

# On the virtualization overhead in consolidated servers

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## Introduction

- Virtualization technology has gained a huge importance.
- The virtualization technology has an inherent performance overhead (extra workload to manage virtualization).
- The virtual machine consolidation allows to manage datacenters in a more flexible way.
- The virtualization overhead depends on the virtualization type and, especially on the number of consolidated virtual machines.
- The virtualization overhead determines the servers' and datacenters QoS.
- It is crucial to minimize the performance degradation due to virtualization overhead.
- There is a trade-off between the ease of management and the performance degradation.

## Objectives

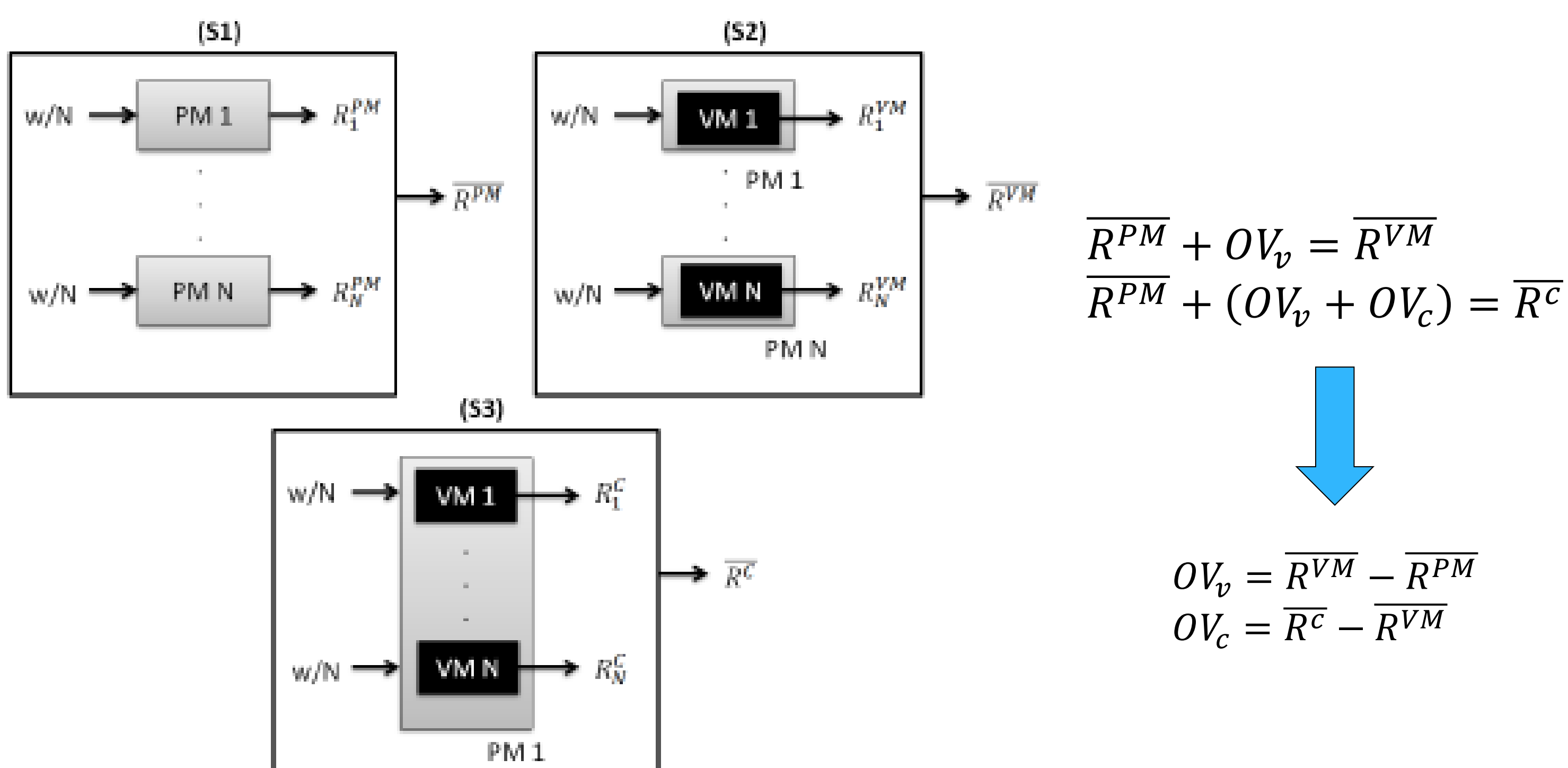
- To study and determine the overhead sources in virtual machine consolidation.
- Defining a methodology to determine the overhead virtualization.
- Understand how the overhead affects to the performance degradation.

## Methodology

Two overhead sources:

- $OV_v$ : overhead due to VMM.
- $OV_c$ : overhead due to VMC management

To determine  $OV_v$  and  $OV_c \rightarrow$  Comparison between scenarios



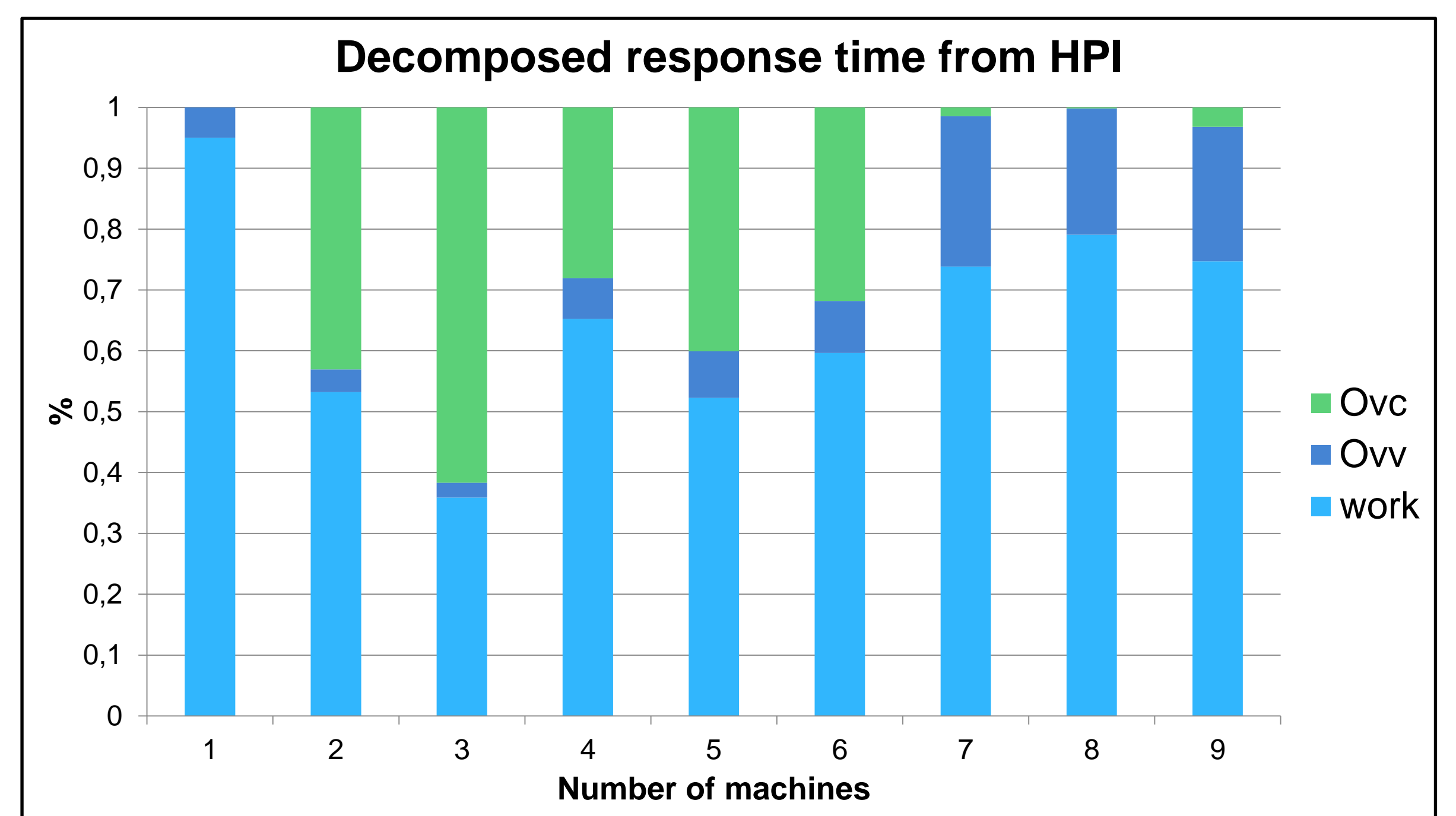
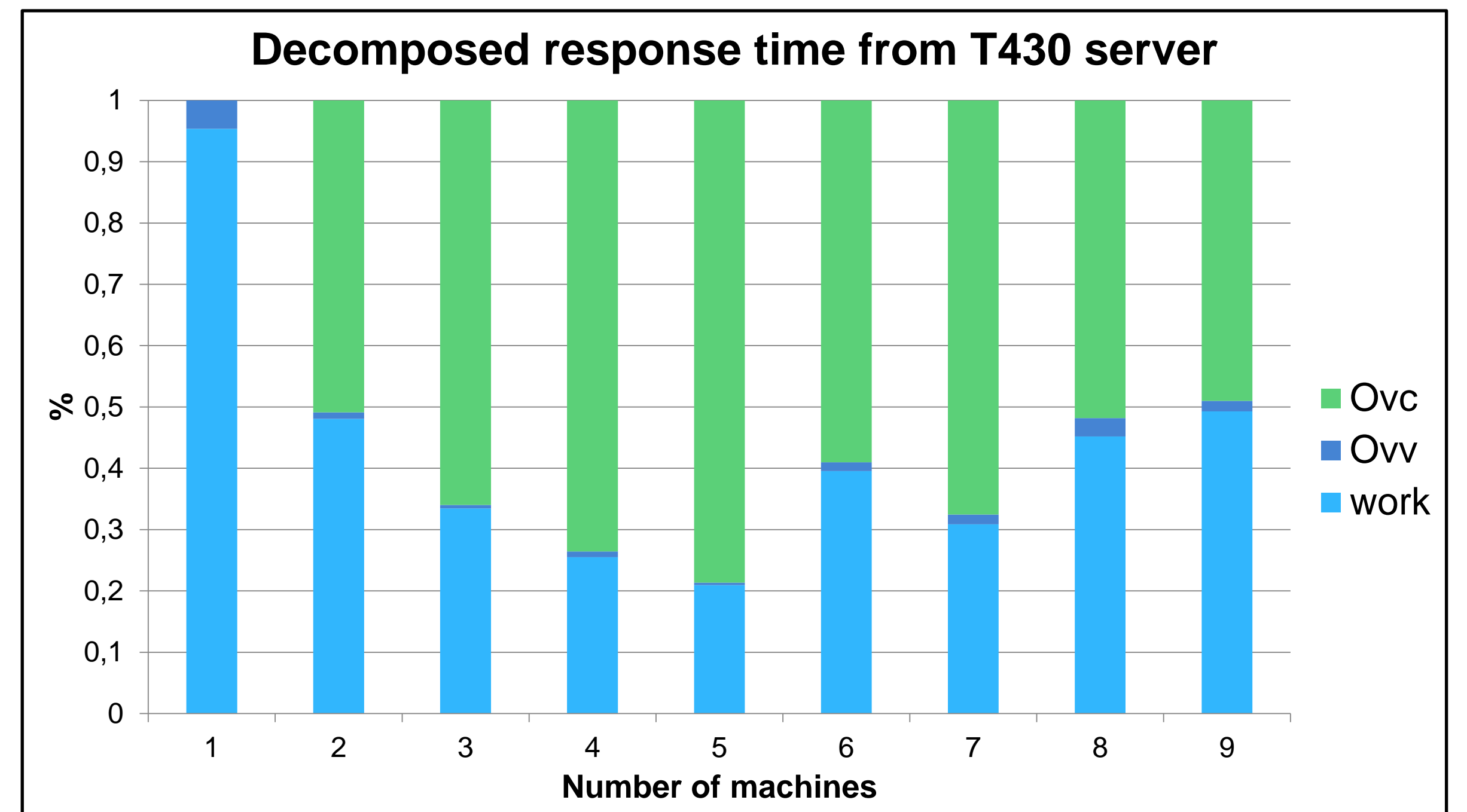
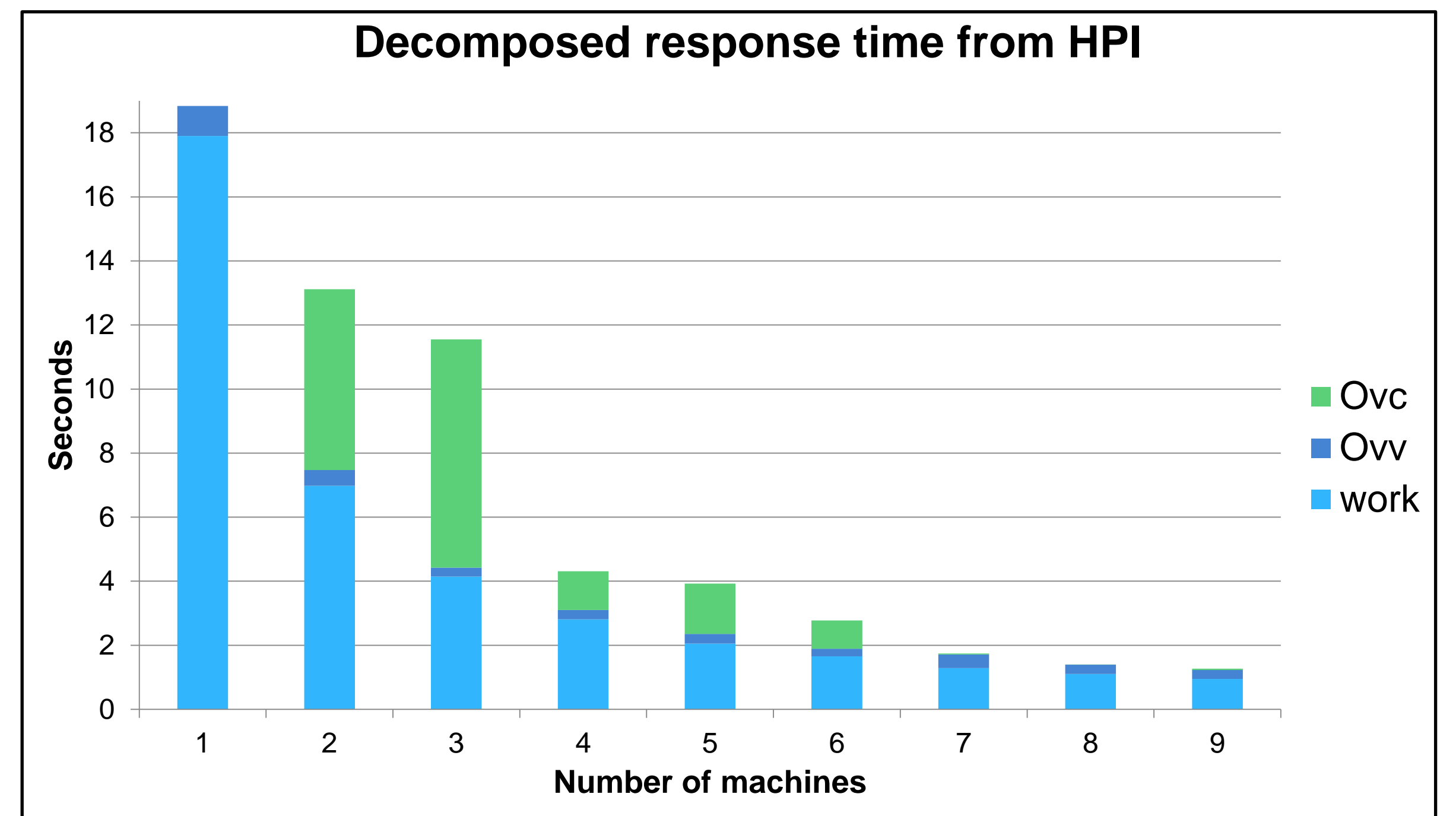
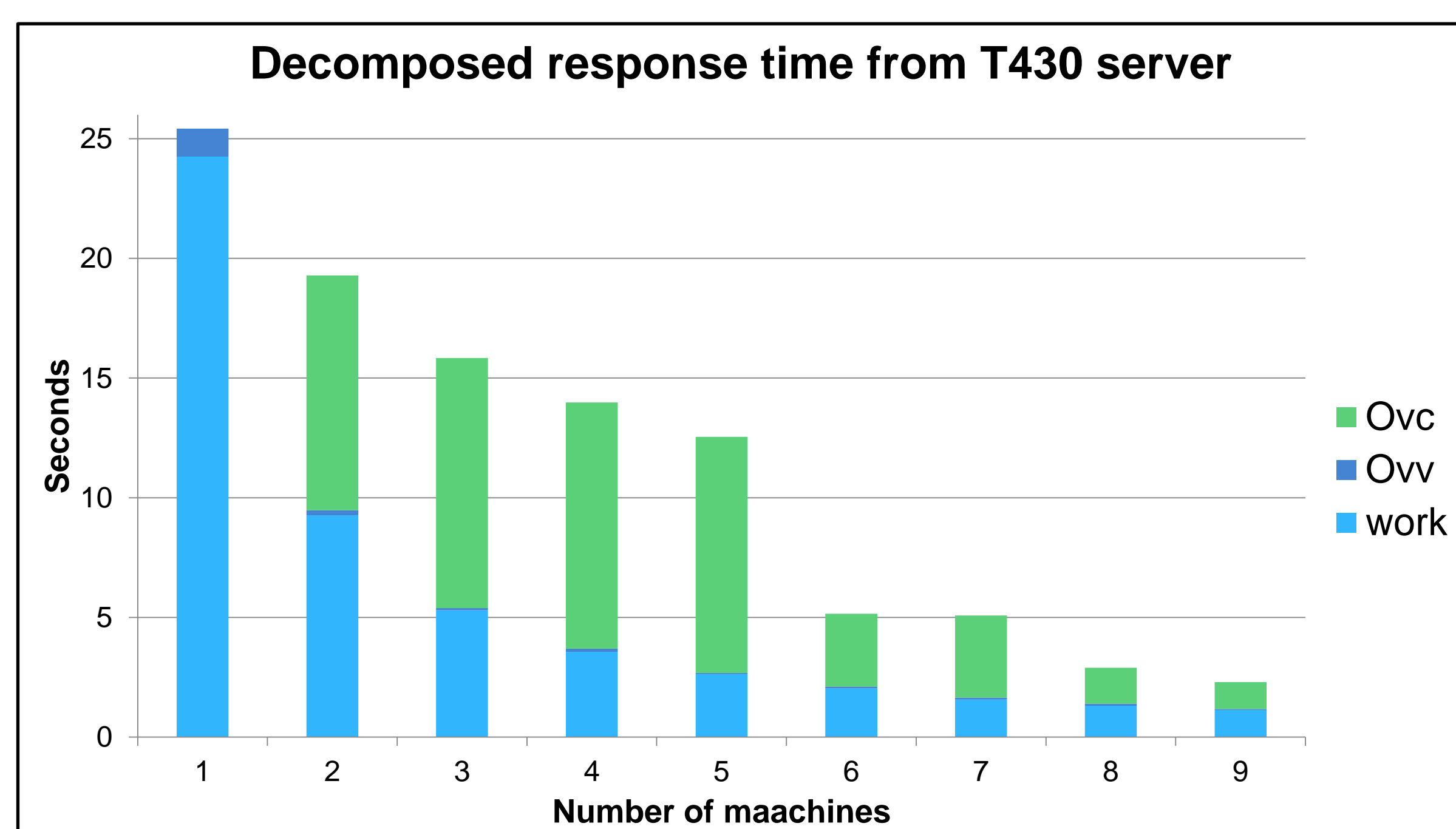
**S1: physical machines.** Black box composed by N PM which executes a whole workload in a balanced manner.

**S2: virtual machines.** Black box composed by N PM, each one hosting a single VM, which executes the N workload fraction.

**S3: consolidated physical machine.** Black box composed by a single PM, which has N consolidated VMs. Each VM executes the N workload fraction.

**SUT:** rx600s5-1 (HPI) and Dell PowerEdge T430 (UIB)  
**Workload:** Sysbench CPU under CPU saturation conditions

## Results



## Conclusion

- We identified two sources of overhead: from the VMM and the VMC management.
- We determined  $OV_v$  and  $OV_c$  through scenarios comparison (S1, S2 and S3).
- $OV_v$  and  $OV_c$  depends directly on the physical resources, the VMM type and the number of allocated VMs.
- The HPI infrastructure has lesser  $OV_c$  than the UIB one, due to the amount of resources.
- The HPI infrastructure has more  $OV_v$  than the UIB one because of the amount of resource to manage.

## References

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- [3] B. Bermejo, C. Juiz, and N. Thomas, "On the virtualization overhead and energy consumption in consolidated servers." in UK- Performance Engineering Workshop (UKPEW), 2018.