移动开发工具

杨君，移动图形开发工具经理
Jonas Yang, Manager of Mobile Graphics Tools

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NVIDIA开发者工具

构建，调试，性能测试

Microsoft DirectX

OpenGL

NVIDIA CUDA

OpenGL ES

ANDROID NDK

GNU C/C++

集成开发环境

Visual Studio

eclipse

独立工具

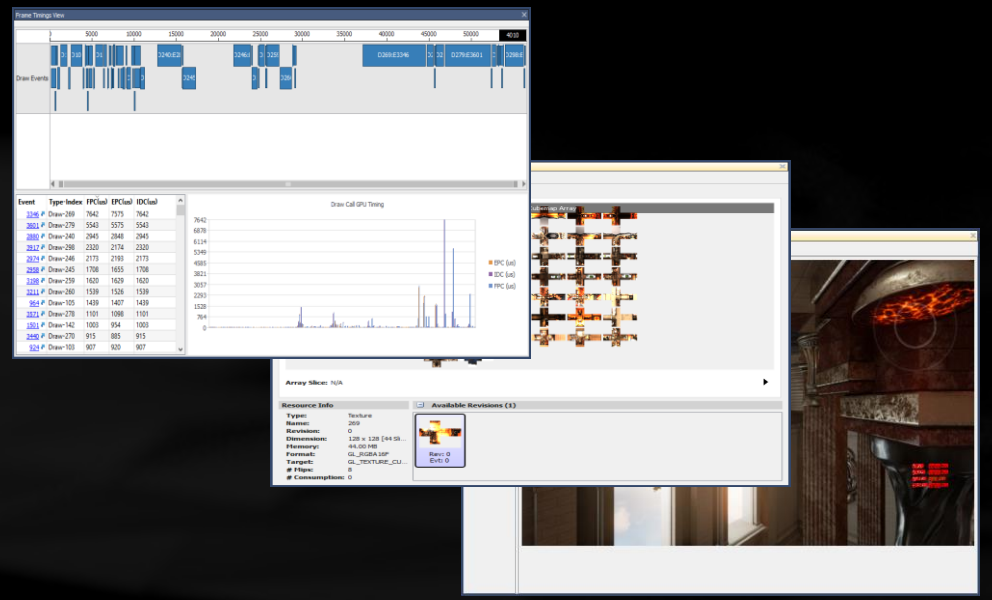
硬件支持的 CPU和GPU的调试和性能分析

NVIDIA GAMEWORKS™

NVIDIA® TEGRA GRAPHICS DEBUGGER

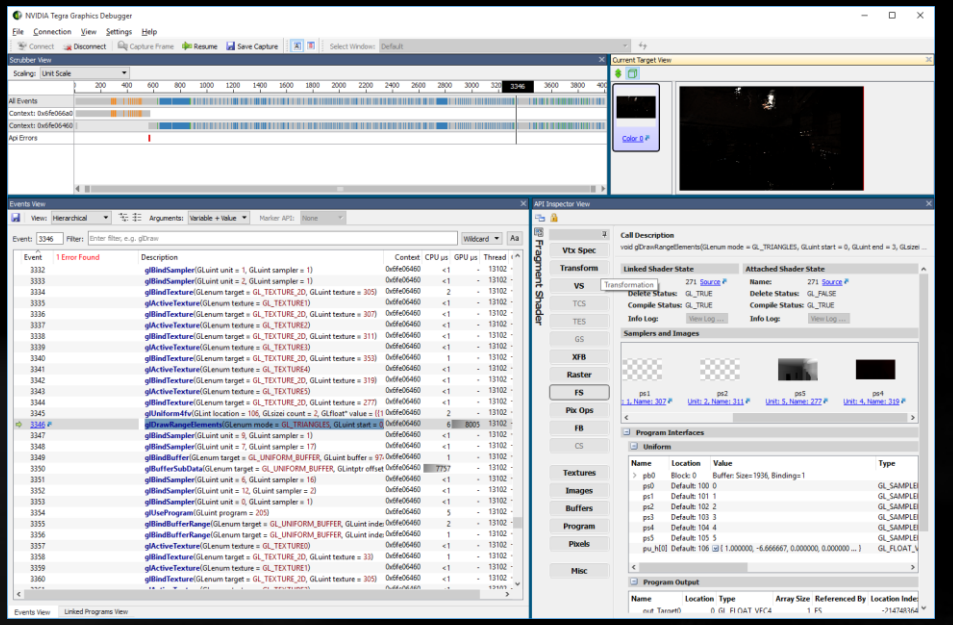
帮助移动平台开发者加速视觉计算开发

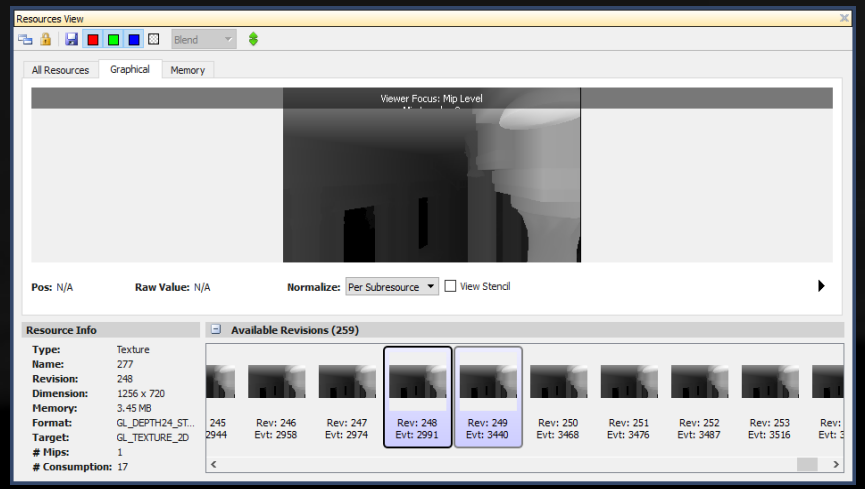
- 支持最新工业标准OpenGL
- 图形开发的调试和性能剖析
- 运行中抓取渲染帧
- 自动化GPU瓶颈分析
- 高级渲染调用时序分析
- 独立跨平台工具



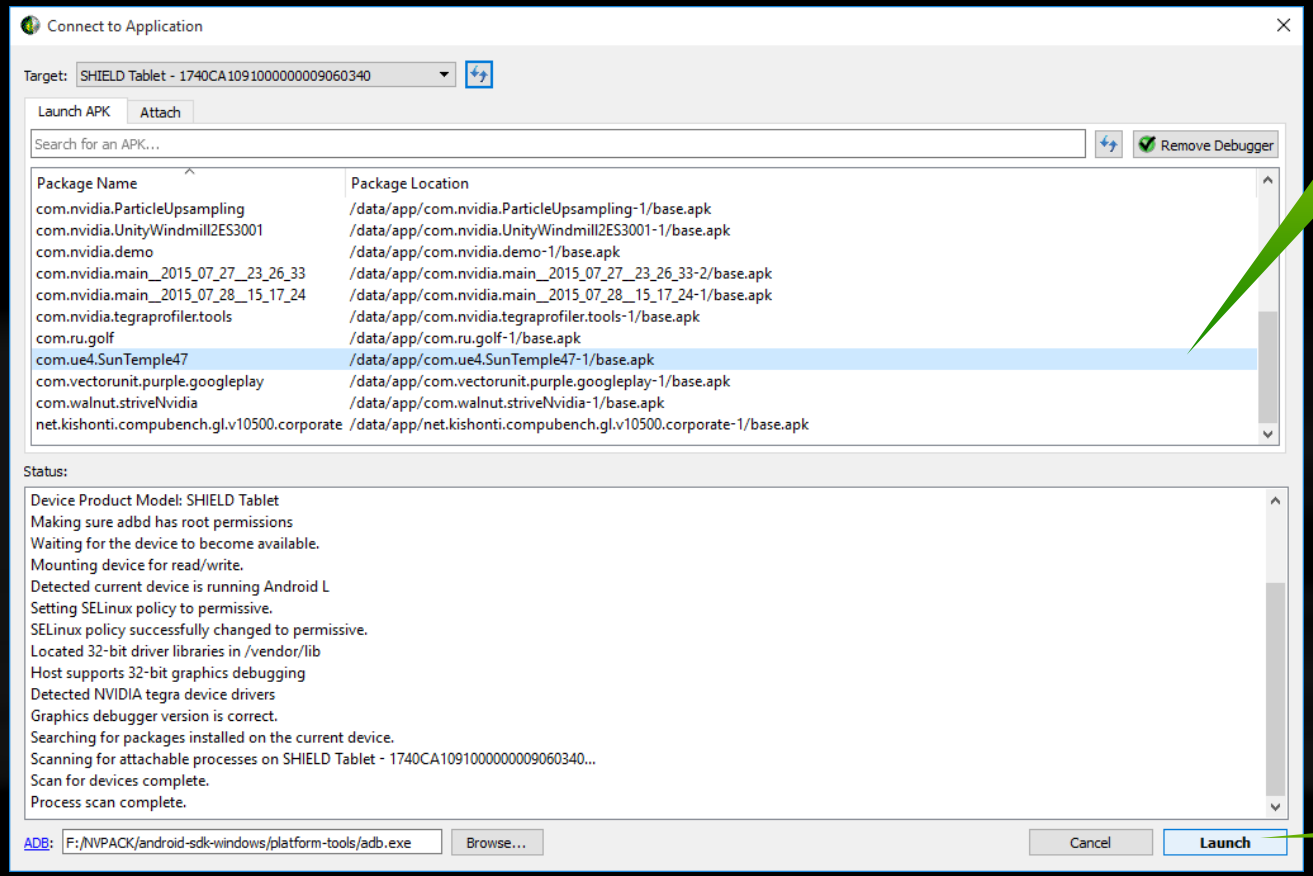
2.0新特性

- 支持OpenGL ES 3.2以及OpenGL 4.5
- 支持Android 5.0以及Android TV
- 支持基于arm 32位以及64位Android
- 序列化抓取帧
- 设备HUD显示

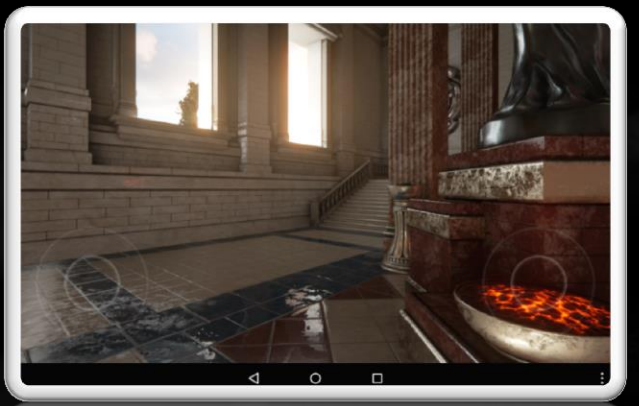




分析UE4 SUNTEMPLE演示

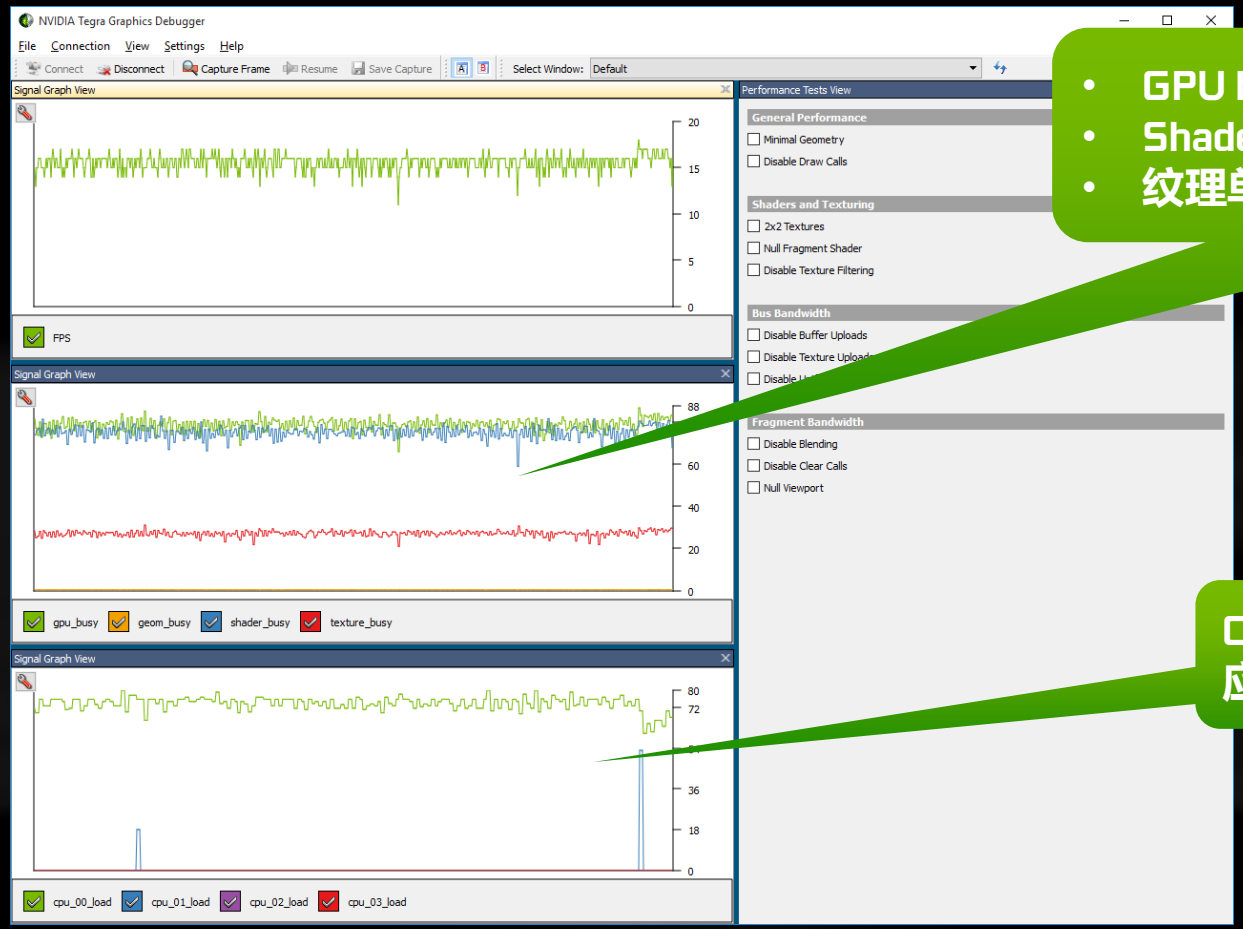


APK



运行!

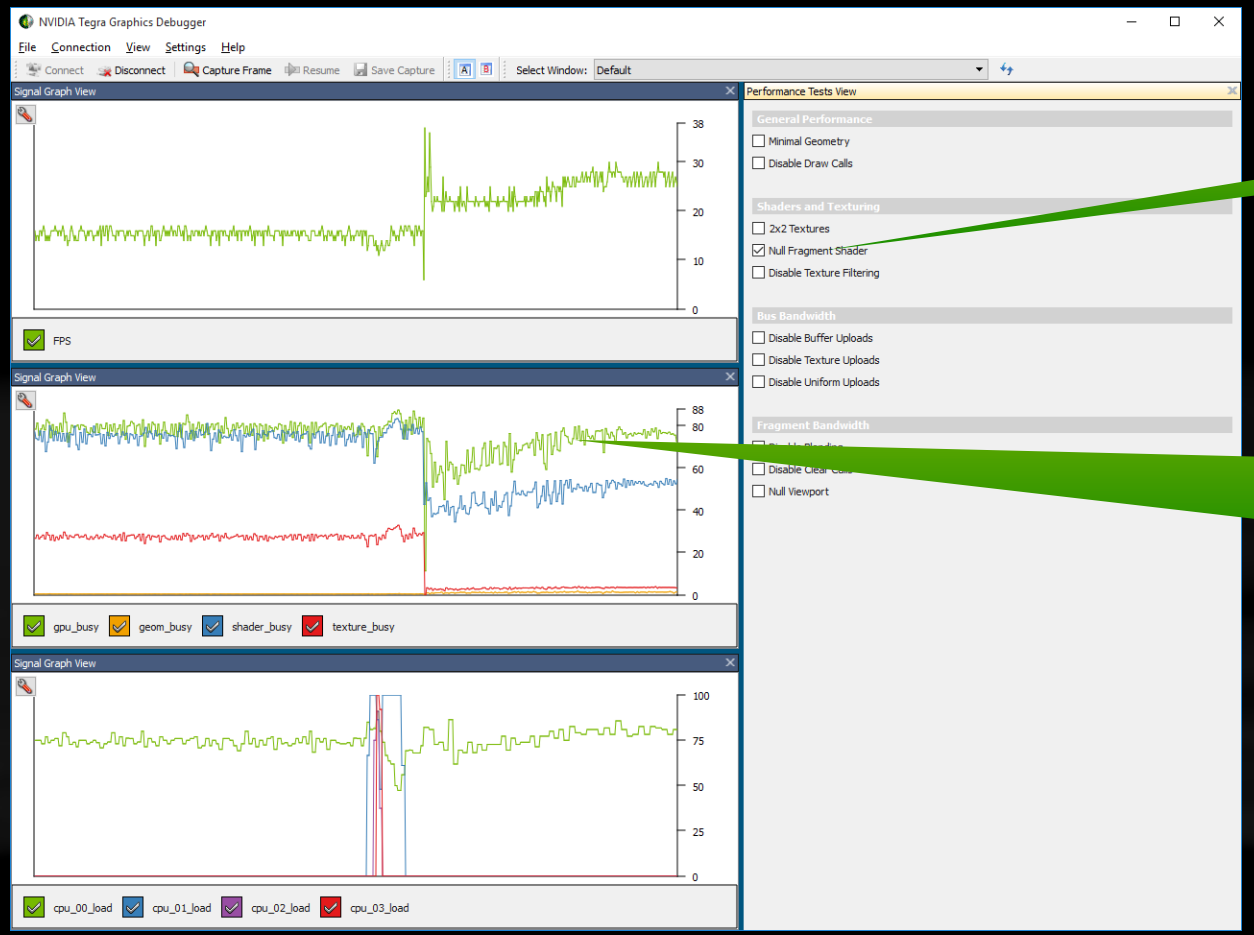
分析UE4 SUNTEMPLE演示



- GPU busy 80%
- Shader unit busy与GPU busy有很高相关性
- 纹理单元负载不高，大约30%

CPU负载大约80%
应用程序只使用了一个CPU核心

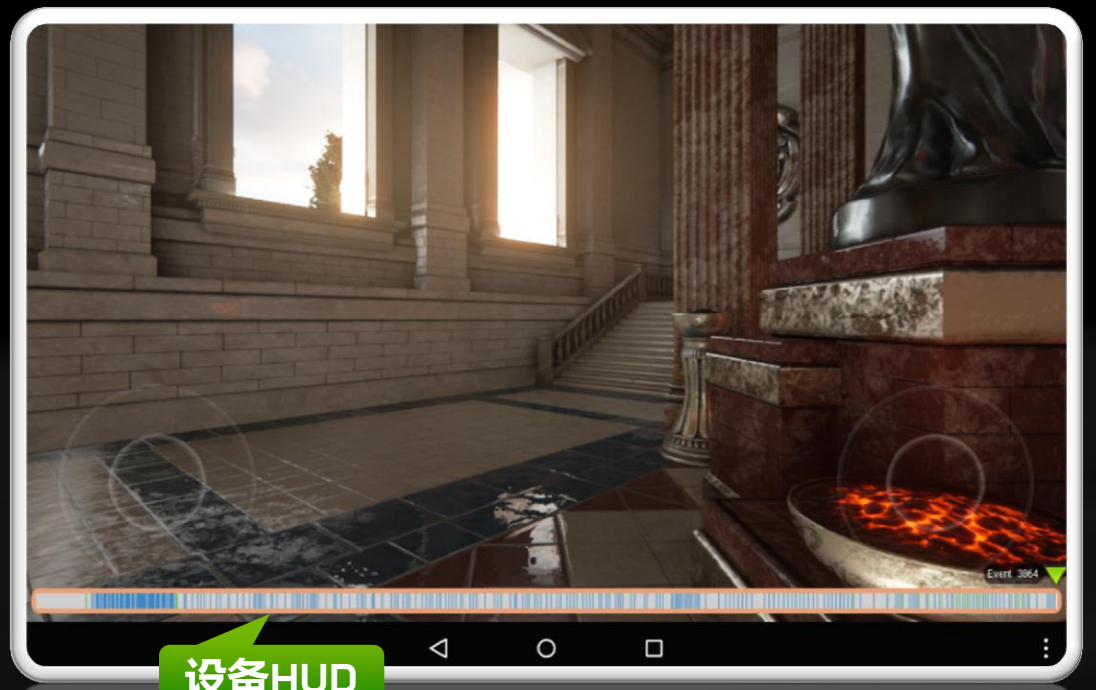
初步测试



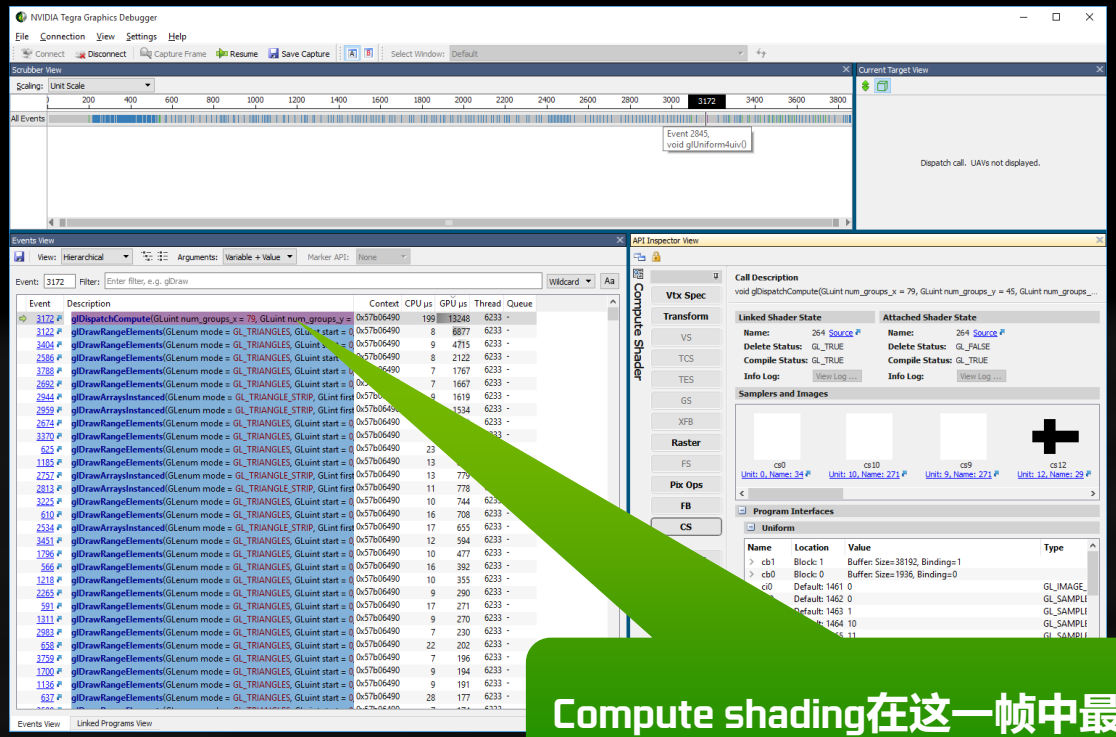
开启Null Fragment Shader测试

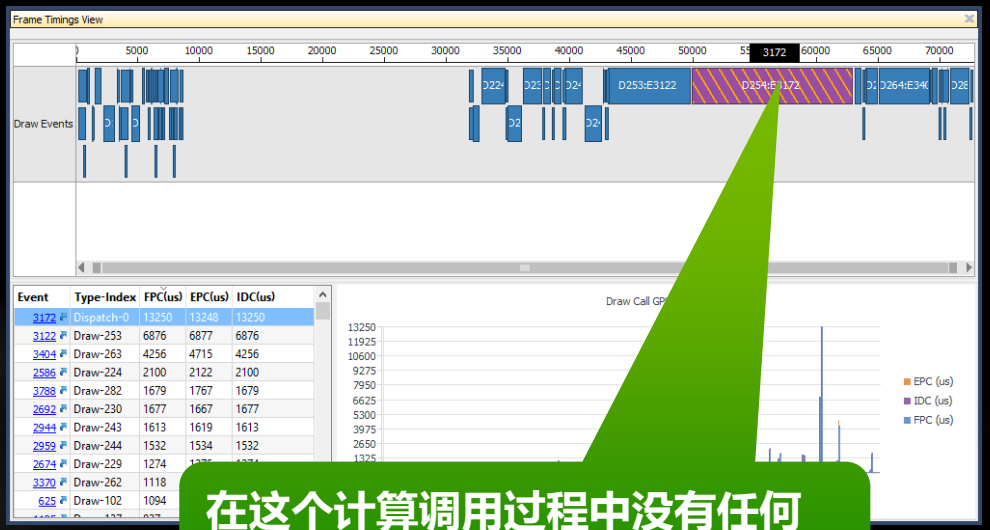
意外?
GPU负载依然很高?
Shader单元负载下降?
原因: Compute Shader被使用了!!!

抓取一帧



观察GPU最耗时的调用

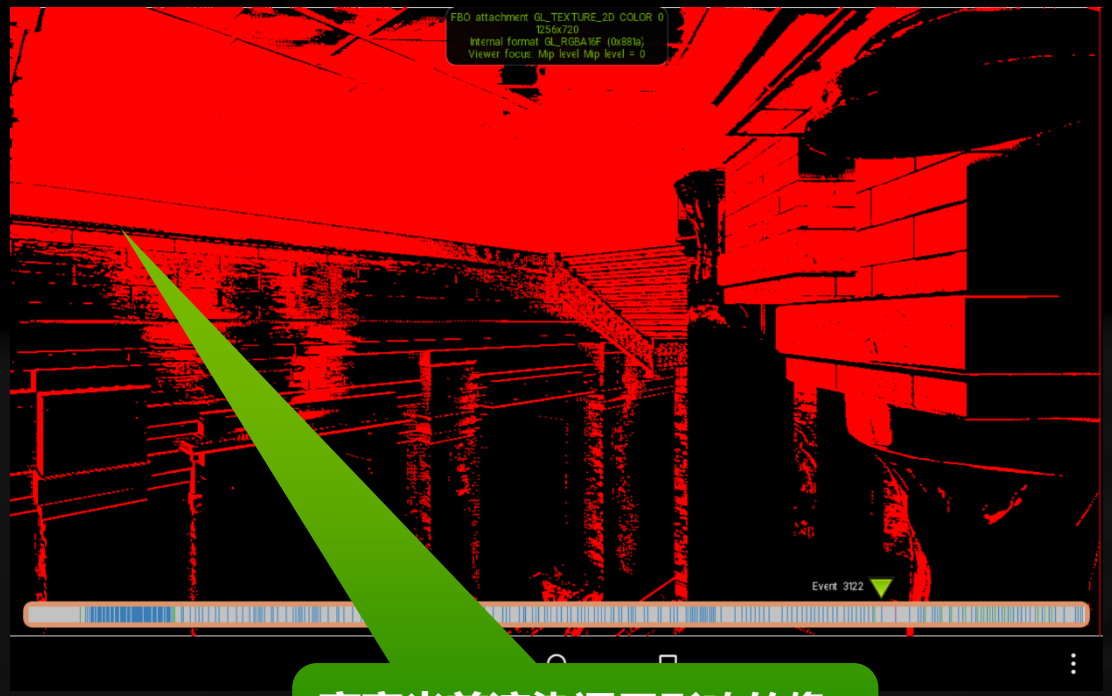




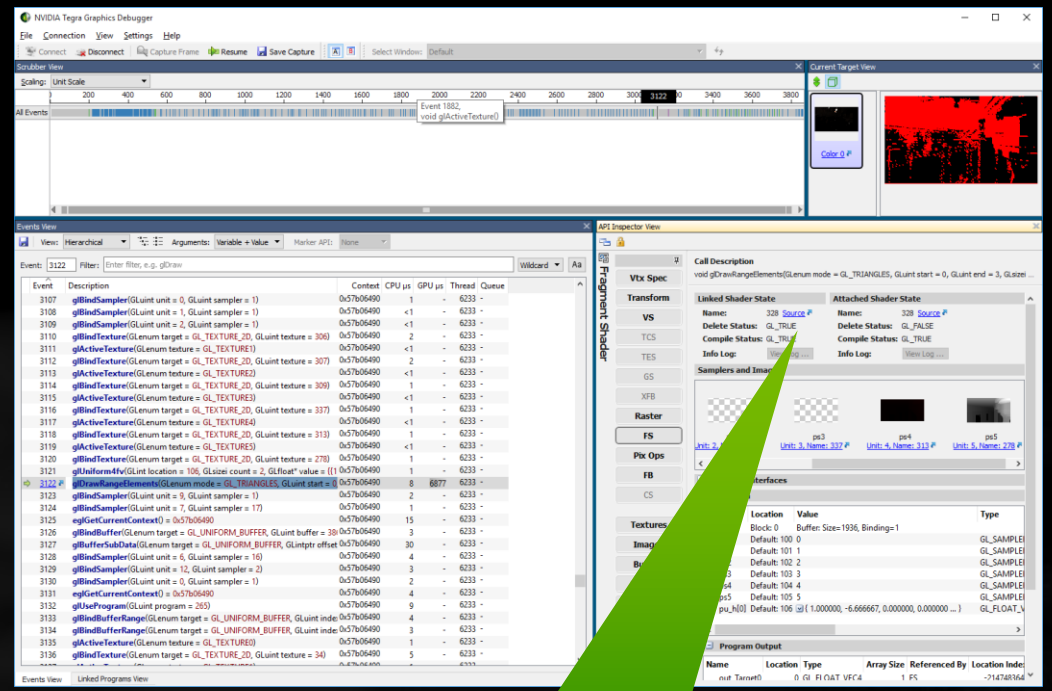
Compute shading在这一帧中最耗时!

在这个计算调用过程中没有任何别的GPU工作并行

观察GPU最耗时的调用

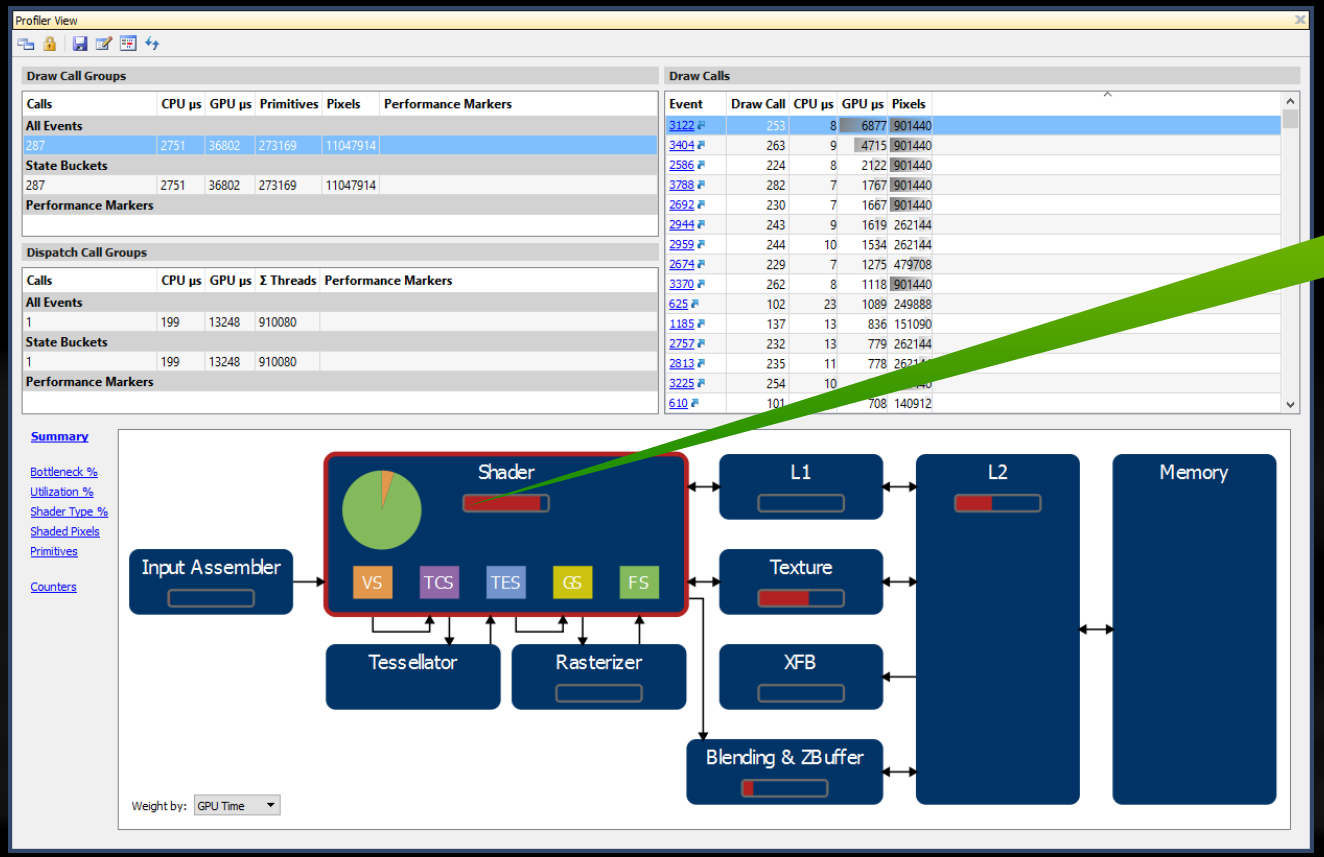


高亮当前渲染调用影响的像素



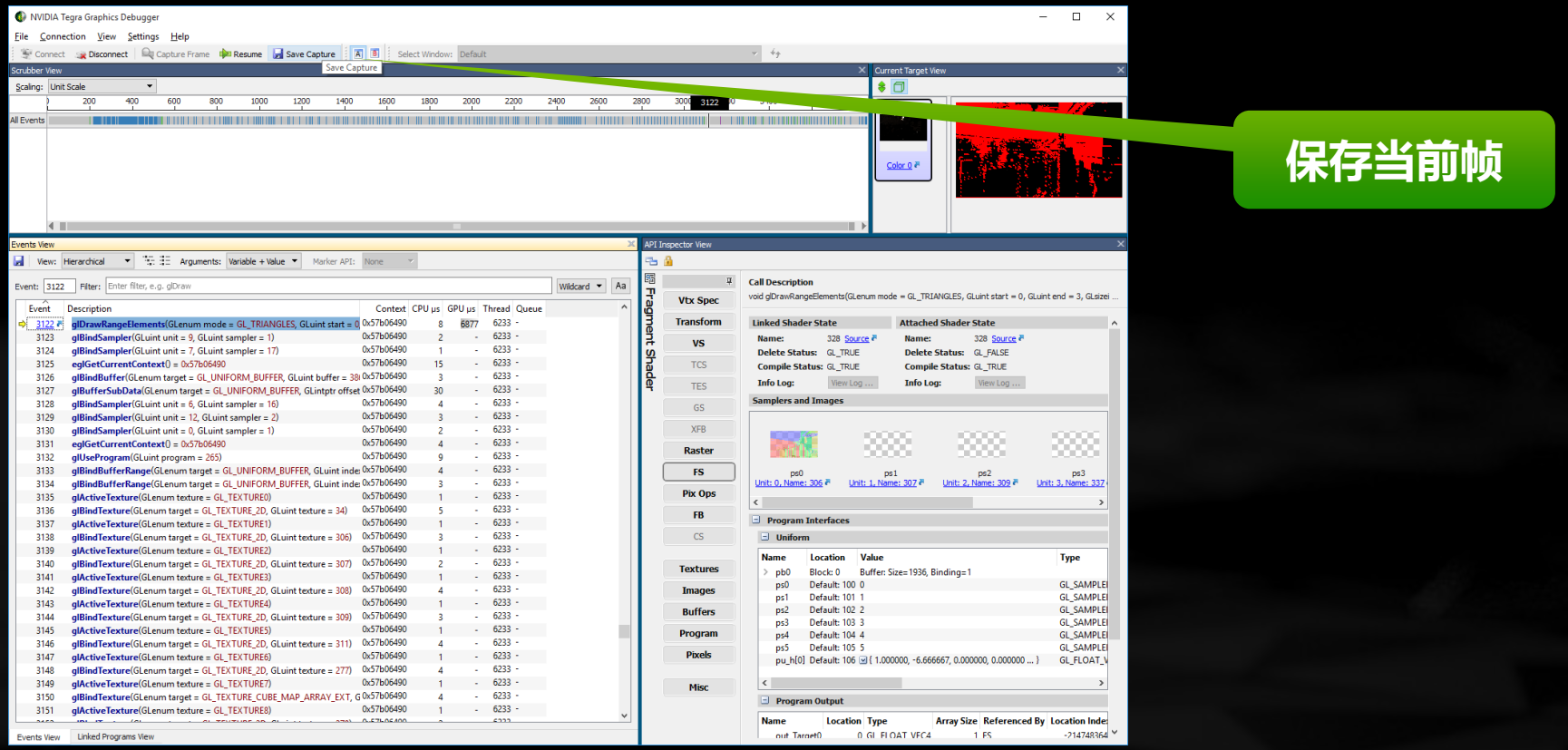
利用API视图查看Shader代码

运行性能测试器

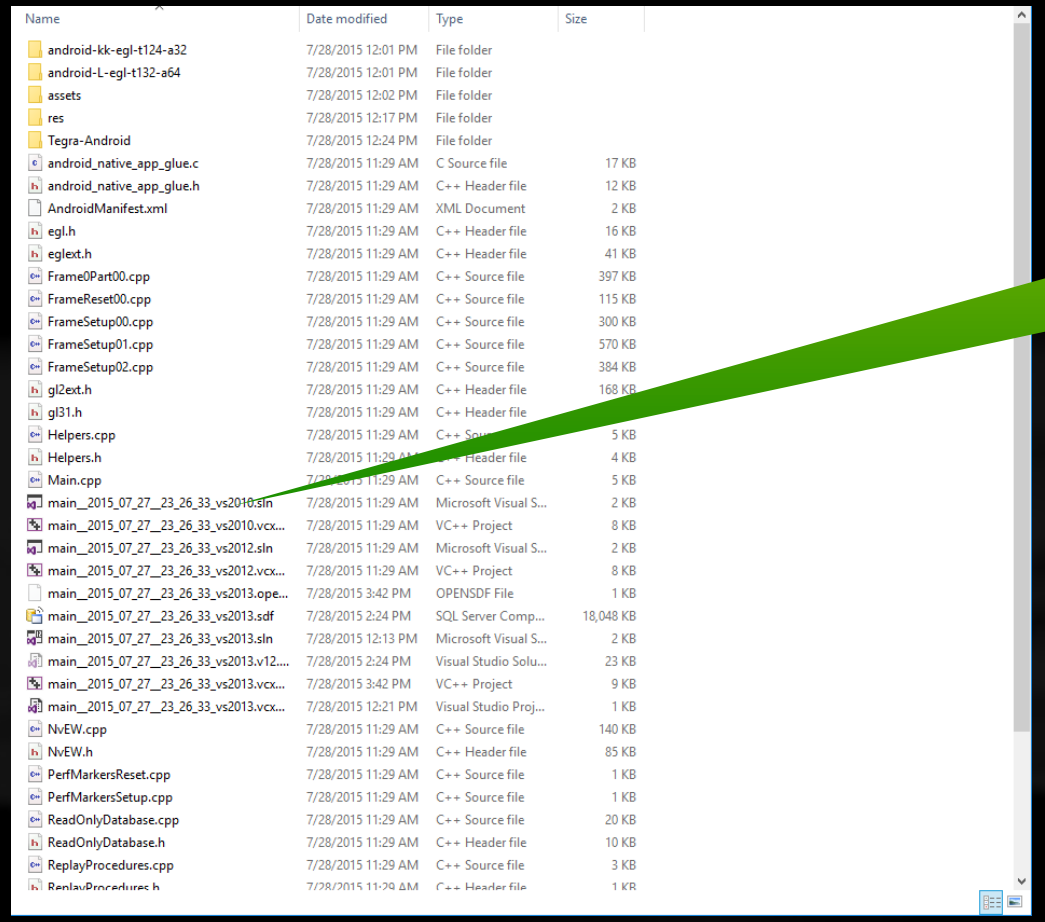


当前渲染GPU负载大部分集中在Shader单元

序列化抓取帧


NVIDIA Tegra Graphics Debugger
File Connection View Settings Help
Connect Disconnect Capture Frame Resume Save Capture
Save Capture
Scrubber View
Current Target View
Events View
API Inspector View
Fragment Shader
Vtx Spec
Transform
VS
TCS
TES
GS
XFB
Raster
FS
Pix Ops
FB
CS
Textures
Images
Buffers
Program
Pixels
Misc
Call Description
Linked Shader State
Attached Shader State
Samplers and Images
Program Interfaces
Uniform
Program Output
保存当前帧

查看保存的文件



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android-L-egl-t132-a64	7/28/2015 12:01 PM	File folder	
assets	7/28/2015 12:02 PM	File folder	
res	7/28/2015 12:17 PM	File folder	
Tegra-Android	7/28/2015 12:24 PM	File folder	
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android_native_app_glue.h	7/28/2015 11:29 AM	C++ Header file	12 KB
AndroidManifest.xml	7/28/2015 11:29 AM	XML Document	2 KB
egl.h	7/28/2015 11:29 AM	C++ Header file	16 KB
eglext.h	7/28/2015 11:29 AM	C++ Header file	41 KB
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FrameSetup00.cpp	7/28/2015 11:29 AM	C++ Source file	300 KB
FrameSetup01.cpp	7/28/2015 11:29 AM	C++ Source file	570 KB
FrameSetup02.cpp	7/28/2015 11:29 AM	C++ Source file	384 KB
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gl31.h	7/28/2015 11:29 AM	C++ Header file	
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main__2015_07_27__23_26_33_vs2013.ope...	7/28/2015 3:42 PM	OPENSDF File	1 KB
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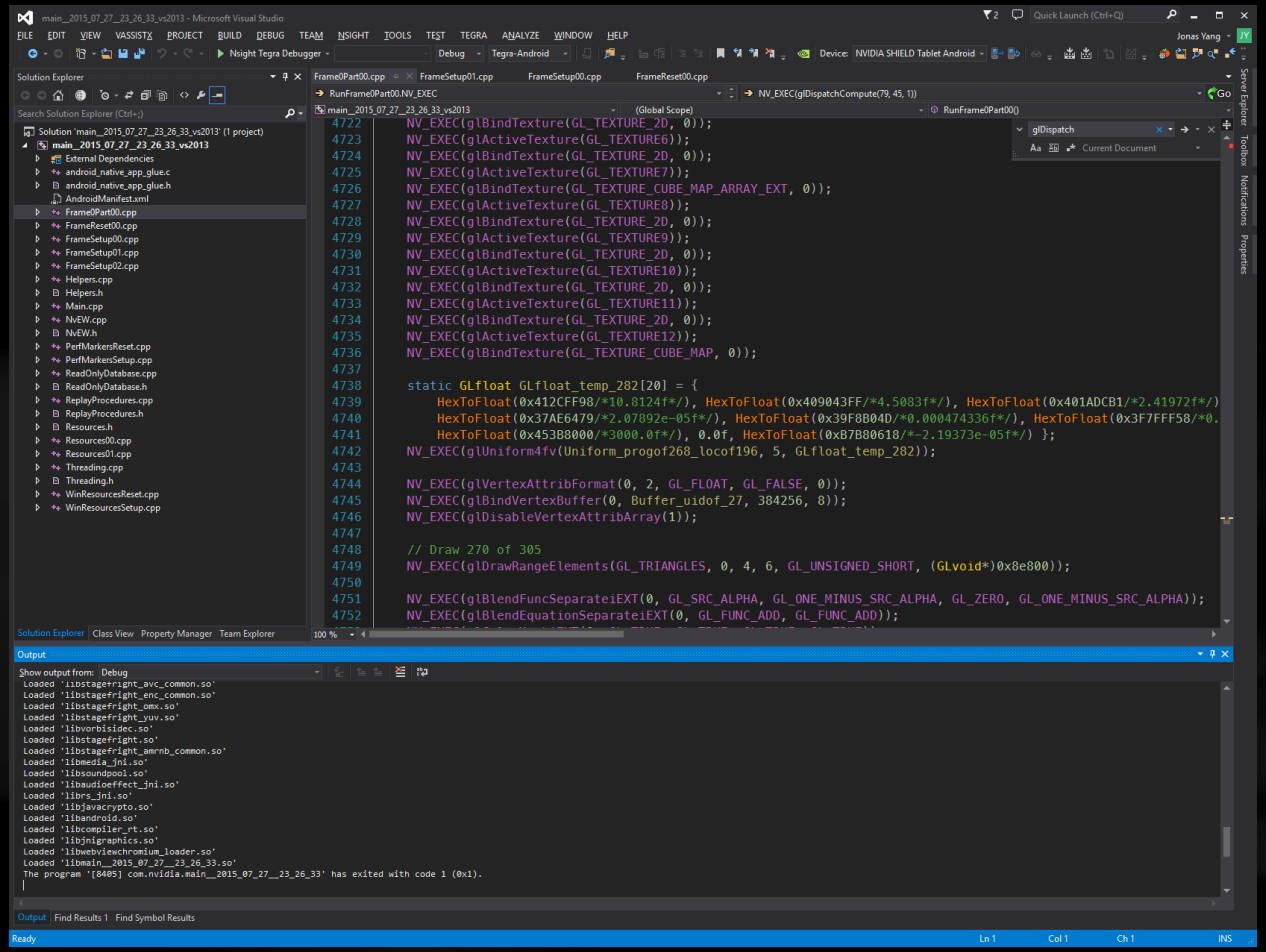
main__2015_07_27__23_26_33_vs2013.vcx...	7/28/2015 12:21 PM	Visual Studio Proj...	1 KB
NvEW.cpp	7/28/2015 11:29 AM	C++ Source file	140 KB
NvEW.h	7/28/2015 11:29 AM	C++ Header file	85 KB
PerfMarkersReset.cpp	7/28/2015 11:29 AM	C++ Source file	1 KB
PerfMarkersSetup.cpp	7/28/2015 11:29 AM	C++ Source file	1 KB
ReadOnlyDatabase.cpp	7/28/2015 11:29 AM	C++ Source file	20 KB
ReadOnlyDatabase.h	7/28/2015 11:29 AM	C++ Header file	10 KB
ReplayProcedures.cpp	7/28/2015 11:29 AM	C++ Source file	3 KB
ReplayProcedures.h	7/28/2015 11:29 AM	C++ Header file	1 KB

VS2010
VS2012
VS2013
请务必确认已经安装
Nsight Tegra!

编译并运行


main__2015_07_27__23_26_33_vs2013 - Microsoft Visual Studio
Solution Explorer
Frame0Part00.cpp
FrameSetup01.cpp
FrameSetup00.cpp
FrameReset00.cpp
RunFrame0Part00.NV_EXEC
NV_EXEC(glDispatchCompute(79, 45, 1))
(Global Scope)
RunFrame0Part00()
4722 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4723 NV_EXEC(glActiveTexture(GL_TEXTURE6));
4724 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4725 NV_EXEC(glActiveTexture(GL_TEXTURE7));
4726 NV_EXEC(glBindTexture(GL_TEXTURE_CUBE_MAP_ARRAY_EXT, 0));
4727 NV_EXEC(glActiveTexture(GL_TEXTURE8));
4728 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4729 NV_EXEC(glActiveTexture(GL_TEXTURE9));
4730 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4731 NV_EXEC(glActiveTexture(GL_TEXTURE10));
4732 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4733 NV_EXEC(glActiveTexture(GL_TEXTURE11));
4734 NV_EXEC(glBindTexture(GL_TEXTURE_2D, 0));
4735 NV_EXEC(glActiveTexture(GL_TEXTURE12));
4736 NV_EXEC(glBindTexture(GL_TEXTURE_CUBE_MAP, 0));
4737
4738 static GLfloat GLfloat_temp_282[20] = {
4739 HexToFloat(0x412CFF98/*10.8124f*/), HexToFloat(0x409043FF/*4.5083f*/), HexToFloat(0x401ADCB1/*2.41972f*/)
4740 HexToFloat(0x37AE6479/*2.07892e-05f*/), HexToFloat(0x39F8B04D/*0.000474336f*/), HexToFloat(0x3F7FFF58/*0.
4741 HexToFloat(0x453B8000/*3000.0f*/), 0.0f, HexToFloat(0xB7B80618/*-2.19373e-05f*/) };
4742 NV_EXEC(glUniform4fv(Uniform_progof268_locof196, 5, GLfloat_temp_282));
4743
4744 NV_EXEC(glVertexAttribFormat(0, 2, GL_FLOAT, GL_FALSE, 0));
4745 NV_EXEC(glBindVertexBuffer(0, Buffer_uidof_27, 384256, 8));
4746 NV_EXEC(glDisableVertexAttribArray(1));
4747
4748 // Draw 270 of 305
4749 NV_EXEC(glDrawRangeElements(GL_TRIANGLES, 0, 4, 6, GL_UNSIGNED_SHORT, (GLvoid*)0x8e800));
4750
4751 NV_EXEC(glBlendFuncSeparateiEXT(0, GL_SRC_ALPHA, GL_ONE_MINUS_SRC_ALPHA, GL_ZERO, GL_ONE_MINUS_SRC_ALPHA));
4752 NV_EXEC(glBlendEquationSeparateiEXT(0, GL_FUNC_ADD, GL_FUNC_ADD));
Output
Loaded 'libstagefright_avc_common.so'
Loaded 'libstagefright_enc_common.so'
Loaded 'libstagefright_omx.so'
Loaded 'libstagefright_yuv.so'
Loaded 'libvorbisidec.so'
Loaded 'libstagefright.so'
Loaded 'libstagefright_amrnb_common.so'
Loaded 'libmedia_jni.so'
Loaded 'libsoundpool.so'
Loaded 'libaudioeffect_jni.so'
Loaded 'librs_jni.so'
Loaded 'libjavacrypto.so'
Loaded 'libandroid.so'
Loaded 'libcompiler_rt.so'
Loaded 'libjnigraphics.so'
Loaded 'libwebviewchromium_loader.so'
Loaded 'libmain__2015_07_27__23_26_33.so'
The program '[8405] com.nvidia.main__2015_07_27__23_26_33' has exited with code 1 (0x1).
Ready

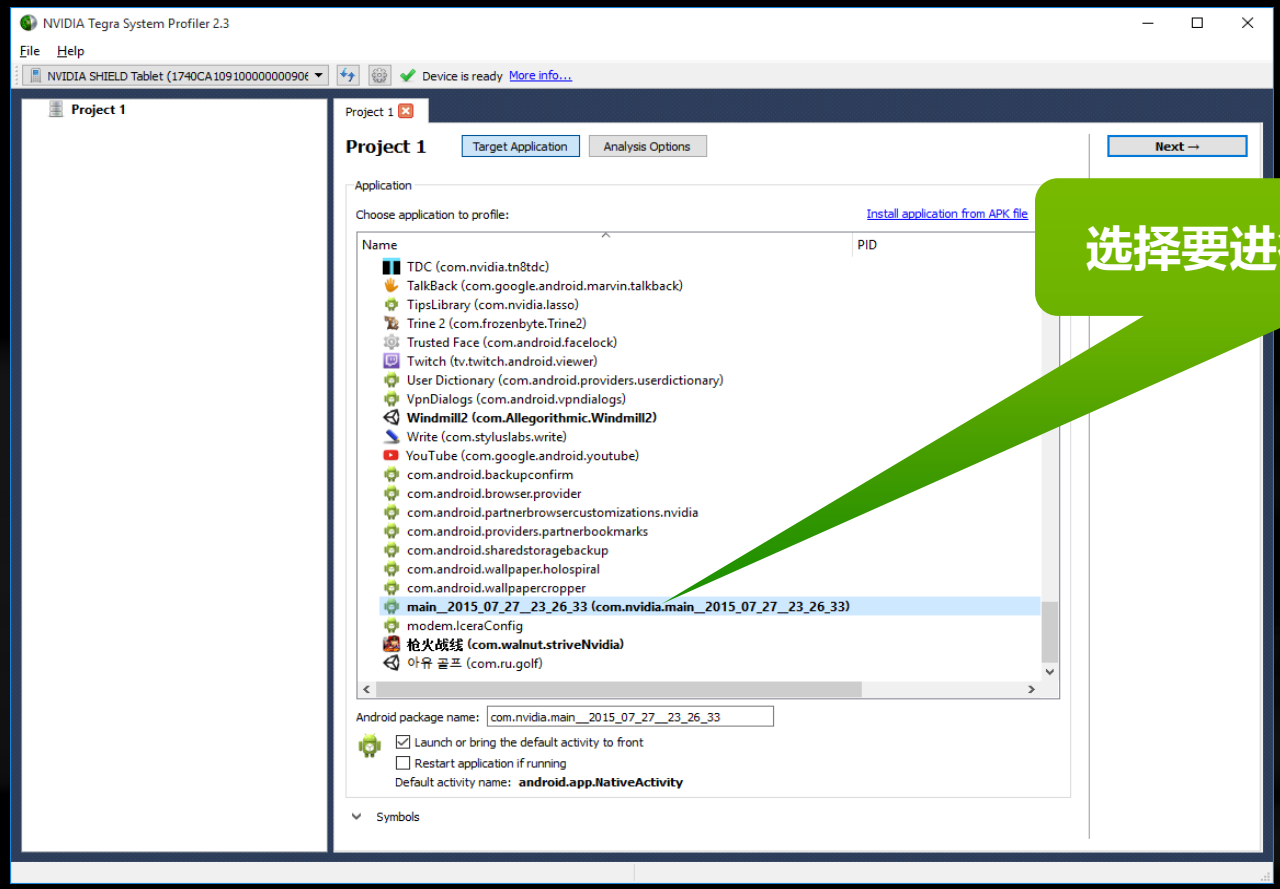
生成代码的优点

- 你可以控制一切！
  - 修改重新编译代码
  - 所有CPU负载都被移除了
  - 修改，增加，删除渲染调用
  - 更改渲染状态

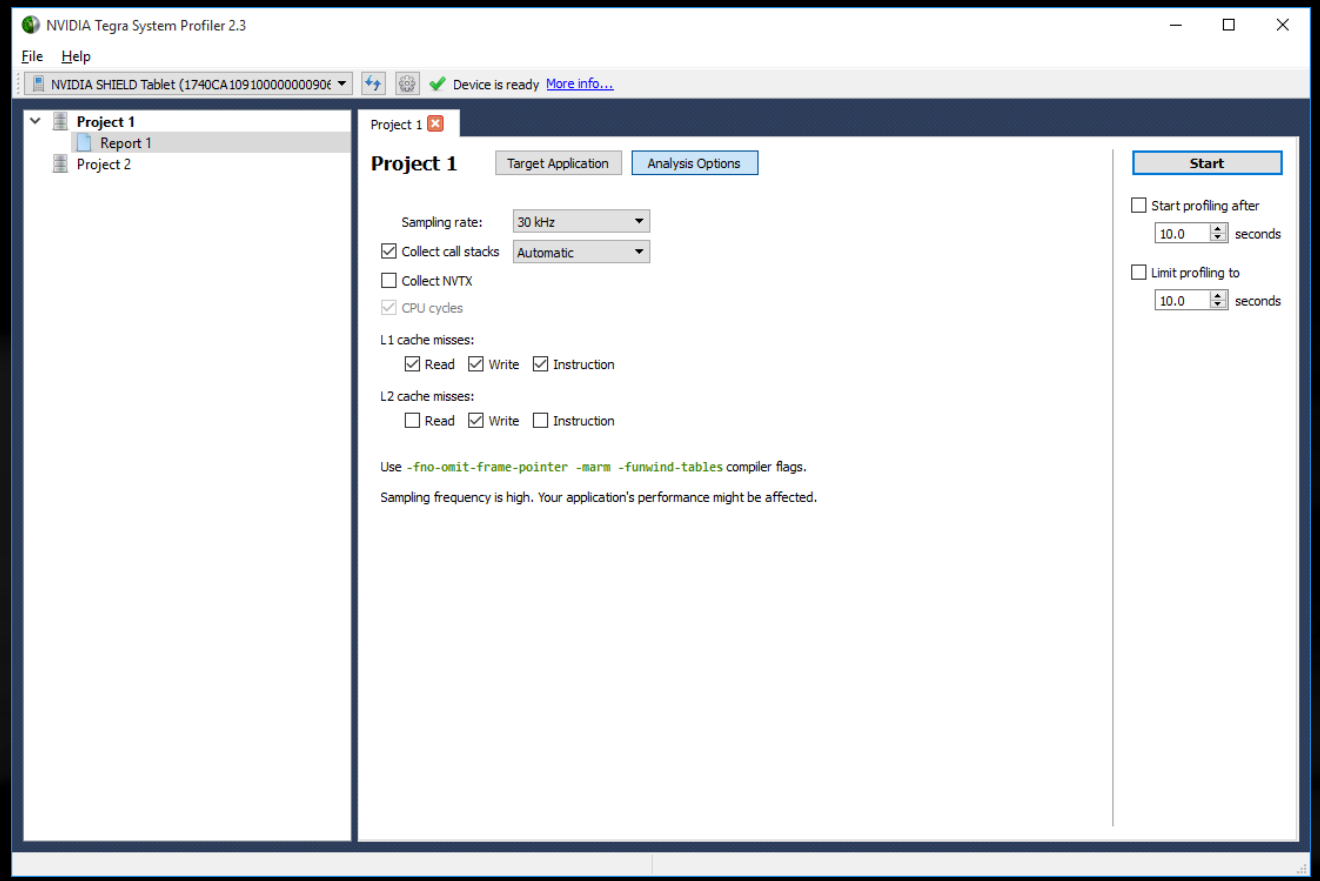
TEGRA SYSTEM PROFILER

- 基于采样分析最耗时代码
- 调用堆栈分析
- 独立跨平台工具
- 支持基于arm 32位以及64位的Android

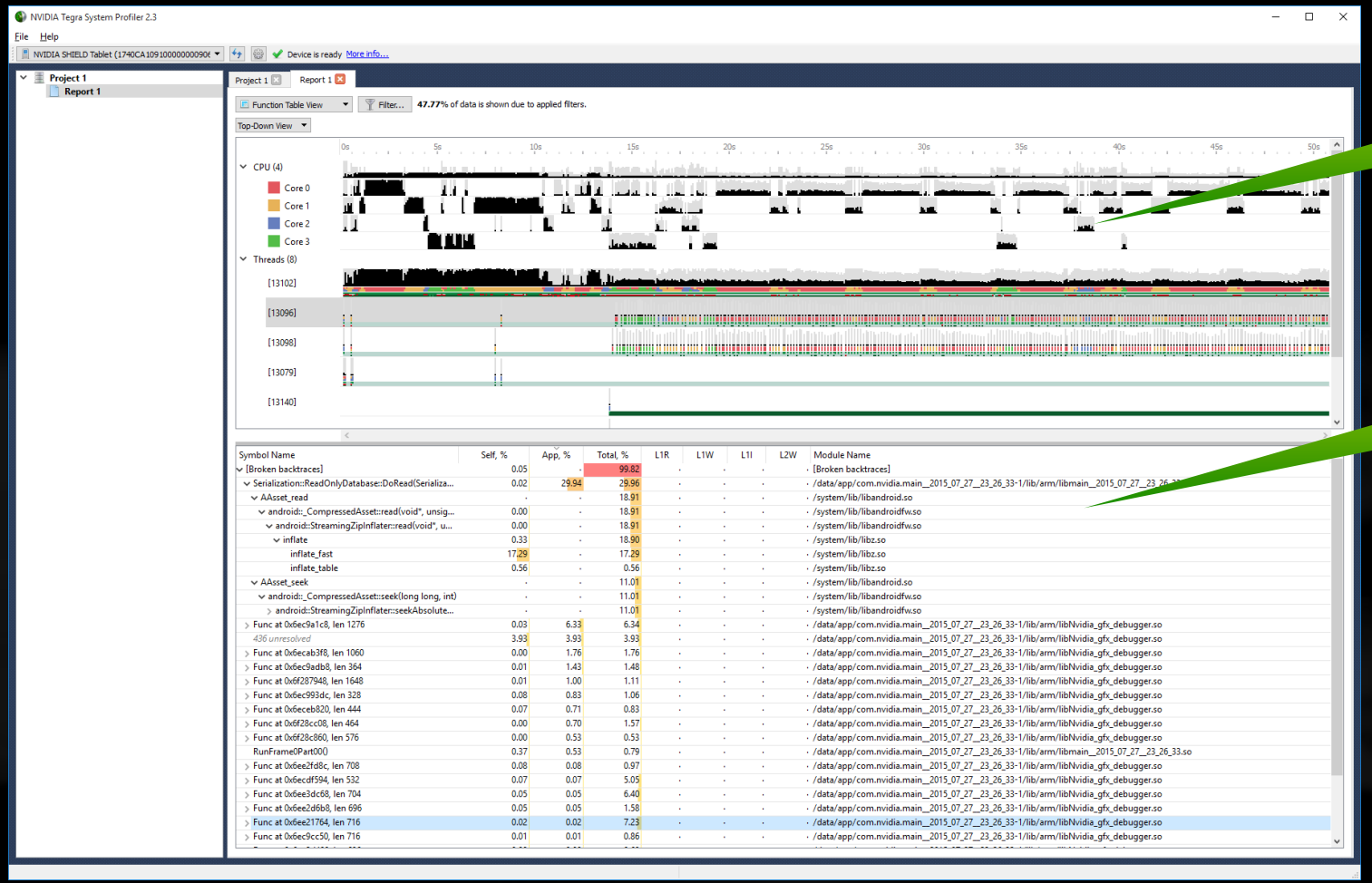
TEGRA SYSTEM PROFILER



TEGRA SYSTEM PROFILER



TEGRA SYSTEM PROFILER



CPU/Threads 活动视图

函数性能视图

NVIDIA GAMEWORKS™

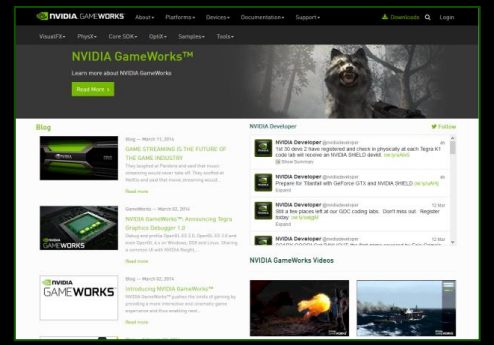
Links…

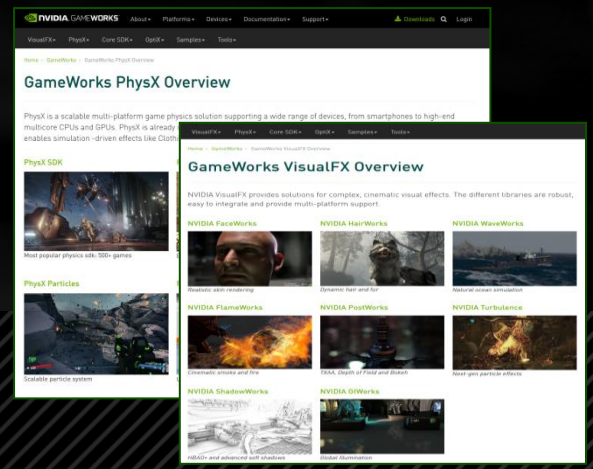
Web: http://gameworks.nvidia.com
Latest info and download options

YouTube: https://www.youtube.com/user/nvidiaGameWorks
Tools, effects, and game integration videos

Twitter: https://twitter.com/nvidiadeveloper
Catch up on up to the minute happenings

Survey: https://developer.nvidia.com/developer-tools-survey-201503





THANK YOU