

Previewing the cloud trading environment

Elizabeth Gisch

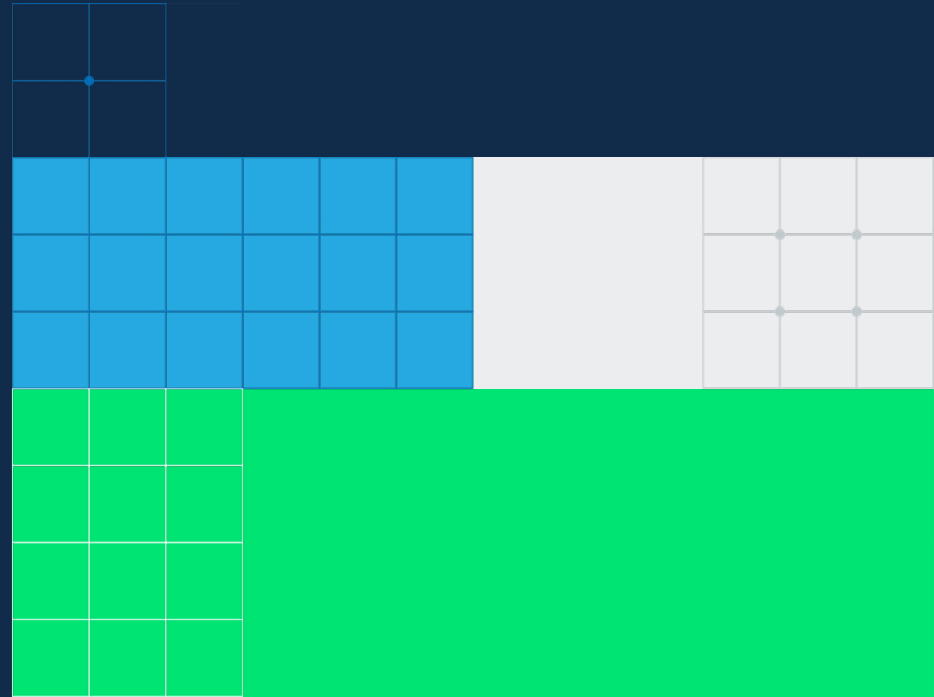
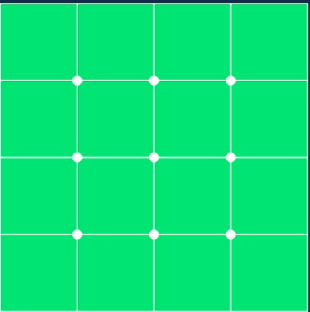
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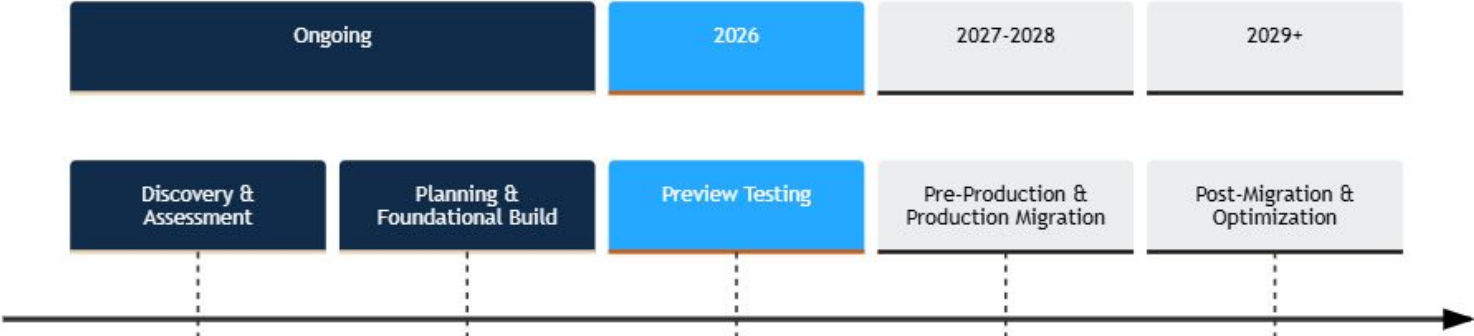
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Agenda

- 1 Preview Overview
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- 2 Access and Onboarding
.....
- 3 Key Activities and Success Criteria for Preview Testing
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- 4 Considerations for Cloud-First Trading
.....
- 5 Next Steps
.....
- 6 Maximizing Value from CME Preview Investment
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CME Globex Migration to Google Cloud



Preview Overview

What is the CME Globex Migration Preview Phase?

- A low-risk opportunity for clients to begin testing CME Globex markets in a production-like environment.
- Leverages the Ultra Low Latency (ULL) private zones of the Google Cloud Dallas region.
- The same specialized platform as will be used in Production, offering performance, determinism and reliability.

Key Objectives and Benefits

- Your most critical opportunity to validate your systems in the new environment before the production migration.
- Confirm your connectivity, application performance, and operational readiness
- Test against a realistic, high-volume flow of injected data to verify performance and resilience under load

Timing and Scope

- Scheduled to begin mid-year 2026
- A wide range of markets, applications and services will be offered

CME Group strongly encourages clients to evaluate cloud usage requirements and establish early access in Preview to prepare for the migration.

CME Globex for Preview Testing

Clients can test a wide range of core CME Globex markets, applications and services.

Energy and Metal
Options

E-mini and
Micro E-mini S&P
Options

Treasury Options

Energy Futures

Equity Futures

Crypto Futures, Crypto
Options and Event
Contracts

CME Globex Applications & Services for Preview Testing

Clients can test a wide range of core CME Globex markets, applications and services.

Order Entry

- iLink Market Segment Gateways
- iLink Convenience Gateways
- iLink Order Entry Service Gateways

Market Data

- MDP 3
- Streamlined MDP
- Hardware multicast
- Cloud multicast

Risk Management

- Drop Copy

Accessing the Preview Environment

Access to CME Globex Preview will only be available through co-located Ultra Low Latency (ULL) Google Compute Engine (GCE) instances.

ULL GCE Instances	U4C Bare Metal	U4S Virtual Machine
ULL Access • Market Segment Gateways (MSGW) • Drop Copy for MSGW • Hardware Multicast market data		
Premium Tier Access • Convenience Gateways (CGW) • Drop Copy for CGW • Cloud Multicast market data		

Further details on access to CME Globex in Production will be shared as soon as they are available.

Accessing the Preview Environment

Onboarding

From Google Cloud

- Google Cloud Master Service Agreement
- Google Project ID
- Network Name & IP

From CME Group

- Whitelisted Access based upon Google Project ID & Network information
- Preview-only sessions for iLink and Drop Copy

Key Activities of the Preview Phase

Performance

- Measure end-to-end latency and jitter under load from CME Group's injected traffic

Zone Swap

- Test your applications' ability to seamlessly migrate between zones
 - This is a brand-new dynamic that requires dedicated focus

Functional

- Verify your order entry, market data, and Drop Copy systems on Google Cloud managed services

Operations

- Cloud scaling, financial operations, third-party integrations, monitoring, security, ingress and egress and more
-

Performance Testing in Preview

Enhanced Connectivity and Latency Validation

Sustained Connectivity

- Beyond initial connection, focus on maintaining sustained, stable connectivity throughout periods of CME Group-injected traffic.
- Test resilience against high-volume data streams

Validated Latency Under Load

- Measure round-trip latency, consistency and jitter for order entry and market data while CME Group's synthetic traffic is active.
 - This will provide a more realistic understanding of performance under normal operating conditions.
-

Zone Swap in Preview

Zone Swap Execution & Resilience

Zone Swap Events

- CME Group will offer regular zone swaps to facilitate client testing
- Ensure your applications can manage the zone swap process correctly

Zone Swap Transitions

- Measure the time it takes for your system to migrate from between zones including spinning up machines in the new production zone
- The success of a zone swap is not just about a successful migration, but the speed at which your system resumes normal operation with minimal disruption.

State Management

- Validate that your applications maintain their state and correctly re-establish connections and order flow after the swap
 - Ensure they can seamlessly switch to the appropriate endpoint.
 - Verify your application accurately reflects the state of the market on the new zone.
-

Functional Testing in Preview

Comprehensive Application Functionality Testing with Injected Traffic

Order Book Interaction

- Actively test your order entry and management systems by placing, modifying, and canceling orders against CME Group's injected order book traffic.
- Verify that your system correctly interprets the state of the market as driven by this synthetic activity.

Market Data Processing Scalability

- Validate your market data handlers' ability to consume and process the around-the-clock market data traffic injected by CME Group.
- This is crucial for confirming your system's capacity and ensuring no data loss or processing delays occur during peak volumes.

Drop Copy Verification

- Confirm your Drop Copy systems can accurately process your firm's real-time market activities within the context of continuous traffic flow.
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Accelerate Operational Readiness Through Preview Testing

Operational, Financial Operations, and Support Readiness

Team Upskilling

- Train your developers and DevOps teams on Google Cloud fundamentals, focusing on the specific services you plan to use

Monitoring and Logging

- Set up and test your monitoring and logging tools to ensure you can effectively track performance, troubleshoot issues, and generate the necessary audit trails in the Google Cloud environment.
- Focus on identifying and reacting to issues within a dynamic trading environment
- Simulate a migration within a zone, from one compute instance to another

Troubleshooting Under Pressure

- Use the injected traffic as an opportunity for your support teams to practice troubleshooting and diagnosing issues in a simulated active market environment.
- Become proficient with Google Cloud tools for identifying root causes

Vendor and Partner Readiness

- Coordinate with any third-party software or service providers to confirm their solutions are compatible and prepared for the new CME Globex platform

Resource Scaling During Load

- Observe how your deployed Google Cloud resources (e.g., ULL GCE instances) perform and scale against varying traffic patterns.
 - Identify any bottlenecks or areas requiring optimization before production.
 - Evaluate financial operations considerations for cloud operations
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Strategic Considerations for Cloud-First Trading

An opportunity to consider other strategic changes

Prioritize Cloud-Native Solutions

Look for cloud-native solutions optimized for Google Cloud.

Data as a Service (DaaS)

Consider transitioning to DaaS models where data is delivered and managed directly within the cloud, like CME Smart Stream

- Allow your teams to access and analyze data without managing the underlying infrastructure

Re-evaluate Co-location Requirements

Evaluate new connectivity models, directly or via vendors, through Google Cloud's facilities.

Establish a Cost Baseline

Use the Preview phase to calculate your cloud consumption and establish a strategy for your cloud utilization.

Leverage Google Cloud Tools

Implement tools like Cloud Billing Reports and Cost Management APIs to monitor spending and set up budgets.

Optimize Resources

Experiment with different compute instance types and autoscaling to find the optimal balance of performance and cost efficiency

Next Steps for Access to Preview

- ✓ Continue your Discovery, Assessment, Planning and Foundational Build tasks
- ✓ Get started onboarding for Preview
- ✓ Review the [Client Systems Wiki](#) and watch for updates
- ✓ [Subscribe](#) to the [CME Globex Notices](#)

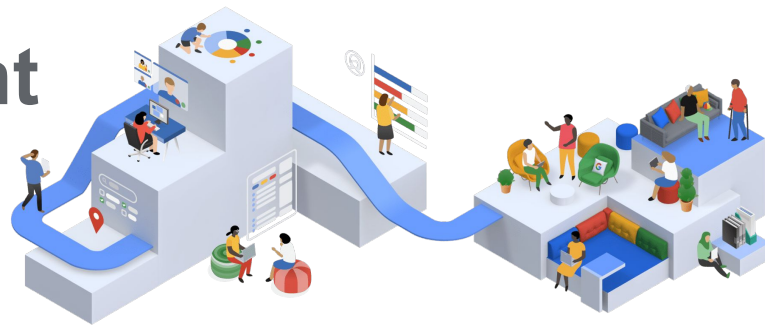
CME Group and Google Cloud resources are here to support you

- [Global Account Management](#)
- cloud.google.com/resources/trading-in-the-cloud



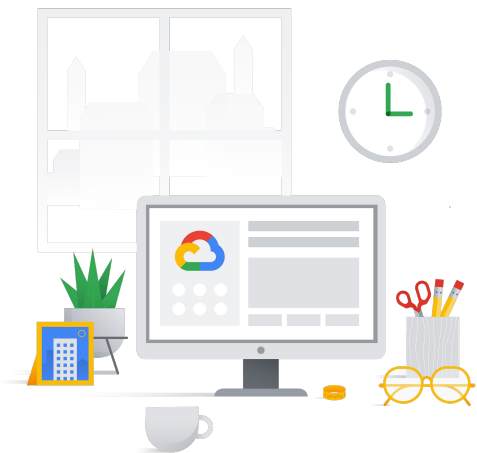
Google Cloud

Maximizing Value from CME Preview Investment



September 17th

Agenda



- 1 Opportunity: Quantitative Research & Market Access
- 2 Getting Started on Google Cloud



Transform with Google Cloud

How Citadel Securities is reimagining quantitative research on the cloud



The operating question was not “How do we replicate what we do on-prem in the cloud?”

but rather:

“What can we build that would provide us with the most productive, scalable, and cost-efficient Quant Research Platform?”

How many tests do we want to run per day?

What types of cores work best for different tests?

How quickly should a researcher get a result on a test?

Opportunity:

Increased researcher productivity with rapid access to markets

Each researcher has access to compute they need



Task
Task
Task
Task
Task
Task

50,000
cores



Task
Task
Task
Task

50,000
cores



Task
Task

50,000
cores



Task
Task
Task

50,000
cores



Rapidly deploy to trade



Trade Algo A
Trade Algo B
Trade Algo C

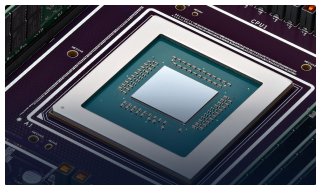


Entry into market faster and cheaper

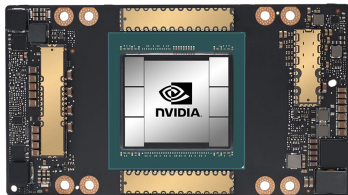
Faster compute time → greater productivity → new ideas & revenue opportunities

Google Cloud offers leading performance-optimized compute resources

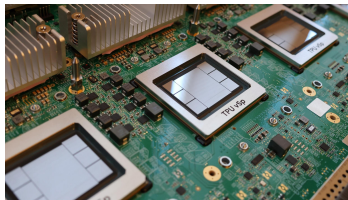
Diverse **CPU** options, including Google Cloud's custom CPUs



State-of-the-art **GPUs** in partnership with NVIDIA



Google Cloud's **TPUs** are optimized for large AI models



Benefits

Cost effectiveness

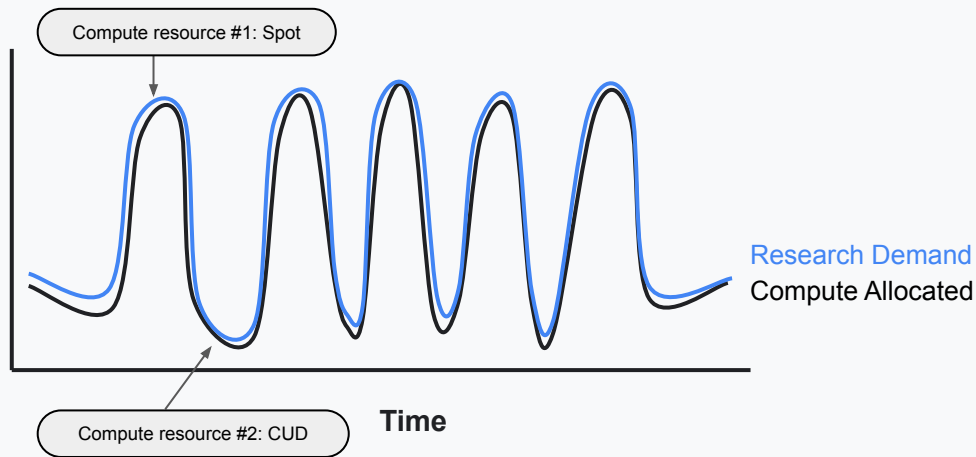
Compute versatility and speed

Cutting edge innovation

Choose from a wide variety of machine types with different combinations of CPUs, GPUs, and TPUs to tailor your infrastructure to your specific applications.

Google Cloud's flexible infrastructure helps optimize price-to-performance

Dynamic compute allocation

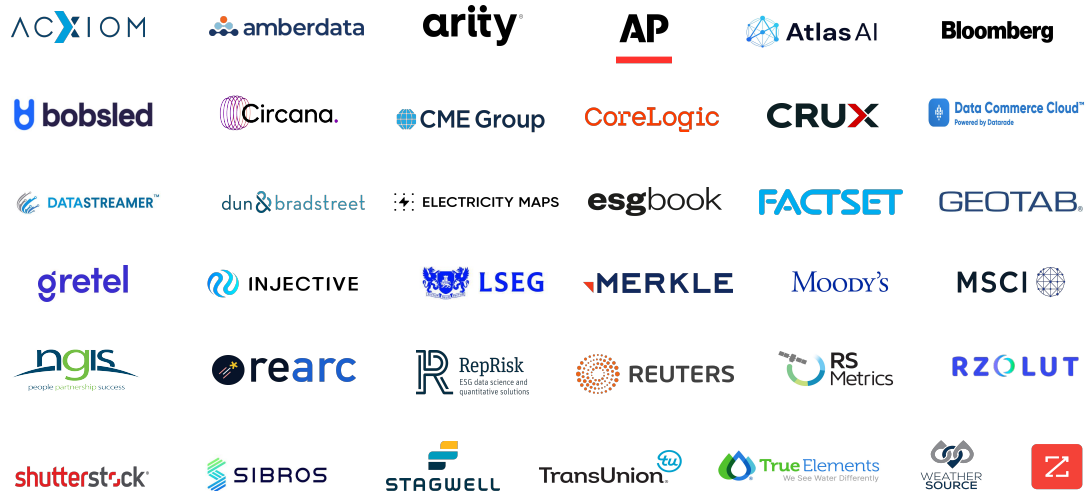


Benefits

- Improve price-performance ratio
- Reduce cost-per-research-hour
- Lower operational overhead

Automatically adjust compute resources based on real-time demand, scaling up during peak periods to maintain performance and scale down during off-peak hours to save costs.

Google Cloud offers frictionless market, vendor & alternative data onboarding



3,500+

datasets from hundreds of providers directly in BigQuery



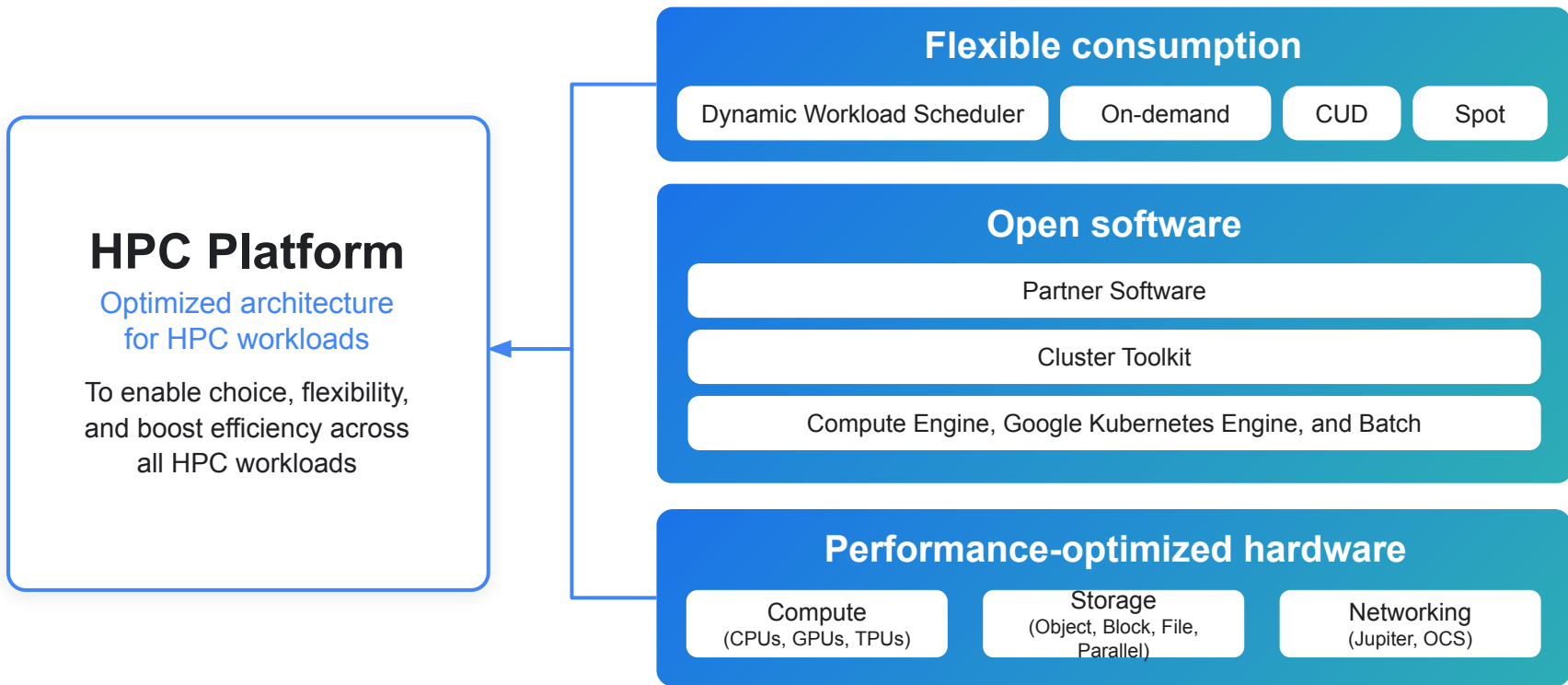
Benefits

Faster time to
access data

Less data wrangling

Advanced analytics
built in

Google Cloud's HPC Platform



The value of building **Research Platforms** on Google Cloud



Efficiency

“Citadel Securities’ costs — measured in costs-per-research-hour — have dropped precipitously.”

Costas Bekas, Head of Quant Research Platform, **Citadel Securities**



Speed

“Dynamic Workload Scheduler improved on-demand GPU obtainability by 80%, accelerating experiment iteration for our researchers.”

Alex Hays, Software Engineer
Two Sigma



Scalability & Flexibility

“Hudson River Trading’s collaboration with Google Cloud’s scalable and reliable infrastructure is a perfect fit for our compute-intensive workloads.”

Gerard Bernabeu Altayo, Compute Lead
Hudson River Trading

How to get started with Google Cloud for trading CME Markets

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Reach out to your Sales Team



<https://bit.ly/45Ppjgr>

1

Architect an environment with Google

Work with Google engineers and solution architects to design an architecture to address your workload needs and Google's world class security.

2

Technical Acceleration Workshop

Participate in workshops including technical training, hands-on labs, roadmap sessions, and more.

3

Implement Proof of Concept

Engage with Google SMEs, Google PSO, or partners to design and implement an HPC POC based on workload, requirements, and goals.



Accelerate

Google Cloud Consulting

Google Cloud Build Partners

why Google Cloud Consulting

We collaborate with our specialists to **work alongside you** to understand your business goals and **help drive your cloud journey forward.**

Architects

who connect the technology dots



Engineers

who build great products



Delivery Executives

who empower teams



Strategists

who define and design innovative solutions



Trainers

who drive growth and development

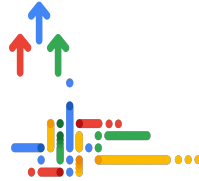
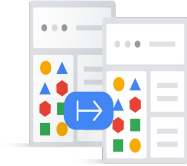
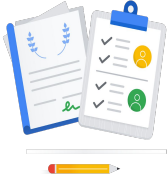


Experts

who bring leading industry and product knowledge



Onboarding and Acceleration Offerings



Onboarding Foundation Setup

Duration: 8-15 Working Days

Establish an infrastructure foundation on Google Cloud. Implement secured foundational components.

Onboarding Workload Migration

Duration: 25 Working Days

Migration of first workload (VMs, Containers, DBs, DW, etc.) to Google Cloud.

Research Environment

Duration: 20 Working Days

Deploy Monte Carlo, Value at Risk, or Option Pricing with scale and automation

GenAI MVP Launchpad

Duration: 25 Working Days

Deploy a GenAI use case in a production/production ready environment on Google Cloud

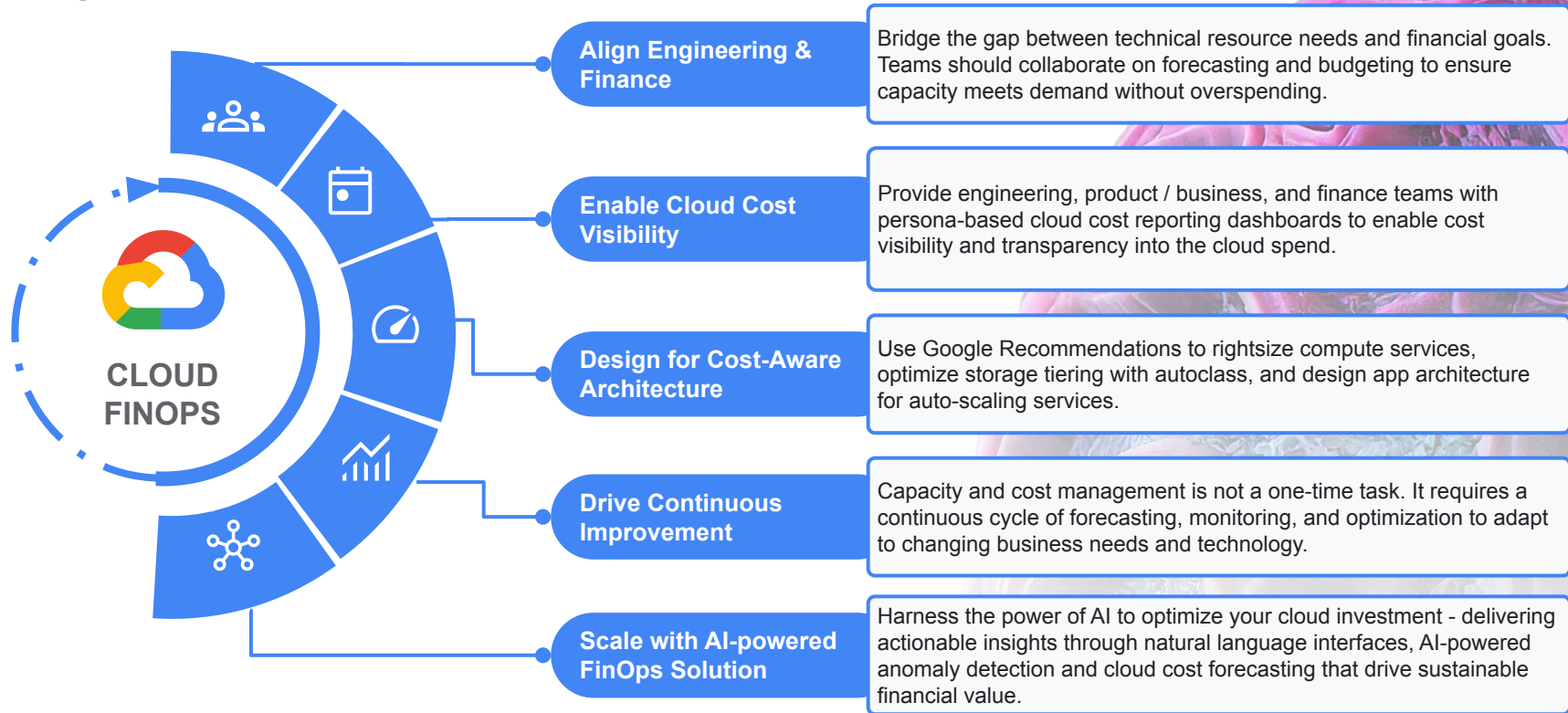
Agent Launchpad

Duration: 30 Working Days

Deploy your first intelligent agent use case with Google Cloud using ADK

Google Sales Team will help your firm understand and take advantage of these offerings

Our Google Cloud FinOps team partners with you at every stage to build and scale robust FinOps capabilities



Specialized Google Build Partners

High speed, low latency, and deterministic are hard on the best of days

Adaptive

Deep capital markets expertise meets cloud-native technology

- Custom trading solutions & architecture modernization
- Hybrid & multi-cloud transformation

Market-leading in-house technology

- Aeron open-source: high-performance messaging & resilient clustering
- Aeron-based infrastructure platform: solving distributed systems at scale
- Cloud-native by design

weareadaptive.com

28STONE

Since 2011, 28Stone has been at the forefront of developing game-changing custom trading software for the world's leading financial markets participants.

Our expertise includes design and delivery of cloud native **trading infrastructures**, **cloud performance optimization technologies** and cloud native **GenAI FSI solutions**.

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