CySim

Sdmay23-11

Client - Doug Jacobson

Brady Schlotfeldt - Backend Developer
Matthew Daoud - Full Stack Developer
Bailey Heinen - Full Stack Development
Ethan Swan - Full Stack Development
Jacob Boicken - Full Stack Developer

Introduction

- What is CySim?
  - CySim is a work-in-progress cybersports complex
    - Host cyber security scrimmages or skill development events for learners
  - A testing platform to for companies and academics to challenge a candidate/student's aptitude
- CySim's goal
  - Allow the next generation of cybersecurity students/learners to gain experience within the field

Scope of Work

- CySim is a multi-year project
  - The full network will be implemented over time
    - Virtual Machines (VMs), Security Operations Center (SOC)
  - The end goal is a physical venue to host CySim's competitions and network
- Our focus is the front-facing web application
  - Primary interface between CySim's users and its network features
  - Consists of the main user interfaces
    - Team portals, scoreboard, game information
- Passing the project along
  - Supported by detailed documentation and developer features

Implementation Architecture

- How was CySim designed?
    - .NET Core Framework
    - MS SQL
    - JQuery
    - Bootstrap
- Web Application Pages
    - Home
    - Login/Register/Profile
    - Tutorial
    - Scenarios
    - Team Registration
    - Scoreboard

CySim Pages

CySim Pages Cont.

Profile

Email

Password

Two-factor authentication

Personal data

Profile

Username

Admin@gmail.com

Phone number

Save

Profile

Email

Password

Two-factor authentication

Personal data

Change password

Current password

New password

Confirm new password

Update password

Profile

Email

Password

Two-factor authentication

Personal data

Manage Email

Email

Admin@gmail.com ✓

New email

Admin@gmail.com

Change email

Profile

Email

Password

Two-factor authentication

Personal data

Personal Data

Your account contains personal data that you have given us. This page allows you to download or delete that data.

Deleting this data will permanently remove your account, and this cannot be recovered.

Download

Delete

CySim Pages Cont.

Welcome to the Tutorials Page

Some general background on the Tutorial Page:

- Below you will see the resepective tutorials for your team. If you are red you will have access to red tutorials, if blue you will have access to blue tutorials.
  - There is four total tables for tutorials. Two red and two blue, the two red are for tutorials as well as gametype, and blue is for tutorials and gametype too.
  - Admin is able to create/edit and delete tutorials as well as assign them to respective teams.
- You will be able to click the hyperlinked lines for each tutorial, this will allow you to download the pages and view them to better understand CySim.

Access Tutorial Documents

[Add a Tutorial]

Red Team Tutorials

File Name	Description	Actions
NMAP.pdf	Tutorial on Nmap	Edit Delete
Meta-Tutorial.docx	Metasploit Tutorial	Edit Delete

Red Team GameTypes

File Name	Description	Actions
RedTeamGameType1.pdf	Red Team GameType 1	Edit Delete
RedTeamGameType2 .pdf	Red Team GameType 2	Edit Delete

Blue Team Tutorials

File Name	Description	Actions
LDAP.docx	Tutorial on Setting up LDAP	Edit Delete

Blue Team GameTypes

File Name	Description	Actions
BlueTeamGameType1.pdf	Blue Team GameType 1	Edit Delete
BlueTeamGameType2.pdf	Blue Team GameType 2	Edit Delete
BlueTeamGameType3.pdf	Blue Team GameType 3	Edit Delete

Edit the LDAP.docx Tutorial Document Below

Tutorial document to replace LDAP.docx contents (Optional):

[Browse...]   No file selected.

Provide the file name for the document:

LDAP.docx

Provide the description for the document:

Tutorial on Setting up LDAP

☐ Is this a red team document?

☐ Is this a Game Type?

[Update] [Back]

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Access Tutorial Documents

Blue Team Tutorials

File Name	Description
LDAP.docx	Tutorial on Setting up LDAP

Blue Team GameTypes

File Name	Description
BlueTeamGameType1.pdf	Blue Team GameType 1
BlueTeamGameType2.pdf	Blue Team GameType 2
BlueTeamGameType3.pdf	Blue Team GameType 3

CySim Pages Cont.

Add a New Team

Select a Profile Picture to Upload

| Browse... | No file selected. |

Team Name

☐ Red Team?

Create   Back

Welcome to Team Registration

Some things to know before you register for a team

- If you do not see a team that you wish to join then you will be able to create your own
  - The creator of a team is also able to edit and delete the team that they create
- If you see a team that you wish to join then you will be able to click join on that team
- Each team has the ability to have up to 6 players so choose wisely

Red Teams

Add a New Team

Profile Picture	Team Name	Available Spots	Users	Controls
	Vipers	6		Join
	Vultures	6		Join

Some things to know before you register for a team

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  - The creator of a team is also able to edit and delete the team that they create
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Red Teams

Add a New Team

Profile Picture	Team Name	Available Spots	Users	Controls
	Vipers	6		Edit Delete
	Vultures	6		Edit Delete

Blue Teams

Profile Picture	Team Name	Available Spots	Users	Controls
	The Goats	6		Edit Delete
	Eagles	6		Edit Delete

8

CySim Pages Cont.

Add a New Scenario Document

Select Scenario Document to Upload

| Browse... | No file selected. |

Provide the description for the document:

☐ Red Team?

Create   Back

Access CySim's Scenario Documents

Add a Scanario Document

Red Team Scenario Documents

FileName	Description	Actions
RedScenario1.docx	Red Team Scenario 1	Edit Delete
RedScenario2.pdf	Red Team Scenario 2	Edit Delete

Blue Team Scenario Documents

FileName	Description	Actions
BlueScenario1.docx	Blue Team Scenario 1	Edit Delete
BlueScenario2.pdf	Blue Team Scenario 2	Edit Delete

Access CySim's Scenario Documents

Red Team Scenario Documents

FileName	Description
RedScenario1.docx	Red Team Scenario 1
RedScenario2.pdf	Red Team Scenario 2

CySim Pages Cont.

Accomplishments

- Microsoft Identity
  - Login and register account
  - Edit their profile
- Team Registration Page
  - Users can create teams
  - Red/Blue users can join teams
    - One Red/Blue user can only join one team at a time
    - Each Team can only allow up to 6 spots
  - Team Creators/Admins can edit all functionalities of a team

Accomplishments Cont.

- Scoreboard Page
  - Displays the current standing of overall score for Red/Blue team respectively
  - Admins have the ability to edit the team scores manually
- Tutorials
  - Red/Blue users can see PDF/Docx tutorials
  - Players follow on their own to learn skills and assist with scenarios
  - Admins can add, edit and delete tutorials
- Scenarios
  - Red/Blue users can see PDF/Docx scenarios
  - Provide event for players to accomplish
  - Admins can add, edit and delete scenarios

Accomplishments Cont.

- MS SQL Server
  - CySim can store user, team, and game data
- Error handling and alerts
  - Prevent disallowed operations and warn users
- Logging system
  - Assist developers with detailed logs about app behavior
- Full design documentation to pass on to future developers

Accomplishments Cont.

- Looking at our goals for the last semester.
  - We were able to accomplish besides two
    - We were not able to deploy the application to a server as one is not available yet
    - We found that Iowa State blocks the email port, so we were told to hold off on the email service
- Looking at our milestone goals
  - We meet or even exceeded deadlines that we had in place

CySim
GANTT CHART
⭐ = MILESTONES COMPLETED

	DEC	JAN	FEB	MAR	APR	MAY
SCOREBOARD	DEC 1 - JAN 5 ⭐					
TUTORIALS		DEC 20 - MAY 5				⭐
TEAM REGISTRATION				MAR 1 - APR 5 ⭐		
BACKEND		JAN 5 - APR 15			⭐	
NETWORKING AND INTEGRATION		DEC 1 - MAY 5				⭐
DEV EXPRESS REPORTING			FEB 12 - MAR 5 ⭐			
DEBUGGING		DEC 1 - MAY 5				
MICROSOFT IDENTITY TOUCHUP	JAN 5 - JAN 15 ⭐					
LOGGER IMPLEMENTATION				MAR 5 - MAR 18 ⭐		
SERVER FUNCTIONALITY			FEB 21 - MAY 5			⭐
EMAIL SERVICE					APR 1 - MAY 5 ⭐	

Key Contributions

Bailey:

MS SQL, Microsoft Identity, Entity

Developed beginning phases of CySim to establish a route

Beginning design work for all of the views

Guided team to get started

Implement microsoft managers for data

Development on Team Registration and Scoreboard

Github manager

Documentation throughout the semester.

Matthew:

Help windows team members get started

Developed Scoreboard frontend helped backend

Final testing of the master branch

Wrote in depth manual to install/operate CySim

Brady:

Developed tutorials backend and frontend

Creation of mock tutorials for demo

Documentation throughout the semester

Scheduled team meetings and workshops

Pushed team to meet deadlines

Jacob:

Developed scenarios backend and frontend

Assisted with tutorials backend

Updated .NET version and Nuget packages

Created unit, integration, and security tests

Handled automation for testing

Ethan:

Plotting out project direction with client

Development on Team Registration

Editing team communications and project documentation

Challenges and Solutions

- Team registration
  - Users can only join one team
    - Made a new role called Team User
  - Refresh views after actions so user does not see unnecessary buttons
    - Sign-in manager provides ability to refresh the UI
- Scoreboard implementation
  - Sorting the scoreboard
    - Access the database context
    - Order teams by score in descending order

Challenges and Solutions Cont.

- Tutorials/Scenarios
  - Loading files from local directory to CySim directory
    - Using IFormFile to transfer files in application
- Accessing the application locally
  - Different host OSes cause issues with .NET data control
    - Own local MS SQL
    - Own local Migrations
- Microsoft Identity
  - Login and register
    - Give users a role at login to load different views
    - Passwords must meet security requirements

Future Work

- Deploy to a permanent server
- Launch Virtual Machines (VMs) to make up the playfield
  - Various hosts for users to defend/attack
  - Interface with the web app
- Implement Nagios (server monitoring software) to power scoreboard
  - Blue and Red teams generate scores based on network behavior and game type
  - Scoreboard to display visuals that represent game progress
    - Include graphic visualizers to enhance player experience
- Polish the frontend
  - More aesthetically pleasing UI
  - Support more window sizes
- Build physical location
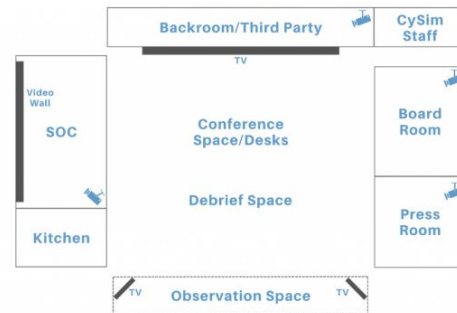
Conclusion

- We are satisfied with the current status of CySim and excited to watch its progress in the coming years
- Project summary
  - Implemented key interface features
    - Scoreboard currently offline, but correctly organizes data
  - Supports user, team, and documentation management
  - Debugged all web application features
  - Ready to be carried on by next developers

Thank you!