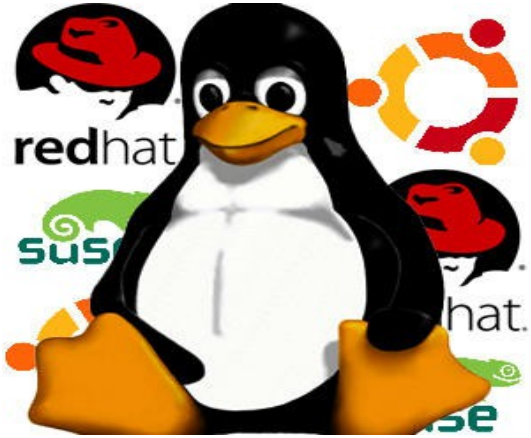
Introduction to UNIX and Putty



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Agenda

- Overview of UNIX
- UNIX Architecture
- UNIX Directory Structure
- UNIX Based Operating Systems
- Overview if PuTTY

UNIX (UNiplexed Information and Computing System)

- Unix is a computer operating system based on C language.
- Originally developed in 1969 by Ken Thompson, Dennis Ritchie at AT&T Bell Labs.

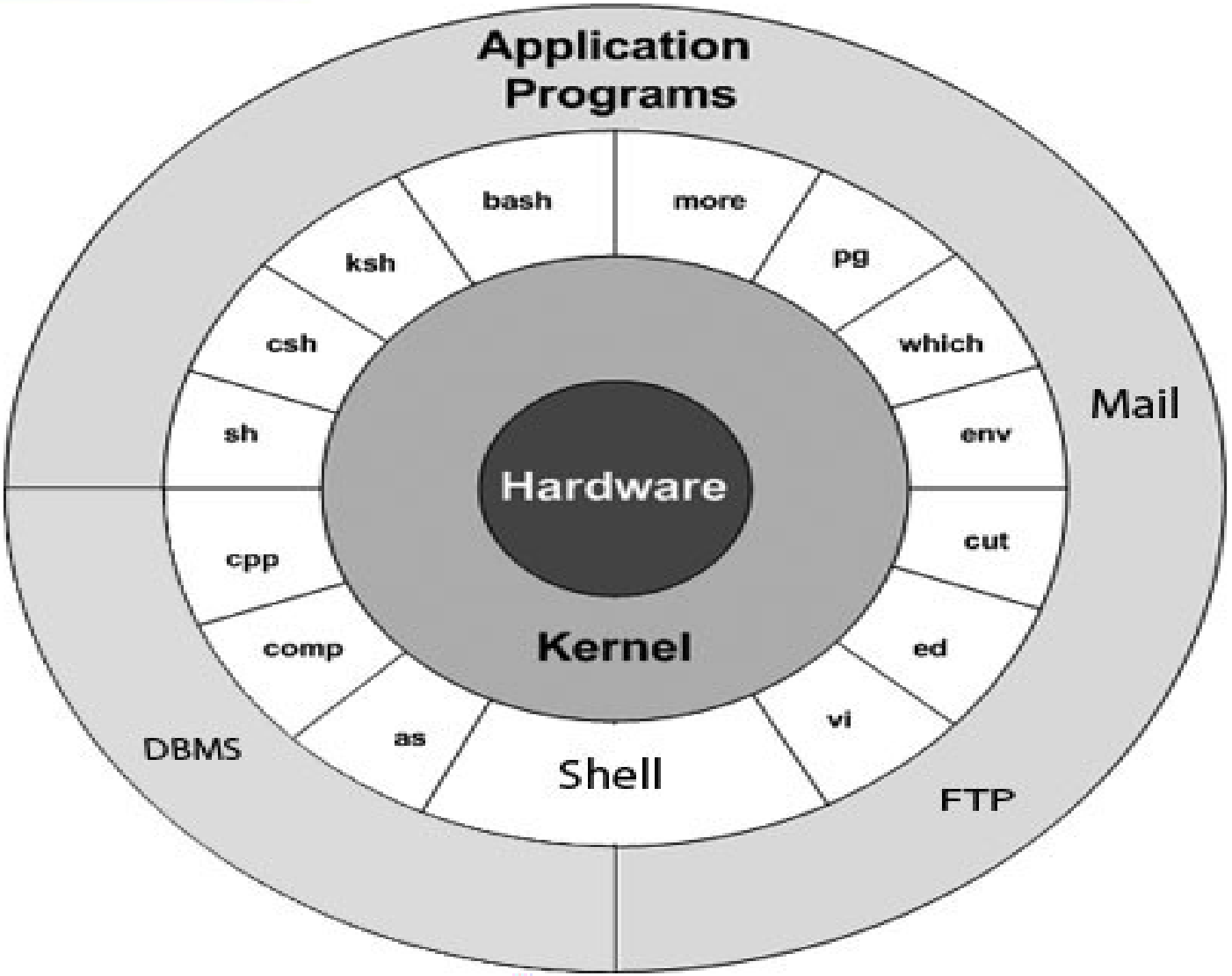
Dennis Ritchie

Ken Thompson

Features of UNIX

- **Multi-User Operating System**
- **Multi-Tasking Operating System**
- **Portability**
- **Job Control**
- **Hierarchical Structure (Single Root)**
- **Case sensitive**
- **Device Independence -** Considers all devices connected to it as files.
- **Security**

Unix Architecture



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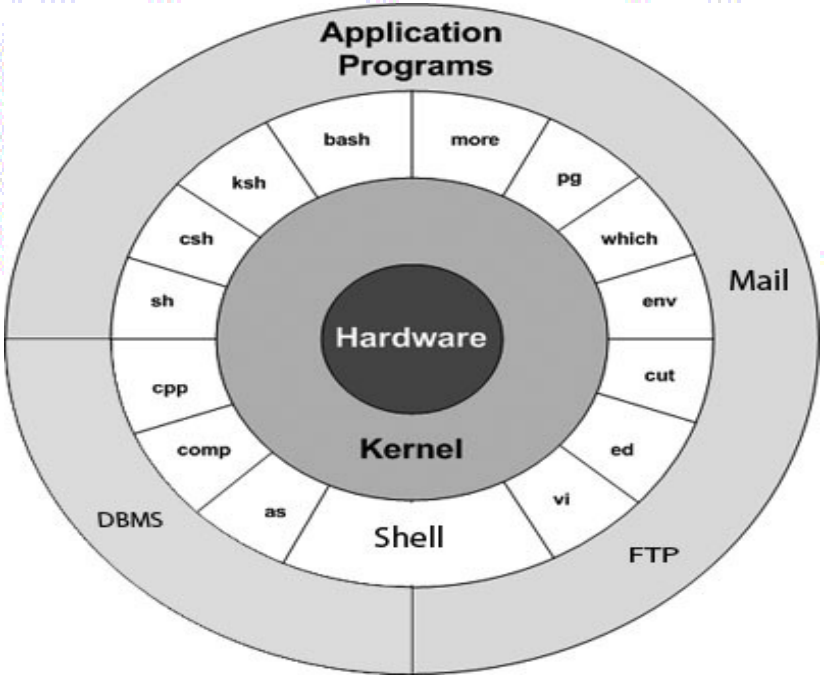
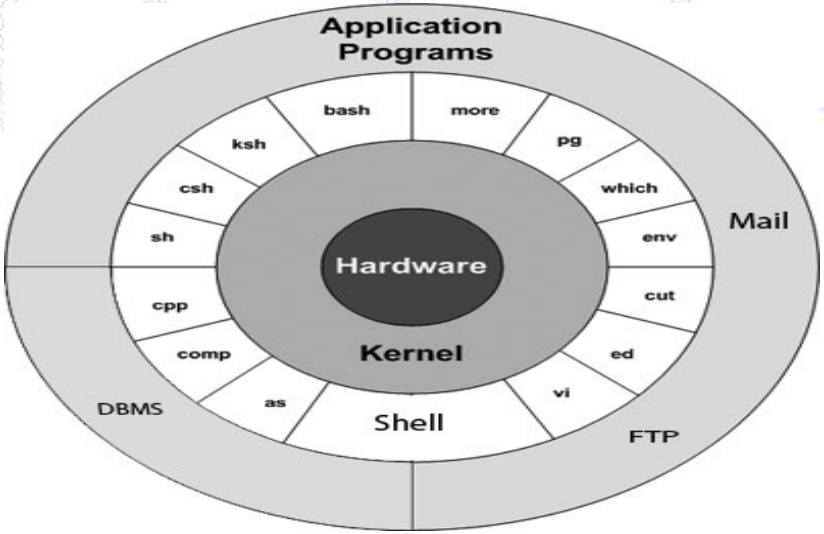
Kernel

- It is the heart of the UNIX system.
- Manages the system resources.
- Communicates between hardware and software.
- Also handles the scheduling and execution of commands.



Shell

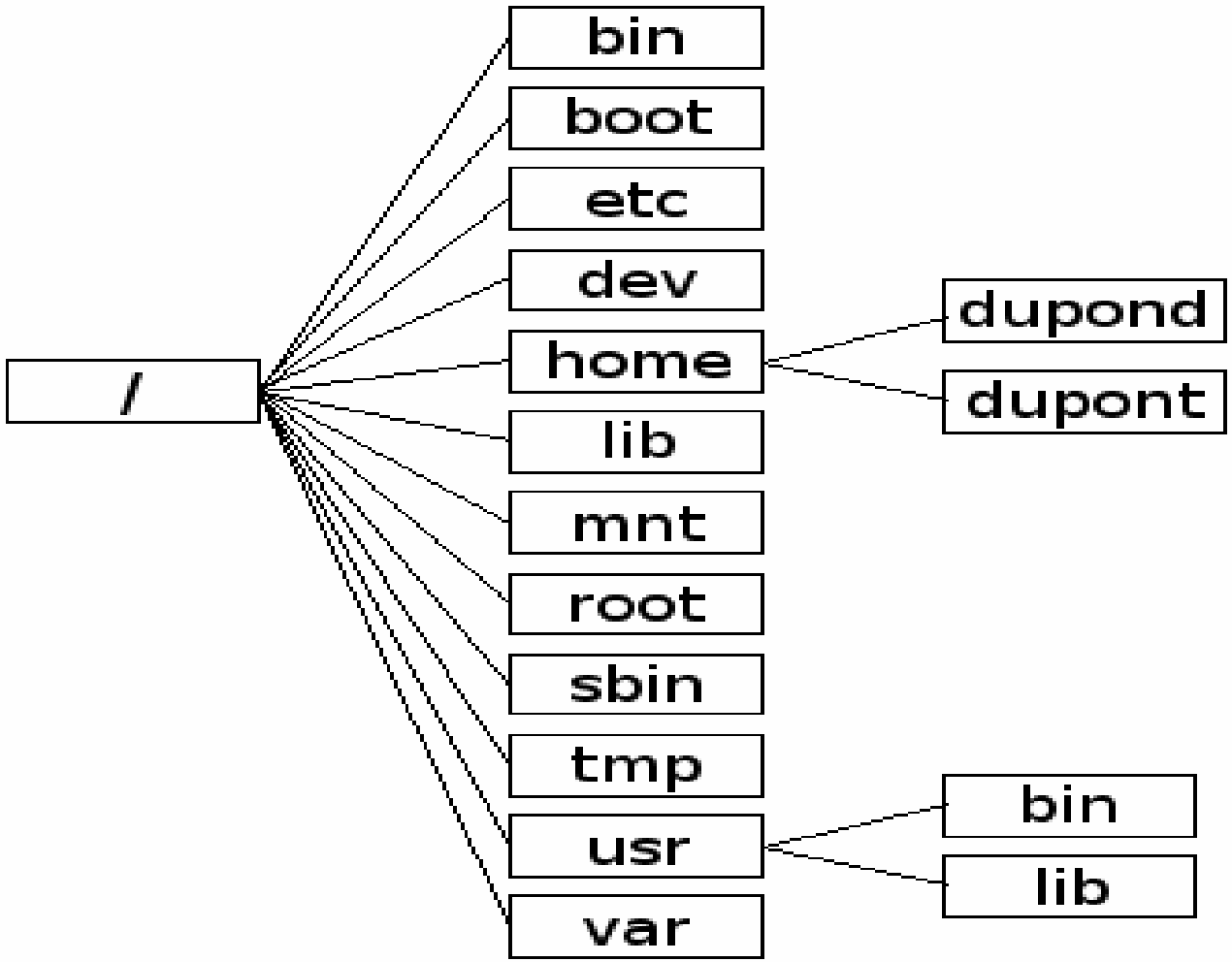
- It is a special program which provides you to interact with a UNIX system.
- It gathers input from the user executes it and then displays output.
- It is similar to the DOS shell , but it is much more powerful than any command interpreters.
- It is also a powerful programming language, complete with conditional statements, loops, and functions.



Types of Shells

- **Bourne Shell (Default Prompt # Character)**
  - Bourne Shell (sh)
  - Korn Shell (ksh)
  - Bourne Again Shell (bash)
  - Posix Shell (sh)
- **C Shell (Default Prompt % Character)**
  - C Shell (csh)
  - Tenex C Shell (tesh)
- Note that default prompt for a normal user of Bourne Shell & C Shell is "$" Character.

UNIX Directory Structure



The “ / “ Directory

- The (“ / “) notes the "root" of the filesystem, where the entire system is contained.
- Unlike Microsoft Windows, where each drive has its own root directory named by a letter, such as C:\ or F:\, Unix holds the entire system in this single top-level directory, including each device and document. Thus, it is commonly said that in Unix, everything is a file.
- Unix uses the forward slash (/) rather than the backslash (\ ) commonly used in Windows.

The /bin Directory

- Stands for "binaries"; Contains commands that may be used by both the system administrator and by users such as ls, cp, mv etc.
- The bin directory is where all the executable binaries were kept in early Unix.
- Over time, as more and more executables were added to Unix, it became quite unmanageable to keep all the executables in one place and the bin directory split into multiple parts.
  - /sbin
  - /usr/bin

The /sbin Directory

- Stands for "system (or "superuser") binaries".
- Contains the essential System Binaries and System Administration tools essential for the system operation and performance such as init, usually needed to start, maintain and recover the system.
- A normal user (not a system administrator) can not run directly these executables directly, must give the entire path. Eg:/sbin/ifconfig
- If a normal user wants to run it directly, then it must be placed in one of the *"bin"* directories.

The /boot Directory

- This directory contains all the important files which are required for the successful boot process.
- It includes config files:
  - Grub or Lilo
  - initrd
  - system.map

The /dev Directory

- The /dev directory contains the essential system files and drivers.
  - /dev/null -- Also known as the "bit bucket" or "black hole", this virtual file discards all contents written to it (but reports that the write operation succeeded).
  - The null device typically used disposing of unwanted output streams of a process, or as a convenient empty file for input streams. This is usually done by redirection.

The /etc Directory

- The etc directory is a storage place for all the administrative files and information.
- Contains configuration files and directories that are specific to the current system. No binaries are to be put in /etc.
  - **/etc/hosts.[allow, deny]:** you can control access to your network by using these files.
  - **/etc/profile :** when a user logs in, a number of configuration files are executed, including /etc/profile. This file contains settings and global startup information for the bash shell.
  - **/etc/services :** this configuration file maps port numbers to named services.

The /etc Directory cont ...

- /etc/passwd : This file contains user information.
  - Whenever a new user is added, an entry is added to this file containing the user's login name, password and so on.
  - This file is readable by everyone on the system.
  - If the password field contains "x", then encrypted passwords are stored in /etc/shadow, a file that is accessible only by the root user.

root:x:0:0:root:/root:/bin/bash

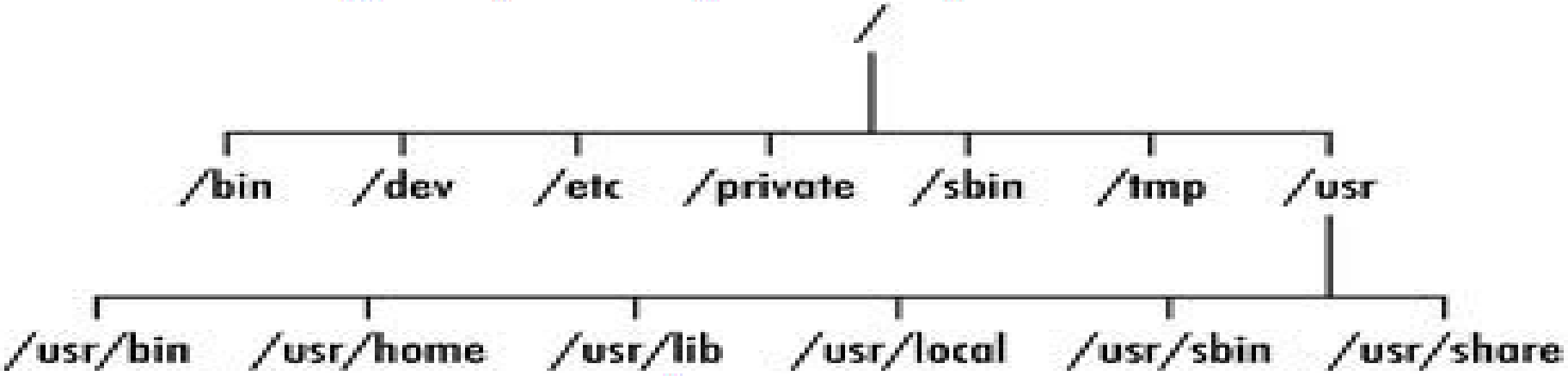
miracle:x:500:500::/home/miracle:/bin/bash

The /home Directory

- All the user home directories are held under this directory with the exception of the root home directory which is kept under /root directory.
- This directory holds users files, personal settings like **.profile** etc.
- On some Unices, this is under /usr/home.

The /usr Directory

- It is the second major section of the file system.
- It is shareable, read-only data.
- It should be shared with other machines with the same architecture and operating system version, and most of the root directory structure is mirrored here.



The /usr Directory cont ...

- Originally the directory holding user home directories.
- Its use has changed, and it now holds executables, libraries, and shared resources that are not system critical, like the X Window System, KDE etc.
- However, on some Unix systems, some user accounts may still have a home directory that is a direct subdirectory of /usr, such as the default ast in Minix.

The /var Directory

- **/var** -- Short for "variable." A place for files that may change often, such as the storage to a database, the contents of a database, log files (usually stored in */var/log*), email stored on a server, etc.
- **/var/log** -- Storage for the system log files.
- **/var/mail** -- The place where all the incoming mails are stored. The user can access his/her own mail only unless he/she has admin rights.
- **/var/spool** -- Contains print jobs, mail spools and various other tasks that have been queued , waiting for some related task to finish.

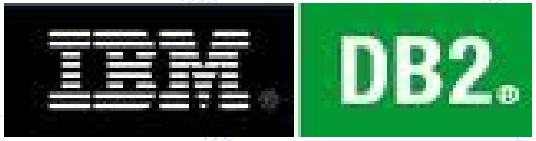
The /media Directory

- A default mount point for removable devices.
- Eg: CD-ROM, USB, External Hard Disks etc.




The /opt Directory

- /opt is reserved for the installation of add-on application software packages.
- A package to be installed in /opt must locate its static files in a separate /opt/<package> directory tree, where <package> is a name that describes the software package.



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Other Directories

- **/lib** – The /lib directory should contain only those libraries that are needed to execute the binaries in /bin/ and /sbin/.
  - These shared library images are particularly important for booting the system and executing commands within the root file system.

- **/proc** – The /proc/ directory contains special files that either extract information from or send information to the kernel.

- **/tmp** – The tmp directory contains temporary files created by Unix system programs.
  - It is recommended that files and directories located in /tmp be deleted whenever the system is booted.

UNIX Based Operating Systems

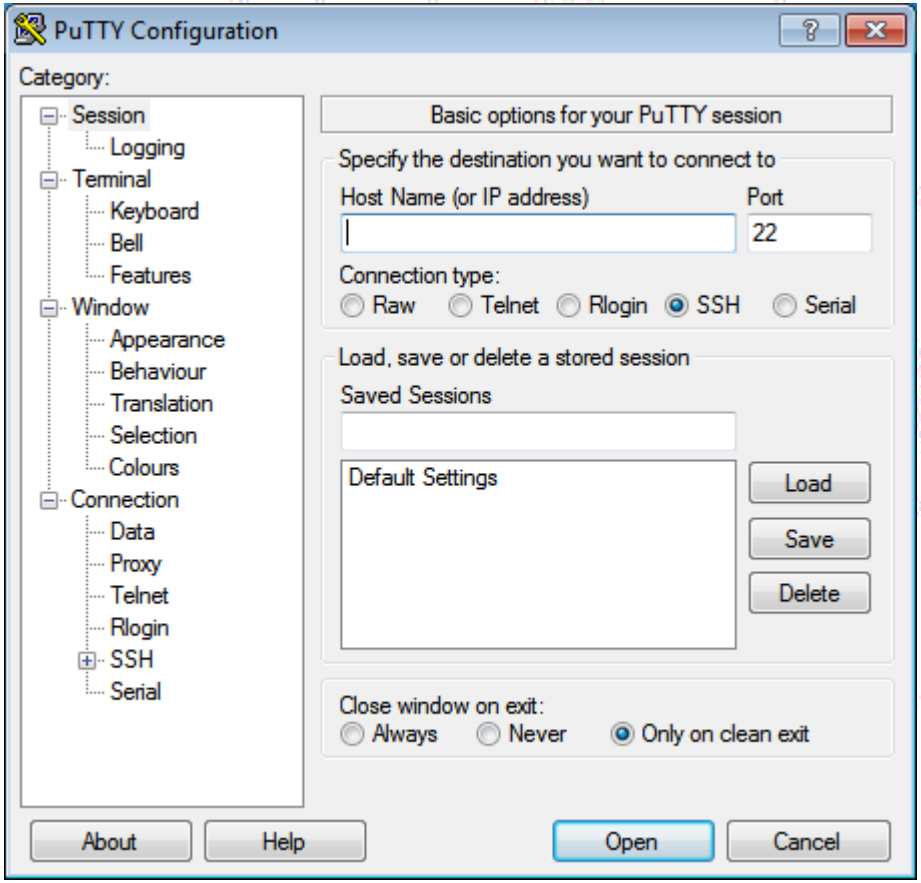
- Linux
- HP-UX
- Sun Solaris
- AIX
- Free BSD
- MINIX

PuTTY

- PuTTY is an SSH, telnet and Rlogin client, developed originally by Simon Tatham for the Windows platform.
- These protocols are all used to run a remote session on a computer, over a network.
- PuTTY implements the client end of that session: the end at which the session is displayed, rather than the end at which it runs.
- Pageant is an SSH authentication agent. It provides authentication to PuTTY.
- If you run PuTTY on a Windows machine:
  - It to connect to a Unix machine. PuTTY opens a window.
  - Then, anything you type into that window is sent straight to the Unix machine, and everything the Unix machine sends back is displayed in the window.
  - So you can work on the Unix machine as if you were sitting at its console, while actually sitting somewhere else.

PuTTY cont ...

- It's light-weight with a single putty.exe file and nothing else to install.
- PuTTY is open source software that is available with source code and is developed and supported by a group of volunteers.



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Any Queries ...

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