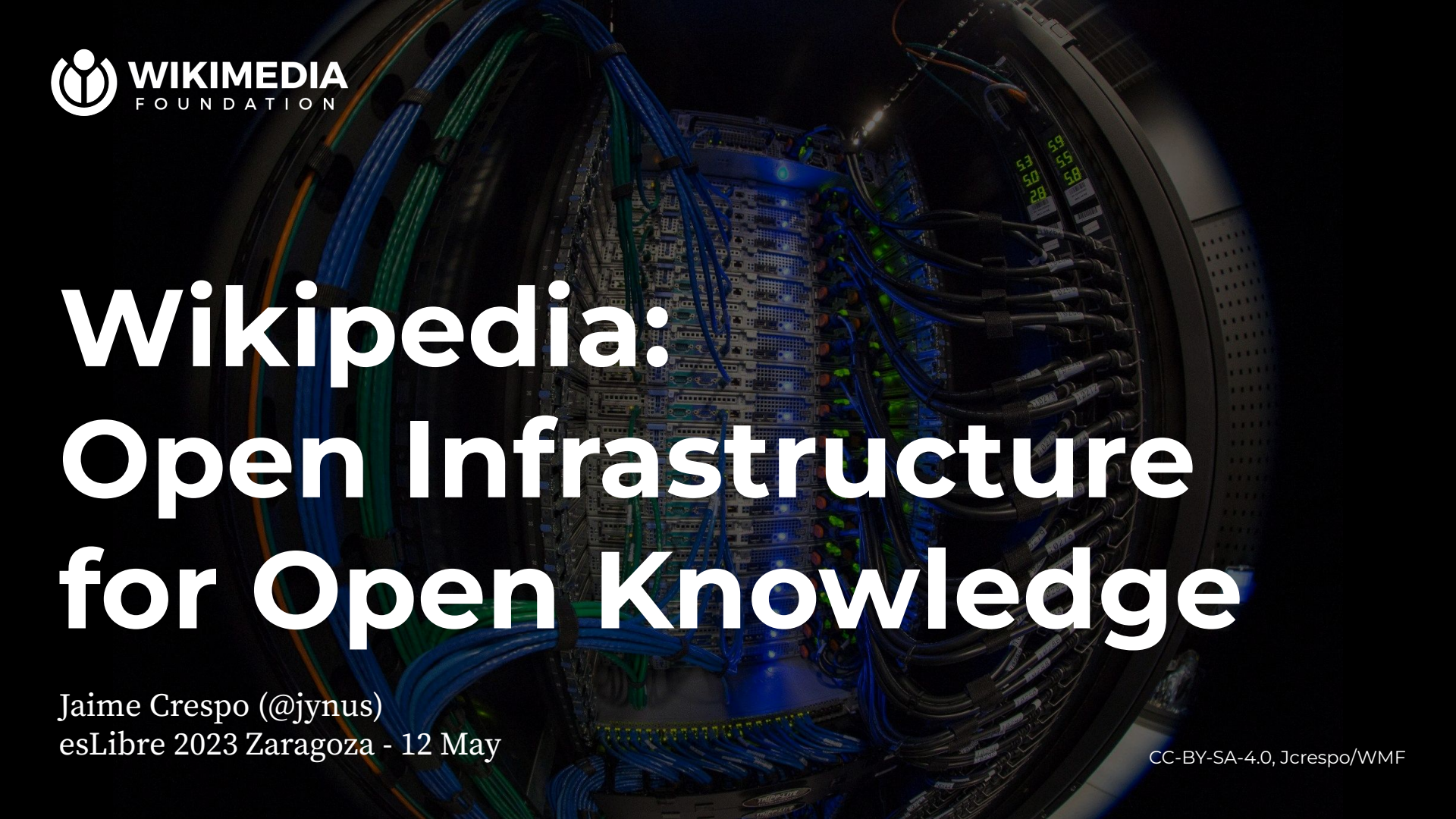

WIKIMEDIA FOUNDATION

Wikipedia: Open Infrastructure for Open Knowledge

Jaime Crespo (@jynus)
esLibre 2023 Zaragoza - 12 May

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Introduction

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What is Wikimedia?

- Global movement whose mission is to bring free educational content to the world
- The Wikimedia Foundation is a not-for-profit organisation that maintains some of the largest wikis on the internet, including **Wikipedia**, **Commons** and **Wikidata**

How it all started?

- **Jan 2001**: UseModWiki (Perl + text files)
- **Jan 2002**: "The PHP script" (PHP + MySQL 3.23). Hosted on a Bomis server
- **July 2002**: "Phase III" (MediaWiki)
  - Apache 1.3 + PHP 4.2 + MySQL 3.23. Wikipedia's first own server
- **May 2003**: Separate web server for enwiki + database server/web server for other wikis
- **Sept 2003**: Two front-end web servers, each with its own cache (file-based). About 8-11 page req/s.
- **Jan 2004**: Tampa datacenter. Primary and replica dbs + dumps, en + foundation and other webservers, misc server (mail list). Files locally.
- **Feb 2004**: 3 squid servers over 2 DCs, file cache turned off. 5 Apaches using NFS
- **2005**: 40 servers
- **2006**: 120 servers. Tampa + Amsterdam + Seoul
- **2009**: 350 servers
- **2013**: New primary DC in Ashburn, Virginia
- **2014**: New secondary DCs in Dallas, Texas and San Francisco (4 in total, including Amsterdam)
- **2016**: ~1200 bare metal servers. First datacenter failover test.
- **2018**: New facility in Singapore, 5 colocation facilities
- **2020**: ~1300 bare metal servers
- **2022**: Multi-dc app servers

Monthly overview

Reading

Total page views

24B

April ↓ *-9.05% month over month*

281B ↑ *7.57% year over year*

Last 12 Months (May 2022 - Apr 2023)

Page views by country

Countries with the most views for April

3B	United States of A
918M	Japan
863M	Germany
863M	United Kingdom

Contributing

Edits

47M

April ↓ *-3.86% month over month*

560M ↑ *2.00% year over year*

Last 12 Months (May 2022 - Apr 2023)

New registered users

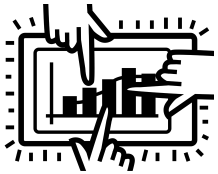
258K

April ↓ *-10.47% month over month*

3M ↑ *4.95% year over year*

Last 12 Months (May 2022 - Apr 2023)

Some stats

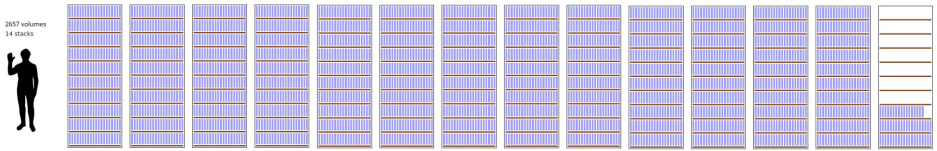


100-170K HTTP(S) requests/s

92 million multimedia files

970 wikis

~320 languages



IT Philosophy

- Only using free software (Debian)
- Self-hosted (for privacy)
- Managed by volunteers and staff
- Transparency:
  - Open code (Gerrit/GitLab)
  - Open infrastructure (configuration management and orchestration)
  - Open bug tracker (Phabricator)
  - Open metrics (Grafana)
  - Open discussions (mail lists & IRC)
  - Open docs (mw.org & WikiTech)
  - Open data (dumps.wm.org, Wikireplicas)

“Imagine a world in which every single person on the planet is given free access to the sum of all human knowledge.
That's what we're doing.

WIKIMEDIA FOUNDATION

How It All works?

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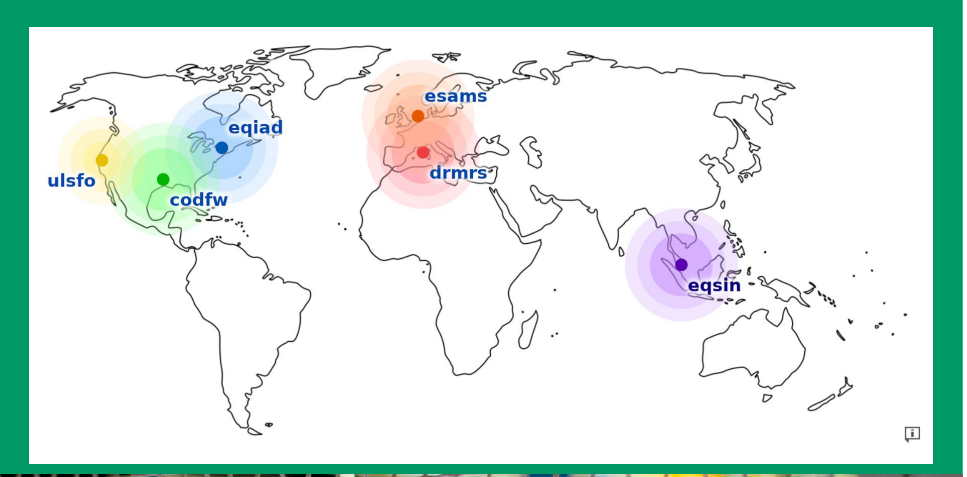


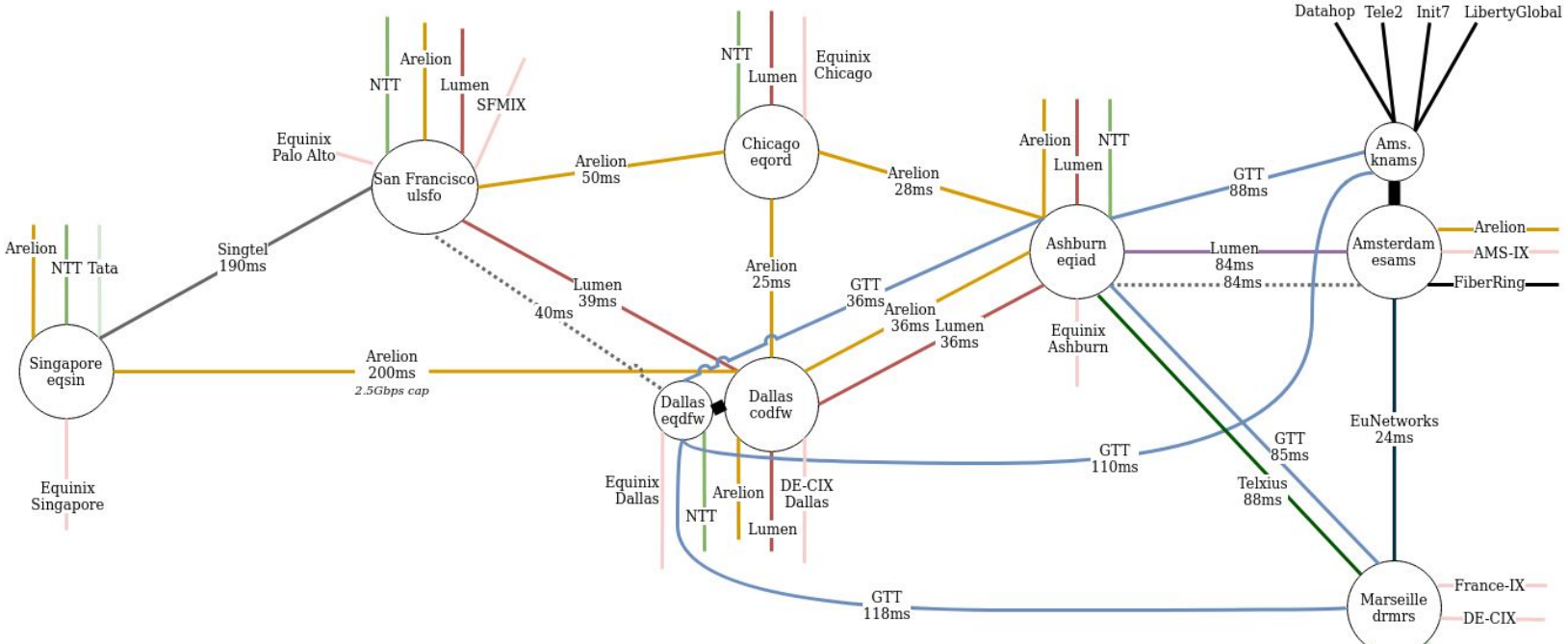
Datacenters

- 6 colocation facilities around the world
  - Want to expand to Africa, South America
- ~1800 bare metal servers
  - No public cloud, ext. CDNs
- gdnsd: GeoDNS to redirect you to our closest edge

CC by SA 3.0, Victorgrigas

Network

- **AS14907** operated with per-site and global prefixes
- IPv4 and IPv6 connectivity
- Internet transit and IXP peering at each POP
- Private wavelength services interconnect POPs

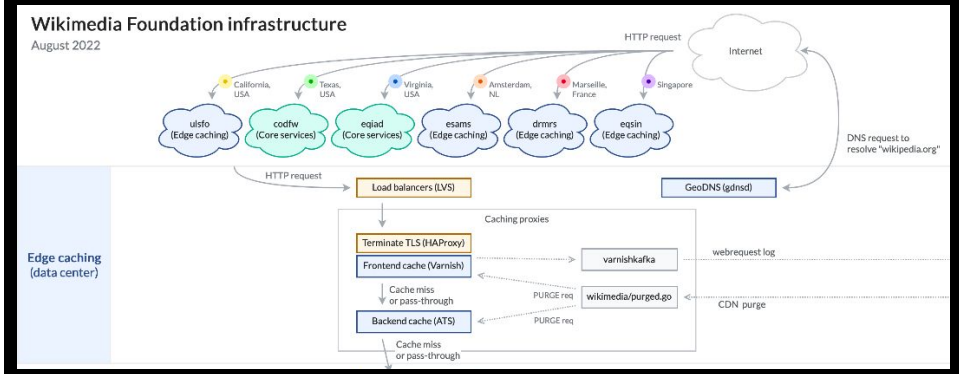


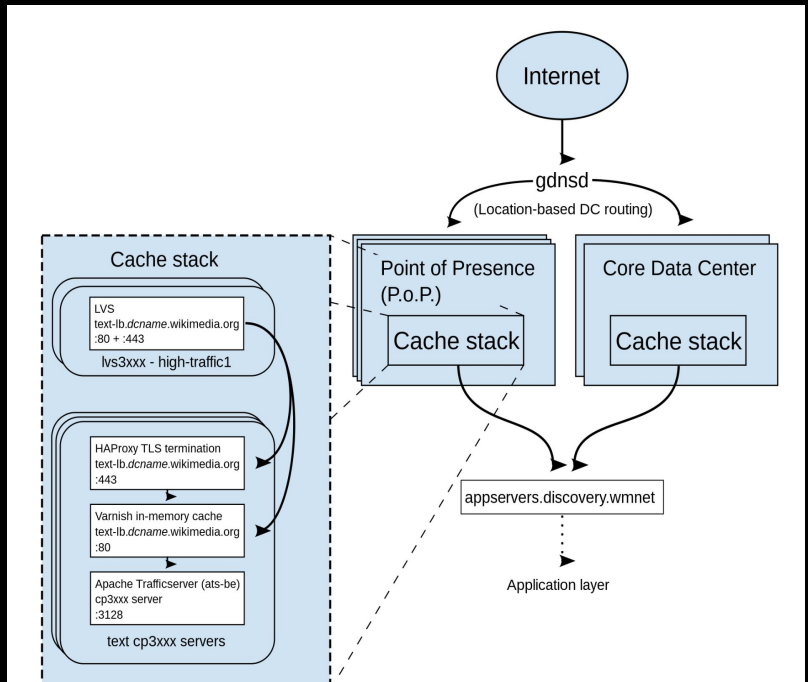
Edges & Cache

- **Linux Virtual Server** for load balancing all layers below
- **HAProxy** for TLS termination and HTTP 2
- **Varnish** for the in-memory cache ("frontend"), and
- **Apache Traffic Server** is responsible for on-disk persistent caching ("backend").

upload (media files) and text (HTML, js, CSS) separate clusters

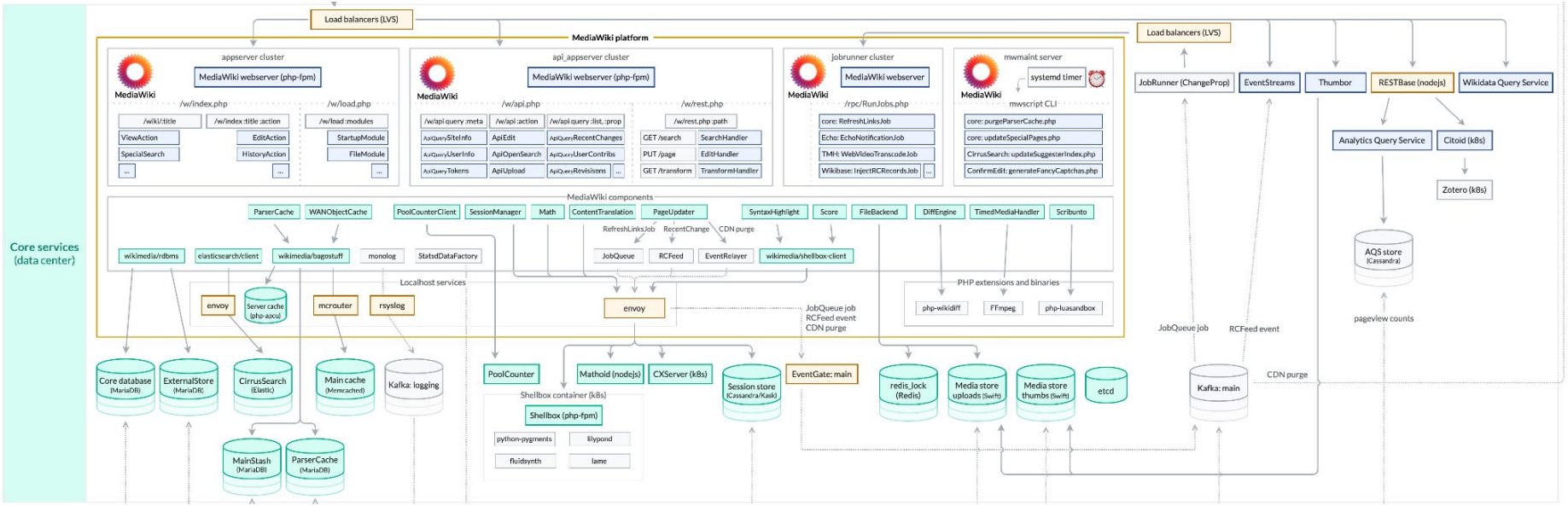
- ~90% of traffic ends at the cache layers





App servers

- MediaWiki monolith (Apache + PHP 7.4)
- 4 (+ 1) clusters: app_servers, api_servers, parsoid, jobrunners/videoscalers (+ mwdebug)
- In migration to Kubernetes
- Multiple levels of caching (code, raw wikitext, parsed HTML, internal state) on memcache, app cache, databases

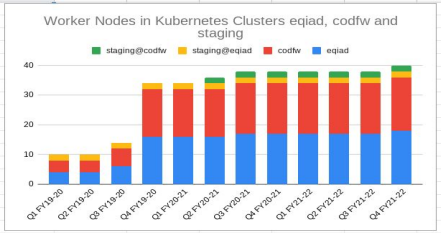


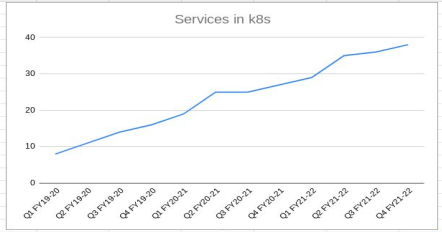
Services

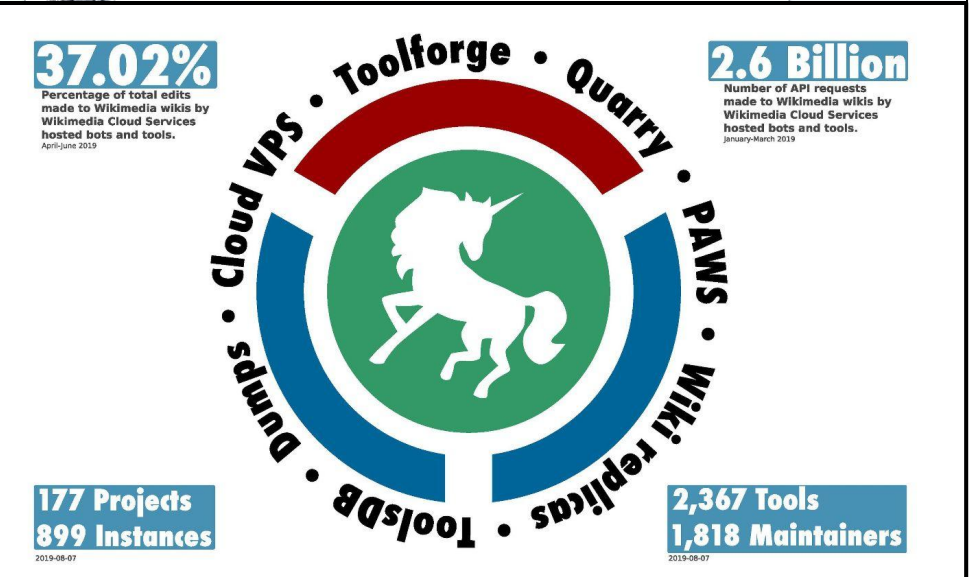
- Handled in Kubernetes:
  - Several media rendering services: Thumbor, PDF generation, timeline, mathoid
  - Mobile apps APIs
  - Services depending on external requests: Citoid, Translation
  - Events and streams
  - Machine learning

```
mw:
  # The datacenter. To be overridden in deployments.
  datacenter: local
  domain_suffix: "local"
  egress:
    database_networks: "10.0.0.0/8"
    etcd_servers: [] # If present, they need to have the form "{ip: <>, port: <>}"
  httpd:
    image_tag: latest
    # Add here any apache configuration you might want to test/preload.
    # It will be loaded before all the rest of conf-available and after modules have loaded.
    # See https://github.com/wikimedia/operations-docker-images-production-images/blob/master/ima
    additional_config: false
  localmemcached:
    # Enable to start memcache daemons in the pod, one for each of the
    # ports listed.  These can serve as placeholders for
    # mcrouter to allow for image testing in non-production
    # environments.  If this section is enabled then the mcrouter
    # sections must be disabled.
    enabled: false
```

```
==> v1/Deployment
NAME             DESIRED  CURRENT  UP-TO-DATE  AVAILABLE  AGE
mathoid-staging  1        1        1           1          148d

==> v1/NetworkPolicy
NAME             POD-SELECTOR                AGE
mathoid-staging  app=mathoid,release=staging  148d

==> v1/Pod(related)
NAME                              READY  STATUS   RESTARTS  AGE
mathoid-staging-6b84b94b47-wtp5m  2/2    Running  0         34d


NOTES:
```







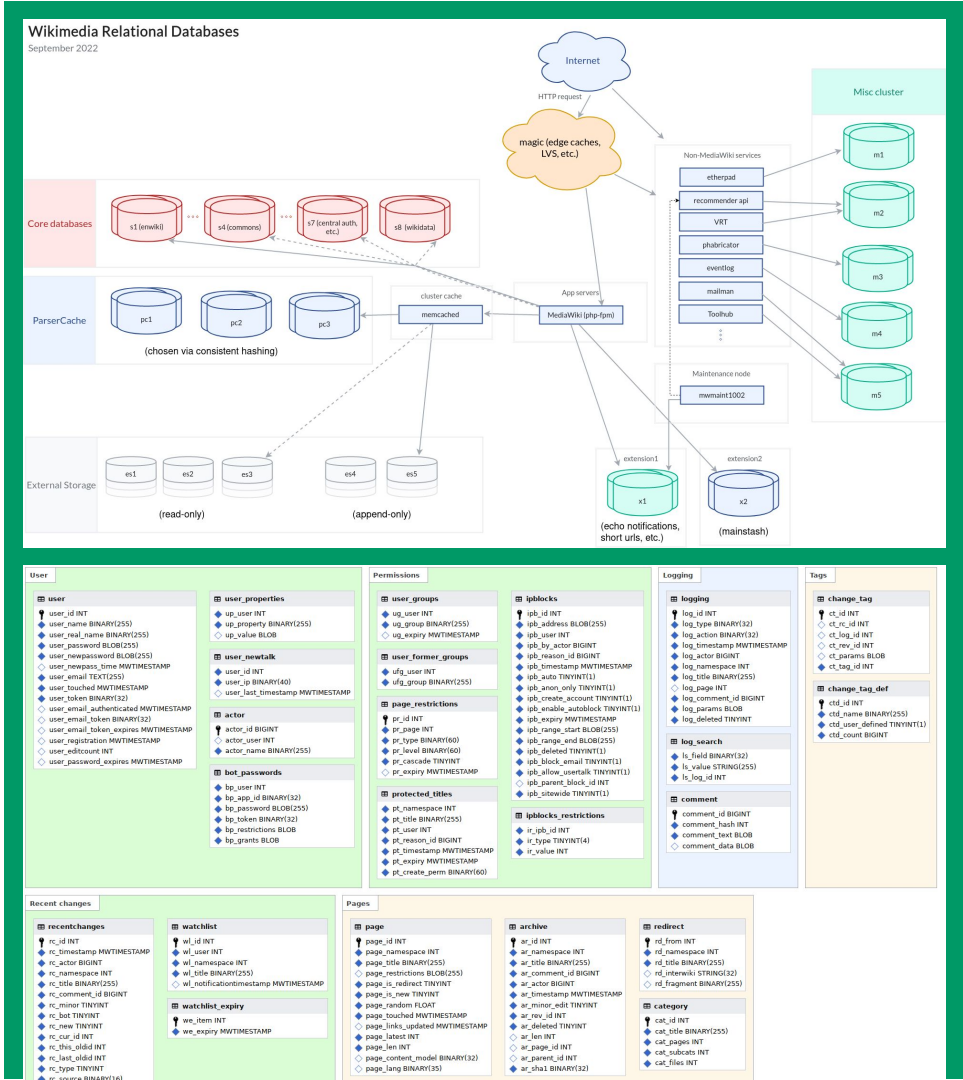
Supporting clusters

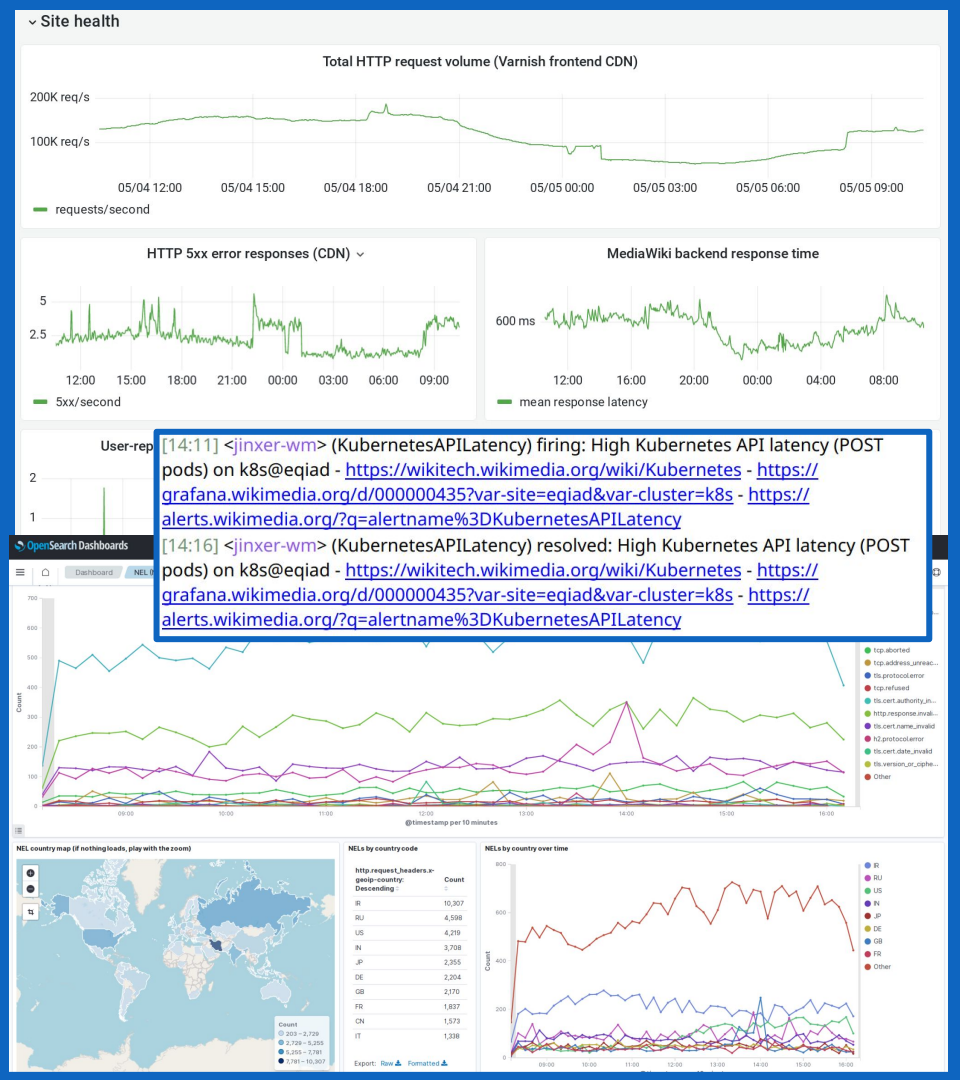
- Sessions
- Search
- Analytics
- Cloud Services

Databases & Storage

- **MariaDB** (10.4 -> 10.6) main structured data storage (metadata and wikitext revisions)
  - Also used by many internal services (bug tracker, backups, etc)
- Openstack **Swift** for multimedia and thumbnails/transcoded video
- **Cassandra** for sessions, additional storage
- Other specialized data stores*: Hadoop, Druid, Redis, PostgresQL, Memcache, MiniIO, Etcd, Kafka, Bacula

*In some cases, for a generous definition of "data stores"





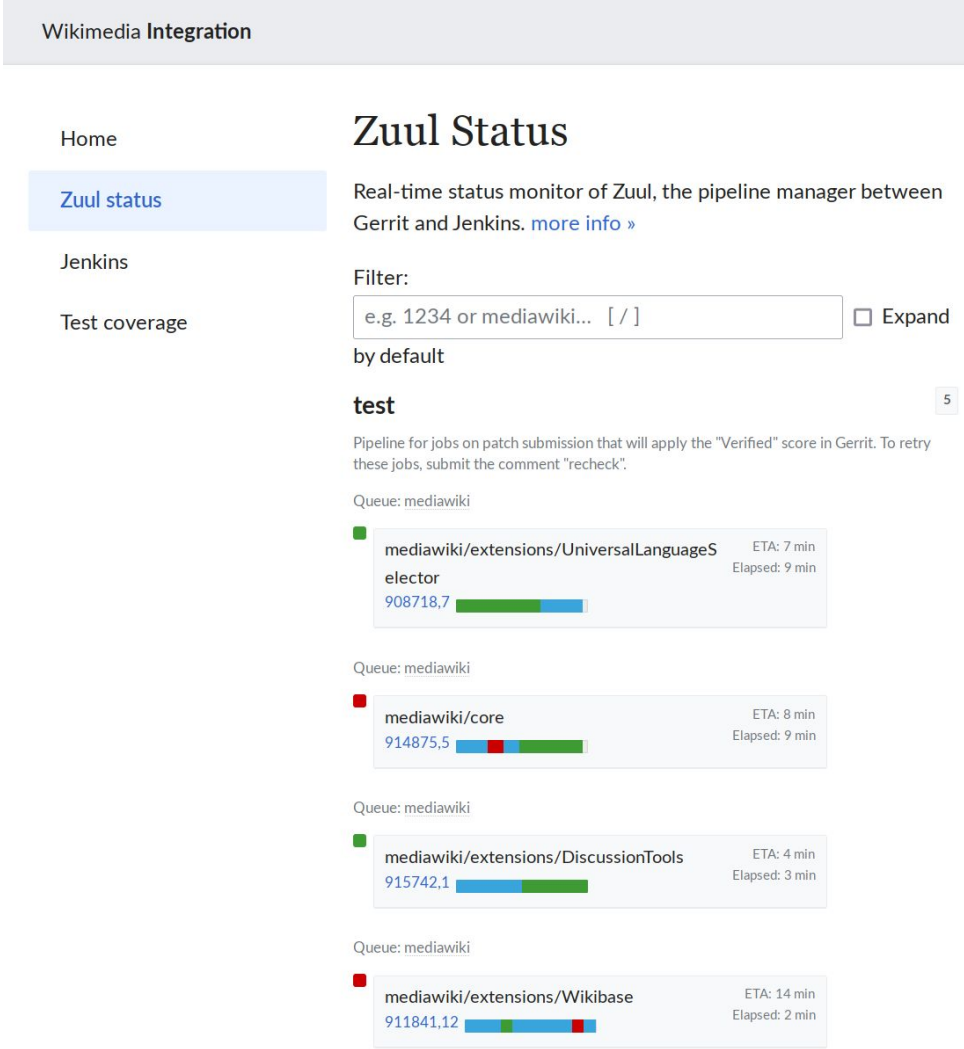
Monitoring

- ELK (OpenSearch) for logs
- Prometheus + Thanos + Grafana for metrics (publicly available)
- Icinga/Alertmanager for alerting
- Server Admin Log registers deploys and changes on production (wiki, IRC, twitter)
- A few specialized dashboard apps
- Statuspage: * https://www.wikimediastatus.net/

*Exception to self-hosted policy

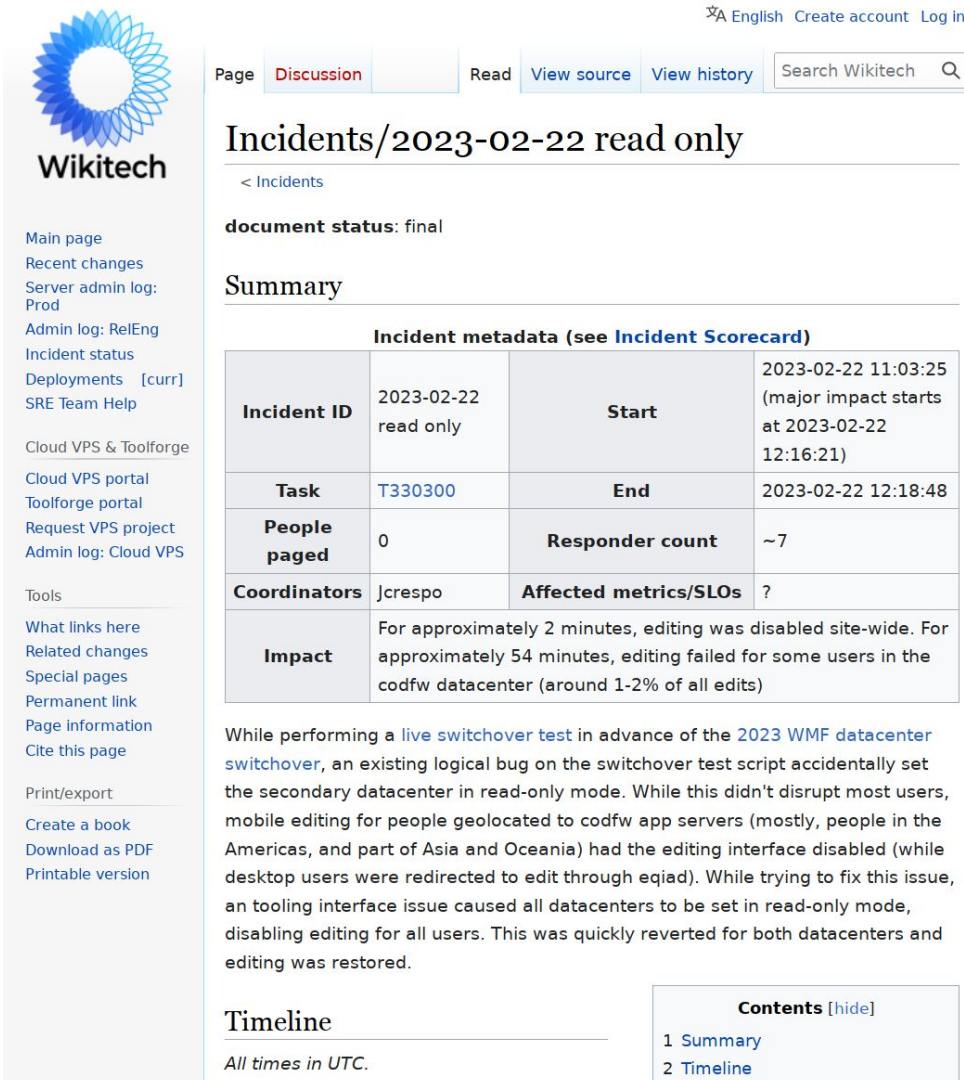
Deployment cycle

- Users report bugs and feature requests in Phabricator
- Developers (both WMF staff and community members) create and review patches in Gerrit/GitLab
- Testing envs for CI/CD
- Integration testing in beta
- MediaWiki branch cut weekly from HEAD (e.g. 1.41.0-wmf.6)
  - Canary deployments
  - Deployed in 3 phases: production test, small wikis & large wikis
  - Scap tool (pre-k8s)



Incident handling

- 2 SREs are on call and normally one becomes **Incident Coordinator**
- IC coordinates response, escalates it
- Workbooks are written for the most common debugging and fixing procedures
- Incidents inform gaps in procedures and team knowledge
- Postmortems published publicly at https://wikitech.wikimedia.org/wiki/Incident_status
- Status page: https://www.wikimediastatus.net/ (exception to not self-hosted/open source solution)



English Create account Log in

Wikitech

Page Discussion Read View source View history Search Wikitech

Main page
Recent changes
Server admin log: Prod
Admin log: RelEng
Incident status
Deployments [curr]
SRE Team Help

Cloud VPS & Toolforge
Cloud VPS portal
Toolforge portal
Request VPS project
Admin log: Cloud VPS

Tools
What links here
Related changes
Special pages
Permanent link
Page information
Cite this page

Print/export
Create a book
Download as PDF
Printable version

Incidents/2023-02-22 read only

< Incidents

document status: final

Summary

Incident metadata (see Incident Scorecard)

Incident ID	2023-02-22 read only	**Start**	2023-02-22 11:03:25 (major impact starts at 2023-02-22 12:16:21)
Task	T330300	**End**	2023-02-22 12:18:48
People paged	0	**Responder count**	~7
Coordinators	Jcrespo	**Affected metrics/SLOs**	?
Impact	For approximately 2 minutes, editing was disabled site-wide. For approximately 54 minutes, editing failed for some users in the codfw datacenter (around 1-2% of all edits)		

While performing a live switchover test in advance of the 2023 WMF datacenter switchover, an existing logical bug on the switchover test script accidentally set the secondary datacenter in read-only mode. While this didn't disrupt most users, mobile editing for people geolocated to codfw app servers (mostly, people in the Americas, and part of Asia and Oceania) had the editing interface disabled (while desktop users were redirected to edit through eqiad). While trying to fix this issue, an tooling interface issue caused all datacenters to be set in read-only mode, disabling editing for all users. This was quickly reverted for both datacenters and editing was restored.

Timeline

All times in UTC.

Contents [hide]
1 Summary
2 Timeline

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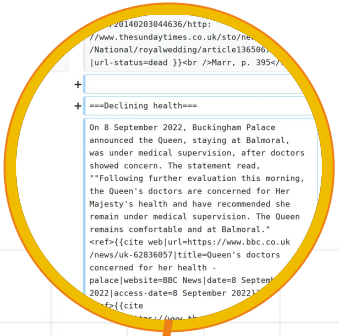
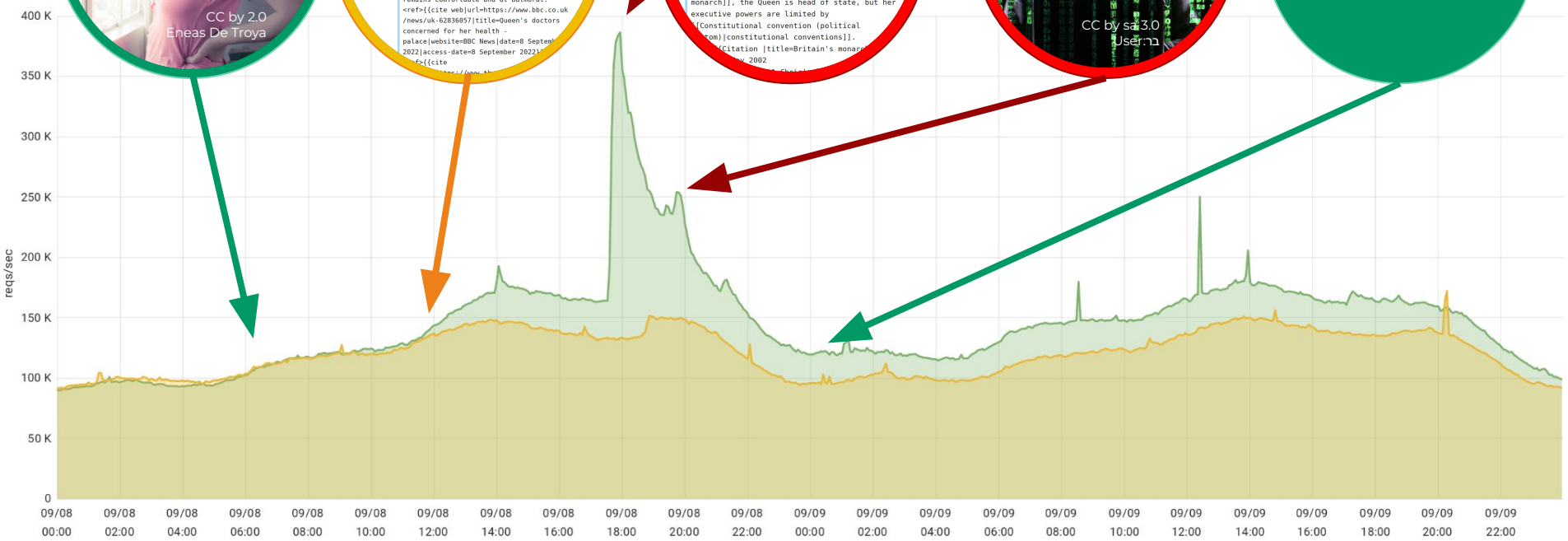
Back in September 2022... (story time)

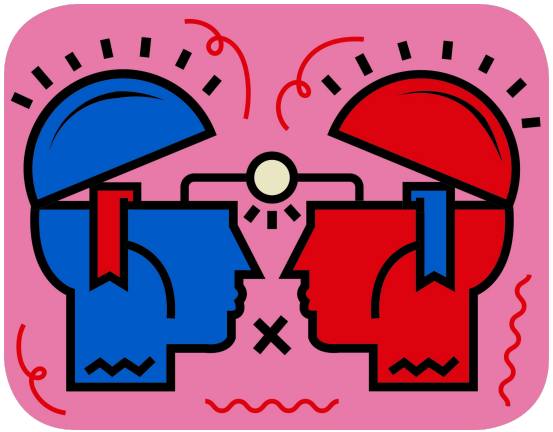




Takeaways?

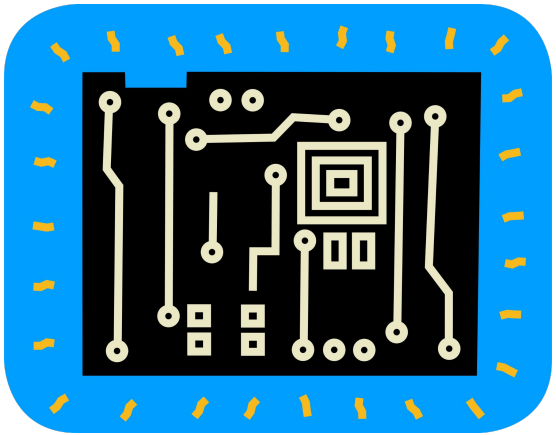
Community is key

Our community is faster at reporting ongoing issues, finding bugs and sending patches (although not every job is suitable to be left for volunteers)



Openness in everything, not only code

Not only free software is necessary, also open infrastructure, open data and open procedures.



It is not always easy!

The technological challenges are huge, and the resources are limited- it is not always easy to succeed.

We need your help!

https://www.mediawiki.org/wiki/How_to_contribute

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Questions?

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Wikipedia: Open Infrastructure for Open Knowledge

Thank you for attending!
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Thanks to everyone that contributed: marostegui, godog, akosiaris, kwakuofori, _joe_, moritz, topranks, simon, bblack

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