

# Voice over IP in Africa

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From humble beginnings, Voice over Internet Protocol is growing rapidly to be a force to be reckoned with. However, the technology and implications are frequently misunderstood and unnecessary regulatory barriers are placed in the way of the use of this technology. This is particularly the case in Africa.

## A Brief History of VoIP

Voice over IP began as the result of work done by some hobbyists in Israel in 1995. At that stage, only PC-to-PC communication was available. The potential of the technology was soon seen, and by 1998 VoIP had reached "respectability". A number of entrepreneurs set up gateways to allow first PC-to-Phone and later Phone-to-Phone connections. Some of these operated a "free to the customer" marketing model, typically paid for by advertising. These (SIP based) services often required the services of a PC to originate the call, although the actual communication was from "phone to phone". At this stage, VoIP traffic represented rather less than 1% of voice traffic. Three IP switch manufacturers introduced equipment capable of switching VoIP traffic in 1998. At present, most IP switching and routing equipment suppliers offer VoIP as either a standard or as an option on their mid-range and up equipment. VoIP traffic exceeded 3% of voice traffic by 2000, and is forecast to grow rapidly to between 25% and 40% of all international voice traffic by 2004.

Two standards exist for VoIP switching and gateways: SIP and H.323. The former primarily relates to end-user IP Telephony applications, whereas the latter is a new ITU standard for routing between the circuit-switched and packet-switched worlds. It is typically used for termination of an IP originated call on the PSTN, but the converse is increasingly becoming common. Indeed, it is the basis for the recent trend of African PTTs to enter into agreements with VoIP Operators for transmission of international traffic between the USA / Europe and Africa. This traffic originates and terminates in a PSTN. What is VoIP?

VoIP is a generic term for a number of different technologies. In general use, the term means the transmission of digitised and packetised voice over an IP network – generally but not always the Internet. In this sense of the term, communication is usually from end-user to end-user. Also called IP Telephony, particularly when applied to end-user driven applications.

VoIP may be implemented in a number of ways – from individual end-users using off-the-shelf software to communicate with each other, perhaps via a routing or switching gateway somewhere in the world (SIP), to VoIP Operators making use of dedicated high quality networks supplying a commercial service, often to PTTs (H.323). Why use VoIP?

The primary reason is cost. Most developing countries pay exceeding high tariffs for termination of international calls in the USA or Europe. When this is added to the high fees charged by the typical monopoly PTT in Africa, the cost of international calls becomes exorbitant.

The cost savings are sufficient for a significant percentage of the eligible population to be prepared to suffer the generally lower quality voice achieved by VoIP without using a dedicated network.

From the point of view of the PTT, there are also significant cost savings to be achieved. When using the services of an international VoIP operator (usually with a dedicated network), the PTT can avoid the settlement rate balancing tariffs, and typically save about 50% of the cost of terminating international calls.

A number of African PTTs have recently entered into agreements with international VoIP Operators for this reason, notably ITXC, Deltathree and iBasis.

Why build IP based Telecommunication Networks?

They are cheaper and more efficient. Rates are around US\$0.05 per minute for calls to the USA and Europe. A traditional digitised switched voice network requires 64 kbps to be dedicated to each call for its duration. VoIP has significantly lower bandwidth requirements, allowing up to four simultaneous calls to be made using the same bandwidth with no degradation in quality.

In addition, high-end circuit-switching equipment has a relatively small market worldwide and costs are high. Packet switching equipment has a large and rapidly growing market, with many competing suppliers. Costs of high-end switching and routing equipment are therefore lower and dropping.

However, a paradigm shift in thinking is required by a PTT to build a packet switched (IP) network rather than a circuit switched (voice) network. Many PTTs have not yet made the mental leap to embrace IP-based technology, and instead regard it as a threat. This is despite the fact that both capital and operating costs are lower.

It is worth noting that data traffic already exceeds traditional international voice traffic worldwide. Any PTT that fails to make use of both IP and VoIP technology, both internally and internationally, is not only depriving its customers of a cost-effective service, but is likely to find itself left behind in technology development and deployment.

An additional factor, felt especially by Zimbabwe for example, is VoIP can relieve congestion over limited existing international connections, as the bandwidth requirements are significantly lower. Regulatory Restrictions on VoIP in Africa

A significant number of African countries place restrictions on the use of VoIP. Depending on the nature of the restriction, this may be impractical. The table below summarises the legislative regime with respect to VoIP in some African countries. The table is somewhat incomplete due to lack of information at present. This is one of the primary issues that AfrISPA has as its objectives &ndash; collating and exchanging information on the regulatory regimes in Africa.

Country	VoIP restricted	Used by PTT	Used by others
Botswana	Yes	Chad	Yes
Cote d'Ivoire	Yes	Egypt	Yes
Ethiopia	Yes	Gambia	Yes
Ghana	Yes, PTT only	Guinea	Yes, PTT only
Kenya	Yes, PTT only	Madagascar	Yes
Malawi	No	Malawi	Limited private use
Mauritania	Yes	Namibia	Yes, PTT only
Nigeria	Yes	Rwanda	No
Rwanda	No	Senegal	Yes
South Africa	Yes, (future use by PTTs & SMMEs to be allowed)	Tanzania	Yes, PTT only
Tanzania	Yes, PTT only	Togo	Yes, Call Centre
Uganda	Yes, Licensed	Zimbabwe	Yes, PTT only
Zimbabwe	Yes, PTT only	ISPs	future

It is quite obviously futile to try to legislate to make the personal use of end-user VoIP application software, such as NetMeeting and Net2Phone, illegal. Such laws are unenforceable and impractical. Nevertheless, several African countries have attempted to do so. Interestingly, Egypt has gone from this extreme to a "If you can't beat them, join them" approach and is now offering public Internet Telephony at a quarter of the price of traditional international calls.

Many other countries have legislated to restrict the provision of VoIP to the (usually state owned monopoly) PTT. The purpose of this is presumably to protect the revenue base of the PTT.

What seems to escape most legislators is that PTT legislation is properly confined to the provision of facilities. This may be summarised in simplistic terms as "who has the right to lay a wire (or the radio equivalent) over land belonging to third parties." Legislation regarding the applications that may be used over such facilities has no proper place. This may be summarised as "now that I am paying for the use of a facility, what can I do with it?" Attempting to regulate the use of applications such as VoIP is in any case a losing battle with the rapid development of technology over the last few decades.

Benefits of VoIP for ISPs

An ISP may provide VoIP services as an additional "value added service" to its customers, where not restricted by law from doing so. Both the ISP and the customer are already paying for the facilities used, so the PTT is receiving due

income. In addition, the relatively low cost at which VoIP may be offered results in additional traffic that would not otherwise have occurred. The PTT therefore is not losing a revenue opportunity.

The ISP may offer VoIP services under two scenarios: to corporate networks, where the expertise of the ISP may be leveraged to the advantage of both parties, typically for internal use; and to the end user, where the user typically is in any case in possession of suitable software.

Indeed, the promise of IP Telephony is one of the driving factors in the adoption of the Internet in Africa.  
VoIP and Universal Access

VoIP has a role to play in the provision of Universal Access in Africa. VoIP cannot replace the need to install copper wires or the equivalent to remote places. However, it has a real role to play in reducing the cost of providing communication facilities to remote regions, due to the lower bandwidth requirements, the lower operating costs and the larger number of choices in transmission mechanism.

At least one country, South Africa, has realised this and made specific provision for SMMEs to provide telecommunications facilities in designated areas with a teledensity of less than 5%, using any technique including VoIP.  
Conclusions

VoIP has a very real and important role to play in bridging the Digital Divide in Africa. The current legislative restrictions on its use are therefore counter-productive and not in the best interests of the country concerned as a whole. AfrISPA This white paper is submitted on behalf of AfrISPA, a recently formed body representing the interests of ISP Associations in Africa. AfrISPA's primary focus is in providing a unified interface with legislators in Africa. To this end, it is collecting and collating information on the regulatory regimes in all African countries. This paper can be found at [www.afrispa.org](http://www.afrispa.org), with the details shown here updated as information becomes available.

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