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VAXELN

Introduction & Technical Overview

Summary: This presentation covers present products for VAXELN.

Contents:

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VAX REALTIME SOFTWARE STRATEGY

OVERVIEW

- *VAXELN*

  Memory-resident realtime software for dedicated or embedded applications. VAXELN is an *operating environment* designed to support both the low-end VAX-11, uVAX, and the high-end VAX-BI systems with an easy-to-use, high performance run time system for realtime and/or distributed applications.

- *VMS*

  General purpose, disk-based, time-sharing operating system with realtime features. VMS is Digital's premium OS supporting the largest variety of tools, services, and applications.

- *ULTRIX*

  Digital's UNIX environment supporting standard and enhanced UNIX features and allowing for portability and upgrading of applications and tools for VAX, PDP-11s, and other systems. ULTRIX is *NOT* intended for realtime applications.

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VAX REALTIME SOFTWARE STRATEGY

VMS and VAXELN should *NOT* be viewed as competing operating environments for realtime applications.

VAXELN is a realtime *extension of VMS.*

NO Intent to transform VAXELN into a general-purpose OS.

Customer has access to a premier development environment—VMS.

Broad range of VAX based offerings.

Can choose the execution environment based upon needs.

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DIGITAL COMMITMENT TO VAXELN

Continued support/growth of engineering resources

Product rapidly evolving to cover full range of real time computing needs

Future engineering plans focus on closer integration with VMS

New course offerings in U.S. and Europe with more to come

rtVAX program promotes and highlights VAXELN capabilities

VAXELN used in other DIGITAL products

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VMS and VAXELN

COMMON FEATURES

- Multitasking
- Priority driven scheduling
- Inter-task communication and synchronization
- Asynchronous I/O
- Contiguous file I/O
- User control of system resources
- Ability to lock processes in memory
- Compatible run-time libraries
- Exception Handling Mechanism

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VMS and VAXELN

DIFFERENCES

- Level of system services 'overhead'
- Memory resident code
- Priority based pre-emptive scheduler
- Predictability of response time
- Minimum configuration supported
- Interprocessor communication methods
- Interprocessor synchronization
- Types of RMS file organization supported
- Number and type of layered products
- Development & target systems

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WHAT IS VAXELN?

- VAXELN is a *run-time environment*, not an operating system. Application development takes place on a host VMS system, using VMS development tools. Execution takes place on a target system, which may be downloaded and debugged from the host.

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WHAT IS VAXELN?

- VAXELN is aimed at, but not limited to, realtime applications. It provides multiprogramming and multitasking, with scheduling done on a pre-emptive prioritized basis. Time-sharing or time-slicing is not supported.

- VAXELN is ideal for building distributed applications that run on multiprocessor systems. It provides efficient message-based communication services, with messages delivered either as datagrams or via reliable circuits. It is transparent to the message sender whether the receiver is running on the same processor, on another processor in the network or another processor on the same bus.

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WHAT IS VAXELN?

- VAXELN has small memory requirements.
- VAXELN has low system *overhead*.
- VAXELN uses high-level languages for applications development and system implementation. VAXELN device drivers can be written in EPASCAL, C, FORTRAN or Ada.
- The toolkit includes a powerful remote debugger and utilities to help tune the application. These tools help you to develop your application faster and also make it easier to add functionality.
- VAXELN systems may be diskless.
- VAXELN has Ethernet support built in. Applications may be booted, programs loaded, and remote files accessed through the Ethernet. Message services operate transparently across the Ethernet.

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WHAT IS VAXELN?

VAXELN is not a general-purpose operating system. General-purpose computing needs on VAX are well met by VAX/VMS or ULTRIX systems. VAXELN is aimed at a much more restricted, although large, market: Technical users building dedicated, realtime systems. These systems are characterized by any of the following attributes:

- Real memory (not paged or swapped)
- Diskless, or disk is only used for file storage
- ROM-based
- Ethernet-based (including down-line loading)
- Time critical application with requirement for absolute predictability of interrupt service

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VAXELN V3.2 Supported targets

- - KA620. Single Board Computer.
- - MicroVAX 2000
- - MicroVAX II, MicrVAX 3300/3400 ,MicroVAX 3500/3600
- - VAX 11/730, 11/750
- - VAX 6210/6220/6230/6240.
- - VAX 8500/8530/8550, VAX 8700, VAX 8800

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VAXELN V3.2
Supported realtime devices

- ADV11-D , ADV11-C , AXV11-C
- DLVJ1 , DLV11J.
- DRV11-J, DRV11-WA , DRQ3B.
- DRB32-E , DRB32-M , DRB32-W.
- IEU11 , IEQ11.
- KWV11-C.
- DZQ11 , DHV11 , DHQ11 , CXY08 , CXA16 , CXB16.
- DECscan (BITBUS)
- IXV industrial modules.

Note: Last two are not included in ELN kit , but sepate options.

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Rdb/ELN

- VAX Rdb/ELN is a relational database management system designed for dedicated applications on systems running in the VAXELN operating environment.

- Development is done using the VAXELN toolkit on a host VMS or uVMS system

- The resulting bootable, VAXELN based Rdb/ELN application is then loaded into the target via:
  - Ethernet
  - Mass storage device

- Rdb/ELN implements the Digital Standard Relational Interface (DSRI)

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Rdb/ELN

Digital Standard Relational Interface (DSRI)

- An architecture for relational database management systems
- A standard calling mechanism that can be used for database creation and population
- Allows applications running on any VAX or uVAX node in a DECnet network to access all other DSRI compliant databases in the network

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Rdb/ELN

Remote Database Access

- Rdb/ELN applications can access:
  - Rdb/ELN database on same node
  - Rdb/ELN or Rdb/VMS database on other nodes in the same network
- Rdb/VMS applications can access:
  - Rdb/VMS database on same node
  - Rdb/VMS or Rdb/ELN database on other nodes in the same network

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V3.0 Features - Current Version

Utilities

- User command interface (ECL)
  - Target processors
  - Incoming set host
  - File manipulation
  - Device manipulation
  - Program manipulation

- Performance analysis utilities (EPA)
  - PC sampling
  - Job sampling
  - Process sampling
  - System service counts

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V3.0 Features

- Resource monitoring utility (EDISPLAY)
  - Dynamic system monitoring
  - Memory
  - Job
- Error Logging:
  - Logfile - local or remote
  - ERF - VMS error report formatter
  - Soft and hard errors
  - Virtually no impact on system performance

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V3.0 Features

Miscellaneous

New Kernel Procedures

- Allocate_system_region
- Deallocate_system_region
- Get_jcb
- Set_job_eligibility

Q-bus Interrupt Optimization

- New Ebuild menu option
- Allows user to choose between latency and response

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V3.1 Features

Announced 7 may 1988

- Performance Enhancements for Terminal Driver
- Driver for Virtual Disk in Memory
- New debugger "warm-start" feature
- Full FORTRAN support for realtime programming
- Presentation of information in Histogram Form for ELN Performance Analyzer

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V3.2 Features

Announced sep 1988

- New processor/new device support.
- LAT support.
- System math library compatibil with VMS 5.0
- Multiprocessing support: 6000 serie and KA800.
- Enhancements in utilities.

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VAXVMS-ELN Integration software

- RTA = Real Time Accelerator.
- RTA = Integration Software for VMS and ELN.
- RTA = Standard Application Architecture.

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VAXVMS-ELN Integration software

Benefits RTA software:

- One System solution:
  - RTA integrates general purpose VMS and real-time ELN functions into one system solution.
- A standard Application interface:
  - RTA interface will be supported across new architectures.
- RTA delivers performance:
  - RTA allows VMS hosts to distribute I/O to ELN realtime processors for fast and predictable interrupt response time.

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VAXVMS-ELN Integration software

RTA product description:

- DCL commands or callable routines.
- Down-line load ELN to RTA nodes.
- Load program into ELN image.
- Generate a list of RTA nodes.
- Initialise a target node.
- Start/stop jobs in a loaded image.
- Get status of a RTA node.

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VAXVMS-ELN Integration software

RTA product description:

- File I/O capabilities:
  Via host control or via ELN realtime processor control.
- Interprocessor communication:
  Message I/O between:
  ELN Realtime processors & VMS host.
  ELN Realtime processors on VAXBI.
- Data transfers between realtime processors on different VAXBI busses is transferred via VMS host memory.