



Challenges of Capacity Management in Large Mixed Organizations

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Topics

- Capacity planning challenges in a very large mixed environment
- How ASG PERFMAN 2020 could help
- A simplified approach to capacity planning







According to ITIL

Capacity Management is a process used to manage <u>information technology</u> (IT). Its primary goal is to ensure that IT capacity meets current and future business requirements in a cost-effective manner. One common interpretation of Capacity Management is described in the <u>ITIL</u> framework. ITIL version 3 views capacity management as comprising three sub-processes: business capacity management, service capacity management, and component capacity management (known as resource capacity management in ITIL version 2).

Capacity management is concerned with:

. . .

- 1. Monitoring the performance and throughput or load on a server, server farm, or property
- Performance analysis of measurement data, including analysis of the impact of new releases on capacity
- 3. Performance tuning of activities to ensure the most efficient use of existing infrastructure
- 4. Understanding the demands on the Service and future plans for workload growth (or shrinkage)
- 5. Influences on demand for computing resources
- 6. <u>Capacity planning</u> developing a plan for the Service





Challenges

- Scale
- Clusters and Resource Pools
- Self tuning environment
- Power management
- Constantly evolving technology
- ... and many more







Scale – The Basic View





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Scale – The Reality

















Clusters and Resource Pools







Self Tuning Environment



VMware Distributed Resource Scheduler (DRS) Automatic resource allocation based on CPU and memory load status





Power Management









Constantly Evolving Technology

- Memory sharing
- Memory compression
- CPU Scheduler improvements
- Support for wide VMs (more vCPUs)
- NUMA support









How can PERFMAN help?





ASG-PERFMAN 2020 Overview



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ASG-PERFMAN 2020 is a capacity management solution focused on servers & their workloads



Complete, out-of-the-box solution

- Collection, data management, analysis, reporting, modeling, etc.
- No "roll your own" required
- Professional Services not required for success

Platform-specific collection technologies

Install & run on premise

Highly scalable, to the largest IT organizations No expensive software prerequisites

ASG-PERFMAN Server

Windows Server-based platform Core technology for all supported platforms





Key Activities & Benefits

- Consistently gather useful resource consumption metrics
- Summarize metrics into consistent historical views
- Turn metrics into useful information to enable decisions
- Provide meaningful reports to decision-makers
- Understand workloads that drive resource consumption
- Gather business drivers of workload growth
- Forecast future workload requirements for budgeting & procurement planning purposes
- Identify bottlenecks that affect service delivery



ASG-PERFMAN 2020 Platforms Supported



- VMware VI + VSphere
- Windows
 - Including IIS, SQL Server, Exchange, AD, HyperV...
- AIX and PowerVM
- HP-UX
- Solaris
- Linux
 - zLinux
- Oracle
- XenServer
- z/OS:
 - Optional: DB2, CICS TS, Tape Library and Virtual Tape





Data Collection – Data Sources



X

1

Platform	Data Source	Collector
z/OS (+BUA)	70–75, 78, DCOLLECT (30, 42)	z/OS-based Programs
DB2	100-102	z/OS-based Programs
CICS TS	110	z/OS-based Programs
Tape Libraries	94, BVIR, STK	z/OS-based Programs
Windows	MS Performance Library	Agentless (RPC)
AIX, HP-UX, Solaris, Linux	sar, iostat, vmstat, nmon, etc.	SSH (shell script)
VMware	VMware Infrastructure (VI)	Agentless (API)
Citrix	XenServer	Agentless (API)
Oracle	v\$tables	Agentless





VirtualCenter



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Data Collection – Windows



Data Collection – Unix/Linux



- PerfMan for UNIX Agent
 - Shell script deployed via SSH from PerfMan Server
 - Utilizes NMON, PS, IOSTAT, SAR, etc
 - Data forwarded to PerfMan Server after each interval
- HP OpenView Performance Agent support













Data Collection – Unix/Linux

UNIX Utilities & Resources

- CPUINFO (Linux)
- DF
- GETCONF (HP-UX, Linux)
- IOSTAT
- LPARSTAT (AIX PowerVM; formerly known as Advance Power Virtualization [APV])
- LSPS (AIX, for swap space metric)
- MPSTAT (SunOS/Solaris)
- NETSTAT
- Nmon (optional data source for AIX PowerVM, AIX and Linux)
- PAGESIZE (AIX, SunOS/Solaris)
- PRTCONF (AIX, SunOS/Solaris)

• PS

- SAR (Nmon may be substituted on AIX/Linux)
- SW APINFO (HP-UX, for swap space metric)
- syslog.log (HP-UX)
- TOPAS CEC Recording (optional data source for AIX PowerVM)
- UPTIME
- VMSTAT

ASG-PERFMAN also interfaces directly with **HP Performance Agent** to use the data it has already collected.





Data Collection – z/OS



ASG-PERFMAN for z/OS

- No data accumulation on z/OS platform
- Direct transfer of mainframe data via FTP

FTP

 No SAS or third-party product installed on the mainframe



Data Collection – z/OS



- Processes multiple
 SMFIDs in a single pass
 Handle all record types
- Highly efficient ASM programs 100x faster than SAS
- Minimal DASD space consumption – product footprint only
- CPU Performance Table for ratings & normalization
 - Customer overrides allowed

- Automatic handling of dynamic capacity/configuration changes
- Proper handling of uncaptured time
- Proper handling of zIIP/zAAP/IFL specialty processors
- Automatic support for goal mode configuration information
- Turnkey operation no "parm file" required





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ASG-PERFMAN 2020 Overview

PerfMan Portal

PerfMan Analyst





ASG-PERFMAN 2020 Architecture





ASG-PERFMAN 2020 Portal

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- Fully-integrated, customizable webbased interface
- Access Windows, VMware, UNIX & Linux information as soon as it's collected
- Identify service exceptions for groups or individual systems



ASG-PERFMAN 2020 'Heat Map'





ASG-PERFMAN 2020 'Heat Map Drilldown'





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ASG-PERFMAN 2020 Analyst



ASG-PERFMAN 2020 Analyst – Web Publishing



Analyst provides a powerful scripting language that allows customers to **automate repetitive reporting tasks** for viewing via the web.

Reports		Server	CPU (d)	CPU (W)	56	commit (d)	commit (w)	96	file(d)	file(w)	5	KBrate (d)	KBrate (w)	4				
Alert Thresholds (TBD	·	app-act-1	5	5	0	751	847	-11	46	60	-24	1	1	0				
CPU - total utilization		app-adpl-2	6	5	0	406	390	4	41	53	-24	1	1	0				
MEMORY - committed MB		app-amity-8	6	5	0	350	347	1	38	53	-28	9	9	2				
NETWORK - KB/sec		App-apog-1	2	2	0	928	913	2	164	178	-8	2	1	104				
		app-bmirpt-1d	11	11	0	1703	1683	1	88	104	-16	1	1	0				
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O Total Utilization	Leh	-file-5		89.8	6	9	5.62	4(6	5)	112	2(351	15)	1747					
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	app	-dayzer-2		37.1	9	5	6.45	0(0))	10094	(1149	(1)	1597	-				
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Tue 8/10/2010	app	-hpos-3		34.9	4	4	2.89	4(6	5)		82 (15	(8)	9045	_				
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	Gen	-file-8		33.5	0	9	2.55	5(10))	56	4 (108	30)	969	- 1				
	App	-webprf-1		31,9	0	5	0.63	0(1	0	52	3 (256	3)	2807	-				
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	Leh	-tier2-1		25.7	7	8	3 26	1(7	7)	5	47 (81	(8)	4122					
	App	-webprf-2		25.5	9	3	2.62	0(1	12	3	64 (63	30)	1550					
	Leh	-file-7		24.2	0	8	6.05	4(6	5)	55	4 (153	35)	1291					
	App	-perf-1		24.1	6	4	9.39 1	1(29))	38	3 (123	(6)	3179					
	app	-ssdb-1		24.0	0	9	5.25 1	4 (28	3)	64	9 (147	73)	1750					
	App	-soms-1		23.4	4	3	3.41	6(10	35	4	95 (81	(8)	2125					



ASG-PERFMAN 2020 Analyst – Planning and Modeling



ASG-PERFMAN for Windows & ASG-PERFMAN for UNIX

- Capacity Planning
- Workload Modeling

ASG-PERFMAN for VMware

- Capacity Planning
- VM + ESX Modeling
- Virtualization Planning Tool (VPT)





ASG-PERFMAN 2020 Analyst – Planning and Modeling

Chart Tools

-- Charts



ASG-PERFMAN for z/OS

- Capacity Planning
- **CPU Modeling**
- LPAR Modeling
- Workload Modeling
- zIIP Speciality Processor Monitoring
- Sub Capacity Monitoring
- Analysis
- Forecasting
- Monitoring





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ASG-PERFMAN 2020 What If Capabilities

- Capacity Planning (ESX or Cluster level)
 - Allows forecasting of the CPU resource for ESX Hosts or Clusters.
 - Forecasting driven by historical trends.
 - Allows user changes to Workload (VMs) growth trends
 - Including adding and deleting workloads.
 - Allows increases/decreases in future CPU capacity.





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ASG-PERFMAN 2020 What If Capabilities CPU Modeling

- Allows modeling of a single ESX Host
- Simulation model of CPU response times by Virtual Machine (VM) •
- Models impact of changes to:
 - Workload (VM) Growth
 - VM configuration changes including:
 - # of virtual CPUs
 - Min and Max CPU %s
 - CPU Shares







Average CPU Response Times



ASG-PERFMAN 2020 What If Capabilities

- Planning tool for P2V and V2V
- Allows use of data from existing:
 - Physical Windows Servers
 - VMware ESX Hosts
 - VMware Clusters
- Provides physical candidate selection
- Allows definition of one or more virtual targets (ESX Hosts or Clusters)
- Provides automated mapping of both virtual and physical candidates into virtual targets based on user supplied balancing criteria
- Provides reporting of expected aggregated resource requirements at the Virtual Target (ESX Host and Cluster) level.
- Provides simulation modeling of each Virtual Target (ESX Host and Cluster)
- Provides a report of the planned configuration.







OARD	REPORTS	ALERTS	ANALYZE	FORECAST	ADMINISTER
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1.271			HPUX		
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•	Dashboard – Enteryou	r personal dashboard interfac	Linux		
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	Analyze – Performana	lysis of specific systems within	Service Group		
	Forecast – Access auto	omated forecast reports	Solaris	orise Automation	i .
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			XenServer VM	/	
			z/OS CPU		

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ASG-PERFMAN



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1	Cluster	System Name	CPU MHz Capacity	Phys Mem GB	Active VMs	CPU MHz Used	VM Alloc GB	Disk IO/Sec	Network KB/Sec	
2	N/A	brsapvmhost1	18616.00	16.00	5.00	301.74	5.01	. 23.40	1423.00	
3	N/A	brsapvmhost2	18616.00	16.00	0.00	00 66.83 1.07		8.00	285.00	
4	N/A	frmulvmhost1	11968.00	48.00	16.70	4623.59	32.13	185.40	229.00	
5	N/A	frparvmhost1	18616.00	16.00	13.70	2161.74	12.68	162.30	1570.00	
6	N/A	frparvmhost2	15952.00	16.00	8.00	811.49 11.97		122.90	1625.00	
7	N/A	frsopvmhost1	18616.00	32.00	11.00	0 3642.68 18.85		151.80	1868.00	
8	N/A	frsopvmhost2	18616.00	32.00	16.80	5223.30	5223.30 23.65		2052.00	
9	N/A	frsopvmhost3	18616.00	32.00	16.10	1278.24	15.64	143.70	1788.00	
10	SOPHIA1	frsopvmhost4	15952.00	32.00	5.50	2690.13	17.31	. 28.90	78.00	
11	SOPHIA1	frsopvmhost5	57600.00	64.00	1.00	114.37	5.00	1.60	3.00	
12	N/A	gechemedemo1	18616.00	32.00	22.00	2876.16	i 29.19	93.00	68.00	
13	N/A	gechemedemo2	18616.00	32.00	13.00	1230.28	24.69	49.80	347.00	
14	N/A	gechemesx1	51056.00	16.00	9.80	2948.02	13.77	37.70	61.00	
15	N/A	gechemesx2	18616.00	32.00	30.00	3011.38	25.34	115.30	56.00	
16	N/A	gechemesx3	18616.00	32.00	16.00	4268.17	25.90	136.30	774.00	
17	N/A	gechemesx4	18616.00	32.00	22.00	4171.37	24.36	61.60	262.00	
18	N/A	gechemesx5	17016.00	96.00	25.20	3310.52	77.55	186.10	2281.00	
19	N/A	gechemesx6	63816.00	96.00	15.00	1783.83	43.82	40.50	1124.00	
20	N/A	gechemesx7	63816.00	96.00	22.00	3243.71	. 77.15	131.70	6956.00	
21	PROD	geeschvmhost1	5984.00	16.00	5.10	668.75	8.19	7.10	42.00	
22	PROD	geeschvmhost2	11968.00	16.00	1.00	4269.88	9.13	4.20	37.00 🗸	
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	А	В	С	D	E	F	G	Н		J	К	L	M
6		Collected Data									Average	VM Calcs	
7	Cluster Name	System Name	CPU MHz Capacity	Phys Mem GB	Active VMs	CPU MHz Used	VM Alloc GB	Disk IO/Sec	Network KB/Sec	Mhz/VM	MemGB/VM	Disk IO/VM	NetKB/VM
8		Totals	2,844,948	4,919	1,598	283,663	3,097	10,306	140,399	178	2	6.4	87.9
9		Averages	33,080.79	57.20	18.58	3,298.41	36.01	119.84	1,847.36	178	2	6.4	99.4
10	N/A	brsapvmhost1	18616.00	16.00	8.10	945.16	i 11.74	18.40	6.00	117	1	2.3	0.7
11	N/A	brsapvmhost2	18616.00	16.00	0.80	109.64	5.24	12.50	0.00	137	7	15.6	0.0
12	N/A	frmulvmhost1	11968.00	48.00	16.60	5458.31	. 42.09	106.70	153.00	329	3	6.4	9.2
13	N/A	frparvmhost1	18616.00	16.00	15.00	2444.27	13.12	208.90	1518.00	163	1	13.9	101.2
14	N/A	frparvmhost2	15952.00	16.00	7.00	691.05	8.26	122.30	1467.00	99	1	17.5	209.6
15	N/A	frsopvmhost1	18616.00	32.00	12.20	2098.84	17.33	155.70	1880.00	172	1	12.8	154.1
16	N/A	frsopvmhost2	18616.00	32.00	15.60	3994.32	23.17	147.20	1988.00	256	1	9.4	127.4
17	N/A	frsopvmhost3	18616.00	32.00	15.10	1429.86	6 16.74	122.90	1529.00	95	1	8.1	101.3
18	SOPHIA1	frsopvmhost4	15952.00	32.00	4.00	2892.42	16.08	28.50	4.00	723	4	7.1	1.0
19	N/A	gechemedemo1	18616.00	32.00	22.00	2877.18	28.99	76.70	129.00	131	1	3.5	5.9
20	N/A	gechemedemo2	18616.00	32.00	13.00	1271.46	i 23.01	104.70	1147.00	98	2	8.1	88.2
21	N/A	gechemesx1	51056.00	16.00	5.00	2253.69	11.07	20.00	2.00	451	2	4.0	0.4
22	N/A	gechemesx2	18616.00	32.00	30.00	3426.21	. 25.98	143.50	110.00	114	1	4.8	3.7
23	N/A	gechemesx3	18616.00	32.00	16.00	4411.96	25.43	104.60	721.00	276	2	6.5	45.1
24	N/A	gechemesx4	18616.00	32.00	22.00	4600.25	24.83	80.20	198.00	209	1	3.6	9.0
25	N/A	gechemesx5	17016.00	96.00	25.50	4156.72	78.44	179.80	736.00	163	3	7.1	28.9
26	N/A	gechemesx6	63816.00	96.00	12.80	1021.39	39.29	51.60	2818.00	80	3	4.0	220.2
27	N/A	gechemesx7	63816.00	96.00	21.80	5073.73	76.91	144.00	7378.00	233	4	6.6	338.4
28	N/A	masingedemo1	7976.00	32.00	13.80	2720.13	24.04	64.50	5.00	197	2	4.7	0.4
29	N/A	masingvmhost1	19944.00	32.00	13.00	2563.19	19.56	225.10	2445.00	197	2	17.3	188.1
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ASG-PERFMAN 2020 – z/OS



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ASG-PERFMAN 2020

Chart Tools

-- Charts

+ LPARs

ASG-PERFMAN for z/OS

- Capacity Planning
- **CPU Modeling**
- LPAR Modeling
- Workload Modeling
- zIIP Speciality Processor Monitoring
- Sub Capacity Monitoring
- Analysis
- Forecasting
- Monitoring









ASG-PERFMAN 2020 – DB2 Response Time Components for a Tran Group

CPU UTILIZATION PROFILE | DBM2/JNL8 - *OTHER THREAD GROUP | 10/28/10



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ASG-PERFMAN 2020 – Service Exceptions



Service Exception Types

- Threshold: A performance metric is met in either real-time or summarized data.
- **Trend Forecasting:** A metric appears to be approaching a specified level.
- Abnormal Behavior Detection: A metric is deviating from the expected/historical norms.

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Platform-specific exceptions are provided as customizable templates.





ASG-PERFMAN 2020 – Key Advantages

- Easy to install, Windows-based solution
- Integrated, consistent multi-platform support
- Quick & painless implementation
- Highly scalable for large data centers
- Robust, up-to-date support for z/OS
 - No prerequisite z/OS software
- Web-based interface







- Did the idea of an "average VM" have merit?
- How could it be applied to the problem at hand?
- I needed ESX host level data to experiment with...







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	N/A	brsapvmhost1	1861	5 16	5.0	301.74	5.01	23.4	1423
	N/A	brsapvmhost2	18616	5 16	0.0	66.83	1.07	8.0	285
	N/A	frmulvmhost1	11968	3 48	16.7	4623.59	32.13	185.4	229
	N/A	frparvmhost1	1861	5 16	13.7	2161.74	12.68	162.3	1570
	N/A	frparvmhost2	15953	2 16	8.0	811.49	11.97	122.9	1625
	N/A	frsopvmhost1	18610	5 32	11.0	3642.68	18.85	151.8	1868
	N/A	frsopvmhost2	18610	5 32	16.8	5223.30	23.65	155.4	2052
	N/A	frsopvmhost3	1861	5 32	16.1	1278.24	15.64	143.7	1788
	SOPHIA1	frsopvmhost4	15953	2 32	5.5	2690.13	17.31	28.9	78
	SOPHIA1	frsopvmhost5	57600	64	1.0	114.37	5.00	1.6	3
	N/A	gechemedemo 1	18610	5 32	22.0	2876.16	29.19	93.0	68
	N/A	gechemedemo2	18610	5 32	13.0	1230.28	24.69	49.8	347



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2	N/A	brsapvmhost1	18616.00	16.00	5.00	301.74	\$ 5.01	23.40	1423.00
3	N/A	brsapvmhost2	18616.00	16.00	0.00	66.83	3 1.07	8.00	285.00
4	N/A	frmulvmhost1	11968.00	48.00	16.70	4623.59	9 32.13	185.40	229.00
5	N/A	frparvmhost1	18616.00	16.00	13.70	2161.74	12.68	162.30	1570.00
6	N/A	frparvmhost2	15952.00	16.00	8.00	811.49	9 11.97	122.90	1625.00
7	N/A	frsopvmhost1	18616.00	32.00	11.00	3642.68	3 18.85	151.80	1868.00
8	N/A	frsopvmhost2	18616.00	32.00	16.80	5223.30	23.65	155.40	2052.00
9	N/A	frsopvmhost3	18616.00	32.00	16.10	1278.24	15.64	143.70	1788.00
10	SOPHIA1	frsopvmhost4	15952.00	32.00	5.50	2690.13	3 17.31	28.90	78.00
11	SOPHIA1	frsopvmhost5	57600.00	64.00	1.00	114.37	7 5.00	1.60	3.00
12	N/A	gechemedemo1	18616.00	32.00	22.00	2876.16	5 29.19	93.00	68.00
13	N/A	gechemedemo2	18616.00	32.00	13.00	1230.28	3 24.69	49.80	347.00
14	N/A	gechemesx1	51056.00	16.00	9.80	2948.02	13.77	37.70	61.00
15	N/A	gechemesx2	18616.00	32.00	30.00	3011.38	3 25.34	115.30	56.00
16	N/A	gechemesx3	18616.00	32.00	16.00	4268.17	7 25.90	136.30	774.00
17	N/A	gechemesx4	18616.00	32.00	22.00	4171.37	7 24.36	61.60	262.00
18	N/A	gechemesx5	17016.00	96.00	25.20	3310.52	2 77.55	186.10	2281.00
19	N/A	gechemesx6	63816.00	96.00	15.00	1783.83	3 43.82	40.50	1124.00
20	N/A	gechemesx7	63816.00	96.00	22.00	3243.73	l 77.15	131.70	6956.00
21	PROD	geeschvmhost1	5984.00	16.00	5.10	668.75	5 8.19	7.10	42.00
22	PROD	geeschvmhost2	11968.00	16.00	1.00	4269.88	9.13	4.20	37.00
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•••• in Anaheim



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6			Collected Data		·							Average	VM Calcs		
7	Cluste	r Name	System Name	CPU MHz Capacity	Phys Mem GB	Active VMs	CPU MHz Used	VM Alloc GB	Disk IO/Sec	Network KB/Sec	Mhz/VM	MemGB/VM	Disk IO/VM	NetKB/VM	
8			Totals	2,844,948	4,919	1,598	283,663	3,097	10,306	140,399	178	2	6.4	87.9	
9			Averages	33,080.79	57.20	18.58	3,298.41	36.01	119.84	1,847.36	178	2	6.4	99.4	=
10	N/A		brsapvmhost1	18616.00	16.00	8.10	945.1	5 11.74	18.40	6.00	117	1	2.3	0.7	
11	N/A		brsapvmhost2	18616.00	16.00	0.80	109.64	1 5.24	12.50	0.00	137	7	15.6	0.0	
12	N/A		frmulvmhost1	11968.00	48.00	16.60	5458.3	42.09	106.70	153.00	329	3	6.4	9.2	
13	N/A		frparvmhost1	18616.00	16.00	15.00	2444.27	7 13.12	208.90	1518.00	163	1	13.9	101.2	
14	N/A		frparvmhost2	15952.00	16.00	7.00	691.0	5 8.26	122.30	1467.00	99	1	17.5	209.6	
15	N/A		frsopvmhost1	18616.00	32.00	12.20	2098.84	17.33	155.70	1880.00	172	1	12.8	154.1	
16	N/A		frsopvmhost2	18616.00	32.00	15.60	3994.32	2 23.17	147.20	1988.00	256	1	9.4	127.4	
17	N/A		frsopvmhost3	18616.00	32.00	15.10	1429.80	5 16.74	122.90	1529.00	95	1	8.1	101.3	
18	SOPHIA1		frsopvmhost4	15952.00	32.00	4.00	2892.42	2 16.08	28.50	4.00	723	4	7.1	1.0	
19	N/A		gechemedemo1	18616.00	32.00	22.00	2877.18	8 28.99	76.70	129.00	131	1	3.5	5.9	
20	N/A		gechemedemo2	18616.00	32.00	13.00	1271.40	5 23.01	104.70	1147.00	98	2	8.1	88.2	
21	N/A		gechemesx1	51056.00	16.00	5.00	2253.69	9 11.07	20.00	2.00	451	2	4.0	0.4	
22	N/A		gechemesx2	18616.00	32.00	30.00	3426.23	25.98	143.50	110.00	114	1	4.8	3.7	
23	N/A		gechemesx3	18616.00	32.00	16.00	4411.90	25.43	104.60	721.00	276	2	6.5	45.1	
24	N/A		gechemesx4	18616.00	32.00	22.00	4600.2	24.83	80.20	198.00	209	1	3.6	9.0	
25	N/A		gecnemesx5	1/016.00	96.00	25.50	4156.72	/8.44	1/9.80	/36.00	163	3	7.1	28.9	
26	N/A		gecnemesx6	63816.00	96.00	12.80	1021.3	39.29	51.60	2818.00	80	3	4.0	220.2	
2/	N/A		geonemesx7	7076.00	96.00	21.80	2720.1	70.91	144.00	/3/8.00	233	4	6.0	338.4	
28	N/A		masingedemoi	10044.00	32.00	12.80	2/20.1	24.04	04.50	3445.00	197	2	4./	100.1	
29		losts Work	Clusters VMs Hoete	19944.00	52.00	13.00	2503.1	19.56	225.10	2445.00	197	2	17.3	188.1	
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- How well does the average VM represent typical VM activity?
- We needed VM level data to experiment with...







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	ADA	1	0.0	18	3.92	3.29	0.1	1						
	ALN2003DC	1	1571.0	16	1.00	1.00	1.3	0						
	ALN2003SRV1	1	748.0	47	4.00	2.97	3.0	0						
	ALN2003SRV2	1	1629.6	39	4.00	2.99	3.4	0						
	ALN2012DC	1	1764.2	27	4.00	4.00	0.8	0						
	ALN2012N1	1	781.9	74	4.00	3.97	0.3	0						
	ALN2012N2	1	758.9	67	4.00	4.00	0.4	0						
	apacdev-Exch	1	0.0	153	1.99	1.26	2.1	6						
	ARLvsa1	1	0.0	122	0.82	0.99	23.3	310						
	ARLvsa2	1	0.0	122	0.95	0.98	23.1	371						
	asgacit2	1	360.0	47	3.66	1.00	2.1	0						
	ASGdev2vm3dc1	1	743.9	17	0.50	0.50	0.8	-						



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	Riverglass2		2	9439.1		4158	7	.74	7.96	3.1	0			
	usdenmr7		4	0.0		2915	1	.95	1.86	5.4	18			
	usdenmfbsd2		1	0.0		2882	1	.96	0.06	0.0	0			
	QA5VM8R2WFD1		1	372.4		2823	2	.00	0.98	1.1	0			
	cfDemo_xenApp2		1	2310.5		2822	4	.00	4.00	0.6	0			
	usdenmu 18		1	0.0		2798	C	.09	1.99	3.2	1			
	usnapswebdocs		2	1569.4		2785	3	.00	3.60	8.8	6			
	usryevmxpKSF11		1	460.0		2769	2	.00	0.86	5.5	0			
	QA5VM8SERVER1		1	371.5		2766	2	.00	1.25	0.8	1			
	cfDemoCloudStack_t	trn	1	0.0		2709	1	.88	1.96	5.9	0			
	usrchv3cypsub		1	0.0		2519	2	.00	1.26	3.8	2			
	usden3apief		1	0.0		2446	C	.50	0.46	126.3	1			



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	dev13vm3bobbyk	4	0.0	206	2.98	0.78	1.6	2							
	DEV6SPt2K13-1	4	2181.7	353	5.77	5.57	5.4	0							
	DEV6SPt2K13-2	4	1486.9	348	7.77	3.91	1.9	0							
	frsop8vmbuild_IS2009	4	0.0	831	3.89	1.92	7.5	94							
	gechcae-rochade	4	0.0	90	8.00	7.88	0.8	0							
	gechem 12qa 1	4	964.0	49	4.00	4.00	1.0	0							
	gechem3infa	4	0.0	289	4.00	4.00	1.6	0							
	gechem4dev1.asg.com	4	4098.0	303	4.00	3.95	17.2	55							
	gechem4dev2.asg.com	4	0.0	121	6.00	6.00	8.5	65							
	gechem4roket	4	0.0	806	2.00	1.59	33.9	339							
	gechem7qa1	4	965.0	55	2.00	2.00	0.7	0							
	gechem7qa2	4	964.0	7	2.00	2.00	0.1	0							

Average VM CPU is 81st Percentile



In Anaheim

CPU Mhz used by each VM





Average Memory is 63rd Percentile



Memory (GB) used by each VM





Average IO is 82nd Percentile



In Anaheim

Average VM Calcs



SHAKE

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	A	В	С	D	E	F	G	Н	I.	J	К	L	М	N	0	Р	Q
1		CPU Capacity Limit	80%														
2		Memory Commit	100%														
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5																	
6		Collected Data									Average	VM Calcs			Avai	ilable VM C	apacity
7	Cluster Name	System Name	CPU MHz Capacity	Phys Mem GB	Active VMs	CPU MHz Used	VM Alloc GB	Disk IO/Sec	Network KB/Sec	Mhz/VM	MemGB/VM	Disk IO/VM	NetKB/VM	By CPU Mhz	BY Mem	By Disk IO	By NetKB
8		Totals	2,844,948	4,919	1,598	283,663	3,097	10,306	140,399	178	2	6.4	87.9				
9		Averages	33,080.79	57.20	18.58	3,298.41	36.01	119.84	1,847.36	178	2	6.4	99.4				
10	N/A	brsapvmhost1	18616.00	16.00	8.10	945.16	11.74	18.40	6.00	117	1	2.3	0.7	78.6	2.2	183.2	113.8
11	N/A	brsapvmhost2	18616.00	16.00	0.80	109.64	5.24	12.50	0.00	137	7	15.6	0.0	83.3	5.6	184.1	113.8
12	N/A	frmulvmhost1	11968.00	48.00	16.60	5458.31	42.09	106.70	153.00	329	3	6.4	9.2	23.2	3.0	169.5	112.1
13	N/A	frparvmhost1	18616.00	16.00	15.00	2444.27	13.12	208.90	1518.00	163	1	13.9	101.2	70.1	1.5	153.7	96.5
14	N/A	frparvmhost2	15952.00	16.00	7.00	691.05	8.26	122.30	1467.00	99	1	17.5	209.6	68.0	4.0	167.1	97.1
15	N/A	frsopvmhost1	18616.00	32.00	12.20	2098.84	17.33	155.70	1880.00	172	1	12.8	154.1	72.1	7.6	161.9	92.4
16	N/A	frsopvmhost2	18616.00	32.00	15.60	3994.32	23.17	147.20	1988.00	256	1	9.4	127.4	61.4	4.6	163.2	91.2
17	N/A	frsopvmhost3	18616.00	32.00	15.10	1429.86	16.74	122.90	1529.00	95	1	8.1	101.3	75.8	7.9	167.0	96.4
18	SOPHIA1	frsopvmhost4	15952.00	32.00	4.00	2892.42	16.08	28.50	4.00	723	4	7.1	1.0	55.6	8.2	181.7	113.8
19	N/A	gechemedemo1	18616.00	32.00	22.00	2877.18	28.99	76.70	129.00	131	1	3.5	5.9	67.7	1.6	174.2	112.4
20	N/A	gechemedemo2	18616.00	32.00	13.00	1271.46	23.01	104.70	1147.00	98	2	8.1	88.2	76.7	4.6	169.8	100.8
21	N/A	gechemesx1	51056.00	16.00	5.00	2253.69	11.07	20.00	2.00	451	2	4.0	0.4	217.4	2.5	183.0	113.8
22	N/A	gechemesx2	18616.00	32.00	30.00	3426.21	25.98	143.50	110.00	114	1	4.8	3.7	64.6	3.1	163.8	112.6
23	N/A	gechemesx3	18616.00	32.00	16.00	4411.96	25.43	104.60	721.00	276	2	6.5	45.1	59.0	3.4	169.9	105.6
24	N/A	gechemesx4	18616.00	32.00	22.00	4600.25	24.83	80.20	198.00	209	1	3.6	9.0	58.0	3.7	173.6	111.6
25	N/A	gechemesx5	17016.00	96.00	25.50	4156.72	78.44	179.80	736.00	163	3	7.1	28.9	53.3	9.1	158.2	105.4
26	N/A	gechemesx6	63816.00	96.00	12.80	1021.39	39.29	51.60	2818.00	80	3	4.0	220.2	281.9	29.3	178.1	81.7
27	N/A	gechemesx7	63816.00	96.00	21.80	5073.73	76.91	144.00	7378.00	233	4	6.6	338.4	259.0	9.9	163.7	29.8
28	N/A	masingedemo1	7976.00	32.00	13.80	2720.13	24.04	64.50	5.00	197	2	4.7	0.4	20.6	4.1	176.1	113.8
29	N/A	masingvmhost1	19944.00	32.00	13.00	2563.19	19.56	225.10	2445.00	197	2	17.3	188.1	75.4	6.4	151.2	86.0
30	N/A	masingvmhost2	19944.00	32.00	16.00	3441.23	20.77	202.00	2556.00	215	1	12.6	159.8	70.5	5.8	154.8	84.7
31	N/A	masingvmhost3	18616.00	32.00	8.00	1041.34	13.69	127.20	2407.00	130	2	15.9	300.9	78.0	9.4	166.3	86.4
32	N/A	nibelvmhost1	7976.00	32.00	8.50	880.38	8.35	60.60	477.00	104	1	7.1	56.1	31.0	12.2	176.7	108.4
33	N/A	nibelvmhost2	7976.00	28.00	4.40	567.50	5.60	47.10	317.00	129	1	10.7	72.0	32.8	11.6	178.8	110.2
34	N/A	nibelvmhost3	7976.00	28.00	4.00	405.45	9.14	42.50	519.00	101	2	10.6	129.8	33.7	9.7	179.5	107.9
35	N/A	nibelvmhost4	12760.00	32.00	3.00	538.38	7.20	29.30	30.00	179	2	9.8	10.0	54.5	12.8	181.5	113.5



Average VM Calcs



	Α	В	С	D	E	F	G	Н	1	J	К	L	M	N	0	Р	Q	R		
1		CPU Capacity Limit	80%																	
2		Memory Commit	100%																	
3		Disk IO Limit	1200																	
4		Net KB Limit	10000	(2500=10MB d	luplex, 25000=1	.00MB duplex)														
5																				
6		Collected Data									Average	VM Calcs		Available VM Capacity						
7	Cluster Name	System Name	CPU MHz Capacity	Phys Mem GB	Active VMs	CPU MHz Used	VM Alloc GB	Disk IO/Sec	Network KB/Sec	Mhz/VM	MemGB/VM	Disk IO/VM	NetKB/VM	By CPU Mhz	BY Mem	By Disk IO	By NetKB	Best		
8		Totals	2,844,948	4,919	1,598	283,663	3,097	10,306	140,399	178	2	6.4	87.9					933.4		
9		Averages	33,080.79	57.20	18.58	3,298.41	36.01	119.84	1,847.36	178	2	6.4	99.4		<u> </u>					
10 N	I/A	brsapvmhost1	18616.00	16.00	8.10	945.16	11.74	18.40	6.00	117	1	2.3	0.7	78.6	2.2	183.2	113.8	2.2		
11 N	I/A	brsapvmhost2	18616.00	16.00	0.80	109.64	5.24	12.50	0.00	137	7	15.6	0.0	83.3	5.6	184.1	113.8	5.6		
12 N	I/A	frmulvmhost1	11968.00	48.00	16.60	5458.31	42.09	106.70	153.00	329	3	6.4	9.2	23.2	3.0	169.5	112.1	3.0		
13 N	I/A	frparvmhost1	18616.00	16.00	15.00	2444.27	13.12	208.90	1518.00	163	1	13.9	101.2	70.1	1.5	153.7	96.5	1.5		
14 N	I/A	frparvmhost2	15952.00	16.00	7.00	691.05	8.26	122.30	1467.00	99	1	17.5	209.6	68.0	4.0	167.1	97.1	4.0		
15 N	I/A	frsopvmhost1	18616.00	32.00	12.20	2098.84	17.33	155.70	1880.00	172	1	12.8	154.1	72.1	7.6	161.9	92.4	7.6		
16 N	I/A	frsopvmhost2	18616.00	32.00	15.60	3994.32	23.17	147.20	1988.00	256	1	9.4	127.4	61.4	4.6	163.2	91.2	4.6		
17 N	I/A	frsopvmhost3	18616.00	32.00	15.10	1429.86	16.74	122.90	1529.00	95	1	8.1	101.3	75.8	7.9	167.0	96.4	7.9		
18 S	OPHIA1	frsopvmhost4	15952.00	32.00	4.00	2892.42	16.08	28.50	4.00	723	4	7.1	1.0	55.6	8.2	181.7	113.8	8.2		
19 N	I/A	gechemedemo1	18616.00	32.00	22.00	2877.18	28.99	76.70	129.00	131	1	3.5	5.9	67.7	1.6	174.2	112.4	1.6		
20 N	I/A	gechemedemo2	18616.00	32.00	13.00	1271.46	23.01	104.70	1147.00	98	2	8.1	88.2	76.7	4.6	169.8	100.8	4.6		
21 N	I/A	gechemesx1	51056.00	16.00	5.00	2253.69	11.07	20.00	2.00	451	2	4.0	0.4	217.4	2.5	183.0	113.8	2.5		
22 N	I/A	gechemesx2	18616.00	32.00	30.00	3426.21	25.98	143.50	110.00	114	1	4.8	3.7	64.6	3.1	163.8	112.6	3.1		
23 N	I/A	gechemesx3	18616.00	32.00	16.00	4411.96	25.43	104.60	721.00	276	2	6.5	45.1	59.0	3.4	169.9	105.6	3.4		
24 N	I/A	gechemesx4	18616.00	32.00	22.00	4600.25	24.83	80.20	198.00	209	1	3.6	9.0	58.0	3.7	173.6	111.6	3.7		
25 N	I/A	gechemesx5	17016.00	96.00	25.50	4156.72	78.44	179.80	736.00	163	3	7.1	28.9	53.3	9.1	158.2	105.4	9.1		
26 N	I/A	gechemesx6	63816.00	96.00	12.80	1021.39	39.29	51.60	2818.00	80	3	4.0	220.2	281.9	29.3	178.1	81.7	29.3		
27 N	I/A	gechemesx7	63816.00	96.00	21.80	5073.73	76.91	144.00	7378.00	233	4	6.6	338.4	259.0	9.9	163.7	29.8	9.9		
28 N	I/A	masingedemo1	7976.00	32.00	13.80	2720.13	24.04	64.50	5.00	197	2	4.7	0.4	20.6	4.1	176.1	113.8	4.1		
29 N	I/A	masingvmhost1	19944.00	32.00	13.00	2563.19	19.56	225.10	2445.00	197	2	17.3	188.1	75.4	6.4	151.2	86.0	6.4		
30 N	I/A	masingvmhost2	19944.00	32.00	16.00	3441.23	20.77	202.00	2556.00	215	1	12.6	159.8	70.5	5.8	154.8	84.7	5.8		
31 N	I/A	masingvmhost3	18616.00	32.00	8.00	1041.34	13.69	127.20	2407.00	130	2	15.9	300.9	78.0	9.4	166.3	86.4	9.4		
32 N	I/A	nibelvmhost1	7976.00	32.00	8.50	880.38	8.35	60.60	477.00	104	1	7.1	56.1	31.0	12.2	176.7	108.4	12.2		
33 N	I/A	nibelvmhost2	7976.00	28.00	4.40	567.50	5.60	47.10	317.00	129	1	10.7	72.0	32.8	11.6	178.8	110.2	11.6		
34 N	I/A	nibelvmhost3	7976.00	28.00	4.00	405.45	9.14	42.50	519.00	101	2	10.6	129.8	33.7	9.7	179.5	107.9	9.7		
35 N	I/A	nibelvmhost4	12760.00	32.00	3.00	538.38	7.20	29.30	30.00	179	2	9.8	10.0	54.5	12.8	181.5	113.5	12.8		
36 N	I/A	ukstavmhost1	7976.00	16.00	7.20	949.19	8.50	172.40	3034.00	132	1	23.9	421.4	30.6	3.9	159.3	79.3	3.9		
37 N	I/A	ukstavmhost2	7976.00	16.00	13.00	1376.92	13.04	147.40	2356.00	106	1	11.3	181.2	28.2	1.5	163.2	87.0	1.5		
38 N	I/A	ukstavmhost3	7976.00	16.00	11.00	1602.89	13.83	154.00	2535.00	146	1	14.0	230.5	26.9	1.1	162.2	85.0	1.1		
39 N	I/A	usarlvhost1	7976.00	16.00	7.70	558.13	9.52	52.80	501.00	72	1	6.9	65.1	32.8	3.3	177.9	108.1	3.3		
40 N	I/A	usarlvhost2	7976.00	16.00	7.00	1016.11	13.21	60.10	525.00	145	2	8.6	75.0	30.2	1.4	176.8	107.8	1.4		
41 u	sdenvmhosts	usdenvmhost01	63816.00	96.00	37.70	7283.24	80.00	122.80	4228.00	193	2	3.3	112.1	246.6	8.3	167.0	65.7	8.3		
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