Internet Governance in the UK.

Richard Collins. 2004.

R.E.Collins@open.ac.uk

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> It is through the complexity of the empirical that one gets a sense of the irreducibility and contestability of the social, the disjunctures between the programmatic statements of policy and the messiness of actuality…. Empiricism is, in this sense, opposed to "social theory" in so far as what is called social theory can too often over-determine what is and what can be said about empirical investigations (Barry 2001: 22).

Introduction.

The Internet is now indispensable. The UK government has recognised its importance for the UK's economic, social and political future eg in the White Paper on Competitiveness (which stressed the importance of ICTs and the Internet for improving the UK's competitiveness and economic performance [DTI 1998]) and in aiming both to have all Government services available online and universal Internet access for all who want it by 2005. Yet, in spite of the Internet's importance and the challenges posed by an overstretched Internet infrastructure having to cope with the increasing demand of millions of new users for faster connections and new wireless applications, Internet governance, in contrast to earlier wired and wireless communication systems, is informal, un-codified and dispersed. Rather than the vertically integrated end to end systems adopted for wired voice telephony and wireless broadcasting, the Internet is dis-integrated with different firms handing on traffic to each other, operating in separate layers and under different governance regimes. Three myths of Internet governance prevail - none is well founded. First, the myth dominant in the public policy domain, that Internet governance is best when the market decides. Second, the myth dominant in scholarly discussion of the Internet that network governance and self-regulation is both pervasive and effective. Third, the myth that Internet governance is quite distinct from the governance of "legacy media" (notably the established electronic communications media of

broadcasting and telephony). The third myth has led Internet scholarship to focus on the DNS (Domain Name System) and ICANN (Internet Corporation of Assigned Names and Numbers) with, as Wilson (2004:2) has observed, a consequential neglect of national governance of the Internet. In this paper I will explore these issues in the context of the Internet in the UK.

The UK Communication Act 2003 came into effect on December 29th 2003 and for the first time the governance of UK telecommunications and broadcasting has been brought together under a single statutory regime. The Act was drafted to "establish a new policy framework" and to "simplify the regulatory framework" (DTI/DCMS 2002: 3), however, the Act is possibly the longest Act ever to appear on the Statute Book with 411 clauses and 19 schedules! Moreover, sections of its predecessors, the Broadcasting Acts 1990 and 1996, the Telecommunications Act 1984 and the Wireless Telegraphy Act 1949, remain in force. But, in spite of the Act's length, the new policy framework it established seems poorly endowed with the "resilience and adaptability for the future" (DTI/DCMS 2002: 3) which the sponsoring Secretaries of State sought to achieve. Not least because the Act excludes the Internet. This exclusion may seem to betoken a surprising view of the future but is not accidental. The sponsoring Secretaries of State stated explicitly that "it is not the intention…. to extend regulation into the Internet" (DTI/DCMS 2002: 48) and a DTI (Department of Trade and Industry) source (interviewed 4.8.2003) also testified to the subtle efforts given to drafting the Act so that Internet services were neither caught by provisions for television licensable content services nor for telephone numbering. Another DTI interviewee (interviewed 14.7.2003) stated: "there's an underlying feeling that we're not in a telecoms situation. Overcontrol puts someone out of business and someone else in I-space takes over".

The UK's policy stance of "hands off the Internet" is widely representative of the stance taken by other states. The European Union Framework Directive (European Parliament and the Council of the European Union 2002b), in Recital 20, explicitly excludes a key element of the Internet's control infrastructure, Internet naming and numbering, from national regulatory bodies' responsibilities. Moreover, in contrast to the long standing treaty based governance regimes for other forms of international communication, notably the post, telegraphy and telephony which are governed by international organisations affiliated to the United Nations (the Universal Postal Union and International Telecommunications Union), international governance of the Internet is divided between different institutions whose remits and authority are contested and uncertain. ICANN, the overall authority for Internet addressing, is the outstanding case in point. But the absence of explicit, hierarchical,

mechanisms of governance doesn't mean governance is absent. Instead, self-governance seems to fill the gap –

ICANN for addressing; the Internet Watch Foundation (IWF) for content control; setting of standards through

requests for comment (RFCs) and so on. Mueller (1999: 498) described "self-governance as a "term commonly

applied to the Internet itself" and identified "self-regulation" as characteristic of the Clinton administration's

approach to Internet – an approach also followed by the Bush administration. The Internet thus seems to

exemplify what Taylor (2001) has argued is a general shift in governance in contemporary societies from

hierarchy and markets to networks (Thompson 2003). Instead of hierarchy Taylor argues that "What is emerging

at the moment is a new *network culture"* (Taylor 2001: 5) - a network culture that is characterised by self

regulation (Thompson 2003: 30).

Network governance is required, Taylor argues, because of modern societies' complexity, "The moment of

complexity", for Taylor, constitutes a "tipping point where more is different" and engenders a shift to network,

rather than hierarchical or/and market governance. In turn, Taylor (2001: 4) identifies the "explosive

development of cybernetic, information and telematic technologies since the Second World War" as triggering

this "tip" to network culture (see also Barabasi 2002, Castells 2001, Keohane and Nye 1998). From this

perspective, the Internet is but the most recent, and arguably the most influential, of these technologies and is

representative of network organisation. And, Castells contends, network organisation "constitute[s] the new

social morphology of our societies" (Castells 1996; 469). If network organisation is displacing both hierarchy

and markets as the dominant contemporary forms of governance then "the "new information technology

paradigm provides the material basis for its pervasive expansion throughout the entire social structure" (Castells

1996: 469). Barry (2001) has made a similar observation: "the network has come to be seen by many to be the

basis for a "third way" beyond the opposition between statist social democracy and free-market capitalism

(Barry 2001: 86). The Internet thus has, if we follow this line of argument, both a crucial constitutive role in

network culture and is also an exemplar of network culture.

But all these formulations imply that the Internet is a distinct medium; something we understand in the same

way that we understand television, radio or voice telephony; something distinct, bounded and different to all

other electronic media. There is an important truth here. The Internet has its own history (see, for example,

Zakon 2003) and institutions (eg ICANN, national registries, ISPs[1]). Such scholarly work as there is on Internet governance has focused on such distinctive Internet institutions and has constructed Internet governance as constituted of solely Internet issues – notably the DNS (see, inter alia, Geist 2001, Lessig 1999 and 2001, Marlin-Bennett 2001, Mueller, 1999, Verhulst 2001, Vixie 2003). But there's also an important misconception in such a formulation. For the Internet and legacy media are intimately interdependent.

Internet services are carried on infrastructures established and used for voice telephony; new, hybridized services span both legacy and Internet media (eg the interdependence of television programmes and websites); the Internet and legacy media are, in some areas, substitutable (eg Voice over IP and conventional voice telephony). However, more important than such intimate interdependencies between Internet and legacy media is the way the Internet foreshadows a new form of electronic network architecture. From this point of view, the Internet is not a distinct new medium but rather is a stage in a continuing process of transformation from established technologically distinct media of communication to an integrated digital topology of interconnecting networks. We see this transition, often called convergence, in the transformation of the architecture of telecommunication systems from the vertically integrated structures characteristic of circuit switched systems to the layered structure characteristic of packet switched systems; in use of Internet Protocol (IP) standards in telephony (particularly mobile telephony) transmission paths; in hybridised multi-media and in the increasing extent to which the Internet substitutes for existing media (Werbach 1997).

The UK Communications Act 2003.

Although the UK Communications Act 2003 was drafted to exclude the Internet, many of its provisions, particularly those that arise from the transposition of EU Directives[2], mean that the provisions of the Act **do** extend to the Internet. For example, Internet transport is regulated in the same way as is transport of other telecommunication services. Article 1 of the European Union's Network and Services Directive (CEC 2002) provides, inter alia, that:

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[1] Internet Service Providers.
[2] Notably, the Access and Interconnection Directive 2002, the Network and Services Directive 2002, the Framework Directive 2002 and the Universal Service Directive 2002. European Parliament and the Council of the European Union 2002, 2002a, 2002b, 2002c.

'electronic communications network' shall mean transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed (circuit – and packet – switched, including Internet) and mobile terrestrial networks.

This is clearly a formulation sufficiently wide to include the Internet. And though Clause 32 (1) of the UK Communications Act 2003 defines 'electronic communications network' differently to the Network and Services Directive (and without explicitly specifying the Internet) it does so in such a way that the Internet is included. Clause 32 (1) (a) provides that an electronic communications network is "a transmission system for the conveyance, by the means of electrical, magnetic or electro-magnetic energy, of signals of any description".

However, in other instances we can see a truth to the Secretaries of State's belief that the Act does not extend to the Internet. Clause 32 (2) excludes Internet content services[3] from the ambit of provisions for electronic communications services. Section 2 states:

> In this Act "electronic communications service" means a service consisting in, or having as its principal feature, the conveyance by means of an electronic communications network of signals, except in so far as it is a content service.

The Act does not therefore provide powers for regulation of radio or television like services distributed over the Internet. However, this means that far from being technologically neutral the Act applies different regulatory regimes to similar services received on the same domestic screen (and loudspeaker). Different regimes apply depending on the transmission path followed by a particular service: broadcast television is subject to Ofcom whereas a moving image service accessed through a browser isn't. Furthermore, the Act includes eight specific clauses (56-63) on telephone numbering but does not apply to[4] Internet naming and numbering.

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[3] Defined in section 7 of Clause 32 as one or both of "(a) the provision of material with a view to its being comprised in signals conveyed by means of an electronic communications network; (b) the exercise of editorial control over the contents of signals conveyed by means of such a network"
[4] The Government proposes to lay a Statutory Instrument before Parliament to ensure it has reserve powers to govern Internet naming and numbering activities undertaken in the UK should the need arise.

How can we account for these contradictions? Perhaps, by exempting the Internet from the provisions of the Act, the UK Government sought, and achieved, a covert large scale liberalisation of a substantial and growing portion of the electronic communication sector. Perhaps the Secretaries of State's refusal to extend regulation to the Internet was a pragmatic decision to keep as tightly closed as possible a particularly messy can of worms. Perhaps the Government's pragmatism came from a recognition that in important respects the Internet is beyond UK control because control lies elsewhere – notably in the United States. Or perhaps the Government just went with the flow, with the pervasive utopian sentiment that not only is the Internet ungovernable but the Internet **should** be ungovernable, as one of the prophets of the Internet, John Perry Barlow, proclaimed:

> Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather (Barlow 1996).

But the absence of consistent, effective and coherent regulatory bite on the Internet in the UK doesn't mean that governance is absent. As Lessig (1999: 220) said, "When Governments step aside, it is not as if nothing takes its place. Paradise does not prevail." What has filled the gap when government, at least in the UK, has stepped aside? To understand UK Internet governance we need to understand three things. First, that there are different forms of Internet governance and here I shall use Thompson's three part distinctions between hierarchical, market and network governance for discussion of Internet governance in the UK. Second, that the Internet infrastructure is organised differently to the infrastructures of "legacy media": Internet organisation is dis-aggregated and horizontally layered rather than vertically integrated. And third, there is an inescapable international dimension to Internet governance that has not yet been, and perhaps will never be, subject to international agreement expressed in a formal international treaty.

Network organisation.

The arguments about network and self-regulatory organisation of the Internet made by Barry, Castells and others chime with Foucault's (1978 [2002]) influential propositions about governmentality: that is the idea that important practices of governance take place outside the formal institutions of the state and notably through internalised habits and rituals of self-regulation. What characterises governmentality in network organisations?

Putatively, co-operation, trust, solidarity and loyalty (Thompson 2003: 112) are the attributes of network organisation, Thompson claims, following Riles 2001, that networks have a kind of "elective affinity" with self-regulation; with "bottom up type of organizational arrangements…. [that] strongly connect to 'private interest governance' and the sphere of non-governmental organizations" (Thompson 2003: 30). Internet organisation and governance does indeed display such characteristics but these are manifest only in **some**, not all, parts of the Internet and in only some moments of Internet history.

Network organisation, with its attendant shared values and commitment to consensus building, was characteristic of the "early moment" of the Internet. A moment when commercial use of the Internet was proscribed; when governance took place through RFCs (Requests for Comment – the governance propositions drafted by Internet "insiders" such as Jon Postel and Vint Cerf and which were circulated to the Internet community for revision, rejection and/or adoption); and when Internet infrastructure and services to users were "free" at the point of use. 1994/5 is a convenient date to mark the end of this end of this period, this was the date when NSFNET ceased to be generally available as a backbone infrastructure, when domain name registration in the USA was first priced and when, in the UK, commercial ISPs (eg CompuServe, AOL, Demon, Pipex) began to operate as serious businesses with significant customer bases. However, in the UK at least, network organisation (with rules, practices and institutions characteristic of the "early moment") continues to characterise some important parts of the Internet. Co-operation, trust, solidarity and loyalty are notably evident in the not for profit Internet exchange LINX (the London Internet Exchange), in "knock for knock" peering (versus the priced interconnection characteristic in voice telephony), the Internet Watch Foundation, the not profit distributing status of the UK's registry Nominet and so on. These examples suggest that network self-governance remains a key, but not necessarily dominant or enduring, organisational characteristic of the contemporary UK Internet.

How do network attributes – co-operation, solidarity, trust and loyalty - play out when the network in question is made up of different, sometimes competing, firms working through markets and under different political jurisdictions (ie subject to different hierarchies)? Perhaps through a shared ideology, or put another way, at a different social site. Instead of being embodied in formal network institutions, such as self-regulatory agencies, these values are sustained in social networks and a shared ideology. A striking feature of findings from interviews the author conducted in 2003 was the extent to which interviewees referred to the "interests of the

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Internet". This culture of self-regulation and shared purpose chimes with the utopian, indeed anarchistic, culture of the Internet. But this culture and these practices may lead to governance being performed, *faute de mieux,* by unaccountable (ie required neither to report or give reasons for their decisions nor submit to election or other means of being held to account by their citizen and consumer constituencies) and incompetent (in the sense of being unable to resist capture of the Internet by powerful firms) institutions. Self-regulating organisations by definition tend to exclude those who don't share the dominant values of the self-regulating community (or network). See, inter alia, the persistent critique of self-regulatory network governance by Sandy Starr in "Spiked" (eg Starr 2003) and SACOT's (2003) arguments for the strong and effective presence of independent regulators and against regulation by interested parties.[5]

Starr's and SACOT's concerns are echoed elsewhere. Geoff Huston (formerly a senior executive with the Australian incumbent telco, Telstra, and now Executive Director of the Internet Architecture Board),[6] for example, contends that:

- The Internet ethos of collaboration as the mechanism for policy formulation has failed to meet the demands of an environment of widespread deployment across many market sectors. Collaboration simply does not scale.

- Industry self-regulation is perhaps more an expression of faith in the outcomes of the competitive market as being an efficient distributor of a public resource of service than it is a well-understood mechanism to achieve the desired objectives in all situations. Industry self-regulation is a faith, not a science.

- The established communications industry players perceive a substantial threat to their existing mode of business within the guise of the Internet.

- The traditional methods of policy formulation in the public sector are attuned to gradual and well-researched changes to a relatively static policy framework, and a very strong tendency exists to preserve the status quo within the process. Public policy often comes as too little, too late (Huston 1998: 15).

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[5] SACOT stated, inter alia, that "Trade associations and other existing industry bodies are not suitable structures to exercise co-regulatory functions" (SACOT 2003:2).

[6] The Internet Architecture Board (IAB) is a committee of the Internet Engineering Task Force (IETF). Its responsibilities include architectural oversight of IETF activities, Internet Standards Process oversight and appeal, and is responsible for the management of publication of the RFC Series and the management of the IETF protocol parameter registry, operated by the IANA.

The Internet's self-regulatory governance structures may not be well adapted to securing long term public interest objectives. And it remains an open question whether important interests vital to the long term health of the Internet in the UK are well served by the UK's emphasis on self-regulation. Perhaps the present relatively benign order is unstable and may metamorphose into the concentration of control seen in other related sectors such as broadcasting but, because of the UK Government's reliance on self-regulatory governance, without countervailing hierarchical regulatory institutions. This would be cause for concern even if it were only the Internet as presently configured that was at issue. But many aspects, and elements, of the Internet are paradigmatic of, and will form part of, what are called Next Generation Networks (NGN)[7].

Horizontal v Vertical.

The Internet is not only an important phenomenon in itself but is also paradigmatic of a general shift[8] in the provision of electronic communication services from circuit to packet switched systems. Consider the evolution of mobile telephony from circuit switched second generation GSM (Global System for Mobile Communications) to the hybrid circuit/packet switched architecture of 2.5G, GPRS (General Packet Radio Service), which has a packet switched core and then to 3G (Third Generation) which has moved further towards a fully packet switched architecture. Together with the transition from circuit to packet switching goes a shift away from a vertically integrated to a disaggregated sector structure.

Indicative comparison of vertically integrated network and NGN.[9]

	Vertically integrated network (eg wireline telephony) examples.	New Generation Network.
Access	In firm; dial tone and call routing	Disaggregated. ISP.

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[7] That is IP based networks where layers, eg access, transport, control, services, are independent and multi-purpose (voice, data, access to services). Devoteam 2003 provides an excellent account of the architecture of emerging NGNs.

[8] The direction of this change is clear – its pace may lag because of the strength of legacy networks, incumbent inertia, the generally superior current quality of service over circuit switched networks etc.

[9] Broadcasting too has characteristically followed the vertically integrated model: eg the BBC has provided content through its own orchestras, makes programmes using its own staff and facilities, transmitted programmes from its own transmitters. In broadcasting too we see moves towards disaggregation – eg independent production, sale of transmission networks though in the Pay TV sector in particular there have been moves towards vertical integration eg the vertical integration of production, scheduling and control (vie EPGs and CAS).

Transport	In firm: wired local loop and trunk network.	Disaggregated: local loop unbundled and backbone network(s) routing dependent on traffic volumes. Wired and wireless.
Control	In firm: numbering and directory enquiry.	Disaggregated: DNS, search engines.
Content	In firm: eg speaking clock, cricket scores.	Disaggregated: Internet and www content providers.

New loci of control and dominance are characteristic of NGNs and governance (hierarchical, market or network/self-regulatory) is an issue not only **within** each layer but also in the connections **between** layers. Interfaces between network layers, such as APIs (Application Programming Interface) – the interface between network and customer intelligence – have the potential to become bottlenecks and incumbents, whether telcos or proprietors of dominant standards, such as Microsoft, may resist moving to emerging generic standard APIs such as Parlay and JAIN (Java Advanced Intelligent Networks). In a study for the European Commission, Devoteam has argued persuasively that:

> So far, market power has been associated with a certain market share related to networks and transmission services. With NGN, market dominance may also be derived from controlling more limited sets of functions and capabilities that are necessary for the provision of services to end users. One example is the system of domain name servers, which perform translations from domain names to IP addresses. The ability to use domain names is fully dependent upon this function and in this sense, the number translation function constitutes a *control point*. In a hypothetical situation where the domain name translation would be controlled by a commercial profit seeking organisation, there would be obvious dangers of abuse of dominant position (Devoteam 2003: 100).

Moreover, in contrast to vertically integrated circuit switched networks where bottlenecks, such as the local loop, have been fairly easy to identify loci of control may be anywhere in a NGN architecture. A shift towards a new network architecture not only creates new loci of power (opening up the question of whether generic

competition law and regulation – the application of hierarchy to redress failure of market governance – will be sufficient to secure the public interest) but is also a shift which makes applications, services and firms associated with the emerging new order dependent on incumbent "legacy" firms because "legacy" infrastructures are still indispensable. Whereas in a vertically integrated network operators had an interest in managing network congestion and ensuring good quality of service now, with the emergence of NGNs using "legacy" infrastructure provided by incumbent firms, there are powerful disincentives to incumbents providing high quality of service. For example, provision of a sufficiently high quality of service to make voice over internet protocol (VoIP) circuits practicable is unattractive to incumbent telcos because of the revenue loss they are likely to experience with a migration of traffic from circuit switched to IP networks.

Castells makes an analogous point (though his meaning remains somewhat fugitive). And generalises from a well founded observation about the changing characteristics of network to a more speculative larger scale observation about society and social power.

> "network morphology is also a source of dramatic re-organization of power relationships….. Since networks are multiple, the interoperating codes and switches between networks become the fundamental sources in shaping, guiding, and misguiding societies. The convergence of social evolution and information technologies has created a new material basis for the performance of activities throughout the social structure. This material base, built in networks, earmarks dominant social processes, thus shaping social structure itself (Castells 1996: 471).

Hierarchy and markets.

Hierarchical governance, the province of Barlow's weary giants of flesh and steel, embraces the activities of Government, law and statutory regulation. For the UK electronic communications sector, including the Internet, the key agency is Ofcom (the Office of Communications)[10]. Ofcom has concurrent powers to regulate competition with the UK's principal competition regulator, the Office of Fair Trading, and is the lead regulator for the communications sector. And it's Ofcom's competition powers that are most relevant to Internet

governance. These powers chiefly derive from transposition of the EU telecom liberalisation and regulation Directives promulgated in 2002[11]. As the No 10 Strategy Unit (ie the Prime Minster's office) has stated: "In dealing with SMP[12], Ofcom's powers will be largely determined by the EU regulatory framework. This framework restricts the majority of regulatory activity to those instances where there is SMP as identified by the process of market reviews" (Strategy Unit 2002: 66). The Prime Minister's Office Strategy Unit gave examples of anti-competitive behaviour that Ofcom would be expected to regulate including:

Leverage of SMP through horizontal or vertical integration.

Cross subsidies or price squeezing

Differentiating Product availability

Differentiating level of service.

Differentiating availability of information.

Bundling different products.

Leverage of customer base.

Managing profits; and

Generally obstructive behaviour ("strategic incompetence").

(Strategy Unit 2002: 68).

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[10] Ofcom was established under the Communications Act 2003 and replaces five earlier regulators – the Broadcasting Standards Commission (BSC), the Independent Television Commission (ITC), the Office of Telecommunications (Oftel), the Radio Authority and the Radiocommunications Agency.
[11] See European Parliament and Council 2002, 2002a, 2002b, 2002c, and CEC [Commission of the European Communities] 2002.
[12] Significant Market Power – ie the ability of a firm or firms to act anti-competitively.

The Strategy Unit summarised Ofcom's powers of economic regulation thus:

Sector Specific	All diminish with increased likelihood of competition
• Retail price controls (RPI-x) or rate of return regulation • Wholesale price controls (RPI-x) and service level agreements • Wholesale price controls (cost plus) and service level agreements • Requirements to allow interconnection • Co-regulation with industry • Alternative dispute resolution (ADR) • Self-regulation by industry	
Competition Law. • Investigation under the Competition Act 1998 • Referrals to the Competition Commission	

(Strategy Unit 2002: 80).

The Strategy Unit's analysis, conveniently expressed in the table above, shows clearly that Government expects an **inverse** relationship between hierarchical and market systems of governance: the better market governance works the less hierarchical governance will be required. Implicitly, well functioning market governance is equated with effective competition. In a well functioning market the market's invisible hand (Smith 1776) governs firms' behaviour and establishes an equilibrium in which prices and long run costs converge. In such circumstances, firms secure rents (ie profit beyond the levels required to maintain the system in equilibrium) only if they innovate and are thereby able to create and capture a new market where they can capture rents in the, theoretically, short period before other firms imitate them and re-establish a competitive equilibrium. This compressed sketch of competition theory is important because it shows, contrary to assumptions in some contemporary literature on the governance of electronic communications, that self-regulation is not an exclusive

property of network governance but may also obtain in market governance regimes. In theory, both markets and networks may be self-regulating – it is, however, an empirical question as to whether in any particular instance a homeostatic, self-regulating, system, the telos of competition theory, actually exists.

The standard method of applying hierarchical governance to the market is through competition law. The relevant UK statutes are the Competition Act 1998 and the Enterprise Act 2002 which are now complemented by the sector specific Communications Act 2003. However, several commentators have remarked that competition law is too slow to provide effective remedies. The Director of Public Policy of AOL UK (interviewed 28.7.2003) asserted that the "problem lies in the timing of the regulatory process". It may take up to 3 years for judgement". This estimate is supported by the testimony of the Office of Fair Trading's then Director of Competition Enforcement who stated: "cases have taken longer than we expected when planning for the introduction of the Act. A realistic estimate for an infringement decision ranges from one year – in a very straightforward case – to 3 years or possibly even longer. Perhaps there are no "straightforward" infringement cases". (Bloom 2003: 5).

The Layered structure of the Internet.

I have earlier referred to the Internet as a series of layers and contrasted this dis-integrated form of organisation to the vertical integration characteristic of voice telephony and broadcasting. This distinction is convenient but over-simplified. The layers of the Internet may be conceived in a technical and in a market sense. There are two established descriptions of the Internet's technical layers - the four layers of the Internet protocol (IP) – applications, transport, Internet and network access and seven (physical, data link, network, transport, session, presentation, application) which derive from the Open Systems Interconnection Reference Model (OSI) designed for telecommunication systems in general, ie, not solely for the Internet, (see Wikipedia entry at http://en2.wikipedia.org/wiki/Layer_2 consulted on 9.1.2004). The OSI model is seldom replicated in real world situations. As Wikipedia states, "real-world protocol suites often do not strictly match the seven-layer model. There can be some argument as to where the distinctions between layers are drawn; there is no one correct answer. However, most protocol suites share the concept of three [ie neither seven nor four RC] general sections" (Wikipedia ibid). Moreover, OSI and IP layers do not necessarily correspond to either market sectors (albeit also fuzzily demarcated) or to functional layers which make up our everyday experience of the Internet as

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a public communication system. How far does the market provide effective homeo-static governance of the UK Internet? How far does competition exist in new generation, layered, telecommunication networks?

The different layers of the Internet are distinguished by effective competition in varying degrees. How far can each be considered to be homeostatically self-regulating? There are challenging difficulties in answering this question[13]. Not least that, because markets are changing fast, conclusions drawn from a snapshot at a particular time may soon be outdated. Moreover, a definitive answer to this question would require a comprehensive market analysis based on rigorous definition of markets followed by an analysis of each market thus defined. Such an analysis goes beyond what's possible here, however, an indicative analysis follows.

Whilst I have distinguished between hierarchical, market and network forms of governance, it's important to recognise that agents in any or all of the Internet layers may be influenced (whether consciously or not) by the possibility of another form of governance being visited on them. If network and market governance regimes don't work to the satisfaction of government or citizens (or both) hierarchy may replace them. The "shadow"[14] of hierarchy always lays over market and network governance systems and often shapes the behaviour of such agents in such systems of governance.

Let us conceive of the Internet as made up of distinct horizontal layers[15] as schematised in the table below and consider, in the context of UK arrangements, each layer in turn.

Layer	Extent of competition
Control	DNS – monopoly.
Access	ISPs – competition.
Internet Exchanges and Network Access Points (IXPs and NAPs).	Competition – but LINX dominance.
Transport	Wired backbone – competition but diminishing.

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[13] OECD 2001 suggests that answers will differ between different countries.
[14] I am indebted to Grahame Thompson for this idea and metaphor.
[15] Another analysis, "Measuring the Internet Economy", (dated January 2001) which uses a layered model of the Internet (with four layers; infrastructure, application, intermediary, Internet commerce) can be found at http://www.internetindicators.com/jan_2001.pdf on 9.2.2004.

	Local access – wired some dominant suppliers but competition from resale assisted by regulation and competition from wireless – few providers but growing.
Content	Competition - but strong presence of "negative externality" providers hence walled gardens (eg AOL) and IWF/ICRA regulation.

Control.

Consider how far markets act as effective, homeo-static, self-regulatory governance mechanism in the central areas of the Internet. In the control area, notably the DNS, of Internet naming and numbering the market is recognised not to be an effective governance mechanism. The same is true in the analogous case of telephone numbering. Unique addresses, secure and reliable routing systems and an authoritative dispute resolution mechanism are all required and the market is not well suited to providing these attributes of a numbering system.

As is well known, Internet addressing is organised hierarchically whereby the "a" root server, which is at the top of the DNS addressing hierarchy, directs traffic to top level domains.[16]The "a" root server is located in the United States (where a further 9 of the 13 root servers also reside). Moreover, the potential power of the USA accruing from location of the "a" server and the majority of other root servers, and reflecting the historical development of the Internet, is strengthened by the global co-ordination of Internet addressing which resides with the US based ICANN[17]. ICANN operates outside the remit of an international treaty or intergovernmental agreement.[18]ICANN determines whether, and if so which, new top level domains (TLDs) are established (see, inter alia, http://www.icann.org/tlds/report/report-iiib1b-09nov00.htm). Via the Internet Assigned Numbers

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[16] County codes, such as .de (Germany), .uk (United Kingdom), .za (South Africa) are known as CcTLDs (country code top level domains) and other top level domains, such as .com, .net, .info, .arpa are known as GTLDs.

[17] ICANN is incorporated under Californian law and works under the umbrella of a Memorandum of Understanding (MoU) with the US Federal Government's Department of Commerce.

[18] However, ICANN has a (significantly named) Government Advisory Committee (GAC) which provides a forum for the representation of other states' interests.

Authority – IANA, ICANN assigned the allocation of Generic top level domains (GTLDs)[19] to a US based corporation Network Solutions Inc (NSI) which was subsequently acquired by a for profit corporation VeriSign (which also administers the "a" root server). ICANN assigned the allocation of country code top level domains (CcTLDs) to four regional registries. In turn, these have assigned blocks of addresses to national Internet registries.[20] In the UK to the national registry, the non profit distributing company, Nominet. It is generally accepted that, like telephone numbering, the DNS does not lend itself to governance through the operation of markets. But, perhaps not surprisingly, there are live concerns about the extent, balance and orchestration of different methods and institutions of DNS governance. Here it is instructive to compare the operation of the US and UK national registries.

The US registry, VeriSign, has shown itself ready to use its monopoly power to advance its commercial interest. In September 2003 VeriSign redirected erroneously addressed messages via its own commercial Site Finder web site. ICANN responded by requesting VeriSign to suspend its redirection "service". Initially, VeriSign refused but after a further communication from ICANN demanding suspension of redirection (itself perhaps inspired by China briefly withdrawing from the global DNS system) VeriSign complied (see, inter alia http://www.theregister.co.uk/content/6/33432.html on 15.12.2003). The VeriSign redirection imbroglio of September/October 2003 suggests that national registries potentially have very significant market power and that ICANN, whether conceived as an institution of hierarchical or network governance, may not command sufficient authority alone to secure the compliance of the most powerful national registry in the DNS. However, ICANN's authority, when augmented by the prospect of VeriSign's loss of the "network externality" benefits of a single, integrated, global Internet (a loss which would have been incurred had China permanently seceded from the established DNS) and perhaps complemented by US Government pressure on VeriSign, was sufficient to secure VeriSign's eventual compliance.

Like VeriSign, the UK registry, Nominet, also has monopoly power in a key area of the control layer of the Internet. The locus of VeriSign's power is the GtLD and the locus of Nominet's the UK's CCtLD. Nominet's mission "is to control, manage and operate the .*uk* country code Top Level Domain in the interest of the UK Internet community as a whole. In order to achieve our mission Nominet consults regularly with representatives

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[19] VeriSign has handed management of the GTLD .org to the Internet Society (ISOC).

of consumer groups, industry and government bodies" (source http://www.nic.uk/AboutUs/Introduction/Mission on 8.12.2003). Nominet is a non profit distributing company and claims to be "cost and not profit oriented" with cost based pricing of services. A Nominet interviewee, (interviewed 1.9.2003), claimed that Nominet does "what needs to be done centrally" (ie focuses on its core task and does not expand beyond that) does not expand into provision of for profit services "no added value services" and seeks to "cover costs and maintain a prudent reserve".

Nominet is controlled by a Council of Management comprising two executive directors (both ex officio and one of whom shall be the Managing Director of the company) and four non executive directors – the non-executives are elected by Nominet's members at the company's annual general meeting. Anyone interested in the Internet is eligible to become a Nominet member by paying a one-off joining fee of £400 (plus VAT) and an annual subscription charge of £100 (plus VAT). Most of the 2800 members are Nominet clients and voting is weighted so that members registering most names have more votes – that is Nominet's big customers are more influential than are its small customers. In late 2003 relative voting power varied between 1 and 795 votes. Nominet also has a Policy Advisory Board (PAB) which comprises two of the non-executive directors, five representatives of appointed organisations (such as the CBI and Companies House) and eight representatives who are elected by Nominet members. Nominet also provides a dispute resolution service

Nominet's Executive Chairman – Dr Willie Black (interviewed 1.9.2003) claimed Nominet as a leading instance of what he termed a "4th way" – that is, a well run, reasonably priced and efficient private organisation. "managing a valuable resource" and operating in circumstances where supply is constrained, responsive to its users but not formally regulated by external body. The key characteristics that Dr Black identified as distinguishing a "4th way" organisation are:

- Fair, reasonable and non-discriminatory trade practices
- Efficient
- Cost not profit based pricing.
- Public service ethos.

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[20] APNIC for Asia, ARIN for the Americas, LACNIC for Latin America and the Caribbean and RIPE for

Nominet's monopoly market power is not only mitigated by its non-profit status but also the possibility of acquiring a GTLD address (eg .com instead of .uk) from VeriSign[21]. And, because Nominet is not covered by the provisions on "electronic communications network" and "associated facilities" in the Communications Act 2003 (Chapter 1 clause 32), Nominet is also effectively outside hierarchical governance[22]. Its autonomy was underlined by the Office of Fair Trading (OFT) decision not to pursue a complaint made against Nominet by Scotnom. Scotnom sought to establish a .scotland registry, to administer a new .scotland domain and complained that Nominet acted anti-competitively in considering this matter.[23] However, the OFT found (on 15.4.2003) that there was "not enough evidence to launch a formal investigation" (OFT 2003)[24].

In conclusion, in the control layer, network governance, with some influence of competition from the market sector, has produced a well functioning layer where Nominet's monopoly power is tempered by:

- Nominet's "4th way" vocation.

- Competition among second level domain registries.

- Competition from GTLD registry.

- Competition from other national registries (ie, a UK based company or individual could acquire an address from a CcTLD registry other than Nominet).

Access.

Europe and parts of Africa and Asia.

[21] Or a different CcTLD, for many national registries (including Nominet) allocate addresses to persons not-resident in the country in question – it is quite possible for a German company, or individual, resident in Germany to have a .uk address.

[22] A DTI source (interviewed 4.8.2003) stated that though it might be arguable that some parts of Nominet might be covered by the associated facilities provisions of the Act, "It's clear that Internet names are not telephone numbers". Moreover, Nominet (interview 1.9.2003) contends that, even if the Communication Act 2003 provided Ofcom with powers to direct Nominet, because Nominet has intellectual property rights in the .uk address data base, no effective alternative to Nominet as a .uk registry could be established.

[23] A .scotland domain could not, under ICANN's current operating practices, be established independently of Nominet for ICANN permits CcTLDs to be established only for states recognised by ISO. Customarily national domains are given the ISO country code as their country code (Australia changed from .oz to .au to conform to this doctrine). Curiously, the UK is an exception to this rule, for gb is the ISO code however ICANN uses .uk, the CcTLD that Nominet administers.

[24] This is not an unusual finding by the OFT. Its then Director of Competition Enforcement, Margaret Bloom, has estimated that only c5% of complaints to the OFT "convert" into cases where there are reasonable grounds for suspecting an infringement of the Competition Act 1998 (Bloom 2003).

Oftel's review of the wholesale unmetered narrowband Internet termination market (Oftel 2003a and 2003b), a key element of the access market[25], found that no single firm (other than in the geographical market around Hull/Beverley served by the incumbent Kingston Communications) had SMP. However, in Hull the incumbent telco's own ISP, Karoo, was dominant.

Estimated market shares of narrowband unmetered (including partially unmetered) ISPs in the Hull area

	Residential share	Business (SME) share
Karoo	65%	46%
AOL	27%	27%
Freeserve	3%	7%
Demon	1%	5%
Hull24	0%	5%
Other	3%	11%

Oftel consumer research (January 2003). Source Oftel at
http://www.oftel.gov.uk/publications/eu_directives/2003/eu_narrow_term/imr_2.htm on 13.12.2003.

Accordingly, Oftel directed Kingston to provide network access to competitors, not to unduly discriminate against competitors, to publish a reference offer, notify charges, and publish technical information.

In the UK the ISP trade association ISPA (Internet Service Providers Association) estimates (interview ISPA 4.9.2003) that there are more than 300 ISPs trading – however this number represents a fall from a number once in excess of 1000. Moreover, three ISPs (AOL, BT, Freeserve) each account for c20% of the market and the sector thus has a long tail of small companies of which a representative of a large ISP (interviewed 28.7.2003) commented "losses are so bad small ISPs can't even merge". However, low barriers to entry have enabled new firms to enter the ISP sector (eg Tiscali in 2001[26]).

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[25] In mid 2003 c78% of Internet homes used narrow band connections for Internet access see
http://www.statistics.gov.uk/pdfdir/int0903.pdf accessed on 29.1.2004.
[26] Tiscali UK launched in July 2001 following acquisition of Liberty Surf, World Online, LineOne and subsequently Tiny Online and Gateway ISP to form the fourth largest ISP in the UK.

In conclusion, in the access layer, a combination of hierarchical and market governance has produced a well functioning layer.

Internet exchanges.

Consideration of this level illuminates the difficulties that sometimes exist in differentiating layers. Where does the boundary lie between the, putative, Internet exchange and the transport layers? Internet exchanges are key junctions at which traffic is handed from one transport provider to another – in one sense they are part of the transport layer. But the distinct institutional and governance characteristics of the exchange and transport layers, different firms, different balances between hierarchical, market and network governance, suggest that these layers should be considered separately.

The London Internet Exchange, LINX, clearly dominates the UK Internet exchange market with c60% of UK Internet traffic passing through the LINX. However, although LINX is not subject to specific hierarchical governance, and its market share suggests it is not subject to strong forces of market governance, SMP exercised by LINX is mitigated by

- Competition in UK (from other UK based Internet Exchanges such as Manap) and international competitors.
- LINX's "4th way" governance arrangements.

Like Nominet, LINX is a not for profit organisation which prices to recover costs. Its customers are members of LINX and are "expected to contribute towards the running of LINX by volunteering for work required to run and manage LINX" (LINX MoU 3.1) and to abide by the LINX Memorandum of Understanding (LINX 2003). In turn, they are eligible to participate in the governance of LINX. LINX's objectives (LINX MoU iii) are to:

- Provide efficient interconnectivity within the UK for the Internet (core activity).
- Promote the interests of its members (non core activity).

Clearly, LINX's objectives and constitution are characteristic of a mutual organisation with membership open to all interested parties who pay fees and fulfil technical operating requirements.

In conclusion, in the Internet exchange layer, a combination of network self-governance and market governance through competition has produced a well functioning layer.

Transport.

At the time of writing there is evidence to suggest the UK Internet transport works reasonably well. There are a number of competing transport providers (notably Energis, Cable and Wireless, BT, Thus, NTL/Telewest). And Oftel (2003d) has estimated that in November 2003 the UK had more than 100 DSL service providers with ADSL accounting for c 53% of the broadband market of c3m UK subscribers at the time of the survey. Technological change, notably through wireless transmission (wifi, satellite), promises to augment competition. Though Devoteam has advanced a plausible alternative account of likely European trends – notably a decline in competition in the European transport sector to as few as 3/5 players in the next few years (Devoteam 4.3.3 p 86).

Some concern has been voiced both about the decline in peering[27], relative to paid transit, and about possible abuse of market power by incumbents. However, of LINX's c 120 members, most will peer with anyone though a few will peer only with operators passing on more than a certain amount of traffic (interview LINX 15.7.2003). Moreover, a representative of a large ISP (interviewed 28.7.2003) contended that BT exercises SMP in transport and claimed that BT is a "problem on the access side", is "squeezing out rivals", that "everyone relies on BT's infrastructure" and also claimed: "BT sells on retail minus, everyone wants cost plus but Oftel determined to use retail minus" and that BT was thus able to squeeze competitors' margins. Another commentator made an analogous argument claiming that "if there is a commercial bottleneck in the UK, it's a shortage of high capacity leased lines – not in London but outside London….. it all comes back to the Oftel

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[27] Peering and transit can be distinguished in the Internet transport layer. Peering is the exchange of IP traffic between networks; transit is a pay for version of the same. In the utopian, early, moment of the Internet peering was the norm. Operators handed on traffic to each other on a "knock for knock" basis. Latterly, peering has been supplanted by priced transit and, where peering still obtains, often transport providers will peer only with their equivalent peers. See, inter alia, Cable and Wireless' peering policy at
http://www.cw.com/our_network/peering/peering_europe.html on 8.1.2004.

policy of encouraging infrastructure build". In 2001 Oftel (2001) reviewed the UK Internet transport market and concluded that the market was effectively competitive. More recently, however, Oftel (2003c) concluded that BT has SMP both in provision of inter-tandem conveyance and in transit on fixed public narrowband networks in the UK (excluding the Hull Area).[28]

There is some uncertainty, therefore, about how well the UK Internet transport market works.[29] Experience in the UK suggests that extensive regulatory intervention has been required to redress the market power of incumbent telcos. Oftel[30] has intervened on a continuing basis to create conditions in which quasi homeostatic markets have developed. For example, Oftel's valedictory (published less than three weeks before it was subsumed into Ofcom) "Internet and Broadband Brief" of December 10th 2003 resumed its interventions designed to secure effective competition in UK Internet connectivity. Headlines include Oftel's direction of May 2000 to BT to introduce FRIACO (Flat Rate Internet Access Call Origination)[31]which, Oftel claimed, led to the UK enjoying among the cheapest prices for Internet access in the world; extensive and intensive liaison between Oftel, BT and other operators to implement local loop unbundling (LLU);[32] Oftel's Direction (23 December 2002) on Partial Private Circuit (PPC)[33] prices and service level agreements and Oftel's investigation into BT's IP Stream[34] price cuts which, following discussions between Oftel and BT, resulted in BT reducing the price of its wholesale Datastream product (see

http://www.ofcom.org.uk/legacy_regulators/oftel/oftel_internet_broadband_brief/?a=87101 accessed on 7.1.2004)

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[28] This finding, among other things, demonstrates that the distinct layers I have identified above can, for some purposes, be usefully further dis-aggregated.

[29] For persuasive testimony of the dynamic character of transport markets, on the difficulty of defining markets, and thus the difficulty of giving an account of the extent to which transport markets function well, see Giovanetti 2000 and Giovanetti and Ristuccia 2003.

[30] The Office for Telecommunications, the sectoral regulator for telecoms until superseded by Ofcom on December 29th 2003.

[31] FRIACO is an unmetered wholesale product that allows other network operators to offer their own unmetered Internet access products in competition with incumbents.

[32]However, by Nov 2003 only 7,800 loops were unbundled. Further regulatory proposals on LLU are anticipated in 2004.

[33] PPCs are the key wholesale components of leased lines which telecoms operators buy from BT so they can offer their own services directly to end users. The prices set by Oftel for PPCs are typically 50 per cent lower for connection and 20 per cent lower for rental than BT's previous charges.

[34] A family of BT broadband products.

In conclusion, in the transport layer, a combination of hierarchical and market governance has produced a well functioning layer (though one which may revert to a state of dominance).

Content.

Prima facie, the content layer is extremely competitive. There are no obvious barriers to entry and innumerable suppliers but, in the UK, there may be dominance by the BBC. An independent report, the Graf report, on the BBC's role in the Internet content sector was published in the summer of 2004. Its author, Philip Graf, commented that "the process of independent review is not, in my opinion, a very efficient one…. The Charter review should seek to find a better regime for regulating services such as BBC Online" (Graf 2004: 6) and observed that though financial information about BBC Online was "opaque" (Graf 2004: 9) it was "very generously funded by comparison to its commercial competitors" (Graf 2004: 11).

Graf's findings provided few solid foundations for a challenge to KPMG's earlier conclusion (in a report commissioned by the BBC) that "despite BBCi's evident popularity, we consider that it has had relatively little commercial impact to date" (KPMG 2003: 9). Graf brought in a "not proven" verdict arguing that "the nature and complexity of BBC Online's services, and the evidence available to the review" meant that the hypothesis of no adverse market impact could neither be proven nor disproven. Nonetheless, Graf judged BBC Online may have "crowded out" new entry to the online market but that overall "it seems unlikely that BBC Online has eliminated effective competition" (Graf 2004: 58). Moreover, Graf found that the BBC's own internal procedures and processes of governance had been deficient. He observed, for example, that "The Board of Governors does not appear to have sufficiently scrutinised the service's value to the public and its impact on the market" (Graf 2004: 83).

However, concern about the governance of the Internet content layer has focussed more on the negative externalities thought to arise from dissemination of harmful content than on competition issues. The availability and effects of unlawful pornographic material, particularly child pornography, unlawful solicitation of children for sex in Internet chat rooms and the defamation of individuals through content published on the Internet have been particularly salient concerns. That some of this material and activity is/are unlawful means, by definition,

that hierarchical governance pertains in the content layer. But this layer also has particularly prominent institutions of network, self-regulatory, governance notably The Internet Watch Foundation (IWF).

The IWF was established in 1996 by two Internet bodies, the trade association – the Internet Service Providers Association (ISPA) and the London Internet Exchange (LINX) together with a charitable foundation, the Safety Net Foundation. Initially, the IWF focused on "R3", that is **rating, reporting,** and **responsibility** issues and operated a hot-line to allow UK Internet users to **report** material which they believed to be illegal[35], it promoted **rating** of Internet content[36] and the availability of filtering devices and supported initiatives to make Internet users, and others, better informed and more competent in dealing with Internet content issues - **responsibility**. Latterly, the IWF has adopted three priorities:

- To foster trust and confidence in the Internet among current and future Internet users

- To assist service providers to combat the abuse of their systems for the dissemination of criminal content

- To assist law enforcement in the fight against criminal content on the Internet [37]

The IWF is governed by a board of ten members of whom three are industry members, (selected by its Funding Council – made up of IWF funders) and six are non-industry members, (formerly selected by invitation but latterly through an open selection process involving press advertisements and an interviewing panel which includes independent representation) and an independent chair. The IWF is largely funded by Internet service providers, mobile telephony operators and a small number of other organisations (in and outside the Internet sector).[38] It works by establishing and encouraging good practice throughout the UK Internet sector and by assisting in and promoting the operation of relevant UK law. It has succeeded in commanding the support and respect of much of the sector and policy community (though libertarians have expressed concern about the possible chilling effect on free expression of a number of IWF policies and recommended practices[39]) For

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[35] Notably material which contain images of child abuse, anywhere in the world; contains adult material that potentially breaches the UK Obscene Publications Act; contains criminally racist material in the UK.
[36] Notably by the Internet Content Rating Association (ICRA) see www.icra.org
[37] See http://www.iwf.org.uk/about/policies/remit2003.htm accessed on 17.9.2004.
[38] The most recent IWF Annual Report available (that for 2002 at http://www.iwf.org.uk/about/annual_report/annual2002.htm on 14.1.2004) shows an annual income of c£0.5m which derives from 22 identified funders – a small number of the firms active in the sector – and the IWF has experienced financial difficulties in consequence of its narrow funding base.
[39] See, inter alia, http://www.cyber-rights.org (on 14.1.2004). Starr's (Starr 2003) remark is representative "Internet users are quite capable of deciding for themselves what to read, watch, listen to and download, and

example, a DTI interviewee stated (4.8.2003) that the IWF model "set up here, has been widely replicated around the world" and that "There's lots of pornography[40] on the Internet but almost none comes from the UK". The IWF chair stated that "we have and have had the full support of Government for what we do" and that both the DTI and Home Office were involved in setting up the IWF, funded a review of IWF governance after the IWF's first two years and were consulted on the IWF's own review of its governance practices and procedures. The IWF and Government had, the Chair claimed, "a very close relationship but not one which is institutionalised".

No concerns have been raised by the UK ISP sector in respect of the takedown of unlawful images (notably of child abuse), but the ISP sector (ISPA interview 4.9.2003) is concerned that the "takedown" practices mandated in consequence of the judgement in Godfrey v Demon Internet Ltd[41] (see Akdeniz 1999) expose ISPs to legal action (and to adverse judgements) if they do not promptly respond to all "take down" requests by prima facie interested parties or, if they do so respond, freedom of expression on the Internet will be lethally chilled. In ISPA's view there is insufficient authoritative guidance on key matters such as who is qualified to give a notice of offence leading to a take down and what constitutes a notice on which they should act. [42] The IWF Chair, on the other hand, observed (27.7.2004)[43] that "The problem with the Godfrey case was the arrogance of the industry, they wouldn't even respond to Godfrey".

In conclusion, in the content layer, a combination of hierarchical and network governance has produced a well functioning layer.

Between the layers.

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whether they think it's any good to boot. The imposition of new responsibilities, in order to safeguard users, can only insult their intelligence and undermine their freedom".

[40] That is unlawful images of child abuse rather than lawful adult pornography.

[41] Case No: 1998-G-No 30 in the High Court of Justice, Queens Bench Division, (Handed Down at Leicester Crown Court), before Mr. Justice Morland, 26 March, 1999; and Godfrey v. Demon Internet Ltd, Queens Bench Division, (1999) The Times, April 20, [Judgement March 26].

[42] ISPA (interview 4.9.2003) stated its preference for an indemnity regime similar to that provided in the USA Digital Millennium Copyright Act. The lack of legal certainty left ISPs vulnerable and was "an ongoing worry".

[43] Making clear that issues such as those raised by the Godfrey v Demon case were not within the IWF's remit.

Analysis of governance, and the extent to which a self-regulating homeostasis exists, and/or is possible, **within** each layer of the Internet supply chain is an important element of my analysis. However, it's also important to consider the interfaces **between** layers. How are these controlled? Essentially, the general adoption of TCP/IP and HTTP protocols has simplified interfacing between layers and inhibited the accumulation of market power by owners of proprietary standards (see discussion of Open Systems Interconnect at http://en2.wikipedia.org/wiki/Open_Systems_Interconnect on 9.1.2004). Wikipedia also conveniently lists some alternative standards and applications for linking and interfacing between layers (at http://en2.wikipedia.org/wiki/OSI_model on 9.1.2004) which support my contention that control of connections between layers is not concentrated and hierarchical governance is not so significant an issue between layers as it is within some layers.

Conclusion. From layers to vertical integration?

> "If technology companies owned the newspapers (and, not impossibly, one day they will – although I wouldn't bet on this outcome), they would not be entirely happy until they owned the town, or at least the shopping areas. It is not at all a secret that the competition among technology companies on the Internet is to own the network itself. It is perhaps the natural insecurities of most nascent industries – railroads, movies, oil, long before software – that made them monopolistic. (Wolff 1998: 155).

In spite of the generally well functioning governance of the contemporary UK Internet, nothing is for ever. Experience in other media suggests that control of interfaces between layers is vulnerable to capture by proprietary standards and applications. Moreover, there are a series of established practices and institutional arrangements whereby co-ordination between the layers of the UK Internet is effectively secured through network governance arrangements. These are particularly noteworthy in the:

- Control -Access Interface.

Where ISPs are represented on the Nominet Council.

- Access-Internet Exchange Interface.

Where ISPs are represented on the LINX Council.

- Access-Content Interface.

Where the IWF is (partly) funded by ISPs who are also represented on the IWF Council.

My argument thus far has focussed on the Internet in the UK and deliberately so. As Wright (2004) has observed, discussion of Internet governance has neglected the national dimension. Although Internet governance is undoubtedly complicated by the Internet's international character, contentions such as Castells (1996) – influential though they have been – that the traffic carried by the Internet is largely outside national regulation are surely overstated. Here is another Internet myth. And one, which sustains the myth of Internet self-governance, for Castells implies that if national governments, and thus hierarchical governance, are absent Internet governance, can only be undertaken through market and network arrangements.

But as examination of the UK case suggests neither national nor hierarchical governance is absent. Nor is the Internet best understood as a single "thing". It is not a vertically integrated medium of communication with a single governance regime but a layered entity with multiple governance regimes in and between the layers. But how far is the layered, dis-aggregated, structure a permanent, structural feature of the Internet and how far a contingent characteristic? Perhaps the commercial uncertainties which derive both from the layered organisation of the Internet and its uncertain governance regime (markets, hierarchies and self-regulation in shifting patterns and further complicated by uncertainties in international governance arrangements) are giving rise to an industry structure whereby functions are becoming internalised in the firm (Coase 1937).

Some aspects of UK Internet industry structure lend support to this hypothesis. Notably the vertical integration of carriage and content in two of the UK's three largest ISPs: in mid 2003 BT and Yahoo linked, earlier AOL and Time Warner merged. And key features of both the historical (evolution of the sector towards public or private/regulated monopoly structure) and recent experiences in telecoms also lend support to this thesis. For example, the difficulties of contracting on acceptable terms for international transit of Internet traffic (due to the pricing of circuits differently to the voice telephony model of the sender and receiver each paying for half a circuit), has recently led to bypassing of the international settlements regime through the building out, or creation through merger and acquisition, of global networks – to internalisation of functions within the firm. An (hierarchical) organisational form which echoes that of circuit switched systems where either the state sponsored

the establishment of public monopolies (displacing private sector firms in the interests of achieving universal service) or tolerated establishment of regulated private monopolies in preference to governance through market institutions.

> The launch of BT Yahoo! Broadband signals the arrival on European shores of the broadband access provider/portal partnership model already prevalent in the US. It also signals a move away from content and online services for one of Europe's leading incumbent-owned ISPs. Both could have dire consequences for alternative broadband ISPs, now competing against not only a dominant access provider but also the leading portal. Partnerships between incumbent access providers and portals are nothing new in the US – indeed, they are fast becoming the norm for broadband access. SBC Yahoo! was announced as early as November 2001. Verizon and Qwest both have partnerships with MSN while BellSouth works with ISP EarthLink on its broadband services. However, such close partnerships are as yet unknown in Europe. A sign of things to come. Ovum comment downloaded on 4.8.2003 http://www.ovum.com/go/content/018869.htm

But this is not a fully satisfactory explanation. Although 3 firms, (AOL, BT and Freeserve), account for c60% of the UK ISP market and at least two of these are internalising functions by vertically integrating, there are also many (albeit a declining number) of small and medium sized ISPs operating in the UK. So too in other areas – there are a number of transit providers (notably BT, Cable and Wireless, Energis and Thus). And, where key bottlenecks exist, such as the Internet exchange (notably LINX) and registry functions (Nominet), in the UK (in contrast to the USA) these are controlled by non-profit distributing and/or mutual companies with strong user representation and/or control. A Coasian explanation seems therefore incomplete.

An alternative, and I think more plausible, hypothesis is that, by benign accident for there has clearly been no conscious design, the UK enjoys an uneven but appropriate matching of different regimes and institutions of Internet governance to different parts of the Internet supply and value chains. Where, prima facie, there is significant market power, eg in the local loop, there is an appropriate level of effective regulation (Oftel on BT). Where there are regulatory issues arising from offensive content, eg pornography, the sector itself (in partnership with Government) has developed institutions (notably the Internet Content Rating Association - ICRA, and the Internet Watch Foundation – IWF). To be sure, these UK (ICRA is UK based but European in

scope and funding) institutions are not fully competent to deal with a very international medium, the objections made by Starr (2003), SACOT (2003) and others (to which I have referred above) about the legitimacy of such arrangements are cogent, and various forms of unwanted content, eg spam, viruses and worms, remain untamed (though in the case of each of the latter there are clear commercial incentives for firms in the sector to devise effective measures against these forms of offensive and/or damaging content). But, improvised though the UK system may be it seems to work better than Mueller judges the USA's Internet governance to be which he contends is characterised by "poorly thought out improvisations" (Mueller 1999: 498).

But, concern for the interests of the Internet, to which interviewees testified[44], may not be sustainable when firms from outside Internet history and culture enter Internet markets – eg Time Warner (now merged with AOL); incumbent telcos (eg British Telecom) and retailers (eg Dixons, which established and later sold Freeserve, and Tesco). How are conflicts managed when the network in question is not a "private" organisation (eg a self-organising NGO, the focus of Riles' work) but a public communication network? How does self-regulation work when consensus (eg on content regulation) may not be widely shared and when firms with significant market power exercise their power? What happens when the pioneering generation who are bound together by a shared commitment to the "interests of the Internet" are displaced by another with different commitments – probably to self-interest? And what of other governance challenges not yet met? Spam is a notable case in point and one where network governance seems the least likely potential mode of governance to provide a satisfactory solution. Nonetheless, the reservations I make above aside, it is striking how far network governance has pervaded the UK Internet and how well the "4th Way" has served it.

Mythical though the inevitably international character of Internet governance may be and mythical though an exclusively (or even preponderantly) network governance regime may be, like most myths these myths of Internet governance have more than a grain of truth in them. Compared to the legacy media of broadcasting and telecommunications the salience of network governance and the limits of national governance in the Internet are striking. Striking but over-emphasised. And over emphasised because of the over-riding importance of the

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[44] In summer 2003 the author interviewed 11 senior officials and managers from UK and international governance agencies (ICANN, OECD, DTI and Oftel), Internet firms and trade associations in access (ISPs), transport (telecom carriers), addressing and Internet exchange sectors. Subsequently other interviews have been conducted.

biggest myth of Internet governance – that Internet governance is new, unprecedented and distinct from governance of legacy media.

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