**Introduction**

We are working with F5 industries to create a capture the flag learning platform. A capture the flag event is one that provides ethical hacking challenges to a user and when the user can successfully complete the challenge they are rewarded with a token. Depending on the type of CTF event, the token may be used to continue to a more difficult challenge or be used to add to a user’s score or both. A user’s score is displayed on a leaderboard to promote competition and to provide an incentive to keep going.

We aim to create a CTF learning platform that is targeted at users in the age range of 16-20. Although this age group is our primary target, this program will be an ideal learning tool for anyone who would like to start getting into hacking but does not possess the technical knowledge to participate in many other available CTF applications, which have a much higher barrier to entry regarding technical knowledge.

**Minimum Viable Product**

Have a backend and frontend implemented to the point where we can start adding design challenges that can be tested. For each of these challenges we will need to compile documentation on the methods/languages that users will need to understand to solve the challenges. We do not necessarily have to write the documentation ourselves but can compile already existing documentation and credit the creator(s) as necessary. We also plan to have several beginner-level challenges available to users. These are secondary to getting the backend implemented and at first, we may have some challenges designed, but will be unable to implement them until the back end is ready. Once we have that up and running, we can start adding the challenges as modules.

**Assumptions**

* It is assumed that we can use Kubernetes to deploy to both bare metal and cloud environments like Amazon EKS, Google Cloud GKE, and Azure AKS.
* It is assumed that we can repackage existing articles in more readable format in our documentation viewer and cite their original source.

# **Epics**

# Epic 1 - User Interface

|  |  |  |  |
| --- | --- | --- | --- |
| User Stories | Acceptance Criteria | Story Points | Priority level |
| As a user, I want to be able to run this in an online shell environment, so I do not have to install anything on my personal computer. | * Application runs in a web browser. * Environment is secure from outside threats and other users using network policies. | 3 | High |
| As a user, I want to be able to view available challenges so I can select one to attempt. | * Home screen displays available challenges that the user can select from which will spin up a container. | 1 | Medium |
| As a user, I want to be able to create an account so that I can track my progress. | * User can create an account that they can log into. * Account keeps track of completed challenges. | 2 | Low |
| As a user, I want to be able to modify or delete my account to keep it up to date. | * User can view their public profile and modify it. * User can view their private details and modify them. | 1 | Low |
| As a user, I want to be able to view my own statistics to compare myself against others. | * User can view their own statistics. * Users can compare their own statistics against a leaderboard. | 1 | Low |
| As a user, I want to be able to filter the available challenges to better find ones that are applicable to me. | * User can easily see the filter controls on the view challenges screen. * User can filter by challenge topic or category. * User can filter by challenge difficulty. | 1 | Low |
| As a user, I want to be able to report problems to help improve the challenges. | * User can easily find the “report a problem” button on any screen of the application. * User can easily fill out a title and description to submit with any logs / metrics from the application. | 1 | Low |

# Epic 2 - Administrator

|  |  |  |  |
| --- | --- | --- | --- |
| User Stories | Acceptance Criteria | Story Points | Priority level |
| As an administrator, I want to be able to set the application up easily. | * Administrators can easily access documentation to get started with the platform. | 1 | High |
| As an administrator, I want to have access to documentation for setting the platform up in both a bare metal and a cloud environment. | * Administrators can easily access documentation that shows them how to install in a bare metal environment. * Administrators can easily access documentation that shows them how to install in a cloud environment (e.g., AWS, Azure, GCP). | 2 | High |
| As an administrator, I want to have access to documentation to be able to create new challenges. | * Administrators can easily access documentation that shows them how to create and edit challenges and deploy them to the platform. | 2 | Medium |
| As an administrator, I want to be able to view system logs so that I can make sure no one is abusing the platform. | * Administrator can view the resource usage of each user. * User can view logs from terminal sessions. | 1 | Low |
| As an administrator, I want to be able to view user statistics so I can see if users struggle with a particular challenge. | * Be able to compare the number of attempts with the number of successful attempts. | 1 | Low |
| As an administrator, I want to be able to view user reports and feedback so that I can make improvements to the system. | * Be able to view user submitted comments. * Separate user comments by type (e.g., bug report, feature request, other) | 1 | Low |

# Epic 3 – Challenges

|  |  |  |  |
| --- | --- | --- | --- |
| User Stories | Acceptance Criteria | Story Points | Priority level |
| As a user, I want challenge documentation to be available so that I can learn about the topics before I apply them in a challenge. | * Users can access readily available documentation that is concise and well-written. * Users can have the documentation open at any point, even with a challenge running. | 3 | High |
| As a user, I should be able to pick from at least two challenges that cover unique and interesting topics. | * User can pick from at least two different challenges designed by our team. * User can decide between an easier or more difficult topic, and the difficult one may depend on skills learned from the easy one. | 3 | High |
| As a developer, I want to be able to save the state a challenge is in, so the user does not have to start from the beginning of each challenge each time they log in. | * Allow the user to perform some sort of state save where their current progress will not be lost if they must do something else in the middle of a challenge. * Could be implemented with checkpoints based on the complexity of the specific challenge. | 3 | Medium |
| As a developer, I want the system to provide context-aware hints so that users do not become discourage. | * System can detect if user has been in a state for longer than a pre-determined amount of time and provide them with a hint that is relative to their current progress within the challenge. | 3 | Medium |