



Teradactyl LLC. Statement of Capabilities

Background on Teradactyl LLC.

Teradactyl LLC. is a software engineering company headquartered in Albuquerque, New Mexico. Teradactyl was formed in January 1999 and is classified by the U.S. Small Business Administration as a small business concern. Teradactyl offers products and services, specified below, for centralized network backup and recovery of distributed computer systems over local and wide area networks. Teradactyl is 100% U.S. owned and operated and is a registered DOD CCR and NSA ARC contractor. Teradactyl maintains a 100% customer retention rate!

Teradactyl Products and Services

Teradactyl's flagship product is the True incremental Backup System® (TiBS). TiBS is a software application that employs centralized servers for backup and recovery of computer systems operating under AIX, BSDos, Digital UNIX, FreeBSD, HP-UX, IRIX, Linux, Mac OSX, NetBSD, Solaris, and Microsoft Windows. TiBS also develops advanced solutions for network file systems including AFS, NFS, and OpenAFS.. Our unique patented technology, TeraMerge®, takes an initial full backup of the data on a client computer system and then only requires the transfer of data which is new or has changed since the previous backup to be sent across the network to the backup server. The TiBS backup server is capable of merging the True incremental Backup volumes with the existing backup data to create multiple lower level backups, including differential and other forms of cumulative incremental (CI), partial cumulative incremental (PCI), and consolidated full, backup volumes. This multiple level & multiple volume synthetic consolidation process is performed entirely on the backup server without the need for network intervention. Periodic full network backups are not required to maintain expedient restore times. Our TeraMerge technology significantly reduces the impact of backup processing on both client computer systems and the network by eliminating the need for periodic full and lower level network backups. The advancements in synthetic consolidation technology provide backup administrators with a more broad variety of data management strategies to meet the desired balance of storage cost, data granularity, and expedient restore times. TeraMerge multi-level and multi-volume synthetic backup consolidations provide more control and include both disk and tape verification and repair to protect restore integrity.

TiBS Automated Tape Library Interface (ATLI) provides support for robotic tape libraries from most major manufacturers. TiBS ATLI requires libraries to be SCSI-2 compliant or fibre channel direct attached with a barcode reader. The TiBS ATLI supports most standard tape technologies including; AIT, SAIT, DLT, SDLT, and LTO. TiBS ATLI can also support multiple robotic libraries to permit a site to scale as capacity requirements grow. In the event that the processing environment is compromised, damaged, or destroyed, TiBS backup servers can restore to the original site or a contingency operations center. TiBS can produce mirrored tapes within the same robot for off-site storage. Teradactyl is currently working on a project to mirror data to second, remotely located, robot for automated off-site data storage and retrieval.

TiBS now has a Disk Library Interface (DLI) for all product versions. Administrators can maintain daily True incremental backup volumes and any combination of synthetically generated lower level volumes on disk. This includes multiple level synthetic cumulative incremental and partial cumulative incremental volumes, a unique feature with TiBS. This expanded capability means the new PCI Backups will typically be significantly smaller in size at any backup level than currently available CI Backups. An initial study found the PCI backups were up to five times smaller than corresponding cumulative incremental backup volumes. ***The TiBS Full Version with the DLI now allows any number of backups to be taken at each level without ever increasing backup sizes. As the number of backups per each cycle increases, the savings that PCI Backups provides over CI Backups will continue to increase as well.***

In addition to the products mentioned above, Teradactyl provides a variety of service offerings. Teradactyl has four software maintenance plans; standard, silver, gold, and platinum. Each of these plans includes automatic version upgrades to the True incremental Backup System in addition to minor release updates. The maintenance plans permit a site to select the level of support response times and site contacts, which are required. Standard support provides two site contacts with twelve (12) hour support windows Monday through Friday, excluding Teradactyl holidays. Sites with significantly greater service level requirements can have an unlimited number of support contacts and access to technical support twenty four (24) hours a day, seven (7) days a week, three hundred and sixty five (365) days a year.

Teradactyl also offers OnSite services for client installations, configuration, and training. With this option, Teradactyl will send engineers and training support staff to your facilities to expedite the setup and configuration of new TiBS servers. Changes in configuration, such as the addition of new operating system clients, can be facilitated by hiring Teradactyl engineers to visit your site and quickly make changes to your system(s). Training or retraining of your staff in the use of TiBS is also available either at your location or off site.

Another service offering, quite unique to the industry, is our custom engineering services. We have worked very hard to provide our clients with extensive functionality. In some instances, however, features are not available which would provide significant value or utility to an individual site. Often we find that other customers also require these capabilities. Teradactyl takes all requests for enhancements seriously and we try to incorporate those that provide the most benefit to the widest customer base. Sometimes, however, we can't schedule engineering for a specific request or may not be able to design and implement the request in a time suitable to the client. In these instances, we form research projects that are funded by one or more Teradactyl clients and may also include government research funding. This gives us the ability to contract additional resources to meet your needs. Fixed cost projects are generally structured. In some instances, a time and material basis is used for charging costs to interested clients. We want to give all our customers the maximum flexibility in conforming TiBS to their environment and procedures.

Teradactyl Pricing

Teradactyl has a pricing model that uniquely benefits large sites both in terms of price and ease of license administration. TiBS is licensed by operating and network file systems. An initial license charge (ILC) for each operating or network file system purchased, permits the user to backup an unlimited number of client machines within that operating or network file system. We do NOT have any per seat charges for TiBS. We do not require our customers to track or report the number of machines currently being backed up by TiBS. If multiple TiBS servers are required, the ILC's purchased may be deployed on multiple TiBS servers within a licensed site at NO additional charge.

To support an increasing number of computers or to reduce the backup window, TiBS uses process packs. A process allows one backup job to run on any of a site's backup servers. Purchasing additional processing licenses allows more backups to run in parallel at any given time. With TiBS, you can generally add more processing packs to increase data processing capacity and/or reduce backup windows. This pricing architecture gives our clients the ability to scale their backup system to meet future needs without having to pay upfront charges for utility not currently needed. Processing packs are not operating system or network file system specific. Your change from one flavor of UNIX to another, for instance, will not require you to buy new processes or pay an upgrade fee for the processes you currently own. Processes may be transferred between TiBS backup servers. The only restrictions with your processes are that they must remain within the department or entity that purchased them and they must be applied to the TiBS Edition purchased (Full, Lite, or Small Business).

The TiBS Automated Tape Library Interface (ATLI) and Disk Library Interface (DLI) are both licensed per backup server. With the ATLI module there are no additional charges for the number of drives, tape slots, or physical libraries connected to a TiBS backup server. The charge is the same regardless of tape library manufacturer for all supported models. With the DLI module there are no additional charges for the capacity or RAID level of the disk array connected to a TiBS backup server. The charge is the same regardless of the manufacturer for all supported models.

OnSite services for installation, configuration, and training are priced per hour plus expenses including travel, lodging, and a reasonable regional per diem when applicable. Teradactyl OnSite services within Albuquerque, New Mexico do not have any charges in addition to the per hour charges unless specified in the contract.

Annual software maintenance plans are priced as a fixed percentage of the software purchase price. These fees are charged annually and are due at the beginning of each contract period. Incremental support fees vary by type of service and are discounted at different rates for Teradactyl annual support plan customers based on plan type. Please contact Teradactyl for additional information.

Teradactyl offers discounts to education, government, and non-profit institutions for all software and services excluding Open Transaction Manager by Colombia Data Products, custom engineering services, and incremental support options.

Security aspects of TiBS

TiBS software encryption can be turned on and off. If activated, TiBS uses 128-bit, 192-bit or 256-bit symmetric key encryption (twofish) for all network file data transfers. TiBS centralized backup servers can communicate with the client systems in encrypted formats to protect data during network transfers on both local area networks (LAN's) and wide area networks (WAN's). Files are restored by TiBS to their original operating systems with security data intact. Cross platform restores may not support security features of the original files but this information is reported.

Teradactyl Customers

Teradactyl sells to clients in the commercial, education, and government sectors. We are very proud of our customer base. These clients have consented to accept calls concerning Teradactyl and TiBS:

U.S. Department of Energy, Fermi National Accelerator Laboratory
Operating Systems Support Department, Central Systems and Infrastructure Group
Contact: Ray Pasetes, CSI & CD-CORE Support Services Systems Administrator
Phone: (630) 840-5250 (Unsecured)
E-Mail: rayp@fnal.gov
Mailing Address: P.O. Box 500 Batavia, IL 60510-0500

Fermi generated statistics on TiBS: www-css.fnal.gov/csi/afs/stats/tibs/html/bindex.html

Carnegie Mellon University, Department of Electrical & Computer Engineering
Contact: Jim McKinney, System Administrator Manager, ECE
Phone: (412) 268-5141
E-Mail: jmck@ece.cmu.edu
Mailing Address: 5000 Forbes Avenue, HH 1304 Pittsburgh, PA 15213

Vanderbilt University and the Advanced Computing Center for Research & Education (ACCRE)
Contact: Alan Tackett, Ph.D., Director for the High Performance Computing and Storage Center
Phone: (615) 322-1028
E-Mail: alan.tackett@vanderbilt.edu
Mailing Address: 143 Hill Student Center Nashville, TN 37203

White Papers (available online at www.teradactyl.com)

TeraMerge® Enables Single Level Synthetic Backup Consolidation for the Lite Version of the True incremental Backup System® (Reduces the Impact of Backups on Networks): This white paper studies TeraMerge® single level synthetic backup consolidation, as used in the Lite Version of the True incremental Backup System® (TiBS). This technology was first engineered by Teradactyl® for the software release of TiBS 1.0. TeraMerge® was later improved and extended to do multiple level merges for TiBS 2.0. Teradactyl® has received a patent for TeraMerge® multiple level synthetic backup consolidation.

TeraMerge® Enables Multiple Level Synthetic Backup Consolidation for the Full Version of the True incremental Backup System® (Increases Backup Server Performance): This white paper studies TeraMerge® multiple level synthetic backup consolidation, as used in the Full Version of the True incremental Backup System® (TiBS). This technology was first engineered by Teradactyl® for the software release of TiBS 1.0. TeraMerge® was later improved and extended to do multiple level merges for TiBS 2.0. Teradactyl has received a patent for TeraMerge® multiple level synthetic backup consolidation.

TiBS Disk Library Interface Improves Backup and Recovery Performance: This white paper studies the Disk Library Interface (DLI) enhancement to the True incremental Backup System® (TiBS). The DLI will allow faster restore times, shorter network backup windows, more data to be supported per backup server, and higher data granularity on disk.

Considerations when Choosing a Backup System for AFS: The Andrew File System® has a proven track record as a scalable and secure network file system. The most telling sign of the longevity of AFS is the adoption of the open source version of the software (OpenAFS). One of the important challenges facing AFS system administrators is the need to provide efficient, cost-effective backup strategies that can scale with ever increasing cell sizes. This paper provides an overview of the issues to consider when putting together or purchasing a long term backup and recovery strategy.

Partial Cumulative Incremental Backups Offer Unique Advantages to Customers: This paper provides an overview of how Partial Cumulative Incremental (PCI) backups work and how they can be used as a replacement for Cumulative Incremental Backups (CI Backups). Typically much smaller than currently available CI Backups, PCI Backups extend the patented TeraMerge multiple level synthetic backup consolidation process to include multiple backup volumes at each level of consolidation. These new, disk based PCI Backups allow for increased near line storage of backups, faster synthetic backup consolidation, improved efficiencies in backup hardware, and faster average restore times.

Supported Operating & Network File Systems as of November 2007

| Operating System | Architecture | TiBS Client | TiBS Server |
|------------------|-----------------|-------------|--------------|
| AIX | RS6000 | yes | call |
| BSD/OS | Intel | yes | no |
| Digital Unix | Alpha | yes | no |
| FreeBSD | Intel | yes | call |
| HP-UX | PA-Risc | yes | call |
| IRIX | SPx | yes | call |
| Linux | Intel | yes | yes |
| Mac OSX | Powerpc & Intel | yes | beta (Tiger) |
| NetBSD | Intel | yes | no |
| Novell | Intel | beta | no |
| Solaris | Intel | yes | call |
| Solaris | sparc | yes | yes |
| Windows | Intel | yes | no |

TiBS 2.0 Currently Supported Network File Systems

Andrew File System - IBM AFS
Andrew File System - OpenAFS
Network File System - NFS

NOTE: If you have operating systems that are not listed here please call our research center and let us know. Our backup client can be easily ported to just about any UNIX platform. Candidates for Mac OSX TiBS Backup Server (Tiger) Beta Program are currently being considered. This is limited to U.S. institutions only.

Emergency Response: Any client who is on an annual maintenance plan and declares a site disaster recovery emergency is automatically given priority to Teradactyl OnSite services. One or more Teradactyl technical support staff members will be sent to your location as quickly as possible after we receive a valid authorization to engage our services. OnSite standard pricing, terms, and conditions apply. In the event of a true emergency, Teradactyl will focus its resources on support of its existing customers.

In addition to Teradactyl being a registered U.S. Defense CCR Contractor, we are also registered with the National Security Agency, Acquisition Resource Center. Teradactyl is a proud member of the US Department of Homeland Security, as a National Emergency Resource Contractor and registered with the Federal Emergency Management Agency, as part of the Southwest Emergency Response Network.

Teradactyl Contact Information

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100 Word Statement of Capabilities

Teradactyl specializes in the development of enterprise network backup system software for backup and disaster recovery of large installations in commercial, education, and government sectors. Teradactyl's patented multi-level and multi-volume synthetic consolidation enables system administrators to run perpetual True incremental network backups. The True incremental Backup System (TiBS) consolidates the incremental volumes offline in a variety of configurable fashions to meet the desired balance of cost, data granularity, and expedient restore times. TiBS can scale backup operations with significantly lower impact on network and client resources while maintaining disk and tape verification and repair to protect restore integrity.