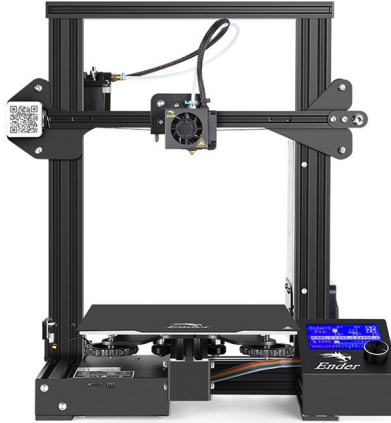


Secure and Remote 3D Printing Milestone Progression



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Sponsored by

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Client

Mike C Newton

Progress of current Milestone (progress matrix)

Task	Completion %	Tiffanie	Carl	Isaiah	Nick	To do
1. Test/demo of the entire system	100%	33%	33%	34%	0%	
2. Evaluation results	100%	100%	0%	0%	0%	
3. Create user/developer manual	100%	0%	100%	0%	0%	
4. MitM script for decryption	100%	0%	0%	100%	0%	

1. Discussion (at least a few sentences, ie a paragraph) of each accomplished task (and obstacles) for the current Milestone:

- Task 1: To test the entire system, we created a user account and uploaded a gcode project. We then had to switch to an admin account to view the queue. In the queue we deleted projects, sent a project to the 3D printer, and sorted the projects. Then when the printer started to print the project we knew that the remote printing worked. From there we tested the security features. We started with trying to start the server, which requires an admin account to be created. Then when connecting to the website the admin must allow the ip address otherwise it cannot be connected to. From there we checked that the website was https and checked the wireshark traffic to ensure the data was encrypted.
- Task 2: The compilation of results was based on when students returned the results from the google form that was sent out. We created one that focused on the efficiency of the queue and printer in general and the other was based on user interaction on the web application. The results were then compiled into graphs to shed light on issues present in the project and what needs improvement.
- Task 3: The creation of the user manual was important to provide a way to show how to use the project. This document talks about how to start the

web server, download dependencies, and run the actual project. The manual also talks about how to connect the raspberry pi to the 3D printer as well as the GreatFet. Because most of the project is the web server, we have also added how to download the setup from github for those who don't know how to use it.

- Task 4: The MitM script was created because there were a few questions about the last milestone of how we knew what data was being pulled from the keyboard. The script was created to be able to change the data from a device to plain text to ensure you were getting the expected responses. The data will convert the bytestring to ascii to show each of the key presses.

Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:

- Tiffanie Petersen: Tiffanie has compiled more evaluation responses to gain more feedback on the project. She has also worked on the documentation needed for the showcase as well as the forms. She also created the presentation and updated the poster and ebook page. She also took screenshots of some of the security features in place.
- Carl Mann: Carl was in charge of writing the user manual for this milestone. He also planned a meeting with Dr. Sid to talk about our progress. He also was working with the team to get the final demo of the project.
- Isaiah Thomas: Isaiah was in charge of writing a script to change the MitM data to plain text to prove we knew what we were intercepting (from the keyboard) and we could see that we were getting the expected results. For example when the key "P" was pressed we would see "P" not another character. He also helped with the final demo of the project.
- Nick Contrell: Nick helped to fill out a form for the showcase.

2. Plan for the next Milestone (task matrix) or [skip if this is for Milestone 6]

SKIP	SKIP	SKIP	SKIP	SKIP
SKIP	SKIP	SKIP	SKIP	SKIP
SKIP	SKIP	SKIP	SKIP	SKIP

3. Discussion (at least a few sentences, ie a paragraph) of each planned task for the next Milestone or "Lessons Learned" if this is for Milestone 6

- A lesson that we learned was that there is a lot more documentation required on a project than originally thought. Documentation is important for outside users to know where the project is going and how to use the remote 3D printing capabilities.
 - We also learned that the GreatFet cannot intercept traffic from the Ender 3 because there is a chip which changes the usb interface to a serial interface. This causes the GreatFet to grab data that is not how the extruder head is moving.
 - Octoprint is good at checking the bounds and settings in gcode which will alter settings to fit the 3D printer. If a print is too big for the print bed, octoprint will throw an error and not start the project which allows the printer to stay in its working position. Because the extruder gets very hot it is important that it does not touch the print bed or any other part of the printer, it must stay 0.2 mm above the bed.
 - 3D printers are not as accurate as originally thought. This means that usually the printer must be calibrated between every 5-10 prints but in our case it was every time. Because we thought that the printer was good after the original set up, we did not realize that part of the problem with the prints was caused by the bed leveling but really it was off by 3 degrees.
4. Date(s) of meeting(s) with Client during the current milestone:
- None (Dr. Siddhartha Bhattacharyya acts as an intermediary between our team and the client until further notice)
5. Client feedback on the current milestone
- The client will be met once the project proceeds further. Depends on when Dr. Siddhartha Bhattacharyya decides the product is ready.
6. Date(s) of meeting(s) with Faculty Advisor during the current milestone:
- 4/18
7. Faculty Advisor feedback on each task for the current Milestone
- Task 1: A complete demo has been discussed and will be organized within the next 2 weeks.
 - Task 2:
 - Task 3: Elaborate on security measures that are yet to be implemented or may need to be expanded upon. Describe what measures have been taken so they can be evaluated.
 - Task 4: Keep developing MITM proof of concept. Also continue to investigate the connection from OctoPrint to the printer.

Faculty Advisor Signature: _____ Date: _____

Evaluation by Faculty Advisor

- **Faculty Advisor: detach and return this page to Dr. Chan (HC 214) or email the scores to pkc@cs.fit.edu**

■ Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Tiffanie Petersen	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Carl Mann	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Isaiah Thomas	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Nick Contrell	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____