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Graphics Feature Status

- Canvas: **Software only, hardware acceleration unavailable**
- Canvas out-of-process rasterization: **Disabled**
- Custo Wallpaper Animation: **Disabled**
- Direct Rendering Display Compositor: **Disabled**
- Compositing: **Software only. Hardware acceleration disabled**
- Multiple Raster Threads: **Enabled**
- OpenGL: **Disabled**
- Rasterization: **Software only. Hardware acceleration disabled**
- Raw Draw: **Disabled**
- Video Decode: **Software only. Hardware acceleration disabled**
- Video Encode: **Software only. Hardware acceleration disabled**
- Vulkan: **Disabled**
- WebGL: **Software only, hardware acceleration unavailable**
- WebGL2: **Software only, hardware acceleration unavailable**
- WebGPU: **Disabled**

Problems Detected

- WebGPU has been disabled via blocklist or the command line.
*Disabled Features: **webgpu***
- Accelerated video encode has been disabled, either via blocklist, about:flags or the command line.
*Disabled Features: **video_encode***
- Gpu compositing has been disabled, either via blocklist, about:flags or the command line.
The browser will fall back to software compositing and hardware acceleration will be unavailable.
*Disabled Features: **gpu_compositing***

ANGLE Features

- **allowCompressedFormats** (Frontend workarounds): **Enabled**: true
Allow compressed formats
- **cacheCompiledShader** (Frontend features) [anglebug:7036](#): **Enabled**: true
Enable to cache compiled shaders
- **disableAnisotropicFiltering** (Frontend workarounds): **Disabled**
Disable support for anisotropic filtering
- **disableDrawBuffersIndexed** (Frontend features) [anglebug:7724](#): **Disabled**
Disable support for OES_draw_buffers_indexed and EXT_draw_buffers_indexed
- **disableProgramBinary** (Frontend features) [anglebug:5007](#): **Disabled**
Disable support for GL_OES_get_program_binary
- **disableProgramCachingForTransformFeedback** (Frontend workarounds): **Disabled**
On some GPUs, program binaries don't contain transform feedback varyings
- **emulatePixelLocalStorage** (Frontend features) [anglebug:7279](#): **Disabled**: false
Emulate ANGLE_shader_pixel_local_storage using shader images
- **enableCaptureLimits** (Frontend features) [anglebug:5750](#): **Disabled**
Set the context limits like frame capturing was enabled
- **enableProgramBinaryForCapture** (Frontend features) [anglebug:5658](#): **Disabled**
Even if FrameCapture is enabled, enable GL_OES_get_program_binary
- **forceDepthAttachmentInitOnClear** (Frontend workarounds) [anglebug:7246](#): **Disabled**
Force depth attachment initialization on clear ops
- **forceGLErrorChecking** (Frontend features) <https://issuetracker.google.com/220069903>: **Disabled**: (IsAndroid() && isSwiftShader)
Force GL error checking (i.e. prevent applications from disabling error checking)
- **forceInitShaderVariables** (Frontend features): **Disabled**
Force-enable shader variable initialization

- **forceRobustResourceInit** (Frontend features) [anglebug:6041](#): Disabled
Force-enable robust resource init
- **loseContextOnOutOfMemory** (Frontend workarounds): Enabled: true
Some users rely on a lost context notification if a GL_OUT_OF_MEMORY error occurs
- **scalarizeVecAndMatConstructorArgs** (Frontend workarounds) [1165751](#): Disabled: false
Always rewrite vec/mat constructors to be consistent
- **singleThreadedTextureDecompression** (Frontend workarounds): Disabled
Disables multi-threaded decompression of compressed texture formats
- **allocateNonZeroMemory** (Vulkan features) [anglebug:4384](#): Disabled: false
Fill new allocations with non-zero values to flush out errors.
- **allowGenerateMipmapWithCompute** (Vulkan features) [anglebug:4551](#): Disabled:
supportsSubgroupQuadOpsInComputeShader &&
mSubgroupExtendedTypesFeatures.shaderSubgroupExtendedTypes &&
maxComputeWorkGroupInvocations >= 256 && ((isAMD && !isWindows()) || isNvidia || isSamsung)
Use the compute path to generate mipmaps on devices that meet the minimum requirements, and the performance is better.
- **asyncCommandQueue** (Vulkan features) [anglebug:4324](#): Disabled: false
Use CommandQueue worker thread to dispatch work to GPU.
- **bottomLeftOriginPresentRegionRectangles** (Vulkan workarounds): Disabled:
IsAndroid()
On some platforms present region rectangles are expected to have a bottom-left origin, instead of top-left origin as from spec
- **bresenhamLineRasterization** (Vulkan features): Enabled: true
Enable Bresenham line rasterization via VK_EXT_line_rasterization extension
- **clampPointSize** (Vulkan workarounds) [anglebug:2970](#): Disabled: isNvidia && nvidiaVersion.major < uint32_t(IsWindows() ? 430 : 421)
The point size range reported from the API is inconsistent with the actual behavior
- **compressVertexData** (Vulkan workarounds): Disabled
Compress vertex data to smaller data types when possible. Using this feature makes ANGLE non-conformant.
- **deferFlushUntilEndRenderPass** (Vulkan workarounds)
<https://issuetracker.google.com/issues/166475273>: Enabled: !isQualcommProprietary
Allow glFlush to be deferred until renderpass ends
- **depthClamping** (Vulkan workarounds) [anglebug:3970](#): Disabled: isNvidia && mPhysicalDeviceFeatures.depthClamp && ExtensionFound("VK_EXT_depth_clip_enable", deviceExtensionNames) && (!isLinux() || nvidiaVersion.major > 418u)
The depth value is not clamped to [0,1] for floating point depth buffers.
- **disableFlippingBlitWithCommand** (Vulkan workarounds) [anglebug:3498](#): Disabled:
IsAndroid() && isQualcommProprietary
vkCmdBlitImage with flipped coordinates blits incorrectly.
- **disallowMixedDepthStencilLoadOpNoneAndLoad** (Vulkan workarounds)
[anglebug:7370](#): Disabled: isARM && armDriverVersion < ARMDriverVersion(38, 1, 0)
Disallow use of LOAD_OP_NONE for only one of the depth or stencil aspects of a depth/stencil attachment
- **eglColorspaceAttributePassthrough** (Vulkan features) [anglebug:7319](#): Disabled:
IsAndroid() && isSamsung
Support passthrough of EGL colorspace attribute values
- **emulateAdvancedBlendEquations** (Vulkan features) [anglebug:3586](#): Disabled:
!mFeatures.supportsBlendOperationAdvanced.enabled && !isIntel
Emulate GL_KHR_blend_equation_advanced
- **emulateDithering** (Vulkan features) [anglebug:6755](#): Disabled: IsAndroid()
Emulate OpenGL dithering
- **emulateR32fImageAtomicExchange** (Vulkan workarounds) [anglebug:5535](#): Enabled: true
Emulate r32f images with r32ui to support imageAtomicExchange.

- **emulateTransformFeedback** (Vulkan features) [anglebug:3205](#): **Enabled**:
(!mFeatures.supportsTransformFeedbackExtension.enabled &&
mPhysicalDeviceFeatures.vertexPipelineStoresAndAtomics == 1U)
Emulate transform feedback as the VK_EXT_transform_feedback is not present.
- **emulatedPrerotation180** (Vulkan features) [anglebug:4901](#): **Disabled**
Emulate 180-degree prerotation.
- **emulatedPrerotation270** (Vulkan features) [anglebug:4901](#): **Disabled**
Emulate 270-degree prerotation.
- **emulatedPrerotation90** (Vulkan features) [anglebug:4901](#): **Disabled**
Emulate 90-degree prerotation.
- **enableAsyncPipelineCacheCompression** (Vulkan workarounds) [anglebug:4722](#):
Disabled: false
Enable compressing pipeline cache in a thread.
- **enableMultisampledRenderToTexture** (Vulkan workarounds) [anglebug:4937](#): **Disabled**:
mFeatures.supportsMultisampledRenderToSingleSampled.enabled ||
mFeatures.supportsMultisampledRenderToSingleSampledGOOGLEX.enabled ||
(supportsIndependentDepthStencilResolve && (isTileBasedRenderer || isSamsung))
Expose EXT_multisampled_render_to_texture
- **enablePreRotateSurfaces** (Vulkan features) [anglebug:3502](#): **Disabled**: IsAndroid() &&
supportsNegativeViewPort
Enable Android pre-rotation for landscape applications
- **enablePrecisionQualifiers** (Vulkan features) [anglebug:3078](#): **Enabled**: !
(IsPixel2(mPhysicalDeviceProperties.vendorID, mPhysicalDeviceProperties.deviceID) &&
(mPhysicalDeviceProperties.driverVersion < kPixel2DriverWithRelaxedPrecision)) &&
!IsPixel4(mPhysicalDeviceProperties.vendorID, mPhysicalDeviceProperties.deviceID)
Enable precision qualifiers in shaders
- **explicitlyEnablePerSampleShading** (Vulkan workarounds) [anglebug:6876](#): **Disabled**:
isARM
Explicitly enable per-sample shading if the fragment shader contains the sample qualifier
- **exposeNonConformantExtensionsAndVersions** (Vulkan workarounds) [anglebug:5375](#):
Disabled: kExposeNonConformantExtensionsAndVersions
Expose GLES versions and extensions that are not conformant.
- **forceContinuousRefreshOnSharedPresent** (Vulkan features)
<https://issuetracker.google.com/229267970>: **Disabled**: false
Force to create vulkan swapchain with continuous refresh on shared present
- **forceD16TexFilter** (Vulkan workarounds) [anglebug:3452](#): **Disabled**: IsAndroid() &&
isQualcommProprietary
*VK_FORMAT_D16_UNORM does not support
VK_FORMAT_FEATURE_SAMPLED_IMAGE_FILTER_LINEAR_BIT, which prevents
OES_depth_texture from being supported.*
- **forceFallbackFormat** (Vulkan workarounds): **Disabled**
Force a fallback format for angle_end2end_tests
- **forceFragmentShaderPrecisionHighToMediump** (Vulkan workarounds)
<https://issuetracker.google.com/184850002>: **Disabled**: false
Forces highp precision in fragment shader to mediump.
- **forceMaxUniformBufferSize16KB** (Vulkan workarounds)
<https://issuetracker.google.com/161903006>: **Disabled**: isQualcommProprietary &&
isAdreno540
Force max uniform buffer size to 16K on some device due to bug
- **forceNearestFiltering** (Vulkan workarounds): **Disabled**
Force nearest filtering when sampling.
- **forceNearestMipFiltering** (Vulkan workarounds): **Disabled**
Force nearest mip filtering when sampling.
- **forceStaticVertexStrideState** (Vulkan workarounds)
<https://bugs.fuchsia.dev/p/fuchsia/issues/detail?id=107106>: **Disabled**:
mFeatures.supportsExtendedDynamicState.enabled && isARM
*Force static state for VK_DYNAMIC_STATE_VERTEX_INPUT_BINDING_STRIDE_EXT
due to driver bugs*

- **forceSubmitImmutableTextureUpdates** (Vulkan app workarounds) [anglebug:6929](#): **Disabled**
Force submit updates to immutable textures
- **forceTextureLodOffset1** (Vulkan workarounds): **Disabled**
Increase the minimum texture level-of-detail by 1 when sampling.
- **forceTextureLodOffset2** (Vulkan workarounds): **Disabled**
Increase the minimum texture level-of-detail by 2 when sampling.
- **forceTextureLodOffset3** (Vulkan workarounds): **Disabled**
Increase the minimum texture level-of-detail by 3 when sampling.
- **forceTextureLodOffset4** (Vulkan workarounds): **Disabled**
Increase the minimum texture level-of-detail by 4 when sampling.
- **forceWaitForSubmissionToCompleteForQueryResult** (Vulkan workarounds) <https://issuetracker.google.com/253522366>: **Disabled**: isARM || (isNvidia && nvidiaVersion.major < 470u)
Force wait for submission to complete before calling getQueryResult(wait).
- **hasEffectivePipelineCacheSerialization** (Vulkan features) [anglebug:7369](#): **Disabled**: !isSwiftShader
Whether the implementation serializes the Vulkan pipeline cache effectively. On some implementations, pipeline cache serialization returns no data, so there is no benefit to serializing it
- **logMemoryReportCallbacks** (Vulkan features): **Disabled**: false
Log each callback from VK_EXT_device_memory_report
- **logMemoryReportStats** (Vulkan features): **Disabled**: false
Log stats from VK_EXT_device_memory_report each swap
- **mapUnspecifiedColorSpaceToPassThrough** (Vulkan features): **Disabled**
Use VK_COLOR_SPACE_PASS_THROUGH_EXT for EGL_NONE or unspecified color spaces
- **mergeProgramPipelineCachesToGlobalCache** (Vulkan workarounds) [anglebug:7369](#): **Enabled**: !mFeatures.supportsGraphicsPipelineLibrary.enabled || (mFeatures.preferMonolithicPipelinesOverLibraries.enabled && libraryBlobsAreReusedByMonolithicPipelines)
Whether it's beneficial to merge the pipeline cache for the shaders subset of the pipeline into the monolithic pipeline cache. Only useful on platforms where monolithic pipelines can reuse blobs from partial pipelines
- **mutableMipmapTextureUpload** (Vulkan features) [anglebug:7308](#): **Enabled**: !(IsWindows()) && isIntel)
Enable uploading the previously defined mutable mipmap texture.
- **overrideSurfaceFormatRGB8ToRGBA8** (Vulkan workarounds) [anglebug:6651](#): **Enabled**: true
Override surface format GL_RGB8 to GL_RGBA8
- **padBuffersToMaxVertexAttribStride** (Vulkan workarounds) [anglebug:4428](#): **Disabled**: isAMD || isSamsung
Vulkan considers vertex attribute accesses to count up to the last multiple of the stride. This additional access supports AMD's robust buffer access implementation. AMDVLK in particular will return incorrect values when the vertex access extends into the range that would be the stride padding and the buffer is too small. This workaround limits GL_MAX_VERTEX_ATTRIB_STRIDE to a maximum value and pads up every buffer allocation size to be a multiple of the maximum stride.
- **perFrameWindowSizeQuery** (Vulkan workarounds) [anglebug:3623](#): **Disabled**: IsAndroid() || isIntel || (IsWindows() && isAMD) || IsFuchsia() || isSamsung || displayVk->isWayland()
Vulkan swapchain is not returning VK_ERROR_OUT_OF_DATE when window resizing
- **permanentlySwitchToFramebufferFetchMode** (Vulkan features): **Disabled**: isTileBasedRenderer
Whether the context should permanently switch to framebuffer fetch mode on first encounter
- **persistentlyMappedBuffers** (Vulkan features) [anglebug:2162](#): **Enabled**: true
Persistently map buffer memory to reduce map/unmap IOCTL overhead.

- **precisionSafeDivision** (Vulkan workarounds): **Disabled**: isSamsung || isAMD
Special case handling for platforms that do not generate 1.0f even when the dividend and divisor have the same value
- **preferAggregateBarrierCalls** (Vulkan workarounds) [anglebug:4633](#): **Enabled**: isImmediateModeRenderer
Single barrier call is preferred over multiple calls with fine grained pipeline stage dependency information
- **preferCPUForBufferSubData** (Vulkan features) <http://issuetracker.google.com/200067929>: **Disabled**: isARM
Prefer use CPU to do bufferSubData instead of staged update.
- **preferDeviceLocalMemoryHostVisible** (Vulkan features) [anglebug:7047](#): **Enabled**: canPreferDeviceLocalMemoryHostVisible(mPhysicalDeviceProperties.deviceType)
Prefer adding HOST_VISIBLE flag for DEVICE_LOCAL memory when picking memory types
- **preferDrawClearOverVkCmdClearAttachments** (Vulkan workarounds) <https://issuetracker.google.com/166809097>: **Disabled**: isQualcommProprietary
On some hardware, clear using a draw call instead of vkCmdClearAttachments in the middle of render pass due to bugs
- **preferDriverUniformOverSpecConst** (Vulkan features) [anglebug:7406](#): **Enabled**: (isQualcommProprietary && mPhysicalDeviceProperties.driverVersion < kPixel4DriverWithWorkingSpecConstSupport) || isARM || isPowerVR || isSwiftShader
Prefer using driver uniforms instead of specialization constants.
- **preferLinearFilterForYUV** (Vulkan features) [anglebug:7382](#): **Disabled**
Prefer to use VK_FILTER_LINEAR for VkSamplerYcbcrConversion
- **preferMonolithicPipelinesOverLibraries** (Vulkan workarounds) [anglebug:7369](#): **Enabled**: !mGraphicsPipelineLibraryProperties.graphicsPipelineLibraryFastLinking || isSwiftShader
Whether monolithic pipelines perform significantly better than libraries
- **preferSkippingInvalidateForEmulatedFormats** (Vulkan workarounds) [anglebug:6860](#): **Enabled**: isImmediateModeRenderer
Skipping invalidate is preferred for emulated formats that have extra channels over re-clearing the image
- **preferSubmitAtFBOBoundary** (Vulkan workarounds) <https://issuetracker.google.com/187425444>: **Enabled**: isARM || isSwiftShader
Submit commands to driver at each FBO boundary for performance improvements.
- **preferSubmitOnAnySamplesPassedQueryEnd** (Vulkan workarounds) <https://issuetracker.google.com/250706693>: **Disabled**: isTileBasedRenderer
Submit commands to driver when last GL_ANY_SAMPLES_PASSED query is made for performance improvements.
- **provokingVertex** (Vulkan features): **Enabled**: true
Enable provoking vertex mode via VK_EXT_provoking_vertex extension
- **retainSPIRVDebugInfo** (Vulkan features) [anglebug:5901](#): **Disabled**: getEnableValidationLayers()
Retain debug info in SPIR-V blob.
- **roundOutputAfterDithering** (Vulkan workarounds) [anglebug:6953](#): **Disabled**: isQualcomm
Round output after dithering to workaround a driver bug that rounds the output up
- **slowDownMonolithicPipelineCreationForTesting** (Vulkan workarounds) [anglebug:7369](#): **Disabled**
Artificially slow down async monolithic pipeline creation for threading testing
- **supportsAndroidHardwareBuffer** (Vulkan features): **Disabled**
VkDevice supports the VK_ANDROID_external_memory_android_hardware_buffer extension
- **supportsAndroidNativeFenceSync** (Vulkan features) [anglebug:2517](#): **Disabled**
VkDevice supports the EGL_ANDROID_native_fence_sync extension
- **supportsBlendOperationAdvanced** (Vulkan features) [anglebug:3586](#): **Enabled**: ExtensionFound("VK_EXT_blend_operation_advanced", deviceExtensionNames)
VkDevice supports VK_EXT_blend_operation_advanced extension.

- **supportsColorWriteEnable** (Vulkan features) [anglebug:7161](#): **Disabled**
VkDevice supports VK_EXT_color_write_enable extension
- **supportsComputeTranscodeEtcToBc** (Vulkan features): **Disabled**:
!mPhysicalDeviceFeatures.textureCompressionETC2 && kSupportTranscodeEtcToBc && (mSubgroupProperties.supportedOperations & kRequiredSubgroupOp) == kRequiredSubgroupOp && (limitsVk.maxTexelBufferElements >= kMaxTexelBufferSize)
supports compute shader transcode etc format to bc format
- **supportsCustomBorderColor** (Vulkan features) [anglebug:3577](#): **Enabled**:
mCustomBorderColorFeatures.customBorderColors == 1U && mCustomBorderColorFeatures.customBorderColorWithoutFormat == 1U
VkDevice supports the VK_EXT_custom_border_color extension
- **supportsDepthClipControl** (Vulkan features) [anglebug:5421](#): **Enabled**:
mDepthClipControlFeatures.depthClipControl == 1U
VkDevice supports VK_EXT_depth_clip_control extension.
- **supportsDepthStencilResolve** (Vulkan features) [anglebug:4836](#): **Enabled**:
mFeatures.supportsRenderpass2.enabled && mDepthStencilResolveProperties.supportedDepthResolveModes != 0
VkDevice supports the VK_KHR_depth_stencil_resolve extension with the independentResolveNone feature
- **supportsExtendedDynamicState** (Vulkan features) [anglebug:5906](#): **Enabled**:
mExtendedDynamicStateFeatures.extendedDynamicState == 1U
VkDevice supports VK_EXT_extended_dynamic_state extension
- **supportsExtendedDynamicState2** (Vulkan features) [anglebug:5906](#): **Disabled**:
mExtendedDynamicState2Features.extendedDynamicState2 == 1U
VkDevice supports VK_EXT_extended_dynamic_state2 extension
- **supportsExternalFenceCapabilities** (Vulkan features): **Enabled**: true
VkInstance supports the VK_KHR_external_fence_capabilities extension
- **supportsExternalFenceFd** (Vulkan features) [anglebug:2517](#): **Disabled**:
ExtensionFound("VK_KHR_external_fence_fd", deviceExtensionNames)
VkDevice supports the VK_KHR_external_fence_fd extension
- **supportsExternalMemoryDmaBufAndModifiers** (Vulkan features) [anglebug:6248](#): **Disabled**:
ExtensionFound("VK_EXT_external_memory_dma_buf", deviceExtensionNames) && ExtensionFound("VK_EXT_image_drm_format_modifier", deviceExtensionNames)
VkDevice supports the VK_EXT_external_memory_dma_buf and VK_EXT_image_drm_format_modifier extensions
- **supportsExternalMemoryFd** (Vulkan features): **Enabled**:
ExtensionFound("VK_KHR_external_memory_fd", deviceExtensionNames)
VkDevice supports the VK_KHR_external_memory_fd extension
- **supportsExternalMemoryFuchsia** (Vulkan features): **Disabled**:
ExtensionFound("VK_FUCHSIA_external_memory", deviceExtensionNames)
VkDevice supports the VK_FUCHSIA_external_memory extension
- **supportsExternalMemoryHost** (Vulkan features): **Enabled**:
ExtensionFound("VK_EXT_external_memory_host", deviceExtensionNames)
VkDevice supports the VK_EXT_external_memory_host extension
- **supportsExternalSemaphoreCapabilities** (Vulkan features): **Enabled**: true
VkInstance supports the VK_KHR_external_semaphore_capabilities extension
- **supportsExternalSemaphoreFd** (Vulkan features): **Enabled**:
ExtensionFound("VK_KHR_external_semaphore_fd", deviceExtensionNames)
VkDevice supports the VK_KHR_external_semaphore_fd extension
- **supportsExternalSemaphoreFuchsia** (Vulkan features): **Disabled**:
ExtensionFound("VK_FUCHSIA_external_semaphore", deviceExtensionNames)
VkDevice supports the VK_FUCHSIA_external_semaphore extension
- **supportsFilteringPrecision** (Vulkan features): **Enabled**:
ExtensionFound("VK_GOOGLE_sampler_filtering_precision", deviceExtensionNames)
VkDevice supports the VK_GOOGLE_sampler_filtering_precision extension
- **supportsFragmentShaderPixelInterlock** (Vulkan features): **Disabled**:
mFragmentShaderInterlockFeatures.fragmentShaderPixelInterlock == 1U

VkDevice supports the VK_EXT_fragment_shader_interlock extension and has the fragmentShaderPixelInterlock feature

- **supportsFragmentShadingRate** (Vulkan features) [anglebug:7172](#): **Disabled**:
canSupportFragmentShadingRate(deviceExtensionNames)
VkDevice supports VK_KHR_fragment_shading_rate extension
- **supportsGGPFrameToken** (Vulkan features): **Disabled**
VkDevice supports the VK_GGP_frame_token extension
- **supportsGeometryStreamsCapability** (Vulkan features) [anglebug:3206](#): **Disabled**:
mTransformFeedbackFeatures.geometryStreams == 1U
Implementation supports the GeometryStreams SPIR-V capability.
- **supportsGraphicsPipelineLibrary** (Vulkan features) [anglebug:7369](#): **Enabled**:
mGraphicsPipelineLibraryFeatures.graphicsPipelineLibrary == 1U
VkDevice supports the VK_EXT_graphics_pipeline_library extension
- **supportsHostQueryReset** (Vulkan features) [anglebug:6692](#): **Enabled**:
mHostQueryResetFeatures.hostQueryReset == 1U
VkDevice supports VK_EXT_host_query_reset extension
- **supportsImage2dViewOf3d** (Vulkan features) [anglebug:7320](#): **Disabled**:
mImage2dViewOf3dFeatures.image2DViewOf3D == 1U &&
mImage2dViewOf3dFeatures.sampler2DViewOf3D == 1U
VkDevice supports VK_EXT_image_2d_view_of_3d
- **supportsImageCubeArray** (Vulkan features) [anglebug:3584](#): **Enabled**:
mPhysicalDeviceFeatures.imageCubeArray == 1U
VkDevice supports the imageCubeArray feature properly
- **supportsImageFormatList** (Vulkan features) [anglebug:5281](#): **Enabled**:
ExtensionFound("VK_KHR_image_format_list", deviceExtensionNames)
Enable VK_IMAGE_CREATE_MUTABLE_FORMAT_BIT by default for ICDs that support VK_KHR_image_format_list
- **supportsImagelessFramebuffer** (Vulkan features) [anglebug:7553](#): **Enabled**:
mImagelessFramebufferFeatures.imagelessFramebuffer == 1U
VkDevice supports VK_KHR_imageless_framebuffer extension
- **supportsIncrementalPresent** (Vulkan features): **Disabled**:
ExtensionFound("VK_KHR_incremental_present", deviceExtensionNames)
VkDevice supports the VK_KHR_incremental_present extension
- **supportsIndexTypeUint8** (Vulkan features) [anglebug:4405](#): **Disabled**:
mIndexTypeUint8Features.indexTypeUint8 == 1U
VkDevice supports the VK_EXT_index_type_uint8 extension
- **supportsLockSurfaceExtension** (Vulkan features): **Disabled**: IsAndroid()
Surface supports the EGL_KHR_lock_surface3 extension
- **supportsLogicOpDynamicState** (Vulkan features) [anglebug:3862](#): **Disabled**:
mExtendedDynamicState2Features.extendedDynamicState2LogicOp == 1U && (!
(IsLinux() && isIntel) || isAtLeastMesa22_2)
VkDevice supports the logicOp feature of VK_EXT_extended_dynamic_state2 extension
- **supportsMultiDrawIndirect** (Vulkan features) [anglebug:6439](#): **Enabled**:
mPhysicalDeviceFeatures.multiDrawIndirect == 1U
VkDevice supports the multiDrawIndirect extension
- **supportsMultisampledRenderToSingleSampled** (Vulkan features) [anglebug:4836](#): **Disabled**:
mFeatures.supportsRenderpass2.enabled &&
mFeatures.supportsDepthStencilResolve.enabled &&
mMultisampledRenderToSingleSampledFeatures.multisampledRenderToSingleSampled == 1U
VkDevice supports the VK_EXT_multisampled_render_to_single_sampled extension
- **supportsMultisampledRenderToSingleSampledGOOGLEX** (Vulkan features) [anglebug:4836](#): **Disabled**:
!mFeatures.supportsMultisampledRenderToSingleSampled.enabled &&
mFeatures.supportsRenderpass2.enabled &&
mFeatures.supportsDepthStencilResolve.enabled &&
mMultisampledRenderToSingleSampledFeaturesGOOGLEX.multisampledRenderToSingleSampled == 1U

VkDevice supports the VK_GOOGLEX_multisampled_render_to_single_sampled extension

- **supportsMultiview** (Vulkan features) [anglebug:6048](#): **Enabled**:
mMultiviewFeatures.multiview == 1U
VkDevice supports the VK_KHR_multiview extension
- **supportsNegativeViewport** (Vulkan features): **Enabled**: supportsNegativeViewport
The driver supports inverting the viewport with a negative height.
- **supportsPipelineCreationCacheControl** (Vulkan features) [anglebug:5881](#): **Disabled**:
mPipelineCreationCacheControlFeatures.pipelineCreationCacheControl &&
!isSwiftShader
VkDevice supports VK_EXT_pipeline_creation_cache_control extension
- **supportsPipelineCreationFeedback** (Vulkan features) [anglebug:5881](#): **Enabled**:
ExtensionFound("VK_EXT_pipeline_creation_feedback", deviceExtensionNames) ||
mPhysicalDeviceProperties.apiVersion >= (((uint32_t)(0)) << 29) | (((uint32_t)(1)) << 22) |
(((uint32_t)(3)) << 12) | ((uint32_t)(0)))
VkDevice supports VK_EXT_pipeline_creation_feedback extension
- **supportsPipelineProtectedAccess** (Vulkan features) [anglebug:7714](#): **Disabled**:
mPipelineProtectedAccessFeatures.pipelineProtectedAccess == 1U &&
mProtectedMemoryFeatures.protectedMemory == 1U
VkDevice supports the VK_EXT_pipeline_protected_access extension
- **supportsPipelineRobustness** (Vulkan features) [anglebug:5845](#): **Enabled**:
mPipelineRobustnessFeatures.pipelineRobustness == 1U &&
mPhysicalDeviceFeatures.robustBufferAccess
VkDevice supports VK_EXT_pipeline_robustness extension
- **supportsPipelineStatisticsQuery** (Vulkan features) [anglebug:5430](#): **Disabled**:
mPhysicalDeviceFeatures.pipelineStatisticsQuery == 1U
VkDevice supports the pipelineStatisticsQuery feature
- **supportsPresentation** (Vulkan features): **Enabled**: !displayVk->isGBM()
VkDisplay supports presentation through a present family queue
- **supportsPrimitiveTopologyListRestart** (Vulkan features) [anglebug:3832](#): **Enabled**:
mPrimitiveTopologyListRestartFeatures.primitiveTopologyListRestart == 1U
VkDevice supports VK_EXT_primitive_topology_list_restart extension.
- **supportsPrimitivesGeneratedQuery** (Vulkan features) [anglebug:5430](#): **Disabled**:
mPrimitivesGeneratedQueryFeatures.primitivesGeneratedQuery == 1U
VkDevice supports VK_EXT_primitives_generated_query extension
- **supportsProtectedMemory** (Vulkan features) [anglebug:3965](#): **Disabled**:
mProtectedMemoryFeatures.protectedMemory == 1U && (!isARM ||
mPipelineProtectedAccessFeatures.pipelineProtectedAccess == 1U)
VkDevice supports protected memory
- **supportsRasterizationOrderAttachmentAccess** (Vulkan features) [anglebug:7604](#):
Enabled: !isQualcomm &&
mRasterizationOrderAttachmentAccessFeatures.rasterizationOrderColorAttachmentAccess
== 1U
VkDevice supports VK_EXT_rasterization_order_attachment_access extension
- **supportsRenderPassLoadStoreOpNone** (Vulkan features) [anglebug:5371](#): **Enabled**:
ExtensionFound("VK_EXT_load_store_op_none", deviceExtensionNames)
VkDevice supports VK_EXT_load_store_op_none extension.
- **supportsRenderPassStoreOpNone** (Vulkan features) [anglebug:5055](#): **Disabled**:
!mFeatures.supportsRenderPassLoadStoreOpNone.enabled &&
ExtensionFound("VK_QCOM_render_pass_store_ops", deviceExtensionNames)
VkDevice supports VK_QCOM_render_pass_store_ops extension.
- **supportsRenderpass2** (Vulkan features): **Enabled**:
ExtensionFound("VK_KHR_create_renderpass2", deviceExtensionNames)
VkDevice supports the VK_KHR_create_renderpass2 extension
- **supportsShaderFloat16** (Vulkan features) [anglebug:4551](#): **Disabled**:
mShaderFloat16Int8Features.shaderFloat16 == 1U
*VkDevice supports the VK_KHR_shader_float16_int8 extension and has the
shaderFloat16 feature*

- **supportsShaderFramebufferFetch** (Vulkan features): **Enabled**: (IsAndroid() && isARM) || mFeatures.supportsRasterizationOrderAttachmentAccess.enabled
Whether the Vulkan backend supports coherent framebuffer fetch
- **supportsShaderFramebufferFetchNonCoherent** (Vulkan features): **Enabled**: (IsAndroid() && !(isARM || isQualcomm)) || isSwiftShader
Whether the Vulkan backend supports non-coherent framebuffer fetch
- **supportsShaderStencilExport** (Vulkan features): **Enabled**: ExtensionFound("VK_EXT_shader_stencil_export", deviceExtensionNames)
VkDevice supports the VK_EXT_shader_stencil_export extension
- **supportsSharedPresentableImageExtension** (Vulkan features): **Disabled**
VkSurface supports the VK_KHR_shared_presentable_images extension
- **supportsSurfaceCapabilities2Extension** (Vulkan features): **Enabled**: true
VkInstance supports the VK_KHR_get_surface_capabilities2 extension
- **supportsSurfaceProtectedCapabilitiesExtension** (Vulkan features): **Disabled**
VkInstance supports the VK_KHR_surface_protected_capabilities extension
- **supportsSurfaceProtectedSwapchains** (Vulkan features): **Disabled**: IsAndroid()
VkSurface supports Protected for protected swapchains
- **supportsSurfacelessQueryExtension** (Vulkan features): **Disabled**
VkInstance supports the VK_GOOGLE_surfaceless_query extension
- **supportsTimestampSurfaceAttribute** (Vulkan features) [anglebug:7489](#): **Disabled**: IsAndroid() && ExtensionFound("VK_GOOGLE_display_timing", deviceExtensionNames)
Platform supports setting frame timestamp surface attribute
- **supportsTransformFeedbackExtension** (Vulkan features) [anglebug:3206](#): **Disabled**: mTransformFeedbackFeatures.transformFeedback == 1U
Transform feedback uses the VK_EXT_transform_feedback extension.
- **supportsVertexInputDynamicState** (Vulkan features) [anglebug:7162](#): **Disabled**
VkDevice supports VK_EXT_vertex_input_dynamic_state extension
- **supportsYUVSamplerConversion** (Vulkan features): **Enabled**: mSamplerYcbcrConversionFeatures.samplerYcbcrConversion != 0U
VkDevice supports the VK_KHR_sampler_ycbcr_conversion extension
- **supportsYuvTarget** (Vulkan features): **Disabled**
VkDevice supports VK_ANDROID_render_to_external_format and VK_EXT_ycbcr_attachment
- **swapbuffersOnFlushOrFinishWithSingleBuffer** (Vulkan features) [anglebug:6878](#): **Disabled**: IsAndroid()
Bypass deferredFlush with calling swapbuffers on flush or finish when in Shared Present mode
- **syncMonolithicPipelinesToBlobCache** (Vulkan workarounds) [anglebug:7369](#): **Disabled**: mFeatures.hasEffectivePipelineCacheSerialization.enabled && (hasNoPipelineWarmUp || canSyncLargeMonolithicCache)
Whether it's beneficial to store monolithic pipelines in the blob cache when VK_EXT_graphics_pipeline_library is in use. Otherwise the libraries are stored only, and monolithic pipelines are recreated on every run
- **useMultipleDescriptorsForExternalFormats** (Vulkan workarounds) [anglebug:6141](#): **Enabled**: true
Return a default descriptor count for external formats.
- **useNonZeroStencilWriteMaskStaticState** (Vulkan workarounds) [anglebug:7556](#): **Disabled**: isARM && armDriverVersion < ARMDriverVersion(40, 0, 0)
Work around a driver bug where 0 in stencil write mask static state would make the corresponding dynamic state malfunction in the presence of discard or alpha to coverage
- **varyingsRequireMatchingPrecisionInSpirv** (Vulkan workarounds) [anglebug:7488](#): **Disabled**: isPowerVR
Add additional SPIRV instructions to make sure precision between shader stages match with each other
- **waitIdleBeforeSwapchainRecreation** (Vulkan workarounds) [anglebug:5061](#): **Disabled**: IsAndroid() && isARM
Before passing an oldSwapchain to VkSwapchainCreateInfoKHR, wait for queue to be

idle. Works around a bug on platforms which destroy oldSwapchain in vkCreateSwapchainKHR.

- **warmUpPipelineCacheAtLink** (Vulkan features) [anglebug:5881](#): **Enabled:** libraryBlobsAreReusedByMonolithicPipelines && !isQualcommProprietary && !(IsLinux() && isIntel) && !(IsChromeOS()) && isSwiftShader)
Warm up the Vulkan pipeline cache at link time

DAWN Info

<Integrated GPU> Vulkan backend - Intel(R) Graphics (ADL GT2)

[Default Toggle Names]

- **lazy_clear_resource_on_first_use**: <https://crbug.com/dawn/145>: Clears resource to zero on first usage. This initializes the resource so that no dirty bits from recycled memory is present in the new resource.
- **use_temporary_buffer_in_texture_to_texture_copy**: <https://crbug.com/dawn/42>: Split texture-to-texture copy into two copies: copy from source texture into a temporary buffer, and copy from the temporary buffer into the destination texture when copying between compressed textures that don't have block-aligned sizes. This workaround is enabled by default on all Vulkan drivers to solve an issue in the Vulkan SPEC about the texture-to-texture copies with compressed formats. See #1005 (<https://github.com/KhronosGroup/Vulkan-Docs/issues/1005>) for more details.
- **vulkan_use_d32s8**: <https://crbug.com/dawn/286>: Vulkan mandates support of either D32_FLOAT_S8 or D24_UNORM_S8. When available the backend will use D32S8 (toggle to on) but setting the toggle to off will make it use the D24S8 format when possible.
- **vulkan_use_s8**: <https://crbug.com/dawn/666>: Vulkan has a pure stencil8 format but it is not universally available. When this toggle is on, the backend will use S8 for the stencil8 format, otherwise it will fallback to D32S8 or D24S8.
- **disallow_unsafe_apis**: <http://crbug.com/1138528>: Produces validation errors on API entry points or parameter combinations that aren't considered secure yet.
- **use_vulkan_zero_initialize_workgroup_memory_extension**: <https://crbug.com/dawn/1302>: Initialize workgroup memory with OpConstantNull on Vulkan when the Vulkan extension VK_KHR_zero_initialize_workgroup_memory is supported.

[WebGPU Forced Toggles - enabled]

- **disallow_spirv**: <https://crbug.com/1214923>: Disallow usage of SPIR-V completely so that only WGSL is used for shader modules. This is useful to prevent a Chromium renderer process from successfully sending SPIR-V code to be compiled in the GPU process.

[Supported Features]

- texture-compression-bc
- texture-compression-etc2
- texture-compression-astc
- pipeline-statistics-query
- timestamp-query
- timestamp-query-inside-passes
- depth-clip-control
- depth32float-stencil8
- chromium-experimental-dp4a
- indirect-first-instance
- rg11b10float-renderable
- dawn-internal-usages
- dawn-native

<CPU> Vulkan backend - llvmpipe (LLVM 11.0.1, 256 bits)

[Default Toggle Names]

- **lazy_clear_resource_on_first_use**: <https://crbug.com/dawn/145>: Clears resource to zero on first usage. This initializes the resource so that no dirty bits from recycled memory is present in the new resource.
- **use_temporary_buffer_in_texture_to_texture_copy**: <https://crbug.com/dawn/42>: Split texture-to-texture copy into two copies: copy from source texture into a temporary buffer,

and copy from the temporary buffer into the destination texture when copying between compressed textures that don't have block-aligned sizes. This workaround is enabled by default on all Vulkan drivers to solve an issue in the Vulkan SPEC about the texture-to-texture copies with compressed formats. See #1005

(<https://github.com/KhronosGroup/Vulkan-Docs/issues/1005>) for more details.

- **vulkan_use_d32s8:** <https://crbug.com/dawn/286>: Vulkan mandates support of either D32_FLOAT_S8 or D24_UNORM_S8. When available the backend will use D32S8 (toggle to on) but setting the toggle to off will make it use the D24S8 format when possible.
- **vulkan_use_s8:** <https://crbug.com/dawn/666>: Vulkan has a pure stencil8 format but it is not universally available. When this toggle is on, the backend will use S8 for the stencil8 format, otherwise it will fallback to D32S8 or D24S8.
- **disallow_unsafe_apis:** <http://crbug.com/1138528>: Produces validation errors on API entry points or parameter combinations that aren't considered secure yet.
- **use_vulkan_zero_initialize_workgroup_memory_extension:** <https://crbug.com/dawn/1302>: Initialize workgroup memory with OpConstantNull on Vulkan when the Vulkan extension VK_KHR_zero_initialize_workgroup_memory is supported. [WebGPU Forced Toggles - enabled]
- **disallow_spirv:** <https://crbug.com/1214923>: Disallow usage of SPIR-V completely so that only WGSL is used for shader modules. This is useful to prevent a Chromium renderer process from successfully sending SPIR-V code to be compiled in the GPU process. [Supported Features]
- texture-compression-bc
- pipeline-statistics-query
- timestamp-query
- timestamp-query-inside-passes
- depth-clip-control
- depth32float-stencil8
- indirect-first-instance
- rg11b10float-renderable
- dawn-internal-usages
- dawn-native

<CPU> Vulkan backend - SwiftShader Device (Subzero)

[Default Toggle Names]

- **lazy_clear_resource_on_first_use:** <https://crbug.com/dawn/145>: Clears resource to zero on first usage. This initializes the resource so that no dirty bits from recycled memory is present in the new resource.
- **use_temporary_buffer_in_texture_to_texture_copy:** <https://crbug.com/dawn/42>: Split texture-to-texture copy into two copies: copy from source texture into a temporary buffer, and copy from the temporary buffer into the destination texture when copying between compressed textures that don't have block-aligned sizes. This workaround is enabled by default on all Vulkan drivers to solve an issue in the Vulkan SPEC about the texture-to-texture copies with compressed formats. See #1005 (<https://github.com/KhronosGroup/Vulkan-Docs/issues/1005>) for more details.
- **vulkan_use_d32s8:** <https://crbug.com/dawn/286>: Vulkan mandates support of either D32_FLOAT_S8 or D24_UNORM_S8. When available the backend will use D32S8 (toggle to on) but setting the toggle to off will make it use the D24S8 format when possible.
- **vulkan_use_s8:** <https://crbug.com/dawn/666>: Vulkan has a pure stencil8 format but it is not universally available. When this toggle is on, the backend will use S8 for the stencil8 format, otherwise it will fallback to D32S8 or D24S8.
- **disallow_unsafe_apis:** <http://crbug.com/1138528>: Produces validation errors on API entry points or parameter combinations that aren't considered secure yet.
- **use_vulkan_zero_initialize_workgroup_memory_extension:** <https://crbug.com/dawn/1302>: Initialize workgroup memory with OpConstantNull on Vulkan when the Vulkan extension VK_KHR_zero_initialize_workgroup_memory is supported. [WebGPU Forced Toggles - enabled]
- **disallow_spirv:** <https://crbug.com/1214923>: Disallow usage of SPIR-V completely so that only WGSL is used for shader modules. This is useful to prevent a Chromium renderer

process from successfully sending SPIR-V code to be compiled in the GPU process.

[Supported Features]

- texture-compression-bc
- texture-compression-etc2
- texture-compression-astc
- timestamp-query
- timestamp-query-inside-passes
- depth-clip-control
- depth32float-stencil8
- indirect-first-instance
- rg11b10float-renderable
- dawn-internal-usages
- dawn-native

<CPU> OpenGL backend - ANGLE (Google, Vulkan 1.3.0 (SwiftShader Device (Subzero) (0x0000C0DE)), SwiftShader driver-5.0.0)

[Default Toggle Names]

- **lazy_clear_resource_on_first_use:** <https://crbug.com/dawn/145>: Clears resource to zero on first usage. This initializes the resource so that no dirty bits from recycled memory is present in the new resource.
- **disable_base_vertex:** <https://crbug.com/dawn/343>: Disables the use of non-zero base vertex which is unsupported on some platforms.
- **disable_base_instance:** <https://crbug.com/dawn/343>: Disables the use of non-zero base instance which is unsupported on some platforms.
- **disable_indexed_draw_buffers:** <https://crbug.com/dawn/582>: Disables the use of indexed draw buffer state which is unsupported on some platforms.
- **disable_snorm_read:** <https://crbug.com/dawn/667>: Disables reading from Snorm textures which is unsupported on some platforms.
- **disallow_unsafe_apis:** <http://crbug.com/1138528>: Produces validation errors on API entry points or parameter combinations that aren't considered secure yet.
- **flush_before_client_wait_sync:** <https://crbug.com/dawn/633>: Call glFlush before glClientWaitSync to work around bugs in the latter
- **use_placeholder_fragment_in_vertex_only_pipeline:** <https://crbug.com/dawn/136>: Use a placeholder empty fragment shader in vertex only render pipeline. This toggle must be enabled for OpenGL ES backend, and serves as a workaround by default enabled on some Metal devices with Intel GPU to ensure the depth result is correct.

[WebGPU Forced Toggles - enabled]

- **disallow_spirv:** <https://crbug.com/1214923>: Disallow usage of SPIR-V completely so that only WGSL is used for shader modules. This is useful to prevent a Chromium renderer process from successfully sending SPIR-V code to be compiled in the GPU process.

[Supported Features]

- texture-compression-bc
- dawn-internal-usages
- dawn-native

Version Information

Data exported	2023-04-28T08:12:56.790Z
Chrome version	YaBrowser/23.3.1.929 (corp)
Operating system	Linux 5.15.109-un-def-alt1
Software rendering list path	Path=/src/gpu/config/software_rendering_list.json RevisionId=438f1bb988fc57da1bf7b793ebbf97f9a357caf2
Driver bug list path	Path=/src/gpu/config/gpu_driver_bug_list.json RevisionId=438f1bb988fc57da1bf7b793ebbf97f9a357caf2
ANGLE commit id	unknown hash
2D graphics backend	Skia/110 438f1bb988fc57da1bf7b793ebbf97f9a357caf2
Command Line	/usr/bin/yandex-browser-stable --flag-switches-begin --flag-switches-end --desktop-startup-id=mate-menu.py-3259-


```
strepkovaas.ipa.basealt.ru-/usr/bin/yandex-browser-stable-0_TIME7495009 --external-app-null-path --external-app-data=null_data
```

Driver Information

Initialization time	43
In-process GPU	false
Passthrough Command Decoder	true
Sandboxed	false
GPU0	VENDOR= 0xffff [Google Inc. (Google)], DEVICE=0xffff [ANGLE (Google, Vulkan 1.3.0 (SwiftShader Device (Subzero) (0x0000C0DE)), SwiftShader driver-5.0.0)], DRIVER_VENDOR=SwANGLE, DRIVER_VERSION=5.0.0 *ACTIVE*
Optimus	false
AMD switchable	false
GPU CUDA compute capability major version	0
Pixel shader version	1.00
Vertex shader version	1.00
Max. MSAA samples	4
Machine model name	
Machine model version	
GL_VENDOR	Google Inc. (Google)
GL_RENDERER	ANGLE (Google, Vulkan 1.3.0 (SwiftShader Device (Subzero) (0x0000C0DE)), SwiftShader driver-5.0.0)
GL_VERSION	OpenGL ES 2.0.0 (ANGLE 2.1.0 git hash: unknown hash)
GL_EXTENSIONS	GL_AMD_performance_monitor GL_ANGLE_base_vertex_base_instance GL_ANGLE_base_vertex_base_instance_shader_builtin GL_ANGLE_client_arrays GL_ANGLE_compressed_texture_etc GL_ANGLE_depth_texture GL_ANGLE_framebuffer_blit GL_ANGLE_framebuffer_multisample GL_ANGLE_get_image GL_ANGLE_get_serialized_context_string GL_ANGLE_get_tex_level_parameter GL_ANGLE_instanced_arrays GL_ANGLE_memory_object_flags GL_ANGLE_memory_size GL_ANGLE_multi_draw GL_ANGLE_program_cache_control GL_ANGLE_read_only_depth_stencil_feedback_loops GL_ANGLE_relaxed_vertex_attribute_type GL_ANGLE_request_extension GL_ANGLE_rgbx_internal_format GL_ANGLE_robust_client_memory GL_ANGLE_robust_fragment_shader_output GL_ANGLE_robust_resource_initialization GL_ANGLE_texture_compression_dxt3 GL_ANGLE_texture_compression_dxt5 GL_ANGLE_texture_usage GL_ANGLE_vulkan_image GL_APPLE_clip_distance 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_texture GL_CHROMIUM_copy_texture GL_CHROMIUM_lose_context GL_CHROMIUM_texture_filtering_hint GL_EXT_EGL_image_external_wrap_modes GL_EXT_base_instance GL_EXT_blend_minmax GL_EXT_buffer_storage GL_EXT_clip_control GL_EXT_color_buffer_half_float

GL_EXT_compressed_ETC1_RGB8_sub_texture
 GL_EXT_copy_image GL_EXT_debug_label GL_EXT_debug_marker
 GL_EXT_discard_framebuffer GL_EXT_disjoint_timer_query
 GL_EXT_draw_buffers GL_EXT_draw_elements_base_vertex
 GL_EXT_float_blend GL_EXT_frag_depth GL_EXT_instanced_arrays
 GL_EXT_map_buffer_range GL_EXT_memory_object
 GL_EXT_memory_object_fd GL_EXT_multi_draw_indirect
 GL_EXT_occlusion_query_boolean GL_EXT_read_format_bgra
 GL_EXT_robustness GL_EXT_sRGB GL_EXT_sRGB_write_control
 GL_EXT_semaphore GL_EXT_semaphore_fd
 GL_EXT_separate_shader_objects GL_EXT_shader_framebuffer_fetch
 GL_EXT_shader_framebuffer_fetch_non_coherent
 GL_EXT_shader_non_constant_global_initializers
 GL_EXT_shader_texture_lod GL_EXT_shadow_samplers
 GL_EXT_texture_border_clamp GL_EXT_texture_compression_bptc
 GL_EXT_texture_compression_dxt1
 GL_EXT_texture_compression_rgtc
 GL_EXT_texture_compression_s3tc_srgb
 GL_EXT_texture_filter_anisotropic
 GL_EXT_texture_format_BGRA8888 GL_EXT_texture_rg
 GL_EXT_texture_sRGB_decode GL_EXT_texture_storage
 GL_EXT_texture_type_2_10_10_10_REV GL_EXT_unpack_subimage
 GL_KHR_blend_equation_advanced GL_KHR_debug
 GL_KHR_robust_buffer_access_behavior
 GL_KHR_texture_compression_astc_ldr GL_NV_depth_buffer_float2
 GL_NV_fence GL_NV_framebuffer_blit GL_NV_pack_subimage
 GL_NV_pixel_buffer_object GL_NV_read_depth
 GL_NV_read_depth_stencil GL_NV_read_stencil
 GL_OES_EGL_image GL_OES_EGL_image_external
 GL_OES_EGL_sync GL_OES_compressed_EAC_R11_signed_texture
 GL_OES_compressed_EAC_R11_unsigned_texture
 GL_OES_compressed_EAC_RG11_signed_texture
 GL_OES_compressed_EAC_RG11_unsigned_texture
 GL_OES_compressed_ETC1_RGB8_texture
 GL_OES_compressed_ETC2_RGB8_texture
 GL_OES_compressed_ETC2_RGBA8_texture
 GL_OES_compressed_ETC2_punchthroughA_RGBA8_texture
 GL_OES_compressed_ETC2_punchthroughA_sRGB8_alpha_texture
 GL_OES_compressed_ETC2_sRGB8_alpha8_texture
 GL_OES_compressed_ETC2_sRGB8_texture GL_OES_depth24
 GL_OES_depth32 GL_OES_depth_texture
 GL_OES_depth_texture_cube_map
 GL_OES_draw_elements_base_vertex GL_OES_element_index_uint
 GL_OES_fbo_render_mipmap GL_OES_get_program_binary
 GL_OES_mapbuffer GL_OES_packed_depth_stencil
 GL_OES_primitive_bounding_box GL_OES_rgb8_rgba8
 GL_OES_sample_shading GL_OES_standard_derivatives
 GL_OES_surfaceless_context GL_OES_texture_3D
 GL_OES_texture_border_clamp GL_OES_texture_float
 GL_OES_texture_float_linear GL_OES_texture_half_float
 GL_OES_texture_half_float_linear GL_OES_texture_npot
 GL_OES_texture_stencil8 GL_OES_vertex_array_object
 GL_OES_vertex_half_float

Disabled Extensions	
Disabled WebGL Extensions	

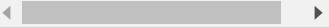
Window system binding vendor	Google Inc. (Google)
Window system binding version	1.5 (ANGLE 2.1.0 git hash: unknown hash)
Window system binding extensions	EGL_EXT_create_context_robustness EGL_ANGLE_surface_orientation EGL_KHR_create_context EGL_KHR_image EGL_KHR_image_base EGL_EXT_image_gl_colorspace EGL_KHR_gl_colorspace EGL_KHR_gl_texture_2D_image EGL_KHR_gl_texture_cubemap_image EGL_KHR_gl_renderbuffer_image EGL_KHR_get_all_proc_addresses EGL_KHR_fence_sync EGL_KHR_wait_sync EGL_ANGLE_create_context_webgl_compatibility EGL_CHROMIUM_create_context_bind_generates_resource EGL_KHR_swap_buffers_with_damage EGL_EXT_pixel_format_float EGL_KHR_surfaceless_context EGL_ANGLE_display_texture_share_group EGL_ANGLE_display_semaphore_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 EGL_ANDROID_recordable EGL_ANGLE_create_context_backwards_compatible EGL_KHR_no_config_context EGL_IMG_context_priority EGL_KHR_create_context_no_error EGL_KHR_reusable_sync EGL_EXT_buffer_age EGL_ANGLE_create_surface_swap_interval EGL_ANGLE_vulkan_image EGL_KHR_partial_update
XDG_CURRENT_DESKTOP	MATE
XDG_SESSION_TYPE	x11
GDMSESSION	mate
Ozone platform	x11
Direct rendering version	unknown
Reset notification strategy	0x8252
GPU process crash count	0
gfx::BufferFormats supported for allocation and texturing	R_8: not supported, R_16: not supported, RG_88: not supported, RG_1616: not supported, BGR_565: not supported, RGBA_4444: not supported, RGBX_8888: not supported, RGBA_8888: not supported, BGRX_8888: not supported, BGRA_1010102: not supported, RGBA_1010102: not supported, BGRA_8888: not supported, RGBA_F16: not supported, YVU_420: not supported, YUV_420_BIPLANAR: not supported, YUVA_420_TRIPLANAR: not supported, P010: not supported

Compositor Information

Tile Update Mode	One-copy
Partial Raster	Enabled

GpuMemoryBuffers Status

R_8	Software only
R_16	Software only
RG_88	Software only
RG_1616	Software only

BGR_565	Software only
RGBA_4444	Software only
RGBX_8888	Software only
RGBA_8888	Software only
BGRX_8888	Software only
BGRA_1010102	Software only
RGBA_1010102	Software only
BGRA_8888	Software only
RGBA_F16	Software only
YVU_420	Software only
YUV_420_BIPLANAR	Software only
YUVA_420_TRIPLANAR	Software only
	
P010	Software only

Display(s) Information

Info	Display[0] bounds=[0,0 1920x1200], workarea=[0,0 1920x1169], scale=1, rotation=0, panel_rotation=0 external.
Color space (all)	{primaries:BT709, transfer:SRGB, matrix:RGB, range:FULL}
Buffer format (all)	BGRA_8888
Color volume	{name:'srgb', r:[0.6400, 0.3300], g:[0.3000, 0.6000], b:[0.1500, 0.3300], w:[0.3127, 0.3290]}
SDR white level in nits	203
HDR relative maximum luminance	1
Bits per color component	8
Bits per pixel	24

Video Acceleration Information

Decoding	
Encoding	

Vulkan Information

Device Performance Information

Log Messages

- GpuProcessHost: The GPU process exited normally. Everything is okay.
- GpuProcessHost: The GPU process exited normally. Everything is okay.
- [8739:8739:0428/110938.294669:ERROR:viz_main_impl.cc(186)] : Exiting GPU process due to errors during initialization
- GpuProcessHost: The GPU process exited normally. Everything is okay.
- [8844:8844:0428/110938.345659:WARNING:sandbox_linux.cc(393)] : InitializeSandbox() called with multiple threads in process gpu-process.
- [8844:8844:0428/110938.349404:ERROR:gpu_memory_buffer_support_x11.cc(49)] : dri3 extension not supported.