Networking Essentials Semester Project

Instructor: William A Loring

Table of Contents

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This is a case-based project. It is designed to be open ended; you will have to do some research to figure out what to do. When you aren't sure what is expected, you should communicate with the instructor (customer). This type of project is designed to simulate real world conditions and problem solving. In the real world, you don't always have clear directions and expectations.

This is a group/team/final project. Experienced students will be paired with inexperienced students.

You will be working on a final project one assignment at a time over the semester.

Don't Wait! This project is a major part of your grade, get started now!

Rationale for the project: Work in IT is rarely done alone. It is almost always done as part of a team. Presenting or selling an idea or plan is an important part of being in IT. An IT person is always persuading someone that change is good, the project or idea will benefit them, the change to the network will help productivity, make the network more secure, etc. Give reasons why this project will benefit the customer. This real-world project will help you synthesize and consolidate what you are learning in class and the lab activities.

Outlook Groups

An Outlook Group will be created for each Guild. This can be used to share documents, send email, and work collaboratively.

Outlook Group email is a requirement of this project. How professionally, how responsive, and how often you communicate is part of your individual evaluation throughout the semester project.

Please address all Semester Project asynchronous communication to the Outlook Group Email address shown in your Outlook Group. There is no need to include separate email addresses. Everyone's wncc.edu email address is already in the Group Email address.

Each Team has a similar Outlook Group Email address. The last number is the only thing that is different.

For example, if you are in Group 1: Loring-Networking-Group1

Using this address archives a copy of all email in the Groups feature in Outlook. You should see this group under Groups in Outlook. You can create new email messages from the Group.

Here is a video on how to use Outlook Groups. https://youtu.be/DDG5n0QdvUg

How to Work with Word in Outlook Groups

IT Project Components

IT projects typically have three main components:

- Where we are now?

- Where we want to be?

- How do we get there?

Minimum Requirements

Think of this document as setting out the minimum requirements for the project. As long as the minimum requirements are met in your assignments, you have license to be creative and go further than the assignments request.

Scenario

You are working for a networking consulting company. You have been hired to put in a new or upgrade an existing network for the Smalltracks Logistics Company (or company name of your choice). You will gather the information needed to design and specify the components needed for this network.

Smalltracks Logistics Company

The Smalltracks Logistics company is responsible to maintaining the level of small toys at many retail businesses. There are currently 25 employees, with expected growth to 35 in the next 2 years. They are also looking at adding large toys to their portfolio of services. Their network infrastructure is currently a peer to peer network, with 100 base-T switches.

As the company has grown, management of their network has become more time consuming and much harder to secure. The employees don't always know where their files are, and much work is duplicated. Anti-virus software is installed and managed individually on each workstation.

The proposal is to put in new network equipment, and to upgrade the infrastructure to 1000 baseT with corresponding gigabit managed switches. This upgrade will be done in phases.

1. Re wire building to tested Cat 6

2. Replace switches with gigabit managed switches

3. Transition from a peer to peer-based network to a client server network

This network infrastructure upgrade will benefit the business in many ways, including:

- High speed local network

- Portable device access

- Increased speed of internet access

The time saved by these network upgrades will pay for itself in increased productivity within 3 years. Employees will always know where their files are. Files will be backed up each night.

Week 6 Milestone: Teams, Zoom or Discord Synchronous Communication

50 points

Time required: 60 minutes

You can use whatever you wish for synchronous team communication. This lab will look at Teams and Zoom as options for team synchronous communication.

Assignment Submission

Show screenshots of each person participating the video conference.

1. **Screenshots:** The Team leader submits the completed Screenshots in Blackboard.

2. **Team Individual Evaluation:** Each team member submits a Guild Individual Evaluation in Blackboard.

Week 7 Milestone: Team Charter

100 points

Time required: 60 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

Requirements:

1. **Read:** Creating Productive Teams

2. **Read:** Elements of a High Performing Team

3. **Read:** Team Charter

Do: Determine how your team will handle the following items.

1. Communication

    a. Synchronous

        i. Skype

        ii. Zoom

        iii. Video conference software of your choice

    b. Asynchronous

        i. Outlook Group Email (Required)

2. Collaboration on documents

    a. Outlook Group (The instructor will create the group)

3. The team will create a list of the skills needed for the project.

    a. Team skills

    b. Computer skills

4. Each member will create a list of the skills they bring to the project.

    a. Team skills

    b. Computer skills

5. Team leader for the week

    a. The team leader is not responsible for doing all the work, only organizing or getting everyone together.

    b. Rotate between each member for team leader of the week.

    c. A recommended practice is to set a schedule for team leader rotation at the beginning of the project.

    d. The team leader is responsible for submitting the project assignment for that week.

6. Expectations for Team Members

    a. Set your shared expectations for the Team

    b. Responsiveness

        i. What are the expectations for response to communication?

    c. This is a collaborative team project.

        i. It is not ok to say to the rest of the team: plan this week without me and let me know what I am supposed to do.

        ii. Collaboration means each team member contributes equally.

    d. Deadlines for individual assignments

    e. Deadline for team assignments

    f. If these expectations are not met, ask the team member why

    g. If there is no response, move on without them

    h. Give an honest evaluation of individual performance with the evaluation

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Assignment Submission

1. **Team Charter:** The Team leader submits the completed Team Charter in Blackboard.

2. **Team Individual Evaluation:** Each team member submits a Guild Individual Evaluation in Blackboard.

Week 8 Milestone: Physical Wiring Map

100 points

Time required: 90 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

Our first step to designing a new network is to document our customer's current network. You are drawing the physical layout of your customer's current network.

Use draw.io or another diagramming software to draw a physical wiring map of your customer's current network. This diagram should be saved separately and pasted in the main document. Reference the drawing in the text and use a caption.

- Show the physical location of the patch panel, network drops and their labels.

- Label the jacks. A typical labeling scenario is A1, A2 etc. (Patch panels are typically marked A, B, C, etc.)

- Show the physical location of the patch panels, switches, wireless access points, server, etc.
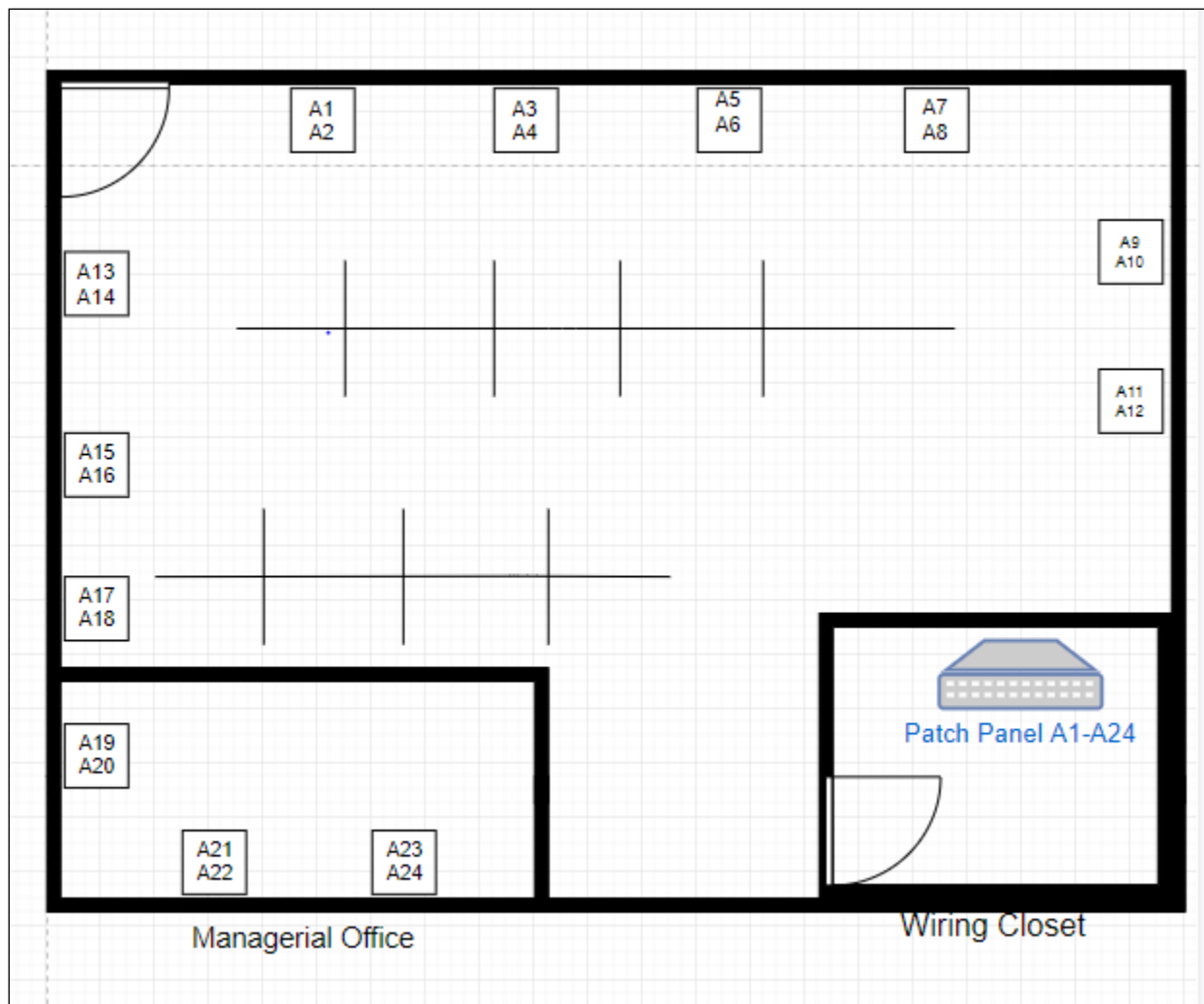
Example drawing. Yours does not have to look like this.

Figure 1 Sample Physical Wiring Map

Assignment Submission

Attach the drawing to the assignment in BlackBoard.

Week 10 Milestone: Logical Network Diagram

100 Points

Time required: 90 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

NOTE: Use Packet Tracer to create a create a functional network.

A screen shot of the Packet Tracer network should be placed in your main document.

- This should include the major components, how the data flows.

- The names and IP addresses (static or dynamic) of the devices.

- Static IP: servers, switches, printers, routers, and wireless access points.

- DHCP: Workstations, laptops, and other portable devices should be put in as a group using DHCP.

Assignment Submission

Attach the Packet Tracer file to the assignment in BlackBoard.

Week 11 Milestone: Project Outline
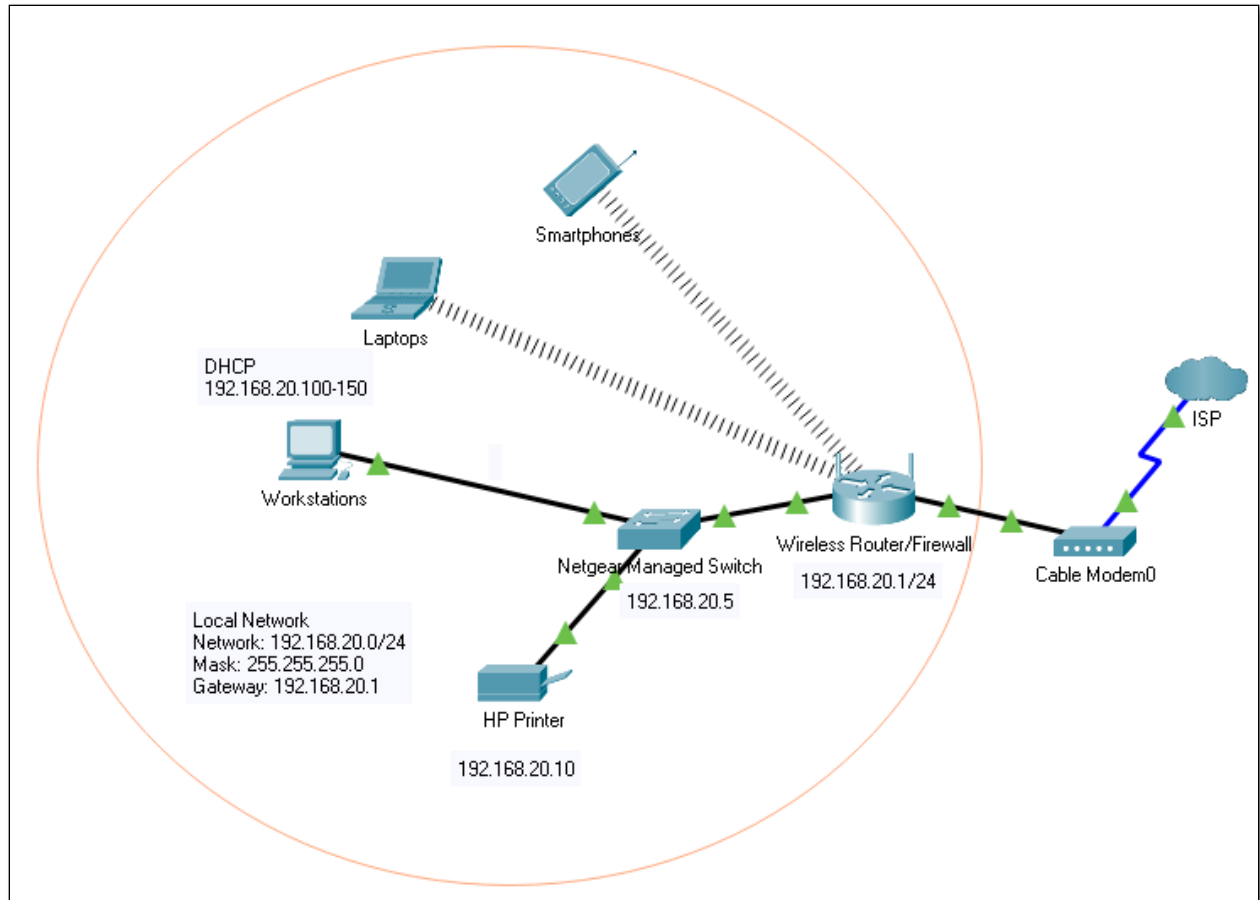
100 points

Time required: 90 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

Creating an Outline from Indiana University of Pennsylvania.

*   Create an outline of your entire Semester Project Final Report.

*   An outline doesn't have content.

- This is an outline of the major milestones of your project.

- It is a high-level view of the shape of the project.

- Use the Multilevel List feature in Word.

- Use the report sections at the end of the document as a general structure of the order of your outline.

- Add a **small** amount of detail to each outline point.

Sample outline

This is a rough idea of the format an outline can have:

I. Main idea

    A. Secondary or supporting idea to main idea I

    B. Secondary or supporting idea to main idea I

        1. Secondary idea to B

        2. Secondary idea to B

            a. Secondary idea to 2

            b. Secondary idea to 2

II. Main idea

    A. Secondary or supporting idea to main idea II

    B. Secondary or supporting idea to main idea II

    C. Secondary or supporting idea to main idea II

III. Main idea

Assignment Submission

Attach the Word document to the assignment in BlackBoard.

Week 12 Milestone: Budget

100 points

Time required: 90 minutes

NOTE: Each person contributing to the outline:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

This should be a separate document. It should also be linked and embedded in the main document.

The budget includes all hardware, software and labor in a table showing the quantity, item, description, vendor. and price. Please include a link to the specific item.

NOTE: Even though we covered server software in class, this project is about network hardware.

1. Structured wiring supplies (patch panels, wire, jacks, wall plates, etc.)

2. Switch

3. Router/firewall

4. Wireless access point

5. Bandwidth from ISP

6. Internet access

7. Specific items, Netgear ProSAFE GS116NA 16-port Gigabit Ethernet Switch, etc.

8. A breakdown of all costs, including labor

Sample Budget				
Qty	Item	Vendor	Price	Total
1	Netgear JGS524E 24-Port Gigabit Managed Switch Rackmount	Amazon	$ 149.99	$ 149.99
1	Sonicwall TZ-SOHO Wireless Network Firewall Appliance	Amazon	368.00	368.00
10	Labor installing Firewall and Switch		75.00	750.00
			Grand total	$1,267.99

Assignment Submission

Attach the Excel workbook to the assignment in BlackBoard.

Week 13 Milestone: Rough Draft

100 points

Time required: 90 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

Get started now.

Use the Final Project Submission Minimum Requirements at the end of this document to create a rough draft.

Connect the scenario to the issues/risks to the solution to the benefits. Here is an example.

Scenario: Lack centralized and regularly scheduled backup.

Issue: Data could be lost forever.

Solution:

- Migrate all data to a central server.

- Schedule nightly backup using Windows Server Backup.

- Use a scheduled rotation of portable hard drives on and offsite.

- Test backup on a regular basis.

Benefits: Reliable backup will avoid catastrophic data loss.

1. Put enough detail in each section to give the general idea of the project.

2. Write to a person without a technical background. No acronyms. If there are any acronyms, explain them.

3. Your rough draft should be in Microsoft Word. This entire document is an example of what it should look like.

4. Include a real table of contents with headings and page numbering.

5. Rough out all the parts of your project report.

6. All past milestones will be included, either in the report, or as a supporting separate document.

7. You may have to change some of your past work to align with the rough draft. We want a consistent project and document.

8. Complete a rough draft of your report.

This is a technical document.

- Write clearly and concisely.

- Use short and to the point sentences and paragraphs.

- Bullet points and numbered lists are appropriate.

Helpful Hint: This is a technical document, don't use first person words like I, you, etc. Example: (First person) I will configure the Cisco switch.

Configure the Cisco switch, log into 192.168.1.1 with the username: admin Password: Password01.

Assignment Submission

Attach the Word document to the assignment in BlackBoard.

Week 14 Milestone: Network Documentation

100 points

Time required: 90 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

Requirements

1. Document all settings, IP addressing scheme and information, DHCP, DNS, specific make and model of device, passwords, configurations, etc.

2. Make up the WAN/Internet settings for a public IP address, Gateway and subnet mask. The rest of the settings, DNS, SMTP, POP3, IMAP, could be gathered from any ISP, like Charter or ALLO. Specify the ISP you will be using, include their support information.

3. The following template gives an example of some of the information needed in the documentation. Your documentation does not need to be in this format.

Network Documentation Template

WAN/Internet Settings from ISP

WAN IP	
Subnet Mask	
Gateway	
DNS	
SMTP	
POP3	
IMAP	

LAN Settings

Domain	
Network	
Subnet Mask	
Gateway	
DNS	

IP Address Ranges

Routers	
Switches	
Servers	
Printers	
WAP	
Static Devices	
DHCP Range	

Static IP Devices

IP Address	Host Name	Description	Location
192.168.100.1			
192.168.100.2			
192.168.100.3			
192.168.100.4			
192.168.100.5			
192.168.100.6			
192.168.100.7			
192.168.100.8			
192.168.100.9			
192.168.100.100	DHCP		
192.168.100.149			

Router Configuration

External IP Address	
Trusted IP Address	
DMZ IP Address	
Internal DNS	
Status Passphrase	
Configuration Passphrase	

Assignment Submission

Attach the Word document to the assignment in BlackBoard.

Week 15 Milestone: Project Presentation

100 points

Time required: 90 minutes

You are pitching your proposal to upper management. Sell them on the tangible benefits of your proposal. Be specific.

Fluff: This project will benefit your employees by helping them to be more efficient.

Specific and Tangible: A nightly backup of all data on the server with rotating media, a nightly cloud backup, and a physical copy offsite weekly, monthly, and yearly will reduce the possibility of data loss. Recreating data that is lost could cost your company $2,000 or more in lost time.

1. Each member of the team should be heard equally in the presentation.

2. You can use Zoom or any other screen recording software to record your presentation. You can record it all at the same time, or record separate parts and edit them together.

3. Please have the speaker showing in a thumbnail, like a screencast recording.

4. Use PowerPoint, www.prezi.com or your choice of presentation software.

Presentation Helpful Hints

- Don't put too much detail in the presentation, use it as a guide to help tell the story.

- Use the 6x6 rule, no more than 6 bullet points and 6 words per bullet point.

- Use pictures and diagrams. Use as little text as possible.

- The presentation should follow your final project Word document. Use the same headings in the presentation as the Word document. The Table of Contents can be used as a guide.

- Practice the presentation, preferably for an audience.

- Practice the presentation until it feels comfortable. Minimize the uh's, um's, or hesitations. Be enthusiastic, sell the project!

- Target an audience that doesn't know anything about the subject. If you use technical terms, please explain them.

Length: The presentation should be a minimum of 5 minutes long.

Presentation Example

When you record the presentation, don't read it line by line. Use it as a guide to tell the story of how your company's plan can benefit the customer. Sell the audience, not with fluff like guaranteed service, but with tangible benefits. For instance:

This is what you might say:

Increasing the internet bandwidth will benefit the faculty in the following ways:

- More than just a few faculty at a time can do research or work on their online classes.

- The faculty will spend much less time uploading and downloading videos and other educational media.

- Two way communication such using technologies such as Skype or Collaborate is now possible with the students, faculty, and other campuses

For the presentation, cut the verbiage down to enough to remind you of what you wanted to say.

This is what might be in the presentation:

Faculty benefit with increased bandwidth:

- Increased faculty efficiency

- Decrease time spent online

- Video conferencing is now possible

Now you are selling the project with tangible, measurable benefits.

Assignment Submission

Submit your PowerPoint or other presentation and recorded presentation url to the assignment in Blackboard.

Week 16 Milestone: Discussion on Project Presentation

Use this discussion board to analyze another team's presentation. Please be constructive. We are here to learn and look at all objective feedback. This is one of the ways we learn.

- All feedback is good.

- What did the team do well?

- What could have been improved?

Finals Week: Semester Project Final Report Submission

300 points

Time required: 180 minutes

NOTE: Each person contributing to the document:

1. Highlight your text in a different color.

2. Put your name by the parts you worked on.

NOTE: The Writing Center is available in person and online. It is a good idea to work with them.

1. Submit the project early. There may be feedback and adjustments, just like any real project.

2. Attach the written report to the assignment.

    a. Entire report in Word

    b. Presentation file or URL

    c. All supporting documents and drawings

Final Report Requirements

TIP: Use Track Changes in Word to work on the Final Report. That will allow whoever is working on the document at the time to see the other changes that have been made. When the document is complete, turn off track changes to finalize the document.

The final report should be formatted like a research paper, this document is an example. References are not necessary. This is a professional presentation to sell the proposal to a business or internally to management.

Audience

The audience for the final report is non-technical people. Explain any acronyms or technical concepts. The supporting documents are for technical or detail people who want more detail.

Technical Writing Tips

- Short sentences

- Short paragraphs

- Concise

- Less is more

- Bullet points and numbered lists

- The best writing is re writing

- Text at least 1.5 or double spaced

Semester Project Report Outline

References are not necessary.

This is a professional presentation to sell the proposal to a business or internally to management. The following is an outline of some of the minimum necessary components, and some examples in each area. Your report should have much more detail.

1. **Title Page**

2. **Table of Contents**

    a) Construct a real Word Table of Contents linked to styles.

    b) Headers and/or footers with document information after the table of contents page.

    c) The header or footer should contain the project name and page numbers.

3. **Scenario**

    a) General information about the company and future growth.

4. **Current Issues**

    a) What does the company see as issues?

    b) What did your team discover as issues and bottlenecks?

5. **Solution**

    a) How do you propose to upgrade their network?

    b) Your solution must align with the issues.

    c) Be specific.

6. **Benefits**

    a) How will your solution benefit the company?

    b) How will this project save money and/or time?

    c) Be tangible and specific.

    d) Align this with the issues mentioned earlier.

7. **Budget**

    a) Create a line item budget in Excel.

    b) This is a supporting document.

    c) Link the budget as an Excel workbook object.

    d) Provide a summary in the main document.

8. **Item Discussion**

    a) Discuss each item in the budget, what it is used for, how it works, why that item was chosen, a photo, and a URL.

    b) This is a supporting document.

    c) Provide a summary in the main document.

9. **Supporting Documents**

Refer to the supporting documents in the main report. Give a short summary, then refer the reader to the supporting documents.

The following items are supporting documents.

    a) Budget

    b) Item discussion

10. **Supporting documents also include:**

    a) Documentation about any special hardware or software. For example, VoIP: how to set up, advantages and disadvantages.

    b) Include any diagrams or other supporting documents that will help describe the project.

    c) Provide an appendix in the main document.

    d) Reference the appendix items in the main document.

11. **Executive Summary**

    a) Summarize the project proposal.

    b) Include the next steps in the process.