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MythBusters: Taking on Virtualization, z/VM and Linux on System z

Session 9154

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http://vm.marist.edu/track/present.html

Session Overview

- Myths, FUD and Facts
  - – With lots of discussion!
  - – Can you say “disclaimer”? Good…
- Sources & Thanks!
  - – Mark Post, Martin Schwidefsky, Rick Troth, Phil Smith, Christopher Gombola, Jim Vincent and others

Myth or Fact?

- **The Mainframe is old technology; companies should consider "newer" technology instead**
- Fact! But only if you still have a S/390 or older machine. Get a z10
- Almost complete Myth if you look at the evolution of the z990 to z9 to z10

Myth or Fact?

- **VM == VMware** (or Voice Mail, or has to do with Java…)
- Like with most acronyms, the good ones get re-used for different meanings
- VM does not automatically mean VMware
  - The context should always be well defined

Myth or Fact?

- **IBM’s strategic direction is to eliminate z/VM**
- Bwah ha haw!! That’s a good one!
  - Remember button from the mid 1990’s – “VM: The rumors of my death have been greatly exaggerated”
  - If IBM *lost their collective wits* and tried (again) it would be fun to watch them try to hide from us…

Myth or Fact?

- **z/VM is a Strategic and Mission Critical OS**
- A little history:
  - Up to early 1990’s, absolutely; mid to late 90’s and early 2000s, not really.
  - 2007 and beyond?
- A growing number of corporations are insisting that z/VM *is* Mission Critical or soon will be
- IBM has heard and seem to understand the direction…

Myth or Fact?

- **Virtualization is a relatively new concept**
- Comparing it to the *relative age* of the universe, yeah it is
- Same as when AOL said Instant Messaging is new technology too
  - – CMS TELL was around long before AIM
- The technology of virtualization is at least 35 years old!
  - – If that is new, then I am fairly *young*

Myth or Fact?

- **To get Linux to run on System z, it has to know/speak EBCDIC**
- This is an old urban legend
- Linux is Linux, even on System z
  - – Linux talks ASCII

Myth or Fact?

- **Mainframe == z/OS**
- Kind of like saying your garage == Chevy
- Mainframe is the machine; the OS can be a lot of different ones, not just z/OS
- They are not interchangeable terms

Myth or Fact?

- **Linux runs on/under z/OS**
- z/OS has Unix System Services
- z/OS does not have the functional ability to run Linux servers
- z/OS \== mainframe (remember? ☺)

Myth or Fact?

- **Virtualization allows you to run any arbitrary software on any arbitrary hardware architecture**
- That *would* be cool, wouldn’t it?!
  - Just think… Windows 95 on System z, running Carmageddon – sweet!
- The software needs to understand the real/virtual hardware architecture
  - The hardware, even virtualized, needs to handle the software interfacing to it

Myth or Fact?

- **You can run tens-of-thousands Linux servers on z/VM**
- While technically true, not practical
- The servers really would not be “useful” or “productive”
- Hundreds, most certainly. Thousands? Maybe simple web/Apach/IHS servers. More than that is very unlikely

Myth or Fact?

- **I/O is *fast* on a mainframe**
- Not if you compare a single SATA attached PC disk, with DASD sitting on a storage server kilometers away from your mainframe
  - Falls into the “be careful what is used for comparison” list
- I/O on the mainframe does have higher efficiencies in a lot of cases, and can certainly handle a huge amount of I/O traffic

Myth or Fact?

- **CPU on mainframe is really *slow***
- Looking at the raw, Glossy Flyer GHZ speeds of the engines, one might believe so (pre z10)
  - You probably don't want to run folding @ home
- In a z990 class machine, high CPU intensive apps didn't do too well
  - z9's did much better and could run more than before
  - z10's are the New Frontier in CPU capacity; there are far fewer applications that won't be able to run there

Myth or Fact?

- **Mainframes are too expensive**
- A 40 ton truck is more expensive than your Nissan as well, but you can haul a lot more stuff around with it!
- It has been shown in real implementations that given the right number of Linux servers and the right mix of software (DB2, Oracle, WAS, etc), the TCO is far less than discrete server solutions
- Start-up costs for non-mainframe shops could be high, but if planned right, savings will kick in as it grows in use

Myth or Fact?

- **z/VM is so reliable it *never* fails**
- If it were only so!
- z/VM is *very* reliable, but it has bugs as would any software/code
- Outages happen even to good folks
- Following good practices and guidelines, you can expect high availability, but don’t expect perfection and you won’t be disappointed

Myth or Fact?

- **Virtualization will allow me to cut my IT staff**
- If it is done right, no one loses their job
  - They have better efficiencies in supporting the servers, possibly giving them more time for other projects
  - This could result in some staff reduction, but it is rare
- The server counts may not change, but get consolidated into single machines

Myth or Fact?

- **My application will run worse on a virtual server**
- Is your application written very poorly?
  - Then you bet it will run like cra.. uh, poorly!
  - Virtualization is like exposing every nook and cranny of an application’s coding techniques
- Applications on their own physical server can “hide” poor design
- Well written apps often benefit in a virtual environment, sharing resources with other servers/apps and utilizing all the resources to their fullest

Myth or Fact?

- **Our Linux on z/VM environment is doing great; we should be moving everything to it**
- Personal commentary: Please don’t!
- Use the right tool for the right job; the right platform for the right need
- A quad-core Intel server that runs an application at +80% CPU on average, with required sub-microsecond response times *might* not be a good choice for *any* virtualization
- z/VM and Linux are a great team and *are* successful, but there are still good reasons to look at different solutions depending on the requirements

Myth or Fact

- **Perceived response times are the defacto SLA**
- Unfortunately, true
- Give them a big z10 and “they” begin to expect sub-second response times – all the time
  - Even if they have a <5 minute response time SLA

Myth or Fact?

- **Linux is automatically more secure when hosted on z hardware**
- The awesome security IBM boasts about for System z is a result of a combination of both the z operating systems (z/VM and z/OS) and the z hardware
- While Linux can surely take advantage of LPAR separation and things like crypto engines, it can also be just as vulnerable as if it were on any other platform
- We can't be complacent with security just because we are on z hardware!

Myth or Fact?

- **If I have 4GB memory on my Dell server, I need a 4GB virtual machine on z/VM**
- Linux will buffer I/O and eventually consume all memory it has access to, which, in turn, will probably cause paging and short memory problems
- In a lot of cases, smaller (memory) is better
- You are much better off sizing memory based upon application requirements with a little extra thrown in for Linux

Myth or Fact?

- There is a known ratio of distributed servers to virtual servers when moving to a Linux for z environment that I can provide to my management

- Corollary: In general, it is a simple matter of math to know how much memory I need per IFL

… ratio of server, memory per IFL …

- The combination of factors that determine the number of servers that can be supported by a single IFL is almost limitless
  - The amount of memory per IFL is also limitless
- There is no easy way to prove a TCO without doing your homework, obtaining sizings and probably running pilots of your own applications
- It's often a moving target with rapid application requirements changes, usage patterns, and agile development processes

Myth or Fact?

- **Linux on z/VM: If we build it, they will come**
- Some grassroots efforts have worked, however…
- Eventually you will need budget for hardware, software licenses, people, backup, DR, (etc) before self-funding can occur
- There are also a myriad of other people in your company who will happily torch your project for one reason or another
- Having a champion or sponsor in upper management increases your odds for success a great deal

Myth or Fact?

- **Installing z/VM and Linux is easy**
- It is deceptively easy
- Things like security, DR, systems management, availability, automation, chargeback, performance tuning, and provisioning will need to be addressed and are not intuitively obvious
- Decisions need to be made on what should be implemented now versus later, especially with the tendency for pilots to become production overnight
- A balance should be struck between initial project complexity and pushing too much work off to the future

Myth or Fact?

- **Because the z/VM and Linux systems run so well, we really don’t need a performance monitor – at least not for a while**
- When you figure out you need one, you’re probably too late
- As things grow/change, performance characteristics will too
- Application areas will question things – you will want to show them the facts

Myth or Fact?

- **Vendor “B” claims their agent only uses about 1% CPU on the Linux server to collect performance data, that should be fine**
- For a discrete server, sure!
- For a virtualized environment, especially a z/VM one with a bunch of servers, do some math:
  - 100 servers times 1% CPU = 1 full IFL for just getting your performance data from Linux
- Don’t let your performance monitor be the cause for you to have to monitor your performance

Myth or Fact?

- **Using a 3270 console for managing/editing Linux files in a crunch is simple**
- For some, maybe
- Surprisingly sed, ed and other basic line-commands aren't memorized
  - Basic necessity when network, fstab, etc is mis-configured
- The 3270 console with Linux servers is probably one of the biggest difficulties for SysAdmins to get used to

Myth or Fact?

- **Mainframe people are old**
- Some (not me) could very well be
- There are a number of young people as well though
  - zNextGen
  - My entire team – including me

Contact Info

Light travels faster than sound, that's why people seem bright until you hear them...

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