



On-Premises IT Cloud Simulator Checklist

A quick On-Premise Cloud Simulator data collection primer and checklist

Table of Contents

KEY SIMULATOR CONCEPTS.....	3
QUICK TIPS:	3
HOW THE SIMULATOR WORKS.....	4
ADJUSTING VALUES IN THE SIMULATION.....	5
HARDWARE AND STORAGE COST	5
SYSTEM HOST COST.....	5
SERVER RAM	5
SHARED STORAGE.....	6
HARDWARE AND SOFTWARE DEPRECIATION.....	6
HYPERVERSOR DETAILS.....	6
3RD PARTY LICENSES.....	7
ANNUAL LICENSE COST/ VM.....	7
ANNUAL LICENSE COST/ HOST	7
ENVIRONMENTAL.....	8
ON-PREMISE PRE-SIMULATION COSTING CHECKLIST.....	9
DISCLAIMERS	12

Key Simulator Concepts

Knowing the estimated cost per workload on premise is critical to understanding what your workloads will cost when migrated to the cloud or compared against new data center hardware. Multiple variables can directly impact your cost per workload. Knowing Hardware, Software, Management, Environmental, and depreciation are key to finding an accurate estimate.

Quick Tips:

- The simulation will provide flexibility to include or exclude soft costs in the environment. If you can identify a cost and your host count, you can incorporate the cost of the service into the simulation through management and 3rd party licenses.
- If your organization does not pay for a hypervisor or will be re-using the same licenses, you can quickly exclude the cost of the hypervisor from the simulation with 100% ELA Discount and No Support Costs options
- This card will help you identify the current cost per workload and potential cost savings if rightsizing is applied to every workload. Total costs can be viewed as a Per Year cost when depreciation is applied over time.
- Take advantage of the simulator Walk-Through by selecting “Show Me” next to the card title on the top of the page for a guided walk-through of the card and the important attributes to adjust when considering your on-premises costs.
- Power and Cooling are often soft costs that may not impact your decision to migrate. They can be quickly excluded from the simulation.
- Get quick overview of your environment scope by clicking on Host Details near Host / Storage Costs.

How the simulator works

First, note that all estimates are built using US Dollars. This allows for easy comparison when comparing on-premises IT vs public cloud models in other simulators.

As a top-level summary, we allow you to estimate the total cost of all resources required to operate your datacenter over a defined period of time and derive a cost per year and cost per VM. The Cost per Year is determined by the depreciation term. For this simulator, all costs are either Full Purchase Costs or Annualized Costs. Cost of hardware should be the average full cost of hardware when purchased new. If you have multiple system types, an average cost is required. We will derive an annual cost for these systems based on the depreciation term.

The Cost per VM is more complicated. A basic way to think of this is to use the total resources for all server hardware, software, and related services to determine the annual cost of the entire data center. We aggregate the total defined size of all VM's for CPU, Memory, and Storage to determine the total resources defined. Each VM is then measured as a percentage of total allocated CPU, Memory, and Storage. This percentage of allocated vs defined is used as a percentage of the datacenter cost. With a defined cost for memory, storage, and compute, we can quickly estimate the operating cost per VM. Note, if the entire datacenter annual estimated cost was \$1M, and you only had 1 VM with 1vCPU, 1GB RAM, and 80GB of disk, it still represents 100% of the allocated environment and would equate to a \$1M VM.

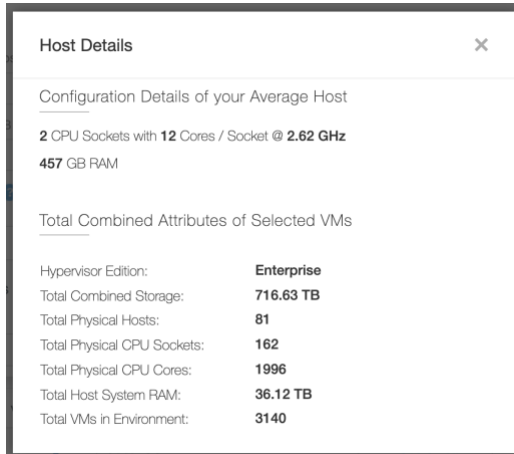
Costs for 3rd party licenses and services are annual costs per VM or Per Host. These fields allow you to adjust some aspects of the annual cost as well as include guest OS operating systems as operational costs. Including Microsoft Enterprise Agreements as a per host value for OS costs is strongly advised to reduce complexity. Microsoft Windows Datacenter Licenses are Per CPU Socket and should be averaged to Per Host when possible.

Your cost will never be \$0 since we include the estimated retail cost of vSphere Editions, vCenter, and Support and Subscription (SNS) based on observed details in the environment. Discounts will only discount the software but not the SNS costs.

Adjusting Values in the Simulation

The simulator allows users to customize the values and scope the simulation with some quick options. These options can provide quick estimates or allow you to be very accurate based on the effort you are willing to invest and the accuracy of your data.

If you need quick insights into your environment, click on the Host Details link near the Host / Storage Costs title. Here you will find the details of the servers and an overview of the environmental details that will be part of your assessment scope.



The screenshot shows a 'Host Details' window with the following information:

Configuration Details of your Average Host	
2 CPU Sockets with 12 Cores / Socket @ 2.62 GHz	
457 GB RAM	

Total Combined Attributes of Selected VMs	
Hypervisor Edition:	Enterprise
Total Combined Storage:	716.63 TB
Total Physical Hosts:	81
Total Physical CPU Sockets:	162
Total Physical CPU Cores:	1996
Total Host System RAM:	36.12 TB
Total VMs in Environment:	3140

Hardware and Storage Cost

Please provide server cost as a fully configured server minus the cost of RAM. We will calculate RAM costs separately. This should address the average cost per server with all network adapters, HBA's, redundant power, and advanced configuration upgrades. We will cost RAM separately to allow for VM memory calculations.

Host/Storage Costs [Host Details](#) ?

Physical Host System Cost	Hardware/ Software Depreciation Term
\$ <input type="text" value="16300"/>	<input type="range" value="4"/> 1 4 10 years
Shared Storage Cost/ GB	Average Host RAM Cost/ GB
\$ <input type="text" value="6"/>	\$ <input type="text" value="24"/>

System Host Cost

These are examples of typical configured system costs (minus RAM)

- Dell PowerEdge R730xd Rack Server range between \$16,000 to \$26,000
- Cisco UCS B-Series B260 M4 range between \$5,500 and \$8,800
- Supermicro SuperServer range between \$4,800 and \$6,400

Server RAM

RAM is cost per GB Examples:

- HPE 512 GB RAM Kit is range from \$24-\$50 / GB
- Dell 32GB RDIMM's range between \$15-\$20 / GB
- Crucial 128GB Kit (2 x 64GB) range between \$13-\$18 / GB
- Manufacturer Enterprise Class ECC RAM 128GB range between \$30-\$50/GB.

Shared Storage

Shared Storage and Array cost fluctuates greatly. Be sure to take into account support, maintenance, and switches when addressing shared storage cost per GB.

Depreciation in the US typically ranges from 3 to 5 years.

Calculator Default Values:

Host System = \$16,300

Depreciation Term = 4 years

Storage Cost = \$6.00

System RAM = \$24.00

Hardware and Software Deprecation

Most organizations depreciate the cost of an asset over a number of years for tax purposes. As a result, the full cost of a server may not be realized in a single year. The slider to specify the depreciation term length will allow you to spread your annualized costs over multiple years. For many startups and small business, they may depreciate faster while non-profits and government agency may extend the depreciation terms. In the United States, 5 years is the average term length for most enterprise organizations to depreciate assets.

Hardware/ Software Depreciation Term



Hypervisor Details

Default Hypervisor Edition is selected from the most common Hypervisor Edition reported by vCenter. You can see this in the Host Details above.

Support Level is available in two versions in the calculator. Production Support for 24/7 and Basic Support for 12Hr/Day Mon-Fri. Business Critical Support (BCS) and Mission Critical Support (MCS) as well as advance support options are not available as these are priced on a per customer basis. Support is estimated at 20% of Hypervisor Retail cost.

In keeping with VMware licenses, ELA Discounts apply only to Hypervisor edition but not to Hypervisor Support.

Hypervisor Details ?
 vSphere Support Hypervisor/ELA Discount

Production 0 %

You can zero out all hypervisor costs by changing the options to in the simulation if the Hypervisor should not be considered in the simulation. Change the default values to the following to exclude all hypervisor costs:

- No Support
- 100% Discount

Each vCenter is also included in the estimate.

Default Values:
 Support = Production
 ELA Discount = 0%

3rd Party Licenses

The simulator can be greatly tuned to be more accurate with the inclusion of additional cost factors that impact your annual data center costs. Cost of management, physical racks, 3rd party licenses, staffing and support services can all be factored into the simulation if you can identify its costs and calculate it back to either a Per VM or Per Host cost.

While many items in the data center are managed per host, there are occasions where some licenses are purchased per VM. The distention between the two allows for a very dynamic pricing model that can be used to model your cost needs more accurately.

3rd Party Annual License Costs ?

Annual License Cost/ VM Annual License Cost/ Host

\$ 0 \$ 0

Annual License Cost/ VM

These costs can include enterprise management, systems management, backup, reporting, audit, and security tools. These costs can also include management tools and support costs unique to your VM's. You may choose to ignore management or software costs if they will exist in both environments.

Annual License Cost/ Host

These costs can include products like CloudPhysics, Hardware Management, Systems Management, Security, Backup, Storage Management, and other support costs. This

may often include Operating Systems Costs such as Windows Server or Linux variant. OS Costs may be useful when comparing against cloud cost where the new instances already include the Guest OS costs.

Default Values:

License / Management per VM = \$0

License / Management per Host = \$0

Environmental

Environmental Costs

These costs will address power consumed by the host, cost per kWh in your area, and cooling ratios.

Electricity and environmental costs can be excluded by checking the “Exclude from Estimate”.

Average Watts per Host

Power in Watts is the typical power burden generated by a host. Estimates for 80% load should be used as guidelines. A typical rack server will draw between 380 Watts and 800 Watts depending on CPU Sockets, Memory, and Drive configuration.

Cost of Electricity

Electrical cost varies by region in the US. National averaged as of January 2016 was \$0.105 / kWh. The US Energy Information Administration provides a detailed report of Power by State for the United States. It can be read at the Electric Power Rates by State Monthly:

https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_06_a

Cooling Ratios

Power to Cooling Ratios, also known as Power Usage Effectiveness (PUE), relate how much electricity is required to cool each 1kWh or electrical use. The most efficient organizations can achieve 1.2 kWh of Cool for every kWh of Electricity used. A typical US data center will have a ratio of 1.8. A very inefficient data center will have a ratio of 2.0 to 2.4. More details on Power Usage Effectiveness.

https://en.wikipedia.org/wiki/Power_usage_effectiveness

Environmental Costs Exclude from Estimate 

Average Watts/ Host

430

Cost/ kWh Electricity

\$ 0.105

Cooling to Power Ratio

1.8

Default Values

- Watts Per Host = 430
- Cost per kWh = \$0.105
- Cooling Ratio = 1.8

On-Premise Pre-Simulation Costing Checklist

Determine Scope of Simulation

- The Scope will be
 - Single Cluster
 - Datacenter
 - Entire vCenter
 - Geography
 - Full Organization
 - Tag or Name Specific (Select Scope)

Identify factors that influence costs:

- Over how many years do you depreciate hardware?

- Do you have purchase orders for these systems with pricing available?
Yes / No
- Can you ask purchasing dept or reseller for your average system costs?
Yes / No

Host Costs

- Identify Host Inventory from the CloudPhysics Host Inventory Card
 - What are your common server manufacturers?

 - What are your common server models?

 - Do you order these systems without RAM?
Yes / No
 - Is the RAM configuration the same for all servers?
Yes / No
 - Do you know what components have been added to these systems?
 - Multiple HBA's \$ _____
 - Additional network adapters \$ _____

- Redundant power \$ _____
- Extra Processors \$ _____
- Cache / Storage Acceleration \$ _____
- Extra boot drives (HDD/SDD) \$ _____
- Will you be accounting for these costs in the simulation?
Yes / No

What is the average Fully Burdened Host Server cost?

What is the cost of this system without RAM?

Storage Costs

Identify Shared Storage Manufacturer and Models from Shared Storage Analysis Card

What is your primary storage vendor in GB in this environment?

Do you have a total cost of your storage solutions

- Drives \$ _____
- Total Drives: _____
- Total GB of Storage: _____
- Cost of Drives per GB: _____
- Storage Enclosure costs \$ _____
- Management Software \$ _____
- Support and Subscription \$ _____
- Enclosures \$ _____
- Fibre / iSCSI / Ethernet interfaces \$ _____
- Network fabric and connectivity \$ _____
- Flash / SSD / NVMe Addons? \$ _____
- Additional software features \$ _____
(Deduplication, compression, snapshots, replication)
- Multipathing software and licenses
- Storage replication \$ _____
- Backup hardware and software \$ _____

Hypervisor Costs

Do you pay for your Hypervisor software under an ELA or per host?

Did you receive a discount on your VMware vSphere ELA?

[] Do you pay for Basic, Production, or No Product Support and Subscription?

Per VM Management Costs and 3rd Party Costs

- [] Do you have any per VM costs?
- [] Anti-Virus \$ _____
 - [] Backup \$ _____
 - [] Management \$ _____
 - [] DR / replication \$ _____
 - [] Snapshots \$ _____
 - [] Guest OS licenses \$ _____
 - [] Application licenses \$ _____
 - [] 3rd party support \$ _____

Per Host Management and 3rd Party Costs

- [] Do you have any per HOST costs?
- | | | |
|-----------------------------------|----------|--------------------------------|
| [] Anti-Virus | \$ _____ | Examples: |
| [] Backup | \$ _____ | Trend Micro Antivirus per host |
| [] Management | \$ _____ | Veeam Backup, NetBackup |
| [] DR / replication | \$ _____ | vRealizeOps, Turbonomics, CA |
| [] Snapshots | \$ _____ | Zerto, Datrium |
| [] Host based OS licenses | \$ _____ | NetApp, Pure, NetBackup |
| [] Application licenses | \$ _____ | Microsoft Windows Datacenter |
| [] 3 rd party support | \$ _____ | Microsoft SQL Server |
| [] vSAN, NSX, vRealize Ops | \$ _____ | Windows/Linux OS Support |
| [] Multi-path software | \$ _____ | VMware Cloud Suite |
| [] Storage Appliances | \$ _____ | Dell/EMC PowerPath |
| [] Networking Appliances | \$ _____ | vSAN, Delphix, HPE, Nexenta |
| | | Palo Alto Networks, Cisco |

Environmental Costs

[] Will you be including environmental cost in your estimate?
Yes / No

[] Do you know the average KW / Server?
If not, visit CloudPhysics Aggregate Infrastructure Performance Card.

[] Do you know the cost / KWh for your datacenter? \$ _____

[] Do you know your power to cooling ratio? _____

[] Do you know your power to PUE? _____
https://en.wikipedia.org/wiki/Power_usage_effectiveness

Disclaimers

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