FreeBSD Portsnap

What (it is), Why (it was written), and How (it works)

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May 19, 2007

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A Case Study in Black Magic

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- Individual client systems update /var/db/portsnap from a randomly selected mirror.
- The ports tree can be extracted or updated from /var/db/portsnap.

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- If HTTP_PROXY is set, Portsnap uses SHA256(HTTP_PROXY) as a random number seed when selecting a random mirror.

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- Each time a commit is done, automatically rebuild checksum files going up to the root, and re-sign the root checksum file.
- I hope someone builds this some day. I didn't have time.

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  - We don't really need to invent a new protocol after all...

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  - We don't need to worry about the possibility of an SSL certificate being compromised.

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- In Portsnap, the pieces are
  - /usr/ports/category/port
  - /usr/ports/category/file
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  and each piece is stored as a tarball.

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- Commits to the ports tree often modify several files, but usually they are part of the same port.
  - Dividing the tree into individual ports is a natural granuality based on how the tree changes.

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  - A hacked-up textual patch format is used for the index of components and for the ports INDEX file.
- For a typical 58 hour window of updates in 2005, CVSup used 6388kB of bandwidth, while portsnap only used 370kB.
  - When very little has changed in the tree, CVSup spends most of its time/bandwidth listing files and deciding that they haven't changed.

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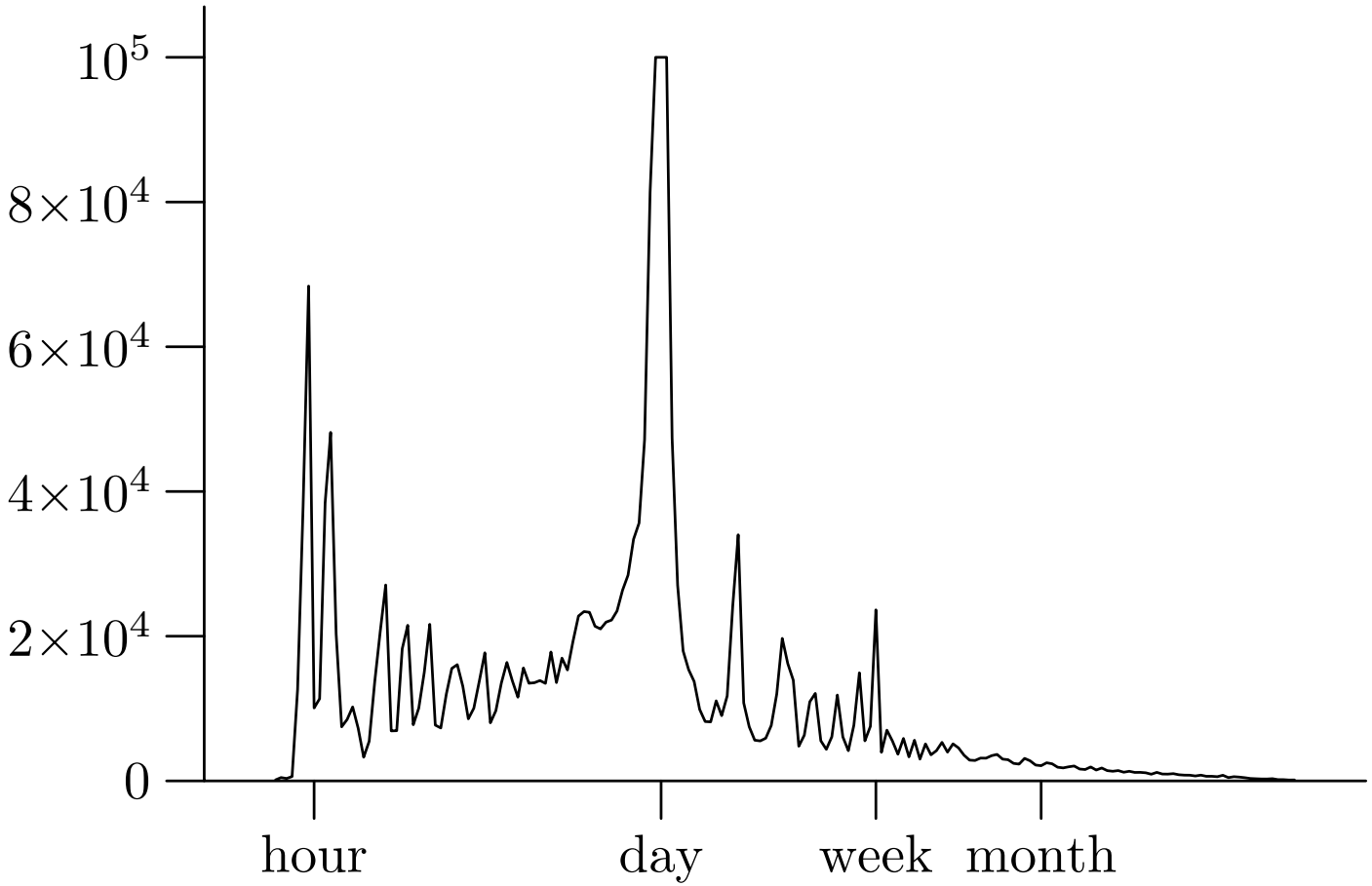
  - By building a small number of patches, we can ensure that most systems will be using patches most of the time.
  - Right now, patches are always for Portsnap on systems which update at least once a week.

Portsnap updating statistics



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- Not really black magic at all — pipelined HTTP is something which everybody should be using.
  - Unfortunately, shockingly few people do.
  - I had to write my own command-line pipelined HTTP client as part of Portsnap because I couldn't find one anywhere.

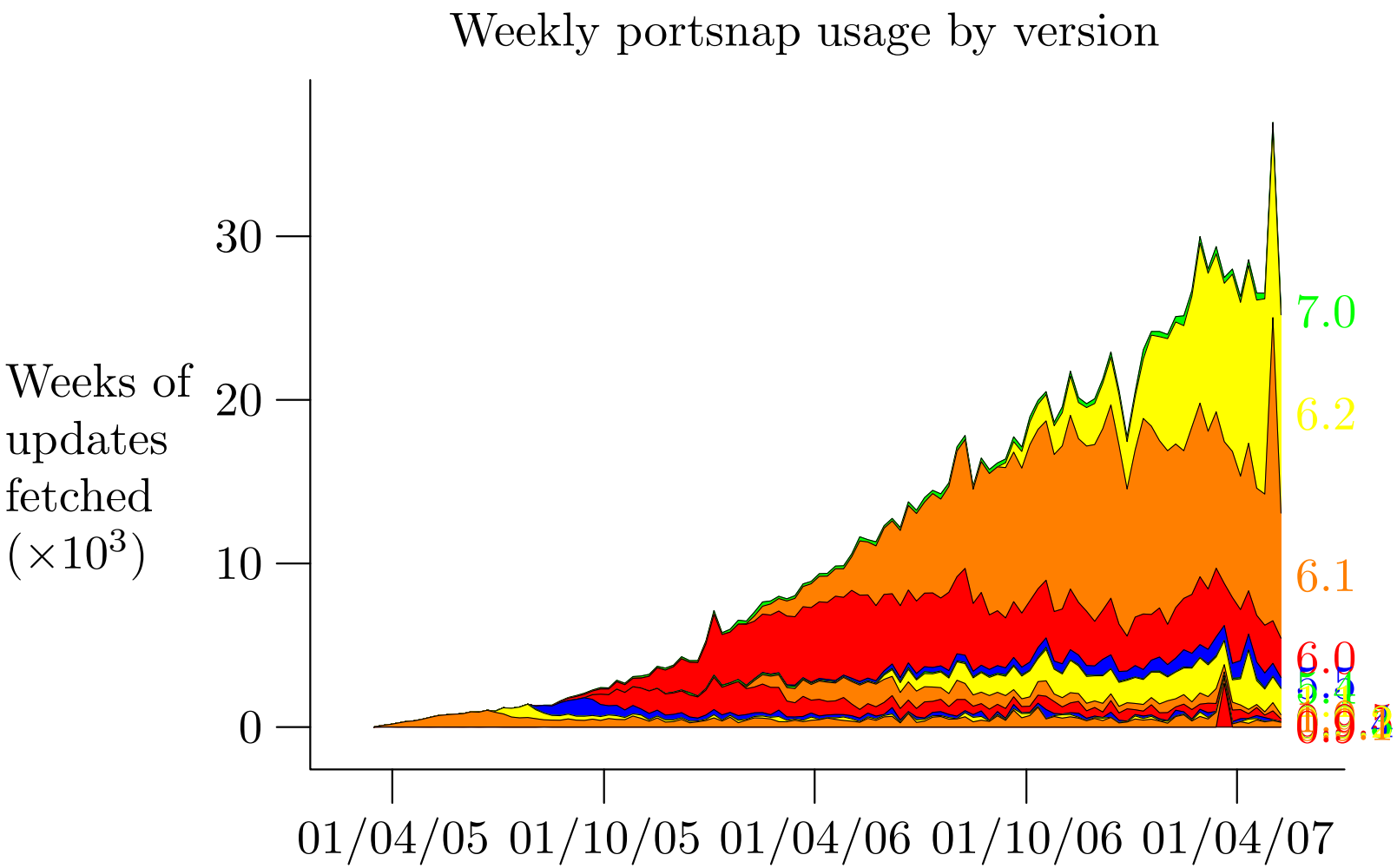
Spyware!

PRIVACY NOTICE

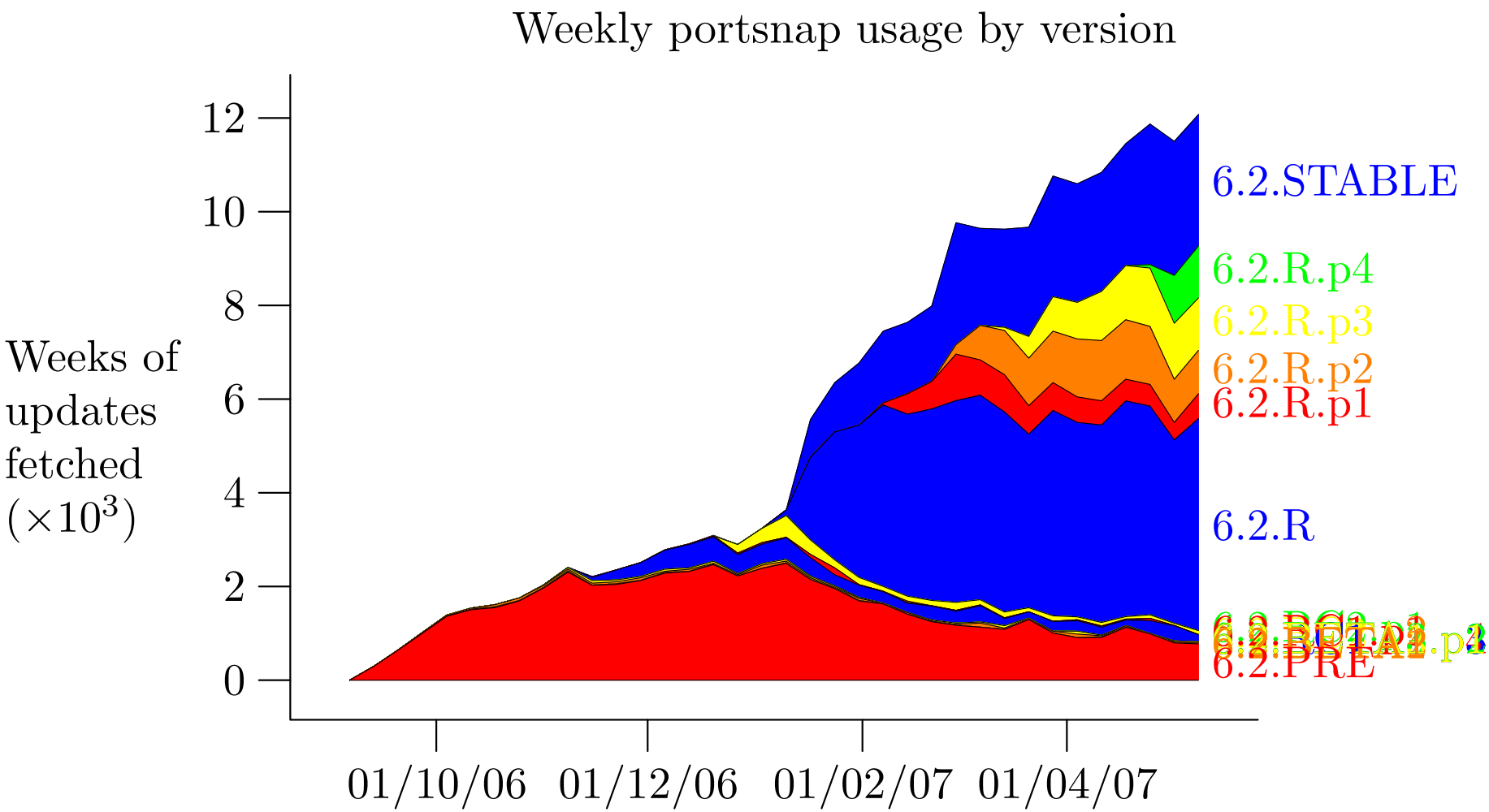
As an unavoidable part of its operation, a machine running portsnap will make its public IP address and the list of files it fetches available to the server from which it fetches updates. Using these it may be possible to recognize a machine over an extended period of time, determine when it is updated, and identify which portions of the FreeBSD ports tree, if any, are being ignored using "REFUSE" directives in portsnap.conf. In addition, the FreeBSD release level is transmitted to the server.

Statistical data generated from information collected in this manner may be published, but only in aggregate and after anonymizing the individual systems.

Portsnap usage



Portsnap usage on FreeBSD 6.2



Questions?