THEORETICAL

Explain some of the practical benefits of using the cloud

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What is cloud computing?

Simply put, cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.

CLOUD COMPUTING ARCHITECTURE
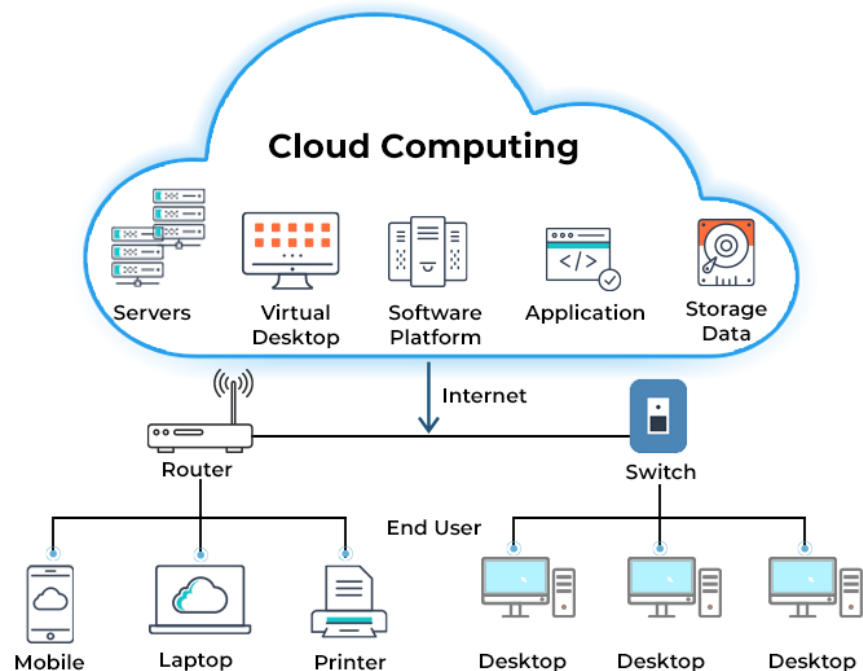
benefits of cloud computing

There are tons of benefits but we will show some of them.
Here are seven common reasons organizations are turning to cloud computing services:

Cost:

Cloud computing eliminates the capital expense of buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling, and the IT experts for managing the infrastructure. It adds up fast.

Global Scale:

The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when they're needed, and from the right geographic location.

Performance:

The biggest cloud computing services run on a worldwide network of secure datacenters, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacenter, including reduced network latency for applications and greater economies of scale.

Security:

Many cloud providers offer a broad set of policies, technologies, and controls that strengthen your security posture overall, helping protect your data, apps, and infrastructure from potential threats.

Speed:

Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.
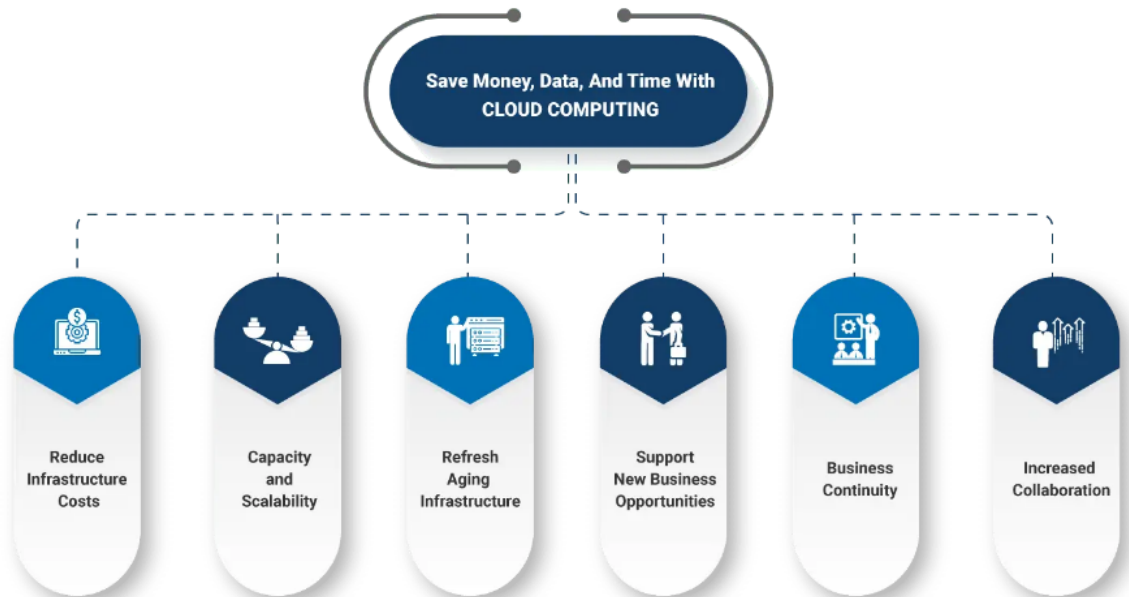
Productivity:

On-site datacenters typically require a lot of "racking and stacking"—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals.

Reliability:

Cloud computing makes data backup, disaster recovery, and business continuity easier and less expensive because data can be mirrored at multiple redundant
sites on the cloud provider's network.

Summary:

Save Money, Data, And Time With
CLOUD COMPUTING

Reduce
Infrastructure
Costs

Capacity
and
Scalability

Refresh
Aging
Infrastructure

Support
New Business
Opportunities

Business
Continuity
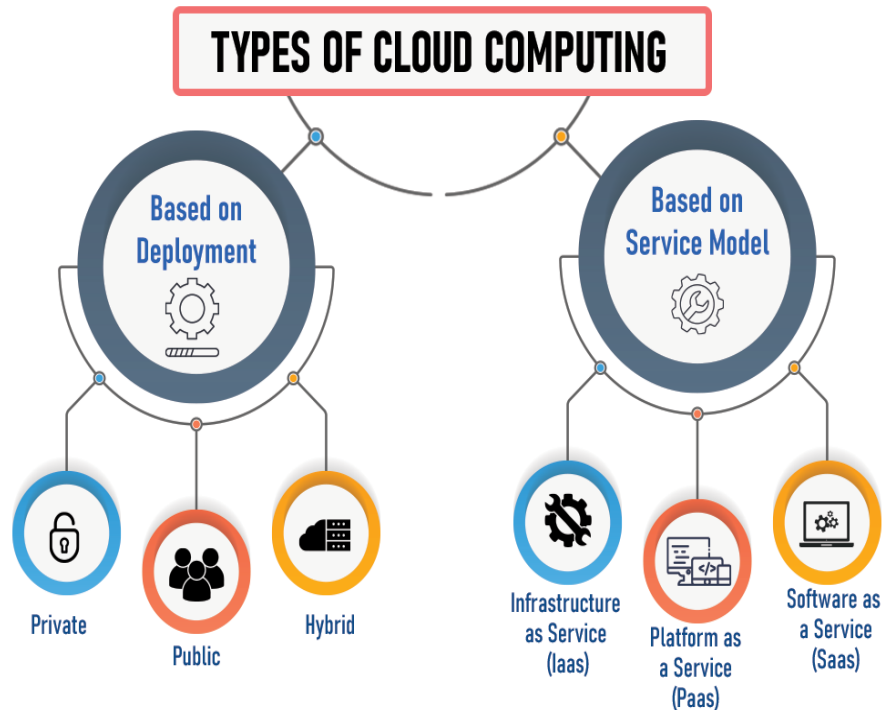
Increased
Collaboration

Types of cloud computing

Not all clouds are the same and not one type of cloud computing is right for everyone.

Several different models, types, and services have evolved to help offer the right solution for your needs. First, you need to determine the type of cloud deployment, or cloud computing architecture, that your cloud services will be implemented on.

There are three different ways to deploy cloud services: on a public cloud, private cloud, or hybrid cloud.

TYPES OF CLOUD COMPUTING

Based on Deployment: Private, Public, Hybrid

Based on Service Model: Infrastructure as Service (Iaas), Platform as a Service (Paas), Software as a Service (Saas)

1-Public cloud :

are owned and operated by third-party cloud service providers, which deliver their computing resources, like servers and storage, over the Internet.

Microsoft Azure is an example of a public cloud.

With a public cloud, all hardware, software, and other supporting infrastructure is owned and managed by the cloud provider.

You access these services and manage your account using a web browser.

2-Private cloud :

refers to cloud computing resources used exclusively by a single business or organization.

A private cloud can be physically located on the company's on-site datacenter.

Some companies also pay third-party service providers to host their private cloud.

A private cloud is one in which the services and infrastructure are maintained on a private network.

3-Hybrid cloud:

combine public and private clouds, bound together by technology that allows data and applications to be shared between them.

By allowing data and applications to move between private and public clouds, a hybrid cloud gives your business greater flexibility, more deployment options, and helps optimize your existing infrastructure, security, and compliance.

4-Infrastructure as a service (IaaS):

The most basic category of cloud computing services.

With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis.

5-Platform as a service (PaaS):

refers to cloud computing services that supply an on-demand environment for developing, testing, delivering, and managing software applications.

PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network, and databases needed for development.

6-Software as a service (SaaS):

is a method for delivering software applications over the Internet, on demand and typically on a subscription basis.

With SaaS, cloud providers host and manage the software application and underlying infrastructure, and handle any maintenance, like software upgrades and security patching.

Users connect to the application over the Internet, usually with a web browser on their phone, tablet, or PC.

Uses of cloud computing:

You're probably using cloud computing right now, even if you don't realize it. If you use an online service to send email, edit documents, watch movies or TV, listen to music, play games, or store pictures and other files, it's likely that cloud computing is making it all possible behind the scenes.

The first cloud computing services are barely a decade old, but already a variety of organizations—from tiny startups to global corporations, government agencies to nonprofits—are embracing the technology for all sorts of reasons.

1. Create cloud-native applications.
2. Store, back up, and recover data.
3. Stream audio and video.
4. Deliver software on demand.
5. Test and build applications.
6. Analyze data.
7. Embed intelligence.

Burham Badr eldin Burham Soliman **GitHub** [**egstar (Burham B. Soliman) (github.com)**](github.com)	## 1. High Speed – Quick Deployment The ability to spin up new cloud computing instances in a matter of seconds reshaped the agility and speed of software development. Developers can easily test new ideas and design application architecture without the dependency on on-site hardware limitations or slow procurement processes. ## 2. Automatic Software Updates and Integration Continuous Integration and Continuous Delivery rely on the fact that new software versions can be easily tested and deployed in the cloud environment, which allows for higher velocity of product innovation, releasing more and more features to the end-users on a monthly, weekly and in some cases even daily basis. Cloud environments also integrates with common DevOps tools and logging systems which makes it easier to monitor and detect issues in production. ## 3. Efficiency and Cost Reduction By using cloud infrastructure, you don't have to spend huge amounts of money on purchasing and maintaining equipment. This drastically reduces CAPEX costs and Total Cost of Ownership (TCO). You don't have to invest in hardware, facilities, utilities, or building out a large data center to grow your business. You do not even need large IT teams to handle your cloud data center operations, as you can enjoy the expertise of your cloud provider's staff. Cloud also reduces costs related to downtime. Since downtime is rare in cloud systems, this means you don't have to spend time and money on fixing potential issues related to downtime. ## 4. Data Security One of the major concerns of every business, regardless of size and industry, is the security of its data. [Data breaches](#) and other cybercrimes can devastate a company's

revenue, customer loyalty and brand positioning.

Cloud offers many advanced security features that guarantee that data is securely stored and handled. Features like granular permissions and access management via federated roles can restrict access to sensitive data only to the employees that need access to it, and by that reducing the attack surface for malicious actors.

Cloud storage providers implement baseline protections for their platforms and the data they process, such as authentication, access control, and encryption. From there, most enterprises supplement these protections with added security measures of their own to bolster cloud data protection and tighten access to sensitive information in the cloud.

5. Scalability

Different companies have different IT needs — a large enterprise of 1000+ employees won't have the same IT requirements as a start-up. Using the cloud is a great solution because it enables enterprises to efficiently — and quickly — scale up/down their IT departments, according to business demands.

Cloud-based solutions are ideal for businesses with growing or fluctuating bandwidth demands. If your business demands increase, you can easily increase your cloud capacity without having to invest in physical infrastructure. This level of agility can give businesses using cloud computing a real advantage over competitors.

This scalability minimizes the risks associated with in-house operational issues and maintenance. You have high-performance resources at your disposal with professional solutions and zero up-front investment. Scalability is probably the greatest advantage of the cloud.

6. Collaboration

Cloud environments enables better collaboration across teams: developers, QA, operations, security and product architects are all exposed to the same infrastructure and can operate simultaniously without stepping on each other toes. Cloud roles and

permissions help with better visibility and monitoring on who did what and when, to avoid conflicts and confusion. Different cloud environments can be built for specific purposes like staging, QA, demo or pre-production. It's much easier to collaborate in a transparent manner and the cloud encourages it.

7. Unlimited Storage Capacity

Related to the scalability benefit above, the cloud has essentially unlimited capacity to store any type of data in various cloud data storage types, depending on the availability, performance and frequency the data has to be accessed. The rule of thumb is that the cost of storage goes up according to the levels of availability of the data, performance and access frequency. Creating and optimizing the cloud cost structure policy can reduce the cost of cloud storage significantly while maintaining the company's business goals related to data storage in the cloud.

8. Back-up and Restore Data

The fact that data can be stored in the cloud without capacity constrains also helps with backup and restore purposes. As end-users data changes over time and needs to be tracked for regulations or compliance reasons, older software versions can be stored for later stages, in cases they would be needed for recovery or rollback.

9. Disaster Recovery

Having previous versions of software stored in the cloud, and having production instances running on multiple cloud availability zones or regions allow for faster recovery from disasters: if your application is deployed on multiple locations and for some reason one region goes down – the traffic can automatically failover to the working regions without any interruptions to the end-users. In other cases where there is a major bug in the software release, a quick rollback can be initiated to restore a previously released, more stable version to minimize damage.

10. Mobility

Cloud computing allows mobile access to corporate data via smartphones and devices, which is a great way to ensure that no one is ever left out of the loop. Staff with busy schedules, or who live a long way away from the corporate office, can use this feature to keep instantly up-to-date with clients and coworkers.

Resources in the cloud can be easily stored, retrieved, recovered, or processed with just a couple of clicks. Users can get access to their works on-the-go, 24/7, via any devices of their choice, in any corner of the world as long as you stay connected to the internet. On top of that, all the upgrades and updates are done automatically, off-sight by the service providers. This saves time and team effort in maintaining the systems, tremendously reducing the IT team workloads.

11. Data Loss Prevention

Data loss is a major concern for all organizations, along with data security. Storing your data in the cloud guarantees that data is always available, even if your equipment like laptops or PCs, is damaged. Cloud-based services provide quick data recovery for all kinds of emergency scenarios – from natural disasters to power outages.

Cloud infrastructure can also help you with loss prevention. If you rely on a traditional on-premises approach, all your data will be stored locally, on office computers. Despite your best efforts, computers can malfunction for various reasons — from malware and viruses to age-related hardware deterioration, to simple user error.

But, if you upload your data to the cloud, it remains accessible for any computer with an internet connection, even if something happens to your work computer.

12. Control

Having control over sensitive data is vital to any company. You never know what can happen if a document gets into the wrong hands, even if it's just the hands of an

untrained employee.

Cloud enables you complete visibility and control over your data. You can easily decide which users have what level of access to what data. This gives you control, but it also streamlines work since staff will easily know what documents are assigned to them. It will also increase and ease collaboration. Since one version of the document can be worked on by different people, and there's no need to have copies of the same document in circulation.

13. Competitive Edge

Not every company will migrate to the cloud, at least not yet. However, organizations which adopt cloud find that many benefits that cloud offers positively impacts their business .

Cloud adoption increases every year, since companies realize that it offers them access to world-class enterprise technology. And, if you implement a cloud solution now, you'll be ahead of your competitors.

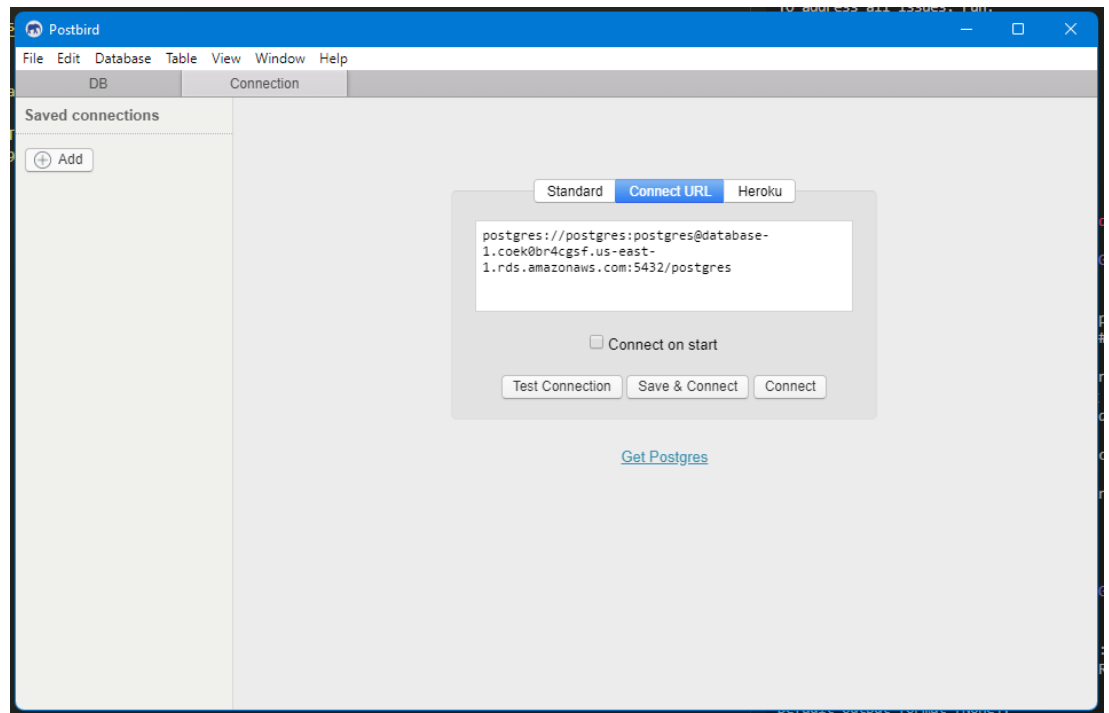# PRACTICAL

Connect our project to an Amazon RDS database

Mohammed Ahmed Hassan

GitHub:
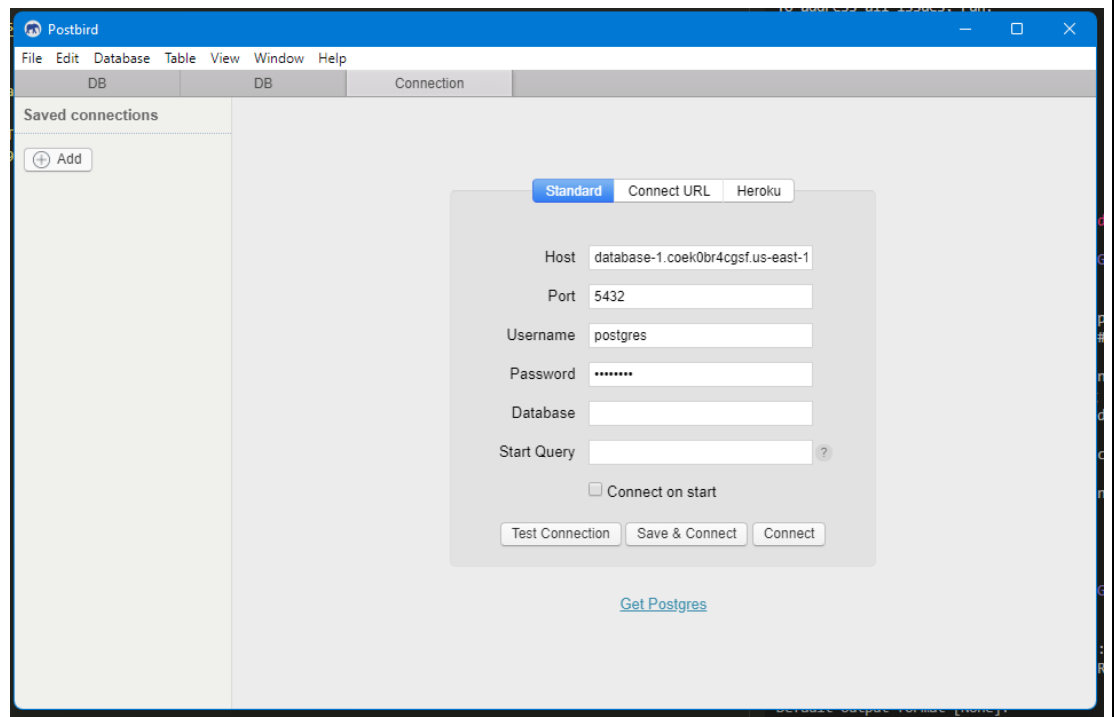[mohamedlolx (Mohamed Hassan) (github.com)](github.com)

Linkedin
[(6) Mohamed Hassan | LinkedIn](LinkedIn)

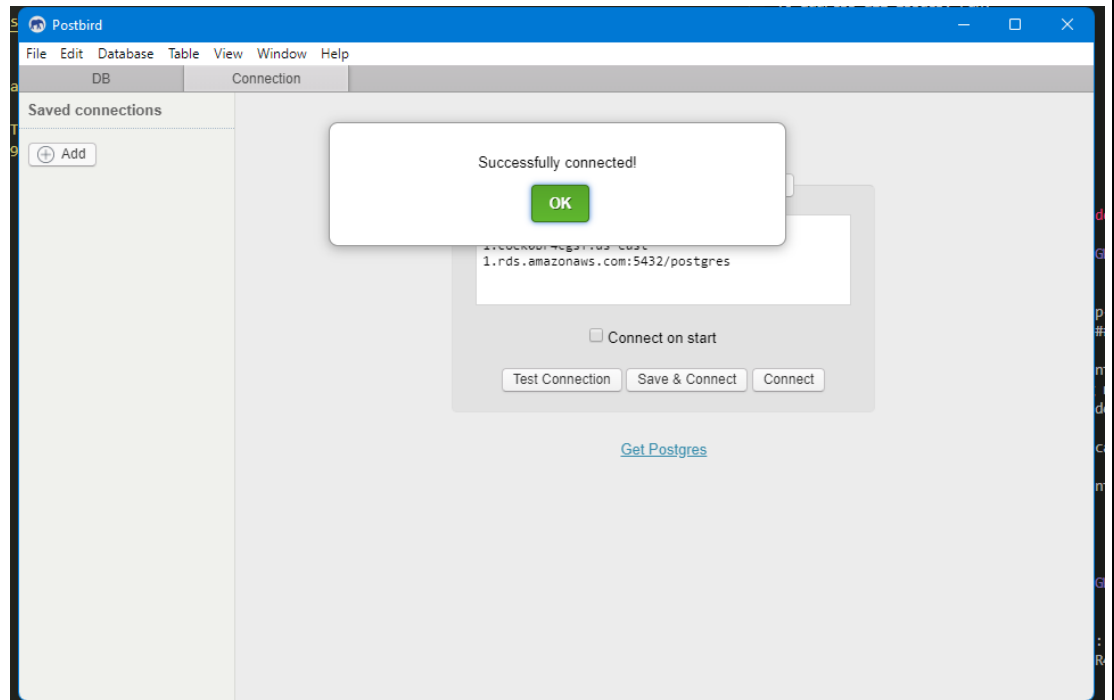We could connect to db through POSTBIRD with 2 ways:

1-Connect Directly through the endpoint of DB

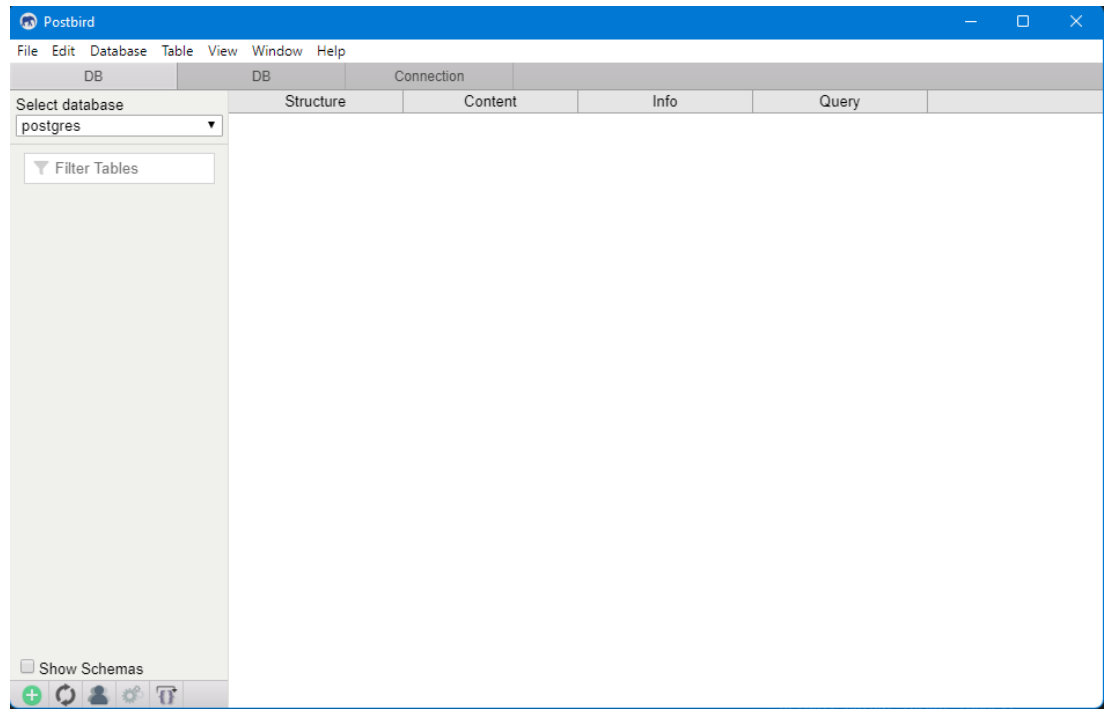**2-Connect through the normal parameters of any DB like : DB name, DB port, DB userName, DB password, DB:**
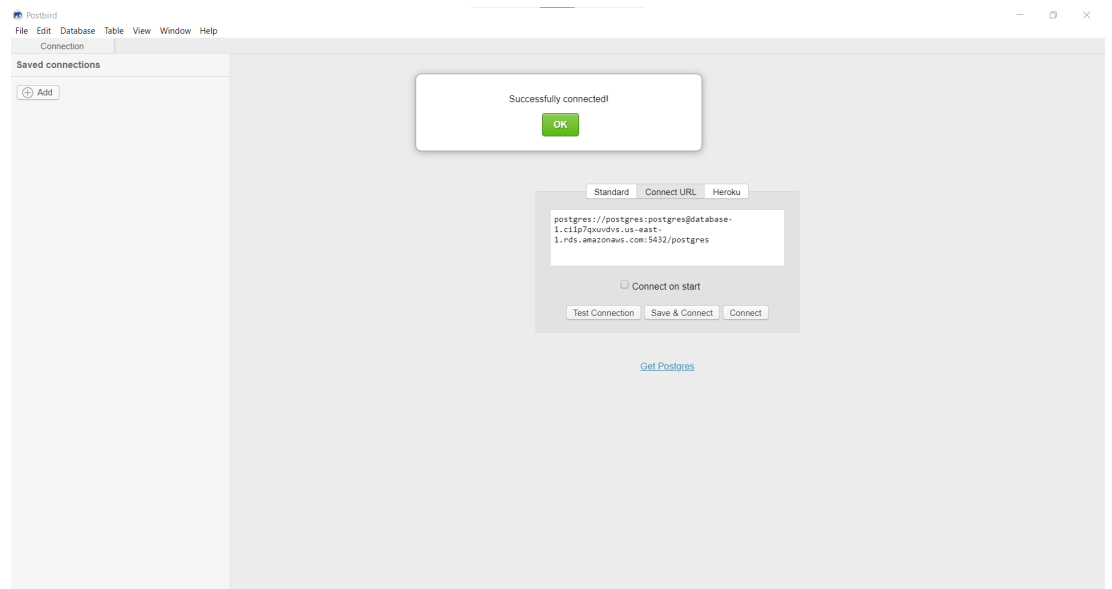
And now everything is FINE :)

	Here is our DB **Thx for Your Time :)**
Shaimaa Adel **GitHub**	To connect our project to AWS RDS we go through: - creating the DB on AWS RDS - making the DB publicly accessible - testing the connection through postbird

Burham Soliman
 	
GitHub
 	
[**egstar (Burham B. Soliman) (github.com)**](github.com)
	Successfully connected to the AWS RDS DB using the PostBird
	
	-> **Created the AWS RDS at the Free Tier**
	    ● **Used Postgres version 13.x**
	    ● **Created a database with name [burham]**
	    ● **Allowed the VPC for 0.0.0.0/0**
	-> **Sent a connection test using PostBird**