



Customer Best Practices for Teradata Upgrades

Major Software Upgrades

Revision History

Summary of Changes			
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June 23/08	Initial input from all areas	0.1	SFT Members
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Important Notes	
Date	
July 5, 2008	This initial version of the document was written while Teradata V2R6.2 was widely accepted as the current stable version, and V12 was starting to be adopted by customers. Any instructions and software references in this document should be taken with that context in mind.
August 21, 2012	This updated version of the document was written while Teradata TD13 was widely accepted as the current stable version, and TD14 was starting to be adopted by customers. Any instructions and software references in this document should be taken with that context in mind.

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1. Introduction

This paper is prepared for the use and benefit of Teradata customers. It is written by customers; for use by customers.

A successful upgrade of any computing environment requires careful planning, coordination, and execution. A Teradata computing environment is no different. There are many factors that need to be considered and brought together for a successful plan. The success you experience is in part dependent on the success of your efforts throughout the process.

In general, there are three things that influence the success or failure of an upgrade:

- The quality of the product being added/upgraded
- The service procedures followed by Teradata associates
- The planning and execution of operational procedures by the customer

All three need to come together without flaw during the upgrade process in order to achieve success. The first two are the responsibility of Teradata. For the purposes of this paper, they are considered out of scope, but assumed to be present and bear no negative impact on the upgrade process.

This paper will focus on those operational procedures which are the responsibility of the customer. They include, but are not limited to:

- Planning
- Coordination
- Communication
- Testing
- Benchmarking
- Execution
- Project management

Upgrades can include database software (major, minor, maintenance) and database hardware (upgrade, expansion, migration). [This white paper will focus only on database software upgrades.](#) Hardware upgrades and expansions are covered in a separate document which can be found here.

<http://www.teradata-partners.com/About/ServiceFocusTeam/Whitepapers>

Note to the reader. *This guide is provided as a courtesy of the Teradata Partners Service Focus Team (SFT). It comes as is; with no implied support. The procedures represent the combined learning of the customer members who contributed to it. The procedures are meant to be high level guides and do not represent step-by-step procedures. They are accurate to the best combined knowledge of the team, but should always be followed with caution and good judgment as they are not guaranteed to be free from flaws.*

2. The Upgrade Process for Teradata Software

Major Database Software Upgrades, Defined

This paper deals primarily with major database software upgrades. A major database software upgrade is moving from one database version to another as represented by the following software version numbering format: a.bb.ccc.dddd, with “a” being a major release of the database. Moving from Teradata 13 to Teradata 14 is a major upgrade. However, many of the points in this document could apply to minor software upgrades as well.

A Teradata Database *major* release generally includes significant new features and enhancements which may involve the conversion of system tables, user data or custom user features.

A Teradata Database *minor* release may include a number of new features and enhancements, as well as some Requests for Change (RFCs) and Discrepancy Reports (DRs).

A minor upgrade generally does not include the conversion of system tables, user data or custom user features.

Upgrade Process Overview Diagram

This diagram gives an overview of the upgrade process. The body of this document will describe each task in more detail:

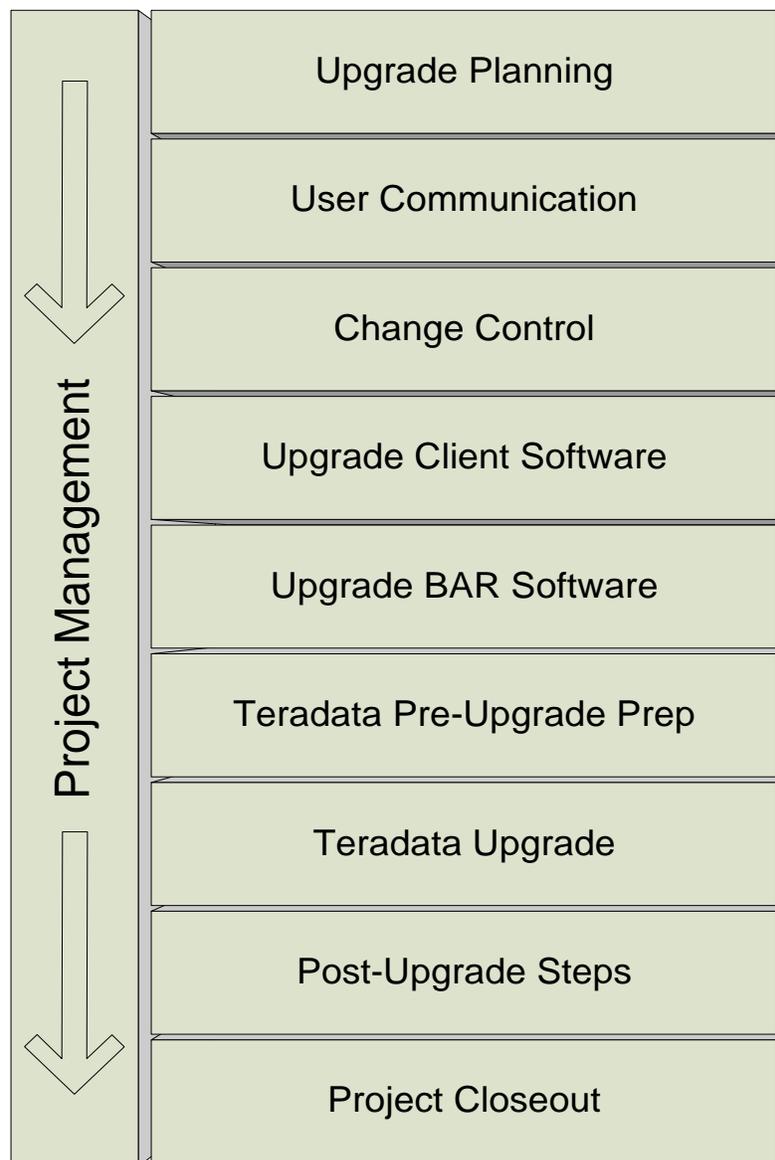


Figure 1: Upgrade Process Overview Diagram

3. Project Management

Any successful project requires strong and focused project management. A Teradata upgrade is a significant undertaking that is well worth treating as a formal project.

Assign a project manager to coordinate all the required tasks as a single project. This person will ensure that all involved parties communicate effectively, schedules are set and followed, and all tasks are completed successfully.

Create an upgrade team with DBAs, operations, developers, performance / testing specialists and others to ensure cross-team participation and communication. Have a kick-off meeting to update everyone and then provide regular status updates to the members. You may want to include your Teradata Customer Service Representative (CSR) in the team meetings.

Some SFT member DBAs have found it helpful to maintain an upgrade plan template document that covers both hardware and software changes. It lists items to remember for specific circumstances. For example, when adding new nodes you would want to remember to request firewall rules changes, obtain IP addresses, make DNS entries, etc. This is a living document to which you would add new reminders learned during each new upgrade.

Other points to be considered as part of your project plan include:

- Consider what progress needs to be communicated to whom and at what points. Communication could make or break the project.
 - A Steering Committee may need a monthly report, whereas others will need the very latest information during the actual upgrade.
 - During the upgrade give timely (maybe every 4 hours) updates on the upgrade progress.
- Are you prepared to accept non-supported configurations? For example, if you are not able to upgrade exploitation tools before a database software upgrade, can you obtain approval for running a non-supported configuration? Who from your company will approve the configuration?
- Agree well ahead of time who will work on the project and obtain commitment that they will be available.
- Be sure to know who will test changes and be sure that they have a proper test plan.
- Does your site have software distribution mechanisms like packages for desktops and servers? If not, put in place processes to ensure that the change takes place in the same way for each similar change.
- Will your own staff carry out the changes and execution of the testing (performance) plan? Will Teradata employees make any of the changes? Will other 3rd party employees make the changes?
- Have you developed a Risk Management Plan? What are the alternative courses of action?

4. Upgrade Planning

An upgrade can be complex. Take the time up front to investigate the new version before taking the plunge. The time invested upfront will pay off later.

Research the new version

Find the differences between the new version and your current version. There are usually significant changes and improvements between major versions. Places to find information are:

- Partners Presentations. Various presentations exist describing the new version and its features which are available via the Partners website to attendees of the conference for up to 2 years.
<http://www.teradata-partners.com/presentations>
- Attend a local Teradata User Group meeting. These are available around the world and are usually held twice a year. Attendance is free of charge. In addition to hearing presentation material, it's a great place to socialize with your peers and build helpful relationships.
<http://www.teradata.com/user-groups/>
- Package Comparison Tool. This is available on the Teradata At Your Service website under the "Tools and Reports" menu. Given two package version numbers, this report displays the DRs (Discrepancy Reports) in the first package but not the second, and the DRs in the second package but not the first. This knowledge is invaluable in determining your particular risks and benefits of upgrading to a particular new version.
- Reserved Words Document. This will help you identify any necessary changes to existing application SQL. Teradata provides scripts to check existing database objects for use of reserved words. However, these scripts don't identify usage as aliases in the user queries. These can be

found by querying the DBQL tables. (Note: if you are not logging SQL text in DBQL you really should be.)

- SQL Fundamentals Appendix E (SQL Feature summary) will detail SQL differences.
- New version manuals, specifically the Release definition and Release Summaries for the new version. These are available on CD and on the Teradata website at <http://www.info.teradata.com>.
- You may also want to consider becoming involved in an EFT (Engineering Field Trial) or BETA testing program for the new version.
- Research DevX with an upgrade tag. <http://developer.teradata.com/>
- Reference applicable Orange Books available via T@YS
- Investigate changes to DBQL and Resusage tables, and prepare changes to your jobs that move such data into your history tables.
- Investigate new DBSCONTROL parameters - ask Teradata to provide recommended values for them, and discuss values with your local Teradata team
- Check to see if the version you want to upgrade to is available as a downloadable, non-production, non-supported Virtual Machine. This could be a great way to get your hands on the new version prior to purchasing it. Note, however, to set your expectations properly as a VM running on your PC will have poor performance, but still gives you a chance to try the latest feature functionality. <http://developer.teradata.com/>

Identify your dependent applications

Be sure you know all the Teradata client applications in use and investigate whether they are able to use the new Teradata version. Some Teradata and/or third-party applications using Teradata will need to be upgraded in order to work with the new version. Once they are upgraded they will need to be tested. For critical applications, it may be necessary to delay the Teradata upgrade until a compatible version is available.

Some potential clients include:

- Third-party reporting tools such as Microstrategy, Cognos, SAS and Business Objects.
- Third-party ETL tools like ab initio and Informatica.
- Teradata Applications (ARM, DCM. Etc)
- Teradata Tools and Utilities (TTU) client software (See following section for details).
- Teradata Backup and Recovery (BAR) software (See following section for details).
- Teradata Managed Servers (Viewpoint, Data Mover, TMSM, BAR, Unity) See sections 9 & 10
- Replication solutions (Unity, Golden Gate)
- DBA housekeeping scripts that are dependent on the data dictionary (DBC) schema. Check for changes to DBQL, resusage and adjust DBA scripts accordingly.

Are there pre-requisites that affect the order of changes? An obvious one is that TTU software would normally be upgraded ahead of database software.

If you are planning an O/S upgrade as part of the project, you will be executing a migration which will require an extra level of planning with Teradata. Your data will need to be backed up and then restored after the upgrade. In what order should the O/S upgrades occur? Do they have to be done at the same time or could the BAR server O/S be upgraded prior to the database server O/S?

Pre-upgrade Benchmarking

If your management is concerned about the Return on Investment (ROI) of the upgrade, you'll want to identify queries you can use for before/after benchmarking. Types of SQL you may want to include are expedited queries, canary queries, heavy hitting queries, frequently run queries, ETL SQL and possibly some more complex queries that may have caused problems in the past. We recommend you identify at least 10-20 different queries.

Collect explain output, TSET information, elapsed times and details for each query. DBQL is a great resource to capture this information. Be sure you have a backup of DBQL or whatever table you use to store this information so you are sure to have it after the upgrade.

If possible, run the queries when the system is quiet before and after the upgrade to accurately compare results. Note that run-time should be long enough to retrieve comparable runtime figures. Keep in mind they might run faster than usual on a quiet system.

You may want to include TPT, Fastload, Fastexport, Multiload, T-Pump, archive and restore jobs in your benchmark suite.

Another important area you may need to consider is performance if you have a mixed workload. You will want to ensure that the various workloads will continue to perform as expected when the system is saturated. Creating a scenario to test this will help to prevent surprises after an upgrade.

For more detailed information regarding Benchmarking practices please refer to the SFT Customer Best Practices for Teradata Benchmarking whitepaper available at

http://www.teradata-partners.com/Content/docs/SFT_Benchmarking_v2.1Final.docx

Regression Testing

We strongly advise that you install the new Teradata version on a test system first and then perform some regression testing. The benchmark queries mentioned above would be good contenders for the testing. Be sure to include queries from your most critical applications.

Use the TSET utility to replicate your production test bed including statistics to the test system. This will ensure that you get the same explains in test that you'll get in production.

If you can't copy down production data to test with, at least run explains on your critical queries to check for syntax errors and parser problems like segment violations (3610 errors).

Key Risk Questions to be answered

Whenever you undertake a major software upgrade, there will always be risks that need to be mitigated prior to execution of the upgrade. The following table provides a list of some common risk items and mitigation steps that can be taken to reduce or prevent any business impact associated with the risk.

Upgrade Risk Item	Description	Mitigation Steps	Teradata Guidance
Statistics Collection	There are often questions as to whether statistics need to be collected before or after an upgrade. Teradata	<ul style="list-style-type: none"> Develop a plan to focus on stats recollection during the outage window for mission critical tables, using a tiered approach. The customer needs to identify what tables are deemed mission critical. 	<ul style="list-style-type: none"> Assuming there isn't enough time to recollect all statistics, put focus on mission critical tables for statistics recollection

Upgrade Risk Item	Description	Mitigation Steps	Teradata Guidance
	<p>always recommends having fresh statistics for the best optimizer performance. However, statistics collection can take some time, and it may not always be feasible to do a full statistics collection during an upgrade window.</p>	<ul style="list-style-type: none"> • Priority for what stats are collected on a given table should be in the following order: <ul style="list-style-type: none"> ○ Partition Stats (on system defined columns PARTITION on both PPI and non-PPI tables) – this is mandatory ○ PI and NUSI stats (NUSI stats should always be recollected after a system expansion) ○ Single Columns stats (High Confidence in explains) ○ Multi Column stats (High Confidence in explains) ○ Single Column stats and Multi column stats (both with low Confidence) • Consider freshness of statistics as you develop your plan (i.e. when the last time statistics were collected on a given table). 	<p>during outage window.</p> <ul style="list-style-type: none"> • Recollect all Partition and NUSI statistics on the system. • Recollect statistics that are known to be stale, and have exceeded their normal re-collection time. • Phase in remaining statistics either on a best effort basis during non-business impacting hours, or during their next scheduled refresh. • Plan for isolated statistics refresh given unexpected performance issues.
<p>Check Table @ Pending Ops Level during system outage window</p>	<p>This is designed to execute as an upgrade prep process, and is a standard utility to determine if issues exist with any objects that must be addressed prior to an upgrade process commencing. While the utility typically takes 10-20 minutes to execute on a system, successfully dealing with identified objects may extend the time required in the plan, which could add time to the outage window. The check table pending ops can take much longer to run on larger systems with many objects.</p>	<ul style="list-style-type: none"> • Execute multiple checktable level 2 operations as part of normal planning to ensure that issues are resolved well ahead of time. • Execute checktable level 2 on dbc, level 1 on other tables post merge, as well as scandisk 	<ul style="list-style-type: none"> • Execute checktable level 2 during normal prep activities and successfully resolve any identified issues. • Executed another checktable level 2 just prior to the system outage window and address any remaining issues. • Execute checktable @ pending ops level at beginning of outage window – there should be no significant errors.

<p>VPN, Service Connect (Axeda), External Network Connectivity Problems</p>	<p>Teradata Customer Services will most likely need to access your systems remotely during the software upgrade. The typical way is through a VPN connection that is already in place for normal customer support reasons. The failure of VPN connectivity can compromise what can be done, and add significant risk to getting all upgrade work completed.</p>	<ul style="list-style-type: none"> • Understand from customer if there is scheduled network maintenance or other activities that would potentially impact Teradata VPN system connectivity. If present, determine ahead of time what can be done to pre-test or mitigate any exposure during the software upgrade. • Use WebEx or other web-based connectivity option that allows for sharing desktops as a backup method for connecting to the Teradata systems from a customer desktop. This should be tested in advance of the upgrade. • As a third option, leverage onsite Teradata CSR resources to assist in the completion of all required activities. While an option, this is least desirable. 	<ul style="list-style-type: none"> • Assume normal VPN connectivity in the plan. • Plan for and pre-test WebEx or other web-based desktop sharing solution to be used as backup • Consider having local CSR support during the software upgrade that can be onsite in the data center if the first two options do not work – this would have to be an agreed upon between Teradata and customer.
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<p>General risks</p>	<p>The Teradata database supports investment protection through its ability to support multiple generations of Teradata platform hardware, including the ability to have nodes of different generations co-exist with each other. This provides the customer with flexibility, but it is important that appropriate planning steps are conducted in advance to ensure a successful software upgrade.</p>	<ul style="list-style-type: none"> • Provide ample time and appropriate software upgrade windows for Teradata Customer Services team to complete all activities. • Meet twice per week 4-6 weeks out from expansion window to develop detailed run book with multiple walk-throughs between Teradata and the customers DBA team. • Run PDCR data collection reports to be reviewed by the Teradata Customer Services for identification of any issues. • Execute new Teradata Customer Services Pre-Upgrade Assessment Service. This service is conducted within 7 days from the software upgrade event and includes work performed by the CS organization: <ul style="list-style-type: none"> ○ Accesses the system and performs the data collection process. ○ Data Collection process is non-intrusive and will not impact the system. ○ Analyzes data to pinpoint known performance opportunities. ○ Works with system/site CSR personnel to communicate issues that require additional attention or follow-up. ○ Completes Assessment and delivers to the system/site CSRs and SSM for review. 	<ul style="list-style-type: none"> • Ensure that all required prep windows are obtained prior to the software upgrade. • Conduct bi-weekly status meetings to develop and review plan, and build out joint detailed run book. • Execute recommended pre-upgrade activities performed by both Teradata Professional Services personnel and Teradata Customer Services personnel.
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5. User Communication

You will want to keep your users well-informed regarding the upgrade timing and content.

Ideas for user communications include:

- Pass on your findings on the use of new reserved words in existing user SQL.
- Publish upgrade information and schedule on your intranet website.
- Consider giving a new features overview class.
- Request users to drop unneeded objects from their personal databases. This is more important for hardware upgrades, but always a good thing to do.
- Verify with users that all their critical data will be backed up, if you don't already regularly back up user personal databases.
- Provide a demo of new tools available in the new release.
- Execute a pilot rollout of TTU to ensure a smooth upgrade.

6. Change Control

The argument for formal change control is that system upgrades are managed in a controlled and successful manner such that there is minimal negative impact on the users of the system.

Main points to consider and potentially include in your change control procedures are:

- Include all software that is being touched. Apart from the obvious new Teradata database release and its client software, you need to include all data exploitation tools being upgraded as well, e.g. SAS, Business Objects and Cognos. Include any data load tools being upgraded as well.
- Be very clear about when changes are to take place and how long they are expected to take.
- Are there pre-requisites that affect the order of changes? An obvious one is that TTU software would normally be upgraded ahead of database software.
- Does your site have software distribution mechanisms like packages for desktops and servers? If not, put in place processes to ensure that the change takes place in the same way for each similar change.
- Will your own staff carry out the changes? Will Teradata employees make any of the changes? Will other 3rd party employees make the changes?
- All changes must have a backout mechanism. Remember to test that mechanism where possible.
- Are you prepared to accept non-supported configurations? For example, if you are not able to upgrade exploitation tools before a database software upgrade, can you obtain approval for running a non-supported configuration? Who from your company will approve the configuration?
- Agree well ahead of time who will work on the project and obtain commitment that they will be available.
- Make sure your change control includes a list of contact names and details for use during the time of change.
- Ensure that you have developed a proper test plan (connectivity testing, functional testing, performance testing, volume testing, data integrity testing, user acceptance testing) and that you know who will execute the testing. Consider if you want to include Teradata PS performance testing specialists early in the process.
- Consider what progress needs to be communicated to whom and at what points. Communication could make or break the project.
 - A Steering Committee may need a monthly report, whereas others will need the very latest information during the actual upgrade.
 - During the upgrade give timely (maybe every 4 hours) updates on the upgrade progress.
- Ensure that you take into account the lead time required for the Teradata Change Control process.

The key to successful change is planning and communication. Change control helps ensure all eventualities have been considered and communicated. Many of the points included in your change control procedures should also be considered as part of your upgrade planning process.

7. Upgrade Client Software

Once you have identified all dependent client software in your environment, communicated with your users and opened your change control you can proceed with applying any required client application updates. This is something you want to do long before doing the Teradata server software upgrade.

Work with your third-party software vendors to upgrade their products according to their recommendations. Specifics on that are outside the scope of this document. The remainder of this section will focus on the Teradata-supplied Tools and Utilities (TTU).

The acronym “TTU” refers to the Teradata-supplied Tools and Utilities that enable a client to interface with a Teradata database server. This includes software that runs on Windows as well as various flavors of UNIX and Linux. The Teradata ODBC driver, SQL Assistant, Teradata Administrator (WinDDI) and BTEQ are the most commonly used components, but there are many others. See the *Teradata Tools and Utilities Installation Guide* for a complete list and detailed installation instructions.

8. Upgrade Teradata Tools and Utilities

Normally the TTU client software will support 1 version back and 2 versions forward, but the general rule is to upgrade your tools prior to the database being upgraded.

Investigate which version of TTU should be installed. Depending on the timing of when TTU is to be installed, different versions will be available for the database version in question. Ensure this TTU version will work with the database version, OS version and any third-party tools.

Future TTU versions will be forward compatible with the next database release. This may remove the need for a mass upgrade. It is likely though that certain software - e.g. Arcmain - will still need to be upgraded. Please discuss, at the time, with Teradata.

Identify servers and workstations that need upgraded versions of the Teradata client tools. Create an implementation plan and checklist to ensure none are missed.

Some companies push TTU clients to workstations. However, it is very common for users with workstation administrative rights to install their own TTU software. In that case you may wish to have each user download the latest install packages from a central source.

Uninstall the old version prior to installing the new one. In the past various issues have surfaced during uninstalls, like leftover DLLs and registry entries. You will want to have a procedure to check that the uninstall completes successfully.

Have database and application teams test the new TTU version. Include tests of TTU along with any third-party tools used. Be sure to do regression testing of unique features of your environment, regardless of prior certifications. You may need to apply software patches as problems are found.

9. Upgrade Teradata Managed Server Applications

Identify which managed servers need to be upgraded and to what version they need to be upgraded to. It is recommended that the managed servers be upgraded prior to the database upgrade. If this cannot be done prior to the database upgrade, it should be the first task in the DB migration plan.

These key steps should be used when upgrading a managed server.

- Create plan for upgrade
- Initiate change control process for both Teradata and local
- Communicate outage to users if they access managed server
- Run full backup of managed server

- Turn managed server over to CSR to apply upgrade
- Run test cases once upgrade complete
- Communicate to users that managed server is available
- Close change control

10. Upgrade BAR Software

Your backup and recovery (BAR) software may need to be upgraded prior to the database upgrade. Common BAR software is ARCMAIN on mainframes, and NetBackup (Symantec) and NetVault (BakBone) on the open clients.

First, check the Teradata roadmap to determine which versions of software are compatible with the version of database software you are upgrading to. By understanding your options up front, you will save significant time later.

Should an upgrade to the BAR platform be necessary, you'll need to take inventory of all system software levels in use in the environment (TTU, OS, Patch Level, NBU/NetVault, Tape Silo Software, etc.). In addition to verifying BAR software compatibility, you'll need to verify the OS environment will continue to support this upgraded software. Should your corporation have certain standards of software, make sure the new versions are permitted for use within your company, or begin the process of certifying them as soon as possible. Verify there are no licensing issues with upgrading to the new software version.

Depending on your corporate structure, several groups may need to be involved in this process. Make sure you have representation from the following types of groups:

- NetBackup/NetVault Support (Symantec or BakBone)
- BAR Master and Media server support (OS)
- Tape silo server support (if present)
- Any tape library server support
- Teradata DBA/System admin
- Someone that has or can verify appropriate permissions for the upgrade process on all platforms

You should schedule your BAR upgrade around any critical backups your location may require, in the event additional time is required for the upgrade process.

The BAR master server is typically upgraded first. It is a good idea to save any custom configuration files present on the master server before the upgrade (java, perl, nbu, etc.) as the upgrade process will probably write over them. The master server should also have a full, comprehensive backup prior to the upgrade in case any files need to be restored. Also verify the master catalog is in good shape and has a good backup. Part of the upgrade process is to convert the master catalog for use on the new version. After the software has been upgraded on the master server, run several tests to validate any older versions of media server clients still work with the new master server.

Once the BAR master server software is upgraded, you are ready for the media servers to be upgraded. After those are upgraded and running backups on the local drives successfully, the Teradata software may be upgraded. Record the current software levels of all Teradata software in the event you need to back off the upgrade.

Here is a typical BAR upgrade scenario example using NetBackup:

- Uninstall TDE/TARA.
- Uninstall ARC, PIOM, CLI, ODBC, ICU, GSS (in that order).

- Install the new versions of GSS, ICU, ODBC, CLI, PIOM, ARC (in that order).
- Verify you can log on using ARC to your target Teradata database.
- Install the new version of TDE or TARA.
- Perform your all-system validation again:
- Backup all local media server drives (non-Teradata backup)
- This validates NBU can communicate with the master server and tape drives
- Backup a test Teradata table using all media servers
- This validates NBU can communicate with Teradata
- Restore a test Teradata table
- Test a scheduled backup within NBU to validate the scheduling still works as expected
- If you have a separate test or development Teradata server, consider performing a complete DBC system dump and restore to ensure that the new version of Arcmain will restore the 'old' version of the system in case of disaster recovery

If all runs well, document your new software levels and make sure you test again once your Teradata database is upgraded. Be aware of new TTU patches that are released in the meantime that may resolve newly discovered performance or connectivity issues.

11. Teradata Pre-Upgrade Preparations

This section concerns those tasks that need to be done shortly before the Teradata software is upgraded. This is a typical list of things to do:

- Open change Controls – Teradata & local.
- Clean reserved words (including TPT).
- It is a good idea to reboot nodes one week prior to upgrade.
- Ensure you have backups of DBS control settings, SysSecDefaults, ResUsage, TDWM, XCTL, PSF settings, etc. in case you need to do a full recovery if something goes wrong.
- Run full backups of important data. All-amp backups are preferred over clustered backups if the amp configuration will be different after the upgrade. Remember that cluster backup datasets must be restored serially to a different amp configuration. That may require an unreasonably long restore window.
- Clean-up unnecessary data and objects
- Run scandisk and checktable on the existing system. Do this enough in advance to allow time to address any problems discovered.
- Clean leftover Spool.
- Generate DDLs of Hash, Join Indexes, Triggers and UDFs. These should be dropped prior to the upgrade.
- If you use journaling, you may need to drop your journal tables prior to the upgrade.
- Disable DBQL and offload to history repository.
- Purge ampusage over 180 days old.
- Resolve checktable issues (tables in a pending load status).
- For any daily archiving of dictionary tables ensure that any dictionary changes implemented by this upgrade are understood. (as an example, PDCR)
- If you have tables with Identity Columns, capture the max value of the column immediately before the upgrade. If you use identity columns in one table to generate the key of another, you need to find the max value of the id generated. If you have to restore such tables, check the AvailValue in dbc.idcol after you have restored. If these values are lower than the value you captured, you will

need to carry out a table change and set the STARTS WITH value to the max captured value plus one.'

- Turn off access logging before the upgrade
- Starting with TD 13.10 and higher, there are several activities that the customer DBA must perform before and after the upgrade. Ensure that you have discussed these with the CSR performing the upgrade so you understand and execute them appropriately.

12. Teradata Upgrade

Now that the system is fully prepared, the actual upgrade may begin. While the software upgrade itself will typically be done by your Teradata CSR, these are last-minute functions the customer DBA may need to perform:

- Quiesce the system
- Abort remaining user sessions
- Backup DBC
- Bring down any TDPs
- Disable the system being upgraded in the Viewpoint configuration and/or shutdown Teradata Manager server
- Shutdown open systems backup application (NetBackup, NetVault)
- Disable unnecessary user ID's
- Stop any job schedulers such as AutoSys, cron, etc.
- Run checktable Pending OP and resolve any identified issues
- Ensure that all Hash, Join Indexes, Triggers and UDFs have been dropped
- Turn the system over to the Teradata CSR to perform the software upgrade

13. Post-Upgrade Steps

After the CSR has completed and validated the upgrade, he or she will turn the system back over to the DBA. The DBA would then perform a sequence of functions, including:

- If not performed by the CSR during the outage window, run checktable DBC only at level 3. This should only take a few minutes.
- If not performed by the CSR during the outage window, run scandisk and checktable to verify the rest of the file system is clean.
- Backup DBC and any other critical databases. If any new system databases were created as part of the upgrade, remember to grant the appropriate dump/restore privileges on them and add them to your BAR scripts.
- Run collect stats on application tables if recommended for this upgrade version.
- Check/reset TDWM, DBScontrol, XCTL and PSF settings.
- Restart DBQL, Access logging, System Security, Priority scheduler, etc. as before.
- Restart Viewpoint monitoring by enabling the system on the Viewpoint servers and/or restart the Teradata Manager server
- Recreate Hash, Join Indexes, Triggers and UDFs that were dropped prior to the upgrade.
- Recreate journal tables (if any).
- Make sure the default date format is set correctly. This often gets changed.
- The upgrade scripts would have identified and recompiled any Teradata Stored Procedures (TDSP).
- Recompile and test any user stored procedures. The upgrade will not have recompiled any stored

procedures whose code is stored outside the system

- Restore DDL for system databases that you may have modified (i.e. Sys_Calendar.CALENDAR).
- Validate statistics are collected as should be on DBC and user tables. Recollect if necessary.
- If you have to restore a PPI table you may need to revalidate the Primary Index afterwards : 'Alter table x revalidate primary index'. This command normally runs quickly.
- May need to adjust user spool settings if number of amps changed.
- DBA regression testing. Run test program to validate all settings, connectivity, programs, DBC tables, procedures, etc.
- Test applications such as SQL Assistant, BTEQ, BTEQWin, OLELoad, Teradata Administrator, Visual Edge, TASM, AQM, Teradata Manager, backup, restore etc.
- Start/confirm TDP's and enable logons.
- Restart job schedulers such as AutoSys, cron, etc.
- Restart open systems backup application.
- Notify customers of system availability.
- Sign off on user acceptance of upgrade with Teradata.
- Close Change Controls – Teradata & Local.

At this point you could run your post-upgrade benchmarks and compare them to your pre-upgrade benchmarks. Publish results.

14. Project Closeout

Shortly after the upgrade is complete and users are happily using the system you will want to have a project wrap-up meeting. The project manager should lead a “lessons learned” session and document what went well and what could be done better next time. This information will be invaluable for planning the next major upgrade.

If you are maintaining an upgrade plan template document (see the Project Management section above), this would be a very good time to update it with any new learnings.

Hit your management up for a party. You deserve it!

15. Closing

The SFT is a committee of the PARTNERS User Group that works closely with Teradata on issues related to support services and other areas that fall beyond the scope of product enhancements. Members represent the concerns of Teradata customers by serving as catalysts for service improvements, providing ongoing feedback to Teradata and the PARTNERS Steering Committee.

The members of the SFT sincerely hope that you found this document useful. Please let us know of any comments or suggestions you may have. See you at Partners!

You can find our contact information and more about the SFT at our website:

<http://www.teradata-partners.com/partners-user-group/service-focus-team>