Virtualization Strategy and Technology Webinar

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Introduction: Who is TrueFit?

- Founded in 1997
- IT consulting and technology firm
- Consult, design, deploy, monitor, and support networks
- Provide custom development and web solutions
- Provide Project and Portfolio Management Solutions based on @Task

Introduction: Who Am I?

- Network Services Manager
- Chief Network Architect
- With TrueFit Solutions since 1998
- 18 years of industry experience in an engineering and consultative role

Goals

- Gain an understanding of virtualization benefits and technologies
- Explore some of the industry-leading virtualization products
- Begin to formulate a roadmap for applying virtualization technology in my organization

Session Overview

- Technology brief
  - Definition and types of virtualization
- Benefits (Why virtualize?)
- Leading Technologies
- Choosing a virtualization technology (What is the right product or product mix for my organization?)
- Developing a virtualization roadmap

- What is virtualization?
  - A broad term that refers to the abstraction of computing resources (not a new concept)
  - There are many types of virtualization
  - We are going to discuss:
    - Server Virtualization: Running multiple servers virtually on a single physical server (also called Platform Virtualization)
    - Application Virtualization: Running applications in virtual environments transparent to the end user

Types of Virtualization

- Server Virtualization
  - Key concept: Hypervisor or Hypervisor Layer
  - Hypervisor: Software that allows multiple operating systems to run on a host system concurrently (also referred to as a Virtual Machine Monitor, VMM)
    - Bare-Metal: Runs directly on server hardware (also referred to as Native)
      - VMware ESX and ESXi, Citrix XenServer
    - Hosted: Runs within a conventional operating system environment
      - Microsoft Hyper-V (and previously Virtual Server), VMware Server

Types of Virtualization

- Application Virtualization
  - Software technologies that improve portability, manageability and compatibility of applications by encapsulating them from the underlying operating system on which they are executed
  - The application believes that it is directly interfacing with the host operating system and all the resources managed by it, when in reality it is not
    - Microsoft App-V, Citrix XenApp

Benefits

- Why virtualize?
  - Server Virtualization
    - Improve utilization via consolidation (deploy fewer servers and utilize them more effectively)
    - Lower operational costs
    - Increase availability
      - Building block for business continuity
    - Increase responsiveness
      - Rapid provisioning of services

Benefits

- Why virtualize?
  - Application Virtualization
    - Rapid deployment (no visiting desktops)
    - Increase mobility
      - Application delivery via Internet
    - Centralized management
    - Eliminate software conflicts as each application exists in it's own 'virtual bubble'
    - Building block for business continuity
      - With minimal or no locally-installed applications, replace user PCs without time-consuming application re-installation

Virtualization Technology

- Microsoft Solutions
  - Hyper-V
  - System Center Virtual Machine Manager
  - App-V
  - App-V for Terminal Services

Virtualization Technology

- Hyper-V
  - Server virtualization (hosted)
  - Built in to Windows Server 2008 64-Bit
    - Also available as dedicated Hyper-V Server
  - Hardware-assisted virtualization for high performance
    - CPU VMM extensions
    - Data execution prevention (no execute bit)
    - Hardware must be VMM-capable (most servers today are)
  - Licensing model
    - Microsoft has updated their server licensing model to reflect popular usage of virtualization
    - Windows Server 2008 versions include licenses for additional virtual servers

Virtualization Technology

- Hyper-V: Key Features
  - 64-bit microkernel hypervisor
  - Supports 32-bit and 64-bit guests, including Linux
  - SMP support for VMs (up to 4)
  - Network Load Balancing (NLB) support for VMs
  - Virtual machine snapshot (using VSS)

Virtualization Technology

- Microsoft System Center Virtual Machine Manager
  - Management platform for Hyper-V (also supports VMware ESX and Microsoft Virtual Server)
  - Physical to Virtual conversion
  - Convert VMware VMs to Hyper-V format
  - PRO and Intelligent placement (requires Operations Manager)

Virtualization Technology

- App-V
  - Application virtualization
  - Runs on Windows Server 2008
- App-V: Key Features
  - Enable applications to run without the need to visit a desktop, laptop, or terminal server
  - Dynamic Streaming Delivery: Applications delivered rapidly
    - Typical 20% of application code is required for launch – remainder is streamed in the background, on-demand, transparently
  - Policy-based management via App-V console
  - Side-by-side virtualization
  - Over-the-Internet application delivery
  - Application roaming
  - Offline capability
  - Low-bandwidth support via App-V for Terminal Services

Virtualization Technology

- App-V for Terminal Services
  - Solves common TS issues with server siloing (deploying separate servers for different applications due to software conflicts)
  - Ideal for low-bandwidth scenarios
  - Users can run applications via TS, even though the applications are virtualized using App-V
  - Increase utilization of TS servers, and reduce the size of TS server farm

Virtualization Technology

- VMware Solutions
  - VMware Server
  - VMware Infrastructure (ESX)
  - VMware ESXi
  - VMware vShpere

Virtualization Technology

- VMware Server
  - Server virtualization (hosted)
  - Free product (optional to purchase support)
  - Runs on Windows or Linux host (32-bit / 64-bit)
- VMware Server: Key Features
  - Multi-OS support with same virtual hard disk format (VMs can be migrated between Windows and Linux hosts)
  - VMware Converter: free tool for P2V conversion
  - Managed via VMware Management Console

Virtualization Technology

- VMware Infrastructure (ESX)
  - Server virtualization (bare-metal)
- Vmware Infrastructure: Key Features
  - Dynamic Load Balancing
  - SAN support
  - Live migration of VMs from host to host
  - Consolidated backup
  - 4-way SMP support / 64 GB RAM for each VM

Virtualization Technology

- VMware ESXi
  - Server virtualization (bare-metal)
  - Free product (optional to purchase support)
- VMware ESXi: Key Features
  - 64-bit hypervisor architecture
  - SAN support
  - Stripped-down version of VMware Infrastructure for free

Virtualization Technology

- VMware vShpere
  - Q2 2009 availability
  - Cloud operating system
    - Specifically designed to holistically manage large collections of infrastructure – CPUs, storage, networking – as a seamless, flexible and dynamic operating environment
  - Essentially a suite of VMware products wrapped around management tools
  - Turn your hardware into a single computing pool

Choosing a Virtualization Technology

- Determine if virtualization is appropriate
  - Focus on specific servers and applications
    - Compatibility issues
    - Support issues (will the vendor support their product in a virtual environment)
  - Licensing benefits
    - Microsoft Windows Server 2008, for example
  - Business benefits
    - Can my organization reap the benefits of virtualization?

Choosing a Virtualization Technology

- What are our highest pain points?
  - More servers than we need, underutilized, pain to manage it all, and current plans call for even more servers
  - No idea what would happen if a server failed: how long would we be down, do we have the tools needed to rebuild it, how would we find replacement hardware, etc. (business continuity)
  - Users complain that applications are not available enough
  - When a PC fails the user is down for a whole day or more while it gets rebuilt from scratch
  - Etc., etc., etc.

Choosing a Virtualization Technology

- Analyze your existing environment
  - Operating system
    - What network operating systems are deployed?
      - Windows, Linux, UNIX, NetWare, other
    - What desktop operating systems are deployed?
      - Windows, MacOS, Linux, other
  - Server hardware
    - Speed and power
    - Warranty status
    - Number of servers
  - Applications
    - What environment do our key applications run in?

Choosing a Virtualization Technology

- Now that you've identified your pain points, examine the benefits and look at mid-to-long term ROI
- Based on those factors, what is the appropriate technology mix?
  - Server virtualization
  - Application virtualization
  - All of the above

Choosing a Virtualization Technology

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Choosing a Virtualization Technology

- Based on your current environment and the types of virtualization you have selected as best fit, choose the appropriate products and platform
- Capacity planning
  - Example 1: We have all Windows-based servers and will implement server virtualization: Hyper-V, VMware Server, and VMware ESX or ESXi are all viable options
    - We have 10 total servers currently
    - The OS upgrade path for our organization is to Windows Server 2008
    - Hyper-V is an excellent choice because it will provide cost savings on server licensing
    - We can run all 10 servers on 2-3 physical servers
    - We will begin building business continuity and optimize our utilization by implementing Microsoft System Center Virtual Machine Manager

Virtualization Roadmap

- How will our organization begin to implement virtualization effectively?
  - First step is selecting the right technology
  - A detailed plan is required for success
    - What servers will be virtualized, and in what order/timeframe?
    - What new hardware will be required?
      - Storage capacity and technology (internal/external RAID, Fibre-channel, drive types, etc.)
      - CPU speed and cores
      - Physical memory (RAM)
    - How will virtualization impact backup and disaster recovery?

Conclusion

- 40% of organizations deploy virtualization
- Server and application virtualization can have a positive impact on your organization in a number of areas…
  - Operating costs
  - Availability (uptime)
  - Business continuity
  - Application mobility
  - Application availability
- …BUT, careful planning is required to implement effectively.