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CS Senior Design

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Individual Capstone Assessment

My group project for this course is multi-faceted with two large objectives. We are creating an app for users to simultaneously record and upload data to a backup repository, as well as a secure messaging app with encryption. The app will be able to use the existing camera apis for mobile devices and backup the audio and video in real time. The messaging portion will have full end-to-end encryption. We may also allow the user to select the encryption type, but that may prove to be too complicated. We want this app to be a private and secure way for users to record data and communicate with each other.

Some aspects of this project have been covered by coursework, while others have not. The encrypted messenger is more relevant to coursework than the simultaneous video backup in my opinion. Although some of the principles from Computer Networks, like communication protocols and some cryptography knowledge, may be helpful as a precursor to building both parts of our app. Software Engineering will be useful as well, the course taught a lot of good principles for developing long term projects, working in a team, and creating user stories. Programming Languages, Python Programming, and Computer Science I all introduced us to several different programming languages for us to choose from and adopt principles from for our project. Every course has contributed to our knowledgebase in some ways, we will likely draw from all of them, as this will likely be a very complicated project.

I worked for two different companies during my co-op experiences over the years. At Hyland Software as a Software Development Intern, I worked mostly with XML, XSLT, and Schemas. I don't believe this will come into play for this project, although it is possible we could use XML in the backend. At Siemens PLM Software as a Co-op in the Strategic Student Program, I created an OAuth module for Mendix applications, generated C++ code, and worked on a web application for displaying 3D models. I believe all three of these experiences are relevant to this project. We will be using OAuth for our

authentication solution, we may use C++ for part of the app, and the app will likely be a web application, so that experience will be quite valuable.

I am very excited to work on this project, privacy and security are some of my favorite topics in Computer Science. Both privacy and security are becoming afterthoughts in software development, which to me is a dangerous trend that will not reverse until there is a widespread breach with devastating effects. Additionally, some law enforcement agencies are attempting to get encryption banned in software, I would like to prove that encryption is a good thing and should not be feared. I hope that with this app we can show that security and privacy can be maintained in a complicated app and prove how beneficial it is. The project will likely be quite difficult, but it will be a good test for our programming skills. Working with apis, Oauth, and encryption will be great experience for our future careers.

Initially, we will ensure we can reliably use the Google Drive upstream apis to stream video, and get encryption and decryption working correctly. We expect reliable simultaneous video upstream with no data corruption and minimal delay. We also expect secure encryption that cannot be cracked easily in the messaging portion of the app. It may be difficult to evenly distribute the work for this project, but we will do our best to distribute responsibility evenly among the group members. I will be satisfied with my contributions when I have completed my tasks and have been involved in the work of the other members as well. We will feel we are done when our app is fully functioning including video upstream and secure messaging with as few bugs as possible.