Configuring TIBCO Data Virtualization

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1 Introduction

1.1 Purpose
The purpose of this paper is to provide guidance for setting server configuration parameters for TIBCO Data Virtualization (TIBCO DV)

This document assumes a working knowledge of TIBCO DV, as well as the ability to navigate Studio to access the Configuration panel

This document is broken into major sections according to the major sections of the configuration panel, with a discussion of settings changes that would assist the majority of clients in properly tuning TIBCO DV. This document does not provide an exhaustive coverage of all configuration parameters available inside TIBCO DV

For more information on a specific configuration parameter, please refer to the description in the Configuration panel inside Studio
2 Discovery

TIBCO recommends the following configuration settings for Discovery. Skip this section if not using Discovery with TIBCO DV

2.1 Indexing / Maximum Concurrent Tasks
The maximum number of tasks that may run concurrently. The maximum allowable value is 40.

Recommended setting: 5 – 10

Reasoning: This value affects the number of indexing and discovery tasks that may run at any given time, alongside other queries and tasks inside TIBCO DV. Tune this value down to decrease Discovery load on a TIBCO DV server that is busy or low powered. Tune it up to allow Discovery to use more server resources on a server that is less busy or has more resources for concurrent processing

2.2 Indexing / Sampling is Enabled
Enable sampling to increase index speed, but this will lose some accuracy.

Recommended setting: true

Reasoning: With sampling disabled, TIBCO DV must table scan an entire table to determine the set of distinct column values for each column to be indexed. This can use considerable resources on TIBCO DV and the physical source system. Turning on sampling reduces the accuracy, but may substantially increase the speed of, and reduce the resources required to perform, indexing tasks. Do not change this value if you require accuracy

2.3 Indexing / Sampling Size
If sampling is enabled, we will sample data according to this specified size. If the number of entries in a column is less than this sampling size, then all data in the column will be indexed. The minimum allowable value is 10000.

Recommended setting: 100000

Reasoning: This value sets effective limits on the number of rows TIBCO DV will process from a physical table, reducing the resources required to perform indexing tasks. This value only has an effect if sampling is enabled (see above)
3 Monitor

The following settings are recommended to tune Monitor

3.1 Data Collection / Enable Data Collection
If 'true', then all available TIBCO DV data and events will be pushed to any listening monitor server.
When 'false', all data collection will be disabled.

Recommended setting:
- If this server is part of a cluster, and Monitor will be used, set this value to true
- If this server is not part of a cluster, or Monitor will not be used, set this value to false
- If this server is not part of a cluster, but single-server monitoring will be used, set this value to true

Reasoning: Monitor is typically only used to monitor clusters of TIBCO DV servers. As such, if the server is not part of a cluster, it is not necessary to collect the data required to feed Monitor

NOTE: Monitor may be used in single-server mode, where a server effectively monitors itself. If this setup is to be used, then the data collector must be enabled

3.2 Monitor Server / Enable Monitor Server
If 'true', then this TIBCO DV will run Monitor Server.

Recommended setting:
- If this server is to be used to monitor a cluster, or single server, set this value to true
- If this server is not to be used to monitor, set this value to false

Reasoning: An instance of TIBCO DV is required to monitor a cluster of TIBCO DV servers. If this instance is to be used for this purpose, then the Monitor server must be enabled. Otherwise, it may be disabled to redirect the resources required to run it to other processing

NOTE: Monitor may be used in single-server mode, where a server effectively monitors itself. If this setup is to be used, then the Monitor server must be enabled

3.3 Monitor Server / Monitor Connection / TIBCO DV Host
The host of the remote TIBCO DV connection.

Recommended setting:
- If this server is to be used to monitor a cluster, set this value to the host address of any node in the cluster
- If this server is to be used to monitor this server in single-server model, set this value to localhost
Reasoning: An instance of TIBCO DV is required to monitor a cluster of TIBCO DV servers. If this instance is to be used for this purpose, then the Monitor server must be given the host address of one cluster node. The cluster node to which Monitor server connects is not important (i.e. you do not have to specify the timekeeper, etc..) If Monitor is to be used in single-server mode, then, we must provide the local host

3.4 Monitor Server / Monitor Connection / TIBCO DV Port

The base port of the remote TIBCO DV connection.

If this value is non-zero, then that port will be used.

If this value is 0 and the host is "localhost", then the port of this TIBCO DV instance will be used; otherwise port 9400 will be used.

See the effective port for the actual port that will be used.

Recommended setting:

- If this server is to be used to monitor a cluster, set this value to the port corresponding to the host address set above
- If this server is to be used to monitor this server in single-server mode, set this value to 0

Reasoning: An instance of TIBCO DV is required to monitor a cluster of TIBCO DV servers. If this instance is to be used for this purpose, then the Monitor server must be given the port number corresponding to the host address (given above) of one cluster node. The cluster node to which Monitor server connects is not important (i.e. you do not have to specify the timekeeper, etc..) If Monitor is to be used in single-server mode, then, we may give a value of zero, which corresponds to "monitor this instance"

3.5 Monitor Server / Monitor Connection / TIBCO DV Password

The password for the "monitor" system user within the "composite" domain that the Monitor Server will use to connect with the remote TIBCO DV.

Recommended setting:

- If the password for the "monitor" user has been changed on the TIBCO DV instance to be monitored, provide this password
- If the password for the "monitor" user has not been changed on the TIBCO DV instance to be monitored, leave this value as the default

Reasoning: Monitor uses a built-in user account for connecting to TIBCO DV it is to monitor. This password does not have to be changed, but, if it is, Monitor server requires the new password to continue monitoring the target instance
4 Server

The following settings directly affect TIBCO DV

4.1 Configuration / Cache / Failover to Original Data Sources
Applicable to cached resources using a relational cache. When set to true, if the cache is not accessible, the resources will be treated as not being cached.

Recommended setting: true

Reasoning: This allows TIBCO DV to query directly to a physical data source if the cache target is not available for a particular resource. This setting improves resource reliability by ensuring that a query will not fail because the cache is down or inaccessible. Enabling this setting may have undesirable effects for resources cached for performance reasons, or to avoid additional load on the physical source.

NOTE: This is a server-wide setting and affects all cached objects

4.2 Configuration / Cache / Cache Loading / Enable Native Loading
Indicates whether cache loading using native mechanisms, such as Oracle Database Links, is enabled.

Recommended setting: true

Reasoning: Enabling this setting allows TIBCO DV to use configured native loading mechanisms to insert records into cache tables. These mechanisms may include, but are not limited to, Teradata FASTLOAD, Netezza NZLOAD, Oracle DBLINKS, and Microsoft BCP. Enabling this setting will enable the function globally. Individual data sources must still be configured to support the use of native loading mechanisms. See the TIBCO DV Users Guide for more details on supported sources, utilities, and configuring data sources to use these mechanisms

4.3 Configuration / Cache / Cache Loading / Enable Parallel Loading
Indicates whether parallel cache loading is enabled.

Recommended setting: true

Reasoning: Enabling this setting allows TIBCO DV to use parallel load mechanisms to insert records into cache targets. Enabling this setting allows this functionality to be used globally, given the additional constraints for this functionality. Please see the TIBCO DV Users Guide for more details on conditions required for individual cached resources to make use of this functionality

4.4 Configuration / Cache / Cache Loading / Resume Incremental Refresh on Server Restart
If set to true in-progress incremental cache refreshes detected on server restart will not be marked as failed, causing the server to perform an incremental (instead of full) refresh the next time the cache should be loaded.

Recommended setting: true
Reasoning: By default, if an incremental cache refresh is in progress and TIBCO DV restarts, the incremental refresh operation will be marked as failed, causing the next refresh to be a full refresh. As a consequence of this behaviour, historical data will be cleared from the incremental cache table, and this data may not be re-constructible. Enabling this setting will override this behaviour, allowing the scripts controlling the refresh behaviour to clear any partially loaded increments, and restart an incremental load.

NOTE: Incremental scripts must be built to handle fault tolerance and restart operations where a partial set was loaded before failure.

4.5 Configuration / Cache / Cache Loading / Do Not Clear Incremental Cache On Refresh Failure

If set to true, cache status will not be marked as failed when an exception is encountered during an incremental cache refresh. This will avoid clearing the current contents of the cache, and the "Refresh" cache procedure will be run instead of the "Initialize" cache procedure during the next cache refresh.

NOTE: Enabling this option may result in missing or duplicated rows in the target cache table. Enable this option only if missing or duplicated data is not a problem with the cache data set.

Recommended setting: client specific

Reasoning: By default, if an incremental cache refresh is in progress and fails, the incremental refresh operation will be marked as failed, causing the next refresh to be a full refresh. As a consequence of this behaviour, historical data will be cleared from the incremental cache table, and this data may not be re-constructible. Enabling this setting will override this behaviour, allowing the scripts controlling the refresh behaviour to clear any partially loaded increments, and restart an incremental load.

NOTE: Incremental scripts must be built to handle fault tolerance and restart operations where a partial set was loaded before failure.

4.6 Configuration / Cache / Cache Status Sync Interval Seconds

Maximum allowed interval between syncing in memory cache status with that in database table. This need not be set for automatic caching.

Recommended setting: 60

Reasoning: Modifying this setting increases the frequency of synchronization between Manager and Studio panels showing cache status, the data stored in the cache_status tables of physical data sources, and the TIBCO DV in-memory structures that hold this information.

4.7 Configuration / Debugging / Enable Bulk Data Loading

Setting to true will: 1. Allow INSERT/SELECT statements inserting rows into Netezza, Teradata or SQL Server to use bulk loading methods. 2. Allow procedures cached into Netezza or SQL Server to use bulk loading methods.

Recommended setting: true

Reasoning: Modifying this setting allows all INSERT statements issued against Netezza, Teradata or SQL Server to use bulk load tools, substantially boosting performance of large INSERT operations, or INSERT INTO TABLE AS SELECT statements.
4.8 Configuration / Debugging / Detailed Profiling Enabled

Defaults to "false". When "true", the server will produce detailed profiling information in excess of what is normally produced. This will have negative performance impact. This option should only be enabled when requested by a support team member.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: true

Reasoning: To receive full request statistics, it is necessary to enable this configuration setting. Otherwise, TIBCO DV will not provide full background / foreground read / execution times. This information is very useful for performance tuning and issue triage. It may also be used in a production setting. Some slight performance impact has been observed, but it is negligible and typically an acceptable trade-off for the additional information produced.

4.9 Configuration / Debugging / Parallel Processing / Activate Resource Management

Recommended setting: If you know that changing this setting will not negatively impact results then it

Reasoning:

4.10 Configuration / Debugging / Parallel Processing / Concurrent Request Limit

This property defines the maximum number of concurrent connections that can be created to data sources for the purposes of executing a MPP query. For any value greater than 0, the query engine will throttle concurrency to X where X = concurrentRequestLimit. This is a server level configuration that affects all data sources that supports MPP.

Recommended setting: 0

Reasoning: This configuration property is a server wide configuration that impacts all data sources. Data sources that support MPP have a unique Concurrent Request Limit advanced property that overrides this property. It is generally preferable to server property to 0, to avoid unintentionally enabling MPP for new data sources, and configure a separate concurrent request limit for individual data sources based on the capabilities of the individual data source.

NOTE: This configuration can take a value between 0 and 65536.

4.11 Configuration / Debugging / Parallel Processing / Disable Low Data Volume Restriction

The TIBCO DV query engine will not route low data volume requests to the MPP engine by default. Changing this value to true will disable this restriction and will make low data volume queries involving supported SQL operations eligible for MPP processing.

Recommended setting: false

Reasoning: The additional processing overhead needed to prepare and manage a MPP request is rarely justified by whatever performance gains may be seen for a low data volume query. Low data volume queries generally can be handled efficiently using standard TIBCO DV query engine functionality.
4.12 Configuration / Debugging / Parallel Processing / Parallel Queue Factor
When resource management policies are enabled, this property defines the maximum size of the parallel request wait queue. Requests received while the queue is full will instead be served sequentially.

Recommended setting: **10**

Reasoning: Requests that are added to the parallel request wait queue will not execute until system resources become available to execute the query. Increasing this value can result in extended query wait times during periods of high activity. Decreasing this value too much can result in queries intended for MPP processing to be executed by the standard TIBCO DV query engine.

4.13 Configuration / Debugging / Parallel Processing / Relax Equi Join Restrictions
Join conditions are typically required to be equi joins in order to be eligible for evaluation by the MPP engine, for example A = B or RTRIM(A) = RTRIM(B). This setting can be used to relax the equi join requirement somewhat, for example RTRIM(A) = B can be allowed, however this can result in unexpected results being returned.

Recommended setting: **Client-Dependent**

Reasoning: If you know that relaxing the equi join restriction will not impact delivered results you can relax the equi join restriction. However, changing this value must be carefully validated, to ensure accuracy of results.

4.14 Configuration / Metadata / Privilege Cache Size (On Server Restart)
The privilege cache holds the most often-used privilege data in memory in order to reduce access to the database. Consider increasing this cache if the "Privilege Cache Access" falls below 90% under normal stable workload.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: **50000; monitor and tune to keep “Privilege Cache Access” above 90%**

Reasoning: The metadata repository is highly optimized for reading, but, TIBCO DV maintains a local cache of often-used data. The entries in this cache speed up query processing and resource access. In Studio, monitor the value "Privilege Cache Access" on the Server Overview panel of the Manager tab.
If this value drops below 90%, slowly increase the size of the Privilege Cache Size configuration parameter to allow more entries to be stored in memory. Monitor the “Privilege Cache Access” value regularly.

NOTE: TIBCO DV will pre-allocate this memory. Setting this value too high may result in a large amount of memory being set aside for metadata caches, which will then be unavailable for server processing.

4.15 Configuration / Metadata / Relationship Cache Size (On Server Restart)

The relationship cache holds the most often-used relationship data in memory in order to reduce access to the database. Consider increasing this cache if the “Relationship Cache Access” falls below 90% under normal stable workload.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: 100000; monitor and tune to keep “Relationship Cache Access” above 90%

Reasoning: The metadata repository is highly optimized for reading, but, TIBCO DV maintains a local cache of often-used data. The entries in this cache speed up query processing and resource access. In Studio, monitor the value “Relationship Cache Access” on the Server Overview panel of the Manager tab.

If this value drops below 90%, slowly increase the size of the Relationship Cache Size configuration parameter to allow more entries to be stored in memory. Monitor the “Relationship Cache Access” value regularly.

NOTE: TIBCO DV will pre-allocate this memory. Setting this value too high may result in a large amount of memory being set aside for metadata caches, which will then be unavailable for server processing.

4.16 Configuration / Metadata / Metadata Cache Size (On Server Restart)

The metadata cache holds the most often-used metadata objects in memory in order to reduce access to the internal database. Server performance can improve with a larger cache size. However, increasing the size of the cache will reduce the amount of memory available for query processing. The metadata cache is stored in the "Managed Memory"...
area and will never grow larger than 25% of the total amount of managed memory, regardless of how large the cache size is set. The minimum size is 500 objects and the default size is 10000 objects. Please check the "Repository Cache Access" statistic in the Server Overview console. Consider increasing this cache if the "Repository Cache Access" falls below 90% under normal stable workload.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: **100000; monitor and tune to keep “Repository Cache Access” above 90%**

Reasoning: The metadata repository is highly optimized for reading, but, TIBCO DV maintains a local cache of often-used data. The entries in this cache speed up query processing and resource access. In Studio, monitor the value “Repository Cache Access” on the Server Overview panel of the Manager tab

If this value drops below 90%, slowly increase the size of the Repository Cache Size configuration parameter to allow more entries to be stored in memory. Monitor the “Repository Cache Access” value regularly

NOTE: TIBCO DV will pre-allocate this memory. Setting this value too high may result in a large amount of memory being set aside for metadata caches, which will then be unavailable for server processing

**4.17 Configuration / Metadata / User Cache Size (On Server Restart)**

The user cache holds the most often-used user data in memory in order to reduce access to the database. Consider increasing this cache if the "User Cache Access" falls below 90% under normal stable workload.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: **2000; monitor and tune to keep “User Cache Access” above 90%**

Reasoning: The metadata repository is highly optimized for reading, but, TIBCO DV maintains a local cache of often-used data. The entries in this cache speed up query processing and resource access. In Studio, monitor the value “User Cache Access” on the Server Overview panel of the Manager tab

If this value drops below 90%, slowly increase the size of the User Cache Size configuration parameter to allow more entries to be stored in memory. Monitor the “User Cache Access” value regularly

NOTE: TIBCO DV will pre-allocate this memory. Setting this value too high may result in a large amount of memory being set aside for metadata caches, which will then be unavailable for server processing

**4.18 Configuration / Security / Enable Exception For Column Permission Deny**

If true, raise exception for missing column level privileges.

Recommended setting: **true**

Reasoning: If a user does not have privileges to view data in a specific column, the default behaviour is to return NULL values for the data in that column. Enabling this parameter will ensure that users instead receive a security exception, instead of different data depending on privileges

**Configuration / Security / Enable Privilege Logging**
If true, privilege changes to otherwise unchanged resources will be written to the metadata log

Recommended setting: **true**

Reasoning: Enabling this setting ensures that full auditing and logging of any resource privilege changes are written to the cs_server_metadata.log file. This information may then be used to perform security auditing

### 4.19 Configuration / Transactions / Maximum Request Depth

This value specifies an upper limit on the depth of the request stack in a transaction.

Recommended setting: **100**

Reasoning: This setting controls the maximum recursion level allowed for transactions.

NOTE: This setting is required when using TIBCO Advanced Services published Utilities, and Best Practices, assets

### 4.20 Events and Logging / Logging / SNMP / Enable SNMP Events

true: enable SNMP for sending events. false: disable SNMP for sending events.

Recommended setting: **true**

Reasoning: TIBCO DV implements passive monitoring and notification through SNMP traps. TIBCO highly recommends enabling SNMP traps, and monitoring traps through a network monitoring tool. If using SNMP traps with TIBCO DV, see the “Configuring Events and Logging” document, and accompanying tracking spreadsheet

### 4.21 Events and Logging / Logging / SNMP / Trap Host List

A comma separated list of host names/IPs that will be sent SNMP v1 trap messages.

Recommended setting: **comma separated list of network monitoring tool hostnames**

Reasoning: TIBCO DV implements passive monitoring and notification through SNMP traps. TIBCO highly recommends enabling SNMP traps, and monitoring traps through a network monitoring tool. If using SNMP traps with TIBCO DV, see the “Configuring Events and Logging” document, and accompanying tracking spreadsheet

### 4.22 Client Drivers / Data / Default Bytes to Fetch

Server JDBC/ODBC/ADO.NET client fetch byte setting. Fetch byte setting affects the amount of data streamed between the client and server. Use a value of '0' to fetch infinite bytes. This setting is similar to 'Rows To Fetch' in that both control data flow rates between the server and client, and whichever limit is reached first is enforced. Difference is that this setting uses the number of bytes to control the amount of data coming from the server.

Recommended setting: **8000000**

Reasoning: This setting determines how much data is sent between client drivers and TIBCO DV in each batch. A lower setting requires more batches, and more round trips between client drivers and the server. A higher setting increases the time required to read a batch, but reduces the number of round trips required to fetch the full data set
4.23 Client Drivers / Data / Default Rows to Fetch
Server JDBC/ODBC/ADO.NET client fetch row setting. Rows to fetch setting affects the amount of data streamed between the client and server. Use a value of '0' to fetch infinite rows. This setting is similar to 'Bytes To Fetch' in that both control data flow rates between the server and client, and whichever limit is reached first is enforced. Difference is that this setting uses the number of rows to control the amount of data coming from the server.

Recommended setting: 4000

Reasoning: This setting determines how much data is sent between client drivers and TIBCO DV in each batch. A lower setting requires more batches, and more round trips between client drivers and the server. A higher setting increases the time required to read a batch, but reduces the number of round trips required to fetch the full data set.

4.24 Client Drivers / Performance / DBChannel Queue Size
Defaults to "0". If greater than 0, the server will prefetch data from the data source in the specified number of buffers. This setting is used to reduce the latency of queries that return a lot of rows.

It will not be necessary to restart server if this value changed.

Recommended setting: 10

Reasoning: This setting allows the server to pre-fetch data. The next batch can be returned as soon as the client requests it, decreasing wait times. Without this setting, TIBCO DV will fetch the data only when requested by a client.

4.25 Client Drivers / Requests / Default Request Timeout
The number of seconds of inactivity the Server will wait before closing a JDBC/ODBC/ADO.NET request. Use '0' for unlimited.

Recommended setting: 900

Reasoning: This setting controls how long a request may sit idle before being automatically closed by TIBCO DV. A request is deemed idle when it has begun returning data, but is not being actively read by a client connection.

4.26 Client Drivers / Requests / Maximum Requests
The maximum number of simultaneous requests/queries the Server will support across all JDBC/ODBC/ADO.NET sessions. Use '0' for unlimited.

Recommended setting: Number of CPU cores available to TIBCO DV multiplied by 30 (i.e. on a 4-core machine = 4x30 = 120)

Reasoning: This setting controls how many concurrent requests may be processed by TIBCO DV. This setting is dependent on the capabilities of operating systems, java, and the number of CPU cores available for multi-threading.

4.27 Client Drivers / Sessions / Default Session Timeout
The number of seconds of inactivity the Server will wait before closing a JDBC/ODBC/ADO.NET session. Use '0' for unlimited.

Recommended setting: 900
Reasoning: This setting controls how long a session may sit idle before being automatically closed by TIBCO DV. A session is deemed idle when it has no active requests associated with it

NOTE: It is not recommended to leave the default value of 0, as any connections that are terminated improperly by the client will never close

4.28 Client Drivers / Sessions / Maximum Sessions
The maximum number of JDBC/ODBC/ADO.NET client connections the Server will simultaneously support. Use ‘0’ for unlimited.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: **Equal to, or greater than, the maximum number of requests (set above)**

Reasoning: This setting controls how many concurrent sessions may be open to TIBCO DV. Setting this value too low may prevent the full server capacity from being utilized. Setting it too high allows more connections to be opened than available query requests, and requests may be queued

4.29 Client Drivers / Sessions / Ignore Client Drivers Session Timeout
Determines whether the server ignores sessionTimeout setting of client drivers. The default value is false.

Recommended setting: **true**

Reasoning: TIBCO DV configuration determines the maximum idle timeout for a session. Client drivers, by default, may override this server setting by specifying a timeout when making a connection. This could allow a client to stay connected to TIBCO DV indefinitely, even if it is not actively requesting data. Enabling this setting ensures that server timeout values are always respected

4.30 Memory / Java Heap / Total Available Memory (On Server Restart)
The total amount of Java heap (memory) available for the server’s use. The minimum value is 50 MB.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: **Available RAM on server machine – OS / Repository / Default Cache Database overhead**

Reasoning: Providing more memory to TIBCO DV allows for greater query concurrency, and parallel development. An absolute minimum of 16 GB of RAM is recommended. Typical deployments use between 64 and 128 GB of RAM. Many clients have successfully used upwards of 256 GB of RAM for a single TIBCO DV instance

Overhead must also be considered. Linux / Unix systems typically require 4 GB of overhead, where Windows systems may require more. When calculating OS overhead, be sure to include OS functions, monitoring tools, scripts, daemons, services, etc. that could consume memory

Be sure to monitor the system memory consumption, as paging will dramatically decrease performance
4.31 Memory / Managed Memory / Maximum Memory Per Request

This value is the percentage of managed memory that a single request is limited to during execution. This can be used to prevent excessive memory use by a single request.

This property only applies to requests processed by the classic query engine. Maximum memory allocation for requests serviced by the MPP query engine is controlled using the configuration properties SQL Engine / Parallel Processing / Maximum Direct Memory and SQL Engine / Parallel Processing / Maximum Heap Memory.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: 15

Reasoning: TIBCO DV attempts to execute all requests in memory. Any request that takes more memory than allowed, or available, will spill to disk and continue processing. To avoid having one large query force all other queries to process on disk, it is recommended that no query be allowed to use more than 15% of the total available memory. On a system with 30 GB of RAM dedicated to TIBCO DV, this translates to

\[30 \text{ GB} \times 70\% \text{ (managed memory limit)} \times 15\% \text{ (maximum memory per request)} = 3.15 \text{ GB}\]

Thus, each query may use a maximum of 3.15 GB of memory before it is spilled to disk.

NOTE: Set this number higher to support larger queries that use more memory (which may cause other, smaller queries to spill to disk.) Set this number lower to support a greater number of concurrent queries (spilling larger queries to disk)

4.32 Memory / Managed Memory / Unmanaged (Reserved) Memory (On Server Restart)

This is the memory set aside for use by the server for dynamic actions, so it is not available for use by data processing. If this value is too small, the server may experience out of memory errors.

Changing this value will have no effect until the next server restart.

This value is locally defined. It will not be altered when restoring a backup and will not be replicated in a cluster.

Recommended setting: 256

Reasoning: TIBCO DV uses a small portion of heap space to perform internal actions. This unmanaged memory space is not available for data processing. Adding more memory to this space ensures the server will not run out of memory for internal functions such as query optimization, cache refreshes, and trigger executions. This is especially important in a system with many internal operations.

4.33 Runtime Processing Information / Input / Output / Maximum Samples Stored

This configuration setting determines how many samples are persisted for capturing historical I/O monitoring data. The setting of 0 results in no samples being persisted.

Recommended setting: 24

Reasoning: By default, TIBCO DV only stores IO logging information for a small period of time. Increasing this time allows for a greater trend analysis on management and monitoring consoles.
4.34 **Runtime Processing Information / Requests / Maximum Requests Tracked (On Server Restart)**
The maximum number of requests tracked.
Changing this value will have no effect until the next server restart.
Recommended setting: **10000**
Reasoning: By default, TIBCO DV only stores a small number of requests. Increasing this amount allows for a greater trend analysis on management and monitoring consoles.

4.35 **Runtime Processing Information / Requests / Request Purge Period**
Controls how often the server cleans out completed requests that are older than the purge period.
Recommended setting: **60**
Reasoning: By default, TIBCO DV only stores completed request information for a small period of time. Increasing this amount allows for a greater trend analysis on management and monitoring consoles.

4.36 **Runtime Processing Information / Sessions / Maximum Sessions Tracked**
The maximum number of sessions tracked.
Recommended setting: **1000**
Reasoning: By default, TIBCO DV only stores a small number of sessions. Increasing this amount allows for a greater trend analysis on management and monitoring consoles.

4.37 **Runtime Processing Information / Sessions / Session Purge Period**
Controls how often the server cleans out closed sessions that are older than the purge period.
Recommended setting: **60**
Reasoning: By default, TIBCO DV only stores completed session information for a small period of time. Increasing this amount allows for a greater trend analysis on management and monitoring consoles.

4.38 **Runtime Processing Information / Storage / Maximum Samples Stored**
This configuration setting determines how many samples are persisted for capturing historical disk storage monitoring data. The setting of 0 results in no samples being persisted.
Recommended setting: **24**
Reasoning: By default, TIBCO DV only stores storage logging information for a small period of time. Increasing this time allows for a greater trend analysis on management and monitoring consoles.

4.39 **SQL Engine / SQL Language / Case Sensitivity**
This setting controls the default case-sensitivity of queries. If false, string comparisons are done ignoring case. If this setting does not match the case-sensitivity setting of a data source, performance will be degraded when querying that source. Note changing this has no effect on currently running queries.
Recommended setting:

- If clients have requested a specific value, set to client requested value
- If the architects have requested a specific value, set to architect requested value
- Otherwise, set to match the setting of the data source that contains the largest volume / most frequently accessed set of character data

Reasoning: Each physical data source must enforce a case sensitivity setting for string comparisons, and TIBCO DV will enforce its settings on physical data sources. Aligning the TIBCO DV setting with the largest volume or most frequently accessed character data set minimizes the impact of pushing UPPER functions

4.40 SQL Engine / SQL Language / Ignore Trailing Spaces
This setting controls the ignore trailing spaces during string comparisons in queries. If true, string comparisons are done ignoring trailing spaces. If this setting does not match the trailing spaces setting of a data source, performance will be degraded when querying that source. Note changing this has no effect on currently running queries.

Recommended setting:

- If clients have requested a specific value, set to client requested value
- If the architects have requested a specific value, set to architect requested value
- Otherwise, set to match the setting of the data source that contains the largest volume / most frequently accessed set of character data

Reasoning: Each physical data source must enforce a setting to determine if trailing spaces are included in (i.e. honoured,) or excluded from (i.e. ignored,) string comparisons, and TIBCO DV will enforce its settings on physical data sources. Aligning the TIBCO DV setting with the largest volume or most frequently accessed character data set minimizes the impact of pushing RTRIM functions

4.41 SQL Engine / Optimizations / Parallel Unions
This setting controls the default threading model for Unions. Setting it to false causes Union operations to be streamed for best memory usage. Setting it to true causes Unions to use extra memory and to use threading to increase throughput.

Recommended setting: true

Reasoning: Parallel unions will allow each fetch operation for a union to be executed in parallel, by default, instead of in serial, decreasing response time to a full result set

4.42 SQL Engine / Optimizations / Semi Join / Max Source Side Cardinality Estimate
This setting controls the estimated maximum number of rows in the source side of a join to trigger an automatic semi-join. This value can be overridden at data source level using the Studio.

Recommended setting: 5000
Reasoning: Semi-join optimization is very useful when performing joins between federated data sets, where the number of join keys from the right side is small, and the size of the left table is large. Semi-join performance is heavily dependent on indexing of the join key in the left table, and may well be appropriate beyond 5000 values. TIBCO DV automatically batches requests to the left table, if required, by physical source constraints.

4.43 SQL Engine / Optimizations / Data Ship Query / Execution Mode

Controls the behavior of queries to which data ship execution mode applies.

- EXECUTE_FULL_SHIP_ONLY: After ship query must be pass-through. Otherwise a runtime error will be generated.
- EXECUTE_PARTIAL_SHIP: After ship query may still be a federated query.
- EXECUTE_ORIGINAL: If after ship query is not pass-through, execution will proceed with original 'unshipped' query plan.
- DISABLED: Disable data ship feature.

Recommended setting: EXECUTE_PARTIAL_SHIP

Reasoning: Data Ship Join is a specialized federated join algorithm that can drastically improve performance with disparate data sets of medium to large size. Setting this configuration parameter is the first step to using Data Ship Join. Additional steps will be required to configure data sources that can participate in this join type. See the Administration Guide for more information on configuring data sources to participate in Data Ship Join.

4.44 SQL Engine / Overrides / Push Even If Case Sensitivity Mismatch

Determines whether the server ignores case sensitivity setting differences between the server and the data source. The default value is false.

Recommended setting: Client-dependent

Reasoning: If you know that case differences will not impact delivered results, you may disable TIBCO DV accommodation of differences in case sensitivity settings. This means UPPER functions will not be pushed. For many clients, setting this value to true is appropriate. However, it must be used with care, as it could lead to unintended results.

NOTE: When performing joins or filters inside TIBCO DV, TIBCO DV setting is always respected.

4.45 SQL Engine / Overrides / Push Even If Trailing Spaces Mismatch

Determines whether the server ignores trailing space setting differences between the server and the data source. The default value is false.

Recommended setting: Client-dependent

Reasoning: If you know that trailing spaces differences will not impact delivered results, you may disable TIBCO DV accommodation of differences in trailing spaces settings. This means RTRIM functions will not be pushed. For many clients, setting this value to true is appropriate. However, it must be used with care, as it could lead to unintended results.

NOTE: When performing joins or filters inside TIBCO DV, TIBCO DV setting is always respected.
4.46 SQL Engine / Parallel Processing / Enabled
Determines if the Massively Parallel Processing (MPP) engine is enabled on the TIBCO DV server. The default value is false.

Recommended setting: Client-dependent

Reasoning: MPP functionality is intended to enable processing of queries against massive data sets. MPP queries can place substantial load on your TIBCO DV server, data sources and infrastructure, so the functionality is not enabled by default.

NOTE: MPP is only supported for Linux installation of TIBCO DV. This setting is ignored on all other platforms.

4.47 SQL Engine / Parallel Processing / Limit Scalar Subqueries
Determines if the TIBCO DV query engine automatically appends LIMIT 1 to any subqueries when the MPP engine is used.

Recommended setting: true

Reasoning: It is generally recommended to limit the number of rows returned by subqueries to a single row. This generally reduces the amount of time the MPP engine has to block waiting for results to return from the subquery and limits complexity of the overall query plan.

4.48 SQL Engine / Parallel Processing / Logging Level
Configuration property controls logging level of MPP engine components. Please refer to the TIBCO DV Administration Guide for descriptions of each logging level.

Recommended setting: OFF

Reasoning: Logging should be disabled in production except for debugging and validation purposes. Excessive logging can slow down the TIBCO DV server and consume system resources.

4.49 SQL Engine / Parallel Processing / Maximum Direct Memory
Maximum direct memory allocated for parallel processing. If the value is set to 0 the MPP engine will use 50% of total system memory.

This property only applies to requests processed by the MPP query engine. Maximum memory allocation for requests serviced by the classic query engine is controlled using the configuration property Memory / Managed Memory / Maximum Memory Per Request

Recommended setting: Client-dependent

Reasoning: The appropriate resource allocation for MPP processing is highly dependent upon the volumes of data involved, expected queries to be executed, capacity of the infrastructure TIBCO DV is hosted on and SLAs that need to be supported.

NOTE: If you make changes to this value you will need to disable and re-enable parallel processing for the updated value to take effect.
4.50 SQL Engine / Parallel Processing / Maximum Heap Memory
Defines the maximum heap memory allocated for parallel processing. If the value is set to 0, the MPP engine will use 10% of total heap memory.

Recommended setting: Client-dependent

Reasoning: The appropriate resource allocation for MPP processing is highly dependent upon the volumes of data involved, expected queries to be executed, capacity of the infrastructure TIBCO DV is hosted on and SLAs that need to be supported.

4.51 SQL Engine / Parallel Processing / Minimum Partition Volume
The minimum data volume to be fetched by each partition in megabytes. Note that the actual partition size may not meet the minimum size due to the fact that the MPP engine performs a virtual scan query to estimate result data volumes.

Recommended setting: Client-dependent

Reasoning: The appropriate resource allocation for MPP processing is highly dependent upon the volumes of data involved, expected queries to be executed, capacity of the infrastructure TIBCO DV is hosted on and SLAs that need to be supported.

4.52 SQL Engine / Parallel Processing / Resource Quota Per Request
The maximum percentage of system resources that each MPP request is limited to during execution. Setting this value to 100 would allow one query to run at a time in the parallel processing engine, setting the value to 50 would allow two requests to run at a time.

Recommended setting: Client-dependent

Reasoning: The appropriate resource allocation for MPP processing is highly dependent upon the volumes of data involved, expected queries to be executed, capacity of the infrastructure TIBCO DV is hosted on and SLAs that need to be supported.
5 Data Sources

The following settings are suggested for Data

5.1 Oracle Sources / Introspect All Objects
In Oracle 8.1.7 there are many schema objects that have no use or meaning within the Server. If set to True all schema objects will be introspected. If set to False a filter will be applied to only return objects that are of use within the Server.

Recommended setting: true

Reasoning: This allows TIBCO DV to introspect all objects in an Oracle database, even those in system and hidden catalogues

5.2 Oracle Sources / Push Oracle Query Hints
This setting controls whether to push oracle query hints to Oracle data sources. Query hints occur immediately after the SELECT keyword, and must begin with --+ or /*+. Regular comments will be dropped. TIBCO DV will not validate the query hints, and Oracle ignores invalid query hints. TIBCO DV does not guarantee that the query hint will be pushed, as plan optimizations may cause the hint to be dropped.

Recommended setting: true

Reasoning: This allows TIBCO DV to push Oracle query hints through to the underlying physical data source. See the setting description for usage and caveats

5.3 Oracle Sources / Set Session Time Zone
Sets the time zone on Oracle connections to retrieve values for TIMESTAMP WITH LOCAL TIME ZONE data types.

Recommended setting:

- If TIMESTAMP WITH LOCAL TIME ZONE support is required, set this value to true
- If TIMESTAMP WITH LOCAL TIME ZONE support is not required, set this value to false

Reasoning: Some Oracle instances and Oracle projects require local timezone offsetting when fetching TIMESTAMP values. TIBCO DV may request this offsetting through a session variable

NOTE: This setting is server-wide, and affects all connections to all Oracle data sources

5.4 MS SQLServer Sources / Microsoft BCP utility path
The absolute file path of the Microsoft BCP utility

Recommended setting: <client specific>

Reasoning: The default installation location of BCP is C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\110\Tools\Binn\bcp.exe. If you will be using Data Ship Join, or bulk data loading, to SQL Server, the BCP utility may be used for faster load times. The utility has to be installed on TIBCO DV machine, and TIBCO DV has to be configured to point to the executable in order to correctly work
5.5 **Netezza Sources / Disable Concurrent Requests Per Connection**

Setting this value to "True" will create a new Netezza connection if there is already one request running on the current connection. The Netezza driver may throw "netezza.max.stmt.handles" if concurrent queries are submitted using the same connection. Default value is "False"

Recommended setting: **true**

Reasoning: The Netezza JDBC driver does not support concurrent request processing. Concurrent requests in the same connection object will cause exceptions at runtime. Setting this configuration parameter to true will ensure TIBCO DV does not execute multiple concurrent requests in the same connection object.

5.6 **Netezza Sources / Ignore Impermissible Resources During Introspection**

During introspection, skip any resources inaccessible to the given user.

Recommended setting: **true**

Reasoning: TIBCO DV is able to introspect multiple Netezza schemas as part of one data source. Often, user accounts in Netezza have access to some schemas, but not others. This setting will allow TIBCO DV to ignore objects that the user account configured in the data source cannot access, avoiding introspection failures.

5.7 **Sybase Sources / Ignore Microseconds**

Ignore microseconds in TIMESTAMP values.

Recommended setting: **true**

Reasoning: Most data sources do not store TIMESTAMP or TIME values with microsecond precision. Truncating these values allows for better casting and manipulation of these data types when working with other data sources.
6  Studio

The following settings for Studio may be useful

6.1  Data / Cursor Fetch Limit
This value affects how many rows can be fetched by Studio when looking at the results for a SQL request or procedure output.

Recommended setting: \textbf{100000}

Reasoning: When previewing results from executing a resource, Studio limits the amount of data returned to avoid overloading the user. The side effect is sometimes users wish to see more than the maximum default of 1000 rows, to export to a spreadsheet for further analysis. Increasing this setting allows those users to take more data

6.2  Data / Fetch Rows Size
When a query is executed from the Studio, this setting determines the number of rows to fetch and display.

Recommended setting: \textbf{1000}

Reasoning: When previewing results from executing a resource, Studio fetches data in batches, and limits the amount of data returned through each batch. The side effect is sometimes users wish to see more than the default batch of 50 rows. Increasing this setting allows those users to take more data at a time

6.3  Data / XML Fetch Size
When a xml query is executed from the Studio, this setting determines the number of characters to fetch and display.

Recommended setting: \textbf{100000}

Reasoning: When previewing results from executing a resource that returns XML, Studio limits the amount of data returned. The side effect is sometimes users wish to see more than the default first 10000 characters. Increasing this setting allows those users to see a larger preview
7 Conclusion

This document has outlined some configuration values that will tune and configure TIBCO DV for optimal operation.

TIBCO recommends the use of a tool to keep track of TIBCO DV configuration settings. Please see the example spreadsheet accompanying this document as a sample.

Additional configuration parameters are available. See the Configuration panel and TIBCO DV Administration Guide for more information.