Executive Summary

The United States today has a plethora of unused electronic equipment. This equipment comes from universities, small businesses, corporations, and many other sources. This project looks at the best way to put this equipment back to use for the remainder of its usable life by donating it to non-profit organizations in need. In order to complete this project it was necessary to research the areas of Supply Chain Management, Operations Research, and Engineering Economics.

The approach for this specific project first involves analyzing the current donation process at California Polytechnic State University – San Luis Obispo, and its ability to benefit the local and surrounding towns. The analysis looks at the supply chain procedure necessary to get electronic equipment to the non-profits. From here, a proposed solution is developed based on how a student run program could add benefit and make donations a more common occurrence.

By acting as a liaison, a student run program can currently handle most of the technical and administrative tasks necessary to release Cal Poly’s computers to a non-profit, and the developed supply chain shows the most effective way to do this. In addition, further steps to better the process involve starting a Cal Poly ASI club, and eventually turning this club into a functioning 501c3 non-profit organization.

This report details many of the necessary processes and tools needed to carry out these actions, and also includes documentation of a trial run that was carried out using the liaison role with the Boys and Girls Club of Santa Maria.
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Introduction
In today’s ever growing technological world, many universities and businesses throughout the central coast have old electronic equipment including computers, printers, projectors etc. that are unused by the organization after a few years when they become outdated. Although this equipment may be outdated to that particular organization, most of it is in working condition with many years of useable life still remaining. In addition, many local non-profit organizations throughout the central coast could greatly benefit from older but functioning technology. The problem that lies herein is what method can successfully pair this old equipment with needy organizations.

Background
Across the United States corporations and educational institutions purchase massive amounts of computers, projectors, and other technological equipment that need to be replaced within a few years. Currently many of these corporations and educational institutions do not have an action plan to reuse these electronics. Instead they usually follow one of two paths, neither of which is productive. The first path involves the companies or universities storing their old equipment and using it for spare parts which waste valuable space and money without providing much of a benefit to the company. The second route deals with the organization permanently destroying the computers for fear of data loss, something that is unnecessary and very wasteful.

There are many areas around the United States and internationally that could benefit greatly from this donated technology. By donating these computers these companies and educational institutions will eliminate their storage costs, and be able to gain tax write off benefits from the donated equipment. Presently there are only a few non-profit organizations
that focus on refurbishing and recycling electronics by donating to organizations in need. There are a number of organizations that accept local donations, but only a few that will accept nationwide donations. One of the main nationwide non-profit recyclers is Computers With Causes (referred as CWC). This company currently accepts electronic donations in all 50 states; however they are not actively looking for donations. Another non-profit we discovered during our research was the Cornell Computer Reuse Association. CCRA was of particular interest to us because their organization stemmed from a project scope similar to ours. Their organization collects and refurbishes computers and mainly redistributes them to the local Ithaca community. The CCRA also donates too many locations overseas including Mexico, the Caribbean, and various parts of Africa.

Locally, there is a non-profit organization named The Exploration Station that is located in Grover Beach, CA. This is a successful organization that has been accepting computer donations from individuals for almost twenty years. Their model is slightly different than the CCRA in that donations are accepted by organizations and individuals however they are not sought out. Since this organization has been around for such a long time they have a fairly steady stream of computers being donated year around; however several times of year they will be stocked-out of inventory and have to turn away organizations seeking computers. The second main difference is that the Exploration Station deals more with individual donations to needy families than to local non-profit organizations.

The main reason that corporations and educational institutions may be reluctant to donate their computers is fear of data theft. This loss of personal or confidential information can result in large financial losses or a tarnished reputation of the donating organization. This hinders the amount of computers donated even though most of the non-profits that accept this equipment
have strict data precautions to prevent this from happening. Even with this possible hindrance, corporations still find the donation process to be valuable due to tax incentives. The main benefit of donating electronic equipment is the various tax incentives given to corporations and citizens by the federal government. These tax deductions become particularly large in the case of corporations donating parts of their electronic inventory. Under the IRS Section 170(e) (3) it states that, “the charitable deduction for contributions of inventory will be the total of the donor's tax basis in the donated inventory plus one-half of the difference between the inventory tax basis and its fair market value. This is limited to 200% of the inventory tax basis plus any incidental costs associated with donating the inventory” (ComputersWithCause). The tax incentives for citizens are slightly different. They state, “For individuals, the charitable deduction for contributions of technology equals the fair market value of the donated property. The donation is tax deductible for the year in which our organization receives the equipment. Shipping costs are also tax deductible under applicable rules and regulations” (ComputersWithCause).

During our research we encountered numerous sets of electronic equipment donation requirements, because of this we decided to consolidate these and come up with our own requirements. The most basic requirement we have is that all electronic equipment is in working condition. After that it depends on the piece of equipment being donated. Our requirements for donating a computer are:

- Pentium III processor (or higher)
- 10 GB hard drive (or higher)
- 256 MB of RAM (or higher)
- Ethernet interface
These requirements may seem low in terms of data capacity and speed; however, we believe these lowered requirements would allow use to obtain more computers without greatly hindering the functionality these computers would provide at their non-profit destination.

**Motivation for Project**

The Central Coast is home to many small businesses, a polytechnic university, a University of California school, and a multitude of community colleges. Since all of these have large emphases on technology in their curriculum and operations, there is an abundance of opportunity for technological donations. These organizations stay up to date with their technology, leaving a large surplus of outdated technology that is still in good working condition. This is the reason we believe there is a large market for unused technology that goes to waste when it could easily be reused in needy organizations throughout the area.

This project is philanthropic in nature, and deals with helping children in schools gain access to technology that would otherwise be difficult or impossible to receive. We hope to help these underprivileged children by giving them access to necessary technological equipment by providing to local non-profit organizations such as The Boys and Girls Club. We also hope that the information learned from existing organizations can be used throughout the process of establishing a sustainable computer donation program here at Cal Poly. Eventually we would like to see a computer donation program that could serve the entire central coast, as well as a policy put in place throughout the California education system to provide old equipment to needy organizations.

Another portion of the project is to make companies more aware of the hazards of electronic waste, known as E-Waste. This portion of the project deals with sustainability and properly disposing of electronic equipment. Many of the computers that are disposed of by
companies across the nation are considered old because of a few components, not the entire machine. If these computers are not donated, many of the parts that are still functional are being wasted, and are unnecessarily taking up space in our landfills. In addition, many of these electronic devices are disposed of incorrectly by companies and by individual residents. Since electronic discards are one of the fastest growing segments of our nation’s waste contribution, it becomes very important that we not only get the most out of each device by recycling certain useable components, but also properly disposing of the waste when the end of the useful life has been reached.

There are a few reasons why people and businesses might not recycle their equipment, or dispose of their old machines incorrectly. The first possible reason is because they do not realize the potential value that is still in their old machines. Many people and businesses alike are not aware of the possibility of dissecting the machine and reusing a selection of the parts for a refurbished unit. The second possible reason is they do not understand the importance of correctly recycling their electronic equipment. Some kind of dumping is even illegal such as cathode ray tubes in old computer monitors and television. This information is not well known by a large percentage of the population, and is something that would be greatly beneficial for the environment, and future generations and technology becomes more and more accessible throughout the world.

To bring this environmental impact into our project, we will work with the Exploration Station that has a government funded program that collects E-Waste and recycles components that are still useable and correctly disposes of those components that are not. We will try to make organizations aware of the hazards of E-waste and correctly dispose of old equipment that is being replaced at the final stage non-profit organizations such as The Boys and Girls Club.
Literature Review

For this section of the project we have divided our research to include scholarly journal articles as well as text references. This was done because of the valuable information contained in the different texts, and the lack of research in the field of non-profit supply chain management. We have also been conducting research involving existing non-profit organizations (listed in previous section) to see if we can identify any specific methods that lead to successful operations.

Further research will be conducted through more existing organizations as well as literature regarding measuring supply chain performance. These sources will give insight on possible problems we will encounter and the best way to provide an efficient, cost-effective solution. In addition, we will be researching aspects of Operations Research, and Engineering Economics because of their important role in creating a sustainable computer donation program that will function long-term as a supply chain.

Supply Chain Management

Supply Chain Management was developed in the 1980’s to stress the need to integrate all the business processes from end customers to raw materials. During its beginning Supply Chain Management was regarded as unimportant to the success of businesses. It wasn’t until the arrival of Enterprise Resource Planning (ERP) systems that supply chains became important. In today’s global economy Supply Chain Management is of the utmost importance and many companies have developed entire divisions devoted to supply chain logistics.

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves (Chopra and Meindl, 2007). The objective of every supply chain should be to maximize the overall value generated (Chopra
and Meindl, 2007). The main supply chain operations within a firm can be separated into three different categories; which include: Customer Relationship Management (CRM), Internal Supply Chain Management (ISCM), and Supplier Relationship Management (SRM). The combination of these three divisions can be the deciding factor if the supply chain is a success or a failure.

**CRM:** All processes that focus on the interface between the firm and its customers

**ISCM:** All processes that are internal to the firm

**SRM:** All processes that focus on the interface between the firm and its suppliers

The first section of our project involves analyzing current operations of organizations that connect unused equipment with needy organizations or people. When doing this we will mainly focus on analyzing the ISCM of the non-profit organization. Once we figure the internal workings and processes of the organizations we can take what we think is applicable and begin to adapt it to our desired computer donation program. In order for a supply chain to be successful a company must have its supply chain strategy and competitive strategy fit together (Chopra and Meindl, 2007). The first step in achieving strategic fit between competitive and supply chain strategies is to understand customers and supply chain uncertainty (Chopra and Meindl, 2007). There are several important issues that should be identified and answered during the first stage. They include:

- The quantity of the product needed in each lot
- The response time that customers are willing to tolerate
- The variety of products needed
- The service level required
- The price of the product
- The desired rate of innovation in the product
The second step in achieving strategic fit is to understand the supply chain’s responsiveness (Chopra and Meindl, 2007). Supply chain responsiveness can be influenced by a firm’s ability to perform the following factors:

- Respond to wide ranges of quantities demanded
- Meet short lead times
- Handle a large variety of products
- Build highly innovative products
- Meet a high service level
- Handle supply uncertainty

The final step in achieving strategic fit is to match supply chain responsiveness with the implied uncertainty from demand and supply. One difficulty in achieving strategic fit within non-profit supply chains is that the supply of donations is never constant. Therefore this must be taken into account in the initial design phases of the non-profit’s supply chain. Once a strategic fit is in place it is important to identify the supply chain’s performance drivers. The three logistical drivers are facilities, inventory, and transportation (Chopra and Meindl, 2007). The three cross-functional drivers are information, sourcing, and pricing (Chopra and Meindl, 2007). Metrics are the measures of performance for the drivers listed above (Stadtler and Kilger, 2000). It is important to identify and understand the various metrics associated with our non-profit organization because they directly influence whether the supply chain is successful or a failure.

During our research we encountered a number of articles that dealt with the various activities involved within supply chain management of non-profit organizations. These articles are very valuable to us because we can learn from the different theoretical and experimental methods that were used to set up their non-profit organizations.
The article, “A Humanitarian Supply Chain Process Reference Model” by Bernd Hellingrath and Wilhelm Dangelmaier talks about the variety of activities provided by humanitarian organizations. Although these organizations have different scopes, objectives, and target populations, they all have similar supply chain and logistical requirements. This commonality between these organizations provides the motivation of the authors to develop this project. During the initial development of their model they studied disaster relief supply chains and came to the conclusion that they would focus on five distinct elements: plan, source, make, deliver, and return. A key step the authors cited in the article was the need for metrics; which is comprised of four levels. The four levels of metrics range from highly aggregated indicators to very specific measurements of operational methods. The objective of the metrics is to allow effective communication between sectors of the supply chain, as well as evaluate supply chain performance. The final model outlines generic procedures that should be followed when developing different aspects of the supply chain which include: procurement, warehousing, transport, and distribution. The main goal of the finished model provides non-profit organizations with supply chain design processes that improve communication and coordination between the separate divisions. This article has provided us with a very useful template that we can use to help us identify and evaluate the metrics of our non-profit organization. The article has also given us some insight on the limitations of a non-profit organizations supply chain, specifically the limits associated with information infrastructure and funding.

“Acquiring Computer Equipment and Software” by Gary Bertoline, the head of the Department of Engineering Graphics of Ohio State University, provides a detailed method of obtaining computer equipment and software donations. In this article the author provides three different way donations can be acquired: direct corporate funding, grant proposals, and funding
for research. Naturally, computer donations from corporations would be the only relevant way
for us to obtain computers. According to Bertoline, “acquiring donations involves three major
steps: finding sources for funding, locating those individuals that have the authority to fund your
proposal, and writing a proposal that will be funded.” Many corporations are willing to donate
because it is cheaper to donate excess equipment rather than scrapping or storing it. Establishing
connections with the right people within the corporation is essential to obtaining computer
equipment. One of the techniques that were outlined in the article was to call corporate offices
and simply ask for a director of public relations or someone with a similar title. The article also
includes a sample procedure to follow when your organization receives donations. This
includes: a thank you letter from you, any advisors of the project or department, the college, and
providing the appropriate documentation to the company so they can support their claim for tax
deductions. This article is very valuable for the critical part of our project involving locating and
requesting computers from corporations and local businesses around the central coast. Although
our program will mainly focus on educational institutions around the central coast, corporations
and businesses are still a viable option.

**Operations Research**

Operations Research more commonly referred to as OR, is a practice that has been
around for many decades helping streamline business processes for organizations in government,
business, and industry. Organizations and people have tried to make their day to day operations
efficient for hundreds of years; however the modern field of Operations Research arose from
military efforts during World War II. During this time the US and British forces used teams of
scientists to research military operations with the goal of making them more efficient while using
fewer resources. These teams of scientists worked on various projects involving effective
methods of using radar, and ways to manage convoy and antisubmarine operations. The findings
from these projects played major roles in the Battle of the North Atlantic. After World War II,
these strategic efforts to streamline operations were shifted to government, and business
organizations.

Operations Research by nature involves a scientific approach that looks into one aspect of
an organization’s operations whether it is supply chain management, logistics development,
customer interaction study, infrastructure planning, or a plethora of other applications. Since OR
can be used in almost any organization for almost any purpose, the procedure for approaching an
OR problem becomes very important (Hillier and Lieberman, 2005).

The Operations Research Modeling Approach

1. Defining the Problem and Gathering Data
   - This is possibly the most important stage because it thoroughly analyzes the
     system and identifies exactly what aspects of the problem need to be
     answered. Things that are researched during this stage include:
     - Appropriate objectives
     - Constraints on operation
     - Interrelationships between area of study and other areas of the
       organization
     - Possible alternative courses of action
     - Time limits on making the decision
   - Once these key aspects are thoroughly researched the OR team can proceed with
     the next steps dealing with modeling.

2. Formulating a Mathematical Model
Once the general problem is stated with all the associated research, the next step is to make the problem more concise in a format that can be used for analysis. The goal of the mathematical model is to represent the organization’s business or operational problem with mathematical expressions. There are three main aspects of the mathematical model that are found in all OR problems which are:

- **Decision Variables**: The key variables whose values are changed to make the solution optimal
- **Objective Function**: The function that is made up of the decision variables and their associated contribution to the solution
- **Constraints**: Restrictions on any of the decision variables

### 3. Deriving Solutions from the Model

- In this stage, the mathematical model is taken and applied to computer software to find the optimal solution, or in many cases the solution that satisfies the problem at hand. From here, the very important “Post Optimality” analysis is performed which includes sensitivity, what-if, and other types of scenario investigations.

### 4. Testing the Model

- This stage tests the model to ensure major bugs are worked out of the computer software. The final stage of this test is Model Validation in which the model is tested to ensure it is producing reasonable and accurate results.

### 5. Preparing to Apply the Model

- This stage usually involves taking the computer model and calculated optimal solution, and using it to make real world changes. Many times this step deals
with data management, operations changes, or even restructuring of the organization.

6. Implementation

- Once the environment has been prepared to make the desired changes, and the entire organization is informed of the change, the final implementation can be carried out. This can be considered the most important step of the OR process because it is the one that determines the amount of benefits that are reaped by the company. (Hillier & Lieberman 2005).

These six steps as outlined by Hillier and Lieberman are essential to performing a complete and effective Operational Research solution. The process is very complete and can be applied to almost any operational problem in almost any type of organization. For this reason, operations research methodology becomes extremely important for our project and the aid that it will provide us when analyzing operational methods of a non-profit computer donation supply chain.

Application to Our Project

For our specific project, Operations Research techniques will have a role in the analysis of current organizations operations and some of the shortcomings of their day to day standards. In addition, once our computer donation is at a sustainable level with a constant flow throughout the supply chain, operations research techniques will prove to be very valuable when trying to streamline operations and cut costs.

There are many aspects of a supply chain that have multiple different decision options, as well as being susceptible to inefficiencies. Both of which are aspects that can be solved via OR techniques. Some examples of situations where these techniques might be used include finding
optimal shipping routes, determining location of computer drop-off sites, and most cost effective shipping methods. These are all types of problems that can be solved using the OR solution process and are the most likely to present themselves while analyzing the operations of the preexisting non-profit.

In addition to OR techniques, there are many other cutting edge ways to advance the donation of computers to non-profit organizations. One example is Cimon.net, a California web-based startup company, which in 1999 created an online service that connects companies with excess computers to needy non-profit organizations such as schools, charities, etc. Since then, numerous similar sites have been started with the same overall goal. With this introduction of technology into the computer donation industry, it has made it easier and more desirable for companies to donate their retired computers to needy organizations.

Even today there is still great room for improvement in the computer donation system, which is why our project focuses on finding the best practices from existing organizations and adapting them to our own unique computer donation program on the central coast. Our hope is to set the groundwork and infrastructure for a sustainable program that would encourage educational institutions and local businesses to continuing donating their equipment for years to come.

**Engineering Economics**

Economics is the study of production, distribution, and the consumption of goods and services. Engineering economics is the division of economics that deals with solving complex problems which are a mixture of economic, political, and humanistic elements (Newman and Eschenbach 2009). Engineering economic analysis focuses on costs, revenues, and benefits of projects that occur at different times (Newman and Eschenbach 2009). It is difficult to quantify
the benefits that our project will bring to the recipients of the donated computers; however, engineering economics will be very useful when examining the benefits gained by donating organizations. In the following section we will outline some key economic terms that are crucial to understanding the benefits associated with computer donation.

**Asset:** Anything of monetary value owned by a firm or individual. (In respect to our project assets will be comprise of computers)

**Credit:** An accounting item that increases the value of an asset.

**Debit:** An accounting item that decreases the value of an asset.

**Positive Externality:** A benefit obtained without compensation by third parties from the production or consumption of sellers.

**Fixed Cost:** costs that are constant or unchanging regardless of the level of output or activity.

**Variable Cost:** costs that depend on the level of output or activity.

**Marginal Cost:** is the variable cost for the production of one more unit.

**Life-cycle Costing:** refers to the concept of designing products, goods, and services with a full and explicit recognition of the associated costs over the various phases of their life cycles.

**Internal Rate of Return:** the interest paid on the unpaid balance of a loan such that the payment schedule makes the unpaid loan balance equal to zero when the final payment is made.

**Corporate Income Tax:** A tax levied on the net income (accounting profit) of corporations.
**Depreciation:** is a decline in market value of an asset, decline in value of an asset to its owner, systematic allocation of an asset’s cost over its depreciable life.

**Modified Accelerated Cost Recovery System (MARCS):** is the current method of depreciation that is required by the United States tax code.

These key terms listed above will help us understand and quantify the benefits received by the donating organizations; however, a deeper look into the classification of these assets is necessary. In terms of the United States Tax Code, a computer is defined as a depreciable asset. This means that equipment with useful lives in excess of one year are acquired, the taxpayer will recover the investment through depreciation charges. (Newman and Eschenbach 2009)

In addition, engineering economy will be used to analyze the operational economic stability of our computer donation program once it has reached a sustainable level with a constant flow through the supply chain.
**Design**

The design section of this project will define the problem, the objective, the current situation of the problem, the alternatives, and finally the selected solution method. It will also include components of the supply chain and some of the constraints associated with electronic equipment donation. This section is very important to the report because it demonstrates the various problems that were encountered due to the unique nature of the project.

**Objective**

Before discussing the objective of the project it is first necessary to define the problem. The problem statement is that Cal Poly and local businesses have excess computers that are not used. This results in a large amount of electronic waste as well as a surplus of computers that occupies space in warehouses and storage rooms. This has been identified as the current situation at Cal Poly, local businesses around the San Luis Obispo area, as well as on a large scale in corporations. The pool of electronic equipment that has further useable life but is too outdated for the owning organization is very large and has potential to donate hundreds of computers per year in the San Luis Obispo area alone. On the other hand, there are many organizations such as schools, non profits, and community centers that do not have the resources to obtain electronic equipment for themselves and could greatly benefit from this unused technology. The number of these needy organizations is also in the hundreds in the local San Luis Obispo area. The need depends on the size and function of the organization; however, most organization would take any computers they could get if the equipment was semi up to date.

The objective of this project was identified based on the problem statement, which is to create a sustainable PC donation supply chain that puts this surplus of excess computers back into use via donations to the needy organizations. Although this is an ongoing problem with a very large need, developing a sustainable supply chain is the first step to solving this problem.
The first step before creating this supply chain was to first analyze some of the operations of existing organizations with the same goal, many of which were mentioned in the literature review section. The two most important of these organizations are the Cornell Computer Reuse Association (CCRA) of Ithaca, NY, and the Exploration Station of Grover Beach, CA. These two organizations are important to this project for their own particular reason. The CCRA is important and relevant because it is a group of students who started a computer donation program that now sends computers internationally. They obtain computers from their school and have the support of faculty and staff in their efforts to reuse the surplus technology of Cornell. Their start-up situation was very similar to this project which allowed a perfect place to start researching ideas and to receive advice. Secondly, the Exploration Station is very valuable because it is located on the central coast with both the same target donation market as well as the same recipient market as our venture. Even though their organization has been around for many years, they can still provide extremely valuable insight on some of the most difficult hurdles when trying to donate equipment to needy organizations.

Although many active organizations were researched, the CCRA and Exploration Station were the most essential in providing important information on the beginning stages involved in starting a computer donation program. They will be referred to throughout the design section as well as the remainder of the report due to their continued help and advice at various points throughout the project.

After learning about critical operations from some pre-existing organizations with similar goals, Cal Poly was identified as the largest potential supplier. In order to develop the computer donation supply chain, the possible components need to be defined and discussed.
**Components of the Computer Donation Supply Chain**

The components of the supply chain can be split up into three categories: suppliers, distribution centers, and customers. A diagram of the generic supply chain can be seen below in Figure 1.

![Diagram of the generic supply chain](image)

**Figure 1. Generic Supply Chain**

**Electronic Equipment Suppliers:**

The suppliers within the supply chain are entities that have provided computers, laptops, printers, or any other type of reusable electronic equipment. The primary focus was on Cal Poly as the supplier of computers; however, there is a large market for possible equipment donations around San Luis Obispo and the greater central coast.

The three main suppliers for computers and electronic equipment in order of importance are as follows:
1. **The Cal Poly Surplus**

   - When old equipment is no longer needed at Cal Poly, it is checked into the surplus center. Here is stays for one month where it can be taken by another department that is in need, or used as salvage parts for broken computers. Most often the equipment is not touched at this stage because it is old enough that no other department wants or is in need of it. After this limbo period, the equipment is then released to either be donated to a non-profit organization that is in need or be sold for an extremely low price through the online surplus auction. The university does not make much if any money off the auction site due to the inconvenience of managing the website and the cost of keeping the excess inventory until it leaves the surplus area. Due to these facts, the surplus center would rather donate the equipment to a needy organization than try to sell it. This is why Cal Poly is the most important supplier of equipment for this point in the computer donation program; because they have a great need to reduce their excess inventory.

2. **Local Businesses**

   - Although this is a substantially smaller target supplier of electronic equipment than Cal Poly, it is still very important to the project’s overall and future goals. There are many businesses around San Luis Obispo and the greater central coast area that are constantly cycling out their old technology. This is where we see many companies miss the opportunity to put their old equipment to good use. In addition, many of the companies that have old computers that are not working properly do not know of the correct disposal methods. Although some of these
smaller businesses may only donate two or three computers, it is still very important to an organization such as the Boys and Girls Club that may only need that small amount. The goal with the small business community is to develop relations in which donating their old equipment will become part of their normal business cycle. Also that the process of electronic equipment donation will perpetuate and grow in the future.

3. Corporations

- The third group of suppliers in the proposed supply chain design is corporations. This is the smallest market in terms of donating organizations and the most difficult to receive donations from. Many corporations have company-wide donation policies that cannot be determined at a local level. In this situation it is almost impossible to receive donations. In addition, many corporations are worried about data theft after they have donated computers so they destroy them instead of letting someone else reuse them. These are large obstacles; however, the prospect of finding corporations that are willing to donate is still very valuable due to the large quantity of equipment that would most likely be donated. Even just one corporation willing to donate could potentially benefit several needy organizations in the area, thus making this supplier option a valid one despite the many obstacles.

Student Run Program:

The next component of the supply chain is the “student run program” which includes ourselves and the active role we play in the supply chain. There are potentially two options at
this stage, which include how things are set up currently and secondly the role in the supply chain if the program were able to become a functioning 501c3 non-profit organization.

**Current Role:**

Due to Cal Poly’s donation policies, the electronic equipment that is no longer being used by Cal Poly cannot be donated directly to us. Instead, the equipment has to be donated to a non-profit company, with written request made to Cal Poly and signed by an executive staff member of the requesting organizations. In addition, once the equipment is ready for pickup, someone from the receiving organization has to sign for the equipment upon pickup. Due to these restrictions, we can merely act as a liaison for the non-profit organization, transferring the letter, picking up the equipment, and obtaining the release signature once the process is complete. This is the first proposed option for the supply chain design.

**Role as a 501c3 Non-Profit:**

Although the role as a distribution center is fairly disconnected at this point, there are other options down the road. If a Cal Poly ASI club could be started for the computer donation program, eventually it could turn into a non-profit organization itself, alleviating all of the obstacles mentioned before. With this second more desirable option, Cal Poly could use the clubs Tax ID as the final location, and the club could direct the computers to organizations as it sees fit. Down the road this would be the best option, and would facilitate many donations to a diverse group of organizations that are further away. Also, with this option the computer donation non-profit could potentially reach international needs like the efforts of the students in the CCRA. This is the second proposed option for the supply chain design.

**Receiving Organizations:**
This portion of the supply chain includes any receiving organization that obtains a released computer via our efforts, whether it is currently through acting as a liaison or through the potential non-profit organization in the future. These organizations include local schools, the Boys and Girls Club, the YMCA, and several other non-profit organizations. Each of these organizations has varying level of need for electronic equipment, so it was necessary to develop a method of prioritization.

**Computer Recycling:**

The final stage of the supply chain is to take the old computers from the receiving organizations and properly recycle them.

**Exploration Station:**

For this stage a government supported non-profit that deals with computer recycling and e-waste was identified and located. The Exploration Station is located in Grover Beach, about 15 minutes outside of San Luis Obispo. They accept old computers and have an operation in which the old computers are taken apart with good parts being reused, old parts being recycled, and hazardous parts being properly disposed of under the guidelines set by the government. They do not limit the amount of computers that can be disposed of, and currently run a large enough operation that could handle the amount of old computers the project generates.

**Constraints of Supply Chain**

**Donating Businesses**

Most of the businesses and corporations that would donate their computers would want to be sure their data is properly erased from the donated equipment. Many corporations will have already run software to erase their drives before others can come in contact with them, and some may require signatures on documents ensuring that the appropriate software be run in order to
make sure data recovery is impossible. In order to fulfill the security needs of different organizations it is necessary to work with each separately to meet their needs and limit the potential consequences of a security leak. Minimizing the risk of this will hopefully eliminate the constraint on the effectiveness of the computer donation program.

**Receiving Organizations**

Although the organizations are in need of computers, it still does not mean they are desperate enough to take low quality equipment. This is why one of the supply chain constraints is the receiving organization’s computer requirements for the equipment. Although they may not be specific with regards to processor speed and hard drive size, they still include things such as the requirement of a CD drive, ability to run educational games, and a hookup for Ethernet connection. Since these types of requirements had already planned on being fulfilled it is not a limiting constraint, but one that still needed to be addressed.

**Capacity**

Currently there are only two people working on the computer donation program which limits the capacity greatly. The initial goal was to satisfy all of the needs of the three identified organizations (BGC-Santa Maria, BGC-Paso Robles, and YMCA-SLO); however, this became unrealistic for the given timeline due to time constraints, and the ability to prepare the amount of equipment for these organizations. The Boys and Girls Club of Santa Maria alone requested ten computers, a level that is already high for two people to handle. This limiting constraint is one of the biggest problems of the computer donation program and is found at the ‘Distribution Center’ level of the supply chain.

The combination of the three categories of suppliers provides more than enough donated equipment for the program, and the need for equipment is always there. Thus, the capacity
problem lies within the refurbishing that takes place in the middle, something that is a point of improvement for the future.

**Cal Poly’s Current Process for Computer Donation**

![Diagram of Cal Poly’s Current Computer Donation Process]

**Figure 2. Cal Poly’s Current Computer Donation Process**

As seen above in Figure 2 the current process for computer donation begins with the non-profit organization preparing a donation request letter and delivering it to Cal Poly. From here, the request for the electronic equipment (could include printers, computers, monitors, etc.) is either approved or denied. If it is approved, the surplus will take the equipment based on specifications included in the letter and pull the appropriate equipment. The requesting organization will then pick up the equipment from Cal Poly and have to set up and install appropriate software themselves.

**Problems with Current Process**

The current computer donation process is very seldom used and its existence is not even known by most non-profit organization around the area. The head of the surplus warehouse, Gage Sahl, stated that electronic equipment was donated to an organization once per quarter at a maximum. He also explained that most the equipment was sold for pennies on the dollar on the surplus website to people who gather the equipment and use it for spare parts. The reason this
process is rarely used is mainly due to its lack of publicity to organizations in the San Luis Obispo area. Even the organizations that are aware of the process do not necessarily know exactly what to include in the letter and who to turn it in to. Additionally there are other identifiable problems with the current process that contribute to its lack of use by needy organizations. In addition, there are other shortfalls of the current process:

**Communication with Cal Poly:** The donation process can often take a very long time due to the difficulty of communication between the non-profit organization and Cal Poly. The visibility as to what is happening in the approval process and the lack of knowledge of the process in general by the non-profit hinders the performance of the donation process.

**Computers without Software:** Possibly one of the largest deterring factors is that the donated computers are given to the non-profit organizations with absolutely no software provided. In order to make these computers usable the organization would have to have some kind of IT support that would help to load an operating system and associated desired software in order to make the equipment functional and ready for use.

**Possible Alternatives to Current Situation**

**Acting as a Liaison:**

With this alternative to the current situation, there would be people handling intermediate steps and acting as a liaison between Cal Poly and the non-profit organization. This is a necessary option due to Cal Poly’s restriction that the university can only donate to recognized non-profit organizations. Under this alternative, the intermediary people (students) would handle communication with Cal Poly, directions on how to draft a request letter, delivering the letter, refurbishing and loading the appropriate software on the computers, and other administrative tasks along the way.
Although this is the most feasible option, it also has great limitations, in that the students acting as liaisons do not have the power to receive donations directly and therefore cannot distribute computers as seen fit.

**Using Other Sources of Supply:**

Since Cal Poly has such a formal donation policy, it limits the options of receiving and handing out computers at well. Although local businesses, when donating their equipment would most likely want to use their donation as a tax write off, most businesses would not have

**Proposed Supply Chain Design**

After exploring possible alternatives and aspects of the supply chain that would be most beneficial, a proposed supply chain design was constructed. This proposed supply chain for an improved electronic equipment donation process involves a liaison based role due to its feasibility, and the ability to use Cal Poly as the main supplier. Details of this proposed design are explained below, and a diagram of the process can be seen in Figure 3.

![Figure 3. Proposed Computer Donation Supply Chain](image-url)
The proposed solution involves the following main steps:

1. Determine Non-Profit Organization: The first step is to determine the non-profit organization that is most in need of receiving donated electronic equipment and contacting them to confirm their need.

2. Formal Donation Request: From here, the non-profit needs to be notified and instructed on how to draft a formal donation request letter. This includes the letter’s content and requirements for who it is signed by.

3. Student Run Program: The third step involves the program taking possession of the letter and delivering it to Cal Poly. At this point, the communications and administrative tasks with Cal Poly will be handled entirely by the student run program.

4. Pick Up Equipment: If approved, the student run organization will be responsible for picking up the equipment from surplus and signing for it on behalf of the donating organization.

5. Install Software: This step is the most time intensive step and is the student run program’s largest value-add step. Some of the types of software that are to be used include:

   - **Darik’s Boot and Nuke (DBAN):** is a self-contained boot disk that securely wipes the hard disks of most computers. DBAN will automatically and completely delete the contents of any hard disk that it can detect, which makes it an appropriate utility for bulk or emergency data destruction. DBAN is a Freeware program that can run once downloaded to a bootable CD or DVD disk. One downside of using DBAN is that it can be complicated to run because it is booted up before and operating system and is lacking a well defined user-interface. In the case of the project DBAN was
relatively simple to use because we were able to use the “autonuke” feature, which completely erases all data automatically.

- **Ubuntu**: is an operating system originally based on Debian GNU/Linux distribution. Ubuntu is free and open source software. The program includes a built-in web browser and the ability to download thousands of other open source software applications like Open Office. The system is often compared with the iPhone because of its ability to be fully customized. Ubuntu is very fast and safe; it cannot be infected by viruses or other harmful programs. Ubuntu is also very easy to install, it is similar to DBAN, and it only requires the program to be written to a bootable CD or DVD disk. Once booted the program installs itself.

- **Windows**: probably the most common and widely used operating system. The Exploration Station had provided a procedure that they use when they are installing Windows onto a computer, which can be seen in Appendix C. This process is very complex because in order to reinstall Windows it is necessary to reimagine the hard drive. A problem with Windows and the project is the cost. However, many non-profit organizations can obtain licenses from Microsoft’s website that allows them to download the operating system for only a few dollars. Another issue with Windows is security. Windows is very susceptible to viruses and requires some form of anti-virus software. Again non-profits like the Boys and Girls club have access to anti-virus software like Norton Anti-Virus for a very minimal cost.

- **Open Office**: an open-source office software suite for word processing, spreadsheets, presentations, graphics, and databases. This program has been highly developed over the years as part of OpenOffice.org, which is an open source project
with a goal of providing a quality product that is available to all for no cost. The primary sponsor of this program is Oracle. This means that they provide the majority of the coding for this program. This program is free and easily installed after being downloaded. Open Office is compatible with many different types of operating systems making it an inexpensive alternative to costly office software suites.

6. Deliver the Computers: Once the appropriate software has been loaded onto each of the machines, they need to be delivered and set up at the non-profit organization.

**Method**

The methods section of the project discusses the steps that were taken for obtaining donated computers, selecting the appropriate software, and contacting local non-profits centers. This section also describes many of the obstacles faced, which primarily dealt with financial constraints. Currently, the largest financial constraint apparent is that the students own income is the only available source of funding.

The overall approach taken to solve this problem was based on Deming’s Plan-Do-Check-Act cycle, specifically the DMAIC process. This began with defining the problem, which was given to us by Professor Sema Alptekin, how to provide computers from surpluses to needy organizations. The next step was to measure the existing process. This was very difficult because there were few organizations that specialized with this particular problem as mentioned previously in the Report and the Literature Review. After contacting these organizations and analyzing the structure of their organization we determined that the primary problem with their process was inconsistent supply. The proposed program tries to improve upon these organizations structures by combining private donations as well as donations from Cal Poly.
Hopefully the attempt to combine these two aspects the supply chain donation program will see a more steady supply with regards to donations.

**Donated Computers**

There were many challenges associated with computer donations with respect to the project. The main issues dealt with supply, and security. Supply was the largest challenge for this project because many businesses have excess computers, but they replace all of their equipment very seldom. It was because of this reason that the project decided to focus on an entity that could continuously provide a surplus of computers. This was one way to ensure that the supply chain would be sustainable and be able to be carried on in further projects. The donating entity the project decided to focus on was Cal Poly. One of the challenges with the project was to identify the department that was responsible for releasing excess computers from Cal Poly’s surplus. Figure 4 below shows the chain of communication that led to Matthew Roberts, chairman of the Property Survey Board, who is responsible for releasing surplus equipment.

![Figure 4. Computer Donation Information Chain](image_url)
Once in contact with Matthew Roberts he informed us of the required steps to receive Cal Poly surplus computers. The first step was to submit a formal written donation request on the non-profits letterhead. This letter needed to be written by a member of the branch’s executive board, and include the non-profits Tax ID number. The second step was to contact Gage Sahl, the head of the Facilities Services/Surplus and Moving, because he is the person in charge of gathering the requested items. The next step in the process was to go to the non-profit selected and obtain the formal written request. After obtaining the letter, it was submitted to the Property Survey Board Chair Matthew Roberts.

In order to obtain a donated computer it is necessary to ensure the supplier (donating entity) that all of the data on their computers will be completely erased. If the memory is not erased properly this can result in leakage of sensitive/confidential information, which can result in large lawsuits to compensate for damages. Fortunately there is a reliable program that is able to do. Cal Poly also provides their surplus equipment with a blank hard drive because it is required by the CSU system. A blank hard drive is one that has had all of its data and software completely erased. This includes the operating system as well as all the programs that had previously been installed. A computer with a blank hard drive can be easily identified because when turned on the computer will only show a blue screen.

**Software**

The project defines a fully refurbished computer as one that has had its memory completely erased; new software installed which includes a new operating system, a web browser, and a word processing package. This presented many challenges because of limited knowledge, and financial resources. The first step that was taken to solve this problem was
contacting the CCRA, Cal Poly’s Information Technology Services, and the Exploration Station to get insight on the best possible software solution.

After evaluating the options and consulting our references (Cal Poly ITS, CCRA, and Exploration Station) we decided that the best options for software would be to use DBAN, Ubuntu, and Open Office. These programs are simple to install and are all available as open source software. The combination of these programs provided the necessary tools to fully refurbish computers and make them donation ready. Figure 5 shown on the following page shows the procedure that was taken to refurbish the donated computers as well as an alternate path if the non-profit organizations preferred Windows installed on the refurbished computers.

![Figure 5. Computer Refurbishment Process](image)

The steps that are required to use/install DBAN and Ubuntu can be found in Appendix A & B respectively. Installing Open Office is very simple. Once the program is downloaded from www.openoffice.org the file needs to only be opened, then the installation begins automatically. The Window operating system is very difficult to install on a computer, for this reason we have...
provided the steps provided to us by the Exploration Station. These steps can be seen in Appendix C. If Windows is installed it is necessary to install an anti-virus software. These programs are simple to install because they offer step by step installation guides.

**Non-Profit Organizations**

The first step that was involved in selecting a non-profit organization was to create a list of organizations that could potentially have a need for computers. In order to do this it was necessary to contact the Student Community Services (SCS). The SCS is a student run organization that provides students with volunteer opportunities. This club has many non-profit contacts within the San Luis Obispo area. After meeting with them they provided two websites that could assist in locating non-profits with needs similar to the scope of the project. The websites are listed below:

- [www.volunteerslo.org](http://www.volunteerslo.org)
- [www.liveUnited.org](http://www.liveUnited.org)

Using these two websites we were able to locate 9 Boys & Girls Clubs, and 10 YMCA’s within a 40 mile radius. In addition to these non-profit organizations it was important to identify other possible candidates for donations. The San Luis Obispo School District currently has 15 schools it is responsible for. This includes 10 Elementary Schools (K-6), 2 Middle Schools (7-8), and 3 High Schools (9-12). Due to the limited labor resource for the project it was necessary to only contact a few organizations rather than all that were identified. We decided to contact The Boys and Girls club of Santa Maria Valley, Paso Robles, and the YMCA of San Luis Obispo.

The next step in the process was to contact these organizations and describe the nature of the project and see if they were interested in being a recipient of donations. All of the
organizations expressed interest but we simply did not have the resources to fulfill all the
organizations needs. It was necessary to select the best candidate based on size and level of
need.

Results & Discussion
The result of the proposed supply chain design was effective for a beginning point;
however, there is an opportunity for great improvement. Figure 6 below shows the progress of
the trial run with the proposed supply chain design.

Figure 6. Computer Refurbishment Process – Trial Run

The steps that are filled in green are the steps that have been completed, while the steps filled in
with yellow are still pending. The Boys & Girls Club of Santa Maria Valley seemed like the best
candidate to perform the first trial with, because it is the largest club on the central coast and they
are trying to expanding their computer lab. Our contact was Anna Libbon, Unit Director, of the
Boys & Girls Club. After meeting with her and touring the facility we informed her about the
donation letter that was required to begin the donation process. Once the formal donation
request letter was obtained it was submitted to Matthew Roberts. The letter has been approved
by the Property Survey Board. A copy of this letter can be seen in Appendix D. It is important
to note that we have maintained contact with the other organizations and asked for their patience
as the proposed design is developed, and the trial run with the Boys and Girls Club of Santa
Maria is carried out. We are currently waiting for Gage Sahl to collect the necessary equipment
to fulfill the donation request. Once the computers have been obtained from surplus it will
necessary to perform the required steps to make them donation ready. Since Cal Poly provides
computers that have already been cleared of all memory, the only required installation is the
Ubuntu operating system, Open Office, and a few educational programs provided by the Boys
&Girls Club of Santa Maria. Testing of this process has been completed on a computer received
from a private donator. The process was very successful with no undesired effects. The total
elapsed time for this trial was 60 minutes. Breakdowns for these processes were approximately
30, 20, and 10 minutes for DBAN, Ubuntu, and Open Office respectively.

A major problem that we encountered during the course of the project was capacity. We
were limited by space and manpower. The limitation in space was mainly due to the program
being run out of a small apartment. In addition, the manpower constraint was a result of only
two people working as liaisons for this process. These two constraints limited our trial run to
only include the Boys and Girls Club of Santa Maria, even though other organizations were
contacted to determine need. In order to address this situation, procedure and contact
information was provided to the other non-profit organizations that were contacted. These steps
were taken to assure that these organizations could obtain computers without using the proposed
supply chain design. The information provided to them was the donation letter requirements (signed by executive board member, organizations letterhead, tax ID number), and Matthew Roberts contact information.

**Recommendations for the Future**

One of the main goals of this project was to provide a solid foundation for students to build upon in the future and continue as either a senior project or as a personal project. We hope that these students would benefit from the problems that we overcame, and be able to further this project to new lengths.

Our two proposed steps for the future as mentioned earlier involve the first step of starting a Cal Poly ASI club, and the second step of eventually taking this club to the point of becoming a functioning 501c3 non-profit organization.

**Starting a Cal Poly ASI Club**

This project as a senior project has a limited lifespan; however the foundation that has been put out could be taken to new levels. Starting a club at Cal Poly that is dedicated to maintaining the computer donation process would bring longevity to this process, and could potentially help numerous additional organizations in need around California. In addition, the biggest constraint of the current operation deals with capacity, both manpower and space. These two constraining factors could be alleviated with the size, support and funding that a club would provide.

**Manpower:** If a club at Cal Poly were to be started, the most important gain would be the possibility of having multidiscipline members. By having a multitude of majors such as computer science, engineering, business, communications, and many others all involved with
different aspects, the program could reach new levels and help a greater population of people. Computer science majors could deal with the software of the computers and some of the refurbishing aspects, while other majors could handle the logistics of reaching out to businesses and corporations to receive donations.

**Funding:** In addition, as an official ASI club, sponsorship is available through Cal Poly and will provide an amount of $350 available to use for an organization’s missions, programs/activities, and general operations. This money could be used for things such as a storage facility to keep electronic equipment that has not yet been prepared for donation, something that would become very necessary with an increase in program capacity and throughput. This is a great solution to the space constraint that is currently holding back the program. A second type of Cal Poly sponsorship is listed under the ‘Club Event Co-Sponsorship’ and can have 50% of the total cost of the event (up to $1500) donated to the club. This type of sponsorship would be perfect if the club wanted to put on a community computer donation day where local residents and businesses could come and drop off their computers. From here the club could donate the equipment that is useable, and recycle the e-waste that is not. Funding in this type of situation would help to promote and run the event in a location that would be convenient for large amounts of people to attend.

**Website:** Another idea that could be carried out easily if the student run program were to become a club would be to create a website for donation requests. Information about computer donations could be publicized to local non-profits and at their own leisure organizations could access the website to find more information about the program, learn what kind of equipment is available, and make donation requests to the student run program. This idea could be
implemented regardless of the program becoming a club; however the additional resources gained from being a club would help effectively establish and run the website.

Overall, starting a recognized ASI club is undeniably the next step for this project, and is something that would take it to new bounds. A list of requirements to start an ASI club are listed below, and a ‘New Student Organization Process flow’ can be found in Appendix E. The next step after creating an ASI club would be to eventually create a 501c3 non-profit organization from the club.

**Creating a 501c3 Non-Profit Organization**

This future step is one that is much more difficult and requires resources, long term planning, and financial support. That being said, if it is accomplished, the program would have the potential to help organizations around the country and even around the world.

One of the main hindering factors to the computer donation program is that Cal Poly cannot donate computer directly to individuals, but instead only recognized non-profit organizations. This is also true for corporations and small businesses that want the tax write off that comes from donating salvageable equipment. If this computer donation program were able to reach non-profit status then universities and companies alike could donate directly to the program. The added benefit of this would be that the program could decide on its own how to distribute the donated equipment. This opens up the realm of donating to needy individuals, schools, and far reaching places such as organizations outside the country.

If this program were able to become a non-profit, the scope and reach of its philanthropic efforts would be greatly increased and is the reason it is the long term goal of the project. Details for the requirements to become a 501c3 non-profit organization can be found in Appendix F.
Conclusion

The problem this project aimed to address was the fact that Cal Poly and local businesses around the central coast have old working condition electronic equipment that is no longer in use. In addition, organizations around the area such as the Boys and Girls Club are constantly in need of newer up to date electronic equipment such as computers and printers. The objective therefore was to create a sustainable PC donation supply chain that puts this surplus of unused equipment back to use for the remainder of its useable life. The solution approach included locating a donator with a constant supply and several needy organizations that could benefit from these donations. Three scenarios were investigated for the possible computer donation supply chain; the first run by individuals, the second as a recognized Cal Poly ASI club, and the third as an established 501c3 non-profit organization. Some of the significant results achieved throughout the project are listed below.

- Approval of donation request from Boys and Girls Club of Santa Maria
- Contact information and donation procedure has been provided to other non-profits
- Established contacts within Cal Poly that support the computer donation program
- Successfully tested the refurbishing process to ready computers for donation
- Analyzed future steps for project to be taken up by others

Throughout the course of this project many issues were encountered that were relevant to supply chain design. These issues were inconsistent supply with regards to fluctuations in donations, limited capacity when considering manpower and space requirements, low information visibility with regards to computer donation process as a whole. These issues were addressed through analysis of similar organization’s supply chains which provided a foundation to develop the best possible solution.
Currently as a program run by individuals there are great limitations to the scope and reach of the donated equipment. It is recommended as a next step, to start a recognized Cal Poly ASI club to gain the access to more manpower as well as the added financial support given by Cal Poly to its clubs. In addition, the long term future goal of this club should be to become an established 501c3 non-profit organization. This would provide complete control of the final stage of the supply chain, controlling the destination of the donated equipment. It is hoped that this project will serve as a foundation for others to build upon and carry on its value to the community.
Appendix A – DBAN Instructions

The steps required to use DBAN on a computer are as follows:

1. Download DBAN onto bootable CD/DVD/USB drive
2. Restart computer with DBAN in drive
3. As computer restarts press F12 for boot menu
4. In boot menu select CD/DVD ROM (This will bring up DBAN’s user interface)
5. Type in “autonuke” and press Enter
6. This will run DBAN automatically (program can take up to an hour to run depending on amount of Memory)
7. Once program finishes running eject disk and proceed to installing operating system.
Appendix B – Ubuntu Instructions

The steps required to install Ubuntu on a computer are as follows:

1. Download Ubuntu onto bootable CD/DVD/USB drive
2. Boot the installation system
3. Select the installation language
4. Activate the Ethernet network connection, if available
5. Create and mount the partitions on which Ubuntu will be installed
6. Watch the automatic download/install/setup of the base system
7. Install a boot loader which can start up Ubuntu
8. Load the newly installed system for the first time.
Appendix C – Exploration Station Checklist for Windows Installation

### Exploration Station

**Computers 4 Youth—Rebuild Checklist (Windows XP)**

<table>
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<tr>
<th>Rebuilt by:</th>
<th>Date Started:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer/Model:</td>
<td></td>
</tr>
<tr>
<td>Machine ID:</td>
<td></td>
</tr>
<tr>
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<td>Speed: MHz</td>
</tr>
<tr>
<td>Hard Drive:</td>
<td>GB</td>
</tr>
<tr>
<td>Video Chipset/Card</td>
<td></td>
</tr>
<tr>
<td>Audio Chipset/Card</td>
<td></td>
</tr>
<tr>
<td>Motherboard Chipset</td>
<td></td>
</tr>
<tr>
<td>NIC Chipset Card</td>
<td></td>
</tr>
<tr>
<td>Modem</td>
<td></td>
</tr>
</tbody>
</table>

- Remove unneeded cards, change hard drive if necessary (to 20 GB+, slower machines get smaller drives)
- Check CMOS battery voltage (should be 2.9–3.1 V)
- In BIOS Setup:
  - Set Time and Date — don’t do this later or activation may fail
  - Reset to BIOS Setup Defaults & reset any passwords
- Verify floppy drive functions (if applicable)
- Set boot sequence A, CD, C:
- Add cards as needed: Sound, Modem, NIC, etc.
- Examine motherboard for bulging and/or leaking capacitors!
- Be sure you are NOT networked until you’re sure CD will boot
- Connect to the network for imaging and boot from Acronis True Image Workstation 9.1. Restore image from server to HD using Universal Restore (full version). Remove CD and reboot.
- You will see ‘hillside’ screen background. Reboot again.
- Log on as Admin (pcw-admin, screen color is RED)
- Click Start | Programs | Accessories | Command Prompt | type “control userpasswords2”. Click users tab, check “users must enter”... box, click “user”, uncheck “users must enter”... box, click “OK” & “OK” again without entering any passwords.
- Press Windows Key | Pause and navigate to device manager.
- Note devices with yellow flags that need drivers.
  - (if no flags then all drivers are ok - skip to sign below)
- If NIC has no driver, install one (shot down, put a 3Com NIC in altg [temporarily], reboot & connect).
- Locate missing drivers by looking for them in motherboard or device websites, Windows Update, etc. If you’re certain that computer will be OK, consider activating early, then run Windows Update afterward to get more drivers.
- Restart and verify NO yellow flags in Device Manager.
- If you installed a 3Com NIC earlier, don’t forget to remove it.
  - Remove icons in our standard format.
- Verify sound works at Windows startup.

- Verify automatic reading of data CD.
- Insert music CD & verify that Media Player starts and plays.
- Set video to 1024 x 768 resolution and at least 16-bit color.
- Check that at least two applications run correctly.
- Check modem: Dial estation@vtr30.com with our usual password and make sure it’s ok.
- If all is ok and machine is reliable, activate Windows:
  - Go to server computer, enter Certificate of Authorization (COA) numbers for both new and original stickers and retrieve activation code for Windows XP per instructions. Save as PDF and print the page on the back of this sheet (if possible) so all three codes will be saved for future reactivation if needed.
- Then run Windows Update once more. (Turn On Automatic Updates | More Options | Notify Me… then get the updates)
- Install Microsoft Security Essentials (no scan necessary)

**Clean inside system:**
- Blow out dust
- Power Supply Fan
- CPU Fan
- All surfaces

**Comments / Problems:**

<table>
<thead>
<tr>
<th>Old COA</th>
<th>New COA</th>
<th>Activation Code</th>
</tr>
</thead>
</table>

Completed by: ___________________________ Date: __________

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**System Recipient Name:** ___________________________

**Date of receipt of system:** ___________________________

**Phone Number (optional):** ___________________________

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07/20/2010
Appendix D – Boys and Girls Club Donation Request

November 15, 2010

California Polytechnic State University
Attn: Property Survey Board Chair, Matthew Roberts
1 Grand Avenue
San Luis Obispo, CA 93407

Dear Mr. Roberts:

We would like to request 10 refurbished computers including monitors, keyboards and mice as well as 2 printers to be used in our Club computer lab.

We appreciate your consideration of this matter, as these items will help us to continue to provide, a positive place for kids.

Regards,

Bill Libbon
Executive Director
Boys & Girls Club of Santa Maria Valley

Our mission is to provide programs for youth from all backgrounds that will teach them the values of life and make them better citizens of our community.
Appendix E – Process for Starting and ASI Club

Starting a New Student Organization Process

Student Organization
- Research that no other student organization currently exists with a similar purpose
- Find 8 or more currently enrolled Cal Poly students that are interested in being a part of the organization
- Find a Cal Poly State employee who would be willing to serve as a student organization’s advisor
- Complete a "Petition for University Recognition"
- Complete bylaws using the "Bylaws Template"
- Submit “Petition for University Recognition,” bylaws, and a copy of the bylaws on a disc (not mandatory) to ASI Club Services for processing

ASI Club Services
- Verify necessary documents are completed
- Route paperwork to Student Life & Leadership for review

Student Life & Leadership
- Review bylaws and either approve or deny the process to continue
- May contact the student organization to set up a meeting to discuss the group’s purpose

ASI Club Services
- Review bylaws for content and grammar
- Return bylaws to the student organization for revisions or notify the student organization that they are now officially recognized by the University and the officers can begin online training

Student Organization
- President, vice president, treasurer, and advisor must complete the online training
- Once training is completed, president is emailed the Charter
- Charter must be completed and submitted to ASI Club Services for processing

ASI Club Services
- Route Charter to SL&L

Student Life & Leadership
- Verify officer GPA and advisor employment
- Approve Charter or require Charter changes, and send Charter back to ASI Club Services

ASI Club Services
- Notify Student Organization that changes need to be made to the Charter and return it to the student organization’s mailbox, or if Charter was approved by SL&L, ASI Club Services will update all internal databases
- Notify the Student Organization once the Charter process is complete
- Student Organization is now officially recognized as an active University student organization, and can begin submitting paperwork
Appendix F – Steps for Starting a 501c3 Non-Profit Organization

The following are a few broad steps for starting a 501c3 non-profit organization (NPO).

**Step 1: Statement of mission/purpose.** In order to learn how to start a non-profit organization, you need to establish what your organization stands for. As a first step, it is essential to prepare a statement of mission/purpose that clearly outlines the purpose of the organization, the philosophy behind its formation and the reason for its existence.

**Step 2: Board of Directors.** An NPO needs to be administered by a group of qualified people; choose a set of people having commonality of beliefs and goals, who are willing to devote necessary time and resources for working towards the common cause. It will help if the members of the board are qualified in varying disciplines such as accounting, finance, law, technology, public administration and so on. There are provisions on minimum [usually three] number of directors in each NPO and this is decided by legislations issued by the states.

**Step 3: Articles of Association.** Articles of association contain the objective to be pursued by the NPO, its formation, rights, responsibilities and obligations of the board members and rules for functioning and administration. When setting up a non-profit organization, this document should be registered with an agency nominated by the State. Besides the foregoing, the Articles also contain provisions that distinguish members of the NPO from itself, thereby making the organization the holder of properties, contributions, and assets and also being liable for the debts and liabilities incurred.

**Step 4: Byelaws and rules.** Besides the Articles of Association, it is advisable to draft byelaws or rules that govern the operations of the organization. You may want to look at sample non-profit bylaws from other organizations. It is not essential to register the byelaws, but may be adopted by the members for their self-governance.

**Step 5: Systems.** It is very essential and legally required that every NPO has acceptable and efficient systems for accounting, finance, operations and expenditure incurred by it. Minutes of all meetings of the boards, committees and groups must be maintained in writing and authenticated by the chairperson of the meeting.

**Step 6: Acquiring status as a 501c3 NPO.** There are 501c3 requirements that must be met. Every NPO desirous of having its contributions exempt from tax under the IRS Code is required to register with the appropriate agency, normally the local office of the IRS. Pay the necessary filing fees, submit appropriate forms, documents, declarations and other relevant information - fees depend on the budget of the NPO. There may be exemptions under state and local laws as well, which will require a separate 501c3 application process. 501c3 organizations take some work to establish, but the filing status can be helpful come tax time.

There are various laws and regulations that govern the formation and functioning of a 501c3 organization. It is highly recommended to seek professional help from attorneys and Chartered Accountants for starting a 501c3 organization as well as obtaining their advice in day-to-day functions. It is useful to include board members with experience and skills in these domains as well.
References


Nielson, Garrett. 2010. “Starting a Non-Profit Organization: 501c3 Organizations”.


**Additional References:**

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