

IBM Storage Enabler for Containers  
Version 2.0.0

*Release Notes*



**Second Edition (January 2019)**

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# Overview

IBM Storage Enabler for Containers provisions storage volumes from an external IBM storage to container frameworks. Storage provisioning can be fully automatized with additional support of cluster orchestration systems to automatically deploy, scale and manage containerized applications.

IBM Storage Enabler for Containers supports IBM block storage systems and IBM Spectrum Scale.

- The block storage is supported via IBM Spectrum Connect. IBM Storage Enabler for Containers communicates with the IBM storage systems through Spectrum Connect. Spectrum Connect creates a storage profile and makes it available for Kubernetes.
- IBM Spectrum Scale, file storage solution, is supported directly, using the IBM Spectrum Scale management API v2.

You can download the IBM Spectrum Connect software package at any time from the [IBM Fix Central website](http://www.ibm.com/support/fixcentral) ([www.ibm.com/support/fixcentral](http://www.ibm.com/support/fixcentral)).

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## What's new in version 2.0.0

Version 2.0.0 introduces a range of enhancements and fixes as detailed in the following sections.

**General availability date:** 20 December 2018

### IBM Spectrum Scale support

Version 2.0.0 introduces support for IBM Spectrum Scale, innovative storage and data management platform.

### Support for IBM Cloud Private version 3.1.1 and Kubernetes version 1.12

Version 2.0.0 adds support for version 3.1.1 of IBM's application platform for developing and managing on-premises, containerized applications, IBM Cloud Private (ICP). In addition, it can be operated in conjunction with the new release of Kubernetes orchestration platform, version 1.12.

### More flexible storage connection, using mixed Fibre Channel and iSCSI SANs

Version 2.0.0 allows for more efficient use of installed storage infrastructure by mixing Fibre Channel and iSCSI storage connectivity within the same Kubernetes cluster. However, each node supports only one connection type, either FC or iSCSI.

### Performance improvements

Version 2.0.0 improves handling of faulty multipathing devices and introduces Kubernetes service accounts for more effective pod authorization procedure.

### Resolved issues

For information about resolved issues in version 2.0.0, see [“Change log” on page 3](#).

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## Compatibility and requirements

This section specifies the compatibility and requirements of version 2.0.0 of IBM Storage Enabler for Containers.

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**Note:** For information about the compatibility and requirements of previous versions of IBM Storage Enabler for Containers, refer to relevant release notes of IBM Spectrum Connect software suite.

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## Supported storage systems

IBM Storage Enabler for Containers version 2.0.0 supports different IBM storage systems as listed in the following table.

Storage system	Microcode version	Compatibility note
IBM DS8870	7.5.1	IBM System Z (s390x) architecture is not supported.
IBM DS8880	8.0.1, 8.1.x, 8.2.x, 8.3.x, 8.4.x, 8.5.x	IBM System Z (s390x) architecture is not supported.
IBM FlashSystem 9100	8.2.x	
IBM FlashSystem A9000	12.0.x, 12.1.x, 12.2.x, 12.3.x	
IBM FlashSystem A9000R	12.0.x, 12.1.x, 12.2.x, 12.3.x	
IBM FlashSystem V9000	7.4.1, 7.5.0, 7.6.0, 7.7.0, 7.8.x, 8.1.x, 8.2.x	
IBM SAN Volume Controller	7.4.0, 7.5.0, 7.6.0, 7.7.0, 7.8.x, 8.1.x, 8.2.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM Spectrum Accelerate	11.5.x	
IBM Spectrum Scale	5.x.x, see <a href="#">recommended version for deployment</a>	<ul style="list-style-type: none"><li>• Operating system: RHEL 7.x, SLES 12 SP3 (s390x only). See <a href="#">IBM Spectrum Scale FAQs</a>.</li><li>• Architecture: x64, IBM Power Systems (ppc64le), IBM System Z (s390x)</li><li>• Orchestration platform: Kubernetes (1.10, 1.11, 1.12), ICP (2.1.0.3, 3.1.x)</li></ul>
IBM Spectrum Virtualize™ as software only	7.7.1, 7.8.x, 8.1.x, 8.2.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM Storwize® V3500	7.4.0, 7.5.0, 7.6.0, 7.7.0, 7.8.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM Storwize V3700	7.4.0, 7.5.0, 7.6.0, 7.7.0, 7.8.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM Storwize V5000	7.4.0, 7.5.0, 7.6.0, 7.7.0, 7.8.x, 8.1.x, 8.2.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM Storwize V7000	7.4.0, 7.5.0, 7.6.0, 7.7.0, 7.8.x, 8.1.x, 8.2.x	Microcode 7.3.0 PTF (with security fix) is also supported.
IBM XIV® Storage System	11.4.x, 11.5.x, 11.6.x	

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### Note:

- Newer microcode versions may also be compatible. When a newer microcode version becomes available, contact IBM Support to inquire whether the new microcode version is compatible with the current version of IBM Storage Enabler for Containers.
  - IBM FlashSystem® V9000, IBM FlashSystem 9100, IBM Storwize Family and IBM SAN Volume Controller storage systems run the IBM Spectrum Virtualize software. In addition, IBM Spectrum Virtualize package is available as a deployable solution that can be run on any compatible hardware.
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## Supported operating systems

The following table lists operating systems required for deployment of the IBM Storage Enabler for Containers.

Table 1: Operating systems	
Operating system	Architecture
Red Hat Enterprise Linux (RHEL) 7.x	x64, IBM Power Systems (ppc64le), IBM System Z (s390x)
Ubuntu 16.04 or later (not supported the Storage Enabler with IBM Spectrum Scale serving as a backend storage)	x64
SUSE Linux Enterprise Server (SLES) 12	IBM System Z (s390x)

## Supported orchestration platforms

The following table details orchestration platforms suitable for deployment of the IBM Storage Enabler for Containers.

Table 2: Orchestration platforms		
Orchestration platform	Version	Architecture
Kubernetes	1.10–1.12	x64, IBM System Z (s390x)
IBM Cloud Private	2.1.0.3, 3.1.1	x64, IBM Power Systems (ppc64le), IBM System Z (s390x)

**Note:** For details about IBM Cloud Private offering, refer to [IBM Marketplace](#).

## Change log

This section summarizes the changes that were made in released version of IBM Storage Enabler for Containers.

**Note:** New functional features of these versions are only briefly summarized. For a detailed summary of the new functional features of a specific version, refer to the 'What's new' section of its release notes.

### Version 2.0.0 (December 2018)

Version 2.0.0 provides the following enhancements:

- Support for IBM Spectrum Scale platform.
- Support for IBM Cloud Private version 3.1.1.
- Support for Kubernetes version 1.12.
- Support for mixed Fibre Channel and iSCSI storage connectivity.

Ticket ID	Description
<b>UB-1103</b>	<b>Fixed:</b> Installation of the IBM Storage Enabler for Containers fails on DS8000 storage systems.
<b>UB-1525</b>	<b>Fixed:</b> Installation of Enabler for Containers on x86 or IBM System Z servers for Spectrum Virtualize storage systems in Fibre Channel environment might fail.

## Limitations

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As opposed to known issues, limitations are functionality restrictions that are part of the predefined system design and capabilities in a particular version.

### **IBM Storage Enabler for Containers does not support simultaneous deployment with IBM block and IBM Spectrum Scale storage systems**

Currently, a single instance of IBM Storage Enabler for Containers can be deployed with either IBM block storage system or IBM Spectrum Scale, but not with both of them.

### **IBM Storage Enabler for Containers does not support volume migration using IBM Hyper-Scale Mobility**

IBM Storage Enabler for Containers does not support volume migration using IBM Hyper-Scale Mobility for the storage volumes utilized by Kubernetes clusters.

## Known issues

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This section details the known issues in version 2.0.0 of Storage Enabler for Containers, along with possible solutions or workarounds (if available).

The following severity levels apply to known issues:

- **HIPER** – High Impact Pervasive. A critical issue that IBM has either fixed or plans to fix promptly. Requires immediate customer attention or code upgrade.
- **High Impact** – Potentially irrecoverable error that might impact data or access to data in rare cases or specific situations/configurations.
- **Moderate** – Limited functionality issue and/or performance issue with a noticeable effect.
- **Service** – Non-disruptive recoverable error that can be resolved through a workaround.
- **Low** – Low-impact usability-related issue.

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### **Important:**

- **The issues listed below apply to version 2.0.0 or earlier versions.** As long as a newer version has not yet been released, a newer release notes edition for version 2.0.0 might be issued to provide a more updated list of known issues and workarounds.
  - When a newer version is released for general availability, the release notes of version 2.0.0 will no longer be updated. Accordingly, check the release notes of the newer version to learn whether any newly discovered issues affect version 2.0.0 or whether the newer version resolves any of the issues listed below.
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*Table 3: Known issues*

<b>Ticket ID</b>	<b>Severity</b>	<b>Description</b>
<b>UB-66</b>	Moderate	If a volume is renamed directly on a storage system and removed from a node, it is deleted from the Enabler for Containers database, but remains intact on the storage itself.  To avoid this issue, do not rename volumes on a storage system, if the volumes are used by containerized applications.

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Table 3: Known issues (continued)

Ticket ID	Severity	Description
<b>UB-380</b>	Moderate	<p>When creating a PVC with an underscore, <code>_</code>, in <i>pv-name</i> label, the volume is created on the storage system, but it fails to be created in the Kubernetes environment.</p> <p>To avoid this issue, do not use an underscore in a PVC <i>pv-name</i> label.</p>
<b>UB-454</b>	Moderate	<p>Identifying incorrect IP address of the Enabler for Containers server by the FlexVolume driver might take up to 2 minutes.</p> <p>Currently there is no solution or workaround for this limitation.</p>
<b>UB-499</b>	Moderate	<p>On the storage systems that run Spectrum Virtualize, volume operations might fail, if a Kubernetes node name starts with a number</p> <p>To avoid this issue, do not use numbers as initial symbols in Kubernetes node names.</p>
<b>UB-579</b>	Moderate	<p>A container might remain in the <i>ContainerCreating</i> status for a long period of time. In addition, an unresponsive <i>sg_inq</i> process exists on a pod worker node and failed multipath devices are present in the system.</p> <p>To resolve this issue, terminate the unresponsive process, using the <code>-9</code> signal, or run the <code>multipath -F</code> command to clean the faulty devices, holding the process.</p>
<b>UB-612</b>	Moderate	<p>PVC creation process might remain in the Pending state for more than two minutes. In addition, the following message is stored in the IBM Storage Enabler for Containers pod log No storage resource that can match the requirements found. Reason is: A volume with this name already exists. Array is: <code>storage_system_name</code>. Requested volume name is: <code>volume_name..</code></p> <p>To resolve this issue:</p> <ul style="list-style-type: none"> <li>• Delete the pending PVC, using <code>kubectl delete pvc PVC-&lt;ID&gt;</code> command.</li> <li>• Create a new PVC.</li> <li>• Contact your storage administrator, requesting to delete the failed PVC volume on the storage system itself. Then, refresh the storage system in the Spectrum Connect GUI.</li> </ul>
<b>UB-1073</b>	Moderate	<p>Pod becomes unresponsive, persisting in the <i>ContainerCreating</i> status. An error indicating a failure to discover a new volume WWN, while running the <code>multipath -ll</code> command, is stored in the FlexVolume log. This log belongs to the node, where the pod was scheduled.</p> <p>To resolve this issue, restart the <i>multipathd</i> service by running the <code>service multipathd restart</code> command.</p>
<b>UB-1733</b>	Moderate	<p>When a pod is deleted, it might become unresponsive, persisting in the <i>Terminating</i> status.</p> <p>Currently there is no solution or workaround for this limitation.</p>

Table 3: Known issues (continued)

Ticket ID	Severity	Description
UB-1534	Low	When used on DS8000 storage systems, the Enabler for Containers service cannot be stopped via the <code>./ubiquity_cli.sh -a stop</code> command.  Currently there is no solution or workaround for this limitation.

## Related information and publications

You can find additional information and publications related to IBM Storage Enabler for Containers on the following information sources.

- [IBM Knowledge Center](http://ibm.com/support/knowledgecenter) (ibm.com/support/knowledgecenter)
- [IBM DS8000® on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/ST8NCA) (ibm.com/support/knowledgecenter/ST8NCA)
- [IBM DS8880 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/ST5GLJ) (ibm.com/support/knowledgecenter/ST5GLJ)
- [IBM FlashSystem V9000 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STKMVQV) (ibm.com/support/knowledgecenter/STKMVQV)
- [IBM SAN Volume Controller on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STPVGU) (ibm.com/support/knowledgecenter/STPVGU)
- [IBM Spectrum Scale on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STXKQY) (ibm.com/support/knowledgecenter/STXKQY)
- [IBM Storwize V3500 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STLM6B) (ibm.com/support/knowledgecenter/STLM6B)
- [IBM Storwize V3700 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STLM5A) (ibm.com/support/knowledgecenter/STLM5A)
- [IBM Storwize V5000 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STHGJ) (ibm.com/support/knowledgecenter/STHGJ)
- [IBM Storwize V7000 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/ST3FR7) (ibm.com/support/knowledgecenter/ST3FR7)
- [IBM Storwize V7000 Unified on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/ST5Q4U) (ibm.com/support/knowledgecenter/ST5Q4U)
- [IBM XIV Storage System on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STJTAG) (ibm.com/support/knowledgecenter/STJTAG)
- [IBM Spectrum Accelerate on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STZSWD) (ibm.com/support/knowledgecenter/STZSWD)
- [IBM FlashSystem A9000 on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STJKMM) (ibm.com/support/knowledgecenter/STJKMM)
- [IBM FlashSystem A9000R on IBM Knowledge Center](http://ibm.com/support/knowledgecenter/STJKN5) (ibm.com/support/knowledgecenter/STJKN5)
- [Spectrum Connect-related questions on IBM developerWorks®](http://developer.ibm.com/answers/topics/spectrum%20control/#) (developer.ibm.com/answers/topics/spectrum%20control/#)
- [Persistent volumes on Kubernetes](http://kubernetes.io/docs/concepts/storage/volumes) (kubernetes.io/docs/concepts/storage/volumes)

## Getting information, help, and service

If you need help, service, technical assistance, or want more information about IBM products, you can find various sources to assist you. You can view the following websites to get information about IBM products and services and to find the latest technical information and support.

- [IBM website](http://ibm.com) (ibm.com®)
- [IBM Support Portal website](http://ibm.com/support/entry/portal/support?brandind=Hardware~System_Storage) (ibm.com/support/entry/portal/support?brandind=Hardware~System\_Storage)
- [IBM Directory of Worldwide Contacts website](http://ibm.com/planetwide) (ibm.com/planetwide)

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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