

DETAILED WORK INSTRUCTIONS

GROUP 2



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1 PURPOSE

- The goal of this project is to help Infinity Sports select and implement the best strategy for migrating their IT systems to the cloud. This will optimize their infrastructure.
- Float Tech will compare major cloud platforms like Azure and AWS to see which would be the best fit for Infinity Sports' needs and recommend the best cloud provider that is the ideal match based on factors like costs, functionality, performance, security and suitability.
- Float tech will also create a plan for transitioning Infinity Sports' systems from their current virtual environment to the selected cloud provider.
- Finally , Float-Tech will design and deploy a modern architecture in the selected cloud which helps Infinity Premium to upgrading aging on-premise systems and reducing operating costs through cloud efficiencies.

2 INTRODUCTION

- Float-Tech Solutions helps businesses make the most of cloud technology. They provide solutions using Microsoft Azure, Amazon Web Services and other clouds. Float-Tech's expertise in areas like multi-cloud infrastructure, data analytics, application development and security helps clients grow their business.
- Float-Tech is advising Infinity Sportswear, a global athletic apparel brand. Infinity distributes products worldwide by partnering directly with manufacturers.
- Infinity currently runs systems on virtual machines hosted on aging physical servers. To keep up with growth and new technologies, they want to move workloads to the cloud for more flexibility, scalability, reliability and cost savings.
- Float-Tech is helping Infinity Sportswear determine the best cloud platform for their needs. They're comparing options like Azure and AWS. Factors under consideration include costs, features, performance, security and how well each cloud could optimize Infinity's systems now and in the future.
- Once a cloud is selected, Float-Tech will develop a migration plan. This will transition Infinity's systems to the chosen cloud platform and take advantage of that environment through a modern architecture.

3 BACKGROUND INFORMATION

- Infinity Sports is a firm which sells and distributes various sports gear. They provide equipment to athletes competing in the Olympics and other sporting events.
- There are 6 locations for Infinity sports in which Edinburgh functions as the main domain controller and also the primary location and rest of them are located in Bern,Lima,los Angeles,London and Toronto. Each site is linked to the others using routers, switches, servers. The main domain controller provides directions to each location on how to complete certain activities.

Azure Architecture



Milestone	Deliverables
Project Plan	<ul style="list-style-type: none"> • A comprehensive project schedule that includes resource allocations and deadlines • Project scope and objectives • Risk evaluation and mitigation strategies • Communication plan
Cloud architecture design	<ul style="list-style-type: none"> • Choosing a cloud platform

	<ul style="list-style-type: none"> • Security and compliance considerations • High-level architectural diagram
Migration implementation	<ul style="list-style-type: none"> • Data Migration strategy • Testing of migration process
Application	<ul style="list-style-type: none"> • Analysing the existing applications • Application Migration plan • Deployment of the migrated applications
Testing	<ul style="list-style-type: none"> • Test plan with test cases • Unit testing and Integration testing • Performance testing
Cutover implementation	<ul style="list-style-type: none"> • Cutover plan with minimal downtime • Data integrity checks and having a rollback plan in case of issues
Training	<ul style="list-style-type: none"> • User training sessions • Provision of Training materials
Completion and Final PPT	<ul style="list-style-type: none"> • Summary of the entire project • Lessons learned and recommendations

4.2 SERVICES

Azure Services

- **Azure Backup** is used to protect critical data, applications, and workloads in Azure. It backs up on-premises data, including financial records stored at the headquarters in Edinburgh, to Azure Blob Storage. The backups are scheduled to ensure regular data protection and data retention policies are defined to meet the seven-year retention requirement for financial records.
- **Azure Migrate** was used for assessing, planning, and migrating the company's existing virtualized environment to Azure. It discovered and assessed the on-premises infrastructure, including physical servers and virtual machines at all six locations.
- **Azure Blob Storage** is used as the primary storage for unstructured data, including documents, images, videos, backups, and logs. It also stores the company's financial records for seven years as a backup.
- **Azure VPN Gateway** facilitates secure communication between on-premises locations and Azure Virtual Networks. It enables headquarters and other sites to securely access resources hosted in the Azure cloud.
- **Azure Load Balancer** is used to distribute incoming traffic among multiple instances of the application servers for high availability and fault tolerance. It ensures a seamless and reliable experience for users accessing the company's web applications.
- **Azure AD** is utilized for managing user identities and access control in the cloud. It enables all the employees including 2000 members to authenticate with Microsoft Office 365 and other cloud-based applications, providing single sign-on (SSO) capabilities.
- **Azure App Service** is used as a fully managed platform for hosting web applications. It hosts and runs Microsoft-based applications, including Power BI dashboards and ERP systems. It provides scalability and cost-effectiveness without the need to manage underlying infrastructure.

- **Azure Bastion** provides secure RDP/SSH access to virtual machines in Azure without the need for public IP addresses. It ensures secure access to Azure resources, enhancing the overall security posture of the infrastructure.
- **Azure Monitor** helps monitor the performance and availability of Azure resources and provides alerts and insights for optimizing and troubleshooting. It collects data from multiple sources and presents it in an integrated view.
- **Azure Firewall** protects the company's virtual network from unauthorized access and threats. In order to ensure a safe communication channel for all sites, it offers a secure and managed firewall service to filter and examine network traffic between on-premises and Azure services.
- **Azure SQL Database:** The company uses Azure SQL Database by setting up on VMs as their cloud-based SQL server solution. It enables scalable and controlled SQL databases, including the ERP systems and Power BI dashboards, offering high-performance data storage and administration capabilities.
- **Azure Availability Sets:** To improve the availability and fault tolerance of crucial virtual machines, Azure Availability Sets are used. The business guarantees that VMs are deployed over several fault domains by grouping them into an availability set. This reduces the impact of probable hardware failures and boosts the uptime and resilience of applications.
- **Azure Database Migration Service:** SQL databases can be easily migrated to Azure SQL Database or Azure SQL Managed Instance using the Azure Database Migration Service (DMS).

4.3 ASSUMPTIONS

1. The internet connection at Infinity Premium Sports Company is reliable.
2. The OPEX and CAPEX budgets are adequate to cover the costs of the migration and modernization.
3. Without significantly altering the applications, the current infrastructure can be moved to the cloud.

4.4 EXCLUSIONS

1. This migration strategy does not include attempts to create customised applications or re-architect existing ones, such as moving all applications to PowerApps or a modernised architecture based on Kubernetes.
2. The migration plan will not address licencing issues or third-party application integrations; these issues will be handled individually.

5 ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Jaishaanth Suresh – Cloud Engineer	Manage cloud-based solutions that are consistent with the objectives of the company

Venkata Sai Ramesh Seerapu - Cloud Architect	Designing and Planning the cloud architecture Selection of cloud platform and migration strategy
Goutham Reddy Baddam - Cloud Analyst	Analyse costs,performance,usage and data
Mehul Jain – Project Manager	Responsible for planning, coordinating, and executing the migration process
Nikita Dhingra – Cloud Security Analyst	Protection of the company's cloud assets and data, defence against online attacks

6 PROJECT PHASES

Solution design

1. Workload evaluation:

Conduct a thorough assessment of the existing on-premises infrastructure and applications at each location (Edinburgh, Bern, Lima, Los Angeles, London, Toronto).
Determine which workloads can be shifted using the Lift and Shift method to the Azure cloud.
Sort workloads into categories according to their dependencies, resource needs, and criticality.

2. Cloud Environment Setup:

Provision an Azure Virtual Network (VNet) for each location to represent their isolated network environments in the cloud.
Establish site-to-site VPN connections between on-premises locations and their respective Azure VNets for secure and seamless communication.

3. Virtual Machines Migration:

List the physical servers and VMs (virtual machines) at each site that will be migrated.
Create matching VM instances in Azure using the CPU, RAM, and storage configurations from the on-premises machines.
Utilise Azure Site Recovery (ASR) to ensure data replication for disaster recovery needs and ease VM migration with little to no downtime.
Verify that the migrated VMs are operating as intended by thoroughly testing and validating them.

4. Database Migration:

Determine which SQL Server instances that are now on-premises need to be transferred to the cloud.
Use Azure Database Migration Service (DMS) to move SQL databases smoothly to Azure SQL Database or Azure SQL Managed Instance.

5. Networking and Security:

The inbound and outgoing traffic between VMs in Azure VNets can be managed by configuring Azure Network Security Groups (NSGs) and route tables.

Use Azure Bastion to give VMs in Azure direct and secure RDP/SSH connectivity without requiring a public IP.

Enable Network Virtual Appliances (NVAs) or Azure Firewall to improve network security and defend the cloud environment from outside attacks.

To provide secure connectivity between on-premises locations and Azure VNets, configure Azure ExpressRoute or VPN Gateway.

6. Testing and Development Environment:

Provision two dedicated Azure Virtual Network (VNet) for the testing and development environments.

Create separate Azure Virtual Machines (VMs) for testing, mirroring the production VM configurations.

7. Data Backup and Storage:

Use Azure Blob Storage to store backups and unstructured data.

Configure Azure Backup to automatically backup virtual machines, SQL databases, and other crucial resources.

Create a backup retention policy to ensure data recovery in the event of an error or corrupted data.

8. Access Control and Identity Management:

Utilise Azure AD Connect to connect on-premises Active Directory (AD) with Azure AD for seamless user authentication and Single Sign-On (SSO) features.

To allow older applications to use AD authentication, implement Azure AD Domain Services (AAD DS) on Azure VNets.

9. Optimisation and performance:

To check performance indicators, resolve problems, and maximise resource usage, monitor Azure resources with Azure Monitor.

Use Azure Advisor to receive recommendations for optimizing cloud resources, reducing costs, and enhancing security.

10. Disaster Recovery and High Availability: Create and put into action a disaster recovery plan that replicates virtual machines and data to a backup Azure region using Azure Site Recovery (ASR).

To achieve high availability and fault tolerance for key workloads, configure availability sets or availability zones.

11. Cost Management: In order to maximise cost-efficiency and guarantee that the project stays within budget, track and analyse how Azure resources are used.

Utilise cost allocation and showback systems to monitor how resources are being used by various departments or teams.

12. Validation and Testing:

Conduct thorough testing, such as load testing and scalability testing, to make sure the cloud infrastructure is capable of successfully handling the anticipated workloads.

Verify the performance, data integrity, and application operation in the new cloud environment.

- 13. Training and Documentation:** To familiarise IT workers and end users with the new cloud environment and its functions, provide documentation and training.

Cloud tools Selection

Azure tools

Azure Resource Manager:

Used to deploy and manage your Azure resources in a structured template. Allows you to automate the deployment of all resources in your architecture.

- Free to use. Only charged for the underlying Azure resources provisioned through ARM templates.

Azure Policy:

Creates, assigns and manages policies that ensure your Azure resources comply with your organization's standards and regulations. Useful for governance and compliance.

- Free if you use native Azure resources
- \$6/month per server for Azure policy Guest Configuration.
- Azure Policy guest configuration is a feature that extends its capabilities to non-Azure resources like servers running on Azure Arc. The pricing for utilizing Azure Policy guest configuration for these non-Azure resources is \$6 per server per month. This cost is distinct from using Azure Policy for native Azure resources and is applicable only to resources managed via Azure Arc.

Azure Monitor:

Provides monitoring and diagnostic capabilities for your Azure resources like VMs, databases, network resources, and applications. Alerts you of any issues.

- Basic Logs: This is a lower-cost plan suitable for debugging and troubleshooting purposes. It charges \$0.615 per GB of data ingested and provides 8 days of interactive retention. Currently, billing for Basic Log search is not active, but it will be enabled in the future with prior notice.
- Analytics Logs: This is a premium plan that allows advanced analytics and insights on logs. It costs \$2.76 per GB of data ingested and offers 30 or 90 days of interactive retention, depending on your region. Additionally, there are different commitment tiers available that provide discounts for higher volumes of data ingestion.

Azure Security Center:

Provides security monitoring, recommendations and policies to help protect your Azure resources. Assesses potential vulnerabilities and threats across your resources.

- Free for basic security monitoring and recommendations

Azure Site Recovery:

In order to maintain data replication and disaster recovery readiness, Azure Site Recovery (ASR), a service, makes it easy to move virtual machines. For business continuity, it allows for the seamless transfer of virtual computers to Azure or a backup datacenter.

Azure Site Recovery to customer-owned sites:

- First 31 days: Free
- Price After 31 Days: \$16/month per instance protected

Azure Site Recovery to Azure:

- First 31 days: Free
- Price After 31 Days: \$25/month per instance protected

Azure Bastion

With Azure Bastion, secure access to virtual machines are guaranteed. It allows for direct access through the Azure portal with SSL encryption, protecting your infrastructure from online threats, and does away with the requirement for public IP addresses or VPN connections.

- Azure Bastion Basic : \$0.253/hour
- Azure Bastion Standard: \$0.385/hour
- Additional Standard instance: \$0.186/hour

Azure Automation:

Automates repetitive manual tasks across your Azure resources using runbooks, modules and PowerShell/Python scripts. Helps standardize configurations.

- Free tier allows 2 runbooks, 500 runbook jobs/month, and 500 MB of data.

Practical implementation

	Pre Migration Tasks	
Sl. No	Task	Description
1	Cloud Provider selection	Azure
2	Migration strategy	Lift and Shift
3	Take back up of on premises data	Use Azure Blob Storage for taking backups of on-premises data.
4	Access Control	Use Azure AD for synchronizing on-premises AD to Azure cloud. Also, ensure Role-based access is present for application servers and apps.
5	IAM- Identity and Access Management (use Azure AD)	Identify the configuration and understand how Single Sign-on and MFA works.

6	Note down the upstream and downstream application lists and dependencies information.	Prepare a list with type of connection and configuration between each application.
8	Analyze costs	Prepare a cost chart
9	Migrate the on-premises data to cloud	Migrate the data from on-premises to the cloud environment. Blob Storage is useful in transferring data between on-premises and cloud
10	Create a migration roadmap (Use ASR and integrate with Azure Migrate)	Develop a detailed timeline and set of tasks outlining the migration steps, dependencies, and responsibilities. We can automate the pre-migration tasks, replication, testing and failover/failback using ASR. Integrate with Azure migration service to assess the on-premises workloads.
11	Disaster Recovery Plan	Prepare a DR recovery Runbook
12	Training and Upskilling	Set up training for employees on Cloud concepts

Migration Tasks		
Sl. No	Task	Description
1	Shut down and Stop the application services of on-premises environment	Shut down of DB server and server of on-premises and also the stop the application services of on premises servers.
2	Verify Access to Azure Virtual Machines and Azure SQL Database Servers	Verify server access using Azure Bastion and DB access and new server box configuration after purchasing new cloud servers which are in multiple AZs and regions (US-West and US-East)
3	Migrate file share services to Azure file	Azure file can be used for mounting file sharing services with all the servers.
4	Use Azure AD connect to enable and Configure UID(Single Sign-on) for apps	Configure UID (Single sign-on) at the application level and use Azure AD Connect for seamless connection

6	Configure the DNS name changes (if we want to use the same DNS name) and also configuration of any intermediate data transfer protocols like SFTP	Pointing DNS to a new alias name and also Configure intermediate connections like SFTP with the latest server information
7	Integrate Azure app service with DNS based Azure load balancer	Useful for auto-scaling and even distribution of traffic and helps in achieving High availability and fault tolerance
8	Network migration (Built Azure Virtual Network and Azure Firewall)	<p>Create a VNet during migration to establish communication between environments</p> <p>Use Azure NSGs to control inbound and outbound traffic from cloud create a subnet for the web server, another for the application server and a third for the database server. So it helps in improving security and network</p> <p>Create Azure Firewall which helps in secure connection between on premises and cloud</p>
9	Application Testing	Perform functionality and integration testings after application migration
10	Integrate Azure key vault with Azure App Service, Virtual Machines, and other azure services for strong encryption	Secure DB Connection string in the Application Configuration file. Azure key vault helps in managing SSL certificates, connection strings and cryptographic keys
11	Configure Monitoring alerts using Azure Monitor	Configure Monitoring alerts for Disk, CPU and any other required application-level alerts

Post Cloud Migration

Sl. No	Task	Description
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1	Verify the application data and DB data on new cloud servers	Verify whether the application and DB data is migrated and present without any loss on the new DB and VM machines.
2	Monitor the Production environment for a week.	Fix the issues if there are any reported from application/business users.
3	Monitor and take action on the alerts that we had setup on Azure Monitor	Monitor the alerts for any infra and application issues and fix them. It identifies the performance and usage of Azure resources)
4	Schedule Back up of VMs, DB and other resources using Azure Backup	Performs automated backups of VMs, SQL databases, and other critical resources
5	Update the Runbooks	Update the Runbooks if any with latest server and application information
6	Fix the cloud vulnerabilities	Fix the cloud vulnerabilities in all new Cloud machines
7	Perform Disaster Recovery Activity	Implement DR activity on the DR site
8	Azure Advisor for resource optimization to cut down cost	Provides recommendations for optimizing cloud resources. So that we can cut down the cost that we are spending on the infrastructure.

7 ACCEPTANCE CRITERIA

Acceptance milestone	Acceptance content	Acceptance completion
Project plan	A detailed project plan is created with timelines, milestones, dependencies, resource allocation, and stakeholder identification and communication.	Complete
Design and architecture	The cloud architecture is designed based on requirements and addresses security, performance, scalability, availability, and disaster recovery. The architecture is validated through	Complete

	peer review or proof-of-concept.	
Migration plan	On-premises systems for migration are identified. Cloud equivalents and migration strategies are determined. A data migration approach is defined. Test and validation plans are created for the migration.	In Progress
Project implementation and verification	Cloud resources are provisioned according to the architecture. Systems and data are successfully migrated to the cloud. The migrated systems are validated to be functioning properly. Required monitoring, management, and security controls are established. Knowledge transfer and documentation are completed.	Pending

8 PLACE AND PERIOD OF PERFORMANCE

Service Level Agreement

The SLA's goal is to lay forth the groundwork for communication and services between Float-Tech Solution (FTS) and the customer: Infinity Premium Sportsworld. This SLA is a crucial component of the contract which will be signed between Float-Tech Solution and Infinity Premium Sportsworld.

YOU AGREE TO ABIDE BY THE TERMS AND CONDITIONS OF THIS AGREEMENT BY ACCEPTING THIS SERVICE LEVEL AGREEMENT THROUGH THIS DOCUMENT WHICH INCORPORATES THIS AGREEMENT IN PARTS AS FOLLOWS:

USE OF THE SERVICES:

Float-Tech Solution provides the services unless sooner terminated in accordance with this Agreement or the order (the "Services Period"), you (Infinity Premium Sportsworld) have the non-exclusive, international, restricted right to use the Services of Fintech Solution in collaboration with the Microsoft Azure platform and services for your internal business activities within the constrained time frame and licence specified in Your Agreement to (a) access and use the Services, (b) incorporate the Services for the application, and (c) only make the Services available to Application users as they are integrated into the Application, during the Term. You are accountable for their adherence to this Agreement and your order, and you may permit your employees and users to use the Services for the behold reason.

You may not, and you may not promote or enable anyone to: (a) use the Services to publish any false, defamatory, harassing, or obscene material; violate another person's right to privacy.

FINANCES AND PAYMENTS

Within thirty (30) days of the invoice date, 60% of total fees are payable and must be paid before the implementation of the project. Your order cannot be cancelled after it has been placed, and the payment

amounts are not refundable. In a situation where you require more Services than what is required, you must immediately buy the extra and pay the associated fees for the services while the rest 40% amount of payment has to be done in the upcoming months including the training, professional, and services as well as licenses fee payment. All the payments have to be made in CAD (Canadian Dollar). The bank details supplied by FTS (Float-Tech Solution) must be included in wire transfer payments.

INFRASTRUCTURE AND RELEVANT SERVICES

In accordance with the terms of the Service Agreement, FTS will provide cloud infrastructure and relevant services, such as virtualization, CPU, network connectivity, storage, backup services, and other pertinent cloud-based services within the timeframe described for the proposed agreeable solution listed and signed. We have provide a brief summary of the cloud services provided by Microsoft Azure for the proposed infrastructure architecture solution and the providers consist of compute, security and storage IaaS PaaS. Yearly uptime of physical nodes (servers) working the virtual infrastructure at a rate of 99.95%; the downfall of the constructed virtual infrastructure; and allocated by the Customer for a greater amount of time overall shall be higher than that specified under the Uptime Guarantee the FTS uptime.

DATA PRIVACY

All information and materials kept in the cloud infrastructure remain the property of the Customer. FTS commits to protecting the security and confidentiality of your data. Therefore we protect and adhere to the guidelines of Data Protection Law.

MONITORING AND ANALYSING

We continuously track the Services in order to make it easier for FTS to operate the Services, to assist with Your service requests, to identify and address threats to the functionality, security, and availability of the Services as well as any data, , or applications found, and to identify and address any illegal activity. Other than what is required for such purposes, FTS monitoring tools do not gather or store any of your confidential data or content present in the Services.

SECURITY AND SUPPORT

To safeguard the customer's infrastructure and data, we are intended to set high level of safety precautions in place. This involves taking precautions like access limits, encryption, performing regular security audits, and adhering to all applicable privacy and data protection laws within the regions of the services being used. FTS support service is readily accessible around-the-clock for You to report issues or failures within the duration of the project. Any reports will be sent to technical support in a timely manner, strictly adhering to the order of receipts.

WARRANTY AND DISCLAIMER

We assure you that during the Services Period, we are going to carry out the Services with the necessary care and competence in all significant ways as outlined in the Service Specifications.

YOUR ONLY REMEDY AND OUR ENTIRE LIABILITY FOR ANY BREACH OF THE SERVICES WARRANTY SHALL BE THE CORRECTIVE PERFORMANCE OF THE DEFICIENT SERVICES THAT CAUSED THE BREACH OR, IF WE ARE UNABLE TO SUBSTANTIALLY CORRECT THE DEFICIENCY IN A COMMERCIALY REASONABLE MANNER, YOU MAY TERMINATE THE DEFICIENT SERVICES AND WE WILL PROVIDE REFUND FOR THE SPECIFIC TIME PERIOD AGREED UPON. WE ARE NOT RESPONSIBLE FOR ANY DAMAGE WITH THE OPERATION, OR SECURITY OF THE SERVICES CAUSED BY THIRD PARTY OR EXTERNAL SERVICES PROVIDED BY THIRD PARTIES AND NOT KNOWN TO US WITHIN THE INFRASTRUCTURE PROVIDED BY US.

RESTRICTION

Customer (Infinity Premium Sportsworld) will not, and cannot allow third parties or users under its control to: duplicate, decompile, modify, create , reverse engineer, translate, or otherwise try to extract the source code of the Services or any component or for the purpose of replicating or acting as one Application or Project for many others.

9 PROJECT PLAN

ALL	TASK NAME	DURATION	PLANNED START DATE	PLANNED FINISH DATE
1	Project Initiation	6 days	2023-05-08	2023-05-15
2	Proposals	3 days	2023-05-08	2023-05-10
3	Understand current infrastructure	1 day	2023-05-11	2023-05-11
4	Define project scope, objectives	3 days	2023-05-11	2023-05-15
5	Cloud Provider Selection	6 days	2023-05-16	2023-05-23
6	Evaluate various cloud service providers	4 days	2023-05-16	2023-05-19
7	Compare pricing & features	2 days	2023-05-22	2023-05-23
8	Design Cloud Architecture	7 days	2023-05-24	2023-06-01
9	Cloud architecture design	2 days	2023-05-24	2023-05-25
10	Design strategies for various features	3 days	2023-05-26	2023-05-30
11	Plan network topology	3 days	2023-05-30	2023-06-01
12	Data Migration	9 days	2023-06-02	2023-06-14
13	Identify and prioritize data migration requirements	2 days	2023-06-02	2023-06-05
14	Utilize Azure Database Migration Service	5 days	2023-06-06	2023-06-12
15	For large data sets use other suitable service	3 days	2023-06-12	2023-06-14
16	Application Migration	6 days	2023-06-15	2023-06-22
17	Planning	3 days	2023-06-15	2023-06-19
18	Choose the appropriate migration strategy	3 days	2023-06-20	2023-06-22
19	Networking and Connectivity	9 days	2023-07-03	2023-07-13
20	Configure Virtual Private Cloud (VPC) for each location	5 days	2023-07-03	2023-07-07
21	Set up Application Load Balancer	4 days	2023-07-10	2023-07-13
22	Security Implementation	9 days	2023-07-18	2023-07-28
23	Planning for security services	5 days	2023-07-18	2023-07-24
24	Implementing appropriate services	4 days	2023-07-25	2023-07-28
25	Testing and Quality Assurance	6 days	2023-08-01	2023-08-08
26	Testing cloud resources	3 days	2023-08-01	2023-08-03
27	Testing various functionalities	3 days	2023-08-04	2023-08-08

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