3／YOU CALL IT ART
WE CALL IT INDEPENDENCE

"The Internet has made the local global – but it has made it easier to talk to people across the world than to those across the street.

"Once, people knew every tree in the forest; they could fix the things in their houses. Now if a computer breaks down, most people rely on others to repair it. When you get involved with something like a wireless community network, you're faced with the challenge of taking control of your environment again, and of course, you start to do this locally."

Quote left: Manu Luksch

This page: Ma'am (designed by Nick Dewolf and Harvie Branscomb) at Burning Man 2004, Nevada.
Photo: Yayoi Wakabayashi

go glocal

GO GLOCAL!

When New Labour announced their policy aim for the UK to be the leading nation in terms of broadband infrastructure by the year 2005, the resulting media buzz rendered the term broadband into daily vocabulary. However, a recent report about broadband penetration by the OECD listed the UK 22nd out of 30 nations. 28 people out of 1000 use broadband in the UK, compared to over 140 per 1000 in the leading nation, South Korea. In the UK, delays in provision and high prices have left the netizens feeling short-changed. Some have taken matters into their own hands.

In the last few years, some of the more technically-minded Internet users have experimented with data transfer using microwaves in order to enable fast, cheap, and wireless access to the Internet. Fast, because under an internationally agreed protocol named IEEE 802.11b, microwave transmission has a theoretical bandwidth of 11 Mbps – that's over 20 times a typical ADSL (wired broadband) connection. Cheap, because a broadband connection can be shared among many users, and a portion of the microwave frequency spectrum – around 2.4 GHz – is available for use without licence.

Networkers with broadband who want to share their bandwith create a network node by installing an antenna on their roof or windowsill. The antenna connects to a dedicated traffic-control computer called a router, which in turn is linked to the broadband connection and the networker's other computer systems. Anyone with an antenna that is in line of sight of the first antenna can log on to the Internet through a microwave link between the antennas. Some laptops and palmtops have antennas built in. This convenience and speed comes relatively cheaply – with some care, a good antenna can be made at home, and the required wireless card bought for less than £80. And for the router, you can reconfigure an obsolescent PC like those that are regularly thrown out by offices.

Manu Luksch, Mukul Patel, Ilze Black
2001

Introduction to a radio programme investigating DIY wireless network initiatives in London and New York

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Adam Burns and Manu Luksch on the roof of Regent Studios (poster) Original photos: Chris Helgren

Surfing as free as a cloud

On Sunday morning, a week later, news of another node from an unlikely source proves it's not just geeks wiring the East End. Father Alan Green, the rector of the Church of St Johns in Bethnal Green has just returned to the rectory from a local Sunday school. He has recently given approval for one his tenants in the church crypt, Martin Kavanagh, to set up an antenna in the bell **page 7 ▸**

◂ page 3 tower built by Sir John Soane in 1826.

Like many priests, Father Green faces a dilemma. The church is broke. Earlier this year, the Archbishop's Council announced a plan to offer the use of Church of England steeples to mobile phone companies wanting to erect new masts. It would bring in much needed cash, but Father Green is a progressive priest, and he thinks there may be another way to connect the church to the wireless age.

"We are really keen [on the data cloud] because it combines our notions of helping the community and how to use the building itself. Here we have an enormous tower that precisely facilitates what is needed.

"I suppose we could make money if we allowed a mobile phone mast to be installed in there," he admits, "but on balance, what we must offer is a commitment to the community, so the wireless idea is the cleverest I think."

Excerpt from Sean Dodson's 'Surfing as Free as a Cloud' in The Guardian, *20 June 2002*

ON FREE WAVELENGTHS: WIRELESS NETWORKS AS TECHNO-SOCIAL MODELS

Armin Medosch

2003

Introduction

This article describes the early days of the Consume project and related wireless community network initiatives in London. Consume[1] developed a practical network utopia, a workable model, which sets it apart from much of the hype and hope that has surrounded the Internet[2].

In essence, the Consume concept involves using self-administered open wireless networks to leapfrog the services offered by conventional telecommunications companies[3]. The 'last mile', the cable connecting the nearest exchange with the homes of the users, becomes the 'first mile', the self-administered zone of a network managed by the users themselves. This is made possible by the existence of open standards, licence-free bandwidth and WLAN technology based on IEEE 802.11 standards[4].

I hope to show that the key difference here is made not by this or that specific technology, but by the attitude of those involved. Inspired by experience with free/libre and open source software (FLOSS), a network ethics emerged – a habitus[5] in dealing with new technologies that is shaped by social and cultural values. On the basis of this habitus, attempts were made to build a Network Commons, a network that does not obey the logic of the market, but where services are rendered on the basis of barter and gift economies[6].

The social structure aimed for is one of decentralized self-organisation. The history and impact of these projects highlight a different way of dealing with technology. However, the idea of a 'different' approach still implies that technology is an autonomous field, subject only to its own laws. It is therefore important to emphasize that wireless network projects of this kind also open up the prospect of a reformulation of the fundamental character of technology. A culture based on grassroots democracy and participation gives rise to alternative goals for technological developments and for the embedding of technologies within social contexts[7].

Translator: Nicholas Grindell. First published as 'Auf freien Wellenlängen: Funknetze als techno-soziale Entwürfe' in B. Lutterbeck, M. Bärwolff & R. A. Gehring (eds.) *Open Source Jahrbuch 2006* (Lehmanns Media: Berlin 2006) and downloadable at www.opensourcejahrbuch.de/download/jb2006 Portions previously published in English as the essay 'London.ZIP' for the *DMZ* Festival (London 2003)

[1] http://consume.net

[2] See, for example, Kevin Kelly *Out of Control: The Rise of Neo-Biological Civilization* (New York: Addison Wesley, 1994). Kelly is former executive editor of *Wired* magazine.

[3] See the Consume Manifesto of 2000, available at http://dek.spc.org/julian/consume/consume.html

[4] WLAN stands or Wireless Local Area Networks. The corresponding technical standard, part of a family known as IEEE 802.11, was originally adopted in 1997 and has now been extended to include a group of

related protocols. For details, visit the Internet Engineering Task Force (www.ietf.org) and the Institute of Electrical and Electronic Engineers (www.ieee.org). In principle, any networking technology can be used.

[5] See Pierre Bourdieu *The Field of Cultural Production* (London: Routledge, 1993).

[6] See Armin Medosch *Freie Netze. Geschichte, Politik und Kultur offener WLAN-Netze* (Heidelberg: dpunkt, 2003).

[7] See Armin Medosch 'Die Gesellschaft im Ad-hoc-Modus' in C. Bieber and C. Leggewie (eds.) *Interaktivität. Ein transdisziplinärer Schlüsselbegriff.* (Frankfurt & New York: Campus Verlag, 2004). Available online in English as 'Society in ad-hoc mode: Decentralised, self-organising, mobile' at http://data-browser.net/01/DB01/Medosch.pdf

[8] On network topology in general see Albert-László Barabási *Linked: The New Science of Networks* (Cambridge MA: Perseus, 2002).

METHOD

In analytical terms, the approach taken in this article is based on the layered structure of networks[8]. From a technical point of view, the Internet is determined by the properties of two protocols, the Transmission Control Protocol (TCP) and Internet Protocol (IP) – known collectively as TCP/IP. These protocols enable communications within the Internet across different technical networks and platforms. In the layered model of TCP/IP these protocols form the 'network layer', with an applications layer on top and a layer containing physical connection paths underneath. The analytical model proposed here could be extended to include further layers on top of the applications layer, such as an organisation layer, or one covering emotional links.

It is important to keep in mind which of these layers is being discussed at any given point. Each layer has different forms of encoding and distinctive inner structures, and each is also influenced by external factors, including regulatory frameworks. The analytical approach using the layer model permits a discussion of forms and structures within networks that remains rooted in the material reality of the networks. Of particular importance for this study are network topologies, the arrangement of the nodes in the network and the character of the links between them[9].

In the exceptional case of the combination of peer-to-peer networks with socially decentralized structures, the technical and social topologies actually do coincide. I say 'exceptional', because in many cases where causal relations or even strong analogies are posited between the technical and social layers of a system, it is as an outcome of a (perhaps unconscious) belief in technological determinism. For this reason, it needs to be made clear from the outset that what we are talking about here is not technology and its cultural impact, but cultural techniques on the one hand, and technical cultures on the other. The technical is understood here in an extended sense, as an organising principle that brings together social and material aspects – the work of machines and the work of human beings – in the transformation of both matter and information. It is only in terms of this re-socialized notion of technology that we can speak of the overlapping of the technical and social network topographies. Network utopias are produced not by the ghost in the machine, but by the active endeavours of groups of people working under specific conditions.

Consume

Trip the loop, make your switch, consume the net![10]

PREHISTORY AND EARLY DAYS

The idea for the Consume project arose from experience gained in the Clink Street community in Southwark, London, which for several years was a hotbed in the fields of music, web design, technological development and art. A former warehouse and nearby buildings on the banks of the Thames housed record labels like Ninja Tune, new media companies like Obsolete, and more art-orientated groups like I/O/D and Audiorom. The social focus of the Clink Street community was Backspace, a cross between an Internet café and a Net art gallery.

Internet bandwidth was then very expensive and only businesses could afford a permanent high-bandwidth connection through a dedicated leased line. James Stevens, founder of Backspace, convinced former colleagues in a commercial website company upstairs to share their 512 kbps connection (which allegedly cost EUR 60,000 annually). Backspace and the other tenants of the building were linked to this connection via a local cable-based network.

For many, Backspace was like a home from home, a public living room where they came to work on projects in a collaborative atmosphere. Run as a shared resource, users were responsible for the maintenance and upkeep of the infrastructure. The World Wide Web was still relatively young, the need for learning and exchange was great. Backspace became a place for digital network culture, a space to trade ideas at the local level, with links to other network culture scenes worldwide via conferences, mailing lists and live streaming events[11].

It was the relatively fast Internet connection that allowed Backspace to stream live audio and video, in addition to hosting websites for individuals, groups and projects. Live streaming from home was unthinkable at the time, no one could afford it. Internet activists at Backspace took part in the net.radio jam sessions organised by the Xchange Network[12] and streamed 'almost live' TV from the J18 Carnival Against Capitalism demonstrations in London on 18 June 1999.

Just across the road from Backspace's home in Winchester Wharf, a few more artists and new media businesses located in Clink Street Studios also wanted to participate in the sharing

[9] Compare this 'network materialism' with Lev Manovich *The Language of New Media* (Boston & London: MIT Press, 2001).

[10] Consume slogan

[11] These contacts included other 'hothouses' of the network culture that emerged in the mid-1990s such as Desk.nl (Amsterdam), Ljudmila (Ljubljana), Public Netbase (Vienna) and The Thing (New York, Berlin, Basel, Vienna). In 1998, the *Art Servers Unlimited* conference (http://asu.sil.at) brought together representatives from projects of this kind for a workshop lasting several days at Backspace.

[12] The Xchange Network and mailing list was established in Riga in 1997, and is online at http://xchange.re-lab.net/m

Carnival Against Capitalism, 18 June 1999
Photo: Manu Luksch

Backspace in 1998
Stills from the* Art Servers Unlimited *DVD (Manu Luksch & Armin Medosch 1998)

of precious bandwidth. But the Telecommunications Act of 1984 prohibited them from throwing a cable across the narrow street to connect with Backspace's local network. Julian Priest, then technical director of the company Mediumrare, suggested a wireless solution. The technology now known as Wi-Fi or WLAN (then, brand new in the commercial world) was used to establish a connection between the two buildings, a bridge through the air that served well for many years. About 100 bandwidth-hungry users spread over two buildings shared the benefits of a high speed local network with a gateway to the Internet. Creativity, art and new media business flourished. It was this local experience of the power of wireless that would later encourage James and Julian to launch Consume.

The weird thing was that you very often got the whole thing to yourself, which is how we learned about contention, i.e. you can share a network without really noticing the speed drop off. Now, when you buy ADSL in the UK, you share your 512k with between 20 and 100 users. That's a contention ratio of 20:1, which is how the price is so low. If you buy real dedicated bandwidth, then it's way more expensive.[13]

THE CONSUME MANIFESTO

Backspace was forced to close in 1999 when the building was sold in the course of rampant property speculation. Although bemoaned by many at first, the end of Backspace created the opportunity for a new beginning. In Clink Street, James Stevens and Julian Priest had learned about networking the local community and gathered experience with WLAN technology.

The wireless network had also been used as an intranet (internal network) for broadband and multimedia applications. Further inspiration was drawn from the reports about peering agreements between Internet providers presented at Backspace during the *Art Servers Unlimited* conference in 1998[14]. Peering between providers means that they transport data traffic for each other without charging each other for the volume of data carried. The more peering agreements a provider can make, the lower the costs for Internet bandwidth.

We had talked on and off about peering and wireless over those years, and of course spent lots of time scrabbling about with cabling and crimpers. In the summer of 2000, I was coming back on a train from Cornwall and I wrote some notes which outlined most of it, came back and showed it to James, and we sat down and wrote this text together, and put it up on consume.net[15].

[13] Julian Priest, in an email to the author (2003)

[14] http://asu.sil.at

[15] Julian Priest, email (2003)

This text – the Consume manifesto – described James' and Julian's ideas for a free network, a network that would be built and maintained by its users[16]. It suggested the use of WLAN technology based on the IEEE 802.11 standards to jump over the local loop and create neighborhood networks outside the commercial provider model. Local networks would wirelessly connect to each other and thereby create an ever growing free network cloud of data – a public MAN (metropolitan area network). Inside this cloud, users would enjoy the benefits of a high-bandwidth connection without having to pay fees to owners of cables such as British Telecom. File-sharing, gaming, audio-visual media and communications experiments of all kinds would blossom in the free network. At its borders, the network would be connected to the Internet. Those in possession of a broadband connection would share it with other users for the mutual benefit of all.

[16] http://dek.spc.org/julian/consume/consume.html

The Consume concept drew on the idea of the Internet as a 'network of networks', a structure created by linking up many separate networks. In principle, each node in this network has the same status, as a peer among other peers. The connections between these nodes are always two-way connections with the same capacity. The Consume concept uses this egalitarian principle that is inherent in the Internet's architecture (but which has been masked by its commercialization) turning users into (self-)providers. The network grows not as a result of centrally controlled planning and capital investments, but as a result of the accumulated actions of many individuals.

Starbucks, formerly Backspace
Photos: Bill McAlister

So we scribbled down this quite lengthy paper, with our expectations concerning such a network. It was to provide ownership of network segments to self-provide those services; it was about the redistribution of wealth or access or whatever the actual medium is. [...] I think obviously that script was quite potent, because an awful lot of people picked up on it or glued it to their own ideas or took a hint from it and went ahead and established this whole family of Free Network initiatives.[17]

[17] James Stevens, in an email to the author (2003)

THE CONSUME METHOD

Not content with writing a manifesto, Consume immediately put ideas into action, building components of the proposed network and organising workshops. Their method deserves to be examined in its own right as the basis for something like a 'Consume operating system' – above all because it proved to be a method that could be copied and transferred.

Vital to the method were the workshops, or 'Consume Clinics', where people interested in the Free Network idea would meet, discuss ways of developing the network, and actually build the hardware needed to handle wireless traffic – antennas, routers and access points. What was clinical about these sessions was above all the approach to hardware. Consume attempted to give a practical demonstration of how wireless networks could be built using a DIY approach. Instead of buying off-the-shelf commercial solutions, the components for the network were assembled using cheap, standard electronic components and second-hand hardware. 'James drove up to the warehouse for the main Orinoco importer and bought a load of wireless network cards, materials for antennas and other parts.'[18] Old PCs were reconfigured as wireless routers and access points. In some cases, this involved using several old computers to assemble a single functioning new one. 'At the end of the session, there were a couple of nodes, one on Linux and one on BSD, and a huge stack of PC carcasses, and empty Coke bottles.'[19]

[18] Julian Priest, email (2003)

[19] ibid.

The Clinics drew an inner circle of network enthusiasts, who got down to work on sensitive configuration problems[20]. But they also served as open forums for informal exchange and making contacts. Consume never aimed to build an extensive wireless network themselves, working instead primarily as a technical and cultural avant-garde. They demonstrated how it could work technically and how the associated forms of social organisation might look. The emphasis was on individual responsibility and initiative, and a DIY attitude to learning and passing on knowledge. As in the early community of Internet developers, the approach was based not on lengthy political discussions and voting mechanisms, but on 'loose consensus and functioning code'.

[20] One problem was the shortage of Internet addresses. The transition to the new Internet Protocol (IPv6) should improve matters, but is advancing slowly.

The Consume idea had legs and the notion of the Free Network was picked up by many and carried off in different directions. Internet tools such as mailing lists, a wiki and the Consume Node Database helped to coordinate these efforts and allowed them to make an impact nationwide. Consume also became involved at an early stage in policy discussions on the subject of spectrum regulation, but refused to become a legal entity for the official representation of community networks. They insisted that only decentralised uptake of the idea and self-organised network development could guarantee that it remained uncompromised by bureaucratisation or commercialisation. An official Consume organisation could become a target for

legal action or takeover attempts. A decentralised network built on consensus between many independent owners of small network fragments was the favoured model. The network should grow in the same way that a tune is 'collectively' invented and developed in freely improvised music.

EAST END NET

Now I would like to zoom in on a specific period in a local cluster in London's East End. This part of the city is home to free2air[21], an open wireless network node that was created around 1999, independently of Consume, and which can claim to be the oldest free and open wireless network node in Europe. In the winter of 2001–02, the Consume idea was particularly virulent. Loosely united by it, but in many respects working independently, free2air, the artists of ambientTV.NET, *Mute* magazine's *YouAreHere* project[22] and a number of other individuals and groups developed a project to build a wireless backbone[23] for the East End. The idea was to link four points (Limehouse Town Hall, Brick Lane, Shoreditch/Hoxton and London Fields) that enclosed an area populated by artist's studios, new media companies, shared office spaces, and cooperatives – fertile ground for Free Networks. The East End Net was to demonstrate the feasibility of the Consume concept on a large scale.

free2air

free2air is based in an inconspicuous house at the end of Hackney Road, between shops selling cheap overseas phone calls and halal fried Chicken. For years, a laptop named Groundzero and an omnidirectional antenna on the roof of the building have ensured the existence of a friendly 'data cloud' that provides the whole of the surrounding area with connectivity. The credit for this facility goes to the Australian Adam Burns, also known as vortex. With a background in IT security, he began experimenting with wireless networks in 1999, although his interest in Free Networks goes further back, stemming from the days of the mailbox and early Internet scenes in Australia. Using wireless networks based on the 802.11 standard, vortex saw the possibility of reviving these old ideas. free2air was launched without knowledge of the existence of Consume, but is based on a similar set of ideas, and its name makes a compatible political statement[24]:

free2air is a contentious name. Basically it has a dual meaning. Firstly, once you have established such a network the cost of information travel is free. It's not a totally free service

Directional antenna on the roof of ambient.space
Photo: Chris Helgren

[21] www.free2air.org

[22] www.metamute.org

[23] 'Backbone' is the term used for a network whose function is to bridge large distances and to help connect other networks.

[24] See Saul Albert's interview with Adam Burns in *The Sarai Reader 03: Shaping Technologies* (New Delhi: Sara Media Lab, 2003).

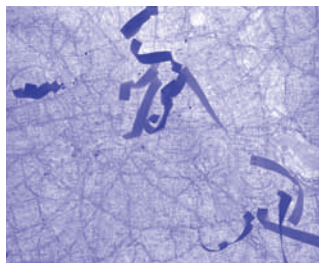




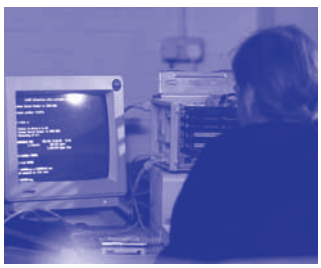






Wireless antenna building workshop at ambient.space, 2002, with Saul Albert, Ilze Black, Alexei Blinov, Darron Broad, Adam Burns, Manu Luksch, James Stevens, Simon Worthington, Ten Yen, Rolf Gehlhaar, among others. Photos: Chris Helgren




to establish, you need to buy hardware, you need computer expertise, and so on. But the ongoing costs are minimal. And secondly, what I liked about it is the plans for a distributed, open, public access network, getting rid of the idea of a central ISP. In the context of the Internet today, there is a strong global tendency towards control of content. How does something get 'air'? So there is a double meaning to free2air: it also means you are free to air your opinion.[25]

[25] Adam Burns, in an interview with the author (2003)

free2air is designed as an open network for public use. As a security expert, Adam Burns places particular emphasis on the political implications of the configuration of a network. free2air uses none of the methods for the authentication or registration of users that are provided for in the wireless network standard[26] – it is truly as free as air. Anyone with the right 'nose' can sniff out access to free2air – no password, no registration.

[26] Such access control methods include WEP and WPA encryption and MAC address filters.

You want to avoid the 'Halt, who goes there!' moment. It is that point, philosophically speaking, that we want to keep open. A packet passing through the network is like a passenger passing through the transit lounge of an airport. It does not have to show a passport to get to the next destination. But packets don't really wait very long, so maybe it's not the best metaphor, but it shows the difference between transit traffic (that just sits in the lounge and then passes on) and incoming traffic, a packet wanting to come into your little country which you then regulate with access control, authentication, and authorization.[27]

[27] Adam Burns, interview with author (2003)

Years of uninterrupted operation of the free2air open node is proof that free public-access wireless networks can exist.

ambientTV.NET

Around 500 metres from the free2air base station stands Regent Studios, a former workshop complex that now consists mainly of studio spaces. And on the top floor of the building is ambient.space, from where the artist group ambientTV.NET had been watching the growth of the Consume project with interest. When initial tests in late 2001 showed that free2air was accessible from their studio, this interest turned into activity. ambientTV.NET sent out an email to institutions appealing for donations of obsolescent computers that would otherwise have ended up on the scrapheap. Soon afterwards, thanks to the LSE, Reuters, and the National Aids Trust, their space was overflowing with antique machines in various

1

materials

- 1. 550mm length / 40mm diameter of UPVC pipe
- 2. 150mm square aluminium plate
- 3. N connector to plug into the pigtail from the wireless card
- 4. a length of 12 gauge solid copper wire
- 5. 1x10mm dia nut & bolt
- 6. 4x1mm dia nuts & bolts
- 7. Plastic cap from large aerosol can that will fit over the UPVC pipe
- 8. copper plate 55 mm x 12.5 mm
- 9. electrical wire

tools

- 10. scissors
- 11. power drill
- 12. glue gun
- 13. screwdriver
- 14. soldering iron
- 15. hacksaw
- 16. file
- 17. pliers
- 18. pins

action

2

states of usability. A series of workshops was organised, well remembered because they brought together not only key Free Network initiatives – Consume, free2air and *YouAreHere* – but also many individuals, including Alexei Blinov from Raylab, Jasper Wallace, Ian Morrison, Darron Broad, and Ten Yen. These sessions ended with familiar scenes – gutted computers, parts and tools strewn about. And out of the junk rose phoenixes of new access points, routers and antennas.

Since early March 2002, there has been a wireless connection between ambientTV.NET and free2air. Apart from its use by the ambient.space studio, the connection is shared with the rest of Regent Studios via Ethernet cables, augmented with another link to the Internet, and re-broadcast towards London Fields via an omnidirectional antenna. ambientTV.NET initially developed an interest in wireless technology because it enabled them to use an existing ADSL connection more efficiently and share the costs with others. 'But then the focus shifted,' explains Manu Luksch, 'the practical aspects became secondary, social and creative aspects took priority'.

In my view, there is a disturbing lack of vision running through governmental and business organisations, due to the fact that they are trained to focus on short-term results. For me, the greatest value of these experiments with islands of wireless connectivity is that they are first steps towards the development of many self-generating, dynamic and distributed IP network structures. These interwoven networks have the potential to generate an entirely different, more diverse Internet structure.[28]

Today, ambientTV.NET's interest in Free Networks is primarily artistic, and their participation in the East End Net illustrates how Net art projects and Free Networks can benefit each another. On 23 March 2002, ambient.space hosted a live event with art music group Meta4, the first event to be broadcast live via wireless over the East End Net. Encouraged by the success of the network, ambientTV.NET went on to develop a number of media art works that incorporated it, and its infrastructure has supported other artists' projects such as Kaffe Matthews' *Radio Cycle*.

THE RISE OF CONSUME

Consume was very successful as a catalyst for ideas and in helping interested people to find each other. A few months after the publication of the Consume manifesto online, the

3

[28] Manu Luksch, email to author (2003)

1
Mukul Patel collecting 'obsolete' computers
Photo: Manu Luksch

2
Material list for DIY antenna
From the* ambient.wireless *website

3
Darron Broad & Ten Yen configuring routers at ambient.space
Photo: Chris Helgren

first article about Consume appeared in a major newspaper[29]. Previously, media accounts of the rise of wireless Internet had been completely dominated by pieces on the practice of 'war-driving' (locating and logging unprotected, usually corporate, wireless networks) and 'piggybacking' (siphoning off available bandwidth for personal use). Consume managed to transform that perception. The BBC, the *Wall Street Journal* and other major media outlets reported the irresistible growth of wireless community networks in London, New York City and Seattle. This in turn mobilised many more people to become involved in the movement. Consume built a database with a visualisation tool, the Consume NodeDB, where owners of wireless networks could register their nodes with exact geographical location and access details. From a few nodes in the year 2000, this database grew to more than 3,000 entries in 2003.

[29] On 12 October 2000, *The Guardian* published a piece entitled 'Free as the air we breathe' by Sean Dodson. This article heralded a sea change in reporting on 802.11 technology. Previously, the focus had been on security aspects – stories about evil hackers armed with laptops and antennas made from Pringles cans marauding through the streets and stealing bandwidth.

It seemed that the zeitgeist had caught up with the Consume concept. Many who were disappointed by the exaggerated promises of the Internet boom of the late-1990s were looking for something that involved networks but which did not speak the language of Internet hype. Projects inspired by the Consume method emerged in various parts of London, in Wales, on the Isle of Wight and in the north of England. The idea fell on particularly fertile ground in places where broadband Internet was not available for various reasons, such as distance from urban centres. But the idea was also adopted by community initiatives in many cities with the hope that networking might help to counteract social decline. A workshop by the name of BerLon (Berlin-London) in Berlin in October 2002 provided an opportunity to present the Consume method in Germany. This event prompted Berlin initiatives to become better organised, resulting in projects such as Freifunk[30], the WaveLoeten meetings, and the Berlin Backbone project, all of which in many ways count among the avant-garde of the Free Network movement.

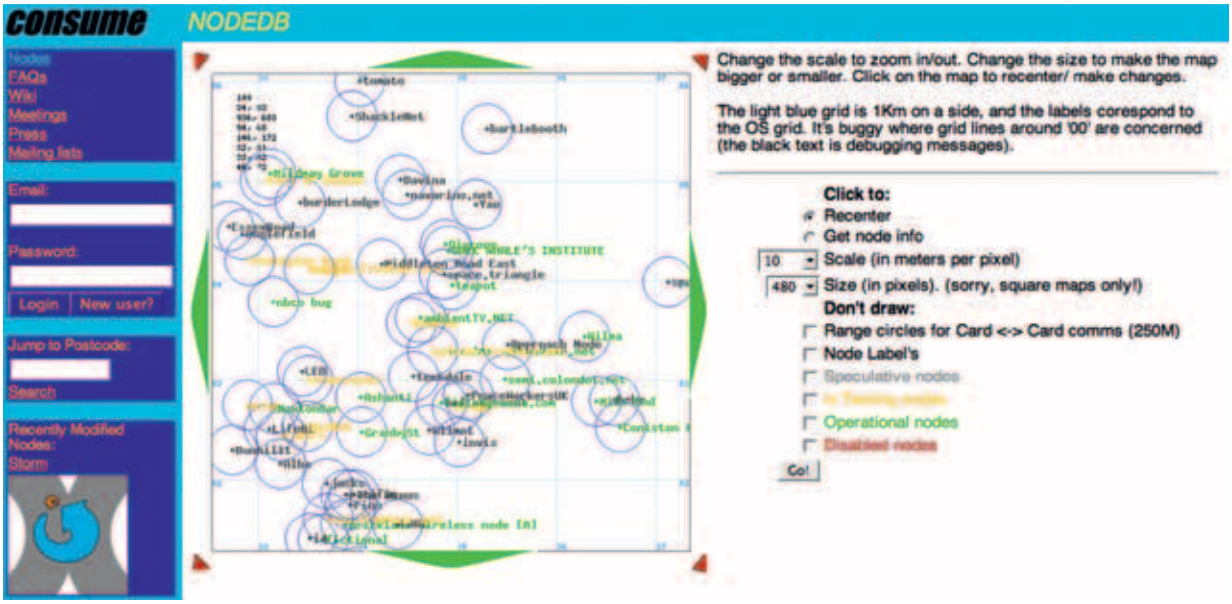
[30] www.freifunk.net

The Network Commons

FREE NETWORKS AS AN OPERATING SYSTEM

In industrial societies, infrastructure is traditionally the domain of the state and of large companies. Consume wanted to show that this does not have to be the case. 'You can also take a grassroots, bottom-up approach, almost literally, on every level.'[31] Unlike cellphone networks, for example, which are centrally planned, built, administered and operated with the aim of maximizing profit, Free Networks are based on the

[31] James Stevens, email (2003)



model of Network Commons – a special form of the 'Digital Commons' which came to occupy a central position in recent discussions on intellectual property[32]. The use of the term 'Network Commons' underlines the fact that what is at stake here is not just technical networks as carriers of information but also the creation and improvement of options for human action. For the Network Commons to come into existence, a series of conditions must be given.

Probably the most important condition is the existence of open standards. Internet communications are based on the Internet protocols TCP/IP[33]. Although their development was originally commissioned by the U.S. military, the results of this work were made available to the public. On the basis of this tradition, all Internet protocols are free and publicly accessible. Of equal importance is the existence of Free Software and the licensing system that protects it, the General Public Licence (GPL)[34]. Thanks to the viral character of the GPL, there is a growing pool of Free Software, from the GNU/Linux operating system to a wide range of network services through to applications. Most key Internet functions can be provided without needing to use proprietary software. The third condition is a free transmission medium. Wireless networks based on the WLAN standard exploit a portion of the spectrum, the ISM (Industrial, Scientific and Medical) band, which can be used without licence[35]. And finally, Free Networks

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CONSUME node database http://nodedb.consume.net/nodedb.php

[32] See V. Grassmuck *Freie Software* (Bonn: Bundeszentrale für politische Bildung, 2002).

[33] Internet protocols are formulated as so-called 'requests for comment' (RFC). See www.rfc-editor.org

[34] The GPL can be consulted online at www.gnu.org/licenses/licenses.html

[35] For more detail on frequency regulation with regard to WLAN, see Medosch *Freie Netze* (2003).

depend crucially on social motivation and connection protocols. For something to be called a network at all, there must be more than one node – connections must be established. This process involves finding partners willing to link up and then working with them to build a network. The necessary rules are established via processes based on the principle of self-organisation. The Network Commons draws on the desire to create a network based on free cooperation and self-made rules. It was to provide a framework for making such rules that the Pico Peering Agreement[36] was developed.

[36] http://picopeer.net/PPA-en.html

In the long term, networks motivated by a collective need for a space of free, self-determined communication may become necessary in order to protect freedom of speech and freedom of the media on the Internet. Besides the GPL and the GNU Documentation Licence, other copyleft licences have now been developed to protect the distribution of not only programmes but also individual units of content – images, texts, pieces of music[37]. A growing number of authors now use such licences to allow public use of their creative output. To secure this freedom in the long term, there is also a need for free or self-determined network infrastructures. According to Eben Moglen, interrelations between Open Source, Open Hardware and Free Networks are the main guarantors of this freedom, of its survival and its extension[38] – an insight that is becoming increasingly significant.

[37] see especially the Creative Commons licences: www.creativecommons.org

[38] From a lecture given at the Open Cultures Conference, Vienna (2003). See http://opencultures.t0.or.at

PICO PEERING

In 2002, a small group of networkers began to develop a framework agreement designed to lay down basic conventions for data exchange in Free Networks – the Pico Peering Agreement (PPA). The prefix 'pico' was added to the term peering because the agreement in question concerns free data transfer between very small network cells. Consideration was given to what, exactly, constitutes the core of this resource, the Free Network, and the conclusion was that it involves the readiness to allow others free data transit: you can cross my 'virtual plot of land' and in return I can cross yours. The PPA regulates the basic principles of free data transit and implicitly describes the nature of 'freedom' in Free Networks (as distinct from sponsored charge-free networks). Like the GPL for Free Software, the PPA for Free Networks is meant to provide a kind of seal of uncompromising quality. The PPA is the first step towards a constitution for the Network Commons, a declaration of fundamental rights and duties.

OPEN SPECTRUM

In the United States, a lobby has gathered under the banner of Open Spectrum to demand the deregulation of the entire spectrum. Technical progress in the field of frequency-spreading techniques and 'cognitive' wireless technologies, it is claimed, make frequency regulation as we know it obsolete and allow spectrum regulation to be left to the devices involved. Now, Open Spectrum initiatives in Europe are also trying to gain influence within the regulation debate in order to put additional wavebands at the disposal of the Network Commons.

MESH NETWORKS

Technical developments have focussed above all on dynamic routing protocols for mobile ad-hoc networks. A meshed network is based on the assumption that new wireless network nodes can be added while others temporarily or permanently go out of service. The routers in a mesh network should automatically register new nodes deal with nodes going out of service. To achieve this, dynamic routing protocols must be employed. Like so many things, these were initially developed within the framework of R&D programs financed by the U.S. military[39]. Today, MANET (Mobile Ad-hoc Networks) is an official working group of the IETF. But it should not be overlooked that amateur radio enthusiasts have also been working for a long time on wireless protocols – so-called Packet Radio – where the same problems arise.

The London company Locustworld[40] developed integrated hardware-software solutions, the MeshBook and the MeshBox; 4G-Systems from Hamburg[41] developed the MeshCube – products inspired by the early discussions in the context of Consume and Freifunk. The combined hardware-software solutions were informed by the idea of distributing a standard configuration for a mesh network node as a bootable Linux distribution, the idea being to allow those without in-depth knowledge of network administration to get involved and to set up and operate nodes[42]. In this respect, the Free Network scene made a major contribution to the implementation and alpha-testing of mesh protocols like OLSR[43], thus aiding academic research, at least indirectly.

DIGITAL CARTOGRAPHY

Another area of technical development is the entire field of digital cartography and related open mapping approaches, such as the Consume NodeDB. In this case, data supplied by the operators of network nodes is used to automatically

[39] See http://cs.itd.nrl.navy.mil/work/mas/index.php and www.mitre.org/work/tech_transfer/mobilemesh

[40] http://locustworld.com

[41] www.4g-systems.de

[42] Free Unix distributions with special network functionality have been worked on by a number of Free Network initiatives, including SeattleWireless and NYCWireless. Freifunk firmware also exists.

[43] www.olsr.org

generate a map, which can be used to locate nodes in the meshed network that might be willing to link up. According to the original concept, the NodeDB was to contain information necessary to establish connections on the technical level, such as the IP addresses of the main services being provided. The Consume NodeDB is stable and enables hotspots to be located with relative precision on the basis of postcodes. But the precision of the geographical data comes at a price, since it is obtained from the Ordnance Survey, the British state agency for mapmaking whose maps are not in the public domain. Where official maps are protected by copyright, there is always the option of making one's own – inspired by practices such as war-driving and geocaching[44].

In 2002, in the *air shadow* project[45], vortex suggested that the leisure activities of war-driving and war-walking could be used for more systematic mapmaking. The information broadcast by the wireless nodes would be registered, saved and visualized on maps. If one drives or walks a specific area, covering all the ground more or less systematically, then the data gathered can be used to establish the actual range of the wireless signal from a particular access point. Vortex called this range the 'air shadow'. If concrete, up-to-date information about the broadcasting range of wireless networks were to be collected by large numbers of people, it would be possible to create useful maps, overlaying data about open wireless networks with information about what they offer.

Developments of this approach are currently being pursued under the names 'bottom-up mapping' and 'open mapping', in connection with ideas concerning decentralized database resources (the semantic web). If every network node also had a machine-readable description, then it would be possible to generate a map that would also show services and resources, such as live streams. This development work is taking place within the context of an open geodata approach, focussing on attempts to generate a London Free Map[46] modelled on the Mumbai Free Map[47]. These endeavours are situated within the context of new cultural and narrative formats collectively referred to as 'locative media'.

Concluding Remarks

The demands of the Consume Manifesto have never been fully implemented, at least not in London, and not to the extent of

[44] Geocaching is a new kind of outdoor treasure-hunting game. Players use GPS devices to try to locate hidden containers that hold trinkets or messages.

[45] www.free2air.org/section/airshadow

[46] http://uo.space.frot.org/freemap

[47] http://freemap.in

realizing an extensive mesh network. Nonetheless, the basic concept did take off and has undergone further development in many different directions. Technical development and testing have been carried out in the field of dynamic routing protocols and free hardware/software solutions. These approaches show how alternative objectives can provide the inspiration for technical innovation. But the Free Networks also brought forth a kind of social protocol, the Pico Peering Agreement. This process fed further debate concerning self-regulation and openness in social systems. Experience with wireless networks also gave grounds to the hope that ad-hoc networks could be operated with mobile devices such as cellphones. Transferring this idea to the social field, one can imagine a society in ad-hoc mode[48]. The Free Network idea has also made an impact on neighbouring fields, such as work on open mapping or bottom-up cartography[49]. The convergence of socio-politically motivated groups, artistic intentions, and DIY media provide valuable impulses for alternative use and an alternative understanding of technology. The focus here, then, is on technologies as techno-social artefacts whose development is not top-down, but driven by grassroots processes. Economies based on gift and barter dissolve logics that have been in force for centuries: in the hands of alternative groups, they become disruptive technologies that bear within them the seed of a paradigm shift in how we understand the interplay of technology and society.

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[48] Medosch 'Die Gesellschaft im Ad-hoc-Modus' in C. Bieber and C. Leggewie (2004). Online in English: http://data-browser.net/01/DB01/Medosch.pdf

[49] See University of Openness. http://uo.twenteenthcentury.com/index.php/Main_Page

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SIDELONG GLANCES

Mukul Patel
2007

1. A future too late

At Bill McAlister's house, entering the kitchen: a moment at the gateway is marked by the Greenwich Time Signal. Synchronised to an atomic clock at the National Physical Laboratory, the pips reach me from the past: an analog radio in the bedroom. Ahead, a digital receiver by the stove repeats the signal, delayed a couple of seconds by the encoding-decoding process.

In the future, we will wonder: must we not all have been here before?

Mukul Patel
2002

ON AIR

ambientTV.NET has collaborated on several works with Austrian independent radio station FRO 105.0 FM in Linz, including *On Air*, a project with young '2nd generation' musicians streamed from London for broadcast in Linz, and *Suvara*[1].

Suvara arose out of impromptu recording sessions with traditional Afghani group Rafi Hanif & Party at Radio FRO in 2002. At a presentation by participants of a DJ/VJ workshop that I ran with Manu at Radio FRO, one DJ asked to be accompanied by his brother, a percussionist. The brother (Rafi Hanif) arrived, together with 11 other family members ranging in age from five to 75. The party then proceeded to fill the basement of Radio FRO's headquarters in Stadtwerkstat with song and dance, refusing to leave without recording a session.

[1] Literally, 'horseback rider': a song genre from Khorezm expressing spiritual and lyric poetry.

Suvara *LP cover*

The wild evening that followed suggested that a dialogue between the traditional musicians, recently displaced from Afghanistan, and the younger generation working with electronic instruments would be rewarding. Radio FRO made the recorded sessions available for download and reinterpretation, while I ran workshops in music production at Stadtwerkstat. Workshop attendees submitted their reinterpretations, which were compiled together with contributions from established artists (such as Asian Dub Foundation) onto a CD and double LP.

ZINOVY ZINIK RAISES A QUESTION ABOUT WIRELESS COMMUNITY INITIATIVES

Zinovy Zinik *et al*
2002

ZZ – [...I]t's become fashionable, especially in Manhattan, to oppose these corporal structures of the Internet etc. etc., but you create a certain collective, a certain community. Isn't the danger, talking about the future of that type of project, that somebody would start running it? Exactly because people know each other, and they become a new commune, is there a danger of it being taken over by some evil person?

MP – It's already happened.

ZZ – You see? Could you elaborate?

MP – We just don't know who that is.

ZZ – Could you elaborate?

ML – [...A]ll those who were in charge of a node in this network entered their data in a database. [...The] same kind of database operates in many cities. [...] A company based in the States was actually using all this data about access points as a commercial asset, [selling information on] free access in Europe.

TM – So how do you safeguard against the same old structure just repeating itself three years down the line?

AA – Your being hacked by the corporation...

TM – Your being hacked by the corporation, yes...

ML – We just keep moving on. [...]

Transcript excerpt from the INTERNATIONAL NECRONAUTICAL SOCIETY (INS) Second First Committee Hearings: Transmission, Death, Technology.

First Committee Delegation: Tom McCarthy (General Secretary), Anthony Auerbach (Chief of Propaganda), Zinovy Zinik (Extra-mural Assessor) Witnesses: Heath Bunting, John Cussans, Ken Hollings, Cerith Wyn Evans, Jane Lewty, Manu Luksch, Mukul Patel

ZZ = Zinovy Zinik
MP = Mukul Patel
ML = Manu Luksch
TM = Tom McCarthy
AA = Anthony Auerbach

Members of the INS cross-examined experts in the field of sound/broadcast art. The hearings took place on Saturday 16 November 2002 at CUBITT, 8 Angel Mews, London.

www.necronauts.org
www.cubittartists.org.uk