

Graphics Feature Status

- Canvas: **Hardware accelerated**
- Flash: **Hardware accelerated**
- Flash Stage3D: **Hardware accelerated**
- Flash Stage3D Baseline profile: **Hardware accelerated**
- Compositing: **Hardware accelerated**
- Multiple Raster Threads: **Enabled**
- Native GpuMemoryBuffers: **Software only. Hardware acceleration disabled**
- Out-of-process Rasterization: **Disabled**
- Hardware Protected Video Decode: **Unavailable**
- Rasterization: **Hardware accelerated**
- Skia Deferred Display List: **Disabled**
- Skia Renderer: **Disabled**
- Surface Control: **Disabled**
- Surface Synchronization: **Enabled**
- Video Decode: **Hardware accelerated**
- Viz Service Display Compositor: **Enabled**
- WebGL: **Hardware accelerated**
- WebGL2: **Hardware accelerated**

Driver Bug Workarounds

- clear_uniforms_before_first_program_use
- decode_encode_srgb_for_generatemipmap
- disable_accelerated_vpx_decode
- disable_discard_framebuffer
- disable_framebuffer_cmaa
- exit_on_context_lost
- force_cube_complete
- msaa_is_slow
- scalarize_vec_and_mat_constructor_args
- disabled_extension_GL_KHR_blend_equation_advanced
- disabled_extension_GL_KHR_blend_equation_advanced_coherent

Problems Detected

- Older Intel GPUs cannot support protected video decoding in swap chains
*Disabled Features: **protected_video_decode***
- Some drivers are unable to reset the D3D device in the GPU process sandbox
*Applied Workarounds: **exit_on_context_lost***
- Clear uniforms before first program use on all platforms: [124764](#), [349137](#)
*Applied Workarounds: **clear_uniforms_before_first_program_use***
- Always rewrite vec/mat constructors to be consistent: [398694](#)
*Applied Workarounds: **scalarize_vec_and_mat_constructor_args***
- ANGLE crash on glReadPixels from incomplete cube map texture: [518889](#)
*Applied Workarounds: **force_cube_complete***
- On Intel GPUs MSAA performance is not acceptable for GPU rasterization: [527565](#)
*Applied Workarounds: **msaa_is_slow***
- Framebuffer discarding can hurt performance on non-tilers: [570897](#)
*Applied Workarounds: **disable_discard_framebuffer***
- Use GL_INTEL_framebuffer_CMAA on ChromeOS: [535198](#)
*Applied Workarounds: **disable_framebuffer_cmaa***
- Disable KHR_blend_equation_advanced until cc shaders are updated: [661715](#)
*Applied Workarounds: **disable(GL_KHR_blend_equation_advanced)**, **disable(GL_KHR_blend_equation_advanced_coherent)***
- Decode and Encode before generateMipmap for srgb format textures on Windows: [634519](#)
*Applied Workarounds: **decode_encode_srgb_for_generatemipmap***
- VPx decoding is too slow on Intel Broadwell, Skylake, and CherryView: [616318](#)
*Applied Workarounds: **disable_accelerated_vpx_decode***
- Native GpuMemoryBuffers have been disabled, either via about:flags or command line.
*Disabled Features: **native_gpu_memory_buffers***
- Skia renderer is not used by default.
*Disabled Features: **skia_renderer***
- Skia deferred display list is not used by default.
*Disabled Features: **skia_deferred_display_list***

Version Information

Data exported	2019-02-18T16:04:02.772Z
Chrome version	Chrome/72.0.3626.96
Operating system	Windows NT 10.0.15063
Software rendering list URL	https://chromium.googlesource.com/chromium/src/+84098ee7ef8622a9defc2ef043cd8930b617b10e/gpu/config/software_rendering
Driver bug list URL	https://chromium.googlesource.com/chromium/src/+84098ee7ef8622a9defc2ef043cd8930b617b10e/gpu/config/gpu_driver_bug_li
ANGLE commit id	a6992f2f25d7
2D graphics backend	Skia/72 d7ae3da7f2879de968a56570a1585b78d643cc6f-
Command Line	"C:\Program Files (x86)\Google\Chrome\Application\chrome.exe" --flag-switches-begin --flag-switches-end --site-per-process https://outlook.office.com/mail/inbox/id/AAMkAGMyYmU0NGI0LTUyNTQ0tNDQ0Ys1hZTU4LWY0MzM5MWMYzJliNgBGAAAAAABE2K...

Driver Information

Initialization time	621
In-process GPU	false

Passthrough Command Decoder	false
Sandboxed	true
GPU0	VENDOR = 0x8086 [Google Inc.], DEVICE= 0x1916 [ANGLE (Intel(R) HD Graphics 520 Direct3D11 vs_5_0 ps_5_0)] *ACTI
Optimus	false
AMD switchable	false
Desktop compositing	Aero Glass
Direct composition	true
Supports overlays	false
Overlay capabilities	
Diagonal Monitor Size of [file:///./DISPLAY2]\\.\\DISPLAY2	24.0"
Diagonal Monitor Size of [file:///./DISPLAY1]\\.\\DISPLAY1	24.0"
Driver D3D12 feature level	D3D 12.1
Driver Vulkan API version	Vulkan API 1.0.0
Driver vendor	Intel Corporation
Driver version	22.20.16.4771
Driver date	8-13-2017
GPU CUDA compute capability major version	0
Pixel shader version	5.0
Vertex shader version	5.0
Max. MSAA samples	16
Machine model name	
Machine model version	
GL_VENDOR	Google Inc.
GL_RENDERER	ANGLE (Intel(R) HD Graphics 520 Direct3D11 vs_5_0 ps_5_0)
GL_VERSION	OpenGL ES 2.0 (ANGLE 2.1.0.a6992f2f25d7)
GL_EXTENSIONS	GL_ANGLE_client_arrays GL_ANGLE_depth_texture GL_ANGLE_explicit_context GL_ANGLE_explicit_context_gles1 GL_ANGLE_framebuffer_multisample GL_ANGLE_instanced_arrays GL_ANGLE_lossy_etc_decode GL_ANGLE_memory_s GL_ANGLE_multiview_multisample GL_ANGLE_pack_reverse_row_order GL_ANGLE_program_cache_control GL_ANGLE_robust_client_memory GL_ANGLE_texture_compression_dxt3 GL_ANGLE_texture_compression_dxt5 GL_ANGLE_translated_shader_source GL_CHROMIUM_bind_generates_resource GL_CHROMIUM_bind_uniform_location GL_CHROMIUM_color_buffer_float_rgb GL_CHROMIUM_color_buffer_float_rgba GL_CHROMIUM_copy_compressed_text GL_CHROMIUM_sync_query GL_EXT_blend_minmax GL_EXT_color_buffer_half_float GL_EXT_debug_marker GL_EXT_disjoint_timer_query GL_EXT_draw_buffers GL_EXT_frag_depth GL_EXT_map_buffer_range GL_EXT_occlusion_query_boolean GL_EXT_read_format_bgra GL_EXT_robustness GL_EXT_sRGB GL_EXT_shader_texture_lod GL_EXT_texture_compression_dxt1 GL_EXT_texture_compression_s3tc_srgb GL_EXT_texture_filter_anisotropic GL_EXT_texture_float GL_EXT_texture_float_linear GL_EXT_texture_half_float GL_EXT_texture_half_float_linear GL_EXT_texture_rg GL_EXT_texture_storage GL_EXT_unpack_subimage GL_KHR_debug GL_KHR_parallel_shader_compile GL_NV_EGL_stream_consumer_external GL_NV_fence GL_NV_pack_subimage GL_NV_pixel_buffer_object GL_OES_EGL_image GL_OES_compressed_ETC1_RGB8_texture GL_OES_depth32 GL_OES_element_index_uint GL_OES_get_program_binary GL_OES_packed_depth_stencil GL_OES_rgb8_rgba8 GL_OES_standard_derivatives GL_OES_surfaceless_context GL_OES_texture_float GL_OES_texture_float_linear GL_OES_texture_half_float GL_OES_texture_half_float_linear GL_OES_vertex_array_object OES_compressed_EAC_R11_signed_texture OES_compressed_EAC_R11_unsigned_texture OES_compressed_EAC_RG11_signed_texture OES_compressed_EAC_RG11_unsigned_texture OES_compressed_ETC2_RGBA8_texture OES_compressed_ETC2_punchthroughA_RGBA8_texture OES_compressed_ETC2_RGBA8_texture OES_compressed_ETC2_sRGB8_alpha8_texture OES_compressed_ETC2_sRGB8_texture
Disabled Extensions	GL_KHR_blend_equation_advanced GL_KHR_blend_equation_advanced_coherent
Disabled WebGL Extensions	
Window system binding vendor	Google Inc. (adapter LUID: 000000000001268f)
Window system binding version	1.4 (ANGLE 2.1.0.a6992f2f25d7)
Window system binding extensions	EGL_EXT_create_context_robustness EGL_ANGLE_d3d_share_handle_client_buffer EGL_ANGLE_d3d_texture_client_buffer EGL_ANGLE_surface_d3d_texture_2d_share_handle EGL_ANGLE_query_surface_pointer EGL_ANGLE_window_fixed_size EGL_ANGLE_surface_orientation EGL_ANGLE_direct_composition EGL_NV_post_sub_buffer EGL_KHR_create_context EGL_KHR_image EGL_KHR_image_base EGL_KHR_gl_texture_2D_image EGL_KHR_gl_texture_cubemap_image EGL_KHR_get_all_proc_addresses EGL_KHR_stream EGL_KHR_stream_consumer_gltexture EGL_NV_stream_consumer EGL_ANGLE_flexible_surface_compatibility EGL_ANGLE_stream_producer_d3d_texture EGL_ANGLE_create_context_web EGL_CHROMIUM_create_context_bind_generates_resource EGL_CHROMIUM_sync_control EGL_EXT_pixel_format_float EGL_ANGLE_display_texture_share_group EGL_ANGLE_create_context_client_arrays EGL_ANGLE_program_cache_control EGL_ANGLE_robust_resource_initialization EGL_ANGLE_create_context_extensions_enabled EGL_ANDROID_blob_cache
Direct rendering	Yes
Reset notification strategy	0x8252
GPU process crash count	0

Compositor Information

Tile Update Mode	One-copy
Partial Raster	Enabled

GpuMemoryBuffers Status

R_8	Software only
R_16	Software only
RG_88	Software only
BGR_565	Software only
RGBA_4444	Software only
RGBX_8888	GPU_READ, SCANOUT
RGBA_8888	GPU_READ, SCANOUT
BGRX_8888	Software only
BGRX_1010102	Software only
RGBX_1010102	Software only
BGRA_8888	Software only

RGBA_F16	Software only
YVU_420	Software only
YUV_420_BIPLANAR	Software only
UYVY_422	Software only

Display(s) Information

Info	Display[2528732444] bounds=[0,0 1920x1200], workarea=[0,0 1920x1160], scale=1, external.
Color space information	{primaries_d50_referred: [[0.6400, 0.3300], [0.3000, 0.6000], [0.1500, 0.0600]], transfer:0.0777*x + 0.0000 if x < 0.0450 else (0.9478*x + matrix:RGB, range:FULL)}
Bits per color component	8
Bits per pixel	24
Info	Display[2779098405] bounds=[1920,0 1920x1200], workarea=[1920,0 1920x1200], scale=1, external.
Color space information	{primaries_d50_referred: [[0.6400, 0.3300], [0.3000, 0.6000], [0.1500, 0.0600]], transfer:0.0777*x + 0.0000 if x < 0.0450 else (0.9478*x + matrix:RGB, range:FULL)}
Bits per color component	8
Bits per pixel	24

Video Acceleration Information

Decode h264 baseline	up to 4096x2304 pixels
Decode h264 baseline	up to 2304x4096 pixels
Decode h264 main	up to 4096x2304 pixels
Decode h264 main	up to 2304x4096 pixels
Decode h264 high	up to 4096x2304 pixels
Decode h264 high	up to 2304x4096 pixels
Encode h264 baseline	up to 3840x2176 pixels and/or 30.000 fps
Encode h264 main	up to 3840x2176 pixels and/or 30.000 fps
Encode h264 high	up to 3840x2176 pixels and/or 30.000 fps

Diagnostics

0	
b3DAccelerationEnabled	true
b3DAccelerationExists	true
bAGPEnabled	true
bAGPExistenceValid	true
bAGPExists	true
bCanRenderWindow	true
bDDAccelerationEnabled	true
bDriverBeta	false
bDriverDebug	false
bDriverSigned	false
bDriverSignedValid	false
bNoHardware	false
dwBpp	32
dwDDIVersion	12
dwHeight	1200
dwRefreshRate	59
dwWHQLLevel	0
dwWidth	1920
iAdapter	0
lDriverSize	60397088
lMiniVddSize	0
szAGPStatusEnglish	Enabled
szAGPStatusLocalized	Enabled
szChipType	Intel(R) HD Graphics Family
szD3DStatusEnglish	Enabled
szD3DStatusLocalized	Enabled
szDACType	Internal
szDDIVersionEnglish	12
szDDIVersionLocalized	12
szDDSStatusEnglish	Enabled
szDDSStatusLocalized	Enabled
szDXVAHDEngish	Supported
szDXVAModes	ModeMPEG2_A ModeMPEG2_C ModeWMV9_C ModeVC1_C
szDescription	Intel(R) HD Graphics 520
szDeviceId	0x1916
szDeviceIdentifier	{D7B78E66-5A56-11CF-B966-2102BCC2DB35}
szDeviceName	[file:///DISPLAY1]\\.\\DISPLAY1
szDisplayMemoryEnglish	4151 MB
szDisplayMemoryLocalized	4151 MB
szDisplayModeEnglish	1920 x 1200 (32 bit) (59Hz)
szDisplayModeLocalized	1920 x 1200 (32 bit) (59Hz)
szDriverAssemblyVersion	22.20.16.4771
szDriverAttributes	Final Retail
szDriverDateEnglish	08/12/2017 6:00:00 PM
szDriverDateLocalized	8/12/2017 18:00:00
szDriverLanguageEnglish	English

szDriverLanguageLocalized	English
szDriverModelEnglish	WDDM 2.1
szDriverModelLocalized	WDDM 2.1
szDriverName	C:\WINDOWS\System32\DriverStore\FileRepository\ki124058.inf_amd64_0e932b587b2f1d15\igdumdim64.dll,C:\WINDOWS\Syst
szDriverNodeStrongName	oem61.inf:5f63e534f36b7c6d:iSKLD_w10_DS:22.20.16.4771:pci\ven_8086&dev_1916&subsys_223117aa
szDriverSignDate	Unknown
szDriverVersion	22.20.0016.4771
szKeyDeviceID	Enum\PCI\VEN_8086&DEV_1916&SUBSYS_223117AA&REV_07
szKeyDeviceKey	\Registry\Machine\System\CurrentControlSet\Control\Video\{3A801B1B-A751-419A-8BCF-B88758720BD7}\0000
szManufacturer	Intel Corporation
szMiniVdd	unknown
szMiniVddDateEnglish	Unknown
szMiniVddDateLocalized	unknown
szMonitorMaxRes	Unknown
szMonitorName	Dell U2412M(DisplayPort)
szNotesEnglish	No problems found.
szNotesLocalized	No problems found.
szOverlayEnglish	Supported
szRankOfInstalledDriver	00D10001
szRegHelpText	Unknown
szRevision	Unknown
szRevisionId	0x0007
szSubSysId	0x223117AA
szTestResultD3D7English	Not run
szTestResultD3D7Localized	Not run
szTestResultD3D8English	Not run
szTestResultD3D8Localized	Not run
szTestResultD3D9English	Not run
szTestResultD3D9Localized	Not run
szTestResultDDEngish	Not run
szTestResultDDLLocalized	Not run
szVdd	unknown
szVendorId	0x8086
1	
b3DAccelerationEnabled	true
b3DAccelerationExists	true
bAGPEEnabled	true
bAGPEistenceValid	true
bAGPEexists	true
bCanRenderWindow	true
bDDAccelerationEnabled	true
bDriverBeta	false
bDriverDebug	false
bDriverSigned	false
bDriverSignedValid	false
bNoHardware	false
dwBpp	32
dwDDIVersion	12
dwHeight	1200
dwRefreshRate	59
dwWHQLLevel	0
dwWidth	1920
iAdapter	1
lDriverSize	60397088
lMiniVddSize	0
szAGPStatusEnglish	Enabled
szAGPStatusLocalized	Enabled
szChipType	Intel(R) HD Graphics Family
szD3DStatusEnglish	Enabled
szD3DStatusLocalized	Enabled
szDACType	Internal
szDDIVersionEnglish	12
szDDIVersionLocalized	12
szDDStatusEnglish	Enabled
szDDStatusLocalized	Enabled
szDXVAHDEngish	Supported
szDXVAModes	ModeMPEG2_A ModeMPEG2_C ModeWMV9_C ModeVC1_C
szDescription	Intel(R) HD Graphics 520
szDeviceId	0x1916
szDeviceIdentifier	{D7B78E66-5A56-11CF-B966-2102BCC2DB35}
szDeviceName	[file:///DISPLAY2]\\.\\DISPLAY2
szDisplayMemoryEnglish	4151 MB
szDisplayMemoryLocalized	4151 MB
szDisplayModeEnglish	1920 x 1200 (32 bit) (59Hz)

szDisplayModeLocalized	1920 x 1200 (32 bit) (59Hz)
szDriverAssemblyVersion	22.20.16.4771
szDriverAttributes	Final Retail
szDriverDateEnglish	08/12/2017 6:00:00 PM
szDriverDateLocalized	8/12/2017 18:00:00
szDriverLanguageEnglish	English
szDriverLanguageLocalized	English
szDriverModelEnglish	WDDM 2.1
szDriverModelLocalized	WDDM 2.1
szDriverName	C:\WINDOWS\System32\DriverStore\FileRepository\ki124058.inf_amd64_0e932b587b2f1d15\igdumdim64.dll,C:\WINDOWS\Syst
szDriverNodeStrongName	oem61.inf:5f63e534f36b7c6d:iSKLD_w10_DS:22.20.16.4771:pci\ven_8086&dev_1916&subsys_223117aa
szDriverSignDate	Unknown
szDriverVersion	22.20.0016.4771
szKeyDeviceID	Enum\PCI\VEN_8086&DEV_1916&SUBSYS_223117AA&REV_07
szKeyDeviceKey	\Registry\Machine\System\CurrentControlSet\Control\Video\{3A801B1B-A751-419A-8BCF-B88758720BD7}\0001
szManufacturer	Intel Corporation
szMiniVdd	unknown
szMiniVddDateEnglish	Unknown
szMiniVddDateLocalized	unknown
szMonitorMaxRes	Unknown
szMonitorName	Dell U2412M(Digital)
szNotesEnglish	No problems found.
szNotesLocalized	No problems found.
szOverlayEnglish	Supported
szRankOfInstalledDriver	00D10001
szRegHelpText	Unknown
szRevision	Unknown
szRevisionId	0x0007
szSubSysId	0x223117AA
szTestResultD3D7English	Not run
szTestResultD3D7Localized	Not run
szTestResultD3D8English	Not run
szTestResultD3D8Localized	Not run
szTestResultD3D9English	Not run
szTestResultD3D9Localized	Not run
szTestResultDDEngish	Not run
szTestResultDDLlocalized	Not run
szVdd	unknown
szVendorId	0x8086

Log Messages

- [10372:11316:0218/092326.980:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(60,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(68,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- [10372:11316:0218/092327.023:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(57,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(65,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- [10372:13924:0218/092327.064:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(38,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(46,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- GpuProcessHostUIShim:
- [10372:11316:0218/092351.249:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(47,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(55,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- [10372:12968:0218/100235.914:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(58,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(66,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- [10372:12968:0218/100331.576:WARNING:angle_platform_impl.cc(52)] : compileToBinary(230): C:\fakepath(58,8-58): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
C:\fakepath(66,9-43): warning X3571: pow(f, e) will not work for negative f, use abs(f) or conditionally handle negative values if you expect them
- GpuProcessHostUIShim: