TIBCO® Graph Database Release Notes

Software Release 2.0.0
November 2018

Two-Second Advantage®

Important Information

Contents

TIBCO Documentation and Support Services

How to Access TIBCO Documentation

Documentation for TIBCO products is available on the TIBCO Product Documentation website, mainly in HTML and PDF formats.

The TIBCO Product Documentation website is updated frequently and is more current than any other documentation included with the product. To access the latest documentation, visit https://docs.tibco.com.

Documentation for TIBCO Graph Database is available on the TIBCO Graph Database Product Documentation Page.

Product-Specific Documentation

The following documents for this product can be found on the TIBCO Documentation site:

- *TIBCO Graph Database Getting Started Guide*
- *TIBCO Graph Database Administration Guide*
- *TIBCO Graph Database Release Notes*

How to Contact TIBCO Support

You can contact TIBCO Support in the following ways:

- For an overview of TIBCO Support, visit http://www.tibco.com/services/support.
- For accessing the Support Knowledge Base and getting personalized content about products you are interested in, visit the TIBCO Support portal at https://support.tibco.com.
- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to https://support.tibco.com. If you do not have a user name, you can request one by clicking Register on the website.

How to Join TIBCO Community

TIBCO Community is the official channel for TIBCO customers, partners, and employee subject matter experts to share and access their collective experience. TIBCO Community offers access to Q&A forums, product wikis, and best practices. It also offers access to extensions, adapters, solution accelerators, and tools that extend and enable customers to gain full value from TIBCO products. In addition, users can submit and vote on feature requests from within the TIBCO Ideas Portal. For a free registration, go to https://community.tibco.com.

New Features

The following is the list of new features added in the corresponding version of TIBCO Graph Database:

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Minimum Database Name Length

Minimum database name length has changed from 8 characters to 3 characters.

SSL Communication

Transport Layer Security (TLS) 1.2 protocol is now supported between clients and servers.

To set up this protocol:

1. In the Java client, specify the following client URL: `ssl://<host>:<port>/{dbName=<dbname>;verifyDBName=true;}` for the connection string.
2. In the `tgdb.conf` file, turn on the SSL parameter (ssl = true) under the net listener section in the `tgdb.conf` file.
3. In the `initdb.conf` file, specify the self-signed certificate creation parameters.

The database name must be at least 3 characters long.

Blob and Clob Attributes

You can now define blob and clob attributes in the `initdb.conf` file and in the Administration console.

Data Type Conversion

Implicit-type conversion now occurs at runtime when the client sends a data type that does not match the data type defined on the server.

Gremlin Traversal Language

Queries now support Gremlin language steps, such as aggregation, sorting, projection, traversal, filters, and express complex traversals. Use the Java API-based client and the Administration console to run the Gremlin queries.

Steps supported in this release:

Gremlin Steps	Server / Java Client	Admin Console
V()	Y	Y
hasLabel(type)	Y	Y
has(type, attr, value)	Y	Y
has(type, attr, predicate)	Y	Y (Support for predicates lt, lte, gt, gte, eq, neq)
has(attr, value)	Y	Y
has(attr, predicate)	Y	Y (Support for predicates lt, lte, gt, gte, eq, neq)

Gremlin Steps	Server / Java Client	Admin Console
values(...)	Y	Y
valueMap(...)	Y	Y
count()	Y	Y
pageRank()	Y	N
fold()	Y	Y
toList()	Y	Y
and(...)	Y	N
or(...)	Y	N

Example Gremlin queries on Admin Console: (with "routes" example)

```
g.V().has('airportType','country','Aruba');
```

```
g.V().has('airportType','country','Aruba').count();
```

Users can run gremlin queries similar to above examples based on the gremlin steps supported in this release.

Predicates:

eq, neq, gt, gte, lt, lte, inside, outside, between, and, or

Graphics Processing Unit (GPU)

Gremlin queries now support calling the `pageRank` algorithm on a node set invoked on the GPU using Nvidia's CUDA graph analytics package `nvGraph`.

To get started with GPU:

1. Confirm that you have installed Nvidia's GPU Card with Pascal+ architecture set.
2. Install CUDA 9.0+ from https://developer.nvidia.com/cuda-downloads.
3. Follow the CUDA installation information for your operating system.
4. In addition:
   - Linux: Specify the LD_LIBRARY_PATH to include the CUDA library.
   - Windows: Specify the PATH to include the CUDA BIN directory.
   - MacOS: Supply a link to the `/usr/local/cuda/lib`.

Alternatively, use the following command to change the path:

```
otool -L ./libtgcuda.dylib
../lib/libtgcuda.dylib (compatibility version 10.10.0, current version 10.10.0)
@rpath/CUDA.framework/Versions/A/CUDA (compatibility version 1.0.0, current version
9.2.64) /usr/local/cuda/lib/libcudart.dylib (compatibility version 0.0.0, current
version 9.2.64) /usr/local/cuda/lib/libcuda.dylib (compatibility version 1.1.0,
current version 8.0.90) /usr/local/cuda/lib/libnvgraph.dylib (compatibility version
0.0.0, current version 9.2.64) ../lib/libtgcommon.dylib (compatibility version
2.0.0, current version 2.0.0) ../lib/libtgserver.dylib (compatibility version
2.0.0, current version 2.0.0) /usr/lib/libSystem.B.dylib (compatibility version
1.0.0, current version 1238.60.2)
```

Then run the following commands:

```
install_name_tool -change /usr/local/cuda/lib/libcudart.dylib <newpath>
libtgcuda.dylib

install_name_tool -change /usr/local/cuda/lib/libnvgraph.dylib <newpath>
libtgcuda.dylib
```

Amazon Web Services (AWS)

The TIBCO Graph database is now on AWS Marketplace.

- **Launching Single Amazon Machine Image (AMI)**

  After you subscribe to the TIBCO Graph Database, launch the AMI from the marketplace page and create an EC2 instance from AMI.

  The Single AMI provides the following artifacts/directories in the following directory: `/home/tibco/tgdb/<version>`

  1. `bin`: Contains tgdb runtime artifacts.
  2. `docker`: Contains the following TIBCO Graph Database Enterprise Edition Docker scripts and configuration files:
     - `createdocker-image.sh` script, which creates TIBCO Graph Database Enterprise Edition base Docker image.
     - `run-dockerimage.sh` script, which runs the TIBCO Graph Database Enterprise Edition Docker image.

     

     The AMI comes pre-installed with docker and pre-built docker images for the TIBCO Graph Database.
  3. `data`: A data directory for TIBCO Graph Database.
  4. `lib`: TIBCO Graph Database runtime libraries.
  5. `examples`: TIBCO Graph Database Sample examples and data.
- **Running TIBCO Graph Database container application on Standalone EC2**

  To run a TIBCO Graph Database container application on a standalone EC2 instance using Single AMI:

  1. Log in to the EC2 instance of the TIBCO Graph Database that was created during the Single AMI launch.
  2. Navigate to the docker folder: `cd /home/tibco/tgdb/<VERSION>/docker`.
  3. Execute the `run-docker-image.sh` script.

  For example :

  ```
  prompt#> PRODUCT_DIRECTORY=/home/tibco/tgdb VERSION=2.0 ./run-docker-image.sh -Y
  ```
- **Running TIBCO Graph Database container application on Standalone EC2 Using User-Specified Configuration Files**

  To specify external configuration files for running the database:

  1. Set `USER_CONFIG_DIRECTORY=<path to directory containing external conf files>` while running the `run-docker-image.sh` script.
  2. Set `dbPath = /mnt/tibco/tgdb/data` in the respective `conf` files as per `variables.txt`.

  For example:

  ```
  prompt#> PRODUCT_DIRECTORY=/home/tibco/tgdb VERSION=2.0 USER_CONFIG_DIRECTORY=/
  home/centos/conf ./run-docker-image.sh -Y
  ```

The `initdb.conf` and `tgdb.conf` files in the user-specified directory `conf` are specified.

Performance Optimization

There are several performance optimizations:

- Define log level for components.
- Improved error management.
- Faster data import.
- Better memory management.
- Disk storage improvement.

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Fault Tolerance

TIBCO Graph Database servers support fault-tolerant operation by configuring a pair of servers.

- Primary (one)
- Secondary (one or more)

On startup, the server that starts first turns into the active state and the other server turns into the standby state. The active server accepts client connections. If the active server fails, the next standby server becomes active and resumes the operation.

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Edge Type as First Class Relational Object

An instance of an edge between two nodes of Type T. You can define the edge type in the `initdb.conf` file or the Administrative console. You can also query on the edge type.

Traversal Queries

Queries are enhanced to support conditions on edges so that the queries can traverse the graph till an end condition is reached.

Import and Export

You can export the data from the database to the `CSV` files and import the data from the `CSV` files in to the database.

New Example

New examples, import openflights data set and perform traversal queries, have been added to find out the routes between two airports.

Simplified Packaging

Simplified packaging as reusable shared libraries.

New Administrative Commands

The following new administration commands have been added:

- `checkpoint server`- Forces flush data to persist in the medium.
- `dump server stack trace`- Shows the current execution point of all the server threads, which is useful for debugging and monitoring deadlock situations.
- `describe metadata`- Shows the detailed information on the nodetype, edgetype, index, and the attribute descriptor.
- `export and import`- Exports data from the database or imports data in to the database.

- `create edgetype`- Defines the edgetype.

Docker Support
The Linux distribution provides scripts to build the Docker image.

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Client/Server Architecture
SEDA-based client/server architecture. C99-based server.

Dynamic Schema Management
Static and dynamic addition of attribute descriptors.

Property Bag Models
Property bag models for nodes and edges.

ACID Behavior
Transactional Semantic (ACID) behavior.

Client API
Open-source Java and NodeJS-based client API.

Large Database
Supports large database with the large file segment.

Page Cache Management
Supports large and efficient page cache management (maximum of 4 TB).

Administrative Console
Administrative console for schema and user management.

Migration and Compatibility

This section describes migration and compatibility for the TIBCO Graph Database 2.0.0.

Recreating the Database

For migration, the database created in TIBCO Graph Database 1.1.1 must be recreated in TIBCO Graph Database 2.0.0.

To recreate the database:

1. Export the data from TIBCO Graph Database 1.1.1 using the Administrative console. For more information, see *TIBCO® Graph Database Administration Guide*.
2. Shut down the server and Administrative console.
3. Delete the `<tgdb-home>/data/<your_database_name>` folder.
4. Install TIBCO Graph Database 2.0.0.
5. Import the data to TIBCO Graph Database 2.0.0. For more information, see *TIBCO® Graph Database Administration Guide*.

Config Files

Use the latest 2.0.0 configuration files (`tgdb.conf` and `initdb.conf`) that were installed with the 2.0.0 TIBCO Graph Database. The new files have the following changes:

- Double forward slashes (//) are used to indicate inline comments - a semicolon (;) is no longer used.
- Security parameters are now all in the configuration files instead of separate files.
- The security parameter `tgsec.conf` and its related parameters were replaced with more robust security parameters.
- New logging levels for server components were added. The default log level is `info:*` where `*` stands for any component.
- A GPU section was added to the `tgdb.conf` file.

Database

The 1.1.x Graph Database must be reinitialized and then recreated in the 2.0.0 Graph Database.

To reinitialize the database:

1. Export the 1.1.x database to CSV.
2. Import the 1.1.x database as the 2.0.0 database.

To recreate the database:

1. Use the Administrative Console to export data from the 1.1.x Graph Database to the 2.0.0 database.
2. Shut down the server and Administrative Console.
3. Delete the following folder: `<tgdb-home>/data/<your_database_name> folder`.
4. Install 2.0.0.0 database.
5. Import the 1.1.x database data to the 2.0.0 database.

For more information on recreating the database, see *TIBCO® Graph Database Administration Guide*.

Known Issues

The following table lists known issues in 2.0.0 version of TIBCO Graph Database:

Key	Summary
TGDB-519	**Summary**: Starting with TIBCO Graph Database v2.0.0, the support on platform: Apple Mac OS X, 10.11.x, is deprecated.
TGDB-499	**Summary**: Blob/Clob not supported for export.
TGDB-498	**Summary**: Blob/Clob not supported for import.
TGDB-497	**Summary**: Administration client does not support SSL.
TGDB-480	**Summary**: Page leaks occur when a delete node does not release page(s) back to the database. **Workaround**: Export and import the database to clean up disk space.
TGDB-473	**Summary**: Excessive warnings during shutdown. **Workaround**: These are harmless warnings and can be ignored.
TGDB-382	**Summary**: In a fault tolerant setup, the Java client API throws a IllegalMonitorStateException when connected to the stand-by server. **Workaround**: This is harmless exception, ignore it.
TGDB-378	**Summary**: Re-importing the same set of data from Administrative console might result in unwanted duplicated nodes in the database. **Workaround**: For re-importing data, re-initialize the database first and start with a fresh import.
TGDB-372	**Summary**: The selective export option exports too many nodes and edges. **Workaround**: None
TGDB-318	**Summary**: The non-unique indices are not supported. **Workaround**: When defining indices in the Administrative console, or in the `initdb.conf` file, ensure that you choose a unique option.
TGDB-195	**Summary**: The connected clients stops responding when server shuts down. **Workaround**: Terminate the connection to the clients manually.

Key	Summary
TGDB-167	**Summary**: The attributes of type Date, Time, and Timestamp do not support Timezone. **Workaround**: None.
TGDB-163	**Summary**: Indices work only for the following attribute types: char, short, int, long, float, double, and string. The remaining attribute types are not supported as index in the 2.0.0 release of TIBCO Graph Database. **Workaround**: None.
TGDB-158	**Summary**: Java API does not have `getAsNumber()`, `getAsDate()`, `getAsTime()`, and `getAsTimestamp()` methods for attributes. **Workaround**: Use `attribute.getValue()` and cast it.
TGDB-131	**Summary**: You cannot delete and re-insert a node within the same transaction. **Workaround**: Do the delete and re-insert sequence in two different transactions instead. For example, perform the sequence delete node - commit - re-insert node - commit.
TGDB-120	**Summary**: The current system does not support attribute changes to Index keys. **Workaround**: Delete the Index key and insert it again as a part of the transaction.

Closed Issue

There are no closed issues in version 2.0.0 of TIBCO Graph Database.

Deprecated Features

Platform MacOS 10.11 is deprecated.