



How Data Gravity is Pulling Your Analytics to the Cloud

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Introduction

Data and applications used to be hosted locally, on organizations' own premises. But a cloud computing revolution has changed this default. Data is moving to the cloud, and data gravity is changing how software and analytics run in organizations.

The pandemic and economic crisis has only accelerated cloud adoption, with organizations pursuing the cloud as a critical component of their data-driven, digital transformation. Promising benefits from greater efficiencies, optimization, and cost-savings, to improved customer service, data analytics and cloud technologies are helping businesses be more agile and resilient through this moment of unique business challenges.



The pandemic validated cloud's value proposition. The ability to use on-demand, scalable cloud models to achieve cost efficiency and business continuity is providing the impetus for organizations to rapidly accelerate their digital business transformation plans. The increased use of public cloud services has reinforced cloud adoption to be the 'new normal,' now more than ever."

— Sid Nag, Research Vice President, Gartner

Source: Gartner Press Release

Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 18% in 2021

November 17, 2020



What's Newton got
to do with data?



Two bodies in the universe attract each other with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.”

— NEWTON'S LAW OF UNIVERSAL GRAVITATION

Data, applications, and services all have their own “gravitational pull,” but data has the most mass. Other technologies therefore gravitate toward it. If the data is in the cloud, then data gravity will pull other applications and services to the cloud as well. So as more enterprises rely on cloud computing to help them quickly and easily ingest, store, analyze, and share their data, the forces of data gravity will be more dramatic and create a greater impact.

Not long ago, many organizations stored their data and ran their applications entirely on their own premises. But a cloud computing revolution has changed this default. And with this revolution, Newton’s 15th century law has reemerged.

Seeing the coming transition of data and applications from on-premises to cloud infrastructure, Dave McCorry, an early cloud technologist, realized that Newton's foundational law could be applied to more than physical objects. He called this data gravity. Dave adapted the formula for universal gravitation to fit the concepts of data gravity:

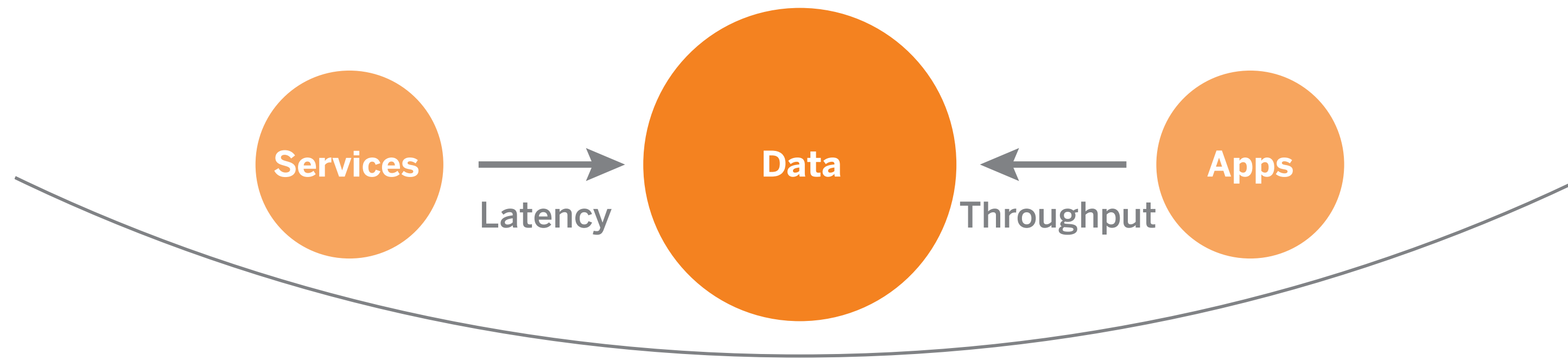
$$\frac{\left(\begin{array}{c} \text{Data} \\ \text{mass} \end{array} \times \begin{array}{c} \text{Application} \\ \text{mass} \end{array} \right) \times \begin{array}{c} \text{Number of requests} \\ \text{per second} \end{array}}{\left(\begin{array}{c} \text{Latency} \\ \text{in seconds} \end{array} + \left(\begin{array}{c} \text{Average request} \\ \text{size in MBs} \end{array} / \begin{array}{c} \text{Bandwidth in MBs} \\ \text{per second} \end{array} \right) \right)^2}$$

In simpler terms: data, applications, and services all have their own gravitational pull. But data is the heavy hitter in this arena, and therefore has the most gravitational pull.

The apple fell on Newton's head because the Earth has more mass than the apple, thereby pulling the apple closer via the phenomena we know as gravity. In the same way, data pulls other technologies toward it, software applications and services included.

Data gravity

Data's tendency to attract applications and services, particularly to where the data is stored.



*Source: Dave McCory, [Data Gravity — in the Clouds](#)

The gravitational pull on analytics

Latency: The amount of time required to perform an action or produce a result.

Throughput: The number of times an action can be performed or result achieved per given unit of time.

Why are these two factors important when thinking about your analytics?

Latency and **throughput** are the underlying drivers of data gravity. Unlike Newton's apple, data doesn't have physical mass to draw in surrounding objects. Instead, latency and throughput act as accelerants to the analytics process.

Applied to analytics, latency is the wait time between your query traveling from the software application to the database, and then back to again.

In the same example, throughput is the number of times your software application can query the database in a given amount of time.

Speed

Achieve speed through the right choice of location.

Data is only useful when people can use it to answer their questions. To have that kind of impact, you'll need to access the data in a timely manner. Queries that take hours break people's analytical flow, and get in the way of insight leading to meaningful action. Decreasing latency and increasing throughput returns your queries quickly, allowing you to get to your analysis and answers faster.

While there are many variables that can determine your system's latency and throughput, the constant is location. When entities—data, applications, or services—are closer to one another, latency is lower and throughput higher.

Based on this concept, data will exert a gravitational pull on the applications and services it fuels. In the quest for speed, the location of data will be an important factor when determining the location of the applications used to collect, store, and analyze it.

The road to the cloud

On the data highway, the signs point to the cloud. More companies are moving their data and analytics to the cloud to leverage the scalability and reliability of cloud infrastructure.



The increasing use of public cloud is driving up cloud spend for organizations of all sizes. Public cloud spend is now a significant line item in IT budgets, especially among larger organizations.”

Source: [Flexera 2020 State of the Cloud](#)

But there's no single path to get there.

Some organizations are moving only their data from on-prem to the cloud. Others are transitioning infrastructure to cloud platforms. Often they're doing both simultaneously. And even more are born in the cloud and run exclusively on web applications and cloud-native data.

Data, gravity, and the cloud

Applications used for data analysis and visualization are gravitating toward the data itself. Today, that means a large-scale shift towards the cloud.

According to an IDC survey, almost 50 percent of technology decision makers expect to moderately or significantly increase demand for cloud computing as a result of the pandemic.



A number of CIOs tell us their cloud migration investments paid off during the pandemic as they were able to easily scale up or down.”

— Meredith Whalen, Chief Research Officer, IDC

Source: IDC, [COVID-19 Brings New C-Suite Priorities](#), May 2020

Business intelligence and cloud computing technologies are proving critical in helping businesses effectively, and with agility, manage their diverse, ever-expanding data sets as they transform digitally. To ensure your analytics experience remains fast and supports your business while facing a dynamic, unstable environment, consider data gravity as you plan out your analytics deployment supported by the cloud and overall enterprise IT architecture.

But in a world where each organization’s path to the cloud looks different, this is easier said than done. Ensuring your services and applications remain close to your data requires analysis and visualization tools that support a hybrid model, ensuring you don’t have to change platforms as your environment shifts and evolves.

The many faces of hybrid data analytics

A hybrid model for analytics gives you choice. The choice to deploy software where your data lives and to adjust your deployment as your data strategy evolves.

Data gravity is only one piece of the puzzle when planning out your analytics infrastructure. Other factors to consider are your current use and future plans for data applications.

Moving data and changing long established workflows can be challenging, so your analytics applications should support you on every step of your journey.

And most importantly, you need to consider the needs of your users, ranging from system administrators to end users analyzing their data. Do you have a dedicated team that can look after on-premises hardware and software? Or do your business users demand easy access to fully managed cloud applications?

A hybrid model supports both on-prem and cloud technologies for your data, infrastructure, and applications. It gives you the flexibility to choose where you deploy your analytics today, and supports you as your environment shifts and changes.

Data and analytics applications range on a spectrum between on-premises and fully-hosted in the cloud. And each has its own benefit.

On-premises — Databases and analytic applications are hosted and managed by the organisation on its own premises. This means it is responsible for provisioning sufficient hardware and making sure it scales with future demand. The organization is also actively managing and maintaining the software.

IaaS and PaaS — Instead of buying your own hardware, you can rent infrastructure from public-cloud vendors such as AWS, GCP, or Microsoft Azure and deploy your database or analytics in the cloud. There are often benefits in cost, scalability, and flexibility to using infrastructure or platform as a service (IaaS and PaaS).

St. Mary's Bank moved its data and analytics from on-premises to the cloud, resolving nearly 40,000 data errors and saving around 15 hours per week with automated reporting.

[Hear the full St. Mary's Bank story](#)

Fully hosted SaaS — Web-based analytics can also be delivered as software-as-a-service. This means you don't have to worry about hardware or software maintenance.

Remember that data carries the most mass. Moving data is costly, both in time and resources. A hybrid model for analytics allows you to connect to data regardless of the database in which it's stored or the infrastructure upon which it's hosted.

Specialized Bicycle Components eliminated infrastructure roadblocks to enable authentication and security upgrades, and scaled BI across five continents.

[Read the full Specialized story](#)

Bring us along on your journey

There are many ways organizations use the cloud to run their business. And they're taking different paths to get there. The applications you choose should be able to support both your current and future needs.

Tableau's approach to cloud is simple: It's all about choice. The choice of how and where you deploy your analytics. The choice to analyze any data, regardless of where it resides. From a fully hosted SaaS solution to licensed software deployed on a cloud platform or on-premises, Tableau lets you deploy and manage your analytics on your own terms.

Wherever you are on your journey to the cloud, we are here to help.

Tableau Online

Tableau Online is hosted self-service analytics in the cloud—it's secure, scalable, and removes your need to manage servers.

Tableau Server

Extend the value of your data across your entire organization with **Tableau Server**, on-premises or in a public cloud.

Tableau Desktop

Called “the gold standard” in visual analytics, **Tableau Desktop** offers unlimited data exploration through an intuitive interface.

Tableau Prep

Tableau Prep provides a visual and direct way to combine, shape, and clean data, as well as automate data prep flows.



Tableau Online gives us an opportunity to bring different facets of our organization together. And the ease with which we've been able to give that to Red Hatters across the globe and in different functions has helped speed up and create a community groundswell.”

— Wes Gelpi, Senior Manager, Business Intelligence & Analytics, Red Hat

[Read the full story](#)

About Tableau

Tableau is a complete, integrated, and enterprise-ready visual analytics platform that helps people and organizations become more data driven. Whether on-premises or in the cloud, on Windows or Linux, Tableau leverages your existing technology investments and scales with you as your data environment shifts and grows. Unleash the power of your most valuable assets: your data and your people.

Additional resources

Resource hub: Data and analytics in the cloud

Whether you're modernizing your analytics, planning a cloud migration, or ready to optimize your cloud investments, we have resources to help you in your cloud journey.

[Visit the hub](#)

Ready to go cloud. What now?

Plan for success in the cloud. Find out the most critical questions your organization should ask and answer to prepare for migrating to the cloud.

[Get the whitepaper](#)

Should I move my analytics to the cloud?

Learn important considerations for choosing between Tableau Server—deploying on-premises or on a public cloud—and Tableau Online, fully hosted SaaS analytics.

[Read the blog post](#)