



vizioncore

White Paper

Attaining Real Cost Tracking When Going Virtual

Gaining the Value of Chargeback Data

Introduction

Virtualization is a proven strategy for reducing IT expenses – but can deprive organizations of the ability to accurately track costs because it becomes difficult to measure utilization by specific users of virtualized shared resources. Traditional chargeback and utilization reporting tools developed for physical environments do not necessarily transition well for virtual environments, and to date, few tools have been specifically developed for capturing utilization and chargeback data in virtual environments. The lack of tools and insight makes it difficult for organizations to understand and obtain the full value from virtualization efforts – and to measure the value that companies do receive.

IT administrators recognize that virtualization reduces costs, even if actual costs are hard to measure and allocate. They're willing to make the tradeoff, which helps explain why virtualization is booming and users report strong satisfaction and ROI. But even though costs are reduced, they still need to be tracked and managed, which presents an unusual challenge in a virtualized environment. This white paper presents options for addressing this challenge. It will:

- Show the value of chargeback information in virtual environments;
- Identify types of data that are advantageous to collect;
- Outline challenges for obtaining this data, and;
- Present options for collecting and using it.

Virtualization is an effective way to give business users all the IT resources they need while improving asset utilization and slowing infrastructure growth. Virtual environments become more valuable when they are optimized for user needs based on actual utilization and operating expense data. The key is collecting the information needed to make good decisions about how assets are deployed, configured and allocated.



Reinventing & Reapplying Chargeback for Virtual Machines

Technology development frequently outpaces users' understanding of how best to manage it, and the current cost-tracking difficulties in virtual environments provide a good example. Interestingly, to understand the difficulties of chargeback for virtualization, it is helpful to look back to how chargeback was applied to mainframe environments. Chargeback in IT originated in the mainframe era. Expensive mainframes were frequently shared among multiple user groups to leverage the expense and better utilize the resource. Information systems and accounting staffs developed chargeback applications and reports to help ensure mainframes and their associated costs were shared equitably among users. Chargeback policies and systems remained in place and evolved, but in large part were deemphasized as IT architectures became server based and decentralized, with different business groups getting their own dedicated IT resources.

Today's virtual environments actually combine the concepts of shared resources (hardware) and dedicated resources (the virtual machines themselves). As a result, many of the established principles and best practices for measuring costs and managing utilization of shared resources originated with mainframes are applicable to virtual machines today. Building upon this basis, and factoring in the nuances of virtualized environments, many vendors are emerging with solutions tailored specifically for virtualized systems with an eye to capturing IT costs and allocating them appropriately.



The Value of Chargeback Data

When properly applied, chargeback data can actually help lower and control expenses, rather than merely documenting and allocating them. The information can help all sizes of companies -- from the enterprise to the SMB -- optimize virtualization by helping guide decisions regarding outsourcing, upgrades, new purchases, leases and service models. Chargeback and utilization data also help simplify management and reporting by enabling some consistency in how virtual and traditional assets are measured and managed.

Many organizations don't use chargeback data to actually charge business units for the IT resources they consume. Instead, they find the data valuable for optimizing how resources are deployed and to guide forward-looking decisions about purchases, leases, licenses, warranties and other expenditures. This ability is just as valuable, if not more, for virtual environments. Detailed utilization and performance data helps IT administrators decide the value of virtualizing various assets, and measure the pay back of virtualization efforts. The data may reveal excess capacity in some areas, or could lead to recommendations for some business units to have their own dedicated resources instead of using shared ones. Utilization data not only helps measure true IT costs, but also the value of different business units or initiatives relative to the IT costs they incur.

Organizations already track many traditional IT costs by user or business group, and benefit from a wealth of mature management applications to produce and report this information. Managers have grown to rely on this information to support a variety of decision making. Chargeback information for virtual assets derived from using legacy systems provides a foundation for viewing them in traditional terms and brings some consistency to management. This consistency helps make virtualization more tangible to business managers and prepares them to better assess its merits.

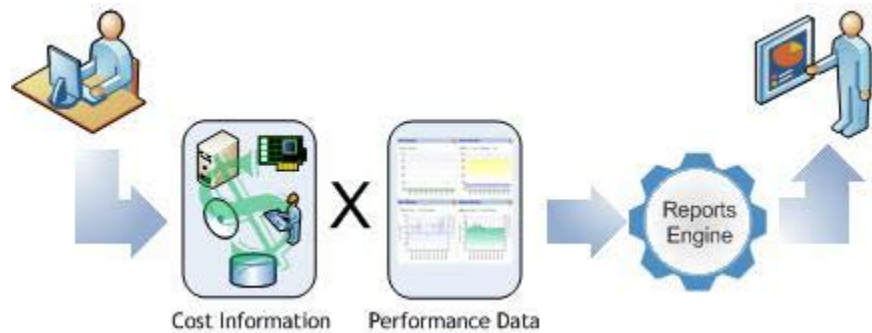
For enterprise companies, the need for software that collects metrics on usage and costs is very clear, given the enormous investment that is made in hardware, software, square footage and personnel in the data center. Although these tools are used to allocate acquisition costs, usage and depreciation among user or business groups, a more compelling motive to adopt them is the enterprise's need to stay on top of the maintenance, power consumption, administration, refresh and data center infrastructure costs that represent the lion's share of IT expenditures. Therefore many enterprises have already invested in off-the-shelf or proprietary software to collect this information. However, as enterprises incorporate virtualization into their environments, they are finding that these systems are less than ideal for the shared resource model of running many machines on a single piece of hardware. Many traditional systems are based on a "per physical asset" model which is tied into dedicating physical servers to applications used by a single or limited groups of users. While many off-the-shelf applications have extended their models to include storage as a shared resource, they have not addressed virtualization yet. Therefore, enterprises would benefit from using software that is specifically geared to monitoring and providing metrics on virtual machines performance.

However, virtualized environments have unique characteristics that can present problems for these legacy systems and processes in that the one-to-one approach is changed to one-to-many.

In addition, many of the tools for chargeback are typically out of the price range for small to mid-size businesses. And, while many SMBs would probably not receive much value for allocating costs back to business units, they would benefit from obtaining performance metrics and cost reporting that would assist in their planning and replacement strategies. A cost effective option such as vCharter from Vizioncore offers SMBs the ability to gather information about their IT environments that they have never been able to afford or use in the past.

Data & Presentation Needs

There is some consistency between traditional and virtual environments with regard to the data and functionality users need their chargeback tools to provide. However, the characteristics of virtual environments render traditional, general IT asset management systems incompatible or ineffective for collecting and presenting meaningful information. Beyond basic utilization and reporting features, a chargeback system for virtual environments needs to provide granular visibility into fixed, variable and shared costs – even as parameters change as virtual machines are reconfigured and redeployed. Reporting must reflect key virtualization and IT metrics but also support business decision making. And because virtual environments change frequently, chargeback solutions must be flexible so they can easily be adjusted to reflect changes and support different information needs. The following sections describe some of the key requirements for a chargeback solution specific for virtual environments.



The most fundamental need is to report utilization by business group. However, getting this basic information is not so straightforward. Because virtual machine allocations change frequently and utilization is inconsistent, there are often significant variances between actual and planned usage. For the true picture of how virtual resources are utilized, actual performance data for each virtual machine – including CPU processing time, storage used, software licensing costs and other information – should all be factored into the calculation. Further, the chargeback system should segment costs that apply equally to all servers and those that vary by host.

All this data exists at various places within the virtual environment, but it is very difficult to aggregate and present in a meaningful way without a chargeback tool or report generator specifically developed for the purpose. Even when presented with the necessary data, users may have trouble making sense of it or using it to support requests for budget, support or policy changes. Therefore a virtual chargeback tool should have a convenient user interface that simplifies the tasks of collecting, reviewing, formatting and presenting data. Reporting capabilities should be flexible enough to support the enterprise's preferred formats and metrics.

The preceding paragraphs hint at the complexity involved in collecting and using chargeback tools for virtualization. An IT support worker could easily occupy most of his or her time with such tasks. Because virtual chargeback calculation has traditionally been impractical, it is not widely utilized. A few workarounds have been developed, but until recently, no practical, purpose-built solutions have been available. The following section outlines options for chargeback data collection and management.

Chargeback Reporting Options

Users have traditionally had limited choices in their options for chargeback reporting for virtual environments. The traditional choices have been to develop a home-grown spreadsheet application using whatever data could be gleaned from the virtualization environment, or adapting legacy IT asset management applications, despite their rudimentary support for virtual machines. A third option has recently emerged – chargeback tools specifically developed for virtual environments. Each approach has merits and limitations, which are outlined below.

Spreadsheets

Spreadsheet applications are easy to set up and customize to support enterprises' preferred reporting methods. Spreadsheets are also fully capable of making the basic calculations needed to show utilization and allocation. The leading limitation and challenge to spreadsheet-based chargeback reporting is collection of the data needed to drive the application. As the previous section referenced, actual usage data can be difficult and time consuming to collect, and most virtualization software doesn't readily provide the type of data necessary for chargeback reporting.

Asset Management Software

Traditional IT asset management systems -- another option for chargeback reporting -- are limited by data availability specific to virtual environments. Most were developed for mainframes and networks. At best, they are not optimized for virtualization, and at worst, they are completely incompatible. Typically, such systems are expensive and time consuming to install and configure, so users may not realize a satisfactory return on investment when they attempt to modify traditional systems to cover virtual environments. The applications themselves can provide fairly good information and excellent reporting capabilities – provided they can be fed with the data they need to analyze and report.

Chargeback Software for Virtualized Environments

Chargeback reporting tools from virtualization providers solve the data issue. They can provide data and visibility that traditional methods can't attain. Availability is the major limitation to virtualization-based chargeback tools. Chargeback features are not available for all virtualization environments, and the category is just emerging. Some currently available chargeback tools also are proprietary and may lack the flexibility to integrate with legacy IT asset management systems.



Virtualized Solutions Overcome Drawbacks to Traditional Chargeback solutions

Many existing chargeback systems utilize agents which must be placed on each server in order to collect chargeback information. This approach can become expensive in physical environments, but downright cost prohibitive in a virtualized environment, where virtual machines can proliferate. In addition, agents put additional overhead into virtualization management tools, such as VMware's VirtualCenter, which may disrupt performance. A chargeback solution, such as vCharter by Vizioncore provides real time collection of data without the use of agents, lessening the performance impact on the virtual system.

Many existing physical chargeback systems cannot provide a 100 percent metered technical process of cost accounting to IT managers, mainly because they cannot easily address the fact that the vast majority of environments are a heterogeneous mix of mainframe, UNIX and NT servers, as well as commercial software and proprietary software. However, chargeback systems designed for virtualized environments can take advantage of a common platform and a consistent set of metrics to make a more homogenous environment for accounting purposes.



Chargeback for vCharter

Vizioncore's vCharter is the first virtualization software with integrated chargeback functionality. vCharter provides real-time monitoring and control for the VMware ESX Server 2.5 environment and is compatible with VMware Infrastructure 3 as well. This software solution collects historical monitoring data, which is used for robust chargeback reporting and analysis.

vCharter includes a Windows-based GUI that makes it easy for users to create their own reports. It supports chargeback reporting through either Utilization Mode or Full Recovery Mode.

Full Recovery Reporting Mode allows organizations to measure and recover the entire cost of the ESX Server host on a monthly basis. Costs are calculated by the percentage of utilization each virtual machine is responsible for, rather than the percentage of resources consumed.

Utilization Mode calculates the cost of each virtual machine based on resource utilization. It is typically used by IT organizations to optimize utilization, and by enterprises that don't seek to recover the total costs of the virtualization system. vCharter further segregates costs by "Global Properties" and "Host Properties". Global Properties are defined as costs that apply equally to all virtual machines. Examples include SAN costs, network port costs and software agents. Host Properties are specific to each host, but vary for each host. Examples include server, memory and software licensing costs.

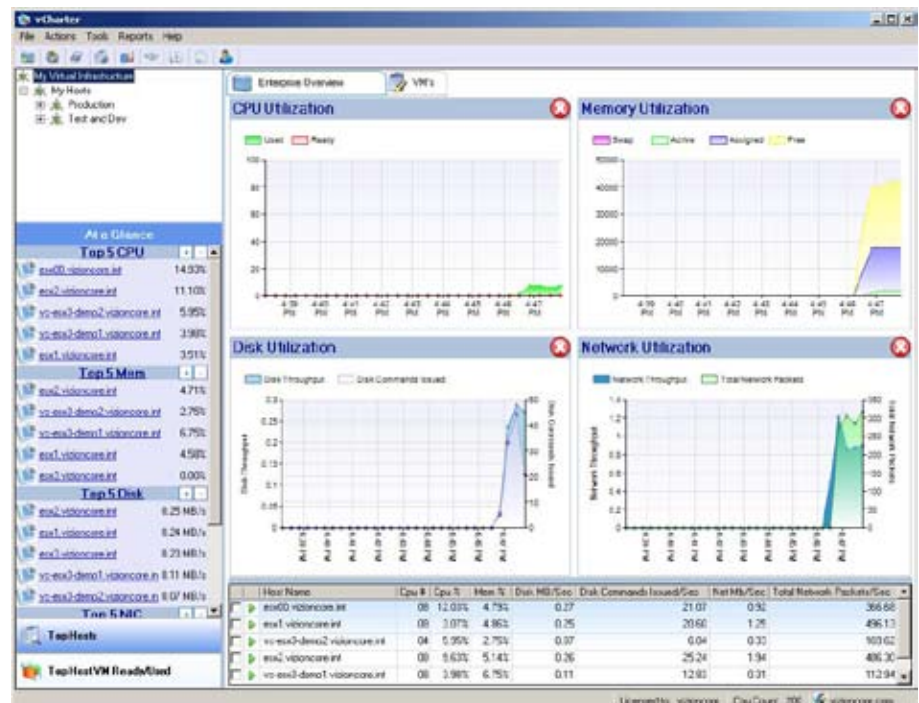
Other vCharter features include:

- SQL Server and Access databases for integration flexibility
- Trend reports
- I/O performance metrics
- Intelligent alerting and proactive reporting

In the next sections, vCharter features are covered in detail.

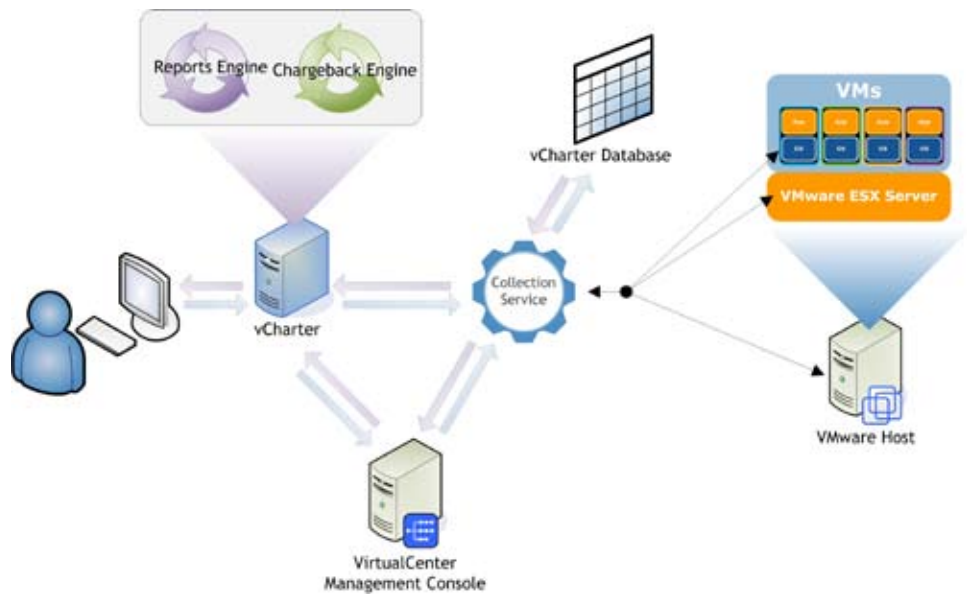
GUI Interface

The graphical user interface for vCharter provides a comprehensive view of performance for an entire virtualized server farm view with drill down capabilities into a particular container or host and inside the virtual machine. Summarized "At a Glance" views will also provide "Top Five" groupings for hosts or virtual machines to gain immediate information on the hosts or virtual machines with performance challenges. Console OS level information is also included to help diagnose potential areas of improvement in VM performance.



Data Collection Engine

The vCharter data collection engine is centralized on a Windows server and connects to each host on a user-defined interval to collect metrics about that host and the virtual machines that reside on the particular hosts. That information is stored in a database on the centralized host for real-time views and reporting purposes. The collection engine will gather information about the CPU, Memory, Network and disk for the host and the individual virtual machines, leveraging API calls and other direct access methods for the most complete and relative information regarding performance.



Database Backend

A SQL database can be used to store collected metrics, leverage the alerting engine, run reports and use the chargeback utility. vCharter will automatically store the collected metrics and aggregate the stored metrics for periods that exceed 30 days. User-defined information will also be stored to leverage alerting rules, reporting needs and the chargeback utility.

Chargeback Utility

vCharter provides an intelligent chargeback engine to segment the costs associated with a particular virtual machine. User-defined input regarding the cost of hardware, software and other maintenance needs are combined with collected metrics from vCharter in the chargeback rules engine. Reports can be generated on demand or automated on a scheduled basis for management and departmental needs. These chargeback reports are useful in defining the cost of a particular virtual machine or host and can also be used for capacity planning purposes.

Alerting

An intelligent alerting engine is delivered with vCharter to inform the administrator of any potential performance issues, prior to them becoming problems. Alerts can be defined on breached thresholds for any collected metric, with time elapsed variables associated. Alerts can be sent via e-mail or page with escalation policies and defined with global settings or by individual host or virtual machine.

Reporting

vCharter reports will generate on demand or by scheduled Reports can also be automatically e-mailed to recipients on a scheduled basis. Reports will generate information from stored metrics detailing performance across the virtualized infrastructure as well as the host capacity information needed for capacity planning purposes. Reports will use user-defined input for specific hosts or virtual machines as well as time frames in order to generate relative information.



Conclusion

Getting accurate, actual utilization information for virtual environments has been a challenge. This limited visibility makes it difficult to optimize system resources and measure costs by users. IT departments often bear the burden, because they are forced to carry costs that can't be documented and assigned to specific business users.

To ease this burden, IT departments can emulate chargeback approaches from earlier eras. The principals are still relevant, but tactics need to change because legacy solutions built for physical environments have proven less than effective for virtual environments. Appropriate solutions are now emerging. A new generation of chargeback tools created specifically for virtual environments is providing IT and business managers the visibility they need to optimize their resources and better control their costs.

Vizioncore's vCharter is at the forefront of performance monitoring and reporting for virtual environments. Contact Vizioncore to learn more about how to apply vCharter in your environment and about the company's full range of products and services. Founded in 2002, Vizioncore Inc. is the leading provider of innovative dynamic backup, performance monitoring, migration and disaster recovery software applications for virtualized environments. The creator of the first commercially-available hot backup disaster recovery tool for VMware ESX Server, Vizioncore offers an array of products available through its global PartnerNetwork channel. Additional information about Vizioncore and its products can be found at www.vizioncore.com or can be obtained by contacting sales@vizioncore.com.



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