Campus Connect

Members:

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This document provides a high-level overview of the Campus Connect project. More in-depth technical documentation, including deployment, architecture, and implementation details (for Deliverable 2), is available at the following link:
https://tylergeiger513.github.io/CampusConnect-Prod/

Chapter 1. Vision

Campus Connect is an application designed to foster meaningful collaboration among university students. Inspired by platforms like Discord, but focused exclusively on academic contexts, our goal is to build a community where students can:

- Connect with peers on campus
- Form study groups and class-specific subgroups
- Collaborate on assignments and projects
- Communicate in real time via chat and messaging
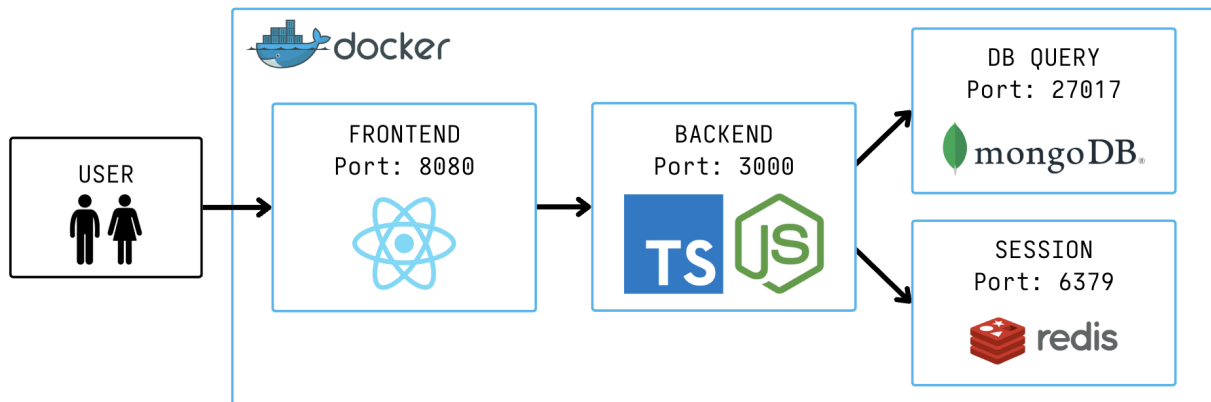
Chapter 2: Design & Implementation

Our system consists of a Kubernetes-deployed full-stack application, featuring:

- A React frontend hosted via NGINX
- A NestJS backend for API and WebSocket communication
- MongoDB and Redis databases for persistence and sessions
- NGINX Ingress to route traffic

All services are containerized and orchestrated in Kubernetes using Helm, Skaffold, and Minikube (for both development and deployment in CloudLab)

Backend

- **NestJS** application providing REST and WebSocket APIs
- Uses **express-session** with **Redis** for session handling
- Authorization handled via guards, decorators, and manual logic
- Stateless service design using Redis/Mongo for persistence

Frontend

- **React** app bundled and served through an NGINX container
- Reverse proxy setup to route /api and WebSocket paths
- Handles all user interaction, chat, authentication, and navigation

Kubernetes

- **Helm** templates used to manage service, deployment, ingress, and configmap manifests
- **Minikube** used for both local dev and CloudLab production
- **NGINX ingress controller** routes HTTP and WebSocket traffic to backend/frontend services

Runtime Configuration

- Dynamic environment variable injection using *envsubset*
- Helm templates accept a *domain* value for configuring all services

Chapter 3: Docker Build & Deployment Procedures

Backend Image

- **Multi-stage Node.js Dockerfile**
- Production-only dependencies
- Compiled and run as non-root *appuser*
- Environment passed via Helm ConfigMap

Frontend Image

- React built using Node
- Served via NGINX with runtime templated config
- Uses envsubst to inject runtime variables (e.g., backend hostname)

Helm

- Helm charts structure the deployment, exposing the frontend via Ingress, injecting config via ConfigMaps, and supporting environment switching via Skaffold profiles.

Skaffold

- Used for rapid local development and CloudLab production deployment
- Profiles allow switching between local/production configs

install_deps.sh

- Installs Docker, Helm, Skaffold, Minikube
- Creates and configures ccuser for non-root deployments

startup.sh

- Starts Minikube, ingress, and socat port forwarding
- Deploys app via Skaffold with dynamic domain resolution

Preliminary Testing

- Successful deployment on CloudLab with Minikube tunnel and ingress
- WebSockets, auth, and session logic all tested live
- Confirmed public accessibility at http://$(hostname -f)

Chapter 3: Docker Image Procedures & Data Management

Backend Image

- Multi-stage Dockerfile using Node 20
- Installs NestJS CLI and production dependencies
- Runs as appuser (non-root)
- Uses ConfigMap and environment variables for configuration

Build: docker build -t campus-connect-backend -f Dockerfile.backend.prod ./backend

Frontend Image

- React app built in Node, then served via custom NGINX config

- NGINX config dynamically injected with environment values using envsubst

Build: docker build -t campus-connect-frontend -f Dockerfile.frontend.prod ./frontend

MongoDB & Redis

- Use official images with Helm configuration
- Redis stores sessions using session:{sid} keys with TTL
- MongoDB manages user, message, and channel collections

Collection	Fields
users	_id, email, username, passwordHash, friends, friendRequests, etc.
channels	_id, participants[], type, name
messages	_id, channelId, senderId, content, createdAt, edited

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WORK EXPERIENCE

PJM Interconnection L.L.C.   **Audubon, PA**

Cyber Security / Platforms and Client Operations   *May 2023 - Aug 2023*

- Spearheaded the implementation of advanced security protocols, reducing vulnerabilities and enhancing overall system resilience.
- Assisted the Platforms and Client Operations team in deployment refreshes, flash drive encryption, and Image Processing.
- Assisted a cross-functional team to conduct comprehensive security audits of several Intrusion Detection Systems.
- Followed processes accurately with attention to detail while being responsible for monitoring IP address traffic coming in and out of the network.
- Created simulated phishing emails for Critical Infrastructure Protection (CIP) audits, enhancing organizational resilience against social engineering and deepening knowledge of cybersecurity awareness and compliance.

West Chester University   **West Chester, PA**

Resident Assistant   *Aug 2023 - Present*

- Implementing and enforcing all College and Campus Living policies, promoting academic excellence, addressing student needs, and encouraging involvement.
- Promoting the interaction and construction of social networks between the community and residents.
- Create, market, and lead student-centered hall programs to promote social, education, diversity, health, emotional, understanding, and growth.
- Communicating a budget, allocating money for residence hall and floor events, and collaborating with on- and off-campus offices such as counseling, student activities, maintenance, etc.
- Collaborating with orientation staff on first year and transfer student opening week activities.
- Budgeting and allocating money used for residence hall and floor events.
- Developed a positive living environment for residents, often resolving conflicts.

Top Golf   **King of Prussia, PA**

Bay Host   *Oct 2023 - Present*

- Facilitated a welcoming atmosphere for over 50 guests daily, enhancing overall guest satisfaction ratings by 50% through attentive service and efficient operations.
- Coordinated with kitchen and bar staff to streamline food and beverage service, resulting in a 10% reduction in wait times and a significant boost in customer retention.
- Trained and mentored new team members on best practices and service standards, leading to an improvement in team performance ratings by 15% within the first 6 months.
- Analyzed guest feedback to identify trends and areas for improvement, successfully addressing concerns that led to an increase in positive online reviews.

EDUCATION

West Chester University   **West Chester, PA**

Bachelor of Computer Science: Cybersecurity   *Graduation Date: Date*

LEADERSHIP EXPERIENCE

Dowdy Multicultural Center   **West Chester, PA**

Peer Mentor   *Aug 2023 - Present*

- Mentored and provided guidance to at least 6 students in the Educational Opportunity Program, resulting in an increase in program completion rates.
- Developed and implemented tailored academic plans for students, leading to several improvements in GPA averages.
- Collaborated with academic advisors to identify at-risk students and successfully implemented interventions that improved student retention.
- Organized and facilitated weekly study groups for students, resulting in a 20% increase in exam scores.

- Assisted in the planning and execution of EOP events and workshops, contributing to an increase in student participation and engagement.

SKILLS & INTERESTS

Skills: VMWare, Computer Security, Windows, Network Security, Java, Big Data Analytics, HTML, CSS, JavaScript, CI/CD and Docker, Communication, Crisis Management, Event Planning, Software Engineering, Data Structures and Algorithms, Team Collaboration, Critical Thinking, Leadership, Community Building,

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Education

West Chester University of Pennsylvania	**West Chester, Pennsylvania**
B.S. in Computer Science	Expected Graduation: Spring 2026

- **Related Coursework:** Computer Science III, Calculus I, Discrete Mathematics, Statistics, Data Structures and Algorithms, Computer Security, Computer Systems
- Participated in the 7th and 10th Annual West Chester Programming Contest
- Spring 2024 Dean's List, Fall 2024 Dean's List

University of Delaware	**Newark, Delaware**
	August 2022-May 2023

- **GPA:** 3.45/4.00
- Spring 2023 Dean's List

Projects/STEM Experience

Statistics Tutor	**West Chester, Pennsylvania**
Peer Tutor	August 2024-Current

- Assisted students in either one on one or small group (less than 4) settings to work through topics from the Statistics I course at the West Chester University Learning Assistance and Resource Center (LARC)
- Covered topics including probability, confidence intervals, tests of hypothesis', and regression
- Reviewed material and developed individualized plans to ensure each student was able learn effectively and communicated between faculty, students, and peers to ensure continuity.
- Participated in training with the College Reading and Learning Association to be certified.

Thermostat Project	**Lancaster, Pennsylvania**
	July 2024

- Programmed an Arduino UNO to take in input from a thermistor and display the temperature onto an Liquid Crystal Display(LCD), change a Tri-color LED to a corresponding color based on range, and start a DC motor depending on the registered temperature.
- Utilized the Arduino IDE to write code for communication between the arduino and components.
- Designed the circuit and implemented the appropriate techniques and components to regulate current outputs for protection of all components.

Stock Price Analyzer	**West Chester, Pennsylvania**
Solo Developer	December 2023-February 2024

- Built a program using Python that can read comma separated value (CSV) files and uses the info to visualize the information provided and attempts to predict future prices using linear regression.
- Utilized the Pandas library to create DataFrames which store the values to be visualized in graphs and the terminal, these DataFrames are then manipulated to add more detail and to be accessed for different purposes.
- Used the Matplotlib library to create plots and subplots to help visualize the information into a variety of graphs.

- Applied the scikit-learn (sklearn) library to run a linear regression model based on training and testing sets to determine the information's trend.

Weather Website   **West Chester, Pennsylvania**

Solo Developer   January 2024
- Built a website that can tell the current temperature and weather for any city in the United States.
- Used HTML to build the user interface which has a designated area to enter a city name and used CSS to style the site.
- Utilized my skills and knowledge to integrate the fetching of information using an application programing interface (API) key.
- Used JavaScript to write the functions that locate the coordinates of a given city and then use those coordinates to determine the weather, updating the HTML to display a description, picture, and temperature converted to Fahrenheit.
- Implemented throwing exceptions to prevent errors when a city is misspelled or can not be located.

Encryption/Decryption Program   **Newark, Delaware**

Solo Developer   February 2023-April 2023
- Built a program using Python which can encrypt messages providing a unique hashkey for each combination of characters, the program can also decrypt messages made using said cypher and confirms the integrity of the messages by verifying the hashkey.
- Integrated my knowledge of the ASCII table for character rotation and manipulation functions.
- Supports user inputs and can be customized to support variations of haskeys in different bases.

Technical Skills

Languages: Python, Java, HTML, JavaScript, CSS,C,C++
Libraries: Pandas, Numpy, Matplotlib, scikit-learn, Java.util
Environments/Tools: Thonny, BlockPy, jGRASP, Visual Studio Code, GitHub,Arduino IDE

Non-Technical Work Experience

Valvoline Instant Oil Change   **Lancaster, Pennsylvania**

Senior Technician   May 2022-August 2024
- Supervised a team of employees to ensure speed of service, quality work, and safety.
- Interacted with suppliers to ensure supplies and resources were properly managed and available.
- Used a variety of new technologies, and industry standards to perform a number of roles during vehicle servicing.
- Kept track of and issued disciplinary files and ensured accountability for team members.

Resident Assistant Internship and Leadership Exploration(RAILE)   **Newark, Delaware**

Intern/Mentee   February 2023-May 2023
- Attended a variety of professional workshops that addressed issues commonly seen in work places and resident halls.
- Received on-site training and met with a mentor to build and develop characteristics of a leader.
- Helped coordinate and host events to engage with members of the community.

TYLER GEIGER

Software Developer

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in linkedin.com/in/tyler-geiger

WORK EXPERIENCE

Copyright Office – Temporary Employee

ASTM International

📅 2022 - current 📍 Conshohocken, PA

- Successfully registered over 5000 of ASTM's published literary works with the U.S Copyright Office through the ECO system.
- Developed and proposed an automation to the IT Department for the process above using Node.js, the XLSX library, and a Copyright Public Records API.
- Developed numerous ease-of-use automations and shortcuts utilizing Excel Office scripts and Windows PowerShell, significantly improving workflow efficiency, and simplifying tasks for my supervisor.

IT Operations – Temporary Employee

ASTM International

📅 June 2023 - August 2023 📍 Conshohocken, PA

- Application Portfolio Management: Populated an APM (Application Portfolio Management) site by conducting interviews with IT team members to gather and document detailed metadata on applications, including application dependencies, subject matter experts, and infrastructure components (DEV, QA, Prod servers), among other details.

PROJECTS

Software Engineering, Chester County Association for the Blind and Visually Impaired (CCABVI) Website Rework

Team Lead

📅 Sept 2024 - Dec 2024

- Led a website enhancement project, implementing UI/UX improvements focused specifically for accessibility with blind users, including features designed to comply with 508/ADA standards and optimize screen reader navigation.
- Led requirements gathering sessions with a non-technical client, translating their needs into actionable development plans.

SUMMARY

I am a third-year Computer Science student at West Chester University with a passion for software development and problem-solving. I am seeking an internship or research opportunity to apply my technical skills, gain hands-on experience, and contribute to innovative solutions in the field.

SKILLS

- Javascript
- NodeJS, ExpressJS, & MongoDB
- React.js (Familiar, actively learning)
- HTML, CSS
- Git, Github, & Bitbucket
- Excel & MS Office Scripting
- Java
- Problem Solving
- Bash & Powershell
- Visual Studio Code
- SQL

EDUCATION

Diploma

Souderton Area High School

📅 2018 - 2022
📍 Souderton, PA

Bachelor of Sciences

Major in Computer Science, Minor in Applied Statistics

West Chester University

📅 Aug 2022 - current

- Resolved technical issues, including fixing a PayPal integration and identifying hosting configurations for the WordPress-based website.
- Collaborated with teammates, taking a leadership role in front-end development and team communication.

Electronic Copyright Office Registration Automation

Creator

- Automated the registration process on the Copyright Office's Electronic Copyright Office (ECO) system using PuppeteerJS and Node.js.
- Designed and implemented workflows to extract data from Excel spreadsheets, format it for automation, and retrieve prior registration numbers by querying the Copyright Public Records API.
- Designed additional scripts using PuppeteerJS to automate the upload of PDFs from a shared network drive to the ECO system.
- Reduced a previously week-long, sometimes multi-week manual process into an automation that can be configured and executed in a single day, significantly improving efficiency.

West Chester, PA

Awards

- Dean's List, Fall 2024
- Dean's List, Spring 2024

Relevant courses

- Computer Science I, II, & III
- Foundations of CSC
- Data Structures & Algorithms
- Computer Security & Ethics
- Programming Lang Concepts & Paradigms
- Software Engineering
- Database Mgt Systems
- Modern Web Apps Using Server-Side Technologies
- Computer Science Principles
- Data communications & Networking

Kadin Matotek

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EDUCATION

Strath Haven High School   Wallingford, PA
High School Diploma   *Graduation: 5/2022*
- Clubs and Organizations: Ice Hockey, Track and Field, and Soccer.
- Relevant Coursework: Computer Science Principles

West Chester University of Pennsylvania   West Chester, PA
B.S. in Computer Science   *Expected Graduation: 5/2026*
- Minor: Mathematics
- GPA: 3.94/4.0
- Clubs and Organizations: Omicron Delta Kappa, Computer Science Club, and Club Ice Hockey.
- Relevant Coursework: Discrete Mathematics, Computer Systems, Computer Security, Data Structures and Algorithms, AI, Software Engineering, Data Communications and Networking, Cloud Computing, Calculus I and II, Linear Algebra and Applied Statistics.

PROJECTS

Email Classifier | *Java*   Oct 2023
- Achieved 89% prediction accuracy in distinguishing legitimate emails from spam across a dataset of 5,000 emails by calculating distances between individual emails and clusters.
- Implemented Java GUI enabling users to assess email authenticity and calculate distances between individual emails and/or email groups.
- Integrated a range of classification techniques, including nearest neighbors and Euclidean distance calculations, to improve adaptability and strengthen analytical precision.

Happy Programming Language | *Java*   Nov 2024
- Designed and developed "Happy", a custom programming language featuring support for variable assignments, conditional expressions, loops, functions, list operations, and string formatting, aimed at providing a clean and concise syntax compared to other common programming languages.
- Documented the development and syntax through knowledge base documentation, allowing for anyone to learn the syntax, built in functions, and everything needed to know to start developing with this language.

2D Unity Game | *C#, Unity*   Oct 2023
- Developed a 2D video game inspired by *The World's Hardest Game*, incorporating challenging level design and precise player controls.
- Designed and implemented multiple levels with increasing difficulty to test players' reflexes and problem-solving skills.
- Conducted play-testing to refine game mechanics and enhance user experience based on feedback.

3D Unity Game | *C#, Unity*   Nov 2023
- Developed a 3D game incorporating custom graphics, custom player scripts, and realistic physics simulations in outer space.
- Developed multiple levels, presenting players progressively challenging obstacles to overcome, ensuring continuous skill progression.
- Conducted user testing to get feedback and implemented improvements through updates.

Facial Recognition | *Python*   Feb 2024
- Engineered a real-time face recognition program achieving over 90% accuracy on a structured dataset, providing efficient visual identification.
- Integrated advanced facial detection and recognition algorithms, utilizing libraries to detect and recognize faces in diverse environments.

EXPERIENCE

D.P. Dough West Chester   Mar - Aug 2023
Delivery Driver   *West Chester, PA*
- Executed over 1,000 customer deliveries with a strong focus on optimizing delivery routes, resolving logistical challenges, and ensuring timely, accurate order fulfillment through advanced problem-solving techniques.
- Utilized problem-solving skills to streamline order management processes and provide customer service.
- Took orders, served customers, addressed inquiries, resolved any issues to ensure the best customer experience.

Vicky's Place   Jun - Jul 2021
Dish Washer   *Swarthmore, PA*
- Assisted kitchen staff by ensuring a steady supply of clean cookware and dishware during peak hours.
- Maintained a fast-paced and organized dishwashing station to support smooth kitchen operations.
- Trained new employees on proper dishwashing procedures, safety protocols, and kitchen cleanliness standards to ensure consistency and efficiency.

Fort Delco Gym   Jun - Jul 2020
Gym Custodian   *Morton, PA*
- Maintained cleanliness and sanitation of workout areas, locker rooms, and equipment to ensure a safe and hygienic environment for both members and staff.
- Conducted routine inspections to identify and address maintenance or cleanliness issues promptly.
- Collaborated with staff to uphold gym standards and provide a positive experience for members.

Open Sky Energy   Aug - Nov 2019
Social Media Manager   *Swarthmore, PA*
- Collaborated with the team to develop marketing strategies and improve social media outreach.
- Developed and scheduled posts to promote solar energy solutions, company updates, and customer success stories.
- Managed and created content for the company's social media platforms, increasing engagement and brand visibility.

VOLUNTEERING

Media Food Bank   Mar - Aug 2023
Volunteer   *Media, PA*
- Assisted customers by taking food orders and providing a welcoming, supportive environment.
- Retrieved and organized food items based on customer orders to ensure accuracy and efficiency.
- Worked collaboratively with volunteers and staff to maintain smooth food distribution operations.

TECHNICAL SKILLS

Proficient Languages: Java, Python
Familiar Languages: Haskell, C, R, C#, SQL, HTML, CSS, Swift, LaTeX
Developer Tools: R Studio, SPSS, Git, VS Code, Linux, Zshell, Windows, Mac OS, Stack Overflow
Other Familiar Tools: Microsoft Office Suite, Unity