Cloud Computing SaaS Paradigm for Efficient Modelling of Solar Features and Activities

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ABSTRACT

Cloud computing is one of the promising approaches that add a lot of revolutionary contribution to power many real life applications. More power is gained by the ability of such approach to handle different programming languages that were previously handled by one standalone platform (normal computer) only. There are many different solar activities that originate from the Sun and may extremely impact daily life. The existence of these activities is highly associated to different solar features that can be modelled using the huge number of available solar images. There are many different agencies that analyse these images to visualize these activities and features. In this paper, a new cloud-based service that allows efficient and remote access for the users and specialists in the Solar imaging field is proposed without overwhelming the users with any software installation, maintenance, and not requiring them to upgrade to new releases of this service. It is aimed to provide such a service in real time using cloud computing capabilities while saving the cost of procuring resources.

Keywords: Cloud Computing, Image Processing, MATLAB, SaaS, Solar Activities, Solar Features, XML Files

1. INTRODUCTION

In this section, the concept of cloud computing, its architecture, configurations, important advantages, possible applications and capabilities will be covered. Also, a quick review of solar features and activities, their association, their available images and the possible modelling approaches will be pointed out. Problem statement and the driving motivation of the proposed works represented in section 2 while in section 3 the proposed utilization of the cloud-based computing is pointed out. Section 4 concludes the work and paves the way for future deployment of related research.

1.1. Cloud Computing

Cloud computing is describes an internet based model that allows the global, convenient, easy and on-demand remote access to public or private shared network of configurable virtualized...
computing resources that could include hardware and software (e.g. network components, servers, data storage, applications, protocols, and (or) services). These resources can be quickly and dynamically released, leased, upgraded, provisioned with minimal management, maintenance, and (or) service provider interaction to guarantee the maximal utilization (Avouk, 2008; Arumbrust et al., 2009; Mell & Grance, 2011; Vaquero, Rodero-Merino, Caceres, & Lindner, 2008).

Primarily, the architecture of this cloud model can be defined to have a front-end where the users (clients) initiate their tasks and requests (demands), and a back-end where the servers, data storage and most of the heavy processing are handled, Figure 1. These two ends are controlled by a middleware software (i.e. protocol) that ensures the maximal utilization of the available resources power and keeps smooth interaction between these two ends (Hill, Hirsch, Lake, & Moshiri, 2012; S. Zhang, Zhang, Chen, & Huo, 2010).

The following list outlines some compelling advantages of cloud based computing that makes it an attractive solution that cannot be overlooked and strongly stimulates the development of the work being proposed in this paper:

1. It reduces hardware and software demands on the user’s side. In other words, a simple cloud computing interface, such as a simple Web browser, will be enough to handle and run different difficult services (TOgraph & Morgens, 2008).
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