

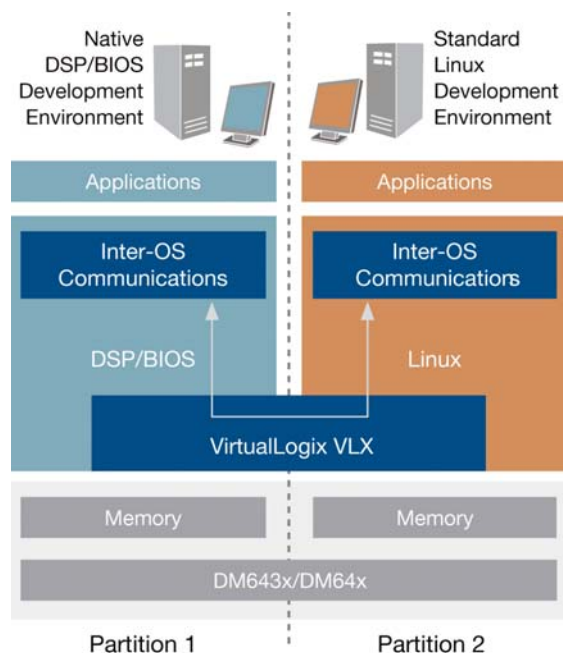
# VLX for Digital Multimedia Supporting Texas Instruments DSP Processors

## Overview

VLX for Digital Multimedia, Version 2.0 (v2.0) is an innovative real-time virtualization solution that allows Linux and TI DSP/BIOS to run concurrently on TI processors for digital video applications, without sacrificing the performance required by the DSP-targeted system.

By combining real-time multimedia processing with Linux device drivers and general purpose applications on a single-core DSP processor, VLX for Digital Multimedia reduces the bill-of-materials (BOM) for digital multimedia devices such as video phones, video surveillance cameras and other high-volume digital multimedia devices.

VLX for Digital Multimedia includes a complete Linux environment optimized for the DaVinci DM643x and the DM64x/C641x processor families. Using VirtualLogix's embedded Linux kernel and distribution, VLX for Digital Multimedia supports both Linux and DSP/BIOS on the same processor. Each operating system runs independently of the other, and uses its own scheduling, drivers and memory management. As OEM designs evolve, VLX for Digital Multimedia will seamlessly support multi-core chips offering significant savings in development costs and reduced time to market.



## Key Benefits

- Reduces the bill of materials (BOM) for digital multimedia devices
- Maximizes software options by leveraging both TI DSP/BIOS ecosystem and Linux development community
- Isolates proprietary DSP/BIOS Codecs, services, drivers and applications from open source Linux
- Guarantees real-time performance and native behavior of TI DSP/BIOS
- Provides high performance, flexible communication between operating systems
- Provides a scalable software and hardware platform, which is reusable across low, mid, and upper-tier product variants



## Key Features

### Development Environment

VLX for Digital Multimedia v2.0 leverages native development environments:

- TI's Code Composer Studio for DSP/BIOS applications, Codecs, and drivers.
- The GNU Compiler Collection tools (gcc, gdb, etc.) enhanced to generate C64x+/C64x code for both Linux kernel and Linux applications.

### Supported Target Processors

- TMS320DM643x
- TMS320DM64x
- TMS320C641x
- Others upon request

### High Performance Virtualization

VLX for Digital Multimedia includes all services necessary to allow Linux and DSP/BIOS to operate concurrently on a single TI DSP.

- **Scheduler**  
Guarantees that DSP/BIOS receives priority access to the hardware for native real-time performance and response.
- **Shared Interrupt Controller**  
Allows the use of native OS device drivers.
- **Device Driver Framework**  
Facilitates the creation of new virtual devices by providing a high-level API for virtual device management and inter-OS communications services.

### Inter-OS Communication

Inter-OS communication services support diverse product architectures with low level communication mechanisms.

- **Cross-interrupts** - Enables Linux to send an interrupt to DSP/BIOS and vice-versa.
- **Shared Memory** - Provides standard shared memory block services.
- **Circular Buffer** - Provides FIFO-like services.
- **Virtual DSP/BIOS Link** - Communicates between Linux and DSP/BIOS using the same APIs used by the DaVinci dual-core DM644x processors

### High-Level Virtual Devices

High-level virtual devices provide simplified communications between operating systems or I/O devices, in order to simplify interface, operations, and product development.

- **Shared Console Output** – Enables developers to directly access each operating system for development or debug.
- **Shared Video Framebuffer Device** - Enables graphical data to be transferred transparently between applications running on Linux and video processing applications running on DSP/BIOS.
- **Shared Ethernet Device** – Enables existing DSP/BIOS applications to share the network access with Linux applications.

### Performance

VLX for Digital Multimedia has been designed to be fast, small and efficient. Special care has been taken to avoid unnecessary latency in interrupt response or context switch times. VLX performance overhead presents a negligible load on system resources with a footprint that can be as small as 64KB.

### Linux Support Package

VLX for Digital Multimedia includes a Linux distribution that has been optimized for TI DaVinci DM643x and DM64x/C641x DSP processors.

- **Standard Linux**
  - 2.6 or 2.4.20-based kernel with MMU-less support
  - Full, standard APIs for C and C++ application development
  - Pre-emptible kernel for improved real-time response
- **Linux root file system utilities for MMU-less**
  - Basic core, networking and graphical packages (QT, GTK), web browser
- **Standard file systems**
  - Ext3, NFS, DevFS, CRAMFS, AutoFS, MSDOS, VFAT, ISO 9660, JFFS, JFFS2
- **Networking Protocols**
  - TCP/UDP, IPv4, IPv6, IP multicast, IP forwarded and advanced routing,
  - DHCP/BOOTP/ RARP, IP tunneling, Fair packet scheduling (DiffServ, RSVP), RTP/RTSP

Developers can recompile and debug their kernels, device drivers and applications without needing special vendor services