

An Optimisation Framework for Microsoft Hyper-V in a Failover Cluster Environment

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Introduction

Virtualisation has established itself as an important part of IT for most enterprises, with 80% of server workloads virtualised [1]. However, virtualised systems suffer from a 10-40% performance penalty compared to a non-virtualised system [2-4]. This has led to considerable interest from the global academic community, industry experts and online communities into areas of optimisation and tuning. This project plans to test practical optimisation techniques and features of Microsoft Hyper-V (an increasingly favoured choice of the small enterprise [1]).

Aim & Objectives

To formulate a comprehensive framework on how to optimise Microsoft Hyper-V in a failover cluster environment:

- Provide a critical literature review of type 1 hypervisor benchmarking and optimisation strategies
- Develop a framework of optimisation recommendations, applicable to Hyper-V
- Implement the framework recommendations on a test Hyper-V cluster
- Evaluate the effectiveness of the framework implementations using established benchmarking tools, elicited in the literature review

Optimisation Framework Highlights

Static Memory - improves server CPU performance by **6.87%** compared to Dynamic Memory.

Fixed VHDXs - on average improves write performance by **30.49%**; made no change to read performance; improves random write performance by **4.68%**; and reduces random read performance by **9.22%** compared to Dynamic VHDXs.

Removal of unnecessary protocols from adapters and NIC teams - improves server CPU performance by **13.83%**.

Increasing Transmit and Receive buffers on NICs - improves network throughput by **2.96%** and server CPU performance by **6.04%**.

Major Findings

- In general, optimisation recommendations and guides seen online from vendors, industry and experts do improve the performance of Hyper-V to a significant degree.
- However, it was also found that not every method improves performance.

Conclusion & Further Research

- Significant performance benefits can be gained from the modification of Hyper-V settings.
- The recommendations from this project will likely not always apply to different Hyper-V configurations.
- Further research is needed into how the framework behaves when implemented on a different Hyper-V deployment.
- Further research is also needed into the interactions between different optimisation methods.

References

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- [4] A. Gordon et al., "Eli," in Proceedings of the seventeenth international conference on Architectural Support for Programming Languages and Operating Systems - ASPLOS '12, 2012, p. 411.

TURING CLUSTER

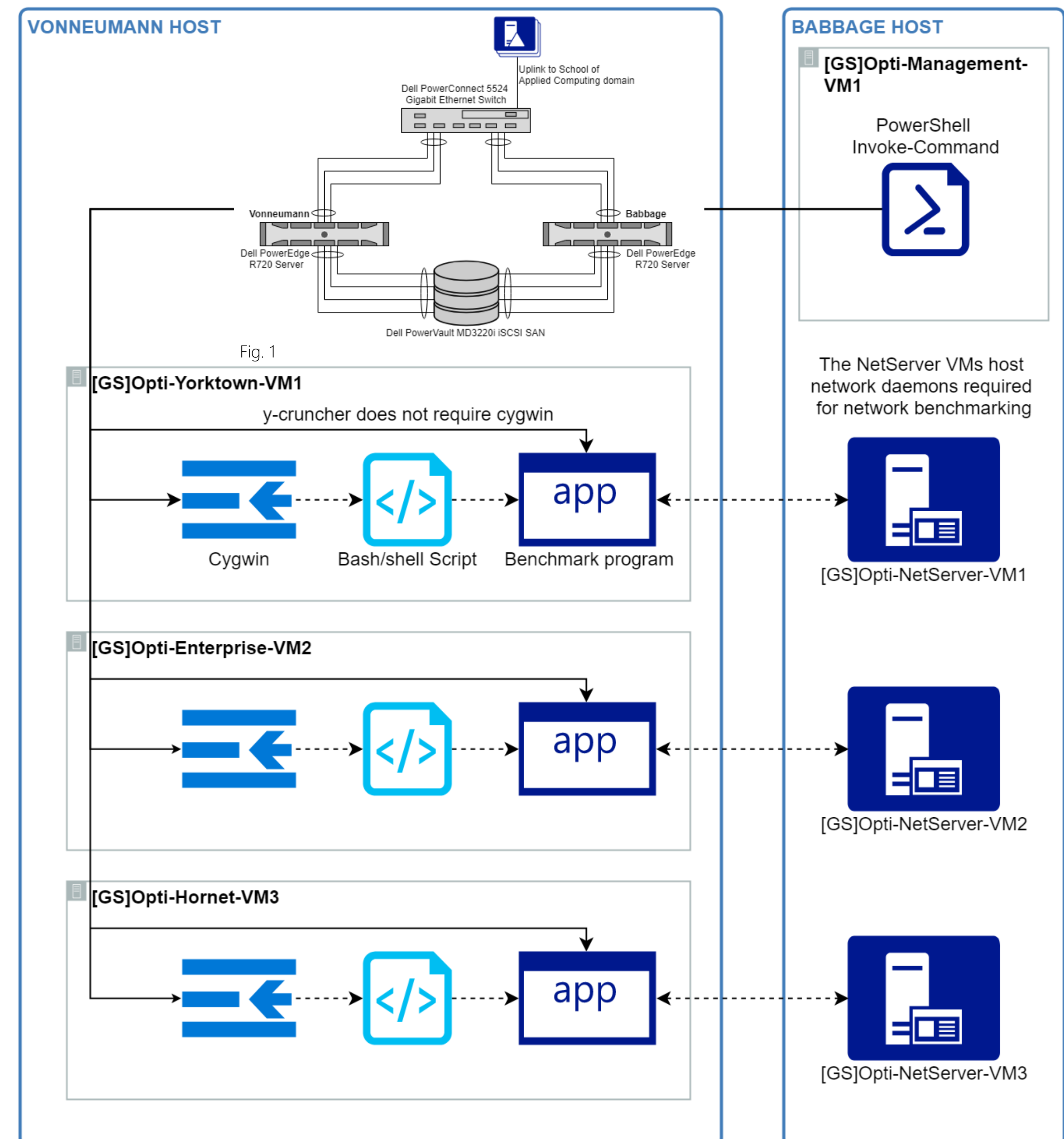


Fig. 2

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1. Project Cluster Topology
2. Project Benchmark Execution Diagram



Microsoft
Hyper-V

