Cancerous Tumor Tracking System – Project Plan

Project name: Cancerous Tumor Tracking System

Date: 04/12/2020

Project leader: Debashis Jena

Phase: Initiation phase

For approval: Debashis Jena

# **Introduction**

This is a project plan document for the software development for a cancerous tumor tracking system for University of Maryland Medical Center (UMMC). Since this is the initiation phase of the project, the requirements are not detailed out yet. The detailed requirements will be created in the definition or analysis phase. This document is subject to be reviewed and changed as the requirements are created.

# **General information about the project**

## **Situation sketch and problem definition of the project**

University of Maryland Medical Center (UMMC) has a highly qualified team researching about different types of cancerous tumors. As the researches are done the documentations, artifacts, and references are saved in researchers local computer and then at the end of the day, the researchers upload the files into a shared drive in the local area network. However, there have been a few challenges faced by the researchers and also by the system administrator.

* As the researchers work remotely, connecting to the department network becomes an issue.
* With large volume of research artifacts, the shared drive is becoming overloaded and eventually slow. It is a problem for both the researchers and the network admins.
* Also, with the large files, accessing from the network, it takes a long time to load and save the files.
* Currently there is no way to publish these documents to public directly from the shared drive.
* There is no version control available for the artifacts. As they are saved in the shared drive, the old updates are lost. If there is a upload by mistake, then some of the work gets overwritten.

Therefore, the head of the cancer research department at UMMC, is trying to find an optimal solution to handle the above situation without any issues related to performance, storage or outage. Additionally, they want to publish the files to the public with a 100% availability.

For this project AbcTech consulting company has been hired to setup a solution to address the above situation and requirement. AbcTech has ample of experience in past, setting up cloud-based repository services where the files can be uploaded, downloaded and accessed in a scalable environment.

## **Project assignment**

As the problem that the UMMC team has been facing to manage the documents and artifacts, is not uncommon. There are many such organization who have had the same problem that they have already addressed.

* 1. The project specifics – UMMC cancerous tumor research team requires a solution which can do the following.
  + A cloud-based service that can be accessed anywhere, without a need to connect to the on-site network.
  + The solution should allow any volume of documents, files and artifacts. Since the cloud storage services are typically expensive, the solution should be cost effective.
  + A system that can auto publish some of the research documents to the that are marked as public.
  1. Timeline – The researchers are currently facing the document accessibility issues more than earlier. Also, the system admins are experiencing network congestion because of the storage size as well. So, the UMMC would like to have a solution as earliest as possible. So, the timeline in this project is vital and cannot be an open-ended project.
  2. Deliverables – The major deliverables of this project will be the following.
     + Secured cloud-based storage system
     + A web application which will be an interface to upload and access the files
     + A system that can publish the artifacts to public
     + User manual and training documents for the system usage
     + System maintenance plan
  3. Out of Scope – The below parts of the system will be out of scope for the project.
     + Data migration – As the files can be highly confidential nature, AbcTech may not access them. Therefore, the research department plans to have the internal system administrative department to perform the migration process.
     + Maintenance – After the system is developed, the contracting company will provide sufficient formal and informal trainings to the researchers and to the network admins. However, maintaining the system and any post-production support issues will not be part of this project. That may be handled by the internal team or even by AbcTech, but as a separate project.
  4. Work breakdown structure (WBS)

The project can be split into the below work breakdown structure.

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## **Risk Analysis**

The project may have a few foreseeable risks that may affect the deliverability. The risks associated may affect both the time and cost of the project. Here is the list of some of the potential risks for the project.

* 1. Delay in the requirement gathering – Failing to gather the requirements on time may hamper the project deliverability as it drives the implementation and the rest of the activities in the project. So, the JAD sessions and interview processes will be done with a timebox and in a closed room. The users or the stakeholders are required to be available fulltime during this interview process.
  2. Insufficient details of the vital features of the requirement – The risk of insufficient detail may lead to the project delivery. Therefore, the stakeholders need to be interviewed about the most critical part of the application. Each of the system features will be prioritized based on their criticality. Prioritizing will help focusing on the analysis and requirement gathering of the most important components.
  3. Delay in the technical procurement – As the technical analysis is finished the leaders from the AbcTech, will start the procurement process and gather the technical resources as early as possible. That also will be done on a priority basis.
  4. Inadequate testing – Quality assurance is one of the most important part of the software development. Inadequate testing may leave a lot of system defects within the application and may affect the productivity of the system significantly. Therefore, a test plan will be created, and the system use cases will be defined much prior to the development process and will be reviewed constantly. The requirement traceability matrix will be created to ensure 100% test coverage of the application.
  5. Security of the cloud-based service – Cloud platforms such as Amazon Web Services, provide in built security systems. The contractors from AbcTech have experience setting up cloud-based systems in past and aware of the security features that are already available. The provider companies also publish the white papers and recommendations how to secure the systems, which will be followed in this development project.

## **Organization of the project**

This project is a midsize project and will be fixed term project. Therefore, the traditional waterfall model will be followed to create the application and deliver the project. Here are the basic phases that the project will go through.

* 1. **Initiation phase**

As the problems are identified above, the need of a solution becomes eminent.

Therefore, the proposed project is around setting up of a cloud-based application that will aid both the researchers and the network admins in addressing the problems.

Having experience in cloud-based services, AbcTech is hired to setup the platform and environment for UMMC.

With having such urgency in having a replacement solution to the current system, the waterfall method is identified to be followed, where the project progress will be constantly reviewed and adjusted as required.

* 1. **Definition phase**
     1. *Activities*

As the project initiation phase is complete and the project proposal document is approved and signed off by the project sponsor, which is UMUC head of the research department in this case, the definition phase starts. The activities will include the following.

To help with the knowledge base of the current application and the requirements, a group of users are identified from different functionality.

A group of business analyst from AbcTech will be staffed to analyze the system requirements.

Interviews with the users in a closed room will be organized and facilitated by the project manager. Joint application development (JAD) sessions will be carried out for a specific period of time where the system requirements will be analyzed and documented.

* + 1. *Timeline*

As this is one of the most important phases of the project and drives the following phases, this needs to be accurate and well time spent activity. As the analysts are assumed to be expert and experienced in this, they are expected to breakdown the system into subsystems and that will help them analyzing each of the sub-systems separately and will allow them to prioritize the application components.

This phase is expected to take 7 days to complete the analysis and requirement documentation. However, an additional day is reserved to accomplish any unplanned activities. That makes the phase to take 8 days in total.

**Anticipated start date**: *04/01/2020*

**Anticipated end date**: *04/10/2020*

The below diagram can be referred to visualize the planned work during this phase. The group of analysts and the users will be divided into three teams and each of them will focus on one or other parts of the analysis. The three teams are shown in the colored legends below.

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* + 1. *Milestones*

This phase will have the following milestones set before the analysis commences. Each of these milestones will be validated and monitored as the requirement analysis continues.

Finish system breakdown – End of day 3 (04/03/2020)

Requirements on cloud-based service complete – End of day 6 (04/08/2020)

Requirements on GUI for the web application – End of day 6 (04/08/2020)

Requirements on network and security – End of day 6 (04/08/2020)

Complete requirement documentation – End of day 7 (04/09/2020)

Other activities and client approval – End of day 8 (04/10/2020)

* + 1. *Budget*

The analysis and definition activity will be carried out in a conference room inside the department campus. In this phase the department staffs and contractors will be completely involved. This phase will require computers, projector, whiteboard and stationery supplies for presentation and tracings. The below budget breakdown will only include the labor cost from AbcTech side.

|  |  |  |
| --- | --- | --- |
| # | Activity | Budget |
| 1 | 3 analysts x 8 days x 8 hours = 192 hrs x $50 (Hourly labor cost) | $9,600 |
| 2 | Conference room, Computers, projectors, and office stationery (Provided by the department) | $0 |
| 3 | Lunches, water, snacks (Provided by the department) | $0 |
|  | Total | $9,600 |

* 1. **Design phase**
     1. *Activities*

Before this phase starts, it is assumed that the requirements phase has been duly complete. The leads of the project including the system architect, development lead, test lead have a full understanding of the requirements and the customer’s expectation. For such a requirement there may be many solutions available, however the best solution for the UMMC cancer research department needs it to be highly available, fast response, easy to use and most importantly secure. Keeping all that in mind, the design team will come up with multiple options and present the cost and effort required to the project sponsor.

Analysis – Architect and team leads will discuss the requirement and feasibility of some of the commercial off the shelf platforms to do the job. Creating a brand-new application will be tabled as the last option. A few solutions for this requirement may be as follows.

AWS S3 – S3 is an object-based storage available in AWS platform. It supports all kinds of files and objects with version control capability. It also lets you create a static website from the file itself, without requiring any custom web application. It also cost effective and has a pay-as-you-use price structure. It has archiving capabilities too.

Salesforce knowledge base with force.com platform – This may be a second-best solution and has the capabilities same as S3, however, it needs some customization. Force.com platform may be used to publish the knowledge base as a separate website.

Custom application – This solution will be built from scratch by AbcTech. It may be the cheapest solution. However, this requires long time to setup the project and deliver the entire product.

Presentation to sponsor – These solutions will be presented to the sponsor and will require an approval.

Design – This is the core part of this phase. In this phase the approved solution will be broken down and architected in detail.

Create architecture diagram

Data flow diagram and context diagram

Entity Relationship diagrams

Documentation – As the architecture diagrams are created, a fully explained documentation will be created which will be referred during the implementation phase. Also, how to approach the testing of the application will be discussed. The below documents will be created as part of this task.

Design document

Test plan creation

* + 1. *Timeline*

**Anticipated start date**: *04/13/2020*

**Anticipated end date**: *04/20/2020*

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* + 1. *Budget*

The design phase will be carried out in AbcTech office and does not require to take place in the customer’s site. As the documents require approval, they can be sent to the sponsor electronically. Here is the high-level budget for design phase.

|  |  |  |
| --- | --- | --- |
| # | Activity | Budget |
| 1 | 1 architect x 3 days x 8 hours = 24 hrs x $70 (Hourly cost) | $1,680 |
| 2 | 1 dev lead x 4 days x 8 hours = 32 hrs x $60 (Hourly cost) | $1,920 |
| 3 | 3 senior dev x 4 days x 8 hours = 96 hrs x $50 (Hourly cost) | $4,800 |
| 4 | 1 test lead x 3 days x 8 hours = 24 hrs x $60 (Hourly cost) | $1,440 |
|  | Total | $9,840 |

* 1. **Implementation phase**
     1. *Activities*

This phase may be split into modules as per the WBS document. Assuming the first approach is approved by the sponsor and the other stakeholders, AWS account will be purchased. Below is the list of the activities.

* + - AWS S3 Bucket creation – Buckets for each category of the documents will be created. Appropriate security settings will be applied.
    - User setup – AWS has its built-in user authentication system called IAM (Identity and Access Management). The user accounts, roles and profiles will be created for the users.
    - Public websites – AWS S3 provides capabilities to publish documents to the public. These websites will essentially be static ones, since the documents are only for being accessed as read-only.
    - User interface creation – Whereas the researchers can use AWS web console to upload and download the documents, for the ease of use a user interface will be created for them to access the files. This web application will have user authentication which will utilize AWS IAM in the background. This application also will have the below capabilities which will utilize AWS APIs in the background making it relatively less complicated build.

Upload the document

Download an existing document

Manage different version of a file

Delete / undelete a file

Archive documents

Publish a document

Submit document for approval

* + 1. *Timeline*

**Anticipated start date**: *04/21/2020*

**Anticipated end date**: *06/01/2020*

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* + 1. *Milestones*

Bucket setup – Planned finish date 04/28/2020

Finish user and IAM setup – Planned finish date 05/04/2020

Static website creation – This will require 2 weeks and is planned to finish by 05/18/2020.

Web application user interface for researchers for accessing documents – This requires technical development effort and is estimated to take 3 weeks. However, it can be carried out parallel with other development activities. It may be started from 3rd week of development and finish before the end of 5th week. Anticipated end date 05/31/2020.

* + 1. *Budget*

The tasks involved in this phase can be performed by technical resources with different skills. AbcTech employs a number of DevOp resources who have extensive experience using AWS features. They will perform the bucket setup and declarative programs within AWS. AbcTech software developers will work on the web application setup and create unit tests.

|  |  |  |  |
| --- | --- | --- | --- |
| # | Activity | Hours x Hourly cost | Budget |
| 1 | AWS S3 bucket and IAM setup | 3 DevOps x 10 days x 8 hours = 240 hrs x $50 (Hourly cost) | $12,000 |
| 2 | S3 Website creation | 3 Developers x 10 days x 8 hours = 240 hrs x $50 (Hourly cost) | $12,000 |
| 3 | User interface creation | 3 Developers x 15 days x 8 hours = 360 hrs x $50 (Hourly cost) | $18,000 |
| 4 | Reserve 5 days for unplanned tasks for 3 developers | 3 Developers x 5 days x 8 hours = 120 hrs x $50 (Hourly cost) | $6,000 |
|  | Total | | $48,000 |

* 1. **Quality Assurance phase**
     1. *Activities*

Quality assurance is an integral part of any development phase. However, since AWS S3 is a COTS software, so testing of the built-in features is assumed to be out of the scope for testing. This may go through the below activities.

* + - Since the researchers’ interface web application is a custom made by the internal developers, it needs to be tested thoroughly. Therefore, test cases need to be created to validate each part of the application.
    - System testing – This is an end-to-end testing activity, where the system validation will be performed to test the below systems.

Research documents are uploaded/ downloaded/ archived from the user’s perspective.

The website pages contain the published documents only and can be accessed directly from the UMMC website.

Non-functional testing – Apart from the above functional tests, the below non-functional testing will be performed.

Load testing – With a high number of users accessing the web application concurrently, the system should perform normally without any system failure.

Performance testing – There will be a high volume of documents placed in the S3 buckets. The performance of the application should not be hampered by the number or size of files.

Security testing – Being highly sensitive, the security and confidentiality of the research documents must be ensured. Therefore, extensive security testing will be performed by the skilled QA team within AbcTech.

Acceptance testing – As the exit criteria is met, the user acceptance testing will commence. In this phase, the UMMC researchers will be actively involved and run use cases for each of the features. This will be performed by the users, but will be supported by the QA testers and if required developers too.

* + 1. *Timeline*

**Anticipated start date**: *06/02/2020*

**Anticipated end date**: *07/06/2020*

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* + 1. *Budget*

The quality assurance will be performed by experienced testing resources from AbcTech. Here is a high-level budget for the task.

|  |  |  |  |
| --- | --- | --- | --- |
| # | Activity | Hours x Hourly cost | Budget |
| 1 | Researcher’s access web App | 3 Testers x 5 days x 8 hours = 120 hrs x $50 (Hourly cost) | $6,000 |
| 2 | System testing | 3 Testers x 10 days x 8 hours = 240 hrs x $50 (Hourly cost) | $12,000 |
| 3 | Security testing | 3 Testers x 5 days x 8 hours = 120 hrs x $50 (Hourly cost) | $6,000 |
| 4 | Reserve 5 days for unplanned testing tasks for 3 testers | 3 Testers x 5 days x 8 hours = 120 hrs x $50 (Hourly cost) | $6,000 |
|  | Total | | $30,000 |

* 1. **Deployment**
     1. *Activities*

As all the acceptance criteria of the application is met, the DevOps team will start preparing for the deployment. It will have the below activities.

Deployment in staging or a pre-production environment.

Deployment in live or production environment.

Smoke testing is performed to test some of the major functionalities.

Cut over – The legacy application will be turned off and the new application will replace it.

* + 1. *Timeline*

All the above activities are expected to take one week including the buffer time for any unplanned event or tasks.

**Anticipated start date**: *07/07/2020*

**Anticipated end date**: *07/14/2020*

* + 1. *Budget*

|  |  |  |  |
| --- | --- | --- | --- |
| # | Activity | Hours x Hourly cost | Budget |
| 1 | Deployment in Staging | 3 DevOps x 1day x 8 hours = 24 hrs x $50 (Hourly cost) | $1,200 |
| 2 | Deployment in Production | 3 DevOps x 2 days x 8 hours = 48 hrs x $50 (Hourly cost) | $2,400 |
| 3 | Smoke testing | 3 Testers x 1day x 8 hours = 24 hrs x $50 (Hourly cost) | $1,200 |
| 4 | Reserve 1 day for unplanned testing tasks for 3 resources | 3 Resources x 1day x 8 hours = 24 hrs x $50 (Hourly cost) | $1,200 |
|  | Total | | $6,000 |

* 1. **Closing and Follow-up phase**

This is the phase where the project closing will take place the below activities will be performed as part of it.

* + 1. *Activities*

Create user manual.

Demonstration and provide user training.

Maintenance plan and identify potential enhancements.

Create project report.

Retrospective.

* + 1. *Timeline*

All the above activities are expected to take one week including the buffer time for any unplanned event or tasks.

**Anticipated start date**: *07/15/2020*

**Anticipated end date**: *07/22/2020*

* + 1. *Budget*

|  |  |  |  |
| --- | --- | --- | --- |
| # | Activity | Hours x Hourly cost | Budget |
| 1 | User manual creation | 1 Analyst x 3 days x 8 hours = 24 hrs x $70 (Hourly cost) | $1,680 |
| 2 | User training | 1 resource x 1day x 8 hours = 8 hrs x $50 (Hourly cost) | $400 |
| 3 | Maintenance plan | 1 resource x 1day x 8 hours = 8 hrs x $50 (Hourly cost) | $400 |
|  | Total | | $2,480 |

## **Project Plan Overview**

As the above phases have been laid out the project is expected to take 12 weeks. If the start date of the definition phase is set at 04/01/2020 then it is expected to finish by third week of July which is 07/22/2020.

Here is the table indicating the start date and end date for each of the phase and includes the labor cost.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase** | **Expected starting date** | **Expected date of completion** | **Total cost estimate** |
| Definition | 04/01/2020 | 04/10/2020 | $9,600 |
| Design | 04/13/2020 | 04/20/2020 | $9,840 |
| Implementation | 04/21/2020 | 06/01/2020 | $48,000 |
| Quality Assurance | 06/02/2020 | 07/06/2020 | $30,000 |
| Deployment | 07/07/2020 | 07/14/2020 | $6,000 |
| Closing and Follow-up | 07/15/2020 | 07/22/2020 | $2,480 |
|  |  | Total: | $105,920 |

The above does not include the cost for the tools. Below is the budget for the tools and technical requirements. AWS S3 will be used for the entire life-cycle of the system. Therefore, it will vary as per the usage and file size. There are different plans available for different types of storage. Below is a breakdown of the apps. Many of the development tools are free of cost as long as the developers are using the community version of the tools. If there is a requirement for any specific tool for any activity, that will be purchased.

|  |  |
| --- | --- |
| **Phase** | **Total cost estimate** |
| AWS Account | $0 |
| AWS S3 – Pay per number of files and size (https://aws.amazon.com/s3/pricing/) | Variable – Monthly cost per Gb of data |
| Microsoft tools for tracking – Office 365 with Sharepoint (Office 365 E3) - <https://www.microsoft.com/en-us/microsoft-365/business/office-365-enterprise-e3-business-software> = for $20 x15 users x 4 months. | $1,200 |
| Development IDEs – IntelliJ or Visual Studio Code | $0 |
| Miscellaneous others | $1,000 |

**Reference**

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