Software Process Quality Metrics

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EGEE-II final EU Review

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Summary

- **Software process**
- **Tools and tracking**
- **Metrics**
- **Improving software quality**

Software process

- **We operate a continuous program of updates to gLite**
  - On average one set of updates is released per week
- **Services and components are updated individually**
- **This process incorporates a number of QA checkpoints, including a full certification stage**
- **The process works on Patches, self consistent sets of changes to the middleware stack**
- **The process is recorded in a number of standard documents:**
  - **MSA3.2** & **8** : Process document
  - **MSA3.5**: Test plans
  - **MSA3.7**: Developers' guide
- **Metrics can be found at:**
  - Software process monitoring:
    - *http://glite.web.cern.ch/glite/statistics/PatchStatistics.asp*
  - Defects and new features:
    - *http://glite.web.cern.ch/glite/statistics/BugStatistics.asp*

Why our own process?

- **Our process uses elements of processes that are used in the industrial environment**

- **EGEE operates in a unique environment**
  - Less central control than in a commercial setting
  - More control than in a community driven project
  - The process is based on experience and we will adapt it with the environment

- **We used the Capability Maturity Model (CMM) as a “leitmotif”**

A gLite 3.1 update announcement

Enabling Grids for E-sciencE

Patch #	Description
1648	sl4/i386 New torque 2.3.0-snap.200801151629.2cri and Maui 3.2.6p20-snap.1182974819.8
1708	R3.1/SLC4/i386: glite-AMGA_oracle metapackage
1782	VOMS Admin Server 2.0.14.1 & VOMS Admin Client 2.0.7.1 & VOMS Admin Interface 2.0.2.1
1787	VOMS server configuration update (multiple bug fixes)
1802	New version of lcg-info to support multiple BDII endpoints in LCG_GFAL_INFOSYS
1854	New yaim to fix the bug #36982 in WMS patch 1726
1874	Fix for rpm conflicts in gLite 3.1 update 25

Service updates

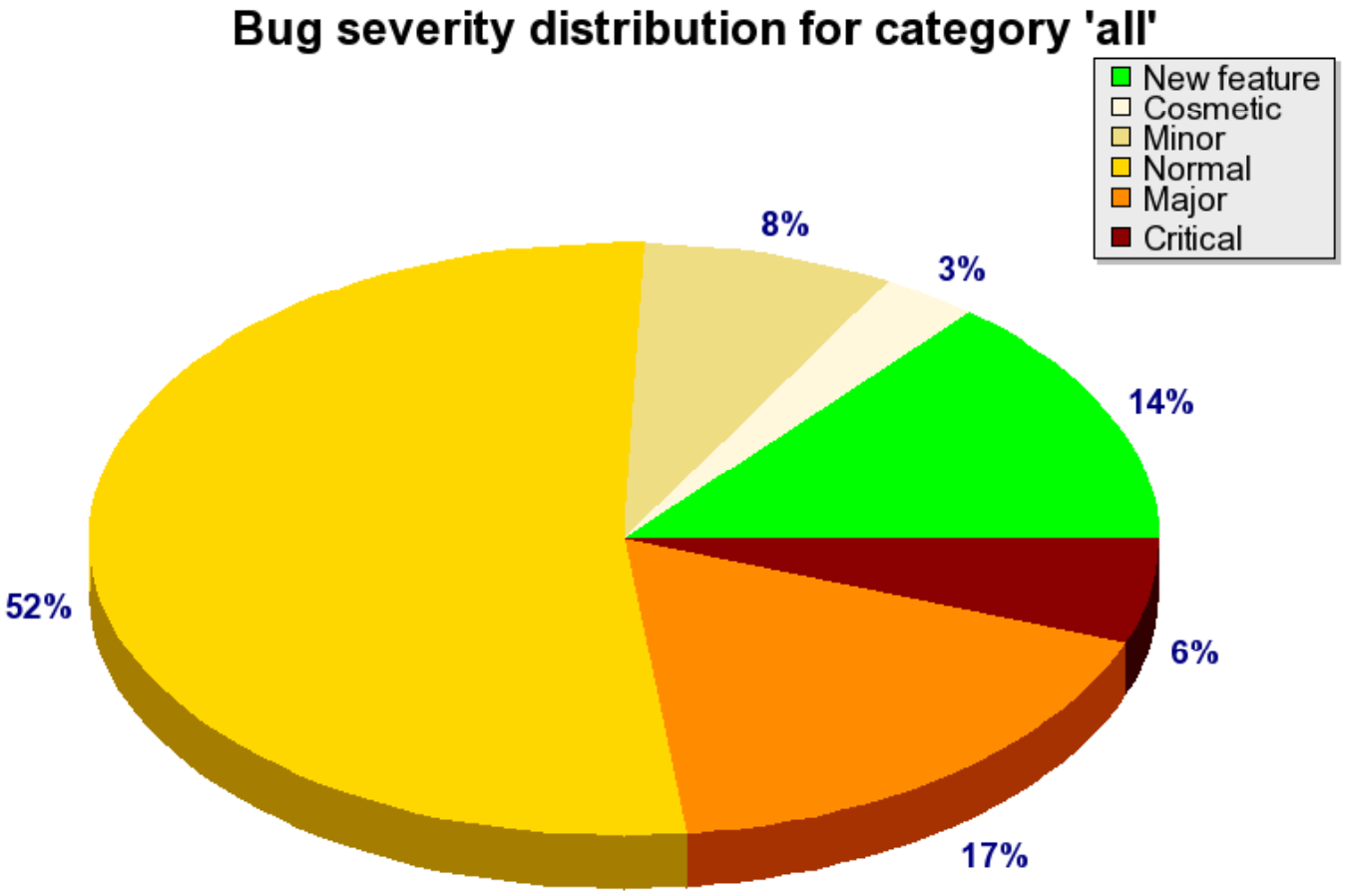
Priority	Service	Version	Details
Normal	glite-TORQUE_client	3.1.4-0	Details
Normal	glite-AMGA_postgres	3.1.6-0	Details
Normal	glite-LB	3.1.1-1	Details
Normal	glite-VOBOX	3.1.13-0	Details
Normal	glite-VOMS_oracle	3.1.11-0	Details
Normal	glite-WMS	3.1.2-0	Details
Normal	lcg-CE	3.1.16-0	Details
Normal	glite-AMGA_oracle	3.1.1-0	Details
Normal	glite-TORQUE_server	3.1.4-0	Details
Normal	glite-VOMS_mysql	3.1.11-0	Details
Normal	glite-WN	3.1.15-0	Details
Normal	glite-UI	3.1.15-0	Details

This indicates to an administrator which services they should update

Release Process QA Checkpoints

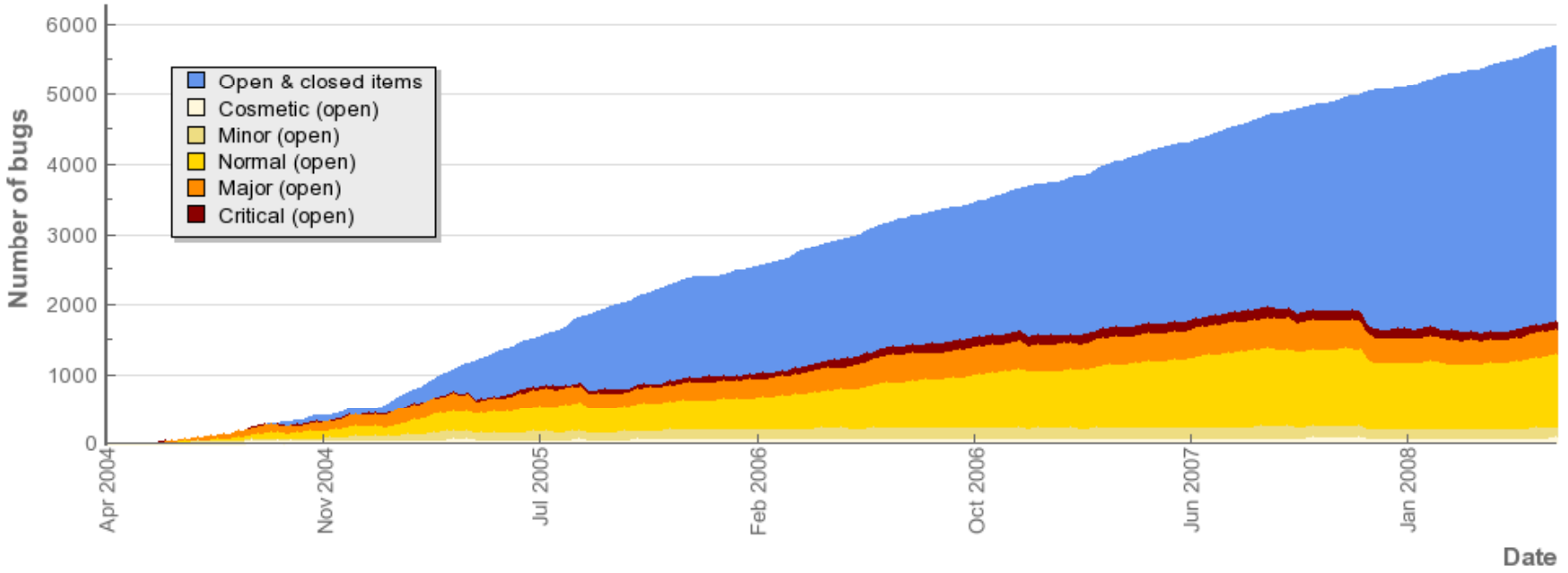
- **Acceptance Criteria**
  - At each stage in the release process acceptance criteria are imposed
- **Build (ETICS)**
  - Reports and code based analysis
- **Certification**
  - Documentation checks
  - Deployments tests
  - Functional tests
  - Stress tests (on demand), ageing tests
- **Pre Production Service**
  - Expose the updates to other deployment scenarios and real world workflows

Defects and change requests



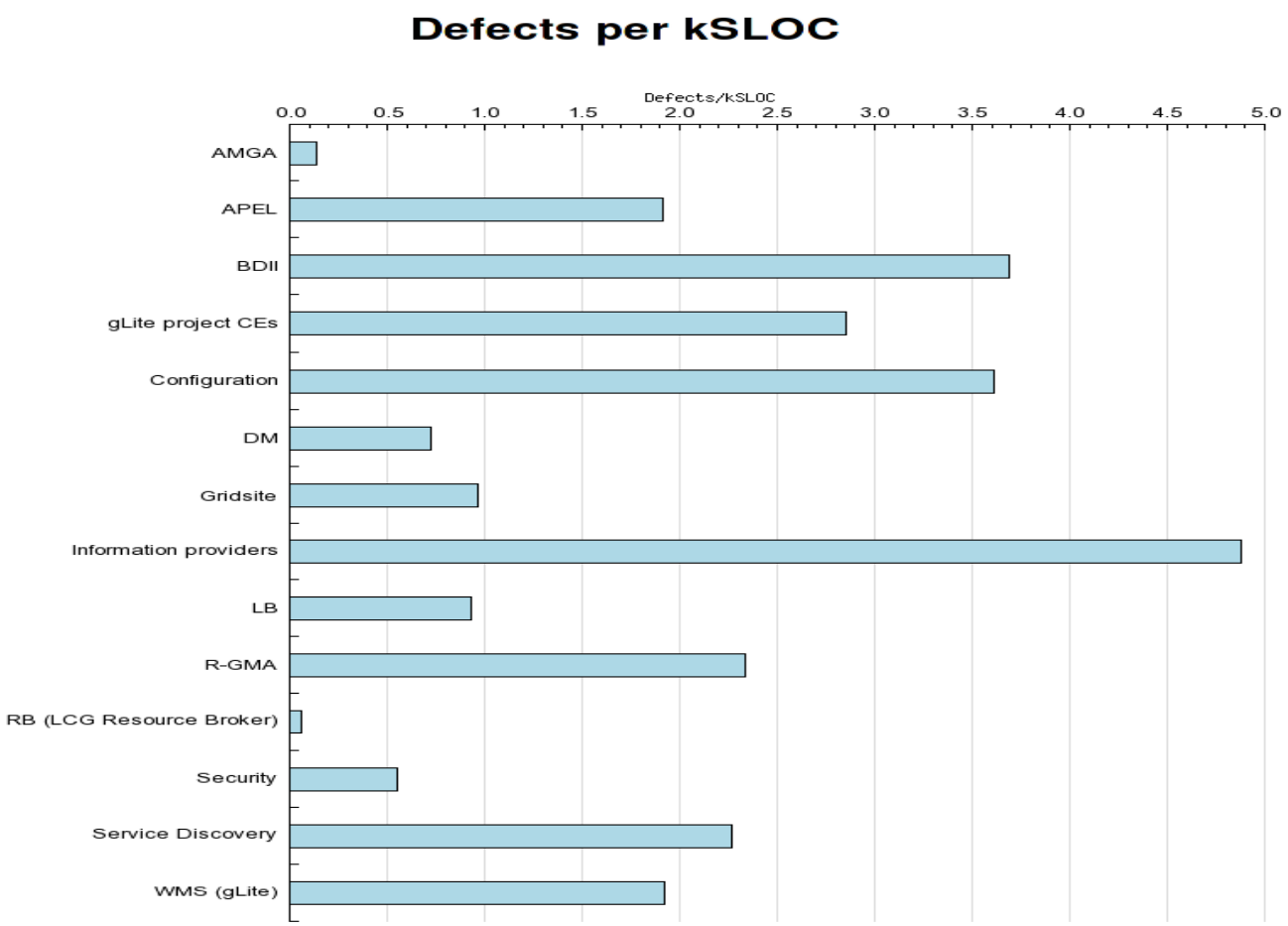
'Bugs' are classified as 'Feature Requests' or 'Defects' of varying severity

Defect Trends



- Covers 4 years of EGEEI/II
- Number of open bugs is now relatively stable
- No automated closure of old bugs ('ready for review')
  - Will soon be possible
- The step in Dec 2007 was a cleanup

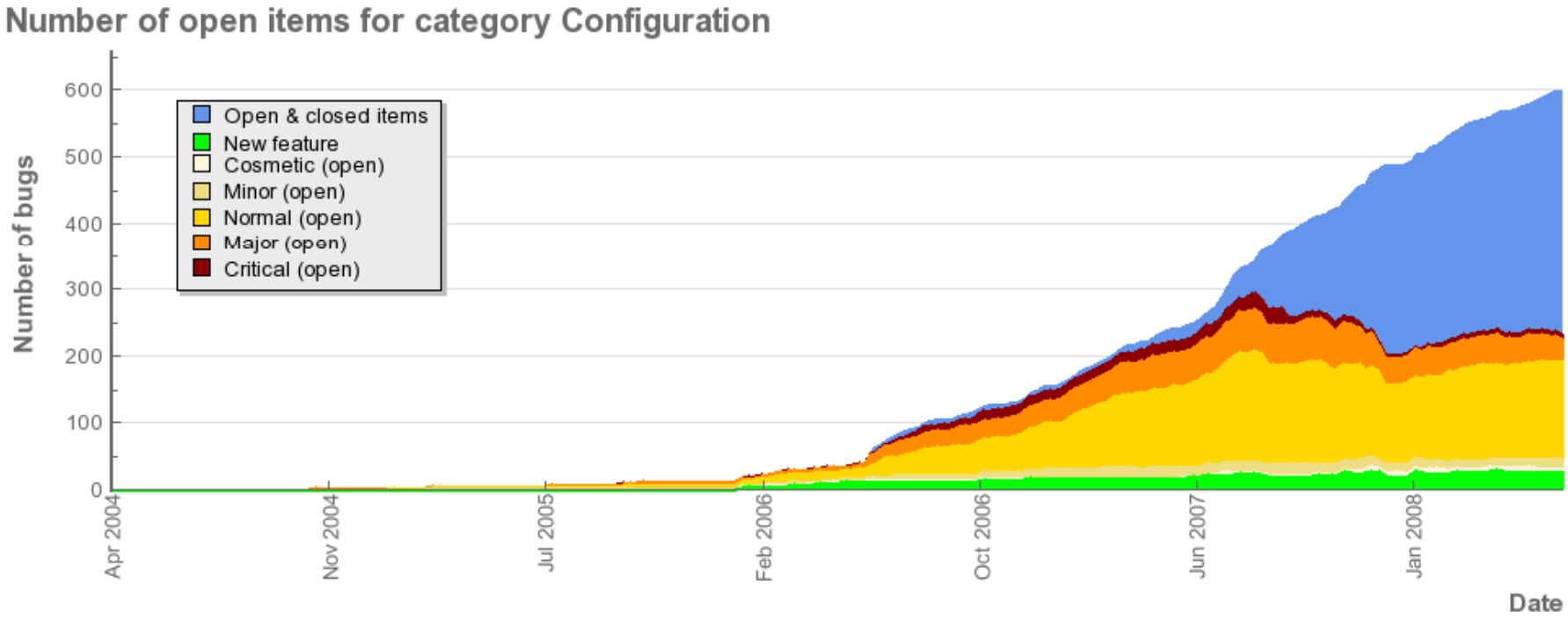
The Defects/kSLOC Chart



- Differences in production exposure, test coverage and even source management policies make comparisons between services misleading
- Better to track trends within one service

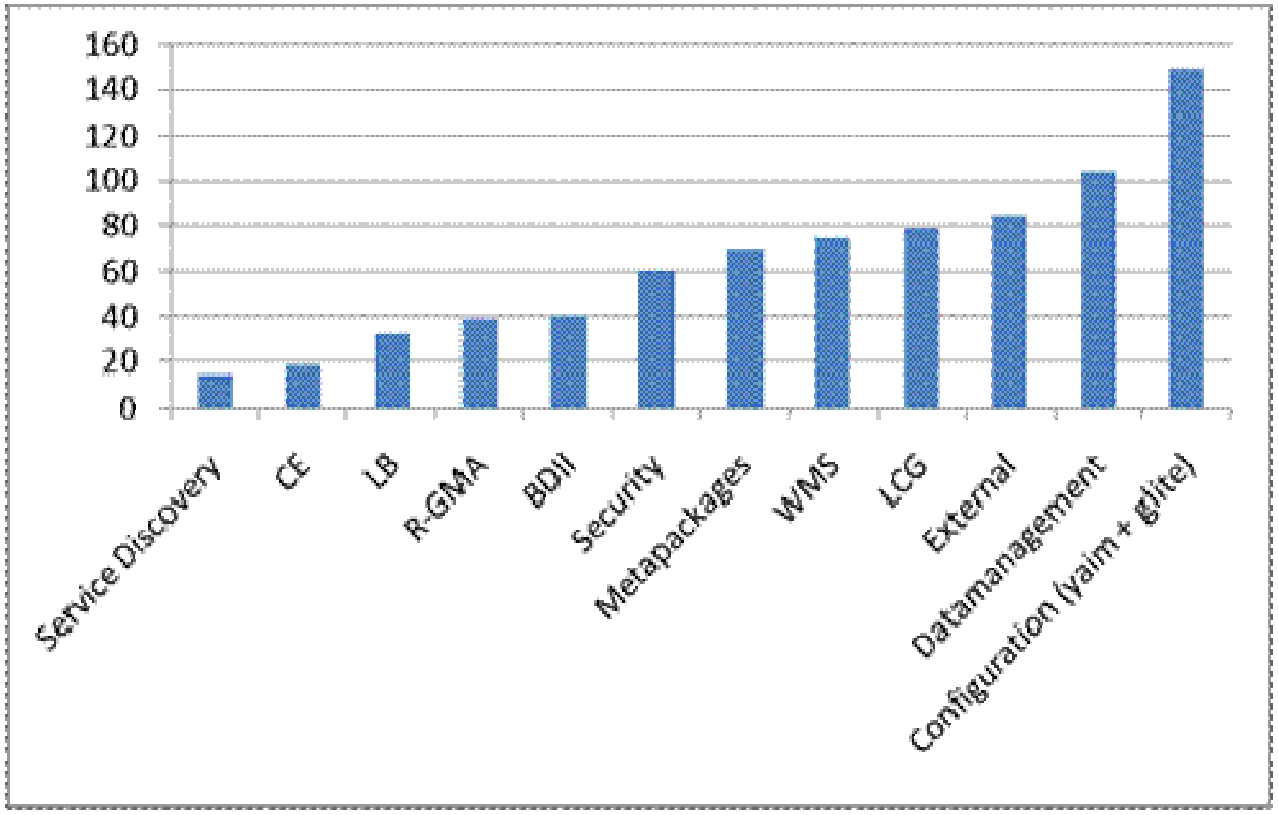
Open issues for 'configuration'

- **Historical overview for 'configuration'**



Component release density

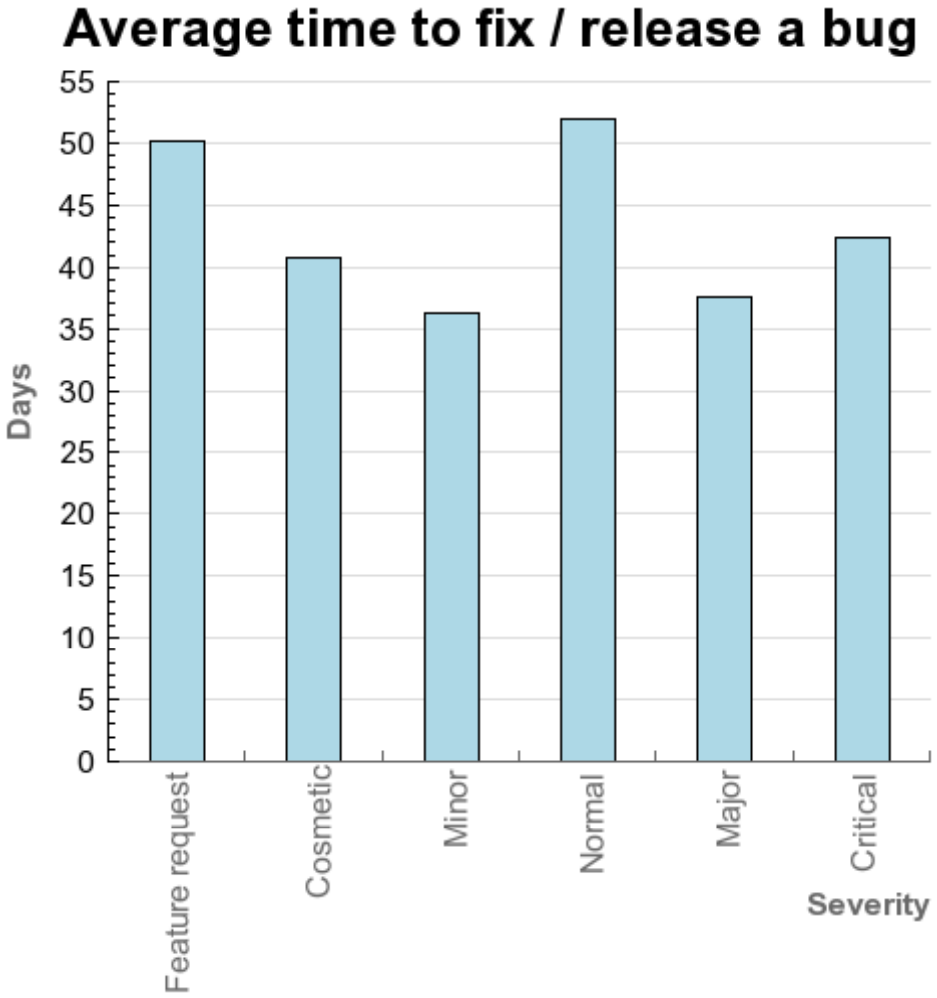
Patches released per service



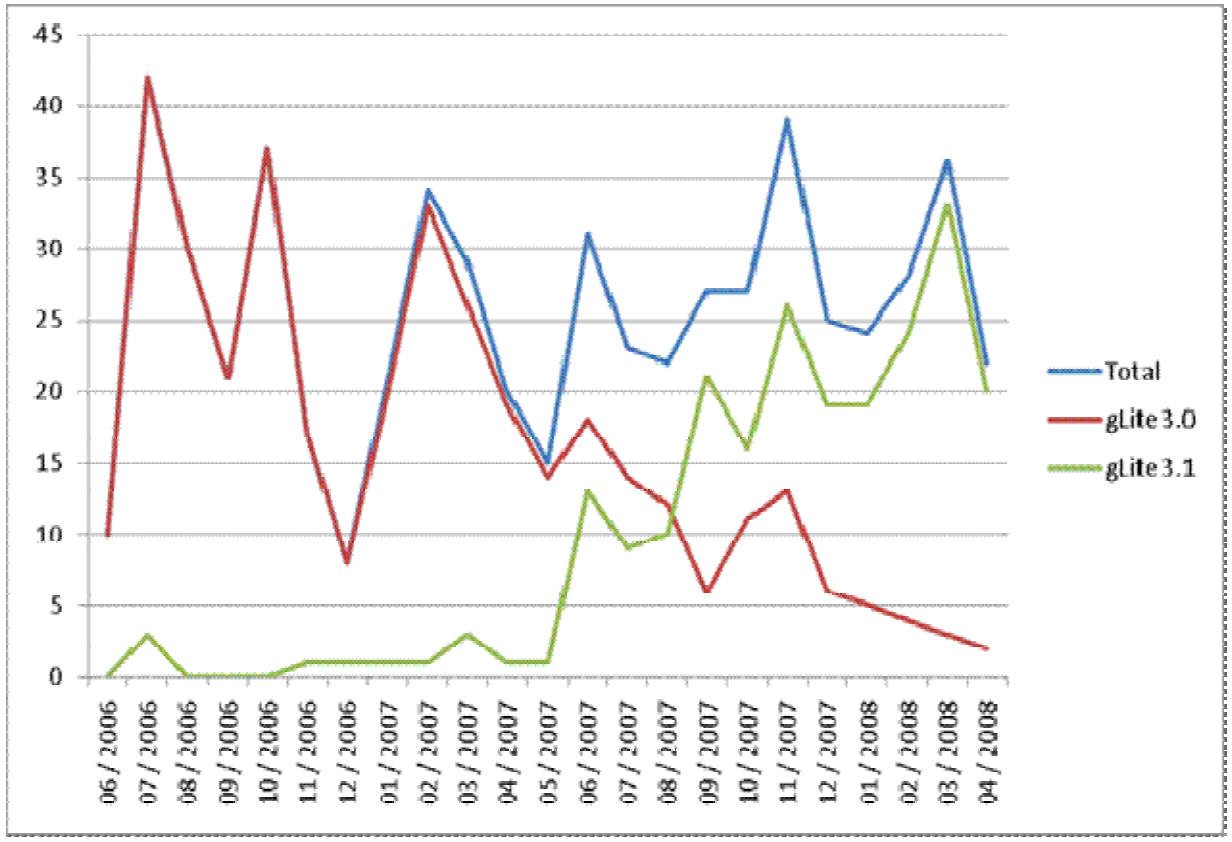
- Data Management update rate due to SRM 2.2
- Changes in any other component can trigger a configuration change

Meantime to release a fix

- Diagram shows lifetime of bugs which were eventually fixed by the release of a patch
- Severity is judged by the bug submitter
  - An issue affecting only one individual can be 'critical' if it blocks them
- The variance within each column is not shown
  - Under 'critical', some issues have in fact been fixed in 24hrs

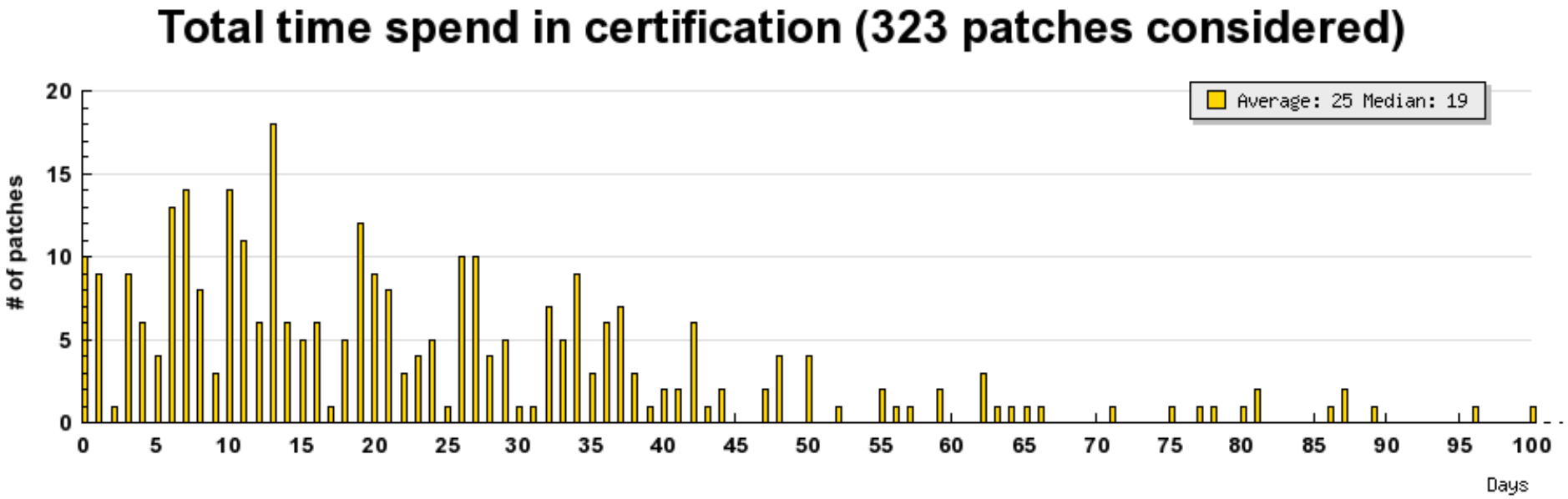


Patches released over time



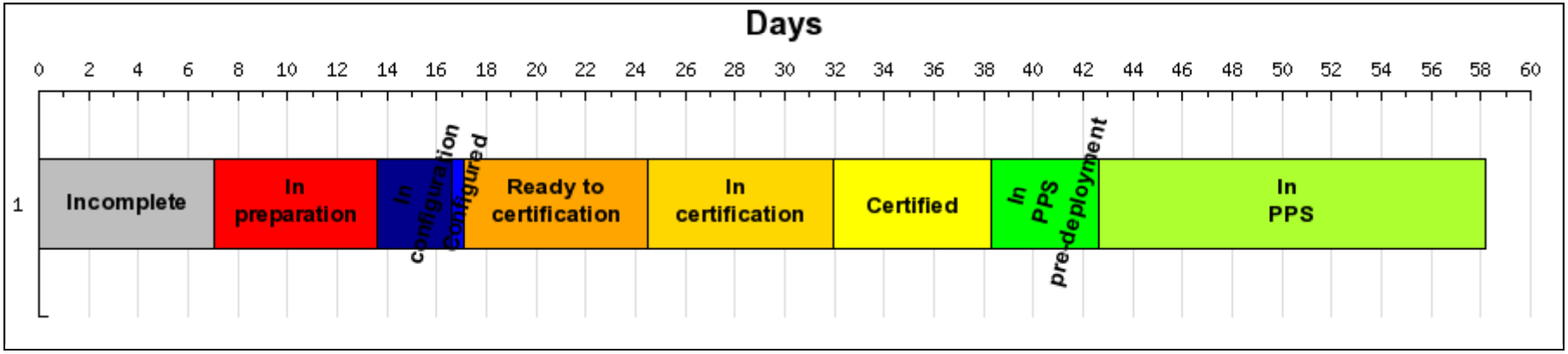
- A natural limit for the release process is around 40 patches per month
- This has implications for multiplatform support

Time spent in certification



- Some patches are certified within one day
- The long tail is mainly due to patch recycling

Average lifetime of patch states



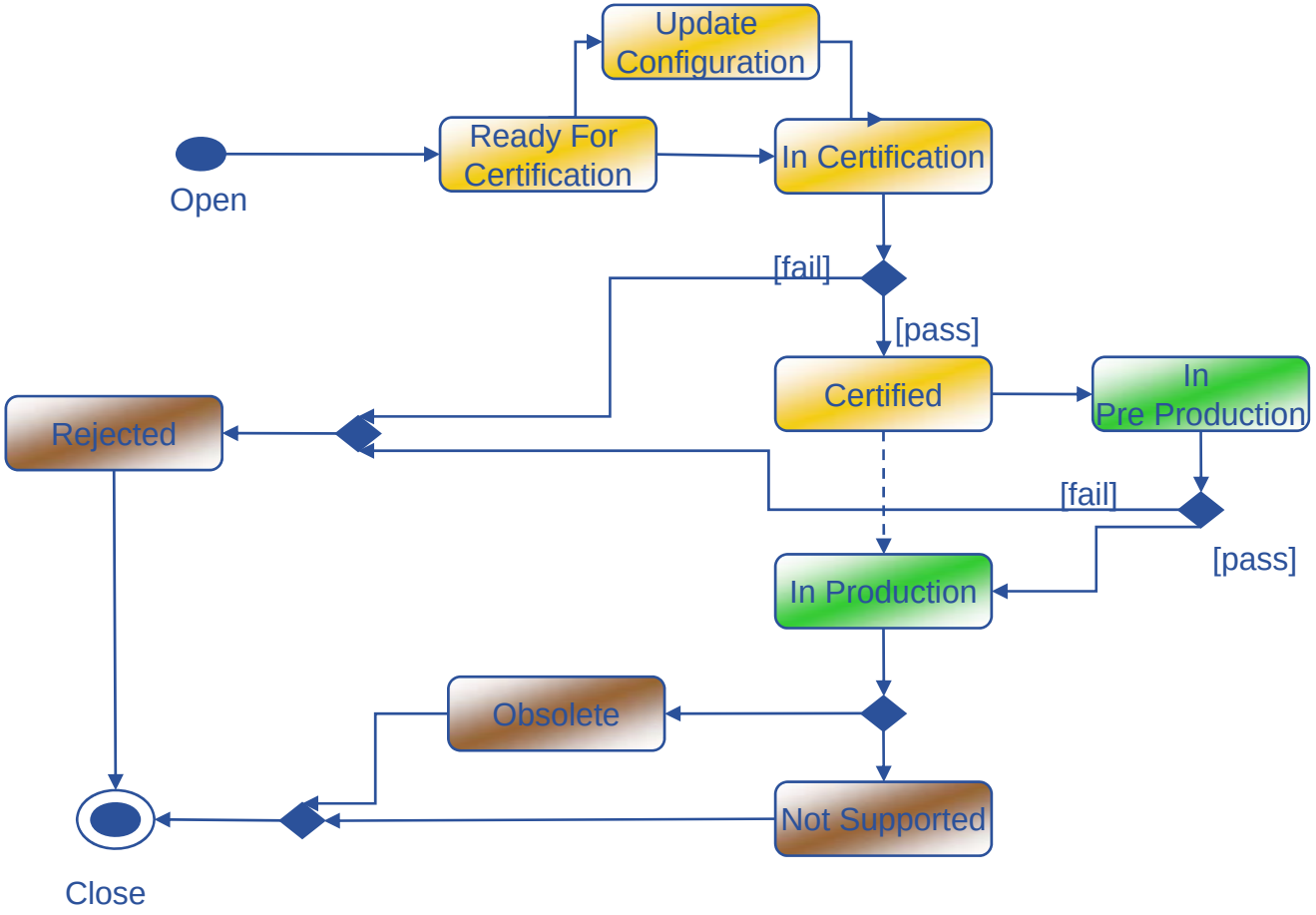
- There are certain 'dead' states such as 'ready for certification' and 'certified' where no work is performed on a patch
  - 'ready for certification' is a result of queuing for the appropriate expert
  - 'certified' is a result of the release process and steps are being taken to remove this delay

Improving software quality

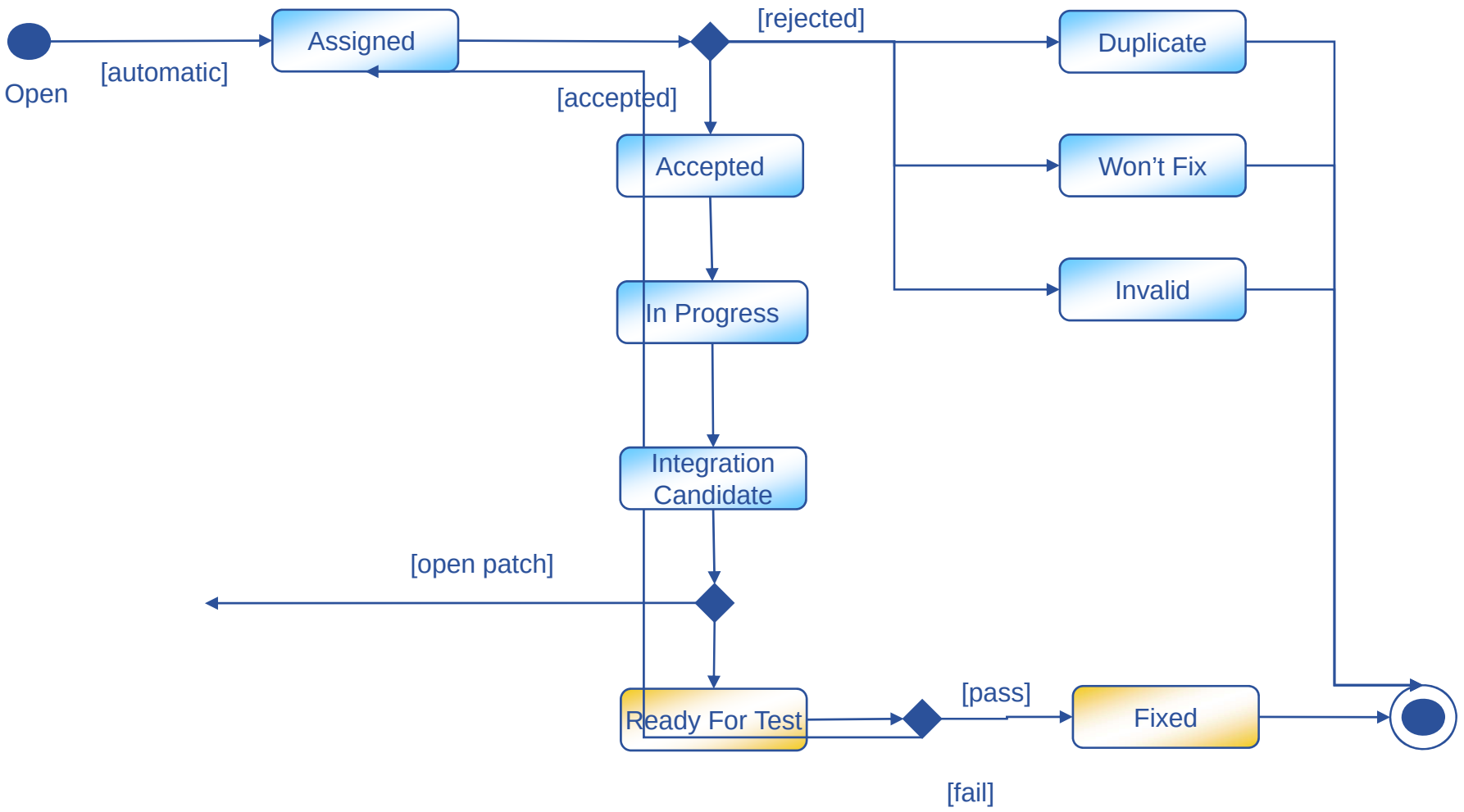
- The purpose of these metrics is to help improve software quality and to quantify progress
- Automating the testing and certification procedures will continue, with the aim of making as much testing available to the developers as possible
- EGEE-III co-locates testing manpower directly with the developers, reducing overheads
- Formalisation of regression testing
- Optimise reporting and release process to be maximally responsive
- Programmatic interface to savannah
- Many metrics are now available in realtime and serve as monitoring tools for the release process

Extra slides

Patch lifecycle



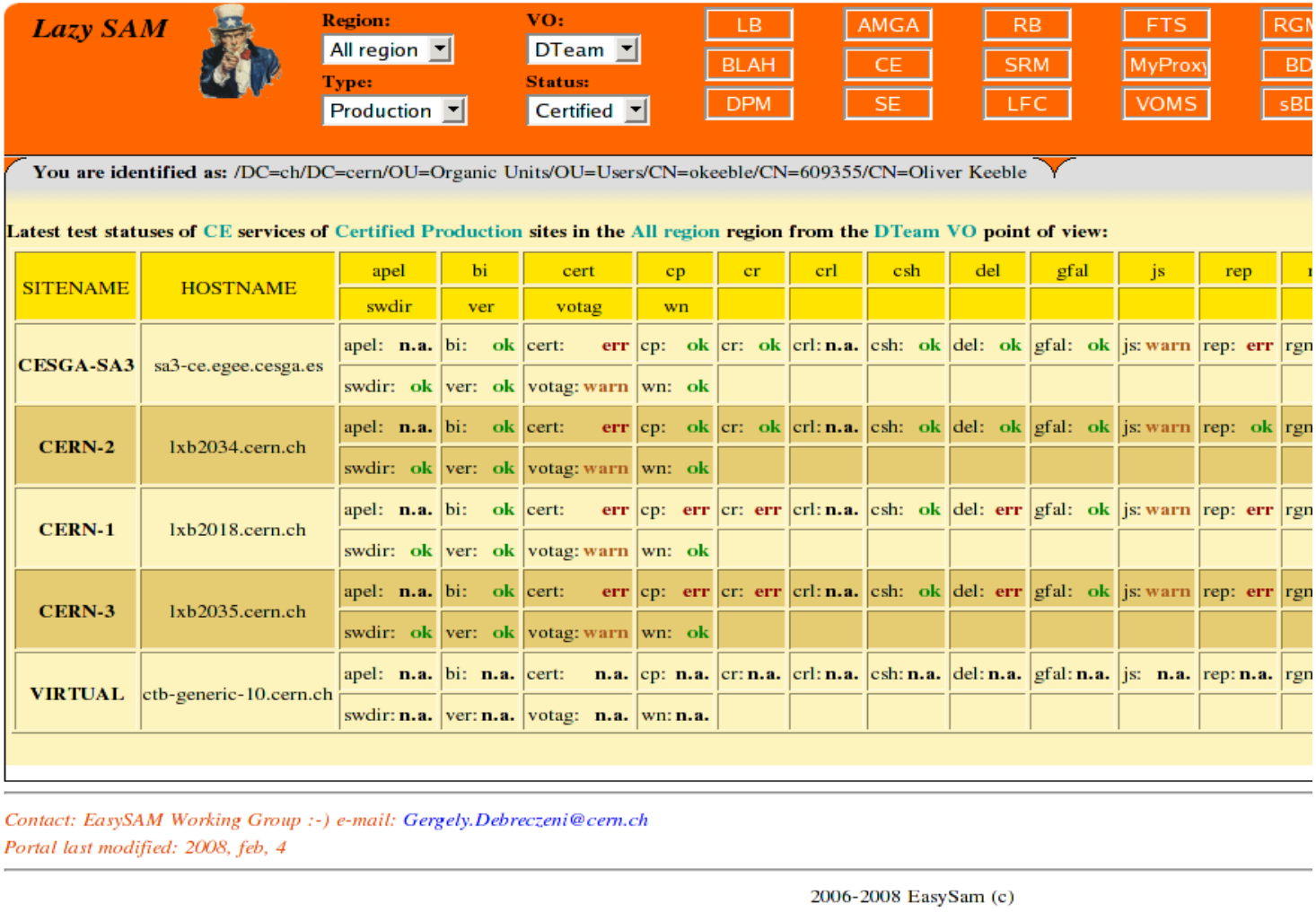
Defect Tracking Cycle



Build infrastructure

- **gLite uses the ETICS build infrastructure**
- **To produce a release candidate we require;**
  - Remote build (thus a known environment)
  - Locked configuration (for repeatability)
  - Permanently stored build logs alongside artifact
- **Build configuration is centrally maintained by the integration team**
- **Developers can build against this and perform initial tests on their release candidates**

Test Reports



Lazy SAM

Region: All region | VO: DTeam | Type: Production | Status: Certified

LB | AMGA | RB | FTS | RGM
BLAH | CE | SRM | MyProxy | BD
DPM | SE | LFC | VOMS | sBD

You are identified as: /DC=ch/DC=cern/OU=Organic Units/OU=Users/CN=okeeble/CN=609355/CN=Oliver Keeble

Latest test statuses of CE services of Certified Production sites in the All region region from the DTeam VO point of view:

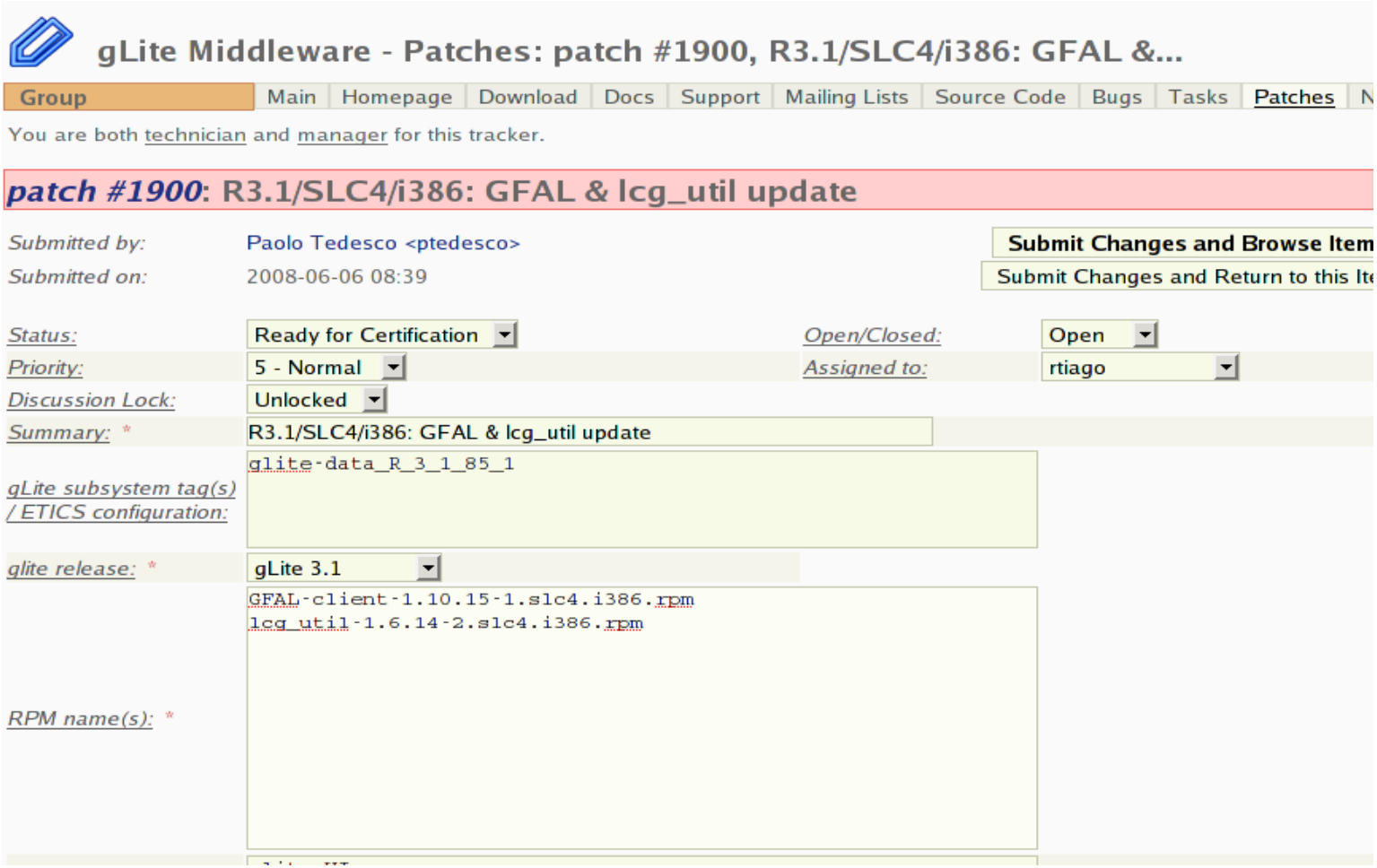
SITENAME	HOSTNAME	apel / swdir	bi / ver	cert / votag	cp / wn	cr	crl	csh	del	gfal	js	rep	
CESGA-SA3	sa3-ce.egee.cesga.es	apel: n.a. swdir: ok	bi: ok ver: ok	cert: err votag: warn	cp: ok wn: ok	cr: ok	crl: n.a.	csh: ok	del: ok	gfal: ok	js: warn	rep: err	rgn
CERN-2	lxb2034.cern.ch	apel: n.a. swdir: ok	bi: ok ver: ok	cert: err votag: warn	cp: ok wn: ok	cr: ok	crl: n.a.	csh: ok	del: ok	gfal: ok	js: warn	rep: ok	rgn
CERN-1	lxb2018.cern.ch	apel: n.a. swdir: ok	bi: ok ver: ok	cert: err votag: warn	cp: err wn: ok	cr: err	crl: n.a.	csh: ok	del: err	gfal: ok	js: warn	rep: err	rgn
CERN-3	lxb2035.cern.ch	apel: n.a. swdir: ok	bi: ok ver: ok	cert: err votag: warn	cp: err wn: ok	cr: err	crl: n.a.	csh: ok	del: err	gfal: ok	js: warn	rep: err	rgn
VIRTUAL	ctb-generic-10.cern.ch	apel: n.a. swdir: n.a.	bi: n.a. ver: n.a.	cert: n.a. votag: n.a.	cp: n.a. wn: n.a.	cr: n.a.	crl: n.a.	csh: n.a.	del: n.a.	gfal: n.a.	js: n.a.	rep: n.a.	rgn

Contact: EasySAM Working Group :-) e-mail: Gergely.Debreczeni@cern.ch
Portal last modified: 2008, feb, 4

2006-2008 EasySam (c)

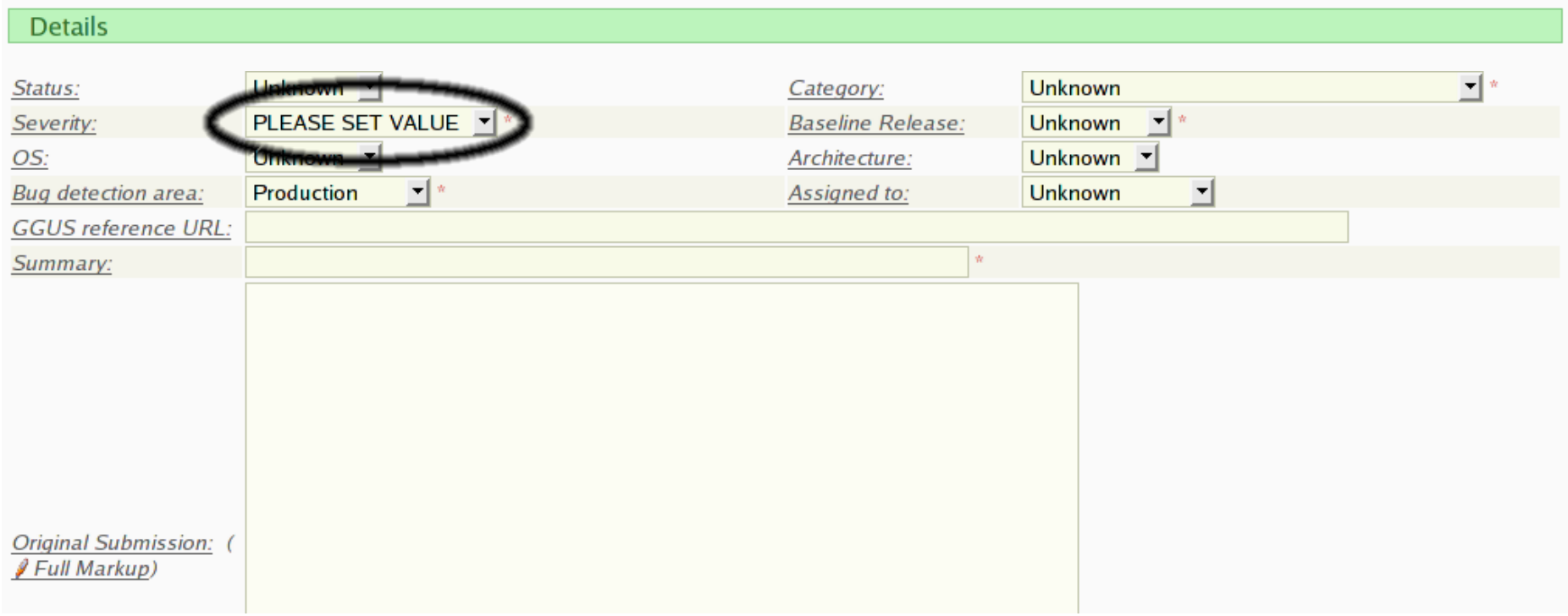
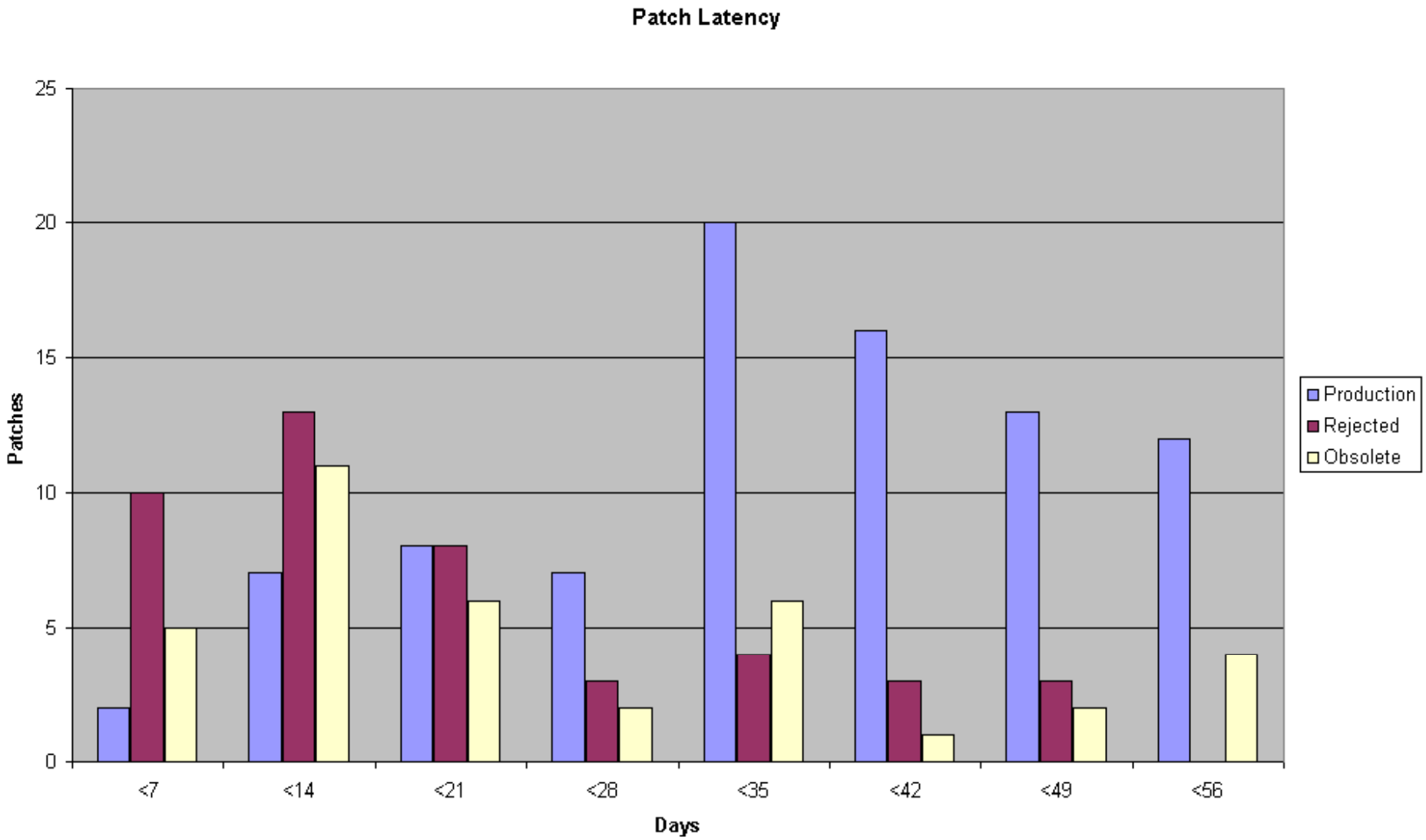
A Patch

- **Based on the Savannah project at CERN**



Defect Tracking System

- As with Patches, based on the Savannah project at CERN
- Used also for feature requests.
- Allows defects to be associated directly with the changes which fix them
- Stats are primarily based on the data in this system



Patch Latency