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OSS in 2012: a long-term sustainable alternative for corporate IT

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Abstract. The current internet leaders (Google, Facebook, etc.) all have OSS in their DNA. Traditional corporations still rely mostly on proprietary software for their mission-critical IT systems. But, situation is changing: as tip of the iceberg, major stock exchanges of the world have announced successful migrations to OSS. Many traditional corporations can now follow the OSS path because this market has clearly matured in many relevant aspects for them. In addition, solutions are here to achieve quick, efficient and secure mutations to OSS which must be undoubtedly considered by CIO as the technological state of the art for 2012.

1. Historical situation

Current high-tech leaders like Google and Facebook were born with Open Source Software. They massively leveraged it to develop their huge infrastructure with an incredibly high price-performance ratio:

- Google is known for having an infrastructure in the million-range of servers^[1]. They are equipped with a customized version of Linux^[2].
- Facebook is relying on Linux and the Cassandra NoSql database, that it initially created^[3], to accumulate and manage the incredible amount of content uploaded daily on its hundreds of thousands of servers.

It was obvious for their founders that OSS software was the way to go when those giants of 2012 were very nimble startups: the cost of OSS, mostly free (like in “free beer”), is clearly one of its major advantages for a nascent company.

For more traditional and well-established corporations, origins of OSS and its inception mode made it clearly suspicious in its early days. How can you rely for the mission-critical part of your business on an OS like Linux, initially conceived by Linus Torwald, a student, as a personal project to make better use of its new 80386 PC^[4]? More generally, major components of Linux were built by Internet-connected communities of individuals who very often never met each other and who tend to make the software, that they develop, evolve in the direction that best suits their own

needs first. Their project dies or succeeds if its functions match the needs of a vast community, if its quality is high and if its improvements / versions appear quickly.

This very Darwinian evolution clearly doesn't meet the usual and traditional corporate requirements where suppliers have to be reliable, foreseeable and dependable. This is the reason why OSS was mostly limited to students, researchers and hobbyists until recent years.

But, things have started to change: London Stock Exchange announced in 2011 the successful end of its migration to Linux. It is part of a pack of similar achievements in the financial community^[5]: NYSE, Deutsche Börse, Qatar Exchange, Shanghai Stock Exchange, etc. also migrated. Many of those systems claim to run at rate over 1 million transactions/second !

A very professional and corporation-oriented approach of OSS in the recent years is clearly the catalyst of these changes.

2. OSS: now run by professionals

OSS, exemplified by Linux, has clearly left its hobbyist status. A study by Linux Foundation of December 2010^[6] demonstrates that the vast majority of developments and patches around the 13.5 millions of source code of the Linux kernel is achieved by regular IT suppliers: Redhat, IBM, Oracle, Intel, HP, etc.

Because the adoption of Linux is growing rapidly, traditional leading IT suppliers didn't have any other choice: they must get seriously involved in this common resource.

They can't take the risk that their hardware equipment or software solution would work less efficiently or less reliably than those of competitors on this platform aimed at very strong growth: about 5 times faster than the global server market for years to come^[7].

Additionally, not taking advantage of a common resource, valued at more than 11 billions dollars^[8] for a leading Linux distribution like Fedora, would clearly demonstrate poor business abilities in R&D optimization...

The plethora of distributions can really be perceived as a mess: Distrowatch counts 321 distributions^[9] at time of writing. This abundance could repel many corporations frightened by the fear of doing the wrong choice.

So, as his founder Robert Young explains, companies like Redhat have taken early on the role of becoming the "Heinz" of Linux in comparison with tomato ketchup^[10]: *"All leading companies selling commodity products, including bottled*

water (Perrier or Evian), the soap business (Tide), or the tomato paste business (Heinz), base their marketing strategies on building strong brands. These brands must stand for quality, consistency, and reliability. We saw something in the brand management of these commodity products that we thought we could emulate.” The role of Redhat was not initially to develop Linux per se but to create a solid, credible and reliable brand around it in order to foster its adoption in the corporate world. The figures of IDC already mentioned and achievements of Redhat as flagship Linux company just reaching the billion dollars in yearly revenues^[11], demonstrate clearly that this approach has succeeded.

Beyond the important factors of image, credibility and dependability, Linux has also demonstrated leadership by the usual technical measurements:

- in the scientific world, the K system, leader of the Top500 supercomputers for October 2011^[12], is running Linux on its 705'000 Sparc cores to reach peak computations at 10.51 petaflops. Its 9 followers in this list are also running Linux.
- In the corporate world, Linux reaches around 50% of the top 10 spots for benchmarks like those of Transaction Processing Performance Council^[13]. It is mostly due to the fact that suppliers tend to demonstrate for obvious commercial reasons that their proprietary systems perform as well as Linux for their equipment by publishing close results for both situations.
- Reliability surveys demonstrate clearly that Linux is at least as reliable as its proprietary counterparts if not more.^[14]

Those exhaustive criteria have validated over time that OSS in general and Linux in particular have become a fully viable and even premium solution for large, critical and sophisticated corporate IT system.

3. OSS for traditional corporations: the way forward

Behind the leaders, the crowd of traditional corporations is by far not on OSS / Linux for their mission-critical activities yet^[15]. All companies nowadays have Linux somewhere in house but it is most of time limited to serving the corporate web site or running the email gateway and DNS server.

Our analysis of this situation through meetings and business cases with many prospects and customers demonstrates that the question is not willingness but ability to migrate.

Most CIOs are today under a pressure of an intensity never felt before to produce massive savings in their IT budget^[16]. All of them want to reduce their cost of operations, often amounting up to and even beyond 80% of their total budget. They want to compress this dominant section of their costs in order to return savings to

their management and users but also to free up new resources for innovation projects desperately needed in a world where competition never stops increasing.

For most CIOs in this situation, the major virtue of OSS is its costs: they clearly care much more for its quasi-gratuitousness (compared to the proprietary world where their current system currently exist) and its licensing simplicity than for its other virtues (access freedom, changeability, etc.).

But, most of those CIOs are trapped already because the savings are required today with no allowance for transient budget increase in order to produce them. So, an evolutionary path where a system built over decades (of economic stability) would be progressively replaced over decades (of economic tension) by its OSS equivalent is clearly excluded.

In parallel, those CIOs, especially those in the information processing business (finance, media, etc.), have to protect the massive investments represented by their current IT system, where all the expertise and distinctive features of their business lie. Their value is embedded in sophisticated algorithms and processes “engraved” in millions of lines of source code over decades. Their teams also assembled over long periods of time represent the associated knowledge and competences. No way that a mutation to Open Source could jeopardize any of those 2 assets!

Finally, when solutions are demonstrated to protect the current assets, the final issue to be solved for CIOs is the path forward to this new world. It must be quick, secure and safe.

Truly, safety is a must. No CIO will embark such a massive mutation when it puts the business of his company, and consequently his own job, at risk.

Our analysis over many years has proven that this safety for quick mutations to Open Source Software can only come from 2 factors combined jointly in those projects:

- Automation: the new OSS system is generated by a translating automaton that will analyze the old proprietary system to generate its OSS equivalent via some kind of translation / cross-generation.
- Iso-functionality: the new OSS system must be fully equivalent to its proprietary predecessor. It processes and stores data in the exact same way, the user interactions are strictly identical and the processing algorithms remain unchanged.

We have applied this methodology for migration to OSS in various projects, perfecting the translating technology that we rely on over time. Our last project is the migration of a sophisticated banking system composed of over 10 millions lines of source code.

Each time, in those projects, we obtain very similar feedback from CIOs:

- Quick mutation to OSS for a mission-critical system must be a repeatable industrial process (via full automation) and clearly not a “1-shot best-effort trial” in order to succeed. The repeatability guarantees that the quality level and also allows safe parallel construction of the new OSS system by repetition of translation on a nightly basis (to include last maintenance of legacy system).
- Iso-functionality is key to the safety of the process : the new OSS system can share the same database as the old system because the source of modified data is indistinguishable. So both, old and new system can harmoniously cooperate to jointly host the user crew while it is smoothly migrating from the old to the new system.

Combining those 2 characteristics foster success:

- massive savings are achieved, up to 90% of the costs of the original system, so millions of dollars / euros per year on a recurring basis,
- competitive software assets are moved to state-of-the-art technology for a “second life” with big potential for further evolution,
- people (both end users and IT staff) also migrate with very moderate effort and resistance because their adaptation needs are minimized,
- risks to achieve the objectives have been reduced to a strict minimum.

4. Conclusion

This paper demonstrated that traditional corporations can and should nowadays catch up technologically with current high-tech stars of the Internet. The pioneering path for OSS has been paved by Google, Facebook when they had no assets to protect and when they had to leverage all available opportunities to succeed. It is no longer the sole ability of this technological elite: OSS road is now open to all corporations!

The OSS world is now also open to more traditional companies that were initially more reluctant because of their already existing assets: OSS is now dependable upon because reliable brands have emerged around it and because its technical qualities and abilities have been clearly demonstrated for large-scale traditional applications.

With market solutions automating the migration to OSS, the last barrier is removed: CIOs can migrate quickly and securely to the technology that they must recognize as state-of-the-art for their systems in 2012.

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