EQAA Modes for AMD 6900 Series Graphics Cards

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Overview

Enhanced Quality Anti-Aliasing (EQAA) is a new anti-aliasing technology available from the AMD HD 6900 series of graphics cards onwards. This new Anti-Aliasing (AA) technology offers advanced smoothing of aliased edges without requiring additional video memory, and with a minimal performance cost.

Coverage Sample Details

EQAA offers enhanced AA quality over standard Multi-Sample Anti-Aliasing (MSAA) modes by adding more coverage samples per pixel but keeping the same number of color/depth/stencil samples to achieve better AA quality than standard MSAA modes. Since it doesn't require additional color/depth/stencil samples, it consumes the same video memory as the equivalent MSAA mode.

The coverage samples are used to test if a polygon is present at the location of the sample, and these samples can be used as the weight value for calculating the final color of the pixel. Because coverage samples can be gathered more easily than increasing color sample count, EQAA can increase AA quality with quite a small performance overhead. EQAA is also compatible with other existing AA techniques supported by AMD.

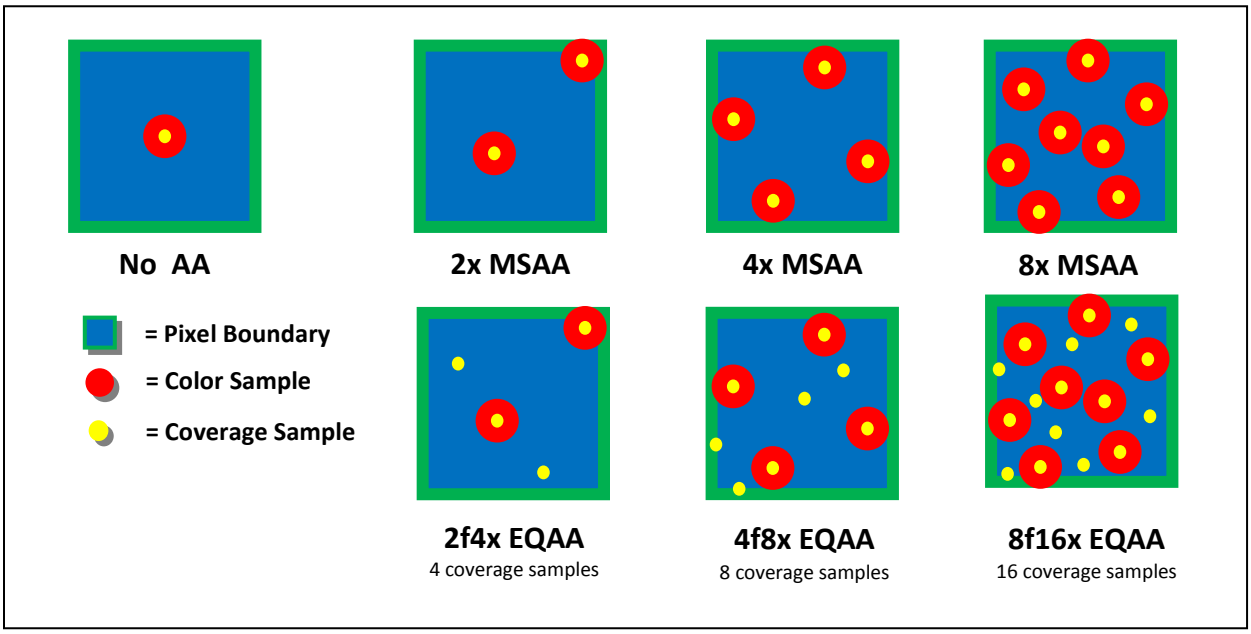

Figure1. MSAA and EQAA color/coverage sample patterns

How to Enable EQAA Modes in Direct3D®

Direct3D 9

In Direct3D 9, the programmers can use the combinations of multisample type and multisample quality level to enable standard MSAA and new EQAA modes. To get the number of available quality levels for a particular multisample type, the programmers can use the ***IDirect3D9::CheckDeviceMultiSampleType()*** method of the Direct3D9 interface. Below is the list of all combinations in Direct3D 9.

Multisample Type	Quality Level	AA Mode	Color Sample Count	Depth/Stencil Sample Count	Coverage Sample Count
D3DMULTISAMPLE_NONE	0	No MSAA	0	0	0
D3DMULTISAMPLE_NONMASKABLE	0	2x MSAA	2	2	2
	1	2f4x EQAA	2	2	4
	2	4x MSAA	4	4	4
	3	2f8x EQAA	2	2	8
	4	4f8x EQAA	4	4	8
	5	4f16x EQAA	4	4	16
	6	8x MSAA	8	8	8
	7	8f16x EQAA	8	8	16
D3DMULTISAMPLE_2_SAMPLES	0	2x MSAA	2	2	2
	1	2x MSAA	2	2	2
	2	2f4x EQAA	2	2	4
	3	2f4x EQAA	2	2	4
	4	2f8x EQAA	2	2	8
D3DMULTISAMPLE_4_SAMPLES	0	4x MSAA	4	4	4
	1	4x MSAA	4	4	4
	2	4f8x EQAA	4	4	8
D3DMULTISAMPLE_8_SAMPLES	0	8x MSAA	8	8	8
	1	8x MSAA	8	8	8
	2	8f16x EQAA	8	8	16

Direct3D 10/11

In Direct3D 10/11, the programmers can use the combinations of multisample count and multisample quality level to enable variable standard MSAA and new EQAA modes. To get the number of available quality levels for particular multisample count, the programmers can use ***ID3D11Device::CheckMultisampleQualityLevels()*** method of Direct3D10/11 device interface. Below is the list of all combinations in Direct3D 10/11.

Multisamples Count	Quality Level	AA Mode	Color Sample Count	Depth/Stencil Sample Count	Coverage Sample Count
0	0	No MSAA	0	0	0
2	0 ~ 3	2x MSAA	2	2	2
	4	2f4x EQAA	2	2	4
4	0 ~ 7	4x MSAA	4	4	4
	8 ~ 15	4f8x EQAA	4	4	8
	16	4f16x EQAA	4	4	16
8	0 ~ 15	8x MSAA	8	8	8
	16	8f16x EQAA	8	8	16

Remark: In Direct3D 10.1/11 programmers are able to access individual sample data via the Load() shader instruction. However it is not possible to access the additional coverage samples of EQAA modes. For example when selecting 4f8x EQAA mode, only the first 4 samples (sample index 0 to 3) can be accessed from the shader and the remaining 4 samples (sample index 4 to 7) cannot be retrieved. This limitation may impact the ability to leverage EQAA for deferred or semi-deferred rendering techniques.

How to enable EQAA Modes in OpenGL®

Currently AMD does not provide a specific extension to create an EQAA-enabled render buffer. However end-users can still enable EQAA by using AMD Catalyst Control Center to override the AA settings of application.

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