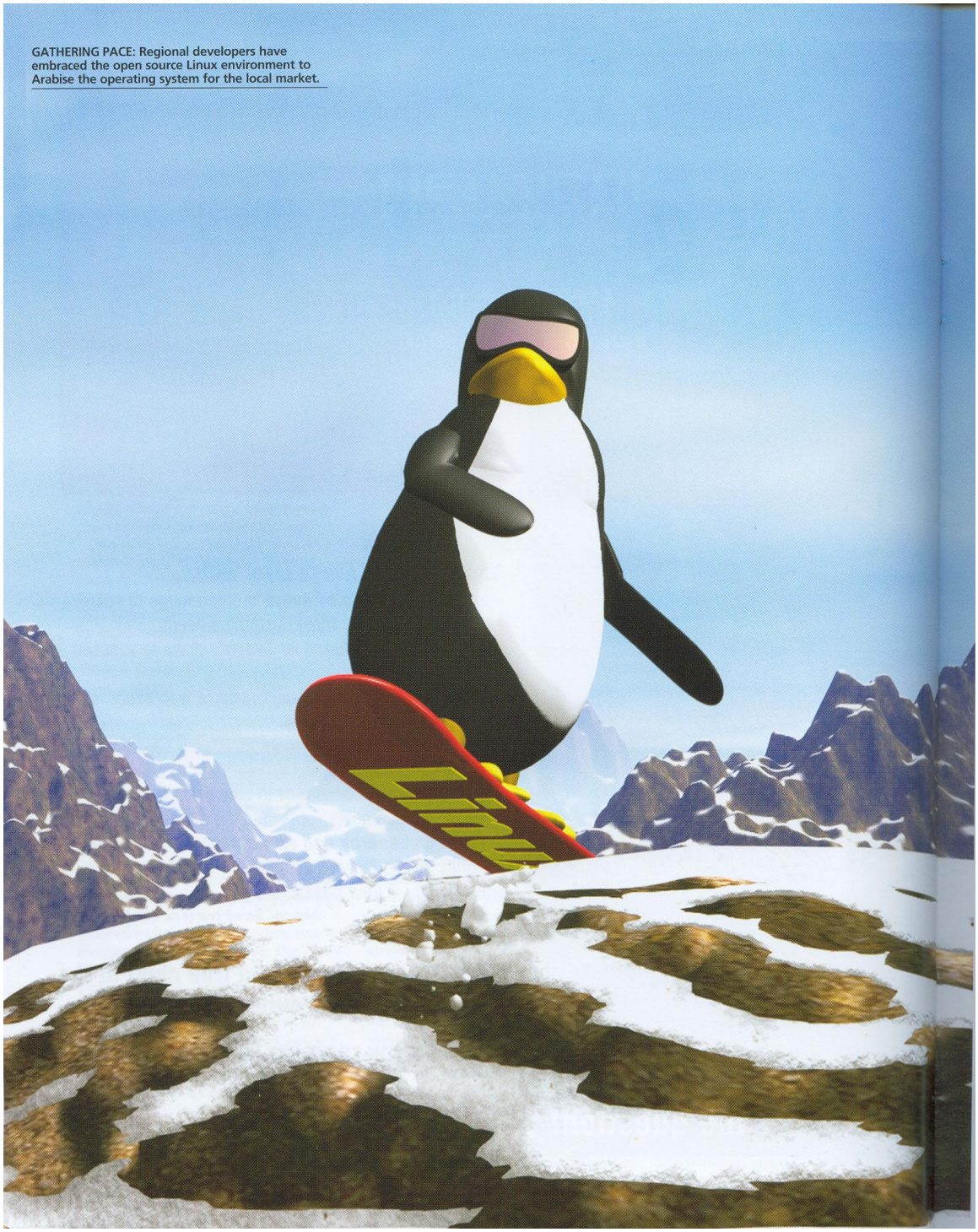


GATHERING PACE: Regional developers have embraced the open source Linux environment to Arabise the operating system for the local market.

ALL ABOARD

Linux has been touted as many things, from a stable operating system for servers to a free desktop OS that will end Microsoft's dominance forever. Alex Cruickshank explains how it is being used and modified by developers throughout the Middle East

Linux came to prominence several years ago as the brainchild of Linus Torvalds. His idea was to take the best elements of the various different 'flavours' of the Unix operating system and combine them into a freely available, open source operating system that could be scaled down to embedded devices and up to clustered servers, as well as anything in between.

It's fair to say that this approach has been wildly successful. Although it hasn't made a significant dent in the desktop operating system market, Linux is a popular choice with server administrators, particularly those running web sites, where the stability and performance of server software, such as Apache, has been of great benefit to web managers across the world.

To understand the appeal of Linux to systems administrators and developers, it's important to understand just what Linux offers. As Mohamed Eldesoky, systems engineer at TE Data in Egypt, says: "There are many benefits. Linux depends on open standards, thus making the migration from one application to another easy, as there are no proprietary file formats. There is a large, knowledgeable developer base, making the growth of Linux and its adaptation to new technologies a matter of course. It is supported by major solution providers, thus you won't be owned by any company for using their proprietary software."

These are just a few benefits, but there are others, not least the fact that the vast majority of applications for Linux, as well as the underlying code itself, are free and can be modified by anyone with the necessary skills. Couple this with the fact that Linux has powerful security features built in, that it doesn't greedily consume computer resources, that it is multi-threaded and that it is available for the majority of computing platforms on the market, and it's easy to see why it has become so popular around the world.

In the Middle East, there are numerous projects underway to create bespoke applications, or modify existing Linux-based programs, to suit a particular task.

In the majority of cases, the Linux operating system is being used as a basis for database engines and server clusters, while some of the larger ISPs and hosting companies also depend on Linux due to its stability, low cost and built-in security features. In addition, foreign companies setting up branches in the region tend to bring Linux implementations with them, as an extension to the systems they have in their home offices.

Eldesoky believes that there are two reasons why Linux use isn't growing at an even faster rate. "The main obstacle is the lack of qualified personnel. Hence providing more training opportunities for youth to learn and excel in Linux/Unix environments is an economical decision for big corporates as well as

GENERAL PUBLIC LICENCE

BENEFITS AND ADVICE FOR LINUX DEVELOPERS

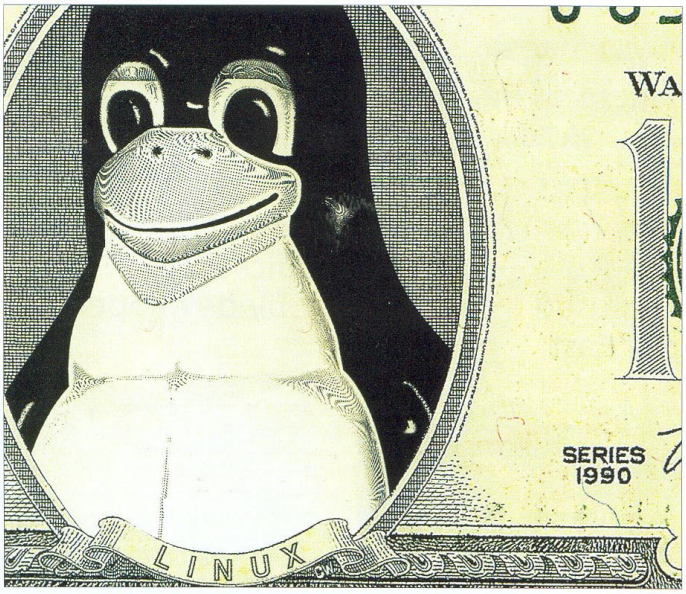
If open source software sounds like a disaster waiting to happen, it's not. While anyone can make changes, only those that have been thoroughly tested are incorporated back into the original code. This peer-reviewed nature means that developers try hard to produce good quality, bug-free code.

That pride is often absent in commercial development houses. And while there's generally no central company to which complaints or technical support queries can be directed, developers can usually find someone to help out with a particular problem pretty quickly. If not, plenty of third-party Linux service companies make their money this way.

Much of the software that's made available under open source principles is done so on the basis that the user agrees to the terms of a particular licence.

The most common of these is the GNU General Public Licence (GNU is a recursive acronym meaning "GNU's Not Unix"). This applies a 'copyleft' attribute to a piece of code or a document, meaning that it can be copied and modified (with appropriate notification) but cannot be sold, even when modified. This helps ensure that the developers' work is not stolen by a commercial company and sold for profit.

You can find out more about the GNU GPL at www.gnu.org/copyleft/



PENGUIN POWER: The number of developers and users of Linux is growing in the Middle East, however, many enterprises still lack the skills required to customise the operating system in-house.

small ones too. Also one of the reasons for the slow progress of Linux in the Middle East is the great propaganda [marketing] by Microsoft, plus ties between some governmental institutions and Microsoft," he says.

Despite Microsoft's marketing clout, Linux uptake is benefiting from the Seattle-based company's new licensing regime, which is making some companies look again at their back-end architecture. As Anas Tawileh from Sara Technologies in Syria explains: "Linux has gained an excellent reputation in particular networking tasks, being the most solid mail server and web server, and it's now [gaining] ground in other areas. In the Middle East, the low cost of ownership is pushing companies of all sizes to use Linux in their networking infrastructure, but because of the conservative nature of the Middle East market, using Linux in other areas will take some time."

Although it's difficult to collect Linux usage statistics because of the many ways in which it is possible to obtain and use the operating system, RedHat appears to have the upper hand as far as enterprise solutions are concerned, largely due to the company's alliances with Dell, IBM, Oracle and other IT organisations. It is normal for corporates to prefer complete packaged solutions provided by one source, as this makes it easier to spot and solve technical problems.

At other levels, though, there's no dominant distribution company. Members of the Arabeyes (www.arabeyes.org) project, which is aimed at fully supporting the Arabic language in the Linux/Unix environment, have had close contact with some distributors but little response from others. At this point, they believe, the choice of distribution should be down to personal preference since there is no prevailing differentiator.

> "Linux has gained an excellent reputation in particular networking tasks, being the most solid mail server and web server."
> Anis Tawileh - Sara Technologies

The take-up of Linux may be slightly slower in the Middle East than in other parts of the world, but there are still many companies making use of its flexibility and that has encouraged the development of localised versions of the operating system.

"Customisation is at the core of using Linux. In the Middle East it started with the Arabisation project, which is now almost complete. This project was to encourage the spread of Linux use in the Middle East, with volunteers all over the world. There are now some companies working on complete Arabised Linux distributions, such as Hayder Linux and Hancom Linux," says Tawileh,

While few companies have the necessary facilities or skills base to have their own in-house development team, groups of developers, both in the region and elsewhere, are writing bespoke Linux applications.

Locally, these developers have formed communities to organise their activities, for example the Linux Egypt and Linux Syria groups. Leaving aside the language localisation issues, many of the challenges faced by developers and Linux implementers are related to security.

While Linux — and its Unix base — have always been perceived as being inherently more secure than other operating systems, any application or operating system is potentially vulnerable to attack, as recent Linux worm alerts have shown.

Fortunately, there are a huge number of security tools and applications used to protect Linux systems and detect and fix code bugs. Some of the better known tools include Tripwire, which is used to detect system breaches; Portsentry, used to detect port scans against Linux systems; Nmap, which runs port scans so you can highlight the insecure parts of your system; and Snort, a network intrusion detection system.

There are many other such tools available, giving developers some useful weapons against hackers, worms, viruses, bugs and other unwanted intruders. In development terms there's little that's required in order to use these tools other than checking that they suit your requirements and then compiling the source code. With some Linux distributions users won't even need to do that, since the relevant package manager will install it all.

Despite the recent worm scares, Arabeyes says that security is one of the major contributors to the success of Linux. It can act as an extremely good firewall, intrusion detection system (IDS), network address translator (NAT) and many other

functions, all on relatively cheap hardware that may not be powerful enough for commercial operating systems. In other words, all the things that companies pay lots of money to third party vendors to supply as semi-custom solutions are free, or virtually free, with Linux and can be customised to suit your purposes.

Easing the customisation process is the fact that utilities and applications for Linux can be written in any one of a number of different programming languages, from Java and C++ for commercial apps to Perl and Python for scripted solutions. Plenty of support exists for these and other languages, so the development process isn't likely to be too hard. That said, there are fewer 'programming suites' available compared with the Windows platform, where various development studios take some of the debugging pain out of application development. But with the general ethos of development quality, modifying other applications is generally fairly straightforward, as code is often well documented and correctly structured.

> "Linux fosters a competitive attitude and as such, people are always trying to prove each other wrong and/or to come up with a better implementation."
> Arabeyes Group

The Arabeyes group has this advice to offer to developers planning to customise aspects of Linux to suit their own particular purposes. "Be very knowledgeable in the area you are about to work in. In other words, don't belittle any one aspect or think that it will be easy — it won't. Spend time reading, researching and asking lots of questions before you form an opinion. We've found that our first thought or take on something wasn't always entirely right, so a solid foundation goes a long way."

For help on this approach, there are literally thousands of web sites that offer help, advice and practical tips and tools to developers working to customise the operating system or higher level applications to suit their purposes. One of the best places to start is www.linux.org, which contains links to the major contributors and a thorough help section.

It seems likely that the number of organisations using Linux in the Middle East will grow once companies realise how easy it is to get support for customisation, bug-fixing and development issues. Tawileh believes that there's a clear pattern to Linux growth: "What we need is a positive feedback cycle in deploying Linux more and more in businesses and organisations. This will create more demand for new applications and customisation, and will drive the market forward until we will see a lot of specialised applications out there in the market, which in turn will drive more businesses to deploy Linux."

Eldesoky agrees, and believes that one driver of this growth will be the realisation that customisation can be implemented at a lower level than is possible with commercial operating systems. "Linux extends the knowledge of its developers to areas beyond the normal Microsoft Foundation Class and .NET outer shells. It enables you to dive deep into the system, and even into other systems that you need to interact with," he says. "Even changing the kernel itself is possible and is done on a daily basis in many parts of the world."

If the short-term lack of local Linux expertise can be alleviated, it seems that growth in the rate of adoption of Linux will increase in the region, driven by the ease with which applications, and the operating system itself, can be customised by developers. Arabeyes summarises the benefits of this situation nicely.

"Linux fosters a competitive attitude and as such, people are always trying to prove each other wrong and/or to come up with a better implementation. That attitude in itself caters to discovering and fixing bugs and developing new features. The Arab Linux community doesn't differ in that regard — we're simply a smaller microcosm of that universe."

SECURITY TOOLS FOR LINUX

DOWNLOADABLE SOLUTIONS ARE AVAILABLE FOR THE OS

Linux supporters have always championed the security levels of the open source platform as one of its key benefits. However, as the operating system has grown in popularity, the number of viruses and worms has likewise grown, with Slapper being the most recent example. But help is at hand with a number of free, downloadable tools that can help detect and fix code bugs. Here are a few examples:

- Snort is an open source network intrusion detection system, which can analyse protocol and content information in real-time to identify malicious activities. Snort detects electronic reconnaissance actions, such as port scan, SMB probes, and OS fingerprinting efforts. It uses a rule-based language to define attack signatures.
- Tripwire Open Source, Linux Edition, protects against system breaches. The downloadable solution is specifically designed to run on the Linux operating system and was inspired from Tripwire 2.2.1 software. It is now co-developed by the open source community. The source code for Tripwire Open Source, Linux Edition, is available for download at www.tripwire.org.
- Nmap (Network Mapper) is an open source tool that scans the ports on systems to detect any vulnerabilities. It uses raw IP packets to establish which hosts are on the network and the services and operating system they are running. Nmap is free and available with full source code under the terms of the GNU GPL.
- Portsentry 2.0 offers protection against port scans on Linux systems. The tool will block any port scans on the OS in real time. Any violations are logged with details pertaining to time, system name, attacking host IP and the TCP or UDP port that was under threat.