A Fault-tolerant and Open Platform for Social Music

(Version 2)

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For anyone who loves music.
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1. Abstract

This paper describes a platform that if implemented will provide pervasive access to music across the Internet. It allows music to be available to a larger group of people in a similar fashion to torrents. Improvements over existing systems include:

- Reduced cost of management.
- Free promotion and income for artists and content providers.
- No central network for music distribution.
- Increased access to music across the Internet.
- Improved flexibility of technology.

There is also potential for this system to be used to facilitate open research and innovation into the music listening experience. Improved technology also presents new possibilities for the web.

The system's reliability is not guaranteed, nor is its efficiency; however, the intention is that the efficiency and reliability will be sufficient to make the system useful, and demonstrate that such a system is feasible.

This report also describes several prototypes designed to highlight the practicality of such a system. These are performed upon real-world targets. Improvements over similar systems are also highlighted in this report. The system is considered a prototype, and areas for further improvements are highlighted throughout this report.

2. Aims

A fault-tolerant and open platform for social music as described in this report, allows anyone connected to the Internet to easily retrieve music. The methods and limitations upon how music can be added to the system, and limitations upon how the music is accessed are specific to individual systems. The aims of this project are to devise a platform with the following properties:

1. Open access to the platform and its information for developers, researchers, users, artists, and labels.
2. Legal indemnity and anonymity from prosecution for users.
3. Flexible, dynamic, redundant, and fault-tolerant organization of music networks.
4. Improved musical listening experiences.
5. Social environment and model for sharing and discovering music.
6. A platform for experimentation and innovation.
7. Alternative promotion and income streams for artists, labels, content providers and associated parties.

And also to evaluate the practicality of such a system by means of experimentation.

3. Introduction

The first version of this white paper helped introduce new concepts to the public at large. The paper was well received where people were capable of reading between the lines and prolonged attention, especially in sections that were either too vague, non-existent, or technical; Where people were incapable it created misunderstandings which are a distraction from the paper's main purpose. Additionally, since the original paper was published many helpful comments and changes have arisen which should be tactfully addressed in this new paper.

Some of the main problems with the original paper could have been easily solved if the paper had been peer reviewed. Problems like using the word "piracy" instead of "freedom" and not enough emphasis on how the system should help to address the needs of artists, labels, and listeners. This paper should outline our goals, opinions, philosophy, progress, and more regarding the project. We hope this helps explain our main intentions.

Specifically, version 2 of this white paper adds a new section for our business proposal and a discussion on our social platform. Other sections have been improved or extended.

3.1. A Discussion of Music Piracy

> *"One of the most effective weapons for defeating online piracy is providing legal, easy-to-use alternatives."* - Kevin Tsujihara

In an attempt to recover lost revenues, the music industry has made progress in allowing legal alternatives to flourish in the hope they may compete with "illegal" alternatives like file sharing. It is reasoned that if the legal alternatives are as easy to use more people will start using them. Unfortunately in our opinion, by the very nature and design of commercial music, this is impossible.

Commercial music is about money, so users of these legal alternatives are always going to be controlled compared to alternatives. This is because in order to protect current revenue streams restrictions on access need to be imposed. By design, users can expect to provide rigorous registration information including credit card information just to use the service. There may also be restrictions on how the music can be used – So called Digital Rights Management or "DRM."

Illegal alternatives don't have these restrictions therefore they will always be easier to use – If a user wants to download music from a P2P network they don't have to enter their birth certificate just to listen to restricted music. That is why we conclude from a user's perspective legal alternatives are horrible.

> *"Online piracy is a huge problem, one which costs the U.S. economy between $200 and $250 billion per year, and is responsible for the loss of 750,000 American jobs."* - You.

When we talk about piracy normally, the knee jerk reaction is to conclude piracy is bad because it robs creators of their entitled income.

Those figures about losses above are so grossly exaggerated they can be safely ignored – if you're really interested, the TED video at http://www.ted.com/talks/rob_reid_the_8_billion_ipod.html will explain more about this. It also needs to be mentioned that there is no production cost when music is pirated. Digital piracy is not the same as stealing a physical item. With digital piracy, a copy is created and the original is left untouched. With physical stealing, the original is taken and that counts as an actual loss. It costs nothing to pirate so you can't call piracy "stealing."

You can say there is a loss, but in reality if the only alternative was to pay, you can't say that this also implies the pirate would have otherwise made the purchase. That's the whole point; If you think of it like that, a person who pirates potentially receives value he or she might otherwise have never had. You can't argue that isn't good for promotional purposes. It may even lead to legitimate sales of other merchandise or related products.

> *"Music may be as effective as food, drug, and facial expressions in eliciting subcortically mediated affective responses."* - Some researcher.

When you consider the properties of music it seems strange to uphold the notion that music should be restricted by price. Music is no longer in the same category as it once was. It no longer costs heaps to distribute; It is not as hard to find somewhere to play it; It will not degrade overtime; It is now almost everywhere; Piracy shows us a glimpse of a dream (freedom) that is now impossible to kill without the complete eradication of all present technology. If this concept of freedom were to be embraced rather than feared the right culture and attitudes towards music would be allowed to spread which would be singularly more effective than the rational behind any DRM measures or restrictions proposed to date.

It is human nature to want to share your music. Music may reflect or compensate for aspects of the personality. It may represent aspects of culture, providing the social cohesion of a group or movement. These are good, tangible reasons to share and display your taste in music. For these reasons we conclude the current commercial model for music is wrong and now must either evolve or die. The truth needs to be accepted: Piracy is winning because it offers freedom. Freedom is better than control, and music should be free. Free as in "freedom", not free as in "free beer."

Restricting the availability of music just leaves a bitter taste in the mouth. It is obvious that people are going to respond negatively when they see such aggressive reactionary responses towards piracy and unauthorized sharing. This taste only clouds all sense of reason and breeds hatred towards the industry. When people can easily bypass such limitations themselves, any restrictions are just going to further the dislike and reinforce the movement for freedom.

Essentially, by retaliation, the industry digs their own grave.

4. Business

> "*Show me the money.*" - Jerry Maguire

For this proposal to be a success it is important to consider how it will work for artists, labels, and industry and not just from the perspective of a listener. It is hoped that this section will at least afford the project the possibility of being able to improve music freedom without depriving those involved within the music industry of their income.

In essence, this will work by marketing something to generate income for content providers and artists in a way that is both flexible and fair. Similar to how traditional radio works, the platform will use streamed music as the attraction and based on that attraction try and generate sales. It will not allow music to be downloaded. This is a controlled streaming platform. However, dissimilar to radio the platform makes music primary and not profit. Paradoxically, we speculate that this will actually generate more income.

Distribution of revenue is solely the business of the artist and content provider. The artist is chosen to receive income rather than their label or other associated parties based on the complexity of contract arrangements. It is reasoned that if an artist is commercial and under contract then they are a suitable proxy to any parties that may be entitled to their revenue. It will be up to them to distribute their funds from there, and this approach also works for independent artists without a contract. The second party (content providers/labels) are chosen for promotion because the platform causes a potential business expense for them. Lastly, the third party which is implicit in this arrangement is the platform itself. Anontune is not a commercial entity and will not take cuts in any income generated through promotion.

- For content providers, their advertisements and website can be featured prominently on the platform.
- For artists, a donate button, purchase link, website link, and information about future concerts and albums will also feature prominently on the player.
- We may host an online storefront system allowing merchandise and music purchases (downloads) to be handled by the artist directly.
- Bitcoin will be our preferred payment method but the artist may elect to use a wide variety of payment methods for donations.
- We are willing to work directly with both parties to better meet their needs.

If Bitcoin is used by some artists the following benefits can be offered:
- Controversial artists will now have a place where they can receive money for their work as the platform will not and can not employ censorship – after all, the source code is freely available and anyone could potentially set up his own Anontune.
- Privacy and anonymity will be protected as Bitcoin is a pseudo-anonymous currency.
- The health of the Bitcoin network will be improved which will help place Bitcoins into mainstream usage. This could help lead to widespread adoption by more financial institutions and thus improving our privacy and economic systems on the whole.
- There will be little if any financial fees therefore artists and content providers could earn more income than they ever have.

Our system will enable artists to manage all their relevant information themselves. Once verified, they will be able to choose their payment method for donations or instead elect to link to the iTunes store, input information about future concerts and more. The same applies for content providers who can, for example, use our system to choose which ads are displayed. The system should be flexible, with all the revenue going back to the artist and content provider. We will not force any revenue through the platform but instead act as a place where existing efforts can be highlighted. For example: Showing an artist's "donate" button instead of having our own financial system handle the donations ourselves. We act as a kind of proxy to existing efforts.

The verification process hasn't been defined yet but it will require irrefutable proof that a particular party has the authority to manage an artist or content provider's interest.

Playing devil's advocate here, if both the content provider, artist, and associated parties were to support us 100% we would be in a position to revolutionize business for music in a way that is more up to date and consistent with the online world. Simply speaking, its reach, ease of use and innovation would be unprecedented - but until we have backing, Anontune cannot provide the most effective system for these parties. We will, however, still do the best we can. An example of a more effective system would be closely integrating an iTunes-like store feature into the website to allow music to be purchased as simply and easily as possible.

As Anonymous, it will be hard to make any legally binding deals, however, I'm sure there are solutions to this. We already have potential spokesmen lined up for the project who could be the public face of Anontune and help negotiate deals, face-to-face, if required. I believe because we are open source this also gives the project confidence as the music industry can view and contribute to the project directly if desired or required.

I hope this proposal helps highlight how Anontune isn't necessarily a bad thing for the music industry. It may be radical, and highly controversial but it is not our intention to forget basic manners. Hopefully this will stabilize anyone thinking of suing us and instead will spend their time more productively trying to work with us to help create this new, all-inclusive model.

But wait . . . there's more :) The platform will be able to promote independent artists and labels through multiple channels. Let's start with the artist.

- **Potential** – YouTube uses an algorithm to distribute it's traffic from searches amongst new videos (so they can be watched) and existing videos. We can do the same thing with music for the alternative result system. At the bottom or amongst them, results will appear for music with similar tags to the promoted music.
- **Justified** – An algorithm can be developed to ensure good music will propagate through Anontune based on positive behavioral responses. This is similar to how Google rates websites.
- **Discovery** – Anontune will have multiple algorithms to help users discover new music and they won't be designed to bias independent artists.
- **Featured** – Anontune can officially promote promising new artists through multiple channels such as it's own radio station, blog, player library, and more.

This will generate promotion for independent artists (not necessarily looking to make a profit) and this income will be in addition to the existing revenue the RIAA already commands. It will not cannibalize their income which is certainly good news.

The same logic is also applicable for content networks. Webmasters can integrate with the platform if they want to make their content available. Traffic can then be distributed to these music networks based on certain criteria. This actually encourages the creation of independent labels whilst supporting existing ones and should our proposals be backed then the only thing a label will have to worry about will be music (the way it should be.) It will also be accessible to artists that don't have a label deal or distribution channel.

We can handle all the marketing, distribution, promotion, and so forth. This is probably the most negative aspect of commercial music because it has nothing to do with the music. By handling this for all parties we are allowing music to be the focus, as it rightly should be.

In conclusion we are proposing a new platform that enables music to reach more people without depriving artists, content providers, or related parities of their income. Anontune is not a commercial entity and will not take a cut in any profits.

5. Related Works

In this section we examine related services for musical enjoyment online and use these to justify the aims of this project.

Streaming Websites

> "*If it's not broken, fix it until it is.*" - You.

Our biggest fault with these services is that they don't take their ideas far enough. Where is the Facebook of social music? There is none.

The web is currently ripe for innovation around online music and I'm sure we will see more improvements show up over time; however, as things stand it is very disappointing. Compared to what we know about music and the state of innovation in the online world, there is a huge gap.

Where are the music services experimenting with biofeedback to enhance musical listening? Where are the experiments and innovation? None of these platforms are open enough to nurture innovation thanks in large part to totalitarian restrictions and bullying imposed by the music industry. We need to overcome these restrictions to create the music environment of the future.

If we look at services like Muziic, Pandora and Facebook there is definite innovation, and it's a start.

Muziic introduced the concept of YouTube as a music player. Incidentally, others already had the idea, but it's the right direction: Pervasive and open access to music by anyone.

Pandora introduced the Music Genome Project which seeks to understand the essence of music at a fundamental level. This is hugely important. It marks a turning point in popular understanding: If we can understand the properties of music we might be able to enhance the musical listening experience.

Imagine if, for example, we were able to analyze the rhythmic properties of any song or piece using intelligent software. Further imagine, that these rhythmic qualities were correlated to changes in attention or alertness. It would be possible to scientifically determine music in degrees of wakefulness promotion. Then, let's say that a listener was hooked up to a device which monitored their heart rate. We could select music which promotes the listener's alertness thereby keeping them more awake and alert. Here's the cool part: We can. The research supports this and human biofeedback devices are readily available.

This is what we're talking about regarding innovation. A new way of thinking about music and understanding it not just as entertainment but in terms of changes that take place around its exposure. Music is really powerful like that, we can and do use it for practical purposes: The regulation of mood, alertness, induction of emotion, relaxation, exercise, social promotion, listener promotion, even in the treatment of mental illness.

That is why we say, these services are boring and behind current advances. We can do so much more with music, and there is so much more to know about it but currently these possibilities are left poorly explored.

Then there are the social aspects of music: Music is inherently social and provides a bonding experience. If music reflects aspects of personality, then it may be that people who share similar interests in music have more in common than those who don't.

Further expanding on this thesis, what if we were to test this by creating a new kind of dating website: You go to the website, sign-up/fill in your bio, and start listening to music. Crude algorithms are then used and refined to determine matches. The algorithm is then improved based on the success of relationship outcomes. The end result would be a mathematical model of music and personality. Expanding from there, we now have the means to match music to personality. So then all we need to do to determine highly compatible music for an individual is assess their personality.

These propositions aren't just science fiction. They are actually testable and researchers are testing them right now. Facebook, is boring, go away. Facebook is way too overrated as is. The only innovative thing Facebook has done with social music is real-time listening to what your friends are listening to (I think this was in a Twitter leak.)

This is all a little disappointing . . . These streaming websites – places where people actually go to listen to music, focus so little on trying to improve the musical experience itself. Anontune isn't going to make the same mistake. We have numerous theories, ideas, and research directions to try out. We're not going to ignore current research in music and emotion. Academia is light years ahead and we acknowledge that with vigorous interest and respect.

Limewire

Limewire is (or rather, was) a very cool program. Almost everyone knows about Limewire but for those who don't – it was a file sharing client. The technical details aren't significant but the result is as they got sued to hell and are no more. The same thing happened to Napster.

The music industry executives decided that downloading one song was worth millions of dollars to them and started suing children and single mothers for downloading their content. Paradoxically speaking, by spending so much money on legally pursing "pirates" they were actually right.

The actual mechanics of the situation are easy to understand: Downloading and saving copyrighted data in an obvious way that is easy to track, leads to potential prosecution. Thus, we are forced to propose a solution:

Anontune as a platform has to exist in such a way that it technically and practically distances itself from all copyrighted material and legal consequences. It has to have plausible deniability regarding providing access to copyrighted material. Users of the platform also need to be physically distanced from the possibility of committing a crime and getting caught for it. The legal responsibility needs to reasonably exist and not on Anontune or on a user's behalf, but on third parties providing the music (knowingly or not.)

Anontune cannot and will not host any infringing content at any point in time. Therefore, for the platform to meet its design goals, it must integrate systems that DO potentially provide such infringing content. An example of such systems are YouTube and Soundcloud. Copyrighted music is often uploaded to these services. The legal responsibility for ensuring its removal is in the hands of these services, not Anontune. The DMCA safe harbor act protects these content providers but Anontune still won't host such content. Anontune will include the means to interact with multiple music networks on one platform.

These networks can be added and removed as needed to expand access to music. If a particular network blocks Anontune then music can be retrieved from the other networks. From a technical perspective, Anontune is at the intersection of meta-information about music and its distribution. It does not provide any music in and of itself, which makes it unusually resilient. Its design is similar to that of the Internet (regarding routing) which had in its design goals "the ability to withstand nuclear attack."

That is our vision for Anontune. We will give developers the technology and ability to add new networks directly to the platform. It won't just be about one network for everything like Limewire or Napster was. The only fault in this system will be Anontune itself. Thus, Anontune will need stand-alone distributions and multiple avenues to host it. We believe this goal is attainable when considering the web as a publishing platform.

This should also help distance users from the current legal climate of prosecution. Basically, under the Limewire model, user's IP addresses were easy to track and it was easy to prove they downloaded the music. Under the Anontune model music isn't saved by the user, and it is not direct. The user accesses third party content on Anontune through a content provider and this content provider acts as a kind of proxy between the user and the content. This proxy is always free to log IP addresses but because the content provider is only streaming music it's legality is much better than if the content provider was download-based and unsanctioned like the Gnutella network can be. Thus, even if the user's IP address is logged you cannot prove intent to pirate nor can you prove the user knew the music they were accessing was copyrighted if it so happens that it is.

For these reasons, Anontune will actively ensure users can't save any music for their own protection. It is only an open, no-nonsense, distribution network for music and not a Limewire wannabe.

More on how this will be possible later.

6. Social Networking

This paper is about a **social** music platform and so far music has only been discussed. Where the social aspects of Anontune will differ from popular networks today is it's design around privacy. Facebook, the world's most popular social network believes in openness or transparency in identity. They have essentially translated the real-world equivalent of social exchange to the online world and in so doing destroyed one of the most important parts of using the Internet: being anonymous. It's an approach that might of made sense at the time but it makes no sense to us.

Transparency means you will act the same way on Facebook as you do in the real world. People in the real world are fake and maintain a social facade. They don't say what they really think, it's all just a lie. Give a man a mask and he will tell you the truth.

Thus, Anontune will employ two concepts that differ from Facebook: Aliases and Anonymous. Aliases are easy enough to understand, we're saying here that you don't have to sign up with your real-world identity nor will we care about such things. The second concept is a little harder to understand. Anonymous . . . How to define it? It's something that alludes definition (and should) and yet it's still possible to explain from a higher perspective. So how to explain Anonymous?

Anonymous is not a group, collective, individual, idea, or philosophy (though parts of it can be.)

On Anontune, Anonymous social interactions will be possible. When you talk as Anonymous you will be all those things above. You may also talk from the perspective of your chosen alias, of course.

Actual message exchange will be exceedingly simple. The technical details are similar to Facebook's chat: Send a message to a party and they will receive it instantly if online otherwise it will just be saved so they can read it later. Our spin on this is we will store user messages with AES-256 bit public-key and private-key cryptography and all messages are deleted the moment they are received. Hence Anontune's social system is more like a secure cross between real-time and off-line engagement.

There will be no status like features on Anontune because that's obnoxious. Instead actual social content will have value and meaning by allowing places for organized discussion to occur. Facebook may be a great place to connect with friends but that is pointless when the only things people ever post are "lol lyke 4 a lyke", "oh mai god that poor ba-be, lol." Anontune also won't be an alternative to Anonplus. Our proposal is not as anonymous as the architecture Anonplus are using therefore it's social network is preferred for high risk participants such as whistle blowers and political activists.

Also, in Facebook social networking is the focus and everything else is just an add-on. Anontune is the reverse: The focus is the music and social features are the add-on. In reality, social features are only planned for implementation based on the potential for sharing your music with friends. The chat system will be similar in design to an instant messaging client. This client will show all the music your friends are currently playing in your friend's list. Should you chose to engage any parties on your list all music brought up in conversation enters a place in the conversation window where all participants can easily play it.

You may add individuals, groups, or Anonymous -- switching between being Anonymous or your alias as necessary.

7. Technical Proposal

For music to be set free a web-player is needed. The web is chosen because of its reach and accessibility. The player will be entirely web-based and live on a profile. Every user has their own profile which is accessible from their own URL. At this URL users can view another user's music. This promotes one form of social interaction and sharing. Users can add their friends, send private messages, chat to one another – exchanging music in real time if needed, and more.

For this to work a highly flexible and powerful engine needs to be created to locate and play music. This requires the engine have access to networking features. Client-side, this is currently impossible. To overcome these limitations a bridge will be constructed providing a BSD-style Socket API to Javascript applications. The bridge will link up with a specialized Java application which will service API requests.

If Java is required that limits the platforms reach, therefore alternatives need to exist. One such alternative is the possibility of users who run the Java code becoming networking routers for those who don't, won't, or can't and because this technology may create a burden it will only ever be used as a last resort.

Such technology, once constructed, will make it possible to talk to arbitrary services on the Internet from the music engine. This allows developers to create standalone enhancements called "routes." Each route describes a way to find, filter, and play music in a particular way. A route for YouTube would search YouTube for music, filter out invalid results, and play the most accurate result when required. In this way the music engine can be dynamically extended to tap pervasive music across the Internet.

Developers will be able to submit routes targeting particular music niches. Thus overtime, more and more music will be available for listening. This architecture requires simplifying and understanding the process for developers and users. Users will be able to control the routes they use and customize their experience. It will also be possible to easily create many other networked applications with this networking technology thereby drastically expanding what can be done with the web.

Once complete, pervasive access to music will be centralized on one platform, in which case the core platform will need to be built to provide programmatic access to all aspects of Anontune. It is at this point new research and innovation will be possible. All of this, from a legally respectable stand-point.

Anontune is really about information regarding music and the unique usage there of. This is the meta-paradigm. It operates on a higher level to consider abstractly just how musical listening occurs online.

8. Prototypes

"Talk is cheap! Where's the action?" - Zhang Fei from Dynasty Warriors.

Much of the core technology required to make this proposal a reality has already been constructed; It's just very crude. We've already built the networking technology for the music engine. Details are available at www.anontune.com/netjs/. Presently, this technology is quite stable (considering.) We've observed the obvious trade-offs with such an approach such as the speed issues, crashes, and the requirement of Java being installed.

Even with the issues of such a technology, it appears we're going to be able to use it for the music engine. Already, a library to talk to web servers has been written and tested using netjs. We've successfully created three prototype routes from the library which allow the music engine to include music from 4shared, Soundcloud, and YouTube with many more potential routes planned for the future.

Our prototype proves our proposals are feasible, at least for the moment. We don't know how the Internet community are going to react if things start to get big. Are all the routes going to cut us off before we can find an alternative? Is performance and stability going to be adequate? We're technically not breaking terms of services at this point.

We've also completed a crude web-based player (www.anontune.com/demo/) and the surrounding API calls required to make it work. Obviously, neither of these creations are up to our standards yet but we don't yet see any challenges that can't be overcome in their improvement. With most of the difficult problems solved already, development can proceed at full force.

The other prototype we are proud of is the ability to add all the music from an Apple iPod.

Usability of all systems at this point are poor, and this will need to be overcome for Anontune to be a success. As will presentation, stability, and performance problems.

9. Conclusion

In this paper we introduced the Anontune project, what our aims are, where we're heading, and where we are. At this point in time, our most difficult technical aims have been reached but many of our long term aims remain unfilled. It will be the focus of future research and development to ensure these aims are met. In reality, specifications may be changed or improved but for now the future of the project looks bright and stable.

Thanks for your interest in Anontune.

Anonymous.

8. Outro

If you're a user, with the press, or just want to get in contact. Get in touch at *anontune [et at at at] gmail [dawt] com*.

If you want to get involved with the project join us on IRC. The channel is #anontune and the server is irc.cryto.net (see http://irc.lc/cryto/anontune if you don't have an IRC client.) We're open to collaboration. You might even get a spot on the core team.