

3.1.3 System Design Facts

This lesson covers the following topics:

- Planning and designing advantages
- Effective installation design

Planning and Designing Advantages

Planning and designing a Linux installation has the following advantages:

- A plan ensures that the installer knows exactly what should happen during the installation. The plan places all the information in the installer's hands before installation begins.
- There are fewer variables involved when diagnosing and resolving problems.
- The plan gives the IT team a point of reference when changes are requested that will require the project scope, resources, or schedule to be modified.

Effective Installation Design

Other times, you might use a table. The table should use the proper html class attributes. The header row of the table should use class=header. At least one paragraph should be included before the table.

Steps	Description
Perform a needs assessment	<p>An effective needs assessment determines the goals of the installation, creates a plan to meet those needs, and measures the results of the plan. This involves:</p> <ul style="list-style-type: none">▪ Interviewing managers to determine the goals they want to achieve, the problems they need to solve, and the results they expect.▪ Writing clear, measurable statements that specifically address the goals.▪ Identifying the stakeholders.▪ Confirming correct authorization.▪ Aligning the installation with current organizational strategy and technology.▪ Verifying funding.▪ Creating a support strategy.▪ Determining the scope by:<ul style="list-style-type: none">▪ Identifying deadlines▪ Determining the tasks that must be completed▪ Planning for human resource allocation
Pick a distribution	<p>Picking a distribution involves:</p> <ul style="list-style-type: none">▪ Determining whether the computer should be a server or a workstation. Most distributions can be either, but some are better designed for specific functions and even specific types of servers.▪ Determining whether end users will be comfortable with the distribution or whether configuration changes might be necessary.▪ Determining whether required software is available for the distribution. Make a list of applications and ensure that they are provided on the distribution.▪ Ensuring that the distribution has the necessary support.
Determine the hardware requirements	<p>Some computer hardware is incompatible with some distributions. Ensure that:</p> <ul style="list-style-type: none">▪ The computers' hardware is on the distribution's hardware compatibility list.▪ The computers have sufficient CPU speed, memory, and other system requirements to run the distribution and the installed software.▪ The distribution's architecture matches the computer's CPU architecture. These include:<ul style="list-style-type: none">▪ x86 for 32-bit CPUs▪ x64 for 64-bit CPUs▪ IA-64 for Itanium CPUs▪ ALPHA for Alpha CPUs▪ PPC for Power PC (Apple) CPUs
Plan the file system	<p>The file system determines how a computer's files are organized on a hard drive. Linux supports several file system types that have different characteristics, including the following:</p> <ul style="list-style-type: none">▪ ext2 has volume integrity features that may take several minutes to run after a system crash.▪ ext3 uses journaling to ensure that only incomplete transactions are checked after a system crash.▪ ext4 similar to ext3, but includes newer features that reduce file fragmentation. It also allows for larger volumes and files and uses delayed allocation to improve flash memory life.

	<ul style="list-style-type: none"> ▪ btrfs allows for drive pooling, on-the-fly snapshots, transparent compression, and online defragmentation. ▪ XFS is similar to ext4. It uses delayed allocation to help with file fragmentation and does not allow for mounted snapshots. It can be enlarged on the fly, but not shrunk. <p>Pick the file system that best meets your organization's needs. Considerations include:</p> <ul style="list-style-type: none"> ▪ Maximum volume size ▪ Maximum file size ▪ File name size ▪ Permissions and file security ▪ Encryption support ▪ Recovery support and speed ▪ Backup support ▪ Journal support
Plan the partitions	<p>Partition planning is another element of file system planning. An efficient strategy is to create multiple partitions based on the types of files held on the partition and the user access needs. Consider creating separate partitions for the following directories and set mount options based on the type of files in the directory:</p> <ul style="list-style-type: none"> ▪ / (root) must be at least 8 GB, but really should be much larger. The partition holding the root directory, should not be on an extended MBR partition and must be formatted with a Linux file system. ▪ /home should be as large as needed to store the user files. ▪ /boot should be 100–200MB. It needs to be in the first 1024 cylinders of the disk for older BIOS versions. ▪ /opt should be large enough to support the applications that will be installed. ▪ /tmp should be large enough to store the temporary files created by the system. Be aware that these temporary files are periodically cleaned out by the operating system. ▪ /usr should be large enough to support the packages to be installed on the system. ▪ /var should be large enough to support the user mail boxes, print queues, and log files that will be created on the system. ▪ swap should be two times larger than the amount of installed RAM on desktop systems and one times the amount of installed RAM on server systems. Linux can use either a swap file or a swap partition for the swap area. Whenever possible, use a separate swap partition. To increase performance, consider creating multiple swap partitions on multiple storage devices. <p>/etc, /bin, /sbin, /lib, /dev, and /proc must be all on the same partition (/). These directories have system configuration files that are necessary for Linux to function properly.</p>
Identify software	Determine which software packages need to be installed and install only those packages. This ensures that system resources are conserved and vulnerabilities are limited.
Identify the users	<p>Determine the users who will use the computer. Consider the following:</p> <ul style="list-style-type: none"> ▪ Ensure correct name spelling for the users. ▪ Determine whether users log in locally or over the network. ▪ Define a list of groups to which the users will belong. <p>The root user is always installed. Use this account only when necessary to ensure security.</p>
Gather network information	<p>Gather the following types of network information:</p> <ul style="list-style-type: none"> ▪ Protocol (IPv4 or IPv6) ▪ IP address ▪ Default gateway ▪ Subnet mask ▪ Server information for DNS servers, mail servers, and other network servers ▪ Network topology information, such as domain names ▪ Naming conventions for servers and workstations ▪ Domain names
Select an installation source	<p>Installation sources include:</p> <ul style="list-style-type: none"> ▪ CD ▪ DVD ▪ ISO file ▪ Network share ▪ Online installation repository