

Centre de Calcul
de l'Institut National de Physique Nucléaire
et de Physique des Particules

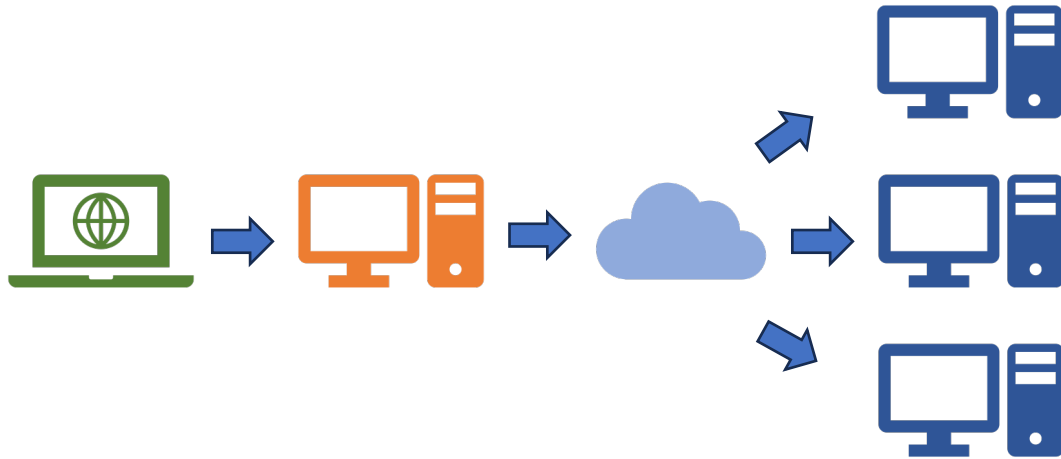
VARNISH FOR ATLAS @ CC-IN2P3

L. GUYARD, M. HAMANT, V. HAMAR

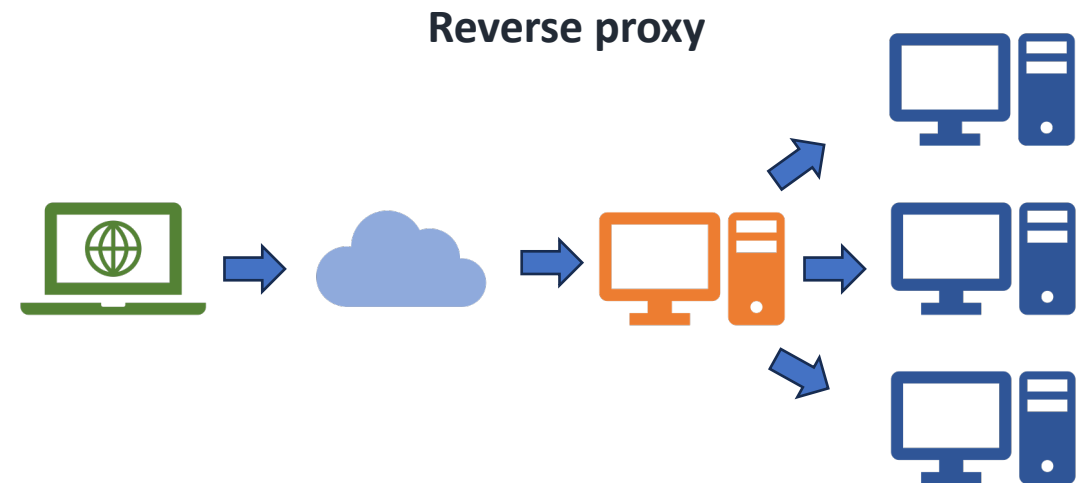
This presentation is based on information and materials sourced from the internet, including contributions from Mistral AI, as well as insights derived from other presentations and resources.

- Concepts
- VARNISH
- VARNISH – ATLAS
- VARNISH @ CC-IN2P3

Proxy server and reverse proxy



Forward Proxy

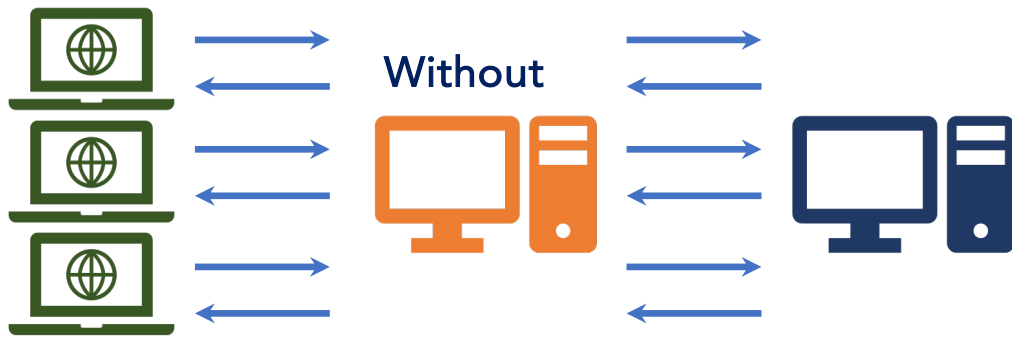


Reverse proxy

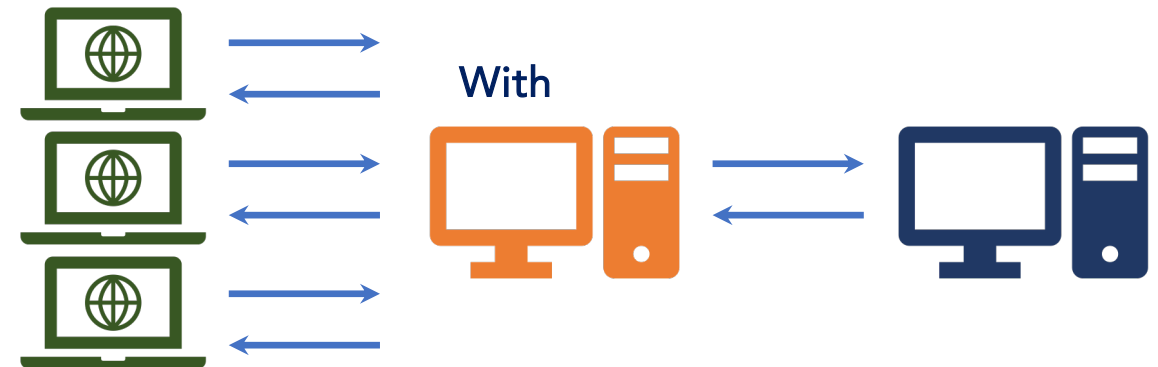
<https://www.cloudflare.com/learning/cdn/glossary/reverse-proxy/>

Collapse forwarding

This refers to the process where a proxy server consolidates multiple requests for the same resource into a single request to the origin server.

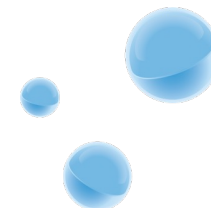


Reducing load and improving response times.



« Varnish Cache is a web application accelerator also known as a caching HTTP reverse proxy. You install it in front of any server that speaks HTTP and configure it to cache the contents. Varnish Cache is really, really fast. »

<https://varnish-cache.org/#>



The name “Varnish”

The name Varnish comes from when the instigator of Varnish spent a long time staring at an art-poster with the word “Vernissage” and ended up checking it in a dictionary, which gives the following three meanings of the word:

r.v. var-nished, var-nish-ing, var-nish-es

1. *To cover with varnish.*
2. *To give a smooth and glossy finish to.*
3. **To give a deceptively attractive appearance to; gloss over.**

<https://varnish-cache.org/intro/>

Feature	Description
License	Free and open-source software under BSD License (use and modification)
Commercial Support	✓
Initial Release	Initiated in 2005 . Version 1.0 released in 2006 .
Varnish Configuration Language (VCL)	VCL scripts are translated to C, compiled to a shared object by the system compiler, and loaded directly into the accelerator, allowing dynamic reconfiguration without requiring a restart .
Functionality	Acts as a reverse proxy .
Advanced Feature: Collapse Forwarding	Combines multiple requests for the same content into a single request to the backend.
Caching Mechanism	Utilizes in-memory caching to store and quickly serve frequently accessed content, reducing latency and server load.
Performance	Designed for high performance, capable of handling thousands of requests per second , making it suitable for high-traffic websites.
Flexibility	Highly customizable through VCL, allowing administrators to define specific caching policies and request handling rules.
Scalability	Efficiently scales to handle increased traffic loads, making it ideal for growing web applications and services.
Community	Supported by a robust community providing a wealth of resources, plugins, and third-party integrations.



Releases & Downloads

Varnish Cache is released every 6 months.

Release	Date	EOL Date	Download
7.7.1	2025-05-12	2026-03-15	varnish-7.7.1.tgz
7.6.3	2025-05-12	2025-09-15	varnish-7.6.3.tgz
6.0.14	2025-05-12	Supported	varnish-6.0.14.tgz

All releases not mentioned above are End-Of-Life and unsupported.

Varnish Documentation

Documentation Links					
7.7	Installation	Tutorial	User-Guide	Reference	Latest
7.6	Installation	Tutorial	User-Guide	Reference	Previous
6.0	Installation	Tutorial	User-Guide	Reference	LTS
Trunk	Installation	Tutorial	User-Guide	Reference	Next
7.5	Installation	Tutorial	User-Guide	Reference	Deprecated
7.4	Installation	Tutorial	User-Guide	Reference	Deprecated
7.3	Installation	Tutorial	User-Guide	Reference	Deprecated
7.2	Installation	Tutorial	User-Guide	Reference	Deprecated
7.1	Installation	Tutorial	User-Guide	Reference	Deprecated
7.0	Installation	Tutorial	User-Guide	Reference	Deprecated
6.6	Installation	Tutorial	User-Guide	Reference	Deprecated
6.5	Installation	Tutorial	User-Guide	Reference	Deprecated
6.4	Installation	Tutorial	User-Guide	Reference	Deprecated

← → ↺ 🔍 https://ccrepository3.in2p3.fr/pulp/content/rhel/9/AppStream/x86_64/Packages/v/		
valgrind-devel-3.22.0-2.el9.i686.rpm	03-Jul-2024 12:06	49.4 kB
valgrind-devel-3.22.0-2.el9.x86_64.rpm	03-Jul-2024 12:07	49.4 kB
valgrind-devel-3.23.0-4.el9.i686.rpm	13-Nov-2024 14:19	50.3 kB
valgrind-devel-3.23.0-4.el9.x86_64.rpm	13-Nov-2024 14:19	50.3 kB
valgrind-devel-3.24.0-3.el9.i686.rpm	14-May-2025 13:23	51.4 kB
valgrind-devel-3.24.0-3.el9.x86_64.rpm	14-May-2025 13:22	51.4 kB
varnish-6.6.2-2.el9.i686.rpm	03-Jul-2024 11:46	1.2 MB
varnish-6.6.2-2.el9.x86_64.rpm	03-Jul-2024 11:46	1.2 MB
varnish-6.6.2-2.el9_1.1.i686.rpm	03-Jul-2024 11:55	1.2 MB
varnish-6.6.2-2.el9_1.1.x86_64.rpm	03-Jul-2024 11:55	1.2 MB
varnish-6.6.2-3.el9.i686.rpm	03-Jul-2024 11:57	1.2 MB
varnish-6.6.2-3.el9.x86_64.rpm	03-Jul-2024 11:55	1.2 MB
varnish-6.6.2-3.el9_2.1.i686.rpm	03-Jul-2024 12:00	1.2 MB
varnish-6.6.2-3.el9_2.1.x86_64.rpm	03-Jul-2024 12:00	1.2 MB
varnish-6.6.2-4.el9_3.1.i686.rpm	03-Jul-2024 12:06	1.2 MB
varnish-6.6.2-4.el9_3.1.x86_64.rpm	03-Jul-2024 12:06	1.2 MB
varnish-6.6.2-6.el9.i686.rpm	13-Nov-2024 14:19	1.1 MB
varnish-6.6.2-6.el9.x86_64.rpm	13-Nov-2024 14:19	1.1 MB
varnish-6.6.2-6.el9_6.1.i686.rpm	03-Jun-2025 13:23	1.1 MB
varnish-6.6.2-6.el9_6.1.x86_64.rpm	03-Jun-2025 13:23	1.1 MB
varnish-docs-6.6.2-2.el9.x86_64.rpm	03-Jul-2024 11:50	707.4 kB
varnish-docs-6.6.2-2.el9_1.1.x86_64.rpm	03-Jul-2024 11:55	706.6 kB
varnish-docs-6.6.2-3.el9.x86_64.rpm	03-Jul-2024 11:55	706.5 kB
varnish-docs-6.6.2-3.el9_2.1.x86_64.rpm	03-Jul-2024 12:00	705.9 kB
varnish-docs-6.6.2-4.el9_3.1.x86_64.rpm	03-Jul-2024 12:06	706.0 kB
varnish-docs-6.6.2-6.el9.x86_64.rpm	13-Nov-2024 14:19	706.0 kB
varnish-docs-6.6.2-6.el9_6.1.x86_64.rpm	03-Jun-2025 13:23	701.7 kB
varnish-modules-0.18.0-1.el9.x86_64.rpm	03-Jul-2024 11:47	93.7 kB
vim-X11-8.2.2637-15.el9.x86_64.rpm	03-Jul-2024 11:47	2.0 MB
vim-X11-8.2.2637-16.el9_0.2.x86_64.rpm	03-Jul-2024 11:50	2.0 MB
vim-X11-8.2.2637-16.el9_0.3.x86_64.rpm	03-Jul-2024 11:50	2.0 MB
vim-X11-8.2.2637-20.el9_1.x86_64.rpm	03-Jul-2024 11:55	2.0 MB
vim-X11-8.2.2637-21.el9.x86_64.rpm	13-Nov-2024 14:19	2.0 MB
vim-X11-8.2.2637-22.el9_6.x86_64.rpm	14-May-2025 13:24	2.0 MB

Lists:

<https://varnish-cache.org/lists/mailman/listinfo>

[varnish-announce](#) Release announcements and other important news.

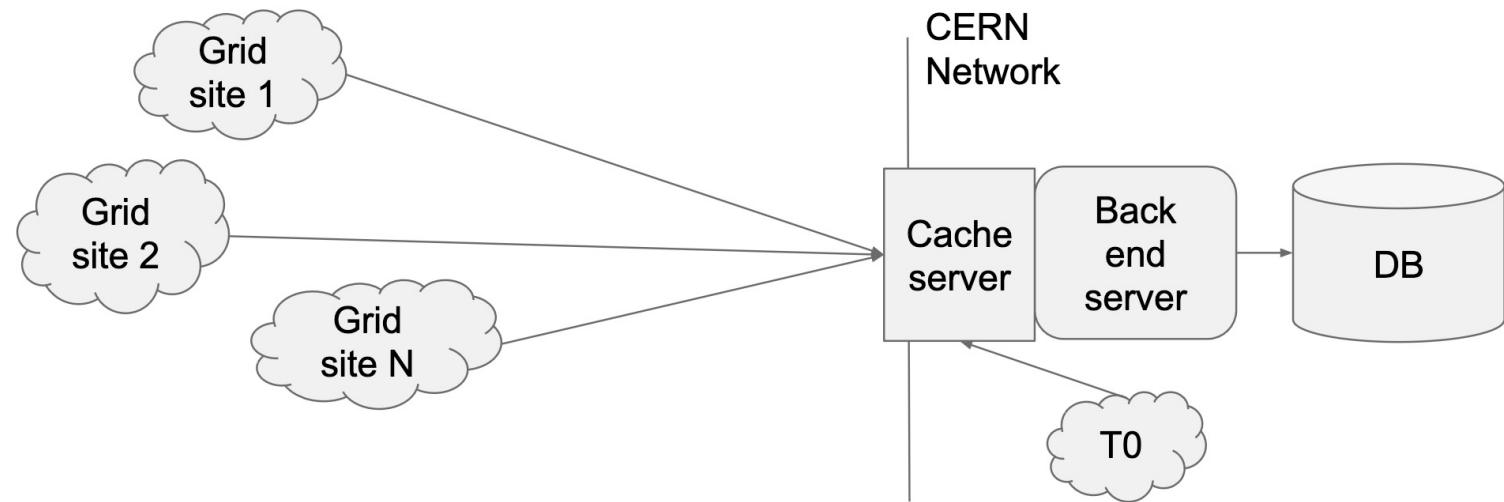
[varnish-misc](#) Miscellaneous discussions relating to Varnish Cache.

Why?

Conditions Data: Why caching is needed ?



- Conditions data are stored on the Oracle database at CERN. ATLAS jobs running on the grid need access to those data
- Many jobs $O(10K)$ may request the same conditions in a short time interval $O(10min)$



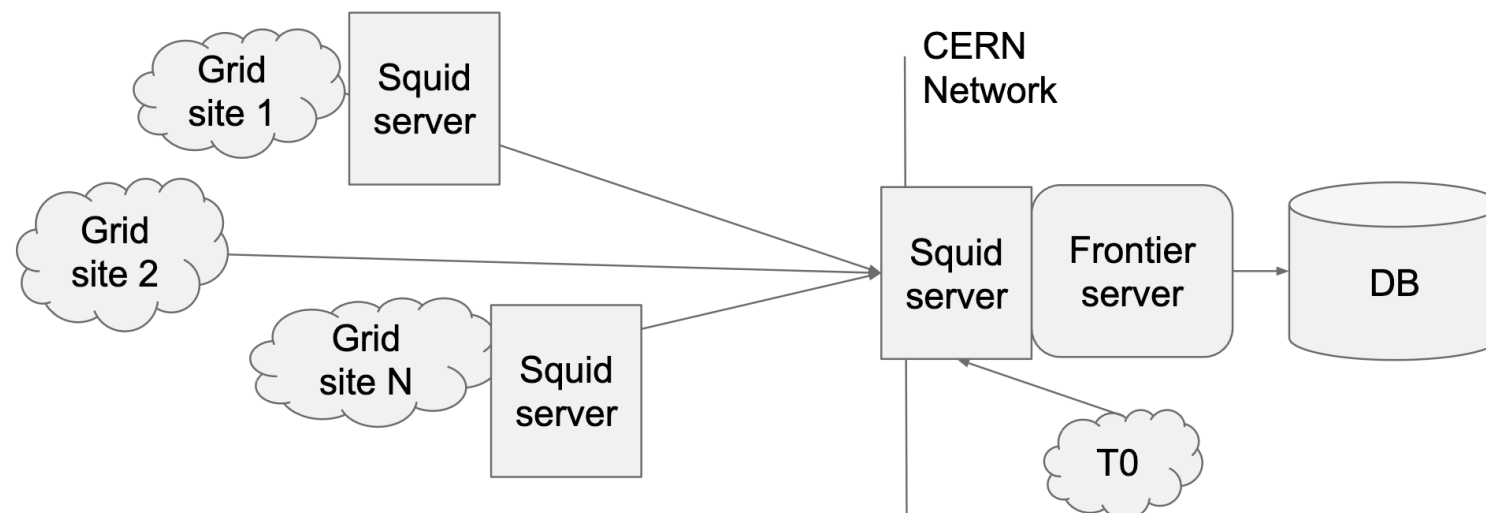
Typical problems:

Protect the DB
Protect the backend server
Reduce latency for far sites

(role of a backend server, control number of connections)
(thundering herd problem, use a cache)
(add cache close to the site)

[https://indico.cern.ch/event/1554526/contributions/6546144/attachments/3081628/5454674/WLCG-ATLAS-ConditionsData-Caching%20\(1\).pdf](https://indico.cern.ch/event/1554526/contributions/6546144/attachments/3081628/5454674/WLCG-ATLAS-ConditionsData-Caching%20(1).pdf)

- Frontier server used to retrieve data from Oracle
 - Also defines TTL (time to live) for the cached results
- Squid : proxy cache used to protect the Frontier server

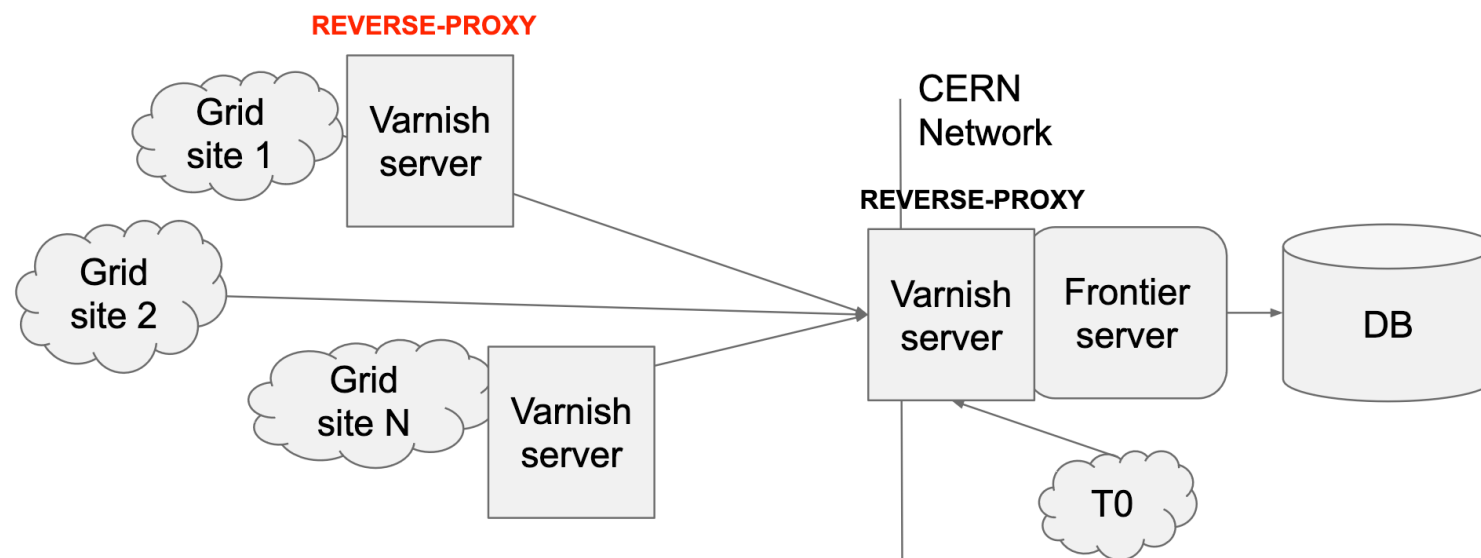


Using VARNISH

Conditions Data: ATLAS Varnish test infrastructure



- Proposed architecture using reverse proxy for Conditions data



Grid sites will use Varnish as a reverse proxy

[https://indico.cern.ch/event/1554526/contributions/6546144/attachments/3081628/5454674/WLCG-ATLAS-ConditionsData-Caching%20\(1\).pdf](https://indico.cern.ch/event/1554526/contributions/6546144/attachments/3081628/5454674/WLCG-ATLAS-ConditionsData-Caching%20(1).pdf)

Motivation

Conditions Data Caching - Motivations for Varnish



- **squid-5** version is currently in use (basically an obsolete version), need to switch to **squid-6** which had an important [bug](#) filed in Dec. 2023. The bug is not being fixed by its community. CMS experts reported this problem in our joint Frontier bi-weekly meetings.
 - The bug is on **“Collapsed-forwarding” feature**. It is a standard technique used in HTTP caching systems to optimize performance and reduce redundant requests to backend servers
 - Possible to overcome with the usage of Rock-cache for Squid, but then hit another [bug](#) with **“If-Modified-Since” feature** (essential in ATLAS to avoid going back to DB too often)

Brainstorming inside ATLAS community

- How is it possible that a bug related to a very important feature is not addressed for more than one year by the developer community ?
- Are we using the right tool and dataflow for our Conditions data access ?
- What can we test eventually as a replacement ?
 - This points to a potential issue in terms of long-term support

Ticket GGUS After that ...

Hardware (Note: it's not the final server !!!!)

- 96GB RAM
- 16 Processors
- 100 TB disc

Software

- Operating system: RedHAT 9
- RPMs
 - varnish-6.6.2-6.el9_6.1.x86_64 (rhel-appstream)
 - prometheus-varnish-exporter-1.6.1-1.x86_64 (<https://varnish-cache.org/extras/> https://github.com/jonnenauha/prometheus_varnish_exporter)

ACLs

- Permit tcp any host 134.158.238.16 eq 6082

DNS

- ccvarnishli01.in2p3.fr alias ccatlasvrn01.in2p3.fr (cric)

From <https://github.com/ivukotic/v4A/tree/frontier>

- Any version will work .. Only basic fonctionnality will be needed

```
export SITE=<SITE>
```

```
export INSTANCE=<SITE>
```

```
export VARNISH_TRANSIENT_MEM=1G
```

```
export VARNISH_MEM=12G
```

```
wget https://raw.githubusercontent.com/ivukotic/v4A/refs/heads/frontier/runme.sh
```

```
source runme.sh
```

- Script for external monitoring

<https://github.com/ivukotic/v4A/blob/frontier/Monitoring/monitor.sh>

- Ideally you want both of these (server and monitoring script), to be run in systemd.

```
class site_varnish::profile::server (  
)  
{  
    include site_varnish::resource::server::install  
    include site_varnish::resource::server::logrotate  
    include site_varnish::resource::server::dnf  
    include site_varnish::resource::server::nagios  
    include site_varnish::resource::server::systemd  
    include site_varnish::resource::server::cron  
    include site_varnish::resource::server::lbd  
    include site_varnish::resource::server::prometheus  
}
```

```
[root@ccvarnishli01 ~]# cat /tmp/v1.vcl
```

```
vcl 4.1;

import std;

import directors;

backend frontier_1 {
    .host = "atlasfrontier1-ai.cern.ch";
    .port = "8000";
}

backend frontier_2 {
    .host = "atlasfrontier2-ai.cern.ch";
    .port = "8000";
}

backend frontier_3 {
    .host = "atlasfrontier3-ai.cern.ch";
    .port = "8000";
}

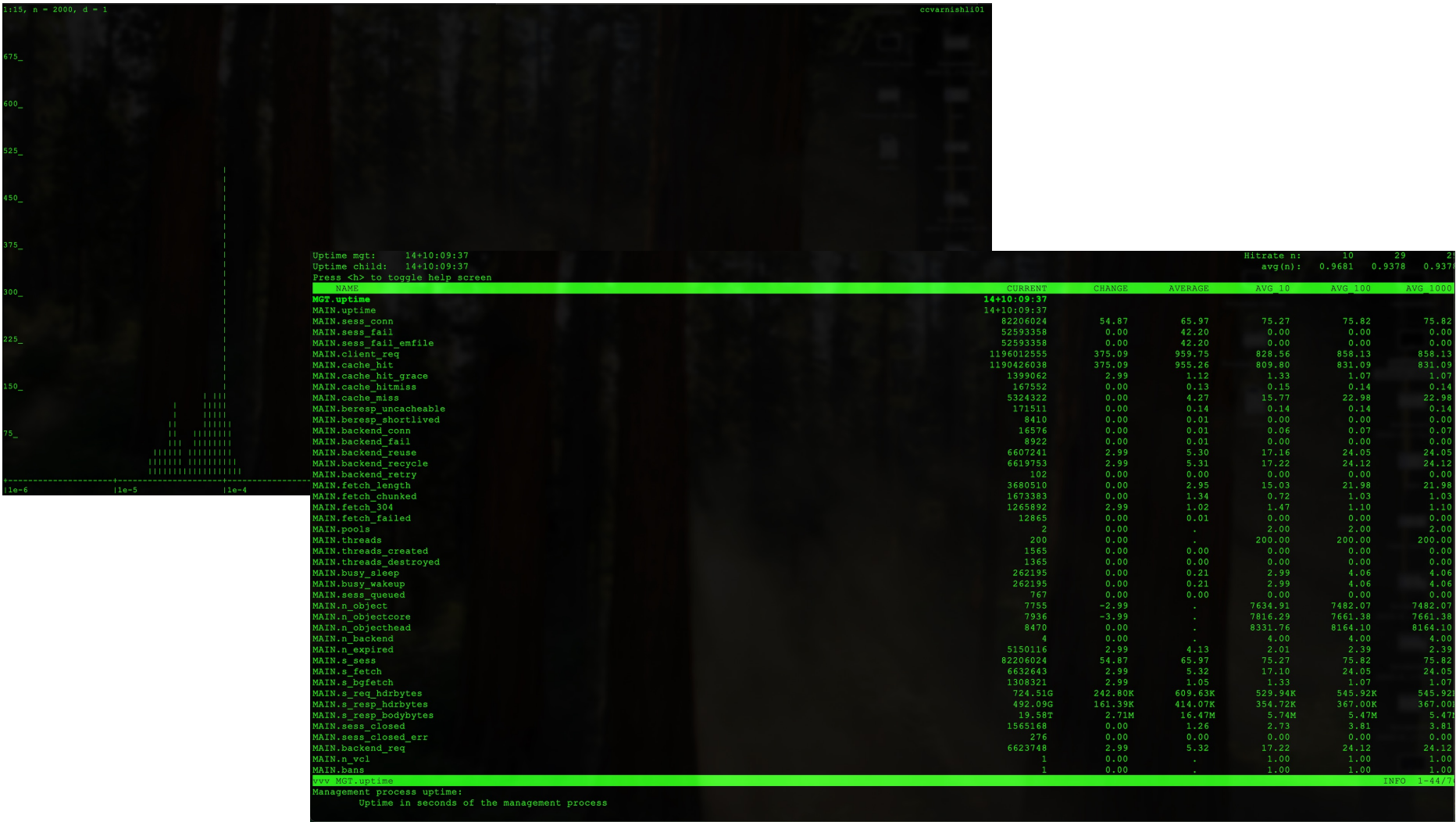
backend frontier_4 {
    .host = "atlasfrontier4-ai.cern.ch";
    .port = "8000";
}
```

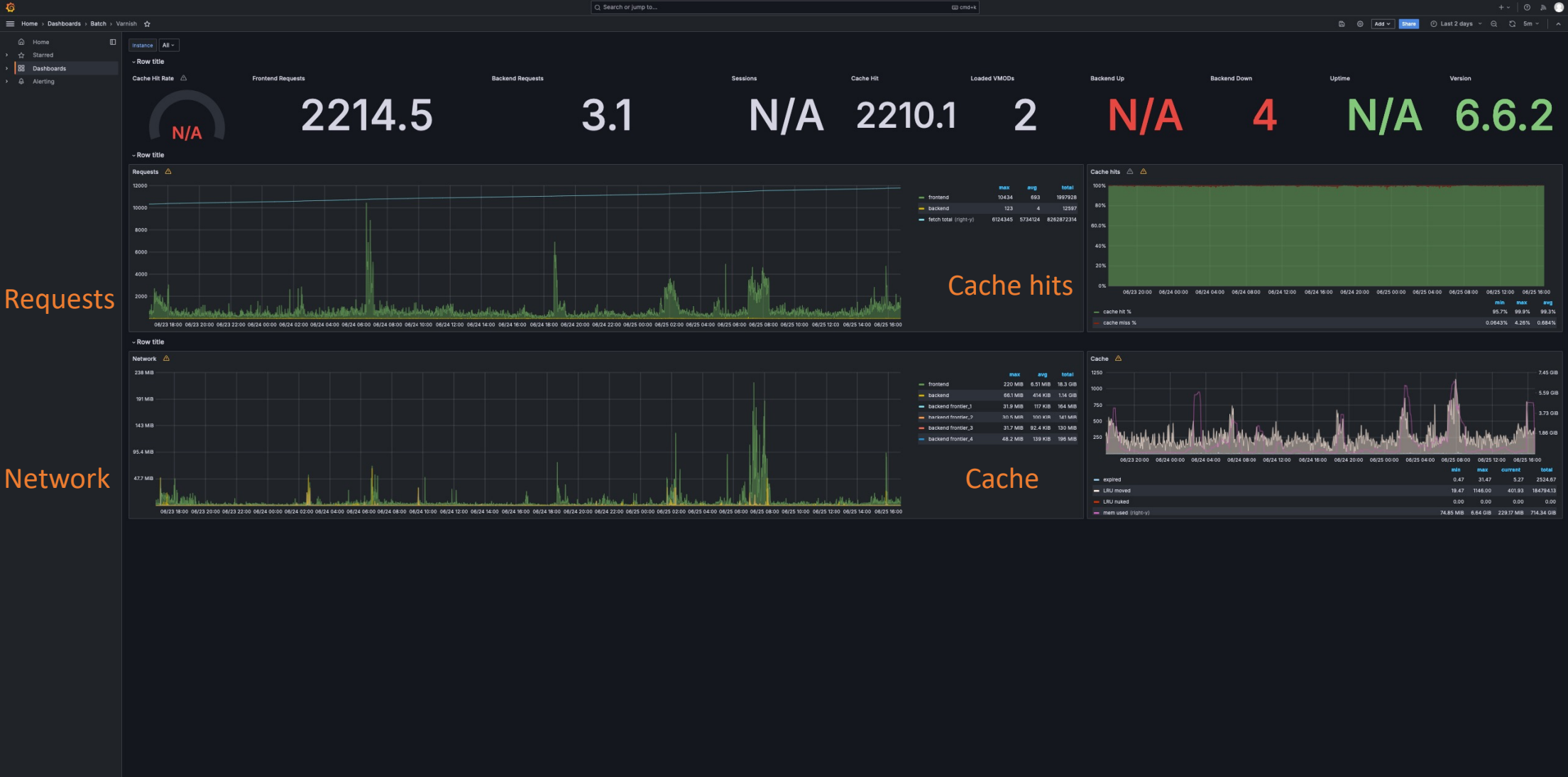
```
sub vcl_init {
    new vdir = directors.round_robin();
    vdir.add_backend(frontier_1);
    vdir.add_backend(frontier_2);
    vdir.add_backend(frontier_3);
    vdir.add_backend(frontier_4);
}

sub vcl_recv {
    set req.backend_hint = vdir.backend();
    set req.http.X-frontier-id = "varnish";
    if (req.method != "GET" && req.method != "HEAD") {
        return (pipe);
    }
}
```

<https://varnish-cache.org/docs/trunk/users-guide/vcl.html>

- varnishadm
- varnishd
- varnishhist
- varnishlog
- varnishncsa
- varnishreload
- varnishstat
- varnishstat_help_gen
- varnishtest
- varnishtop





- Varnish servers that serve Frontier should be in [CRIC](#).
- Atlas has a CloudFlare DNS loadbalancer that makes important Frontier Varnish instances reachable at <http://v4a.hl-lhc.net:6082>.
- Health checks in CF are trying to access "/atlr" directory once per minute. (<https://atlas-cric.cern.ch/core/service/detail/2635/>)

36G varnishncsa.log

4.0K varnishncsa.log-20250611.gz

12K varnishncsa.log-20250612.gz

845M varnishncsa.log-20250613.gz

4.8G varnishncsa.log-20250614.gz

8.8G varnishncsa.log-20250615.gz

8.3G varnishncsa.log-20250616.gz

8.1G varnishncsa.log-20250617.gz

11G varnishncsa.log-20250618.gz

13G varnishncsa.log-20250619.gz

5.4G varnishncsa.log-20250620.gz

5.5G varnishncsa.log-20250621.gz

7.3G varnishncsa.log-20250622.gz

5.4G varnishncsa.log-20250623.gz

5.3G varnishncsa.log-20250624.gz

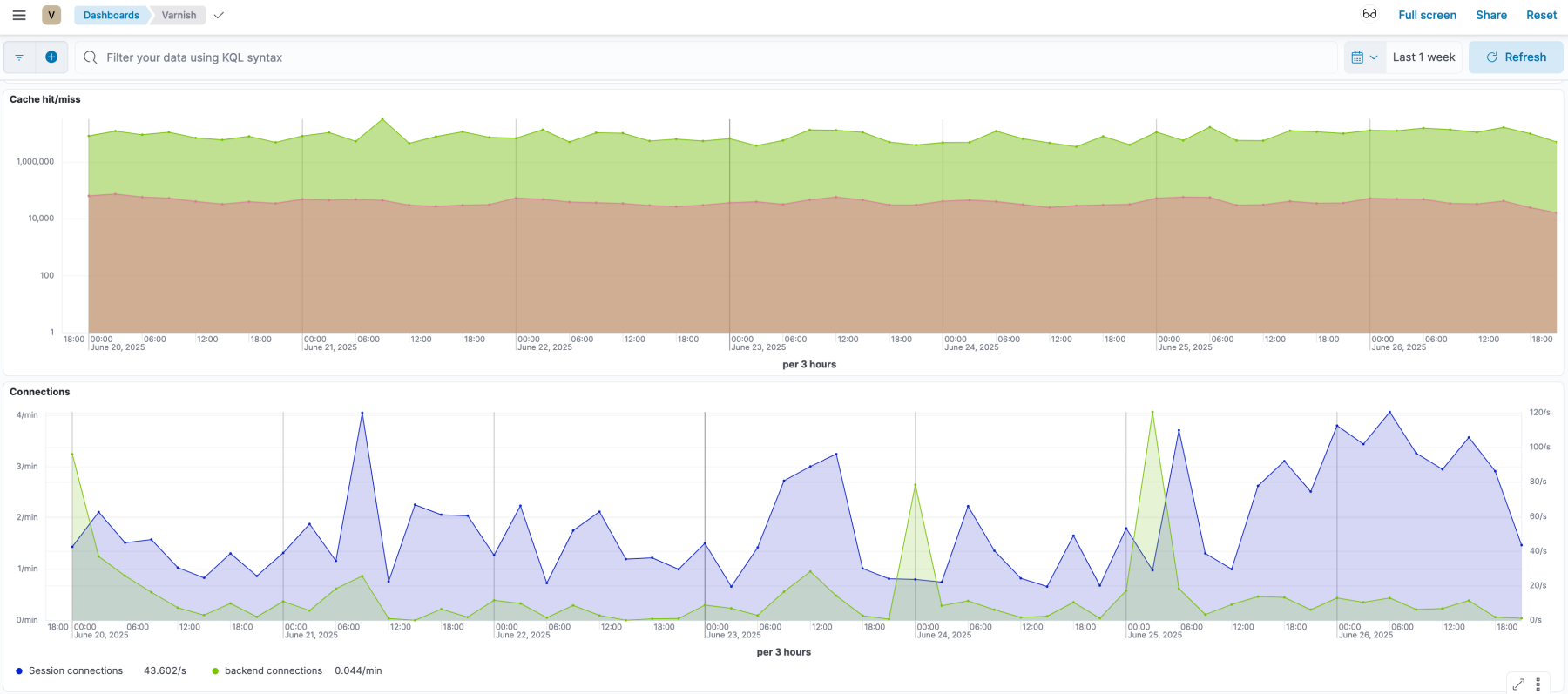
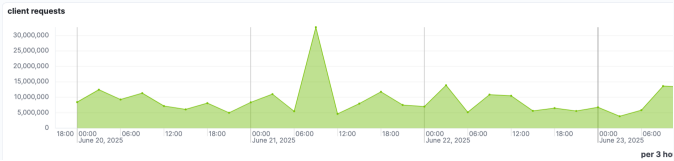
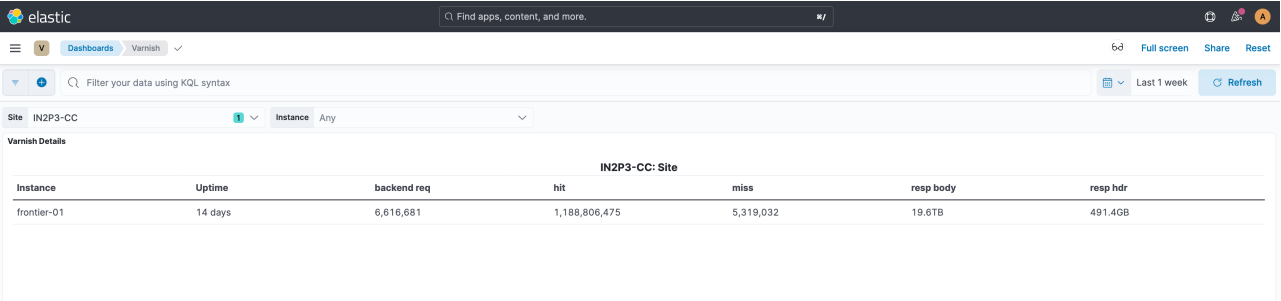
4.3G varnishncsa.log-20250625.gz

29G varnishncsa.log-20250626

27/06/2025

W.X.Y.Z - - [26/Jun/2025:00:08:00 +0200] "GET http://atlasfrontier-ai.cern.ch:8000/atlr/Frontier/type=frontier_request:1:DEFAULT&\ \
encoding=.....HTTP/1.0" 200 648 "-" "-" 73 1085 "hit"
A.B.C.D - - [25/Jun/2025:02:08:16 +0200] "GET http://atlasfrontier-ai.cern.ch:8000/atlr/Frontier/type=frontier_request:1:DEFAULT&\ \
encoding=. HTTP/1.0" 200 48580 "-" "-" 8587 49002 "miss"

VARNISH @ CC-IN2P3



[https://atlas-kibana.mwt2.org:5601/s/varnish/app/dashboards#/view/419c7d70-0928-11ed-9a2c-41033d72f6b6?_g=\(filters:!\)&refreshInterval:\(pause:!t,value:10000\)&time:\(from:now-1w,to:now\)](https://atlas-kibana.mwt2.org:5601/s/varnish/app/dashboards#/view/419c7d70-0928-11ed-9a2c-41033d72f6b6?_g=(filters:!)&refreshInterval:(pause:!t,value:10000)&time:(from:now-1w,to:now))

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[varnish-cache security](#)

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[atlas-kibana varnish](#)

[varnish cvmfs](#)

[CVMFS Workshop 2024 -vanish and jump combined.](#)