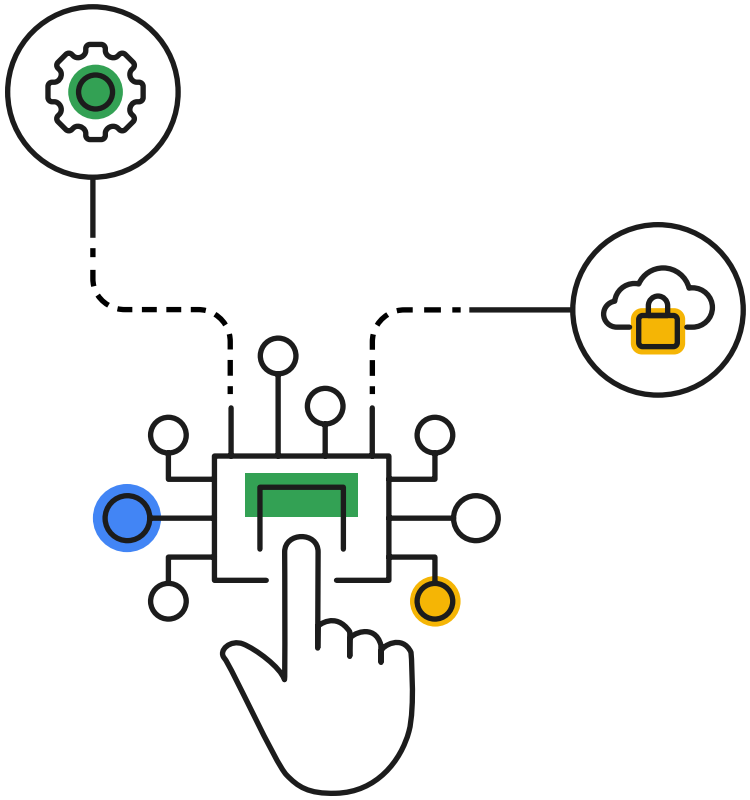
Google Cloud

Google Cloud for SAP:
The enterprise cloud for business agility, insights, and innovation



Google Cloud

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Introduction

Applications and innovation in the cloud for SAP customers

Why do SAP customers choose Google Cloud? Whether it's for the powerful and scalable infrastructure, the first-class customer experience, or the open platform for modernization, one thing is clear: Google Cloud provides the applications and innovation that SAP customers need to unlock agility, efficiency, and innovation across the organization.

Two recent independent studies by Forrester and IDC verify the significant cost savings and efficiency and productivity improvements that result from moving SAP environments to Google Cloud.

$7.1 million
in legacy system savings[1]

$1.3 million
in IT efficiency improvements[1]

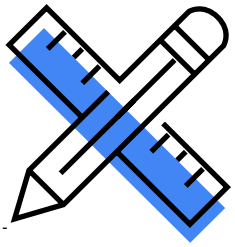
98% drop
in business losses due to unplanned outages[2]

46% decrease
in three-year operations costs[2]

The following pages detail the innovative capabilities Google Cloud delivers to SAP customers. From SAP-certified compute and storage to application modernization and live migration, read on to learn how we're powering the smarter cloud for your enterprise.

1. Forrester, The Total Economic Impact Of SAP On Google Cloud, July 2020
2. IDC, Business Value of Google Cloud for SAP Environments, July 2020

Modernize and create new SAP apps with Apigee full life-cycle API Management



Maximize the value of your SAP systems and data stores by overcoming the challenges of data access, reliability, and governance. Apigee is a full lifecycle API management platform that unlocks SAP data and services to power connected experiences, reduces technical debt and complexity in SAP systems, and minimizes business disruption during SAP system upgrades and migrations.

Apigee provides broad SAP support to enable APIs across platforms

Apigee API Management

- **iPaaS**
  like SAP Cloud Platform, Dell Boomi, etc.
- **Middleware**
  like SAP PO, TIBCO, Software AG, Informatica, etc.
- **SAP NW Gateway**
  either embedded or as a hub in the SAP landscape
- **Standalone SAP systems**
  Built-in SAP interfaces for Netweaver or HANA systems

- Accelerate access to your SAP data
- Make SAP data available in a secure setup
- Avoid business disruption during SAP migrations
- Access legacy and modern services with ease
- Measure interface usage to your SAP systems

Learn more:

Apigee: Your gateway to more manageable APIs for SAP blog

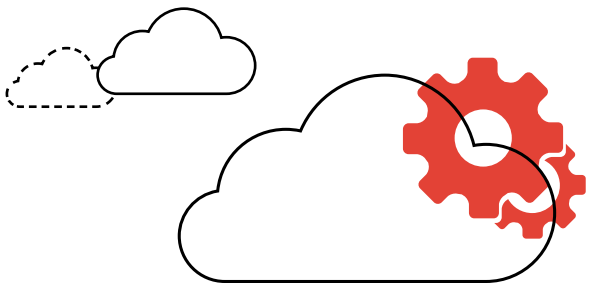
Google Cloud Apigee for SAP Customers solution brief

Bring cloud-native practices to SAP ecosystems with application modernization

Overcome the challenges of developing and maintaining custom objects by shortening the length of development lifecycles, operating in an environment built for microservices, and reducing dependency on niche knowledge.

Google Cloud is uniquely positioned to bring cloud-native practices to SAP ecosystems by deploying modernized applications as extensions on serverless platforms. Application modernization with Google Cloud also aids digital transformation by introducing DevOps to existing teams, leading to a more agile and user-centric culture.

- Keep the core clean and innovate faster
- Facilitate user feedback
- Avoid impact on business processes
- Keep better track of technical debt
- Adopt cost-effective and flexible runtimes
- Avoid vendor lock-in



Learn more:

Application modernization solutions page

Revolutionize how your SAP system runs with Google Cloud AI

Innovate within your existing workflow, empower teams to implement machine learning (ML) without the need for additional expertise, and streamline development with artificial intelligence (AI). Google Cloud's advanced AI solutions enable everyone in your organization to make an impact. The more data you bring, the more unique insights you'll get—and the more opportunities to redefine how your enterprise is run.

SAP customers are already using Google Cloud AI to:

- Predict when to ramp up production to meet market demands
- Identify when customers are ready to upgrade for personalized, relevant communications
- Automate warehouse processes embedded into manufacturing or business workflows
- Detect and assess damages early to save time and reduce costs

Cloud AI building blocks make it easy for you to add sight, language, conversation, and structured data into your applications.

You can use proven, pre-trained APIs, or use Cloud AutoML to create high-quality custom models with minimal effort and machine learning expertise.

By 2030, companies that fully absorb AI could double their cash flow.[1]

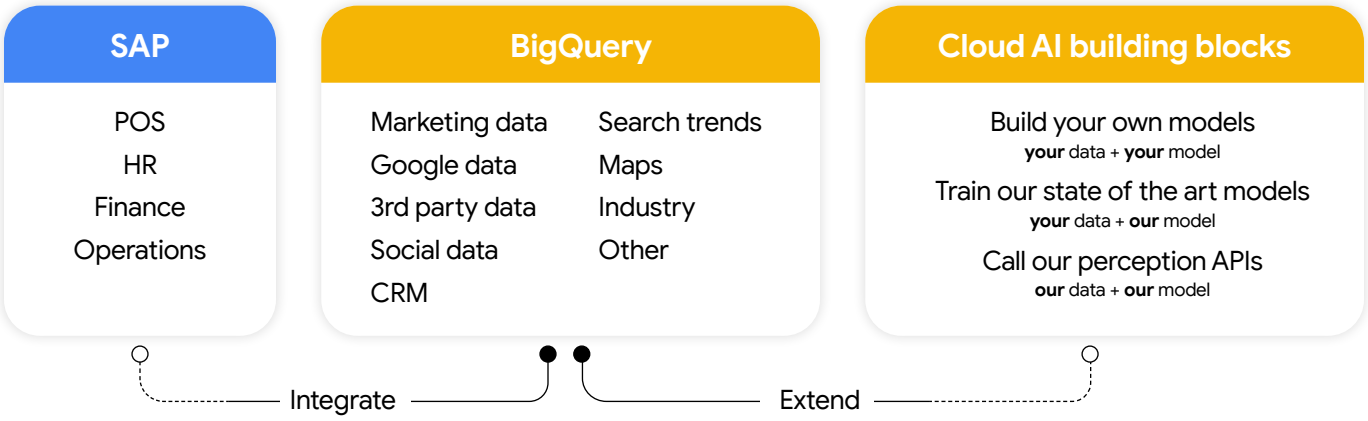
1. McKinsey & Company, Notes from the AI frontier: Modeling the impact of AI on the world economy, September 2018.

Learn more:
Artificial intelligence solutions page
Google Cloud Machine Learning video
Google Cloud AutoML Vision for SAP customers video

Analyze all SAP and non-SAP data quickly, cost effectively, and at petabyte scale with BigQuery

Uncover deep, data-driven insights with seamlessly consolidated SAP and non-SAP data in BigQuery, a serverless, highly scalable, and cost-effective multi-cloud data warehouse designed for business agility.

- **Integrate SAP data sources with BigQuery** leveraging best-of-breed partner solutions from SAP, Informatica, Qlik, Datavard to Software AG, Dell Boomi, HVR, and more
- **Cut the time-to-value** for cross-enterprise insights
- **Create and execute machine learning models directly** in BigQuery using standard SQL queries with BigQuery ML
- **Extend with Cloud AI building blocks to easily infuse AI** into existing solutions or accelerate the build of entirely new ones



Learn more:

BigQuery for SAP customers solution brief

BigQuery solution page

Protect your SAP systems with Google Cloud data protection and recovery

Improve how you compete in an unpredictable, complex, and dynamic business environment with cloud-based data protection and recovery for your SAP instances. From persistent disk snapshots to machine images, Google and SAP's cloud solutions work seamlessly together to provide an ecosystem of customizable solutions.

Choose from a range of cloud-based backup solutions that are flexible, scalable, and self-manageable:

Persistent disk snapshots
Fast and cost-effective, persistent disk snapshots allow you to specify the storage location as regional or multi-regional. In an SAP HANA database running on Google Cloud, store backup folders on separate persistent disks to capture and replicate the database server independently.

Machine images (Beta)
A Google Compute Engine resource, machine images store all the configuration, metadata, permissions, and data needed from disks to create a VM instance. Machine images are ideal resources for disk backups as well as instance cloning and replication.

Shared file storage
SAP systems can use shared file storage to fulfill any high availability and disaster recovery requirements. Shared file systems can be combined with appropriately chosen Cloud Storage buckets to ensure availability of data backups across zones and regions.

HANA Backint agent for Cloud Storage
For SAP HANA database backup, Google Cloud offers customers a free, SAP-certified, and application-aware Cloud Storage Backint agent for SAP which would eliminate the need for backing up with persistent disks.

Learn more:
9 ways to back up your SAP systems in Google Cloud blog
SAP on Google Cloud: Backup strategies and solutions whitepaper

Elastically scale your architecture with SAP custom VMs

Google Cloud's SAP custom VMs offer a virtualized solution that enables you to manage capacity with machine learning that right-sizes your infrastructure. Lower service costs by paying for today and not tomorrow, flex and move at your own pace, and manage peak processing needs with ease.

SAP Certified for SAP HANA

Fast track your implementation with 26+ Google Cloud solutions certified for successful integration with SAP HANA. See SAP note 2456432 for more details

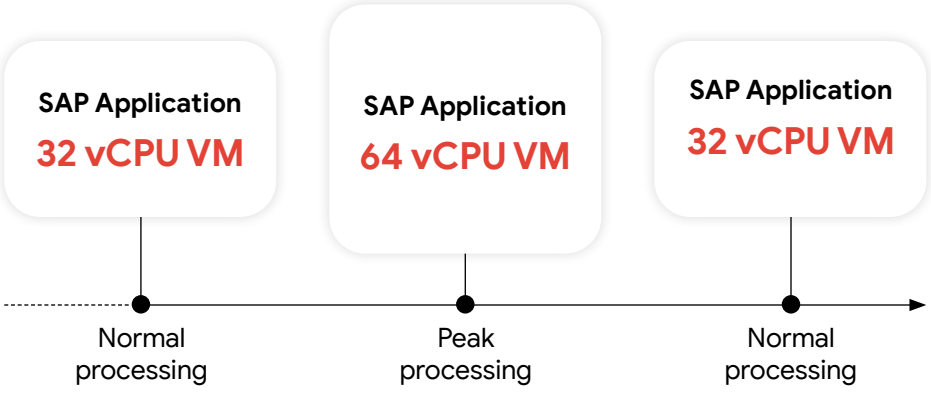
Multiple VM shapes

- 2 to 80vCPU with up to 8GB per vCPU
- Memory to vCPU ratio 0.5 -> 8GB:vCPU
- Custom Machine Types for N2 and N2D, 640GB of memory

Select a minimum CPU platform

Up to 3.4Ghz

Auto-upgrade to new hardware



Learn more:

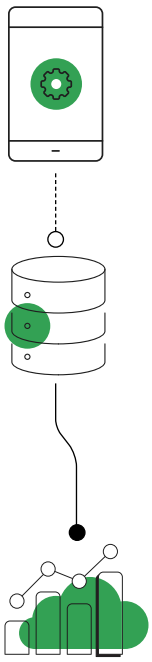
Best practices for SAP app server autoscaling on Google Cloud blog

Google machine types guide

Run your enterprise on a cloud platform designed to deliver high availability and performance

Maximize SAP application uptime, even in the most challenging circumstances, by designing high availability (HA) architectures for your SAP systems in Google Cloud. Realize the potential of a reliable, scalable, and cost-effective SAP environment built on a cloud platform designed to deliver high availability and performance for your mission-critical systems.

Leverage HA at three critical levels



Infrastructure

Moving an SAP system from on-premises hardware to Google Cloud infrastructure can deliver big improvements in uptime. Google Cloud has two built-in capabilities to achieve this goal, Live Migration and host auto restart. Together, they can significantly reduce downtime caused by hardware failures and maintenance activities.

Database

By supporting and documenting the use of HA architectures for SAP HANA, IBM Db2, MaxDB, SAP ASE, and Microsoft SQL Server, Google Cloud provides the freedom to decide how to balance the costs and benefits of HA database systems for your SAP environments. We support synchronous replication between primary and secondary database instances across multiple zones within the same region, and other replication methods like log shipping with low latency.

Application server

Get the HA compute and networking capabilities you need to protect against the loss of data through synchronization and maximize reliability and performance from SAP NetWeaver. Deployment Manager automates spinning up additional application servers, eliminating human error, and making it fast and easy to scale your SAP system load during peak times.

Learn more:

How to run SAP on Google Cloud if high availability is high priority blog

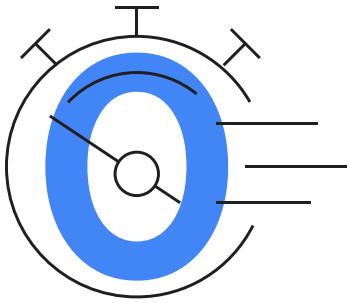
SAP on Google Cloud: High availability whitepaper

Drive near-zero planned downtime for SAP environments with Live Migration

Keep your SAP instances running during regular infrastructure maintenance and upgrades, network and power grid maintenance in the data centers, host OS and BIOS upgrades, and more. With Live Migration, your virtual machine instances will remain operational even when a host system event occurs.

Increase uptime and maintain high availability, minimize downtime for planned maintenance and unplanned outages

- Live-migrate running SAP instances to another host in the same zone without reboots
- Run without disruption to keep SAP infrastructure protected and reliable
- Take advantage of new Google infrastructure updates and improvements delivered automatically



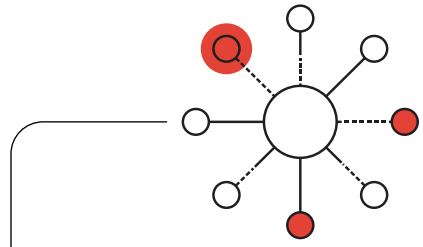
99.99%
guaranteed
Google Cloud uptime for
Instances in Multiple Zones

$800K
saving from faster, simpler
SAP maintenance[2]

2. The Total Economic Impact Of SAP On Google Cloud, Forrester.

Learn more:
Live migration guide
Run SAP S/4HANA smarter and faster on Google Cloud technical webinar

Automate Google Cloud infrastructure deployments with best-practice templates



Get started with your cloud transition by using Google's deployment guides and templates to help install the underlying compute, network, and storage infrastructure, and in some cases also install SAP specific software such as SAP HANA scale-out systems with host auto-failover.

Go beyond "one-click installs" with:

- Step-by-step deployment guides that are publicly available and customizable
- Complete flexibility to tailor the initial SAP environment installs into cloud and apply your own customization
- Reusable templates that save time and minimize errors in infrastructure setup and configuration
- Automation in minutes with Google Deployment Manager
- Best-practice designs like Linux clustering with pacemaker for high availability (HA)
- Certified disk sizes for guarantee minimum required I/O bandwidth and IOPS

SAP deployment templates managed by Google

- SAP HANA scale up, high-availability cluster on SLES
- SAP NetWeaver on Linux*
- SAP NetWeaver on Windows*
- SAP ASE on Linux*
- SAP MaxDB on Linux*
- SAP MaxDB on Windows*
- IBM DB2 high-availability cluster for SAP

*Template deploys the compute and storage to allow for manual installation of these software/DB tools.

Learn more:

SAP on Google Cloud: Migration strategies

Automating SAP deployments on Google Cloud with Deployment Manager guide

Increase network performance and reduce risk with Google Cloud's private network

Improve customer experiences globally with increased network performance and innovation that spans all global regions. Reduce 'vendor in the middle' risk with security that is built in, not bolted on.

Google Cloud offers one private network across regions:

- 24 regions, one virtual private cloud (VPC)
- One subnet across availability zones in a region
- Configurable and expandable subnets
- Shared VPC provides centralized network administration, scaling to thousands of service projects while reducing operational overhead and risk with one VPC
- Automatic connection to workloads across any regions
- Access to any region by interconnecting through a single location, through Google's premium network
- Control of firewall rules from one location reduces the risk of error and provides visibility when changes are made

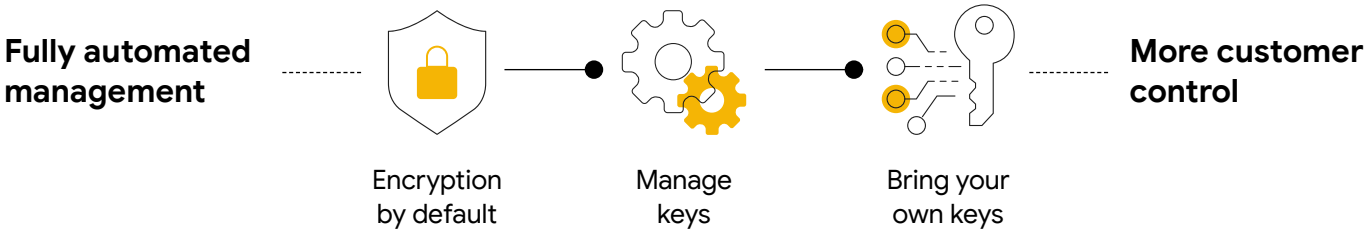
55%

of companies lack an enterprise-wide encryption strategy.[3]

3. Ponemon Institute Global Encryption Trends Study, 2019

100%

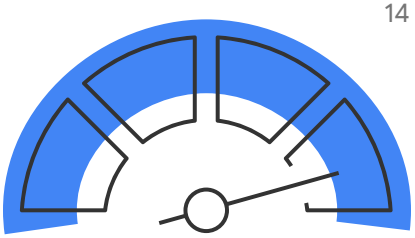
of Google Cloud customers have encrypted data.



Learn more:

VPC network overview

Your top network performance problems and how to fix them blog



Gain performance improvements with continuous optimized compute

SAP-certified deployments combine the agility and flexibility you need for growth. Leverage performance enhancements with a better TCO using Google Cloud's compute families.

- **Efficient VMs:** 31% cheaper with Dynamic Resource Management
- **General purpose VMs:** The best choice for most workloads, balancing price and performance
- **AMD VMs:** Technical chipset optimization for SAP NetWeaver
- **Compute optimized VMs:** High frequency CPUs for compute intensive workloads
- **Memory optimized VMs:** Large memory machines for SAP and in-memory computing
- **Large instances:** Large instance engineered machines
- **Largest VM ever certified by SAP:** M2-ultramem-416, 12TB 100% virtualized (12TB OLTP scale-out for SAP S/4HANA), Intel Cascade Lake

Compute families to meet real work needs

Best TCO

Cost-optimized (E2)

- Web serving
- Business-critical applications
- Steady-state LOB apps
- Dev & test environments

Cost savings a priority

Balanced

General purpose (N1 + N2 + N2d)

- **Enterprise apps (SAP)**
- **SAP HANA (<640GB)**
- Medium Dbs and business critical apps
- Web & app serving

Higher performance and performance/$

Workload-optimized

Compute-optimized (C2)

- **Enterprise apps (SAP)**
- EDA
- HPC
- Scientific modeling
- AAA gaming

Highest performance CPUs

Memory-optimized (M1 + M2)

- **SAP HANA (> 1TB)**
- Largest in memory VMs
- Real-time data analytics
- In-memory cache

Most memory on Compute Engine

Learn more:

Certifications for SAP applications on GCP

Certifications for SAP HANA on GCP

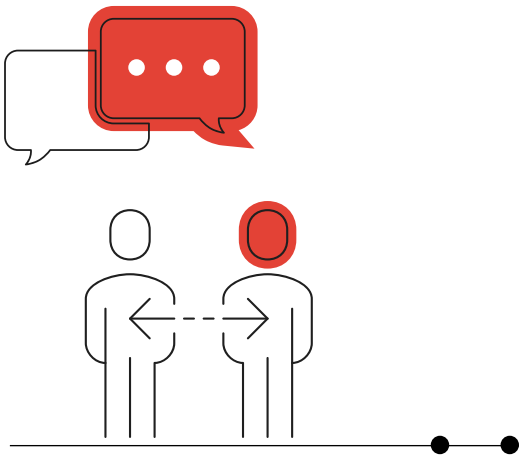
Collaborate with experts to optimize your SAP business applications on Google Cloud

Run your critical business applications on our secure global infrastructure, leverage your growing data volumes to impact business outcomes, and work hand in hand with Google Cloud Professional Service Organization (PSO) SAP experts.

Our deep technical expertise and PSO services help you unlock business value from the cloud across a range of solutions—including infrastructure, application modernization, data management and analytics, machine learning, security, and more.

Leverage a proven implementation methodology

- **Assess:** Determine use cases, explore high-level solutions, and test a solution through experiments
- **Plan:** Develop a detailed architecture design and deployment plan—comprehensively scoped to implement the solution—and execute on the detailed design and plan documents
- **Deploy:** Execute on the detailed design, plan documents created during the previous plan phase, and realize the SAP solution in production
- **Optimize:** Look for opportunities to review and enhance existing processes and technologies, and to establish operational best practices



Learn more:
Consulting services homepage
SAP on Google Cloud Technical Resources

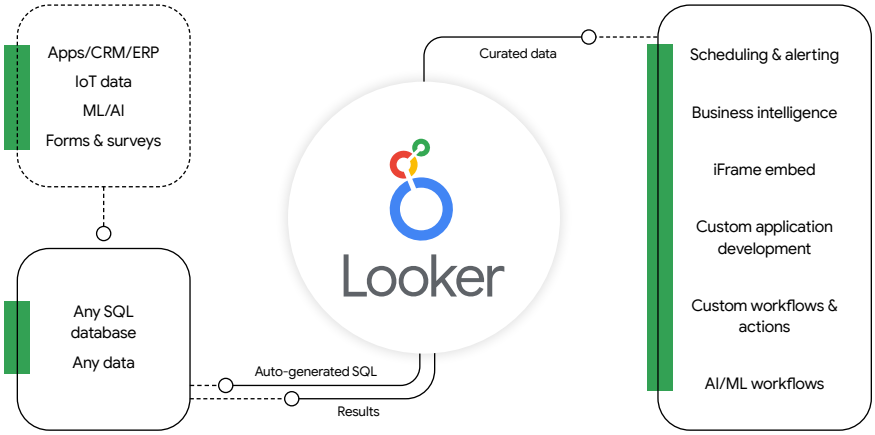
Connect, analyze, and visualize all your data with Looker smart analytics

Big data isn't big if you can only use a fraction of it. Looker's in-database architecture supports multiple data sources and multiple deployment methods to provide flexibility without compromising on transparency, security, or privacy. The governed centralized data model promotes metric consistency and reuse, and the suite of modern APIs lets you supply this trusted data—in real-time and at full scale—to your ecosystem of applications and workflows.

Generate insights that drive results across your business with your SAP data and Looker:

- Train machine learning algorithms on Google Analytics and SAP transactional data to segment customers and recommend products
- Combine Google Trends and Ads data to push timely, relevant, and specific marketing campaigns to the right people
- Infuse procurement workflows with real-time operational insights to improve inventory management of the items sitting in your warehouses

With Looker's modern analytics platform, you get complete customization and control to tailor data for proactive and operational use cases far beyond traditional static visualizations, reports, and dashboards.



Learn more:

Looker and Google Cloud solution page

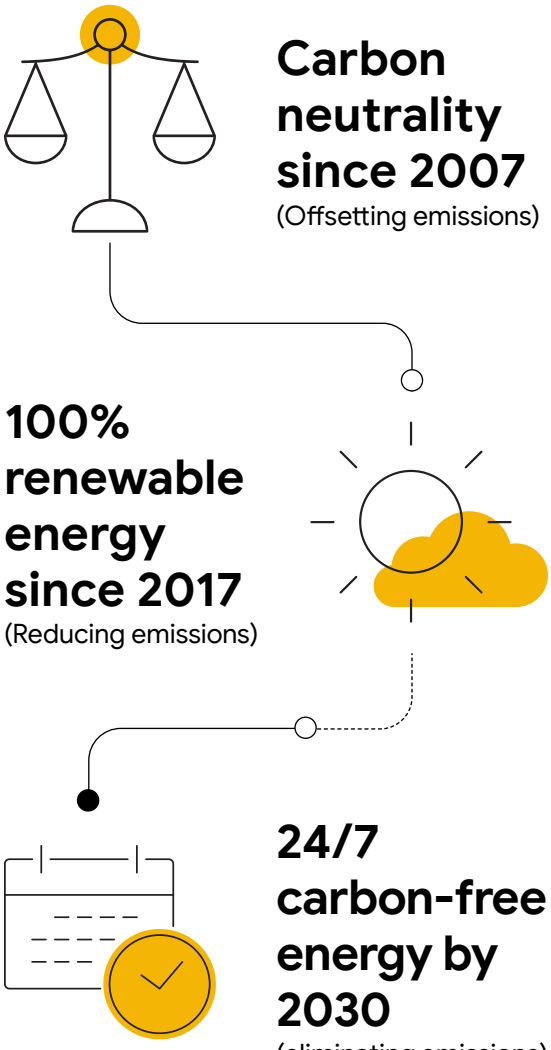
SAP HANA Looker configuration instructions

Innovate sustainably with the cleanest cloud in the industry

Google has been carbon neutral since 2007 and by 2030, our goal is for cloud workloads to use carbon-free electricity every hour of every day in every region. We unify our practices, partnerships, and products around a single mission—to foster sustainability at scale.

- **Setting the pace:** As the world's largest purchaser of renewable energy, we continue to innovate ways to make our operations more sustainable, inspiring others to follow.
- **Pushing change forward:** We partner with nonprofits, research organizations, governments, and businesses to build custom technology and tools to accelerate meaningful change.
- **Making impact personal:** We build products and technology to help people to better understand their impact and actions.

Google Cloud is the only cloud provider that has achieved 100% renewable energy.



Carbon neutrality since 2007
(Offsetting emissions)

100% renewable energy since 2017
(Reducing emissions)

24/7 carbon-free energy by 2030
(eliminating emissions)

Learn more:
Sustainability homepage
Sustainability commitments webpage

Google Cloud

Take the next step with Google Cloud for SAP

Learn more.
cloud.google.com/solutions/sap

See how other SAP customers are driving innovation with Google Cloud.
Google Cloud & SAP Youtube channel

Discover the potential value of deploying your SAP environment on Google Cloud.
Take the IDC self-assessment

intel