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Enhancing Productivity with Windows Server 2012 R2: Real-World Applications and Case Studies

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Abstract

The development of Windows Server 2012 R2 marked a significant milestone for Microsoft's server operating system. Major aim to provide organizations of all sizes with a server operating system that meets their needs. It introduced several new features and functionalities, including improved integration with cloud services, virtualization, management, security, storage, and networking. To create a cloud-ready server operating system, Windows Server 2012 R2 introduced features that enabled organizations to create and manage hybrid cloud environments that integrated with public cloud services such as Microsoft Azure. It focused on improving virtualization by introducing support for live migration and virtual storage, which helped organizations consolidate servers, reduce costs, and improve efficiency.

Also included several management features such as Server Manager and PowerShell 4.0, which streamlined management tasks for IT professionals and improved efficiency. Additionally, Windows Server 2012 R2 provided several security improvements, including Dynamic Access Control for improved access control and enhanced protection against malware through Windows Defender.

Keywords: SCW, MSF

I. Introduction

Windows Server 2012 R2 is an operating system specifically designed for server deployment, offering a broad range of features and functionalities that cater to enterprise-level applications and services. Despite its robust capabilities, the software may experience several issues that could potentially impact its performance and stability. These issues include hardware and software compatibility problems, security vulnerabilities, system slowdowns, unexpected shutdowns, installation and configuration difficulties, network connectivity issues, application and service crashes or errors, disk and storage problems, backup and recovery challenges, and Active Directory and domain-related complications.

The Windows Server 2012 R2 datasheet, which was released on May 31, 2013, highlights four editions of the operating system: Foundation, Essentials, Standard, and Datacenter. The Datacenter and Standard editions are feature-identical, with the only variation being in licensing (particularly in virtual instances). Meanwhile, the Essentials edition shares the same features as the Datacenter and Standard products, albeit with some restrictions.

II. Related Study

In Information Technology field, Windows Server has been a go-to choice for organizations of all sizes for decades. It has been a cornerstone of IT infrastructure for small businesses as well as large global enterprises. Regardless of your area of expertise in IT, it is highly likely that you have had some experience with Windows Server at some point in your career. Windows Server 2012 is the sixth edition of the Windows Server series and is the server version of Windows 8. It superseded Windows Server 2008 R2, bringing several improvements and new features to the table.

One of the significant differences between Windows Server 2012 and its predecessors is that it does not support Itanium-based computers. The 2012 edition of Windows Server comes in four different

editions, including Foundation, Essentials, Standard, and Datacenter. With a focus on cloud computing, several new features and improvements were introduced in this edition, including an updated version of Hyper-V, an IP address management role, Graphical User Interface, a new version of Windows Task Manager, and ReFS, a new resilient file system designed to address specific enterprise storage needs.

Despite the inclusion of the same controversial Metro-based user interface seen in Windows 8, Windows Server 2012 received generally positive reviews. The new features and improvements, especially those geared towards cloud computing, helped organizations leverage the full potential of the technology.

If you're planning to introduce Windows Server 2012 to your environment, you need to prepare yourself and your team adequately. You can start by learning more about the new features and improvements that come with this edition. Developing a roadmap and strategy to integrate the technology into your existing infrastructure is also critical to ensure that you take full advantage of the benefits that come with Windows Server 2012.

It will provide you with a comprehensive guide on how to secure a server by implementing proper planning and security measures. It is important to be meticulous when considering server hardening because failing to do so can cause the role or feature to break, rendering it unsupported. Fortunately, Windows Server 2012 offers a built-in Security Configuration Wizard that simplifies this process and ensures that your server is properly secured. It also includes an overview of the Server Manager, which is a powerful tool for managing server roles and features, and step-by-step instructions on how to install them in Windows Server 2012. In addition to these features, you will also learn about best practices for securing servers, including disabling unnecessary services, using firewalls, and configuring access control lists. By implementing these measures, you can protect your server from unauthorized access and ensure that it functions optimally.

Existing Approaches

Windows Server 2012 R2 has several built-in security features to ensure the safety and integrity of your server. Some of the existing approaches include:

Security Configuration Wizard (SCW): The SCW is a built-in tool that allows you to create security policies for your server based on predefined templates. These policies can be applied to specific server roles or features, and they help to ensure that your server is securely configured.

BitLocker Drive Encryption: BitLocker is a data encryption feature that provides full disk encryption to protect your server against data theft and unauthorized access. It uses a hardware-based encryption mechanism to ensure the security of your data.

AppLocker: AppLocker is a security feature that allows you to control which applications can run on your server. It uses a set of rules that can be applied to users or groups, and it helps to prevent the execution of unauthorized software.

Windows Firewall: The Windows Firewall is a network security feature that controls incoming and outgoing traffic on your server. It can be configured to block or allow specific traffic based on predefined rules.

Group Policy: Group Policy is a powerful tool that allows you to configure settings for multiple users and computers in your network. It can be used to enforce security policies, manage user access, and control system settings.

III. Improvements

Windows Server 2012 brought significant improvements to the world of enterprise computing. One of the most notable changes was its ability to integrate with cloud systems while still maintaining classic features of local data centers. This integration was made possible through the addition of Hyper-V Virtualization with new features like Hyper-V replicas that allowed users to create virtual machine replications between clusters and storage systems.

Moreover, with the introduction of Storage migration, virtual disks can now be moved to different physical storages with ease. Virtual machine snapshots are now also possible, and virtual machines can be deleted from the Hyper-V and virtual disks without the need to shut down the virtual machine. This feature enhances the flexibility of the system, making it more adaptable to users' needs.

Another significant improvement was the Core Server Installation, which can now be easily switched to GUI installation without the need for reinstallation. The file server and storage service improvement eliminated identical copies in the same volumes and saves space. Additionally, the Storage pools and storage spaces feature allows users to group hard disks into one or more storage pools and create virtual disks. Users can add other disks to the storage pools and make them available without impacting users.

Another exciting addition to Windows Server 2012 is the iSCSI Target Server, which offers block storage to other servers and applications on the network using the iSCSI standard. This feature has significantly simplified storage management for enterprises. Lastly, the Active Directory cloning feature can deploy additional domain controllers by cloning an existing virtual domain controller, which makes deployment faster and more efficient.

IV. System Methodology

The system methodology for Windows Server 2012 R2 is based on the Microsoft Solutions Framework (MSF), which is a comprehensive and flexible framework for delivering IT projects. MSF provides a set of best practices, principles, and models for planning, designing, implementing, and managing IT projects, including Windows Server 2012 R2 deployments. The MSF methodology for Windows Server 2012 R2 includes several phases, including:

Envisioning: In this phase, the project team defines the goals, objectives, and scope of the Windows Server 2012 R2 deployment. They also identify the key stakeholders, risks, and constraints that may affect the project.

Planning: In this phase, the project team develops a detailed project plan, including timelines, budgets, and resources. They also define the technical requirements for the Windows Server 2012 R2 deployment, including hardware, software, and network infrastructure.

Developing: In this phase, the project team installs, configures, and tests the Windows Server 2012 R2 environment. They also develop custom scripts, policies, and procedures to meet the project requirements.

Stabilizing: In this phase, the project team optimizes the performance and stability of the Windows Server 2012 R2 environment. They also conduct user acceptance testing and training to ensure that end-users can effectively use the system.

Deploying: In this phase, the project team deploys the Windows Server 2012 R2 environment to production. They also conduct post-deployment testing and monitoring to ensure that the system is functioning as expected.

Closing: In this phase, the project team completes all project-related activities, including documentation, handover, and transition to operations.

Specifications	Foundation	Essentials	Standard	Datacenter
Distribution	OEM only	Retail, volume licensing, OEM		Volume licensing and OEM
Licensing model	Per server		Per CPUpair + CAL	
Processor chip limit	1	2	64	
Memory limit	32 GB	64 GB	4 TB	
User limit	15	25	Unlimited	
File sharing limits	1 standalone DFS root	1 standalone DFS root	Unlimited	
Network Policy and Access Services limits	50 RRAS connections and 10 IAS connections	250 RRAS connections, 50 IAS connections, and 2 IAS Server Groups	Unlimited	
Remote Desktop Services limits	50 Remote Desktop Services connections	Gateway only	Unlimited	
Virtualization rights	N/A	Either in 1 VM or 1 physical server, but not both at once	2 VMs	Unlimited
Active Directory Certificate Services	Certificate Authorities only	Certificate Authorities only	Yes	
Hyper-V	No	No	Yes	
Server Core mode	No	No	Yes	
Windows Server Update Services	No	No	Yes	

Table 4.1 – Different types of Sever Editions

V. Conclusion and Research Scope

The installation and configuration of Windows Server 2012 is a complex process that requires technical knowledge and experience. However, with proper guidance and practice, anyone can become proficient in setting up the various services needed to manage a network effectively.

The research scope of Windows Server 2012 installation and configuration can be extensive, ranging from basic installation and configuration to more advanced topics such as virtualization, cloud computing, and network security. It is essential to keep up with the latest advancements in technology and stay informed about updates and patches released by Microsoft to ensure a stable and secure network environment.

Future research in this area can focus on exploring the latest features and functionalities of Windows Server 2012 and their applications in different scenarios. Additionally, research can be conducted to identify and mitigate security risks and vulnerabilities in Windows Server 2012 installations, such as ensuring proper access control, network segmentation, and secure authentication protocols. Overall, the installation and configuration of Windows Server 2012 is a vast field with endless possibilities for research and exploration, and there is always room for improvement and innovation.

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