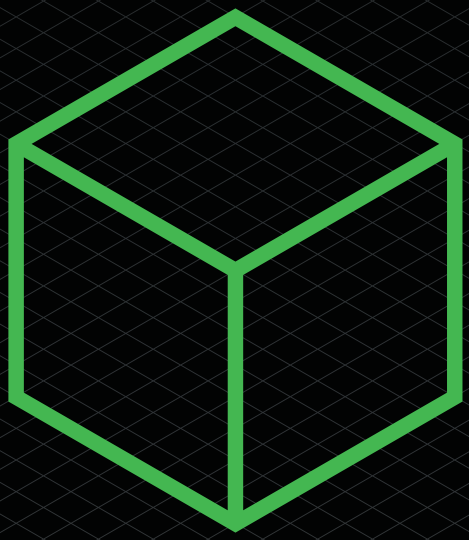
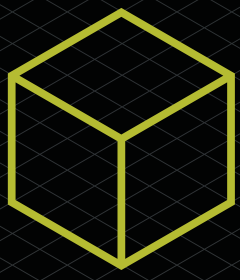
Part 2: Impacts on the Wider Landscape

Section 17

The Legal and Regulatory Impacts of Non-Centralisation




Section 17: The Legal and Regulatory Impacts of Non-Centralisation

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Introduction: network topologies – non-centralised networks

A network can be defined as a system of connections and interconnections that facilitate exchanges. Networks traditionally are 'centralised', meaning they have a central authority controlling network decision-making and information-processing. Any peer-to-peer (**P2P**) interactions that occur over a network are only those permitted by the network's central authority.

As an alternative to centralised networks, disaggregated, decentralised and distributed networks have arisen (each being a **non-centralised network**). Each network type describes distinct architectures, with the distinguishing characteristic between these networks being the locus of network control:

— **Disaggregated networks** are centralised networks with interoperable functional components separately provided and operated by multiple vendors.

— **Decentralised networks** comprise multiple independent control authorities that share network control and maintain independent decision-making and information processing. P2P interactions again only occur as permitted by the decentralised control authorities.

— **Distributed networks** have no central control authority, where instead decision-making and information-processing is shared across independent nodes in accordance with a common network protocol. P2P interactions may occur as is permitted by this protocol.

Blockchain has rapidly realised the potential for non-centralised networks by facilitating network decision-making without a centralised locus of control. Even in a distributed network, without a 'consensus mechanism' there is still someone ultimately responsible for the network's governing protocol.

This chapter focuses on how non-centralised networks can disrupt P2P platforms by helping to solve their unique challenges, and the potential legal and regulatory hurdles arising from this disruption.

1. Creators and consumers – realising non-centralised content

Centralised vs. non-centralised content platforms

Non-centralisation, enabled by blockchain technology, is expected to disrupt the way that content is currently created, consumed, monetised and distributed. Content platforms with a non-centralised backend offer alternative solutions to issues faced by traditional platforms while also providing novel commercial opportunities for content creators, consumers and advertisers.

Traditional streaming models generally rely on centralised content delivery networks (**CDNs**) to obtain, store and distribute content. This centralised approach makes platform owners susceptible to high operational costs, as storage, administration and hardware fees increase with user growth. A centralised model is also by its nature, more vulnerable to hacking compared to platforms built using a non-centralised architecture. The storage structure of a non-centralised platform can enable faster and more reliable streaming by improved content transit.

Platform operators traditionally retain most of the revenue created within a platform's ecosystem.[447] Blockchain-powered platforms using a non-centralised model provide options for alternative revenue sharing structures, where content creators exert

447 Chainflix White Paper, Version 2.0, October 2020 https://www.chainflix.biz/assets/pdf/whitepaper.pdf

greater control over the price of their content and consumers can be rewarded for viewing content.

Chainflix – the use case

Chainflix is a distributed P2P content streaming platform, with features similar to popular video-sharing platforms (**VSPs**) such as YouTube and Reddit. A user-centric platform, Chainflix utilises blockchain and AI technology combined with a P2P structure, to create multi-level efficiency in a monetised, ad-based content platform. Whilst the platform's revenue still comes from advertising, the model is disruptive due to its revenue structure and who controls it. The native utility coin (**CFX)** powers the Chainflix ecosystem by rewarding participants in the following ways:[448]

— Consumers can earn or 'mine' CFX coins by viewing content or advertisements through a 'proof-of-view' (**POV**) consensus mechanism that enables advertisement monetisation while protecting against bot manipulation.

— Content creators can set the CFX mining ratio between themselves, viewers and 'enhancers'.

— Enhancers can earn CFX by 'adding value' to a video, for example by providing subtitles or dubbing.

— Users can also earn CFX for hosting platform content.

Distributed storage

Peers across the Chainflix network contribute to a P2P storage pool in a meshed overlay structure, allowing creators to store content in a distributed system for viewers to access and stream. Using this system, Chainflix can provide faster streaming speeds compared to a centralised network whilst avoiding high infrastructure costs.

A distributed storage network, while a commercially favourable alternative to a centralised network, paints a complex legal picture. Who would be liable for any illegal or harmful content hosted or made available through a distributed peer hosted network? How can illegal content be removed and who should be responsible for removing it? How would this liability assessment change if illegal content is distributed across a storage network in fragments?

As the technology evolves, it remains an ongoing question whether software protocol developers should hold fiduciary duties to network users. In *Tulip Trading v Bitcoin Association for BSV and others*,[449] the claimant's private key was stolen from being hacked, leading to billions of dollars' worth of Bitcoin taken from his wallet without his authorisation. The claimant asserted that the Bitcoin software protocol developers owed him a duty to patch the software and restore his stolen Bitcoin[450] on the basis that he had entrusted the care of his tokens to the Bitcoin software protocol developers, who exercised "complete power over the [blockchain] system". The Court initially rejected this argument, finding that the Bitcoin network software developers did not owe a fiduciary duty to the claimant. The judgment highlighted that the distinguishing characteristic of a fiduciary relationship, the obligation of "undivided loyalty" to its beneficiaries, was not present as the claimant's request benefited the claimant alone, and not the rest of the network. The Court, however, did not rule out whether such duties might be owed in other circumstances.[451]

448 Chainflix White Paper, Version 2.0, October 2020 https://www.chainflix.biz/assets/pdf/whitepaper.pdf
449 Tulip Trading v Bitcoin Association for BSV and others [2022] EWHC 667 (Ch).
450 The Dao, an early decentralised autonomous organisation, was hacked in 2016 leading to a loss of over $60m of Ether. The Ethereum blockchain was forked to restore funds stolen from tokenholders as if the hack never occurred.
451 At the time of writing, the case in on appeal before the Court of Appeal for which judgment is due to be handed down in H1 2023.

P2P advertising

The structure of the content network at Chainflix is built across multiple layers:[452] (1) The first layer is responsible for streaming original content, (2) the second for any on-chain acts that enhance content (such as dubbing or special effects) and (3) the third layer upon which advertisements are displayed. Incentives relating directly to that advertisement are provided according to the relevant smart contract terms once the consumer interacts with the advertisement. The POV consensus mechanism also gives the consumer the option to decide whether they want to see advertisements (and therefore obtain any rewards for doing so).

This advertising model creates greater transparency for consumers compared to centralised models and from this perspective aligns with the Advertising Standards Authority (**ASA**) focus on transparent advertising. A key rule within the UK Code of Non-broadcast Advertising and Direct & Promotional Marketing (**CAP Code**) is that marketing communications must be obviously identifiable as such.[453] In the Chainflix ecosystem, advertisements are technologically distinguished from content within the content network, giving consumers greater awareness and control over what they view.

Influencer marketing, which has in recent years fallen foul of advertising regulations in the UK,[454] raises further complexities for distributed P2P platforms. Whilst influencer marketing can look and feel like content, its actual purpose is to endorse a product or brand. The CAP Code requires influencers to clearly identify advertisements to ensure consumer transparency.[455] UK-established video-sharing platforms must also include terms and conditions regarding any advertising on their platform and provide technical functionality for content creators to declare whether their video contains advertising.[456] Distributed P2P platforms could immutably address these requirements through their embedded smart contracts for advertisements on their platform. There remains however room for human error and creators could incorrectly or fail to categorise their content as containing advertising, meaning distributed P2P platforms would need to retain some form of centralised technical functionality to ensure ongoing compliance.

Limits to decentralisation?

Video-sharing platforms will soon be regulated under the Online Safety Bill and subject to more stringent requirements designed to improve the safety of these platforms for users, particularly children.[457] Platforms that fail to protect their users from harmful content face fines of up to 10% of their revenue or, in the most severe cases, could be blocked.[458] Platforms must implement measures to proactively tackle and erase or remove illegal material shared or stored on their platform.[459] Platforms likely to be accessed by children will also need to maintain sufficient age assurance mechanisms to prevent children from viewing harmful content.[460] Regulators will expect platforms to maintain comprehensive 'Community Guidelines' setting out terms and conditions for use and regulation of their platform.[461] Platforms must prominently communicate these guidelines to consumers and demonstrate enforcement of any non-compliance.[462] Platforms will need to ensure their terms are readily accessible and notified to users before streaming or contributing content.[463]

452 Chainflix White Paper, Version 2.0, October 2020 https://www.chainflix.biz/assets/pdf/whitepaper.pdf
453 CAP Code, Rule 2.1
454 ASA escalates sanctions against influencers who repeatedly break the rules, ASA, 18 January 202
455 CAP Code, Rule 2.4
456 Ofcom's video-sharing platform framework: a guide for industry, Ofcom, 25 July 2022 (https://www.ofcom.org.uk/online-safety/information-for-industry/vsp-regulation/guide)
457 Online Safety Bill: Ofcom's roadmap to regulation, Ofcom, 6 July 2022
458 Online Safety Bill: Ofcom's roadmap to regulation, p.10, Ofcom, 6 July 2022
459 Online Safety Bill: factsheet, Online Safety, Gov.uk (https://www.gov.uk/government/publications/online-safety-bill-supporting-documents/online-safety-bill-factsheet#key-points-the-bill-covers)
460 Ofcom's first year of video-sharing platform regulation, What we found, Ofcom, 20 October 2022 (https://www.ofcom.org.uk/__data/assets/pdf_file/0032/245579/2022-vsp-report.pdf)
461 Ibid.
462 Ibid.
463 Online Safety Bill: factsheet, Online Safety, Gov.uk (https://www.gov.uk/government/publications/online-safety-bill-supporting-documents/online-safety-bill-factsheet#key-points-the-bill-covers).

Chainflix proposes a 'content supervisor' within its decentralised ecosystem responsible for assessing the eligibility of content, preventing illegal content from entering the platform and imposing restrictions against harmful content.[464] The content supervisor would be a "public organisation or government institution" whose decisions would be recorded on-chain.[465] While purists will baulk at limits being applied to full network decentralisation, it demonstrates the necessary and increasingly implemented trade-off to enable decentralised platform growth in the context of a regulated real-world ecosystem.

2. Efficiency and governance in two-sided markets

Somewhat ironically, when considering an industry susceptible to disruption by non-centralisation, a good place to start may well be an industry recently disrupted by web 2.0. The traditional taxi market has since been disrupted by several (now global) ride-sharing platforms offering services centred around a mobile app connecting riders with drivers. They were disruptive by solving the problems for ride market supply and demand, specifically (1) riders being unable to find a taxi when needed, where needed and with a suitable payment method and (2) drivers being unable to find riders when and where needed facing 'dead time' between rides.

While this may *feel* P2P, it isn't P2P in the same way as a P2P crypto DEX or a file-sharing protocol.[466] A ride-sharing platform regulates the interface between the network's value creators and value extractors, and itself extracts value in the form of a percentage of the ride value from drivers and subscription or management fees from riders. Without consensus mechanisms, such networks need control authorities.

A ride-sharing platform's primary interest therefore is in extracting value typically achieved through:[467] (1) imposing commissions; (2) dictating pricing (using a proprietary, undisclosed algorithm); and (3) excluding riders and drivers from participating in platform governance. Ride-sharing platform are not incentivised to allow supply and demand to set the pricing since its revenue depends on commission. Further, regulators have so far intervened mainly to set caps on fares to respond to perceived market distortions, without addressing how to balance the interests of the ride-sharing platform against consumer or policy goals.

Improving the quality or decision making of the network's 'central node' is not enough when a misaligned incentive structure persists. A decentralised network provides a solution by setting ride fares with a real-time auction model allowing riders to choose a driver based on price, timing, and rating. The platform meanwhile charges a flat fee to drivers for using the platform instead of commission on each fare.

DRIFE – the use case

DRIFE uses blockchain technology to drive efficiency by using smart contracts to transparently and immutably compute ride prices, transfer payments, resolve simple disputes, handle ratings, and carry out other basic operations.[468]

A thematic legal challenge for non-centralised networks is that, particularly in regulated industries such as ride-sharing, regulators expect a person of substance to remain responsible for compliance and holding legal responsibility for the network. Centralised ride-sharing platforms retain such responsibility, including for vetting drivers, upholding consumer standards, and providing legal recourse for grievances. If a network fully relinquishes its authority to network participants (riders and drivers in this case), it can neither functionally nor practically carry this legal burden.

464 Chainflix White Paper, Version 2.0, October 2020 https://www.chainflix.biz/assets/pdf/whitepaper.pdf.
465 Ibid.
466 Early examples of decentralised web infrastructure include file sharing protocol BitTorrent through which a network shares the infrastructure burden of file transfer. A protocol can be fully P2P (as some decentralised crypto exchanges (DEX) are) because it is simply a set of rules by which a network operates internally and there is no need for a single authority.
467 DRIFE, discussed below, identifies these value extraction points as potential areas for further disruption.
468 DRIFE White Paper (http://whitepaper.drife.io/).

DRIFE proposes a solution to this by using a 'franchise NFT' model. Key platform operations (including compliance with local laws) are assigned to franchise NFT holders each covering a distinct geographic area.[469] NFT holders are chosen using an auction format where potential franchisee operators can bid DRIFE tokens.[470] Franchise NFT holders are granted powers by the network's central node (hence only a decentralised rather than a distributed network) to choose smart contract parameters and ultimately extract some value of their own from rider subscription fees in exchange for handling local compliance. The platform shares in this value as well as benefiting from its own token allocation.[471]

There isn't yet a widely accepted model to operate a decentralised network in a regulated environment without some form of centralised structure apportioning legal responsibility to specific legal or natural persons.[472] DRIFE's model is, in some ways, no different from a traditional franchise model. For example, in a franchised food chain, the central operating burden (including regulatory burden) is obviated and in return franchisees benefit from the brand's reputation and ubiquity.[473] However, using blockchain technology, local franchisees benefit not only from the global brand but from the efficient operational technology and tokenomics of the wider network.[474]

This use case demonstrates that governance is a key consideration for resolving the unique legal issues arising from network decentralisation. The absence of a central authority is both the precise benefit as well as a critical challenge of decentralised networks, creating an inherent tension between full decentralisation and the need to maintain legal and regulatory accountability.

3. Decentralised governance in telecommunications networks

While decentralised franchise models governed by smart contracts is one model for addressing governance challenges arising for non-centralised networks, decentralised telecommunications networks provide us with further blockchain use cases.

Pollen is a mobile network comprised of multiple P2P individuals hosting small cells placed in a host's window, roof or garden, with backhaul provided through the host's broadband connection.[475] The network was established as an alternative to centralised wireless communications offering the alternative of a "privacy focused, anonymous, decentralized, 4G /5G, open-source mobile network enabled by a crypto economy… owned and operated by its users".

Decentralised networks promise: (1) increased network resilience, by providing alternative network solutions for both consumer use and to bolster vendors' existing offerings; and (2) a solution to the last mile issue,[476] where centralised infrastructure expansion such as establishing new cell sites in urban environments is often prohibitively expensive or not possible due to the presence of legacy equipment. In a decentralised network, individual hosts instead make micro-infrastructure investments to expand network footprint.

PollenCoin (**PCN**) drives incentive arrangements underpinning the Pollen ecosystem, by providing benefits to participants for network roll-out, maintaining network

469 This has the additional purported benefit of allowing franchisees to capitalise on local market understanding
470 This is not dissimilar to a validator in a proof-of-state network consensus mechanism.
471 The DRIFE foundation proposes to retain 20% of tokens. Tokens are then used throughout the DRIFE ecosystem, with their value potentially being driven by increased service uptake.
472 Some jurisdictions have taken steps to recognise decentralised autonomous organisations, but the UK is yet to do so. Potential regulatory responses to decentralised networks include minimum code, audit and transparency requirements to ensure the network protocols meet required consumer protection and policy requirements.
473 Many fast food chains benefit from a franchise model since a local operator can set up an outlet locally, take on responsibility for standards at the outlet while having a household name brand from day one. Two examples of global franchise models are Domino's and McDonald's.
474 For example, payments and refunds can be processed by smart contract, and tokens allocated to franchisees may increase in value as activity on the network (and therefore reliance on its native token) increases.
475 The small cells available to purchase vary in size, signal strength and cost.
476 Government Guidance: Telecoms resilience - https://www.gov.uk/guidance/telecoms-resilience

connections and completing validation tests.[477] The Pollen network also incentivises deployment in areas where there is coverage demand by increasing the amount of earnable PCN in target locations.

Decentralised mobile networks do however give rise to challenges similar to those faced in other regulated industries,[478] throwing up novel issues in spectrum access[479], telecoms regulatory compliance[480] and back-haul[481], as the existing regulatory structures naturally assume there to be centralised network ownership or control.

Pollen has devised a potential solution to the central authority issue, showing an alternative to the 'franchise NFT' approach taken by DRIFE. The network has developed what it calls an enhanced DAO (eDAO) model. Once fully implemented, all PCN token-holders will be entitled to vote on strategic decisions of the eDAO, which includes appointing Pollen's governing board and the management team responsible for day-to-day operations. Authority and accountability for the Pollen network will be placed on these bodies, who will be responsible for ensuring legal and regulatory compliance.[482]

A key challenge facing these decentralised mobile networks is incentivising adoption. Helium Mobile[483] is a prime example of this. Helium is a similar concept to Pollen, though it began with providing connectivity to IoT devices via similar small cells installed by the Helium community, who, again, are incentivised by earning Helium's native cryptocurrency (**HNT**).

Helium's pivot to a crypto tokenomics structure initially solved many of its decentralised network incentivisation issues. Early adopters reported high initial earnings and began investing heavily in setting up hotspots to earn HNT. However, some issues soon arose: (1) participants were able to game the system into making it appear that their cells were spread across a location, when they were in fact only in one location, therefore generating a larger amount of tokens due to the clarity of signal. (2) it was reported that a small number of insiders held 70% of the mined tokens during Helium's lucrative start, with only 30% going to the rest of the Helium community, which, while not illegal, effectively centralised control of what was supposed to be a decentralised network.[484] (3) Helium's tokenomics model makes network demand have a direct impact on HNT's value, allowing all those involved in creating the network to earn HNT and share any gains. However, flagging demand,[485] initial difficulties sourcing compatible costly small cells and urban area oversaturation have all combined to adversely affect the take-up required to effectively propagate the network and provide HNT incentives to participants.[486]

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477 Portable mobile devices that carry out the network coverage validation tests when passing by the small cells can also be purchased, through which PCN is also earned. Pollen also plans to implement a level of gamification to the network, via methods such as loot boxes or geographic multiplier boosts that provide additional PCN to those who provide coverage in those areas. (Pollen White Paper: Payments - https://docs.pollenmobile.io/pollen-mobile-docs/white-paper/payments)

478 See further discussion above regarding non-centralised content or ride-sharing networks.

479 In the US, the Federal Communication Commission has created the Citizens Broadband Radio Service (CBRS), which enables the use of the frequency bands from 3.55 GHz to 3.70 GHz without purchasing a spectrum licence. Previously only large corporations realistically had access to such bands, as allocation would be decided through an expensive auction process. However, access to these bands is not so widely available in other jurisdictions, including in the UK (FCC - 3.5 GHz Band Overview - https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview) .

480 For example, both Electronic Communications Networks and Electronic Communications Services providers in the UK must comply with Ofcom's General Conditions (GCEs). How these would apply to someone attaching a mobile small cell to their window and using their broadband connection for backhaul to establish a publicly available network is yet to be seen. Compliance with many GCEs as they stand would also be cumbersome, difficult to maintain or just outright impossible on a decentralised basis. (Ofcom's General Conditions - https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/telecoms-competition-regulation/general-conditions-of-entitlement)

481 Networks like Pollen rely on back-haul connectivity to each individual users' broadband internet connection. While there is no issue with this in functionality, it remains to be seen if such a network were to become mainstream whether internet providers would be so willing to allow for such uses.

482 White Paper: Key Pollen Network Actors - https://docs.pollenmobile.io/pollen-mobile-docs/white-paper/key-pollen-network-actors

483 Helium - https://www.helium.com/

484 Forbes: Crypto Darling Helium Promised A 'People's Network.' Instead, Its Executives Got Rich - https://www.forbes.com/sites/sarahemerson/2022/09/23/helium-crypto-tokens-peoples-network/?sh=8edaecc73166.

485 Helium users fret as revenue fails to keep pace with network growth - https://coingeek.com/helium-users-fret-as-revenue-fails-to-keep-pace-with-network-growth/

486 Unsuccessful deployments in IoT – a furore about failure c/o NB-IoT, Sigfox, Helium (LoRaWAN) - https://enterpriseiotinsights.com/20220929/internet-of-things-4/unsuccessful-iot-deployments-on-nb-iot-sigfox-helium-lorawan-a-furore-about-failure

This is not to say that Pollen will suffer the same fate, and indeed Helium may rally, but as will all new technologies and services they key for a decentralised platform's success is to maintain user appeal.

4. Conclusion: governance is the central challenge

While we are yet to see the full scope of the legal and regulatory challenges that decentralisation will face, the lack of a central governing body is one of the greatest legal hurdles at present to non-centralised networks. This is in no small part due to the current legal and regulatory ecosystem built to assume a centralised model of network ownership and accountability.

Where non-centralised networks do not offer alternative options for legal accountability (such as DRIFE's franchise NFT model or Helium's network-elected governing body) to replace the traditional centralised structures structure in their centralised competitors, they will struggle succeed particularly in regulated sectors.

While the blockchain space remains innovative in the area of network governance and compliance protocols, market participants watch with interest as to whether these proposed alternatives stand up against regulatory scrutiny and potentially judicial treatment.