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Abstract: Remote Linux Desktop Options

Remote, off-site access to Linux systems must, on occasion, go beyond the command line. The prevalence of municipal broadband usage has made remote access to Linux X Window system desktops viable. The long-standard ways to remotely login to UNIX systems were telnet and rlogin. These insecure methods have largely been replaced (hopefully) by Secure Shell (ssh). Still, a need often arises to go beyond the command line provided by telnet/rlogin/ssh. For instance, a CS department that standardizes on X Window GUI tools under UNIX for student program development should provide a way for students, especially commuters, to access the same UNIX GUI tools remotely, understanding that most of these students are going to be using a non-UNIX operating system on their personal PCs/laptops.

Among the oldest methods for remote X Window desktop logins is the use of a local X Window server and the XDMCP protocol to connect to a remote UNIX machine on which a login manager, such as XDM, is running, an approach made possible by the network transparency of the X Window system. After login, the user is able to display and run locally a window manager or desktop environment on the remote UNIX machine. The local X server/XDMCP approach can work for off-site, remote users who can install a PC X server such as Cygwin/X on Windows or the X11 package on MacOSX. However, running remote X Window desktops is bandwidth intensive, and performance is likely to be unacceptable at the usual municipal broadband network speeds. Also, XDMCP is an insecure protocol. Both of these factors make it likely that XDMCP will be blocked at institutional firewalls.

Virtual Network Computing (VNC) is a cross-platform, open source remote desktop access system utilizing the remote framebuffer (RFB) protocol. The RFB protocol is a client-server protocol that uses significantly less network bandwidth than the X Window system and can provide acceptable remote desktop performance over municipal broadband. A VNC session, itself, is considered relatively insecure, so VNC is also likely to be firewalled. However, solutions exist to securely tunnel VNC logins and sessions through ssh port forwarding, with optional compression to reduce bandwidth usage even further. VNC sessions are normally started on a per-user basis, i.e., the user starts a VNC server process on the remote UNIX system and connects to it using a local VNC client and ssh port-forwarding. But on a remote UNIX system that runs XDM or similar login manager with XDMCP enabled, the VNC server (Xvnc) can be configured through (x)inetd to allow on-demand XDMCP logins over VNC, which can greatly simplify the remote login process for non-UNIX saavy users.

A relatively new technology that is used for remote desktop access to UNIX is NX from NoMachine. The client-server NX protocol was derived from the Differential X Protocol Compressor project. Beyond compression of network-transmitted X Window data, NX eliminates most of the X Window traffic round-trips and makes extensive use of client-side caching to make the session as responsive as possible. Using NX, remote X Window desktop session performance over municipal broadband is superior to VNC, which is understandable considering that NX was designed to make remote UNIX desktops usable over dial-up networking. NoMachine has open sourced portions of the NX server code, resulting in the freenx server project. Proprietary NX clients exist for Linux, Windows and MacOSX. The NX client uses ssh port-forwarding so usage around firewalls is generally not an issue.

Beyond performance and session responsiveness, there are other factors to consider in remote Linux desktop solutions. One important factor is portability. It is sometimes desirable to be able to carry the remote desktop client package on removable media, such as USB flash drives. Other factors to consider include software licenses, file transfers from the remote desktop, clipboard sharing with the local desktop and the ability to print locally from a remote desktop.