



Connecting Rural Communities

– enhancing broadband, skills & applications

April 16 2020

Andrew Stirling

So I'm Andrew Stirling. I'm based near London in the UK, but I'm a frequent visitor to the Isle of Arran, in Scotland, a beautiful part of the world, which certainly enjoys wonderful scenery, society, and a range of benefits. It would be lovely to visit but, unfortunately, they can't welcome visitors at the moment, due to being locked down and vulnerable. But, some of the struggles that Arran's had in the past with connectivity have made me particularly interested in this whole topic of rural connectivity. So, I've been in the field of communications, media and communications for a number of years, starting with BBC Research and Development, and quite close to where I am in, in Surrey, in the UK, at the moment. And I've then been providing strategy advice and regulatory advice around that field for a number of years to large companies, following on from the BBC. And, more recently, about 10 years ago, we started working with Microsoft on the whole topic of how you improve connectivity to a slightly wider area than, let's say, a typical Wi-Fi hotspot would give you. And I've now switched my focus from the policy around communications, which was the interest of Microsoft, to actually how do you apply these things, and how do you foster skills development in the places where you are now improving the connectivity, and obviously with the current situation, a lockdown, there's a great need for these sorts of skills and this connectivity to be able to allow people to live as much of their normal lives as is possible. So, a few words of introduction on the Internet Society. Olivier, please?

Olivier Crépin-Leblond

Thank you for this introduction, Andrew. It's Olivier Crepin-Leblond, the chair of the UK Chapter of the Internet Society, and one of the topics that we deal with, or we address, is community networks. There are a number of, well it's one of the Internet Society Global HQ's strategic plan. Often, when one speaks about community networks, one thinks about developing countries, and initiatives that take place in parts that are underserved as being the typical, very far away in Africa, or someplace in Asia, or Latin America, very seldom in

Europe. And yet, we do find that there is a significant need for community networks in our parts of the world, especially when one speaks about rural connectivity. We're well aware that in the UK, in particular, and I guess many countries around Europe, you do find a rural connectivity often is quite challenging in many ways, and both on fibre or landline networks, but also in 4G, 3G, and sometimes not even 2G in some parts of the world. So, that's just one of the topics. We've got many other topics that we work on. I'll just invite you to have a look at that the www.isoc-e.org website.

Olivier Crépin-Leblond

But, anyway, I guess we can go over to Andrew and, you know, go and dig deeply into the topic. And I'll just put a couple of references to our website in the participants list. Sorry, in the zoom group chat. And I guess that what the way that Andrew is going to run this is to have the presentation and then we'll have an open discussion, as open as one can have it. And, of course, you're all very much encouraged to contribute. So thanks for turning up, and yeah, over to Andrew.

Andrew Stirling

Thank you, Olivier. Yes, I'm delighted to have such a wide representation on the call. People from Finland, the UK, US, and Africa. I don't know exactly where in Africa. But we've got ISOC colleagues, Internet Society colleagues, who've joined us, and fellow collaborators is at different times, and a colleague from Royal Holloway, which is great. Great to have you all on the call. What I'm going to do now is switch to my presentation. So I'm going to try to share a screen with you and save the bandwidth by cutting my camera. So, let's see if this works.

Andrew Stirling

Yes. So, what we'd like to do is run through some of the issues around rural connectivity, its shortcomings and potential solutions, talk about the host of applications which we see for broadband and the benefits they can bring communities, talk about the the role, and the need for, skills, which is where something called the Digital Blacksmith comes in. And I'm pleased that Callum is on the call as well., a collaborator on the Digital Blacksmith, and then time for questions and answers, and discussion, and we're due to run until about six, but let's see how it goes. So, case in point, I'm going to frequently refer to the Isle of Arran, which is a beautiful part of Scotland. This is a view you would see from the ferry, which is actually going away from Arran in this case, on a rather nice day. And I think it's been very nice today, but no one's encouraged to visit, so we'll have to leave it as a virtual reference. And why does connectivity matter? Well, I think it's been very clear for us recently that a number of the typical places we would go physically to meet other people, or access services, have simply become closed because we have a government lockdown. And, in rural areas, of course, it hasn't been just the lockdown. Over a number of years different services have closed their offices, and in order to access them, you now have to travel to an urban center, perhaps, for example, from Arran, you might have to

go up to Glasgow, to access a particular service, housing, or some other thing that you might need. So it's become very clear that, if you've got the Internet, you have a way of overcoming these physical barriers, which of course mean much more for rural users, because they have to travel further. It costs them time, it costs them money, to make the journeys to access services which, in the city, we've come to take for granted. And now, if you were thinking about what sort of connectivity might be ideal to enjoy, so that everyone can participate, I've called this 'Connect-utopia'. For me, it's seamless connectivity. It's always fast. It's present wherever you go, and it's affordable, so that everyone can share in the benefits. And, of course, the pie will be bigger because people will contribute content, as well as consuming it, and communicating with each other. So that's my thoughts about what the ultimate would be, where we're trying to get to with rural connectivity. And there's the question of, well, why are rural areas so often left behind? And, of course, attention readily falls on to government and policy because, in the early days, certainly in the UK and Europe, it was very much a government action, through the post office in each country, to roll out networks which were, of course, originally letters mail but latterly added telephone wires to the range of services, and infrastructures were built, which eventually encompassed probably most houses, if not all houses in the land, and offices, and so on. And that was a huge investment made over many years, and was then transferred into the private domain through a change in policy, whereby the government wanted increasingly, in the UK, to have the private sector deliver major public services, and benefit from competition. So, that competition had been achieved through regulation, but didn't encourage what I would call deep infrastructure investment. So, we were left with copper telephone wires instead of optical fiber and, unfortunately, long old telephone cables of the sort that we find in rural areas do not deliver very good broadband. The technology which has been developed for broadband over telephone works tolerably well in urban areas, and can deliver a reasonable standard, but simply doesn't do much when you get into a rural environment. And unfortunately, rural users formed only a few percent of the overall national figure, so they tended to be lower down in terms of the order of spending by the big telecommunication companies.

Andrew Stirling

And so, how do we get towards more affordable access and better coverage? Well, I think of it as the dream team, fabulous fibre, wonderful wireless, because it's about combining optical fibre, which is gradually moving out and around the different countries that that we have, and wireless technology, which is filling the gap from wherever that fiber is to wherever we need to enjoy Internet connectivity. The exact combination can be varied to suit all budgets, and can be evolved over time. So, if you're, say, in the middle of Africa, and the fibre's stopping at the coastline, it is possible to use what we call microwave wireless technology to bring bandwidth into even remote rural villages where there's no power at the moment, and we've seen that happen in different places around Africa, with the white spaces initiative, which Microsoft and others have played a leading role in. But,

over time, we can expect fibre to get closer, and we can certainly expect people's appetites in terms of speeds to evolve. Now in terms of connection, thinking about your Internet connection, at the one end of your connection, there's going to be some sort of service, and it's typically in the cloud, and let's say it's a photo sharing service, or maybe it's Facebook, something like this. It's sitting on various servers that might be dotted around the world, or they might be located in one particular country or region, but that's basically what we're referring to as the cloud. And it's typically not where you are, it's some remote place which your connection is going to bring you into, into contact with. So, starting with the cloud, we have quite a dense network of optical fibres that span the globe, connecting all those servers up, and fibres also bring that access to somewhere in your local neighborhood, it might be, for example, your local exchange, which was typically the case up to a few years ago in developing countries, and, sorry, developed countries, and then it might be now to a cabinet, which could be in your neighborhood, and from that point, there are a number of ways of getting it into your home or your office. If it's over the old telephone wires, then there's a technology called DSL, but gradually now, countries are replacing these copper wires with optical fibre and enabling what we call fibre to the premise, which which supports very high speeds, connectivity of gigabits per second, potentially there. And we can see that quite far advanced in places like Korea and Japan. where there was a major public sector drive to invest in this technology. And, incidentally, the counterpart to the cloud, which is remote computation storage and processing capability, we now have something called the edge, which is a capability emerging closer to where you are, which is also an ability to process data, and it means that some of the data you have, which might be very private to you, like things to do with your house, don't actually have to travel across oceans to some remote servers, they can actually be handled locally and responded to locally. But, having talked about the telephone line connection to the house, if you look on the right hand side of that diagram, you can see there's something like a spike, which is meant to be a wireless tower, and that is something you'll see dotted around the landscape which enables radio waves to be used to deliver signals to your house. It doesn't have to be tall towers, it can be quite short towers, or it can even be parts of buildings and roofs, from which signals can be beamed to carry broadband around your community. And, indeed, in rural areas there are some sensitivities, particularly places like the Isle of Arran, visibility of infrastructure is is an issue because, in a beautiful landscape, the last thing you want is a huge tower marring the view. It's also worth mentioning that, at the top of that picture, the curious object, the circle with the bar through it, is my attempt to portray a satellite because, typically now in many parts of the world, if you can't get anything else, you can probably at least get some satellite connectivity. And, of course, that's been particularly important across the wide stretches of ocean, and all the water, where, clearly it's not feasible to have telephone wires, or wireless towers, readily mounted. So, there are a number of ways that you can receive your Internet connection. But, actually, when you look at it in the end, whether it's Wi-Fi in your home, or a cellular signal, 4g, 5g, when you're outside the home, it's typically a wireless signal that's going to your device. There

are fewer and fewer computers that now need a cable plugged in in order to have Internet access. So that's an overview of where fibre and wireless come in and work together to deliver you Internet connectivity.

Andrew Stirling

And the the wireless part of that depends on properties of something we call spectrum, the electromagnetic spectrum, where you can find a whole range of frequencies, or sometimes we refer to them as wavelengths, and wavelengths are the inverse of frequencies, if you've studied your physics. So, at the long end of the wavelength spectrum, we have long wave radio, aptly named, that's very good for propagating very far, but can't carry very much data. And then we move up through higher frequencies. and gradually, we can support richer services like radio, TV, 3G, 4G, Wi-Fi, and then we go up to smaller and smaller wavelengths, where we start to come into the visible part of the spectrum through infrared, into visible light, and then on into ultraviolet as we go shorter in wavelength. So, there's a whole range of frequencies there, and by using those carefully, we can construct very efficient wireless communications, but, we have to bear the properties of the spectrum in mind when we're applying wireless. And what I want to do is illustrate for you here a few of the technology choices you have in wireless. So, for example, with Wi-Fi in your home, that will give you a certain range, it might not cover even the whole of your home from a single access point, but it will probably do most of it, for most people. And then we've got some adjacent technologies like, for example, TV white space, and 5Ghz Wi-Fi, which are available now for distribution of broadband within local areas, local communities, and we've seen white space's applied in the US, in Africa, in Scotland on the Isle of Arran, even. And then, counterpart to that, we've got cellular technology 2, 3, 4 and 5 G's, which is the latest range of the latest evolution of that technology, and that's under the control of major operators at this point, so you won't get a cellular signal unless the operators decided it's worthwhile, or your government's kindly paid some money towards coverage in your area, as is the case in some parts of Arran now. So, a range of wireless technology is available. Using them carefully allows you to get the coverage which works and is affordable. This is actually a view of a part of Arran, there's a little island off it called the Holy Island which is a nice feature. We can see here. If we were thinking about providing coverage in a place like this, we would have to look at things like foliage, where the hills are, because wireless in general can't travel through objects, it has to be arranged in general that you can see the place you're trying to get to with your wireless signal, although with the TV white spaces technology, we have been able to cope with some level of foliage, and some degree of hill shading, which is very useful in a rural environment, or rugged environment like this. And also important to think about indoor planning for your networks. If you've got Wi-Fi, then there are various considerations that enable you to get better connectivity with some careful thought. We talked about how you get coverage out there with fibre and wireless, but another part of getting affordable access is with devices. So, we've seen models like, for example, shared access to devices in libraries, where PCs are provided by a library. But, of course, in the

current shutdown, or lockdown, that we have in the UK and around Europe, a library is the last place you can get to, it would be considered as a place where you would pick up a virus probably, not just a computer kind but, obviously, a nasty human kind. And, counterpart to that, we don't have those in developing countries perhaps as much anyway. So, increasingly, the hope is that smartphones and tablets, which have come down greatly in price, can help to serve that growing market for affordable access.

Andrew Stirling

Now, policy of big levers driving that affordable access, because if regulators and policymakers make the right decisions, then we can all enjoy better broadband, and we can make sure that even the people who are the poorest in the community don't miss out on services which they are entitled to have. And, I've shown a spinning top on the picture here because, typically, the regulator is trying to balance a number of things. It's trying to balance the forces of industry, which are very significant and can make great things happen in terms of rolling out connectivity, for example, and making new devices, also investors who want a return on their investments and, of course, consumers, who want to have decent broadband, which is at a reasonable price, and people who want to make sure that everyone is included. So, balancing all those things isn't trivial. universal service requirements are one tool that's been used, and governments can also make life easier for broadband providers by arranging what we call way leaves, planning permissions, and also stopping local taxes being imposed on infrastructure, which could be fibre or towers. Not all countries, unfortunately, have regulatory resources to craft the perfect broadband framework. And, in fact, nor do they really need to, because it's perfectly possible for us to have model rules that are developed internationally. And we've seen this with the sharing of spectrum through the Dynamic Spectrum Alliance's model rules, which are available for governments to adopt and adapt to their own circumstances. So, for spectrum, having raised that topic, there are a couple of issues that come up, one is whether you have a license to access spectrum, because clearly you can't use wireless technology. If you don't have a license. The licence provides exclusive access for big operators like Vodafone, EE, in the UK, for example. It's wide area, it's very suitable for regional national operators, and it supports massive centralized investments, they can get billions from investors to roll out new networks. On the other hand, we've got license exempt access, epitomized by Wi-Fi, which is shared access. Anyone can put a Wi-Fi access point up, it's opportunistic, connect when you want to, or need to, it relies on the technology obeying rules that the regulator's set down. So, it's not up to the consumer, it's down to the manufacturer, also facilitates end user communications. And, what we've had more recently, is an introduction of some new tools that help us move from this black and white world of licenced to licence exempt, where license exempt In the past was poor relation, only qualifying for low power limited range into a new world where dynamic sharing tools like the database that high key is on the call from fair spectrum and operate one of the the spectrum databases that enables the TV white spaces. And that supports now much more efficient use of spectrum, because instead of regulators having to assume

the worst case for a license exempt access, they can now take into account where the spectrum is available, and where you might be able to allow higher power, and you can adapt the regime as the market develops, and be much more scalable and granular than would be possible with conventional licensing. There's a whole new range of possibilities for wireless being opened up with tools like spectrum databases, so Fair Spectrum is an interesting place to look you have an interest in reading more after the call. Sharing, i think, is is also a theme which is very important to make rural connectivity viable. It's very hard to generate commercial interest, because no single company is likely to be able to realize the benefits, returns, from investing in rural coverage, unless it's an entity that's based in the community itself, which is great, but the bigger companies tend to have to look at the short term, because that's where their investors are looking for returns on investment, particularly if it's the stock market. But if, for example, we are able to see sharing between businesses, they can split the cost of infrastructure between them, share access to the spectrum, and share applications, then the costs-benefits start to come closer into balance. And the community can share in that by contributing land, contributing opportunities to mount, for example, wireless equipment without exacting a rental cost to the provider. So, there are a number of ways that you can make this thing viable.

Andrew Stirling

There are some great examples of how the Internet can help with community cohesion. I've moved into applications now, following on from the connectivity, with local media facilitating local society. Facebook is very well established, and very well used, in places like the Isle of Arran, but there are other channels available. I just wanted to call out one here called Hello Hub, which is from an entrepreneur based in London ,who's set up, effectively a facility to allow you to have your own private chat rooms, and we've set up a little temporary virtual coffee shop for people on Arran, which we we haven't introduced to them yet. But we'll be happy to do that to allow people to share views safely, and in private, with no greedy advertisers watching over their shoulders. And, of course, we might use these tools for capturing, and making shareable, rich local history, so people can capture details of the geology, the flora, the fauna, share those with people who might want to visit that location, and people who live there, and are not aware of all the wonderful aspects of the place they live in. There's another initiative on Arran called Eco Savvy, which has put a lot of effort into reducing carbon footprint, for example, including lower food waste, and is using online participation extensively to drive and coordinate local people's actions., with food sharing schemes to avoid waste, transport schemes to share lifts. I've just thrown a final one in there, something called the Coaltown Daisies, which is a local flavor of music in Scotland, building on folk traditions, who've got their own TV channel online, and can feed their own, now captive, audience sitting in homes, eager to see what content comes online because they can't go to physical events anymore. So, just a little flavor of applications there. And, the Internet of Things is another huge area, remote health monitoring is is one of the applications and clearly

there's great interest, for example, at the moment in testing, tracing and monitoring for the COVID bug, farming and food production is another major area, could be fisheries monitoring, could be habitat monitoring for wildlife. There's so many applications for the Internet of Things in rural areas, and it can just help people to manage what can be quite large tracts of land with relatively few people, in a very convenient way. Smarter homes and communities, people can keep an eye on properties, for example, of course it might be their holiday home, or it might be that they've got an elderly relative in another part of the community, where they want to just check in from time to time. Clearly you need some privacy safeguards, you don't want anyone able to check into your home at any time and take a look at what you're doing, so that's something that needs careful consideration and security, but we already have frameworks within Europe that are designed to give us those sorts of protections, so that is a very encouraging foundation.

Andrew Stirling

And, to enjoy the benefits of connectivity and all those applications, I want to now call out the role of skills, because that would be no good having the best connectivity in places like the Isle of Arran, but if there was no skills available locally to apply that. And this model called the Digital Blacksmith is something I've been working on for a few years with local people, and with very talented guys like Callum, who came up with this wonderful logo and poster for the Digital Blacksmith. I'm pleased to say he's on the call as well, and can answer questions, no doubt about it, if they get raised. So, the idea is that by doing work locally for businesses, applying digital tools, we can help the local businesses, they can pay towards the cost of maintaining the talent, the technical talent, in a rural community that would otherwise head off to the nearest big urban center, or beyond. And so, if the technical talent is around, it can feed into various local projects, it can feed through social groups in the community. It can help raise people's awareness, and bring an understanding of what's available online to people who would never think of going into an Apple store, or a PC shop, or some other classic way that you might encounter IT / ICT technologies. And I was delighted to see that, we have been doing a little bit of work piloting on Arran, and I was delighted to see that they'd also done a pilot in the Orkney, which is further northeast in Scotland. What sort of things do we promote within the Digital Blacksmith? Well, Internet safety, we've had workshops at the local school on Internet safety for up and coming students. There are areas like career signposting, we've fed into careers workshops for teenagers, helping them to think how the world of work could be transformed by digital technologies in the future. We can help people with web and social media applications, for example, we've helped local entrepreneurs look at their digital possibilities and local business look at its digital readiness, mentioned Internet of Things applications already. There's a whole host of things where the Digital Blacksmith doesn't have to do all these things. It can signpost people, and help people get the help they need. So, I've pretty well used the presentation time. I'm going to...

Andrew Stirling

Before I go off on this, I'm going to invite, I think, Peter Stanforth, who's on the call and was very much instrumental in the TV white spaces development and history, and has been connected with developments in the rural, in the US, just going to invite Peter just to say a few words about things in the US, and where there might be big differences from this UK / European picture. Thank you, Peter.

Peter Stanforth

Hello, Andrew. Hello, everybody else. The US environment's actually quite similar, although on a bigger scale. The FCC defines the minimum standard for broadband as 25 Meg down and 3 Meg up and, using that metric, that means about 20 million US households do not have broadband. And, as this is an election year, that was already getting attention because of the potential of a lot of votes, but with the similar kinds of lockdowns we've been experiencing, the necessity and impact of lack of connectivity has meant that it's got an even higher priority, and there's at least significant talk and promise of a lot of money going to be invested in solving the problem here in the coming years, but the challenges are quite similar. Although the large number of people are underserved, the vast majority of them are rural, and they typically are in population densities of a handful per square mile, and so traditional fibre and, many cases, coax, which is widely deployed here, are economically challenging because of the distances and the distribution, and so wireless is a key component and, in fact, millions of rural households in the US currently do get their broadband from some form of wireless internet solution. Almost all of them are 5Ghz, unlicensed or license exempt, based off of Wi-Fi, although there are, and I'll run through them real quickly, a number of initiatives for new ideas. TV white spaces, the first, as Andrew mentioned, which has not really taken off in the US because the regulation kept shifting, although Microsoft for one kept plugging away, and there are new rules in the works that might make wireless broadband using TV white space a viable option here. There was another similar initiative called CBRS, Citizens Band Radio Service, which is a 3.5 Ghz using LTE technology, but this is more of a licence sharing approach, and is quite complicated and quite expensive from the perspective of an Internet Service Provider, and so it hasn't really become a big option and, in part, because when you compare it to other alternatives, 5G always gets thrown out there as the solution. But, again, as Andrew said, many rural communities here don't have good 4G, or even 3G, coverage, and so 5G will be a long time in coming to be the solution to those.

Andrew Stirling

Great, thanks. Thanks very much, Peter. That's really helpful. I was just going to say, I was impressed to call, Internet Society call, I was on recently with people from the Internet Society around Europe, focused on helping the chapter in Italy with an initiative that they're doing to help their local community and provide resources, identify how to help people with affordability, affordable access to the Internet, and some ways of coordinating sharing information. And so, I think there's a great need internationally for

these sorts of facilities, and connectivity in rural areas. So, with that, I would like to offer the floor for any questions. So, let's see who would like to ask a question.

Andrew Stirling

Oh, yes. There's Foldestine. So Foldestine? Do you have a question?

Foldestine Paye

My question is to the second speaker.

Andrew Stirling

Ah,

Foldestine Paye

From the US. Yes. He spoke about so many programs in the US, and also know how is the E-Rate program in the US? E-Rate.

Andrew Stirling

E-Rate. Yup.

Foldestine Paye

For the access?

Andrew Stirling

Can you address that, Peter?

Peter Stanforth

So, E-Rate is a mechanism by which the government will subsidize the deployment of connectivity, and it has quite a lot of money associated with it. It's used by both mobile operators as well as local Internet Service Providers. The challenge with E-Rate tends to be that there's quite a lot of government bureaucracy, which means that small operators find it difficult to navigate and get access to funds. It's more suited to the larger operators and, unfortunately, they have focus in many areas. So, it is being used to improve access, but I think if they could find a way to do it more efficiently the smaller operators could make use of it and accelerate things.

Foldestine Paye

Good. Thank you. Thank you very much.

Andrew Stirling

Thanks, Peter. I hear that Geoff Revill is on the call, and might like to say something. Geoff, do you want to say something?

Geoff Revill

Yes. Appreciate the opportunity. So...

Andrew Stirling

Where are you from Geoff. Sorry, I missed...

Geoff Revill

So, my company is Krowdthink, that's out of UK, and we're an innovator in the messaging context, so to connect communities together and, in fact, we've just launched a new capability, as a result of the COVID-19. We were previously connecting people specifically in a very tight area in the context of places like stadia, and retail malls, and things like that, but in COVID-19 situation, clearly, things have changed significantly. So we were looking at how we could evolve our technology and help communities, particularly remote communities, to connect together, so we've launched a new platform called Community Crowd, and it's a free messaging platform that will connect the rural communities together, and it's very, very simple to set up, you literally just download the app, choose or create your community, and away you go. The key about it is that we have a fundamental belief that just because I go online does not mean everything I do, everything I say, and everybody I connect with, is useful data for somebody else to monetize for purposes that I don't understand. So, it's very much a private by design and fundamentally trustworthy by design platform,

Andrew Stirling

Okay, that's great. Thanks. Thanks, Geoff. That sounds very interesting. I notice that Callum Nash is on the call. And I wonder, Callum, whether you might like to say a few words on community innovation using online tools, or online access?

Callum Nash

Yeah, absolutely. Thanks very much for the interesting talk so far. Just as a kind of brief introduction, everybody, I'm a researcher at Northumbria University. I'm doing my PhD around how communities are using digital tools for innovation, and I'm particularly interested in building common value, so what I mean by that is assets which are held in common, which are producing value which is not with the intensive purpose of being owned by anybody which, which actually has the capacity to be owned by everybody so, things such as the kind of localized infrastructure we're talking about in terms of digital technology seems to be quite relevant to that, and so that's what a lot more research has been around with Andrew. And, last November, we ran an event on on Arran looking at, it was called the idea generator, and it was a kind of roleplay, gameplay event around looking at some fictional disaster scenarios for Arran, and where technology might fit in around that. And just specifically on this topic we're talking about today, around connectivity, these issues of developing something that had local benefits, and that was locally controlled, came to the fore. So, even though there was a lot of discussion around,

in the event of lack of sort of infrastructural connection to the island, and in terms of the problems that they have with ferry, there needs to be better local production, and that's where local connectivity, and local skills, become really important, because obviously at the moment, if you have technological skills on Arran, and have a technological job necessarily on Arran, you might get moved over to Glasgow. And then, within the event, looking at the emergency scenario, so, one example is a couple of years ago on Arran there was actually a snowstorm which prevented the ferry from coming in for a few days, and so needing to be able to find out available public data on resources, on where food is, and particularly at the moment with COVID-19 in terms of understanding where people who are ill are, and what the healthcare capacity is, and became a major issue, so there's a need to be able to bring (inaudible) more into local production. So, this is where I think we need to think about appropriating other technologies potentially, other than fibre and 5G, because those technologies are, as Andrew and the other speakers have said, rolling out really slowly. So, yet the question is how communities can do that themselves, and how that relationship works with government policy, and what's interesting on Arran is that, even a community of 5000 people have got some capacity to try to bargain with network providers. So, I'm very interested in solutions like white space and mesh networking, and this edge which Andrew was talking about, which I'd like to ask for a bit more information on at some point. I'll let somebody else ask a question. And yeah, it comes down to an issue of enabling these technologies for our appropriation.

Andrew Stirling

That's great.

Callum Nash

Yeah, I'll leave it at that.

Andrew Stirling

Thanks, Callum. That's wonderful. I just noticed that David Lawrie has raised his hand, and so I'd like to invite David to introduce himself, and also to raise the question. Please?

David Lawrie

So thanks. Thanks Andrew. Trust you can hear me okay?

Andrew Stirling

Perfect. Yeah. Go ahead, please.

David Lawrie

Yeah, I'm a Scot, originally from Glasgow, living down in Cambridge, and for nearly 3 years an electronics technician, and I did a (inaudible), became an airline pilot, and after retiring, I've become an electrician, supporting some of the people in the local community by, for example, just clicking forward Wi-Fi extenders, and various bits and pieces like

that. I was interested in the comment you made about rural communities, sometimes being helped by microwave facilities. Just, I do recall, I've got some friends in southwest Australia who are fairly, I think there are something like an hour and a half to two hours from the nearest town, and the only way they could get Internet was basically, from one of your slides actually, it illustrated that, was by satellite. And they'd been talking about having other facilities, but I imagine the cost of providing microwave, especially for a very small community, would probably be prohibitive, and I guess that's where maybe the investment from governments or larger companies, if they were going to have a matrix covering rural community, might be quite important. It's just a (inaudible).

Andrew Stirling

Thank you, David. Yes, well, in fact, the economics are improving for deploying that type of technology, and also we have governments rolling out more fibre. I think there was a plan in Australia to have nearly 100% fibre coverage, but I think it ran out of steam, and probably political will to do it. So, it didn't get as far as the politicians envisaged but, yeah, this technology is becoming affordable and we are seeing it deployed in places around the world, from Africa to South America, to US, to Scotland, and it's definitely on the move.

David Lawrie

Thank you. Excellent. Thank you for that.

Andrew Stirling

And let's see. Foldestine has got a hand up. Foldestine?

Foldestine Paye

Yeah.

Olivier Crépin-Leblond

Mike also had his hand up as well.

Foldestine Paye

Oh, sorry, Mike. Mike. Yes. Let me have Mike first then.

Mike Locke

Oh, yeah. Good. Good evening all. Strangely, as somebody who used to work in the satellite industry, I know a reasonable bit about what what Andrew was saying. Watch out for the two different types of satellites, low earth orbit and geostationary as they are effectively different technologies. They also had issues with working too far away from the equator. But, anyhow, that wasn't what I meant to say. I just wanted to bring to people's attention, I work for an organization called INCA, which is a UK-based organisation which is the Independent Network Cooperative Association, and we are the independent

operators' trade body. Quite a lot of them, as you might gather, work in rural communities, some are city-based, but quite a lot of out there in rural communities actually bringing fibre and wireless to remote and unserved communities. We're working very hard with the government and others on COVID-19 responses for people like key workers and educational purposes. But, what's happening today, what is going to change the shape of the industry, are a couple of big things that are going on, one is called Universal Service Obligation, where Ofcom will lay on the chosen, already done, chosen universal service obligate provider, which is BT Retail, that they must provide services of a certain spec, if asked. And BT Retail can then only use networks that meet the specification for the USO, which is laid down by Ofcom. So, the message to independent networks, and to our industry, is, unless you can provide services that meet the spec of USO, you will not be usable by BT Retail to provide the Universal Service Obligation. That's one issue that I recommend people should look at. There's also an initiative that's been brought in by the new EEC, European Electronics Communications code, which the government has decided will be enacted in this country this year, and that means that consumers will have the right to switch broadband to the provider of their choice, simply by asking the new provider, and the industry has to then work out how to communicate, and get people to switch across networks. And the last major change, that is coming along, is a thing called All-IP migration, which quite a lot of people haven't grasped the fundamental change this is going to be. In the past, or currently, you have to rent a phone line, which may be fibre, maybe other technology, maybe copper, but then that phone line, you can get broadband services down it. What is now currently changing, it's in trial in two areas, and it will have completed by 2025, is a new system whereby you will rent broadband line over which you can choose to have voice services delivered. So, this is a fundamental reshaping of the UK industry, from being a phone service which happens to deliver your broadband, to a broadband service where you can choose the broadband, or the phone, or television, or other added value services, from a range of different providers. And these are quite challenging times for the industry, in any case, and then you go and get COVID-19 on top. So, everybody's quite busy. That's just the view from INCA, as we have it.

Andrew Stirling

Thank you, Mike. Very, very helpful overview and, actually, I was just reflecting on the things that Callum was saying about our idea generator evening, and we never envisaged anything as severe as the pandemic happening on on Arran, or anywhere else for that matter. And, just before we close, actually Foldestine had a query, so, let's see what. Hello Foldestine?

Foldestine Paye

Yes, hello. I'm Foldestine Paye from Liberia, and actually this session is very good. In my country, Liberia, we have a deep digital divide, and many people are not connected to the Internet. So, an organization called Future Empowerment Foundation Liberia, we are

seeing how best we can connect the unconnected in Liberia, but the government is not listening to us. We do have universal access Fund, and they are not looking at (inaudible). So, I really want to get a knowledge from you guys about how can we engage government for (inaudible) universal access funding so that we can connect the unconnected in Liberia because it is a serious challenge in my country. Thank you very much.

Andrew Stirling

It's a pleasure. Thank you, Foldestine, Well. I think that the Internet Society is the perfect vehicle for channeling the discussions to help you and, of course, we can reach out to experts, including people on this call as well, if they if they want to contribute towards that, they're very welcome. So, I'd invite everyone who would like to do that to just to let us know, let me know.

Foldestine Paye

Okay.

Andrew Stirling

Let me just see, there's any other? Ah yes, Farhan. Farhan, let's see.

Farhan Khan

All right, everyone. My name is Farhan, and I'm originally from Pakistan, and I've been a general secretary of the Internet Society Pakistan Chapter. Currently I have moved to Ireland, and working in the University College Cork as a PhD student. So, very interestingly, I took a took a course of the wireless community, an online course by ISOC, which actually helped us, helped me to see how we can actually extend the connectivity to the rural areas. And I would like to mention that, in Pakistan, there is also one organization which is funded, which is a government body known as Universal Service Fund, and it actually funds to the areas where, to the communities which are underserved. So, they actually tried to connect the remote villages, and all that, where the commercial viability is not, where the commercial operators do not want to invest because of the commercial viability, because of the profit loss scenario. So, they fund them In order to connect the small communities for an area, but the thing I would like to know that how can we engage the Internet Society for this? I mean, from the funding part, is it? Is it like Internet Society is pushing the the operators to go to the areas where it is, although it's not commercially viable, but still in order to facilitate the communities for connectivity, and in order to increase their network footprints?

Andrew Stirling

Yeah, I think the Internet Society's role is an education role, but also can support community efforts. I don't know if Olivier would like to say a few words about that.

Olivier Crépin-Leblond

Yeah. Thanks very much, Andrew. Olivier Crepin-Leblond speaking. So, I'm the chair of the UK chapter of the Internet Society, if you weren't there at the beginning, I repeat this. I've just put in the chat a link to the Internet Society's HQ, so global, Issues on Community Networks. It's one of the five, or seven, main, it's either seven or five, main topics for this year. And so, the page that I've linked to here, that goes to community networks, has got a lot of information about the different projects that the Internet Society is currently associated with, and it's, of course, looking for more projects such as those. So, if you have a project that you're working on, it would be good to get in touch with them. I was just reading the page. I don't know if there is a direct connection as to who to contact at the Internet Society. but I'll have a look at this. Well, have a look at this page. if you can't find who to contact, then drop me a note, drop us a note at contact@isoc-e.org, and we'll put you in touch with people. In general, the community grants is one of the programmes that is used, there's also the Internet Society foundation that is ready these days to fund projects worldwide, and I understand they've got pretty deep pockets, they're an offshoot of the Internet Society that now runs those grants. So, that's where it is. And, because this year, community networks is a focus for the Internet Society, I think it's particularly important that you have read this, and then move forward on that. I hope that's helpful.

Farhan Khan

Yeah. Just one more thing, Olivier, I want to know that, as I have just moved recently to Ireland. Do you have any idea , is there any active Ireland chapter for Internet Society? I mean, do you have any idea?

Olivier Crépin-Leblond

I was gonna check this, and I think that the Irish chapter is in rejuvenation. It means that it's currently changing hands, there was a group that was running it, and it's kind of moving to another group. So, at present, I don't think there's an active active chapter. But, drop me a note, and I'll put you in touch with with ISOC Global, so they let you know who the people are that are stepping in in Ireland.

Olivier Crépin-Leblond

Okay. Thank you.

Andrew Stirling

Okay, thanks very much, Olivier. I just want to say, of course, ISOC is a great resource for anyone looking to install community networking. We've got the INCA, as Mike mentioned, in the UK which is great at supporting a whole range of operators other than the big ones, who've got their own support, and ...

Olivier Crépin-Leblond

You have two minutes for Barrack? Because I know Barrack Otieno also got some things to share.

Andrew Stirling

Yes. Yes. Let's give Barrack the floor. Barrack. Go ahead, please.

Andrew Stirling

Barrack, are you there?

Olivier Crépin-Leblond

Maybe his mic isn't working after all, so..

Andrew Stirling

Oh, okay. I think he had a question about engagement with the regulator, and it's certainly something I've done a lot of in the past, but it's a whole topic in its own right, because it's about, probably, feeding into whatever the thoughts are on universal service. But, experience I have seen with universal services, it can have unintended consequences as well, in that it forces operators to choose the lowest possible cost route with no upgrade possibilities, and hasn't always yielded the results that were required. Compared to, for example, community based efforts, such as we've seen in Scotland, for example, and elsewhere, including in Africa, and other, US, and so on, where having the local presence, having the local ownership, has made a huge difference to the quality of service that they can provide.

Andrew Stirling

So I think with that we are complete. I'd like to thank everyone very much, participants, people who've contributed on the call, people who have attended, and waited patiently with their microphones muted. I'd like to wish you all a very good evening, and hope we'll be in touch again, with further progress on rural networking. All the best, everyone.

Olivier Crépin-Leblond

And thank you very much, Andrew, for this webinar. Thanks to everyone who's attended. Yes, we will make the recording of this webinar available. The only difficulty we have at the moment is, because it's recorded to the cloud, and you might have read in the press that zoom is somehow busier than usual. It sometimes takes up to four or five days to process, for them to process, the cloud to process the recording. Whilst, you know, used to do it in 20 minutes, but you know, such is the price of COVID-19 for the time being, so as soon as we've got that, we'll put it on the website. Andrew, are you going to make the the slide deck available as well?

Andrew Stirling

Yeah, I'm happy to do that by whatever route is convenient.

Olivier Crépin-Leblond

We'll cross link it on whichever, website whether digital or (inaudible) website.

Andrew Stirling

We can do that, provide it to all the invitees. And they can. There's plenty of other online entertainment while you're waiting the four or five days for the recording to go up. Okay. All right. All the best everyone. Wish you a good evening. Bye Bye.

Tony Henderson

Thanks, Andrew. Thanks, Olivier.

Andrew Stirling

Pleasure. Pleasure. Bye bye.