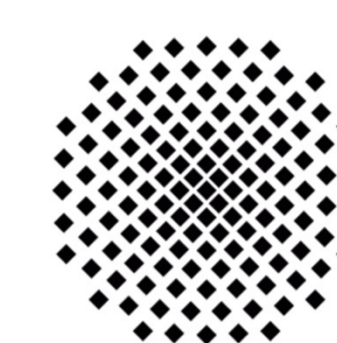


# Decision Support for Application Migration to the Cloud: Challenges and Vision



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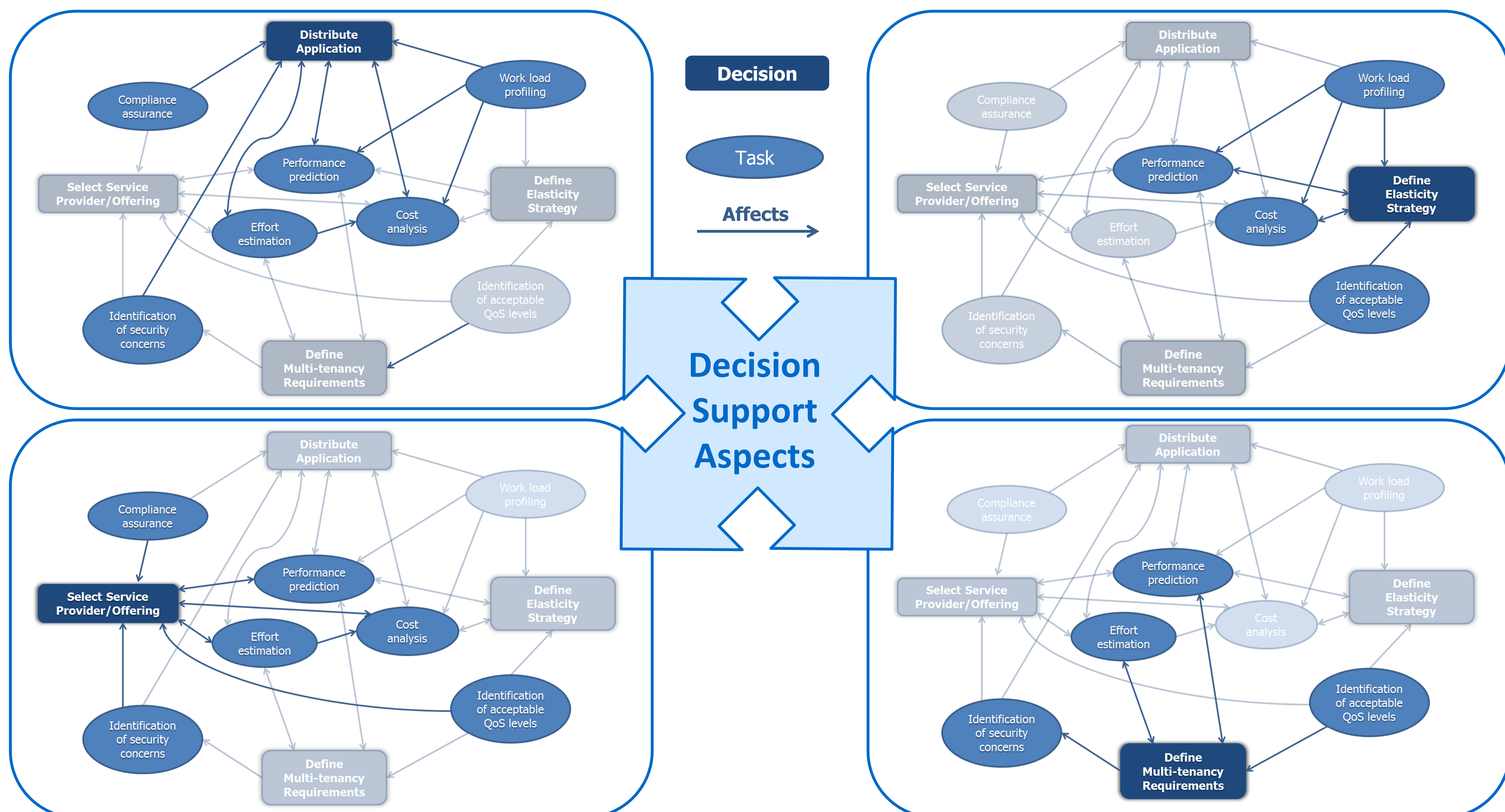
## Application Migration & Research Challenges

The success of Cloud computing has encouraged many application developers to consider migrating their applications to the Cloud. Given the early market dominance of the IaaS service model, many existing works focus on selecting the best service provider for a set of criteria related to the virtualization and hosting of the application. In this work, we aim to progress the State of the Art by formulating a vision of a decision support system that incorporates multiple dimensions and different analysis tasks in feedback relationships with each other. The research challenges that need to be addressed towards this direction are identified and related to the different aspects of migration of applications to the various Cloud service models.

More specifically, this work takes the position that migrating an application to the Cloud is a **multi-dimensional problem** with **multiple decision points** that create feedback loops with each other, and with **various analysis tasks** related to them. The contribution of this paper is to identify these decision points and analysis tasks, and define their dependencies. Based on these results, a **vision** of a **Cloud migration decision support system** considering these aspects is provided. In order to reach this point however, a comprehensive analysis of the challenges related to migrating to the Cloud is required.

<b>Application Distribution</b>	<ul style="list-style-type: none"> <li>• How to estimate the effect of logical and physical distribution of the application?</li> <li>• How to address compliance across jurisdictional domains?</li> <li>• What is the trade-off between business resiliency and additional costs?</li> </ul>
<b>Migration &amp; Operation Costs</b>	<ul style="list-style-type: none"> <li>• How to identify the cheaper provider in the presence of different pricing models?</li> <li>• What is the trade-off between cost and performance?</li> <li>• How to decide which deployment option fits better the application work load profile?</li> <li>• What is the additional effort required for adapting the application to operate in the Cloud?</li> </ul>
<b>Elasticity</b>	<ul style="list-style-type: none"> <li>• How to decide which elasticity strategy to implement for a given application?</li> <li>• What is the effect of this decision to the operational costs of the application under different work loads?</li> </ul>
<b>QoS</b>	<ul style="list-style-type: none"> <li>• What is the acceptable level of Cloud service availability and performance variability for an application with respect to existing and future SLAs?</li> <li>• How to factor and address network latency in the performance analysis?</li> <li>• How does the choice of service provider affects this analysis?</li> </ul>
<b>Multi-tenancy</b>	<ul style="list-style-type: none"> <li>• Which Cloud service model to choose when considering the multi-tenancy needs of the application?</li> <li>• What is the effort required to implement multi-tenancy for the chosen service model?</li> </ul>
<b>Security &amp; Data Confidentiality</b>	<ul style="list-style-type: none"> <li>• What is the effort to (re-)engineer the application to incorporate security mechanisms like encryption of data?</li> <li>• Which part of the application data can be characterized as critical, and under which conditions can it be migrated to the Cloud securely?</li> </ul>

## Decision Support for Cloud Migration



## Further Information

### Selected Publications

Andrikopoulos, A., Binz, T., Leymann, F., Strauch, S.: How to Adapt Applications for the Cloud Environment – Challenges and Solutions in Migrating Applications to the Cloud. In: Springer Computing (to appear, 2013). <http://dx.doi.org/10.1007/s00607-012-0248-2>

Strauch, S., Andrikopoulos, V., Bachmann, T., Leymann, F.: Migrating Application Data to the Cloud Using Cloud Data Patterns. In Proceedings of CLOSER 2013 (to appear).

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