Modernize by migrating to Google Cloud

Jack Lo, Director of Engineering, Google Cloud
Every industry is going digital.

By 2021,
Over 75% of midsize and large organizations will have adopted a multicloud and/or hybrid IT strategy*

By 2022,
Public cloud services will be essential for 90% of business innovation*

And by 2025...
The sum of the world’s data is expected to swell more than 5 times its current size**

That is why migration and modernization are top of mind

- Migrate existing applications to the cloud: 68%
- Evolve our application portfolio to promote agility and innovation: 59%
- Align the IT organization and business units for the strategy implementation and usage of our business apps: 58%
- Rationalize the number of business applications in our portfolio: 51%
- Increase investment in customer insight applications: 49%
- Integrate systems of record with customer-facing systems of engagement: 43%

70% of current IT spend goes to “keeping the lights on” -- not towards innovation that drives the business forward.

Source: Forrester
Source: Gartner
But migration pathway not always clear

- Drive innovation
- Reduce costs
- Create value
- Improve efficiency
- Increase productivity
Migration and Modernization 101
The deployment landscape: today

- Classic apps & operations
- Cloud-native apps & operations

Public

On-prem

Rigid & expensive

Google Cloud
The deployment landscape: tomorrow

- Developer productivity
- Portable
- Scalable
- Available
- Efficient & ops agility
- Pay for use
- Secured

Classic apps & operations vs. Cloud-native apps & operations

Google Cloud
Strategy 1: Rebuild

- Rigid & expensive
- Developer productivity
- Portable
- Scalable
- Available
- Efficient & ops agility
- Pay for use
- Secured

Classic apps & operations vs. Cloud-native apps & operations

Google Cloud
Strategy 1: Rebuild (but not practical for most apps)

Rigid & expensive

Developer productivity
Portable
Scalable
Available
Efficient & ops agility
Pay for use
Secured

Classic apps & operations
Cloud-native apps & operations

Public
On-prem

Rigid & expensive

Google Cloud
Strategy 2: Lift & shift

Efficient & ops agility
Pay for use
Secured

Rigid & expensive

Public
On-prem

Classic apps & operations
Cloud-native apps & operations
Lift & shift: overview

What it is

Moving applications as they exist to the cloud

When to use it

Applications that can run unmodified in the cloud

Speed is necessary

Little appetite or need for change
Strategy 3: Improve & move

Rigid & expensive

Classic apps & operations

Cloud-native apps & operations

Developer productivity
Portable
Scalable
Available

Public
On-prem
Introducing Google Cloud’s Anthos

Anthos lets you build and manage modern hybrid and multi-cloud applications without lock-in.

Build once, to run anywhere, across your existing on-premise infrastructure and all major public cloud providers.

Marketplace, Service Management, and Managed Operations.

“Anthos' multi-cloud capabilities are so far unique in the industry”

Forbes, April 2019
"At HSBC, we needed a consistent platform to deploy both on-premise and in the cloud. Google Cloud’s software-based approach for managing hybrid environments provided us an innovative, differentiated solution that was able to be deployed quickly for our customers."

Darryl West
Group CIO

"At Siemens we believe that having a winning hybrid strategy is going to be instrumental in achieving our vision of being a leading provider of Industrial Internet of Things solutions. Anthos is a great fit for us as it gives us the ability to have a unified management view of our hybrid deployment while giving us a consistent platform to run our workloads across environments."

Martin Lehofer
Head of Research
Group IoT/Distributed Computing
Modernize workloads in Cloud
Lift-and-optimize workloads
Lift-and-shift workloads
Unlock business value in-place
Modernize workloads in-place

It’s not one-size-fits-all

Classic apps & operations
Cloud-native apps & operations

Public
On-prem

Google Cloud
Google Cloud is here to meet you where you are, to be your partner in crafting a migration journey that lets you run what you want, where you want, how you want
Why move to Google Cloud

Hybrid and Multi-Cloud
   Enables choice
   Open source gives customers the freedom to choose where to deploy workloads and avoid vendor lock-in

Best-in class security
   Security by design
   Privately managed network with > 100 POPs worldwide

Faster provisioning and scale
   Infrastructure that underpins 8 products with > 1B users each
   On-demand pricing
   Scale up quickly as your needs change

Drive your innovation
   Ease of use with Serverless and Managed Services
   Cutting-edge compute, AI & ML capabilities
   Unlock the ability to solve problems that previously were not possible
Cutting-edge compute platforms in Google Compute Engine

**Latest CPUs**

Intel Skylake CPU available on GCP 4 months before public launch

First to market with Intel Cascade Lake CPU and Optane DC Persistent Memory

**GPU and accelerators**

HPC is entering a new era defined by new accelerator technologies, rapidly enabling significant new advances.

Nvidia K80, P100, V100, P4, and T4 GPUs on Compute Engine

**Google’s Cloud TPUs**

Cloud TPU v2 and v3 Pods now publically available

Cloud TPUs 84% faster on MLPerf benchmark
Cloud TPU Pods - Supercomputers for ML

Cloud TPU v2 Pod\textsuperscript{Beta}
- 11.5 petaflops
- 4 TB HBM
- 2-D toroidal mesh network

Cloud TPU v3 Pod\textsuperscript{Beta}
- 100+ petaflops
- 32 TB HBM
- 2-D toroidal mesh network
Unlocking discoveries

**MIT research:** computational mathematics
- 1.8 M cores on Preemptible VMs
- 300 CPU-yrs of computation in a single afternoon

“*It changes your whole outlook on research when you can ask a question and get an answer in hours rather than months,*” he said. “*You ask different questions.*”
- Andrew Sutherland

Recursion Pharmaceuticals: AI-enabled discovery to treat rare diseases

The potential of using Cloud TPU pods to accelerate our deep learning research while keeping operational costs and complexity low is a big draw. 

*It takes us now a little over 24 hours to train models on our local GPU cluster. It will take us, depending on the size of the TPU pod, anywhere from 7 hours to 15 minutes.*

Getting answers to our researchers in an order of minutes or hours versus days is a definite value add for the business.”
- Ben Mabey, Vice President, Engineering, Recursion Pharmaceuticals
Google and Schlumberger’s partnership

Schlumberger is shifting the development and innovation focus away from individual technologies towards complete and high-performing technology systems and has selected Google Cloud as a preferred Cloud provider to develop cloud-native E&P applications to help its customers derive actionable insights from data and harness and for its clients’ digital journey to the cloud on the DELFI cognitive energy and production (E&P) environment.

Schlumberger is making a critical investment in high performance computing and we’ve chosen Google Cloud as our preferred platform. By scaling data, processing workflows, and using advanced algorithms, we can innovate faster than ever.

Ashok Belani, Executive Vice President of Technology, Schlumberger

“Our strategic collaboration with Google Cloud enables Schlumberger and our customers to take advantage of the latest digital technologies to unlock the value in all data for making critical business decisions. Using GCP, Schlumberger is launching several cloud-native applications for its customers, including global exploration screening, seismic processing, field development planning, and production optimization workflows…”

– said Hinda Gharbi, Executive Vice President, Schlumberger Reservoir & Infrastructure.
Beginning your migration journey
Strategies differ; approach remains similar

- **Assess** your application landscape
- **Plan** what you can move, what you should move, and in what order
- **Migrate** work with your team and/or partner to pick a path and start migrating!
- **Optimize** your systems and operations, help save on costs
Partners to help you on your journey

Full-Service Partners

Discovery & Assessment Partners

Atos
Deloitte
accenture
Cognizant

burwood group, inc.
Maven Wave
TATA Consultancy Services
GFT

SADA systems
Onix
AGOSTO

Cloud Physics
Stratotrozone
RISC Networks
Cloudamize
Google is the best cloud partner for your journey

**New Workloads**
Build new cloud-native applications or spin up new data warehouse

**On-Prem Migration**
Modernize data and applications, enabling AI/ML

**Digital Transformation**
Deliver new customer experiences, redesign business models and transform culture

Only Google Cloud lets you **write once, run anywhere** on prem or in any cloud

We pioneered the use of data to help you **gain unique insight** at extreme **global scale**

Google is an **innovation company** at the core; we build cultures of collaboration & agility
Appendix
Beginning your migration journey
Consistent experience
Modernize in place
Automate policy & security at scale
Consistent experience

Anthos
Multi-cluster management
Secure service management
Marketplace

Built on Kubernetes, Istio, and Knative
A portable platform that's consistent across environments
Anthos Migrate

Migrate VMs as-is or upgrade to containers
Negligible app downtime (often < 10 minutes)
Built-in pre-migration testing and post-migration rollback options
Cloud instance rightsizing
“Put simply, Anthos provides us the security we need, the portability we want, and the productivity that our developers crave”

Keith Silvestri
Chief Technology Officer
Google Compute Engine

**Compute power**
- Up to 416 vCPUs
- Up to 12TB RAM

**Easy to manage**
- Flexible configuration
- Managed Instance Groups
- Deployment Manager scripts
- Powerful APIs

**GPUs**
- NVIDIA K80, P100, V100
- NVIDIA P4/T4
- Up to 8 GPUs per VM via PCIe x16

**Compute Optimized VMs**
- Fast Clocks - 3.8 GHz
- Up to 60 vCPU, 240GB RAM
- vNUMA exposure

**Cost-effective computing**
- Preemptible VMs
- Custom Machine Types
- Rightsizing Recommendations
- Auto-scaling HPC clusters

**Google Cloud**