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From Shrink Wrap to Services: The Universal Machine and Universal Exchange

Andrew Lison

The shift within digital media from software to services represents a level of ubiquity above and beyond that of multimedia, the digital's relation of previously-existing forms of media within its binary system of equivalence, and into the relation of social relations themselves. In this sense, it both mirrors and complements the global spread of capitalism, which also seeks to make both goods and relations equivalent (but not equal) through the money form. Tracing this shift, this chapter examines connections between the development of end-user Software as a Service and the service economy enabled by mobile apps like Uber and TaskRabbit to argue that "service" in this context should be understood as the universal medium's extraction of value from the increasingly universalized process of exchange.

Information is the key commodity in the organizational logic of protocological control. (Galloway and Thacker 2007, 57)

The digital is a totalizing force. The history of its development as medium, which is equally the history of its development as concept, is the progressive subsumption of previously existing methods, media, and, eventually, relations into fundamentally binary logics of (re)production and transmission. Thus, when Friedrich Kittler asserts that "There is no Software," he does so in order to highlight the capabilities (and, ultimately, limitations) of Turing's *universal machine*, wherein the potential for this subsumption resides, as opposed to any individual program, which can only represent a particular instance of it (Kittler 1995). Capital, too, effects a similar totalization, rendering human relations as much as the goods they produce comprehensible through a logic of universal exchange, one that simultaneously and paradoxically implies both equality (all social transactions can be made equivalent, for they can be effected by conversion into the money form) and inequality (one side of the transaction—that of the capitalist—nevertheless accrues more value than the other). If software is the mechanism by which specific processes and media become interchangeable aspects of the universal machine, then globalization is the process by which individual regions, peoples, and labor practices are incorporated within a worldwide system of capitalist political economy. Thus, significant work considering the encounter between a globalizing capitalist tendency and regional particularity notwithstanding (e.g. Tsing 2005), analyses of capitalism as a totalizing force remain key to fully accounting for both its power and drive.

The question thus arises of the relation between the digital and global or late capitalism, as Marxist thinkers have often termed it (e.g. Mandel 1978, Jameson 1991). It has been a foundational

tenet of Marxist epistemology that, contrary to the way I have described it above, universal exchange has served to *obscure* human relations rather than—or, to be more precise, simultaneously instead of and in addition to—rendering them into a system of equivalence. Thus, the critique of the commodity form laid out in the opening of *Capital* and, hence, the many subsequent attempts to lift, provisionally and in advance of a really-existing communist society, the "veil…from the countenance of the social life-process" (Marx 1976, 173) by way of demystificatory analysis and, subsequently, avant-garde *Verfremdung*, the latter being the very technique that, as Lev Manovich has argued, graphical digital interfaces ultimately defang by fully incorporating (Manovich 2001, 306–307). Yet the rise of *graphical user interfaces* (GUI) in the late 1980s and early 1990s, and especially the multimedia software that accompanied them, situates software at a paradoxical nexus in that the critique it renders toothless is outlasted by the very form it was meant to critique. This form is not so much capitalism itself as it is its specifically commoditized manifestation, which reaches its apotheosis in the *shrink-wrapped* software package and, in doing so, also outlasts—if only just barely—the really-existing "communist" societies of Eastern Europe.

To say that the commodity peaks with the advent of the shrink-wrapped software package is not to say that shrink-wrapped software somehow represents the ideal, Platonic commodity. Rather, it is to assert that shrink-wrapped software indicates the final moments of a political economy fundamentally predicated upon the commodity form, that is, one in which nearly all socio-economic relations, even those primarily effected through medium-agnostic "informational" products, are masked through the circulation of material goods. The view of modern media as essentially a function of technological reproducibility has been in play at least since Walter Benjamin's analysis (Benjamin 1968), if not the advent of movable type itself, but the antinomies between a commodity in which a fixed amount of labor

is invested and one in which an initial, extensive outlay of labor is subsequently amortized over large numbers of comparatively inexpensive copies is stretched to its breaking point in shrink-wrapped multimedia software.[1] At the root of these contradictions lies the question of whether consumers are purchasing an object to do with as they please (including copying whatever content it may contain), or a license to the content contained *within* the object, to which they are subsequently subject to restrictions.[2] The question of licensing becomes crucial precisely at the moment that media are no longer confined to the objects in which the industrial production process has enshrined them but become effortlessly reproducible, which is to say subject to piracy (Kittler 1995). Already the lesson of 1980s campaigns like the British Phonographic Industry's (BPI) "Home Taping is Killing Music," in the case of digital multimedia so-called intellectual commodities become reproducible without so much as the degradation of quality induced by analog reproduction. Consequently, the BPI campaign was followed shortly thereafter by both a cavalcade of digitally-enabled sampladelia in the popular music of the late 1980s and a renewed focus on copyright law within the industry (see, for example, Clover 2009, 25–50). Shrink-wrapped software represents the apotheosis of the commodity form because, without the deliberate addition of

1 This problematic is not easily reducible to the classical Marxist distinction between fixed and variable capital in that components of the culture/media industry's creative process, in pre-networked times, were (and still often are) generally not themselves able to be commoditized as easily (if at all) as its output was. Thus, "creative" costs (storytellers, directors, musicians, programmers, etc.) remain to a large extent variable; one cannot (yet?) purchase a scripting machine at fixed cost and thereby make professional screenwriters obsolete, although one *can* now "crowdsource" them.

2 It is of course imperative to consider this question in relation to the music industry's own shift to digital media with the compact disc in the early 1980s, a shift predicated upon convincing consumers to repurchase their favorite recordings as new media commodities and most decidedly not characterized in terms of any kind of "media upgrade license" affording those who already owned them on vinyl or cassette the right to experience them on a new format. See also Sterne (2012), 219.

"copy protection," it is the first commodity that can be exactingly yet painlessly copied by end-users on a massive scale and thus, in a sense, the last. This is a problem analyzed by Kittler from the perspective of what might still barely be called production, or *software development*: the impossibility of claiming ownership of a universally computable algorithm that must be overcome in order to ground the rise of software as commodity (Kittler 1995).[3] On the side of what might equally as tenuously still be described as consumption, that of the end-user, consider instead in this regard The Software Publishers Association's (SPA) infamous 1992 "Don't Copy That Floppy" video, which tellingly highlights

3 For Kittler, software compilation enables universally computable algorithms to become obscured and thus property, a process which he productively but erroneously equates with mathematical encryption: "The ever-growing hierarchy of high-level programming languages works exactly the same way as one-way functions in recent mathematical cryptography…For software, this cryptographic effect offers a convenient way to bypass the fact that by virtue of Turing's proof the concept of mental property as applied to algorithms has become meaningless…Every license, every dongle, every trademark…prove[s] the functionality of one-way functions" (Kittler 1995). In actuality, the distinction between the two is key: decoding a message encrypted with a sufficiently advanced "one-way" algorithm, while so computationally intensive as to remain infeasible without the key with which it has been encrypted, nevertheless produces an exact replica of the encoded message when performed successfully; there is no such guarantee with decompilation. Although crucial for the reification of software into a commodity, compilation might be more accurately analogized to a kind of lossy compression. To put it another way, decompilation is properly undecidable, with only a partial reconstruction existing in the complexity class NP-complete (Horspool and Marovac 1980, 223, 227), while by contrast full decryption of a "one-way" ciphertext without the key is, at best, as Kittler describes, NP-complete. (What Claude Shannon defines as a "Perfect Secrecy" system, however, would be properly undecidable because the number of possible decryptions would equal the number of possible plaintext messages (Shannon 1949, 659). Such a system carries the difficult requirement of a truly random key, pre-shared between the sender and receiver, of equal or greater informational value (e.g., length) to the message to be encrypted; contemporary digital encryption systems generally trade this undecidable perfection for smaller amounts of entropy (i.e., manageable key length), reusability, and the possibility of public, yet reasonably secure, key exchange).

the issue of software piracy through a musical form then at the height of its popularity, hip-hop.

The video begins with two schoolchildren debating whether to copy a game in order to take it home and continue playing when "DP," a rapping "disk protector," appears on their computer screen to discourage them. Citing the economic costs of copying software, DP, played by actor and lawyer M.E. Hart, explicitly connects the software industry to the retail store:

> One leads to another then ten then more
> and no one buys any disks from the store
> so no one gets paid and they can't make more
> the posse breaks up and that closes the stores.
> (SPA/M.E. Hart 1992)

Indeed, the video seems to suggest that software is inseparable from the physical medium in which it is inscribed:

> The more you take the less there will be
> the disks become fewer, the games fall away
> the screen starts to shrink and then it will fade
> programs fall through a black hole in space
> the computer world becomes bleak and stark
> loses its life and the screen goes dark.
>
> Welcome to the end of the computer age.
> (SPA/M.E. Hart 1992)

The "computer age" here is unthinkable not simply without a material support (an observation unremarkable to the point of obviousness) but without a very specific material support, the floppy disk, and the system of economic relations—again not simply capitalism but a specific system of commodity distribution and retail sales—that enables it. Yet the video itself not only seems aware of the uphill battle it faces in convincing computer-savvy kids not to pirate software (at one point it even seemingly admits that it is often trivial to do so), it relies on the very features of iterability whose deployment it seeks to curtail in its audience.

Hip-hop, of course, as Joshua Clover has noted, is perhaps the popular musical genre most closely associated with sampling and appropriation (Clover 2011, especially 89–90; see also Clover 2009, 25–50), and the video's musical backing track is accompanied by stock graphics that are cycled through by applying various changing color palettes in a veritable *tour de force* of the era's multimedia production standards. Indeed, one wonders to what extent the video and its soundtrack are composed out of fully licensed (or license-free) sources, or rather if its makers might instead perhaps claim fair use for at least some of the sampled drums and/or visual motifs it incorporates. Regardless, the video's existence is ultimately inseparable from the techniques of reproduction it decries, as digital logics of reproducibility are the cultural legacy to which producers and consumers alike are heir in the age of multimedia, which is perhaps why the focus here is less on the legal ramifications of piracy than its supposed economic and, ultimately, moral consequences.

To say that the commodity peaks with the advent of the shrink-wrapped software package is also to say that from there it goes into decline. Software, and software "publishing" specifically, does begin to disappear as the SPA predicted, but not as it feared. Screens do, in fact, begin to shrink and even fade as mobile devices and the embedded components that will make up the *Internet of Things* come to be the dominant computing platforms of the early 21st century, and programs themselves do seem to fall through a black hole as the commoditized software package is increasingly replaced with the *Software as a Service* (SaaS) paradigm. SaaS is generally conceived as a back-end phenomenon, powering platforms like Amazon Web Services and Microsoft Azure, on which other companies' software applications can run without the need for them to maintain a physical server infrastructure. Even more so, the term is used to describe a paradigm for constructing made-to-order applications, business processes, or workflows out of individual, constituent parts as, for example, with the widely popular Salesforce.

com, whose phone number is in fact listed on their website as 1-800-NO-SOFTWARE. Yet, today, with the retail software store practically nonexistent and the floppy itself a media-archeological relic, it is worth considering the ways in which the service paradigm has subsumed even shrink-wrapped end-user software.

In January 2015, for example, following its success in rebranding Office, arguably its most valuable software product, as a subscription service with Office 365, Microsoft announced that its forthcoming operating system, Windows 10, would be available under similar terms:

> We think of Windows as a Service – in fact, one could reasonably think of Windows in the next couple of years as one of the largest Internet services on the planet. (Meyerson 2015)

One could view this move in terms of the software giant playing catch-up to Apple, which has offered upgrades to its iOS mobile operating system free to those with a valid mobile carrier contract since the release of the original iPhone in 2007 and free upgrades to its desktop OS X operating system since 2013. Unlike the latter company, however, which could be said to take a more Kittlerian approach, subsidizing its OS development costs through the sale of hardware, Microsoft, which licenses Windows to third-party hardware manufacturers and thus relies directly on software sales for revenue, explicitly evokes the service paradigm as a justification for this transition. Where once new operating systems, most notably Windows 95, were met with customers queuing up to be the first to walk out the door with a boxed copy, the Windows as a Service paradigm suggests that even the software most fundamental to the operation of our personal computers is now considered something akin to infrastructure, maintained under contract rather than delivered as standalone product.

Free and *Open Source* software (F/OSS) has often been championed as a response to the shrink-wrapped commodity model, but the interventions that made it a powerful alternative to proprietary software have thus far proven largely ineffective in addressing the specific inequalities perpetuated by the expansion of capital via SaaS. Many of the requirements of the venerable GPL (*GNU General Public License*), such as the requirement to publicly offer source code (including any modifications made), do not apply to those running such software on a server that only presents the output of its computations to the end-user via the network, leaving these stipulations to the compatible, but less popular AGPL (*GNU Affero General Public License*, see GNU Operating System 2015). Exceptions like this allow "cloud" companies, including major tech players like Google and Apple, to take advantage of free software while maintaining the proprietary nature of their online services. Indeed, legal measures like the AGPL can only partially ameliorate this situation. GNU founder Richard Stallman describes the conundrum in terms of *Service as a Software Substitute* (SaaSS):

> [I]f the programs on the server are free that doesn't protect *the server's users* from the effects of SaaSS…SaaSS always subjects you to the power of the server operator, and the only remedy is, *Don't use SaaSS!* (Stallman 2010, emphases in original)

The service paradigm can thus be seen as supplanting not only commodity, but free software ideology as well.

Perhaps even more strikingly, Adobe Systems' 2013 move to a "Creative Cloud" infrastructure for its suite of multimedia software including Photoshop, Flash, and Illustrator replaces the shrink wrap model with a subscription service for the very group of "creative professionals" whose jobs, at least until the financial crisis of 2008, were seemingly one of the few bright spots in an otherwise bleak global economy. If, as Lori Emerson has argued, Apple has made of "creativity" something of a

fetish, obscuring the very *lack* of creativity it fosters upon users through its increasingly closed software and hardware interfaces (Emerson 2014, 18-19), the Creative Cloud paradigm and its corresponding mobile apps suggest that even that limited amount of imagination is now only available on loan from major multinational corporations. Viewed in comparison with the origins of Photoshop, one of the Creative Cloud's (and, indeed, Adobe's) flagship products, the "Creativity as a Service" paradigm tracks the ongoing reduction of the so-called "creative class" (Florida 2002) to bonded laborers. Developed in the late 1980s and debuting as a 1.0 product in 1990, where it quickly became a cornerstone of the digital multimedia revolution, Photoshop is arguably the software product most responsible for the ascendance of this class in the first place: on a website recently constructed to celebrate the program's 25th anniversary, Hungarian artist and photographer Flora Borsi writes,

> When I was a young girl, I didn't have the money to organize shoots in a studio, so I created whatever I wanted in Photoshop. Thank you, Adobe, for giving me the tools and opportunity to build my career. (Adobe 2015)

Yet, in a Reddit *Ask Me Anything* with Photoshop co-creator Thomas Knoll scheduled as part of this celebration, one particular thread (amongst a handful of other mentions of the topic) remarked upon how crucial the role of piracy had been in developing children, who usually could not afford the famously expensive software, into paying adult professional users. User mkautzm writes,

> It's very indirect and it's definitely playing the long game, but if you can get teenagers invested in your product before it's actually time to make a purchasing decision either for a business or for personal use, I think that's extremely sustainable and profitable for a business...This is hugely at odds with the Adobe Cloud. (Reddit 2015)

As a method of shifting away from a commodity model that also carries with it the added benefit of being more closely able to contain piracy, SaaS, especially when extended into end-user software like Windows and Photoshop, offers an example of Thomas Piketty's much-celebrated analysis describing how a rentier economy flourishes when *r*, the rate of capital return, exceeds *g*, the rate of economic growth (Piketty 2014, 25–27 and 422–424), shifted into the "immaterial," digital realm. Correlative with a decline in career development and upward mobility, commercial software providers, rather than relying upon those who pirate a shrink-wrapped copy to develop into legitimate owners of subsequent major versions when they become financially and professionally solvent, now prefer to lease them as "services" to all users on a monthly or yearly basis in exchange for precarious, ever-revocable access to a steady stream of incremental updates.

Services in fact occupy something of a contradictory place in Piketty's analysis in that they simultaneously account, at least in Western economies, for the largest sector of economic growth over the past 200 years—one primarily based upon raw human labor such that "an hour's work of the typical wage-earner in the twenty-first century can buy just as many haircuts as an hour's work a hundred years ago" (Piketty 2014, 90)—yet, at the same time, one that contains "the lowest paid workers" (Piketty 2014, 280). In fact, he argues that services have become so dominant and such a catchall term that

> [i]t would probably be more perspicuous to group activities in terms of their ultimate purpose (health, transport, housing, etc.) and give up on the distinction agriculture/industry/services. (Piketty 2014, 589, n. 17)

In much the same way that nearly all media are now digital, nearly everything is now a service, so the need to specifically identify them as such is superfluous; this is an expansion of autonomist Marxists Michael Hardt and Antonio Negri's assertion

that what they call "immaterial labor has become *hegemonic in qualitative terms*" (Hardt and Negri 2004, 109, emphasis in original). The service sector, for them, is a subset of immaterial labor, which also includes logical and semantic practices such as programming, but in a SaaS economy, these distinctions are rapidly vanishing. With mobile applications like Uber, Airbnb, and TaskRabbit connecting contractually-independent drivers, part-time landlords (or sublessors), and contingent workers with paying customers, software becomes the means for the supposed "disintermediation" of buyers from sellers in an immaterial labor market more accurately defined in terms of service than "sharing."[4] With companies like Elance-oDesk and OnForce, this regime is extended to developers as the "Everything as a Service" model incorporates even the creation of software services themselves (DCR TrendLine 2014).

If the autonomist hope was that the qualitative hegemony of immaterial labor offered a turn away from the mystification of the commodity form and towards Marx's "social life-process" not through the disenchantments of the avant-garde but via the expanding multitude that capital attempts to subject to this potentially more self-evident regime of labor, then the (return of the) service economy in software, as the qualitative and quantitative expansion of an already-existing contingent labor force, represents capital's full-throated response to these conditions.[5] Services do make more apparent the social networks

4 On apps like Uber and Airbnb the provider is rated as much if not more than the amenities "shared." An Uber driver is not so much "sharing" her or his car as they are chauffeuring someone somewhere; in order to ensure a favorable rating on the site, an Airbnb "host" often, if not always, provides a variety of services (cleaning, cooking, potentially even companionship) above and beyond the strict "sharing" of lodging with his or her "guests."

5 It is important to note that the mainframe era of computing offered its own version of SaaS with companies like IBM complementing the sale or rental of their massive and costly hardware with development consulting services. The current SaaS model is thus in a sense both a return to and an expansion of this concept whereby it is extended from the enterprise to the population at large. For more on the multitude, see Hardt and Negri (2004).

that constitute labor relations, but they do so while taking an invisible, yet hefty cut. Indeed, this is Piketty's point when he highlights the absurdity inherent in the president of the European Central Bank's campaign against "rents":

> What the central banker had in mind, apparently, was lack of competition in the service sector: taxi drivers, hairdressers, and the like were presumably making too much money. The problem posed by this use of the word 'rent' is very simple: the fact that capital yields income, which in accordance with the original meaning of the word we refer to…as 'annual rent produced by capital,' has absolutely nothing to do with the problem of imperfect competition or monopoly. (Piketty 2014, 423)

Capital, in other words, extracts rent regardless of the licensed professions it seeks to disrupt in the name of "efficiency," and software-enabled service economy companies like the taxi-supplanting Uber are nothing more than the way it does so at their expense. Thus, if it seems that, in a sense, there is no (longer any) software, it is not through its reduction to the pure potential of the universal machine, but by way of its hypostatization into the agent of universal economic exchange, the ultimate mediator of social relations and the ultimate aim of globalization. Similarly, when everything becomes a service, humanity can no longer be considered to be approaching a common existence as unalienated beings marshaling the free *potentia* of our collective labor; rather, everyone becomes a serf. Just as information security analyst Graham Cluley has suggested, echoing Stallman, that we ought to replace the word "cloud" with the phrase "somebody else's computer" (Palmer 2013), when we hear the word "service" we should instead think "somebody else's property," a deniable reality as long as we still had a chance of convincing ourselves that it was we who had ownership over the contents of a box, rather than the other way 'round.

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