



AstroCloud, a Whole Lifecycle Management Platform for Astronomical Data Based on Virtual Observatory and Cloud Computing

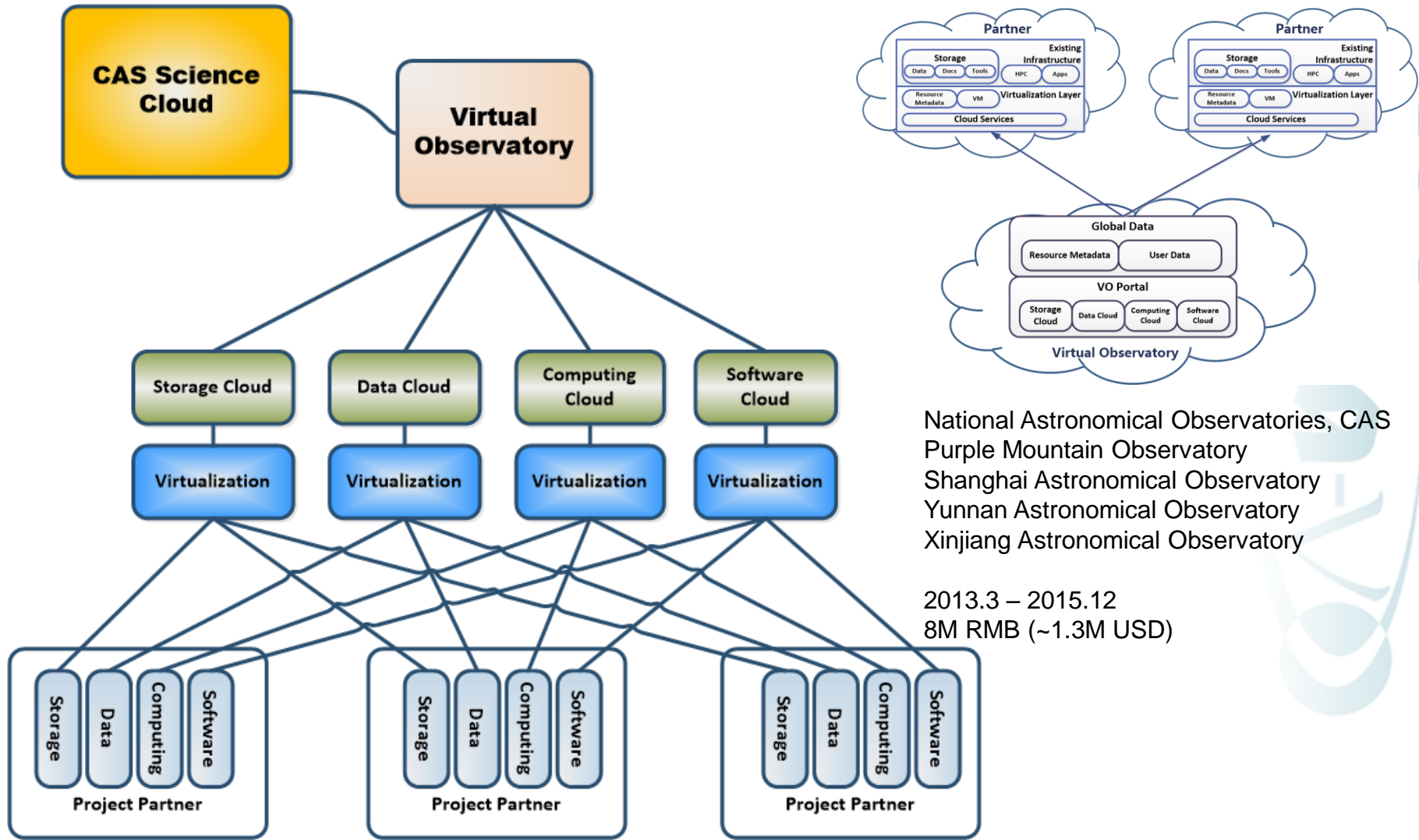
Chenzhou Cui

Chinese Virtual Observatory (China-VO)

National Astronomical Observatory of China

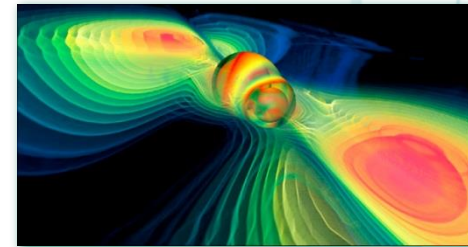
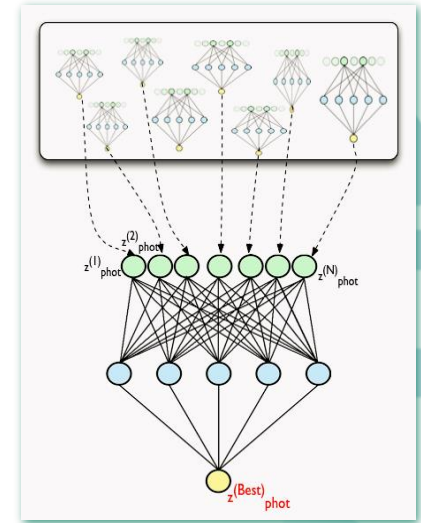
Ce Yu, Jian Xiao, Boliang He, Changhua Li, Dongwei Fan, Chuanjun Wang, Zhi Hong, Shanshan Li, Linying Mi, Wanghui Wan, Zihuang Cao, Jiawei Wang, Shucheng Yin, Yufeng Fan, Jianguo Wang, et al.

AstroCloud Project



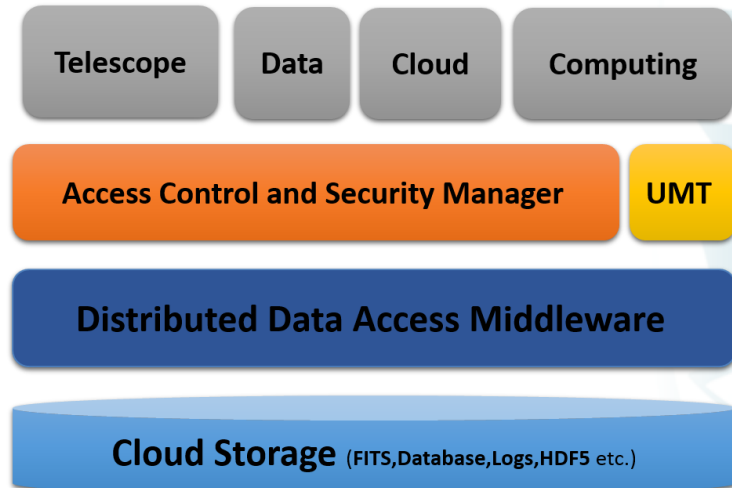
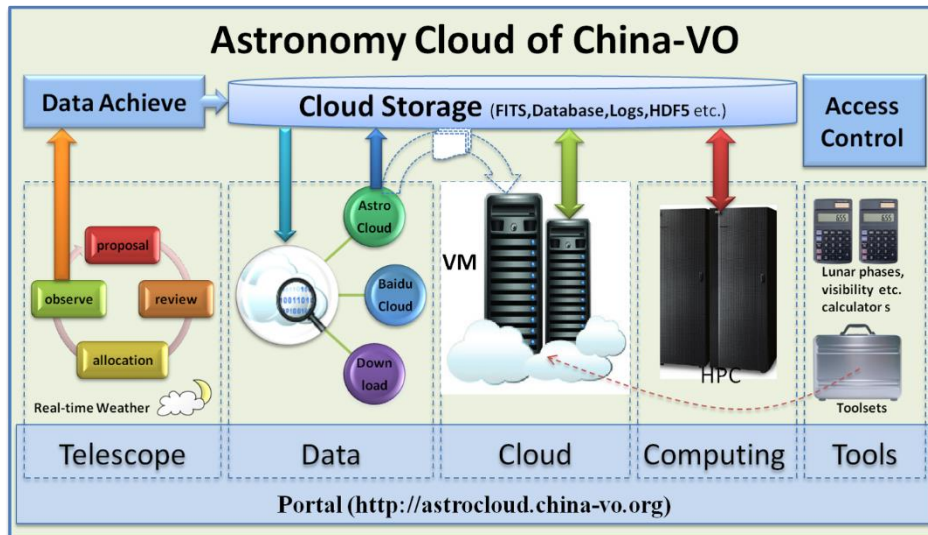
AstroCloud Major Functions

- Telescope Open Access
 - 2.4m, 2.16m, radio telescopes, public telescopes
- Data Discovery and Access
 - Virtual Observatory
 - Seamless astronomy
- Data Mining and KDD
 - Cloud computing
 - Software and tools
- Data Visualization
 - Interactive
 - On-the-fly



AstroCloud Architecture

- The ultimate goal of this project is to provide a comprehensive end-to-end astronomy research environment where several independent systems seamlessly collaborate to support the full lifecycle of the modern observational astronomy based on big data, from proposal submission, to data archiving, data release, and to in-situ data analysis and processing.





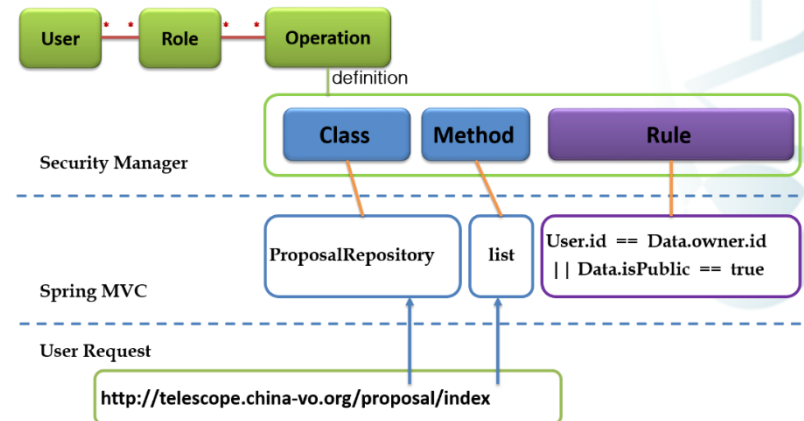
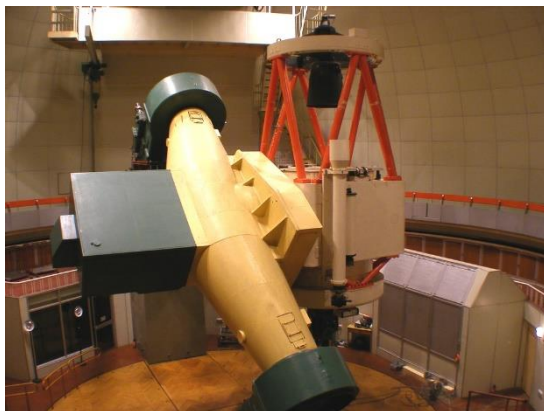
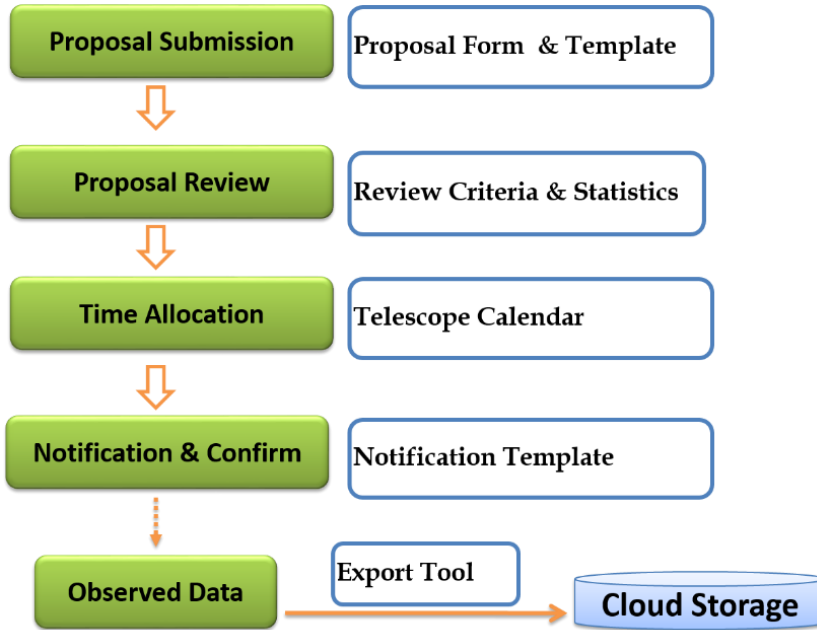
进入图库

2.4米望远镜时间申请指南

热点新闻

2.4米光学望远镜观测时间首次在线申请完成 丽江2.4米光学望远镜2014年下半年观测时间开始申请 2014年WWT全国教师培训
天文科技领域云试用版开始公开测试 天文观测数据的归档与发布技术培训举行 更多...

Proposal Submission and Management



YNAO 2.4m Proposal Management

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system management

users roles operations telescope proposal proposals formal exam reviews telescope management open time telescopes councils time allocation

Opentime management

New Save Delete

opentime detail

ID: 2
Instrument ID: 240
Year: 2014
Start date: 2014-01-01
End date: 2014-02-01

Opentime List

| ID | Telescope ID | year | Start Date | End Date | Instruction File |
|----|--------------|------|------------|------------|------------------|
| 1 | 240 | 2013 | 2013-11-01 | 2013-11-20 | Upload Download |
| 2 | 240 | 2014 | 2014-01-01 | 2014-02-01 | Upload Download |

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system management

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Edit Proposal

中国科学院云南天文台丽江高美古2.4米望远镜观测时间申请表

该在线观测时间申请表提供了一个完整的2.4米望远镜观测申请表。您可以在线完成该申请表的填写，然后提交就可以了。如果在有任何疑问，请发送邮件到如下地址：timeappadmin@ynao.ac.cn

提示: **指的是必填项。在填写所有的必填项之前，您不能提交您的申请。您可以通过点击 [申请表使用说明](#) 获取关于该申请表帮助信息，也可以通过点击每个部分的帮助按钮获取帮助信息。

注意: 填写完所有的表格之后，直接提交，不需要单独发送邮件到如上的地址；只有通过该在线系统提交的观测申请才有可能被望远镜科学委员会所接受。

观测者信息

说明: 请填写完主要申请人的所有信息(手机号码是选通的)，如有可能，应该提供协助参与者的姓名和单位，该协助观测者的姓名应该列在项目简介中。参与观测的所有人，除了主要申请人(但是包括协助观测者)都应该在下面的“其他观测者”列表中列出其相应信息。

PI* 姓名: 肖健 电话: 12345678

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system management

users roles operations telescope proposal proposals formal exam reviews telescope management open time telescopes councils time allocation

Proposal Management

New Edit Delete Assign Roles

Proposal Instructions

| Telescope ID | Telescope Name | From | To | Instruction |
|--------------|----------------|--------|------------|-------------|
| 1 | 240 | 云台2.4m | 2013-11-01 | 2013-11-20 |

Displaying 1 to 1 of 1 items

Proposal List

| program title | proposal ID | search |
|---|-------------|--------|
| Proposal ID PI cstnetID PI Name Program Title Requested Time From Requested Time To Proposal Status | | |
| 1 10001 hongzhi@jlu.edu.cn 洪智 search Mari 2014-01-01 2014-02-12 0 | | |

Displaying 1 to 1 of 1 items

Proposals

Title: project1
ProposalId: 20131030
need 20 hours
17:00-20:00

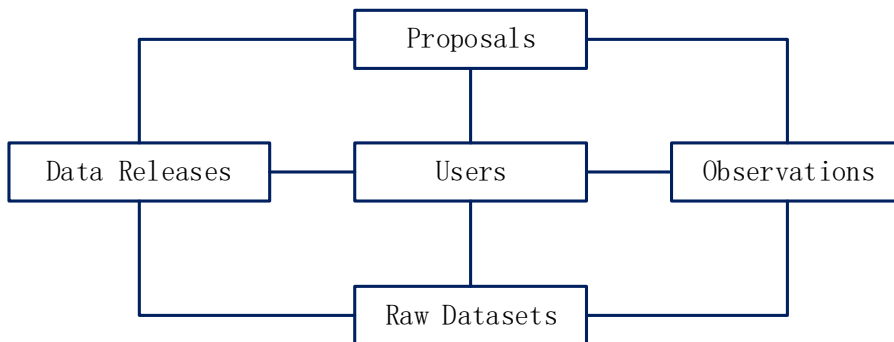
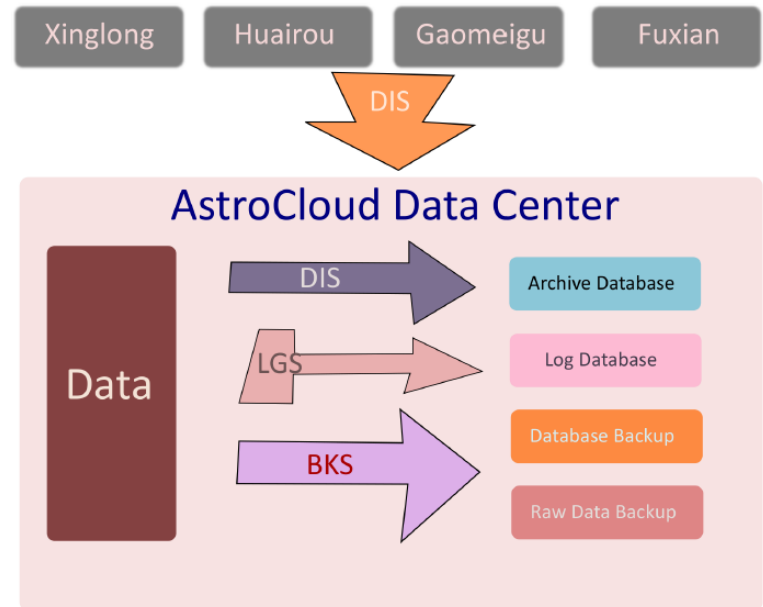
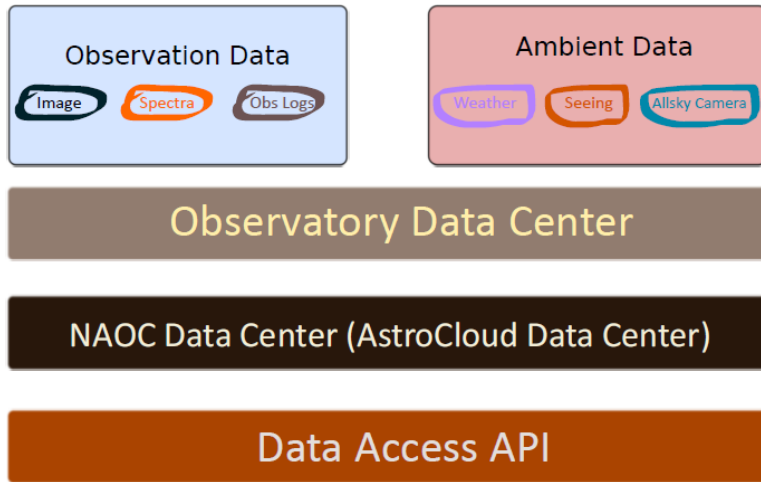
Title: project2
ProposalId: 20131120
need 13 hours
18:00-23:00

Submit

today Nov 17 — 23 2013 month week day

| | Sun 11/17 | Mon 11/18 | Tue 11/19 | Wed 11/20 | Thu 11/21 | Fri 11/22 | Sat 11/23 |
|---------|--------------------------------------|--------------------------|---------------------------|-----------------------|---------------------------------------|-----------------------|-----------------------|
| all-day | | | | | | | |
| 12am | | | 12:00 - 2:00 project1_ | | 12:00 - 3:00 project1- 20131030 | | |
| 1am | 1:00 - 4:00 project1- 20131030 | | | | | | |
| 2am | | | | | | | |
| 3am | | | | | | | |
| 4am | 4:00 - 6:00 project2_ | 3:00 - 5:00 project1_ | | 3:00 - project2-20131 | | | |
| 5am | | 5:00 - project2-20131 | | | | | |
| 6am | | | | | 4:00 - project2-20131 | 4:00 - project1-20131 | 4:00 - project1-20131 |
| 7am | | | | | | | |
| 8am | | | | | | | |
| 9am | | | | | | | |
| 10am | | | | | | | |
| 11am | | | | | | | |
| 12pm | | | | | | | |
| 1pm | | | | | | | |
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| 10pm | | | | | | | |

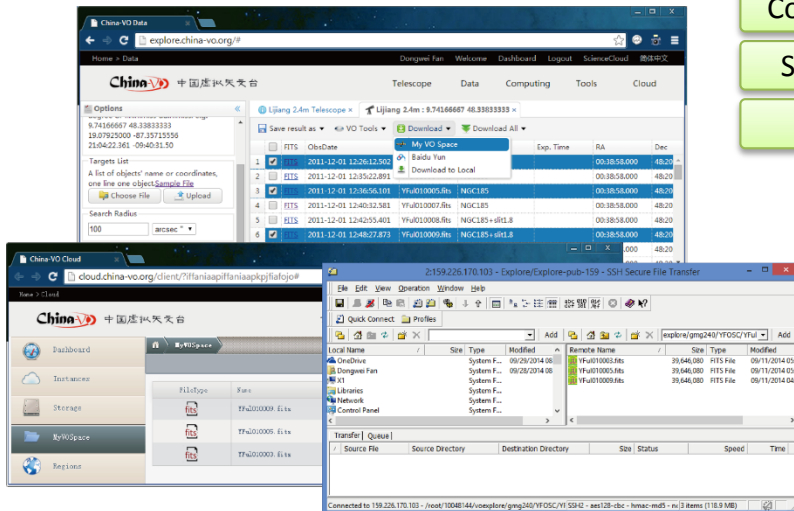
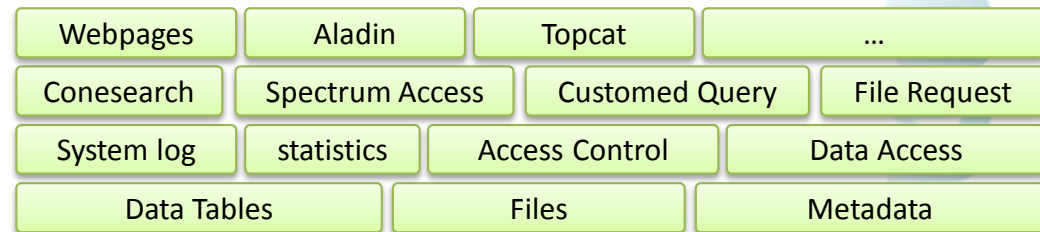
Data archiving and quality control



- data transfer
- data ingestion
- metadata management
- backup and security

Date exploration and interoperability

- Data channel connects the observation proposals, data, virtual machines and software. According to the unique ID system, data can be collected by PI's proposals, or by the search interfaces. Search results can be easily saved to cloud storages, including the storage with virtual machines, or several commercial platforms like Dropbox. VOTable formatted searching result could be sent to kinds of VO software.



Cloud Computing and VMs

- Based on CloudStack, we set up the cloud computing environment for AstroCloud. It consists of five distributed nodes across the mainland of China.
- Based on GlusterFS, we built a scalable cloud storage system. Each user has a private space, which can be shared among different virtual machines and desktop systems.

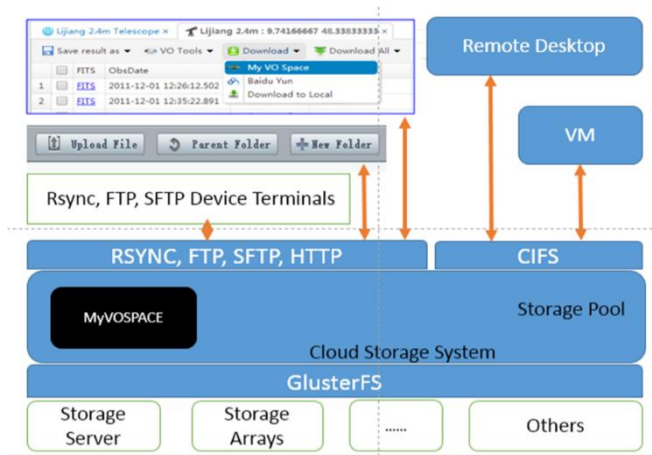


Fig. 4.1 the framework of MyVOSpace, cloud storage system and the relation with other components, technology.

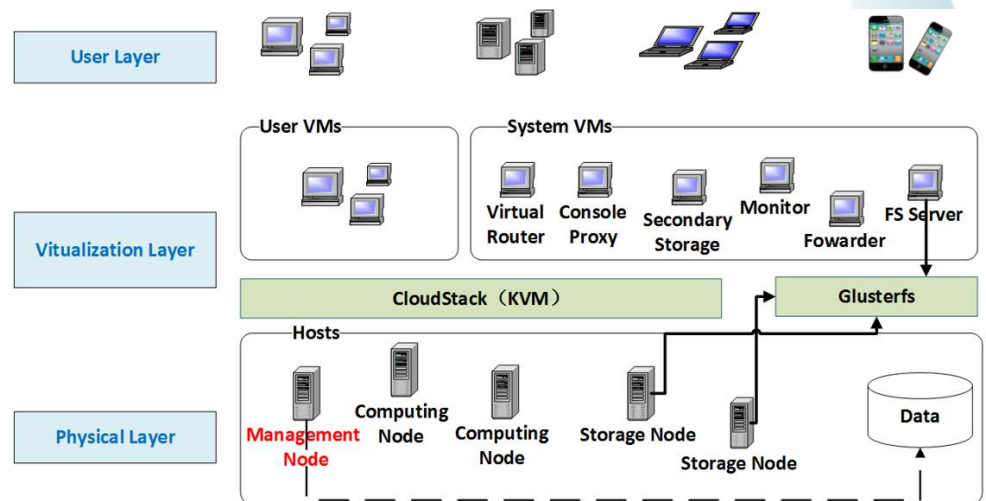
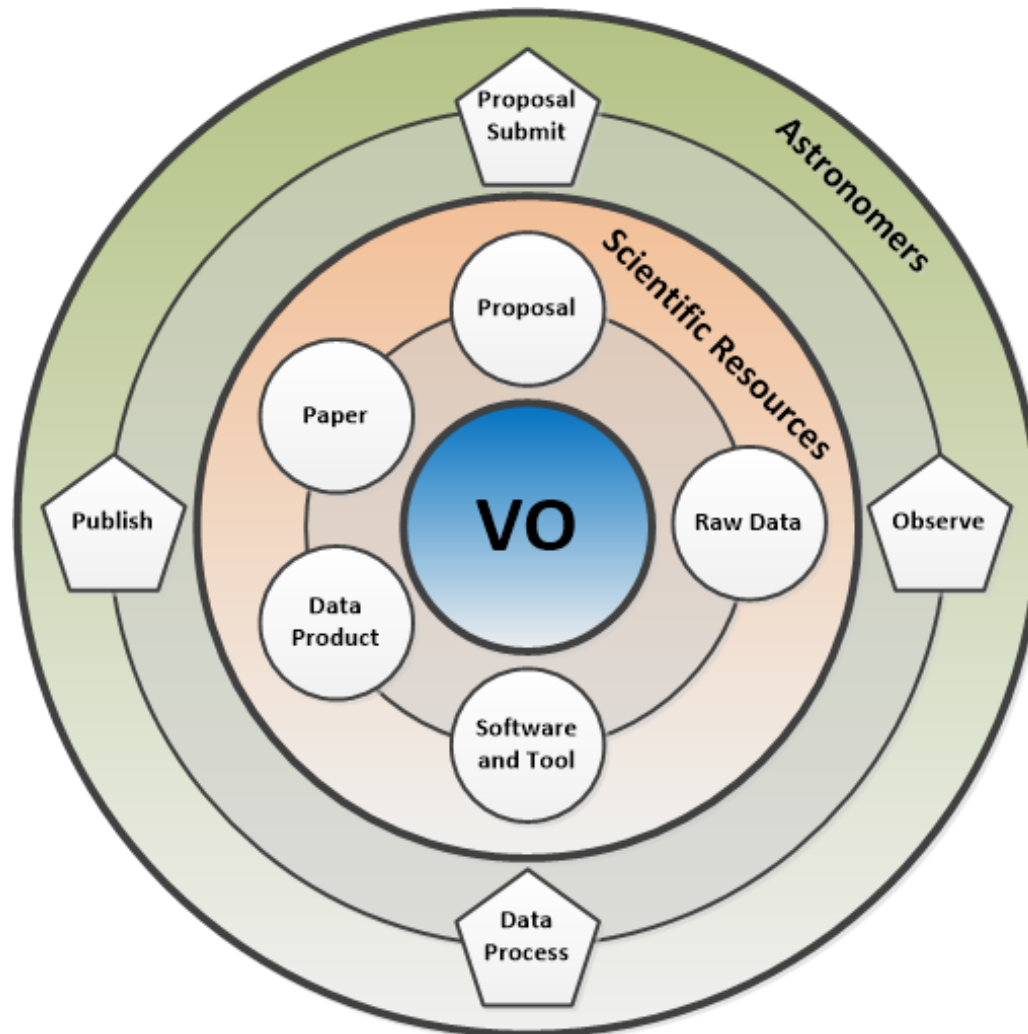


Fig. 2.1 The Architecture of Cloud Computing Environments for AstroCloud

Whole lifecycle management



China-VO

Timeline

- Project approved
 - 2013.3
- Alpha version and commissioning
 - 2014.5.15
- Beta version
 - early of 2015
- Operation
 - by the end of 2015



Current Status

- Registered users: 171 (by 2014.10.08)
- Cloud nodes: 3
 - Beijing, Kunming, Urumqi
- VM stances: 41
- Proposal management client: 1
 - YNAO 2.4 telescope
 - NAOC 2.16 telescope
 - Xinjiang 25m radio telescope
- Datasets collected in China: 7
 - LAMOST、BATC、CSTAR、SCUSS、AST3、Bootes-4、2m4
- User contributed photographs: 41



IVOA Recommendations Involved

- Metadata
 - UCD
 - VORegistry
 - VOResource
- Data access protocols
 - ConeSearch, SSA
 - TAP, SIAP
- SAMP, WebSAMP
- VOSpace



AstroCloud: prospects

- An information and data management system for Chinese telescopes
 - Astronomical Resource Planning platform
- A gateway for astronomical data
- A data mining and scientific discovery environment for astronomical research
- A test bed for VO technologies

VO, from “virtual” to “physical”

Special thanks to directors of the 5 observatories, CAS



Thank You!



<http://astrocloud.china-vo.org>

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