



# Access to the Web and its use in Southern Africa

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## 1. Internet in Southern Africa

The Internet has spread rapidly through Southern Africa over the last two years. At the end of 1996 only five countries had local Internet services and most of these were e-mail-only systems. Now all the capital cities are online.

It is difficult to measure actual numbers of Internet users, but figures for the number of dial-up accounts provided by ISPs are more readily available. From these it is estimated that there are now over 500 000 subscribers in Africa. Each computer with an Internet or e-mail connection supports an average of three users, a recent study by the UN Economic Commission for Africa (ECA) has found. This puts current estimates of the number of African Internet users at somewhere around 1.5 million. Most of these are in South Africa (about 1 million), leaving only about 500 000 among the remaining 734 million people on the continent. This works out at about one Internet user for every 1 500 people, compared to a world average of about one user for every 38 people, and a North American and European average of about one in every 4 people. No studies have been made of the number of rural vs urban users, but it is safe to say that users in the cities and towns vastly outnumber rural users. In Southern Africa there are about 30 000 users outside of South Africa, which is one user for every 1300 people – marginally better than the continental average.

The definition of a 'user' or 'subscriber' may vary, however. The number of accounts being shared in Africa may be much greater than in more developed regions. This could push the number of e-mail users in Southern Africa outside of South Africa to as high as 50 000 to 60 000. With an estimated 200 million e-mail accounts worldwide, an optimistic estimate would put Africa at 1% of the total (it has 13% of the world's population). South Africa by itself is still behind the world average, at about 65 people for every user, but including the country brings the average up for the whole of Africa to one in every 1 000 people.

The countries with the most users and particularly active and mature markets are (in order of most numbers) South Africa, Zimbabwe, Mauritius, Tanzania, Mozambique, Namibia and Zambia. All of the SADC countries, except perhaps Lesotho, have over 1 000 users, but only Mauritius, South Africa and Zimbabwe have over 10 000 users. South Africa's Internet community is 30 times larger than any other in Africa, being among the top 20 countries in the world when ranked by number of Internet nodes.

Services in the capital cities do not, however, provide for access by many Africans, as 70% live in rural areas. The exception to this is in Malawi, Mauritius and Zimbabwe, which provide local call access across the whole country. This facility is supplied by the local telecom operator that sets up a special 'area-code' for ISPs, which is charged at local call tariffs. It is surprising that this method has not been used more often, as it allows the ISPs to immediately roll out a network with national coverage and, as utilisation increases, traffic monitoring will indicate where it is most cost effective to install new local POPs. Some countries (Angola, Botswana, Namibia, South Africa, and Tanzania) do have POPs in the major and second major cities, and South Africa has POPs in about 70 cities and towns, but for most people it is still a prohibitively expensive call. In some cases even a local call costs over US\$10 an hour.

The total number of computers permanently connected to the Internet in Southern Africa (excluding South Africa) finally broke the 6 000 mark in July 1999. As measured by Network Wizards, growth doubled in the six months from Jan 99 when there were only about 3 000 hosts. The figure may actually be closer to 10 000 or 15 000 due to the measurement technique that cannot count hosts which are not properly reverse referenced in domain name servers or behind firewalls.

The rapidity with which most Southern African public telecom operators (PTOs) have started to establish Internet services is noteworthy. PTOs have recently brought full Internet services on stream in most of the SADC countries and Madagascar, leaving only Malawi and Namibia's operators without any immediate plans to establish services.

This follows trends in the developed countries where almost all of the major PTOs have established Internet services. Although there are still considerable human resource issues to be resolved in obtaining the necessary skills to manage these services, they could squeeze out many of the smaller private service providers when they are competing in the retail market. At the same time, using shared international links could have a significant positive impact on the cost and accessibility of the Internet, given the much larger economies of scale that the PTOs apply to the provision of the services.

Very few of the PTOs in Southern Africa have officially defined themselves as the 'only' supplier – that is where private companies are barred from reselling Internet services to end users. This is currently only the case in Mauritius.

Where PTOs and their subsidiaries operate dial-up and leased line services in competition with other independent ISPs, such as in South Africa and Zambia, there have been some claims by the competing ISPs that access to the telecom network is not provided on a fair and equal basis.

Other countries have been more extensively liberalised and the PTOs have no direct role in the growing ISP market. However, in all the countries where the PTO has established the international Internet backbone, it has assumed a monopoly position for this role except in Mozambique, South Africa and Zambia.

SITA, the airline co-operative, has by far the largest network in Africa. SITA's commercial division, SCITOR (recently renamed Equant), which was formed to service the non-airline market, has been making available its X.25 packet switched network which has dial-up points of presence in 40 African countries. Subscribers of ISPs in Europe and North America who are members of IPASS (a group of ISPs who share their POPs) can access these points of presence for \$0.22c a minute. See <http://www.ipass.com>.

As far as the other big multinational ISPs are concerned, AfricaOnline, (<http://www.africaonline.com>) is consolidating its year of growth which saw its ISPs open in Swaziland, Tanzania, Zimbabwe, adding to its stable in Ghana, Kenya and Cote d'Ivoire. The other three multinational ISPs that are operating subsidiaries or franchises in Africa are now trailing considerably with UUNET just in South Africa, Zimbabwe and Namibia, while Swift Global is in Kenya, Tanzania and Uganda. The bulk of the service providers, however, are small businesses, often started by technicians who learned their skills at university.

Access to sufficient international bandwidth for carrying out interactive activities over the Internet is still a big problem in most African countries. Few of the countries outside of South Africa had international circuits larger than 64 Kbps until recently, but 256 Kbps connections are becoming increasingly common. However, more than 256 Kbps of outgoing bandwidth is currently only present in Botswana, Mauritius, Namibia, South Africa, Tanzania and Zambia.

Most of the international connections are carried via satellite, aside from the marine optical fibre link from South Africa to the hub in the Canaries. Countries sharing borders with South Africa benefit from the PTO, Telkom's tariff policies for neighbouring country connections, which means lower costs of terrestrial links, resulting in most of the ISPs in the neighbouring countries connecting to the South African Internet infrastructure.

Elsewhere, the international Internet circuits connect to the USA (Angola, Tanzania, Zambia and Zimbabwe). The major international Internet suppliers to Southern Africa are AT&T, BT, Global One/Sprint, UUNET/AlterNet, MCI, NSN, BBN, Teleglobe, Verio and France Telecom/FCR. A rapidly increasing number of other links are provided by PanamSat and Intelsat direct to private and PTO groundstations in the US and UK, circumventing local PTO infrastructure.

Generally, ISPs must pay the entire cost of the connection to Europe or the US, which effectively gives the developed countries' ISPs free access to Southern Africa's Internet and further increases the costs that ISPs in Africa must bear. Aside from the South African hub for some neighbouring countries, regional backbones or links between other neighbouring countries are currently non-existent.

The American Registry for Internet Numbers (ARIN) has now taken over administration of Internet IP address space for Africa (along with North America, South America and the Caribbean). This means that IP address space is no longer free. Until a local African registry can be set up networks will now be required to pay ARIN USD\$2500 per year to obtain a Class-C address.

Reflecting the high telecommunication costs and the small markets, ISP charges for dial-up access accounts are generally higher in Africa than elsewhere. Currently, the average cost of a low volume full Internet account in southern Africa ranges from about \$25/month to \$90/month when using the lowest priced services in each country for 10 hours a month. According to the Organization for Economic Cooperation and Development, 20 hours of Internet access in the US costs \$29, including phone and provider fees and it costs \$74 in Germany, \$52 in France, \$65 in Britain and \$53 in Italy. These countries have per capita incomes which are 10 times greater than the African average.

However, monthly ISP dial-up charges in Southern Africa do vary greatly – between \$10 and \$75 a month, largely reflecting the immaturity of the markets, the tariff policies of the PTOs and the different national policies on access to international telecommunications bandwidth. But generally the high charges mean that in some countries, even if a computer is available, the service is beyond the reach of all but the top elite.

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## 2. **Summary of major constraints to networking in Southern Africa**

- The extremely limited telecommunications infrastructure is a major constraint (less than one phone line per 100 people, high cost of local telephone access)
- Computer penetration and literacy is even lower
- National connectivity within countries is minimal and confined to the capital cities – direct connectivity between countries is virtually non-existent
- International bandwidth is insufficient due to high cost and lack of digital circuits
- Cost of access to Internet is high, over \$50 a month on average
- Good business models for information distribution are rare
- Intellectual property issues are poorly understood.
- The impact of ICTs on cultural heritage, and vice-versa, has received little attention'

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## 3. **Opportunities for improved networking in Southern Africa**

- 3.1 Take advantage of reduced technology costs. Plummeting prices of the technologies of transmission, storage and processing are perhaps the most important initial factor. Capitalise on the South's unique opportunity to try out new models in building national information and communication infrastructures using the latest technology right from the start – something few developed countries can hope for. Also use:
- Stripped-down Windows Compatible 'NetPCs' (cost \$500)
  - Java-based Network Operating Systems run on older 386 equipment
  - Network-based Computers (NCs) (cost \$200).

There is much potential to make use of emerging communication technologies for improving the bandwidth available – satellite-based systems (VSAT/LEOs/MEOs), Digital Subscriber Lines (DSL), packet radio and Wireless in the Local Loop (WILL), and data broadcasting. Network-based computing places more reliance on the communications and network infrastructure, but wireless technologies are reducing the cost of the local loop in telephone lines from an average of \$1500 to \$500 per line, and the cost of data/voice transmission capacity (satellite and terrestrial bandwidth) is decreasing even more rapidly.

- 3.2 Ensure that Local Area Networks and dial-up Internet services are fully implemented to minimise costs and maximise access.
- 3.3 Use free software and open systems. Mature applications and operating systems are available at no cost (e.g. Linux). Most of the Internet applications and operating systems in use in many institutions cost nothing at all. Increasingly it is possible to carry out all types of application use inside the Web browser.
- 3.4 Exploit the highly scalable nature of ICTs – initiatives can start small, with minimal costs.
- 3.5 Focus on capacity building through training, support desks and skills transfer.
- 3.6 Help establish National Network Information Centres (NICs) for provision of national information, user and service directories, local training and advice.
- 3.7 Help establish electronic forums for stakeholders in the different sectors.
- 3.8 Work out means to improve the awareness among the highest levels of national decision-makers in the different sectors.
- 3.9 Make use of the ongoing inter-agency collaboration and co-ordination initiatives, for example the African Information Society Initiative (AISII) and Partnerships for ICTs in Africa (PICTA).
- 3.10 Examine strategies for reducing Internet access costs for the network participants that cannot transfer the costs to the end-user.
- 3.11 Support pilot projects that experiment with new services and new

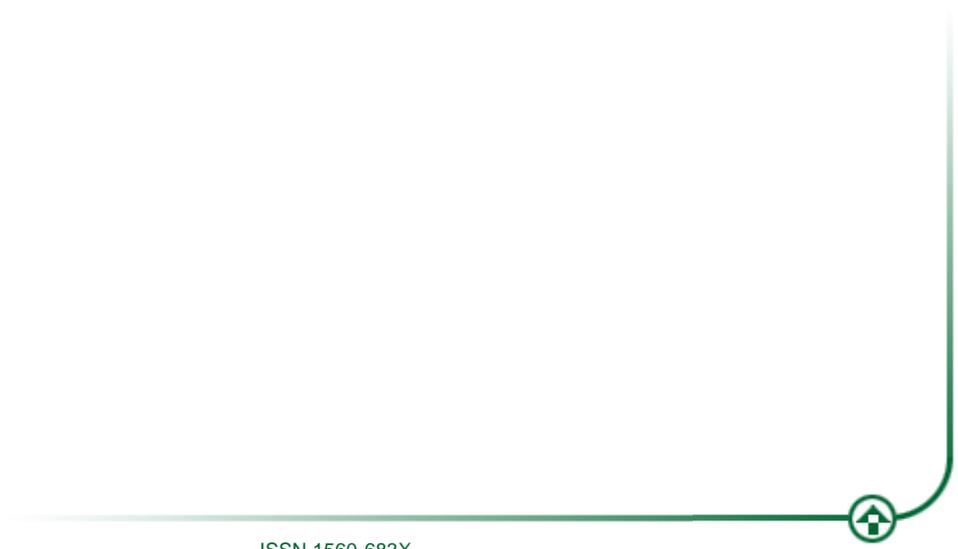
partnerships.

3.12 Identify priority areas for building electronic information content and applications, especially by digitising existing hard copy information sources, in particular:

- Meteorology
- Scientific journals
- Library holdings
- Directories of researchers and research organizations.

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