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Cloudy with a Chance of Success: a comedy of errors in Cloud Architecture Design

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Cloud waste refers to the unnecessary expenditure of cloud resources, resulting from poor platform and solution designs, poor management, under-utilisation, and in general, inefficient provisioning.
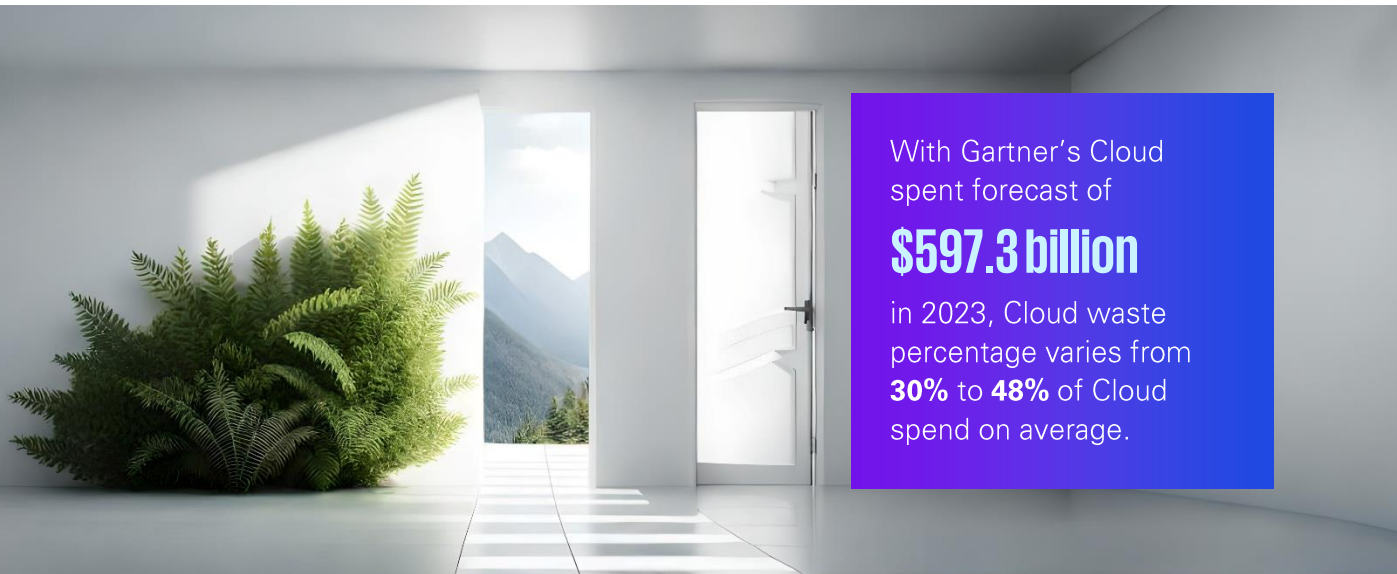
With Gartner's Cloud spent forecast of

$597.3 billion

in 2023, Cloud waste percentage varies from **30%** to **48%** of Cloud spend on average.

These numbers are jaw dropping considering that 75% of cloud waste can be designed out before the workload is deployed.

> One of our Directors has written a very interesting Though Leadership paper about the best practices of Cloud engineering to reduce Cloud Waste. Please have a look as it clearly summaries some very important findings and suggestions to fight bad implementation habits!
>
> **(Follow the Money: Why accountability is key in saving money in public cloud)**

Jonathan Grice
Director of Cloud
and formerly Software Engineering

The State of FinOps survey is still showing that **"Compared to 2022, our 2023 respondents still find that Enabling Engineers to Take Action is a top challenge".** Therefore, accountability, the right tools and best practices are key to properly manage the operational cost of a Cloud platform.

In a recent engagement, I have also experienced the responsibility of the business in reducing the cloud costs.

One of the workstream I have been leading is the migration of unstructured data to Azure. Millions of files, 1 PB of data, that need to be migrated because the business capabilities have not taken responsibilities to delete old documents sitting in abandoned network shares.

There could be many other examples of recommendations the company should follow if they would implement the best FinOps practices, but I will leave them for another time.

What I want to cover here is the importance of designing the right Cloud Platform and solutions to have the best benefits, included cost reduction, from a Cloud migration. My colleagues in the engineering team always emphasis the DevOps mantra **"You build it and you run it"** but there is an important previous step you need to take to guarantee your success and that is **"Design it properly!".**

In my recent loft-conversion home project, I was horrified to discover that the constructor was building the roof 20 cm lower than what we agreed with the company. When we had a look at the cause of the problem, it came out that the architect has not designed it accurately. I was lucky to have an approved project with the right specifications, so the poor builder had to readjust the floor to match the contractual agreement.

Fortunately, in our virtual IT world there are many frameworks and tools to support a cloud architect in his daily job. Every Cloud Service Provider has its own Well Architecture Framework that covers the main important pillars to build the most secure, high-performing, resilient, and efficient infrastructure possible for your applications.

But you still need to avoid certain design mistakes.

I have summed up below some examples of attention points you need to be aware of, and the obvious consequences if you underestimate the challenges.

01 ▶ **Poorly Managed Data Storage:**

Storing large amounts of seldom-used data in high-performance, expensive storage tiers instead of utilising lower-cost options like cold storage for archival data. This will lead to inefficient data storage practices, increased costs, slow access times and difficulties in managing data.

02 ▶ **Monolithic Architecture:**

Deploying a large, tightly integrated application on a single server without utilising microservices or containerisation, making it difficult to update and scale independently. Lift and shift a monolithic architecture in the cloud may hinder flexibility, scalability, and continuous deployment.

03 ▶ **Over-provisioning server instances:**

This is a typical habit transposed from the DC way of working. In the traditional DC environment usually architects and engineers

have one shot, the annual budget, to define their computing requirements. Because they can't perfectly forecast their future needs, they want to be sure to have enough hardware firepower to secure performance and reliability. But if you apply this same strategy in the Cloud this will result in running instances with higher specifications than necessary, not implementing auto-scaling, or not leveraging reserved instances.

- As a proof of this, Granulate, a provider of autonomous real-time computing workload optimisation and cost reduction solutions, released the findings from its first State of Cloud Computing survey **(Granulate Survey)**. The respondents were 100 senior DevOps and IT professionals from companies across various industries that spend over **$80,000** per month on their cloud computing needs. The results indicate a widespread underutilisation of cloud computing resources across the board. Over **50%** of respondents to the survey stated that their server utilisation rate is only **20-40%** – even though respondents listed improving performance as a top priority.

- My security colleagues would remind me that Insufficient security measures may expose sensitive data to unauthorised access or compromise the integrity of the system. For example, storing sensitive customer information in an unencrypted form or using weak access controls, making it easier for malicious actors to exploit vulnerabilities.

- Working with a client in a recent engagement, I have been witnessing the frightful consequences of not investing enough effort and attention in the designing processes. The Cloud migration plan and activities have been pushed back and heavily delayed due to the inaccuracy of low-level networking and security design. Millions of pounds wasted due to wrong planning, insufficient resourcing, and underestimation of the complexity of the task.

◆ The Cloud provides a lot of benefits to industries and business of any dimension. The adoption rates and investments and forecasts clearly show that Cloud, in its different flavours: Public, Hybrid or Private, is consistently growing. Worldwide end-user spending on public cloud services is expected to have grown **21.7%** to total **$597.3** billion in 2023, up from **$491** billion in 2022, according to the latest analysis from Gartner, Inc. Forecast for 2024 is estimated around **20.4%**. But companies need to understand that rushing without a proper Cloud strategy, accurate designs and plans will not help to achieve the expected benefits and, in the worst scenario, could turn out to be a big failure and services repatriation.

Some useful suggestions could come in handy to reduce your cloud waste:

Design cloud-native applications that leverage cloud services in the most effective way.

Employ technologies distributed and modern application architecture patterns such as containers and serverless computing to achieve better resource utilisation and scalability.

Optimise data transfer between services and applications and work to minimise the use of long-running instances for intermittent workloads.

If you want to manage the complexity of a hybrid Cloud environment, the right approach is just one: take your time to design your platform and solutions and trust your architect team!

Contacts

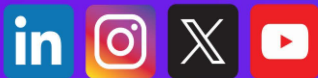## Davide Gorini
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Davide is a Lead Cloud Architect within the Cloud Transformation team at KPMG. Focusing on public Cloud adoption. Specifically, the way that teams and organisations most effectively leverage Cloud and modern DevOps approaches to increase business agility. Davide has a special interest on Cloud native solutions.

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