



**USING OPEN SOURCE SOFTWARE IN THE SOUTH AFRICAN GOVERNMENT  
REQUEST FOR INFORMATION ON A PROPOSED POLICY BY THE OPEN SOURCE  
SOFTWARE WORK GROUP, GOVERNMENT INFORMATION TECHNOLOGY OFFICERS  
COUNCIL  
AUGUST 2002**

**PREFACE**

The Government Information Officers Council (GITO) has recommended to Government that the use of open source software (OSS) be explicitly supported in e-Government policy. Government is now in a phase of discussion and information exchange aimed at finalising a comprehensive OSS policy and strategy for use in government institutions. This document reflects the current understanding of the issues related to using OSS in government.

Readers are encouraged to come forward with information that will enable government to develop this document further into one that comprehensively address the issues concerned, in a way that will enable us to derive maximum possible use from OSS.

Although this project only focuses on use of OSS inside the public service, many institutions in the broader public sector, as well as the private sector can be affected by the way government implements OSS. The need therefore exists for thorough information exchange on the topic.

This request for information creates the opportunity for all parties who can add to government's insights on how best to understand and utilise OSS to come forward with relevant information. Implementation must in the end be to the overall benefit of all sectors – must in many ways be implemented in partnership with several stakeholders.

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# 1 Open source software: What is it and what does it offer<sup>1</sup>

Open source software (OSS) refers to software that is developed, tested, or improved through public collaboration and distributed with the idea that it must be shared with others, ensuring open future collaboration. Open Source has emerged as a powerful new way to generate knowledge and economic value. It is available to anyone at usually little or no cost, it does not attract proprietary license fees and it may be freely re-distributed. Users also have access to the “source code” revealing the inner workings of the software; hence the term “open source”. Such access has the potential to empower people in ways that proprietary software (PS) does not allow. It offers users the choice to probe, modify, learn from and customise the software, harnessing the power of many small contributions from a large network of individuals, to suit their needs, Open Source supports a rapid evolutionary process that produces better products in less time than the traditional closed model.

This model can have profound educational benefits, but, even without taking advantage of the freedom offered by access to the source, the non-proprietary status of open source software has huge implications for affordable IT solutions in both public and private sectors. Open source may be poised to stimulate a new wave of opportunities in IT.

While the notion of open source is not new, the Internet has fuelled current interest in it. The Internet is founded on non-proprietary standards and applications contributed by individuals and distributed communities of developers. The future challenge of the Internet predominantly lies in applications, content and distributed services. There is also growth in IT hardware products that are closely coupled to open systems. Hence the “open philosophy” in IT covers open standards, open source, open content, open services and open hardware.

Government, in partnership with industry and society, has a key role to play in the debate. Government is the largest procurer of ICT on the continent. Realising the potential benefits of OSS and Open Standards, Government can contribute and benefit significantly, especially in the following areas:

- ✓ Maximising the value of the ICT budgets through saving on dollar-based licence costs and efficiency gains through avoidance of potential lock-in and wider choice through appropriate policies and legislation.
- ✓ Stimulating the local software industry. This will lead to better export potential and better capacity locally to satisfy Government’s ICT needs. It will also contribute significantly to human resource development, especially in the area of ICT.
- ✓ Lowering the entry barriers for Research and Development by creating an enabling space unconstrained by policy and legal requirements that discriminate against OSS.

Open software has reached a critical mass that has allowed it to enter the mainstream software market and its impact is becoming noticeable in the software industry and in society as a whole. Companies like IBM, SAP, Sun, Intel, Hewlett-Packard and Silicon Graphics are committed to using open software as a core part of their business and are investing significantly in enhancing its already impressive capabilities.

Open software is an especially useful tool to allow developing countries to leapfrog into the information age. It encourages novel development models that have been demonstrated to be particularly well suited to take advantage of the work of developers collaborating across the Internet. In general, it also has a positive impact as an enabler for the creation of new markets and business opportunities.

In summary, the major benefits of open software and open standards include:

- Reduced costs and less dependency on imported technology and skills

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<sup>1</sup> SITA, CSIR: **Development of a Strategy for the use of Open Source Software in Government**, unpublished, 2002.

- Affordable software for individuals, enterprise and government
- Universal access through mass software rollout without costly licensing implications
- Access to government data without barriers of PS and data formats
- Ability to customise software to local languages and cultures
- Lowered barriers to entry for software businesses
- Participation in global network of software development.

The types of strategies employed by Government might take on the form of:

- Neutral approach, but ensuring that choice is supported and discrimination against OSS is limited
- Enabling approach where policies are geared towards the encouragement of the use of OSS
- Aggressive Approach where Government actively push the development of OSS through legislation and policy

## **2 Concepts**

### **2.1 Open source software**

Open Source Software (OSS) is software of which the source code is openly published, which is usually available at no charge, and which is often developed by voluntary efforts<sup>2</sup>.

### **2.2 Open standards**

Software in respect of which the standards that are used when executing the software are made known, enabling users to develop or use other software or data sources that will be able to interact with the open standards software.

### **2.3 Policy and strategy**

In this context *strategy* refers to broad actions that are undertaken to achieve certain goals. *Policy* refers to the principles and rules laid down by decision makers that guide those activities.

## **3 Context**

### **3.1 Strategy for national use vs strategy for government-wide use**

GITOC focuses on the latter. The Department of Communication is coordinating a series of activities aimed at developing a national "e-strategy", to which the government strategy will contribute.

### **3.2 GITOC resolution to promote OSS**

The Government IT Officers Council's resolution to promote wider use of OSS is described below. That step is the major factor behind this policy development process.

### **3.3 OSS already in use for specific applications**

Important applications are already operational, both in and outside the public service in specific areas. In other areas OSS is however not well known/understood/developed.

### **3.4 Large amounts of documentation available, but no comprehensive South African policy document**

Valuable studies are available, produced by the European Union and the UK Government. Based on these and local investigation, reports have been produced for the GITO Council, but they do not yet constitute a detailed guideline for implementation in government.

### **3.5 OSS promoted through pilot projects, no concerted implementation strategy in place yet**

At present further pilot applications of OSS are encouraged in order to fully understand how best

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<sup>2</sup> [http://www.govtalk.gov.uk/interoperability/egif\\_document.asp?docnum=430](http://www.govtalk.gov.uk/interoperability/egif_document.asp?docnum=430)

to derive benefits from them for government. The Centre for Public Service Innovation has recently positioned themselves to facilitate such pilots.

### **3.6 Need for partnership and proper consultation**

The need results from the fact that institutions outside government are in some cases further advanced in utilising OSS.

Mechanisms include the forum to be established, the release of this document, a symposium and a workshop related to OSS.

## **4 Situation analysis**

### **4.1 The OSS movement**

#### **4.1.1 Short history**

A substantial amount of source code for programmes has been open since the 1980s. The collaborative model that is one of the central features of the OSS model gained momentum in the late 1980s and early 1990s. The term "open source software" came into general use in 1998. See the Open Source Initiative

#### **4.1.2 Development Model**

Essentially OSS is developed through volunteers, who collaborate to develop the software and then improve and extend it over time. The software is then made freely available to any users. A more detailed description appears at **Annexure B**.

The model works best for software that has a wide application and a large number of users.

### **4.2 Usage**

#### **4.2.1 Pockets of implementation in government.**

A few areas of expertise in government exist. That includes applications supported by SITA. The applications are mainly for Internet usage and related applications.

#### **4.2.2 Usage in business sector**

Some prominent South African businesses confidently and successfully use OSS. A number of other organisations use it on a trial basis.

#### **4.2.3 Usage in tertiary education**

Some institutions are implementing policies of implementing OSS software where it is available in preference to PS.

#### **4.2.4 Usage by other governments**

Several governments have taken a formal position on OSS. Some prominent examples are the UK, China, Peru and some components of the US government.

### **4.3 Categories of OSS widely used**

#### **4.3.1 Internet**

Some widely used current applications are the following:

- ✓ Apache, which runs over 50% of the world's web servers.
- ✓ Perl, which is the engine behind most of the "live content" on the World Wide Web.
- ✓ BIND, the software that provides the DNS (domain name service) for the entire Internet.
- ✓ Sendmail, the most important and widely used email transport software on the Internet.

#### **4.3.2 Operating system**

The Linux operating system is one of the most widely known OSS applications.

#### **4.3.3 Office suites**

[http://www.govtalk.gov.uk/interoperability/egif\\_document.asp?docnum=430](http://www.govtalk.gov.uk/interoperability/egif_document.asp?docnum=430) contains an analysis of relevant OSS alternatives for word processing, spreadsheets, presentations, etc.

#### **4.3.4 Translation**

Progress has been made on using OSS for translations into all official languages in South Africa. Significant further work is needed.

#### **4.3.5 Other**

Worldwide a wide variety of other software has been developed, including -

- ✓ Geographical Information Systems
- ✓ Compilers for C, C++, Fortran, Objective C and other languages
- ✓ Graphical music notation
- ✓ Numerous games.

### **4.4 Initiatives in South African Public Sector**

#### **4.4.1 National Advisory Council on Innovation (NACI) initiative**

During 2001 NACI took an initiative to promote wider OSS usage in South Africa. After workshopping, a discussion document was released. Based on the response the document was amended and recommendations were submitted to Cabinet. Cabinet supported the idea of investigating wider implementation of OSS and requested that a committee be formed to manage the process.

#### **4.4.2 Presidency's initiatives**

Partly as the result of NACI's initiative, OSS is now entering the agendas of other high level bodies, such as the Presidential International Advisory Council on Information Society and Development (PIAC on ISAD) and the Presidential National Commission on Information Society and Development (PNC on ISAD).

#### **4.4.3 Government IT Officers Council (GITOC) and its OSS Work Group**

In speeches in Parliament during 2001 there were suggestions that government should promote wider use of OSS. The Government IT Officers Council subsequently formed an OSS Work Group to investigate. The Work Group found that –

1. OSS is a significant and growing phenomenon within many governments. It should not be ignored.
2. In certain areas of application OSS has reached a high level of maturity. Its use can safely be allowed, even encouraged, and it has the potential of generating significant efficiencies.
3. In other areas the performance of OSS has not been proved to be superior to proprietary software.
4. Academic institutions are often enthusiastic, successful champions of OSS. Partnerships between them and government institutions may be beneficial.
5. Challenges regarding orderly, responsible implementation, such as security, interoperability, and providing user support are generally not unrealistically high and should not in themselves constitute reasons for not choosing OSS.
6. The level of knowledge and understanding of OSS in the South African government is currently inconsistent. Pressure to opt for OSS may be inappropriate.

The GITO Council therefore recommended that –

1. Government recognise open source software as a legitimate alternative to proprietary software to be used in information systems in government;
2. Government avoid any unfair discrimination against implementing OSS in government;
3. The Government IT Officers Council –

- 3.1 Review processes for setting criteria for software selection, ensuring that any unfair bias against OSS is removed.
- 3.2 Launch a programme of promoting greater knowledge and understanding of OSS in government. This is to include disseminating background documents and reporting widely on pilot applications.
- 3.3 Promote trial use of OSS.
- 3.4 Provide guidelines for integrating OSS meaningfully in government's service delivery and general operational processes.
- 3.5 Develop a model for support structures and services for OSS users.
- 3.6 Submit recommendations for a more aggressive later phase of OSS implementation in government, including inducements associated with procurement.

4. Government-funded research on the development and utilisation of OSS be initiated.

#### **4.4.4 CSIR**

The CSIR is investigating strategies of providing information and support to OSS usage that could contribute to increased socio-economic development.

### **4.5 Support available**

#### **4.5.1 Websites**

Help can be solicited through posting messages on appropriate Internet sites or sending them to e-mail addresses provided on the www.

#### **4.5.2 Vendors**

Vendors that sell OSS could provide a measure of support with installation and operation.

#### **4.5.3 Special interest groups**

For widely used software such as Linux, special interest groups are formed in many countries.

## **5 Potential advantages**

### **5.1 Advantages for institutions using OSS**

#### **5.1.1 Freedom to enhance and extend existing software**

Because the source code is available, users can enhance and extend the software to suit their individual needs and can make these available to all without charging.

#### **5.1.2 Avoiding lock-in**

Source code is made available to all users who wish to have it and can then be amended by others, without having to depend on the original developer.

#### **5.1.3 Freedom to redistribute**

Provided certain rules and conventions are observed, software can be passed on to other potential users without having to infringe licensing or copyright conventions.

#### **5.1.4 Expenditure**

As the software is not sold and no licensing fees are involved, the recipient only has to bear the cost of duplicating and distributing.

Several programmes can be downloaded via the Internet free of charge. The only cost is that associated with lengthy connections with the download site.

In many cases CDs containing the software can be purchased, often accompanied by a greater or lesser amount of printed material.

It should be noted though that whereas acquisition cost is normally low, total implementation and

maintenance cost can vary widely and could be the major portion of total cost to company.

### **5.1.5 No need for license management and policing**

The cost of recording which work stations and/or users possess licenses entitling them to use the software falls away. The danger of employees using unauthorised, pirated copies of software is eliminated.

## **5.2 Advantages for government**

State Security - lowering dependence on foreign vendors who do not always have the country's interest.

## **5.3 Economic advantages**

### **5.3.1 Reducing imports of software and licenses**

Better management of the value chain and reducing the amount of money that leaves the country annually.

### **5.3.2 Stimulating local business, especially SMME's**

Development of software by local software SMMEs can be enhanced.

Expenditure on software by all SMMEs can be reduced.

### **5.3.3 Supporting the Proudly South African Campaign**

OSS development and use can be one way of promoting the use of locally produced goods and services.

### **5.3.4 The funding and costing model**

A model is to be developed that will ensure that OSS is used in a fully functional manner at a lower overall cost than PS. The model must show clearly what functions the developers and suppliers of software and support will perform, how they will be compensated, where funds used for compensation will originate and how it will flow through the system. The model must help us understand how cost:benefit ratios improve when migrating from PS to OSS for specific applications.

## **5.4 Advantages for civil society**

### **5.4.1 Educational**

Improving the skills base and giving real opportunities to learners to become proficient in software development and maintenance.

### **5.4.2 Electronic access**

Improving public access to online government documents.

## **5.5 Advantages for all**

### **5.5.1 Public Access to Information**

By making information held by the public service accessible through the use of open source software, users are enabled to get access from their computers without having to obtain licensed software.

### **5.5.2 Participation in global movements for software development**

Open source software is often developed and enhanced jointly by networks of collaborators from all over the world. Using OSS enables the public service and others to participate in such ventures.

### **5.5.3 Access to global support resources**

The international OSS user community is often accessible and prepared/ able to assist over long distances when a user has a problem.

## 6 Vision

A vision should paint a picture of where you want to be. It should be –

- sufficiently more attractive than the present situation to create a strong general desire to work towards it;
- sufficiently far removed from where you are now to pose a real challenge and to stretch your capabilities;
- not that far removed that it is unreachable;
- described in sufficient detail to enable common understanding (shared vision) and to base detailed planning on.

### 6.1 *Broader vision*

#### 6.1.1 **Balance software imports and exports**

The OSS model enabling local development of software to an extent that it meets a significant portion of software needs.

#### 6.1.2 **A software industry component based on OSS**

A local software industry based on OSS development, stimulated by public service usage of OSS.

#### 6.1.3 **IT specialists fully familiar with OSS**

IT specialists who are fully familiar with the characteristics, capabilities and potential of OSS and utilise it to the full.

#### 6.1.4 **Copious participation in OSS networking at a global level**

Specialists and users networked at a global level, easily obtaining assistance from anywhere and in turn respected for their expertise, professionalism and ability to provide assistance to others in the area of OSS.

#### 6.1.5 **Balanced attitude towards OSS**

Wider usage of OSS, but retention of a balanced view and level playing fields, still enabling the use of PS where it is more suitable.

#### 6.1.6 **OSS fully embedded in education and training delivery systems**

Syllabi at all education and training institutions that equip students adequately for working in the OSS paradigm when they enter into the labour market.

#### 6.1.7 **Similar levels of acceptance and usage throughout NEPAD countries**

Most NEPAD participants at an advanced level of utilisation and development of OSS.

### 6.2 *Government vision*

#### 6.2.1 **Mirroring the broader vision**

The broader vision described above will apply in the public service as well.

#### 6.2.2 **Level playing fields**

No discrimination in setting criteria for and selection of software. Selection on merit, and the best option will be selected, regardless of whether it is OSS or PS. This will result not only from neutrality of documented software assessment criteria, but from an objective, unprejudiced mindset of decision makers.

#### 6.2.3 **OSS networking**

A strong OSS networking culture, with networks functioning for all OSS applications.

#### 6.2.4 **OSS support structures**

Institutions that are able to assist users with implementation and by developing OSS or extending existing software.

### **6.2.5 OSS utilisation: significant and growing**

An increasing ratio of OSS:PS usage will increase to a point where the overall benefit to government is at its peak.

### **6.2.6 Knowledge and expertise**

OSS knowledge and expertise in government well developed. There should be specialist programmers, expert users who can also make minor programming adjustments themselves, as well as ordinary users who, despite not doing programming have a good understanding of the programmes and how they function.

### **6.2.7 Fully developed security measures**

Security associated with OSS software will be equal if not better than in the case of PS.

### **6.2.8 An effective software industry using OSS**

Government will give a substantial amount of its software development assignments to local software houses that use OSS to provide the solutions, leading to a well-established local industry.

### **6.2.9 Government a software provider**

Output of software developed in the South African government according to the OSS philosophy will equal or exceed input of OSS taken over from other developers.

### **6.2.10 OSS for service provision**

OSS which is freely available to the general public will be used in the vast majority of computer-driven interaction between government and citizens.

## **7 Prerequisites for implementation in government**

### **7.1 Knowledge, understanding, commitment**

A sufficient level of knowledge, understanding and commitment among users, IT professionals and decision makers in the public service.

### **7.2 Non-discrimination**

No unfair discrimination for or against either OSS or PS, either because of adopted criteria or a prejudicial mindset..

### **7.3 Support**

#### **7.3.1 Software selection**

Expertise must be available to assist users to select the best option, OSS or otherwise.

#### **7.3.2 Implementation and troubleshooting**

Support that is quick, efficient and effective to help with operationalising and troubleshooting of newly implemented OSS.

#### **7.3.3 Software development assistance**

Programmers and related experts should be available to provide users with developing new and/or enhancing existing software as needed.

#### **7.3.4 Training**

Training of OSS developers and OSS users must be available.

### **7.4 Enabling security measures**

The security of OSS-based systems must be able to meet all requirements applicable to government IT systems in general.

### **7.5 Providing a demonstrably better option**

Migrating to OSS has to be a business decision based on sound business principles. Subjective

preferences because of noble principles involved should not be the deciding factor.

## **7.6 Research**

A well-run research programme will be needed to enable optimal understanding and decision making on OSS.

## **7.7 Interoperability**

OSS that is developed and implemented in government must uphold the principle of interoperability with other IT systems in use.

## **7.8 Prerequisites are not prohibitive**

The above prerequisites are not seen as prohibitive. Initial cursory assessment point to the conclusion that it will be feasible to implement a strategy for increasing OSS usage in government. A widely publicised study in this regard is the response of the Peruvian government to a position taken by a PS developer on the difficulties associated with OSS usage. See

## **8 Policy**

### **8.1 Basic principle**

Regardless of many other advantages, the primary reason for adopting OSS will remain the improvement of efficiency, effectiveness and economy of service delivery by government to its citizens.

### **8.2 Incorporation in e-Government policies**

OSS policies must integrate smoothly with broader e-Government policy.

### **8.3 Opting for OSS where advantages of OSS and PS are more or less the same**

Because of the many indirect advantages of using OSS, it will be the preferred option where PS and OSS solutions in all other respects provide more or less equal functionality.

### **8.4 OSS for the citizenry**

In order to enhance government's electronic service delivery access to and use of OSS by the public will be promoted by government.

## **9 Strategy**

### **9.1 Introductory phase**

#### **9.1.1 Information dissemination**

Because the level of knowledge and understanding of OSS within government is still relatively low, information dissemination will be an important feature of the initial phase. This will take the form of briefing sessions, publishing information in appropriate media, developing a website and presentations to relevant interest groups.

#### **9.1.2 Pilot projects**

Using OSS on a pilot basis will be encouraged. Developing enhancements to software by using the OSS model will be promoted.

#### **9.1.3 Consultation**

Opportunities to consult with users, developers and researchers will be created.

#### **9.1.4 Research**

The research agenda at present is based on the following objectives:

1. Develop a consistent picture of the needs and expectations of Government with regard to OSS.
2. Develop policies and legislation relevant to the use of OSS in Government.
3. Develop research and evaluation instruments to assist decision makers in the identification

and evaluation of opportunities and areas for the appropriate use of OSS.

4. Develop a definition of the roles of the various sections of Government in the area of OSS, including the roles of SITA and ITAC.
5. Identify opportunities and identify pilots for the use of OSS in Government.
6. Define a clear longer term research agenda to support the OSS strategy.

### **9.1.5 Develop support structures**

Develop planning to establish structures that can –

1. provide expert guidance and advice to users of OSS software;
2. develop new OSS or enhancements to existing OSS to improve their utility.

### **9.1.6 Level playing fields**

Review procurement procedures and criteria to ensure that there is no discrimination for or against OSS procurement.

### **9.1.7 Communication**

Develop a comprehensive OSS communication strategy that will ensure optimal knowledge, understanding and commitment to OSS.

## **9.2 Enabling phase**

Put in motion the plans developed during the introductory phase in order to –

1. Provide expert guidance
2. Provide training
3. Provide software development assistance
4. Enforce non-discriminatory procurement criteria.

Develop systems and procedures needed during the mature phase described below.

## **9.3 Mature phase**

Have systems and procedures in operation so as to –

1. Persist with communication to maintain general confidence in the viability of OSS solutions
2. Provide Certification for OSS developers
3. Undertake assessment and certification of software
4. Maintain Clusters and Networks of support
5. Promote OSS development and use in many other African countries.

## **10 Conclusion**

Some of the key issues are:

- Full implementation of the OSS model implies that we not only acquire and use the freely available software, but also contribute to development. A pool of skills need to be established in the public sector.
- There are conflicting views on cost savings resulting from using OSS. Acquisition cost may be lower, but that is usually a minor component of software lifecycle cost. Indirect advantages, including indirect savings and spin-off developments or savings contribute to the overall advantages, leading to advantages outweighing disadvantages.
- Information security is an issue which makes careful management of OSS implementation essential, in which case it may be possible to safeguard information to the same extent as when using proprietary software.
- Implementation of carefully selected OSS in the public service should be seriously considered. The current environment demands, however, that this be accompanied by a well-planned change management strategy.

The open source software movement is a very beneficial addition to the software scene in government. Its achievements and the enthusiasm of its supporters, together with its potential

advantages, lead to the belief that it has a promising future. If properly managed, its benefits for South African society can be considerable. It is government's challenge now to find the appropriate strategy to enable these benefits to materialise.

## **ANNEXURE A: SOME HISTORY**

The Open Source Initiative summarises it as follows<sup>3</sup>:

The "open source" label itself came out of a strategy session held on February 3rd 1998 in Palo Alto, California. The people present included Todd Anderson, Chris Peterson (of the [Foresight Institute](#)), John "maddog" Hall and Larry Augustin (both of [Linux International](#)), Sam Ockman (of the Silicon Valley Linux User's Group), and Eric Raymond.

We were reacting to [Netscape's announcement](#) that it planned to give away the source of its browser. One of us ([Raymond](#)) had been invited out by Netscape to help them plan the release and followon actions. We realized that the Netscape announcement had created a precious window of time within which we might finally be able to get the corporate world to listen to what we have to teach about the superiority of an open development process.

We realized it was time to dump the confrontational attitude that has been associated with "free software" in the past and sell the idea strictly on the same pragmatic, business-case grounds that motivated Netscape. We brainstormed about tactics and a new label. "Open source," contributed by Chris Peterson, was the best thing we came up with.

Over the next week we worked on spreading the word. Linus Torvalds gave us an all-important imprimatur :) the following day. Bruce Perens got involved early, offering to trademark "open source" and host this web site. Phil Hughes offered us a pulpit in [Linux Journal](#). Richard Stallman flirted with adopting the term, then changed his mind.

The Open Source Definition is derived from the [Debian Free Software Guidelines](#). Bruce Perens composed the original draft; it was refined using suggestions of the [Debian GNU/Linux](#) Distribution developers in e-mail conference during most of June, 1997. They then voted to approve it as Debian's publicly stated policy. It was revised somewhat and Debian-specific references were removed at the origination of the Open Source Initiative in February 1998.

The Open Source Initiative is now a California public benefit (not-for-profit) corporation.

## **ANNEXURE B: THE OPEN SOURCE MODEL**

NACI describes the model as follows<sup>4</sup>:

"Open software has an unusual but very powerful development model. The bulk of the development effort has traditionally been provided by a large group of volunteers from all corners of the globe connected by the Internet. This is possible exactly because access to the sources of the software is unrestricted and modern computer networks allow for very efficient distribution and scrutiny of the latest versions of the software by people all over the world. This has proven to be a way of producing very robust software that is well known for its reliability. Eric Raymond refers to such a distributed volunteer model as a "Bazaar" as opposed to the "Cathedral" in an orthodox hierarchical development model<sup>5</sup>.

This volunteer model has arisen in the developed world, especially the USA, where there is an implicit subsidy provided by wealthy institutions, well-funded universities and corporations. The question is how this model translates to poorer countries and how it should be modified if need be without killing the goose that lays the golden egg.

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<sup>3</sup> See <http://www.opensource.org/docs/history.php>

<sup>4</sup> <http://www.naci.org.za/D01.cfm>

<sup>5</sup> "The Cathedral and the Bazaar", Eric Raymond, <http://www.tuxedo.org/~esr/writings/cathedral-bazaar/>

South Africa has a tradition of public support for enterprises in the public and national interest. This tradition should be extended to the development of open software that addresses national needs. This suggests a hybrid development model involving distributed volunteers anywhere in the world and explicit financial support (perhaps by making use of the Universal Service Fund) for others in the country with the enthusiasm and aptitude to be involved in chosen development projects. Well-conceived projects can be an excellent mechanism for capacity building in ICT and assimilating the discipline of collaborative software development.

A complement to development is evaluation and certification of open software. The hybrid development model might include a co-ordinating agency with longer-term employees to carry out this function on behalf of bodies such as the State Information Technology Agency (SITA). It is expected that the training and support role would be fulfilled by a groundswell of companies that a government commitment to open software would undoubtedly give rise to.

It would also make sense for Government to co-operate with other governments and international agencies to build software components and systems that are of common interest. An example is the UK government's involvement in the development of XML schemas (open web-based information exchange standards) as part of an e-government interoperability framework (e-GIF), as described by a UK government study<sup>6</sup>. Governments could also share experiences on various projects, such as OSS desktop deployment pilots."

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<sup>6</sup> "e-Government Interoperability Framework", <http://www.govtalk.gov.uk/library>