

The “New” Virtualization



- Historically the term meant:
 - Creating a system within a system
 - Partitioning hardware into multiple virtual machines
 - Simulating one operating system or application within another system
- Today virtualization is:
 - A broad term that refers to the abstraction of computer resources. This allows you to
 - Merge analogous system resources into carefully designed resource groups
 - Separate processes and services across multiple systems
 - Ramp these up or down as demand dictates

Platform Virtualization / Resource Virtualization

Virtualization Examples



■ Storage

- Logical volume management tools can combine multiple disks across a network into one large logical disk.

■ Network bandwidth

- Technologies such as a redundant array of independent network (RAIN) interfaces can merge several network access points
- This allows them to function (when needed) as a single, higher-bandwidth link

■ Applications

- Hiding of technical detail, through encapsulation
- Java Virtual machine, Smalltalk

■ Scalable server partitions

- RAID volumes
- SANS

■ Threaded processing

- Execute on any available processor

Virtualization Vs. Distributed Processing

- Resource virtualization is very application- and process-focused

While...

- Distributed systems usually throw raw processing power at a specific application in order to speed it up
 - Such systems usually don't provide a shared application resource environment or directory and component interactions or on-demand services
- Today's resource virtualization drives the ability to consolidate systems and reduce total cost of software ownership. (It's more than just processing power.)

The Larger Virtualization Trends

- Tying together different programs and data sources over a network
- Using component services to construct entirely new applications
- New services can be added in a way that allows any application to take advantage of that service.
- Government offices often start with
 - Financial,
 - Human resource
 - Supply chain management
- Almost any process can be virtualized

Virtualization Spending: Five-year Trend



Total U.S. Federal IT Budget vs. New Development & Modernization

	2005	2006	2007	2008	2009	2010	CAGR
Total Federal IT	62,232.6	63,536.6	63,852.7	64,827.4	65,637.5	66,447.5	1.3%
New Dev & Mod	21,214.9	21,088.2	20,739.9	20,539.3	20,301.8	20,064.3	-1.1%
Percent	34.1%	33.2%	32.5%	31.7%	30.9%	30.2%	

New Development vs. Engineering Toward Virtualization

	2005	2006	2007	2008	2009	2010	CAGR
New Dev & Mod	21,214.9	21,088.2	20,739.9	20,539.3	20,301.8	20,064.3	-1.1%
Virt. Efforts	2,675.9	3,009.7	3,098.8	3,351.0	3,562.5	3,773.9	7.1%
Percent	12.6%	14.3%	14.9%	16.3%	17.5%	18.8%	

Virtualization Spending by Technology

Hardware, Software & IT Services Portion - Virtualization Spending

	2005	2006	2007	2008	2009	2010	CAGR
HW	583.7	670.5	687.6	740.7	774.7	795.3	6.4%
SW	420.7	469.2	490.5	544.5	599.3	662.2	9.5%
IT Serv	1,671.5	1,870.1	1,920.6	2,065.8	2,188.5	2,316.4	6.7%
Total	2,675.9	3,009.7	3,098.8	3,351.0	3,562.5	3,773.9	7.1%



The Big Challenges

- Quality of service
- System response times
- Engineers who are capable of realistic planning to offset the two challenges above
 - Should be able to develop a map of how and when resources are needed
 - Arranging for adequate processing power
- Taking a componentized approach can actually speed services in many circumstances because the burden of executing tasks doesn't fall on a single machine – but the system design must be correct



Other Challenges



- Business objectives of both the government agency and its IT department must be clearly defined
- Systems must be construction in a way that allows for a virtualized and expandable solution.
- Agencies must be able to dedicate enough funding to start a true virtualization effort
 - Many IT budgets are mainly targeted at keeping existing systems running
- Good first step: Establish a plan that allows you to approach virtualization in a series of steps expanding services and eventually processing power as you go

Next Steps

- Create pools of similar resources such as servers, storage devices possibly databases -- work to virtualize them across available machines.
- Then start virtualizing resources at the application level. This may mean calling data and services from different locations, but managing the data as a single entity.
- Next, start virtualization efforts across the whole enterprise. It's not about creating islands of virtualization, but rather re-architecting the .whole IT infrastructure."
- At some point virtualized resources can be offered externally, as a way of sharing data, processing power and services with other entities, be they other government agencies or commercial partners



Once the Virtualization Effort is Underway – Start Promoting On-demand Services

- Identify all services which exist on your network. Make sure you understand exactly what they do and how they may be of use to additional users
- Write adapters to wrap these services in a way that they can be located, called and used by other applications. Multiple services should be made available in a uniform way
- Install a common communications policy, so all systems and components can interact with each another
- Establish a registry so programmers can identify applications and use them.
- Consider building a business rules engine that can run a composite application when called by a user

Questions? Comments?



Shawn McCarthy
smccarthy@government-insights.com