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# Visual Data Analysis: a Key Component of Digital Video Software Development

The TI Digital Video Software Development Kit (DVSDK) contains a variety of components to help you rapidly develop digital media software. One of the key components is the TMS320DM644x SoC Analyzer. The analyzer is a graphical interface tool that provides complete system visibility, enabling developers to easily identify bottlenecks. This tool is minimally invasive to the performance of the application and aids in analyzing and identifying problems by capturing and graphically displaying system interaction, load distribution, and other types of behavior.

As tasks run on the DSP and ARM cores of TMS320DM644x processors, the analyzer captures and displays the data on a single time line. This provides a complete system view of the application and eliminates the tedious process of manually collecting and comparing data on each core before optimization begins.

1.1 Data Collection

Data collection for use in the analyzer begins with the instrumentation of applications used to collect data. Once instrumented, BIOS Logs, Linux Trace, and Codec Engine Trace data are captured by the analyzer in real time from the running system. Data is then transported in run mode using TCP/IP without disrupting the system, and without the need for an IDE or J-TAG interface. After transport, data is decoded, analyzed, and correlated for visualization by the analyzer. This concept is illustrated in Figure 1-1.
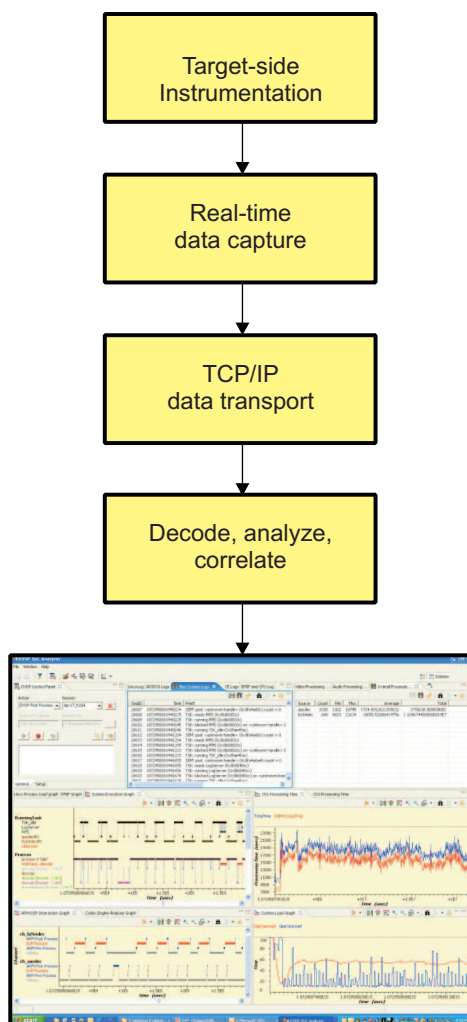
Figure 1-1. Data Collection

1.2 Visualizing Data

The analyzer interface provides the ability to visually analyze the collected data. Visualization features include:

- A control panel for selecting predefined actions and defining data collection sessions
- A log view of collected data
- Statistical view of collected data
- Graphical view of collected data
  - ARM↔DSP interaction
  - Processing time
  - System load
  - System execution state
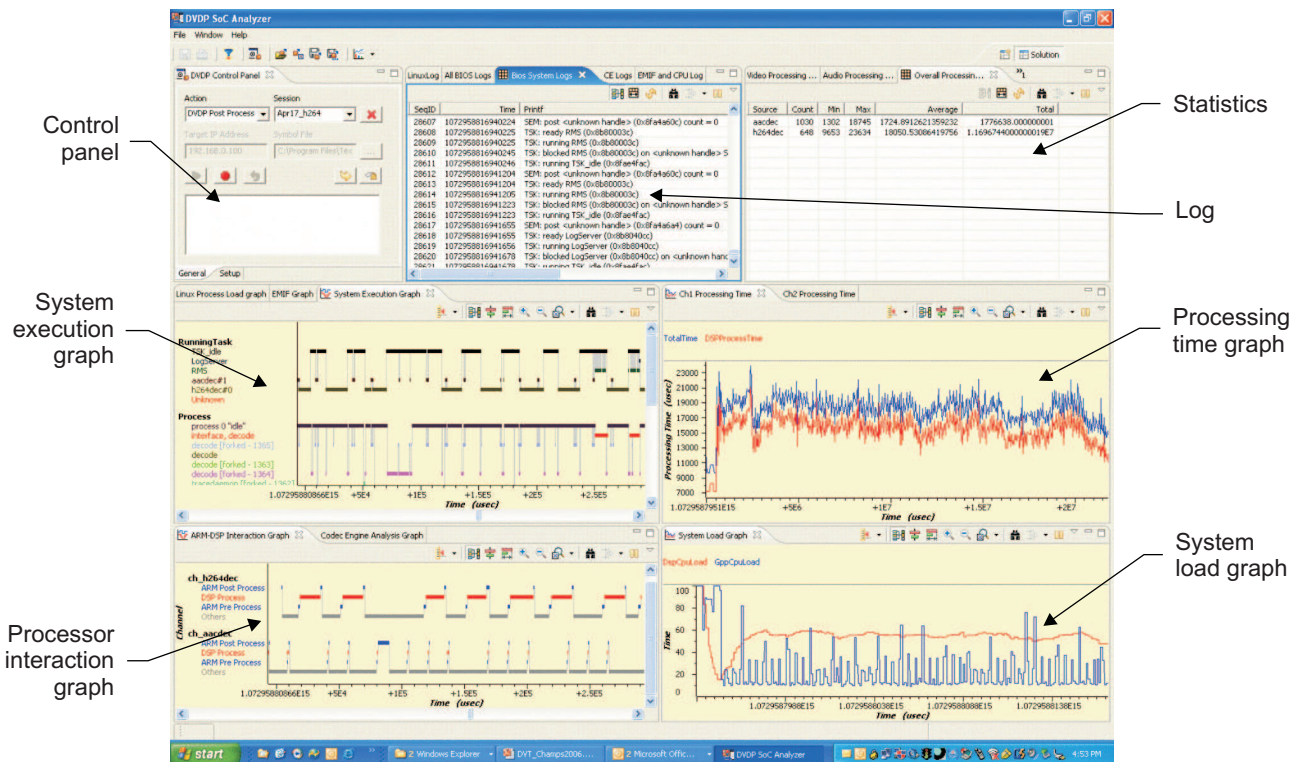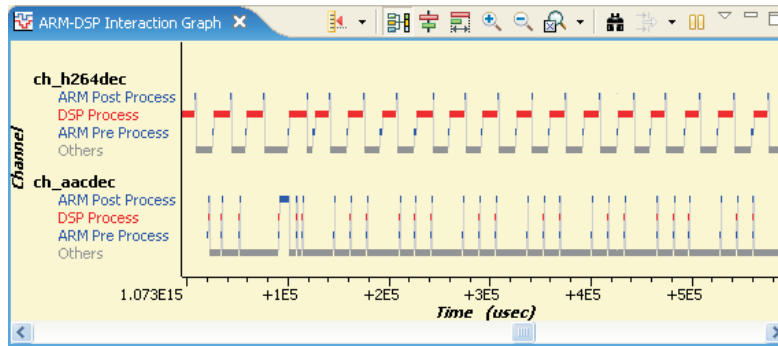
Figure 1-2 shows the visualization features.

Figure 1-2. Data Visualization

1.3 Analyzing Data

Analysis can be performed by examining the visual representation of data. The following figures show examples of visualized data.

Visualization of the ARM interaction with the DSP (via the Codec Engine) can identify inconsistent or unforseen actions.

Figure 1-3. DSP ↔ARM Interaction

The amount of time taken to process codec requests can be used to identify latency and consistency issues to help maximize performance.
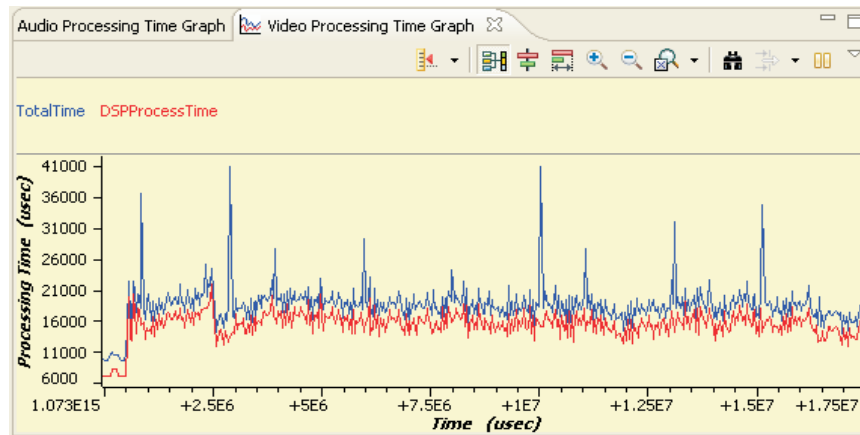
Figure 1-4. Application Processing Time

Overall CPU load as well as the individual load on the ARM and DSP can be visualized to perform load balancing and increase overall system performance.
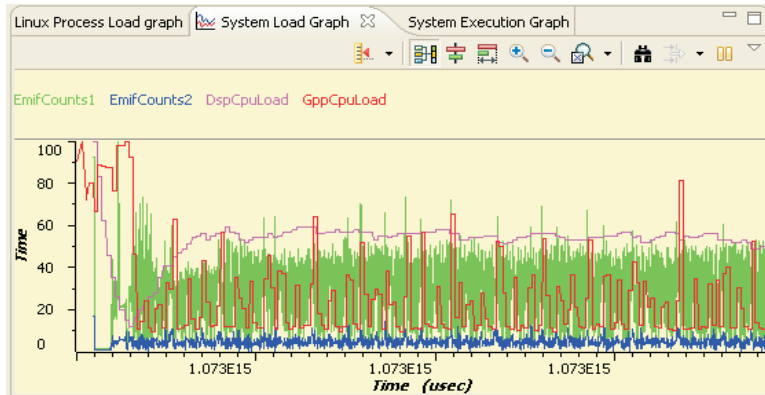

Figure 1-5. System Load

Visualizing tasks as they are being run simultaneously on the ARM and DSP can help diagnose problems during system execution.
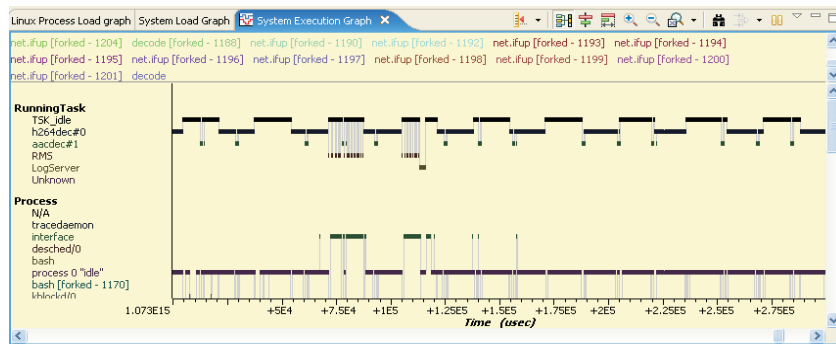

Figure 1-6. System Execution

1.4   Supporting Features

The analyzer has a variety of features to make data collection and analysis tasks simple. Features include:

- Using the mouse to select data points and view time stamps of data.
- Easily mark data points for reference while scrolling the time line.
- View and scroll the same time across all graphs simultaneously.
- Customize measurement and increment type of time and axis.
- Easily measure distance between data points.
- Advanced filtering and find capabilities.
- Zoom and toggle between views.
- Ability to export data.

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