



Paint Your Video in Style

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Style Transfer for Static Images

Content



Style



Your Art



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Style

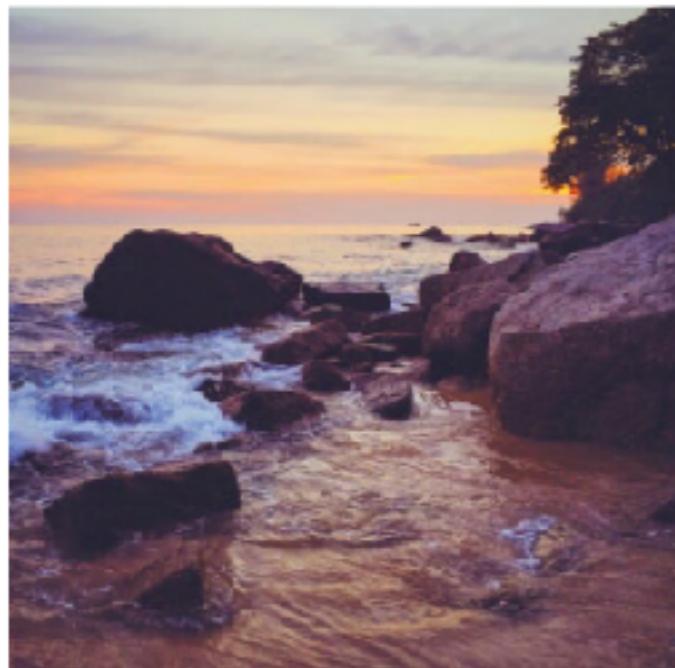


Your Art



Style Transfer for Static Images

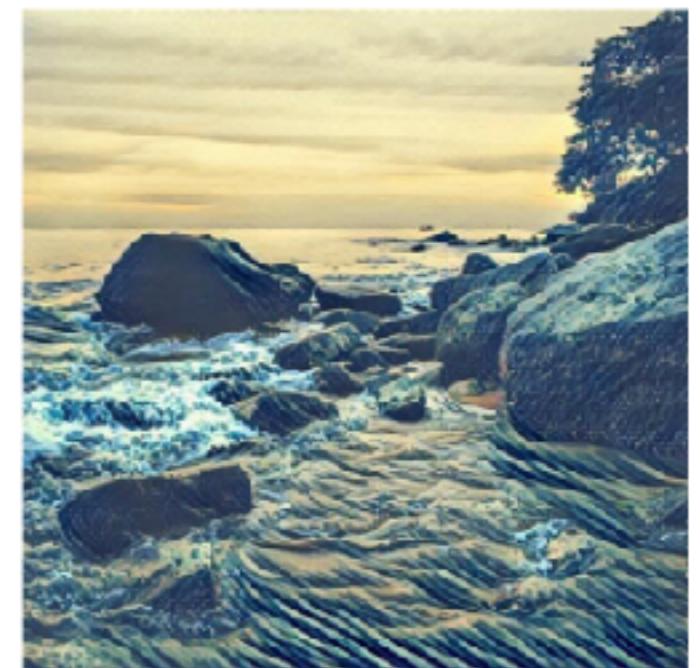
Content



Style

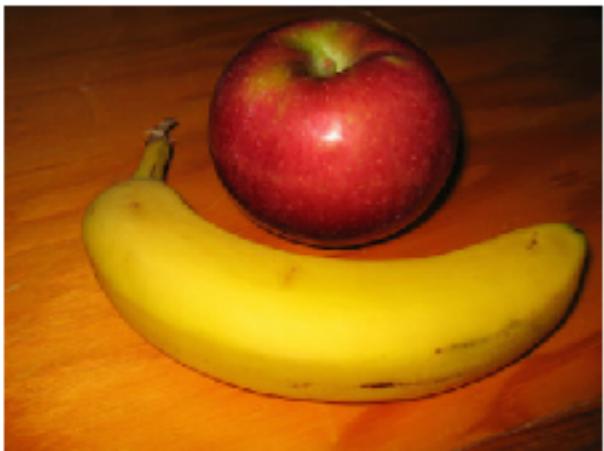


Your Art



Style Transfer for Static Images

Feature Extraction



Content Image



Layer 1



Layer 2



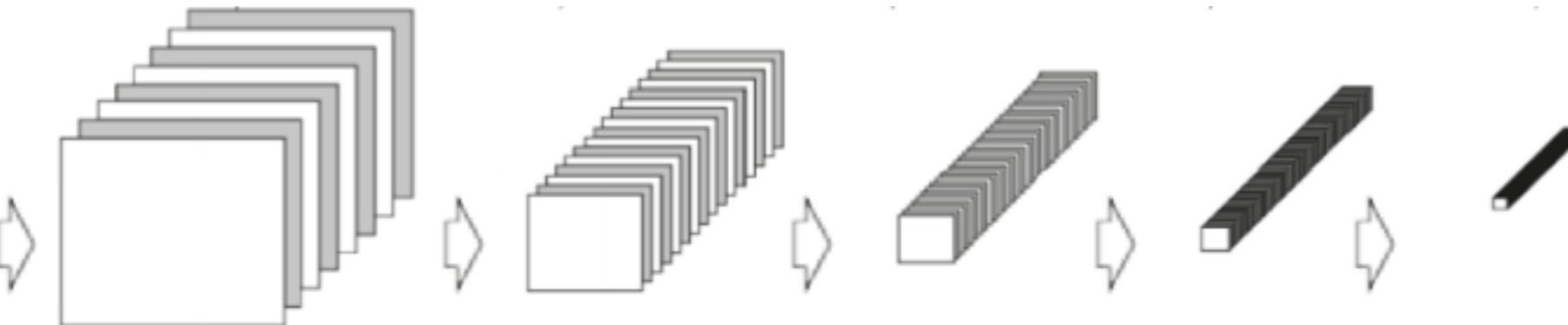
Layer 3



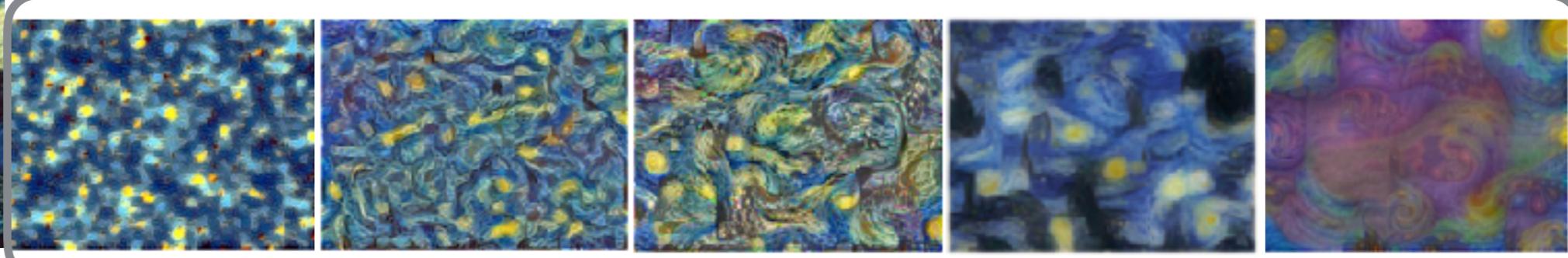
Layer 4



Layer 5



Convolutional Neural Network



Style Image

Style Transfer for Static Images

Optimization

Minimize loss function to produce transferred image.

$$\mathcal{L} = \text{Content Loss} + \text{Style Loss}$$

A Neural Algorithm of Artistic Style (Gatys 2015)

Fine-tune VGG 16

Fine-tuned the last convolutional layer with 20k images to distinguish paintings from pictures at 88%.

Feature Extraction

Content features from 4th and 5th layers.
Style features from all layers.

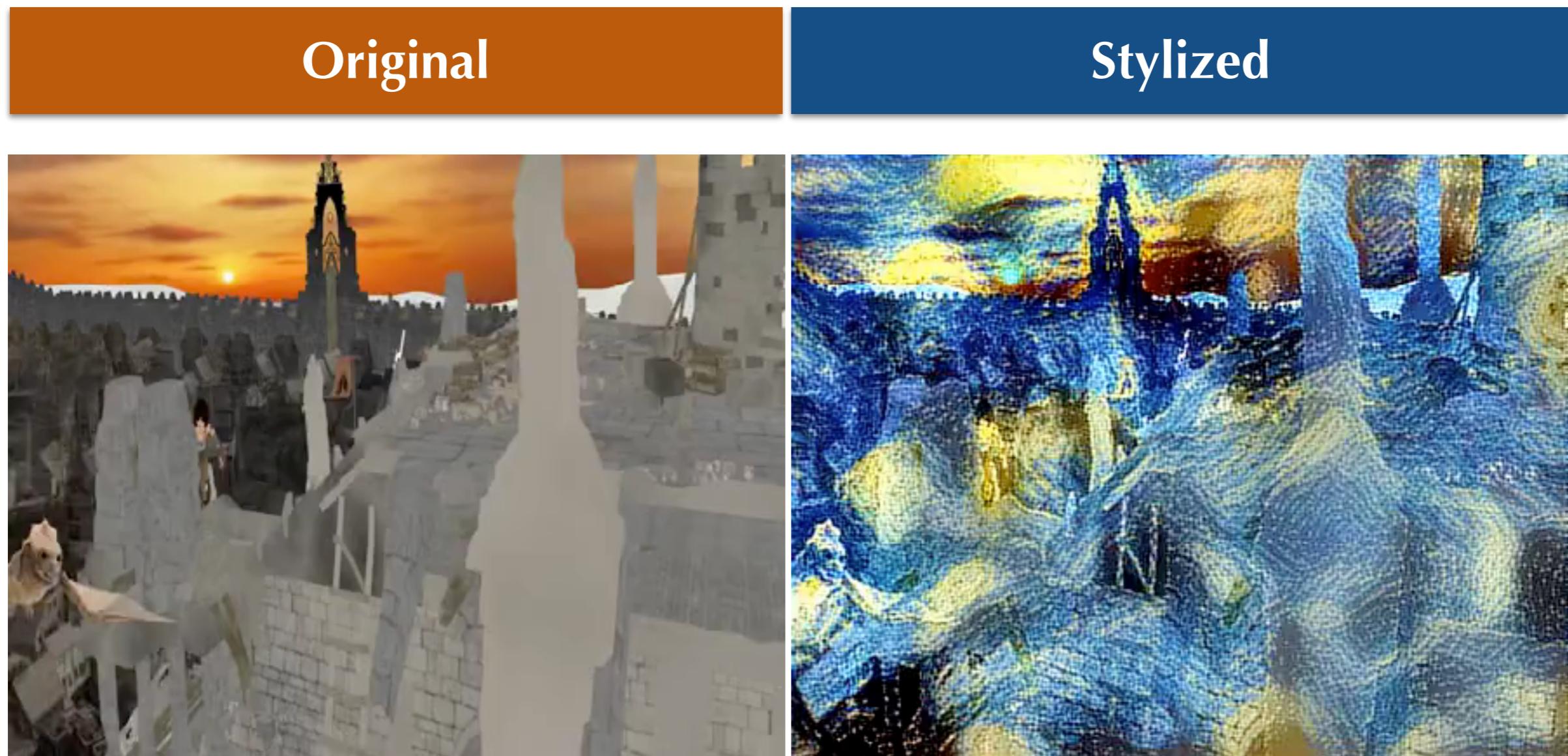
Optimization

Style Transfer
=

Loss Minimization

Style Transfer for Videos

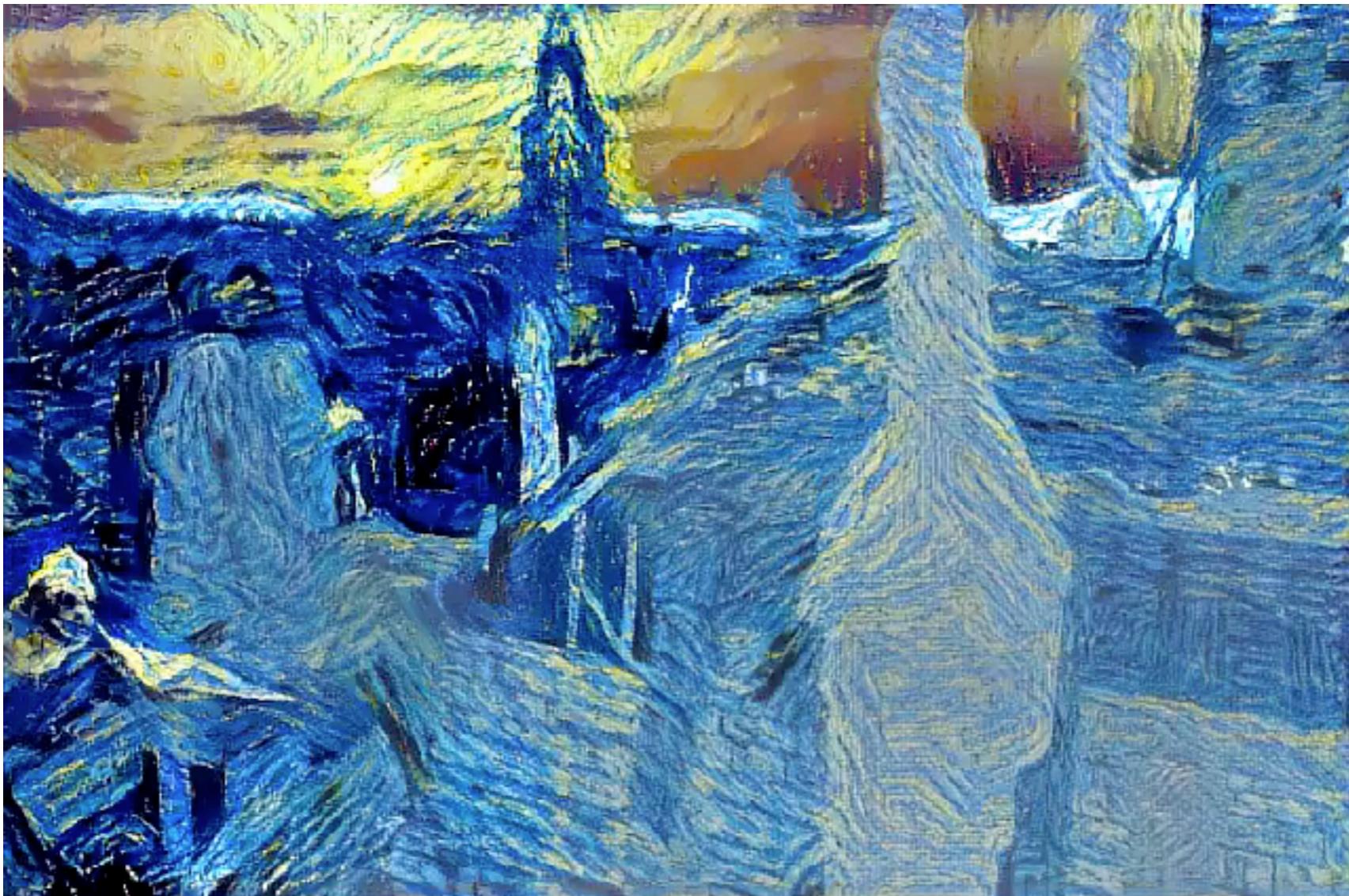
Without Temporal Constraints



Style Transfer for Videos With Temporal Constraints

$$\mathcal{L} = \text{Content Loss} + \text{Style Loss} + \text{Temporal Loss}$$

Artistic style transfer for videos (Ruder 2016)



Initialize from the last frame.

Identify moving objects to initialize them at the correct position.

Penalize temporal loss between adjacent frames.

Tools and Frameworks

Deep Learning



Web Scraping



Video Processing



Style Transfer for Videos



Style Transfer for Videos



Muse by Picasso

Scream by Munch

The Future

Google

Google Brain has pre-trained a style transfer network that substantially cuts down the running time.

A learned representation for Artistic style (Dumoulin 2017)

Facebook

Facebook is testing a video style transfer mobile app caffe2go in a few countries and it will soon be deployed in a wider range of countries.

For All of Us

Real-time style transfer on streaming data seems to be a not-so-distant possibility.

Thank you!

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