SIF-Approved Document: SIF-001-1996
(SIF Contribution #: SIF-095-1294)

SIF APPROVED DOCUMENT

WORK GROUP: **Remote Login**

TITLE: **Remote Login User Requirements Specification**

DATE: **February 22, 1996**

EDITOR: **Name:**
Voice:
email:

ABSTRACT: **The purpose of this document is to define the ”user” requirements for remote login (in a multi–vendor environment). That is, this document defines the user expectations for the behavior/features of remote login.**

SIF-Approved Document: SIF-001-1996
(SIF Contribution #: SIF-095-1294)

SIF-Approved Document: SIF-001-1996
(SIF Contribution #: SIF-095-1294)

REVISION HISTORY

ISSUE	DATE	SUMMARY OF CHANGES
1.0	4/18/95	initial release
2.0	2/22/96	1.) addition of third paragraph to Section ”1.” 2.) addition of this section on ”Revision History”

Remote Login User Requirements Specification

1. Introduction

The SONET Interoperability Forum (SIF) has identified a need to provide a multi–vendor solution for remote login. A ”Remote Login Sub–group” has been formed by the SIF to address this need. The Sub–group has defined remote login as:

Definition of Remote Login: ”workstation access to network management systems from a remote site for the management of network elements.”

Remote Login does not preclude the use of local craft access to NEs or the use of proprietary or other future standard solutions to allow local craft access units to access remote NEs via the DCC.

The Remote Login Sub–group has come across several obstructions, partly due to lack of formally defined written requirements. It is hoped that formally defining the user requirements will, in the long run, facilitate progress in the group. After the user requirements are agreed, further analysis will be done to define the implementation requirements.

1.1 Purpose of This Document

The purpose of this document is to define the ”user” requirements (see Section 1.4 for definition of ”user”) for remote login (in a multi–vendor environment). That is, this document defines the user expectations for the behavior/features of remote login.

1.2 Purpose of the SIF Project on Remote Login

The purpose of remote login as defined in Section ”1.” is to provide remote access to the functionality of the network management system. This document is intended to define incremental user requirements necessary for this remote access.

The following list identifies possible network provider applications for remote login:

- initial turn–up of network elements and/or systems (e.g., test the operation of a SONET ring)
- trouble verification
- repair verification
- monitor Network Element (NE) performance (e.g., query PM data)
- update NE software and hardware
- manual control of NE (e.g., protection inhibit/restore, manual protection)
- remote inventory

1.3 Scope

User requirements for workstations, network elements, network management systems, and networking are within the scope of this specification.

1.4 Definitions

DCN The Data Communications Network (DCN) can consist of a wide area network, local communications network, data communications channel(s), or any combination thereof.

GUI A Graphical User Interface (GUI) is a user interface that supports graphical symbols and windows and uses direct manipulation, usually in addition to textual displays. Command line support is also available (e.g., the GUI could also support the TL1 command/response mode). See Reference ”1)” for general information about GUI.

Menu Mode A user interface that supports text displays that consist of Titles and Menu Items. Titles provide a name for a particular level of a menu. Menu Items are the possible choices at a level of a menu. See Reference ”1)” for additional information.

NMS A Network Management System (NMS) is a computer based system (distributed or centralized or both) that performs remote management of NEs. A NMS can consist of an Operations System (OS), or a Element Manager (EM), or a combination of both.

User Network service provider personnel.

User Interface The preferred user interface is graphical (GUI). The GUI for WS–R should be a full graphical, point and click, picture based interface. The WS–R shall support the same GUI as the WS–C (see also definition for WS–C).

WS–C The Workstation Central (WS–C) is a workstation that is located in a centralized maintenance center that has access to information about all SONET network elements in the network. Access to subnetworks and network elements is through the network management system.

WS–R The Workstation Remote (WS–R) is a workstation that can be located at any site and has the same functionality as the centralized workstation. WS–R provides this functionality by providing access to the network management system. Access to the network management system is accomplished by remote login (see architectures shown in Figure II through Figure IV).

1.5 References

1) ”User Interface Generic Requirements for Supporting Network Element Operations,” Bellcore GR–826–CORE, Issue 1, June 1994, Section 10.2 of OTGR.

2. User Requirements

The following sub–sections define the key areas of user requirements for remote login.

2.1 Architecture

Figure II through Figure IV show the anticipated architectures for remote login. The flow for messaging associated with remote login is shown by the solid and broken lines. Support for more than one architecture may be necessary.

Figure I shows the Remote Login Generic Reference Model. The Workstation Remote (WS–R) connects to the DCN to gain access to information about the Remote/Target NE (NE_Z). Message traffic (for remote login) is sent over the DCN to the NMS. The NMS would interact with the target network element (NE_Z), on behalf of the WS–R user, as required, to retrieve information or perform required operations on the network element (NE_Z) over the DCN.

DCN is shown here as a generic Data Communications Network and, depending on the implementation, would consist of any combinations of SONET DCC, Local Area Network in the central office (i.e., LCN), or the Wide Area Network (WAN) constructed using services such as SMDS, Frame Relay (FR), X.25, or ATM Cell Relay services. Thus, in addition to SONET NEs, the DCN would involve Routers, Hubs, and other Switching Elements of the WAN.

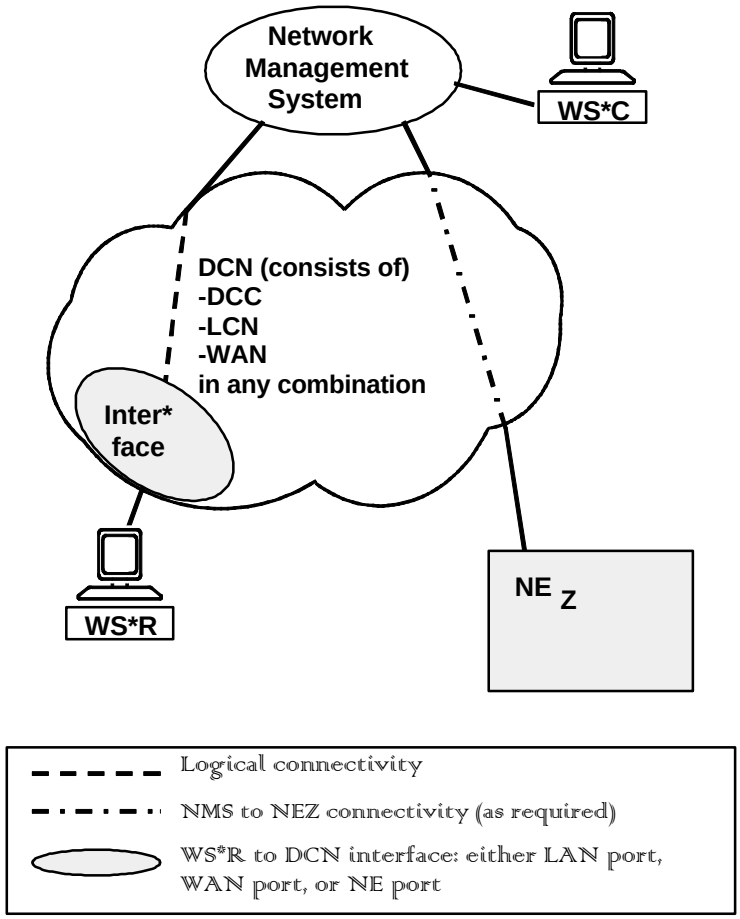


Figure I. Generic Reference Model for Remote Access to Far End NE

Figure II shows the Workstation Remote (WS–R) directly connected to the local NE (NE_A). Message traffic (for remote login) would be sent by NE_A over the DCN to the Network Management System (NMS). The NMS would retrieve information or perform operations on the remote NE (NE_Z) via the DCN on behalf of the WS–R user. Appendix A.1 provides an example specific implementation of the configuration shown in Figure II.

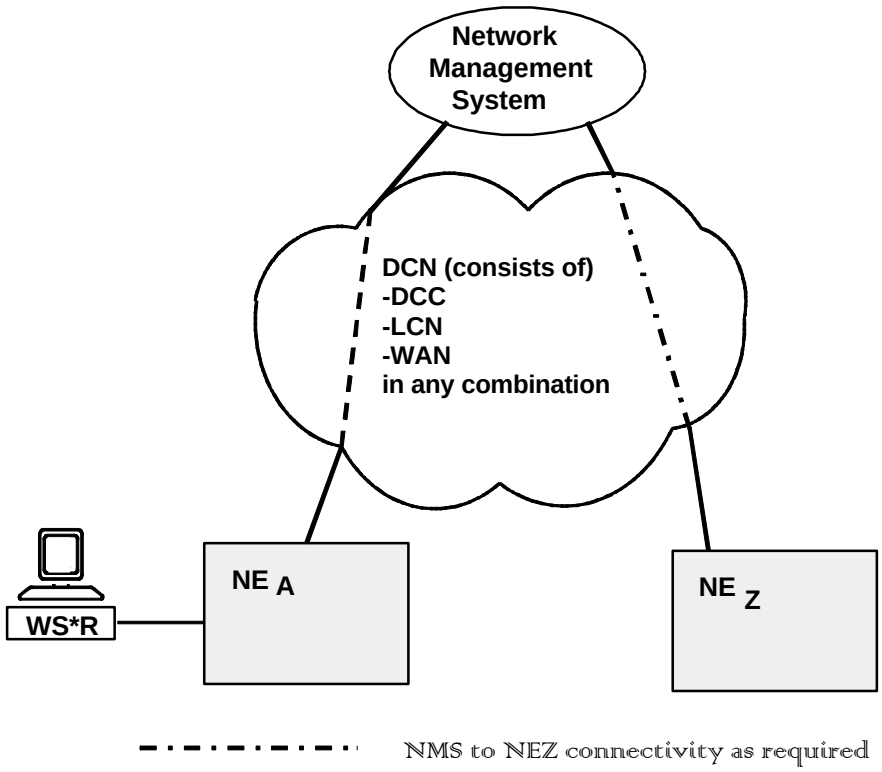


Figure II. Direct Connection of Workstation to Local NE

Figure III shows the Workstation Remote (WS–R) connected to the Local Communications Network (LCN). Note that the LCN could involve one or more NEs and DCCs carrying the message traffic. The message traffic would be sent to the network management system over the DCN. The NMS would retrieve information or perform operations on the remote NE (NE_Z) via the DCN on behalf of the WS–R user. Appendix A.2 provides an example specific implementation of the configuration shown in Figure III.

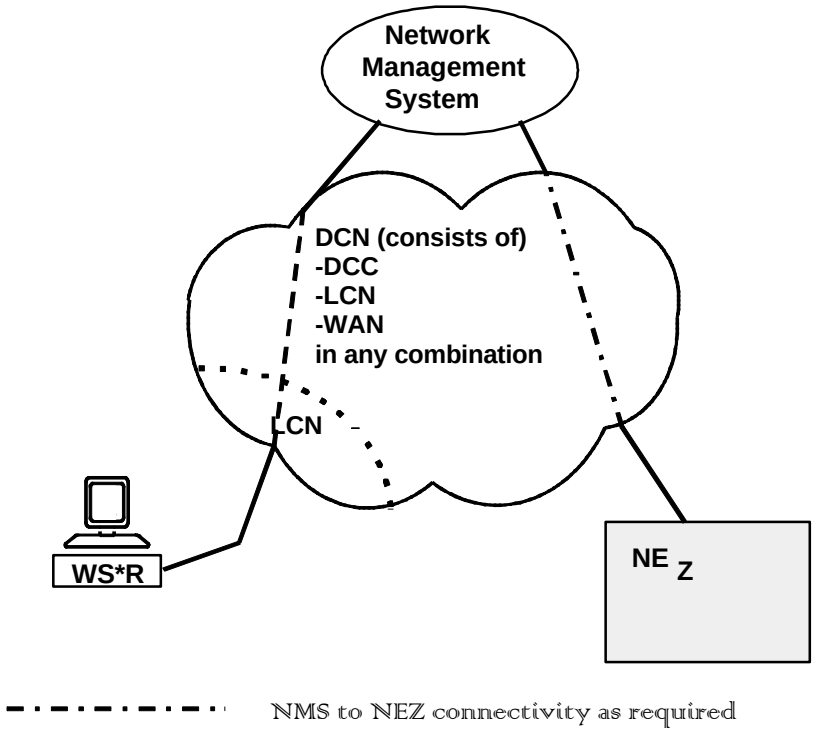


Figure III. Connection of Workstation to LCN

Figure IV shows the Workstation Remote (WS–R) connected to a Wide Area Network (WAN) for transport of message traffic to the network management system. Note that the WAN provides message transport that is independent of network elements (e.g., the DCC is not involved). The NMS would retrieve information or perform operations on the remote NE (NE_Z) via the DCN on behalf of the WS–R user. Appendix A.3 provides an example specific implementation of the configuration shown in Figure IV.

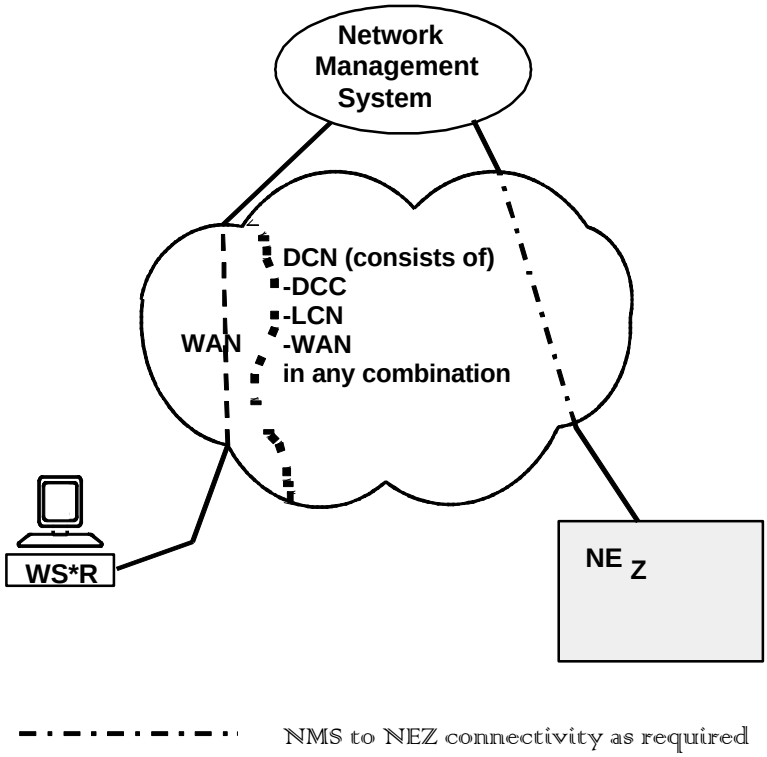


Figure IV. Connection of Workstation to WAN

2.2 Network Management System

It is assumed that the Network Management System (NMS) is always used for the remote management of NEs.

2.3 Workstation

2.3.1 Physical Connector(s)

2.3.1.1 Connection to NE

The workstation connection to the NE can be either:

- S 10BaseT
- S RS–232

2.3.1.2 Connection to LCN

The workstation connection to the LCN can be either:

- S 10Base2
- S 10BaseT

2.3.1.3 Connection to WAN

The workstation connection to the WAN can be either:

- S 10Base2
- S 10BaseT
- S RS–232
- S V.35

Additional effort may be needed to narrow down the above alternatives (e.g., eliminate V.35).

2.3.2 Minimum Processing Capacity

The workstation should have at least the equivalent processing capacity of an 80486 CPU based computer, or a Unix workstation.

2.3.3 Software Administration

2.3.3.1 Vendor Dependant Software

Users are willing to support different software modules on the workstation that are specific to different network management systems. This would include the distribution and synchronization of the different software modules. However, the goal should be to minimize vendor specific software on the workstation.

2.3.3.2 Workstation Operating Environment

Any vendor specific software shall be developed to a common workstation operating environment. Further analysis would be needed to define this common workstation operating environment.

2.3.3.3 Support for Multi–vendor Network Management Systems

The workstation shall have the capability to login to different vendor network management products.

2.3.4 Sessions

Multiple simultaneous remote login sessions may be required. The minimum number of simultaneous sessions necessary is not known at this time. In general, a greater number of sessions will require additional workstation resources (e.g., memory), and may negatively impact workstation performance (e.g., response time).

2.4 **Network Element**

See Section 2.3.1.1 for a description of the physical connection between the NE and the workstation.

2.5 **User Interface**

2.5.1 User Interface Display Mode

The user interface shall be a GUI. This specification does not define requirements for making the user interface at the workstation look the same.

2.5.2 Response time

User interface response time requirements are to be provided.

2.5.3 Synchronization of Operation

The acknowledgement of a completed operation at the workstation user interface shall occur only after the entity responsible for completing the requested operation (could be the NE or the NMS) has done so.

2.6 **Naming**

We assume that the name of the particular network manager is known by the user. Once access to the network manager is achieved, further naming is dependant on the network manager capabilities.

2.7 **Network Bandwidth Constraints**

The remote login implementation requirements should have an objective of working within the bandwidth constraints of TMN and SONET networks.

The NMS interface is migrating from 64 Kbps X.25 service to higher rate services such as SMDS, Frame Relay, and ATM on DS1s or DS3s. Remote login should be optimized for these higher rates, with slower performance provided at 64 Kbps. Some known bandwidth constraints are:

- S 192 Kbps Section DCC[1]
- S 64 Kbps (if and when existing WANs are used)[1]

2.8 Availability

The availability of remote login depends on the availability of the network and the network management system.

2.9 Security

Security for remote login is provided by the network management system.

3. Future Study Items

3.1 NE to NE Remote Login

Figure V shows an example of access directly to the remote NE native interface, without the involvement of the NMS.

[1]. Not all of this bandwidth will be available for remote login (the bandwidth is shared).

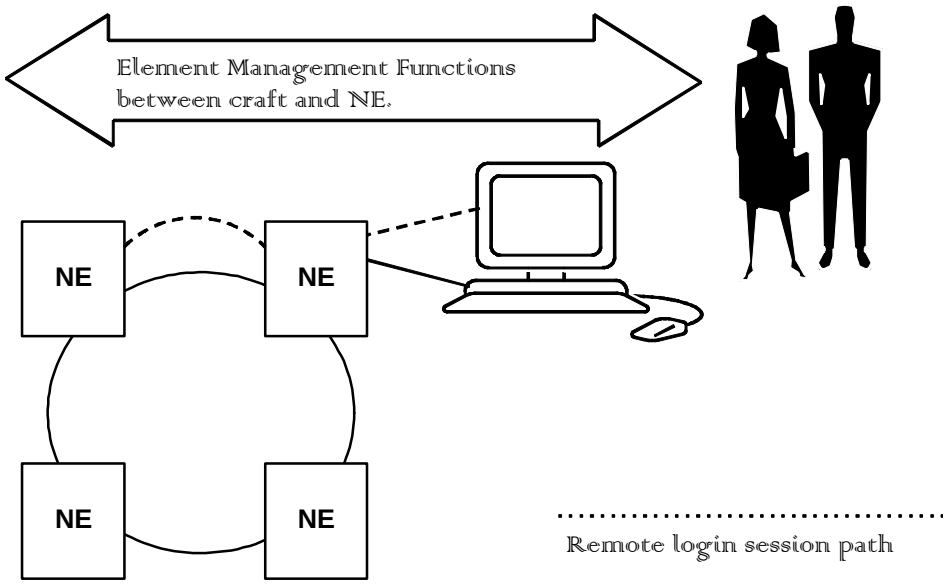


Figure V. Remote access to native NE interface without intervening NMS
For future study

The need for an NE–to–NE remote login standard (i.e., multivendor environment) to provide remote access without an intervening NMS is for further study. Potential needs include: when the management system is inaccessible due to network failure, during initial turn–up, when the management system has failed, for disaster recovery, for non–routine maintenance and for functions the management system does not support.

4. Bibliography

1) "Remote Login Issues for Consideration," SIF–074–10–94, Albert White, SPRINT, September 12, 1994.

2) "Remote Login Nomenclature," contribution in Remote Login Sub–group, Peter Ostling, NYNEX, September 15 1994.

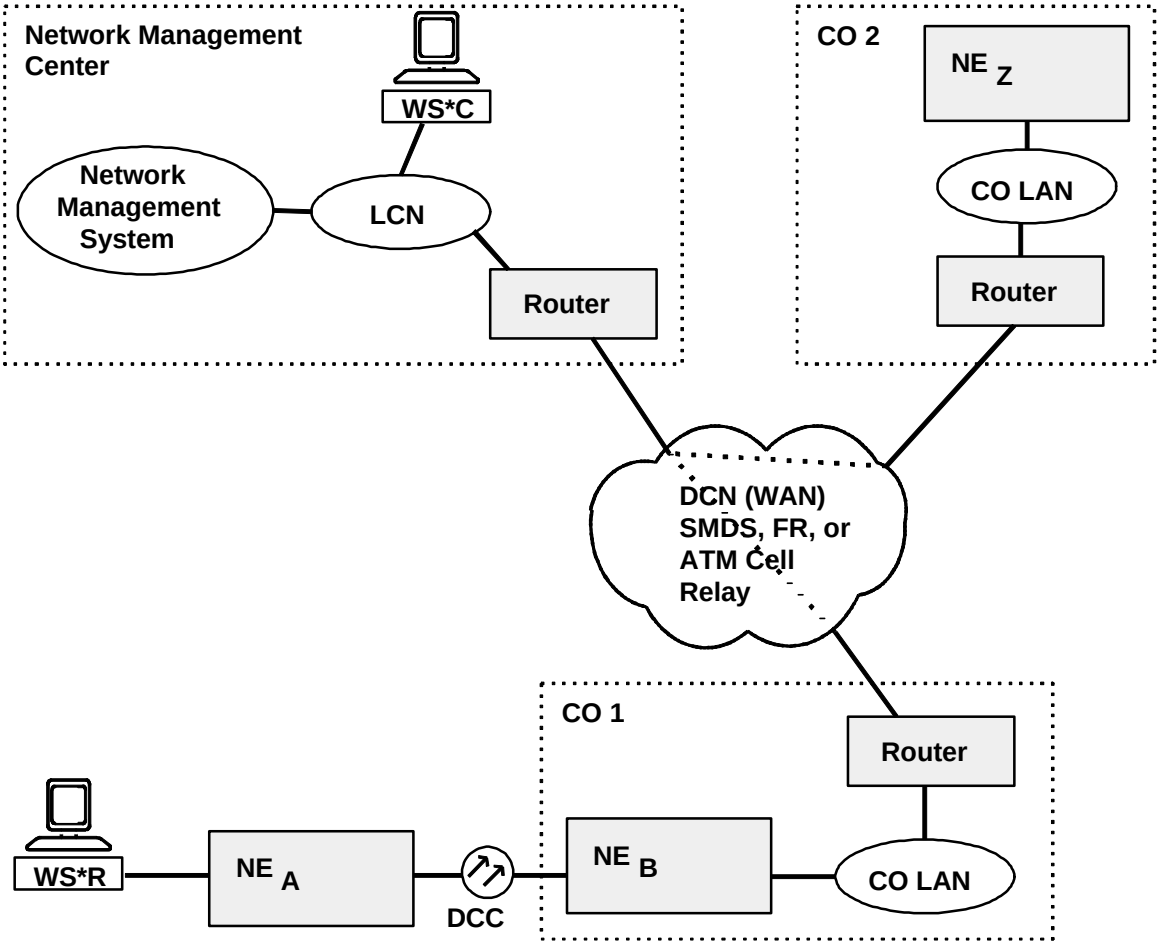
3) "Comments on 'Remote Login Nomenclature' Proposed by NYNEX (see Reference 2)," contribution in Remote Login Sub–group, Steve Pelosi, DSC Communications, October 5 1994.

4) Minutes from October 5, 6 1994 Remote Login Sub–group Meeting (Virginia), minutes were distributed October 12 by–way–of the SIF Remote Login E–mail exploder, Steve Pelosi, DSC Communications.

APPENDIX A. Example Network Implementations (Informative)

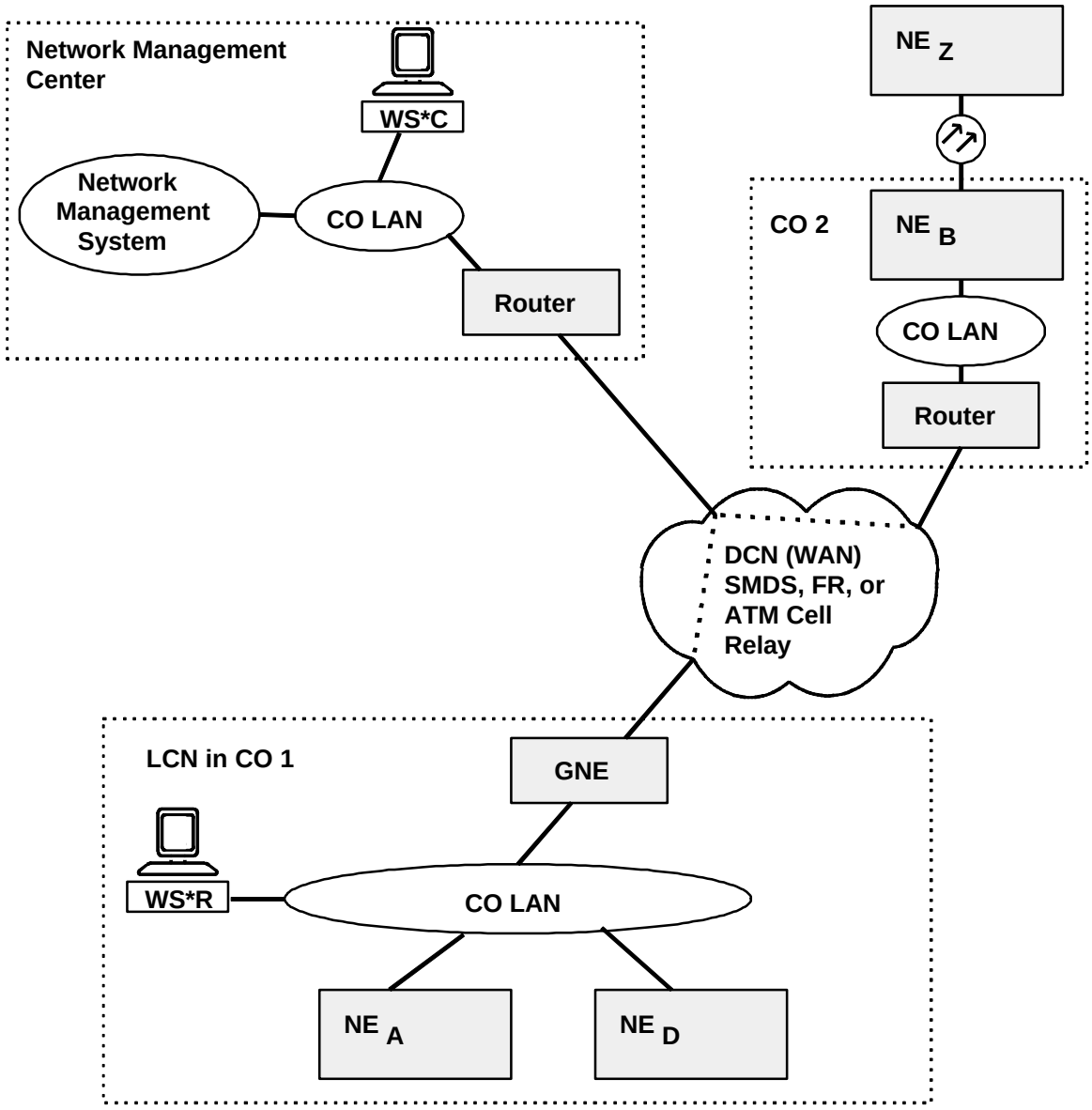
A.1 WS–R Directly Connected to Near–end NE

The figure below shows the Workstation Remote (WS–R) connected to NE_A. The connectivity between WS–R to the NMS in the Network Management Center (NMC) is provided using the DCC, Central Office (CO) LAN (commonly called ”LCN”), Wide Area Network (such as Frame Relay (FR) through the CO 1 Router), and finally the LCN in the NMC. In this example, LCNs and the WAN form the DCN on the path between NMS and NE_Z. However, in some cases the DCC may also be part of the NMS to NE_Z path.


Network Management Center
WS*C
Network Management System
LCN
Router
CO 2
NE Z
CO LAN
Router
DCN (WAN) SMDS, FR, or ATM Cell Relay
CO 1
Router
WS*R
NE A
DCC
NE B
CO LAN

A.2 WS–R Directly Connected to LCN

The figure below shows the Workstation Remote (WS–R) connected to the CO LAN (i.e., LCN). The message traffic would be sent to the network management system over the DCN by a Gateway NE (GNE). The NMS would interact with the destination Network Element (NE_Z) over the DCN.



A.3 WS–R Directly Connected to WAN

The figure below shows Workstation Remote (WS–R) connected to the Wide Area Network (WAN) for transport of message traffic to the network management system. Note that the WAN provides message transport that is independent of the network elements (i.e., the DCC is not involved). The NMS would interact with the destination NE (NE_Z) over the DCN. In this case the DCN consists of the LCN n CO 1.