Azure cloud computing

A REPORT

submitted by

Mudunoori Rohan Raj 20BRS1207

in partial fulfilment for the award

of

B. Tech. Computer Science and Engineering

School of Computer Science and Engineering

VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

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DECLARATION

I hereby declare that the project entitled **"Teachnook Online Internship Azure cloud computing"** submitted by me to the School of Computer Science and Engineering, Vellore Institute of Technology, Chennai Campus, Chennai 600127 in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology – Computer Science and Engineering with specialisation in Artificial Intelligence and Robotics** is a record of bonafide work carried out by me**.** I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma of this institute or of any other institute or university.

Signature

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CERTIFICATE

The project report entitled "**Teachnook Online Internship Azure cloud computing**" is prepared and submitted by **Mudunoori Rohan Raj (Register No: 20BRS1207)**. It has been found satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology – Computer Science and Engineering with specialisation in Artificial Intelligence and Robotics** in Vellore Institute of Technology, Chennai, India.

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ABSTRACT

In today's technology-driven world, Azure cloud computing plays a pivotal role in transforming the landscape of IT infrastructure and services. This abstract presents a scenario of the current state of cloud computing, highlights its limitations and pitfalls, addresses the problems faced, and proposes a solution for a more efficient and effective future.

Scenario of the Area:-

Azure cloud computing, offered by Microsoft, is a prominent player in the cloud services industry. It empowers organisations to migrate their workloads, data, and applications to the cloud, providing on-demand scalability, cost-efficiency, and access to cutting-edge technologies. However, despite its many advantages, the current scenario of cloud computing reveals several limitations and pitfalls.

Limitations/Pitfalls of the Present Scenario:-

The present scenario of cloud computing is marred by several limitations:
1. Security Concerns: Data breaches and cyber threats pose significant security challenges.
2. Complexity:-Managing cloud resources and optimising costs can be complex and challenging.
3. Vendor Lock-In:- Organisations often face vendor lock-in issues, limiting their flexibility.
4. Data Governance:-Compliance and data governance can be problematic in multi-cloud environments.
5. Scalability Management:-Efficiently scaling resources up or down can be daunting for many.

Problem Addressed:-

The central problem addressed in this context is the need for an improved and more comprehensive cloud computing solution. Addressing these limitations is crucial to ensure that organisations can harness the full potential of cloud technology without compromising security, flexibility, or cost-effectiveness.

Proposed Solution:-

The proposed solution involves the development and adoption of a more robust and holistic cloud computing framework. This framework will:
1. Enhance Security: Implement advanced security measures, including encryption, threat detection, and identity management.
2. Simplify Management: Offer tools and platforms for easier resource management, cost optimization, and monitoring.
3. Promote Interoperability: Support open standards and interoperability to mitigate vendor lock-in concerns.
4. Strengthen Governance: Integrate compliance and governance tools to ensure data integrity and regulatory compliance.

5. Streamline Scalability: Provide automated scaling and load-balancing mechanisms for resource efficiency.

In summary, Azure cloud computing, as part of the broader cloud computing landscape, holds immense potential. By addressing the limitations and pitfalls of the present scenario through a comprehensive solution, organisations can unlock the true benefits of the cloud while addressing security, complexity, and governance challenges.

Azure :-

Azure is Microsoft's cloud computing platform that offers on-demand infrastructure as a service (IaaS) and platform as a service (PaaS) solutions. Azure helps organisations store and manage their data efficiently, improve their cybersecurity and compliance practices, quickly build and deploy complex web apps, and much more. Since Azure is fully integrated with all Microsoft products and is a public cloud platform, users can scale up their infrastructure without buying or maintaining the underlying infrastructure.

Using below Benefits of Azure :-

On-demand Scalability: Whether for growth or downsizing, business requirements can change quickly. Azure's public cloud framework allows companies to adjust their service agreements by increasing/decreasing their storage space and computing power on demand. No on-site Hardware Required: Businesses don't have to own and operate on premise data storage equipment, reducing upfront costs and consistent overhead. Cost-effective Subscription Models: Azure has a consumption-based pricing structure that allows small businesses and large enterprises to manage their IT budgets better. High availability: Azure operates in 55 regions in 140 countries worldwide and provides high availability and redundancy across all data centres. Enterprise-Level Development Tools: Businesses can build, deploy, and manage their custom web apps using various popular tools and programming languages. World-Class Cybersecurity: Azure has an advanced encryption process, and the built-in security tools help maintain the integrity, privacy, and availability of sensitive customer information.

INTRODUCTION

Cloud computing is a paradigm shift in how IT services are delivered and consumed. It allows organisations to outsource their computing needs to cloud providers, who offer services based on the pay-as-you-go model. This approach is transforming the way businesses operate, reducing capital expenses, and increasing agility.

Azure, Microsoft's cloud computing platform, is at the forefront of the digital transformation era. It offers a vast array of services and solutions that empower organisations to harness the power of the cloud. With Azure, businesses can scale, innovate, and optimise their IT infrastructure, making it a driving force behind modern IT operations. This introduction provides a glimpse into the world of Azure cloud computing and its transformative capabilities.

CHAPTER NAMES

Module-1:-Cloud computing overview, Introduction, Architecture of Cloud Computing.

Cloud Computing Overview:-
Cloud computing is a technology that enables users to access and utilise a wide range of computing resources, including servers, storage, databases, networking, software, and more, over the internet. It provides scalable and on-demand services, reducing the need for physical infrastructure and offering flexibility and cost-efficiency.

Introduction to Cloud Computing:-
Cloud computing is a paradigm shift in how IT services are delivered and consumed. It allows organisations to outsource their computing needs to cloud providers, who offer services based on the pay-as-you-go model. This approach is transforming the way businesses operate, reducing capital expenses, and increasing agility.

Architecture of Cloud Computing :-
Cloud computing architecture consists of three primary service models:
1. Infrastructure as a Service (IaaS): Provides virtualized computing resources like virtual machines, storage, and networking.
2. Platform as a Service (PaaS): Offers a platform for developers to build, deploy, and manage applications without worrying about underlying infrastructure.
3.Software as a Service (SaaS): Delivers software applications over the internet, accessible through web browsers.

Cloud architecture also includes deployment models:-
- Public Cloud: Services available to the public on a shared infrastructure.
- Private Cloud: Services hosted on a dedicated infrastructure for a single organisation.
- Hybrid Cloud: A combination of public and private clouds, allowing data and applications to be shared between them.

Module-2: Cloud Computing Advantages & Disadvantages, characteristics, Cloud computing Applications

Advantages:-

- Scalability:- Cloud services can be easily scaled up or down based on demand.
- Cost-Efficiency:- Reduced capital expenses and pay-as-you-go pricing models.
- Accessibility: - Access data and applications from anywhere with an internet connection.
- Flexibility:- A wide range of services and deployment options to meet diverse needs.

Disadvantages:

- Security Concerns:- Data privacy and security challenges.
- Downtime:- Dependency on service providers can lead to downtime.
- Limited Control:- Less control over infrastructure and maintenance.
- Bandwidth and Connectivity:- Reliant on stable internet connections.

Characteristics:

- On-Demand Self-Service: Users can provision resources independently.
- Resource Pooling: Resources are shared among multiple users.
- Rapid Elasticity: Resources can be quickly scaled up or down.
- Measured Service: Users are billed based on their actual usage.

Cloud Computing Applications:

- Data Storage: Clouds offer secure and scalable data storage solutions.
- Web Hosting: Hosting websites and web applications in the cloud.
- AI and Machine Learning: Leveraging cloud resources for AI and ML tasks.
- Business Software: SaaS applications for business productivity.

cloud computing offers scalability, cost-efficiency, and accessibility. However, it comes with security and downtime concerns, limited control, and dependence on connectivity. Its key characteristics include self-service, resource pooling, elasticity, and metered service. Cloud applications span data storage, web hosting, AI/ML, and business software.

Module-3:- Cloud Computing Architecture: Deployment Models (Public, Private, Hybrid, Community)

Cloud computing architecture encompasses various deployment models, each with its own characteristics and use cases. The four primary deployment models are:

1. Public Cloud:
   - Public clouds are operated and maintained by third-party cloud service providers and are made available to the general public.
   - Resources like servers, storage, and applications are shared among multiple users and organisations.
   - Public clouds offer scalability and cost-effectiveness, making them suitable for a wide range of applications and services.

2. Private Cloud:
   - Private clouds are designed for the exclusive use of a single organisation, whether it's hosted on-premises or by a dedicated third-party provider.
   - They offer greater control, security, and customization compared to public clouds, making them ideal for industries with strict compliance and security requirements.

3. Hybrid Cloud:
   - Hybrid clouds combine elements of both public and private clouds, allowing data and applications to move between them as needed.
   - Organisations can leverage the scalability and cost-efficiency of the public cloud while maintaining sensitive data and critical workloads in a private cloud for security and compliance.

4. Community Cloud:
   - Community clouds are shared by a specific group of organisations with common interests or requirements, such as government agencies, research institutions, or healthcare providers.
   - These clouds provide a balance between public and private cloud features and are customised to address the needs of the community they serve.

Choosing the appropriate deployment model depends on an organisation's specific requirements, including data sensitivity, compliance, scalability, and cost considerations. Many organisations opt for a hybrid cloud approach to balance flexibility and security, but the choice ultimately depends on their unique needs and constraints.

Module-4:- Cloud Computing Service Models (IAAS, PAAS, SAAS) Service Providers

Cloud computing service models refer to the different levels of cloud services provided to users and organisations. The three primary service models are:

1. Infrastructure as a Service (IaaS):
   - IaaS provides virtualized computing resources over the internet, including virtual machines, storage, and networking.
   - Users have control over the operating system, applications, and data, while the cloud provider manages the underlying infrastructure, such as servers and data centres.
   - IaaS is well-suited for organisations that need to quickly scale resources up or down and want more control over their computing environment.

2. Platform as a Service (PaaS):
   - PaaS offers a development and deployment platform that includes tools, libraries, and services for building, testing, and deploying applications.
   - Users focus on developing and running their applications, while the cloud provider handles the underlying infrastructure, including hardware and operating system management.
   -
3. Software as a Service (SaaS):
   - SaaS delivers fully functional software applications over the internet on a subscription basis.
   - Users access and use the software through a web browser, eliminating the need for installation and maintenance on their local devices.

Major cloud service providers that offer these service models include:

1. Amazon Web Services (AWS): AWS offers a wide range of IaaS and PaaS services, including Amazon EC2 (IaaS) and AWS Elastic Beanstalk (PaaS).

2. Microsoft Azure: Azure provides a comprehensive suite of IaaS, PaaS, and SaaS offerings, such as Azure Virtual Machines (IaaS) and Azure App Service (PaaS).

3. Google Cloud Platform (GCP): GCP offers IaaS and PaaS services like Google Compute Engine (IaaS) and Google App Engine (PaaS).

4. Salesforce: Salesforce is known for its SaaS offerings, including Salesforce CRM and Salesforce Marketing Cloud.

5. Oracle Cloud: Oracle Cloud provides IaaS, PaaS, and SaaS solutions, such as Oracle Cloud Infrastructure (IaaS) and Oracle Cloud Applications (SaaS).

6. IBM Cloud: IBM Cloud offers IaaS, PaaS, and SaaS services like IBM Virtual Servers (IaaS) and IBM Cloud Pak for Applications (PaaS).

Module-5:- Cloud Computing Virtualization and Types of Virtualization

Virtualization in cloud computing is a technology that enables the creation of multiple virtual instances or environments on a single physical server or infrastructure. This allows for more efficient use of computing resources, better isolation, and greater flexibility. There are various types of virtualization used in cloud computing:

1. Server Virtualization:
   - In server virtualization, a hypervisor (virtual machine monitor) is used to create multiple virtual machines (VMs) on a single physical server.
   - Each VM functions as an independent server with its own operating system, applications, and data.
   - Server virtualization is the foundation for most cloud environments and helps optimise resource utilisation and scalability.

2. Network Virtualization:
   - Network virtualization abstracts and combines networking resources to create virtual networks.
   - It allows for the creation of isolated virtual networks on a shared physical network infrastructure.
   - Network virtualization enhances network flexibility and isolation, making it easier to manage and secure cloud environments.

3. Storage Virtualization:
   - Storage virtualization pools physical storage devices into a single storage resource.
   - It abstracts the physical storage hardware, allowing for efficient management and allocation of storage resources.
   - Storage virtualization simplifies data management and enables features like data migration, replication, and snapshots in cloud storage.

4. Desktop Virtualization (VDI):
   - Desktop virtualization delivers virtual desktops to end-users, providing them with access to a virtualized desktop environment.
   - Users can access their desktops and applications from various devices and locations, making it convenient for remote work and BYOD (Bring Your Own Device) scenarios.

5. Application Virtualization:
   - Application virtualization decouples applications from the underlying operating system, allowing them to run in isolated containers.
   - This simplifies application management, as different versions of applications can coexist on the same server without conflicts.
   - Application virtualization is beneficial for cloud-based and containerized applications.

6. Storage Area Network (SAN) Virtualization:
- SAN virtualization abstracts and combines multiple physical storage devices into a single virtual storage pool.
- It offers centralised management of storage resources and improves storage utilisation in data centres.

7. Hardware Virtualization:
- Hardware virtualization involves the creation of virtual instances of hardware components like CPU, memory, and storage.
- It enables efficient allocation of hardware resources to virtual machines and applications, contributing to resource optimization in cloud environments.

These various types of virtualization play a crucial role in cloud computing by enhancing resource utilisation, scalability, flexibility, and cost-efficiency. They allow cloud providers and organisations to better manage their IT infrastructure and meet the evolving demands of their users and applications.

Module-6:-Hypervisors and Types of Hypervisors (Choosing the right type of Hypervisor)

Hypervisors are software or hardware systems that create and manage virtual machines (VMs). There are two primary types of hypervisors, and the choice depends on specific requirements:

1. Type 1 Hypervisor (Bare-Metal):
- Runs directly on physical hardware without an underlying operating system.
- Offers high performance, security, and resource efficiency.
- Ideal for enterprise data centres and cloud environments.

2. Type 2 Hypervisor (Hosted):
- Runs on top of an existing operating system.
- Easier to set up and suitable for development and testing.
- Less efficient and secure compared to Type 1 hypervisors.

Choosing the right type of hypervisor depends on factors such as performance, security, management complexity, and use case. Type 1 hypervisors are typically preferred for production environments, while Type 2 hypervisors are suitable for development and testing or when ease of use is a priority.

Module-7:- Service Level Agreements, Web service SLA, SLA Requirements, Metrics for Monitoring and Auditing

Service Level Agreements (SLAs) are formal contracts that define the expectations and commitments between a service provider and its customers regarding the quality, availability, and performance of the provided services. In the context of web services and IT, SLAs are essential for ensuring service reliability and meeting customer expectations. Here are short explanations of key SLA-related concepts:

1. Web Service SLA (Service Level Agreement):
   - A Web Service SLA outlines the agreed-upon terms and conditions for a web service, specifying the expected service quality, availability, response times, and support.

2. SLA Requirements:
   - SLA requirements are the specific criteria, metrics, and objectives that need to be met to fulfil the SLA. They define what the service provider must deliver to the customer.

3. Metrics for Monitoring:
   - Metrics are measurable values used to assess the performance and quality of a service. In web service SLAs, common metrics include response time, uptime, error rates, and throughput.

4. Auditing:
   - Auditing involves the systematic review and assessment of service performance to ensure compliance with SLA requirements.
   - It may include regular monitoring, reporting, and, if necessary, corrective actions to maintain service quality.

Effective SLAs and monitoring mechanisms are crucial for maintaining customer satisfaction, managing service expectations, and holding service providers accountable for delivering the promised quality of service.

Module-8:-Cloud Security and Measures to be taken to secure the cloud

Cloud security is the practice of safeguarding data, applications, and infrastructure in cloud computing environments from security threats, breaches, and vulnerabilities. Cloud security measures are essential to ensure the confidentiality, integrity, and availability of information and services in the cloud. Here's a detailed discussion on cloud security and the measures to be taken to secure the cloud:

1. Data Encryption:
   - Encrypt data at rest and in transit to protect it from unauthorised access. Use strong encryption algorithms and ensure that encryption keys are managed securely.

2. Identity and Access Management (IAM):
   - Implement robust IAM controls to manage user access and permissions effectively.
   - Use multi-factor authentication (MFA) and enforce the principle of least privilege to limit access to necessary resources.

3. Network Security:
   - Implement network security controls, such as firewalls, intrusion detection and prevention systems, and virtual private networks (VPNs), to protect data during transit.

4. Security Patch Management:
   - Regularly update and patch operating systems, software, and applications to address known vulnerabilities and security issues.

5. Security Monitoring and Logging:
   - Set up comprehensive monitoring and logging systems to detect and respond to security incidents and anomalies promptly.

6. Data Backup and Recovery:
   - Regularly backup data to ensure business continuity in case of data loss, and test the recovery process to validate its effectiveness.

7. Security Audits and Compliance:
   - Conduct security audits, assessments, and compliance checks to ensure that cloud services adhere to industry standards and regulations.

8. Threat Detection and Prevention:

- Employ security solutions that can identify and mitigate threats, such as malware, DDoS attacks, and unauthorised access attempts.

9. Disaster Recovery Planning:
- Develop a comprehensive disaster recovery plan to minimise the impact of unforeseen incidents on cloud services and data.

10. Vendor Security Assessment:
- Evaluate the security practices of cloud service providers, including their physical security, data centre practices, and certifications.

11. Employee Training and Awareness:
- Train employees and create awareness about security best practices and the potential risks associated with cloud computing.

12. Secure Development Practices:
- Adhere to secure software development practices to build and deploy secure cloud applications.

13. Data Loss Prevention (DLP):
- Implement DLP solutions to prevent unauthorised access, sharing, or loss of sensitive data.

14. Incident Response Plan:
- Develop an incident response plan outlining how to react to security incidents and data breaches, including notification procedures.

15. Secure APIs:
- Ensure that APIs used in cloud services are properly secured and authenticated to prevent unauthorised access.

Securing the cloud is a shared responsibility between cloud service providers and customers. Customers must implement the above security measures, while cloud providers must offer secure infrastructure, comply with industry standards, and provide tools and features that help customers meet their security goals. A well-planned and executed cloud security strategy is crucial to protect sensitive data and ensure the resilience of cloud-based applications and services.

Module-9:- Cloud Migration, Migration strategy and benefits of Migration

Cloud migration is the process of moving an organisation's data, applications, and workloads from on-premises or legacy infrastructure to cloud-based environments. It's typically done to take advantage of the benefits offered by cloud computing. Here are key components of cloud migration:

1. Cloud Migration Strategy:
- Organisations need a well-defined migration strategy to ensure a smooth transition to the cloud. Common strategies include:

- Rehosting (lift and shift): Migrating applications and data without significant modifications.
- Refactoring (replatforming): Making minimal changes to adapt applications for cloud environments.
- Rearchitecting: Restructuring applications for cloud-native design.
- Rebuilding: Building applications from scratch using cloud-native services.
- Retiring: Decommissioning unnecessary systems and services.

2. Benefits of Cloud Migration:
- Cost Savings: Cloud migration often leads to cost reductions through pay-as-you-go pricing and reduced infrastructure maintenance.
- Scalability :Cloud environments offer the ability to scale resources up or down to meet changing demands.
- Flexibility and Agility The cloud provides the flexibility to rapidly deploy and modify resources to support business needs.
- Security: Many cloud providers offer robust security features and compliance certifications, enhancing data protection.
- Disaster Recovery: Cloud-based data redundancy and backup options improve disaster recovery capabilities.

- Global Reach: Cloud services are accessible from anywhere with an internet connection, enabling global reach.
- Innovation: Cloud services offer tools and capabilities for innovation, such as artificial intelligence and machine learning.
- Reduced IT Maintenance: Cloud providers handle infrastructure management, reducing the IT burden on organisations.

Cloud migration can lead to a more efficient, cost-effective, and agile IT environment, but it requires careful planning and execution to maximise these benefits while minimising risks and disruptions to business operations.

Module-10:- Introduction to Service Providers (Platforms Introduction)

Service providers, in the context of technology and cloud computing, are companies or organisations that offer various platforms, services, and resources to customers, enabling them to build, deploy, and manage applications and services. These service providers typically operate in the cloud and deliver their offerings over the internet. Here's a brief introduction to different types of service providers and their platforms:

1. Infrastructure as a Service (IaaS) Providers:
   - IaaS providers offer virtualized computing resources, including servers, storage, and networking, as a service. Customers can use these resources to build and manage their own virtualized infrastructure.
   - Examples include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).

2. Platform as a Service (PaaS) Providers:
   - PaaS providers offer development and deployment platforms that include tools, libraries, and services for building, testing, and deploying applications. Customers can focus on their applications without managing the underlying infrastructure.
   - Examples include Heroku, Google App Engine, and Red Hat OpenShift.

3. Software as a Service (SaaS) Providers:
   - SaaS providers deliver fully functional software applications over the internet, typically on a subscription basis. Users can access these applications through a web browser without the need for local installations.
   - Examples include Salesforce, Microsoft 365, and Dropbox.

4. Function as a Service (FaaS) Providers:
   - FaaS providers enable serverless computing, allowing developers to run individual functions or pieces of code without managing servers. This is suitable for event-driven and microservices applications.
   - Examples include AWS Lambda, Azure Functions, and Google Cloud Functions.

5. Content Delivery Network (CDN) Providers:
- CDN providers optimise the delivery of web content by caching it on servers distributed across various geographic locations. This accelerates content delivery and improves user experience.
- Examples include Akamai, Cloudflare, and Amazon CloudFront.

6. Database as a Service (DBaaS) Providers:
- DBaaS providers offer managed database solutions that handle database administration, maintenance, and scaling, allowing users to focus on their data and applications.
- Examples include Amazon RDS, Microsoft Azure SQL Database, and Google Cloud SQL.

7. Managed Kubernetes Service Providers:
- These providers offer managed Kubernetes clusters, making it easier for organisations to deploy and manage containerized applications.
- Examples include Amazon EKS, Azure Kubernetes Service (AKS), and Google Kubernetes Engine (GKE).

Service providers play a crucial role in the digital transformation of businesses and the development of modern applications. They offer a wide range of tools and services to meet the diverse needs of organisations, from startups to large enterprises, and empower them to leverage the benefits of cloud computing and emerging technologies.

Module-11:-Exploring Azure services and Different types of services

Azure, Microsoft's cloud computing platform, offers a wide range of services to help organisations build, deploy, and manage various applications and workloads. These services can be broadly categorised into different types, each serving specific purposes:

1. Compute Services:
- Azure Virtual Machines (VMs): Provides scalable and flexible virtualized computing resources.
- Azure App Service: Hosts web apps, APIs, and mobile app backends.
- Azure Functions: Supports serverless computing for event-driven applications.

2. Storage Services:
- Azure Blob Storage: Offers scalable object storage for unstructured data.
- Azure File Storage: Provides file shares that can be accessed via SMB.
- Azure Table Storage: Offers NoSQL data storage for semi-structured data.

- Azure Queue Storage: Supports message queuing for building scalable applications.

3. Networking Services:
- Azure Virtual Network: Creates isolated network environments.
- Azure Load Balancer: Distributes incoming network traffic across multiple resources.
- Azure VPN Gateway: Extends on-premises networks to Azure securely.
- Azure Content Delivery Network (CDN): Accelerates content delivery to users globally.

4. Databases and Analytics Services:
- Azure SQL Database: Managed relational database service.
- Azure Cosmos DB: Globally distributed, multi-model database.
- Azure Data Factory: Data integration and ETL service.
- Azure Synapse Analytics: Analytics service for big data and data warehousing.

5. AI and Machine Learning Services:
- Azure Machine Learning: Enables building, training, and deploying machine learning models.
- Azure Cognitive Services: Offers AI capabilities for vision, speech, language, and more.

6. Identity and Access Management (IAM):
- Azure Active Directory: Provides identity and access management services for users and applications.

7. Security and Compliance Services:
- Azure Security Center: Monitors and enhances the security of your resources.
- Azure Policy: Enforces compliance policies across your organisation.

8. Internet of Things (IoT) Services:
- Azure IoT Hub: Connects, monitors, and manages IoT devices.
- Azure IoT Edge: Extends cloud capabilities to edge devices.

9. DevOps and Development Tools:
- Azure DevOps Services: Offers tools for planning, developing, testing, and delivering software.
- Visual Studio Team Services (VSTS): Provides application lifecycle management and continuous integration.

10. Management and Governance:
- Azure Resource Manager: Deploys and manages Azure resources.
- Azure Monitor: Monitors the performance and availability of applications and infrastructure.

11. Containers and Kubernetes Services:
- Azure Kubernetes Service (AKS): Manages Kubernetes clusters for container orchestration.
- Azure Container Registry: Stores and manages container images.

12. Integration and Messaging Services:
- Azure Logic Apps: Automates workflows and integrates services.
- Azure Service Bus: Provides reliable messaging between applications and services.

These are just a selection of Azure services. Azure continues to expand its offerings to cater to a wide range of use cases, from web applications and data analytics to AI and IoT solutions. Organisations can mix and match these services to build and scale applications and infrastructure based on their specific needs.

Module-12:-Introduction to Oracle cloud Platform and their Services

Oracle Cloud Platform is Oracle's cloud offering that provides a comprehensive suite of cloud services to build, deploy, and manage applications and infrastructure. It includes services for databases, computing, storage, analytics, integration, and more.

Module-13:-AWS cloud Platform discussion on the services and free tier Account

AWS Cloud Platform
Amazon Web Services (AWS) offers a wide array of cloud services, including computing, storage, databases, AI/ML, and networking, to meet diverse cloud needs.

Free Tier Account
AWS Free Tier provides limited free access to many AWS services for 12 months, allowing users to experiment with cloud resources at no cost within specified usage limits.

Module-14:-Practicals of S3.EC2 and Detailed Discussion On the same

Amazon S3 (Simple Storage Service)
S3 is an object storage service that allows users to store and retrieve data, serving as a scalable, durable, and cost-effective storage solution for files, documents, and more.

Amazon EC2 (Elastic Compute Cloud)
EC2 provides scalable, virtual servers in the cloud, known as instances, which users can configure and manage to run applications, host websites, and perform various computing tasks.

PROJECT :- Azure Cloud Service

Cloud Service is a Platform as a Service that is designed to support web applications that are scalable, reliable, and cheaper to operate. Using cloud service, we can deploy a web application into Azure. We have more control over Virtual Machines. We can install custom software on VMs that uses Azure Cloud Service, and we can access them remotely. Using cloud services, we don't create virtual machines. Instead, we provide a configuration file that tells Azure how many instances we would like to create, the size of the instance, and the platform we create. Cloud service detects any failed VMs and applications and is ready to start new VMs or application instances when a failure occurs. Cloud service applications shouldn't maintain state in the file system of its own VMs

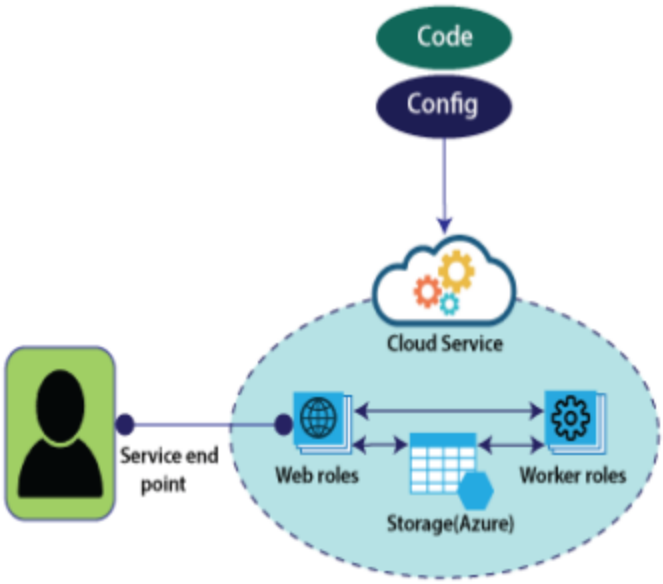


FIG 1: Cloud service Roles

ROLE:-

It does not use IIS and runs apps standalone. To run any continuous bathes, then we can use worker roles, and both the Web role and Worker role will interact with storage to get an application package. To deploy these Web roles and Worker roles, we will provide configuration and code associated with these web applications.

Cloud Service Components

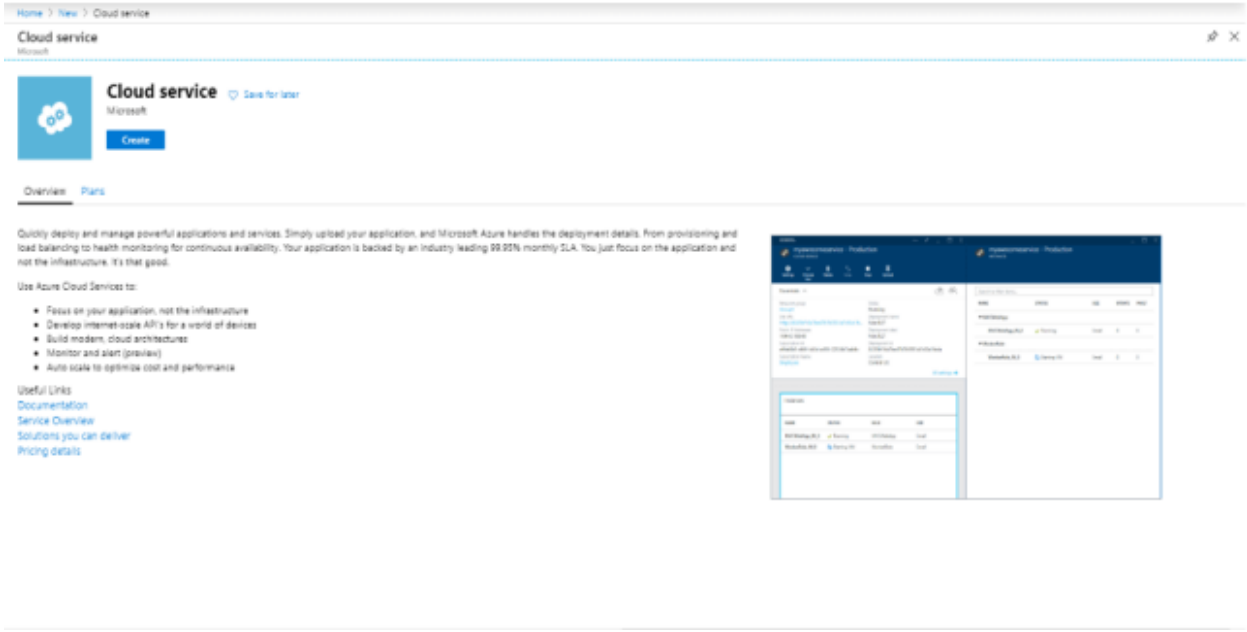
Three key components constitute a cloud service.

● ServiceDefenition.csdef file specifies the settings that are used by Azure to configure the cloud service. For example - sites, endpoints, certificates, etc.

● ServiceConfiguration.cscfg contains the values that will be used to determine the configuration of settings for the cloud service. For example - number of instances, types of instances, ports, etc.

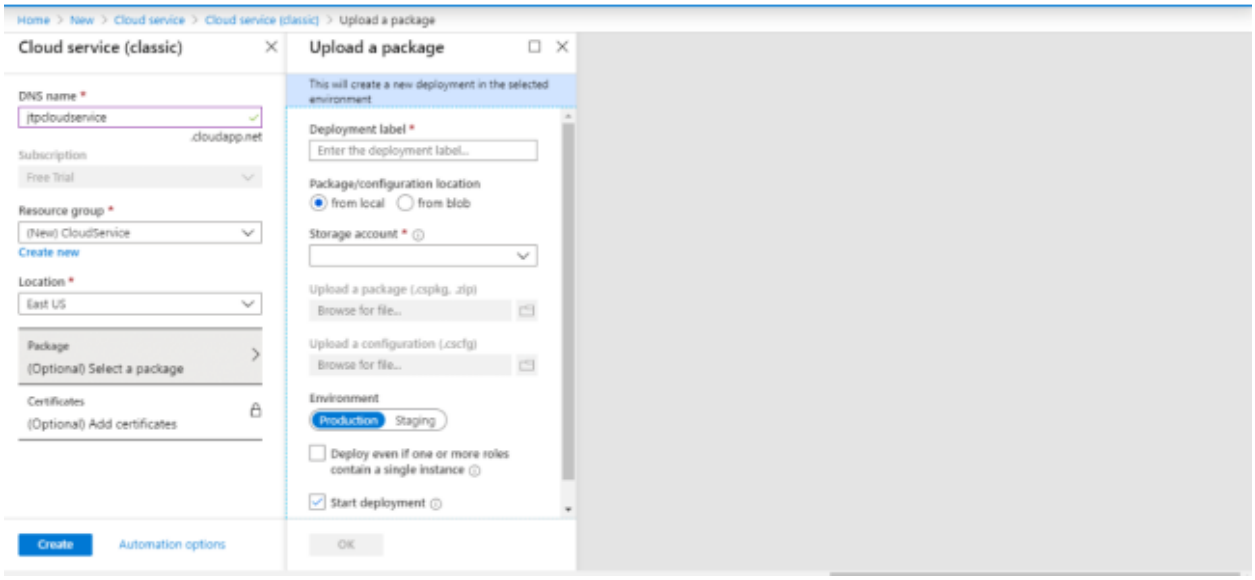
● Service package.cspkg used to deploy the application as a cloud service. First, it needs to be packaged using the CSPacK command-line tool. CSPacK generates an application package file that can be uploaded into Azure using the portal.

Step 1: Click on create a resource and then type-in Cloud Service.

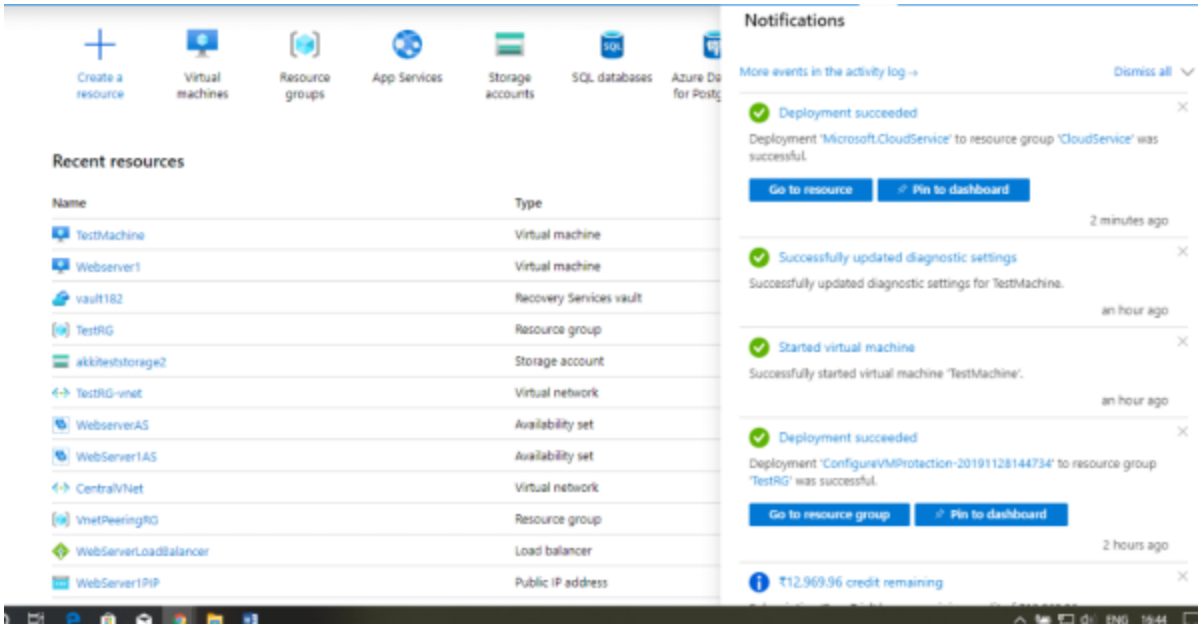


Step 2: After that, click on it and then click on create.

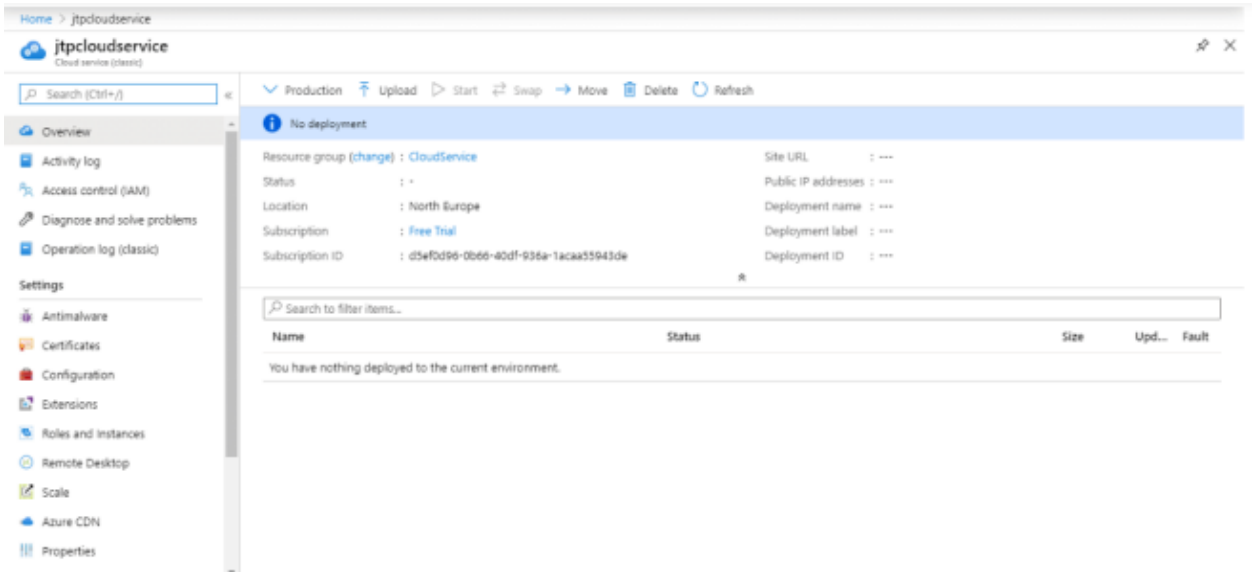
Step 3: Fill-in the DNS name, select the resource group, and location.



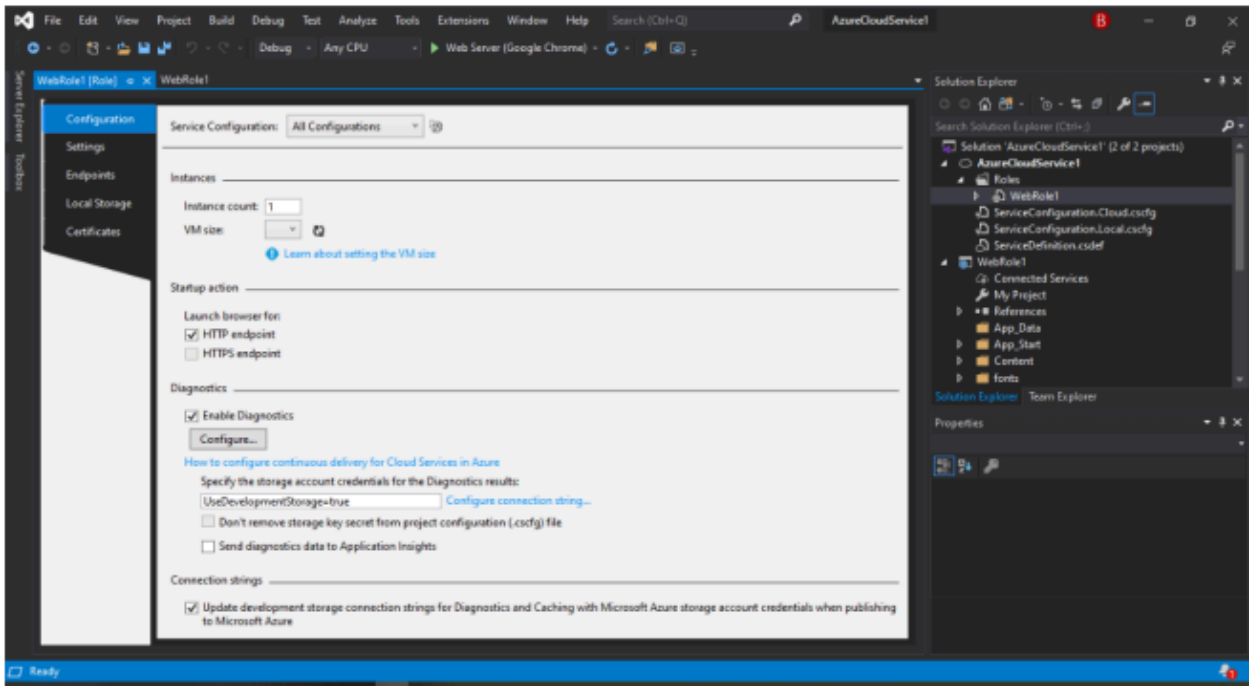
Step 4: Now, Click on create. Your cloud service will be created.



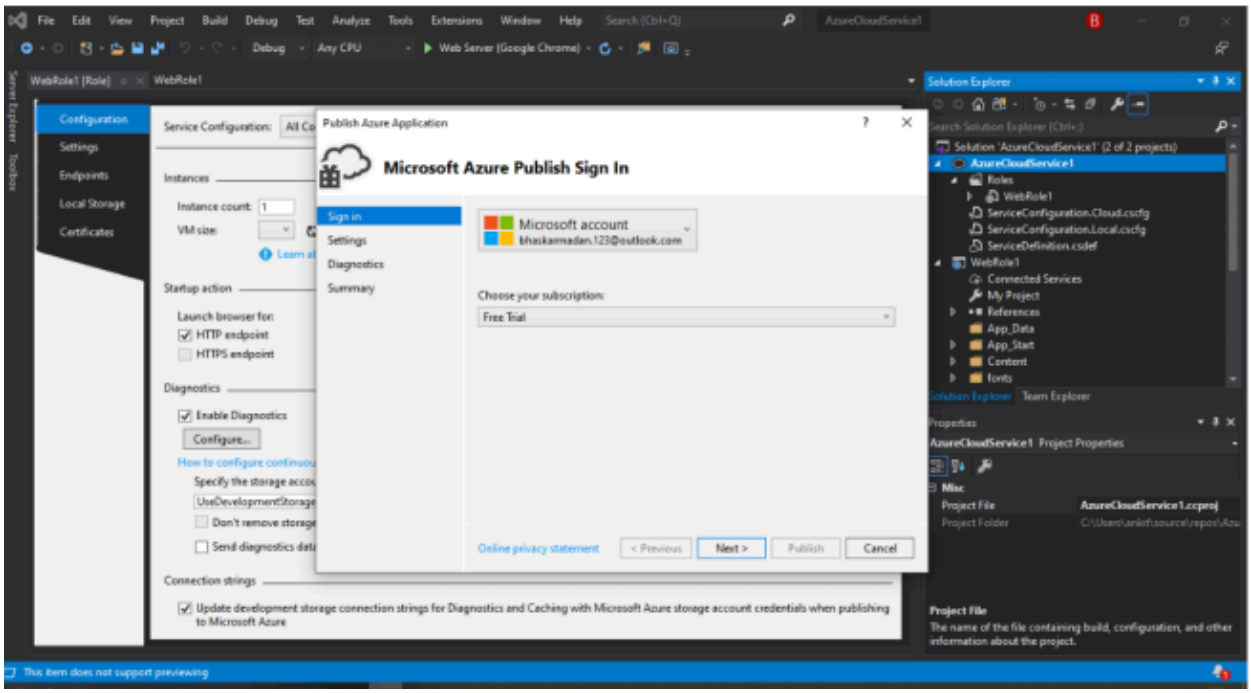
Step 5: To view the cloud service, click on go-to resources.



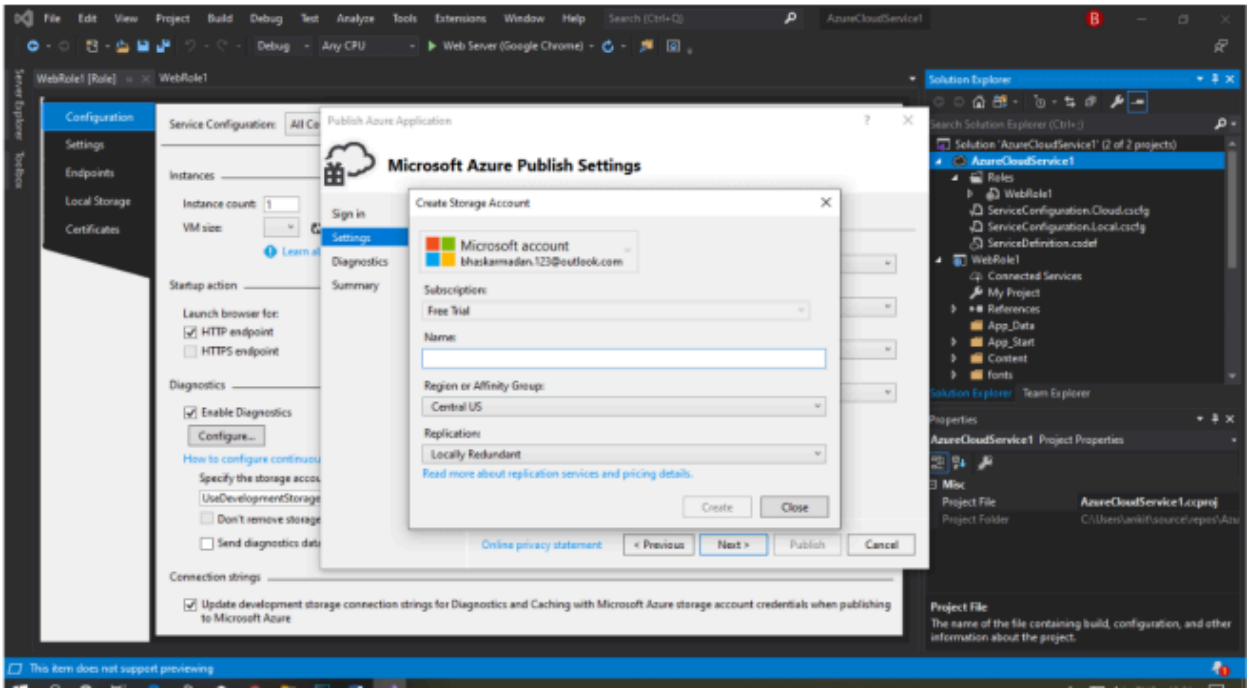
Step 6: Now, go to Visual Studio and create a new cloud service project. Here you can see the basic configuration setting, as shown in the image below.



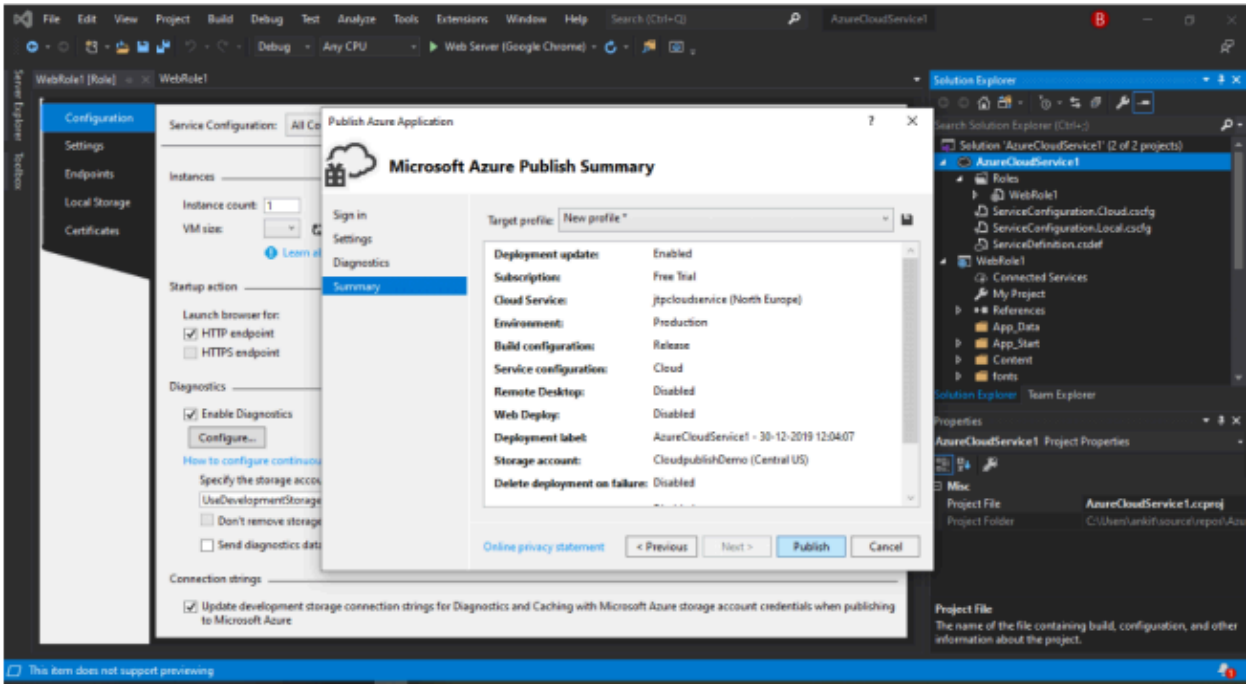
Step 7: To publish this cloud service into Azure, right-click on the file name. Then click on publish



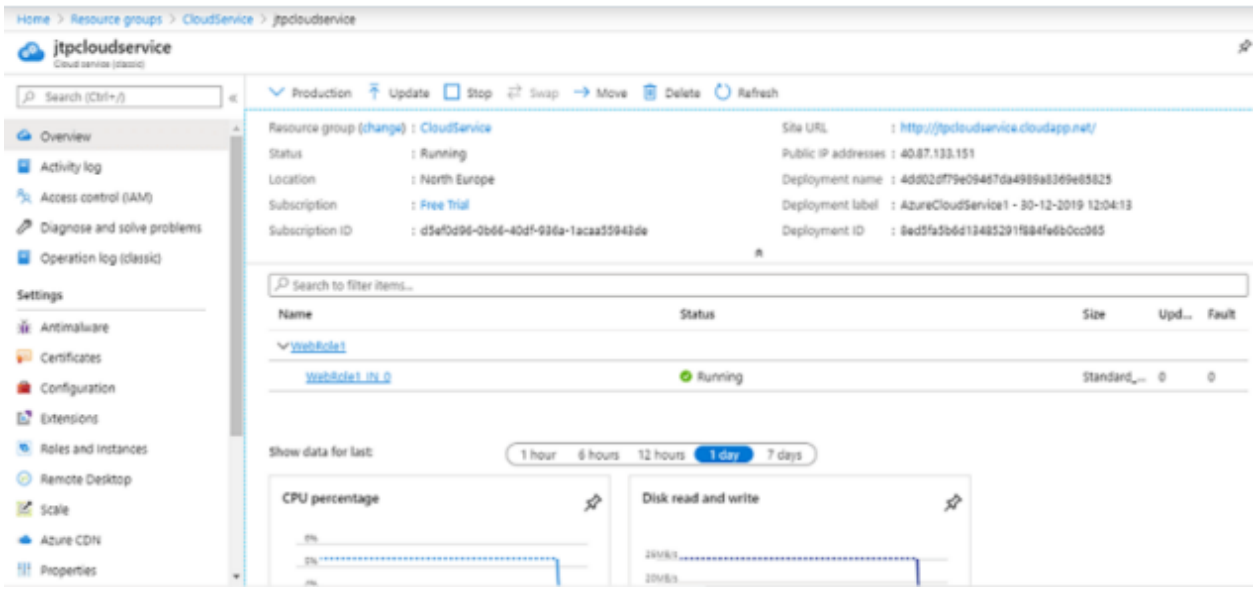
Step 8: Select your subscription and click next.



Step 9: Fill all the required details and then click on publish.



Step 10: Now, go to the Azure portal and click on the Resource group that you have created. You can now see your web role published



CONCLUSION

In conclusion, this course provided a comprehensive overview of cloud computing concepts and practical skills related to cloud platforms such as Azure, AWS, and Oracle Cloud. The course covered various aspects of cloud technology, including virtualization, service providers, cloud security, and migration strategies. Additionally, it explored specific cloud services and practical applications like Amazon S3 and EC2.

The hands-on experience gained through the course, including creating a cloud service on Azure, helped in understanding the practical aspects of cloud deployment. The knowledge and skills acquired are valuable for anyone looking to work with cloud technologies and leverage them for various applications and projects.

Overall, this course has equipped me with a solid foundation in cloud computing, enabling me to explore, deploy, and manage cloud services effectively. It's a valuable asset for those seeking to stay competitive in the ever-evolving world of cloud technology.

REFERENCES

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