Chapter 1
Introduction to the netWorks Application

Overview

Communications networks—voice and data—are key strategic assets for any size business or organization, and their importance to success grows every day. The combination of new technology, industry deregulation, mergers, and increased competition has forced network service and equipment providers not only to upgrade their own networks and equipment but also to offer many new services and equipment to their customers. Both providers and users of this rapidly changing technology need powerful tools to help them manage and exploit their network investments. The netWorks application addresses this need and can be used to

- document an existing network
- design a new network
- investigate network capacity, reliability, and performance issues
- create a repository of network equipment information.

Communication networks are expensive and are continually evolving, so it is important to keep an accurate record of your installed equipment and network configuration. You can use the netWorks application to create a schematic of your network, which displays all installed equipment and its current location.

If you need to build a new network, or if you are considering upgrading an existing network, you can use this application to model and evaluate different possibilities. By constructing network models of competitive proposals and then sampling the performance characteristics of your potential configurations through simulations, you can decide which proposal best fits your needs.

Another important use of the netWorks application is as a repository of network equipment specifications and details. By keeping up-to-date information on network equipment options in a single, easily accessible location, you can not only make network modification decisions in a timely and effective manner, but you can also make this information readily available to others in your organization.

Application Content

The netWorks application is a SAS application for modeling and simulating electronic information networks. The netWorks application functions as two separate

tools—one for modeling connection-oriented networks and the other for connection-less networks. The connection-oriented subsystem focuses on telecommunication networks and is referred to as the Telecom Environment of the netWorks application. Generic equipment models are provided for common telecom equipment including models for telsets, switching systems, transmission facilities, and so forth. You create a picture of the network you want to investigate using these models (or you can create your own models) and then invoke netWorks simulation routines to generate traffic over your model network. Figure 1.1 shows a sample telecom network model representing links among three cities.
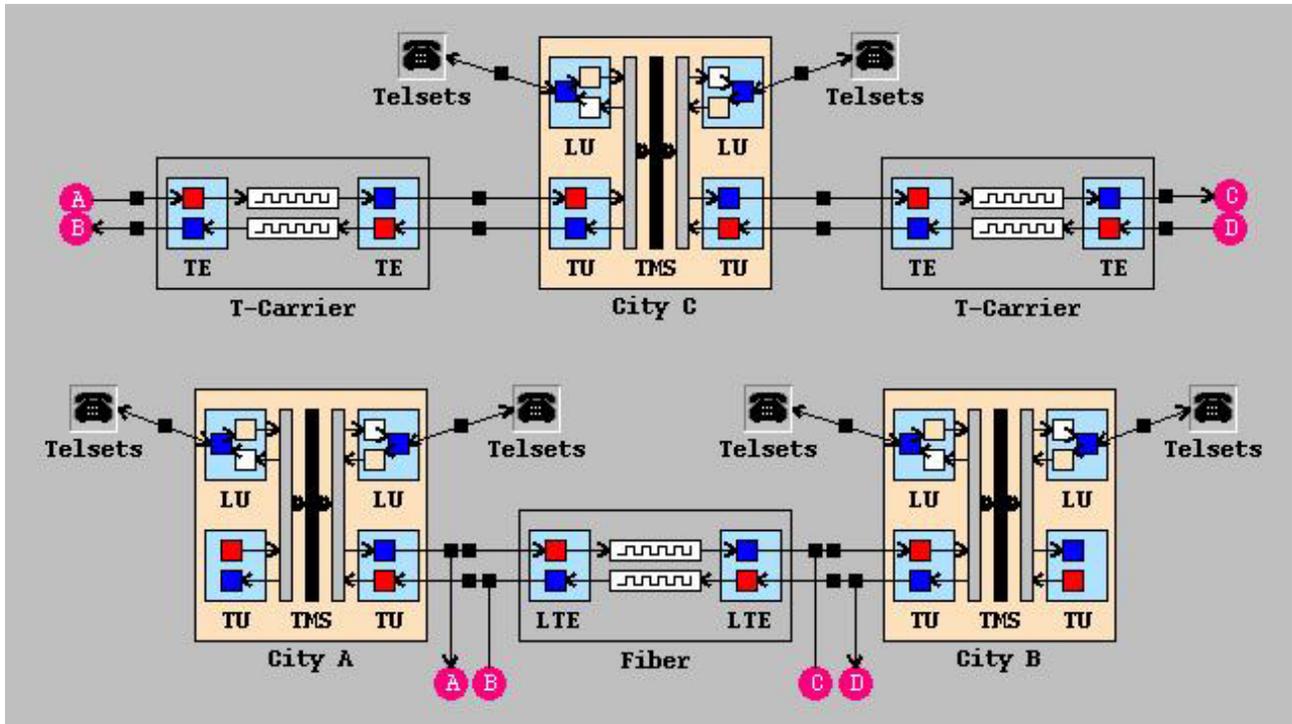

Figure 1.1. Sample Telecom Network Model

This network model uses three types of equipment models—telsets, digital switching systems, and digital transmission facilities. You can modify the telset models so that they represent banks of telephone sets and then have them generate simulated calls over your model network. Using this network model, you could investigate equipment capacity issues among these cities or the effect of changing traffic patterns on network performance. You could also simulate the effects of replacing or upgrading your switching systems or transmission facilities.

The connectionless subsystem of the netWorks application focuses on computer networks, particularly local area networks (LANs). The LAN subsystem provides models of equipment commonly found in computer networks along with their associated communication protocols. You construct a model LAN network as you would a model telecom network; however, you must also ensure that the equipment models are configured with the appropriate communication protocols. A sample LAN network model is depicted in Figure 1.2.
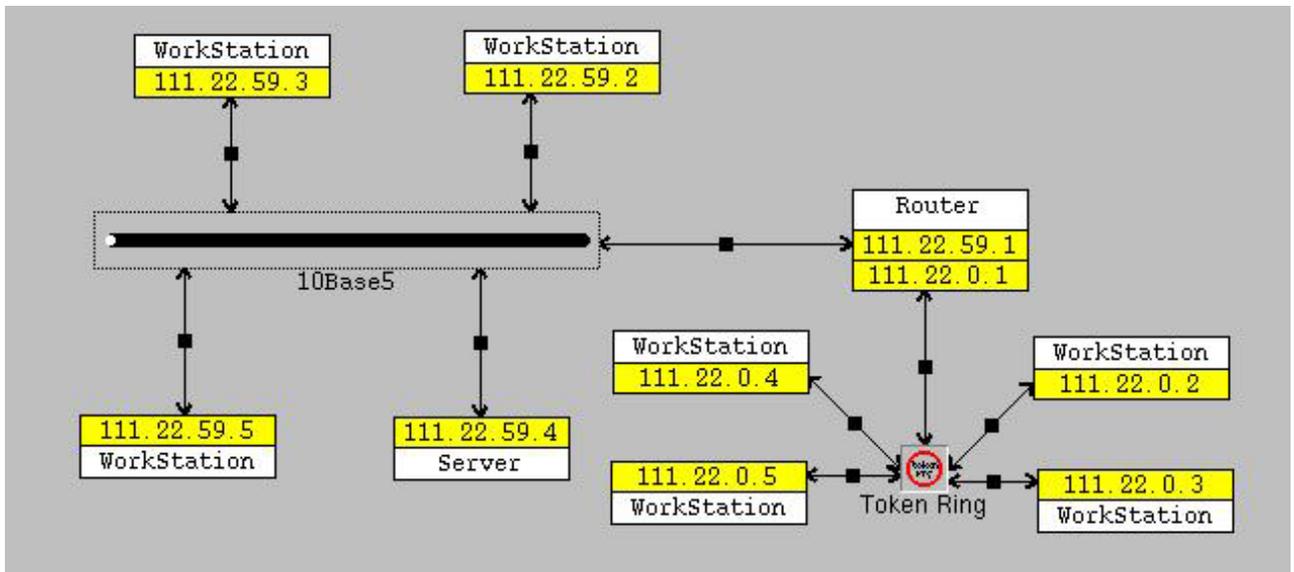
Figure 1.2.   Sample LAN Model

Using this network model, you could generate (data packet) traffic between the workstation and the server models (or between workstation models only) and measure the packet delays between devices. You could also change traffic patterns, routing protocols, or router characteristics and note the impact these changes have on your model network's performance.

You should note that, although the netWorks application does not put any restrictions on connecting equipment models (that is, there is nothing to prevent you from connecting equipment models in a meaningless manner), you would undoubtedly generate some (obscure) error message upon invoking the simulation functions on an improperly connected network model. The netWorks application assumes that you have a good familiarity with networking technology when you use it.

Application Interface

Your interaction with the netWorks application is typically through the computer mouse. Using a drag-and-drop user interface, you create a graphical depiction of your network by dragging icons representing models of various network equipment from equipment palettes and then dropping them in netWorks drawing panel. You then draw arcs between the equipment models to represent a logical connection of the equipment. Pop-up menus and control dialog boxes are available on every model for examining and modifying attributes or other characteristics to better approximate the network you want to model.

If your primary purpose is to document an existing network, you can save your model network in a SAS data set for later use. If, however, you are interested in simulating traffic on your model network, you can set up traffic generators in your model network to reflect the traffic patterns you want to examine. After creating your traffic

generators, you can invoke the netWorks simulation routines to start simulated traffic flowing over your model network.

While the telecom and LAN environments of the netWorks application are treated separately, there are naturally many similarities between them—particularly with regards to the user interface. Chapter 2, "User Interface Features," discusses the features and functionality common to both subsystems. Chapter 3, "Telecom Environment," and Chapter 4, "LAN Environment," detail the specifics of the respective subsystems. Chapter 5, "Example Models," provides examples of model networks that you can build with this application.

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