TCP/IP Hostname Resolution and the BLM

By Ken Osborne

BASIS first introduced the BASIS License Manager (BLM) component in our FLEX*lm* licensing software a little more than a year ago. Since then, Customers have learned many of its benefits, such as allowing floating licenses, which give Customers the ability to manage and dispense licenses for networked UNIX terminals, workstations and/or Microsoft Windows seats. The TCP/IP protocol, specifically TCP/IP hostname resolution, is used in the process of dispensing licenses across the network. The majority of BLM installation and configuration problems we see are directly related to TCP/IP hostname resolution.

Hostname resolution is the process of converting human-friendly computer names into computer-friendly numbers (IP addresses), and it is nothing new to BASIS products. BASIS developers have been using hostname resolution to connect their client/server applications for years. BBXPROGRESSION/4® and the BBXPROGRESSION/4 Data Server® used it. Visual PRO/5® and the PRO/5 Data Server® use it. The BBj Data Server™ also uses it.

In the BBj architecture, the client, BBj ODBC Driver™, is only responsible for telling the BBj Data Server what it needs to do. Then, the BBj Data Server, which runs on the server, is responsible for doing the actual processing of the SQL statements. Therefore, in network environments, the TCP/IP protocol must be configured to resolve hostnames so that connections between the client and server can be established. How difficult is this? The answer depends on your level of experience with TCP/IP networks.

The first step is to understand that the BLM needs TCP/IP hostname resolution to start up the license daemons before the BLM can do its job of dispensing licenses across the network. A critical part of the setup is selecting the system(s) on which you will run the BLM. Keep in mind that any server running a BLM must have a working network card and a static, assigned IP address.

Two of the industry standards used to resolve hostnames to IP addresses are Domain Name Service (DNS) and Hosts files.

Domain Name Service

A domain name server can run on a UNIX server or Microsoft Windows NT server and can be implemented in small or large organizations. DNS is primarily used in a domain model network, or, in other words, an enterprise-computing environment. DNS servers are becoming more widely used, mainly because of the exploding use of the Internet. One of DNS's main functions is to map the hostname to the IP address. From within the DNS server, Primary and Reverse DNS Zones are created along with the various host records, which perform the hostname resolution. UNIX DNS servers use DNS configuration files to create the Zones and Host Records. Windows NT servers use an administrative tool called the DNS Manager to perform the same function through a GUI interface. In order for the workstations on the network to use the DNS server, they simply need to know the hostname and the IP address of the server running the Domain Name Service. This information must be added to each workstation's network configuration. It is important to note that a qualified, network system administrator should perform the DNS installation and configuration.

Hosts Files

Hosts files are often used in a client/server model and in smaller organizations. Hosts files are ASCII text files that contain IP addresses and the hostnames to which they correspond. A UNIX hosts file is located in a root-level directory called the */etc/* directory. On Windows NT, the hosts file is located in the */winnt/system32/drivers/etc/* directory. On a Windows 95 or 98 PC, the hosts file is located in the */windows/* directory. In general, the hosts file must contain an entry (a pairing of the IP address and hostname) for the local machine, as well as any other computers with which the machine needs to communicate, such as those running the BLM and the BBj Data Server. On a UNIX system, you can obtain the correct hostname by typing hostname at the UNIX prompt. On a Windows NT system, type the same command at the DOS prompt. Here is an example.

```
$hostname
mainserver
```

While at the operating system prompt, the next step would be to ping the hostname:

```
$ping mainserver

Pinging mainserver [191.164.1.136] with 32 bytes of data:

Reply from 191.164.1.136: bytes=32 time<10ms TTL=128
Reply from 191.164.1.136: bytes=32 time<10ms TTL=128
Reply from 191.164.1.136: bytes=32 time<10ms TTL=128
Reply from 191.164.1.136: bytes=32 time<10ms TTL=128
```

If the hosts file has the correct entries, `mainserver's` IP address will be correctly resolved and replies are sent back as seen above. This is a good indication that hostname resolution is now in place. Here is an example of a TCP/IP hosts file.

```
#Hosts file
#  To make this file active, save the file as hosts with no extension.

127.0.0.1       localhost
191.164.1.136     mainserver          # main server

#End of Hosts file
```

The hostname, which in our example is mainserver, is the same name you would use when creating the BASIS.lic file. This file points the client to the server running the BLM. Here is an example of a typical BASIS.lic file.

```
SERVER mainserver ANY
USE_SERVER
```

This hostname would also be on the `SERVER` line of the permanent license file. On a UNIX system, the permanent license file is located in the */blmgr/* directory. On a Windows system, it is located in the */BASIS License Manager/* directory. It is a good idea to check these files for the correct hostname entry. If an edit is needed, consult first with a BASIS Technical Support Analyst. If improperly edited, the permanent license file can be voided, resulting in FLEXlm errors and nag messages. Also, there are important rules to keep in mind when working with these files. For example, the BASIS.lic file should never be edited until all users are logged out of the application.

With proper planning prior to BLM installation, no editing to these files is needed. However, if you do need to edit the hostname in the permanent license file, you must stop the BLM, edit the license file and then restart the BLM for the changes to take effect.

Local Hosts Files

The hosts files of individual workstations must have the IP address and hostname of the server that is running the BLM as well as the IP address and hostname of the local machine.

You can enter this information before installing the BLM or at the end of the installation and configuration process, but you MUST enter this information. Unless you are running a DNS server, this is the only way the workstations will know where and how to connect to the server. Once the PC is connected, a license can be checked out and checked back in as needed by the end users.

The Internet, e-business, more complicated intranets and enterprise computing bring network issues to the forefront. But the BLM and hostname resolution are not that difficult to understand, once you realize their interdependence to run your client/server system. Once you've planned where you want the BLM and configured the machines for hostname resolution, the BLM can dispense licenses for anyone you choose from all across the network, whether it is a client/server model or a Domain model in an enterprise network environment.