VMS Software

News from VMS Software Inc. (VSI)

OpenVMS x86 Update
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Agenda

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

Business Update

VSI Business Update

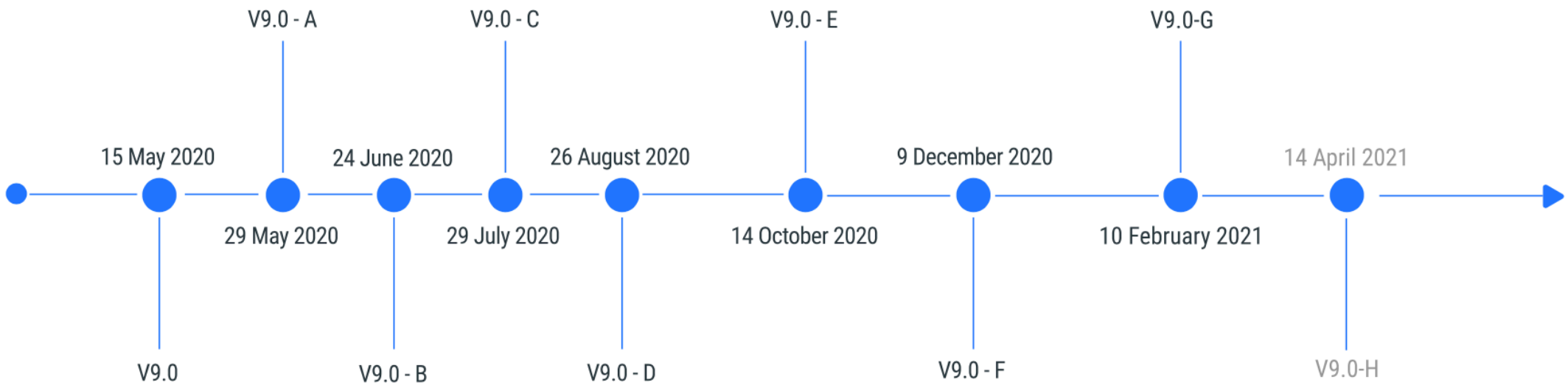
- Reported positive EBITDA for the first time in FY2020.
- Since VSI October 2020 webinar, added hundreds of new customers.
  - Getting closer to a total of 1,000 OpenVMS customers
  - Many new VSI subscription license and support customers.
  - Many new HPE V8.4 Support only customers
- New Product 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
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 customer feedback		

New Users Added

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)

- VMware SMP - remove the ‘2-CPU maximum’ restriction
- Introduction of VSI TCPIP Services 6.0 (Telnet and FTP)
- BASIC cross compiler
- Update C, FORTRAN, and XMACRO cross compilers
- OpenLDAP
- Additional DECset tools
- Process dump - threaded application support
- Parallel Processing Library (PPLRTL)
- System Service Logging

VSI TCPIP 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

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
  - 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

Work in Progress Now

To name just a few….

- DEBUG
- VAXfp
- New LLVM
- DL380
- INSTALL /RESIDENT
- Security Server
- Installation / Upgrade
- More network utilities

Not all of the above will be in V9.1, but later in V9.1-A, -B, -C, etc.

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,….

VMware Adventures

- We ran on VBox and KVM for many months but 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 / SYSBOOT assumptions
- Time was tooooooo slooooooow
  - $ 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)

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    17    6      190     0 00:00:04.48         497       291
000002DB UETLOAD11_00199 CUR     7    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 booted on #1 and #3 but not #2
  - 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: We were 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

- 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
  - 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; XMACRO likely first
- Initial compilers will be /NOOPT

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

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

Thank You

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