

“Don’t Fear the Penguins”: Negotiating the Trans-local Space of Linux Development¹

MATT RATTO

Networked Research and Digital Information (NERDI), KNAW-Royal Netherlands Academy of Arts and Science, Joan Muyskenweg 25, Postbus 95110, 1090 HC Amsterdam, The Netherlands. (matt.ratto@vks.know.nl). 28 IV 05

[Supplementary material appears in the electronic edition of this issue on the journal’s web page (<http://www.journals.uchicago.edu/CA/home.html>).]

Many writings about modernity emphasize the changing sense of time and space which seems to accompany modern technological developments. Some scholars examine changes in the personal experiences of space/time given such technologies as the railroad and the telegraph (e.g., Schivelbusch 1979). Others explore socioeconomic and political conditions seemingly brought about by electronic networks and digital media (e.g., Harvey 1989; Poster 1995, 2001; Castells 1996, 1997, 2000a, b, 2001). Both sets of literature focus on the sense of compression encouraged by technological development, on the one hand in the reduction of the experienced distance of a journey to the enclosed and unchanging space of the railway carriage and on the other hand in the bringing together of previously separated economic units under the rubric of globalization. Compression, whether of personal, economic, or cultural experience, becomes the primary dynamic for describing modernity.

However, other research demonstrates that this socio-temporal compression is matched by an equivalent *expansion* in the objects of work. This scholarship notes that recent technological developments are also implicated in more distributed forms of labor, whether that of scientists (Knorr-Cetina and Bruegger 2000, Knorr-Cetina 2001), criminal investigations, agriculture, or medicine (Engeström et al. 2003). Thus, while some aspects of modernity seem to imply a shrinking of the world to a “global village” (McLuhan 1966, Harvey 1989), other aspects, in particular those related to group labor, seem to imply the reverse.

© 2005 by The Wenner-Gren Foundation for Anthropological Research. All rights reserved 0011-3204/2005/4605-0006\$10.00

1. I thank members of the Networked Research and Digital Information (NERDI) research group, particularly Anne Beaulieu and Andrea Scharnhorst, for their comments on this report.

A desire to address this dynamic of compression and expansion may be one of the reasons for the current emphasis on the relationship between the global and the local, the connected notions of space/place, and the concept of “flow” which has characterized discourse in anthropology and related fields since the early 1990s (e.g., Massey 1994, Appadurai 1996, Castells 1996). While the focus of individual and collective activity is increasingly diffused across spaces, experience of these spaces often mirrors the experience of the local; the resultant spaces are called by some “trans-local” (Clifford 1997), by others “techno-locales” (Schwarz 2001), and by still others “network localities” (Ito 1999). Rather than see trans-locality as an entirely novel phenomenon generated by technologies such as the Internet, some scholars view it as part of an overall critique of the anthropological emphasis on continuity and the boundaries that separate society into discrete national and cultural units (Gupta and Ferguson 1992, Clifford 1997, Ito 1999).

One response to this has been work on “virtual ethnography” (Hine 2000). Here, questions as to how to constitute the ethnographic field (e.g., Escobar 1994, Lyman and Wakeford 1999) or how to describe identity and embodiment in a digital space (e.g., Balsamo 1995) point up the desire to maintain the strengths of grounded ethnographic analysis while taking seriously the idea that “culture and social relations are distributed across space and structured by forces of a translocal nature” (Ito 1999, Beaulieu 2004).

A separate thread of work has focused on the role of shared objects in maintaining social reality. This scholarship, which examines material objects as one source of social cohesion, comes from such diverse fields as science-and-technology studies (e.g., Latour and Woolgar 1979, Haraway 1991, Bijker et al. 1992, Latour 1999, Pels et al. 2002), anthropology (e.g., Goodwin 1994), and cultural and consumption studies (e.g., Abbas 1996, Bennett 2001). This work includes implicit or explicit critiques of traditional social theories that focus on hierarchical legal or political systems as the main source of social order and studies in social theory (e.g., Giddens 1984) that foreground face-to-face interactions as the primary means by which societies and cultures are constituted and maintained.

In this report I connect these two threads to explore how the contradictory aspects of (post) modernity are addressed by a collective of individuals working together to create and maintain a complex software development project called Linux. In it I rely on ethnographic and historical work done in the preparation of my dissertation (Ratto 2003). This work, based primarily on analyses of web pages, a mailing list used by Linux software developers, interviews with Linux novices and experts, and an examination of the Linux source code, demonstrates

both the complexity of the relationship between Linux developers and the object of their work and the distributed nature of the work itself. I argue that inhabitants of trans-local spaces such as the Linux developers may manage some of the contradictions of local and global, compression and expansion, through a particular relationship to Linux itself, a relationship that allows them to maintain a productive tension between global affiliation and local situatedness and to construct an emotional and empathetic sensitivity to their shared creation. In order to flesh out this relationship, I explore the creation of an image used by Linux developers and advocates to represent their shared object and to locate themselves in relation to it. This image provides a way for developers to articulate their attachments to Linux for themselves and others.

OVERVIEW OF LINUX

Linux² is an operating system like Microsoft Windows or Apple's Mac OS that provides services (such as interfaces, file systems, and application environments) to personal computer users. Linux is currently running on approximately 29–35% of all computer servers and a much smaller percentage of desktop computers (Halperin 2004). Some estimates put the current number of Linux users at around 18 million.³

In contrast to many other operating systems, Linux has been developed via a distributed group of mostly volunteers coordinating their activities over the Internet and relying on the General Public License (GPL).⁴ The Linux development effort is seen as a particularly successful example of free/open-source software development methods.⁵ The originator of Linux, Linus Torvalds, along with a loose and changing group of developers, has

2. There has been some controversy over the naming of Linux. Some developers, notably Richard Stallman, have called for it to be referred to as "Linux/Gnu" in order to validate its dependence on the longer-running GNU development project that Stallman started in 1984. While it is certainly true that the Linux operating system depends upon many other development efforts that accompanied or preexisted the start-up of Linux development, since the majority of programmers themselves call it "Linux" I shall do likewise.

3. Estimate at The Linux Counter (<http://counter.li.org/>), February 8, 2005.

4. The GPL enforces two main values of free/open-source software development. First, every program distributed under the GPL must include the underlying source code that makes it work. Second, and related to the first, users must be allowed to use the available source code to extend the original program or to create their own projects. Developers who make use of the GPL source code must also release the results under the GPL.

5. Research in the social sciences on this software has tended to address issues of motivation and cohesion, including the importance of reputation, trust, and shared values (e.g., Sproull and Moon 2000, Kelty 2001, Hertel et al. 2003), the role of the Internet in the coordination of developer activity (e.g., Smith and Kollock 1999, Preece 2000, Tuomi 2001), and the relationship of the software to traditional forms of development, economics, and markets (e.g., Ghosh 1998, Benkler 2002). More recently, anthropologists have written on Linux and free/open-source software projects, seeing them as sites for the examination of the "everyday experience of living in multiple technically-mediated worlds" (Kelty 2004:500) and "processes of cultural contrast" (Coleman 2004:516).

continued its development since 1991, making it one of the longest-lasting projects of this type. The result is a very large set of programs, the most complex of which contains more than 15 million lines of computer code.⁶ Thus, Linux demonstrates that, despite traditional theories about software development, open-source efforts in developing large-scale software projects can be successful.

THE LINUX COLLECTIVE

Linux is typically understood as a complex set of computer programs that, when combined, constitute a complete operating system that can be used to control a personal computer. There are a number of different groups of programmers working on the various parts of this operating system. While the majority of developers remain volunteers who, for reasons of their own, decide to contribute time and energy to the Linux project, a number of large computer companies including IBM, HP, and Fujitsu also have programmers devoted to Linux coding. In addition there are many commercial companies and non-profit organizations that arrange, distribute, and, in some cases, sell what are known as "distributions" of Linux. These latter groups, called "distributors," are necessary given that individual developers typically work on only one part of the overall system, with few ties between them. While technical standards (typically set at the level of the Linux kernel project run by Torvalds) help to maintain interoperability, collecting all the pieces together, creating programs to install the system, and coordinating bug finding and user issues is typically delegated to these distributors.

The loose and sometimes even combative relationships⁷ between various groups of developers and distributors raises the question how Linux development can be seen as any kind of a "whole"; the system has no central coordinating authority, no specific lines of power and responsibility running between the constitutive elements, and no one to blame when things go wrong.⁸ And

6. This number and the start-up date of 1991 both refer to the development of the Linux kernel, the "heart" of the operating system. Calculating the size of the operating system is impossible, given the number of various parts of it that are customized for different types of computer hardware, different purposes, and different users.

7. The battle between KDE and Gnome, competing desktop interfaces for Linux, is a good example of these relationships. Recalling the PC-versus-Macintosh debates, the developers involved in the KDE and Gnome projects leverage technical, social, and legal arguments to make the case that one desktop project is better than the other (see Foley 2000).

8. For example, in the SCO's recent suit against Linux claiming patent and copyright infringement, rather than suing Torvalds, who besides being the originator of the project is the current copyright holder of the name "Linux," the SCO attacked IBM. The reasons for this choice of defendant are furiously debated within the Linux collective. Deciding whom to blame if infringement is found is difficult given the dispersed and "volunteer" nature of the collective.

yet, there is a sort of collectivity⁹ that includes developers, users, and advocates held together by a set of not always entirely consistent ideas. An important element of this collective is the attachment that exists between its members and Linux itself. A key element of this attachment, revealed in my examination of e-mail lists, web pages, and news articles, is the mascot of the Linux project, Tux the penguin.

TUX THE PENGUIN

In 1996, developers on the Linux kernel mailing list began a conversation about a possible mascot for Linux. At some point in this conversation, Torvalds expressed interest in using a penguin. After a few efforts by developers at creating an image to be used, Torvalds posted the following message:¹⁰

Now, when you think about penguins, first take a deep calming breath, and then think “cuddly.” Take another breath, and think “cute.” Go back to “cuddly” for a while (and go on breathing), then think “contented.” With me so far? Good.

Now, with penguins (cuddly such), “contented” means it has either just gotten laid, or it’s stuffed on herring. Take it from me, I’m an expert on penguins, those are really the only two options.

Now, working on that angle, we don’t really want to be associated with a randy penguin (well, we do, but it’s not politic, so we won’t), so we should be looking at the “stuffed to its brim with herring” angle here.

So when you think “penguin,” you should be imagining a slightly overweight penguin (*), sitting down after having gorged itself, and having just burped. It’s sitting there with a beatific smile—the world is a good place to be when you have just eaten a few gallons of raw fish and you can feel another “burp” coming.

(*) Not FAT, but you should be able to see that it’s sitting down because it’s really too stuffed to stand up. Think “bean bag” here.

After a few efforts and much more discussion by members of the Linux collective,¹¹ a developer named Larry

9. I use the term “collectivity” rather than “community” to point up the fragile and limited associations that connect the Linux project participants and to avoid the important issues beyond the scope of this paper that would need to be discussed if the latter term were used.

10. Re: Linux Logo prototype (torvalds@cs.helsinki.fi) Thu, 9 May 1996 17:48:56 +0300 (EET DST). While Torvalds and many of the other developers originate from other than English-speaking countries, the working language of the Linux collective is English.

11. These discussions, which took place mainly in May 1996, reveal a multitude of possible options for the Linux mascot, including platypus, peacock, albatross, shark, and fox, and a variety of poses and positions, including standing on top of shards of a “Windows” logo, punching out a BSD demon, standing next to a drooling Bill Gates, holding the world in its flippers, and, alternatively, sitting on top of a globe. In the end, Torvalds announced that while the Linux collective could use any depiction of a penguin it chose, he preferred the images created by Larry Ewing (Re: Linux Logo [(tor-



FIG. 1. Larry Ewing’s Tux.

Ewings created an image of what was later named “Tux” (fig. 1) that has since become the de facto standard for the Linux penguin.

This image and the terms listed by Torvalds are not depictions that would typically be associated with computing—“contented,” “randy,” and “beatific” do not conjure up the normal image of computers as standardized, objective, and, most important, rational thinking machines.¹² However, the terms do map what Torvalds obviously thinks should be an affective and emotional relationship between Linux and its human developers and adopters. This is made more apparent by his comments about why he has chosen a penguin as a mascot:

All the other logos were too boring—I wasn’t looking for the “Linux Corporate Image,” I was looking for something fun and sympathetic to associate with Linux. A slightly fat penguin that sits down after having had a great meal fits the bill perfectly.

Don’t take the penguin too seriously. It’s supposed to be kind of goofy and fun, that’s the whole point. Linux is supposed to be goofy and fun (it’s also the best operating system out there, but it’s goofy and fun at the same time!).

These comments indicate the separation of Linux from other operating systems and, to a degree, the rejection of “rational” as the primary characteristic that Torvalds

valds@cs.helsinki.fi) Sun, 12 May 1996 09:39:19 +0300 (EET DST)]. While this did not put an end to the debate, Torvalds’s decision was gradually accepted and Ewings’s penguin became the default image.

12. In fact, emotions are sometimes associated with computers in the realm of the media. However, except in Richard Power’s (1995) *Galatea 2.2*, associating emotions and computers is often depicted as having negative effects. The Hal 2000 computer in Kubrick’s *2001: A Space Odyssey*, despite its unmodulated tone, seems to harbor anger toward Dave after his attempt at deactivation. Equally, Hal’s expression of fear as Dave slowly pulls out his memory modules remains a moving and emotional moment. However much we may sympathize with Hal, his emotions are seen as causing the failure of the mission. For more on Hal, see Stork (1996); for more on people’s emotional responses to computers and other devices, see Reeves and Nass (1996). In addition, recent developments in human–computer–interaction research emphasize the need to develop “affective” interfaces.



FIG. 2. Logos of Linux user groups in Davis, Calif. (left), Vietnam (center), and Israel (right).

wants associated with Linux. Such a perspective on computing follows from the overall emotional and enthusiastic nature of the Linux developers. The development of Linux as both a technical object and a social movement has been built on contentious debates about both how it should develop (i.e., what technical features should be included) and what it might mean (i.e., its social ramifications). People care deeply about Linux, a point that goes some way toward understanding how the collective involved in maintaining and developing Linux manages to stay coordinated. What, then, is the role of Tux and these “feelings” that Linux developers and users have for the object of their work?

TUX AS “BRAND”: COMMERCIAL USE

One way to explain the creation of the Tux penguin image is to see it as part of a process of “branding” and Torvalds’s (and ultimately the collective’s) choice as simply a business decision. Tux, as the representation of Linux, is designed to attract new users, to market Linux as a cuddly alternative to other operating systems, and to indicate the kind of “goofy and fun” world Linux users inhabit. This use of emotions and affect to create consumer desire is of course nothing new. As recent work on commercial logos and mascots indicates, the process of branding is often specifically directed toward conveying particular emotional relationships to consumers. Rather than being only a marketable symbol aimed at encouraging visual recognition, successful brands carry emotional context in the form of specific “personalities” aimed at encouraging and maintaining particular relationships¹³ between consumers, companies, and products (Aaker et al. 2004).

However, the popular commercial distributions of Linux typically do not use the Tux image in their logo. Instead, they have developed their own specific images—the head of a man wearing a red hat for RedHat, a green

lizard for SUSE, a star logo for Mandrake, and a blue spiral for Debian’s specific collection of Linux programs. In fact, few if any of the 344 currently maintained Linux distributions¹⁴ use a penguin in their logos except non-commercial developers. The absence of Tux in the branding of commercial distributions is in no small part due to the desire of each distribution to set itself off from the competition, to establish its own relationships to Linux user/developers, and to maintain a coherent presence/identity distinct from the larger (and more chaotic) Linux collective. Apart from the distributions, however, Tux does appear in commercial contexts and is typically used by both small Linux services organizations and large existing computer companies (such as IBM and Hewlett-Packard) who adopt a Linux strategy. These groups do desire a connection with the larger Linux collective and use the image of Tux to reveal this relationship. This desire was particularly clear in the “Peace, Love, and Linux” ad campaign, during which IBM spray-painted logos containing a peace sign, a heart, and Tux on city sidewalks in San Francisco, Chicago, and New York.¹⁵ In this case, Tux served as a way for IBM to demonstrate its commitment to the “goofy and fun” sensibility of Linux in order to create an alignment with the primarily (at least thus far) noncommercial development environment.

TUX AS LOGO: COLLECTIVE USE

Within the developer community itself, there are a variety of uses of Tux. Many Linux user groups incorporate Tux into their own logos (fig. 2). These groups, typically set up as clearinghouses for Linux knowledge and to encourage and help new Linux users, emphasize the local nature of their charter. The additional elements in each logo also emphasize the local context. The logo of the Davis, Calif., user group incorporates a water tower, a distinctive part of the Davis skyline. In the Vietnamese user group’s logo, Tux is wearing a conical hat that is specific to the Vietnam region, and in the logo of the Israeli user group Tux carries an Israeli flag.

13. And discouraging others. Aaker et al. found that when transgressive behaviors are associated with “sincere” personality-type brands consumers are less ready to “forgive” them than when they are associated with “exciting” personality-type brands. The line of research is demonstrative of the ways in which consumer and marketing research is adapting theories of emotions, trust, and relationships to material and symbolic artifacts.

14. Listed at <http://www.linux.org/dist/list.html>.

15. Needless to say, city officials were not pleased. For more on this campaign see Niccolai (2001).

Tux is also used by advocates and developers in cartoons, often to articulate a particular political or social perspective. Most frequently the picture subject matter relates to the relationship between Linux and Microsoft, a topic of great concern to many groups within the Linux collective. Microsoft and Linux are frequently compared in both social and technical terms. In one such cartoon (fig. 3), Tux is weighed against the Windows logo, and the caption reads: "Competition, the scale of justice, you choose. The symbolism is there, do you get it?" In a more telling image, the friendly Tux has been transformed into a large, angry character, complete with piercings, towering over a chained-up Bill Gates (fig. 4). This is a semiotically loaded image. For example, the fork stuck in the penguin's side may gesture toward the collective's fear of "forking" or division of the Linux collective, a prospect that is frequently seen as damaging to free/open-source software development efforts. Also, the knife sticking out of the back of the transformed Tux speaks to what many members of the Linux collective see as increasingly damaging attacks on Linux by Bill Gates and Microsoft's management team.¹⁶

Importantly, we can see how the attachment to Linux is played out: Linux as Tux is shifted from its "cute" representation (Larry Ewing's original drawing) to represent the anger of the Linux collective toward Gates for his attacks on their beloved artifact. This image and the many others like it are revealed as a space for working out the developer's bond to Linux and reflecting on and defending Linux. In an important sense, then, the image of Tux provides a way of letting Linux speak for itself or, at least, imagining how Linux would speak.

16. These attacks range from specific technical strategies such as the "commodification of protocols" (see <http://www.opensource.org/halloween/>) aimed at reducing Linux's success to discursive moves such as Bill Gates's calling the Linux movement nothing more than "hype" in an interview with the Australian information-technology web site (<http://www.australianit.com.au>).

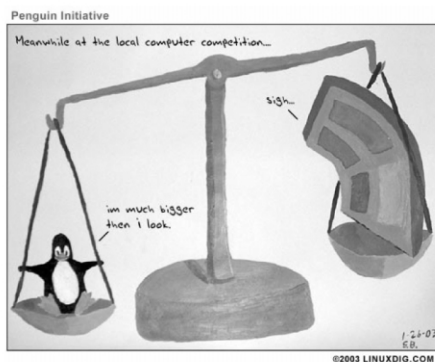


FIG. 3. *Tux weighed against the Windows logo.*



FIG. 4. *Tux and Bill Gates.*

ATTACHMENTS AND SHARED OBJECTS

Above I have pointed to four different uses of the Tux logo: generating a particular type of relationship to the shared object of Linux development, showing a commitment to the sensibilities of Linux, locating oneself as part of the shared, distributed space of development as well as within a specific local geography, and speaking for Linux. What is intriguing about these uses is that they all point to the emotional attachments between the developers and their shared object and the role of these attachments in the management of the distributed Linux collective. These attachments may help answer the question posed by Pels, Hetherington, and Vandenberghe (2002:2): "If (post) modern individualizing societies are able to survive on much less structure, cohesion, or foundation than social theorists generally assumed, how much cement, how much 'existence' does the social actually need? And what is the stuff that it is made of?" The authors point to the "performative and integrative capacity of things" in addressing this question. Moreover, they note that older frameworks (and in particular critical materialist analyses based on Marx) that focus on reification and fetishization do not provide the resources necessary for understanding the role of material objects in social coherence. Understanding this role requires more than a dismissal of the affective relationships between things and people as simply "commodity fetishism." In this, Bruno Latour's (1999) definition of the "factish" or "faitiche" (as opposed to the fetish) as a shared object given social power through a community's collective agreement provides a good starting point. Studies of commodity culture are also a rich terrain for exploring alternative materialist positions. One such analysis replaces the idea of "fetishism" with that of "enchantment," replacing the fear of the "idolatry of consumption" (Bennett 2001:2) with a perspective that acknowledges emotional response, "the sense of vitality,

the charged-up feeling," as a means for participation in commodity culture. While this author notes that the "demystification" of commodification and the normalization (of bodies and/or identities) that commercial exploitation often involves should be encouraged, her goal is to "design individual and collective strategies for exploiting the ethical potential within commodity culture."¹⁷

Here, the Linux collective provides a good case for examining how emotional responses to what is arguably¹⁸ a commodity object are a socially productive part of maintaining a geographically dispersed collective identity. Moreover, the variety of Tux images available on the web points to an equal variety of emotional responses. These images include Tux going for a walk on a rainy day in the Netherlands, Tux sitting in the oval office of the U.S. White House, Tux dressed like the Statue of Liberty, and Tux lying on the beach drinking something cool.¹⁹ The association between Tux and these various activities and more abstract aspects such as power and freedom point the way toward a better understanding of the relationship between emotions and social order.

A possibly useful starting place is the work of cultural psychologists and social theorists who explicitly focus on the relationship between higher-order mental functions (such as emotions) and social relations. Much of this scholarship draws upon the work of Russian psychologists such as Vygotsky and Leontev who reflected on the relation between individual actions and group activities (Leontjev 1978; Vygotsky 1978; Vygotsky et al. 1987, 1997; Shotter 1989; Kozulin 1990; Cole 1999; Mahn and John-Steiner 2002; Aboulafia and Bannon 2004). One example of this work explicitly divides the category of "feelings" into three discrete levels; affects, brief immediate responses to sudden, local stimuli; emotions, episodic responses to longer-term situations; and sentiments or attitudes, which orient individuals over time, determine the content of emotional responses, and are linked to social phenomena such as ethics, morals, and

17. In this light, analytic traditions from marketing, management, and business studies, while often uncritical of their implicit consumerist language, may provide a more sophisticated understanding of the role of symbols, emotional attachments, and objects in the formation and maintenance of (post) modern society (e.g., Aaker et al. 2001, 2004; Muñiz and Schau 2005). A laudable task would be to connect the consumption and cultural studies literature cited earlier with research from marketing and management studies. However, it may never be possible to overcome the different social, political, and moral goals that these various disciplines implicitly and explicitly hold.

18. I say "arguably" because on the surface there seems to be more of a connection between the production of Linux and the generators of the images of Tux than there is between most people and the material objects in their lives. However, we might be hard-pressed to identify the line between labor and commodification that seems so clear in Marx. For example, does the "breaking-in" of a pair of jeans count as labor? What about the customization of a car or bicycle or the installation of a software package?

19. For these and many other images of Tux, see <http://lwn.net/Gallery/> (accessed April 1, 2005). [For a selected subset, see the electronic edition of this issue on the journal's web page.]

aesthetics (Aboulafia and Bannon 2004). Such a framework can provide a way of linking individual affectual and emotional responses to the performance of cultural attitudes and, importantly, better understanding of the way feelings relate to the maintenance of social relations.

For example, the angry Tux is used to express the anger felt by the creator of the image in response to what are seen as Microsoft's transgressions. In this image the moral codes of the Linux collective are performed, and the individual feeling of anger is linked to the moral sentiment of the collective. Both the creation of this image and its circulation on the web become a means for the production and maintenance of the culture of Linux. Although this is a brief example, it points the way toward an understanding of the way collectives may use shared objects and the feelings individuals have for them to support their activity.

CONCLUSION

I have examined the affective relationship of developers and users of Linux to their shared object, the way this relationship is manifested through the collective use of the image of Tux, and some of the possible ways in which Linux and Tux help manage the issues involved in maintaining distributed and collective social relations. In this effort I have combined two perspectives that may be useful in understanding how distributed (post) modern cultures may overcome the tensions of global/local spaces and the dynamics of expansion and compression characteristic of recent technological development: the view that shared material objects (such as the Linux software) can serve as an alternative location for social organization and the position that "feelings" are an important cognitive resource used by individuals to manage their individual actions and connect them to larger cultural activities. The combination of these perspectives results in an analysis that views the feelings developers and users have for Linux as a necessary and important part of their participation in their distributed collective.

In one further example (fig. 5), the message seems facetious—who could fear the cuddly, cute, and contented Tux? However, as in the 1970s horror film *Night of the Lepus*, in which giant mutant rabbits attack a town in Arizona, it is the number and size of the penguins that



FIG. 5. *Multiple Tuxes.*

make one a little uneasy. The image thus draws upon a sophisticated emotional repertoire both to raise and to quiet fears about the spread of Linux and, simultaneously, to poke fun at the proprietary software developers²⁰ who express them. In addition, in contrast to the “localized” versions of the penguin depicted above, here it is the shared “multiplicity” of Tux that is represented. From it one gets the sense that away from the particular and specific geographical contexts and cultures (depicted by skylines, clothing, and flags), the “Tuxes” are all the same. The balancing of the variety of geographical and cultural contexts in which development takes place with the shared object of Linux is thus enacted through the creation and circulation of representations of this object that convey the sentiments of the Linux collective by attempting to engender affective and emotional responses.

References Cited

- AAKER, J., V. BENET-MARTÍNEZ, ET AL. 2001. Consumption symbols as carriers of culture: A study of Japanese and Spanish brand personality constructs. *Journal of Personality and Social Psychology* 81:492–508.
- AAKER, J., S. FOURNIER, ET AL. 2004. When good brands do bad. *Journal of Consumer Research* 31:1–16.
- ABBAS, A. 1996. “Cultural studies in a postculture,” in *Disciplinary and dissent in cultural studies*. Edited by C. Nelson and D. P. Gaonkar, pp. 291–92. London: Routledge.
- ABOULAFIA, A, AND L. BANNON. 2004. Understanding affect in design: An outline conceptual framework. *Theoretical Issues in Ergonomics Science* 5(1): 4–15.
- APPADURAI, A. 1996. *Modernity at large: Cultural dimensions of globalization*. Minneapolis: University of Minnesota Press.
- BALSAMO, A. 1995. Forms of technological embodiment: Reading the body in contemporary culture. *Body and Society* 1: 215–37.
- BEAULIEU, A. 2004. Meditating ethnography: Objectivity and the making of the Internet. *Social Epistemology* 18:139–64.
- BENKLER, Y. 2002. Coase’s penguin, or Linux and the nature of the firm. *Yale Law Journal* 112:369–446.
- BENNETT, J. 2001. Commodity fetishism and commodity enchantment. *Theory and Event* 5(1). http://muse.jhu.edu/journals/theory_and_event/v005/5./bennett.html.
- BIJKER, W. E., AND J. LAW. Editors. 1992. *Shaping technology, building society: Studies in sociotechnical change*. Cambridge: MIT Press.
- CASTELLS, M. 1996. *The rise of the network society*. Cambridge: Blackwell.
- . 1997. *The information age: Economy, society, and culture*. Vol. 2. *The power of identity*. Oxford: Blackwell.
- . 2000a. 2d edition. *The information age: Economy, society, and culture*. Vol. 1. *The rise of the network society*. Oxford: Blackwell.
- . 2000b. 2d edition. *The information age: Economy, society, and culture*. Vol. 3. *End of millennium*. Oxford: Blackwell.
- . 2001. *The Internet galaxy: Reflections on the Internet, business, and society*. Oxford: Oxford University Press.
- CLIFFORD, J. 1997. *Routes: Travel and translation in the late twentieth century*. Cambridge: Harvard University Press.
- COLE, M. 1999. “Cross-cultural research in the sociohistorical tradition,” in *Lev Vygotsky: Critical assessments*, vol. 1, *Vygotsky’s theory*. Edited by E. Peter Lloyd and E. Charles Fernyhough. London: Taylor & Francis/Routledge.
- COLEMAN, G. 2004. The political agnosticism of free and open source software and the inadvertent politics of contrast. *Anthropological Quarterly* 77:507–19.
- ENGESTRÖM, Y., A. PUONTI, ET AL. 2003. “Spatial and temporal expansion of the object as a challenge for reorganizing work,” in *Knowing in organizations: A practice-based approach*. Edited by D. Nicolini, S. Gherardi, and D. Yanow, pp. 151–86. Armonk: M. E. Sharpe.
- ESCOBAR, A. 1994. Welcome to Cyberia: Notes on the anthropology of cyberculture. *CURRENT ANTHROPOLOGY* 35:211–321.
- FOLEY, M. 2000. GNOME vs. KDE: This means war? *ZDnet News*. http://news.zdnet.com/2100-9595_22_523188.html?legacy-zdnn.
- GHOSH, R. A. 1998. Cooking-pot markets: An economic model for the trade in free goods and services on the Internet. *First Monday* 3(3). http://www.firstmonday.dk/issues/issue3_3/ghosh/index.html.
- GIDDENS, A. 1984. *The constitution of society: Outline of the theory of structuration*. Cambridge: Polity Press.
- GOODWIN, C. 1994. Professional vision. *American Anthropologist* 96:606–33.
- GUPTA, A., AND J. FERGUSON. 1992. Space, identity, and the politics of difference. *Cultural Anthropology* 7:6–23.
- HALPERIN, D. 2004. Stat Wars: Measuring OS market share. <http://www.TechNewsWorld.com>.
- HARAWAY, D. 1991. *Simians, cyborgs, and women: The reinvention of nature*. New York: Routledge.
- HARVEY, D. 1989. *The condition of postmodernity*. Oxford: Basil Blackwell.
- HERTEL, G., S. NIEDNER, ET AL. 2003. Motivation of software developers in the open-source projects: An Internet-based survey of contributors to the Linux kernel. *Research Policy* 32: 1159–77.
- HINE, C. 2000. *Virtual ethnography*. London: Sage.
- ITO, M. 1999. *Network localities: Identity, place, and digital media*. San Diego: Society for Social Studies of Science.
- KELTY, C. 2001. Free software/free science. *First Monday* 6(12). http://www.firstmonday.org/issues/issue6_12/kelty/index.html.
- . 2004. Culture’s open sources: Software, copyright, and cultural critique. *Anthropological Quarterly* 77:499–506.
- KNORR-CETINA, K. 2001. “Objectual practice,” in *The practice turn in contemporary society*. Edited by K. Knorr-Cetina, E. v. Savigny, and T. R. Schatzki, pp. 175–88. London: Routledge.
- KNORR-CETINA, K., AND U. BRUEGGER. 2000. The market as an object of attachment: Exploring postsocial relations in financial markets. 25:141–68.
- KOZULIN, A. 1990. *Vygotsky’s psychology: A biography of ideas*. New York, Harvester Wheatsheaf.
- LATOUR, B. 1999. *Pandora’s hope: Essays on the reality of science studies*. Cambridge: Harvard University Press.
- LATOUR, B., AND S. WOOLGAR. 1979. *Laboratory life: The social construction of scientific facts*. Beverly Hills: Sage.
- LEONTJEV, A. N. 1978. *Activity, consciousness, and personality*. Moscow: Progress.
- LYMAN, P., AND N. WAKEFORD. 1999. Going into the (virtual) field. *American Behavioral Scientist* 43:359–76.
- MC LUHAN, H. M. 1966. *Understanding media: The extensions of man*. New York: Beacon.
- MAHN, H., AND V. JOHN-STEINER. 2002. “Gift of confidence: A Vygotskian view of emotions,” in *Learning for life in the 21st century: Socio-cultural perspectives of future education*. Edited by G. Wells and G. Claxton, pp. 46–59. Oxford: Blackwell.
- MASSEY, D. 1994. *Space, place, and gender*. Oxford: Polity Press.
- MUNDIE, C. 2001. The commercial software model. <http://www.microsoft.com/presspass/exec/craig/05-03sharedsource.asp>.

20. One fear that has been expressed about Linux and other software licensed under the GPL is that it is “viral” —a term used by Microsoft Senior Vice President Craig Mundie to refer to the fact that “the GPL mandates that any software that incorporates source code already licensed under the GPL will itself become subject to the GPL” (Mundie 2001).

- MUÑIZ, A. M., JR., AND H. J. SCHAU. 2005. Religiosity in the abandoned Apple Newton brand community. *Journal of Consumer Research* 31:737-47.
- NICCOLAI, J. 2001. IBM's graffiti ads run afoul of city officials. <http://archives.cnn.com/2001/TECH/industry/04/19/ibm.guerilla.idg/>.
- PELS, D., K. HETHERINGTON, AND F. VANDENBERGHE. 2002. The status of the object: Performances, mediations, and techniques. *Theory, Culture and Society* 19(5/6):1-21.
- POSTER, M. 1995. *The second media age*. Cambridge: Polity Press.
- . 2001. *What is the matter with the Internet?* Minneapolis: University of Minnesota Press.
- POWER, R. 1995. *Galatea 2.2*. New York: Farrar, Straus & Giroux.
- PREECE, J. 2000. *Online communities: Designing useability, supporting sociability*. Chichester: Wiley.
- RATTO, M. 2003. The pressure of openness: the hybrid work of Linux free/open source kernel developers. Ph.D. diss., University of California, San Diego, La Jolla, Calif.
- REEVES, BYRON, AND CLIFFORD NASS. 1996. *The media equation: How people treat computers, television, and new media like real people and places*. Stanford: CSLI Publications.
- SCHIVELBUSCH, W. 1979. *The railway journey: Trains and travel in the 19th century*. New York: Urizen.
- SCHWARZ, H. 2001. *Techno-locales: Social spaces and places at work*. Cambridge: Society for the Social Study of Science.
- SHOTTER, J. 1989. Vygotsky's psychology: Joint activity in a developmental zone. *New Ideas in Psychology* 7:185-204.
- SMITH, M., AND P. KOLLOCK. Editors. 1999. *Communities in cyberspace*. London: Routledge.
- SPROULL, L., AND I. Y. MOON. 2000. Essence of distributed work: The case of the Linux kernel. *First Monday* 5(11). http://www.firstmonday.dk/issues/issue5_11/moon/index.html.
- STORK, D. Editor. 1996. *HAL's legacy: 2001's computer as dream and reality*. Cambridge: MIT Press.
- TUOMI, I. 2001. Internet, innovation, and open source: Actors in the network. *First Monday* 6(1). http://firstmonday.org/issue6_1/tuomi/index.html.
- VYGOTSKY, L. S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.
- VYGOTSKY, L. S., R. W. RIEBER, ET AL. 1987. *The collected works of L. S. Vygotsky*. Vol. 1. *Problems of general psychology*. New York: Plenum Press.
- . 1997. *The collected works of L. S. Vygotsky*. Vol. 4. *The history of the development of higher mental functions*. New York: Plenum Press.