

# **ITOP 2205- Infrastructure Project**

# **BUSINESS CONTINUITY AND DISASTER RECOVERY**

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#### **INTRODUCTION:**

The client NG Buyers is a retail shop situated in several cities of Canada and deals in all sorts of electronic goods.NG Buyers was co-founded in 2015 by two UBC students named Aditi and Jivesh pursuing master's in business Analytics.

Aditi and Jivesh, like many other international students, traveled to Canada from India with the goal of accomplishing something remarkable and novel. With this goal in mind, they designed and founded NG Buyers with the intention of offering their clients excellent electrical goods and services.

#### **BUISNESS OBJECTIVES:**

**24/7 Service Availability:** NG Buyers strives to offer its clients unbroken service via the business' web portal. This increases accessibility and convenience by ensuring that clients may browse, buy, and ask questions about products whenever they choose, day or night.

Business Credit Card: NG Buyers gives clients a 10% discount on their purchases when they use their company credit card. Every transaction made with this credit card also earns points for the consumer, which they may then use to get rewards and discounts in the future. Customer satisfaction is raised and repeat business is encouraged by this loyalty program.

**Refund Policy:** If customers are not happy with their purchase, they can return it to NG Buyers within 10 days of the date of purchase thanks to their customer-friendly refund policy. Customers can feel secure in their purchases thanks to this policy because they can return things if needed.

Exclusive Deals & Discounts: NG Buyers frequently runs exclusive deals and discounts on long weekends, Black Friday, and Christmas. The purpose of these promos is to boost sales during periods of high consumer traffic.

**Professionals advise:** NG Buyers takes great satisfaction in offering its clients professional advice. The employees are educated in the electronic goods offered in the store and have had extensive training, so clients are guaranteed to receive helpful advice and support while making purchases. This degree of assistance improves clients' entire shopping experience and aids in their decision-making.

# CURRENT SITUATION AND PROBLEMS/OPPORTUNITY STATE-MENTS:

**Problem:** NG Buyers, like any other company, has an official website that is hosted on "**Awardspace**." A platform with the highest level of consistent uptime. The business's website collapsed during the Black Friday deal. Customers were unable to take advantage of services and discounts as a result, which directly decreased income for the business. After some time, the business contacted the IT department. Upon investigation, the IT staff learned that the **Nginx** and **Apache servers** had crashed and that they now needed to add backup servers that could manage client data routing with ease.

**Backups:** To better manage the traffic, the IT staff suggested utilizing Backup Servers. But the company had a new obstacle to overcome as they had never used these backup servers before. Because of their unfamiliarity, the IT staff had to pick up the skills necessary to configure and maintain these servers fast to guarantee that they could offer the required support during periods of high traffic.

**Solution:** After conducting thorough research, the IT team identified **Cloudflare** as a viable solution. Cloudflare, an American company, offers a range of services including DNS (Domain Name System) management and various features designed to enhance website efficiency and security. By integrating Cloudflare, NG Buyers can benefit from improved website performance, reduced downtime, and increased security measures. Cloudflare acts as an intermediary between the website and web server, caching website content and serving it from the nearest location to the visitor, thus reducing load on the original servers and preventing future crashes. This solution not only addresses the immediate need for backup and data routing but also provides long-term improvements to the website's resilience and reliability.

#### **BUDGET:**

Budget plays a crucial role in every little thing. While coming up with the solution budget was also discussed with the business administrators. So, the proposed budget was 10,000 dollars.

We have chosen a business plan which will cost us around \$200-\$250 per month. This plan guarantees us Enhanced performance, Advanced security, and reliability too. Other than we have an IT team and business teams whose salary will completely depend on the management.

**Cost Management Plan:** This plan outlines how the project budget will be managed and controlled.

This section provides a detailed breakdown of all project expenditures, including those for training, hardware, software, and other relevant expenses.

## 1.Budget Breakdown

This section provides a detailed breakdown of the project costs, including software, hardware, training, and other relevant expenses.

Category	Item	Description	Estimated Cost
Software	Cloudflare Sub- scription	Business Plan subscription (\$250/month)	\$3,000
	Backup Software	Licensing for backup management software	\$2,000
	Total Software		\$5,000
Hardware	Servers	Backup and recovery servers	\$2,000
	Network Equipment	Routers, switches	\$1,000
	Total Hardware		\$3,000
Training	IT Staff Training	Training sessions for IT staff	\$1,000
	User Training	Training sessions for end-us- ers	\$500
	Total Training		\$1,500
Other Expenses	Documentation	Creating project documentation	\$500
	Total Other Expenses		\$500
<b>Grand Total</b>			\$10,000

## **2.Cost Control Measures**

These measures ensure that the project stays within the budget.

Measure	Description
Regular Budget	Conduct monthly budget reviews to track spending and
Reviews	forecast costs.
<b>Spending Approv-</b>	Require approval for any additional spending outside the
als	allocated budget.
Evnongo Twooking	Use project management software to track all expenses in
<b>Expense Tracking</b>	real-time.
<b>Cost Variance</b>	Perform cost variance analysis to identify and address de-
Analysis	viations from the budget.
<b>Change Control</b>	Implement change control procedures to manage scope
Procedures	changes that may impact costs.

# **3.Financial Reporting**

Regular financial reporting ensures transparency and keeps stakeholders informed about the budget status.

Report	Frequency	Recipients	Description
Monthly Financial Report	Monthly	Project Sponsor, Stakeholders	Overview of budget status, actual vs. planned expenditures, and forecasted costs.
Budget Sta- tus Update	Bi-weekly	Project Manager, IT Team	Detailed update on current spending, cost variances, and corrective actions.
Quarterly Review	Quarterly	Senior Manage- ment, Stake- holders	In-depth review of budget performance, cost control effectiveness, and financial health of the project.
Ad-hoc Reports	As needed	Relevant Stake- holders	Special reports on specific budget issues or changes as requested.

#### **HOW CLOUDFLARE WILL WORK:**

Cloudflare came into existence once the server went down. Cloudflare has its server which is placed between the website and webserver. So, now the website will not communicate directly with the server, but it will communicate with the Cloudflare network which already has stored the website content and loads this via a server depending on the location of the visitor.

So, whenever a DNS goes down the request is deviated to the Cloudflare server which will provide its own DNS service and ensure the website has 95% uptime.

#### **TECHNICAL REQUIREMENTS:**

**DNS records:** Access to the DNS records was one of the main things which was needed at this time.

**Cloudflare account:** We created an account on Cloudflare.

**Nameserver:** By updating domain's nameservers to point to Cloudflare's nameservers, which will be provided when we need to add your domain to Cloudflare.

**SSL/TLS Configuration:** Cloudflare provides SSL/TLS Certificates. And we ensured that our website works according to Cloudflare's SSL/TLS settings.

**Firewall and Security:** We configured the firewall rules, security settings, and additional Cloudflare settings.

**Performance Optimization:** Utilize Cloudflare's performance optimization such as caching, image optimization and Mini faction.

#### **DIVISION OF WORK AMONGST THE TEAM:**

**IT/INFRSATRUCTURE TEAM:** The IT/Infrastructure team primarily does manage the DNS settings and server configuration. They are solely responsible for handling Migration of Cloudflare.

**DEVOPS TEAM**: Devops team is responsible for integrating the Cloudflare with the existing CI/CD pipeline, ensuring the process is not disrupted.

**WEB DEVELOPMENT TEAM:** This team will deal with necessary code adjustments, particularly with any issues with caching and **SSL/TLS**.

**NETWORK TEAM:** This team will manage everything related to **DNS** changes and will even ensure that traffic routing through Cloudflare is set up properly.

**PROJECT MANAGEMENT:** This team is responsible for checking the migration process. Ensures that everything is going in proper direction and there is coordination amongst all.

#### HOW TO SYNC DNS SERVER AND CLOUDFLARE CDN TOGETHER:

**Create an account:** -Sign up to Cloudflare account and add your website.

**Scan:** -Cloudflare will scan the DNS record. This process helps Cloudflare replicate current DNS configuration within their system, ensuring a seamless transition.

**Cost:** -Post that we will choose the business plan (Which will cost around \$200-\$250 per month). Better performance optimization, quicker assistance, and cuttingedge security measures are all included in this plan.

**Update the nameservers:** Over here Cloudflare will provide two nameservers. So, we will replace the current nameservers with the provided nameservers.

**Verify nameserver change:** After changing the nameserver, Cloudflare will automatically check the status of nameserver. It will take up to 48 hours (about 2 days) to update the nameserver.

**Verify DNS settings:** In this step, we will verify that the intended destination is reachable or not. For this we will use 'dig' and 'nslookup.'

**Monitor Performance:** In the last step we will monitor the performance of the website.

#### **RISK:**

**1.Centralization of traffic**: Routing all the traffic to Cloudflare can cause a single point of failure. If Cloudflare experiences an outage, it can disrupt access to your service.

**Mitigation:** We will make use of multi-CDN strategy, where we can divide the traffic across multiple CDN providers. This will reduce the overheads by a single point.

**2.Dependency on Cloudflare Security:** Security features in Cloudflare may lead to complacency in implementing security measures

**Mitigation:** By maintaining in-house security postures and implementing additional security measures such as firewalls and intrusion detection systems we will overcome this issue.

**3.IP address exposure:** Sometimes attackers can bypass Cloudflare and directly attack server's IP address.

**Mitigation:** By allowing Cloudflare's original server protection features, such as allowing only Cloudflare IPs to access your server. Implement firewall rules to block direct access from non-Cloudflare IPs. Regularly rotate and manage your origin IP addresses.

**4.Privacy Concerns:** Cloudflare handles all traffic passing through its network, raising concerns about data privacy and potential surveillance.

**Mitigation:** By ensuring that the traffic between the server and Cloudflare is encrypted using HTTPs. End-to-end encryption options such as SSL/TLS, can protect the data in transit.

**5.Performance Impact:** In some cases, using Cloudflare might introduce latency or performance issues, particularly if Cloudflare's edge servers are not optimally located for your user base.

**Mitigation:** By monitoring Cloudflare matrix carefully by using certain routing tools we can ensure optimal performance for all user regions.

**6.Configuration Errors:** Service interruptions or security flaws could result from incorrectly configuring Cloudflare settings.

**Mitigation:** Before implementing configurations in the production environment, make sure they have been thoroughly tested in a staging environment. Conduct routine audits and teach IT personnel on best practices for configuring Cloudflare.

# **Risk Index**

Risk		Likeli- hood	Risk In- dex	Sever- ity	Mitigation
Centralization of Traffic	3	2	6	High	Multi-CDN Strategy
Dependency on Cloud- flare Security	2	2	4		In-house Security Measures
IP Address Exposure	3	2	6	High	Cloudflare Origin Protection
Privacy Concerns	2	2	4	Me- dium	End-to-End Encryption
Performance Impact	2	1	2	Low	Monitoring Cloudflare Metrics
Configuration Errors	3	2	6	High	Testing in Staging, Regular Audits

# **Risk Assessment**

Impact	Likelihood	Severity Level	Color Zone
Low (1)	Low (1)	1	Low Risk
Medium (2)	Medium (2)	4	Medium Risk
High (3)	Medium (2)	6	High Risk
High (3)	High (3)	9	Critical Risk

# **Risk Severity Matrix**



# **Risk Mitigation**

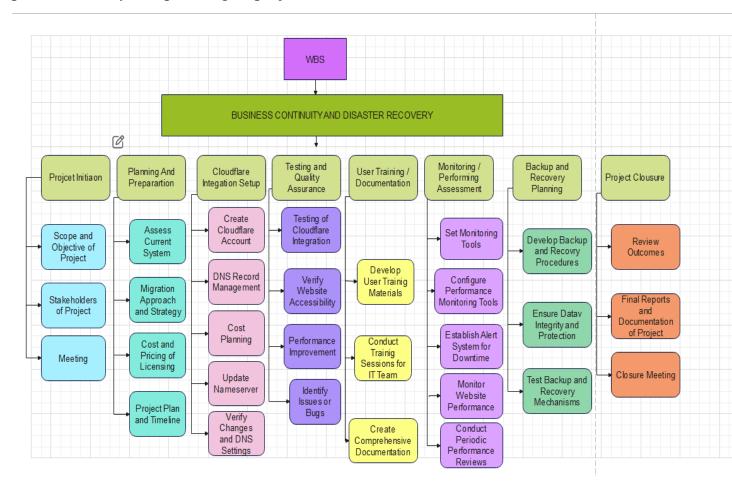
Risk	Severity Level	Mitigation
Centralization of Traffic	Medium- High	Implement a multi-CDN strategy to distribute traffic across multiple CDN providers.
Dependency on Cloudflare Security	Medium	Maintain in-house security postures and implement additional security measures such as firewalls and intrusion detection systems.
IP Address Expo- sure	High	Utilize Cloudflare's origin server protection features, allow only Cloudflare IPs, implement firewall rules, and rotate/manage origin IP addresses regularly.
Privacy Concerns	Medium- High	Ensure traffic between the server and Cloudflare is encrypted using HTTPS and SSL/TLS for end-to-end encryption.
Performance Impact	Medium	Monitor Cloudflare metrics carefully using routing tools to ensure optimal performance for all user regions.
	Medium- High	Evaluate configurations thoroughly in a staging environment before production, conduct routine audits, and train IT personnel on best practices.

## **Time Management**

Time Management plays a crucial role in every aspect whether it would be in a business or in a project, hence with the help of this every task can be managed and completed with priority and within the limited scope of time.

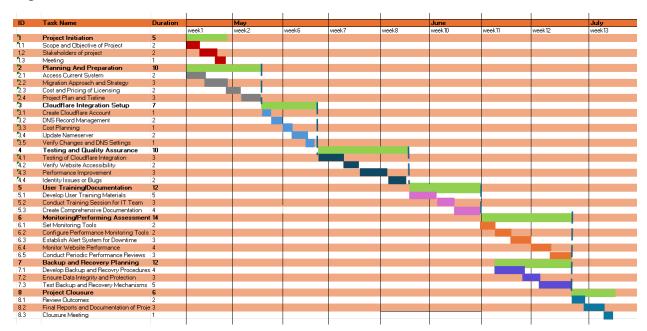
## Work Breakdown Structure (WBS)

Work Breakdown Structure is a tool used in Project Infrastructure to divide the whole project into smaller portions from start to the end at a hierarchical level. These components are breaking into more detailed sub-tasks to work on the project efficiently and effectively. It includes the goal of the project, phases and so on. It provides clarity and planning of projects.



#### **Gantt Chart**

Tasks, durations, and dependencies are displayed visually in a Gantt chart, which illustrates the project timeline. It facilitates work planning and scheduling, sequence determination, and key path identification. Project managers can monitor progress and make required adjustments to ensure activities finished on time by using a Gantt chart to see the whole timeline.



The above picture represents the weekly work done by simultaneously with planning, the brief gantt chart uploaded in a zip file to which describes the day-by-day progress of all tasks with weekday and weekend shows the holiday which will not be included the total days of working. The project was initiated in the first week of May and ended in the third week of July.

This is the link of gantt chart (Sheet 5): - Gant Chart



#### **RACI Matrix**

This project management tool outlines the roles and responsibilities associated with each activity. Responsible, Accountable, Consulted, and Informed is what RACI stands for. The RACI matrix improves teamwork and communication by outlining who is liable for each task's completion, who must consult or informed, and who is responsible for its success. It facilitates fast decision-making, ensures that tasks are distributing to the appropriate people, and helps to eliminate confusion.

Task Name	Responsible	Accountable	Consulted	Informed
Project Initiation				
Scope and Objective of Project	Project Manager	Project Sponsor	Team Leads,	Stakeholders
Stakeholders of project	Project Manager	Project Sponsor		Stakeholders
Meeting	Project Manager	Project Sponsor	Team Leads	Stakeholders
Planning And Preparation				
Access Current System	System Analyst	Project Manager	IT Team	Stakeholders
Cost and Pricing of Licensing	Procurement Team	Project Manager	Finance	Stakeholders
Migration Approach and Strategy	Project Manager	Project Sponsor	IT Team	Stakeholders
Project Plan and Time- line	Project Manager	Project Sponsor	Team Leads	Stakeholders

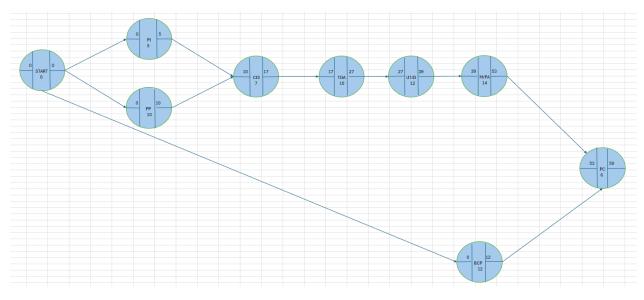
Cloudflare Integration Setup				
Create Cloudflare Account	IT Admin	Project Manager	IT Team	Stakeholders
DNS Record Manage- ment	IT Admin	Project Manager	IT Team	Stakeholders
Cost Planning	Finance	Project Manager	Procurement Team	Stakeholders
Update Nameserver	IT Admin	Project Manager	IT Team	Stakeholders
Verify Changes and DNS Settings	IT Admin	Project Manager	IT Team	Stakeholders
Testing and Quality Assurance				
Testing of Cloudflare Integration	QA Tester	Project Manager	IT Team	Stakeholders
Verify Website Accessibility	QA Tester	Project Manager	IT Team	Stakeholders
Performance Improvement	IT Admin	Project Manager	IT Team	Stakeholders
Identify Issues or Bugs	QA Tester	Project Manager	IT Team	Stakeholders
User Training/Documentation				
Develop User Training Materials	Trainer	Project Manager	IT Team	Stakeholders, Users
Conduct Training Session for IT Team	Trainer	Project Manager	IT Team	Users

Create Comprehensive Documentation	Technical Writer	Project Manager	IT Team	Stakeholders, Users
Monitoring/Performing Assessment				
Set Monitoring Tools	IT Admin	Project Manager	IT Team	Stakeholders
Configure Performance Monitoring Tools	IT Admin	Project Manager	IT Team	Stakeholders
Establish Alert System for Downtime	IT Admin	Project Manager	IT Team	Stakeholders
Monitor Website Performance	IT Admin	Project Manager	IT Team	Stakeholders
Conduct Periodic Performance Reviews	IT Admin	Project Manager	IT Team	Stakeholders
Backup and Recovery Planning				
Develop Backup and Recovery Procedures	IT Admin	Project Manager	IT Team	Stakeholders
Ensure Data Integrity and Protection	IT Admin	Project Manager	IT Team	Stakeholders
Evaluate Backup and Recovery Mechanisms	IT Admin	Project Manager	IT Team	Stakeholders
Project Closure				
Review Outcomes	Project Manager	Project Sponsor	Team Leads	Stakeholders
Final Reports and Documentation of Project	Project Manager	Project Sponsor	Team Leads	Stakeholders
Closure Meeting	Project Manager	Project Sponsor	Team Leads	Stakeholders

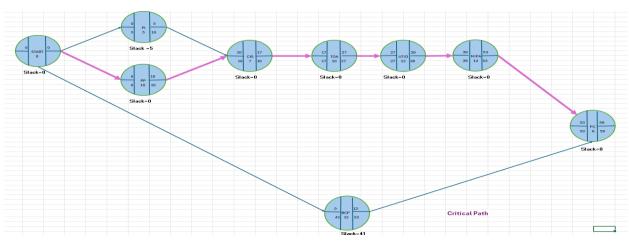
# **Network Diagram – Activity time estimates.**

Activity	Description	Time (Days)
PI	Project Initiation	5
PP	Planning And Preparation	10
CIS	Cloudflare Integration Setup	7
TOA	Testing and Quality Assurance	10
UT/D	User Training/Documentation	12
M/PA	Monitoring/Performing Assessment	14
BCP	Backup and Recovery Planning	12
PC	Project Closure	6

# **Network Diagram- Forward Pass**



# Network diagram- slack time and critical path.



#### **CHANGE CONTROL:**

## 1. Continuous Monitoring:

- ➤ **Performance Testing:** By using Cloudflare analytics tools (time to first byte) we can easily track the performance of our website.
- > Security Monitoring: To identify potential threats and vulnerabilities we will regularly review the security logs.

## 2. Regular Audits:

➤ Configuration Audits: This part includes reviewing the DNS settings, firewall rules, SSL/TLS configuration and caching policies.

## 3. Documented Change Process:

- ➤ Change Requests: Formalize the process for requesting changes which includes a detailed description, risk assessment and planned implementation steps.
- ➤ **Approval Workflow:** A smooth workflow where changes are reviewed and approved by relevant stakeholders.

# 4. Implementation of changes:

- > Scheduled changes: We will plan the changes accordingly during the maintenance so that the impact on users can be minimized.
- **Testing:** We will test everything before production.
- ➤ Backup and Recovery: We will ensure that we have all the snapshots before making any changes. So that we can roll back all the changes easily.

#### 5. Automation Tools:

➤ Configuration Management Tools: By using tools such as Terraform or ansible we will manage Cloudflare configuration as code. This allows us for version control, automated deployment, and easier rollback.

# 6. Incident Response:

- ➤ Incident Handling: Having an incident plan is directly proportional to identifying and responding to configuration changes.
- ➤ Communication: We will ensure we have clear communication channels in place for reporting and managing incidents.

#### **COMMUNICATION PLAN:**

#### 1. Channels:

- **Email:** Regular updates including the scrum meetings timing and announcements.
- ➤ Meetings: Project updates and review sessions.
- **Webinars:** Product description and QA testing.
- **Documentation:** User manuals and best practices.

#### 2. Frequency:

- ➤ Weekly: Review everything weekly.
- ➤ Monthly: Status All Webinars and training sessions.
- > Quarterly: Strategic Planning.

#### TRAINING PLAN:

## 1. Initial Training:

- ➤ **Kick-off session:** This will include Introduction to Cloudflare, project scope and timelines.
- ➤ Introductory session: This part will include Cloudflare dashboards, key features, and initial setup.
- ➤ **Role-Specific Session**: All the customized sessions for Devops, Security and Support teams.

# 2. Ongoing Training:

- > Security Protocols: Practices that are helpful in enhancing web security using Cloudflare.
- ➤ **Performance Optimization:** Techniques that can be used to increase website speed.
- > Regular updates: Sessions on latest updates.

# 3. Training Materials:

- ➤ Video Tutorials: Face-to-face video tutorials for making Cloudflare understand better.
- ➤ **Documentation:** Detailed guides, FAQ's and troubleshooting manuals.
- **Workshops:** Hands on practical sessions.

#### **Consultation Interview**

## **Business continuity and Disaster Recovery**

## 1. What is the problem?

#### Answer:

We have a retail business by the name NG Buyers. Which deals with all sorts of electronic items. During the black Friday sale, the online site crashed, because the servers were unable to bear the load. Which contributed to the company's revenue loss.

# 2. What kind of existing technology and infrastructure do you have? Answer:

We have e-commerce platform, mobile app, an inventory management system, and security technology.

# 3. What type of operating systems do you use? Answer:

As of now, we are using windows operating system because it is easy to use and easily available to everyone.

The distinct needs of several departments influence our decision about operating systems:

<u>Backend systems and servers</u>: Nginx and Apache Server are preferred for their dependability and security.

<u>Development Environments</u>: Windows 10/11 for Windows-specific programs, and Ubuntu Desktop for Linux developers that prefer that environment.

<u>End-user Workstations</u>: Windows 10/11 primarily, due to its interoperability with corporate software and ease of use.

<u>Design & Creative Work</u>: macOS is a great tool for creative work such as video editing and graphic design.

# 4.Describe the background of the internal IT staff. Answer:

Our IT staff is very well educated. They all are holding a bachelor's degree in computer science and have firsthand experience on new IT technologies such as cloud

computing, cybersecurity, and DBMS. Our managers have 5-6 years of experience in the industry.

# 5. What is the main goal you have for a site visitor?

#### Answer:

For the site visitor we have a team who is professionally qualified and can answer all the questions/queries which a site visitor is having.

#### 6. What is the solution?

#### Answer:

To keep the business continuity, we are planning to infuse the Disaster recovery servers. As these will easily route the data.

Content Delivery Network (CDN): To cache website content across several international locations, we will incorporate Cloudflare's CDN. By serving the user's content from the closest server, this will speed up load times and enhance user experience.

DDoS Protection: Even in situations with high traffic, Cloudflare's sophisticated DDoS protection will help lessen attacks and guarantee website availability.

## 7. How to implement the solution?

#### Answer:

Configuring will be implementing it by choosing the right backup software on backup servers, configuring backup policies will be our next step and after the network security will be part of plan too.

Data backup and synchronization will take place after all these steps have been taken to ensure the data has been properly backup and synchronized.

In between we will be performing the testing too.

# 8. How are you going to assess whether the Cloudflare implementation was successful?

#### Answer:

The following criteria will be used to determine success: better website performance metrics, fewer occurrences of outage, successful backup and recovery testing, and favorable comments from users regarding the accessibility of the website.

# 9. What are your long-term objectives for disaster recovery and IT infrastructure? Answer:

Our long-term objectives include putting in place innovative AI-based monitoring tools, automating and scaling our IT infrastructure, and making sure that our disaster recovery plan is routinely tested and updated.

What is the projected timing for completing the Cloudflare solution's implementation?

#### Answer:

Our goal is to finish the implementation in three months. This covers the preliminary stages of testing, configuration, training, and setup.

#### References

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## **Project weightage**

Task	Guneet Sidhu	Navneet Kaur
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Introduction	Responsible	Support
Business Case and Objectives	Responsible	Support
Current Situation and Problem	Shared	Shared
Budget	Responsible	Support
Cost Management Plan	Shared	Shared
How Cloudflare will Work	Responsible	Support
Technical Requirements	Responsible	Support
Divion of work amongst the Teams	Responsible	Support
How to Syn DNS Server and Cloudflare CDN To-		
gether	Responsible	Support

Risk	Responsible	Support
Risk Index	Support	Responsible
Risk Severity Matrix	Support	Responsible
Risk Mitigation	Support	Responsible
Risk matrix	Support	Responsible
Time Management	Support	Responsible
Work Breakdown Structure	Support	Responsible
Gantt Chart	Support	Responsible
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Change Control	Responsible	Support
Communication Plan	Responsible	Support
Training Plan	Responsible	Support
Questionnaire	Shared	Shared
References	Shared	Shared

The combine weightage of our project is 50-50.