

Vertica® Analytic Database 4.1, Revision 1

# Release Notes

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# Vertica® Analytic Database 4.1

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Vertica is pleased to announce the general availability of the Vertica® Analytic Database Release 4.1.

This release includes enhancements on reliability, performance, scalability, and manageability, delivering a more comprehensive and improved out-of-the-box experience. Most of the features implemented in this release are a result of your feedback. We hope you have a great experience with the product and welcome your continued input.

The topics in this book describe important information about this release that you should review before you install or upgrade the product. See also the Resolved and Known Issues on the Vertica Web site **download page** [http://myvertica.vertica.com/v-zone/download\\_vertica](http://myvertica.vertica.com/v-zone/download_vertica), which contains information about fixed customer-reported issues.

## Vendor Information

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## Product and Version

Vertica® Analytic Database 4.1

## Media

The Vertica software and documentation are available for download (with registration) on the Vertica Web site **download page** [http://myvertica.vertica.com/v-zone/download\\_vertica](http://myvertica.vertica.com/v-zone/download_vertica). To obtain these materials on DVD, contact **Technical Support** (page 10).

# Supported Platforms

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## Hardware

Constructing a hardware platform for your Vertica database involves a number of decisions including your data volumes, number of users and performance requirements.

For guidance or questions, contact Technical Support.

## Operating Systems for Vertica Database Servers

### Supported for All Purposes Including Production

- Red Hat Enterprise Linux 4, 64-bit
- Red Hat Enterprise Linux 5, 64-bit
- SUSE Linux Enterprise Server 10, 64-bit
- SUSE Linux Enterprise Server 11, 64-bit
- CentOS 4 (Use Red Hat Enterprise Linux 4, 64-bit RPM)
- CentOS 5 (Use Red Hat Enterprise Linux 5, 64-bit RPM)
- Debian 5.0, 64 bit

### Supported for Non-production (Testing and Evaluation) Purposes Only

- Red Hat Enterprise Linux 4, 32-bit
- Red Hat Enterprise Linux 5, 32-bit
- SUSE Linux Enterprise Server 10, 32-bit
- SUSE Linux Enterprise Server 11, 32-bit
- Fedora Core 10, 32-bit
- Fedora Core 10, 64-bit
- Fedora Core 11, 32-bit
- Fedora Core 11, 64-bit

### Supported Client Interfaces and Platforms:

- 32-bit and 64-bit ODBC for AIX 5.3 with unixODBC
- 32-bit and 64-bit ODBC for Windows
- 32-bit and 64-bit ODBC Linux (Red Hat 4 and 5, Suse 10) with unixODBC and iODBC Driver Managers
- 32-bit and 64-bit ODBC Sun Solaris SPARC 10 with iODBC, unixODBC, and Data Direct Connect Driver Managers (certified with select third-party tools only)
- 32-bit ODBC Sun Solaris x86 10 with iODBC and unixODBC Driver Managers (certified with select third-party tools only)
- ADO.NET for Microsoft .NET Framework 3.0 SP1 (minimum)
- 32-bit and 64-bit JDBC for all platforms
- Python and Perl for all platforms

- Informatica Server and Client Plug-ins for 32- and 64-bit Windows and Linux, and 32-bit Solaris SPARC
- vsql on Red Hat 4 and 5, Suse 10 and 11

The ODBC driver is ODBC Level 3.5.1 compliant. The JDBC driver is JDBC 3.0 compliant and based on JDK 5.

### VMWare

Vertica supports vSphere 4.0. vSphere ESXi 4.0 is not supported.

### The Server Download Package

Download the Vertica® Analytic Database server package that matches the word size (32-bit or 64-bit) of the operating system on which you intend to install it. If the installer reports multiple dependency problems, you are probably trying to install the wrong package. For example, if you install a 64-bit Vertica database package on a 64-bit computer and get dependency errors, you are probably running a 32-bit version of Linux and need a 32-bit RPM package.

Use a Web browser to download the Vertica server package from the **Vertica Website Download Page** [http://myvertica.vertica.com/v-zone/download\\_vertica](http://myvertica.vertica.com/v-zone/download_vertica).

After you have installed the server package, read the Known Issues section in the Resolved and Known Issues before you run the `install_vertica` installation script. The Resolved and Known Issues is available on the Downloads site after you choose your server package and accept the license agreement.

### The Client Download Package

The client driver version should match the version of the server on which the database runs. For example, all Vertica client drivers 3.0 require Vertica® Analytic Database server version 3.0 or later.

**Note:** Vertica Server Version 4.1 is backwards compatible with the Vertica Version 4.0 client drivers. Use the older version of the drivers if you want to preserve the client behavior of Vertica Version 4.0. Future versions of Vertica may not be backwards compatible with older drivers, so you should migrate your client applications to the new client drivers as soon as possible.

For additional information about supported drivers, see Driver Prerequisites in the Programmer's Guide.

# Software Compatibility

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For optimal performance, Vertica is designed to use all available resources on each host machine. Vertica recommends that you:

- Remove or disable all non-essential applications from cluster hosts
- Deploy Vertica as the only active process on each host—other than Linux processes

# Version Compatibility and Upgrade Path

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Vertica can be upgraded, as follows:

- Vertica 2.0 to 2.1.
- Vertica 2.1 to 2.5. This upgrade is permanent because the process of loading data into the upgraded system modifies VARCHARs.
- Vertica 2.5 to 3.0.
- Vertica 3.0 to 3.5.
- Vertica 3.5 to 4.0.
- Vertica 4.0 to 4.1.

**IMPORTANT!** Vertica strongly recommends that you follow the above upgrade path. If you must skip a release and upgrade (for example) from 3.5 directly to 4.1, make sure you read both the Release Notes and Resolved and Known Issues for each version you skip. See the **Downloads page** [http://www.vertica.com/v-zone/download\\_vertica](http://www.vertica.com/v-zone/download_vertica) for previous releases of the documentation.

See the Installation Guide for instructions.



# Installation and Upgrades

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This section contains special announcements about installation, upgrade, migration, and packaging. For complete information, see the Installation Guide.

## Installation without parameters

If you run the Vertica installation script without parameters, the script performs a single-node install on `localhost`. This means that if you try to add a node later, you must first uninstall Vertica before you can proceed. See Installing Vertica in the Installation Guide.

## Upgrades

Upgrading Vertica from version 2.1 to 2.5 is permanent because the process of loading data into the upgraded system modifies `VARCHAR` data types.

## Documentation changes

The HTML output, which is still provided in `.tar` and `.zip` files, now extracts to an `\HTML\Master` directory only. There are no longer individual folders for each book because they are not necessary.

# Technical Support

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To submit problem reports, questions, comments, and suggestions, use the Technical Support page on the Vertica Systems, Inc., Web site.

**Note:** You must be a registered user in order to access the support page.

- 1 Go to <http://www.vertica.com/support> (*http://www.vertica.com/support*).
- 2 Click **My Support**.

You can also email [verticahelp@vertica.com](mailto:verticahelp@vertica.com).

Before you report a problem, run the Diagnostics Utility described in the Troubleshooting Guide and attach the resulting `.zip` file to your ticket.

# New Features

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This section briefly describes new functionality and enhancements in Vertica 4.1 and in subsequent point releases.

## New Features in Vertica 4.1

This section describes new functionality and enhancements in Vertica 4.1.

### Enhanced Password Security Policies

Vertica now lets you set password policies in a flexible manner. The newly-introduced profile system contains the password policies. You can create different profiles for different types of users (for example, one profile for interactive users and another for user accounts used by applications). You then assign users to each profile to set the password policy for the user.

Profiles contain many parameters you can configure to set password policy. Some of the policies you can set include:

- How often users must change passwords.
- The minimum and maximum number of characters a password can contain.
- The minimum number digits, symbols, and upper-case and lower-case letters a password must contain.
- How many consecutive failed login attempts cause Vertica to lock the user's account, preventing logins.
- How long an account that has been locked due to failed login attempts remains locked.

See Profiles in the Administrator's Guide for more information about profiles.

During an upgrade to Vertica version 4.1 from a prior version, a new profile named DEFAULT is created in the database, and all existing users are assigned to it. This default profile has the same policies that previous versions of Vertica had, so you will not see any different behavior. You can change the policies in the DEFAULT profile to implement new password policies, or you can create new profiles and assign users to them.

### New and Changed Password-Related Commands

To support the new password features, Vertica has three new statements:

- CREATE PROFILE create a new profile.
- ALTER PROFILE changes an existing profile.
- DROP PROFILE removes a profile.

In addition, several commands have been altered to work with the new password system:

- CREATE USER and ALTER USER have a new PROFILE parameter to set a user's profile, and have a different parameter for setting passwords (IDENTIFIED BY *password* REPLACE *old password*). They also have a parameter to allow you to lock the account, preventing it from logging in, and to immediately expire the password, forcing the user to change the password on the next login.

- vsql has a new meta-command, \password, to change passwords.

### Password Encryption

All passwords stored in a Vertica database are now encrypted. Databases upgraded from versions of Vertica prior to 4.1 have any unencrypted passwords automatically encrypted.

### Enhanced Subquery Support

Vertica now supports a larger class of subqueries in the following areas:

- Uncorrelated queries in the `WHERE` or `HAVING` clause as single-row expressions are permitted:  
=> `SELECT COUNT(*) FROM SubQ1 WHERE SubQ1.a = (SELECT y from SubQ2);`  
=> `SELECT COUNT(*) FROM SubQ1 GROUP BY SubQ1.a HAVING SubQ1.a = (SubQ1.a & (SELECT y from SubQ2));`
- In previous releases, a scalar subquery required a `LIMIT 1` clause. This restriction has been lifted.
- Previously the system returned an error message during subquery planning on scalar subqueries that *might* return more than one row, but now error messages occur during run time only when these queries do return more than one row:  
`ERROR: More than one row returned by a subquery used as an expression`
- `IN` clause subqueries are allowed with constants in the lefthand argument:  
=> `SELECT x, y FROM SubQ2 WHERE 1 IN (SELECT b FROM SubQ1 WHERE b = 1);`
- Subqueries can now refer to multiple outer tables:  
=> `SELECT a, x FROM SubQ1, SubQ2 WHERE SubQ2.x IN (SELECT x FROM SubQ2 WHERE SubQ2.x = SubQ1.a);`
- Subqueries can also refer to non-preserved (inner) tables in outer joins:  
=> `SELECT a, x FROM SubQ1 LEFT JOIN SubQ2 ON SubQ1.a = SubQ2.x WHERE SubQ1.a IN (SELECT x FROM SubQ2 WHERE SubQ2.x = SubQ1.a);`

### SQL Macros

SQL Macros let you define and store commonly used SQL expressions as a function and are useful for executing complex queries and combining Vertica built-in functions. To access, call the function name that you defined in your query.

**Note:** A SQL Macro can be used anywhere in a query where an ordinary SQL expression can be used, except in the table partition clause or the projection segmentation clause.

See the following topics in the SQL Reference Manual:

- CREATE FUNCTION
- ALTER FUNCTION
- DROP FUNCTION
- GRANT (Function)
- REVOKE (Function)
- V\_CATALOG.USER\_FUNCTIONS

## See Also

Using SQL Macros in the Programmer's Guide

## New System Tables

The following system tables have been added in Vertica 4.1:

- `V_CATALOG.USER_FUNCTIONS` returns metadata about user-defined SQL Macros, which store commonly used SQL expressions as a function in the Vertica catalog.
- `V_CATALOG.DELETE_VECTORS` holds information on deleted rows to speed up delete operations.
- `V_MONITOR.RESOURCE_ACQUISITIONS_HISTORY` provides details about resources (memory, open file handles, threads) acquired by any profiled query for each resource pool in the system.

See the SQL Reference Manual for details.

## See Also

**Modified System Tables** (page 19) in this guide

## New EXTRACT() Fields

The `EXTRACT()` function now takes the following fields:

- **ISODOW:** The day of the week (0 - 6; Sunday is 0)  
=> `SELECT EXTRACT(DOW FROM TIMESTAMP '2001-02-16 20:38:40');`  
Result: 5  
=> `SELECT EXTRACT(DOW FROM DATE '2001-02-16');`  
Result: 5
- **ISOYEAR:** The day of the year (1 - 365/366)  
=> `SELECT EXTRACT(DOY FROM TIMESTAMP '2001-02-16 20:38:40');`  
Result: 47  
=> `SELECT EXTRACT(DOY FROM DATE '2001-02-16');`  
Result: 47

See `EXTRACT` in the SQL Reference Manual

## See Also

**EXTRACT Function Performance** (page 23) in this guide

## New Regular Expression Functions

Vertica now has a set of regular expression functions that let you match and extract portions of strings. These new functions are:

- `REGEXP_COUNT` returns the number of times a pattern matches a string.
- `REGEXP_INSTR` returns the starting and ending position in the string where the pattern matched.
- `REGEXP_LIKE` returns true if the pattern matches the string.

- `REGEXP_REPLACE` replaces all occurrences of a substring that match a pattern with another string.
- `REGEXP_SUBSTR` extracts a substring that matches a pattern.

The regular expression format used by these functions is compatible with the Perl 5.0 regular expression format. See Regular Expression Functions in the SQL Reference Manual for details.

### **New EVALUATE\_DELETE\_PERFORMANCE Function**

Vertica has a new function named `EVALUATE_DELETE_PERFORMANCE` to help find issues in projection designs that can degrade bulk delete or update performance. If you intend to delete or update rows, run this function to verify that your design will perform reasonably.

This function complements the *Delete Performance Improvements* (page 23) described in this guide.

## **New Features in Vertica 4.1, Patchset 1**

This section describes new functionality and enhancements in Vertica 4.1, Patchset 1.

### **Additional Parameter for the `copy_vertica_database.sh` Script**

The `copy_vertica_database.sh` script lets you copy a database from one cluster to another. In previous versions of Vertica, you specified which database you wanted to copy by passing the script the path to the database's catalog files. In Vertica 4.1 Patchset 1, you can use the new `-d` parameter to specify the database to copy by name instead. See Copying a Database to Another Cluster in the Administrator's Guide for details.

### **New Sequences Support**

A new `vsql` command `\ds` (lowercase s) returns a list of sequences and their parameters. You can also obtain additional information about sequences by querying a new system table: `SELECT * FROM V_CATALOG_SEQUENCES`.

See The `\d [ PATTERN ]` meta-commands in the Programmer's Guide and `V_CATALOG.SEQUENCES` in the SQL Reference Manual for details.

### **New Regular Expression Function Modifier and new ISUTF8 Function**

To address issues caused by invalid UTF-8 strings, the regular expression functions have new modifier, `b`, that tells the functions to treat the strings passed to them as binary octets rather than UTF-8.

In addition, a new function named `ISUTF8` tests whether a string conforms to the UTF-8 standard. Use `ISUTF8` to test the strings you pass to the regular expression functions to ensure they are valid UTF-8 strings.

## **New Administration Tools Parameter `--no-log`**

A new option named `--no-log` allows the Administration Tools to run silently (without logging anything).

For details, see Edit the `vertica-dashboard.xml` file in the Administrator's Guide (step 3).

## **Additional Client Support**

Vertica 4.1, Patchset 1 adds support for additional client configurations.

The Vertica ODBC Client Drivers support the following additional platforms:

- AIX 5.3 32-bit and 64-bit using the unixODBC 2.2.12 driver manager.
- ODBC on Sun SPARC 64-bit is now supported using the DataDirect Connect® 5.3 driver manager.
- The DataDirect Connect® 6.0 driver manager is now supported.

See ODBC Prerequisites in the Programmer's Guide for details.

The support for Informatica has also been expanded:

- Support for Solaris Sparc 64 bit has been added to Informatica 8.6.1.
- Support for Informatica 9.0.1 has been added for all previously supported platforms except for Solaris Sparc 32 bit (which Informatica does not support in version 9.0.1).

See Supported Third-party Software in the Programmer's Guide for details.

# Behavior Changes

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This section describes behavior changes in Vertica 4.1 and in subsequent point releases.

## Behavior Changes in Vertica 4.1

This section describes changes to behavior and functionality in Vertica 4.1.

### Adding a Node with Vertica Preinstalled

If you use the Administration Tools to add a node to a Vertica cluster and Vertica is already installed on that node, the operation fails with a warning. You must uninstall Vertica before you can add that node to the cluster.

### Password Policy Enforcement

The new password policy features include provisions for passwords to expire and for accounts to be locked. Both vsql and Administration Tools have been changed so that they:

- Prevent users with locked account from connecting to the database.
- Warn users on login that their password has expired if their profile has a password grace period set.
- Force the user to change passwords on login when their password has expired and after any grace period has elapsed.

See *Enhanced Password Security Policies* (page 11) for details on the password changes.

Client applications now receive an error when they attempt to connect to the database using an account that is either locked or has an expired password.

### ODBC and JDBC Batch Loading Changes

The performance of batch loading via ODBC and JDBC has significantly improved by bundling the data from small batches into a single large insert when you disable the auto-commit setting of the connection.

Even though a single `COPY` command is being used to load multiple batches, you can still retrieve the rejected row results for each individual batch after it has been loaded. After the `COPY` command closes (which occurs when you complete the transaction containing multiple batch loads, close the cursor, or run a non-insert statement) you can now retrieve the counts of accepted and rejected rows for all the batches loaded in the transaction.

Due to the bulk data loading changes, some connection parameters have been deprecated:

- In the ODBC driver, the `BatchAutoComplete`, `BatchInsertManaged`, `ReportParamSuccess`, and `Use35CopyParameters` connection parameters have been deprecated. Setting a value for these parameters has no effect.
- In the JDBC driver, the `managedBatchInsert` and `Use35CopyParameters` connection properties have been deprecated. Setting a value for these properties has no effect.



**Note:** Because Vertica uses a single `COPY` statement to load multiple batches, if an error causes the statement to abort none of the prior batches in the same transaction will be committed. This behavior is similar to the behavior of Vertica 3.5.

## The `install_vertica` Script

Spread daemon can be enabled with the `-w` parameter in the `install_vertica` script. and `update_vertica` script..

**Note:** The `-q` parameter is no longer supported and is ignored.

## The `copy_vertica_database.sh` Script

The `copy_vertica_database.sh` script requires only one hostname from the source and target clusters. The script automatically determines the names of the remaining nodes in the cluster. See Copying a Database to Another Cluster in the Administrator's Guide.

## Resource Management Changes

The following changes have been made to Resource Manager functionality.

### MAXCONCURRENCY

Based on improvements in the resource management queuing model, the parameter `MAXCONCURRENCYGRACE` has been deprecated, and the setting is ignored.

Re-tune your pool and set the `MAXCONCURRENCY` parameter to the value you want. See Guidelines for Setting Pool Parameters in the Administrator's Guide for details.

### PLANNEDCONCURRENCY

The `PLANNEDCONCURRENCY` setting on the `GENERAL` pool defaults to a too-small value for machines with large numbers of cores.

To adjust to a more appropriate value:

```
=> ALTER RESOURCE POOL general PLANNEDCONCURRENCY <#cores>;
```

See Guidelines for Setting Pool Parameters in the Administrator's Guide and Built-in Pool Configuration and `ALTER RESOURCE POOL` in the SQL Reference Manual.

## Query Profiling

Four new columns have been added to the `QUERY_REPO` table:

- `QUERY_IDENTIFIER`: A string to identify the query in virtual tables.
- `EXTRA_MEMORY`: Extra memory assigned to the query by the resource manager.
- `SCHEMA_NAME`: The schema name that data is loaded into.
- `TABLE_NAME`: The table name that data is loaded into.

If the query repository has been saved to a table (`SYS_DBA.QUERY_REPO` by default) in Vertica 4.0 or prior, the table does not contain the above columns. You must drop the table and recreate it to get the latest table definition.

If the query repository has never been saved, or if you have installed Vertica on a new cluster, the above four columns are available in `QUERY_REPO` and no further action is required.

See [Monitoring the QUERY\\_REPO Table in the Troubleshooting Guide](#)

## Data Type Changes

The NUMERIC data type behavior has been modified in the following areas:

- NUMERIC divide now operates directly on numeric values, without converting to floating point. The numeric result has at least 18 decimal places and is rounded.
- NUMERIC mod (including %) now operates directly on numeric values, without converting to floating point. The numeric result has the same scale as the numerator and never needs rounding.
- NUMERIC CAST and NUMERIC ROUND() now return the correct rounded numeric value; previously they used floating point, which lost precision in some cases.
- NUMERIC TRUNC(), CEILING(), and FLOOR() now return the correct truncated numeric value; previously they used floating point, which lost precision in some cases.

## String to Numeric Casting

String-to-numeric data type conversions accept formats of quoted constants for scientific notation, binary scaling, hexadecimal, and combinations of numeric-type literals:

- **Scientific notation :**  

```
=> SELECT FLOAT '1e10';  
      ?column?  
-----  
      10000000000  
(1 row)
```
- **BINARY scaling :**  

```
=> SELECT NUMERIC '1p10';  
      ?column?  
-----  
      1024  
(1 row)
```
- **Hexadecimal :**  

```
=> SELECT NUMERIC '0x0abc';  
      ?column?  
-----  
      2748  
(1 row)
```
- **Combinations :**  

```
=> SELECT NUMERIC '0x1pe3';  
      ?column?
```

```
-----
      1000
(1 row)
```

**Note:** The `p` (which defaults to `p0`) is required for hexadecimal, because `SELECT '0x1e3'::NUMERIC = 483.`

## MOD() Changes

`MOD(<float>, 0)` now gives an error, instead of returning 0:

```
=> SELECT MOD(6.2, 0);
ERROR: numeric division by zero
```

## TO\_CHAR Changes

The following are the changes to the `TO_CHAR` formatting function for `INTERVAL` data types:

- Interprets `DD` as day of year (001-366) instead of day of month (01-31)
- Interprets `HH` as `HH24` (00-23) instead of (01-12)

```
=> SELECT TO_CHAR(INTERVAL '13:59:58', 'hh24:mi:ss');
      TO_CHAR
```

```
-----
      13:59:58
(1 row)
```

- Meridian indicators (AM/PM) now return errors

```
=> SELECT TO_CHAR(INTERVAL '13:59:58' PM, 'hh24:mi:ss');
      ERROR: syntax error at or near "PM" at character 36
      LINE 1: SELECT TO_CHAR(INTERVAL '13:59:58' PM, 'hh24:mi:ss');
                                     ^
```

**Note:** These changes work for `INTERVAL` data types only: `TO_CHAR (<interval>, <format>)`

## PARTITION\_PROJECTION Data Purging

The `PARTITION_PROJECTION()` function now purges data while partitioning ROS containers if deletes were applied before the AHM epoch.

## Modified System Tables

The following system tables have been modified in Vertica 4.1:

- `V_MONITOR.QUERY_PROFILES` contains four new columns:
  - `QUERY`: The query string used for the query.
  - `SCHEMA_NAME`: The schema name in which the query is being profiled.
  - `TABLE_NAME`: The table name in the query being profiled.

- `RESERVED_EXTRA_MEMORY`: The amount of extra memory reserved for the query.
- `V_MONITOR.EXECUTION_ENGINE_PROFILES` has three new columns:
  - `BASEPLAN_ID`: The ID in the original plan by the optimizer (EXPLAIN plan).
  - `LOCALPLAN_ID`: The ID in the plan that was actually executed (EXPLAIN LOCAL plan).
  - `COUNTER_TAG`: A string that uniquely identifies the counter for operators that might need to distinguish between different instances; such as to which of the node bytes are being sent to or received from via the `NetworkSend` counter.

The following `COUNTER_NAME` values have also been added to `EXECUTION_ENGINES_PROFILES`:

- `buffers spilled` — buffers spilled to disk by `NetworkSend`
- `bytes received` — number of bytes received over the network for query execution
- `bytes sent` — size of data after encoding and compression sent over the network (actual network bytes)
- `bytes spilled` — bytes spilled to disk by `NetworkSend`
- `encoded bytes received` — size of received data after decompressed (but still encoded) received over the network
- `encoded bytes sent` — size of data sent over the network after encoding
- `file handles` — number of file handles used by the operator
- `memory allocated` — actual memory in bytes that the operator allocated at run time
- `memory reserved` — memory reserved by the operator in the `ResourceManager`
- `network wait` — time in microseconds spent waiting on the network
- `producer wait` — time in microseconds spent by the input operator making rows to send
- `producer stall` — time in microseconds spent by `NetworkSend` when stalled waiting for network buffers to clear
- `rows sent` — number of rows sent over the network
- `rows received` — number of rows received over the network
- `V_MONITOR.RESOURCE_POOL_STATUS` has one new column:
  - `QUERY_BUDGET_KB`: The current amount of memory that queries are tuned to use.

### Deprecated system tables

All system tables preceded by a `VT_` (for example, `VT_GRANT`), which were supported in Vertica 3.0, are now deprecated and have been removed from the documentation. Supported system tables are described in *SQL System Tables (Monitoring APIs)* in the *SQL Reference Manual*.

See the *SQL Reference Manual* for details

### See Also

***New System Tables*** (page 13) in this guide

## HistoryRetentionTime Default Change

The history epoch retention level in Vertica 4.0 was based on a period of time with a default of 604800 seconds (1 week), which you set through the `HistoryRetentionTime` configuration parameter.

In Vertica 4.1, the `HistoryRetentionTime` configuration parameter now defaults to 0, which means that Vertica only keeps historical data when nodes are down.

The new default setting effectively prevents the use of the Administration Tools option, 'Roll Back Database to Last Good Epoch,' because the AHM remains close to the current epoch and a rollback is not permitted to an epoch prior to the AHM.

**Tip:** If you rely on the Roll Back option to remove recently loaded data, consider setting a day-wide window for removing loaded data; for example: `SELECT SET_CONFIG_PARAMETER ('HistoryRetentionTime', '86400');`

See Epoch Management Parameters in the Administrator's Guide.

## Behavior Changes in Vertica 4.1, Patchset 1

This section describes changes to behavior and functionality in Vertica 4.1, Patchset 1.

### Execution Engine Profiles Counters

A new counter called "rle rows produced" has been added to the `EXECUTION_ENGINE_PROFILES` system table:

COUNTER_NAME	Description
<code>rle rows produced</code>	Shows the number of physical tuples produced by an operator. Complements the <code>rows produced</code> counter, which shows the number of logical rows produced by an operator. For example, if a value occurs 1000 rows consecutively and is RLE encoded, it counts as 1000 <code>rows produced</code> not only 1 <code>rle rows produced</code> .

For information about other counters, see `EXECUTION_ENGINE_PROFILES` in the SQL Reference Manual

### WOSDATA Default Value Change

In previous versions of Vertica, the WOSDATA resource pool's `MAXMEMORYSIZE` defaulted to 25% of the general memory pool. In new databases created using Vertica 4.1, Patchset 1, the default `WOSDATA MAXMEMORYSIZE` is set to 25% of the general pool or 2GB, whichever is less. Limiting the size of the WOSDATA pool to under 2GB ensures that enough memory remains in the system to process queries.

## Analyze Statistics on a Single Column

You can now analyze statistics on a single table column, rather than on the entire table. Running statistics on a single important column (such as the predicate column) is useful for large tables, which could take a long time to compute.

See `ANALYZE_STATISTICS` in the SQL Reference Manual.

## PROJECTION\_REFRESHES History

In previous releases, the `V_MONITOR.PROJECTION_REFRESHES` system table did not retain projection refresh history across database restarts. Information was stored on nodes on which the `START_REFRESH()` command was run, so all refresh history for that node was lost if a node failed.

Now history is retained with disk-based storage. Information about a refresh operation—whether successful or unsuccessful—is maintained in the `PROJECTION_REFRESHES` system table until either the `CLEAR_PROJECTION_REFRESHES()` function is executed or the storage quota for the table is exceeded. The `PROJECTION_REFRESHES.IS_EXECUTING` column returns a boolean value that indicates whether the refresh is currently running (t) or occurred in the past (f).

You can clear refresh information immediately by invoking the new function `CLEAR_PROJECTION_REFRESHES()`. Only the rows where the `PROJECTION_REFRESHES.IS_EXECUTING` column equals false are cleared

See `CLEAR_PROJECTION_REFRESHES` in the SQL Reference Manual and `Clearing PROJECTION_REFRESHES History` in the Administrator's Guide.

## REPORT\_TIMESTAMP Removed From All System Tables

The `REPORT_TIMESTAMP` column has been removed from all system tables, making it easier to write natural joins where previously a timestamp of differing values would prevent the join from occurring.

If you want to know the report timestamp, issue `SELECT NOW()` ;

# Performance Improvements

---

This section describes performance improvements in Vertica 4.1.

## GROUP BY Query Performance

The performance of GROUP BY queries has been improved for the case where the data is not segmented on the grouping keys. Vertica can push aggregations below a join or expression and improve query performance when:

- A query has a single distinct aggregate – for example, `COUNT(DISTINCT col)` or `SUM(DISTINCT col)`
- All joins in the query are FK-PK joins
- The only non-distinct aggregates in the query are MIN or MAX of columns from the Primary Key table of the final join

Under the above conditions, Vertica partially pushes the aggregation of the distinct aggregate into the Foreign Key table.

## COUNT DISTINCT and GROUP BY Performance

Queries that use `COUNT DISTINCT` or large numbers of groups now run faster than in previous releases.

## EXTRACT Function Performance

In Vertica 4.1, the `EXTRACT()` function, which retrieves year or hour from date/time values for computational purposes, runs faster than in previous releases.

### See Also

*New EXTRACT() Fields* (page 13) in this guide

## ODBC and JDBC Batch Loading Improvements

The performance of loading small batches through ODBC and JDBC have improved. For details, see *ODBC and JDBC Batch Loading Changes* (page 16).

## Delete Performance Improvements

In Vertica 4.1, deleting data is now faster and uses less resources than in previous releases. There is no change to the syntax of deleting data.

A *new function* (page 14) was also added to help evaluate projection design for potential delete performance issues.

**Note:** Tuning a projection for delete performance is the same as tuning it for updates.

## Resource Manager Improvements

The Resource Manager in Vertica 4.1 has been improved to be cluster-aware. The state of all participating nodes is now taken into account when scheduling a query on the cluster. This improvement eliminates the possibility of queries being rejected on executor nodes due to insufficient resources.

Improved scheduling further simplifies the process of tuning a Vertica cluster to run any given workload, and results in additional resilience to changes in workload at run time.



# Deprecated Components

---

Components described in this section have been deprecated in Vertica 4.1.

## ODBC/JDBC

Due to the bulk data loading changes, some connection parameters have been deprecated:

- In the ODBC driver, the `BatchAutoComplete`, `BatchInsertManaged`, `ReportParamSuccess`, and `Use35CopyParameters` connection parameters have been deprecated. Setting a value for these parameters has no effect.
- In the JDBC driver, the `managedBatchInsert` and `Use35CopyParameters` connection properties have been deprecated. Setting a value for these properties has no effect.
- See also ***ODBC and JDBC Batch Loading Changes*** (page 16) in this guide.

## System Tables

All system tables preceded by a `VT_` (for example, `VT_GRANT`), which were supported in Vertica 3.0, are now deprecated and have been removed from the documentation. Supported system tables are described in SQL System Tables (Monitoring APIs) in the SQL Reference Manual.

## Ganglia on Red Hat 4

Vertica Ganglia software on the Red Hat Enterprise Linux 4 platform has reached its end of life period and is no longer supported.

## Configuration Parameters

The `RefreshHistoryDuration` option has been deprecated.

While the syntax is still supported, the command does nothing. For example, if you try to save refresh data for eight hours, Vertica returns a warning:

```
=> SELECT SET_CONFIG_PARAMETER('RefreshHistoryDuration', '0.333');
WARNING: Configuration parameter RefreshHistoryDuration has been deprecated;
setting it has no effect
      SET_CONFIG_PARAMETER
-----
Parameter set successfully
(1 row)
```

Information about a refresh operation—whether successful or unsuccessful—is maintained in the `PROJECTION_REFRESHES` system table until either the `CLEAR_PROJECTION_REFRESHES()` function is executed or the storage quota for the table is exceeded. The `PROJECTION_REFRESHES.IS_EXECUTING` column returns a boolean value that indicates whether the refresh is currently running (t) or occurred in the past (f).

See also ***PROJECTION\_REFRESHES History*** (page 22) in this guide.

# Documentation Updates and Clarifications

---

This section describes updates, clarifications, corrections, and notifications of structural changes to the document set in Vertica 4.1. It also lists customer-reported documentation issues that have been resolved.

As always, the Vertica documentation is available online as a compressed tarball (`.tar`) or a zip archive (`.zip`) file.

## Documentation packaging changes

- Documentation is no longer rooted in `/opt/vertica/doc`. When you extract the file on the database server system or locally on the client, contents are placed in a `/vertica41_doc/` directory.
- The example database files that were originally part of the documentation RPM are now in the server RPM and are installed in `/opt/vertica/examples`. See [Installing Vertica Documentation](#) for information about installing the documentation and the [Getting Started Guide](#) for information about example database files.

## HTML documentation changes

HTML output is still provided in `.tar` and `.zip` files, but the files now extract to an `\HTML\Master` directory only. Individual folders for each book are not included because they are unnecessary.

## Print (PDF) documentation changes

The copyright content has been moved to the back of all printable (PDF) books. The copyright in the online documentation remains unchanged.

## SQL Reference Manual

- All system tables preceded by a `VT_` (for example, `VT_GRANT`), which were supported in Vertica 3.0, are now deprecated and have been removed from the documentation. Supported system tables are described in [SQL System Tables \(Monitoring APIs\)](#) in the SQL Reference Manual.
- A transaction retains its isolation level until it completes, even if the session's transaction isolation level has changed mid-transaction. Vertica internal processes (such as the Tuple Mover and Refresh operations) and DDL operations are run at `SERIALIZABLE` isolation to ensure consistency.

## Troubleshooting Guide

- When you execute an external procedure from the command line, make sure there are no extraneous spaces before the command `#!/bin/bash`. If you are using programs within the external procedure, such as `vsq`, make sure the program is fully pathed in the script; for example `/opt/vertica/bin/vsqli`.
- If you encounter a "Database did not start cleanly on initiator node!" warning, make sure there is no firewall running.

Certain file names are allowed to be present in the top-level catalog directory for a successful bootstrap/restore. Any other files cause the bootstrap/restore to fail, so be sure no files are present, with the exception of the following files, which are allowed and/or needed:

- Anything starting with vertica.log
- Epoch.log
- vertica.pid
- not-yet-initialized
- global
- ErrorReport.txt
- SAL
- tmp
- CopyErrorLogs
- Snapshots
- Anything starting with Catalog-old-
- bootstrap-catalog.log
- Anything ending in .conf

### Programmer's Guide

Previous versions of the documentation incorrectly stated that UnixODBC 2.2.11 and 2.2.12 on 64-bit Linux platforms were not supported.

## Documentation Updates, Patchset 1

Aside from continuous improvements, the primary notable change to the documentation for this release has been to rename the Installation and Configuration Guide to Installation Guide. Configuration procedures are described in the Administrator's Guide.

**Note:** Be sure to review the *Deprecated Components* (page 25) topic in this guide.

### SQL Reference Manual

- A new appendix has been created to serve as a repository for topics that will help simplify database migration to Vertica from other RDBMS. New in this release, the topic Data Type Mappings Between Vertica and Oracle compares the behavior of Oracle data types to Vertica data types.
- When interrupting a statement within an external session, the documentation previously recommended that users look at the V\_MONITOR.SESSIONS.LAST\_STATEMENT column. The last\_statement column has been removed from the SESSIONS system table, so now the current\_statement becomes blank when the statement has been interrupted. See INTERRUPT\_STATEMENT for examples.

### Programmer's Guide

Previous versions of the documentation did not indicate that the Vertica ODBC client driver is supported under Solaris 10 x86 using the DataDirect Connect® 5.3 driver manager. This combination has been and is currently supported.



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- lib/gssapi/generic/gssapi\_err\_generic.et
- lib/gssapi/mechglue/g\_accept\_sec\_context.c
- lib/gssapi/mechglue/g\_acquire\_cred.c
- lib/gssapi/mechglue/g\_canon\_name.c
- lib/gssapi/mechglue/g\_compare\_name.c
- lib/gssapi/mechglue/g\_context\_time.c
- lib/gssapi/mechglue/g\_delete\_sec\_context.c
- lib/gssapi/mechglue/g\_dsp\_name.c
- lib/gssapi/mechglue/g\_dsp\_status.c
- lib/gssapi/mechglue/g\_dup\_name.c
- lib/gssapi/mechglue/g\_exp\_sec\_context.c
- lib/gssapi/mechglue/g\_export\_name.c
- lib/gssapi/mechglue/g\_glue.c
- lib/gssapi/mechglue/g\_imp\_name.c

- lib/gssapi/mechglue/g\_imp\_sec\_context.c
- lib/gssapi/mechglue/g\_init\_sec\_context.c
- lib/gssapi/mechglue/g\_initialize.c
- lib/gssapi/mechglue/g\_inquire\_context.c
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- lib/gssapi/mechglue/g\_inquire\_names.c
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The Administration Tools part of this product uses Python Dialog, a Python module for doing console-mode user interaction.

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RRDTOOL - Round Robin Database Tool

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This is used by the project to load zipped files directly by COPY command. [www.zlib.net/](http://www.zlib.net/)

zlib.h -- interface of the 'zlib' general purpose compression library version 1.2.3, July 18th, 2005

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