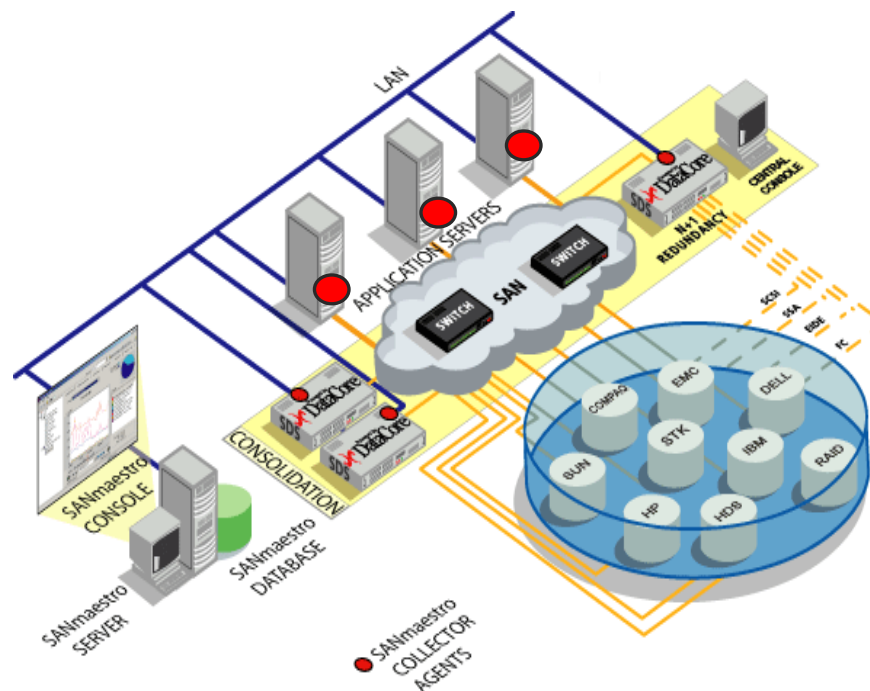


Determining Resource and Storage Utilization in a Modern Networked Environment

- 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



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.

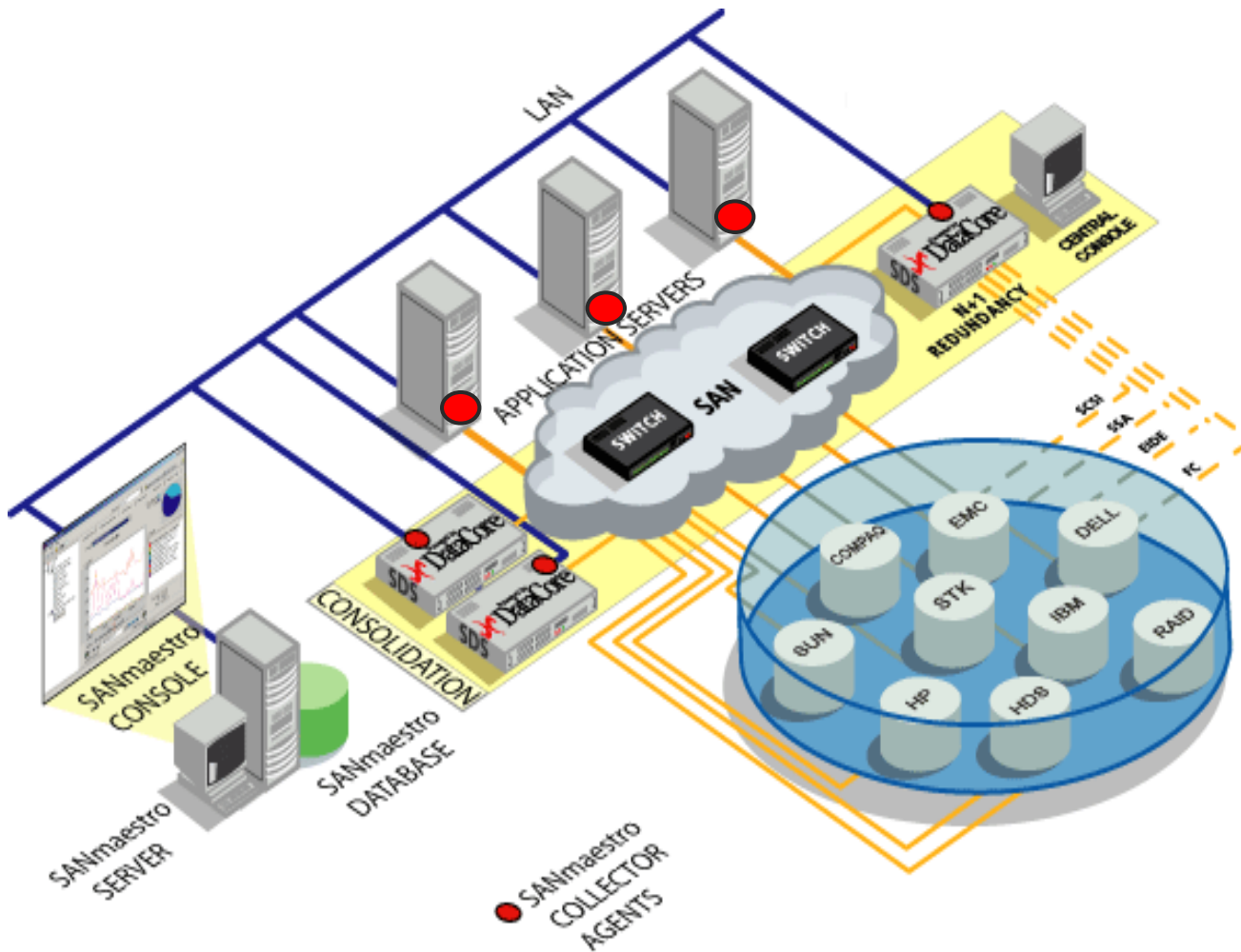


Figure 2. SANmaestro Modules

Monitoring Component Option

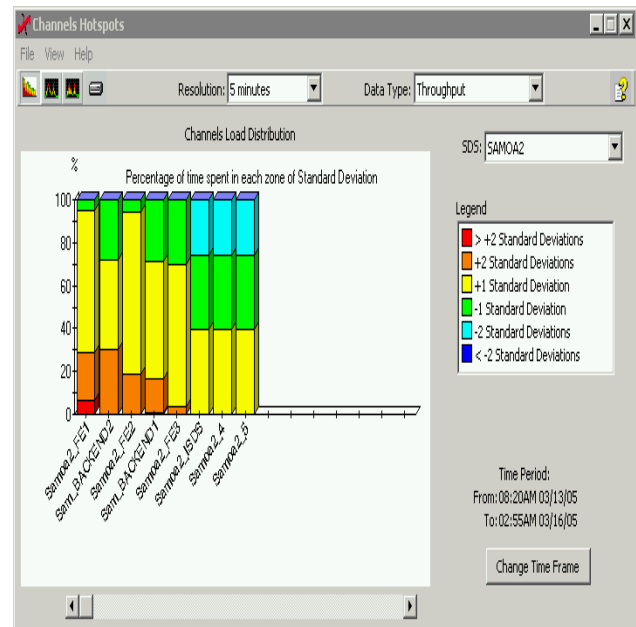
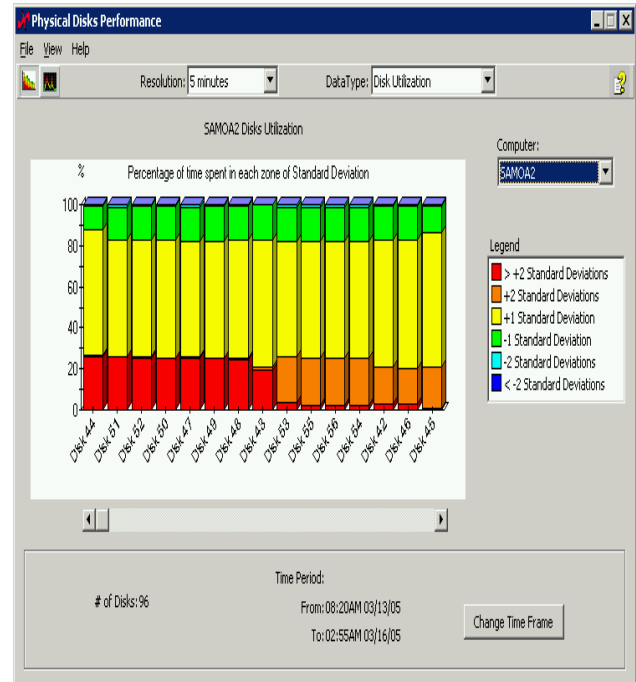
A subset of the SANmaestro Analysis Suite, known as the Monitoring Component, is available for environments that do not require customization. The software package consists of the Collector Agents, the Aggregation Server software, generic displays and several pre-built Windows Platform/ SANSymphony /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

SANmaestro Analysis Suite

Example Pre-built Displays



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.

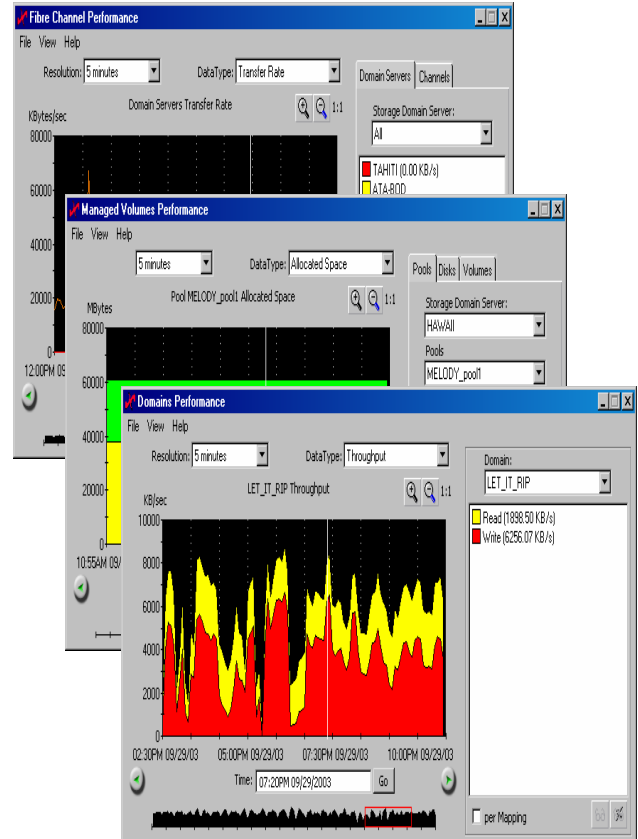
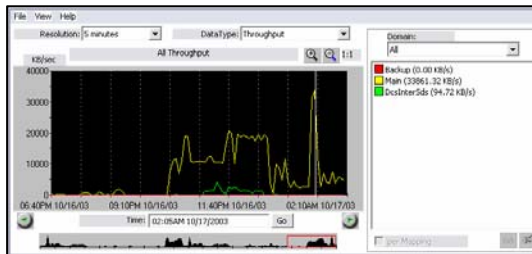


Figure 3. SANmaestro Real-Time and Historical Charts

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.

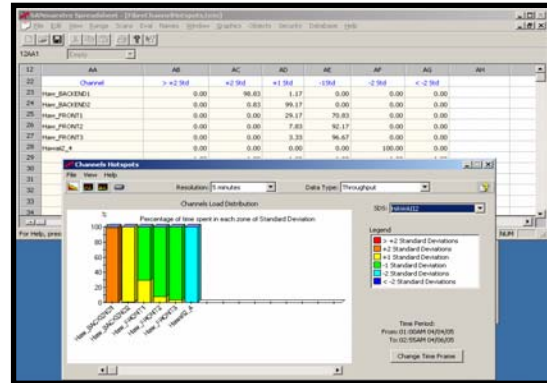
Customization

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 Server¹. 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.

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.

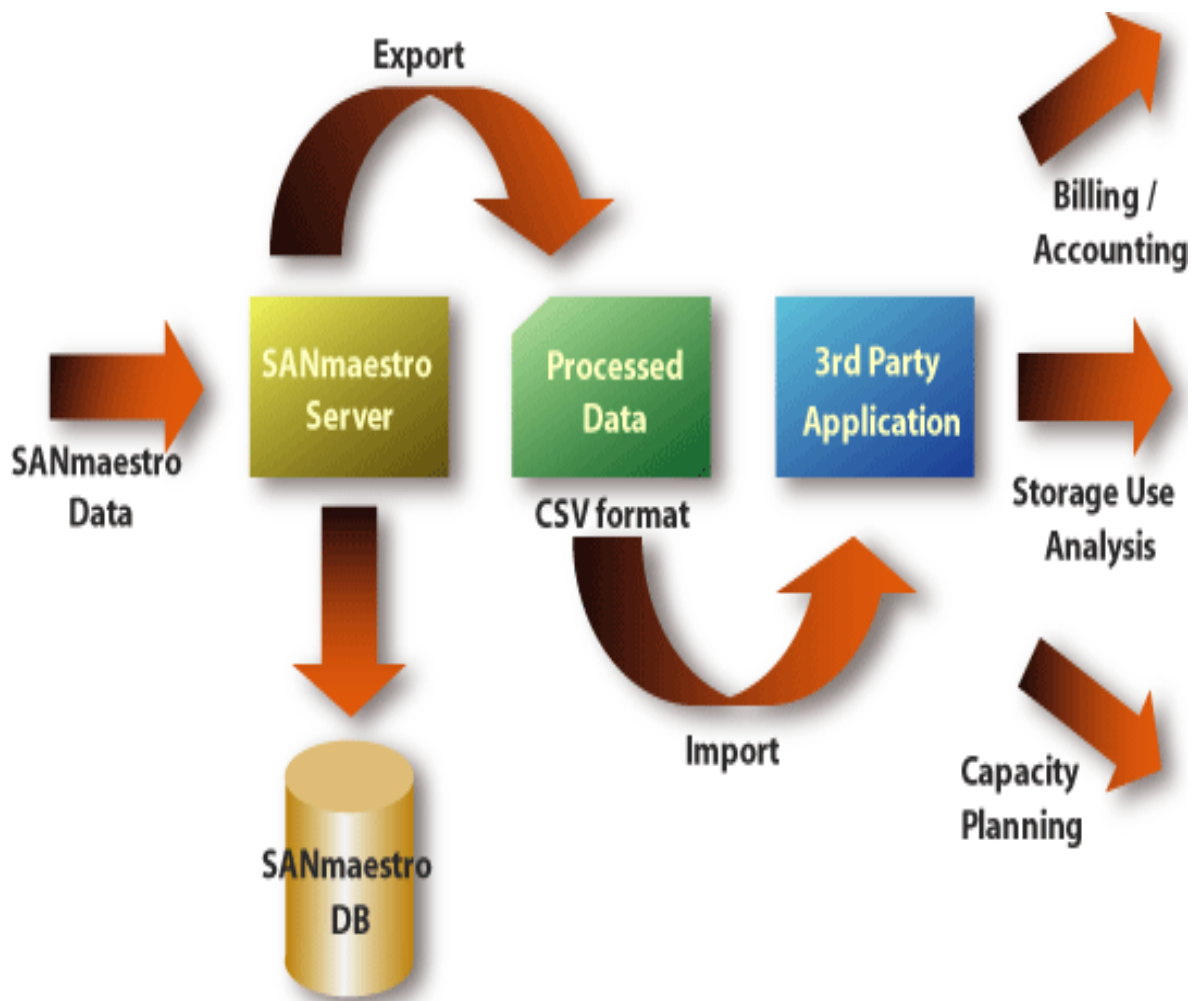


Figure 4. Exporting Data to Third Party Applications.

Note:

To assist enterprises in deployment, DataCore's Professional Services team offers SANmaestro training, development, integration and customization.



Summary

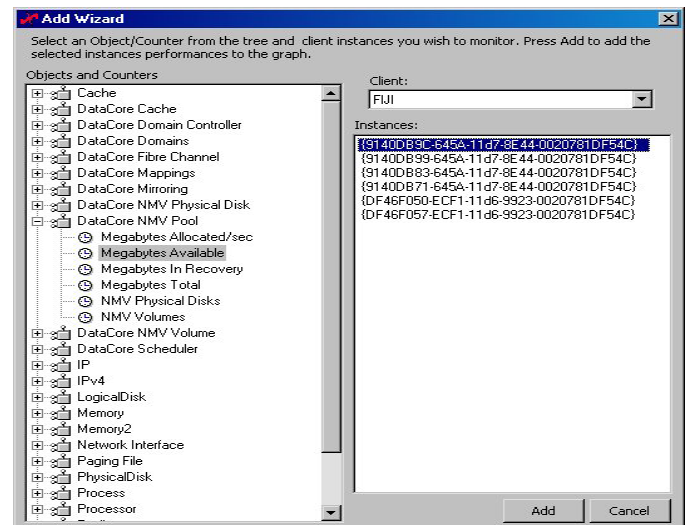
SANmaestro Utilization Analysis Suite offers Powered by DataCore™ IT organizations an intuitive and extensible tool to characterize, analyze and account for the utilization of their storage infrastructure and of Microsoft Windows Environments. By exploiting DataCore's unique consolidated view of the 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:

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.

- 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
- Never miss critical performance data



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