

Internet content distribution and blocking

Corporate social responsibility for the mobile, social and cloud era

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About the author



Martin Geddes is a thought leader on business models in the telecommunications, media and IT industries. As a consultant Martin integrates deep business and technology knowledge with skilful analysis and an awareness of the political and social dimensions of organisations. Taken together, these provide the capacity to act as powerful thinking partner and critical friend to executives and industry leaders. He is supported by a team of highly accomplished colleagues who contribute rich expertise in ISPs, broadband, wireless, investment, organisation change, and corporate communications. His clients include global technology giants, national telcos, SMEs, start-ups and investors.

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Beyond consulting Martin also provides:

- Masterclasses and workshops for senior executives on cloud communications, open business models and multi-sided markets
- Strategic thinking and scenario planning workshops for strategy teams and decision-makers
- Individual and team coaching that integrate practical education with the development of solutions for strategic business problems
- Research on specific applications to fit a particular client situation
- Mutually beneficial introductions between compatible businesses within the ecology, based on an extensive industry network.

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Introduction

This briefing paper is a summary of the speech delivered by me to the AGM meeting of the Internet Watch Foundation (IWF) in London on 5 October 2010. I accepted the honour of speaking at the IWF because I believe that the 'dark side' of new technology is real and important to confront. As a geek, entrepreneur, futurist, consultant, parent and citizen I have a personal stake in the matter and a meaningful intellectual contribution to make.

This paper presents a high-level vision of the future of the information economy, how the Internet and content distribution technology will change, and how those involved in mitigating the effects of illegal content must adapt to the new reality.

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Cycles of technology change

The Internet often feels like an unprecedented shift in society. However, in reality it is following a well-worn path of technological revolutions¹. Each of these cycles since the Industrial Revolution took a newly abundant raw material – coal, electricity, oil – and built a new economy and society around them. We are now 40 years into the wireless, silicon and fibre-optics revolution, and our economic growth is based on the raw material of cheap information. This revolution is entering a new phase of development, with a deep dispersion of Internet technology into society that changes our patterns of everyday living. We are moving beyond online media and e-commerce into home healthcare, home working, and booking hire-by-the hour street cars and bicycles.

This same shift happened before. Once, electric motors were scarce and special. A farm might have one motor and a multitude of adaptors for different uses. Now your toothbrush comes with a micro-motor embedded and you think nothing of it. Tomorrow's appliances will also come connected by default to the information utility as well as the power utility.

Old social problems, new media

The social problems of new technology have to be seen in context of enormous societal benefit. These social concerns are not new either. Writing about the expansion of railways in the 19th century in Britain, Prof. Andrew Odlyzko notes² that:

Moral and social effects of railways also continued to be of some concern, but that also did not count for much. Cambridge and Oxford universities, which had been strong opponents of proposals to extend railway to their towns, were placated by inserting special provisions in the charters of the lines that reached them. Those provisions were supposed to allow those institutions to prevent moral corruption of their students by controlling those students' travel to the fleshpots of London, and by keeping "loose women" from coming from London.

¹ "Technological Revolutions And Financial Capital: The Dynamics of Bubbles and Golden Ages" by Carlota Perez.

² Collective hallucinations and inefficient markets: The British Railway Mania of the 1840s, <http://www.dtc.umn.edu/~odlyzko/doc/hallucinations.pdf>

As a former inmate of one of these institutions, I can confirm their fears of licentious behaviour were well founded – and a trivial concern compared to the benefit of the railway.

These historical patterns suggest it is worth having an overall optimism towards the progress of technology and humankind. That does not deny the existence of serious social problems that arise as a by-product of progress. What can we expect to unfold over the next few years in the Internet content space? And what are the implications for dealing with the spread of illegal content?

The next decade: connected, contextual, capable

The easiest thing to predict is that technology will continue to improve. Whilst Moore's law famously refers to a doubling of computing capacity every 18 months, there are even faster improvements in storage (doubling every 12 months) and optical data transmission (every 9 months). Our ability to create, transmit and store content is soaring even faster than our ability to process information. The world is, and will become ever more so, awash with stored content.

No device with a screen will be left disconnected. The \$99 Apple TV box we see today will become – rather like the toothbrush motor – a cheap component embedded into every TV. All displays meant for living room use will come with Internet access in 5-10 years.

The number of devices on which content is created and shared is multiplying and diversifying. They are becoming smaller, more powerful, cheaper and appliance-like. These devices are not just for media consumption, but also become our eyes and ears, enabled by cameras, microphones and sensors. Rather than a 'Big Brother' society we see the rise of 'sousveillance', where every act and gesture can be captured, stored and shared by ordinary citizens. Networks will increasingly carry user-generated content as the majority of the traffic, not professional media content.

Life beyond the web browser

The next decade will see content consumption extend beyond the Web, with 'augmented reality' being a hot growth area. These connected devices blend the purely digital with the physical reality of their context. Satnav is a good example that is already ubiquitous – it takes your location and direction, and presents you with a small screen that tells you where you are and where to go. The Nintendo Wii game console blends physical motion with gaming. These are experiences that work off local data sets (a map or game software) held on the device.

The future of augmented reality is a connected one. Install Layar on your smartphone and it will overlay information (from the Internet) onto a display of the world around you. Google Goggles turns every physical object into a searchable object by photographing it. Today you sort through your emails in Outlook; tomorrow you may put on your 'smart spectacles' and have piles of virtual documents and messages you can shift around by hand gestures. No doubt your boss or partner will still nag you to sort out your untidy (virtual) desktop before important visitors come.

What this highlights is that 'online content' is no longer just a simple image or linear video file transmitted over well-defined Web and streaming protocols and watched on a PC. Rather, we have a highly complex set of media types, consumed in a wider range of contexts, via a wider range of devices, with a wider range of user experiences.

An ever-changing Internet

To deliver these new experiences, the Internet will not remain as constituted today. The 'Internet' is not a thing, but a collection of 26,000 autonomously managed private networks, with around 70,000 peering agreements to exchange traffic. This ecosystem is in a constant state of change.

From a technical viewpoint the Internet is moving to a different architecture:

- **The Internet will re-shape to support distributed computing.** Rather than just being a data transmission system, storage and computing are appearing at more nodes of the network. Content delivery networks are a long-established example of this. Soon homes will also have a home data server that syncs with the cloud. Street cabinets and telephone exchanges may become 'micro' data centres for resilience and performance reasons.
- **Parallel non-Internet packet networks are growing.** There is a proliferation of private agreements to host and deliver content via non-public networks – hence the 'network neutrality' debate as these private agreements spill over to using 'public' access. There will be an ever-increasing complexity to those agreements to exchange traffic, with richer possibilities for who pays for what data to be transmitted where.
- **The underlying sources of connectivity on which the Internet operates are changing.** For example, mesh and ad-hoc wireless networks³ allow users (when in range of each other) to share content directly. Connected machines will increase the number of connected devices and demand new network architectures and operational processes. New access technologies change the nature of what is possible on the networks built on top of them.

There will be political change too. Users today have no part in the governance of the Internet, and there is no transparency to those thousands of agreements. As the Internet becomes a core piece of social and economic infrastructure, there will be increased scrutiny of those who have power over the distribution of information.

Drivers of change: mobile, social, cloud

In reaching this future, there are three widely-recognised technology 'mega-trends' that affect content distribution and blocking: integrated mobile ecosystems, social media, and cloud computing.

Mobile

The mobile phone is dead. Welcome instead to your pocket lifestyle assistant. By adding an applications store, touch screen, high quality camera, and location awareness we have created a qualitatively different device. Companies like Apple and Google are defining a new economic model for this device type, one that complements their cloud services such as iTunes or search. This model features the economic 'vertical integration' that defined the business model for telephony in the past. This integration brings together devices, application development standards, content, communications, payments, and advertising into a single platform.

³ The Wi-Fi Direct standard is currently being deployed in smartphones such as the Samsung Galaxy S

This mobile world is centred on a few global giant communications and commerce platforms. None of them are telcos or ISPs. Devices like the Apple iPad or Amazon Kindle provide a more controlled user environment than we have seen on the PC. The ability to send payment attracts abuse; the ability to control identity and access offers different solutions.

Social

Users are faced with an excess of attractive content compared to their available time to participate in media use. As a result, the power of aggregation and recommendation services (like YouTube) increases compared to traditional media outlets. Online shows like 'The Guild' are a precursor of this new social media world of content distribution. 'Webisodes' are launched first on YouTube, complemented by video podcasts that offer streams of content that we can dip into on our mobile devices. Shows like the The Guild also rely on being native 'Web objects' that can be linked to, embedded and shared. The concept of a 'TV scheduler' as an occupation is going away, to be replaced by software and social recommendation engines, or user-created channels⁴.

Social media means networks also have to cope with a shift from being download-centric to being upload-centric. YouTube has an upload rate of over 28 hours of video per minute. This is likely to grow by orders of magnitude as the technology bottlenecks to uploading are removed.

Cloud

Finally, the cloud is re-shaping the technology industry. The cloud is not just cheap and flexible hosting, but a different way of doing business 'on demand'. Historically we have acquired media as a product – physical tapes or DVDs. We are moving towards a world of 'everything as a service', exemplified in the UK media world by BBC iPlayer or YouView. These platforms offer two-way communications (not just broadcast streaming) and rich interactivity.

As an intrinsic part of the function of these cloud-based media services, 'cheap data' from every user is captured and exploited. In the past you would press the buttons on your remote control to channel hop and nobody knew what you were doing; now the fact you skipped the car ad the moment it came on is valuable data to be used by advertisers to personalise their marketing messages. ISPs have a role as both data and bandwidth brokers to enable this.

Content: not what it used to be

As a result of the mobile, social and cloud revolutions, the very nature of content is changing.

Content is not going to just be simple linear video. Content is software, and software is content. Each device has scripting and programming capabilities, and content embeds those capabilities. We see this on the web with the shift from banner and text adverts to 'appvertising', which changes and becomes interactive as you move the mouse or point at it.

This 'programmable content' means you can send a piece of content which may seem innocent, but the real content can self-decode at run time. There may be both good and bad stuff hidden inside. That places organisations like the IWF into an arms race with those wishing to profit from illegal content.

⁴ For an example of what the future holds, see <http://www.youtube.com/user/NeuroSoup>.

Entertainment content becomes ever more software-like and interactive. As a result the technology of interactive gaming will become more embedded. The experience may appear photorealistic and immersive - 'manga on steroids' - and potentially explicit. Indeed, the very definition of 'illegal content' will become contentious. Imagine a software plug-in to a virtual online world that creates (photo-realistically) images that are illegal in the physical world. Is this piece of software itself illegal? At what point is the line of illegality crossed in the formation of the imagery?

By democratising the tools of creation and distribution, content is increasingly user-generated, semi-professional in quality, and may involve 'mashups' of multiple sources of content and data sets. The teen craze for 'sexting' – sending naked images of yourself to friends – suggests that the growing social threat is less from people buying content of minors being abused, but of them busily making the content themselves, and it becoming available for public distribution⁵. Tackling child abuse in isolation from more ordinary ills such as bullying is difficult, since there aren't clear dividing lines between these activities, especially when the victim and perpetrator are both juveniles.

New delivery systems, new problems and solutions

The way that content reaches users will also change as the linear/analogue distribution model breaks down. Reliable old cash-cows of the media business are going to fade and die. Live sports may be the only 'real time' anchor for TV. Indeed, TV may be 'the new music' – with large-scale piracy impending. 'Audio only' porn is not much of a social issue, whereas image/video is. This creates a problem: if the economic model for content delivery implodes, there's less money to pay for policing of content networks, and increased opportunity to come across illegal content.

Indeed, based on past experience, users will continue to turn to peer-to-peer content distribution –the 'darknet' – and will gladly 'jailbreak' locked devices (or buy unofficial devices on the grey/black market) in order to get to the content they want for free. That could simply be a case of receiving the file via email.

As content distribution shifts from broadcast to user-to-user it forces a convergence of two previously separate spheres – media and personal communications. Is Facebook more like an IPTV content distribution platform, or like a user-to-user instant messaging service? It is clearly a bit of both. As users send content directly to each other, their privacy needs come into conflict with the needs to police content delivery networks for illegal content. If illegal content is 'served' via sending encrypted files via social media services there may be no URL or IP address to block.

The simple split between downloaded and streamed media will blur as the role of ISP changes to become 'digital logistics' providers. Their job is to get the content to the right place at the right time, and at the right price. They have to solve complex technical problems, like how to manage offload of traffic from mobile to fixed networks. An ISP may pre-distribute a video show to the user device when the network is quiet, and send decrypt key at run-time. This is much more complex than selling plain vanilla broadband packages bundled with TV content and phone service. The good news is that accessing these capabilities is likely to be restricted to 'legitimate' sources of content and communications.

⁵ An example of this is the recent suicide of gay US teenager Tyler Clementi following his being covertly filmed by classmates, and the video link distributed via Twitter.

What this means for the Internet industry

Is the Internet the technology of human arousal or enrichment? How can we favour the healthy, and reject the harmful? At the heart of these questions is a false dichotomy between control and security. The over-use of force to gain control over technology mutates the social problems into harder-to-reach forms. For example, the 'three strikes' law on copyright – established following intense lobbying by content owners – is an expensive and ineffective regime with lots of unintended consequences.

A better approach is to treat the problem more like that of a viral attack. Go for diversity in responding, to ensure no one defence is overwhelmed. That means blocking in the discovery of content, not just delivery; block at the device, not just network; and block in the onward sharing, not just the original receiving.

Many issues industry faces are local to a country, an industry sector, or a company – and hence demand local response. Apple self-polices its apps store by allowing users to flag inappropriate content. Mobile operators have long enforced age limits on content and access. Each system of content distribution needs a unique response.

However, providing diverse technological answers will never be enough. The problem of illegal content is ultimately a social one, amplified through new technology, driven by economic profit, with IWF as a political response in the UK. The solution has to come from across all these domains.

A social problem with political risk

The danger to the Internet industry is political. Is it inevitable the agenda will be driven by politicians rather than industry? This depends on the amount of scare stories in media. Youth usage is up, and temptation to interfere becomes too high. Just as with the ill-considered Dangerous Dogs Act of 1991, we may see the 'Dangerous Devices Act of 2013' as being the low point that wakes the industry up to its responsibilities.

Given the size of the threat to their ability to innovate and revenue models, surprisingly little is spent on CSR by Internet and online media companies. Mumsnet, Consumer Reports and the Daily Mail can change the political environment faster than any technology solution can adapt. There is high uncertainty on future events. These stakeholders need to be involved, educated and engaged in addressing these problems.

In tackling illegal content, there are powerful lessons to follow from the worlds of drugs, political and religious extremism, and copyright piracy. Most critically, decentralised and multi-disciplinary solutions work best. This requires transparency, open source techniques, peer networks of industry practitioners, and voluntary co-operatives to take action. The IWF as a non-government body places the UK at the lead.

Industry answer: prevent contagion

The achievable mission for the Internet industry is to prevent contagion of illegal content into mainstream society. Containment of the problem is realistic, eradication in the face of multiplying technology complexity is not.

The music industry insisted that the utterly natural human impulse to share music non-commercially constitutes theft. As a result the industry lost the moral authority it needed to preserve copyright as a social institution. It became normal and acceptable to break the law,

especially for younger people. At the extreme example of this social norm breaking down, *The Economist* reports that the total sales of CDs in China in 2009 was only \$19m⁶.

The Internet is an amplifier of human social behaviour. That behaviour can be mischievous, as the 'Rickrolling' craze shows. This involved misdirecting people to a video of Rick Astley singing a 1980s hit song. There are less innocent (and considerably more obscene) versions of the same idea⁷. Contagion happens at the margin, and that is where an effective intervention must be targeted.

Tackling determined paedophiles through Internet blocking technology is a futile exercise. Preventing widespread access to such content is not. Fortunately the use of illegal content is rightly seen as repulsive by the great majority of people, who do not seek to find it and wish to see it actively prevented. Contagion containment fits with the wishes of ordinary Internet users, and does not require '1984'-like total control over the Internet.

A diverse response

In order to prevent contagion into the mainstream, a broader response is required.

- **Political:** A 'panic button' in social media applications or in browsers, and safe harbour law on seeing and reporting illegal content, in order to capture data about the problem from the end users.
- **Economic:** As the Net evolves, make the cost for Chinese and Russian sites more expensive than revenue. Make it cost the bad guys more. Tax trade with low-compliance hosting sites to reflect social harm. Make payment and content delivery networks carry more responsibility for whom they do business with.
- **Social:** Make corporate social responsibility (CSR) a board-level priority, to pre-empt political interference. Engage with stakeholder groups outside of the technology industry – schools, journalists, mental health care providers, even mainstream adult content providers.
- **Technical:** Focus on traceability and auditability in content and communications, allow for a more flexible response to be built on top of this data. Put more blocking intelligence at the 'edge' in the device and operating system.

An evolving role for the IWF

For the IWF, the best response is to mirror the key industry trends: get mobile, social and cloudy too.

- **Mobile:** Have to look beyond ISPs and telcos to device, OS, and commerce platform owners, who may be reluctant at first to play since they do not appreciate the threat to their business model.
- **Social:** Help the mainstream media adopt a less hysterical attitude to casual users of illegal content; it is a mental health problem that demands education, not vilification. Work with the NHS to offer helplines, and if you block access to a site make that transparent and offer a place to get such help for those at the margin of

⁶ <http://www.economist.com/node/17199460>

⁷ <http://en.wikipedia.org/wiki/Goatse.cx> has a 'suitable for work' textual description of one such example

use of illegal content. Engage people with different skills sets: epidemiologists , psychologists, and anthropologists are as valuable as network engineers.

- **Cloud:** See the technology role of IWF as ‘filtering as a service’ – the building blocks for service providers to take up their CSR mantle, and a clearing house and co-ordination role. Be an enabling platform, not a complete solution. Focus on the core mission of classification, notification and international co-ordination.

There is a great diversity of needs in CSR for Internet industry members. There are potential conflicts of interest between different players in the ecosystem. There are no easy answers, and the IWF is a unique forum in which to address these problems.

If you would like to discuss any of the ideas presented in this paper, feel free to contact me at mail@martingeddes.com.