LHCOPN Operation status

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LHCOPN meeting, 2009-12-10, Bologna

www.eu-egee.org

CCIN2P3

e-infrastructure

Enabling Grids for E-sciencE

- **Background & since last LHCOPN meeting**

- **Update on implementation status**
  - Tools and processes

- **Statistics**
  - From TTS and network monitoring
  - Correlation

- **Possibilities for improvements**

- **What's next?**

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- **Last LHCOPN meeting: Vancouver, 2009-08-31**
  - http://indico.cern.ch/conferenceDisplay.py?confId=59842

- **Outcomes around operations**
  - Pure T1-T1 links (not allowed to carry T0-T1 traffic) to be included in LHCOPN to benefit of existing process and tools
  - Events of interest for WLCG and interactions around to be clarified
  - Existing BGP monitoring no longer suitable
  - Model needs some extra practice before being assessed

- **Pending from Utrecht's LHCOPN meeting, 2009-04-21**
  - http://indico.cern.ch/conferenceDisplay.py?confId=50345
  - Information on Twiki need to be reviewed
  - Access to information repositories to be regularly checked
  - KPIs for Ops to be defined and provided

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- **LHCOPN Ops phoneconf, 2009-10-08**
  - https://twiki.cern.ch/twiki/bin/view/LHCOPN/8thOctober2009
  - 8 sites, no major outcomes
    - Details around GGUS, BGP monitoring tbd

- **LHCOPN Ops training 4, 2009-12-10**
  - http://indico.cern.ch/conferenceDisplay.py?confId=69191
  - Attendances NDGF, IT-INFN-CNAF

Operations – Current depl. status

	Trained	R/W Access to the twiki verified	Access to the TTS verified	Started Ops production mode	Review of twiki
CA-TRIUMF	2009-04-08	2009-04-30	2009-04-30	2009-04-30	Partial 2009-06-19
CH-CERN	2009-04-02	2009-02-04	2009-02-04	2009-02-04	
DE-KIT	2009-04-02	2009-02-23	2009-02-04	2009-02-23	2009-09-14
ES-PIC	2009-04-02	2009-08-12	2009-02-04	2009-02-04	2009-08-12 (Twiki access issue)
FR-CCIN2P3	2009-04-02	2009-02-04	2009-02-04	2009-02-04	2009-12-07
IT-INFN-CNAF	2009-12-10		2009-03-25		
NDGF	2009-06-16	2009-07-14	2009-07-06	2009-07-14	
NL-T1	2009-06-16	2009-06-19	2009-03-20	2009-06-19	2009-10-07
TW-ASGC	2009-04-08	2009-06-03	2009-04-13	2009-06-03	2009-10-30
UK-T1-RAL	2009-06-16	2009-06-23	2009-06-19	2009-06-23	2009-11-04 Postponed 2009-11-23
US-FNAL-CMS	2009-04-08	2009-06-22	2009-05-04	2009-06-22	Started 2009-11-23
US-T1-BNL	2009-04-08	2009-05-27	2009-05-08	2009-05-27	2009-10-20 (twiki access issue)

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- ## Several "pure" T1-T1 links added
  - = T1-T1 links not able to carry T0-T1 traffic
    - https://twiki.cern.ch/twiki/bin/view/LHCOPN/NamingConventionAndLinksIDs

T1-T1 links					
T1	**T1**	**Link ID**	**Bandwidth**	**Default Responsible site**	**Able to carry T0-T1 traffic**
US-T1-BNL	CA-TRIUMF	BNL-TRIUMF-LHCOPN-001	1G	CA-TRIUMF	Y
IT-INFN-CNAF	DE-KIT	CNAF-GRIDKA-LHCOPN-001	10G	IT-INFN-CNAF	Y
NL-T1	CA-TRIUMF	SARA-TRIUMF-LHCOPN-001	1G	NL-T1	N
DE-KIT	NL-T1	GRIDKA-SARA-LHCOPN-001	10G	DE-KIT	Y
DE-KIT	FR-CCIN2P3	GRIDKA-IN2P3-LHCOPN-001	10G	FR-CCIN2P3	Y
NDGF	NL-T1	NDGF-SARA-LHCOPN-001	10G	NDGF	Y
TW-ASGC	NL-T1	SARA-ASGC-LHCOPN-001	1G	TW-ASGC	N
US-FNAL-CMS	NL-T1	SARA-FNAL-LHCOPN-001	1G	US-FNAL-CMS	N
TW-ASGC	US-FNAL-CMS	ASGC-FERMI-LHCOPN-001	2G	TW-ASGC	N

- ## Now 34 links IDs in production
  - 18 T0-T1 + 9 T1-T1 (4 pure) + 7 'internal'

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- **Process to put new links in production documented**
  - https://twiki.cern.ch/twiki/bin/view/LHCOPN/OpsFAQ#What_is_the_process_to_release_a
  - Lot of steps usually forgotten
    - Is link monitored
    - Are technical details documented on twiki
    - Is new link advertised

- **Feedbacks from third training session**
  - NDGF:
    - A lot of things are internal site process
  - IT-INFN-CNAF
    - Lack of central operational coordination
    - Monitoring is a key tool
    - Centralising tools is excellent
    - Grid interactions are a complex topic

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From Wayne's Vancouver follow up:

- **Relevant Incident for WLCG**
    - Any incident which results in a reduction in the committed bandwidth (in general 10Gbps except for CA-TRIUMF - 5Gbps) or an instability causing unreliable data transfers

- **Major Incident for WLCG**
    - A WLCG Relevant Incident lasting more than 1 working day for a single site and/or a WLCG Relevant Incident affecting multiple sites

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- **Review of Twiki information**
  - 6 sites have still reviewed information into
    - Huge amount of wrong information corrected
    - We nearly discovered new links part of the LHCOPN...
  - Indispensable, but taking too much time (~2 weeks/site)

- **Sustainability of GGUS ensured**
  - https://edms.cern.ch/document/1021528/
  - Seems moving from EGEE to WLCG

- **IMHO GGUS in a very good shape not preventing good operations to happen**

- **Complete list of opened items maintained on twiki**
  - https://twiki.cern.ch/twiki/bin/viewauth/LHCOPN/GGUSstatusList

Major wish list ordered by priority:

1. **Display organisation's name of people acting on tickets**
2. **Link GGUS LHCOPN tickets to standard GGUS LHCOPN tickets**
3. **API to remotely handle GGUS tickets from sites**
4. **Checkbox: "clone this ticket and assign it to all impacted sitename" . The main ticket assigned to the submitting site being master of all cloned tickets.**
5. **Regular tickets / to be clarified by us**

Major bug solving ordered by priority:

1. **Ticket should be "in progress" instead of "assigned" if self assigned**
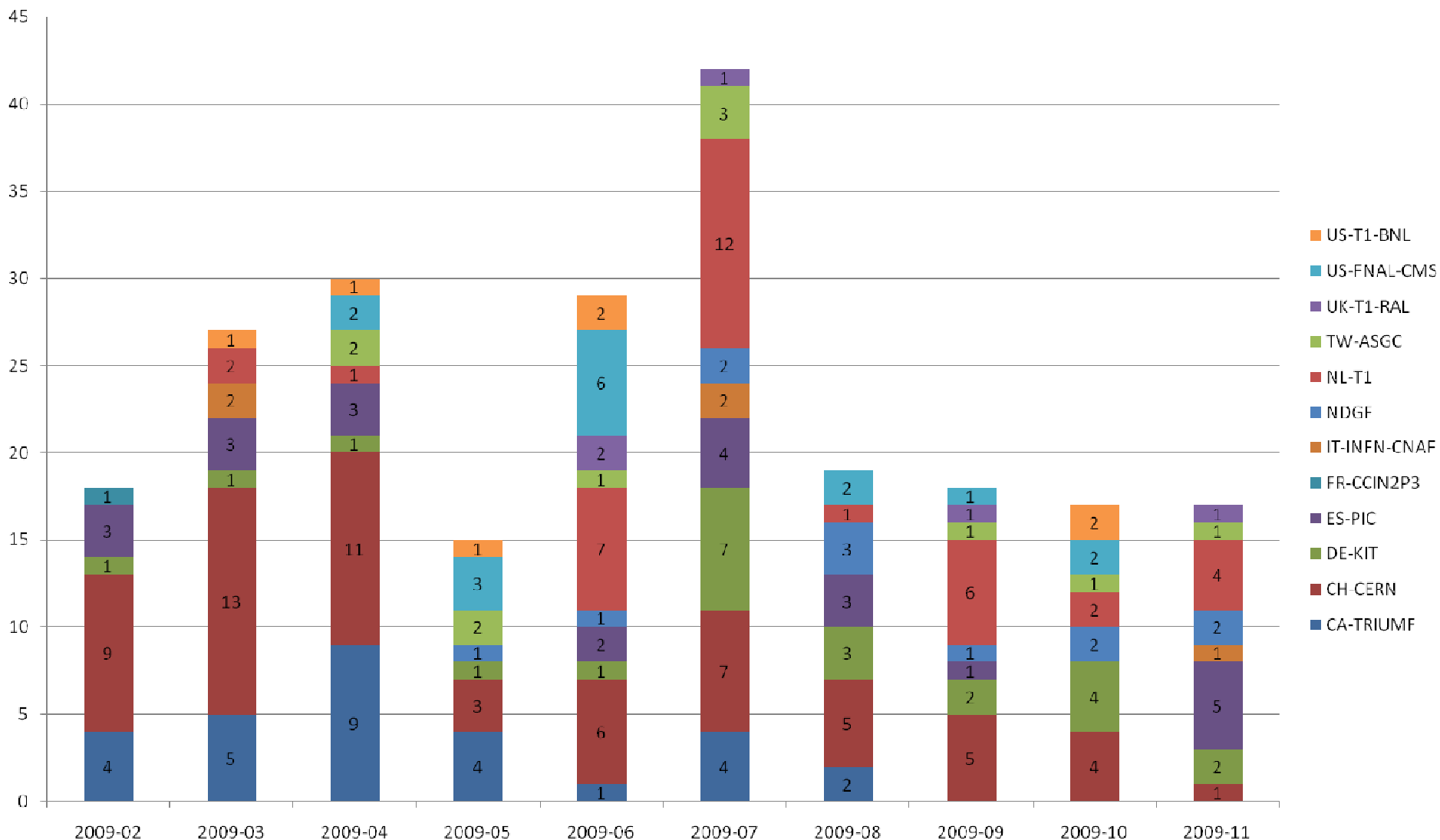2. **Last diary of tickets in e-mails sometimes disappearing**
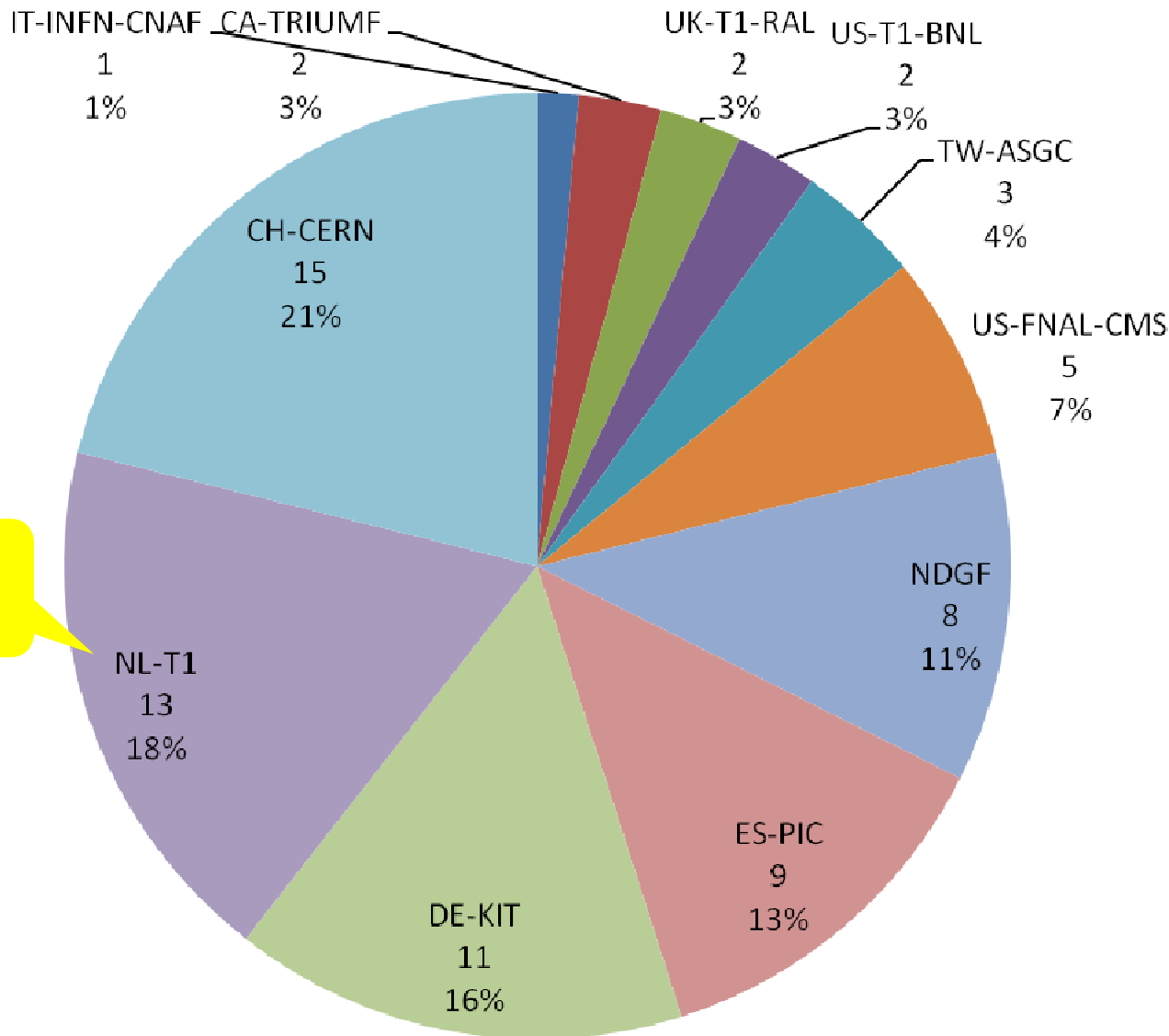
Rejected:

1. **Entire tickets in notification e-mails**

Statistics

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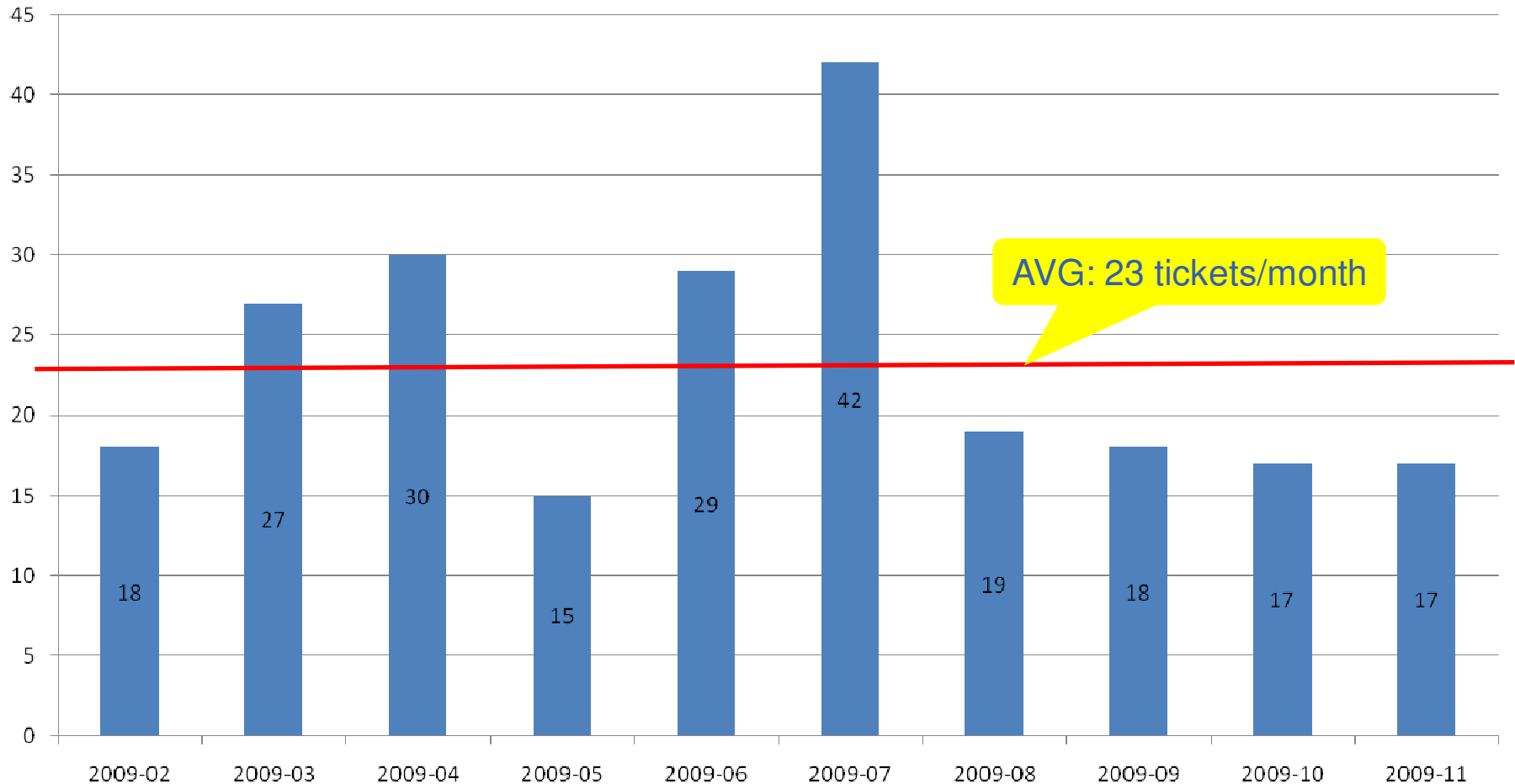
- **232 'valid' tickets in the TTS**
- **57 priviledged users**

Enabling Grids for E-sciencE

Between 2009-08-01 and 2009-11-30

Enabling Grids for E-sciencE

Between 2009-08-01 and 2009-11-30

eGee

Enabling Grids for E-sciencE
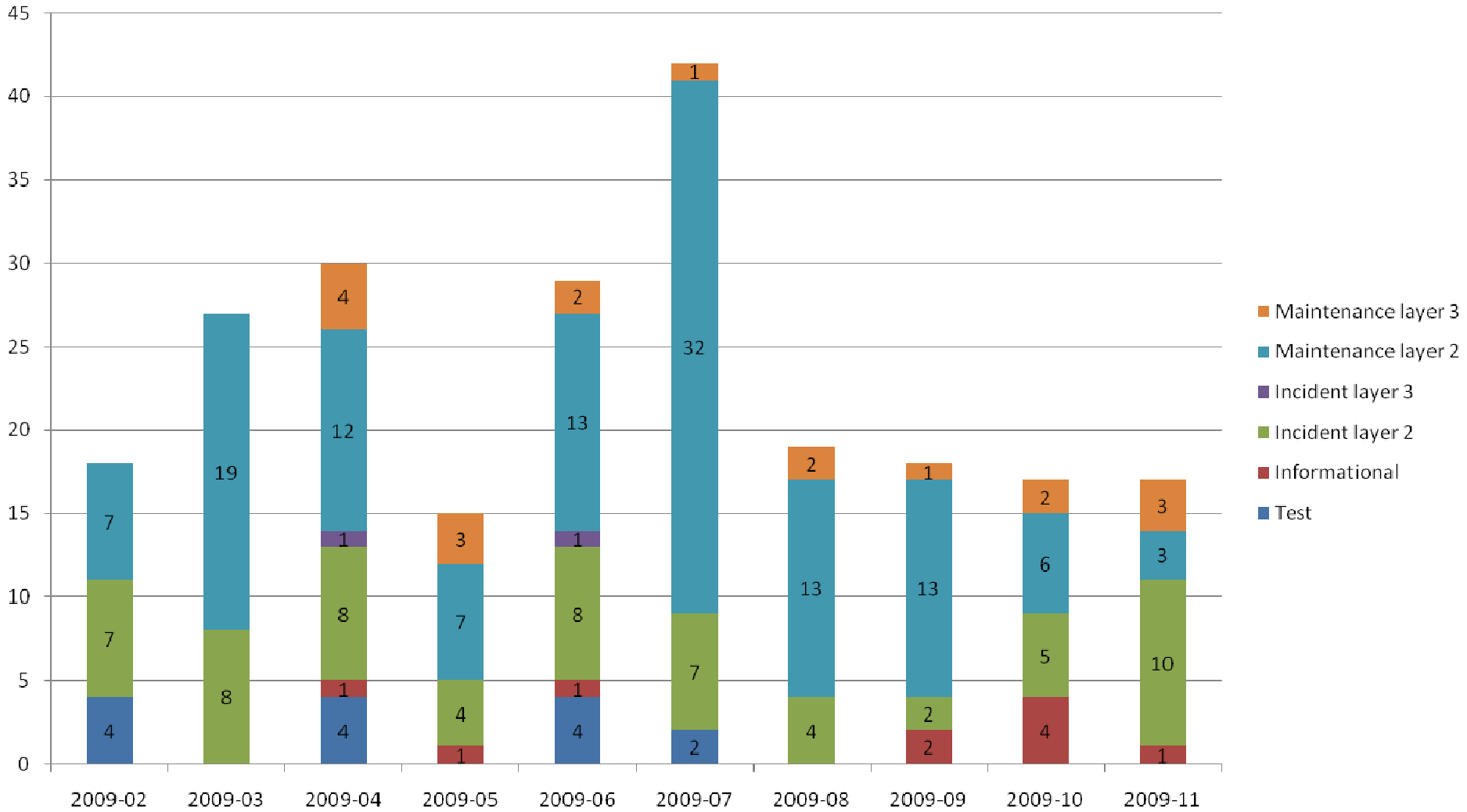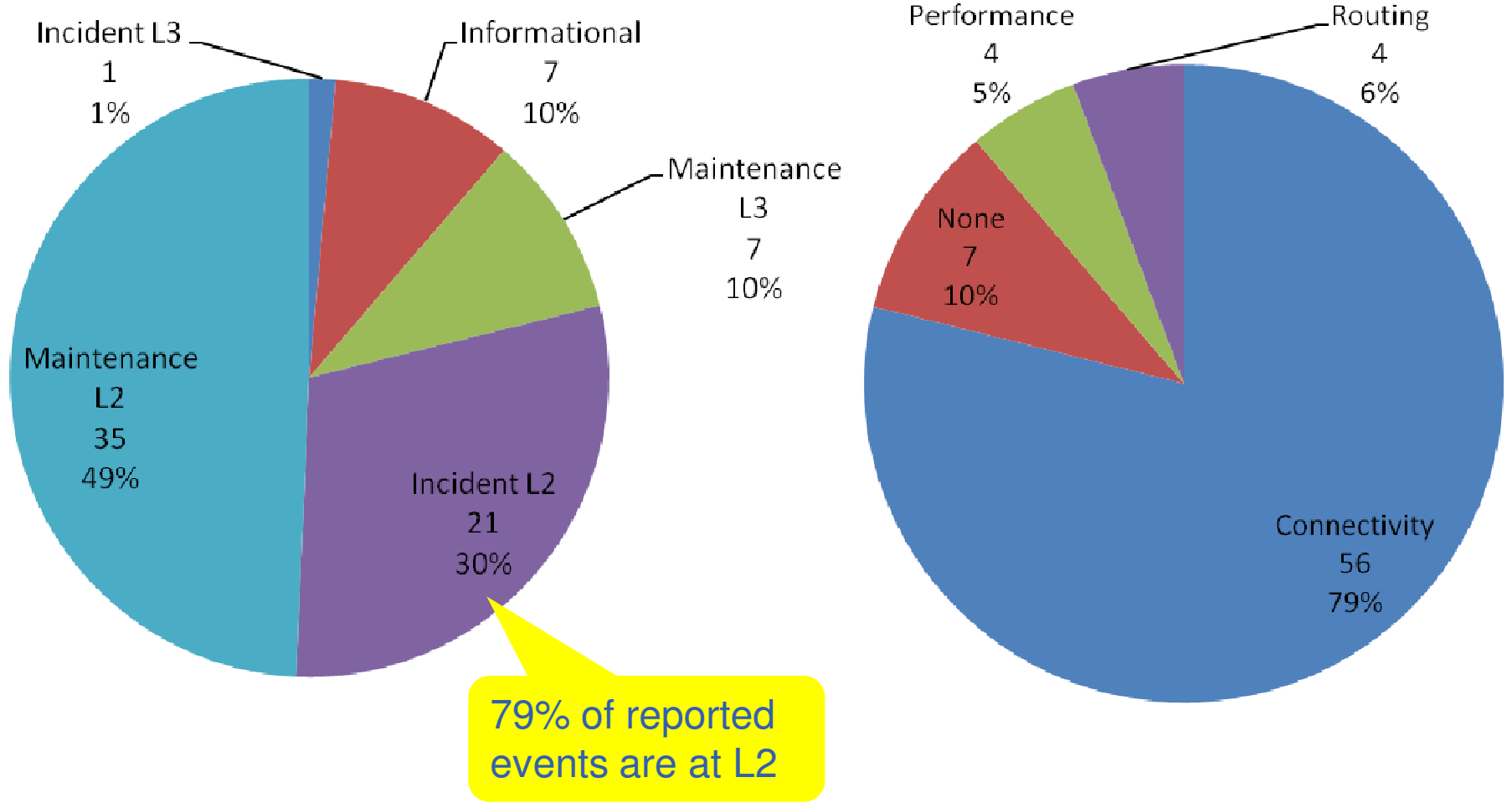
~2/3 of events are
without impact on service

Unknown
2
3%

Possible
Performance
Degradation
3
4%

Performance
degradation
10
14%

None service
affecting
23
32%

Loss of service
12
17%

Reduced
redundancy
21
30%

Between 2009-08-01 and 2009-11-30

Enabling Grids for E-sciencE
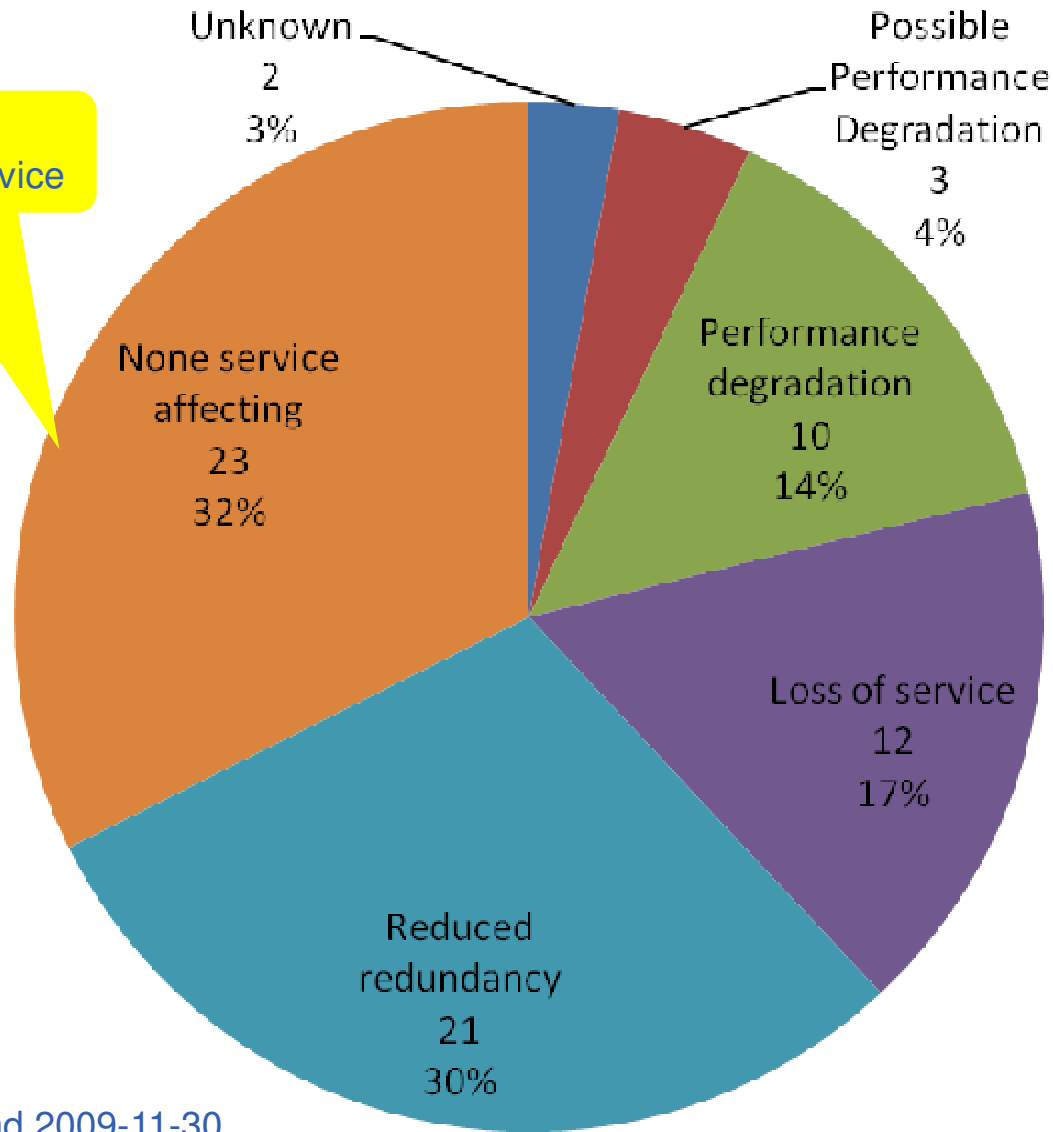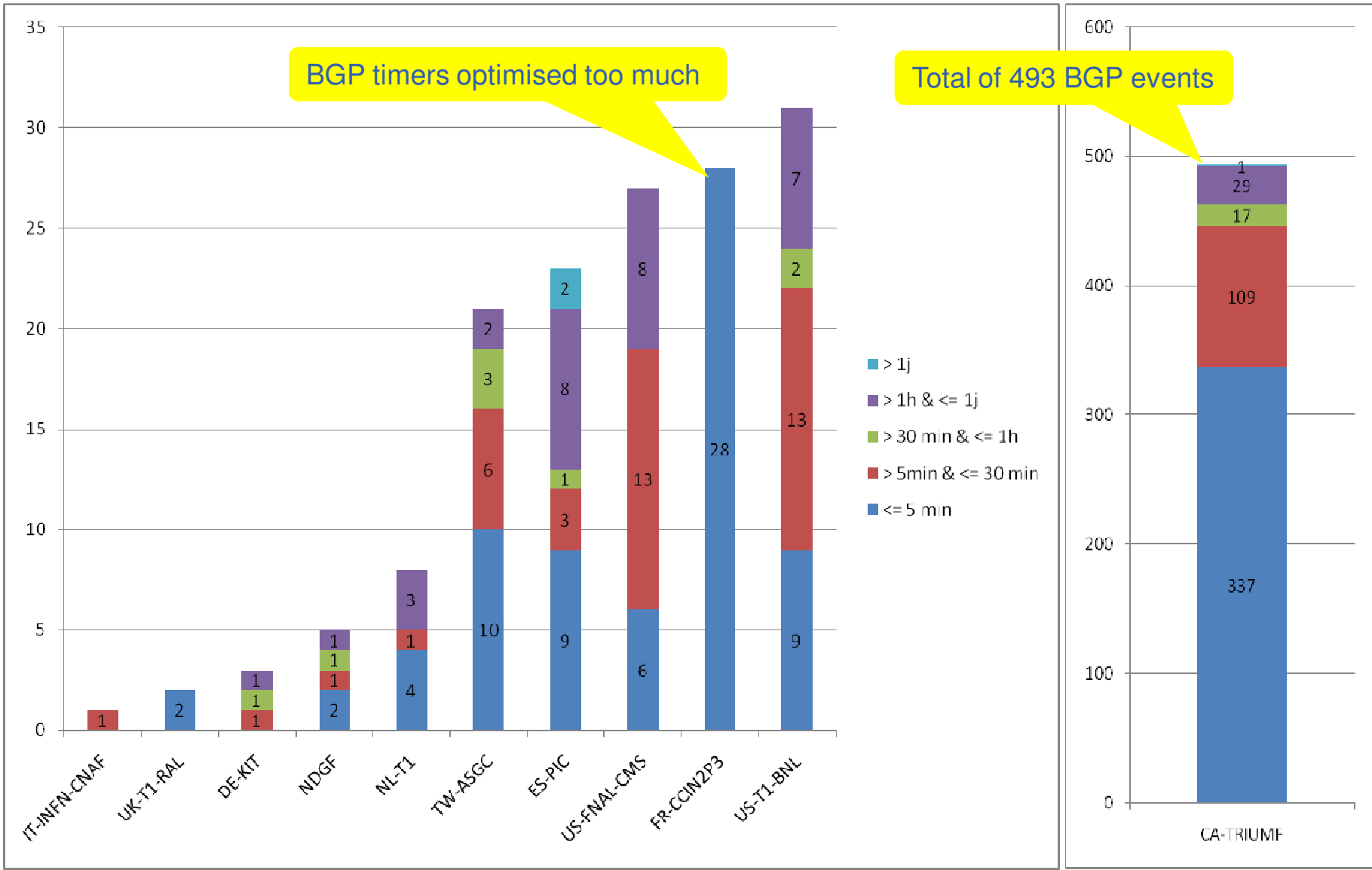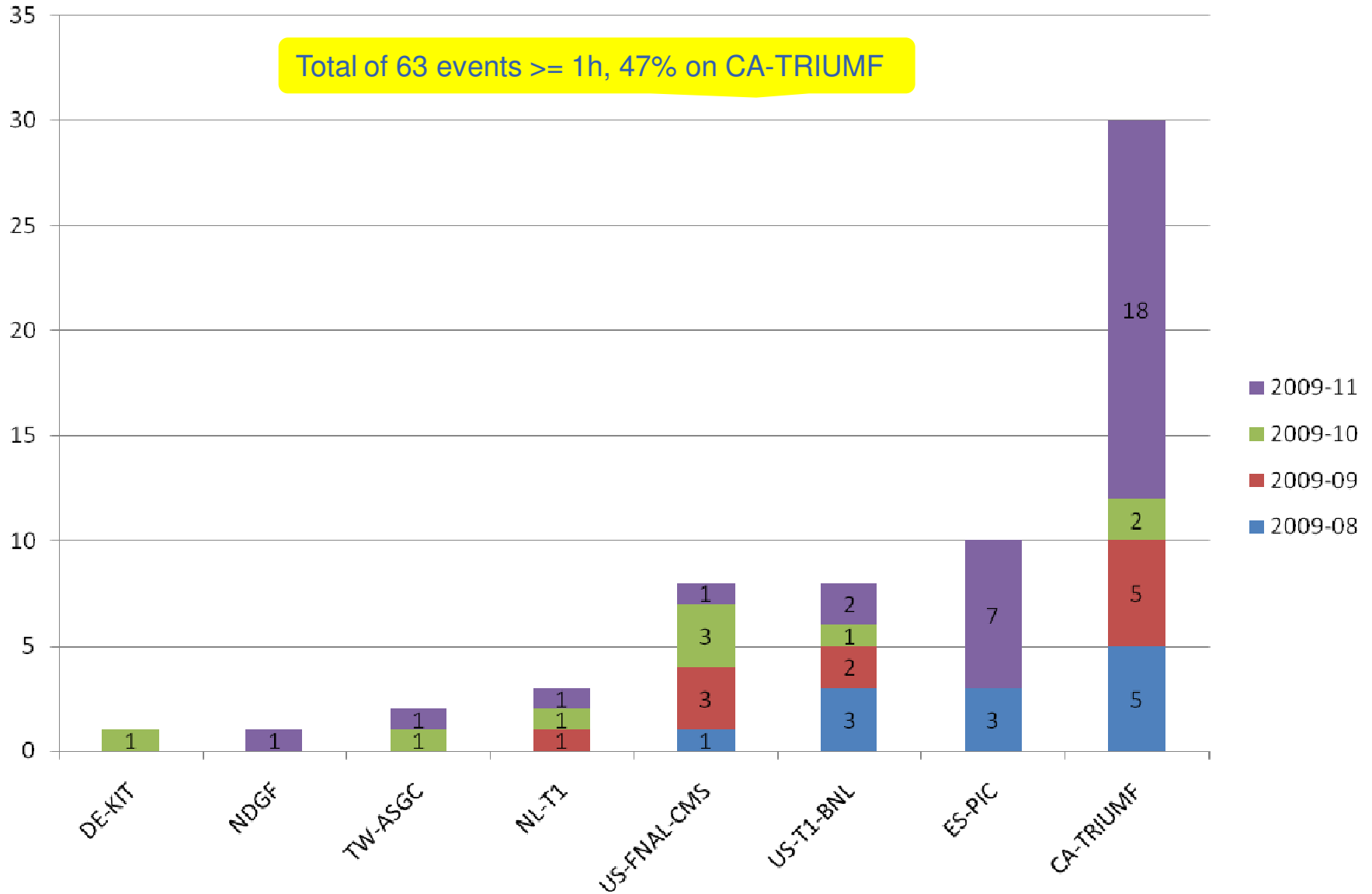
- **Previous trends (2009-02 → 2009-08) confirmed**
  - 2/3 of reported events without impact on service
  - 80% of reported events occurring at L2

- **Hard to assess if behaviour around tickets is normal**
  - Drop in number of tickets etc. strongly linked to infrastructure behaviour

- **GGUS is only reflecting what is registered into**
  - Does this match what occurs on the network?

Enabling Grids for E-sciencE

- **What is occurring on the network?**

- **BGP monitoring from the ENOC stopped 2009-10**
  - You can close SNMP access previously requested
  - Backup through default route and new routers killed it
  - No monitoring is better than wrong

- **CERN offered to provide Spectrum's data**
  - In a database format!
    - Big thanks to Carles Kishimoto (CERN IT-CS) for the technical arrangements
  - BGP peer monitoring events
    - T0-T1 only, from CERN's viewpoint
    - Service impact of BGP peer down unclear

Number of BGP events between 2009-08-01 and 2009-11-30

BGP timers optimised too much

Total of 493 BGP events

Legend:
- > 1j
- > 1h & <= 1j
- > 30 min & <= 1h
- > 5min & <= 30 min
- <= 5 min

Enabling Grids for E-sciencE

Total of 63 events >= 1h, 47% on CA-TRIUMF

- **Some bias**
  - Only CERN viewpoint, no T1-T1 links

- **Real service impact of BGP events unknown**
  - Dedicated backup path and also through generic IP
  - We miss the service view

- **Not so many events exceeding threshold**
  - Reasonable amount of GGUS tickets expected
    - < 5 tickets per month – But also T1-T1 issues
    - Maybe a little more for CA-TRIUMF

- **Objective: Check if behaviours of operations and infrastructure match**

- **Process: See for each monitoring event exceeding threshold if we have a corresponding GGUS ticket**
  - Are significant faults reported as they should?

- **The previously agreed network thresholds were:**
  - https://twiki.cern.ch/twiki/bin/view/LHCOPN/OperationalModel#Processes
  - Any event with an impact on the service must be reported with at least 1 ticket per issue not per event
  - For non service impacting events, those lasting more than 1 hour or occurring more than 5 times an hour should be reported in the TTS
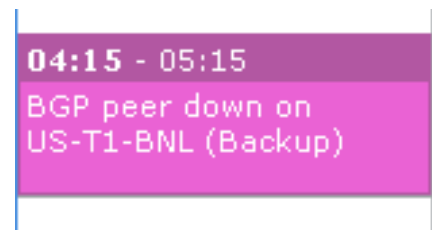
Monitoring 1 – Ticket 1
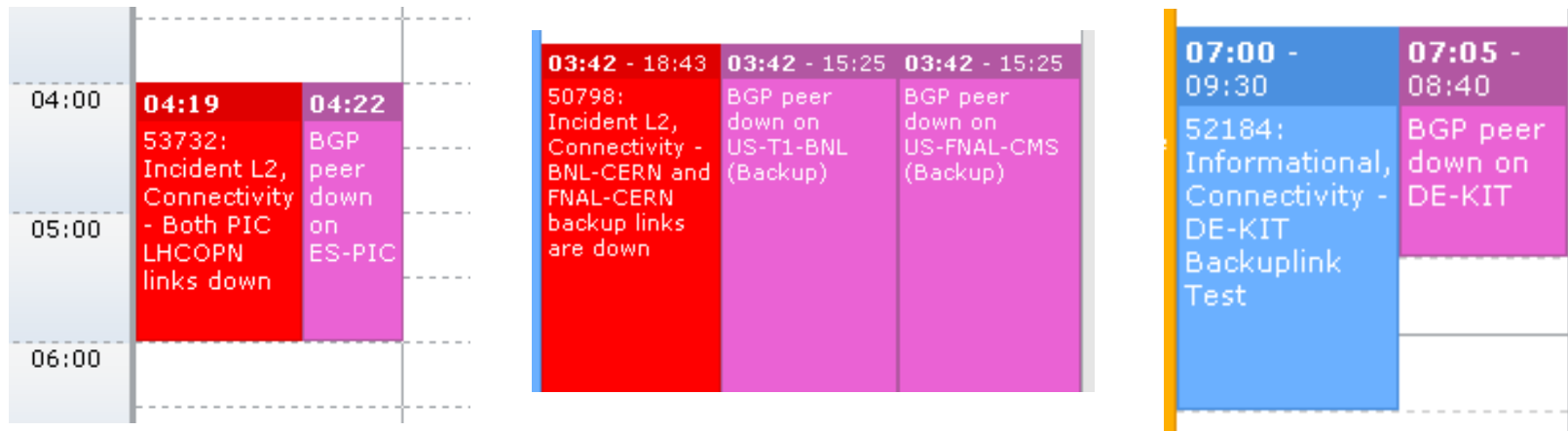
Monitoring 0 – Ticket 1
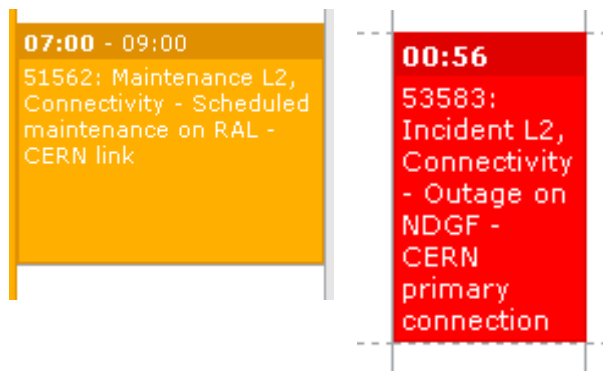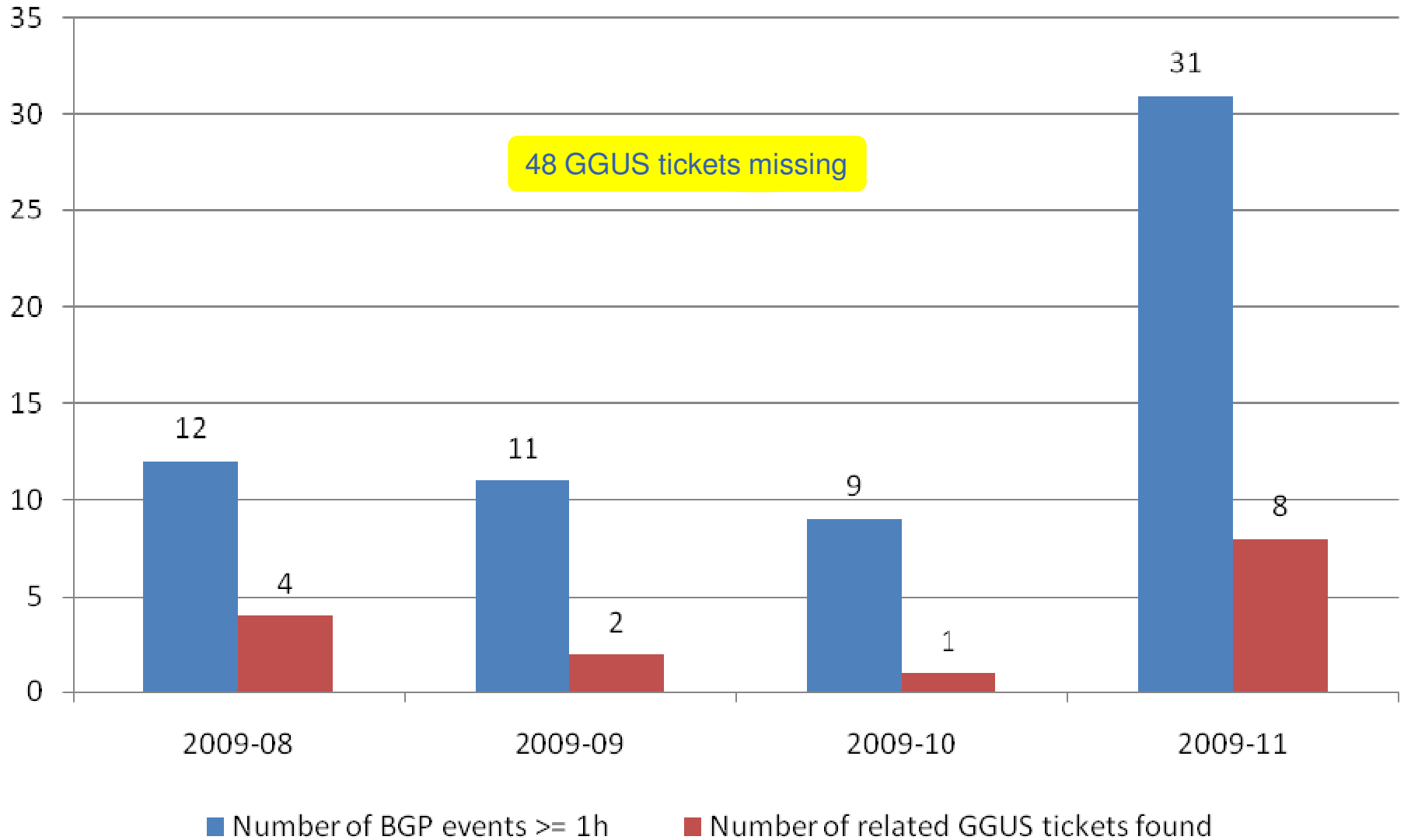

Monitoring 1 – Ticket 0

Legend:
- 🔴 LHCOPN Incident
- 🟠 LHCOPN Maintenance
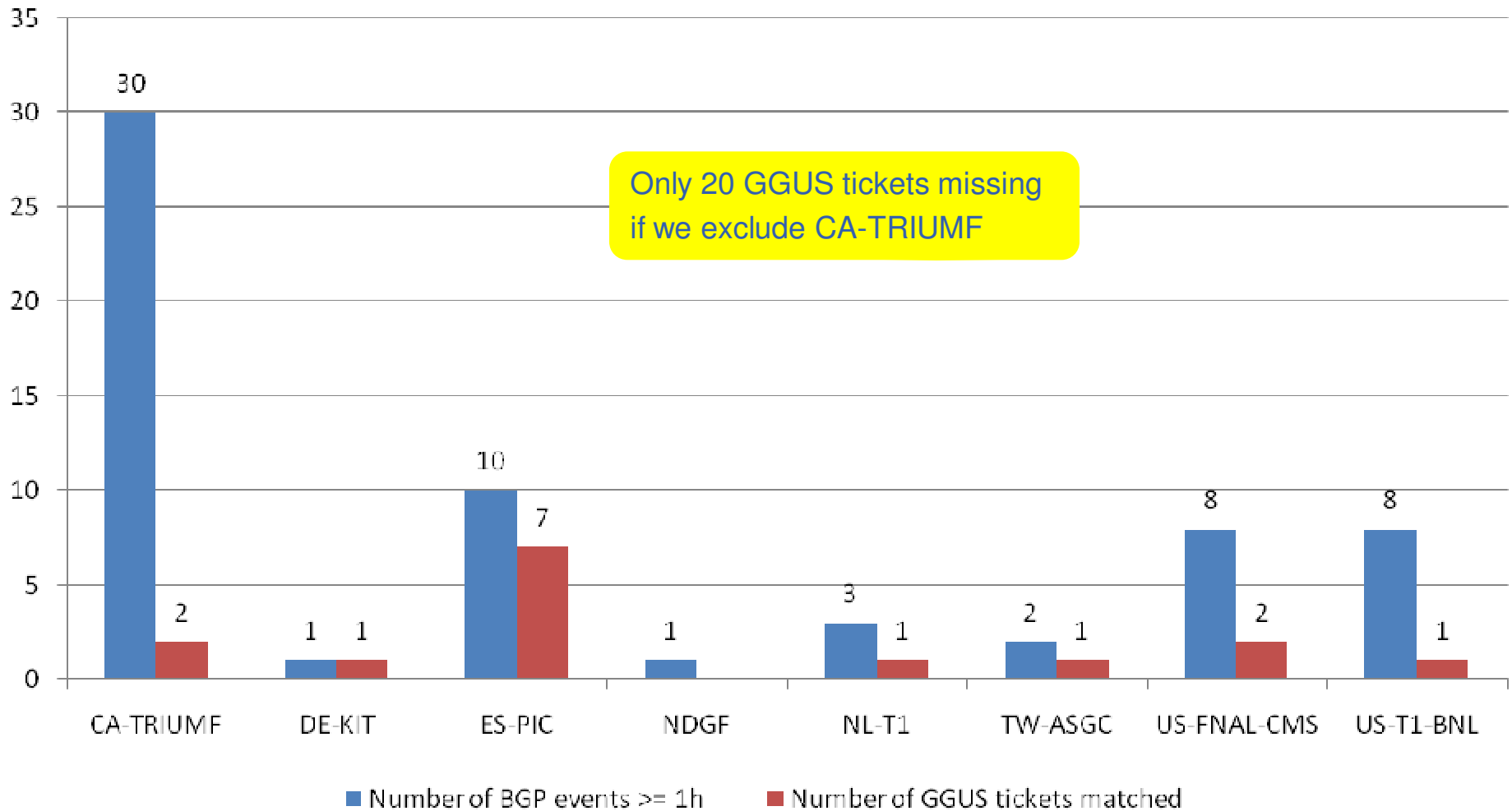- 🔵 LHCOPN Other
- 🟣 LHCOPN Spectrum events from CH-CERN

https://ccenoc.in2p3.fr/LHCOPN/webcalendar/

- **Daily computation shown on a webpage**
  - https://ccenoc.in2p3.fr/LHCOPN/report/   [Auth with any valid CERT]
  - With automated correlation
    - **Fully** automated (= maybe errors & no pity on inaccuracy)
  - Show if events are included in time range of GGUS tickets

2009-08					
58	CA-TRIUMF	2009-08-28 13:00:01	2009-08-28 14:42:01	1 hour 42 minutes	
54	CA-TRIUMF	2009-08-26 07:30:01	2009-08-26 17:02:01	9 hours 32 minutes	
52	US-T1-BNL (Backup)	2009-08-23 02:17:02	2009-08-23 04:40:01	2 hours 22 minutes 59 seconds	
51	CA-TRIUMF	2009-08-23 02:15:01	2009-08-23 04:40:01	2 hours 25 minutes	
50	ES-PIC	2009-08-		50 minutes 1 second	[#GGUS-50816]
48	CA-TRIUMF (Backup)	2009-08-		54 minutes 59 seconds	[#GGUS-50863] [#GGUS-50851]
47	CA-TRIUMF	2009-08-		17 hours 20 minutes	
44	ES-PIC	2009-08-		1 day 10 minutes	
39	TW-ASGC	2009-08-19 08:17:01	2009-08-19 08:55:01	38 minutes	
27	ES-PIC	2009-08-15 06:05:01	2009-08-15 07:37:01	1 hour 32 minutes	[#GGUS-50949]
24	US-T1-BNL (Backup)	2009-08-14 04:15:01	2009-08-14 05:15:01	1 hour	
9	US-FNAL-CMS (Backup)	2009-08-06 03:42:01	2009-08-06 15:25:01	11 hours 43 minutes	[#GGUS-50798]
8	US-T1-BNL (Backup)	2009-08-06 03:42:01	2009-08-06 15:25:01	11 hours 43 minutes	[#GGUS-50798]
7	ES-PIC	2009-08-04 13:27:01	2009-08-05 15:45:01	1 day 2 hours 18 minutes	[#GGUS-50777]
6	CA-TRIUMF	2009-08-04 04:15:01	2009-08-04 11:47:01	7 hours 32 minutes	

Callout box overlapping rows 50–47:
06:03 - 07:53 50949: Incident L2, Connectivity - Interoute fiber cut
06:05 - 07:37 BGP peer down on ES-PIC

Enabling Grids for E-sciencE

Enabling Grids for E-sciencE

Only 20 GGUS tickets missing
if we exclude CA-TRIUMF

Legend: ■ Number of BGP events >= 1h   ■ Number of GGUS tickets matched

Between 2009-08-01 and 2009-11-30

Enabling Grids for E-sciencE

- **No deep details, only to give global trends**

- **Only 25% of events are correctly matched**
  - If we exclude CA-TRIUMF, 40% are matched
  - 56 tickets not matched: Unnecessary tickets?
    - To be mitigated, a lot are related to T1-T1 issues

- **Confirming some feelings**
  - Maybe too many efforts spent reporting unnecessary things
    - L2 maintenances? Non service impacting events?
  - While some key events are not reported
    - Information improperly relayed or no information?

- **Link monitoring systems with TTS**
  - Automatically create tickets for some key events
    - After ½ hour? 1 hour?
    - Skipped if tickets is still existing
    - But how to avoid killing pro-activity of sites?
      - *Late is better than never?*
      - *Maintenances must be registered in advance*

- **Real time KPIs delivery**
  - Live Ops dashboard to show sites what they miss
    - Done: https://ccenoc.in2p3.fr/LHCOPN/report/

- **Review during Ops phoneconf correlation and open tickets**
  - But only post mortem

Enabling Grids for E-sciencE

- **Be sure network teams are doing the strict useful minimum for operations**
  - And give this feeling to them
  - Improve thresholds – balance laziness and risks
    - Really taking account resilience possibilities
    - EU / Non EU sites, L2 / L3 events, Incident/Maintenance, Service impacting / non impacting
  - Can we say we no longer report non service impacting events?
    - Not relevant for WLCG
    - But we need to have reliable backup paths
      - *Only report non service impacting events > 5 hours?*

- **Are shape of processes or tools stoppers?**
  - Submit ticket in one click, ease authentication etc.
  - Better integration heavily required?

Enabling Grids for E-sciencE

- **Some efforts are duplicated as we did not report events at source**
  - Fibre cut in AMS, GVA, etc: Bunch of links affected
  - But several sites need to report after being warned

- **Avoid some steps, increase number of actors**
  - Enable particular providers to report on behalf of sites?
    - Those having end to end vision: USLHCNET...

- **Reliable and accurate network monitoring**
  - Link and service view missing making operations harder
  - Backup through generic IP may completely hide LHCOPN failures
    - Ping etc. won't see LHCOPN failure, delays variation are not reliable
    - BGP won't see backup through generic IP

Enabling Grids for E-sciencE

- **Review of twiki to be finalised**

- **Ops phoneconf, 2010-01-14**
  – Review ops behaviour

- **Ops Working Group phoneconf or meeting**
  - Work around possible improvements
  - KPIs to be accurately precised and regularly computed

Enabling Grids for E-sciencE

- **Tools and processes supporting operations in place and maturing**
  - But still of production quality

- **Assessment of operations to be improved**
  - Heavily relying on correlation with accurate network monitoring

- **We are learning from first production period**
  - Definitely a place for improvements