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THERE'S ONE REASON FOR GOVERNMENT'S FAILURE TO EMBRACE OPEN SOURCE SOFTWARE (and that's faulty advice)

Introduction

1. I recently visited NSW's Parliament House to meet with a senior adviser to the Minister for Finance in the NSW Government on matters relating to ICT.

2. I came away from that meeting angry and disappointed.

The Issue

3. To give readers some background, the NSW Government, each year, spends around $2 billion on ICT. Of this, at least $80 million is spent purchasing software the Government could obtain for free; namely the Open Source equivalents to Microsoft Operating Systems, Microsoft's Office Suite, Microsoft Outlook and Outlook Exchange Server, Microsoft's SQL Server and Oracle's Database; not to mention a raft of proprietary software related to web-services.

4. The purpose of my meeting with this adviser was to discuss how NSW might, like the city of Munich or a number of other government entities around the world, gradually transition towards the wholesale introduction of Open Source Software. (If you have not done so already, it would be helpful for your understanding of the issues, to read a related paper I have written, "How The Australian Government wastes over $400 Million per year (and stifles an industry that could earn billions)")

5. The adviser I met with had no intention of discussing this concept. His agenda was to close down the debate.

6. He informed me that he had discussed the matter of the replacement of proprietary software with open source software with colleagues and there was a general consensus that:

   a. **Security.** Open Source Software had security concerns.

   b. **Locked in (and helpless).** The NSW Government uses applications that will only run on Microsoft Operating Systems. As a consequence, it would be too expensive for the NSW Government to migrate its systems to applications that would run on most commercially popular operating systems.

   c. **Greater use of the cloud avoids having software licences.** There is a general trend to move computer systems into the cloud and, as a consequence, the NSW Government will not pay for software licences in the manner it presently does.

7. From these opening posits, I could clearly see the general direction of the discussion and also knew this person had sought advice from people, like himself, who knew little about computing science.

8. On this last point, regarding his qualifications, he strenuously disagreed. He felt he was well qualified because he held a business degree in information technology and had years of experience in the ICT industry. For those who don't already know it, a business degree is something one should take after a grounding education in a "real (STEM) tertiary qualification" like engineering,

mathematics, pure science, physics, chemistry or computing science. A business degree by itself is a weak qualification. It is a fact that those persons, holding such a qualification, who then attempt a degree in computing science, frequently fail. Put bluntly, my experience tells me a business degree in IT is a soft arts degree sprinkeled with technical words, taught by people of a similar background. These are the same group who have overseen failure after failure in matters computing within Government; helped along by similarly qualified consultants from the large accounting firms.

9. It is noteworthy that universities teaching IT degrees generally use Microsoft Software, even for the programming environments (C sharp). Computing Science courses on the other hand have a heavy component of UNIX and, as a consequence, computer scientists are far more at home with Linux and open source software generally; particularly those who major in subjects like public key cryptography.

10. This is where the "rot" starts. Students doing business degrees gravitate to management and when they achieve these positions, with a weak grounding in computing science, they are only comfortable with Microsoft products.

11. Here are some facts countering the assertions put to me by this advisor:

    a. **Security**.

        (1) It is a fact that by being able to view the source code of an application one is fully informed as to its capabilities and vulnerabilities. This is simply not possible with closed source software. If the advisor and his mates had even a slim grasp of computing science, they would appreciate this. The fact that they don't is testament to the low quality of their education in computing science.

        (2) The Australian Signals Directorate uses Open Source Software because, by being able to review all of the source code, they can ensure the software has no backdoors. All complex software, especially that which caters for multiple users, has vulnerabilities. With open source software these can be properly assessed and the limitations of such applications can be properly judged. The same is not possible for closed source. Added to that, what little review of the code which occurs in closed source, is by a narrow audience, often driven by commercial imperatives. Prevalent open source applications, such as public key cryptography, and the Linux kernel, on the other hand, are reviewed by a diverse range of computer scientists; some amongst the best on this planet.

        (3) The National Security Agency of the USA also uses Open Source Software and operating systems extensively. Public Key Encryption systems are all Open Source. They provide the backbone for all secure communication between customers and banks.

        (4) Google, eBay, Amazon, Facebook, Twitter.... all use Open Source Software almost exclusively. (In the case of Google, it is exclusively.) They do this because it is secure, stable, adaptable and represents exceptional value for money.

        (5) To learn more, go to http://en.wikipedia.org/wiki/Open-source_software_security . In there, it makes the telling observation that: " This concern has become more and more SEVERE as backdoors in well-established software have been disclosed[by Edward Snowden]. In the face of this, the ongoing debate on whether open-source software increases software security or is detrimental to its security has become pointless. Even though some of the arguments on either side are subjective and no relationship between number of vulnerabilities in an application and its open-source/proprietary status has been observed, both of them may contain backdoors. However, only open-source software can be freely audited and therefore, proprietary software must be considered inherently insecure."

b. **NSW Government is locked into Microsoft.**

(1) It may presently be the case that the NSW Government is locked into Microsoft. That has always been Microsoft's intention. But shouldn't our public servants be actively looking to find ways to break out of this entrapment? It is costing NSW around $80 million per annum (not much compared to the total bill of $2 billion I'll grant you... but do you have $80 million to spare?!! Just think what effect $80 million would have if it were supplied as bursaries to talented students studying computing science in our regional universities.) This present situation of "lock-in" could be changed by a methodical approach over a number of years. The advisor, and those advising him, don't care. They are comfortable with the status quo. It's **not** their money and, lacking imagination, they cannot appreciate the benefits that would flow from the wholesale adoption and furtherance of open source software.

(2) The posit it would cost more to move to open source software on the desktop than it is presently costing to use Microsoft annually is not supported by any hard, factual evidence. Indeed, Munich stands as an example to demonstrate that this is blatantly untrue! Munich now saves millions of Euros per year through the universal adoption of Open Source Software. Additionally, nationally, more than $400 million presently flows out of Australia. Think of the tax claw-back if it were spent in this country and the effect generally it would have on our economy.

c. **All NSW Government Computer Systems will soon be in the Cloud therefore we shouldn't worry about changing now.**

(1) The term "Cloud-based" is simply another name for highly inter-connected (networked) computers; often using a software solution referred to as "Virtualisation". This means creating the perception one is using a stand-alone computer when, in fact, your "computer" is actually located on a server running with many other "computers" supporting many other users. To avail oneself of a cloud system, one needs a computer on the desk, a notebook, a tablet or a smart-phone. These have to run an operating system. The proprietary systems being run in the cloud also require that licences be paid for every session. Using the cloud will not address this. It will not reduce the costs for the taxpayers of this country. The NSW Government, left to people like this advisor, will continue to use applications that will only run on Windows Operating Systems. The alternative to virtualisation is to provide a person with a web interface that performs like an application. In the main, most web-based applications are now written in Open Source programming languages like Drupal, Joomla, django and the Play Framework (Scala). The front end is a generic browser running with embedded software like AngularJS or jquery. Having said that, Government agencies continue to use Microsoft Hypervisors, “dot Net” and with programming being done in C#, Microsoft's copy of the Open Source programming language, Java; running on Microsoft servers!

(2) When considering putting all Government computing into "the cloud", it is useful to note that cloud based systems are heavily dependent on communications. Should communications fail, for any reason (cyclone, bushfire, natural disaster, war), then all Government services located in the cloud would likely fail for most users.

(3) Security has to be a concern when considering adopting a cloud solution as this generally involves using servers, run by third parties, often foreign-owned. Should a server ever be compromised then sensitive data relating to Government and individuals will likely fall into the wrong hands. The idea of moving all

Government services into the cloud may not be the brightest of ideas.

(4) The advisor's view is that the taxpayers should tolerate the present situation because one day it might change. If the NSW Government's applications will only run on machines running Microsoft Windows then this will still remain when/if the Government moves its applications to the cloud. *Licence fees will still have to be paid; along with those associated with the software that provides for virtualisation and other proprietary software-enablers that make cloud computing possible.*

The Root-cause for this Situation

12. *The root-cause of this problem is therefore the quality of the people providing advice throughout Government; both internally and externally.*

13. This is not an isolated case. I have now met with quite a number of CIOs, CTOs and advisors in Government. None, so far, possessed any credible tertiary qualifications in computing science. The most stark example of this can be found in the Government's largest department, the Department of Defence. As far as I can ascertain, the CTO of Defence's only formal qualification is that he was once a computer operator in the public service! The person responsible for his appointment, the then newly appointed Chief Information Officer, held a aged business degree. Before coming to Defence, he and the CTO had presided over an ATO system's debacle with Accenture. Reported in an Inspector General's report, the "fixed-price" contract was to cost $230.7 million but by 2010 Accenture had been paid $677 million. This project has cost the tax-payer well over three quarters of a billion dollars. At one point the systems became so badly infected with malware that the ATO could not issue payments to small businesses for around 3 months!

14. So far, Defence, with the continuous and hugely expensive advice from the major accounting firms, has spent tens of billions of dollars on computing systems yet common, essential processes like marking the unit roll, conducting PT assessments and range practices are still largely manually administered.

15. There are many other instances of abject failure in Government IT I could point to and which I'm sure readers are well aware. The problem is definitely the poor quality and lack of current qualifications in computing science of the people presiding over these projects.

16. These managers and advisors are definitely politically adept but they are thoroughly ignorant about matters of computing science. Worse, most are devoid of imagination. Whilst people like this are in the position they occupy, there will be no progress in saving money for the tax-payer and creating an industry for our economy that would benefit our youth in the future plus those countries that are in Australia's region of strategic interest.

17. Australian Governments of all political persuasions will reach first for taxation, and then to cutting services, to balance the budget rather than search for innovative ways, such as the enthusiastic adoption of Open Source Software, to save money whilst improving the services being delivered and growing the "tax-cake". Government does this because its managers and advisors lack the necessary qualifications, experience and imagination to conceive of anything else.

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