Analytics Center Cost Accounting Methodology

One approach in trying to measure the cost contribution of individual virtual machines in a vmware environment is to record and analyze every parameter that is made available by the VMs host system. We have taken an alternative approach of focusing on the parameters that matter most in a (non-hosting) private cloud environment. There are three main reasons why we've taken this approach:

a) Parameters with a high margin of error
Some system usage parameters such as CPU usage, storage bandwidth and network load undergo a high frequency of change and therefore each recorded data point of those parameters is only correct for a very small fraction of time. Since the frequency of data points taken per parameter is limited, a high margin of error is inherent in the statistical values that those parameters produce.

b) Accounting for "non-critical" resources
In a non-hosting environment; many usage parameters represent a system resource that is rarely fully utilized (e.g. CPU usage, storage bandwidth etc.). The required service level (SLA) can therefore always be provided in a satisfying manner, independently of the host system resource utilization by the virtual machine. While the cost of those general resources needs to be (and is) accounted for, the amount of their utilization by an individual VM can easily be calculated in relation to the usage of that VM's more critical resource allocation such as system memory and storage.

c) Memory and storage are key system resources
Based on our experience from countless virtualization projects; the two main limiting factors in private cloud implementations are the amount of memory available in the hypervisor and the size (and performance) of the storage subsystem.

To understand why this is the case, let's take a closer look at these so called key system "limiting" factors:

a) The amount of memory available in the hypervisor directly limits the number and size of VMs that can be actively running on a host system at any given time. Simultaneously, system memory is – directly or indirectly – one of the two major cost factors in terms of required hardware.

b) The size of the storage subsystem determines the amount and size of VM's that can be stored in an active and dormant state on the host system. The transfer speed of the storage system has a strong influence on the VMs' overall performance. Both, size and performance (i.e. Hard Disk vs. Solid State based subsystems) of the storage subsystem(s) are also major contributors to overall system cost.

The Challenge

The virtualization of IT infrastructure has changed the entire IT industry for good. Along with operational efficiencies in systems management, the much-increased utilization of hardware resources has resulted in significant savings as well as gains in overall system performance.

The side effects of this development have provided IT departments with a new set of challenges, including the ability to gain and provide visibility into system usage and costs generated by individual business units.

In pre-virtualization days, when a business unit needed a new server, a purchase order was created and the associated cost was easily assigned to the business unit that requested the server.

The abstraction layer and highly dynamic nature of today's virtualized IT environments has made it nearly impossible for IT managers to effectively break down (host) systems cost based on the individual business units' usage patterns.

EffectiveV Analytics Center enables any organization to automatically analyze each business unit's dynamic usage patterns of virtual machines and to provide accurate visibility into the actual associated costs.

This white paper gives you insights into the methodology that EffectiveV Analytics Center employs to produce relevant, timely and accurate vmware utilization analytics.

EFFECTIVE**V**™

With our approach of focusing on memory and storage as for our key metrics, the footprint of every VM is only defined by the random access memory (RAM) it uses on the hypervisor level and the disk space it occupies on the storage subsystem. We also determine the storage volume (LUN) on which any given VM resides. This means we are able to identify different tiers of storage, which can greatly vary in cost per space occupied by a VM. For instance, the different tiers can be RAID levels, disk architectures (SSD, SAS, and SATA) or even different storage systems (FC, iSCSI).

EffectiveV AC operates based on the assumption that each investment in the virtual infrastructure can be related either to the amount of system memory the VMs utilize on the hypervisor or to the storage space they occupy on the storage subsystem. For this model, to work successfully, the cost of physical servers as well as network components and software licenses needs to be related to the RAM parameter and storage systems, SAN components as fabrics, FC cabling and the like need to be related to the storage parameter.

For relevant results EffectiveV Aanalytics Center focuses on key utilization parameters

All system resources and cost components are accounted for

The Setup of Your Cost Model

EffectiveV Analytics Center provides an easy-to-use interface that enables the assessment of all capital and operational expenditures (CAPEX, OPEX) for the entire vmware cluster.

CAPEX is always recorded in conjunction with its intended time of use. The resulting depreciation is calculated automatically and used to generate the actual monthly cost figures.

OPEX such as electrical power, cooling, support contracts, maintenance and salaries of system administrators is accounted for on a monthly basis.

Cost types are divided into capital expenditures and operating expenditures

How Utilization Data is Processed

The usage data from the vmware cluster is transferred on a daily basis and includes all virtual machines within a cluster. Consumed memory will only be accounted for if a virtual machine is in a running state. VM templates and systems for disaster recovery or testing purposes don't put load on the hypervisor level. Neither do they produce network bandwidth and are therefore not accounted on the memory parameter side. Such powered-off or suspended VMs however do create storage footprint and are accounted for on the storage side of the equation. Naturally, each VM's footprint is calculated with respect to the kind of storage tier it occupies.

Active and powered off VMs are automatically measured and assigned

To achieve realistic storage cost values, we are employing a unique algorithm that distributes the summarized storage cost across individual RAID levels and storage tiers as they are defined in each individual setup. Widely accepted industry averages for pricing variations and volume efficiencies of the various disk architectures are applied and RAID levels are precisely calculated according to the given amount of "waste" storage.

Different storage tiers and types are accounted for in the cost model

EffectiveV Analytics Center is fully dynamic and automatic in processing all critical metrics, parameters and factors to achieve accurate results in real-time.

The Admin's Job: Almost Hands Off

For best results, administrators are required to ensure that each investment in the system (CAPEX) and all of the monthly expenditures (OPEX) are registered via an easy to use setup console.

New virtual machines are automatically detected and the administrator is informed, so she can assign them to one of the organization's business units or departments.

Realtime Dashboard and Reports

The EffectiveV AC Dashboard provides updates on the state of utilization for any given day and at the end of each month, a report is automatically generated. Summarized report(s) as well as individual reports for each business unit's usage pattern are available from a web-based document library, allowing for easy access by any authorized individual or team.

With the help of these highly relevant real-time reports its' easy to keep everyone in your organization informed on their virtualized IT system usage and, if desired, perform invoicing and chargebacks to each business unit in a timely manner.

Since EffectiveV AC runs by itself it creates litle overhead for administrators

EffectiveV AC provides just-in-time reports for chargebacks, activity-based costing as well as budgeting and systems optimization.

Try EffectiveV Analytics Center - Free For 60 Days
visit: www.EffectiveV.com/trial

See Sample Reports and More Information
visit: www.EffectiveV.com for more information

Got Questions? Contact us
Email: sales@EffectiveV.com
Call toll free: +1 888 255 3456 (9-6pm Pacific time)