

THE LINUX OPERATING SYSTEM

Prepared for

Mr. Ralph Walker
Instructor of Business Information Systems Management
Kennesaw State University
1000 Chastain Road
Kennesaw, GA 30144-5591

Prepared by

Michael Cameli
Jason Noble
Alex Cook
Trey Mangum
Bill Morford

November 14, 2004

Letter of Authorization

BISM 2100 Students:

The purpose of this assignment is to integrate the material you have learned about Business Information Systems into a coordinated report and presentation and to allow students to focus on areas of intended major concentration. This report will be web published and available for professor/employer viewing.

Your professor/employer has asked you for a detailed analysis of:

An Available Information System or software – a complete description of the product – be thorough

- What business problem is the software designed to solve?
 - How does it make doing business easier?
 - How have others used it to improve performance?
 -

Who is it intended for (size of business, existing clients)?

What training is involved

- What level of technology experience is required

A Cost/Benefit Analysis of the Available System and its competitors

- Who are the primary competitors?
- What features differentiate the product?
- Is service, training, support provided?
- Why this product and not another?

A Detailed Demonstration of System Outputs – demos or snapshots with description

- Visually and narrative, describe the use of the software, its report capabilities, its web support etc.

Your Recommendations for System Adoption and Implementation

- After a thorough investigation your report – make a recommendation based on your research and experience with the software.
- Analyze purchase and implementation considerations – include switchover and training
- Predict outcomes of adoption

The information contained in your presentation will be used for a potential purchase decision. You will therefore want to present a carefully researched, thoughtfully written, and comprehensive formal report. Note, this is not a ‘sales job’. Your conclusion may be that this software does not provide best fit for certain organizations or that there are others that are more robust in their applications.

In general, you have great flexibility in completing this assignment. You may choose any type of system or software related to your major field of study.

Use a FORMAL REPORT structure for the report. Employ the “Seven C’s” of effective business writing and refer back to Chapter Eight - *Improving Business Communication Skills* (3rd Edition), Deborah Roebuck, 2001. Be creative and complete in your analyses and presentation. You should gather and include any analysis necessary to appropriately convey an understanding of the systems use and benefits. Use both commercial and academic resources. Where appropriate, you should incorporate charts, graphs, or other visual aids to illustrate the facts you present both in your report and PowerPoint presentation. Use an internal attribution style (based on APA standards).

Your report must be submitted through WEBCT. (Each student must submit a copy of his or her team’s output through WebCT)

Your report must be published to your team WEB PAGE

Your team may earn 05 additional points if your paper is proofread and corrected by another group and those changes are incorporated into the finished project. I must be able to see evidence of the changes and improvements made. Hard copy must be submitted **before** the assignment closes to receive credit.

Your team may earn 05 additional points if your team proofreads and corrects another team’s paper. Your team (minimum of three recorded individuals) must provide quality written feedback and corrections, including suggestions for improvement. Hard copy must be submitted **before** the assignment closes to receive credit.

Report Grading Criteria (100 Points):

Primary Trait Analysis by Expectations	Exceeds	Meets	Below
A comprehensive correctly formatted formal report employing the 7 C’s of business writing (30 Points)	27-30	21-26	0-20
Thorough research of sources – Web Page Evaluation Form Required for Each Source Use a mix of Internet and OTHER sources – Points will be allocated according to the validity and reliability of sources chosen. (10 Points)	9-10	7-8	0-6
Attributions and Citations done properly – nothing without attribution. Anti-plagiarism component (10 Points)	9-10	7-8	0-6
Well written and thorough Operating Agreement included as a separate section after of the Letter of Transmittal (10 Points – see attached rubric)	9-10	7-8	0-6
Detailed analysis covering requirements stated above – remember, analysis is taking a whole and breaking it down into parts (20 Points)	18-20	14-17	0-13
Well developed recommendations – Summary relates back to main points and recommendations include implementation schedule or proposed next steps (20 Points)	18-20	14-17	0-13
Extra Point Opportunity – paper exchange and proof read (10 Points)	5-10	0-5	

Letter of Transmittal

The Linux Operating System Group
1000 Chastain Road
Kennesaw, GA 30144-5591

November 14, 2004

Mr. Ralph Walker
Instructor of BISM 2100
Kennesaw State University
1000 Chastain Road
Kennesaw, GA 30144-5591

Dear Mr. Walker:

Our team has completed the formal report. The report analyzes the Linux operating system.

The report describes the Linux operating system, and its cost effectiveness for implementation in the business world. The team has enjoyed undertaking this project, and we look forward to delivering our presentation for your review.

Sincerely,

Michael Cameli
Alex Cook
William Morford
Jason Noble
Kenneth Mangum

OPERATING AGREEMENT

Team Purpose

The purpose of the Linux Operating System Group is to successfully complete the systems analysis paper and the systems presentation requirements for the Business Information Systems and Communications course (BISM 2100) at Kennesaw State University during the fall 2004 semester.

Team Objectives

Our objective is to effectively work together as a team to complete a systems analysis paper for final submission on December 10, to obtain the extra credit points by completing the cross-team evaluation, and to provide a professional presentation about the Linux Operating System to the class. Our success in completing these objectives will be measured by the number of points awarded by Professor Walker and by our confidence in the knowledge we have gained in this subject matter.

Membership Provisions

- Operating Agreement Duration

This agreement is in effect from Monday, October 20, 2004 through Friday, December 10, 2004.
- Class Enrollment

Each member of the Linux operating system project team must be enrolled in the Business Information Systems and Communications course (BISM 2100 - Section 05) at Kennesaw State University during the fall 2004 semester.
- Team Member Contact List

Name	Phone	School Email
Jason Noble	404.394.1676	jnoble5
Alex Cook	404.934.6957	acook20
Trey Mangum	678.778.1030	klm0439
Mike Cameli	770.356.4556	mcameli
Bill Morford	404.285.4786	wam6997
- Decision Making / Conflict Resolution

It is preferred that decisions are fully supported by all team members. If there is a difference of opinion about a decision, each member will present the pros and cons of each idea. After careful evaluation, the appropriate decision should be made. If no agreement can be reached, the team will defer the issue in question to Professor Walker; his decision will be final.

- Team Leader
 - The team leader will be Alex Cook.
- Meeting Attendance
 - Meeting attendance is mandatory. If a member is unable to attend a scheduled meeting, he must notify the other members at least four hours before the scheduled meeting is to take place. The cancellation notification should be done via e-mail *and* telephone call.
- Preparation and Performance
 - Each member of the team is expected to complete tasks on time, as defined in the project plan. Each member of the team will communicate, ahead of time, to the other team member if tasks might be completed after the task scheduled completion date. Each member of the team is expected to devise a strategy to maintain the project schedule if a task deadline is missed.
- Non-Performance
 - If a team member does not complete the tasks assigned to him, all extra credit points earned by the non-performing team member will be given to the other (performing) team member(s).
 - If, however, there is an emergency and a milestone task cannot be completed as scheduled, the following procedure should be followed:
 - team member with the emergency is to notify the other team members via phone call *and* e-mail
 - project plan is to be reviewed for possible ways to makeup time lost (what can we do to keep this project on schedule?)
 - notify Professor Walker
 Project milestones are defined in *Project/Meeting Schedule* section.
- Peer Review
 - It is our intention to obtain an agreement, by November 8, with another team for cross-evaluation of our systems analysis report. We will be able to incorporate the peer review task for the other team by planning the evaluation upfront.

Membership Contributions

- Outline Project Requirements
 - The members will gather the information needed to complete the paper required. This research will include finding web resources that help explain the cost benefits of deploying a Linux based infrastructure at a company instead of a Microsoft Windows based infrastructure.
- Assign Component Ownership

Each group member will be responsible for conducting research and contributing to the collective knowledge of the group. We will also help each other write the content of the final paper.

- Measure Compliance
 - Compliance will be measured by talking after class on Monday nights in addition to keeping the group on track. Further communication will be facilitated via email or if needed telephone.
- Time for Review and Feedback
 - We plan on having each milestone completed at least 3 days before it is due in order to provide the group ample opportunity to proof read the document for completeness.

Project/Meeting Schedule

- Modes of Communication
 - Since team member work schedules are vastly different, the primary mode of communication will be e-mail.
 - We will have regularly scheduled meetings (see *meeting schedule* section below).
- Meetings
 - Meetings will be conducted either face-to-face, chat room, or phone call, depending on member availability.
 - Face-to-face meetings will be held in the accounting computer lab (2nd floor, Burruss building) or in the classroom after lecture on Monday nights or during class time (8-10:45pm) on Wednesday nights.
 - Meeting lengths will be mutually agreed upon when they are scheduled. In general, a meeting should not last longer than one hour.
- Meeting Schedule
 - Wednesday, October 27 (8 pm – 9:00 pm)
 - TBD as needed
- Project Milestones
 - October 13; decide on subject matter
 - October 28; submit operating agreement to Professor Walker
 - October 31; submit project reference list to Professor Walker
 - November 5; submit first draft of formal report to Professor Walker
 - November 10; receive other team edit of report
 - November 14; submit System Analysis Paper and Peer Evaluation
 - November 21; submit Webpage for evaluation
 - November 22; submit presentation outline to Professor Walker
 - November 29 – December 2; record presentation
 - December 3; formal presentation submitted

- December 10; review video presentation
- Proof-Edit-Exchange Extra Credit
 - At least four days total are allotted to the proof-edit exchange.
 - We promise to give the other team participating in the proof-edit exchange the highest quality of editing that our personal experience can provide. We will edit the other team's work as if it were our own project.
 - We will provide the other team with timely feedback, positive and negative. We will not cause the other team to lose their extra credit opportunity.
 - We will be very clear when communicating our feedback to the other team.

Quality Definition

- Expected Performance
 - All members will respond to member communications within a 24-hour period.
 - All members will apply the appropriate effort that is required to produce college-level work.
 - All members will ensure that the final report is free from spelling and grammatical errors and that the report contains all the components of a formal report, as described in the *Improving Business Communication Skills* text.
 - All members will ensure that the final PowerPoint presentation is free from spelling and grammatical errors and that the presentation is professional in appearance and in delivery.
 - All members will meet their assignment deadlines.
 - All members will respect the ideas of others.
 - All members will encourage creativity and work towards having fun with this assignment.
 - All members will follow the code of conduct as defined by Kennesaw State University.
- Anticipated Number of Sources
 - We anticipate using at least ten Web sources.
- Anticipated Number of Charts and Tables
 - We anticipate using at least three charts and/or tables.
- Grade Allocation
 - We are a team. As such, the points earned for our effort on this project will be divided equally. (There is one exception regarding the division of points; refer to *Non-Performance* section on page vi.)

TABLE OF CONTENTS

Letter of Authorization.....	ii
Letter of Transmittal.....	iv
Operating Agreement.....	v
List of Illustrations.....	ix
Abstract.....	x
Background.....	1
Scope of the Report.....	1
Limitations of the Report.....	1
Sources and Methods of Data Collection.....	1
Report Organization.....	1
Origin of the Linux Implementations.....	2
Solving Business Problems.....	2
Making Business Easier.....	2
Performance.....	2
Business that can use Linux.....	3
Training.....	3
Technology Expertise.....	3
Cost Benefit Analysis of the System and its Competitors.....	3
Competitors.....	3
Differentiating Features.....	4
Training and Support.....	4
Conclusions and Recommendations.....	5
Works Cited.....	6

LIST OF ILLUSTRATIONS

Figure 1.	Totals for Top Servers Across All Domains.....	4
-----------	--	---

ABSTRACT

The Linux operating system was developed to be a low cost alternative to Microsoft Windows. Linux is an open source software package that allows users free access and also allows users to modify Linux to satisfy any custom needs they may have. Implementing Linux in a corporate environment provides low implementation costs, high reliability, and a more stable and secure alternative to Microsoft Windows.

THE LINUX OPERATING SYSTEM (BACKGROUND)

This report provides an analysis of the Linux operating system. Successful business operations depend upon a manageable and efficient information system infrastructure. Corporate infrastructure designers have only a few operating systems on the market to choose from, and this research addresses the question regarding the most cost-effective operating system to maintain and utilize. The Linux operating system is a software package that a business can use to provide their employees a reliable, cost efficient resource to satisfy their information technology needs.

Scope of the Report

This report gives an analysis of the Linux operating system and how its implementation can impact a business, from a cost perspective, as well as a reliability perspective.

The analysis provides the reader an objective look at the Linux operating system. It details its origin, how it is used, and why it is cost effective to be utilized in a corporate environment.

Limitations of the Report

The researchers of the report encountered a problem when searching for in depth price comparisons among the Linux operating system competitors; when looking at a long-term utilization of each of the operating systems. The public comparison between the operating systems is clouded in biased rhetoric. The TCO (total cost of ownership) reportedly varies among resources due to the inconsistencies of the provided sources.

Sources and Methods of Data Collection

The report utilizes data gathered from multiple sources including websites, periodicals, and personal interviews with users of Linux. The researchers searched local libraries for articles and books about the Linux operating system. The team also scoured multiple websites for information looking for objective material to implement in a presentation about the system.

In addition to the research listed above, each of the group users experimented with Linux to further understand the capabilities of the operating system.

Report Organization

The report contains three major sections: Origin of the Linux Implementation, How Businesses can utilize Linux, and a Cost and Benefit Analysis of the Operating System and its Competitors. The sections provide insight to the potential return on investment of implementing Linux in a business environment.

ORIGIN OF THE LINUX IMPLEMENTATIONS

This section describes how Linux came about, and how it is used in the modern business world. Linux is an operating system that was created by a Norwegian programmer named Linus Torvald. It is considered an open source program, which entails that Linux is essentially free, and anyone can make additions to the Linux operating system and then provide the changes to the rest of the Linux community so that everyone can benefit from the updates.

Solving Business Problems

There are several problems that the Linux operating system is designed to solve. The first problem revolves around reliability, and optimal usability. Servers and desktop computers that run on the Linux operating system on average experience longer periods between crashes. Also, the Linux operating system is similar to UNIX in that if one process or program on a machine crashes, that process will die, but the rest of the programs will continue to run. On a Windows box, a program crashing can lock up the entire machine requiring a reboot before the machine is usable again. A business can also employ less systems engineers because Linux is a more stable operating system.

Another problem that Microsoft Windows has that Linux does not is that Linux is open source based, and Windows is a closed source program. By having an open source program, any number of external users can improve the Linux product. Users of Linux can also modify it to meet their needs for more advanced applications.

Making Business Easier

The Linux operating system provides a low cost alternative to the market dominating Microsoft Windows. The Linux operating system is able to provide server solutions, including databases, web, print, mail, and other servers at a significantly lower cost than similar products based on Microsoft Windows. There are only a few Linux distributors that charge for implementing Linux based drivers or software. The abundance of free software available for the Linux operating system allows business cheaper start up costs, as well as less expensive maintenance costs.

Performance

Companies use the Linux operating system because it is extremely secure. Unlike Linux, Microsoft Windows has a high rate of virus infection. Fixes for Microsoft programs can take months or years to correct, assuming Microsoft decides to address the problem. When users of the Linux operating system discover a problem, there is typically a multitude of patches submitted to mitigate the problem within hours.

Operating efficiency is a large concern for businesses. By utilizing Linux, they can improve performance in each department through the elimination of unproductive hours due to operating system crashes.

BUSINESSES THAT CAN USE LINUX

All companies that are looking for a stable information technology environment can utilize the Linux operating system. The cost benefits for a large company with many users is obvious with open source. Linux is also usable by small companies who are looking for a low cost operating system solution. By having reduced procurement costs, smaller companies can invest their capital in other areas, without having to worry about purchasing expensive Windows licenses. The cost of maintaining the Linux operating system also provides smaller companies with reduced payroll expenses in their information technology department. Although the limited applications for small businesses reduce the significance of Linux, the costs associated with maintaining the operating system justify its use. However, as demand is increasing, applications are becoming more readily available.

Training

Very little training needed to operate Linux. Windows and Linux share a similar level of functionality; however, Linux comes with word processing, spreadsheet, and other applications preinstalled for free. Users navigate the desktop in the same fashion they would with Microsoft Windows. Employees at companies can be supplied with a working knowledge of the operating systems environment with minimal time obligations. The costs associated with certifying employees are less expensive for Linux than compared to Microsoft. On average, training for MCSE (Microsoft Certified Systems Engineer) cost \$6,000 for five weeks. Linux users can be certified as LPI Level II for \$4,500 lasting only two weeks. The time and money saved training employees for Linux is a comparative advantage over Microsoft.

Technology Expertise

Users of all experience levels can learn to use the Linux operating system. Linux provides help guides as well as tutorials on using the product. The research demonstrates that people that are unfamiliar with the product can explore and utilize programs with relative ease, because of the similar user interface with windows. There is also a large base of Linux users on the Internet who are excited and willing to help new users to learn how to fully utilize the benefits of Linux.

COST BENEFIT ANALYSIS OF THE SYSTEM AND ITS COMPETITORS

The Linux operating system provides an excellent alternative to its competitors. Implementation of Linux requires very low start up costs. Running the Linux operating system provides a simpler and more cost-effective solution.

Competitors

The Linux operating system competes with Microsoft Windows.

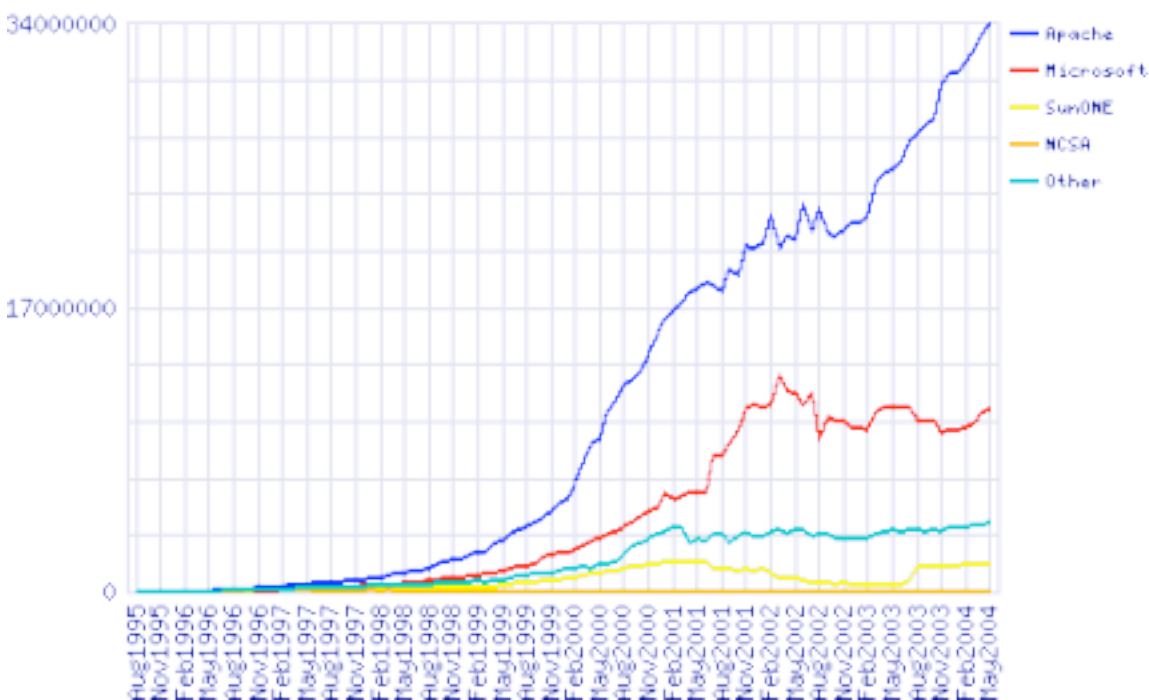
Differentiating Features

The features that separate Linux from other operating systems are its inexpensive start up costs. Linux also has improved security, and is less likely to crash than Windows. Linux is an open source program, it is free for all users to improve upon and utilize. Although Microsoft possesses a dominating share of the market, Linux distribution is increasing at a higher annual percent than its competitor. This statistic implies that Linux has an advantage in product and cost features.

Training and Support

Linux has a wide range of support worldwide. It has online support that is superior to Windows in all systemic aspects. The graph below shows the amazing lead open-source apache servers have over other options currently available. Apache is the free and very stable server used by both Linux and Unix systems.

FIGURE 1. Totals for Top Servers Across All Domains



CONCLUSIONS AND RECOMMENDATIONS

The findings of this report suggest that companies will benefit from utilizing the Linux operating system. Linux provides less expensive start up costs as well as it is cheaper to maintain. Linux is stronger in the areas of security and reliability than its competitors. Less frequent crashes/lockups allow an information technology infrastructure to be more efficient. These attributes of the Linux operating system allow the group to make two recommendations.

1. All companies utilizing computer systems would benefit from the Linux operating systems low cost and ease of use.
2. Reliability issues are solved because the open source Linux operating system, has been tested and improved upon by many users, and it makes it ideal for implementation.

WORKS CITED

(<http://linux.about.com/od/news/a/mandrakepc.htm>)

(http://www.businessweek.com/magazine/content/03_09/b3822601_tc102.htm)

(<http://www.linbox.com/en/about/glossary.html>)

(<http://www.linuxinsider.com/story/37655.html>)

(<http://liw.iki.fi/liw/texts/linux-the-big-picture.html>)

(<http://www.microsoft.com/windowsserversystem/facts/analyses/opencost.mspx>)

(<http://www.tuxs.org/what.htm>)

Egger, Daniel (2004, November, Volume 6, Issue 11). Munich demands clarity. *Linux Magazine*, p. 30 <http://www.vnunet.com/analysis/1157793> (Similar, but not the exact same article)

Greiner, Lynn. "Educating Linux". *Computing Canada*. Vol.30, Issue 8; pg. 16
Database: ABI/ Inform

Mears, Jennifer. "Open source products grab corporate attention". *Network World*
Vol.21, Issue 42; pg. 26
Database: ABI/ Inform

Searls, Doc (2004, November, Issue 127). We're going to be a 90% Linux Shop. *Linux Journal*, p. 48-50 <http://www.linuxjournal.com/article.php?sid=7730>