



CernVM-FS

CernVM-FS tutorial

6th EasyBuild User Meeting (EUM'21)

Jan 26-29 2021

<https://cvmfs-contrib.github.io/cvmfs-tutorial-2021>

<https://easybuild.io/eum/#cvmfs-tutorial>

Sessions

- [Mon Jan 25 2021, 17:00-17:30 UTC] **Introductory presentation** at EUM'21 (by Jakob Blomer, CERN)
See <https://www.youtube.com/watch?v=IxZLS3O9wo4>
- [Tue Jan 26 2021, 09:00-10:00 UTC] **CernVM-FS tutorial (part 1/4)**
 - 0. Azure resources
 - 1. Quick CernVM-FS introduction (concepts and terminology)
 - 2. Stratum-0 and client access
 - *hands-on exercise*
- [Wed Jan 27 2021, 09:00-10:00 UTC] **CernVM-FS tutorial (part 2/4)**
 - 3. Stratum-1 + proxies
 - *hands-on exercise*
- [Thu Jan 28 2021, 09:00-10:00 UTC] **CernVM-FS tutorial (part 3/4)**
 - 4. Publishing
 - *hands-on exercise*
- [Fri Jan 29 2021, 09:00-10:00 UTC] **CernVM-FS tutorial (part 4/4)**
 - 5. Advanced topics



CernVM-FS

problems?



Support available throughout the day, via:

`#eum21-cvmfs-tutorial` in EasyBuild Slack

Email: eum@lists.ugent.be

If necessary, an additional Zoom call can be set up

Q&A at end of each live session

0. Azure resources

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/00_azure_cloud_resources



0. **Log in to CycleCloud** via <https://cvmfstutorial.westeurope.cloudapp.azure.com>
 - Use personal credentials (see email) + pick new password (and remember it!)
1. Add your **SSH public key** (must be RSA!)
2. **Start cluster** (and keep it running until you're done with all exercises)
 - IP addresses are NOT fixed, and will change on reboot

If you experience any problems, let us know (via eum@lists.ugent.be or Slack)!

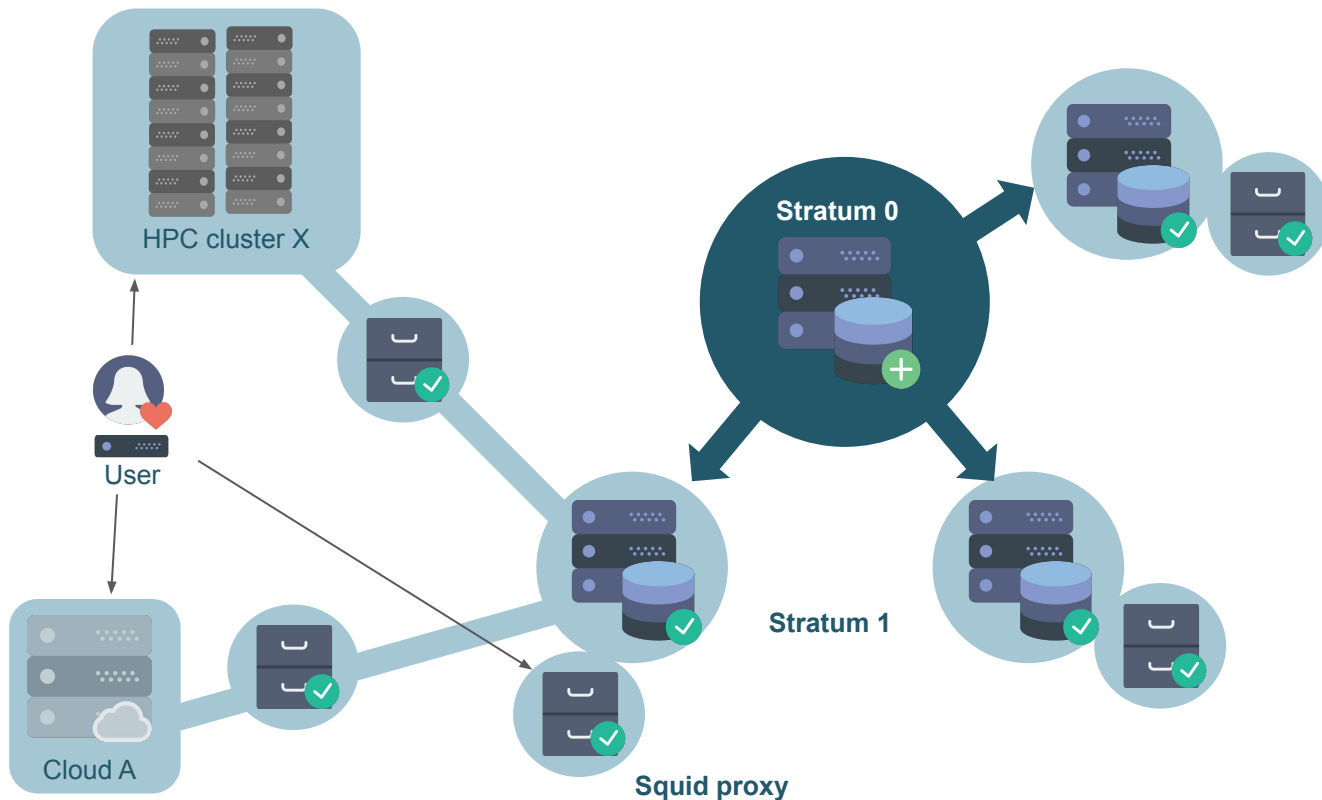
Sponsored by  **Microsoft Azure**

1. CernVM-FS introduction

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



CernVM-FS



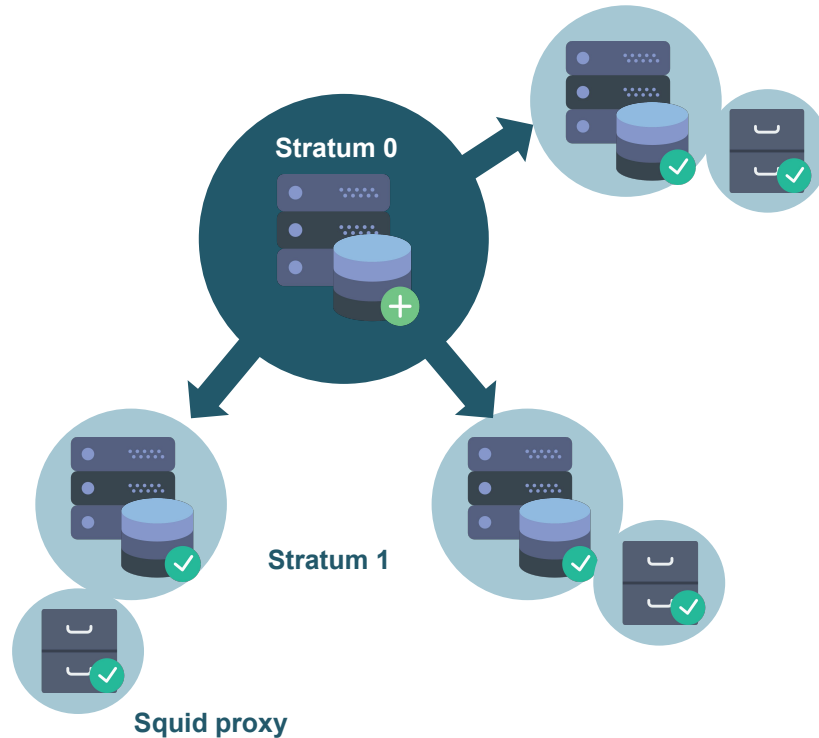
1. CernVM-FS introduction

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



CernVM-FS

(icons via <https://www.flaticon.com/author/s/nashicons>)



1. CernVM-FS introduction

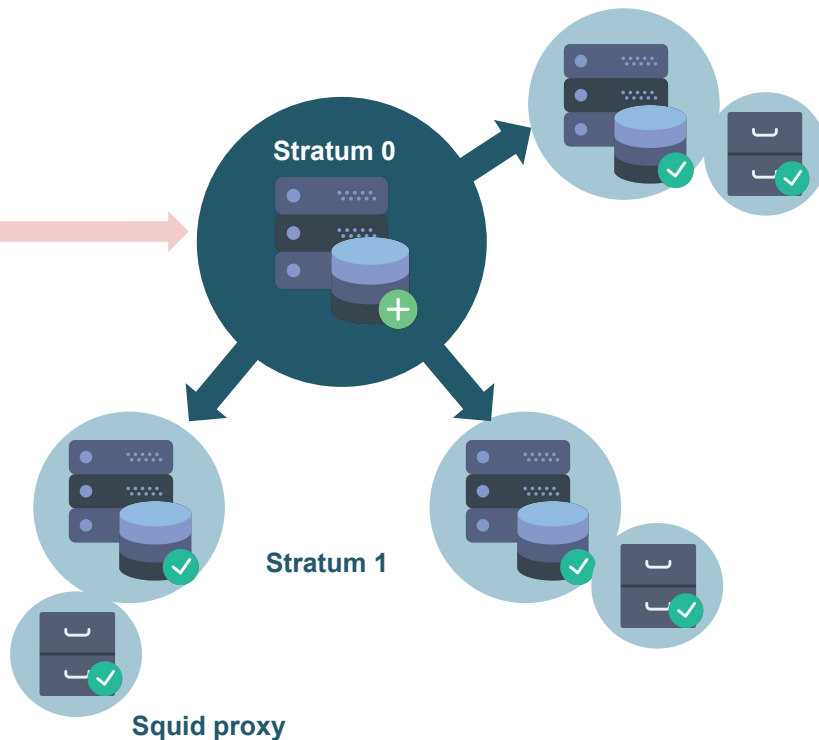
https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



(icons via <https://www.flaticon.com/author/s/nashicons>)

Stratum 0

- Central server
- Only one
- Hosts CVMFS “repositories”
- New software is added here
- Usually restricted access

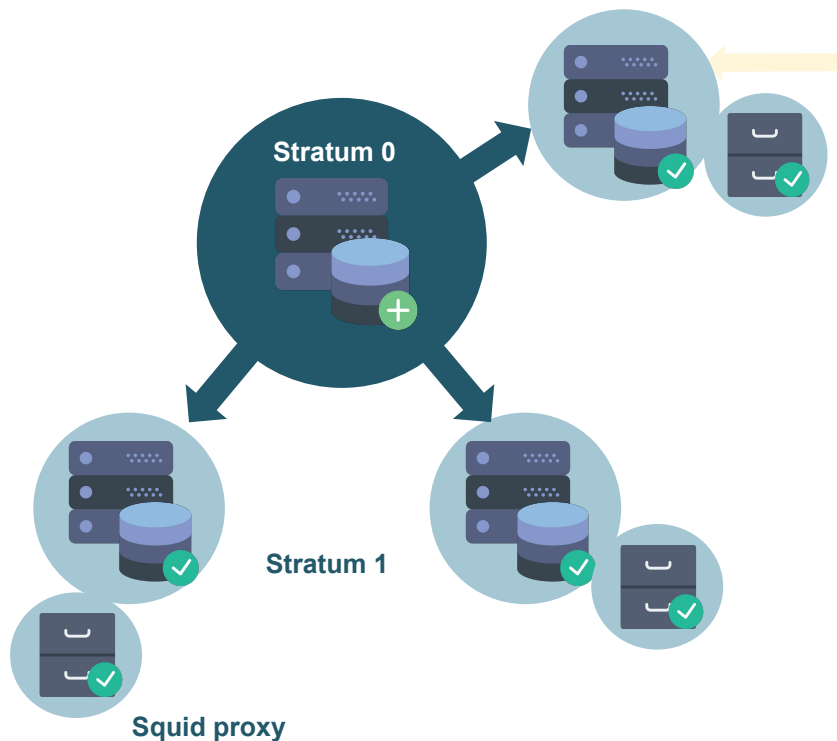


1. CernVM-FS introduction

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



CernVM-FS



Stratum 1



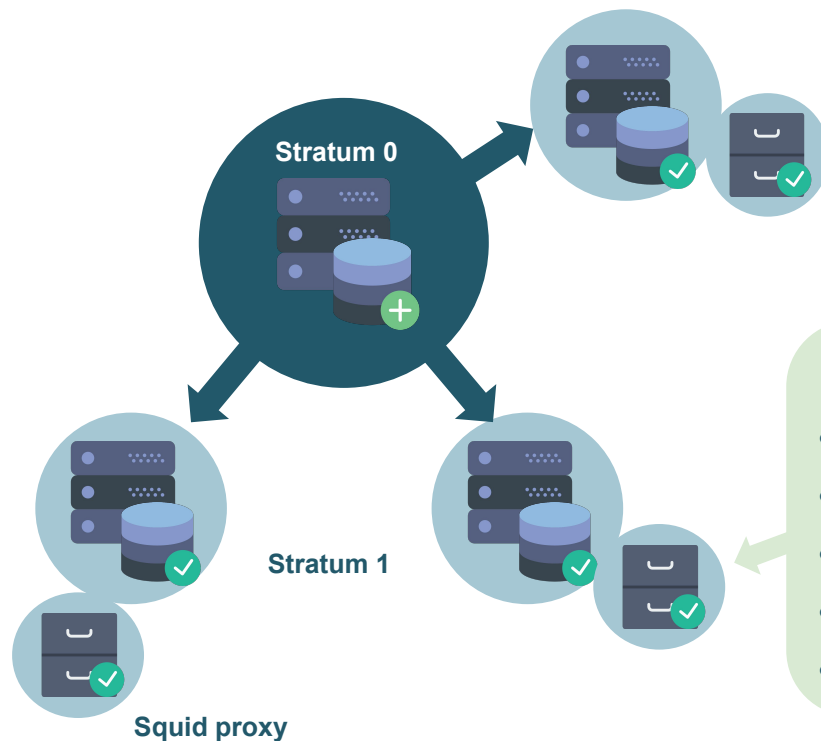
- CernVM-FS “replica”
- Full copy of repositories (mirror)
- **Read-only**
- **Multiple servers**
- Geographically distributed
- Standard web server (HTTP)
- Reduce load on Stratum 0
- Improve reliability
- Clients *may* connect here

1. CernVM-FS introduction

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



(icons via <https://www.flaticon.com/authors/smashicons>)



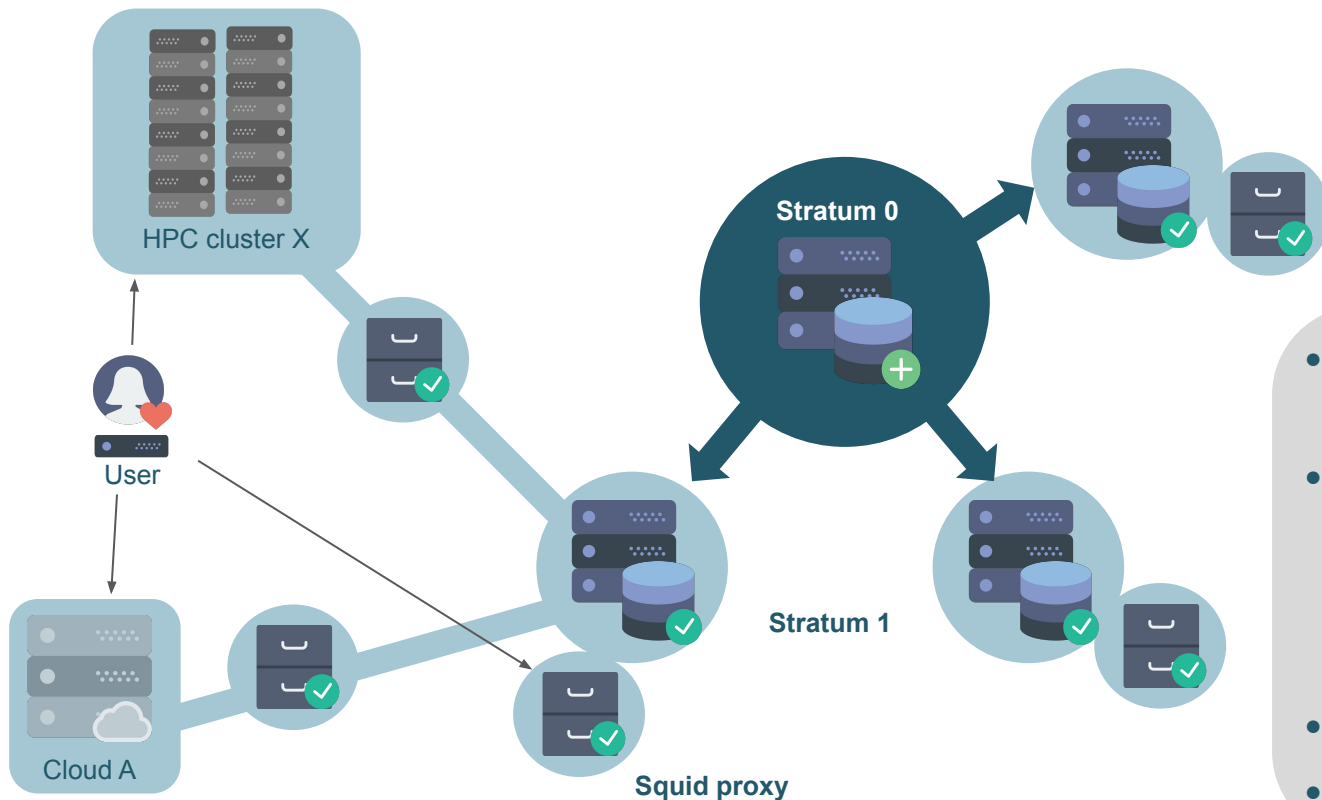
Squid proxy



- Reverse proxy for Stratum 1 servers
- Caching to improve client I/O performance
- Reduce load on Stratum 1 servers
- Can be used for load balancing
- Clients usually connect to one of these

1. CernVM-FS introduction

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/01_introduction



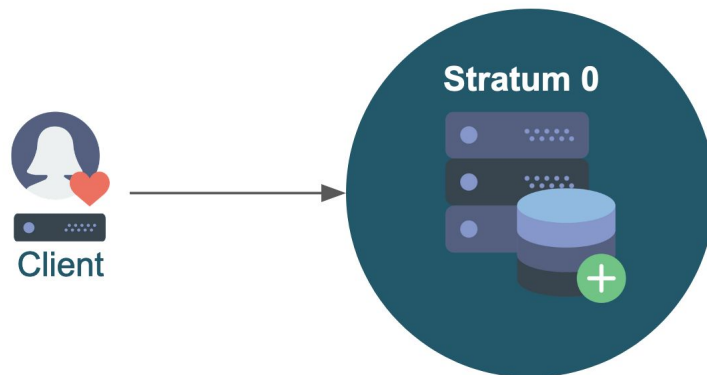
- Clients access software stack via (squid proxy of) a Stratum 1
- Clients include:
 - Laptops
 - Personal workstations
 - HPC clusters
 - Cloud instances
- Clients also use local filesystem cache
- **Same software stack everywhere!**

2. Getting started: Stratum 0 and client

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/02_stratum0_client



- Deploy a fully operational Stratum 0 server
 - Make a repository
 - Add a file
 - Set up a client that connects to the Stratum 0
- (WARNING: you should not do this in production!)
- Exercise



2. Getting started: Stratum 0 and client (recap)

Recap of yesterday's exercise



- A client can mount multiple repos, even from different servers
(i.e. from different domains/projects/organizations)
- The repository name can basically be anything, but make sure to pick a suitable one
 - The domain name part doesn't really have to exist (but it usually does exist)
 - You're free to pick a domain (or even repository) name that doesn't belong to you
- `cvmfs_config setup` **should be run before** `cvmfs_config chksetup` (*fixed in tutorial*)
- `CVMFS_DEBUGLOG` (see Debugging section on the Advanced topics page)
should point to a location that is *writable* for the `cvmfs` user
- Make sure that you put the public key at the right location!
 - Note the difference between its original location on the Stratum 0 (`/etc/cvmfs/keys`) and the recommended location on the clients (and Stratum 1)

3. Stratum 1 and proxies

https://cvmfs-contrib.github.io/cvmfs-tutorial-2021/03_stratum1_proxies



- Deploy a Stratum 1 server
- Set up a replica of the repository
- Synchronize the replica
- Deploy a Squid caching proxy server
- Reconfigure your client, so that it uses the proxy and Stratum 1
- Exercise

