

IBM Storage Host Attachment Kit for Linux
Version 2.7.0

Release Notes

IBM

First Edition (April 2016)

This document edition applies to version 2.7.0 of the IBM Storage Host Attachment Kit for Linux software package. Newer document editions may be issued for the same version in order to add missing information, update information, or amend typographical errors. The edition is reset to "First Edition" for every newly released version.

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Overview

The IBM® Storage Host Attachment Kit (HAK) for Linux is a software pack that simplifies the task of connecting a Linux host to the IBM storage systems.

The HAK provides a set of command-line interface (CLI) tools that help host administrators perform different host-side tasks, such as: detect any physically connected storage system (single system or multiple systems), detect storage volumes, define the host on the storage system, run diagnostics, and apply best practice native multipath connectivity configuration on the host.

You can download the IBM Storage Host Attachment Kit software package at any time from the IBM Fix Central website(www.ibm.com/support/fixcentral).

Compatibility and requirements

The IBM Storage Host Attachment Kit for Linux is compatible with different versions of the Linux operating system and the storage system, as well as with different HBAs and multipath solutions.

Certain software packages, patches, or drivers must be installed on the host, as detailed in the following subsections.

Note: This section applies to version 2.7.0. For information about the compatibility and requirements of a previous Host Attachment Kit version, refer to its relevant release notes. In addition, the HAK lifecycle and support matrix (ibm.com/support/knowledgecenter/STJTAG/hsg/hak_lifecycle.dita) details the HAK lifecycle with compatible storage system microcode versions and supported operating system releases.

Supported Linux versions

Version 2.7.0 of the IBM Storage Host Attachment Kit for Linux supports different Linux versions and editions, as listed in the following table.

Operating system	Architecture
Red Hat Enterprise Linux (RHEL) 5.1–5.11	x86, x64
Red Hat Enterprise Linux (RHEL) 6.0–6.8	x86, x64, POWER7®/8 (if applicable)
Red Hat Enterprise Linux (RHEL) 7.0–7.2	x64, POWER7/8 (if applicable)
CentOS Linux 7.x	x64
SUSE Linux Enterprise Server (SLES) 11	x86, x64
SUSE Linux Enterprise Server (SLES) 11 SP1–4	x86, x64, POWER7/8 (if applicable)
SUSE Linux Enterprise Server (SLES) 12	x64, POWER7/8 (if applicable)
SUSE Linux Enterprise Server (SLES) 12 SP1	x64, POWER7/8 (if applicable)

Note: For details on Linux support on IBM Power Systems™ servers, refer to IBM Knowledge Center.

Supported storage systems

Version 2.7.0 of the IBM Storage Host Attachment Kit for Linux supports different microcode versions of the IBM storage systems, as listed in the following table.

Storage system	Microcode version
IBM XIV [®] Storage System	10.2.4.x
	11.1.x, 11.2.x, 11.3.x, 11.4.x, 11.5.x, 11.6.x
IBM Spectrum Accelerate [™]	11.5.x
IBM FlashSystem [®] A9000	12.0.x
IBM FlashSystem A9000R	12.0.x

Note: Newer microcode versions may also be compatible. When a newer microcode version becomes available, refer to the latest storage system release notes to check whether the new microcode version is also supported. In addition, the HAK lifecycle and support matrix ([ibm.com[®]/support/knowledgecenter/STJTAG/hsg/hak_lifecycle.dita](http://ibm.com/support/knowledgecenter/STJTAG/hsg/hak_lifecycle.dita)) details the HAK lifecycle with compatible storage system microcode versions and supported operating system releases.

Supported HBAs

The IBM Storage Host Attachment Kit for Linux supports different host bus adapter (HBA) brands and types.

For the latest support information and compatibility matrix, see the IBM System Storage[®] Interoperation Center website (www.ibm.com/systems/support/storage/config/ssic).

Important: For iSCSI connectivity, only iSCSI software initiators are supported. Hardware iSCSI HBAs are not supported.

Note: For best performance, install the latest firmware and drivers for the HBAs that are in use. The HBA vendor should provide the latest firmware and drivers.

Supported multipath I/O solutions

The IBM Storage Host Attachment Kit for Linux supports the following multipath solutions:

- Native Device Mapper-Multipath (DM-MP), including the device-mapper multipath switch (*dm-switch*) module.
- Veritas Dynamic Multipathing (DMP) 5.1, 6.x.

Important: Using more than one multipath I/O framework on the same host is not supported.

Required software on the host

Prior to installing the IBM Storage Host Attachment Kit for Linux, depending on the installed Linux version (RHEL or SLES) and storage connectivity type (FC or iSCSI) – specific software packages must be installed on the host, as detailed in the following table.

Operating system	Connectivity type	Required software package
Red Hat Enterprise Linux (RHEL), CentOS Linux	Fibre Channel (FC)	<ul style="list-style-type: none"> • device-mapper-multipath • sg3_utils
	iSCSI	<ul style="list-style-type: none"> • device-mapper-multipath • sg3_utils • iscsi-initiator-utils
SUSE Linux Enterprise Server (SLES)	Fibre Channel (FC)	<ul style="list-style-type: none"> • multipath-tools • sg3_utils
	iSCSI	<ul style="list-style-type: none"> • multipath-tools • sg3_utils • open-iscsi

Change log

This section summarizes the changes made in different version releases of the IBM Storage Host Attachment Kit for Linux.

Version 2.7.0 (December 2016)

Version 2.7.0 improves security by adding ability to set passwords for hosts, accessing storage systems. Additional changes in version 2.7.0:

Ticket ID	Description
HA-261894*	Change: Added support for RHEL 6.8
HA-62994*	Fixed: The xiv_devlist command output displays the current HAK version with uppercase -V.
HA-261877*	Fixed: Error messages generated, when invalid LDAP credentials are supplied, may be overly general without specifying the exact reason for host attachment failure.

* Applies to all supported operating systems.

Version 2.6.0 (April 2016)

Version 2.6.0 added support for IBM FlashSystem A9000 and IBM FlashSystem A9000R storage systems with microcode 12.0. In addition, this version introduced support for RHEL 7.2, SLES 12 and SLES 12 SP1, including Linux support on IBM Power Systems servers.

Additional changes and fixes in version 2.6.0:

Ticket ID	Description
HA-261809*	Change: The xiv_syslist command output displays all supported storage system types.
HA-261811*	Change: The xiv_devlist command output displays all supported storage system types.
HA-261816*	Fixed: When running the xiv_attach command, scanning for FC-connected storage systems is performed, even if the user chooses not to complete it.

Ticket ID	Description
HA-261859*	Fixed: A general exception may occur during the <code>xiv_iscsi_admin</code> , <code>xiv_fc_admin</code> or <code>xiv_attach</code> command execution.
HA-261869*	Fixed: If during new iSCSI target discovery an IP address is unreachable on a single storage systems, the error message appears for all connected devices.
* Applies to all supported operating systems.	

Version 2.5.0 (September 2015)

Version 2.5.0 added support for XIV microcode version 11.6.x, IBM Spectrum Accelerate 11.5.1.x, and RHEL 7.1. In addition, this version introduced the host-side acceleration (HSA) for improved iSCSI communication between Spectrum Accelerate and a host.

Additional enhancements, changes and fixes in version 2.5.0:

Ticket ID	Description
HA-261623	Enhancement: Provisions for enabling and configuring the HSA are added to the <code>xiv_attach</code> and <code>xiv_iscsi_admin</code> commands. For more information, refer to the user guide.
HA-261629*	Change: The <code>-L</code> option of the <code>xiv_iscsi_admin</code> and <code>xiv_fc_admin</code> commands is deprecated. Only the <code>xiv_syslist -L</code> command can be used for listing the attached storage systems, as detailed in HA-204578. For more information, refer to the user guide.
HA-261657	Fixed: After upgrading from RHEL 5.x to 6.x, the <code>xiv_devlist</code> command may fail, when it is run by a host installed on an HP server.
* Applies to all supported operating systems.	

Version 2.4.0 (March 2015)

Version 2.4.0 added support for XIV microcode version 11.5.1 and IBM Spectrum Accelerate 11.5.0.b, and included the following enhancement and fix.

Ticket ID	Description
HA-261509	Enhancement: This new feature allows the host administrator to automatically discover and connect to new, already-attached iSCSI ports. For more information, refer to the user guide.
HA-261551	Fixed: Syntax <code>-m --no-native-mp</code> has changed to <code>-m IGNORE</code> .

Version 2.3.0 (August 2014)

Version 2.3.0 added support for XIV microcode version 11.5 and includes the following enhancements and fixes.

Ticket ID	Description
HA-250756*	Enhancement: The <code>--list (-L)</code> command option can be used with <code>xiv_diag</code> to display information that is to be gathered by the utility. For more information, refer to the user guide.
HA-261277	Enhancement: The <code>--clean</code> command option can be used with <code>xiv_fc_admin --rescan</code> or <code>xiv_iscsi_admin --rescan</code> to remove unreachable devices from the host. For more information, refer to the user guide.
HA-261361*	Enhancement: Added support for the XIV multi-tenancy feature, allowing work with different and separate storage domains that are defined on the same XIV storage system. This enhancement applies only to XIV microcode version 11.5 or later. For more information, refer to the user guide.
HA-261367	Enhancement: The <code>--no-native-mp (-M)</code> command option can be used with <code>xiv_fc_admin</code> and <code>xiv_iscsi_admin</code> to ignore the native multipath framework of the operating system when either the <code>-V</code> , <code>-C</code> , or <code>-R</code> option is used. For more information, refer to the user guide.
HA-22503	Fixed: On RHEL 6 and SLES 11, unmapped (or dead) LUNs are not removed from the <code>xiv_devlist</code> output after performing rescan.
HA-91689	Fixed: A host cannot be attached over iSCSI if it is already attached over FC.
HA-261223*	Fixed: A general error message appears when running <code>xiv_attach</code> , <code>xiv_fc_admin</code> , or <code>xiv_iscsi_admin</code> if non-English characters are used in the XIV credentials.

* Applies to all supported operating systems.

Version 2.2.0 (November 2013)

Version 2.2.0 added support for version 11.4.0 of the XIV microcode and for Linux Enterprise Server (SLES) 11 SP3.

Additional changes in version 2.2.0:

Ticket ID	Description
HA-204578*	Enhancement: Summary of the attached storage systems is now listed, using the <code>xiv_syslist -L</code> command.

Ticket ID	Description
HA-261142*	Enhancement: The Host Profiler utility (xiv_host_profiler) can now detect the microcode versions of the XIV systems to which the host is connected. In addition, users can use the --xiv-microcode option with the --analyze command argument in order to run the host profile analysis against a specific microcode version.
HA-255825	Fixed: Uploading the host profile to the XIV storage system over an iSCSI connection fails silently when the host HBA FC ports are zoned but not registered with the FC targets of that XIV system.

* Applies to all supported operating systems.

Version 2.1.0.1 (August 2013)

Version 2.1.0.1 included the following hotfix and change.

Ticket ID	Description
HA-261196	Fixed: In some cases, a general error (type 'exceptions.AttributeError') might occur if xiv_devlist , xiv_attach , xiv_fc_admin , or xiv_iscsi_admin is used when the online volume migration (IBM Hyper-Scale Mobility feature) is in Proxy state.
HA-261181*	Change: In the xiv_devlist output, "OLVM State" was renamed to "Hyper-Scale Mobility".

* Applies to all supported operating systems.

Version 2.1.0 (June 2013)

Version 2.1.0 added support for version 11.3.0 of XIV microcode and for the IBM Hyper-Scale Mobility (online volume migration) feature. It also adds support for RHEL 6.4 and 5.9.

Additional changes in version 2.1.0:

Ticket ID	Description
HA-231357*	Enhancement: The --no-headers argument can be used with the xiv_devlist -t csv and xiv_syslist -t csv commands to generate CSV output without column headers.
HA-253044*	Enhancement: An additional step in the xiv_attach procedure allows scheduling a task for running the Host Profiler utility on the host. For more information, refer to the user guide.
HA-256729*	Fixed: In some cases, the xiv_host_profiler --analyze command might generate notices that are unrelated to the host processor architecture.
HA-257071	Fixed: The xiv_devlist output is limited to 80 characters per line, ignoring any console-defined screen width.

Ticket ID	Description
HA-260447	Fixed: On RHEL 6.3, devices other than the 'Boot from SAN' volume might not be encapsulated by the multipath framework, and might appear as several single path devices.
HA-261114	Fixed: Instead of running once as scheduled, Host Profiler scheduled tasks run every minute within the specified hour. Note: Scheduled tasks that were created with version 2.0.0 should be removed and redefined with version 2.1.0.
HA-261126*	Fixed: xiv_devlist might exit with error messages when running on a host connected to a storage device other than the XIV storage system.
HA-8442*	Fixed: xiv_host_profiler and xiv_syslist might exit with error messages when running on a host connected to a storage device other than the XIV storage system.

* Applies to all supported operating systems.

Version 2.0.0 (March 2013)

Version 2.0.0 included the following enhancements.

Ticket ID	Description
HA-26055*	Enhancement: A new host diagnostics utility, Host Profiler (xiv_host_profiler), is now available. The utility collects comprehensive host configuration information, creates a profile based on this information, and allows detailed analysis of the collected information. For more information, refer to the Diagnostics chapter in the IBM XIV Host Attachment Guide. Note: The Host Profiler utility is compatible only with XIV microcode version 11.2 or later.
HA-251470	Enhancement: Reduced HAK package size, requiring less disk space.

* Applies to all supported operating systems.

Known issues

This section details the known issues in version 2.7.0 of the IBM Storage Host Attachment Kit for Linux, along with possible solutions or workarounds (if available).

Ticket ID	Description
HA-11718	Unmapped LUNs are not always removed after the rescan. In some of the early RHEL 5.x releases, multipathd (responsible for removing stale multipath maps) stops reacting to udev events. Red Hat provides a fix for multipath-tools and kpartx at the Red Hat Customer Portal website(rhn.redhat.com/errata/RHEA-2009-1377.html).

Ticket ID	Description
HA-37888	<p>xiv_devlist does not identify LUN0.</p> <p>Currently there is no workaround or solution for this limitation.</p>
HA-65405	<p>xiv_attach shows 'Unknown type' for the Hitachi HBA driver.</p> <p>Currently there is no workaround or solution for this limitation .</p>
HA-100800	<p>Mapping the LUN0 volume causes errors.</p> <p>Due to the distinctive properties of the XIV LUN0 volume (on any storage pool), mapping it to the host causes numerous errors or performance problems.</p> <p>Accordingly, mapping the LUN0 volume is not recommended.</p>
HA-101053	<p>When using xiv_attach over iSCSI on x86-based RHEL 6 or RHEL 5, a failure may occur on the last step in which the host is defined the XIV storage system. This applies to XIV microcode versions 10.2.4.x and 11.0.x.</p> <p>To resolve this issue, manually configure the host on the XIV system as follows:</p> <ol style="list-style-type: none"> 1. Use xiv_iscsi_admin -P to detect all iSCSI addresses of the host. 2. Define a new host on the XIV system by using the XIV GUI or XCLI, and add this host the iSCSI posts that you found in the previous step.
HA-159609	<p>On RHEL 6.1 or earlier, when no volumes are mapped to the host, the iSCSI daemon does not start, and the configuration task of the iSCSI service fails.</p> <p>To resolve this issue, use RHEL 6.2 or later.</p>
HA-163935	<p>xiv_diag may hang when unreachable block devices are present.</p> <p>Regardless of this issue, the xiv_diag log file (xiv_diag_results*.tar.gz) is properly generated. To avoid this issue, remove all unreachable block devices before running xiv_diag. Also, due to a known issue in RHEL 6 (631009 (bugzilla.redhat.com/show_bug.cgi?id=631009)), you may need to use multipath -f <mpath device> to clean up all multipath devices.</p>
HA-165868	<p>The user_friendly_names multipath parameter is automatically assigned with 'yes'.</p> <p>Workaround: If you want to use non-friendly names, manually change the parameter value to 'no'.</p>

Ticket ID	Description
HA-165914	<p>udev-related problems may occur on hosts that were upgraded from HAK versions earlier than 1.7.0.</p> <p>To resolve this issue, manually delete the udev rule in <code>/dev/udev/rules.d/44-ibm-xiv.rules</code>. You might need to reload the udev rules or reboot the host.</p> <p>Note: This workaround removes the <code>/dev/xiv</code> device tree, as in a clean HAK installation.</p>
HA-171098	<p>Due to a known issue in RHEL 6 (662433 (bugzilla.redhat.com/show_bug.cgi?id=662433)), hosts that use mapped volumes over iSCSI might freeze during an OS shutdown or reboot.</p> <p>If this occurs, power off and restart the host manually.</p> <p>To avoid this issue, upgrade to RHEL 6.3.</p>
HA-173095	<p>If the host is predefined on the XIV storage system without CHAP authentication, using CHAP credentials during the attachment procedure (xiv_attach) silently succeeds, but does not apply any CHAP authentication.</p> <p>Workaround: Ensure that the host is already defined on the XIV storage system with a CHAP name and secret.</p>
HA-227476	<p>If XIV volumes mapped to a host that regularly boots from SAN, deleting a WWPN associated with these volume mappings causes the server to hang.</p> <p>Currently there is no workaround or solution for this limitation.</p>
HA-251225	<p>The xiv_host_profiler and xiv_syslist utilities might not detect all connectivity parameters if the host uses HBAs manufactured by LSI. In such a case, the utilities would not be able to determine whether the host is connected to two or more XIV modules, and the xiv_host_profiler --analyze command will report that the host is not properly configured.</p> <p>Currently there is no workaround for this limitation, and you need to manually check whether the host is connected to at least two XIV modules (if LSI HBAs are used).</p>
HA-254724	<p>When running the xiv_host_profiler --create-scheduled-task command and no crontab file exists for the root user, a Linux message stating 'No crontab for root' is displayed.</p> <p>This is a one-time occurrence that has no impact on the creation of the scheduled task.</p>
HA-261163	<p>On RHEL 6 or SLES 11 SP3, xiv_devlist might hang after a volume is unmapped.</p> <p>To resolve this issue, restart the host.</p>

Ticket ID	Description
HA-261166	<p data-bbox="683 226 1365 352">"No Adapter Found" message might appear in some cases when using xiv_host_profiler --create or xiv_host_profiler --analyze, even though a host bus adapter is actually found.</p> <p data-bbox="683 380 1325 443">This has no impact on the created host profile or host analysis, and you can ignore this message.</p>
HA-261345	<p data-bbox="683 464 1354 554">On SLES 11 SP2, xiv_attach, xiv_iscsi_admin, and xiv_fc_admin and may hang when using the rescan (-R) option.</p> <p data-bbox="683 581 1211 611">To avoid this issue, upgrade to SLES 11 SP3.</p>
HA-261359	<p data-bbox="683 632 1414 722">On SLES 12.0, if one of the iSCSI ports on the storage system is unreachable, then iSCSI service fails to start and an error message is displayed.</p> <p data-bbox="683 749 1403 873">To avoid this issue, connect the iSCSI port, if it is disconnected, or disable the unreachable port. Then, log out of all the existing nodes. Alternatively, upgrade to SLES 12 SP1.</p>
HA-261402	<p data-bbox="683 894 1419 1020">Running rescan with the --clean flag in RHEL 7.x environment (xiv_iscsi_admin -R --clean or xiv_fc_admin -R --clean) may take several minutes, depending on amount of multipath devices without existing paths.</p> <p data-bbox="683 1047 1321 1110">Currently there is no workaround or solution for this limitation.</p>
HA-261434	<p data-bbox="683 1131 1365 1222">On RHEL 7.0, the iSCSI service fails to start and an error message is displayed if one of the XIV iSCSI ports is unreachable.</p> <p data-bbox="683 1249 1198 1278">To resolve this issue, use RHEL 7.1 or later.</p>
HA-261572	<p data-bbox="683 1299 1419 1362">On CentOS Linux 7.x and RHEL 7.x, running the xiv_syslist may fail with exception.</p> <p data-bbox="683 1390 1419 1411">To avoid this issue, install the PCI Utilities (<i>pciutils</i>) package .</p>
HA-261626	<p data-bbox="683 1432 1414 1522">LUNs with IDs higher than 255 mapped to a host over iSCSI may result in incorrect listing of the storage volumes, using the xiv_devlist command.</p> <p data-bbox="683 1549 1365 1579">To avoid this issue, do not use LUN IDs higher than 255.</p>
HA-261648	<p data-bbox="683 1600 1414 1690">Updating routing table on the device-mapper multipath switch (xiv_iscsi_admin -U) immediately after restoration of an iSCSI session may cause an execution error.</p> <p data-bbox="683 1717 1305 1747">To resolve this issue, rerun the routing table update.</p>

Ticket ID	Description
HA-261731	<p>On RHEL 7.x, unmapped LUNs remain associated with the host and continue to appear in the xiv_devlist output if the xiv_devlist command is run immediately after rescanning storage systems with the --clean argument (xiv_iscsi_admin -R --clean).</p> <p>To resolve this issue, run the xiv_iscsi_admin -R --clean command again.</p>
HA-261758	<p>When run under CentOS Linux, the xiv_host_profiler --analyze command declares the operating system as unsupported, producing an incorrect host configuration analysis.</p> <p>Currently there is no workaround or solution for this limitation.</p>
HA-261835	<p>When run on a VM under SLES11 SP4 in VMware environment, the xiv_fc_admin -R or xiv_iscsi_admin -R commands may fail with exception.</p> <p>To resolve this issue, configure the virtual machine to display local disk UUID. Then, remove the VMware disk device from black list in <code>multipath.conf</code> file.</p>
HA-261881	<p>Operating systems added in the HAK version 2.6.0 (SLES 12.x, RHEL 7.2 for x86/x64 and all Linux flavors for POWER7/8) appear as unsupported, when running the xiv_host_profiler command on host connected to a storage system with the 11.x microcode.</p> <p>Currently there is no workaround or solution for this limitation.</p>
HA-261885	<p>LUNs with IDs higher than 255 mapped to a host over iSCSI may result in faulty update of the routing table on the device-mapper multipath switch, using the xiv_iscsi_admin -U command.</p> <p>To avoid this issue, do not use LUN IDs higher than 255.</p>
HA-261930	<p>When running the xiv_devlist command on volumes during the Hyper-Scale Mobility process, the storage system serial number indicates either a source or a destination system. This may be confusing, when this command is used several times in a row, and each time a different storage system serial number is displayed.</p> <p>Currently there is no workaround for this issue.</p>

Related information and publications

You can find additional information and publications related to the IBM Storage Host Attachment Kit for Linux on the following websites.

- IBM Knowledge Center (ibm.com/support/knowledgecenter)

- IBM XIV Storage System on IBM Knowledge Center (ibm.com/support/knowledgecenter/STJTAG)
- IBM Spectrum Accelerate on IBM Knowledge Center (ibm.com/support/knowledgecenter/STZSWD)
- IBM FlashSystem A9000 on IBM Knowledge Center (ibm.com/support/knowledgecenter/STJKMM)
- IBM FlashSystem A9000R on IBM Knowledge Center (ibm.com/support/knowledgecenter/STJKN5)
- IBM Power Systems software website for AIX®(www.ibm.com/systems/power/software/aix)
- IBM System p website(www.ibm.com/systems/p)
- IBM Flash Storage and Solutions marketing website (ibm.com/systems/storage/flash)

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Use the Directory of Worldwide Contacts to find the appropriate phone number for initiating voice call support. Select the Software option, when using voice response system.

When asked, provide your Internal Customer Number (ICN) and/or the serial number of the storage system that requires support. Your call will then be routed to the relevant support team, to whom you can provide the specifics of your problem.

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