SE, IS & (FL)OSS @ EASE

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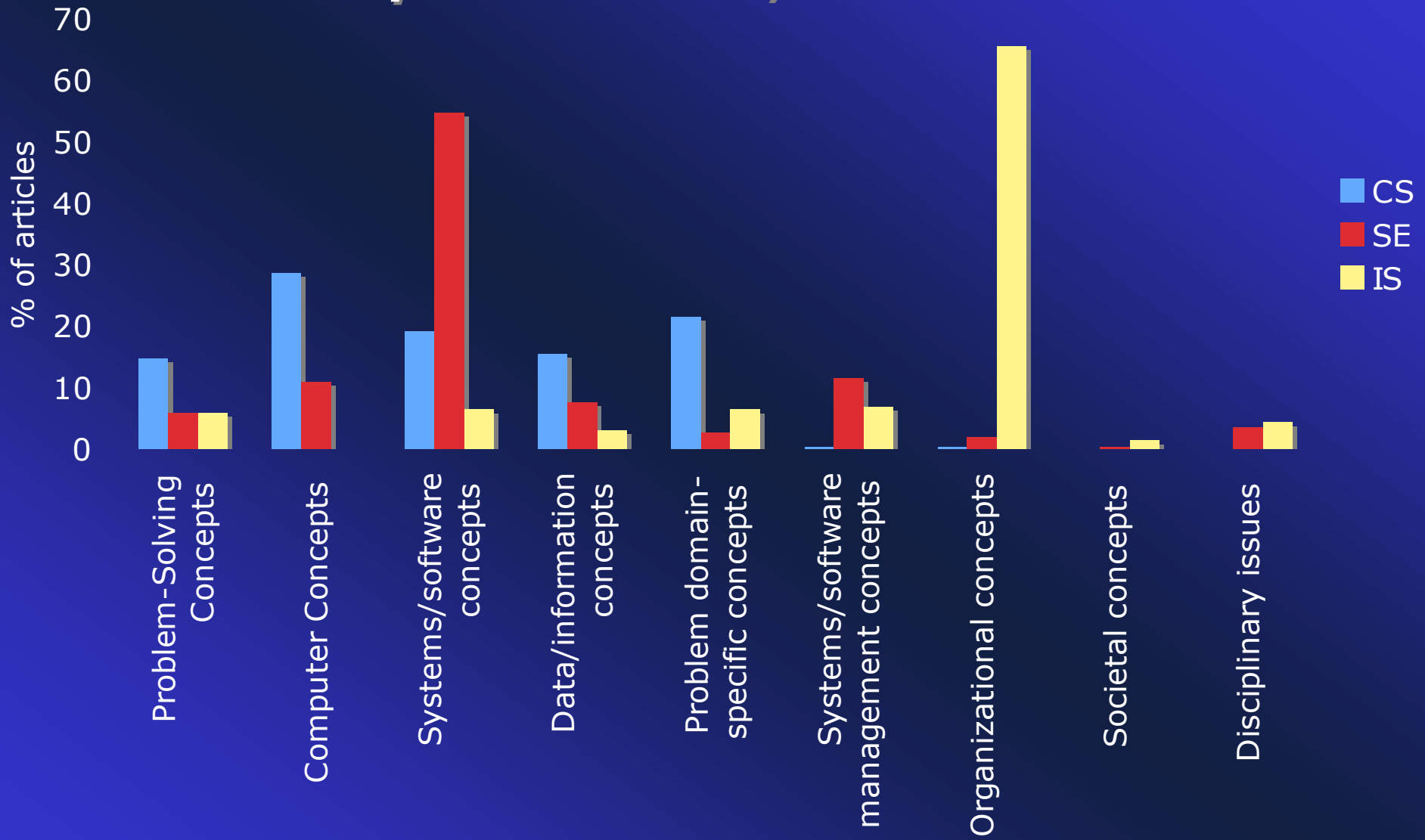
SE & IS?

	Topic Categories	CS	SE	IS
1.0	**Problem-Solving Concepts**	14.7%	5.9%	5.9%
1.1	Algorithms	5.8%	0.5%	0.2%
1.2	Mathematics/Computational Science	6.7%	-	-
1.3	Methodologies (object, function/process, information/data, event, business rules, ...)	-	4.9%	0.8%
1.4	Artificial Intelligence	2.4%	0.5%	4.9%
2.0	**Computer Concepts**	28.7%	10.9%	0.0%
2.1	Computer/hardware principles/architecture	10.2%	-	-
2.2	Intercomputer communication (networks, distributed systems)	17.7%	9.5%	-
2.3	Operating systems (as an augmentation of hardware)	0.80%	1.4%	-
2.4	Machine/assembler-level data/instructions	-	-	-
3.0	**Systems/software concepts**	19.1%	54.8%	6.4%
3.1	System architecture/engineering	0.48%	1.9%	2.9%
3.2	Software life cycle/engineering (incl. requirements, design, coding, testing, maintenance)	-	8.7%	1.4%
3.3	Programming languages	3.8%	3.8%	1.4%
3.4	Methods/techniques (incl. reuse, patterns, parallel processing, process models, data models...)	3.8%	18.2%	0.2%
3.5	Tools (incl. compilers, debuggers)	5.3%	12.2%	0.2%
3.6	Product quality (incl. performance, fault tolerance)	1.8%	8.4%	1.4%
3.7	Human-computer interaction	3.2%	1.1%	1.4%
3.8	System security	0.80%	0.5%	0.2%
4.0	**Data/information concepts**	15.4%	7.6%	3.0%
4.1	Data/file structures	1.9%	0.8%	-
4.2	Data base/warehouse/mart organization	8.4%	4.6%	1.6%
4.3	Information retrieval	4.0%	1.4%	0.4%
4.4	Data analysis	0.64%	0.5%	0.6%
4.5	Data security	0.48%	0.3%	0.4%
5.0	**Problem domain-specific concepts**	21.5%	2.7%	6.4%
5.1	Scientific/engineering (incl. bioinformatics)	0.48%	0.3%	-
5.2	Information systems (incl. decision support, group support systems, expert systems)	0.64%	1.6%	6.4%
5.3	Systems programming	-	-	-
5.4	Real-time (incl. robotics)	0.16%	0.5%	-
5.5	Edutainment (incl. graphics)	20.2%	0.3%	-

	Topic Categories	CS	SE	IS
6.0	**Systems/software management concepts**		11.5%	6.8%
6.1	Project/product management (incl. risk management)	0.2%	3.3%	3.1%
6.2	Process management	-	2.2%	0.6%
6.3	Measurement/metrics (development and use)	-	6.2%	0.8%
6.4	Personnel issues	-	0.3%	-
6.5	Acquisition of (Packaged/Custom) Software	0.2%	0.5%	2.3%
7.0	**Organizational concepts**	0.3%	1.9%	65.6%
7.1	Organizational Structure	-	0.5%	5.0%
7.2	Strategy	-	-	6.6%
7.3	Alignment (incl. business process reengineering)	-	0.5%	6.9%
7.4	Organizational learning/knowledge management	-	-	4.4%
7.5	Technology transfer (incl. innovation, acceptance, adoption, diffusion)	0.1%	0.3%	19.4%
7.6	Change management	-	-	1.6%
7.7	Information technology implementation	-	-	1.6%
7.8	Information technology usage/operation	-	-	24.4%
7.9	Management of "computing" function	0.2%	-	11.6%
7.10	IT Impact	-	0.3%	15.3%
7.11	Computing/information as a business	-	-	-
7.12	Legal/ethical/cultural/political (organizational) implications	-	0.3%	3.4%
8.0	**Societal concepts**	-	0.3%	1.4%
8.1	Cultural implications	-	-	0.2%
8.2	Legal implications	-	-	0.2%
8.3	Ethical implications	-	-	-
8.4	Political implications	-	0.3%	1.0%
9.0	**Disciplinary issues**	-	3.5%	4.3%
9.1	"Computing" research	-	1.1%	3.3%
9.2	"Computing" curriculum/teaching	-	2.4%	1.0%

Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.

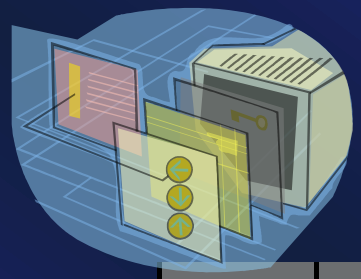
Topics in CS, SE & IS



Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.

Research Approach		CS	SE	IS
Descriptive:		9.9%	27.9%	9.0%
DS	Descriptive System	4.1%	8.1%	2.7%
DR	Review of Literature	0.6%	1.6%	-
DO	Descriptive Other	5.1%	18.2 %	6.3%
Evaluative:		11.0%	13.8%	66.8%
ED	Evaluative-deductive	1.1%	4.3%	46.7%
EI	Evaluative-interpretive	-	<1%	4.7%
EC	Evaluative-critical	-	1.4%	-
EO	Evaluative-other	9.9%	7.3%	15.4%
Formulative:		79.1%	55.3%	24.2%
FC	Formulative-concept	17.0%	3.0%	1.0%
FF	Formulative-framework	2.4%	4.1%	2.5%
FG	Formulative-guidelines/standards	0.6%	4.3%	0.8%
FM	Formulative-model	5.7%	9.8%	12.5%
FP	Formulative-process, method, algorithm	52.6%	36.0%	4.7%
FT	Formulative-classification/taxonomy	0.8%	1.1%	2.7%

Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.

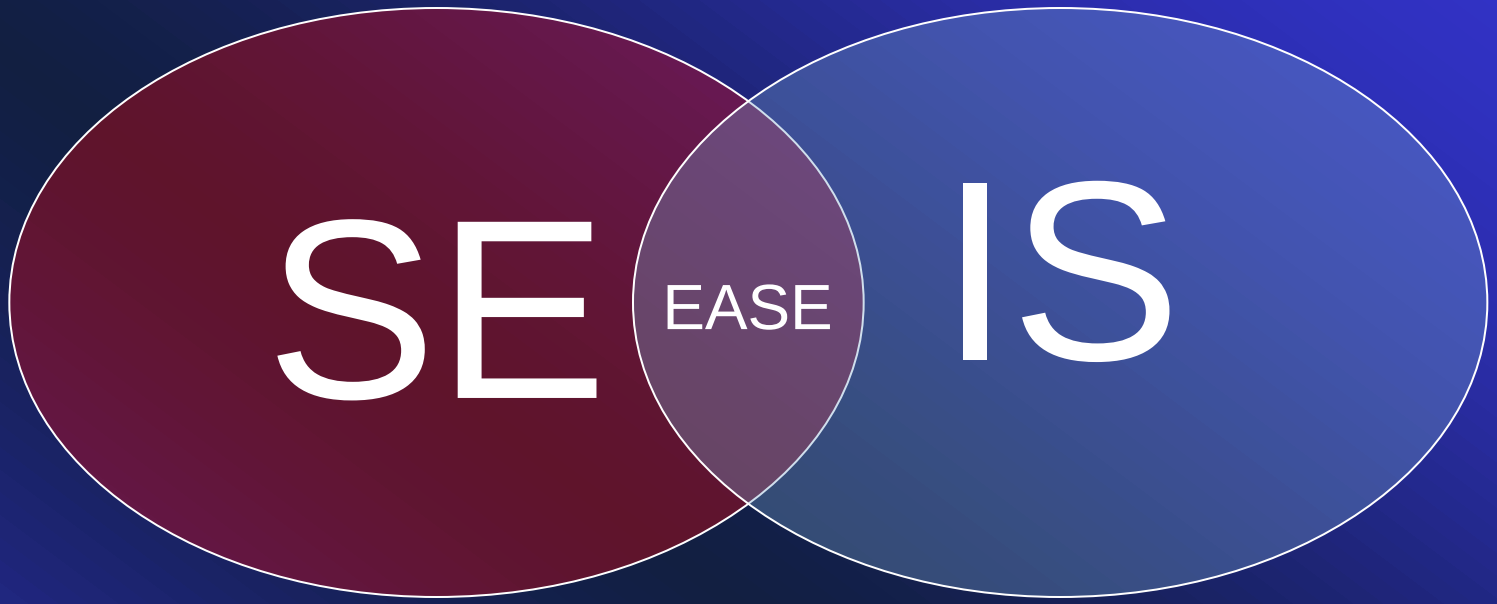


	Level of Analysis	CS	SE	IS
SOC	Society	-	0.27%	3.1%
PRO	Profession	.32%	2.4%	1.8%
EXT	External Business Context	-	-	5.1%
OC	Organizational Context	-	2.2%	25.6%
PR	Project	-	4.1%	8.8%
GP	Group/Team	-	1.4%	10.9%
IN	Individual	1.91%	1.4%	23.8%
AC	Abstract Concept	38.85%	49.9%	8.8%
CS	System	5.57%	10.6%	7.2%
CE	Computing Element - Program, component, algorithm	53.34%	27.9%	4.9%

Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.

	Research Method	CS	SE	IS
AR	Action Research	-	0%	0.8%
CA	Conceptual Analysis	15.1%	43.5%	14.7%
CAM	Conceptual Analysis/Mathematical	73.4%	10.6%	12.1%
CI	Concept Implementation (Proof of Concept)	2.9%	17.1%	1.6%
CS	Case Study	0.2%	2.2%	12.5%
DA	Data Analysis	0.2%	2.2%	5.3%
ET	Ethnography	-	-	0.2%
FE	Field Experiment	-	<1%	1.6%
FS	Field Study	0.2%	<1%	24.5%
GT	Grounded Theory	-	<1%	0.2%
HE	Hermeneutics	-	<1%	-
ID	Instrument Development	-	-	3.5%
LH	Laboratory Experiment - Human Subjects	1.8%	3.0%	16.2%
LR	Literature Review/analysis	.3%	1.1%	0.8%
LS	Laboratory Experiment - Software	1.9%	<1%	0.6%
MP	Mathematical Proof	2.4%	<1%	0.2%
PA	Protocol Analysis	-	-	1.2%
SI	Simulation	1.8%	1.1%	1.4%
ES	Descriptive/Exploratory Survey	-	1.6%	2.7%

Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.



- Systems and software
- Formative
- Abstract concept/ computing element
- Conceptual analysis

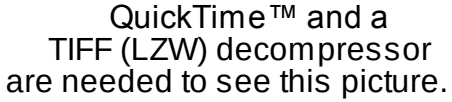
- Organizational concepts
- Evaluative
- Organizational/ individual
- Field study/experiment

Reference Discipline		CS	SE	IS
CP	Cognitive Psychology	0.80%	0.54%	10.7%
SB	Social and Behavioral Science	-	0.27%	9.0%
SC	Science	0.96%	0.27%	-
EC	Economics	-	-	11.1%
MG	Management	-	0.27%	18.0%
MS	Management Science	-	0.27%	6.6%
MA	Mathematics	8.60%	-	-
OT	Other	0.32%	0.27%	12.5%
NA	Not applicable	-	-	4.9%
SR	Self-Reference	89.33%	98.1%	27.2%

Source: Glass, R. L., Ramesh, V., & Vessey, I. (2004). An analysis of research in computing disciplines. *Communications of the ACM, 47*(6), 89–94.

FLOSS

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.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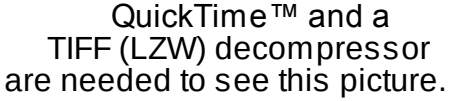
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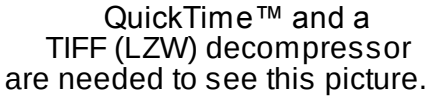
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FLOSS = Data

Editorial: Open Source and Empirical Software Engineering

Until recently, few of the empirical software engineering research community took open source software as an object of study seriously. To many, it was one step up from studying student projects, and the "real action" was almost always with commercial software products. When queried, the typical response was that open software products weren't used seriously, and perhaps that open source represented an unrepresentative software development "niche" that had little societal relevance (read that as "insignificant").

That was then and this is now.

As empirical software engineers, we should embrace this development. Suddenly one of the greatest obstacles in the way of empirical software engineering has been cleared! Not only is source code available, but also defect reports, update logs, etc. For a change, we can now focus on the analysis rather than the data collection. At the same time, we can no longer claim lack of progress on the "inability to gather data due to proprietary restrictions". The burden is now on us.

Empirical Software Engineering, 6, 193–194, 2001.
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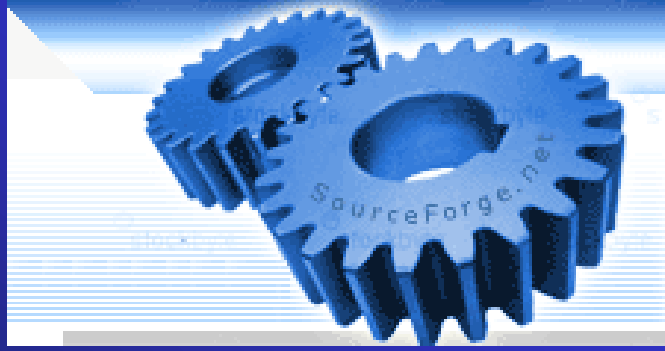
Warren Harrison
Portland Oregon
USA

SourceForge



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are needed to see this picture.

Our research question*

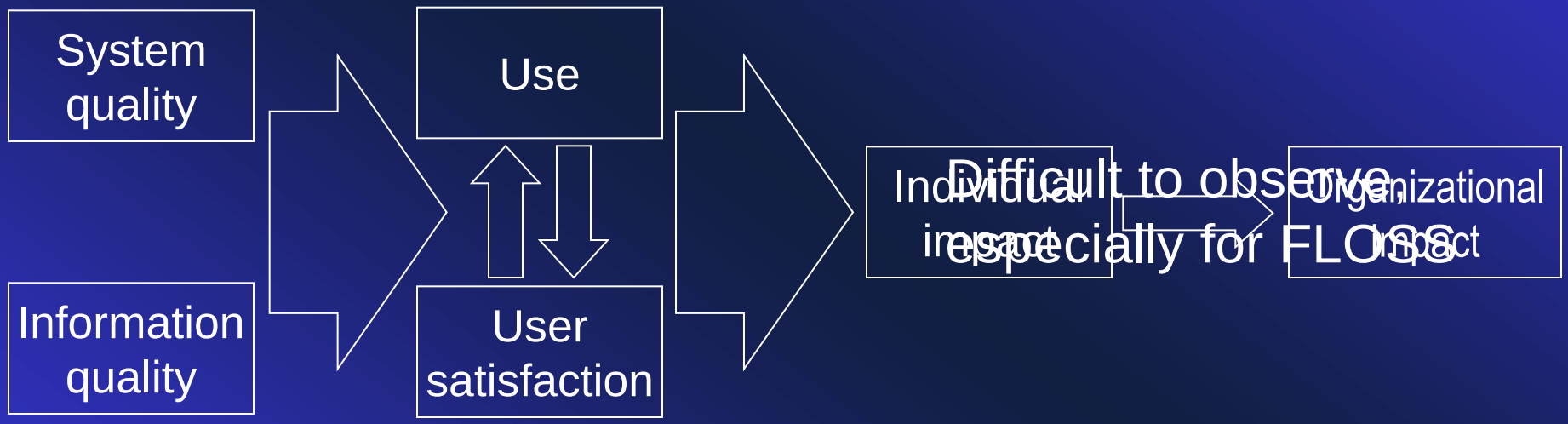
What work practices make some FLOSS teams more effective than others?

* Our = Kevin Crowston, Hala Annabi, James Howison, Chengetai Masango, Yeliz Eseryel, Kangning Wei and Qing Li

Partially supported by US NSF Grants 03-41475 and 04-14468.

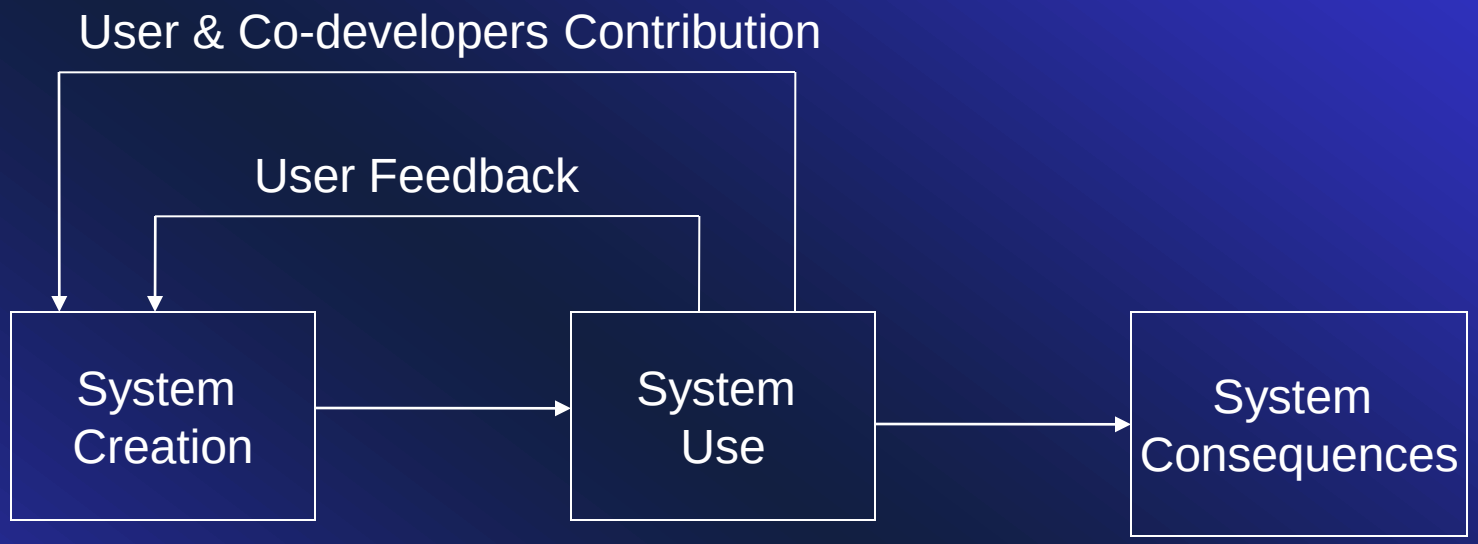
Success measures in IS

DeLone & McLean (1992):



Seddon (1997): system quality, information quality, perceived usefulness, user satisfaction, and IS use

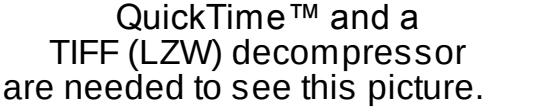
Our success model



- Project completion
- Progress of process
- Number and frequency of releases
- Number of developers

- Users
- "Popularity"
  - Downloads
  - Page views

- Meets development goals
- Developer satisfaction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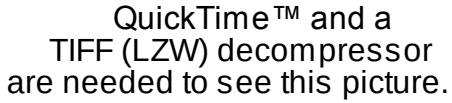
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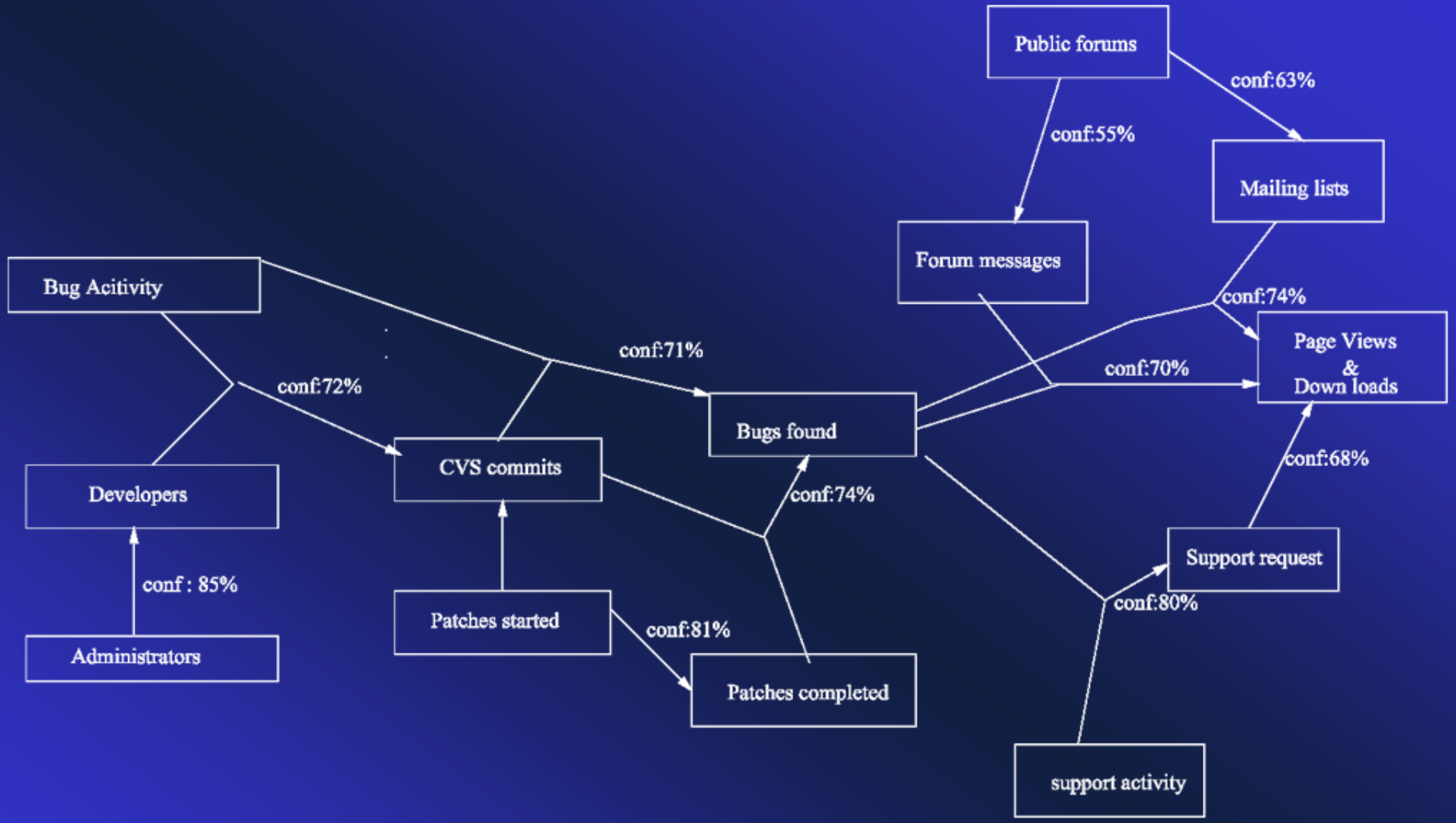
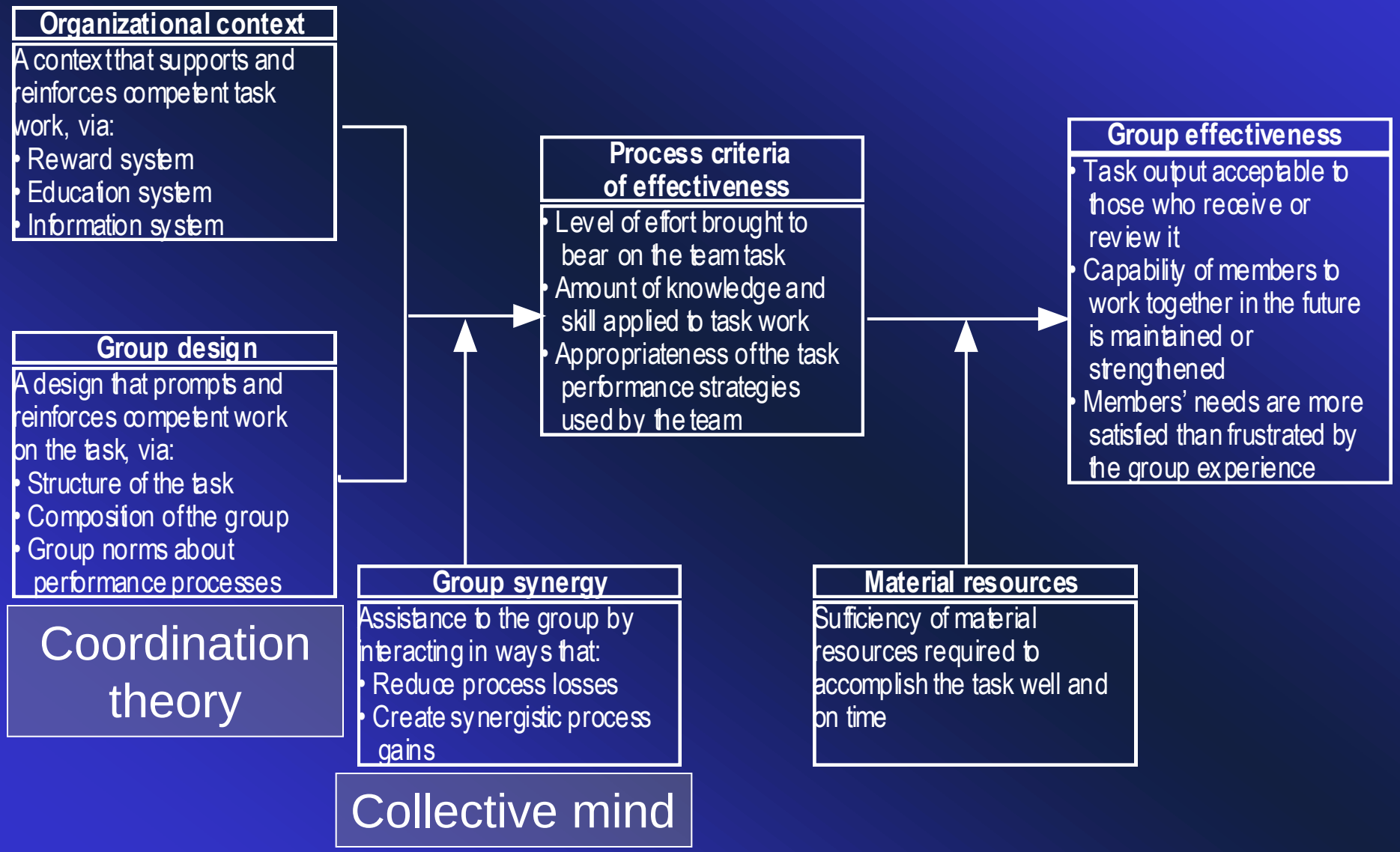


Source: Chawla, S., Arunasalam, B., & Davis, J. (2003). Mining open source software (OSS) data using association rule network (Technical Report No. 535). Sydney: School of Information Technologies, University of Sydney.

Hackman's Group Effectiveness Model



Task Structure: Coordination theory

- Addressing task structure through Coordination Theory (Malone & Crowston, 1994)
  - Actors in organizations face coordination problems arising from interdependencies that constrain how tasks can be performed
  - Coordination problems require additional work in the form of coordination mechanisms
- Propositions:
  - Teams with task structures and practices that minimize dependencies will be more effective
  - Teams with coordination practices to manage dependencies will be more effective

Team synergy: Collective Mind

- Addressing Team Synergy through "Collective Mind" (Weick & Roberts, 1993)
  - Subordination (Alignment)
  - Contribution
  - Representation
- Propositions
  - Teams with more highly developed shared mental models will be more effective.
  - Teams which are able to align individual goals and team goals will be more effective
  - Teams with higher levels of socialization, conversation and narration will display more highly developed shared mental models

Practices of interest

- Team social structure
- Coordination of tasks
- Development of collective mind, rules and norms
- Team leadership
- Member recruitment and socialization

[686314] New incoming convo takes focus

onitor this Tracker item after you login (register an account, if you do not already have one).

By:
basso (poppins24m)
ed By:
omment added

o:
onymous (nobody)

Date Submitted:
2003-02-13 16:44
Date Last Updated:
2003-05-05 17:23
Group:
None
Priority:
5
Resolutior
Accepted

ng convo takes focus
n2000
yping to a buddy (aim) and another buddy
he first message of a conversation, the focus
om my text box and placed on the newly
. So, my continuing to type is futile.

is new to Alpha 5.

ips:

Message

3-05-05 17:23
schiere
: YES
8833

his might be fixed in 0.63

3-04-05 16:18
ermanator
: YES
13964

the case.. re-opening

3-04-05 11:35
schiere
: YES
8833

Gain 0.60 has been released. This makes your bug report out of date.

Date: 2003-02-24 11:28
Sender: hermanator

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

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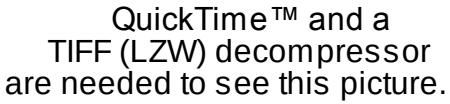
TIFF (LZW) decompressor
are needed to see this picture.

```
<?php
/**
 * abook_local_file.php
 *
 * Copyright (c) 1999-2005 The SquirrelMail Project Team
 * Licensed under the GNU GPL. For full terms see the file COPYING.
 *
 * @version $Id: abook_local_file.php,v 1.35 2005/03/20 10:06:45 tokul $
 * @package squirrelmail
 * @subpackage addressbook
 */

/**
 * Backend for address book as a pipe separated file
* Stores the address book in a local file
 *
 * An array with the following elements must be passed to
 * the class constructor (elements marked ? are optional):
 *<pre>
 *   filename  => path to addressbook file
 * ? create    => if true: file is created if it does not exist.
 * ? umask     => umask set before opening file.
 * ? name      => name of address book.
*</pre>
* @package squirrelmail
 */
class abook_local_file extends addressbook_backend {
…
```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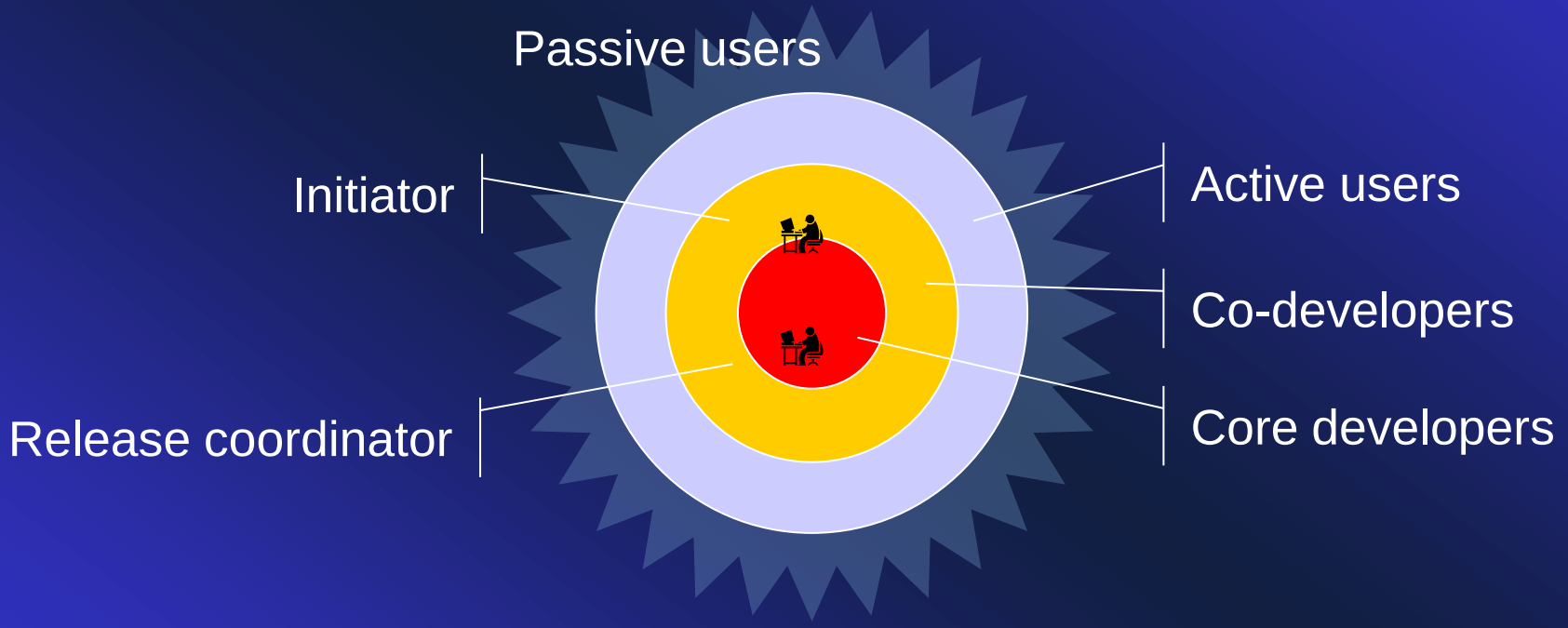
Team structure



[686314] New incoming convo takes focus

You may monitor this Tracker item after you login (register an account, if you do not already have one).

Submitted By:
Joseph Trapasso (poppins24m)

Date Submitted:
2003-02-13 16:44

Last Updated By:
lschiere - Comment added

Date Last Updated:
2003-05-05 17:23

Category:
None

Group:
None

Assigned To:
Nobody/Anonymous (nobody)

Priority:
5

Status:
Open

Resolution:
Accepted

Summary:
New incoming convo takes focus

Alpha 5, Win2000
When I'm typing to a buddy (aim) and another buddy sends me the first message of a conversation, the focus is stolen from my text box and placed on the newly created tab. So, my continuing to type is futile.

I think this is new to Alpha 5.

Followups:

Message

Date: 2003-05-05 17:23
Sender: lschiere
Logged In: YES
user_id=28833

i think this might be fixed in 0.63

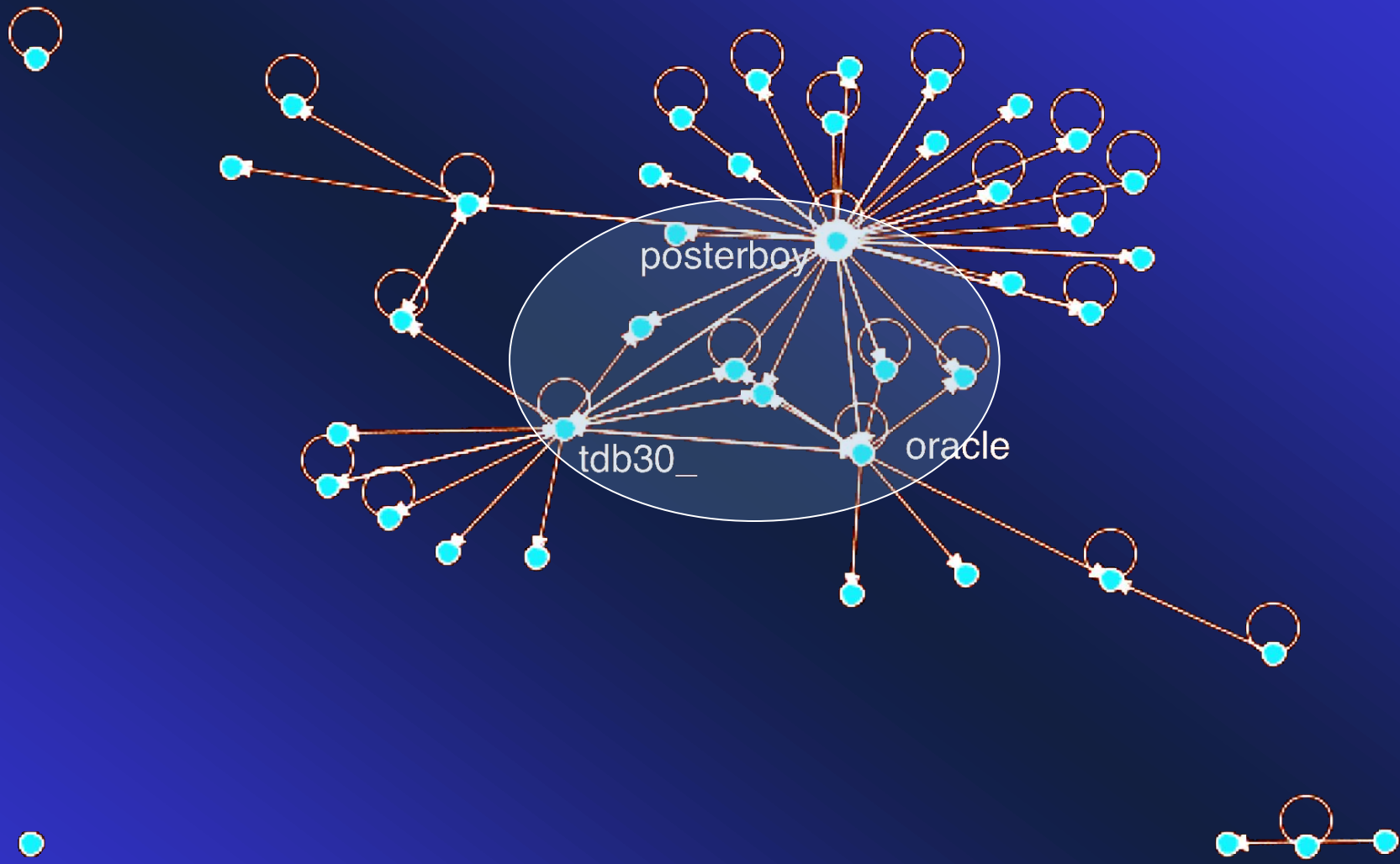
Date: 2003-04-05 16:18
Sender: hermanator
Logged In: YES
user_id=613964

Still is the case.. re-opening

Date: 2003-04-05 11:35
Sender: lschiere
Logged In: YES
user_id=28833

Gaim 0.60 has been released. This makes your bug report out of date.

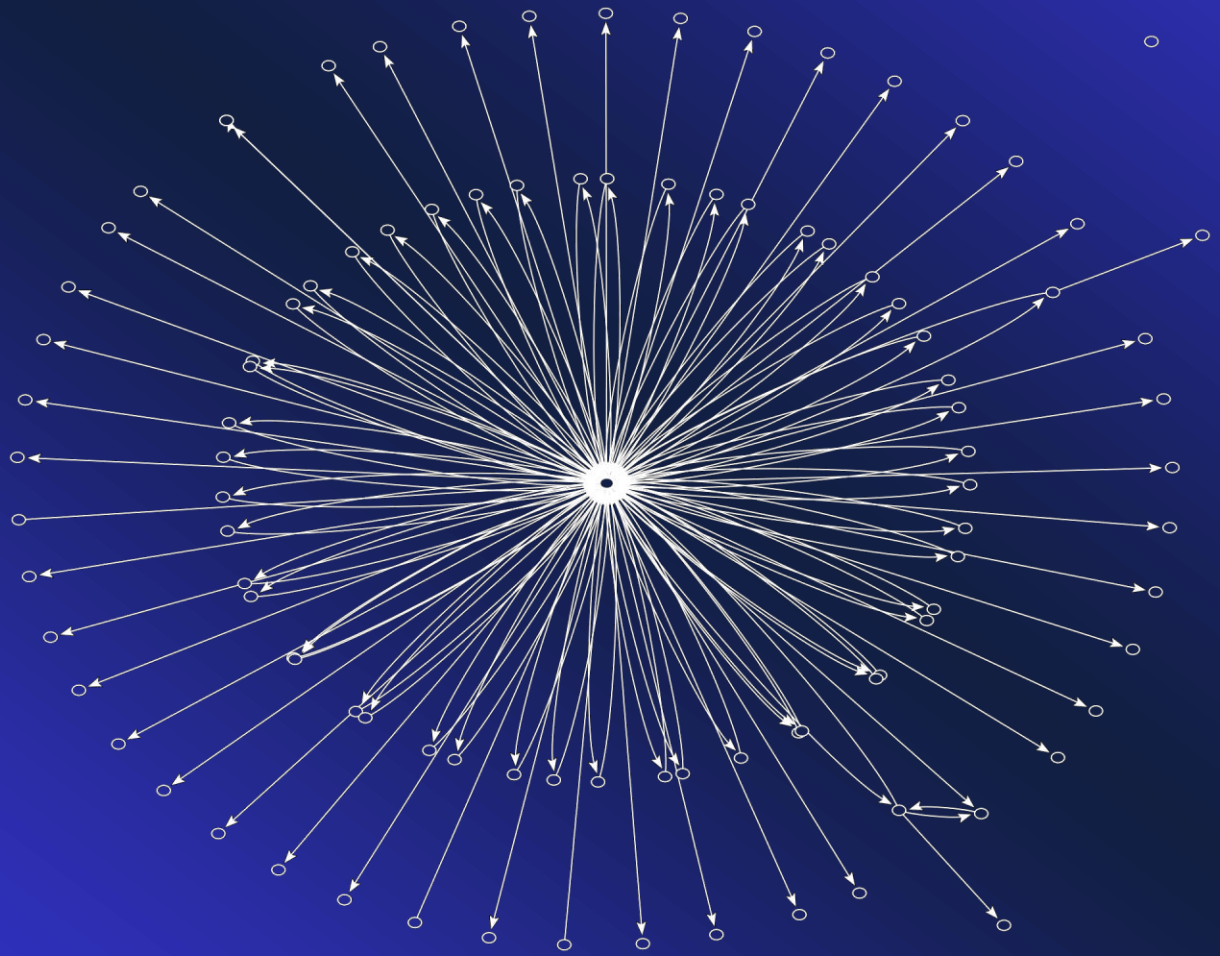
Date: 2003-02-24 11:28
Sender: hermanator



Plot of bug report interactions for openrpg project (Netminer)

Team structure

- A highly centralized project (centralization = 0.922)



Plot of bug report interactions for Curl project

Submit New | Browse | Admin | Search

Assignee: (?) Any | Status: (?) Any | Category: (?) Any | Group: (?) Any

Show only: Submitter username: | Summary keyword:

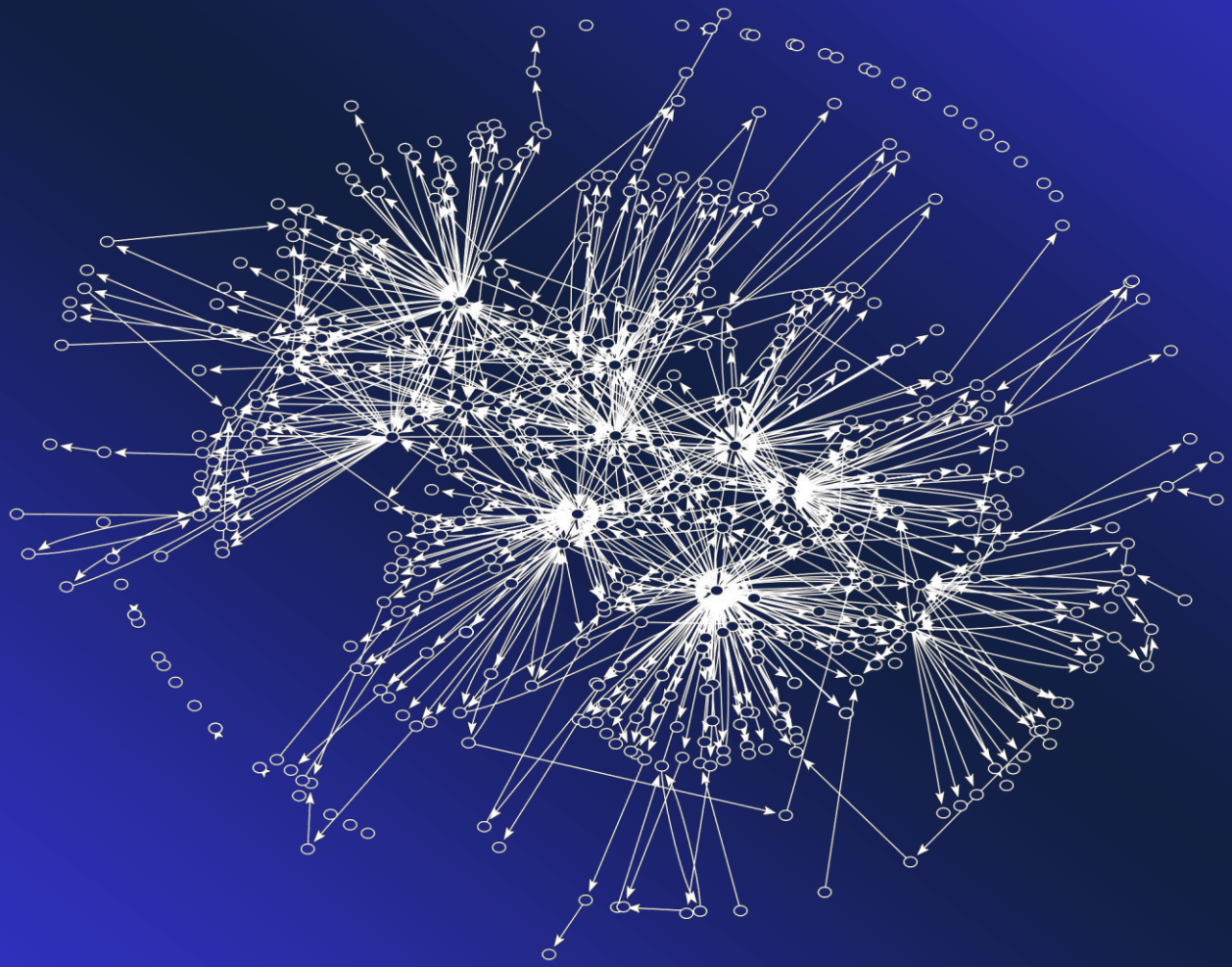
Sort By: (?) ID | Ascending | Browse

Request ID	Summary	Open Date	Priority	Status	Assigned To	Submitted By
203068	compile 6.5 on AIX 4.2 with gcc fails	* 2000-03-17 03:40	5	Closed	nobody	bagder
203142	bug in curl_unescape() which crash curl on an IBM AIX	* 2000-03-19 05:03	7	Closed	bagder	nobody
203625	redirect uses incorrect port	* 2000-03-29 08:03	5	Closed	bagder	idcmp
204014	https disabled when OpenSSL present and located	* 2000-04-06 09:49	3	Closed	bagder	allisonb
204699	update the spec files :)	* 2000-04-22 21:01	3	Closed	bagder	idcmp
207241	Error Code 20 after successful file transfer to As400	* 2000-06-09 09:49	6	Closed	bagder	nobody
209737	Missing port in Host header	* 2000-07-18 06:39	5	Closed	bagder	geekatcmu
210105	Sending authentication data to other servers	* 2000-07-23 23:38	5	Closed	bagder	bagder
210332	bad Host: port when proxy is used	* 2000-07-27 00:19	7	Closed	bagder	bagder
210734	problem with SSL3	* 2000-07-31 20:15	3	Closed	bagder	nobody
211353	URLs with just a password don't work	* 2000-08-07 23:15	4	Closed	bagder	mdowell

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

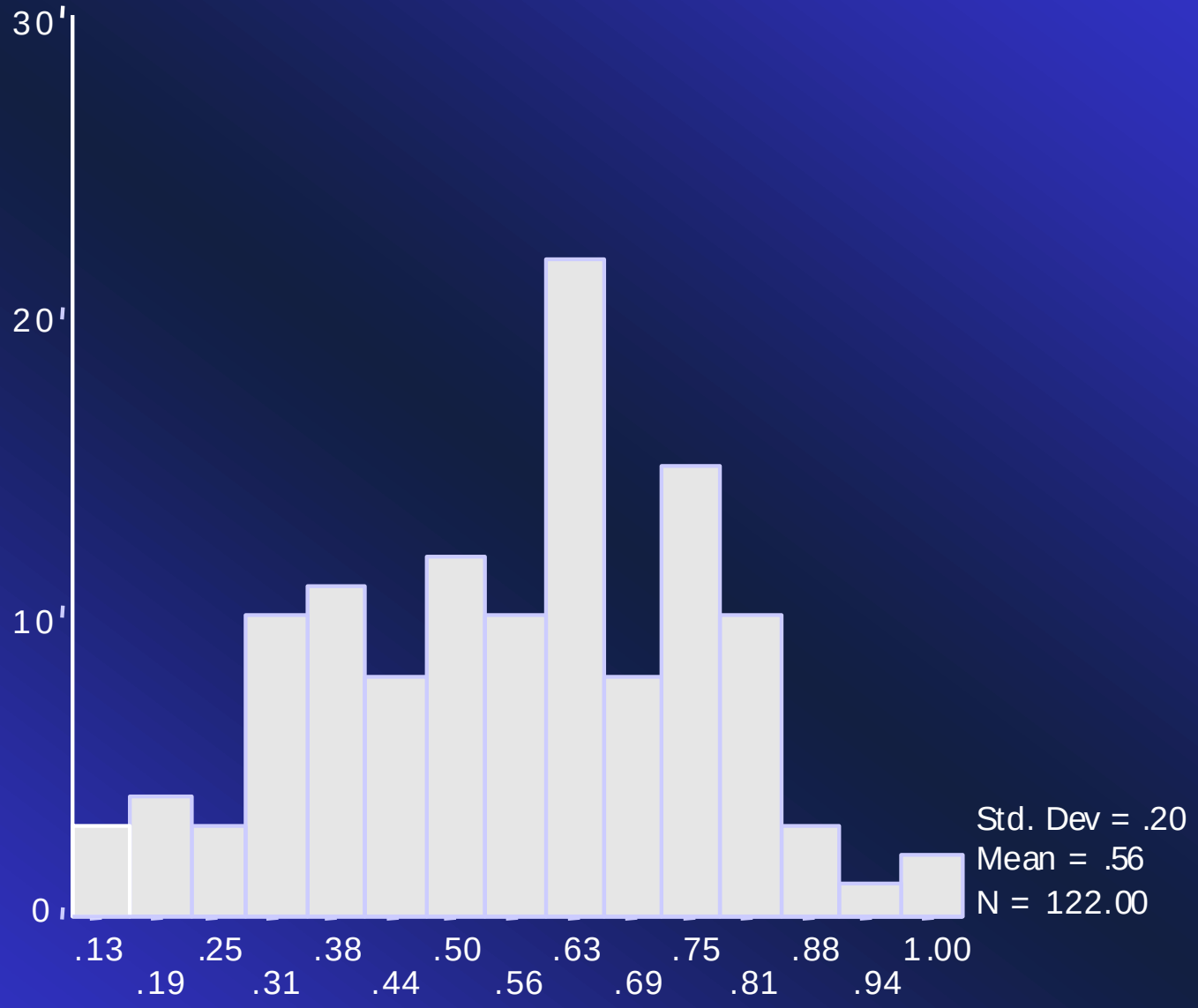
Team structure

- A non-centralized project (centralization = 0.377)



Plot of bug report interactions for SquirrelMail project

Distribution of centralizations



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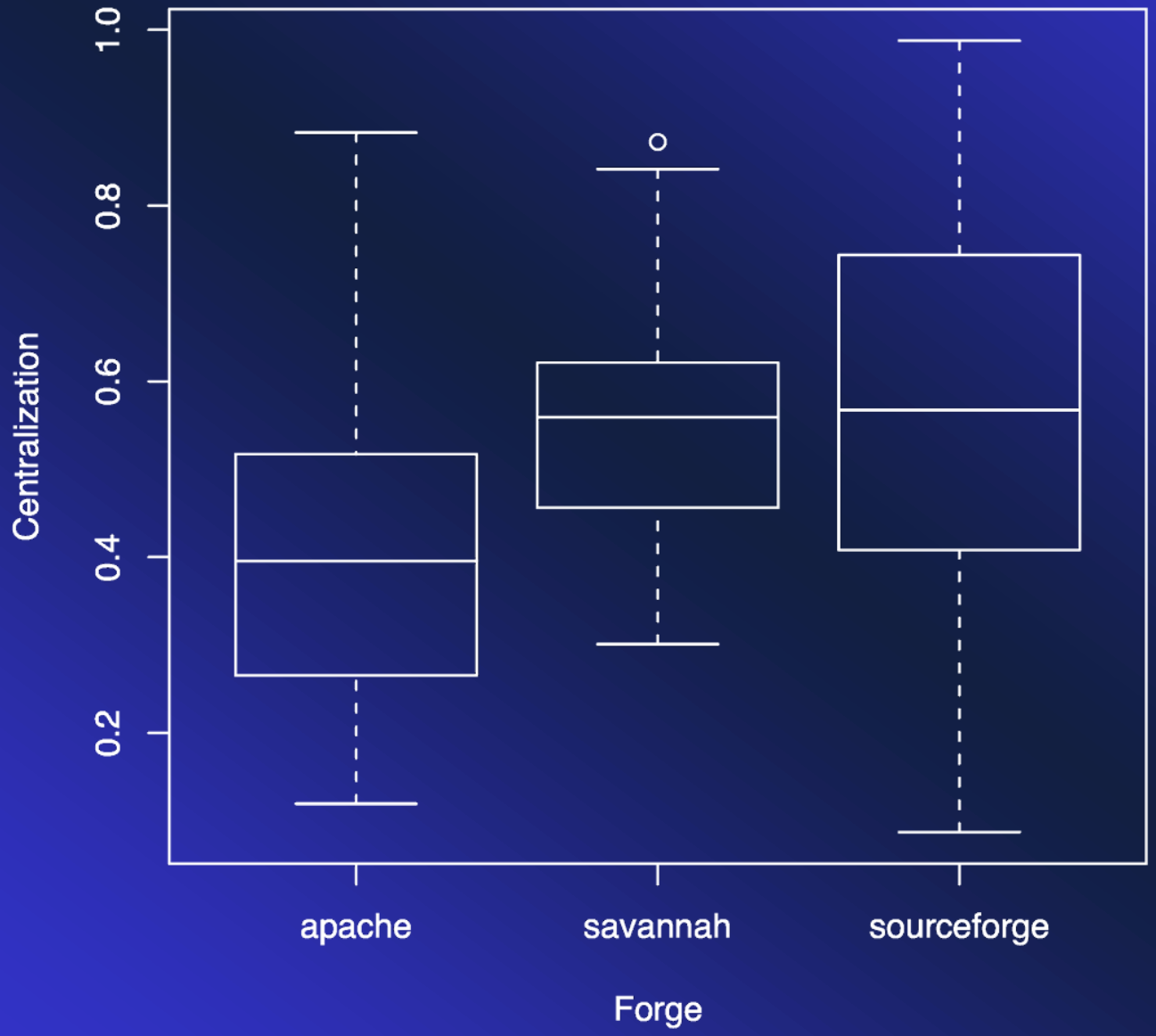
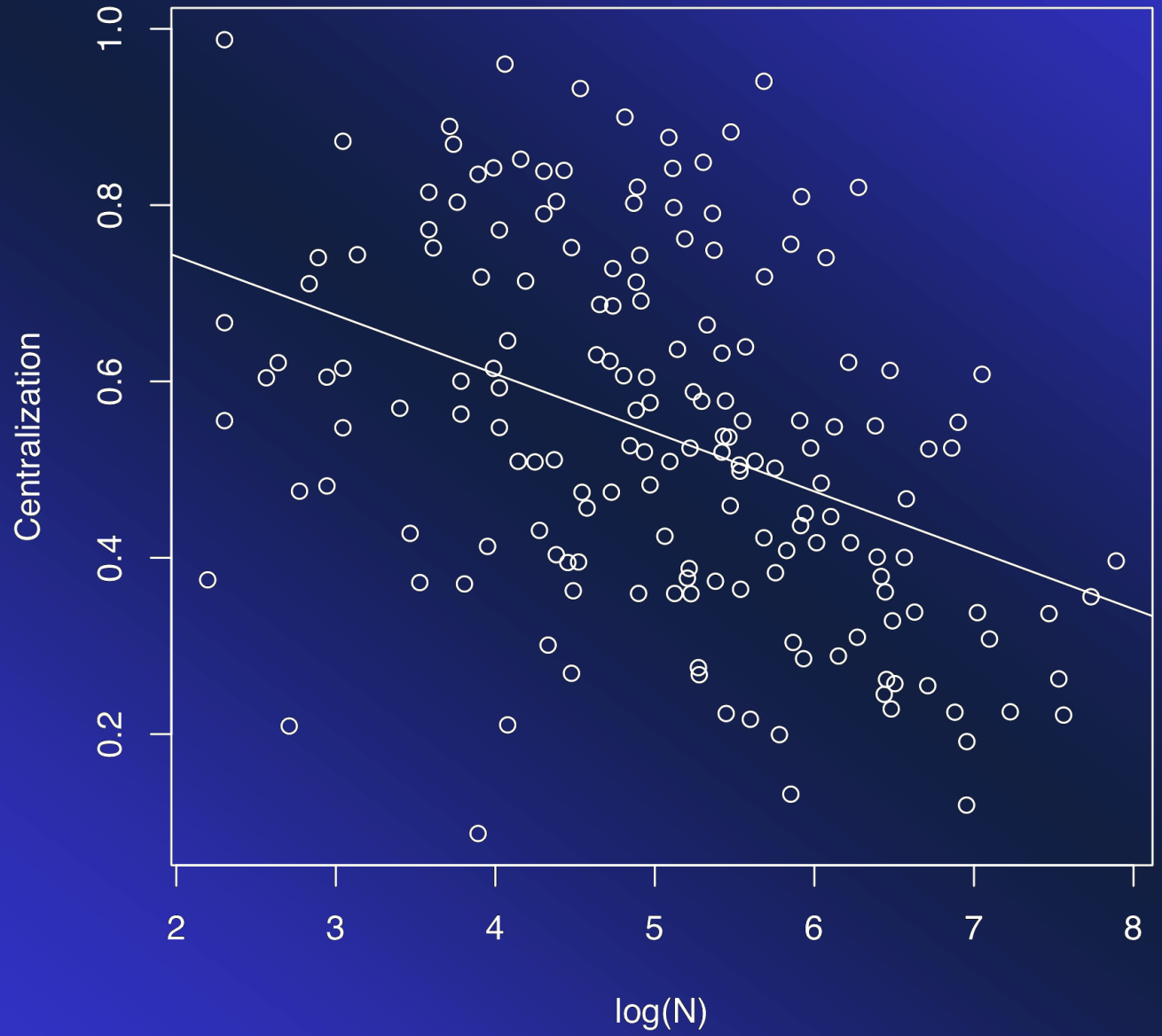
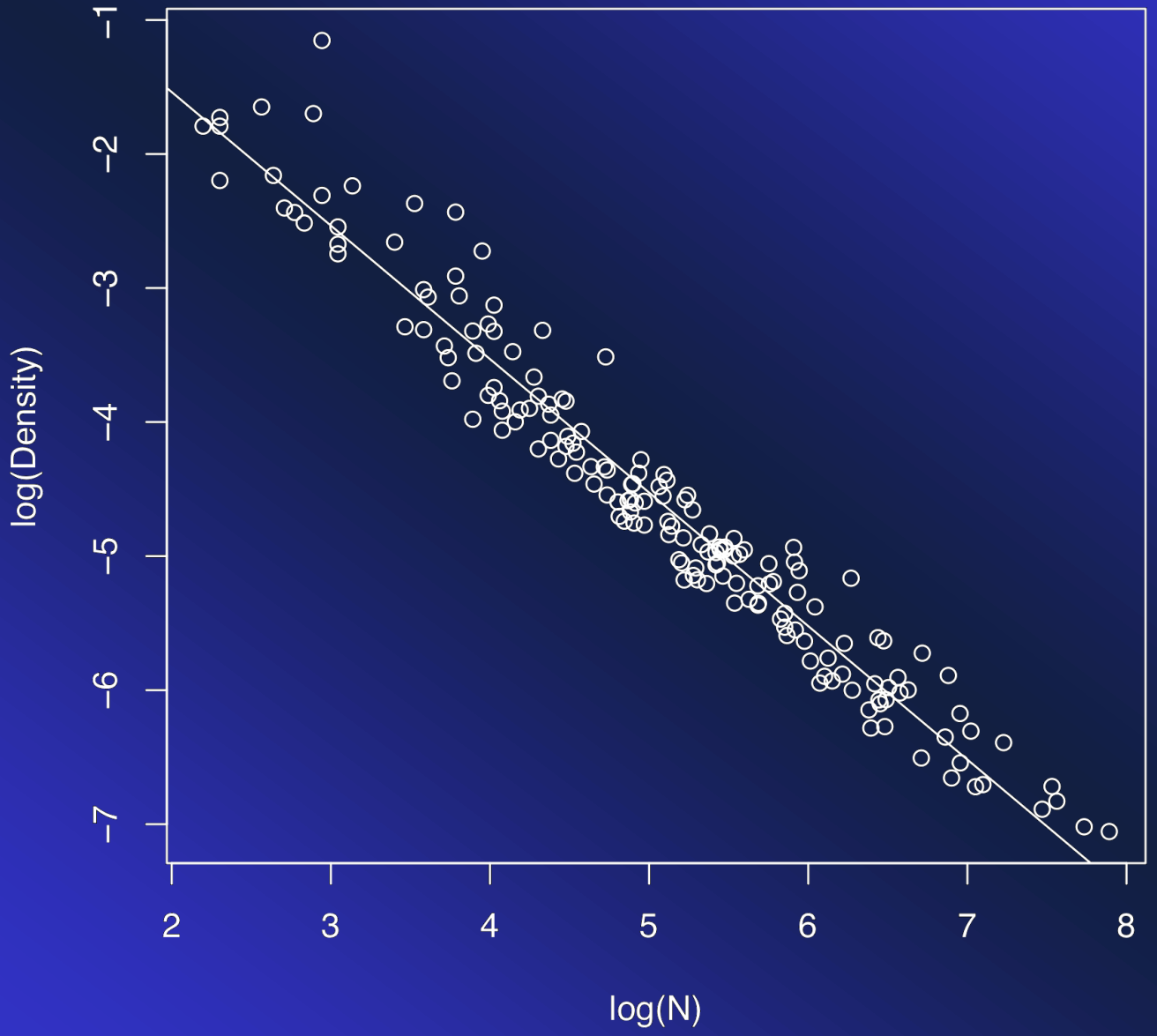


Centralization vs. project size



Density vs. project size



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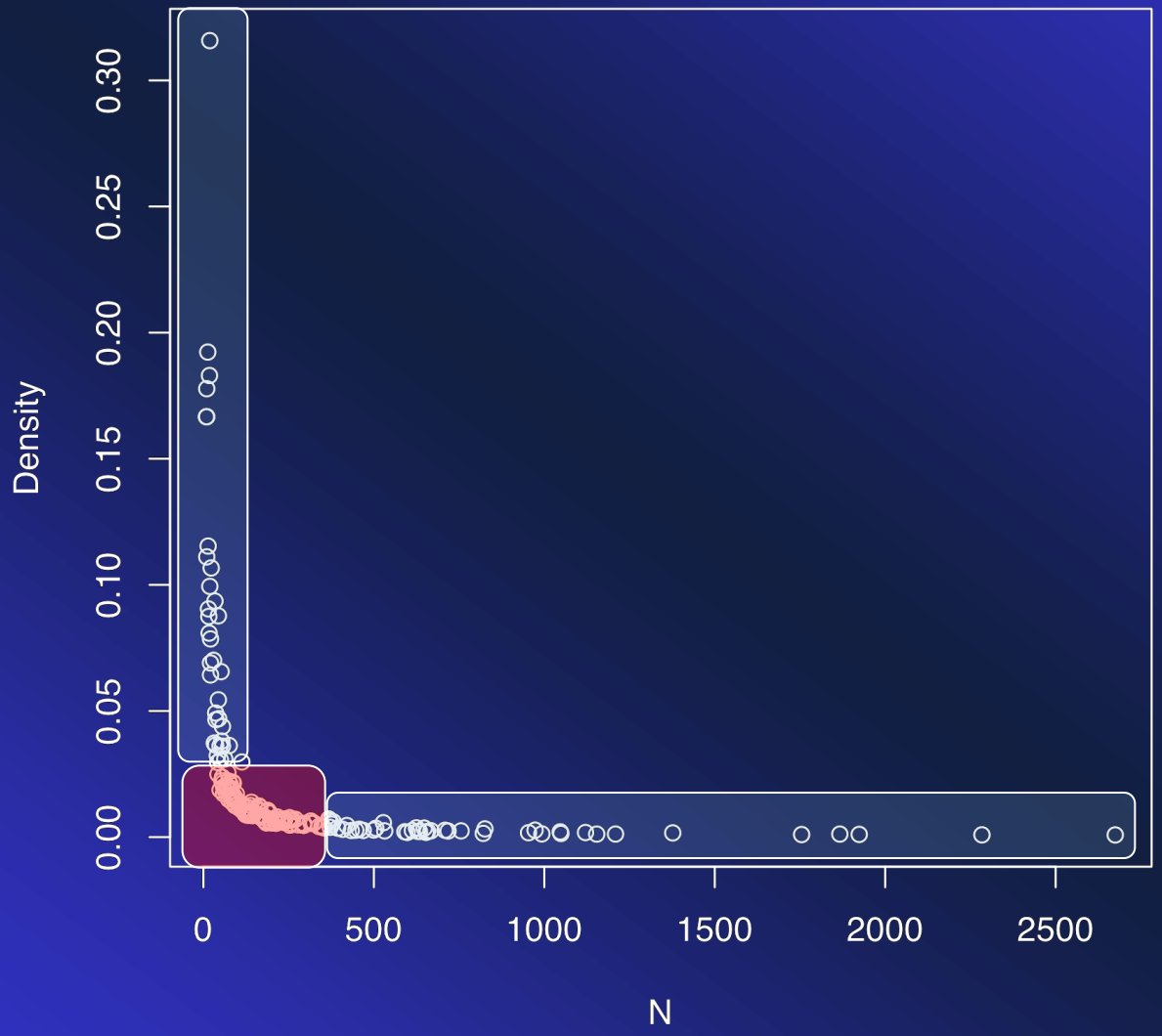

[686314] New incoming convo takes focus

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Submitted By:
Joseph Trapasso (poppins24m)
Date Submitted:
2003-02-13 16:44
Last Updated By:
lschiere - Comment added
Date Last Updated:
2003-05-05 17:23
Category:
None
Group:
None
Assigned To:
Nobody/Anonymous (nobody)
Priority:
5
Status:
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Resolution:
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Summary:
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Followups:

Message

Date: 2003-05-05 17:23
Sender: lschiere
Logged In: YES
user_id=28833

i think this might be fixed in 0.63

Date: 2003-04-05 16:18
Sender: hermanator
Logged In: YES
user_id=613964

Still is the case.. re-opening

Date: 2003-04-05 11:35
Sender: lschiere
Logged In: YES
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Gain 0.60 has been released. This makes your bug report out of
date.

Date: 2003-02-24 11:28
Sender: hermanator

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

```
<?php
/**
 * abook_local_file.php
 *
 * Copyright (c) 1999-2005 The SquirrelMail Project Team
 * Licensed under the GNU GPL. For full terms see the file COPYING.
 *
 * @version $Id: abook_local_file.php,v 1.35 2005/03/20 10:06:45 tokul $
 * @package squirrelmail
 * @subpackage addressbook
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 * Backend for address book as a pipe separated file
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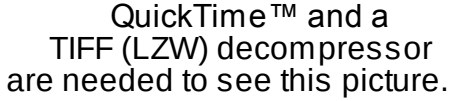
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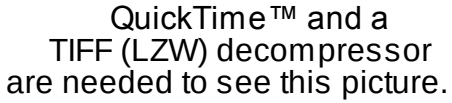
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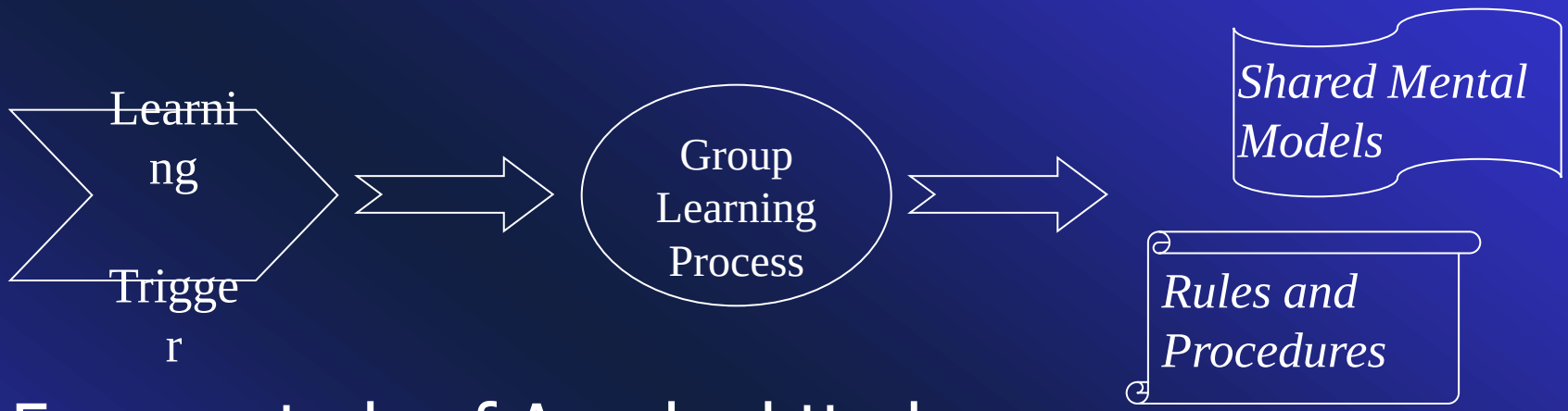
Learning in FLOSS Teams



- From a study of Apache httpd
  - Learning episodes more often triggered by core group member (75%)
  - Learning episodes most often lead to development of shared mental model (76%)
  - Focus of learning was on product (code) rather than process

Source: Hala Annabi, unpublished PhD dissertation.

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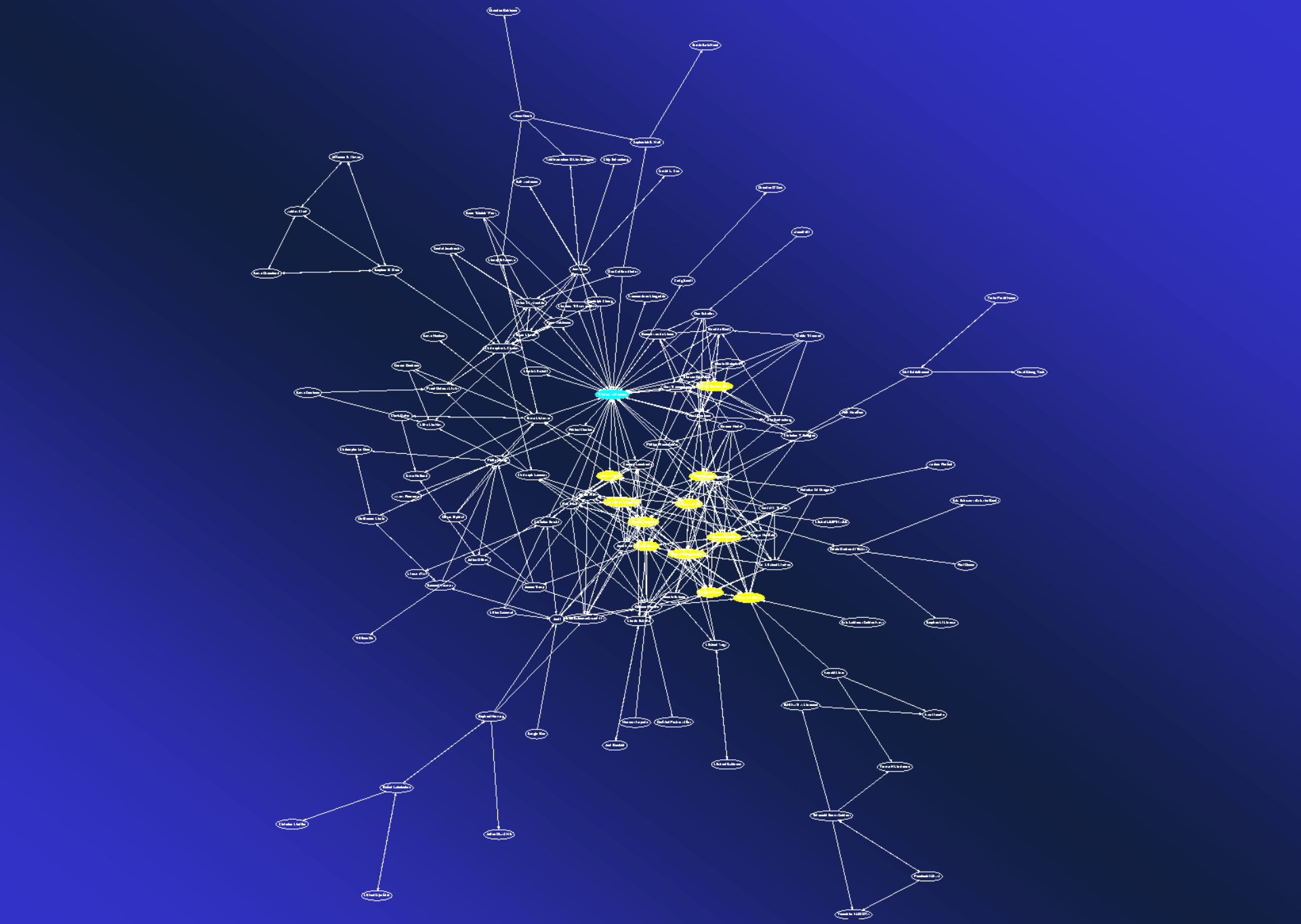
ApacheCon
THIS SITE
UNDER
CONSTRUCTION
Convention
Center

HTTP Server Ant APR Avalon Cocoon Commons Excalibur
Struts TCL Web Server XML XML Beans Beehive Geronimo SpamAssassin
Portals Perl Maven Logging James Jakarta Incubator Derby Gump Forrest
ApacheCON U.S. 2004
THE ONLY SURE THING IN LAS VEGAS
ApacheCON 2004
Hackathon
Sponsored by
IBM
http://www.apachecon.com/
Sister Projects: PHP Module Registry Apache-SSL mod_ssl

Socialization

- In depth participant observation study of Plone, a content management system
  - Importance of IRC, conferences and "sprints"
  - Those with aligned commercial purposes (eg web designers) move quickest to centre
  - Socialization through rich references to geek culture (Star Wars, Ghostbusters, Snowcrash ...)

Source: Chengetai Masango



Source: http://www.chaosreigns.com/code/sig2dot/debian.html

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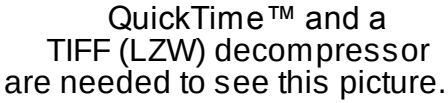
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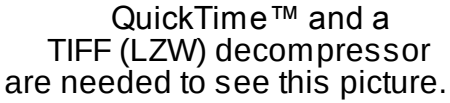
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IS, SE & FLOSS

Sources

- References
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  - http://floss.syr.edu/
  - http://opensource.mit.edu/
  - http://opensource.ucc.ie/