Toward Consumer-ownable Digital Personal Property

The IEEE P1817 Working Group is creating a *Standard for Consumer-ownable Digital Personal Property*. Our mission is to enable people to actually *own* the movies, music, books, and games that they buy and download. If you thought that you already *do* own your downloads, then you're not alone; most people think this. We are going to help make it true.

The Unwinnable and Unnecessary War

Someday we will look back on this time in utter amazement. We will wonder that there once was a time when we couldn't own the downloaded digital movies, music, books, and games that we bought, when law couldn't even define what consumer ownership meant, when suppliers claimed the moral right to restrict private behavior, when people claimed the moral right to post copyrighted works on the Internet, and when we had so blurred the line between products and services that we couldn't remember that products are inherently ownable and services are inherently not.

To the benefit of all mankind, money has gone digital without denying consumers their rights. Digital products should be no different.

Imagine what electronic consumer banking would look like if people didn't "own" the money in their bank accounts. What if employers could dictate with whom and for what you could spend your direct-deposit paycheck? What if vendors could refuse to accept your electronic payment based on the bank that held it or the circumstances under which the money was deposited? What if employers or product vendors were to require that you use only the bank account provided by them, with all of your bank transaction records visible to them?

What if people were to respond by declaring that "all bits are free", and that once money is converted from physical bills and coins into digital bits it is their right to replicate them at will and distribute the resulting wealth to anyone they choose?

Consider how ludicrous is it so claim, when money takes a purely electronic, digital form, that all of the principles and rules protecting the rights of individuals and the viability of commerce must be rewritten. How silly it would be to pretend that digital monetary systems cannot be made secure enough to preserve the fairness, privacy, and freedom that fueled all pre-digital economies?

And yet, here we are at the dawn of the Digital Millennium, waging an unwinnable and unnecessary war between consumer rights and copyright, without having created consumer-ownable digital personal property – the foundation that could bring sanity and peace to the great battle. The building-block technologies have already been invented. We need only assemble the components of ownable digital products and make them available to consumers. Watch the sanity settle in.

Executive Summary

Global Internet commerce is suffering from the absence of downloadable digital products that are both consumer-ownable and supplier-profitable. Some problems include:

- DRM-protected content is too restrictive to satisfy the consumer notion of ownership.
- Plain, unprotected files are so easily copied and distributed as to guarantee both for-profit counterfeiting and for-fun distribution to strangers.
- Suppliers intentionally present unownable services as if they were ownable products, and in response consumers see those pseudo-products as unfairly and unreasonably restricted.
- Today's so-called "buy-to-own" downloads are licensed but not owned, whereas both suppliers and consumers are generally unaware that consumer-ownable downloads could be made technologically feasible and commercially practical.

The result of these problems is an ongoing war between the defenders of consumer rights and the defenders of copyright. The solution requires that technology conform to consumer expectations, rather than vice versa. Consumer expectations for ownership include: exclusion, inclusion, ownership transfer, autonomy, privacy, and platform- and vendor-independence. Supplier expectations include blocking the use of sold products for counterfeiting and unauthorized public redistribution. P1817 proposes a solution that satisfies these expectations.

The key to making digital personal property supplier-profitable without restricting consumer behavior is to apply security technology to the preservation of its singular identity, its continued utility, and its monetary value, rather than to restrict the private behavior of consumers.

Products and Services

We own things. Almost everything we see in stores is a consumer-ownable product. Everything else is a service, even if it involves use of physical objects. A service may involve an owned product (my wife owns the bits of plastic applied to her fingertips by her manicurist), an unowned product (U-haul rents me the trailer, but it isn't my trailer), or no product at all (a massage, a counseling session, or a live performance). Everyone understands that we do not buy services to own. Any time a vendor claims to sell a product, the purchaser naturally assumes that he owns it.

Once upon a time, customers paid to attend live events or else they either endured or enjoyed commercials as compensation for programs – services – that were broadcasted for free into their homes and automobiles, without complaining that those services were not also sold to own, because at that time everyone knew that it was infeasible. When consumer-affordable audio recordings on vinyl discs became feasible, a buy-to-own market grew and prospered in spite of fears that copyright and service businesses might be harmed.

Whenever consumer-ownable equivalents of services have been practical, humans have always demanded that they be made available for sale – for sale to own. And if not available, we have made our own recordings, whenever that was feasible.

The Line Between Services and Products

Before digital, the distinction between products and services was clear. The lack of a similar clarity for digital commerce is a problem.

In 2009 it was big news when Amazon silently deleted copies of George Orwell's *1984* and *Animal Farm* from their customers' Kindle eBook readers and refunded their accounts. Those customers were surprised and offended to discover that they didn't actually own those eBooks. There was nothing nefarious about what Amazon did, but there was a problem of expectations. Consumers thought that they owned what they "bought".

Sales and marketing may talk about delivering buy-to-own downloads, but if you ask their lawyers, they will rightly insist that those so-called "products" are licensed, not owned. The license is a contract between Amazon and you, the consumer. Amazon agrees to deliver a service by granting you the non-expiring but limited use of downloaded files that you don't own. To be fair to Amazon and all other online businesses, it isn't clear what it even means sell you a downloaded file to own. We don't yet have a satisfactory legal definition of what it means for a consumer to own a downloaded instance of a copyrighted work.

Before digital product ownership can be legally recognized and protected, ownership must be unambiguously defined, and ownable digital objects must be made technologically feasible.

Ownership Defined

We're not trying to unravel the Gordian Knot of court rulings to discover an underlying legal definition of consumer ownership. Instead, we wish to conform to the shared notion of humanity about what it means to own something. Look for a formal definition of consumer "ownership", and you are most likely to discover that if you own it, then you have the right to *exclude* others from using it. That is easy enough to understand.

There is a corollary to exclusion that is so obvious that it is virtually never stated: "If you own it, then you have the right to *include* whomever you choose in its use." You can share.

Meanwhile, there is our gut-feel notion of ownership: "If I own it, then it is nobody else's business what I do with it." In other words, we expect that ownership grants us the right to act *autonomously*, without having to seek permission before acting, and we see ownership as the right of *privacy*, free from supervision or observation by the suppliers of the product. We also imagine that ownership includes our right to cease to own by *giving or reselling* what is ours to a new owner.

To summarize, some essential elements of consumer ownership are inclusion, exclusion, autonomy, privacy, and ownership transfer.

Making a Profit

For suppliers, the two greatest obstacles to the profitable sale of digital content products are (1) volume counterfeiting businesses (that is, criminal enterprises) and (2) stranger sharing, where people post content on the Internet for unlimited numbers of complete strangers to copy and use. We must be careful to say "stranger sharing" instead of "file sharing", because the real problem is not sharing with friends by whatever means, but sharing with strangers.

For consumers, the unencrypted, unmonitored, unrestricted, plain file is currently the only form of digital product that is unrestricted enough to be consumer-ownable as we consumers define ownership. But plain files make counterfeiting and stranger sharing trivially easy, so we need an

alternative that is just as convenient and flexible as plain files, but that doesn't enable counterfeiting and stranger sharing. We strike a similar compromise in our ownership of digital money: we demand our freedom, our privacy, and our autonomy, but we neither claim nor grant to others the right of digital fraud or counterfeiting; our collective welfare depends upon the integrity of the electronic monetary system.

Physical v. Digital

Physical objects – items of tangible personal property – encourage both ownership and profitability. First, a physical object is inherently *singular*, made of a singular set of atoms and molecules, retaining a unique identity in time and space compared to all other objects, even identical ones.

Physical objects are naturally untethered from both suppliers and consumers – suppliers can't monitor or restrict their usage, and they can slip freely from hand to hand or from person to person, regardless of who claims to own them.

Physical objects are inherently sharable. Time and space constrain the speed and concurrency with which we can share, but nothing limits us from deciding who can share. The owner has the power and the burden to choose who can be trusted to share. An unwise owner may lose his property. For each object you own, you define a particular circle of trusted sharers. You define and dynamically re-define that circle at will, because you are the owner – you are in control, and no big brother is needed.

Digital personal property must have the same attributes of singularness, untetheredness, and sharability. For most tangible personal property, ownership is based on human judgements, interactions, and relationships, not on legal, physical, or electronic tethers. So too should ownership of digital products be a matter of human judgements. Their utility as carriers of art and information should be the basis of their monetary value, the ability to share or exchange them should constitute their value as social capital, and the potential to lose them through unwise sharing should be the reason why they are not shared with strangers.

About Copying

When you deliver a downloaded file, you are not delivering material atoms and molecules, you are delivering state. Things cannot be transmitted electronically; the state of things is what you transmit. The consumer applies that state to electronic circuits, to magnetic materials, or to tiny dimples burned into plastic disks. Electronically transmitted data is useless if it cannot be copied.

There are amazing advantages to dealing, not with matter, but with the state of matter. This difference between the physical and the digital is why suppliers want to sell digital, and it is why consumers want to buy digital. We all want all of the digital advantages.

Because copying is an inseparable element of digital systems, we acknowledge that the use of multiple copies enhances the speed and concurrency with which we can share what we own, and make sure instead to preserve the conditions that lead us to share only with those we trust, and never with strangers.

Let Digital Do As Things Do

Let us then have our digital products emulate the elements of the physical that sustain a balance between personal freedom and commercial viability. At the same time, let us be careful not to emulate physical attributes that would deny us the ethical digital advantages we all desire.

All it takes to *share* a physical object is for people to come together in the same place and at the same time. There are practical limitations, based on the nature of the object, to how many people can share it simultaneously, but we wouldn't tolerate laws, surveillance or enforcement of a supplier's or vendor's arbitrary limit on sharing. Digital personal property lacks the space and time constraints of physical objects, which is why we want digital products, but those products must preserve the ultimate limit on sharing – that sharing is only safe among those you trust, and sharing too widely results in losing what was yours.

All it takes to *give* a physical object is to hand it to another person and let go. All that is required to *take* a physical object is to grasp it and carry it away. All details and corner cases are handled by our personal judgements and behavior. For digital objects, enabling those same two actions – giving and taking – lets us share, lend and borrow, bequeath and inherit, donate, resell, and even steal digital objects.

In order for all of those human actions to mean the same thing as they do for physical objects, digital property must also be singular – all copies of a single purchased product must be collapsible to a single instance by the simple action of one owner or sharer. This would constitute magic in the physical world, but in the digital world it is straightforward.

The "Give & Take" Media Player

Digital content always needs a player device, implemented with electronic circuits and software. Player developers must provide two mandatory player functions: a "share" or "give" button for inclusion, and a "take" button for exclusion – plus, they may add any other functions to their media players that they wish, to enable unfettered use. The only restriction to new functions is that they must not defeat the "give" and "take" buttons.
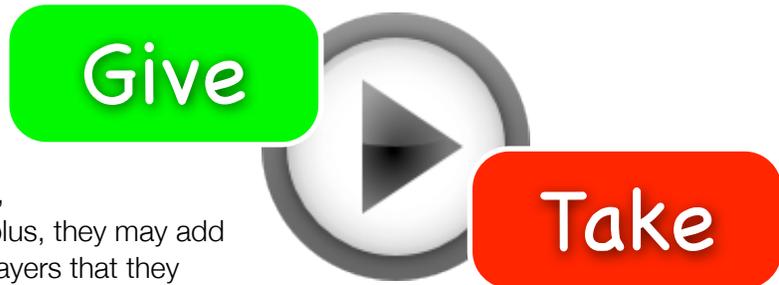
You share a content item with media player devices in your possession such as TVs, computers, smartphones, and eBook readers. Select what you want to share, then select the players to share with, then hit the give button, and those players receive playable copies. Any sharing player can be used to extend sharing further. Each new sharer increases the risk of loss.

Media players don't distinguish which player is the "owner". This makes sense because media players don't own anything – people do. Sharing people must agree on who among them is the real owner. Of all sharing players, the first one to have its "take" button clicked causes all other players to cease to share as soon as they detect the take – they lose the power to play their copies.

In other words, the person who first presses the take button becomes the new, sole, and de-facto owner of the content item.

The Power of "Give & Take"

The "take" button is powerful. It introduces the risk of property loss – a risk that approaches 100% when sharing with strangers. It assures that each sold product item represents a single product in the field that collapses to its essential, singular self, although it may be transiently shared within intimate circles of trusted sharers.

The "give" & "take" buttons together are incredibly powerful because they endow digital personal property with value as *social capital*, enabling consumers to truly give digital gifts corresponding to a giver's loss and a receiver's gain. In addition, they preserve the real *monetary value* of digital products, enabling consumers to ethically give, donate, or resell their used property without increasing the number of products in the field.

 The "give" button enriches personal relationships through kindness and generosity. The "take" button puts, not a credit card number, but individual judgement front and center as the arbiter of the line between friends and strangers. It embodies the idea of technology conforming to human nature.

Creativity Beyond Content Creators

When your media player is dealing with a licensed service, it must dutifully enforce whatever DRM restrictions are associated with your licensed content. When dealing with content that you own, you have no restrictions, only freedoms, including the liberating freedom to share or "give", the risky freedom to "take", and whatever other freedoms of action are enabled by the media player that you have chosen to use.

"Unfettered use" indicates the opportunity for media player developers to innovate in any way they choose – it means generations upon generations of new hardware and new software player products that provide compelling new ways for consumers to interact with content and with people – ways not yet imagined, even by those who created the content in the first place. Player makers might add buttons like back up and restore, retarget (for other formats and encodings, perhaps ones invented after the product was first sold), annotate (write in the book margin), edit (G-rated versions for your kids), and mix (sound from here, video from there) – with all derived content equally subject to the same "give" and "take" buttons.

The Playkey Banking System

The singularness of a digital product depends upon some component of it that is guaranteed to

remain singular. This is often accomplished by maintaining such a singular record on a server with an online service. A truly general-purpose and global repository of such records must protect the autonomy and privacy of individuals and must be counted on to endure far beyond the lifetime of individuals or corporations. Our retail
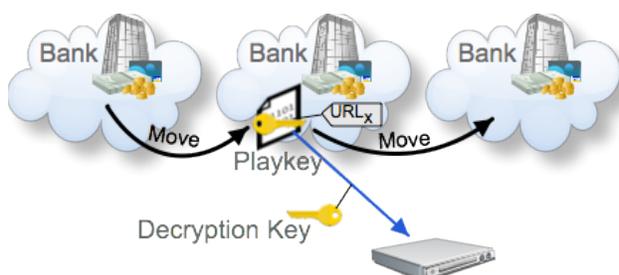
banking system already has these attributes.

That singular record for each sold digital product is called a playkey. A playkey can be thought of in two ways: (1) it serves as a proof of original sale or certificate of authenticity, and (2) it is the keeper of the content decryption key. The playkey can disclose the decryption key to you.

Now consider a Playkey banking system. Just to make it really clear, imagine that our existing retail banking system (Wells Fargo, Bank of America, the credit union) provides not just checking and savings accounts, credit and debit cards, and ATMs, but that they also provide *playkey safe deposit boxes*. A consumer can set up an online account with any bank of his choosing to hold his playkeys. Suppliers can no longer can observe you after the purchase, nor do they need to provide any support services for your purchases to continue to be usable, sharable, or resellable forever. Original suppliers can cease to exist, and it doesn't matter. Playkeys move from one user's bank account to another, just as digital money can be transferred from bank to bank, and just as tangible personal property moves from one person to another.

Pressing your media player's "give" button not only delivers an encrypted content file to another player, but it also delivers a pointer or URL to the playkey in your bank account. Once an item is shared, whoever first presses the "take" button causes the playkey to be electronically transferred to the bank account of the taker. Messages are also sent or queued, informing sharing players to delete any privately cached copies of the item's decryption key.

The supplier-independent Playkey banking system defends our autonomy and privacy. Establishing the system as an open IEEE standard is the first step to assure vendor and platform independence. Allowing for "deferred singularness", where giving and taking can occur through local connections without an active Internet connection, enables the use of Digital Personal Property to be just as convenient as plain files.

The Good of Society

It is our goal to help copyright-respecting parents to avoid having to call their own children pirates and criminals. We'll give those kids music and video that they can actually share without embarrassing their parents. We're going to support parents who teach their children that sharing is a good and a kind act by extending sharing to the digital realm in a way that honors and respects the rights of authors and artists. The IEEE P1817 Working Group truly aspires to advance technology for humanity.