Designing Wired Network

March 23, 2011

Design a Network

Every network technician will eventually design their first computer system that has a Local Area Network (LAN) and Wide Area Network (WAN) for a customer as a professional. When we put the proposal together, we will want our first career project to be a success, so we will gather all the necessary information and we will create a network diagram, quote and cover letter to communicate our concept. A well thought out plan will end with a properly running LAN and WAN and hopefully a happy customer. Also, a successful process will enable the technician to move to larger and more complex networks.

Meeting the Client

When we meet the client, we need to discover what they wish to do with their system. This can happen over the telephone or by email, but a site visit can save the installation team valuable time since we will know where the computers will go, the power bars will have the acceptable power cord length, and network cables will be have an sufficient length. Also, during the site visit, we will discover where we want to run the cables, so when the quote and diagram is made, our information will assist the installation technician in completing the job in the shortest amount of time.

Site Visit Equipment List

When we visit a customer, we want to gather sufficient information, so we can create an accurate quote that has the correct number of computers, an adequate length on the cables and the location of the devices including the distances to available and open power outlets. We need to bring equipment with us to make a proper site visit,

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Site Visit Checklist
- ❏ Pen / paper/ notepad
- ❏ Flashlight
- ❏ Measuring tape
- ❏ Digital camera
- ❏ Standardized LAN diagrams
- ❏ Red pen
- ❏ Ladder

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We need a notepad and pens to record the customer requests and to sketch the ideas. We need a flashlight to see in dark areas such as crawl spaces where the network cable could go. We need a measuring tape to determine lengths for cables and distances to open power outlets, so the surge protectors have a long enough cord. We can have standardized diagrams to reduce the time to make sketches and a digital camera to capture the images of the rooms. On some site visits, we may need a ladder to look above a drop ceiling where cables will run.
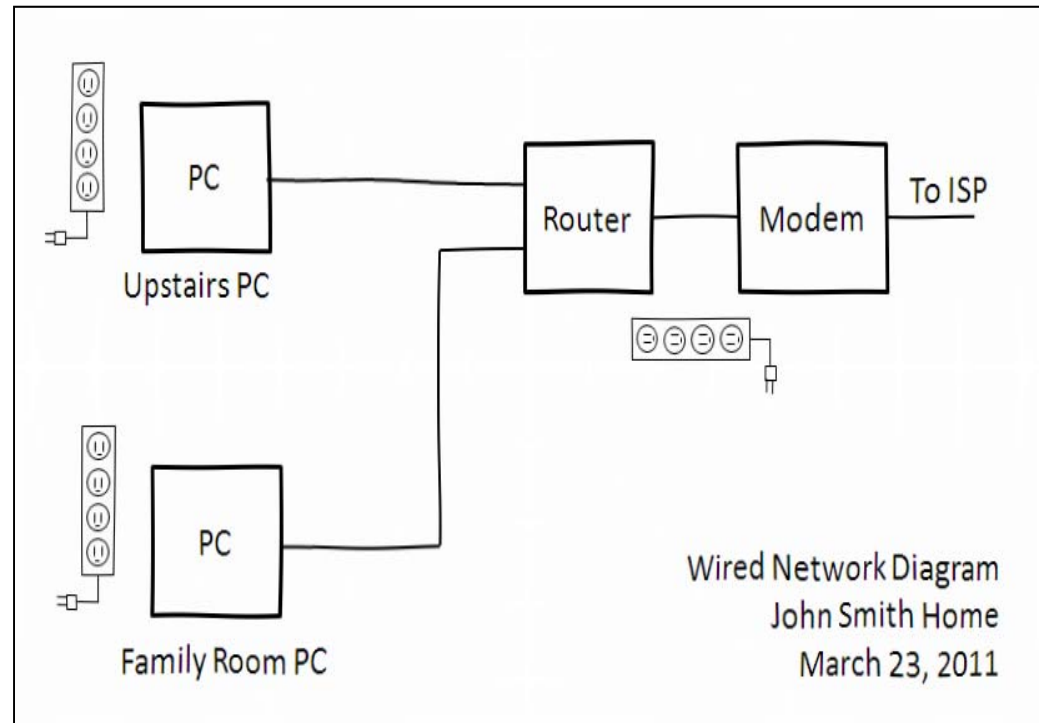
Cable Lengths

Network cables should be 25% to 50% longer than what we actually need, so the customer can change the location of a workstation without making new cables. The extra length can be above a drop ceiling or in the crawl space, so there is not a bunch of cable lying on the floor. We can ask the customer how much extra cable they want.

We can also use RJ45 receptacles that we mount in the wall for a neat and clean look.
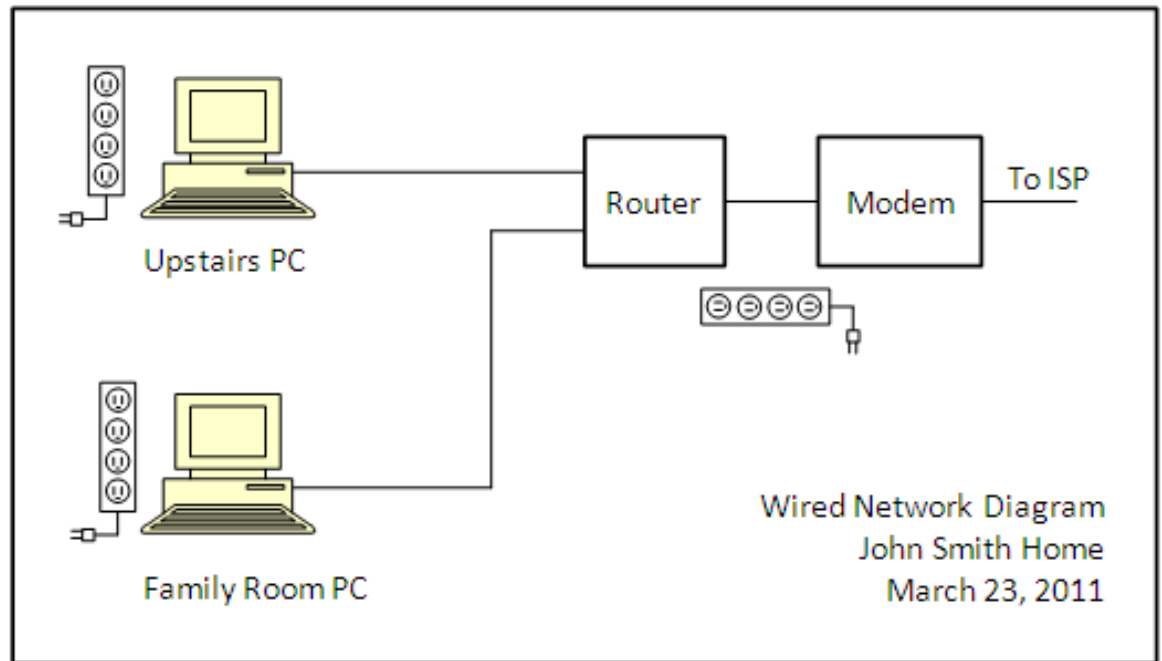
Sketching a LAN Diagram

When we visit the building where the new wired network will be built, we need to identify where the customer will locate each Personal Computer (PC). We can also determine where the Internet Service Provider (ISP) will bring the cable or fiber line into the building. In some cases, the customer can already have a ISP connection.

We will determine where the modem and the router will sit and where we will route the cable from the RJ45 receptacles on the router to the Network Interface Card (NIC) on each computer. We draw a sketch showing everything we need.

Draw a Diagram

A diagram should show all the hardware we need to purchase. If we have a floor plan of the building, our blueprint can show the devices in the exact room and location where they will be installed. Do not forget to account for power receptacles.

Upstairs PC

Router

Modem

To ISP

Family Room PC

Wired Network Diagram
John Smith Home
March 23, 2011

A personal computer can require two power receptacles, one for the desktop unit and the second for the monitor. The customer may require a printer, and speakers which will also need a power plug. If the router and modem are at the same desk, there will be two more plugs. Count the plugs you need at each workstation.

Create a Quote in a Spreadsheet

In a spreadsheet application, we need to create a quote that details every item in the project. We begin with the router and the cables. Then we add the components of the workstations. We can place warrantee statements on the quote.

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Customer: Mr. John Smith
10291 High St.
Columbus, Ohio 43201
614-899-1212
jsmith@hotmail.com

Items	Qty	Price	Extended Price
Router	1	$ 69.99	$ 69.99
Category 6 cable, 6 ft	2	$ 12.00	$ 24.00
Category 6 cable, 50 ft	1	$ 25.00	$ 25.00
Workstations - Intel I5 processor, 3.2 Ghz, 6 GB memory, 1 TB hard drive, built-in Gb LAN, 7.1 audio, 18.5" Widescreen LCD monitor, standard keyboard/mouse, DVD-R/CD-R combo	2	$ 799.99	$ 1,599.98
NVIDIA GeForce video card	2	$ 199.99	$ 399.98
Speakers	2	$ 24.99	$ 49.98
Laser printer, black and white	1	$ 99.99	$ 99.99
Surge protector	3	$ 12.50	$ 37.50
Windows 7 Operating System	2	$ 80.00	$ 160.00
Microsoft Office Home and Business 2010	2	$ 199.99	$ 399.98
Antivirus software licenses	2	$ 49.99	$ 99.98
Labor - Shop time hours	8	$ 75.00	$ 600.00
Labor - Site time hours	4	$ 75.00	$ 300.00
Warranty of computers, router and components by their manufacturers.			
Installation of equipment is warranted for 60 days			
Modem and ISP costs provided by customer			
Sub Total			$ 3,866.38
Tax at 6.75%			$ 260.98
Total			$ 4,127.36

Quotes have the business' name, address and contact information. It also has the date and the customer name and contact data. There is a subtotal, tax amount and grand total.

Write a Cover Letter

The last document we will make is the cover letter. As a professional correspondence, the document has three paragraphs, an opening that quotes a price for their work. The second paragraph summarizes the system and the last paragraph will offer our warrantee and provide the contact information for the client.

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Mr. John Smith
10291 High St.
Columbus, Ohio 43201

Mr. Smith,

We have designed a two-computer network on a Gigabit local area network for your home for $3967.27 The majority of work building your system will be done at our shop as to limit any disruption of your busy schedule.

Your computer network has two personal computers with Intel I5 processors, 6 GB of internal RAM and 1 Terabyte hard drives, DVD-R/CD R/W, NVIDIA GeForce Video Cards, and a 18.5 inch widescreen monitor. The PCs have speakers and the first floor unit will have a black and white laser printer. The two systems will have the Windows 7 operating system, Microsoft Office and Business 2010 application, Adobe Reader, Adobe Flash Player, and Antivirus software. We will install a Gigabit Ethernet router, multiple tested Category 6 cables, and surge protectors in your home. We will post the manufacturer warranties for you and you will receive your documentation in a permanent binder for easy reference. Our installation warrantee is valid for 60 days.

If you desire to purchase an extended warranty, we will add an additional $200 a year to covers all equipment. If you wish to contact me to schedule your installation or to make changes to our quote, you can call me at 614-222-9200 Monday through Friday from 8 AM to 5 PM, or email me at bwhite@gmail.com. Thanks you for your consideration.

Sincerely,

Brian White

Brian White
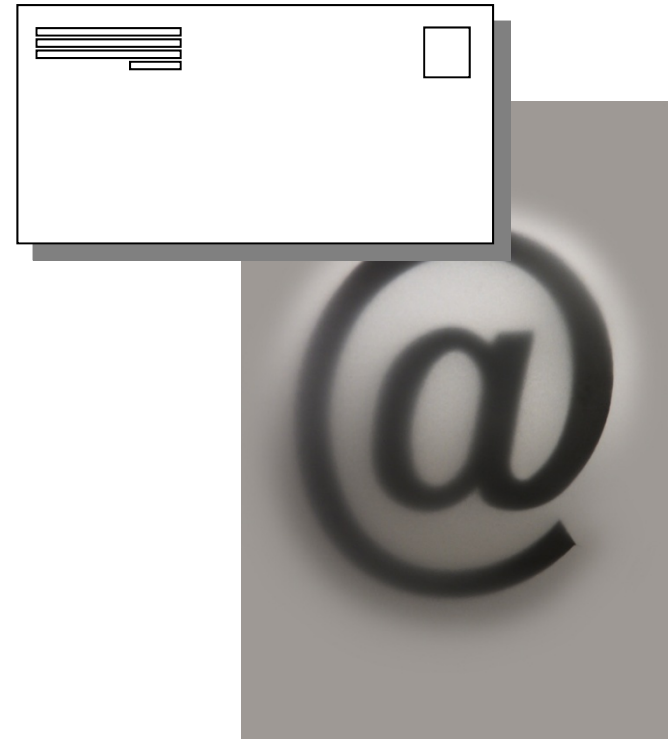Network Technician

Checking the Quote Documents

Have another network technician check your three quote documents. You can provide the site visit notes to the checker when they are verifying the quote.

On some more expensive systems, the organization may require a supervisor to sign off on your quote before it is mailed or emailed to the client.

Sending the Quote

We should send the quote to our customer and verify they receive it. We can put a receipt on the email, so we will be sent a return email that our correspondence has been opened. We will find that some customers do not have the capability to open the quote documents because they do not have the software to view them. A good idea is to convert the diagram, quote and cover letter to the PDF format, so they can be read and printed using free Adobe Reader software. Some companies will email their quote so the customer gets the information quickly and then we would send a hardcopy of the documents in the regular mail to handle the printing issue.

Presenting the Quote

For customers who need an explanation of our design, we can give a presentation to them that covers the layout, itemized quote and summarizes how their new system will operate. We can create a Power Point presentation quickly from our work and make a 15 minute slide show. The talk should concentrate on the performance and appeal of the network such as the look of the workstations, the applications that will be on them, and the speed of the connections. Some of our customers may need training on how to use email, handling attachments and more. Adding another item to the quote for training is good customer support and it will help us expand our business.

Accepting and Scheduling

When the customer decided to install the system, we will want to have a contract ready for them to sign. In many cases, they will put as much as 50% down to cover the purchase of equipment. We should schedule an installation date at the meeting with enough time for us to receive the devices and build their system.

We should order the equipment as soon as possible, since some items may take up to two weeks for shipment. Call the customer 48 hours ahead of time to verify the day we will be there setting up their system. While this lesson was designing a wired network, in another tutorial, we will cover the actual installation day.

Review Questions

1. Name the three documents in a network quote?
2. What items would you bring to a site visit? Explain why each item is needed.
3. What items plug into a surge protector at a standard workstation?
4. Describe the contents of the three paragraphs of a cover letter for a network proposal.
5. Who should check the quote before it is sent to the customer?
6. What file format should we send so the customer can open the documents?
7. What is the purpose of adding a receipt to an email?
8. If we make a slide show presentation, what would we discuss for 15 minutes?
9. When scheduling an installation, what do we do prior to the installation date?
10. What if we find that the customer cannot send emails, open attachments and perform other basic functions?

Network Design Exercise

Design a simple wired network for the customer:

Ryan Small

5432 Main St.

Cleveland, Ohio 49123

407-999-8989

rsmall@bignet.com

Ryan wants a four computer network for his family with mainstream processors and capabilities. He wants a wired network for his LAN and a connection to the Internet using a local Internet Service Provider (ISP). The family room will have his wife's computer, his office will have his computer. Both children will have a computer in their room. He wants a network laser printer in the family room.

Create a diagram, spreadsheet quote and cover letter for the job and send the documents to your instructor with attachments. Make an informative PowerPoint presentation highlighting the features of the network you designed.