



Future Proof Your SysAdmin Career

A sysadmin's guide to essential
skills for advancing your career

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1

Essential Skills for SysAdmins: An Introduction

As the technology industry evolves, today's system administrators need command of an ever-expanding array of technical skills. However, many experts agree that skills like effective communication and collaboration are just as important. With that in mind, in this ebook we are highlighting essential skills for sysadmins to stay competitive in the job market. These chapters will delve into important technical requirements as well as non-technical skills that hiring managers see as crucial.

Linux.com has published several lists highlighting [important skills for sysadmins](#). These lists correctly balance generalized skills like problem solving and collaboration with technical skills such as experience with security tools and network administration.

Today, sysadmins also need command of configuration management tools such as Puppet, cloud computing platforms such as OpenStack, and, in some cases, emerging data center administration platforms such as Mesosphere's Data Center Operating System. Facility with open source tools is also a key differentiator for many sysadmins.

As Dice data scientist Yuri Bykov [has noted](#), "Like many other tech positions, the role of the system administrator has evolved significantly over time due, in large part, to the shift from on-premise data centers to more cloud-based infrastructure and open source technologies. While some of the core responsibilities of a system administrator have not changed, the expectations and needs from employers have."

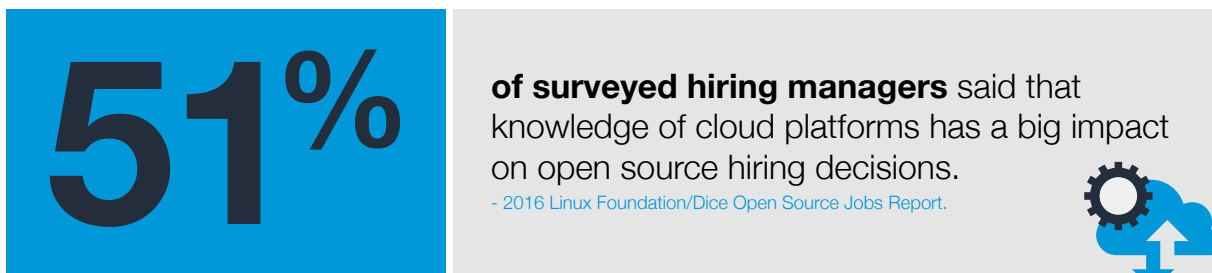
Additionally, "as businesses have begun relying more upon open source solutions to support their business needs, the sysadmin role has evolved, with employers looking for individuals with cloud computing and networking

experience and a strong working knowledge of configuration management tools....The future job outlook for system administrators looks promising, with current BLS (U.S. Bureau of Labor Statistics) research indicating employment for these professionals is expected to grow 8 percent from 2014 to 2024,” Bykov said.





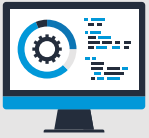
Experience with emerging cloud infrastructure tools and open source technologies can also make a substantial compensation difference for sysadmins. According to a [salary study](#) from Puppet, “Sysadmins aren’t making as much as their peers. The most common salary range for sysadmins in the United States is \$75,000-\$100,000, while the four other most common practitioner titles (systems developer/engineer, DevOps engineer, software developer/engineer, and architect) are most likely to earn \$100,000–\$125,000.”

Sysadmins who have experience with OpenStack and Linux can also fare better in the hiring and salary pool. Fifty-one percent of surveyed hiring managers said that knowledge of cloud platforms has a big impact on open source hiring decisions, according to the [2016 Linux Foundation/Dice Open Source Jobs Report](#). There is also healthy hiring demand for sysadmins, with 48 percent of respondents in the same study reporting that they are actively looking for sysadmins.



The fact that fluency with Linux can make a big difference for sysadmins should come as no surprise. After all, Linux is the foundation for many servers and cloud deployments, as well as mobile devices. Several salary studies have shown that Linux-savvy sysadmins [are better compensated](#) than others.

3 OPEN SOURCE SKILLS for SysAdmins

 <p>Cloud Computing 51% of hiring managers rank it as the most important open source skill</p>	 <p>Network Management & Security Knowledge of fundamentals as well as networking security experience</p>	 <p>Configuration Management Tools Puppet, Chef, Ansible and SaltStack</p>
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In this ebook, we will look at the essential skills sysadmins need to stay relevant and competitive in the job market, well into the future. These include:

- Networking essentials
- Cloud infrastructure
- Security and authentication
- Configuration and automation
- DevOps
- Professional certification
- Communication and collaboration
- Open source participation

As we delve into these topics, we'll keep three guiding principles in mind:

- Successful sysadmins are actively moving up the technology stack with their skillsets and embracing open source as rapidly as organizations are doing so.
- Training for sysadmins is more readily available than ever—ranging from instructor-led courses to online, on-demand courses that allow the student to set the pace.

- Sysadmins have an increasingly crucial role in keeping organizations performing at their best.

Read on as we highlight the changing requirements and opportunities for advancing your system administration career.



2

New Networking Essentials

In this ebook we are looking at some important considerations for sysadmins who want to expand their skills and advance their careers. In this chapter, we'll focus on one of the fundamental skills that every sysadmin needs to master: networking.

Networking is a complicated but essential core competency for sysadmins. A good sysadmin understands:

- How users connect to a network, including managing remote connections via a Virtual Private Network (VPN)
- How users authenticate to a network, ranging from standard two-factor authentication, to custom authentication requirements
- How switching, routing and internetworking work
- Software-Defined Networking (SDN)
- End-to-end protocols
- Network security

Fundamentals

TCP/IP (Transmission Control Protocol/Internet Protocol) forms the basis of how devices connect to and interface with the Internet. Sysadmins understand how TCP/IP packets address, route, and deliver data across a network.

A good sysadmin also knows how domain name servers (DNS) and resource records work, including understanding nameservers. They typically are fluent with DNS query tools such as `dig` and `nslookup`, as well topics such as sender policy framework and NOTIFY.

With large-scale security threats continuing to emerge, there is now a premium on experience with network security tools and practices. That means understanding everything from the Open Systems Interconnect (OSI)

model to devices and protocols that facilitate communication across a network. Locking down security also means understanding the infrastructure of a network. Securing a network requires competency with routers, firewalls, VPNs, end-user systems, server security, and virtual machines.

Additionally, knowledge of a platform like OpenStack can effectively expand any sysadmin's networking clout, because OpenStack, CloudStack, and other cloud platforms essentially expand the perimeter of what we think of as "the network."

Likewise, the basics of software-defined networking (SDN) are [increasingly important](#) for sysadmins to understand. SDN permits admins to programmatically initialize, control, and manage network behavior dynamically through open interfaces and abstractions of lower-level functionality. This, too, is a category where familiarity with leading open source tools can be a big differentiator for sysadmins. [OpenDaylight](#), a project at The Linux Foundation, is an open, programmable, software-defined networking platform worth studying, and [OpenContrail](#) and [ONOS](#) are also on the rise in this space.

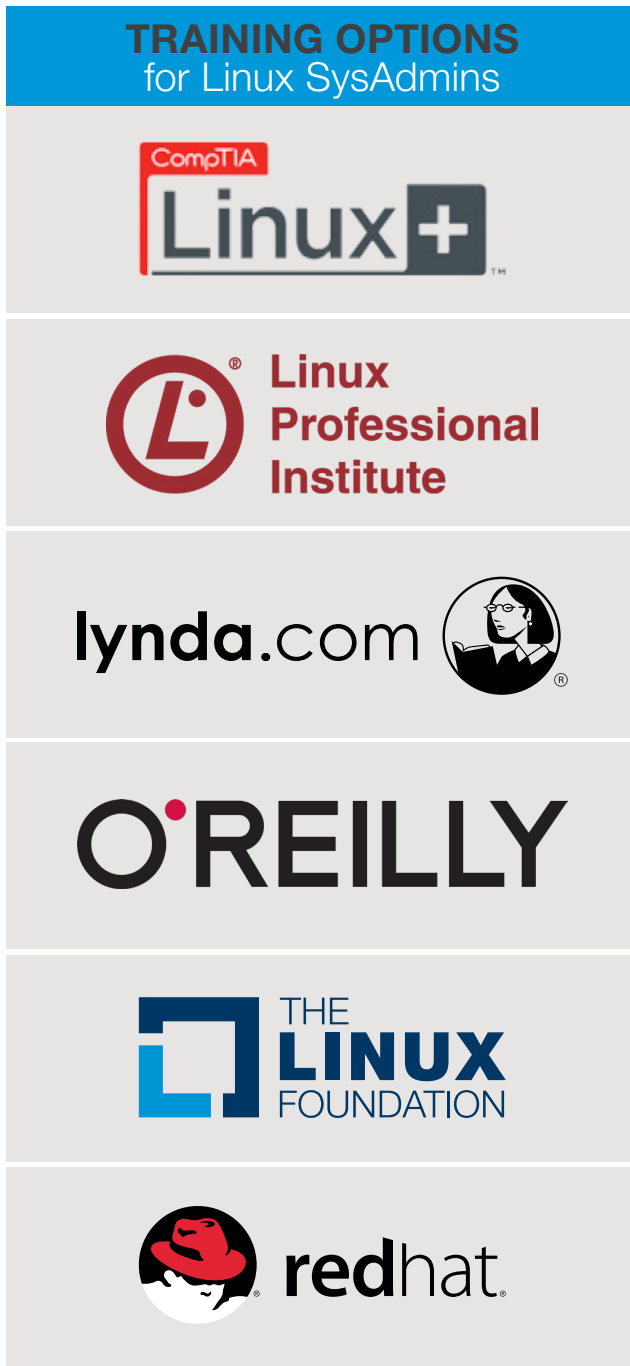
Additionally, many smart sysadmins are working with open configuration management tools such as Chef and Puppet. Julian Dunn, a product manager at Chef, [writes](#): "System administrators have got to stop thinking of servers/disk/memory/whatever as 'their resources' that 'they manage.' DevOps isn't just some buzzword concept that someone has thought up to make sysadmins' lives hell. It's the natural evolution of both professions." See our list of relevant, open configuration management tools [here](#).

"...there is now a premium on experience with network security tools and practices."

Training courses

For sysadmins who want to learn more about networking, the good news is that training in this area is very accessible and, in some cases, free. Furthermore, excellent free and open source administration and configuration

tools are available to help boost any sysadmin's networking efficiency.



Training options for Linux-focused sysadmins include a variety of networking courses. For sysadmins, [CompTIA Linux+](#) offers solid training options, as does the [Linux Professional Institute](#). The [Linux Foundation Certified System Administrator \(LFCS\)](#) course is another good choice. The Linux Foundation offers the LFS201 basic course and LFCS exam. Many vendors in the Linux arena also offer networking-focused training and certification for sysadmins, including [Red Hat](#).

It's also worth checking out O'Reilly's [Networking for Sysadmins video training options](#). These videos cover TCP/IP basics, OSI, and all the essential components within a network's infrastructure, ranging from firewalls to VPNs to routers and virtual machines.

The information is comprehensive, with some of the individual videos requiring a full day to complete and digest. Additionally, the curriculum is available on demand, so it can be used as reference material for networking essentials.

Additionally, [Lynda.com](#) offers an array of online network administration courses taught by experts. Sysadmins can quickly get through courses such as [Linux File Sharing Services](#) and [Identity and Access Management](#).

Even as sysadmins focus on moving up the technology stack with their skillsets, networking basics remain essential. Fortunately, training and education are more accessible than ever. In Chapter 3, we'll look at important security requirements to consider when advancing your sysadmin career.



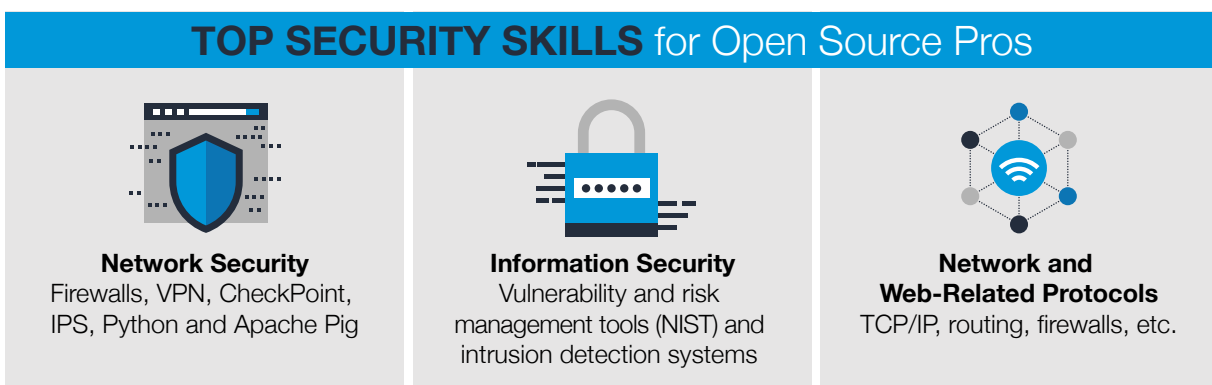
3

Locking Down Security

For today's system administrators, gaining competencies that move them up the technology stack and broaden their skillsets is increasingly important. However, core skills like networking remain just as crucial. In this chapter, we'll focus on another core skill: security.

With ever more impactful security threats [emerging](#), the demand for fluency with network security tools and practices is increasing for sysadmins. That means understanding everything from the Open Systems Interconnect (OSI) model to devices and protocols that facilitate communication across a network.

Locking down systems also means understanding the infrastructure of a network, which may or may not be Linux-based. In fact, many of today's sysadmins serve heterogeneous technology environments where multiple operating systems are running. Securing a network requires competency with routers, firewalls, VPNs, end-user systems, server security, and virtual machines.



Securing systems and networks calls for varying skillsets depending on platform infrastructure, as is clear if you spend just a few minutes perusing, say, a [Fedora security guide](#) or the [Securing Debian Manual](#).

However, there are good resources that sysadmins can leverage to learn fundamental security skills.

For example, The Linux Foundation has published a [Linux workstation security checklist](#) that covers a lot of good ground. It's aimed at sysadmins and includes discussion of tools that can thwart attacks. These include SecureBoot and Trusted Platform Module (TPM). For Linux sysadmins, the checklist is comprehensive.

The widespread use of cloud platforms such as OpenStack is also introducing new requirements for sysadmins. According to The Linux Foundation's [Guide to the Open Cloud](#): "Security is still a top concern among companies considering moving workloads to the public cloud, according to Gartner, despite a strong track record of security and increased transparency from cloud providers. Rather, security is still an issue largely due to companies' inexperience and improper use of cloud services," and a sysadmin with deeply entrenched cloud skills can be a valuable asset.

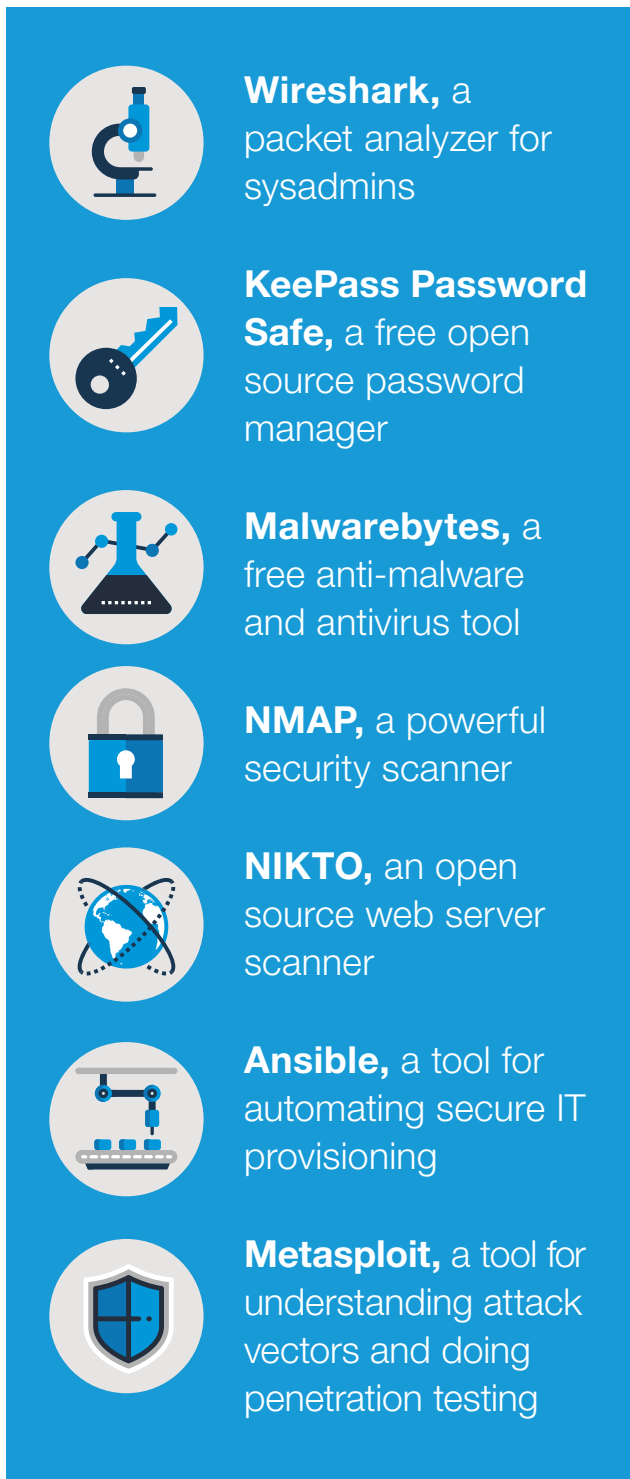
Most operating systems and widely used Linux distributions feature timely and trusted security updates, and part of a good sysadmin's job is to keep up with these. Many organizations and administrators shun spin-off and "community rebuilt" platform infrastructure tools because they don't have the same level of trusted updating.






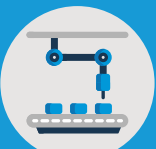

Network challenges

Networks, of course, present their own security challenges. The smallest holes in implementation of routers, firewalls, VPNs, and virtual machines can leave room for big security problems. Most organizations are strategic about combating malware, viruses, denial-of-service attacks, and other types of hacks, and good sysadmins should study the tools deployed.

Freely available security and monitoring tools can also go a long way toward avoiding problems. Here are a few good tools for sysadmins to know about:

For a lot of these tools, sysadmins can pick up skills by leveraging free online tutorials. For example, there is a whole [tutorial series](#) for Metasploit, and there are [video tutorials](#) for Wireshark.



-  **Wireshark**, a packet analyzer for sysadmins
-  **KeePass Password Safe**, a free open source password manager
-  **Malwarebytes**, a free anti-malware and antivirus tool
-  **NMAP**, a powerful security scanner
-  **NIKTO**, an open source web server scanner
-  **Ansible**, a tool for automating secure IT provisioning
-  **Metasploit**, a tool for understanding attack vectors and doing penetration testing

Also on the topic of free resources, we've [previously covered](#) a free ebook from the editors at [The New Stack](#) called Networking, Security & Storage with Docker & Containers. It covers the latest approaches to secure container networking, as well as native efforts by Docker to create efficient and secure networking practices. The ebook is loaded with best practices for locking down security at scale.

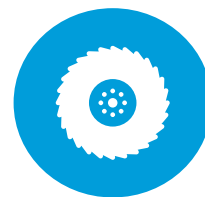
Training and certification, of course, can make a huge difference for sysadmins as we discussed in [“7 Steps to Start Your Linux Sysadmin Career.”](#)

For Linux-focused sysadmins, The Linux Foundation's [Linux Security Fundamentals \(LFS216\)](#) is a great online course for gaining well-rounded skills. The class starts with an overview of security and covers how security affects everyone in the chain of development, implementation, and administration, as well as end

users. The self-paced course covers a wide range of Linux distributions, so you can apply the concepts across distributions. The Foundation offers other [training and certification options](#), several of which cover security topics. For example, [LFS201 Essentials of Linux System Administration](#) includes security training.

Also note that [CompTIA Linux+](#) incorporates security into training options, as does the [Linux Professional Institute](#). Technology vendors offer some good choices as well; for example, Red Hat offers sysadmin [training options](#) that incorporate security fundamentals. Meanwhile, Mirantis offers three-day “[bootcamp](#)” training options that can help sysadmins keep an OpenStack deployment secure and optimized.

In the [2016 Linux Foundation/Dice Open Source Jobs Report](#), 48 percent of respondents reported that they are actively looking for sysadmins. Job postings [abound](#) on online recruitment sites, and [online forums](#) remain a good way for sysadmins to learn from each other and discover job prospects. So the market remains healthy, but the key for sysadmins is to gain differentiated types of skillsets. Mastering hardened security is surely a differentiator, and so is moving up the technology stack—which we will cover in the next chapters.



4 Looking to the Cloud

Sysadmins will always need core competencies such as networking and security, but increasingly, they can differentiate themselves by mastering new platforms and tools. In today's environment, experience with open cloud computing platforms such as OpenStack can make a huge difference for a sysadmin.

The cloud advantage

Experience with emerging cloud infrastructure tools and open source technologies can make a substantial compensation difference for sysadmins. According to a [salary study](#) from Puppet, "Sysadmins aren't making as much as their peers. The most common salary range for sysadmins in the United States is \$75,000-\$100,000, while the four other most common practitioner titles (systems developer/engineer, DevOps engineer, software developer/engineer, and architect) are most likely to earn \$100,000-\$125,000."

If you search recruitment sites for sysadmin positions that demand cloud skills, [opportunities abound](#). There are many positions that require strong cloud monitoring skills, and jobs that demand facility with both open source and popular public cloud platforms.

Certification also makes a difference. The value of cloud-centric certification is being driven by shortages in the number of skilled cloud-skilled professionals. CEB, a company focused on best practices in technology, recently

“Experience with emerging cloud infrastructure tools and open source technologies can make a substantial compensation difference for sysadmins.”

provided Forbes with the results of [a database dive](#) on cloud computing hiring trends. It found shortages in expertise surrounding many cloud computing platforms, and it also called out a strong job market for skilled professionals. In fact, \$124,300 was the median advertised salary for cloud computing professionals in 2016, according to the database.



Some sysadmins are blogging about their experiences in adding OpenStack skills to their arsenals. For example, Michalis Giannos, [writing for Stackmasters](#), said, “As an old-school system administrator, what impressed me about OpenStack is that it extends resource management over to storage and network — that is, going beyond the CPU and memory management options that you get with the typical virtual machine offerings. Having a unified view of your computing resources utilization, and having the ability to manage it from a single place is a very powerful feature. And it’s especially mind blowing, even to an old hat like me, raised up on the CLI, that you can access all that power from an easy to use web-based UI.”

Giannos also said, “The ease of creating images and customized flavors of your virtual machines allows you to deploy a new server in minutes without having to repeat trivial configurations all over again. Heck, you can literally create an HTTP Load Balancer AND the back-end service farm for it in just a few minutes.”

Indeed, OpenStack, CloudStack, Nextcloud, and some other open cloud platforms automate and streamline many tasks that old school sysadmins may be most familiar with. With all of this in mind, providing cloud platform training aimed directly at sysadmins is on the radar at technology vendors focused on the cloud and at independent training organizations.

The Linux difference

Fluency with Linux can make a big difference for sysadmins, which should be no surprise. Several salary studies have shown that Linux-savvy sysadmins [are better compensated](#) than others. With that in mind, note that Linux is the bedrock for the majority of cloud deployments, according to The OpenStack Foundation.

This leads to a multi-faceted career path that many sysadmins can take to differentiate themselves from the pack. In fact, Tom's IT Pro has called this path "[the triple threat career path to IT success.](#)" Specifically, it involves obtaining certification as a Linux-savvy sysadmin, as a project manager, and as a cloud administrator.

Training options for Linux-focused sysadmins are expanding accordingly. For professional certification, [CompTIA Linux+](#) is an option, as are certifications from [Linux Professional Institute](#). The Linux Foundation's [Linux Foundation Certified System Administrator \(LFCS\)](#) training and certification is another good choice.

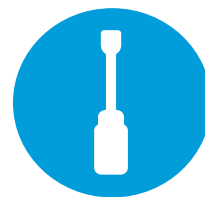
Earning the title of [Red Hat Certified System Administrator in Red Hat OpenStack](#) demonstrates that you have the skills needed to create, configure, and manage private clouds using [Red Hat OpenStack Platform](#). Red Hat's training for this certification covers configuring and managing images, adding compute nodes, and managing storage using Swift and Cinder.

Mirantis and other vendors also offer [certified OpenStack administrator curriculum](#). The Linux Foundation offers an [OpenStack Administration Fundamentals course](#), which serves as preparation for certification. The course is available bundled with the COA exam, enabling students to learn the skills they need to work as an OpenStack-skilled administrator and get the certification to prove it. A unique feature of the course is that it provides each participant with a live OpenStack lab environment

that can be rebooted at any time. Customers also have access to the course and the lab environment for a full 12 months after purchase. Like the exam, the course is available anytime, anywhere. It is online and self-paced — definitely worth looking into.

The OpenStack Foundation works directly with The Linux Foundation to make the [Certified OpenStack Administrator \(COA\)](#) exam available, and getting certified is a rock solid credential for many sysadmins. The [Guide to the Open Cloud 2016](#) from The Linux Foundation also includes a comprehensive look at other cloud platforms and tools that many sysadmins would be wise to pick up skills for, including tools that orbit the open cloud ecosystem.

Clearly, sysadmins interested in adding meaningful skills and credentials to their arsenals shouldn't ignore the cloud. Training and certification opportunities are proliferating, and widespread skills shortages are well documented. In the next chapter, we'll take a closer look at configuration and automation.



5 Configuration and Automation

System administrators looking to differentiate themselves from the pack are increasingly getting cloud computing certification or picking up skills with configuration management tools. From **Puppet** to **Chef** to **Ansible**, powerful configuration management tools can arm sysadmins with new skills such as cloud provisioning, application monitoring and management, and countless types of automation.



Configuration management platforms and tools have converged directly with the world of open source. In fact, several of the best tools are fully free and open source. From server orchestration to securely delivering high-availability applications, open source tools such as Chef and Puppet can bring organizations enormous efficiency boosts.

The prevalence of cloud computing, and the open platforms that facilitate it, have contributed to the benefits organizations can reap from configuration management tools. Cloud platforms allow teams to deploy and maintain applications serving thousands of users, and the leading open source configuration management tools have integrated ways to automate all relevant processes.

When many people envision a sysadmin in action, they imagine an interaction with an end user. However, as organizations move to the cloud and heterogeneous technology infrastructure

environments, many sysadmins need to expand their skills. Today, automation of tasks and application delivery are big themes. Among other benefits, automated provisioning and configuration can result in time savings and reduce human error.

“...automated provisioning and configuration can result in time savings and reduce human error.”

Tools for the task

Puppet and Chef are both open configuration management tools that can automate many common tasks. As noted in an UpGuard [blog post](#), “It is frequently stated that Puppet is a tool that was built with sysadmins in mind. The learning curve is less imposing due to Puppet being primarily model driven. Getting your head around JSON data structures in Puppet manifests is far less daunting to a sysadmin who has spent their life at the command line than ruby syntax is.”

Puppet can automate many sysadmin tasks, including deploying new machines, pushing changes out to existing systems, and performing verification checks. Chef, however, is noted for providing a great deal of power and flexibility. It automates the management of systems in the cloud, on-premises, or in a hybrid environment.

So, how can sysadmins gain familiarity with these tools? Puppet and Chef have commercial enterprises behind them, and flexible training options are available. For example, if you just want to take Puppet for a test drive within a virtual machine, you can do so [here](#); instructor-led and online training options are detailed there as well. You can chart a learning roadmap for Puppet [here](#).

Red Hat and other vendors also offer [training options](#) for Puppet as used in a standard operational environment or in a cloud environment. Red Hat also offers [training for Ansible](#), and the curriculum is specifically geared toward sysadmins who need to automate, configure, and manage systems and processes. In-person or online training options for Chef can be found [here](#), and you can sample some of the online tutorials [here](#).

The Linux Foundation's "[Guide to the Open Cloud: Current Trends and Open Source Projects](#)" includes a comprehensive section on configuration management tools, and you can find out more and visit some relevant open source project repositories [here](#).

Sysadmins who add cloud and configuration management skills to their toolkits are keeping pace with rapidly changing technology environments. These aren't the only ways to expand your skills, though. In the next chapter, we will look at the importance of DevOps.



6 Embracing DevOps

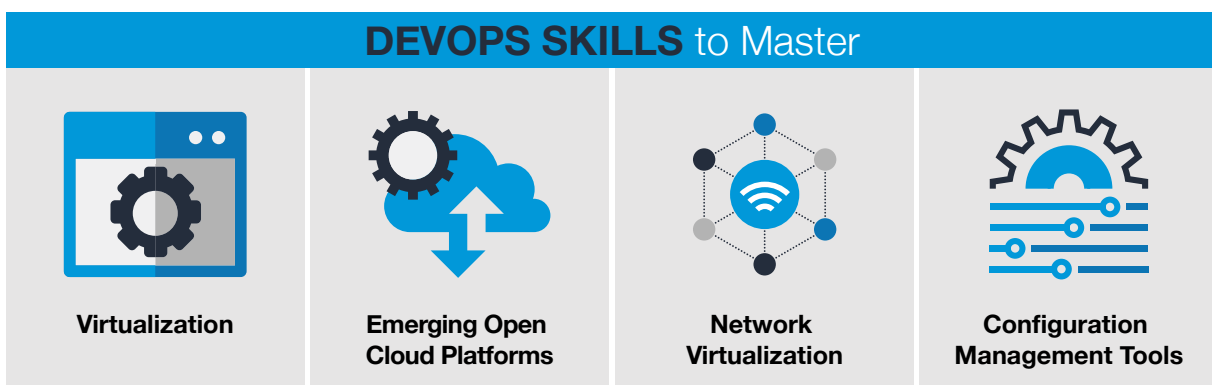
Sysadmins are increasingly looking to expand their skillsets and carve out new opportunities. With that in mind, many sysadmins are looking to the world of DevOps. At lots of organizations, DevOps has emerged as the most effective method for application delivery, including in the cloud.

One of the drivers of the DevOps movement is that organizations simply have limits on the number of IT staffers, sysadmins, and developers that they can employ.

Cross-pollination of traditional skillsets makes good business sense. And, as Jeff Cogswell [has noted](#), “The line between hardware and software is blurrier than it used to be.”

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Cogswell also laid out a good recipe for what specific skills to master in order to meet DevOps goals:



- Learn what virtualization is and how, through software alone, you can provision a virtual computer and install an operating system and a software stack.

- Study emerging open source platforms and frameworks, such as OpenStack.
- Learn network virtualization.
- Learn to use configuration management tools, such as Puppet and Chef.

All of these pursuits can help sysadmins appeal to organizations looking to create more collaborative and efficient working environments. Additionally, as mentioned earlier, fluency and facility with emerging cloud, virtualization, and configuration management tools can make a substantial compensation difference for sysadmins.

Training options

Sysadmins interested in becoming more fluent with DevOps skills and practices can start by exploring [Dice's Skills Center](#). A look there makes it clear that skillsets surrounding configuration management tools, containers, and open platforms are much in demand. Savvy sysadmins can combine existing competencies with these skillsets and move the needle.

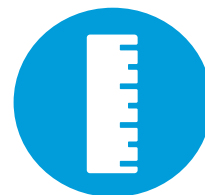
Flexible training options are available for these tools. For example, if you just want to take Puppet for a test drive within a virtual machine, you can do so [here](#), or there are instructor-led and online training options detailed on the same page. For example, you can chart a [learning roadmap](#) for Puppet, find [in-person or online training](#) options for Chef, or [sample some of the available online tutorials](#).

A great way to learn more about cloud skills is to open an account on Amazon Web Services and work with EC2 technology. OpenStack training options also abound. The Linux Foundation, for example, offers an [OpenStack Administration Fundamentals course](#), which serves as preparation for certification. The course is available bundled with the COA exam, enabling students to learn the skills they need to work as an OpenStack-skilled administrator and get the certification to prove it.

The [Guide to the Open Cloud 2016](#) from The Linux Foundation also includes a comprehensive look at other cloud platforms and tools that many sysadmins would be wise to pick up. Mirantis and other vendors, such as Red Hat, also offer [certified OpenStack administrator curriculum](#).

Finally, scripting and development skills can also expand a sysadmin's horizons and fit in with organizational DevOps goals. Scripting skills, from Python to Perl, are a valuable part of sysadmin's toolkit. The Linux Foundation offers coursework in this area, too, including [Developing Applications for Linux](#) and [Linux Performance Tuning](#). Additionally, The Foundation offers a free, online self-paced [Introduction to DevOps course](#) that is worth exploring.

In the next chapter, we will explore specific professional certifications and relevant training to help you move to the next level.



7

Getting Certified

In today’s rapidly changing system administration landscape, skills and credentials count for a lot, but professional certification can also make a difference. With that in mind, in this chapter, we look at five valuable types of certification for sysadmins along with relevant training options.

Linux credentials

As mentioned previously, Linux provides the foundation for many servers and cloud deployments, as well as mobile devices. And, several salary studies have shown that Linux-savvy sysadmins [are better compensated](#) than others.

“...training options for Linux-focused sysadmins are expanding.”

Meanwhile, training options for Linux-focused sysadmins are expanding. For professional certification, [CompTIA Linux+](#) is an option, as are certifications from [Linux Professional Institute](#). The Linux Foundation’s [Linux Foundation Certified System Administrator \(LFCS\)](#) is another good choice. These educational options delve into everything from managing file permissions and partitioning storage devices to troubleshooting filesystem issues.



Sysadmins without much previous experience may want to consider the [Introduction to Linux](#) online course, which is delivered through a partnership between The Linux Foundation and edX. The course is [hugely popular](#) and can help with basic preparation for the Linux Foundation Certified SysAdmin Exam.

Platform-specific certification

Many organizations are in need of sysadmins who have specialized and specific skillsets surrounding the core technology platforms that they run. For example, organizations based on Red Hat's platform technology may prefer to hire a [Red Hat Certified System Administrator](#). This credential is earned after successfully passing the Red Hat Certified System Administrator (RHCSA) Exam (EX200). Likewise, training and certification are available for [SUSE Certified Administrators](#), for [Microsoft-focused administrators](#), for [VMware administrators](#), and for numerous other platforms.

CompTIA Server+ hardware, network and security certification

Today's IT environments demand more planning, better security, and more maintenance than ever before, and CompTIA offers an array of entry-level [certifications](#), including A+ for hardware technicians, Network+ for network admins and Security+ for security specialists. These certification have earned recognition among hiring managers, and they can help a sysadmin land a job or serve as a good platform for obtaining a more targeted type of certification. HP, Intel, and the U.S. Department of Defense are all among organizations that employ CompTIA Server+-certified staffers.

Cloud certification

Salary studies show that sysadmins fluent with the cloud command more pay. As mentioned previously, 51 percent of surveyed hiring managers

said that knowledge of cloud platforms has a big impact on open source hiring decisions, according to the [2016 Linux Foundation/Dice Open Source Jobs Report](#). If you search recruitment sites for sysadmin positions that demand cloud skills you'll see that [opportunities abound](#). There are positions that require strong cloud monitoring skills, and jobs that demand facility with both open source and popular public cloud platforms.

A sysadmin who holds the [Red Hat Certified System Administrator in Red Hat OpenStack](#) credential has demonstrated the skills, needed to create, configure, and manage private clouds using [Red Hat OpenStack Platform](#). Red Hat's training for this certification covers configuring and managing images, adding compute nodes, and managing storage using Swift and Cinder.

Mirantis and other vendors also offer [certified OpenStack administrator curriculum](#). The Linux Foundation offers an [OpenStack Administration Fundamentals course](#), which serves as preparation for certification, and the course is available bundled with the COA exam. The OpenStack Foundation works directly with The Linux Foundation to make the [Certified OpenStack Administrator \(COA\) exam](#) available.

Cloud Foundry Developer Certification

Many sysadmins have experience with scripting, and some have experience with full-blown application development. For those with some scripting and development skills, [Cloud Foundry Developer Certification](#) is an emerging credential worth looking into. It's a professional cloud-native developer certification that can be earned through a performance-based exam that evaluates knowledge of the Cloud Foundry platform.

In the next chapter, we'll consider some non-technical skills that are equally important for sysadmins looking to advance their careers.



8

Communication and Collaboration

Today's system administrators are wise to arm themselves with specialized technical skillsets, but sysadmins interact with people at least as much as they deal with systems, software, and security. Strong communication capabilities, problem solving, teamwork, and leadership skills are therefore not to be underestimated.

In fact, [a previous article on Linux.com](#) emphasized the fact that across all levels of [a system administrator's career](#), these skills are key.



Not all people are equally proficient in these areas. In fact, as Lynn Taylor, a national workplace expert, noted [in speaking with Forbes](#): “Having good people radar is harder to teach than technical skills, but is a requisite.”

Effective communication

The good news is that solid training options are available to help you improve communications and people skills, including options specifically focused on IT and technical personnel. [According to Allan Hoffman](#), an expert on tech jobs, taking a seminar or course is a good first choice

for workers such as sysadmins who want to improve communications skills. “To excel as a technical professional, you need to learn how to communicate your ideas and work effectively with others,” he writes.

Global Knowledge offers a course called “Customer Communication Skills for IT Professionals,” with curriculum completed in two days. The class covers such topics as clearly communicating technical concepts to non-technical users, active listening, and conflict management strategies. Downloadable course details are available [here](#).

[The American Management Association](#) offers a similar course, according to Hoffman. It has a three-day “[Communication and Interpersonal Skills: A Seminar for Technical Professionals](#)” course that has received good notices.

In “[How Can Sysadmins Foster Better Employee Communication](#)” Tim Mullahy notes that too much reliance on jargon can undermine a sysadmin’s communication effectiveness. “When discussing the details of a system update or scheduled downtime with non-IT employees, avoid using highly technical language,” he advises.

“Jargon could make you sound like you know what you’re talking about, but it can also teeter on the edge of talking down to people,” [writes Fathom’s Caroline Bogart](#). “If someone doesn’t understand what you’re saying, they’re not going to feel very intelligent.”

Project management

Many of today’s sysadmins are directly involved with supporting the rollout and maintenance of cloud platforms and other complex projects. And, sysadmins with strong project management and collaboration skills are needed to help lead such efforts.

Project management for sysadmins is covered in the [Sysadmin Casts](#) series of podcasts. The basic methodology laid out in this podcast series

has been used by sysadmins to coordinate complex, multi-month projects.

Many sysadmins also use specific project management and collaboration tools. [Trello](#) is an example of a popular collaboration-focused tool, and you can find others [here](#). [LibrePlan](#) is a free, web-based project management application that sysadmins can leverage, and it is available in [mobile versions](#).

In the final chapter, we'll look at other open source ways to broaden your skills and examine the connection between open source experience and improved employment outcomes.

“...sysadmins with strong project management and collaboration skills are needed...”

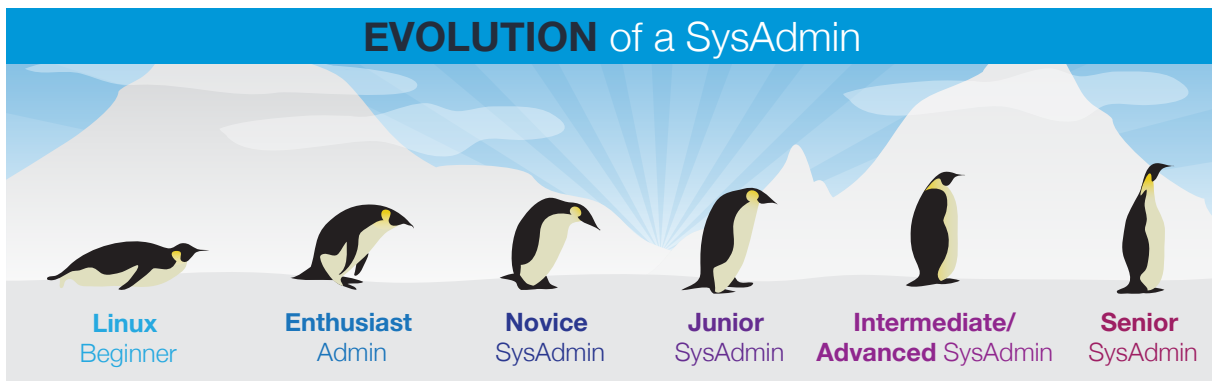


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Advancing with Open Source

For today’s system administrators, the future holds tremendous promise. In this ebook, we have covered many technical skills that can be big differentiators for sysadmins looking to advance their careers. But, increasingly, open source skillsets can also open new doors.

A decade ago, Red Hat CEO Jim Whitehurst predicted that open source tools and platforms would become pervasive in IT. Today, that prediction has come true, with profound implications for the employment market. Participating in open source projects — through developing code, submitting a bug report, or contributing to documentation — is an important way to demonstrate open source skills to hiring managers.



“Successful open source projects thrive on a wide variety of contributions from people with all levels of coding skills and commitment. If just one person fixes a compiler warning, closes a bug, or adds to the documentation, pretty soon you’re talking real progress,” according to this [New Relic article by Andy Lester](#).

Additionally, market researchers have pointed to the connection between open source skillsets and improved employment outcomes. Knowledge of open source best practices, licensing requirements, and project

management experience are all important skills that can be gained through working with open source projects. However, the collaboration and communication skills acquired through such participation are equally valuable.

Collaboration is key

Collaboration “is an increasingly important skill in today’s job environment because software is being built outside of a firm,” said Jim Zemlin, Executive Director at The Linux Foundation in an [article in PCWorld](#). “Someone who can collaborate within their company and across different organizations is highly sought after.”

Sysadmins should take note of how they can improve job prospects by contributing to open source projects. As open source technology becomes more pervasive, tech and DevOps workers are building out

and overseeing their own open source projects. From Google, to Netflix to Facebook, companies are also releasing their open source creations to the community. Sysadmins who contribute to open source projects can showcase their fluency and experience in this space.

More information on tools to help you understand and contribute to open source projects can be found in [this post](#). The bottom line is that open source is now part of the essential playbook for sysadmins, and seeking training and making contributions can greatly advance your prospects.

“Collaboration ‘is an increasingly important skill in today’s job environment...”

Conclusion

A key takeaway from this ebook is that complacency is the enemy. You may be a Linux wizard or a Microsoft-certified admin with years of experience, but staying competitive and advancing your career requires continuous improvement.

We've covered some of the skills that are highly valued in the job market now, but emerging skillsets for sysadmins will always be a moving target. As the landscape shifts for sysadmins, adding new skills and acquiring experience is essential.

 THE **LINUX** FOUNDATION

The Linux Foundation promotes, protects and standardizes Linux by providing unified resources and services needed for open source to successfully compete with closed platforms.

To learn more about our Linux Training program, please visit us at training.linuxfoundation.org.