

NuttX Graphics Subsystem (NX)

Overview

NX provides a tiny windowing system in the spirit of X, but greatly scaled down and appropriate for most resource-limited embedded environments. The current NX implementation supports the general following, high-level features:

- **Virtual Vertical Graphics Space.** Windows that reside in a virtual, vertical space so that it makes sense to talk about one window being on top of another and obscuring the window below it.
- **Client/Server Model.** A standard client server/model was adopted. NX may be considered a server and other logic that presents the windows are NX clients.
- **Multi-User Support.** NX includes front-end logic to an NX server daemon that can serve multiple NX client threads. The NX sever thread /daemon serializes graphics operations from multiple clients.
- **Minimal Graphics Toolset.** The actual implementation of the graphics operations is performed by common, back-end logic. This back-end supports only a primitive set of graphic and rendering operations.
- **Device Interface.** NX supports any graphics device either of two device interfaces:
 1. Any device with random access video memory using the NuttX framebuffer driver interface (see `include/nuttx/video/fb.h`).
 2. Any LCD-like device than can accept raster line runs through a parallel or serial interface (see `include/nuttx/lcd/lcd.h`). By default, NX is configured to use the frame buffer driver unless `CONFIG_NX_LCDDRIVER` is defined `=y` in your NuttX configuration file.
- **Transparent to NX Client.** The window client on "sees" the sub-window that is operates in and does not need to be concerned with the virtual, vertical space (other that to respond to redraw requests from NX when needed).
- **Framed Windows and Toolbars.** NX also adds the capability to support windows with frames and toolbars on top of the basic windowing support. These are windows such as those shown in the screenshot above. These framed windows sub-divide one one window into three relatively independent subwindows: A frame, the contained window and an (optional) toolbar window.
- **Mouse Support.** NX provides support for a mouse or other X/Y pointing devices. APIs are provided to allow external devices to give X/Y position information and mouse button presses to NX. NX will then provide the mouse input to the relevant window clients via callbacks. Client windows only receive the mouse input callback if the mouse is positioned over a visible portion of the client window; X/Y position is provided to the client in the relative coordinate system of the client window.
- **Keyboard input.** NX also supports keyboard/keypad devices. APIs are provided to allow external devices to give keypad information to NX. NX will then provide the mouse input to the top window on the display (the window that has the focus) via a callback function.

See also

- [NX Graphics Subsystem Documentation](#)
- [NxWidgets](#)
- [NxWidgets Documentation](#)
- [NuttX Window Manager \(NxWM\)](#)