

Q&A

Intermedia talks to **VANU BOSE**, chief executive of software radio pioneer, Vanu Inc



Q HOW DID YOU COME TO SET UP VANU?

A I got really interested in wireless when I was at the Massachusetts Institute of Technology (MIT) – it was the topic of my PhD thesis – and it was a typical story of setting up a start-up from this work. Engineering runs in my family – my father, Amar Bose, founded the audio firm, Bose Corporation, and in fact he donated a majority of the company to MIT to advance its education and research. Our particular mission at Vanu is to enable cellular coverage in areas that cannot be covered profitably with existing technology.

Q WHY TELECOMS IN PARTICULAR, AND WHY FOCUS ON THE CHALLENGING AREA OF UNSERVED AREAS?

A I believe communications is fundamental to everything we do, and particularly for bringing the developing world up to the developed world's standards. When you think that fewer than a million people had cell phones in the 1980s and more than 45% of the world's population do now, it's absolutely transformational. But there is so much more to do. Our assumption is that every carrier wants to cover all areas, and the only reason they don't is that most technology doesn't make it cost-effective for them to do so yet.

The largest unaddressed cellular market in the world is the 55% of people who don't have cellular coverage. The primary reason they don't have coverage is the lack of a power grid, but to run a traditional cell site could cost \$5,000 a month in

diesel fuel, which is more than you can make from the site. You are also burning 7,000 gallons of fuel a year, polluting the environment. And it is a big security issue – it's not unknown for guards at cell sites to be attacked by people

wanting to steal the fuel used to power the generators. If we can get the cell sites off diesel there is a huge unaddressed market to go after.

Q IS POWER THE MAIN PROBLEM?

A It is certainly one of the biggest for developing countries. There are other key challenges though – no telecoms infrastructure for backhaul, a lack of skilled labour to install and maintain systems, and not least an ARPU that can be as low as three to four dollars a month. So it is not surprising that it has

been very difficult to deliver coverage. What we have developed are software radio, packet based micro base stations that consume only 50 watts of power – that's much lower than the usual macro cell site of one to two kilowatts. And our systems are very small – they can be put easily on a pole and run off a battery charged by solar power. Instead of scaling up to larger cell sites, we are showing it is possible to be profitable by deploying networks of these much smaller micro-sites. Further, we can maintain systems from our headquarters in Massachusetts, which cuts the need for labour on the ground.

Q WHAT ABOUT BACKHAUL?

A We are very flexible on backhaul – our strategy is to use whatever we can get hold of. That means satellite, microwave, WiMAX, DSL and cable modems – anything we can run IP traffic over. We have designed our systems to be very jitter and latency tolerant and by running over a wide choice of shared networks we can be much more cost-effective in rural areas. White space spectrum can also work well – it has its pros and cons and we can also use it, although we are not involved with the current projects in Africa.

Q WHICH DEVELOPING MARKETS ARE YOU ACTIVE IN?

A We are working with partners in India and Africa. For example our first solar powered base stations were deployed in Zambia last year and we are working with the regulator in Nigeria to deploy GSM/WiFi to deliver broadband. It's easy to forget that in the age of smartphones and 4G, in these remote areas the key application is the voice call, and the vast number of people in say India who do have mobiles now are on GSM, which has a good ten years of life left in it. In one step we are bringing people their first electronic voice communications and data too, with applications such as social media, which is hard to imagine for people in the developed world. GSM also has the advantage of having a low fee and enough data to do something useful, and the battery life of devices is great – charging is actually the biggest cost for many. We have a business model where a village system is profitable at about \$4 a month for 1,000 subscribers.

Q YOU ARE ALSO ADDRESSING DEVELOPING MARKETS WITH A WHOLESALE MODEL...

A Yes, our technology is as applicable to unserved areas in developed countries, and one of our successes is with the US state of Vermont, where the Vermont Telecommunications Authority has



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← just recently selected our subsidiary, CoverageCo, to expand coverage along highways and some other roads, following earlier work we have done in the state. Our target is to cover where people live, work and commute and if you cover the roads and about half a mile off the roads you cover most of these places. So what we are doing is putting our base stations on telephone poles about every mile or so, and this a much better way of covering a rural area than say building a big mast on a mountainside. And because the base stations are small and easy to install, it's also easy to redeploy them if you don't get the coverage right first time.

Q YOU ARE NOT A RETAIL OPERATOR, SO HOW DOES SPECTRUM LICENSING WORK IN THIS CASE?

A In Vermont the key is secondary market licensing, which allows spectrum licence holders to lease or lend their spectrum to third parties. So in Vermont, by definition we are covering areas where spectrum isn't being used, and secondary market regulation has allowed Sprint in this case to let us use its spectrum to build the network, and in turn

we can provide coverage to customers of other carriers through the usual roaming agreements. The key to making rural coverage cost effective here is to run a multistandard, multicarrier wholesale network.

Q THERE ARE OBSTACLES TO THIS TYPE OF ARRANGEMENT IN OTHER COUNTRIES...

A Yes, this secondary market is not allowed in countries such as India at present, and it is the case that it is the spectrum holder that is the only company allowed to operate base stations. Obviously that can't work for the type of wholesale network operation we want to build as we want to use leased spectrum from multiple carriers. There are also still restrictions on roaming and MVNOs in India that might not make a wholesale network possible. But regulation in India and other countries is moving in the right direction, although progress has been rather slow. You can appreciate the concerns – that allowing companies to exchange spectrum would result in consolidation, a lack of competition, and even the rise of spectrum speculation. My perspective is OK, just allow it in rural areas where spectrum isn't being used anyway so we can provide coverage to people who really need it.

Q YOU SAY REGULATION IS MOVING THOUGH...

A Take Nigeria – the head of the country's telecoms regulatory authority has been very supportive in helping to work out how to get more rural coverage. As 55% of the African population is rural it's a real driver on the continent. We can get an audience with regulators anywhere there is widespread lack of coverage as we have figured out how to make it profitable. All governments face the same problem – if you have a universal service fund and you pay companies to build rural networks with traditional technology all you are doing is paying for them to build a network that will lose money every day. There is a lot of money in these funds that can be used best for networks that are self-sustaining once they are built. Further, the fact that networks can also be carrier and technology neutral is viewed positively by regulators as it opens up competition, and we are also seeing carriers putting the case for wholesale in rural areas too, such as in Nigeria.

Q AMONG YOUR OTHER POSTS YOU SIT ON THE UN BROADBAND COMMISSION...

A One of the commission's most valuable initiatives is working with governments to put in place broadband plans. I think it took a lot of guts to do a survey of countries that have plans to see if they have made any difference as it may have been negative – but it turns out that those with plans have higher adoption and growth rates than those without. Making people aware that you have to plan to get results is one of the commission's biggest impacts. Overall though it is not the industry bodies and forums that matter most – it's sitting down with regulators and figuring out how to move policy.

Q WHAT'S A GOOD EXAMPLE?

A I was on the committee that wrote the US President's Council of Advisors on Science and Technology (PCAST) report on federal spectrum and a lot of good things have come from that. For example, the FCC has just updated proposals for opening up the 3.5 GHz band that can promote small cell use and rural broadband – I think that's a huge step forward and will set the ground for a lot of spectrum sharing in the future. In the US we are facing a spectrum crunch sooner than most other countries so we have to do something, but for me this is not really about the technology – it's a policy and business issue. I do feel more regulators should become less focused on technology itself – I wonder why Africa and India, for example, haven't leapfrogged 3G and gone to a GSM/4G combination as a policy to get ahead.



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