Introduction to Systems and Network Administration

What does System Administrator do?

- No precise job description
- Often learned by experience
- "Makes things run"
- Work behind the scenes
- Often known as Operator, Network Administrator, System Programmer, System Manager, Service Engineer, and Site Reliability Engineer.

System Administrator is a person who supports a multi-user computing environment and ensures continuous, optimal performance of IT services and support systems.

Systems Administrator Duties and Skills

System Administrators must be comfortable working with application and file servers, desktops, networks, databases, information security systems and storage.

A **network administrator** is responsible for keeping an organization's computer network up to date and running smoothly.

Tasks of a Network Administrator

- Installing network and computer systems
- Maintaining, repairing and upgrading network and computer systems.
- Diagnosing and fixing problems or potential problems with the network and its hardware, software and systems.
- Monitoring network and systems to improve performance.

Skills of a Network Administrator

- Analyzing and Critical Thinking
- Time Management
- Interpersonal Skills
- Lifelong Learning

The Linux System Administration Basics

Basic Configuration of Linux System Administration

Set the Hostname

Follow the instruction is setting the hostname. Use the following commands to make sure it is set properly:

```
hostname
hostname -f
```

The first command should show your short hostname, and the second should show your fully qualified domain name (FQDN).

Set the Time Zone

When setting the time zone of your server, it may be best to use the time zone of the majority of your users. If you're not sure which time zone would be best, consider using Universal Coordinated Time or UTC (i.e., Greenwich Mean Time).

By default, Linodes are set to UTC. Many operating systems provide built-in, interactive methods for changing time zones:

Set the Time Zone in Ubuntu

Issue the following command and answer the questions as prompted on the screen.

```
dpkg-reconfigure tzdata
```

Set the Time Zone Manually on a Linux System

Find the appropriate zone file in `/usr/share/zoneinfo/` and link that file to `/etc/localtime`. See the examples below for possibilities:

Universal Coordinated Time:

```
ln –sf /usr/share/zoneinfo/UTC /etc/localtime
```

Eastern Standard Time:

```
ln –sf /usr/share/zoneinfo/EST /etc/localtime
```

Configure the `/etc/hosts` File

The `/etc/hosts` file provides a list of IP addresses with corresponding hostnames. This allows you to specify hostnames for an IP address in one (1) place on the local machine, and then have multiple applications connect to external resources via their hostnames.

File excerpt: `/etc/hosts`

```
127.0.0.1 localhost.localdomain localhost
103.0.113.12 username.example.com username
```

The ping Command

The following commands "ping" google.com and 216.58.217.110

```
ping google.com
ping 216.58.217.110
```

Here is the sample output of four pings to google.com

```
PING google.com (216.58.217.110): 56 data bytes
64 bytes from 216.58.217.110: icmp_seq=0 ttl=54 time=14.852 ms
64 bytes from 216.58.217.110: icmp_seq=1 ttl=54 time=16.574 ms
64 bytes from 216.58.217.110: icmp_seq=2 ttl=54 time=16.558 ms
64 bytes from 216.58.217.110: icmp_seq=3 ttl=54 time=18.695 ms
64 bytes from 216.58.217.110: icmp_seq=4 ttl=54 time=25.885 ms
```

The time field specifies in milliseconds the duration of the round trip for an individual packet. When you've gathered the amount of information you need, use Control+C to interrupt the process. This will resemble:

```
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3007ms
rtt min/avg/max/mdev = 33.890/40.175/53.280/7.679 ms
```

The **ping** command is useful as an informal diagnostic tool to measure point-to-point network latency, and as a tool to simply ensure you are able to make a connection to a remote server.

The **traceroute** command expands on the functionality of the ping command.
Here is an example of output from a traceroute command:

```
traceroute to google.com (74.125.53.100), 30 hops max, 40 byte packets
1 207.192.75.2 (207.192.75.2) 0.414 ms 0.428 ms 0.509 ms
2 vlan804.tbr2.mmu.nac.net (209.123.10.13) 0.287 ms 0.324 ms 0.397 ms
3 0.e1-1.tbr2.tl9.nac.net (209.123.10.78) 1.331 ms 1.402 ms 1.477 ms
4 core1-0-2-0.lga.net.google.com (198.32.160.130) 1.514 ms 1.497 ms 1.519 ms
```

```
5 209.85.255.68 (209.85.255.68) 1.702 ms 72.14.238.232 (72.14.238.232) 1.731 ms
21.031 ms
```

Philosophy of System Administration

Although the specifics of being a system administrator may change from platform to platform, there are underlying themes that do not. These themes make up the philosophy of system administration.
The themes are:

- Automate and Document everything
- Communicate as much as possible
- Know your Resources, users, and business
- Plan Ahead

Automate and Document Everything

Most system administrators are outnumbered, either by their users, their systems, or both. In many cases, automation is the only way to keep up. In general, anything done more than once should be examined as a possible candidate for automation.

Here are some commonly automated tasks:

- Free disk space checking and reporting
- Backups
- System performance data collection
- User account maintenance (creating, deletion, etc.)
- Business-specific functions (pushing new data to a Web server, running monthly/quarterly/yearly reports, etc.)

Many system administrators put off doing the necessary documentation for a variety of reasons:

- "I will get around to it later"
- Why write it up? I will remember it."
- "If I keep it in my head, they will not fire me, I will have job security"

What should you document?

- Policies
- Procedures
- Changes

Communicate as Much as Possible

The method in communicating with the users can vary according to the organization. It is best to follow this paraphrased approach used in writing newspaper stories:

- Tell your users what you are going to do
- Tell your users what you are doing
- Tell your users what you have done

Know your Resources, Users, and Business

System administration is mostly a matter of balancing available resources against the people and programs that use those resource.

Some of the resources are listed below:

- System resources, such as available processing power, memory, and disk space.

- Network bandwidth
- Available money from the IT budget
- The services of operations personnel, other system administrators, or even an administrative assistant.
- Time
- Knowledge

For Users. People that use the systems and resources for which you are responsible – no more, and no less.

For Business. What is the purpose of the systems you administer?

The key point here is to understand your systems' purpose in a more global sense:

- Applications that must be run within certain time frames, such as at the end of a month, quarter, or year.
- The times during which system maintenance may be done.
- New technologies that could be used to resolve long standing business problems.

Plan Ahead

Certainly, no one can predict the future with 100% accuracy. However, with a bit of awareness it is easy to read the signs of many changes:

An offhand mention of a new project gearing up during that boring weekly staff meeting is a sure sign that you will likely need to support new users in the future.

Talk of an impending acquisition means that you may end up being responsible for new (and possibly incompatible) systems in one (1) or more remote locations.

REFERENCES:

Linode. (2016). *Linux system administration basics*. Retrieved from https://www.linode.com/docs/tools-reference/linux-system-administration-basics on September 5, 2017.

Pfeffer. J. (2016) *What does a network administrator do? A behind-the-scenes look*. Retrieved from http://www.rasmussen.edu/degrees/technology/blog/what-does-a-network-administrator-do/ on September 5, 2017

Red hat enterprise linux 4 introduction to system administration. (2008). 2nd Ed. Retrieved from https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/4/pdf/Introduction_To_System_Administration/Red_Hat_Enterprise_Linux-4-Introduction_To_System_Administration-en-US.pdf on September 5, 2017

Rouse. M. (n.d.). *System administrator (sysadmin).* Retrieved from http://searchnetworking.techtarget.com/definition/system-administrator on September 5, 2017.

System administration basics. (n.d.). Retrieved from https://www.slideshare.net/gamme123/introduction-to-system-administration on September 5, 2017