Virtual Consultant (VC)
Release Plan

Version: <1.0>
Last Modified : <19/10/2021>

REVISION HISTORY

Version	Date	Organization/Point of Contact	Description of Changes
1.0	<19/10/2021>	404Found, Aratrika Pal	Baseline Version
2.0	<22/10/2021>	404Found, Shruthi Srinivas	Final Plan

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1. INTRODUCTION

This document describes the release plan for Virtual Consultant developed by Team 404Found. Virtual Consultant is an application designed for patients and doctors to assist in remote consultation and to provide social media for healthcare. The document describes Virtual Consultant's release strategy and lays out the relevant details for past, present and future releases of the application. The first version when the application is rolled out for the users is the version 1.0.0 release. Team 404Found will use this document to track and document the relevant details of all the releases of the application. When new releases are to be made, this document shall be updated to track the new features that are planned for the aforementioned new release. The purpose of this document is to record all the releases made to help future members of the team understand the application's progress over the years. Such an understanding will also facilitate the team members to make decisions about future releases. This document can also be used as reference by developers when they try to resolve issues or bugs in older releases.The primary target audience of the Release Plan document is the internal application development team of 404Found. It contains sensitive, private information about the present and future releases and thus it is not a public document. For past releases and some present releases which are rolled out, some information from the document may be released to the public. However, the release of such information is under the project manager's complete discretion.

2. REFERENCED DOCUMENTS

Table 1: Referenced Documents

Document Name	Issuance Date
Virtual Consultant Project Proposal	01/09/2021
Virtual Consultant System Requirement Specification	14/09/2021
Virtual Consultant Quality Plan	15/09/2021
Virtual Consultant Risk Management Plan	23/09/2021
Virtual Consultant Project Plan	05/10/2021

3. OVERVIEW

With the rise of global pandemic Covid 19 cases, people are seeking to reduce the number of physical interactions and move to virtual interactions whenever possible, in the interest of health and safety. Hence, virtual platforms have become the preferred option. The growth of healthcare services is also a beneficiary for this phenomenon. This convenience for users, in turn, brings about an easy and convenient way for people to seek medical assistance at the comfort of their own home. Moreover, according to a new report from the World Bank and WHO, at least half of the world's population cannot obtain access to essential health services.

Virtual Consultant is envisioned with this in mind, to integrate and provide a convenient online platform where patients can seek consultation from doctors without physical interactions. Our product also provides a simplified version of a social media platform with the theme of medical

health and wellbeing. It allows doctors to create posts to share experiences, provide information, and improve the patients' knowledge of diseases, symptoms and recovery. Patients can follow the doctors and engage with their posts through likes, with the final goal of improving their medical literacy.

Virtual Consultant is a progressive web application that runs on both desktop and mobile, developed using the MERN stack permitting a rapid cross-platform deployment to reach out to as many users as possible. We place an emphasis on a good user-experience and are excited to build a powerful application with the ability to positively-impact lives. While version 0.0.0 of Virtual Consultant was developed for the team's internal development and testing, version 1.0.0 is slated to be the first version of the application to be rolled out to users.

The latest use case diagram for Virtual Consultant, showing all the users and the use cases of the system, is given below:

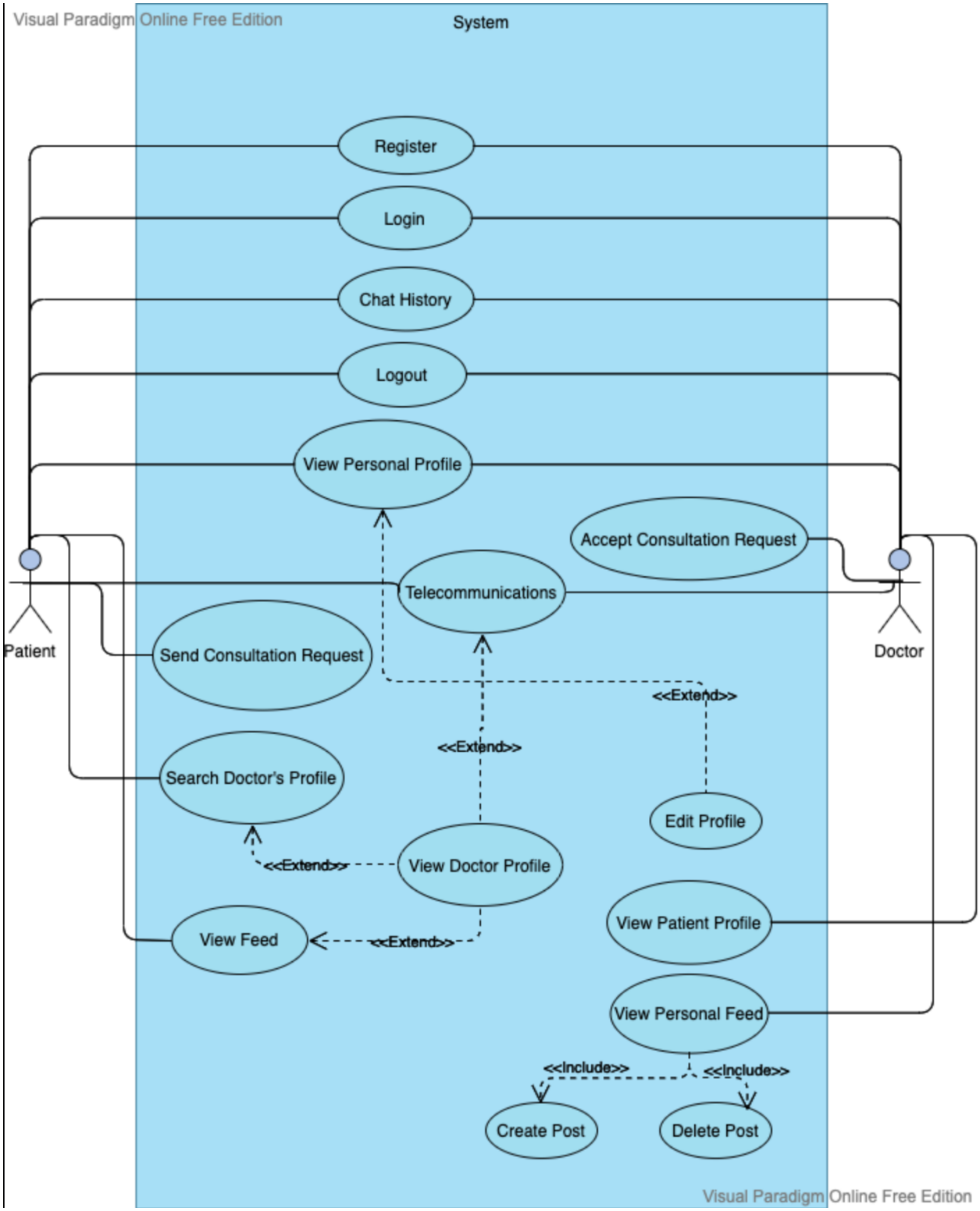

Figure 1: Use Case Diagram for Virtual Consultant

The latest high level system architecture diagram for Virtual Consultant is given below:

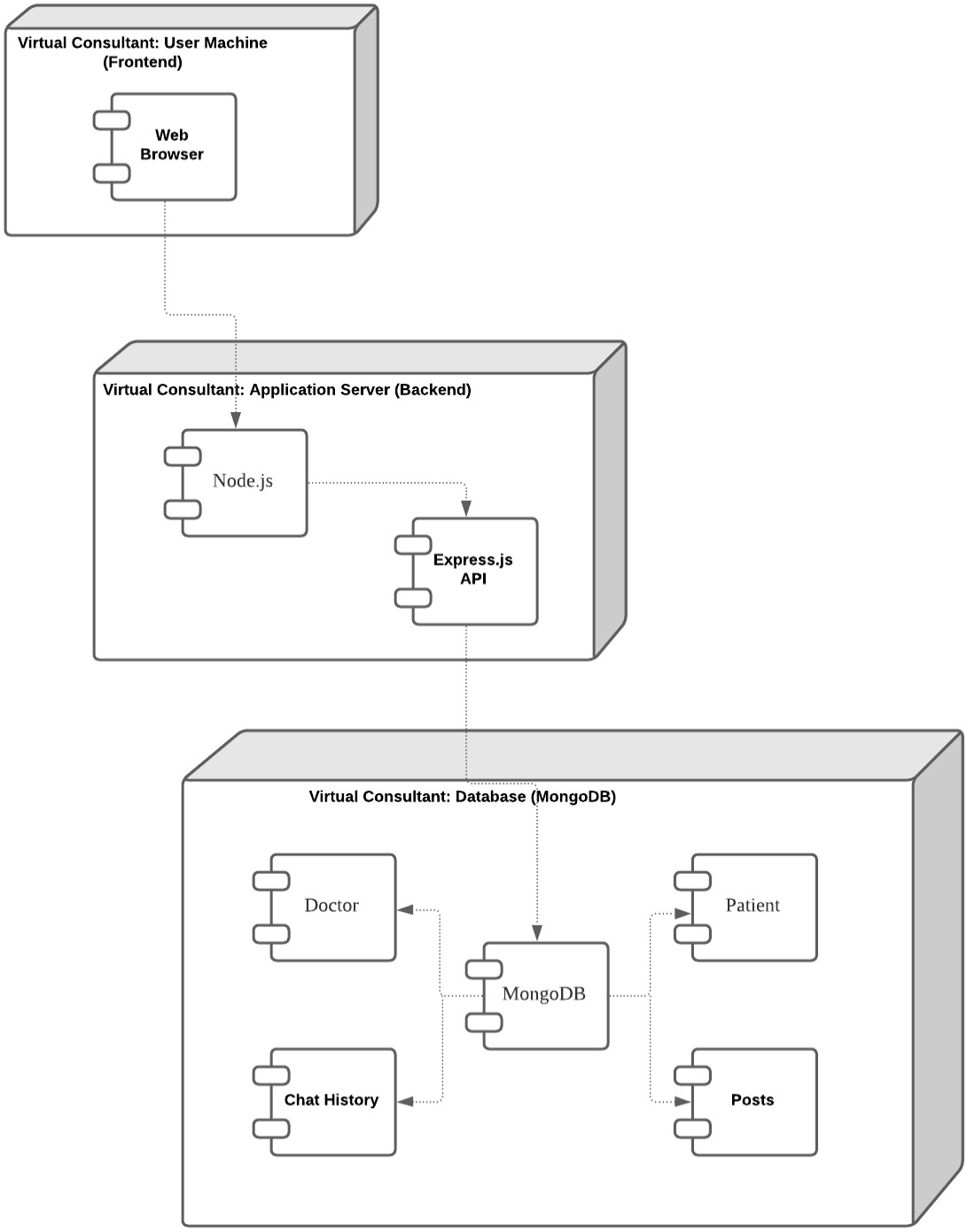

Figure 2: System Architecture for Virtual Consultant

4. ASSUMPTIONS, CONSTRAINTS, RISKS

4.1. Assumptions

Administration:

1. Virtual Consultant does not violate healthcare policies by the Ministry of Health Singapore, and Singapore Medical Council.
2. Singapore doctors registered with the Singapore Medical Council are willing to become users of Virtual Consultant.

Software Development:

1. The developers in the 404Found team possess the skills required to develop Virtual Consultant.
2. There is effective collaboration within the frontend and backend development teams to facilitate efficient and timely development and integration.

Schedule:

1. The software development timeline as well as the release timeline must be followed in general, without too many alterations.
2. All team members of 404Found can satisfy the time commitment needed for Virtual Consultant.
3. The tasks are completed within the deadlines set by the team, following the schedule.

Cost and Budget:

1. Team 404Found's budget estimation for the project Virtual Consultant is accurate.
2. During the project development, there will be no sudden cuts in the budget or hidden costs.

4.2. Constraints

Functionality:

1. The application currently verifies doctors registered with the Singapore Medical Council (SMC), thus it is restricted to Singapore for now.

Team size:

1. The 404Found team consists of 8 members, which is comparatively small to develop an application of this scale.

Schedule:

1. The project must be completed within 10 weeks time, which is a tight schedule for implementing all features. Thus, we must prioritize during implementation.

4.3. Risks

The Risk Management Plan gives detailed descriptions of the risks related to Virtual Consultant. The following table shows the main risks, along with their probability and impact.

Serial No.	Risk	Area of Risk	Probability	Impact
1.1	The scraper that scrapes doctor information for doctors registered with the Singapore Medical Council, assumes a particular structure of data. If the structure changes, the scraper will not work	Technology	**Low**	**Low**
1.2	Server can crash during application execution	Technology	**Low**	**High**
1.3	The MongoDB Atlas database is unable to handle many access requests simultaneously beyond a particular threshold	Technology	**Low**	**Medium**
1.4	Existing software components which are reused directly in the project may have bugs or get deprecated which can introduce code-related errors	Technology	**Medium**	**High**
2.1	Work or personal conflict may arise between the project manager, QA personnel and developers	People	**Low**	**Medium**
2.2	Since the team members may be involved in multiple other projects or courses, they may be too busy to attend meetings	People	**Medium**	**Medium**
2.3	The project timeline is short and tight, and every member has a prominent role to play, so if any member stops contributing due to sickness or other personal emergencies, it can significantly delay task completion	People	**Medium**	**Medium**

2.4	There may be undermined motivation or burnout faced by team members during the course of the project	People	**Low**	**Low**
2.5	Developers may lack the required domain knowledge to implement the project	People	**Low**	**Medium**
2.6	Potential slack off by some members can threaten the development speed	People	**Low**	**Medium**
3.1	Completely new components might be added to the project and might require completion in a tight schedule	Organizational	**Medium**	**Low**
3.2	There might be a restructure in the project team and new responsibilities may be allocated to different people	Organizational	**Low**	**Low**
3.3	Lack of proper communication between the different sub-teams such as QA and developer teams	Organizational	**Low**	**Medium**
4.1	1. MongoDB Atlas free version which will be used for the project, may not have sufficient storage for all the application data	Tools	**Medium**	**Medium**
4.2	The source code may not be fully complete to be ready for deployment	Tools	**Low**	**High**
4.3	Due to server limitations, there may be a limit on how much user traffic can be handled by the application simultaneously	Tools	**Low**	**High**
5.1	There are changes in requirements at a much later stage in the project timeline	Requirement Changes	**Medium**	**Medium**
5.2	New use cases are discovered and	Requirement	**Medium**	**Medium**

	added at a much later stage in the project timeline	Changes		
5.3	Due to insufficient discussions and workshops with the customers early on in the project timeline, customer requirements are not understood properly and clarified much later in the project timeline	Requirement Changes	**Low**	**Medium**
6.1	Underestimation of the time required to develop the software components	Estimation	**Medium**	**Medium**
6.2	Underestimation of the size of the progressive web application	Estimation	**Low**	**High**
6.3	Underestimation of the rate, impact or probability of bugs or defects in the application	Estimation	**Medium**	**High**
6.4	Underestimation of the customer base of the application, which can affect application design decisions adversely	Estimation	**Low**	**Medium**
6.5	Abandonment of planning when under pressure	Estimation	**Low**	**Medium**

Table 2: Risks related to Virtual Consultant

5. RELEASE APPROACH

5.1. Rationale

The lifecycle chosen for the development of the Virtual Consultant software is the **Waterfall model**. The waterfall model is a breakdown of project activities into linear sequential phases, where each phase depends on the deliverables of the previous one and corresponds to a specialisation of tasks. In software development, it tends to be among the less iterative and flexible approaches, as progress flows in largely one direction ("downwards" like a waterfall) through the phases of conception, initiation, analysis, design, construction, testing, deployment and maintenance.

Since the release strategy adopted depends on the type of development lifecycle, the release approach here will be in accordance with the Waterfall methodology. Extensive testing and thorough documentation will be carried out between every phase of development to ensure that the application remains error free. Remaining bugs can be removed by relying on documentation and older versions of the application. Such steps will ensure that any release developed also meets appropriate quality requirements.

5.2. Release Strategy

The release strategy employed for Virtual Consultant will be Phased Function Rollout. This involves incremental development and implementation of separate modules of the system, capable of existing independently, and combining them in the end. This strategy seems to be in line with the Waterfall model as both involve a phased approach allowing progress to the next stage only if the current phase is thoroughly implemented and tested.

To facilitate streamlining of the release process, Continuous Integration followed by a Build-Package-Deploy process will be employed. Continuous Integration involves merging of components and modules along the way so that everyone has access to the latest build and can see changes made to the application. We will use Git as the default Version Control Software to enable continuous integration.

To ensure that the correct versions of all software configuration items are combined, relevant members of the team must see to it that the components satisfy the following key requirements-

- Complete- self-sufficient
- Repeatable- automatic, consistent
- Informative- provides feedback
- Schedulable- auto-triggered
- Portable- independent of IDE

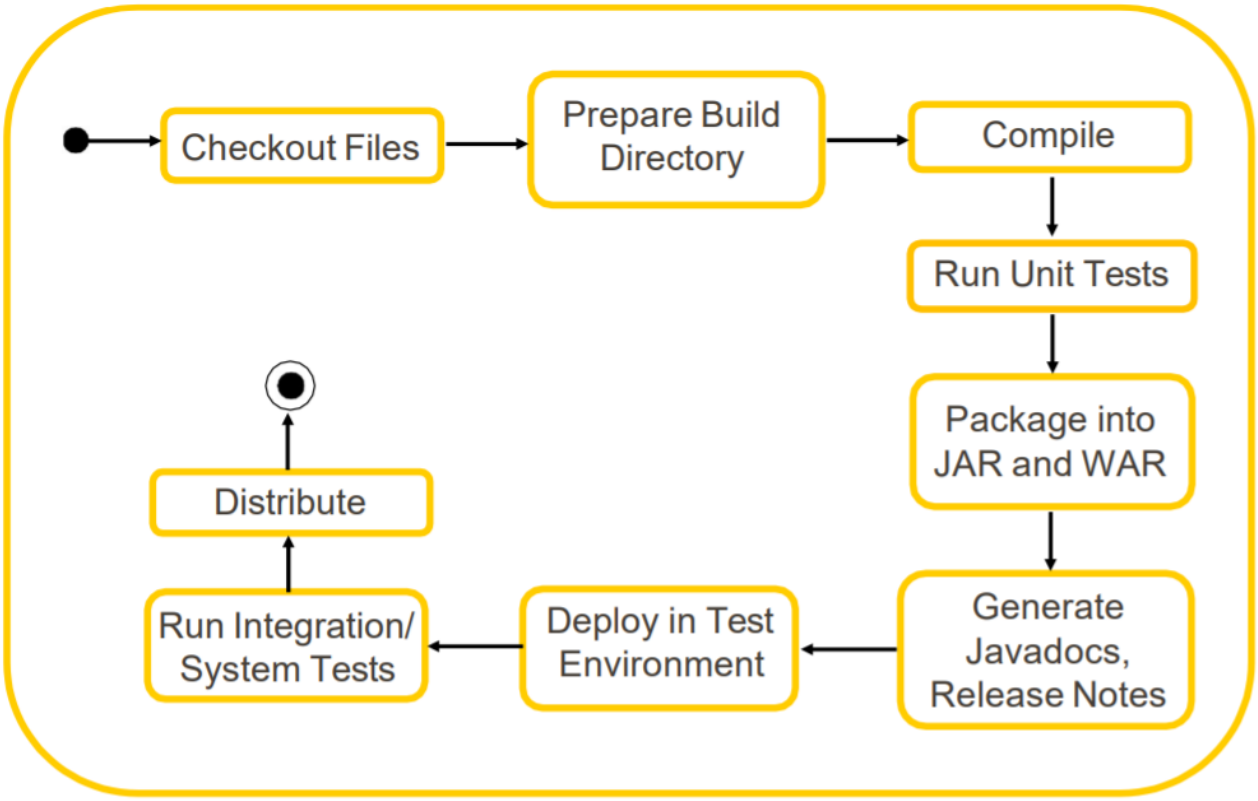

Figure 3: **Build-Package-Deploy process** (Source - CZ3002 Lecture Notes - Dr Quah T.S., Jon)

The different types of releases involved would be-

- Major Release: This involves addition and updates of the key functionalities of the application. They include features that form the basis of the application without which the application would not function. A major release will indicate significant changes and improvements to the application.
- Minor Release: This involves smaller changes and updates that don't affect the main functionalities of the application on a large scale. It serves to improve user experience and debug older releases.
- Revision: This involves small changes and minor bug fixes to the application.
- Internal Release: This involves making versions of the application available to the team for internal testing before any major or minor releases.

Any type of release in Git will be through branches and will involve the following steps-

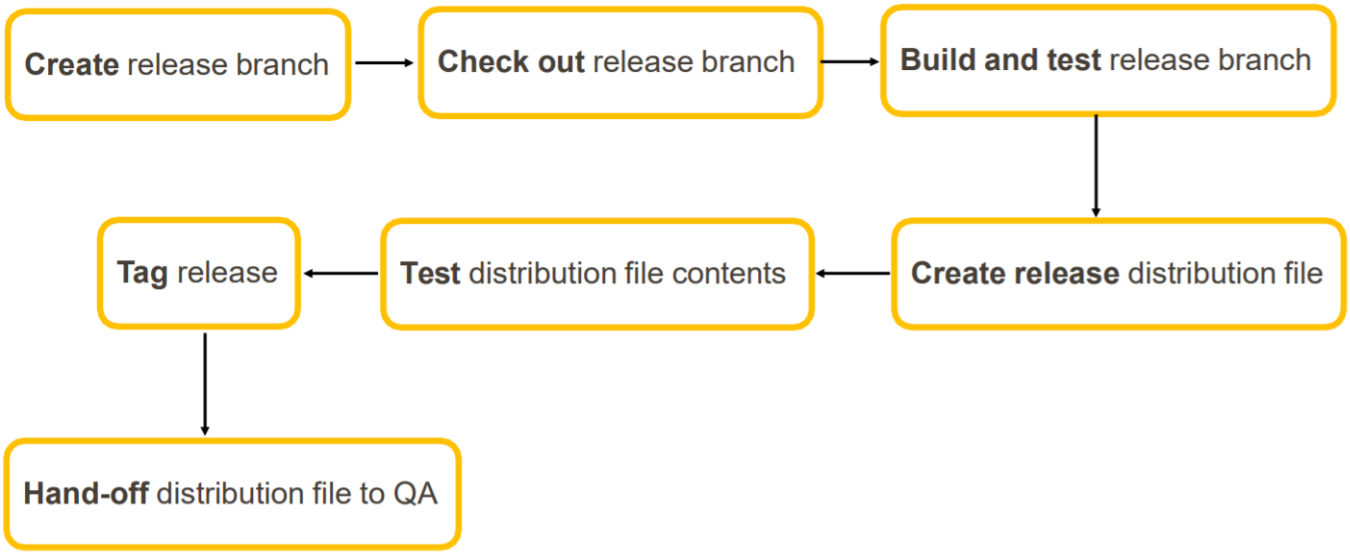

Figure 4: **Release Preparation in VCS** (Source - CZ3002 Lecture Notes - Dr Quah T.S., Jon)

5.2.1. Release Content

Based on Virtual Consultant's System Requirements Specification and Use Case Descriptions, the following are the key functionalities of the application-

1. User Registration and Login
2. (Patients) Send and (Doctors) Accept Consultation Requests
3. Telecommunication
4. View Feed
5. (Doctors) Create and Share Posts
6. View Own Profile
7. (Patients) View Doctor's Profile
8. View Chat History
9. (Patients) Search Doctor's Profile

Release Version	Release Type	Release Content
0.0.0	Internal (within team)	Use Cases 1 to 5 (as mentioned above). These use cases form the base of the application and need to be implemented and tested before a user-facing release is made.
0.0.1	Internal (within team)	Use Cases 6 and 7. These are secondary features but add great value to the application so should be implemented and tested out before the first major release.

1.0.0	Major (to users)	All functionalities implemented and tested out in internal release 0.0.1 will be made available to users. With this release, Virtual Consultant will be made available on all major application stores such as PlayStore and AppStore. The team will then start gathering user feedback to help improve the application through future releases.
1.1.1	Minor (to users)	Use Cases 8 and 9. Relevant notification mechanisms will be employed to let users know of the availability of this feature. Again, the team will gather information to make necessary amendments for future releases.
1.1.X	Revision	Based on bugs and feedback received from users, the application will be updated regularly. The updated versions will be available for users to download as per their convenience.

Table 3: Release Content

5.2.2. Release Schedule

The Release Schedule is an essential aspect for Virtual Consultant as the frequency of releases can determine the user's satisfaction. Users might not be satisfied with the product if the frequency of releases is too low as it may be deemed as the application is not well maintained and does not have regular updates to implement new features. However, if the releases are too frequent, this may annoy the users and they may opt to skip the releases, resulting in them using the older version of the application.

The following table is an approximate schedule for the different releases version specified below:

Release Version	Date of Release
0.0.0	24th August 2021
0.0.1	10th September 2021
1.0.0	17th September 2021
1.1.1	15th October 2021
1.1.X	Recurring monthly basis

Table 4: Release Version and Dates

The initial version of Virtual Consultant was first released on the 24th of August 2021. Under the subsequent release versions, minor updates and patches were implemented. The minor releases and patches were spaced out to ensure that the users will not have the need to constantly update the application, and at the same time, assuring the continuous maintenance and improvement of the application.

5.2.3. Release Impacts

Release	Business Process Impact	System Impact	Goals and Objectives
0.0.0	Completes the essential features of Virtual Consultant as a product	Updated the source code in the main branch	Complement implementation. Conducted testing of essential features of the application.
0.0.1	Add product value with the help of the new features	Release branch tagged and ready for deployment in Git VCS.	Virtual Consultant ready for deployment to actual users
1.0.0	Product released to users	Main branch is ready for new changes to be made.	First major release to users.
1.1.1	Improve business value through the addition of important features,	Minor release branch tagged and release deployed to users.	First minor release to users with the additional feature such as displaying the additional information of Virtual Consultant
1.1.X	Improve user experience through bug squashes	Parallel updates of main and release trunks in Git VCS	Remove bugs, deploy patches and introduce minor features improvement.

Table 5: Impacts on Release

In addition to the impacts mentioned above, Team 404Found has also deployed a Build - Package - Deploy process. The following machines that are involved are shown below:

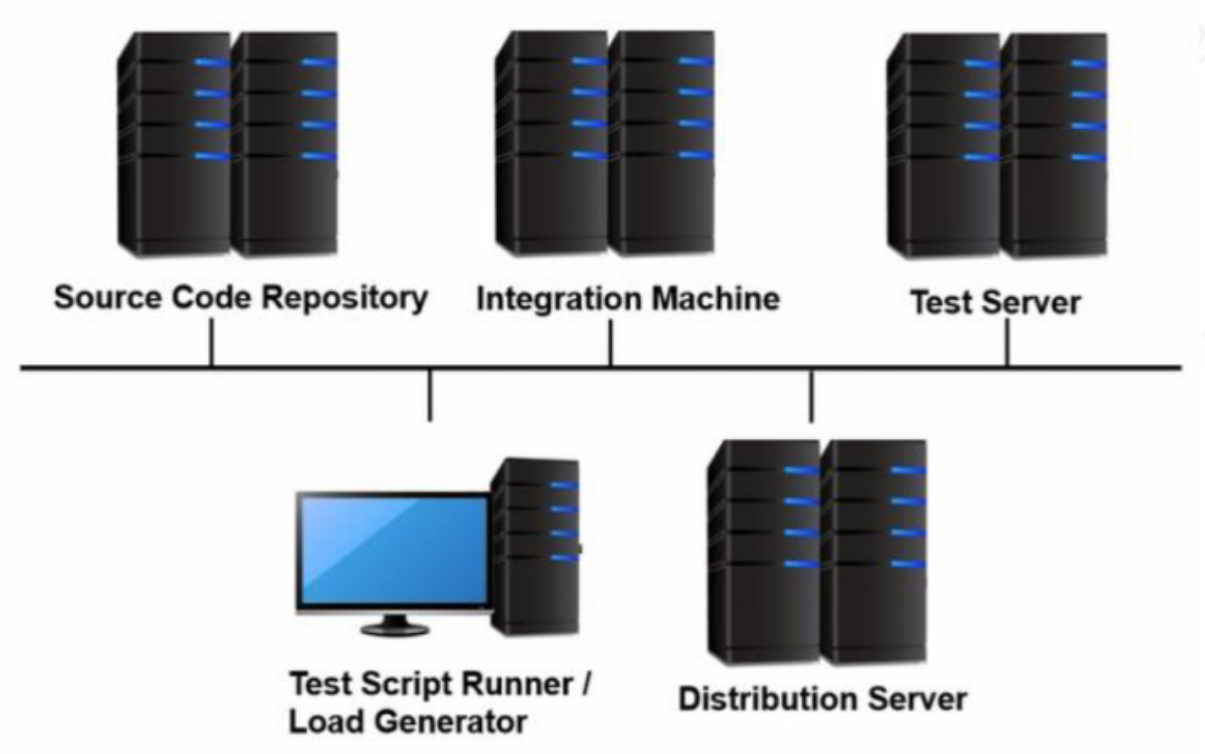

Figure 5 : Build-Package-Deploy Configuration (Source - CZ3002 Lecture Notes)

All the machines that are shown above are involved in all of the releases. The source code repository contains the source code, integration machines are responsible for integrating different sub-systems together while the test servers and test scripts runners carry out the effective testing prior to any releases. The distribution server helps to distribute both the internal and external releases.

It is essential to identify the impact of each release as it helps to improve the quality of future releases and provides a good baseline. If any release regardless of it being major or minor encounters an issue, it will be easier to avoid similar mistakes in future releases. In order to add this process, Team 404Found will ensure that all releases and related processes are properly documented and made available to the entire team. There will also be guidelines and steps provided in cases where issues are encountered in the process of each release. These will help to mitigate the impact of errors and prolong users' satisfaction.

5.2.4. Release Notification

After which a release version is generated, it is important to let all stakeholders and users of Virtual Consultant know about its availability. This can be achieved through a detailed and well-laid release notification mechanism. Notifying the users of a new release ensures that the users understand that the application is constantly behind updated and improved to give them a better user experience.

The release notification mechanism involves the use of the following media:

1) **Push Notifications** on the phone from the relevant application store that Virtual Consultant will be made available on (AppStore for IOS, PlayStore for Android)
2) **In-App Notifications** such that users are reminded every time they use the application
3) **Email and text messages reminders** for users who have indicated their contact details in Virtual Consultant
4) Detailed information upon user request through **customer hotlines**

Such extensive methods of notifications ensure that users stay updated and do not miss out on any release, providing them with a better experience when using the application.

On top of the methods mentioned above that are intended for the users of Virtual Consultant, it is imperative to alert the entire team about the approval of a new release and the changes it undergoes. This is to ensure that all members of Team 404Found are aware of the new version even through they might not have work on that particular release. The primary mode of notifications for team members will be the official Email IDs, team meetings, and briefings as well as text messages on the registered mobile phone numbers.

As shown below will be the information and timeframe included in the notification:

Stakeholders	**Information included in the notification**	**Timeframe for receipt of notification**
Users	Changes made include the updated and added features, bug fixes, and how the new updates will provide the user with a better users' experience	One day prior to the release of the version, followed by recurring reminders in the application
Virtual Consultant team	Important information about the architecture changes, availability of documentation, and the team members that are directly involved in the development of the specific release and the changes made in the application.	Immediately after the approval of new release

Table 6: Information and timeframe

6. GLOSSARY

Term	Meaning
Virtual Consultant	The website developed by 404Found
Use Case Diagram	Diagram showing the different use cases of

	interaction between the system and actors such as doctors and patients in this case.
Release	A version of the application that is made available for public use