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A Linux/Open-Source Best-Practices Guide: Applications

With the advent of Linux and open source in the enterprise, IS departments must adopt a rigorous method for applying disciplined standards and management of Linux open-source application deployments.

Core Topic
Hardware Platforms: Server Platforms

Key Issue
How will centralized and distributed servers evolve during the next five years?

Linux and open-source integration will demand new processes in the overall development, deployment, maintenance and support of IT infrastructures. These processes can have beneficial and negative consequences. Without implementing a rigorous best-practices approach, IT investment could escalate to higher, unanticipated costs. This framework (see also "A Linux/Open-Source Best-Practices Guide: The OS") is an initial view by Gartner into some of the major focal points that CIOs, architectural planning managers and project developers need to consider in applying discipline to the hybridization of commercial and open-source system design.

Open-Source Software (OSS) Selection: Do not apply a blanket policy (for example, outright rejection, total acceptance or no position at all). Segment open-source products into different categories or application areas and apply an appropriate policy to each category according to a risk/benefit assessment, in-house experience and expertise, and vertical-industry factors. Specifically, some useful categories might be production servers, development systems and administration tools, embedded systems, and desktop software. Other categories could be security, infrastructure, research and laboratory, and so on. Choosing the extremes (outright rejection or total acceptance) may carry risks, such as missed opportunities at one end and costs or loss of flexibility at the other. In any case, the enterprise should set down guidelines on when and how open source should be used in the IT infrastructure. For example, suppose the enterprise project of which the OSS will be a component has a strategic road map. Will the future direction of the IT project be able to rely on OSS as in its current manifestation, or will it depend on enhancements by the maintainer and the community? If the latter, we recommend that the IS department delegate a member as liaison to the community and act as a champion for new deliverables in alignment with its current goals. IS should

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recognize that release schedules are the province of the maintainer and out of the control of the IS department.

OSS Modifications: Many OSS packages come with the operating system (OS) distributions. In general, it is not recommended that users make changes to the OSS. Changing the software for specific internal use will by definition break any support contract for that software (in some cases picked up by the OS distributor). Moreover, if you modify an application in the Linux distribution, future versions of the distribution may be more difficult to use because the modifications may no longer be applicable, or, worse, they may break other parts of the code. In selected cases, where the expertise and willingness to work with the OSS community exists, the enterprise may engage with the OSS community with the stipulation that the enterprise is willing to feed back the modifications it has made to the source. While the enterprise has the opportunity to influence the direction of the software, it will concede any intellectual property rights. And if the enhancements are deemed proprietary and delivering a competitive advantage, the licensing terms may require that the changes be made available for public redistribution. When modifications are essential, then it is best either to make the changes through the application programming interfaces (APIs) that are exposed, or, if current APIs are not useful, then to present a case to the developer community for future adoption of APIs.

Licensing Open Source: The temptation in dealing with OSS is the wide variety of choices and the freedom to freely use or modify the code to suit the needs of the enterprise. However, apart from introducing possible incompatibility with future "official" versions, as discussed above, enterprises should also make sure that they adhere to the terms and conditions that different open-source licenses impose. Some licenses, and in particular the GNU General Public License (GPL), require that any redistribution that includes modifications must make available those modifications in source form. This means that, if modified OSS is redistributed outside the organization, say to partners or customers, then such modifications must be made available to the recipients in source form. Although such circumstances will arise very rarely, there should still be guidelines for developers to ensure that any valuable intellectual property is not inadvertently lost via this route. There are further potential risks with contributions to open-source projects by internal staff. In particular, code created by internal staff may accidentally or intentionally infringe someone else's intellectual property, or cause damage to another organization.

We recommend that the IS department form a code licensing and definition committee for OSS to ensure that any projects

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borrowing or utilizing the open source conform to license standards and comply with corporate legal restrictions. Furthermore, IS departments should apply discipline to how open-source and proprietary applications are mixed. Processes should be established that create a firewall between OSS-specific projects and commercial and proprietary applications, each with their independent software configuration management systems, when the potential exists for GPL to compromise corporate intellectual property. Further guidelines are needed regarding the circumstances under which internal staff can contribute to open-source projects based on a realistic risk assessment and the existence of shielding mechanisms for different OSS.

Test and Conformance: Much of the testing for standards conformance is on the shoulders of the distributors and application vendors. However, we recommend as a good practice that IS organizations monitor and document the various links in the chain toward implementing and deploying compliant open-source distributions and applications. Such monitoring will include addressing the following questions:

1. Has the Linux distributor's OS version for a specific architecture (such as IA-32) been certified and audited by an authorized third party and included in the Free Standards Certification Register?
2. Have the applications for deployment (either from the open-source community or commercial independent software vendors) been certified on the Linux OS distribution(s) of choice for deployment?
3. Is the development environment being used by the internal software development department building applications on certified configurations and build environments?
4. Are the application developers testing customized and homegrown code with sample test suites offered by the Linux Standards Base (LSB)?

Over and above these steps is the continual monitoring of the next versions of the LSB for inclusion of ever-broadening scope (for example, high availability, embedded applications, and new architectures such as Advanced Micro Devices' Opteron, 64-bit reduced instruction set computer or IBM zSeries).

Distribution Maintenance: Compliance testing is not relegated to a point in time but is a continuing process. Patches and new releases are constantly emerging from the open-source community. Certain fixes and updates will be more important than others will, but, as in any OS environment, especially the increasingly Web-based applications, vigilance and careful

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monitoring of distribution changes are essential. In deciding on a distributor, users should read carefully the terms and conditions of maintenance contracts to determine how well they fit with the deployment strategy. For example, the service may offer various options regarding telephone, e-mail and on-site support, response times, coverage time, partnering with other vendors for shared responsibility, and so on. These services are usually available on a per-server basis, allow for manually requested or automatic downloaded updates and patches, and are delivered as renewable subscription contracts. Costs will be commensurate with the degree of responsiveness and coverage. IS organizations must determine the degree to which maintenance is critical to the overall enterprise operations and factor in the costs as part of the total overall cost of ownership. In addition, if and when administrators should detect bugs to which no known patch exists, they may apply to the source code maintainer to have a patch included in an upcoming release, or apply their own fix. However, until that fix is applied to a new release, the IS department should request the distributor or vendor to support the modified code base.

Training: Because Linux and OSS develop according to a different process and paradigm, IS departments must ensure that staff members are knowledgeable and aware of the implications and responsibilities that come with the community process. The ease with which an engineer can download code from the Internet and integrate it into the corporate proprietary application base and IT infrastructure makes it mandatory that external and internal training, best practices and rules of procedure be maintained. On another level, it is advisable to have certified engineers in Linux and open-source packages on staff. These training programs are offered by professional institutes such as the Linux Professional Institute (www.lpi.org) and SAIR (www.linuxcertification.org). These programs can have intangible benefits, including: building the foundation and knowledge base within the IS department; boosting confidence levels of trading and distribution partners in the reliability of systems management and interfaces; and building good judgment and practices when working with the open-source community. A transition strategy can best begin with an inventory of skills and their relevance to the new OS environment. For example, advanced Solaris administrators and programmers knowledgeable in Apache, Perl and Samba would require far less training than a Windows administrator or a Unix administrator experienced only in packaged applications.

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Bottom Line: A disciplined and carefully considered best-practices process is essential to delivering maximum returns and benefits from Linux and open-source application deployments. The fact that open-source software (OSS) and Linux standards compliance are still in an early phase of maturity will require active vigilance and engagement on the part of the IS organization in the open-source development and deployment process. Through year-end 2005, 70 percent of large enterprises will neglect to implement formal corporate guidelines and best practices applied to Linux and open source (0.7 probability). Without such practices, 90 percent of these enterprises will unknowingly have deployed some poorly documented, "unauthorized" systems running open-source code or combinations of OSS and commercial code (0.7 probability).

Acronym Key

API	Application programming interface
GPL	GNU General Public License
LSB	Linux Standards Base
OS	Operating system
OSS	Open-source software

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