

ResNet Program Automation NetReg: A History of Hysteria

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Abstract

This presentation will take you through Franklin College's process of automating the connection of student dorm rooms. We will show our humble beginnings with only a handful of students to our present state of over 500 students connected. We will demonstrate the different phases of development from manual installation to our new automated system which registers, enables billing for services, identifies and activates student ports without intervention.

Let us take you through our experiences, both failures and successes while creating this program.

September 1998: Franklin College Residential Networking Program (FC ResNet) consists of 7 dorms and 50 students connecting to the internet and network resources. All ports are active in all dorms as a student would never think of attaching a device to our network without asking permission. Besides they cannot connect without a network card. By the way, we sell and install those.

September 1999: FC ResNet doubles in size to 100 students. The IT staff believes that this computer thing is really going to take off with students. Estimated total of NIC cards needed for the 2000 – 2001 academic year is 300. Students begin to complain that their computers worked fine before "we" installed the NIC card.

September 2000: ResNet students again double; now 200 active connections. Manual billing is becoming difficult and students have brought computers to campus that are not registered. Need to begin looking at deactivating ports that are not in use.

September 2001: ResNet student count at 400, virus count on the network shares at 32,000, cost of anti-virus software \$50.00 per person. Net Admin piece of mind... priceless.

September 2002: ResNet registration program on line for billing and port activation. Students now required to bring their computer CPU to "ResNet Ready Stations" to have anti-virus installed and have computer joined to the domain. ResNet student count for the year now at 500 computers connected.

September 2003: NetReg Automated ResNet system installed.

As you can see from our brief history of allowing students connection to the internet and network resources, the Franklin College IT staff has tried numerous methods to streamline the process. At one point during our “learning phase” we had students waiting for connection up to 45 days into the semester. Not something to be proud of but we learned much from our mistakes. We knew there had to be some way of automating this process so that our students could connect and we did not have to utilize 3 full time staff and 6 students.

NetReg

In October a colleague from Westmont College in Santa Barbara introduced a program to me called NetReg. NetReg, for those who have not heard about it, is an automated DHCP registration system. NetReg was designed at Southwestern University. It runs on basic Linux Red Hat and uses standard DHCP, Bind and Apache. This system answers DHCP requests from any subnet it is associated with. It checks an internal log for the MAC address of the DHCP request machine and if it finds it, NetReg will supply the machine with a valid network IP address. If the MAC address is not listed in the NetReg log it will give the machine a bogus address. All internet requests made from machines that have invalid IP addresses are redirected with bind to the NetReg registration page. The student then has the opportunity to register their computer and receive a valid IP address.

Although this process sounds fairly straightforward there are a few areas that need special attention. This is a description of how Franklin College integrated this system into our Windows 2000 Active Director environment.

Authentication

One of our biggest challenges was that the NetReg program requires a user to register with their user name and password. The program verifies this with your network and then allows or disallows registration based on authentication. We at Franklin College felt that any program capable of using LDAP should integrate with MS Windows Active Directory. This became a major stumbling block as we tried again and again to access AD through the NetReg program. Finally after weeks of searching an answer presented itself. It was not possible! At least not possible with the tools available to us now. Microsoft widely publicized Active Directory’s ability to interface with other systems because it uses or is based on standard LDAP. What Microsoft should say (and they do in the small print) is that you can interface AD with any standard LDAP as long as you have a developer using .Net technologies.

Although we do have a fine programmer/security administrator, there wasn’t time to complete this phase and we opted for the FTP route. One of the great features of NetReg is that it offers you a variety of authentication methods. You can use a POP3, IMAP or FTP server to verify user names and passwords.

DHCP

Although not too difficult there were a few challenges configuring DHCP. First you must make sure that you separate the DHCP from other active subnets on your network. You do not want

the Linux/NetReg server providing IP addresses for everyone on campus. Second, it is a good idea that the invalid IP addresses is completely different from your regular subnet IP's. This will help avoid confusion when you are trying to identify a connection problem later.

BIND

BIND is a great tool and easy to use. It is no wonder why it surprised us when problems occurred. When setting your BIND configuration be careful and ensure that it is not dynamically updating and that you have told your real DNS server that BIND is a bogus server. BIND is really where much of the NetReg "magic" happens as it refers all but valid IP address back to itself as an authoritative DNS server. Once the NetReg server has registered a computer and issued a valid IP, DHCP all provides the proper DNS and gateway information.

NetReg Administrative Tools

NetReg logs all active registrations in a text file and allows you to view registered information such as user name and MAC address for each PC. Those who charge students separately for ResNet connection can export this file and use it for billing purposes. At Franklin College we added the student ID number to the registration criteria to make interface with our administrative software easier. This enables us to create an electronic billing file that can match and verify the student information in our Student Information System (SIS). This ensures correct billing to each student registered.

The administrative tools also allow you to view various information by subnet, users, and computers, providing you with useful information that is easy to obtain. The administrative tools are accessible from anywhere as they are completely web based and password protected.

Summary

With the NetReg system going live for the first time in September 2003 we are of course a little apprehensive. One piece of advice that will help you considerably is to set up a full test environment. This can be done by using Windows 2000 servers configured as routers and programmable hubs or switches. It allows you to test how the NetReg program will function in the real world application. The second piece of advice is to set your routers and switches separately so you can roll the project out subnet by subnet; testing each section as you go live. Doing so will help you avoid unanticipated problems by solving them one section at a time.

We in the IT Service department are very excited about this new venture. With proper implementation we look forward to this new system providing faster more reliable service to our students. What we hope to hear from the campus community will be; no more waiting in line... I just plugged in and the system worked. We will provide members of the conference with updates on how our rollout went. Hopefully everyone can learn from both our successes and mistakes.