

Ethernet CDreader

An Overview

DIGITAL CONFIDENTIAL

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Abstract

This document provides a high level view of the Ethernet CDreader project. The information in this document is not final and may change. Questions regarding the Ethernet CDreader can be directed to STAR::Drayton.

Digital Equipment Corporation

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Preface

This document provides some history and reasons for Ethernet CDreader.

Associated Documents

1. Ethernet CDreader Functional Specification

Document Change History

1. X1.0.0 5-May-1989 Original
2. V1.0.0 13-Jun-1989 Clean-up (EAD)
3. V1.0.1 24-Jul-1989

1 Introduction

Digital Equipment Corporation is moving toward making software installation easier for the customer. In the past, distribution media for the VMS operating system has been provided on various types of media including tapes, floppies, and many types of disks. Over the years problems and costs have risen from usage of these media. There has not been a common piece of media that can be used for all machines. In an effort to solve this problem Digital Equipment Corporation is moving towards distributing its software products only on Compact Disc. This Compact Disc provides approximately 622 mega-bytes of READ-ONLY "tamper-resistant" random access data which shall be used as distribution media. The Compact Disc is:

- more durable than tapes or magnetic media,
- non-magnetic,
- easier to handle,
- cheaper to manufacture,
- and a convenient physical size. Approximately 1/16th of an inch thick by 4.75 inches in diameter.

VMS is following the corporate goal and is moving toward support of Compact Disc as a distribution media. In its efforts to support this corporate goal, VMS worked with the Tape and Optical Storage group to qualify and support a Compact Disc drive on the VAXstation 3100. By providing this device, the VS3100 Low-End workstation can now use a Compact Disc as its distribution media for:

- traditional VMS kits
- Desktop VMS kits
- Consolidated Software Distribution Services
- Online Documentation Library disc
- the VMS Listing disc
- the Decus Software Library disc
- all future Compact Disc distributions

This Low-End CPU with its Compact Disc reader can be placed in a VAXcluster and also made available as a DECnet node thus providing remote accessibility to a Compact Disc. This was a first step. Other Q-bus and Low-End systems also have Compact Disc drives on them now, the DECStation 3100, DECSystem 3100, VAXstation 3520 and 3540, the MV IIs and the Mayfair systems.

All these machines mentioned are in the Low-End family of systems. To date no Compact Disc drive has existed for Midrange or High-End machines (large systems) to access, except through the purchase of a Low-End system. A solution to this problem would be to engineer a specific Compact Disc interface for each bus on large systems, but this solution is not cost effective to the corporation. The Ethernet CDreader solution provides a simple low-cost(\$2K-4K) remote box on the Ethernet which has one or more Compact Disc drives connected to it which can be accessed by any system which supports the necessary protocols.

An Ethernet CDreader can be created from the KA420 system module. The KA420 system module consists of memory, a CPU, a peripheral controller, and an Ethernet controller. With this hardware module and a Compact Disc drive the customer now has a Compact Disc Reader on the Ethernet accessible by their Midrange or High-End systems. There are many advantages for the customer:

- all software and online documentation can be made available to any system on the wire.
- initial installation of software can occur from the Ethernet CDreader.
- our High-End systems customers would now have an easy, low-cost method to access our products through Consolidated Distribution.
- not required to purchase a Low-End CPU to acquire access to a Compact Disc drive.
- and the customers can obtain reliable, simple-to-use access to Compact Disc media.

2 Version 1 Overview

The Ethernet CDreader V1 project will specify a system which will provide access over the Ethernet to a Compact Disc connected to a remote KA420 Ethernet CD Controller. The goal of the project is to provide a - simple to use, easy access method - for Initial Software Installation, Software Upgrades, Layered Product Installation, Console Patch Updates and Diagnostic Booting/Loading.

Why use a Ethernet CDreader?

The Ethernet CDreader frees the future CPUs from requiring an imbedded console device, while allowing multiple system simultaneous Ethernet access to the reader.

What CPU configurations require an Ethernet CD Reader ?

In any stand-alone or uninitialized configuration of CPUs which have no imbedded console devices the Ethernet CDreader would be mandatory for Initial Software Loading of the target system disk. In existing cluster configurations where a CPU will be added, the Ethernet CDreader is not mandatory, but can be used.

The Ethernet CDreader allows software distribution devices to be visible to every node on the Ethernet. The Ethernet CDreader module allows Ethernet access to blocks of data from Compact Disc. Any operating system on any CPU that follows the protocols can access the Ethernet CDreader.

This has many benefits for the customer. It is now easier for them to do business with Digital. The customer can purchase a single piece of media, CD ROM, on which there are more products available than on any other single piece of media. Since multiple Layered Products can be shipped on one Compact Disc, only a license is necessary for the user to utilize a product from the CD ROM.

A few advantages to Digital is that our cost for producing this media is far less than for magnetic tapes and disk, the Compact Disc manufacturing cycle is shorter, and our future large systems do not require an imbedded console device thereby reducing cost. Data Centers making use of the Compact Disc media for accessing Digital products will find it:

- requires less storage space than tape or hard disk,

- far easier to use than tape,
- far less prone to media problems,
- and highly desired by their personnel, our customers.

These attributes allow CD ROM to be the primary distribution media for all Digital Equipment Corporation software.

3 Overview and Goals

The Ethernet CDreader V1 solution is geared toward sites which can make use of remote installation media. It allows the customer to have one type of media that can be used on multiple types of CPU's, a common distribution media for their systems. This product is highly desired by our customers. The current lack of a common distribution media that works for all machines is a weak point of Digital's current software distribution method in our customers opinion.

The Ethernet CDreader solution also has the advantage of being shared across multiple operating systems and many different CPU architectures. The Ethernet CDreader serves blocks of data to a client no matter what type of CPU, no matter what type of operating system, provided the software on that client follows the DEC protocols used by the Ethernet CDreader.

3.1 Simple Configuration

The Ethernet CDreader configuration chosen for the V1 product gives the maximum benefit for the minimal amount of hardware cost to Digital Equipment Corporation. It consists of a box which houses a KA420 module, 4MB of memory, a minimum of one Compact Disc drive and its controller, and an Ethernet thinwire and thickwire connection. In addition to the base Ethernet CDreader up to five additional external CD drives can be connected. The software environment controlling the system is a dedicated environment that does not contain a user console or interfaces, file systems, MSCP, SCA, MOP, DECNET, NFS, TCP/IP or any other communication protocols other than the protocols specified in the KA420 Ethernet CD Controller design documents.

This hardware module should be low cost, physically small, Ethernet compatible and be a block serving device that supports many CPU architectures and operating systems.

What does it look like to the user?

The interface - in the box - and - to the box - is simple:

- It is a load and go system.
- There is no software installation required by the user.
- It does not require a terminal to be permanently attached to it.
- The hardware module does not require system management.

To use the Ethernet CD controller, the user simply powers on the system box and then inserts a Compact Disc into a drive to load the controllers dedicated operating environment.

4 Software Components

The controlling software for the Ethernet CDreader, is contained on a Compact Disc. Updates to the software are accomplished by simply replacing the Compact Disc with an updated version on another Compact Disc and reloading the system. The software for the controller is dedicated to supporting Ethernet access to the Compact Discs.

Several options existed for the operating environment in the Ethernet CDreader module. They were:

- MSCP/SCS
- LAD/LAST
- DECNET-MOP
- ELN

The main criteria in choosing the LAD/LAST software was the ability to develop software that was relatively simple, compact, with protocols that are transportable to many operating systems, not required to be proprietary, efficient, and could be placed in ROM for manufacturing.

5 V1 Goals

The Ethernet CDreader Version 1 goal is to provide an architecture that can be used by different operating systems and CPU's to achieve easy Initial Software Installation, Software Upgrades, and Layered Product Installation from a Compact Disc over the Ethernet. The first implementation of the software and the architecture will be placed in the Mariah CPU.

This architecture consists of three major portions:

- The Mariah Console software necessary to access the Ethernet CDreader.
- The operating environment and protocols in the Ethernet CDreader.
- The software necessary to access the Ethernet CDreader from the running VMS operating system, which includes code in the VMS booting path.

The Mariah Console software allows booting access to the Ethernet CDreader. It allows the individual at the console to query the network to gain information about the status of the available Compact Discs. A disk inside a CD drive on the Ethernet CDreader is called a "SERVICE". This "service" provides the user access to the disk. From the Mariah console the user can ask for a display of the available "services" and then subsequently enter the name of a "service" for use in booting an image for software installation. This results in the system progressing through the booting of an image that will allow the user to install the VMS operating system onto a target system disk.

Subsequently, after the system has been installed, the user can now boot this new system disk and install layered products from a "service". The individual would then use the documented VMSINSTAL procedure to add layered products to the new system from a Compact Disc on the Ethernet CDreader.

During version one development, baselevels of the Ethernet CDreader operating environment will be made available to allow interested Digital groups to test with.

5.1 V1 Non-Goals

It is NOT a goal of Version 1 to support or supply:

- Booting access from CPUs shipped prior to MARIAH
- An operating system independent system management interface in the Ethernet CDreader
- Writeable media
- Container files or multiple virtual disks per physical disk
- Shadowing support
- DECNET or VAXcluster support in the KA420 Ethernet CD Controller

6 Future Areas of Investigation

It is a goal to enhance the Version 1 software in the VMS operating system which accesses the Ethernet CDreader. Areas of investigation are:

- System Management
- File System Operations
- Bookreader availability
- ISO 9660
- DECNET or cluster serving support thru VMS to the Ethernet CDreader.
- Enhanced Trouble Shooting Methodologies
- Enhanced Documentation on New Features
- Cost Reduced Family of Ethernet Controllers for Compact Discs

Schedules for a Version 2 product will not be available until mid 1990.

7 Integration

Our testing intentions for Version 1 support are limited to the Mariah CPU. We plan on providing baselevels for other intrested groups to test with. No explicit support will be provided to other projects and groups during the Mariah testing phase, except for new CPU development teams (EG. RAVEN).

8 Dependencies, Risks, and Contingencies

Our dependencies are on the Mariah console team, LAST and LAD Architects, production resources including the equipment to produce the product (CPU's,development environment,...) and product management negotiating reasonable cost for the KA420 Ethernet CD Controller.

8.1 Dependencies of other Project/Events on this Project

The Mariah and Raven CPU teams depend on this project to provided the mechanism for Initial Software Loading through CD ROM.

9 Documentation

Documentation will be written for this hardware controller module and the appropriate VMS manuals will also be updated.

10 Issues

- Security - access restrictions to Compact Disc
- Locking a compact disc in the drive, preventing physical removal of the disk