

# Wiring Africa

## A Status Report / May 2002

The so-called Digital Divide is at its most extreme in Africa, where the use of Information and Communication Technologies (ICTs) is still at a very early stage of development compared with other regions of the world. At the beginning of 2002, of the approximately 770 million people in Africa, on average only one in:

- 5 have a Radio (160 million people)
- 13 have a TV (50m)
- 33 have a GSM line (23m)
- 39 have a fixed line (20m)
- 130 have a PC (5.9m)
- 150 use the Internet (5.5m)
- 400 have pay-TV (2m)

The divide between the urban areas and the rural areas is even greater. Most of the users are concentrated in the towns, while the majority of Africans are scattered in small communities spread out across the vast rural areas. Often over 75% of the country's telephone lines are concentrated in the capital city with very little perfusion of the telecommunication networks into rural areas. This, as well as irregular or non-existent electricity supplies, is a common feature and a major barrier to use of ICTs, especially outside the major towns. Furthermore, most tax regimes still treat computers and cell phones as luxury items, which makes these almost exclusively imported commodities all the more expensive, and even less obtainable by the majority.

However these rather discouraging statistics do not paint the entire picture. The ICT landscape has begun to change dramatically over the last few years and the huge diversity of the continent means the averages given above obscure many pockets of significant developments. Just five years ago only a handful of countries had local Internet access, yet now it is available in every capital city. In the same period, 23 million mobile cell phones were deployed on the continent—more than the number of fixed lines laid in the last century. Hundreds of new local and community radio stations have been licensed, and satellite TV is now also widely available.

The convergence of ICTs to what is today being called the Internet has also begun to receive significant attention in Africa. Ensuring that broader sections of the population have access to the Internet is now being seen as an important development priority by governments and the international development assistance community, as typified by NEPAD, the G8 Dot.Force and the UN ICT Task Force. This status report looks in more detail at the Internet's progress in Africa.

By 1995, when the Internet had 'gone commercial' in the developed world and was beginning its ascendancy as a general purpose tool amongst the public and businesses, the academic and research sectors in Egypt, South Africa and Tunisia were the only groups to obtain full connectivity. Their levels of funding did not require them to seek other means of defraying costs, but in the rest of Africa, universities were the first to



So are the generators every company needs to keep going.



Mobile and fixed radio towers are everywhere in Lagos, Nigeria.

exploit the Internet's commercial potential to help meet their own connectivity costs. Following similar trends in North America and Europe, by 1996 the Internet had gained sufficient attention to warrant the interest of the public telecom operators (PTOs) in Africa. Sonatel, the Senegalese PTO, was the first to roll out IP services on the continent, providing them on a wholesale basis to resellers. From the latter half of the 1990s onwards, the Internet steadily spread across the continent. By 1998, 42 countries had established Internet facilities in the capital cities and in 2000 Eritrea became the last country in Africa to begin public access Internet services with assistance from USAID's Leland Initiative.

During the same period there was steadily increasing world-wide recognition of the importance of access to information and communication technologies for developing countries. This first gained widespread attention in 1995 when Thabo Mbeki, then deputy president of South Africa, spoke at a G7 meeting in Brussels, saying there could be no 'Global Information Society' when half the world had not yet made a phone call, and announced that his country would invite the developed countries to a conference on the issue of the Information Society and Development (ISAD). In the same year President Nelson Mandela made similar statements at the ITU Telecom conference in Geneva, and in 1996 ISAD was held in Johannesburg, providing the first major platform for addressing the issues around what has now come to be known as the 'Digital Divide.'

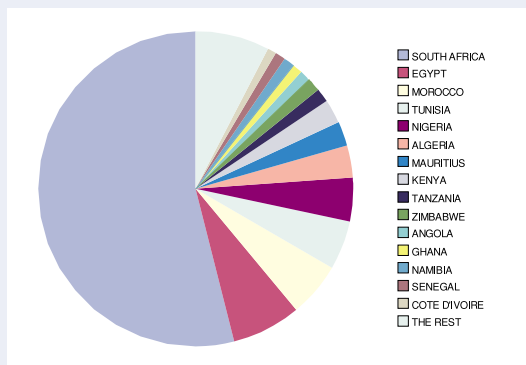
These more political activities were also taking place at the same time as "Africa's Information Society Initiative" (AISI), developed with support from the UN Economic Commission for Africa (UNECA) on behalf of the Conference of African Ministers in Addis Ababa in mid 1996. AISI called for the development of a national information and communication infrastructure (NICI) plan in every African country, driven by national development priorities, and proposed co-operation among African countries to share experiences and stimulate regional development in the area of ICTs. The debate continued to gain momentum worldwide and this culminated in the recent activities of the G8 Dot.Force, UN ICT Task Force and related efforts which aim to rally the developed countries around various projects to provide assistance to developing countries to allow them to be in a better position to take advantage of the digital revolution. As the majority of the world's Least Developed Countries (LDCs) are located in Africa, the continent is receiving the bulk of attention in this regard.

At the same time, international donors and research agencies realized that using the Internet to communicate with their local partners was now becoming feasible, and increasing amounts of funds began to be used to support connectivity for sectors such as within the health, educational and research institutions in Africa.

## Mike Jensen

For example, the World Bank's WorldLinks programme began providing connectivity to high schools, USAID's AfriLink project provided support for obtaining Internet access and training to agricultural researchers, while WHO and the US National Library of Medicine have provided VSAT links to support medical researchers in Africa. There were also a number of important programmes specifically within the many African francophone countries, mainly supported by France and Canada, and a series of 'Centres Syfed' were also set up in the campuses of most francophone universities with support from the French government, providing access to CD-ROM, Online databases and the Internet.

As a result, the use of the Internet has grown relatively rapidly in Africa. By the beginning of 2002, the number of dialup Internet subscribers was close to 1.5 million and the total international Internet bandwidth surpassed 1.5 gigabytes per second. Although almost all of this activity is confined to the major cities, many countries now have points of presence (POPs) in the secondary towns—about 280 different urban areas across the continent now have local Internet servers (100 of which are in towns in South Africa). In addition, many countries now have local call charges for all calls to the Internet regardless of distance.



Countries with more than 10 000 Internet subscribers

The total number of dialup Internet subscribers in Africa now stands at close to 1.5 million. Of these North Africa is responsible for about 300 000 and South Africa for 750 000, leaving about 350 000 for the remaining 49 Sub-Saharan African countries. Assuming each computer with an Internet or email connection usually supports a range of three to five users, this puts current estimates of the number of African Internet users at around 4-5 million, with about 2 million outside of South Africa.

As shown in the table below, there are now about 39 countries with 1000 or more dialup subscribers, 20 countries with more than 5000 and 16 countries with 10 000 or more subscribers.

However these figures are becoming increasingly meaningless as an indicator of size of the Internet sector because of the large numbers of users sharing accounts, the use of corporate and academic networks and in particular public cybercafes and business centres. This is evident when we look at the total international Internet bandwidth, which has jumped 70% since mid-2001 and is now over 1.4 gigabytes per second for outgoing traffic (the most accurate measure due to the great number of grey-market satellite downlinks with uncommitted information rates). However, the increased deployment of international IP bandwidth and the recent launch of new services offered such as low-cost 2-way VSAT, fatter pipes via the new marine fibre cable running along the west coast of Africa to Europe (see map), and VOIP and GPRS mobile data, indicate that the continent may be poised for a new round of expansion in the Internet sector.

There are a variety of other reasons for this substantial growth in international bandwidth. These are, most notably, the increasing use by ISPs of low bandwidth via satellite to augment their existing links, the greater demand by a maturing user-base for more bandwidth (including for VOIP), growth in use of public access facilities (cybercafes, business centres) and also the lower pricing for bandwidth created by new supplies from satellite providers, and the establishment of the new marine fibre cable along West Africa.

Currently, the average total cost of using a local dialup Internet account for 20 hours a month in Africa is about \$60/month (user fees and local call telephone time included, but not telephone line rental). ISP subscription charges vary greatly—between \$10 and \$80 a month, largely reflecting the different levels of maturity of the markets, the varying tariff policies of the telecom operators, the different regulations on private wireless data services and on access to international telecommunications bandwidth. According to the Organization for Economic Cooperation and Development, in 2000, 20 hours of Internet access a month in the U.S. cost \$22, including telephone charges. Although European costs were higher (\$33 in Germany, \$39 across the EU), all of these countries have per capita incomes which are at least 10 times greater than the African average. In fact \$60/month is higher than the average African salary.

In response to the high cost of Internet services and the slow speed of the web, and also because of the overriding importance of electronic mail, lower-cost email-only services are continuing to attract subscribers. Similarly, because of the relatively high cost of local electronic mailbox services from African ISPs, a large proportion of African email users make use of the free international Web-based services such as Hotmail, Yahoo or Excite, most of which are in the US. These services can be more costly and cumbersome than using standard email software, because extra online time is needed to maintain the connection to the remote site. But they do provide the added advantage of greater perceived stability than a local ISP who may not be in business next year. Unfortunately for the ISPs, these services can also use up scarce International bandwidth.

As is most evident in Nigeria and Senegal, but also in most major urban areas in other countries, there is a rapidly growing interest in kiosks, cybercafes and other forms of public Internet access, such as PCs installed in community phone-shops, schools, police stations and clinics. These PCs address low-income levels by shar-



ing the cost and maintenance of equipment and access amongst a larger number of users. Many existing 'phone shops' are now adding Internet access to their services, even in remote towns where it is a long-distance call to the nearest dialup access point. In addition a growing number of hotels and business centres provide a PC with Internet access.

Due to high international tariffs and lack of circuit capacity, obtaining sufficient international bandwidth is still a major problem in most countries, and although conditions have improved over the last year, users generally still have to contend with substantial congestion at peak times.

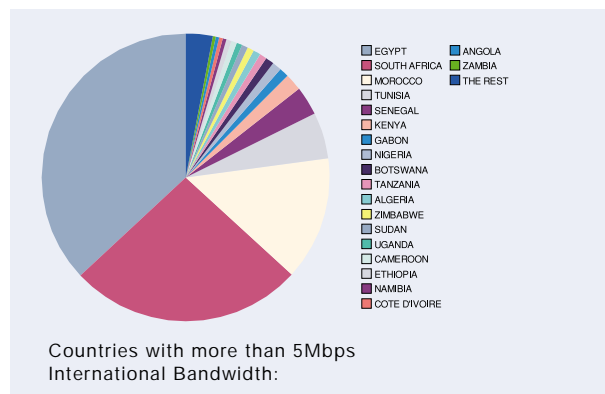
Incoming bandwidth is about 50% greater, but is not as easy to monitor because much of it comes in via variable bit-rate satellite broadcast circuits. This is a common response to the bandwidth problem in which data broadcasting services are now being installed by ISPs in Africa. A basic satellite dish to receive a stream of popular web data for caching locally, as well as encoded broadcasts of other user traffic can provide incoming bandwidth in chunks of 64Kbps (uncommitted information rates) for about US\$30–\$1000/month (depending on use) which is often far cheaper than services available via local operators.

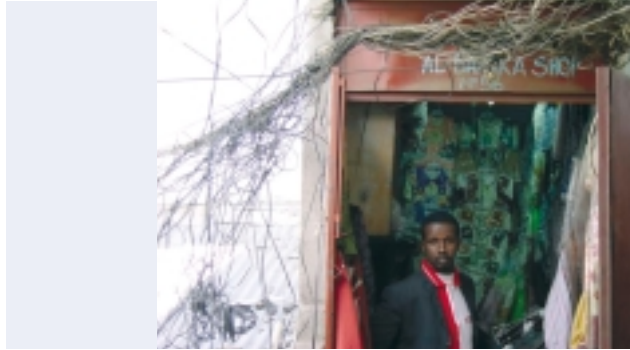
Two-way satellite-based Internet services using very small aperture terminals (VSAT) to connect directly to the US or Europe have also been quickly adopted wherever regulations allow. A number of low-cost consumer oriented two-way VSAT services are being launched this year by companies such as Afsat Kenya, or Ireland-based Web-Sat, which are expected to see rapid uptake, especially in the rural areas where no other telecommunication infrastructure exists.

With the exception of some ISPs in Southern Africa, most of the international Internet circuits in Africa connect to the USA and Canada, with some to Belgium, Germany, the Netherlands, the United Kingdom, Italy, and France.

In Southern Africa, however, Internet Service Providers in countries with borders shared with South Africa benefit from the low tariffs from the South African telecom operator for international links to neighbouring countries. As a result South Africa acts as a hub for some of its neighbours—Lesotho, Namibia, Swaziland and Zimbabwe. Aside from this, there is only one other intra-regional Internet link between neighbouring countries—a 2 Mbps connection between the two telecom operators in Gambia and Senegal, which is mainly used for VOIP. The main reason there are so few such links is that the high international tariffs charged by telecom operators discourage ISPs from establishing multiple international links. As a result ISPs are forced to consolidate all of their traffic over a single high-cost international circuit.

This is also the cause of the common practice of hosting popular African Internet sites on servers that are in Europe or the U.S. This is especially necessary for the many countries where ISPs operate their own independent international links with-





Typical Kenya Telecom local loop installation



E-Touch exterior, downtown Nairobi

out local interconnections (peering), such as in Tanzania and Nigeria, which means that traffic between the subscribers of two ISPs in the same city must travel to the US or Europe and back. This makes it more efficient to host web sites outside-country, and is also being encouraged because local web hosting costs can be very high, while there are even a number of free hosting sites in the US and Europe, and others subsidized by development agencies.

In general, the African web-space continues to expand and almost all countries now have some form of local or internationally hosted web server, unofficially or officially representing the country with varying degrees of comprehensiveness. Although there are a few more notable official government web sites, such as those of Angola, Egypt, Gabon, Lesotho, Mauritius, Morocco, Mozambique, Senegal, South Africa, Togo, Tunisia and Zambia, there is as yet little discernible government use of the Internet for existing administrative purposes. Web presence is higher in some sectors, particularly those involved in tourism and foreign investment, and these often have more mature sites, aimed at developing an international market presence.

The African news media are now relatively well represented on the web. As early as 1999, the US Columbia University African Studies department identified over 120 different newspapers and news magazines that were available on the Internet, of which over 60 percent were published on the sub-continent, in about half of the countries (23). Those best represented in this area are again the countries with more advanced economies and Internet sectors—Côte d'Ivoire, Egypt, Ghana, Kenya, Senegal, South Africa, Tanzania, Zambia and Zimbabwe. Also of note are the efforts to develop local content and host daily newspapers by the ISP AfricaOnline which has offices in 8 countries.

French speaking countries generally have a higher profile on the Web and greater institutional connectivity than the non-French speaking countries. This is largely due to the strong assistance provided by the various Francophone support agencies, and the Canadian and French governments, which are concerned about the dominance of English on the Internet. ACCT's BIEF and AUPELF-UREF/REFER's Syfed Centres, which are building Web sites of local information as well as providing access, are the two dominant content developers in this respect.

It is expected that considerable resources will be directed over the coming years toward supporting access to the Internet in Africa, both by the international community and national governments. Regional collaboration within Africa is being



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Competing unbranded cybercafe/business centre



Nairobi Kenya: Somali area E-Touch Franchise  
Cybercafe Interior

addressed most notably through the NEPAD initiative but also at an institutional level through agencies such as the African Telecommunication Union's African Connection project hosted at the Development Bank of Southern Africa, and the recently formed African Telecommunication Regulators Network (ATRN).

The region's telecommunication links to the rest of the world are also in for substantial change with a large number of international telecommunication infrastructure building initiatives having been announced in the last 2-3 years. Aside from projects aimed directly at the African market such as the marine fibre networks which will soon be present in most coastal African countries, a number of satellite projects planned for the much larger European and Middle-Eastern markets will also cover parts of Africa. While these developments will hopefully help address the high cost of trunk bandwidth in Africa, the issues of the last mile connection and the high cost of access devices are still outstanding. Laying copper is increasingly being abandoned as it is subject to theft and is much more labour-intensive to deploy than the new wireless networks. Organisations all over Africa are also extensively using the new generation of spread-spectrum wireless networking equipment (WiFi/802.11) to cut local connectivity costs and increase available bandwidth. At less than \$250 for a wireless hub (or an old 486 with a \$60 WiFi card), the technology is now more affordable for the small department, organisation or even some individuals in Africa. As a result urban areas in many countries will likely have low-cost high-speed cellular metropolitan data networks that share the costs of Internet bandwidth and are independent of the existing telecom infrastructure.

Probably a larger barrier to increased Internet access is the high cost of a PC with its associated software, which also results in high levels of software piracy. Recycling of PCs is being adopted on an increasing scale through such agencies as Computer Aid and World Computer Exchange. Also, institutions in Africa, especially those in Francophone countries, have been addressing some of these problems through extensive use of free and open-source application software and operating systems such as Star Office and Linux. With the more recent worldwide growth in popularity of Open Source Software worldwide, this is further encouraging the use of low-cost software options more widely in Africa.

However, the impact of much of this effort will depend largely on the extent of improvements to the telecommunication infrastructure on the use of which the Internet depends. Liberalisation of the telecommunication sector and the introduction of competi-

tion are seen as a key to driving down the prices of connectivity and increasing the quality of service. However, while some countries have begun to open up their markets, there is a general sense that too little is being done.

While there are a variety of efforts underway to restructure national telecom operations and build better national and international infrastructure, many of these lack a cohesive approach built on a clear understanding of the dynamics and impact of the breathtakingly fast-changing communications technologies. Models of infrastructure provision are likely to be quite different to those employed in developed countries because of the generally low income levels, limited formal business activity and the much greater importance of the rural population. In addressing the low income factor, innovative models are still needed which focus on shared infrastructure, public access facilities and the use of intermediaries to interact with the public which may not have functional literacy, let alone be computer literate.

#### Countries with only one public access full service ISP:

- |                             |              |
|-----------------------------|--------------|
| 1. Burkina Faso             | 5. Ethiopia  |
| 2. Central African Republic | 6. Mauritius |
| 3. Congo                    | 7. Niger     |
| 4. Djibouti                 |              |

#### Countries with local dialup Internet access nationwide:

- |                 |                  |
|-----------------|------------------|
| 1. Burkina Faso | 10. Morocco      |
| 2. Benin        | 11. Namibia      |
| 3. Cape Verde   | 12. Niger        |
| 4. Ethiopia     | 13. Senegal      |
| 5. Gabon        | 14. South Africa |
| 6. Malawi       | 15. Chad         |
| 7. Mali         | 16. Togo         |
| 8. Mauritius    | 17. Tunisia      |
| 9. Mauritania   | 18. Zimbabwe     |

#### Countries with local Internet Exchange (peering) points (IXs):

1. Egypt—Cairo IDSC <http://www.idsc.gov.eg>
2. Kenya—Nairobi KIXP <http://www.kixp.net>
3. South Africa—Cape Town (CINX), Johannesburg (JINX)  
<http://www.ispa.org.za> / <http://www3.frd.ac.za/mrtg/jinx/summary.html>

#### Countries with Advanced Data Services:

1. Botswana—ISDN, Frame Relay
2. Egypt—ISDN, Frame Relay, ATM, DSL
3. Kenya—ISDN, DSL
4. Ghana—Frame Relay
5. Mauritius—ISDN, Frame Relay, DSL, ATM
6. Morocco—ISDN, GPRS, Frame Relay
7. Senegal—ISDN
8. Seychelles—ISDN
9. South Africa—ISDN, GPRS, Frame Relay
10. Tunisia—ISDN
11. Uganda—ISDN, DSL



# The Internet: Out of Africa

**Bits per capita** is a relatively new measure of Internet use. The size of the Internet in a country indicates an element of its progress towards an information-based economy. International Internet bandwidth provides a measure of Internet activity because many people share accounts, or use corporate and academic networks along with cyber cafes and business centers. Outgoing bandwidth also takes better account of the wide range of possible

use, from those who write a few emails each week, to users who spend many hours a day on the net browsing, transacting, streaming, and downloading. Because of this, the often used 'Number of Internet Users' indicator may have less relevance in the developing world than in other places. The coloured circle in each country on the map shows, to exact scale, the international bandwidth in bits per capita (BPC) available in Mid 2002 from

publicly accessible IP networks. Bandwidth availability in Africa varies tremendously, but is generally very low compared to developed countries. Although there are few intra-African links, the marine fibre cables shown are now all operational and should provide faster and cheaper routes within and out of Africa, 17/04/2002

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