FACULDADE ENGENHARIA

Departamento de Informática

Tecnologias de Virtualização e Centros de Dados (14467)

Mestrado em Engenharia Informática / Master's in Computer Engineering

Ano Letivo de 2023/2024, 2.º Semestre
Docente: Prof. Doutor Alexandre Fonte
Versão 1.0 – 27 março de 2024

Work No. 1 - Laboratory Project No. 1

Updated performance analysis of a native vs host-based hypervisor

Organisation of student groups: Work to be carried out by a group of no more than 2 students.

Identification of students: Indicate, on the cover of the report, the title of the work (indicated above) and the names and numbers of the students who make up the group that carried out the work.

Quotation for the assignment: This assignment contributes 6.0 marks (5.0 marks for the report, including the results, and 1.0 mark for the presentation and demonstration) to the student's final mark, expressed on a scale of 0.0 to 20.0.

Report format: The report must comply with the IEEE article template of the type Conference: https://template-selector.ieee.org/

Practical classes to support the completion of the work: The assessment work will be monitored in practical classes until 9 April 2024. **Date to be confirmed in class on 5 March 2024.**

Date and form of submission: One student from each group must submit the report, in pdf format, by 15 April 2024, for presentation in class on 16 April 2024, in the submission folder on moodle: TVCD 2023/2024 - Synthesis Work. **Date to be confirmed in class on 5 March 2024**

Objectives

The main objective of this work is to analyse the performance of a native hypervisor and that of a host-based hypervisor. To achieve this main goal, each group must fulfil the following objectives:

1) Install and configure a native hypervisor and analyse its performance.
2) Installandconfigureahost-basedhypervisorandanalyseitsperformance.

In the event that you don't have the appropriate licence or because of other difficulties, you can choose to compare the two existing alternatives of a native and/or host-based and/or emulation hypervisor.

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The aim of this work is to install and configure:

1) A native hypervisor on a computer (single node). The hypervisor can be Windows Server 2016 or higher, with Hyper-V role, or Windows 10/11; QUEMU/KVM on Linux; or Xen. A comparison of various platform virtualisation software packages is presented in [1].

2) A host-based hypervisor on a computer (single node). The hypervisor can be VirtualBox [2] or VMWare Workstation [3], or another.

Once the hypervisors have been installed, experiments should be carried out to illustrate the system's performance, using suitable *benchmarks*.

Examples of *benchmarks* that can be used to analyse the performance of hypervisors can be found in the master's thesis available at [4].

When comparing and analysing the final *benchmark* results, it is suggested that, where applicable, the added *overhead should* also be quantified.

Organisation of the Report

The report should be organised according to the IEEE Template Conference format and the following generic structure is suggested as an example (maximum 8 pages):

- Title (<8 words): should focus on the topic, be short, clear and eye-catching; Authors and affiliations (in 1-2 lines after the title).
- Abstract (<50 ~ 100 words): should explain the research objectives, summarise the research results and highlight the innovative contributions.
- Introduction (including title, abstract) (1 page): should motivate readers to read the rest of the article and prepare them with the necessary background.
- Background and Related Work: should prepare readers with the necessary *background* and related work (1-2 pages).
- Architecture, algorithms, methods, protocols, analytical results and illustrated example, etc. (1 page) (If applicable)
- Experimental configuration (1-2 pages): architecture of the implemented system, installation and configuration details, *benchmarks* and data set used.
- Experimental results (1-2 pages): in figures or tables and respective interpretations and performance analyses.
- Conclusions and References (last page): Conclusions and list of relevant articles referenced in the text.

Referências

[1] Comparison of platform virtualization software, https://en.wikipedia.org/wiki/Comparison_of_platform_virtualization_software , último acesso: 15 de março de 2022.
[2] VirtualBox, https://www.virtualbox.org, último acesso: 27 de março de 2024.
[3] VMWare, https://www.vmware.com último acesso: 27 de fevereiro de 2024.
[4] André Louro, "Comparação do Desempenho de Infraestruturas Virtualizadas de Elevada Disponibilidade Usando Hypervisors Nativos ou Containers", Dissertação de Mestrado em Engenharia Informática, UBI, 2018, https://ubibliorum.ubi.pt/handle/10400.6/9837