

Cornerstones Unified Database Design Project

Final Report

Version 1.0

December 10, 2014

SYST 699

Aisha Sikder

Abdul Azeem Khan

Daniel Kim



Table of Contents

Executive Summary.....	6
1 Problem Definition.....	7
1.1 The Client	7
1.2 The Legacy System	9
1.3 Problem Statement	11
1.4 Our Proposed Solution	12
2 Project Planning	14
2.1 Capabilities Roadmap.....	14
2.2 Integrated Master Schedule (IMS).....	16
2.3 Milestones.....	17
2.4 Meetings and Status Reporting.....	18
2.5 Roles & Responsibilities	19
3 Analysis	19
3.1 Use Cases.....	20
3.2 Paper Intake Form Analysis.....	20
3.3 Existing Cornerstones Report Analysis.....	22
3.3.1 Food Pantry Master Report Sheet Analysis	23
3.3.2 CBI Master Report Sheet Analysis	27
3.3.3 Neighborhood Improvement Program Master Report Sheet Analysis	30
4 Requirements.....	33
5 Design.....	35
5.1 The Conceptual Design.....	35
5.2 The Logical Design	37

5.3	The Physical Design	38
6	Tools	40
7	Integration	40
8	Test & Verification	41
9	Validation	45
10	Delivery	46
11	Conclusions & Future Work	47
Appendix A:	Use Cases.....	49
Appendix B:	Paper Intake Forms Received.....	68
Appendix C:	Cornerstones Reports Analysis	71
Appendix D:	Requirements	79
Appendix E:	Conceptual Design.....	83
Appendix F:	Logical Design	90
Appendix G:	Physical Database Design	91
Appendix H:	Tools Install Instructions	103

List of Figures

Figure 1-1: Neighborhood Resources Clients 7

Figure 1-2: Neighborhood Resources Locations 8

Figure 1-3: The Existing System 10

Figure 1-4: Our Proposed Solution 13

Figure 1-5: The Systems Engineering Life Cycle..... 14

Figure 2-1: The Capabilities Roadmap 15

Figure 2-2: Project IMS/WBS 17

Figure 3-1: Food Pantry Master Report Example 24

Figure 3-2: CBI Master Report Example..... 28

Figure 3-3: NIP Report Example 32

Figure 5-1: Conceptual Model Diagram 36

Figure 5-2: Logical Model Diagram 37

Figure 5-3: Physical Database Model..... 39

Appendix Figure 1: ASAPP Intake Form 68

Appendix Figure 2: CBI Intake Form 69

Appendix Figure 3: Wellness Intake Form 70

Appendix Figure 4: Conceptual Model Diagram..... 84

Appendix Figure 5: Logical Model Diagram 90

Appendix Figure 6: Physical Database Model..... 91

List of Tables

Table 2-1: Meeting Types and Purposes..... 18

Table 3-1: Paper Intake Form Analysis - Data Fields..... 21

Table 3-2: Food Pantry Master Report - Statistics Summary 24

Table 3-3: CBI Master Report - Statistics Summary..... 28

Table 6-1: Tools Description 40

Table 8-1: Requirements Traceability Matrix 42

Table 10-1: Delivered Artifacts 46

Executive Summary

In the Cornerstones Unified Database Design Project (CUDDP), the GMU team completed a systems engineering project to address a problem faced by Cornerstones, a nonprofit organization focused on providing support and advocacy for those in need of human services such as food, shelter, affordable housing, and quality childcare. The main focus of the project was to provide Cornerstones with an alternative way of tracking their clients and the services provided. The legacy system in place consisted of maintaining client records using pen & paper forms, and a variety of electronic spreadsheets. Having multiple repositories for client data made it difficult for Cornerstones to accurately track client information, history, identification, and demographics. Cornerstones uses the client data to report to local governing agencies and to their financial sponsors. Because of the urgent need for an effective system, the GMU team performed a rapid development of a unified database following systems engineering principals.

The GMU team completed the following phases of the systems engineering life cycle – definition, design, integration, test, validation, and operations. A working prototype of the Cornerstones Unified Database was delivered to Cornerstones, and staff was trained in its use. This Final Report provides the detailed description of completed phases of this project.

1 Problem Definition

The following section will define the problem and scope of the Cornerstones Unified Database Design Project. We present a brief overview of the Cornerstones operation, the existing mechanisms for recording information, the issues with the current system, and our solution.

1.1 The Client

Cornerstones is a nonprofit organization that promotes self-sufficiency by providing support and advocacy for those in need of food, shelter, affordable housing, quality childcare, and other human services. To complete this mission, Cornerstones provides various services that address these needs. To make the services readily available to their customers, Cornerstones has organized these services into various program groups. Of the various divisions within the Cornerstones organization, the focus of this project will be on the Neighborhood Resources division programs. The Neighborhood Resources division programs focuses largely on providing food and community-based initiatives to the local area of Reston.

Neighborhood Resources makes up a large portion of the clients seen by Cornerstones. The figure to the right, taken from Cornerstones’ annual impact report, shows that Neighborhood Resources accounted for approximately 80% of the clients seen in fiscal year 2014.

Through early scope definition meetings with Cornerstones, the GMU Team determined that limiting the scope of this semester’s project to the Neighborhood Resources programs would be the most

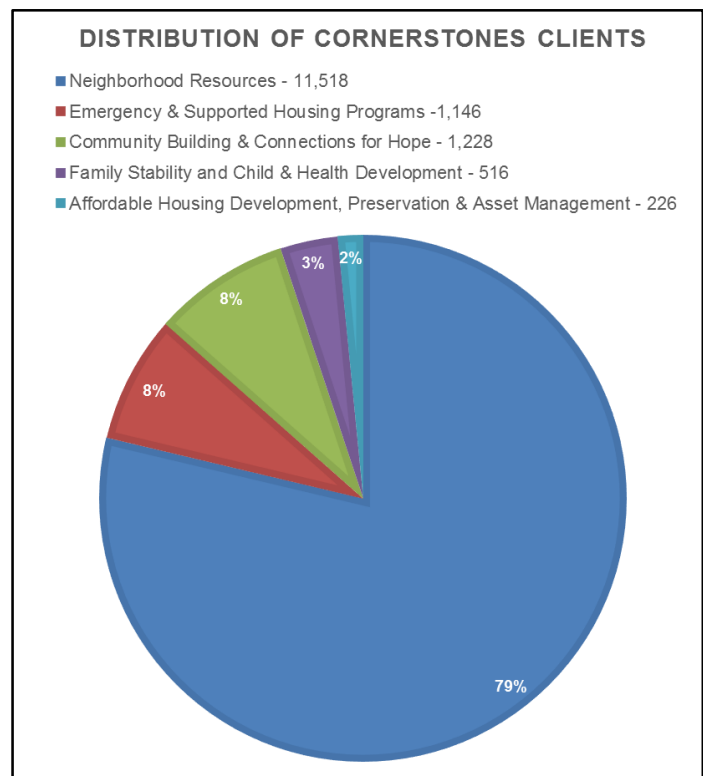


Figure 1-1: Neighborhood Resources Clients

effective use of time and resources to complete the project within the semester’s time frame. Focusing on this division would provide enough complexity to require a thorough analysis of the program artifacts, and provide a solution that would make a significant impact to the largest portion of their business.

Within the Neighborhood Resources program, there are two main focus areas: (1) Assistance Services and Pantry Program (ASAPP) and (2) Community Based Initiative (CBI). ASAPP operates as a local food pantry and provides packaged food products to those in need. It operates out of one facility located near Lake Anne in Reston. CBI provides services through local community resource centers. The focus of the CBI program is to address specific needs of the community such as building leadership, self-sufficiency, skills development, child development, and meeting urgent needs. CBI operates out of five locations in Reston – Cedar Ridge Community Center, Crescent Community Center, Stonegate Village Community Center, Southgate Community Center, and Westglade Club House. The figure below shows the location of each of the Neighborhood Resources facilities, as well as the central location of the Cornerstones main corporate office.

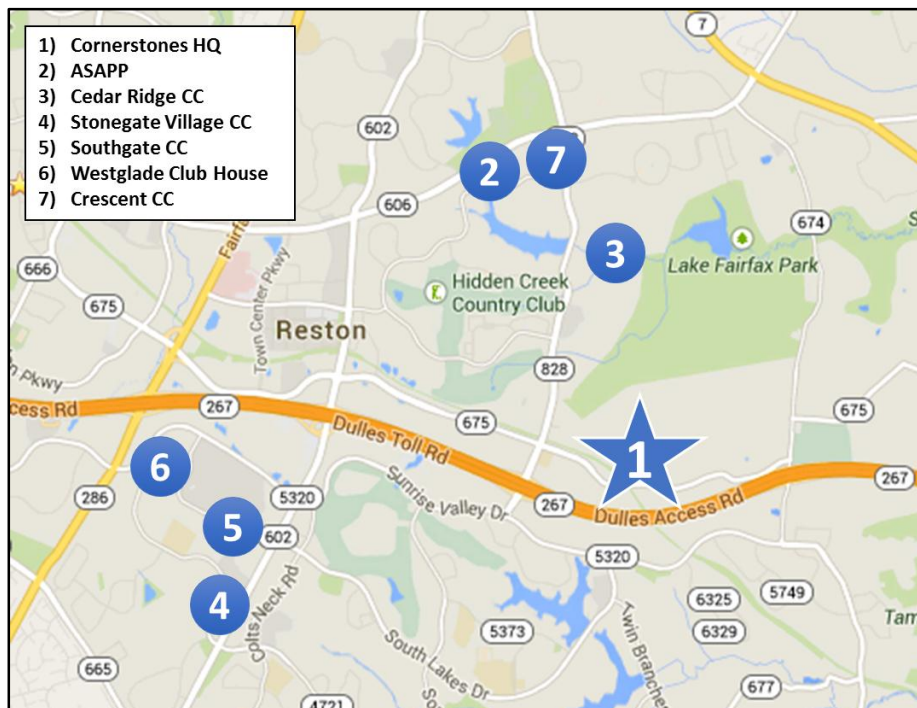


Figure 1-2: Neighborhood Resources Locations

1.2 The Legacy System

A major mechanism for managing the operations that Cornerstones performs and for reporting results of their efforts is through the tracking of client data. Cornerstones records client information, demographics, history of services received, and household information in order to understand the needs of their clients. The main objective of client tracking is to answer the following high level questions:

- How much services did we perform?
- How well did we serve our clients?
- Has any of these services improved the overall well-being of our clients?

It is important to capture this information so that Cornerstones can understand the impact of the work that they do and report it to their financial sponsors as well as to local and federal governing bodies. Also, by accurately determining their effectiveness in improving the community and its residents, Cornerstones is able to generate more funding, staff appropriately, and optimize their business functions.

In the existing system, Cornerstones relies on two main methods for tracking client data. The first method is pen & paper recording keeping. Physical applications, or “intake forms”, are used at each of the program locations to collect client data. These are either filled out by the clients or completed with the assistance of a Cornerstones staff member. Depending on the program location, the type of service received, or community event held, different subsets of data may be collected. This can range from a simple name and address sign-up sheet to an in-depth application including personal, household, and employment history. The pen & paper records are stored in filing systems at the program location or at central offices. The information on these forms can also be transferred to an electronic record.

The method of tracking client data is through electronic spreadsheets. Much of the data in these spreadsheets comes directly from the paper forms. The level of completeness of these records

vary greatly given that each location, program, service, or event collects different subsets of the client data.

From the individual spreadsheets for each program office, a master spreadsheet is generated and maintained by Cornerstones staff at the central Cornerstones office. This master spreadsheet is used to derive all of the performance, demographic, and statistical analysis that Cornerstones requires for their reporting processes. The master spreadsheet is used to calculate specific figures required in their reports to sponsors and governing agencies.

This overview of the existing system can be summarized in the diagram below:

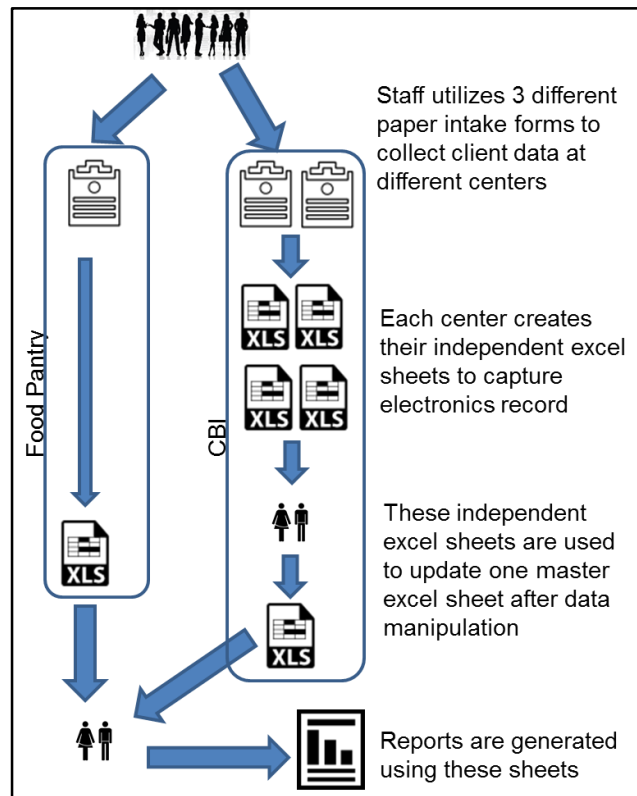


Figure 1-3: The Existing System

1.3 Problem Statement

Due to the distribution of their programs, varying levels of data collection, and utilization of multiple and independent spreadsheets, Cornerstones has experienced difficulty in their client tracking process. The existing system allows for significant tracking issues. For example, when a client visits multiple community centers to receive different kinds of service, Cornerstones may not be able to track reliably that the same individual is using multiple services. Reasons for discrepancies in tracking include: (a) there may be variations in the way the staff member spelled the clients name, (b) the client may have changed addresses since their last visit, or (c) the client's household structure may have changed. When the records cannot determine the uniqueness of individuals, the accuracy of the reports may be compromised (i.e. one individual may be counted as many, or different individuals might be thought to be the same person). Currently, Cornerstones relies heavily on the staff members' familiarity with repeat clients and also on the investigative abilities of their back-office staff to correct such issues.

In addition, it is difficult to track a client's service history. Cornerstones is interested in knowing how much service is being rendered to a single individual or family in order to gauge their level of need. With better tracking, it is hoped that Cornerstone would be able to identify clients in greater need of service and pro-actively provide that service. For example, a client who has increased their need for food pantry services may also need job-finding services or additional child care assistance. Also, being aware of this history could prompt Cornerstones staff to recommend nutritional seminars and counseling to the client. With the current system, this level of monitoring and response is difficult.

Lastly, the distribution, inconsistency, and insufficiency of client tracking in the current system prevents Cornerstones from being able to realize many additional reporting and analysis capabilities that could greatly improve their ability to monitor their performance. With a unified, central database of client records, Cornerstones would be able to generate many types of reports about their clients, services rendered, and trends over time.

1.4 Our Proposed Solution

The objective of this project is develop a robust data strategy and a unified database design for the Neighborhood Resources division programs that can help track clients across programs to generate more effective and accurate reports. The envisioned, final system is a unified database that can be accessed by all Cornerstones staff from all locations to support their daily operations. This system will also support automation of the standard reports that Cornerstones generates on a periodic basis, and allow the customization of reports for trend and performance analysis. The unified database will also decrease the amount of human intervention required to accurately determine client uniqueness. Instead, each client will be assigned a unique identifier – developed by this team – which is a combination of their personal data. The team has determined that collecting three additional bits of information: the client’s birthdate, the client’s city of birth and the client’s gender coupled with the information already asked on the forms (name, address, number of household members, etc.) can be used to uniquely identify each client.

To develop a quality system within the time constraints of the semester, the GMU team will deliver an intermediate phase of this envisioned system. The intermediate phase will provide a strong foundation needed to realize the envisioned system. The design and implementation of the unified database will be completed to support full functionality of Cornerstones requirements within the Neighborhood Resources division programs. The figure below displays the transition from the existing system to our delivered system and then the future work of the envisioned system.

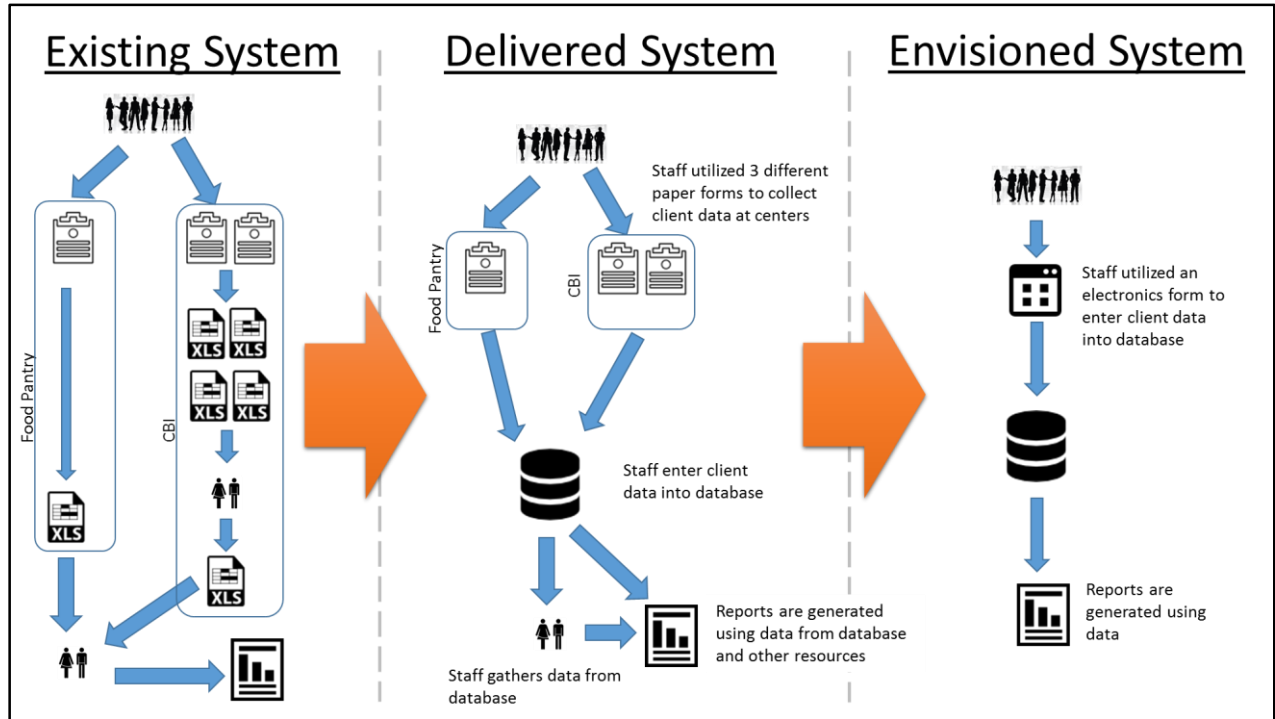


Figure 1-4: Our Proposed Solution

To complete this project, the GMU Team followed the systems engineering lifecycle phases of definition, analysis, design, development, integration, test, validation, and operation. The definition and analysis phases consisted of review of the existing forms and reports used in the Neighborhood Resources division programs, analysis of the data collected, generation of use cases, and development of requirements. The design phase was focused on design of the database. This was divided into three main phases of design – conceptual model, logical model, and physical model. The integration, test, and verification focused on the installation of the database and ensuring that it met all the requirements we developed. Showing successful adoption of the database by the Cornerstones staff completed the validation stage. Lastly, delivery and operations of this project consisted of providing all planning, definition, and design documents and to the customer so that they will be able to continue operating the system and prepare for any future work to be completed by the next GMU team to inherit this project.

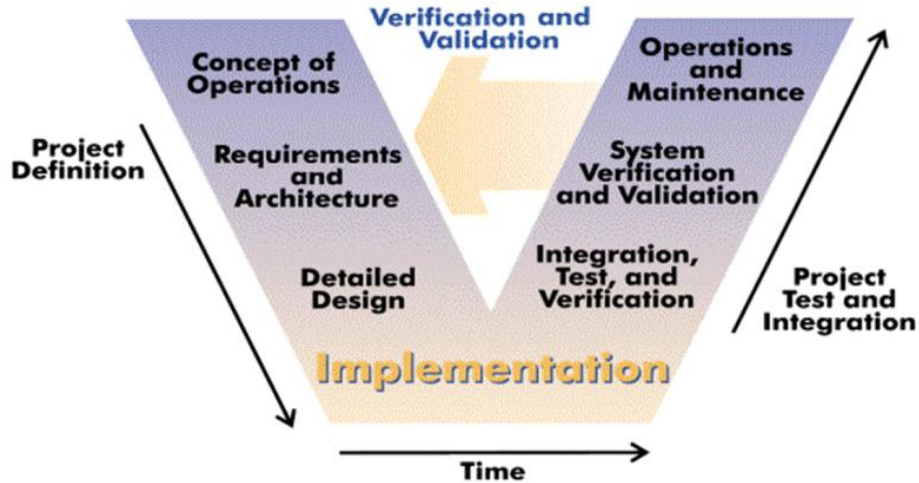


Figure 1-5: The Systems Engineering Life Cycle

2 Project Planning

Given the large scope of this project, the ambitious goal of completing a full systems-engineering life cycle, and the tight schedule of a single semester, our team decided to dedicate the first two weeks of the project to developing a project plan. Additionally, our team consisted of two distance-learning students and one in-class student, so having a defined plan of work, with established roles and responsibilities, was extremely important. A formal Project Plan document was delivered as a class assignment and to our customer. The highlights from this plan are presented in the sub-sections below.

2.1 Capabilities Roadmap

The first step of planning involved identifying a high level definition of the system's capabilities so that the work could be logically decomposed into manageable portions. Keeping the envisioned system in mind, the following Capabilities Roadmap figure was created.

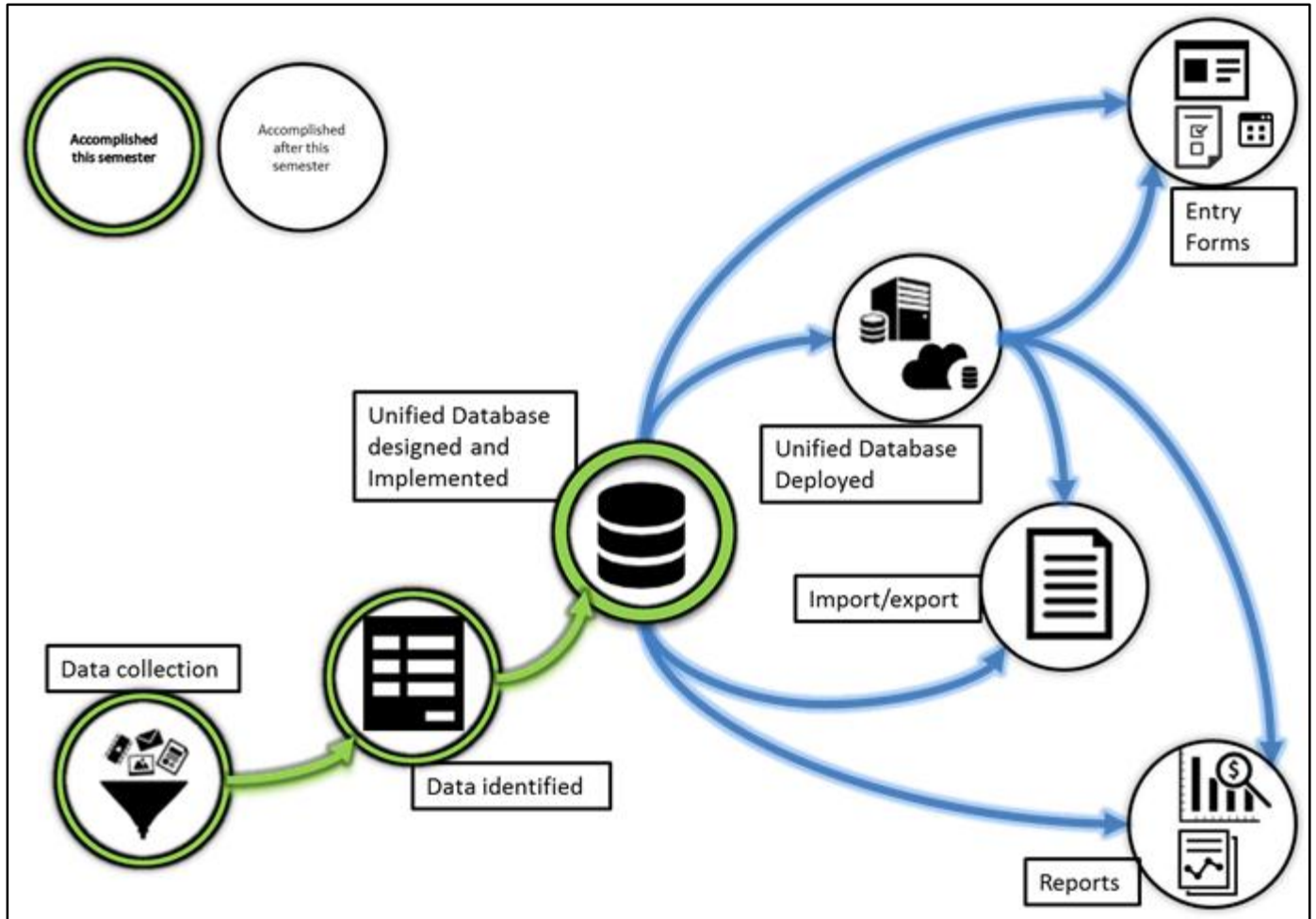


Figure 2-1: The Capabilities Roadmap

We identified the capabilities that needed to be captured to create the unified database of the envisioned system. The capabilities shown in the figure above are defined as:

1. “Data collection” – One needed to identify the data collected on both the pen and paper intake forms as well as the data that was input to each of the spreadsheets. From this analysis, one could determine a single intake form.
2. “Data identified” – A method needed to be determined that would guarantee the unique identity of each client. In addition, the entire collection of data that would be input into the data base needed to be identified together with the output expected to be generated for the normal reports with the expectation that other reports would be generated on an as-needed basis from queries to the database.

3. “Unified Database designed and implemented” – The design of the unified database needs to support all required functionality, as well as be flexible enough to adapt to future needs. The database must be implemented so that Cornerstones staff can use it for all current functions.
4. “Unified Database deployed” – The unified database must be deployed to the Cornerstones program locations so that it is accessible to all Cornerstones staff at all program locations and offices.
5. “Import/export” – Existing client data needs to be migrated to the Unified Database.
6. “Entry forms” – Electronic forms must be designed and implemented so that Cornerstones staff can use them at program sites to directly enter client data into the Unified Database.
7. “Reports” – Custom reports must be designed and tested to enhance Cornerstones’ ability to track their clients, measure volume of services provided, discover trends, and capture performance metrics.

2.2 Integrated Master Schedule (IMS)

The Integrated Master Schedule (IMS) was created and used by the team as a project management tool. It provided our team with a high-level schedule to follow for the semester. In addition, a Work Breakdown Structure (WBS) was developed to identify all of the work items to be completed within each phase of the project. These tools allowed us to assign a team member as the lead for each activity. We also used this tool during our weekly team meetings to gauge the status of our progress against our schedule. A view of these items is presented below:

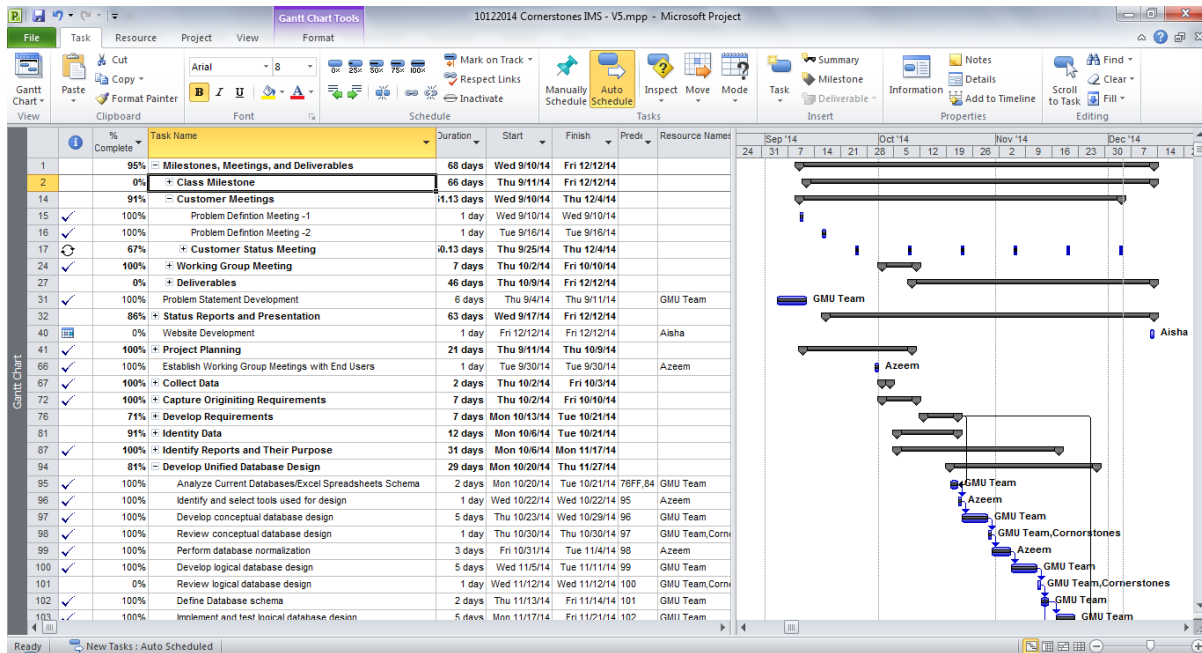


Figure 2-2: Project IMS/WBS

2.3 Milestones

The team developed two sets of milestones for this project. The first set of milestones were class deliverables such as presentations, documents, status reports, meetings with the professor, and the final project presentation. The second set of milestones were directly related to the development of the final product for Cornerstones. These milestones included major deliverables to our customer, such as a project plan, requirements document, design document, integration and test goals, etc. These milestones closely followed our major phases of the systems engineering process. These milestones are listed below:

- Develop Project Plan
- Collect Data
- Capture Originating Requirements
- Develop Requirements
- Identify Data
- Identify Reports
- Develop Unified Database Design

- Develop Test Database
- Integrate, Test, and Validate
- Customer Handoff

2.4 Meetings and Status Reporting

Throughout the semester, our team utilized four types of scheduled meetings to communicate with each other, our customer, and the professor.

Table 2-1: Meeting Types and Purposes

Meeting Type	Frequency	Purpose	Attendees
Scope/Problem Definition	As needed (weekly)	The scope and problem definition meetings were used to investigate the current system, develop the problem statement, and define the scope of the semester's project.	<ul style="list-style-type: none"> • The GMU Team • Cornerstones staff • Professor Hoffman (optional)
Status Meeting (internal)	Every Sundays	The internal status meetings were performed every Sunday for the GMU Team members to update each other on progress of existing work items, and planning of future work items.	<ul style="list-style-type: none"> • The GMU Team
Status Meeting (external)	Every other Wednesday	The external status meetings were used to update Cornerstones on the team's progress, discuss questions about their processes and existing system, present briefings of upcoming deliverables, and capture/assign action items.	<ul style="list-style-type: none"> • The GMU Team • Cornerstones staff • Professor Hoffman (optional)
On-site Working Group Meeting	As needed	The on-site working group meetings were completed at Cornerstones HQ and were used when we needed to learn about their organization or perform training/test/integration	<ul style="list-style-type: none"> • GMU Team members (various) • Cornerstones staff (various)
Technical Interchange Meeting	As needed (leading up to major deliveries)	The technical interchange meetings were used to present briefings of major deliverables to Cornerstones (e.g. Project Plan, Requirements Document, Design Document). Questions and feedback were captured and addressed at following status meetings.	<ul style="list-style-type: none"> • The GMU Team • Cornerstones staff

2.5 Roles & Responsibilities

The roles and responsibilities of the GMU Team members were captured in the Project Plan. In addition, the Integrated Master Plan (IMS) and Work Breakdown Structure (WBS) show the assigned team member for each task.

3 Analysis

After defining the problem and planning the work, our team performed an analysis of the existing system. The analysis phase consisted of two major efforts – developing use cases for the delivered system and evaluation of the Cornerstones artifacts we received.

The use cases were analyzed so that the GMU Team and Cornerstones could come to an agreement of the high-level functionality of the unified database. Additionally, the use cases were used to derive the high-level requirements for the system, which would allow us to have an effective test plan for the delivered system.

The artifacts that we received from Cornerstones for analysis covered both the front-end and back-end data that Cornerstones collects during their client tracking and reporting operations. The specific items received from Cornerstones were:

1. Intake forms from the three Neighborhood Resources programs:
 - a. Food Pantry (ASAPP)
 - b. CBI
 - c. Wellness Support
2. Microsoft Excel Spreadsheets
 - a. Food Pantry Master Report
 - b. CBI Master Report
 - c. Neighborhood Improvement Program (NIP) Master Report

The analysis of these materials involved identification of all data collected, identification of all data reported, and then determination of how each collected item rolled into the reported figures. We also performed a gap analysis of the existing intake forms to determine what overlap existed across the data that was collected at each program. The results of this investigation were used to determine if there was sufficient data collected to provide for unique identification of all clients. Our team identified additional data fields that should be collected to ensure that each client can be identified uniquely within the Neighborhood Resources programs operated by Cornerstones.

3.1 Use Cases

The following use cases were identified to capture the processes of Cornerstones' existing programs, how the staff interacts with clients, and how the database will be operated.

1. Use Case 1: New Applicant Filling Out Form
2. Use Case 2: Staff Providing Food Pantry Service to Existing Applicant
3. Use Case 3: Client Attends Service
4. Use Case 4: Staff Generates Reports for Program
5. Use Case 5: Create New Entry From Household
6. Use Case 5a: Single Client Becomes Part of a Household
7. Use Case 5b: Client Moves from Member of a Household to His/Her Own Household as a Head
8. Use Case 6: Add New Client to Database
9. Use Case 7: Update Existing Client Record in Database

The detailed descriptions of the Use Cases can be found in Appendix A: Use Cases.

3.2 Paper Intake Form Analysis

As described in Section 3 above, there were three paper intake forms that our team received from Cornerstones. Each form was unique to the program that it was being used in – ASAPP, CBI, and Wellness Support. However, there was significant overlap in the data fields that were collected across all three programs. The following table shows each data field captured and the form that the field was

found in. It also provides the type of data that was collected (e.g. text, date, yes/no, etc.). A green check mark represents a field that is present in the form listed. The “NEW” column represents data fields that were not collected in any of the programs, but our team determined would be important to collect in order to support the unique identification of clients.

Table 3-1: Paper Intake Form Analysis - Data Fields

	Data Type	Food Pantry (ASAPP)	Community Based Initiative (CBI)	Wellness	New
First Name	Free Text	✓	✓	✓	
Last Name	Free Text	✓	✓	✓	
DOB	Date				✓
City of Birth	Free Text				✓
Gender	Male/Female				✓
Co-Applicant Name	Free Text	✓	✓	✓	
Address	Free Text	✓	✓	✓	
Referred by	Free Text	✓	✓	✓	
Email	Free Text	✓	✓	✓	
Employment Status	Y/N	✓		✓	
Reason if not employed	Free Text	✓		✓	
Financial Assistance from Government Programs	Free Text			✓	
Help with budgeting \$	Y/N	✓			
Desire info on budgeting	Y/N	✓			
SNAP	Y/N, Date	✓			
WIC	Y/N, Date	✓			
Current participant in Cornerstones programs	Y/N, Free Text	✓		✓	
Race	From List	✓	✓	✓	
Ethnicity	From List	✓	✓	✓	
Country of Origin	Free Text	✓		✓	
Primary Language	Free Text	✓		✓	
Household Members	Table	✓	✓	✓	
Disabled	Y/N for each member	✓		✓	
Single Female Head	Y/N	✓	✓	✓	
Male Head	Y/N	✓	✓	✓	

	Data Type	Food Pantry (ASAPP)	Community Based Initiative (CBI)	Wellness	New
Members <18	Y/N	✓	✓	✓	
Disabled Members <55	Y/N	✓	✓	✓	
Members >55	Y/N	✓	✓	✓	
Member Unemployed 18-55	Y/N	✓	✓	✓	
TANF Received	Y/N		✓		
Monthly Income Source	Free Text	✓		✓	
Total Income	Free Text			✓	
Annual Income	Free Text		✓		
Health Insurance	Y/N	✓			
Children w/ Health Insurance	Y/N	✓			
Miscellaneous	Free Text	✓			

Appendix B: includes scans of the original paper intake forms received for these three Neighborhood Resources programs.

The fields identified in this analysis were major drivers for the preliminary requirements for the envisioned system. Our team’s goal was to enhance the client tracking and reporting functions of the Cornerstones organization, so it was important to ensure that all the data that they currently track is accounted for in our unified database design.

3.3 Existing Cornerstones Report Analysis

The second set of documents that were received from Cornerstones for analysis was the back-end reports. These include the Food Pantry Master Report, CBI Master Report, and the Neighborhood Improvement Program (NIP) Master Report. Our team analyzed each report by documenting the statistics presented in the report, the data fields that are summarized in the statistics, and which reported values will be required as a minimum for the Cornerstones Unified Database.

Overall, we found that the following list of reported items would be a minimum requirement for the reporting functions of the Cornerstones Unified Database:

- # of individuals client by race
- # of households client by race
- # of individuals client by ethnicity
- # of households client by ethnicity
- # of households with any children (under 18)
- # of households with a senior (over 55)
- # of households with an unemployed member
- # of times a service is received/delivered over a given time frame
- # of households by income category
- # of households headed by gender type

In the following sub-sections, we describe in detail each report that was received.

3.3.1 *Food Pantry Master Report Sheet Analysis*

The format for the Food Master Reports is an Excel file with two tabs. The first tab includes the master list of all the data for the program, including all clients seen, their personal information, the services received, and other summary data. The second tab in the Excel file shows specific reporting statistics that describe the clients seen in this program (e.g. number of clients by race, number of clients by income category, etc.). Along with these, there are charts and graphs to represent the data for each statistic. The figure below shows an example of the layout of the two sheets in this report.

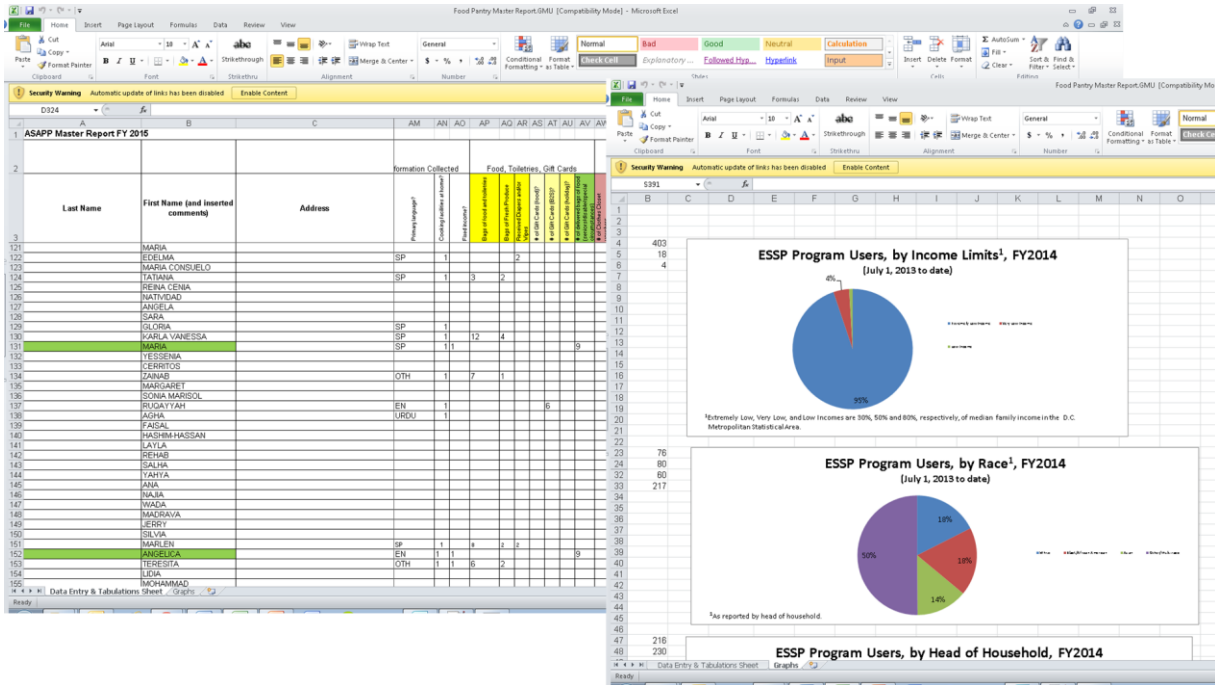


Figure 3-1: Food Pantry Master Report Example

The data fields from the intake form that map to the appropriate column in the Food Pantry Master Report were noted and captured in the requirements document. The statistics captured by the graphs and charts are summarized in the table below. The table lists the statistic measured, a description of the statistic, if the data came from the associated intake form, and other notes about the specific chart or graph.

Table 3-2: Food Pantry Master Report - Statistics Summary

Statistic Measured	Description	Data from Intake Form?	Notes
Program Users by Income Category	Measures the number of clients/households within different income brackets, respective to median family income in the Washington, D.C. Metropolitan Statistical Area.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Race	Measures the race distribution of clients as reported by clients on the intake form. Includes race count of all household members if included.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Head of Household	Measures the proportion of households by gender of the head of household, male or female.	Y	This statistic is measured for both the Food Pantry and CBI programs.

Statistic Measured	Description	Data from Intake Form?	Notes
Program Users by Households with Children	Measures the proportion of households with children; children defined as household members under 18 years of age.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Households with Elderly	Measures the proportion of households with elderly members; elderly members defined as household members at or over 55 years of age.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Households with Unemployed	Measures the proportion of households with members unemployed and seeking employment.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Participation Rates by Outcome Area	Measures the distribution of client participation in different outcome areas: (1) Information & referral, financial assistance, etc., (2) Supplemental food/toiletries assistance, (3) Wellness support, (4) Life skills education.	Y (see notes)	Statistic only measures initial service received by client; history of services received is not accounted for.
Services Delivery by Quarter	Measures the number of services delivered to all clients by calendar quarter.	Y/N (see notes)	Repeat clients may not fill out intake forms after first service received; this statistic needs to be supplemented by program records. This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Ethnicity	Measures the proportion of households by Hispanic ethnicity.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Zip Code	Measures the proportion of clients by reported zip code.	Y	Specific zip codes are used in the statistic, but the pie chart only shows distribution by city (i.e. Reston, Herndon).
New Households/Household Members Served by Month	Measures the number of new households and/or household members served by calendar month.	Y/N (see notes)	Information is counted based on when the household is first created or provided a service. This statistic is measured for both the Food Pantry and CBI programs.
New and Repeat Households/Household Members Served by Month	Measures the number households and/or household members served by calendar month.	Y/N (see notes)	Even if only one household member is helped, all the members of the household may be counted in this statistic. This statistic is measured for both the Food Pantry and CBI programs.

Statistic Measured	Description	Data from Intake Form?	Notes
Households Participating in Food Assistance with and w/o Wellness Support	Measures the proportion of households receiving food assistance either with or without participation in Wellness Support programs.	N	The data for this statistic will come from Cornerstones program records.
Food/Toiletries Assistance	Measures the number of goods/services provided: (1) Bags of food provided, (2) Bags of fresh produce provided, (3) Bundles of diapers and/or wipes provided, (4) Emergency gift/holiday cards provided, (5) Household served through food/toiletries assistance, (6) Household beneficiaries (sum of household size).	N	The data for this statistic will come from Cornerstones program records.
Special Distributions, Clothing, Vouchers, and Financial Assistance – Information & Referrals	Measures the number of specific distributions: (1) Holiday distribution recipients, (2) Clothing vouchers provided, (3) Back to school distribution recipients, (4) Financial assistance recipients, (5) Referrals to employment center, (6) Referrals to SNAP, (7) Referrals to Wellness Support, (8) Referrals to Fairfax County's Coordinated Services Planning, (9) Services Planning, (10) Recipients of other referrals or programs, (11) Households participating in special distributions, clothing vouchers, financial assistance, or referrals, (12) Household beneficiaries (sum of household size).	N	The data for this statistic will come from Cornerstones program records. The statistics measured here are presented in three separate pie charts and bar graphs.
Classes and Wellness Support	Measures the number of household and/or household members participating in classes and Wellness Support: (1) Instances of participation in ESL class or other life skills programming, (2) Households participating in ESL classes or other life skill programming, (3) Household beneficiaries, (4) Instances of Wellness Support provided, (5) Households participating in Wellness Support, (6) Household beneficiaries, (7) Household achieving at least one Wellness Support goal, (8) Household beneficiaries where at least one Wellness Support goal was achieved.	N	The data for this statistic will come from Cornerstones program records.
Program Users by Participation in Other Cornerstones Programs	Measures the number of client participation in other Cornerstones programs: (1) Herndon Outreach/Neighborhood Resource Center, (2) Community Building Initiative, (3) Housing Opportunities Support Team (HOST), (4) Laurel Learning Center, (5) Healthy Families, (6) Multiple Programs, (7) Embry Rucker Community Shelter, (8) Foreclosure Prevention, (9) Transitional Housing, (10) Community Case Management, (11) Herndon Enrichment Program, (12) Housing, (13) CBI.	Y/N (see notes)	The sources for this data are both intake forms and program records. This statistic is measured for both the Food Pantry and CBI programs.

Statistic Measured	Description	Data from Intake Form?	Notes
Financial Assistance	Measures the instances of assistance provided, the number of beneficiaries assisted, and the total financial assistance provided by the following types: (1) Rent, (2) Utilities, (3) Other.	N	The data for this statistic was missing in our copy of the report due to deletion of protected client data. This statistic will not be included in the preliminary database design.

Sample captures of the statistics and graphs found in these reports, including those listed above, can be found in Appendix C: Cornerstones Reports Analysis.

3.3.2 ***CBI Master Report Sheet Analysis***

The format for the CBI Master Reports is also an Excel file with two tabs. Like the Food Pantry Master Report, the first tab includes the master list of all the data for the program, including all clients seen, their personal information, the services received, and other summary data. The second tab in the Excel file shows specific reporting statistics that describe the clients seen in this program (e.g. number of clients by race, number of clients by income category, etc.). Along with these, there are pie graphs to represent the data for each statistic. The statistics measured in the CBI Master Report is also organized by the five community locations that the CBI program operates out of. The figure below shows an example of the layout of the two sheets in the CBI Master Report.

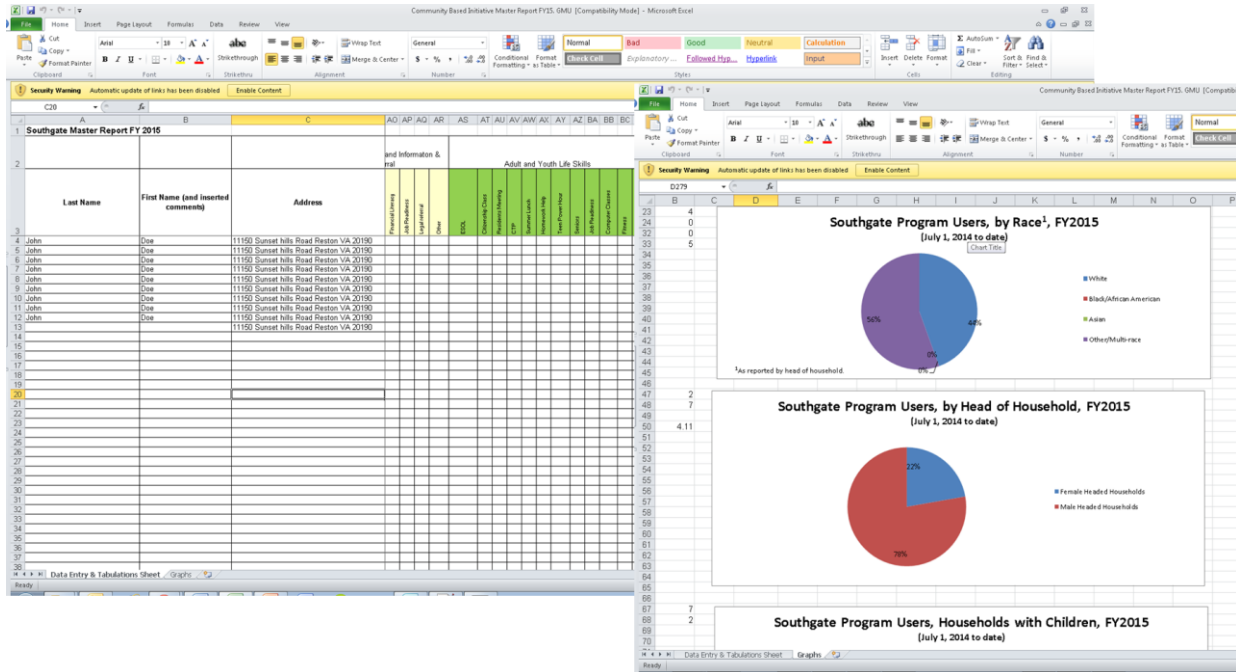


Figure 3-2: CBI Master Report Example

The data fields from the intake form that map to the appropriate column in the CBI Master Report were noted and captured in the requirements document. The statistics captured by the pie graphs are summarized in the table below. The table lists the statistic measured, a description of the statistic, if the data came from the associated intake form, and other notes about the specific chart or graph.

Table 3-3: CBI Master Report - Statistics Summary

Statistic Measured	Description	Data from Intake Form?	Notes
Program Users by Income Category	Measures the number of clients/households within different income brackets, respective to median family income in the Washington, D.C. Metropolitan Statistical Area.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Race	Measures the race distribution of clients as reported by clients on the intake form. Includes race count of all household members if included.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Head of Household	Measures the proportion of households by gender of the head of household, male or female.	Y	This statistic is measured for both the Food Pantry and CBI programs.

Statistic Measured	Description	Data from Intake Form?	Notes
Program Users by Households with Children	Measures the proportion of households with children; children defined as household members under 18 years of age.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Households with Elderly	Measures the proportion of households with elderly members; elderly members defined as household members at or over 55 years of age.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Households with Unemployed	Measures the proportion of households with members unemployed and seeking employment.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Participation Rates by Outcome Area	Measures the distribution of client participation in different outcome areas: (1) Information & referral, financial assistance, etc., (2) Supplemental food/toiletries assistance, (3) Wellness support, (4) Life skills education.	Y (see notes)	Statistic only measures initial service received by client; history of services received is not accounted for.
Services Delivery by Quarter	Measures the number of services delivered to all clients by calendar quarter.	Y/N (see notes)	Repeat clients may not fill out intake forms after first service received; this statistic needs to be supplemented by program records. This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Ethnicity	Measures the proportion of households by Hispanic ethnicity.	Y	This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Zip Code	Measures the proportion of clients by reported zip code.	Y	Specific zip codes are used in the statistic, but the pie chart only shows distribution by city (i.e. Reston, Herndon).
New Households/Household Members Served by Month	Measures the number of new households and/or household members served by calendar month.	Y/N (see notes)	Information is counted based on when the household is first created or provided a service. This statistic is measured for both the Food Pantry and CBI programs.
New and Repeat Households/Household Members Served by Month	Measures the number households and/or household members served by calendar month.	Y/N (see notes)	Even if only one household member is helped, all the members of the household may be counted in this statistic. This statistic is measured for both the Food Pantry and CBI programs.

Statistic Measured	Description	Data from Intake Form?	Notes
Program Users by Participation in Other Cornerstones Programs	Measures the number of client participation in other Cornerstones programs: (1) Herndon Outreach/Neighborhood Resource Center, (2) Community Building Initiative, (3) Housing Opportunities Support Team (HOST), (4) Laurel Learning Center, (5) Healthy Families, (6) Multiple Programs, (7) Embry Rucker Community Shelter, (8) Foreclosure Prevention, (9) Transitional Housing, (10) Community Case Management, (11) Herndon Enrichment Program, (12) Housing, (13) CBI.	Y/N (see notes)	The sources for this data are both intake forms and program records. This statistic is measured for both the Food Pantry and CBI programs.
Program Users by Households Receiving TANF	Measures the proportion of households receiving TANF.	Y	

Sample captures of the statistics and graphs found in these reports, including those listed above, can be found in Appendix C: Cornerstones Reports Analysis.

3.3.3 **Neighborhood Improvement Program Master Report Sheet Analysis**

The NIP Master Report differs from the other two reporting formats. The NIP Master Report is used to report specific statistics to sponsors, so it includes statistics that are of interest to those parties. The Fairfax County Department of Neighborhood and Community Services is the primary audience for this report.

The Excel file for the NIP Report is presented in a “form” style of format, where there are spaces to provide the specific counts of tracked metrics. The statistics presented in this report are determined by back-office Cornerstones staff, using the overall set of collected data, and entered in manually into the NIP Master Report. There are no graphs or charts generated in this report. The NIP Report is generated monthly by Cornerstones staff. Each month’s report is stored in a separate Excel file. Within each file, there are tabbed reports. Each tab consists of the full NIP Report for a given CBI location: (1) Cedar Ridge, (2) Stonegate, (3) Southgate, (4) Westglade, and (5) Crescent.

The NIP Report consists of multiple sections to categorize the type of data reported. Overall, the general theme of the type of data collected in this report is that of improving the local neighborhood and community. As such, the types of categories included in this report are:

- Increased leadership skills
- Improved relationships among people and organizations
- Increased life skills among residents such as parenting, financial literacy, employment, and nutrition
- Improved access to services
- Provision of services in support of Human Services System priority areas (economic self-sufficiency, sustainable housing, healthy people, connected individuals, successful children and youth, positive living for older adults and individuals with disabilities)

The figure below shows a sample capture of the NIP Report screen.

Neighborhood Improvement Program, master Report: GMU - Microsoft Excel

Fairfax County Department of Neighborhood and Community Services
Monthly NIP Outcomes, Indicators and Measures

Site Name: Cedar Ridge Community Center Month: July

Please identify which of the Human Service Results is/are the primary focus area(s) of the initiative?

Connected Individuals Economic Self-Sufficiency Healthy People Positive Living for Older Adults & those w/ Disabilities Sustainable Housing Successful Children and Youth

Indicator/Measures	Enter Data	List Information and Comments
Section I. (To be completed by NIP Provider)		
Increased leadership skills:		
<i>A. Expanded Leadership Structure: Formal programs</i>		
A1. Number of leadership training and development programs Curriculum based/instructor-led leadership programs offered by NIP provider Sources: Monthly Calendars / Program Flyers	1	List Trainings/Programs: Gardeners Meeting - cancelled Note: Residents Meeting will resume in August
A2. Number of participants Total number of participants attending formal leadership programs offered by NIP provider Sources: Registrations /Daily Attendance Logs	0	
A3. Number of graduates Total number of graduates from formal leadership programs offered by NIP provider Sources: Certificates awarded for course completion	0	
A4. Number of graduates who serve as a resource to the community Total number of graduates of formal leadership programs who then continue on to serve in some capacity as a resource to the community Sources: Listed in a community resource guide / Surveyed after the training	0	List in what capacity?
<i>B. Expanded Leadership Structure: Informal training</i>		
B1. Number of non-instructor based opportunities offered Someone who has no formal position of authority over people but who becomes a group's leader informally	0	List opportunities:
<i>C. Increased community participation in neighborhood planning</i>		
C1. Number of community volunteers participating in planning committees or advisory councils Residents and other volunteers who actively engage in and make decisions affecting the community through planning committees and/or advisory council work. Sources: Meeting Attendance Logs	0	

Figure 3-3: NIP Report Example

4 Requirements

After identifying the use cases for the envisioned system and analyzing the front-end and back-end artifacts that Cornerstones captures during client processing and tracking, our team developed a requirements baseline for the project. The requirements were generated directly from the needs that were identified in the use cases and the received documents. A formal requirements document was delivered to the customer. After review by their staff, our team updated the document according to their feedback and redelivered for their acceptance.

The main categories of requirements captured in this system include:

- **Functional Requirements:** capture the main functions of the database, such as data entry, storage, and maintenance; retrieval and update of data; reporting of data; and configuration of the database.
- **Interface Requirements:** capture the interface that allows database users to interact with the database, including both software and hardware interfaces.
- **Non-Functional Requirements:** capture all non-functional aspects of the database such as performance, environment, and security.

The Functional requirements include the following subsections, which represent the categories of requirements:

- **Data Management:** The Data Management requirements include all specifications around the management of Cornerstones client data. This includes specific data fields collected for each client, the organization of data fields as part of a table, and the queries used to retrieve data from the database.
 - **Data Field Requirements:** The Data Field requirements capture the minimum set of data fields to be tracked for each client/household in the database.
 - **Import/Export:** The Import/Export requirements capture the specifications for the import and export of data into the database from existing records, and export of data into reports.

- Reporting: The Reporting requirements capture the specifications for the reports that the database must provide at a minimum in order to support the needs of the existing report formats.
- Configuration: The Configuration specifications detail all the configuration needs of the database.

The Interface requirements include the following subsections, which represent the categories of requirements:

- User Interface: The User Interface requirements capture the methods that the users will interact with the database.
- Hardware: The Hardware specifications provide the requirements around the hardware used to support the database.

The Non-Functional requirements include the following subsections, which represent the categories of requirements:

- Performance: The requirements in this Performance section provide the performance specifications for the database's operations.
 - Capacity: The Capacity requirements provide requirements around the volume of data entries that must be supported by the database.
 - Availability: The Availability requirements provide requirements around the availability of the database and how many down times are acceptable performance.
- Operational Environment: The Operational Environment requirements describe the environment that the database will operate within.
- Security: The Security requirements provide all the detailed security needs for the database.
 - Protection: The Protection specifications detail the ways in which the client data will be protected, including security of the data as well as security of the facility that houses the database.

- Authorization and Authentication: The Authorization and Authentication requirements detail the access privileges of users and who is able to access, update, and delete data from the database.

Appendix D: contains all of the requirements for the system. It is organized according to the categories above. Each requirement was assigned a unique ID which was used to track the requirement through the life of this project. In addition, the requirement ID's were useful during our test and verification activities, where each requirement was tracked in a traceability matrix to verify that the integration of the system was successful in addressing the specific requirements. The traceability matrix also allowed us to associate design elements to the requirements that they addressed. This traceability matrix is presented in Section 7.

5 Design

Once the use cases and requirements were developed, our team had a full understanding of the data that Cornerstones needs to capture and the reports they needed to generate. The next step in the systems engineering life cycle was to take the results of this analysis and begin to design the system. In this case, the system we would be delivering was a unified database. The database design was conducted using a three stage database design process. These stages are conceptual model design, logical model design, and physical database model. The following sub-sections will describe each design stage.

5.1 The Conceptual Design

Development of the conceptual model was the first step in our design process. The purpose of the conceptual design was to capture a high-level understanding of the information used in Cornerstones' operations of the Neighborhood Resources program. A model of this information was drafted by identifying the entities involved in these operations, and the relationships they have with each other. The conceptual design is independent of all physical consideration, and is only concerned with the entities and their relationships.

The conceptual design was created using entity-relationship models, and diagrams for these models were developed using the Visual Paradigm software. It is presented below:

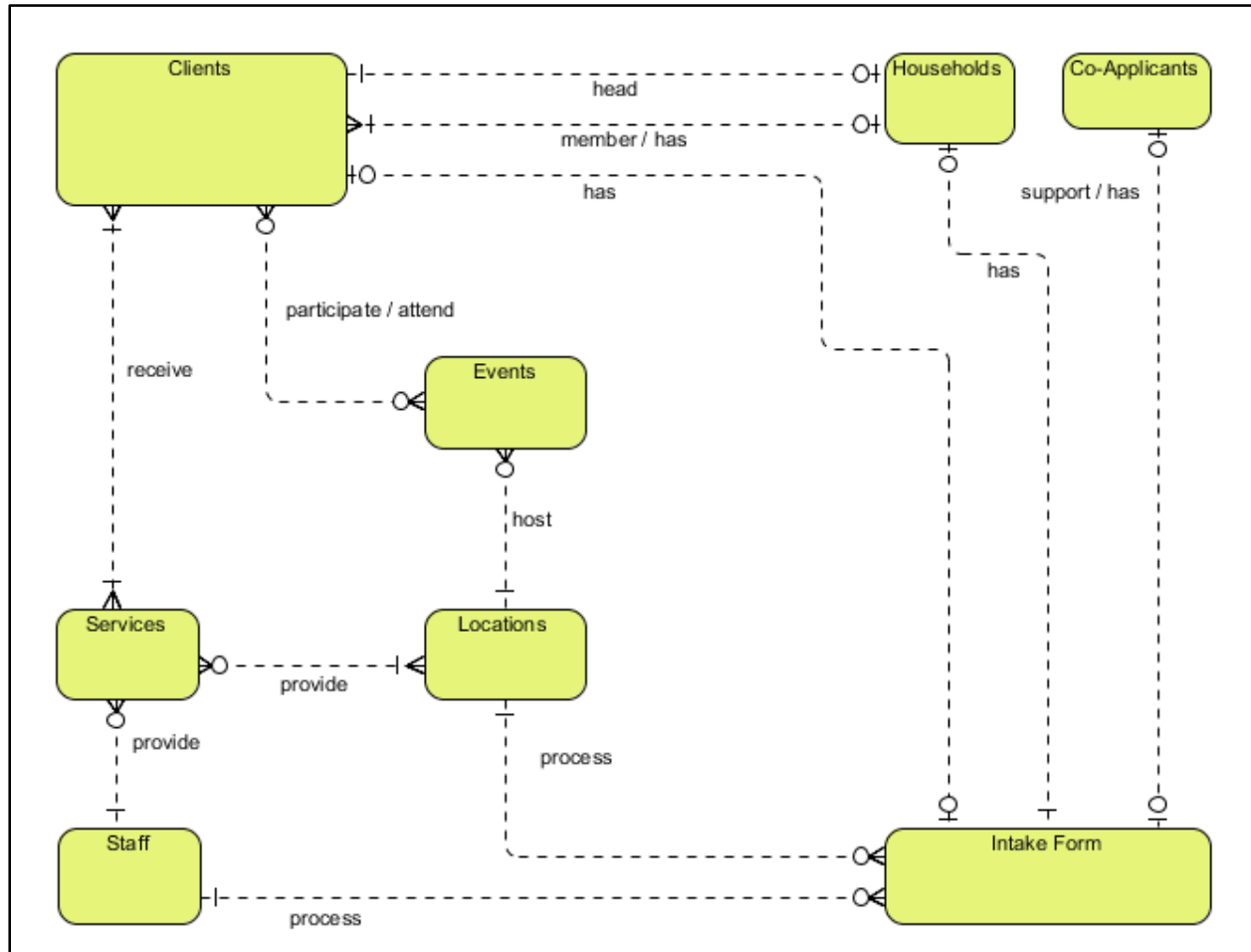


Figure 5-1: Conceptual Model Diagram

The lines connecting the entities in the diagram above represent the relationship between the entities. The types of relationships can be one-to-one, one-to-many, many-to-many, and so on. A full description of each relationship presented in the conceptual design can be found in Appendix E.

Once the design was drafted, the GMU Team reviewed this design with Cornerstones. We received all feedback, addressed deficiencies or inconsistencies between our design and the way Cornerstones staff understood their processes, and then redelivered a final conceptual design.

5.2 The Logical Design

The logical model takes the conceptual model and begins to define the elements that are a part of each entity. For example, the “client” entity may contain elements such as name, address, date of birth, race, member of household, etc. The logical models were created using entity-relationship models and diagrams were developed. The elements in each entity were identified through our analysis process (Section 3), as well as data captured from the working group meetings with Cornerstones.

The logical design was created using entity-relationship models, and diagrams for these models were developed using the Visual Paradigm software. It is presented below:

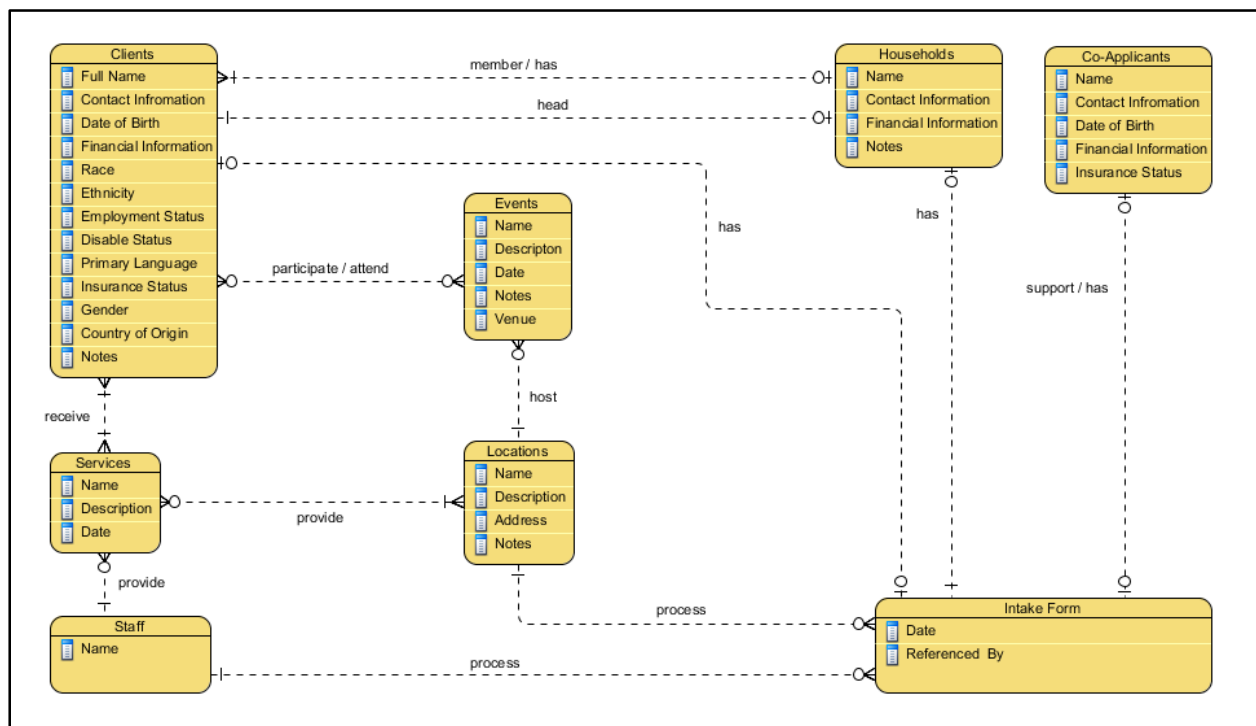


Figure 5-2: Logical Model Diagram

Like the conceptual model, the logical design was reviewed with Cornerstones. We received all feedback, addressed deficiencies or inconsistencies between our design and the way Cornerstones

staff understood the elements of each entity, and then redelivered a final logical design. Additional details for the logical design can be found in Appendix F:.

5.3 The Physical Design

The purpose of the physical design is to provide an architecture framework that can be understood by a database management system. For the Cornerstones Unified Database, our team decided to use MySQL as the relational database management system. MySQL had many advantages over other systems. Some of these advantages are: (1) open source, so cost is free and it is available under the terms of the GNU General Public License; (2) widely used, so there is familiarity with the system by all potential users and maintainers of the database; (3) fully supported, being an open source product allows access to useful updates and support of the system throughout its lifetime, as well as being fully operable on many types of operating systems; (4) well documented, and (5) proven to be a robust platform for database management.

In order for the MySQL relational database management system to understand how to handle the data in the database, it relies on a physical design. The MySQL Workbench tool was used to develop our physical database model of the Cornerstones Unified Database. It is presented below:

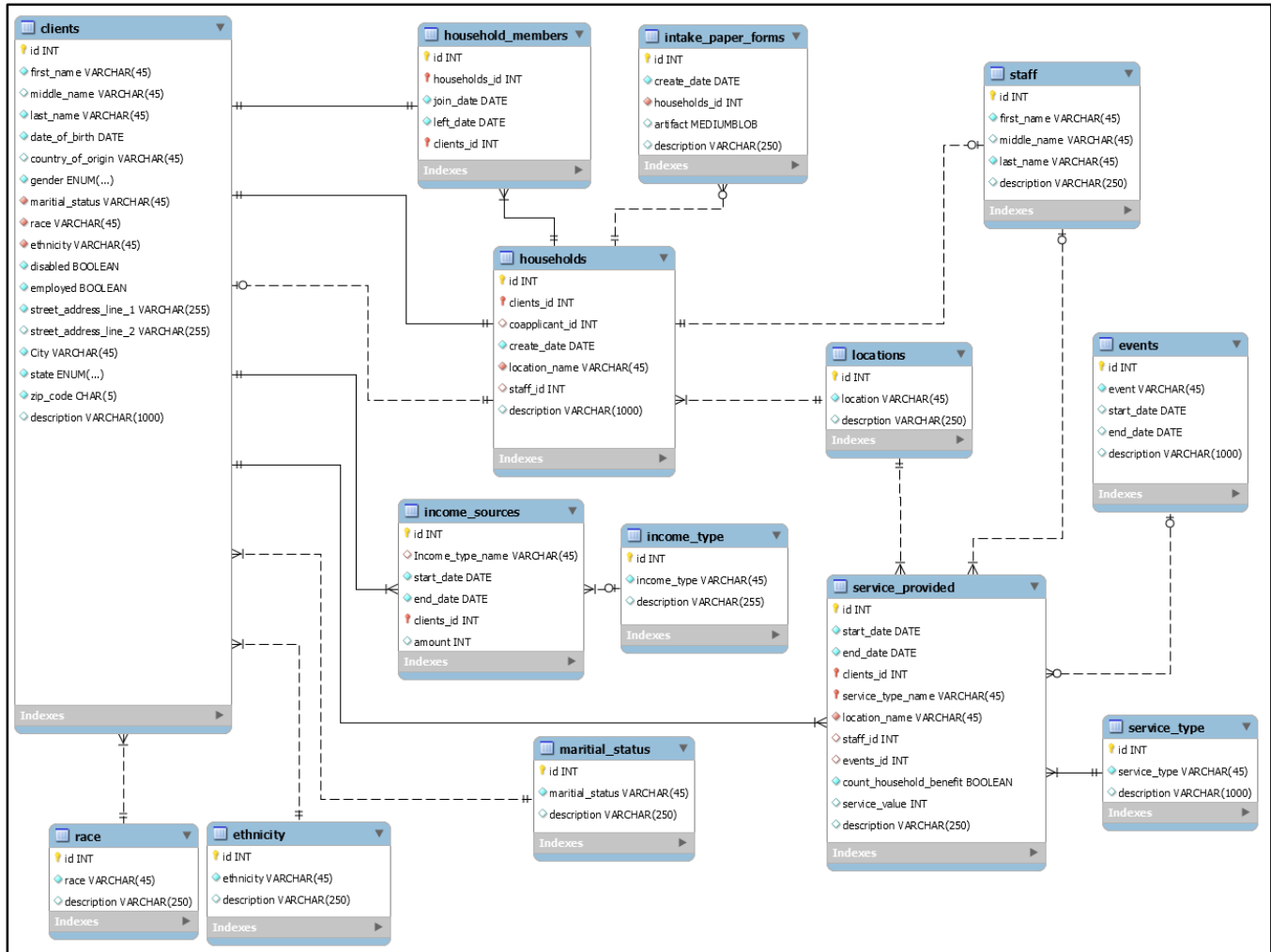


Figure 5-3: Physical Database Model

The physical design takes the logical design and provides rules around the behavior and content of the elements. In addition, it enforces the relationships amongst entities as defined in our conceptual model. The physical design also allows us to assign primary keys for each entity, giving us the structure for creating unique client IDs, households, Cornerstones locations, services provided, etc. Additional details about the physical design are presented in Appendix G:

6 Tools

Several tools were used by the team during the design process. Tools were also used during the testing and deployment of the unified database. A description of these tools is listed in Table 6-1. The “Function” column listed in the table shows what phase of this project each tool was used in. To aid Cornerstones during the operation of the unified database, we also developed a set of installation instructions for the tools, which are found in Appendix H:

Table 6-1: Tools Description

Tool	Description	Function
MySQLInstaller (v 5.6.21.1)	This is an installer for all MySQL tools, such as the database server, workbench, and others. This installer tool is used to install all the MySQL tools needed.	Development, Testing, Active Database
XAMPP (v 1.8.3)	This is an installer for the Apache server and phpMyAdmin web based database management tool.	Development, Testing, Active Database
phpMyAdmin (v 4.2.11)	phpMyAdmin is a web based database management tool used. The XAMPP does not come with the latest version of phyMyAdmin, thus the latest version is used from their website.	Development, Testing, Active Database
FlySpeed SQL Query (Standard Free Version)	This tool is used to generate SQL queries by using a visual method.	Development, Testing
Visual Paradigm (v 11.2)	This tool is used for capturing conceptual and logical models.	Development

7 Integration

During the Integration phase of this project, the GMU team installed the test database onto the dedicated Cornerstones workstation. In addition, the tools used to create database queries, host the web server, and provide a MySQL interface for the database were installed. A description of the tools can be found in Section 6.

The Cornerstones workstation provided to the team was a Dell desktop workstation. It is located in the Cornerstones main office in Reston, and is accessible to Cornerstones staff. The workstation is protected by a user authentication as required. The workstation operates on a Windows

7 operating system, and all of the installed tools are compatible with this system. The licenses for all software on the machine are up to date and fully supported for Cornerstones use.

During integration, the following schedule of activities was followed:

- October 2014:
 - Finish up with database design;
 - Request for workstation through Cornerstones IT staff;
 - IT ticket created;
 - Required specifications for workstation captured;
- November 2014:
 - Follow-up with IT staff;
 - Tools tested on local GMU Team members' machines;
 - Database installed on local GMU Team members' machines;
 - Mock data for testing created;
- December 2014:
 - Workstation acquired;
 - Tools and database installed on workstation;
 - Test of database functions;
 - Training of Cornerstones staff;

Integration activities overlapped with the test phase, which is presented in the next section.

8 Test & Verification

The test and verification phase of this project involved testing of the database functions and verification that the design of the database meets all the requirements. The tests were performed both on individual GMU Team members' computers, as well as the formal installation of the database on the Cornerstones workstation. The tests were performed with mock client data, due to the privacy

issues with actual client data. The team found all functionalities of the test database to be successful with the mock data set, and have trained the Cornerstones staff to execute the tests with the real data.

The test procedures for this phase consisted of running through the use cases defined during the analysis phase of the project. In summary, these activities include:

- Enter new client
- Update existing client record
- Enter new household
- Update existing household
- Delete client data
- Run query for specific statistics as found in the Analysis section

The verification process involved the mapping of each requirement to the use case that it addresses as well as the design elements that fulfill the requirement. The Requirements Traceability Matrix tracks this mapping. The Requirements Traceability Matrix is shown below:

Table 8-1: Requirements Traceability Matrix

Section	ID	Requirement	Use Case	Conceptual Design Entity	Logical Design Element	Physical Design Element
3.1.1 Data Management	CUD-001	The database shall store the "First Name" of the client.	1, 6	Client	Clients: Full Name	clients: first_name
3.1.1 Data Management	CUD-002	The database shall store the "Last Name" of the client.	1, 6	Client	Clients: Full Name	clients: last_name
3.1.1 Data Management	CUD-003	The database shall store the "Date of Birth" of the client.	1, 6	Client	Clients: Date of Birth	clients: date_of_birth
3.1.1 Data Management	CUD-004	The database shall store the "Gender" of the client.	1, 6	Client	Clients: Gender	clients: gender
3.1.1 Data Management	CUD-005	The database shall store the "Address" of the client, where the Address consists of a street number, street name, unit/apartment (if applicable), city, state, and zip code.	1, 6	Client	Clients: Contact Information	clients: street_address_line_1/street_address_line_2/City/state/zip_code
3.1.1 Data Management	CUD-006	The database shall store the "Country of Origin" of the client.	1, 6	Client	Clients: Country of Origin	clients: country_of_origin

Section	ID	Requirement	Use Case	Conceptual Design Entity	Logical Design Element	Physical Design Element
3.1.1 Data Management	CUD-007	The database shall store the "Email Address" of the client.	1, 6	Client	Clients: Contact Information	clients: description
3.1.1 Data Management	CUD-008	The database shall store the "Race" of the client.	1, 6	Client	Clients: Race	clients: race; race: race/description
3.1.1 Data Management	CUD-009	The database shall store the "Ethnicity" of the client.	1, 6	Client	Clients: Ethnicity	clients: race; ethnicity: ethnicity/description
3.1.1 Data Management	CUD-010	The database shall assign clients to "Household" as needed.	1, 5, 6	Household	Household: Name	households: clients_id
3.1.1 Data Management	CUD-011	The database shall store a "Head of Household" for all households recorded.	1, 5, 6	Household	Household: Name	households: clients_id
3.1.1 Data Management	CUD-012	The database shall store the "Employment Status" information of the client.	1, 6	Client	Clients: Employment Status	clients: employed
3.1.1 Data Management	CUD-013	The database shall enforce the following fields as required for each client record: (1) First Name, (2) Last Name, (3) Date of Birth, (4) Gender, (5) Address, (6) City of Origin, (7) Country of Origin	1, 6	Client	Clients	clients
3.1.1 Data Management	CUD-014	The database shall store the client's history of visits to Cornerstones program sites.	3, 7	Location	Locations: Name	locations: location
3.1.1 Data Management	CUD-015	The database shall store the client's history of participation in Cornerstones events and/or programs.	3, 7	Event, Location	Events: Name/Description/Date; Locations: Name	events: event/start_date/end_date; locations: location
3.1.1 Data Management	CUD-016	The database shall store the client's history of receiving goods, services, or other forms of aid/assistance from Cornerstones programs.	2, 7	Service, Location	Services: Name/Description/Date; Locations: Name	service_provided : service_type_name/start_date/end_date; locations: location
3.1.1 Data Management	CUD-017	The database shall store a "Notes" field to capture all miscellaneous client data.	1, 6	Client	Clients: Notes	clients: description
3.1.2 Import/Export	CUD-018	The database shall support the entry of client data from existing client records (i.e. pen & paper forms, Excel spreadsheets).	6	Client, Household	Clients; Households	clients; households

Section	ID	Requirement	Use Case	Conceptual Design Entity	Logical Design Element	Physical Design Element
3.1.2 Import/Export	CUD-019	The database shall enforce the required fields for each client record when importing client data.	6	Client	Clients	clients
3.1.2 Import/Export	CUD-020	The database shall support the export of client data from the database and into other file types (e.g. Excel, csv, etc.) to support Cornerstones operations.	4	Client	Clients	clients
3.1.3 Reporting	CUD-021	The database shall support reporting of client data by specified fields (e.g. race, ethnicity, age, income, location, etc.).	4	Client	Clients	clients
3.1.3 Reporting	CUD-022	The database shall report the number of individual clients per race.	4	Client	Clients: Race	clients: race
3.1.3 Reporting	CUD-023	The database shall report the number of households per race.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-024	The database shall report the number of individual clients per ethnicity.	4	Client	Clients: Ethnicity	clients: ethnicity
3.1.3 Reporting	CUD-025	The database shall report the number of households per ethnicity.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-026	The database shall report the number of households with male/female head of households.	4	Household	Households: Name	households: clients_id
3.1.3 Reporting	CUD-027	The database shall report the number of households with a member under the age of 18.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-028	The database shall report the number of households with a member over the age of 55.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-029	The database shall report the number of households with an unemployed member.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-030	The database shall report the number of households per income group.	4	Household	Households	households: clients_id
3.1.3 Reporting	CUD-031	The database shall support reporting of client data by specified program, event, or site.	4	Client, Event, Service, Location	Clients; Events; Services; Locations	clients; events; services; locations
3.1.3 Reporting	CUD-032	The database shall report client data as needed for official reports.	4	Client	Clients	clients
3.1.4 Configuration	CUD-033	The database shall be configurable to select which client data fields are required.	6	Client	Clients	clients

Section	ID	Requirement	Use Case	Conceptual Design Entity	Logical Design Element	Physical Design Element
3.2.1 User Interface	CUD-034	The database shall be accessible to Cornerstones staff through a web interface.	6, 7	NA	NA	NA
3.2.1 User Interface	CUD-035	The database shall allow Cornerstone staff to input client information.	6	Client	Clients	clients
3.2.1 User Interface	CUD-036	The database shall allow Cornerstones staff to update client information.	7	Client	Clients	clients
3.2.1 User Interface	CUD-037	The database shall allow Cornerstones staff to retrieve client information.	4	Client	Clients	clients
3.2.1 User Interface	CUD-038	The database shall be accessible on the designated Cornerstones computer work station.	4, 6, 7	NA	NA	NA
3.2.1 User Interface	CUD-039	The database shall be accessible through any authorized device.	4, 6, 7	NA	NA	NA
3.2.2 Hardware	CUD-040	The database shall operate successfully on the hardware specifications of the designated Cornerstones computer work station.	NA	NA	NA	NA
3.3.1 Performance	CUD-041	The database shall support a minimum of 100,000 client records.	NA	NA	NA	NA
3.3.1 Performance	CUD-042	The database shall support a minimum availability of 0.999.	NA	NA	NA	NA
3.3.2 Operational Env	CUD-043	The database shall operate in a Microsoft Windows environment.	NA	NA	NA	NA
3.3.2 Operational Env	CUD-044	The database shall support simultaneous access of client records by multiple users.	4, 6, 7	NA	NA	NA
3.3.3 Security	CUD-045	The database shall be stored on a password protected machine.	NA	NA	NA	NA
3.3.3 Security	CUD-046	The database shall warn users before a client record is deleted.	7	NA	NA	NA
3.3.3 Security	CUD-047	The database shall allow access to client records through authentication with a valid username and password.	6, 7	NA	NA	NA
3.3.3 Security	CUD-048	The database shall allow authorized users to create, access, view, update, and delete client records.	6, 7	NA	NA	NA

9 Validation

The goal of the validation phase was to show proficient use of the installed database by the Cornerstones staff. In order to measure this proficiency, the staff were required to execute all of the use cases, following the test procedures presented above. Successful passing of these tests were seen as validation that the delivered test database met the requirements and addressed Cornerstones immediate needs.

At the time of delivery of this Final Report, our team was still in the process of validating the database with Cornerstones staff. An update on the progress of this phase may be presented at the Final Presentation.

10 Delivery

After completing the above phases of the project, the GMU Team performed a formal delivery of all project artifacts to Cornerstones. The most important delivery was the active database, as installed on the Cornerstones workstation. The complete list of formally delivered artifacts is presented below:

Table 10-1: Delivered Artifacts

Delivered Artifact	Description	Type
Project Plan	The Project Plan outlines the plan for semester. This includes schedule, roles and responsibilities, milestones, risk management plan, and communications plan. This document also provides the preliminary definition of the project scope.	MS Word file
Project IMS	The Integrated Master Schedule shows the detailed Work Breakdown Structure for this project and all major milestones and deliveries.	MS Project file
Requirements Document	The Requirements Document presents an overview of the requirements, their function in this project, and a full set of the accepted requirements.	MS Word file
Design Document	The Design Document provides the final designs of the Conceptual, Logical, and Physical Models.	MS Word file

Delivered Artifact	Description	Type
Meeting Minutes and Status Reports	These artifacts were captured throughout the semester and provide a record of all topics discussed, action items assignments, and status of the project phases.	MS Word files
Final Report	The Final Report gives a comprehensive briefing of everything that was performed in this project.	MS Word file
Active Database	The Active Database is delivered as a MySQL database management system installed on the Cornerstones workstation.	MySQL RDBMS installation
Supporting Documents	Supporting documents provide guidance on how to use the Active Database.	MS Word files

11 Conclusions & Future Work

At the beginning of the semester, Cornerstones approached GMU with the challenges they experience in their current system. These challenges were in the areas of accurately and comprehensively tracking their clients, and their clients' participation in Cornerstones programs. This problem was important to Cornerstones because they desired more resolution into the success of their programs and the impact they had on the local community. Through careful planning, analysis, design, and deployment of a unified database system, the GMU Team delivered a solution to Cornerstones that addresses these immediate challenges.

The improvements that were delivered in the unified database fall into three distinct categories:

1. Functions that were previously difficult or time-consuming for Cornerstones to perform. For example, unique identification of clients across multiple programs, tracking of program participation by clients
2. Functions that were desired, but impossible for Cornerstones to perform. For example, assignment of unique client IDs, reporting of successful program tracks (looking at a client whose livelihood was greatly improved and retrieving their history of program participation to determine which programs were effective), update of client data simultaneously from different program offices

3. Functions that were unknown to Cornerstones. For example, trend analysis of multiple variables over time (such as mapping of amount of aid received during particular times of the year over the five CBI locations), anticipation of clients' needs in specific areas and forecasting of demand for certain services

With the unified database, Cornerstones is able to benefit in their client tracking and reporting functions and make their business more effective. The unified database also allows Cornerstones staff members to spend less time manually entering, sorting through, and compiling data. This will free up Cornerstones staff to focus more on analysis of their programs' effectiveness in the community. With all the data being centrally stored in the database, Cornerstones can also run more complex types of analysis, which will yield greater understanding of the dynamics that are present in their local community. Accurate tracking of aid provided also provides sponsors with a clearer picture of Cornerstones' effectiveness, and can allow Cornerstones to secure additional funding.

With the completion of the first three capabilities as illustrated in the capabilities roadmap in Section 2.1, there is still more capabilities to be implemented of the fully envisioned system. With the preliminary database in place, future teams will now be able to perform improvements to the database, design and implement web-based entry forms and data access, import and export real client data, create of more advanced report types, and upgrade the system as needed.

Overall, this was a very fulfilling project for each of the GMU Team members. Cornerstones' mission was one that we valued and we were honored to be able to work on such a meaningful final project. We hope that the unified database we delivered will be useful to Cornerstones, and that the work we captured here will be useful to future teams as they improve upon the database's capabilities.

Appendix A: Use Cases

The following use cases were identified to capture the processes of Cornerstones' existing programs, how the staff interacts with clients, and how the database will be operated.

1. Use Case 1: New Applicant Filling Out Form
2. Use Case 2: Staff Providing Food Pantry Service to Existing Applicant
3. Use Case 3: Client Attends Service
4. Use Case 4: Staff Generates Reports for Program
5. Use Case 5: Create New Entry From Household
6. Use Case 5a: Single Client Becomes Part of a Household
7. Use Case 5b: Client Moves from Member of a Household to His/Her Own Household as a Head
8. Use Case 6: Add New Client to Database
9. Use Case 7: Update Existing Client Record in Database

Use Case 1: Entering data for new applicant into database

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	New applicant successfully gives the appropriate information to the staff to collect data for the database.
Scope:	Database
Level:	User Goal
Pre-Condition:	The applicant must be new
Success End Condition:	Able to enter form into database
Minimal Guarantees:	N/A
Primary Actor:	New Applicant
Trigger Event:	Applicant in need of a service that Cornerstone can provide

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	New Applicant	Comes to program to receive services provided by Cornerstone.
2	Staff	Asks for required and optional information needed from New Applicant before New Applicant can begin using Cornerstone Services.
3	New Applicant	Provides staff with required and optional information.
4	Staff	Submits electronic form into database after collecting the required and optional information from New Applicant.

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
-------------	-----------------	----------------------------

3a	Lack of Information	New Applicant cannot provide staff with some of the required information needed to submit electronic form successfully.
3b	Alternative Method	Staff enters/selects pre-determined answer for the required field for the applicant form to be entered into database
3c	Selection	Staff can now submit electronic form to database successfully.
4a	Submission Status	Staff is unable to submit electronic form to database for New Applicant.
4b	Submission Type	Staff takes down information from New Applicant on pen & paper and then submits it back-end staff at a later time.

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Must
Performance Target:	TBD
Frequency:	Daily
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Staff
Channel(s) To Secondary Actor(s):	Verbal Communication

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

Issue ID **Issue Description**

Use Case 2: Staff Providing Food Bag Service to Existing Applicant

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	To have the Existing Applicant attend a Service provided by Cornerstone
Scope:	Database
Level:	Task
Pre-Condition:	The applicant is entered already in the database
Success End Condition:	Applicant attends the service/services
Minimal Guarantees:	Staff knows to inform applicant of the services they are suggested to attend in order to seek help (aid/assistance)
Primary Actor:	Staff: The staff will verbally interact with the applicant and suggest the applicant attend a service.
Trigger Event:	The applicant has come for a service X amount of times

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Applicant	Comes to a Food Pantry location to receive services
2	Staff	Pulls up existing applicant information and sees how many times applicant has received the services within a given time frame
3	Staff	Staff provides food
4	Staff	Refers the client for other services if food is provided X time in the given period
5	Applicant	States if he/she can attend
6	Staff	Enters the food bag services given to the client in the database

Scenario Variation

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
4a	Refusal	Applicant states to Staff that he/she will not attend service

4b	Refusal	Staff makes note that he/she has suggested to applicant to attend service but applicant refuses to attend
----	---------	---

Scenario Extensions

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
--------------------	-------------------------	----------------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Must
Performance Target:	TBD
Frequency:	Daily
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Existing Applicant
Channel(s) To Secondary Actor(s):	Verbal Communication

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
------------------------	---------------------------------

Use Case 3: Client Attends Suggested Service

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	Client will get the information they need from the service to better their situation
Scope:	Service
Level:	User Goal
Pre-Condition:	Applicant has agreed to come to the service
Success End Condition:	Applicant extracts useful information for themselves and their family
Minimal Guarantees:	Client attends service
Primary Actor:	Applicant: Comes into service and learns about how to better their situation
Trigger Event:	Applicant attends service

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Applicant	Comes to service and signs name in sign-in sheet
2	Staff	Informs applicant about the service they are attending
3	Applicant	Provides feedback from service

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
1a	No-Show	Applicant never shows up to the service

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Want
Performance Target:	TBD
Frequency:	Per Schedule
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Staff, Database
Channel(s) To Secondary Actor(s):	Verbal Communication, enter data

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
------------------------	---------------------------------

Use Case 4: Staff Generates Reports

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	Staff can generate a report for any of the Neighborhood resource programs; annual, quarterly reports, etc.
Scope:	Database
Level:	High Level Summary
Pre-Condition:	Applicant information is captured and submitted into database
Success End Condition:	Back-end Staff can access the information and create reports
Minimal Guarantees:	Back-end Staff can access the information in the database
Primary Actor:	Staff: Staff is interacting with the database to generate reports
Trigger Event:	Staff needs to present progress/efforts that has been made from Neighborhood Resources

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Staff	Logs into database
2	Staff	Extracts data from the database for reporting
3	Staff	Generates report

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
-------------	-----------------	----------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	High
Performance Target:	TBD
Frequency:	Weekly, Monthly
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Stakeholders, Government
Channel(s) To Secondary Actor(s):	N/A

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
------------------------	---------------------------------

Use Case 5: Creating new entry from a co-applicant in household

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	Separating a co-applicant from a household to a separate new applicant
Scope:	Database
Level:	User Goal
Pre-Condition:	Applicant must have already been a co-applicant to a household at one point in time
Success End Condition:	Co-applicant becomes a new individual applicant with the option to have co-applicants under his/her household
Minimal Guarantees:	N/A
Primary Actor:	Staff
Trigger Event:	Co-applicant wants to be apart from current household and into his/her own household as a new applicant

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Applicant	Comes to staff and gives information to find which household he/she is a co-applicant of.
2	Staff	Pulls up co-applicants information and deletes him/her from current household
3	Applicant	Gives new information to staff
4	Staff	Creates new applicant

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
2a	Results Page	Staff cannot find co-applicants information in database

2b Entry Staff will create new entry

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Want
Performance Target:	TBD
Frequency:	Weekly, Monthly
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Applicant
Channel(s) To Secondary Actor(s):	Verbal Communication

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

Issue ID **Issue Description**

Use Case 5a: Single Client Becoming A part of a Household

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	Database will add a current single applicant to apart of a current applicant that has a household already in the database
Scope:	Database
Level:	High
Pre-Condition:	Single applicant and the Head of the current household applicant must already be within the system
Success End Condition:	Single applicant is a part of another household
Minimal Guarantees:	N/A
Primary Actor:	<Role Name>: <Description Of The Actor that is interacting with the system, an actor can be anything with behavior>
Trigger Event:	<Action or Time event that starts the Use Case, often this is step 1>

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Single Applicant	Comes to staff to be integrated to another household
2	Staff	Asks for approval from Head of household that single applicant wants to be a part of
3	Head of Household Applicant	Verbal verifies they want to integrate single applicant as part of their household
4	Staff	Pulls up information on both applicants and adds single applicant to Head of household applicant then deletes single applicant from database

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
-------------	-----------------	----------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Want
Performance Target:	TBS
Frequency:	As needed
Super Use Case:	Creating new entry from a co-applicant in household
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Single applicant and head of household applicant
Channel(s) To Secondary Actor(s):	Verbal Communication

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
-----------------	--------------------------

Use Case 5b: Client moving from a household to his/her own household as a head

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	Database will separate a client from a current household to his/her own separate household as the head
Scope:	Database
Level:	Medium
Pre-Condition:	Client must already be a part of a current household as not a head
Success End Condition:	Single applicant is a part of his/her own household as the head
Minimal Guarantees:	N/A
Primary Actor:	Staff
Trigger Event:	<Action or Time event that starts the Use Case, often this is step 1>

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Client	Comes to staff to be separated from one household to his/her own household as the head
2	Staff	Pulls up information of client of current household, removes client from that household and creates a new entry for the client as the head of that household

Scenario Extensions

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Scenario Variations

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
-------------	-----------------	----------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Want
Performance Target:	TBS
Frequency:	As needed
Super Use Case:	Creating new entry from a co-applicant in household
Sub Use Case(s):	N/A
Channel To Primary Actor:	Verbal Communication
Secondary Actor(s):	Client
Channel(s) To Secondary Actor(s):	Verbal Communication

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
-----------------	--------------------------

Use Case 6: Add New Client to Database

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	To have the Cornerstone Staff member enter a new client record into the database.
Scope:	Database
Level:	Task
Pre-Condition:	The client is not already entered in the database
Success End Condition:	Client record is stored in the database
Minimal Guarantees:	Staff enters new client record in database
Primary Actor:	Staff: The staff will access the database, create a new client record, and store this in the database.
Trigger Event:	The staff has processed a new applicant and has obtained their personal data through the application form.

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Staff	Accesses database
2	Database	Prompts Staff for user identification and password
3	Staff	Staff provides authentication credentials
4	Database	Accepts credentials and allows access to client records
5	Staff	Selects new client record entry and enters in the information collected from the application; saves the input
6	Database	Stores the new client record

Scenario Variation

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
4a	Rejection	Database does not accept the entered authentication credentials

Scenario Extensions

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Must
Performance Target:	TBD
Frequency:	Daily
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Database Interface
Secondary Actor(s):	Database
Channel(s) To Secondary Actor(s):	Database Interface

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
-----------------	--------------------------

Use Case 7: Update Existing Client Record in Database

Characteristic Information

The following defines information that pertains to this particular use case. Each piece of information is important in understanding the purpose behind the Use Case.

Goal In Context:	To have the Cornerstone Staff member update an existing client record in the database.
Scope:	Database
Level:	Task
Pre-Condition:	The client is already entered in the database
Success End Condition:	Client record is updated and stored in the database
Minimal Guarantees:	Staff updates the client record in database
Primary Actor:	Staff: The staff will access the database, find the existing client record, and update the information in the database.
Trigger Event:	The staff has processed a client as having updated personal data (including household data), attended an event, received goods/services, or enrolled in a program.

Main Success Scenario

This Scenario describes the steps that are taken from trigger event to goal completion when everything works without failure. It also describes any required cleanup that is done after the goal has been reached. The steps are listed below:

<u>Step</u>	<u>Actor</u>	<u>Action Description</u>
1	Staff	Accesses database
2	Database	Prompts Staff for user identification and password
3	Staff	Staff provides authentication credentials
4	Database	Accepts credentials and allows access to client records
5	Staff	Searches for existing client record and updates the information (by changing existing fields or adding new fields); saves the input
6	Database	Stores the new client record

Scenario Variation

This is a listing of how each step in the Main Success Scenario can be extended. Another way to think of this is how can things go wrong. The extensions are followed until either the Main Success Scenario is rejoined or the Failed End Condition is met. The Step refers to the Failed Step in the Main Success Scenario and has a letter associated with it. I.E if Step 3 fails the Extension Step is 3a.

<u>Step</u>	<u>Variable</u>	<u>Possible Variations</u>
-------------	-----------------	----------------------------

4a	Rejection	Database does not accept the entered authentication credentials
5a	No Results	Staff is unable to locate the existing client

Scenario Extensions

If a variation can occur in how a step is performed it will be listed here.

<u>Step</u>	<u>Condition</u>	<u>Action Description</u>
-------------	------------------	---------------------------

Related Information

The following table gives the information that is related to the Use Case.

Schedule:	TBD
Priority:	Must
Performance Target:	TBD
Frequency:	Daily
Super Use Case:	N/A
Sub Use Case(s):	N/A
Channel To Primary Actor:	Database Interface
Secondary Actor(s):	Database
Channel(s) To Secondary Actor(s):	Database Interface

Open Issues

The following table provides insight to any unresolved problems or questions. These are the things that seem to apply but could not be fit into this use case on this pass.

<u>Issue ID</u>	<u>Issue Description</u>
-----------------	--------------------------

Appendix B: Paper Intake Forms Received

This Appendix provides copies of the three paper intake forms received from Cornerstones.

Appendix Figure 1: ASAPP Intake Form

TODAY'S DATE: _____

Garden School
Assistant status
RACE
vegan

~~ESSP~~ Food Pantry

Asian Interfaith has a new name. Our mission stays the same.

Cornerstones
Hope for Tomorrow Today

Assistance Services and Pantry Program (ASAPP)

Name: (Last) _____ (First) _____ (MI) _____

Co-Applicant: (if any) (Last) _____ (First) _____ (MI) _____

Street Address: _____ Apt: _____

City/State/Zip: _____ Phone: _____

Referred By: _____

*Would you like to sign up to receive regular emails about programs and services? Email: _____

Are you employed? ___ Yes ___ No Co-applicant employed? ___ Yes ___ No

Do you have health insurance? ___ Yes ___ No Co-applicant has health insurance? ___ Yes ___ No

Children have health insurance? ___ Yes ___ No

If not employed (or co-applicant), what are your/their plans for an income? _____

Are you currently a client of other Cornerstones programs? ___ Yes ___ No (if yes, please check those that apply)

Cornerstones Housing Laurel Learning Center Healthy Families Embry Rucker Shelter

Community Centers Townhomes C4H/NRC

Do you need help w/budgeting your money? ___ Yes ___ No Do you want information on budgeting? ___ Yes ___ No

Are you receiving SNAP? ___ Yes ___ No if yes, date applied ___/___/___

Are you receiving WIC? ___ Yes ___ No if yes, date applied ___/___/___

HOUSEHOLD COMPOSITION:
Please fill in ALL blanks for each member of your household that you support – **INCLUDING YOURSELF!!**
What is your race? Please write for each member of the household race as follows:

(AI) American Indian (A) Asian (B) Black/African American (ME) Middle Eastern (W) White/Caucasian (O) Other

Are you Hispanic? ___ Yes ___ No What is your country of origin: _____

What is your primary language? _____


Last Name	First Name	MI	Sex	Race	DOB	Disabled Y/N
1.						
2.						
3.						
4.						
5.						
6.						
7.						

school

Appendix Figure 2: CBI Intake Form

TODAY'S DATE: _____

Reunion Interfaith has a new name. Our mission stays the same.



Cornerstones
Hope for Tomorrow Today

CBI Program Participant Form

Personal Information:

Name: (Last) _____ (First) _____ (MI) _____

Co-Applicant: (if any) (Last) _____ (First) _____ (MI) _____

Street Address: _____ Apt: _____

City/State/Zip: _____ Phone: _____

Email (if applicable): _____

<p>Race (head of household):</p> <p><input type="checkbox"/> (W) White/Caucasian</p> <p><input type="checkbox"/> (B) Black/African American</p> <p><input type="checkbox"/> (AI) American Indian/Alaskan Native</p> <p><input type="checkbox"/> (A) Asian</p> <p><input type="checkbox"/> (NH) Native Hawaiian/Other Pacific Islander</p> <p><input type="checkbox"/> (MR) Multi-racial</p> <p><input type="checkbox"/> (O) Other/Not Reported</p>	<p>Household Information:</p> <p>Household Size (including applicant): _____</p> <p>Annual Household Income: _____</p>
---	---

Are you Hispanic? Yes No

Yes / No Are you a female head of household?

Yes / No Do you have household members under 18?

Yes / No Do you have **disabled** household members under age 55?

Yes / No Do you have household members **over** age 55?

Yes / No Do you have **unemployed** household members between the ages of 18-55?

Yes / No Do you receive Temporary Assistance for Needy Families (TANF)?

PHOTO RELEASE: I hereby give Cornerstones, Inc. permission to use my photograph or my child's photograph in digital, printed, or video format for any purpose, including, but not limited to printed marketing materials and on the Internet.

**I do not give Cornerstones, Inc. permission to use my photograph or my child's photograph. Initial here: _____


I declare that all information I have provided on this form is true and correct to the best of my knowledge and belief.

Client Signature

Date

Appendix Figure 3: Wellness Intake Form

TODAY'S DATE: _____



Cornerstones
Hope for Tomorrow Today

Wellness Support Intake Form

Wellness Support Goal (What are we working on?):

Section I: PERSONAL INFORMATION

Name: (Last) _____ (First) _____ (MI) _____

Co-Applicant: (if any) (Last) _____ (First) _____ (MI) _____

Street Address: _____ Apt: _____

City/State/Zip: _____ Phone: _____

Referred By: _____

*Would you like to sign up to receive regular emails about programs and services? Email: _____

Are you employed? ___ Yes . ___ No Co-applicant employed? ___ Yes ___ No

If not employed (or co-applicant), what are your/their plans for an income? _____

Do you receive any financial assistance from government programs?

Are you currently participating in any other Cornerstones programs? ___ Yes ___ No (if yes, please check those that apply)

Housing Programs Laurel Learning Center Healthy Families Embry Rucker Shelter

CBI Site: _____ ESSP C4H/NRC Other _____

Section II: HOUSEHOLD COMPOSITION

Please fill in ALL blanks for each member of your household that you support – INCLUDING YOURSELF!!

What is your race? Please write for each member of the household race as follows:
 (W) White/Caucasian (B) Black/African American (AI) American Indian/Alaskan Native (A) Asian
 (NH) Native Hawaiian/Other Pacific Islander (MR) Multi-racial (O) Other/Not Reported

Are you Hispanic? ___ Yes ___ No What is your country of origin: _____

What is your primary language? _____

Last Name	First Name	MI	Sex	Race	DOB	Disabled Y/N
1.						
2.						
3.						
4.						

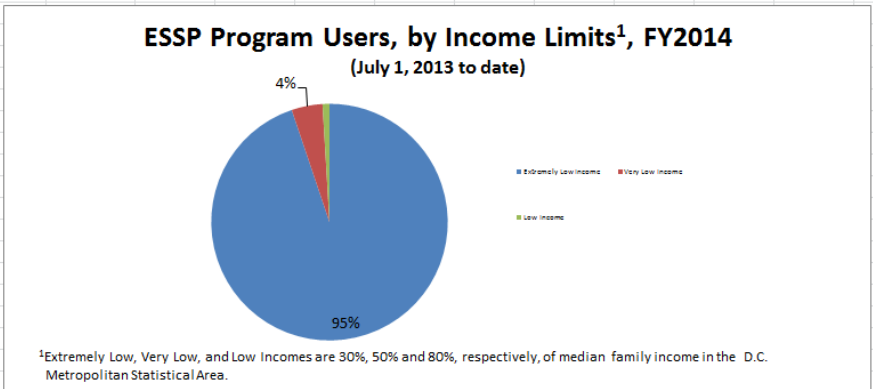
Relationship

Appendix C: Cornerstones Reports Analysis

Food Pantry Master Report:

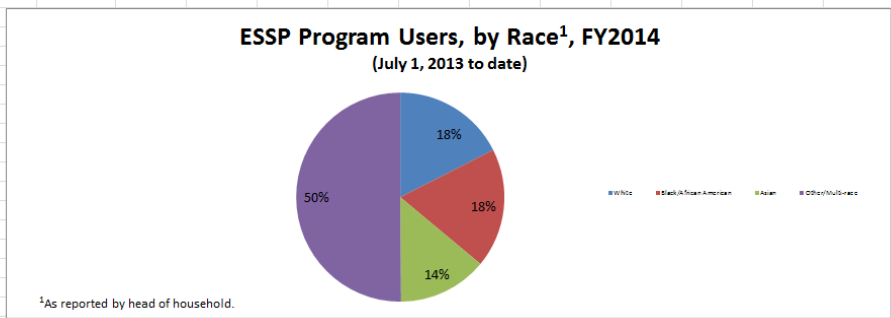
Graph # 1 - Program Users, by Income Limits

Extremely Low Income	403
Very Low Income	18
Low Income	4



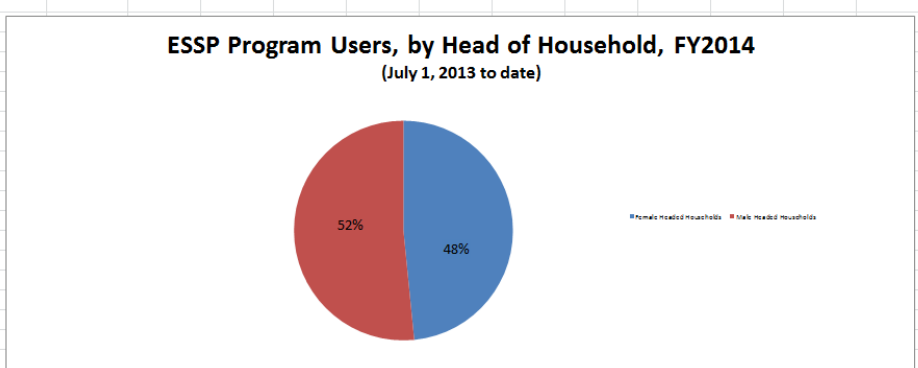
Graph # 2 - Program Users, by Race

White	76
Black/African American	80
Asian	60
Other/Multi-race	217



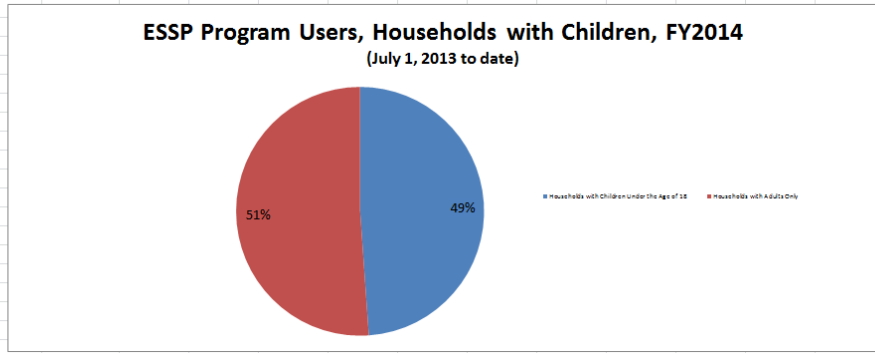
Graph # 3 - Program Users, by Head of Household

Female Headed Households	216
Male Headed Households	230
Average household size	4.54



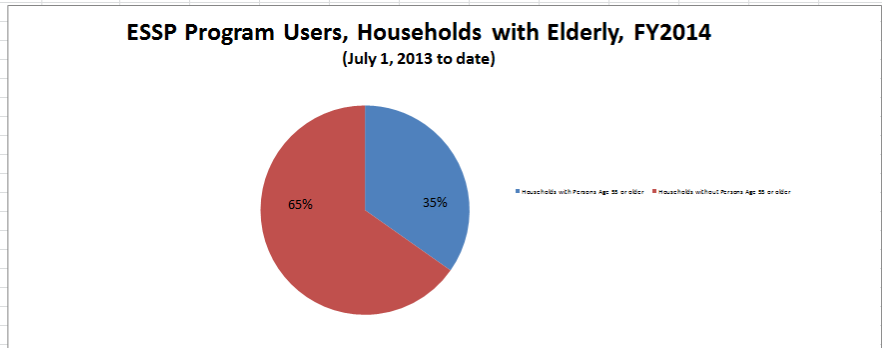
Graph # 4 - Program Users, Households with Children

66		
67	Households with Children Under the Age of 18	218
68	Households with Adults Only	228
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		



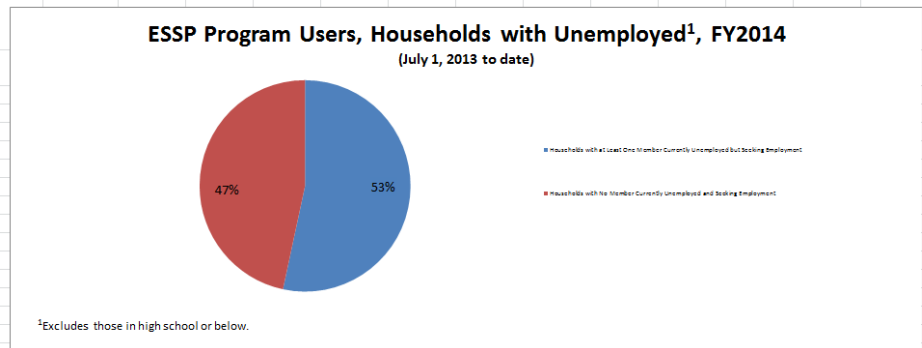
Graph # 5 - Program Users, Households with Elderly

1		
2	Households with Persons Age 55 or older	155
3	Households without Persons Age 55 or older	291
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		



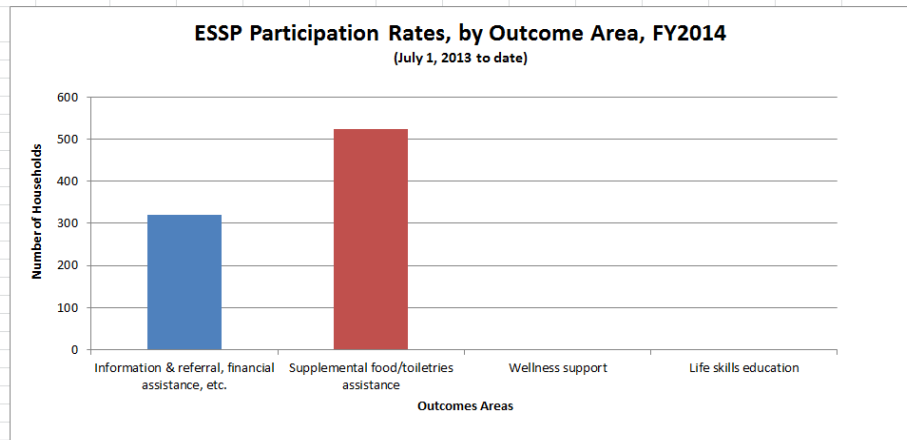
Graph # 6 - Program Users, Households with Unemployed

106		
107	Households with at Least One Member Currently Unemployed but Seeking Employment	238
108	Households with No Member Currently Unemployed and Seeking Employment	208
109		
110		
111		
112		
113		
114		
115		
116		
117		
118		
119		
120		
121		
122		
123		



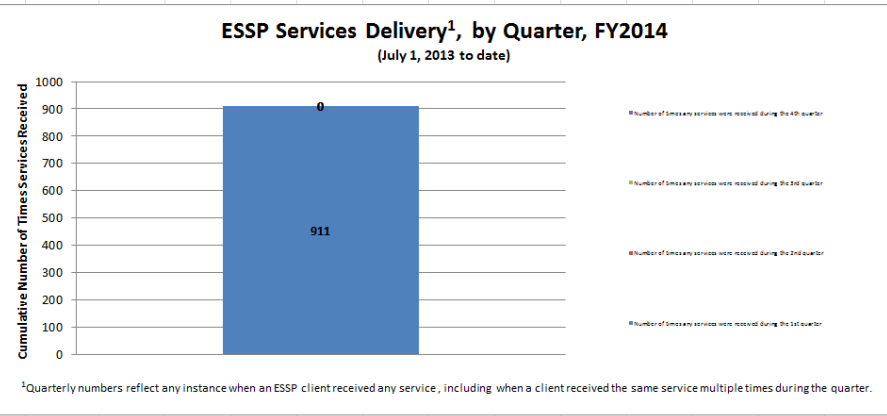
Graph # 7 - Participation Rates, by Outcome Area

143	Information & referral, financial assistance, etc.	321
144	Supplemental food/toiletries assistance	525
145	Wellness support	0
146	Life skills education	0
147		
148		
149		
150		
151		
152		
153		
154		
155		
156		
157		
158		
159		
160		
161		
162		
163		
164		
165		
166		
167		



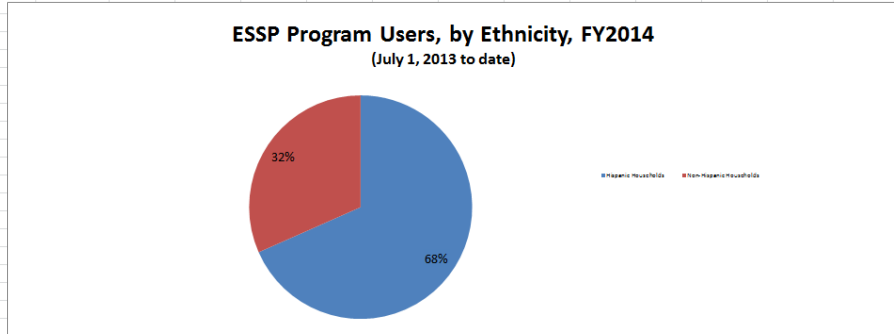
Graph # 8 - Services Delivery, by Quarter

38	Number of times any services were received during the 1st quarter	911
39	Number of times any services were received during the 2nd quarter	0
40	Number of times any services were received during the 3rd quarter	0
41	Number of times any services were received during the 4th quarter	0
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		

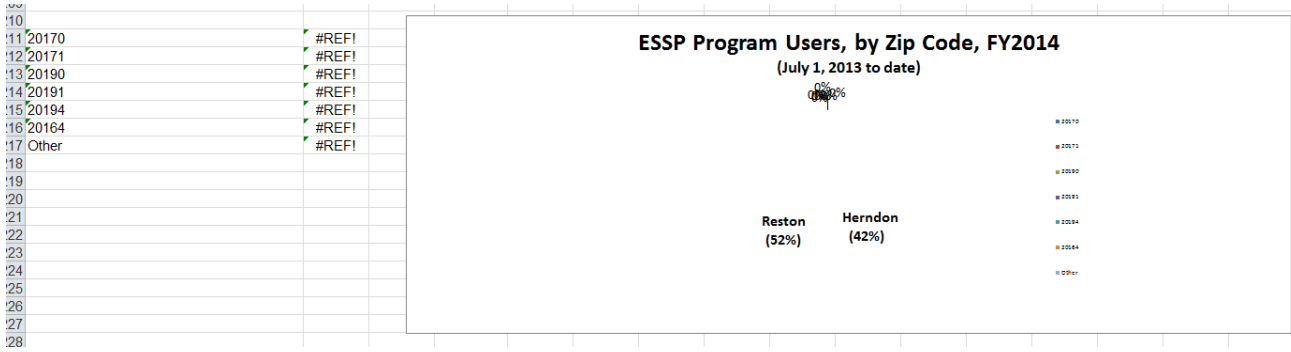


Graph # 9 - Programs Users, by Ethnicity

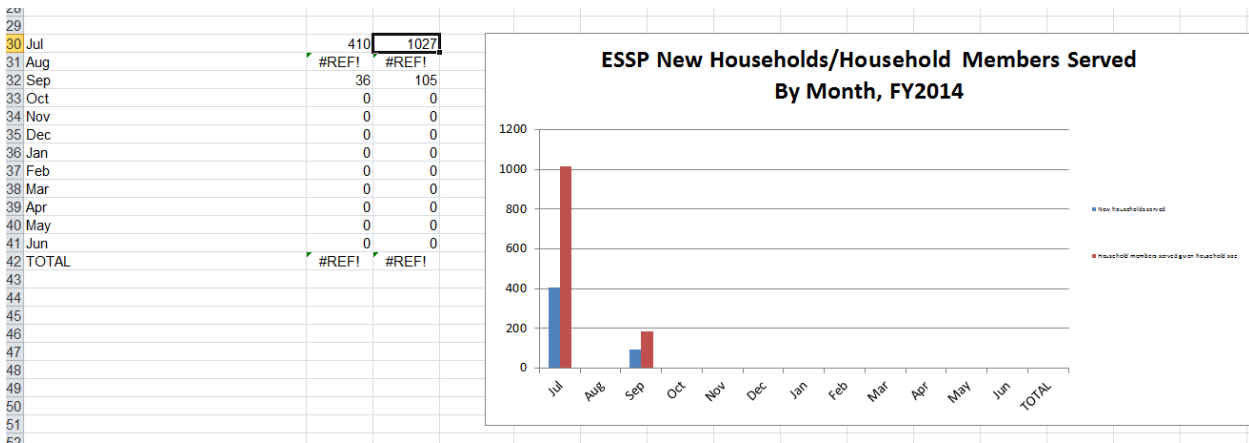
189	Hispanic Households	305
190	Non-Hispanic Households	141
191		
192		
193		
194		
195		
196		
197		
198		
199		
200		
201		
202		
203		
204		
205		
206		
207		
208		
209		



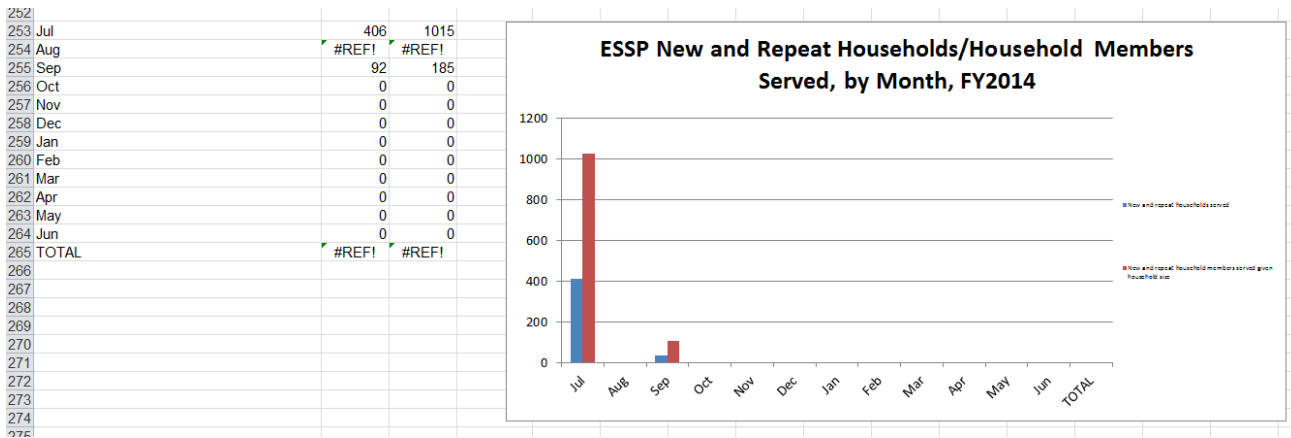
Graph # 10 - Program Users, by Zip Code



Graph # 11 - New Households/Household Members Served By Month

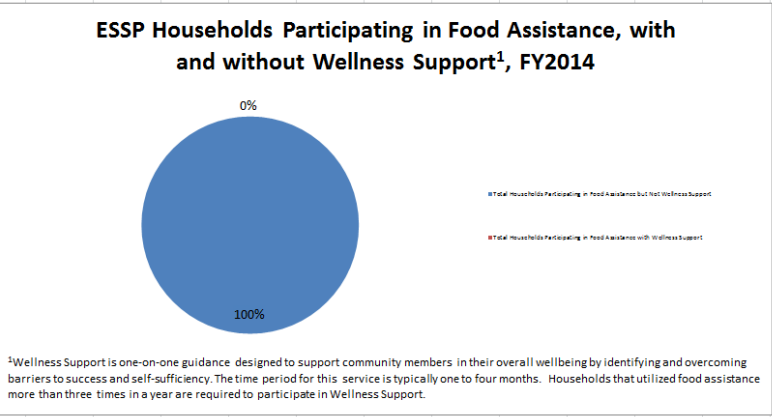


Graph # 12 - New and Repeat Households/Household Members Served, by Month



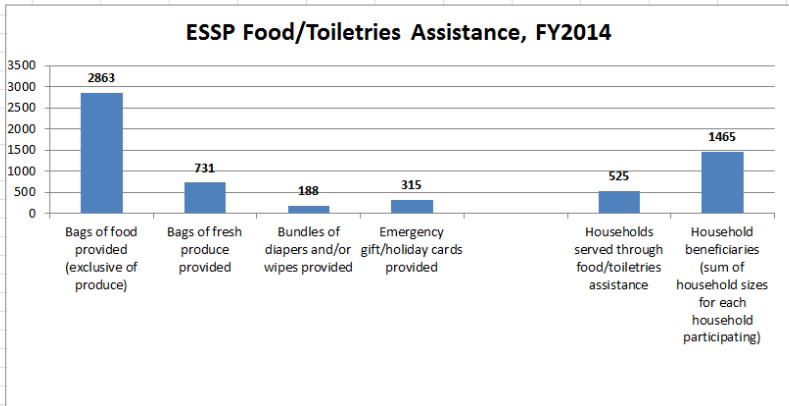
Graph # 13 - Households Participating in Food Assistance, with and w/o Wellness Support

276		
277	Total Households Participating in Food Assistance but Not Wellness Support	525
278	Total Households Participating in Food Assistance with Wellness Support	0
279		
280		
281		
282		
283		
284		
285		
286		
287		
288		
289		
290		
291		
292		
293		
294		
295		
296		
297		
298		



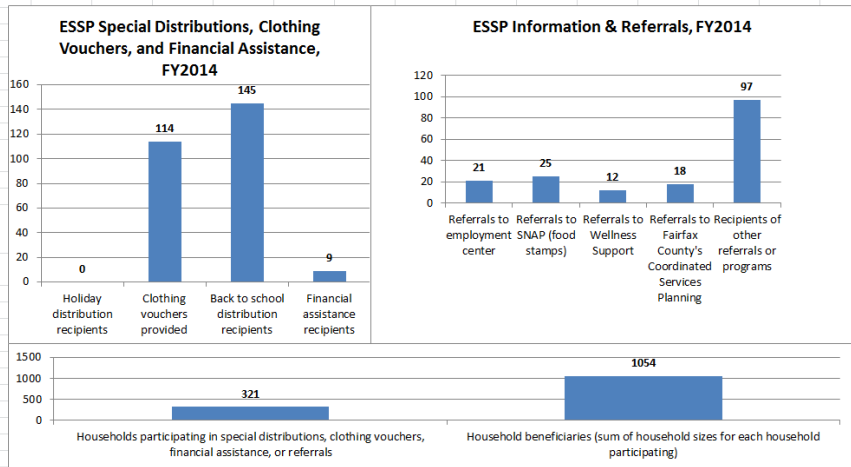
Graph # 14 - Food/Toiletries Assistance

299		
300	Bags of food provided (exclusive of produce)	2863
301	Bags of fresh produce provided	731
302	Bundles of diapers and/or wipes provided	188
303	Emergency gift/holiday cards provided	315
304		
305	Households served through food/toiletries assistance	525
306	Household beneficiaries (sum of household sizes for each household participating)	1465
307		
308		
309		
310		
311		
312		
313		
314		
315		
316		
317		
318		
319		



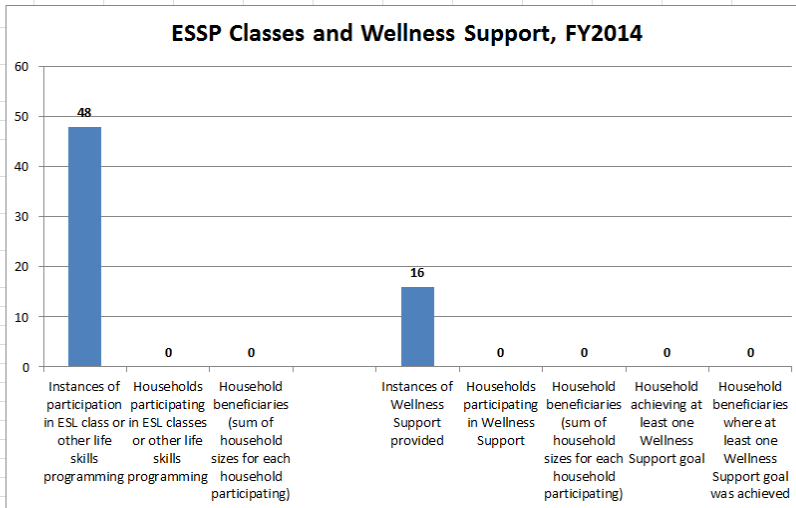
Graph # 15 - Special Distributions, Clothing, Vouchers, and Financial Assistance - Information & Referrals

119		
120	Holiday distribution recipients	0
121	Clothing vouchers provided	114
122	Back to school distribution recipients	145
123	Financial assistance recipients	9
124		
125	Referrals to employment center	21
126	Referrals to SNAP (food stamps)	25
127	Referrals to Wellness Support	12
128	Referrals to Fairfax County's Coordinated Services Planning	18
129	Recipients of other referrals or programs	97
130		
131	Households participating in special distributions, clothing vouchers, financial assistance, or referrals	321
132	Household beneficiaries (sum of household sizes for each household participating)	1054
133		
134		
135		
136		
137		
138		
139		
140		
141		
142		
143		



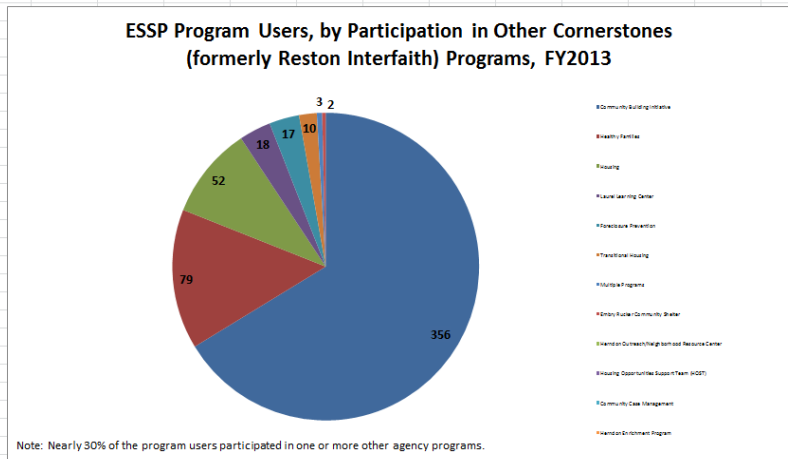
Graph # 16 - Classes and Wellness Support

4	Instances of participation in ESL class or other life skills programming	48
5	Households participating in ESL classes or other life skills programming	0
6	Household beneficiaries (sum of household sizes for each household participating)	0
7		
8	Instances of Wellness Support provided	16
9	Households participating in Wellness Support	0
0	Household beneficiaries (sum of household sizes for each household participating)	0
1	Household achieving at least one Wellness Support goal	0
2	Household beneficiaries where at least one Wellness Support goal was achieved	0
3		
4		
5		
6		
7		
8		
9		
0		
1		
2		
3		
4		



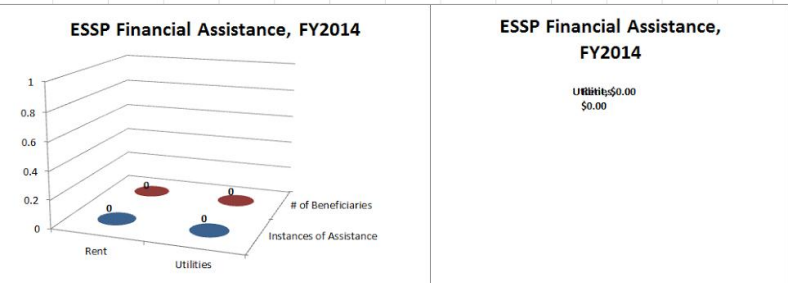
Graph # 17 - Program Users, by Participation in Other Cornerstones Programs

366			
367			
368	Herndon Outreach/Neighborhood Resource C	1	0%
369	Community Building Initiative	54	12%
370	Housing Opportunities Support Team (HOST)	0	0%
371	Laurel Learning Center	11	2%
372	Healthy Families	2	0%
373	Multiple Programs	0	0%
374	Embry Rucker Community Shelter	8	2%
375	Foreclosure Prevention	0	0%
376	Transitional Housing	0	0%
377	Community Case Management	0	0%
378	Herndon Enrichment Program	0	0%
379	Housing	52	12%
380			29%
381			
382	Community Building Initiative	356	80%
383	Healthy Families	79	18%
384	Housing	52	12%
385	Laurel Learning Center	18	4%
386	Foreclosure Prevention	17	4%
387	Transitional Housing	10	2%
388	Multiple Programs	3	1%
389	Embry Rucker Community Shelter	2	0%
390	Herndon Outreach/Neighborhood Resource C	0	0%
391	Housing Opportunities Support Team (HOST)	0	0%
392	Community Case Management	0	0%
393	Herndon Enrichment Program	0	0%
394			120%
395			



Graph # 18 - Financial Assistance

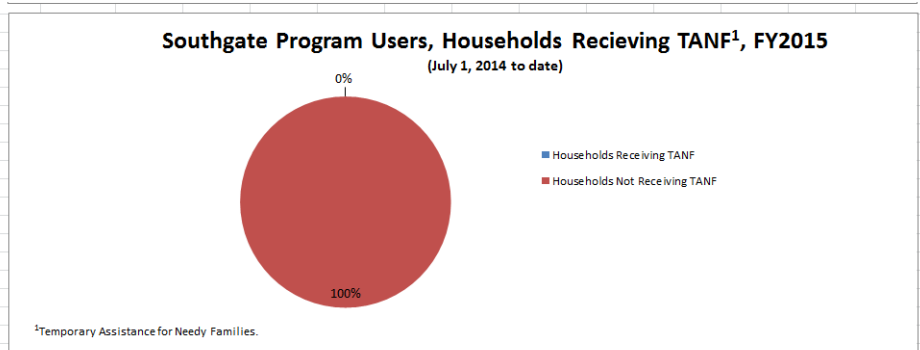
	Instances of Assistance	# of Beneficiaries	Total Financial Assistance Provided
398			
399	Rent	#VALUE!	#VALUE!
400	Utilities	#VALUE!	#VALUE!
401	Other	#VALUE!	#VALUE!
402			
403			
404			
405			
406			
407			
408			
409			
410			
411			
412			
413			
414			
415			
416			



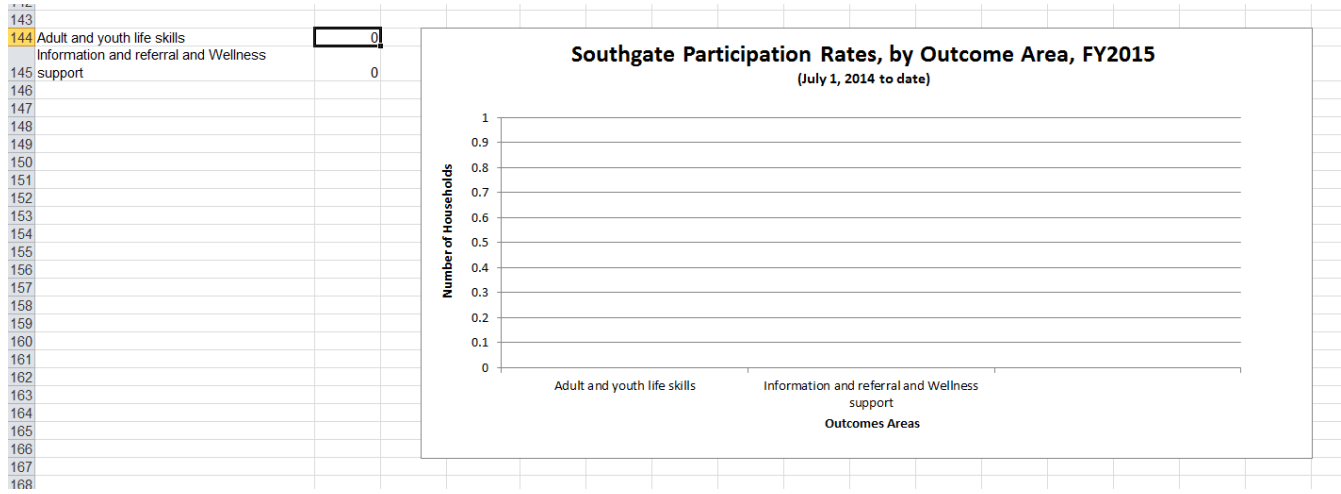
CBI Master Report: (not including those listed above)

Graph # 1 - Program Users, households Receiving TANAF

123		
124	Households Receiving TANF	0
125	Households Not Receiving TANF	9
126		
127		
128		
129		
130		
131		
132		
133		
134		
135		
136		
137		
138		
139		
140		
141		
142		



Graph # 2 - Participation Rates, by Outcome Area



Appendix D: Requirements

This Appendix provides all of the requirements captured in the CUDDP Project.

Functional Requirements

Data Management

The Data Management requirements include all specifications around the management of Cornerstones client data. This includes specific data fields collected for each client, the organization of data fields as part of a table, and the queries used to retrieve data from the database.

Data Field Requirements

The Data Field requirements capture the minimum set of data fields to be tracked for each client/household in the database.

ID	Requirement
CUD-001	The database shall store the "First Name" of the client.
CUD-002	The database shall store the "Last Name" of the client.
CUD-003	The database shall store the "Date of Birth" of the client.
CUD-004	The database shall store the "Gender" of the client.
CUD-005	The database shall store the "Address" of the client, where the Address consists of a street number, street name, unit/apartment (if applicable), city, state, and zip code.
CUD-006	The database shall store the "Country of Origin" of the client.
CUD-007	The database shall store the "Email Address" of the client.
CUD-008	The database shall store the "Race" of the client.
CUD-009	The database shall store the "Ethnicity" of the client.
CUD-010	The database shall assign clients to "Household" as needed.
CUD-011	The database shall store a "Head of Household" for all households recorded.
CUD-012	The database shall store the "Employment Status" information of the client.
CUD-013	The database shall enforce the following fields as required for each client record: (1) First Name, (2) Last Name, (3) Date of Birth, (4) Gender, (5) Address, (6) City of Origin, (7) Country of Origin
CUD-014	The database shall store the client's history of visits to Cornerstones program sites.

CUD-015	The database shall store the client's history of participation in Cornerstones events and/or programs.
CUD-016	The database shall store the client's history of receiving goods, services, or other forms of aid/assistance from Cornerstones programs.
CUD-017	The database shall store a "Notes" field to capture all miscellaneous client data.

Import/Export

The Import/Export requirements capture the specifications for the import and export of data into the database from existing records, and export of data into reports.

ID	Requirement
CUD-018	The database shall support the entry of client data from existing client records (i.e. pen & paper forms, Excel spreadsheets).
CUD-019	The database shall enforce the required fields for each client record when importing client data.
CUD-020	The database shall support the export of client data from the database and into other file types (e.g. Excel, csv, etc.) to support Cornerstones operations.

Reporting

The Reporting requirements capture the specifications for the reports that the database must provide at a minimum in order to support the needs of the existing report formats.

ID	Requirement
CUD-021	The database shall support reporting of client data by specified fields (e.g. race, ethnicity, age, income, location, etc.).
CUD-022	The database shall report the number of individual clients per race.
CUD-023	The database shall report the number of households per race.
CUD-024	The database shall report the number of individual clients per ethnicity.
CUD-025	The database shall report the number of households per ethnicity.
CUD-026	The database shall report the number of households with male/female head of households.
CUD-027	The database shall report the number of households with a member under the age of 18.
CUD-028	The database shall report the number of households with a member over the age of 55.
CUD-029	The database shall report the number of households with an unemployed member.
CUD-030	The database shall report the number of households per income group.
CUD-031	The database shall support reporting of client data by specified program, event, or site.
CUD-032	The database shall report client data as needed for official reports.

Configuration

The Configuration specifications detail all the configuration needs of the database.

ID	Requirement
CUD-033	The database shall be configurable to select which client data fields are required.

Interface Requirements

The following section describes the Interface Requirements for the Cornerstones Unified Database.

User Interface

The User Interface requirements capture the methods that the users will interact with the database.

ID	Requirement
CUD-034	The database shall be accessible to Cornerstones staff through a web interface.
CUD-035	The database shall allow Cornerstone staff to input client information.
CUD-036	The database shall allow Cornerstones staff to update client information.
CUD-037	The database shall allow Cornerstones staff to retrieve client information.
CUD-038	The database shall be accessible on the designated Cornerstones computer work station.
CUD-039	The database shall be accessible through any authorized device.

Hardware

The Hardware specifications provide the requirements around the hardware used to support the database.

ID	Requirement
CUD-040	The database shall operate successfully on the hardware specifications of the designated Cornerstones computer work station.

Non-Functional Requirements

The following section describes the Non-Functional Requirements for the Cornerstones Unified Database.

Performance

The requirements in this Performance section provide the performance specifications for the database's operations.

Capacity

ID	Requirement
CUD-041	The database shall support a minimum of 100,000 client records.

Availability

ID	Requirement
CUD-042	The database shall support a minimum availability of 0.999.

Operational Environment

The Operational Environment requirements describe the environment that the database will operate within.

ID	Requirement
CUD-043	The database shall operate in a Microsoft Windows environment.
CUD-044	The database shall support simultaneous access of client records by multiple users.

Security

The Security requirements provide all the detailed security needs for the database.

Protection

ID	Requirement
CUD-045	The database shall be stored on a password protected machine.
CUD-046	The database shall warn users before a client record is deleted.

Authorization and Authentication

ID	Requirement
CUD-047	The database shall allow access to client records through authentication with a valid username and password.
CUD-048	The database shall allow authorized users to create, access, view, update, and delete client records.

Appendix E: Conceptual Design

What is conceptual design?

- model of information used in an enterprise
- independent of all physical consideration
- identification of entities and relationships

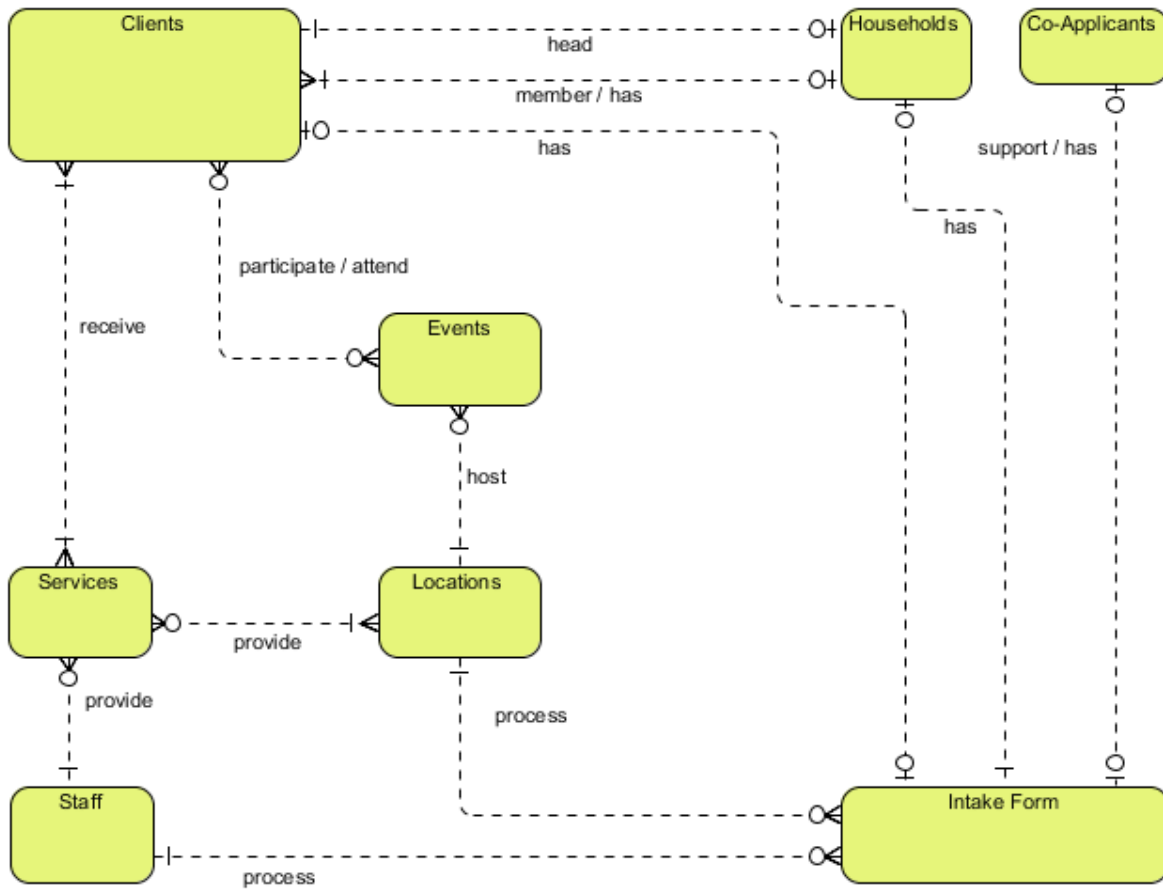
Process used for conceptual design:

- Identify entities
- Identify relationships
- Develop a Conceptual Model entity-relationship model
- Review
- Update per review

The conceptual model illustrated in the figure below captures information collected and used by Cornerstones as part of their daily operations.

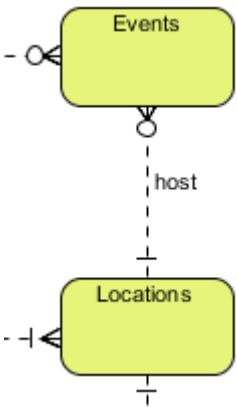
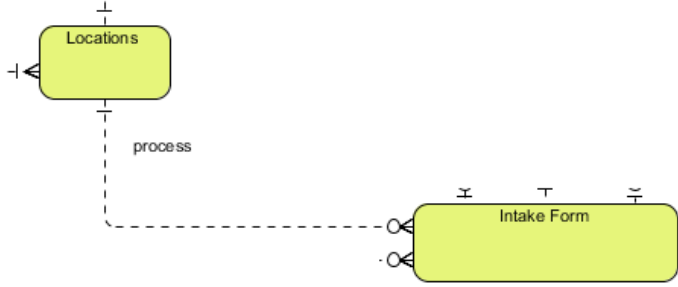
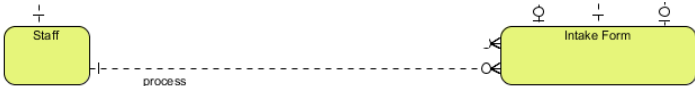
Entity Name	Description
Staff	General term describing all staff employed by Cornerstones
Client	General term describing all people needing help
Household	Family with a head and may have members
Intake Form	Form filled out by a client with staff member help at a location
Co-Applicant	The person supporting a household, (typically a spouse, but could be a member of a household)
Event	General term for seminars, classes, etc...
Service	General term describing counseling, housing, food bags, gift card, etc...
Location	General term describing all programming/branches

Appendix Figure 4: Conceptual Model Diagram



Conceptual Model ERD snippet	Relationships
<p>The diagram shows two entities: 'Clients' and 'Services'. 'Clients' is connected to 'Services' via a relationship labeled 'receive'. The 'Clients' entity has a 1:1 relationship with 'Services'. The 'Services' entity has a 1:1 relationship with 'Clients'.</p>	<p>One client receives many services</p> <p>One service is received by many clients</p>
<p>The diagram shows two entities: 'Clients' and 'Households'. 'Clients' is connected to 'Households' via two relationships: 'head' and 'member / has'. The 'Clients' entity has a 1:1 relationship with 'Households'. The 'Households' entity has a 1:1 relationship with 'Clients'.</p>	<p>One client is a member of one household</p> <p>One household has many clients</p> <p>One client is a household head of one household</p> <p>One household has one household head who is a client</p>

Conceptual Model ERD snippet	Relationships
	<p>One client participates in many events</p> <p>One event is attended by many clients</p>
	<p>One service is provided by one staff</p> <p>One staff provides many services</p>
	<p>One service is provided at many location</p> <p>One location provides many services</p>

Conceptual Model ERD snippet	Relationships
	<p>One event is hosted at one location</p> <p>One location hosts many events</p>
	<p>One location processes many Intake forms</p> <p>One Intake form is processed at one location</p>
	<p>One staff processes many Intake forms</p> <p>One Intake form is processed by one staff</p>

Conceptual Model ERD snippet	Relationships
<p>The diagram shows two entities: 'Households' and 'Intake Form'. 'Households' is a primary key (PK) entity with a cardinality of 1. 'Intake Form' is a foreign key (FK) entity with a cardinality of many (represented by a crow's foot notation). The relationship between them is labeled 'has'.</p>	<p>One household has many Intake forms</p> <p>One Intake form has one household</p>

Conceptual Model ERD snippet	Relationships
<p>The diagram shows two entities: 'Co-Applicants' and 'Intake Form'. A dashed line connects them, labeled 'support / has'. The 'Co-Applicants' entity has a cardinality of 1 (indicated by a vertical bar and the number 1). The 'Intake Form' entity has a cardinality of 1 (indicated by a vertical bar and the number 1).</p>	<p>One co-applicant supports one Intake form One Intake form has one co-applicant</p>
<p>The diagram shows two entities: 'Clients' and 'Intake Form'. A dashed line connects them, labeled 'has'. The 'Clients' entity has a cardinality of 1 (indicated by a vertical bar and the number 1). The 'Intake Form' entity has a cardinality of 1 (indicated by a vertical bar and the number 1).</p>	<p>One client has one Intake form One Intake form has one client</p>

Appendix F: Logical Design

What is logical design?

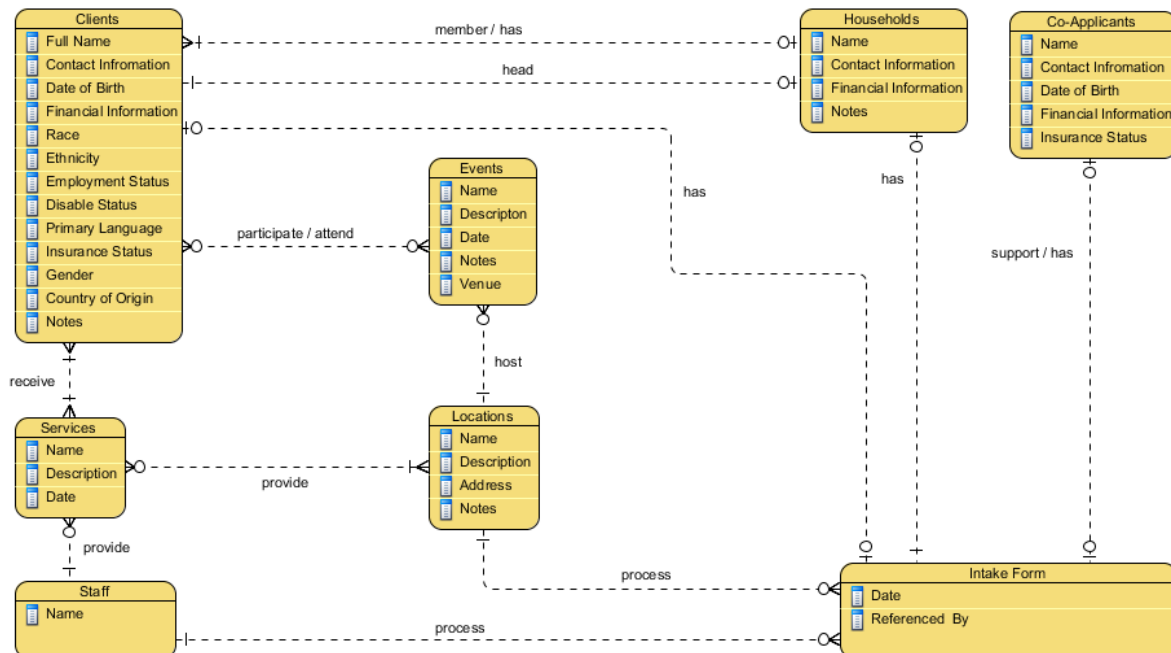
- Add columns to the conceptual model

Process used for conceptual design:

- Identify columns
- Develop a Logical Model entity-relationship model
- Review
- Update per review

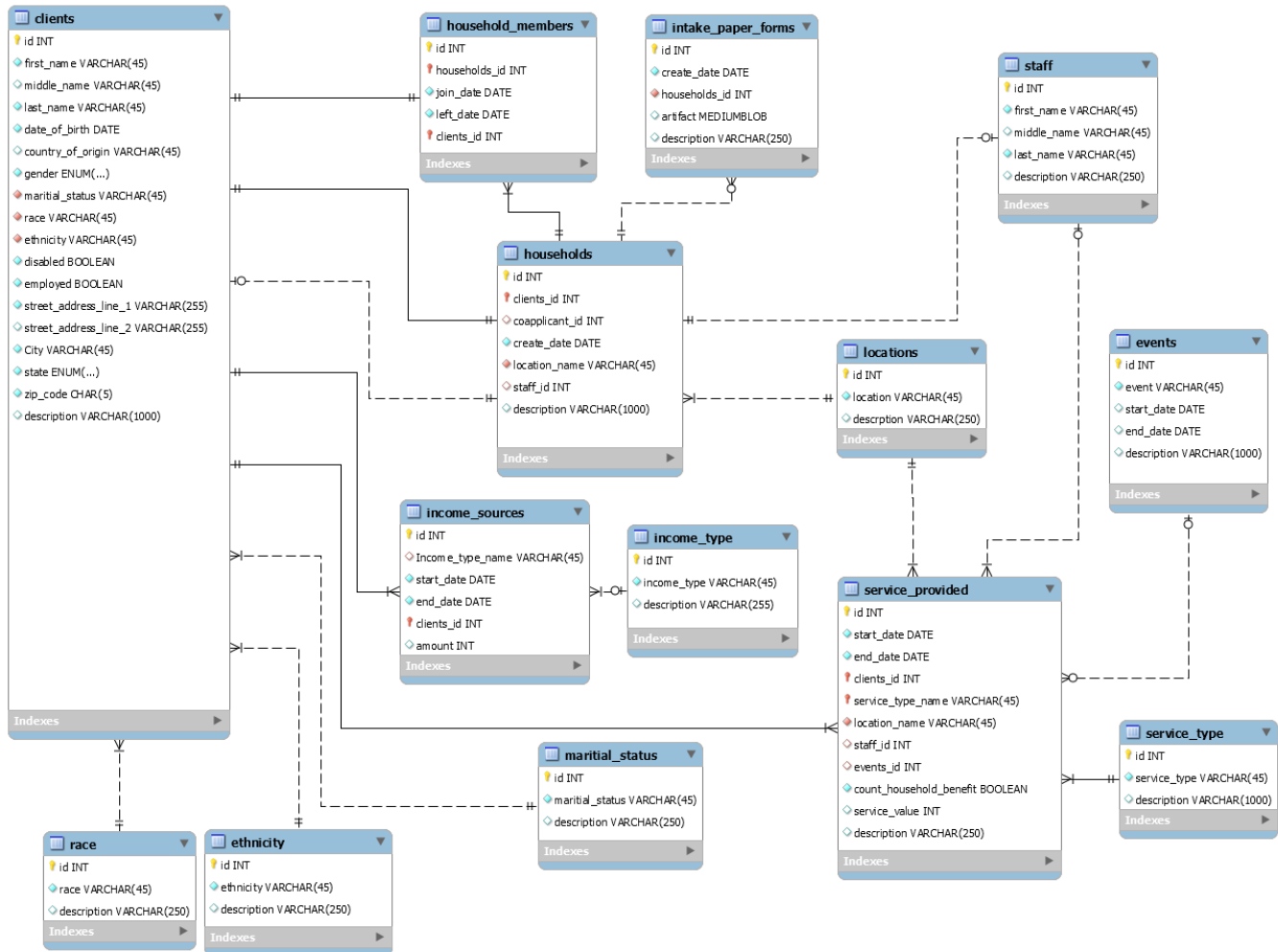
The logical model illustrated in the figure below captures filed needed to capture information used by Cornerstones as part of their daily operations.

Appendix Figure 5: Logical Model Diagram



Appendix G: Physical Database Design

Appendix Figure 6: Physical Database Model



clients

Table comments: This table contains clients and their information. Each client served and co-applicant information is saved in this table.

Column	Type	Null	Default	Comments
Id	int(11)	No		auto-generated ID
first_name	varchar(45)	No		This column contains the first name of the client

Column	Type	Null	Default	Comments
middle_name	varchar(45)	Yes	NULL	This column contains the middle name or middle name initial of the client
last_name	varchar(45)	No		This column contains the last name of the client
date_of_birth	date	No		This column contains the date of birth of the client in 'YYYY-MM-DD' format
country_of_origin	varchar(45)	Yes	NULL	This column contains the name of the country the client was born in
gender	enum('Male', 'Female')	No		This column contains the gender of the value. Value is either "Male" or "Female"
marital_status	varchar(45)	No	Single	
race	varchar(45)	No		This column contains the race of the client. The value must be one of the values in "race" table
ethnicity	varchar(45)	No		This column contains the ethnicity of the client. The value must be one of the values in "ethnicity" table
disabled	tinyint(1)	No	0	This column is set to 'true' or 'non-zero' to indicate if the client has disability.
employed	tinyint(1)	No	0	This column is set to 'true' or 'non-zero' to indicate if the client is employed.
street_address_line_1	varchar(255)	No		This column contains the first line of street address of the client

Column	Type	Null	Default	Comments
street_address_line_2	varchar(255)	Yes	NULL	This column contains the second line of street address of the client
City	varchar(45)	No		This column contains the city of the client
state	enum('AL', 'AK', 'AZ', 'AR', 'CA', 'CO', 'CT', 'DE', 'FL', 'GA', 'HI', 'ID', 'IL', 'IN', 'IA', 'KS', 'KY', 'LA', 'ME', 'MD', 'MA', 'MI', 'MN', 'MS', 'MO', 'MT', 'NE', 'NV', 'NH', 'NJ', 'NM', 'NY', 'NC', 'ND', 'OH', 'OK', 'OR', 'PA', 'RI', 'SC', 'SD', 'TN', 'TX', 'UT', 'VT', 'VA', 'WA', 'WV', 'WI', 'WY')	No	VA	This column contains the state of the client. Following are the Postal Abbreviation used 'AL','AK','AZ','AR','CA','CO','CT','DE','FL','GA','HI','ID','IL','IN','IA','KS','KY','LA','ME','MD','MA','MI','MN','MS','MO','MT','NE','NV','NH','NJ','NM','NY','NC','ND','OH','OK','OR','PA','RI','SC','SD','TN','TX','UT','VT','VA','WA','WV','WI','WY'
zip_code	char(5)	No		This column contains the 5 digit US zip code of the client

Column	Type	Null	Default	Comments
description	varchar(1000)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired

ethnicity

Table comments: This table contains a list of Ethnicity types. Each row is a unique type.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
ethnicity	varchar(45)	No		This column contains the ethnicity type
description	varchar(250)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

events

Table comments: This table contains a list of events hosted by Cornerstones.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
event	varchar(45)	No		Name of the event
start_date	date	Yes	<i>NULL</i>	Start date of the event
end_date	date	Yes	<i>NULL</i>	End date of the event
description	varchar(1000)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

household_members

Table comments: This table contains a list of clients who are a member of a household and not a head of household. There should never be two active record with same client id. If this case happens it means that two client left data of the one of the record was not set when the other record was created. Active record is managed with the use of join data and left date. Thus two records with overlapping dates should not exist.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
households_id	int(11)	No		
join_date	date	No		This is a date when the client became a member of this household.
left_date	date	No	9999-12-30	This is a date when the client is no longer counted as a member of this household.
clients_id	int(11)	No		

households

Table comments: This table contains list of household and their head. Each household is saved in this table. There should never be two records with same client id. Clients_id column is set to unique to ensure that. There should never be an active record in household_members table for the client id who is a head of the house when a new record is added. If this case happens it means that the household_member record left date was not set.

Column	Type	Null	Default	Comments
Id	int(11)	No		Auto-generated ID
clients_id	int(11)	No		This is the id of a client record from client table who is the head of this household record.
coapplicant_id	int(11)	Yes	NULL	
create_date	date	No		This is a date on which the household was originally created.
location_name	varchar(45)	No		
staff_id	int(11)	Yes	NULL	
description	varchar(1000)	Yes	NULL	This column is used to capture notes, comments, or any other relevant information as desired.

income_sources

Table comments: This table contains a list of income sources reported from all clients. Active record is managed with the use of start date and end date Thus two records with overlapping dates should not exist for a given client.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
Income_type_name	varchar(45)	Yes	<i>NULL</i>	
start_date	date	No		
end_date	date	No	9999-12-30	
clients_id	int(11)	No		
amount	int(10)	Yes	<i>NULL</i>	

income_type

Table comments: This table contains a list of Income types. Each row is a unique type.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
income_type	varchar(45)	No		
description	varchar(255)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

intake_paper_forms

Table comments: This table contains data of paper application received in a PDF format. It's only to capture those paper copy data in table for if Cornerstones wants to in a PDF copy of paper format. This table is NOT used by this database design.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
create_date	date	No		This is a date on which the initial application was created.
households_id	int(11)	No		This is the id of a household record from household table who the application record belong to.
artifact	mediumblob	Yes	<i>NULL</i>	This column has the binary data of the file
description	varchar(250)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

locations

Table comments: This table contains a list of Location or Centers. Each row is a unique location/center.

Column	Type	Null	Default	Comments
Id	int(11)	No		Auto-generated ID
location	varchar(45)	No		This is the name of the location/center
description	varchar(250)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

marital_status

Table comments: This table contains a list of marital status types. Each row is a unique type.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
marital_status	varchar(45)	No		This column contains the marital status type
description	varchar(250)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

race

Table comments: This table contains a list of Race types. Each row is a unique type.

Column	Type	Null	Default	Comments
Id	int(11)	No		Auto-generated ID
race	varchar(45)	No		This column contains the race type
description	varchar(250)	Yes	<i>NULL</i>	This column is used to capture notes, comments, or any other relevant information as desired.

service_provided

Table comments: This table contains a list of all services provided to all clients. Active record is managed with the use of start date and end date. Thus two records for same service for a client with overlapping dates should not exist.

Column	Type	Null	Default	Comments
Id	int(11)	No		Auto-generated ID
start_date	date	No		
end_date	date	No	9999-12-30	
clients_id	int(11)	No		
service_type_name	varchar(45)	No		
location_name	varchar(45)	No		
staff_id	int(11)	Yes	NULL	
events_id	int(11)	Yes	NULL	
count_household_benefit	tinyint(1)	No	0	
service_value	int(11)	Yes	NULL	This column is used to capture the value of the service provide. The value is of the unit appropriate for the provided service. For example, dollar amount is added if gift card, money voucher, or services like that. Amount of food in lbs is capture in this field for the value. In general this column is used to capture a number (if any) appropriate for the type of service provided.

description	varchar(250)	Yes	NULL	This column is used to capture notes, comments, or any other relevant information as desired.
-------------	--------------	-----	------	---

service_type

Table comments: This table contains a list of Service types. Each row is a unique type.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
service_type	varchar(45)	No		This column contains the name of the service type
description	varchar(1000)	Yes	NULL	This column is used to capture notes, comments, or any other relevant information as desired.

staff

Table comments: This table contains staff and their information.

Column	Type	Null	Default	Comments
id	int(11)	No		Auto-generated ID
first_name	varchar(45)	No		
middle_name	varchar(45)	Yes	NULL	
last_name	varchar(45)	No		
description	varchar(250)	Yes	NULL	This column is used to capture notes, comments, or any other relevant information as desired.

Appendix H: Tools Install Instructions

Software for Test Database

The following software needs to be installed to deploy a test database. See instruction in this document.

1. MySQL Installer
2. XAMPP
3. phpMyAdmin

Instruction

1. Follow instruction in each software sections below to install to install SW
2. Download version 4.2.11 zip file from http://www.phpmyadmin.net/home_page/downloads.php
3. Rename the “phpMyAdmin” folder under “c:\xampp” to “phpMyAdmin_old”
4. Create a new folder called “phpMyAdmin” folder under “c:\xampp”
5. Unzip the file downloaded in step 2 under the folder created in step 4

Software for Development and Testing

The following software needs to be installed for development

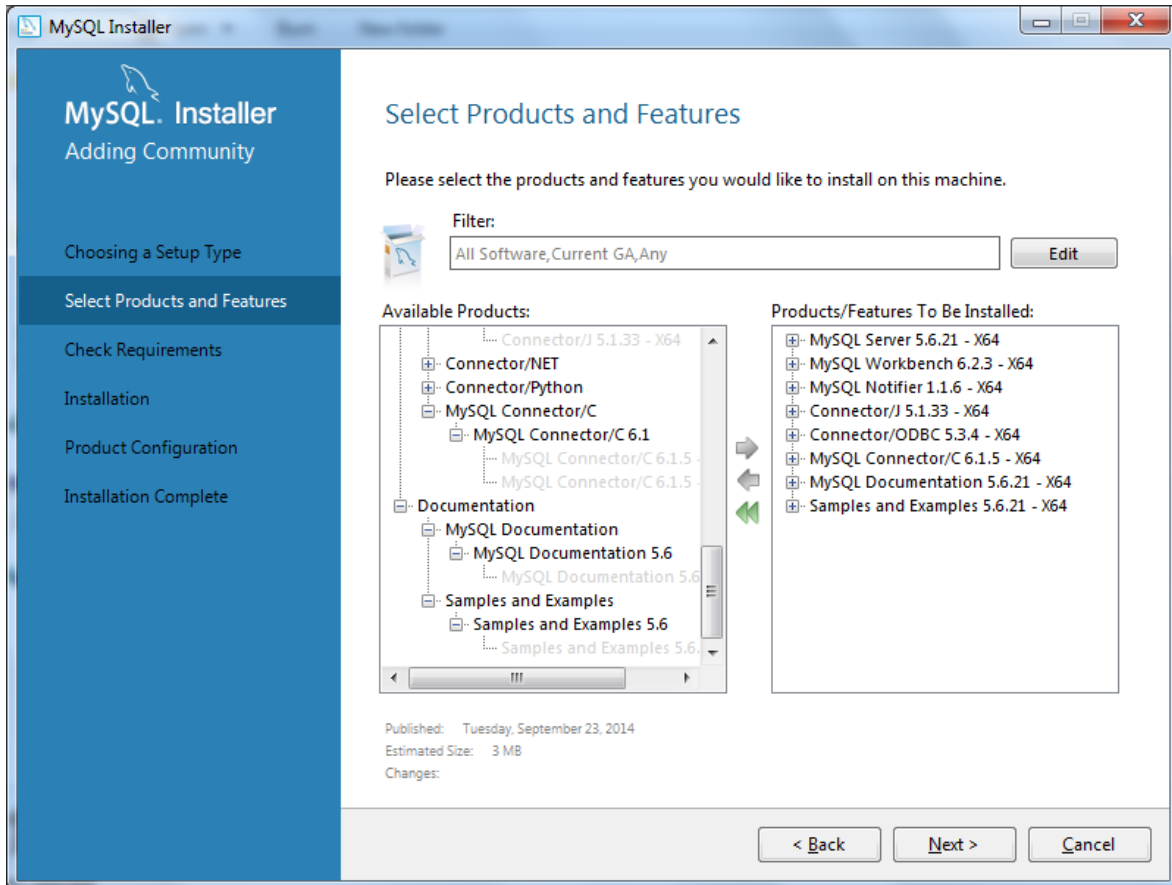
1. MySQL Installer
2. XAMPP
3. phpMyAdmin
4. FlySpeed SQL Query
5. Visual Paradigm

Instruction

1. Follow instruction in each software sections below to install to install SW
2. Download version 2.4.11 zip file from http://www.phpmyadmin.net/home_page/downloads.php
3. Rename the “phpMyAdmin” folder under “c:\xampp” to “phpMyAdmin_old”
4. Create a new folder called “phpMyAdmin” folder under “c:\xampp”
5. Unzip the file downloaded in step 2 under the folder created in step 4

MySQL Installer

1. Download the MySQL Installer from here
<http://dev.mysql.com/downloads/windows/installer/5.6.html>
2. Install the following products



3. If installation fails, following the instruction from MySQL site or google it to resolve

XAMPP version 1.8.3

1. Download XAMPP from <https://www.apachefriends.org/index.html>
2. Install Apache Server, phpMyAdmin, and php ONLY (use default settings)

FlySpeed SQL Query (Standard Free Version)

1. Download from <http://www.actedbsoft.com/overview-querytool.html>
2. install with default setting

Visual Paradigm version 11.2

1. Download from <http://www.visual-paradigm.com/download/community.jsp>
2. install with default setting