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Veeam Backup and Replication 9.5 with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x — Phase 3

Lab Validation Report

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April 2017

Feedback

Hitachi Data Systems welcomes your feedback. Please share your thoughts by sending an email message to SolutionLab@hds.com. To assist the routing of this message, use the paper number in the subject and the title of this white paper in the text.

Revision History

Revision	Changes	Date
AS-593-00	Initial release	April 24, 2017
AS-593-01	Correct document numbering in all places	April 27, 2017

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Veeam Backup and Replication 9.5 with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x — Phase 3

Lab Validation Report

Use this lab validation report to find out the results of the add-on test of Veeam Backup and Replication 9.5.0.823 when used with Hitachi Data Ingestor v6.1.x (HDI) and Hitachi Content Platform v7.2.x (HCP). The tests covered the following topics, which are important for your data protection and recovery:

- Veeam 9.5.0.823 backup (full and synthetic) to Data Ingestor
- Veeam backup files migration to Content Platform, converting them to stub files
- A full restoration of the stubbed files from Content Platform to Data Ingestor to Veeam.

The test captured baseline on throughput and total run time of each data backup and recovery operation.

Testing showed that the following backup and recovery scenarios work without any issues:

- Veeam Backup and Replication 9.5 with Hitachi Data Ingestor v6.1, using NFS and CIFS for backup operations (full and synthetic), stubbed and migrated files to Hitachi Content Platform
- Veeam Backup and Replication 9.5 with Hitachi Data Ingestor v6.1 for restore operations (full and synthetic), migrated files from Content Platform back to Veeam,

Note — Testing of this configuration was in a lab environment. Many things affect production environments beyond prediction or duplication in a lab environment. Follow the recommended practice of conducting proof-of-concept testing for acceptable results in a non-production, isolated test environment that otherwise matches your production environment before your production implementation of this solution.

Product Features

This lab validation report covered testing these products.

Hitachi Content Platform

Hitachi Content Platform (HCP) provides distributed object storage for advanced unstructured data storage management. This helps you address challenges of ever-growing volumes of unstructured file storage. Divide a single Content Platform into multiple virtual object stores, secure access to each store, and uniquely configure each store for a particular workload.

Eliminate storage silos using Content Platform with a single object storage infrastructure that supports a wide range of data types, applications, and users with different service level needs in enterprise and cloud environments.

Hitachi Content Platform enables archiving of fixed content in a manner that does the following:

- Ensures content integrity, authenticity, security, completeness and accessibility over the long term, in accordance with relevant laws and regulations
- Offers fast, online access to content
- Allows integrated searching and indexing of the archive, including search of file contents
- Supports business continuity, data recovery, compliance search and retention needs
- Scales horizontally to support multiple applications and content types; and vertically to support continued data growth

Hitachi Data Ingestor

Hitachi Data Ingestor (HDI) is an elastic-scale, backup-free cloud file server with advanced storage and data management capabilities. With this solution, you can greatly reduce the cost and complexity of providing IT services to geographically dispersed locations or cloud consumers.

Data Ingestor includes the following features:

- Provides CIFS and NFS read/write access to a local or remote Hitachi Content Platform systems
- Migrates data to Content Platform, maintaining a local link to the content
- Supports Microsoft® Active Directory® and LDAP authentication
- Supports Content Platform tenant and namespace features over CIFS and NFS

Veeam Backup & Replication

Veeam Backup & Replication is a powerful, easy-to-use, and affordable backup and availability solution. It provides fast, flexible and reliable recovery of virtualized applications and data, bringing virtual machine backup and replication together in a single software solution. Veeam Backup & Replication delivers award-winning support for VMware vSphere and Microsoft® Hyper-V® virtual environments.

It provides fast and reliable image-based backup for vSphere and Hyper-V virtual environments — all without the use of agents. This gives you the ability to achieve shorter backup windows and reduce backup and storage costs.

Restore entire virtual machines in minutes with Instant VM Recovery by Veeam Backup & Recovery. Run any virtualized application on VMware vSphere or Microsoft Hyper-V directly from the latest backup, instead of making users wait while you provision storage, extract the backup, and copy it to production. After restoration, you can use VMware Storage vMotion, Hyper-V Live Migration or Veeam's proprietary Quick Migration to move virtual machines back to production storage.

These key capabilities enable an always-on business:

- **High-Speed Recovery**

  Rapid recovery of what you want, the way you want it. Veeam Availability Suite helps you quickly recover the data you need to enable an RTOS of less than 15 minutes with tools like the following, and more:

  - Instant VM Recovery
  - Veeam Explorer for Microsoft Exchange
  - Microsoft Active Directory
  - Microsoft SharePoint®
  - Microsoft SQL Server®
  - Veeam Explorer for Oracle

- **Verified Recoverability**

  There is guaranteed recovery of every file, application, or virtual server, every time. With Veeam SureBackup and Veeam SureReplica, you can be certain your files, applications, and virtual servers can be reliably restored when needed. You can ensure business resiliency through automated backup and disaster recovery (DR) testing.

- **Leveraged Data**

  Use backup data and storage snapshots to create an exact copy of your production environment. Enjoy low-risk deployment with Virtual Lab, allowing you to test changes in a production-like environment before actually deploying them.

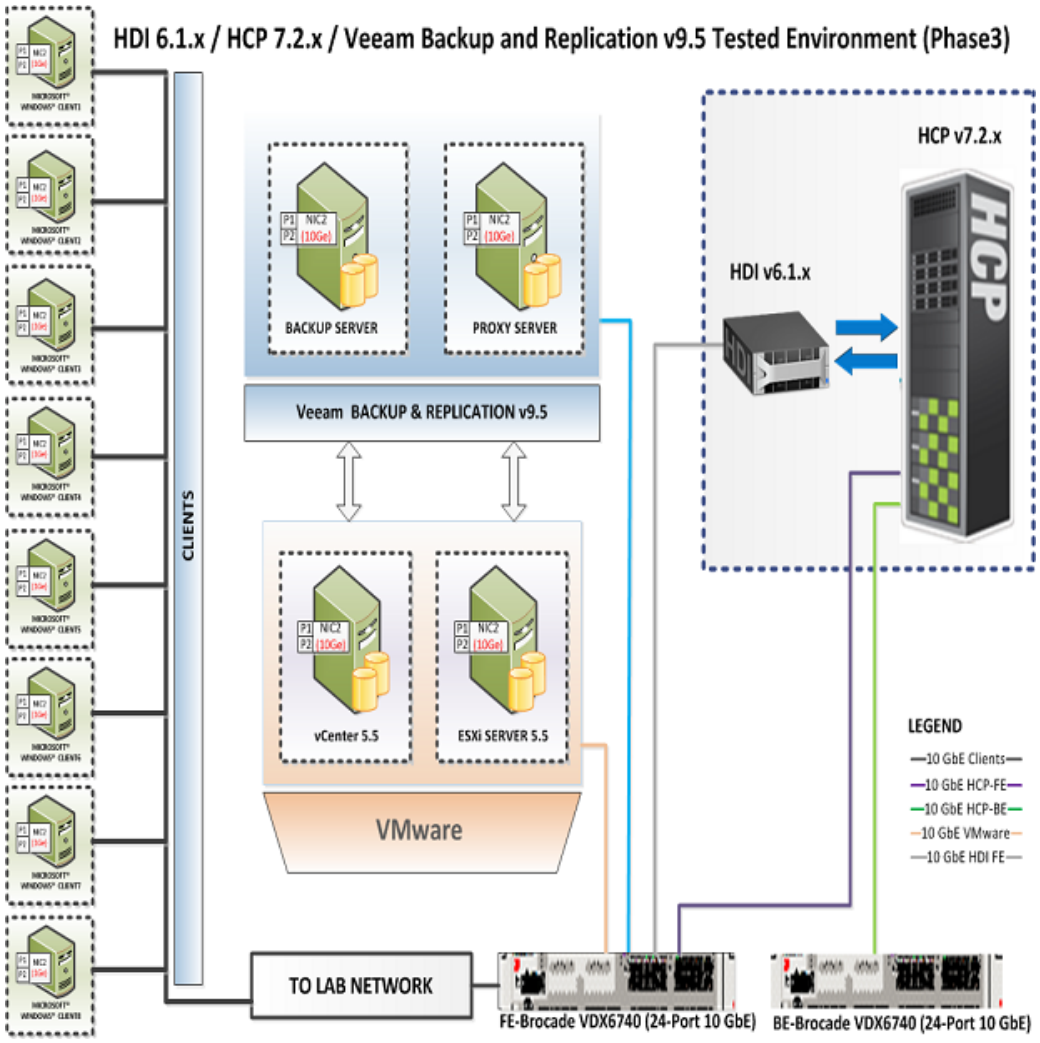
- **Proactive monitoring and alerting of issues before operational impact**

  Veeam Availability Suite provides monitoring and alerting tools so that you can discover, and be alerted of, issues in your IT environment before they have a significant impact that gives you complete visibility of your Veeam backup, VMware vSphere, and Microsoft Hyper-V infrastructures.

Test Environment Configuration

Figure 1 shows the test environment for Veeam Backup & Replication 9.5 with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x.

Figure 1



Hardware Components

This is the hardware used to test Veeam Backup and Replication 9.5 with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x in the laboratory.

- VMware ESX 5.5 Server on rack optimized server for solutions, 2U single node.
  - Intel Xeon E5-2680 v3 processor @ 2.50 GHz with 24 CPUs × 2.494 GHz
  - 256 GB RAM
- Veeam Backup and Replication Server 9.5 on Hitachi HA8000 server Model 4 (1 Unit) (from Hitachi, Ltd.)
  - 1 (Quad) Intel Xeon E5620 processor @ 2.4 GHz
  - 8 GB RAM
  - 6 × 500 GB HDD
- Veeam Backup and Replication Proxy Server 9.5 on Dell R710 Server (1 Unit)
  - 2 Intel 4-core Xeon E5620 processor @ 2.4 GHz
  - 12 GB RAM
  - 1 × 300 GB HDD
- VMware virtual machine clients for Microsoft Windows® (8 Units)
  - 2 Intel 4-core Xeon E5620 processor @ 2.4GHz
  - 4 GB RAM
  - 40 GB HDD
- Hitachi Data Ingestor on VMware vSphere Management Assistant 6.1.x server (1 Unit)
  - 8 Intel 2-core Xeon E5-2420 processor @ 1.9 GHz,
  - 64 GB RAM
  - 2.93 TB HDD
- Hitachi Compute Rack 220S server (4 Units)
  - Intel 6-core Xeon E5-2420 processor @ 1.9 GHz
  - 32 GB RAM
  - Hitachi Content Platform nodes (HCP 300), the primary Content Platform node
- Brocade VDX 6740 switch (1 Unit)
  - 10 GbE
  - For the Hitachi Content Platform virtual machine front and back-end network

Software Components

These are the software components used to test Veeam Backup & Replication 9.5 with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x in the laboratory.

- Hitachi Content Platform software v7.2.x
- Hitachi Data Ingestor on VMware vSphere Management Assistant 6.1.x
- Veeam Backup and Replication Server 9.5.0.823
- Veeam Backup and Replication Proxy Server 9.5.0.823
- Veeam Backup and Replication Console 9.5.0.823
- VMware ESX Server 5.5
- VMware vCenter Client 5.5
- Microsoft® Windows Server® 2008 R2 Enterprise (64 bit)
  - Veeam Backup and Replication Server
  - Veeam Backup and Replication Proxy Server
  - VMware virtual machine clients
- Red Hat Enterprise Linux 6.6

Test Methodology

The goal of Phase 3 testing was to capture results for the following:

- The newest Veeam Backup and Replication 9.5 backup and restore operation (CIFS and NFS) with Hitachi Data Ingestor v6.1.x and Hitachi Content Platform v7.2.x in a 10 GbE network
- Veeam backup and restore of Hitachi Data Ingestor stubbed files migrated to and from Hitachi Content Platform.
- Results comparison of Veeam.5 to Veeam 9.0 results.

The tested environment had four Veeam test appliance virtual machines containing data as the user data source for Veeam's backup and restore operations. The tests were in two parts:

- “Part 1: Baseline Test Veeam 9.5 (10 GbE)” on page 6
- “Part 2: Baseline Add-On Test Veeam 9.5 (10 GbE)” on page 7

Part 1: Baseline Test Veeam 9.5 (10 GbE)

The baseline test covers the following five areas:

- Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform
- Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform
- Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform
- Veeam Full Restore Operations from Hitachi Data Ingestor and Hitachi Content Platform
- Veeam Full Synthetic Restore Operations from Hitachi Data Ingestor and Hitachi Content Platform

Part 1 of this test covered the following:

- Capture results of a Veeam 9.5 full, incremental, synthetic backup, and restore operation to and from Hitachi Data Ingestor (CIFS and NFS) in a 10 GbE network, while capturing baseline numbers
- Capture results for Veeam 9.5 and Veeam 9.0.

Part 2: Baseline Add-On Test Veeam 9.5 (10 GbE)

The baseline add-on test for Veeam 9.5 covers the following five areas:

- Veeam Full Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform
- Veeam Incremental Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform
- Veeam Full Synthetic Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform
- Veeam Full Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor
- Veeam Full Synthetic Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor

Part 2 of this test covered the following Veeam 9.5 add-on testing:

- Full backup and full synthetic backup to Hitachi Data Ingestor:
  - Stubbed files were migrated to Hitachi Content Platform
  - Incremental backup
- Full restore and full synthetic backup from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor to Veeam.

The baseline add-on test measured the throughput for Veeam 9.5 backup and restore operations. The test also captured the results of Veeam 9.5 and Veeam 9.0. Veeam's dashboard was used via the console to capture results.

Analysis

This is an analysis with observations from the test results. All percentage comparisons are made to baseline test results, unless otherwise stated.

Part 1: Baseline Test Veeam 9.5 (10 GbE)

This summarizes results of integration testing.

Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Testing of Veeam full backup operation to Hitachi Data Ingestor v6.1 with Hitachi Content Platform v7.2 in the backend with a 10 GbE network found no issues.

For CIFS, using a single virtual machine resulted in almost no change in average throughput between Veeam 9.5 and Veeam 9.0. For four virtual machines, it resulted in a 19% increase in average throughput.

For NFS, using a single virtual machine resulted in almost no change in backup duration time. For four virtual machines, it resulted in a 24% decrease in average throughput.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Testing of Veeam Incremental Backup Operation with Hitachi Data Ingestor v6.1 using CIFS and NFS as Veeam's backup repository in a 10 GbE network found no issues.

For CIFS, using a single virtual machine resulted in a 10% increase in average throughput in Veeam 9.5 compared to Veeam 9.0. For four virtual machine, it resulted in an 18% increase in average throughput for Veeam 9.5 compared to Veeam 9.0.

For NFS, using a single virtual machine resulted in duration time shortened by 17%. For four virtual machines, it resulted in a 240% increase in average throughput.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Backup Operation from Hitachi Data Ingestor and Hitachi Content Platform

Testing of Veeam Full Synthetic Backup Operation with Hitachi Data Ingestor v6.1 using CIFS and NFS as Veeam's backup repository in a 10GbE network found no issues.

For CIFS, using a single virtual machine resulted in duration time shortened by 2% in Veeam 9.5 compared to Veeam 9.0. For a four virtual machines, it resulted in duration time shortened by 24% in Veeam 9.5 compared to Veeam 9.0.

For NFS, using a single virtual machine resulted in duration time shortened by 2%. For four virtual machines, it resulted in duration time shortened by 6%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform

Testing of Veeam Full Restore Operation with Hitachi Data Ingestor 6.1 using CIFS and NFS as Veeam's backup repository in a 10 GbE network found no issues.

For CIFS, using a single virtual machine resulted in duration time shortened by 21% with a 13% increase in average throughput in Veeam 9.5 when compared to Veeam 9.0. For four virtual machines, it resulted in a 1% improvement in duration time with a 13% increase average throughput in Veeam 9.5 compared to Veeam 9.0.

For NFS, using a single virtual machine resulted in a 76% decrease in average throughput. For four virtual machines, it resulted in a 30% decrease in average throughput.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform

Testing of Veeam Full Synthetic Restore Operation with Hitachi Data Ingestor 6.1 using CIFS and NFS as Veeam's backup repository in a 10 GbE network found no issues.

For CIFS, using a single virtual machine resulted in duration time shortened by 84% with a 550% increase average throughput in Veeam 9.5 compared to Veeam 9.0. For four virtual machines, it resulted in duration time shortened by 3% with a 14% increased average throughput in Veeam 9.5 compared to Veeam 9.0.

For NFS, a single virtual machine resulted in a 35% increased average throughput with a duration time shortened by 30%. For four virtual machines, it resulted in a 15% increase in average throughput.

For details on baseline numbers, see “Test Results” on page 10.

Part 2: Baseline Add-On Test Veeam 9.5 (10 GbE)

This summarizes the results of a backup and restore operation testing for Hitachi Data Ingestor where Veeam backup files are stubbed and migrated to Hitachi Content Platform.

Veeam Full Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform — CIFS

This was a Veeam full backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform with CIFS. Four test virtual machines resulted in no change in average throughput while observing a duration time lengthened by 4%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform — NFS

This was a Veeam full backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform with NFS. Four test virtual machines resulted in a 4% slight decrease in average throughput while observing a duration time shortened by 8%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Incremental Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform — CIFS

This was a Veeam incremental backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform with CIFS. Four test virtual machines resulted in a 63% decrease in average throughput while the duration time was shortened by 69%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Incremental Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform — NFS

This was a Veeam incremental backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform with NFS. Four test virtual machines resulted in a 189% increase average throughput while the duration time lengthened by 97%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform — CIFS

This was a Veeam full synthetic backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform with CIFS. Four test virtual machines resulted in an 8% increase average throughput while the duration time shortened by 3%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Backup to Hitachi Data Ingestor, Stubbed Files and Migrate to Hitachi Content Platform — NFS

This was a Veeam full synthetic backup to Hitachi Data Ingestor using stubbed files with migration to Hitachi Content Platform — NFS. Four test virtual machines resulted in 11% decrease average throughput while the duration time lengthened about five times.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor — CIFS

This was a Veeam full restore from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor — CIFS. Restore of a stubbed Veeam backup file (1 virtual machine) resulted in a 73% increase in average throughput while duration time was shortened by 27%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor — NFS

This was a Veeam full restore from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor — NFS. Restore of a stubbed Veeam backup file resulted in a 51% decrease in average throughput resulting in duration lengthened by 124%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor — CIFS

This was a Veeam full synthetic restore from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor — CIFS. Restore of stubbed Veeam backup file resulted in 168% increase in average throughput while duration time was shortened by 57%.

For details on baseline numbers, see “Test Results” on page 10.

Veeam Full Synthetic Restore from Hitachi Content Platform via Stubbed Files in Hitachi Data Ingestor — NFS

This was a Veeam full synthetic restore from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor — NFS. Restore of stubbed Veeam backup file resulted in 42% decrease in average throughput and lengthened duration time by 40%.

For details on baseline numbers, see “Test Results” on page 10.

Test Results

These are the test results used to provide analysis of this environment.

Part 1: Baseline Test — Veeam 9.5 (10 GbE)

The integration test covers the following areas:

Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Table 1 and Figure 2 contain test results of the Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform.

TABLE 1. VEEAM FULL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB Size)	System Throughput Average (MB/sec) — Veeam 9.0	System Throughput Average (MB/sec) — Veeam 9.5	Duration (Minutes) — Veeam 9.0	Duration (Minutes) — Veeam 9.5
1 virtual machine	205.60	209.60	12.02	12.18
4 virtual machines	417.20	498.30	24.13	18.20

Figure 2 contains test results of the Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

Figure 2

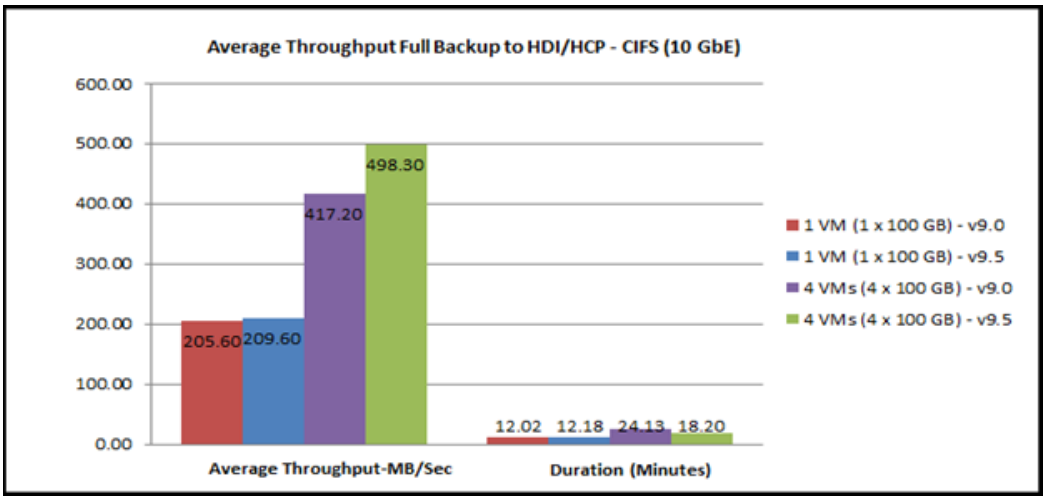


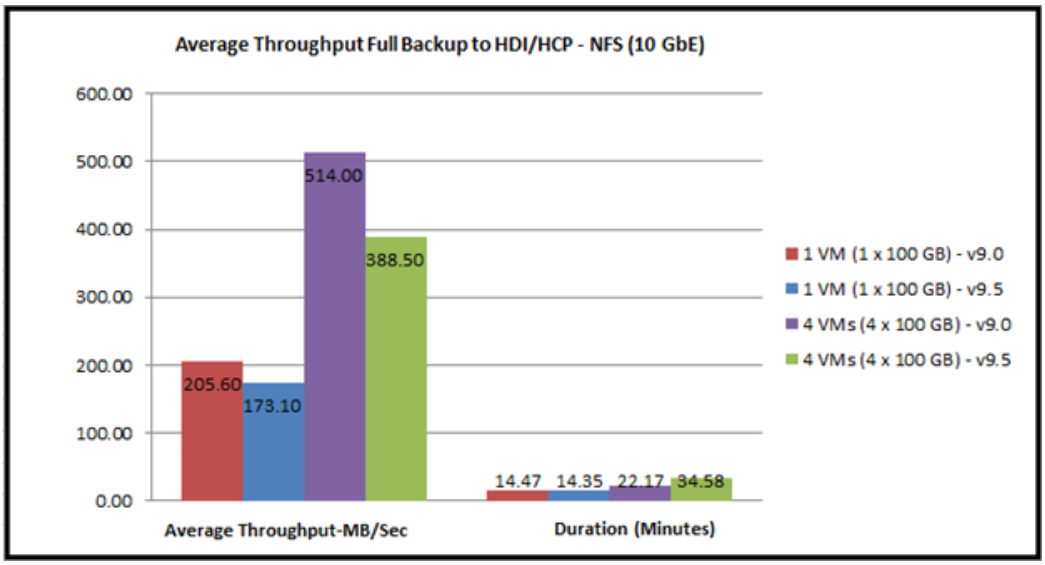
Table 2 contains test results of the Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

TABLE 2. VEEAM FULL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	205.60	173.10	14.47	14.35
4 virtual machines	514.00	388.50	22.17	34.58

Figure 3 contains test results of the Veeam Full Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 3



Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Table 3 and Figure 4 contain test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform.

TABLE 3. VEEAM INCREMENTAL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	153.60	168.80	12.85	10.77
4 virtual machines	479.70	567.00	19.68	15.12

Figure 4 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

Figure 4

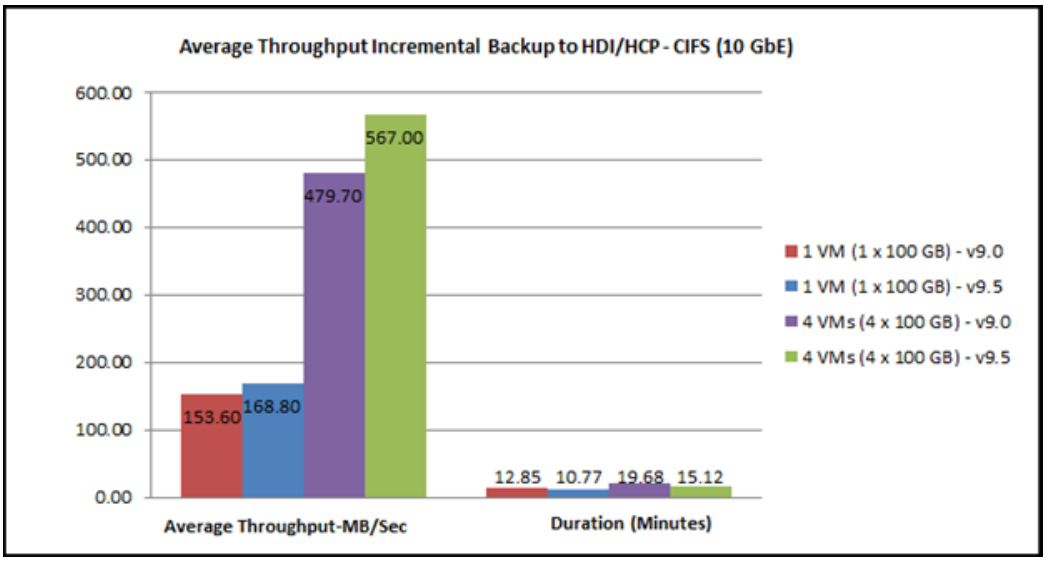


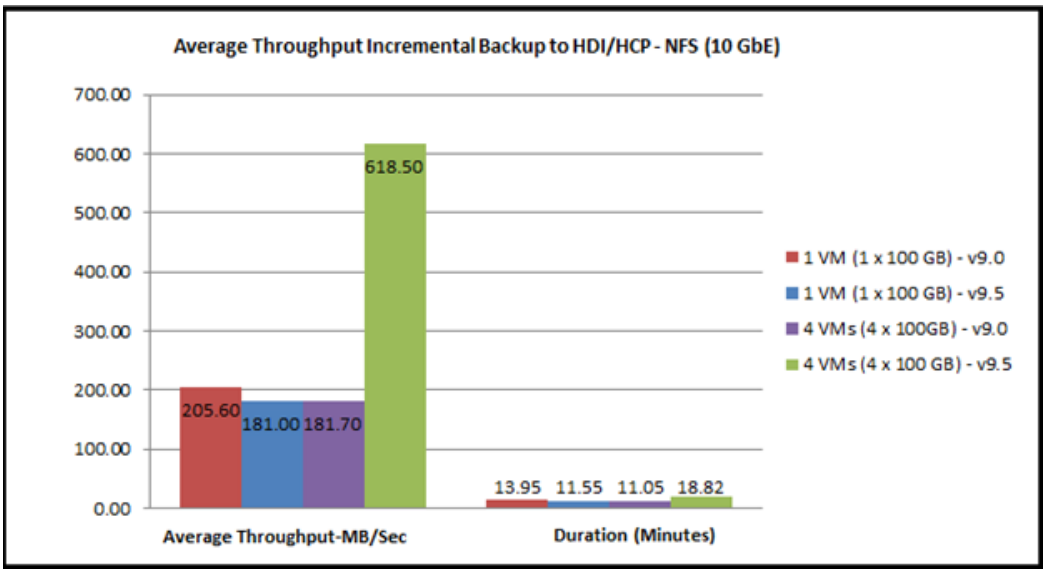
Table 4 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

TABLE 4. VEEAM INCREMENTAL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	205.60	181.00	13.95	11.55
4 virtual machines	181.70	618.50	11.05	18.82

Figure 5 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 5



Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Table 5 and Figure 6 contain test results of the Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

TABLE 5. VEEAM FULL SYNTHETIC BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	75.20	82.10	36.75	8.67
4 virtual machines	539.00	213.60	56.72	42.95

Figure 6 contains test results of the Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

Figure 6

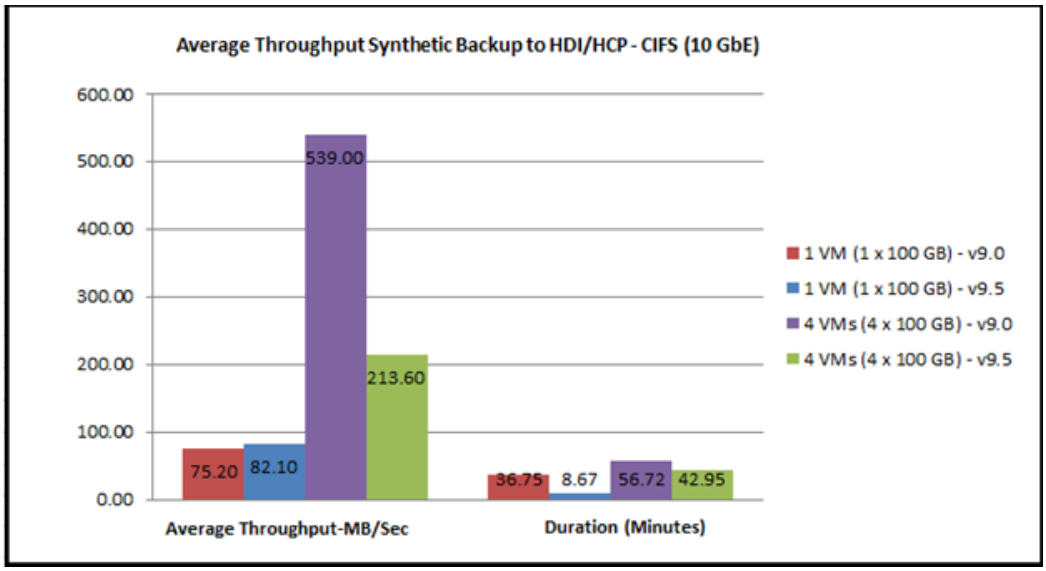
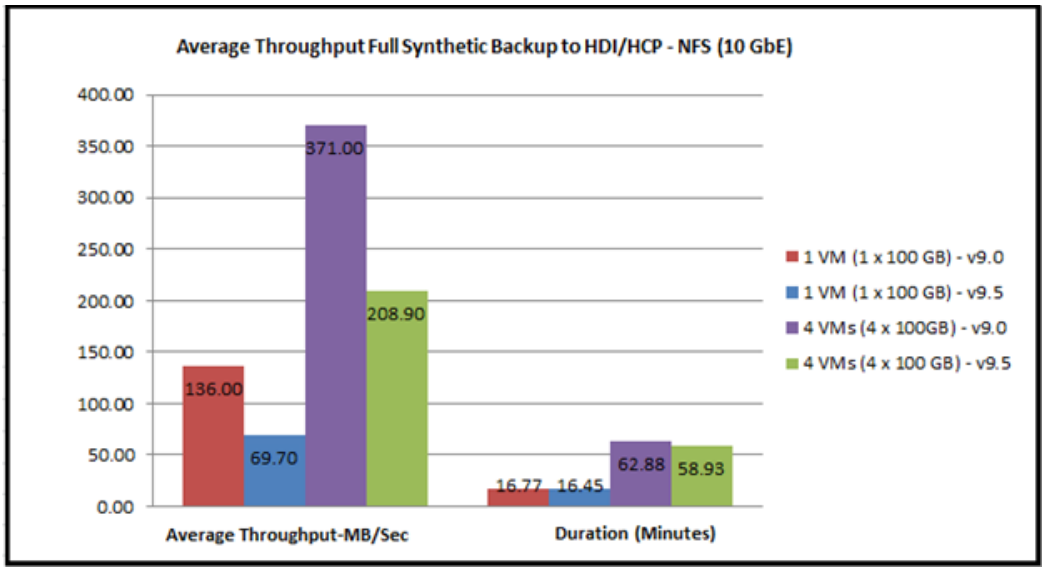


TABLE 6. VEEAM FULL SYNTHETIC BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	136.00	69.70	16.77	16.45
4 virtual machines	371.00	208.90	62.88	58.93

Figure 7 contains test results of the Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 7



Veeam Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform

Table 7 and Figure 8 contain test results of the Veeam Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform.

TABLE 7. VEEAM RESTORE OPERATION FROM HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	158.00	179.00	9.62	7.60
4 virtual machines	52.50	59.50	34.68	34.32

Figure 8 contains test results of the Veeam Full Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform— CIFS.

Figure 8

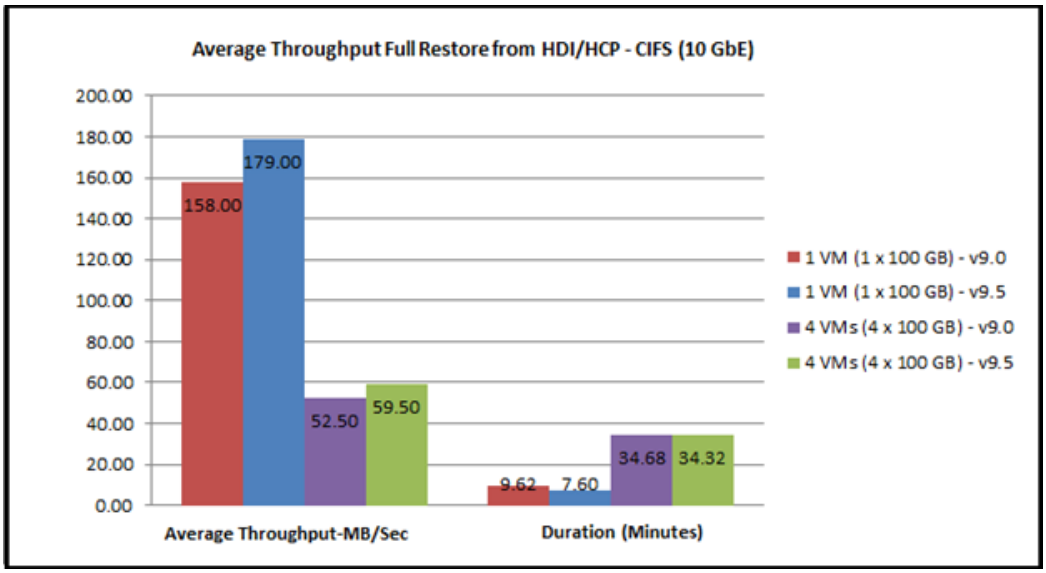
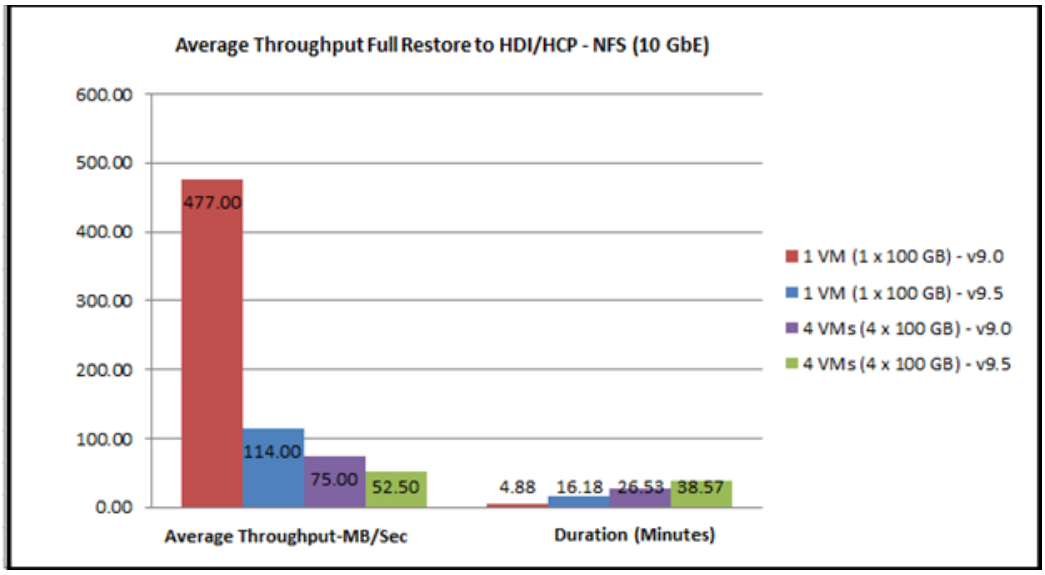


TABLE 8. VEEAM RESTORE OPERATION FROM HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	477.00	114.00	4.88	16.18
4 virtual machines	75.00	52.50	26.53	38.57

Figure 9 contains test results of the Veeam Full Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 9



Veeam Full Synthetic Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform

Table 9 and Figure 10 contain test results of the Veeam Full Synthetic Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

TABLE 9. VEEAM FULL SYNTHETIC RESTORE OPERATION FROM HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	26.00	170.00	49.33	8.88
4 virtual machines	53.75	61.25	33.73	34.68

Figure 10 contains test results of the Veeam Full Synthetic Restore Operation to Hitachi Data Ingestor and Hitachi Content Platform— CIFS.

Figure 10

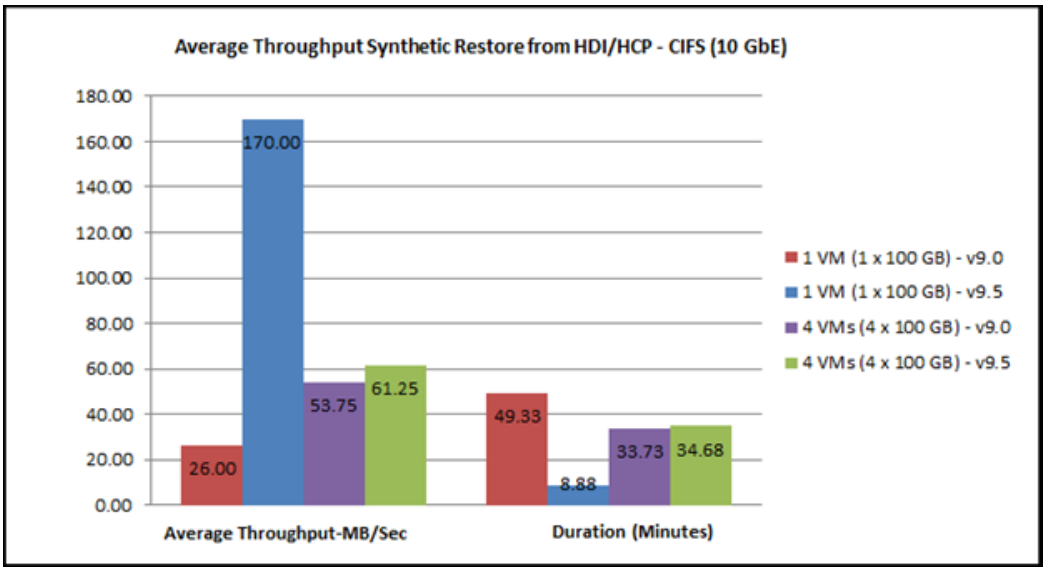
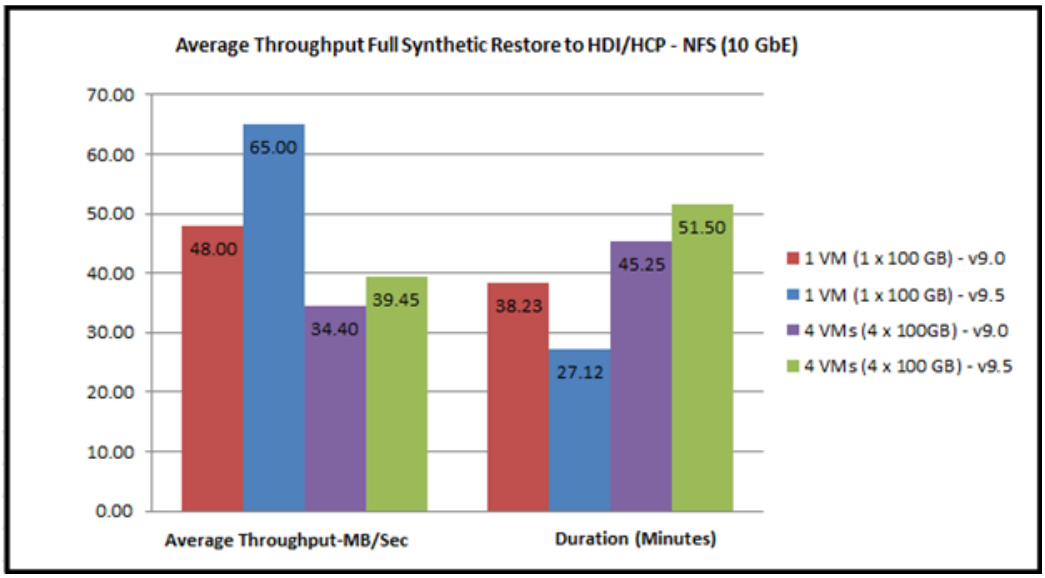


TABLE 10. VEEAM FULL SYNTHETIC RESTORE OPERATION FROM HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	48.00	65.00	38.23	27.12
4 virtual machines	34.40	39.45	45.25	51.50

Figure 11 contains test results of the Veeam Full Synthetic Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 11



Part 2: Baseline Add-On Test — Veeam 9.5 (10 GbE)

The add-on baseline test for Veeam 9.5 covers the following areas:

- “Veeam Full Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform” on page 21
- “Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform” on page 22
- “Veeam Full Synthetic Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform” on page 24
- “Veeam Full Restore From Hitachi Content Platform Using Stubbed Files in Hitachi Data Ingestor” on page 26
- “Veeam Full Synthetic Restore From Hitachi Content Platform Using Stubbed Files in Hitachi Data Ingestor” on page 28

Veeam Full Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform

Table 11 and Figure 12 contain test results of the Veeam Full Backup Operation to Hitachi Data Ingestor, stubbed files, and migrate to Hitachi Content Platform.

TABLE 11. VEEAM FULL BACKUP TO HITACHI DATA INGESTOR, STUBBED FILES, AND MIGRATE TO HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	205.60	198.50	12.85	12.25
4 virtual machines	419.00	420.30	25.43	24.42

Figure 12

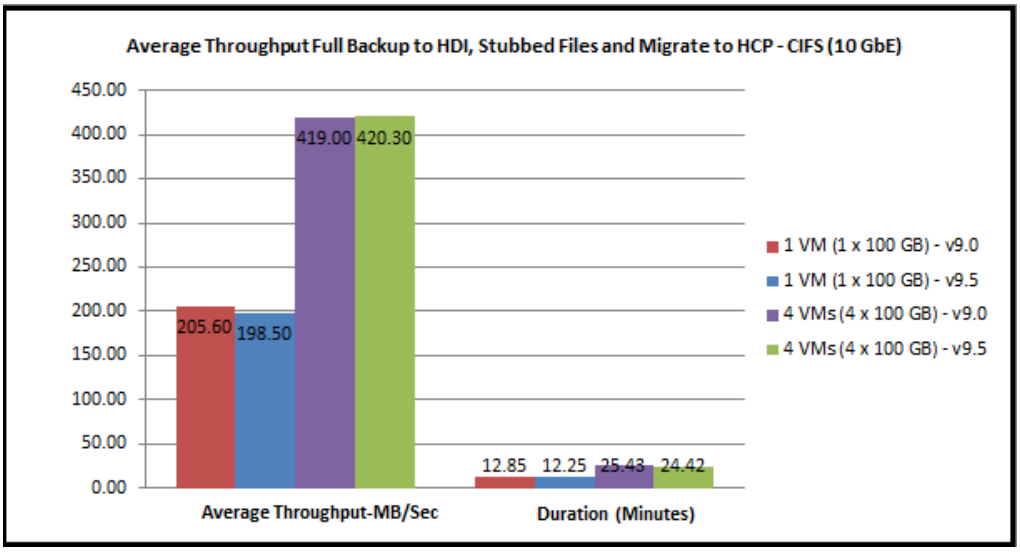
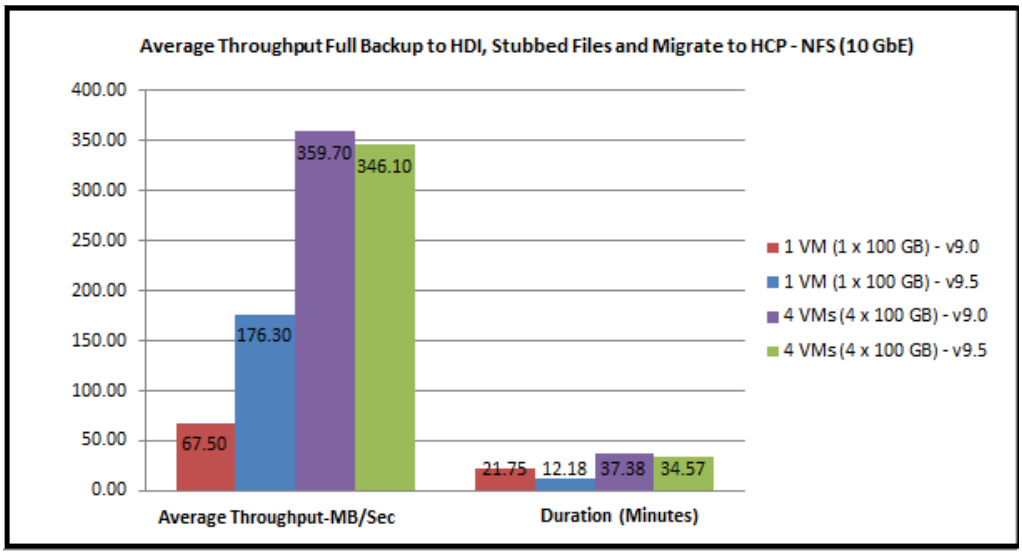


TABLE 12. VEEAM FULL BACKUP TO HITACHI DATA INGESTOR, STUBBED FILES, AND MIGRATE TO HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	67.50	176.30	21.75	12.18
4 virtual machines	359.70	346.10	37.38	34.57

Figure 13



Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform

Table 13 and Figure 14 on page 23 contain test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform.

TABLE 13. VEEAM INCREMENTAL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	204.80	189.20	13.50	11.48
4 virtual machines	546.60	200.30	19.25	5.97

Figure 14 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

Figure 14

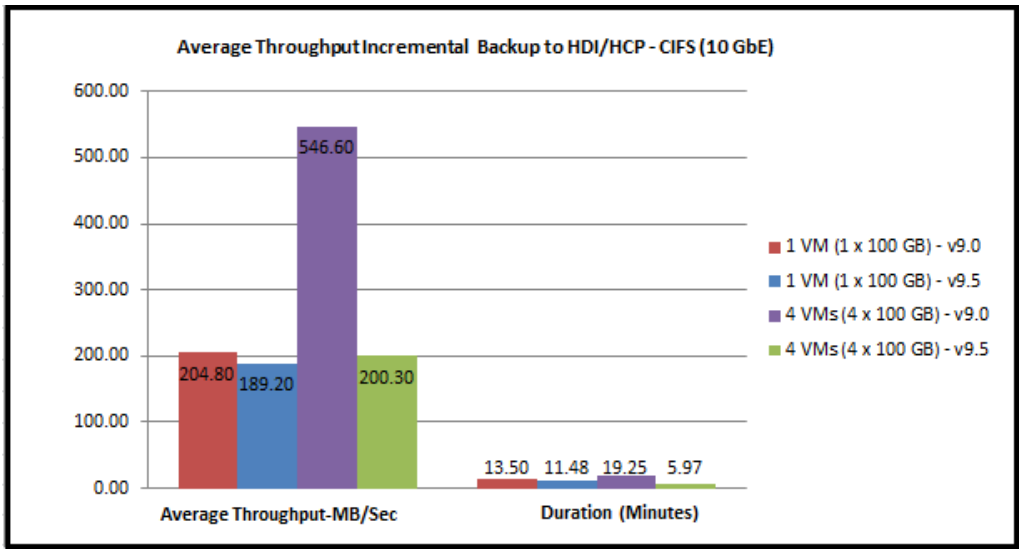


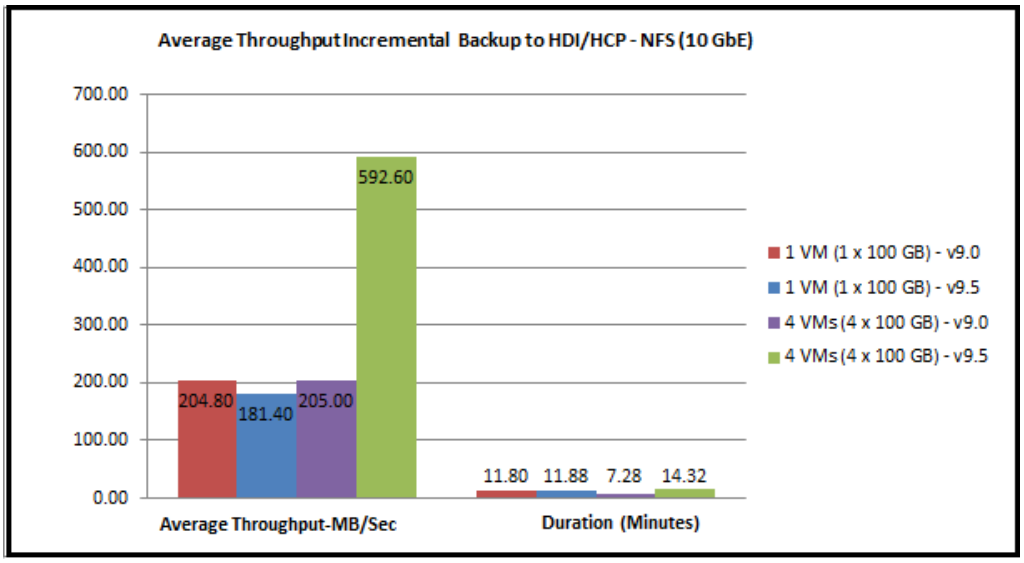
Table 14 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

TABLE 14. VEEAM INCREMENTAL BACKUP OPERATION TO HITACHI DATA INGESTOR AND HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	204.80	181.40	11.80	11.88
4 virtual machines	205.00	592.60	7.28	14.32

Figure 15 contains test results of the Veeam Incremental Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 15



Veeam Full Synthetic Backup to Hitachi Data Ingestor, Stubbed Files, and Migrate to Hitachi Content Platform

Table 15 and Figure 16 on page 25 contain test results of the Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor, stubbed files, and migrate to Hitachi Content Platform — CIFS.

TABLE 15. VEEAM FULL SYNTHETIC BACKUP TO HITACHI DATA INGESTOR, STUBBED FILES AND MIGRATE TO HITACHI CONTENT PLATFORM — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	167.20	74.10	57.00	55.92
4 virtual machines	190.70	206.60	43.82	42.70

Figure 16

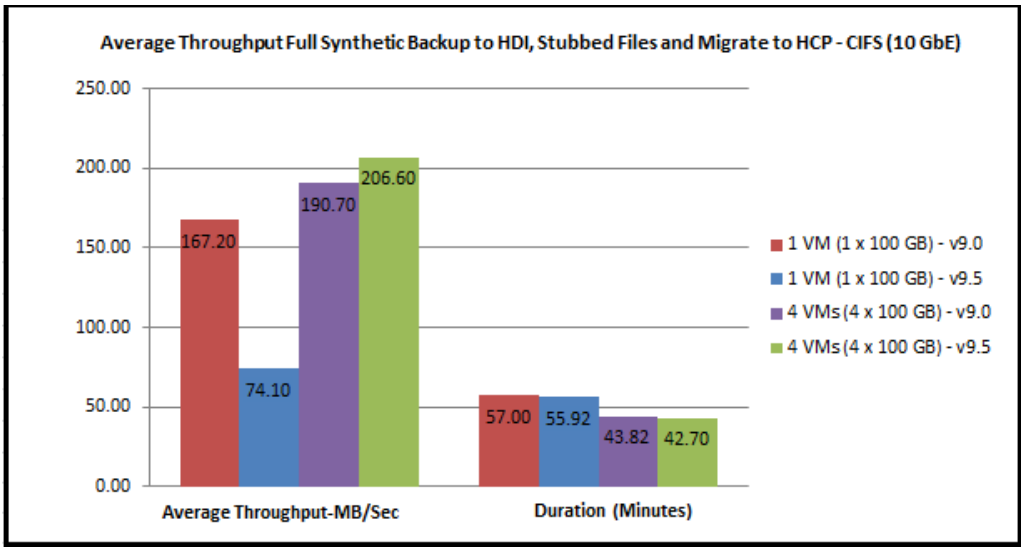
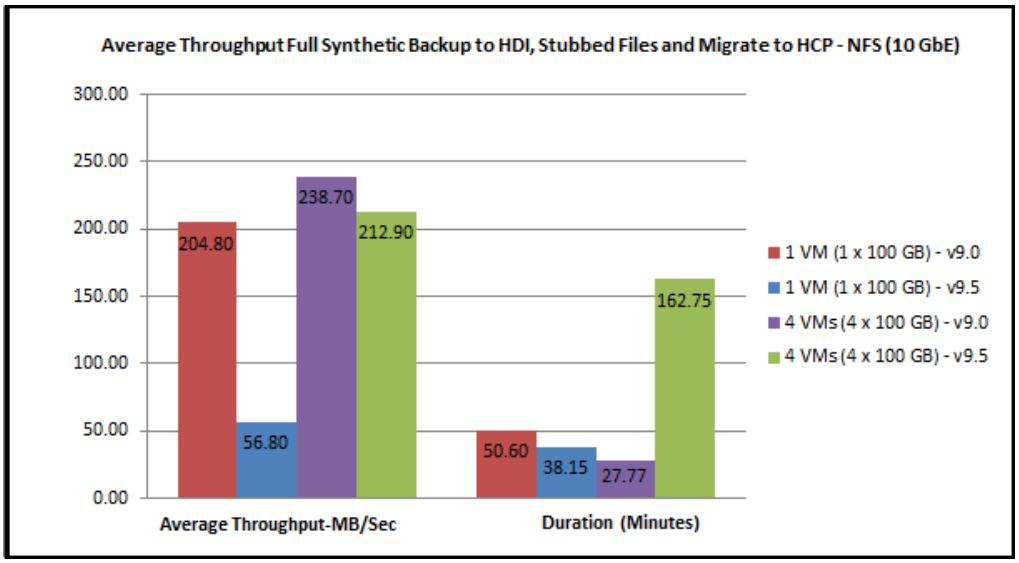


TABLE 16. VEEAM FULL SYNTHETIC BACKUP TO HITACHI DATA INGESTOR, STUBBED FILES AND MIGRATE TO HITACHI CONTENT PLATFORM — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	204.80	56.80	50.60	38.15
4 virtual machines	238.70	212.90	27.77	162.75

Figure 17 contains test results of the Veeam Full Synthetic Backup Operation to Hitachi Data Ingestor and Hitachi Content Platform — NFS.

Figure 17



Veeam Full Restore From Hitachi Content Platform Using Stubbed Files in Hitachi Data Ingestor

Table 17 and Figure 18 on page 27 contain test results of the Veeam Full Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — CIFS.

TABLE 17. VEEAM FULL RESTORE FROM HITACHI CONTENT PLATFORM VIA STUBBED FILES IN HITACHI DATA INGESTOR — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	23.00	40.00	59.92	43.77
4 virtual machines	15.75	56.25	48.20	36.07

Figure 18

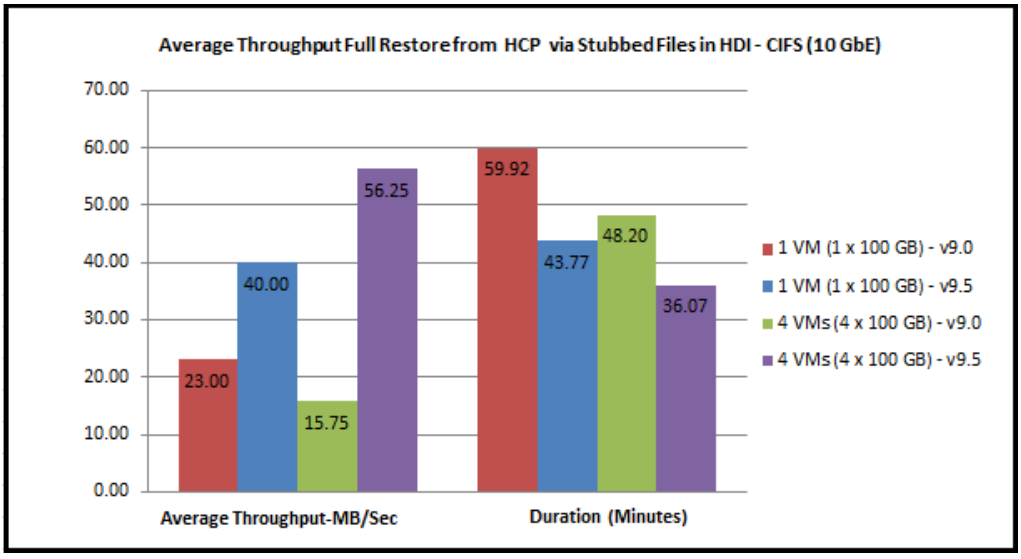
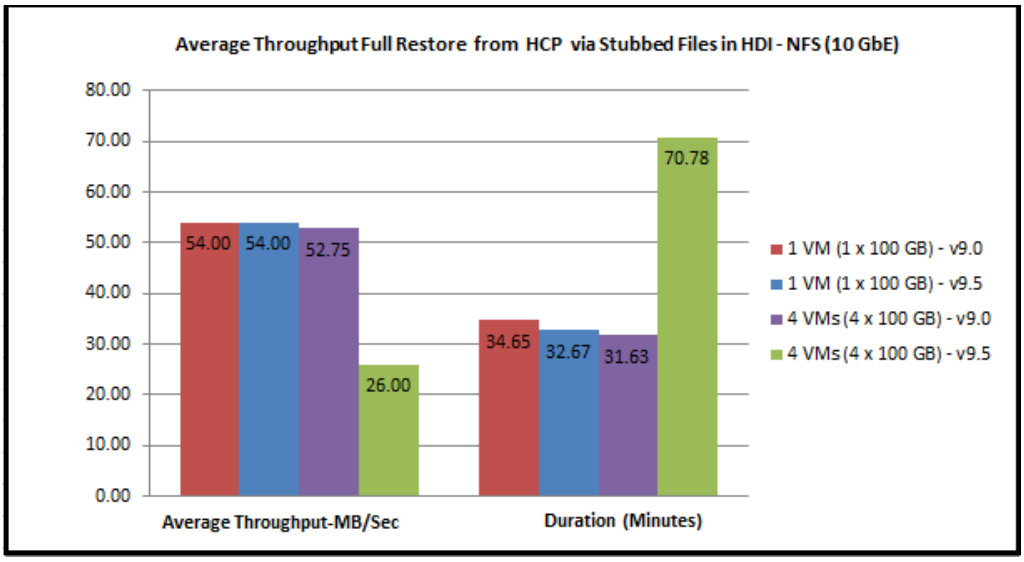


Table 18 and Figure 19 on page 28 contain test results of the Veeam Full Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — NFS.

TABLE 18. VEEAM FULL RESTORE FROM HITACHI CONTENT PLATFORM USING STUBBED FILES IN HITACHI DATA INGESTOR — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	54.00	54.00	34.65	32.67
4 virtual machines	52.75	26.00	31.63	70.78

Figure 19



Veeam Full Synthetic Restore From Hitachi Content Platform Using Stubbed Files in Hitachi Data Ingestor

Table 19 and Figure 20 on page 29 contains test results of the Veeam Full Synthetic Restore from Hitachi Content Platform using stubbed files in Hitachi Data Ingestor — CIFS.

TABLE 19. VEEAM FULL SYNTHETIC RESTORE FROM HITACHI CONTENT PLATFORM USING STUBBED FILES IN HITACHI DATA INGESTOR — CIFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	23.00	39.00	61.93	42.97
4 virtual machines	23.00	61.75	77.48	33.17

Figure 20

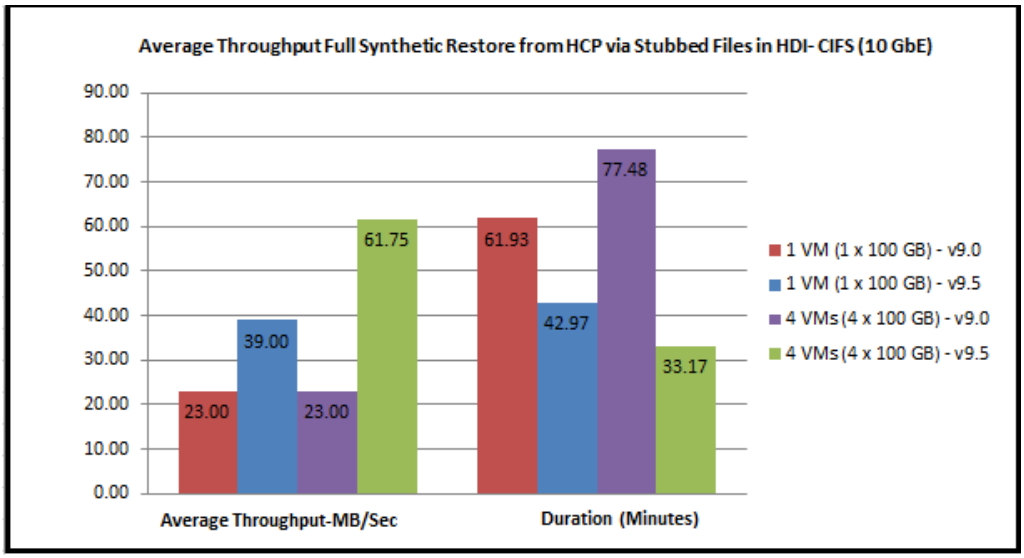
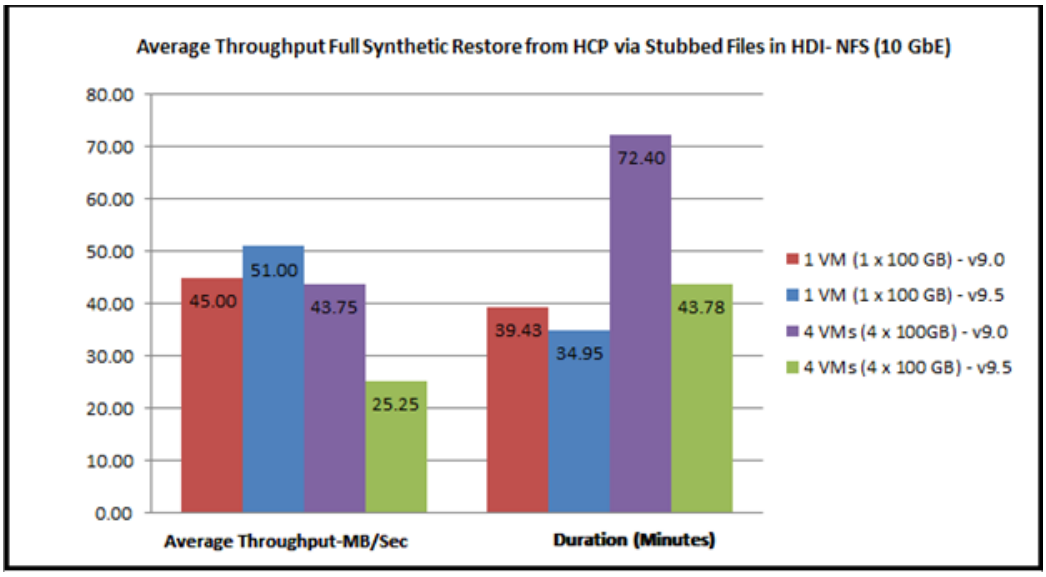


Table 20 and Figure 21 on page 30 contain test results of the Veeam Full Synthetic Restore Operation from Hitachi Data Ingestor and Hitachi Content Platform — NFS.

TABLE 20. VEEAM FULL SYNTHETIC RESTORE FROM HITACHI CONTENT PLATFORM USING STUBBED FILES IN HITACHI DATA INGESTOR — NFS (10 GBE)

Veeam Test Appliance Virtual Machine (100 GB size)	System Throughput Average (MB/sec) Veeam 9.0	System Throughput Average (MB/sec) Veeam 9.5	Duration (Minutes) Veeam 9.0	Duration (Minutes) Veeam 9.5
1 virtual machine	45.00	51.00	39.43	34.95
4 virtual machines	43.75	25.25	72.40	43.78

Figure 21


Average Throughput Full Synthetic Restore from HCP via Stubbed Files in HDI- NFS (10 GbE)
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
45.00
51.00
43.75
25.25
39.43
34.95
72.40
43.78
Average Throughput-MB/Sec
Duration (Minutes)
1 VM (1 x 100 GB) - v9.0
1 VM (1 x 100 GB) - v9.5
4 VMs (4 x 100GB) - v9.0
4 VMs (4 x 100 GB) - v9.5

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