International Journal of
Soft Computing and Software Engineering (JSCSE)
e-ISSN: 2251-7545
Vol.3,No.2, 2013
Published online: February 25, 2013

DOI: **10.7321/jscse.v3.n2.2**

Cloud Template, a Big Data Solution

Mehdi Bahrami

Electronic Engineering and Computer Science Department

University of California, Merced, USA

MBahrami@UCMerced.edu

Abstract. **Today the emerging field of cloud computing has become as a new concept for hosting and delivering different services over the Internet and network for dealing with big data issues. Cloud computing is attractive to different business owners of both small and corporations as it eliminates the requirement for end-users to plan ahead for provisioning a massive and expensive infrastructures, and allows corporations to start with low investment and increase resources on demand. Despite the fact that cloud computing offers huge opportunities to the both in-house IT and out-house IT industry, the development of cloud computing technology is currently has several issues, such as lack of customization. This study presents an idea for introducing concept of "Cloud Templates" which will be used for analyzing, designing, developing and implementing cloud computing systems. We present a template based design for cloud computing systems, highlighting its key concepts, architectural principles and state-of-the-art implementation requirements, as well as research challenges and future work requirements. The aim of this idea is to provide a concept for important area of big data.**

Keywords: *Software Architecture, Cloud Computing, Software Template, Big Data*

* Corresponding Author:
Mehdi Bahrami,
Electronic Engineering and Computer Science Department,
University of California, Merced,
5200 Lake Road, Merced, CA 95343, USA
Email: MBahrami@UCMerced.edu

1. Motivation

Currently, emerging field of cloud computing [10] provides several advantages, such as elastic resource on demand and uses pay-per-use basis [9]. However, still cloud computing system is immature and it requires improvement, in particular customization. For improving such issues we provide a concept of "Cloud Template" for handling big data.

This idea is based on the concept of natural cloud [2]. Different weather patterns are related to different cloud formations in the sky. Similarity, we can use different cloud templates as bases for designing a cloud computing [11, 12] systems with different characteristics.

First of all, this idea initiates the concept of various types of clouds in the sky. As shown in Figure 1, we have different characters of the cloud and each character has different style and makes different weather. It means different forms of a cloud are useful for different atmospheres and geographies. As a first step, we'll consider this idea which is based on natural cloud then we'll back to cloud template architecture.

International Journal of
Soft Computing and Software Engineering (JSCSE)
e-ISSN: 2251-7545
Vol.3,No.2, 2013
Published online: February 25, 2013
DOI: **10.7321/jscse.v3.n2.2**

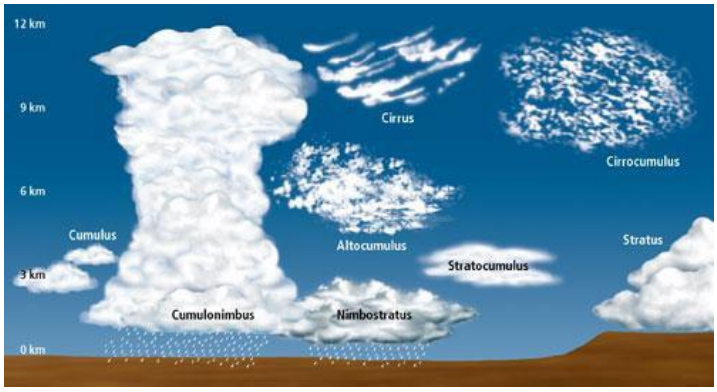

Figure 1. Various types of clouds [2]

2. Various types of Clouds:

Various types of clouds are available [2] in the sky and each of them has different purposes:

2.1. High-level Clouds

High-level clouds occur above about 20,000 feet (*abstraction level*). Due to cold tropospheric temperatures at these levels (*feature*), the clouds primarily are composed and forms of ice crystals (*feature*), and often appear thin, streaky, and white (*Shape*).

2.2. Mid-level Clouds

The bases of clouds in the middle level of the troposphere appear between 6,500 and 20,000 feet (*abstraction level*). Depending on the altitude, time of year, and vertical temperature structure of the troposphere, these clouds may be composed of liquid water droplets, ice crystals, or a combination of the two, including super cooled droplets (*feature*).

2.3. Low-level Clouds

Low clouds occur below 6500 feet (*abstraction level*) and normally consist of liquid water droplets or even super cooled droplets, except during cold winter storms when ice crystals (and snow) comprise much of the clouds (*feature*).

3. Cloud Template

As mentioned in the last section each type of cloud has one or more characteristics and features. It means we can use this feature in computing systems when we need different types of computing in a cloud computing system, we can use a cloud, based on a selected template. This proposed idea which we called "Cloud Templates" is shown in Figure 2 and shows how we can design a cloud computing system by using a cloud template for different purposes (*different abstraction levels*) with a customization (*different features*) at high-level design.

As a first step for proposed idea, we should choose a preferred cloud template which is designed in high level abstract. Then we will have a customized cloud architecture based on the selected cloud template. As a result, we will have different cloud computing systems for different applications with collaboration between each of them.

International Journal of
Soft Computing and Software Engineering (JSCSE)
e-ISSN: 2251-7545
Vol.3,No.2, 2013
Published online: February 25, 2013
DOI: 10.7321/jscse.v3.n2.2

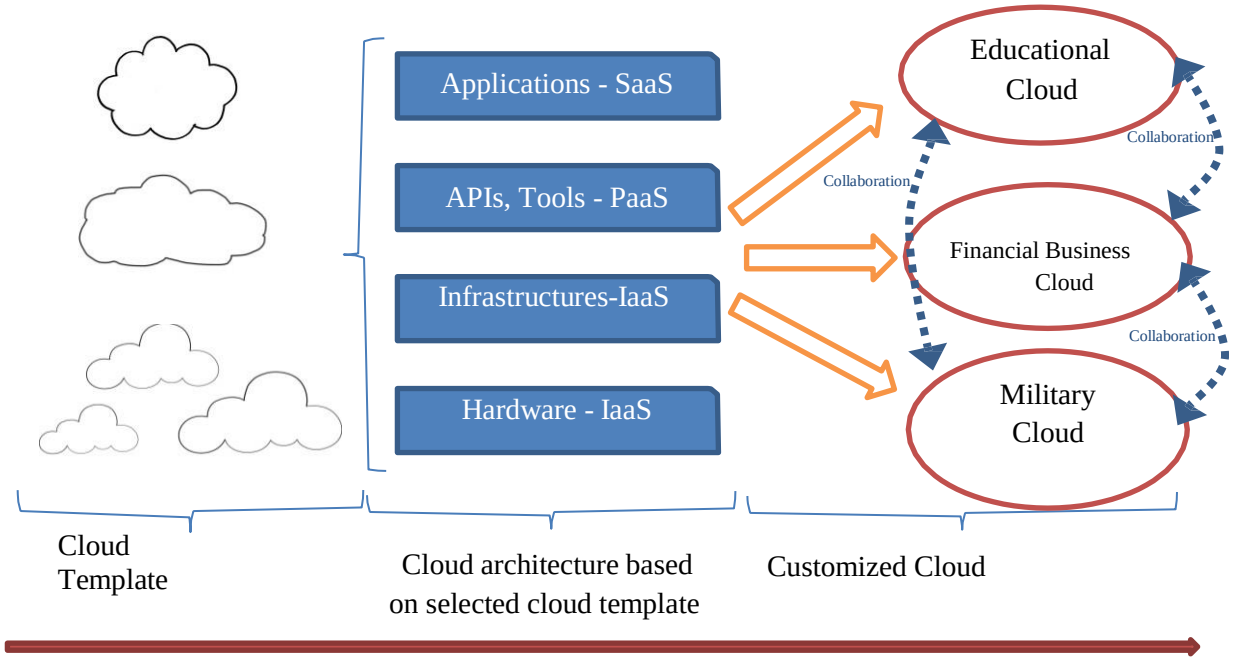

Figure 2. Template based Design

4. Why we need different cloud templates:

As mentioned in [1, 3-8, 13], we have several issues in designing a cloud computing system and we need a high-level design to overcome to potential issues. We can use cloud templates to solve or improve these issues:

1- **Complexity:** Cloud computing systems often are complex. So, by introducing different levels of abstract in high level design and implementation of a cloud by a template, we can overcome complexity.
2- **Flexibility in cloud architecture:** This proposed idea helps us to customize cloud computing architecture based on selected template.
3- **Different templates for different applications:** Introduce different type of cloud computing systems based on different applications.
4- **Different templates for different business types:** Small business owners need small architecture. A cloud template helps small business owners to have their own clouds, without considering detail of the cloud. However other business, such as enterprise, should use other cloud templates for more detail and for different applications.
5- **High level design:** When we design a cloud template with a security plan [24, 27], stability plan [27], reliability plan [24, 27] in a high-level design [28], then this template could be used in the lower level with more reliable, secure and stable features.
6- **Define cloud collaboration in high level design:** When we design a template and customize it for future collaboration [21, 29, 30], then we will have a simple way for collaborating in the cloud.

International Journal of
Soft Computing and Software Engineering (JSCSE)
e-ISSN: 2251-7545
Vol.3,No.2, 2013
Published online: February 25, 2013
DOI: **10.7321/jscse.v3.n2.2**

5. Future Work and conclusion:

This is a new idea and concept and it requires more study as we list below:

1- How we can implement some tools for developing and designing a cloud template with different features.
2- How we can have different abstract level for cloud computing systems based on each template.
3- How the proposed idea could customize the cloud computing layer architectures (SaaS, PaaS, IaaS).
4- How a cloud template could help us in a cloud computing collaboration between different clouds.
5- How cloud template could make a connection to public, private and hybrid clouds.

With the emergence of cloud computing system as one of the feature of a computer science paradigm in which computing requires exclusively on resources leased when needed from big data centers, scientists, and small company with low-investment are faced with a new platform option. However, the initial target often cloud computing system does not match the characteristics, features of the scientific computing workloads, such as High-Performance Computing (HPC), also often scientists and vendors are require customize their own cloud environment based on their requirement and requests. In this paper, we introduced an idea and concept in a high level design of cloud computing architecture for overcoming to cloud computing issues. Our main finding is that the cloud computing systems are requiring a revolution any approaches such as using cloud template for different purposes.

References:

[1] Santosh Kumar, R. H. Goudar, "Cloud Computing – Research Issues, Challenges, Architecture, Platforms and Applications: A Survey", International Journal of Future Computer and Communication, Vol. 1, No. 4, December 2012.
[2] www.jason.org/digital_library/201.aspx retrieved on March 6, 2013.
[3] T. Dillon, C. Wu, E. Chang, "Cloud Computing: Issues and Challenges," 2010 24th IEEE International Conference on Advanced Information Networking and Applications(AINA), pp. 27-33, DOI=20-23 April 2010.
[4] J. F. Yang, Z. B. Chen, "Cloud Computing Research and Security Issues," 2010 IEEE International Conference on Computational Intelligence and Software Engineering (CiSE), Wuhan pp. 1-3, DOI=10-12 Dec. 2010.
[5] S. Zhang, S. F. Zhang, X. B. Chen, X. Z. Huo, "Cloud Computing Research and Development Trend," In Proceedings of the 2010 Second International Conference on Future Networks (ICFN '10). IEEE Computer Society, Washington, DC, USA, pp. 93-97, DOI=10.1109/ICFN.2010.58, 2010
[6] B. Grobauer, T. Walloschek, E. Stöcker, "Understanding Cloud Computing Vulnerabilities," 2011 IEEE Security and Privacy, pp. 50-57, DOI= March/April 2011.
[7] W. A. Jansen, "Cloud Hooks: Security and Privacy Issues in Cloud Computing, "Proceedings of the 44th Hawaii International Conference on System Sciences, 2011.
[8] Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., ... & Zaharia, M. "A view of cloud computing", Communications of the ACM,53(4), 50-58, 2010.
[9] Mell, P., & Grance, T.,"The NIST definition of cloud computing (draft).", NIST special publication, 800(145), 7, 2011.
[10] Foster, I., Zhao, Y., Raicu, I., & Lu, S. "Cloud computing and grid computing 360-degree compared", In Grid Computing Environments Workshop, 2008. GCE'08 (pp. 1-10). IEEE, 2008.
[11] Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. "Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility", Future

International Journal of
Soft Computing and Software Engineering (JSCSE)
e-ISSN: 2251-7545
Vol.3,No.2, 2013
Published online: February 25, 2013
DOI: **10.7321/jscse.v3.n2.2**

Generation computer systems, 25(6), 599-616, 2009.
[12] Youseff, L., Butrico, M., & Da Silva, D., "Toward a unified ontology of cloud computing", In Grid Computing Environments Workshop, 2008. GCE'08 (pp. 1-10). IEEE, 2008.
[13] Vouk, M. A. "Cloud computing–issues, research and implementations." Journal of Computing and Information Technology", 16(4), 235-246, 2004.

Revised edition