owning the entire supply chain from start to finish for many of its brands—a key differentiator for the company. The inherently innovative company saw cloud technology as a way to increase content production, improve marketing, and boost sales.

Enter

Jamboard to effectively capture brainstorming insights and content—including HR employee engagement survey focus group and leadership strategy meeting content—and seamlessly share globally, **Slides** to centralize sales slides that save real-time updates from the whole team while removing the hassle of version control, **Explore in Sheets** for intelligent automation of charts, **Sites** and **Forms** to create sites and survey forms for trip and event planning for distributors.

Outcome

- ✱ Advances productivity with integrated cloud-based tools that allow employees to create and collaborate from anywhere
- ✱ Increases content and insight capture with Jamboard and real-time updates

"

With G Suite, our 150-year-old company gains access to and benefits from the prowess in AI, built-in security, and truly impressive reliability of Google Cloud. We've taken advantage of many G Suite features to work smarter and faster, and look forward to continued innovation and creative collaboration on products, such as Jamboard.

Jonathan Riehm, Manager Business Applications, Brown-Forman Corporation

Google Cloud

Going digital to improve shopper experiences

In 2017, new CEO Alexandre Bompard joined Carrefour to usher the digital transformation necessary to stay competitive. At that point, only 1 percent of global sales were online and 7 percent of marketing investments were devoted to digital. The company was due for "profound transformation" in order to reach the goal of becoming a "world leader of food transition for all."

Enter

GCP to "lift and improve" IT and data platforms, set up a foundation for ML, and create a cloud-agnostic big data platform, plus **Google Shopping** to integrate with **Google Assistant** and **YouTube** on any device (including **Google Home**), and **G Suite** to transform internal culture with cloud-based collaboration.

Outcome

* Revolutionizes the shopping experience with Google platform integrations
* Launched new AI Creation Lab to infuse and industrialize AI in processes

In collaboration with Partners

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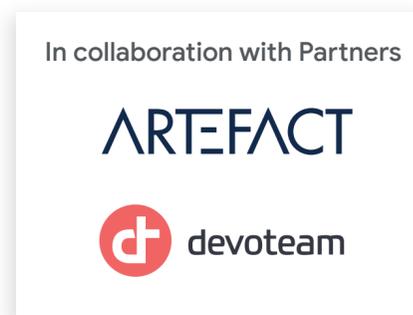
At every level of the company, we were 100% in on transformation and innovating and changing how people access quality food and products. Google Cloud has been a critical part of our new initiatives, from advancing our technology platforms to inspiring exciting new solutions with AI.

Enrique García Lopez, Executive Director, eCommerce and Digital Transformation, Carrefour

Google Cloud

COLGATE-PALMOLIVE COMPANY

Empowering global collaboration with G Suite

A leader in consumer packaged goods that has built a thriving and lasting global business founded more than 200 years ago, Colgate-Palmolive desired a productivity suite that current and future employees would embrace, and that would regularly offer new features without requiring IT involvement to upgrade.

Enter

G Suite to empower employees to collaborate with colleagues, clients, and partners worldwide to better serve millions of families around the globe.

Outcome

* Drives fast adoption with 94% of users collaborating on Google Drive

* Logs 57,000 hours of Hangouts Meet sessions in 1 month alone

* Provides a productivity suite for ongoing employee collaboration to drive efficiency within the organization

* Improves user productivity without compromising security

In collaboration with Partner

SADA systems

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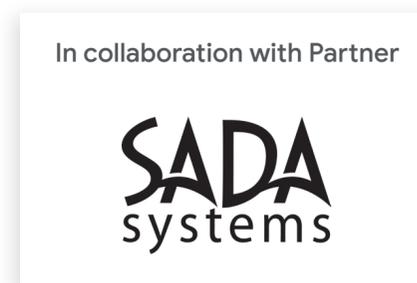
We were encouraged by the positive responses from employees when we announced we were going Google. We knew it was going to be a major change management effort to go to a new collaboration platform.

Mike Crowe, CIO, Colgate-Palmolive

Google Cloud

Loblaw DIGITAL

Using data analytics to serve customers and internal teams

The 100-year old company, one of Canada's largest private-sector employers, strives to enhance quality of life for customers and the community with the purpose "Live Life Well." Loblaw needed timely data analytics and a new business approach to improve customer experience and engagement while empowering marketers without expanding IT.

Enter

GCP to provide a certified infrastructure for SAP Hybris and greater resiliency than on-premises data centers, **BigQuery** to analyze customer data in real time, **Compute Engine** and **Custom Machine Types** to run virtual machines, **Google Kubernetes Engine** to automate deployment and scaling, and **Stackdriver** for monitoring and logging.

Outcome

* Achieves 4x improvement in online grocery site, equating to higher revenue and conversion rates

* Enables new real-time personalization features

* Reclaims up to 50% of site reliability engineers' time for innovation

In collaboration with Partner

publicis
sapient

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In addition to enhancing our Quick Shop feature, BigQuery provides the foundation for understanding our customers using analytics and data science. We'll be able to make more accurate predictions about what customers want and what they are likely to buy.

Hesham Fahmy, VP Technology, Loblaw

Google Cloud

METRO

Improving sales for customers with greater business intelligence

Success for METRO, one of the largest B2B wholesalers in the world, rests on the everyday decisions customers make, not just on what they purchase, but how they want to buy. To adapt to the changing landscape, the company decided to fully embrace digitalization, with a close focus on customers and their needs.

Enter

Compute Engine instances using **Virtual Private Cloud** for a full ecommerce platform migration and to create easy integrations with backend systems, **BigQuery** and other **GCP** managed services to build a data lake that effectively scales up and down and provides analytical power on demand, **Google Data Studio** to surface data dashboards in every part of the organization for outcome-driven product management, **Google Analytics 360** to measure customer-facing applications and integrate that data into the data lake, and **TensorFlow** to explore new ML applications.

Outcome

* Can reduce instability of its ecommerce platform by up to 80%

* Scales capacity to match 45x increase in daily events in just 3 months during data lake ramp-up phase

* Reduces infrastructure costs by 30% to 50%

> "With the data lake (built on Google Cloud Platform), we can do much more for customers. By connecting data points, we can offer advice like hygiene laws for certain foods, or information on provenance. We can even integrate their local weather forecast so a store doesn't run out of ice cream on a sunny day.

Sven Lipowski, Unit Owner Customer Solutions, METRONOM

Google Cloud

StubHub

Smart analytics powering smarter business and greater data access

StubHub's customer activity across 48 countries for over 10 million live sports, music, and theater events generates massive data. Effectively capturing, analyzing, and leveraging this data and making it instantly accessible—whether from applications, services, or data consumers—could help the business deliver more seamless and personalized experiences to every customer.

Enter

BigQuery, **Cloud ML Engine**, **Google Data Studio**, and **Cloud Dataflow** to transition StubHub's technology stack to the cloud and modernize data infrastructure, so that data becomes its own product and a single recommendation engine can be leveraged during all stages of a user's journey.

Outcome

* Supports growth with a single centralized source for data activities
* Leverages a recommendation platform that's more scalable
* Data scientists now design algorithms, write code, and put data products in production without having to rely on application engineers

"

Advanced solutions in data warehousing, self-serve analytics and reporting tools, and an integrated ML platform from Google Cloud significantly improve our business intelligence, and help us meet our ideal state targets to create a work environment that fosters independence and transforms every team member into a data consumer.

Yao H. Morin, Chief Data Officer, StubHub

Google Cloud

WOOLWORTHS GROUP

Unlocking insights with full-scale data processing and analytics

Woolworths, Australia's largest retailer and second-largest company, operated with many systems that separately culled and leveraged different types of data. To evolve into a data-driven company, Woolworths needed to unlock insights with full-scale data processing and real-time analytics gathered from multiple systems onto one central platform. The company also wanted intuitive collaboration and productivity tools to help teams work more efficiently.

Enter

BigQuery and ML to advance business intelligence and improve operational efficiency.
Plus, **G Suite** and **Chrome Enterprise** to reinvent how employees work and serve customers.

Outcome

✱ Completes queries in seconds versus hours on the previous platform

✱ Migrates previous environment onto GCP

✱ Empowers staff to work from any device at any time, boosting collaboration and productivity

> Google Cloud aligns with our forward–looking strategy by providing breakthrough AI and ML technologies and a whole new approach to collaboration and productivity.

John Hunt, CIO, Woolworths

Google Cloud

Telecommunications, Media & Entertainment

Google Cloud

Google Cloud

Laith Massarweh

Global Marketing Lead,
Telecommunications,
Media & Entertainment,
Google Cloud

The global entertainment industry is simultaneously experiencing an era of both transition and incredible growth. Digital native entertainment companies are finding new ways to connect consumers with world-class content and experiences, while traditional players in the industry are left to grapple with rising consumer expectations, increased competition for mindshare, and changing monetization models.

In order to remain competitive and thrive in the new digital age of media, entertainment companies of all kinds—television, publishing, music, and gaming—must capitalize on the opportunities that moving to the cloud represents throughout the entire content value chain.

From helping visual effects studios deliver world-class animated films on time and under budget, to improving player engagement with mobile games through machine learning and artificial intelligence, Google Cloud is providing media and entertainment companies with tools and services to help modernize how content is created, distributed, and monetized.

Seamless global experiences

Distribute your content on Google Cloud's global private network. We've invested heavily to build out 19 regions across the globe, all connected by thousands of miles of privately owned fiber optic cables to help ensure that viewers, players, listeners, and readers experience your content quickly and securely.

Modernize your content supply chain

In the next five years, nearly a quarter of all the world's data will be entertainment data—movies, shows, and songs. Media companies will need scalable, reliable storage solutions to house all this data, but more importantly, will also need new machine learning tools to understand, categorize, and derive additional value from their content. Google Cloud provides a variety of AI building blocks that can codify how humans perceive speech, text, photos, and videos, so companies can infuse intelligence into their content supply chain.

Deliver insights, fast

Break down data silos and gain a single view of the consumer. BigQuery, Google Cloud's fully managed serverless data warehouse, runs blazing-fast queries on petabytes of data, and comes with machine learning models built in, increasing the productivity of business analysts and more importantly, providing consumers with a more personalized experience wherever and however they're consuming your content.

"Google Cloud provides a variety of AI building blocks that can codify how humans perceive speech, text, photos, and videos, so companies can infuse intelligence into their content supply chain."

Help secure your content

We do our part to help protect your business against current and future threats by offering identity management, network security, and threat detection and response capabilities at scale. Google Cloud is also audited quarterly to meet the specific security guidelines of Hollywood film studios, and we have our controls mapped to the Motion Picture Association of America's best practices for cloud providers.

We are extremely privileged to work with the world's leading media, entertainment, and gaming companies to inform, entertain, and delight consumers across the world. We look forward to seeing what amazing new experiences will be delivered by media and entertainment companies using Google Cloud in the future.

Google Cloud

## Leading the charge on innovative streaming solutions

fuboTV streams live sports, entertainment, and news content, including major-league games, events, top shows, and popular movies. The company built a stable cloud-native streaming platform from the ground up in less than two years, bringing viewers closer to real time than any other service. It was the first to launch a 4K HDR feature in beta. The demands were high for the company's cloud solutions.

Enter

Compute Engine and **Cloud Storage** to help orchestrate fuboTV's streaming video distribution supply chain, **BigQuery** to gain business insights, **Stackdriver** to diagnose problems with real-time access logs, and **Google Kubernetes Engine** for video streaming microservices.

Outcome

✱ Provides fuboTV with a solid underlying platform for its cutting edge, premium video product offerings

✱ Improves user experience, which significantly contributes to the company's growth, including 100%+ increase in subscribers (2018 versus 2017)

In collaboration with Partners

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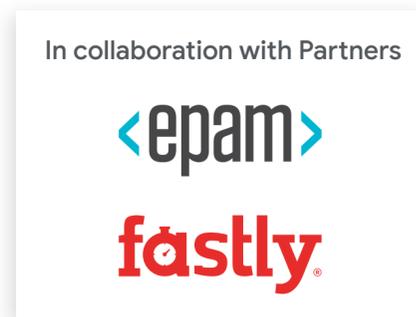
> With a small team, fuboTV has built a stable cable replacement product in less than two years that provides our subscribers with some of the most premium, state-of-the-art offerings in the content streaming space. Google Cloud networking, storage, and compute solutions help us relentlessly improve user experience.

Geir Magnusson Jr., CTO, fuboTV

Google Cloud
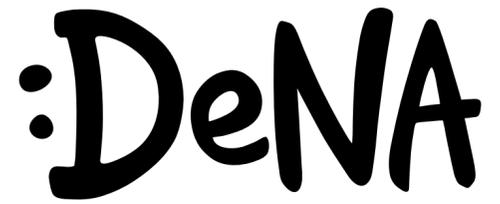
Improving game experience with AI

In DeNA's popular game *Gyakuten Othellonia*, players must use finely honed strategy to construct decks, choosing 16 among more than 3,000 characters with diverse skills. A challenge for beginners is the lack of an appropriate place to practice in order to improve their battle skills. The game's complexity for beginners led to a high churn rate, but estimations showed that lowering the 30-day churn rate could increase revenue by tens of percents. The team turned to AI to create a deck recommendation system for beginners and a smart AI player with various archetypes and strengths to play against.

Enter

BigQuery to help prepare extensive data for AI use by processing various types of in-game data in minutes, **Compute Engine** to run pre-processing of features and AI model training, **Cloud Storage** to provide scalable, fast storage for big data and newly trained models, **Cloud ML Engine** to deploy models with quick, easy scaling and low latency in real time and to provide user-friendly prediction APIs, **App Engine** to autoscale and run applications in several programming languages, and **Stackdriver Monitoring** to monitor performance.

Outcome

* Supports beginner onboarding and increases win rate by about 5%
* Runs error-free with autoscaling and low latency while handling high traffic and requests
* Significantly increases system speed and stability

> DeNA chose to work with Google Cloud because of the powerful, flexible tools in Google Cloud Platform for data science that integrate well with its scalable and robust infrastructure services. This was the perfect combination to broaden our ability to innovate.

Kenshin Yamada, General Manager for AI Division, DeNA

Google Cloud

Data warehouse management: Playing to win

The makers of *Candy Crush Saga*, along with hundreds of other popular games, have been successful in their market space with a focus on bite-sized entertainment and a blend of art and science. With 270 million users per month (Q2 2018), King operates at a scale that few other companies can even hope to achieve, with its data archives in double-digit petabytes, but the company found its on-premises data infrastructure suffering stability issues and needing increasingly more management.

Enter

BigQuery to form the core of a new data warehouse, **Cloud Storage** to hold its massive archive more securely in the cloud, **Deployment Manager** to deploy **Google Kubernetes Engine** workloads to create virtual players trained with **Cloud ML Engine**, and **Cloud Pub/Sub** to exchange data with data analytics modules.

Outcome

* Ingests, stores, and analyzes data from hundreds of millions of players while reducing infrastructure management overhead

* Solves game design challenges

> Our infrastructure needs to support hundreds of thousands of concurrent connections per second, as well as our data warehouse, and we saw that Google has the capability to handle our needs. At the same time, we were very excited by Google Cloud's focus on machine learning and artificial intelligence.

Jacques Erasmus, CIO, King

Google Cloud

NATIONAL GEOGRAPHIC

Helping people better understand the world with cloud

One of the world's most recognized brands, National Geographic believes that when people understand our world, they care more deeply about it. Their storytellers are some of the brightest scientists, explorers, photographers, and filmmakers in the world, who are exploring and documenting some of the farthest reaches of the world. Creating secure access to the National Geographic photography archive to host and maintain a curated collection of the photography assets demanded cloud solution expertise.

Enter

Compute Engine, **Cloud Filestore**, and **Cloud Storage** to move National Geographic photographers' "crown jewels" from on-premises to the cloud and provide more secure and seamless access to more than 130 years of groundbreaking photography.

Outcome

* Scales servers up/down to adjust to user demands

* Provides more flexible architecture, better disaster recovery, and higher level of security

* Increases upload speeds by more than 10x

In collaboration with Partner

›Globant

"

National Geographic and Google Cloud share a spirit of exploration and discovery and a vision to drive impact on a global scale. We see Google Cloud as a true partner in innovating solutions that help us create a planet in balance, including expanding access to stories and photography that inspire people to preserve and protect nature, world cultures, and life on Earth.

Marcus East, CTO, National Geographic

Google Cloud

netmarble

Using data and ML to improve player experiences

With the mission to "entertain the world with fun games," Netmarble is committed to consistently improving player experience. The company saw analyzing gaming data to gain player insights and using ML to fuel innovation as two avenues to better serve players.

Enter

Google Kubernetes Engine, **BigQuery**, **Cloud Spanner**, **Cloud TPUs, Cloud ML Engine**, **Cloud Bigtable**, and **Google Cloud Professional Services** to support new game development, manage infrastructure, and infuse business intelligence throughout operations, and **G Suite** for real-time collaboration in entire front and back offices, including studios.

Outcome

✱ Enhances player experience with better underlying infrastructure and more comprehensive business intelligence

"

Google Cloud aligns with our vision for innovation and is as committed as we are to building better player experiences with advanced AI and reliable, scalable cloud infrastructure.

Duke Kim, SVP,
Head of Netmarble AI Revolution Center, Netmarble

In collaboration with Partners

BESPIN GLOBAL

MZ Cloud Innovator
MEGAZONE

Google Cloud

Sky is the limit with a scalable data warehouse

Sky provides TV, streaming, mobile TV, broadband, talk, and line rental services to more than 22 million customers and looked to create a new cloud-based architecture that could scale and effectively handle data from all Sky products, including millions of Sky Q TV boxes. This could advance business insights, ensure service uptime and delivery, and improve customer experience.

Enter

GCP to provide managed services upon which Sky's entire data pipeline is built, enabling automatic and seamless scaling during peak times, **Cloud Pub/Sub** to ingest data and eliminate data loss caused by bottlenecks in server capacity, **Cloud Dataflow** to pass parsed data to **Cloud Storage**, **BigQuery** to create a data warehouse, **Stackdriver Monitoring** to trigger email and alerts if issues occur, and **Cloud IoT Core** to help collect all diagnostic reporting with expanded pipeline/architecture.

Outcome

* Publishes 200-300 million events daily, up to 600 million during peak times
* Establishes a hub for all data used to enhance Sky Q customer experience and cuts data loss from Sky Q boxes from 50% to 0% with no additional DevOps

In collaboration with Partner

⁺datatonic

" This capability has the power to change the way we develop our products and has made me very proud of what we have built together.

David Parfett, Director of Data Architecture, Sky

Google Cloud

Working toward a global virtual studio model

Academy Award-winning Sony Pictures Imageworks Inc. creates visual effects and computer-generated animations. With CGI-packed blockbusters and animated films often released in the summer, workloads peaked in some months and drastically slowed in others. During peak periods, the company would expand on-premises infrastructure, rent 10,000 or 20,000 extra rendering machines, and add workstations. In slower months, Imageworks would return and take extra rendering machines and workstations offline. The process was inefficient and prevented juggling of simultaneous projects.

Enter

GCP to more securely and flexibly spread production pipeline and collaborate to build **OpenCue**, an open source, high-performance render manager for visual effects and animation, **Compute Engine** for **Custom Machine Types** and temporary preemptible virtual machines that handle larger workloads, **Dedicated Interconnect** to directly connect on-premises network with Google network, and **Persistent Disk** for reliable block storage.

Outcome

* Saves 30% in rendering costs and speeds up approvals and workflows
* Advances work on simultaneous projects
* Keeps intellectual property highly secure

In collaboration with Partner

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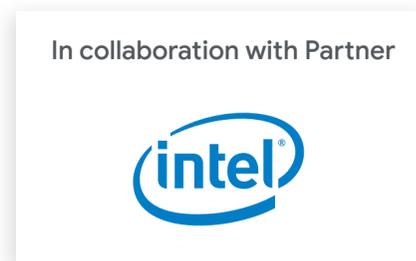
There's no way we could have successfully managed those major projects, *Hotel Transylvania 3: Summer Vacation* and *Smallfoot,* at the same time without Google Cloud Platform. We were able to easily and affordably double the size of our render farm during that period with Compute Engine Custom Machine Types and preemptible VMs. It worked so well that we're planning to work on four big productions simultaneously in 2019. With GCP, we can spread our production pipeline anywhere more securely, so we can attract the world's best talent. That's a huge win for us.

Steve Kowalski, VP of Systems Engineering, Sony Pictures Imageworks

Google Cloud

UBISOFT

Using ML to transform our understanding of the ancient world

Assassin's Creed Origins was inspired by the landscape and history of the Ptolemaic period of ancient Egypt. It was the starting point for a project with Google ZOO: The Hieroglyphics Initiative, which aims to translate hieroglyphics using AI. With no centralized digital repository for information on hieroglyphics, data was the largest challenge to address.

Enter

GCP to train ML models based on hieroglyphics drawn by the gaming community, **Firebase** to build a drawing tool that feeds images into a **Firebase Cloud Storage** database, **Cloud Firestore** to sync user data, **Chrome** to provide access to the tool online, **App Engine** to support the user at various stages of the translation process, and **Cloud AutoML** to provide developers with a user-friendly experience and quickly handle complex processes such as data pre-processing and model design and deployment.

Outcome

* Builds an ML model capable of recognizing hieroglyphics using Cloud AutoML
* Creates tools replicating the translation process used by Egyptologists
* Enables the crowdsourcing of data using a custom-built drawing tool with 80,000 glyphs contributed in one night

"

We put human beings at the center of everything we do. Rather than just build a data repository, we wanted to create a toolset that could then be adapted and developed by both the AI and the Egyptology communities. This kind of research project is all about engaging people and pushing the limits of what is possible.

Guillaume Carmona, VP of Marketing, EMEA, Ubisoft

Google Cloud

Technology

Google Cloud

Google Cloud

AIRSHIP

A database that could sustain the highest demands

Airship provides mobile engagement, analytics, data integration, and wallet marketing solutions that include timely notifications—such as breaking news and sports scores. Deploying a cloud-based strategy with a speedy network for data processing was critical for the company, which offers hyper-personalized, real-time service.

Enter

Cloud Bigtable to maintain a database that could sustain a load so large and demanding that it "murdered every other database the company came across."

Outcome

* Increases reliability and stability
* Migrates previous environment into GCP
* Empowers staff to work from any device at any time, boosting collaboration and productivity
* Improves reliability >100% from self-managed HBase
* Saves 50% in database management costs

"

With the help of Google Cloud, the World Cup was a huge success for us and we peaked our throughput at 400,000 messages per second. If it had been on our previous platform, I don't think the World Cup would have gone nearly as well.

Mike Herrick, SVP of Technology, Airship

Google Cloud

GEOTAB

management by measurement

Simplifying management of complex data

Geotab, one of the world's fastest-growing telematics companies, has tripled its workforce over the last few years and more than tripled the number of vehicles from which it captures data. A fast, reliable, highly secure, and scalable database infrastructure would keep the company's data flowing, but the self-hosting customer databases on-premises had become too complex.

Enter

GCP to house the entire server infrastructure, including 800 virtual machines in **Compute Engine**, **BigQuery** to receive data in a unified data lake and provide support for standard SQL, reliability, and simplified management, **TensorFlow** to apply ML models to raw data and deliver context-specific benchmarks to customers, and **Google Kubernetes Engine** to deliver infrastructure agility and massive scale.

Outcome

* Captures telematics data from over 1.4 million vehicles
* Streams more than 3 billion data records daily
* Analyzes raw sensor data in 5 to 10 seconds

In collaboration with Partner

SpringML

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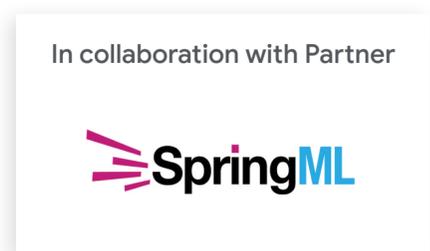
Google Cloud Platform is helping us transform the way we create value for our customers. We can contextually benchmark data at scale, develop richer, more extensive data insights, grow our smart city business, and share intelligence data with the general public. GCP is helping us achieve all that, and more.

Mike Branch, VP of Data & Analytics, Geotab

Google Cloud

Technology that scales to support a fast-growing company

Growing from 100 to more than 2,000 employees in a short period of time, GO-JEK needed to support its rapid growth and automate key processes in order to deliver the availability and stability required to provide the best possible customer service.

Enter

Compute Engine to create high-performance, scalable virtual machines to power hundreds of backend services that provide everything from ride services and food delivery to tickets and shopping, **BigQuery** to analyze massive amounts of data, and **Google Maps Platform** integration for user route planning and ride selection.

Outcome

✱ Supports hundreds of thousands of concurrent transactions and more than 100 million internal API calls per second

✱ Generates up to 4 TB of data per day, delivers response times of 50 milliseconds, and achieves nearly 100% payment success rates

" We receive a lot of data and billions of events per day across multiple products. Using Google Cloud Platform has enabled us to capture and analyze this data to identify new opportunities and areas for improvement.

Ajey Gore, Group CTO, GO-JEK

Google Cloud
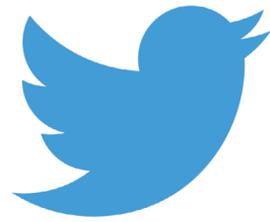
Scale and speed: Keeping up with the conversation

Every day, millions of people come to Twitter to find out what's happening in the world and talk about it. With hundreds of millions of tweets sent daily, it's critical that the infrastructure and data platforms are able to scale.

Enter

GCP to provide a platform and infrastructure that could support Hadoop file systems that host more than 300 PB of data across tens of thousands of servers.

Outcome

✱ Enables faster capacity provisioning and increased flexibility

✱ Improves security and disaster recovery capabilities

✱ Separates compute and storage for Hadoop workloads, which advances scaling and operational efficiencies

"

Twitter runs on a Hadoop compute system as the core of our data platform with multiple large clusters that are among the biggest in the world. Google Cloud Platform provides the infrastructure that can support this and the advanced security that well serves not just our company but also our users. This peace of mind is invaluable.

Parag Agrawal, CTO, Twitter

Google Cloud

Thank you

Thank you for taking the time to learn about our customers. They're proud of the successes they've had and the results they've achieved, and so are we.

Visit us at **https://cloud.google.com/customers/** to learn more about how Google Cloud customers are using cloud technologies.

Google Cloud

Google Cloud

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