



News from VMS Software Inc. (VSI)

OpenVMS x86 Update

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VMS Software

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Agenda

- Business Update
- Schedule
- Platform Support
- Compilers
- Q & A

Business Update

VSI Business Update

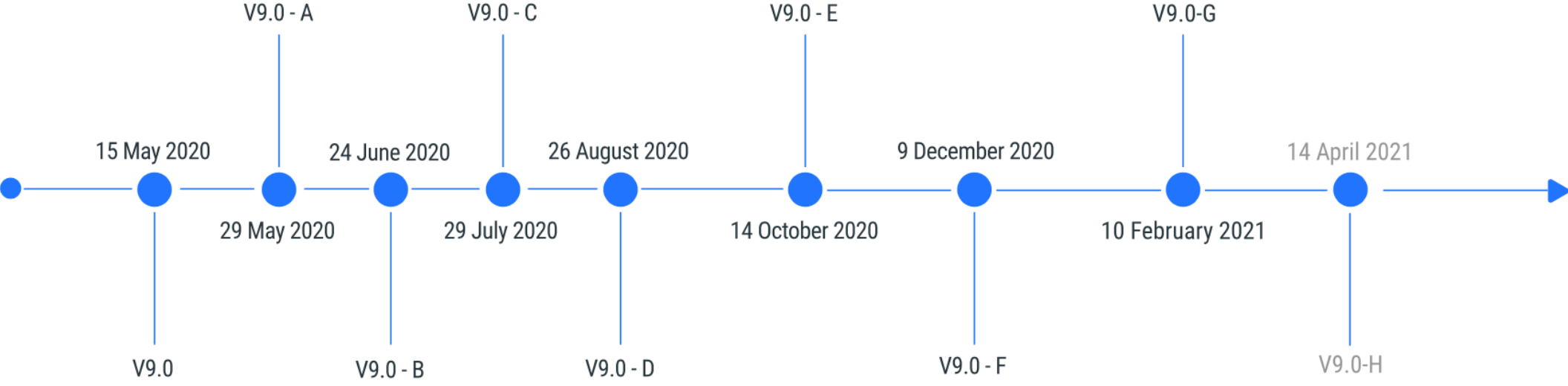
- Reported positive EBITDA for the first time in FY2020.
- Since VSI October 2020 webinar, added hundreds of new customers.
 - Getting closer to a total of 1,000 OpenVMS customers
 - Many new VSI subscription license and support customers.
 - Many new HPE V8.4 Support only customers
- New Product Enhancements (Outside of x86 development)
 - Service Control (OSC)
 - OpenSource Updates (Python, OpenLDAP, SQL Relay, WebUI, Samba)
- Professional Services Expansion
 - Core Services
 - Migration Services
 - Application Services

Schedule

Rollout Plan (old slide from May 2020)

- Cross Tools Kit
- V9.0 EAK – early rollout
 - 15-May: available for first customer - Software Concepts International (www.sciinc.com)
 - Announcement mail sent at 2:40PM
 - Customer booted and running at 4:20PM
 - 30-May: add 4 more customers
 - 26-June: 5 more
 - 31-July: 5 more
 - Etc.
 - Target: 40 users by the end of 2020 <<< There were 41.
- Add native tools (Cross Tools Kit still available for some time period)
- V9.1 Field Test – available to all customers, most system components present
- V9.2 – production release, complete operating environment
- Regular updates from now until V9.2

Schedule Timeline



Schedule

V9.0	15-May-2020	✓	1	}	New Users Added
V9.0-A	29-May-2020	✓	7		
V9.0-B	24-Jun-2020	✓	8		
V9.0-C	29-Jul-2020	✓	5		
V9.0-D	02-Sep-2020	✓	7		
V9.0-E	14-Oct-2020	✓	6		
V9.0-F	09-Dec-2020	✓	7		
V9.0-G	10-Feb-2021	✓	6		
V9.0-H	14-Apr-2021				
V9.1	30-Jun-2021				
V9.1-A	tbd				
V9.1-B	tbd				
V9.2	Q4/2021 – Q1/2022: depends on V9.1-x customer feedback				

V9.0-G (10-February)

- **Support for VMware** – Fusion, Workstation Player, ESXi
- Cross Tools: Updated LINKER and ANALYZE
- Improved TRACEBACK
- Process dumps
- Reserved Memory
- System Service Intercept (SSI)
- DECset: PCSI kit containing DTM, CMS, ENV
- Kerberos
- Many updates for:
 - Boot Manager
 - DECthreads
 - Exception handling
 - Memory management
 - SDA

V9.0-H (14-April) Current Targets

- VMware SMP - remove the '2-CPU maximum' restriction
- Introduction of VSI TCPIP Services V6.0 (Telnet and FTP)
- Update C, FORTRAN, and XMACRO cross compilers
- OpenLDAP
- Additional DECset tools
- Process dump - threaded application support
- Parallel Processing Library (PPLRTL)
- INSTALL /RESIDENT
- System Service Logging
- DECnet V
- DCPS
- Mosquitto MQTT Broker

VSI TCPIP Services V6.0

- Previous attempt at a new TCPIP was abandoned
 - Technically, the results were not as we had hoped
 - Customer feedback was not good
 - Some of the original decision factors are no longer true
- Step 1: add open source modules to HP TCPIP Services – OpenSSH, DHCP, NTP, BIND
- Step 2: Build and Release on IA64
- Step 3: Port to X86
- Step 4: Build and Release in V9.0-H (telnet and ftp)

Moving toward V9.1 - 30-June-2021

What is the difference between V9.0-H and V9.1?

- Many more users
 - EAK users are selected from a list of “volunteers”
 - We know what they need and what they can temporarily live without
 - We can balance what we have ready with what they need
 - **V9.1 will be open to all VSI customers and partners**
- System must be more complete than it is today
 - In stages: V9.1, V9.1-A, V9.1-B, etc.
 - Can't have many universally-used system components missing
 - We need to engage as many customers as possible, as soon as possible

Targeted for V9.1

To name a few....

- DL380, Gen 9 and Gen 10; VSI tests on both
- Installation procedure – an ISO file, no physical media
- More TCPIP utilities
- Clustering with shared storage
- SECURITY_SERVER

Goal: Allow the x86 system(s), bare-metal and VM, to be integrated into existing environments.

Platform Support

Virtual Machine Hypervisors

- Now supporting Virtual Box, KVM, **and VMware**
- Testing on
 - VBox – macOS, Windows, Debian
 - KVM – CentOS, Debian
 - VMware – Workstation Player, Fusion, ESXi
- A virtual machine is “just another platform” to OpenVMS
- All virtual machine hypervisors are different, just as all hardware platforms are different (even in the same family)
- Environment Variables, CPU enumeration, time keeping, device drivers, console support,..... there will always be something.

VMware Adventures

- We ran on VBox and KVM for many months but then booting on VMware was very problematic
- Early boot path assumptions about "exiting boot services" more strict than VBox and KVM
 - Received great help from VMware developer
 - Changed some of our Boot Manager / SYSDISK assumptions
- Time was tooooooo sloooooooow
 - \$ WAIT 00:00:01 - took 10-20 seconds on Fusion and Player (ESXi was fine)
 - **Problem:** Fusion and Player do not give you a High Precision Event Timer (HPET) by default and our interaction with the LAPIC timer is not yet working correctly
 - **Solution:** Augment the guest's .vmx configuration file with `hpet0.present = "TRUE"`
- SMP
 - Fine with two CPUs but more caused a hang when doing the first process creation
 - **Problem:** a CPU was waiting for an interrupt that never arrived
 - **Solution:** Updated our boot path recognition and use of xAPIC vs. x2APIC (APIC = Advanced Programmable Interrupt Controller); all CPUs must be the same

VMware Licenses and Versions

License	VSI Tested
Enterprise Plus *	
Enterprise *	6.7.0
Standard	
Essentials Plus	
Essentials	
Hypervisor	
Other	
Fusion *	11.5
Workstation Player *	16.1.0

* = supports serial lines

VMware Problems in V9.0-G

- Appliance Problem
 - No reliable compatibility from one VMware version to the next
 - VSIVMSX86V90G_VMware.ova only known to work with versions VSI tests
 - **Problem:** VSI cannot supply appliances for all combinations of versions and platforms
 - **Solution:** Standard OpenVMS installation eliminates the issue
- Licensing Problem
 - Only Enterprise and Enterprise Plus support virtual serial lines
 - **Problem:** OpenVMS requires a serial line for its console
 - **Solution:** Implement a driver we had not planned on doing until after V9.2
 - Working on project plan and schedule now
 - NOTE: Looking at other temporary possibilities

ESXi – 64 CPUs

\$ show cpu /active

System: CEGSUU, INTEL 440BX

CPU ownership sets:

Active 0-63

CPU state sets:

Autostart 0-63

Powered Down None

Not Present None

Hard Excluded None

Failover None

\$

ESXi 64 CPUs – 300 UETP processes running

```
$ SHOW SYSTEM /STATE=CUR
```

```
OpenVMS XFUU-N4A on node CEGSUU 16-FEB-2021 11:50:40.10 Uptime 0 00:03:00
```

Pid	Process Name	State	Pri	I/O	CPU	Page flts	Pages	
00000211	SYSTEM	CUR	17	4	2825	0 00:00:06.67	12282	520
00000214	UETLOAD02_00000	CUR	39	4	48	0 00:00:17.66	549	619
00000216	UETLOAD04_00002	CUR	49	4	57	0 00:00:18.55	26208	4539
00000219	UETLOAD07_00005	CUR	46	5	182	0 00:00:03.10	603	462
0000021E	UETLOAD02_00010	CUR	7	4	50	0 00:00:18.16	549	619
.								
.	(52 lines eliminated)							
.								
000002D4	UETLOAD04_00192	CUR	19	4	58	0 00:00:23.84	36883	874
000002D5	UETLOAD05_00193	CUR	59	5	155	0 00:00:04.48	1410	519
000002DA	UETLOAD10_00198	CUR	14	6	190	0 00:00:04.48	497	291
000002DB	UETLOAD11_00199	CUR	3	4	216	0 00:00:03.74	989	345

```
Total of 61/93 total processes.
```

```
$
```

Hardware Platform Support

- Old News:
 - VSI is not abandoning direct HW platform support
 - VSI will test a limited set of systems and encourage customers to try other platforms and let us know the results
 - Bottom line: HW support will depend largely on the customers
- Breaking News:
 - We are testing on 1) DL380 Gen9, 2) DL380 Gen10, 3) DL580 Gen10
 - We first booted on #1 and #3 but #2 was a problem
 - DL380 Gen10 would hard reset during OpenVMS startup
 - It was difficult to pin down exactly where
 - Finally zeroed in on a particular instruction causing a page fault
 - **Problem:** OpenVMS was causing multiple, unresolvable page faults which caused the processor to resort to its 'three strikes and you are out' policy
 - **Solution:** Create our own version of the Interrupt Dispatch Table (IDT) rather using the UEFI IDT

Compilers

Native Compilers – Be Patient

- V9.1 (30-June) will still be Cross Tools on IA64
- Must update our current LLVM (backend code generator)
- Problem:
 - LLVM is written in C++
 - We have no C++ cross compiler
- Solution:
 - Compile LLVM modules on linux
 - Move objects to IA64
 - Link with Cross Tools linker
 - Move resulting libraries to x86
- Create x86 native compilers
 - Add OpenVMS-specific changes to new LLVM
 - Port compiler frontends to x86
 - Port open source clang (C++) to OpenVMS
- All native compilers will not appear in a single release
- Initial native compilers will be /NOOPT
- Native compilers are slated for Q3 and will arrive in V9.1-A, V9.1-B,

Native Compilers – What about C++ ?

- Porting clang (C++) to OpenVMS is a very big job, must add many VMS-isms
 - DCL command line
 - Include files from .TLBs
 - create a .LIS file
 - Understand VMS file-specs
 - Dual-sized pointers
 - Header changes
 - Condition handling in the LLVM RTLs
- There will never be a C++ in the Cross Tools Kit
- C++ is the priority for native compilers
- Native compilers are slated for Q3 and will arrive in V9.1-A, V9.1-B,

Q & A

First - A Few Answers

Q: What is the schedule for Rdb on x86 OpenVMS?

A: Ask Oracle.

Q: What about Hyper-V support?

A: It is our next planned hypervisor to support; investigation has started, but still early stages.

Q: What about AMD, Dell, other HPE platforms?

A: Many options will be considered post V9.2.

Q: Will there be a binary translator?

A: No plans for translating either Alpha or IA64 images.

Q: What about performance comparisons with current systems?

A1: Not worth pursuing until we have native, optimized compilers.

A2: There is no massive amount of extra debugging code in V9.0-x. We are shipping with SYSTEM_SHECK and POOLCHECK set to 1 which is normal during test periods; loads 8 images with debugging code

Thank You

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