Technical Review

Move SAP to the Cloud for Faster Time to Innovation: SAP on Google Cloud with BigQuery

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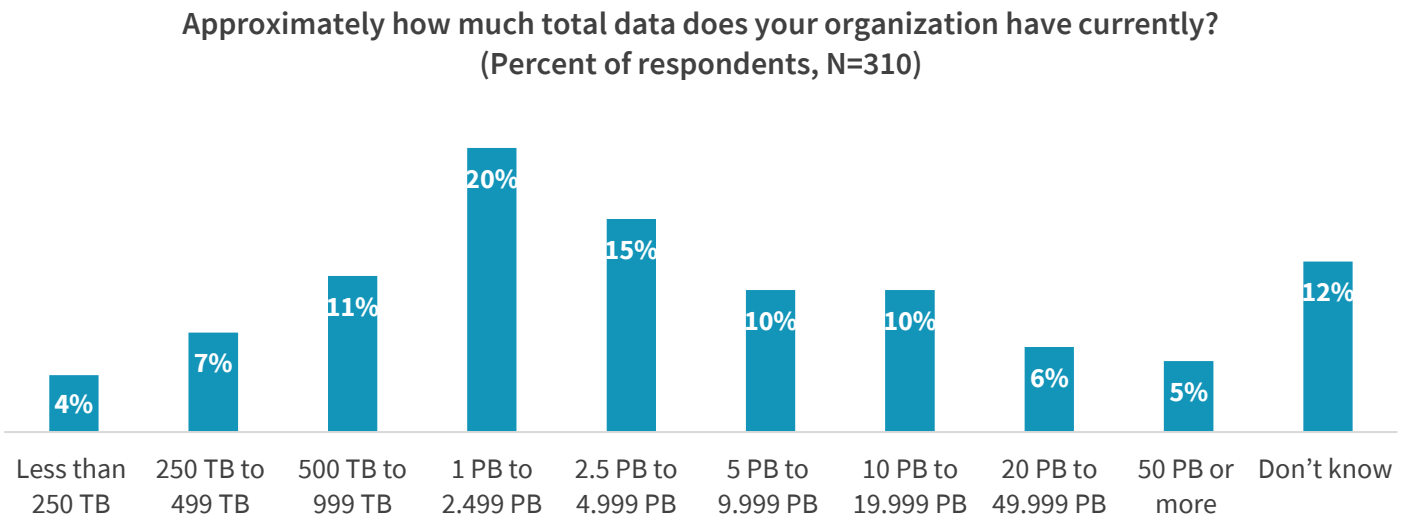
Abstract

This ESG Technical Review highlights how Google Cloud enables organizations using SAP to manage, safely store, and securely analyze their data to generate in-depth insights for greater business intelligence. A combination of hands-on analysis and customer use cases were used to validate the advantages of leveraging Google Cloud and BigQuery for robust advanced analytics and AI/ML capabilities. ESG also examined how SAP customers leverage Google Cloud to deploy enterprise-ready applications on which to run their mission-critical operations.

The Challenges

Collecting and using data in real time is transforming and empowering organizations. A growing variety of sources generate real-time data from devices and machines, customers, suppliers, partners, and market interactions. Messaging applications are now real-time, and sensor-enabled machines deliver constant streams of data. Social media delivers real-time feedback and insight to consumers, and clickstream data from digital commerce can deliver predictive value to companies. All these data sources present the opportunity to add significant business value. This does not come without challenges; the volume of data has been increasing at an accelerating pace for a long time. In a recent survey, two-thirds (66%) of organizations reported that they are managing a petabyte of data or more, with nearly one-third (31%) managing 5PB of data or more (see Figure 1). This explosion in the volume of data makes it difficult to manage, safely store, securely analyze, and generate robust insights. Most organizations surveyed reported that they use no more than 30% of their total data for analytics purposes.[1]

Figure 1. Top Total Data Under Management



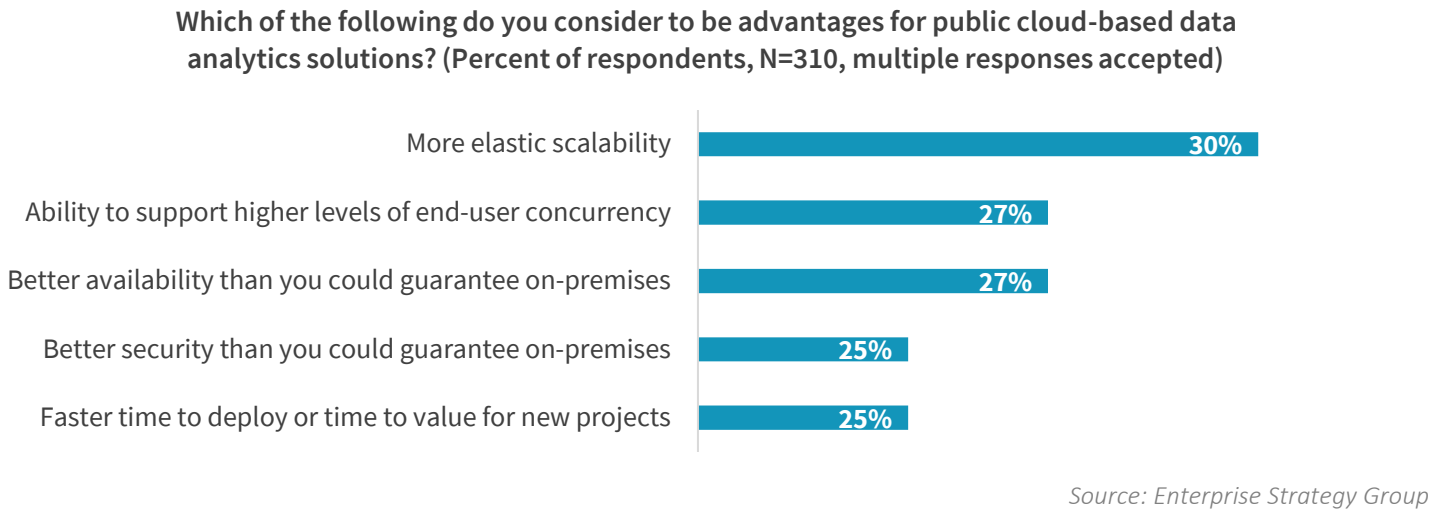
Source: Enterprise Strategy Group

[1] Source: ESG Master Survey Results, *The State of Data Analytics*, August 2019.

It's critical that organizations have access to their data and can analyze it for deep insights. Organizations want to use this data to understand customers, identify trends, and design products, as well as to prevent and solve problems. As a result, real-time data analytics has become a key business priority. When asked what business initiatives they believed would drive the most technology spending in their organizations in 2019, 32% of ESG survey respondents cited improving data analytics for real-time business intelligence and customer insight, making it the second most-cited initiative, behind strengthening cybersecurity.[2]

Businesses are moving applications and functions to the cloud, and analytics is no exception. ESG asked organizations how they view public cloud services in terms of alignment to their data analytics strategy going forward, and 81% responded that public cloud services are either *critical* (12%), very important (35%), or somewhat important (34%).[3] In the same survey, organizations were asked what they consider to be the advantages of public cloud-based data analytics solutions, and the five most cited responses are shown in Figure 2.

Figure 2. Top Five Advantages of Public Cloud-based Data Services



Source: Enterprise Strategy Group

These responses clearly show that organizations require a cloud platform that's flexible, agile, available, and secure.

Google Cloud

Google Cloud is a fully managed cloud with integrated security to protect systems, data, and users. Google Cloud differs from other hyperscalers in several ways. Google leveraged 15 years of experience in keeping customers safe on Google applications like Gmail and Google Apps to create Google Cloud, so customer applications and data benefit from the same security model. The backbone of Google's network uses software-defined networking and edge caching services to deliver fast, consistent, and scalable performance. Google Cloud's compute and storage infrastructure is virtualized so that customers can easily scale up or down. Very large virtual machines (up to 12TB) are certified for SAP HANA with customers running in production today.

At Google Cloud's foundation lies a compute engine that can charge instances in one-second increments with a one-minute minimum. Google Cloud offers Google-developed big data technology innovations like MapReduce, Bigtable, and Dremel, plus next-generation services and frameworks for cloud data warehousing (BigQuery), advanced machine learning (AI Platform), batch and real-time data processing (Cloud Dataflow and Cloud Pub/Sub), intelligent data preparation (Cloud Dataprep via Google Cloud's partnership with Trifacta), data integration (Cloud Data Fusion), managed Hadoop and Spark (Cloud Dataproc), and visual analytics (Google Data Studio) to help organizations transform their business with powerful

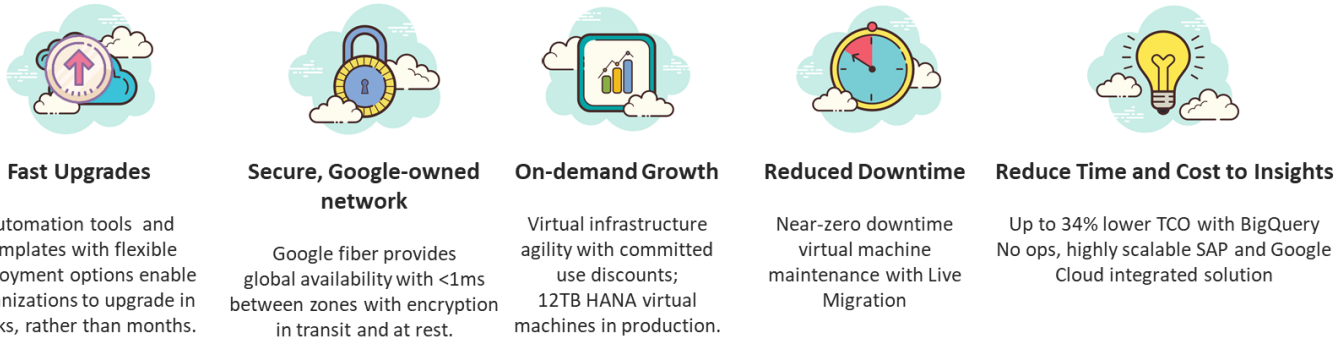
[2] Source: ESG Master Survey Results, *2019 Technology Spending Intentions Survey*, March 2019.
[3] Source: ESG Master Survey Results, *The State of Data Analytics*, August 2019.

data intelligence. Google Cloud big data analytics solutions are either managed services or serverless, designed to remove the complexity of building and maintaining a data analytics system, accelerating time to insight. Where most data centers use almost as much non-computing or "overhead" energy (like cooling and power conversion) as they do to power their servers, Google Cloud data centers are much more efficient, running on half the energy of a typical data center and on 100% renewable energy where available.

SAP on Google Cloud

For SAP customers, Google Cloud offers a smooth path for enterprises to move from on-premises to the cloud. ESG has confirmed through testing that organizations can spin up a Google Cloud instance in 30 seconds. Google Cloud customers report that the ability to deploy instances quickly has reduced the time required for full deployments from months to weeks in many cases. Google Cloud is committed to operating as a trusted and involved partner to help customers with their SAP digital transformation.

Figure 3. Benefits of Running SAP in Google Cloud



Source: Enterprise Strategy Group

Google Cloud is designed to simplify IT and data management; Google Cloud puts the user experience first, with the goal of making it easy for customers to use and innovate. Google Cloud breaks data silos to provide access to new datasets from SAP and Google Cloud as well as Google Search in some cases.

Google Cloud leverages Google's infrastructure, including one of the largest secure private networks in the world. This is the same network that powers YouTube, Gmail, Stadia, and all other Google apps, providing an always-on platform for mission-critical enterprise apps. Because the platform is fully virtualized, customers can use it as a utility. Google Cloud only charges customers for what they use, when they use it, rather than forcing them to build an infrastructure capable of handling the peak load/capacity of the environment. This gives organizations the power to scale up and down at will. The Google Cloud Acceleration Program (CAP) provides incentives for customers to migrate their SAP landscapes to Google Cloud with little to no risk and at the same time, allows them to try a number of different services, including BigQuery. With CAP, customers can experiment and not be locked into any contracts before they go live.

Simply implementing an app in the cloud does not solve downtime problems. Google designed Google Cloud Live Migration to eliminate planned and minimize unplanned infrastructure downtime. Live Migration keeps virtual machine instances running when a host system event occurs, such as a software or hardware update. Compute Engine live migrates running instances to another host in the same zone rather than requiring reboots of VMs. Google Cloud simplifies HA and DR with Virtual Private Cloud (VPC) networks that can span zones and regions, eliminating the need for remapping of IP addresses. This allows Google Cloud to perform maintenance that is integral to keeping infrastructure protected and reliable without interrupting any VMs or changing any attributes or properties of the VM itself. This is quite significant for SAP customers, since taking the system down can have serious financial impact. One customer, a $10B manufacturer, reports that an SAP outage shuts down their supply chain with a cost of $1M per hour.

Customers running SAP on Google Cloud report multiple benefits realized; here is a sampling from five Google Cloud customers:

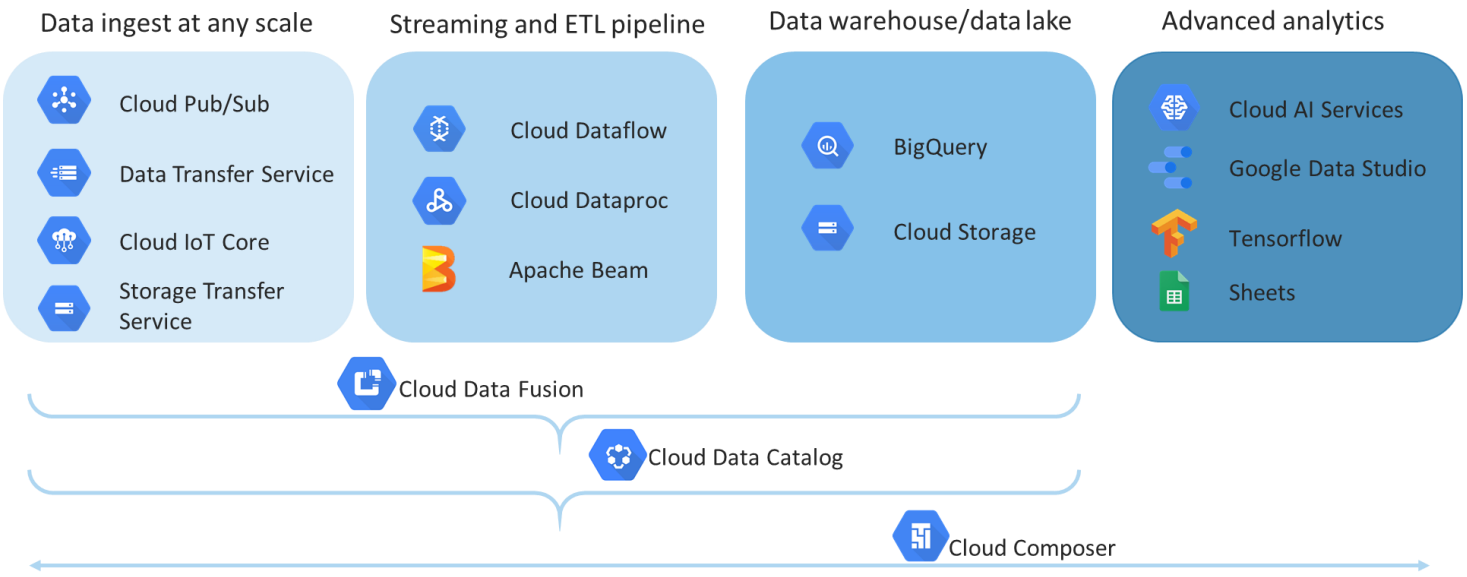
- Reduced deployment time by more than 60%.
- Consolidated more than 100 SAP systems into a single instance.
- Reduced SAP operating costs by up to 70%.
- Accelerated runtimes (50% faster) and inventory replenishment (6x faster).
- Reduced new project resource allocation time from 8 weeks to 20 minutes.

The Solution: Data Analytics on Google Cloud

Google Cloud can help SAP customers in any industry to improve efficiency and agility, reduce costs, and capture new market opportunities. Whether organizations are shifting SAP applications to the cloud, integrating machine learning into business processes, or enriching enterprise data to unlock new business value, SAP is certified to run on Google Cloud.

Engineered with flexibility, agility, and scalability top of mind, Google Cloud provides access to a broad set of tools to support robust advanced analytics from end to end and AI/ML capabilities through BigQuery.

Figure 4. Data Analytics on Google Cloud



Source: Enterprise Strategy Group

Agile Operations Enables Faster Innovation

Organizations are generating and collecting real-time data at massive scale from retail points of sale, factory sensors, gaming applications, web transactions, and more. Insights lay buried in every event stream and that data can change an organization's trajectory—if they can access it quickly, make it usable, and analyze it. Organizations can create additional revenue sources and augment existing ones via opportunities to interact in real time while customers are in an app, through website personalization, advertising based on purchase/clickstream history, gaming interactions, etc.

To achieve all this, SAP customers need sophisticated analytics solutions to not only integrate their SAP data onto Google Cloud but also enrich their SAP data with subsequent data from sources mentioned above. Google designed BigQuery to be that solution. BigQuery is a cloud-based, fully managed, serverless analytics data warehouse that supports petabyte-scale projects. It offers built-in machine learning (ML), streaming analytics, serverless scale, geographical information system (GIS) mapping, and federation with data lakes, plus an analysis engine and storage engine in one package.

BigQuery delivers high-speed analysis of large datasets without requiring investments in onsite infrastructure or database administrators. BigQuery automatically scales its hardware use up or down to maximize performance of each query, adding and removing compute and storage resources as required. Users can also build ML models and use ML algorithms on BigQuery Data Warehouse using SQL queries.

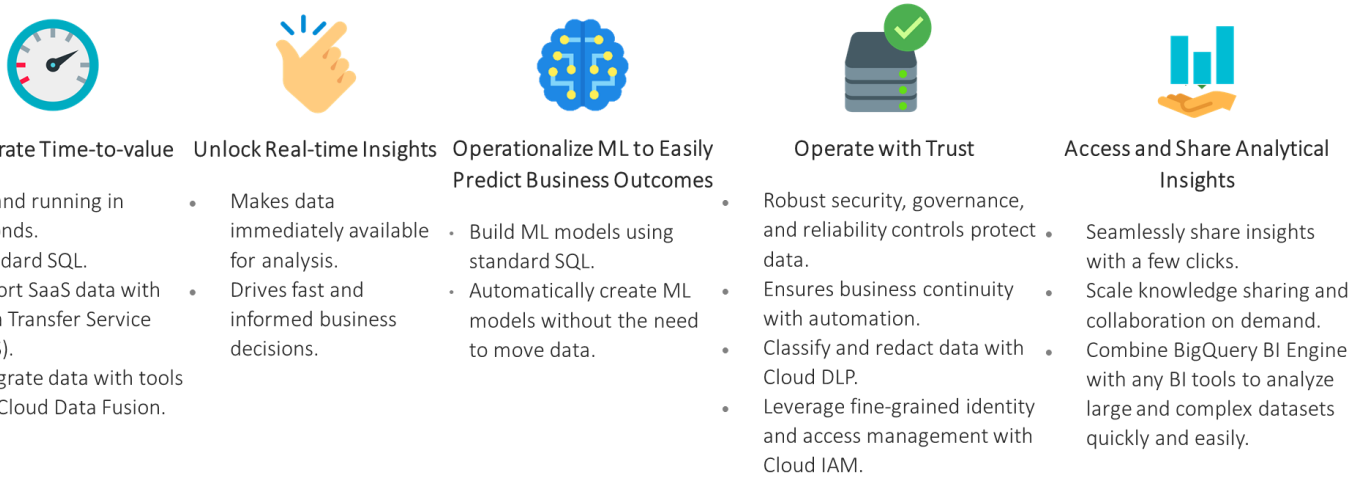
Google Cloud offers SAP customers an upgrade path with integrated migration tools, flexible scaling, and a fully hybrid infrastructure to use data in motion, obtain immediate insights, and take rapid action. This enables organizations to achieve agile operations on an all-VM architecture that can respond immediately to events as they happen and drive new revenue with Google's breadth of technologies, including petabyte-scale analytics, applied machine learning, and smart device automation. Setting up an on-premises infrastructure for that end-to-end process is difficult, time consuming, expensive, and complex to manage not only the infrastructure, but also the applications required for processing and analysis.

BigQuery in the Real World

One of America's largest retailers, with 450,000 employees and revenue in excess of $100 billion dollars migrated to Google BigQuery from an on-premises data warehousing solution. Their goals included reducing cost, increasing infrastructure flexibility, and simplifying deployments and maintenance. Google Cloud's flexibility for infrastructure sizing enabled the customer to grow the systems as needed, in step with their actual workload increase, and saved them a lot of money, while improving performance dramatically. Execution time for complex analytical workloads decreased from hours to minutes. BigQuery also enabled them to execute workloads that would not complete on the legacy platform.

Google BigQuery is designed to streamline—while removing all the overhead and complexity of maintaining onsite hardware and administration resources. ESG reviewed Google BigQuery in 2016[4] and some of the specific advantages of Google BigQuery for businesses validated by ESG are shown in Figure 5.

Figure 5. Google BigQuery Business Benefits Validated by ESG



Source: Enterprise Strategy Group

SAP on Google Cloud in the Real World

ESG talked with Google Cloud customers to learn about their experience moving SAP to Google Cloud. METRO, a global B2B wholesaler with revenues of €36.5 billion measures its success by the everyday decisions its customers make—both what they purchase and how they choose to buy. Customers and their needs were a primary focus of METRO's digital transformation project. METRO rebuilt its digital applications and made company and customer data analysis much more

[4] Source: ESG Technical Review, *Data Warehouse Analytics in the Cloud with Google BigQuery*, September, 2016.

available inside the business. The customer solutions unit owner of METRONOM (METRO's technology unit) said, "A new data lake built with Google Cloud managed services, integrated analytics, and machine learning lets us further develop our products based on far more precise observation points and therefore serve our customers better. Beyond the short-term advantages of saving time and resources…Google Cloud AI and machine learning is always going to be ahead of the things we can build in-house."

METRO: Moving 100 SAP Instances to Google Cloud

METRO is now migrating its SAP S/4HANA finance systems to Google Cloud. METRO AG's CIO/CSO recently announced the move: "Google Cloud, in addition to technical advantages, offers the possibility to optimize collaboration within the individual teams. Moreover, we can now adapt our system to customer demands in real time."

METRO partnered with the software development company freiheit.com technologies to build a new, cloud-based microservices platform. The founder and head of engineering at freiheit.com said, "After trying several other solutions based on Docker, we became early adopters of Kubernetes when it was still in the early beta. We never looked back." METRONOM's unit owner of IT operations added, "We loved the way Compute Engine offered a generic approach to VMs, It's a simpler, more practical setup. Instead of a huge range of VM types that need upgrading every few months, we just match memory and CPU to workloads…the simple costing model means we can configure machines as we need them, without worrying about a major cost impact."

Business intelligence at METRO was previously based on a well-accepted, heavily used, and user-friendly enterprise data warehouse reporting system. Today, its BI landscape has a data lake of big data and advanced analytics solutions, which can store unlimited information for data science and advanced analytics, giving METRO the possibility to run complex models with high computing power. METRO's data lake and analytics solution is primarily based on BigQuery and other Google BI services. "The main advantage of the managed services is that we can scale up and down," said the analytical platform engineering domain owner at METRONOM. The owner continued, "Scaling is about more than storage space, it's about having analytical power available on demand. Calculating item recommendations for customers requires a lot of CPU. With Cloud Dataproc, we can create a cluster for the calculation, get the results, and then shut the cluster down. It's much more efficient."

Machine learning is already making an impact at METRO. Drawing on customer behavior data from many areas, a new app measures and predicts levels of customer satisfaction, so sales teams know which customers to reach out to, when to do it, and why. As more elements of METRO's business connect to the data lake, the company is increasing sales, scaling up data, and planning for the future.

Loblaw, Canada's largest retailer, is committed to continuous improvement of the customer experience. Loblaw knows that better understanding of its customers, and the agility to run promotions on demand that serve their customer's needs are critical to this goal.

"We thought, 'why don't we offload all that effort to someone who's doing it at scale, making the appropriate investments, and staying ahead in technology so that we can really focus our efforts on driving value to the customer,'" says Hesham Fahmy, Vice President Technology at Loblaw. The first phase of the multi-phase transition to Google Cloud involved Loblaw's online grocery system powered by SAP Hybris, for which Google Cloud offers a certified infrastructure.

Loblaw: Improvement and Innovation with Google Cloud

"We want our tech talent focused on creating better experiences for our customers, not maintaining infrastructure. By moving to Google Cloud Platform, we're improving our capacity, scalability, resilience, security, and performance—and we don't have to worry about any of it." Hesham Fahmy, Vice President Technology at Loblaw.

Why This Matters

With the number of tools and technologies that exist in a traditional ERP/analytics pipeline, the cost and complexity related to maintaining the infrastructure, ensuring constant uptime, and quickly addressing issues can easily get out of hand. In many cases, all it takes is a single failure somewhere in the infrastructure to disrupt everyone and everything, creating havoc within IT organizations and even worse, shutting down essential business processes.

ESG validated the flexibility, reliability, and security features of Google Cloud for enterprises' ERP and analytics. SAP on Google Cloud can easily integrate with Google BigQuery to enable faster loading, transforming, and visualizing of data to increase time to value. Google's powerful cloud infrastructure leverages proprietary technology that serves as a reliable foundation to guarantee performance, accessibility, and uptime. Underlying security features help organizations get the protection needed to keep data private and control access to organizations, projects, and datasets. Put it all together and with Google Cloud and BigQuery, organizations can provide a reliable service within the Google Cloud to handle ERP and analytics and power their digital transformation.

The Bigger Truth

ESG found that Google Cloud provides SAP customers with a powerful, service-based solution that gets them up and running quickly, easily, and cost-efficiently. This enables customers to focus on the analysis, insights, and actions relevant to their businesses, not on provisioning, configuring, deploying, monitoring, tuning, scaling, and protecting their infrastructure and data. Instead of silos built for different parts of the process, Google Cloud helps customers build more responsive businesses, modernize their SAP implementations, protect/govern data at scale, and turn data into actionable intelligence.

The results presented in this document are based on analysis of SAP implementations on Google Cloud in customer environments. Due to the many variables in each production environment, it is important to perform planning and testing in your own environment to validate the viability and efficacy of any solution.

As datasets continue to grow, so too must the infrastructure to support enterprise resource planning and data analytics but scaling on-premises infrastructure is difficult. Complexity, performance constraints, and cost are just a few of the issues that quickly arise as IT personnel scramble to address ever-changing business requirements. And what happens when something goes wrong? If one component in the pipeline becomes unavailable, it impacts everything down the line; the potential for delays in gaining insights is massive.

Certified to run on Google Cloud, SAP is ready whether your organization wants to shift SAP applications to the cloud, integrate machine learning into business processes, or enrich enterprise data to unlock new business value. Google Cloud can help businesses become more data-driven; this can speed time to insight and subsequent insight to action. Further, Google Cloud can automatically scale up and down to ensure cost-efficiency. If your organization is looking to improve efficiency and agility, reduce costs, and capture new market opportunities, ESG recommends SAP customers in any industry take a close look at Google Cloud and BigQuery.