



**Total Cost Of Ownership Analysis:
SCO UnixWare®, Microsoft Windows Server 2003 and
Red Hat Enterprise Linux**

A White paper

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Executive Summary

This white paper compares the cost of SCO UnixWare, Microsoft Windows Server 2003 and Red Hat Linux. The proprietary UNIX operating systems were not evaluated because those operating systems are only available bundled with hardware, and the price of the operating system alone cannot accurately be identified.

Linux (and other Open Source Products) have gained a lot of attention in the industry because they are widely publicized as being free. Unfortunately, “free” is often misunderstood. There are over 50 software distribution licenses that are approved by the The Open Source Initiative (OSI), all of which adhere to the principle that “free” means freely available, not zero cost. OSI certification requires that the software be distributed under a license that guarantees the right to read, redistribute, modify and use the software freely. The OSI website further states: **“If the "free software" label were ever to catch on in the corporate world, it all would be all too easy to imagine Microsoft claiming Internet Explorer is "free software" because its cost is zero dollars. Would we really want that?**¹

Yet the concept of “free software = zero cost” is prevalent in the industry, partly because in the past, many commercial Linux distributors permitted the code to be copied and/or installed on multiple systems without incurring an obligation to pay license fees.

The major Linux distribution vendors have long since realized that their long term viability is directly related to revenue. The revenue generated under the model where the binary executables are given away and the sole revenue source is optional maintenance and support services just doesn't generate enough revenue to make the Linux distribution business profitable.²

For this reason, the distributors are trying to move customers away from the “purchase once install and run multiple times” paradigm. The result is that the cost to run Linux systems has dramatically increased, to the point that Linux is becoming more costly than either SCO UnixWare and even Microsoft Windows.

¹ <http://www.opensource.org/advocacy/free-notfree.php>

² Poe, Tom: “Conversations: A Successful Linux/Open Source Business Model”, June, 2002

Overview of Competitors

Red Hat

Until recently, most of the commercial Linux vendors, including Red Hat, established a business model on the assumption that commercial users required support and maintenance for every copy of Linux they deployed. So Red Hat (and others) permitted their Linux distributions to be freely copied and installed on multiple servers without requiring the purchase of a license for each copy. Red Hat provided fixes to customers that have support agreements.

Some customers deployed a mix of supported and unsupported servers. There was no restriction that prevented customers from reproducing the updates and fixes and applying them to all servers, both supported and unsupported. When Red Hat and the other vendors realized that this model generated insufficient revenue to make the business viable, the vendors required users to purchase a maintenance and support agreement for each copy deployed. Red Hat introduced this new model by discontinuing the Red Hat Linux products and rolling out the Red Hat Enterprise product line.

Red Hat's fiscal year end (Feb 29, 2004) bears witness to the fact that the model that permitted unlimited copying and installation of binaries is not viable, whereas the current model of requiring a maintenance and support agreement for every copy deployed, for as long as the software is in use, can sustain a business. In FY 2003, Red Hat reported a loss of \$6.6M. In FY 2004, Red Hat revenues increased 39% over FY 2003, and Red Hat reported net income of \$14M.

Microsoft

In July, 2002 Microsoft implemented significant changes to its licensing policy. Previously, companies purchased software licenses for a one-time fee, and then upgraded those licenses on an as needed basis. The cost of the upgrade was typically between 60 – 75% of the original license, but could vary if a previous version of the software was being used. On average, Microsoft reports that their customers upgrade server software approximately every 3 to 4 years.

The new licensing policy, License Plan 6.0, incorporated radical changes in the License Program. Among the more significant:

- Microsoft gave their top performing resellers the opportunity to be designated as "Large Account Resellers" (LARS) and to sell the new 6.0 Volume License Agreements. Lower performing resellers who didn't meet the requirements were excluded from becoming a LAR, and thus ineligible to sell the new license program.
- Microsoft created the Software Assurance (SA) Program. SA is a time based agreement whereby end users are entitled to receive all product upgrades and updates released during the term of the SA agreement for the products covered under the agreement. The term of the SA

- Agreement is generally one or two years. The annual cost of Software Assurance is 25% of the software list price for each server, and 29% of the software list price for each desktop. (Software Assurance fee is computed on the total list price of the software, including user bump packs.)
- Software Assurance is only available at the time the product is licensed, and is the only method of licensing product upgrades. If a product is not covered by SA, the cost of upgrading to a new release of that product is 100% of the list price of the product. In other words, existing Microsoft licensees who don't buy Software Assurance receive no financial benefit by being an existing customer. Microsoft effectively eliminated the concept of "upgrade" except as it pertains to SA.
 - The Volume License Program was instituted for customers with as few as 5 licenses.
 - LARS convince the customer to buy Microsoft products, and LARS deliver the products to the customer. However, the Volume Purchase Agreement (VPA) is executed between Microsoft and the end customer. Microsoft establishes and maintains a direct relationship with end customers. Obviously, resellers are not happy about this, because most believe that when the VPA is up for renewal, the reseller will be totally out of the loop. The reseller will derive neither revenue nor commission for VPA or SA renewals.

Method of Cost Comparison

This paper compares the products based on initial acquisition cost and based on total cost of ownership. The prices quoted are from the respective vendor's web site as of February, 2004.

In part one of this paper, the list prices are compared via a list price matrix as a means of quantifying the initial acquisition cost. Although initial acquisition cost is not an accurate indicator of long term costs, in today's sluggish economy, some IT managers place more emphasis on initial acquisition cost than they do on total cost of ownership. Their assumption is that by the time they need to pay additional fees to renew the license, the budgetary restrictions they currently face will have eased.

In part two, the total out of pocket software costs are analyzed over the period that the software is used. Excluded are staff costs associated with maintenance, lost revenue due to downtime, differences in salary and/ or skill level between UNIX engineers, Windows engineers and Linux engineers.

Throughout the analysis only list prices are used. Discounts are not part of the calculation because that information is not publicly available, and therefore is subjective in nature.

Part One

List Price Comparison

Following are the published list prices for each vendor's products. These are the prices that are used to calculate the total cost of ownership.

UnixWare 7.1.4

	Small Business	Base	Business	Departmental	Enterprise	Data Center
PRICE	\$599	\$799	\$1,399	\$2,299	\$4,999	\$9,999
USERS	1	1	10	25	50	150
CPUs	1	1	4	4	6	8
MEMORY	1GB	2GB	4GB	8GB	16GB	32GB

Windows Server 2003

	Small Business Standard	Small Business Premium	Standard	Enterprise	Data Center
PRICE	\$599	\$1,499	\$999	\$3,999	OEM only
USERS	5	5	5	25	
CPUs			4	8	
MEMORY			4GB	32GB	

	UnixWare 7.1.4	Windows 2003 Server
5 user bump pack for SBE or SBS	\$499	\$499
5 user bump pack - all other editions		\$199
10 user bump pack -all other editions	\$499	
20 user bump pack - all other editions		\$799
25 user bump pack- all other editions	\$1,199	
100 user bump pack- all other editions	\$4,699	
500 user bump pack- all other editions	\$22,999	
unlimited user license - all other editions	\$24,999	

Red Hat Enterprise Linux v 3				
	ES Edition		AS Edition	
	Basic	Standard	Standard	Premium
Price	\$349	\$799	\$1,499	\$2,499
Users	1 -2 users	unlimited	unlimited	unlimited
CPU	1	2	16	16
Memory		8GB	64GB	64GB
Support	1 Year	1 Year	1 Year	1 Year

Each product is configured slightly differently, making it difficult to do a simple price comparison. Even add-ons, like additional user licenses are not packaged in a similar manner. The list price is useful to establish an impression of the costs. A more thorough cost analysis is required (part two) to draw conclusions about the price differences.

There are, however, certain observations that can be made based on the target market and the license model for each product.

The UnixWare Small Business Edition is shaded in green to call attention to the fact that this is a new UnixWare Edition, available for UnixWare 7.1.4. This edition was created in response to customer requests for a lower priced, lower entry edition. It is appropriately compared to Microsoft's Small Business Server (highlighted in yellow in the Microsoft matrix) and Red Hat Basic ES Edition. All of these products are intended to be used to support edge of network services, to host a pilot or prototype project on a limited budget, or for running applications in support of a small business. The products are low cost, which is an important attribute in the market the products intend to serve.

Additional user licenses for the Small Business Edition of UnixWare 7.1.4 are priced at \$499 for an additional 5-user license (i.e. \$100 each additional user). Additional user licenses for the Business, Departmental, Enterprise and Data Center Editions of UnixWare 7.1.4 cost approximately \$50 each (i.e. \$499 for an additional 10-User License Pack.) These prices were established to be competitive with the Microsoft server offerings. (Additional users for Microsoft Small Business Server cost \$100 each, whereas additional users for the Standard and Enterprise Edition of Windows cost approximately \$40 each)

Additional user bump packs are not available for the Red Hat Basic ES Edition. Red Hat customers who need more than two users must license the ES Standard Edition. Red Hat doesn't offer discounted fees for customers who migrate from the ES Basic Edition to the ES Standard Edition. So while the entry point price for the Red Hat Basic ES Edition is \$250 less than either the Microsoft or SCO products, that product can't be built up to handle more capacity. Customers who need additional capacity must license a new product. The fact that Red Hat doesn't offer upgrade pricing is not very important, since the annual cost for each product remains constant for as long as the product is in use. Customers should update their systems when the annual renewal fee is due.

There are some differences among the products worth noting.

Microsoft Small Business Server Standard Edition is bundled with:

- Windows Server 2003 - Technologies that enable the server to be used as a file & print server, mail server, terminal server, streaming media server and VPN server. Functionality for remote access, directory services,

Domain Name Server, Dynamic Host Configuration Protocol and Windows Internet Naming Service is also included.

- Windows Sharepoint Services – Web-based team communications and collaboration
- Exchange Server 2003 – Messaging, Communication and collaboration infrastructure
- Office Outlook 2003 – Manages e-mail, calendar and contact information

Microsoft Small Business Server Premium Edition is bundled with all of the functionality in the Standard Edition, plus:

- SQL Server 2000 – relational database
- Internet Security & Acceleration Server (ISA) – Firewall and Proxy Server
- Microsoft Office FrontPage® 2003 – Tools for website development or for creating customized solutions for Windows Sharepoint Services

The SCO UnixWare Small Business Edition of UnixWare 7.1.4 contains:

- Samba – File and Print Server
- IPsec & Squid – Firewall and Proxy server, respectively. These provide similar functionality as is found in Microsoft's IS&A server. (Microsoft only includes IS&A in the higher priced Premium Edition)
- Apache – Web server
- Mozilla – Web browser. The combined functionality of Mozilla and Apache provide tools that enable web-based team communications and collaborations, similar to Microsoft Sharepoint Services.
- OpenSSL – Secure Sockets Layer
- OpenSLP – Service Location Protocol
- OpenSSH – Secure Shell
- PostgreSQL – Relational data base, similar to SQL Server 2000 which Microsoft only includes in the higher priced Premium Edition.
- Sendmail, IMAP4, POP3, SMTP and MIME – Basic mail and messaging services. Optionally, SCOoffice Mail Server can be used to provide a more robust e-mail, collaboration and calendaring server.

Red Hat has a smaller range of product configuration offerings. Their primary differentiator is on the level of service the customer opts to purchase. (Support service is mandatory for each server that the software is installed on.) Since it is not the goal of this paper to evaluate service offerings the Red Hat prices quoted include the lowest level of support.

Despite having fewer out of the box configurations, all of the popular Open Source components are available natively for Red Hat Enterprise Edition. (For example, Apache, Squid, PostgreSQL, Samba, Mozilla, etc.) This enables a customer to configure and deploy a server with comparable functionality to Microsoft and SCO.

Red Hat Enterprise ES Server Basic Edition has a lower list price than both UnixWare Small Business Edition and Microsoft Small Business Server. This gives Red Hat the advantage in initial acquisition cost in edge of network, file and print, or other environments where no more than 2 users are required.

In a small business environment that requires 3 – 5 users, the initial acquisition cost advantage goes to Microsoft and SCO. However, since Red Hat Enterprise ES Edition is bundled with unlimited users, the high cost of adding users to both the Microsoft SBS and UnixWare SBE can quickly cause the acquisition cost of UnixWare SBE and Microsoft SBS to exceed the acquisition cost of Red Hat. So for small businesses that need 6 or more users, the initial acquisition cost advantage goes to Red Hat.

Based on a feature comparison, Red Hat has many, many more packages and software bundled into their distribution than does either UnixWare or Windows. It is beyond the scope of this paper to perform a thorough analysis of the additional functionality that Red Hat packages with their OS distribution. Suffice it to note that the commercial functionality of Linux vs. UnixWare vs. Windows is somewhat comparable. In most cases, the significant feature difference is in the application layer.

Part Two:

Total cost of Ownership Comparison

The assumptions used to create the total cost comparison model are:

1. The total cost is defined as only the out of pocket cost of acquiring, maintaining and updating the operating system. Administrative, training, and other operational costs are not included in the calculations.
2. The total cost for each operating system is computed for three and five years. Red Hat Linux is priced with the lowest level (least expensive) support agreement available. If faster response times or coverage beyond the standard 40 hour week window is required, additional charges would apply.
3. The UnixWare costs include the initial right to use, plus the cost of SCO Update for the three or five year period.
4. For purposes of computing the cost of SCO Update over the 3 and 5 year periods, I've assumed that SCO releases a major upgrade of UnixWare every 18 months.
5. The Microsoft fees include the initial right to use fee, plus the cost of a Software Assurance (SA) Agreement for 3 or 5 years. Software Assurance is similar to SCO Update except that SA is an agreement between Microsoft and the end customer, and SA is time based. SA entitles the end user to receive all maintenance and upgrades released during the term of the agreement (generally 2 or 3 years). SCO Update is release-based and entitles the end user to receive the all maintenance and updates up to and including the next release of the product.

6. If a Red Hat customer stops paying the annual support and maintenance fee for a given system, the customer is no longer entitled to run the software on that system. If a SCO UnixWare customer either stops paying for SCO Update, (or never buys it in the first place,) the SCO customer retains the right to run that version of the software on the licensed CPU. Similarly, Microsoft customers have a perpetual right to use a specific version of the software, regardless of whether or not the customer signs up for Software Assurance.
7. Except for the Basic Edition of Enterprise ES, the Red Hat license permits an unlimited number of users on each system. The Basic Edition is for up to 2 users presumably to offer a very competitive file & print or edge of network server.
8. Prices are assumed constant for the three and five year period. (No price increases are included in any of the calculations.)
9. The Five Year TCO table has additional calculations that exclude SCO Update for UnixWare and Software Assurance for Windows Server. These additional two columns are necessary because the cost of SCO Update over five years exceeds the cost of trading in an older version of UnixWare after five years. Similarly, the cost of Software Assurance over five years exceeds the cost of buying a new Microsoft product license. Thus the TCO comparison considers the case where a customer would opt for the lower cost option. The downside is that the lower cost option customers are not entitled to receive maintenance, including security fixes after one year. The lack of the availability of maintenance and security fixes may sway customers away from the lower cost option. Hence both options are computed for both products.

Customer Configurations

Each of the vendors has a slightly different license model and cost structure. In order to normalize these differences and compute a fair and accurate cost comparison, actual customer configurations are used as the basis to compute the total cost of ownership. These configurations were submitted by the NA sales and SE teams³. The cost comparison is shown in Figure 1 and Figure 2.

1. Large Replicated Site

The first customer has 5500 servers distributed across the US; each server supports up to 10 users. The calculations are based UnixWare Business Edition, Windows Standard Edition Server and Red Hat Enterprise ES Linux.

The reason that Red Hat is so much more expensive in both the 3 year and the 5 year example is that an annual fee is charged that is equal to the initial year fee, whereas the annual Microsoft fee is 25% of the initial license fee, and SCO's annual fee for SCO Update is 20% of the initial license fee (when bundled – if unbundled, its 25% of the initial year fee.)

³ Contact me at jms@sco.com if there are other configurations that you would like to have analyzed. I am especially interested in getting data about configurations outside of North America.

UnixWare is more expensive than the Microsoft alternatives in both periods; however the price difference gets narrower in the 5 year example.

The difference in price between Microsoft and SCO is attributable to:

- The UnixWare Business Edition initial license fee is higher than Windows Standard Server, but it includes 5 more users than the Microsoft solution. The Windows customer must purchase an additional five user license.
- Offsetting the higher initial UnixWare license fee is the fact that Microsoft charges Software Assurance fees on the additional user licenses, whereas SCO Update fees are only assessed on the base UnixWare product.
- Similar to Red Hat, the Microsoft Software Assurance fee is payable each year, whereas SCO Update is in effect until the next major operating system release. (Generally about 18 months.)

2. Large Retail Chain

This is a typical large retail chain store with 800 store locations. Each store has a single server, supporting five or fewer back office users. The UnixWare SBE and Microsoft's SBS each have enough capacity to handle the workload. The Red Hat product is Enterprise ES Linux.

As in the prior example, Red Hat is more expensive over both periods because of the high cost of renewing the mandatory maintenance and support agreement year after year. Notice how Red Hat costs continue to increase faster than either SCO or Microsoft as the period of time is extended.

Even though SCO's and Microsoft's initial license fees are the same, the Microsoft product is packaged with 5 users, whereas the UnixWare customer has to purchase an additional 5 user bump pack for \$499. The additional bump pack is what causes the UnixWare solution to be more expensive.

3. Small Business Application Server

This is a typical small business running single UnixWare Small Business Edition or Microsoft Small Business Server. Like most small business, they need proven, tested, tried and true technology, and are not interested in having the latest version of anything. For this reason, they have opted not to purchase SCO Update for UnixWare or Software Assurance from Microsoft. They prefer to buy the upgrade if and when they need it in the future. I've assumed that this customer does upgrade within 5 years (but not within 3 years). Despite their intention to run the same software for long periods of time, Red Hat requires the annual fee maintenance & support fee in order to be in compliance with the terms of their agreement.

Optionally, the customer could access the free Linux source code and create and maintain their own distribution. Maintaining their own distribution is not practical

for many businesses, especially small businesses and businesses with limited IT resources.

As in the previous example, note that the UnixWare cost is higher because the SBE has only a single user bundled in the product, and the customer needs a 5 user system. The UnixWare customer incurs the additional cost of a user bump pack license.

4. Medium Sized Replicated Site

This is a replicated site customer that has a single server in each of their 350 sites. Each server has to support up to 25 users, so the customer opts for the UnixWare Departmental Edition, the Microsoft Enterprise Edition and the Red Hat ES Edition. This is a case where Red Hat wins by a slight margin over UnixWare because Red Hat licenses an unlimited number of users for each server.

The higher cost of the Microsoft solution in both periods is due to the higher price of the Microsoft Enterprise Server vs. the UnixWare Departmental Edition. Note that the Microsoft is almost double the cost of SCO and more than double the cost of Red Hat.

5. Workgroup Server

This configuration is a running UW Departmental Edition with 50 users, or Microsoft Enterprise Edition or Red Hat Enterprise AS Edition.

Even though the initial license fee of the Red Hat product is less than the UnixWare Departmental Edition, the high annual Red Hat support and maintenance fee yields a small price advantage for Red hat in the 3 year comparison, and disadvantages Red Hat over SCO in the 5 year comparison.

Once again, Microsoft's policy of levying the Software Assurance fee on bump packs makes Microsoft the highest cost option over both periods.

6. Medium Size Business Application Server

This customer needs to support 100 users on a single server. The servers being compared are:

- UW Business Edition plus 100 users
- Windows Standard Edition plus 100 users
- Red Hat Enterprise AS Server.

Red Hat is lowest cost provider in the 3 year analysis due to the fact that Red Hat products are licensed for an unlimited number of users, whereas both Microsoft and SCO charge additional user license fees. Red Hat's advantage on this point overshadows the total cost disadvantage created by their policy of charging high maintenance fees in the 3 year scenario. By the fifth year, Red Hat's high

maintenance fee negates the cost advantage created by offering unlimited user license.

In the three year scenario, Microsoft and SCO are about equal, however, by the fifth year, Microsoft's policy to charge Software Assurance on bump packs makes SCO the lowest cost provider.

7. Infrastructure Server

This is perhaps the most enlightening example of all, as it dispels the myth that Linux is the lowest cost option for edge of network, file and print workloads. The configuration is a single server used as a file and print server in a departmental workgroup. This is the best illustration that low initial cost doesn't necessarily mean low total cost of ownership.

The following spreadsheets illustrate the scenarios described above.

TCO - 3 Years	UnixWare 7.1.4 (3 yrs)	Windows 2003 Server 3 yr	Red Hat Linux 3 yr
Large Replicated Site	\$9,426,863	\$9,059,875	\$13,183,500
Large Retail Chain	\$1,094,200	\$658,900	\$1,917,600
Small Business App. Server	\$1,098	\$599	\$2,397
Medium Size Replicated Site	\$1,166,813	\$1,924,519	\$838,950
Medium Size App. server	\$4,533	\$6,871	\$4,497
Workgroup Server	\$6,798	\$6,867	\$4,497
Infrastructure Server	\$869	\$824	\$1,047

TCO - 5 Years	UnixWare 7.1.4 5 yrs w/o SCO Update	Windows 2003 Server 5 yr w/o SA	UnixWare 7.1.4 5 yrs w SCO Update	Windows 2003 Server 5 yr w SA	Red Hat Linux 5 yr
Large Replicated Site	\$13,465,375	\$13,178,000	\$13,620,365	\$14,825,250	\$21,972,500
Large Retail Chain	\$1,237,800	\$958,400	\$1,247,544	\$1,078,200	\$3,196,000
Small Business App. Server	\$1,922	\$1,198			\$3,995
Mid size Rep Site	\$1,408,138	\$2,799,300	\$1,424,301	\$3,149,213	\$1,398,250
Mid Size App. Server	\$5,222	\$9,994	\$5,268	\$11,243	\$7,495
Workgroup Server	\$7,147	\$9,988	\$7,175	\$11,237	\$7,495
Infrastructure Server	\$1,048	\$1,198	\$1,060	\$1,348	\$1,745

Conclusions

1. The initial acquisition cost of Red Hat Linux is lower than either Windows or UnixWare for deployments that need only one or two users. (File & print server, edge of network, etc.) However, as illustrated in the above Infrastructure Server example, low initial cost is not necessarily an indicator of TCO.
2. Microsoft Small Business Server is the lowest cost solution for small businesses that need 3 to 5 users, but don't need a relational data base or Internet Security Accelerator (firewall) services.
3. The high annual Red Hat mandatory maintenance and support fee drives the cost of Red Hat solutions higher at an ever increasing rate over time.
4. Red Hat server solutions get more cost-effective as the required number of users increases because Red Hat products (except for the Enterprise ES Basic Edition) are licensed for unlimited users.
5. The low cost solution for small business users that either don't need firewall features or a relational data base, or who are willing support the Open Source version of these features on a Windows platform is the Microsoft Small Business Server (SBS) Standard Edition. SBS has a TCO advantage over SCO's Small Business Edition for deployments that need to support more than a single user.
6. Small Business users that do need the Open Source firewall and security features and a relational data bases get a better deal by licensing UnixWare Small Business Edition, even when up to 5 users are required. UnixWare customers have to pay for the user bump pack, but they gain

- the advantage of having a single point of contact for UnixWare and the Open Source components. Microsoft customers who want the identical features, with single point of contact support from Microsoft pay \$500 more than the UnixWare customer.
7. Microsoft's policy of levying the Software Assurance surcharge on all system components, (including bump packs) disadvantages the MS products relative to SCO, who charges for SCO Update only based on the out of the box product configuration.
 8. While the initial acquisition cost of Linux is lower in some cases than UnixWare, the total software, support and maintenance fees for Red Hat Linux are generally higher than similarly configured UnixWare Systems⁴.

⁴ See Lyons, Daniel; Forbes Magazine, "Linux Loyalists Leery", March 31, 2004