Spam Control on the Web

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The Problem

- Comment / post spam evolves
- There will never be a silver bullet
- Old projects in maintenance mode get increasingly hard to keep spam-free

"An Internet service cannot be considered truly successful until it has attracted spammers."

- Rafe's law

http://rc3.org/2006/10/20/rafes-law/

The Story of Btwlzyq

Tracking a resourceful spammer on http://communityalmanac.org.

Existing Solutions

A brief taxonomy / survey

See also appendix B - prior art.

Existing Solutions: Form Modifiers

- Captcha (obtrusive)
- Other problem solving (obtrusive)
- Honeypot Fields (unobtrusive)

By design, only useful against bots.

Content Filtering Services

Remote APIs:

- Bayesian filters
- IP blacklist

Good: Unobtrusive. Large training set.

Bad: Network overhead. Reliabilty.

Content filters: Local

- Bayesian filters and IP blacklists, but also:
- IP throttling
- Other metadata filtering: link counting, admin users, …

Good: Unobtrusive. Low I/O overhead. Reliable.

Bad: Requires training.

Summary

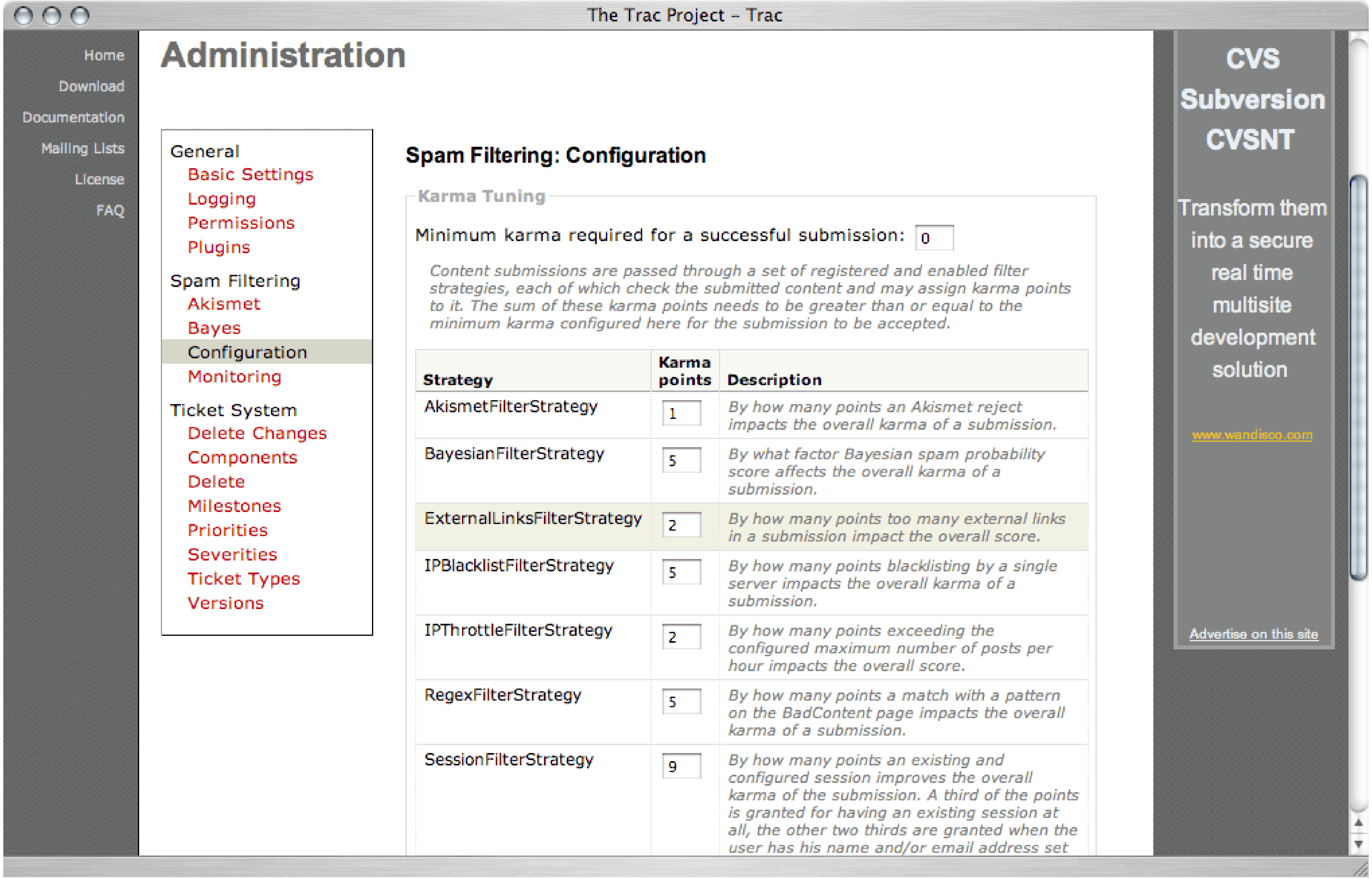
- Lots of solutions
- None are sufficient alone
- Complement each other
- *n* solutions == *n* APIs
- *n* APIs integrated into *m* web apps == *aaargh*

Trac SpamFilter plugin - a flexible approach

- "all of the above" approach
  - 14 filters and 3 captchas
- extensible, easy to code new filters
- highly configurable
  - select filters
  - assign karma scores to filters (positive = good)
  - set minimum karma needed for posting

Trac SpamFilter plugin (cont'd)

- Records possible spam in database for moderation
- Moderation UI: rough but useful
- Moderation includes training
- Lots of tests



Administration

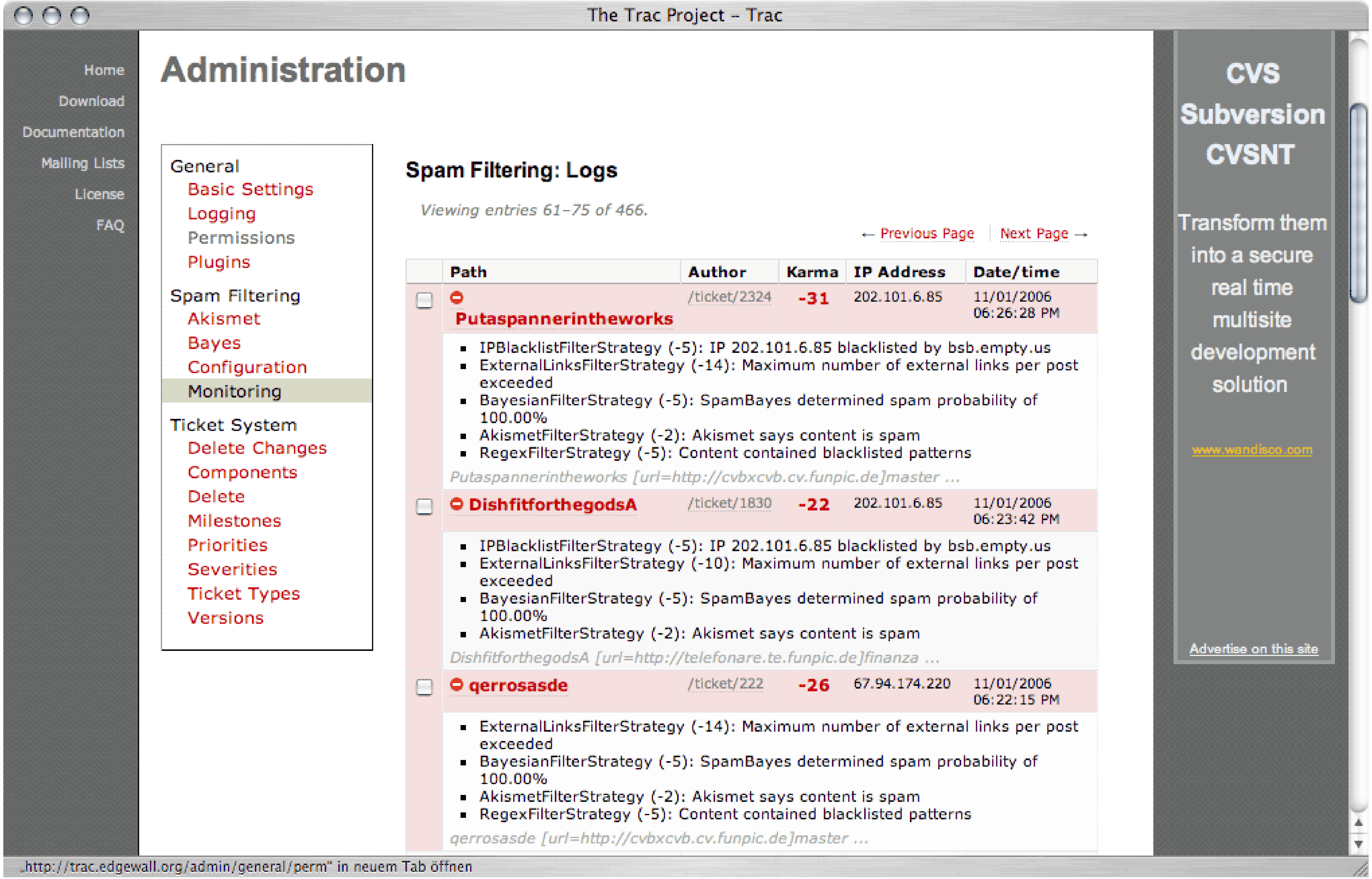
Spam Filtering: Configuration

Karma Tuning

Minimum karma required for a successful submission: 0

Content submissions are passed through a set of registered and enabled filter strategies, each of which check the submitted content and may assign karma points to it. The sum of these karma points needs to be greater than or equal to the minimum karma configured here for the submission to be accepted.

Strategy	Karma points	Description
AkismetFilterStrategy	1	*By how many points an Akismet reject impacts the overall karma of a submission.*
BayesianFilterStrategy	5	*By what factor Bayesian spam probability score affects the overall karma of a submission.*
ExternalLinksFilterStrategy	2	*By how many points too many external links in a submission impact the overall score.*
IPBlacklistFilterStrategy	5	*By how many points blacklisting by a single server impacts the overall karma of a submission.*
IPThrottleFilterStrategy	2	*By how many points exceeding the configured maximum number of posts per hour impacts the overall score.*
RegexFilterStrategy	5	*By how many points a match with a pattern on the BadContent page impacts the overall karma of a submission.*
SessionFilterStrategy	9	*By how many points an existing and configured session improves the overall karma of the submission. A third of the points is granted for having an existing session at all, the other two thirds are granted when the user has his name and/or email address set*



Administration

Spam Filtering: Logs

Viewing entries 61–75 of 466.

	Path	Author	Karma	IP Address	Date/time
☐	Putaspannerintheworks	/ticket/2324	-31	202.101.6.85	11/01/2006 06:26:28 PM
	▪ IPBlacklistFilterStrategy (-5): IP 202.101.6.85 blacklisted by bsb.empty.us ▪ ExternalLinksFilterStrategy (-14): Maximum number of external links per post exceeded ▪ BayesianFilterStrategy (-5): SpamBayes determined spam probability of 100.00% ▪ AkismetFilterStrategy (-2): Akismet says content is spam ▪ RegexFilterStrategy (-5): Content contained blacklisted patterns *Putaspannerintheworks [url=http://cvbxcvb.cv.funpic.de]master …*				
☐	DishfitforthegodsA	/ticket/1830	-22	202.101.6.85	11/01/2006 06:23:42 PM
	▪ IPBlacklistFilterStrategy (-5): IP 202.101.6.85 blacklisted by bsb.empty.us ▪ ExternalLinksFilterStrategy (-10): Maximum number of external links per post exceeded ▪ BayesianFilterStrategy (-5): SpamBayes determined spam probability of 100.00% ▪ AkismetFilterStrategy (-2): Akismet says content is spam *DishfitforthegodsA [url=http://telefonare.te.funpic.de]finanza …*				
☐	qerrosasde	/ticket/222	-26	67.94.174.220	11/01/2006 06:22:15 PM
	▪ ExternalLinksFilterStrategy (-14): Maximum number of external links per post exceeded ▪ BayesianFilterStrategy (-5): SpamBayes determined spam probability of 100.00% ▪ AkismetFilterStrategy (-2): Akismet says content is spam ▪ RegexFilterStrategy (-5): Content contained blacklisted patterns *qerrosasde [url=http://cvbxcvb.cv.funpic.de]master …*				

„http://trac.edgewall.org/admin/general/perm" in neuem Tab öffnen

About the Trac plugin

http://www.cmlenz.net/archives/2006/11/managing-trac-spam

SpamAssassin has a similar multi-filter strategy, but is designed for use with email, not web:

http://wiki.apache.org/spamassassin/BlogSpamAssassin

Filters - remote

stopforumspam.py

akismet.py

blogspam.py

defensio.py

extlinks.py

httpbl.py

ip_blacklist.py

linksleeve.py

typepad.py

Filters - local

regex.py

bayes.py

extlinks.py

ip_blacklist.py

ip_regex.py

ip_throttle.py

session.py

Captcha

recaptcha.py

image.py (uses PIL)

expression.py ("what is three plus twelve") … looks unfinished

It only works with Trac.

Hamage Control!

- Goal: Decoupling SpamFilterPlugin from Trac
- Prototype
- http://github.com/slinkp/hamage

Hamage Control: modes of operation

- Python library API
- WSGI middleware
- Hybrid
- Native integration with every framework
  - Nooo.

Python API: Filters

```
class MyFilter(object):
    def test(self, req, author, ip):
        return (score, 'reason')
```

Positive score = ham, negative = spam.

Python API: FilterSystem

```
>>> from hamage.filter import FilterSystem
>>> config = {
...  'options': {'min_karma': 1},
...  'filters': ['hamage_extlinks']}
>>> config['options']['backend_factory'] =
'django_orm'
>>> filtersys = FilterSystem(config)
```

Python API: FilterSystem

```
>>> filtersys.strategies
[<hamage.filters.extlinks.ExternalLinks
FilterStrategy object at ...>]
>>> filtersys.backend_factory
<class'hamage.backends.django_hamage.mo
dels.DjangoBackendFactory'>
```

Python API: FilterSystem

```
>>> from hamage.filter import Request
>>> req = Request.blank('/foo',
...remote_addr='10.20.30.40')
>>> filtersys.test(req, author='fred',
...     changes=[('Old content', 'New content')])
Traceback (most recent call last):
...
hamage.filter.RejectContent: Submission rejected as
potential spam
```

Python API: FilterSystem

```
>>> filtersys.min_karma = 0
>>> filtersys.test(req,
...    author='fred',
...    changes=[('Old content', 'New
content')])
(0, [])
```

Python API: FilterSystem

```
>>> lotsa_links = 'http://somewhere.org ' * 100
>>> filtersys.test(req, author='fred',
...     changes=[(None, lotsa_links)])
Traceback (most recent call last):
...
hamage.filter.RejectContent: Submission rejected as
potential spam  (Maximum number of external links per
post exceeded)
```

Python API: Registering filters

```
# Put entry points in your setup.py
setup(name='hamagecontrol',
   entry_points={
    'hamage_filters': [
      'hamage_extlinks =
hamage.filters.extlinks:ExternalLinksFilterStrategy',],
   'hamage_backends': [
      'django_orm
=hamage.backends.django_hamage.models:DjangoBackendFact
ory',],
...
```

WSGI Middleware

Request: Client POST → hamage (filtering) → application

Response: application response→ hamage (form field and error message injection) → client

Demo

- Django running via wsgiref server, behind WSGI middleware

Wish List: RESTful web service?

- Use with any language
- Scale independently
- Would love to do this
- … later

Performance & Scaling

- Run cheapest filters first; allow them to short-circuit.
- Parallelize slow filters (eg. network IO)
  - How?
- Asynchronous operation

More about async

- Use case: speed
- Use case: moderation
  - Integration just got tougher
  - Feedback just got really hard
    - Don't bother?

More on logging

- Remember Btwlzyq?
- Consistency matters

Parting shot

<a href="http://example.com" **rel="nofollow"**>
buy my cheap replica rolexes</a>

No page rank for you buddy

Appendix A. Links

- Hamage Control:https://github.com/slinkp/hamage
- Django integration demo code: https://github.com/slinkp/pygotham_hamage_demo
- These slides: https://github.com/slinkp/pygotham_hamage_demo/blob/master/pygotham2_hamage_slides.odp?raw=true
- Trac plugin: http://trac.edgewall.org/wiki/SpamFilter
- About WSGI: http://lucumr.pocoo.org/2007/5/21/getting-started-with-wsgi/
- About entry points: http://stackoverflow.com/a/9615473/137635

Appendix B. Prior Art

Python packages related to spam. Too many for one slide, see https://gist.github.com/2896944#file_prior_art.txt