

# KNIME Big Data Extensions Admin Guide

KNIME AG, Zurich, Switzerland  
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# Overview

KNIME Big Data Extensions integrate Apache Spark and the Apache Hadoop ecosystem with KNIME Analytics Platform.

This guide is aimed at IT professionals who need to integrate KNIME Analytics Platform with an existing Hadoop/Spark environment.

The steps in this guide are required so that users of KNIME Analytics Platform run Spark workflows. Note that running Spark workflows on KNIME Server requires **additional** steps outlined in [Secured Cluster Connection Guide for KNIME Server](#).

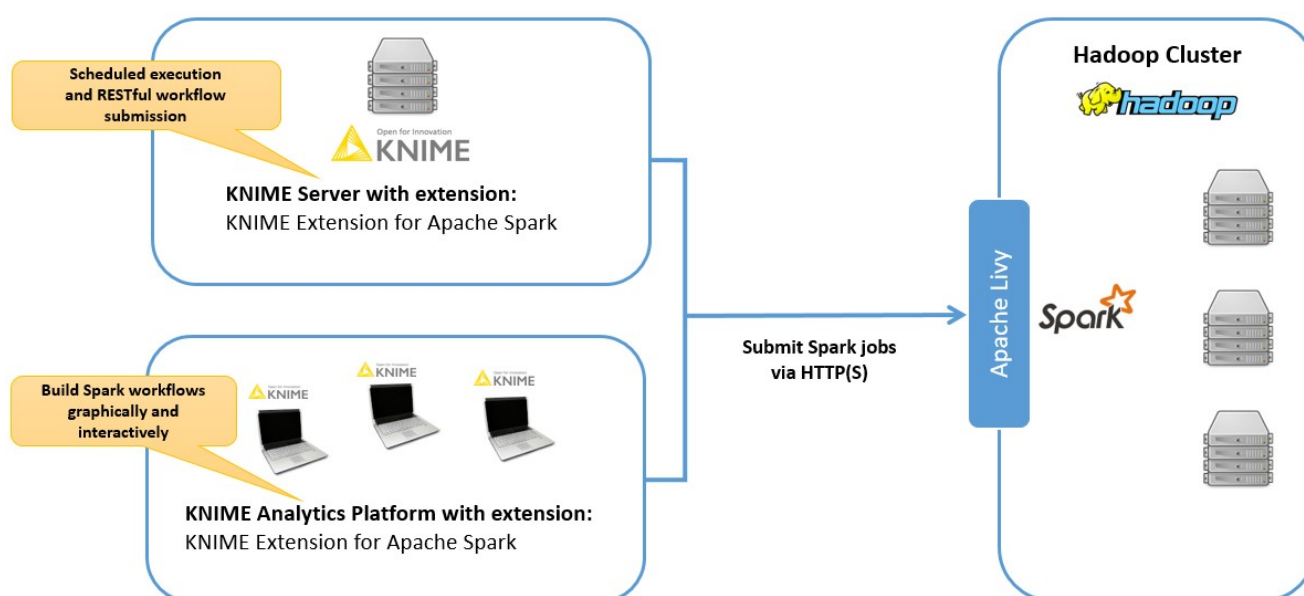


Figure 1. Overall architecture

KNIME Extension for Apache Spark requires [Apache Livy](#) as REST service to be installed on an edge/fronted node of the cluster. See the requirements in the compatibility lists below and howto [install Livy](#).

## General Compatibility

KNIME Extension for Apache Spark is compatible with

- Spark 2.x - 3.5
- Livy 0.4 - 0.7

## Cloudera CDP Compatibility

*KNIME Extension for Apache Spark* is compatible with

- Spark 3.3 on CDP 7.1.8 as provided by [Cloudera CDS 3.3](#)
- Spark 3.2 on CDP 7.1.7 as provided by [Cloudera CDS 3.2](#)
- Spark 3.1 on CDP 7.1.6 as provided by [Cloudera CDS 3.1](#)
- Spark 3.0 on CDP 7.1.5 as provided by [Cloudera CDS 3.0](#)
- Spark 2.4 as included in CDP 7

## Cloudera CDH Compatibility

*KNIME Extension for Apache Spark* is compatible with

- Spark 2.x on CDH 5 as provided by [Cloudera CDS](#)
- Spark 2.x as included in CDH 6



Cloudera CDH 5/6 does not include Livy, therefore KNIME provides CSDs/parcels for Livy (see [Cloudera CDH](#)).

## Cloudera HDP Compatibility

*KNIME Extension for Apache Spark* is compatible with

- Spark 2.x as included in HDP 2.6.3 - 2.6.5
- Spark 2.x as included in HDP 3.0.0 - 3.1.5

## Amazon EMR Compatibility

*KNIME Extension for Apache Spark* is compatible with

- EMR 7.x with Spark 3.5 and Livy 0.7 - 0.8
- EMR 6.x with Spark 3.x and Livy 0.6 - 0.7
- EMR 5.9+ with Spark 2.x and Livy 0.4 - 0.7

## Phase out of support for H2O Sparkling Water

Starting with KNIME Analytics Platform version 5.3 the support for **H2O Sparkling Water** is being phased out, and no support will be added for upcoming Spark versions. That means, Sparkling Water is not supported anymore on clusters with Spark 3.4 or higher, e.g. Databricks. Only the "Create Local Big Data Environment" node is currently still supported, however this support will also be removed in the near future.

## Apache Livy setup

### Cloudera CDP

Cloudera Runtime 7.0 - 7.1 includes Spark 2.4 and Livy as Service. Cloudera provides Spark 3.x as a Custom Service Descriptor that can coexist with the included Spark version. See *Installing CDS Powered by Apache Spark* in the **CDS 3.3** or **CDS 3.2** or **CDS 3.1** or **CDS 3.0** Cloudera documentation for more information. Note that Livy in the Spark 3.x CSD uses 28998 instead of the usual 8998 as default port.



If you plan to run Spark workflows on KNIME Server: Please consult the **Secured Cluster Connection Guide for KNIME Server** to allow KNIME Server to impersonate users.

### Cloudera CDH

For Cloudera CDH, KNIME provides a CSD and parcel so that Livy can be installed as an add-on service. The current version of Livy for CDH provided by KNIME is 0.5.0.knime3.



The following steps describe how to install Livy as managed service through Cloudera Manager using a parcel. If in doubt, please also consider the official **Cloudera documentation on handling parcels**.

### Prerequisites

- A cluster with CDH 5.8 and newer, or CDH 6.0 and newer
  - *Only On CDH 5:* Spark 2.2 or higher as an add-on service (provided by **Cloudera CDS**)
- Root shell access (e.g. via SSH) on the machine where Cloudera Manager is installed.

- Full administrative access on the Cloudera Manager WebUI.

## Installation steps

### In a root shell on the machine where Cloudera Manager is installed:

1. Download a matching CSD from [CSDs for Cloudera CDH](#) to `/opt/cloudera/csd/` on the machine, where Cloudera Manager is installed.
2. **Only if Cloudera Manager cannot access the public internet:** Download/copy the matching `.parcel` and `.sha1` file from [Parcels for Cloudera CDH](#) to `/opt/cloudera/parcel-repo`.
3. Restart Cloudera Manager from the command line, for example with:

```
systemctl restart cloudera-scm-server
```

### In the Cloudera Manager WebUI:

1. Navigate to the Parcel manager and locate the LIVY parcel.
2. Download (unless already done manually), Distribute and Activate the LIVY parcel.
3. Add the Livy Service to your cluster (see the official Cloudera documentation on [adding services](#)).
4. Navigate to the HDFS service configuration and add the following settings to the *Cluster-wide Advanced Configuration Snippet (Safety Valve) for core-site.xml*:
  - `hadoop.proxyuser.livy.hosts=*`
  - `hadoop.proxyuser.livy.groups=*`
5. *If your cluster is using [HDFS Transparent Encryption](#):* Navigate to the KMS service configuration and add the following settings to the *Key Management Server Advanced Configuration Snippet (Safety Valve) for kms-site.xml*:
  - `hadoop.kms.proxyuser.livy.hosts=*`
  - `hadoop.kms.proxyuser.livy.groups=*`
6. *If you plan to run Spark workflows on KNIME Server:* Please consult the [Secured Cluster Connection Guide for KNIME Server](#) to allow KNIME Server to impersonate users.
7. Restart all services affected by your configuration changes.

## Cloudera HDP

HDP already includes compatible versions of Apache Livy and Spark 2 (see [Cloudera HDP Compatibility](#)). Please follow the respective Hortonworks documentation to install Spark with the *Livy for Spark2 Server* component:

- [Installing Spark Using Ambari \(HDP 2.6.5\)](#)
- [Install Spark Using Ambari \(HDP 3.1\)](#)



KNIME Extension for Apache Spark only supports *Livy for Spark2 Server* which uses Spark 2. The *Livy for Spark Server* component is not supported, since it is based on Spark 1.

## Amazon EMR

Amazon EMR already includes compatible versions of Apache Livy and Spark 2 (see [Amazon EMR Compatibility](#)), simply make sure to select *Livy* in the software configuration of your cluster.

# Downloads

## Apache Livy downloads

### CSDs for Cloudera CDH

- [CSD for CDH 5](#)
- [CSD for CDH 6](#)

### Parcels for Cloudera CDH

#### Download links for CDH 5:

|                    |                                                       |                                                       |                                                      |
|--------------------|-------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------|
| <b>RHEL/CentOS</b> | RHEL 7: <a href="#">parcel</a> / <a href="#">sha</a>  | RHEL 6: <a href="#">parcel</a> / <a href="#">sha</a>  | RHEL 5: <a href="#">parcel</a> / <a href="#">sha</a> |
| <b>SLES</b>        | SLES 12: <a href="#">parcel</a> / <a href="#">sha</a> | SLES 11: <a href="#">parcel</a> / <a href="#">sha</a> |                                                      |

|               |                                                                     |                                                                     |                                                                      |
|---------------|---------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Ubuntu</b> | Ubuntu 16 (Xenial):<br><a href="#">parcel</a> / <a href="#">sha</a> | Ubuntu 14 (Trusty):<br><a href="#">parcel</a> / <a href="#">sha</a> | Ubuntu 12 (Precise):<br><a href="#">parcel</a> / <a href="#">sha</a> |
| <b>Debian</b> | Debian 8 (Jessie):<br><a href="#">parcel</a> / <a href="#">sha</a>  | Debian 7 (Wheezy):<br><a href="#">parcel</a> / <a href="#">sha</a>  |                                                                      |

### Download links for CDH 6

|                    |                                                                     |                                                                     |                                                                      |
|--------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>RHEL/CentOS</b> | RHEL 7: <a href="#">parcel</a> / <a href="#">sha</a>                | RHEL 6: <a href="#">parcel</a> / <a href="#">sha</a>                | RHEL 5: <a href="#">parcel</a> / <a href="#">sha</a>                 |
| <b>SLES</b>        | SLES 12: <a href="#">parcel</a> / <a href="#">sha</a>               | SLES 11: <a href="#">parcel</a> / <a href="#">sha</a>               |                                                                      |
| <b>Ubuntu</b>      | Ubuntu 16 (Xenial):<br><a href="#">parcel</a> / <a href="#">sha</a> | Ubuntu 14 (Trusty):<br><a href="#">parcel</a> / <a href="#">sha</a> | Ubuntu 12 (Precise):<br><a href="#">parcel</a> / <a href="#">sha</a> |
| <b>Debian</b>      | Debian 8 (Jessie):<br><a href="#">parcel</a> / <a href="#">sha</a>  | Debian 7 (Wheezy):<br><a href="#">parcel</a> / <a href="#">sha</a>  |                                                                      |



KNIME AG  
Talacker 50  
8001 Zurich, Switzerland  
[www.knime.com](http://www.knime.com)  
[info@knime.com](mailto:info@knime.com)