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# Minimizing Desktop Downtime and Improving Business Productivity at Hanover Insurance

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# Minimizing Desktop Downtime and Improving Business Productivity at Hanover Insurance

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_____
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# ABSTRACT

The goal of this project was to provide recommendations on ways to improve the impact of downtime to business productivity at Hanover Insurance Group by reducing downtime of desktops. To help formulate these recommendations, the team developed an “as-in” state by conducting interviews with Hanover Technology Group (HGT) managers, shadowing different departments within HTG, and by analyzing service center incident ticket data. Consequently, a “to-be” model was developed through industry best practice research and interviews with managers from the Computing and Communication Center (CCC) department at Worcester Polytechnic Institute.

# EXECUTIVE SUMMARY

The reducing of desktop downtime project was done with cooperation of the Hanover Technology Group (HTG) at Hanover Insurance. The goal of this project was to provide recommendations on different ways to reduce the impact on business productivity by minimizing desktop downtime. The current system to reduce desktop downtime would benefit from additional analysis and changes in order to better minimize the downtime. The developed "to-be" state will address the areas of asset management, asset data integration, incident management (ticket data), asset life cycle management, employee's educational training, and service level agreements (SLA).

The team gathered data through interviews with HTG managers from different lines of business, shadowed different departments, interviewed the Computing and Communication Center's (CCC) managers at Worcester Polytechnic Institute, and performed extensive research on industry best practices in areas that contribute to reducing the impact of downtime. This data helped the team analyze the "as-in" state and develop a "to-be" model that would significantly improve the current system.

The principle goal of this project was to make recommendations for a "to-be" model that will help the IT department at Hanover increase the level of performance and increase companywide business productivity.

# AUTHORSHIP

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# INTRODUCTION

The impact of downtime creates an enormous gap in productivity in companies around the world. There are different categories for downtime; information technology (IT) downtime and manual labor downtime. The ever-increasing reliance of businesses upon their IT systems and electronically stored business makes data an equivalent priority in management's duty. The potential costs of failing to acknowledge the impact of IT can be enormous (Vision Solutions, 2008). Every organization experiences the challenge of minimizing computer asset downtime and reducing its impact on business productivity. According to IT analyst Gartner, a poorly managed desktop can cost the company an additional 40% more than necessary. Effective desktop management is one of the best ways to reduce total cost of ownership (TCO) on the companies IT hardware. A well-managed desktop gives you control over your IT costs (MindShift, 2011). Break-fix, wear and tear, and aging equipment all contribute to this challenge. One of the main contributing factors of downtime is the unavailability of computing devices, which in turn, creates a business impact measured in both lost revenue and lost productivity.

The goal of this project is to reduce the impact of downtime to business productivity at Hanover Insurance by diminishing downtime of computer assets. The objective to make this goal feasible is to provide recommendations based on data analysis of: current logistics of Hanover Technology Group (HTG) infrastructure, the perspective of current Hanover employees, and current asset management best practices. The project team would develop a current state model focusing on processes, service levels and impact to the customers.

The recommendations provided to Hanover will revolve around a “to-be” state, which would include; an emphasis on increased and more efficient interdepartmental and documented communication, financial savings associated with an adjusted life cycle management, asset management integration with incident management, and the development and implementation of a more utilized educational system.

# BACKGROUND

The following section reviews the background research necessary for the completion of this project. Sections include information on the history of The Hanover Insurance Company, the insurance industry, information technology systems, desktop management, and the IT infrastructure of Hanover Insurance. This section will introduce the potential areas that could benefit from this project.

## HISTORY OF HANOVER

Hanover Insurance Group, based in Worcester, Massachusetts established in 1852, is a leading insurance agency that deals with property and casualty insurance. Hanover's main competitors are companies such as Berkshire Hathaway, American International Group (AIG), Travelers, and Allstate. The Hanover Insurance Group is doing well, with over 4,400 employees, and market cap of 2.17 billion and revenues of 3.05 billion, both above industry averages (Yahoo, 2011). Hanover would like to continue their customer-to-customer relations while growing nationally.

The Hanover Insurance Group provides packages tailored to a variety of market segments, offering personal, small business, mid-size business, and enterprise insurance. Personal insurance has coverage options for home, auto, and boat insurance, as well as umbrella coverage against personal liability lawsuits (The Hanover Insurance Group, 2010).

For smaller customers, The Hanover offers insurance for automotive, property, liability, workers' compensation, and protection against lawsuits brought by workers. (The Hanover Insurance Group, 2010). A mid-size business can get insurance for automotive, property, liability, workers' compensation, and protection against lawsuits

brought by workers. Enterprise plans offer bond management, investment management, and financing for large corporations.

## INDUSTRY OF INSURANCE

The insurance industry took root in America even before the country won its independence from the British Empire, beginning with the insuring of house's who could be potentially lost to fires (Investopedia, 2011). Over time the insurance industry has changed the way American's protected their investments and help maintain their standard of living. Early insurance agencies also started the trend of evaluating the variables of risk inherent in each building, helping to determine what it would cost to insure them.

The techniques used to examine a building's insurability later became the basis for not only building codes and requirements, but also zoning laws. Life insurance took hold in America in 1766, after the birth of home insurance, in order to help financially protect the lives of widows and children who had lost family members (Investopedia, 2011). Business insurance and disability insurance found a major role in the insurance industry with the birth of the Industrial Revolution in the 19th century. It is extremely important to note the change the insurance industry experienced in recent decades with the arrival of the internet, which provided the ability to sell policies online, as well as compare prices with competing companies.

## INFORMATION TECHNOLOGY SYSTEMS

In the broadest sense, information technology (IT) refers to services of IT personnel, whether employed in-house or outsourced, to both the hardware and software that are used to manage information. Currently in many organizations, IT is playing a strategic role and has become more important than it was previously for the

business strategy. IT organizations have added value to a firm's effectiveness by acting as change mediators, focusing on business imperatives and helping to achieve effectiveness and efficiency (Rusu, 2009). In addition, IT has become an enabler of business strategies in areas such as; mass customization, quality improvements, and process improvements. Furthermore, companies who have aligned IT with business strategies argue that the integration was crucial to the firm's survival and its success (K. Liu, 2010). Organizations that have been able to successfully integrate technology and business strategy have created significant financial business return (Weiss, 2004). Looking towards the future, companies that aspire to succeed and perform competitively will need to place a high emphasis on their information technology systems.

## DESKTOP MANAGEMENT

IT Systems are commonly separated into different segments. This allows for a more feasible management of different business data. As opposed to its literal name, desktop management includes overseeing desktops, laptops and other computing devices. Desktop management is a component of systems management, which is the administration of all components within an organization's information systems. Other components of systems management include network management and database management.

Tasks performed as part of desktop management include installing and maintaining; hardware, software, spam filtering, and the administration of user privileges. Allocating these issues to one department allows businesses to streamline their operations and have a central hub for their technological assistance. There has been an increased emphasis on security-related issues, therefore, a large portion of administrative resources have been devoted to security-related tasks. These issues

include fighting viruses and spyware, and controlling unauthorized applications, such as instant messaging, file sharing programs, and RSS readers (SearchEnterpriseDesktop.com, 2011).

## IT INFRASTRUCTURE AT HANOVER

Information technology has played a substantial role in the success of businesses, and The Hanover Insurance Group has taken advantage of incorporating IT into their company structure. Hanover, like most competitive businesses, has a structural IT system in place that supervises and manages their technology. There are three departments at Hanover within their IT systems. The Technology Service Center (TSC) provides first response to technical issues. If issues cannot be resolved they are sent to Desktop Services (DTS), where a group of higher skilled technicians will attempt to solve the problem. If the DTS cannot fix the problem, the asset is sent to be re-imaged in the Build Room. The Desktop Engineering (DTE) department compiles application and deploys them through Altiris. Furthermore, the IT system at Hanover is a mix of both in-house and third party desktop management services. Hanover outsources a part of their IT department to a private company, CompuCom, in order to more effectively manage the increasing demand of IT services within the business. The third party desktop management service provided by CompuCom includes distributing desktop products and network integration services (CompuCom, 2011).

# PROJECT GOALS

The goal of this project was to provide recommendations that will help reduce the impact of hardware/software downtime to business productivity at Hanover Insurance. The objectives necessary to complete the goals include an analysis of the current "as-in" state and the development of recommendations for a future "to-be" state. In order to fulfill our objectives, we devised a set of methods including; personal interviews, shadowing, incident report analysis, and research of IT industry best practices.

# METHODOLOGY

In the following section, we will discuss the methods that we have used to achieve our project goal and explain why these served as a suitable approach to fulfill our objectives. These methods were comprised of personal interviews, shadowing, incident report analysis, and research of IT industry best practices. The interview and shadow participants included managers and employees from The Hanover Technology Group, CompuCom, and Worcester Polytechnic Institute (WPI). The participants in the interviews were all involved in the IT departments of their respective organizations. In addition to interviews, we also analyzed six months' worth of incident reports from Hanover, known as tickets. Furthermore, we conducted an extensive research of industry best practices through different research and advisory databases. The interviews were used to both analyze the "as-in" state and to provide proper grounds to formulate an improved "to-be" model. The analysis of incident reports and the research of best practices were used to make recommendations for the "to-be" system.

## INTERVIEWS

Our interviews with Hanover and CompuCom managers and employees were crucial for the team to gain a more profound understanding of the current "as-in" model of Hanover's IT department. Interviewing the managers of the Desktop Services (DTS) and Desktop Engineering (DTE) provided the team with more information about their service level agreements (SLA's), ticket process flow, reasons for variations in ticket quantities, and how they managed their assets. Our interviews were essential for the team to understand the relationship between all of the departments and the responsibilities of each department within IT.

While the aforementioned interviews contributed to the construction and comprehension of the "as-in" state, our interviews with the WPI Computing & Communications Center (CCC) managers assisted the team in establishing recommendations for our "to-be" model. The WPI CCC provided the team with a comparative view of their IT practices with those of Hanover, thus exposing potential areas for improvement. The reason for interviewing WPI's CCC was due to the fact that the institution manages all the assets for a technologically based community composed of students, staff, and faculty, both on a short-term and long-term basis.

## SHADOWING

Shadowing, as opposed to our managerial interviews, gave the team a different perspective on the daily IT operational procedures. We had direct interactions with call-center members of the Technical Services Center (TSC), the service technicians of the DTS, and the Build Room. Through these interactions, we were exposed to real time, end-user issues and the procedure to address these issues. In order for the team to establish a full understanding of the "as-in" state, we needed the point-of-view of the managers, technicians and call-center employees to comprehend each step in the ticket resolution process.

## INCIDENT REPORT (TICKET) ANALYSIS

Since all tickets are generated through the TSC and then sent to DTS, we tracked and analyzed six months' worth of ticket data from 2010 in order to identify and categorize ticket trends. When a call incident cannot be solved over the phone, the incident information is compiled into a ticket. Tickets are not only used to document incidents but are also used to evaluate whether the incident met its SLA requirement. SLA's divide and order incidents and set an expected resolution time for each level of

prioritization. Analyzing ticket data allowed the team to identify the reasons for incidents not meeting their SLA time's and helped the team provide recommendations to reduce the impact of downtime associated with preventable ticket traffic.

## IT INDUSTRY BEST PRACTICE RESEARCH

IT industry best practice research refers to generally agreed upon strategies by esteemed business professionals and those in the industry. The information gathered from our interviews provided a means to compare Hanover's IT against other industry best practices. These areas of research encompassed SLA's, ticket process flow, incident management, departmental organization within IT, and asset management. This information highlighted the gaps within the "as-in" state and facilitated the development of our recommendations for the "to-be" model.

# ANALYSIS

In the following section, we will be discussing our findings from the methods stated in the previous section. These findings allowed the team to analyze the "as-in" state and helped us identify different areas of improvements for the "to-be" model. The first segment of our analysis defines the current state through personal interviews, shadowing, and ticket analysis. The second segment of this section is based on comparing the IT industry best practice research with the analysis of the current "as-in" state. This allowed us to propose recommendations for the "to-be" model in order to reduce the impact of desktop downtime.

## INFORMATION TO ANALYZE FOR THE "AS-IN" STATE

The current "as-in" state defines how the Hanover Insurance Group portrayed their methods and procedures for handling desktop downtime related issues. The current state encompasses the protocol for operations, SLA's, asset management, interdepartmental and documented communication, and ticket resolution processes.

### FLOWCHART/OPERATIONS

In order to fulfill our objective of creating an "as-in" state, one of the first tasks was to create an accurate flowchart representing the ways downtime related to tickets being handled within the organization. Hanover has made a concerted effort to analyze tickets and they have not spotted any notable trends or patterns that warrant changes from an operations standpoint. In order to more effectively comprehend Hanover's current state; please see the following flowchart (Figure 1) and operations summary of the company below.

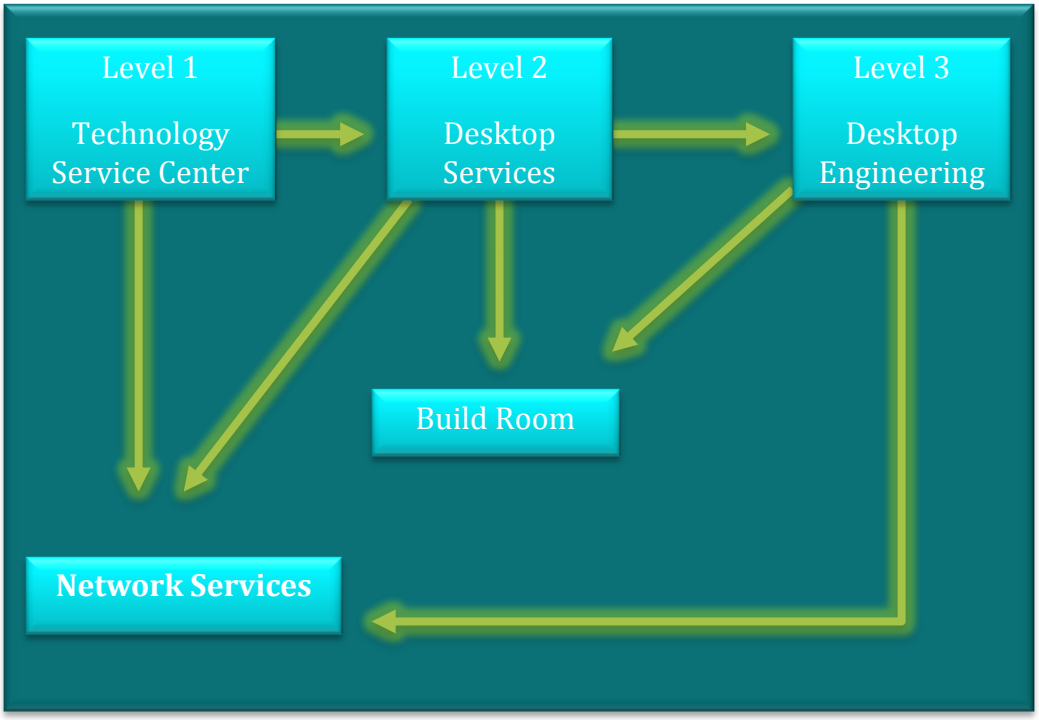



FIGURE 1 - TICKET PROCESS FLOW (PERSONAL COMMUNICATION, 2011)

Level One- Technical Service Center (TSC): The first level of our flowchart begins at the technical services center level, where new tickets and employee problems originate through calls placed to the helpdesk. The goal of the helpdesk staff is to gather as much information from the caller as possible in which to diagnose and solve the issue immediately. The helpdesk staff documents the issues that are being experienced by the caller and begins to develop a ticket in the event that they cannot solve the problem over the phone or via remote desktop.

The TSC is currently composed of eight full-time call-center members. They currently use the remote desktop application, in which the helpdesk worker can access the caller's computer screen and see first-hand what the caller is experiencing. The advantage of the remote desktop is that the helpdesk staff does not need to rely on the description of the issue by the caller, who may not fully understand how to accurately convey the problems they are experiencing (Shadowing, 2011). This can be vital to

solving problems as early as possible and can help them resolve issues that may have otherwise become tickets and gone further down the process flowchart to DTS or DTE.

Level Two – Desktop Services (DTS): In the event that phone representatives at the Helpdesk cannot fix the nature of the call being presented to them, they will generate a ticket and put it into the system. The ticket carries important information regarding the person/people affected by the issue, a brief synopsis of what is wrong, and how the TSC tried to repair the problem. The tickets will go to the DTS and will be handled based on SLA priority level. DTS is comprised of six people at the Worcester, MA headquarters, two at the Howell, Michigan location, and one person at the Atlanta location. The Build Room is considered a part of the DTS as well. Build Room personnel are charged with rebuilding and reimaging assets, as well as resolving hardware related issues. The build room also serves as a storage room for a majority of Hanover's backup assets.

DTS is part of a "managed service relationship with the third party IT and asset management company CompuCom. Hanover pays CompuCom per assets as opposed to paying for individual employees. They seem very pleased with the relationship with CompuCom" (Personal Communication, 2011).

The DTS team sends a representative to the employee's location that is experiencing the issue and does a self-diagnosis on their technical asset or affected software. The DTS representative will make a judgment on what the next best option is. This may involve a computer rebuild or reimaging, in the event of hardware malfunction, or in some cases the representative will be able to address and fix the asset on-site, thus closing the ticket.

Level Three-Desktop Engineering (DTE): Desktop Engineering deploys applications that Hanover currently has licenses for and require for their daily business.

These applications are sent to the Build Room where they are physically put onto computers. Tickets end up at Desktop Engineering if there is a defect in the application design, as opposed to the application crashing or causing an error for a particular user. In that case, it would simply be deleted and reinstalled by Desktop Services.

## SERVICE LEVEL AGREEMENTS

Service Level Agreements (SLA) are the metrics by which Hanover Insurance evaluates the effectiveness of their ticket resolution. This is relevant to priority levels because every ticket is assigned a certain priority which determines the response time of that incident. The SLA's are currently composed of seven priority levels, known as; P1, P2, P3, P4, P5, P6, P7 but our focus on this project will primarily revolve around evaluating P3's. We are omitting P1-P2 and P4-P7 because the third priority level is the most crucial to individual desktop downtime. Definitions of these are listed below in Table 1.

Table 1 - Problem & Change Request Priority Codes (The Hanover Insurance Group, 2010)

| **Business Hours Monday – Friday 7:00am-7:00pm (ET)** | **Response** | **Resolution** |
|---|---|---|
| **Priority 1 – Enterprise Wide issue** | 15 min. | 2 hours |
| **Priority 2 – Workgroup or business critical area problem** | 30 min. | 4 hours |
| **Priority 3 – Individual problem** | 2 business hours | 8 business hours |
| **Priority 4 – Request, no purchase** | | 5 business days |
| **Priority 5 – Request, std. purchase** | | 10 business days |
| **Priority 6 – Request, non-std. purchase** | | 30 business days |
| **Priority 7 – New Hire Request** | | 5 Business day from time of Recruit max feed |
| **After Hours Weekends & Holidays Monday – Friday 7:00am-7:00pm (ET)** | Response | Resolution |
| **Priority 1 – Enterprise Wide issue** | 15 min. | 4 hours |
| **Priority 2 – Workgroup or business critical area problem** | 30 min. | Next 4 business hours |
| **Priority 3 – Individual problem** | Next 2 business Hours | Next 8 business hours |
| **Priority 4 – Request, no purchase** | | 5 business days |
| **Priority 5 – Request, std. purchase** | | 10 business days |
| **Priority 6 – Request, non-std. purchase** | | 30 business days |
| **Priority 7 – New Hire Request** | | 5 Bus. Day from time of Recruit max feed |

SLA's allow Hanover to better evaluate their Helpdesk, Desktop Services, and Desktop Engineering Departments ticket resolution performance. The time metrics and protocol of SLA's produce expectations that these departments are anticipated to meet. As of now the expectation level is that 90% of tickets meet their SLA times on a monthly basis (Personal Communication, 2011). These reports are drafted and reviewed monthly to spot trends and evaluate performance.

## ASSET MANAGEMENT

Asset management is a key component of IT systems and proper management of the available assets will greatly impact desktop downtime. In the following sub-sections, we will be addressing asset data integration, asset life cycle management, asset warranties, and missing assets. Establishing the "as-in" state of asset management through interviews allowed our team to better understand the current asset management practices that take place at Hanover.

## ASSET DATA INTEGRATION

Hanover's IT department currently considers that asset management and incident management should be maintained in two different databases (Personal Communication, 2011). Hanover has an excel database with information pertaining to an assets; life cycle, brand, ownership, location, and other hardware information. However, the incident report history about assets can be found in an alternate location. A lack of cohesion between databases makes it difficult for them to do an incident root cause analysis.

## ASSET LIFE CYCLE MANAGEMENT

Asset life cycle management is defined as the appropriate life span for an asset before it should be replaced. Two of the most common refresh methods are the staggered approach and forklift approach. The forklift approach, where all PCs are refreshed at the same time (Intel, 2004), differs from Hanover's current staggered approach, in which assets are refreshed continually on a limited basis (Personal Communication, 2011). Currently at Hanover, the life cycle of an asset is set to a four year refresh interval, but there have been situations where assets that are not on the Worcester network have been found to be circulating for over four years (Personal Communication, 2011). If an asset is found that has been circulating for over the allotted

refresh time, this asset will be retired from active use. There are instances when assets are past their refresh date and they are not found until an incident is reported regarding the asset. This reactive approach to life cycle management can negatively impact downtime by allowing assets that are past their refresh cycle to circulate the environment. These assets will decrease in performance with time generating less productivity to the business. These assets may be nominal, but the support costs to maintain a PC beyond its life cycle will outweigh the value of the device (Adams, 2009).

## ASSET WARRANTIES

Hanover understands the importance of the refresh cycle and is aware of the shift in technological desires by its employees. Hanover currently buys their desktop equipment directly from Hewlett Packard (HP), which provides Hanover's IT department with a three year warranty (Personal Communication, 2011).

Hanover's current asset breakdown is approximately 75% desktops and 25% laptops. As of March 2011, there is currently a queue for 33 laptops being requested and there is a forecasted increase in laptop demand (Personal Communication, 2011). Certain employees at Hanover, such as on-the-go auto appraisers, are notably hard on their assets due to the nature of their work. Even though laptops are more expensive and lack the durability that desktops provide; employees at Hanover are gravitating towards the advantages of mobility and flexibility of laptops.

## MISSING ASSETS

According to CompuCom's 2010 December report, Hanover is missing 10% of their assets, which should directly affect desktop downtime. If there were more assets available, the effect of downtime would be diminished. The team discovered that

although 10% of the assets were deemed missing, many of those assets are anticipated to still be physically on-hand but not currently on the network. Some of these assets have been missing for over four years (Personal Communication, 2011). Once an asset is categorized as "missing", it remains listed as missing indefinitely, therefore inflating the percentage of missing assets.

## INTERDEPARTMENTAL COMMUNICATION

Interdepartmental communication is important between any factions of an office which must exchange data or information. In the case of the TSC and DTS, it is truly paramount because they are working together to solve specific, technical related issues, but do not optimally utilize the sharing of information and knowledge that can lead to quicker resolution times. Information flow between the two departments is primarily "upstream", meaning that when a ticket is generated at the TSC it is escalated to the DTS where it is then resolved. Information concerning how that ticket was resolved and whether it could have been handled in the TSC never makes its way back "downstream", thus resulting in an unbalanced level of communication.

In some cases tickets go to the wrong department, for example, an application issue being mistaken for a mechanical issue and winding up in the Build Room when it could have potentially been solved through the TSC. Tickets which must be reassigned to a different department due to a mistaken problem diagnosis often do miss their SLA time periods due to the time it takes for the ticket to be addressed in the new department (Personal Communication, 2011).

In addition to Hanover not having an effective procedure to prevent miss-assigned tickets, there is also a lack of interdepartmental meetings between the DTS and TSC on an employee level. Managers of the two departments meet frequently and do their best

to pass on all information to their departments. In the technical support industry there is a high priority put on information sharing and a transfusion of knowledge (Burton, 2010). Information sharing promotes brainstorming, trending analysis, and gives employees from different departments a chance to share with others the means by which to solve common problems that could make both departments more efficient.

## DOCUMENTED COMMUNICATION

The TSC and DTS keep one another aware of reoccurring issues or the potential escalation of tickets which may already be in the system. For example, if someone calls the TSC reporting an issue with the network or ability to connect to the internet and the TSC cannot resolve it; it would become a ticket and likely be categorized as a P3 priority (See Table 1). However, at that point if several other people from the same office begin calling about the same network issues, the TSC is trained to recognize this and communicate amongst each other via an informal SharePoint site. This ticket will then be escalated in priority to either a P2 or possibly a P1. The DTS will be made immediately aware of this if they did not recognize it already. In this way, the TSC can deter any future calls from this office related to the same issue by letting the caller know they are already working on a resolution.

Furthermore, many times when the department catches a reoccurring problem, they don't have a strong, well enforced system in place to communicate to different departments on how the problem should be handled in the near future. The communication is experienced most frequently between different technicians from different departments. The incident is sometimes documented through SharePoint where technicians have access, yet they don't make optimal use of it. Also, if one needs to

see how the incident was handled, they have to manually search for it in the ticket database. Below is a diagram that portrays the current situation at Hanover.

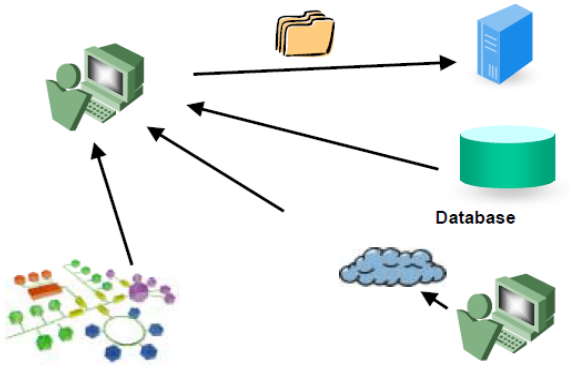



FIGURE 2- TYPICAL CALL CENTER (GONZALEZ, 2001)

## TICKETS

A ticket is the means by which Hanover documents, tracks and evaluates the technical issues experienced by their employees. Tickets are generated through calls which are placed to the TSC. If the TSC Helpdesk representatives can solve or correct the caller's problem over the phone or via remote access, then the request will not become a ticket but rather be categorized as a resolved issue. The IT department has a 48 hour window time for a customer to report back a reoccurring incident. Hence, when the 48 hour window time closes, it will be very complex for them to catch or track a reoccurring incident, a faulty asset, or a troubled customer.

The team gathered ticket data from July-December 2010 (Tables 2-7). Upon analyzing the data, we found a significant number of tickets which the team believed could be categorized as "educational" issues. Educational related issues, such as "Network cable was plugged into the wrong Jetdirect card" (Hanover Service Center, 2010), could be prevented by the employee, as opposed to more technical hardware and software related issues, such as "Changed provider order, ran disk cleanup, ran security

policy update" (Hanover Service Center, 2010), which rely on the support of the TSC and/or DTS. Time spent resolving "educational" issues by the call-center members and technicians directly affect business productivity.

TABLE 2 - TICKET DATA JULY 2010 (COMPUCOM, 2011)[1]

| Priority | Description | Solution |
|---|---|---|
| **3** | C57903 / JRB912 / User is reporting that he had launched MS Online Services, clicked on email and calendaring but Outlook did not open, so he rebooted. When the machine came back up he was then not able to open | USED - HP6910 - C57874 built, tested, delivered to customer |
| **3** | JAH939 :: C54140 :: Getting BSOD regularly, got it twice today :: Sometimes happens when putting a CD into the drive, but happens at other times as well :: x2726 | USED - Hp6000 - C60952 built, tested, delivered to desk |
| **3** | Jericho / Asset C57392 / Was originally receiving a tree or server cannot be found while trying to log in. Asset tag was unregistered, registered MAC address. Redocked the laptop. She was able to log in normal | USED - HP6400 - C57118 built, tested, shipped to customer |
| **3** | gmg679 - C51371 - running slow - only has 1 gig of ram. Desktop is >5 years old - probably due for a refresh. Please check. | NEW - HP6000 - C60887 Built, tested, delivered to desk, logged customer into pc |
| **3** | SEAT sw4c727 jts777 Asset C61015 unable to boot up computer successfully user computer restarted itself when working on excel ; | built tested deployed |

[1] Some information was removed in order to accommodate the format of the paper

TABLE 3 - AUGUST TICKETS 2010 (COMPUCOM, 2011)

| Priority | Description | Solution |
|---|---|---|
| **3** | SW4 C414. C57295, JAC837, Still experiencing very slow response on her laptop. Receivd 2 Physical Memory dumps on her pc. Customer has called several times and it is still occurring. REF previous ticket PM11085 | NEW - HP6930 - C58998 Built, tested, delivered to customer, logged in, etsted o |
| **3** | C57324 / Reporting that her backspace key on her keyboard is not working. The key came off and now is having difficulty popping it back in. | USED - HP6400 - C57532 built, tested, shipped to customer, installed necessary |
| **3** | 8/3 - LEFT VM - sw1a338, mma472, c56262. has gotten the bsod twice today. has done cleanup and it did not help. | ALTE - DEPENDANCY - altiris issues tuesday and wednesday USED - HP5700 - C56139 |
| **3** | BJJ643 - Having problems with the Xactimate, he is unable to upload any estimates. He can retrieve them, but unable to upload them back. The applications hangs and does nothing. Per jeffrey jones, the customer' | USED - HP6930 - C58266 LATE - technbical - issues with pointsec crashing after |
| **3** | SW4C628 / Asset # C56764 / His PC keeps coming back with 'Windows could not because the following file is missing or corrupt./windows/system32/config/system' I tried | LATE - DEPENDANCy - altiris issues - not responding taking a long time to update |

TABLE 4 - SEPTEMBER 2010 TICKETS (COMPUCOM, 2011)

| Priority | Description | Solution |
|---|---|---|
| **3** | ref. 1127955 :: C60008 :: Same issue (copied below) :: 770 353 6740 | Remote: Reinstalled IP Agent and set a configuration setting. |
| **3** | gr1167, ppr549, c60682. she is working in posint region, gets to a certain point and hangs. the developer was able to go through from that point on another pc with her id with no problems. | Remote: Late - Procedural - assigned directly to someone out of the office. Acco |
| **3** | nw3c432, bjr313, c57220. the laptop keyboard doesn't work, the keys stick and skip, | Replaced keyboard. System tests ok. User will test and let me know if problems p |
| **3** | 631-360-4937 / NXC462 / User is reporting that she is receiving physical memory dumps on her laptop. We have changed her virtual memory settings to system managed but the issue is still occurring. | Walked customer through changing the Bios setting from Raid to IDE. |
| **3** | 508-612-9143. rxm240, k00232, unable to boot up laptop, gets a message that windows could not start, windows\system 32\config\system is corrupt or missing. | C57871, 6910 From: STEVENS, JONATHAN To: MUNDINGER, C. RICHARD Sent: Thu Sep 16 |

TABLE 5 - OCTOBER 2010 TICKETS

| Priority | Description | Solution |
|---|---|---|
| **3** | VXN307 :: Venugopal Natarajan :: Thin Client :: Restarted 3-4 times, getting low system resources, can't access anything :: 8553164 | THIN CLIENT - K01177 imaged configured, updated, delivered to desk, logged in c |
| **3** | Seat #SW1C804 / Asset #K01181 / ID - HXK838 Customer is receiving the BSOD screen on her machine. I had her power off and ON and now it's booting up fine. She said she received the same message on friday. I'm | K01246 - Thin Client imaged configured, tested, delivered to desk |
| **3** | 317-208-5704 / Asset #H22402 / IBM Laptop / Customer is reporting that she keeps receiving a BSOD screen on her laptop | NEW - HP8440 - C59142 Built, tested, updated, shipped to customer UPS tracking |
| **3** | NAG938 :: C61164 :: missing C:\windows\system32\config\system :: x8555937 :: NW1 A304 | Build, test and deploy 6000 C61250 |
| **3** | SALEM Office / ID - DBM123 / Asset #C58648 / | Build, test and ship 6930 C59017 UPS tracking 1Z0986E00194937952 |

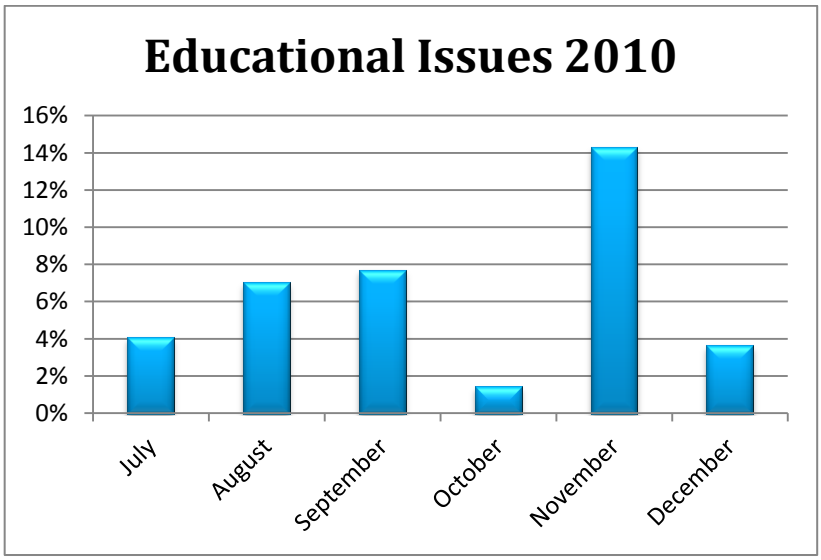
TABLE 6 - NOVEMBER 2010 TICKETS (COMPUCOM, 2011)

| Priority | Description | Solution |
|---|---|---|
| **3** | New Laptop ; Pritners not working lan id dmo170 Asset C59142 user needed printers Indiana saying off line user needs pritners installed | 363047 moved to change ticket. completed paper work and submitted for server cha |
| **3** | JXC782 :: C54247 :: User is unable to print - jobs are sent to the appropriate queue, but nothing happens :: Restarted Print Spooler, reconnected to worprt-a, but can't get properties to show up for printers th | C61410, New 6000 Built, Tested, Delivered (Victor) |
| **3** | nw3a418, whf743, c58915. new laptop, his laptop hangs at the logon screen when logging in on the network. also gets blue screen when putting it into standby mode. | Build, test and deploy 6930 C58594 |
| **3** | Asset #C58849 / ID - FCH011 Customer is unable to access the internet on his laptop. He keeps receiving a limited or no connectivity message. He has a personal laptop and that works fine on the same cable mode | C58929, 6930 Built, Tested, Shipped w/return label Xactimate, Smartview, One bea |
| **3** | 11/29 - left vm - Lavy - USER DOWN / Asset # C59131 / Keeps receiving physical memory dumps while booting up. | NEW - HP8440 - C59183 built, tested, shipped to customer |

TABLE 7 - DECEMBER 2010 TICKETS (COMPUCOM, 2011)

| Priority | Description | Solution |
|---|---|---|
| **3** | txh676, c57211. she is normally able to open pdf docs in word, suddenly she is unable to. The docs open fine as adobe docs. | USED - HP6910 - C57876 built, tested, shipped to customer |
| **3** | JAM508 :: C57552 :: Gets to "starting windows" splash and immediately restarts ::201-602-6150. | built and configured new laptop for user. |
| **3** | Asset #C54305 / x8556615 / Customer needs to install MS SQL 2008 Client Tools STD but it keeps saying that she does not have sufficient hard drive space. She currently has 4GB left. She has done a cleanup and | USED - HP5800 - C60411 built, tested, customer remoted in and checked - Manny |
| **3** | 11/29 - left vm - Lavy - USER DOWN / Asset # C59131 / Keeps receiving physical memory dumps while booting up. | NEW - HP8440 - C59183 built, tested, shipped to customer |
| **3** | Asset # C57254 / She is missing the Adobe option within her MS Office applications. I uninstalled/reinstalled Adobe Standard, performed a detect/repair on MS Office, still not showing. She had restarted right b | USED - HP6910 - C58139 built, tested, shipped to customer |

TABLE 8 - EDUCATIONAL ISSUES 2010 (HANOVER SERVICE CENTER, 2010)




Some employees at Hanover lack a strong foundation in up-to-date technological understanding (Personal Communication, 2011). It is important to note that software

adoption, such as the upcoming transfer to Windows 7 this year, typically causes a large spike in reported ticket issues. The last major software change took place in May of 2010 when Hanover switched from Novell GroupWise email provider to Microsoft Outlook. The ticket data showed that compared to other months in 2010, the number of tickets increased significantly in May and June of 2010 due to this new technology.

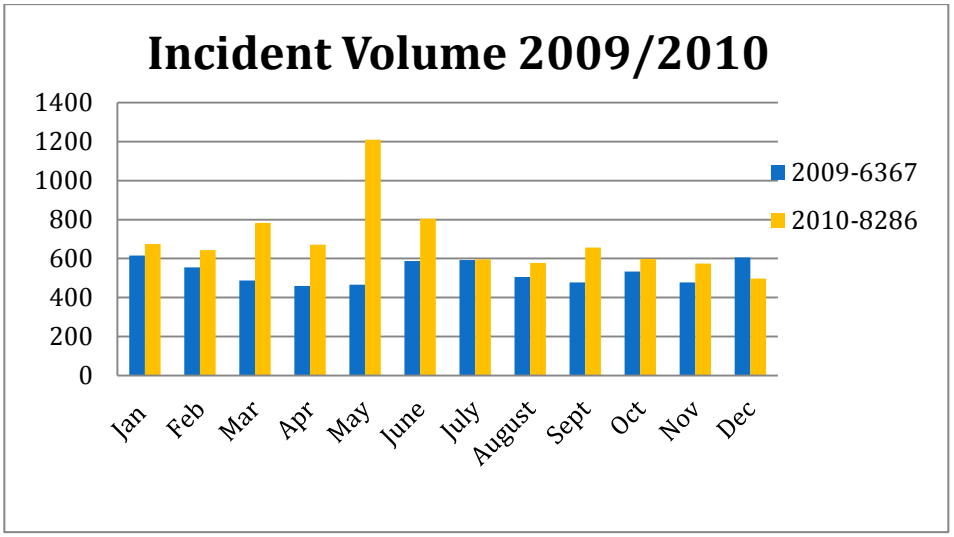



FIGURE 3 - COMPUCOM 2009/2010 INCIDENT REPORT (COMPUCOM, 2010)

## INFORMATION TO ANALYZE A "TO-BE" STATE

The "to-be" model defined below shows the potential areas of improvements for The Hanover Insurance Group based on the analysis of the "as-in" state in comparison with IT industry best practices. The proposed "to-be" state incorporates the protocol for SLA's, asset data integration, asset life cycle management, asset warranties, interdepartmental and documented communication, and ticket resolution processes.

## SERVICE LEVEL AGREEMENT AT HANOVER TECHNOLOGY GROUP

With the exception of senior executives and on-the-road appraisers, Hanover currently places all individual end-user's incidents pertaining to their specific asset within the same P3 priority level (Personal Communication, 2011). P3's are the most

frequently processed incidents but are identified as "low business risk". Within our proposed model for P3, a low business risk incident would be categorized as a user that is not using the core applications as opposed to a TSC technician's desktop going down, an incident that can potentially have high business risk. Prioritization of P3 can be seen in the figure below.

In our proposed "to-be" model, the P3 priority level is further redefined to accommodate the possibility that an individual problem can contain a "high business risk" (Walker, 2001).

TABLE 9- TEAM REVISED PRIORITY LEVEL 3 BASED ON GONZALEZ MODEL (GONZALEZ, 2001)

| | Severity Level | Description |
|---|---|---|
| P3 | Critical Severity | System or a major system component is down or unavailable to a substantial portion of the user community, or the user can not conduct critical business operations that will result in a significant loss of revenue, profit or productivity |
| | High Severity | High Severity problems occurs when there is a partial or potential system or application outage |
| | Medium severity | A Medium severity problem is one that must be resolved but does not impact the service level commitments of the Information Technology organization. The problem does not severely impede the user's ability to conduct business and/or it can be circumvented |
| | Low Severity | A Low Severity problem is a low impact problem that does not require immediately resolution, as it does not directly affect the user's productivity or system or application availability |

Integrating of asset information plays a significant role in the strengthening of the interdepartmental communication and documented communication in an organization. The team's proposed "to-be" model would substantially better root cause analysis by combining both asset management and incident management processes.

Problems may develop between departments if a customer calls about a reoccurring incident or about a faulty asset repeatedly without the IT departments noticing. Theoretically, they may end up fixing the same problem numerous times. Currently in the "as-in" model, there is not a system in place that incorporates both databases, however, in the team's proposed "to-be" model, Hanover's IT department would be able to catch a faulty device or a user that is having a hard time understanding a particular change in a software or hardware.

Currently, Hewlett Packard's HP Service Manager 9.2, endorsed by the Information Technology Infrastructure Library (ITIL), combines incident management and service asset management (ITIL, 2011). The team believes that this combination of service tools could be beneficial to Hanover's IT asset data integration in the future especially since HP is Hanover's primary asset vendor. IT organizations can save an estimated 20% to 30% of the total asset life cycle management cost by integrating asset management processes with incident and problem management (Adams, 2009; Matthew, 2006; Roy, 2007). With a better root cause analysis system, TSC and DTS employees would have a more proactive approach to identifying faulty assets and reducing ticket traffic.

When analyzing the refresh cycle at Hanover, it was important for us to compare the "as-in" state of asset life cycle management with that of IT industry best practices. Intel, a company which holds about 80% of the market share for microprocessors that go into desktop and notebook computers (Epperson, 2011), conducted a survey to answer two of the biggest questions that an IT department can be faced with; how often should a company refresh its PC's and what method of refresh should be used? (Intel, 2004)

The study collected historical and current data, based around the total cost of ownership (TCO) model to determine the optimal timing and mechanism of client refresh. When looking at the aspects of refresh in terms of TCO, Intel focused on PC acquisition costs, maintenance costs, and training costs.

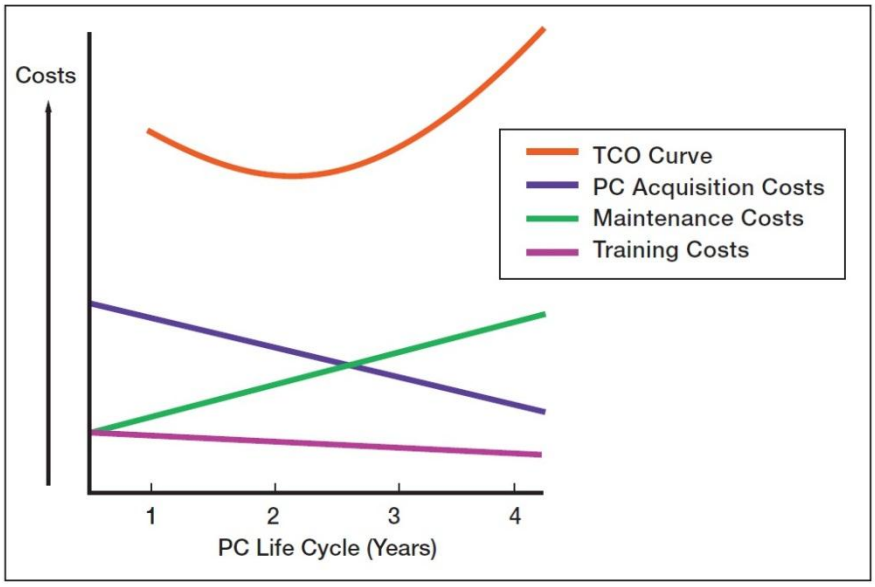



FIGURE 4- TOTAL COST OF OWNERSHIP (TCO) CURVE (INTEL, 2004)

Determining the point on the TCO curve where it is less expensive to replace a PC as opposed to keeping it, is impactful to a company's finances and proper analysis can lead to savings. A number of major emphasize proper assessment of TCO because they

believe that the assets potential resale value falls below the cost of disposal within 36 months of age (National Audit Office, 2007; Johnson, 2011).

There are two approaches to refresh; Hanover currently employs a staggered refresh, where they refresh their assets over a period of time. An alternative approach is the "forklift" approach, where all PCs are refreshed at the same time. Along with the TCO curve, deciding between refresh approaches can have a positive impact on IT strategy.

The Intel study focused on historical data and current data. The historical data was centered around user's perspective on their PCs performance in the last 12 months. The current data used downtime in the previous week pertaining to number of calls to the helpdesk and "hourglass" wait time. The costs of PC performance was divided into "hard costs" and "soft costs", which allowed Intel to determine which ways the refresh was affecting the company.

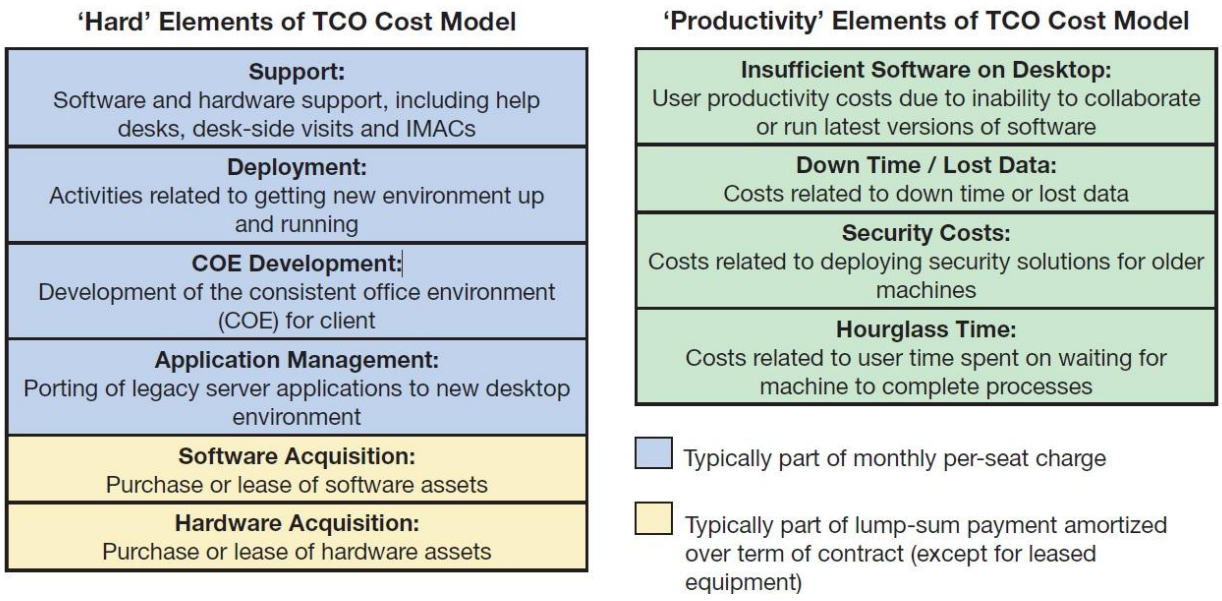



FIGURE 5-COST ELEMENTS OF THE TCO COST MODEL (INTEL, 2004)

Intel's pilot study analyzed the cost components of several different approaches to refresh cycles by looking at support, deployment, consistent office environment development (COE), application management, hardware, and productivity costs.

Comparing a three-year policy to a five-year policy shows how the cost related over time; therefore, parallel conclusions can be made by comparing the differences and implementing them to Hanover's current four year cycle.

TABLE 10 - THREE-YEAR VS. FIVE-YEAR (INTEL, 2004)

| Cost Component | Three-Year Cycle Cost Advantage | Five-Year Cycle Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Frequency of help desk calls increases significantly in year 5. Therefore, the three-year cycle has a cost advantage. |
| Deployment | | ✓ | Deployments occur once per refresh. The five-year cycle reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development: Engineering consistent disk images | ✓ | | COE support costs tend to rise in year 5. Thus, the three-year cycle has a slight cost advantage. |
| Application Management | | ✓ | Applications need to be tested and in some cases ported once per refresh. The five-year cycle reduces the frequency of this process and is therefore lower cost. |
| Hardware &and | | ✓ | A staggered refresh has a reduced effect on cash flow. |
| Productivity Costs | ✓ | | All productivity costs favor a three-year cycle. |

TABLE 11- COST OF THREE-YEAR VS COST OF FIVE-YEAR (INTEL, 2004)

| Cost Category | Three-Year Cycle ($/User/Year) | Five-Year Cycle ($/User/Year) |
|---|---|---|
| Support and Productivity Costs | 1152 | 1770 |
| Deployment | 83 | 61 |
| COE Development | 41 | 52 |
| Application Management | 600 | 585 |
| Hardware | 296 | 222 |
| Software | 200 | 150 |
| **Total** | **2372** | **2840** |

The cost of support and productivity, COE, and application management decreases in a five year model. Based on Intel's study, evaluating the financial savings of a three-year cycle as opposed to a five-year cycle, showcases a saving of $450 to $500 per user per year. By moving to a three year cycle, Hanover, a company with 4,400 employees, can potentially have savings of $1.9 million per year.

Along with adjusting the time period of a life cycle, going from a staggered refresh approach to a forklift approach can also provide savings for Hanover.

TABLE 12 - FORKLIFT VS. STAGGERED APPROACH (INTEL, 2004)

| Cost Component | Forklift Cost Advantage | Staggered Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Support costs are higher in the staggered refresh due to an inconsistent fleet. |
| Deployment | ✓ | | Deployments occur once per refresh, allowing outsourcers to take advantage of massive economies of scale resulting in "production line" level of efficiencies in deploying PCs. Also, the forklift refresh reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development | ✓ | | COE support costs are significantly higher in the staggered refresh due to the several environments that must be concurrently maintained. w |
| Application Management | ✓ | | Applications need to be tested, and in some cases ported, once per refresh. Therefore, the forklift refresh has a cost advantage. |
| Hardware and Software | | ✓* | A staggered refresh has a reduced effect on cash flow.<br>*However, this effect can be eliminated by leasing the hardware. |
| Productivity Costs | ✓ | | All productivity costs slightly favor the forklift refresh. |

TABLE 13 - FORKLIFT COST VS. STAGGERED COST (INTEL, 2004)

| Cost Category | Forklift Refresh ($/User/Year) | Staggered Refresh ($/User/Year) |
|---|---|---|
| Support and Productivity Costs | 1152 | 1186 |
| Deployment | 83 | 120 |
| COE Development | 41 | 66 |
| Application Management | 600 | 611 |
| Hardware | 296 | 294 |
| Software | 200 | 191 |
| **Total** | **2372** | **2468** |

When re-assessing Hanover's refresh policy, our "to-be" model focuses on refresh timing and refresh methods. The team believes that a shorter refresh cycle and a forklift refresh approach can provide financial savings for Hanover.

Hanover's refresh policy is reactive; the company reaches out and refreshes its assets once they have exceeded the declared refresh cycle. Assets on the network are regularly checked, but CompuCom is only present in the Worcester, Michigan, and

Atlanta offices. They have well-equipped their remote offices in order to provide the same amount of business to remote customers as they provide to their local customers. However, Hanover's remote offices put themselves at a great risk for intensified downtime by not adequately responding to older assets that are more prone to issues.

There is a wide array of outlooks on refresh cycles, but because of the assets susceptibility to failure with age, the team's "to-be" model proposes reducing the current four year refresh cycle time. Hanover's assets are currently under a three-year warranty policy from HP that we believe should mirror its refresh cycle (O'Brien, 2011). Having your refresh cycle match up with its warranty policy allows you to constantly have an asset that is covered, and when the coverage is over, replace the PC. The cost of maintenance of an asset increases over its life span and the magnitude of an issue towards the end of that assets life. In turn, the expectation will be that this will have a positive impact on business productivity by decreasing the amount of hardware/software issues.

## MISSING ASSETS

CompuCom's 2010 December report states that Hanover current has 90% of their assets available. Additional research states that if the company is highly diverse and geographically distributed with remote users that sporadically and irregularly logged into the network, the percentage (of available assets) tended to be closer to 85% (Adams, 2010). In the team's proposed "to-be" model, no further actions are required at this point in regards to missing assets because Hanover's asset management falls within the IT industry best practices.

Interdepartmental meetings between the TSC and DTS on an employee level are currently not standard procedure at Hanover. Communication for the team's "to-be" model is centered on an increase of meetings with TSC and DTS service technicians. We suggest monthly meetings that focus on trending issues and common problems. Meetings between managers should continue as they currently do in the "as-in" state. Interdepartmental meetings foster the concepts of increasing education amongst employees (Katz, 1979; Phall, 2003). More educated employees, particularly in an ever changing environment such as Information Technology and technical support, can help decrease resolution time and increase business productivity. The figure below illustrates the "to-be" model for communication.

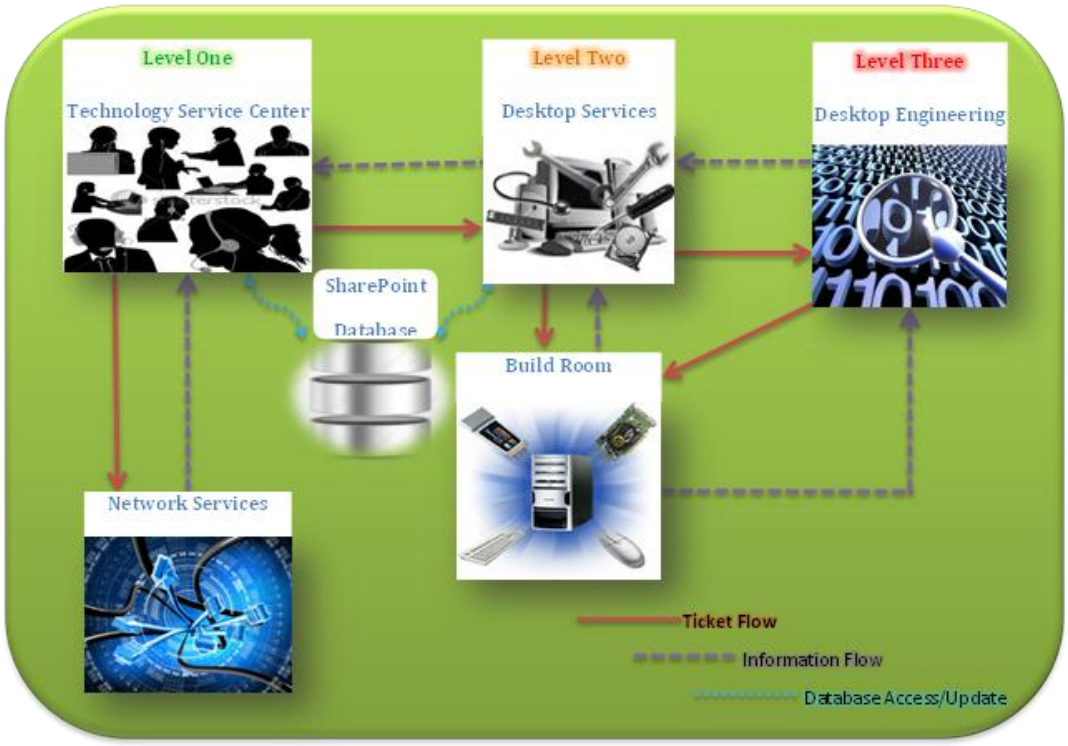



FIGURE 6 -TO-BE MODEL FOR COMMUNICATION

In order to be on the same page of how to handle a specific incident, the IT department should more readily document the incident and distribute it within the SharePoint library. Sharing of simple resolution methods between departments and frequent access of this information allows for these problems to be resolved as close to the source of the call as possible. This allows DTS technicians to focus on other issues at hand, and in turn, helps them address the issues that require their level of expertise. The figure below demonstrates information sharing in our "to-be" model.

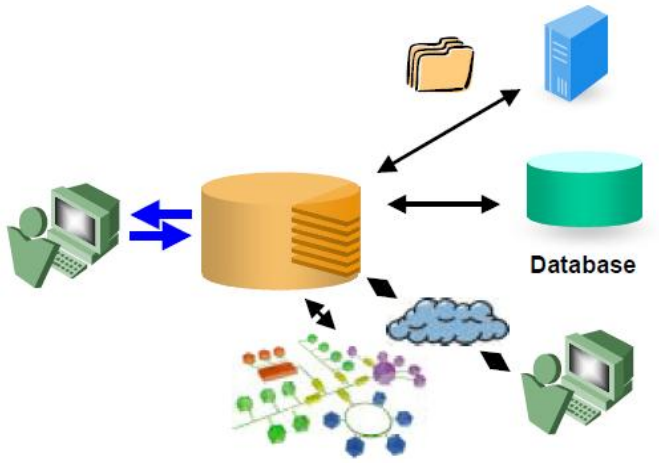



FIGURE 7- PROPOSED "TO-BE" CALL CENTER (GONZALEZ, 2001)

In the team's "to-be" model, a high emphasis is placed upon the SharePoint library's ability to allow employees to upload and create documents that can be categorized and posted for anyone else to see (Diffin, 2010). This is particularly useful for the TSC and DTS because it provides them with an avenue to document and facilitate sharing of information and technical solutions. As of now, Hanover's SharePoint site is not regulated or updated on a rigorous basis, but is rather an optional means to communicate similar goals and techniques between employees.

Hanover Insurance has an effective process of receiving and solving technical asset problems for its more than 4,400 employees. Analyzing ticket data allowed the team to asses a gap in educational related fields. Education is an area where we see potential for improvement. As of now we believe Hanover is achieving more than satisfactory results in ticket resolution related to SLA times, but by decreasing call times and resolution times these figures could improve even more. One of the ways to increase these figures is by having employees recognize and resolve a problem on their own. Our solution to improve the current situation is a multi-tiered educational method (Venkatesh, 1999; Aguinis, 2009; Gallivan, 2005).

In our "to-be" model, we suggest PC maintenance workshops to all employees concerning issues such as printer maintenance, defragmentation, basic network troubleshooting, and disk cleanup (Personal Communication, 2011). The idea to implement these workshops that address the issues above, stem from our interview with WPI's CCC's Assistant Director of Desktop Services, Marie DiRuzza, which were further developed through best practice research. These issues are often called into the TSC and garner unnecessary attention from TSC and DTS technicians. Also, we suggest informational desk-side bulletins with troubleshooting techniques. These desk-side bulletins would provide users with a checklist of common incident solutions for them to refer to prior to calling the Helpdesk. Common incidents may include, but are not limited to; verifying cable connections, checking network settings, and common user login difficulties. Our team believes that highlighting these educational issues would address the gaps in technical knowledge, increasing the amount of self-diagnosed resolutions.

The "to-be" state for Hanover is the culmination of our research and data analysis from February until April. We proposed recommendations to Hanover based on the results of our data collection and analysis. The proposed "to-be" state provides Hanover with several options on how to best proceed with eliminating or minimizing desktop downtime at various company locations.

TABLE 14 - SUMMARY OF THE TEAM'S RECCOMENDATIONS

| Topic | Recommendations |
|---|---|
| **Asset Life Cycle Management** | Change life cycle policy to three years that mirrors the three-year warranty |
| **Asset Data Integration** | Combine incident management and asset management into one database<br><br>Potential Software: HP Service Manager 9.2 |
| **Interdepartmental Communication** | Have monthly meetings for between TSC and DTS employees |
| **Documented Communication** | Actively update and Consistently use SharePoint Site to share ticket data and resolutions |
| **Service Level Agreement** | Redefine priority level three into; critical, high, medium, and low severity |
| **Education & Training** | Hold PC Maintenance workshops and provide desk-side bulletins to employees |

## ASSET LIFE CYCLE MANAGEMENT

Proper adjustment of refresh cycle can lead to financial savings in the IT department of a technologically driven company, such as Hanover. Currently, Hanover's refresh cycle is four years and we believe in order to help reduce the impact of downtime and improve productivity of the business; Hanover should change their policy to three years that mirrors their three-year warranty.

## ASSET DATA INTEGRATION

We recommend that incident management and asset management should be in a combined database. It is important to have an asset's incident report together with the asset's historical data. Putting these pieces of information together will give the organization real time tracking of any recurring, as opposed to miscellaneous, problems an asset is experiencing. This will also help the IT department understand how often a particular end-user contacts the Technical Service [Center] (Brittain, 2009). By taking these steps toward the integration of this data, Hanover will be able to identify problem assets as well as troubled users, further assisting in root cause analysis.

## INTERDEPARTMENTAL COMMUNICATION

We recommend that there be monthly meetings for TSC and DTS employees. As of now there are eight representatives working for the TSC and six representatives working in the DTS. We propose having the technicians from each department meet with their peers from the other department. These meetings do not need to be long periods of time, but rather are a chance to communicate about any issues from the previous month, thus, connecting the helpdesk with technical information and updating the DTS on ticket trends.

## DOCUMENTED COMMUNICATION

The SharePoint site that is currently used as an optional means to communicate similar tickets and resolution techniques should be more actively updated and consistently used. The use of documented communication will provide technicians with information on previously resolved tickets, thus, enabling them to solve problems quicker. The team believes this will reduce the number of tickets filed and increase the number of issues resolved. Shortening the resolution time will reduce the pressure felt

by the Helpdesk, along with the number of tickets received by the DTS. Resolving and being more familiar with potential problems also helps reduce desktop downtime by getting employees back to work as soon as possible.

## SERVICE LEVEL AGREEMENT

Although the team feels that a major change to Hanover's current SLA structure is not necessary, further prioritization within priority level 3 can better assess individual incident risk impact. Accommodating potentially high level risk within the individual priority level will improve business productivity. Some individual users experiencing downtime can have a profound impact on the financial wellbeing of the company.

## RESOURCES & TRAINING

We recommend that Hanover implement PC maintenance workshops and desk-side bulletins in order to empower employees with tools to self-diagnose and potentially solve their own minor issues prior to calling the Helpdesk.

# REFLECTION ON DESIGN

In order to meet the ABET related requirements of the Industrial Engineering Program at WPI the team included a reflective section that would address how their project satisfied the capstone design requirement for their MQP report.

## THE ENGINEERING DESIGN

The Hanover Insurance group experiences the challenge of minimizing desktop downtime and reducing its impact on business productivity and realized that the unavailability of computing devices creates a business impact measured in both lost revenue and lost productivity, therefore, there was a need to provide recommendations that addressed this issue.

In order to convert resources, we analyzed the current "as-in" model in terms of ticket tracking, asset management, communication, and education in order to create our "to-be" model. The combination of asset management and incident management reports into one database helps make Hanover's IT infrastructure into a leaner environment. The team redefined the information flow within the Hanover IT operations flowchart to better balance interdepartmental communication. An increased emphasis on the use of the SharePoint database improves the documented communication between departments.

## CONSTRAINTS

The constraints that apply to the design section of this MQP directly correlate to the Service Level Agreement (SLA) prioritizations. The team's original goal was to redefine and assess the priority levels within the current SLA. In order to achieve this goal, the team aspired to garner the employee's perspective on which issues affected

them individually and on a departmental level. A survey was created to collect these perspectives, but due to company privacy limitations, the survey was unable to be deployed to either employees or managers. Our prioritization was therefore based strictly on industry best practices.

## IMPLEMENTATION

In order to implement our designed "to-be" model, we recommend the integration of all asset information into one database that combines incident management and asset management. The reason for combining this information is to more readily accommodate for root cause analysis, a feature that Hanover could benefit from in the future. In addition, we recommend potentially using our prototype survey (see appendix) as a means in which to gauge employee perspective on prioritization levels and definition of downtime. Hanover can use asset data integration to keep better track of faulty assets, and troubled users. Surveys provide a more precise perspective on employee opinion that will define and prioritize potential downtime. Hanover should purchase the asset data integration software and make it available to the technicians of IT departments at Hanover. We believe the survey should be administered one department at a time and then analyzed by TSC and DTS managers in order to evaluate the results and implement the prioritizations.

# CONCLUSION

The main goal of this project was to provide recommendations to reduce the impact on business productivity by reducing desktop downtime. Given the time constraints and the confidentiality limitations of this project, our interviews, shadowing, ticket analysis, and IT best practice research resulted in a "to-be" model that highlights the areas that would improve Hanover's IT infrastructure. The team's recommendations stem from the analysis on: operations, SLA's, asset management, interdepartmental and documented communication, and ticket resolution processes. The team's biggest limitation concerned improving SLA prioritization due to the lack of data collection that the team was able to gather due to privacy limitations. However, our team believes that this project will benefit The Hanover Insurance Group because constant reevaluation of a company's IT department can lead to financial savings and better prepare them for future advancements in technology.

*Investopedia*. (2011). Retrieved January 2011, from http://www.investopedia.com/articles/financial-theory/08/american-insurance.asp

Adams, P. (2009). *The integration Points Between PC Asset Management and the IT Service Desk.* Gartner.

Adams, P. (2010, October 5). *Developing Ideal IT Asset Management Hardware Inventory Metrics.* Retrieved April 1, 2011, from Gartner: http://my.gartner.com/portal/server.pt?open=512&objID=260&mode=2&PageID=3460702&resId=1445333&ref=AdvSearch&sthkw=%22missing%22+%22asset%22+%22%25%22

Adams, P. (2010, October 6). Tracking IT Assets With RFID and Bar Codes. *Gartner ID Number : G00167876*, 5.

Adams, P. (2010, June 22). What You Need to Know About Inventory Tools for IT Asset Management. *Gartner ID Number:G00201595*, 8.

Aguinis, H. (2009). Benefits of Training and Development for Individuals and Teams, Organizations, and Society. *Annual Review of Psychology*.

Brittain, K. (2009). *Good Practice Guidance for Incident Management.* Gartner.

Burton, B. (2010, July 16). *Hype Cycle for Enterprise Architecture.* Retrieved April 12, 2011, from Gartner: http://my.gartner.com/portal/server.pt?open=512&objID=260&mode=2&PageID=3460702&resId=1402513&ref=QuickSearch&content=html

CompuCom. (2010). *2010 Annual Business Review.* CompuCom.

CompuCom. (2011). *CompuCom*. Retrieved April 2011, from http://www.compucom.com/Pages/defaultnew2010.aspx

Cullen, D. S. (2009). *Service Level Agreements : Module 10 of the outsourcingtoolset.* The Cullen Group.

Diane Knipe, D. S. (2011, January). Interviews with Hanover Personel. (J. K. Ben Cabrera, Interviewer)

Diffin, J. (2010). Cloud Collaboration: Using Microsoft SharePoint as a Tool to Enhance Access Services. *Journal of Library Administration*, 570-580.

Epperson, L. (2011). *Intel Corporation.* Retrieved April 2, 2011, from Hoovers: http://subscriber.hoovers.com/H/company360/fulldescription.html?companyId=13787000000000

ExtremeTech.com. (2008, March 4). *Dell Launches Fully Rugged Laptop.* Retrieved April 2, 2011, from http://find.galegroup.com/gps/infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T003&prodId=IPS&docId=A176055254&source=gale&srcprod=ITOF&userGroupName=mlin_c_worpoly&version=1.0

Gallivan, M. (2005). Does Information Technology Training Really Matter? A Social Information Processing Analysis of Coworkers' Influence on IT Usage in the Workplace. *Journal of Management Information Systems* , 153-192.

Gonzalez, L. (2001). *Technology and Information Management.* Analysis, Orlando.

Hanover. (2010, April 8). Master Service Agreement. *Property & Casualty & Corporate Finance and Services*. Worcester: Hanover.

Hanover Service Center. (2010). *Montly SLA Metrics.* Worcester: Hanover.

Helpdesk, T. (2011, February). Interview with TSC Helpdesk. (B. C. Jared Kellogg, Interviewer) Worcester, MA.

Hiner, J. (2009, October 23). *Many CIO's aren't delaying the PC Refresh Cycle, they're totally rethinking it*. Retrieved March 31, 2011, from TechRepublic: http://www.techrepublic.com/blog/hiner/many-cios-arent-delaying-the-pc-refresh-cycle-theyre-totally-rethinking-it/3111

Intel. (2004). *Pilot Study: Optimum Refresh Cycle and Method for Desktop Outsourcing.* Santa Clara: Intel Corporation.

Interview. (2011). MQP - Hanover - WPI .

ITIL. (2011, March 23). *ITIL - Endorsed Software Tools*. Retrieved April 13, 2011, from ITIL: http://www.itil-officialsite.com/SoftwareScheme/EndorsedSoftwareTools/EndorsedSoftwareTools.aspx

Johnson, G. (2011, March 31). *Organizing IT and OT Networking for Future Integration.* Retrieved April 20, 2011, from Gartner: http://my.gartner.com/portal/server.pt?open=512&objID=260&mode=2&PageID=3460702&resId=1614128&ref=QuickSearch&sthkw=%22refresh%22+%22three-years%22+%22cycle%22+%22asset%22

K. Liu, L. S. (2010). "Alignment Stratergies and frameworks in co-evolution of business and information technology. In *Information Network and Automation.*

Katz, R. (1979). *Communication Patternsn, Project Performance and Task Characteristics.* Cambridge: Massachusetts Institute of Technology.

Matthew, A. (2006). *Reducing Maintance Cost THrough Effective Prediction Analysis and Process Integration.* Krishtel eMaging Solutions.

MindShift. (2011, January). *Managed Desktop*. Retrieved February 22, 2011, from Managed Desktop Services: http://www.mindshift.com/Managed-Desktop-Services.xhtml

National Audit Office. (2007). *Improving the disposal of public sector information, communication and technology equipment.* Retrieved from http://books.google.com/books?hl=en&lr=&id=GWXVbie7STAC&oi=fnd&pg=PA30&dq=asset+life+cycle+management+%22three-year+refresh%22&ots=aI-pDw_QIv&sig=-gts9n_JVIApeasV-fzPDXtnhi8#v=onepage&q=asset%20life%20cycle%20management%20%22three-year%20refresh%22&f=fals

O'Brien, F. (2011, February 24). *Adopt IT Asset Life Cycle Management as the Foundation for Your ITAM Programs.* Retrieved April 20, 2011, from http://my.gartner.com/portal/server.pt?open=512&objID=260&mode=2&PageID=3460702&resId=1559014&ref=QuickSearch&sthkw=%22refresh%22+%22three-years%22+%22cycle%22+%22asset%22

Personal Communication, H. (2011, March). (W. H. Team, Interviewer)

Phall, R. (2003). *Fast Start Technology Road Mapping.* Cambridge University.

Roy, T. (2007). *Final Report Design and Implementation of a Database for IT Helpdesk with Asset Management System.*

Rusu, D. L. (2009, November 16). *Trends and Challenges in Strategic Management of Information Technology.* Retrieved January 2011, from http://api.ning.com/files/ZRnRiIq7NwpPkLjbbOdEkPM1c3VFUiC2ajqMg4XKOWo_/TrendsandChallengesinStrategicManagementofIT.pdf

SearchEnterpriseDesktop.com. (2011, February 7). *Desktop Management*. Retrieved February 22, 2011, from Enterprise Desktop Information, News and Tips: http://searchenterprisedesktop.techtarget.com/definition/desktop-management

Shadowing, P. (2011, February). Shadowing Hanover Helpdesk.

The Hanover Insurance Group, I. (2010). *About Us*. Retrieved from The Hanover Insurance Group: The Hanover Insurance Group, Inc

Venkatesh, V. (1999). Computer Technology Training in the Workplace:. *Organizational Behavior and Human Decision Processes*, 1-28.

Vision Solutions. (2008). *Assessing the Financial Impact of Downtime.* Irvine, CA: Vision Solutions.

Walker, G. (2001). *IT Problem Management.* Prentice Hall.

Weiss, J. (2004). *Aligning Technology and Business Statergy: Issues & Frameworks, A Field Study of 15 Companies.* Hawaii International Conference.

Yahoo. (2011, February 7). *Hanover Insurance Group Inc. Stock*. Retrieved from Yahoo! Finance: http://finance.yahoo.com/q/co?s=THG+Competitors

## 6 MONTH TICKET ANALYSIS

August – 5.3%

December – 3.7%

July – 7.7%

November -4.4%

Oct – 7.4%

Sept – 9.4%

1. Tech went onsite and found the Power cable for the mailbox unplugged. Plugged
2. Tech went on site and replaced the swing plate. Tested ok.
3. Increased the screen resolution to the suggested setting for the monitors. Fonts
4. Customers had paper type set as Bond paper. This could have been originally push
5. There was a jam, the customer cleared it, and it has been fine.
6. D-shaped rollers are worn. Swapped the printer, and it has tested fine.
7. Application was installed successfully. Customer just needed to enter the required data
8. PC Cleanup
9. No network cable, ran long cable to data block under whiteboard, labeled NWG-B4
10. User needs flash player 10. All set.
11. Late - ticket assigned to me when I was out on vacation. User software education
12. Customers had paper type set as Bond paper. This could have been originally push
13. Network cable not plugged into the docking station he was using. He had just move…
14. Had user shutdown computer and printer. Power printer on after logging in had the..
15. Tech went on site and found the manual feed turned on. Turned manual feed off
16. Replaced rollers in tray 4.
17. Remote tech went on site and found paper stuck in fuser. Tech also adjusted pap

18. Tech found paper coiled be hind the manual feed tray.  Removed paper.  Tested ok
19. Late: due to ticket was assigned the following day. Customer education on how to
20. Customer cleared the jam, and it is working fine. we did send a tech onsite, and
21. Network cable was plugged into the wrong Jetdirect card. Installed new fuser and
22. Spoke with Katie, the tech came on site and made some adjustments.  Printer is q
23. Contacted user and the printer is now working ok.  Could have been a loose cable
24. Printer was not plugged in. After plugged in printer jammed. Replaced rollers on
25. Spoke to the customer and she has been printing OK. Would like to close the tick

Total Number of Tickets

64+68+69+78+55+56=390

65 Averages

25/390=6.4%

## INTERVIEW QUESTIONS FOR WPI HELPDESK

1. How does WPI Helpdesk deal with a faulty device?
2. What are some potential areas of improvements?
3. What changes has WPI Helpdesk made in the last year that has improved their process?
4. What is desktop downtime to WPI Helpdesk? How do they asses it? What is done to improve desktop downtime? How does downtime impact business productivity or productivity in general at WPI?
5. A possible, but costly, solution to desktop downtime is having additional assets on reserve, how does WPI feel about a solution like this?
6. Another solution is having an additional shift, does WPI do this? If so, why? If no, then why not?
7. How does WPI prioritize problems? What metrics are used in order to determine priority?
8. What is WPI Helpdesk's biggest problem? What actions are taken towards improving this problem?
9. What was the most cost beneficial improvement that WPI made in the last five years?

## INTERVIEW WITH WPI HELPDESK

Present: Benjamin Cabrera

1. What is the process for a faulty device?
    a. Hardware and Software
        i. Triage, proceeded by going to “the shop”
2. Biggest Problem?
    a. Tracking System is 10 years old, a more efficient tracking system will allow customers to easier diagnose and categorize their problems.
    b. Helps with scheduling
3. Asset Management, what happens when a device goes missing?
    a. Database contains all resources and is identified by the last person to log into the computer/laptop.
4. How does WPI Helpdesk define down-time?
    a. Case by case standard but usually, the computer has a reported problem, it is considered down.
5. Prioritization
    a. Prioritize by person, very broad and general
    b. High/Medium/Low -> simple
6. Biggest improvement in the last year
    a. Separate call center from the front desk
    b. New Phone System
        i. Helps categorize phone and reduces idle time of callers
7. Remote Administration
    a. Students are allowed to help now by accessing desktop remotely, has allowed for a higher call volume than before
8. Feedback?
    a. Surveys
9. After Hours?
    a. Wait until the morning, there is no budget for extra shift.

## HANOVER MQP NOTES

-Jared Kellogg

Day of: 1/26/2011

9:00am – Meeting with Patti Kularski and Danny Salvas took place in conference room – third floor.

-Present members: Jared Kellogg, Ben Cabrera

Notes:

Incident Trending – Dianne – She is in the process of compiling this data for us. (expect Tuesday of next week.)

Garter.com (spelling?) – If we want to see an article than just ask Patti K. We can however read summaries online w/o a subscription.

Dianne – Person to talk to about the flow chart process of desktop assets/issues etc.

DTS: Desktop services. Comprised of:

(5-6 ppl in Worcester)

(2 ppl in Howell MI)

(1 person in Atlanta)

They are rolling out Windows 7 this year office-wide which is a major software change. Expectations are that there will be some friction but they are trying to make the process as smooth as possible by diverting some of the Build work away from Worcester and instead sending it to be done in New Jersey.

Managed Service Relationship – This is the method used between Hanover and CompuCom. Pay exchange is based on device/ assets rather than paying for personnel. They seem very pleased with the relationship with CompuCom. (Some Hanover employees actually became CompuCom employees.).

Cost Level Data – High level cost analysis.

Other Vendors – (Staff Aug system) – a.k.a they give Hanover extra people when they need them. (These people are treated as Hanover employees.)

1 vendor is located in India. The other is located in China. I believe the names are (Cognisin and Dextrus. Spelling?)

They have analyzed tickets looking at virtually every angle and have not spotted any notable trends or patterns that have helped them make any changes from an operations standpoint.

TSC – Technical Service Center – They cover everything application-wise.

The age/generation difference at Hanover is a notable and prominent issue. Especially when it comes to application related downtime and education related issues.

10:30am - Wednesday January 26th

Meeting with Dianne Knipe took place at Dianne's office. Third floor.

Members present: Jared Kellogg, Ben Cabrera

Level 1: Technical Service Center

Level 2: Desktop Services – (Phone support, desk side assistance, etc.)

Level 3: Desktop Engineering – (Danny Salvas)

Desktop Engineering – Builds Applications. They get sent to the Build room where they are actually physically put onto computers. Tickets only end up at desktop engineering if there is a defect in the way an application is designed or the way it runs, as opposed to it just crashing or causing an error for one user. In that case it would simply be deleted and reinstalled by desktop services.

Sometimes tickets go to the wrong team/level/department/etc. such as an application issue being mistaken for a mechanical issue and winding up in the build room when it could have potentially been solved through the TSC.

Important to note that software adoption such as the transfer to Windows 7 this year obviously causes a large spike in reported ticket issues. According to Dianne the last major software change came in May of 2010 when Hanover switches from Novell Groupwise email to Outlook. She showed us ticket graphs from May and June of 2010 and they were much higher than other months. This is important to keep in mind as we examine data.

A lot of SLA's fail with field office related issues. This is because of the distance and time commitment it may take to solve a problem or get a new asset to someone that might be in Sacremento, CA from Worcester, for example.

<u>Things we want to ask about:</u>

Desktop Engineering Dept. – Their role. (Ask Danny)

( Asked and Answered. See above )

ITIL – we need to research this

Online definition:

“The Information Technology Infrastructure Library (ITIL) is a globally recognized collection of best practices for information technology (IT) service management. The United Kingdom's Central Computer and Telecommunications Agency (CCTA) created ITIL in response to growing dependence on information technology for meeting business needs and goals. ITIL provides businesses with a customizable framework of best practices to achieve quality service and overcome difficulties associated with the growth of IT systems. Hewlett-Packard Co. and Microsoft are two businesses that use ITIL as part of their own best practices frameworks.”

What do “tasks” entail?

Tasks are “requests”. Such as someone asking to have an application installed or to have more memory put on their computer.

-Really wouldn’t look at requests as downtime.

-Any downtime that is created by requests is generally minimal.

## INTERVIEW WITH WPI (CCC)

-WPI - Thursday, March 24, 2011

Attendess: Marie DiRuzza (Assistant Director, Desktop Services), Bryan Ferguson (Windows Systems Administrator), Jared Kellogg, Benjamin Cabrera, Otilio DePina

### Questions:

1. Asset Management
    a. What tools CCC uses for asset tracking?
        i. How efficient has it been?
    b. Do you experience missing asset problems?
        i. How do you go about missing assets?
        ii. Do you know how many assets there are missing?
    c. What information does your database holds about a particular asset?
        i. Is there information about how many times a particular asset has been serviced within its life time?
            1. If so, how useful has it been for you to have that information on hand?
    d. What is your due time to refresh an Asset?
        i. Is it same criteria for Desktop and Laptops?
        ii. Why did you choose this particular time?
            1. Do you have any type of data that supports your decision?
    e. What is the CCC process for asset refreshment when the due time is near?
        i. Do you reach out to the user for change or does a user reaches out to you?
2. Prioritization
    a. What metrics do you use to prioritize the problems?
        i. Is there a hierarchy to whom problem should be looked at first?
            1. If so, how do you go about sorting it?
        ii. In what manners do you see your prioritization affecting the impact of downtime?
    b. What is the criterion for giving out Laptops to your staffs and faculties?
3. Operation/Process Flow
    a. Can you tell us the CCC path line for a problem solving, from beginning to your last resort?
        i. How is the communication between departments?
            1. Do they give each other feedback on a particular problem?
        ii. Does CCC follow up with the customer after a ticket is closed?
    b. Do you have a particular time line to solve an issue?
    c. What are the different departments in the CCC and how do they communicate problems?

d. If there is a certain asset that experiences multiple problems in a given amount of time, are the standards in place to replace this asset?

Offices, Worcester MA - March 23rd 2011

Jared Kellogg – Otilio Depina – Benjamin Cabrera

- "Mean time to repair" Can you talk to us a little about it? We heard you guys used to track it monthly but don't anymore.
- Process Flows recommendations
    - Do you have any suggestions for us?
- Auto Appraisers have their own specific SLA priority correct? Where if their asset breaks and they get in a call before 1pm CompuCom must send that order by the end of the day and it must be Overnight shipping?
    - Are there any other particular positions or departments which you could see benefitting from something like this at Hanover?
- How does Mean Time to repair affect field representatives?
    - CompuCom and Field reps, how do they respond and what is the process for getting a new asset to a field representative?
- When someone's asset gets repaired DTS gives them a Think Client correct?
    - Is there an alternative method you could think of?
- Your feelings on Hanover's refresh policy of 4 years for laptops and desktops?
    - Should it be sooner?
- Your take on further educating staff to potentially eliminate some of the resolvable ticket issues that could be handled by a better educated employee (i.e. printers)?
- One of our recommendations to have a few assets available per department, we believe that this will reduce the IMPACT of downtime, what are your thoughts on this?
- Currently assets are tracked by the last person that logged into the asset. Hanover is currently missing about 10% of its assets, we believe a tracking system that utilizes the ID cards of Hanover's employees will increase the ability to assign responsibility to the asset, and do you believe Hanover should re-evaluate how it tracks their assets once they are dispersed to employees?

These notes are gathered from the PowerPoint presentation that was sent out by Danny.

(Summary)

What are other companies in the industry doing to manage their SLA's

SLA's provide consistent expectations with our business partners.

-Operational Excellence

-Know your customer

"If every component of infrastructure is treated as top priority than it is simultaneously being treated as the lowest priority." –Jim Metzler

Platinum – Customer facing (agent, insured)

Direct Loss of income to Hanover

Gold – not customer facing (agent, insured)

Indirect Loss of income to Hanover

Silver – Foundation Applications

Not a loss of income to Hanover

FIRST WEEK OF D - TERM

Where we stand:

Danny:

- We need the core applications list
- CompuCom locations. – Where are they?
- TSC doesn't generate tickets for problems that are resolved. But should they still track them?
    - This leads into whether we should investigate further the way in which the departments (TSC, DTS, DTE) exchange information that may help resolve reoccurring issues.

Prioritization:

Survey:

- Is it approved by Danny/Patti
- Does it need to be changed – Questions?
- How many Employees/ Managers will be sent this survey?

Asset Management:

- Christine Toupin
- Diane Knipe
- Build Room
- Percentage of laptops vs. desktops that are listed as missing
- (Agent vs. Agentless) ----------→ Scan that checks to see who the owner of the asset is. – (It is just based off of who is logged in at the time of the scan. Inaccurate. Consider new method for recommendation.)

1. Define Downtime
    a. Once we receive the list of issues and their description, we will assess and analyze trends to develop a proper definition of what down time is.
    b. Dianne Knipe, Senior Service Manager of CompuCom, Hanover's IT outsourcing specialist, defined downtime as when the entire system is down i.e. "blue screen of death"
    c. FOR NEXT WEEK: List of the definition of downtime as when a computer is down, but Patricia Kularski brought up the event of an application being down but the computer itself being operational, thus, upon receipt of description of issues and problems, we will re-asses downtime
2. Prioritizations
    a. Danny Salvas gave us the Master SLA agreement, which contains descriptions of all the prioritizations
    b. Prioritization P3 by position/department, how valuable their work is/important, costly
3. Flowchart Process
    a. See Minutes for details
        i. Why would a computer go to Network Services? Is it necessary for all?
        ii. What are the logistics of a problem from outside of Hanover and how and where do the products go?
        iii. FOR NEXT WEEK: Interview WPI Helpdesk to assess logistics
4. Analysis of Data of recent years
    a. On Monday, the week of January 31st, Dianne Knipe will provide us with more analysis
    b. They currently have monthly evaluations of tickets that, if need be, could be instrumental to this process
    c. Problem statement As-is state has
5. What services does CompuCom provide Hanover
    a. Find compucom locations
    b. Find all Hanover locations
6. Office for three
    a. At this point, not necessary
7. New Problem State
    a. Received from Danny Salvas
8. Background
    a. History of Hanover(Benjamin)
    b. Industry of Insurance(Jared)
    c. IT Systems(Otilio)
    d. As-is state of Hanover/their desktop management process (later..)
9. Early Possible Recommendations
    a. Graveshift
    b. Additional assets
    c. Prioritizing p3's

## WPI TEAM HANOVER 2/3/11 – NOTES AND FROM MEETING

1. CompuCom Report
    a. Grey P?
    b. Spikes in August-September 2010?
    c. Difference between request and Incident
    d. Customers ticket type?
    e. Move and Refreshes in Jan, Feb, and April?
    f. How can we work on "missing"

Tasks

10. Provide Dianne, Danny, and Patricia with criteria for downtime
    a. Assess and analyze trends to develop a proper definition of what down time is.
11. Prioritizations
    a. Decide metrics with Danny about prioritizing P2/P3
12. Flowchart Process
    a. Review report that Otilio found
    b. Interview WPI Helpdesk to assess logistics
13. Analysis of Data of recent years
    a. On Monday, the week of January 31st, Dianne Knipe will provide us with more analysis
    b. They currently have monthly evaluations of tickets that, if need be, could be instrumental to this process
    c. Problem statement As-is state has
14. Background(DUE TUESDAY)
    a. History of Hanover(Benjamin)
    b. Industry of Insurance(Jared)
    c. IT Systems(Otilio)
    d. As-is state of Hanover/their desktop management process (later..)
15. Early Possible Recommendations
    a. Graveshift
    b. Additional assets
    c. Prioritizing p3's

## MQP MEETING NOTES: 2/15/2011

- Jared Kellogg, Ben Cabrera, Otilio DePina

Faculty Supervisor: Soussan Djamasbi

Where: Professor Djamasbi's office Washburn Shops

Review from February 8th Meeting:

Notes:

- Utilize the WPI writing center/ find an editor who can review our MQP document. (Determine which of us the strongest writer is.)
- Interview with the WPI helpdesk is scheduled for Monday, February 14th 2011

Deliverables for Next Week's Meeting: Tuesday, February 15th 2011

1. Reorder Background Sections so that it flows better.
2. Create an updated outline for our MQP
3. Update our timeline to where we are now, and when we plan to have our proposal in.
4. P2/P3 Priorities – What have we learned?
5. Analysis of the Helpdesk Meeting.

Agenda:

1. Our meeting with the WPI Helpdesk and its relation to managing IT services/ asset Management at Hanover.
2. Status of Proposal development.
3. 'Service Center' is a program used by Hanover that allows us to view ticket information – we feel this will be helpful to us.
4. Developing metrics for prioritizing P2/P3's.

   4a. Develop a survey for managers to determine who are most important in each department and what applications/programs are the must crucial.

   4b. Analyze Danny's research data on prioritization.

Deliverables:

1. Outline for Danny and Patti regarding where we stand with our project to date.

2. Go through tickets to reach definition of downtime using the service center program and Microsoft Excel
3. Asset management – Additional research and background regarding the actual number of missing assets.
   3a. how does WPI handle their asset management.
4. Prioritization – On a departmental level to determine a possible hierarchy/ better way of prioritizing assets.
5. Develop a survey to help us with the role of prioritization.
6. Is there a physical location at Hanover for the DTS, if so is it strategically located within the company?

Attendees: Soussan Djamasbi (faculty advisor), Benjamin Cabrera, Otilio DePina, Jarred Kellogg

Agenda:

1. Proposal
    a. Comments
    b. References
    c. Looking ahead, next submission of paper will be April 5th
2. Project Proposal Presentation to Hanover
    a. Awaiting Danny's e-mail
    b. Doesn't seem like we will be able to present
    c. Presentation
3. This Week at Hanover
    a. Survey
    b. Finish Proposal Sheet
        i. Problem Statement
        ii. Objectives
        iii. Methodology
    c. Interview with CHRISTINE M. TOUPIN – Asset Management Administrator

IBM – Old assets/ computers

HP – New Assets/ 1 model for laptop, 1 for desktop.

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2011

1000- refresh = rebuilt CPU's

1500- windows 7, office 2010

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(1 – 24) people – Compu-Com covered with monthly fee. More than 25 counts as a project and constitutes an additional fee.

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CPU's have a four year life cycles. Right now they use Windows XP as a platform.

-They use McCafee antivirus protection. They are switching to Symantec later this year.

-All laptops are encryption protected.

-"Very tight lockdown protection on all computers and technological devices on the Hanover network."

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SLA's

P3- One person has a problem – 15 mins. to call: 2 hrs. to fix.

P2- Work group (ex. Printer) – 2 hrs. to call: 4 hrs. to fix

P1- Example: South Wing crashes – 4 hrs. to call: 8 hrs. to fix

- Process
- SLA
- Trending
- Reporting – Past + Present

ITTL – We have to look up this online and find out more about it.

Guttner? – Business Technology Recommendation web site subscription.

If we want to look at cost related data than we should just ask Dan. He'll hook us up.

Hanover Facts:

Started working with Compu Com in 2008

Dan has worked here for 11 years. Started at the helpdesk. Became manger/ etc.

Hanover does a reorg once a year

Very career advancement oriented.

Age  demographics

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“Executive offices, I see them going away in the future.” –Danny Salvas

-The help desk is centralized through all of Hanover.

-We need to Quantify and define “Downtime”.

-They rebuild 20-30 PC’s a month

-5700 assets in used company wide

- If we need information on Compu-Com we should contact Dianne

-Some Hanover offices are on the network and some aren’t

-Howell Mich. – 1000 employees

-Atlanta- 300

Worcester – 2000

-72 offices total nationwide.

Business Sponsor: Hanover Insurance Group

Business Unit: Hanover Technology Group

Project Coordinator/Contact Information:

Name: Patty Kularski

Title: AVP, Hanover Technology Group

Phone: 508-855-2623

Fax:

Email: pkularski@hanover.com

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Project Description & Objective:

Every organization experiences the challenge of **minimizing desktop downtime** and reducing its impact on business productivity. For the most part, failure rates are low, but **impact can be high**. Break-fix, wear and tear and aging equipment all contribute to this challenge. **Unavailability of computing devices** creates a business impact measured in both lost revenue and lost productivity.

The objective of this project is to **provide recommendations to improve the impact of downtime to business productivity by reducing or eliminating downtime of desktops**. The project team would **develop a current state model** focusing on **processes, service levels and impact to the customers.** Upon completion of the **"as-in" state**, the team would develop a **"to-be" model** leveraging industry best practice for the service and support of the desktop infrastructure. "To-be" state analysis should highlight process efficiencies, alternate support models, financial savings associated with reduced downtime, staffing/support team impact, service level impacts, development of management reports to monitor service levels and development of a focused customer satisfaction survey to provide awareness back to the support team and management.

Known Dependencies (timelines, separate initiatives, etc.):

None.

6.3 Problem and Request Priority Classification

Priority levels are assigned to each problem and/or request. They are based on industry standards and determined by the TSC analyst at the time of the call.

**Problem - Priority Level 1**

- Severe problem affecting the enterprise, a core business system or application, as well as a network or telecommunication failure
- Demands immediate attention
- ***Business risk is high***
- Business unit affected receives initial notification of problem status within 15 minutes of the incident being reported to the TSC
- Problem must be resolved within two hours

**Problem - Priority Level 2**

- Problem affecting the productivity or availability of a system or application (e.g. response problem)
- Demands immediate attention
- ***Business risk is moderate to high***
- Customer receives initial call to set expectations within 30 minutes
- Problem must be resolved within 4 hours

**Problem - Priority Level 3**

- Problem affecting an individual users productivity
- Low to moderate impact
- Business risk is low
- Client receives initial notification of problem expectation within two business hours
- Problem must be resolved within 8 hours

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**Request - Priority Level 4**

- Request to install/move/add or change privileges or equipment
- **No purchasing activity involved**
- Business impact is low to moderate
- Request must be fulfilled within 5 business days

**REQUEST - PRIORITY LEVEL 5**

- Request to purchase computer equipment with standard configuration
- Business impact is low to moderate
- Request must be fulfilled within 10 business days

**REQUEST – PRIORITY LEVEL 6**

- Request to purchase non-standard computer equipment (*must demonstrate business need)

- Business impact is low
- Request will be fulfilled within 30 days (will be contingent based on need and availability)

### NEW HIRE REQUEST – PRIORITY LEVEL 7

- Request to process a New Hire (full or part time) or Transferred Employee
- Business impact is low to moderate
- Client's Manager or specified contact will receive notification of service expectation within 1 business day.
- Request to be fulfilled on or before employees start date or 5 Business days from the time of the Resumix feed.

# Pilot Study:
# Optimum Refresh Cycle and Method for Desktop Outsourcing

## SOLUTION SUMMARY

| | |
|---|---|
| The Challenge | IT organizations working with reduced budgets often delay refreshing their desktop hardware. And to avoid lump-sum hardware costs, companies often refresh only a portion of their PCs at one time. But delaying the PC refresh can lead to higher support and productivity costs, and staggered refreshes can result in higher deployment costs for companies that outsource their IT infrastructure. Therefore, a question IT decision makers are inclined to ask is, "What is the optimum PC refresh cycle, and what is the optimum refresh method?" |
| The Solution | The Optimum Refresh Cycle and Method for Desktop Outsourcing pilot study indicates that refreshing all PC desktop hardware at once (the "forklift" method) every three years provides the best cost savings all around. |
| The Results | The pilot study participant company decided to perform a forklift upgrade and adhere to a three-year refresh cycle as a result of the study. |

## Introduction

As IT organizations are under continual pressure to reduce costs, many companies may choose to delay their PC refresh to decrease the frequency of spending for PC hardware. However, this study again validates what others have previously indicated, that there is strong evidence suggesting that delaying PC refresh increases support costs and reduces user productivity.

Beyond that, this study went on to evaluate a new IT management dynamic, that for companies with outsourced PC environments, the common conception that a smooth refresh cycle — even over a 3 year period — is not the lowest cost approach. Although staggering the refresh may reduce upfront cash requirements by spreading them out over several years, there is also an associated increase in support and productivity

costs versus utilizing the "forklift" approach, where all PCs are refreshed at the same time. In addition, deployment costs (the average cost to deploy a PC) are reduced by the outsourcer's ability to employ massive economies of scale, scale that an IT organization could never approach. Faced with this critical IT decision, companies with an outsourced PC infrastructure must answer the following two questions:

- How often should a company refresh its PCs?
- What method of refresh should be used?

To objectively find answers to these questions, Intel Corporation and A.T. Kearney, a management consulting firm, conducted a six-week pilot study at a leading financial services company in the UK. The study used the total cost of ownership (TCO) model to determine the optimal timing and mechanism of client refresh.

During the pilot study, a survey was administered to 200 employees to collect data on the current computers they were using. The collected data was used to better understand some of the non-hardware cost elements, such as support and user productivity. It also helped determine how the age of the computer impacts hidden cost elements. Our user survey consisted of two components that looked at the following criteria:

- Historical performance.
- Current performance during the pilot study time period.

## Pilot Study Background

TCO over the life of a PC tends to follow a U-shaped curve, as shown in Figure 1.

Figure 1 shows the relationships between three components of TCO and how they relate to PC refresh timing:

- PC acquisition costs, which are typically amortized and decrease (or stay flat) over the life of the PC.
- Maintenance costs, which tend to rise over the life of the PC.
- Training costs, which tend to decrease slightly over the life of the PC.

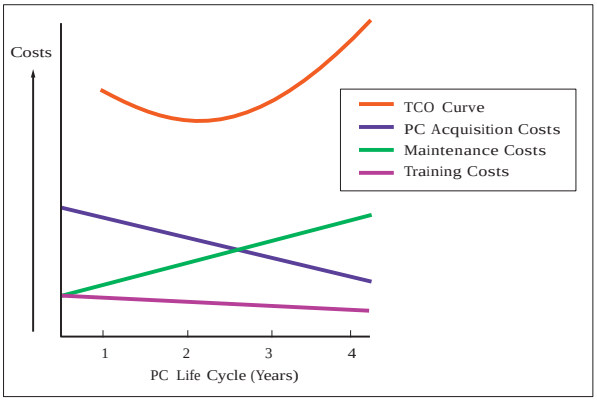



*Figure 1. Total Cost of Ownership (TCO) Curve Based on PC Life Cycle with Three Cost Variables*

Failing to refresh a PC after its maintenance costs have risen above a certain level can cause TCO to rise. Therefore, it is important to determine the point on the TCO curve where it is incrementally less expensive to replace a PC rather than to continue using it.

In addition to considering the TCO curve, companies must also decide whether using a staggered refresh or a forklift refresh will result in overall lower costs. While a forklift refresh can result in higher PC cash acquisition costs for the first year, the deployment costs will be lower and the resulting PC environment will be almost totally homogenous, absolutely minimizing the costs associated with managing multiple PC platforms.

Because both the timing and the method for PC refresh affect a company's TCO, the pilot study team decided to analyze the real-life working environment at an actual (non-laboratory) deployment site.

## Pilot Study Methodology

A large financial services company in the UK was selected as the pilot study site. The bank had recently signed a desktop outsourcing agreement with a major company, and both teams were interested in developing refresh plans based on actual data obtained in the course of the pilot study.

The population of the pilot study included approximately 200 employees. Those chosen for the pilot study had PCs that ranged from brand new to more than five years old.

The pilot study team collected both historical and current data; current data was collected bi-weekly over the course of six weeks. The elements of the current data included down time in the previous week, number of help desk calls and 'hourglass' wait time. For the historical data collection, users were asked to comment on the performance of their PCs over the previous 12 months.

When gathering current and historical data, we collected current "hard" costs at the pilot study site, as well as additional cost information based on current and historical account costs, for the following areas:

- hardware and software acquisition
- consistent office environment (COE) development
- application management
- deployment
- support.

We also validated costs against current and historical outsourcer negotiated internal costs.

When generating the outsourcer cost models, we collected data from the deployment costs model that was developed for the study participant by the outsourcer. We also reviewed additional outsourcer costs models (such as TCO models) for similarly sized companies to determine cost estimates.

## Total Cost of Ownership (TCO) Cost Model

The data obtained from the pilot study was fed into a detailed TCO cost model. The model was developed using multiple sources including more than 50 interviews with desktop outsourcing experts and 20 or more detailed reports on desktop management costs. Several Intel and A.T. Kearney subject matter experts, as well as the outsourcer, contributed to the development of the TCO cost model.

The TCO cost model considered two broad cost categories:

- "Hard" costs — hardware acquisition costs, maintenance costs and other quantifiable costs
- "Soft" costs — user productivity, down time, security breaches, delays, etc.

Figure 2 summarizes these cost elements.

Once the cost variables in the TCO cost model were defined, the team proceeded to conduct the pilot study and input the data into the TCO cost model.

**'Hard' Elements of TCO Cost Model**

| |
|---|
| **Support:** Software and hardware support, including help desks, desk-side visits and IMACs |
| **Deployment:** Activities related to getting new environment up and running |
| **COE Development:** Development of the consistent office environment (COE) for client |
| **Application Management:** Porting of legacy server applications to new desktop environment |
| **Software Acquisition:** Purchase or lease of software assets |
| **Hardware Acquisition:** Purchase or lease of hardware assets |

**'Productivity' Elements of TCO Cost Model**

| |
|---|
| **Insufficient Software on Desktop:** User productivity costs due to inability to collaborate or run latest versions of software |
| **Down Time / Lost Data:** Costs related to down time or lost data |
| **Security Costs:** Costs related to deploying security solutions for older machines |
| **Hourglass Time:** Costs related to user time spent on waiting for machine to complete processes |

Typically part of monthly per-seat charge

Typically part of lump-sum payment amortized over term of contract (except for leased equipment)

*Figure 2. Cost Elements of the TCO Cost Model*

## Pilot Study Results: Timing of Refresh

The results of the pilot study showed that a three-year refresh has a demonstrably lower TCO than a five-year refresh. Table 1 analyzes the various cost elements and how refresh timing relates to them.

| Cost Component | Three-Year Cycle Cost Advantage | Five-Year Cycle Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Frequency of help desk calls increases significantly in year 5. Therefore, the three-year cycle has a cost advantage. |
| Deployment | | ✓ | Deployments occur once per refresh. The five-year cycle reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development: Engineering consistent disk images | ✓ | | COE support costs tend to rise in year 5. Thus, the three-year cycle has a slight cost advantage. |
| Application Management | | ✓ | Applications need to be tested and in some cases ported once per refresh. The five-year cycle reduces the frequency of this process and is therefore lower cost. |
| Hardware &and | | ✓ | A staggered refresh has a reduced effect on cash flow. |
| Productivity Costs | ✓ | | All productivity costs favor a three-year cycle. |

*Table 1. Cost Advantage Comparison with Respect to Refresh Cycle*

Table 2 presents the quantitative comparisons between a three-year and a five-year refresh cycle. The cost-advantaged numbers in the table are blue.

Note that the total cost for a three-year refresh cycle saves between $450 and $500 per user per year compared to the five-year cycle. A company that employed 50,000 people could save up to $25M per year by using a three-year refresh cycle instead of a five-year refresh cycle — a significant savings!

| Cost Category | Three-Year Cycle ($/User/Year) | Five-Year Cycle ($/User/Year) |
|---|---|---|
| Support and Productivity Costs | 1152 | 1770 |
| Deployment | 83 | 61 |
| COE Development | 41 | 52 |
| Application Management | 600 | 585 |
| Hardware | 296 | 222 |
| Software | 200 | 150 |
| **Total** | **2372** | **2840** |

*Table 2. Quantitative Comparisons between Three-Year and Five-Year Refresh Cycles*

| Cost Component | Forklift Cost Advantage | Staggered Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Support costs are higher in the staggered refresh due to an inconsistent fleet. |
| Deployment | ✓ | | Deployments occur once per refresh, allowing outsourcers to take advantage of massive economies of scale resulting in "production line" level of efficiencies in deploying PCs. Also, the forklift refresh reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development | ✓ | | COE support costs are significantly higher in the staggered refresh due to the several environments that must be concurrently maintained. w |
| Application Management | ✓ | | Applications need to be tested, and in some cases ported, once per refresh. Therefore, the forklift refresh has a cost advantage. |
| Hardware and Software | | ✓* | A staggered refresh has a reduced effect on cash flow.<br>*However, this effect can be eliminated by leasing the hardware. |
| Productivity Costs | ✓ | | All productivity costs slightly favor the forklift refresh. |

*Table 3. Cost Advantage Comparison with Respect to Refresh Method*

## Pilot Study Results: Refresh Method — Staggered versus Forklift

The results of the pilot study showed that the forklift refresh has an advantage over the staggered refresh method. Table 3 analyzes the various cost elements and how the refresh method relates to them.

Table 4 presents the quantitative comparisons between a staggered and a forklift refresh. A staggered refresh assumes refreshing one-third of the fleet refreshed every year for three years, while the forklift refresh assumes the entire fleet is replaced every three years. The cost-advantaged numbers in the table are blue.

The differential represents a net present value (NPV) of $275 per PC over three years (utilizing a 10% discount rate).

| Cost Category | Forklift Refresh ($/User/Year) | Staggered Refresh ($/User/Year) |
|---|---|---|
| Support and Productivity Costs | 1152 | 1186 |
| Deployment | 83 | 120 |
| COE Development | 41 | 66 |
| Application Management | 600 | 611 |
| Hardware | 296 | 294 |
| Software | 200 | 191 |
| **Total** | **2372** | **2468** |

*Table 4. Quantitative Comparisons between Forklift and Staggered Refresh*

## Principal Cost Factors

The principal drivers for costs associated with older PCs include:

- Calls to the help desk, and length of call.
- PC down time.

Figure 3 shows how help desk calls increase significantly as a PC ages.

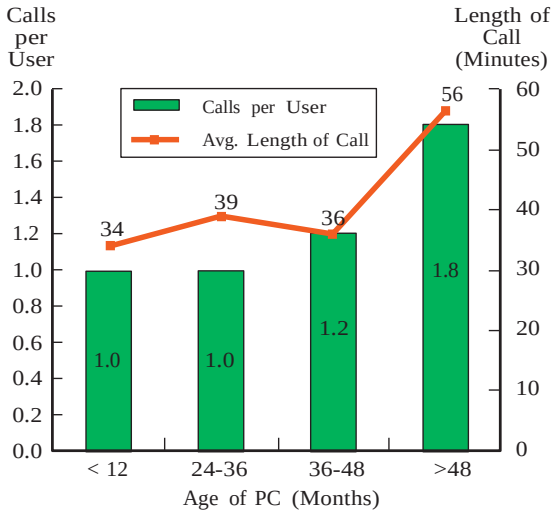



*Figure 3. Number of Help Desk Calls Related to Age of PC*

As displayed in Figure 3, users with desktop PCs more than four years old made twice as many help desk calls as did users with desktop PCs that were less than three years old. Users with older PCs also spent more time on the phone with the help desk. However, the number of help desk calls remained essentially constant for users with PCs that were between one and three years old.

Similarly, computer down-time increased significantly in year 5, as displayed in Figure 4.

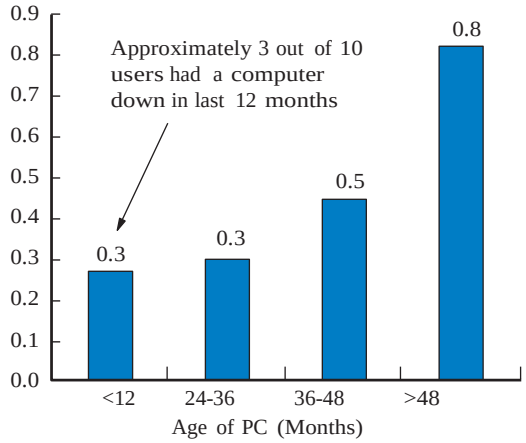



*Figure 4. Computer Down Time Related to Age of PC*

Figure 4 shows that for computers older than four years, down time was twice that of three-year-old computers. However, the down time remained constant for users with PCs that were between one and three years old.

Other cost factors, although not as significant as help desk calls and computer down time, include the following:

- Loss of data
- Security breaches

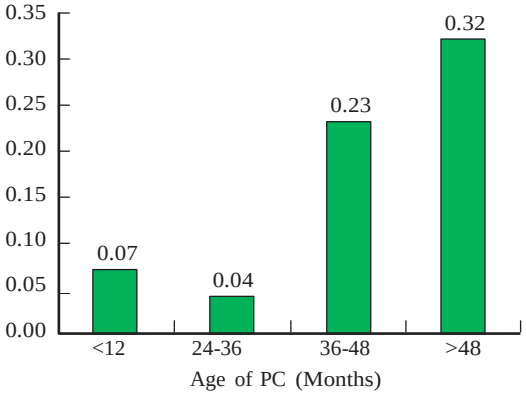



*Figure 5. Loss of Data Related to Age of PC*

Figure 5 and Figure 6 illustrate how these cost factors relate to PC age.

As displayed in Figure 5, users with PCs older than four years lost data three times more often than users with PCs that were less than three years old. In fact, the lost data occurrence rate was actually less in year 3 than it was in year 1.

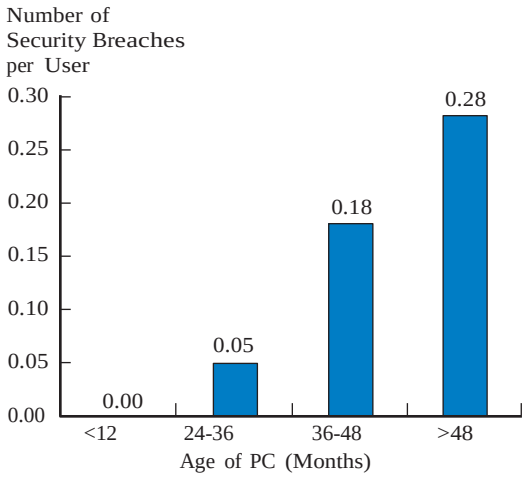



*Figure 6. Security Breaches Related to Age of PC*

Figure 6 shows that users with PCs older than four years had security breaches three times more often than users with PCs less than three years old.

## Conclusions for Outsourcers

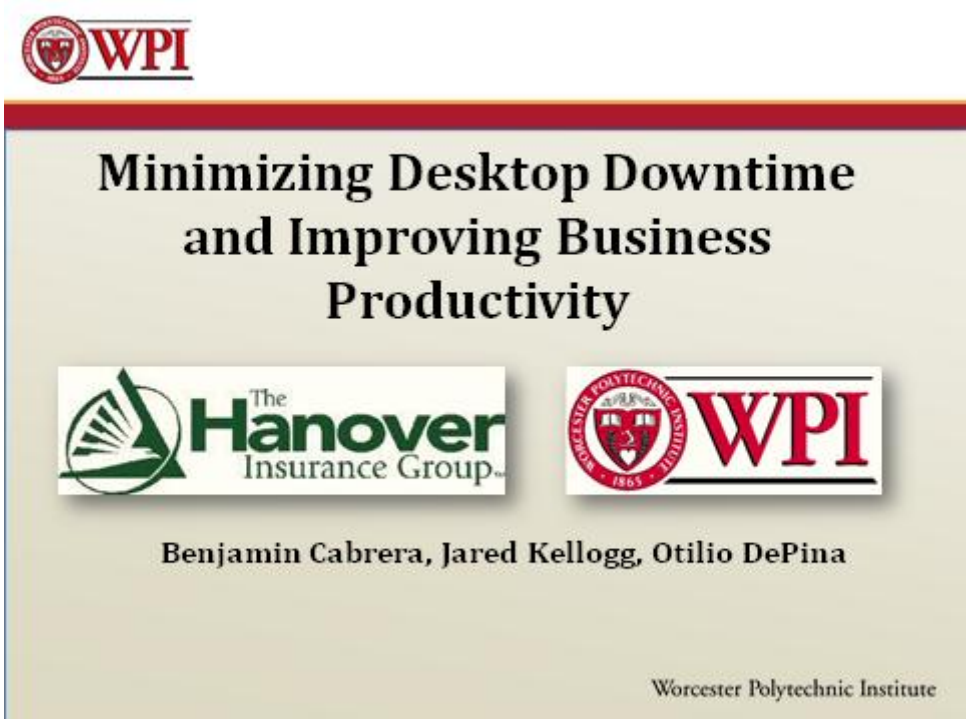
Some conclusions can be drawn from the data shown in Figures 3-6, both in terms of PC refresh timing and PC refresh method.

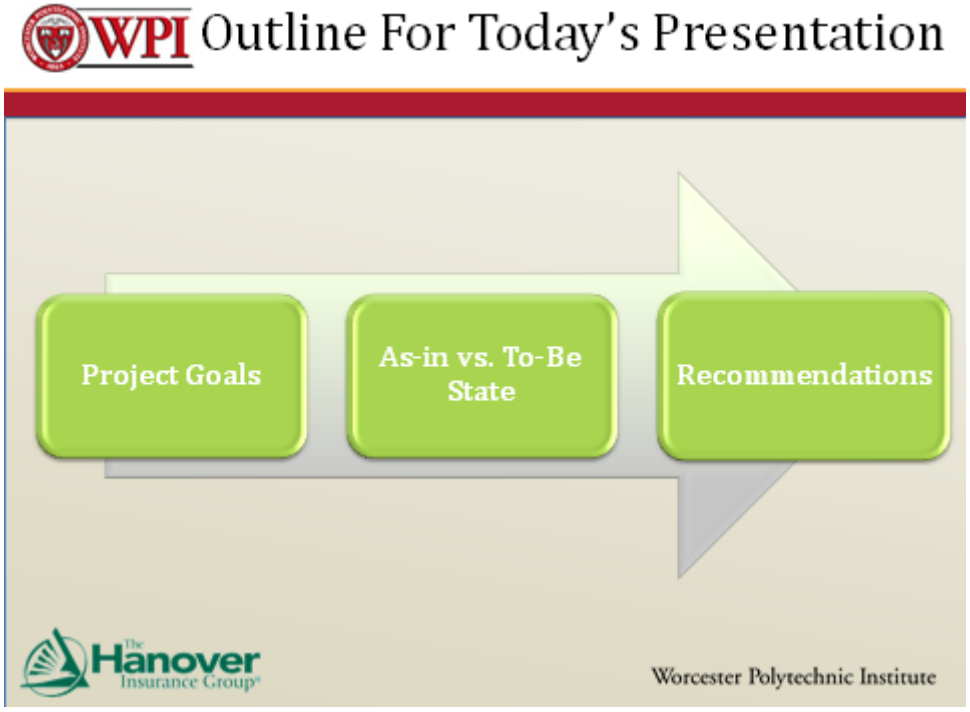
Refresh Timing: There is a significant savings opportunity for outsourcers if they can convince clients to move to shorter refresh cycles. Two reasons for this are:

- Outsourcer costs associated with a three-year refresh cycle are significantly less than costs associated with a five-year refresh cycle.
- Many outsourcer contracts have a flat-fee component, where the revenue for the outsourcer is constant regardless of the number of support calls. Therefore, a reduced number of help desk calls will increase margins for the outsourcer. A three-year refresh cycle provides the least number of support calls per user.

Refresh Method: Similarly, a forklift (all-at-once) refresh results in lower TCO for outsourcers.

- The difference in cost between the forklift and staggered methods is more pronounced when the client has a diverse PC population.
- While an outsourcer can pass on some of the cost increase to its customers, the outsourcer is nevertheless likely to incur decreased margins by avoiding forklift refresh


WPI
Minimizing Desktop Downtime and Improving Business Productivity
The Hanover Insurance Group
WPI
Benjamin Cabrera, Jared Kellogg, Otilio DePina
Worcester Polytechnic Institute


WPI Outline For Today's Presentation
Project Goals
As-in vs. To-Be State
Recommendations
The Hanover Insurance Group
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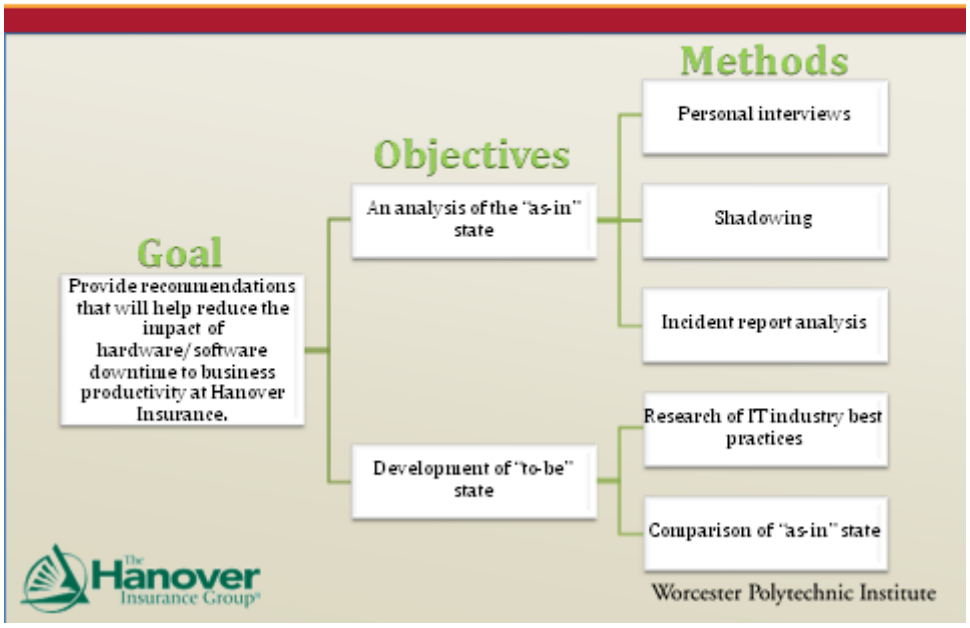
## Project Goal and Objectives




## Current "As-in" vs. Best Practices for a "To-be" state

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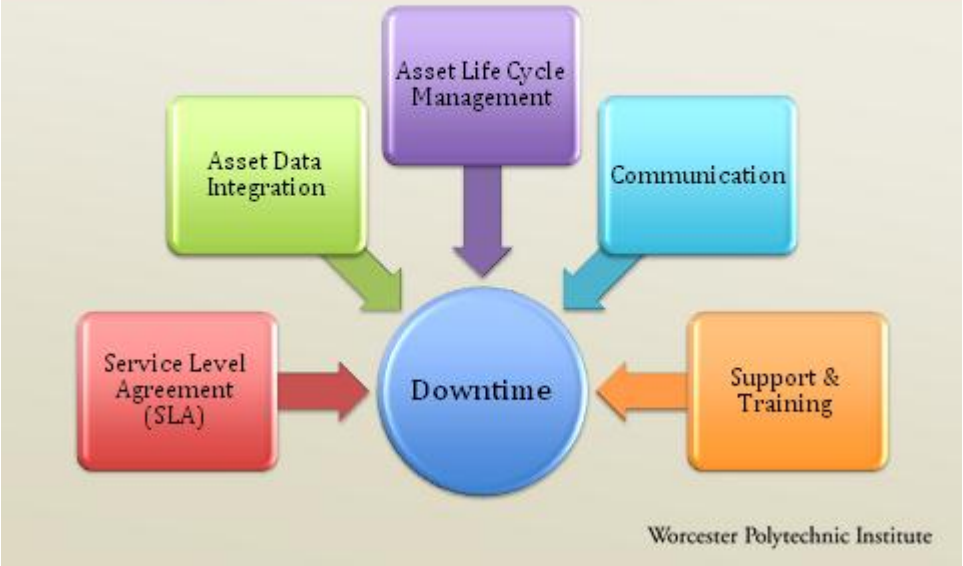
## Areas of Analysis




## Service Level Agreement (SLA)

| Current "As-In" | | Best Practices for "To-Be" | |
|---|---|---|---|
| Currently, issues are categorized into priority levels 1-7 | | Further prioritization of priority level 3 | |
| P3 is the most frequently filed ticket that relates to downtime | All individual tickets are treated the same | An individual problem can contain a "high business risk" | Technician Efficiency |

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## WPI Asset Data Integration

| Current "As-In" | Best Practices for "To-Be" |
|---|---|



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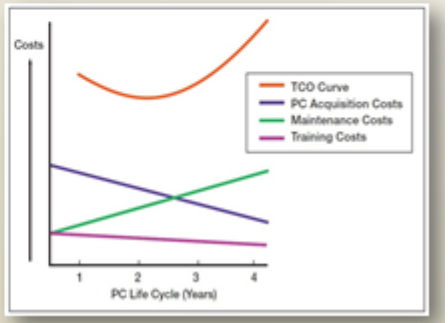
## WPI Asset Life Cycle Management

| Current "As-In" | Best Practices for "To-Be" |
|---|---|

- Four year refresh cycle
- Under a three-year warranty policy from HP
- Gravitation towards flexible and mobile assets

- A decreased life cycle span to accommodate for the increase in maintenance cost over time

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## WPI Refresh Cycle Policy

| Cost Component | Three-Year Cycle Cost Advantage | Five-Year Cycle Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Frequency of help desk calls increases significantly in year 5. Therefore, the three-year cycle has a cost advantage. |
| Deployment | | ✓ | Deployments occur once per refresh. The five-year cycle reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development: Engineering consistent disk images | ✓ | | COE support costs tend to rise in year 5. Thus, the three-year cycle has a slight cost advantage. |
| Application Management | | ✓ | Applications need to be tested and in some cases ported once per refresh. The five-year cycle reduces the frequency of this process and is therefore lower cost. |
| Hardware &and | | ✓ | A staggered refresh has a reduced effect on cash flow. |
| Productivity Costs | ✓ | | All productivity costs favor a three-year cycle. |

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## WPI Productivity Cost

**'Productivity' Elements of TCO Cost Model**

**Insufficient Software on Desktop:**
User productivity costs due to inability to collaborate or run latest versions of software

**Down Time / Lost Data:**
Costs related to down time or lost data

**Security Costs:**
Costs related to deploying security solutions for older machines

**Hourglass Time:**
Costs related to user time spent on waiting for machine to complete processes

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## WPI Forklift Vs. Staggered Approach

| Cost Component | Forklift Cost Advantage | Staggered Cost Advantage | Notes |
|---|---|---|---|
| Support | ✓ | | Support costs are higher in the staggered refresh due to an inconsistent fleet. |
| Deployment | ✓ | | Deployments occur once per refresh, allowing outsourcers to take advantage of massive economies of scale resulting in "production line" level of efficiencies in deploying PCs. Also, the forklift refresh reduces the frequency of deployments and hence lowers costs. |
| Consistent Office Environment (COE) Development | ✓ | | COE support costs are significantly higher in the staggered refresh due to the several environments that must be concurrently maintained. w |
| Application Management | ✓ | | Applications need to be tested, and in some cases ported, once per refresh. Therefore, the forklift refresh has a cost advantage. |
| Hardware and Software | | ✓* | A staggered refresh has a reduced effect on cash flow.<br>*However, this effect can be eliminated by leasing the hardware. |
| Productivity Costs | ✓ | | All productivity costs slightly favor the forklift refresh. |

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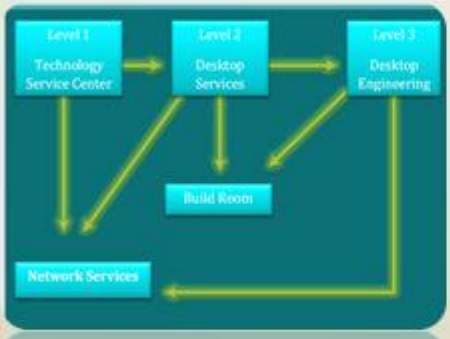
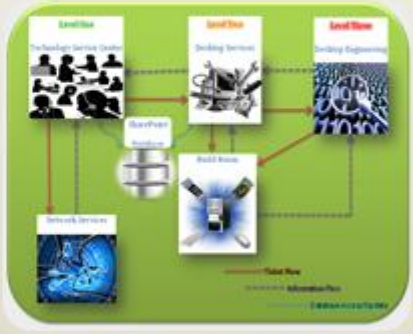
## WPI Communication

**Current "As-In"** | **Best Practices for "To-Be"**



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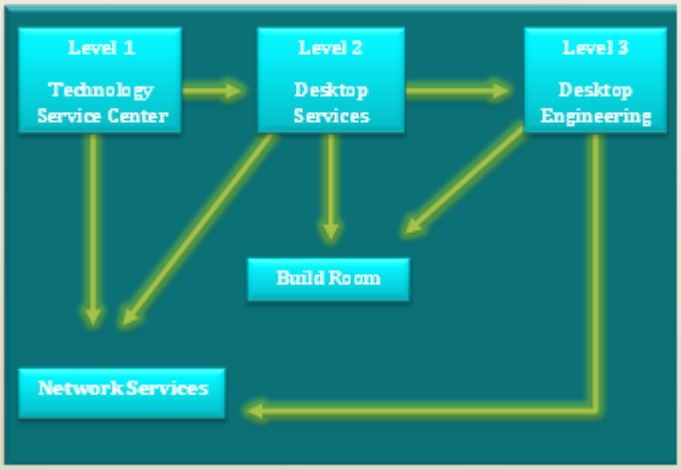
## WPI Communication – As-In

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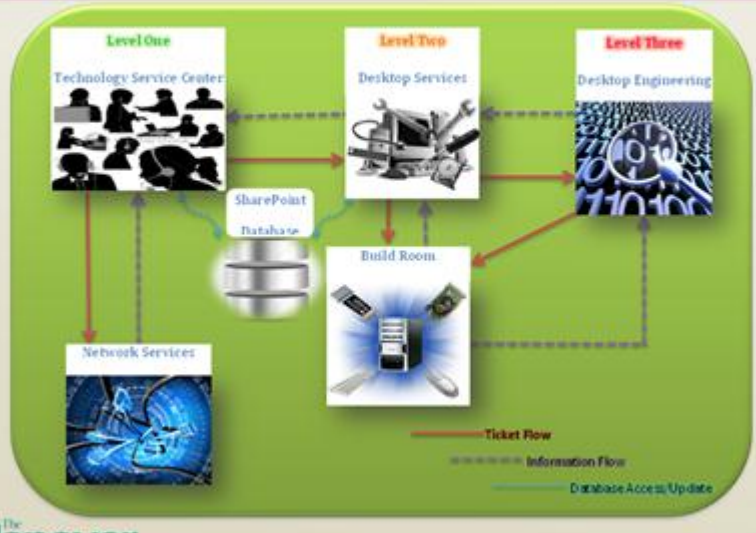
## WPI Communication - To-Be

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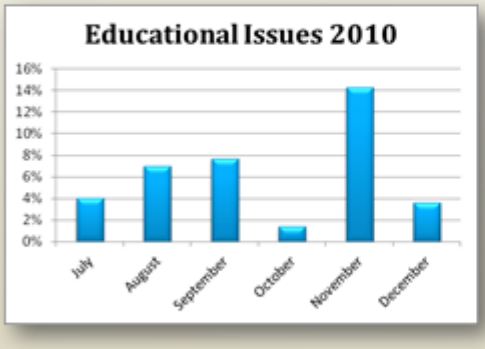
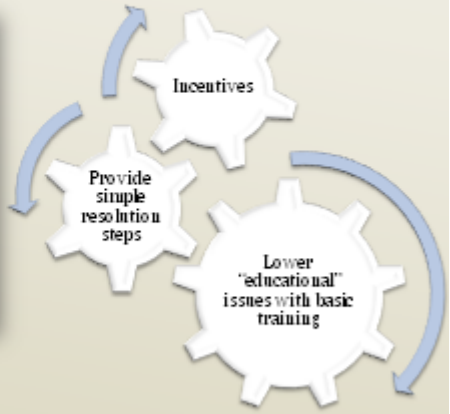
## WPI Support & Training

| Current "As-In" | Best Practices for "To-Be" |
| --- | --- |

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# Recommendations

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## Asset Life Cycle Management

Adjust refresh cycle time to three years

Accommodates the increased cost of maintenance


Aligns with current warranty

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## Redefining Priority Level 3

**P3**

| Severity Level | Description | Resolution Time |
|---|---|---|
| Critical Severity | The user can not conduct critical business operations that will result in a significant loss of revenue, profit or productivity | 3 hours |
| High Severity | When there is a partial or potential system or application outage | 4 hours |
| Medium severity | The problem does not severely impede the user's ability to conduct business and/or it can be circumvented | 6 hours |
| Low Severity | Does not directly affect the user's productivity or system or application availability | 8 hours |

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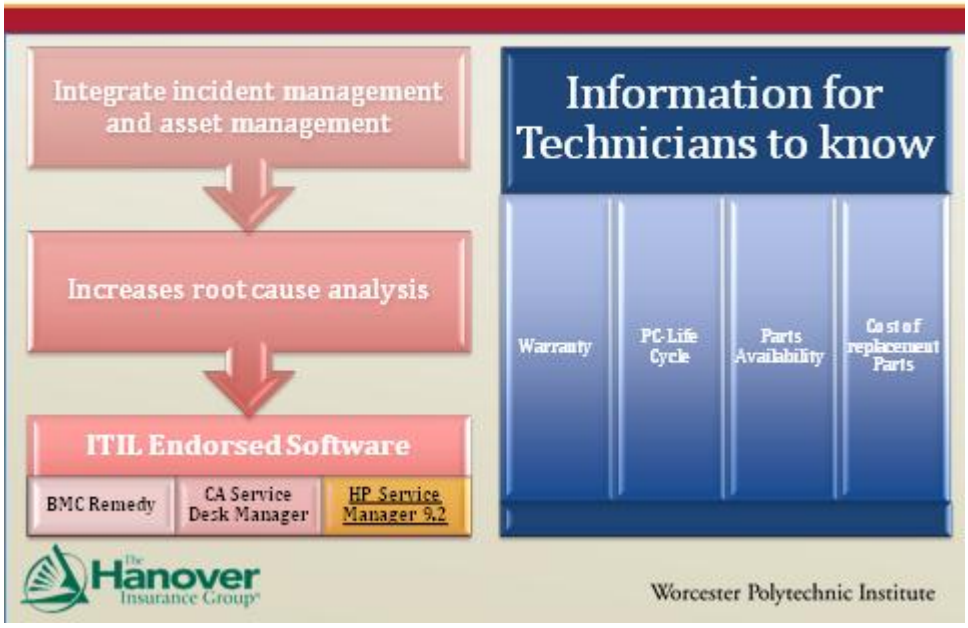
## WPI Asset Data Integration




## WPI Communication

## WPI Support & Training


## WPI Recommendations

| Topic | Recommendations |
|---|---|
| Asset Life Cycle Management | Change life cycle policy to three years that mirrors the three-year warranty |
| Asset Data Integration | Combine incident management and asset management into one database<br>Potential Software: HP Service Manager 9.2 |
| Interdepartmental Communication | Have monthly meetings for between TSC and DTS employees |
| Documented Communication | Actively update and Consistently use SharePoint Site to share ticket data and resolutions |
| Service Level Agreement | Redefine priority level three into; critical, high, medium, and low severity |
| Resources & Training | Hold PC Maintenance workshops and provide desk-side bulletins to employees |

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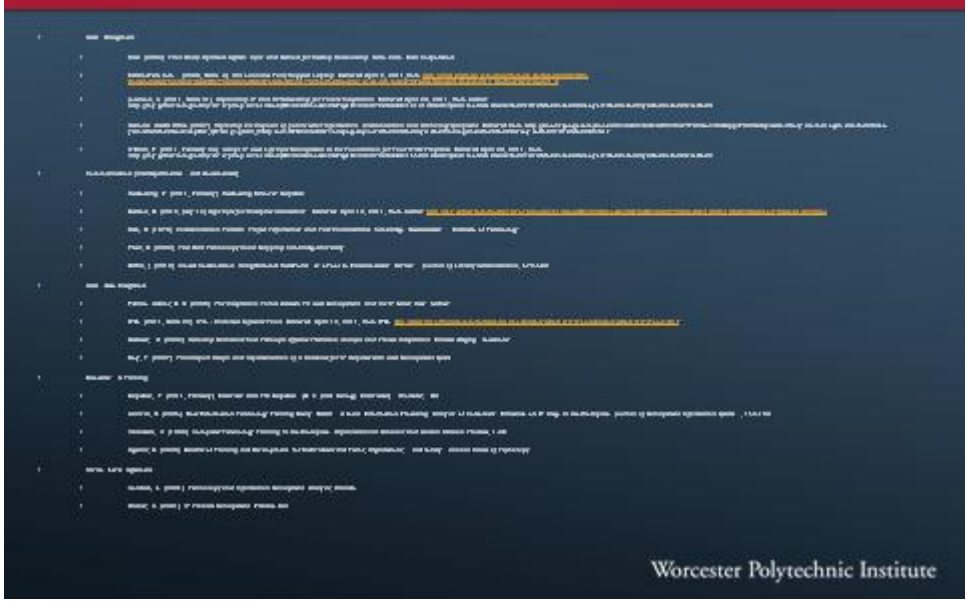
## References Used





## Any Questions?