Red Hat Consumer Version:

Test Marketing Plan

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Introduction

Created by Linus Torvolds, a Finnish graduate student in 1991[1], Linux is a Unix-based operating system (OS) for computers. Since 1991, Linux has grown to be the Unix "flavor" with the largest market share. Despite this dramatic growth and associated fanfare, Linux has yet to make significant inroads in the desktop market, holding only about 2% of this market according to a recent survey[2].

Founded in 1994 as a producer of a Linux distribution (distro), Red Hat is the largest and most recognizable Linux-focused company. Due to the nature of the GNU Public License[3] (GPL), Red Hat is unable to make very much profit from selling their Linux distro. Instead, they focus on value-added products such as support, consulting and complementary products including proprietary software.

Linux is rapidly evolving and improving; many say it is ready for the consumer desktop. Although we believe it is not quite ready for the consumer desktop, we do believe it is ready for the business desktop in limited situations and will, within a short time (2-3 years) be ready for the desktop. As is well documented in "The Innovator's Dilemma"[4] and often seen in nature in such diverse systems as pH titrations, home thermostats and even protein folding, the development and spread of new technologies does not happen in a smooth continuum. It happens more like a pH titration where a great volume of acid is slowly added, drop by drop to the buffered solution with no effect until a single last drop exhausts the buffer and swings the pH of the solution rapidly downward. Disruptive technologies often develop in the same way, being ignored by mainstream companies until it is too late for them to adapt. This shift is not happening overnight, it never does; but the almost viral development and spread of Linux over the last few and into the next five to ten years is one of these disruptive technologies.

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[1] For a good history of Linux written by Linus himself, see http://www.li.org/linuxhistory.php

[2] For many dated (1999) but interesting statistics, see http://www.mc.edu/campus/users/bennet/dontfear/index.html

[3] The GPL allows anyone to modify the source code in any way they wish as long as they contribute their modifications back to the community.

[4] The Innovator's Dilemma by Clayton M. Christensen, Harper Business Books, 2000

Red Hat, as the leading company in a nascent industry is poised to surf the Linux wave when it arrives. Herein is a trial marketing analysis and plan for a new version of Red Hat called Red Hat Consumer Version (RHCV) which will give Red Hat entrée into the lucrative consumer market.

I Marketing Research

A Market Potential

The PC market is maturing with slower growth in recent years (appendix 2). Several reasons for this include a slump in the economy, increasing market saturation and, with the bandwidth bottleneck found at the 56K modem, users have no compelling reason to upgrade.

With the maturation of the market, focus is increasingly turning towards price. Already, a significant percentage of the cost of a new computer, 11 to 42 percent, is represented by the software installed including the OS and office suite (see appendix 4). While the cost of every single component needed to build a PC system has dropped dramatically; the cost of the OS and office suite have more than doubled since 1991[5]. With the cost of OS and software rising as a percentage of total PC cost, there is increasing incentive for PC manufacturers to reduce this cost. Due to the open source nature of the Linux OS and the growing library of open source software available to run on it, Linux will be a natural replacement for Windows.

With a desktop market share of about 1% (see appendix 5), Linux on the desktop is still the domain of only very experienced users and hobbyists. These users are willing to endure the various issues related to running Linux but the average user is not. Even though Linux is ten years old, due to the limited market penetration, it can be considered a new product.

With over 30 million PCs shipped worldwide each quarter and a US market of over 10 million PCs shipped every quarter, the OEM market is a lucrative one[6]. Microsoft holds

[5] Source: http://www.cnn.com/TECH/computing/9901/11/microrise.idg/

[6] It can be argued that OEM installs is how Microsoft was able to take over the desktop market. See http://www.linuxandmain.com/features/os2retro.html.

92% of the OS market and they earn approximately $40 per OS install[7], their revenue from OEM OS installs *alone* can be estimated as follows:

Global: 30 million PCs X 92% X $40 = $1.104 billion per quarter
US: 11 million PCs X 92% X $40 = $404.8 million per quarter

Clearly, even a small share of this $6.6 billion global market is enough to build a very significant business. For comparison, Red Hat, the largest Linux focused company in the world generated total revenue[8] in 2001 of only about $83 million[9].

Linux users tend to be very loyal and vocal "customers". If one scours the internet, it is very easy to find many cases and stories of people who use Linux and are extremely satisfied with it. Scouring the internet for those who have left Linux for Microsoft, one comes up almost empty handed.

The OS market cycle is extending. Where once users refreshed their computer every two to three years, this time frame is extending to four and five years. As most home users refresh their operating system only when they purchase new hardware and then keep this system for four to five years, it is important for Linux to gain a foothold with users when they purchase a new computer.

B Positioning

There are two classes of competition for RHCV. The first class is other Linux distributions. Although Red Hat is the largest and most recognized distribution, the very nature of open source means this could change very quickly. The software is only the gateway to the more lucrative value-added services including support contracts. The second class of competition comes from Microsoft which currently holds 92% market share. Red Hat faces an uphill battle against Microsoft and should position themselves to emphasis the strengths of Linux over Windows and to emphasis the ease of switching (see appendix 12).

[7] $40 is a very conservative figure based on figures from http://www.bviweb.com/pages/windoz.html and http://www.cnn.com/TECH/computing/9901/11/microrise.idg/
[8] Including sales of Red Hat Linux, services and all other revenue generating activities.
[9] See http://www.redhat.com/annualreport/idea.html

Each Linux distribution positions itself to a slightly different market see appendix 6). The four vendors analyzed all have two versions of their distribution, a basic and an advanced. Red Hat should introduce a third aimed at consumers which would emphasize ease of use and compatibility with Microsoft products.

C Market Segments

The simplest and most common market breakdown for PCs is to break it down into three groups: servers, business and home (see appendix 9). Linux has made the biggest inroads to date in the server market, achieving the largest market share in webservers at approximately 55%[10].

Outside of the server market, it is a Microsoft world (see appendix 5) and any OS, be it Apple, Linux or another OS, faces a long uphill battle to gain market share against Microsoft with it's monopolistic practices[11].

D Costs & Diagnosis

In the home, consumers tend to rely on the recommendations and opinions of friends and relatives who have significant computer experience. These tech-savvy people often act as an informal help-desk and support staff for their friends and relatives.

Initially, the campaign for RHCV should aim for these tech-savvy home users. This sub-segment of the home user market is a group-opinion leader and once penetration of this group is achieved, they will actively promote RHCV to other members of the group.

To reach this group a campaign aimed to encourage tryout of RHCV should be used. The elimination of barriers to tryout and education of consumers of the new product are of utmost importance. The primary barriers to tryout for RHCV are:

- **Lack of media** – RHCV will be available as a download for free. However, there are many steps involved before actual installation can be done including selection of version, download, burning the disk-images to a CD-ROM. These steps can be very time consuming, especially given the size of the files and limited bandwidth in the home.

[10] See http://www.netcraft.com/survey/ for web server statistics and analysis.
[11] See http://www.usdoj.gov/atr/cases/ms_index.htm

- **Dual boot** – Most computers in the home have a single OS installed on them. To most end-users the process of backing up data and installing a new OS is a very long and daunting task.
- **File Compatibility** – End users do not want to lose their current data files. If file compatibility is not seamless, users will be reluctant to try out and use.

To minimize these barriers, advertising must educate consumers that RHCV is able to read Microsoft files, the installation already performs a dual-boot install with ease and through AOL-type of advertising (sending CDs directly to consumers) the lack of media can be overcome.

The test market campaign is aimed at the greater Sacramento area. With a population of nearly 2 million and close to 700,000 households[12], this is a sizeable market. The campaign will consist of two prongs:

- **Direct mail** component and a magazine advertisement. See appendix 3 for a cost breakdown for the direct mail. Direct mail, if designed appropriately, addresses all of the stages of the Customer Response Index (appendix 10) including:
  Aware – with proper design, awareness will be built in
  Comprehend – materials with the CD should clearly and simply explain RHCV.
  Interested – By communicating the advantages of RHCV, interest will be built
  Intentions – Once consumers see the benefits of RHCV, many will want to try it.
  Action – By providing RHCV with the mailing, barriers to trying RHCV will be virtually eliminated.
- **Magazine advertisement**. See appendix 3 for a cost breakdown for the magazine advertisement cost breakdowns:
  Aware – with proper design, awareness will be built in
  Comprehend – As the customer interview with Siew Peng Wong (Appendix 8) demonstrates, many consumers are barely aware of what an OS is let alone the advantages of one over another. The ad design should clearly and simply communicate what an OS is.
  Interested – Ad design should be focused on explaining the benefits of RHCV over Microsoft products including lower cost, ease of use and compatibility.
  Intentions – Once consumers see the benefits of RHCV, many will want to try it.
  Action – By providing RHCV with the mailing, barriers to trying RHCV will be virtually eliminated.

[12] Source: http://www.sactoedc.org/economic_profile/population.html

II Marketing Decisions

A Target Segment

Red Hat Linux is the leading distribution of Linux in the server market with 55% percent of all shipments. Also, Red Hat is a leader in the embedded market. The two market remaining market segments where Linux (and Red Hat) is currently weak are the business desktop and consumer markets.

Once Linux has evolved to the consumer level (appendix 11), Red Hat would be well advised to lead the charge into the home by first gaining a portion of the business desktop market.

Consumers purchase computers for the home based on several reasons including:

- **What they use at work/school** – this is the primary driver in what a consumer will want to use at home. As Red Hat gains market share in the workplace, logic dictates that use in the home will follow.
- **What others are using** – Drawing a parallel from the home video game consol market, Metcalf's Law shows that the network effect is a powerful driver. With Microsoft holding 92% market share, this will be a powerful force to overcome.
- **As a tool** – Most consumers use computers as a means to an end; to write a letter, email a friend, balance a checkbook or draw a picture. They do not want to back up files, worry about virus attacks and reboot a crashed computer. Linux is better than Windows on many feature points. Once it is better on most all feature points, it will be ready for roll-out into the home market.

B Positioning

- Red Hat should position RHCV to focus on the strengths of RHCV over other Linux distributions including ease of use, most recognized brand, largest company, give back to the community and provide top notch support. They can not afford to ignore Microsoft Windows and must address the differences between the two. The two differences which will resonate most with consumers is the stability of Linux and the low TCO (Total Cost of Ownership). A certain portion of the ad campaigns should focus on direct comparisons between Microsoft Windows and RHCV.
- Red Hat will generate more revenue over the long run through support and services than they will from selling copies of RHCV. To this end, their market share and perceptions of them as a helpful, friendly and technically advanced company are very important. One reason companies like Dell and UPS were able

to capture as much market share as they did is the perception that they are the best in their respective businesses.

C Objective Attributes

- RHCV will be cheaper and provide more value than any offering MS has (Appendix 1) to the consumer.
- Based on Linux, RHCV is standards compliant – users are not locked into a proprietary format.
- RHCV support subscriptions will generate long term revenue, long after the initial software purchased is obsolete (much like the AOL model).
- Linux is well known to be "rock solid", unlike most Microsoft products. It is not uncommon for Linux PCs to go months between reboots. For most users of Windows PCs, a full work day without the need for a reboot is unusual.
- Microsoft has been developing Windows for over 20 years to get it to the point that it is. Linux was begun in 1991 and Red Hat begun in 1993. In a little over half of the time, Linux and Red Hat has surpassed Microsoft in many areas (networking, reliability) and almost caught up in others (ease of use, end-user programs such as office suites)

D Price

There are two external bounds on the price Red Hat can command for a home version. The lower bound comes from competing Linux distributions and, due to the nature of the GPL, from Red Hat themselves[13]. This lower bound is essentially a price point of free. The upper bound is the price set by the current market leader, Microsoft (appendix 1).

[13] The GPL (appendix 13) requires that any software licensed under it be released to the community freely, without restrictions. No Linux distribution interprets this in its strictest sense – in that sense, they only have to contribute back the source code which most users do not have the skill to compile into a useable program. All Linux distributors interpret this stipulation more generously and liberally, providing compiled software and even disk images as free downloads. A common misinterpretation of the GPL is that they can not sell the software. The GPL says only that the source code must be redistributed with the software and that there are no restrictions on others using the source code in any way they desire.

Practically, Red Hat must cover their costs and generate a profit. There are three considerations for Red Hat's pricing model of their consumer version:

1 Product Media Cost

If a consumer downloads RHCV from the internet, the media cost to Red Hat is essentially free due to extremely large economies of scale. Similarly, an OEM install is performed on a new machine prior to shipment to the consumer. Each copy installed essentially costs Red Hat nothing.

The retail channel is a relatively inexpensive channel but the most expensive one for RHCV. The typical cost to manufacture a boxed version of software is $10 per box. This cost is more than made up by the selling price because software is an industry of great economies of scale. Once software is developed, the cost of selling an additional copy of the software is essentially zero – especially true for internet downloads.

The promotional channel of sending free CDs to consumers is relatively inexpensive compared to boxed versions with a net savings seen. Although there is no guarantee of adoption by consumers, if only a 1% adoption rate is achieved, this channel will break even in a little over 2 years (see appendix 3).

2 Support

The current basic version of Red Hat which regularly sells for about $30 ($20 on sale) includes manuals, media and 30 days of support. Assuming the packaging, manuals and media cost Red Hat about $10 and the retail markup is approximately $10, this leaves $10 for Red Hat's profit to cover overhead and the 30-day support.

Recently Red Hat began a new tier of service on their Red Hat Network, offering yearly support for $60 which works out to $5/month/computer. With the promotional CDs to be included in the magazine and direct mailing, if a code or coupon good for a 30 day free trial of support is included, this will add approximately $5 to the cost of each CD which is activated. But, this is just one

more incentive to the consumer to try the Red Hat service. In most industries, the software industry included, $5 is seen as a very cheap way to gain customers.

To demonstrate the value of selling support over software, consider the following situation:

> Customer A buys a new computer in 2000. They do not buy a new computer (or OS) until 2004. If Red Hat sells customer A a boxed version of RHCV and nothing more, even if the customer buys from Red Hat again in 2004, Red Hat will generate only $30 in revenue from customer A over 4 years.
>
> If customer A is provided with a copy of RHCV when he purchases his computer already loaded and a 30-day free trial of the support, assuming the customer continues the support service, the revenue generated from customer A over the life of the computer ($5/month x 59 months) is $295 – nearly ten times the revenue of a single box!

Red Hat need only convert 1 out of every ten OEM install customers into regular support subscribers to generate the revenue from a single box sale. If Red Hat held the 92% market share Microsoft does, this would translate into ***increasing*** revenue of $55 million dollars/week ***every*** fiscal quarter for the US market alone[14].

Red Hat has always offered support in one form or another; they and the rest of the software industry are moving towards a services model where the software is essentially free but the consumer pays for various services. Even Microsoft is attempting to move in this direction but finding it extremely difficult due to their clinging to a closed-source business model.

3 Competition

Due to the GPL, there is no legal way Red Hat can prevent a competitor from offering support on Red Hat products. The best method for Red Hat to retain market leadership is to model their support offerings after auto makers who encourage customers to take their car to a dealership because the dealership ostensibly has more expertise and higher standards than private shops. Continuing

[14] With 11 million PCs sold each quarter in the US, 11 million x $5/month = $55 million/month

the analogy, notice that auto dealers and auto makers are able to coexist with a thriving secondary auto repair market.

Another example is that of a company Red Hat purchased in late 1999 called Cygnus. Cygnus built their business around Open Source software by being the preeminent leader in developing their software. Others were free to contribute to the code base, free to use the code and free to compete on support but Cygnus held a dominant share of the market because they knew the product better than anyone else.

E Channel

There are four channels of distribution Red Hat should consider:

1 Retail Boxes/books

Until around 1992, the retail channel was how most consumers purchased the OS and other major software for their computers. There are two major benefits to using the retail channel including customer awareness and to minimize barriers for those who desire to switch away from Microsoft products.

Because of the GPL, anyone can copy a Linux distribution freely. Technical book publishers such as IDG and Prima Tech publish “how-to” books for Red Hat and include CDs with the full distributions on them. Red Hat would benefit from these sales by working with the publishers to include promotional materials with the CDs and books.

2 OEM installs

Most home users purchase their computers with an OS already installed and do not upgrade the OS until they purchase a new computer. As the pace of hardware technology improvements has outstripped software technology improvements, users are keeping their computers longer before upgrading.

The OEM channel took on increased importance beginning around 1992 when Microsoft arranged with the leading OEMs to preinstall Windows on their machines. At the time, Microsoft was quickly growing but did not yet hold the

monopoly position they currently do and, the offer they made to the OEMs seemed like a great proposition where everyone made/saved money. The consumer benefited by paying much less for their OS and office suite, the OEM benefited by offering increased value to the consumer and Microsoft benefited by moving more copies of their software. This strategy was so successful that today Microsoft has a virtual monopoly on the desktop.

Recognizing the value of the OEM channel, Red Hat formed an alliance with Dell and other OEMs to sell PCs preloaded with Red Hat software. All of the vendors have since deemphasized this option or dropped it completely claiming a lack of interest by consumers but recent revelations indicate they may have dropped this support due to pressure from Microsoft[15].

3 Internet downloads

As previously discussed, downloading and installing a Linux distribution is a tedious and time consuming task which will deter most home users. With the advent of broadband (i.e. DSL, cable modems, etc.) in the home, this channel will grow in importance. Where the internet takes on great significance is in the support and upgrade areas. If a user is running RHCV on their home machine and is having a problem, it is possible for a Red Hat technician to log into the home user's machine and fix the problem directly. Also, with automated systems and upgrades, the cost of providing support is dropping rapidly.

4 Promotional CDs

Red Hat's biggest challenge with RHCV will be convincing consumers to try RHCV. Once a consumer tries it, they will most certainly be sold on it as it will be a clearly superior product with many advantages over the Windows/Office combination.

Mailing promotional CDs to consumers gained fame from the massive scale used by AOL to gain customers. Analysis (see appendix 3), anecdotal evidence[16] and

[15] See http://www.reuters.com/news_article.jhtml?type=technologynews&StoryID=713590 and http://www.eweek.com/article/0,3658,s=1884&a=24242,00.asp
[16] Personal correspondence with an advertising executive of computershopper.com on 20 March 2002.

the rate of adoption of AOL by consumers is evidence to show the effectiveness of this method.

Though not as cheap as OEM installs, due to the effectiveness of this method (i.e. cost per customer gained) and the barriers to entry in the OEM market, this is the recommended method for Red Hat in pilot marketing studies. Through mailing lists and "carpet-bombing" of entire zip codes, very targeted audiences can be reached further increasing the new customer adoption rate.

F Promotion

Direct mail is cheap and effective. A well designed promotion can cover all of the steps leading to consumer adoption of the product (see appendix 10) and, at the very least, build "buzz" around a product leading to increased sales further down the line.

In conjunction with the direct mail campaign, it is suggested that a print ad be placed in a high-profile magazine to increase consumer exposure and market saturation in the target market.

For a full cost breakdown of the suggested direct mail and print ad campaign, see appendix 3.

G Alternatives rejected and why: Why not follow a successful competitor's approach?

Common and effective promotions for software include TV ads, print ads, web advertising and direct promotions. Since RHCV is aiming at a less technical market, we rule out the use of most web advertising except to targeted audiences – a partnership with AOL would go a very long way with the target audience. TV ads are expensive but can be highly effective in creating consumer demand – something which will aid Red Hat's quest to be adopted by OEMs. This technique is also used at the retail level with coupons. When many consumers go to a grocery store to redeem a coupon for a new product only to find the grocery store does not carry the product, they often ask the manager why. This pressures the manager to carry the new item.

In the test marketing to be done for RHCV, it is recommended that the cost of TV ads be avoided initially. Only when a national roll-out is considered should TV ads be used.

III Implementation

A Budget for 1 metro area

See appendix 3 for a cost breakdown of the suggested test marketing campaign.

B If actual doesn't meet expected targets after 1 purchase cycle, how fix?

If the adoption rate of between 1% and 3% is not seen by customers, further market research should be performed to determine why not. This research can include surveys, focus groups, demographic studies, etc.

It is believed the possible weaknesses that will be seen from this campaign are due to:

- Low market awareness – Linux and Red Hat have had tremendous exposure within the trade press but very little outside of it. To remedy this, Linux should continue their current tactics of organic growth. This will build much value into the Red Hat name and provide a healthy yearly return. When the time is right, they should embark on a national advertising campaign.
- Technical immaturity – If it is found that consumers did not adopt RHCV from the promotion due to technical immaturity, Red Hat must identify the areas where work is most needed and focus on these areas. Repeat the campaign after improvements have been made.
- Poor ad design – If this is found to be the problem, a redesign of the ads to address the various levels of product awareness (appendix 10) should be done and a repeat of the test done.

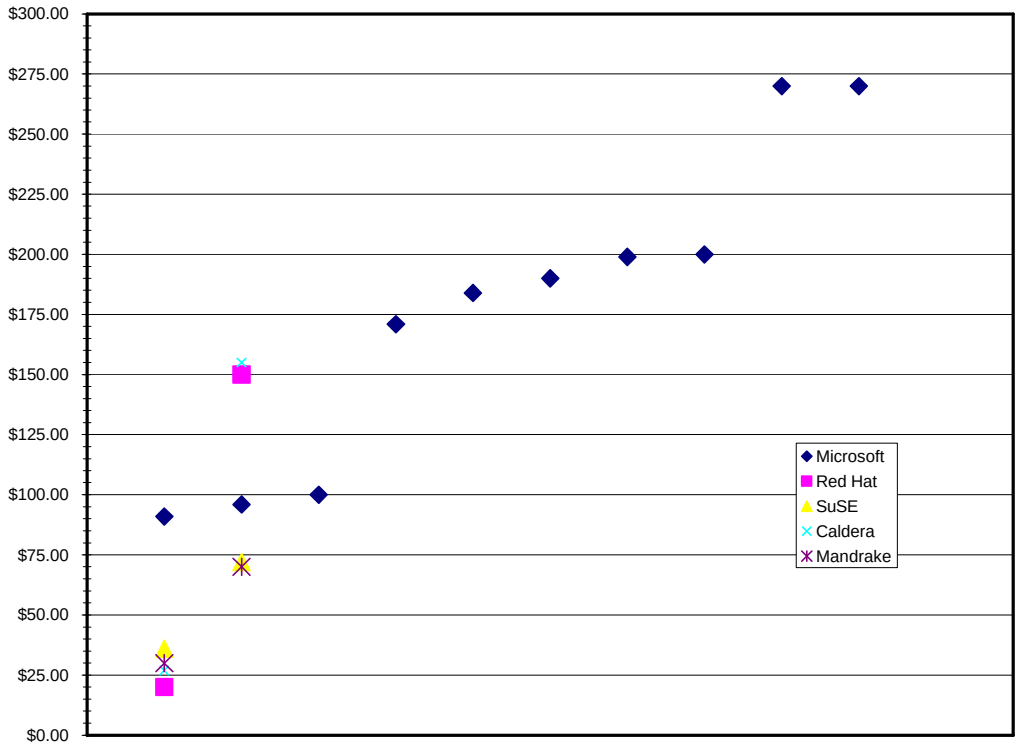
C Who should they call tomorrow?

Red Hat already has a version of their OS suitable for branding as a consumer version. Bundling that with OpenOffice and other productivity software and games to make the RHCV, all that is left to do is design the CD labels, packaging and advertisement for the magazine. They should contact their ad agency, Euro RSCG DSW Partners to fine tune this promotional campaign and design the media.

Appendix 1: Current Product Price Chart

Company	Distribution	Price
Microsoft	98 Retail	$189.95
	98 Upgrade	$95.95
	Me Retail	$170.95
	Me Upgrade	$90.95
	2000 Pro Retail	$269.95
	2000 Pro Upgrade	$183.95
	XP Home Retail	$199.95
	XP Home Upgrade	$99.95
	XP Pro Retail	$269.95
	XP Pro Upgrade	$198.95
Red Hat	Workstation	$20.00
	Professional	$149.99
SuSE	Personal Edition	$35.95
	Professional	$71.95
Caldera	Workstation	$26.95
	Professional	$154.95
Mandrake	Standard	$29.99
	Power Pack Edition	$69.99

Sources: www.dell.com, www.redhat.com, www.cdw.com



As can be seen in the chart above, Microsoft targets 3 separate price points, $100 range, the sub-$200 range and the $275 range. All of the basic Linux distributions can be purchased easily for under $50 with the “professional” distributions found for between $75 and $150.

Note that none of the Linux distributions offer upgrade versions as this is built into the initial purchase. However, even if a Linux user were to follow an upgrade path by purchasing a new version of their system when it came out, the total amount spent would still be far below that of purchasing a version of Windows followed by the upgrade version several years later.

This chart can also be interpreted to show the varying prices the market is willing to bear. With a %92 desktop market share, Microsoft is essentially free to set prices at their whim. Given the pricing strategies found in other monopolistic situations, it is a reasonable assumption that Microsoft prices their products above the optimum price point. Therefore, Red Hat can assume that consumers would be willing to pay up to about $100 for a basic operating system purchased without a computer.

Appendix 2: PC Shipments in US & Worldwide (millions)

	Q4 1999	Q1 2000	Q2 2000	Q3 2000	Q4 2000	Q1 2001	Q2 2001	Q3 2001	Q4 2001
Worldwide	33.2	31.4	31	34	36.6	32	30.4	30.41	34.2
US	12.4	11.4	11.4	13	11.4	11	10.7	10.3	11

The US market comprises approximately one third of global PC sales. This is an important, lucrative and concentrated market. Worldwide PC sales have been flat since the end of 1999 with various reasons posited for this.

Sources:
http://news.com.com/2102-1001-270289.html
http://www.entmag.com/news/article.asp?EditorialsID=5040
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http://cyberatlas.internet.com/big_picture/hardware/article/0,1323,5921_316281,00.html

Appendix 3: Cost of Promotional Campaign

Ad Run in PC Magazine & Promotional CD Price Estimates

PC Magazine, although technical in nature, reaches many home and business users who are opinion leaders in the OS market. Gaining their support is important if RHCV is going to penetrate the home market.

Item	price
2 page ad, single issue	$146,290
CD Insert	$10,000
Artwork	$5,000
Total	**$161,290**

A single print ad in PC Magazine reaches approximately 150,000 readers in Northern California (breakdown for Sacramento is not possible). To add in a CD for just the Northern California region will cost $10,000 and Red Hat supplies the CD. With approximately 150,000 readers in Northern California, $135,000 (see table below) should be added to the $161,290 for a promotion total of **$296,290** to reach 150,000 readers.

Item	piece price	extended price
CD replication & printing	$0.46	$115,000
Sleeve & shrinkwrap	$0.19	$47,500
Postage (approx.)	$0.25	$62,500
Total	**$0.90**	**$225,000**

This estimate, for a run of only 250,000 CDs is a low run number. Increasing economies of scale can be seen for larger runs. AOL, for example, is famous for mailing out millions of CDs and their total cost per CD may be as low as $0.50. But, keep in mind that even if the conversion rate is 1%, this would work out to 2500 new customers at a cost of $225/customer (for $0.90/CD) and $125/customer (for $.50/CD).

Assuming no direct overlap between the PC Magazine advertisement and the direct mail promotion, 400,000 potential customers will be reached by this marketing campaign for a total cost of $521,290.00 which works out to a cost of $1.30 per potential customer.

Cost of customer acquisition

Conversion %	# of customers	cost per customer
0.5%	2,000	$260.65
1%	4,000	$130.32
3%	12,000	$43.44
5%	20,000	$26.06
10%	40,000	$13.03

It is estimated that between 1% and 3% of those exposed to the advertising campaign will become customers of Red Hat by signing up for the monthly support (at $5/month) and other services. Revenue generated by these customers will equal the cost of acquisition after 9 months or 26 months (2 years, 2 months) for 3% or 1%, respectively. This initial campaign should also be looked at as an investment in the future for building awareness of RHCV. 4,000 happy customers will, according the famous and oft-cited statistic, tell 32,000 other people of their experience.

Appendix 4: Hardware/software cost breakdown of a PC

Part	Price	MS %	MS OEM%	Linux %
CPU	$85	6	8	9
Fans	$20	1	2	2
Motherboard	$90	6	9	10
Memory	$90	6	9	10
Case & Power Supply	$40	3	4	4
Hard Drive	$70	5	7	8
CD-ROM drive	$100	7	10	11
Floppy Drive	$10	1	1	1
Video Card	$100	7	10	11
Monitor	$150	10	15	16
Inkjet Printer	$40	3	4	4
Sound Card	$40	3	4	4
Speakers	$20	1	2	2
Microphone	$10	1	1	1
Modem	$15	1	1	2
Mouse & Keyboard	$10	1	1	1
	MS	**MS OEM**	**RH**			
OS	$200	$40	$30	13	4	2
Office Suite	$445	$75	$0	29	7	0
Total:	**$1,535**	**$1,005**	**$920**			

Hardware configuration taken from the geek.com website, prices taken from the pricewatch.com (hardware) and dell.com (software) website. A large scale vendor such as Dell can negotiate lower prices for the hardware components listed but has other costs which make up for these lower prices.

Although secret, it is well known that the prices Microsoft offers to OEMs are dramatically less than those offered through the retail channel. The OEM prices listed here for MS software are estimates from http://www.cnn.com/TECH/computing/9901/11/microrise.idg/

The price differences between MS and RH become even more dramatic when one considers that the RH prices are for the retail version, not an OEM version which could potentially be free bringing the total percentage price difference between an MS OEM machine and RH OEM machine to greater than 10%.

Appendix 5: OS Market Share

	1996	1997	1998	1999	2000
Windows	79%	86%	86%	87%	92%
Apple	7%	5%		5%	4%
Linux		2.40%	2.50%	<1%, 4%	1%, 1.5%

Market share for Windows and Apple is relatively easy to determine from sales records. Linux market share, however, is very difficult to determine as it is perfectly legal to copy it without purchasing it. The trends, however, are very clear: Microsoft has continued to slowly gain market share at the expense of Apple and other OSes while Linux has gained a foothold in the market.

Sources:
http://news.com.com/2100-1001-243527.html?legacy=cnet
http://www.businessweek.com/bwdaily/dnflash/may2001/nf2001051_655.htm
http://news.com/2100-1001-251220.html
http://news.com/2100-1040-817659.html
http://www.zdnet.com/pcweek/stories/news/0,4153,382643,00.html
http://www.cnn.com/TECH/computing/9806/12/upstarts.idg/
http://www.google.com/press/zeitgeist/jan02-pie.gif

Appendix 6: Linux Distribution Market Share Breakdown

	1999[1]	2000[2]	2000[3]
Red Hat	48	25	29
SuSE	15	6	48
TurboLinux	10	8	0.2
Caldera	10	4	0.5
MandrakeSoft	4	32	21
Corel	1	23	1.2

Determining the overall market share of Linux is very difficult and determining the market share of a particular Linux distribution is even more difficult as the conflicting numbers presented above attest. The trend is clear – Red Hat, SuSE and Mandrake lead the market. One possible cause of the discrepancies is the particular market niche each distribution aims for. Currently, Red Hat aims for the server market (claiming, according to the Red Hat website, to have over 50% market share in the Linux portion of the server market) while SuSE, strong in Europe, aims for the business desktop and Mandrake targets the home user.

Sources:

1 http://news.com.com/2100-1001-245203.html?legacy=cnet
2 http://www.linux-mandrake.com/en/pr-numberone.php3
3 http://www.linuxplanet.com/linuxplanet/opinions/3173/1/

Appendix 7: Customer Interview with Advanced User

Interviewee background

Paul Miller, from Georgetown, CA, has extensive (about 30 years) experience with electronics, having begun his work with analog systems used in military jet fighters.

Paul was first exposed to *nix[17] around 1994 and has several years experience working for an Internet Service Provider (ISP)[18] where he has gained a significant understanding of administering Linux systems and the support requirements of individuals and organizations.

With his many years of experience, Paul knows Microsoft, Apple and *nix operating systems well. Similar to Solaris and other *nix variants, Paul began using Linux with Red Hat 5.0, which was released around 1998, and considers himself to be a "power-user."[19]

Summary Points

- Paul is atypical of the consumer computer market with his skills and wealth of previous experience. Also, he is more willing to endure problems with a maturing product such as Linux as a trade off for using the newest and most technically developed products.
- Having worked as a support technician for many years, Paul also understands that the average consumer does not have the knowledge or desire to maintain their own

[17] "*nix" is a common abbreviation used to encompass all of the many Unix variants, Solaris and Linux being two of the more common ones currently.

[18] By looking at bandwidth instead of data flow, the Internet can be broadly broken down into 3 separate areas (but there is much overlap and blurring between these areas):
First is the backbone, maintained by a consortium of universities, governments and large companies, they maintain what is very similar to a long-distance telephone infrastructure. They are analogous to the producers and warehousers in a manufacturing system.
Second are the ISPs themselves. Many backbone providers also function as ISPs either directly or through subsidiaries but there are also many independent ISPs of varying size and sophistication. An ISP is the middleman between the manufacturer and final customer. Some ISPs act as meta-ISPs, buying bandwidth from backbone providers and reselling it to smaller ISPs.
Third are the actual users of the Internet. They connect their computer to an ISP through various methods including dial-up, cable, DSL, T1 lines, etc. However, an end-user can also be host to a network themselves.

[19] In many magazine articles and books, computer users are classified into 4 levels of descending skill/knowledge: Guru, power-user, user and newbie.

computer. They look at the computer as a tool for primarily email, word processing, web surfing and games, much as how most people do not know how to maintain their car – they simply want to get in it and drive.

- Red Hat is the distribution of choice for Paul but he recognizes that there is not a large difference between distributions. Competition between distributions is low and focused more on niche markets (i.e. home, business, scientific, embedded) than on head-to-head competition. His choice of Red Hat is mostly because he perceives Red Hat as the largest and most stable distributor and he likes that Red Hat does R&D where many distributors do not.
- Red Hat and Linux in general have come a very long way in the past 6 years but Paul sees that it will be a few more years before it is ready for the average consumer.

Interview

How and where do you use Red Hat?

- A small network at home which combines Apple Macintosh, Microsoft Windows and Linux operating systems. Linux is the only viable solution for my server because Windows can not do what I want, would be too expensive and I am able to leverage skills I gained elsewhere to run this server at home.
- On the desktop, I have one computer set up for Linux and use it quite often. Linux is a growing and maturing product and I enjoy watching its growth with every revision.

Who do you perceive as competitors to Red Hat and what are their strengths and weaknesses?

- The SuSe Linux distro[20] is more focused on business, the Debian distro is focused on providing a complete distro (i.e. no software is left out) and, Red Hat is more "grassroots" with a focus on innovation, R&D. **All** Linux distros are more technical (better) than Windows which is just packaging and marketing driven.
- Windows is very easy to use for the average person but also very insecure. Microsft has done a very good job of making computers easy to use but has dumbed down the process too much by limiting what can be done: "This is all there is, a limited

[20] "distro" is a very common term used which is short for distribution. Currently it is estimated there are over 300 distributions of Linux available but only about 13 major distributions.

universe". This is a double edged sword – Windows does not have the functionality of *nix systems but the neophyte user has less opportunity to "mess up" things, also. Due to the closed nature of Microsoft (not just source code but their entire process is opaque), there is a lack of trust. Windows lacks security, is expensive and end-user support is lacking when compared to *nix OSes.

- Not everyone wants a command line[21] but choice is important – people should be able to choose if they want to use a CLI or GUI.

What if Red Hat was not available? What would you use?

If Red Hat were not available, I would choose to use the Debian distro. Part of this is cultural, what I am used to and what I have previously used.

What attributes are important to you when you use Red Hat?

- I knew I wanted to use a Linux distro and chose Red Hat in particular because of my expectations of the future market and where it would go. *Interestingly enough, given his comments about Microsoft, one of the reasons he chose Red Hat was because they have better marketing than other Linux distros.*
- I used and tried other Linux distros and most of the reasoning behind my choice of Red Hat was from this research. SuSe might be better for businesses but one problem SuSe may have (in America) is that it is not made in America. SuSe is made in Germany but SuSe has a very strong presence throughout Europe.
- The biggest problem which Red Hat and all other Linux distros have is with the installer scripts[22]. I went through a lot of pain when I first installed Red Hat due to the poor installer. The installers have greatly improved since I began using Red Hat but there is so much choice available when installing Red Hat – you can get confused but

[21] Command Line Interface, or CLI, is the basic interface between humans and computers. In most operating systems, the GUI (Graphical User Interface) runs on top of the CLI and the CLI is easily accessed. In all but the newest of Apple's OSes, there was no easy way to access the CLI without special software and until the latest Windows OSes, all of Microsoft's OSes allowed relatively easy access to the CLI.

[22] All computer programs, including OSes could, in theory, be installed by hand without the assistance of an installer. However, most of the work involved in installing a program is very basic, repetitive copying of files and "pointing" them – telling files where other files are located. With a modern OS, there are literally thousands of files. To copy them by hand and point them would take a skilled individual days. An installer script (or program) can take care of this process (depending on the speed of the computer) anywhere from 10 to 30 minutes.

that's the price of flexibility. Besides, you need to install an OS three times to get to know it well.

- Positives for Windows and negative for *nix are that Windows is easy to interface with Netware (a common networking package), Windows provides a consistent user interface (all programs share same menu structures, icons, shortcut key combinations, etc.), is geared towards people who do not want to learn (are more interested in the task at hand than the computer itself) and appears safer.
- Negatives for Windows include that it is less secure and is less flexible to use than *nix.
- X-Windows (the framework upon which most GUIs for Linux are built around) has many problems due to the plethora of video cards available and multiple standards. But, like much *nix software, it has matured greatly since the mid-90's.

Which competitors do you perceive as best on each attribute?

- Price is not an issue with Linux distros since all can be acquired for free.
- Mandrake installs better than most other Linux distros and has a good default GUI for most people – so much has to do with appearances.
- Debian is available on floppies (many of them) and strives for backwards hardware compatibility.

If you could change one thing about Red Hat, what would it be, and how would it help you?

- Hardware compatibility lists would be of higher quality. Currently these lists include hardware and drivers which may not work as espoused. This is due to many naive but enthusiastic people saying the drivers/hardware work when, in reality, they may only work in a very specific situation. Windows is much more mature on this point because most (if not all) hardware manufacturers produce their own drivers in-house. Microsoft does very little, if any, driver development but, with a 93% market share, they can afford not to. If a hardware vendor wants to reach 93% of all computer users, they must develop a driver on their own.
- Also related to hardware compatibility lists, this would save time on installs and configuring machines.

Segmentation Matrix for Red Hat & Competitors

From the interview with Paul, the below segmentation matrix was developed to show what characteristics he values in an OS and how Red Hat compares with other *nix distros (because all *nix distros are very similar) and with Microsoft OSes (again, because all Microsoft OSes are very similar).

	Weight (%)	Red Hat	Average *nix distro	Windows (all distros)
Quality Attributes	**40**	**33.8**	**33.8**	**23.2**
Flexibility	7	5	5	2
Reliability	7	5	5	2
Security	9	4	4	1
Hardware Compatability	8	3	3	5
Software Availability	3	5	5	5
Software Quality	6	4	4	4
Price Attributes	**20**	**18.8**	**16.4**	**8.8**
Unit Price	4	5	5	1
Volume Price	4	5	5	1
Support Costs	6	5	4	1
Installation Costs	6	4	3	5
Convenience Attributes	**30**	**28**	**24.6**	**18.4**
Flexibility	6	5	5	2
Installation	6	4	3	5
Support	6	5	4	3
Easily acquired	3	5	5	5
Downloadable	3	5	4	1
Customizable	4	5	5	1
Metcalf's Law	2	3	2	5
Signalling Attributes	**10**	**10**	**7.6**	**4.4**
Logo	3	5	1	5
Trust	7	5	5	1
Sum of Weights (%):	100	90.6	82.4	54.8

***** Software availability is defined here as the amount of software available as well as ease of acquiring. With the availability of the internet and various channels including retail and mail order as well as the plethora of programs available for both Windows and *nix software availability is not an issue for these systems.

Note: weights and summaries are expressed as a percentage but scores are recorded on a 5 point scale with 5 being the highest and 1 being the lowest score.

Appendix 8: Customer Interview with Average User

Interviewee background

Siew Peng Wong is a college educated 25 year old living and working in the Washington, DC area. Her current position is with PBS in their media sales department selling and fulfilling orders primarily for videos. Like most average users, she uses a computer mostly at work for work-related tasks. She first used a computer while in college for writing papers on her roommate's computer. Currently, Siew Peng owns a laptop at home but does not use it, preferring to do use the computer at work for all of her computer needs.

Summary Points

- Siew Peng is very typical of the average consumer. She is barely aware of the conceptual framework of a computer – i.e. a word processor is a program running within the OS environment. In response to the question of what word processor she runs, she responded "Microsoft Windows."
- With very little knowledge of computers, Siew Peng often indicated that she would rely on friends for help with installing software or fixing problems with a computer if her company did not have help-desk support. However, she also said that if the installation of a program were easy and straight-forward, she would not hesitate to install it herself.
- Like most users, Siew Peng sees a computer for what it can do for her, how it can solve other problems. Outside of the tasks she knows a computer can do for her (writing letters, email, work related functions, browsing the internet, purchasing online), she has little interest in them.
- With the use of a computer where she works and with only a limited desire to be connected to the internet, Siew Peng has no need of a computer outside of work; all of the tasks she needs from a computer can be done at work.
- Siew Peng is not aware of the existence of Red Hat or Linux. She is not aware that there are different OSes and that they may be mutually incompatible.

Interview

How and where do you use a computer?

- At work mostly. I have a laptop computer at home but I never use it because it doesn't have a modem.
- I use it mostly for writing business letters (MS Word), entering orders… I use (MS) Excel a lot to track orders. The email program I use is called First Class (a proprietary network system popular with educational institutions and non-profits) and we use Act Calendar 3.0 as a group calendar. For internet I use Internet Explorer. *Answering the questions about what software she uses took Siew Peng a bit of time to answer and she hesitated at several places giving the indication that she had never thought about what the software was – it just did the job she wanted.*

What features would you like to see added to your computer and, what would you do it your current software was taken away?

- The only feature I would like to see added is a template function so that I would not have to type the date and my address every time I write a letter. *Siew Peng is unaware that this feature already exists in MS Word.*
- If all of my software was taken away? I'd complain to the help desk that I need to get work done! Seriously, I would find something else, I mean, there's got to be something else, right? I suppose a friend of mine could help me figure out what to get and what to use. If the installation is easy and straight forward, I would do it myself but, otherwise, I would try to get a friend to help me with the installation.

What would you pay for an OS and an office suite?

- If I were buying a computer for my home, I don't think I'd pay no more than $50 for the OS and maybe up to $150 for an office suite. *An explanation of what an OS is and the difference between the OS and an office suite was required. She was very surprised to learn that Red Hat and other Linux distributions are available for less than $50 and include an office suite.*
- I would pay more for ease-of-use. Even if a competing product were cheaper, if it required me to buy books or take classes to learn how to use, I would be willing to pay more for the product which did not require training.

- *Informed that Windows has a market share of 92%, Siew Peng was asked if this mattered.* No, it does not matter to me at all as long as the files are compatible… you know, like I can write a letter at work and bring it home on a disk.

What would you pay for support?

Several options and scenarios of support were offered – the option of paying on a monthly basis as a subscription and a per-incident basis. Both options were presented as "full" support including a website and toll-free number.

- If none of my friends could help me, I think I would pay, maybe $20 for support for a one-time payment or no more than $5 a month as a subscription.

Segmentation Matrix for Red Hat & Competitors

From the interview with Siew Peng, the below segmentation matrix was developed to show what characteristics she values in an OS and how Red Hat compares with other *nix distros (because all *nix distros are very similar) and with Microsoft OSes (again, because all Microsoft OSes are very similar).

	Weight (%)	Red Hat	Average *nix distro	Windows (all distros)
Quality Attributes	**30**	**27.6**	**27.6**	**19**
Flexibility	4	5	5	2
Reliability	9	5	5	2
Security	2	4	4	1
Hardware Compatability	1	3	3	5
Software Availability*	6	5	5	5
Software Quality	8	4	4	4
Price Attributes	**24**	**22.4**	**19.2**	**11.2**
Unit Price	7	5	5	1
Volume Price	1	5	5	1
Support Costs	8	5	4	1
Installation Costs	8	4	3	5
Convenience Attributes	**37**	**34.2**	**29.8**	**25**
Flexibility	8	5	5	2
Installation	8	4	3	5
Support	8	5	4	3
Easily acquired	5	5	5	5
Downloadable	3	5	4	1
Customizable	2	5	5	1
Metcalf's Law	3	3	2	5
Signalling Attributes	**9**	**9**	**5**	**5.8**
Logo	5	5	1	5
Trust	4	5	5	1
Sum of Weights (%):	100	93.2	81.6	61

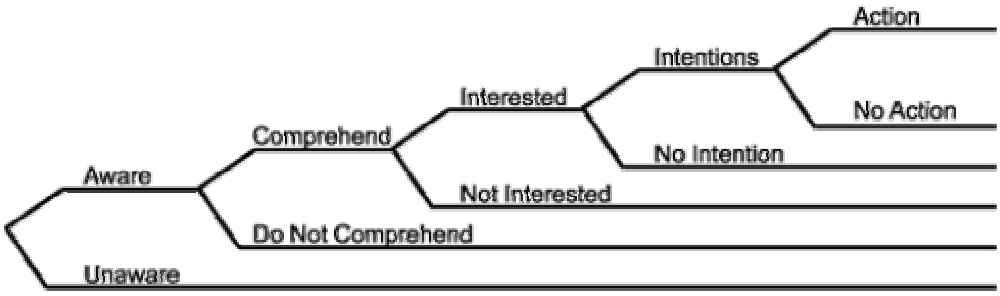
***** Software availability is defined here as the amount of software available as well as ease of acquiring. With the availability of the internet and various channels including retail and mail order as well as the plethora of programs available for both Windows and *nix software availability is not an issue for these systems.

Note: weights and summaries are expressed as a percentage but scores are recorded on a 5 point scale with 5 being the highest and 1 being the lowest score.

Appendix 9: Positioning Matrix

	Home	Business	Server
Quality Attributes	**30**	**40**	**49**
Flexibility	4	7	8
Reliability	9	7	10
Security	2	9	10
Hardware Compatability	1	8	8
Software Availability	6	3	3
Software Quality	8	6	10
Price Attributes	**24**	**20**	**12**
Unit Price	7	4	2
Volume Price	1	4	2
Support Costs	8	6	4
Installation Costs	8	6	4
Convenience Attributes	**37**	**30**	**29**
Flexibility	8	6	6
Installation	8	6	5
Support	8	6	7
Easily acquired	5	3	2
Downloadable	3	3	2
Customizable	2	4	5
Metcalf's Law	3	2	2
Signalling Attributes	**9**	**10**	**10**
Logo	5	3	3
Trust	4	7	7
Sum of Weights (%):	100	100	100

Appendix 10: Consumer Response Index



A well designed ad (or marketing campaign) will lead consumers through all of the steps of the above chart to close the sale. The proposed test market for RHCV plans to accomplish each step through advertisement and direct mail to consumers (aware), copy for the advertisement and in the packaging for the CD (comprehend), by providing compelling copy and graphics, consumers will be curious (interested). With the media in their hands, many barriers to try-out will have been removed (intentions) and consumers will insert the media into their CDROM drive to satisfy their curiosity (Action).

Source: Roger Best, *Market-Based Management*, p. 217, Prentice Hall 2000

Appendix 11: What Linux needs to equal/surpass MS:

Technical

The basic OS is rock solid, more dependable and secure than any OS put out by MS. But, above that layer, problems begin to show. These are not problems of decay or poor design but, rather, the problems seen in an immature project which is still working towards completion. Linux gets better by the day, not worse. Major, overarching issues which need to be dealt with before widespread consumer adoption will take place:

- In the absence of a Linux-only "killer-app", the basic software suite including a word processor, spreadsheet program, presentation package and internet browser must be developed to be as functional as and fully file-compatible with those provided by Microsoft[23].
- To a lesser degree, many other programs must be improved or developed to reduce the switching costs from Windows to Linux. A sample of these programs includes personal financial software, image editors, drawing programs, web development suites, and music players. Individually, each of these programs is not that important but in the aggregate, they represent a very diverse amount of functionality.
- Complete file format compatibility. In some areas, Linux has achieved this, in others it needs work.
- Speed of operations – as robust as Linux is, the latency in the GUI is noticeably worse than that for Windows on the same machine. This problem will be mitigated as hardware improves but must be addressed.

It is estimated it will take Linux (and Red Hat) between three and five years to catch up to and surpass Microsoft's OS offerings. Within two to three years after they catch up/surpass MS, Linux should begin to easily dominate the desktop.

[23] See http://www.linuxplanet.com/linuxplanet/reviews/4078/1/ for a recent opinion piece on this topic.

Social

One very large reason Windows controls the desktop market is related to Metcalf's Law (the network effect). It is difficult to overcome this effect and can only be done when the contender shows a clear superiority over the defender to not only overcome the switching costs but the social costs of using a different system. To reduce the social switching costs, Linux needs:

- Positioned as a "cool" operating system. This is already slowly being taken care of as early adopters begin to use it.
- Easy to use. The average user is not interested in the technology, they are interested in the functionality – sending email, writing a letter, editing a photo. If these tasks are more difficult or take more time to do on a Linux system, users will not want to switch. , The usability of Linux for the consumer is rising lock step with the slow maturation of KDE and GNOME.

There will be a certain amount of lag between when Linux has a clear advantage in financial, technological and most of social and widespread adoption occurs. It is at this point, when Linux has achieved its superiority, that Red Hat should begin marketing RHCV in earnest.

Appendix 12: Linux strengths versus Windows

As documented in Appendix 11, there are key social and technological areas where Linux must mature within before it is ready for the common computer user. Common estimates are that Linux, when compared to Windows, is at about the level of Windows 95 in terms of ease of use, installation, etc.[24] Presented here are a number of areas where Linux is clearly leading Windows:

- **Networking** – This is a fundamental design of the system. Linux is designed from the ground up to be a networking OS while Windows has been slowly and painfully evolving in that direction. There are many areas of networking where Windows simply does not scale as well as Linux.
- **Security** – Various reports have been produced to demonstrate Linux is more secure than Windows. Truth is, security is more dependent upon the system administrator. However, when one looks at the number of viruses and losses due to inadequate security as well as how fast holes are closed and bugs fixed, Linux is clearly the superior OS.
- **Price** – The TCO (Total Cost of Ownership) for running a Linux system is much lower than running a Windows system. Major savings include cost of licensing, cost of hardware and less downtime due to system problems and maintenance. Tools and systems are also in development to further ease remote administration of Linux systems which will further decrease the Linux TCO.
- **Flexibility** – Not as important for the home user today, the ability to run software on multiple platforms (PDA, desktop, webpad, car, etc.) will gain increasing importance in the future. Microsoft has been developing individual proprietary systems for each platform while Linux, as a single system, has been extended to encompass each platform, lessening developer costs and increasing ease of portability between platforms.
- **Freedom** – Windows licensing is restrictive, preventing modifications and studying of code which restrains the creative process. The GPL (see appendix 13) is protective of freedom to create and modify Linux.

[24] Personal experience with several Linux distributions and having used Windows extensively beginning with Windows 3.1 bears this out.

Appendix 13: The Gnu Public License

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Preamble

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