Wikimedia Technical & Operational Infrastructure

A high level overview of Wikimedia Operations

Presented by: Rob Halsell

Wikimania 2009 - Buenos Aires, Argentina
August 26-28, 2009

Operations Personnel

- Pretty much everyone does some form of operations.

- 16 shell users, 10 of them with root.

- We are slowly moving into distinct development and operations roles, however we will probably never move into fully dev and ops roles only.

Datacenters

- Wikimedia currently actively occupies 4 different sites.
  - Two are in Amsterdam, Netherlands.
  - Two are in Tampa, FL, USA.
- New Primary DC soon in Ashburn, Virginia, USA.

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DC Deployments

- The initial servers were in Tampa because that is where Jimmy lived.

- Tampa is not ideal for network transit or routing.

- Hurricanes!

- With new installs being mainly lights out manageable, on-site work is significantly reduced.

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Tampa DC Overview

- Currently occupy two datacenters (PMTPA & SDTPA.)

  - They are in the same building ;_;

- Each site has a router, and all traffic is routed out via PMTPA.

- SDTPA was deployed due to power and cooling restrictions in PMTPA.

Amsterdam DC Overview

- We have two locations in Amsterdam (KNAMS & ESAMS).

  - KNAMS is strictly for peering and transit.

  - ESAMS houses servers and associated kit.

- The majority of transit costs are donated via sponsorship and peering!

  - We pay for some cross-connects and our fiber between KNAMS & ESAMS.

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Daily Operations

- Operations is NOT software development.

- Site Requests: extensions, groups, configuration changes requiring shell access.

- Repair & Upgrade: broken hardware replacement.

- Deployment: new hardware allocation and setup.

- Tweaking: Adding new management tools, software...

- Inventory Management

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Site Requests

ALL YOUR BUG
ARE BELONG
TO ME !

- Primarily handled in Bugzilla.

- bugzilla.wikimedia.org

- Sometimes handled by poking Rob in IRC and giving him the Bugzilla Ticket #.

- Changes such as logo, user groups, permissions for group assignments, extensions....

- Some things still get delayed, but overall more and more tickets are handled faster and faster.

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Repairs

- Most new servers are either Dell or Sun

  - This makes ease of deployment and RMA repairs much easier.

- Repairs include any physical required access to the servers, such as hard disk replacement, memory upgrades, and the like.

- All new servers have remote management capabilities, so on-site hands are not required for day to day operations.

Deployment

- New deployments are FUN!

- They are also very time consuming to do it properly.

  - Designing takes time.

  - Implementing takes even more time.

    - We label everything!

- Regular Occurrence: Faster hardware for demands.

Tweaking

- This includes new software testing for operations use.
  - Testing internal software development.
  - Changing settings in things such as OTRS or Bugzilla.
 - Updating blog software and the like...

Inventory Management

- We currently use Racktables to keep track of all our servers.

- We are also developing our own extensions to do this within Mediawiki. \o/

  - If any extension developers want to work on this, we welcome it!

- Yearly audits require an accurate accounting for all hardware, software, and spending.

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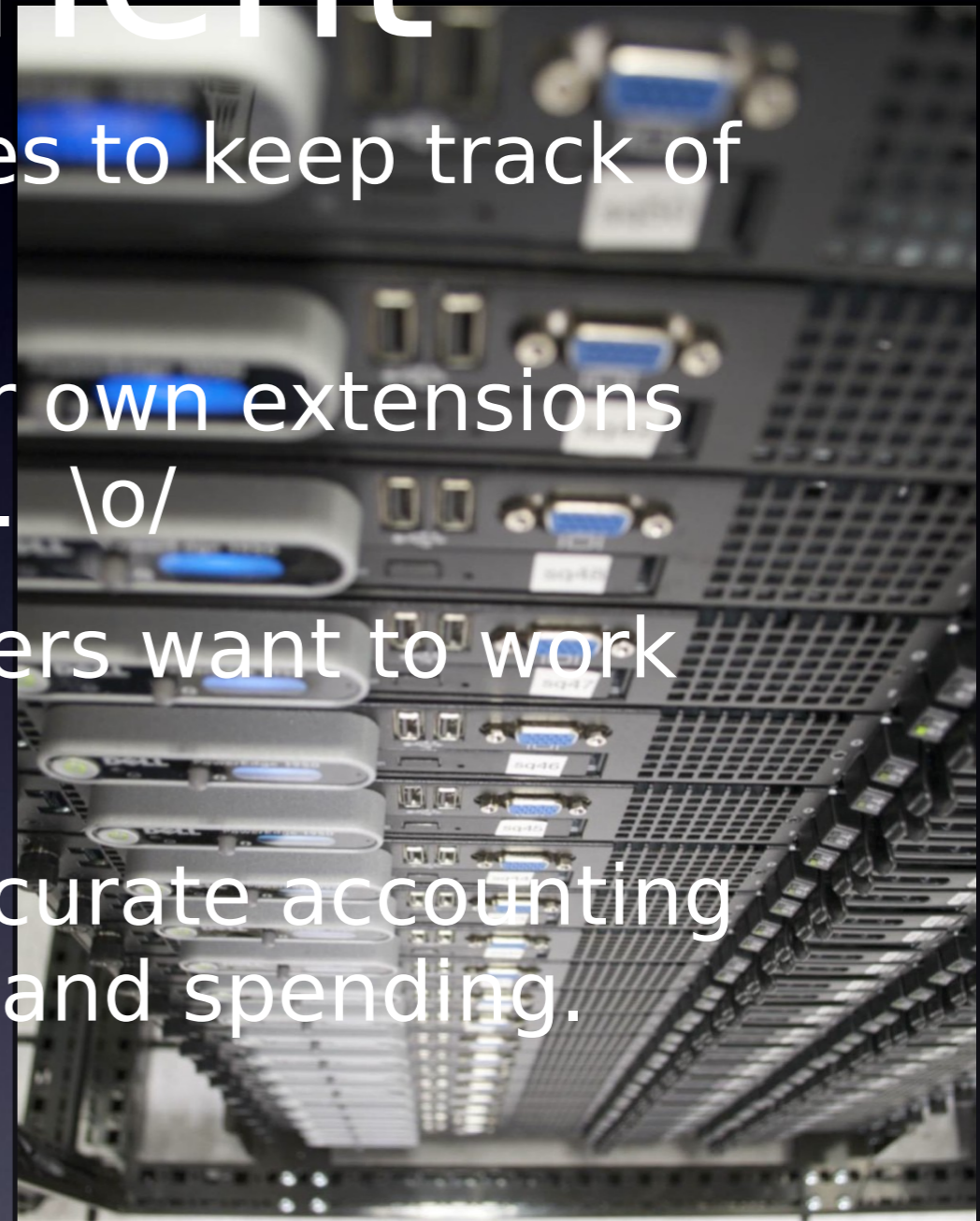
Cool Numbers

- Total # of servers:

- Requests per second at peak: 75,000 requests

- Comscore rates Wikipedia as #5 most visited site.
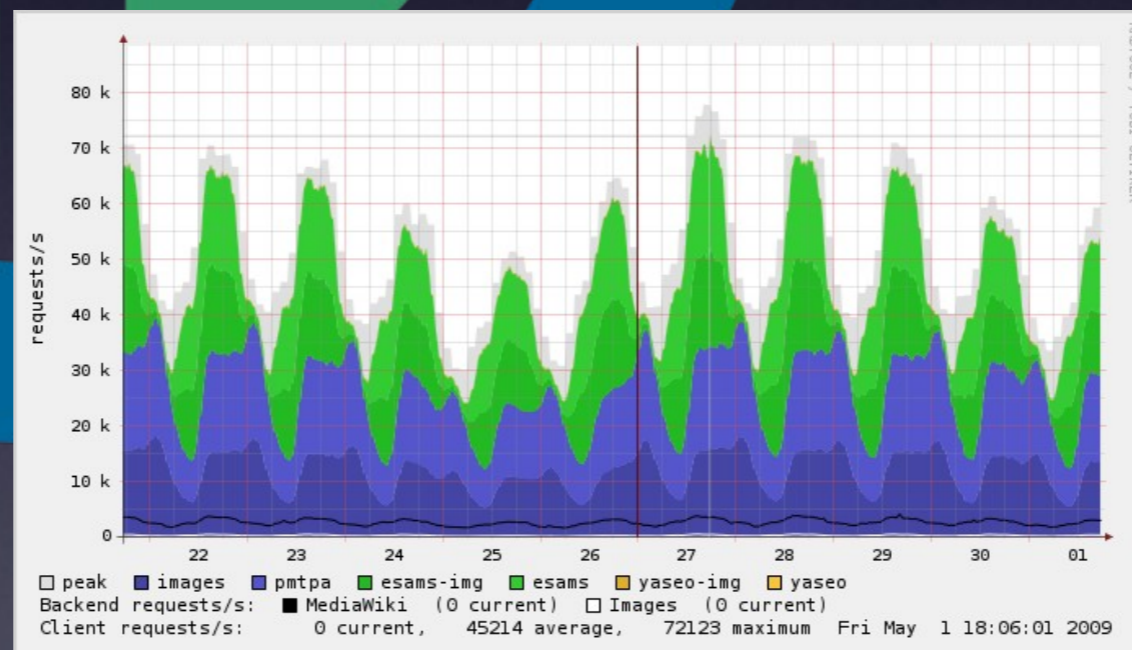
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Traditional Web Server

- Two major components: Apache and MySQL

Apache

MySQL

Wikimedia Web Server

- Squid > Apache > Memcached > MySQL

| Squid | ⬌ | Apache | ⬌ | Memcached | ⬌ | MySQL |

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Squid

- Caching Servers

- Currently deployed in both Tampa and Amsterdam

- Caching stores info so requested pages do not need to be recompiled by Apache.

Squid ⬅➡ Apache ⬅➡ Memcached ⬅➡ MySQL

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Apache

- Does the heavy lifting.

- Currently deployed only in Tampa

- When a page changes, Apache pulls data from Memcached and MySQL to render the page for viewing.

Squid ⬅➡ **Apache** ⬅➡ Memcached ⬅➡ MySQL

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Memcached

- Run on apache servers.

- Stores recently fetched database data in resident memory.

- No need to hit the database and pull lots of data if its in memory.

| Squid | ⬌ | Apache | ⬌ | Memcached | ⬌ | MySQL |

MySQL

- Run out of Tampa datacenters.

- Sites are broken into Database clusters.

  - s1 for English Wikipedia, s2 for the 19 other largest wikis, s3 & s4 for remaining 750+ wikis

- Each cluster has a master and multiple replication servers.

Squid ⬅➡ Apache ⬅➡ Memcached ⬅➡ MySQL

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Software

- Ubuntu 8.04

- We run our own netboot/PXE server, as well as our own apt-repository.

- We create some custom packages for ease of installation (our apache and squid servers are very simple to reinstall)

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More Software

- Apache 2.2

- PHP5

- Memcached 1.2.8

- Squid Version: 2.7

- Load balancing for squid and apache is handled on one of the 4 LVS servers. Each server runs pybal, which is written by our own Mark Bergsma.

MySQL

- There are multiple database roles within the cluster.

- Primary Databases contain revision data for every page and article of the projects.

- External Store databases contain the text data for every revision.

- Images are stored on an NFS server and apaches access it. Basically this stinks but we don't have a better way... yet. (Not really MySQL related)

Neat Operations Tools

- Nagios

- Ganglia

- Torrus

- Racktables

- Mediawiki ;]

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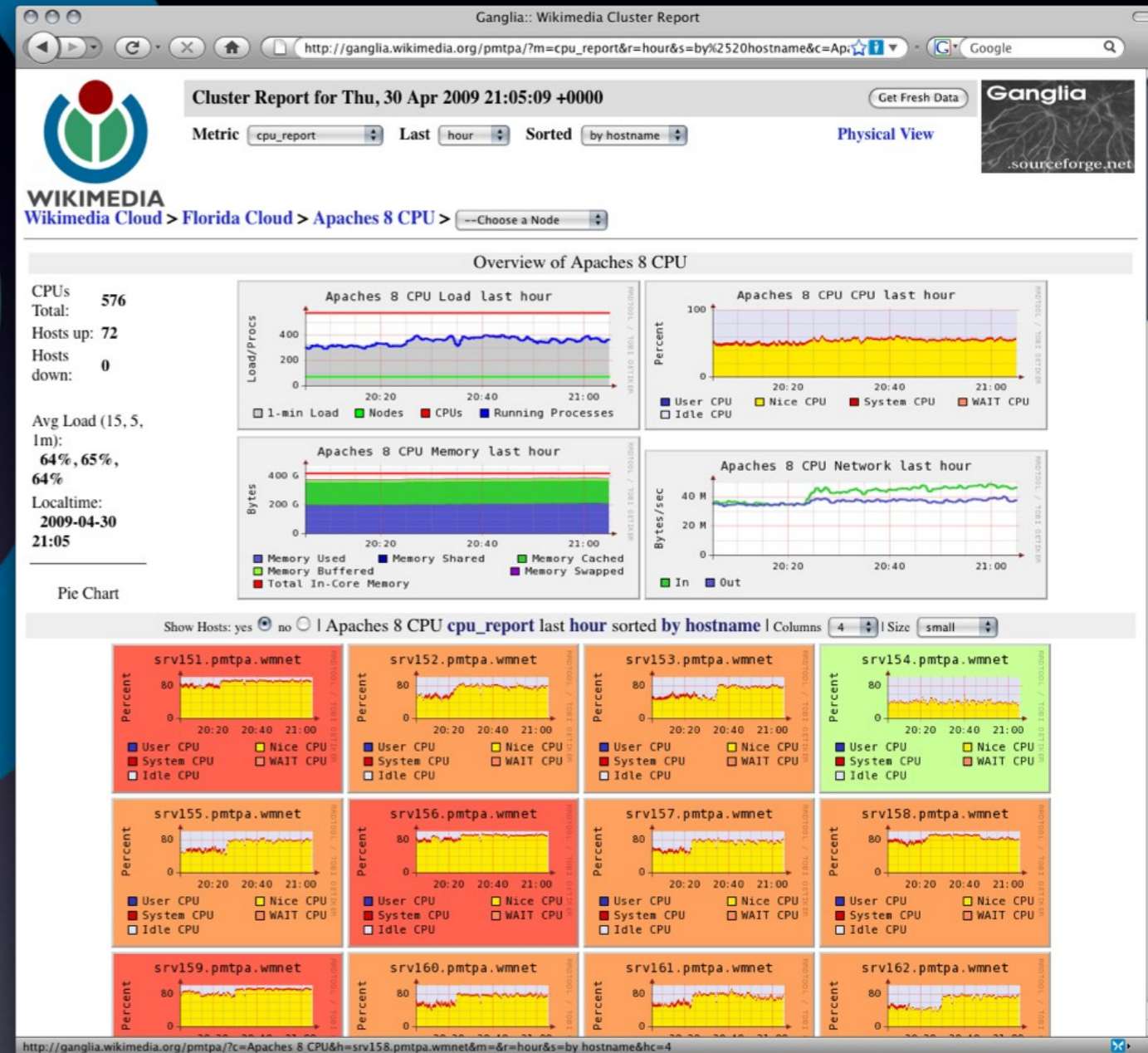Wikimania 2009 - Buenos Aires, Argentina
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Nagios

- Shows all servers, and the services they are running.

- Shows downtime of various services.

- nagios.wikimedia.org

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Ganglia

- Distributed monitoring software, graphing, and reviewing tool for servers.

- Shows us how hard the servers are working.

- ganglia.wikimedia.org

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Torrus

- SNMP monitoring and graphing software.

- We capture and display network usage, power and temperatures in our datacenters, squid performance, and other items.

- torrus.wikimedia.org

Last day graph

ps1-a1-sdtpa:th1:1

	Current	Average	Maximum	Minimum	
	23.00	22.45	23.00	21.52	Temperature
	15.00	15.00	15.00	15.00	Low threshold
	40.00	40.00	40.00	40.00	High threshold

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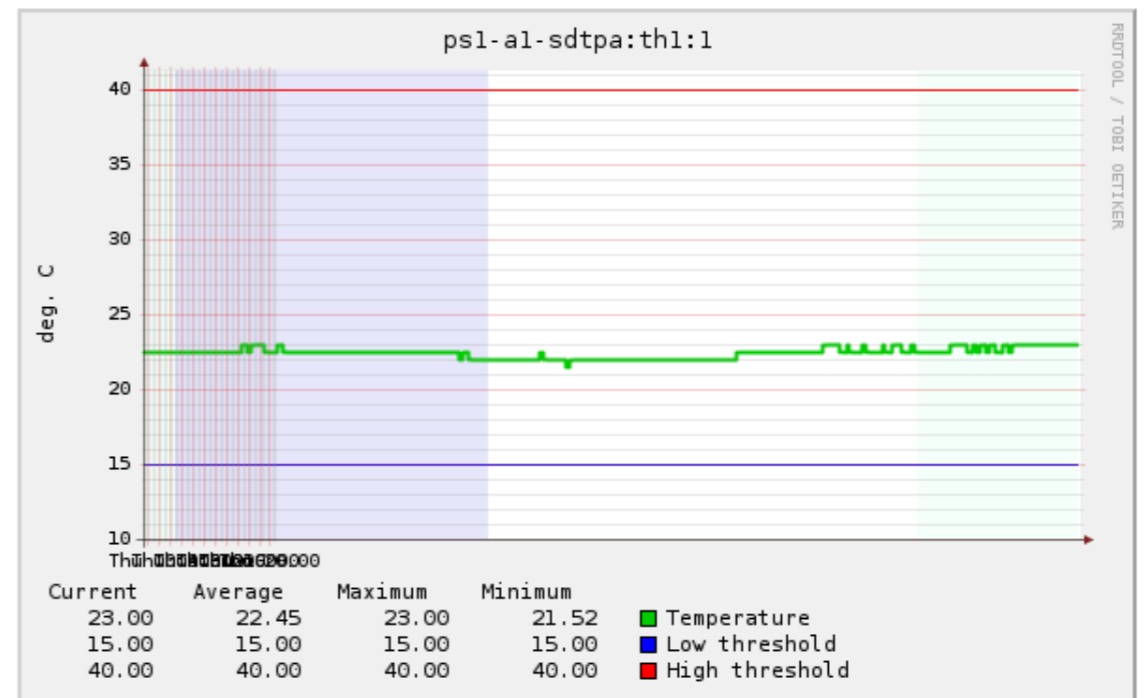
Racktables

- No URL needed, its locked and no one can login unless we employ you ;]

- Keeps track of every server, purchase price, date of purchase, warranty information, location, etc...

Rack diagram

sdtpa row A : A1 > > >

	Front	Interior	Back
42			
41			
40			
39			
38			
37			
36			
35			
34			
33			
32			
31			
30		csw1-sdtpa	
29			
28			
27			
26			
25			
24			
23			
22			
21			
20		msw1-sdtpa	
19			
18			
17		scs-a1-sdtpa	
16			
15			
14			
13		ms3	
12			
11			
10			
9		ms4	
8			
7			

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Wikitech (Mediawiki)

- Mediawiki Installation that we use to document setup, maintenance, recovery, etc...

- Exists outside the cluster, so if the cluster goes down, we still have notes on how to fix it.

- wikitech.wikimedia.org

Memcached – Wikitech

http://wikitech.wikimedia.org/view/Mem

RobH   my talk   my preferences   my watchlist   my contributions   log out

page   discussion   edit   history   delete   move   protect   watch

Memcached

The memcached master php file is located in:

```
/home/wikipedia/common/php/mc-pmtpa.php
```

You can install a memcached server with:

```
apt-get install memcached
```

Be certain you start memcached after install. The installer states it is starting it, but it lies.

You can test the servers to see which memcached are functioning and which are not with the following:

```
cd /home/w/common/php-1.5/maintenance; php mctest.php
```

Note that all servers that are up will return incr: 100 get: 100 and servers that are down will return incr: 0 get: 0.

Editing mc-pmtpa.php   [edit]

Please note what the file says, the order and format is **very important.** Make sure you add servers to the correct ***DOWN*** or ***SPARE*** sections, removing the slot number and replacing it with XX. If you move a server into the memcached pool, ensure you remove the XX and put in the correct number.

If you fix a memcached server and it is not immediately needed to go into rotation, be sure to move it from DOWN to SPARE.

Once you finish updating the file, you need to sync it out with the following:

navigation
- Main Page
- Server admin log
- Datacentre tasks
- Sysadmin tasks
- Recent changes
- Help
- Tech blog

clusters
- Tampa cluster
- Kennisnet cluster
- Yahoo cluster
- Corporate office
- IP addresses
- Server roles

doc tasks
- Document me!
- Fix me!

search

Go   Search
Advanced search

toolbox

Done

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In Closing...

- Thanks for listening!
- Wikimania Rocks!
- Buenos Aires Rocks!
- Questions?

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Questions from Presentation

- What is the hit rate on the caching servers?

  - 98% on images, 90-95% on text.

- How much is WMF spending on new servers and associated kit this year?

- Not counting the new DC deployment, we will spend 1M USD just keeping up with growth trends (both use and software feature growth.)

- There were a number of others, I just do not recall them all, sorry =/

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