

Android Graphics System: Study of Dual-Software VSync Synchronization Architecture and Optimization

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Abstract : In Graphics-display subsystem, frame buffers are shared between producer i.e. content rendering and consumer i.e. display. If a common buffer is operated by both producer and consumer simultaneously, their processing rates mismatch can cause tearing effect in displayed content. Therefore, Android OS employs triple buffered system, taking in to account an additional composition stage. Three stages-rendering, composition and display refresh, operate synchronously on three different buffers, which is achieved by using vsync pulses. This synchronization, however, brings in to the pipeline an additional latency of up to 26ms. The present study details about the existing synchronization mechanism of android graphics-display pipeline and discusses a new adaptive architecture which reduces the wait time to 5ms-16ms in all the use-cases. The proposed method uses two adaptive software vsyncs (PLL) for achieving the same result.

Keywords : Android graphics system, vertical synchronization, atrace, adaptive system

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