Cyberspace's Architectural Constitution

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Something worked.

We didn't earn this. No one planned it. There wasn't just one single change that happened. But something worked.

We are in the middle of the most extraordinary explosion of innovation and creativity that we have known in two centuries. It has taken off, in the United States, and around the world. It has fueled at least half the growth that the US economy has seen in the last five years. It has made possible an explosion of commerce that was never foreseen.

Never foreseen. Never expected. Unpredicted. Surprising. Something worked; we didn't know it was going to work; and now that it has, we don't know why.

We have tripped onto this Waldon Pond of creativity and innovation, and we have no idea about what inspires its magic.

I am a law professor. I hold a chair at one of the most prestigious universities in America. I teach hundreds of students each year; they have all been told they are the best in the nation. My colleagues have been told that they are the best in the world. We have all been told there is none better. That there is none that knows more. None with a clearer insight.

Yet we have no idea what has made this work.

I spend too much time, though it's not much time at all, talking to policy makers in Washington. They race about their capital wildly excited about the revolution that they enjoy. The nation is churning with energy and growth; tax coffers are overfilled. And like a child riding a bicycle for the very first time, they are panicked to do simply whatever it is that they've been doing so far that has been so right—to keep the revolution rolling.

Yet they have no idea about what has made this work.

And I'm about to move to the West Coast in America. To Silicon Valley, to teach at Stanford Law School, a law school in the heart of the Valley. A valley that is filled with talent and pas-

sion and energy to build the next great thing, the next killer application, the next revolution.

But they have no time to even think about what has made this work.

Something has worked; no one knows why.

In my country, we always know why. We are always quick to offer a reason, and the reasons are usually quite simple. I come from a world where, in particular, two very simple ideas rule:

First: That all good things come from laissez faire – from a world where government does as little as possible.

Second: That property equals progress. That strong property rights equal stronger progress. That the ideal world would be the world where property was perfectly protected.

We know these two things, we Americans, because, well, because we're Americans. We won the Cold War; we won that war because the East didn't get it; the East thought government was great and property was bad; but in the west — the far West, further west than here — we know what worked. We know why the Wall fell. And so, we know why cyberspace will flourish, as it has flourished for the past eight years.

At an eCommerce conference on the West Coast last year, a senior lawyer for a major Internet technology firm delivered a lunch-time talk. He had two points — one prescriptive, one descriptive. The first was a chant: The most important thing, he said, was that "…we keep government out of the Internet. Regulation," he said, "will kill the Internet."

The second point was some corporate bragging: he described, with great pride, how his company had developed online tools to file for patents; they were filing and receiving patents now at a record rate.

Keep the government out; get the patents flowing more quickly.

I was astonished by this talk. I remember thinking it something of a joke. That perhaps here, in the lunch-time eCommerce speaker was someone very deep; someone extremely perceptive about an extraordinary blindness that rages in my country. But, I waited for the punchline, and none came. I looked around the room, to see whether others were as confused as I; I saw no one, except I, was confused. No one thought there was anything askew. Everyone sat with their box lunches open, shaking their heads, Jim Jones-like, almost chanting: yes, keep government out; keep patents flowing.

And I wanted to jump up and scream at the top of my lungs – but I didn't because I'm a coward and could never scream at the top of my lungs—but I wanted to; I wanted to ask, What could you possibly mean by that? How could you possible say in one breath that we should keep the government out, and keep the patents flowing.

For what do you think a patent is, except a regulation by a government?

An overworked, underpaid, pressured-to-issue patent official reviews an often incomplete, yet smartly incomplete, patent application, and decides (on I am told less than 8 hours consideration) whether to issue a government backed monopoly that will extend for practically one score years. A right to have the government stop another from using an idea; a power to force others to get permission before they use an idea; an architecture — this time a legal architecture — for centralizing the creative process. For locating it in the hands of a few; for requiring others, Oliver Twist-like, to get permission before these "inventions" can be used. To move from a world where technologists innovate to a world where innovation is licensed.

And this would be just the beginning: just the beginning of the screaming I wanted to do – if I weren't such a coward that is, milquetoast, good boy, quiet, really, quite harmless—if I weren't that, this pathetic comfortable, professor –if I were free of these silly personal constraints – if I could just say what I wanted to have others hear. I would say this and lots more.

Or I would say this:

That in more ways that we know, we don't understand why we're here. That we don't understand what's going on, and the

first thing we should do is look. Look around. See what's happening. Listen. Watch how things are working. Watch what is making things tick.

But that instead – rather than looking around; rather than trying to understand; rather than watching; we turn to slogans in French ("laissez faire") and prejudices from our bank accounts (patents = good) and we use these slogans to explain everything around us.

And that this has got to change. For unless we begin to understand this revolution; unless we begin to really understand what makes this revolution tick; unless we watch and learn from its reality, we will kill it. It will pass. Its ecology will die.

We. We Americans. We lawyers.

I speak from a particularly credible position to criticize as I want to criticize. For the target of my criticism is a general attitude among Americans, and in particular, a bias among lawyers. I am American, and I produce lawyers for a living. So I know of the errors of which I speak.

I want to show you these errors, through a series of stories that should disturb these common ideas, that should shake the confidence in slogans in French and prejudices from our bank account. That should get us to think differently. That should get us to focus on a reality that is different from the stories we lawyers, we Americans tell.

These stories are about innovation. About the conditions under which innovation occurs. About the conditions that inspire innovation, and about those that chill it. About the world, in other words, that built the Internet.

In 1964, a Rand Researcher named Paul Baran proposed to the Defense Department a design for a telecommunication network that was very much like the design of the current Internet. It was not quite the architecture of the Internet, and Baran was probably not the first to propose such a design. But the idea was radical and important enough that the Defense Department asked their network experts to comment on the design.

Their experts were AT&T. AT&T didn't like the plan. As AT&T executive Jack Osterman said of a plan "First it can't possibly work, and if it did, damned if we are going to allow the creation of a competitor to ourselves."

Allow.

The telephone network had a particular architecture. That architecture embedded certain principles. Those principles were that the network owner — AT&T — got to decide how the network would be used. The network centralized that decision, and this centralized design was supported by the regulations of the FCC. Until the late 1960s, and not fully until the breakup of AT&T in 1984, the network owner had the power to decide what kinds of innovations would be allowed on the telecommunications network. The architecture embedded this power to decide.

This principle affected innovation. Innovators knew that before their ideas about how a telecommunications network should-be-used would be adopted, AT&T would have to approve their ideas. They knew their ideas would need the permission of someone else before they would run, and they knew that this someone else had an interest in the existing model of telecommunications. Some new ideas would be consistent with that model; no doubt they would be embraced. But other new ideas would be inconsistent with this model. They had a snowball's chance in hell. Any rational innovator — or at least, those with a bottom line to support — would turn their innovative energies elsewhere.

At the core of the original design of the Internet is a different architectural principle. This principle has a different effect on innovation.

First described by network architects Jerome Saltzer, David P Reed, and David Clark in 1981, this principle, called the "end-to-end" argument, guides network designers in placing intelligence in the network at the ends, and to keep the network itself, simple. Simple networks, smart applications.

While this principle was first described in terms of efficiency, it soon became clear that it entailed an important corollary. This is the principle of competitive neutrality. What end-to-end meant was that the network was not in a position to discriminate. It was

not capable of deciding which kinds of applications should run, or what forms of content should be permitted. The network was stupid; it processed packets blindly. It could no more decide what packets were "competitors" than the post office can determine which letters criticize it.

This architecture too has an effect on innovation. It encouraged innovation. Innovators knew that if they designed a new application or new form of content, the network would run it. Even if the new application challenged the dominant network application, the network would run it. The test of success thus was not whether the innovation fit with the business model of the network owner; the test of success was whether the market demanded it.

These two networks—the telephone network of AT&T and the Internet—are different. They are different in an infinite number of ways. But the significant differences are not infinite. The significant difference is just one: Architecture. The difference between these two networks is a difference in architectural design. It is difference in the way these networks are built—or more importantly, a difference in principles that these different buildings embraced.

With one, power over innovation is centralized.

With the other, it is not.

With one, the network is designed in a way that gives one entity the power to control how it is used.

With the other, the network is designed in a way that takes that power away from the network owner.

With one, power is vested centrally; with the other, it is vested in individuals. Controllers choose in the first example which ideas will run; the market chooses in the second example which ideas will run.

This difference is profound for an ecology of innovation. Innovation functions best when power can be questioned without consequence. When new ideas don't need to apologize. When a better idea can prevail just because it is better. Where the dominant application or use on the network is dominant in just the sense

that blue might be the color that most people are wearing today – so whatever that it is, it can't control tomorrow. When a new idea can appear on the platform, and the platform will incorporate it if the market allows.

e2e. Not b2b, or b2c, or c2b, or b2g, or g2b, but e2e. End to end. The core of the Internet, the core value that defined its power, the core truth that made innovation around it possible, is this e2e. The fact – a fact – that the network could not discriminate in the way that AT&T could.

What would it have meant — this power to discriminate? What would it have meant if the Internet had allowed it?

Well at every stage of the Internet's evolution, there have been technologies that have prevailed. Technologies that were dominant – the hot thing of the time.

Here's one from the good old days: Remember Gopher? That little rodent that would race on your screen and pull up hyper-link enabled directories? Remember when that was the rage: when every site conformed itself to the gopher protocol, to enable every site to link to another and get that same happy rodent, with that same blue list?

And then came the World Wide Web – a different hyperlink protocol. The Web, not quite as quickly as love bug virus spread across the world, but just about as quickly, killed gopher. Exterminated gopher. Wiped its protocol off the screen of most ordinary users. And as it did this, there was nothing gopher could do in response. 90% market share flipped to 5% market share before spring in Minnesota had passed.

e2e made that possible. It made it possible that a new network use would not be killed by an old use. The network not only allows the creation of a competitor to itself; the network demands it. It demands that the protocols always exist in a way that will assure that competitors can prevail. A network that builds destruction into its architecture. The destruction of the old, the embrace of the new.

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e2e is not the only principle of the early web; or not the only architectural principle that produced innovation. Think about some others.

Much of the early Net was open source software – code that carried its source code with it. GNU/Linux is an example of open source software; the Apache Server, or SENDMAIL are others. This code gets built through a complex interaction; through communities of users who feed fixes back to a source; through institutions that devote resources to building this common source; through leaders, who find ways to inspire others to devote lives to building this common source.

This process of common projects is not new with the Internet; but a common project of the scale of Linux or GNU would not have been possible before the Internet. The Net made a large coordination function; and it made fact iterations in the development cycle real.

Now many people talk about the great power of this code. That it is faster, or more efficient; that more bugs get killed in open source projects than in closed source projects. But I don't want to talk about the efficiency in this code. Indeed, if efficiency is all that open source has, then there isn't really much to be excited about.

But I think open source has much more to it than efficiency. More than efficiency, that movement embeds certain values. Values that get expressed in the architecture of its development; in the way this code is built by tens or hundreds or thousands of people around the world. And values that get expressed in the rules that bind the code to remain open.

These values mean that though there are leaders in an open source project, these leaders are always within the control of the community. Not a formal control, not through voting or courts. But a practical control that comes from the knowledge that if the leaders push the project in a way that many on the project don't like, it is always possible for these others on the project to pick up the code and move on. The source is out there available for anyone to take. A wrong turn at the top would mean a different turn from the bottom.

This architecture checks the power at the top. It limits power at the top. It makes certain gains at the top impossible.

Games.

Think about the games companies play, and just why they can play them.

You might have heard of this company from the United States, Microsoft Corporation. It has some software; operating systems are among its most important software. It has built an extraordinary platform of development from a tiny and simple set of code called DOS. In the twenty something years of its life, it has gone from nothing to the single largest company supplying code to the desktop world; it has produced more millionaires than any other company; it has been led by a man — a genius — who has given over 22 billion dollars to charity around the world. 22 billion dollars.

This operating system is a platform; the company has inspired extraordinary innovation upon its platform. By leaving open most of the APIs, by encouraging developers to code to the system, by supporting these projects, by evangelizing the product, the corporation has done much to assure that the world can build on the platform that Microsoft owns.

But owning the platform means something. In particular, it means the ability to control how the code will evolve. Not perfectly control: if Microsoft decided to dump GUI as the operating system interface on the desktop, and in some radical retro moment, decide to return to the command line, consumers would react; we would flee the platform (though many of us might then return), but this fleeing and fury would have an effect on the platform. It would reform it, for at the extremes the customers have that power.

Within the extremes, however, within the detail within which a system gets built, customers don't have much power. Within the extremes, the owner of the code gets to decide how the code will evolve. It gets to decide, that is, whether a browser remains a separable product – whether an application or a system service doesn't matter for the moment. It gets to decide whether other products get to run well on the platform. It gets to decide all this because the owner owns the code and the code keeps itself secret. The code is closed, not open. If someone doesn't like how it is developing, what they can do is limited.

Now this architecture — the architecture of a closed platform—also has an effect on innovation. Or, at least it has an effect on innovation that threatens the underlying platform – that threatens to weaken its power as a dominant force in the network. For if an innovation develops that the platform doesn't like, then a closed code platform can chose to cancel that innovation. It can choose to refuse it, or confuse it, or embrace it and digest it; it can bundled or bind an alternative; it can displace the competitor; it can play many games to make the competing application have to compete more strongly.

This was the argument, at least, of the government in the recent U.S. action against Microsoft. No one could doubt that in a significant way, Microsoft had fueled innovation. But the charges against the company were based on the ability of the company to target innovations it didn't like. Anytime an innovation threatened its control over the platform – over the APIs to which developers wrote – the government claimed, Microsoft would intervene to kill that innovation. To capture it. To control it. To displace it. To, as a Microsoft executive said to Apple about QuickTime, to "knife the baby".

The platform thus chose which innovations were allowed. And it was empowered to choose because the owners control the code. The platform could behave strategically. It had strategic power because it controls its code.

But this is just the control that an open source platform doesn't have. Since the code is open, and all can see; since the source is available for anyone to take and modify; new innovations need not fear the platform. The platform cannot behave strategically. It cannot intervene to block a new idea. A new idea will flourish on this platform if the consumer likes it; and it will die if consumer doesn't.

And thus a parallel between e2e and openness in platforms. Just as e2e promises innovators that their innovations will be rewarded because the platform cannot act against them, so too an open platform promises innovators that their innovations will rewarded because the platform cannot act against them. Neutral platforms inspire innovators because innovators know the platform can't play games. Work is rewarded, not punished, for being different. Innovation can flourish.

Innovation can flourish because an architecture promises neutrality. Innovation can flourish because the code remains open, and that open code assures neutrality. Innovation can flourish because the code decentralizes it; because it is not vested in the hands of committee, as in AT&T, or even the hands of a genius, as in Microsoft; it is vested through an architecture in the millions who might innovate, develop, and expand this platform of the Net.

Now, in my view, the battle over the operating system on the desktop is very old news. It is the battle of the 1990s; the 1990s are over. The issue right now is the battle over the platform that constitutes the Internet. The battle is what architecture that platform will have.

For while the Net was born on e2e, we are giving e2e up. While the innovation we've seen has been fueled by e2e, the future does not guarantee any place for e2e in its design.

As the Net moves from narrowband to broadband, from telephones to fat pipe – fast, always on — builders of that network are building it differently from how the original Net was built. They are building it to vest control in the network owner. They are building it to guarantee that the network owner gets to control the kinds of applications and the kinds of content that this network will run. They are building it as the old telephone network was built. Indeed, they are the old telephone network.

For in a bizarre twist of history, we in the United States are watching as the new AT&T buys up fat pipe across the country, and builds its network with the same kind of control that the old AT&T had. Building it with control. Building it so the network need not remain neutral. Building it so that the network owner gets to decide what kind of applications will run.

For example: in the United States, cable monopolies make lots of money streaming video to television sets. That's called cable TV. There are many who are building businesses to permit the streaming of video to computers. Cable companies don't like this much. When they're smart, they say they don't like it because it causes congestion and the like, but when they're honest (which is not necessarily the same as being smart) they say something differ-

ent. They say, as the head of AT&T Internet Services said, when asked whether he would allow the streaming of video to computers, We didn't spend 56 billion dollars on a cable network to "have the blood sucked out of our veins."

The network owner will have the power to choose; the network owner is already making its choices; its choices, and this power, will chill innovation in this space.

Now you might ask, why is this happening. How could it be that we, Americans, are allowing the Net to be built in the old way the Net was built; how can it be that we are not intervening to make sure that it follows the architecture of the Internet. Why isn't the government defending e2e; why isn't it insisting that the principle be respected.

And the answer again is the attitude expressed by that speaker at the eCommerce lunch – reflecting the ordinary thought of most ordinary Americans. The thought that the single greatest threat to the future of the Internetgovernment regulation. This thought that the Internet was born French; that it was born because its parents were French; that it was born because laissez faire was the rule; that it flourished because the government was left it alone. We think this, we Americans, because it reflects a deep and profound untruth that we love to believe – that government is not necessary, at least for the best of all things. At least for the Internet.

But the fact is, this view is bullshit. The idea that Internet was born free of government, the idea that government was not responsible for its birth, the idea that this was the second immaculate conception, the second savior born without the ruler's reign, that idea is just wrong.

The single most important event in the history of the Internet (not an event that built the Internet, but that made the decentralized building of the Internet possible) was a radical and powerful regulation by the government called the breakup of AT&T.

The most important event was this decision by the government to end the telecommunications monopoly; to end the world where the owner of the network was allowed to say which innovations would be permitted; to end the world where the owner of

the network controlled evolution on the network. That event, in 1984, gave birth to the industry of innovation around telecommunications, and that birth was given to us by an action by the government.

Why was this important: because when telephones became neutral – when the users were allowed to use the telephone for whatever use they wanted, and not the use the owner wanted — then users were free to connect to the Internet; free to connect to any one of the thousands of ISPs that would feed them the Internet; free to participate in the most competitive and vibrant economy of innovation that we have seen. And when innovators realized that there were millions of potential customers waiting on the lines, they turned their innovation towards serving them. A neutral platform created this; the government created the neutral platform.

Now, I don't mean the government understood what it was doing. No doubt it didn't. But whether it understood these actions then or not, it should understand them now. We should be in a position now to see that this enforced neutrality had an extraordinarily positive effect. We should be in a position to see this; we should be able to learn the lesson from this; we should be able to respond to this lesson by assuring that the next network – broadband – is like the last.

We should be able to do this, but we in America are not able. We, our government, our politicians, are responding to this change in the architecture with slogans. Our response is to say, leave the Net alone. "Hands of the Internet", as one web site puts it. Let the market regulate. Let business take care of itself. Laissez faire will produce the best possible outcome.

And so we do nothing, as the architecture of the original Net transforms, as it gives up it founding value of e2e, as it becomes yet another network where the control controls what's new. And the promise of something different, which was the Internet, fades.

Now, I've told a story about this one central change in the code of the Net that we are seeing just now; a change that will undermine innovation in this space; a change that will make this space just like real space; that will return networks to control. And I've said this change flows from the unwillingness we Americans

have to intervene, and this unwillingness comes from this first slogan that this eCommerce speaker uttered – leave the Net alone.

But now I want to end with a more dangerous change. More fundamental, more threatening to the future, and more likely to occur.

We are in the very early stages of a war. A war between two ways of ordering the content of culture in the world. In one way, content – music, film, anything under the power of copyright—is controlled by content controllers. By distributors, record companies — Hollywood, in short. These controllers attract artists; the artists sell them their souls to work for them; these controls control distribution; distribution feeds from them; these controlled control a vast resource of culture under the label of copyright; this content is theirs; they own it.

In another way of ordering content in the world, these controllers would have much less power. Content is distributed; it is shared and flows freely; it is produced by many, in a bottom up manner; it is sold or not sold, but it is outside of the control of the few.

In the world before the Internet, the first model was the rule. Hollywood was the king. (Elvis was a figurehead). Content controllers exercised massive control over the production and distribution of culture.

The Internet has threatened that world. It has threatened to destroy that first way of ordering content. Free music, easily distributed; film produced and shared; open and easily passed borders that defined the culture of the original Net.

Now, I remember in the old days when we laughed at this old giant. When we looked at Hollywood and said, "They just don't get it." When we felt great pride at seeing how backwards they were. When were convinced they would die a quick and funny death.

But that was a time of extraordinary stupidity by me. The idea that this industry would roll over and die, give up with a fight — silly. They didn't understand the Internet initially; they didn't see its threat. But early into this history, Hollywood got it. And from an early period, they have been working, quietly but powerfully, to

respond. To respond in a way that forces the Net to code itself to fit their business model. To force the Net to become like content has always been in our lives. To force the Net to become TV on speed: more channels, more advertising, more control for Hollywood.

They did this because they are good – smart, powerful, and filled with beautiful movie stars – and they have done this because they can trade on that second insight of that eCommerce lunch time speaker: this idea that when government protects intellectual property, it is not regulating. They can trade on this simple and fundamentally mistaken idea that most Americans have – that sharing IP is theft; that ideas are to be owned as cars are to be owned; that property here means progress.

This is deep in my culture, these ideas. They are ripe to be harvested by Hollywood. And so they have harvested, producing a scad of legislation and governmental action to regain control.

I've described one kind of control that we are seeing – the explosion of patents. Of control over innovation. Of a system fueled in America to take every idea in cyberspace and give it a state backed monopoly. And if I had two more hours, I would describe just how damaging this process will be to innovation in cyberspace — just as with the first AT&T network; just as with platforms that can be controlled; just as with the second AT&T network, innovators realize they must license to play.

But it is a second kind of IP – not patents, but copyright – that is at the core of this new move for control. And we can see it, and the blindness that surrounds it, in a recent story from Pittsburgh.

Consider one example: iCraveTV was a Internet broadcaster in Canada. Under Canadian law, they were permitted to capture the broadcasts from Canadian television, and rebroadcast that in any medium they wanted. iCraveTV decided to rebroadcast that TV across the Internet.

Now, free TV is not allowed in the US. Under U.S. law, the rebroadcaster must negotiate with the original broadcaster. So iCraveTV used technologies to block Americans from getting access to iCraveTV. Canadians were to get access to free TV; Americans were not.

But it is in the nature of the existing architecture of the Net that it is hard to control perfectly who gets access to what. So there were a number of Americans who were able to get access to iCraveTV, despite the company's efforts to block foreigners.

Hollywood didn't like this much. So as quickly as you could say "cut", it had filed a lawsuit in a Pittsburgh federal court, asking that court to shut down the Canadian site. The argument was this: whether or not free TV is legal in Canada, it is not legal in the United States. And so since some in the United States might, God forbid, get access to free TV, the United States Court should shut down free TV. Copyright laws in the US were being violated; massive and quick response by the federal courts was called for.

Now, step back for a moment and think about the equivalent claim being made elsewhere. Imagine, for example, a German court entering a judgment against Amazon.com, ordering Amazon.com to stop selling Mein Kampf anywhere because someone in Germany had succeeded in accessing Mein Kampf from Amazon. Or imagine a court in China ordering an American ISP to shut down its dissidents' site, because the speech at issue was illegal in China. It would take just a second for an American to say that these suits violate the concept of free speech on the Net; that they undermine the free flow of information; that they are an improper extension of state power into the world of cyberspace.

But free speech didn't register in this Pittsburgh court. The idea of the rights of Canadians to their free TV didn't matter. The court ordered the site shut down, until the site could prove that it could keep non-Canadians out.

iCraveTV promised to try. And it quickly developed technologies that it said would succeed in zoning cyberspace based on geography. Whether it would is contested, but its objectives were clear.

Now the pattern here should be clear. Though nations like the US will sing about the importance of free speech in cyberspace, and about keeping cyberspace free, when it comes to issues of national security—as all things copyright are—values fall away. The push will be to zone the space, to allow rules to be imposed that are local. And the technologies for zoning will quickly develop.

That's the first kind of change – building technologies to zone cyberspace, the better to protect content there. The second kind of change is more invidious.

When cyberspace was born, many said copyright was dead. Many were wrong. For while the first architecture of cyberspace made it hard to control content, it was hard to control content only because the code was crude. Smarter code – trusted systems— could be developed, and this smarter code would make it possible to control copyright better.

Hollywood didn't want to choose; it funded both. It funded new East Coast code (law) to protect copyright; and it funded new West Coast code (software) to protect copyright. And it pushed both together in its content to protect its control.

The genius in this legislative movement was a law called the anti-circumvention provision of the DMCA. This law makes it a crime to build tools to circumvent the code Hollywood builds to protect content. Whatever the code is, however it protects content, to crack the code is a crime — even if you use the underlying content for purposes that would fall, under copyright law, in the category of fair use. To build tool to crack it, even for fair use, is a crime.

When I first got into this business, I sold the idea of code as law. I meant it as a metaphor. I argued, we should see the way software regulates; the way the architecture itself is a regulator; there are rules that can be built into this code that control us just as well, indeed much better, than law.

But now Hollywood has taken my idea, and has changed the metaphor into something quite literal. Code now is the law, in as literal a senses as that metaphor could have. To crack the code that Hollywood gives you is to crack the law. It is to break the law. The law and the code work together to reassert the power of control.

We have just begun to see the battles of this most important war. The battles of the deCSS hack; the battles over hacking CyberPatrol; the battles over Napster and the future battles of Gnutella. The battles over MP3.com.

These are the first skirmishes in a very long war, where in the name of copyright, control over culture will be reasserted. Here, the architecture changes as well – just as it is changing with e2e,

just as it is changing with this emergence of code that empowers control.

The symbol of this battle may well be the latest merger in the United States — AOL merging with Time Warner; the Net merging with the content controllers. People thought Microsoft was the danger; but here is the real potential for danger. AOL is not the Internet, though half the dial-up customers in the world get access to the Internet through AOL. It has its own code, its own ability to control. And it controls which code runs on its platform. And now it owns content, and can control how that content can flow. And now it also owns cable companies, and can architect that cable to give it more control. While we have been fighting the battle against the threat of the 1990s, the 1990s came to an end. And even though the government is not yet finished with that battle, new threats have emerged.

I can't believe AOL would forget its roots; I can't believe it would turn against a culture of freedom that defined the original Net. And so I can't work up a fever of fear about this latest merger.

But whether AOL is involved or not: the plan should be clear. Technologies that remove control from the content controllers; technologies that give freedom to the user; technologies that enable sharing and open content; technologies that undermine monopoly power; these technologies are the enemy. And allied against this enemy is now the government of the strongest nation on earth. America, home of the free, land of the brave, is building a brave new world by eradicating the free in the home.

Building through code an architecture for the Internet that will flip what the Internet was. A space of freedom. A space of innovation. A space where more then the few controlled.
