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# Towards a unified taxonomy and architecture of cloud frameworks

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### Abstract

Infrastructure as a Service (IaaS) is one of the most important layers of Cloud Computing. However, there is an evident deficiency of mechanisms for analysis, comparison and evaluation of IaaS cloud implementations, since no unified taxonomy or reference architecture is available. In this article, we propose a unified taxonomy and an IaaS architectural framework. The taxonomy is structured around seven layers: core service layer, support layer, value-added services, control layer, management layer, security layer and resource abstraction. We survey various IaaS systems and map them onto our taxonomy to evaluate the classification. We then introduce an IaaS architectural framework that relies on the unified taxonomy. We provide a detailed description of each layer and define dependencies between the layers and components. Finally, we evaluate the proposed IaaS architectural framework on several real-world projects, while performing a comprehensive analysis of the most important commercial and open-source IaaS products. The evaluation results show notable distinction of feature support and capabilities between commercial and open-source IaaS platforms, significant

and capabilities between commercial and open-source IaaS platforms, significant deficiency of important architectural components in terms of fulfilling true promise of infrastructure clouds, and real-world usability of the proposed taxonomy and architectural framework.

## Highlights

• We propose a unified taxonomy and an IaaS architectural framework. • We introduce an IaaS architectural framework that relies on the unified taxonomy. • We provide a detailed description of each layer and define dependencies between them. • We evaluate the proposed taxonomy and the IaaS architectural framework. • Evaluation results show real-world usability of the proposed framework.



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## Keywords

Cloud Computing; Infrastructure as a service; Taxonomy; Architectural framework

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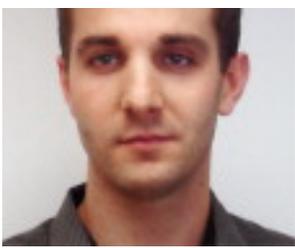
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