Chapter 6

Architectural Comparison

Administrators can choose from a variety of options when determining the structure of their server architecture. This chapter compares architectural approaches to open source public workstations, exploring three distinct approaches and attempting to identify specific advantages and disadvantages of each. All of these approaches should be considered viable options for any library that can live with using an open source operating system—that is to say, any library that doesn't need to offer applications incompatible with the Linux or BSD environments. When evaluating the issue of application compatibility, it is important to consider the possibility of running some applications under Wine or the commercially supported equivalent, CrossOver Linux. Whether this is feasible depends on the specific applications to be run and the number of them. It is also possible to run Windows applications in a VMware virtual server. However, this approach generally requires purchase of a Windows license, which reduces the cost savings possible. The approach you choose will depend on the applications you want to run, the intended use of the workstations, and cost considerations. Decisions about server architecture affect system functionality and determine which features may be available, so it is extremely important to be fully informed before making a choice.

Note: Userful's products are included in the comparison in table 2 because they are based on Linux and other free, open source software and because the applications on a Userful workstation are free and open source. Userful includes proprietary management tools with its products, while the other solutions can be implemented wholly with open source software. Open Sense Solutions makes all of the software used in its custom solutions available as open source. Support services from Canonical, Open Sense Solutions, and Userful that are mentioned below are not free.

Linux

This approach involves loading a Linux distribution like Ubuntu on each workstation. General support services are available from Canonical and other vendors. Custom Linux distributions, updating services, support, and session and print job management are available from Open Sense Solutions and Userful. This approach would be appropriate for any library that puts a premium on workstation performance.

Multi-user Workstation

This approach involves a non-LTSP multi-user workstation configuration based on Linux. The approach typically involves configuring a workstation with multiple graphics cards and using a USB hub to connect a keyboard and mouse for each user. Groovix SLIM and Userful Multiplier both support up to ten users per workstation. This approach would be particularly appropriate for any library that wants to reduce its carbon footprint without dealing with the learning curve associated with LTSP.

LTSP (Thin Client)

This approach involves running Linux applications using a terminal connected to Linux or a server. Terminals may be dedicated devices that boot off the server using a network card with special BIOS, or they may they may consist of a standard PC running the LTSP client software. This approach is great for reducing a library's carbon footprint or setting up limited-use or kiosk workstations and probably offers the greatest potential cost savings.

Feature	Linux	Multi-User Workstation	LTSP (Thin Client)
Audio playback	Free open source software is available, but proprietary software supports more file types. For this reason, Howard County Library elects to use RealPlayer, which is free but proprietary.	Support for USB devices including audio is included. This approach can support full graphics, video, and audio playback for each user.	Requires a terminal that supports sound. Free open source software is available, but proprietary software supports more file types. For this reason, Howard County Library elects to use RealPlayer, which is free but proprietary.
Cost savings	Free operating system and application licenses. Linux runs well on older hardware, so it may be possible to extend the life of workstation hardware.	Free operating system and application licenses. Multi-user configurations that support multimedia generally fall between the cost of a thin client and that of a single-user-per-workstation approach because they typically require additional graphics cards in the workstation configuration. Some reduction in heating/cooling costs and power is possible depending on the number of users sharing a workstation.	Free operating system and application licenses. Terminals cost $200 to $400. An appropriate server is likely to cost between $1,000 and $5,000. Some organizations run as many as 50 users per server (probably without support for audio). Thus, significant reductions in power and heating/cooling costs are possible when using LTSP.
Internet filtering	Open source software is available for this purpose, but it requires significant technical skill to configure. Installers must be proficient in Linux command line, software installation, and text file editing.	Open source software is available for this purpose, but it requires significant technical skills to configure. Installers must be proficient in Linux command line, software installation, and text file editing. Open Sense Solutions offers support for DansGuardian. A proprietary solution is available from Userful.	Open source software is available for this purpose, but it requires significant technical skill to configure. Installers must be proficient in Linux command line, software installation, and text file editing.
Printer management, including job management and support for printing fees	Most libraries using this approach will probably find it necessary to use commercial software for this purpose.	Open Sense Solutions recommends and supports PaperCut, a proprietary solution. A proprietary solution is available from Userful.	Most libraries using this approach will probably find it necessary to use commercial software for this purpose.
Session management—booking and session timeout	A programmer at the Crawford County Federated Library System has written open source software for this purpose (libKi). Open Sense Solutions also offers an open source solution with its Groovix product.	A programmer at the Crawford County Federated Library System has written open source software for this purpose (libKi). Open Sense Solutions also offers an open source solution with its Groovix product. A proprietary solution is also available from Userful.	A programmer at the Crawford County Federated Library System has written open source software for this purpose (libKi). Open Sense Solutions also offers an open source solution with its Groovix product.

Feature	Linux	Multi-User Workstation	LTSP (Thin Client)
Software updates	Linux OS updates are relatively easy to automate, though they do require some management. Some applications may have to be updated manually. Best practices involve maintaining and updating a standard OS image and pushing that out to individual workstations automatically. Canonical, Open Sense Solutions, and Userful will handle this for a fee.	Linux OS updates are relatively easy to automate, though they do require some management. Some applications may have to be updated manually. Best practices involve maintaining and updating a standard OS image and pushing that out to individual workstations automatically. Canonical, Open Sense Solutions, and Userful will handle this for a fee.	Terminals do not require software updates. All updates are handled once on the server. Linux OS updates are relatively easy to automate but require some management. Some applications may have to be updated manually.
Support	Commercial support is available from Canonical and others, but not required.	Commercial support (probably needed by most libraries and required with Userful) is available from Canonical, Open Sense Solutions, Userful, and others.	Commercial support is available, but not required.
USB device support, including thumb drives for user file storage	Available.	Available.	Depends on the terminal hardware.
User authentication	Performing user authentication may require considerable technical skill; however, support for various open source options is available from Canonical and others.	Various open source options are available. Open Sense Solutions supports PAM, LDAP, and SIP2. Userful supports PAM, LDAP, SIP, SIP2, and others.	Performing user authentication may require considerable technical skill; however, support for various open source options is available from Canonical and others.
Video display	Works well if the codec is supported by MPlayer. Other proprietary codecs supported by RealPlayer.	Video display possible when the workstation is configured with a graphics card and/or sound card for each user, but may not be appropriate for more than 2 or 3 users due to performance issues.	Requires a terminal that supports sound. Video display possible, but probably not appropriate on a shared server due to performance issues.
Running Windows applications under Linux	Wine allows users to run some Windows applications under Linux. Not all applications will work. Considerable technical skill may be required to configure and support Wine.	Open Sense Solutions supports CrossOver, which is a commercial version of Wine that provides compatibility for some Microsoft Windows programs that do not have an open source alternative.	Probably not appropriate on a LTSP terminal.

Table 2