

In a Virtual World, Performance is always Physical

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2024 OpenVMS Bootcamp
Marriott Long Wharf
Boston, Massachusetts

Robert Gezelter Software Consultant

Introduction

Simple OpenVMS System

Virtualization

Reality

Client Example

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Introduction

- Today's Environment
- Virtualization Benefits
- Virtualization Falsehoods
- What you see
- Mirages
- Reality
- Summary

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A simple OpenVMS system

```
$ show cpu
```

```
System:      ODYSS2, AlphaServer 400 4/166
```

```
CPU ownership sets:
```

```
Active       0
Configure    0
```

```
CPU state sets:
```

```
Potential    0
Autostart    0,1
Powered Down None
Not Present  1
Hard Excluded None
Failover     None
```

```
$ sho dev dk
```

Device Name	Device Status	Error Count	Volume Label	Free Blocks	Trans Count	Mnt Cnt
ZETA\$DKA0:	Mounted	0	AXPSYS084	4084784	335	1
ZETA\$DKA100:	Mounted	0	DATAVOL1	200503	134	1
ZETA\$DKA200:	Mounted	0	DATAVOL2	729000	22	1
ZETA\$DKA300:	Mounted	0	DATAVOL3	392090	35	1
ZETA\$DKA400:	Online wrtlck	0				

What are the performance characteristics of the above system?

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The Task

- Sort >500MB of data records
- The input/output files are on DKA100
- Which disks should be used for scratch?

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Classic answer

- Use DKA200, DKA300 for scratch

Bottom Line First –

- Virtualization increases efficiency in the absence of contention
- Contention can catastrophically decrease performance (“thrashing”)

The limits of virtualization

- “The Matrix”
- Simulations depart from reality
- Models are not reality

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Appearances can be deceiving

- Not an Alphaserwer 400 4/166
- Not three disks
- The original Star Trek, “Spock’s Brain”

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Reality

- Dell Latitude E6420
- Virtual Alpha
- Intel Core i5-2520M, 2.5 GHz
- Single 2TB Seagate Barracuda

Client Situation

- Integrity rx3600
- 25 SAN-attached volumes
- 2 locally attached SAS drives

Client Situation - SAN attached disks

- HSG80? P2000? MSA2052?
- Each controller is different
- Client doing hardware refresh
- Old: P2000; New: MSA2052

Insufficient Description

- How many disks are there? 80? 20? 10? 1?
- No. There are a eight physical disks, organized into
- four RAID-1 sets
- P2000 has explicit pre-allocation of logical volumes
- Access arms cannot be in two places at one time

Virtualization

- does not create resources
- increases utilization till contention point
- overallocation dramatically decreases performance

Virtualization – Origins

- Virtual memory – Maurice Wilkes, et al, Atlas 1950s
- Cache – Maurice Wilkes, 1965
- Time sharing – MIT 1950s

Virtualization – The calculus

- $90\% \ 0.100 \text{ us} + 10\% \ 1 \text{ us} \rightarrow 0.109 \text{ us}$
- Same basic calculation for all multi-level storage virtualizations

Not IT-specific

- Fractional reserve banking
- Airline Code sharing
- On-demand services

Performance must be analyzed in real context

- Relocating an instance can dramatically alter performance
- Are your resource requirements significant?
- If your instance is “significant”, your instance(s) presence distorts the supply
- If your instance is not “significant”, your instance(s) presence distorts the supply

Summary

- “performance” only has meaning in the physical world
- Performance curves are often non-linear, with unheralded quantum cliffs
- Appearances can be very deceiving

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Underlying Lessons

Summary

Questions?

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Session Notes & Materials:

<http://www.rlgsc.com/openvms-bootcamp/2024/index.html>