



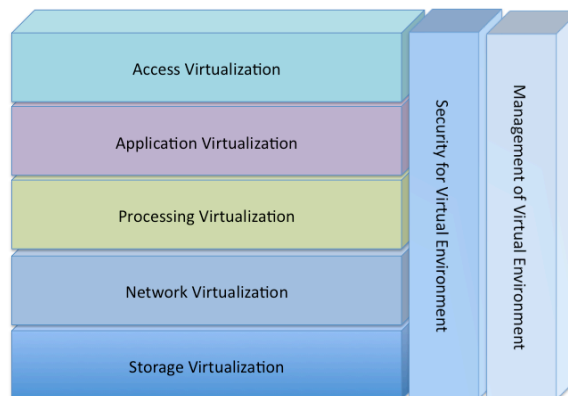
## IBM STG SW Talks Virtualization and Cloud

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IBM's System and Technology Group (STG) asked me to attend a two-day briefing in Somers, NY. As a quick summary, IBM's STG wanted to discuss its complete portfolio of end-to-end virtualization technologies. STG also wanted analysts to better understand how IBM's customers will be able to easily move virtualized workloads into Infrastructure as a Service (IaaS) offerings by all of the major service providers.

IBM is one of a very small number of companies that offers products in each and every category of the Kusnetzky Group model of virtualization (see figure 1). The company has created solutions occupying each layer of technology in that model. Plus, IBM was one of the first participants in that market, and has been involved with virtualization technology for over 40 years.

Figure 1 Kusnetzky Group Model of Virtualization Technology



The company believes that storage virtualization should be a standard part of virtualized environments. As a result, IBM is planning to emphasize its storage virtualization solutions and tools as part of this exercise.

Finally, the company plans to introduce products and services to help organizations move their virtualized workloads into the cloud when that move fits business objectives and requirements.

## TRENDS AND DIRECTIONS OF IBM'S SYSTEM SOFTWARE GROUP

IBM has been watching the transformation of IT organizations as they move from occupying numerous independent silos—such as an applications group, a systems group, a database group, a networking group, a storage group and a virtualization group—into a more responsive business unit-like organization. This development, IBM would say, both simplifies the organization's processes and increases levels of efficiency.

IBM believes that part of this move can be attributed to increasing requirements for more effective risk management and information integration across the organization. Organizations are shifting away from the traditional approach that meant having dedicated physical systems, storage and network switches, rigid structures, complex data centers, and long lead times for application delivery. They're moving to embrace integrated systems based upon modular and energy efficient systems; pools of virtualized resources; ready-to-use appliances and integrated solutions; and a cloud-like self-service, utility style of computing. IBM Distinguished Engineer, Amit Dave, CTO of IBM Systems Software, said, this means that they're moving from being focused on "repair and rebuilding" to "re-imaging and re-deploying" technology. He went on to say that IBM is calling this "Smarter Computing."

### OVERVIEW OF IBM'S "VIRTUALIZATION" EFFORTS

IBM's Ian Robinson, PowerVM offering manager, presented a very narrow view of IBM's virtualization capacities. Although IBM offers home-grown technologies in all seven layers of the Kusnetzky Group model, all that was presented was how virtual machines (one of five types of technology in the virtual processing layer of the model) can be easily created, provisioned, deployed and then managed. This, of course, could be expected when Mr. Robinson's role is taken into consideration.

Overall, I was rather disappointed by the narrow focus of the presentation, though IBM's capabilities are very impressive. Virtual machine technology is integrated into IBM's mainframes and Power systems at a very fundamental level. As Intel and AMD add similar features into their microprocessors, which power IBM's System x solutions, the company is set to offer a very powerful set of management tools that would work across all platforms and provide a powerful level of insight into machine utilization and operations. Although only mentioned in passing during the presentation, IBM's Tivoli System Monitor works with virtual machine software from all of the major players including Citrix, Microsoft, Oracle, Red Hat and VMware.

In other sessions, IBM focused on its view that virtual servers need virtual storage to function optimally. Data, in its view, should be as agile and reliable as virtual servers. The company presented its storage virtualization and management products and demonstrated how IBM Systems Director has the capability to find and then manage virtualized storage from numerous suppliers, including EMC, HP, Hitachi, IBM, NetApp and several others.

### SYSTEMS MANAGEMENT OVERVIEW: TIVOLI AND SYSTEMS DIRECTOR

IBM's Paul Casterlin, program director and product line manager, provided a really interesting, rather complex discussion of what management tools should do and, in the end, often fail to achieve. He

believes that the tools should reduce training costs, create a secure environment, make everything easy to use, take care of system health and make it possible for organizations to do more with fewer resources in less time.

Casterlin showed how Tivoli, when combined with Systems Director, could create, provision, monitor and manage resources from low-level hardware to complete workloads using a Web-based graphical user interface. He also demonstrated how the products could be tailored to serve the needs of IT administrators, developers and even business decision makers. Casterlin also pointed out that these products could manage complex, heterogeneous environments that include systems and software offered by nearly all suppliers.

After watching the demonstrations, I believe that IBM can live up to Casterlin's statements.

#### VIRTUALIZATION INTO CLOUD

Next on the agenda was IBM's Andy Wachs, Marketing Manager and Offering Manager. Andy ran rapidly through what IBM is doing today in the area of virtualized servers and how those capabilities should help IBM customers' project workloads into IaaS environments when they are ready.

IBM has already "baked in" virtual machine capabilities to its System z mainframes, Power Systems and the "i" platform, and is working with Intel and others to enhance the virtualization capabilities of its System x industry standard systems.

Once a workload has been moved into a virtual environment, IBM's products make it possible to move the workload into a private, public or hybrid cloud environment. Wachs spoke about IBM's CloudBurst, a packaged, private cloud offering, and spoke about how its design would make it possible for organizations to use cloud computing's self-service/pay as you go model in their own data centers.

Wachs also spent a bit of time speaking about why he felt that large enterprises would pay attention to IBM's industry standard system offerings. It is his belief that IBM's efforts have gone beyond merely packaging off-the-shelf processors, memory and storage, to building systems having high levels of reliability and maintainability. While I have no doubt that IBM has worked very hard to enhance its System x products, companies may not fully understand the value of this additional engineering and might select less costly products from other suppliers.

IBM clearly has given this a great deal of thought and I have high hopes for the products and services they plan to offer in the near term. Their challenge in this area is to present in clear and simple terms why companies would gain some benefit by buying IBM products instead of a lower-cost alternative. IBM must reach out to high level executives and persuade them to set guidelines that require systems have power management, systems management and reliability built in, rather than allowing lower level decision makers to select products having the lowest initial cost. This, of course, requires IBM to convince executives that they'll reduce their overall costs even though the initial cost might be higher.

## KVM AND INTEGRATION WITH SYSTEMS DIRECTOR/TIVOLI INTEGRATED SERVICE MANAGER

IBM's Michael Day, distinguished engineer and chief virtualization architect, open systems development, took us on a deep dive into the KVM hypervisor and presented data intended to convince the analysts that KVM is a more optimal hypervisor for x86-based systems and servers. Day was able to offer strong support for his statements that KVM should be something IBM customers closely examine.

Day presented hypervisor requirements from Gerald J. Popek's and Robert P. Goldberg's landmark 1974 research paper, "Formal Requirements for Virtualizable Third Generation Architectures," to support his claim that KVM is a Type I hypervisor in the hopes of combating media comments that asserted the KVM is actually a Type II hypervisor. He even suggested that if a software engineer examined the Xen and KVM code, it would be clear that both can be implemented as Type I hypervisors. Since VMware's ESX code is not available for review, Day just pointed out that it is not possible to corroborate VMware's claims in this area.

Day went on to present lab data showing performance improvements as companies move workloads from older Intel and AMD processors to products that have virtualization built in. Each generation of microprocessor has reduced virtualization overhead, and Day projected that microprocessors that will be available in the near future will essentially reduce virtual machine software overhead to zero.

While Day's arguments were interesting and the data impressive, IBM faces significant challenges convincing the industry that KVM is a better choice than offerings from VMware, Citrix and Microsoft, and companies leveraging the open source Xen hypervisor. Day commented that IBM has plans to build KVM-based virtual machine software into its System x products in the future so that these systems will have similar management, reliability and performance characteristics seen in IBM's System z, Power and i families today.

### SUMMARY

IBM promised to review its portfolio of end-to-end virtualization technologies and present how the company is helping its customers move virtualized workloads into IaaS offerings by all major suppliers, why storage virtualization should be a standard part of virtualized environments and how IBM products and services will help organizations move their virtualized workloads into the cloud. Did they succeed? In my view, the answer is "partially."

IBM presented only part of its large portfolio of virtualization technology. Virtual machine software, one of five types of technology in the virtual processing layer, storage virtualization and management for virtualized environments were clearly the focus of this event. Virtual access, application virtualization and network virtualization were not discussed at all. Security for virtual environments was only mentioned in passing.

IBM successfully demonstrated its Systems Director and portions of its Tivoli Management products and showed how companies could create, provision, monitor and manage virtual servers and virtual storage. It then went on to show how easy it was to move those resources around and into its own CloudBurst offerings. Although it is easy to see how those capabilities would play in an Amazon, RackSpace or other service provider environment, those were not actually shown.

IBM discussed the benefits of storage virtualization, how its System Director and Tivoli products could manage storage servers offered by many suppliers and discussed the benefits companies would receive by deploying this type of technology whenever they were moving workloads into virtual servers. IBM was more successful making its case here than in other areas.

IBM's discussion of its CloudBurst family of preconfigured cloud solutions was particularly interesting. It is clear, however, that these products are a work in process rather than completely finished. They hold out a strong promise for the future, but are not fully realized today.

IBM demonstrated an impressive set of products and technologies. It also showed that it has given virtualized environments and cloud computing a great deal of thought. I was very impressed by the capabilities offered by IBM's System Director and how well it integrates into the Tivoli management environment, but, in the end, was left wanting more. It appears that IBM's System Technology Group has taken advice from Phineas T. Barnum: always leave the audience wanting more.

With that in mind, I look forward to the opportunity to speak with IBM's executives and Distinguished Engineers again.