The High Speed “Indie-ternet” Movie

Using the Internet to create, market, distribute, and monetize an independent, low cost TV series or movie

I. Intro

A. Viewers valuation of internet versus cable is shifting

Year after year, Internet usage has climbed, both in terms of number of users and average number of hours spent online per user, and the types of activities performed on the Internet is broadening in scope and sophistication. Along with these trends, the availability of higher bandwidth and the means of accessing that higher bandwidth through new devices and new wired and wireless access channels has grown along with usage trends. One need only look at the plethora of new provider technologies, including DSL, fiber-optic, satellite, Wi-Fi, 3G mobile data, WiMax, and LTE, and at the new types of devices used to harness these provider technologies, including DVRs, desktops, laptops, netbooks, smartphones, sling boxes, iPods, and iPads, as evidence that consumers are moving away from the traditional “bunny ears” and cable box paradigm for home entertainment.

Traditional cable TV providers have broadened their offerings to “bundle” communication and Internet services to their primary television offering, but consumers have started viewing Internet service as the primary service, with cable TV and telephony being the optional add-ons. The availability of TV and movie portals including Hulu, Netflix, YouTube, Roku, Xbox, PlayStation, and
Apple TV\(^{17}\) has unveiled the opportunity for consumers to get everything they need: TV, phone, and Internet, all through a single service, albeit sometimes at lower qualities.\(^ {18}\) Despite these lower qualities, many consumers are favoring the cost savings of a single service that can provide entertainment content in some form.\(^ {19}\)

Over-the-Internet distribution of video content is not only taking away market share from traditional providers,\(^ {20}\) it is also impacting the very sense and practice of owning a physical copy of content. Streaming video services like Hulu and Netflix are obviating the need for DVDs. DVDs served an important role when home users’ data connections had limited bandwidth, as the amount of digital data required to render an entire feature length film\(^ {21}\) was enormous in comparison to bandwidth speeds. Today, the digital size to bandwidth ratio has shrunk enough\(^ {22}\) to make streaming or downloading content acceptable to viewers.

Looking back at the history of data storage, the floppy disk drive was once the main data storage medium for computer users. As size and availability of other mediums increased, the need for floppy disks fell, and the key turning point was when Apple eliminated floppy disk drives from new iMacs. Applying the same considerations to today, one need only look at the new MacBook Air, which no longer comes with a DVD drive, to predict where DVD drives will end up: right next to old floppy drives.

**B. A door has opened for the indie film maker**

For decades, since the very emergence of movies and television, big studios have dominated and controlled the creation of creative video content,\(^ {23}\) primarily due to the high cost of production and distribution,\(^ {24}\) but this stranglehold is
softening. Technical advancements and mass-market consumption of video camera equipment have made professional grade equipment much more affordable to average pocketbooks. Professional grade video editing software and the hardware it runs on has also advanced technically and fallen in cost. Today’s consumers can create a well-edited and sharp looking video right out of their homes with very accessible and relatively affordable equipment.

Production costs and feasibility aside, distributing video content outside of the traditional big studio and cable provider channels is becoming much more viable. Having transitioned from the age of film to the digital age, coupled with the increase of bandwidth and the availability and widespread use of alternative devices that can display digital content, distributing digital video content to masses through alternative means is very achievable at a fraction of the cost.

Going further, indie filmmakers can not only produce and distribute their video creations affordably, they can actually profit from their creations through new business models enabled by the growth of Internet and mobile device usage. Many turnkey solutions now exist for users to purchase content directly over the web, or solutions for indirect advertising revenue, where the video content is free if the viewers are willing to view embedded ads. Additionally, popular websites like Google and Facebook offer low-cost advertising and viral sharing services that enable indie filmmakers to generate interest and attract viewers.

C. Summary of a strategy to ‘cheaply’ leverage today’s technologies

This paper will start by briefly explaining how indie filmmakers’ distribution options were limited in the past, and how technical advancements have unveiled
new options through leveraging video hosting websites, and hosting and
distributing the content themselves, including a discussion of the advantages of the
latter. The paper will then discuss how to use popular social networks and Internet
ad services in order to market video content cheaply by encouraging viral
marketing. Following marketing, this paper will discuss how self-hosted video
content could be monetized by directly charging the viewer, or indirectly by selling
the user a mobile application, or by displaying ads while the user is viewing the
video content.

After discussing how to distribute, market, and monetize the video content,
this paper will then discuss how to produce the video content as cheaply as possible.
The paper will start by how the filmmaker could find both a cast and property
owners that are willing to contribute to a project without compensation, or by
agreeing to accept deferred compensation that is only received as viewers pay for
the video content, discussing the author’s actual attempts to persuade actors and
property owners to participate in the production of the screen play "Burden". This
paper ends with a brief discussion of the minimum overall budget required to
produce an indie film and is followed by the author’s conclusion on the viability of
carrying out the paper’s strategy of producing an ultra-low cost indie film.
II. Alternative Mass Distribution Model

A. Data size of video is a distribution hurdle

Filmmakers create movies in order to have them viewed, and addressing how the movie will reach viewers is a significant hurdle. Traditionally, indie filmmakers would hope to attract a big studio to distribute their films. In stronger economies, big studios often did invest in the distribution of indie films, but this option has collapsed along with the market. To bypass traditional channels, indie filmmakers can look to distributing their video content over the Internet. Standard definition digital video in its raw format, however, can utilize as much as 12GB per hour of video. When compressed and packaged as a DVD, a full-length movie is typically about 8GB, with Blu-ray disks typically being over 40GB. In comparison, an average picture taken from a digital camera is around 3-4MB, less than 1% of the size of a standard definition movie. It’s not uncommon for an email server to reject transmitting an email because of the size of the email attachment, and this can typically happen when trying to send just a handful of pictures. Email providers block these attachments because bandwidth and storage are expensive and typically offer premium services at a cost to handle more data. This illustrates the fundamental issue: data transmission and storage is expensive even for small data formats. The problem is amplified with video content, which is enormous in comparison.
Assuming viewers can get a filmmaker's digital video content, they must consider how it is viewed and on what type of device. Traditionally, the majority of viewers have viewed video content via cable or satellite boxes attached to their TV sets, or through broadcasts received by antenna. Today, people are moving towards viewing content on devices including laptops, monitors, and smartphones. The amount of data required to render an hour’s worth of video content on these various devices differs dramatically. A 720p HDTV may require up to 9GB per hour for satisfactory quality, an 800x600 monitor up to 2GB per hour, and a 320x240 smartphone up to 700MB per hour. The amount of data needed, even for the highest level of compression, is still going to be quite costly to distribute to reach any significant number of viewers. Additionally, viewers will likely expect the content they have chosen to start playing relatively soon after selection, whether the content is streaming or is downloaded, so the distribution mechanism must be capable of delivering content quickly despite the large data sizes.

B. Leveraging video hosting services

One model indie filmmakers can use to bypass traditional distributors and host their video content on the Internet without incurring large bandwidth and storage expenses is to leverage video hosting services like YouTube or Vimeo. YouTube is a video sharing website on which users can upload, share, and view videos, subject to a 10 minute duration limit. Feature length films are typically 100 to 120 minutes, so YouTube clearly does not offer large enough time slots. Despite this limitation, an indie filmmaker can have an entire feature length movie
hosted on YouTube without explicit cost by breaking it into 10 minute or shorter segments, and organizing the segments in sets that represent a feature length movie when viewed consecutively.

This YouTube hosting model does come at a cost, however. Not a monetary one, but it significantly constraints the creative content of the feature length film. YouTube doesn’t offer a seamless transition between starting a new video clip as the prior one completes, so the continuity of viewing the video is disrupted when the viewer has to wait for the next segment to load and start playing. To accommodate these continuity breaks, the overall story should contain self-contained episode story arcs that start and complete within each ten-minute segment, commonly known as “serialization.” This imposes a creative constraint on the script as the writer must adjust the pace and story to align with these breaks, and knit them in with feature length story arcs.

Vimeo, another video hosting service similar to YouTube, enables free and low cost video hosting based on a data size limit, not a duration limit, and using this service to host video content would ease the creative constraint that YouTube imposes. Vimeo offers 5GB of video hosting, which at the highest resolution considered here, HD 720p, would permit a little over 30 minute segments. At the lower laptop or smartphone resolutions, a full feature length film could be hosted and viewed without any segmentation, completely eliminating the creative constraint and viewing-continuity impact.
C. Self hosting video content

Despite the free or nearly free hosting service that the YouTube-Vimeo model enables, it doesn’t offer a solution for monetizing video content; all content is free. Different monetization schemes are discussed in section III of this paper, but all of the schemes to be discussed rely on self-hosting in some fashion.

Self-hosting involves the creation and maintenance of an access portal to content. It requires an indie filmmaker to set up a server that handles storage of the video content, a “front-end” web service that enable users to purchase and access that content, a back end billing solution, and an Internet Service Provider (ISP) that provides a data connection sufficient to enable viewer access to the server and video content. A single feature length film, even at the highest resolutions would easily fit on most even the smallest of hard drives being offered today, which are generally still at least 80GB.37 “Commercial off the shelf” (“COTS”) software for billing and sales on webservers is widely available at reasonable costs. It requires a technically savvy filmmaker, or costs will rise in order to get this set up.

While self-hosting gives the filmmaker an opportunity to charge for video content, bandwidth is a major hurdle. The self-hosted model as described so far enables a viewer to purchase and download video content, but as more and more viewers try to do this concurrently, the self-hosted system will not be able to keep up. The server has to maintain a “connection”, which is a temporary, Internet-based data channel between two computers, and maintaining this channel takes RAM and CPU processing power.38 The host server has to allocate RAM in order to keep track of the details of each client, and must use CPU cycles in order to handle incoming
requests from clients. Even the fastest, highest powered home computers will run out of resources to keep up with multiple connections if demand for concurrent video downloading starts exceeding relatively modest numbers, conservatively in the range of 2-3 thousand connections. If demand for the video content is high, a home computer will eventually run out of resources and won’t be able to accept any new connections. While 2-3 thousand connections may be considered satisfactory or even good demand for many indie filmmakers, the filmmakers will still face a second, bigger problem: bandwidth.

  Consumer grade upload bandwidth offers significantly less throughput than download bandwidth, and when multiple viewers, who are “downloading” from the server, try to access the video content concurrently, viewer download times will skyrocket to unacceptable durations as the server, the “uploader” to the viewers, will not have enough upload bandwidth to keep up with demand. Typical upload speeds for a consumer grade broadband connection vary by provider and geography, with the average upload speed being around 435kbps. At this upload speed, a single download of a feature-length film would take over 3 and a half hours. If ten users try to download at the same time, the server’s upload time averages go up by a factor of ten, as it has to be shared across all ten downloaders, and the average time to download a feature length film would be more than a day. More server upload bandwidth is required or the self-hosted model does not scale to satisfy a filmmakers distribution goals, as too few viewers will be able to get the video content within acceptable times. Unless filmmakers’ aspirations of wide
consumption of their creative content are very limited, more upload bandwidth is required at very high costs.

D. “Smart” Self-hosting

While this bandwidth constraint of the self-hosted model might seem to make the self-hosted model a non-starter, a more sophisticated distribution scheme can be built to offload the bandwidth problem onto the viewers themselves. Rather than relying on the simple self-hosted model to transfer entire video files to each and every viewer one at a time, the video file can be broken up, distributed in pieces to viewers, and viewers can get the outstanding pieces they still need from other viewers, reassembling all the pieces into a single video file once everything is received. The sharing of pieces amongst viewers, rather than downloading the entire file from a single source, offloads the majority of the distribution task from the self-hosted system to the viewers themselves.

The network protocol that defines how this distribution system functions is known as “BitTorrent”, a peer-to-peer sharing protocol that allows people who are downloading a file from the same host to upload pieces of that file to other downloaders, speeding up the download process for the entire group of uploaders, known as a “swarm.” Once the host has uploaded a piece of the file to the swarm, the swarm shares it amongst its members, making sure each member of the swarm gets it. As the host shares each piece of the file, the swarm members continue sharing those pieces among each other. Eventually, the collective swarm
will have all pieces, can ensure that all swarm members get each piece, and each swarm member can reassemble the pieces into the single video file.

Figure 1: Simple Self-Host system vs “Smart” Self-Host system

For example, if a two-hour, 800x600 video file is 3GB, and 3 viewers download and view it, the simple self-hosted system would upload the entire 3GB file 3 times, resulting in 9GB of uploaded data, whereas the smart self-hosted system would break the file up into 3 1GB pieces, upload 1 piece to each of the 3 viewers, resulting in only 3GB of uploaded data. The viewers would get the rest of the pieces from each other, resulting in nearly a 66% savings in uploaded data. If 1,000 viewers want to download the video, requiring 3TB of uploaded data, the impact to
the smart self-hosted system is the same, 3GB. As downloader numbers continue to rise, the bandwidth impact to the smart self-hosted system doesn’t change as the swarm simply shares the content with new downloader. Ultimately, the smart self-hosted system has infinite scale, all at a very low relative cost.

BitTorrent technology has turned conventional distribution economics on its head. The more popular a large video, audio or software file, the faster and cheaper it can be transferred with BitTorrent.47 A technically savvy indie filmmaker can leverage this technology to distribute video content and do it better and faster than hosting services like YouTube and Vimeo, all while using a consumer grade desktop as a server and a consumer grade ISP with very limited bandwidth. An indie filmmaker simply needs to install a free bit torrent application, like Vuze or uTorrent48, create a torrent file using the application, which handles breaking the video file into pieces, and share the torrent file on a marketing website.49
Figure 2: YouTube/Vimeo System vs “Smart” Self-Host system

In order to satisfy the 1,000 viewers mentioned above, large-scale commercial hosting systems like YouTube and Vimeo, have to separately connect to each downloader and transfer the entire file, requiring 3TB of total transferred data. As the numbers continue to rise into the millions, massive amounts of server power and bandwidth are required to keep up with demand, at a very high monetary cost. In contrast, the smart self-hosted model achieves infinite scale at no additional cost. As more and more downloading viewers initiate a download of the video content, the swarm starts supplying the data, relieving the host from this duty (see figure 2 above, where new downloaders are depicted in red).
As discussed above, the smart self-hosted model requires few resources to scale to mass consumption, but customized web applications are required on the downloading viewer's end to make it work. Basically, browsers know how to get files from traditional servers that offer a one-to-one connection; the protocols are built into the browser. However, in order for a viewer's computing device to understand how to get the file through the smart self-hosted system, it must understand that it needs to use the underlying BitTorrent protocol. To enable this, a java-based browser applet can be utilized on the filmmaker's marketing website (marketing will be discussed later in this paper in the next section), that handles the downloading viewer end of the smart self-hosted “swarm” method. These type of applets are available today and would be easily incorporated into a marketing website\textsuperscript{50}

III. Marketing

A. Virality

The traditional aspects of marketing movies, including commercials on TV, previews on DVDs and in theatres, and early viewings to critics who will write about them, all present major hurdles for an indie filmmaker as they are either expensive or not readily available, however, with the advent of Facebook, YouTube, and other web-based services, an indie filmmaker can reach masses of would-be viewers without the need for the traditional channels. In 2008, the primary advertising vehicle for the commercially successful movie \textit{Cloverfield} was a teaser trailer posted
and virally shared through myspace.com.\textsuperscript{51} While \textit{Cloverfield} was distributed and viewed through traditional means, its success validates that movies can be successfully marketed through social networking websites.

Facebook has 500 million users as of July 2010, and also supports uploading free video clips.\textsuperscript{52} Through Facebook's sharing of posts to a “friend of a friend”, the notion of a compelling and popular video clip spreading widely through the Facebook network has become a reality.\textsuperscript{53} Facebook limits video clips to 100MB, but also compresses them, and clips can be roughly 10 minutes, which falls within the same limits as the YouTube model discussed above.\textsuperscript{54} While the smart self-hosting model should serve as the sole and primary distribution mechanism as discussed above, posting a teaser trailer or even the first 10 minutes of the feature length film itself onto Facebook is an easy and free way to attract viewers. Within the video post, the viewers can be directed to the filmmakers marketing website in order to download and view the rest of the video. The Facebook post is merely the hook that can be virally spread at no cost and attract viewers.

Additionally, YouTube supports social networking\textsuperscript{55} and more importantly, a video search function.\textsuperscript{56} In addition to posting on Facebook, the same 10 minute intro should be posted on YouTube, again with a reference link to the filmmaker's marketing website. This will provide the opportunity for YouTube users, estimated at 100 million as of March of 2009\textsuperscript{57}, to search for and find an indie movie intro. Four algorithms can sort YouTube searches: relevance, upload date, ranking, and view count.\textsuperscript{58} Based on experimentation, sorting by relevance appears to be based on matching the search keyword with the name of the uploaded video file, so video
searchers aren’t likely to stumble upon an indie movie that way, but its possible. What’s more likely is for searches to discover the video based on the other three options. Searchers looking for content based on upload date have a reasonable chance of stumbling upon the video when its first uploaded, as the rank is based upon recentness of upload. This should lead to increases in view count and generate a ranking, which will in turn lead to more successful searches when users search using the “view count” and “rank” sort algorithms. Assuming the uploaded video is compelling and well received, rankings should be high, leading to searchers discovering through the high ranking.

The view count search option does present a strategic opportunity for a filmmaker to tailor his or her marketing approach to increase the view count total. While Facebook’s primary “discovery” method is viewing posts from a friend of a friend, YouTube’s primary discovery method is search. An indie filmmaker would like to reach as many Facebook users as possible through re-posting, and as many YouTube users as possible through generation of a high view count. So rather than posting the intro video clip on both Facebook and YouTube, the filmmaker should post the intro video clip on YouTube only, and post a URL link to the YouTube clip on Facebook. It would operate the same in the sense that Facebook users would continue to click on and repost the YouTube link the same way they would have clicked on and reposted the video clip uploaded to Facebook directly. The difference is that all viewings of the intro video clip would increase the YouTube view count total, increasing its position within YouTube search operations.
B. Advertising

It is quite possible that the no-cost viral marketing method would generate enough interest to lead to mass interest in an indie film, but if an added marketing boost becomes desired or even required, the Internet offers low cost solutions that could provide the additional boost. With a service like Google AdWords, a filmmaker can place advertising on Google search webpages based on the type of search being performed and by geographic location. If Google users have not yet discovered the indie filmmaker’s “intro” video through YouTube or Facebook, they may stumble upon and click on a Google ad, bring the user to the filmmaker’s marketing webpage.

Once a few Google users have discovered the “intro” video, the marketing website could suggest to the user post it on his or her Facebook page, perhaps offering the content free to the first x-number of downloaders in exchange for the free marketing. As more Google users click-on Google ads, download the video content, and post on their Facebook pages, pockets of viral sharing will crop up through Facebook. As these pockets of virality spread individually, the filmmaker may notice that his or her video content penetrate certain geographic locations with greater or lesser success. He or she can then start tailoring Google ad placement to help kick start pockets of virality in geographic locations that have yet to be penetrated.

Additionally, with Google’s pay-per-click style of billing, where advertisers only pay for the ad if a user actually clicks on it, not just for presenting the ad, the
filmmaker can track the correlation of the usefulness of Google ads based on the number of downloads from the marketing website to the number of Google ads being paid for using the pay-per-click model. It should become apparent quite quickly if Google ads are generating downloads of the filmmaker’s video content. Ultimately, the filmmaker will be able to control advertising costs by quickly stopping ads if they are not working, or stopping them once viral adoption through Facebook and YouTube picks up. Specifically, if the filmmaker sees that a certain market or locality isn’t responsive over several weeks of advertising, where very few downloads have occurred, the filmmaker could consider halting the ad. Conversely, if the filmmaker starts seeing that within a certain market or locality that downloaders are starting to advertise for the filmmaker by reposting the video content on their Facebook and YouTube accounts, then the filmmaker could stop the ad as its no longer necessary to generate more interest within that area.

IV. Monetization

Once an indie filmmaker has a distribution plan in place, he or she can consider various methods of generating revenue from the video content. Directly charging viewers, or indirectly charging them via the sale of applications or via advertising while the viewer is watching the video are options considered below.

A. Directly charging viewers

The most obvious method of generating revenue from viewers is by charging them to download the video content from the filmmaker’s marketing website.
Viewers, having just been redirected to the marketing website via the various viral hooks discussed above, would then be presented with details on the rest of the story and given the option to purchase it for download. Payment solutions like PayPal can easily be integrated into the marketing website at no up-front cost.\textsuperscript{61} PayPal simply takes a relatively small percentage of the money transfer.\textsuperscript{62} PayPal is the service that eBay buyers and sellers generally transact business with,\textsuperscript{63} and has been widely accepted amongst Internet consumers. Additionally, this “Charge for Download” mechanism still works for the smart self-hosting model as viewers would be basically purchasing access to the torrent swarm by purchasing the torrent descriptor file, which provides instructions to the BitTorrent application on how to get the full file.\textsuperscript{64} The smart self-hosted model only differs on “how” the file gets downloaded, not “if” the file can be downloaded.

\textbf{B. Indirect profit through mobile application sales}

Viewers who visit the marketing website likely have a significant interest in the feature length film already, or they wouldn’t have followed the viral link, but its unclear how many will be willing to purchase the remainder of the story. Separately, viewing video content on mobile devices is rapidly growing\textsuperscript{65}, including services like FloTV\textsuperscript{66}, Sprint TV\textsuperscript{67}, and AT&T Mobile TV\textsuperscript{68}, and mobile apps purchased through app stores is experiencing explosive growth.\textsuperscript{69} Putting these seemingly unrelated pieces of data together, an indie filmmaker could decide to sell a mobile app that plays the feature length film, rather than directly selling the content through a marketing website. The filmmaker would be moving the entire
billing function to the mobile phone platform, and collect revenue from that service. Additionally, the difficulty and mindset behind buying an app on an app store, which requires just a click or two and is simply tacked onto a monthly bill, versus paying up front at a website, which requires submitting account data and authenticating user credentials, might make the difference to many viewers on taking the plunge to purchase the remainder of the story.

The filmmaker, of course, would have to build the mobile application in the first place. The basic function of this application would be to fetch the video file from the smart self-hosted system using the BitTorrent protocol, and then offer the typical play, pause, and stop functions once its on the device. It would be a simple app and easy to develop, likely taking an experienced iPhone or Android developer just a few weeks of development and test time.\(^{70}\) The most complicated piece of the software is the implementation of the BitTorrent protocol, but open source implementations are freely available, preventing the need to implement that piece of the software anew.\(^{71}\)

The mobile application would not only move the billing step to the provider as discussed above, but would also open the door for an additional marketing mechanism, mobile app rankings.\(^{72}\) Mobile device users commonly access app stores in order to find, purchase and install applications that do many different things. Many times, these apps are found simply based upon their ranking or popularity, similar to the YouTube search discussion above, and not necessarily because a mobile device user was out to look for something specific. Whether the
filmmaker wishes to use the mobile app method for revenue generation or not, it can certainly be used as an additional marketing mechanism.

C. Indirect profit through ads

An indie filmmaker can forego charging the viewer altogether, and collect a completely indirect revenue stream through advertising. Expanding on the mobile app player concept, the app and the content could be given to the viewer for free, with the understanding that the mobile app would display ads in a section of the screen while the user was viewing the content. This option is built into both the Apple-iPhone and Android platform as a feature and revenue model to application developers. On a pay-per-click basis, the app developer gets a portion of the ad payment that the advertiser makes to the platform provider (i.e. Apple or Google). The platform provider handles the advertisers themselves. This same free-content-plus-advertising paradigm can be used on PCs and laptops where users download and view content within a browser, again viewing ads above or below the viewing area. Google AdSense offers a free service to add Google ads to a website and an easy payment collection option. AdSense is completely automated and designed for easy incorporation into websites. The Google business model is almost entirely built around ad revenue, and its success is due in part to how easy it has made it to insert into websites and mobile applications.

This option should completely eliminate any hesitation a viewer may have in downloading the remainder of the story when visiting the filmmaker’s marketing website. There is no cost to users, they get to download the remainder of the story for free. While watching, they will discover that ads are being displayed above or
below the viewing area, and could then have the option to purchase a version of the viewer app that doesn’t include mobile ads. This model has enjoyed widespread success for mobile applications and video games,\textsuperscript{75} so it is reasonable to try building a business model using video content as the driver.\textsuperscript{76}

V. Production with a tiny budget

With the marketing, distribution and monetization questions answered, the indie filmmaker must actually create the video content, answering the questions “who, what, where and how.” This section discusses options to find a cast that is willing to contribute to the video project without compensation or by compensation that isn’t received until after the project is completed. Additionally, this section discusses how to gain access to locations from property managers and owners without paying rent. The author includes details of his attempts to secure cast members and set locations throughout the discussion.

A. Compensation free cast

An indie filmmaker can explore several options to defer payment to cast members, or find a cast willing to participate without pay. In an ideal world, an indie filmmaker would be able to rally enough out-of-work and waiting-to-be-discovered actors that would be willing to contribute their time and talent to a project without compensation, simply for the chance to be a part of a project that would provide enough visibility for them to land a future role and be “discovered”.

Mark Lindner 12/4/10
While these people surely exist, finding and convincing enough of them to commit to a feature length project all at the same time is a non-trivial task.

Rather than try to discover and build a volunteer cast piecemeal, an indie filmmaker can approach non-profit organizations, such as www.studentfilmmakers.com, a networking organizations for actors and filmmakers, or university based acting clubs. Acting clubs and film networking organizations are typically composed of people who want to be actors, who want to be in films or on television, and want to be discovered. They are also typically in these clubs because they have yet to be discovered, making it reasonable to think that a group of them would be willing to participate together on a worthy project. It is not uncommon for volunteer acting jobs to be filled by members of acting clubs like UTA.77

Putting this concept to test, I contacted78 the Undergraduate Theater Association (“UTA”)79, a student acting club at the University of Wisconsin, with a proposal based on the work-in-progress script, “Burden" by Steven Scovil,80 a feature length screenplay involving two brothers legal battle on either side of an RIAA case against an illegal downloader of music. The proposal included an introduction of myself as an enthusiastic indie filmmaker with innovative ideas on how to create and monetize a project successfully, a summary of the basic premise of “Burden”, and an “offer”, rather than a request, to invite members of the UTA to participate. Since the UTA was organized under an educational umbrella, the University of Wisconsin, I elaborated on the “Burden” project by explaining that it was not only meant to be a feature-length legal fictional dramatization, but that it
also intended to draw out many legal issues involving digital piracy, hoping that it would align with UTA’s educational foundation. I received no reply.

Being very surprised at the lack of response, I called the UTA, and eventually reached a board member willing to listen. After hearing about the project, he assured me that it sounded very interesting and many UTA members would likely be interested, but also cited past UTA contribution to real projects that involved very short term commitments, typically limited to one to two days. The final word from him was that he would spread around the details of the “Burden” project and get back to me, but I did not hear back. My impression was that there were certainly some UTA members that would participate for short durations, and that there was potential to find a handful of members that would commit to longer projects, but that I would have to pitch the project in person.

B. Deferred compensation for cast members

Another approach to securing a cast is to offer deferred payment to cast members. As discussed above in the YouTube/Vimeo hosting model, the video content could be split up into segments in order to provide an access channel for viewers to find and download content without the filmmaker needing to self-host. Although an alternative hosting model is preferred for continuity and monetization reasons, the method of splitting the creative content up into a few pieces could be considered for another reason: splitting ownership of the creative content across cast members. By splitting ownership, partial owners of the video content will offer their acting services without any compensation other than partial ownership of the
end product, ultimately receiving “payment” only after the final product is purchased by viewers.

In “Burden”, there are two main characters, Gavin and Graham, and the majority of remaining characters have minor roles. If an indie filmmaker was producing “Burden”, the majority of scenes would have to be shot around the availability and schedules of these two actors. The quality of the end product, a feature length version of “Burden”, would also depend on the caliber of the actors playing Gavin and Graham. An indie filmmaker could consider hiring professional actors for these two characters, offering them ownership of a segment of the final feature length film. The supporting cast, with minor roles requiring shorter term and less involved commitments, could be filled by volunteers from the acting clubs mentioned above.

Thus, an indie filmmaker could avoid outlays for compensating the cast prior to shooting, editing, and marketing the film, and only have to pay actors based on proceeds from the film. With “Burden”, an indie filmmaker could decide to split the script into three portions, the beginning part being largely about how Graham attempts to steer his brother towards a more righteous path, the middle part involving Gavin and Graham battling each other in and out of court, and the final part, where Gavin does or does not redeem himself. In order to secure quality actors for the roles of Graham and Gavin, the indie filmmaker can give ownership of the first portion of the film to the actor playing Graham, who has the main role in that portion, and give ownership of the third and final portion to the actor playing Gavin, who was the primary character in the final scenes. In order to benefit himself
monetarily, the indie filmmaker could maintain ownership of the middle piece, and also retain the right to market and distribute the three pieces where the proceeds would be split evenly. The three episodes could be purchased individually, or sold as a set where the three partners split the proceeds evenly.

This structure may actually be an attractive choice for viewers as well. Having seen the “intro” video clip, users may be interested to watch further, but reticent to pay much to keep viewing without any assurance of liking the entire project. Purchasing the first third will allow the user to see much more and really get a feel for the entire movie.

Structuring the film and ownership differently, the indie filmmaker could split the movie into two pieces, with the Gavin and Graham actors owning each piece, but where the filmmaker only transfers ownership of each portion to the actors after a certain revenue point, or after a certain time duration. The details would ultimately have to be negotiated between the indie filmmaker and the actors, but using this model, multiple options become available.

C. Locations

After attracting a compensation-free or deferred-compensation cast, the indie filmmaker must now shoot and edit the film. An analysis of the costs of the video and editing equipment and software are included in Section VI: Overall Budget, answering the question of “how” to shoot and produce. To answer “where”, the indie filmmaker has two options: 1) asking property owners to permit the filmmaker to shoot on their location, or 2) offering deferred compensation to the property owner as payment. Its not uncommon for people to get excited and desire
to get involved in creative projects, so persuading property owners and managers to let the filmmaker shoot on their property without paying rent, is quite possible.

To assess the likeliness of property owners granting permission for filming on their property, I contacted several property owners and managers of locations required for scenes from the feature length script “Burden”, which includes scenes at a courtroom, cemetery, law offices, bars, cafes, private homes, and a park bench. Amongst the easiest to secure for shooting are outdoor locations. I contacted a cemetery by email, asking what I needed to do to get a permit to shoot at their cemetery, and was immediately responded to with a request for more information about when and how many people, but absolutely no resistance on the question on “if” I would get permission. The cemetery manager simply wanted to know when and recommended early in the workweek as the slowest time. Similarly, municipalities simply charge a permit fee, anywhere from $100-$300, to shoot at locations like park benches, and also require details on how many people, dates, times, and durations.

Cafes were also reasonably easy to secure. Both of the cafes where I inquired were enthusiastic about having some filming done at their café, but still had the concerns of how many people, when, and for how long. In both cases, the person I talked to was the owner of the café, which gave some insight into the resistance I received at several bars. Inquiring at a few local bars, I received enthusiastic interest in the details of the project, but lukewarm reception to the idea of actually shooting on the bar property. First, in both cases, I spoke to the bar manager, not the owner, and the the bar manager may have lacked the authority to
grant permission. Second, bars are somewhat used to and expect bad behavior by their customers. Customers go to bars in part to drink alcohol, which can lead to bad behavior. Bar managers may be skeptical of permitting any sort of activity within their property that falls outside of what they are accustomed to permitting and controlling. On the plus side, both café owners and bar managers liked the idea of the potential buzz that would be created by an indie movie project and the potential increase in business it may generate. I concluded that if I persisted with bar managers and ultimately reached the owner, I could convince owners to permit filming, but it would take a lot more effort and explaining to secure a bar.

Offices and private homes were straightforward to secure. Most offices operate Monday through Friday, somewhere between 8AM and 6PM, so there are large time windows where the offices are empty. Assuming the indie filmmaker works at (as I do), or knows somebody who works at an office that could inquire on the filmmaker’s behalf, companies with offices seem to be pretty open to the idea of filming occurring at time of closure. I suspect this has a lot to do with the amount of trust they have in the requesting employee, and even with my own employer, I was asked for the usual, “how many people?” and “for how long?” questions. The same basic experience happened when inquiring about using the private homes of friends and relatives. Based on trust, they said yes, but asked similar questions.

There was one location required by “Burden” that was troublesome: the courtroom. I inquired at two locations: the Boulder County Courthouse in Boulder, Colorado, and the mock courtroom at the Chicago-Kent law school. I was granted permission at first, but told that I would have to be squeezed in when
possible, generally when a case expected to be heard was suddenly settled, however, I know the judge, T.J. Cole, quite well, so I wasn’t all that convinced that any indie filmmaker could talk a courtroom into permission to film. My request at Chicago-Kent was scrutinized much more heavily. I had become accustomed to answering questions about when, how long, and how many people, but in the case of the mock courtroom at Chicago-Kent, my general answers were not sufficient. I was asked for much, much more detail on specifics than I was prepared to answer, and was ultimately told that the courtroom is generally not open to this type of activity.

One would likely expect that a real government courtroom would be less open to filming than a mock academic courtroom, but the reason I was granted permission for a real courtroom is likely due to the judge’s familiarity with me personally. This reasoning based on personal familiarity is similar to my experience gaining access to private home and office locations as discussed above. Ultimately, an indie filmmaker is likely to encounter significant resistance in filming at a location like a courthouse that is accustomed to very formal and official government business, unless the filmmaker has some inside connection.

VI. Overall budget

The costs to produce, market, and distribute a feature length film by leveraging today’s Internet-based technologies in no way compares to traditional budgets. An indie filmmaker with credit cards and an average total limit is enough to get started, opening the door for nearly any technically savvy, would-be indie filmmakers to give their dream project a shot.
The budget below which assumes the smart self-hosting option:

### Video and Editing Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera: 3CCD HD camera Canon XH-A1S (consider 2)</td>
<td>$3000 (used at $1,200)</td>
</tr>
<tr>
<td>Lighting equipment</td>
<td>$1000</td>
</tr>
<tr>
<td>Boom microphone</td>
<td>$100</td>
</tr>
<tr>
<td>Incidentals (permits, wardrobe, props)</td>
<td>$500- $1,500</td>
</tr>
<tr>
<td>Apple Final Cut</td>
<td>$1,000</td>
</tr>
<tr>
<td>MacBook pro with 2TB drive</td>
<td>$2,300</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$6,000 - $12,000</strong></td>
</tr>
</tbody>
</table>

### Distribution and Monetization

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Bones PC as “server”</td>
<td>$600</td>
</tr>
<tr>
<td>Consumer grade internet service</td>
<td>$50/mo = $600</td>
</tr>
<tr>
<td>IPhone/Android app submission</td>
<td>$200 ($100/each)</td>
</tr>
<tr>
<td>IPod/Android devices (for test purposes)</td>
<td>$500 ($250/each)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$1250</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$7250 - $13,250</strong></td>
</tr>
</tbody>
</table>
For just over $7000 in the most scaled back approach, an indie filmmaker
could cast, shoot, edit, market, and distribute over the Internet a feature-length film
to millions of viewers.

**VII. Conclusion**

The Internet and device technology\(^{92}\) has revolutionized many industries,
and indie film creation and film viewership is ripe for revolution. Viewers are
unplugging their cable services, shunning the DVD, and moving to internet-based
services already. Video capture devices are of high quality and are cheaper than
ever. Video hosting services are gaining popularity and sophistication daily. The
old models will not stand this momentum, and those who seek to leverage it will be
the entertainment winners of tomorrow.

Indie filmmakers with the impetus entrepreneurial courage to try a new
distribution model, the technical ability to create the inexpensive smart self-hosted
model, and the wherewithal and social skills to garner a cast and set of locations
suitable to creating a compelling story, can become the pioneers of the new mode of
home entertainment: The “Indie-ternet” Movie.
http://www.articlesbase.com/internet-articles/increasing-use-of-the-internet-127660.html and

http://lbdsl.com/whatisdsl.html definition of DSL

http://www.wisegeek.com/what-is-wifi.htm definition of WiFi

http://www.wimax.com/general/what-is-wimax definition of WiMax

http://www.wisegeek.com/what-is-lte.htm definition of LTE


http://www.slingbox.com/go/products definition of slingbox

http://adage.com/columns/article?article_id=105894 discussing that more people are viewing video content on mobile devices

http://www.businessweek.com/technology/content/jun2009/tc2009063_847908_page_2.htm discussing that providers are bundling Internet, phone, and cable TV together.

Id, stating that “broadband part is more the anchor part of the bundle”

“Hulu is an online video service that offers a selection of hit shows, clips, movies, and more at Hulu.com and numerous destination sites online and across four screens — PCs, TVs, mobile phones and tablets”

http://www.netflix.com/HowItWorks
“The Instantly watch unlimited TV episodes & movies streaming over the Internet to your TV via an Xbox 360, PS3, Wii or any other device that streams from Netflix. You can also watch instantly on your PC or Mac too!”

http://www.pcmag.com/encyclopedia_term/0,2542,t=YouTube&i=57119,00.asp
“A very popular video sharing Web site that lets anyone upload short videos for private or public viewing.”

http://www.roku.com/roku-products “Roku is a little box that allows you to instantly stream tons of entertainment on your TV.”

http://www.xbox.com/en-US/PCSetup/XPSP2 “You can stream music, pictures, and video to your console”

http://us.playstation.com/ps3 “stream thousands of TV shows and movies”

www.apple.com/appletv “Apple TV lets you rent new movies and TV shows, stream Netflix content, watch YouTube videos, and enjoy photos, music, and more right from your HDTV”

http://en.wikipedia.org/wiki/IPTV under the section “Limitations” discussing packet loss’s affect on video quality. See also

http://findarticles.com/p/articles/mi_m0FGI/is_8_19/ai_n28072214/ stating that “Today internet video is still delivered in rather low quality via sites like YouTube.”

http://findarticles.com/p/articles/mi_m0FGI/is_8_19/ai_n28072214/ discussing that “In spite of grainy images and the small window format, these sites have been successful in attracting millions of viewers.”
Mark Lindner 12/4/10


http://www.osta.org/technology/dvdqa/dvdqa6.htm average DVD size is around 8GB

http://www.websiteoptimization.com/bw/1010/ explaining that bandwidth has increased, which in turn decreases the bandwidth/DVD-size ratio

http://www.ejumpcut.org/archive/onlinessays/jc12-13folder/filmbizbooks.html 
talks about the creative freedom a scriptwriter can have and concludes that this freedom is directly proportional to the writer’s importance. Normally a writer has little control over the final shooting script”.

http://www.bukisa.com/articles/370247_independent-filmmaking-takes-place-outside-of-hollywood stating that “Before the advent of digital alternatives, the cost of professional film equipment and stock was also a hurdle to being able to produce” a movie.

http://www.gizmag.com/panasonics-ag-af101-dslr-killer/16353/ stating that “We may be witnessing the final democratization of the film industry with dedicated video cameras that cost several orders of magnitude less than the systems they are replacing.”


http://blogs.suntimes.com/ebert/2009/09/indie_alert_level_severe.html discussing the “collapse of confidence in the prospects of independent film distribution” and that the “The old independent market is over.”

http://www.crutchfield.com/S-Lh10dgM531u/learn/learningcenter/home/fileformats_glossary.html explaining that “Digital Video” is captured at a rate of about 1GB per 5 minutes, which is equivalent to 12GB/hour.

Supra at Section I.A

http://hubpages.com/hub/Blu-Ray-DVD-vs-HD-DVD explaining that Bluray can be up to 50GB

http://www.multi-cam.net/digital-camera-picture-file-size.htm "A digital photo made up of a million pixels contains approximately 1 MB of information if it is a grayscale image, around 3 MB if it is in RGB mode and almost 4 MB is in CMYK color”

Supra at Section 1.A

http://en.wikipedia.org/wiki/YouTube

http://vimeo.com/help/faq#maximum_length stating that Vimeo permits 5GB

HD 720p consumes approximately 9GB per hour. Seeing that 5GB is a little over half of 9GB, the resulting duration would be a little over half an hour.

Laptops and smartphones have much smaller screens, and run at smaller resolutions.
stating that HDD minimum size available today is 80GB under the section “What size do you need?”

38 http://www.codeproject.com/KB/IP/TCP_Connection_Pooling.aspx discussing that connections consume RAM and CPU. See also http://www.iar.com/website1/1.0.1.0/781/1/ discussing that RAM usage has a major impact.


40 435kbps is in units of kilo”bits” per second. A “byte” is 8 bits, so 435kbps is equivalent to 54.375KBPS, which is in units of kilo”bytes”. Multiplying by 60 converts the rate to 3,262.5KB/min or 3.2625MB/min. With the most compressed feature length film being about 700MB, the calculation is 700/3.2625 or roughly 214 minutes, which is 3 hours and 34 minutes.

41 3 and a half hours multiplied by 10 would be 33 hours

42 As shown in figure 1 on the right-hand side, in the smart self-hosted model, the server uploads piece 1 to the smartphone, piece 2 to the laptop, and piece 3 to the desktop. The smartphone exchanges piece 1 with the laptop and the desktop, and receives piece 2 from the laptop and piece 3 from the desktop. At this point, the smartphone has all 3 pieces. The laptop has received piece 2 from the server, piece 1 from the smartphone, and piece 3 from the desktop. The desktop has received piece 3 from the server, piece 1 from the smartphone, and piece 2 from the laptop.

43 A feature length film at 800x600 is generally around 2GB, but to simplify the math in the example, 3GB is being used, which would represent a very long feature length film (roughly 3 hours)

44 In practice, the content is broken up in much smaller pieces, typically between 256KB and 1MB. See at http://wiki.theory.org/BitTorrentSpecification @ section 7.2, discussing typical piece sizes.


48 http://www.associatedcontent.com/article/936681/bitlet_a_bittorrent_client_that_runs.html

51 http://en.wikipedia.org/wiki/Viral_marketing about Cloverfield marketing. The director also indirectly validates the YouTube/Vimeo model by stating “The fun of this movie was that it might not have been the only movie being made that night, there might be another movie! In today’s day and age of people filming their lives on their camera phones and Handycams, uploading it to YouTube… That was kind of exciting thinking about that.”
Facebook has even created a “Six Degrees” application to collect metrics on the connected-ness of the Human Web, and this application has calculated that the average separation per Facebook user is 5.73. See at http://en.wikipedia.org/wiki/Six_degrees_of_separation

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http://smallbiztrends.com/2009/05/5-reasons-youtube-social-marketing-strategy.html discussing youtube’s support of social networking.

http://www.google.com/support/youtube/bin/topic.py?hl=en&topic=17177 discussing the different ways to search for content.

http://social-media-optimization.com/2009/03/100-million-people-use-youtube/

http://www.youtube.com. Sort algorithms for search results can be found by searching for anything at the home page, youtube.com, and the pressing “Search Options” to see the “Sort by” option. Alternatively, there is a “Sort by” drop down menu on the right side of any search results from the main youtube page.

https://www.google.com/adsense/support/bin/answer.py?hl=en&answer=32738 explaining what Google AdWords is. Also see https://www.google.com/adsense/support/bin/answer.py?hl=en&answer=76231 for an explanation of the difference of AdWords and AdSense.

http://adwords.google.com/support/aw/bin/answer.py?hl=en&answer=14185 defining “Google Pay-per-click”

https://www.paypal.com/cgi-bin/webscr?cmd=xpt/bizui/IntegrationHub-outside discussing how to integrate Paypal into a website

https://www.paypal.com/cgi-bin/webscr?cmd=_display-fees-outside stating Paypal’s percentage fee per transaction

https://www.paypal.com/cgi-bin/webscr?cmd=xpt/Help/general/TopQuestion8-outside explaining that Paypal is the primary payment solution for ebay

http://en.wikipedia.org/wiki/BitTorrent_%28protocol%29 discussing the role of the “torrent descriptor file”

http://blog.nielsen.com/nielsenwire/online_mobile/americans-watch-more-mobile-video-now-than-ever/ discussing increases in mobile TV watching


This estimate is the opinion of the author of this paper. The author has a B.S. in Computer Science from the University of Wisconsin – Madison and has been a professional software engineer for 14 years, including the development and
deployment of professional grade software products for both the iPhone and Android platforms.

http://www.bittorrent.com/opensource


http://www.google.com/adsense/support/bin/static.py?hl=en&page=guide.cs&guide=29574&from=29574&rd=2 explaining that AdSense is a service for website hosts to generate income by placing google ads on their websites.

http://tech.fortune.cnn.com/2010/07/29/google-the-search-party-is-over/ discussing that 91% of Google’s revenue is from AdSense and AdWords.

http://blog.w3i.com/category/application-marketing-trends/

http://www.marketingcharts.com/television/online-video-quality-impacts-audience-retention-revenue-opportunities-1230/ stating that 80% of online video users accept the presence of advertising as a trade-off for providing free online video content.”

email message from Jean Hauser to multiple addressees at the University of Wisconsin, 6 December 2010, soliciting volunteer actors to participate in an ad video for a counseling and consultation service.

The author emailed a one page proposal to UTA’s main email address: uta@rso.wisc.edu.

http://uta.rso.wisc.edu/Home.html The home website of the UTA.

The script for “Burden” is available at http://www.kentlaw.edu/perritt/courses/seminar/entertainment-law-fall2010.htm

The author spoke with a UTA member named ‘Charlie’ via telephone the week before Halloween, 2010

If the actors for these two roles are members of the stage-play union, Actors’ Equity Association, (“AEA”) the movie actors’ union, Screen Actors’ Guild, or the television actors’ union, American Federation of Television and Radio Actors (“AFTRA”), they may be prohibited from accepting deferred compensation, except on certain low-budget projects. Exploring those limitations is beyond the scope of this paper.

The author emailed the Louisville Cemetery at pollyb@louisvilleco.gov on 10/24/2010


The author spoke to Nancy, the owner of Super Joe’s in Superior, Colorado, in person on Oct 23rd, 2010 and to Amy, the owner of “Eye Opener” in Niwot, Colorado, also on Oct 23rd, 2010.

The author spoke to David, the bar manager of “The Purple Otter”, in Chicago, IL on Oct 26th, 2010 and to Colby, the bar manager of “C.B. and Potts” in Superior, CO on Oct 29th, 2010.

The author emailed Arul Ananthanarayanan, a VP of Engineering at Qualcomm, Inc, on Nov 9th, 2010 who referred him to Fran Vreeland, a Senior HR Specialist.
The author emailed Miguel Bush, an employee at the Boulder Country Courthouse on Nov 18th, 2010.

The author spoke to someone (anonymous) at the student services office and was referred to Janet Keim, who I emailed on Nov 18th, 2010.

http://education.cardhub.com/statistics/average-available-credit/ stating that the average consumer has access to $19,000 in credit.

Some of these items can be rented, furthering reducing the production cost, depending on the duration of shooting time and complexity of scheduling.

Device technology includes smartphones, laptops, iPods/iPhones, and other “viewing” technologies as discussed in this paper.