Node.js Scalability Investigation in Clouds

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Introduction

- Node.js
  - A JavaScript runtime, running on the V8 engine
  - Single-threaded, event-driven, asynchronous and non-blocking I/O
  - Widely utilized for server-side development
- Docker Swarm
  - Provides native clustering functionality for Docker
  - Provides horizontal scaling

Problem Statement

- Identify horizontal scaling characteristics of Node.js in clouds
- Detect the performance bottlenecks of Node.js in clouds
- Compare Cluster module vs. horizontal scaling

Approach

- Build a Docker swarm
- Develop a scalability-oriented benchmark suite

Result

- Sub-linear scalability
- CPU resource can be a bottleneck
- Horizontal scaling strategy outperforms the Cluster module
  - Master process handles less work and idles

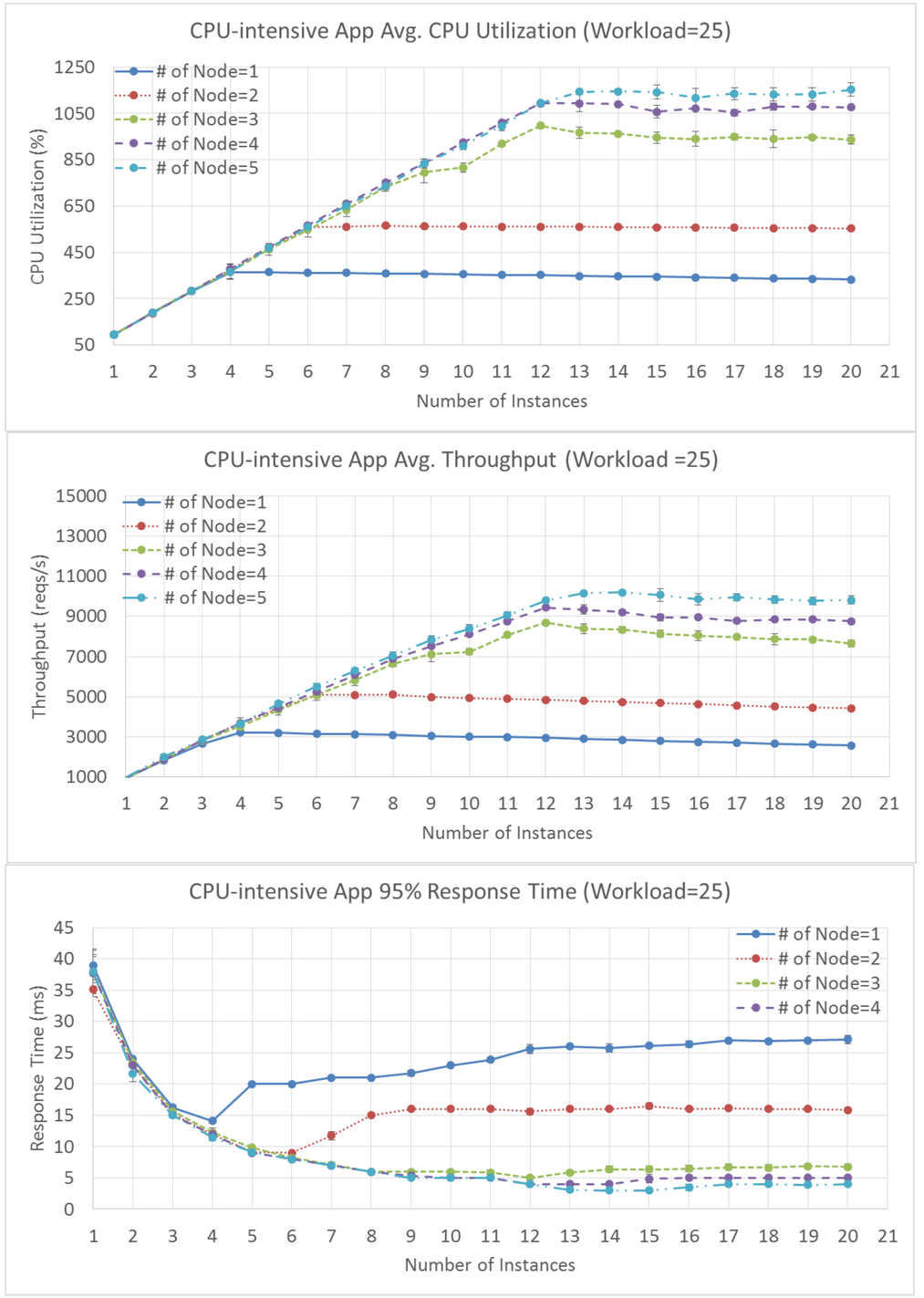

Figure 1: Scaling Effects

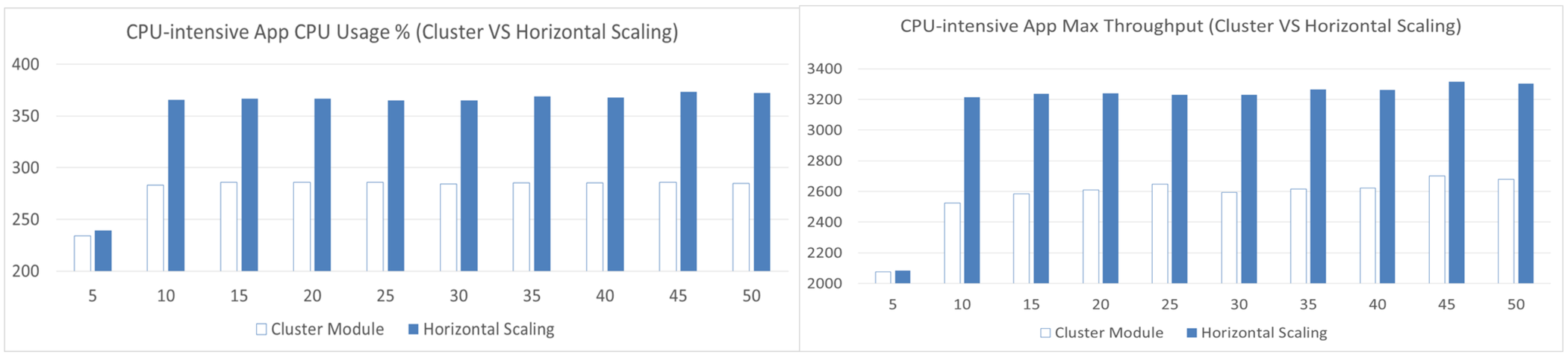

Figure 2: Horizontal Scaling vs. Cluster Module