Pivotal HAWQ

Version 1.2.0

Rev: A01 – September 18, 2014

What's in the Release Notes

This document provides information related to the Pivotal HAWQ 1.2.1 release. It includes the following topics:

Welcome to HAWQ 1.2.1

HAWQ extends the functionality of Pivotal Hadoop (HD) Enterprise, adding rich, proven parallel SQL processing facilities. These SQL processing facilities enhance productivity, rendering Hadoop queries faster than any Hadoop-based query interface on the market. HAWQ enables data analysis for a variety of Hadoop-based data formats using the Pivotal Extension Framework (PXF), without duplicating or converting source files.

HAWQ is a parallel SQL query engine with the scalability and convenience of Hadoop. Using HAWQ functionality, you can interact with petabyte range data sets. HAWQ provides users with a complete, standards compliant SQL interface. HAWQ consistently performs tens to hundreds of times faster than all Hadoop query engines in the market.

About the HAWQ Components

HAWQ comprises the following components:

- HAWQ Parallel SQL Query Engine

- PXF

- MADlib

HAWQ Parallel SQL Query Engine

The HAWQ Parallel SQL Query Engine combines the key technological advantages of the industry-leading Greenplum Database with the scalability and convenience of Hadoop. It reads data from and writes data to HDFS natively. Using HAWQ functionality, you can interact with petabyte range data sets. It provides users with a complete, standards compliant SQL interface. Leveraging Greenplum Database's parallel database technology, it consistently performs tens to hundreds of times faster than all Hadoop query engines in the market.

PXF

PXF enables SQL querying on data in the Hadoop components such as HBase, Hive, and any other distributed data file types. These queries execute in a single, zero materialization and fully-parallel workflow. PXF also uses the HAWQ advanced query optimizer and executor to run analytics on these external data sources. PXF connects Hadoop-based components to facilitate data joins, such as between HAWQ tables and HBase table. Additionally, the framework is designed for extensibility, so that user-defined connectors can provide parallel access to other data storage mechanisms and file types.

PXF Interoperability

PXF operates as an integral part of HAWQ, and as a light add-on to Pivotal HD. On the database side, PXF leverages the external table custom protocol system. The PXF component physically lives on the Namenode and each or some Datanodes. It operates mostly as a separate service and does not interfere with Hadoop components internals.

MADlib

MADlib is an open-source library for scalable in-database analytics. It provides data-parallel implementations of mathematical, statistical and machine learning methods for structured and unstructured data. MADlib combines the efforts used in commercial practice, academic research, and open-source development. You can find more information at http://madlib.net .

What's New in the Release

⚠️ **Note**

For specific information about a previous release, please refer to the associated release notes.

HAWQ 1.2.1 supports the following features:

- **Parquet Storage Format:** HAWQ 1.2.1 supports the Parquet storage format. Parquet is a columnar storage format for Hadoop and supports efficient compression and encoding schemes.

- **Backup and Restore:** HAWQ 1.2.1 supports parallel and non-parallel backup and restore. Parallel backup and restore ensure that operations scale regardless of the number of datanodes.

- **libhdfs:** New APIs that get a detailed error message is added to libhdfs3, version 2.

- **LDAP Authentication:** HAWQ 1.2.1 supports LDAP authentication for HAWQ database users..

- **SECURITY DEFINER**: HAWQ now supports SECURITY DEFINER in addition to SECURITY INVOKER for CREATE FUNCTION and ALTER FUNCTION.

- **PXF**: PFX can now be run as a service. It includes significant (20%-70%) performance improvements on HDFS text scans and also provides Hive connector support for Kerberized Hive.
  Two new Hive connectors provide Hive 0.12 connectivity and significantly speed up RCFile and Text file based Hive tables.

- **User Defined Types/Operators**: 1.2.1 adds support for User Defined Types and User Defined Operators.

- **gppkg**: gppkg is now used to install the HAWQ extensions for PL/R, pgcrypto, and PL/Java.

- **HAWQ error message improvement:** When HAWQ fails to access the HDFS, detailed error message are printed to indicate the issue.

HAWQ 1.2.1 supports the Pivotal HD 2.1 platform.

Installation Options

There are two ways to install HAWQ.

- Pivotal Command Center Command Line Interface – Please see *Pivotal HD Enterprise Installation and Administration*.

- Stand alone install – You can install HAWQ without using the PivotalHD tools ICM and PCC. For more information, please see *HAWQ Installation and Upgrade*.

Upgrading HAWQ

For more information about upgrading HAWQ and other components, see the *HAWQ Installation and Upgrade Guide* .

Supported Upgrade Paths

The upgrade path supported for this release are:

- HAWQ 1.2.0.0 to HAWQ 1.2.1

- HAWQ 1.1.x to HAWQ 1.2.1

Pivotal recommends that you use the Pivotal Command Center CLI (icm_client) to upgrade your HAWQ system.

Resolved Issues

The tables below list issues resolved in HAWQ 1.2.0.0, 1.2.0.0, 1.2.0.1, and 1.2.1.0.

⚠ **Note**

For issues resolved in prior releases, refer to the corresponding release notes available from the Pivotal documentation site.

HAWQ 1.2.1 Resolved Issues

Issue	Category	Description
HAWQ-2648	Data Loading, GPFX	PXF does not work with euc-js and sjis encoding but gpfdist does. This issue has been resolved.
HAWQ-2418	Catalog and Metadata	System panicked at@ "GetQueryContextDipsatchingFileLocation" This issue has been resolved.
HAWQ-2406	GPFX	PXF not able to fetch more then 353 partitions from hive table. This issue has been resolved.
HAWQ-2368	DML	COPY on some particular data causes a postmaster reset. This issue has been resolved.
HAWQ-2345	GPFX	GPXF/Hawq issue when inserting data into writable external table. This issue has been resolved.
HAWQ-2262	Utility Commands	gprecoverseg fails because of stale fifo pgsql_tmp_gpcdb2.sisc_0_114951_564_0_read. This issue has been resolved.
HAWQ-2170	Query Optimizer	Optimizer query crashing for logical window with no window functions. This issue has been resolved.
HAWQ-2143	Management Tools	You may encounter this issue after performing the following tasks: 1. Upgrading the HAWQ cluster from 1.1.x to 1.2.x. 2. Running gpexpand This issue has been resolved.
HAWQ-2008	HDFS Access Layer	query failed with "ERROR: Append-Only Storage Read could not open segment file". This issue has been resolved.
HAWQ-1859	Build and Installer	Run plr_install.sh to copy the pgcrypto.so on the master and segments. To import these pgcrypto functions for another database, run the following: psql -d<TARGET_DATABASE> -f $GPHOME/share/postgresql/contrib/pgcrypto.sql This issue has been resolved.
HAWQ-1834	Build and Installer	plr_install.sh failed with "Platform not supported" This issue has been resolved.
HAWQ-1809	Query Optimizer	Hawq Master SIGSEGV when mapreduce job is inserting data into Hawq table. This issue has been resolved.

Issue	Category	Description
HAWQ-1741	Query Execution	gpsd / pg_dump operation causes PANIC at HAWQ This issue has been resolved.
HAWQ-1728	Query Optimizer	If ORCA is on, the INSERT command fails, but works fine with ORCA off. This issue has been resolved.
HAWQ-1225	Query Execution	Need a mechanism to abort query before gp_vmem_protect_limit is hit. This issue has been resolved.
HAWQ-1219	Query Optimizer	Query (With clause Select) fails with SIGSEV generating core files. This issue has been resolved.
HD-11130	ICM	In a secure cluster, if yarn nodes are not colocated with namenode, querying for external tables with HAWQ will not work

HAWQ 1.2.0.1 Resolved Issues

Issue	Category	Description
HAWQ-1453	Transaction	Executing concurrent INSERT and ALTER TABLE statements, generates the following error: ERROR: read beyond eof in table "tbl_isolation" in file "hdfs://smdw:9000/hawq/gpdb20131226t190718-885441423/releng4/16385/16523/58847.1" (cdbbufferedread.c:199) (seg4 slice1 sdw2:31100 pid=316232) (cdbdisp.c:1571) This issue has been resolved.

HAWQ 1.2.0.0 Resolved Issues

Issue	Category	Description
HAWQ-1834	Build and Installer	The plr_install.sh script failed with the error - *Platform not supported*. This issue has been resolved.
HAWQ-1721	Query Optimizer	The optimizer failed to process a query with join aliases. This issue has been resolved in the optimizer.
HAWQ-1706	Query Optimizer	For certain queries that have inner and outer joins, the optimizer failed while exploring alternative plans leading to a crash. This issue is now fixed in the optimizer.
HAWQ-1702	Query Optimizer	For some queries containing built-in functions such as: pg_stat_get_backend_pid, pg_stat_get_backend_activity_start, or pg_stat_get_backend_userid; the optimizer might generate incorrect plans. This was caused by function properties being mislabeled in the catalog. This issue is now fixed in the optimizer.

Issue	Category	Description
HAWQ-1694	HDFS Access Layer, Query Execution	In a kerberized cluster with a race condition, the master released the file system credentials before the segments reached the HDFS name node. This caused the entire query to fail. This issue has been resolved.
HAWQ-1692	Query Optimizer PXF	PXF Predicate Push-down did not work if Orca was enabled. This issue has been resolved.
HAWQ-1618	Infrastructure	YARN failed to load in SingleCluster This issue has been resolved.
HAWQ-1610	Build and Installer	PL/R package changes. Check the name of your plr package. If it is plr-1.1.4.0-5152.x86_64.tgz,download the latest version plr-1.1.4.0-5664.x86_64.tgz for HAWQ 1.1.4.0 from Pivotal. The new package contains the file plr.sql with the necessary PL/R helper functions. This issue has been resolved.
HAWQ-1527	Build and Installer	HAWQ and PXF version strings are now 4 digits.
HAWQ-1491	AO tables Column Store	After truncating a table, the HAWQ input format did not work with the truncated table. This issue has been resolved.
HAWQ-1490	AO tables Column Store	The function HAWQConvertUtil.bytesToDecimal was not thread safe. This is because decimalCharArray is a public static variable. This issue has been resolved.
HAWQ-1489	AO tables Column Store	After truncating a table, gpextract did not work. This issue has been resolved.
HAWQ-1488	AO tables Column Store	If the HAWQAORecord.getBoolean function encountered a column with boolean data type, it returned the incorrect result, false. This issue has been resolved.
HAWQ-1455	Dispatch	Signal re-entrant during session idle. QD crashes. This issue has been resolved.
HAWQ-1451	Query Exexcution	Explain analyze statistics are not correct for work files . This issue has been resolved.
HAWQ-1450	Infrastructure	SingleCluster hdfs tool was not working with Hadoop 2.2 This issue has been resolved.

Issue	Category	Description
HAWQ-1429	Default	Unable to start HAWQ master because recovery failed. The master failed to start during recovery mode because some files existed locally and were missing on the HDFS layer. This issue has been resolved.
HAWQ-1418	Catalog and Metadata	HAWQ 1.1.4.0 did not support aggregate derived functions. This issue has been resolved.
HAWQ-1379	Management Tools	hawq_toolkit cannot be used directly after upgrading from an old version. This is because toolkit related objects are not created in the old version. **Workaround**: for each existing database instance where a user wants to use hawq_toolkit, perform following steps as superuser: 1. create a new schema named hawq_toolkit: psql -q -c "CREATE SCHEMA hawq_toolkit" $DATABASE_NAME 2. create toolkit related objects: psql -q -f $INSTALL_DIR/share/postgresql/gp_toolkit.sql $DATABASE_NAME After performing the above operations on template1, every newly created database using template1 as template database, will have hawq_toolkit automatically, meaning no need to perform the above operation.
HAWQ-1358	DDL Object	Received a confusing error when creating a table that distributes by text data type. This issue has been resolved.
HAWQ-1260	Query Execution	A certain class of uncorrelated subqueries are known to fail. The subquery should have a user defined object and a distributed table. For example: SELECT * FROM t1 WHERE t1.a < (SELECT foo(t2.b) FROM t2 LIMIT 1); In this example, the subquery "SELECT foo(t2.b) FROM t2 LIMIT 1" has no correlation with the outer query. The subquery also invokes the UDF "foo()" and queries a distributed table "t2". Another example: SELECT array(SELECT foo(t1.a) FROM t1); Such type of queries fail with the following error: ERROR cache lookedup failed for ... This issue has been resolved.
HAWQ-1184	DDL Object	ALTER TABLE ADD COLUMN with default NULL was not supported for append-only tables. This syntax is now supported.
HAWQ-1078	Query Execution	Continuously issued deepslice queries cause error in HDFS with kerberos. This issue has been resolved.

Issue	Category	Description
HAWQ-872	DDL Object	In certain cases, INSERT INTO SELECT from the same table might insert an incorrect number of tuples. This happens if the table is altered prior to the insert. This issue has been resolved.

PXF 2.x.x Resolved Issues

Issue	Category	Description
HAWQ-1482	PXF	gphdfilters created a filter in the reverse order This issue has been resolved.
HAWQ-1364	PXF	While copying data to a writable interface HDFS table, showed remote component error 500. This issue has been resolved.

Known Issues

HAWQ 1.2.1 Known Issues

Issue	Category	Description
HAWQ-2730	Data Loading	An insert command that inserts a very large number of tuples might show an excessive amount of memory used on the segments. In some circumstances, this can cause the insert query to error out. Workaround: Split the insert into several smaller commands that insert fewer tuples.
HAWQ-2699	AO tables, Column Store and Parquet	Difference in compression ratios when inserting directly from external table and CTAS using order by.
HAWQ-2655	DLL-Object	Can't cancel create/drop/truncate table when hdfs is stopped.
HAWQ-2613	Query Execution	EXPLAIN of a query inside a cursor could crash HAWQ.
HAWQ-2530	Query Execution	The Result node in optimizer consumes much higher memory than the planner. In HAWQ, set returning functions maintain their state during the execution of the query. In some cases this could result in larger memory utilization.

Issue	Category	Description
HAWQ-2447	Query Execution	Select operations with a subquery on external web tables results in an out of memory error. Currently, HAWQ does not collect stats from external tables and thus could produce wrong plans of queries involving external tables. You should avoid direct query against external tables.The workaround is to convert/copy an external table to a normal (internal) table, then use it for analysis or running queries.
HAWQ-2370	DML	For sub-partitioned parquet tables, inserting data to the last sub-partition (level-2) of each level-1 partition can consume more memory than inserting data to non-last sub-partition(level-2) of each level-1 partition.
HAWQ-2267	Catalog and Metadata	A known issue exists in operators of type <madlib.svec>. Users are warned that any queries that rely on operators of <madlib.svec> could give incorrect results, such as using <madlib.svec> for GROUP BY, ORDER BY, PRIMARY KEY and INDEX. This issue is expected to be fixed when <madlib.svec> is removed from HAWQ in version 1.3.0.0. To work around this issue,avoid making use of <madlib.svec> for GROUP BY, ORDER BY, PRIMARY KEY and INDEX.
HAWQ-1903	DDL-object, Query Optimizer	User defined equality operators with Non-SQL underlying function are not currently used by the optimizer in hash join plans.
HAWQ-1038	Catalog and Metadata	Possible CAQL memory leak can occur.
HD-10233	ICM	Initialization of HAWQ in HA mode is not currently supported

HAWQ 1.2.0.1 Known Issues

Issue	Category	Description

HAWQ-1980	Query Optimizer	With ORCA enabled, queries that contain multiple join predicates with statistical correlations can cause an "Out of Memory" error.
		
		The work-around is to set the `optimizer_damping_factor_join` configuration parameter (GUC) to a low value (e.g. 0.001). For example:
		
		``
		set optimizer_damping_factor_join=0.001;
		``
		
		The `optimizer_damping_factor_join` GUC controls the impact of multiple predicates on the accuracy of row estimation. As the GUC value decreases, predicates do not result in heavy under-estimation of rows.

HAWQ-1920	Query Optimizer	In some cases, the system was getting stuck in recovery mode because segments continued to run plans with motion nodes during the recovery process. Such plans are now invalid during recovery, and are no longer being generated.
HAWQ-1918	Catalog and Metadata	Nested functions in any language are not supported in HAWQ 1.2.

Issue	Category	Description
HAWQ-1868	DML	If a query does not have a FROM clause, and contains the random() function in the SELECT clause along with another function that returns multiple rows, then the results generate the same random number rather than generating different random numbers
HAWQ-1543	Upgrade	In a single node setting, gpmigrator tries to create temporary directories twice using the same name under DATA_DIRECTORY and MASTER_DIRECTORY, set during gpinitsystem. The second time will fail.
HAWQ-1456	Transaction	Running DROP SCHEMA and CREATE TABLE on the same table makes the newly created table inaccessible.

HAWQ 1.1.x Known Issues

The table below lists known issues discovered in releases prior to the HAWQ 1.2.x release.

Issue	Category	Release	Description
HAWQ-1369	Management Tool	1.1.4.0	When the underlying HDFS is online, hawq_size_of_database includes the data size on both HDFS and local storage of the master; when the HDFS is offline, that view only has the data size on local storage of the master.
HAWQ-1368	Management Tool	1.1.4.0	The view, hawq_size_of_database, does not check user permission of those databases and only reports sizes of all user databases.
HAWQ-1270	Management Tool	1.1.4.0	The user must have access permission to the view, hawq_size_of_schema_disk.
HAWQ-1167	Performance	1.1.3.0	Enabling Kerberos shows a 10% downgrade in HAWQ performance.
HAWQ-1099	Connectivity	1.1.3.0	If you enable kerberos authentication, the ODBC function SQL GetInfo returns an incorrect version of HAWQ.
HAWQ-1056	DML	1.1.3.0	Inserting data into a temp table generates an Append-only Storage Write error.
HAWQ-859	Query Optimizer	1.1.0.3	pg_dumpall test suite runs slowly The overhead is due to the command pg_dumpall. pg_dumpall generates multiple queries over the catalog tables. Since ORCA optimizes these queries. Although these are simple queries, ORCA adds the overhead. **Workaround** : Turn ORCA off.
HAWQ-255	Network	1.1.0.1	HAWQ does not support the IPv6 protocol.
HAWQ-225	Storage	1.1.0.1	When the number of partitions or columns of a column oriented table is large or write concurrency is high, HAWQ encounters an HDFS concurrency write limitation. Data loading performance may degrade and fail. **Workaround:** for partitioned tables, load data partitions one by one, instead of loading all the data randomly to all the partitions.

Issue	Category	Release	Description
HAWQ-224	Backup and Restore	1.1.0.1	Only non-parallel logical backup and restore is supported. Pivotal recommends that you use physical backup and restore.
HAWQ-26	DDL	1.1.0.1	duplicate key violates unique constraint pg_type_typname_nsp_indexWhen two sessions attempt to create a table with the same name and in the same namespace, one of the sessions will error out with a less user-friendly error message of the form "duplicate key violates unique constraint".

PXF 2.x.x Known Issues

Issue	Description
HAWQ-2124	PXF breaks in Namenode High-availability (HA) setups. This occurs in the following setup: The first Namenode (by alphabet order) is the standby. The Namenode is up and running (meaning that you can successfully ping it). The Namenode is HDFS security enabled. **Workarounds**: You can use one of the following: Switch Namenode roles in the configuration. You will need to update the main hdfs-site config and the hdfs-client.xml file on HAWQ. OR Bring down standby Namenode. However, Pivotal does not recommend this,
HAWQ-1739	PXF does not filter UTF8 encoded parameters correctly.
HAWQ-1720	Error table has one extra error reported if the last row has an error
HAWQ-1649	Intermittent failures when using pxf_profile.
HAWQ-1481	PXF Filter pushdown handles badly constants values with embedded quotes .
HAWQ-1394	When using PXF to communicate with a kerberized Pivotal Hadoop, PXF assumes that P-HD is using port 8020. If that is not the case, PXF will fail to communicate and transfer data. You will see the following message: ERROR: fail to get filesystem credential for uri hdfs://<namenode>:8020/ (cdbfilesystemcredential.c:194)

HAWQ and Pivotal HD Interoperability

Pivotal releases a number of client tool packages on various platforms that can be used to connect to HAWQ. The following table describes the client tool package compatibility with HAWQ. Client tool packages are available at the Pivotal Download Center at https://network.pivotal.io/products. HAWQ is compatible with most GPDB client and Loader packages at the Greenplum database download site.

Table: Interoperability Matrix

Client package	Description	Operating system	Client version	HAWQ version
Connectivity	Standard PostgreSQL Database Drivers (ODBC, JDBC). The HAWQ drivers are available for download from the location under Pivotal HD called " HAWQ ODBC and JDBC Drivers" at https://network.pivotal.io/products/pivotal-hd	Windows XP 32 bit RedHat 5, 64 bit	HAWQ: 7.1.4 GPDB: 4.3.2.0	1.2.1.0
HAWQ Client	Command Line Interface	Windows XP 32 bit RedHat 5, 64 bit	4.3.2.0	1.2.1.0
Pivotal Command Center	A web-based tool for managing and monitoring your Pivotal HD cluster. Note: Pivotal Command Center 2.0.x does not support DCA V1, DCA V2 or Greenplum Database.	Windows 2008 RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	2.2	1.2.1.0
PXF	Extensibility layer to provide support for external data formats such as HBase and Hive.	Windows 2008 RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	2.2	1.2.1.0
Pivotal HD	Pivotal Hadoop	RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	2.0.1	1.2.1.0

Client package	Description	Operating system	Client version	HAWQ version
pgcrypto	A library of cryptographic functions	Windows 2008 RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	1.2.1.0, 1.2.0.0 1.1.3.0-4609	1.2.1.0 1.1.3.x and 1.1.4.x
PL/R	Ability to create and invoke user defined functions in R	Windows 2008 RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	1.2.1.0, 1.2.0.0 1.1.4.0-5664	1.2.1.0 1.1.4.x
PL/Java	Ability to create and invoke user defined functions in Java	Windows 2008 RedHat 6.4 and 6.2, 64 bit CentOS 6.4 and 6.2, 64 bit	1.2.1.0 1.2.0.1	1.2.1.0

HAWQ and Pivotal HD Documentation

Documentation for all releases of HAWQ and related products is available in PDF and HTML format on our website at pivotalhd.docs.pivotal.io.

In addition, you can still access previous versions of HAWQ and Pivotal HD product documentation from EMC's Support Zone.