



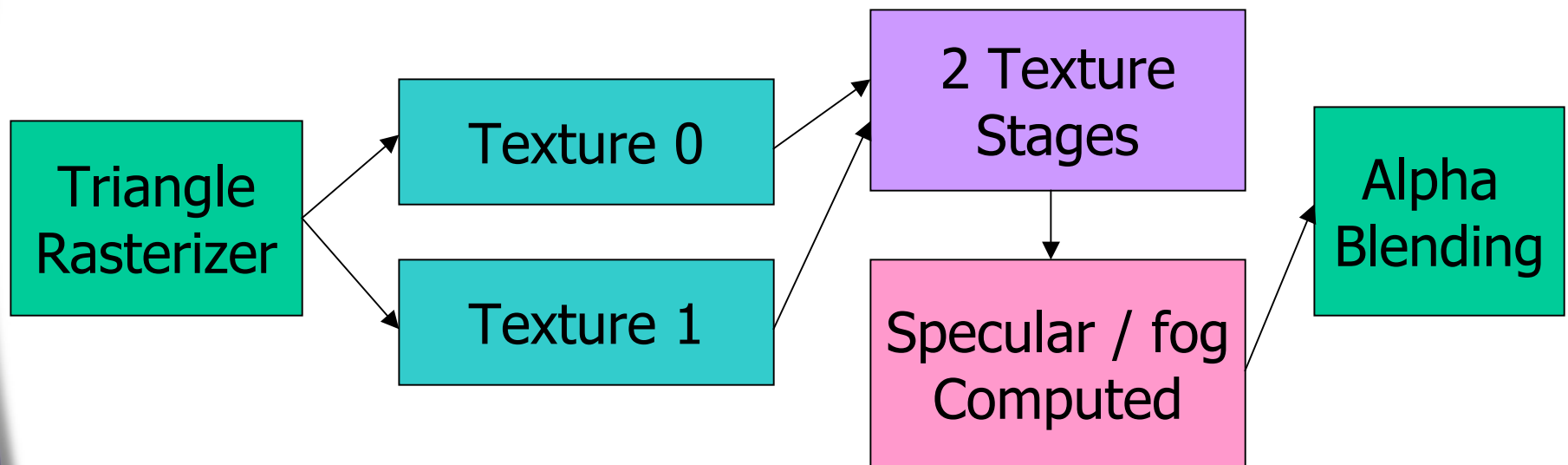
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## **Intro To Pixel Shading in DX8**

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# DX7 Texture Stage Pipeline



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# Dx7 Texture Stages

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- On Dx7-class hardware, you can't use the "Pixel Shader" API
- You can use the old dx6 & dx7-style Texture Stage API
- `pDevice->SetTextureStageState( 0, D3DTSS_COLOROP, D3DTOP_MODULATE);`
- But, there are two new new color ops available
  - `D3DTOP_MULTIPLYADD`
  - `D3DTOP_LERP`



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## **Dx7-Style Multi-pass effects**

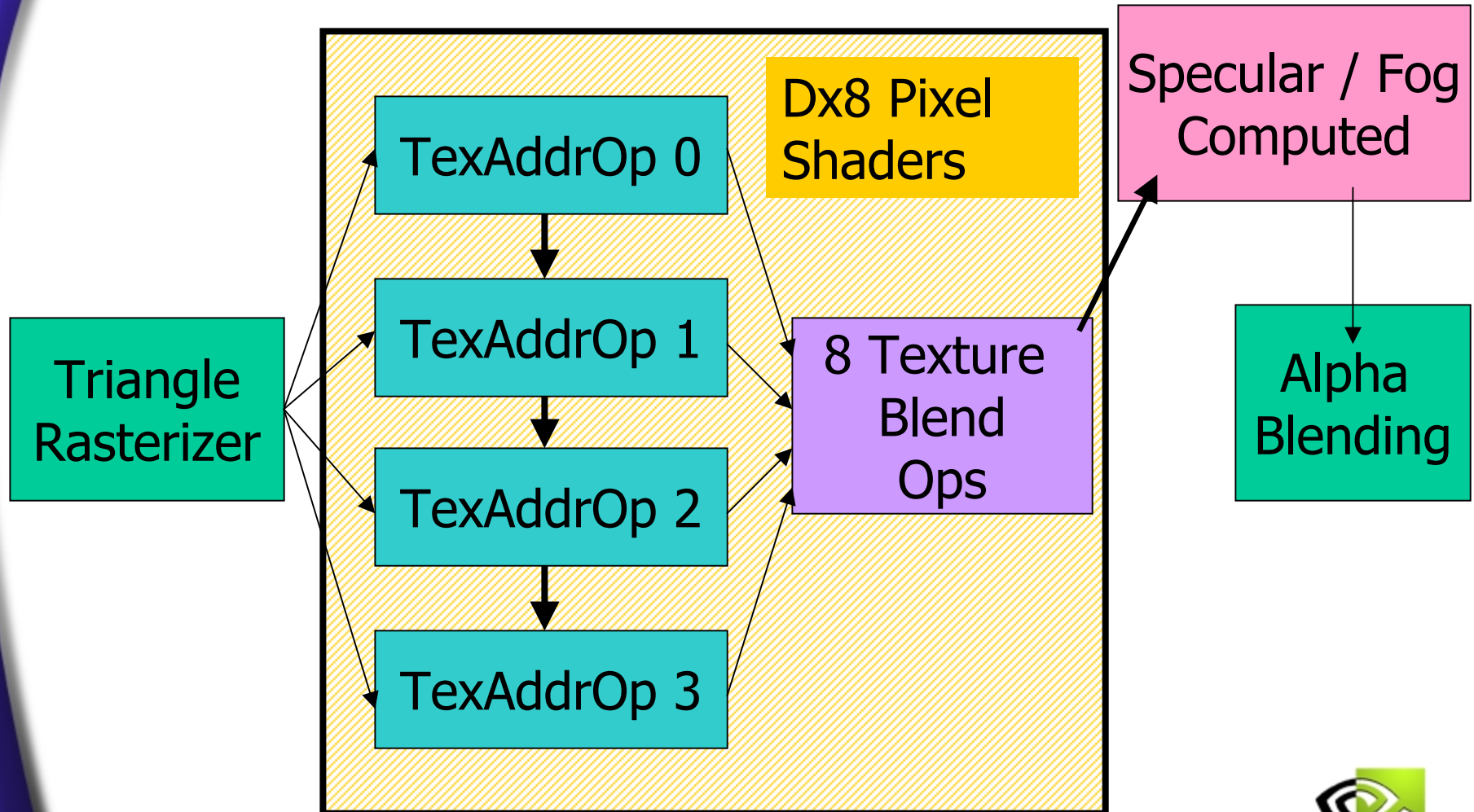
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- **Most interesting effects are enabled through multi-pass techniques**
- **DOT3 is almost always multi-pass under D3D**
  - **Full texture blending functionality of particular hardware is hidden, so more passes are forced**
- **You typically end up burning a stage or two trying to control the look of the DOT3 effect anyway**
  - **For instance, adding ambient or per-vertex colors**



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# DX8 Pixel Shading Pipeline



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# Dx8 Pixel Shaders

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- **DX8 Hardware will have the ability to use either the Pixel Shader API or the TextureStageStates**
- **Pixel Shader API allows more complicated operations**
  - **True per-pixel reflections**
  - **Dependent Textures ( like EMBM )**
  - **Only 8 Texture Blend Ops allowed**
    - **Still does not expose entire pixel shader or register combiner functionality**



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# DX8 HW & TextureStageStates

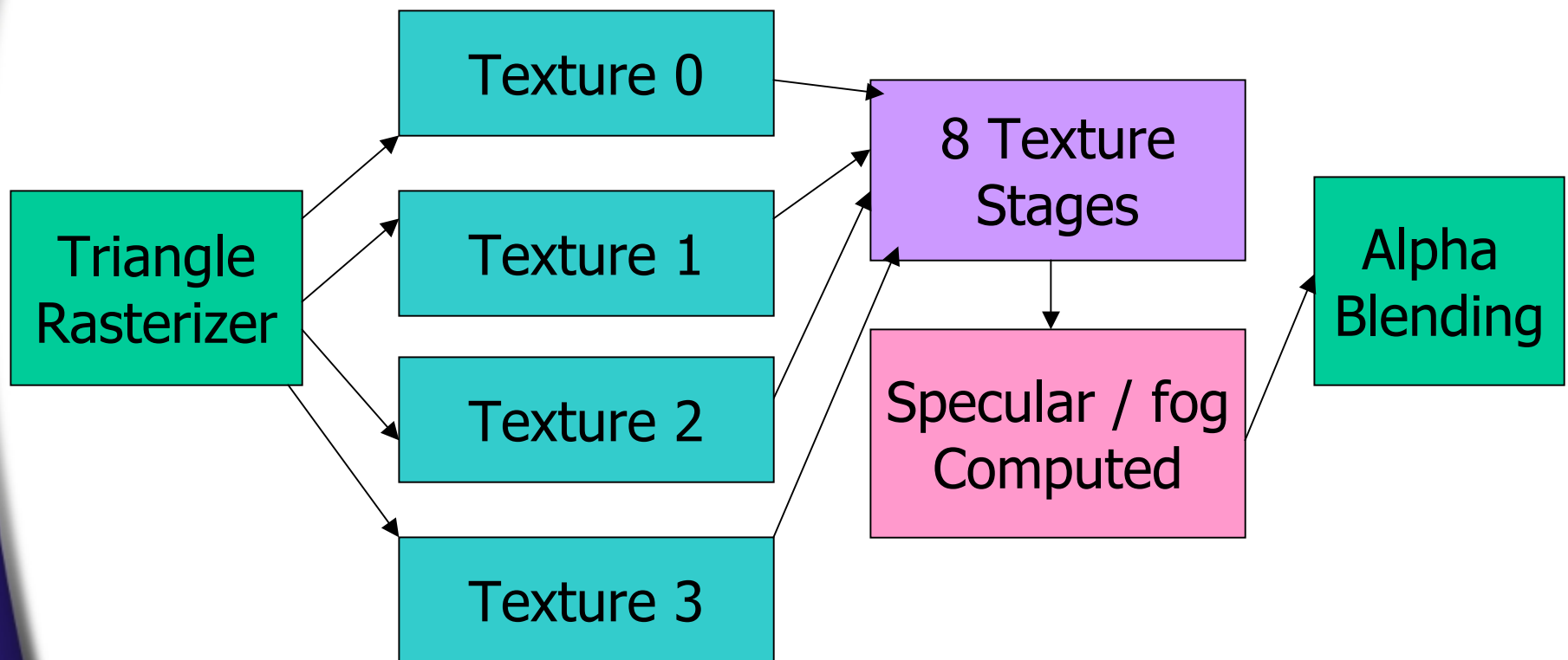
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- **Using the old TextureStageState pipeline for dx6, 7 or 8, DX8 HW will support**
  - **Every available blending operation, including EMBM**
  - **8 Texture Stages**
  - **4 Simultaneous textures**
  - **Cube and Volume Textures**
  - **Texture Border Colors**
  - **Again, this still may be subset of what the HW is capable of**



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# DX8 Texture Stage Pipeline



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# DX8 HW & Pixel Shaders

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- **Using the Pixel Shader API, there are two parts to each program**
  - **Up to 4 Texture Address Ops – Essentially here is where you say what each set of 4 texture coordinates are doing**
    - **This is HOW the texels are fetched**
  - **Up to 8 Texture Blending Ops – These map to the register combiners similarly to the old TextureStageStates**
    - **This is AFTER the texels are fetched and filtered**
    - **There is no loopback to the Texture Address Ops**



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