

# **Real-Time Texture Compression**

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**Introduction:** Most real-time graphics applications rely on texture data to provide visual fidelity to their rendering. Moving texture data across bandwidth intensive channels such as the network, GPU memory bus, and disk is a significant performance bottleneck. In order to improve performance, it is necessary to find ways to reduce the amount of data transferred over such channels. Lossy compression formats with hardware decompression units usually have very large search spaces for compression parameters and require novel algorithms to optimize a texture for a given format. Furthermore, a significant gap exists between data sizes of traditional image compression formats and textures.

## FasTC: Fast Texture Compressor

#### **Quality Comparison**



**Overview:** FasTC is a cross-platform tool that investigates novel algorithms for compressing textures into existing GPU formats. We provide significantly faster compression than most reference codecs while maintaining similar measured compression quality.

#### **Research Goals:**

- Determine how to quickly compress textures into existing texture compression formats with GPU decompression units
- Augment texture compression formats to support a smaller data sizes
- Develop additional compression algorithms on top of existing formats with high decompression throughput

**Results:** Various texture compression tools, new algorithms specialized for certain image types, new compression architecture



#### **PVRTC Compression Method**

NVTC Original FasTC Context

Image	FasTC	DirectX	NVTC		
Peak Signal to Noise Ratio					
kodim13	41.53	40.27	42.27		
atlas	45.16	43.77	46.32		
small-char	47.84	46.20	49.38		
big-char	47.10	45.02	48.05		



kodim13	atlas	small-char	big-char
512x768	512x512	512x512	1024x1024





Real-time Compression of Coverage Masks

**Idea:** Coverage masks are still primarily used for GPU-accelerated path

rendering on general purpose hardware. These masks are low-detail and

## SegTC: Compression using Image Segmentation

**Problem:** How do we choose from a predetermined set of block partitionings to split our compression parameters?



GenTC: Generalized Texture Compression

**Solution**: Compress the images corresponding to texture compression parameters







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Original



- Two low-res images using RGB565 - One full-resolution lerp image using 2-bits per pixel

### **Problems**:

- Codec 1 and Codec 2 are usually very slow
- Offline compression leads to large file sizes





Google

http://www.cs.unc.edu/~pavel http://gamma.cs.unc.edu/FasTC