Software Product Description

PRODUCT NAME: DECmcc Enterprise Management Station (EMS), Version 2.1 **SPD 31.88.02**

DESCRIPTION

DECmcc Enterprise Management Station (DECmcc EMS) is a network management software product designed to provide network managers with a complete set of applications to manage wide area heterogeneous networks.

The DECmcc Enterprise Management Station consolidates Digital Equipment Corporation's network management applications within a DECwindows environment and provides the capability of running all applications on a single system. It consists of products that are compliant with Digital's Enterprise Management Architecture (EMA) as well as products that are not EMA-compliant. As such, DECmcc EMS is a transition vehicle to an EMA-compliant product set within a single software product.

DECmcc EMS consists of the following Digital network management products:

- DECmcc Basic Management System (BMS)
- NMCC/DECnet Monitor
- LAN Traffic Monitor (LTM) VMS
- Extended LAN Management Software (DECelms)
- NMCC/VAX ETHERnim
- Terminal Server Manager (TSM)

Three component products: DECelms, TSM and DECmcc BMS have been upgraded within DECmcc EMS V2.1.

In addition to containing the products listed above, DECmcc EMS supports the ability to install and run other VMS layered products within a DECwindows environment. DECmcc EMS also provides access to non-Digital management products that are based on X11 standards. These products can be installed on the same or separate processors as DECmcc EMS for the purpose of consolidating interfaces on a single workstation display.

Also included with the DECmcc EMS components is the *Network Troubleshooting Guide*. Available through the DECwindows Bookreader application, the *Network Troubleshooting Guide* provides DECmcc EMS users with a systematic, on-line approach to solving some of the most common problems that occur on DECnet-VAX, DECnet-ULTRIX, Ethernet, and TCP/IP networks.

DECmcc Basic Management System

The DECmcc Basic Management System (BMS) software implements Digital's Enterprise Management Architecture (EMA) director model, consistent with the ISO/OSI management framework. The DECmcc Basic Management System (BMS) software, allows users to control, monitor, and test manageable objects (entities) in a network.

The EMA Director Model defines a management platform, called a director, and cooperating but independent software components named "management modules." DECmcc BMS is comprised of a director and management modules of the following types:

- Access Modules (AMs) provide access to and information about different classes of entities.
- Function Modules (FMs) provide high-level management functions for managed entities.
- Presentation Modules (PMs) provide a consistent user interface for Function modules.

The core of the DECmcc BMS software is the EXECUTIVE, which consists of a management kernel and a set of "function modules." The EXECUTIVE also includes a Management Information Repository (MIR), which defines a consistent structure for viewing management data. Together they form DECmcc's operating environment for co-existence and interoperation of management modules.

The DECmcc BMS software allows a user to observe and control a selected group of DECnet-VAX Phase IV entities and many other entities from a common command syntax and a consistent user interface. The DECmcc command syntax is compliant with Digital's Network Control Language (NCL), the command-line syntax used for network DECnet management

commands. Other classes of entities may be managed through additional access modules enrolled in the DECmcc BMS software.

With proper planning, deployment and use, DECmcc management systems are scalable to the size of the network, ranging from a small, homogeneous local area network to an enterprise-wide, multi-vendor, distributed environment. DECmcc software supports, either or both, centralized or distributed management styles.

The following is a list of the EMA-compliant components and modules that comprise DECmcc BMS.

EXECUTIVE

The EXECUTIVE provides the environment where DECmcc BMS management modules operate, allowing them to communicate with each other and with management information stored in the MIR. The DECmcc EXECUTIVE consists of the management kernel, Management Information Repository (MIR), and EXECUTIVE function modules.

Among the features of the EXECUTIVE is its ability, in conjunction with appropriate access modules, to monitor managed entities. This can be done by polling or through a combination of polling and acting as collection points for unsolicited entity event messages.

Management Kernel

The Management Kernel provides the operating environment and dispatching services for management modules. The operating environment consists of a multithreaded processing system, contained within VMS processes, along with a set of callable procedures.

Management Information Repository (MIR)

The MIR is an integrated repository that contains definitions of entity classes, entity instances, entity attributes, and private or miscellaneous data required by individual management modules. The MIR provides storage and access routines for maintaining management information within the DECmcc BMS software. Most data stored in the MIR is structured according to the EMA Entity Model, which is consistent with the ISO/OSI structure of Management Information (SMI).

EXECUTIVE Function Modules

Control FM

The Control FM provides access to primitive directives for observation and control of managed entities. The Control FM supports a pre-defined list of basic directives, plus a small set of generic directives that can be used for different purposes by different AMs.

Registration FM

The Registration FM, in conjunction with the VAX Distributed Name Server (VAX DNS) manages data identifying each entity in a network. It also defines and manages a set of common reference attributes for all entities. The Registration FM uses VAX Distributed Name Service as the DECmcc instance repository. This allows multiple DECmcc BMS systems to share the same view of entity configurations.

Additional Function Modules

Domain FM

The Domain FM works in conjunction with the Registration FM to enable users to define spheres of management interest. Domains may contain other domains as well as reference other domains. Users can set up hierarchical domains and navigate through the managed network from a top-down view. Domains can be represented on the Iconic Map PM, enabling users to select specific domains and manage the entities that comprise them.

Historian FM

The Historian FM enables users to collect and timestamp entity attribute data. The resulting historical attribute data is available for use by other management modules such as the Performance Analyzer FM. Users can define the data to be collected as well as the collection intervals.

Export FM

The Export FM writes attribute data (historical as well as current) to an Rdb/VMS database located anywhere in the network. Exported data can be used to generate reports or other administrative applications that require access to network management data. Included with the Export FM is a set of DATATRIEVE procedures which enable users to generate reports on managed entities.

Performance Analyzer FM

The Performance Analyzer FM calculates statistics for selected DECnet (Phase IV and V) and Bridge entities. These statistics can be used in conjunction with the Alarms FM to set thresholds for triggering alarms as well as for network planning and optimization purposes.

Alarms FM

The Alarms FM provides the ability to notify network managers that alarm conditions have been detected in the network. The Alarms FM can detect alarm conditions about any entity that has an appropriate access module. When an alarm condition is detected, a user-written command procedure is queued for execution.

The Alarms FM includes sample rules for alarm conditions and sample command procedures that can be used directly (e.g., to log, broadcast and mail alarms) or used as examples that can be modified.

Access Modules

DECnet Phase IV AM

The DECnet Phase IV AM allows users to manage DECnet Phase IV entities such as nodes, circuits, lines, and objects. The DECnet Phase IV AM provides an access path to and information about the entities it supports. The DECnet Phase IV AM supports one global entity class, NODE4, and a number of child entity classes such as lines and circuits. With the DECnet Phase IV AM, typical management operations include gathering counters from a child entity (e.g., line) through its parent (e.g., a DECnet Phase IV Node), or modifying parameters on a remote node.

Ethernet Station AM

The Ethernet Station AM provides looptest and display of generic Ethernet devices that support: MOP REQID, MOP SYSID, MOP Counters, Ethernet V2 Loopback IEEE802.3 XID, or IEEE802.3 TEST. The Ethernet Station AM also provides Ethernet control and monitoring functions that can be used by other management modules within the DECmcc BMS system.

Bridge AM

The Bridge AM enables users to control and monitor any Digital LANbridge 100, 150 or 200 in an extended LAN environment. In addition, this module provides an executable procedure to aid in the populating of the DECmcc BMS software database with information contained in an existing Remote Bridge Management Software (RBMS) database.

Sample AM

A Sample Access Module is included as part of the DECmcc BMS software. The Sample AM implements a single management directive, the SHOW directive, for the DECnet Phase IV node entity and associated line subentity. The SHOW directive displays various Characteristic, Status, and Counter attributes for each entity. The Sample Access Module implements a SHOW and TEST management directive to manage the Access Module itself to illustrate the "management of management" concept. Including the Sample AM with the DECmcc BMS is intended to ensure proper end-user licensing of access modules developed using source code provided in the DECmcc Toolkit (SPD 32.49.xx).

Presentation Modules

Presentation Modules included with DECmcc BMS software are the Iconic Map and the Forms and Command Line (FCL) PMs. The FCL PM supports two modes of operation, Command Line Mode and Forms Interface Mode.

Iconic Map PM

The Iconic Map presentation module enables users to interact with the DECmcc BMS using a mouse control. Commands as well as management data can be accessed by selecting icons representing managed domains and entities in a map window, and through pull-down command windows.

FCL PM - Command-Line Mode

The Command-Line Mode is a terminal-based user interface that uses command-line input and output techniques. It is compliant with Digital's NCL, the command-line syntax used for DECnet/OSI network management commands.

Command-Line Mode is available from any terminal or workstation compatible with Digital's VT220 terminal. It supports command-line recall and editing, abbreviation support, on-line HELP, symbol substitution, support of control key sequences, line continuation, and typeahead.

The user interface structure also allows a VMS DCL process to be "spawned."

FCL PM - Forms Interface Mode

The Forms Interface Mode is an extension of the command-line interface that provides a screen-based user interface, using forms and list input and output techniques. It is available from any terminal or workstation compatible with Digital's VT220 terminal.

The screen format contains two regions. One region is for entering data to input fields for issuing DECmcc BMS commands or "directives." The other region is for viewing data resulting from DECmcc BMS directives. Arrow keys, Previous and Next Screen keys may be used for reviewing the data in the output region.

Utilities

Several utilities are included that enable the on-site enrollment of access modules not provided with the DECmcc BMS. Documentation required for such enrollment is provided by the module developer. The utilities are:

- Dictionary Administrator Program (DAP) Utility
- Parse Table Builder (PTB) Utility

- Test Bed Driver (TBD) Utility
- Help File Builder (HFB) Utility

The *DECmcc Developer's Toolkit Reference Manual* (order number AA-PD5MA-TE) describes each of the tools in detail.

On-Line HELP Information

DECmcc BMS includes extensive on-line HELP information similar to VMS HELP. HELP information is provided in the following four categories: Entity information, Function information, Presentation information, and Tutorial information.

NMCC/DECnet Monitor

NMCC/DECnet Monitor is a network monitoring application for Phase IV/IV+ DECnet network nodes. It runs as a layered application on VMS Systems and does not require any additional hardware or software on the remote DECnet nodes to be monitored. NMCC/DECnet Monitor collects and monitors data concerning the DECnet network. NMCC/DECnet Monitor enables the user to store, distribute, analyze, and evaluate the data to create useful and comprehensible information, and to present the data either as a screen display or as a printed report.

NMCC/DECnet Monitor consists of software modules, the Kernel and User Interface, which combine to form a comprehensive monitoring system. The central component of NMCC/DECnet Monitor is the Kernel, a data acquisition process, which collects data from the network using polling and/or event logging. Polling can be used to obtain status, characteristics, and traffic/error counters. Event logging can be set up to cause remote nodes to log events automatically to the kernel, including status changes and traffic/error counters as they occur.

The network manager has full control over which nodes are polled, the polling rates, and which remote nodes log events. The Kernel processes the raw data and creates a log file of statistical data, which is then available to the NMCC/DECnet Reports subsystem for the production of network reports.

Through access to the log files, users can gather the following reports: network summary, system, and line error reports; network summary, system, and line traffic reports; configuration reports.

The User Interface subsystem provides an easy-to-use command interface to the NMCC/DECnet Monitor. It provides on-line graphic and lexical video displays of selected error statistics, traffic statistics, and status information. The displays are designed hierarchically so that the user can select the network components, information types, and levels of detail in a consistent and easy to use manner. The graphic displays include histograms, linear scales, and a network map.

The User Interface subsystem also provides the user with the capability to build and manipulate various databases maintained by NMCC/DECnet Monitor, including a network component reference database. This contains a description of all nodes and physical links in the network. It includes such details as CPU type, type and version of operating system, name and telephone number of system manager, and name and telephone number of customer service contacts. Display commands are provided to retrieve this information. The user interface to these commands is consistent with the operational interface of the product.

LAN Traffic Monitor VMS

LAN Traffic Monitor (LTM) VMS is the software portion of a fully distributed monitor that can support the capture and presentation of traffic data from an extended Ethernet. A LAN Bridge 100 or LAN Bridge 150, downline loaded with monitoring software, is attached to the Ethernet cable and transmits information to a VMS layered application software program located on any VAX in the extended LAN. Multiple users, from different nodes on the extended Ethernet, may access the traffic data. LAN Traffic Monitor also works with Chipcom®'s Broadband Bridges called Ethermodem III Bridges.

LAN Bridge hardware can run either as a LAN Traffic Monitor or as a LAN Bridge, i.e., the primary building block of the Extended LAN (Local Area Network) architecture. An Extended LAN is a collection of LANs that are interconnected and logically appear as one large Local Area Network.

Note that when a bridge is used as a monitoring device or listener, it does not function as a bridge. Users can remotely switch a bridge between monitoring and standard bridge modes using Digital's DECelms (Extended LAN Management Software).

With the LAN Bridge designed to work at full Ethernet speed, the LAN Traffic Monitor can provide real-time data on Ethernet LAN throughput and utilization, allowing a customer to actively monitor their Ethernet usage. The ability to collect data on any protocol type (i.e., LAT, 802.3, DECnet, TCP/IP, etc.) on the Ethernet is also provided.

LAN Traffic Monitor contains the LTM Listener software (which counts and classifies Ethernet traffic using a LAN Bridge as a monitoring device) and the LTM User Interface (which collects and displays data received from the LTM Listener).

The LTM Listener periodically reports traffic statistics to the LTM User Interface located on a VAX host. The LTM User Interface receives unsolicited Ethernet datagrams generated by the LTM Listener, and through the menu structure, the user can also ask the LTM Listener for additional data not found in the unsolicited messages. A single LTM host can be used in conjunction with multiple LTM listeners.

The LTM User Interface performs the necessary data reduction and presents the statistics in logical groupings. Summary displays, which are presented in tabular format, include Network Traffic, Top Ten Talkers, and Throughput and Utilization. LTM also displays Lists of Nodes, Multicast Addresses, Protocols Used by Nodes, Node Traffic by Protocol Type, Multicast Traffic by Protocol Type, and Protocol Type Traffic.

In addition, LAN utilization based on the most recent traffic data received from the LTM Listener may be displayed graphically in intervals of one, four, eight, twelve, twenty-four, or forty-eight hours.

DECelms

DECelms (Extended Local area network Management Software) enables users to configure, manage, monitor, control, and observe any LAN Bridge and FDDI Wiring Concentrator in an extended Ethernet/802.3 LAN and FDDI network environment. Supported devices include Digital's LAN Bridge 100, LAN Bridge 150, LAN Bridge 200, DECbridge 500, DECconcentrator 500, METROwave, and Chipcom's Ethermodem Broadband Bridge. DECelms is comprised of VAX host software and corresponding firmware that resides in the LAN Bridges and FDDI DECconcentrators.

A superset of RBMS V2.0 functions, DECelms provides remote management capabilities for FDDI and Ethernet devices. Using DECelms, users can:

- Observe, monitor, and control interoperable FDDI and Ethernet networks
- Display and modify devices, lines, physical ports, and forwarding database characteristics
- Enable and disable lines and physical ports
- Automatically build a host registry of all reachable FDDI DECconcentrators and LAN Bridges within extended LAN and FDDI environments
- Automatically or manually poll the devices stored in the host registry for faults, errors, and changed information
- Display error conditions to an alarms window and record detailed information in an error log file
- Process the logfile keying off time or type of faults
- Use standard VMS utilities like print, type, search, etc., on the ASCII formatted versions of the DECelms error log file
- Display data-link counters, status and characteristics
- Modify parameters such as operational state, forwarding database, and spanning tree characteristics
- Remotely invoke a device's self-test capabilities
- Associate ASCII names with specific device physical addresses for ease of use in management commands
- Display the logical FDDI network topology through ring mapping

DECelms also provides simultaneous access by more than one user, supports command line recall, and password protection for settable parameters for Digital LAN Bridge 150s, 200s, 500s, and FDDI DECconcentrators.

NMCC/VAX ETHERnim

NMCC/VAX ETHERnim is a network management application that provides the network manager with a tool to gather information about Ethernet nodes, verify reachability of nodes, provide a graphical display of local area network topology and monitor Ethernet traffic.

NMCC/VAX ETHERnim consists of two categories of software, one must be installed on a VMS system set up as the Host, and the other can be optionally installed on Target systems running VMS. In this context, the Host is defined as the node where the NMCC/VAX ETHERnim application runs, while the Target systems are those DECnet nodes on the Ethernet segments which are being tested at the User (task) level. The optional software installed on the Target system is referred to as the Remote Files.

The Host software requires Phase IV DECnet software on a VMS system. When this software has been installed, the network manager has the ability to:

- Build a permanent database containing basic information about each node directly connected to the Ethernet local area network through user commands and automatic procedures.
- Manually construct and maintain a topological view of the network, including transparent network devices (e.g., DEMPR, DELNI, DEREP).
- Test the Ethernet network to help isolate and identify problems.
- Test the communications path to each node up to the DNA application layer by performing a loopback test to a specified user account. This feature is available only for VMS Target systems.

- Monitor the network to determine which nodes are the top talkers and which nodes are the top listeners; sort/display traffic by protocol type or multi-cast address; focus on traffic to/from a specified node.
- Perform information access to properly configured DECnet nodes on the Ethernet to determine the remote nodes's system type, hardware configuration, and software configuration.

Note: Under high Ethernet utilization (above 20%) the ETHERnim Monitor function may cause performance problems on the host running ETHERnim. This may affect time-sensitive network applications which are connected to the host running ETHERnim.

Terminal Server Manager

Terminal Server Manager (TSM) VMS software allows suitably privileged users at a VAX host to control and observe terminal servers anywhere in the extended local area network. TSM provides centralization and increased flexibility in configuring, monitoring, and controlling Digital's family of terminal servers.

Among the features supported by TSM are:

- Support for the DECserver 300 V2.0 products which include Telnet functionality. A set of server commands provide management of the Telnet characteristics of a terminal server.
- User prompts that reflect the current context of the user's TSM session, whether it be DIRECTORY, SERVER, PARTITION, TYPE or TABLE.
- Support for the 3270 Option Software for the CXM04 line card. This line card provides capability of connectivity of 3270-class-terminals to systems on Ethernet.
- Keyboard mapping, which enables the terminal server manager to customize 3270 keyboard tables supplied with the 3270 Option Software by changing the way individual 3270 keyboard keys are mapped to Digital's VT220 keys.
- Wildcarding, which extends the wildcarding capability for server names by allowing a wildcard character such as * and % to replace a server name any place it appears in the syntax.
- A management directory that contains the name, Ethernet address, terminal server type, and other fields for each server to be managed. Through the TSM directory, the user need only to refer to the name of the server in order to gain access.
- The ability to define logical groups of servers. A command can then be executed for all servers in the partition. TSM provides a pre-defined partition called ALL that includes all servers in the directory.
- Access to and manipulation of the database associated with each server within its jurisdiction, including their characteristics and parameters.
- Management of the volatile characteristics for all terminal server types.
- Management of permanent NVRAM characteristics for the DECserver 100, DECserver 200, and MUXserver 100. For the Ethernet Terminal Server and DECserver 500, TSM modifies the permanent attributes contained within the image files which are down-line loaded.
- Automated updates of the DECnet database for servers to match the DECnet related information in the management directory. Users need no longer employ a separate DSVCONFIG or TSVNCP configuration program.
- TSM server and directory commands may be issued as DCL commands; the syntax follows DCL conventions.
- A USE command to allow selection of the server or servers to be managed, or the directory to be referenced. A single server, a user specified group of servers (a partition), or all servers known via the management directory can be selected with the USE command.
- Maintenance of command files outside of TSM (e.g., by use of a VMS editor). This command file support allows values of characteristics to be stored on the host, effectively creating a copy of the permanent database that may be used to configure new servers. Server maintenance is also enhanced by allowing the terminal server to be easily box swapped, and parameters reset. Up to eight parameters may be passed to TSM command files. Additionally, command files may operate on a single server, on a logical group (a partition) of servers or on all servers.
- Trouble shooting within the terminal server network through the ability to centrally read traffic status and counters in addition to error status and counters. With the PASTHRU command, the user can also connect directly to the server without using TSM, allowing isolation of problems between TSM and the server.

Network Troubleshooting Guide

The *Network Troubleshooting Guide* provides an on-line, systematic approach to solving any network problem. Available through the DECwindows Bookreader application, its text can be displayed in a window within a DECmcc Management Station environment. The *Network Troubleshooting Guide* gives specific step-by-step

instructions for solving some of the most common network problems that occur on DECnet-VAX, DECnet-ULTRIX, Ethernet, and TCP/IP networks.

The *Network Troubleshooting Guide* incorporates information from various sources into a single manual, minimizing the documentation required for solving network problems.

The *Network Troubleshooting Guide* covers:

- Background information on DECnet and TCP/IP networks
- How to use a standard troubleshooting methodology to solve any network problem
- How to use network tools such as DECmcc Management Station for ULTRIX, Network Control Program (NCP), NMCC/DECnet Monitor, NMCC/VAX Ethernim, and LAN Traffic Monitor (LTM)
- How to use ULTRIX commands such as netstat, ping, and uerf
- How to use log files and counters to gather information for problem solving
- How to trace a network path to isolate the source of a problem
- How and when to perform loopback tests
- In explicit step-by-step instructions, how to solve nearly 30 of the most common network problems, including:
  - Network partner exited (DECnet networks)
  - Permission denied (TCP/IP networks)
  - LAT Print Queue Problems (Ethernet networks)

INSTALLATION

Only experienced customers should attempt the installation of this product. Digital recommends that all other customers purchase Digital's installation and consulting services. These services provide for the planning, implementation (product setup and startup) and customer orientation on the product by an experienced Digital Software Specialist. Customers should consult their local Digital offices to obtain information on installation and start-up services available in their locations.

HARDWARE REQUIREMENTS

VAX, MicroVAX, VAXstation, or VAXserver configuration as specified in the System Support Addendum (SSA 31.88.02-x).

LANbridge 100/150 for LTM Listener

SOFTWARE REQUIREMENTS*

For Systems Using Terminals (No DECwindows Interface):

VMS Operating System

DECnet-VAX

VAX Rdb/VMS (Run-Time Option)

DEC GKS for VMS (Run-Time Option)

VAX Distributed Name Service (server must be installed somewhere in network)

For Workstations Running DECwindows:

VMS Operating System (and necessary components of DECwindows)

DECnet-VAX

VAX Rdb/VMS (Run-Time Option)

DEC GKS for VMS (Run-Time Option)

VAX Distributed Name Service (server must be installed somewhere in network)

* Refer to the System Support Addendum (SSA 31.88.02-x) for availability and prerequisite/optional software and for information regarding components of VMS DECwindows.

ORDERING INFORMATION

Software License: QL-YFVA9-AA

Software Media: QA-YFVAA-H*

Software Documentation: QA-YFVAA-GZ

Software Product Services: QT-YFVA*-**

* Denotes variant fields. For additional information on available licenses, services, and media, refer to the appropriate price book.

SOFTWARE LICENSING

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

LICENSE MANAGEMENT FACILITY SUPPORT

This layered product supports the VMS License Management Facility (LMF).

License units for this product are allocated on a flat-price basis, regardless of User/Activity or processor type.

For more information on the License Management Facility, refer to the VMS Operating System Software Product Description (SPD 25.01.xx) or the *License Management Facility* manual of the VMS Operating System documentation set.

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 from Digital. For more information, contact your local Digital office.

Other Network Management Services are also available. These include, but are not restricted to, the following:

- Network Management Operations Services
- Network Management Planning and Design Services
- Network Management Implementation Services
- Network Management Training

For local availability, please contact your Digital Sales Office.

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.

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