Free and Open Source Software Overview and Preliminary Guidelines for the Canadian Forces

David Demers

Robert Charpentier, Richard Carbone

R et D pour la défense Canada
Defence R&D Canada

Canada

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JUN 2005		**00-00-2005 to 00-00-2005**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Free and Open Source Software Overview and Preliminary Guidelines for the Canadian Forces	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Defence R&D Canada Valcartier,2459 Pie-XI Blvd N,Val-Belair, QC, Canada G3J 1X5, ,**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**		**30**	

List of Contents

- Administrative summary (5min)
  - Objectives
  - Study strategy and review process
- Report overview (10 min)
  - Executive introduction to FOSS
  - Proposed way-ahead for GoC
  - Guidelines to assess FOSS
- Summary and perspectives for the CF (5 min)

FOSS : Free and Open Source Software

GoC: Government of Canada

Study Context

- Challenging Context
  - *A very complex reality… with many biased perspectives*
  - *Changing very rapidly*
  - *Huge diversity in the target audience*

Summary Report on FOSS

- Synthesis – *High-level vision*
  - *Systematically referring to credible, up-to-date, rigorous reports*
- 3-Cycle validation process
  - ***Cycle 1 – DRDC Valcartier***
  - ***Cycle 2 – DRDC Corporate HQ***
  - ***Cycle 3 – DND/CF and OGD***

DRDC: Defence R&D Canada

DND/CF: Department of National Defence / Canadian Forces

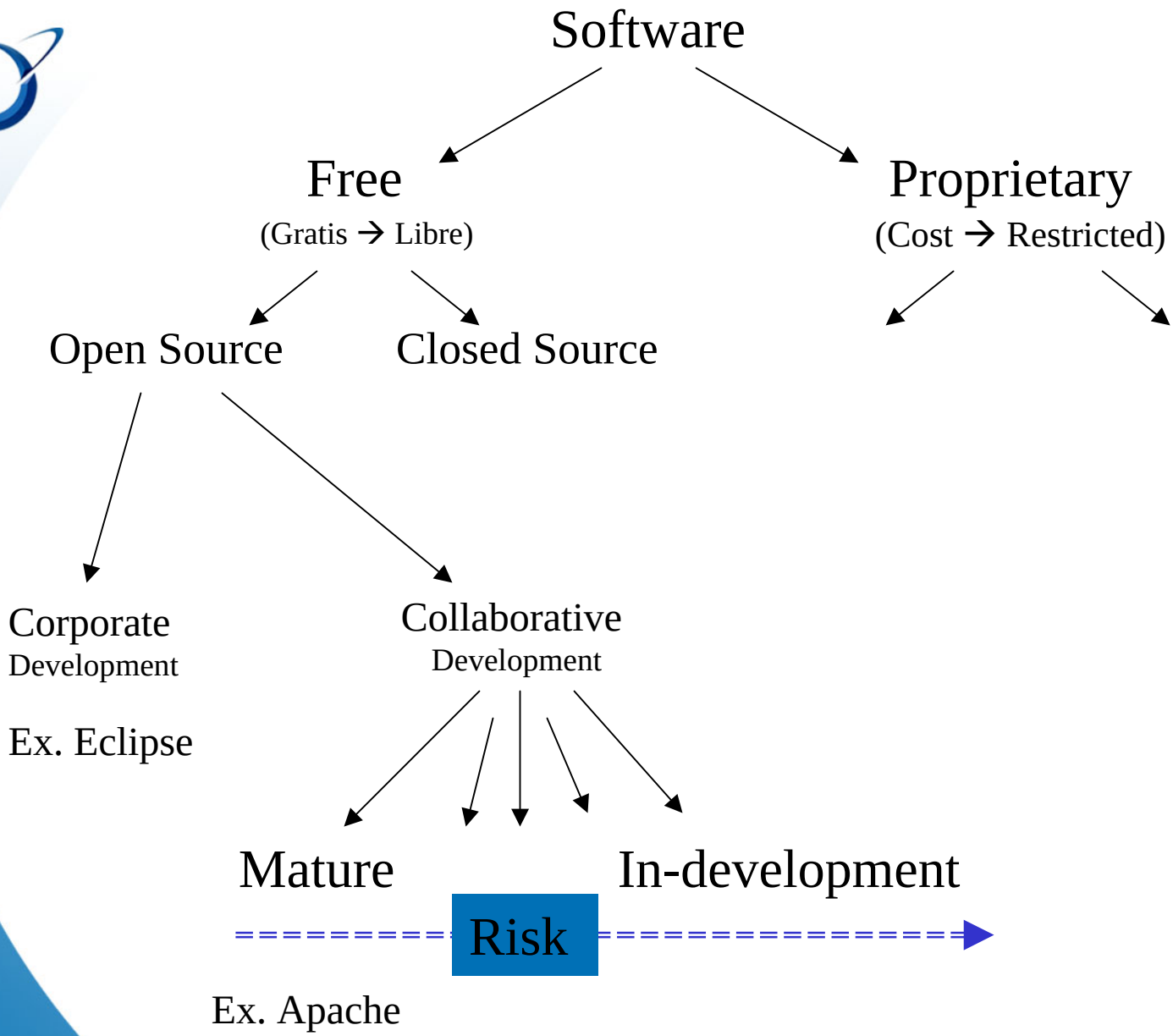
OGD: Other Government Departments

DRDC- Advisory Team on FOSS

Robert Charpentier, Richard Carbone, Paul-André Côté,
David Demers, Martin Salois, Lt Stéphane Fortin,
Dr Denis Poussart (U. Laval), Max Blanchet (CGI), Bertrand Couture (DMR)

Archive & Report Status

- Archive :
  - ~ 287 technical reports evaluated
- Reports :
  - ~ 124 references used in the report
  - ~ 17 topics discussed (~ 59 main statements)
  - ~ 394 selected FOSS introduced


Software
Free
(Gratis → Libre)
Proprietary
(Cost → Restricted)
Open Source
Closed Source
Corporate
Development
Ex. Eclipse
Collaborative
Development
Mature
In-development
Risk
Ex. Apache

Report Overview

Part #1 – Executive Introduction to FOSS

FOSS Evolution

- Approximately 115,000 projects registered
  - more than half of them are inactive (or duplicates)
  - 115-150 software applications on the secure/mature lists

- Collaborative development evolved in a very efficient process
  - Well-structured
  - Systematic code review and testing
  - Very fast bug fixing

FOSS Benefits

- Mature FOSS repeatedly suggested many benefits
  - Huge diversity of software
  - High flexibility and scalability through code editing
  - High reliability and security through code review
  - One-order of magnitude faster release rate than COTS products
  - Rapid “customizing” through code reuse
  - High degree of compliance with open standards
  - Lifetime extension of FOSS-based systems without lock-in

COTS: Commercial-Off-The-Shelf

Current Concerns

- Version control may be more complex *(evolving)*
- System maintainability requires more local resources
- Higher technical skill needed from system administrators
- May offer less integration between applications and less user-friendliness *(evolving)*

FOSS around the World

- European Union is actively adopting FOSS
  - *United Kingdom – policy and partial migration plan*
  - *Germany, France & Sweden – policy and migration up to desktop*
  - *24 countries reviewing policies (as of June 2003)*
- Latin American, African, Oceanian and Asian countries are also moving toward FOSS in varying degrees
- Main motivations:
  - *Direct cost savings*
  - *Less economic losses at the national level compared with COTS imports*
  - *Improve national IT expertise in software*

FOSS in the USA

- FOSS originated largely in the USA and is still strong
- Many large American corporations contribute to FOSS
  - *IBM, Hewlett-Packard, Sun Microsystems, Silicon Graphics etc*
- Some US government initiatives contribute to FOSS
  - *NSA offered SE Linux (Security Enhanced Linux)*
  - *NTA sponsored an impressive Geomatics project (OSPR)*
  - *NASA used collaborative FOSS development for Mars exploration*
  - ….
- Adopting a strong FOSS policy could be problematic for the US Government since the software industry strongly supports the US economy

NSA = National Security Agency

NTA = National Technology Alliance

OSPR = Open Source Prototype Research = Geomatics

FOSS in Canada

- Canada appeared to be behind the curve in FOSS adoption
- Some comprehensive initiatives can be found in the education and health sectors
- GoC position on FOSS adopted on 17th May 2004
  - No barriers to procurement
  - Ensuring that GoC staff are aware of the options available
  - Collaboration between departments is encouraged

GoC: Government of Canada

FOSS and Software Security

- Access to source code greatly eases security enforcement
- Other key advantages include:
    - « Leaner and meaner » software systems
    - Possible source code enrichment
    - Increased code diversity in software ecosystem
- Increased risks to manage:
    - Internal expertise to develop and maintain
    - Lack of imputability when software is developed via internet collaboration

Authors' Synthesis

- FOSS should not be considered as a panacea --

  but appears to be a credible and productive approach

  - *Cost-effective in many instances*
  - *Offering a good maturity, flexibility, high productivity*

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Part # 2 – Proposed Way-Ahead for GoC

Guiding Principles for a Way-Ahead

- FOSS represents a real and credible opportunity for GoC
- Diversity in supplies is preferable
  (Custom Software, COTS and FOSS)
- Open Standards and specifications lead to system interoperability
- Evaluation of FOSS must be done on a case-by-case basis

COTS: Commercial-Off-The-Shelf
FOSS: Free and Open Source Software

Proposed Way-Ahead for GoC

- *Promote progressive FOSS adoption in GoC*
  - *Inform project leaders of potential FOSS benefits*
  - *Provide navigation aids to help identify suitable FOSS*
  - *Provide guidelines to assess FOSS in context*
  - *Train personnel to interpret licenses and estimate cost*
- Consider *FOSS-based solutions in some RFP and*

  Choose « best value on the market » with technology neutrality

http://publiservice.cio-dpi.gc.ca/fap-paf/oss-ll/foss-llo/foss-llo00_e.asp

RFP: Request for proposal

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Part # 3– GoC Guidelines to Assess FOSS

Recommended Evaluation Steps

- Define the application context
- Identify candidates (FOSS and COTS)
- Compare side-by-side the 3-4 best options
- Perform an in-depth code analysis if needed
- Seek approval from local management and client
- Document the lessons learned
  - *An evaluation spreadsheet is proposed*
  - *A simple cost model is offered*
  - *http://publiservice.cio-dpi.gc.ca/fap-paf/oss-ll/foss-llo/foss-llo00_e.asp*

Ingredients for Success

- A good working product
- Led by commited leaders
- Providing a general community service
- Supported by developers who are also its users

Report Overview

Part #4 – Catalogue of Selected FOSS

High-Quality FOSS Lists

- GRAS: Generally Recognized As Secure *(115 FOSS – MITRE / DoD)*
- GRAM: Generally Recognized As Mature *(39 FOSS - Wheeler)*
- IDA: Interchange Data Administrations *(multiple FOSS - EU)*
- DRDC: Includes scientific FOSS *(± 394 FOSS – DRDC)*

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Summary and Perspectives for the Canadian Forces

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Summary

- Importance of FOSS will be increasing

  for most Government departments including DND/CF

- Pratical guidelines proposed

  for comparing FOSS and COTS software in project context

- Numerous navigation aids included in the report
- French version available

Next Steps

- Quality and Security assessment of FOSS
  - *Tools and methodologies to verify & validate C and C++ software*
    - Report for GoC project leaders and security architects
  - *Tools and methodologies to verify & validate Java software*
    - Report for GoC project leaders and security architects
- FOSS licenses and other legal issues
  - Practical information needed to support FOSS adoption in GoC
- Cost estimation
  - Practical information needed to support FOSS adoption in GoC

Issues Requiring Some Attention by the GoC

- Expertise for system development and maintenance

  i.e. more reliance on internal resources – often scarce

- Lack of imputability

  when software is developed via internet collaboration

- Fragmentation of our computer base

  compatibility with existing systems and databases to maintain

- Duplication of certification efforts

  centralized software certification and GoC pre-qualified list of FOSS

Issues Requiring Some Attention by the CF

- Good technology in some cases; criteria to clarify
- Maintain interoperability with our allies moving to FOSS
    - List of trusted sources in preparation
- Assess threat of FOSS having offensive capabilities
    - List of offensive FOSS being built

For comments :

FOSS@drdc-rddc.gc.ca

http://www.cio-dpi.gc.ca/fap-paf/oss-ll/oss-ll_e.asp