PROCEDURAL ADFS
THE NEXT FRONTIER
BACKGROUND

• Two common representations in computer graphics include **images** (pixels) and **SVG** (Structured Vector Graphics)

• Both forms typically overlay scalable type on top to identify elements
BACKGROUND

- Images provide rich texture and detail but don't scale without pixelization artifacts and require considerable space.

- They also provide no level of abstraction which can help when trying to convey various forms of information or when trying to edit a particular element.

Abstraction yields clarity.
SVG is compact and can be scaled to any size without loss of quality but lacks the texture and richness of images.

**SVG**: Small & scalable, but lacks texture & richness of images

**Image**: Rich with texture but not scalable and big
THE NEXT FRONTIER

- What's needed is a representation that provides the richness of pixels with the scalability and size of SVG.
- A new form of ADFs provide such a representation.

**SVG**: Small & scalable, but lacks texture & richness of images.

**Image**: Rich with texture, but not scalable & big.

- Procedural ADFs: Small, scalable, rich with texture.

- New algorithms and data structures.
Similar to Saffron, a detail directed distance field is used to represent geometry such as variable width strokes and solid regions.

The distance field is either explicitly represented in a data structure or generated on demand when required.

The distance field is supplied as input, along with other parameters, to a procedural texture generator which both modifies the geometry and adds texture and color.

The procedural component provides rich texture and detail with infinite scalability.
PROCEDURAL ADFs

• A small set of primitive procedural ADFs (i.e., a set of basis functions) can be combined to produce a very broad range of appearance styles.
PROCEDURAL ADFS: EXAMPLES

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SEAMLESS INFINITE ZOOM

- Procedural ADFs enable a 50 trillion to 1 dynamic zoom range
- Scaling is artifact free and seamless with no fades and other video tricks used to avoid popping
LAYERS

- Procedural ADFs support layering, an essential tool for deconstructing a target image into its parts
- All forms of image creation benefit from this technique
SUMMARY OF ADVANTAGES

- Richness of pixels with the scalability and size of SVG
- Seamless infinite zoom
- Easily supports layers
- Fast by exploiting the massive parallelism inherent in GPUs
- Proven high quality rendering
- Amenable to stylization for different looks and levels of abstraction