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High-Level Design Document: Hanover County Fire/EMS Dashboard

Our purpose is to create a revamped dashboard for Hanover EMS. (Look into other counties data to look at examples of what other departments dashboards and try to recreate that. We will take datasets and be able to represent the info into spatial data/GIS form/ArcGIS). Data cleanup currently takes 3 hours to complete a dashboard... our goal is to be able to reduce this time and not waste time crunching numbers. This projects goal will be to help public safety and potentially help other counties as well (besides Hanover EMS with our product). Currently there are loads of Excel documents that are used by Spenser. This is used to manually compile and generate the data for the reports/analytics of the dashboard. The way we will tackle this project is by separating the problems in two sets. We will have a dashboard project, and a spatial database project. First thing first is that we need to get the dashboard complete, accurate, and make sure that crunching numbers is not a tedious job and very much automated. This project will be done through the agile development methodology. After this project is finished, and reviewed by our sponsor (Spenser Morgan) we will start to work on the second project: spatial databases. This project will be done by learning new technology and ideas and help create a GIS that is useful for Hanover County. We will also focus on having good documentation so that our project can be sustainable and understood by the staff at Hanover EMS. We will show/present the enhancements we made to the dashboard, and to the tech that is already setup for the GIS/spatial databases to give good analytics. Our project should also maintain backwards compatibility.

Workflow of original process:

Currently at Hanover County Fire/EMS the workflow for monthly compliance reports is a long manual process. This was stated to us by our sponsor, Spenser. Who said he had to work long hours to get the compliance reports ready for the end of each month. This process was said to take around 8 hours, of crunching/compiling/cleaning data (at the end of every month). As said in the into, just clean up of data takes around 3 hours, and then there is error checking, creating graphs, and also crunching numbers. With doing this every month, there is room for error.

What will we be replacing:

Our goal is to automate this process (of compiling compliance reports) and replace using excel with a Java script. The goal is to only have to take a .csv file (which we have a sample data set to practice on), and run it through a program that will create a compliance report and export it into a csv.

Quantifying original time vs. after implementing our work goals:

As said from before the creation of the compliance report can take anywhere from 3-8 hours, and our goal is to reduce that. Our goal is to just take a csv and be able to export our a compliance report. If we do a good job of creating a tool that can automate this process, our goal will be to make this tool create a compliance report within minutes. All the user would have to do is type in the .csv file name, and it will be able to create a compliance report. This will increase accuracy, have error checking, and save time/money for Hanover County Fire/EMS.

Why and what language:

The language we have set out to use for the script is Java. We as a group all feel comfortable using Java, and feel that with communal work it will be easier for us to check each others code and create functionalities. There are also other packages that we have researched that can help us put together a great GUI, for after our prototype stage and plan to use Java API's to help build a better foundation for our project development.

Version Goals:

Version 1.0 - This version will be what will be worked on for the prototype. This will deal with creating the backend in Java, and the user interface will be the console in the Java IDE. It will ask the user for the input, and deal with crunching the numbers and printing out the compliance percentages for the 16 different stations. It will also deal with priority level and type, which can also be asked in console or just print all to console/.xlsx file.

Version 2.0 - This will be the same backend as Version 1.0 but with a different front end. Instead of using console to print out to .xlsx file/present in console, it will be using a heavy application GUI. The group will have to create a user friendly UI to handle what the user wants and deal with printing the dashboard to .xlsx file. It will have to deal with conditional functionality (dealing with colors for the compliance report) and also be able to present the graphs.

Version 3.0 - This will be very similar to Version 2.0 but will have a different front end. It will deal with a web based application for the front end, and be able to present in a localhost. This will have to be in localhost due to the sensitivity of the information in the project.

Project Schedule:

This is our project schedule we will be using. These dates are subject to change, due to school closures, and class cancellation. But this will be our guideline, to make sure we are not falling behind and accomplishing milestones.

Computer Science Spring Capstone
Fall 2018

Week	Date	Student Deliverables	Faculty Advisor Responsibilities	Mentor Responsibilities
1	8/23-8/25	Establish Github repositories	- Create 1st Weekly Status Report - Schedule weekly meetings with faculty advisor	Schedule weekly or biweekly meetings with Mentor
2	8/27-8/31	Draft of Requirements Document (with Statement of Work)	Review Requirements Document	Review Requirements
3	9/4-9/7		Review Requirements Document	Review Requirements
4	9/10-9/14	**Final Draft of Requirements**	Review Requirements Document	Review Requirements
5	9/17-9/21	Draft of Design Document		
6	9/24-9/28		Design review with Faculty advisor	Design review with Mentor
7	10/1-10/5	**Final High level Design Document**	Design review with Faculty advisor	Design review with Mentor
8	10/8-10/12	**Sternheimer** - One page Proof of Concept paper due by Noon 10/12	Design review with Faculty advisor	Design review with Mentor
9	10/15-10/19			
10	10/22-10/26	**Sternheimer** – Finalist selected 10/26 **Final Detailed Design**		
11	10/29-11/2	**Sternheimer** – Completed application packet due by noon 11/2	Code review with Faculty advisor	Code review with Mentor
12	11/5-11/9			
13	11/12-11/16	**Sternheimer** - One page Proof of Concept paper due by Noon 11/16	Code review with Faculty advisor	Code review with Mentor
14	11/19-11/23	**Sternheimer** – Winners notified 11/20		
15	11/26-11/30	Mentor/Student Evaluations due **Final Working Prototype due**	Demonstrate Prototype to Faculty Advisor	Demonstrate Prototype to Mentor
16	12/3-12/7			

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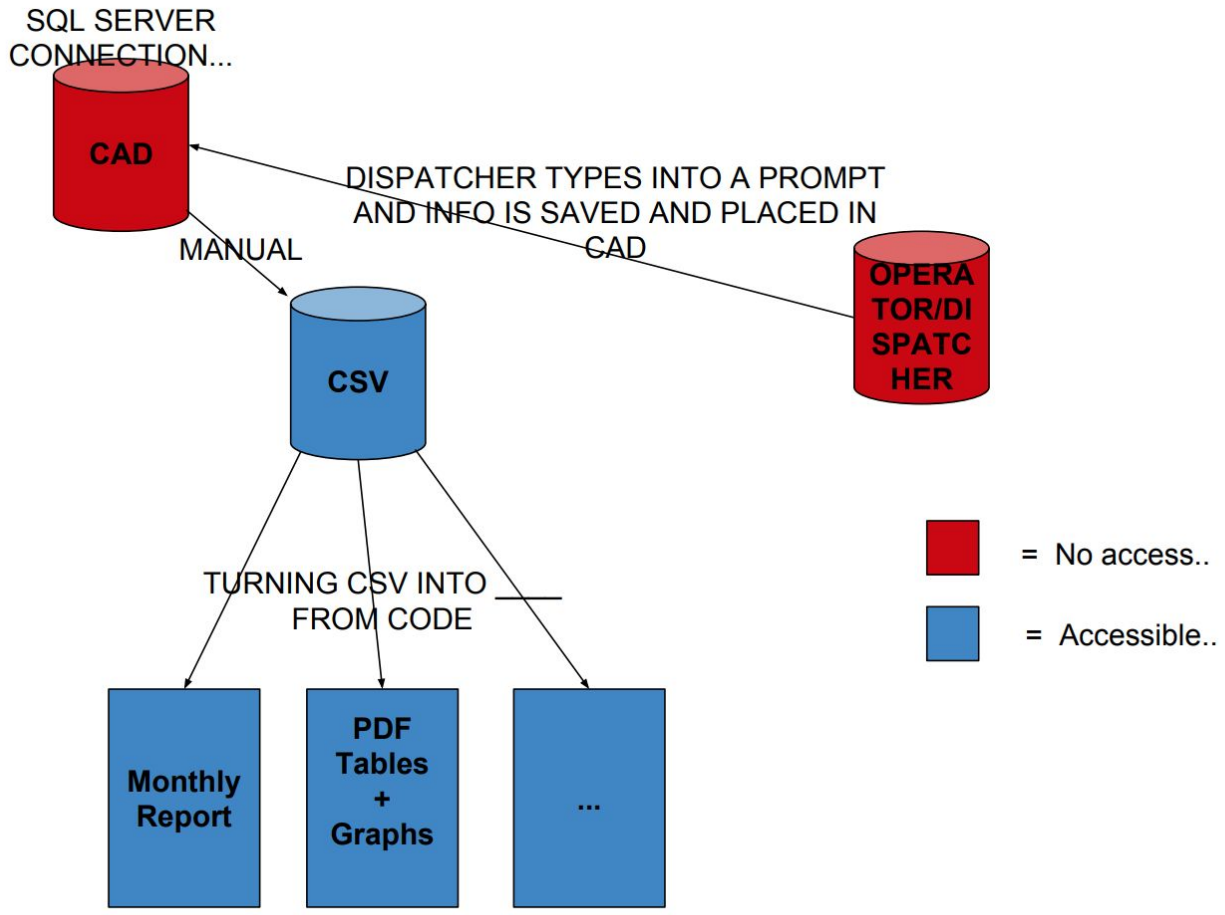
Milestones:

- Requirement Document
- High Level Design Document
- Working Prototype - *Be able to demonstrate to John and Spenser during the first week of December.*

Overview Designs:



Architecture Perspective:

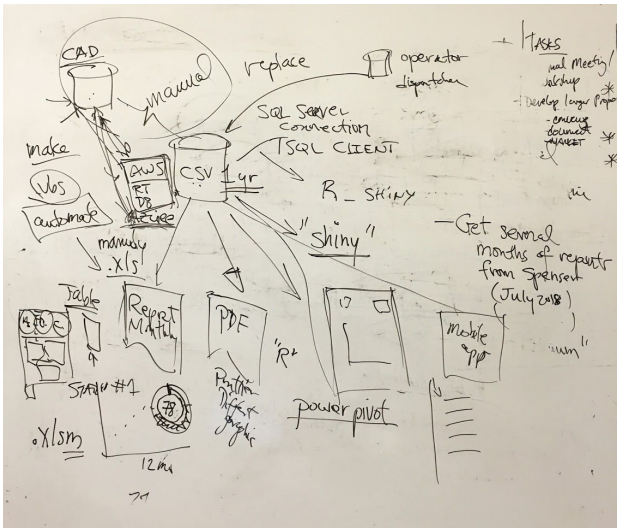
This is a basic overview of our 'beginning/main phase' for this capstone project.

Object from Image:	Background/Explanation:
CAD	This is SQL Server that deals with all the data from all the information from the dispatchers/operators for Hanover County EMS. This server currently is not connected/automated and is also not accessible by us, at the moment. This SQL Server has all the information stored, but at the current time Spenser takes this info and pastes the info into an excel and manually works with the information that he has. Long term goal: automate moving the data off of this

	server into database??
CSV	This is the excel spreadsheet that contains the information the SQL Server. We currently have sample data, to portray this information and plan to work with this data to base our code off. This CSV is manually created by Spenser and then used to create compliance reports, pdfs/graphs/tables, and much more for the State/County. Goal: transform CSV into a properly designed/formatted database which allows the data to be more easily converted into report format?
OPERATOR/DISPATCHER	This is something we don't have much information on. But basically, the information the Operator/Dispatcher plug into the programs they use are then are saved into the SQL Server. They use some program to input data, and this is the main source of the statistics that are used for the Hanover County Dashboard. *Feel like this is beyond the scope of what we're doing for now -- how the data gets from the "field" to the CAD/SQL Server isn't really our concern (yet?).*
Monthly Report	This is what we need to automate/plan to create in the same standards, as previously done by Spenser. The monthly report deals with 'crunching' the months numbers and formatting them nicely in an easy-to-read, one-page report that summarizes the data and whether or not response times (broken down by district) meet the required standards.
PDF Tables + Graphs	From the example Spencer gave us, the report features tables that count up the total number of calls as well as the number of calls where the response time was under the target. From there we can calculate the percentage of calls that meet the standard and shade it red or green depending on if it meets it or not. Spencer's tables also made use of shading to represent the relative proportion of calls per district. These tables are split between EMS (priority 1 calls) and Fire. There are also graphs designed to chart out the average compliance rate by month to show how the rate changes over the course of several months/a year
...	This is referring to the ideas we talked about in terms of what we will do after the basics of the dashboard is completed. The goal is to get the dashboard completed and all the PDFs/Graphs/Tables in one doc, and then plan to do more. Ideas we have: live graphs,

	maybe looking into grabbing information from the main CAD/getting access to the SQL server.

First draft of Phase (planning w/ mentor):



Storyboard (for ending goal/dashboard):

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DASHBOARD

Month YEAR

EMS Priority 1 Performance

		Month YEAR			Fiscal YTD		
Station #	District	Compliance	# Incidients	# Comply	Compliance	# Incidients	# Comply
##	District name	##%	##	##	##%	##	##
			##				
			##				
		(Percent compliance, sorted lowest to highest, below complicance (80%) is red, above complicance is green)	*(Shaded grey, relative to the other stations)*		*(Percent compliance, below complicance (80%) is red, above complicance is green)*	*(Shaded grey, relative to the other stations)*	
		##%			##%		
	Total County	##%	SUM	SUM	##%	SUM	SUM

Fire Incidient Performance

		Month YEAR			Fiscal YTD		
Station #	District	Compliance	# Incidients	# Comply	Compliance	# Incidients	# Comply
##	District name	##%	##	##	##%	##	##
		(Percent compliance, sorted lowest to highest, below complicance (80%) is red, above complicance is green)	*(Shaded grey, relative to the other stations)*		*(Percent compliance, below complicance (80%) is red, above complicance is green)*	*(Shaded grey, relative to the other stations)*	
		##%			##%		
	Total County	##%	SUM	SUM	##%	SUM	SUM

^(Green when above complicance (80%), red when below)

Graph:
EMS Priority 1 Fiscal YTD average response time month-by-month, compared to goal

Graph:
FIRE Incidents Fiscal YTD average response time month-by-month, compared to goal

Conclusion:

The way we will tackle this project is by separating the problems into two sets. We will have a dashboard project and a spatial database project. First priority is completing the dashboard, ensuring accuracy, and automating the process as much as possible. This project will be done through the agile development methodology. After this project is finished, and reviewed by our sponsor (Spenser Morgan) we will start to work on the second project: spatial databases. This project will be done by learning new technology and ideas and help create a GIS that is useful for Hanover County. Priorities include proper documentation so that our project can be sustainable and understood by the staff at Hanover EMS. We will present the enhancements we made to the dashboard, and to the tech that is already setup for the GIS/spatial databases to give good analytics. Our project should also maintain backwards compatibility.