

Time to Glean

MAC for Linux, history and the future

July 25, 2008

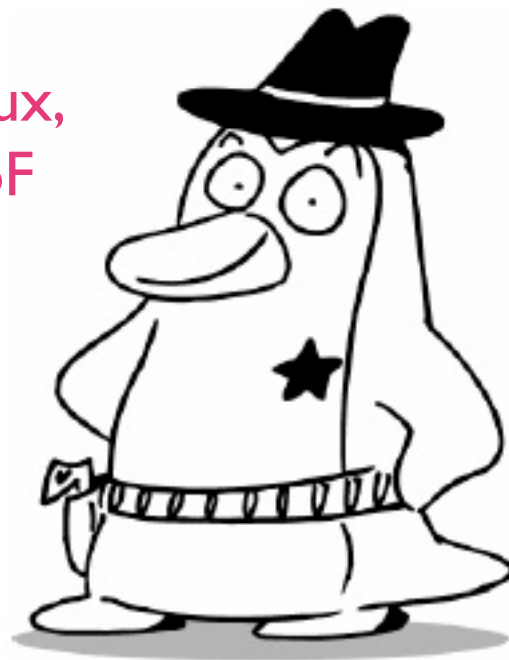
Toshiharu Harada
<haradats@nttdata.co.jp>
Kentaro Takeda
Tetsuo Handa

NTT DATA CORPORATION

Welcome

to my BoF of “MAC for Linux: Time to Glean”

I am project manager of TOMOYO Linux,
but this is **not** a TOMOYO Linux BoF



This BoF

- looks in the history of Linux MAC: (Mandatory Access Control)
 - *As Smack had been added as 2nd in-tree module, it might be a good time to stop by and look what have passed*
 - *I tried to find information from the LSM ml archive during the period December 2003 to June 2008*

Please Don't ...

- Ask me if this is worth spending time (I've already spent my time ...)
- Get mad on me if the result is not what you want (we can't tell what we find until we dig)

Where to look at?

- ML archive has the information
- Whole LKML seems to be too much ...
- LSM mailing list archive should be a modest place for resort

How to glean?

- Downloaded LSM message archive from gmane.org during the period of December 3, 2003 through June 30, 2008
- Plenty of nice tools are available
 - ruby, perl, sort, uniq ... (joy of computing)
- Used *Excel* and *Numbers* occasionally for saving time purpose

Welcome aboard!

Let's start digging

Is this free?



*Of course,
it's open source!*

Can You Guess?

Can You Guess?

1. How many messages has been posted during December 3, 2003 - June 30, 2008?

Can You Guess?

1. How many messages has been posted during December 3, 2003 - June 30, 2008?
2. How many threads were there?

Can You Guess?

1. How many messages has been posted during December 3, 2003 - June 30, 2008?
2. How many threads were there?
3. How big is the downloaded mbox file?

Answer

6545 messages

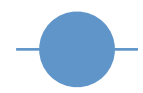
978 threads

55MB

(Dec. 2003 - Jun. 2008)

LSM traffic

(Dec. 2003 - Jun. 2008)

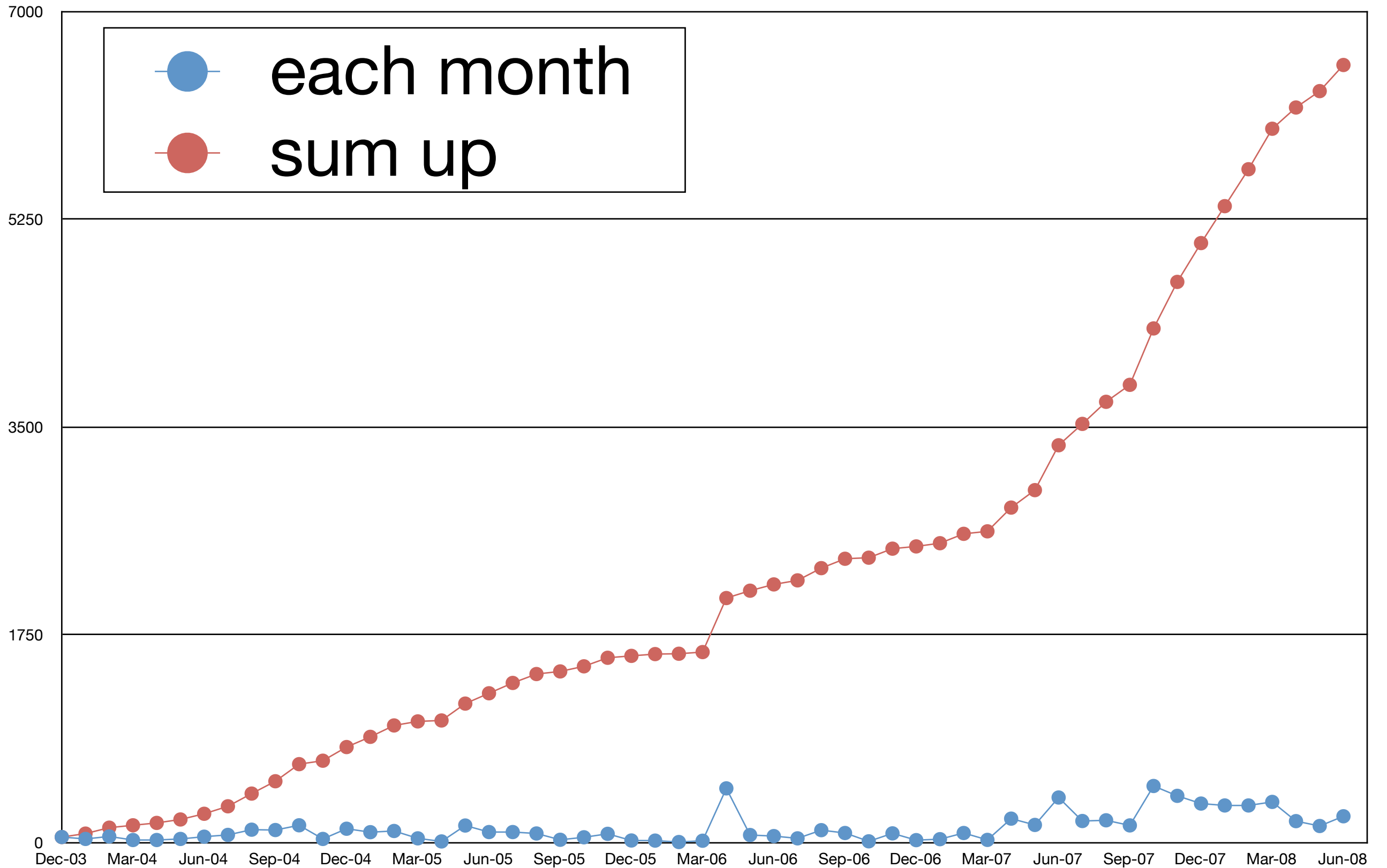


each month

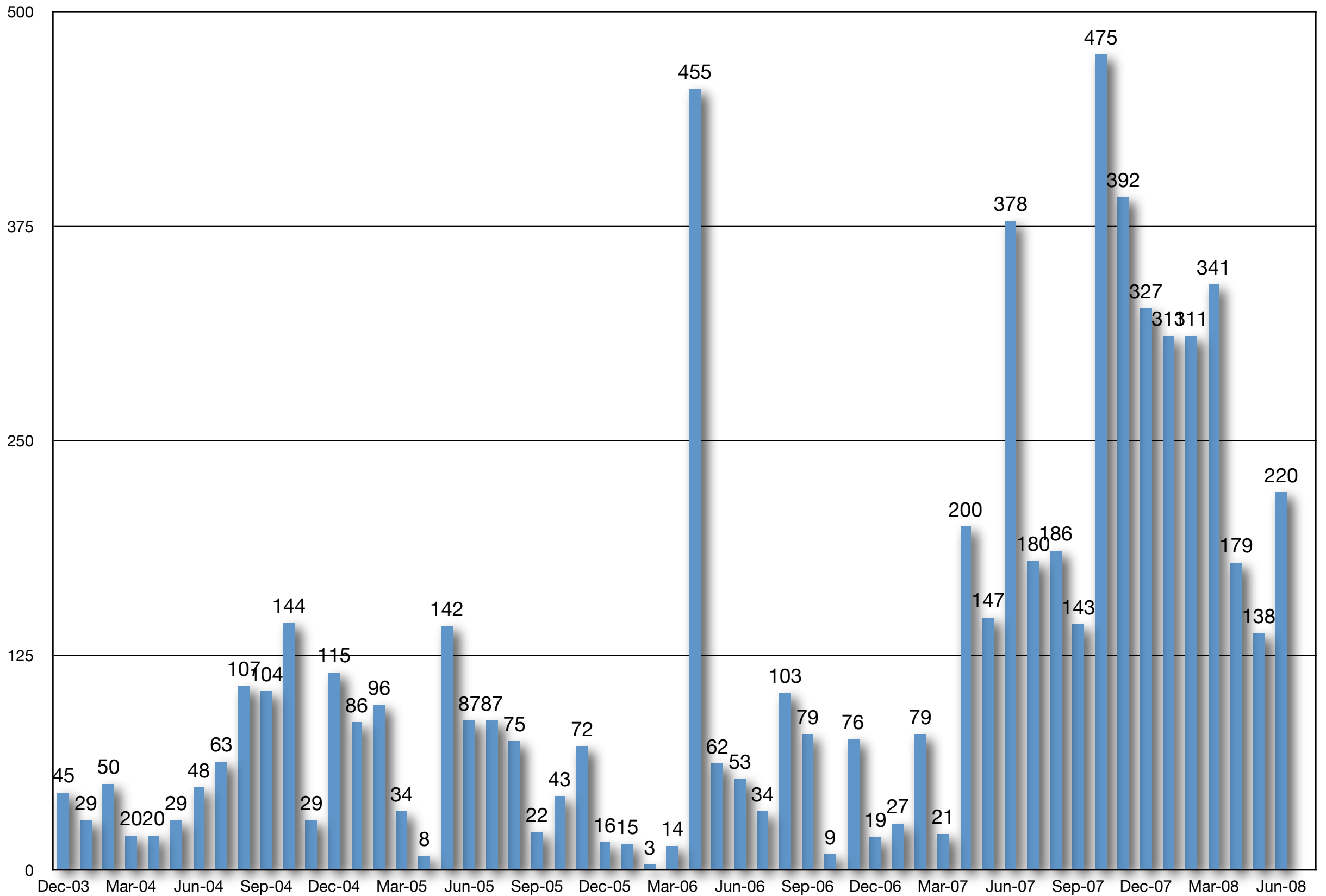


sum up

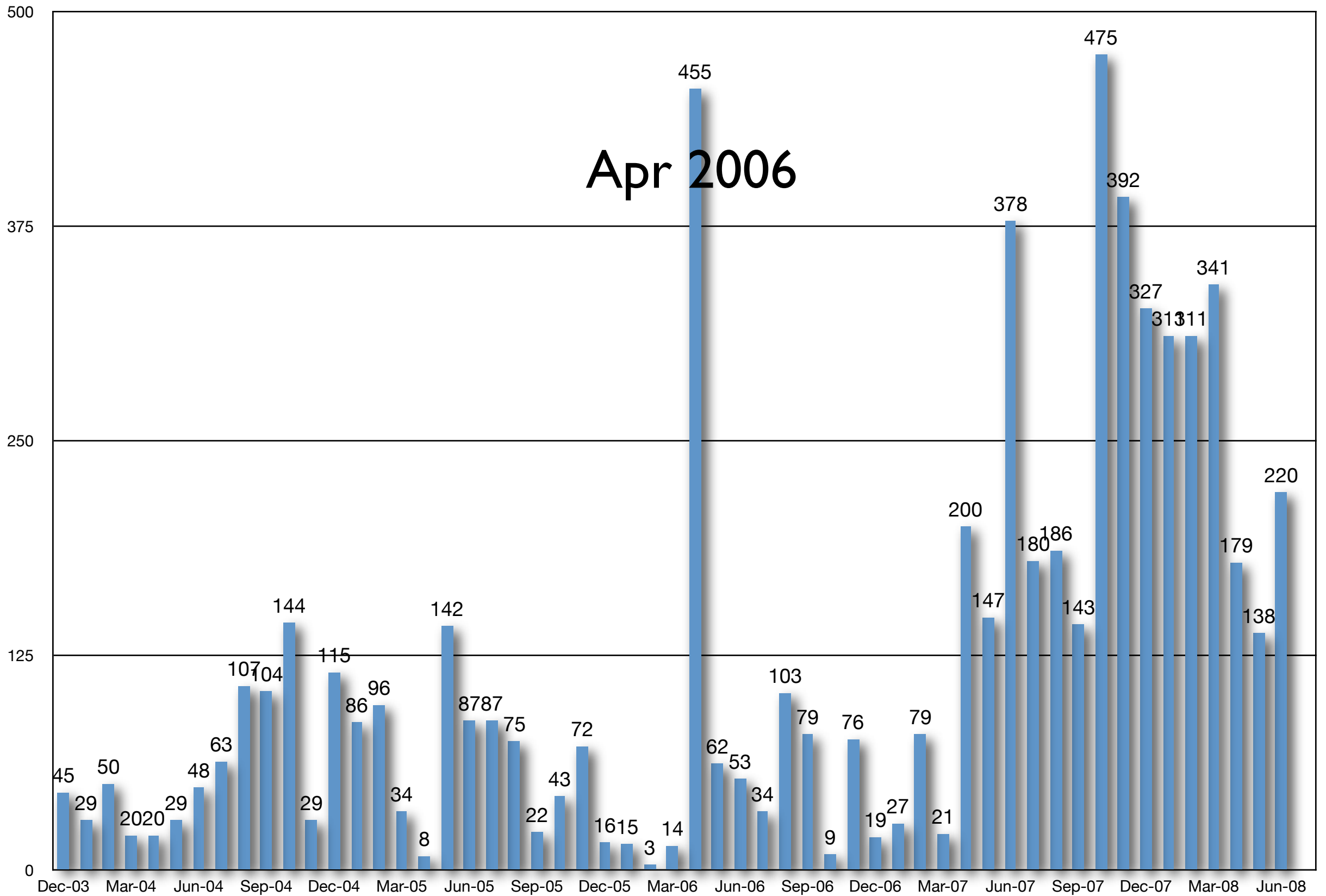
LSM activities at a glance



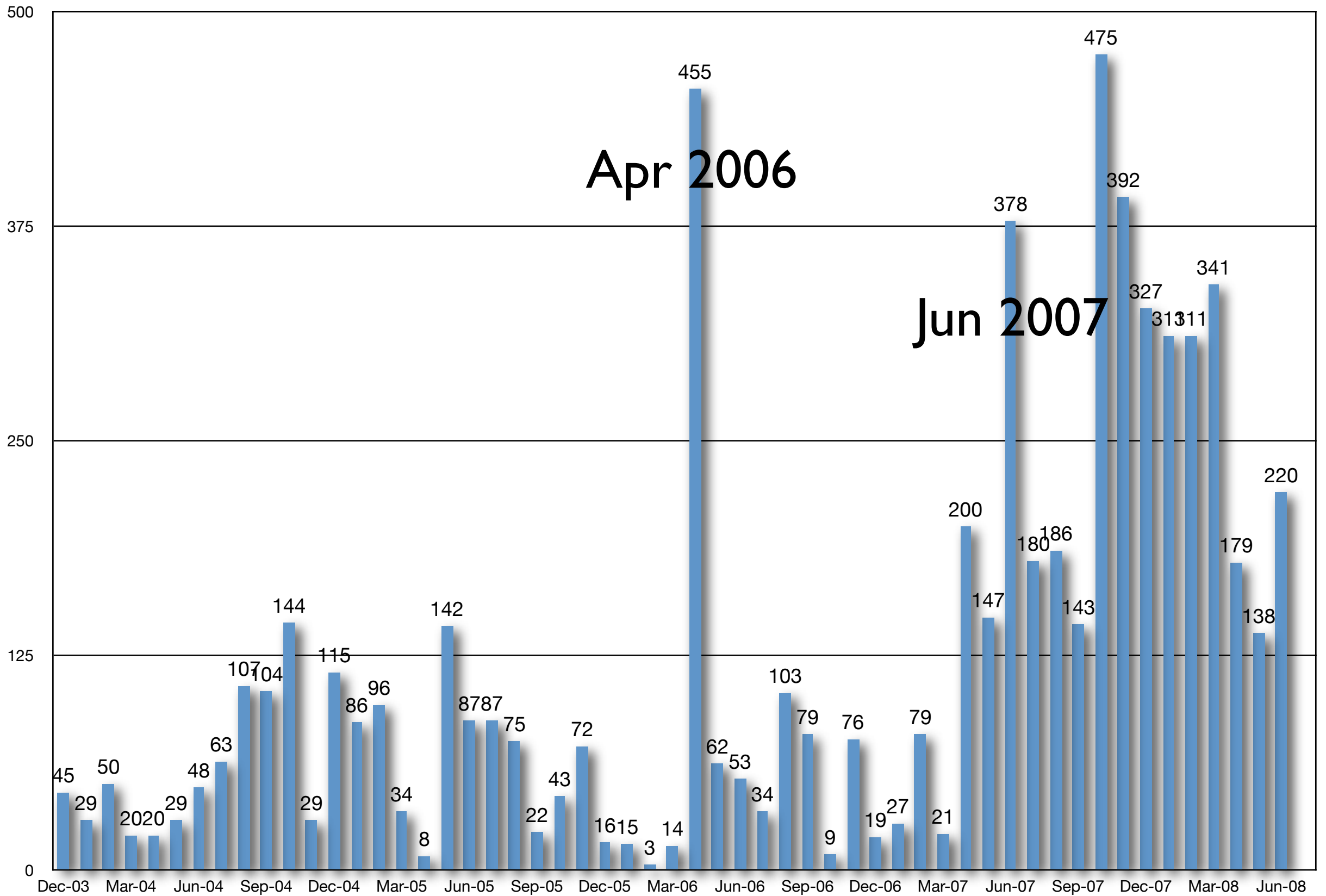
Monthly detail



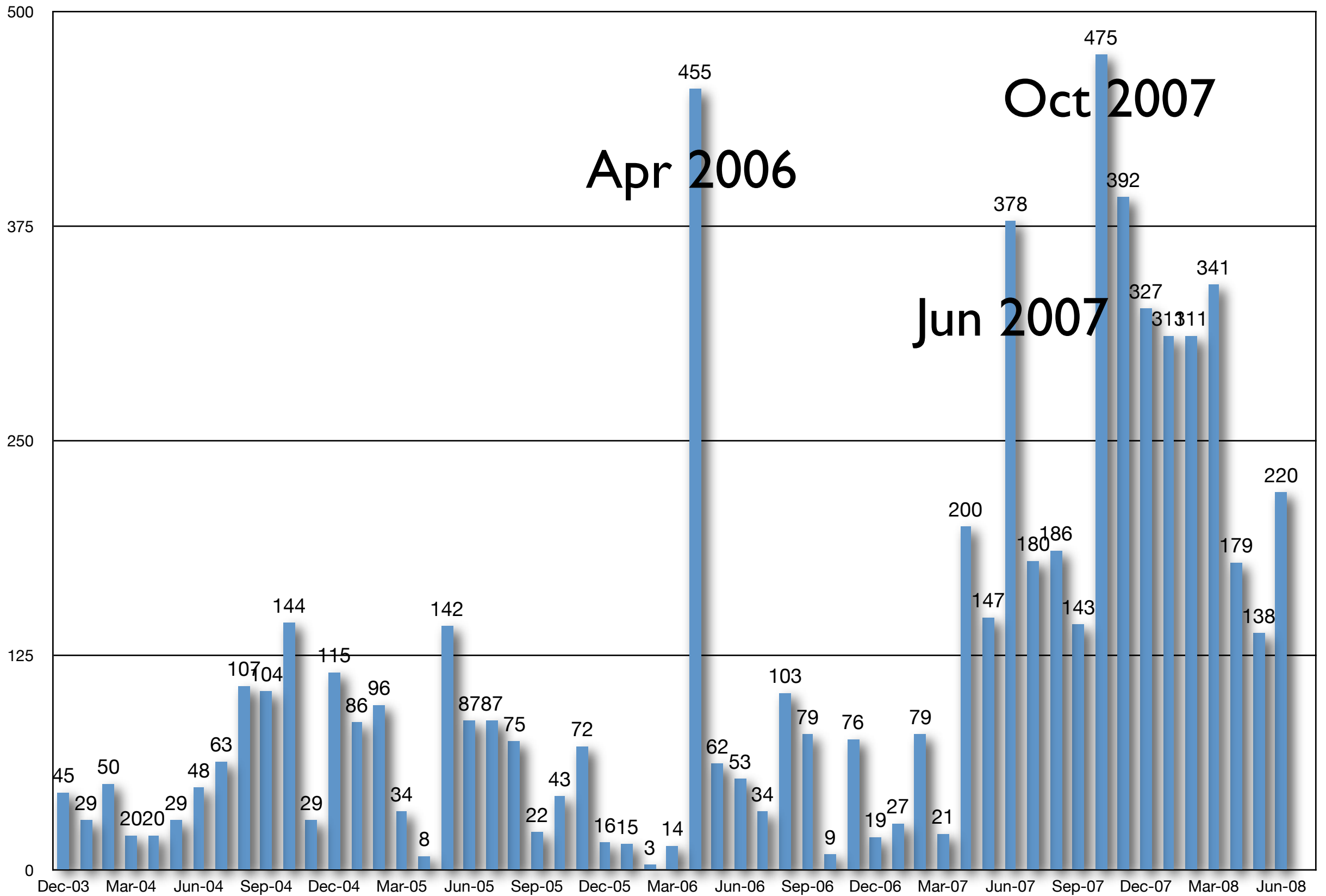
Monthly detail



Monthly detail



Monthly detail



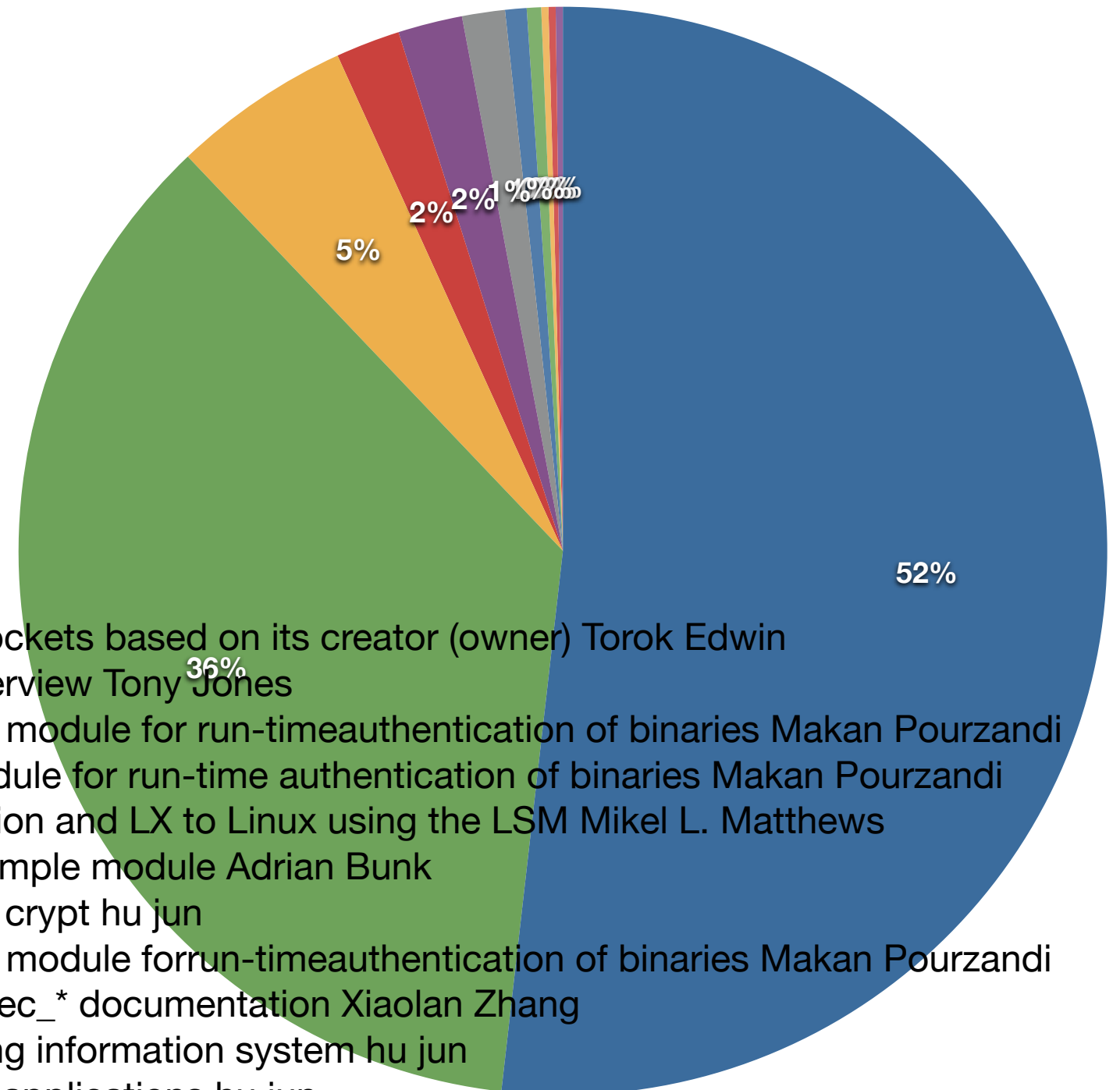
3 Peaks

- Peaks should have reasons
- Let's take a look at each peaks

(I) April 2006

- [RFC][PATCH 0/7] firefliee LSM for labeling sockets based on its creator (owner) Torok Edwin
- [RFC][PATCH 0/11] security: AppArmor - Overview Tony Jones
- RE: [ANNOUNCE] Release Digsig 1.5: kernel module for run-time authentication of binaries Makan Pourzandi
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- [ANNOUNCE] ISSI is porting PitBull Foundation and LX to Linux using the LSM Mikel L. Matthews
- [2.6 patch] remove the Root Plug Support sample module Adrian Bunk
- using lsm hook to implement transparent file crypt hu jun
- RE: [ANNOUNCE] Release Digsig 1.5: kernel module for run-time authentication of binaries Makan Pourzandi
- Re: [PATCH] fix up security_socket_getpeersec_* documentation Xiaolan Zhang
- about security and trust of linux in engineering information system hu jun
- A transparent secure architecture for special applications hu jun

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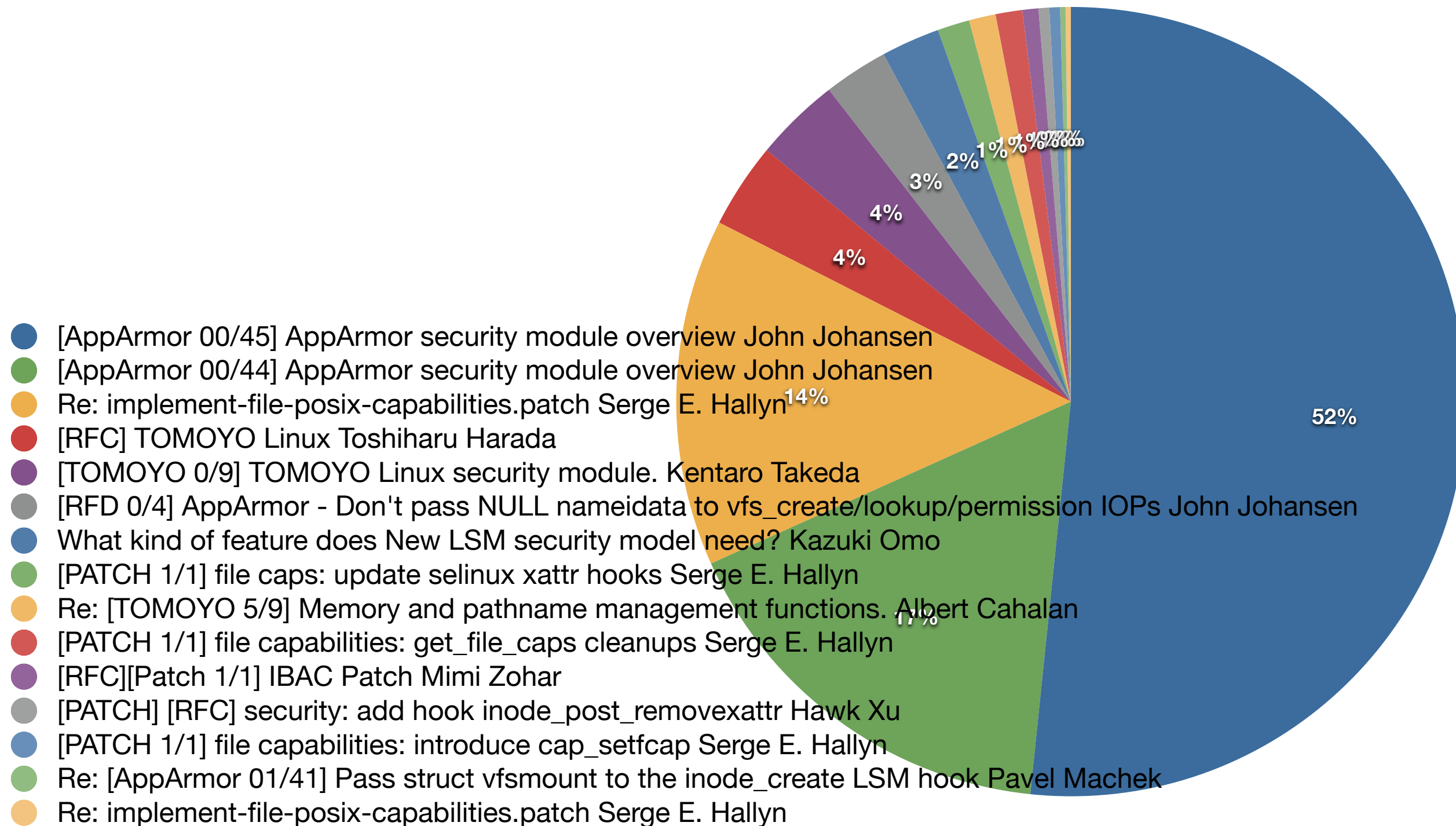


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(2) June 2007

- [AppArmor 00/45] AppArmor security module overview John Johansen
- [AppArmor 00/44] AppArmor security module overview John Johansen
- Re: implement-file-posix-capabilities.patch Serge E. Hallyn
- [RFC] TOMOYO Linux Toshiharu Harada
- [TOMOYO 0/9] TOMOYO Linux security module. Kentaro Takeda
- [RFD 0/4] AppArmor - Don't pass NULL nameidata to vfs_create/lookup/permission IOPs John Johansen
- What kind of feature does New LSM security model need? Kazuki Omo
- [PATCH 1/1] file caps: update selinux xattr hooks Serge E. Hallyn
- Re: [TOMOYO 5/9] Memory and pathname management functions. Albert Cahalan
- [PATCH 1/1] file capabilities: get_file_caps cleanups Serge E. Hallyn
- [RFC][Patch 1/1] IBAC Patch Mimi Zohar
- [PATCH] [RFC] security: add hook inode_post_removexattr Hawk Xu
- [PATCH 1/1] file capabilities: introduce cap_setfcap Serge E. Hallyn
- Re: [AppArmor 01/41] Pass struct vfsmount to the inode_create LSM hook Pavel Machek
- Re: implement-file-posix-capabilities.patch Serge E. Hallyn

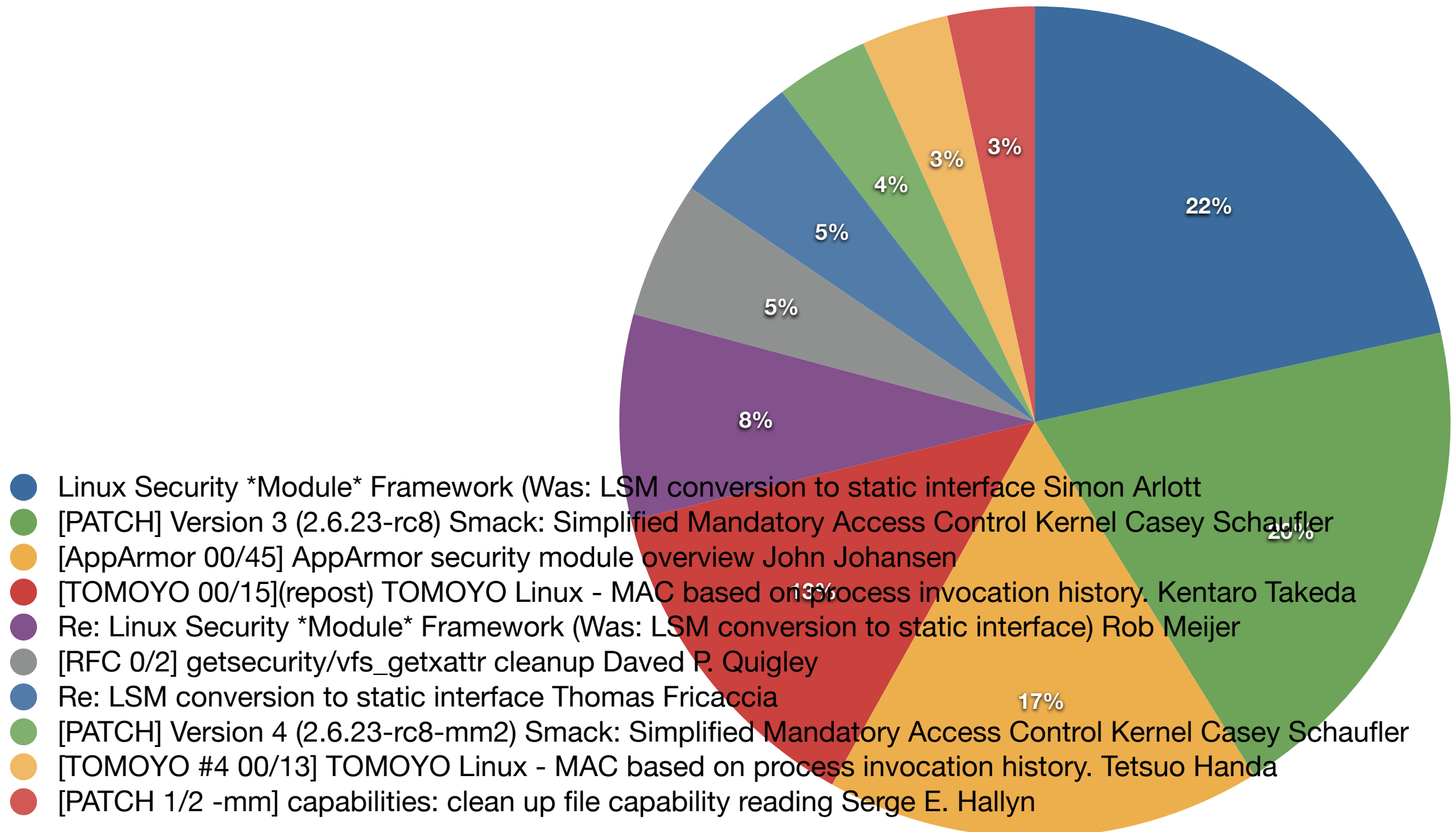
(2) June 2007



(3) October 2007

- Linux Security *Module* Framework (Was: LSM conversion to static interface Simon Arlott)
- [PATCH] Version 3 (2.6.23-rc8) Smack: Simplified Mandatory Access Control Kernel Casey Schaufler
- [AppArmor 00/45] AppArmor security module overview John Johansen
- [TOMOYO 00/15](repost) TOMOYO Linux - MAC based on process invocation history. Kentaro Takeda
- Re: Linux Security *Module* Framework (Was: LSM conversion to static interface) Rob Meijer
- [RFC 0/2] getsecurity/vfs_getxattr cleanup Daved P. Quigley
- Re: LSM conversion to static interface Thomas Fricaccia
- [PATCH] Version 4 (2.6.23-rc8-mm2) Smack: Simplified Mandatory Access Control Kernel Casey Schaufler
- [TOMOYO #4 00/13] TOMOYO Linux - MAC based on process invocation history. Tetsuo Handa
- [PATCH 1/2 -mm] capabilities: clean up file capability reading Serge E. Hallyn

(3) October 2007



People

“It is people that writes and reads messages”



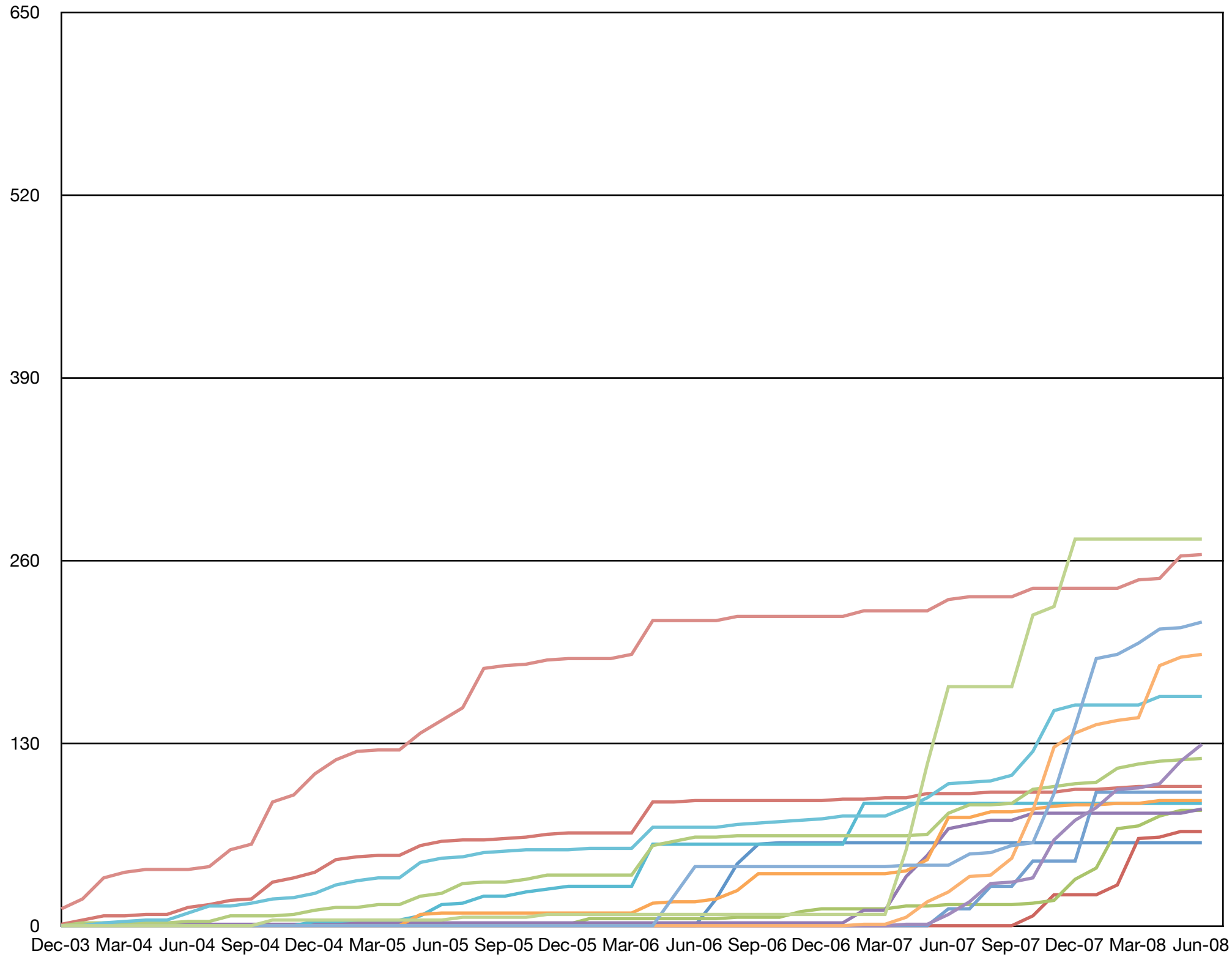
People

“It is people that writes and reads messages”

It is also people that fight and argue (and reject)

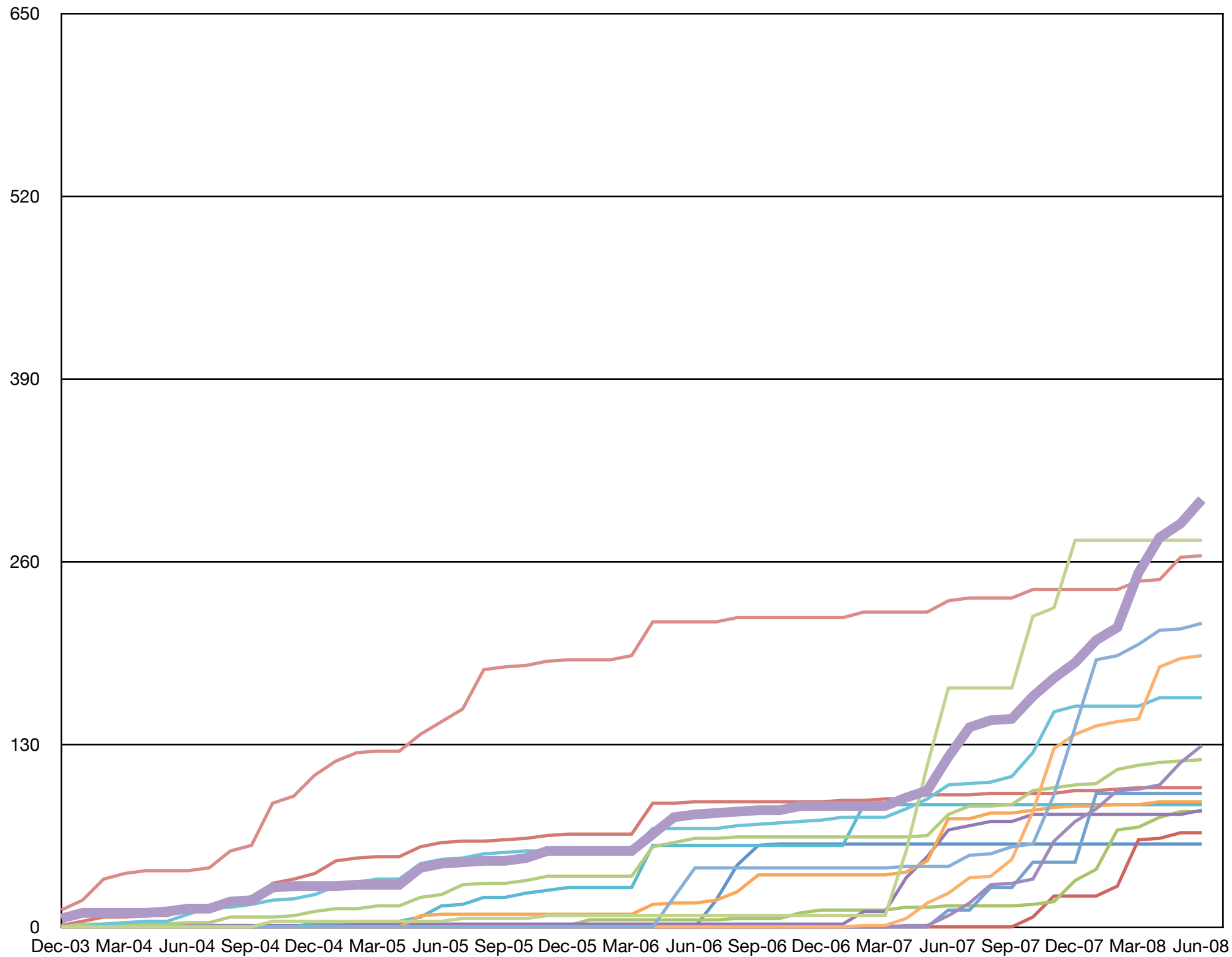


LSM top 20 contributors



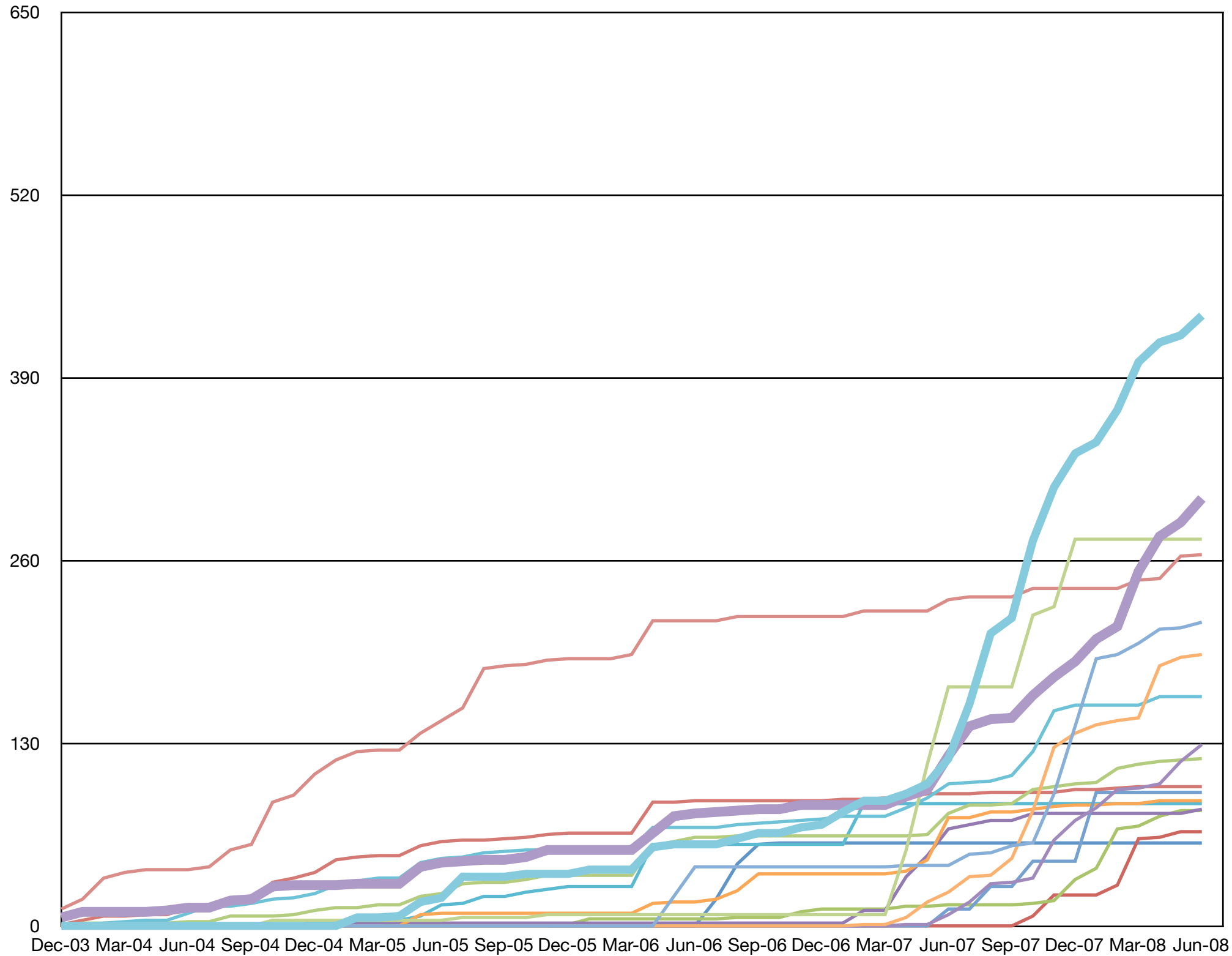
- James Morris
- John Johansen
- Chris Wright
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- Andrew G. Morgan
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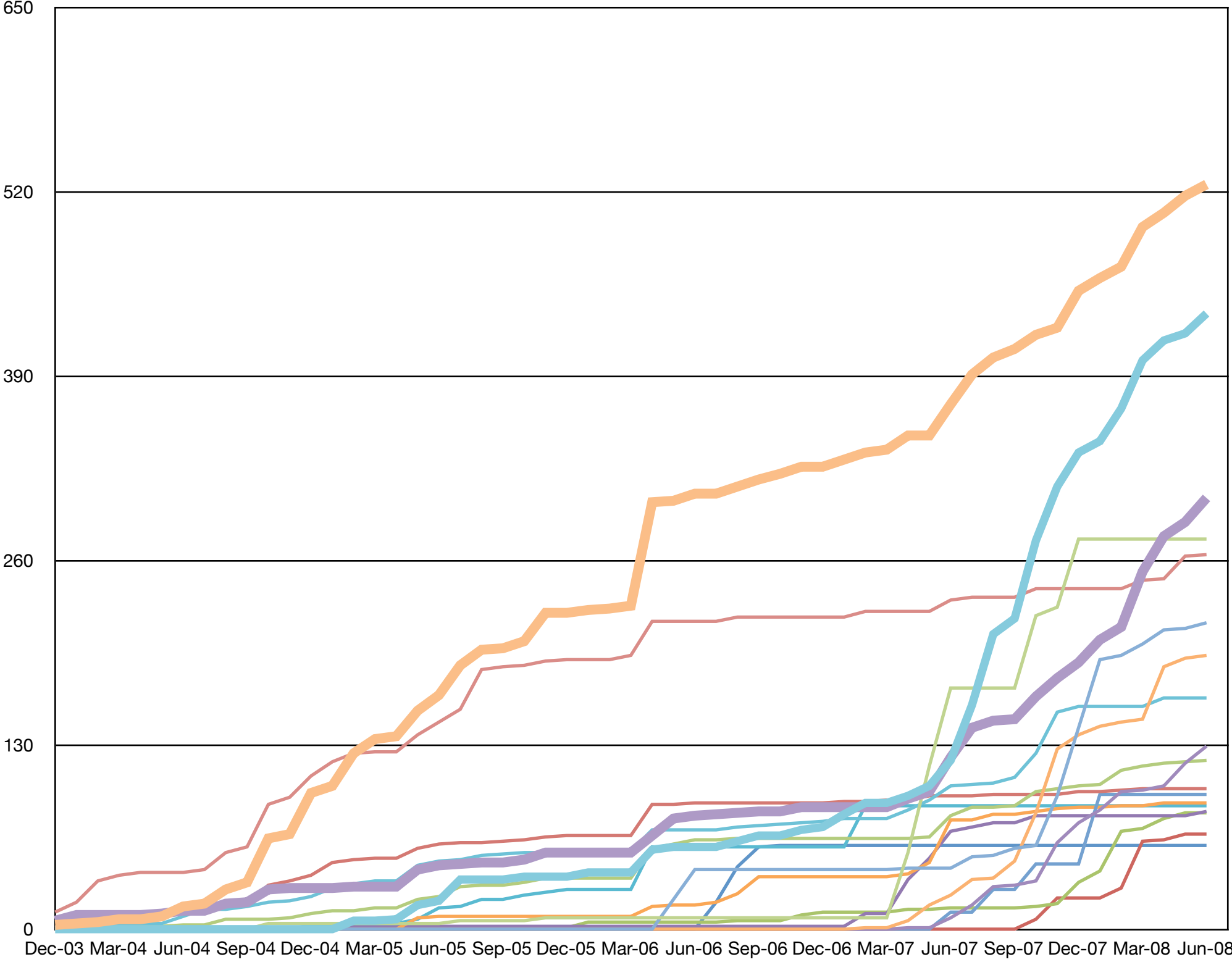
Andreas Gruenbacher

KaiGai Kohei

Ahmed S. Darwish

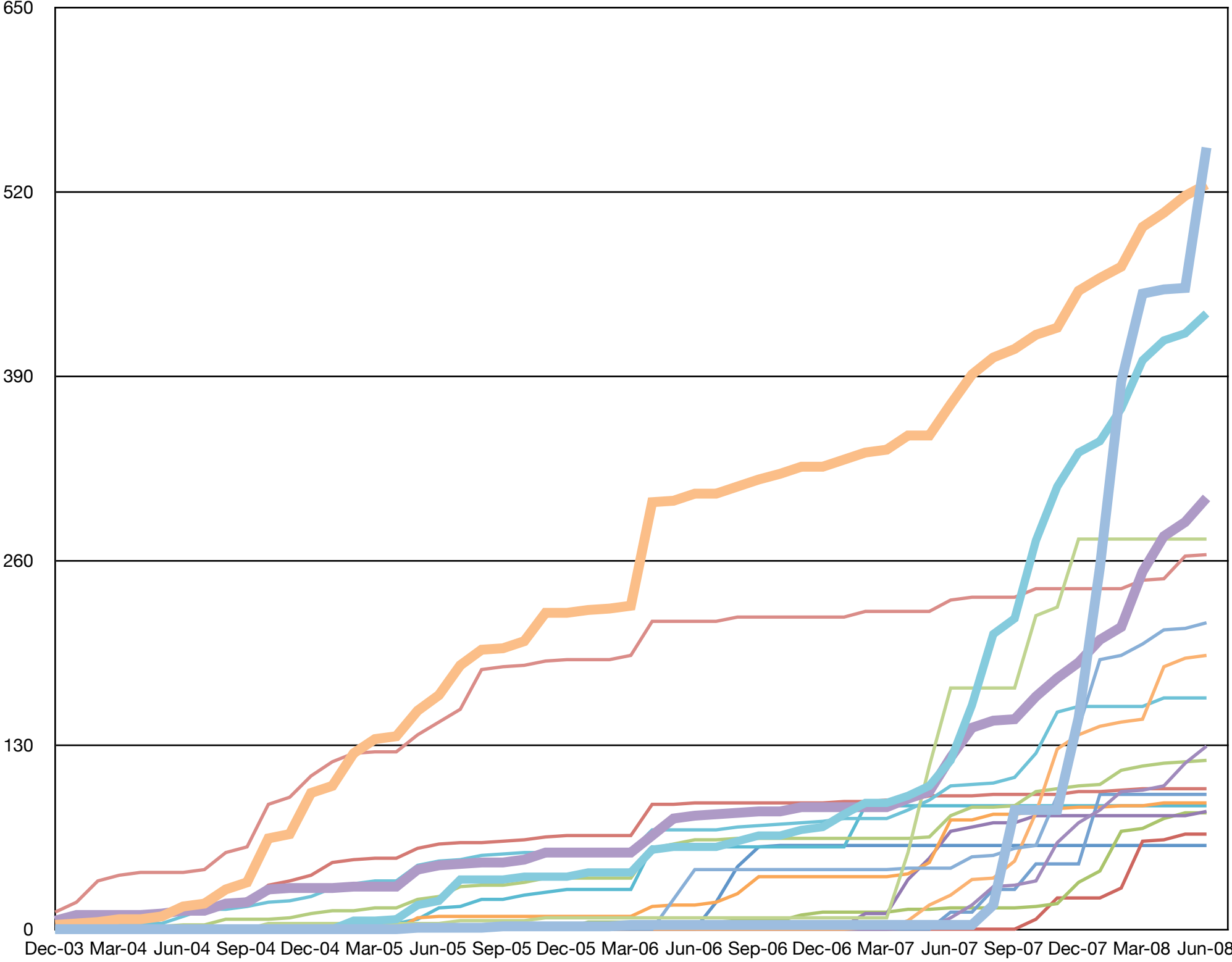
Kylene Jo Hall

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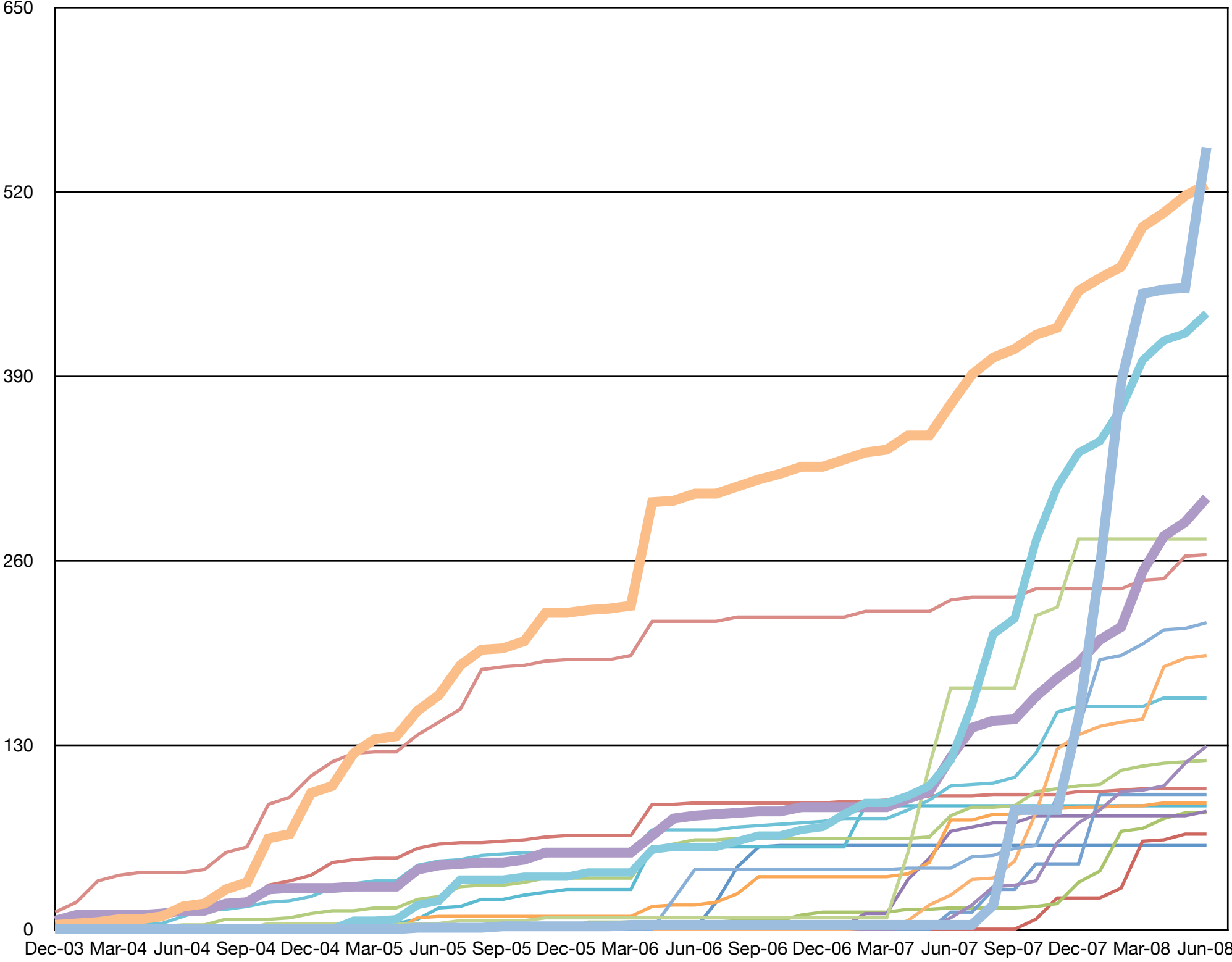
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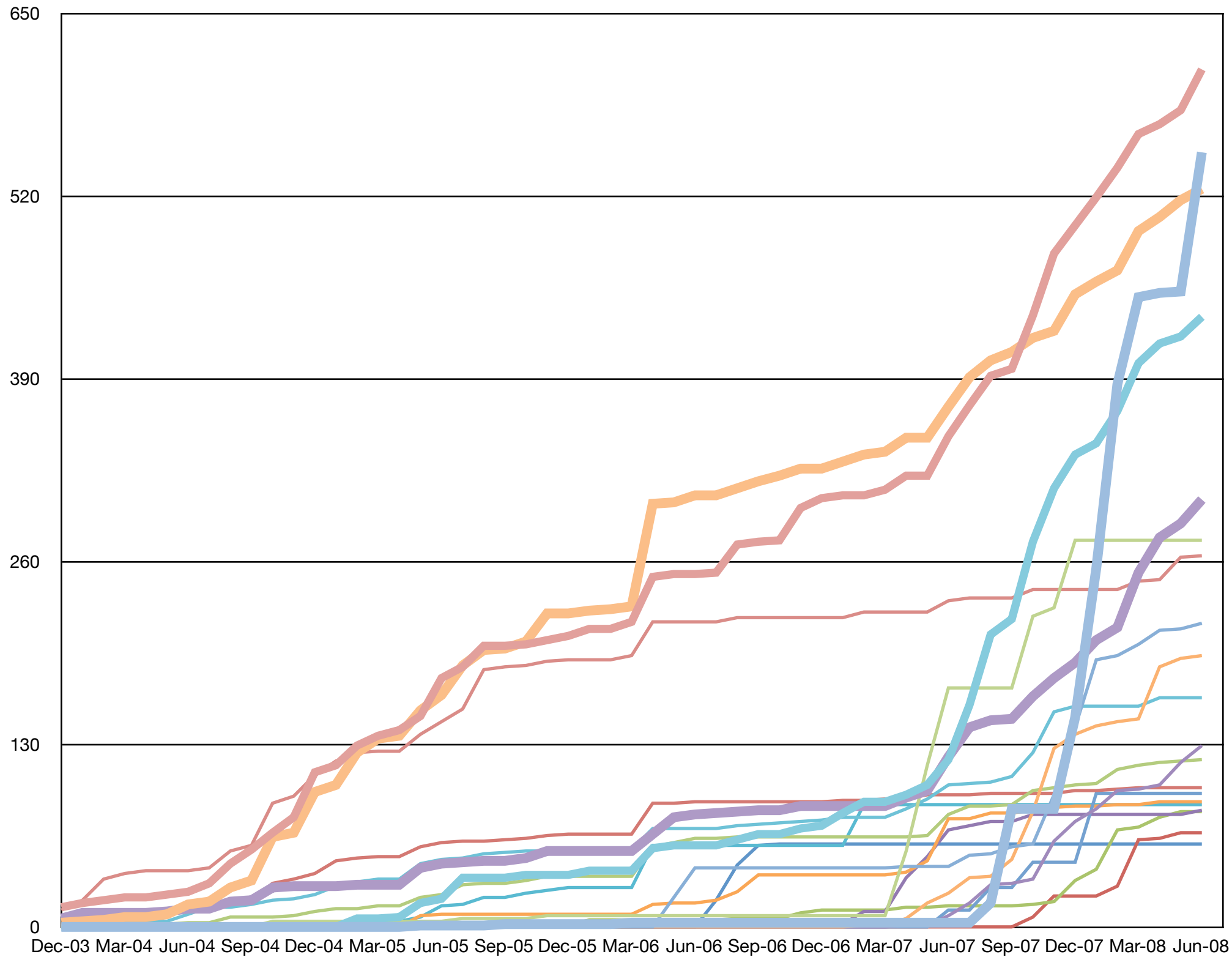
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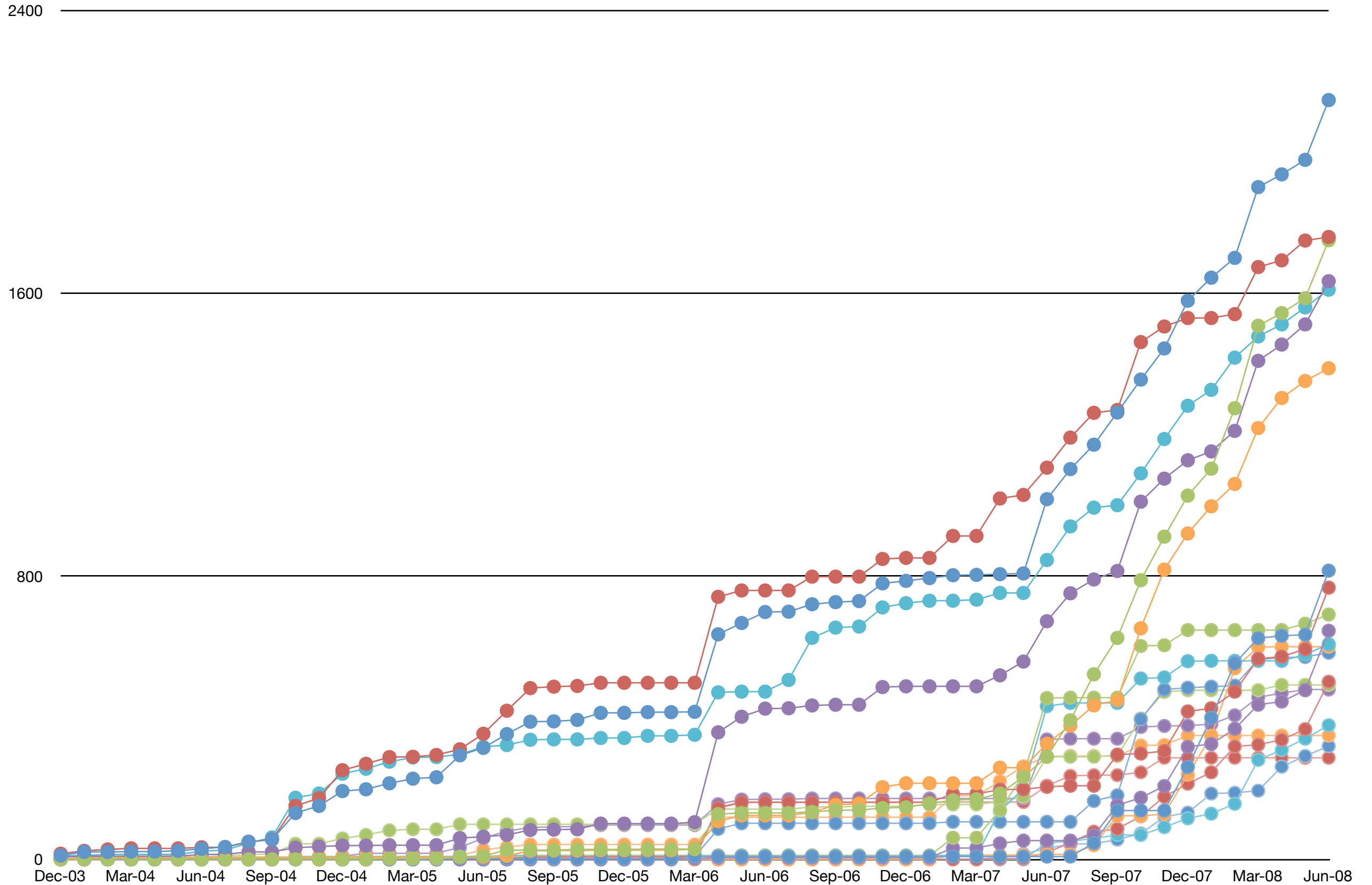
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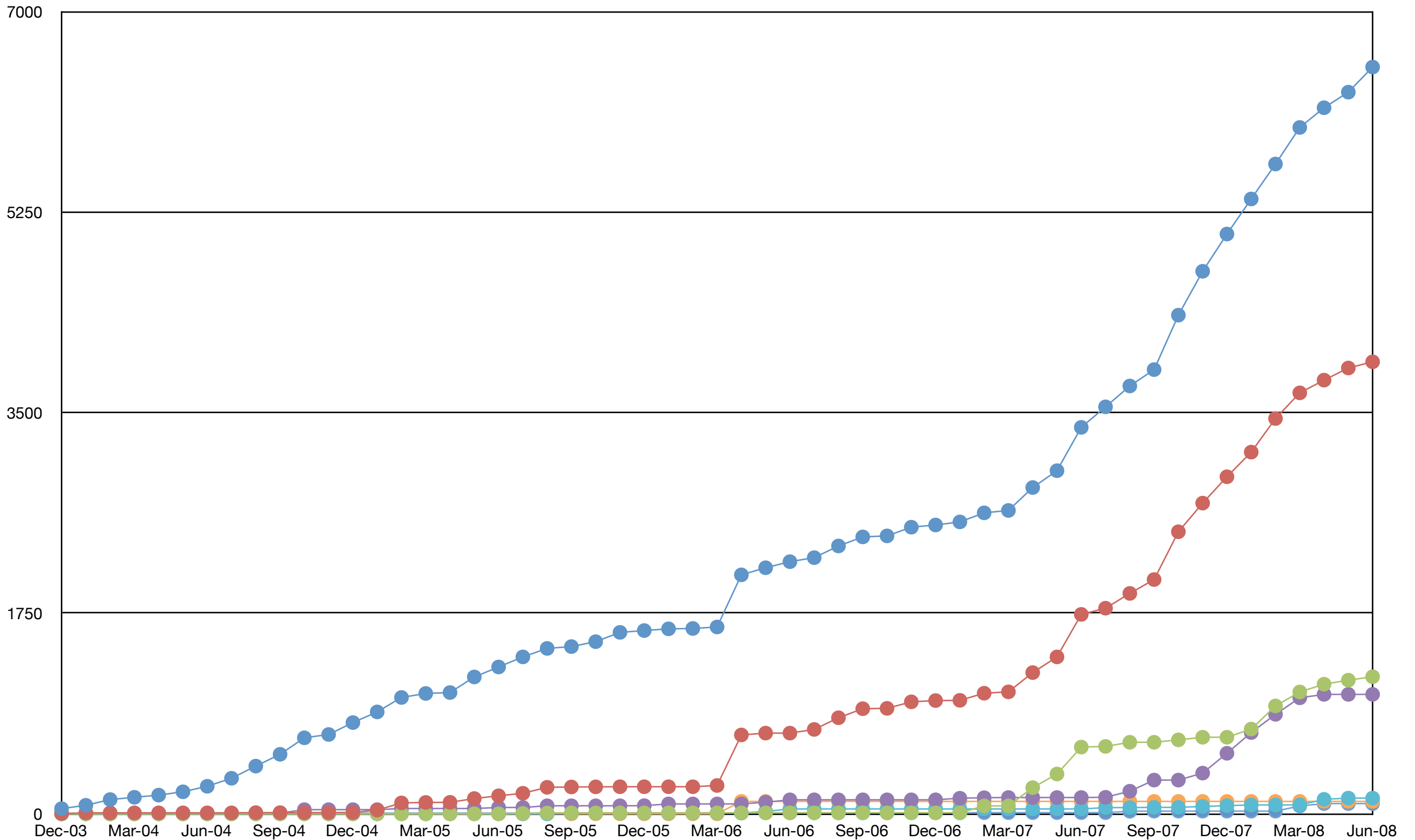


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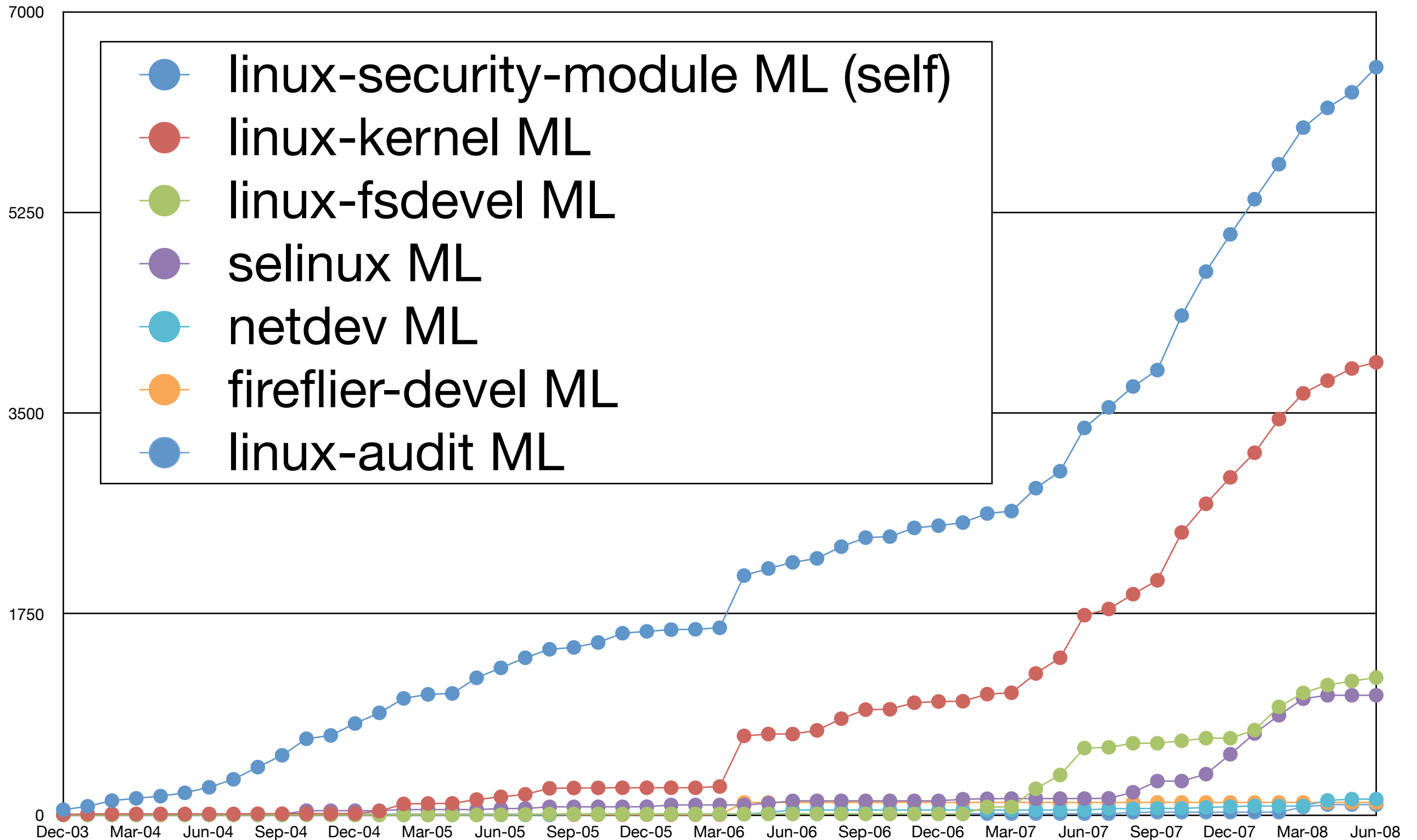
Men of wisdom (“cc”ed ranking)



Which ML cc-ed most



Which ML cc-ed most



Threads

(not threats)



What is thread?

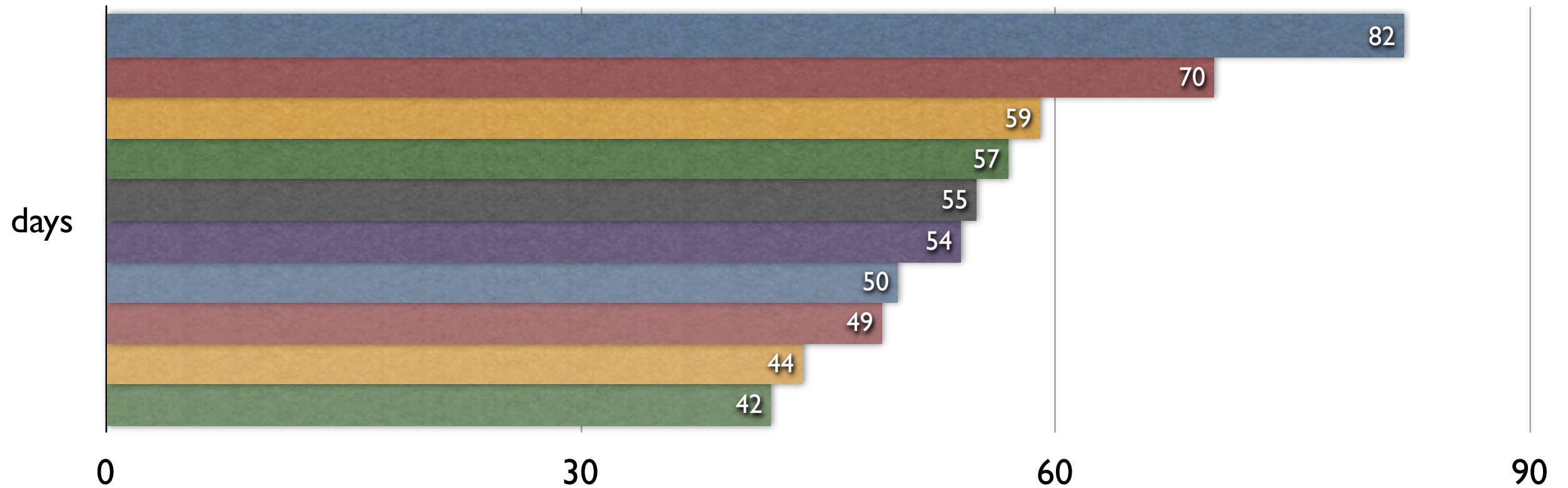
What is thread?

The image displays a vertical stack of seven screenshots, each showing a list of threads. Each thread entry typically includes a title, a user name, and a timestamp. The threads are listed in a scrollable format, demonstrating how multiple threads can exist and be viewed simultaneously. The threads are organized into a list, with each entry representing a separate thread of discussion or data.

What should we look at for threads?

1. Life time (how many days)
2. Number of messages
3. Number of people posted their opinions to the thread

Long lived threads 10



- [PATCH 0/3] exporting capability name/code pairs (final#2)
- [PATCH] capabilities: implement per-process securebits
- [PATCH] Implement file posix capabilities
- [PATCH 2/2-v2] NFS: use new LSM interfaces to explicitly set mount options
- AppArmor FAQ
- Mediating send_sigurg
- [PATCH 00/28] Permit filesystem local caching [try #2]
- [AppArmor 00/41] AppArmor security module overview
- [AppArmor 00/45] AppArmor security module overview
- [PATCH 1/1] security: introduce fs caps

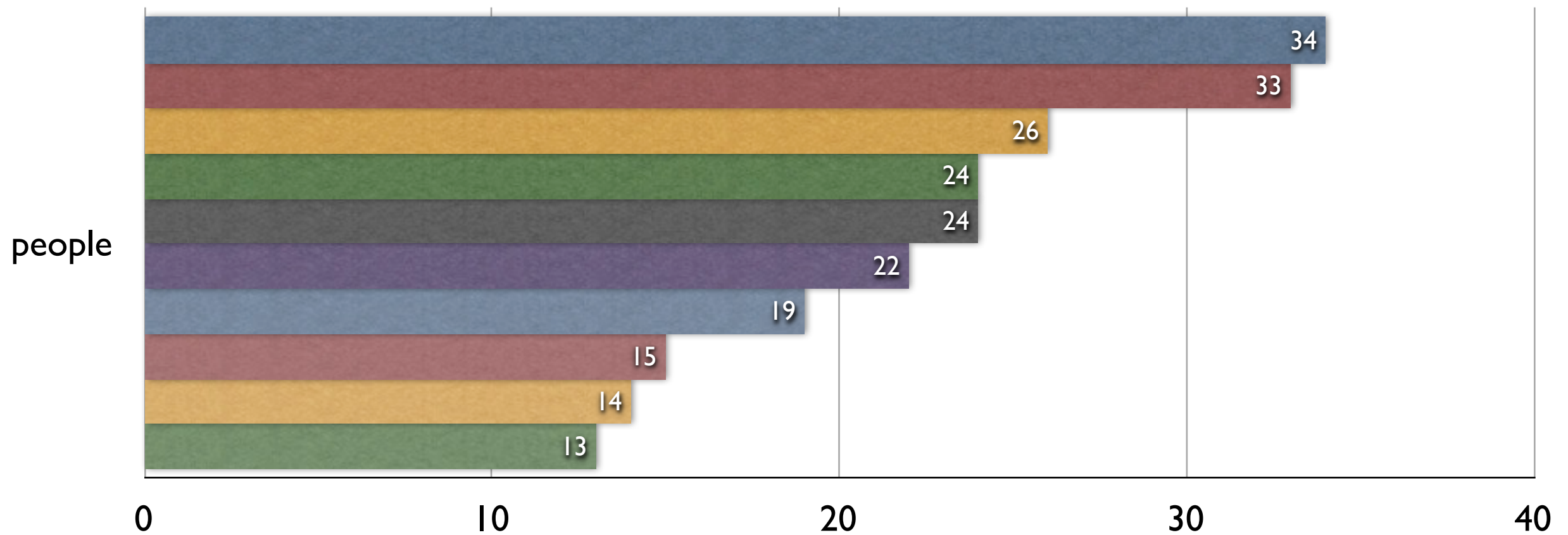
Long lived threads 20

<i>subject</i>	<i>from</i>	<i>start</i>	<i>end</i>	<i>days</i>	<i>people</i>	<i>messages</i>
<i>[PATCH 0/3] exporting capability name/code pairs (final#2)</i>	<i>KaiGai Kohei</i>	<i>2008/02/24</i>	<i>2008/05/15</i>	82	7	32
<i>[PATCH] capabilities: implement per-process securebits</i>	<i>Andrew G. Morg</i>	<i>2008/02/18</i>	<i>2008/04/27</i>	70	3	7
<i>[PATCH] Implement file posix capabilities</i>	<i>Serge E. Hallyn</i>	<i>2006/11/27</i>	<i>2007/01/24</i>	59	5	9
<i>[PATCH 2/2-v2] NFS: use new LSM interfaces to explicitly set mount op</i>	<i>Eric Paris</i>	<i>2008/03/05</i>	<i>2008/04/30</i>	57	3	6
<i>AppArmor FAQ</i>	<i>John Johansen</i>	<i>2007/04/16</i>	<i>2007/06/09</i>	55	15	48
<i>Mediating send_sigurg</i>	<i>Stephen Smalley</i>	<i>2004/08/27</i>	<i>2004/10/19</i>	54	2	12
<i>[PATCH 00/28] Permit filesystem local caching [try #2]</i>	<i>David Howells</i>	<i>2007/12/05</i>	<i>2008/01/23</i>	50	8	126
<i>[AppArmor 00/41] AppArmor security module overview</i>	<i>John Johansen</i>	<i>2007/04/12</i>	<i>2007/05/30</i>	49	24	176
<i>[AppArmor 00/45] AppArmor security module overview</i>	<i>John Johansen</i>	<i>2007/05/14</i>	<i>2007/06/26</i>	44	22	236
<i>[PATCH 1/1] security: introduce fs caps</i>	<i>Serge E. Hallyn</i>	<i>2006/11/08</i>	<i>2006/12/19</i>	42	6	30
<i>[PATCH] Updated BSD Secure Levels Patch</i>	<i>Michael Halcrow</i>	<i>2003/12/03</i>	<i>2004/01/10</i>	39	2	2
<i>[PATCH 3/7] SLIM main patch</i>	<i>Kylene Jo Hall</i>	<i>2006/09/12</i>	<i>2006/10/20</i>	39	3	8
<i>[PATCH] 64 bit capabilities</i>	<i>Andrew G. Morga</i>	<i>2007/11/07</i>	<i>2007/12/13</i>	37	4	19
<i>[RFC] [Stacking v4 3/3] Cleaned up stacker patch</i>	<i>Serge E. Hallyn</i>	<i>2004/12/03</i>	<i>2005/01/06</i>	35	3	8
<i>Linux Security *Module* Framework (Was: LSM conversion to static interface</i>	<i>Simon Arlott</i>	<i>2007/10/24</i>	<i>2007/11/26</i>	34	26	89
<i>[PATCH] Version 3 (2.6.23-rc8) Smack: Simplified Mandatory Access Control</i>	<i>Casey Schaufler</i>	<i>2007/09/29</i>	<i>2007/10/30</i>	32	24	81
<i>Problem of attaching a security structer to sock in 2.6.4!!</i>	<i>Yuan Chunyang</i>	<i>2004/05/17</i>	<i>2004/06/14</i>	29	6	10
<i>[TOMOYO 00/15] TOMOYO Linux - MAC based on process invocation histrc</i>	<i>Kentaro Takeda</i>	<i>2007/08/24</i>	<i>2007/09/21</i>	29	8	37
<i>[PATCH] Smack: Simplified Mandatory Access Control Kernel</i>	<i>Casey Schaufler</i>	<i>2007/08/11</i>	<i>2007/09/07</i>	28	11	43

Average thread life

3.76 days

Popular threads 10



- [RFC][PATCH 0/7] fireflieR LSM for labeling sockets based on its creator (owner)
- [RFC][PATCH 0/11] security:AppArmor - Overview
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- Re: implement-file-posix-capabilities.patch
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Popular threads 20

subject	from	start	end	days	people	messages
[RFC][PATCH 0/7] fireflie LSM for labeling sockets based on its crea	Torok Edwin	2006/04/07	2006/05/03	27	34	244
[RFC][PATCH 0/11] security: AppArmor - Overview	Tony Jones	2006/04/19	2006/04/28	10	33	170
Linux Security *Module* Framework (Was: LSM conversion to static i	Simon Arlott	2007/10/24	2007/11/26	34	26	89
[AppArmor 00/41] AppArmor security module overview	John Johansen	2007/04/12	2007/05/30	49	24	176
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[AppArmor 00/45] AppArmor security module overview	John Johansen	2007/05/14	2007/06/26	44	22	236
[AppArmor 00/44] AppArmor security module overview	John Johansen	2007/06/26	2007/07/04	9	19	76
AppArmor FAQ	John Johansen	2007/04/16	2007/06/09	55	15	48
Re: implement-file-posix-capabilities.patch	Serge E. Hallyn	2007/06/21	2007/07/04	14	14	65
Re: Linux Security *Module* Framework (Was: LSM conversion to static i	Rob Meijer	2007/10/29	2007/11/06	9	13	33
[TOMOYO #7 00/30] TOMOYO Linux 1.6.0 released	Tetsuo Handa	2008/04/04	2008/04/24	21	12	74
New stacker performance results	Serge E. Hallyn	2005/05/18	2005/05/26	9	12	51
[RFC 0/28] Patches to pass vfsmount to LSM inode security hooks	Tony Jones	2007/02/05	2007/02/12	8	12	61
RE: [ANNOUNCE] Release Digsig 1.5: kernel module for run-timeauthenti	Makan Pourzandi	2006/04/24	2006/04/28	5	12	25
[PATCH] Smack: Simplified Mandatory Access Control Kernel	Casey Schaufler	2007/08/11	2007/09/07	28	11	43
[TOMOYO 00/15](repost) TOMOYO Linux - MAC based on process invoc	Kentaro Takeda	2007/10/02	2007/10/15	14	11	54
[PATCH try #3] security: Convert LSM into a static interface	James Morris	2007/07/14	2007/07/24	11	11	27
[patch 00/15] security: pass path instead of inode to security ops	Miklos Szeredi	2008/05/29	2008/06/14	17	10	51
[RFC]Introduce generalized hooks for getting and setting inode secctx	David P. Quigley	2008/03/05	2008/03/10	6	10	39
[AppArmor 00/45] AppArmor security module overview	John Johansen	2007/10/25	2007/10/28	4	10	70

How crowded is the room?



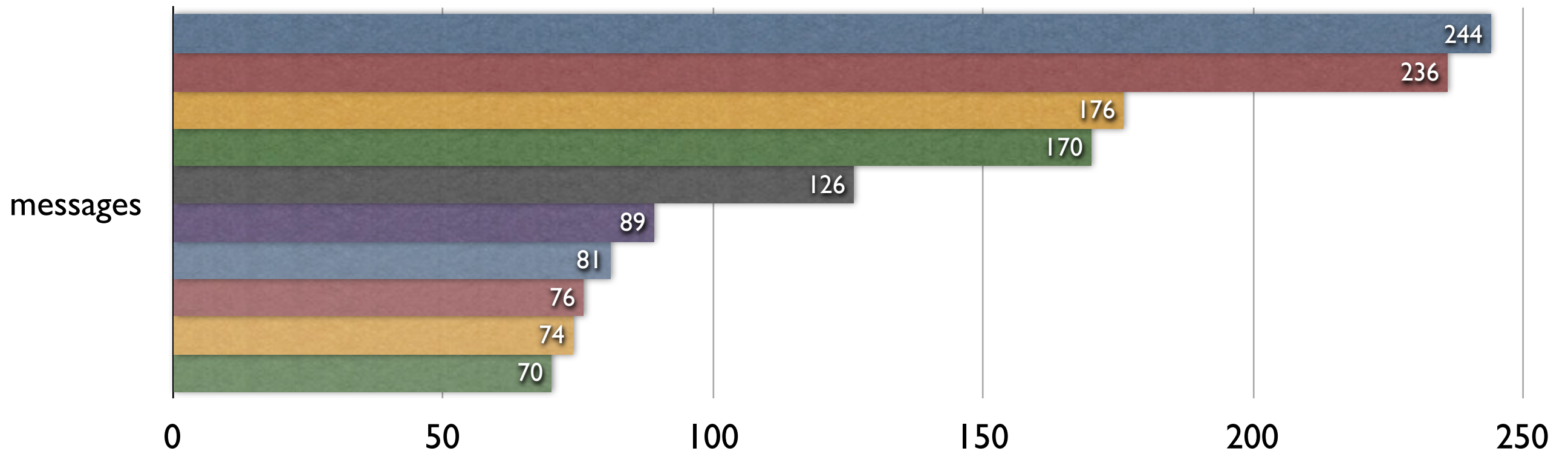
Crowded threads

how many people joined
the party?

2.45

- per thread on the average

Active threads 10



- [RFC][PATCH 0/7] firefliee LSM for labeling sockets based on its creator (owner)
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- [AppArmor 00/44] AppArmor security module overview
- [TOMOYO #7 00/30] TOMOYO Linux 1.6.0 released
- [AppArmor 00/45] AppArmor security module overview

Active threads 20

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[PATCH 00/37] Permit filesystem local caching	David Howells	2008/02/20	2008/02/26	7	8	68
Re: implement-file-posix-capabilities.patch	Serge E. Hallyn	2007/06/21	2007/07/04	14	14	65
[RFC 0/28] Patches to pass vfsmount to LSM inode security hooks	Tony Jones	2007/02/05	2007/02/12	8	12	61
[RFC] [PATCH] Replace security fields with hashtable	Serge E. Hallyn	2004/10/26	2004/11/01	7	8	61
[TOMOYO 00/15](repost) TOMOYO Linux - MAC based on process i	Kentaro Takeda	2007/10/02	2007/10/15	14	11	54
[RFC][PATCH] Simplified mandatory access control kernel implement	Casey Schaufler	2007/07/14	2007/08/06	24	7	53
New stacker performance results	Serge E. Hallyn	2005/05/18	2005/05/26	9	12	51
[patch 00/15] security: pass path instead of inode to security ops	Miklos Szeredi	2008/05/29	2008/06/14	17	10	51
[PATCH] Version 10 (2.6.24-rc1) Smack: Simplified Mandatory Acces	Casey Schaufler	2007/11/02	2007/11/11	10	9	50
AppArmor FAQ	John Johansen	2007/04/16	2007/06/09	55	15	48

how many “no-children”
threads?

470 (48%)

this includes SPAM messages

Time to determine “important” threads

- “How?” is the question
- My version of *completely fair* formula :-)
 - Give points to threads ranked 1-20 according to the rank (1st thread gets 20, 20th one gets 1)
 - Apply for 3 aspects (days/people/messages), so the perfect thread get 60 points

Example

days	people	messages
8th	4th	3rd

rank-days	rank-people	rank-messages
$21 - 8 = 13$	$21 - 4 = 17$	$21 - 3 = 18$

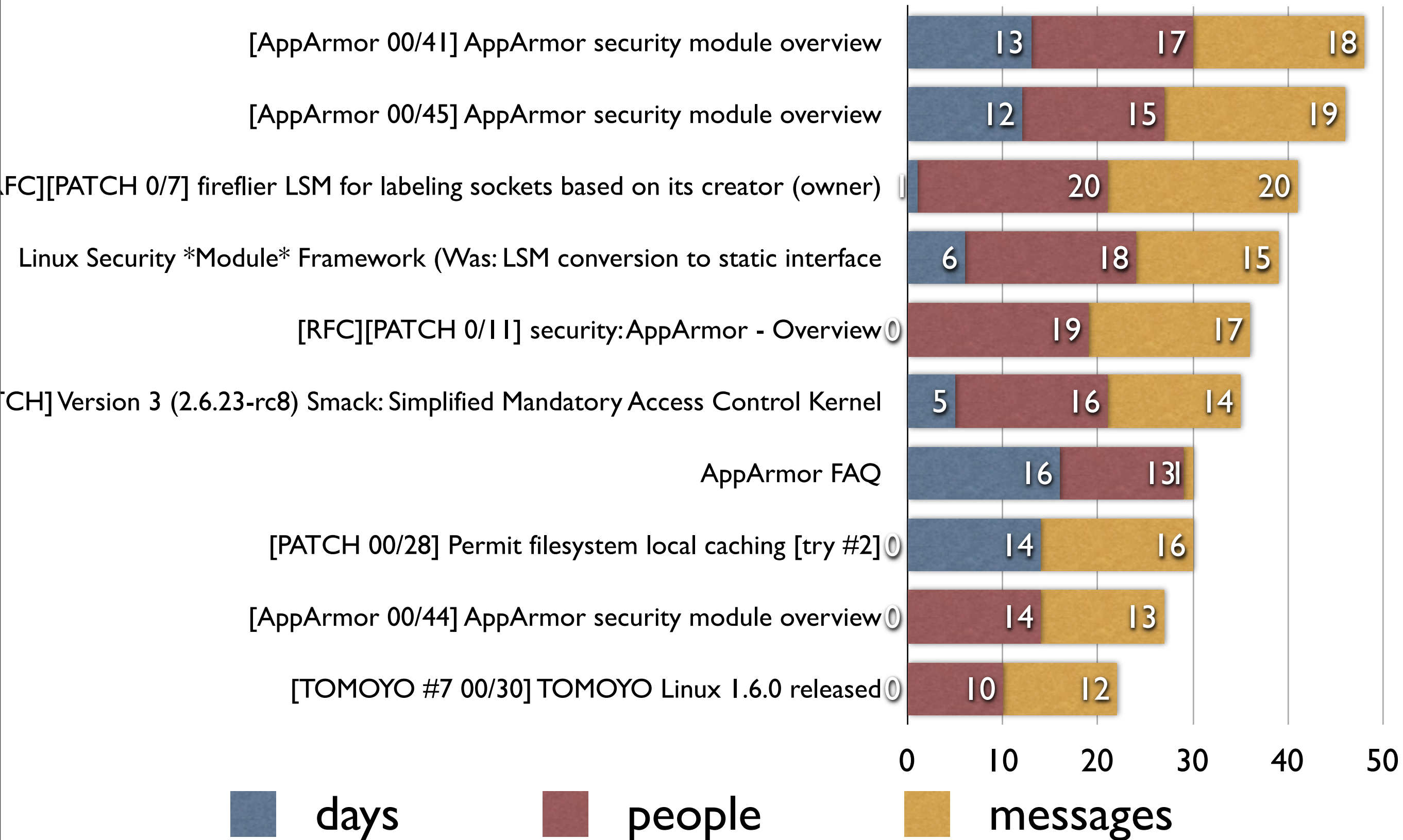
total point is $13 + 17 + 18 = 48$

Results

- LSM ml top 10 important threads are ...



LSM important threads 10



LSM important threads 20

subject	from	days	people	messages	rank-days	rank-people	rank-messages	point
[AppArmor 00/41] AppArmor security module overview	John Johansen	49	24	176	13	17	18	48
[AppArmor 00/45] AppArmor security module overview	John Johansen	44	22	236	12	15	19	46
[RFC][PATCH 0/7] firefliee LSM for labeling sockets based on	Torok Edwin	27	34	244	1	20	20	41
Linux Security *Module* Framework (Was: LSM conversion to	Simon Arlott	34	26	89	6	18	15	39
[RFC][PATCH 0/11] security: AppArmor - Overview	Tony Jones	10	33	170		19	17	36
[PATCH] Version 3 (2.6.23-rc8) Smack: Simplified Mandatory	Casey Schaufler	32	24	81	5	16	14	35
AppArmor FAQ	John Johansen	55	15	48	16	13	1	30
[PATCH 00/28] Permit filesystem local caching [try #2]	David Howells	50	8	126	14		16	30
[AppArmor 00/44] AppArmor security module overview	John Johansen	9	19	76		14	13	27
[TOMOYO #7 00/30] TOMOYO Linux 1.6.0 released	Tetsuo Handa	21	12	74		10	12	22
Re: implement-file-posix-capabilities.patch	Serge E. Hallyn	14	14	65		12	9	21
[PATCH 0/3] exporting capability name/code pairs (final#2)	KaiGai Kohei	82	7	32	20			20
[PATCH] capabilities: implement per-process securebits	Andrew G. Morgan	70	3	7	19			19
[PATCH] Implement file posix capabilities	Serge E. Hallyn	59	5	9	18			18
[PATCH 2/2-v2] NFS: use new LSM interfaces to explicitly set mc	Eric Paris	57	3	6	17			17
[RFC 0/28] Patches to pass vfsmount to LSM inode security hoo	Tony Jones	8	12	61		8	8	16
Mediating send_sigurg	Stephen Smalley	54	2	12	15			15
New stacker performance results	Serge E. Hallyn	9	12	51		9	4	13
[AppArmor 00/45] AppArmor security module overview	John Johansen	4	10	70		1	11	12
Re: Linux Security *Module* Framework (Was: LSM conversion to	Rob Meijer	9	13	33		11		11

LSM important threads 10

	Subject	By
1	[AppArmor 00/41] AppArmor security module overview	John Johansen
2	[AppArmor 00/45] AppArmor security module overview	John Johansen
3	[RFC][PATCH 0/7] firefliee LSM for labeling sockets based on i	Torok Edwin
4	Linux Security *Module* Framework (Was: LSM conversion to	Simon Arlott
5	[RFC][PATCH 0/11] security: AppArmor - Overview	Tony Jones
6	[PATCH] Version 3 (2.6.23-rc8) Smack: Simplified Mandatory /	Casey Schaufler
7	AppArmor FAQ	John Johansen
8	[PATCH 00/28] Permit filesystem local caching [try #2]	David Howells
9	[AppArmor 00/44] AppArmor security module overview	John Johansen
10	[TOMOYO #7 00/30] TOMOYO Linux 1.6.0 released	Tetsuo Handa

LSM important threads top 10

	Subject	By
1	[AppArmor 00/41] AppArmor security module overview	John Johansen
2	[AppArmor 00/45] AppArmor security module overview	John Johansen
3	[RFC][PATCH 0/7] firefliee LSM for labeling sockets based on i	Torok Edwin
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6	[PATCH] Version 3 (2.6.23-rc8) Smack: Simplified Mandatory A	Casey Schaufler
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8	[PATCH 00/28] Permit filesystem local caching [try #2]	David Howells
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10	[TOMOYO #7 00/30] TOMOYO Linux 1.6.0 released	Tetsuo Handa

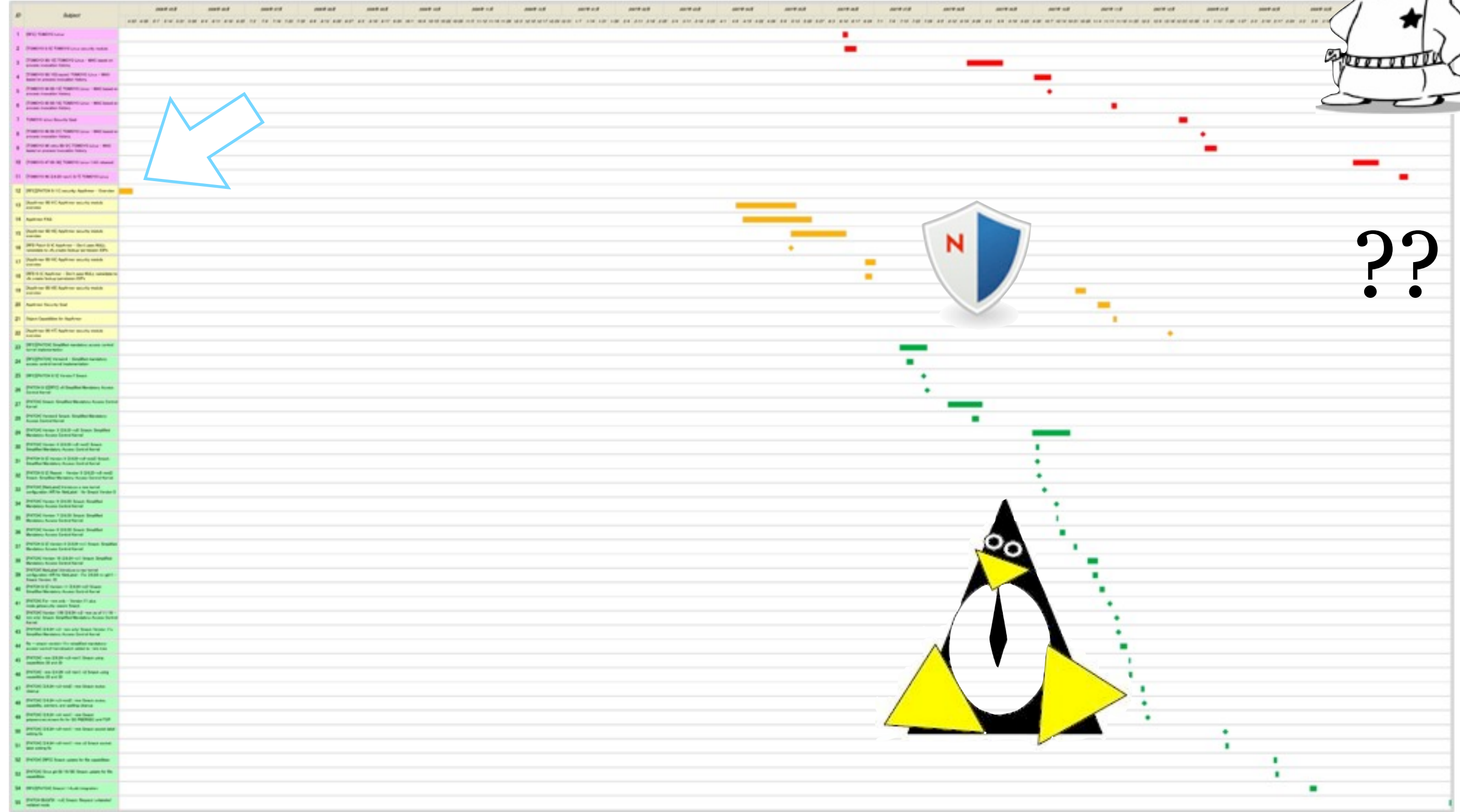
- 4 LSM related (including 1 for Smack)
- 1 for TOMOYO
- 5 out of 10 belong to AppArmor

TOMOYO, AppArmor and Smack

2003-12

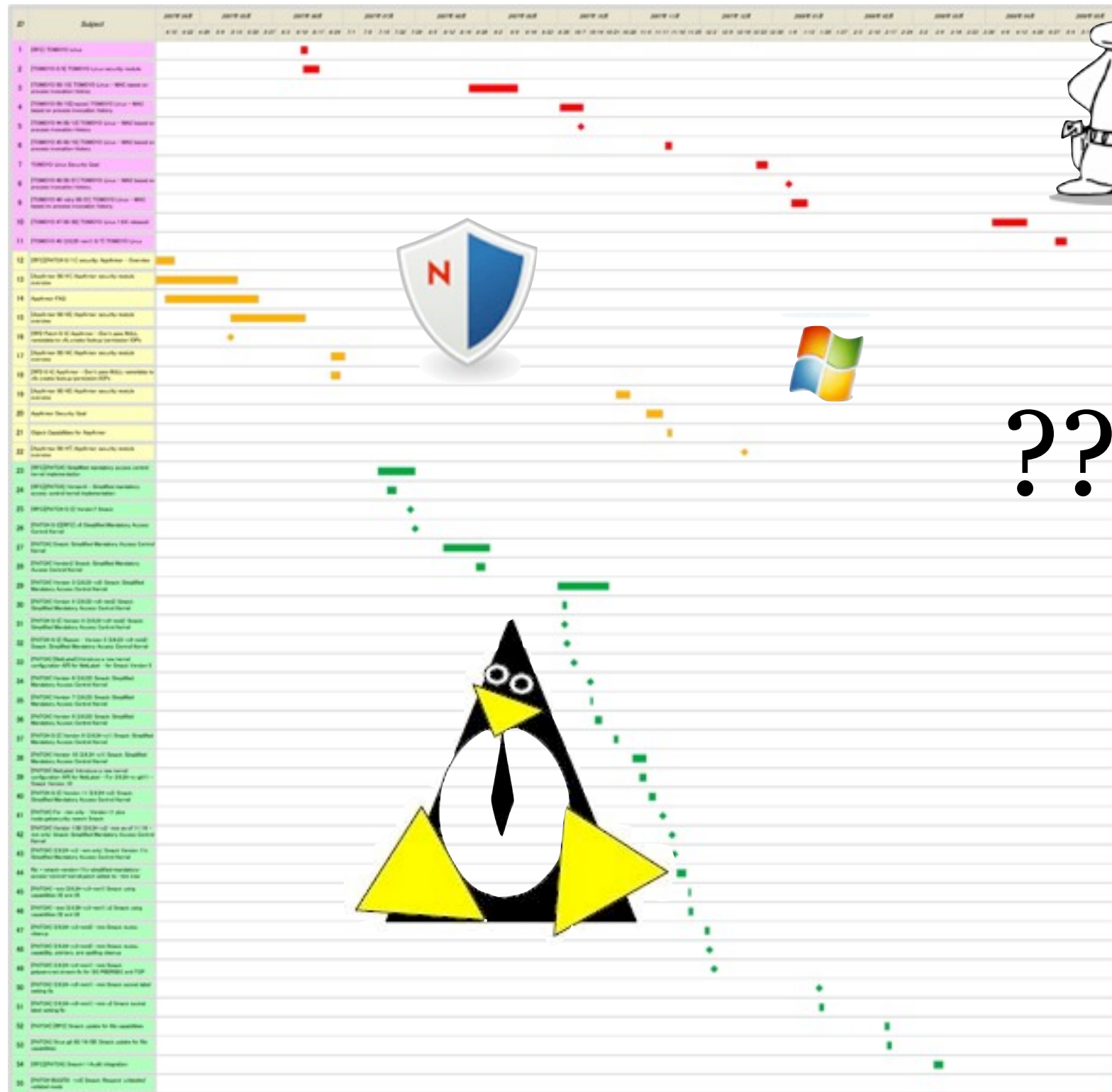
2007

200

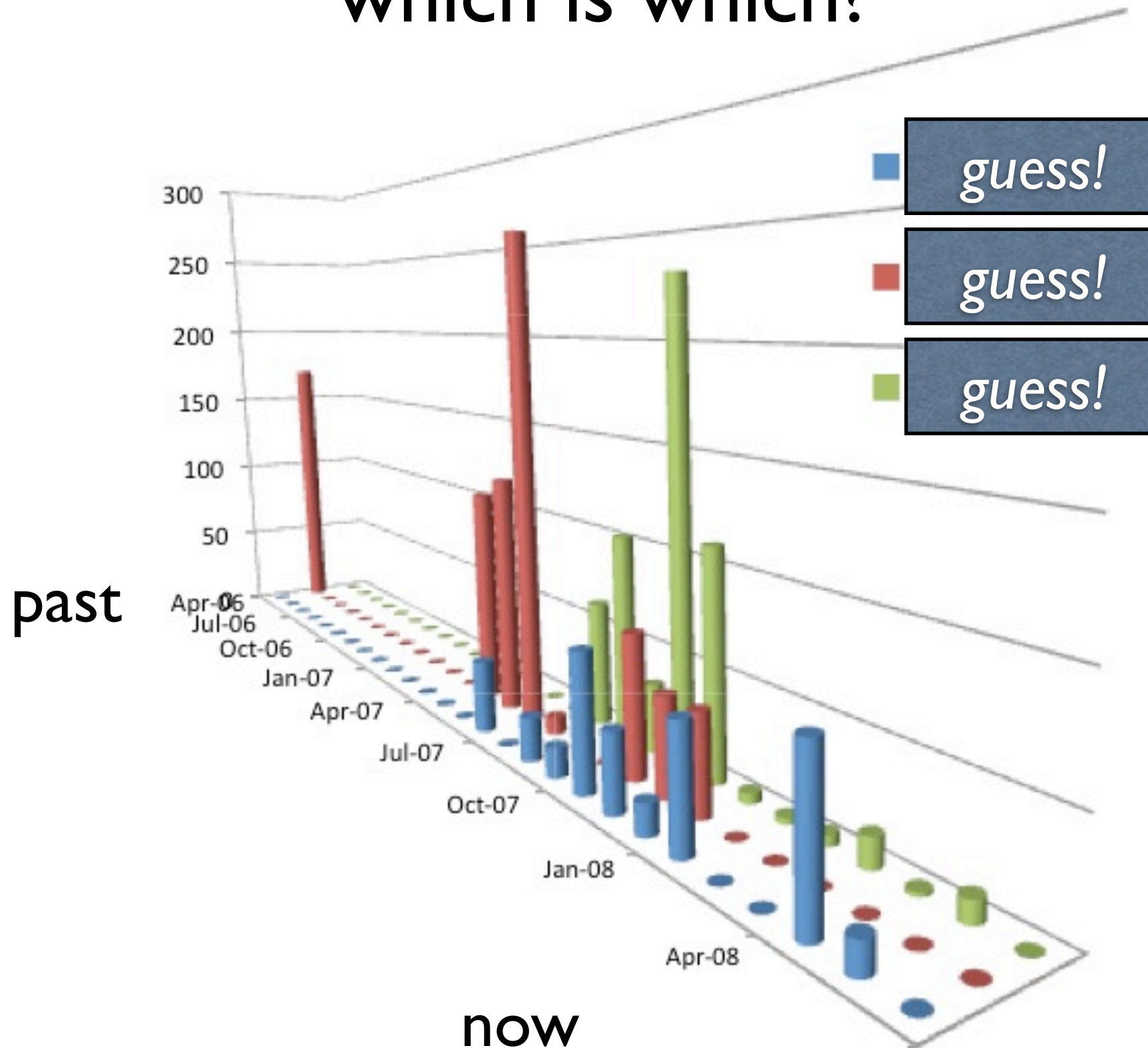


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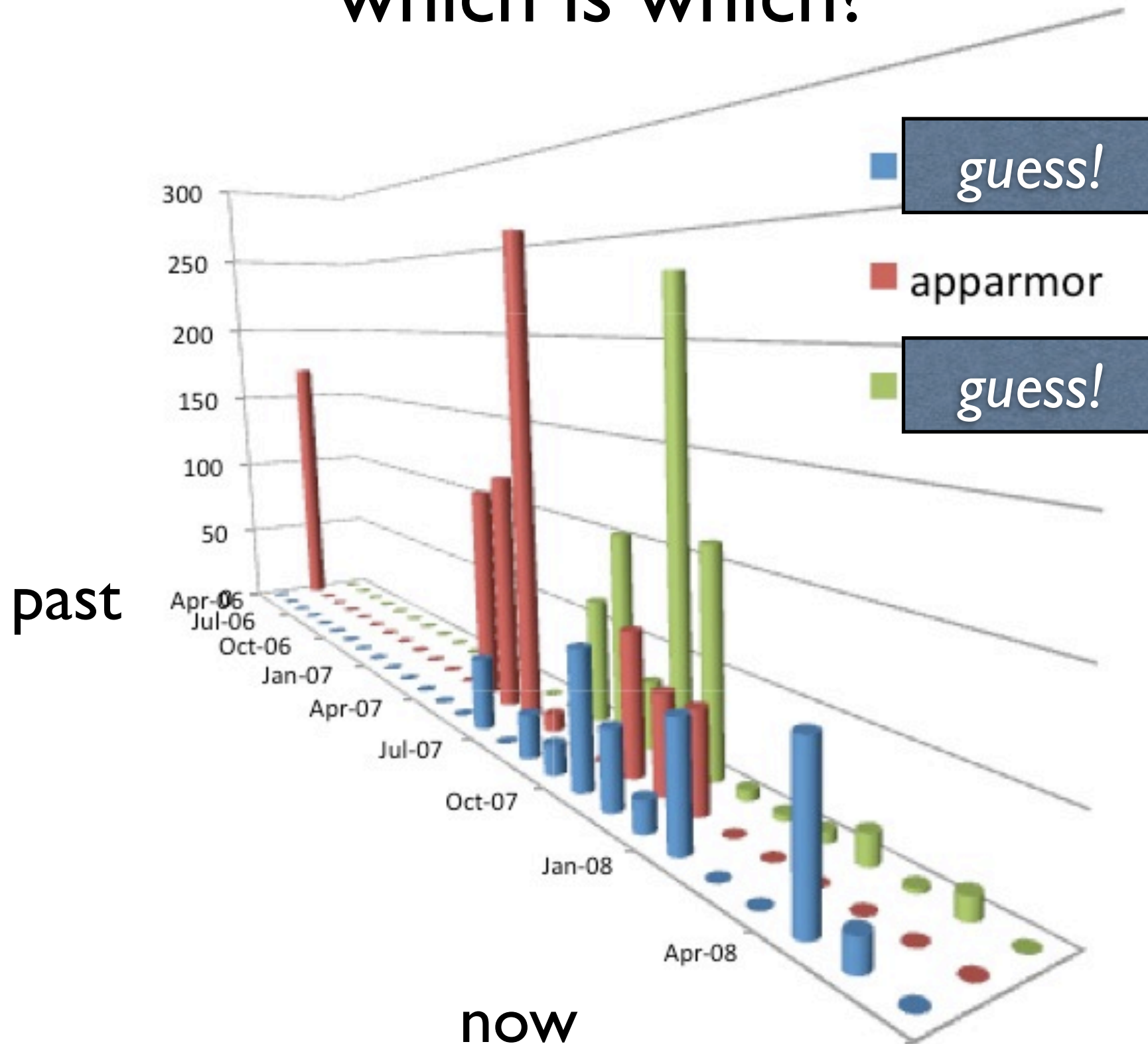
Close up (After 2007)



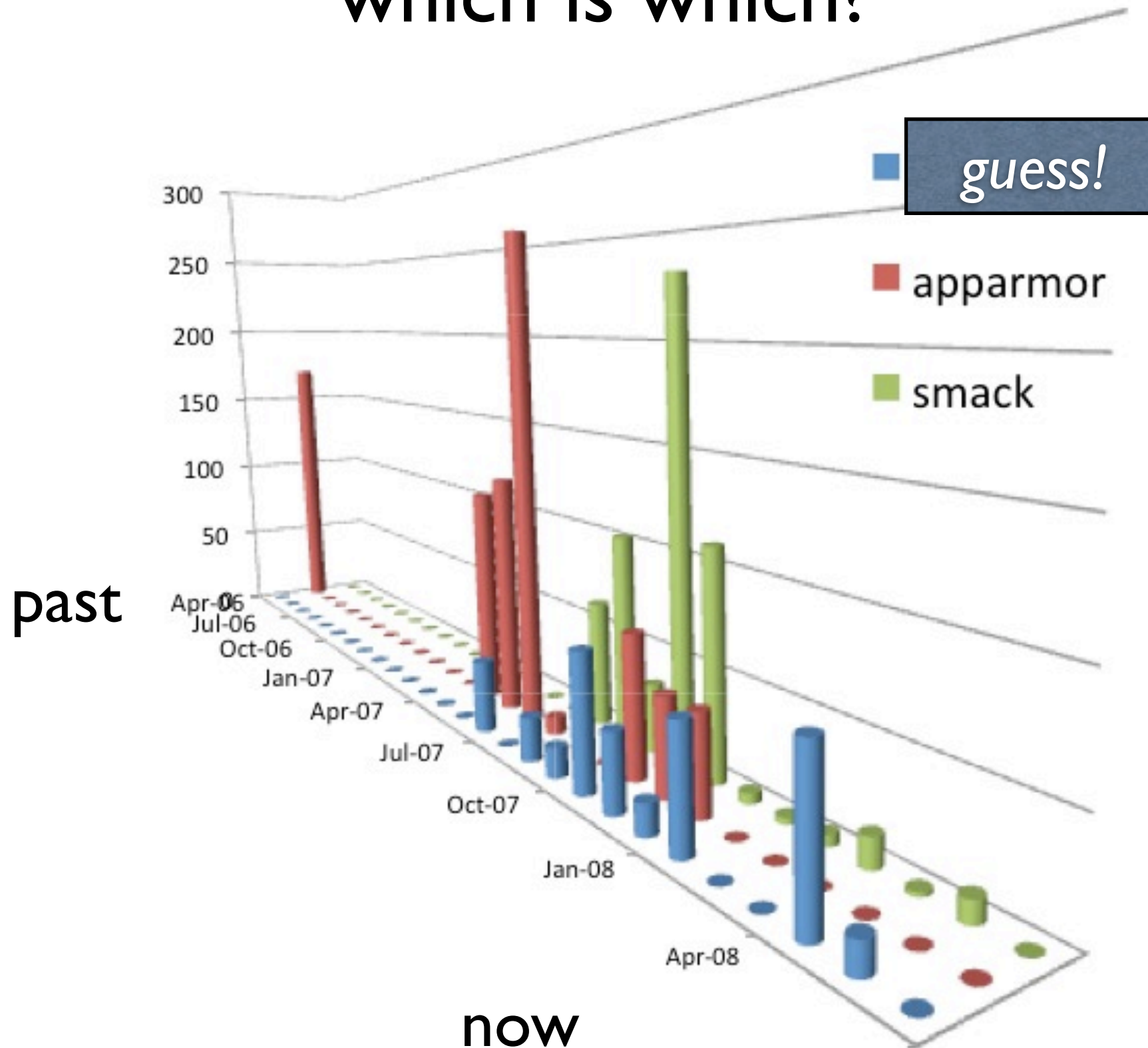
AppArmor, Smack and TOMOYO which is which?



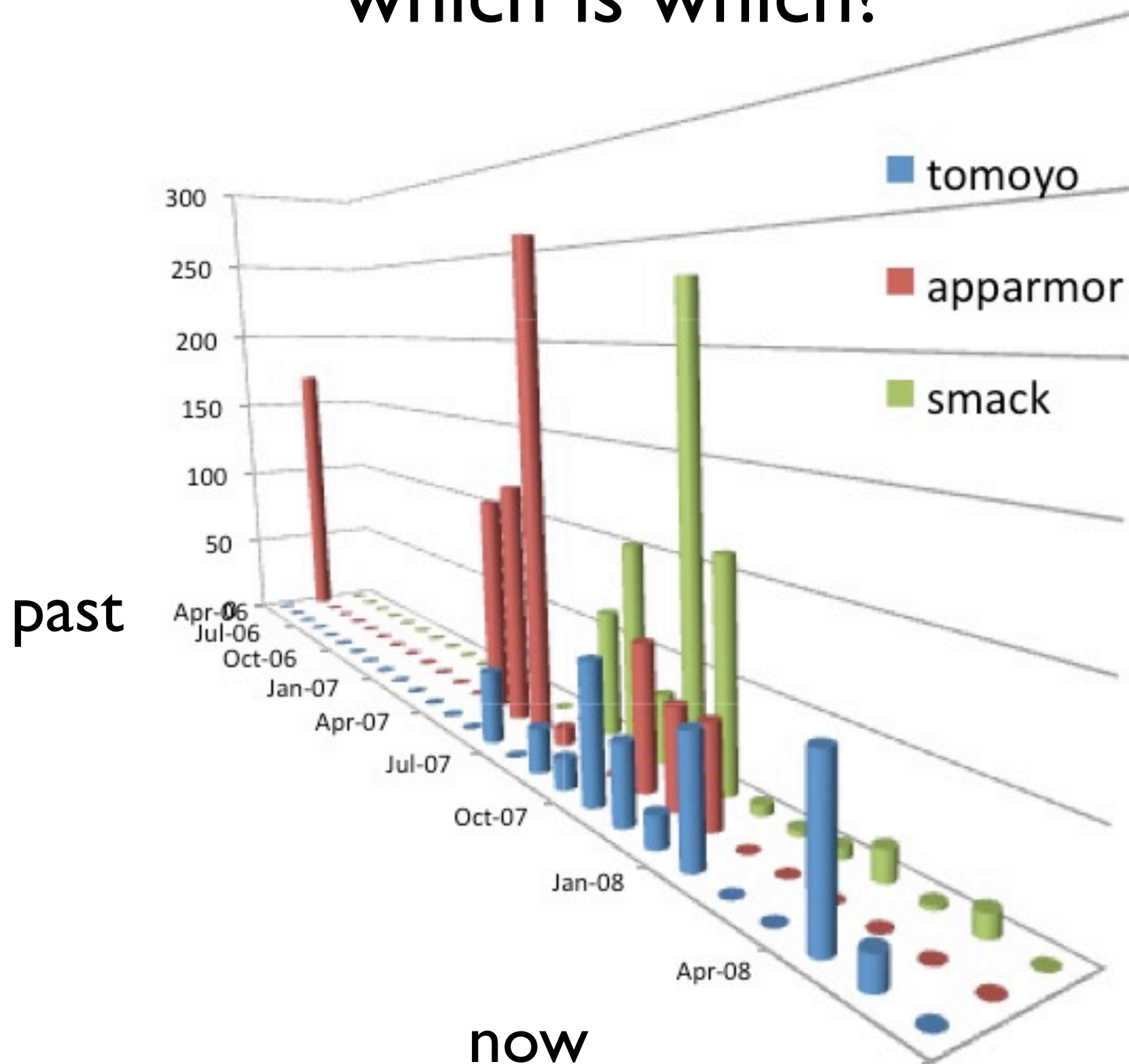
AppArmor, Smack and TOMOYO which is which?



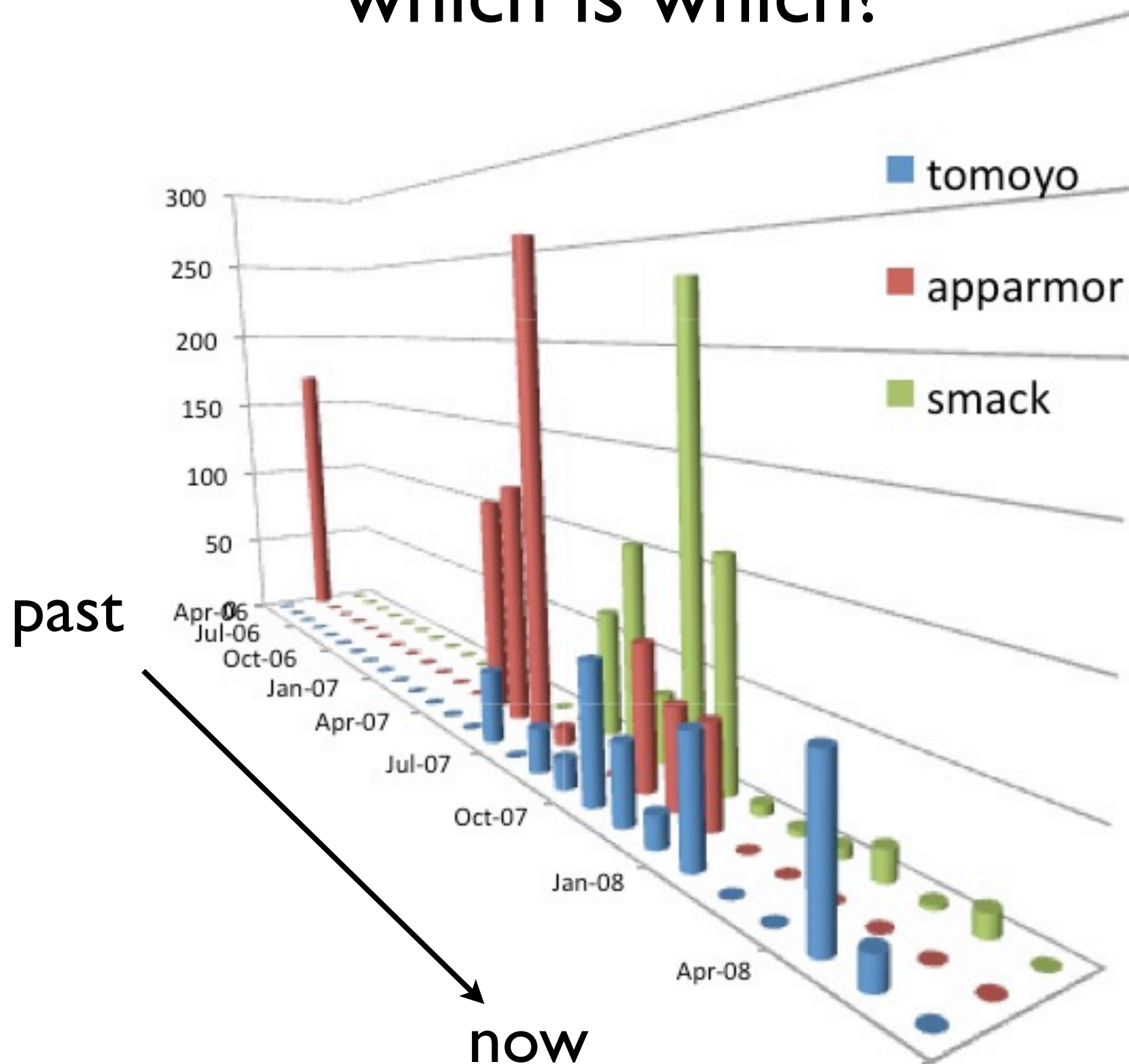
AppArmor, Smack and TOMOYO which is which?



AppArmor, Smack and TOMOYO which is which?



AppArmor, Smack and TOMOYO which is which?



Summary

- Numbers of messages passing by every day
- We always have a lot of things to do and it's hard to stop by and think about the past
- I felt we were doing kind of waste and that was a major motivation of this attempt
- Despite of the amount time I spent, I don't really think I found out something quite new ...
- There should be more wise way to extract valuable information from the past