Update of the China-VO AstroCloud

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Abstract. As the cyber-infrastructure for Astronomical research from Chinese Virtual Observatory (China-VO) project, AstroCloud has achieved solid progress during the last year. The proposal management system and data access system were redesigned. Several new sub-systems were developed, including China-VO PaperData, AstroCloud Statics and Public channel. More data sets and application environments are integrated into the platform. LAMOST DR1, the largest astronomical spectrum archive, was released to the public using the platform. The latest progress will be introduced.

1. Introduction

AstroCloud (Cui et al. 2015) is a cyber-infrastructure for astronomy research initiated by Chinese Virtual Observatory (China-VO) under funding support from NDRC (National Development and Reform commission) and CAS (Chinese Academy of Sciences). Tasks such as proposal management, data archiving, data quality control, data release and open access, Cloud based data processing and analyzing, are integrated into
the physical distributed platform. It acts as a full lifecycle management system and gateway for astronomical data and telescopes.

2. New feature

Since its lunch on May 15, 2014, many new features and remarkable improvements have been made to the platform. The current system consists of five channels: Observation, Data, Tools, Cloud and Public.

![Channels of AstroCloud](image)

**Figure 1. Channels of AstroCloud**

The proposal submission sub-system (Xiao et al. 2015) was re-designed to provide flexible management features for telescope managers. Configuration parameters for back-end instrument, proposal submission, peer-review, and observation time allocation can be changed by telescope managers easily.

The data query and access sub-system (Fan et al. 2015) was improved for better performance and interoperability. Tens of datasets hosted at the platform can be queried and cross identified through a uniform interface. LAMOST DR1 (Luo et al. 2015), the largest astronomical spectrum dataset with 2.2M spectra, was opened to the public in March 2015 through the system.

A new dashboard is designed to give a user fast access points to frequently used resources and services, and summary information of the system and the user.

MADARA (Acquisition, Reduction and Analysis of Multi-wavelength Astronomical Data) is a Cloud Computing (Li et al. 2015) based teaching and research environment for astronomical lectures and graduate students. Commonly used software packages, for example IRAF, DS9, CASA, HEASOFT, SSW, IDL, Python, to process and analyze multi-wavelength observation data are pre-installed. A virtual machine instance with these packages can be initiated and ready for use in only few minutes.

The China-VO Paper Data Repository provides long-term storage and open access service for data from user papers, which includes but is not limited to tables, figures, pictures, movies, source codes, models, software packages mentioned in these scientific papers. A permanent but user specified URL will be provided for each item.

Public channel is a new feature especially developed for the public and amateur astronomers in the last year. Video streams provide live images taken from video cameras at different observatories. Gallery is a collection of beautiful pictures taken by AstroCloud users. China-VO Special is a collection of China-VO hosted services, for example Astronomical Dictionary and WWT Beijing Community.

On July 29, 2015, Popular Supernova Project was lunched. It is the first astronomical citizen science project in China as a joint venture between China-VO and Xingming
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Figure 2. Proposal Management System

 Amateur Astronomical Observatory. In the morning of Sep. 12, a supernova candidate was discovered by a 10-year old pupil. Inspired by the news, the number of registered users of the AstroCloud platform increased dramatically to 105K by the end of September. Two supernova candidates discovered by public users in October 2015 have been confirmed by professional observations.

 In addition to the above user facing channels, several crucial functions are provided by the backend platform. Two examples are given here.

  CSTNET passport, the combination of an email address and a password provided by China Science & Technology Network (CSTNET), that you use to sign in to supported services. If you don’t have a CSTNET passport, you can sign up for free at any time.

 Usage Statistics provide important statistical data about the platform of interest to users and administrators. For example, general weblog results and platform running status including online users, registered users, login numbers, etc., submitted proposals for telescopes, archived astronomical observation datasets and their latest progress (He et al. 2015), running status and number of virtual machine instances at each Cloud computing node.

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Sample: 211.87104166, -89.96046667, m31

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Figure 3. Data Query and Access System

References