IPRO 305 Impact of Emerging Internet Trends on the Media Space
INTERPROFESSIONAL PROJECTS PROGRAM

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1. Abstract

The objective of IPRO 305 is to understand the usage of deep-rooted as well as emerging applications and trends that will drive internet usage over the next 3 to 5 years. These applications and trends need to be personified in terms of various classes of users that will co-exist and the potential use by each.

IPRO 305 is working with Comcast in order to help identify and shed some additional light to the emerging technologies that will further increase the need for Comcast to provide more and more bandwidth to its consumers.

The overall increase in consumption of internet bandwidth as well as the need for ever-increasing speeds may require ISPs (Internet service providers) to embrace technologies beyond what is currently envisioned as the industry evolves from broadband technologies to wideband technologies.

A survey was taken and sent out to approximately 2000 individuals. This was accomplished through a social networking site, Facebook, as well as e-mail lists from cooperating faculty members that advise students on future coursework.

When respondents were asked of their daily usage of the internet as a whole, there were two main sections that stood out. The majority of those surveyed fell in the four to five hour range followed closely by those who spent more than seven hours online doing various internet related things.

Regarding the applications looked into as potential future “strains” on the internet, we asked respondents about their usage within a range of different applications. These applications are Voice over IP (VOIP), instant messaging, social networking (i.e. Facebook, Myspace), email/internet, peer to peer (P2P), online gaming, streaming video, standard definiton video, and HD video.

Results show that people spend a significant amount of time on the internet doing a wide variety of things. Due to the internet speeds becoming faster to the consumer, people are spending more and more time with email and browsing websites and using social networking. People are connecting with others by using instant messaging as a real-time text way to communicate also. Streaming video is becoming more popular as users watch Youtube videos and news clips, and users are downloading more and more files such as programs and movies.

Separate research performed in order to gather insight from others, yield a similar result. Cisco Systems suggests that within just three years there will be a six-fold increase in internet video being watched by users on the internet. They also suggest that there will be a 46% increase in total internet traffic in five years. The top 100 websites compiled by Alexa.com consist of a wide variety of content. The top five—in descending order—are Google, Yahoo, Myspace, Youtube and Facebook. Of the top 100, there are many online retailers such as Best Buy and Amazon.com, and there are several auctioning and information sites such as ebay and craigslist (eighth and eleventh on the top 100, respectively). Also listed in the top 100 are several adult video websites, video sources from news, sports, and weather institutions, streaming movies and television shows provided by hulu.com, and Bittorrent sites like The Pirate Bay and isohunt.

2. Background

Comcast was founded in 1963 as a single system cable operation. Today, it is the largest cable providing company delivering entertainment and communications products and services, with 24.6 million cable customers, 14.4 million high-speed Internet customers and 5.6 million voice customers (Comcast).

In order to satisfy the Internet demand in the coming years, it's critical to project a reasonable and practical overview of Internet usage trends. Therefore, the IPRO team is formed to analyze the past and current Internet growth, and understand the usage of deep-rooted as well as emerging applications and trends that will drive internet usage over the next 3 to 5 years based on data collected in various channels. In technical measurement, the analysis is focused on the growth of the bandwidth consumption in terms of different applications and demographic groups.

The diversity stands out as the internet evolves. Because of the internet having an exponential growth since the early days of consumer adoption, we have moved well beyond web browsing, small ftp file transferring and email as a main consumption of bandwidth that the ISP supplies the customer. A few starting points such as peer to peer networking and internet based video are rapidly increasing in popularity and are accounting for more and more bandwidth consumption on a daily basis. Bittorrent (Peer to Peer) traffic is consistently increasing in the amount of data it can give to its users. There is an equivalent of about 500 million DVDs worth of data that traverses the peer to peer network every month. That figure is equivalent to two exabytes or an equivalent of two billion gigabytes of data over the network in one month. Internet video is also another large part of the bandwidth that is consumed over the network. Already, internet video accounts for ¼ of all internet traffic whether it is YouTube or AOL Video.

Here is a listing of a brief competitor overview and their offerings:

Comcast Offerings

	Plans	
	Base	**Upper***
Bandwidth	5-6 mbps	8 mbps
	12 mbps	16mbps
		22mbps
Price	42.95-56.00	52.95-65.00
Limit	250gb transfer monthly	

*Upper tier plans are only available in some areas.

Competitor Overview

We reviewed major internet providers' current profile. Comcast differentiates itself from its competitors by its technology and service set.

	Down	Up	Service Type	Price
AT&T	768 kbps	128 kbps	DSL	$10.00[1]
	768 kbps	128 kbps	Basic DSL	$14.95
	1.5 mbps	398 kbps	Express DSL	$25.00
	1.5 mbps	1 mbps	Express DSL w UVerse	$25.00
	3.0 mbps	512 kbps	Pro DSL	$30.00
	3.0 mbps	1 mbps	Pro DSL w Uverse	$30.00
	6.0 mbps	768 kbps	Elite DSL	$35.00
	6.0 mbps	1 mbps	Elite DSL w Uverse	$35.00
	10 mbps	1.5mbps	Max DSL	$55.00
Verizon	3 mbps	768 kbps	DSL	$29.99
	768 kbps	128 kbps	DSL	$19.99
	10 mbps	2 mbps	FIOS	$42.99 – 47.99
	20 mbps	5 mbps	FIOS	$52.99-57.99
	20 mbps	20 mbps	FIOS	$64.99-69.99
	50 mbps	20 mbps	FIOS	$139.95 -144.95
TimeWarner	768 kbps	128 kbps	Cable - Road Runner Lite	$26.95
	2 mbps	256 kbps	Cable - Road Runner Base	$29.95
	7 mbps	512 kbps	Cable - Road Runner Upper	$42.99 – 47.99
	15 mbps	768 kbps	Cable - Road Runner Turbo	$51-56.99
RCN	5 mbps	800 kbps	Cable - Mega Modem Mach 5	$24.95
	10 mbps	2 mbps	Cable - MegaModem Mach 10	$59.95
	20 mbps	2 mbps	Cable - MegaModem Mach 20	$99.95
COX	7 mbps	512 kbps	Cable - Preferred	$44.99
	12 mbps	1 mbps	Cable - Premium	$59.99

[1] Available through special contract

http://www.thelist.com/misc/usa/broadband/a-c.html

Customer profiles in the marketing place

By breaking the US population down into separate demographic groups, and making use of data to ascertain the popularity of different online activities of these groups, together with knowledge of the bandwidth requirements of these activities, a theoretical forecast of future bandwidth requirements per household can be derived.

According to a recent survey by Pew Internet & American Life , usage of online activities that require the greatest bandwidth, namely online gaming and the downloading of videos and music, are dominated by two demographic groups; online teens (users aged between 12 and 17) and Generation Y (users aged between 18 and 28). The percentage of a particular demographic group that is online that uses the internet to play games online, for example, is directly proportional to its age. Online teens and Generation Y play games online at rates of 81% and 54%, respectively, while only 29% of users aged between 41-50, and 25% of those aged between 60 and 69 engage in the same activity.

Over the next 3 – 5 years, as current members of the two youngest demographic groups age, many of them will join older demographic groups and may have obtained greater purchasing power, and the usage of bandwidth hungry application of online users aged between 18 -28 will increase. Simultaneously, a new generation of online teens will have replaced them, and they will most likely have the same participation rates in online gaming, music downloading etc. as their predecessors. Also the percentage of people aged between 18 and 29 that use the internet will have increased. According to another survey by Pew Internet & American Life the percentage of people aged between 18 and 29 that use the internet increased from 69% to 84%.

However, the use of the internet by the oldest demographic groups should not be ignored. The greatest increase in the proportion of a particular demographic group using the internet between 2000 and 2005 was that of people aged over 65. When connected, they are doing a lot more than sending emails; they are using search engines, gathering health-related information, making travel plans, handling their finances, paying bills and purchasing products. And as mentioned before, one in four is even gaming. Their use of the internet for many online activities is very similar to younger demographic groups.

Due to respective growth speeds of several factors in the changing of internet usage, the bandwidth consumption may end up with doubling or even larger increase in the near future. The growth of a specific internet usage is influenced by the increase of the demographic group, the increase of the adoption rate of the application, the bandwidth that the application is going to consume, and the general internet growth. With the data we got from both primary and secondary researches, we evaluated element by element to statistically process the data to reach a feasible prediction for major applications. We also looked into the impact of general usage trends. To achieve these goals, we do comprehensive secondary researches, contact professionals and companies that have already dealt with the data, design and conduct surveys focusing on the major demographic users that we are looking into.

We paid close attention to the ethical concerns that we would deal with to carry out researches. The team uses only lawful methods to complete researches and study with respect to all the parties involved. We conduct surveys with honesty and take responsibility of protecting confidential information from outside parties. We comply with scientific rules and industry standards to study the data. We develop hypothesis based on only factual data and reasonable analysis. Lastly, we identified ethical concerns for each of the seven layers of integrity regarding to ethical issues.

3. Objectives

- To conduct a study to predict the trend in internet traffic over the next 3-5 years to enable the project sponsor, Comcast, to adequately satisfy consumer demand for emerging technologies during that time period.

- To conduct surveys of IIT students to predict the trends of potential future customers of Comcast in their use of the internet.

- Research into new internet applications, their bandwidth requirements, and their impact on internet data traffic over the next 3-5 years.

- To analyze the data of the surveys to make a prediction of new internet applications that will dominate internet data traffic in the future, and to predict increases of popularity of different internet applications.

4. Methodology (Also, see appendix 2)

- Initial Concept

After some initial planning sessions, we formulated our initial concept for generating our report. This would contain two separate process trees – the primary and secondary research section followed by a data analysis and interpretation stage. The justification for this was that in order to make the most accurate prediction of trends, it would be necessary to get as recent as possible data; thus, performing primary research was imperative. However, we would not have access to all the resources we would need in order to get as much data as possible directly, thus secondary research was also necessary.

- Primary Research Goals

The primary research task force had three active goals which were as follows:

- Survey current internet users in order to ascertain popular internet trends as they stand today.
- Contact relevant IT specialists and conduct interviews in order to gain a professional opinion of changing internet usage as well as contacting and interviewing corporate technology departments to determine current usage and relevant technologies.
- Identify new technologies and analyze their value and potential for becoming major forces in how the internet is used.

- Primary Research Strategy:

The three tasks given made it necessary to perform several steps. These steps, their initial strategy and any strategic changes made were as follows:

- Surveying
  - Determine important factors and compose a survey to address those. This was completed via a set of group meetings and discussion as intended.
  - Identify target audiences and devise a method to distribute survey to those. This was completed by assessing our distribution options, the final methods were settled as internet distributed and through available campus groups by paper.
  - Data was to be compiled from the different sources and presented in an organized fashion to the collection and interpretation group. This was completed as intended.

- Interviewing
  - Identify and contact professionals in the field who will be able to be interviewed regarding internet trends. Methods used towards this end varied as contacting and finding willing subjects was more difficult than initially expected
  - Where possible, interviews were conducted. As we encountered problems, the strategy was adjusted to attempt to acquire brief, but relevant statements from a company rather than any extensive interview.

- Identification
  - Technologies were assessed and impressions were passed forward to the collection group.

- Secondary Research Goals

  The goals of the secondary research team were as follows:

  - Determine the most high profile and relevant applications and their progressing use.
  - Gather actual technical data matching profiles of survey groups that are categorized based on demographics and applications.
  - Keep track of future technology advancements.

- Secondary Research Strategy:

  In order to complete their three tasks, the secondary research group performed these steps:

  - Top Applications
    - Each group member will identify their most major applications. This was performed individually and completed as intended.
    - The resulting data would be compared and all the most important applications from the members lists as well as further discussion would be analyzed and researched in order to determine current proliferation, how quickly expansion of the application is currently happening and whether or not it is likely to increase or decrease in the future. For all the determined applications, the necessary data was gathered and the secondary research team did not encounter any notable problems in this task.

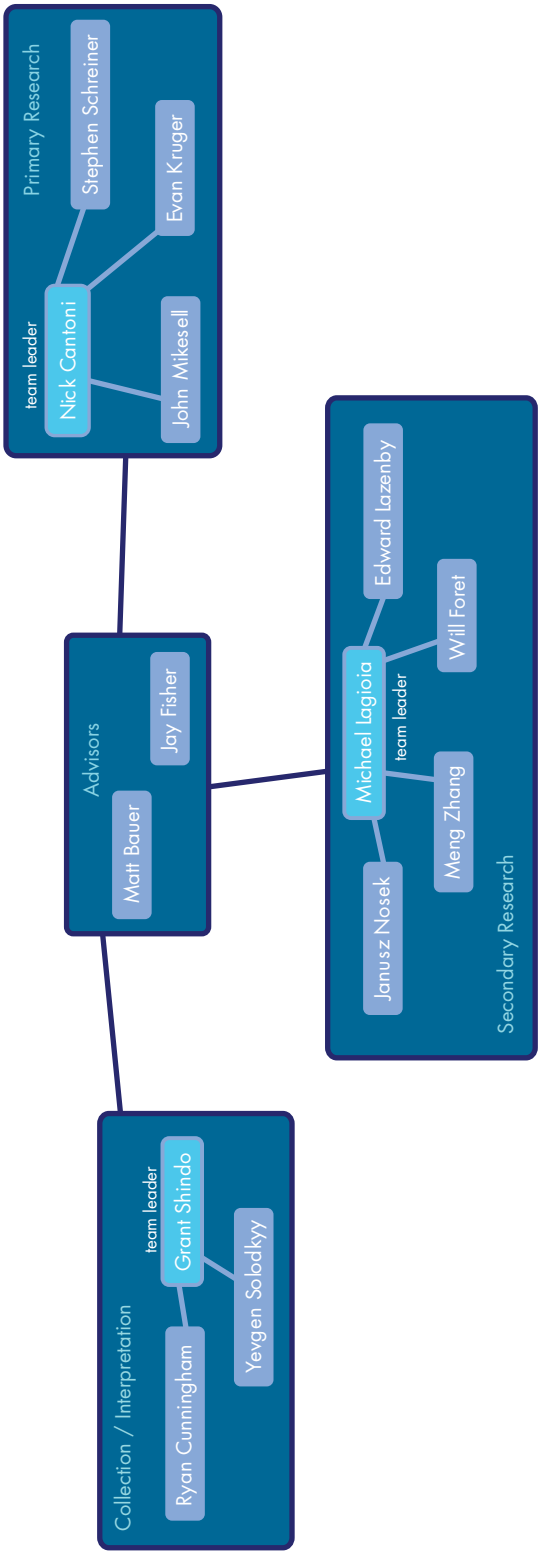
  - Demographic Data
    - Formulate strategies for determining demographic data. This was done through discussion of the options and selecting a couple strategies.
    - Research figures and statistics relevant to the needed data and contact organizations regarding any available data they had compiled. This was completed through standard research by locating published statistics and through contacting organizations such as OTS, which were able to provide their monitored data regarding the college demographic.

  - Future Technology
    - Similar to the primary research team, they identified and researched and current and upcoming technologies for their viability. These impressions were passed on to the collection team for analysis.

  - Collection/Interpretation
    - The Collection and Interpretation team compiled and analyzed the data provided to them.
    - Different attempts at modeling the data were made, but the strategy required revision until the current result set was decided upon and formed.

- Using the various data provided to them, the Collection and Interpretation team generated the resulting report regarding current usage and predicted trends which may occur in the next three to five years, as specified by the sponsor of the task.

5. Team Structure and Assignments



At the beginning of the semester, the groups agreed that our project could be done most efficiently by separating ourselves into three sub-teams: primary research, secondary research, and collection/ interpretation. The following should shed light on why our IPRO decided to split into three teams, as well as the tasks each sub-team worked on throughout the semester.

- Primary Research:
  - Nick Cantoni (4th year Computer Science Major and Psychology Minor)
    Sub-team leader and IPRO305 team leader on alternating weeks.
    Worked on establishing contacts with housing department concerning survey and also distributed survey to fraternities/ sororities. Nick presented midterm report.

  - Jonathan Mikesell (4th year Electrical Engineering Major)
    Worked on survey template, distributed survey (in MTCC) and contacted businesses for relative information.

  - Evan Kruger (4th year Humanities Major and Sociology Minor)
    Revised survey, contacted businesses for pertinent information, distributed survey (via Facebook), and packaged final report.

  - Stephen Schreiner (4th year Computer Information Systems Major and ITM Minor):
    Worked on survey and establishing business contacts.

- Secondary Research:
  - Michael Lagioia (4th year ITM Major)
    Sub-team leader and IPRO 305 team leader on alternating weeks for first half.
    Full-time IPRO 305 team leader for second half.
    Provided tasks and direction to the team in order to accomplish both the IPRO assignments but also ultimately have a competent report for Comcast.
    Presented midterm report, researched pertinent data/ metrics for collection/ interpretation team, produced several market research reports.

  - Janusz Nosek (4th year Computer Science Major)
    Obtained HP and CacheLogic research data, created posters, researched competitors, created IPRO 305 logo, created powerpoint layout and packaged final report.

  - Edward Lazenby (4th year Electrical Engineering Major)
    Worked on ethics statements and telepresence.

  - Meng Zhang (4th year ITM Major and Business Minor)
    Took meeting minutes, researched internet applications and relative data.

- William Foret (4th year ITM with focus on System Administration)
  Created Gantt Chart, researched P2P and VOIP networking, and analyzed bandwidth usage (peaks and averages) pertaining to bittorent and gaming applications (i.e. Xbox live).

- Collection/ Interpretation
  - Grant Shindo (4th year Psychology Major)
    Sub-team leader and part-time IPRO 305 team leader for first half.
    Provided tasks and direction to the team in order to accomplish both the IPRO assignments but also ultimately have a competent report for Comcast.
    Aministered survey distribution in fraternities.

  - Ryan Cunningham (4th year Computer Science Major)
    Worked on and researched streaming video statistics (i.e.YouTube) and analyzed survey data.

  - Yevgen Solodkyy (4th year Electrical Engineering Major, Physics BS)
    Completed Ethics statements, worked on YouTube model, analyzed survey data.

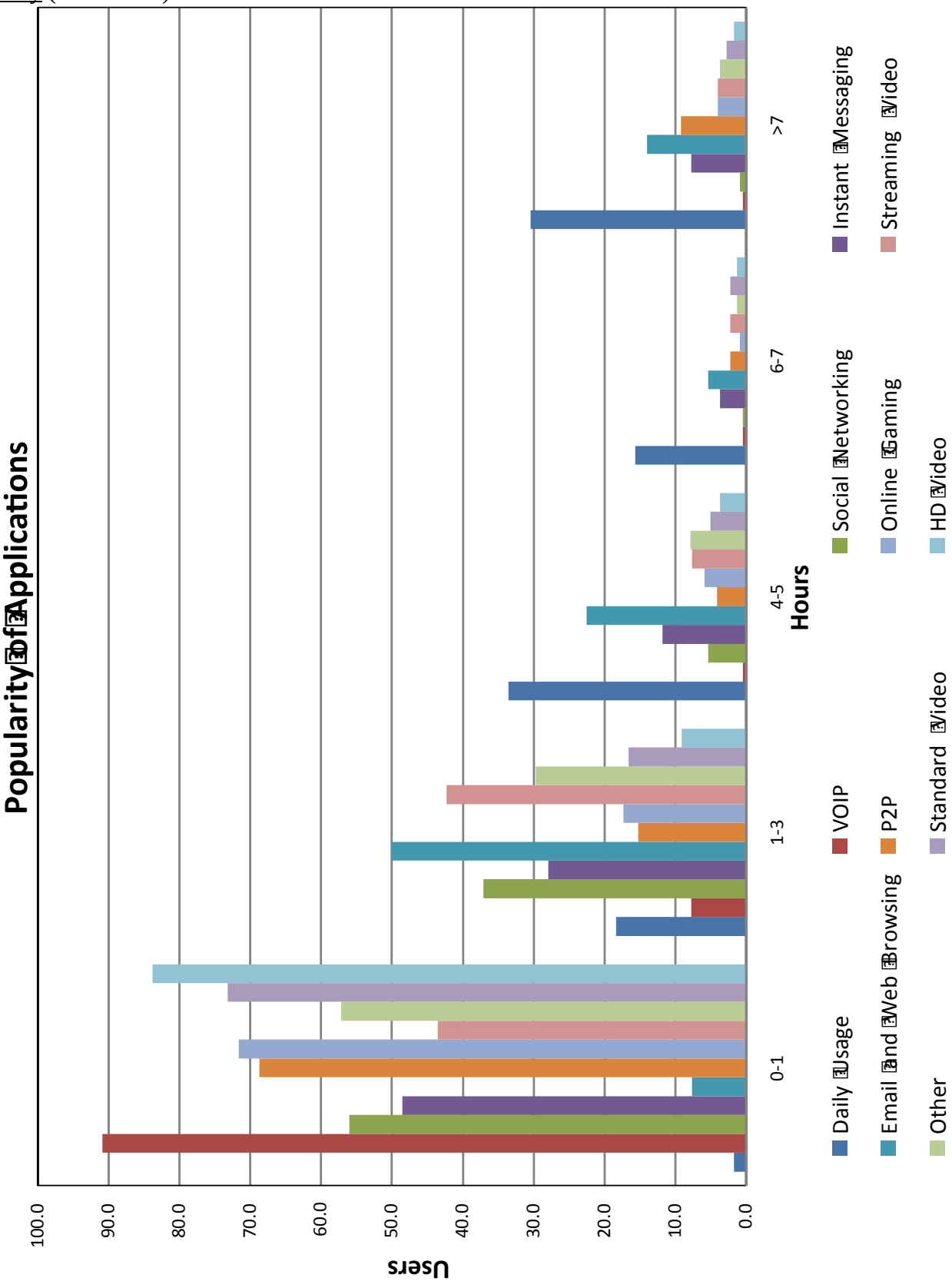
- Advisors
  - Jay Fisher (Adjunct Professor, Chemical Engineer)
  - Matt Bauer (Senior Lecturer, Computer Science)

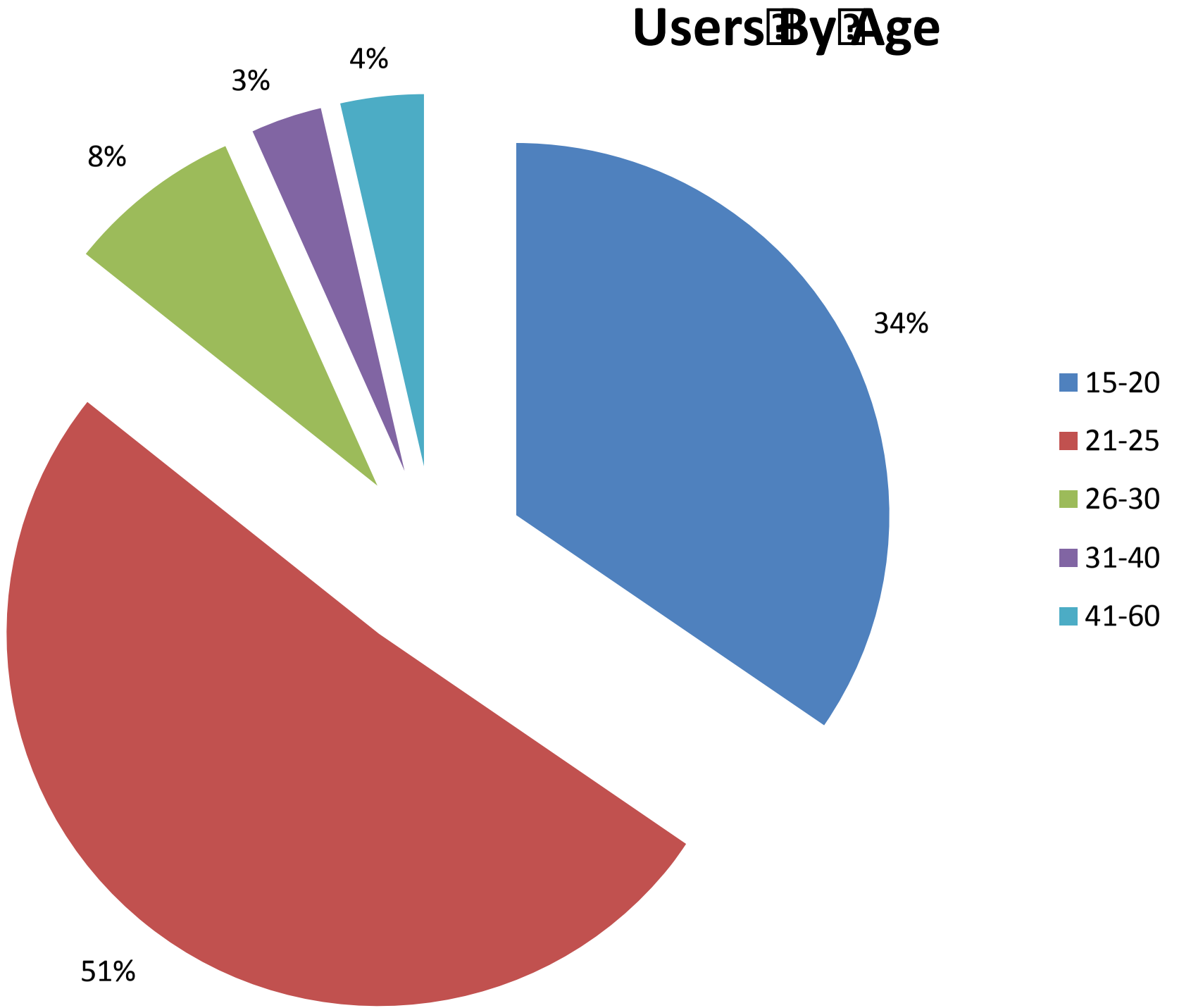
6. Budget

Item	Quantity	Price
Photocopying	500 copies	$50.00
Paper		$40.00
Mailing		$20.00
Transportation		$30.00
Team Building		$70.00
IPRO day fund		$120.00
Pens		$20.00
Survey fund		$150.00
TOTAL		**$500.00**

7. Results

Survey (See Below):




Users By Age
4%
3%
8%
34%
51%
15-20
21-25
26-30
31-40
41-60

- Age Considerations:

The most responses came from the 21-25 year old age group, with the second most coming from the 15-20 group, with the other groups contributing very few responses. This is probably because the 15-25 year olds are mostly still students, whether graduate or undergraduate, which: increases the chance of feeling empathy for the group conducting the survey; increases the significance of the cash prizes used as incentive, as these individuals typically have a low income; and makes the requests to participate in the survey from department heads more influential. Furthermore, the majority of the recipients of prompts to participate, whether online or in person, were in this age group. 15-25 year olds are among the heaviest users of the Internet, and therefore it would be more likely for them to encounter and adopt new Internet applications.

- Other Demographic Information:

The survey also was far more likely to be taken by students and alumni from the Computer Science and Information Technology Management departments, as those departments cooperated the most fully and, perhaps, also because those students were more familiar with online surveys. As a consequence, our data reflects those groups most closely. Those groups are immersed in computer software and the Internet on a daily basis both during their respective educations and their careers, and, in addition, it is probable that an earlier interest in and talent with such things which propagated during spare time played a causal role in choosing their field. Thus, they represent one of the most likely groups to be capable of quickly mastering and utilizing new Internet applications.

- Exponential Decay Pattern:

The bar distribution for Online Gaming is typical of most of the applications we inquired about, with a distinct dropping off with a slowing slope (exponential decay). Often, the 7+ group was rather large in relation to the 6-7 group, but if we had put more categories on the survey to subdivide that category in two hour increments, then each increment would be expected to be lower in incidence than the previous one.

- E-mail and Web Browsing:

In e-mail and web browsing, the most broad and mainstream of all the categories of applications, we observed a different pattern. The 0-1 group is very small, and the exponential decay doesn't begin until after the 1-3 hour group. Moreover, the 7+ group is very large, indicating that many more significantly populated subdivisions could be made after this point.

- Daily Usage:

The most significant deviance from the exponential decay pattern was observed in daily total Internet usage. In this case, the results more resemble a bell curve with a peak in the 4-5 hour group and, in this case more than any other, there would have been many well-populated further gradations if more groups beyond 7 hours were considered.

We believe that the pattern followed by the chart of daily usage is the form that would be approximated by an application that has reached its full potential; however, it is likely also true that no application will ever truly attain such. Email and Web Browsing comes the closest, which is not surprising, given that these are the most rudimentary and longstanding uses for the world wide web. In order of closeness to this pattern follow Streaming Video, Social Networking, Instant Messaging, Online Gaming, Downloading Standard Definition Videos, Peer to Peer Filesharing, Downloading HD Videos, and VOIP. However, none of these applications is anywhere near as close to the 'ideal' pattern as is Email and Web Browsing, indicating that none of them are close to what they could potentially be when and if they become mainstream.

It is surprising that even in the group surveyed this would be true, given that future and current information technology professionals would be expected to be very savvy with such things. Considering that, we project that it is very unlikely that less technically oriented people will be using any of those applications to their potential, and they also probably have not fully matured in their use of email and web browsing. The good news in this is that there is tremendous room for growth: even in our sample of relatively heavy users, at least 25.98% of respondents reported that they would use any application more in the future than they do currently, and for Email and Web Browsing the figure is 79.13%.

But how much will any given figure grow? It is obvious that any given application's use is dependent on total time spent online, though in the modern, progressively more post-dialup, age, it is no longer how much time a person spends online that is a limiting factor, but rather how much time the computer spends online whether a user is present or not. Some of these applications (downloading video, peer-to-peer filesharing) can be queued long in advance and left to proceed on their own, while others (Instant Messaging, Social Networking, Email and Web Browsing, VOIP, Streaming Video) require that the user direct them during leisure time.

While it is not realistic to expect average leisure time to rise significantly over the next few years, the attractiveness of web applications is constantly increasing through advancements in graphics, depth of content, and interactivity, which will help the Internet to take up a larger percent of leisure time by 'stealing' time previously spent on television, reading periodicals, and other non-interactive yet similar in content to popular applications on the Internet.

- Dealing with Peak Times:

An important factor which was not incorporated into the survey (because of the difficulty in

designing questions that both:

1. give good and comprehensive data on the subject and
2. are easy for the subjects to understand and respond to quickly

With adequate bandwidth to do so, users will use more than one of the applications which each require attendance (but not complete concentration) at the computer at the same time. Due to the attention requirements of some applications, not all combinations are possible. For instance, it would not be possible for the average consumer to type an email while editing a profile on a social networking site, but for a skilled typist it is no challenge to watch a streaming video while composing a message. Alternatively, talking over VOIP while navigating and reading web pages is not particularly difficult for even unskilled persons, but watching video while talking with VOIP would make listening to either very hard. Using these multiple applications simultaneously will greatly affect peak bandwidth needs, especially since consumers will be reluctant to pause the other, automatic applications which were already running in the background throughout the day during periods of multi-tasking.

Although it is entirely possible and safe for a computer to be left in operation for more than 24 consecutive hours, and to be online and using certain applications during that time, our data does not support the idea that this is anywhere near common practice. This could be because: most people do not understand their computers or know their capabilities, and thus don't realize that this is possible or safe; most users are unaware of automatic applications or similarly unaware of how to use them; and/or because these people do not realize what they can get from these applications and thus see no reason to look into them in the first place.

The data does support the idea that a typical pattern is only to run automatic applications while in the presence of a PC, most probably while utilizing other applications which require focus. This is not good for business, obviously, since it means that there will be a peak period when every application is active—driving peak bandwidth need as high as it can possibly go.

This can be combated in a variety of ways. The first step in this process is to give users a reason to want to reduce their bandwidth. Consumers do not care about the profits of their provider when weighed against their convenience, and if the provider admits that it cannot give them all the downloads they want at any given time, they will surely be dissatisfied—regardless of whether they understand why. What do users care about that can be used to regulate them in this area? Money, of course, but users will resent having it taken away in certain ways.

It is possible to assign a “peak hour fee,” an additional cost per amount of bandwidth consumed during peak operation times, but this will likely be resented and seen as sneaky if the existence of such fees is not well-publicized; if it is, then its existence will make advertisements less appealing and make it less likely that consumers will choose a provider that has such fees over one that does not.

A better option is to advertise 'smart pricing,' in which software monitors demand over the lines

and provides users with a real-time cost based on their bandwidth consumption's fraction of capacity. In essence, the user should be able to specify a price-per- amount of bandwidth which he or she is unwilling to pay, and the software should automatically disconnect the user whenever the price is higher than that. In addition, there should be an option in the software to regulate the connection based on maximum price total per real time interval, which reduces bandwidth allotted to the user if prices go up so that the user never pays more than the designated rate per time interval. This essentially converts the system into an automated bandwidth auction; if customers are not demanding as much bandwidth as the line is capable of providing, this charge is not applied (the low bid wins), but if customers are demanding more bandwidth than the line is capable of providing, the price climbs and the software disconnects the users who are unwilling to pay the rate. In turn, this reduces the bandwidth used by users paying a fixed rate until the combined needs of the people still demanding the line are less than capacity. If, after this point, bandwidth needs are reduced, the price is lowered until the space is again filled.

This method is not without its own issues. A very high paying user could potentially disconnect everyone else for a very long time. Financially, that is not an immediate issue, but it would surely alienate all of the lower bidding customers. Also, the possibility exists that that this high paying user is only a short term customer (perhaps even a rival provider trying to hurt business!)—driving off long term customers by denying them service. This problem should be avoidable, though, if there is a generous but fair upper cap to bandwidth allocation and if capacity is maintained at a high enough percentage of peak demand (though it should be able to relatively painlessly be a lower percentage than now). Moreover, bandwidth fluctuations could allow lower bidders online during a brief demand lag, only to remove them moments later. Obviously, this would be very frustrating for those particular customers. However, such an event could be prevented by a guarantee of a given rate and service for a short yet specified interval, so that the user has time to do something constructive during that time while using appropriate haste. Some additional problems may stem with network protocols in use and possible future implications with network neutrality.

This system has several advantages. The monthly base rate could be lowered and the time-varying price (which for peak users would be the vast majority of the bill) could be added to comprise the total bill. This would be very attractive to budget-conscious customers and customers who set their own schedules, who would then consume bandwidth as much as possible during slump hours. In addition, it would lower the peak bandwidth needed on a line while still allowing customers to get as much total data transfer as they do currently.

The software could additionally have many helpful functions that aid users in making the most of slump time. For example, it could have a download queue which is set only to download while the price is at a certain rate or lower, a 'queued browsing' feature which downloads and saves images of web pages chosen by the user for later offline viewing (for instance, the top 10 stories on CNN, an email inbox, the top 10 YouTube videos of the day, or a favorite blog), and an action queue which can be used to start certain programs (like AIM or a filesharing client). While not necessary for the proper operation of the system, such things would be very useful to consumers and could help make budget consumers

feel more accommodated.

If such a smart pricing system were implemented, we would still expect the charts for mature operations to resemble the one for e-mail and web browsing in form, but the numbers of hours would increase quite a bit since the overall price for non-peak users would decrease. Also, the usability of the connection while the user is absent would be increased from its present level by proper software.

- Applications Dying Young:

There is the possibility with some of these applications that they will never mature, but will instead become obsolete and disappear too quickly for growth and development. This is most likely in cases where multiple applications compete with each other.

For communication, VOIP, Instant Messaging, and email are all available. For video, Streaming Video, downloading Standard Definition Video, and downloading High Definition video are potential competitors.

We feel it is unlikely that downloading what are now considered lower definition videos will mature before the current higher definition video formats (mainly 1080p) replace it, but it then may only be a matter of time before those are replaced by 2160p media. Regardless of the definition of such video, though, any successor that replaces a popular format will inherit in large part the infrastructure that distributed the old format. Video download sites will simply make the new format available as quickly as possible with all of their apparatuses intact. Consequently, each new format inherits the maturity of the last one.

Streaming Video is a different matter. A major advantage of streaming video is the ability to watch and evaluate a small part of your choosing of the video before committing to download the whole thing. Therefore, for media which is unpredictable and about which rating information is lacking or inconsistent, such as YouTube and other video upload sites, it is important to users and will probably continue to be the standard mode of operation. On the other hand, for videos about which publicity and reviews are plentiful, such as full length cinema and television shows, it has little value other than allowing users to begin watching the beginning of a show while the download of later parts is still in progress. However, this advantage only applies to videos viewers who want to watch immediately and have not planned to view in advance, as otherwise they could queue them for download. Even so, there will always be some users too lazy to bother planning ahead, and for them streaming video is and will continue to be their method of choice. There is another presumed advantage of streaming video over normal downloaded videos: that the video can be kept running using an online applet and kept off of permanent storage space on the user's hard drive, thus keeping copyrighted material (often sold in a pay-per-view form or available for a limited viewing period) from being copied without consent. Unfortunately, software (which accesses the video stream and saves it) and any encrypted video file can be reverse engineered using the applet source which can in turn be captured while running on the host

PC. Also, an applet programmed in a proprietary or encrypted language can be cracked as well. Even if this wasn't possible, screen capture software and software which records the outgoing signals from the sound card allow safeguards against capturing streaming video to be bypassed. Consequently, any but the most rudimentary perceived security benefits of streaming video is an illusion.

In the area of online communications, e-mail is currently the leader. It allows for information transfer at the speed of type, and offers users spellchecking and easy revision to ensure a precise and accurate message. The messages are automatically saved in inboxes and ‘sent’ boxes, they transmit relatively quickly, and they consume a very minimal amount of bandwidth. This could potentially be replaced by the faster and more expressive aural communication of VOIP, but we feel that is unlikely due to factors including the inability to easily attach files to VOIP messages and the lesser degree of formality and polish of such messages. AIM has similar issues without the advantage of increased speed.

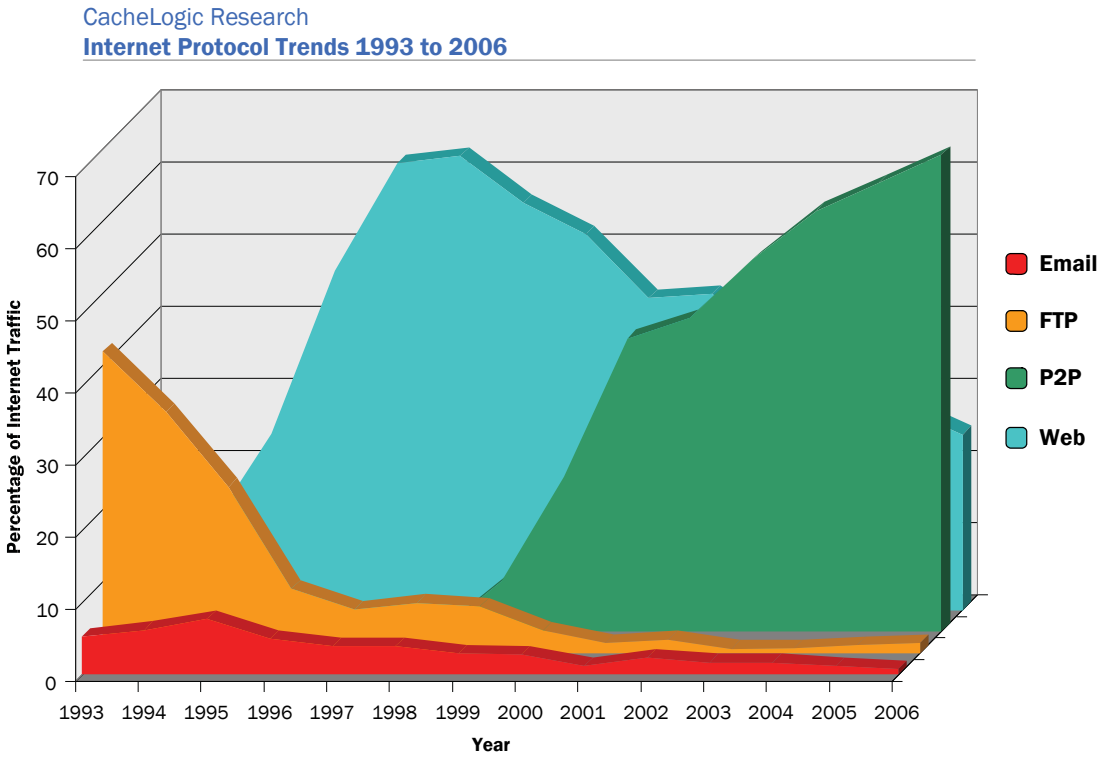
Secondary Research Findings:

The team conducted research in addition to the distribution of the survey. In this research the team attempted to find relevant information regarding bandwidth usage on a large scale for major Internet applications. We had decided that it would be in our best interests to start with applications such as:

P2P
Video
Web-browsing, and email
VOIP

- P2P

Peer to peer has become the most prominent bandwidth intensive program used on the Internet today. This application is used to share files ranging from a small Word document to as large as a high-def movie. A massive quantity of bandwidth is used on a daily basis and represents the majority of Internet traffic. The following graph shows the impact P2P has on the Internet in recent history.



Upon gathering this information we also attained some good data with predictive data up until 2012. This Cisco document outlines the state of the Internet and the future of bandwidth usage. In this table Cisco shows the current usages of the Internet and the applications that represent the majority of all Internet traffic.

Global Consumer Internet Traffic 2006□2012

Consumer Internet Traffic 2006□2012								
	2006	2007	2008	2009	2010	2011	2012	CAGR 2007□2012
By Sub-Segment (PB per month)								
Web, email, data	509	710	999	1,336	1,785	2,337	3,087	34%
P2P	1,358	1,747	2,361	3,075	3,981	5,161	6,740	31%
Gaming	91	131	187	252	324	399	490	30%
Video communications	16	25	37	49	70	103	154	44%
VoIP	23	39	56	72	87	101	114	24%
Internet video to PC	269	647	1,346	2,196	3,215	4,501	6,216	57%
Internet video to TV	14	99	330	756	1,422	2,348	3,529	104%

Source: Cisco, 2008 Cisco Visual Networking Index

Definitions

Web, Email, and Data: includes web, email, instant messaging, newsgroups, and file transfer (excluding P2P and commercial file transfer such as iTunes)

P2P: includes peer-to-peer traffic from all recognized P2P systems such as BitTorrent, eDonkey, etc.

Gaming: includes casual online gaming, networked console gaming, and multiplayer virtual world gaming

Video Communications: includes PC-based video calling, webcam viewing, and web-based video monitoring

VoIP: includes traffic from retail VoIP services and PC-based VoIP, but excludes wholesale VoIP transport

Internet Video to PC: free or pay TV or VoD viewed on a PC, excludes P2P video file downloads

Internet Video to TV: free or pay TV or VoD delivered via Internet but viewed on a TV screen using a STB or media gateway

The table above is a very valuable resource for our team. It provides a baseline to which we should measure our data. The fact that there is an underlying model that is predictive in nature and has current usages built in is a major find. As can be seen at the moment P2P dominates current Internet traffic but although it will grow in volume, it will decline as a percentage according to a prediction by Cisco. P2P as a percentage of consumer Internet traffic dropped to 51 per cent at the end of 2007, down from 60 per cent in 2006, and is estimated to decline to 44 per cent at the end of 2008. The decline in traffic-share is due primarily to the increase in traffic share of video traffic. Cisco predicts that internet video will surpass P2P in volume during 2010. Current internet video growth is in its initial stages. Internet video to the PC screen will soon be exceeded by a second wave arising from the delivery of Internet video to the TV screen. Why? In addition to providing entertainment, video can serve as the centerpiece for social interaction. The success of YouTube and MySpace brings to light the social aspects of video and has proven that these sites appeal is powerful enough to entice millions of internet users to do something they previously showed little interest in doing; watching low quality video on a small screen. YouTube viewers are not watching video despite the computer screen, but because of it – the PC is ideal for interactivity. Cisco predicts that there will be two waves of internet video over the next five years. The first wave will be experiencing a growth of internet video as viewed on the PC, the second wave will see a rise in Internet delivery of video to the TV. Once consumers are in the habit of watching online video, they are more likely to watch traditional video online as well. Even a straightforward, non-interactive, non-social video experience may prove attractive to viewers because the PC is personal and portable, and because content that is not available through a commercial VoD service may be made available on-demand online by the content provider. In terms of bandwidth, the traffic due to video will accelerate dramatically once internet-enabled set up boxes (STB's) are deployed by service providers. STB's enable high definition content to cross the internet. The viewing of internet video by way of the STB will make up only a very small fraction of overall viewing in number of views, but because of the long-form and higher definition nature of the content, Internet video-to-TV traffic will begin to catch up with Internet video-to-PC toward the end of the forecast period.

- Video

Streaming video is any video that you watch that is within a webpage. A good example of a website that deals with streaming video is YouTube. Every minute approximately 10 hours of new content is uploaded to YouTube. According to a Cisco whitepaper all forms of video will account for 90% of internet traffic in 2012. They say that today streaming video accounts for 1400 PB/month and in 2012 it will be 6069.

Additional information collected by the BBC showed current statistics with an estimated 100 million video downloads on YouTube daily.

We also used our own sources and assumed some growth rates and come up with a prediction also that is close to Cisco's prediction in 2012. Video accounts for roughly 10% of all internet traffic. That is approximately 1400 petabytes/month (PB), or about 1.2 billion gigabytes. This is mostly generated by websites like YouTube.

According to IIT's Office of Technology Services, the student body uses, on average, 150 Mb/s of bandwidth. Of that 20-25% is flash videos from sites like YouTube. If we predict a 10% growth rate over the next five years we can expect the usage to be at 3100 PB—that is a 212% increase in traffic. That is also assuming that the quality will not get any better though, which is somewhat misleading since websites are starting to switch to higher quality videos—thus, causing a major increase in the bandwidth consumed by streaming video. For example, assume an instant switch to 1080i High Definition videos—yielding a 432% increase in bandwidth consumption because of the increase in the amount of pixels alone. So, instead of 3100 PB of traffic in five years, we will be at around 13500 PB of traffic. An instant switch is unrealistic, so we assumed a 5% growth of the total video streamed to be in HD is much more. In doing this we came upon 5690 PB/month in 5 years.

- Web-browsing, and email

  - North American internet traffic data

As consumers are allowed more bandwidth allocation from the internet service provider, the obvious increase of internet and usage of the bandwidth supplied is no doubt the future trend. Approximately 600,000,000GB (600 Petabytes (PB)) of data was transferred over the internet every month in 2006. About 900,000,000GB (900 PB) of data was transferred over the internet every month in 2007. Assuming this trend we can anticipate that the amount of data across North America could top 1,800,000,000GB (1800PB) every month by the year 2010 easily. This type of data accounts for ALL internet traffic. This includes email, web, internet video, voip, p2p, etc…At that level, 20 homes would generate more traffic than the entire Internet traffic in 1995. US broadband penetration grew to 85.31% among active Internet users in September 2007. Narrowband users connecting at 56Kbps or less now make up 14.69% of active Internet users, down 0.56 percentage points from 15.25% in August 2007.(PR Leap Website http://www.prleap.com/pr/101247/). This website shows advanced stats for worldwide and North American growth for internet consumption and bandwidth subscribers. http://www.websiteoptimization.com/bw/0710/

US Internet user profile by demographics				
Demographic	**Audience, 000**	**Composition (%)**	**Sessions per Month**	**PC Time per Month**
Male	79,447	48.18	61	71:04:10
Female	85,443	51.82	56	64:58:01
11-Feb	14,799	8.97	12	13:51:05
17-Dec	17,579	10.66	26	32:21:34
18 - 24	12,755	7.74	23	27:22:34
25 - 34	20,309	12.32	54	65:50:47
35 - 49	43,849	26.59	76	91:10:50
55+	38,065	23.09	78	83:21:58
65+	16,672	10.11	74	74:53:32
Source: Pew Internet Project				

US broadband adoption in 2005, 2006, 2007, and 2008				
Americans with broadband at home	**2005**	**2006**	**2007**	**2008**
Yearly adoption				
All adults	33%	42%	47%	55%
Gender				
Male	31%	45%	50%	58%
Female	27%	38%	44%	53%
Age				
18-29	38%	55%	63%	70%
30-49	36%	50%	59%	69%
50-64	27%	38%	40%	50%
65+	8%	13%	15%	19%
Race /ethnicity				
White (not Hispanic)	31%	42%	48%	57%
Black (not Hispanic)	14%	31%	40%	43%
Hispanic (English speaking)	28%	41%	47%	56%
Educational attainment				
Less than high school	10%	17%	21%	28%
High school grad	20%	31%	34%	40%
Some college	35%	47%	58%	66%
College +	47%	62%	70%	79%
Household income				
Under $20K	13%	18%	28%	25%
$20K-$30K	19%	27%	34%	42%
$30K-$40K	26%	40%	40%	49%
$40K-$50K	28%	47%	52%	60%
$50K-$75K	35%	48%	58%	67%
$75K-$100K	51%	67%	70%	82%
Over $100K	62%	68%	82%	85%
Community type				
Urban	31%	44%	52%	57%
Suburban	33%	46%	49%	60%
Rural	18%	25%	31%	38%
Source: Pew Internet Project				

From the above two tables, we can see that users aging between 18-34 and 35-49 are two biggest demographic groups in terms of Internet consuming. Our survey data are mainly contributed by 15-25 year old students, which is a reasonable sample for research analysis.

	How online activities of broadband and dial-up users differ				
	All internet users	Dial-up at home	Broadband at home	Accessed internet away from home or work using WiFi on laptop computer	Pays for premium home broadband services
Use an online search engine	49%	26%	57%	68%	61%
Check weather reports and forecasts	30%	14%	36%	44%	42%
Get news online	39%	18%	47%	54%	33%
Visit a state or local government website	13%	4%	16%	20%	19%
Look online for information about the 2008 election	23%	10%	27%	33%	34%
Watch a video on a video-sharing site like YouTube or GoogleVideo	16%	5%	20%	28%	23%
Look online for information about a job	6%	4%	6%	10%	5%
Send instant messages	13%	6%	16%	23%	19%
Read someone else's blog	11%	3%	15%	17%	16%
Use a social networking site like MySpace, Facebook, or LinkedIn.com	13%	7%	16%	20%	21%
Make a donation to charity online	1%	0%	2%	2%	1%
Downloaded a podcast	3%	1%	4%	6%	6%
Download or share files using peer-to-peer networks such as BiTorrent or LiveWire	3%	2%	3%	4%	5%
Create or work on your own blog	5%	3%	6%	9%	8%
Number of cases	1,553	249	1,138	504	306
Source: Pew Internet Project					

In the previous table, eight out of top ten activities rely on web, email and social networking sites. Over half of users search for information online. Half of them get news online. More than one third check weather reports and forecasts. These top three things people do online are all web-based and daily. It indicates that people tend to use various online resources for both their life and work. The mobile internet traffic is growing. However, it exerts little impact on Broadband traffic in terms of traffic load. The figures in the table refer to percentage of users rather than usage traffic.

o Web-browsing

The bandwidth consumed by web-browsing really depends on the webpage content and the web-browsing software. Basically, people browse websites for four main purposes—news, email, search, and social networking. Stats vary for each of them.

Cisco whitepaper gives the following analysis and prediction for global web traffic, According to the table, North America's traffic increases at the medium speed. This reflects the fact that web-browsing and email are relatively more matured applications compared to other Internet usages in North America.

Consumer Web, Email, and Data Traffic 2006–2012								
	2006	2007	2008	2009	2010	2011	2012	CAGR 2007–2012
By Geography (PB per month)								
North America	152	209	280	365	478	620	799	31%
Western Europe	113	153	205	274	364	469	604	32%
Asia Pacific	168	244	369	507	692	925	1,266	39%
Japan	34	42	54	67	82	97	116	23%
Latin America	12	19	31	44	65	91	128	46%
Central Eastern Europe	23	31	42	55	70	89	112	29%
Middle East and Africa	7	12	17	24	34	46	62	40%
Total (PB per month)								
Consumer web, data	509	710	999	1,336	1,785	2,337	3,087	34%

Source: Cisco, 2008

o Rankings

Top Web companies in June 2008		
Brand	**Audience, 000**	**Time Per Person**
1. Google	120,496	01:17:09
2. Yahoo!	113,187	03:06:57
3. MSN/Windows Live	99,747	02:05:25
4. Microsoft	93,786	00:40:11
5. AOL Media Network	91,167	03:35:11
6. YouTube	71,398	00:55:59
7. Fox Interactive Media	70,039	02:04:36
8. Wikipedia	52,747	00:21:01
9. eBay	52,509	01:51:34
10. Apple	49,911	01:08:33
Source: Nielsen		

Top US search engines in June 2008			
Provider	**Searches, 000**	**YOY Growth**	**Share**
All Search	7,878,483	6.30%	100.00%
1. Google Search	4,650,982	19.00%	59.00%
2. Yahoo! Search	1,310,273	-12.40%	16.60%
3. MSN/Windows Live Search	1,108,976	12.50%	14.10%
4. AOL Search	335,436	-17.00%	4.30%
5. Ask.com Search	159,778	4.90%	2.00%
6. Comcast Search	37,577	23.30%	0.50%
7. My Web Search	35,630	-53.60%	0.50%
8. MapQuest Search	23,997	57.90%	0.30%
9. NexTag Search	21,744	10.40%	0.30%
10. AT&T Worldnet Search	21,222	106.50%	0.30%
Source: Nielsen			

Minutes per viewer spent on network TV Web site	
Name	**Minutes per Viewer**
FOX Broadcasting	114.3
CBS Television	48.4
ABC.COM	45.5
NBC.com	34.6
Source: Nielsen	

Top video sites ranked by number of streams		
Brand	Streams, 000	Audience, 000
YouTube	5,354,392	81,881
Yahoo!	264,266	29,908
Fox Interactive Media	242,444	19,258
MSN/Windows Live	164,776	10,980
Nickelodeon Kids and Family Network	162,971	6,152
Hulu	142,261	6,324
ESPN	127,794	8,434
CNN Digital Network	117,708	9,451
MTV Networks Music	97,207	4,762
Disney Online	87,193	9,146
Source: Nielsen		

- Email

According to Pew Internet Project, the use of email on a typical day rose from 52% to 60% in 2002-2008, resulting to a growth rate of 18%. This figure is well ahead of other popular internet activities, such as checking the news, which 39% of internet users do on a typical day, or checking the weather, which 30% do on a typical day.
(http://www.pewinternet.org/pdfs/PIP_Podcast_2008_Memo.pdf)

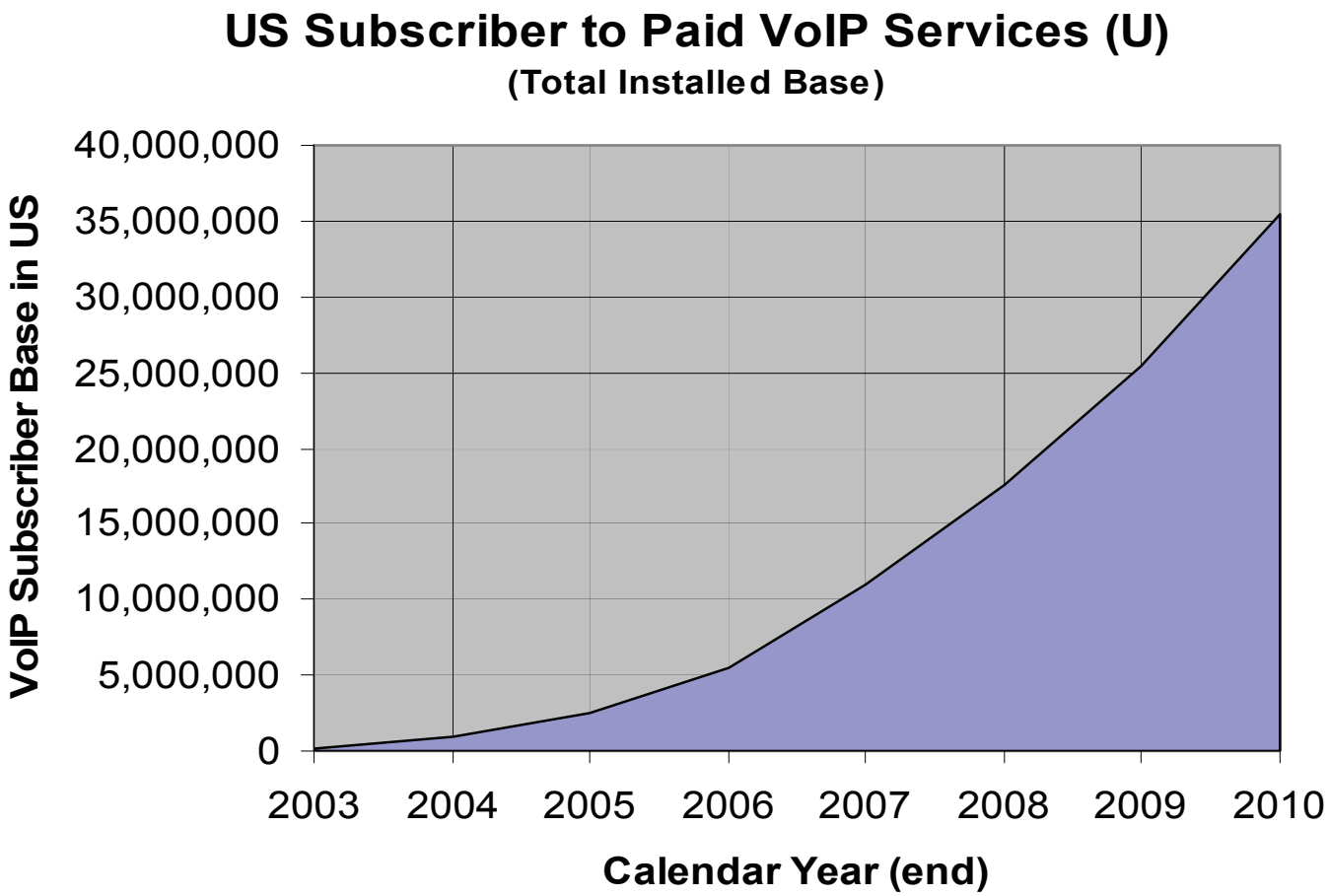
A report from Pew Internet Project shows 81% of employees have an email account.
(http://www.pewinternet.org/pdfs/PIP_Networked_Workers_FINAL.pdf)
Another report shows 53% of working adults have both personal and working email accounts, though they have to check work emails on a daily basis. Most of them also go online for work. (http://www.pewinternet.org/pdfs/PIP_Networked_Workers_FINAL.pdf)

Forrester Research suggests that email is still a main channel for sharing content and information for US adults. Data shows 69% of adults like to use email and personal emails made up 56% of shared content received. However, youth behave with a slight difference. Research indicates over half of them also use instant messaging, videos from YouTube, and wikis to share content. (http://www.reuters.com/article/pressRelease/idUS112815+15-Sep-2008+BW20080915)

There are some figures explaining how adults and youth make difference uses of online content. 64% of adults and 60% of youth still use the traditional cut and paste method to share a URL or information. Video content is shared twice as much amongst online youth than adults, in which over half of them received information through an online video site such as YouTube. Web tools such as wikis are used by 53% of youth vs. 29% of adults. Young users tend to share more types of information and content than adults. In particular, 73% of online youth shared peer-generated video, versus 39% of online adults.

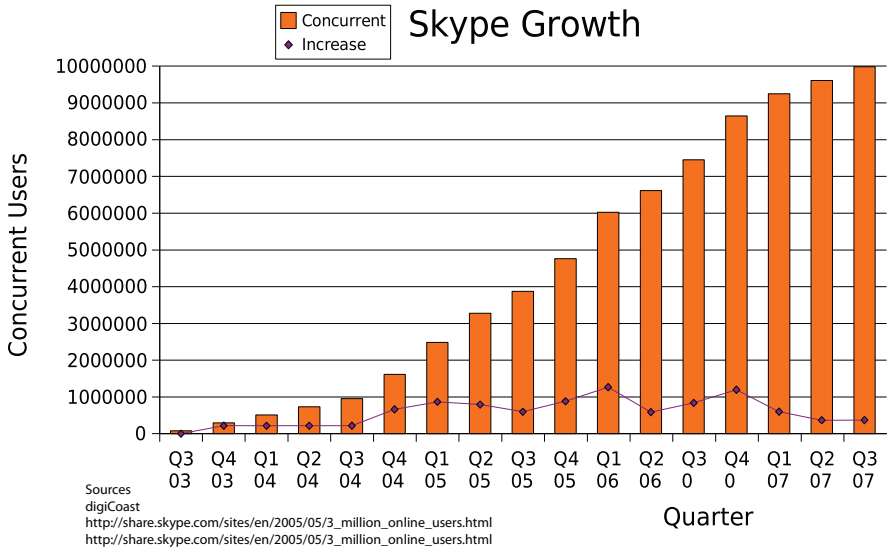
- VOIP

Several charts and statistics we looked at briefly mentioned the growth of VOIP. According to the Yankee Group, adoption in the US of paid VoIP service such as those offered by Comcast is expected to reach 35,000,000 subscribers by 2010. The next 2 graphs show statistics of paid voip services and semi-paid voip services such as Skype. The data is limited many ways, but growth has been significant and possible future forecasts do show high adoption rates.



Sources: Yankee Group ('03, '04, '08) and RTX estimate (all other years).

Looking the growth of Skype for the past few years, the growth has been steady for but seems to follow a logarithmic regression as users grow, the growth rate slopes off and stabilizes. This could be competitor applications or current applications that that enable VoIP ability.



Sources
digiCoast
http://share.skype.com/sites/en/2005/05/3_million_online_users.html
http://share.skype.com/sites/en/2005/05/3_million_online_users.html
http://share.skype.com/sites/en/2005/05/3_million_online_users.html
http://share.skype.com/sites/en/2005/05/3_million_online_users.html
http://share.skype.com/sites/en/2005/10/4_million_online_users.html
http://share.skype.com/sites/en/2006/01/5_million_online_skypers.html
http://share.skype.com/sites/en/2006/03/6_million_onliners.html
http://share.skype.com/sites/en/2006/08/thanks_for_the_nice_birthday_g.html
http://share.skype.com/sites/en/2006/11/eight_million_online.html
http://share.skype.com/sites/en/2007/01/nine_million_online.html
http://seekingalpha.com/article/48825ebayupdateskypesstillgrowing

The growth of paid voip service seems to been more significant since they are more convenient to integrate into current systems versus using a computer terminal every time to make a call. Although, future users may adopt the use of a terminal.

- Summary

According our survey, half of the users spend 1-3 hours every day on email and web browsing, which makes it the only application category that is used more than an hour per day by majority respondents. The largest application for the 0-1 hour daily usage was VoIP at which more than 90% of users were using the application as such daily. The second large application is streaming video, which have 40% of users spend 1-3 hours on it and about 44% spend less than an hour each day. These figures agree with Pew Internet Project's report (http://www.pewinternet.org/pdfs/PIP_Broadband_2008.pdf) which indicates watching videos online is the second most frequent thing people do for Internet besides web browsing and email. In main, web browsing and email are the basic applications for general Internet activities. They have been developed as Internet technology evolves. Therefore, they are relatively matured in comparison with a range of existing applications. Streaming video is the driving trend for both now and future Internet usage. It has such a comprehensive impact that tremendously influences matured applications like web browsing and email.

8. Obstacles

Throughout this semester our IPRO 305 team has faced a few obstacles. From the beginning we've had some trouble identifying the scope of our project. Thus, we kept our scope flexible in case we decided that an expansion or shift of focus was necessary. Our primary research group ran into some issues with implementing a survey pertaining to our 3-5 year projections. Initially permissions were difficult to attain; however, throughout the semester the primary research group spoke with and developed a survey that was sent out to all members living in the campus dormitories. Also, some alternative methods were used to gain additional responses, such as surveying all the Greek houses on the quad, asking people to fill out the survey at a table on the MTCC bridge, and sending the survey out to a couple different departments within the school. Another issue we had concerns poor communication and the "free rider" issue. Communication has greatly increased during the semester as more information was made available on iGroups and via e-mail to the team members, whereas, the "free rider" issue was handled less adequately. Certain members were not as involved as they should have been, and to help combat this, specific tasks were given to these members in attempts to incorporate them more into the group.

9. References

Brown, Robert, and Ruth Washton. MARKETING TO THE INTERNET GENERATION. 306283. 24 Sept. 2008 <http://www.marketresearch.com>. Path: Home Page.
Brown, Robert, and Ruth Washton. Packaged Facts Market Profile: The Young Adult Market.

593155. 24 Sept. 2008 <http://www.marketresearch.com>. Path: Home Page.

Cisco Systems, Inc. Cisco Visual Networking Index – Forecast and Methodology, 2007–2012. C11-481360-00. 11 Sept. 2008 <http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html>.

HP Labs, et al. The Flattening Internet Topology: Natural Evolution, Unsightly Barnacles or Contrived Collapse? HPL-2008-47. 18 Nov. 2008 <http://www.hpl.hp.com/techreports/>. Path: Technical Reports.

HP Labs, et al. YouTube Traffic Characterization: A View From the Edge. HPL-2007-119. 18 Nov. 2008 <http://www.hpl.hp.com/techreports/>. Path: Technical Reports.

HP Labs, et al. Rhythms of social interaction: messaging within a massive online network. 18 Nov. 2008 <http://www.hpl.hp.com/techreports/>. Path: Technical Reports.

HP Labs, Bernardo Huberman, and Gabor Szabo. Predicting the popularity of online content. 18 Nov. 2008 <http://www.hpl.hp.com/techreports/>. Path: Technical Reports.

HP Labs, and Elizabeth McPhillips. The Structure and Trends of the ISP Market. HPL-IRI-1999-002. 18 Nov. 2008 <http://www.hpl.hp.com/techreports/>. Path: Technical Reports.

Infoplease.com. How Internet Access Has Changed. 15 Sept. 2008 <http://www.infoplease.com/ipa/a0921865.html>.

Marigny Research Group, Inc. Baby Boomer Attitudes, Markets and Opprotunities. 1285597. 24 Sept. 2008 <http://www.marketresearch.com>. Path: Home Page.

Marigny Research Group, Inc. TRENDS IN USER DEMOGRAPHICS, ATTITUDES, AND PURCHASING

BEHAVIORS AT HOME AND WORK. 1212198. 24 Sept. 2008 <http://www.marketresearch.com>. Path: Home Page.

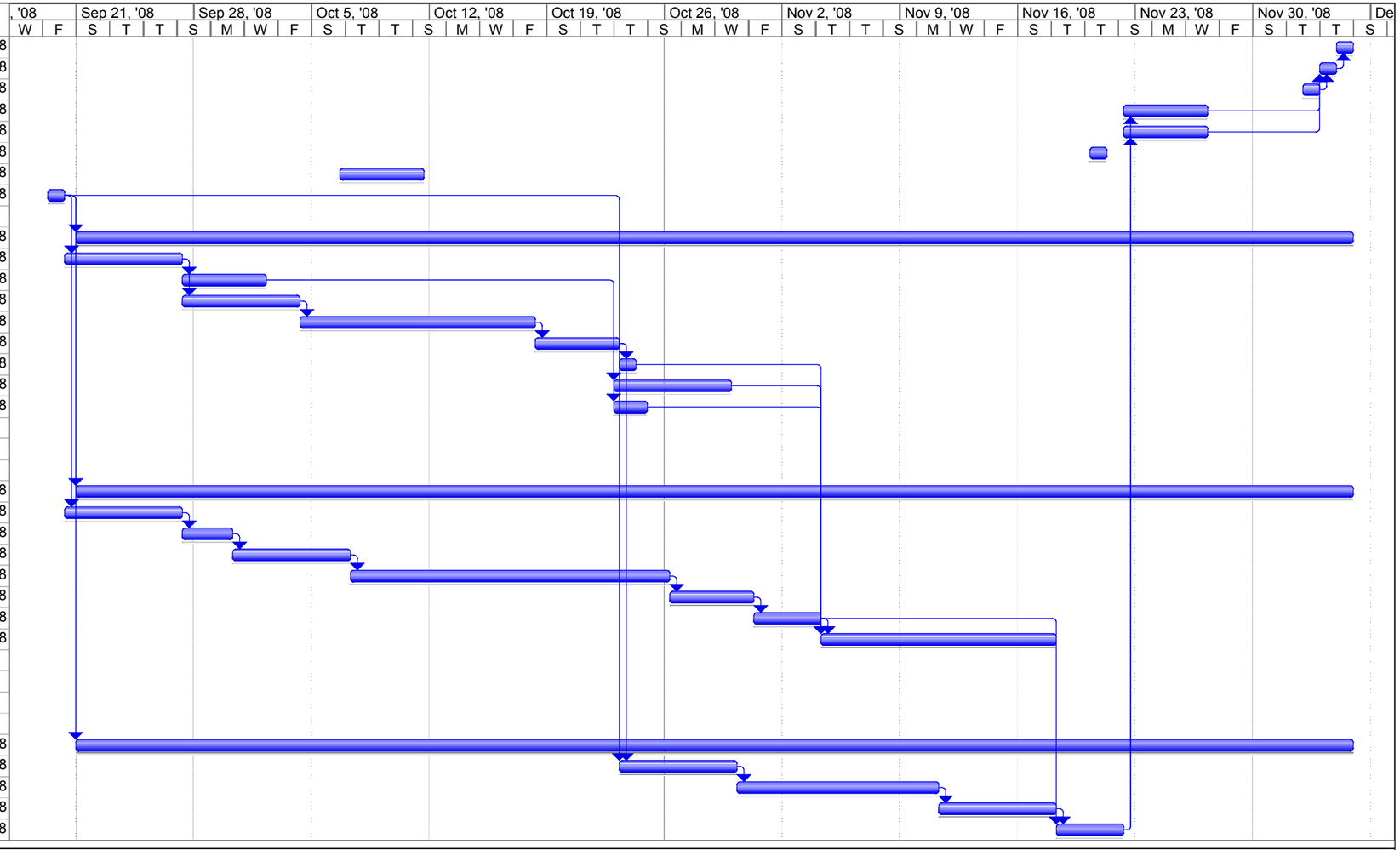
Pew Internet & American Life Project. November 2006 - Parents and Teens. 16 Oct. 2008 <http://www.pewinternet.org/PPF/r/66/dataset_display.asp>.

10. Acknowledgements

We would like to thank Comcast for their unwavering support and communication throughout the semester. Also, we would like to thank everyone who took time out of their busy schedules to participate in the survey and complete it to the best of their knowledge.

Gantt Chart

ID	Task Name	Duration	Start	Finish
1	IPRO Project Day	1 day	Thu 12/4/08	Fri 12/5/08
2	Final Report	1 day	Wed 12/3/08	Thu 12/4/08
3	Presentation Uploads	1 day	Tue 12/2/08	Wed 12/3/08
4	Exhibit Poster	5 days	Sat 11/22/08	Thu 11/27/08
5	Abstract and Brochures	5 days	Sat 11/22/08	Thu 11/27/08
6	IPRO Day seminar	1 day	Thu 11/20/08	Fri 11/21/08
7	Midterm Reviews	5 days	Mon 10/6/08	Sat 10/11/08
8	Project Plan	1 day	Fri 9/19/08	Sat 9/20/08
9				
10	Primary Research Team	76 days	Sat 9/20/08	Fri 12/5/08
11	Research people to survey	7 days	Sat 9/20/08	Sat 9/27/08
12	Create Interview Questions	5 days	Sat 9/27/08	Thu 10/2/08
13	Create Questionaire	7 days	Sat 9/27/08	Sat 10/4/08
14	Conduct Survey	14 days	Sat 10/4/08	Sat 10/18/08
15	Gather Results	5 days	Sat 10/18/08	Thu 10/23/08
16	Identifty future applications	1 day	Thu 10/23/08	Fri 10/24/08
17	Conduct interviews with IT Pro's	7 days	Thu 10/23/08	Thu 10/30/08
18	Interview Company Executives	2 days	Thu 10/23/08	Sat 10/25/08
19				
20				
21				
22	Secondary Research Team	76 days	Sat 9/20/08	Fri 12/5/08
23	Determine top 5 internet intensive apps Individually	7 days	Sat 9/20/08	Sat 9/27/08
24	Consensus of top 5 apps	3 days	Sat 9/27/08	Tue 9/30/08
25	Gather technical data	7 days	Tue 9/30/08	Tue 10/7/08
26	Examine growth of major apps vs time	19 days	Tue 10/7/08	Sun 10/26/08
27	Track future tech advancements	5 days	Sun 10/26/08	Fri 10/31/08
28	Research possible alternate top 5 apps	4 days	Fri 10/31/08	Tue 11/4/08
29	Final statement of findings	14 days	Tue 11/4/08	Tue 11/18/08
30				
31				
32				
33				
34	Collection and Interpretation Team	76 days	Sat 9/20/08	Fri 12/5/08
35	Profile application usage	7 days	Thu 10/23/08	Thu 10/30/08
36	Create Models based on top apps	12 days	Thu 10/30/08	Tue 11/11/08
37	Test models on current usage w/ Comcast	7 days	Tue 11/11/08	Tue 11/18/08
38	Project future usage	4 days	Tue 11/18/08	Sat 11/22/08



Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline