A distributed approach to creating graphical content using OpenStack and JavaScript

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Introduction

• With the rapid development of web technologies, such as WebSockets, HTML's canvas element, Node.js and cloud computing the means to create high-performance real-time interaction and visualization on the web are well primed for use.

• We have created a template to accomplish this through a private OpenStack cloud installation. Our approach is also built in such a way that it can be deployed to Amazon EC2 or Google Cloud Platform.

• HIVE: High-performance Interactive Visualization and Electroacoustics is a new platform for collaboration between artists and developers seeking to build new forms of digital expression using high-performance computing.

• A premade network topology, virtual machines, and server application in HIVE that allows individual compute nodes to render a users canvas content as graphical layers that get composited on a separate node which then outputs its content as a binary stream via WebSockets to a HTTP server.
Network Topology
Methods
• OpenStack – Cloud Computing System

Methods cont.
Methods cont.

- Node.js

Handles Event-Based Callback on Single Thread
Methods cont.

• Socket.io
Image Compositing Example

Node 1

Node 2

Node 3

Image1.js

Socket.io Connection

Image2.js

Combine.js

index.html
Results

Particles

Particle Simulation Comparison

Frames Per Second

Frame #
Future Works

• Future HIVE applications will use the strategies outlined for integrating mobile interaction, various compositing techniques, auto-scaling, and embedding audio.
Thank You