

Processor SDK Linux Matrix Overview

Agenda

- Explain the purpose of the Matrix, an example application that launches by default within the Processor SDK Linux.
- Describe the capabilities of the Matrix, including support for launching other applications and demonstrations.

SDK Target Components: Matrix Overview

Supports: All Platforms

- Matrix is the out-of-box experience application contained within the SDK. It is launched automatically when the development board is booted.
- Matrix is a PHP application that runs on an instance of the lighttpd web server on the target device and generates HTML5 content.
- The display is a simple Qt application that uses webkit to render the generated HTML.
- Because Matrix is a web application, it can also be controlled remotely by connecting to the target board with a web browser. This allows user interaction with the running Linux system, even on boards without video display capabilities.



SDK Target Components: Matrix Main Menu

Supports: All Platforms

- Matrix can be used to launch applications on the target system.
- The content displayed within the Matrix screen is dynamically created by parsing .desktop files contained within the file system.
- Applications bring their own description data, making adding functionality and demonstrations as easy as installing the application.
- Where possible, the .desktop fields are based on the standard specified by freedesktop.org
- Definitions of the .desktop fields and additional details can be found in the Matrix User's Guide: http://processors.wiki.ti.com/index.php/Matrix_Users_Guide





SDK Target Components: Power

Supports: AM37x, Beagleboard-xM

- The Power submenu is accessed from the Matrix main menu.
- The Power submenu includes applications that show how to:
 - Transition between different CPU frequencies
 - Suspend and resume the device
- Available options can vary based on the capabilities of the device.
- Power Management User's Guide:
http://processors.wiki.ti.com/index.php/Power_Management_Users_Guide





SDK Target Components: MultiMedia

Supports: AM335x, AM35x, AM37x, Beagleboard-xM

- The Multimedia submenu is accessed from the Matrix main menu.
- Based on Gstreamer media framework:



- Allows building of dynamic pipelines that describe the data input, transformation operations, and output.
- Pipelines are flexible; Behavior can be changed by adjusting elements in the pipeline.

- All media components are open source and provided without licensing restrictions.
- For Sitara devices with a NEON coprocessor (Cortex devices), the ffmpeg NEON codecs are used to accelerate video decode operations.
- ARM Multimedia User's Guide:

http://processors.wiki.ti.com/index.php/ARM_Multimedia_Users_Guide



SDK Target Components: Camera

- The Camera Loopback is launched from the Matrix main menu.
- For devices with a camera input, this application demonstrates how to take data from the media controller interface and output to the display.
- Camera User's Guide: http://processors.wiki.ti.com/index.php/Camera_Users_Guide



SDK Target Components: Cryptography

Supports: All Platforms

- The Cryptos submenu is accessed from the Matrix main menu.
- Cryptos uses the OpenSSL open-source package to demonstrate a variety of cryptographic operations and performance metrics.
- On devices with cryptography accelerators, the cryptodev API enables OpenSSL to take advantage of hardware acceleration. This operation is seamless to the user and occurs automatically when supporting hardware is available.
- Cryptographic software has a TSU exemption filed and the software is hosted here: http://software-dl.ti.com/dsp/dsp_public_sw/am_bu/crypto/latest/index_FDS.html
- Cryptography User's Guide: http://processors.wiki.ti.com/index.php/Cryptography_Users_Guide





SDK Target Components: 3D

Supports: AM335x, Beaglebone, AM35x, AM37x, Beagleboard-xM, AM57x, and AM437x



- The 3D submenu is accessed from the Matrix main menu.
- The 3D applications demonstrate the use of the SGX graphics accelerator on devices with an SGX for 3D operations.
- The driver and application sources, as well as the SGX libraries, are provided within the Processor SDK.
- Supports the following:
 - OpenGL ES 1.1
 - OpenGL ES 2.0
 - OpenVG



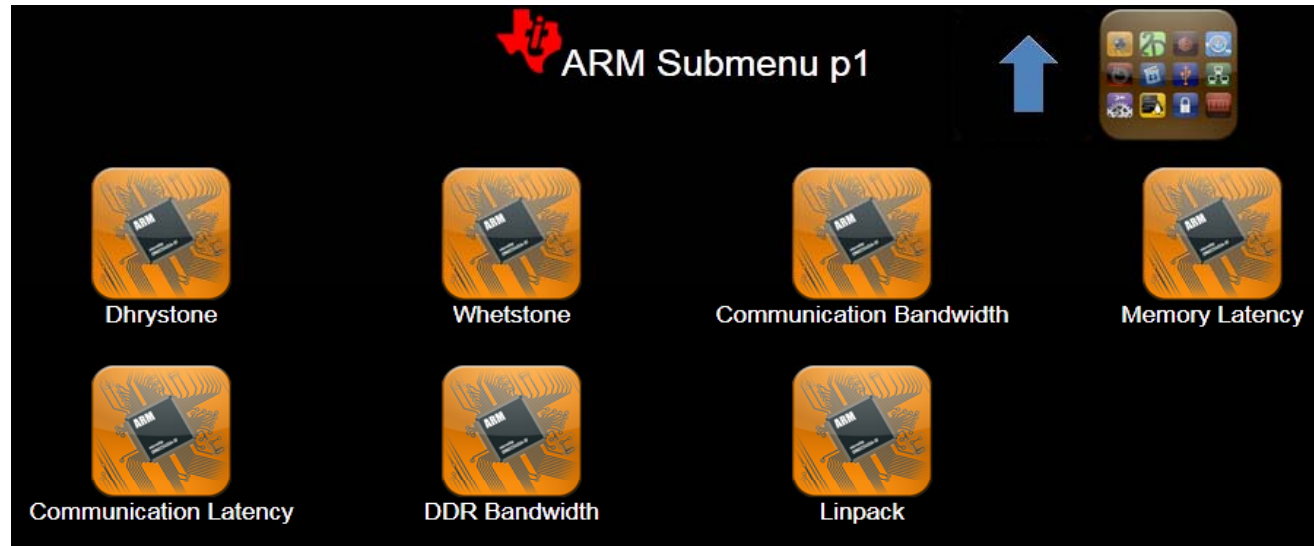
SDK Target Components: ARM Benchmarks

Supports: All Platforms

- The ARM benchmarks submenu is accessed from the Matrix main menu.

- Provides the following benchmarks:

- **Dhrystone** measures relative CPU cycles for comparison with other processors run from L1 cache.
- **Linpack** measures CPU speed for single-precision, floating-point operations.
- **Whetstone** measures CPU speed for double-precision floating point operations
- **Lmbench** benchmarks:
 - **Communication Bandwidth** measures bandwidth between processes.
 - **Communication Latency** measures latency for various control messages.
 - **DDR Bandwidth** measures memory bandwidth.
 - **Memory Latency** measures memory latency.



Summary

- The Matrix is the default application that launches from within the Processor SDK Linux.
- Matrix provides a user interface to launch other applications included in the SDK.
- The Matrix provides examples of what is possible using Linux and TI processors.
- All source is provided as a reference and starting point.

For More Information

- Processor SDK Training Series
 - Processor SDK Overview
 - Processor SDK RTOS Overview
 - Processor SDK Linux Overview
 - Processor SDK Linux Components
 - Processor SDK Linux Installation
- Processor SDK Documentation:
 - Processor SDK Linux Getting Started Guide
 - Processor SDK RTOS Getting Started Guide
- For questions about this training, refer to the E2E Community Forum:
<https://e2e.ti.com/support>