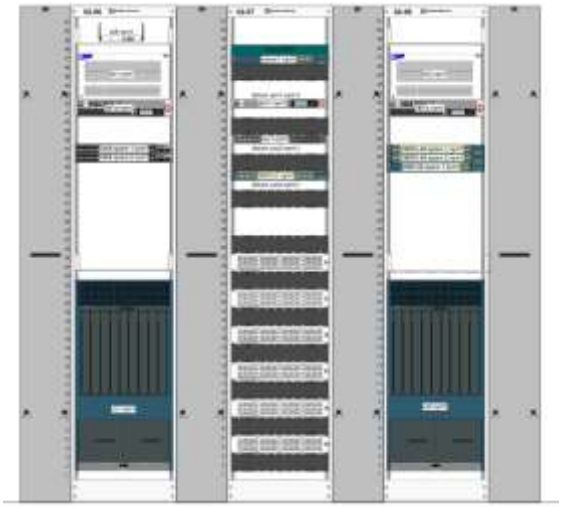
Networking Final Project 2014

This is going to be **2/3** of your final test grade, which is 60% of your overall grade for the Semester. Please note:

- ***Written portfolio and drawings, implementation on your LAN: 20%*** ***Note that this is REQUIRED to be A work to get cross crediting for English***
- ***Benchmarks: 60%***
- ***Written test: 20%***

Read the case study below and do the following:

1. Design a network topology that answers all of the needs of the customer. Create a network portfolio to present to the customer. This portfolio should include all of the following:
    a. A cover page with your company name and logo on it.
    b. An outline of the needs of your customer with your solution to meeting those needs.
    c. A network drawing with all components properly labeled, including
        i. Cabling
        ii. Speed
        iii. Servers (label the role of each server)
        iv. Hardware
        v. Topologies; logical and physical
    d. A spreadsheet of prices of:
        i. Hardware
        ii. Cabling
        iii. Servers
        iv. Software and client access licenses for all versions of Windows 2008 Server and Windows 7
        v. CALs for Terminal Services use
        vi. CALs for all workstations
        vii. Internet access
        viii. Domain name purchase/lease
    e. A proposal for the setup of user accounts, groups, and organizational units.
        i. A description of the proposed username syntax.
        ii. A list of groups created for the network.
        iii. A list of organizational units created for the network.
    f. Group policies to be implemented within the domain—A complete list.
    g. Set up the Active Directory structure within your virtual server.



When you have made all of these decisions you must create a network that emulates the network you are designing. While you may work together on all parts of this project, each student MUST turn in a portfolio that is his/her own work and completely separate from every other student, no exceptions.

Grammar, punctuation, and spelling do count on this. You are proposing this project to a CUSTOMER. Make it look and sound good. It must be ENTIRELY your own work.

You have been hired to create a network for a building that is in the process of being built. You will provide a specific proposal that is no less than **5000 words** and contains the following components:

1. Description of the client.
2. Description of the needs of the client.
3. Description of each network, including all the information required on the network drawing.
4. Written proposal of how each network will be set up:
    a. Type of network
    b. Access method
    c. Benefits of this network
    d. Type of security
    e. Subnet
    f. Hardware included in the network
5. Description and prices of services provided by other companies (for example, you'll need to lease a T1 or T3 line so that they will have enough bandwidth coming in/going out.
6. Spreadsheet of all of the costs related to the project (assume you are purchasing all enterprise materials, so do not get ANY home devices).

Monsters University

You have been hired to design the network for a new, small, exclusive school that is located in Everett, WA. They are locating their campus on a closed business campus so there is some network wiring in place. You need to upgrade the network, purchase hardware, purchase software and operating systems, as well as establish a business account with an ISP.

The school will have three buildings.

- Building one will be the main administrative building and will house about 30 users.
- Building two will be staff offices and some classroom space and will house about 40 users.
- Building three will house a small vending area, a student union/lounge, and 10 classrooms and 3 computer labs.
- Each building also has 750 square feet (25' x 30') of "open use" area that can be used for meetings, studying, etc. and will need full speed Internet access.

The building distances:

- Distance from building 1 to building 2 is 300 meters.
- The distance between building 1 and building 3 is 90 meters.
- There is an existing Internet connection that is NOT hot in Building 1. This will need to be shared among users.

Client needs

- ✓ Wired network that supports high speed transmission and will be useable for at least 5-10 years.
- ✓ Wireless network that can be secured for use only by students and staff of Monster University.
- ✓ State of the Art hardware that supports the needs of MU.
- ✓ Guest network that can be used by groups who might rent facilities that is NOT connected to the school network (for security).
- ✓ Servers that will support:
    - User authentication
    - Group policies to control user access
    - Highly secure storage both on site and off-site (backup)
    - Redundency for fault tolerance

- File storage for student files
- Control of access to programs
- DHCP
- DNS
- WINS
- Dfs

Your proposal should include ALL of the information above, including:

- ✓ Necessary hardware from Cisco, D-Link, or Netgear (think ENTERPRISE not home network hardware)
- ✓ Type of topology used
- ✓ Cable plant with type/speed of cable
- ✓ Active directory setup
  - Domain
  - Users (create ten users as shown below)
    - Randall Boggs
    - James P. Sullivan
    - Frank McKay
    - Dean Margaret Hardscrabble
    - Mike Wazowski
    - Squishy Squibbles
    - Claire Wheeler
    - Professor Andrew Knight
    - Karen Graves
    - Fungus Amongus
  - Groups
    - Administration
    - Faculty
    - Students
    - Guests
  - Organizational Units
    - Determine yourself, think SECURITY and control
  - Group Policies
  - Replication

You will draw four network designs that include all of those components

1. One overview of the entire compound. Include all buildings and indicate type of wiring, where the location of the MDF is, the location of wiring closets, and trunks into/out of buildings.
2. One detail of ONE of the buildings with (do building one because it will have the company):
   a. All hardware required to provide services, properly labeled
   b. Wiring labeled
   c. Location of network and phone jacks
   d. Access speeds, type of cabling, etc.
   e. Identification of routers, switches, firewalls, etc. by NAME and PURPOSE (think border routers, internal routers, access switches, L2 switches, etc.)

    f. Workstations identified.
3. Drawing of just the security/IT office that is VERY detailed (in relation to IT, phone, and wiring)
4. Drawing of your wireless network

Your final packet should be turned in in a folder with:

1. Cover page with your name and graphic on it.
2. Table of Contents
3. Introduction
4. Page numbers
5. Introduction
6. Sections
    a. Customer overview and network setup (current)
    b. Describe the current network
        i. Current Needs
        ii. Future Needs
    c. Proposal of new network
        i. Overview of network changes
        ii. Hardware changes
        iii. Topology Used
            1. Physical
            2. Logical
            3. Why you chose this network topology
        iv. Description of Wiring and WAN
    d. Active Directory Setup
        i. Organizational Units
        ii. Username conventions
        iii. Groups
        iv. Group Policies
            1. Password Policy
            2. Domain Policy
            3. Other OU Policies
            4. Student
            5. Faculty
            6. Administration
            7. Guest
    e. DHCP Addressing Scheme
    f. Server Setups
    g. Backup Scheme
    h. Spreadsheet of Costs
    i. Citation of Resources
7. Drawings
    a. Drawing of Full Network
    b. Drawing of Network Hardware in Wiring Closet
    c. Drawing of Acvtive Directory Setup
    d. Drawing of Wireless network

On your server you will create the domain Monsters University and create:

- Users
- Groups
- Organizational units
- Group Policy Objects
- Dfs
- DHCP
- Wins
- Folders with appropriate share and NTFS permissions.
- Active directory
- Virtual Private Network
- Other things as noted on the benchmark sheet

Directions For the Final

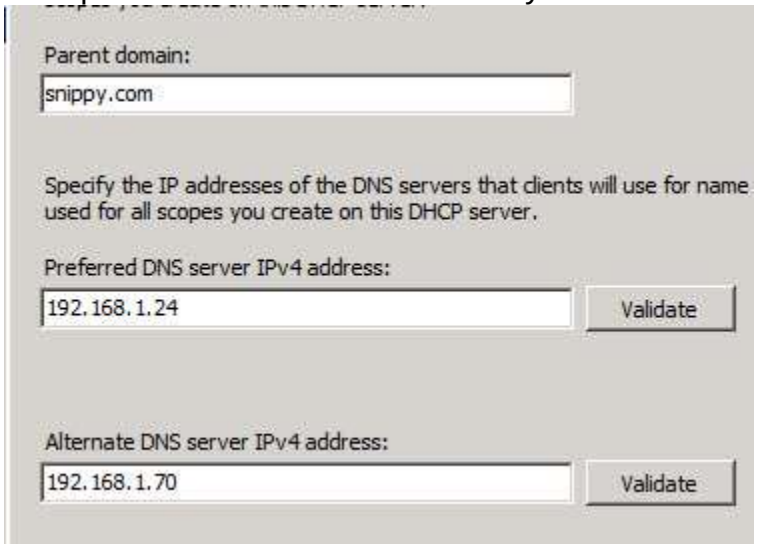
1. Create two new servers using differencing disks (I think that was in unit two or three). Name them *yourname*_MU1 and *yourname*_MU2.
2. In *yourname*_MU2 create a SECOND network card in settings. We're going to use this as a RRAS server down the line, so it needs two NICs.
3. Use the password P@ssw0rd.
4. Put in a static IP address on each server. Reserve THREE of them. I will pass out your static IPS. Do not lose this sheet.
    a. Remember: for DNS you MUST put the IP address of BOTH servers on all computers in your domain.
    b. You also want to be able to get on the internet, so also add 192.168.1.70 and 71.
    c. Put YOUR IP addresses first in DNS or you won't be able to join domains!
5. Set up active directory on *yourname*_MU1. Create a domain name that has the word Pirate in it, but is unique.
6. Set up active directory on *yourname*_MU2. Join it to an existing domain.
    a. If it won't work
        i. Check to make sure the preferred DNS is the IP address of your other server.
        ii. Ping your other server by IP address
        iii. Ping your other server by name.
7. Create one new workstation, OR take your current install of Windows 7 and join it to your new domain.
    a. Go into properties of your computer.
    b. Make sure ADDC1 or 2 is up, so you can unjoin it from that domain.
    c. Put it into a workgroup. It doesn't matter the name. You'll put in the username and password for your ADDC1 domain.
    d. It will tell you that you have to restart, but you don't.
    e. Shut down ADDC1 and start up *yourname*_MU1 or *yourname*_MU2.
    f. Go into properties on your Windows 7 Workstation computer (my computer or whatever you named it).
    g. Join domain.
    h. Join your domain…oh! You may have to manually enter an IP address because remember, we set it to get an address via DHCP and DHCP isn't installed yet on *yourname*_MU2.
    i. If it won't join:
        i. Make sure it has a STATIC IP address (one of the three you reserved)
        ii. Make sure your workstation can get on the internet
        iii. Make sure your preferred DNS is the address of YOUR servers and those are first
        iv. Ping your server by IP address
        v. Ping your server by name
    j. Now you're going to use this setup to create the Active Directory this company would need for it to be effective. You're also going to install all the roles, features, and services required in the benchmarks.
    k. Set up your users. You will also be one of the people and will be member of both IT Staff and Administrators.

New Stuff

Wow, there is new stuff on this project! That's odd…well actually it isn't. Often you are called upon to implement a new technology that you've not worked with before.
However in the interest of time, I'm going to give you resources for installing these services and the purpose of them.

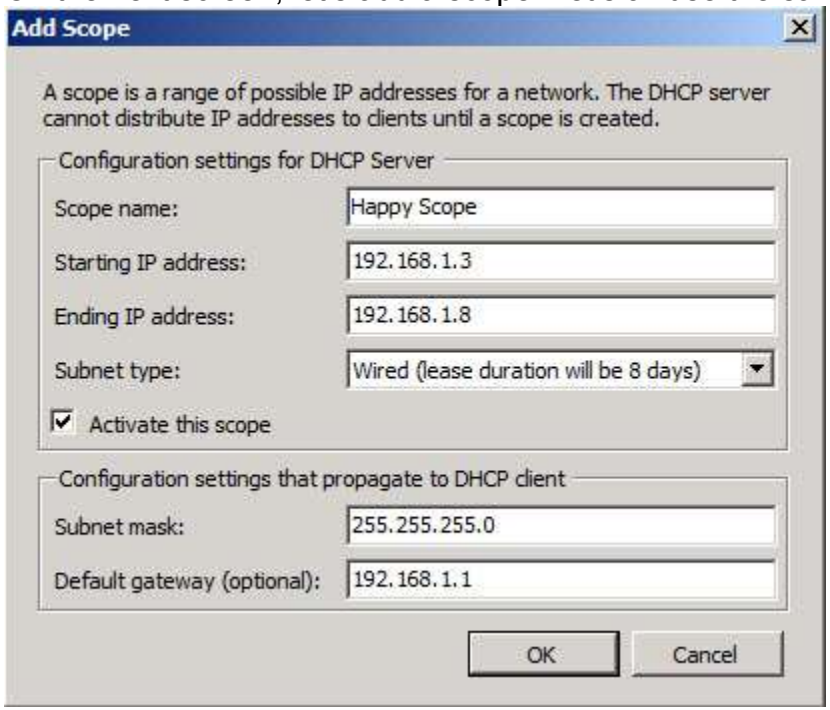
Install DHCP

1. Go into your server (MU2) and open Server Manager
2. Install a new role
3. Select DHCP Server. (A DHCP server assigns IP addresses to computers in your domain automatically.)
4. Select your FIRST NIC to be the one that responds. (If you do not have a static IP on that one you need to go into your network card properties and add that.) Click next.
5. Your preferred servers should already be in there. Mine looks like this:



6. Say YES you want WINS. You only use that if you have old computers in your network, but that's okay. Type in this server's IP address. (Mine is 192.168.1.24.) We will install WINS later, but we want to make the DHCP server assign all the information so you don't have to change it.

7. On the next screen, let's add a scope. Let's all use the same one (it's just for practice) so use the numbers below.

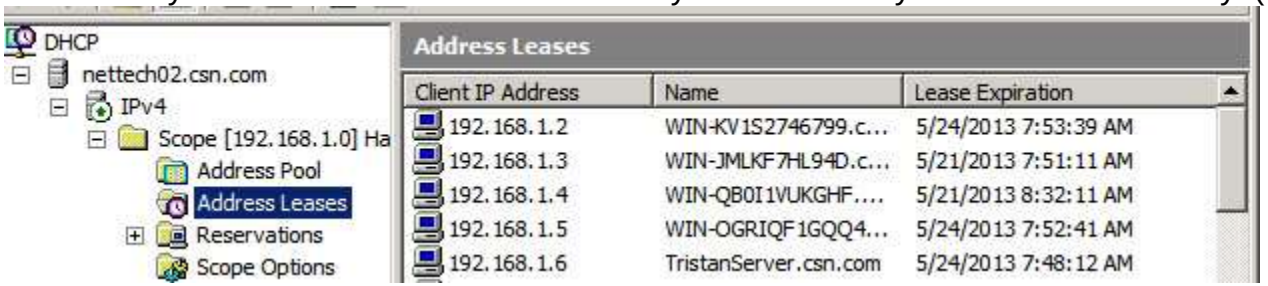


8. On the next screen, DISABLE IPV6 stateless mode. We're not going to use that.
9. On the next screen click "Use current credentials" and click next and let it install.

Test DHCP

10. Unplug your network card from our network so you do not server IP addresses to anyone else.
11. Turn off your other server and turn ON your Windows 7. Log into Windows 7.

12. Open your network card and make sure it is set to get an IP address automatically and DNS automatically. Close it. Open the command prompt.
13. Go over to your server, leave Win 7 open.
14. Go into Administrative Tools and open DHCP→Expand your domain→Expand IPV4→Scope→and click on Address Leases.
15. "Leases" this is where you will see your leases or addresses. If you do not have any, go back to Windows 7 and type ipconfig in the command prompt. If the IP address starts with 169 type ipconfig /release then ipconfig /renew. Type ipconfig again.
16. Go back to your server and refresh leases and you should see your Win 7 in there. Yay! (Below are my leases.)



Install a WINS Server

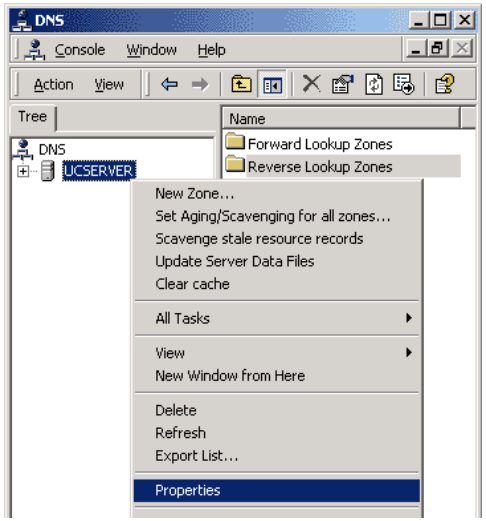
17. WINS takes old computers and converts their IP addresses to NetBios names. How is this different from DNS? DNS converts IP addresses to fully qualified domain names (FQDNs).
18. If you have a computer named fred in the domain rick.com
    a. FQDN=fred.rick.com
    b. NetBios name=fred
19. We're going to add the WINS feature (not role…why? I don't know.) on MU1.
20. Server Manager→Features→Add Feature→WINS Server.
21. 

22. Click Next. Click install. Go. Easy as pie.
23. Open your WINS Server Administrative Tools→WINS server
24. Click on Active Registrations. You won't see anything.
25. Right click on active registrations and select Display Records

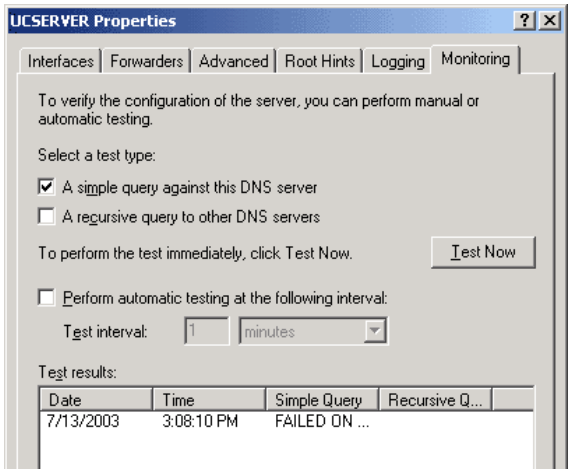
26. Click Find Now.
27. Ta Da! If nothing shows up, you need to go into your network card properties on your servers and click IPv4, Properties, Advanced, Click the WINS tab, and click add. Type the IP address of your WINS server.

Take the following steps to test a query on a DNS server:

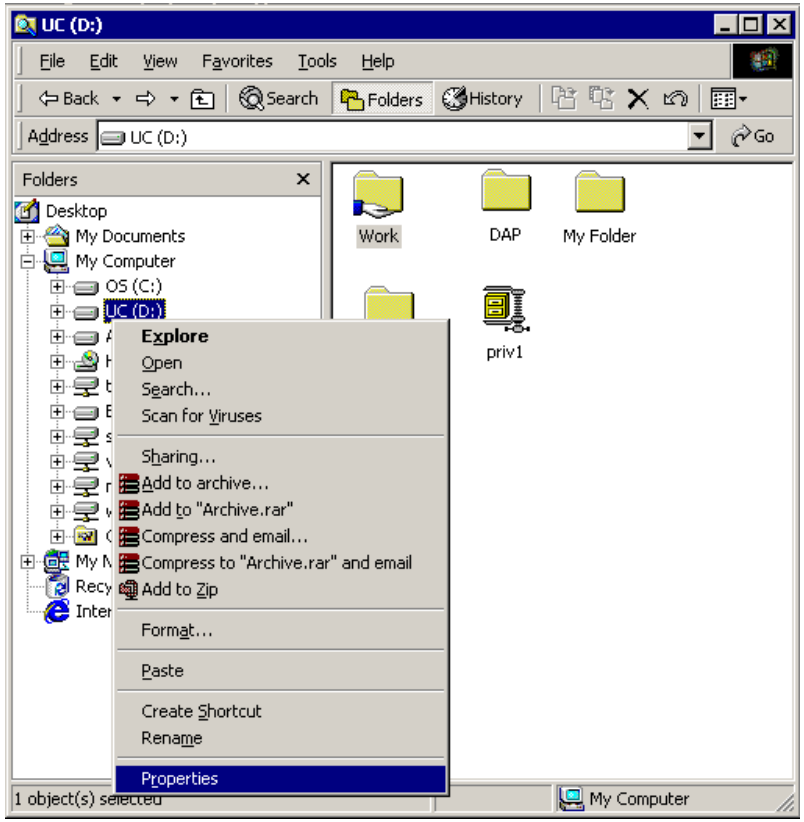
28. Run DNS from Start Menu > Programs > Administrative Tools > DNS.
29. In the DNS console tree, right-click the DNS server on which the query is to be tested, and click Properties.

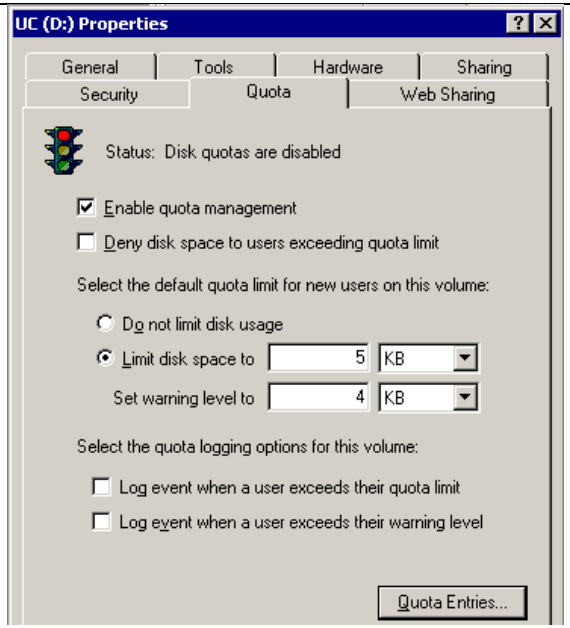
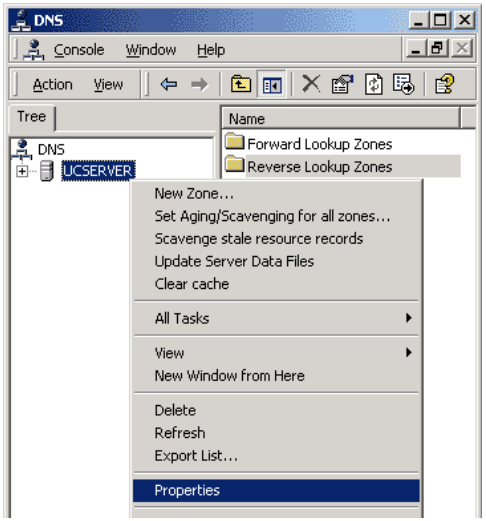


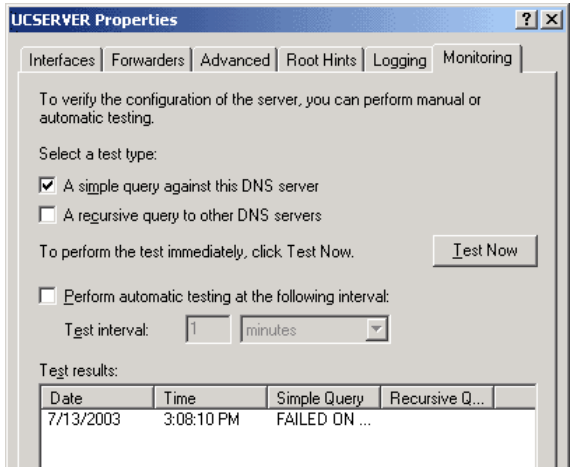
30. In the < servername> Properties dialog box, click the Monitoring tab. On the Monitoring tab page, select the A simple query against this DNS server check box, and click the Test Now button. Click the OK button to close the <servername> Properties dialog box.

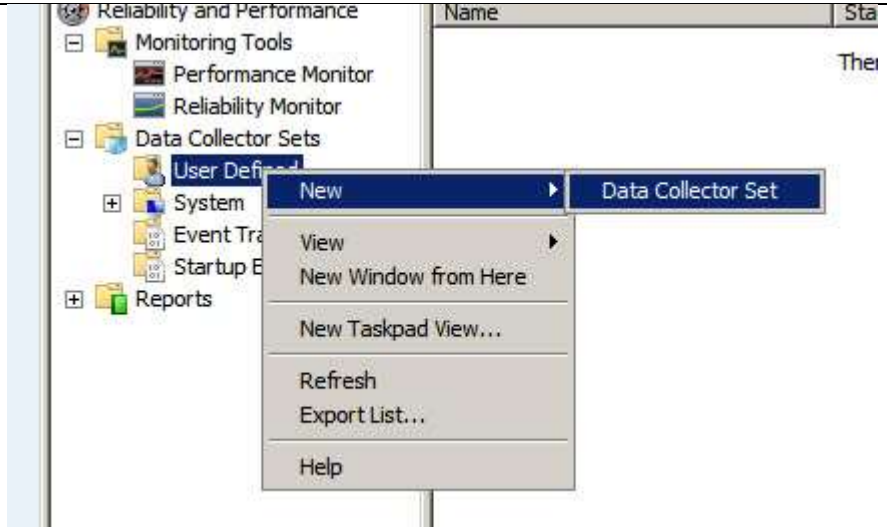


Dfs	Distributed File service allows you to set up one “resource” for clients to get stuff. Rather than having them map to 30 different places, you can set up one dfs hierarchy, point them there using a policy or script, and it makes life a lot easier for you!	**To install Distributed File System using Manage Your Server** 1. Click **Start**, point to **All Programs**, point to **Administrative Tools**, and then click **Manage Your Server**. 2. Click **Add or remove a role**. 3. In the Configure Your Server Wizard, click **Next**. On the **Server Role** page, click **File Server**, and then click **Next.** Click **Next** again. 4. In the Add File Server Role Wizard, click **Next**, and then click **Replicate data to and from this server**. Follow the steps in the wizard to complete the installation. You will be asked to restart the server when the installation is complete.

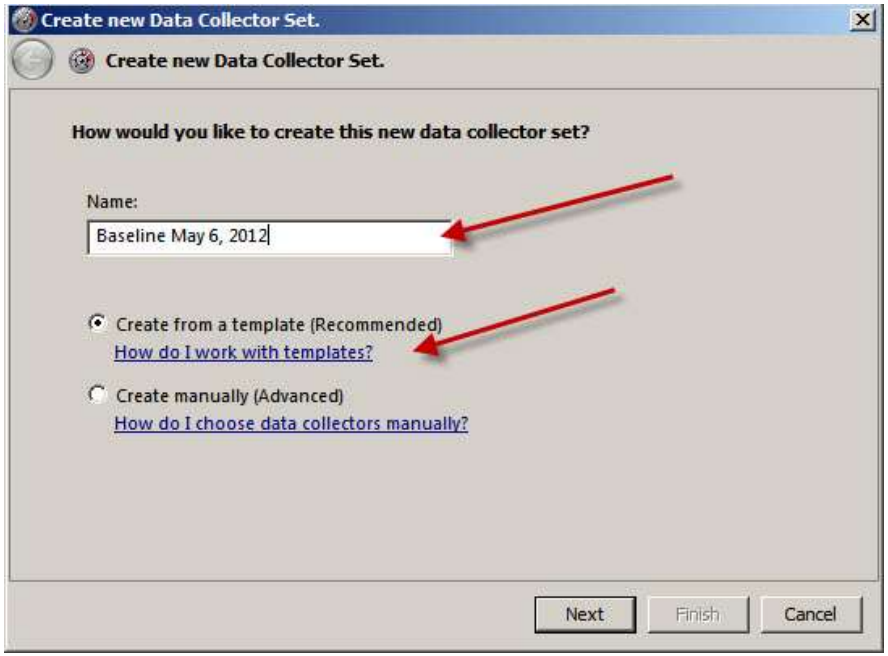
Set disk quotas	When you have a large network you want to limit the amount of hard drive space the users use on your server.	Take the following steps to apply disk quota limit: 1. Run Windows Explorer from Start Menu > Programs > Accessories > Windows Explorer. 2. In Windows Explorer, right-click the (D:) drive (or the drive your server is on) in the Folders section, and click Properties.  3. In the <drivename> Properties dialog box, click the Quota tab. On the Quota tab page, select the Enable quota management check box, and specify disk limit space and warning level. Click the Apply button, and click the OK button.

		
Test a query on a DNS server	Before installing your second active directory, test your new DNS.	Take the following steps to test a query on a DNS server: 1. Run DNS from Start Menu > Programs > Administrative Tools > DNS. 2. In the DNS console tree, right-click the DNS server on which the query is to be tested, and click Properties.  3. In the < servername> Properties dialog box, click the Monitoring tab. On the Monitoring tab page, select the A simple query against this DNS server check box, and click the Test Now button. Click the OK button to close the <servername> Properties dialog box.

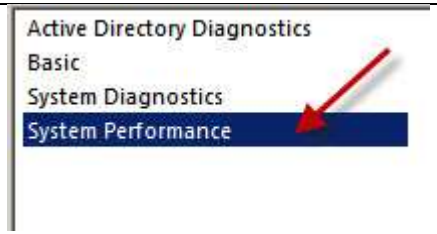
		
Create a baseline using system monitor	A baseline is how your computer is running when you first set it up. A good administrator will test a computer when setting it up, then test it periodically as part of his/her normal routine.	Take the following steps to create a baseline report: 1. Run Performance from Start Menu > Programs > Administrative Tools > Reliability and Performance Monitor.  2. In the Performance console, click Click Data Collector Sets→User Defined, then right click and select New→Data Collector Set. We're going to collect baseline data on the performance of our server.



3. In the dialog box, specify a name for the new collector set, and click the next button.

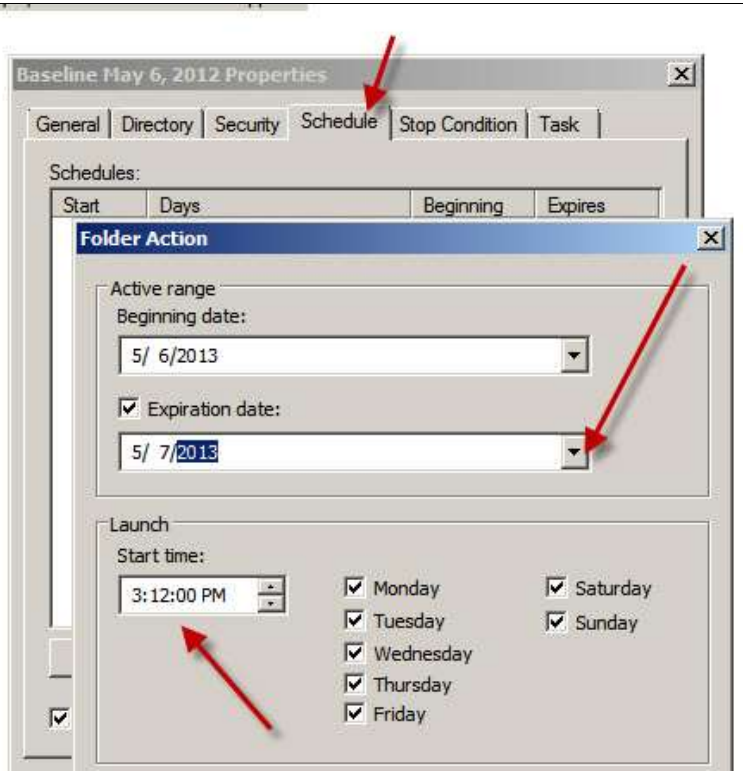


4. We will start with a template, so select System Performance.

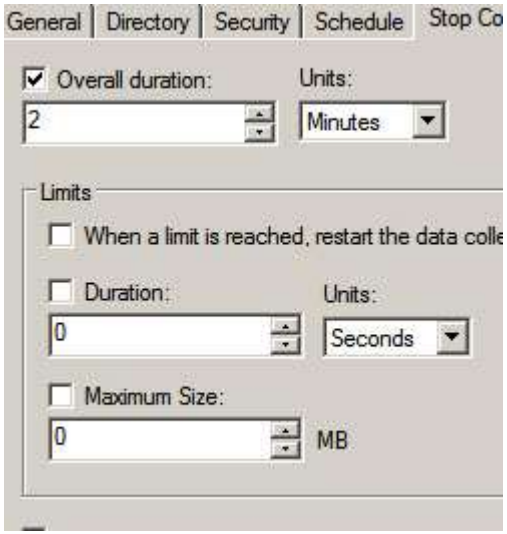


5. Note that when you go back to the MMC the new baseline test is there, but it's stopped. You haven't started it yet to start collecting data.

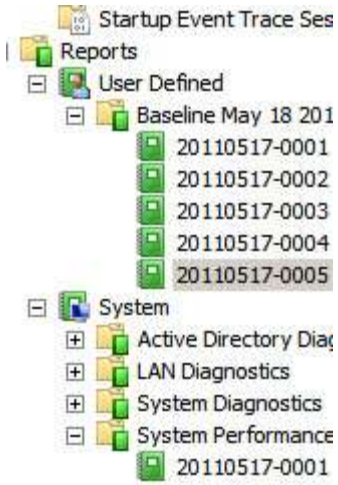
6. Lets set a time for this to start. Click on the schedule tab. Set it to start 2 minutes from now. (I was working on this at 3:09 pm so I chose 3:12 pm). Rich click and select properties. Click the schedule tab.

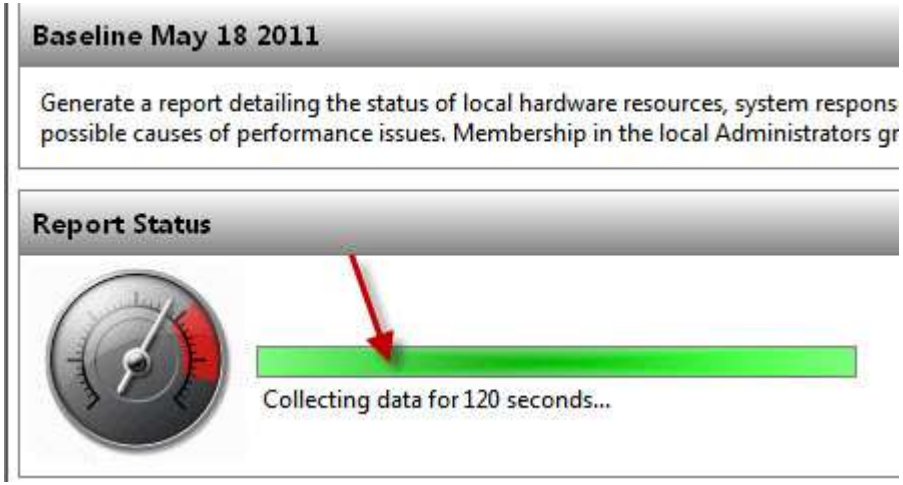


7. Now let's click the stop counter tab and tell it to run for 2 minutes.



8. Close it. You do not have to manually start your baseline. It should start on its own. As soon as it starts you'll notice that a log gets created in the reports section. Click on the new log.





9. Since you set it for two minutes, you'll see it's still collecting data. Let it do its thing until it's finished. When it is finished you'll get a performance report on your CPU, your RAM, Hard Drive Space, etc.

Resouce Overview

Component	Status	Utilization	Details
CPU	Idle	9 %	Low CPU load.
Network	Idle	0 %	Busiest network adapter is less than 15%.
Disk	Idle	9 /sec	Disk I/O is less than 100 (read/write) per second on disk 0.
Memory	Busy	77 %	942 MB Available.

10. On mine it shows that, in general, everything is good but memory. With just what's going on in the lab right now (class is in session) and the monitoring, it's at 77% usage. That should tell me I need to update my RAM and improve performance. Click other "down arrows" to see the full reports. Note the "counters" on each report. The counters tell you very specifically what is going on with each activity that component must perform. In memory look at page faults per second, cache faults, etc. Anything with "fault" will tell you how often you're getting problems. More faults, the worse the performance.
11. Scroll up and find Reliability Monitor. You will want to check this over time to see if there are problems that are reducing the reliability of your system. Right now it won't say much but as time goes by, you'll find it can be very informative.
12. Close the Performance console.

How to Create a Table of Contents in Word

Table of Contents

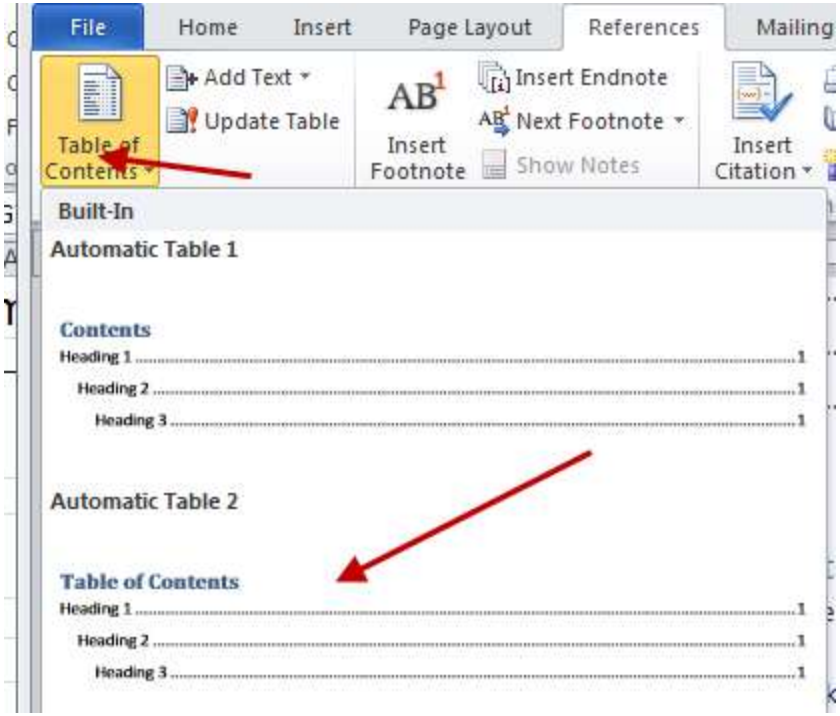
To create a table of contents in Office 2010

1. As you type your paper, use headings from the “home” tab in each section.
    a. Example:
        i. Safety (make this in Heading 1)
        ii. 

        iii. When you hit return it will go back to “normal” type.
        iv. Type your content.
2. If you use sub headers, you’ll have even more entries in the Table of Contents.

Building the automatic table of contents

3. When you are done to build the Table
    a. Scroll to the top of the page and click so that the table of contents is the first thing in your document (you’ll add a cover page later).
    b. Click on the References tab.
    c. Click on Table of Contents (all the way over to the left).
    d. Choose one of the two that say “Automatic Table of Contents”

e. 

Header

Sub-header (use style Heading 2)

Sub-sub-header (use style Heading 3)

Using sub-headers makes your table of contents even more accurate. If you look at the table of contents on the top of the page, you will see entries for Header, Sub-header, etc.

Updating your table of contents

1. As you add pictures and text, your table of contents may change. To fix that you need to update it.
2. Go to the top of your document and click you Table of Contents.
3. There will be a little tab that appears at the top

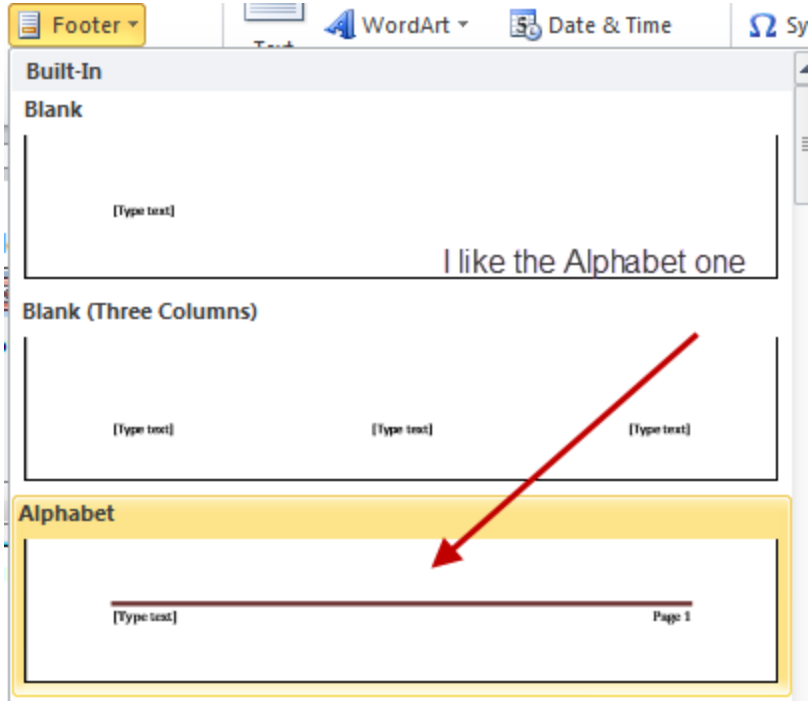
4. 

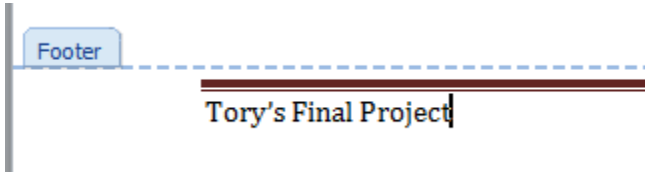
5. Click that tab and select “Update entire table”
6. 

7. Be sure to do this right before you print your project so that it is up to date.

Putting page numbers on each page

1. Click on the “Insert” tab.
2. Click on “Footer”
3. Click on the footer you want on your document.

4. 

5. Where it says “Text” type your name and whatever else you want to be on each page. Don’t change the page number.
6. 

7. Click above the blue dotted line to get back to your project.
8. Be sure to go back and update your table of contents because your page will adjust to include the footer.

IP Addresses for Servers for Final

Prefix	192.168.1			Default Gateway	192.168.1.1			
Last	First	MU_1	MU_2	Workstation	Subnet Mask	DNS 1	DNS 2	DNS 3
Brill	Cody	191	192	193	255.255.255.0	192	191	71
Espana	Joel	194	195	196	255.255.255.0	195	194	71
Fregoso	Mani	197	198	199	255.255.255.0	198	197	71
Gott	Austin	200	201	202	255.255.255.0	201	200	71
Guzman	Oscar	203	204	205	255.255.255.0	204	203	71
James	Jered	206	207	208	255.255.255.0	207	206	71
Murphy	Matthew	209	210	211	255.255.255.0	210	209	71
Paloalto	Ivan	212	213	214	255.255.255.0	213	212	71
Pathompornvivat	Chawin	215	216	217	255.255.255.0	216	215	71
Peterson	Andrew	218	219	220	255.255.255.0	219	218	71
Randall	RJ	221	222	223	255.255.255.0	222	221	71
Reynolds	Jared	224	225	226	255.255.255.0	225	224	71
Root	Geoffrey	227	228	229	255.255.255.0	228	227	71
Schulz	Ian	230	231	232	255.255.255.0	231	230	71
Smith	Tyler	233	234	235	255.255.255.0	234	233	71
Son	Wooyoung	236	237	238	255.255.255.0	237	236	71
Stillwell	Benjamin	239	240	241	255.255.255.0	240	239	71
Tran	Kevin	242	243	244	255.255.255.0	243	242	71
Wagner	Seth	245	246	247	255.255.255.0	246	245	71
Wilkins	Tristan	248	249	250	255.255.255.0	249	248	71
Wren	Randy	251	252	253	255.255.255.0	252	251	71

IP Addresses for Servers for Final

Prefix 192.168.1 Default Gateway 192.168.1.1

Last	First	MU_1	MU_2	Workstation	Subnet Mask	DNS 1	DNS 2	DNS 3
Barrass	Jack	191	192	193	255.255.255.0	192	191	71
Countryman	Matthew	194	195	196	255.255.255.0	195	194	71
Gehlke	Benjamin	197	198	199	255.255.255.0	198	197	71
Golovin	Aleksandr	200	201	202	255.255.255.0	201	200	71
Jensen	Christopher	203	204	205	255.255.255.0	204	203	71
Johnson	Arnesto	206	207	208	255.255.255.0	207	206	71
Knotek	Jacob	209	210	211	255.255.255.0	210	209	71
Kyrylovych	Sergey	212	213	214	255.255.255.0	213	212	71
Nelson	Andrew	215	216	217	255.255.255.0	216	215	71
Ramos	Hector	218	219	220	255.255.255.0	219	218	71
Rattanasithy	Jatalin	221	222	223	255.255.255.0	222	221	71
Scott	Matthew	224	225	226	255.255.255.0	225	224	71
Smith	Nick	227	228	229	255.255.255.0	228	227	71
St. Clair	Gregory	230	231	232	255.255.255.0	231	230	71