Software Product Description

PRODUCT NAME: DECserver 100, Version 2.0
For RSX-11M-PLUS and Micro/RSX

SPD 09.27.02

DESCRIPTION

The DECserver 100 Terminal Server is a network terminal switch for Ethernet Local Area Networks. The DECserver 100 provides a convenient method to logically connect up to eight DIGITAL asynchronous terminals to one or more service nodes (hosts) on an Ethernet. Once the terminal is connected, the user can utilize application programs and utilities as they would through a terminal directly connected to a host via a DZ11, DMF32, or DH11 device, with a few exceptions. Thus, it may be possible to utilize the DECserver 100 to connect all terminals to service nodes in place of traditional interfaces, except for host console terminals.

The DECserver 100 implements the Local Area Transport (LAT) protocol for communication with service nodes that implement this protocol on the same Ethernet. This new interface has been optimized for high terminal I/O performance over an Ethernet, while reducing host CPU cycles required to handle interrupts. Hence, under most I/O loading conditions, a significant performance gain may be realized by using the DECserver 100 versus direct terminal connections via DZ11s.

Software that runs on the DECserver 100 is down-line loaded over the network from a Phase IV DECnet load host. Terminal access using the DECserver 100 on RSX-11M-PLUS and Micro/RSX nodes requires DECnet to be running on all RSX service nodes. Support for the LAT protocol is provided as a part of DECnet-RSX-11M and DECnet-Micro/RSX.

For wide area network communications, terminal users can connect to a local service node running DECnet, where they can ''SET HOST'' to a remote system via the DECnet network terminal protocol. Note, too, that if this system has the requisite X.29 or SNA 3270 access routines, a terminal user could communicate to a remote SNA or X.25 host through the appropriate gateway and this intervening host. A DECserver 100 terminal user cannot communicate directly to remote hosts through DECnet Routers or X.25/SNA Gateways. Wide area network traffic will not provide the same high level of performance as local terminal connections, due to the additional DECnet and internet protocol overhead.

Features such as login load balancing, multiple terminal sessions, and automatic login failover can lead to greater user productivity.

Features

Terminal Connection Management

Through the use of a simple command, users can establish a logical connection, called a session, to any local service node that implements the LAT protocol. This connection makes the terminal appear as if it were physically connected to the service node, and the terminal user can use standard system utilities and applications supported by that node. Each terminal connected to the server can connect to the same or a different service node on the Ethernet. Furthermore, several servers can be used to connect many terminals to one or more service nodes.

A service node can have one or more services that are offered to DECserver 100 users. Services and nodes are identified by name. Users always connect to services, not to nodes, although often one of the service names will be the node name.

Load Balancing

When a connection is made to a service, the actual node for the connection is determined by load balancing. Load balancing is a process the server uses when more than one node offers the same service. Service nodes do not have to be configured in a VAXcluster in order for load balancing to be used. Using the load balancing process, the server connects to the node with the highest rating for the service desired. This rating is based on the current loading, memory, CPU class, and number of users on the nodes that offer the service.

Multiple Sessions

The DECserver 100 allows each user to establish and maintain up to six sessions to one or more service nodes, up to a maximum of 24 per DECserver 100 depending on the number of nodes in the server database. Only one session can be active at a time. Through simple switching commands, the user can access the different sessions without repeating a login dialog each time. Some operating systems may impose limits on the number of LAT sessions such a host will support.

Local Mode and Service Mode

For the most part, the environment provided by the DECserver 100 is identical to that the user would experience if attached directly to the service node. When

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operating in this mode, the user is said to be in Service Mode. Occasionally, such as during connection establishment, the user interacts directly with the DECserver 100. When operating in this mode, the user is in Local Mode.

In Local Mode, the terminal input is interpreted directly by DECserver 100 as commands to be performed by the server.

Local Mode has three different levels of privilege: privileged, nonprivileged, and secure. Privileged mode is provided for the Server Manager to control the environment of the server and of the terminal users. Access to this mode is password protected. Nonprivileged commands allow the terminal users to control their service sessions, set their terminal characteristics and show server information. The Server Manager can set the server to secure mode on a per-terminal bases which further limits the commands users can enter to only those which directly relate to the user's own terminal.

The Server Manager environment is a logical extension of the user environment. The Server Manager is treated as a server user with a privileged status. The Server Manager sets a terminal to this status using a command which requires a password. This privileged status allows the Server Manager to enter commands not normally available to server users. These commands set server characteristics, provide control over server port usage, and provide the ability to control the user's access to the server and network services.

In Service Mode, the terminal input is passed directly to the connected service node with several exceptions. One exception, called the Local Switch Character, allows the user to enter Local Mode from Service Mode. The <BREAK> key may also be used for this function. Other exceptions, called the forward and backward switch characters, allow the user to switch between sessions without the need to enter Local Mode.

The switch characters are disabled by default but may be enabled by command. Both CTRL/S and CTRL/Q are normally interpreted locally but flow control using these characters can be disabled.

Autoconnection

Autoconnection is a function that automatically connects a user terminal to a service node when connection failures occur or upon user login to the server. In conjunction with this function, a dedicated or preferred service can be specified for each terminal user.

If a dedicated service is specified, the DECserver 100 will attempt to connect to that service when a character is typed on the terminal keyboard or when an existing connection fails. In dedicated service mode, only one session is available. As this mode is designed to simulate a direct terminal connection, no Local Mode commands or messages are available to the terminal user. Ports with dedicated service can be automatically logged out of the server when the user logs out of the service node.

If a preferred service is specified, the DECserver 100 will attempt to connect to that service as with the dedicated service mode of operation. However, the terminal user can enter Local Mode and establish other sessions.

Automatic Session Failover

If a service is available on two or more service nodes and a connection to a service fails, the server will attempt to connect the user to another service node offering the same service. Autoconnection must be enabled for this feature to work. The user does not have to be already connected to that service node. Furthermore, the user's context at the time of failure is not automatically restored and login to the new service is required.

Groups

Every terminal and service node in a LAT network is a member of one or more groups. These groups are identified by numbers called group codes. Group codes allow an easy means of subdividing the network into what appears to be many smaller networks. A terminal user is only aware of the services that are offered by nodes in the same group(s).

The Server Manager can specify the authorized group(s) in which a terminal is a member. The authorized groups define the set of services that the user is allowed to access. In addition, a user can further restrict access to services by disabling some of the authorized groups using a nonprivileged group command. The user-settable group codes are a subset of the authorized groups.

Groups provide a restrictive view of the network. This restricted view is mainly for user convenience and, although it also provides a form of security, it is not intended to be the primary form of access authorization or system security for a node.

Security

The DECserver 100 provides functions which enhance security features already available in the service nodes. DECserver 100 security includes the ability to lock a terminal's keyboard from other users, optional login protection, and nonprivileged Local Mode of operation as a default.

A user may lock the terminal using a lock password. This allows the user to leave sessions running at the terminal without fear of security violations. When a terminal is locked, all input from the terminal is ignored until the lock password is re-entered. The lock feature may be disabled by the Server Manager.

Each terminal port can be set to operate in a secure mode which causes all commands that relate to other users to be disabled for that port.

Login passwords can be enabled on a per-line basis by the privileged user. If enabled, the terminal user must enter a login password to access server functions. If a dedicated service is specified, login protection is not available.

DECserver 100 users normally have access to the nonprivileged Local Mode. In this mode, users may only issue commands that affect their own terminal environment. The server has a privileged mode for Server Manager's use. The mode is password protected.

On-line HELP Facility

A limited on-line HELP facility is available to remind users of command syntax. It is not intended as a replacement for the documentation set.

Directory Service

Any DECserver 100 user can obtain a directory of services available to that user with a SHOW SERVICES command. Services for which the user is not authorized will not be displayed.

Permanent Characteristics

The DECserver 100 maintains permanent characteristics in non-volatile memory which is retained even when the power is disconnected. Permanent characteristics are maintained for service and server parameters as well as per-port parameters. Permanent characteristics can be reset to factory defaults by pressing the software reset button on the hardware unit while plugging in the power cord.

Port Characteristics Configuration

Characteristics governing the operation of an individual port can be displayed by a nonprivileged terminal user interactively from their terminal. Many of the characteristics may be set-up by the user, but certain characteristics are privileged and may only be changed by the Server Manager.

Port parameters that can be set and displayed include: speed, character size, group codes, parity, terminal type, access, autobaud, modem and password protection.

Port Access

The port access on a DECserver 100 with Version 2.0 software may be set up in different ways depending on the device attached to the port and its intended use.

Port access is the characteristic which determines how a port my access or be accessed by interactive users and service nodes.

- Access Local - Used for interactive terminals. This allows the device (typically an interactive terminal) attached to the port to CONNECT to LAT services. This type of access is also used for dial-in modems.
- Access Remote - Designed for applications-driven devices such as asynchronous printers which are allocated by a service node process. This allows the implementation of certain shared printers by multiple service nodes.
- Access Dynamic - Designed for devices (such as personal computers or printers with keyboards) which require both Local and remote access.
- Access None - Designed to allow the server manager to disable the use of a port.

Terminal Operation

The DECserver 100 software supports the simultaneous operation of up to eight terminals at speeds from 75 bps to 19.2K bps. The software also supports:

- Split speed (transmit and receive) terminal operation
- Block Mode transfers
- Automatic line speed detection
- DIGITAL Personal Computer file transfer
- XON/XOFF handling
- Data transparency mode
- Ability to pass break character and error notification

Terminals Supported

The DECserver 100 software supports the following DIGITAL terminal devices that have keyboards:

- LA12, LA34, LA35, LA36, LA38
- LA120, LA120
- VT52, VT100, VT101, VT102, VT125, VT131
- VT220, VT240, VT241
- VT320, VT330, VT340 (session management disabled)

Supported terminal parameters are:

- Character size: 7 or 8 bits per character
- Parity: Even, Odd, Mark, or None

The Automatic Line Speed Detection (Autobaud) feature is supported for either seven-bit characters with even parity, or eight-bit characters with no parity.

The DECserver 100 software also supports the following DIGITAL Personal Computers (PCs) in both terminal emulation mode and file transfer mode:

- Professional 325, 350, 380
- Rainbow 100A, 100B, 100+, 190
- DECmate II, III
- VAXmate

Note: This product is not warranted to support non-DIGITAL terminal devices and Personal Computers. However, those supporting VT100-like characteristics may operate with this product.

Modems Supported

None, however the signals available on each DECserver 100 port connector are Tx, Rx, and Gnd.

Server Management

Several facilities exist for managing and troubleshooting server operation. A Server Manager in privileged mode can set up server identification information, change terminal parameters, or fine tune the operating characteristics

of the server. Troubleshooting facilities include diagnostic tests and on-line statistics.

A privileged user can diagnose Ethernet communications problems by looping messages to an Ethernet host and through the Ethernet hardware interface at the server. To diagnose terminal problems, users can execute a command to transmit test data to their terminal, or the Server Manager can send test data to any terminal.

The server maintains a variety of statistics and counters. These include the following: Ethernet data link statistics, LAT protocol statistics, and terminal line error statistics. These data can be displayed and zeroed by a privileged terminal user. Server parameters that can be modified and displayed include the server identification, circuit timer, and login limits.

Remote Server Management

The DECserver 100 implements the console carrier feature which enables access to the DECserver 100 Local Mode from a Phase IV DECnet host on the same LAN. A restricted set of Local Mode functions are available to a console carrier user. This capability provides centralized server management and remote server diagnosis.

Communications

DECserver 100 software is designed to run on DECserver hardware exclusively which includes an Ethernet interface for connection to an Ethernet transceiver cable.

The DECserver 100 has eight EIA RS-232-C/CCITT V.24 asynchronous line interfaces for connecting terminals to the unit. This product is designed for local terminal use only. Support for remote terminals and modem control is not provided.

DECserver 100 Operation

The DECserver 100 ROM-based firmware provides the necessary maintenance operation protocols for down-line loading DECserver 100 software from a Phase IV DECnet load host over the Ethernet into server memory. All self-test diagnostics are in DECserver ROM, so down-line loading is not a precondition for DECserver self-test. In the event of a bugcheck caused by a fatal error, the unit will normally attempt to up-line dump server memory to a DECnet Phase IV host. Following this, the unit will automatically initialize itself and invoke a down-line load.

Additional Features

The DECserver 100 terminal server provides additional features for VMS and MicroVMS (at least at version 4.2) service nodes running LATplus/VMS. Refer to the Software Product Descriptions for VMS Operating System (SPD 25.01.xx) and MicroVMS Operating System (SPD 28.05.xx) for more information.

DECserver 100 Configuration and Performance

The process of configuring the DECserver 100 is based primarily on tradeoffs of cost and performance within the realm of satisfying user application requirements. The performance of a given server is a function of the expected network traffic, the load on hosts to which terminals are connected, and resultant processing pursuant to the dedicated function of the unit.

Thus performance depends on several factors:

- Number of terminals
- Number of host systems with active connections to the server
- Number of active connections to non-LAT hosts
- Terminal speeds
- Terminal user applications
- Number and size of host buffers
- Terminal workload

In order to achieve a viable configuration, the user and/or a DIGITAL software specialist should perform a level of application analysis which addresses the factors above. The actual maximum data throughput cannot be calculated by multiplying the number of lines by the line speed, since many factors already discussed in this section may reduce the actual throughput.

Restrictions on DECserver 100 Usage

While terminal connections using the DECserver 100 have been designed to simulate direct terminal connections as much as possible, a few differences necessarily exist because of the nature of the product. Under most circumstances, these differences are not noticed by terminal users or service node application programs. However, applications which are directly dependent on the following functions may not operate as with a direct connection:

- Applications that depend on reading or setting the terminal speed, character size and parity by manipulating system data structures
- Applications that depend on an extremely fast response time (typically less than 200 ms) to operate
- Applications that utilize an alternate terminal driver in the service node
- Applications that directly receive and send BREAK signals and/or the ON/XOFF flow control characters (since these characters are normally intercepted and processed locally by the DECserver 100)
- Applications that expect incoming connections to have fixed device names.

HARDWARE REQUIREMENTS

The DECserver 100 software runs on either of the following packaged hardware options:

- DSRVA-AA/AB - DECserver 100 hardware, including eight EIA RS-232-C/CCITT V.24 asynchronous lines supporting speeds up to 19.2K bps, factory set at 120V/240V.

Use the following SHIELDED cable with each of the physical lines on the unit:

- BC22D - Null modem cable for local terminal connections
- BC22R - Recommended null modem cable for host systems and other devices, including those which utilize CTS/RTS flow control.
- BC17D - Null modem cable for host systems and other devices which do not utilize CTS/RTS flow control.

The DECserver hardware requires both a transceiver drop cable and Ethernet connection, H4000 or DELNI, to connect to the Ethernet physical channel.

RSX service node software requires a valid RSX-11M-PLUS or Micro/RSX system configuration. Refer to the RSX-11M-PLUS Software Product Description (SPD 14.70.xx) or Micro/RSX Software Product Description (SPD 14.28.xx) for more information.

Refer to the Software Options Chart below to determine the distribution media available for a particular processor and operating system.

Block Space Requirements:

Disk space required for installation: 700 blocks (358.4K bytes)

Disk space required for use (permanent): 700 blocks (358.4K bytes)

The block space requirements above refer to the disk space required on the downline load host system disk. The sizes are approximations; actual sizes may vary depending on the user's system environment, configuration, and software options.

GROWTH CONSIDERATIONS

The minimum hardware requirements for any future version of this product may be different from the minimum hardware requirements of the current version.

OPTIONAL HARDWARE

None

SOFTWARE REQUIREMENTS

For Load Hosts:

PDP-11 Systems:

- RSX-11M-PLUS Operating System
- DECnet-RSX

MicroPDP-11 Systems:

- Micro/RSX Operating System
- DECnet-Micro/RSX

For Service Nodes:

PDP-11 Systems:

- RSX-11M-PLUS Operating System
- DECnet-RSX

MicroPDP-11 Systems:

- Micro/RSX Operating System
- DECnet-Micro/RSX

Refer to the RSX-11M-PLUS and Micro/RSX Optional Software Cross Reference Tables (SPD 20.99.xx and SPD 20.95.xx) for the required versions.

For RSX-11M-PLUS and Micro/RSX, LAT service node support is provided with DECnet. Hence, it is necessary that DECnet be installed and running on all RSX-based LAT service nodes.

RSX-11M is not supported either as a LAT service node, or as a load host.

The DECserver 100 software is installed on an RSX-11M-PLUS or Micro/RSX load host, which must contain DECnet-RSX (Phase IV). DECnet is used for down-line loading the server software into the DECserver 100 units.

The DECserver 100 server software will operate with all DIGITAL service nodes which support the LAT protocol. All features described in this SPD will operate with RSX-11M-PLUS and Micro/RSX service nodes. Additional features are available for VMS and MicroVMS service nodes running LATplus/VMS, which is included with the distribution and documentation for VMS load hosts.

The DECserver 100 software license applies to the DECserver 100 on which the server software runs, not to the service node CPUs in the network. Service node based LAT software is bundled with the host operating system.

Refer to the following SPDs for information on other supported DECserver 100 systems:

DECserver 100 for ULTRIX-32 (SPD 27.42.xx)

DECserver 100 for VMS and MicroVMS (SPD 27.41.xx)

OPTIONAL SOFTWARE

None

SOFTWARE WARRANTY

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

INSTALLATION

This software product can be installed by the customer using the step-by-step documentation available for this product. Optionally, you can purchase DIGITAL Installation Services which provide for the installation of the software product by an experienced DIGITAL Software Specialist.

The installation service consists of:

- Installation of DECserver 100 software on one DECnet load host

- Configuration of up to 10 DECserver 100 units on that load host
- Configuration of LAT service node software (i.e. LTDRIVER) on one service node
- Installation verification and checkout
- Customer Orientation Demo

Customer Responsibilities

Before installation of the software, the customer must:

- Previously have installed all requisite hardware including terminals.
- Obtain, install, and demonstrate as operational other communications equipment and facilities necessary to interface to DIGITAL's communication equipment.
- Make available for a reasonable period of time, as mutually agreed by DIGITAL and the customer, all hardware, communication facilities, and terminals that are to be used during the installation.
- For multi-node networks, designate one Ethernet host to verify installation/connectivity.

SOFTWARE LICENSING

This software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions. For more information about DIGITAL's licensing terms and policies, contact your local DIGITAL office.

SOFTWARE PRODUCT SERVICES

A variety of service options are available. For more information on these or other services, please contact your local DIGITAL office.

SOFTWARE OPTIONS CHART

The distribution Media Codes used in the Software Options Chart are described below. You specify the desired Media Code at the end of the Order Number, e.g., QYAAC-H3 = binaries on an RX50 Floppy Diskette.

3 = RX50 Floppy Diskette
5 = TK50 Tape Cartridge
H = RL02 Disk Cartridge
M = 9-track 1600 BPI Magtape (PE)
Z = No hardware dependency

Note: The availability of these software product options and services may vary by country. Customers should contact their local DIGITAL office for information on availability.

OPTIONS	**ORDER NUMBER Micro/RSX**	**ORDER NUMBER RSX-11M-PLUS**
LICENSE OPTIONS: A LICENSE IS REQUIRED FOR EACH SERVER.		
Single-Use License	QYAAC-UZ	QR925-UZ
MATERIALS AND SERVICE OPTIONS:		
Distribution and Documentation Option	QYAAC-H3 QYAAC-H5	QR925-HH QR925-HM
Software Revision Right-To-Copy Option	QYAAC-HZ	QR925-HZ
Documentation-Only Option	QYAAE-GZ	QJ966-GZ
Installation Service Option	QYAAC-I3 QYAAC-I5	QR925-IH QR925-IM
DECsupport Service	QYAAC-93 QYAAC-95	QR925-9H QR925-9M
Basic Service	QYAAC-83 QYAAC-85	QR925-8H QR925-8M
Self-Maintenance Service	QYAAC-33 QYAAC-35	QR925-3H QR925-3M