Traditional and Emerging Strengths of Linux in 2001

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1. Application server platform.

Linux makes a very good appliactions server. Commercial framework support ranges from Sun J2EE and Weblogic, to Coldfusion, to Websphere, with support for all major RDBMS systems (even Microsoft SQL databases can be accessed via middleware).

Of course, the accent on Linux is on new, open source application server languages/frameworks like PHP (its own perl/VB–like language), Enhydra (J2EE–based), and Zope (Python–based). Pre–built, often free components are the rule, rather than the exception. There is a lot to build on, including LDAP directory services wired into a surprising array of tools and languages.

Remote management support is superb. This is one reason why Linux is so desirable as an off–site–hosting solution. A rack of Linux servers and a terminal server at AboveNet or Exodus can be managed similarly to a datacenter down the hall.

2. Data integration platform

Linux is a very appealing as a platform on which to integrate and consolidate data from multiple sources. A multitude of database libraries, middleware servers, and the Perl and Python programming languages, along with excellent batch scheduling support, give Linux significant advantages in this area.

3. Small–to–midrange scale database server platform

Linux runs all major RDBMS servers, minus Microsoft SQL, and runs them very impressively on up to 8 CPUs and up to 1GB RAM. (Larger configurations are theoretically supported, but RDBMS servers will not yet take advantage of all resources.) In our experience, Oracle can run faster on

Linux than on NT, on the same hardware, in this memory configuration.

The Mysql database is highly embeddable, and very small and speedy in applications where one might have used an embedded Borland, Ashton–Tate (or Fox, or ...), or FairCom database in a DOS/Windows application. It's free (GPL'd).

The Postgres database is a more robust (but larger) database with stored procedures, triggers, views, full transaction support, and more sophisticated SQL conformance (SQL 92). Full object–relational support, too––Postgres was the basis of the Illustra database Informix bought in 1994.

4. **Turnkey deployment platform.**

Linux makes a superb deployment platform for turnkey systems delivered to customer sites. Linux gives you the ability to provide drastically simplified remote management as needed, through Internet access, dialin, or other mechanisms. The Linux licenses cost nothing, so there's no per–site deployment charge for the base system. With a little effort, you can create a system that even installs itself on an unconfigured system.

5. **Advanced file server.**

Linux not only supports Microsoft Windows networking and file serving (currently, compatible up to the NT 4.0 level), but also supports enterprise class systems like AFS, distributed filesystem used by large universities like U of M and CMU. AFS is now free and Open Source.

In fact, Linux's great strength is as a multi–platform file server. Linux supports NFS, Appletalk, Novell, and a variety of other (mostly experimental) remote filesystems, in addition those already mentioned. Typically, Linux can export the same files in a variety of formats simultaneously.

6. **Middleware/Application Integration platform.**

Linux is a great and low–cost place to implement CORBA and Java middleware serving a variety of possibly non–Linux clients. Multiple FREE Corba 2.2/2.3 implementations, database access, and a fair number of CORBA services, simplify projects.

7. **Mail/Web/Groupware server.**

Linux is an ideal Internet mail platform, with superb Imap and LDAP directory services support. Adding in a web application server gives you a standards–based application infrastructure at next to no initial cost.

8. Cluster–enabled systems.

Clustering is the key to ultimate scalability in computing systems.

Linux can be set up in a bunch of cluster aware configurations. This includes compute clusters, of course (where Linux has become a standard choice), but increasingly application server clusters. A new cluster–aware filesystem called GFS is helping this along.

9. **Diskless configurations.**

Linux has a range of options for running diskless or with ethernet and/or FibreChannel attached storage. Ideal for farms of application servers or possibly farms of data entry or POS systems.

10. Embedded deployment platform.

With some effort, standard Linux packages can be shoehorned onto stock embedded hardware platforms for deployment in set–top–box format, and other unlikely places.   License costs for the Linux component remains $0.00.

11.Router/Firewall––or firewalled application server.

Linux has capabilities that make it very attractive as a secure router or firewall (see below). Many of these capabilities are desirable on an applications server, as well. Linux enables you to build up many kinds of deployment platform with well–defined security profiles.

 You are not dependent on a general–purpose system vendor, or a closed source vendor. You can audit––and patch––everything on the host.

11.Legacy deployment platform.

Linux's development tools and database support have made it a very good replacement target for legacy systems (DOS, mainframe, VAX/VMS, AS/400, and others) that have have outlived their original platform.

Some Not–Application Specific Reasons Why Linux is Growing in Key

Sectors

1. Terrific, low−cost remote administration support. Not just console−based, but GUI and/or web based in a growing number of cases.

2. Terrific multi−user support. Unix is multi−user from the ground up, of course.

3. Strong all−round performance, and excellent tunability.

4. Low cost of aquisition, at an entry level. Linux can frequently be dropped into a complex network environment to perform one or two roles, without any fuss. Linux expertise is getting very common, even if it is not always deep (since Linux is new to corporate environments). This experience level is sufficient to get started on many projects and host simple services.

5. Medium− and Long−term retraining costs offset by productivity gains. Really. Explosive emergence of web automation *framework*s built on standard foundation packages (e.g., PHP) reflects this, and also extends it, since it lowers barriers to entry for new developers wanting to build complex, interactive web sites/applications.

6. Exceptional development tools, most of them free of charge. Linux can support applications developed in just about any non−proprietary programming language or combination of languages, including C/C++, Java, various Basics, Perl, Python, Ada, Eiffel, Modula(2,3), Pascal, Delphi, Fortran (77,90,95,HPF), Lisp, Schemem, and of course many others.

   Porting from Microsoft proprietary languages is still a pain, but becoming more manageable.

7. Secure computing foundation. Linux security options have been evolving steadily since 1992, and there have already been a few revolutions.

   Here are some of the highlights:

   1. Impressive and ergonomic packet filter and proxy support (Ipchains, Iptables, Netfilter [also support for Ipfilter and other alternatives])

   2. Mandatory Access Control. The LIDS package (a kernel add−on) gives Linux hardened system profile support comparable to that of TrustedSolaris and other highly−secure operating system platforms. The US National Security Agency (NSA) has also released a fully open−source secured Linux platform with similar capabilities.

   3. Ipsec VPN support. Linux can set up secure wide−area networks using

industry–standard Ipsec VPN protocols. Linux interoperates with Cisco, Sun, Netscreen, Checkpoint, and Microsoft VPNs. Hardware accelerated cryptography support is available.

4. Solid canned applications for web filtering/tracking, mail viru scanning/filtering, and other standard tools.

5. Network troubleshooting and security testing tools. Having these tools available out–of–the–box makes securing and troubleshooting network security much easier on Linux than on competing platforms. (Less costly, too.)

Linux is becoming a platform of choice for some key customers with comprehensive security requirements, so this trend will continue.