The Frontier System for the Fr Atlas Cloud

Vamvakopoulos E.

GRIF-Tokyo-Beijing workshop,

15th-19th June,

LPNHE, Paris

dapnia

cea

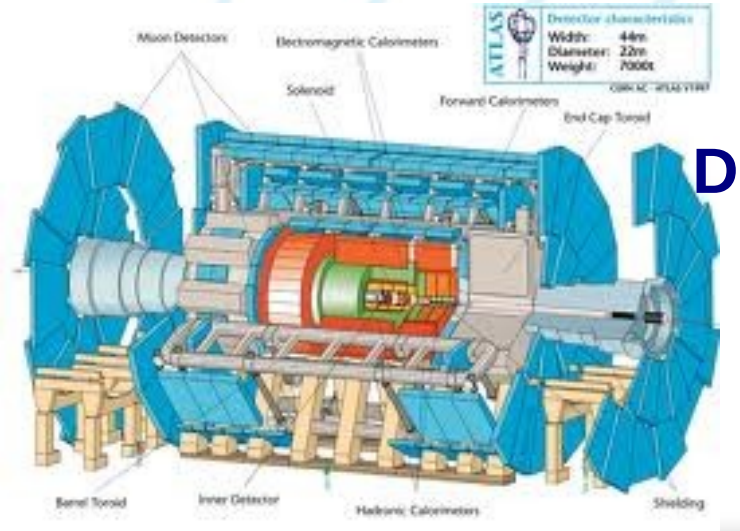
saclay

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

Transfer metadata across Frontiers

Conditions data refers to nearly all the non-event data produced during the operation of the ATLAS detector, together with that required to perform reconstruction and analysis[1] .

Atlas Detector at CERN



How Conditions Data transfer?

Hundreds GRID sites beyond the Frontiers

[1]. **ATLAS TDR-017, CERN-LHCC-2005-022**

Frontier System :

A System for Data Distribution from a Central DB to Many Client System[2]

- **Frontier uses HTTP based Protocol (Rest Arch)[3]**
- **Developed at FermiLab for the needs CDF**
- **Adapted from LHC experiments at CERN: CMS, ATLAS to access "*conditions data*" at all their sites worldwide.**

[2] http://frontier.cern.ch/
[3] http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm

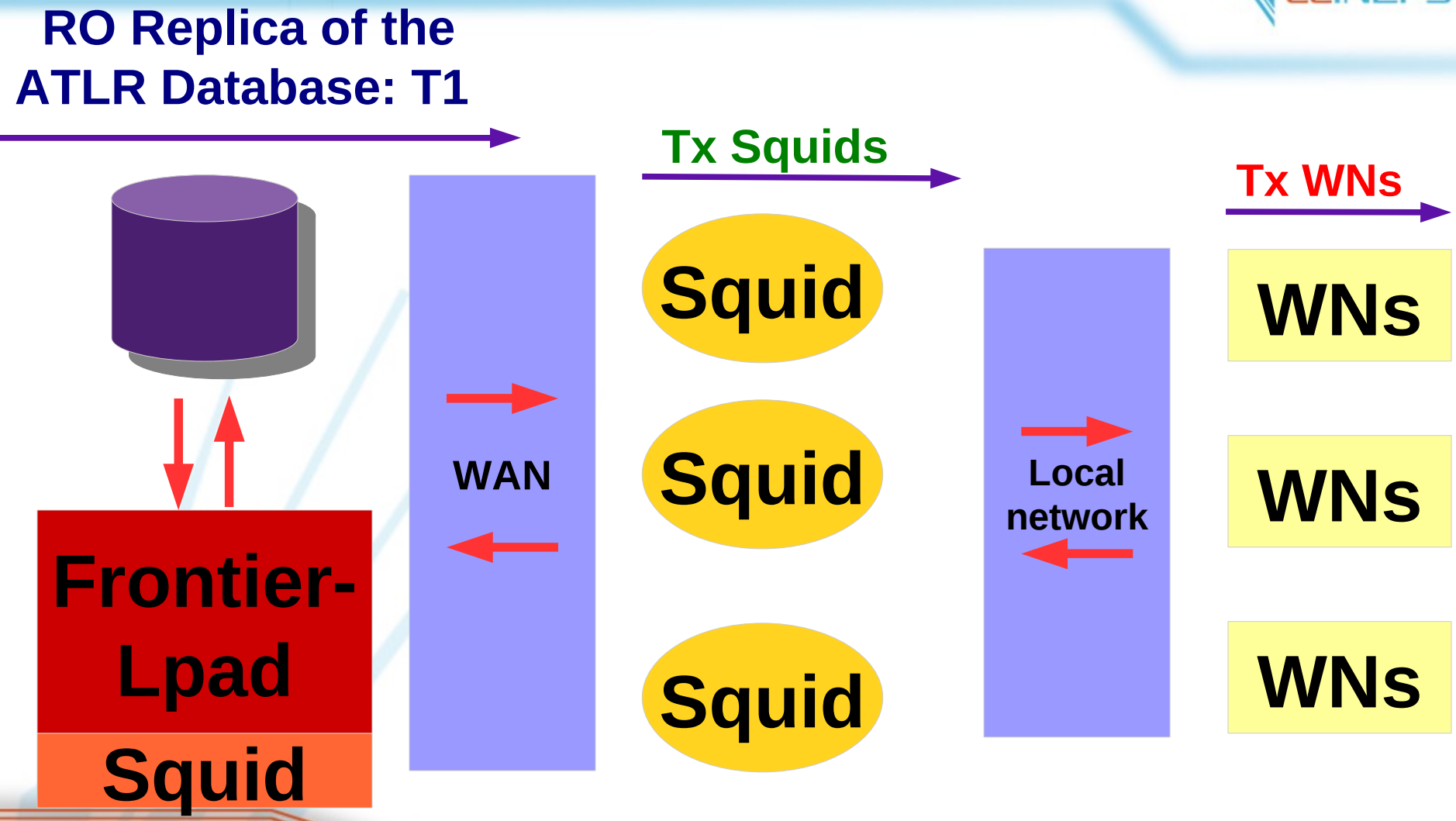
Transfer metadata across the frontiers …

In the case of Condition Data from *ATLR* are transferred down to the ATLAS payload (jobs) by :

a distrusted network of read-only replicas of the central *ATLR DB* (CERN) on selected

Tier1 sites (IN2P3-CC, RAL, KIT, BNL and TRIUMF)
and the employment of the Frontier system

Atlas Frontier System



Recommendation

ATLAS requests that selected T1 sites install both Frontier (launchpad) and Local Squid servers and that

each Tier 2 site install one local Squid instance per 500 user analysis batch queue slots hosted at their site

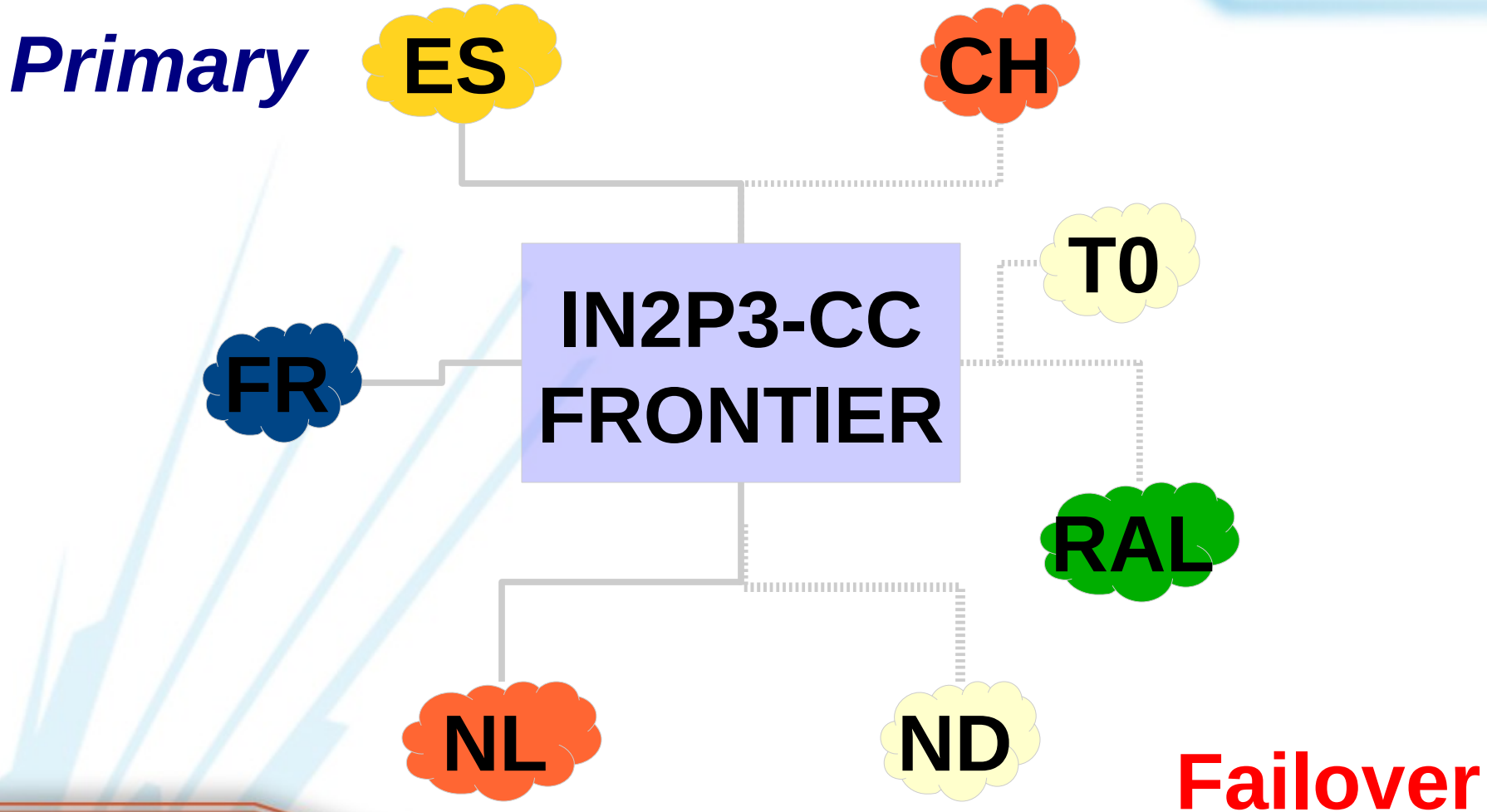
(ref: ATLAS Trigger and Offline Board [TOB], September 16, 2009).

IN2P3-CC

- ***Two Frontier-Lpad***
  - under DNS load balancing
  - Alias: **ccfrontier.in2p3.fr**

- ***Two Site Squids***
  - under DNS load balancing
  - Alias: **ccaltassquid.in2p3.fr**
  - **only for the Frontier dedicated usage (acl on destination)**

IN2P3-CC FRONTIER



Squid Network

- GRIF
  - LAL
  - LPNHE
- IRFU/CEA
- LAPP*
- IN2P3-CC*
  - CPPM
  - LSPC
  - LPC
- BEIJING*
- RO-02-NIPNE*
  - RO-14-ITIM
- RO-07-NIPNE*
- RO-16-UAIC*
- TOKYO*

Frontier endpoint Configuration via AGIS

AGIS

- *Frontier Configuration for the site: primary and backup Frontier Service endpoint.*
- *Squid Configuration for the site: primary and backup squid service endpoint.*

Atlas installation machinery

add to the atlas local environment setup of …the, a site variable with a specific format …

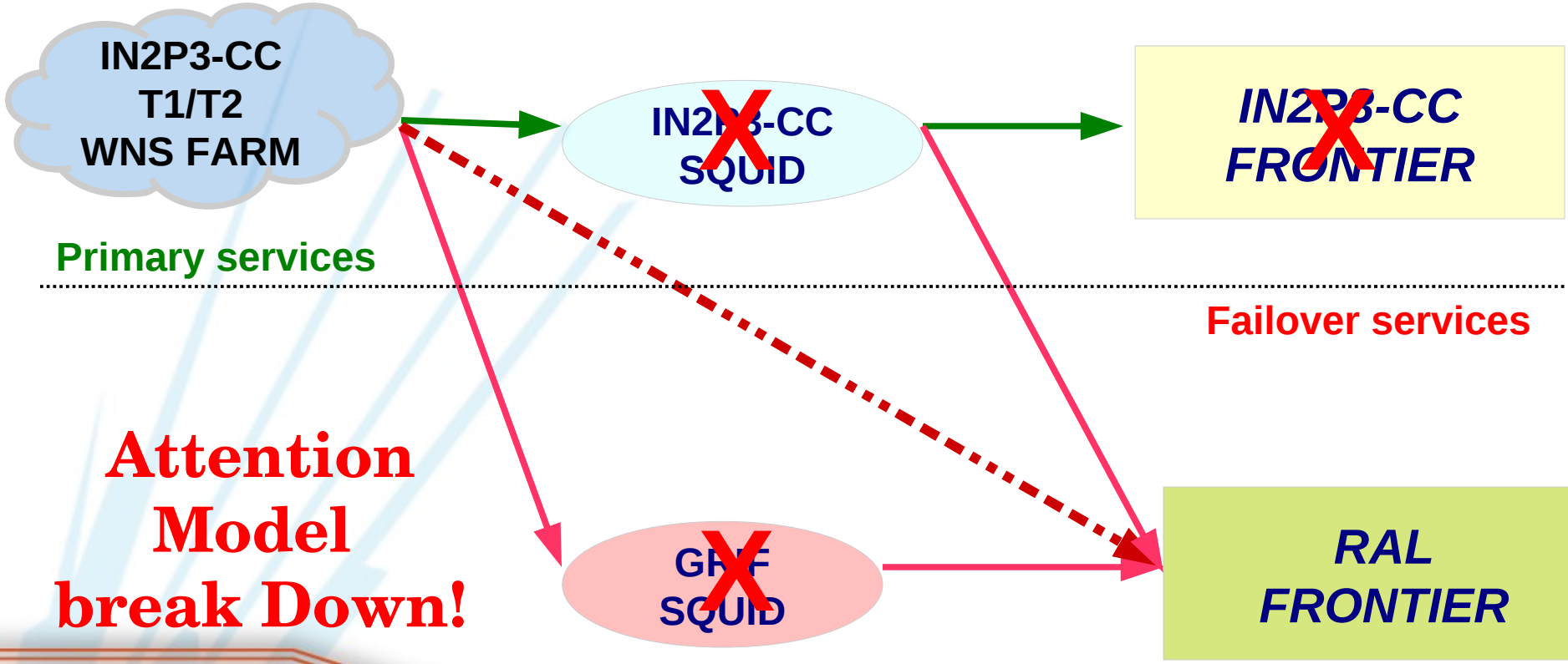
```
FRONTIER_SERVER="(serverurl=http://ccfrontier.in2p3.fr:23128/ccin2p3-AtlasFrontier)
                 (serverurl=http://lcgft-atlas.gridpp.rl.ac.uk:3128/frontierATLAS)
                 (proxyurl=http://ccatlassquid.in2p3.fr:3128)"
....
```

SITE

Topology & Fail-over

Failover in the level of the client :

if a Frontier server fails then the client (frontier lib) will try other Frontier in order to get their data



Attention Model break Down!

Central Monitoring of Frontier-Lpad and Squids

Central Monitoring of Frontier-Lpad and Squid service

- **Service Level Status of ATLAS launchpad servers(SLS)**
  - https://sls.cern.ch/sls/service.php?id=ATLAS-Frontier

- **SUM: Site Usability Monitor & SSB dashboard**
  - http://dashb-atlas-sum.cern.ch
  - http://dashb-atlas-ssb.cern.ch/

- **Awstats Monitoring for Frontier-launchpad (A nice open source tool that generates advanced squid-proxy,web, ftp ,mail server statistics: Domains/countries, Host, Number of visits, TCP_HIT, TCP_MISS)**
  - http://frontier.cern.ch/awstatsatlas.html

- **MRTG Monitoring : (Request/Fetch – in/out Traffic- Count object)**
  - http://frontier.cern.ch/squidstats/indexatlas.html

Service Level Status at CERN

Service Level Status overview - Mozilla Firefox

File Edit View History Bookmarks Tools Help

AdcMonitoring < Atlas < TW... | FroNTier < Atlas < TWiki | ATLAS awstats | Service Level Status overview | Service Level Status overview

cern.ch https://sls.cern.ch/sls/service.php?id=ATLAS-Frontier

Réunion équipe Op... | Software & Comput... | Software & Comput... | ADC Monitoring | Informations about ... | Tier-0 Monitoring O... | ... Atlas Running Job... | Logbook sur la cam...

Service Level Status overview

Home | Search | KPIs | Tags | Admin | Documentation | Help

ATLAS Frontier Service

13 Jun 2012 Wed 23:45:31

ATLAS-Frontier

availability: (more)

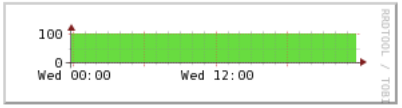
percentage: 100%

status: **available**

this service consists of:

- ATLAS-CERN-Frontier
- ATLAS-T0-Frontier
- ATLAS-BNL-Frontier
- ATLAS-KIT-Frontier
- ATLAS-IN2P3-CC-Frontier
- ATLAS-RAL-Frontier
- ATLAS-TRIUMF-Frontier

availability in the last 24 hours (more):



Additional information

full name: **ATLAS Frontier Service**

short name: ATLAS-Frontier

group: IT-ES-VOS

site: CERN

email: **jd@bnl.gov**

web site: http://frontier.cern...

service managers: **John Steven De Stefano Jr**, Fernando Harald Barreiro Megino, Alessandro Di Girolamo, Florentin Bujor

Availability update

last update: 23:40:39, 13 Jun 2012 (5 minutes ago)

expires after: 60 minutes

rss feed with status changes

Part of (subservice of):

ADC Central Services

Clusters, subclusters and nodes

none / not declared

Admin

admin tools

- **Reason of Outages**
- **Schedule downtime of Oracle backend DB**
- **Problem on back-end storage**
- **Network connectivity**

N 1 error Error

SUM AVAILABILITY TEST

SUM availability test for Frontier/squid submits a simple job, which tests different combination of the Frontier endpoint and the squid endpoint (normally 4 pair)

File Edit View History Bookmarks Tools Help

SUM Visualization | SUM-Detailed Results

dashb-atlas-sum.cern.ch/dashboard/request.py/latestresultssmry-sum#profile=ATLAS&group=

Réunion équipe Op... | Software & Comput... | Software & Comput... | ADC Monitoring | Informa

Algorithm for calculating the Site and Service Availability

Legends for Metric Result Status

Status:	NA	OK	WARNING	CRITICAL	UNKNOWN	MISS
Legend:	NA	OK	W	C	U	M

Note: brightest colors: test is 0 - 12 hours old, ... lightest colors: test is more that 12 hours old

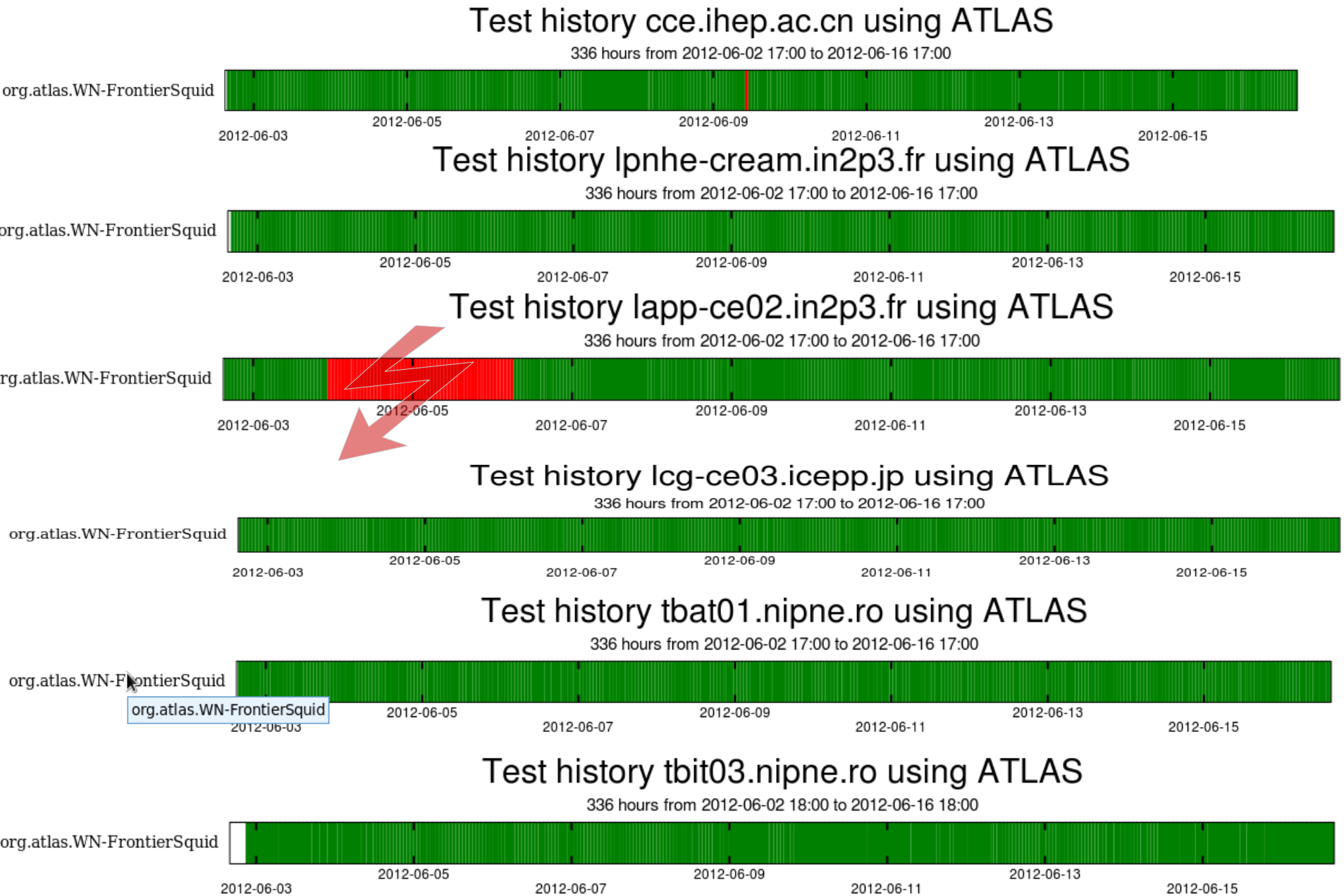
Legends for Metric Names

Legend	Metric Name	Legend	Metric Name	Legend	Metric Name	Legend	Metric Name	Legend	Metric Name
1	org.atlas.WN-FrontierSquid								

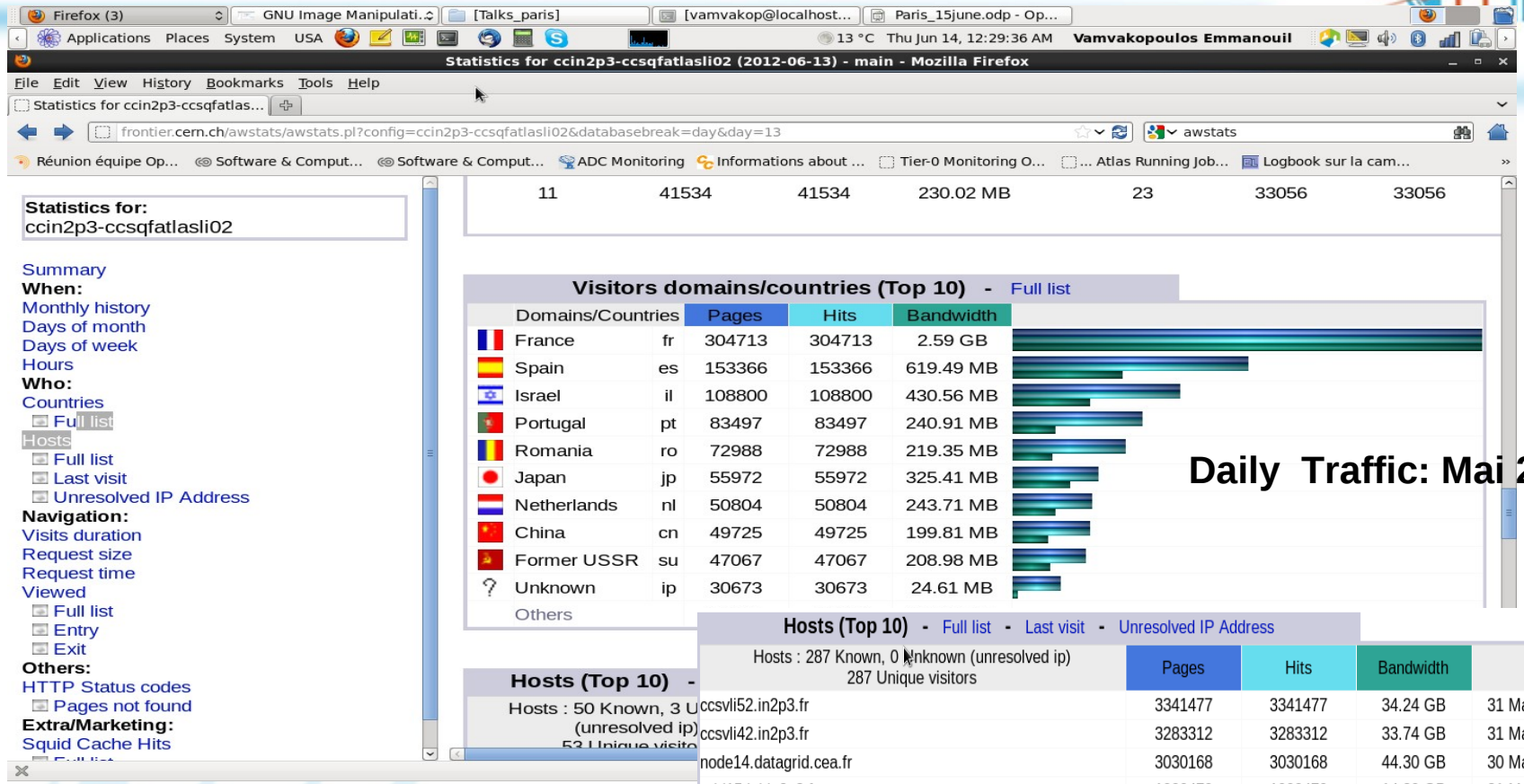
Link to data

Sitename	Flavour	Hosts	1
BEIJING-LCG2	CE	icg002.ihep.ac.cn	OK
			1
	CREAM-CE	cce.ihep.ac.cn	OK
Sitename	**Flavour**	**Hosts**	**1**
GRIF	CE	grid10.lal.in2p3.fr	OK
			1
	CREAM-CE	grid36.lal.in2p3.fr	OK
		lpnhe-cream.in2p3.fr	OK
		node74.datagrid.cea.fr	OK
Sitename	**Flavour**	**Hosts**	**1**
IN2P3-CC	CREAM-CE	cccreamceli05.in2p3.fr	OK
		cccreamceli06.in2p3.fr	OK
Sitename	**Flavour**	**Hosts**	**1**
IN2P3-LAPP	CE	lapp-ce01.in2p3.fr	OK
			1
	CREAM-CE	lapp-ce02.in2p3.fr	OK
Sitename	**Flavour**	**Hosts**	**1**
RO-14-ITIM	CREAM-CE	cream.itim-cj.ro	W

SUM test historical view: examples ..



AWSTATS ...



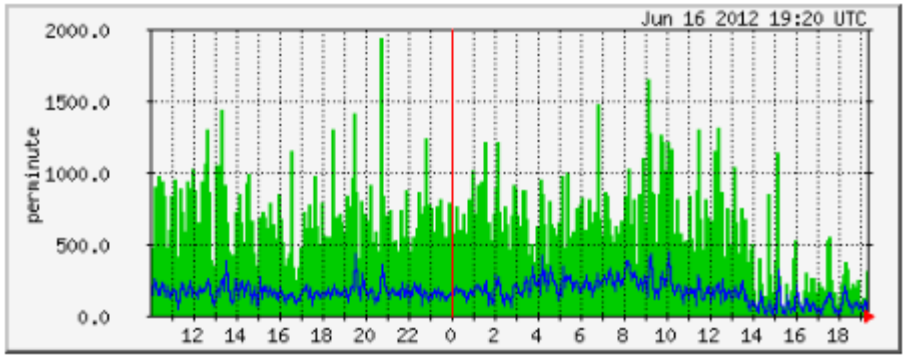
Daily Traffic: Mai 2012

Monthly Traffic: Mai 2012

http://awstats.sourceforge.net/

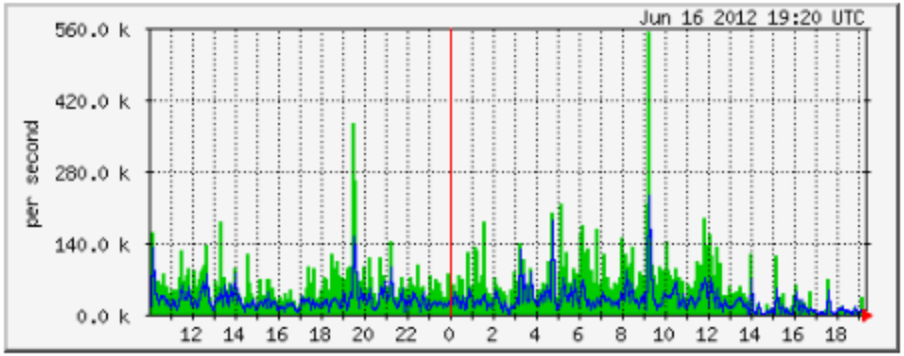
Frontier-lpad at IN2P3-CC

`Daily' Graph (5 Minute Average)



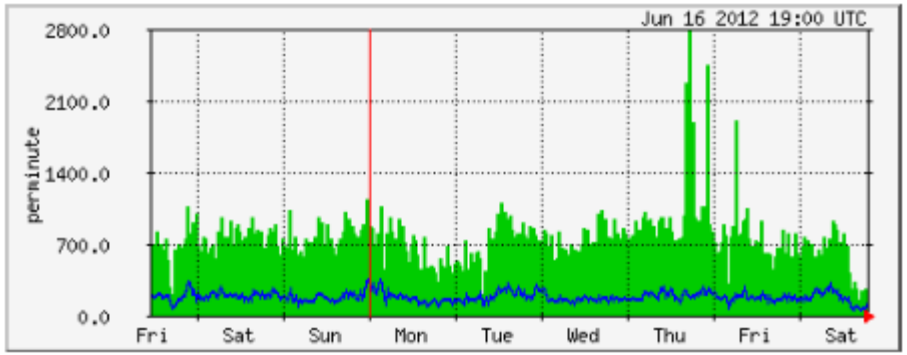
	Max	Average	Current
HTTP reqs	1932.0 req/min	572.0 req/min	306.0 req/min
HTTP fetches	433.0 req/min	157.0 req/min	123.0 req/min

`Daily' Graph (5 Minute Average)



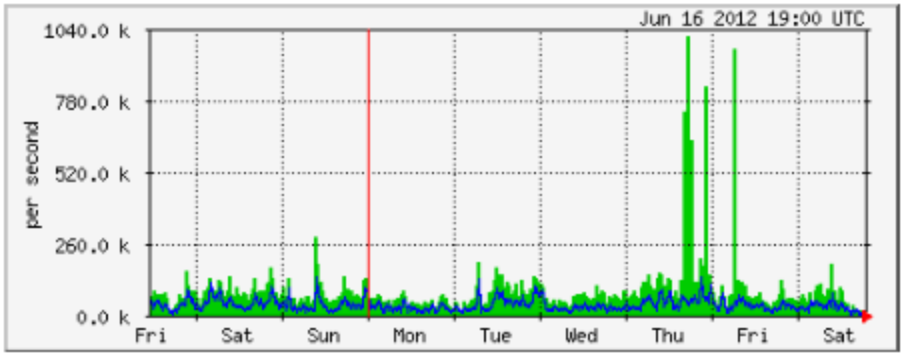
	Max	Average	Current
Total	551.0 kB/s	56.0 kB/s	8.0 kB/s
Fetches	230.0 kB/s	25.0 kB/s	4.0 kB/s

`Weekly' Graph (30 Minute Average)



	Max	Average	Current
HTTP reqs	2780.0 req/min	703.0 req/min	163.0 req/min
HTTP fetches	347.0 req/min	172.0 req/min	59.0 req/min

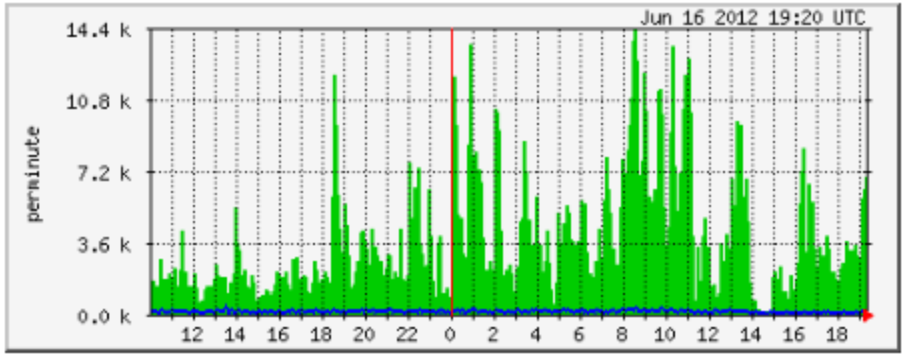
`Weekly' Graph (30 Minute Average)



	Max	Average	Current
Total	1009.0 kB/s	81.0 kB/s	6.0 kB/s
Fetches	133.0 kB/s	35.0 kB/s	4.0 kB/s

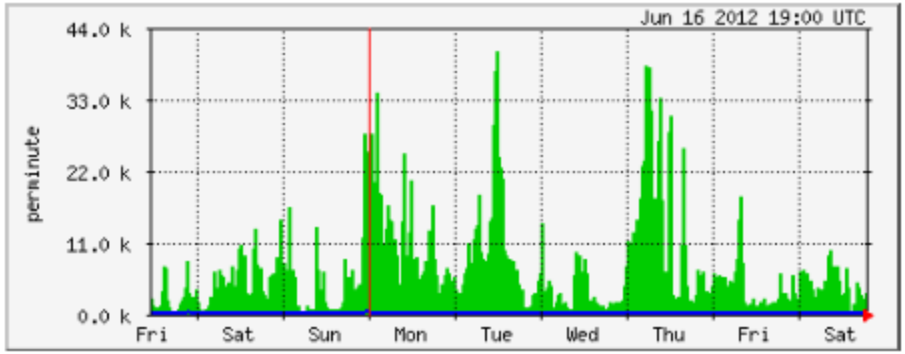
SQUID at IN2P3-CC

`Daily' Graph (5 Minute Average)



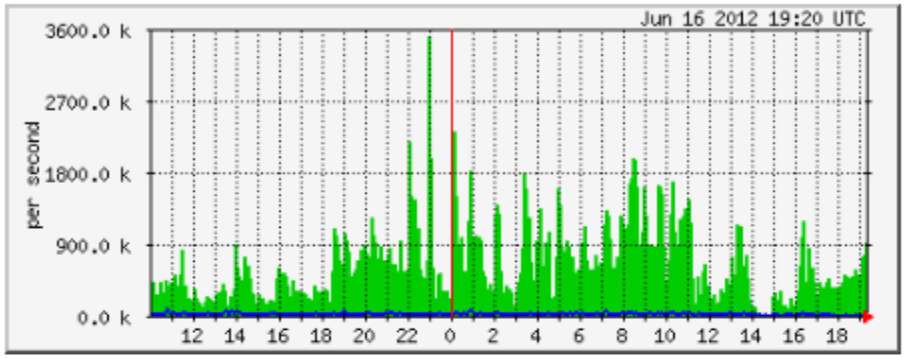
	Max	Average	Current
HTTP reqs	14.3 kreq/min	3346.0 req/min	6928.0 req/min
HTTP fetches	372.0 req/min	112.0 req/min	48.0 req/min

`Weekly' Graph (30 Minute Average)



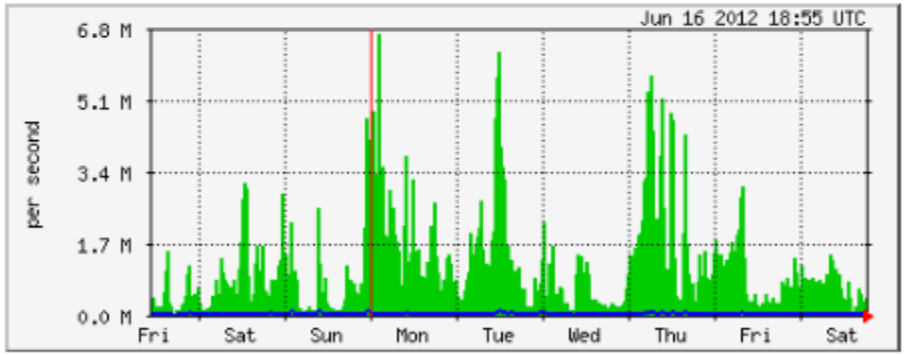
	Max	Average	Current
HTTP reqs	40.4 kreq/min	6464.0 req/min	3099.0 req/min
HTTP fetches	305.0 req/min	122.0 req/min	36.0 req/min

`Daily' Graph (5 Minute Average)



	Max	Average	Current
Total	3506.0 kB/s	578.0 kB/s	918.0 kB/s
Fetches	74.0 kB/s	13.0 kB/s	1.0 kB/s

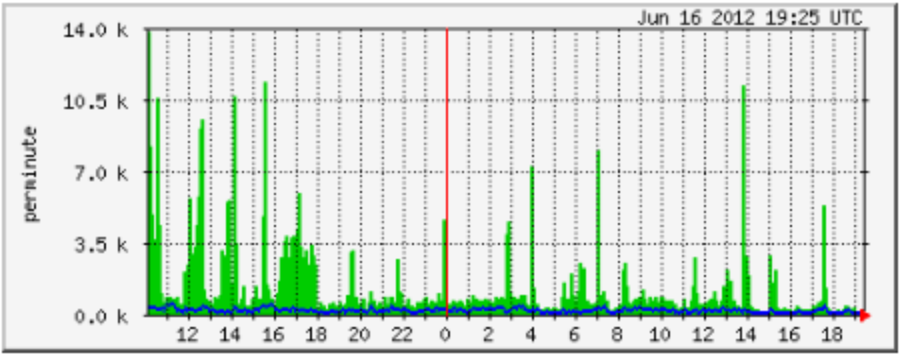
`Weekly' Graph (30 Minute Average)



	Max	Average	Current
Total	6799.0 kB/s	1093.0 kB/s	421.0 kB/s
Fetches	120.0 kB/s	18.0 kB/s	0.0 kB/s

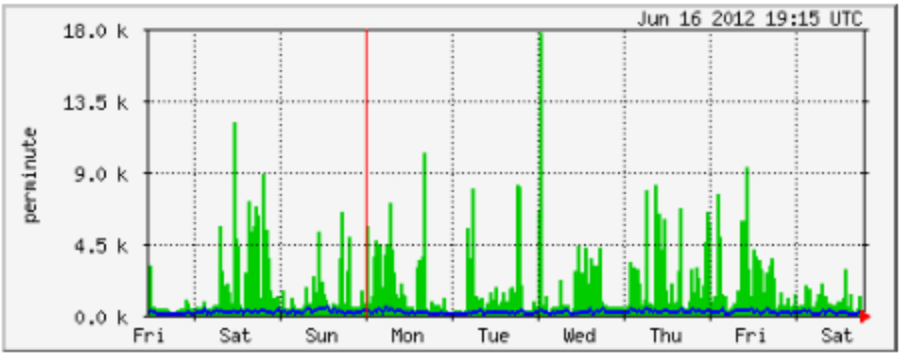
TOKYO

`Daily' Graph (5 Minute Average)



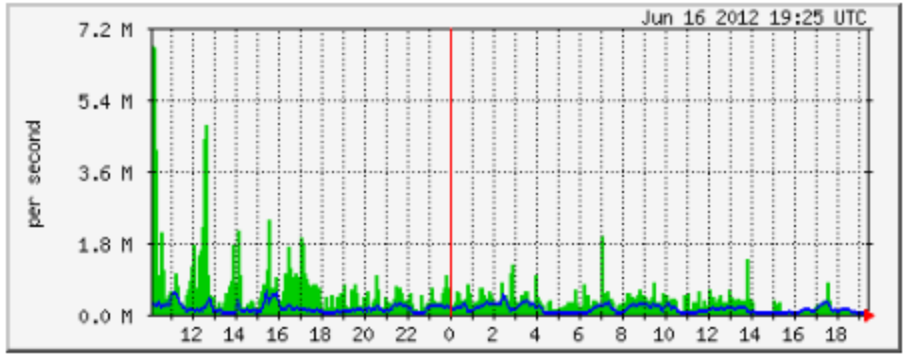
	Max	Average	Current
HTTP reqs	13.8 kreq/min	1156.0 req/min	195.0 req/min
HTTP fetches	502.0 req/min	159.0 req/min	12.0 req/min

`Weekly' Graph (30 Minute Average)



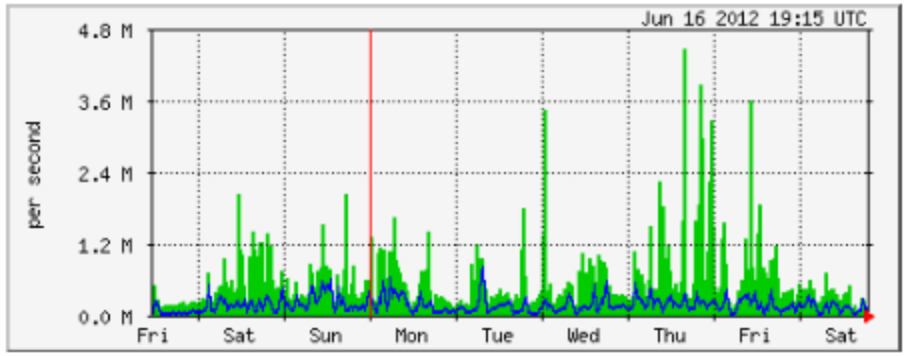
	Max	Average	Current
HTTP reqs	17.7 kreq/min	1560.0 req/min	295.0 req/min
HTTP fetches	516.0 req/min	177.0 req/min	91.0 req/min

`Daily' Graph (5 Minute Average)



	Max	Average	Current
Total	6901.0 kB/s	470.0 kB/s	28.0 kB/s
Fetches	582.0 kB/s	130.0 kB/s	9.0 kB/s

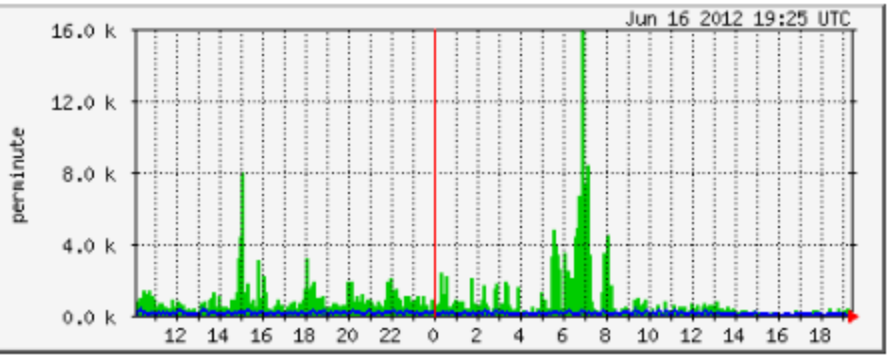
`Weekly' Graph (30 Minute Average)



	Max	Average	Current
Total	4560.0 kB/s	552.0 kB/s	68.0 kB/s
Fetches	822.0 kB/s	162.0 kB/s	40.0 kB/s

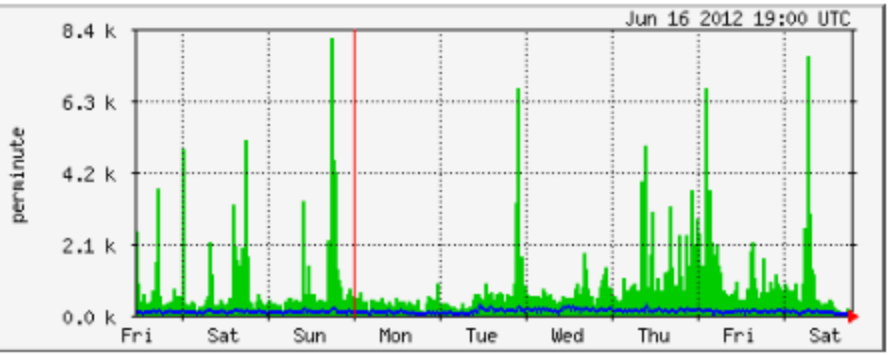
BEIJING

Daily' Graph (5 Minute Average)



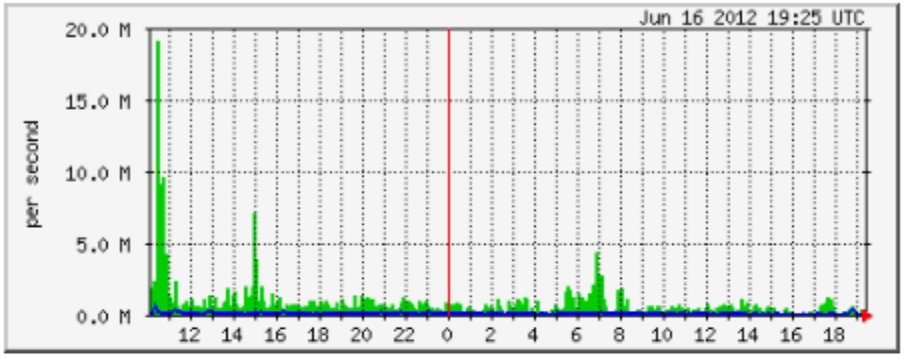
	Max	Average	Current
HTTP reqs	15.8 kreq/min	771.0 req/min	178.0 req/min
HTTP fetches	359.0 req/min	82.0 req/min	11.0 req/min

Weekly' Graph (30 Minute Average)



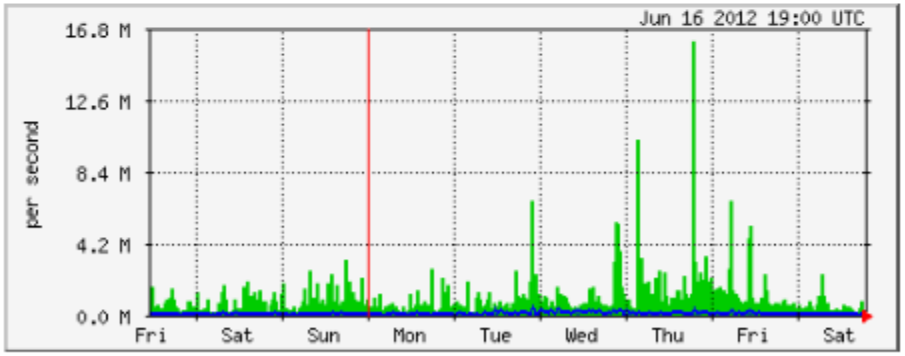
	Max	Average	Current
HTTP reqs	8112.0 req/min	805.0 req/min	125.0 req/min
HTTP fetches	305.0 req/min	97.0 req/min	21.0 req/min

`Daily' Graph (5 Minute Average)



	Max	Average	Current
Total	19.1 MB/s	704.0 kB/s	86.0 kB/s
Fetches	687.0 kB/s	29.0 kB/s	0.0 kB/s

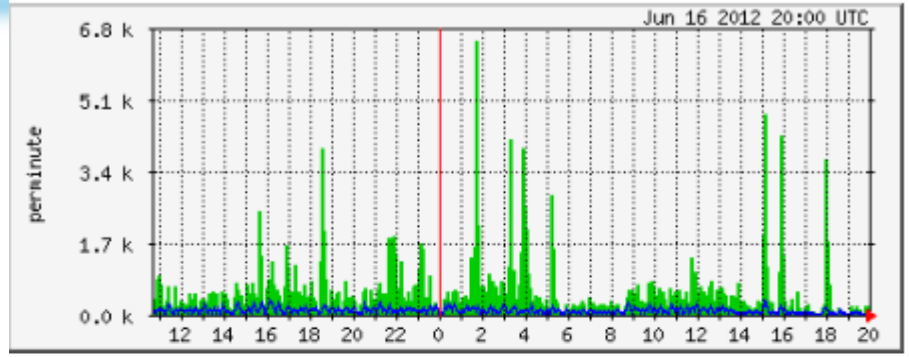
`Weekly' Graph (30 Minute Average)



	Max	Average	Current
Total	16.0 MB/s	978.0 kB/s	261.0 kB/s
Fetches	452.0 kB/s	58.0 kB/s	148.0 kB/s

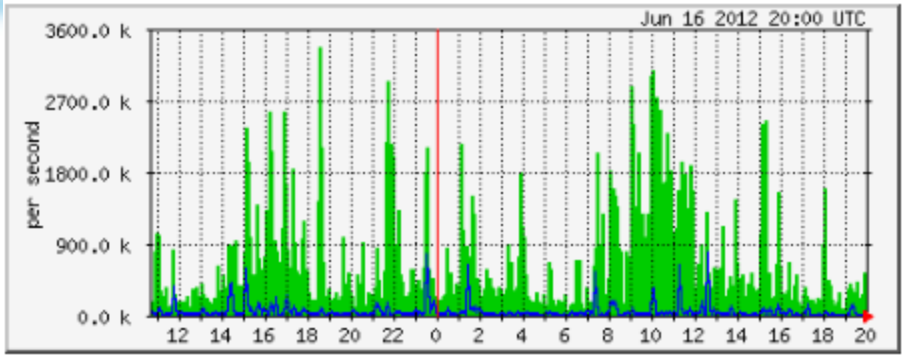
LAPP

`Daily' Graph (5 Minute Average)



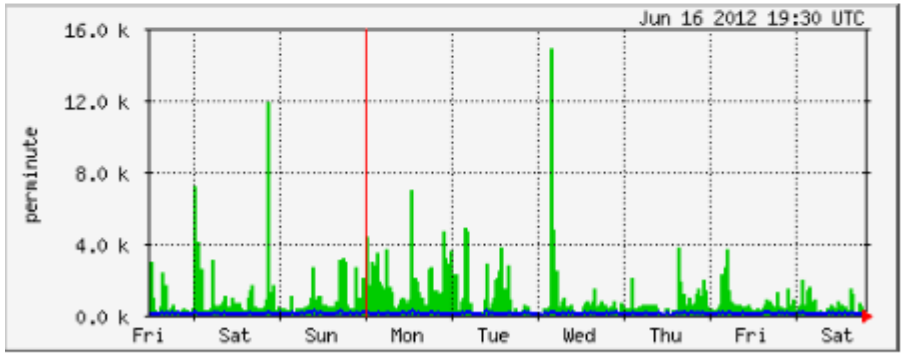
	Max	Average	Current
HTTP reqs	6474.0 req/min	498.0 req/min	43.0 req/min
HTTP fetches	340.0 req/min	74.0 req/min	0.0 req/min

`Daily' Graph (5 Minute Average)



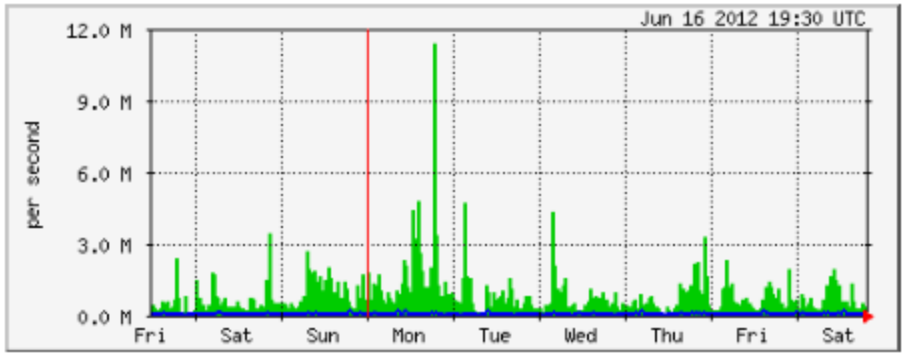
	Max	Average	Current
Total	3354.0 kB/s	613.0 kB/s	123.0 kB/s
Fetches	766.0 kB/s	37.0 kB/s	0.0 kB/s

`Weekly' Graph (30 Minute Average)



	Max	Average	Current
HTTP reqs	14.9 kreq/min	885.0 req/min	111.0 req/min
HTTP fetches	262.0 req/min	77.0 req/min	21.0 req/min

`Weekly' Graph (30 Minute Average)



	Max	Average	Current
Total	11.3 MB/s	757.0 kB/s	309.0 kB/s
Fetches	174.0 kB/s	29.0 kB/s	49.0 kB/s

Operational issues

- **Service Criticality:**
  - *Frontier Criticality:* ***High*** *Allowed downtime:* ***Less than 1 day***
  - *Frontier_squid Criticality:* ***Moderate*** *Allowed downtime:* ***Less than 2 days***

- **Guideline ADCos (24/7) :**
  - Frontier SLS : Periodically (2-3 times per shift)
  - Squid SSB/SUM: *"… Shifters should check the Frontier monitoring once per shift and if problems are observed non-urgent GGUS tickets can be submitted.. "*

Operational issues I

- *Frontier System in FR cloud it Stable*
- *Small number of WARNINGs in SUM test for due to acls (access control list)*
- *<u>Recent</u> Problem with Atlas installation software …*
  - *Frontier service is configured based on ToA DQ2 and not on AGIS (ADC experts informed)*
    - *LAPP case, ROMANIAN sites IN2P3-CC AND NL cloud.*

Further issues

- *Follow the Frontier service at T1*
  - *Improve the local documentation*
  - *Follow the recommendations and rpm updates from ADC*
  - *No GGUS ticket last 7 month*
- *Solve the recent problem of Frontier configuration with ADC experts*
  - *For Romanian sites ,*
  - *LAPP and IN2P3-CC*
- *Improve the squid network for the FR cloud*
  - *Improve the Monitoring for the FR cloud: squid Grif …*
- *Make a mapping of FR Cloud squids*
  - *Hardware spec …*
  - *Number of Squid ? / shared with CVMFS or not ?*

ATLAS Frontier Project

- **Alastair Dewhurst (RAL)** (cord.)
- https://twiki.cern.ch/twiki/bin/viewauth/Atlas/FroNTier
- atlas-adc-frontier@cern.ch
- Regular meeting every second Wed 16:30

New Mailing list frontier-talk@cern.ch

!!SPECIAL THANKS!! TO CC-IN2P3
COLLEGUES FOR THEIR CONTRIBUTION
TO THE OPERATION OF THE FRONTIER SERVICE FOR THE ATLAS VO

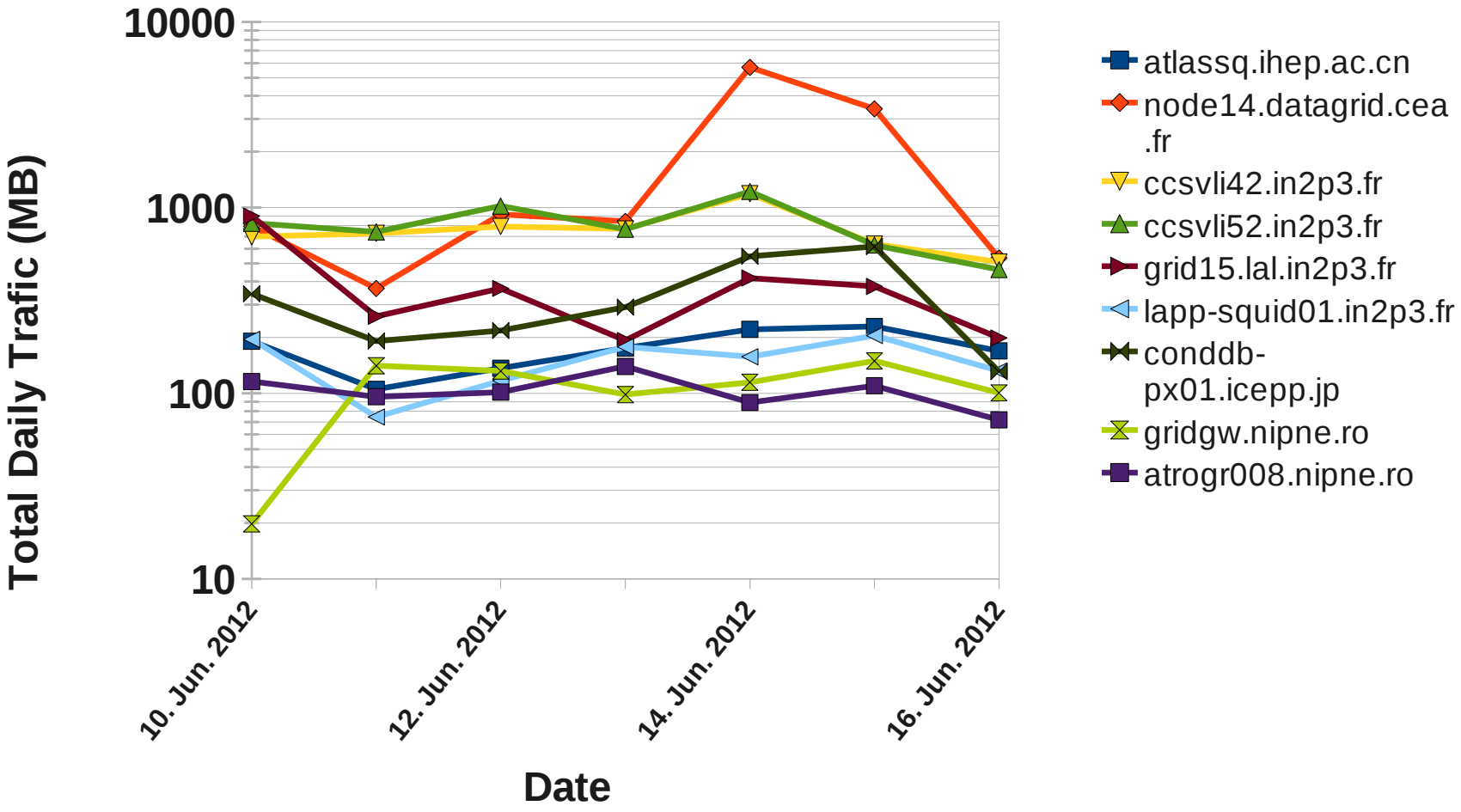
!!SPECIAL THANKS!! TO FR-CLOUD
COLLEGUES FOR THEIR CONTRIBUTION
TO THE CONFIGURATION OF THE FRONTIER SERVICE

!!SPECIAL THANKS!! TO ATLAS-FRONTIER
-GROUP FOR THE FRUITFULL DISCUSSION
AND FOR THE HELP

Thank you for Your Attention

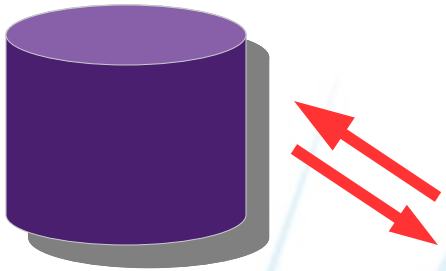
BACKUP SLIDES

Indicate Daily trafic : for frontier T1 to Fr squid



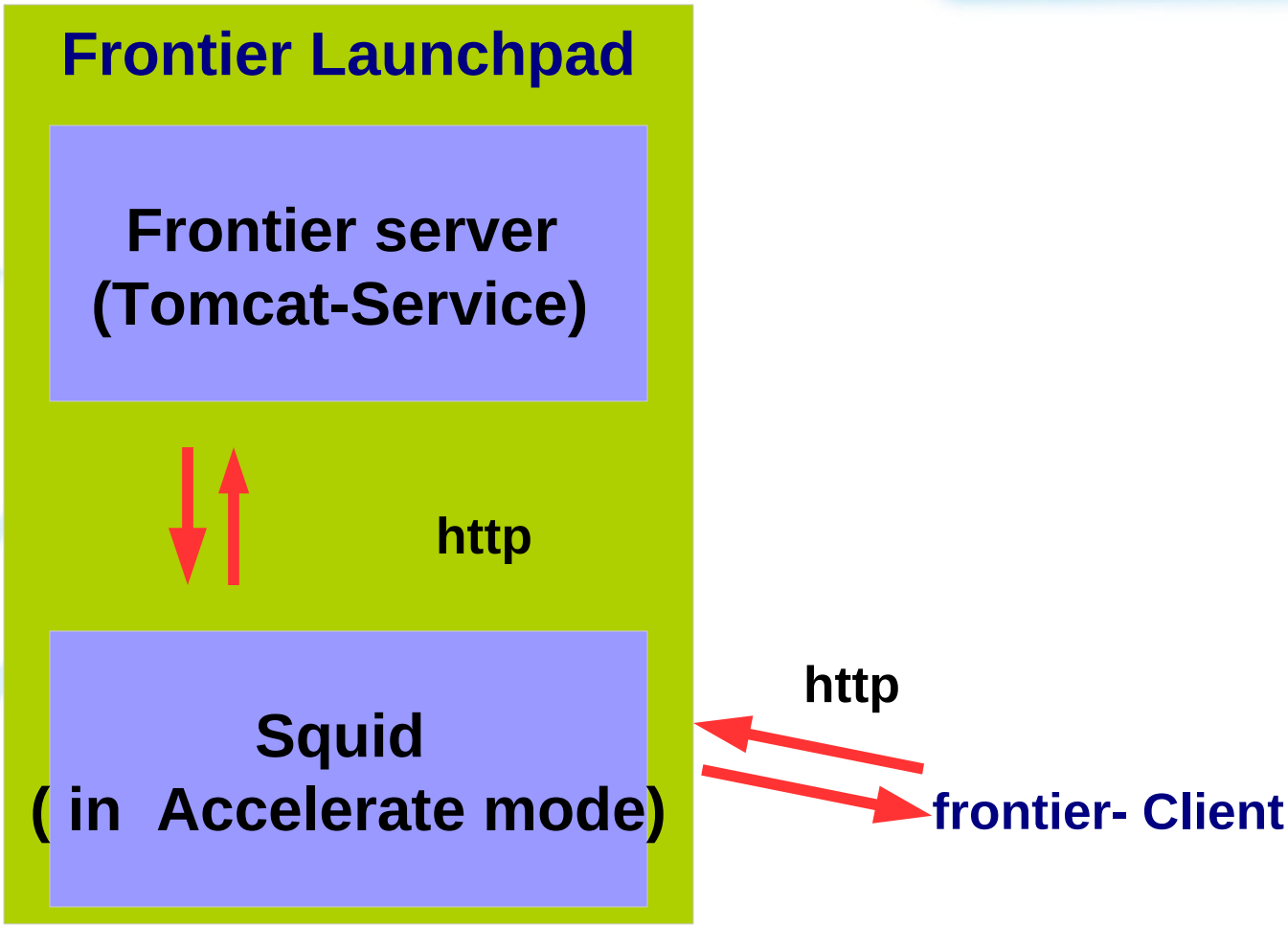
Frontier Launchpad

ATLR REPLICA

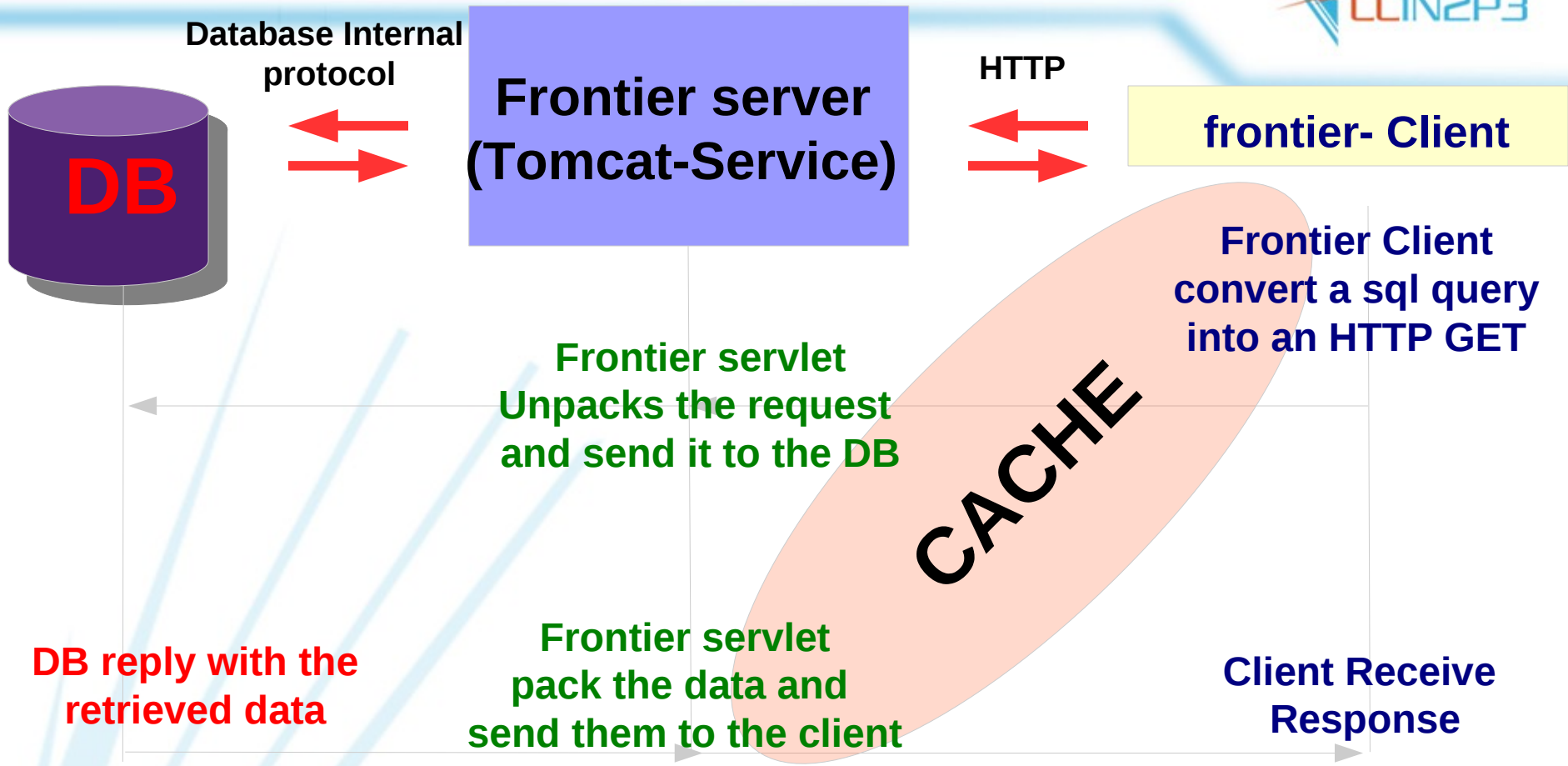


Database Internal protocol

Squid in Accelerate mode: this squid can cache only one site (frontier-Tomcat Service) and can't be use as a general cache squid



Frontier System[4] (?):



[4] FERMILAB-CONF-07-526-CD