



USING OPEN SOURCE SOFTWARE IN THE SOUTH AFRICAN GOVERNMENT

A PROPOSED STRATEGY COMPILED BY THE GOVERNMENT INFORMATION TECHNOLOGY OFFICERS' COUNCIL

PREFACE

The Government Information Officers' Council (GITOC) has concluded that the role of open source software (OSS) should be explicitly recognised in e-Government policy.

The OSS Work Group subsequently initiated a first phase of implementation of the OSS strategy, which includes promotion of knowledge and understanding of OSS through various publications and presentations, initiating pilot projects and initiating a research programme.

The need for a more detailed strategy document prior to more concerted implementation was also identified. This document was therefore compiled by the Work Group and accepted by the GITO Council.

Of special importance is the policy and strategy recommendations in sections 10 and 11 and the proposed way forward in section 12. The Minister for the Public Service and Administration can now consider acceptance of these recommendations.

EXECUTIVE OVERVIEW

Several open source software (OSS) applications are already in use in Government. This document proposes a strategy to ensure that Government exploits the benefits that OSS can offer more systematically by both using available OSS and contributing to further OSS development.

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. OSS has emerged as a powerful new way of generating knowledge and economic value. It is available to anyone, usually at little or no cost, it does not attract proprietary licence fees and it may be freely redistributed. Users also have access to the source code revealing the inner workings of the software - hence the term "open source software".

Different levels of involvement in OSS are possible, ranging from merely using software that is available, to contributing to software development by an OSS community, to making the source code of one's own software freely available.

Success factors for implementation can be divided into three groups: (1) implementation should produce **value**, (2) **capacity** to implement and maintain has to be adequate, and (3) sufficient **support** for the initiative must be given by all key players. This OSS Strategy addresses each of these areas.

Value offered by OSS has been examined extensively in many countries. There is no doubt that under the right circumstances it can offer value to the South African Government and citizens.

Economic value includes contributions to greater efficiency, saving of foreign currency, possible savings on acquisition, and opportunities to stimulate SMME development.

In the social sphere value flows from, for example, wider access to information, and providing an instrument for IT training.

Part of the OSS strategy is aimed at utilising analytical tools to judge whether OSS implementation will deliver superior value in the environment in question – basing decisions to migrate to OSS on rational argument.

The OSS strategy includes action steps to expand and consolidate the **capacity** needed to implement and support OSS solutions. It will include the ability to provide information, expert advice and development assistance. The OSS training strategy will be aimed at providing basic skills to all users in an establishment where OSS is implemented,

more advanced skills to expert users and in-depth training to developers. Building capacity will be an important focus in the immediate future.

Expanding **support** is one of the major objectives of the envisaged communication strategy. The strategy will target the political level, departmental management, IT professionals and computer users in general.

Support has to be based on knowledge and understanding of OSS, which generate commitment to implementation. Initiatives to promote this include –

- information dissemination through presentations, publications, conferences/workshops;
- creating space for experimental implementation of OSS and the OSS development model, in order to gain understanding of the prerequisites for success, not only pertaining to the software itself, but also to the associated business processes, change management and possible wider transformation requirements; and
- maintaining an OSS website for release of information as well as for stimulating dialogue¹.

The future policy will be that –

- discrimination and prejudice will be avoided in software procurement procedures, making choices based on merit, thus giving OSS and proprietary software (PS) equal opportunities to be selected;
- as OSS offers significant indirect advantages, opting for OSS will be preferable where the direct advantages and disadvantages of OSS and PS are equally strong, and where circumstances in the specific situation do not render such preference inappropriate.
- open standards will be a prerequisite for all software development, thus contributing to the ease with which OSS can be implemented and adapted;
- Government will encourage partnerships within the wider public sector, the private sector, civil society, the rest of Africa and globally to foster the utilisation of OSS;
- the State IT Agency (SITA) will provide leadership and support for Government institutions wishing to implement OSS.
- where no inhibiting factors exist, the OSS model will

¹ <http://www.oss.gov.za>

be adopted for development of Government systems and such systems will be developed to run on OSS platforms.

LIST OF CONTENTS

1	<i>Why an Open Source Software Strategy?</i>	8
2	<i>Open source software: What is it and what does it offer</i>	8
2.1	Collaboration, sharing, access	8
2.2	Development Model	8
2.3	Opportunities that OSS offers	8
2.4	Levels of involvement in OSS	9
2.5	Not all projects are good candidates for OSS development	9
2.6	OSS projects require dedication	9
2.7	Summary of benefits	10
3	<i>Government involvement</i>	10
3.1	Government's key role	10
3.2	Actions that Government could consider	10
4	<i>Concepts (see also "Glossary of Terms Relevant to Open Source")</i>	11
4.1	Open standards	11
4.2	Proprietary vs. open source software	11
4.3	The "open" philosophy: going beyond just source code and software ...	12
5	<i>Context: Strategy for national use vs. strategy for Government-wide use</i>	12
6	<i>Situation analysis</i>	12
6.1	The global OSS movement	12
6.2	Usage in South Africa	12
6.2.1	Testing and Implementation in the public sector	12
6.2.2	Large amounts of documentation available, but no comprehensive South African policy document	13
6.2.3	Further experimenting and piloting.....	13
6.2.4	Usage in business sector	14
6.2.5	Usage in tertiary education	14
6.2.6	Usage by other governments.....	14
6.3	Categories of OSS widely used	14
6.3.1	Internet.....	14
6.3.2	Operating system.....	14
6.3.3	Office suites	14
6.3.4	Other	14
6.4	Initiatives in South African Public Sector	14
6.4.1	National Advisory Council on Innovation (NACI) initiative	14
6.4.2	Presidency's initiatives.....	15
6.4.3	Government IT Officers' Council (GITOC) and its OSS Work Group..	15
6.5	Support available	16
6.5.1	Via Internet	16
6.5.2	Vendors.....	16
6.5.3	Special interest groups.....	16
6.5.4	SITA	16
6.6	Cost of ownership	16
6.7	OSS has entered the mainstream	16
7	<i>Prerequisites for implementation in Government</i>	17
7.1	The VCS Model	17
7.2	Demonstrating Value – the first prerequisite in the VCS model	17
7.2.1	Value for institutions using OSS.....	17
7.2.2	Broader economic value	18

7.2.3	Values for society in general	19
7.2.4	General advantages	19
7.3	Building capacity – the second prerequisite in the VCS model	20
7.3.1	Software selection	20
7.3.2	Implementation and troubleshooting.....	20
7.3.3	Software development assistance.....	20
7.3.4	Maintenance.....	21
7.3.5	Training	21
7.3.6	Research.....	21
7.4	Mobilising support – the third prerequisite in the VCS model	21
7.4.1	Enabling security measures	21
7.4.2	Providing a demonstrably better option	21
7.4.3	Interoperability.....	21
7.5	Prerequisites are not prohibitive	21
8	<i>Vision</i>	21
8.1	Favourable balance between software imports and exports	21
8.2	A software industry component based on OSS	22
8.3	IT specialists fully familiar with OSS	22
8.4	Multilingualism	22
8.5	Copious participation in OSS networking at a global level	22
8.6	Balanced attitude towards OSS	22
8.7	OSS fully embedded in education and training delivery systems.....	22
8.8	Similar levels of acceptance and usage throughout AU countries.....	22
8.9	OSS networking	22
8.10	OSS support structures.....	22
8.10.1	OSS utilisation: significant and growing.....	23
8.10.2	Knowledge and expertise.....	23
8.10.3	Fully developed security measures	23
8.10.4	An effective software industry using OSS.....	23
8.10.5	Government a software provider.....	23
8.10.6	OSS for service provision	23
9	<i>Conclusion</i>	23
10	<i>Policy recommendations</i>	24
10.1	Basic policy foundation	24
10.2	Opting for OSS where advantages of OSS and PS are comparable	24
10.3	Create an environment for utilising OSS	24
10.4	Incorporation in e-Government policy	24
10.5	OSS for the citizenry	24
11	<i>Strategy</i>	24
11.1	Introductory phase.....	25
11.1.1	Information dissemination	25
11.1.2	Trial development and use.....	25
11.1.3	Consultation	25
11.1.4	Research.....	25
11.1.5	Consolidate support capacity	25
11.1.6	Including OSS utilisation in short and medium-term plans	26
11.1.7	Level playing fields	26
11.1.8	Communication	26
11.2	Enabling phase	26
11.2.1	Implementing plans compiled during the previous phase	26
11.2.2	Software selection	26

11.2.3	Software development	27
11.2.4	Capacity development	27
11.2.5	Partnerships.....	27
11.3	Mature phase.....	27
11.3.1	Systems and procedures.....	27
11.3.2	Levels of implementation	28
12	<i>The way forward</i>	28
13	<i>Glossary of Terms Relevant to Open Source</i>	30
ANNEXURE A: SOME HISTORY		33
ANNEXURE B: THE OPEN SOURCE MODEL		33
ANNEXURE C: LICENCING ISSUES SURROUNDING OSS		34
ANNEXURE D: OTHER RELATED GOVERNMENT POLICIES		35
ANNEXURE E: FURTHER READING		35

1 Why an Open Source Software Strategy?

1. Open source software (OSS) is raising considerable interest worldwide. There are numerous favourable reports and for some IT applications OSS has a significant following. Like in many other countries, the Government in South Africa investigated its usability. The initial finding was that it may have significant potential, resulting in this proposed strategy for OSS use in Government.

2 Open source software: What is it and what does it offer²

2.1 Collaboration, sharing, access

2. OSS refers to software that is developed, tested, or improved through public collaboration and distributed with the understanding that it will be shared with others, ensuring open future collaboration. It is available to anyone, usually at little or no cost, it does not attract proprietary licence fees and it may be freely redistributed. Users also have access to the source code revealing the inner workings of the software, hence the term "open source software".
3. For a brief history of OSS, see **Annexure A**.

2.2 Development Model

4. Essentially OSS is developed through volunteers³, who collaborate to develop the software and then improve and extend it over time. The software is then made available freely or with limited conditionality to any user. A more detailed description appears at **Annexure B**.
5. The model works best for software that has a wide application and a large number of users.

2.3 Opportunities that OSS offers

6. OSS has emerged as a powerful new way of generating knowledge and economic value. The 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 the public and private sectors. Open source may be poised to stimulate a new wave of opportunities in IT.
7. Such access has the potential of empowering 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. OSS supports a rapid evolutionary process that produces better products in less time than the traditional closed model.

² SITA, CSIR: Development of a Strategy for the use of Open Source Software in Government, unpublished, 2002.

³ Individuals or organisations.

8. OSS 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.

2.4 Levels of involvement in OSS

9. Involvement in OSS can range from simply using existing OSS, to procuring OSS software, to modifying existing OSS for internal use, to modifying OSS software and contributing the modifications to a collective development effort, to managing and supporting one's own OSS project. Each level of involvement has different benefits, requirements and commitment levels, and thus warrants separate approaches to implementation. Even with this breakdown, some levels can be further subdivided. For example, in the simplest case of using existing OSS, this use can be at the server level or the client machine level. OSS servers are extremely popular (i.e. OSS for web servers, database servers, etc.) because of their stability, security and support for open standards. Using OSS on servers affects fewer machines and has much less impact on training than deploying OSS on client machines. Also, OSS desktops have not traditionally been widely deployed compared to OSS servers.

What OSS development is not

The procurement of software from a single company where the software is developed using open standards and licences is not an OSS development activity – it is a standard software development activity where the source code is made available to the customer. Of course, this has tremendous benefit too, but it is important to distinguish between software written in a traditional way that is released under an open source agreement and software that is developed within the open source community. The benefits gained from the former relate to preventing vendor lock-in, while the latter provides in addition the richer benefits of OSS such as increased stability and rapid development.

2.5 Not all projects are good candidates for OSS development

10. OSS projects require a large user base to provide the necessary volunteers – projects must be useful and interesting to the OSS community that is hoped will contribute. This immediately rules out projects that are highly customised, such as website development and niche applications. Also, since it is more difficult to manage deadlines with an OSS project, it may be risky to consider OSS development for projects with critical short-term deadlines (unless specific countermeasures are in place).

2.6 OSS projects require dedication

11. Managing an OSS project is an involved process, the details of which are often overlooked. An OSS project requires initial funding for development, as well as funding for a deployment system (concurrent version control, bug tracking, mailing lists, etc.). Most importantly, a successful OSS project needs a champion, or gatekeeper – a skilled individual who will take responsibility for the project, make strategic

project decisions and prevent forking.

2.7 Summary of benefits

12. In summary, major benefits of open software and open standards include:
 - Reduced costs and less dependency on imported technology and skills.
 - 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 networks of software development.
 - Reduced security risks due to extensive review and access to source code.

3 Government involvement

3.1 Government's key role

13. By promoting OSS development Government could make a huge contribution to the OSS community. However, this activity should be tackled with knowledge of where and how OSS will be beneficial.
14. Government, in partnership with industry and society, has a key role to play in promoting OSS. The South African Government is the largest procurer of ICT on the continent. By acknowledging the potential benefits of OSS and Open Standards, Government can contribute and benefit significantly, especially in the following areas:
 - a. Introducing appropriate policies and legislation that can lead to maximising the return on ICT expenditure through saving on dollar-based licence costs and efficiency gains through avoidance of potential lock-in and allowing wider choice.
 - b. 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.
 - c. Lowering entry barriers for various kinds of new businesses into the IT industry.

3.2 Actions that Government could consider

15. The phasing in of strategies employed by Government could take the form of:
 - a. An initial **neutral approach**, ensuring that choice is supported and discrimination against OSS is eliminated.
 - Adopt policies to ensure that OSS is carefully considered in IT procurement processes.

- Implement criteria for evaluating open source products, and procedures to adopt and maintain open standards.
- Allow open software to compete on an equal basis with proprietary alternatives.
- Initiate communication to enhance knowledge and understanding of OSS.
- **Enabling approach** where policies are geared towards the creation of the capacity to implement and maintain it.
- Develop the capability to give guidance on selecting and implementing OSS.
- Promote education and training in OSS products.
- Support the establishment of partnerships and developer communities.
- **Aggressive approach** where Government actively encourages the development of OSS under appropriate conditions through legislation and policy.
- Active involvement of Government in supporting OSS developer communities and development projects.
- Adopt strategies to increase commitment to open source products.
- Regular auditing of the impact of OSS on service delivery.
- Active participation in programs that can minimise risks associated with OSS.
- Standardising on OSS where analysis shows it to be the best alternative.

4 Concepts (see also "Glossary of Terms Relevant to Open Source")

16. The glossary describes the meaning of a variety of terms. This section highlights only those that are often used in comparisons of OSS with related concepts.

4.1 *Open standards*

17. Where standards used when executing programs are made known, enabling users to develop complementary programs to provide inputs or utilise outputs, they are referred to as open standards.

4.2 *Proprietary vs. open source software*

18. The term "proprietary software" refers to software of which only the compiled (machine language) version is made available to the user, which is only licensed to the recipient, who usually has to buy it and is prohibited from making copies available to anybody else.

4.3 The "open" philosophy: going beyond just source code and software

19. There is also growth in IT hardware products that are closely coupled to open systems. Hence the "open philosophy" in IT, which covers open standards, open source, open content, open services and open hardware.

5 Context: Strategy for national use vs. strategy for Government-wide use

20. GITOC (and therefore this document) focuses on the latter. Although the GITOC deals with national and provincial Government only, this document may provide information that could assist third-tier Government and the public sector as a whole.
21. The Department of Communication is coordinating a series of activities aimed at developing a national "e-strategy", covering the whole of the public sector, as well as the private sector, to which this Government strategy may be able to contribute.

6 Situation analysis

6.1 The global OSS movement

22. 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" started to come into general use in 1998.
23. Globally the development and use of OSS has reached significant proportions. The potential benefits and the level of maturity of the OSS model is such that the South African Government should recognise it as a viable alternative, which will in many cases prove to be the preferred approach to software development and application.

6.2 Usage in South Africa

6.2.1 Testing and Implementation in the public sector

24. GITOC did not attempt to make an exhaustive study of usage, but is aware of important applications that are already operational, both in and outside the public service. In other areas OSS is however not well known or understood. The areas of expertise in using, supporting and development of OSS that exist include applications supported by SITA, such as operating systems and Internet software. Some provinces and national departments have put Linux and other applications on trial. The national and some provincial Departments of Health have implemented an OSS health information system that is now also used in some other African countries. See box for more detail.

Current OSS initiatives in the public sector

- The **Department of Communications** is involved in the following activities regarding OSS:
- Phase 1 will consist of a pilot project to install Open office on windows and to test the compatibility with Windows users in the Department.
- Following the results of the pilot, consideration will be given to a total migration to Linux. The pilot phase will include user training as well as training for the IT support staff in the Department. Initially, external IT support will be provided to allow for the skilling of the departmental IT staff.
- The 2nd phase of the OSS programme is engaging in applications in collaboration with the web Internet laboratories and the Institute for Satellite and Space Applications (ISSA). This flagship project will look at harnessing OSS for specific service delivery initiatives.
- Policy awareness campaign to be initiated both internally and externally, and to stakeholders.
- The **Centre for Public Service Innovation** has launched some initiatives to support OSS development. This includes:
 - Support for some experimental development projects;
 - Producing a CD with information on OSS strategy formulation;
 - Publishing OSS material in its newsletter (Inova); and
 - Organising a workshop on software needs that could be met using the OSS model.

The **CSIR**, through its Information and Communication Technology Business Unit, is actively involved in the use and promotion of OSS, and specifically in the following areas:

- Open development, Open Source and Open Standards is one of its ICT research themes, through which seed funding for research at both the CSIR and tertiary education institutions (TEIs) are provided. Research ranges from the social and economic aspects of OSS to the implementation of OSS systems.
- The development of OSS-based ICT applications aimed at improving quality of life in domains such as education, health and rural development. The intention is to grow these activities by initiating and leading local OSS activities, to create meaningful contributions to the local software development industry.
- Addressing hurdles prohibiting the widespread adoption of OSS in the public and private sectors, e.g. the availability of formal support mechanisms, etc. to facilitate the acceptance of OSS as a viable alternative to more traditional, proprietary software models. To this extent the CSIR is investigating the establishment of centres focusing on development and support in the OSS environment.

6.2.2 Large amounts of documentation available, but no comprehensive South African policy document

25. Valuable studies are available, produced by the European Union and some national Governments. Based on these and local investigation, reports have been produced for the GITO Council⁴. More detailed implementation guidelines are however required.

6.2.3 Further experimenting and piloting

26. The piloting and familiarisation activities already in progress in

⁴ See <http://www.oss.gov.za>

Government will help it to reach a level of understanding enabling it to identify where OSS applications should be implemented.

6.2.4 Usage in business sector

27. Some prominent South African businesses confidently and successfully use OSS. Others are using it on a trial basis.

6.2.5 Usage in tertiary education

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

6.2.6 Usage by other governments

29. Several governments have taken a formal position on OSS. Prominent examples include the UK, China, Peru and some components of the US Government.

6.3 Categories of OSS widely used

6.3.1 Internet

30. The Internet has done much to fuel current interest in OSS. The Internet is founded on non-proprietary standards and applications contributed by individuals and distributed communities of developers. 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.

6.3.2 Operating system

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

6.3.3 Office suites

32. http://www.govtalk.gov.uk/interoperability/egif_document.asp?docnum=430 contains an analysis of relevant OSS alternatives for word processing, spreadsheets, presentations, etc.

6.3.4 Other

33. Globally a wide variety of other software has been developed, including -
- Geographic Information Systems
 - Compilers for C, C++, Fortran, Objective C and other languages
 - Graphical music notation
 - Numerous games

6.4 Initiatives in South African Public Sector

6.4.1 National Advisory Council on Innovation (NACI) initiative

34. During 2001 NACI launched 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.

6.4.2 Presidency's initiatives

35. Partly as a 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), the Presidential National Commission on Information Society and Development (PNC on ISAD) and the National e-Strategy Task Team.

6.4.3 Government IT Officers' Council (GITOC) and its OSS Work Group

36. 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.

37. 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.

6.5 Support available

6.5.1 Via Internet

38. Help can be solicited through posting questions/problem statements on appropriate websites, mailing lists and IRC chat channels.

6.5.2 Vendors

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

6.5.3 Special interest groups

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

6.5.4 SITA

41. SITA maintains a number of systems that are using OSS such as Linux.

6.6 Cost of ownership

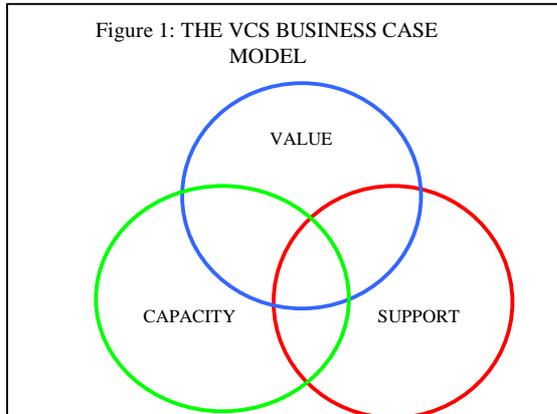
42. Due to the principle of free redistribution, and the possibility of running it on old equipment there are cost savings associated with OSS. There are however still divergent views regarding the total cost of ownership. There is a notion that the cost of training, adapting, maintaining, etc. of OSS could be high enough to exceed savings on purchasing and licensing. The potential savings for each application environment will tend to be unique.

6.7 OSS has entered the mainstream

43. OSS 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.

7 Prerequisites for implementation in Government

7.1 The VCS Model⁵



44. The success factors for implementation can be grouped under the three headings in Figure 1. Before implementation it must be demonstrated that OSS will provide **additional value**, that the **necessary capacity** to implement exists, and that there is **sufficient support** to ensure that the venture will not fail because, for example, resources are not provided, outputs are not utilised or there is a lack of protection against threats.

7.2 Demonstrating Value – the first prerequisite in the VCS model

45. The discussion below shows that clear value can be derived from OSS.
46. Several studies in respect of specific applications have been undertaken, demonstrating the benefits of using OSS. An example that analyses the benefits of using Linux can be found at www.oss.gov.za.
47. Models and frameworks for determining cost-benefit analysis are available and can be used to give an indication as to whether the benefits flowing from an OSS application in a specific environment would justify its implementation.
48. As OSS is due to its nature relatively easy to obtain, trial use is often a viable option for ascertaining whether OSS implementation should be the preferred route.
49. The value of OSS can be magnified if there is a large-scale migration towards it within Government. For this, widespread support should be built.

7.2.1 Value for institutions using OSS

50. Governments and other institutions implementing OSS may benefit in a number of ways:
- a Freedom to enhance and extend existing software
51. The availability of source code makes it possible for users to enhance and extend the software to suit their individual needs as well as share the benefits thereof.

⁵ Moore Mark H; *Creating Public Value*; Harvard University Press, 1995

b **Avoiding lock-in**

52. 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 a single developer whose focus is of necessity on return on investment rather than the country's interest.

c **Freedom to redistribute**

53. Provided certain rules and conventions are observed, software can be passed on to other potential users without having to infringe licensing or copyright conventions. This would include sharing software between Government institutions.

d **Expenditure**

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

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

56. In many cases reasonably priced (sometimes free) CDs containing the software can be purchased, often accompanied by a greater or lesser amount of printed material.

57. Acquisition costs are therefore normally low and can under the right circumstances drive down the total costs of ownership.

e **Non-obsolescence**

58. OSS can readily be amended if new demands arise. Therefore, software need not become obsolete when, for example, the formats of inputs or required outputs change.

f **No need for licence management and policing**

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

g **Savings on equipment replacement**

60. OSS often performs satisfactorily on older equipment that cannot run the latest versions of proprietary software.

7.2.2 **Broader economic value**

a **Reducing imports of software and licences**

61. Better management of the value chain and reducing the amount of money that leaves the country. It also creates the opportunity for significant investment in the local software industry.

b Stimulating local business, especially SMMEs

- 62. Development of software by local software SMMEs can be stimulated.
- 63. Expenditure on software can be reduced and the use of ICTs encouraged by SMMEs can be increased.

c Supporting the Proudly South African Campaign

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

7.2.3 Values for society in general

a Educational

- 65. The ability to study the inner workings of software leads to the improvement of the skills base and to giving real opportunities to learners to become proficient in software development and maintenance.
- 66. Learning opportunities that it creates include that -
 - Students can be involved in real world projects.
 - Students will get exposure to business concepts.
 - Institutions can better collaborate with industry.
 - Best practices and experience can be shared in both directions (educational to practice and vice versa).
 - Institutions can get involved and run open source projects without having to supply infrastructure and system administration facilities associated with an OSS project. These are all supplied by the OSDC.

b Public Access to Information

- 67. 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 in formats that are freely available and accessible without having to obtain licensed software.

7.2.4 General advantages

- 68. The characteristics of the open source software model offer extensive advantages for all people involved in ICT. Some are discussed below.

a Security

- 69. The fact that the source code is available and can be analysed to determine if the software is performing any operations that may pose a risk provides the user with the ability to ensure that the software does not compromise the security of the organisation. The ability to subject the code to scrutiny by many people provides opportunities for better quality management. This is a move away from the faulty notion of 'security by obscurity'.

70. The QinetiQ report⁶ states that it is the authors' view that there is no great security benefit or disbenefit between PS and OSS software. Issues such as properly designed and rigorously maintained security architectures are much more important than the choice between OSS and proprietary systems.

b Participation in global movements for software development

71. OSS 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, allowing for the sharing of expertise and gaining of experience in software development.

c Access to global support resources

72. The international OSS user community is often accessible and able to assist over long distances when a user has a problem and at different times, often 24 hours a day due to location of developers in different time zones.

d Peer review

73. Allowing rigorous review by peers leads not only to a greater understanding of what the software can accomplish, but also to greater opportunities for improvements of its quality.

7.3 Building capacity – the second prerequisite in the VCS model

74. To enable Government to fully utilise OSS, the VCS model requires that capacity to implement the approach be strengthened.

7.3.1 Software selection

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

7.3.2 Implementation and troubleshooting

76. Support that is quick, efficient and effective to help with operationalising and troubleshooting of newly implemented OSS must exist. The utilisation of public-private partnerships may be investigated to drive the implementation process and ensure its continued momentum.

7.3.3 Software development assistance

77. Programmers and related experts should be available to provide users with developing new and/or enhancing existing software as needed. It is critical that strong linkages be set up with institutions of higher learning to build a national collaborative network that can be extended internationally.

⁶ <http://www.govtalk.gov.uk/>

7.3.4 Maintenance

78. Structures for providing ongoing maintenance support need to be in place. This includes ongoing updating, inducting new users, maintaining/amending documentation, etc.

7.3.5 Training

79. Training for OSS developers and OSS users must be available. Institutions of learning must fulfil a role in this respect.

7.3.6 Research

80. A well-run research programme will be needed to enable optimal understanding and decision making on OSS. The model for this research programme should be built on the networking nature of the OSS development model, harnessing the potential of institutions of higher learning and schools.

7.4 Mobilising support – the third prerequisite in the VCS model

81. As the third component of the VCS model, support among all stakeholders is essential. That includes the political level, senior management, IT professionals and users in Government. Factors that can affect the level of support are discussed below.

7.4.1 Enabling security measures

82. The security of OSS-based systems must be able to meet all requirements applicable to Government IT systems in general. Global experience indicates that this is possible. The way in which it will work needs to be demonstrated convincingly to the relevant decision makers.

7.4.2 Providing a demonstrably better option

83. 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.

7.4.3 Interoperability

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

7.5 Prerequisites are not prohibitive

85. The above prerequisites are not seen as prohibitive. It is concluded that it will be feasible to implement a strategy for increasing OSS usage in Government.

8 Vision

8.1 Favourable balance between software imports and exports

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

8.2 A software industry component based on OSS

87. A local software industry based on OSS development, stimulated by public service usage of OSS and demand for applications using OSS solutions.

8.3 IT specialists fully familiar with OSS

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

8.4 Multilingualism

89. The facility to use software and interact with ICT using all official South African languages.

8.5 Copious participation in OSS networking at a global level

90. 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.

8.6 Balanced attitude towards OSS

91. 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. No discrimination in setting criteria for and selection of software. Selection on merit, so that 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 also from an objective, unprejudiced mindset of decision makers.

8.7 OSS fully embedded in education and training delivery systems

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

8.8 Similar levels of acceptance and usage throughout AU countries

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

8.9 OSS networking

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

8.10 OSS support structures

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

8.10.1 OSS utilisation: significant and growing

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

8.10.2 Knowledge and expertise

97. 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 programs and how they function.

8.10.3 Fully developed security measures

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

8.10.4 An effective software industry using OSS

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

8.10.5 Government a software provider

100. 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.

8.10.6 OSS for service provision

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

9 Conclusion

102. Some of the key issues are:
- a. 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 needs to be established in the public sector or supporting the public sector.
 - b. There are conflicting views on cost savings resulting from using OSS. Acquisition cost may be lower, but that is often a minor component of total cost of ownership. Indirect advantages, including indirect savings and spin-off developments, (e.g. investment in human capital) contribute to the overall advantages, leading to advantages outweighing disadvantages.
 - c. Information security is an issue that makes careful management of OSS implementation essential, in which case it may be possible to safeguard information to a greater extent than when using proprietary software due to the inherent security benefits of the OSS model.
 - d. Carefully selected OSS should be implemented in the public

service. The current environment demands, however, that this be accompanied by a well-planned change management strategy.

- e. 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.

10 Policy recommendations

103. Because of the potential benefits associated with OSS, Government will promote its use within the framework outlined below.

10.1 Basic policy foundation

104. Government will implement OSS where analysis shows it to be the appropriate option. The primary criteria for selecting software solutions will remain the improvement of efficiency, effectiveness and economy of service delivery by Government to its citizens.

10.2 Opting for OSS where advantages of OSS and PS are comparable

105. OSS offers significant indirect advantages. Where the direct advantages and disadvantages of OSS and PS are equally strong, and where circumstances in the specific situation do not render it inappropriate, opting for OSS will be preferable.

10.3 Create an environment for utilising OSS

106. OSS has the potential of providing significant advantages to Government. Steps will be taken to create an environment where OSS can be implemented in those areas where Government and the country are correctly positioned to benefit from it by –
 - creating knowledge, understanding and capacity;
 - promoting fair and impartial treatment of OSS in procurement processes;
 - creating opportunities for trial use, through initiatives such as the sponsorship of demonstrator projects by the CPSI.

10.4 Incorporation in e-Government policy

107. OSS policies will be integrated smoothly with broader e-Government policy and related strategies for the ICT sector in the country.

10.5 OSS for the citizenry

108. Government will seek to utilise the opportunities presented by the OSS movement to promote access to information for citizens, seeking more creative procedures to enhance access to Government's electronic service delivery.

11 Strategy

109. A phased approach, moving from an introductory phase to an enabling

phase to a mature phase will be followed.

11.1 Introductory phase

110. The purpose during this phase is to create knowledge, understanding and an environment where OSS can be implemented in areas in Government where conditions favour it. This phase is already in progress. Activities are described below.

11.1.1 Information dissemination

111. Because the level of knowledge and understanding of OSS within Government is still relatively low, information dissemination is an important feature of the initial phase. This includes briefing sessions, publishing information through appropriate media, maintaining the OSS website and presentations to relevant interest groups.

11.1.2 Trial development and use

112. Encourage use of OSS on a trial basis. Developing enhancements to software by using the OSS model will be promoted. This includes continuation of the sponsorship of OSS projects that the CPSI has embarked on.

11.1.3 Consultation

113. Create opportunities to consult with users, developers and researchers. An OSS forum is to be established to involve all stakeholders.

11.1.4 Research

114. The research agenda will be based on the following objectives:
 - a. Develop a consistent picture of the needs and expectations of Government with regard to OSS.
 - b. Develop policies and legislation relevant to the use of OSS in Government.
 - c. Develop research and evaluation instruments to assist decision makers in the identification and evaluation of opportunities and areas for the appropriate use of OSS.
 - d. Develop a definition of the roles of the various sections of Government in the area of OSS, including the roles of SITA and ITAC.
 - e. Identify opportunities and identify pilot applications for the use of OSS in Government.
 - f. Define a clear longer-term research agenda to support the OSS strategy.

11.1.5 Consolidate support capacity

115. Ensure proper mobilising of existing capacity, plan further expansion and build the necessary capacity where successful trial implementations can be replicated.

11.1.6 Including OSS utilisation in short and medium-term plans

116. Planning to convert to OSS should be clearly indicated in IT plans of national and provincial Government departments.

11.1.7 Level playing fields

117. Avoid any bias against OSS solutions in Government procurement procedures.
118. Wherever possible, avoid acquisition of hardware that does not support OSS.
119. ITAC will ensure that tenders and contracts are free of any specifications that unjustifiably discriminate against OSS.
120. The Procurement Standing Committee of GITOC will work with SITA to find the best practical ways of implementing this principle.
121. The Communication Strategy mentioned below will, among others things, aim to remove any biased mindset that may exist among relevant users and decision makers.
122. Tender evaluation teams will be equipped to deal with the relevant options fairly.

11.1.8 Communication

123. Develop a comprehensive OSS communication strategy that will ensure optimal knowledge and understanding of, and commitment to OSS. The strategy is to target the political level, departmental management, IT professionals and computer users in general.

11.2 Enabling phase

11.2.1 Implementing plans compiled during the previous phase

124. Put in motion the plans developed during the introductory phase in order to –
 - a. improve the availability of expert guidance;
 - b. make training more accessible;
 - c. strengthen software development assistance; and
 - d. uphold non-discriminatory procurement criteria.
125. Develop systems and procedures needed during the mature phase described below.

11.2.2 Software selection

126. The aim of promoting OSS will not infringe on the existing authority of specific groups or individuals with regard to software selection. Such selections will continue to be based on existing guidelines, such as the e-Government House of Values⁷.

⁷ Including interoperability, information security, economies of scale, reducing duplication, lowering costs, increasing productivity and increasing citizens' convenience.

127. With the assistance of SITA and others, guidance will be given to users regarding appropriate tools to -
 - a. compare different software solutions, OSS and otherwise, objectively before making a choice;
 - b. compile decision support analyses to confirm that OSS implementation will have advantages.
128. The guiding principle of using open standards will apply for all Government software procurement, development and maintenance.

11.2.3 Software development

129. When planning software development, all government institutions will consider the advantages of using the OSS model and using OSS platforms.

11.2.4 Capacity development

130. Capacity will be developed to enable the following:
 - a. A certain minimum level of training for all prospective users.
 - b. More in-depth training for champion users, from say between 1 out of every 5 to 1 out of every 10 users, enabling them to render immediate assistance to other users around them.
 - c. Expert training for application managers, say approximately 1 for every 100 users. Such individuals will typically be part of the IT section of the organisation, or if it is a small organisation in the organisation of a service provider.
 - d. Availability of highly expert specialists in service provider organisations such as SITA, able to deal with complex problems as well as development needs.
131. Skills development to facilitate joining up with some existing OSS projects will be investigated. Government contributions could be valuable, especially with respect to security and robustness of existing projects.

11.2.5 Partnerships

132. Government will seek partnerships with all sectors in South Africa, with the rest of Africa and the world, for promoting development, implementation and support of OSS.

11.3 Mature phase

11.3.1 Systems and procedures

133. Have systems and procedures in operation so as to –
 - a. persist with communication to maintain general confidence in the viability of OSS solutions;
 - b. provide Certification for OSS developers;
 - c. undertake assessment and certification of software;
 - d. maintain clusters and networks of support;
 - e. promote OSS development and use on the continent.

11.3.2 Levels of implementation

134. Depending on circumstances, implement OSS at different levels, i.e. –
- using existing OSS;
 - procuring OSS software;
 - modifying existing OSS for internal use;
 - modifying OSS software and contributing the modifications to a collective development effort;
 - managing and supporting own OSS projects.

12 The way forward

TARGETS SET AT WORKSHOP, 14 Jan 2003

Action	Responsibility	Target date
STRATEGY FORMULATION		
1. Submit recommendations to GITOC, DG, Minister	Chair, GITOC	31 Jan
2. Review strategic planning guidelines (Implementation to proceed in the mean time)	SITA	31 March
3. Feed into e-Strategy	Chair	Done
FUNDING		
4. Establish a fund for OSS promotion	Work Group	30 June
5. Generate budget proposals to secure funding	Work Group	28 Feb
6. Initiate more pilot/demonstrator projects	CPSI	30 Apr
IMPLEMENTATION		
7. Establish an OSS unit	SITA	30 Apr
8. Establish OSS Resource Centre	CSIR	30 Apr
9. Identify cost:benefit analysis instrument(s)	SITA	31 Jan
10. Draft a framework for recording results of practical use of OSS	SITA	28 Feb
11. Develop a monitoring and assessment procedure	SITA	28 Feb
12. Consolidate write-ups of scenarios and case studies (local)	SITA to consolidate	28 Feb
13. Collect case studies and scenarios (international)	SITA to consolidate	28 Feb
COMMUNICATION & CONSULTATION		
14. Establish the OSS Forum and network	SITA/CPSI	30 Apr
15. Compile a strategy to engage the media (also internationally)	Work Group	31 Jan
16. Schedule workshops for this year	GNNF, SITA	end Jan
17. Develop the Communication Strategy (Incl success stories /user groups/case stories – see also Forum) (Aim at all target groups, inside as well as outside govt)	GCIS	End Feb
18. Consolidate the maintenance of the OSS website (becomes part of communication strategy)	Work Group	28 Feb
R&D		
19. Issue lists of products suitable for implementation	SITA	Version 1: 28 Feb
20. Plan to investigate further applications	SITA	30 June
CAPACITY BUILDING		
21. Communicate available support capacity	Work Group	28 Feb
22. Develop a position on establishing support capacity	SITA	31 March
23. Establish more partnerships (over and above SITA, CSIR, CPSI, public service) (ISSA, academic groups, other parastatals, business, professional interest groups)	Work Group	On-going
PROCUREMENT		

24. Discuss their role with the Procurement Work Group, incl a strategy to promote small business opportunities	Chair	28 Feb
25. Develop guidance for tender evaluation teams	Work Group	28 Feb
26. Compile and integrate detailed plans	Work Group	28 Feb

13 Glossary of Terms Relevant to Open Source

Open

A product or system is described as open when its workings are exposed to the public and capable of being modified or improved by anyone. The alternative is a proprietary product or system.

Open Source Software (OSS)

In general, Open Source Software (OSS) refers to any program whose source code is made available for use or modification as users or other developers see fit. Open source software is usually developed as a public collaboration and made freely available.

In a stricter sense, OSS refers to software that complies with the "Open Source Definition".

The Open Source Definition

Open Source is a software certification mark owned by the Open Source Initiative (OSI). Developers of software that is intended to be freely shared, possibly improved, and redistributed by others can use the Open Source trademark provided that their distribution terms conform to the OSI's Open Source Definition. To summarise, the Definition model of distribution terms require that:

- The software being distributed must be redistributed to anyone else without any restriction
- The source code must be made available (so that the receiving party will be able to improve or modify it)
- The licence can require improved versions of the software to carry a different name or version from the original software

Reference:

- The Open Source Initiative (OSI) definition of Open Source:
http://www.opensource.org/docs/definition_plain.php

Open Standards

Open Standards are characterised by the fact that the specifications on which they are based are owned by a vendor-neutral organisation rather than by the original developers. Anyone is free to build software according to the specifications without infringement of intellectual property rights, though typically there are several freely available implementations (commercial or Open Source). Their real virtue is that they have been adopted by the industry and are "future proof".

An open standard is more than just a specification. The principles behind the standard, and the practice of offering and operating the standard, are what make the standard "open":

- Availability – Open standards are available for all to read and implement.
- Maximize End-User Choice – Open standards create a fair, competitive market for implementations of the standard. They do not lock the customer in to a particular vendor or group.
- No Royalty – Open standards are free for all to implement, with no royalty or fee. Certification of compliance by the standards organisation may involve a fee.
- No Discrimination – Open standards and the organisations that administer them do not favour one implementer over another for any reason other than the technical standards compliance of a vendor's implementation. Certification organisations must provide a path for low and zero-cost implementations to be validated, but may also provide enhanced certification services.
- Extension or Subset – Implementations of open standards may be extended, or offered in subset form. However, certification organisations may decline to certify subset implementations, and may place requirements on extensions (see Predatory Practices).
- Predatory Practices – Open standards may employ licence terms that protect against subversion of the standard by embrace-and-extend tactics. The licences attached to the standard may require the publication of reference information for extensions, and a licence for all others to create, distribute, and sell software that is compatible with the extensions. An open standard may not otherwise prohibit extensions.
- An important aim of adhering to open standards is to achieve and promote interoperability.
- A second set of open standards is typically created by a consortium of industry leaders (being institutions or individuals) that determined that there is a general requirement for a specific standard. It is also important to note the influence of general acceptance of open standards. If a standard is not widely adopted its development will probably stop and it will end up supporting only a very limited number of proprietary products' interaction.

Reference:

Principles and Practice of Open Standards:
<http://perens.com/OpenStandards/Definition.html>

Interoperability

The IEEE defines interoperability as the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

Interoperability is the ability of a system or a product to work with other systems or products without special effort on the part of the customer. The term is widely used in product marketing descriptions.

Products achieve interoperability with other products using either or both of two approaches:

- By adhering to published interface standards
- By making use of a "broker" of services that can convert one product's interface into another product's interface "on the fly"

A good example of the first approach is the set of standards that have been developed for the World Wide Web. These standards include TCP/IP, Hypertext Transfer Protocol, and HTML. The second kind of interoperability approach is exemplified by the Common Object Request Broker Architecture (CORBA) and its Object Request Broker (ORB).

Compatibility

The term compatibility, in the software context, is closely related to interoperability. A product is compatible with a standard but interoperable with other products that meet the same standard (or achieve interoperability through a broker).

Free Software

Free software is software that comes with permission for anyone to use, copy, and distribute, either verbatim or with modifications, either gratis or for a fee. In particular, this means that the source code must be available.

"Free software" is a matter of liberty, not price. Within this context, "free" should be understood as in "free speech", not as in "free beer".

Free software deals with the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom for the users of the software:

- Freedom 0 – The freedom to run the program, for any purpose
- Freedom 1 – The freedom to study how the program works, and adapt it to your needs – access to the source code is a precondition for this
- Freedom 2 – The freedom to redistribute copies so you can help your neighbour
- Freedom 3 – The freedom to improve the program, and release your improvements to the public, so that the whole community benefits – access to the source code is a precondition for this.

Reference:

- The Free Software Foundation (FSF)⁸ definition of

Free Software:

<http://www.gnu.org/philosophy/free-sw.html>

Free Software vs. Open Source

There is significant disagreement in the software community about these two (largely synonymous) concepts – to some extent, the Free Software movement and the Open Source movement are like two political camps within the free software community. The official definition of "open source software", as published by the Open Source Initiative, is very close to the definition of "free software" used by the Free Software Foundation, even though it is a little "looser" in some respects.

We won't go further into this debate, except to acknowledge it as a contentious issue. More information is available at:

<http://www.gnu.org/philosophy/free-software-for-freedom.html>.

Semi-free software

Semi-free software is software that is not free, but comes with permission for individuals to use, copy, distribute, and modify (including distribution of modified versions) for non-profit purposes. PGP is an example of a semi-free program.

Proprietary Software

Proprietary software describes software that is owned exclusively by a single company that carefully guards knowledge about the technology used and the software's inner workings. Some proprietary products can only function properly if at all when used with other products owned by the same company.

Proprietary software is software that is not free or semi-free. Its use, redistribution or modification is prohibited, or is restricted so much that you effectively cannot do it freely.

Commercial software

A software program is commercial if it is developed as a business activity. Commercial software can be free or non-free, depending on its licence. Likewise, a program developed by a school or an individual can be free or non-free, depending on its licence. The two questions, what sort of entity developed the program and what freedom its users have, are independent.

"Commercial" and "proprietary" are not synonymous – most commercial software is proprietary, but there is commercial free software, and there is non-commercial non-free software.

Copylefted software

Copyleft (as opposed to "copyright") is the idea and the

⁸ The Free Software Foundation (FSF) was founded in

1983 along with its demonstration GNU project. See <http://www.gnu.org/fsf/fsf.html>

specific stipulation when distributing software that the user will be able to copy it freely, examine and modify the source code, and redistribute the software to others (free or priced) as long as the redistributed software is also passed along with the copyleft stipulation. The term was originated by Richard Stallman and the Free Software Foundation.

Copylefted software is free software whose distribution terms do not allow redistributors to add any additional restrictions when they redistribute or modify the software. This means that every copy of the software, even if it has been modified, must be free software.

Copyleft is a general concept; to actually copyleft a program, you need to use a specific set of distribution terms (see reference below).

Reference:

The Free Software Foundation (FSF) definition of Copyleft:

<http://www.gnu.org/copyleft/copyleft.html>

Public domain software

Programs that are uncopyrighted because their authors intended to share them with everyone else are in the public domain. The UNIX community has developed a number of such programs over the years. Programs in the public domain can be used without restriction as components of other programs.

The simplest way to make a program free is to put it in the public domain, uncopyrighted. This allows people to share the program and their improvements, if they are so minded. However, it also allows people to convert the program into proprietary software. They can make changes, many or few, and distribute the result as a proprietary product, thus removing the freedom that the original author provided.

Public domain software is software that is not copyrighted. If the source code is in the public domain, it is a special case of non-copylefted free software, which means that some copies or modified versions may not be free at all.

In some cases, an executable program can be in the public domain but the source code is not available. This is not free software, because free software requires accessibility of source code.

Freeware

The term "freeware" has no clear accepted definition, but it is commonly used for software packages that permit redistribution but not modification (and their source code is not available). Freeware is offered at no cost, but it is typically copyrighted so that you can't incorporate its programming into anything you may be developing.

Note that, based on this definition, "freeware" ? "free software".

Shareware

Shareware is software that is distributed free on a trial basis with the understanding that the user may need or want to pay for it later. Some software developers offer a shareware version of their program with a built-in expiration date (after 30 days, the user can no longer get access to the program). Other shareware (sometimes called liteware) is offered with certain capabilities disabled as an enticement to buy the complete version of the program.

Shareware comes with permission for people to redistribute copies, but anyone who continues to use a copy is required to pay a licence fee. Shareware is not free, or even semi-free software, for two reasons:

- For most shareware, source code is not available; thus, you cannot modify the program in any way.
- Shareware does not come with permission to make a copy and install it without paying a licence fee, not even for individuals engaging in non-profit activities. (In practice, people often disregard the distribution terms and do this anyway, but the terms do not permit it.)

Liteware

Liteware is a term for software that is distributed freely in a version having less capability than the full for-sale version. It is usually designed to provide a potential customer with a sample of the "look-and-feel" of a product and a subset of its full capability. Liteware can be considered a type of shareware (where shareware also includes products distributed freely, usually on a trial basis, that do have full capability).

Postcardware

Postcardware is freeware (no-charge software that is freely shared) that requires only that the user send the software provider a postcard as a form of payment. The idea is to humanise the transaction, remind the user that someone else shared something freely, and remind the provider that someone is actually using the creation.

ANNEXURE A: SOME HISTORY

The Open Source Initiative summarises it as follows⁹:

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 follow-on 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 website. 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 follows¹⁰:

"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 model¹¹.

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.

⁹ See <http://www.opensource.org/docs/history.php>

¹⁰ <http://www.naci.org.za/D01.cfm>

¹¹ "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 coordinating 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 cooperate 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 study¹². Governments could also share experiences on various projects, such as OSS desktop deployment pilots."

ANNEXURE C: LICENSING ISSUES SURROUNDING OSS

There are six basic types of OSS licences, each with its own implications. It is important to understand the significance of these licences as they can have important implications. A basic summary of the licences is given below:

Licence	Can be mixed with non-free software	Modifications can be taken private and not returned to you	Can be re-licensed by anyone	Contains special privilege for the original copyright holder over your modifications
GPL				
LGPL	X			
BSD	X	X		
NPL	X	X		X
MPL	X	X		
Public Domain	X	X	X	

The table is available in HTML format at:

<http://www.sindominio.net/biblioweb/telematica/open-sources-html/node119.html>

or

<http://www.openresources.com/documents/open-sources/node119.html>

A short summary of the licences is available at:

<http://www.sindominio.net/biblioweb/telematica/open-sources-html/node118.html>

or

<http://www.openresources.com/documents/open-sources/node118.html>

¹² "e-Government Interoperability Framework", <http://www.govtalk.gov.uk/library>

ANNEXURE D: OTHER RELATED GOVERNMENT POLICIES

e-Strategy

135. At the time of writing an e-Strategy was under preparation. It is anticipated that it will deal with OSS strategy at a national level, which will to a large extent interface with the strategy adopted within the Government's own ICT systems.

e-Government strategy

136. The e-Government strategy is currently in the form of a discussion document. See <http://www.dpsa.gov.za/e-gov/e-govindex.htm>.

R&D Strategy

137. The National R&D Strategy includes information on ICT R&D. See http://www.dst.gov.za/legislation_policies/strategic_reps/sa_nat_rd_strat.htm.

ANNEXURE E: FURTHER READING

OPEN SOURCES

VOICES FROM THE OPEN SOURCE REVOLUTION

Eric S. Raymond, Marshall Kirk McKusick, Scott Bradner, Richard Stallman, Michael Tiemann, Paul Vixie, Linus Torvalds, Robert Young, Larry Wall, Bruce Perens, Tim O'Reilly, Jim Hamerly, Tom Paquin, and Susan Walton

Edited by Chris DiBona, Sam Ockman, and Mark Stone

1999

<http://www.sindominio.net/biblioweb/telematica/open-sources-html/main.html>

A FRAMEWORK ANALYSIS OF THE OPEN SOURCE SOFTWARE DEVELOPMENT PARADIGM

Joseph Feller

Brian Fitzgerald

University College Cork

Ireland

<http://www.josephfeller.com/publications/ICIS2000.pdf>

THE STRENGTHS AND WEAKNESSES OF OPEN SOURCE SOFTWARE

http://www.sourcefire.com/technology/whitepapers/Sourcefire_OSS_0702.pdf
