MICROSOFT HYPER - V NETWORK VIRTUALIZATION

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ABSTRACT - *To bring greater operational efficiencies and reduce costs in deploying and managing corporate-wide IT infrastructure, Microsoft has been delivering against an end-to-end virtualization strategy, over the past few years. **Microsoft's strategy spans** presentation[13], application, network, desktop, storage, and server virtualization. System Center Virtual Machine Manager (VMM) and Hyper-V are foundation components **of Microsoft's virtualization solutions. This Focus profile** describes VMM and Microsoft Hyper-V[1]. It discusses **Microsoft's server** history of virtualization, the origins of the Microsoft server virtual technologies and solutions, and the architecture of those solutions. It describes differentiators and technical features as well as solution limitations and strengths that conclude with a Focus analysis of Microsoft Hyper-V and VMM.*

Key Words: Hyper V, VMM, end to end etc…

1. INTRODUCTION AND SCOPE

When planning a virtualization deployment, customers are faced with many choices. Depending on requirements and workload, storage, Server, and software configurations can be vary. Architectures are three main categories: Small, Medium, and Large. These categories are based on the features and capacity of each product, as well as the complexity[6] of the overall architecture.

- Small–Focuses on providing basic functionality with minimal hardware and designed with simplicity in mind and. advanced virtualization features are not enabled.
- Medium– By providing economical Storage Area Network (SAN) solutions, business continuity options and enhanced virtualization features are designed to meet the production requirements of small and medium businesses.
- Large– A full-featured virtualization solution supporting high availability (HA), 1-to-many management, storage products and enterprise-class server.

2. HYPER-V - ARCHITECTURE

Hyper-V for Microsoft Windows Server 2008 provides the underlying virtualization capabilities within a server using bare-metal hypervisor architecture, as shown in Figure 1.

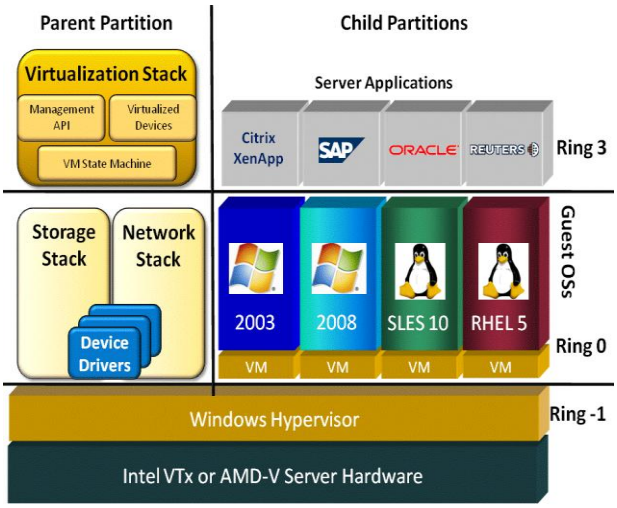

Fig - 1: Architecture for Hyper-V

Figure 1showing, all areas with gold/yellow shading is pieces of Windows Server 2008 specific to Hyper-V. Using Windows Server 2008 new architecture, it is possible to install the windows[5] Core Server with a specific personality, loading only code related to that personality/function. This avoids installing extra code, not directly applicable to that personality, higher-performing. and making the Core Server smaller. Core Server configured with the virtualization personality will load the Hyper-V components, while minimizing the overall code loaded, increasing both performance and security (by minimizing the attach surface). The Hyper-V architecture is based on a parent partition and child partitions. The parent partition manages virtual machines within the child partitions and has all the services needed to launch. At the lowest level, to scheduling and memory management, minimizing the code and the attack surface of the parent partition is the reason for choosing this architecture is to reduce the functionality in the Windows Hypervisor[9]. Including increased security,

the ability to use standard Windows device drivers and increased performance are the many advantages.

2.1 Hyper-V Network Virtualization benefits include:

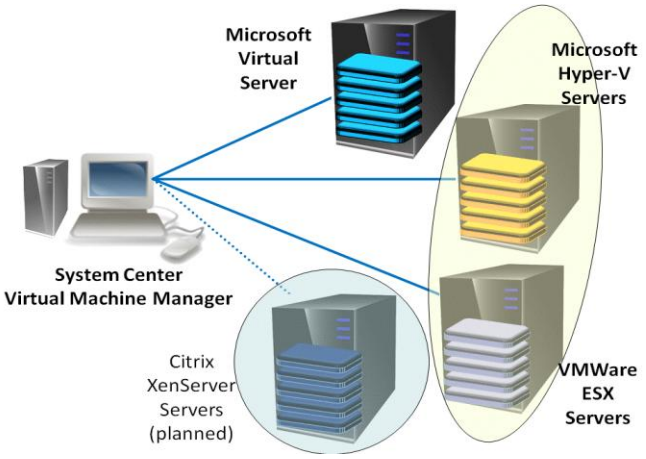

Fig - 2: VMM with Hyper-V

• Minimum reconfiguration or effect on isolation for tenant network migration to the cloud, while they move workloads onto shared IaaS clouds, minimizing the configuration changes needed for IP addresses, DNS names, security policies, and virtual machine configurations. Customers can keep their internal IP addresses anywhere in the data center for tenant virtual machine deployment. While keeping their IP addresses, without being limited to physical IP subnet hierarchy or VLAN configurations, services and workloads can be placed or migrated to any server in the data center.
• Improved server/network resource use and Simplified network. The rigidity of VLANs[8] and dependency of virtual machine placement on physical network infrastructure result in over provisioning and underuse.
• To achieve maximum performance, no new hardware (servers, switches, appliances), network Virtualization of Hyper-V, can be deployed in today's data center, and yet is compatible with emerging data center "flat network" technologies, such as Transparent Interconnection of Lots of Links (TRILL, an IETF standard) architecture intended to expand Ethernet topologies.
• Full management through Windows Power Shell and WMI. IT can use Windows Power Shell[11] to automate administrative tasks and easily script.

3. TECHNICAL FEATURES

Technical features of the Virtual Machine Manager and Hyper-V are summarized below.

Hyper-V

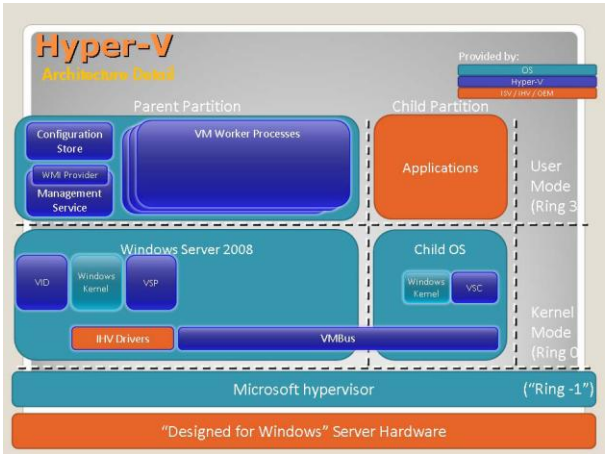

Fig - 3: Architectural Diagram for Microsoft Hyper-V

Following are the Hyper-V's features include, but are not limited:

- 64-bit Hypervisor – The 64-bit Hypervisor has simultaneous support for applications which run on 32-bit and 64-bit operating systems.
- Broad guest OS support – Guest OS support includes Windows 2003, 2008, XP, and Vista, with support for SLES and RHEL in a future release.
- Virtual Hard Disk image[13] format – Hyper-V uses the Virtual Hard Disk (VHD) image format, which is used by Xen-based and Microsoft virtualization solutions.
- Small footprint – Windows Hypervisor is very fast and very small (only 650 KB).
- Standard hardware drivers – With this architecture, standard hardware and drivers are used for simple plug-in of devices and easy implementation.

4. CONCLUSION

Server virtualization is very much a standard in today's organizations, and Hyper-V offers a rock-solid and feature-rich platform for use in organizations of any size. Technologies like Dynamic[12] Memory enable the creation of high-density virtual machine server environments, and dynamic placement technologies can help rebalance virtual machines that may not have been optimally placed. However, any successful virtualization migration first requires the discovery
of resource usage and proper planning to ensure the long-term stability of the Hyper-V environment.

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BIOGRAPHIES

ARABOLU CHANDRA SEKHAR was born in Nandyal Town, India, in 1973. He received the M.Sc. degree in Information Technology (IT) from the Kuvempu University, Shimoga, India in 2008, MBA degree in Marketing from Alagappa University, Karaikudi, India in 2008, M.Sc. degree in Psychology from Karnataka State Open University, Chennai, India in 2013 and PG Diploma in Telecommunication from Periyar University, Salem. Now he is pursuing PhD Degree in Computer Science (Cloud Computing) from the Bharathiar University, Coimbatore, India.

He is having total 15 + years of experience in Software Development in Telecommunication and Application Development domain with Microsoft Technologies. Presently working in Tech Mahindra Ltd, Bangalore as Technical Architect. He worked on IVR (Dialogic API) technologies, VOIP, Mobile technologies and Image Processing Tools. He is expertise and having good experience in C, C++, VC++ and COM, C#.Net, ASP.Net, WCF, WPF, Silverlight, AJAX, jQuery, Cloud Computing Technologies such as MS Azure, Amazon Web Services, and Hadoop for Big Data, as well as expertise in OOAD, Design Patterns and UML with Rational Rose.

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He is having 13 years of teaching experience, presently he is working as a professor of Computer Science and Engineering department for G.Pulla Reddy Engineering College (Autonomous), Kurnool City, India. He has a total of 25 publications out of which 13 papers in International and National Journals and 12 papers in National and International Conferences. He is a member of various professional bodies like ISTE, IE, CSI, IAENG, CSTA, and IACSIT.

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