**CYB 333 Security Automation Class Project:**

**Automation in Multi-Server Firewall Configuration**

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CYB 333 Security Automation

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**Project Title:** Automation in Multi-Server Firewall Configuration

**PROJECT UPDATE**

**Project Progress Overview:**

* **Completed Tasks:**
  + **Summarize the key tasks and milestones you have accomplished so far.**
  + **Highlight any significant achievements or features implemented.**
  + **Link to Github repository (just needs to be started).**

**2. Remaining Work:**

* **Pending Tasks:**
  + **List the tasks that are yet to be completed.**
  + **Provide an estimated timeline for completing these tasks in the final week.**

**3. Challenges and Solutions:**

* **Obstacles Faced:**
  + **Briefly describe any challenges or obstacles you have encountered.**
  + **Explain how you have addressed these issues or plan to overcome them.**

**4. Team Collaboration (if applicable):**

* **Team Dynamics:**
  + **If working in a team, mention how the collaboration is progressing.**
  + **Note any changes to roles or responsibilities since the project's inception.**

**5. Use of AI Tools:**

* **AI Assistance:**
  + **Describe how you have utilized AI tools (e.g., GitHub Copilot) up to this point.**
  + **Include any specific examples where AI tools significantly aided your development process.**

**FINAL SUBMISSION REQUIREMENTS**

**1. GitHub Repository**

* **Repository Link:**
  + **Provide the URL to your GitHub repository containing all your project code.**
  + **Ensure the repository is publicly accessible or grant access to the instructor.**
  + **If you use API keys don’t share them in Github**
* **README File:**
  + **Describes the project objectives and features.**
  + **Provides instructions on how to set up and run your code.**
  + **Lists any dependencies or prerequisites.**
  + **Offers any additional information necessary for understanding your project.**
  + **Include a detailed README.md file that:**
* **Code Documentation:**
  + **Ensure your code is clearly documented with comments explaining key functions and logic.**
  + **Use consistent coding standards and meaningful variable/function names.**

**2. Final Project Report**

**Submit a written report (approximately 1,000 to 1,500 words) that includes the following sections:**

* **Introduction:**
  + **Briefly restate your project objectives and provide an overview of what your project achieves.**
* **Development Process:**
  + **Describe your approach to the project, including planning, design, and implementation stages.**
  + **Mention any methodologies or frameworks you employed.**
* **Use of AI Tools:**
  + **Include prompts and screenshots.**
  + **Provide specific examples of how you utilized AI tools (e.g., GitHub Copilot) during development.**
  + **Discuss the value these tools added to your project.**
  + **Reflect on any limitations or challenges faced while using AI.**
* **Project Challenges:**
  + **Identify significant obstacles encountered during the project.**
  + **Explain how you addressed these challenges and what you learned from them.**
* **Reflection on Learning:**
  + **Discuss how the project contributed to your understanding of security automation.**
  + **Reflect on skills gained or improved upon during the project.**
* **Time Management:**
  + **Indicate the total time spent on the project.**
  + **Reflect on how you managed your time and any strategies that were effective.**
* **Video demonstration or screenshots showing the code successfully running.**
* **Team Collaboration (if applicable):**
  + **Describe how you and your partner collaborated.**
  + **Outline the division of responsibilities and how you coordinated efforts.**
* **Conclusion:**
  + **Summarize the outcomes of your project.**
  + **Offer thoughts on potential future enhancements or next steps.**

**Description:**

Cognitive or mental fatigue is the state of reduced cognitive capacity resulting from sustained mental effort (Steward & Chib, 2024). For personnel in a workplace environment, this term is more commonly recognized and described as mentally and physically drained. Recent studies prove repetitive tasks indirectly increase the risk of errors and accidents (Steward & Chib, 2024). For professionals in computer networking, repetitive tasks are a standard part of the job. Among these tasks, configuring firewall security is particularly important and critical because it establishes a key line of defense against cyberattacks. As a result, the configuration and management process must be carried out without errors.

Incorporating automation capabilities for configuring firewalls across multiple servers can mitigate these errors and increase productivity for any organization. This project aims to assist with firewall configuration across multiple servers via SecureShell, SSH (Canonical Ltd., n.d.). I plan to incorporate the following features that will allow pre-defined firewall rules to be applied remotely and uniformly across multiple servers with one action. In order to achieve this, the script will require a feature to allow iteration over multiple servers by defining server lists and looping through each one to apply the same operation. To access servers simultaneously, the script will require a remote connection feature to open SSH sessions to each server. Data and evidence are essential for analysis to identify efficiencies and vulnerabilities; therefore, the script features autonomous error detection, reporting, logging, and display—finally, a script to support Python best practices and good housekeeping.

**Team Information:**

This project is an individual effort

**Use of AI Tools:**

Visual Studio Code features AI tools extensions, GitHub Copilot, and Copilot chat, which enabled and assisted me in developing this proposal. The copilot feature helped identify repositories that provided models and scripts that share the same or similar objectives as my project (Marinagaid44, 2025). In addition to framework models, Copilot’s generative suggestions and code completions help to provide constant input and inspiration. While providing suggestions, Copilot chat helps clarify code suggestions and fixes I am unfamiliar with. This feature promotes and reinforces Python knowledge retention and comprehension while helping eliminate errors, bugs, and traceback conditions in my script.

**References**

Canonical Ltd. (n.d.). *UncomplicatedFirewall*. Ubuntu Wiki. <https://wiki.ubuntu.com/UncomplicatedFirewall#More_Information> (Canonical Ltd., n.d.)

Marinagaid44. (n.d.). *Marinagaid44/Firewall-configuration-automation: Firewall configuration automation: Write A bash script to automate the setup and management of firewall rules across multiple servers*. GitHub. <https://github.com/Marinagaid44/Firewall-Configuration-Automation>

Steward, G., & Chib, V. S. (2024). The Neurobiology of Cognitive Fatigue and Its Influence on Effort-Based Choice. *bioRxiv : the preprint server for biology*, 2024.07.15.603598. <https://doi.org/10.1101/2024.07.15.603598>