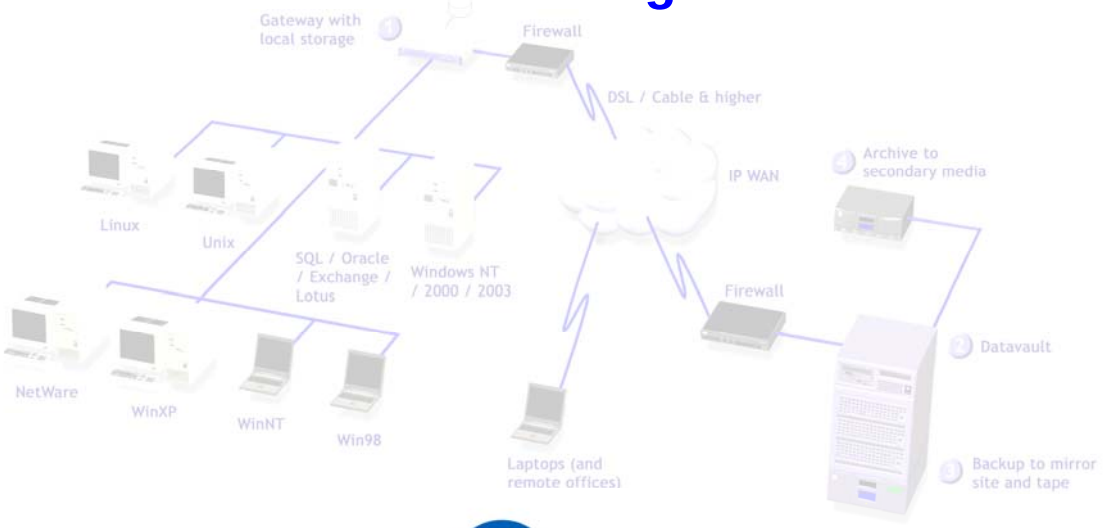
White Paper:

How DataVaulting Works



DS3 DataVaulting

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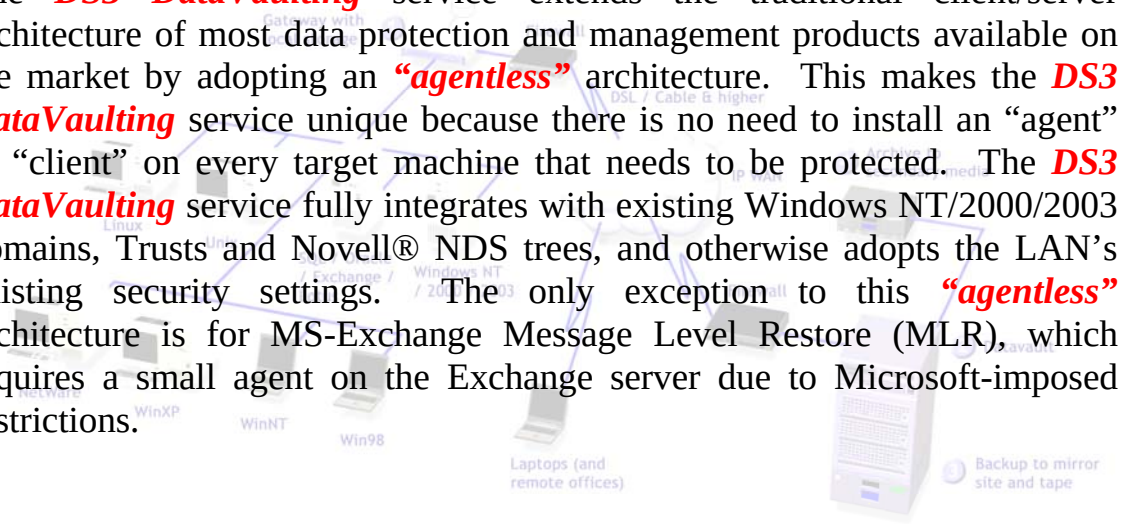
Executive Summary

The ***DS3 DataVaulting*** service performs world class unattended online backup and restore functionality. The DS3 offering is differentiated from traditional backup and restore software in the marketplace because the ***DS3 DataVaulting*** backup/restore functionality was built for service provisioning from the ground up and incorporates a variety of tools, functions, and architecture specifically for that purpose.

The ***DS3 DataVaulting*** service extends the traditional client/server architecture of most data protection and management products available on the market by adopting an ***"agentless"*** architecture. This makes the ***DS3 DataVaulting*** service unique because there is no need to install an "agent" or "client" on every target machine that needs to be protected. The ***DS3 DataVaulting*** service fully integrates with existing Windows NT/2000/2003 domains, Trusts and Novell® NDS trees, and otherwise adopts the LAN's existing security settings. The only exception to this ***"agentless"*** architecture is for MS-Exchange Message Level Restore (MLR), which requires a small agent on the Exchange server due to Microsoft-imposed restrictions.



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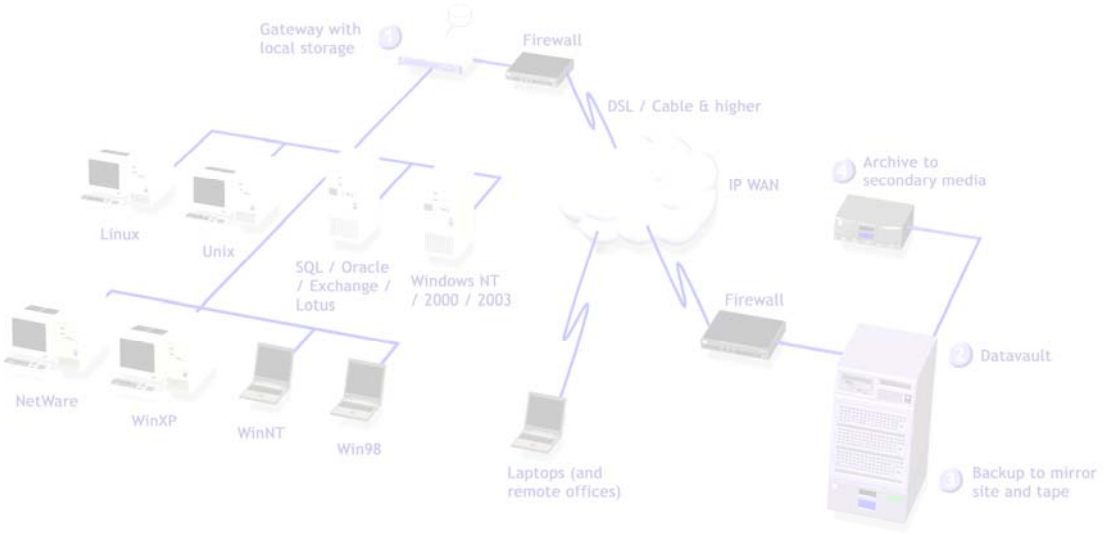

1 Architecture

While DS3 recognizes that each client's architecture is unique, a generalized architecture is shown in Figure 1. Everything to the left of the IP WAN Internet "cloud" represents the customer environment while everything to the right represents the DS3 infrastructure.

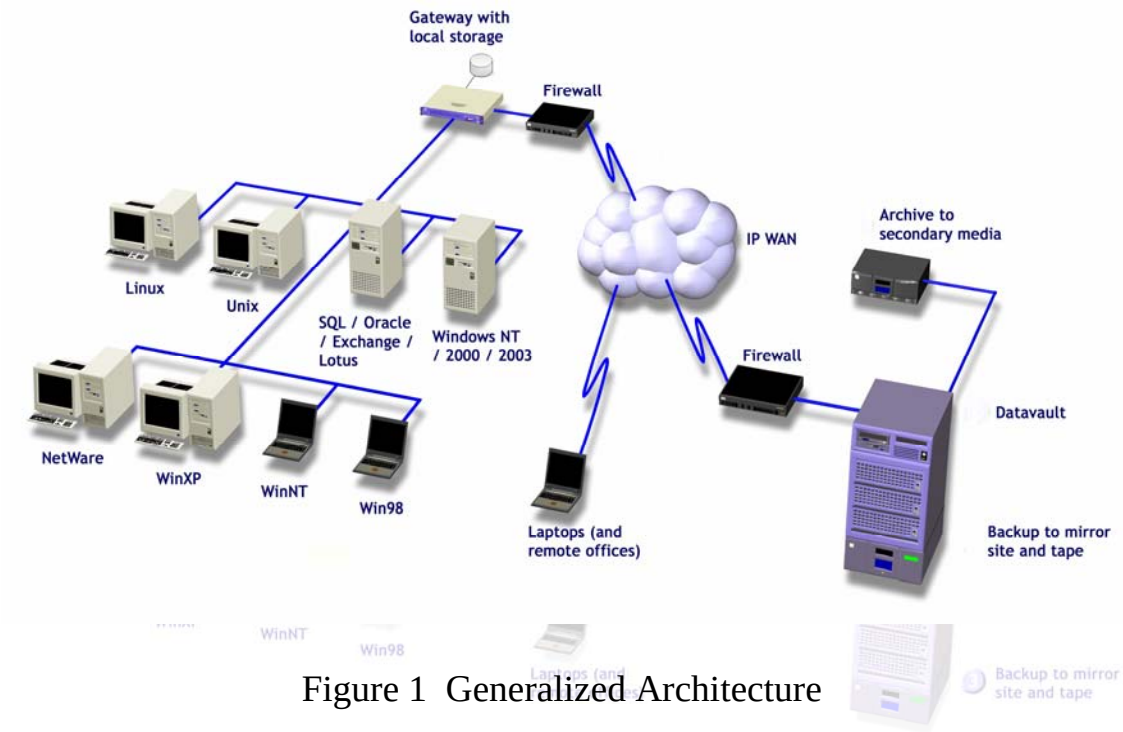

Figure 1 Generalized Architecture

DS3 DataVaulting is comprised of the **DS3 Gateway** and the **DS3 Datavault**. The DS3 Gateway (installed within the customer infrastructure) runs on a Windows 2003 Server platform and collects data to be protected. The DS3 Gateway sends the data in compressed and encrypted format to the DS3 Datavault (installed in our data center) which runs on a Windows 2003 Server platform.

The DS3 Gateway hosts two software applications. **DS-Client** is a Windows NT type service that is always operating to check schedule times, implement file and data block transfers, and perform backups/restores. **DS-User** is a graphical user interface (GUI) that is used to configure, control and monitor the **DS-Client** application. **DS-User** may also be installed on any PC to monitor the activity on the **DS-Client** application on the Gateway (so long

as there is IP connectivity between the PC hosting **DS-User** and the Gateway).

From the diagram above, you can see that only one instance of the **DS3 Gateway** software can protect data residing in numerous servers and workstations across the network. For remote offices, another DS3 Gateway is installed at each location.

A smaller footprint software suite (also consisting of **DS-User** and **DS-Client**) exists on each laptop PC to be backed up. This software handles backing up files on the individual laptop PC by communicating directly with the data center, bypassing the DS3 Gateway. This architecture allows the laptop or desktop to be backed up anywhere in the world, as long as an Internet connection exists.

2 Data Backup

DS3 DataVaulting stores customers' data in encrypted and compressed format to ensure privacy. Moreover, ***DS3 DataVaulting*** optimizes the amount of data stored on the DS3 Datavault by using *delta blocking* and *common file elimination* technologies. *Delta blocking* ensures that after an initial data back up, no updated file will ever be backed up in its entirety. Rather, we segment the file into 1K and 2K blocks and then back up only those blocks that have changed. This typically provides significant storage size savings over traditional back up techniques where a single change in a file entails the entire file having to be backed up. *Common file elimination* ensures that the same data is never transmitted offsite more than twice, thereby saving the bandwidth to transmit only new, unique data. Due to the way this technique is applied, it does not matter if the files are on different servers, or even have different filenames, the DS3 Gateway will still never transmit more than two copies.

These two processes, along with compression, reduce the amount of data that is stored on the DS3 Datavault, which is typically a much lower figure than the amount of data that is protected. Since we charge you based on the amount of data stored, we pass these savings onto you.

At all times in the process, your data is encrypted (up to 256 bit AES) so that no one, not even DS3 personnel, can access your data. You set the encryption key and thus you control access.

The DS3 Gateway retains the latest copy of all backed up data. All previous generations of data (a generation is defined as a backed up version of a file) are stored on the DS3 Datavault.

3 Data Restore

The DS3 Gateway console allows the authorized customer network administrator to quickly and easily select and restore data. Data can be restored to the original server or to a remote system. Multiple restore operations to separate servers can be performed from a single DS-User Administrator console, making this particularly suitable for a help desk role.

Any restore of the latest version of the backed up data (e.g. the current MS Exchange email information store) can be accomplished by restoring from the DS3 Gateway. Alternatively, restores of past versions of data involve accessing the data on the DS3 Datavault.

There are three methods in which data can be restored, each of which represents a unique scale of data restore. The first is online, where data is restored across the. The second is where the restore data is delivered via a portable DS3 disk or media. The third is for major disaster recovery and uses a portable DS3 Datavault that is delivered to the customer's site or alternative disaster recovery location.

DATA RESTORE - Online Restore

The primary method of data restoration is online. Using a wizard driven GUI, your administrator or help desk personnel can easily search for and select the proper data, its proper generation and the target destination server to enable restores in minutes. There is no need to retrieve tapes, mount them, and then hope that the media was not physically damaged during transfer. Depending on the version of the data, the DS3 system automatically searches its archives on the DS3

Gateway and the DS3 Datavault to find the optimal location from which to implement the restore.

Typical data size on this type of restore is 1 MB to 10 GB. Larger data volumes are supported through local restore from the DS3 Gateway.

DATA RESTORE - Portable DS3 Disk Restore

The second method of data restoration is via a DS3 portable disk. Using another wizard driven GUI, your administrator or help desk personnel will request that a copy of the backed up data is copied to a portable DS3 disk/media. Once our data center staff accomplishes the restore to the disk/media, the disk/media will be transported to your site. Another on-screen wizard will guide your administrator or help desk personnel through the process of restoring the information from the disk/media to a target destination server.

This level of restore is used in instances of major data loss, like a major database server or multiple servers. Typical data size on this type of restore is 10 GB to 100 GB.

DATA RESTORE - Portable DS3 Datavault Restore

The third restore option is to request a portable DS3 Datavault. This could be used as an alternative to the portable DS3 disk or in a major disaster situation where complete backup data is required. DS3 will deliver the portable DS3 Datavault to either the customer's site or an alternate disaster recovery location. The portable DS3 Datavault is then connected to the customer's DS3 Gateway via a private LAN connection. In the event of a complete loss of the customer's Gateway, an alternative Gateway will be designated. Data can then be restored in the same way as for an online restore but with the performance benefit of the portable DS3 Datavault being on an internal DS3 Gateway LAN.

Typical data size on this type of restore is hundreds of GB to multiple TB.

4 Benefits

DS3 DataVaulting can protect a range of network platforms and applications such as Windows, NetWare, UNIX, and Linux based data. NetWare 3 capability includes support for bindery, and NetWare 4 and 5 include support for NDS. Windows environments are fully supported including permissions and streams on NTFS volumes, registry, active directory, and so on.

DS3 extends its backup and restore capability by adding its ***DS3 DataVaulting for Laptops and Desktops*** product, which provides the ability to backup laptop users while they are on travel, working at home, or working at a customer site. A scaled down version of the Gateway software (**DS-Client** and **DS-User**) is installed locally on the laptop that periodically (during a specific time schedule) checks for an Internet connection to the DS3 Datavault. Once a connection is detected, the agent sends the changed data in compressed and encrypted format to the DS3 Datavault. The agent runs in the background and can be customized to use very little CPU power on the laptop (as low as 5%). The user is notified when two scheduled backups have been missed. Restores can be performed either online, or via a portable DS3 disk/media.

MS-SQL and MS-Exchange are fully supported without a need to stop the service or install any agent on the host machine. This is accomplished because Microsoft® developed SQL and Exchange with the backup requirement in mind. Both products can respond to API calls requesting the services to dump their data, while online, to an external destination. The DS3 Gateway simply asks the specified MS SQL or Exchange server to stream the data to the DS3 Gateway where it is compressed, encrypted and transmitted to the DS3 Datavault. This process is a totally supported Microsoft® function and guarantees compatibility with your existing Microsoft® systems. Online (also known as “hot”) backups for Oracle 8 are supported.

For MS-Exchange Message Level Restore (known more generically as “Brick Level Restore”), an agent is installed on the MS Exchange server to adhere to Microsoft® requirements. This allows for backup and restore of

individual MS-Exchange and MS-Outlook mailboxes and folders (such as contacts or calendar), as well as individual items within the mailbox or folder. The Message Level Restore (MLR) feature allows for restore of mail messages, calendar items, etc while the MS Exchange system *remains online and fully functional* for all users.

5 Benefits

For further information about this product, please contact your sales account representative. If you have not been assigned a sales account representative, please visit us at www.ds3datavaulting.com, contact us via email at sales@ds3datavaulting.com or telephone us at (703) 968-8100.