

Research Proposal - Final

by Liam Jarvis

Submission date: 20-Oct-2022 09:28PM (UTC+0100)

Submission ID: 187157614

File name: 24859_Liam_Jarvis_Research_Proposal_-_Final_443262_134115632.docx (126.57K)

Word count: 2393

Character count: 12822

Enterprise Networking and Data Servers: The
Improvement to Data Storage and the
Appropriate Configuration of a Server
Research Proposal

Liam Aaron Jarvis (2000388)

Table of Contents

	Page
1. Introduction.....	3
2. Title, Aim and Objectives	4
2.1 Expected Outcomes	4
3. Background to the Proposed Research	6
3.1 Literature Review	6
4. Project Design	8
4.1 Data Collection	8
4.2 Generalisability, Reliability, and Validity.....	8
4.3 Data Analysis.....	9
4.4 Risks, Limitations, and Ethical/Legal Issues.....	10
5. Project Plan.....	11
5.1 Resource List.....	11
5.2 Gantt Chart.....	11
Reference List	12

1. Introduction

The aim of this paper is to lay the groundwork for the proposed project. This document will discuss the title and aims of the project, give background to the proposed title and subject area by performing a mini critical review of literature related to the project. Then, a project design will be formed. This will pertain items such as the evaluation of the devices that will be discussed, identify data collection methods, specialist techniques that may be used, identifying the risks, limitations, and any ethical/legal issues relating to the subject area and how the project aims to handle these issues, the generalisability, reliability and validity of any research performed, and how both the results of any implementation/testing performed, as well as any data collected will be analysed and/or evaluated.

2. Title, Aim and Objectives

I am currently studying Computing (Networks and Cyber Security) and have a particular interest in enterprise networking. I intend to work as a Network Administrator, where Servers are fundamental devices to how enterprises operate. Ensuring users of the organisation's network can effortlessly store data, and just as easily being able to access that data ensures the organisation can work efficiently. This makes knowing how to properly configure a server within an organisation's network a key skill for a network engineer, and by extension, myself to possess, making this a crucial skill to possess. The subject area in question will also help reach the required 10000 words, as it is a multifaceted discussion with many variables to discuss and deliberate on. Lastly, I am familiar with the subject area, having done similar work during year 2 of my course, and it is a subject area I enjoy discussing. Therefore, increasing my understanding of the subject seems worthwhile.

Title: Enterprise Networking and Data Servers: The Improvement to Data Storage and the Appropriate Configuration of a Server

Aim:

To investigate how enterprise networking and servers have influenced organisations and how they interact and store data and determine appropriate configuration of a server within an enterprise network.

Objectives:

- To analyse how organisations stored data before the implementation of networking technologies and using that context to show how data efficiency has improved with the implementation of networking and servers.
- To evaluate what factors should be considered when planning and configuring a server (What Operating System to use, RAID configuration, initial and overhead costs, how much storage space will be needed, High Availability, scalability, security tools to be implemented, etc...)
- To design/implement and configure a server within a small virtual network, further demonstrating how to configure a server (based on the factors discussed in the planning phase).

2.1 Expected Outcomes

By completion of the project, the project itself should be able to provide the reader with enough information to understand the importance of enterprise networking and servers to organisations, the factors a network administrator has to consider when designing and implementing a data server, and have a basic understanding of how to implement a

server within a network. A wealth of credible sources will be used to increase the usability, and reliability of the project further.

3. Background to the Proposed Research

A project proposal can sound good in planning. However, if the subject area in question does not have a wealth of data available to compile and discuss, it can make the project fall short at the first hurdle or lack quality references, hurting its validity. To ensure this is a good subject area to discuss, a literature review can be done to see what academic sources are out there, and to get a grasp at what topics need to be discussed within the project.

3.1 Literature Review

The book "AIX 7.2, PowerVM - UNIX, Virtualization and Security: An administrator's guide" [1] details what RAID storage entails, different types of RAID levels available, their benefits and drawbacks, and a short comparison of the levels stated. Another useful book is "Best Practices for DB2 on AIX 6.1 for POWER Systems" [2]. It too details RAID levels, but includes a more detailed comparison of the levels, utilising graphs, and tables. The data from both sources are applicable to the project, especially the second objective. The former was published in 2020, and the latter was published in 2010, and the topics and data presented are still up to date. The books are also both reliable. Using them in tandem and cross referencing helps to improve the reliability of what is being referenced. The latter book has 13 authors and includes related publications for the book. It is also published by IBM Redbooks, a publishing company that publishes books discussing specialised topics in the technology field, increasing the reliability of the book.

Another valuable resource is the "Physical Security: 150 Things You Should Know" [3] book. It covers a broad range of topics under the physical security branch, including physical barriers, security policies, access controls, etc... As security of an enterprise network is key for keeping data stored on the server safe, ensuring the physical site is crucial, despite not standing out when discussing network security. This makes the source applicable within objective 2. It also makes use of references, such as ASIS, and the information used is still up to date/applicable now. Nonetheless, security only works if all vulnerabilities are dealt with. Therefore, ensuring the cybersecurity of a network is critical. "Enterprise Cybersecurity: How to Build a Successful Cyberdefense Program Against Advanced Threats" [4] covers planning, implementing, and the aftermath of enterprise cybersecurity, as well as active threat mitigation.

The rationale behind the Server OS will be brought up in the project, as this is an important topic when discussing pricing, security, and security tools available to a server. However, (as of now) Windows Server 2019 will be used. Windows has a big share within the OS, and Server OS market. Therefore, basing the project off of a Windows server makes it more applicable to more enterprises. With this being said, "Mastering Windows Server 2019: The Complete Guide for IT Professionals to Install and Manage Windows

Server 2019 and Deploy New Capabilities" [5] will be quite useful for objectives 2 and 3, as it discusses installation, features and tools, etc...

Lastly, the book: "JUNOS High Availability" [6] examines high availability and its importance within an enterprise. It covers high availability and the factors related to it, such as scalability and security.

4. Project Design

Before starting the project, it is a good idea to have a clear project design and plan, as this will help both to understand what needs to be achieved for each objective, and to ensure the project can be completed comfortably within the stated deadline.

4.1 Data Collection

When considering data collection, it would make more sense to establish what data needs collecting to achieve each objective. For Objectives 1 and 2, data will be collected from academic sources, and official websites for select organisations relating to the subject area, as completing these objectives will require research and statistics to achieve, rather than implementation. For objective 1, research will be needed to identify how organisations managed data storage before the introduction of networking, and then the shift towards data storage via data servers, and the impact that had on the efficiency of data storage and access, and consequently the efficiency of the organisations employing these technologies. For objective 2, research will be done to identify what key factors go into configuring a server for an organisation's network, including but not limited to RAID Setup, OS (Operating System), scalability, the initial and overhead costs, etc...

Lastly, for objective 3, data collected during objective 2 will be used to implement and configure a server within a virtual network. However, to actually implement this, some software and tools will have to be utilised. Firstly, Oracle VM Virtual Box will be used. This is a type of virtualisation software that enables the user to run multiple operating systems within their own Virtual Machine (VM). This will allow the creation of a server within a virtual machine, and also allow the testing of the server with other virtual machines running in parallel. Cisco Packet Tracer may also be used to test the security of a network. "Cisco Packet Tracer is a comprehensive, networking technology teaching and learning program "[7] that "Provides a realistic simulation and visualization learning environment that supplements classroom equipment, including the ability to see internal processes in real-time that are normally hidden on real devices" [7]. This could allow testing of the security of a network, and by extension, a server.

4.2 Generalisability, Reliability, and Validity

In the collection process, it is key to ensure that the sources used are valid, reliable, and generalisable. Validity and reliability can be achieved by using databases that include academic sources that include references. From here, we can see where the data used in the original source came from and then quote directly from the source when possible. A combination of the UWTSD databases, Google Books and Scholar, Semantic Scholar, and arxiv, along with any other databases found during the project will be used. This will provide a wealth of academic sources to choose from. To ensure data collected is generalisable, ("the extent to which the findings of a study can be applied to other

situations.” [8]), data discussed within a source should also be applicable to your own work.

4.3 Data Analysis

When collecting data, it is important to properly analyse and evaluate the data collected to ensure it is suitable and useful for its intended purpose. To identify how to analyse the data collected, it is essential to first determine what type of data is being collected. For the project, quantitative data will be collected. Quantitative data are “investigations in which the data that are collected and coded are expressible as numbers” [9]. This is because the research in question is based on statistics, as what is discussed can be proven as fact. Knowing that the data is quantitative, the proper analysis techniques can be identified for use in the project, these being Prescriptive Analysis, Descriptive Statistics, and Inferential Statistics.

Prescriptive analysis is arguably the most important and relevant to the project, as it entails using data to guide decision making. This will be used in the project, as data will be used to determine what configurations should/will be used for server configuration. Descriptive and Inferential Statistics work in tandem. Statistics Descriptive Statistics is the task of summarising data by providing absolute numbers, and displaying them using tables, graphs, and/or charts. Inferential statistics take this summarised data and use it to make predictions and draw conclusions.

4.4 Risks, Limitations, and Ethical/Legal Issues

Identifying the risks, limitations and ethical/legal issues relating to the project will help avoid said issues. To summarise the risks, a risk table was completed:

Risk No.	Risks	Impact	Contingencies
1.	Hardware failure resulting in loss of data	High	Backup work once completed for the day and enable autosave on word, as well as any other software that supports this feature. This means that if data is lost, I am not left with nothing to work on. Incredibly important for any virtual machines used, as losing these will set back the project too far to be manageable.
2.	Time Management and Planning	Medium	Ensuring I plan out when I aim to work on the dissertation, and what I aim to do each day is key to ensure I am using my time to the fullest. This is also a risk, as I need to give myself enough time to cool off and relax between work, as if I am overworking myself, the quality of my work will also decrease. Although it is not as important as other risks, as we are given enough time to complete the dissertation, it is still important to not waste time to ensure my work is of the highest standard in my opinion.
3.	Skills (Research, Analysis, writing, etc...)	High	Being able to find credible and relevant sources to make/backup points, being able to analyse any primary research to better present and make sense of it, and being able to formulate my points concisely, whilst also including all the necessary details are all key skills in projects. Practice throughout the last 2 year of university have helped to improve my skills in these areas. Making sure I have credible resources and data before and during the completion of my dissertation will help with this also.

The biggest limitation to the project will be time, as we only have until late April to ensure the project is complete to a high standard. To negate this, effective time management skills and tools will be implemented to ensure the work coming along as planned through the year, week by week. As for ethical/legal issues are concerned, these are mostly circumvented already. Any issues with any hacking that may need to be done during the implementation phase of the project will be done through VMs or simulated using Packet Tracer. Plagiarism is another issue. To avoid this, proper referencing techniques will be used in line with the IEEE Reference Style, and notes taken from documents will be reworded before being added to the project.

5. Project Plan

Lastly, before starting the project, a list of resources and a plan for how time will be spent throughout the academic year should be drawn up. This will help identify what is needed to successfully complete the project, and to keep on top of the limitations of time mentioned previously.

5.1 Resource List

The following resources will be needed for completion of the project:

- Credible and relevant sources
- Software (Oracle VM VirtualBox, Cisco Packet Tracer, Word, PowerPoint, Google, Graph and table making tool such as excel, Reference Manager, etc...)
- Technology (A computer for example)

5.2 Gantt Chart

A Gantt chart outlines what tasks are to be completed, alongside the time available. Below is the Gantt chart made for the project:

Month	Oct					Nov					Dec					Jan					Feb					Mar					Apr					May				
Week Start Date	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29					
Project Proposal																																								
Interim Viva																																								
Final Report																																								
Final Viva																																								
Exhibition Materials																																								
Other Modules/Assignments																																								
Holidays/Breaks																																								

Minimum Word Count per Week: 1000

Words

This ensures that each component of the project is being worked on as planned for each week. Sticking to this will ensure the project will be completed before the set deadline.

The final report has been planned for completion before the 26th of April deadline, which gives extra time to work on the project if needed, and for things like a second draft, grammar checking, etc...

Reference List

- [1] S. Biedroń, *AIX 7.2, PowerVM - UNIX, Virtualization and Security: An administrator's guide*, Self-Published: S. Biedroń, 2020, ch. 7, pp. 165-173.
- [2] R. Dash, et al. *Best Practices for DB2 on AIX 6.1 for POWER Systems*, 1st ed., IBM Redbooks, 2010, ch. 3, pp. 104-111.
- [3] L. J. Fennelly, M. A. Perry, *Physical Security: 150 Things You Should Know*, 2nd ed., Oxford: Elsevier, 2016.
- [4] S. E. Donaldson, S. G. Siegel, C. K. Williams, and A. Aslam, *Enterprise Cybersecurity: How to Build a Successful Cyberdefense Program Against Advanced Threats*, New York: Apress, 2015.
- [5] J. Krause, *Mastering Windows Server 2019: The Complete Guide for IT Professionals to Install and Manage Windows Server 2019 and Deploy New Capabilities*, 2nd ed., Birmingham: Packt, 2019.
- [6] J. Sonderegger, O. Blomberg, K. Milne, S. Palislamovic, *Junos High Availability*,
- [7] Netacad, "Cisco Packet Tracer 8.2 Frequently Asked Questions", Cisco, [Online] Available: <https://www.netacad.com/courses/packet-tracer/faq#01> [Accessed Oct. 18, 2022].
- [8] R. Bermingham, "Interpreting research evidence", *UK Parliament*, Sep. 8, 2020. [Online] Available: <https://post.parliament.uk/interpreting-research-evidence/> [Accessed Oct. 18, 2022].
- [9] M. Williams, R. D. Wiggins, and W. P. Vogt, *Beginning Quantitative Research*, London: SAGE Publications Ltd, 2021, pp. 3. [E-book]

Research Proposal - Final

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

63 / 100

Instructor

Intro / A&O (400 words)		
Project title; Identification of a specific problem to be investigated; Well-defined aims and SMART objectives; Explaining why this project is worth doing; Discussion of what the project needs to do in order to be a success; Description any deliverables that will be produced at the end of the project Objectives and Aim need to be refined, at the moment it looks like you might need to expand the scope of the project The specific problem you are addressing is not clearly defined. You were supposed to explain why the project is worth doing and provide a discussion of what the project needs to do to be a success. You should also be clear about the deliverables that will be produced at the end of the project.	20	12
Background to the Project / Literature Review (400 words)		
Description of how the work to be done by in the project relates to the work identified in the literature review; Discussion of any ethical issues raised by the project Identifying what has already been done within the field; Topic familiarity; Brief literature review using appropriate sources – 6-8 journal papers and book chapters	20	12

apters rather than just websites; Se lection of relevant models & concep ts Although there is evidence you hav e looked at some initial literature, d escription of how work to be done i n the project relates to the work ide ntified in literature is not explicitly given. You need to discuss any ethi cal issues raised by the project and select relevant models and concept s.		
Project Design (500 words)		
Clear statement of which developm ent methods are to be used and wh y they are appropriate; Clear state ment of which tools are to be used and why they are appropriate; Clea r description of how data collected will be analysed I did not see a clear statement on d evelopment methods to be used an d why they are appropriate. I was e xpecting to see Visual representatio ns of your Design. It is a good thing you described the tools to be used but, you are not clear on how collec ted data will be analysed	30	18
Resources / Planning (200 words)		
List of any deliverables; Clear diagr am showing both timing and resour ce use; Completed ethics form; Limi ted and relevant appendices	15	8

I did not see a list of deliverables, but it's a good thing you had a Gantt Chart . I did not see any completed ethics form, and you should start building on your appendices		
Document Presentation		
Correct spelling, grammar, and punctuation; Flow of narrative/fluency; Coherence; Word processed ; Correct use of referencing with bibliography; Strict word limit It is a good thing you tried your best to use a spell checker, your document is professionally done , with table of contents, and correct use of referencing.	15	13
TOTAL	100	63

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12
