

A unified architecture of IaaS cloud solutions

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Robert Dukarić and Matjaž B. Jurič

XLAB and FRI



Univerza v Ljubljani
Fakulteta za računalništvo
in informatiko

- At least 50 different definitions of Cloud Computing.

The screenshot shows a Google search interface with the query "cloud computing". The search results are categorized into "Web", "Videos", "News", "Shopping", "Books", "Blogs", and "More". The "Web" category is expanded, showing several results:

- Oracle Cloud Computing - Your Strategy. Your Cloud.** (www.oracle.com/Cloud) - Your Choice. Find Out More Today. Solutions - Downloads - Partners - Technical Information
- Fasthosts Cloud - Need advice on moving to the cloud?** (www.fasthosts.co.uk/) - Free one to one consultation. 99.99% uptime guaranteed - Business continuity - What is Cloud Computing?
- HP Cloud Computing | hp.com** (www.hp.com/Cloud_Computing) - Realise the Power of the HP Cloud Computing Portfolio. Learn More.
- Cloud computing - Wikipedia, the free encyclopedia** (en.wikipedia.org/wiki/Cloud_computing) - Cached. Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name ...
- Cloud storage** - Cloud computing comparison - Cloud computing security - Intercloud

There are also several advertisements on the right side of the page:

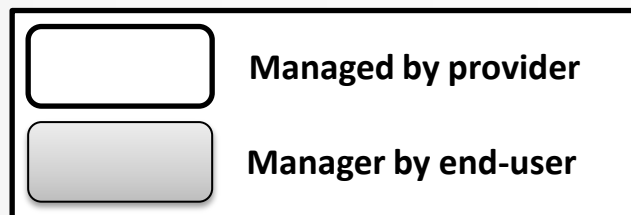
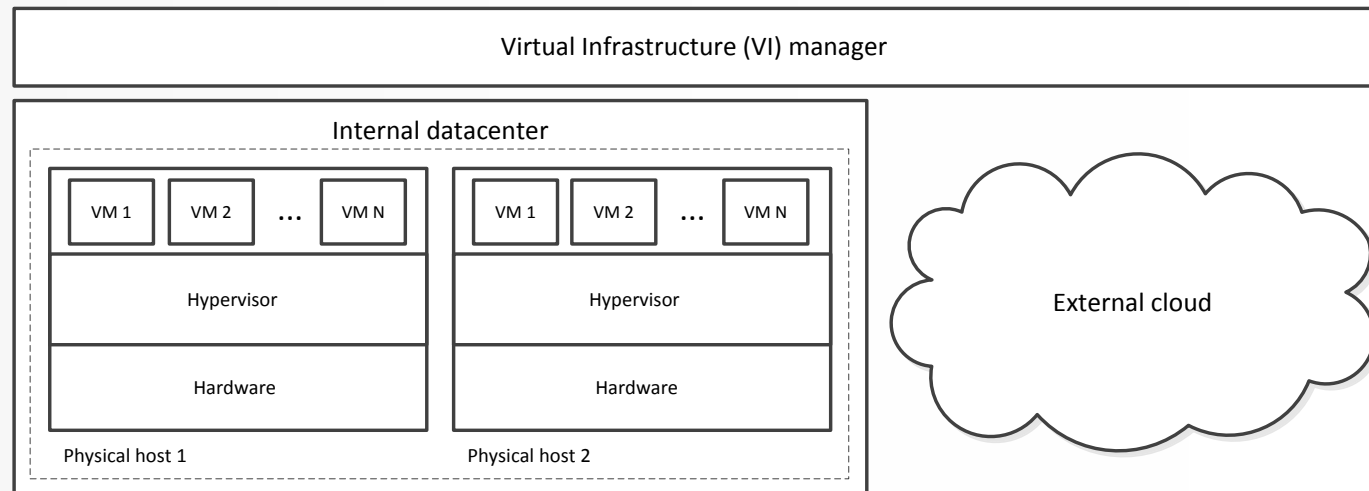
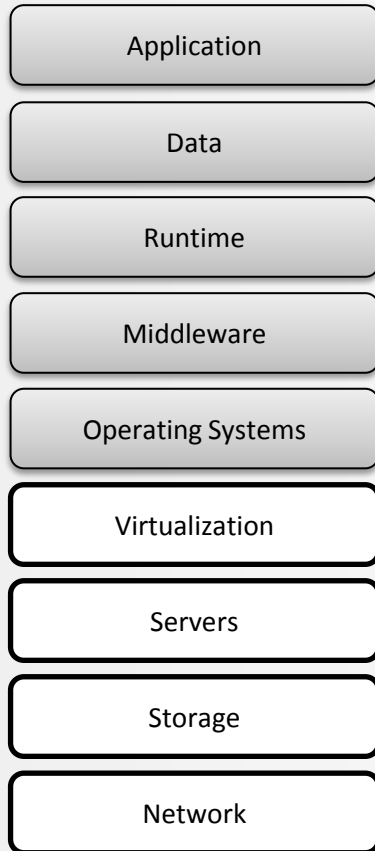
- Cloud Computing** (www.pulsant.com/CloudComputing) - 100% Uptime & 24/7 Support. High Performance Cloud Computing
- Microsoft Cloud Computing** (www.microsoft.com/readynow) - Be Ready For The Future. Learn More About Microsoft® Private Cloud!
- Cloud Computing** (www.google.com/Apps) - Reduce Costs, Increase Mobility with Google Apps. Free 30 Day Trial
- Secure Cloud Computing** (www.opsources.net/CloudComputing) - Specialist Managed Cloud Computing Provider. Scalable & 24/7 Support!
- Cloud Computing**

The search bar shows "cloud computing" and the search button is a magnifying glass icon. The search results show "About 332,000,000 results (0.23 seconds)".

- NO unified IaaS architecture is available.
- Many organizations do not take advantage of IaaS solutions, partly due to uncertainty and a lack of information about their capabilities.
- A mechanism for common understanding of IaaS technologies is required.

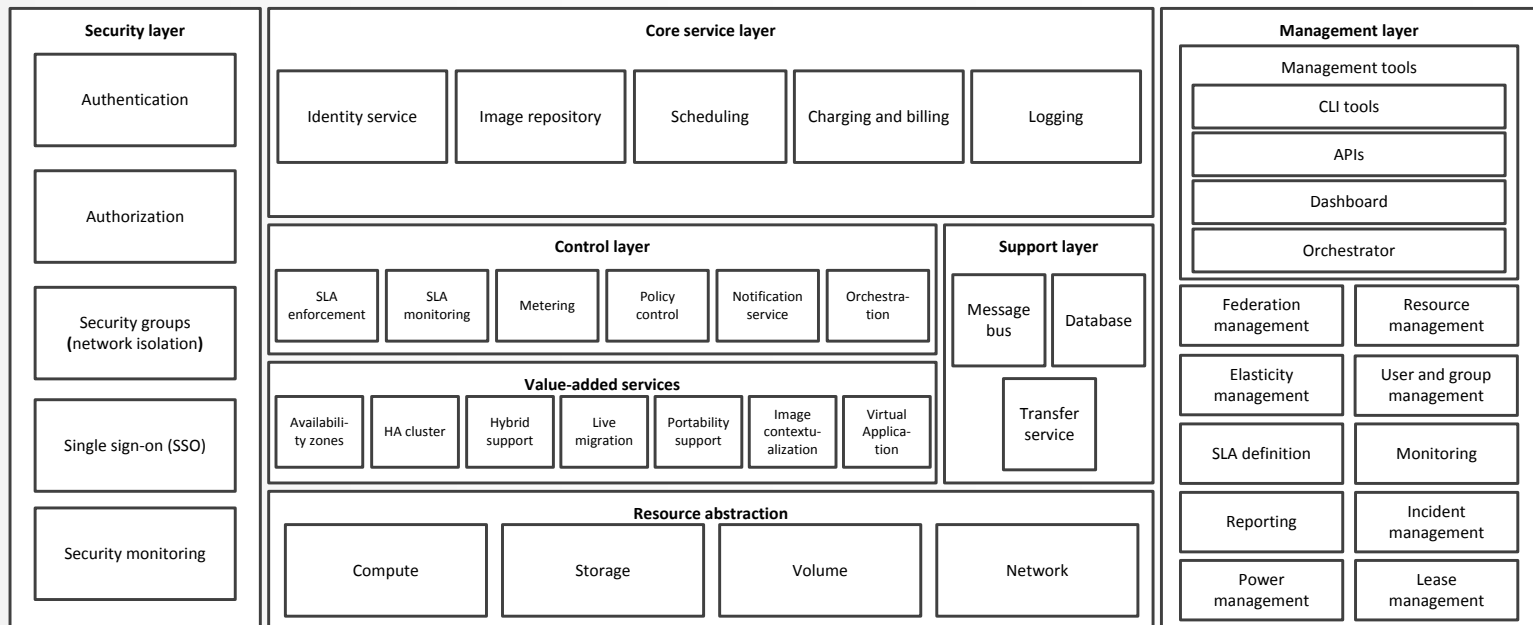
■ IaaS (Infrastructure as a Service)

IaaS



IaaS architectural framework

- The goal of the proposed architectural framework is to
 - 1) present a common ground for analysis, comparison and evaluation of IaaS cloud implementations,
 - 2) organize the essential architectural components into layers, and
 - 3) define dependencies between particular layers and components



- 44 components, 7 layers

Classification Evaluation

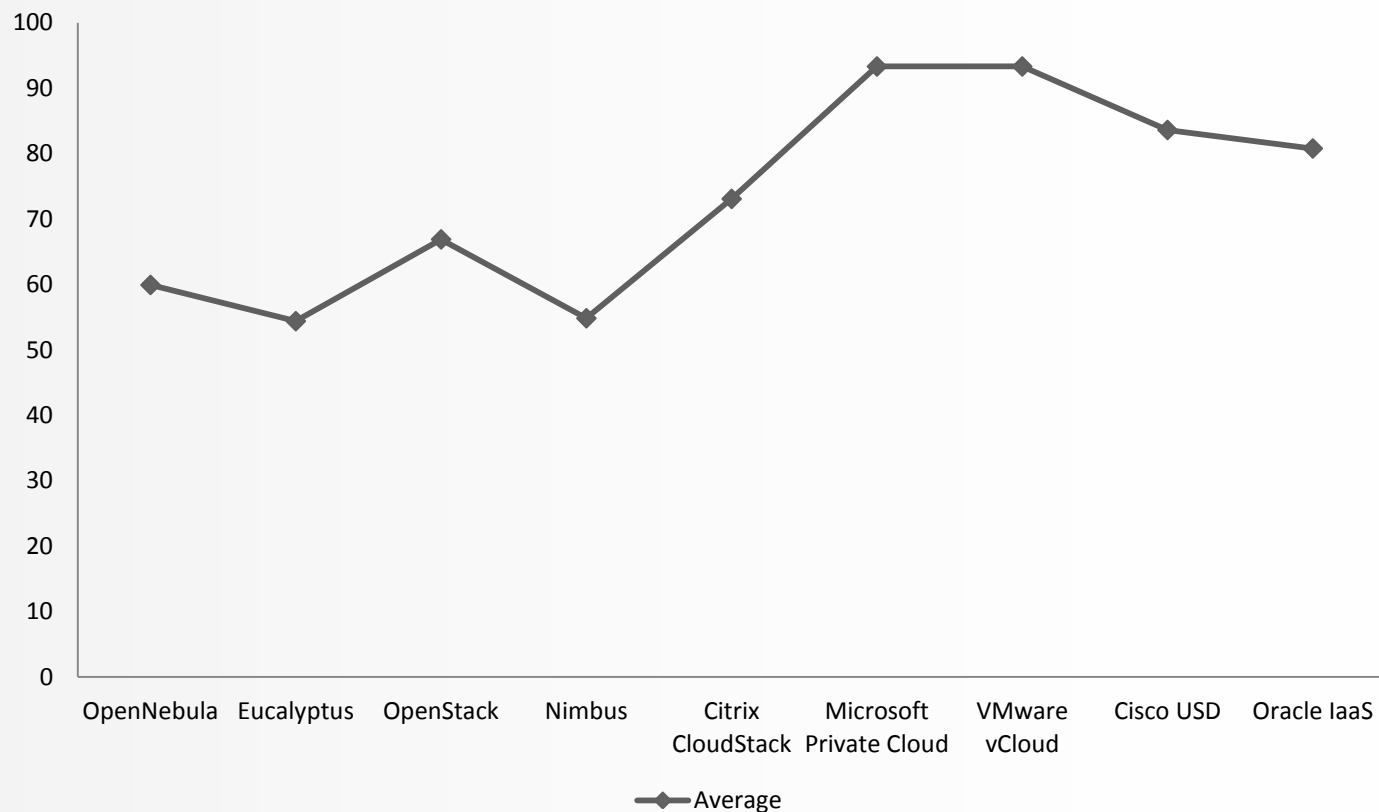
- We evaluated the classification by assessing five open-source and four commercial IaaS platforms, and mapped their capabilities to components and layers defined within our framework.

Layers	OpenNebula	Eucalyptus	OpenStack	Nimbus	Citrix Cloud Stack	Microsoft Private Cloud	VMware vCloud	Cisco USD	Oracle IaaS
Resource abstraction layer	100.00	100.00	100.00	100.00	100.00	75.00	75.00	75.00	75.00
Core service layer	80.00	60.00	80.00	60.00	100.00	100.00	100.00	100.00	100.00
Support layer	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Management layer	50.00	40.00	40.00	40.00	70.00	100.00	100.00	90.00	90.00
Management tools	75.00	75.00	75.00	50.00	75.00	100.00	100.00	100.00	75.00
Security layer	60.00	60.00	60.00	60.00	80.00	100.00	100.00	80.00	80.00
Control layer	0.00	0.00	0.00	0.00	16.67	100.00	100.00	66.67	83.33
Value-added services	14.29	0.00	0.00	28.57	42.86	71.43	71.43	57.14	42.86

Mappings between the proposed framework and chosen IaaS platforms

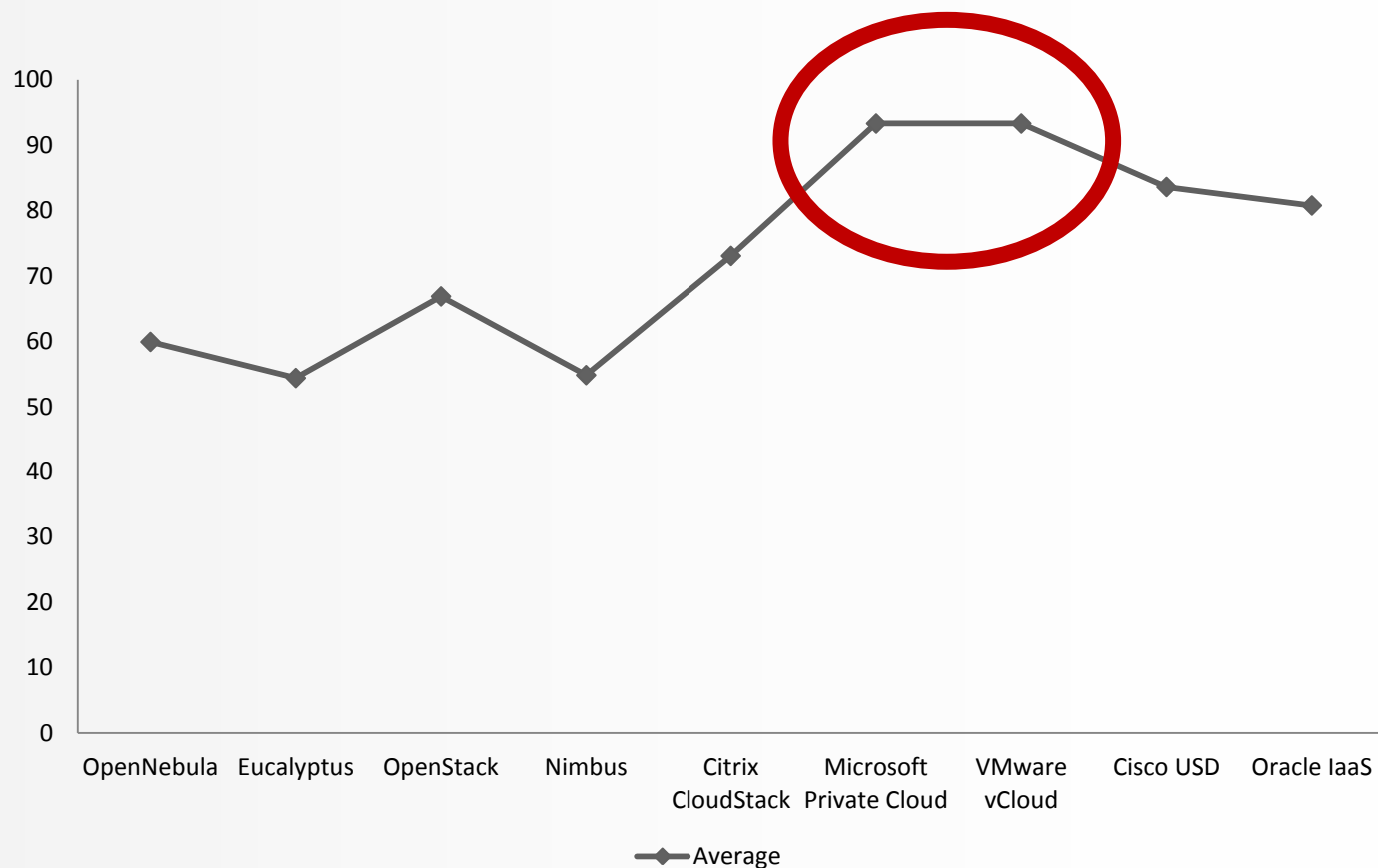
Classification Evaluation

- Average product coverage (%) of IaaS architectural framework



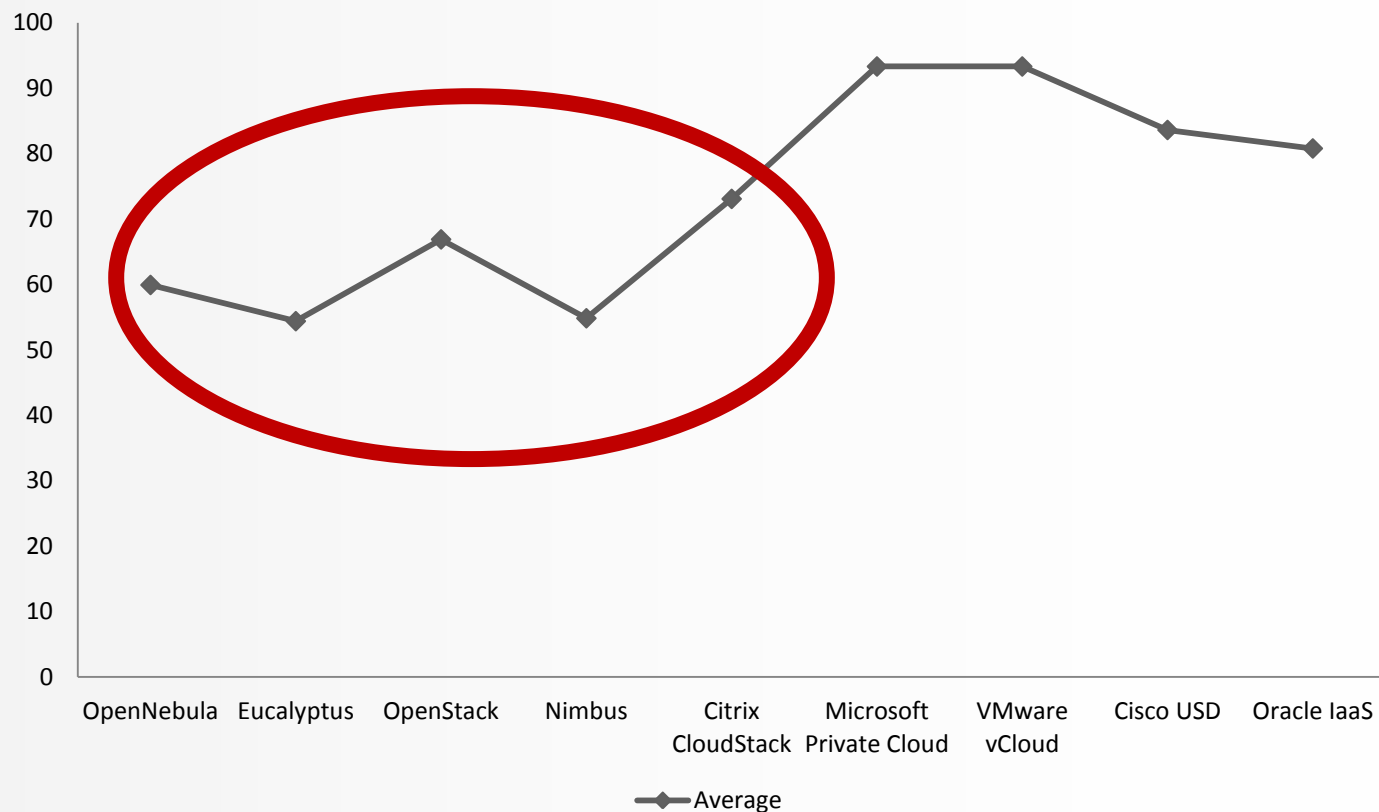
Classification Evaluation

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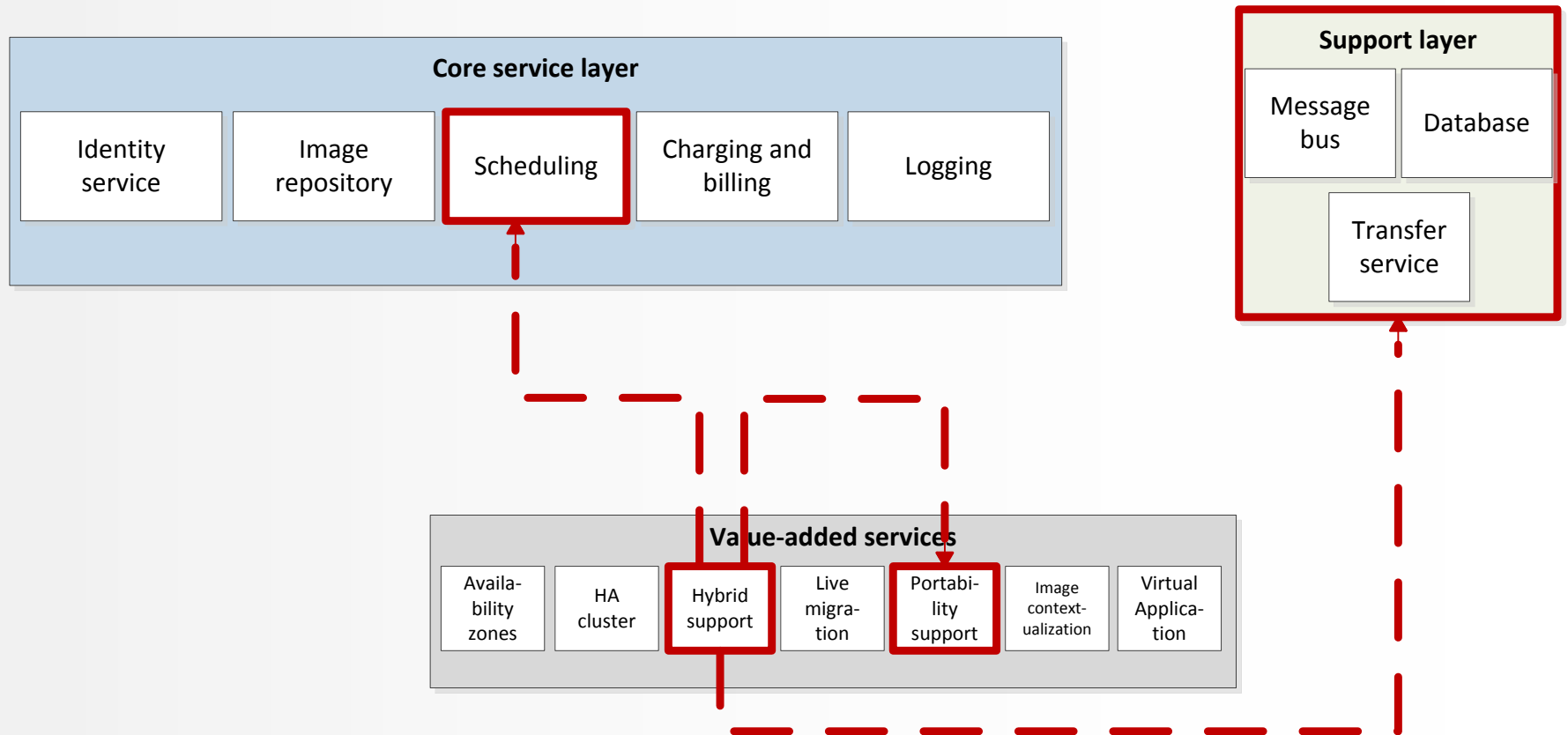
Classification Evaluation

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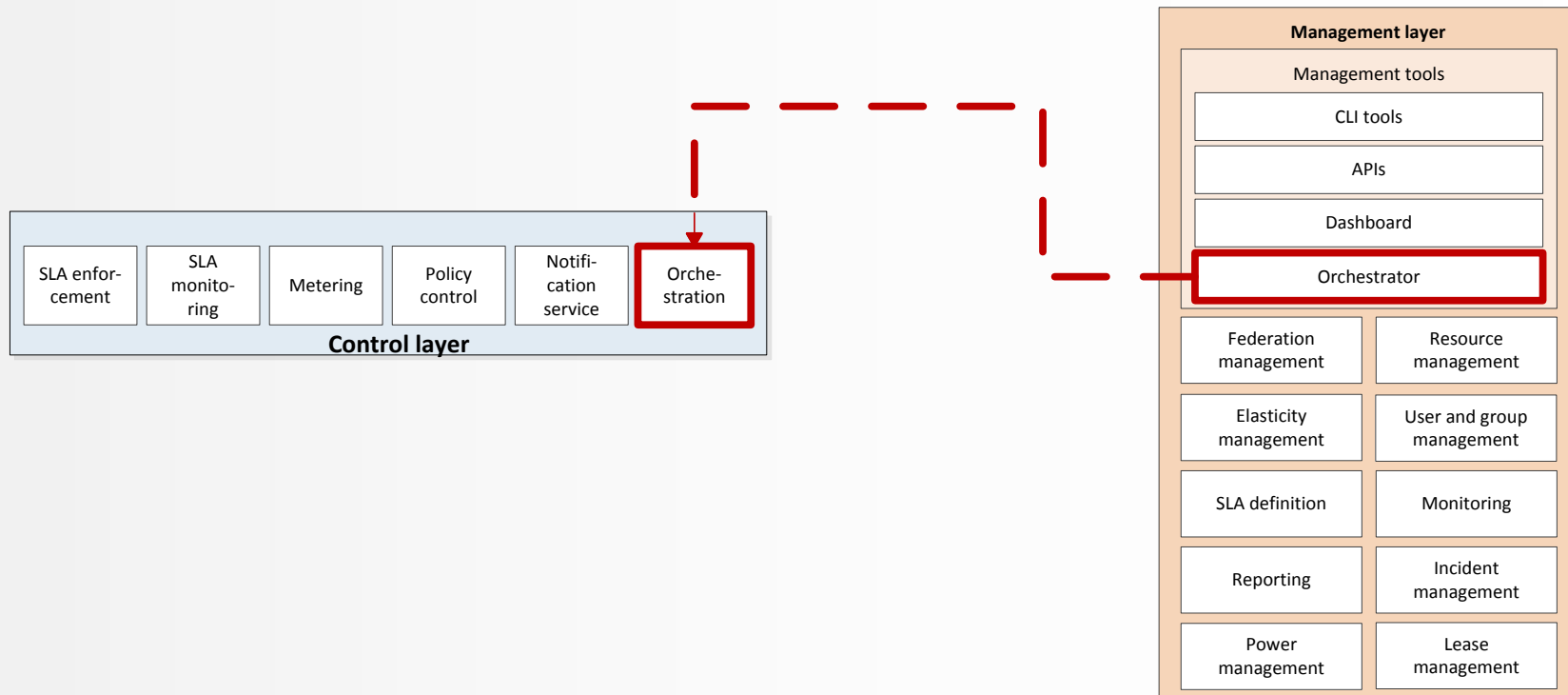
Functional Dependencies

- Example 1 (hybrid support – VaS)



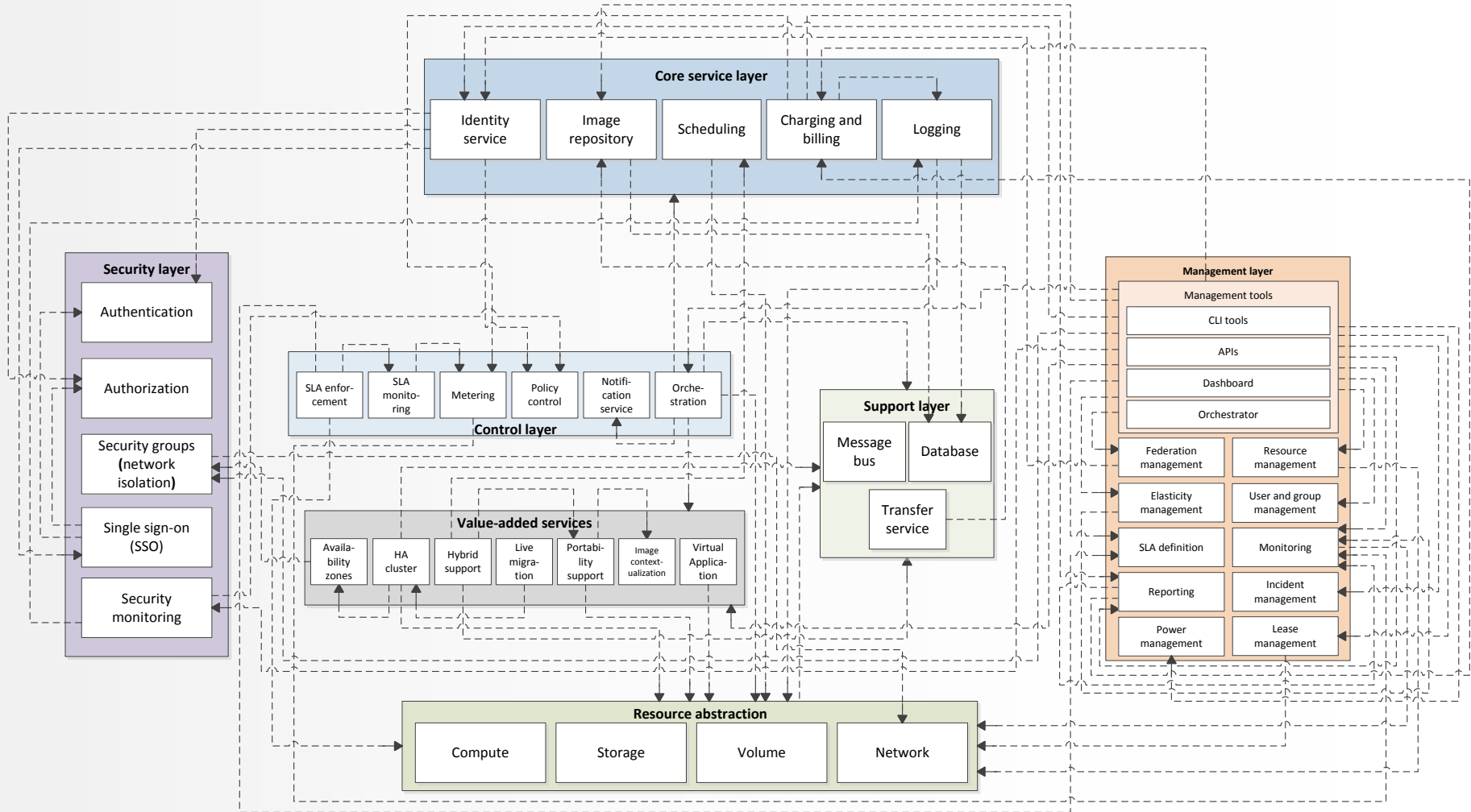
Functional Dependencies

- Example 2 (orchestrator component - management layer)



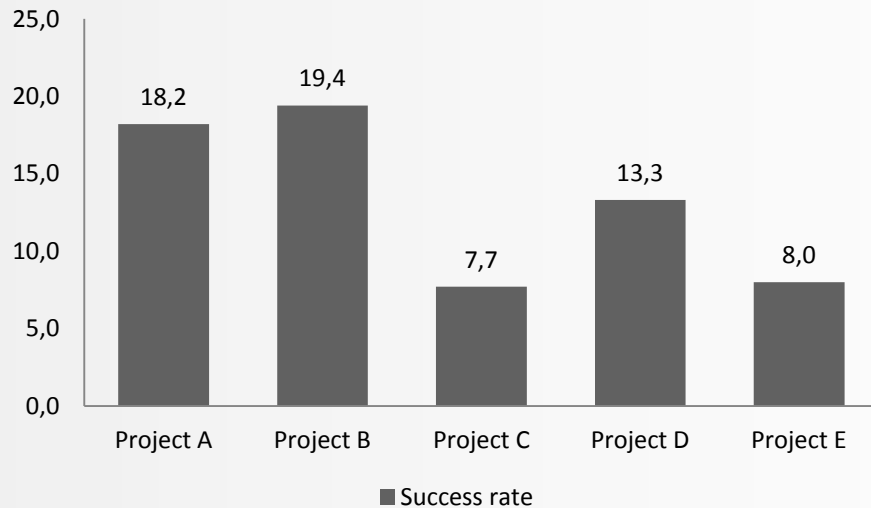
Functional Dependencies

- Functional dependencies between particular components

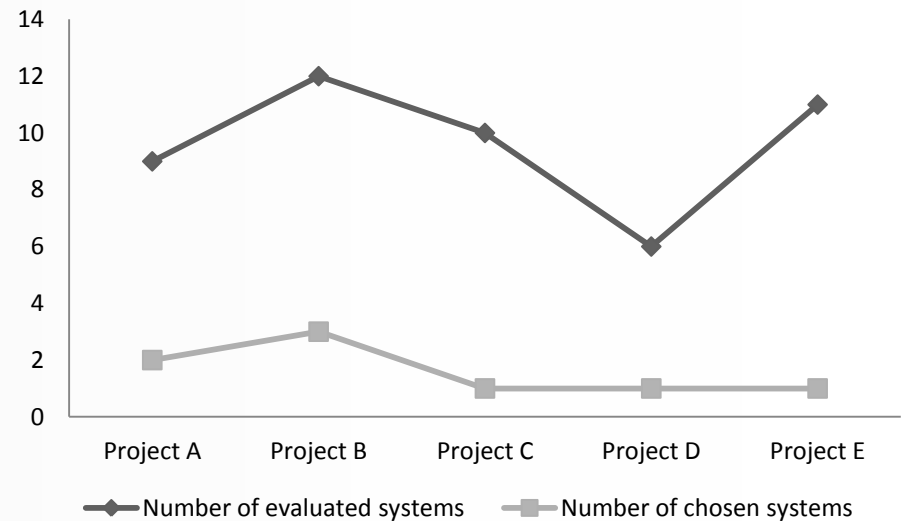


Evaluation and Results

- Success rate of particular project



- Number of evaluated/chosen IaaS systems

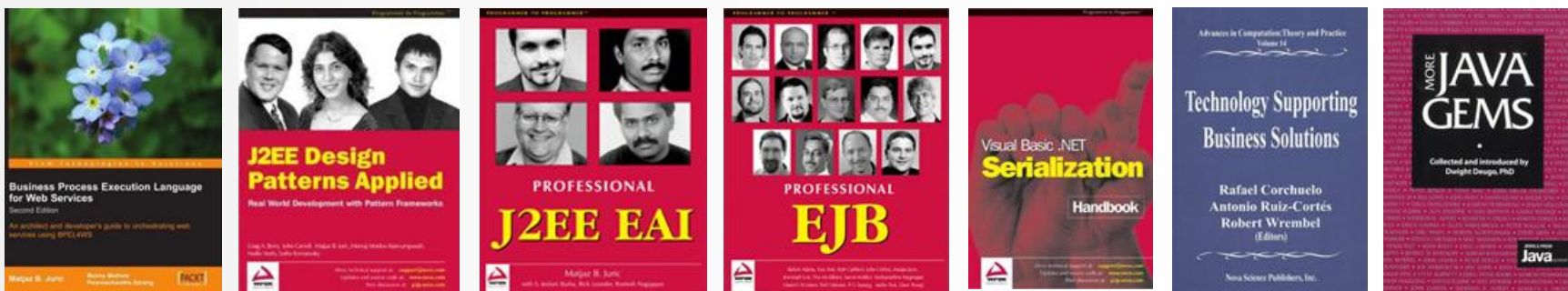


- Projects: KC Class, Telekom Slovenije...

Evaluation and Results

- The evaluation has shown:
 - 1) notable **distinction** of feature support and capabilities between **commercial** and **open-source** IaaS platforms,
 - 2) significant **deficiency** of **important architectural components** in terms of fulfilling true promise of infrastructure clouds, and
 - 3) **real-world usability** of the proposed architectural framework that facilitates the decision making in IT organizations for choosing the most suitable IaaS cloud solution

- Extended article was published in Future Generation Computer Systems – Elsevier (IF = 1.978)
 - DUKARIĆ, Robert, JURIČ, Matjaž B. **Towards a unified taxonomy and architecture of cloud frameworks**. FGCS, Future gener. comput. syst.. [Print ed.], 2012, str. [1-29], ilustr.
<http://www.sciencedirect.com/science/article/pii/S0167739X12001793?v=s5>, doi: 10.1016/j.future.2012.09.006. [COBISS.SI-ID 9458772]



HVALA!



e-naslov: <http://www.cloud.si>

e-naslov: <http://www.soa.si>

e-pošta: info@cloud.si