Determining Resource and Storage Utilization in a Modern Networked Environment

- Easy to deploy
- Never miss critical performance data
- Scales effortlessly to hundreds or even thousands of machines
- Leverage your existing frameworks for management reporting
- Analyze and gather the information to optimize resource utilization
- Customizable to meet your monitoring, trending and analysis needs

Take Charge of your Windows and Storage Environments
Tracking Who Uses What

Many IT organizations have reaped the economic, operational and future-proofing benefits made possible by a modern, scalable and high performance networked storage environment based on DataCore’s SANsymphony™ and SANmelody™ Disk Server platforms. These enterprises as you would expect have first concentrated on the pressing need to consolidate and automate tasks such as storage allocation and data protection. With that practice well in hand, their focus shifts to large scale network-wide monitoring, reporting and projecting how applications employ their disk storage assets.

Most have either too little information or too much minutia to be able to synthesize a meaningful picture of asset utilization. Others are hampered by the numerous application and device-specific products typically needed to piece together an ongoing view of demand and supply.

DataCore provides the required insightful analysis of Microsoft™ Windows systems and the network storage infrastructure with the SANmaestro™ Utilization Analysis Suite.

SANmaestro software helps characterize usage patterns that drive budgets, assist with resource prioritization and ultimately justify IT’s existence. The information also substantiates whether quality of service (QoS) objectives are being met to support billing or charge-backs in “fee for service” arrangements.

SANmaestro - Unique Perspective on Storage

As can be seen figure 1, DataCore occupies a central position in the storage network. Because all storage allocation, I/O operations and advanced storage services are controlled and routed through the network of DataCore powered storage domain servers (SDS), DataCore’s SANsymphony in a storage infrastructure provides a unique perspective on storage resource utilization and is ideally positioned to convey statistical information relating to such usage.

In particular, SANmaestro can acquire how much and how frequently applications access specific storage resources. This occurs without the need to place any probes (agents) on the application servers. As the brokers for all online storage access, DataCore Software provides real-time, granular and comprehensive visibility into the inner workings of the networked IT infrastructure without disturbing it.

Essentially, SANmaestro periodically collects Windows metrics and DataCore’s real-time information, synthesizes it across selected time spans and charts it. It can also export raw or processed results to other analytical and billing tools according to site-specific guidelines.

SANmaestro is a powerful software package available to SANsymphony, SANmelody and Windows system users. SANmaestro consists of three modules (see figure 2).
SANmaestro Collector Agents –
Gather performance and utilization statistics on each node in a SANsymphony and SANmelody configuration or from Windows-based systems.

SANmaestro Aggregation Server –
Builds the SANmaestro database by accumulating daily updates gathered from each collector agent. The module includes several frequently used charts as well as a graphical user interface to set collection intervals, charting preferences and export parameters.

SANmaestro Development Environment –
A spreadsheet-based development tool with an integrated graphics editor for customization of the existing SANmaestro charts/displays and creation of new applications and reports.
A powerful and easily tailorable environment that enables thousands of metrics to be collected, analyzed, and trended to fully optimize your resources. Easy to deploy and set up. Scales effortlessly to monitor hundreds or even thousands of machines.

Figure 2. SANmaestro Modules
Monitoring Component Option

A subset of the SANmaestro Analysis Suite, known as the Monitoring Component, is available for environments that do not require customization. The software package consists of the Collector Agents, the Aggregation Server software, generic displays and several pre-built Windows Platform/ SANsymphony / SANmelody specific displays.

No Invasive Host-based Agents

The key to SANmaestro’s power in a large scale SANsymphony environment is its ability to extract meaningful resource storage, performance and utilization trends from the SANsymphony nodes without placing any intrusive agents on the application servers. Rather than probing each user, file, or application directly to roll up their combined impact on IT storage resources, SANsymphony captures these trends indirectly by associating applications with the I/O ports and volumes they use to access data. For example, the I/O patterns and capacity demands of Exchange or Oracle are evident from watching the activity of their corresponding virtual volumes under SANsymphony management. Similarly, one can gauge response times and periods of peak load. In so doing, SANsymphony customers do not incur the painful, time-consuming effort necessary to deploy, manage, maintain and upgrade host-based agents just to do capacity planning and billing. It is this that sets SANmaestro apart from conventional storage resource management (SRM) approaches.
How SANmaestro Works

SANmaestro collector agents installed on each node continually gather and store statistical information that is output by Windows, SANsymphony and SANmelody on a wide variety of network and storage aspects. Known as ‘metrics,’ the information provided includes such things as % processor use, available memory, the amount of physical storage available and used in the storage pool, the I/Os per second driven down a specific port, the throughput experienced over a logical connection, I/O cache hit rates and so on.

The SANmaestro Aggregation Server software periodically gathers the data accumulated by the collector agents. Typically the transfers take place once a day, but the frequency can be adjusted to suit the environment. The Aggregation Server then consolidates the updates along with prior data points in the SANmaestro Database. Individuals responsible for analyzing trends and behaviors use the SANmaestro Console to display selected historical views of the database (see figure 3).

A VCR-style playback interface makes it easy to navigate through time intervals and do trend analysis.

Cost-effective monitoring of large scale Windows Networks

Plus, SANmaestro goes well beyond storage, monitor and analyze any key Windows metrics, get what you need:

- System Information
- Memory
- I/O and Disk
- Processor Utilization
- IP traffic and Network Interfaces

SANmaestro – Find out what Windows systems are doing. Gather needed metrics to build reports, optimize performance, perform analysis, and meet your capacity planning needs.
Optimizing Your Storage Resources

SANmaestro may be used to display the actual physical space consumed over time by specific applications that rely on SANsymphony’s and SANmelody’s auto provisioning Virtual Capacity service, also known as Network Managed Volumes (NMVs). As with any virtualized or abstracted resource, traditional host-based SRM tools are unable to determine how much real capacity is being allocated to a logical volume. They report logical LUN sizes of the presented image rather than the true physical blocks allocated, thereby giving a false indication of capacity utilization.

The combination of Virtual Capacity NMVs and SANmaestro offers organizations the ability to provision very large virtual volumes while only charging consumers for the actual amount of space they are actually using.

Another example of the benefits of adding SANmaestro to a SANsymphony environment is the ability to chart relevant trends exhibited by subsets of the storage pool called Storage Domains. In this way, it is possible to attribute capacity and network resource utilization directly to applications. Selective data gathered on the basis of Storage Domains can be easily exported for processing by a billing utility (see Integration with Third Party Applications below). Management overhead is kept to a minimum and, in keeping with SANsymphony’s philosophy; no invasive code needs to be deployed on application servers.

Take Charge of your Windows Environment

SANmaestro Utilization Analysis Suite provides a powerful and tailorable environment that enables thousands of metrics to be collected, analyzed, and trended to fully optimize your resources.

Key Benefits
- Never miss critical performance data
- Easy to deploy
- Scales effortlessly to hundreds or even thousands of machines
- Leverage your existing framework for management reporting and resource utilization
- Customizable to meet your monitoring needs
Customization

The full SANmaestro Utilization Analysis Suite provides a development environment that enables IT organizations to customize SANmaestro reports and user interfaces, providing a rich, extensible tool for data manipulation and visualization.

The development environment consists of an interactive spreadsheet coupled with a graphics editor. Historical results can be refined by adding explicit functions to the spreadsheet, much as one would do with Microsoft Excel. The graphics editor connects charts, radio buttons and other graphics objects to cells in the spreadsheet; some as inputs, others as outputs.

The spreadsheet entries and functions are compiled to execute as a data crunching application invoked from the SANmaestro Aggregation Server. Using this environment any statistics gathered by SANmaestro can be processed to generate on-line displays for specific purposes. Figures can be presented in a meaningful, management-focused format; for example, time intervals can be displayed in minutes, hours and days instead of microseconds and milliseconds. Data can be manipulated and correlated to show the effect of changing environments on storage resources and so on.

Customization is a one-time task carried out by a trained individual. Resulting executables can be used by operations staff with no knowledge of the development tool itself.

Integration with Third Party Application

Part of SANmaestro’s flexibility is the ability to process storage related statistical data and normalize it for export to third party applications for higher level processing. SANmaestro data processed in this way is exported to flat files in CSV (comma separated value) format. This standard data format can be imported into other applications such as Excel, SAP and Oracle.

As an example, a common requirement for many organizations is the need to attribute storage resource utilization to specific applications to facilitate accurate billing. SANmaestro enables such a system through its centralized view of the storage network and the detailed information it can gather.

In addition to the usual statistics, such as storage consumed, SANmaestro can provide information on many other storage-related measurements such as IOPS through a given port, cache used by specific virtual volumes (and therefore application servers) and MB/sec driven through a host bus adapter by a particular application. By processing this data into a standard format, SANmaestro provides input for billing applications to enable detailed and accurate accounting for organizations.

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1 Compilation of a customized SANmaestro interface requires access to Visual C++ compiler software.
Integration with Third Party Applications

As shown in figure 4, data normalized by SANmaestro can also be supplied to other applications to further analyze operational characteristics and project future needs; capacity planning models, workload balancing algorithms and historical data / trend analysis are just some of the possibilities.

Figure 4. Exporting Data to Third Party Applications.

Note:

To assist enterprises in deployment, DataCore’s Professional Services team offers SANmaestro training, development, integration and customization.
Summary
SANmaestro Utilization Analysis Suite offers Powered by DataCore™ IT organizations an intuitive and extensible tool to characterize, analyze and account for the utilization of their storage infrastructure and of Microsoft Windows Environments. By exploiting DataCore’s unique consolidated view of the storage environment and the applications that rely on it, SANmaestro is capable of reporting aspects of resource consumption not possible with other tools. Adding SANmaestro to open storage networks provides advantages such as:

- Accurate, centralized reporting of storage resources used by applications.
- Non-invasive storage resource management collectors.
- Visual and electronic audit trail of capacity consumption based on SANsymphony Storage Domains and/or physical resources using simple-to-use charting interface.
- Creation of customized interfaces and charts to present data in any required format.
- Creation of reports for export to higher level applications such as charge-back and accounting tools for storage resource billing, capacity planning, etc.

Windows and Networked Storage:
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- Leverage your existing framework for management reporting and resource utilization
- Customizable to meet your monitoring needs
- Never miss critical performance data

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