Independent Review of the
African Network Operators Group
(AfNOG)

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1 Introduction

This document presents the findings and recommendations of an independent review of the African Network Operators' Group (AfNOG).

The audience for this document includes the leadership and major stakeholders of AfNOG and the many agencies and organizations that participate in AfNOG's development, provide funding, and otherwise contribute to AfNOG's success. In keeping with AfNOG's principles of transparency, it is available to any interested person.

1.1 Why this Study?

Contemplating its tenth anniversary, as part of its planning for a strong and effective future, AfNOG retained a team of outside experts to conduct a review, the principal objectives of which were:

- to examine how and how well AfNOG has accomplished its mission to date,

- to provide forward-looking recommendations for AfNOG's continued growth and continued support of regional, national, and local NOGs,

- to identify potential impediments to AfNOG's growth and effectiveness, and to offer advice on countering them, and

- to identify those internal and external sources of AfNOG's strength that merit further nurturing and development.

1.2 How the Study was Undertaken

The study was conducted by a review team consisting of two principals at Interisle Consulting Group, Lyman Chapin and Chris Owens, with experience in conducting external reviews of Internet governance organizations.

Dr. Owens attended the AfNOG workshops and annual meeting held in Rabat, Morocco at the end of May / beginning of June, 2008, and conducted many of the stakeholder interviews in person there.

The study is based upon four sources of information:

- Review of AfNOG's internal and external written materials

- Interviews conducted with 25 individuals representing various AfNOG constituencies

- The review team's general knowledge of Internet organizations, and specific knowledge of the organizations whose activities have supported AfNOG

- The review team's knowledge about other organizations that are used as a basis for comparison

2 History and Context

The African Network Operators Group (AfNOG) is a forum for technical coordination and cooperation among African Internet service providers and network engineers from the region's universities, research institutions, and industry. It was founded in 1999 to serve as a community of engineers helping each other to meet the technical challenges of setting up, building, and running IP Networks on the African Continent.[1]

The annual series of AfNOG training programs traces its roots to the Internet Society's annual INET/Network Training Workshop model. A number of the core developers and instructors for AfNOG's educational programs were participants or Instructors in one or more of ISOC's annual training workshops, and have extended the model to meet today's training needs in the African region.

The inaugural AfNOG workshop and meeting took place in Cape Town, South Africa in May 2000. Table 1 shows the location and host of each of the nine AfNOG workshops:

Year	Country	Local Host
2000	Cape Town, SOUTH AFRICA	Cequrux
2001	Accra, GHANA	Network Computer Systems
2002	Lome, TOGO	TRS/Café Informatique
2003	Kampala, UGANDA	One2Net
2004	Dakar, SENEGAL	ISOC Senegal
2005	Maputo, MOZAMBIQUE	MICTI/CIUEM
2006	Nairobi, KENYA	KENIC/KENET
2007	Abuja, NIGERIA	NgForum
2008	Rabat, MOROCCO	Mohammedia Engineering Institute (EMI)

Table 1—Location and Host of AfNOG Workshops

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[1] This section taken or adapted in part from the AfNOG 2008 Report and the AfNOG Brochure.

The inaugural Cape Town workshop was followed by Africa's first regional network operators' meeting and a one-day AfriNIC meeting, which was AfriNIC's first general assembly to establish an African IP address registry (www.afrinic.net). AfriNIC meetings continue to be held in conjunction with AfNOG's annual workshops, in close cooperation between AfriNIC and AfNOG.

The current AfNOG program combines training, a conference, and various spin-off and sidebar meetings. In 2008, training included two days of "Unix Boot Camp", five days of lab-based workshops, with three tracks taught in English (Unix System Administration, Scalable Internet Services, Scalable Network Infrastructure) and one in French (Infrastructure Réseaux IP), and two days of technical tutorials on topics such as engineering wireless networks, BGP and Multihoming, and IPV6. The AfNOG Meeting itself consists of a variety of short technical presentations and interactive discussions that provide a forum for the entire African networking community to share experiences and challenges in the region. The spinoff meetings included AfREN, an AfriNIC workshop, the AfriNIC meeting, and the Africa INET day.

Over 600 network operators from 40 different African countries participated in the workshops during AfNOG's first 8 years, and another 150 participated in 2008. Many participants are operators from the Internet Service Industry, University and Research Institutions, and non-governmental organisations (NGOs) in their respective countries. To date, more than 1,400 Africans and many partners from the international community have participated in the AfNOG and AfriNIC meetings that follow the one-week workshop each year.

Table 2 shows the geographical distribution of participants in the first 8 AfNOG workshops: The 2008 meetings in Rabat and the 2009 meetings scheduled for Cairo are expected to draw more North Africans into the AfNOG community.

Region	%
West Africa	41%
East Africa	30%
Central Africa	10%
Southern Africa	15%
North Africa	4%

Table 2—Geographical Distribution of Workshop Participants

AfNOG is an independent community of network engineers that is not affiliated with any national government and has no policy-making role or aspirations. It receives roughly 25% of its

operating funds from the fees paid by workshop participants, and the remaining 75% from public and private sponsors and collaborators, including the Network Startup Research Center (NSRC) in the U.S., the Canadian International Development Research Centre (IDRC), The Internet Society (ISOC), the Association of African Universities (AAU), l'Organisation International de La Francophonie, the African Network Information Center (AfriNIC), and many local and international commercial businesses, which also often provide equipment and manpower. In-kind support allows AfNOG to distribute up-to-date technical materials to participants (over 2,000 kg of books were shipped to Rabat for the 2008 meeting), and to operate the workshop using well-provisioned, state-of-the-art computers, routers, switches, and other networking gear.

3 Findings

Our findings illuminate AfNOG from several perspectives. We begin with AfNOG's identity, mission, and vision for the future. Next, we examine the community of people that create and participate in AfNOG events or that interact with AfNOG in other ways. We then look at organizational issues: leadership, governance, management, and operations, paying special attention to AfNOG's role in initiating and supporting regional and local NOGs, and in nurturing other start-up organizations dealing with the Internet in Africa. We follow that with discussions of outreach and finances, ending with some thoughts about how to measure the impact of AfNOG.

3.1 Identity, Mission, Vision

3.1.1 AfNOG: Meeting, Organization, Community, Idea

AfNOG can be described in four distinct ways: as a collection of annual events, as an organization, as a community, and as an idea. We encountered each of these perspectives, to some degree, in nearly everyone with whom we spoke about AfNOG; they must each be examined in order to understand AfNOG.

For the first AfNOG, a coalition of volunteers and funding agencies came together to create a single conference. Building upon the success of that conference, a growing and evolving group of volunteers and funding agencies has reconvened each year to produce subsequent annual meetings, workshops, and tutorials. Each year the scope and scale has grown. In the eyes of many people, "AfNOG" is synonymous with the annual event.

Faced with the need to run larger and more complex events, to recruit and screen more applicants, to support more instructors teaching richer curricula, and to establish stable, year-round funding, the leaders of AfNOG have begun establishing a more formal governance structure and a year-

round administrative function. The organization is largely distributed and virtual, with a small headquarters office in Accra, a lightweight staff, and a distributed secretariat. It is now possible to refer to AfNOG as an organizational entity rather than an annual, *ad-hoc* event.

AfNOG is not a membership organization. One can participate in AfNOG events as a student, volunteer, or conference attendee, but one does not "join" AfNOG—there are no dues, member entitlements, membership voting, or other attributes of typical membership organizations. In this sense, AfNOG is more like the IETF than, for example, the ACM or the IEEE. Nevertheless, there is a strong sense of an AfNOG community, comprised of the people who shape and participate in AfNOG activities, who attend AfNOG meetings and workshops, who subscribe to the AfNOG mailing lists.

Finally, there is a collection of themes that permeates AfNOG's events, organization, and community: Africa needs a large cadre of Internet engineers who are locally trained, but cognizant of the latest and most advanced technology and engineering practices. In an unsaturated market, technical collaboration, even with competitors, benefits everyone. The beneficiaries of volunteer-taught courses have almost a moral obligation to go out as a volunteer and teach others. Technical knowledge is to be shared. Many times, creative application of inexpensive equipment and open source software can meet, at low financial cost, the same needs as expensive, proprietary vendor solutions. Collectively, these themes form the "AfNOG approach" or "AfNOG philosophy", which appears to be well understood across a broad spectrum of the AfNOG community.

3.1.2 Mission

On of our more striking findings was that, although the mission of AfNOG is subtle and multi-faceted, nearly every stakeholder with whom we spoke, from first-time workshop attendees to long-time participants, articulated AfNOG's overall mission in a similar way. This clarity speaks well of the leadership's ability to communicate clearly a sense of vision and purpose. As people talk about AfNOG's mission, several themes recur:

- At its core, AfNOG is about developing, across Africa, a large and well-trained cadre of networking engineers. It does this not only directly (by conducting training workshops), but also indirectly, by encouraging its own graduates to train others and to create local and regional workshops.

- AfNOG is not just about training people, it is about inculcating Internet culture: a collaborative approach to engineering in which cooperating technically with business competitors creates value for all concerned.

- AfNOG is about creating a community with a spirit of collaboration and a sense of shared purpose.

- AfNOG takes an African-centric approach; many participants espouse a preference for solving technical problems by the application of local talent and open source software rather than packaged vendor solutions. In the words of one instructor: "I teach that by using your own knowledge and open standard, open source software running on general purpose computers, you can build your own networks for cheaper and you understand them better than you would if you bought black box products."

AfNOG is equally clear about what it is not: it is very clear that it is not at all concerned with the space of policymaking or government activity. AfNOG's training and community-building mission is relevant and continues to be so. The market for Internet experts in Africa is far from saturated, and there is an unmet need for advanced technical training.

3.1.3 Curriculum

The curriculum associated with AfNOG's training mission is effective, state-of-the-art, custom developed by the people who teach it, and made freely available to all participants for use in teaching others.

3.1.3.1 Evolution of Curriculum

The technical content of AfNOG exists at multiple levels, with a logical progression over time. The most advanced topics are covered in presentations and discussion at the annual AFNOG meeting; these vary considerably from year to year, in order to focus on topics of current interest. Tutorials cover topics of interest to the most advanced members of the networking community. Workshops provide broader, but still advanced, training for people who have exhausted the resources available locally; their subject focus remains constant from one year to the next, with the content updated as appropriate.

3.1.3.2 Role of Localization

Getting people to AfNOG is expensive; the intent is to use the limited resources available to focus exclusively on advanced training that cannot be obtained elsewhere. This objective underlies AfNOG's push towards regionalization: to establish and support regional NOGs. Ultimately, these regional training opportunities will dovetail with AfNOG, so that students can start more locally and then move on to AfNOG, where the training will continue where the local NOGs leave off.

Reasons to localize include:

1. Scale: you can't be effective with 200 people in the classroom
2. If there is locally-relevant content

3. Travel costs, visa issues, etc. are significant.

4. Language

5. Availability of local support: funding, or in-kind contributions.

6. Support and develop the corps of volunteer instructors across Africa

Obstacles to localization include the availability of administrative support, local instructors, and funding.

This localization has begun to happen in a few instances, with Nigeria being one of the more advanced examples. Much work remains to be done in this area; there are large regions of Africa where local training is not easily available. As a result, AfNOG workshops, in addition to the advanced topics, include some basic content that probably does not warrant flying people across the continent.

In addition to geographic localization, AfNOG has explored constituency-based localization, for example the successful AfNOG Chix workshop focused on the professional career development of women in computing and networking.

3.1.3.3 Reactions to Curriculum

The curriculum and course content received rave reviews from the participants with whom we spoke. Uniformly, people felt that the content was squarely focused on their needs, that the materials were well prepared and valuable, and that the curriculum reflected a perspective not obtainable elsewhere.

We heard a few requests for additional curriculum content, most notably in two areas: an intensive, high-level network architecture track, and a track that covered technical project management and some of the other operational aspects of setting up and running an ISP.

3.1.3.4 Curriculum Development

There is an extensive process for establishing the curriculum that engages people at all levels and is consensus-driven. It starts with discussion on the AfriGeek mailing list, and draws input from past, present, and future students, instructors, track leaders, and program committee members. The process appears to be genuinely open, although a few interviewees were not aware that they could influence the future development of the curriculum.

3.2 Community

As described above in Section 3.1.1, the AfNOG community is not defined by membership in an organization; it is based on broad inclusion criteria that are deliberately blurry. Consistent with

its mission to build community, AfNOG has taken tactical steps such as the creation of mailing lists and the support of spin-off organizations that can share the logistics of AfNOG meetings. AfNOG leaders also repeatedly stress the importance of community in informal and formal communications with participants. Many community members voiced a strong sense of belonging, and of obligation to give back to the community by training others and helping others to solve technical problems.

3.2.1 Students

Workshop participants voiced a high degree of satisfaction with AfNOG. When we asked them to identify themselves as being in less advanced, in the middle, or more advanced than the bulk of their classmates, we found a good distribution.

The quality of students remains excellent, with the number of qualified applicants continuing to grow, and approximately 30% of applicants accepted in 2008. A few instructors note that student preparedness has fallen off slightly over the past few years, citing two probable causes:

- AfNOG has exhausted the available pool of people who are aware of AfNOG and who can absorb the most advanced material.

- There are people who are aware of AfNOG, who know through friends and colleagues that attending AfNOG is a rewarding experience, and who may be less aware of locally available training; they are motivated to exaggerate their experience in order to be selected for AfNOG.

These factors provide additional rationale for the further development of strong local and regional NOGs as described below in the recommendation section: the local and regional training would grow the population of people who are prepared for and who can benefit from the training that AfNOG provides, and the local and regional organizations could do a better job of interviewing and screening applicants than the current process allows. The local NOGs run the entry-level workshop tracks, and provide input into the evaluation of AfNOG applicants.

3.2.2 Instructors

The instructors in attendance at AfNOG 2008 in Rabat were a strong, well-qualified, and dedicated group of volunteers. Some were homegrown products of AfNOG itself: there is a process by which instructors identify students with likely future instructor potential and recruit them. Others were experts from African universities and ISPs. Still others were Westerners with significant expertise in building and operating large networks, recruited by the workshop organizers.

The instructors received the highest marks from the students and from each other for their expertise, and generally high marks for their teaching skills. At some past AfNOGs there has been a separate instructor training "boot camp"; the volunteer who organized that activity in the past was not available this year. Several people recommended that AfNOG re-institute formal instructor training.

We heard a few concerns that there are not enough instructors; see further discussion below in our discussion of the limitations of a volunteer organization.

3.2.3 Leaders

The leaders of AfNOG are strong, charismatic figures, obviously beloved by the community. Although we heard concerns that the success of AfNOG is overly dependent upon the force of personality of a few individuals, we also observed a strong second tier of individuals rising within AfNOG who show obvious leadership qualities. It will be important that the governance and management of AfNOG allow these people to continue to develop.

3.2.4 Alumni

Follow-up with past participants has been uneven. All participants are invited to join a mailing list; some participate very actively and others disappear from sight. There has not been a systematic mechanism in place to contact people proactively, to encourage them to pass along their knowledge and support them in doing so, or to recruit them into supporting AfNOG in other ways. With a small additional expenditure of time and money, AfNOG could benefit significantly from a strengthened alumni network.

3.2.5 Meeting Participants

The AfNOG meeting participants include many of the workshop participants (who tend to be practicing engineers) as well as leaders and policymakers seeking more insight into technical issues. We observed substantial and positive interaction among the various constituencies represented.

3.2.6 Spin-off Organizations

AfNOG deliberately arranges its annual meeting to support meetings of other groups such as AfREN, AfriNIC, and others. In some cases, there are agreements under which AfNOG provides and manages meeting logistics paid for by the other organizations or their sponsors.

This is an important function. Unlike Europe or North America, regional transportation within Africa is costly and difficult. Assembling in one place a group of people interested in the African

Internet is a valuable service; AfNOG provides the glue—the physical context—within which the African networking community gets together. For those familiar with the role that the MLA conference played in the humanities, especially prior to the widespread use of the Internet by scholars, there is an analogous role here. In-person meetings are necessary to nourish year-round collaboration by electronic means.

3.2.7 Other Institutional Constituencies

Relationships between AfNOG and other institutions such as universities, PTTs, corporations, consortia, and other entities appear to be somewhat ad-hoc, as is appropriate for a lightweight organization that has been focused on fulfilling its mission directly rather than upon building institutional empires. In a few cases, there are contractual arrangements under which AfNOG and other institutional entities work together, for example an activity, funded by the Partnership for Higher Education, under which AfNOG will be conducting training and otherwise boosting the technical capacity at 12 African universities.

3.2.8 Funding Sources

Funding for AfNOG is recognized almost entirely as funding for the annual AfNOG workshop and meeting. In 2007, roughly 25% of the funding requirement for the workshop was met by the fees collected from workshop participants; the remaining 75% was met by donors, including the Network Startup Resource Center (NSRC), the Internet Society (ISOC), the Canadian Government's International Development Research Centre (IDRC), the United Nations Development Programme (UNDP), the Economic Commission for Africa, the Association of African Universities (AAU), l'Organisation International de La Francophonie, the African Network Information Center (AfriNIC), and many local and international commercial businesses, which also often provide equipment and manpower. Funding for the workshop is solicited and committed on an annual basis, which means that each year a new fund-raising activity must be launched, and each year a small team of volunteers must be recruited to pursue it. These tend to be the same people (the "good friends of AfNOG") year after year, and we observe that volunteer and philanthropic burnout are virtually inevitable under these circumstances.

AfNOG also benefits from non-monetary sources of support, both in the form of equipment and other goods donated or provided at below-market prices and in the form of volunteers who contribute their time as organizers of and instructors for the annual workshop. This non-monetary support is a significant factor in AfNOG's ability to operate.

3.3 Culture

3.3.1 Limitations of a Volunteer Organization

We heard some concerns about the inherent limitations of a volunteer organization. The number of qualified instructors and senior instructors is not large, and they tend to be hard-working people with busy lives. It would be very difficult to scale up from a single annual workshop to multiple workshops per year simply by asking the existing volunteers for more time. It is also difficult to implement year-round operations with volunteers by asking them for more time outside of the workshop itself, for example to conduct a more extensive review of applications or to participate in administrative and governance tasks.

Certain key individuals do a great deal AfNOG, and keep doing year after year: getting funding, getting donated books, equipment, etc. One volunteer, for example, does more than 20 hours a week for six to eight weeks before the workshop. That obviously does not scale up to multiple workshops per year unless similarly motivated volunteers can be added to the group.

Another limitation lies in the difference between the African and the Western commercial context: The Africans involved tend to be entrepreneurs who work very long days—they don't, in general, have the luxury of 9 to 5 jobs with weekends and holidays off, during which they can work on AfNOG as a volunteer activity.

On the other hand, people are strongly motivated, and instructors talk consistently about their need to give back to the community that nurtured them. Furthermore, there is a strong community-building message associated with the presence of volunteer instructors: it reinforces the concept that participants are expected to give back by teaching others.

3.3.2 Multiple Linguistic Communities

The French track was well attended. We observed significant interaction between Francophone and Anglophone attendees; general attendees appeared to speak more than one language. There has not yet been a Portuguese language track; there may be some interest in creating one.

3.3.3 Ethos of Collaboration

We observed a very strong ethos of collaboration. This raises the interesting question of whether AfNOG inculcates the ethos of collaboration or whether it selects for it among applicants. In either case, the result seems to be effective.

3.3.4 Keeping AfNOG African

On the one hand, there is a desire to have AfNOG be all African. On the other hand there are functions, such as leveraging business relationships to solicit in-kind contributions, that are more easily performed by those with first-world business connections. Similarly, there is a tension between the desire to have instructors be African and to have them be individuals with extensive experience building massive networks; such experience is more easily found in the West. Furthermore, the Internet is global and its coordination and administration is also global. With the most rapid development of the Internet occurring in developed countries it is prudent to maintain a good balance of Africans and non-Africans to encourage knowledge transfer and linkage building.

Our observation is that AfNOG does a good job in balancing these considerations.

3.4 Governance

AfNOG has historically been run effectively by a small group of *de facto* leaders, whose personal leadership style is well matched to the requirements of an annual workshop. At first, ad-hoc governance was appropriate and effective. As the need for a more permanent organization has become apparent, this has been matched with a more formal model of governance, which was adopted officially at the Senegal meeting.

The governance structure is decentralized and consensus-based, with the individual parts (such as specific tracks within the workshop) being highly autonomous. Selection of track leaders, for example, is entirely local and does not require the involvement of the senior AfNOG leadership.

A wide range of stakeholders reported satisfaction with the governance structure; it appears to strike an appropriate balance between consensus and clear decision-making authority.

As is appropriate for an organization oriented towards education rather than policy or administration, AfNOG's current governance structure does not contain formal provisions that define who is or is not a stakeholder (and therefore entitled to vote, for example), nor does it formalize selection criteria for the various governing bodies and committees. This is appropriate for now; as the organization develops more institutional persistence, those aspects of the governance model will need to be fleshed out.

3.5 Management and Operations

3.5.1 Program Management

In general, operational management of AfNOG activities is handled by the AfNOG secretariat; until 2008 this was one person working part-time; additional people were added in 2008. Participants report a high degree of satisfaction with the competence and dedication of the secretariat staff, who, additionally, provide a human face to AfNOG as attendees deal with the application and selection process and the logistics of travel.

While the administrative staff are dedicated and competent, as AfNOG continues to grow in complexity, we believe the current approach to management will not scale. What is lacking is an overall program management function, and our recommendations include a suggestion to fund such a capability.

It is evident that there are several among AfNOG's senior volunteers who are effective program managers; these same people, of course, tend to be busy entrepreneurs and businesspeople in their day-to-day lives, and are not available to run an AfNOG program management office.

3.5.2 Process Documentation

There is very good documentation in some areas, and it is weaker in others. Preparing documentation, especially after-the-fact, does not tend to be a popular activity among action-oriented people, so the unevenness of documentation is not surprising nor particularly problematic.

AfNOG uses Wikis, mailing lists, and other collaboration tools to good effect. The content appears to be up to date and accurate.

One area of interest is the local host document. As it currently stands, the local host document is an accurate specification of what is required to support an AfNOG meeting. It is thorough and detailed, and would be entirely familiar to organizations in the habit of responding to RFPs. It is not, however, a document that invites negotiation.

3.5.3 Application process

There were several comments on the applications process, from both the student and the reviewer perspective. The process was perceived as easy to deal with, but unpredictable (there was no indication as to when to expect responses) and considered too easy to game (by having friends answer questions, for example). This year, a volunteer has agreed to build a database application to support the review of applications. This will help to manage the process, although

it will also require a strong program manager to keep the process on track. The problem of applicants gaming the system can be addressed in part by requiring references or interviews, and by, in general, getting to know the applicant pool better, through a stronger regional presence.

3.5.4 Other Observations on Operations

Transport logistics in Africa are quite unlike what people in more highly developed regions are familiar with. Simply getting people to the workshop is a significant effort. AfNOG does a great deal of logistical handholding with attendees; it is very much appreciated, but it is unclear how much is absolutely necessary.

The issues facing operational management can be summed up by the seeming disparity between two comments we heard often, one of which is that the secretariat is "perfect—you are dealing with human beings and you need to have a very high quality, competent person in that job," and the other being that "the administrative function does not do what we need, and is in some areas a mess."

This reflects a variety of viewpoints, from "old hands" and people new to the process, and is consistent with a historical lack of funding for year-round program management and process: without an institutional infrastructure, even the best people can do only so much, and as the complexity of the operation increases, the old way of doing things begins to break down.

3.5.5 Facilities

Participants were uniform in their praise for the laboratory and technical facilities, and for the competence and attentiveness of the two individuals who prepare and maintain them.

3.6 Marketing, Outreach, and Communications

Awareness of AfNOG, among the public, among potential attendees, and among potential collaborators is uneven. We got mixed responses from students, ranging from "the fact that I was an AfNOG attendee was a big deal on my résumé, to "nobody had heard of it; I needed to tell people about it. Web searches return uneven results; it is difficult to find a good overview online.

Although the PC, Secretariat, and Steering committee are all active and visible champions of AfNOG, there is nobody at the moment whose (explicit, official) job is to manage "marketing" type activities for AfNOG.

There is, on the other hand, a concern expressed by some that increased marketing will create demand that AfNOG cannot fill without significant incremental funding. This concern would be

mitigated if the increased marketing were to bring in students whose employers or sponsors are capable of paying full freight.

3.7 Funding and Finances

3.7.1 Financial transparency

AfNOG has traditionally published its annual report. We commend this display of transparency.

3.7.2 General need for funding

AfNOG charges $1,600 for the workshop (not including meeting, tutorials), cost is $4K per person (includes travel) Per person cost has been somewhat consistent over the years, except that some countries are more expensive than others - +/- 10-15%. Tutorials are free for students of the workshop, but others pay.

3.7.3 Other financial

AfNOG had a significant un-hedged currency exposure with respect to the 2008 workshop in Rabat—many local services were precontracted on the local side in Moroccan Dhirams, but on the income side in USD.

4 Recommendations

It is natural, as an organization grows and matures, to look ahead for new challenges. In doing so, it is a common mistake to overlook and undervalue the areas in which one has already succeeded. Over the past nine years AfNOG has been extraordinarily successful in its core mission: improving the accessibility and value of the Internet in Africa by training engineers and nurturing a collaborative community of networking experts. This mission has lost none of its importance, and AfNOG's first priority should continue to be to perform, with excellence, its training and community-building role, even as it expands to achieve other goals.

Our other recommendations fall into four overlapping and inter-related areas:

- AfNOG should continue on the path of **institutionalizing its capabilities,** becoming, over time, less dependent upon the talent and vision of specific individuals, and more of a persistent, self-sustaining institution capable of fulfilling its mission over the long term.

- AfNOG should **broaden its outreach**, not only to improve the recruiting of workshop students and instructors, but also to create alliances with new constituencies that have not, to date, been strongly represented.

- AfNOG should take steps to **strengthen the "AfNOG community"** and should draw upon the capabilities of the community in ways that would further improve AfNOG's success.

- AfNOG's **curriculum should continue to evolve** and should explicitly complement the training available elsewhere.

4.1 Institutionalize

Historically, AfNOG has operated as an annually renewed collaboration among individuals. AfNOG's success has depended on the ability and willingness of a core group of talented and motivated individuals to pitch in, each year, as fundraisers, organizers, and instructors. Recognizing that this approach can be scaled only so far, AfNOG has recently begun taking steps to transform itself from an annual event into a persistent institution—one that will be populated over time by many different people but that will retain its central premises regardless of who is currently involved.

AfNOG's mission is ambitious, and its trajectory of growth is already beginning to tax the old way of doing things. Creating the right kind of institutional infrastructure will help AfNOG scale further and achieve its future goals.

While useful institutional infrastructure is a good thing, excess institutional baggage is not. One of the attractive attributes of AfNOG to date has been its lack of excessive institutional baggage; AfNOG should continue to emphasize "doing" rather than "being." "Being" (a particular kind of organization) is passive, static, and focused on standing and status; "doing" (things that fulfill a mission) is active, dynamic, and focused on accomplishment, which has been the signal hallmark of AfNOG since the first workshop in 2000.

We expect that creating a lightweight but persistent organization with year-round operations will have several positive effects:

- It can change the nature of fundraising: instead of starting from scratch each year to raise funds for a specific event, AfNOG can raise funds year-round to support its programs, some of which are ongoing and some of which are annual or quarterly events.

- While volunteers can do enormous amounts of work in intensive, focused, once-a-year bursts of activity, it is more difficult to achieve continuity of year-round operations with volunteer labor. Some tasks, most notably outreach, are inherently more compatible with steady, year-round effort than with the current annual cycle of work that surrounds the annual AfNOG event.

- A persistent organization can provide more effective support to regional NOGs and to the other spin-off organizations that AfNOG expects to continue to incubate.

Specific steps towards institutionalizing AfNOG include formalizing governance and establishing a geographically distributed year-round secretariat (both of which are already underway), creating an enhanced program management function, documenting more of the knowledge required to operate AfNOG, and providing more explicit support for those wishing to form regional NOGs.

4.1.1 Continue to Develop Governance Model

AfNOG's lack of formality is a strong, positive attribute. There are no criteria for "membership" in AfNOG—in fact, the concept of membership does not exist—anyone can attend a workshop or meeting or subscribe to a mailing list and become part of the AfNOG community. Similarly, the people who make AfNOG happen are not focused on organizational rank or stature—it is a group of people who come together to make things happen.

At the same time, the lack of formality poses challenges for governance. What is an appropriate decision-making model? Who needs to be informed? Consulted? Where does authority reside?

The governance structure, adopted at the Senegal meeting in 2004, appears to provide a useful working framework and is well regarded by AfNOG participants. While the governance document lays out who is responsible for what, it is less clear about how the roles are to be filled. How does one become a member of the Program Committee? How, in the future, will the Conveners choose their successors?

We recommend that AfNOG, while bearing in mind the value of "doing" over "being," further develop the governance model, particularly with regard to defining who is entitled to a say in the organization's governance, the criteria for inclusion in (or appointment to) the various governing committees, and how the governance model can be changed over time.

4.1.2 Strengthen Program Management

We recommend that AfNOG create an explicit Program Management function, charged with the responsibility for overall planning and operational management of AfNOG events. This might be an outgrowth of the existing secretariat, or it might be a new part of the AfNOG organization. This function would be staffed by one or more individuals whose primary job was to establish operations plans and schedules for all AfNOG events and then to manage against those plans. Program managers need to be individuals with the skill and temperament to deal with complex plans in a highly uncertain environment, and with the seniority and credibility that when they insist that a decision needs to be made or a task completed, everyone involved takes them seriously.

It is clear that such individuals already exist within AfNOG, and there are many advantages to appointing existing, seasoned AfNOG volunteers as program managers. It is not clear, though, as volunteers, whether or not these volunteers., who by nature tend to be busy professionals, can be available enough, on a sustained enough basis, for effective program management.

4.1.3 Consolidate Documentation

For a group with ad-hoc roots, AfNOG already has an impressive amount of documentation. All curriculum materials are available electronically, there is a substantial hosting requirements document, there are several mailing lists with archives, and there is a wiki used to plan and manage the workshops. All of these create a permanent record.

We recommend that a person or small group take on the task of organizing some of this existing material and creating a small amount of additional documentation to complete a comprehensive "How to do AfNOG" document that captures the lessons learned from past AfNOGs and contains advice to future AfNOG leaders. This document should be sufficiently detailed that, in theory, an outsider could read it and become an effective member of the AfNOG team.

"How to do AfNOG" is important for two distinct reasons. First, it supports the program management function described above, and leads to smooth operation of AfNOG itself: More of the plan can be executed directly by the "doers" with fewer hang-ups as problems need to be fixed ad-hoc or decisions escalated to senior management. Secondly, "How to do AfNOG" directly supports the mission of localization: it gives people who have never before run a NOG, a significant push towards success.

In making this recommendation, we recognize that, often, documentation becomes useless institutional baggage rather than effective supporting infrastructure, and that creating documentation after-the-fact is not popular among busy people, who might legitimately ask "Why am I doing this, when instead I could be training more engineers?" It is important to make clear the direct link between the documentation and the program management function: that the documentation will not go onto the shelf but will become the basis of next year's event. It is also important to make clear that the documentation is essential support for those who are creating local NOGs. (See the recommendation immediately following this one.)

It is also important that the documentation remain live—up-to-date. Each event is different; each offers the opportunity to learn new lessons. AfNOG already uses Wikis and other group edited documents, and therefore understands the principles involved. All that is needed is a small, additional, editorial function: a person who sees it as his or her responsibility to look over the entire document set and identify what is missing, incomplete, or out-of-date.

4.1.4 Offer "NOG-in-a-box"

Creating a regional or local NOG appears to be a mixture of passionate, visionary leadership, knowledge, effective administrative management, and hard work. To many would-be leaders, the combination must be daunting. AfNOG has materials that may help reduce the burden.

AfNOG has acquired a great deal of knowledge—both about the technical material at hand—how to build and operate large scale Internet services in Africa—and about how to run tutorials, workshops, and collaborative meetings. Some of this knowledge is explicit in the form of curriculum notes. Other is implicit, but can be made explicit via the documentation activity described immediately above.

In addition to knowledge, operating AfNOG requires tools ranging from spreadsheets to handle registration and administration, mailing lists, Wikis, database applications to handle applications and their reviews, financial accounting templates, configuration information for the PCs, routing equipment, and local networks used in the courses and workshops, and others. AfNOG has, over time, acquired or created a great deal of this material.

We recommend that AfNOG explicitly create a single package containing all the curriculum materials, documentation, and tools needed to plan and operate a local or a regional NOG. With this package, the organizers of regional and local NOGs could benefit directly from AfNOG's experience, saving themselves a great deal of effort and placing themselves further along the learning curve for their first attempt at a workshop.

The package would be most effective if it were not merely offered, but if it came with support: if there were a person within AfNOG whose job it was to support local NOGs—to whom people setting up their own NOGs using the materials in the package could turn for support and practical advice.

The availability of such a package and support might have the effect of reinforcing the message that members of the AfNOG community are expected to build local community, that the task is not impossible, and that AfNOG provides support.

The creation of this "NOG-in-a-box" is central to AfNOG's mission of supporting spin-off and regional organizations; it could easily be a stand-alone project worthy of external funding.

4.1.5 Maintain Volunteer Orientation

As described in our findings above (Section 3.3.1) the scale of AfNOG is taxing the capabilities of an all-volunteer organization. An obvious response is to move from a volunteer model to a paid staff model. We recommend against this for three reasons.

Most importantly we believe that cultural factors trump operational issues. Because the AfNOG instructors and leaders are volunteers, they have tremendous credibility when they say to the students, in effect, "We came here, gave our time and taught you, now you must go out and do the same: give your time and teach others." Many people mentioned this in our interviews and informal conversations.

The second (perhaps obvious) issue is that hiring large amounts of staff is expensive, and part of the AfNOG success has been the organization's ability to do a great deal with limited resources.

Finally, the seniority of instructors available as volunteers may be greater than could be affordably hired as permanent staff. A sense of mission attracts very senior, highly credentialed volunteers to come to AfNOG and teach; attracting a similar caliber of people to work for pay may be nearly impossible.

Since fostering this indirect, follow-on effect is an important part of AfNOG's model, we advise against any significant movement away from a volunteer corps of instructors and leaders. We believe that the operational issues associated with scaling up the organization can be addressed with a combination of the program management function, the expanded secretariat, consolidated documentation, more help from the local hosts, and a larger cadre of volunteer instructors.

4.1.6 Enhance the Role of the Local Host

We recommend that AfNOG take specific steps to recruit local hosts and to gain more leverage from their knowledge and expertise.

We recommend that AfNOG prepare a local host information package. As opposed to the existing local host document, the emphasis here would not be on formal specifications, but instead on explaining the benefits to the local host of supporting AfNOG, outlining the requirements briefly, and inviting further discussion. This package should be crafted as an outreach or marketing tool.

A single person, perhaps within the program management office, should be given the responsibility of responding to every expression of interest from potential local hosts and encouraging further negotiation. For all serious expressions of interest, this person, who would not be involved in evaluating the proposals, could offer assistance in assembling a proposal. Additional outreach, encouragement, and support of potential local hosts could be accomplished if more staff resources were available.

The hosting agreement should be edited to include specific examples of what has been done in the past, and to make it more clear what is flexible and what is fixed.

In cases where the local host has considerable experience in running meetings like AfNOG, (as was the case in 2008), the local host could be given more discretion and authority to manage local arrangements, freeing a considerable amount of time for AfNOG organizers to focus on other tasks. This requires close cooperation among the program management office, the secretariat, and the local host, and carries with it risks.

Wherever possible, the local host should be selected far enough in advance so that the next year's local host can attend the current year's conference as an apprentice host.

AfNOG may wish to look at the [IETF Administrative Support Activity](#) (IASA) for an additional, worked example of a hosting agreement and a local host management process.

4.2 Broaden Outreach

Key to AfNOG's mission is building and supporting community. Toward this end, AfNOG would be well served by broadening its outreach on two fronts: to the general public, and to specific, targeted organizations, institutions and enterprises.

4.2.1 Reach Out to a Broader Public

General awareness of AfNOG is uneven. Broader awareness would serve a triple purpose:

- More applicants would apply to participate in AfNOG workshops, allowing AfNOG to be more selective, increasing the preparation and skill level of attendees.

- The value of having attended an AfNOG workshop would increase; employers who are aware of AfNOG value AfNOG "graduates".

- Potential partner organizations and sources of funding would be more aware of AfNOG.

Although outreach can be time consuming, we recommend that the importance of outreach be elevated: that a single individual be tasked with taking steps such as creating Wikipedia entries, keeping the public web site up to date, inviting the African press to cover AfNOG workshops, writing about AfNOG on blogs, working with ISPs and other partner organizations to publicize AfNOG, and otherwise to keep AfNOG's positive achievements in the public eye. More broadly, an initiative to encourage AfNOG participants to write and speak about their experience may be of value.

4.2.2 Reach Out to Additional Specific Constituencies

Beyond general outreach, AfNOG could benefit from specific outreach to other organizations within the general field of networking in Africa. These include PTTs and commercial networking enterprises, wireless operators, and ISPs beyond those already within the AfNOG community.

Stronger ties with these enterprises could benefit AfNOG in its ability to attract students and instructors to workshops, and could be of financial benefit as well. At the same time, different constituencies can embody different philosophical approaches to collaboration and to the dissemination of technical knowledge. We encourage AfNOG to think strategically about how it is going to engage these other enterprises.

4.3 Emphasize AfNOG as a Community

AfNOG has been successful in creating community. Additional measures may build on that success.

4.3.1 Make Community More Explicit

The message to workshop participants—"you are all part of the AfNOG community and you must go and share your knowledge with others" was delivered clearly and consistently at the workshop. It may be appropriate to reduce some of this message to writing—to create and publish an "AfNOG Manifesto" (not necessarily using that term) that defines what it means to be part of the AfNOG community.

4.3.2 Harness the Power of Alumni

While some workshop attendees go on to become AfNOG volunteers, others disappear from view. "Alumni" relations have been managed ad-hoc. We recommend that AfNOG take more explicit steps to harness the power of the alumni community, specifically:

- Insure that there is follow-up at regular intervals with workshop attendees, instructors, and other participants. Such follow-up can range from "How did we do?" to "Are you benefiting from your AfNOG experience?" to "What have you done lately to help train others?" to "Would you volunteer for us?"

- Explicitly ask alumni to recruit future participants.

- Maintain a group of alumni willing to interview applicants in their local regions. This should improve the selection process, resulting in a higher caliber of workshop attendees. In particular, it should reduce the number of workshop attendees whose paper applications over-represent their actual skills, and who therefore arrive poorly prepared for the advanced workshops. Such a program would need to be introduced carefully, and managed so as to avoid the creation of self-perpetuating cliques, or the perception that "To become part of AfNOG, you need to know someone who has already attended."

4.4 Curriculum

4.4.1 Focus on AfNOG's unique advantage

AfNOG, using its limited resources, should continue to focus on material that cannot easily be learned elsewhere.

- The AfNOG meeting should continue to focus on cutting edge topics. By definition, the content will change from year to year. Should interest in a topic persist, some AfNOG meeting topics could become AfNOG workshop topics.

- AfNOG workshops should continue to cover advanced topics that are not covered elsewhere. In particular, AfNOG should not be giving training that could be given instead at a regional or local NOG. To a first order approximation, we believe that teaching Unix system administration (for example) can be done more cost effectively at a local or regional level (and AfNOG is already doing so in West Africa in Fall, 2008). But this does not equate to striking Unix system administration from the AfNOG curriculum: some students may come from geographic regions where there is no local way to get such training. For them, and for them only, AfNOG should continue to teach material that would otherwise be considered too basic.

- Regional NOGs should cover more basic topics, for which it is not necessary to bring in overseas instructors.

- There is a logical progression, by which, over time, conference topics become workshop topics, which in turn become local NOG topics. This will continue to evolve over time, as new topics are added at the top, and course content is be "pushed down the stack."

4.4.2 Develop the First Tier

AfNOG should form closer relationships with organizations that provide first-tier training: universities, technical schools, local and regional NOGs, and in-house training programs at companies, so that AfNOG can be more explicit about providing advanced, follow-on training to those who have already exhausted the training available to them locally. As this first tier becomes better developed, AfNOG could potentially go so far as to make having received first tier training a prerequisite for attending AfNOG.

4.4.3 Train the Trainers

AfNOG should offer teacher training (as it has done in the past, based upon the availability of qualified volunteers to teach pedagogy). Several instructors have asked for a "boot camp for instructors" or other material that focuses on how to teach.