



اونيورسيتي مليسيا قهغ السلطان عبد الله  
**UNIVERSITI MALAYSIA PAHANG**  
**AL-SULTAN ABDULLAH**

COURSE : DISTRIBUTED & PARALLEL COMPUTING  
COURSE CODE : BCN3063  
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## 1. Introduction

Syahmi Cooperation, a leading enterprise, is expanding its operations by establishing three new departments: research and development, finance, and marketing. To support this expansion, the company must decide whether to employ parallel computing or distributed computing for their network infrastructure. To ensure smooth and effective operations, each department's network must efficiently manage CPU utilization, minimize Ethernet delay, and maximize packet throughput. A parallel computing design divides and processes tasks concurrently on multiple processors within a single system, which may be advantageous for tasks that require high computational power and low latency.

Alternatively, a distributed computing architecture consists of multiple interconnected systems that share computational tasks through a network, providing scalability and fault tolerance. This approach can handle different workloads by dynamically allocating resources as needed, resulting in optimal network performance. Syahmi Cooperation must carefully evaluate each department's specific needs and workload characteristics, taking into consideration elements such as CPU utilization, Ethernet delay, and throughput packet, to determine the best computing design to implement for their expanding operations.

2. Network Topology Design

2.1 Parallel Computing Design

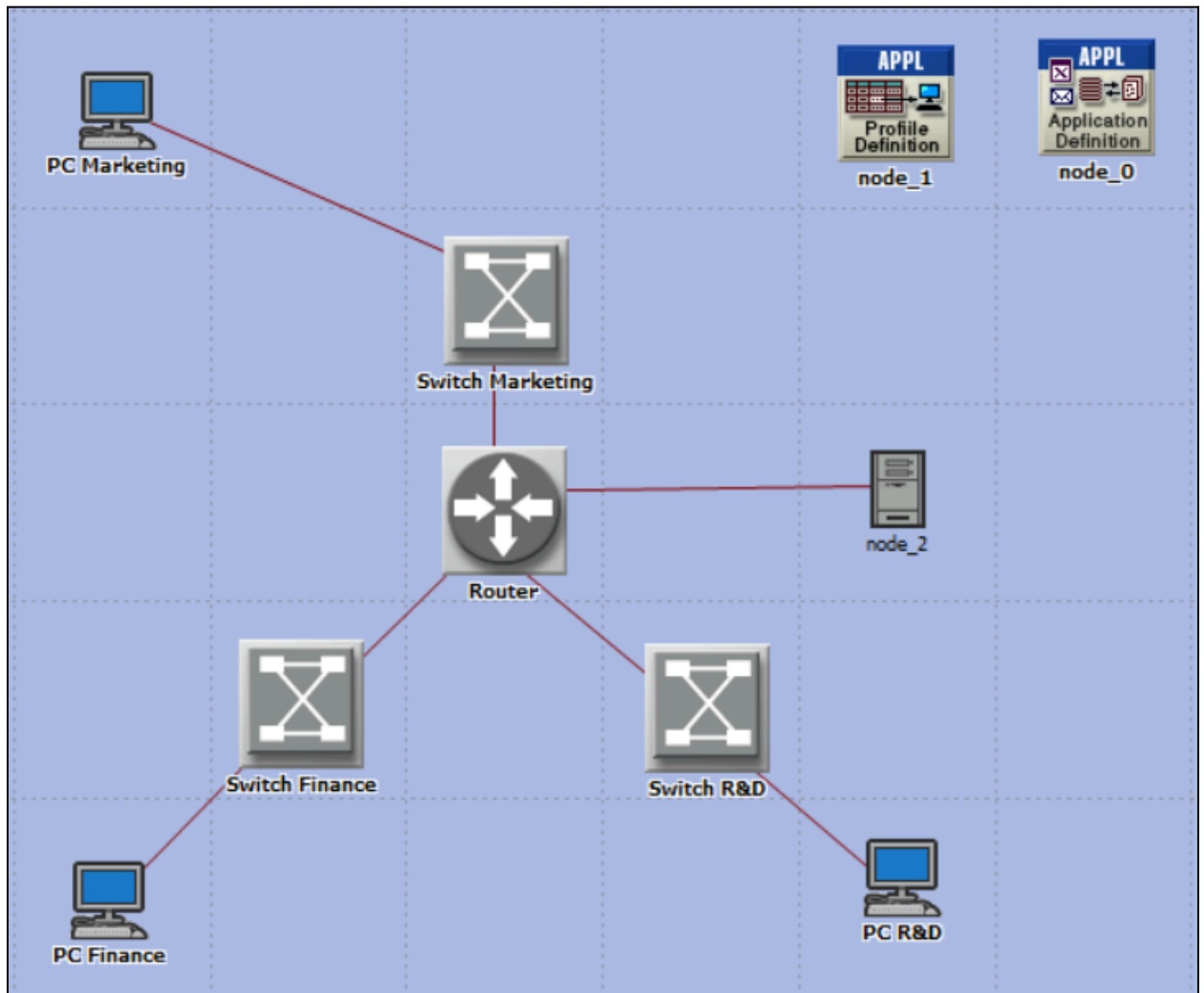


Figure 1 : Parallel Computing Design.

## 2.1 Distributed Computing Design

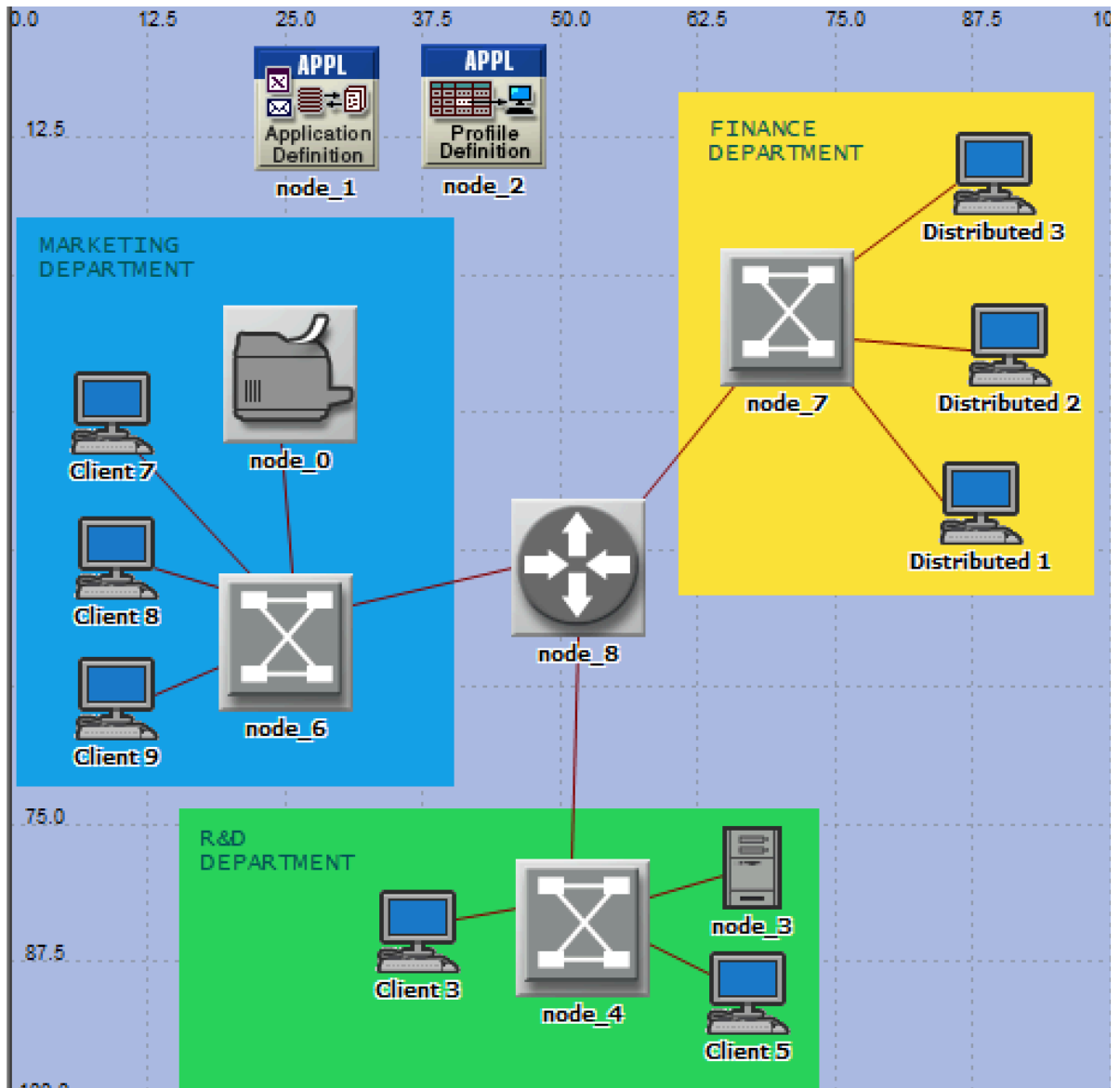


Figure 2 : Distributed Computing Design.

### 3. Comparison analysis between Parallel Computing Design and Distributed Computing

## PARALLEL

### 3.1 Ethernet Delay

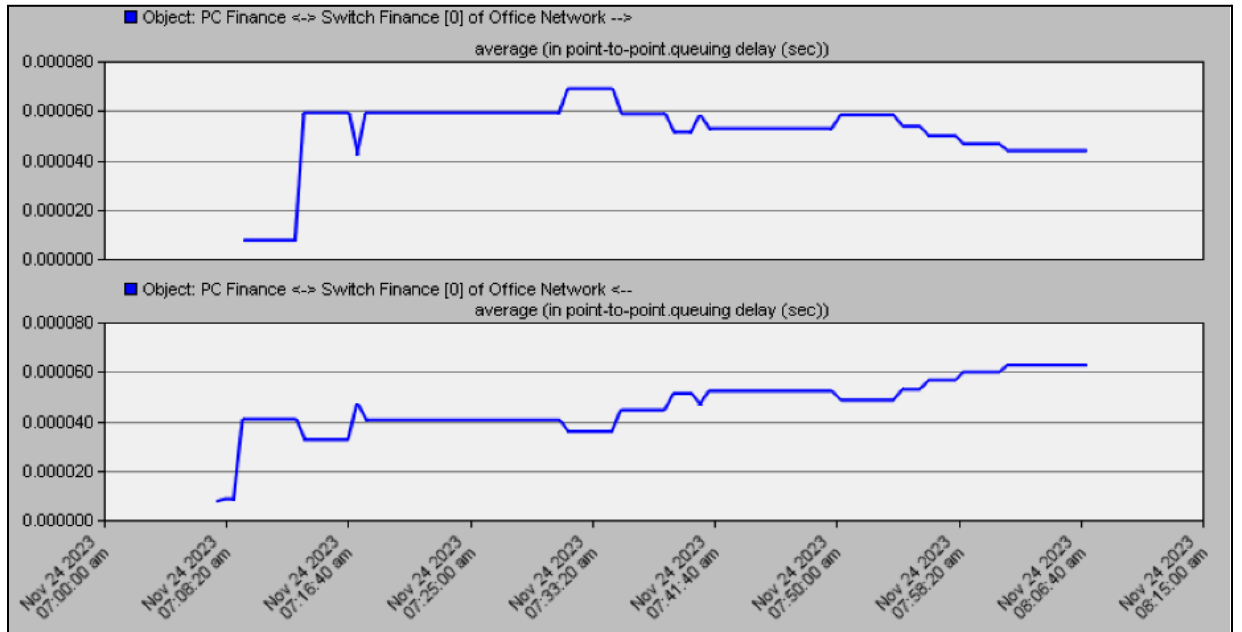


Figure 3: Ethernet delay of Parallel Computing Design.

### 3.2 CPU Time

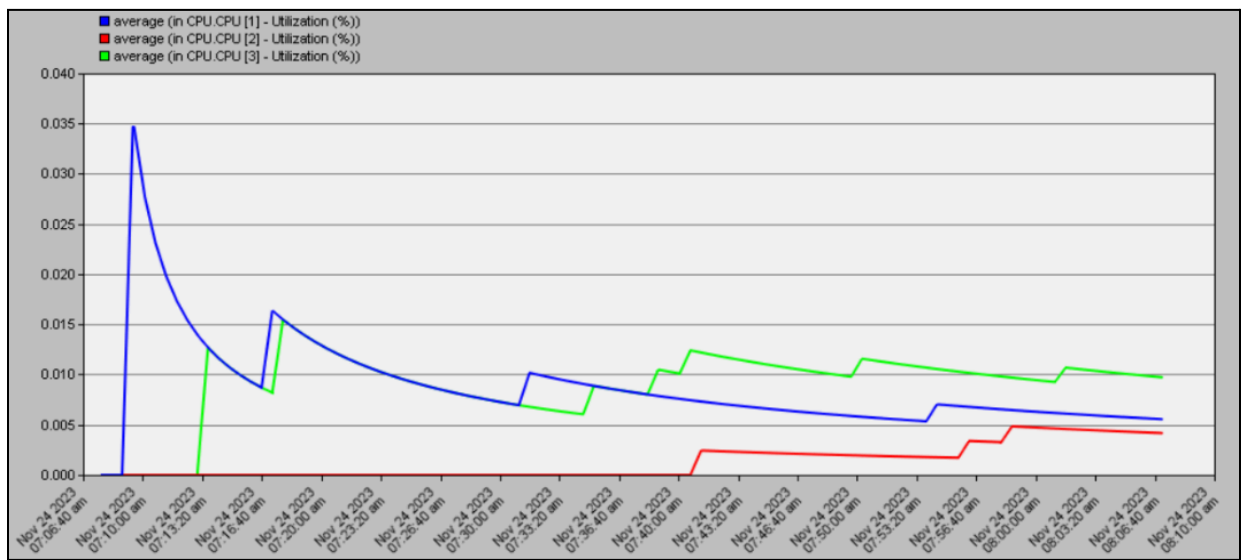


Figure 4: CPU time of Parallel Computing Design.

### 3.3 Throughput Packet

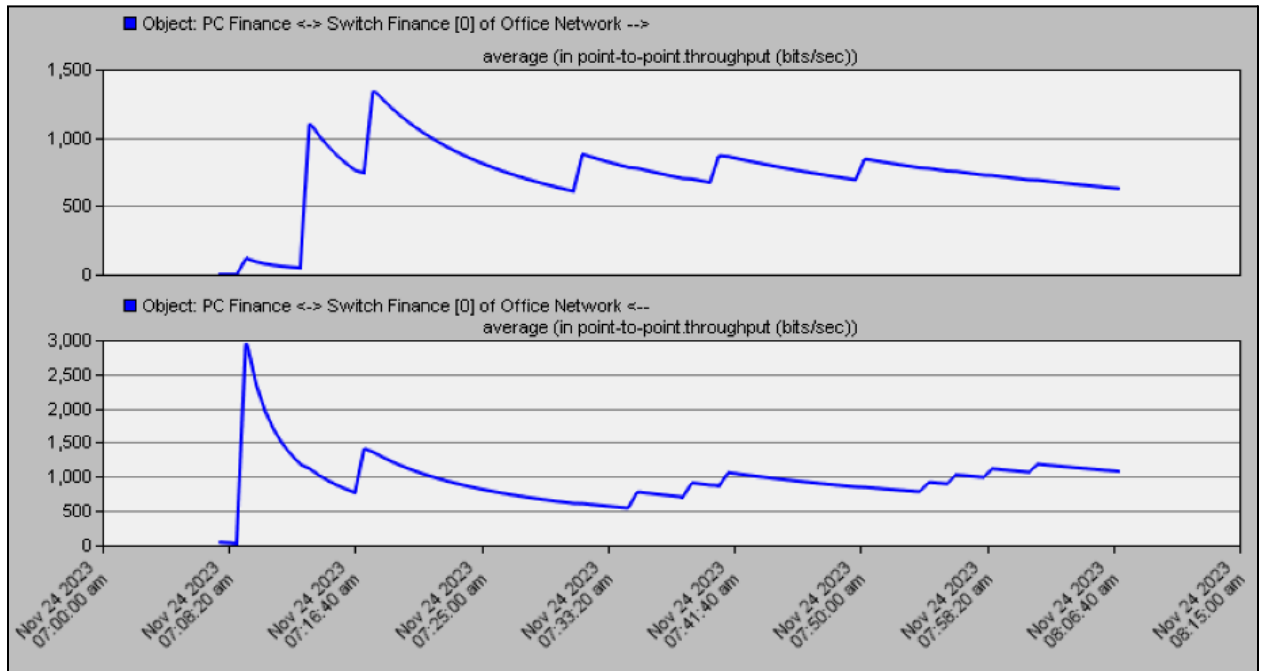


Figure 5: Throughput Packet of Parallel Computing Design.

## DISTRIBUTED

### 3.4 Cpu Time for Distributed System

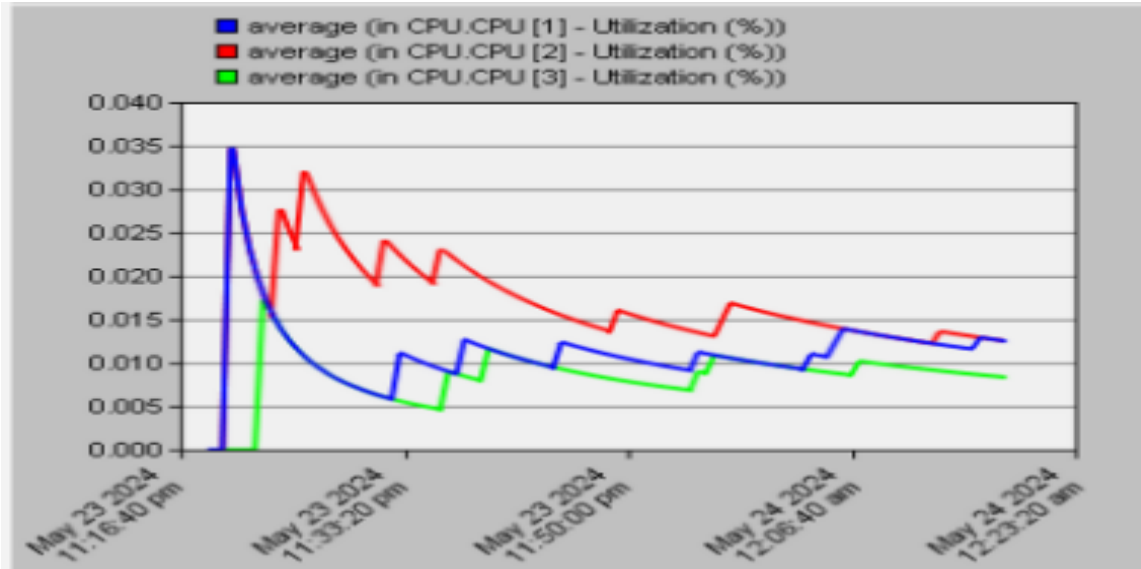


Figure 6: CPU Time of Distributed Computing Design.

### 3.5 Throughput Packet

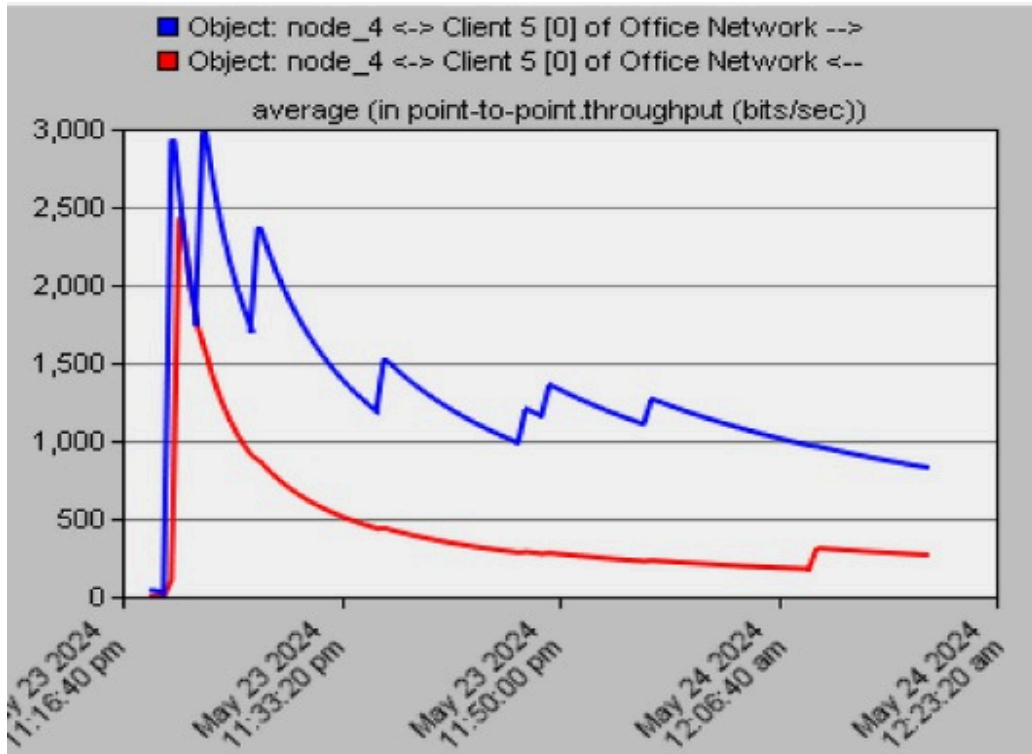


Figure 7: Throughput Packet of Distributed Computing Design.

### 3.6 Ethernet Delay

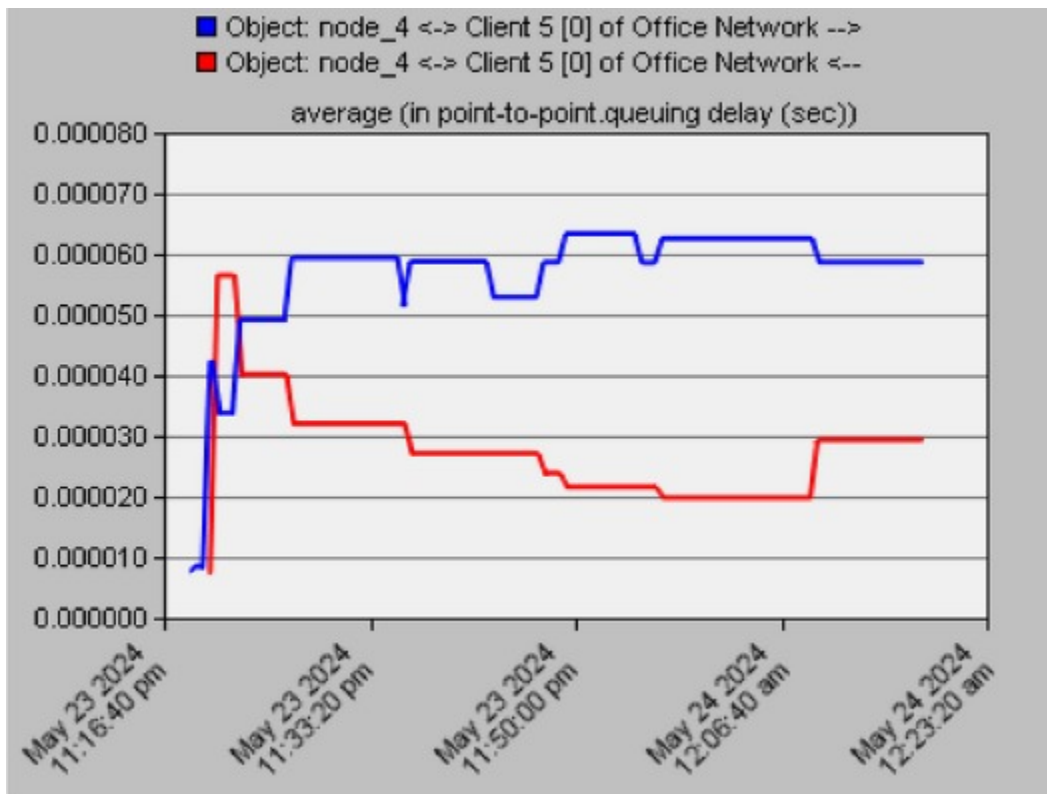


Figure 8: Ethernet Delay of Distributed Computing Design.