V9.2-3 Update V3.0 ECO Kit for VSI OpenVMS x86-64

Release Notes

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Operating System: VSI OpenVMS x86-64 V9.2-3

Kit Name: VMS923X_UPDATE-V0300

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Table of Contents

1. Kit Name

VMS923X_UPDATE-V0300

2. Kit Description

2.1. Installation Rating

INSTALL_1: To be installed by all customers.

This installation rating serves as a guide to which customers should apply this remedial kit.

Reference the Disclaimer of Warranty and Limitation of Liability Statement.

2.2. Reboot Requirement

A reboot is mandated as part of installing this kit, performed automatically following the kit installation.

VSI OpenVMS for the x86-64 architecture uses a memory disk image, stored on the system disk, when booting the system. The content of the memory disk must remain consistent with the system disk content.

This kit updates the memory disk image and invokes a system reboot sequence (shutdown with reboot) directly as part of the kit installation. You must be prepared to allow the system reboot when installing the kit. After all other kit actions are complete, the system will automatically shutdown and reboot.

If you allow the reboot, you will have the choice of whether to invoke the site-specific shutdown procedure, SYS$MANAGER:SYSHUTDWN.COM, during the shutdown portion of the reboot.

By default, after installation completes, the minutes until shutdown is zero. If you wish to leave additional time before the shutdown begins, define the system logical name SHUTDOWN$MINIMUM_MINUTES as the integer value of the wait time in minutes. For example:

```
$ DEFINE/SYSTEM SHUTDOWN$MINIMUM_MINUTES 10
```

No other options for the shutdown may be specified.

The shutdown will commence directly after the memory disk update as the final portion of the kit installation.

2.3. Version(s) of VSI OpenVMS to Which This Kit May Be Applied

VSI OpenVMS x86-64 V9.2-3

2.4. Target Disk Requirements

This kit will create a new memory disk image file during **PRODUCT INSTALL** or **PRODUCT UNDO PATCH** operations. This file is required for x86-64 systems bootstrap. If this file cannot be correctly created, the target disk will not be bootable and you will need to restore from backup.

During **PRODUCT INSTALL**, the kit will check for sufficient space on the target disk. The minimum free space is 600 000 blocks to ensure that the memory disk image file and kit files can safely fit on the disk.

Additionally, a check is made to determine if the disk is too fragmented to correctly create the memory disk file. If either check fails, the installation will be aborted before making any changes. After you take any necessary corrective actions to free up disk space or defragment the volume, the **PRODUCT INSTALL** operation can be re-attempted.

These same checks are not automatically handled by the kit before a **PRODUCT UNDO PATCH** operation. This is not a frequent operation for customer systems. If you need to remove this kit, you should ensure sufficient disk space before you start. The same 600 000 block minimum applies. To check fragmentation requirements, you can use the following commands:

```
$ ANALYZE/DISK/EXTENTS/REQUIRED=200000/NOOUTPUT disk
$ SHOW SYMBOL ANALYZE$REQUIRED_EXTENTS
```

If the symbol value is 25 or more, the disk is too fragmented. You should defragment the disk before using **PRODUCT UNDO PATCH** by using a defragmentation tool or restoring an image backup.

3. Kits Superseded by This Kit

VMS923X_UPDATE-V0100

VMS923X_UPDATE-V0200

4. Kit Dependencies

VMS923X_PCSI-V0100

Important

The VMS923X_PCSI-V0100 kit must be installed prior to installing this kit, using a separate **PRODUCT INSTALL** command. The kits may not be jointly installed with a single **PRODUCT INSTALL** operation.

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5. Problems and Changes Addressed in This Kit

The problems and changes addressed in this kit are grouped into the following sections:

- SYS Changes (Sections 5.1 to 5.8)
- RTL Changes (Sections 5.9 to 5.10)
- DEBUG Changes (Section 5.11)
- Security Changes (Section 5.12 to 5.14)
- ACME Changes (Sections 5.15 to 5.16)

SYS Changes

5.1. Problems With Reserving Large Amounts of Memory

Problem Description

The SYSMAN RESERVED_MEMORY mechanism may be used to reserve memory sections for specific application use.

The following issues are corrected with this ECO kit:

- The SYSMAN **RESERVED_MEMORY ADD** command would sometimes erroneously report that insufficient memory was available.
- After adding a large reserved memory section, the system would sometimes hang or crash with an INCONSTATE bugcheck after rebooting.
- The **SHOW MEMORY/RESERVED** command would sometimes display incorrect totals for reserved memory or exit with an ACCVIO status. This behavior could occur with this command from the DCL prompt or from within SDA when using **ANALYZE/SYSTEM**.

Images and/or Files Affected

[SYS$LDR]EXEC_INIT.EXE
[SYS$LDR]EXEC_INIT.STB
[SYS$LDR]SYSTEM_PRIMITIVES.EXE
[SYS$LDR]SYSTEM_PRIMITIVES.STB
[SYS$LDR]SYSTEM_PRIMITIVES_MIN.EXE
[SYS$LDR]SYSTEM_PRIMITIVES_MIN.STB
[SYSEXE]SHOW.EXE
[SYSLIB]SDA$SHARE.EXE
[SYSMSG]CLIUTLMSG.EXE

VSI Case Identifiers

Jira BO-2131, BO-2132, BO-2169

Netsuite NS8441

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.2. Flood of Math Fault Exceptions May Affect System Performance or Crash

Problem Description

On x86-64, the system may trigger a "math fault" exception if a floating-point exception occurs. Many of these are masked or handled by compiler-generated code, but those that are not handled may wreak havoc on the system if the offending code continuously encounters the floating-point exceptions.

Should a system encounter such a flood of exceptions, they will be reported as non-fatal INCONSTATE bugchecks. If the system parameter BUGCHECKFATAL is set to 1, the system will crash with an INCONSTATE bugcheck. If BUGCHECKFATAL is set to 0, the ERRFMT process will become very busy and the error log file will grow rapidly.

This behavior has been mitigated by establishing a default math fault exception handler. Should there be no application handler set up to trap these types of exceptions, they will be turned into the appropriate SS$_FLT*xxx*_F status and signaled to the caller.

Images and/or Files Affected

[SYS$LDR]EXCEPTION.EXE
[SYS$LDR]EXCEPTION.STB
[SYS$LDR]EXCEPTION_MON.EXE
[SYS$LDR]EXCEPTION_MON.STB

VSI Case Identifiers

Jira BO-2243, BO-2244

Netsuite NS8690

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.3. MTXCNTNONZ Bugcheck When Using SYSMAN CLASS_SCHEDULE ADD

Problem Description

An error accessing the created schedule array would cause the code to unexpectedly exit without releasing the CLASS mutex. A later sanity check would then trigger the MTXCNTNONZ bugcheck.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYSLIB]SMI$OBJSHR.EXE

VSI Case Identifiers

Jira UT-362, UT-363

Netsuite NS8863

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.4. OPCOM Process Goes Compute Bound Until System Reboot

Problem Description

Under rare circumstances, the OPCOM process would sometimes encounter an access violation and end up in a compute-bound infinite loop.

The OPCOM mailbox MBA2 would sometimes get full when heavy system load generated many OPCOM messages. This could result in a stale timer context that caused an access violation. The OPCOM processing looped on the broken context, sending the process compute bound. A system reboot was likely the only way to clear the condition.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]IO_ROUTINES.EXE
[SYS$LDR]IO_ROUTINES.STB
[SYS$LDR]IO_ROUTINES_MON.EXE
[SYS$LDR]IO_ROUTINES_MON.STB

VSI Case Identifier

Netsuite NS8922

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.5. Enabling Audit Alarms for Privilege Failure Impacts System Performance

Problem Description

On all versions of VSI OpenVMS 9.x, enabling security audits for privilege failure generates a large number of audits for attempted use of SYS$CMKRNL without the CMKRNL privilege. These alarms are triggered for non-privileged users running certain user-mode programs, including some standard system utilities.

The EXCEPTION execlet contains a message display routine used primarily by VSI engineering to debug the exception routines. However, even when the trace code was disabled, a SYS$CMKRNL call

was needlessly generated in user and supervisor modes. If the process executing this path lacked the CMKRNL privilege, a security alarm was logged. Systems with audit alarms enabled for privilege failure suffered a significant performance impact for an operation that produced no useful work.

This issue is corrected with this ECO kit

Images and/or Files Affected

[SYS$LDR]EXCEPTION.EXE
[SYS$LDR]EXCEPTION.STB
[SYS$LDR]EXCEPTION_MON.EXE
[SYS$LDR]EXCEPTION_MON.STB

VSI Case Identifiers

Jira BO-2340

Netsuite NS8996

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.6. Performance Improvement for Message Handling Routines

Problem Description

Message processing to access message vectors that should always be accessible were invoking PROBE instructions to validate access. PROBE instruction emulation is expensive on x86-64 systems.

The message processing is now changed to use an exception handler for access violations on disallowed access. Since this would be a very rare circumstance, the PROBE cost can be eliminated for successful access at the expense of an exception when access is not allowed. Overall, this eliminates a performance penalty for correctly behaving code.

As the message services are executed in caller's mode, there is no danger to skipping the PROBEs and allowing the exception to occur for access error handling.

Images and/or Files Affected

[SYS$LDR]MESSAGE_ROUTINES.EXE
[SYS$LDR]MESSAGE_ROUTINES.STB

VSI Case Identifier

Jira UT-382

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.7. Cannot Boot x86-64 System With Over 2 TB Physical Memory

Problem Description

An incorrect sanity check for memory configuration made it impossible to boot an x86-64 system with more than 2 TB of physical memory.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]SYSTEM_PRIMITIVES.EXE
[SYS$LDR]SYSTEM_PRIMITIVES.STB
[SYS$LDR]SYSTEM_PRIMITIVES_MIN.EXE
[SYS$LDR]SYSTEM_PRIMITIVES_MIN.STB

VSI Case Identifiers

Jira DRIV-638

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.8. Various Issues With Writing System Crash Dump Files

Problem Description

The Dump Kernel writes the dump file after a system crash on an OpenVMS x86-64 system.

The following issues have been corrected in the Dump Kernel:

- The Dump Kernel crashed if many disk ports were configured.
- Fibre Channel devices were not always found.
- Very large crash dump files could not be written.
- Many spurious "Unexpected unmatched PTE/PFN pair" messages were sometimes displayed during crash processing.

Images and/or Files Affected

[SYSEXE]SYS$DUMP_KERNEL.EXE

VSI Case Identifiers

Jira BO-2240, DRIV-638

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

RTL Changes

5.9. Various Corrections for the C++ Run-Time Library

Problem Description

The following issues are corrected with this ECO kit:

- The internal condition handler for the C++ Run-Time Library corrupts the sigargs parameter for non-C++ errors. This could cause an access violation or other incorrect behavior during exception error handling. This issue was previously addressed in the HOTFIX V4.0 kit for the customer reporting the problem.
- An incompatibility between standard exceptions and std::string32 is now resolved.
- Symbol table names within the LIBCXX.EXE image are now correctly uppercased.

Images and/or Files Affected

[SYSLIB]LIBCXX.EXE
[SYSLIB]LIBCXX.OLB
[SYSLIB]LIBCXXABI.EXE
[SYSLIB]LIBCXXABI.OLB

VSI Case Identifiers

Jira DEV-3106, DEV-3165

Netsuite NS8777

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.10. Internal LIBOTS Memory Routines Performance Enhancements

Problem Description

Some of the most used Object-Time Library routines in LIBOTS.EXE have been rewritten in native x86-64 assembler to provide better performance. These include the memory handling routines to move, compare, search, and translate characters.

Images and/or Files Affected

[SYSLIB]LIBOTS.EXE
[SYSLIB]LIBOTS.STB

VSI Case Identifier

Jira RTLS-518

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

DEBUG Changes

Note

Some of the changes in the Debugger may work in conjunction with changes in the most recent version of a corresponding language compiler. VSI recommends using the latest version of the language compilers to provide the best experience when using the Debugger.

5.11. Various Corrections to OpenVMS Debugger Behavior

Problem Description

The following issues in the Debugger are corrected with this ECO kit:

- **STEP/NOSHARE** ignored the **/NOSHARE** qualifier.
- Programs linked with the **/BASE=0** parameter could not be debugged. The **STEP** command worked like **GO**, and the program output was disrupted.
- In "single step by instruction" mode, the Debugger did not stop after a "jmpb" instruction.
- Debugger would sometimes crash on startup.
- The Debugger did not display the elements of an array that was passed by descriptor.
- The Debugger incorrectly displayed indirect "jmpq" instructions, truncating the target address.
- Debugger **EXAMINE** of a character array would sometimes display irrelevant extra symbols beyond the array bounds.
- The Debugger would sometimes run past a "jmpb" instruction that had a negative offset.
- When stopping at the start of a routine, the Debugger printed an extra line number after the routine name.
- The Debugger did not display the cell type of a Pascal packed array.
- **DEPOSIT** of double-precision floating-point values would fail.
- A breakpoint at the start of a routine would sometimes be ignored.
- Local variables were not displayed after a **STEP/RETURN** command.
- The Debugger did not display COBOL packed decimal string type.
- When stopping at a label, the label name was not displayed.
- The Debugger crashed on start when a variant part in the program had a name.

- When examining an array in BASIC, raw addresses were shown rather than symbol names.
- **EXAMINE** of %XMMn registers would be inconsistent or would sometimes return an error.
- Source lines in C++ programs could not be displayed.
- Incorrect values were displayed from an **EXAMINE/TYPE** command when the value was an unaligned bitstring.
- The Debugger **MONITOR** command caused an internal memory error.
- The Debugger did not understand forward DWARF references from C++ programs. The user-visible symptom for this problem was error messages similar to the following:

```
%DEBUG-I-INFODWARF, error reading Dwarf info: forward ref
                     (0000008C) for spec attr not supported
-DEBUG-I-DWARFLOC, error occurs 0000002E bytes into
                   .debug_info, in unit TEST
```

- The Debugger was unable to interpret DWARF 4 packed-decimal attributes.

Images and/or Files Affected

[SYSLIB]DEBUG.EXE
[SYSLIB]DEBUGSHR.EXE
[SYSLIB]DEBUGUISHR.EXE

VSI Case Identifiers

Jira DEV-1807, DEV-2456, DEV-2761, DEV-2768, DEV-2777, DEV-2778, DEV-2800, DEV-2901, DEV-2903, DEV-2908, DEV-2974, DEV-3012, DEV-3015, DEV-3023, DEV-3024, DEV-3036, DEV-3058, DEV-3066, DEV-3078, DEV-3079, DEV-3088, DEV-3108, DEV-3114, DEV-3123, DEV-3142, DEV-3147, DEV-3151, DEV-3181, DEV-3205

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

Security Changes

5.12. Changes to SET PASSWORD/GENERATE

Problem Description

The following changes for the **SET PASSWORD/GENERATE** command are provided in this ECO kit:

- Generated passwords may now be up to 64 characters long. The previous limit was 32 characters.
- The **SET PASSWORD/GENERATE** command did not generate passwords when PWDMINIMUM was 0. This has been corrected.

Images and/or Files Affected

[SYSEXE]AUTHORIZE.EXE

[SYSEXE]LOGIN_ACME.EXE
[SYSEXE]LOGIN_UAF.EXE
[SYSEXE]SETP0_ACME.EXE
[SYSEXE]SETP0_UAF.EXE

VSI Case Identifiers

Jira UT-352, UT-358

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.13. Corrections to Proxy Account Creation, Modification, and Removal

Problem Description

The following corrections affect the behavior of the **ADD/PROXY**, **MODIFY/PROXY**, and **REMOVE/PROXY** commands in AUTHORIZE and the resulting security audit messages produced from those commands:

- When adding three or more proxy accounts to a proxy record, the data contained in the "New:" line for proxy audits would sometimes be incorrect. Additionally, some of the preset string values would sometimes have a spurious period character at the end.
- Changes to proxy records with multiple local users were not recorded properly. Updating a proxy record to change the default user or one of several local users was not properly recorded in the proxy database or in the corresponding audit.
- The **REMOVE/PROXY** command would not remove a local user from a proxy record. The command would fail claiming no matching user, with messages similar to the following:

```
UAF> REMOVE/PROXY TAO::FRED PROX1
%UAF-E-NAFREMERR, error removing proxy from TAO::FRED to PROX1
-SECSRV-E-NOSUCHUSER, no user matches your specification
```

- Proxy commands that modify the Default User in a proxy record triggered an audit always containing "" for the value of the New and Original Default User data. The New or Original proxy account fields in the audit message now have the appropriate corresponding username.

Images and/or Files Affected

[SYSEXE]SECURITY_SERVER.EXE

VSI Case Identifiers

Jira BO-1829, BO-2100, BO-2189, BO-2190, BO-2215, BO-2241

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.14. SHOW AUDIT Command Displays Multiple "Process:" Prefixes

Problem Description

The **SHOW AUDIT** command output for process events requiring multiple display lines would sometimes include extra "Process:" prefixes.

For example, prior to the correction from this ECO kit, you would see output similar to the following:

```
$ SHOW AUDIT/ALARM
System security alarms currently enabled for:
  ACL
  Authorization
  Audit:          illformed
  Process:        CREPRC,DELPRC,SCHDWK,CANWAK,WAKE,SUSPND,RESUME,GRANTID,REVOKID,
  Process:        FORCEX,SIGPRC,SETPRI,PROCESS_CAPABILITIES,PROCESS_AFFINITY,
                  SET_IMPLICIT_AFFINITY
  Breakin:        dialup,local,remote,network,detached
  Login:          batch,dialup,local,remote,network,detached,server
  Logfailure:     batch,dialup,local,remote,network,subprocess,detached,server
```

After the correction from this ECO kit, you will see output similar to the following:

```
$ SHOW AUDIT/ALARM
System security alarms currently enabled for:
  ACL
  Authorization
  Audit:          illformed
  Process:        CREPRC,DELPRC,SCHDWK,CANWAK,WAKE,SUSPND,RESUME,GRANTID,REVOKID,
                  FORCEX,SIGPRC,SETPRI,PROCESS_CAPABILITIES,PROCESS_AFFINITY,
                  SET_IMPLICIT_AFFINITY
  Breakin:        dialup,local,remote,network,detached
  Login:          batch,dialup,local,remote,network,detached,server
  Logfailure:     batch,dialup,local,remote,network,subprocess,detached,server
```

Images and/or Files Affected

[SYSEXE]SHOW.EXE

VSI Case Identifier

Jira BO-886

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

ACME Changes

Note

If you change the login mechanism from ACME to UAF (or vice versa) after installing this kit, you will need to take an additional step if you later remove the kit using the **PRODUCT UNDO PATCH** command. Refer to *Section 8.4, "Special Instructions for PRODUCT UNDO PATCH"* for details.

5.15. Changes to OpenVMS ACME Support

Problem Description

The following changes or issues in the OpenVMS ACME Agent are addressed in this ECO kit:

- The ACME Agent can now use the **SET PASSWORD/GENERATE** command to generate passwords of up to 64 characters. The previous limit was 32 characters.
- Authentications could fail when the system was configured with the ACME Server and OpenSSH, and passwords exceeded 16 characters.
- For ACME Server-enabled systems, the **SET PASSWORD** command would accept passwords with illegal characters and return success for accounts without the PWDMIX flag set.
- When the ACME Server is the default login mechanism, the **SET PASSWORD** command could hang or return an ACME$_TIMEOUT error, even though the password was successfully changed.
- For ACME Server-enabled systems, login attempts would sometimes spuriously fail or timeout. This would sometimes be accompanied by event messages in the ACME Server log file, SYS$MANAGER:ACME$SERVER.LOG, ending with either or both of the following error messages:

  ```
  ACME-E-ASTCTXNOTFND, AST context not found

  LOGIN-F-TEXT, When called by FINISH_PROCESSING
                Preface found TEMP_CSCHED_CTX not NULL at start
  ```

  In some cases, the ACME Server process would exit with an error and restart itself, producing a process crash dump file (SYS$SYSTEM:ACME_SERVER.DMP).

Images and/or Files Affected

[SYSLIB]VMS$VMS_ACMESHR.EXE

VSI Case Identifiers

Jira BO-2128, BO-2171, BO-2325, BO-2383, BO-2384, LDAP-185

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.16. Output From SHOW SERVER ACME May Contain Null Characters

Problem Description

Output from the **SHOW SERVER ACME** command would sometimes contain null characters as part of the node name string. With the correction in this ECO kit, the null characters are now correctly replaced with spaces.

Images and/or Files Affected

[SYSEXE]ACME_SERVER.EXE

VSI Case Identifiers

Jira BO-881, BO-2182

Netsuite NS3354

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

I/O Device Support Changes

5.17. MOUNT/MEDIA_FORMAT=FILES11 on a DVD May Hang or Get Read Errors

Problem Description

If a DVD was mounted with the **`/MEDIA_FORMAT=FILES11`** qualifier to use the file system to read OpenVMS content, the process would sometimes hang or encounter incorrect data when the device was read. A DVD- or CD-ROM I/O reads in 2K bytes, and there were edge conditions where either insufficient data was read or stale data from a previous read could be returned.

These issues are corrected with this ECO kit.

Additionally, a sanity check has been added to ensure that only 32-bit values can be used for DVD LBN (logical block number) values in case the device appears to have more blocks due to read errors.

Images and/or Files Affected

[SYS$LDR]SYS$DKDRIVER.EXE

VSI Case Identifier

Jira BO-2133

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.18. VirtIO-SCSI Devices on Oracle OCI Are Offline and Cannot Be Used

Problem Description

VirtIO-SCSI devices on Oracle OCI would appear as offline and could not be used. This was due to missing support for the device type.

Support for SCSI-3 SPC-6 versions has been added to DKDRIVER, and these devices can now be used.

Images and/or Files Affected

[SYS$LDR]SYS$DKDRIVER.EXE

VSI Case Identifier

Jira DRIV-566

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.19. Data Corruption May Occur With Files on a VirtIO-SCSI Disk

Problem Description

Files on VirtIO-SCSI disks would sometimes encounter spurious data corruption. This was highly dependent on data format and usually only occurred on very large files.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]SYS$VSPDRIVER.EXE
[SYS$LDR]SYS$VSPDRIVER.STB

VSI Case Identifiers

Jira BO-2147, BO-2148

Netsuite NS8343

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.20. System May Hang During Boot if Many VirtIO Devices Are Configured

Problem Description

The system would sometimes hang at boot if a large number of VirtIO-Net and/or VirtIO-SCSI adapters were configured.

Some device-specific capability checks were incorrectly using the wrong interrupt mode. The platform bus probing now correctly finds and configures these devices.

Images and/or Files Affected

[SYS$LDR]SYS$PCIE_SUPPORT.EXE
[SYS$LDR]SYS$PCI_SUPPORT.EXE

VSI Case Identifier

Jira DRIV-549

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.21. Cannot Mount or Use a Physical LDDRIVER Device

Problem Description

If an **LD CONNECT** command was issued to a physical device instead of the usual container file target, then the created LD*xxx* device could not be mounted and the error status SS$_ILLBLKNUM was returned.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]SYS$LDDRIVER.EXE

VSI Case Identifier

Jira DRIV-559

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.22. Systems With Very Large Physical Memory May Not Boot

Problem Description

A system would sometimes fail to boot from an LSI Logic SCSI disk if the physical memory size was greater than roughly 270 GB (the limit might vary depending on SYSGEN parameters).

This was due to restrictions in the LSI adapter that required 32-bit physical memory addressing.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]SYS$PKMDRIVER.EXE

VSI Case Identifiers

Jira DRIV-592, BO-2174, BO-2175

Netsuite NS8549

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.23. Some SATA Devices May Not Be Recognized or Configured

Problem Description

SATA devices (like a CD-ROM) would sometimes not be recognized and configured on an x86-64 system. This was due to a missing entry in the system configuration tables in SYS$CONFIG.DAT for a SATA controller on the PCIe bus.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYSEXE]SYS$CONFIG.DAT

VSI Case Identifiers

Jira BO-2233, BO-2234

Netsuite NS8662

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.24. Various Errors on QLogic Fibre Channel Card During Startup or Shutdown

Problem Description

Various intermittent problems have been observed with the QLogic Fibre Channel card during startup or shutdown. It is suspected that these problems are caused when configuring the card from an unknown internal state.

Bare metal systems perform a full reset of the PCI bus, which will always bring the Fibre Channel card back to a known state prior to booting. A full PCI bus reset cannot be done on a VM because it could cause problems with other VMs on the same host.

PGQDRIVER has been modified to perform a full reset of the QLogic Fibre Channel card during driver initialization and in the controller shutdown routine. This prevents problems attempting to configure the card from an unknown state.

Images and/or Files Affected

[SYS$LDR]SYS$PGQDRIVER.EXE

VSI Case Identifiers

Jira DRIV-574, DRIV-611

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.25. 32Gb Fibre Channel HBA Requires V9.2-3 Update V2.0 or Later

Problem Description

Use of the HPE SN1610Q 32Gb Fibre Channel HBA in passthrough mode requires the prior installation of the V9.2-3 Update V2.0 or V3.0 ECO kit as a minimum support level.

Booting the V9.2-3 ISO with an SN1610Q HBA configured may cause a hang or crash. To create a new virtual machine with a 32Gb SN1610Q HBA configured, follow these steps:

1. Define a virtual machine without an SN1610Q HBA.
2. Boot the VSI OpenVMS V9.2-3 ISO and install it to a local disk.
3. Update the new local system disk using the V9.2-3 Update V2.0 or Update V3.0 ECO kit.
4. Power-off the VM and add an SN1610Q HBA to the VM configuration.
5. Reboot the updated VM.

Note

VSI OpenVMS V9.2-3 (regardless of any Update ECO kit which may be applied) supports Fibre Channel LUNs only as data disks. Booting from a Fibre Channel LUN is not supported.

Images and/or Files Affected

[SYS$LDR]SYS$PGQDRIVER.EXE

VSI Case Identifier

Jira IN-188

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

LAN Changes

5.26. LAN Bandwidth Monitoring Issues With System Time Adjustments

Problem Description

When time goes backwards (for example, when Daylight Savings Time ends), the LANCP display of bandwidth data may crash LANCP as it calculates the number of one-second intervals between two bandwidth buckets.

Additionally, if the time goes backwards, LANCP may allocate memory uncontrollably, leading to a LANCP crash.

These issues are corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]SYS$LAN.EXE
[SYS$LDR]SYS$LAN_CSMACD.EXE
[SYSEXE]LANCP.EXE
[SYSHLP]LANCP$HELP.HLB
[SYSLIB]LAN$SDA.EXE

VSI Case Identifiers

Jira DRIV-549, DRIV-556, DRIV-617

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

Workaround

The suggested workaround for this issue is to restart bandwidth monitoring after the time change using the following command:

```
$ MCR LANCP SET DEVICE/ALL/BANDWIDTH=RESTART
```

5.27. LANCP Commands to Enable or Disable Jumbo Frames Are Confusing

Problem Description

The LANCP commands to enable or disable jumbo frames were inconsistent for LAN Failover devices and other devices.

To resolve this issue, the **/STANDARD** qualifier has been added, and the **/JUMBO** and **/STANDARD** qualifiers are now equivalent to the respective **/SIZE=JUMBO|STANDARD** qualifier.

The following sets of commands are now equivalent:

```
LANCP SET DEVICE LLA/JUMBO
LANCP SET DEVICE LLA/SIZE=JUMBO

LANCP SET DEVICE LLA/STANDARD
LANCP SET DEVICE LLA/SIZE=STANDARD
```

Images and/or Files Affected

[SYSEXE]LANCP.EXE
[SYSHLP]LANCP$HELP.HLB

VSI Case Identifier

Jira DRIV-521

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.28. Various LANCP Tracing Improvements

Problem Description

The following improvements have been made to LANCP tracing:

- When decoding trace packets, IP addresses are now displayed in correct byte order.
- Recognize PTY 80-07 for NISCA packet decode, where the PTY is changed from 60-07 to 80-07 so the packet will be lost (in support of debug functionality in SYS$EI1000X.EXE).
- Adjusted the trace display for the **`SHOW DEVICE/TRACE`** command to show up to 10 trace mask bits, reducing the need for executing a full **`SHOW DEVICE/TRACE/HEADER`** command.
- Fixed the timestamp in "special" PCAP entries (non-packet related) to correct the Wireshark display of the PCAP data.

Images and/or Files Affected

[SYSEXE]LANCP.EXE
[SYSHLP]LANCP$HELP.HLB

VSI Case Identifiers

Jira DRIV-549, DRIV-556

Netsuite NS8314

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

MACRO Programming Support

5.29. Updates to the MACRO Compiler

Problem Description

The following changes were made to the MACRO compiler:

- MACRO compiler version is now V6.0-118.
- LLVM internal errors now set $STATUS to failure.
- Removed LLVM internal failures of "non-zero initializer".
- LLVM 10 backend updated from October 2024 drop to July 2025 drop.

Images and/or Files Affected

[SYSEXE]MACRO.EXE

VSI Case Identifiers

Jira DEV-3098, DEV-3112

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

Cluster Changes

5.30. Provide Diagnosis Hints for Lost Connection Cluster Messages

Problem Description

"Lost connection" and "Re-established connection" cluster messages lacked context, making these events difficult to diagnose.

There are multiple reasons why a cluster connection may be closed. Some are visible in the SCACP counters displays for PEDRIVER, such as listen timeouts. However, some closures are connection manager initiated, and the reason for them is not recorded. This makes it difficult to diagnose these events and to determine if they are benign or significant.

The problem addressed here is the lack of context for these cluster connection closures initiated by the connection manager. Once the cause of a closure is known, it can be dismissed as benign or may need to be investigated further.

The closure reason is displayed by new RcvRej fields in the per-node CSB display from the SDA command **`SHOW CLUSTER`**. For example:

```
SDA> SHOW CLUSTER

--- <systemname> Cluster System Block (CSB) 82148280 ---

State:  0B local
Flags:  030A002A member,selected,send_ext_status,local,status_rcvd
                qf_same,qf_noaccess
Cpblty: 00003BF2 vcc,cwcreprc,threads,cwlogicals,ipc_demult_conn
                rmbxfr,wbm_shadow,sched_class,wbm_amcvp,wbm_type
SWVers: XGUT-C6C            LNM Seqnum: 000000010000012D
HWName: innotek GmbH VirtualBox
RcvRej: xxxxxxxx    time   reason1 reason2 reason3 reason4
                           reason5 reason6 reason7 reason8
```

The *xxxxxxxx* field is eight 4-bit nibbles containing reason codes, filled in from right (newest) to left (oldest). The *time* is the time of the most recent event.

The reason strings are listed for nibbles left (oldest) to right (newest), reason1 to reason8.

If nothing has been recorded, the *time* and reason1..*n* are omitted.

The reason codes that exist are:

1 = msgarray
2 = rcv_nopool
3 = btx_allo_fail
4 = not_in_cluster
5 = deadlock_msg

6 = rcvlck_reject_msg
7 = cdrp_allo_fail

The last eight reasons are saved and shifted up 4 bits after each event to make room for the new reason code.

Images and/or Files Affected

[SYS$LDR]SYS$CLUSTER.EXE
[SYS$LDR]SYS$CLUSTER.STB
[SYS$LDR]SYS$CLUSTER_MON.EXE
[SYS$LDR]SYS$CLUSTER_MON.STB
[SYSEXE]SDA.EXE
[SYSLIB]SDA$SHARE.EXE

VSI Case Identifiers

Jira DRIV-556, DRIV-557

Netsuite NS8314

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.31. Use Better Default PEDRIVER Load Class for Newly Discovered Devices

Problem Description

PEDRIVER Load Class would sometimes be wrong for devices that saw link up later than when PEDRIVER discovered the devices. These were usually LAN Failover devices where no failset member had link up.

LAN devices default the line speed to 10 Mbps if the link is down. PEDRIVER uses this line speed as the BUS and Channel Load Class value. Having a very low value (10) causes PEDRIVER to favor other channels when forming an ECS (Equivalent Channel Set). This priority is not justified given the actual speed of the LAN device.

The default Load Class has been changed to address this discrepancy. When creating a new channel, the Load Class is filled in with the device speed as reported by the LAN driver. If the LAN driver is reporting a speed of 10 Mbps or less, the Load Class is set to 1000.

Images and/or Files Affected

[SYS$LDR]SYS$PEDRIVER.EXE
[SYS$LDR]SYS$PEDRIVER.STB
[SYS$LDR]SYS$PEDRIVER_MON.EXE
[SYS$LDR]SYS$PEDRIVER_MON.STB

VSI Case Identifiers

Jira DRIV-577

Netsuite NS-8314

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

RMS Changes

5.32. Spurious Process Terminations From RMS Exception

Problem Description

The Update V1.0 ECO kit contained a change to avoid a system hang due to a process in RWMBX state owning file system locks (described in the *V9.2-3 Update V1.0 ECO Kit for VSI OpenVMS x86-64 Release Notes* [https://docs.vmssoftware.com/v9-2-3-update-v1-eco-kit-for-openvms-x-86-64-release-notes/#d0e739]).

In a small percentage of cases, the context for the owned lock did not yet include all the structures for the AST delivery. Attempting to read these structures would result in an access violation, leading to a process termination or a SSRVEXCEPT system crash if the SYSGEN parameter BUGCHECKFATAL was set to 1.

The triggering issue in the RMS handling of the AST context is corrected with this ECO kit.

Images and/or Files Affected

[SYS$LDR]RMS.EXE
[SYS$LDR]RMS.STB

VSI Case Identifiers

Jira BO-2042, BO-2043, BO-2176, BO-2177

Netsuite NS7912,NS8558

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

XQP Changes

5.33. System May Crash With Rare Spurious XQPERR Bugcheck

Problem Description

The system might crash with an XQPERR bugcheck under rare circumstances. The triggering condition involves the inability to acquire a file system access lock for a file that is set to be truncated on close.

The specific crash was an incorrect sanity check based on how the affected code returns errors. The situation can safely be resolved by returning an SS$_ACCONFLICT (access conflict) status back to the user.

Images and/or Files Affected

[SYS$LDR]F11BXQP.EXE
[SYS$LDR]F11BXQP.STB

VSI Case Identifier

Netsuite NS8738

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

Miscellaneous Changes

5.34. SHOW PATH/DEVICE May Encounter Spurious Access Violation

Problem Description

The **`SHOW PATH/DEVICE`** command may exit with an access violation error.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYSEXE]SETSHOWPATH.EXE

VSI Case Identifier

Jira BO-2277

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.35. JBC$COMMAND Functions Correctly but Returns Spurious Error

Problem Description

The JBC$COMMAND image may be used to perform system management diagnostic or cleanup functions. It now returns a success status when executing correctly.

Images and/or Files Affected

[SYSEXE]JBC$COMMAND.EXE

VSI Case Identifier

Jira UT-284

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.36. VMSINSTAL Procedure May Not Accept Passwords

Problem Description

Some legacy software kits still use the VMSINSTAL procedure for kit installation. If the kit must prompt for a new password for a new or modified account, it will typically use the GET_PASSWORD callback. A flaw in this callback would always reject the password if the PWDMIX flag was set for the account.

This issue is corrected with this ECO kit.

Images and/or Files Affected

[SYSUPD]VMSINSTAL.COM

VSI Case Identifiers

Jira UT-289

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

5.37. Allow Terminals Connected via OpenSSH to Run SHUTDOWN.COM

Problem Description

Beginning with OpenSSH V9.9-2, a process connected to an OpenVMS system via OpenSSH could not successfully shutdown or reboot the system using the SYS$SYSTEM:SHUTDOWN.COM procedure.

The associated process running the SSH image was not recognized as required while the shutdown was in progress and would be deleted, which would leave the shutdown in limbo.

This issue is corrected with this ECO kit.

Warning

If you plan to allow users with SSH-connected sessions to shutdown the system, do not invoke the SYS$STARTUP:SSH$SHUTDOWN.COM procedure from within the site-specific shutdown procedure, SYS$MANAGER:SYSHUTDWN.COM. The SSH shutdown will delete the process executing the

shutdown and leave the system in an inconsistent state with logins, SSH, and other system components disabled, but nothing left executing the shutdown or reboot.

Images and/or Files Affected

[SYSEXE]SHUTDOWN.COM

VSI Case Identifiers

Jira SSH-1813, SSH-1814

Netsuite NS9031

Release Version of VSI OpenVMS That Will Contain This Change

The next VSI OpenVMS x86-64 release after V9.2-3.

6. Problems Addressed From Previous Kits

For details of the problems addressed in the Update V1.0 and Update V2.0 kits, refer to the relevant sections in the *V9.2-3 Update V1.0 ECO Kit for VSI OpenVMS x86-64 Release Notes* [https://docs.vmssoftware.com/v9-2-3-update-v1-eco-kit-for-openvms-x-86-64-release-notes/#d0e124] and *V9.2-3 Update V2.0 ECO Kit for VSI OpenVMS x86-64 Release Notes* [https://docs.vmssoftware.com/v9-2-3-update-v2-eco-kit-for-openvms-x-86-64-release-notes/#d0e124].

7. Images or Files Replaced

[SYS$LDR]EXCEPTION.EXE

Image Name:	"EXCEPTION"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.43
Image Checksum (MD5):	7705D0588822C4196259D2BA680DA8FF

[SYS$LDR]EXCEPTION.STB

File Creation Date and Time:	4-DEC-2025 22:38:11.61
Checksum (MD5):	59181C066D3DE546233945D49540A4DB

[SYS$LDR]EXCEPTION_MON.EXE

Image Name:	"EXCEPTION_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"

Link Date/Time:	4-DEC-2025 22:38:11.82
Image Checksum (MD5):	4875ED63BF490EBF0E75DB3B7F49C899

[SYS$LDR]EXCEPTION_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:11.89
Checksum (MD5):	7BAFE0DB8666BDEC4217D0292EFD2BA9

[SYS$LDR]EXEC_INIT.EXE

Image Name:	"EXEC_INIT"
Image File Identification:	"X-284"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:12.40
Image Checksum (MD5):	F859B58FB76F4E59F8DA47C3DFFFA921

[SYS$LDR]EXEC_INIT.STB

File Creation Date and Time:	4-DEC-2025 22:38:12.56
Checksum (MD5):	FA1A031ADB6115221BE1AF3E98220D34

[SYS$LDR]F11BXQP.EXE

Image Name:	"F11BXQP"
Image File Identification:	"XQP V923R_4 GRV"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:12.16
Image Checksum (MD5):	220BEF05B4B30D5270642A04C6BBE995

[SYS$LDR]F11BXQP.STB

File Creation Date and Time:	4-DEC-2025 22:38:12.30
Checksum (MD5):	EF1C157E5C04F21F51F34D84A4EE296F

[SYS$LDR]IO_ROUTINES.EXE

Image Name:	"IO_ROUTINES"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"

Link Date/Time:	4-DEC-2025 22:38:14.43
Image Checksum (MD5):	8940A8EA99D4AA2E369916B261527206

[SYS$LDR]IO_ROUTINES.STB

File Creation Date and Time:	4-DEC-2025 22:38:14.97
Checksum (MD5):	DD84AB10864970F2956EF72AC76A8D82

[SYS$LDR]IO_ROUTINES_MON.EXE

Image Name:	"IO_ROUTINES_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.72
Image Checksum (MD5):	85310DE55E5EC8D6329E671BF4B72C8A

[SYS$LDR]IO_ROUTINES_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:15.94
Checksum (MD5):	4629AD7ACD4FAD0262A06298BAF0DEB7

[SYS$LDR]MESSAGE_ROUTINES.EXE

Image Name:	"MESSAGE_ROUTINES"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:19.53
Image Checksum (MD5):	E4FBD59E2384CBB344BBC10D72962D95

[SYS$LDR]MESSAGE_ROUTINES.STB

File Creation Date and Time:	4-DEC-2025 22:38:19.57
Checksum (MD5):	416F6F5871BDB8F44A57EC7E26C3853E

[SYS$LDR]PROCESS_MANAGEMENT.EXE

Image Name:	"PROCESS_MANAGEMENT"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"

Link Date/Time:	4-DEC-2025 22:38:20.66
Image Checksum (MD5):	CA6FB5CE5C7B4BA93E82460FDF1BE083

[SYS$LDR]PROCESS_MANAGEMENT.STB

File Creation Date and Time:	4-DEC-2025 22:38:20.98
Checksum (MD5):	0CED93F405985BF0F59000E4CD096860

[SYS$LDR]PROCESS_MANAGEMENT_MON.EXE

Image Name:	"PROCESS_MANAGEMENT_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:21.31
Image Checksum (MD5):	90F94168ABBE2F02BA6733CE2C57BF69

[SYS$LDR]PROCESS_MANAGEMENT_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:21.50
Checksum (MD5):	1B2D73C26BB68F19B581AB4128C7F6CE

[SYS$LDR]RMS.EXE

Image Name:	"RMS"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:13.31
Image Checksum (MD5):	E72B4F730DD9A8DFA95684DACB8F9829

[SYS$LDR]RMS.STB

File Creation Date and Time:	4-DEC-2025 22:38:13.45
Checksum (MD5):	4DA8FBA6842104AC0BDE1875657502A2

[SYS$LDR]SYS$ACPI.EXE

Image Name:	"SYS$ACPI"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:12.82

Image Checksum (MD5):	FA9F1E40979EC0468B3F448B19D299F8

[SYS$LDR]SYS$ACPI0006.EXE

Image Name:	"SYS$ACPI0006"
Image File Identification:	"X-35"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.92
Image Checksum (MD5):	6EA14B4974B8A87A2EE3179D2C9632FE

[SYS$LDR]SYS$ACPI0006.EXE

Image Name:	"SYS$ACPI0006"
Image File Identification:	"X-35"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.92
Image Checksum (MD5):	6EA14B4974B8A87A2EE3179D2C9632FE

[SYS$LDR]SYS$CLUSTER.EXE

Image Name:	"SYS$CLUSTER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.27
Image Checksum (MD5):	D0A2995AAE2D1F4508C14A30A2C965D9

[SYS$LDR]SYS$CLUSTER.STB

File Creation Date and Time:	4-DEC-2025 22:38:16.41
Checksum (MD5):	D32122F34B6754EB346D1B73FE30E10F

[SYS$LDR]SYS$CLUSTER_MON.EXE

Image Name:	"SYS$CLUSTER_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.69

Image Checksum (MD5):	59FCD13D26FE5464ABA8724C49AF9B44

[SYS$LDR]SYS$CLUSTER_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:16.78
Checksum (MD5):	190FA65C432BF414A1DB79650B0C484A

[SYS$LDR]SYS$DKDRIVER.EXE

Image Name:	"SYS$DKDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.48
Image Checksum (MD5):	73E096D7F2EB0E0D99FB71A58CD2C4C4

[SYS$LDR]SYS$EI1000X.EXE

Image Name:	"SYS$EI1000XDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:13.69
Image Checksum (MD5):	8554032207140598F202833A77EEF504

[SYS$LDR]SYS$EVDRIVER.EXE

Image Name:	"SYS$VIRTIODRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:14.85
Image Checksum (MD5):	067CFC23536C9EB356B34A15D24EB4DC

[SYS$LDR]SYS$LAN.EXE

Image Name:	"SYS$LAN"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:19.19

Image Checksum (MD5):	CB5F0E4B8139341C6181F09FC1A29F69

[SYS$LDR]SYS$LAN_CSMACD.EXE

Image Name:	"SYS$LAN_CSMACD"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:19.31
Image Checksum (MD5):	71747DEB442A1CAF554A735A8DD248B1

[SYS$LDR]SYS$LDDRIVER.EXE

Image Name:	"SYS$LDDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:14.98
Image Checksum (MD5):	6FB010EDC550A2EE567B336C89AB9A35

[SYS$LDR]SYS$LLDRIVER.EXE

Image Name:	"SYS$LLDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.19
Image Checksum (MD5):	DA2CAC3775D85084EC7471E93C15D272

[SYS$LDR]SYS$PCIE_SUPPORT.EXE

Image Name:	"SYS$PCIE_SUPPORT"
Image File Identification:	"X-4"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.28
Image Checksum (MD5):	E37B59E392DD264B9C71A425C7C13DFF

[SYS$LDR]SYS$PCI_SUPPORT.EXE

Image Name:	"SYS$PCI_SUPPORT"

Image File Identification:	"X-4"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.41
Image Checksum (MD5):	54743097DF24AAD18622579396DC9BCD

[SYS$LDR]SYS$PEDRIVER.EXE

Image Name:	"SYS$PEDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:12.72
Image Checksum (MD5):	8ABA6079D9102BB8989B368578519F65

[SYS$LDR]SYS$PEDRIVER.STB

File Creation Date and Time:	4-DEC-2025 22:38:12.92
Checksum (MD5):	81018D26001882B015CDB99E7F804BEE

[SYS$LDR]SYS$PEDRIVER_MON.EXE

Image Name:	"SYS$PEDRIVER_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:13.51
Image Checksum (MD5):	E5B5B4FEB3451978963E306BB7BC4388

[SYS$LDR]SYS$PEDRIVER_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:13.66
Checksum (MD5):	E69EADA9BAF30705BCD2006CA7F2C0B7

[SYS$LDR]SYS$PGQDRIVER.EXE

Image Name:	"SYS$PGQDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:19.70
Image Checksum (MD5):	B15FCB1149D5528C1E4FFDAB971F1C41

[SYS$LDR]SYS$PKDDRIVER.EXE

Image Name:	"SYS$PKDDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:18.55
Image Checksum (MD5):	6DC40316894ADDC5BC728BF2F40764FE

[SYS$LDR]SYS$PKMDRIVER.EXE

Image Name:	"SYS$PKMDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.84
Image Checksum (MD5):	8ADD3B5D00EEA9F3027020AC60EDE58E

[SYS$LDR]SYS$SEDRIVER.EXE

Image Name:	"SYS$SEDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:13.44
Image Checksum (MD5):	EC429C3462EC9D6EABBF51AAECCC8476

[SYS$LDR]SYS$VLANDRIVER.EXE

Image Name:	"SYS$VLANDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.68
Image Checksum (MD5):	D85C1CD3AAE135D06AEE6A259E4460E0

[SYS$LDR]SYS$VM.EXE

Image Name:	"SYS$VM"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"

Link Date/Time:	4-DEC-2025 22:38:17.12
Image Checksum (MD5):	7E759BB47957DE8436E06CEF2DCF5F8B

[SYS$LDR]SYS$VM.STB

File Creation Date and Time:	4-DEC-2025 22:38:17.96
Checksum (MD5):	18C6496359DE44FD1E5DEA45E90A3FE3

[SYS$LDR]SYS$VM_MON.EXE

Image Name:	"SYS$VM_MON"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:18.21
Image Checksum (MD5):	FACA88AEE736ED9F2F9F573A4DD46CCE

[SYS$LDR]SYS$VM_MON.STB

File Creation Date and Time:	4-DEC-2025 22:38:18.44
Checksum (MD5):	F00D7B716AC9919B37F952F639E838E5

[SYS$LDR]SYS$VMXNET3.EXE

Image Name:	"SYS$VMXNET3DRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.37
Image Checksum (MD5):	B8F820994A56B9BB7FF1FF7AD0FF85F7

[SYS$LDR]SYS$VSPDRIVER.EXE

Image Name:	"SYS$VSPDRIVER"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:20.56
Image Checksum (MD5):	E2FBC1B5C251B9FE2E9EA2415AFB1F74

[SYS$LDR]SYS$VSPDRIVER.STB

File Creation Date and Time:	4-DEC-2025 22:38:20.74

Checksum (MD5):	3E7AB5E05D70CC56E8FF103DB3A8E7AF

[SYS$LDR]SYSGETSYI.EXE

Image Name:	"SYSGETSYI"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:19.15
Image Checksum (MD5):	864036302BBE28E8CEE9C59D8C1BB140

[SYS$LDR]SYSGETSYI.STB

File Creation Date and Time:	4-DEC-2025 22:38:19.24
Checksum (MD5):	71F6E4FA1E01F5729CDB52152976E184

[SYS$LDR]SYSTEM_PRIMITIVES.EXE

Image Name:	"SYSTEM_PRIMITIVES"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:22.39
Image Checksum (MD5):	AAE11046A8F4BBF106AA0FF1AD326B4B

[SYS$LDR]SYSTEM_PRIMITIVES.STB

File Creation Date and Time:	4-DEC-2025 22:38:23.18
Checksum (MD5):	F02BC736984796AB438957DA85E98A82

[SYS$LDR]SYSTEM_PRIMITIVES_MIN.EXE

Image Name:	"SYSTEM_PRIMITIVES_MIN"
Image File Identification:	"X-16"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:25.35
Image Checksum (MD5):	DA7C33AE0A14D37E7E462A914E46DB90

[SYS$LDR]SYSTEM_PRIMITIVES_MIN.STB

File Creation Date and Time:	4-DEC-2025 22:38:25.74

Checksum (MD5):	464BCD09F9886D6D4308ED9B0BAD85DD

[SYSEXE]ACME_SERVER.EXE

Image Name:	"ACME_SERVER"
Image File Identification:	"X-46"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.27
Image Checksum (MD5):	F359C14D4439BA009E8D35B9B7826644

[SYSEXE]AUTHORIZE.EXE

Image Name:	"AUTHORIZE"
Image File Identification:	"X-38"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.73
Image Checksum (MD5):	F0A8AB71AC813C3840011CDE91EDEE10

[SYSEXE]JBC$COMMAND.EXE

Image Name:	"JBC$COMMAND"
Image File Identification:	"X-6"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.56
Image Checksum (MD5):	5CA5A32745D47C4AF07810EC8FA12D21

[SYSEXE]LANACP.EXE

Image Name:	"LANACP"
Image File Identification:	"X-40"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.57
Image Checksum (MD5):	B0A0586287131D84405807844B344E4E

[SYSEXE]LANCP.EXE

Image Name:	"LANCP"

Image File Identification:	"X-126"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.17
Image Checksum (MD5):	C1A8670F0E366B67E96E2412C24502EC

[SYSEXE]LINK.EXE

Image Name:	"LINK"
Image File Identification:	"I02-99"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.91
Image Checksum (MD5):	DFF2ED53D0F3A831E81CA4095545F000

[SYSEXE]LOGIN_ACME.EXE

Image Name:	"LOGIN_ACME"
Image File Identification:	"LOGIN_ACME"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.39
Image Checksum (MD5):	BA483A7D6B1E08B47E6FD82551C3169B

Note

If the system is using the ACME login mechanism when this kit is installed, the image content from LOGIN_ACME will also be copied to [SYSEXE]LOGINOUT.EXE.

[SYSEXE]LOGIN_UAF.EXE

Image Name:	"LOGIN_UAF"
Image File Identification:	"LOGIN_UAF"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.79
Image Checksum (MD5):	9E18A87802F04CE361962E55CB3196D2

Note

If the system is using the UAF login mechanism when this kit is installed, the image content from LOGIN_UAF will also be copied to [SYSEXE]LOGINOUT.EXE.

[SYSEXE]MACRO.EXE

Image Name:	"MACRO"
Image File Identification:	"60-118-50F9M"
Image Build Identification:	""
Link Identification:	"Linker I02-99"
Link Date/Time:	24-NOV-2025 14:41:16.01
Image Checksum (MD5):	861242DCF72F4918A35C39ED820DD53A

[SYSEXE]SCACP.EXE

Image Name:	"SCACP"
Image File Identification:	"X-36"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.60
Image Checksum (MD5):	5EB5FBB5E97A8FAA212FC814CA4F2C0D

[SYSEXE]SDA.EXE

Image Name:	"SDA"
Image File Identification:	"X-6"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 23:03:03.19
Image Checksum (MD5):	9A8AF2B9A55BA594A381813038245558

[SYSEXE]SEARCH.EXE

Image Name:	"SEARCH"
Image File Identification:	"X02-08"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:15.65
Image Checksum (MD5):	56093A0BDCC57C16632D70307A53CE6A

[SYSEXE]SECURITY_SERVER.EXE

Image Name:	"SECURITY_SERVER"
Image File Identification:	"X-4"
Image Build Identification:	""
Link Identification:	"Linker I02-97"

Link Date/Time:	4-DEC-2025 22:38:16.07
Image Checksum (MD5):	C5A7383611C618A0C91545CF49E4579C

[SYSEXE]SETP0_ACME.EXE

Image Name:	"SETP0_ACME"
Image File Identification:	"LOGIN_ACME"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:39:00.41
Image Checksum (MD5):	37BC047BA9F5E29818C0FE6167096C37

Note

If the system is using the ACME login mechanism when this kit is installed, the image content from SETP0_ACME will also be copied to [SYSEXE]SETP0.EXE.

[SYSEXE]SETP0_UAF.EXE

Image Name:	"SETP0_UAF"
Image File Identification:	"LOGIN_UAF"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:39:00.54
Image Checksum (MD5):	3856ECBCBCD43C7B618CCD47A29C702B

Note

If the system is using the UAF login mechanism when this kit is installed, the image content from SETP0_UAF will also be copied to [SYSEXE]SETP0.EXE.

[SYSEXE]SETSHOWPATH.EXE

Image Name:	"SETSHOWPATH"
Image File Identification:	"X-6"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:39:01.28
Image Checksum (MD5):	E59742E1722934F461ACBDC4497ECB9F

[SYSEXE]SHOW.EXE

Image Name:	"SHOW"

Image File Identification:	"X-9"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:59.55
Image Checksum (MD5):	F91910998BA61F78AA7B4C5B77129D44

[SYSEXE]SHUTDOWN.DAT

File Creation Date and Time:	23-DEC-2025 04:28:46.21
Checksum (MD5):	A5DEA998A1C6690C36C0A43D4D40E9F5

[SYSEXE]SYS$CONFIG.DAT

File Creation Date and Time:	30-SEP-2025 13:10:53.19
Checksum (MD5):	986B7C60631462A29EA0AEE6C5C0FC44

[SYSEXE]DUMP_KERNEL.EXE

Image Name:	"DUMP_KERNEL"
Image File Identification:	"X-88"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.22
Image Checksum (MD5):	C95A5A1C7831531955174D6B56BCAFED

[SYSEXE]SYSBOOT.EXE

Image Name:	"SYSBOOT"
Image File Identification:	"X-3"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:14.39
Image Checksum (MD5):	1E80750C02B785E12151A7472BEC27F2

[SYSHLP]ACMELDAP_STD_CONFIG_INSTALL.PDF

File Creation Date and Time:	4-DEC-2025 22:14:34.06
Checksum (MD5):	74E4BB873FBBB2BD668A3A67610D6FC1

[SYSHLP]ACMELDAP_STD_CONFIG_INSTALL.TXT

File Creation Date and Time:	23-JAN-2025 09:26:58.68

Checksum (MD5):	AADC5FC7665427D39443932C36DEAA7A

[SYSHLP]LANCP$HELP.HLB

File Creation Date and Time:	4-DEC-2025 22:33:42.93
Checksum (MD5):	F28CC0D4808747FE526A581B8FF3ADA2

[SYSLIB]CLUE$SDA.EXE

Image Name:	"CLUE$SDA"
Image File Identification:	"X-92"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:10.23
Image Checksum (MD5):	1F170EA1ADF5DBB9A9652F705D535152

[SYSLIB]DBG$HA_KERNEL.EXE

Image Name:	"DBG$HA_KERNEL"
Image File Identification:	"V9.3-013"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.33
Image Checksum (MD5):	0548804B86CDEA4DA97F107004CAA939

[SYSLIB]DBG$HA_MAIN.EXE

Image Name:	"DBG$HA_MAIN"
Image File Identification:	"V9.3-013"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:16.95
Image Checksum (MD5):	D00B0EAA56FC71334FC41EFB7A9E0A47

[SYSLIB]DEBUG.EXE

Image Name:	"DEBUG"
Image File Identification:	"V9.3-013"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:17.44

Image Checksum (MD5):	6C410CCCEC4F0511C847D7661B22ED35

[SYSLIB]DEBUGSHR.EXE

Image Name:	"DEBUGSHR"
Image File Identification:	"V9.3-013"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:12.43
Image Checksum (MD5):	3F2C63978D097251DB83B3659252903A

[SYSLIB]DEBUGUISHR.EXE

Image Name:	"DEBUGUISHR"
Image File Identification:	"V9.3-013"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:14.11
Image Checksum (MD5):	79584C8A98DDD5A0895FA74181D796A9

[SYSLIB]DEC$BASRTL.EXE

Image Name:	"DEC$BASRTL"
Image File Identification:	"X01-039"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:37:59.51
Image Checksum (MD5):	FFCD57582CC32797AB68B8CF0F6764C7

[SYSLIB]IOGEN$VIRTIO_CONFIG.EXE

Image Name:	"IOGEN$VIRTIO_CONFIG"
Image File Identification:	"X-6"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:37:43.78
Image Checksum (MD5):	9AA201A0D4490A2D1F8CC01DE04F7C72

[SYSLIB]LAN$SDA.EXE

Image Name:	"LAN$SDA"

Image File Identification:	"X-93"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:18.87
Image Checksum (MD5):	8C30DE3C35DAFCB30090B27FC8D06897

[SYSLIB]LDAPACME$LDAP-STD_ACMESHR.EXE

Image Name:	"LDAPACME$LDAP-STD_ACMESHR"
Image File Identification:	"LDAP-STD V1.30"
Image Build Identification:	""
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.23
Image Checksum (MD5):	EA103AF7CB6355945357FCDC9F3CAFF8

[SYSLIB]LIBCXX.EXE

Image Name:	"LIBCXX"
Image File Identification:	"V1.0"
Image Build Identification:	""
Link Identification:	"Linker I02-99"
Link Date/Time:	19-NOV-2025 14:10:21.37
Image Checksum (MD5):	A0A4837CF195FDBCE2E400C5E3D7F33D

[SYSLIB]LIBCXX.OLB

File Creation Date and Time:	4-DEC-2025 22:33:45.25
Checksum (MD5):	ACEC37FCECB548C600A489E72B75F38D

[SYSLIB]LIBCXXABI.EXE

Image Name:	"LIBCXXABI"
Image File Identification:	"V1.0"
Image Build Identification:	""
Link Identification:	"Linker I02-99"
Link Date/Time:	19-NOV-2025 14:10:20.86
Image Checksum (MD5):	B3C2EC22D19F6302998A8A4DDCFDB7CB

[SYSLIB]LIBCXXABI.OLB

File Creation Date and Time:	4-DEC-2025 22:33:45.45

Checksum (MD5):	C0A47A9D84B1DD7795A876DEB01BF6C4

[SYSLIB]LIBOTS.EXE

Image Name:	"LIBOTS"
Image File Identification:	"V1.0"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:37:18.76
Image Checksum (MD5):	D30C1ED676D0552CA4AE5EEFA25BE9F1

[SYSLIB]LIBOTS.STB

File Creation Date and Time:	4-DEC-2025 22:37:18.86
Checksum (MD5):	74B9F77B67277AF24F32E85E1F2DA4CB

[SYSLIB]LIBRTL.EXE

Image Name:	"LIBRTL"
Image File Identification:	"X01-001"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:37:18.78
Image Checksum (MD5):	87B6E2F655071BF69B79AF489ED4350B

[SYSLIB]LIBRTL.STB

File Creation Date and Time:	4-DEC-2025 22:37:18.86
Checksum (MD5):	0A8D97121BE9EA2013C40A07DDCABFA8

[SYSLIB]PAS$RTL.EXE

Image Name:	"PAS$RTL"
Image File Identification:	"PAS$RTL V5.0-31"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:37:43.91
Image Checksum (MD5):	41000A2D77EEFF54EE508EFE14648C5A

[SYSLIB]SDA$SHARE.EXE

Image Name:	"SDA$SHARE"
Image File Identification:	"X-2"

Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 23:03:02.62
Image Checksum (MD5):	4306C5807EEFDF7A795927C7ABADCC8A

[SYSLIB]SMI$OBJSHR.EXE

Image Name:	"SMI$OBJSHR"
Image File Identification:	"X40-A9"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:11.24
Image Checksum (MD5):	2984A030AE81F306B80881332E0C62F8

[SYSLIB]VMS$VMS_ACMESHR.EXE

Image Name:	"VMS$VMS_ACMESHR"
Image File Identification:	"VMS_AGENT V2.0"
Image Build Identification:	""
Link Identification:	"Linker I02-97"
Link Date/Time:	23-DEC-2025 04:46:55.32
Image Checksum (MD5):	D5D33239B40A7BC6613A4B935EFF4C24

[SYSMGR]VMS$IMAGES_MASTER.DAT

File Creation Date and Time:	4-DEC-2025 22:14:46.18
Checksum (MD5):	A9D317C7D2E59192031A796BDA4CF90C

[SYSMSG]CLIUTLMSG.EXE

Image Name:	"CLIUTLMSG"
Image File Identification:	"0"
Image Build Identification:	"XGRV-K6N-000052"
Link Identification:	"Linker I02-97"
Link Date/Time:	4-DEC-2025 22:38:13.76
Image Checksum (MD5):	CEE98A968CAE65DABD994D243D459447

[SYSUPD]VMSINSTAL.COM

File Creation Date and Time:	4-DEC-2025 22:24:26.06
Checksum (MD5):	DBAEB09F957B0DB70AA6D2ABF726142F

Note

VMS Software, Inc. will only distribute kits in signed form. There is no need for most customers to compare file checksums for security or kit integrity reasons.

However, some sites may require such checking even when using signed kits. The image or file checksums (in MD5 format) are supplied to provide comparisons to the extracted final kit files. To find a file checksum, use the following commands:

```
$ CHECKSUM/ALGORITHM=MD5 filename
$ SHOW SYMBOL CHECKSUM$CHECKSUM
```

Note

As a file or image may be replaced by multiple ECO kits over time, a PCSI generation number is used to ensure that the latest version of the file or image is preserved on your system during **PRODUCT INSTALL** of an ECO kit. Should a particular kit installation discover a newer version of a file or image in place on the system disk, the following message will be displayed:

```
%PCSI-I-RETAIN, file filename will not be replaced because file from kit
 has lower generation number
```

This is a normal occurrence depending on the order of kit installation. The correct version of the file or image will remain on the system after the current kit installation. The `%PCSI-I-RETAIN` message is informational only and does not indicate a problem.

8. Installation Instructions

8.1. Compressed File

This kit is provided for download within a ZIP archive container file.

Info-ZIP's freeware ZIP and UNZIP tools are provided for use on this VSI OpenVMS version. Your site may have already set up symbols for these tools or other equivalent ZIP tools. If not, use the following command to define a symbol to run the UNZIP image:

```
$ UNZIP :== "$SYS$SYSDEVICE:[VMS$COMMON.SYSHLP.UNSUPPORTED.UNZIP]UNZIP"
```

Then invoke UNZIP to unpack the kit using the command:

```
$ UNZIP VMS923X_UPDATE-V0300
```

This will extract the installable PCSI product kit file and its associated signed manifest (_VNC file) used for kit validation during **PRODUCT** commands.

VSI strongly recommends always using the manifest to validate the kit content during any **PRODUCT** commands. This will occur automatically if the files are both contained in the same directory.

8.2. Installation Command

Install this kit with the POLYCENTER Software Installation Utility by logging into the SYSTEM account and typing the following command at the DCL prompt:

```
$ PRODUCT INSTALL VMS923X_UPDATE [/SOURCE=location_of_kit]
```

The kit location may be a CD/DVD or a disk directory that contains the kit. The **/SOURCE** qualifier is not needed if the **PRODUCT INSTALL** command is executed from the same directory as the kit location.

This kit requires the use of **/RECOVERY_MODE** and **/SAVE_RECOVERY_DATA** and will automatically set them; they do not need to be present on the command line.

The release notes for any kit may be extracted prior to kit installation using the **PRODUCT EXTRACT RELEASE_NOTES** command.

User-selectable options for installation behavior and scripting are available in this kit. Refer to *Appendix A, "User-Selectable Control Options and Scripting Considerations"* for further details.

Additional help on installing PCSI kits can be found by typing **HELP PRODUCT INSTALL** at the system prompt.

8.3. Special Installation Instructions

Should you need to remove this kit via **PRODUCT UNDO PATCH**, the same mandated reboot requirement is in effect as the memory disk image is changed back to the prior system content.

The kit will update the memory disk image automatically as the final part of installation. There is currently no mechanism within the PCSI utility to cleanly invoke a system reboot for **PRODUCT UNDO PATCH**.

You will be instructed as the kit exits that you must perform this function manually in this case.

Note

When the SYS$UPDATE:SYS$MD.COM procedure is executing to update the memory disk image, some errors similar to the following may be reported:

```
%INSTALL-I-NONRESSHRADR, image installed ignoring '/RESIDENT' image_name
-INSTALL-E-NOGHREG, insufficient memory in the code or data granularity hint region
```

or

```
%INIT-F-GHREGIONFULL, An allocation was attempted from GH region GH_RES_CODE_S2 but
                      there is not enough space in the region for the allocation.
```

These are due to having both old and new copies of some images that are still being used until the system is rebooted. Typically they may be ignored as they will clear up during the reboot. Should there still be similar messages during system startup after reboot, you may need to use AUTOGEN to adjust the related system parameters.

Note

During **PRODUCT INSTALL** or **PRODUCT UNDO PATCH**, the PCSI utility may issue the following message:

```
There is not enough space on the memory disk.
You must take these steps now to complete this installation:

  -  Run @SYS$UPDATE:SYS$MD
  -  Reboot the system
```

In both cases, the kit procedure will run the SYS$MD command procedure automatically. There is no need for you to execute SYS$MD before the reboot.

For **PRODUCT INSTALL**, the reboot is also automatically handled by the kit procedure and you need not do a reboot yourself.

For **PRODUCT UNDO PATCH**, you must manually reboot the system after the operation completes. The kit dialogue will remind you of this requirement at the end of the operation. There is currently no mechanism in PCSI to automatically invoke the system shutdown and reboot for **UNDO PATCH** operations.

8.4. Special Instructions for PRODUCT UNDO PATCH

If you change the login mechanism from ACME to UAF (or vice versa) after installing this kit, you will need to take an additional step if you later remove the kit using the **PRODUCT UNDO PATCH** command.

During **PRODUCT UNDO PATCH**, the PCSI utility is unaware that the LOGINOUT and SETP0 images in use by the system have different content from when the kit was installed. This can result in stale content or the wrong login style images in use after **PRODUCT UNDO PATCH**.

To avoid a spurious change in the system login mechanism, use the SYS$MANAGER:SYS$LOGIN_SWITCH.COM procedure to reset the login style to the desired mechanism, using the following command:

```
$ @SYS$MANAGER:SYS$LOGIN_SWITCH.COM
```

You may use SYS$LOGIN_SWITCH.COM to either:

- Restore the initial login style before using **PRODUCT UNDO PATCH** if you want to return to the original style.
- Reset the login type back and forth from the new style after using **PRODUCT UNDO PATCH**. For example, if you are now using the ACME login and want to continue to use it, invoke the SYS$LOGIN_SWITCH.COM procedure twice, changing it to UAF and then back to ACME. This will correctly reset the ACME login images using the pre-kit installation images.

If you have not changed the login style, the **PRODUCT UNDO PATCH** command will correctly restore the login state with no additional user actions required.

9. Copyright

10. Disclaimer of Warranty and Limitation of Liability

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11. Patch ID

X86VMS-VMS923X_UPDATE-V0300--4

Note

The terms "ECO kit" and "patch kit" may be used interchangeably in this document. This also applies for other VSI OpenVMS documentation when describing PCSI kits that provide remedial updates to a particular product.

A. User-Selectable Control Options and Scripting Considerations

A.1. Controlling Kit Behavior for Introductory Questions

This kit provides user-selectable control options for kit dialogue interaction and automated scripting capability as described here in this appendix.

The general form of a VSI OpenVMS ECO kit, when using **`PRODUCT INSTALL`**, consists of three initial questions regarding these topics:

1. System disk backup: A reminder that VSI recommends backing up the system disk before installing updates, followed by a `Do you want to continue?` YES/NO question, default is `YES`.

2. Reboot requirement: A summary of whether the kit being installed requires a system reboot, followed by a `Do you want to continue?` YES/NO question, default is `YES`.

3. Archival of updated files: A description of saving an "_OLD" copy of each image or file updated by the kit, followed by a `Do you want to save "_OLD" copies of replaced files?` YES/NO question, default is `NO`.

Other questions may be asked later, depending on the target disk or system environment or other kit-specific requirements.

Note

An initial `Do you want to continue?` question may be asked directly by the PCSI utility during any **`PRODUCT`** command—this has nothing to do with the kit being used. To avoid that question, you must supply sufficient detail to uniquely identify the product you wish to use and specify **`/OPTIONS=NOCONFIRM`** on the **`PRODUCT`** command.

Control options are available to customize the dialogue for the initial three kit questions. The controls are logical names, which may be defined in the process logical name table with a value of YES or NO.

To modify the behavior of a VSI OpenVMS ECO kit regarding the initial questions, define one or more of the following logical names before issuing the **PRODUCT INSTALL** command.

- To skip one or more of the questions, define the corresponding logical name shown here to YES:

SKIP$BACKUP	Skips system backup awareness question.
SKIP$REBOOT	Skips system reboot awareness question.
SKIP$ARCHIVE_OLD	Skips question about saving "_OLD" files. This will take the default, which is NO.
SKIP$INTRO	Skips all three of the above questions.

- To specifically override the default for saving "_OLD" files, define this logical name to YES or NO:

VSIKIT$ARCHIVE_OLD	Sets an answer for saving "_OLD" files behavior. This will skip the archive "_OLD" files question regardless of the above SKIP$* logical names.

- Two additional logical names may be defined as YES to modify the amount of explanatory text displayed for each question:

VSIKIT$VERBOSE	Shows all explanatory text for questions.
VSIKIT$BRIEF	Skips some general details in the explanations.

  The default if neither name is defined is VERBOSE. If both names are defined to YES, VERBOSE overrides BRIEF. The BRIEF form is displayed for any questions that are skipped.

For example, to skip all three questions but save an archive "_OLD" copy of each replaced file:

```
$ DEFINE VSIKIT$ARCHIVE_OLD YES
$ DEFINE SKIP$INTRO YES
$ PRODUCT INSTALL kitname
```

A.2. Standard Behavior for YES/NO Questions Asked During Kit Installation

Any YES/NO questions asked during kit installation now follow these rules:

1. **Ctrl/Y** issued while a question is being asked will force the current **PRODUCT** operation to terminate. This is completely safe to do while the initial three questions are being asked during **PRODUCT INSTALL** as no changes have yet been made to the target disk.

2. Some questions may ignore **Ctrl/Y** and ask for a specific answer (for example, if aborting the current operation may have side effects for the system). Additionally, note the following:

   - PCSI may trap **Ctrl/Y** directly for some **PRODUCT** operations.

   - **Ctrl/Y** may be disabled during some sensitive kit processing.

3. The default YES/NO answer is automatically chosen if a kit is installed from a batch job, unless explicitly overridden by a logical name that provides the particular value, such as VSIKIT$ARCHIVE_OLD.

A.3. Installing a Kit From a Batch Job

To install a kit from a batch job, you will need to fully qualify the kit name so PCSI will have enough information to select the kit without asking for confirmation. For example, to install this kit:

```
$ PRODUCT INSTALL VMS923X_UPDATE/VERSION=V3.0/OPTIONS=NOCONFIRM
```

If the kit is located in a directory other than the current default directory, you will also need to add the qualifier:

```
/SOURCE=location_of_the_kit
```

For a batch job, any YES/NO question will automatically select the default answer. Use the control logical names explained above to modify the behavior if necessary. For the system disk backup and reboot questions, the batch behavior is identical to the default. For the save "_OLD" files question, define the VSIKIT$ARCHIVE_OLD logical name to YES if you want to save copies of the files, since the batch default is NO.

A.4. Deprecated Logical Names From HPE ECO Kits

The three names listed below were used by older VSI OpenVMS ECO kits for compatibility with HPE ECO kit behavior. These old names continue to function, but VSI encourages you to modify any scripts you may have to use the new names shown instead:

Old Name	**New Name**
NO_ASK$BACKUP	SKIP$BACKUP
NO_ASK$REBOOT	SKIP$REBOOT
ARCHIVE_OLD	VSIKIT$ARCHIVE_OLD