

# **Introduction to OpenVMS Technology**

**Keith Parris**

Systems/Software Engineer  
HP

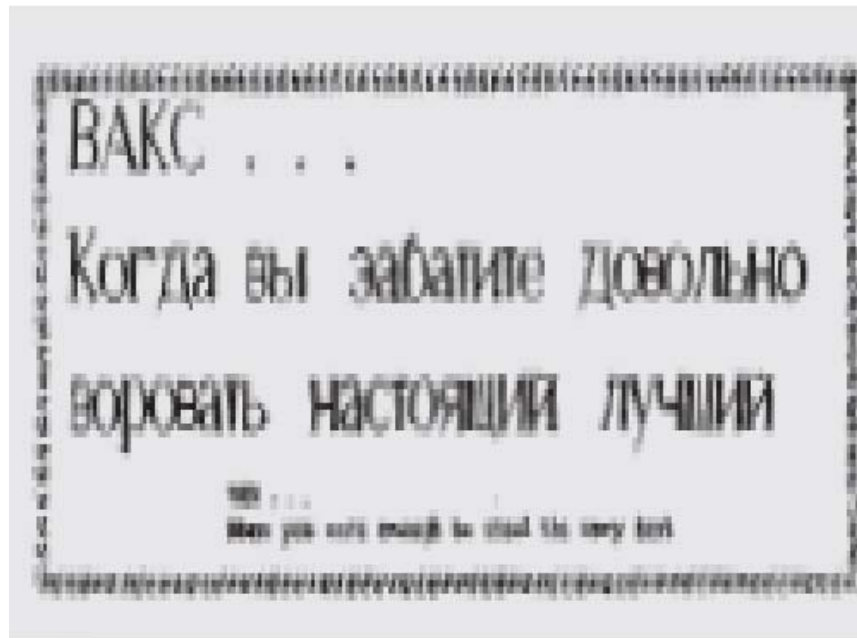


# Brief History

- 1978 V1.0 on VAX-11/780
- 1984: V4.0: VAXclusters
- 1988: V5.0: Symmetrical Multiprocessing
- 1992: V1.0 on Alpha
- 1998: Galaxy
- 2003: V8.0 on Itanium

# VMS Popularity

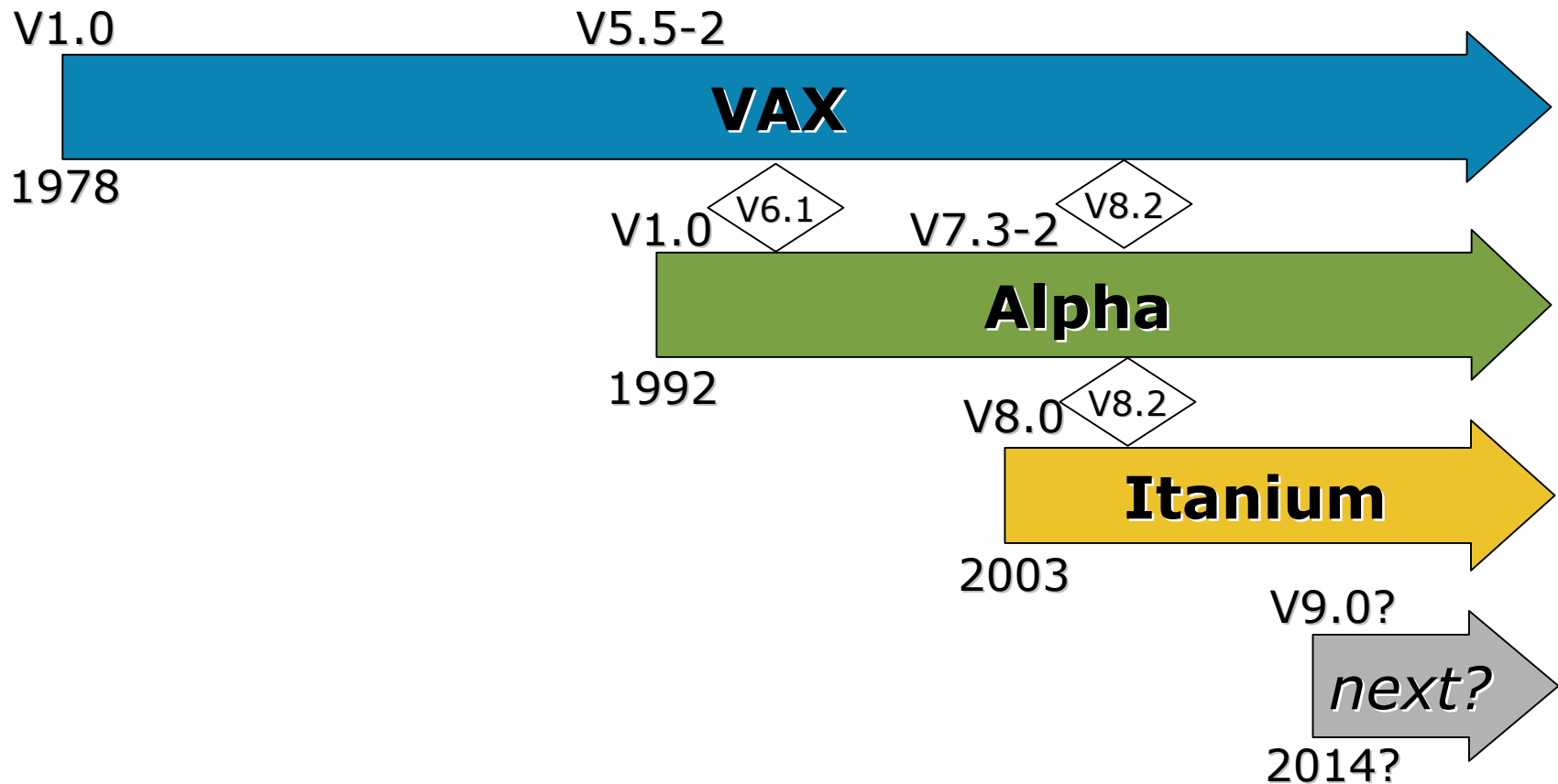
- Communist countries (Russia, Hungary, China) cloned VAX systems during the Cold War
- Inscription on CVAX chip was written in Russian: “When you care enough to steal the very best”



# CPUs on which OpenVMS can run

- VAX
- Alpha
- Intel x86
  - via VAX emulator under Linux or Windows:
    - Charon-VAX (commercial software)
    - simh (freeware by Bob Supnik)
    - ts10 (freeware by Timothy Stark)
- Intel Itanium

# CPU Support in OpenVMS



# Support for Multiples of Hardware

- Not just N+1 or 2X redundancy
- Interconnects
  - Cluster Interconnects
    - LANs (Gigabit/Fast/10-megabit Ethernet, FDDI, ATM)
    - CI, DSSI, Memory Channel
  - Storage Interconnects
    - Fibre Channel, SCSI, DSSI, CI
- Disks
  - Host-based Volume Shadowing (RAID 1)
  - Host-based RAID Software (RAID 0, 5, 0+1 with HBVS)
- Entire Servers (nodes in a cluster)
- Entire Sites (Disaster-Tolerant Multi-Site Clusters)
- Entire Disaster-Tolerant Clusters (RTR Shadowing)

# Support for Hardware Redundancy

- Online addition of hardware:
  - Disks, tapes
    - Dynamic volume size expansion in 7.3-2
  - Complete server addition/removal from cluster
- Not just failover
  - Active / Active utilization
  - Load balancing / Load sharing
- Online repairs in many cases
  - Disks, tapes, interconnects

# OpenVMS Clusters

- Mix of VAX / Alpha / Itanium servers (Supported: pick 2)
- Up to 96 nodes (design limit: 256)
  - Largest real-life example: 151 nodes
- Connection Manager
  - Quorum Scheme to protect against partitioned clusters
- Distributed Lock Manager to coordinate access to shared resources by multiple nodes
- Cluster-wide File System for simultaneous access to the file system by multiple nodes
- Cluster-wide batch job and print job queue system
- User environment appears the same regardless of which node they're using
- Nodes can share system disks (root)



# Summary of OpenVMS Cluster Features

- Common security and management environment
- Cluster Alias for IP (and DECnet)
- Cluster from the outside appears to be a single system
- Cluster communications over a variety of interconnects, including industry-standard LANs
- Support for industry-standard SCSI and Fibre Channel storage
- MSCP Server for indirect access to disks/tapes when direct access is unavailable
- Excellent support for Disaster Tolerant Clusters

# Open Software Runs on OpenVMS

- TCP/IP stack, NFS, Perl, PHP
- Apache web server
- Mozilla web browser
- Java
- C, C++
- Unix Portability Initiative underway to ensure Unix software can drop in and run, unmodified

# OpenVMS Resources

- OpenVMS Documentation on the Web:
  - <http://h71000.www7.hp.com/doc>
- OpenVMS Hobbyist Program (free licenses for OpenVMS, OpenVMS Cluster Software, compilers, and lots of other software):
  - <http://openvmshobbyist.org/>
- Encompasserve (aka DECUServe)
  - OpenVMS system with free accounts and a friendly community of OpenVMS users
    - Telnet to encompasserve.org and log in under username REGISTRATION
- Usenet newsgroups:
  - comp.os.vms, vmsnet.\*, comp.sys.dec

# OpenVMS Resources

- Ken Farmer's OpenVMS.org website:
  - <http://openvms.org/>
- HP OpenVMS Website:
  - <http://www.hp.com/go/openvms/>

# Top Ten Reasons to Run OpenVMS

**10.** You want to run more than one thing on a system at a time

- Application Server
- Web Server
- Mail Server
- Print Server
- File Server

# Top Ten Reasons to Run OpenVMS

9. To you, “downtime” is a four-letter word

# Top Ten Reasons to Run OpenVMS

8. You don't want to be a member of the Virus-of-the Week Club

# Top Ten Reasons to Run OpenVMS

7. You know that “Reboot, and if that doesn’t work, Reinstall” is **NOT** the answer to every problem



# Top Ten Reasons to Run OpenVMS

6. You can count to more than five. Five Nines, that is.  
(99.999% availability)

# Top Ten Reasons to Run OpenVMS

5. Your preferred unit of measurement of system uptime is years, not hours

# Top Ten Reasons to Run OpenVMS

4. You want a system that won't trash the disk structure if you get a power failure

# Top Ten Reasons to Run OpenVMS

3. 8 out of 10 hackers prefer another operating system

# Top Ten Reasons to Run OpenVMS

2. You want to run the only O/S Kevin Mitnick admits he couldn't get into without being given a password

# Top Ten Reasons to Run OpenVMS

1. SCO can't sue you for copyright infringement

# Speaker Contact Info:

- Keith Parris
  
- E-mail: [parris@encompasserve.org](mailto:parris@encompasserve.org)
- or [keithparris@yahoo.com](mailto:keithparris@yahoo.com)
- or [Keith.Parris@hp.com](mailto:Keith.Parris@hp.com)
  
- Web: <http://encompasserve.org/~parris/>
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