ODI

NetWare Server Driver

Development Toolkit

Driver Specification Version 3.1

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Preface

This document provides the information necessary to develop the Hardware Specific Module (HSM) portion of a NetWare server driver. Drivers written using the information in this document conform to the Open Data-Link Interface (ODI) specification.

Because the ODI specification provides many powerful features, drivers are now more complex than they were in previous Novell specifications (NetWare v2.x, etc.). Novell has provided a LAN driver development toolkit containing the Media Support Module (MSM) and the Topology Specific Modules (TSMs). These modules allow the developer-written portion of the LAN driver, the HSM, to be as simple as possible and still retain all the features required by the ODI specification.

This document does not describe the full ODI specification, but explains the development of a driver using the Novell-provided development modules.

This document is organized as follows:

Chapter 1 describes the NetWare environment. It consists of a brief look at the ODI architecture and introduction to ODI LAN driver structure.

Chapter 2 provides an overview of the server driver HSM and its required functions.

Chapter 3 describes the data structures and variables that the HSM developer must define.

Chapter 4 describes the data structures and variables provided by the MSM and TSM for HSM development.

Chapter 5 describes the procedures that the HSM developer must provide.

Chapter 6 describes the TSM procedures available for HSM development.

Chapter 7 describes the MSM procedures available for HSM development.

Chapter 8 describes how to implement Hub Management support in the driver.

Chapter 9 is an explanation of the source routing support of ROUTE.NLM.

Appendix A describes the process of assembling, linking, and loading an ODI NetWare server LAN driver.

Appendix B contains information on using the NetWare integrated debugger.

Appendix C describes the syntax required for the driver installation information file used by the Install utility to simplify driver setup and configuration.

Appendix D contains a table of defined frame types and protocol identifiers. It also provides information and diagrams for the different frame formats.

Appendix E describes the Link Support Layer (LSL) procedures available to the developer.

Appendix F describes the NetWare operating system procedures available to the developer.

Appendix G describes the use of canonical and non-canonical address formats in the driver.

Appendix H contains lists of standardized message numbers and their associated text strings. Message string standardization in drivers simplifies maintenance and provides for foreign-language enabling.

Appendix I contains the listing of a sample template for a NetWare ODI server driver HSM.

Appendix J contains brief instructions on the major points for converting a v3.11 HSM to a v4.0 HSM.

Prerequisites

The developer should be experienced with assembly language programming for the Intel family of microprocessors and have a sound understanding of re-entrant coding, event-driven systems, and interrupt-driven device drivers. The developer should also be familiar with the 80386 microprocessor.

The NetWare operating system runs in both real and protected modes. LAN driver developers need to understand protected mode issues.

Manual Conventions

All numbers in this document are decimal unless otherwise specified. Hexadecimal numbers are identified by a trailing 'h' (i.e. FFh). Where bit fields within a byte are specified, bit 0 is assumed to be the low-order bit.

The following data types are defined:

byte	1 byte unsigned integer
char	1 byte ASCII character
offset	32-bit non-segmented address

Note that numeric fields composed of more than 1 byte can be in one of two formats: high-low or low-high. High-low numbers contain the most significant byte in the first byte of the field, the next most significant byte in the second byte, and so on, with the least significant byte appearing last. Low-high numbers are stored in exactly the opposite order. The Intel microprocessors store numbers in low-high order.