Google Cloud

Accelerate your move to the cloud with managed databases
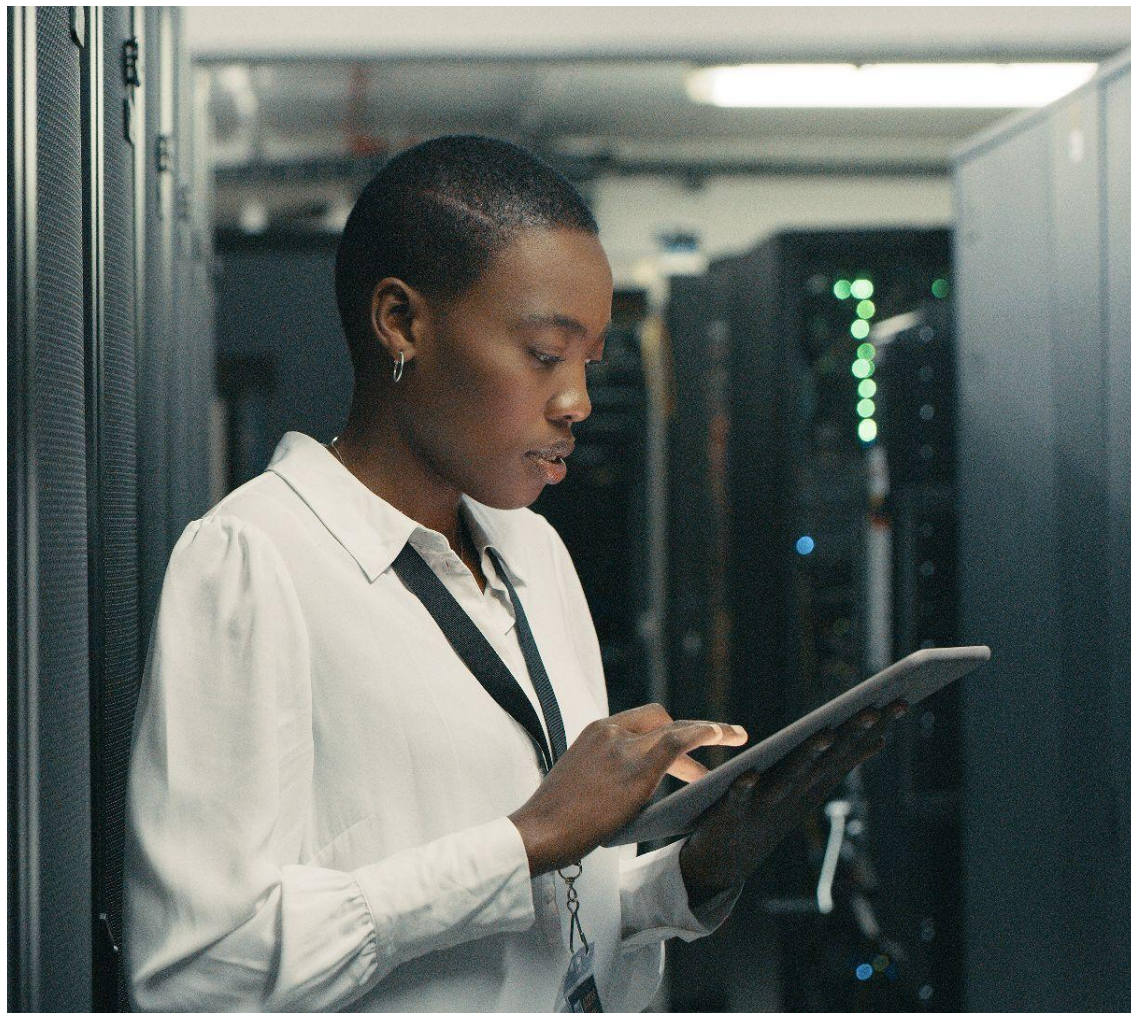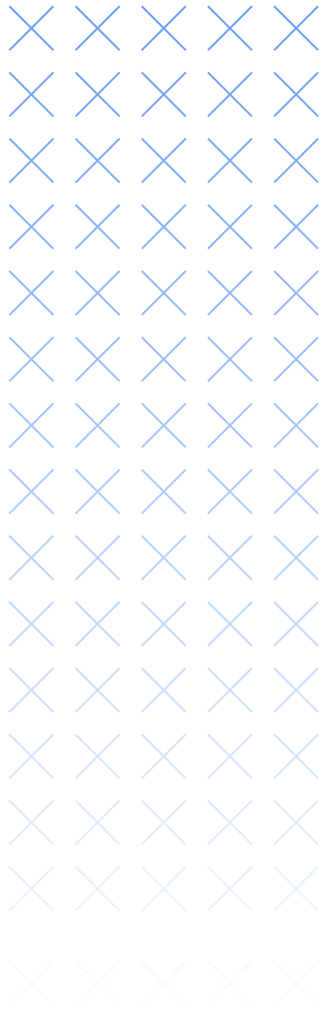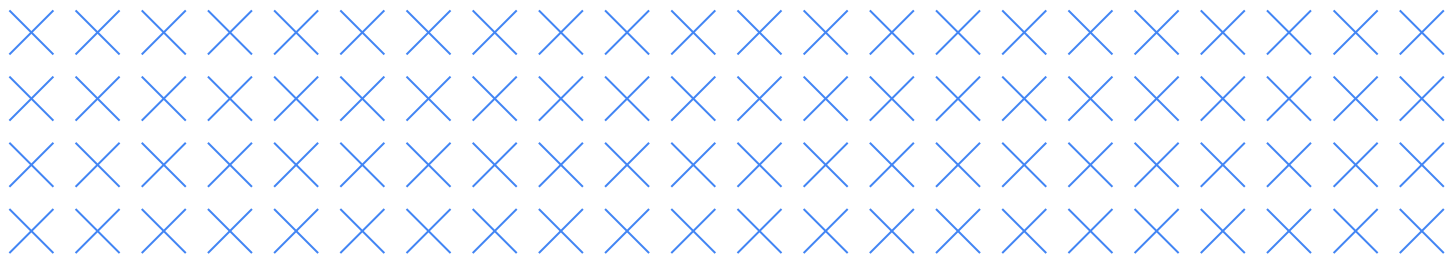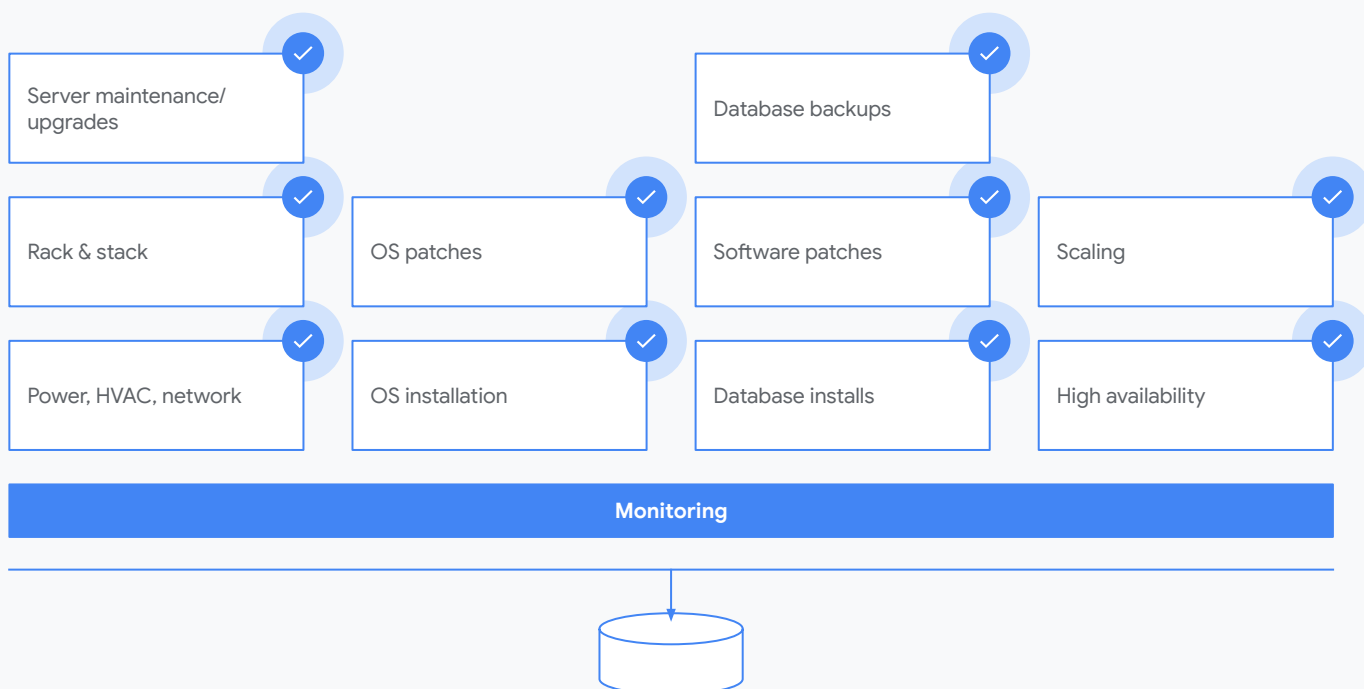
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Migration trends across the industry

Managed services
make sense for databases

Managing your database infrastructure can be a chore. You need to consider:

- The work required to provision, set up and maintain your hardware

- The operating system, database software, management tools, and all the ongoing patches for security and maintenance

- Scaling the system, ensuring that backups and restores are meeting recovery goals and that the application can continue to run during various failure scenarios

- Monitoring everything to ensure that your systems are running the way your business needs them to

| Server maintenance/ upgrades ✓		Database backups ✓	
Rack & stack ✓	OS patches ✓	Software patches ✓	Scaling ✓
Power, HVAC, network ✓	OS installation ✓	Database installs ✓	High availability ✓

Monitoring

This requires a lot of work and a diverse skill set. As your database fleet grows to hundreds or even thousands of databases, the time and energy that you spend managing all this only hinders your ability to outmaneuver your competitors.

Google Cloud

Databases are moving to the cloud, fast

It's no surprise that databases are rapidly moving to the cloud.

The Cloud Database Management Systems (DBMS) market is not new, but the growth in cloud revenue is a newer development.

IDC predicts 80% of enterprises will speed up their shift to a cloud-centric infrastructure. This trend suggests that cloud service provider (CSP) infrastructures and the services that run on them are becoming the new data management platform.

80%
moving quicker
to cloud-centric
infrastructure
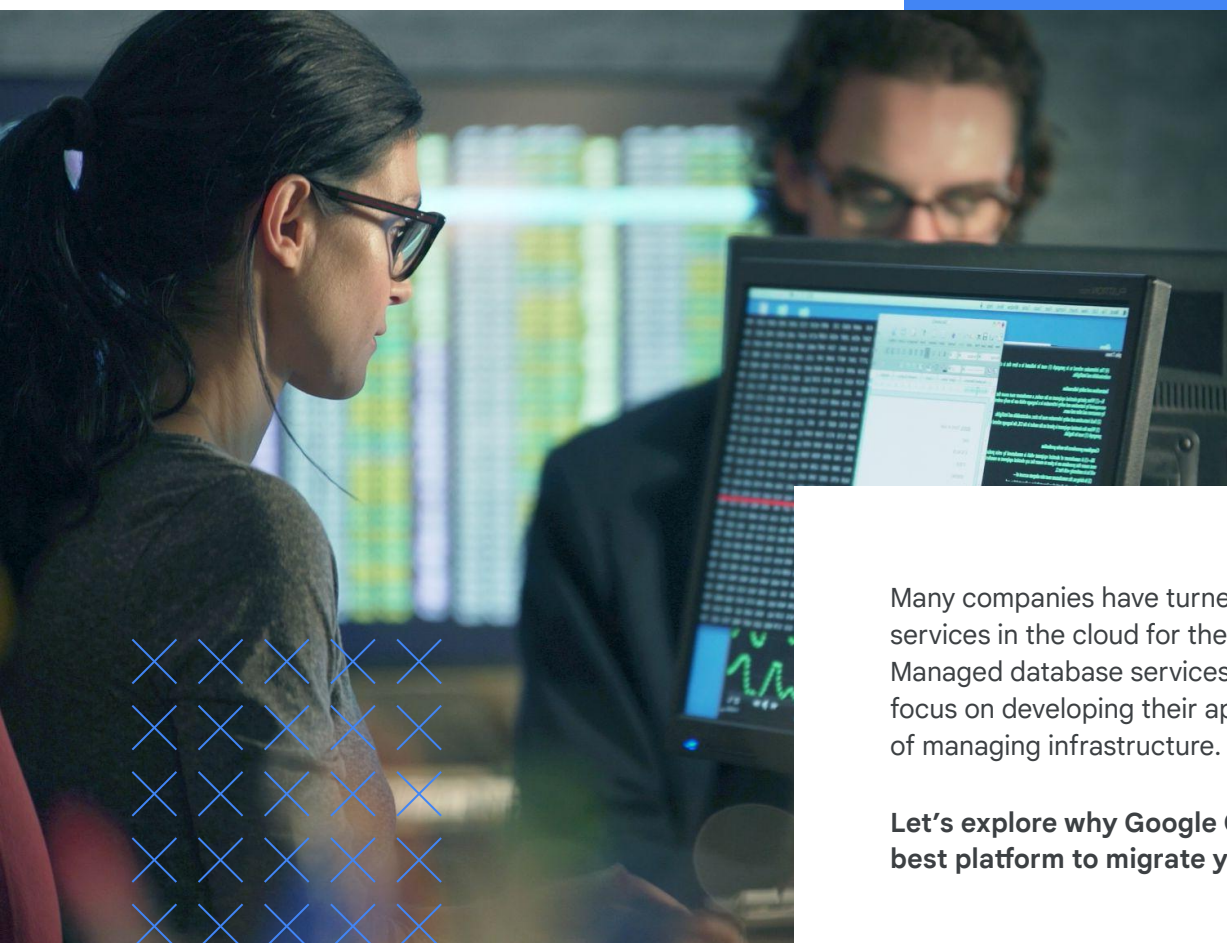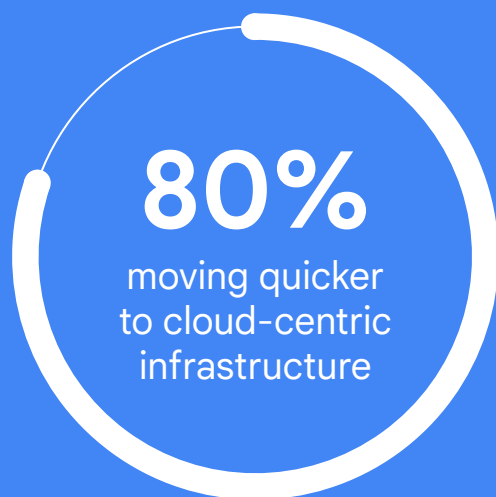
Many companies have turned to managed services in the cloud for their databases. Managed database services allow teams to focus on developing their applications instead of managing infrastructure.

Let's explore why Google Cloud offers the best platform to migrate your databases.

Google Cloud

5 reasons why Google Cloud is right for your databases

Database capabilities that are simply unmatched for speed, scale, security, and reliability

Google Cloud provides a ground-breaking platform for innovation based on decades of first-hand experience developing one-of-a-kind database systems. You can achieve massive scalability and data durability for your applications from the same underlying architecture that powers Google's most popular, globally available products like YouTube, Search, Maps, and Gmail.

Our core services Cloud Spanner, BigQuery, Firestore, Cloud SQL, AlloyDB for PostgreSQL, and Cloud Storage, for example, leverage common infrastructure such as our highly durable distributed file system, disaggregated compute and storage at every layer of the stack, and our high-performance networking infrastructure, to get the highest levels of availability and reliability i.e. up to 99.999% SLA across Spanner, Bigtable, and Firestore, and billions of transactions per second across Spanner (2B+ at peak) and Bigtable (5B+ at peak).

Many organizations have adopted our leading cloud-first solutions: Spanner, Bigtable, and Firestore to deliver the best possible experiences for their users from anywhere, in just a few clicks, and with minimal operational overhead.

99.999%
SLA

Cloud Spanner

Processes over **2 billion** requests per second at peak

Bigtable

Processes over **5 billion** requests per second at peak

Firestore

Has more than **250K** monthly active developers

99.99%
SLA

BigQuery

Customers analyze **110 terabytes** of data every second

Google Cloud

Open and standards-based, providing you the freedom to work the way you want

At Google Cloud, we understand that most companies have a multi-database strategy. In some cases this is intentional and in others it's a natural consequence of growing over the years combined with the intimidating nature of replatforming a database.

Google Cloud databases support the most popular open source and commercial engines - MySQL, PostgreSQL, Oracle, SQL Server and Redis - providing choice and flexibility to work the way you want.

Cloud SQL is a fully managed relational database service for MySQL, PostgreSQL, and SQL Server. Memorystore is a fully managed database service that is 100% compatible with open source Redis and Memcached. AlloyDB for PostgreSQL is a new PostgreSQL-compatible relational database with superior performance, scale and availability for your most demanding enterprise workloads.

Database			Google Cloud Service
Oracle	ORACLE	→	Bare Metal Solution
SQL Server	Microsoft SQL Server		Cloud SQL for SQL Server
PostgreSQL			Cloud SQL for PostgreSQL AlloyDB for PostgreSQL
MySQL	MySQL		Cloud SQL for MySQL
Redis	redis	→	Memorystore for Redis | Redis Labs
Memcached	M	→	Memorystore for Memcached
HBase	H-BASE	→	Bigtable
MongoDB	mongoDB	→	MongoDB Atlas

Relational databases

Database Migration Service can migrate these workloads

Non-relational databases

All these options provide flexibility for quickly and safely migrating to the cloud and a seamless user experience across management, billing, and support.

Google Cloud

Innovative, one-of-a-kind developer experiences

Develop rich applications quickly through our intuitive user interface, robust client and server-side libraries, and one-of-a-kind provisioning and management automation services. Experience seamless integrations with Google Cloud services like Google Compute Engine and Google Kubernetes Engine (GKE), with more than 650K GKE pods securely connected to Cloud SQL.

Drive productivity by automating time-consuming tasks such as database provisioning, storage capacity management, and performance tuning. This frees developers and DBAs to focus on higher-value work like data modelling, performance optimization and deriving value from their data.

Industry-leading database observability features, such as Cloud SQL Insights and Key Visualizer, help developers address database performance problems in development and in production. These features complement existing application performance monitoring (APM) and observability tools by providing database metrics and traces through the OpenTelemetry open standard.

Google Cloud

The unified ecosystem of Google's data cloud

Google Cloud offers a comprehensive data cloud that allows you to securely unify data across your entire organization so you can break down silos, increase agility, innovate faster, and support business transformation.

Bridge the gap between operational data and analytics by using BigQuery federation to query data residing in Cloud SQL, Spanner and Bigtable without moving or copying it. We're also enabling BigQuery customers to directly access Spanner data through a serverless architecture for workload isolated analytical queries. You can now run analytical queries on your operational data in Spanner with virtually no impact on the performance of your low latency, transactional systems.

Datastream for BigQuery supports seamless replication from operational database sources such as AlloyDB, PostgreSQL, MySQL, and Oracle, directly into BigQuery.

We connect the different stakeholders that work with data and provide a common platform for them to build upon. No matter where you start, there are always more places to go with analytics, databases, and AI and machine learning services.

BI and data-driven experiences
Looker

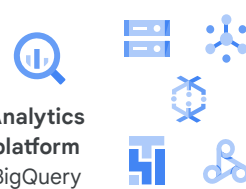**AI models and automation**
Vertex AI

Operational databases
Spanner

Datastream + Dataflow

SQL
Federated queries

Analytics platform
BigQuery

Data Fabric: catalog, workflow orchestration, security controls
Dataplex

Google Cloud

Sophisticated data security and privacy controls

Security and governance are key concerns for every industry, which is why we provide robust tools and technology to protect and govern your data throughout its lifecycle.

Such capabilities ensure that your data is protected. Find out more about leveraging the best of Google Cloud security on our Trust and Security site.
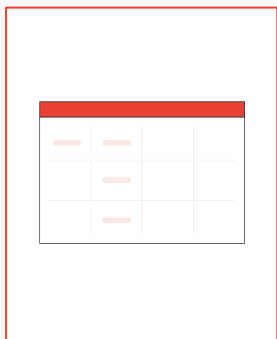
Built-in data protection at scale, by default

All data is **automatically encrypted** in transit and at rest

Customer managed encryption keys **(CMEK)**

Multi-layered security approach

Tools and technology to efficiently govern data

Integration with Cloud IAM for access control and visibility into security policies

With Cloud SQL for SQL Server, we've enabled cross-project integration to authenticate via **Managed Microsoft Active Directory**

Support for compliance requirements
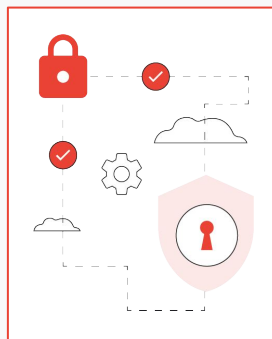
Third-party **audits** and **certifications**

Easy visibility into security policies

Trust through transparency

Access Transparency tool for visibility into our actions

Google Trust Principles for **deployment integrity, privileges, access, and compliance**

Google Cloud

Deep dive into customer use cases

Wayfair

Challenge

With 18 fulfillment centers, 38 delivery centers, and a catalog of more than 22 million items, online retailer Wayfair needed a way to quickly move from their on-premises data ce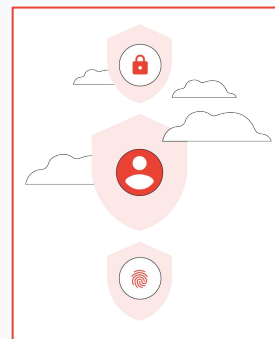nters, running on SQL Server, to Google Cloud. This had to be achieved without inconveniencing their team of over 3,000 engineers, their tens of millions of customers, or their 16,000 supplier partners.

Solution

Wayfair chose Google Cloud database services' Cloud SQL for PostgreSQL, Cloud Spanner and Cloud Bigtable to help shift their workloads to the cloud.

Now that migration is complete, they're also using Google Kubernetes Engine (GKE) and Compute Engine VMs to host the services built by our team. They also use Pub/Sub and Dataflow for sending operational data to their analytical store in BigQuery.

> "
>
> Now we're able to spend more time working with users and less time on infrastructure management. Working with Google Cloud as a cloud provider reduces our time to market to support new use cases, reduces our operational overhead, increases developer velocity, and enables us to scale at the speed of our business.

Phil Portnoy
Associate Director of Engineering

Results

- Ability to scale with the business without having to significantly increase operational headcount.

- Increase in internal engineering support for the DBaaS platform, with an increase of 28.52% for NPS and 41.22% for our tooling (offering) NPS.

Blog

https://cloud.google.com/blog/products/databases/wayfair-migrates-to-cloud-sql-and-cloud-spanner

Google Cloud

Renault Group

Challenge

As part of a company-wide strategic plan, Renault has shifted their focus over the past year from a car company integrating tech, to a tech company integrating cars that will develop software for their business. For the information systems group, that meant modernizing their entire portfolio and migrating 70 in-house applications in 2 years from Oracle to Cloud SQL for PostgreSQL.

Solution

The Renault Group uses BigQuery and Dataflow to improve scaling and costs, but they're also now using fully managed database services like Cloud SQL for PostgreSQL.

Cloud SQL has made it much easier for the company to change their infrastructure as needed, add more power when necessary or even reduce their infrastructure size. Now that they're running on Cloud SQL, they've improved performance even on large databases with many connected users.

"

So as part of our migration to Google Cloud, we optimized our applications with monitoring services. With these insights our team has more control over resources, which has reduced our maintenance and operations activity and resulted in faster, more stable applications. Plus, migrating to Cloud SQL has made it much easier for us to change our infrastructure as needed, add more power when necessary or even reduce our infrastructure size.

Cyril Picchiottino,
Quality & Customer Satisfaction IS VP

Results

- The entire migration project was completed in two years.

- Reduced database maintenance and operation activity, resulting in faster and more stable applications.

- The migration has also resulted in lower cost because Renault group is not overprovisioned.

Blog

https://cloud.google.com/blog/products/databases/renault-drives-fully-loaded-database-migration-to-google-cloud

Auto Trader

Challenge

Auto Trader had invested a lot in on-premises infrastructure and was starting to shift to the cloud, but needed to move faster. Several capabilities were becoming increasingly difficult to realize without a significant overhaul.

Solution

Cloud SQL was a natural fit for Auto Trader and now sits at the heart of its data storage strategy. Cloud SQL's fully managed relational database services for MySQL, PostgreSQL, and SQL Server removed the resources and cost that would typically be taken up by database maintenance.

> **Moving to Cloud SQL significantly impacted the way our teams work and has helped us created a seamless development experience.**
>
> **Mohsin Patel**
> Principal Database Engineer,
> Auto Trader UK

Results

- 65% of Oracle footprint migrated to Cloud SQL.

- Release cadence improved by over 140% year-over-year.

- Peak of 458 releases to production in a single day.

- 36,000 releases in a year with an improved success rate of 99.87%.

Blog

https://cloud.google.com/blog/products/databases/how-auto-trader-migrated-its-on-prem-databases-to-cloud-sql

Google Cloud

COLOPL

Challenge

From 2012 onward, COLOPL relied on a traditional cloud service to develop and run its games. Responding rapidly to load changes—particularly when loads were higher than expected—was extremely difficult. COLOPL tended to add excessive server capacity to reduce the risk of being caught short. As well as taking up to 5.5 workdays to complete, this also drove up costs.

Solution

Using Google Cloud services, including Cloud Spanner and Google Kubernetes Engine, COLOPL is achieving the scalability, stability, and cost efficiency to optimize player experiences of leading mobile games such as Dragon Quest Walk.

> **Cloud Spanner perfectly matched our need for scaling database resources in a cost-effective way to manage game loads. We knew that Google Cloud, by being the leader in Kubernetes development and providing direct access to developers, would boost the spirit of inquiry among our engineers.**
>
> **Kenta Sugai**
> Executive Director,
> COLOPL

Results

- Developers can now focus on game logic and development rather than database complexity and infrastructure issues.

- COLOPL can launch new game titles without concerns over stability, scalability, or performance.

- Database costs have been reduced by up to 25% and operational costs have been reduced by up to 80%.

Case study

https://cloud.google.com/customers/colopl/

Google Cloud

Manhattan Associates

Challenge

Manhattan Associates needed a database solution that could support their availability and cost needs. Their previous database solutions struggled across different cloud platforms and created challenges in total cost of ownership and licensing.

Solution

Manhattan Associates uses Cloud SQL for MySQL to run Manhattan Active® solutions. Cloud SQL helps them meet their availability goals with automatic failovers, automatic backups, point-in-time recovery, binary log management, and more. Cloud SQL also allows us them create in-region and cross-region replicas efficiently with near zero replication lags.

"Today, we run hundreds of Cloud SQL instances and operate most of them with just a few database administrators (DBA). By offloading the majority of our database management tasks to Cloud SQL, we significantly reduced the cost to maintain Manhattan Active® Platform databases."

Sanjeev Siotia,
SVP and CTO, Manhattan Associates

Results

- Create a new replica for a TB size database in <30 minutes, which used to take several days.

- Unplanned downtime is 83% less than with previous database solutions.

- Manhattan Associates moved every Manhattan Active® solution to Google Cloud, including Cloud SQL, with < 4 hours of downtime.

Blog

https://cloud.google.com/blog/products/databases/manhattan-associates-powers-supply-chain-app-with-cloud-sql

Google Cloud

TIM Group

Challenge

In early 2020, TIM Group set out to solve a common challenge faced by large enterprises: keeping up with competitive trends and new technological developments. One of their core IT systems, the billing function, was in need of a modernization overhaul.

Solution

TIM Group used Cloud SQL for PostgreSQL and Google Compute Engine to automate important billing and credit systems that had previously been processed manually.

Results

- 45% savings in database management costs.

- 20% savings in infrastructure costs.

- Decommission of 16 legacy on-premise systems.

Blog

https://cloud.google.com/blog/products/databases/how-tim-group-achieved-45-database-management-cost-savings

> "
>
> **With Cloud SQL powering our new billing system, we can now automate previous manual billing and credit processing, dismiss over a dozen legacy systems, and build upon technology that provides high performance, easy storage scalability, high availability, and disaster recovery. And this is all at significant cost savings in database maintenance and infrastructure.**
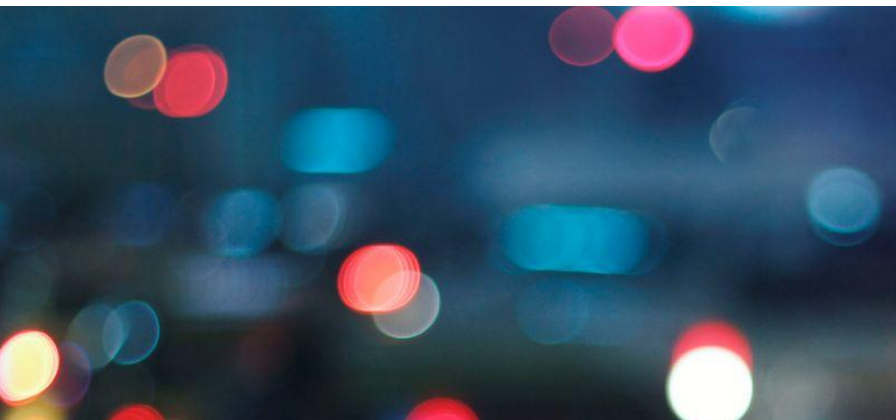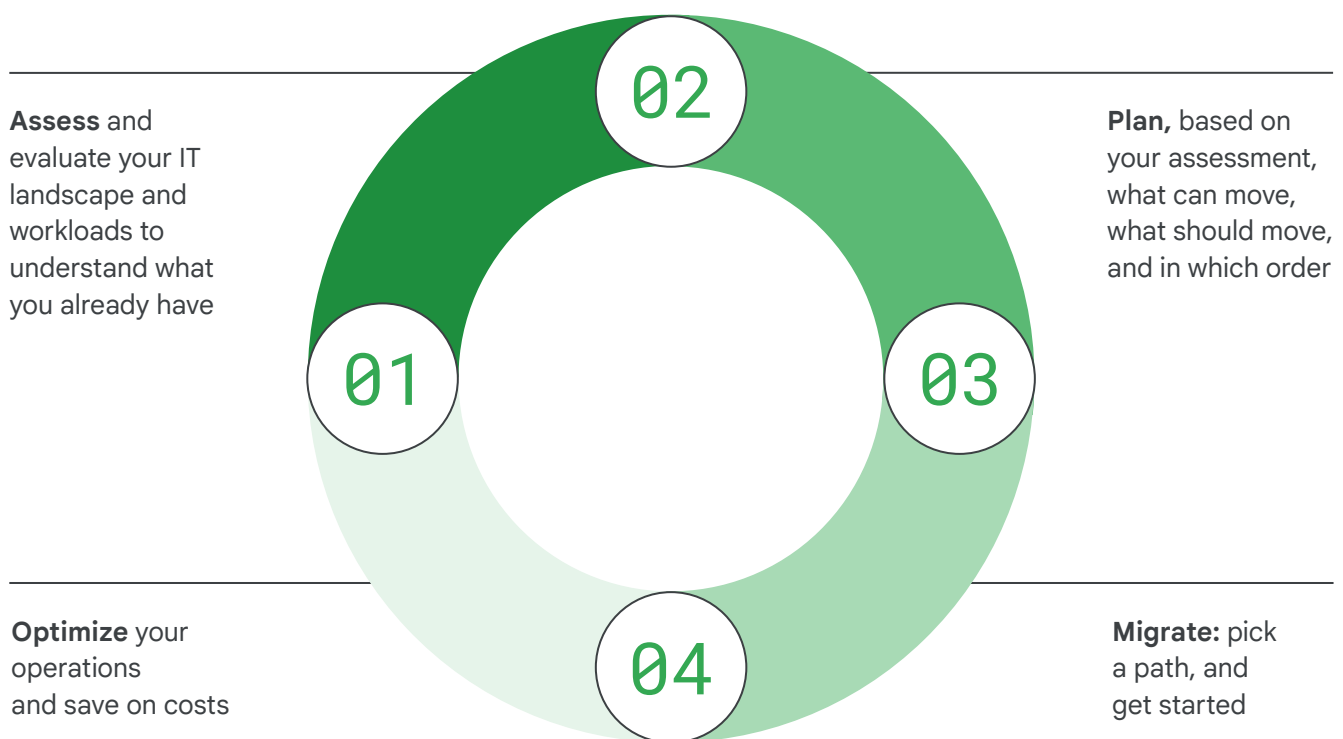
Enrico Rocino
ICT Manager, TIM Group, Responsible for "Wholesale - Billing to Cash" - IT Digital Solutions

Getting started

Four key phases for a successful migration

A good migration plan has four phases: assessment, planning, execution, and optimization

Assess and evaluate your IT landscape and workloads to understand what you already have

02

Plan, based on your assessment, what can move, what should move, and in which order

01

03

Optimize your operations and save on costs

04

Migrate: pick a path, and get started

Though this migration plan is shown as a single circle, it's a bit more iterative than that. You'll have your high-level migration plan, with groups of apps called migration waves that need their own specific plans.

In theory, each plan adapts the lessons from previous migration waves. It's not uncommon to go back and forth between the four different phases. It's all about building that migration muscle memory and realizing that it's a journey.

Google Cloud

We offer tools to help you get there safely and efficiently
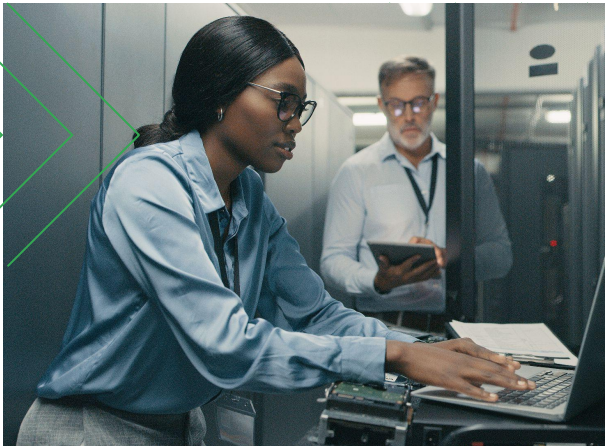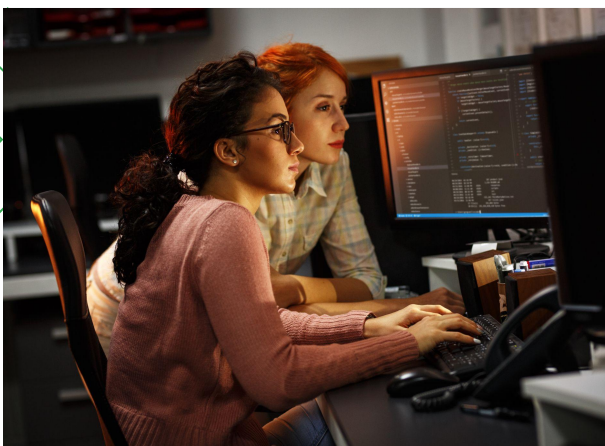

Database assessment

Assess and prioritize
your workloads for migration

Database Migration Program

Quickly migrate your database
workloads to our managed offerings.

Database Migration Service (DMS) and Datastream

Migrate workloads in just a few
clicks with a serverless experience
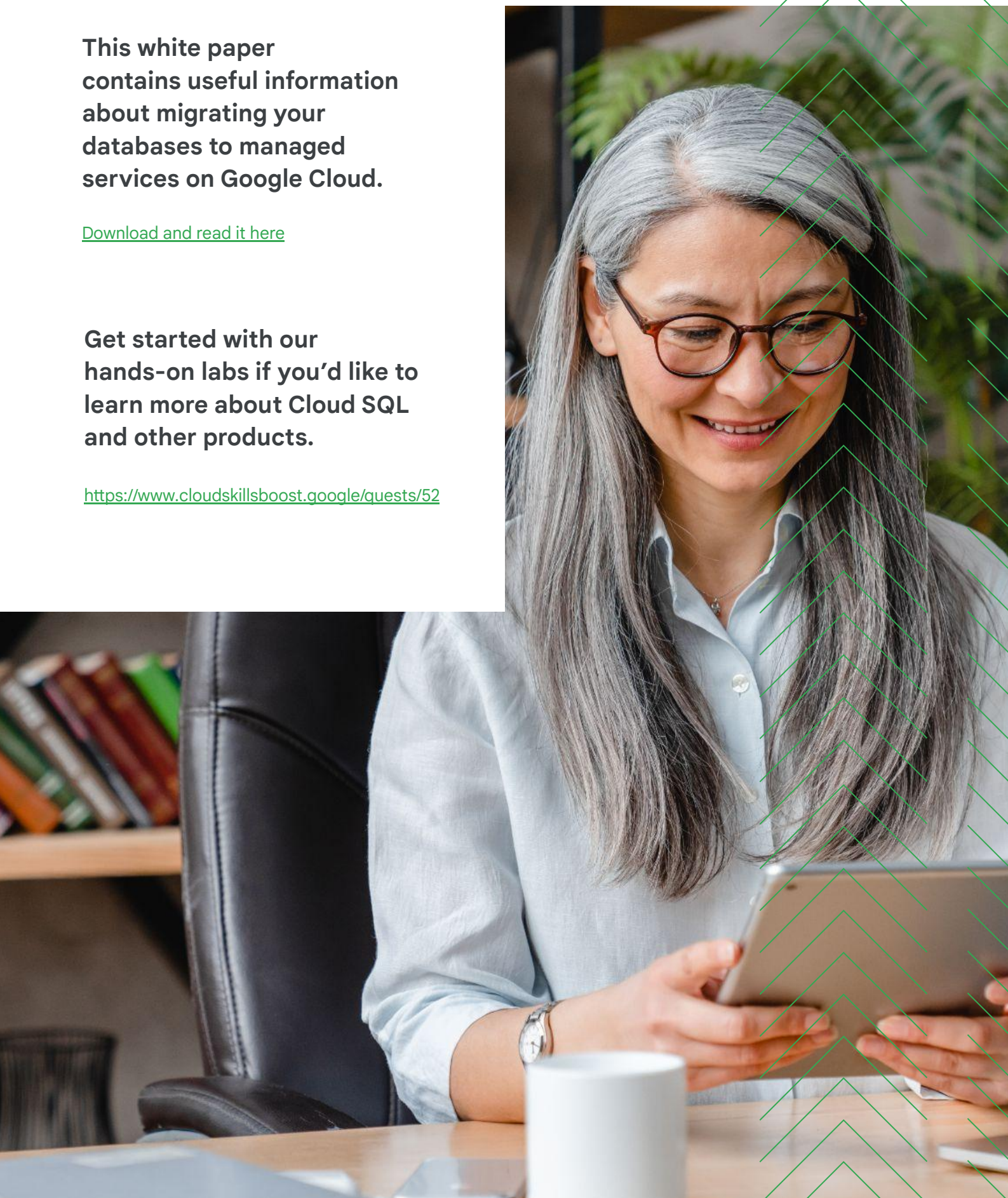

Partner solutions such as Striim

Real-time data integration and
data movement to BigQuery,
Spanner, and Cloud SQL.

Google Cloud

This white paper contains useful information about migrating your databases to managed services on Google Cloud.

Download and read it here

Get started with our hands-on labs if you'd like to learn more about Cloud SQL and other products.

https://www.cloudskillsboost.google/quests/52

Google Cloud

Google Cloud

Thank you