

# Virtual Machines

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- Develop new hardware and new software in low-cost, and safe, environment
- Support software in many different O/S environments for broad customer base
- Simplify environment to one virtual machine, O/S, and window system everywhere: Sun JVM, Sun Da Vinci Machine, Microsoft .NET CLI, . . .



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- zone (Solaris)

```
# zoneadm list -v
```

ID	NAME	STATUS	PATH	BRAND	IP
0	global	running	/	native	shared
1	lm	running	/export/zone/lm	native	shared
2	www	running	/export/zone/www	native	shared
3	mail	running	/export/zone/mail	native	shared
6	www2	running	/export/zone/www2	native	shared

# Architecture and utilization

## Virtualization—Then and Now

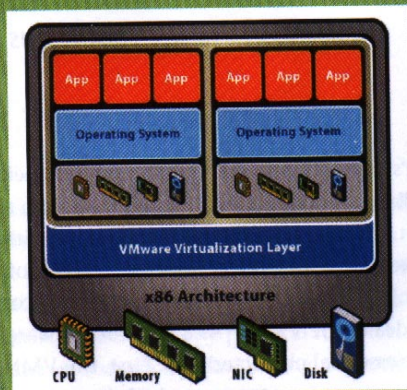
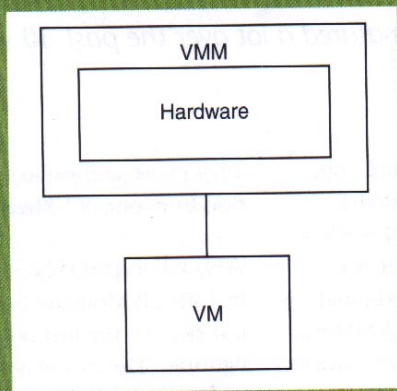
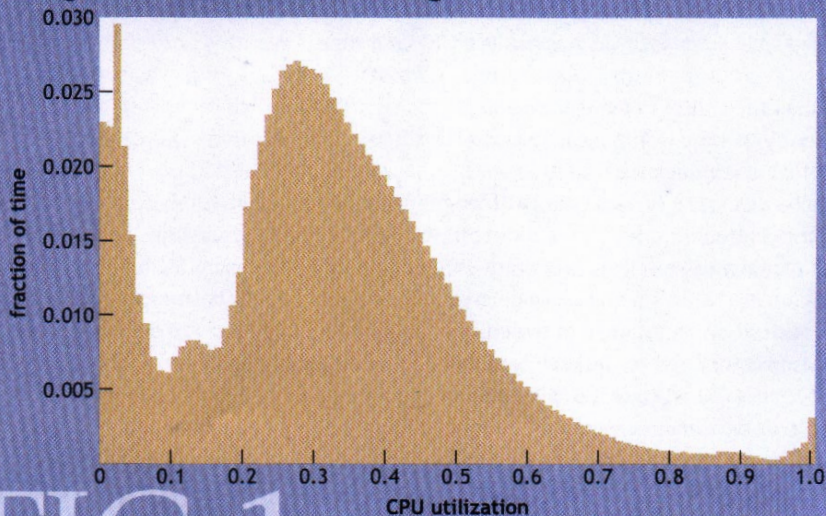


Illustration courtesy of VMware

# FIG 1

# Architecture and utilization

## Average Server-CPU Utilization at Google



graph courtesy of Barroso & Hölzle

FIG 1



# SIMH — Computer History Simulation Project

Altair 8080 & Z80	DEC PDP-10	GRI 909	IBM 7094
DEC PDP-1	DEC PDP-11	HP 2100	IBM System/3
DEC PDP-4	DEC PDP-15	Honeywell 316	Interdata 16
DEC PDP-7	DEC VAX	IBM 1130	Interdata 32
DEC PDP-8	DG Eclipse	IBM 1401	LGP
DEC PDP-9	DG Nova	IBM 1620	SDS

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| | | | | | | | | | | | | | | | | | | | | | |
| ___/ | ___ \ ___ | | ___/ | | | | ___/ ___ | | | | |
| ___/ | ___ \ ___ | | | | ___/ | | | | | | | | |

```

KLH10 and SIMH both run TOPS-10 and TOPS-20:

@compILE (FROM) ? confirm with carriage return

or one of the following:

/10-BLISS	/36-BLISS	/68-COBOL
/74-COBOL	/ABORT	/ALGOL
/BACKGROUND	/BINARY	/C

...

/SIMULA	/SNOBOL	/STAY
/SYMBOLS	/WARNINGS	

or File name

or "@"

or "%"

# Resources

<http://www.math.utah.edu/pub/tex/bib/virtual-machines.html>

<http://www.math.utah.edu/pub/~beebe/vm.html>

