

# VAO VOSpace 2.0 implementation

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# Design goals

- Full compatibility with the IVOA VOSpace 2.0 specification
- High scalability on large cluster
- Possibility of minimal installation on small cluster with minimal hardware requirements
- Modular architecture allowing to choose the desired system design

# Components

- The VOSpace core – Java REST web-service
- MySQL database – users, transfer jobs, searchable metadata
- Data backend – plugins for minimal and large
- Queueing system – async jobs
  
- Web UI

# Development installation

## Web UI

- <http://tempssdss.pha.jhu.edu:8080/vospace-2.0>

## REST endpoint

- <http://tempssdss.pha.jhu.edu:8080/vospace-2.0/rest>

## Source code:

- <svn+ssh://usvao-svn@svn.usvao.org/usvao/prototype/vospace/trunk/vospace-2.0/java/merged>

# All transfer methods supported

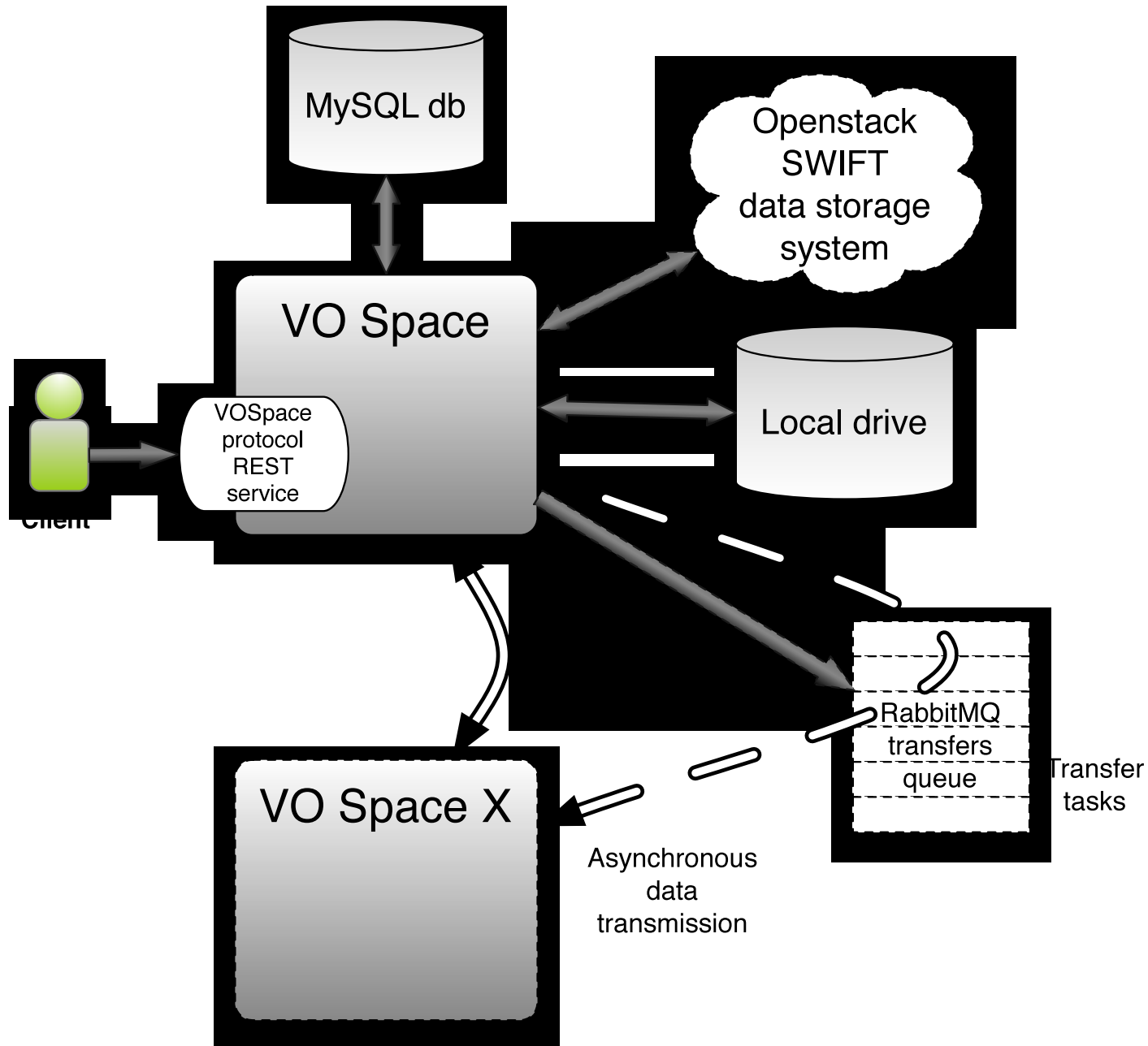
pushToVoSpace

pushFromVoSpace

pullToVoSpace

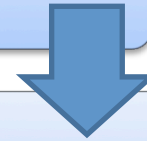
pullFromVoSpace

# System design

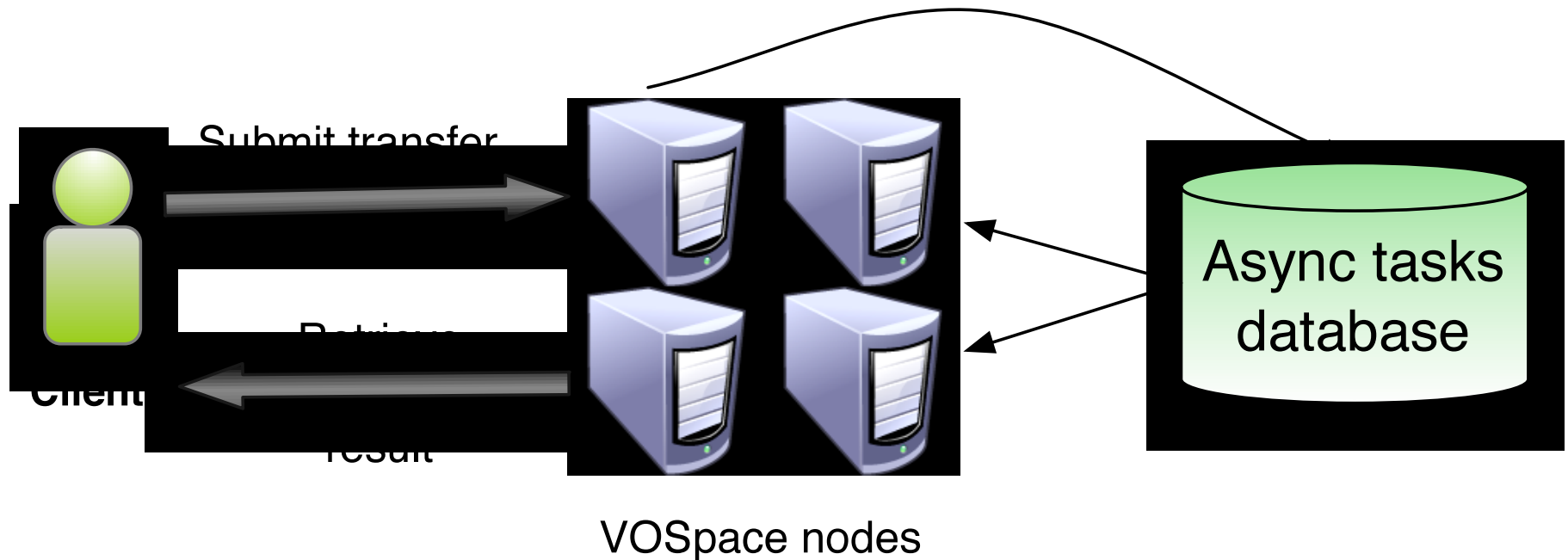


# Asynchronous tasks queue

Transfer tasks are distributed among multiple VOSpace instances in a cluster



**Scalable bandwidth**



# Protocols supported

HTTP GET

HTTP PUT

# To implement

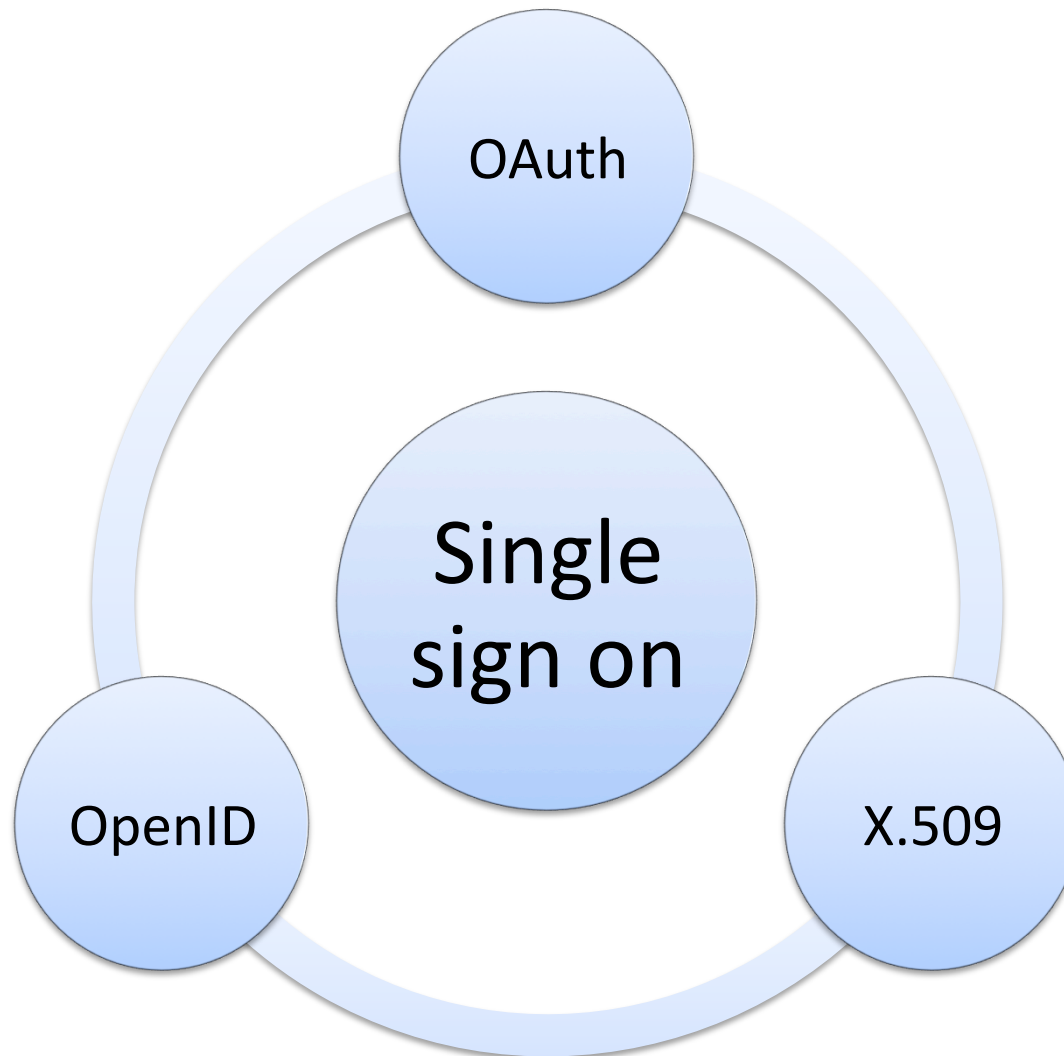
UDT



# Data backend plugins

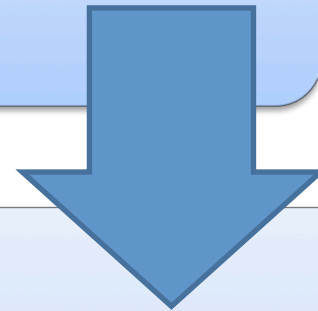
- File store
  - + Easy installation (no additional requirements)
  - Moderate performance
  - Hard to scale out
  - Single point of failure
- Openstack SWIFT: scalable storage for clusters
  - + Great performance
  - + Highly redundant
  - + Easily scalable
  - Needs additional setup and management
  - Needs multiple servers to install (>4)

# Authorization + authentication



# Automatic SSO users mapping

NCSA SSO registered  
users



**Automatic user  
creation in  
VOSpace**

# DOJO Ajax Web interface

Data tree Authentication Help

- pha.jhu.edu
  - images (17.5MB)
    - data.fits (5.8MB)
    - ngc1068.fits (5.8MB)
    - ngc4258.fits (5.8MB)
  - m51 (65.8KB)

directi	state	id	start time (UTC)	end time (UTC)	path
vo	←	dba93f1b-51c7-44ae-92ac-cc7ed78173a	2011-10-06 00:09:04.0	2011-10-06 00:09:04.0	vos://edu.jhu/vospace/m51/aaa
←	vo	af71532e-5df8-46e0-ad6b-4da834e25bf	2011-07-27 20:30:20.0	2011-07-27 20:30:29.0	vos://edu.jhu/vospace/images/data.fits
vo	←	ebc95725-1d62-486df0b681f5a9	2011-07-27 20:29:13.0	2011-07-27 20:29:15.0	vos://edu.jhu/vospace/images/data.fits
vo	←	18605dd7-a21b-42e3-962c-977bb421e3ff	2011-07-27 16:31:01.0	2011-07-27 16:31:02.0	vos://edu.jhu/vospace/images/ngc4258.fits
vo	←	7b3f43fe-8501-41ae-b5f6-02455815f15c	2011-07-27 16:30:07.0	2011-07-27 16:30:09.0	vos://edu.jhu/vospace/images/ngc1068.fits
		013368a4-	2011-07-27	2011-07-27	

Logout dimm Allowed space used: 18%

# Integration with services

Implemented data upload and download from Tap service

- OAuth users authentication
- Single Sign On

# Problems

Create transfer task with  
OAuth authentication

- Service response: 303 See Other



Automatic HTTP GET  
Location

- Unauthorized

# Future work

Structured nodes

UDT protocol

# Title page

The Virtual Astronomical Observatory: Enabling Science


The Virtual Astronomical Obser... +

tempdss.pha.jhu.edu:8080/vospace-2.0/ ☆ ↻ Google 🔍 🏠 🌐

SENDtoREADER Most Visited «Атомный мето... Bookmarks

## VOSpace 2.0 reference beta implementation

Log in to **VOSpace** using your



identity

NCSA single sign-on registration:  
<http://wire.ncsa.uiuc.edu/samplereg/>

How to trust the NCSA certificate:  
<http://dev.usvao.org/vao/wiki/SSOforPortals/TrustRoots>

NCSA identity portal:  
<http://nvologin1.ncsa.uiuc.edu/>



# OpenID login

NVO Login - Complete Login

NVO Login - Complete Login

uiuc.edu https://wire.ncsa.uiuc.edu/openid/provider?openid.ns=http

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Login to the NVO  
Identity Portal  
Create an account  
Documentation

**NVO**  
NATIONAL VIRTUAL OBSERVATORY

what is the nvo  
faq  
the nvo book  
behind the scenes  
documents

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**Do you trust *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize***

The website *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize* has asked you to confirm your NVO identity as **dimmm**.  
It also requires your NVO security credential.

Yes, share my **NVO security credential**, an X.509 credential.


Remember these settings for *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize* and don't ask me again next time.

**Sign in** Yes, I trust *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize*. Sign in with my NVO login, **dimmm**.

**Cancel** No, I decline. Return to *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize* without signing in.

**Use a different ID** Sign out and use a different NVO identity to access *tempsdss.pha.jhu.edu:8080/vospace-2.0/authorize*.

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# Main window

Johns Hopkins University VOSpace

Johns Hopkins University VOSp... +

tempsdss.pha.jhu.edu:8080/vospace-2.0/app.html

SENDtoREADER Most Visited «Атомный мето... Bookmarks

Data tree Authentication Help

- pha.jhu.edu
  - images (17.5MB)
    - data.fits (5.8MB)
    - ngc1068.fits (5.8MB)
    - ngc4258.fits (5.8MB)
  - m51 (0B)

directio	state	id	start time (UTC)	end time (UTC)	path
vo	🚩	dba93f1b-51c7-44ae-92ac-cc7ed78173a6	2011-10-06 00:09:04.0	2011-10-06 00:09:04.0	vos://edu.jhu/vospace/m51/aaa
vo	🚩	af71532e-5df8-46e0-ad6b-4da834e25bfb	2011-07-27 20:30:20.0	2011-07-27 20:30:29.0	vos://edu.jhu/vospace/images/data.fits
vo	🚩	ebc95725-1d62-48d6df0b681f5a9	2011-07-27 20:29:13.0	2011-07-27 20:29:15.0	vos://edu.jhu/vospace/images/data.fits

Logout dimm Allowed space used: 18%

# View node metadata

The screenshot shows a web browser window titled "Johns Hopkins University VOSpace". The address bar displays "tempsdss.pha.jhu.edu:8080/vospace-2.0/app.html". The browser interface includes a search bar with "Google" and a bookmarks bar with "SENDtoREADER", "Most Visited", and "«Атомный мето...".

The main content area is titled "Data tree" and shows a hierarchical view of the file system:

- pha.jhu.edu
  - images (17.5MB)
    - data.fits (5.8MB)
    - ngc1068.fits (5.8MB)
    - ngc4258.fits (5.8MB)
  - m51 (0B)

A dialog box titled "images/ngc4258.fits" is open, displaying the following XML metadata:

```
<vos:node xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:vos="http://www.ivoa.net/xml/VOSpace/v2.0" xsi:type="vos:DataNode" uri="vos://edu.jhu/vospace/images/ngc4258.fits">  
<vos:properties><vos:property uri="ivo://ivoa.net/vospace/core#description">data</vos:property>  
</vos:properties></vos:node>
```

The dialog box has "Save" and "Cancel" buttons.

Below the dialog box, a table lists files with their identifiers, dates, and URIs:

Icon	Identifier	Date 1	Date 2	URI
vo →	dba93f1b-51c7-44ae-92ac-cc7ed78173af	2011-10-06 00:09:04.0	2011-10-06 00:09:04.0	vos://edu.jhu/vospace/m51/aaa
← vo	af71532e-5df8-46e0-ad6b-4da834e25bfb	2011-07-27 20:30:20.0	2011-07-27 20:30:29.0	vos://edu.jhu/vospace/images/data.fits
vo →	ebc95725-1d62-48d6df0b681f5a9	2011-07-27 20:29:13.0	2011-07-27 20:29:15.0	vos://edu.jhu/vospace/images/data.fits

At the bottom of the interface, there is a "Logout dimm" button and a progress bar labeled "Allowed space used:" showing 18% usage.

# Create transfer

The screenshot shows a web browser window titled "Johns Hopkins University VOSpace". The address bar displays "tempdss.pha.jhu.edu:8080/vospace-2.0/app.html". The main content area shows a file tree for "pha.jhu.edu" with subfolders "images (17.5MB)" and "m51 (0B)". The "images" folder contains files "data.fits (5.8MB)", "ngc1068.fits (5.8MB)", and "ngc4258.fits (5.8MB)". A modal dialog box is open in the center, titled "Please enter the URL to use.", with a text input field labeled "URL:" and a "Create the transfer" button.

directic	state	id	time (UTC)	(UTC)	path
→	+	f6b03f14-f96d-4afa-9082-fa87dcede90e	2011-10-19 05:33:36.0	...	vos://edu.jhu.vospace/images/data.fits
←	✓	dba93f1b-51c7-44ae-92ac-cc7ed78173af	2011-10-06 00:09:04.0	2011-10-06 00:09:04.0	vos://edu.jhu.vospace/m51/aaa
←	✓	af71532e-5df8-46e0-af6h-4d1a834e25hfh	2011-07-27 20:30:20.0	2011-07-27 20:30:29.0	vos://edu.jhu.vospace/images/data.fits

Logout dimm    Allowed space used: