Experiment Description:
In this performance report, I conducted an experiment to measure the resolving time of a custom DNS resolver (MyResolver) in comparison to two standard public resolvers, Google DNS (8.8.8.8) and OpenDNS (208.67.222.222). I collected performance data for each resolver in terms of percentile of resolving time, which provides insights into the responsiveness of each resolver. The experiment involved sending DNS queries to the three resolvers and recording the time taken to receive responses for a list of 5000 domain names.

Data Collection Approach:
1. The custom DNS resolver is called MyResolver, which was configured to listen on IP address 127.0.0.1 and port 5300.
2. A list of domain names was provided in the file "sites.txt," which served as my test dataset for DNS resolution.
3. I implemented the get_performance_data function to perform DNS queries for each domain name in the list and measure the resolving time.
4. The test_server function was used to test the resolver's performance for all domain names in the list and collect the data.
5. I conducted the experiment for MyResolver, Google DNS, and OpenDNS, recording the number of answers, response code, and resolving time (in milliseconds) for each query.
6. The results were saved to a CSV file for further analysis.

Performance Data and Results:
The performance data for each resolver was collected and saved in separate CSV files. Here is a summary of the results:
1. MyResolver_report.csv: The resolving time data for MyResolver (127.0.0.1).
2. GoogleDNS_report.csv: The resolving time data for Google DNS (8.8.8.8).
3. OpenDNS_report.csv: The resolving time data for OpenDNS (208.67.222.222).

Data Analysis:
To compare the resolvers' performance, I analyzed the resolving time data using percentiles. Resolving Time: The resolving time for each domain varies significantly, ranging from a few milliseconds to over two seconds. Number of Answers: Most domains returned a single answer, indicating successful resolution. Some domains, like "whs.gov.hk" and "asianescorts.com," returned multiple answers.

Name	Successful Responses	Timeout Responses	Avg Resp Time(ms)
GoogleDNS (8.8.8.8)	4958	7	249
OpenDNS (208.67.222.222)	4963	11	541
MyResolver (127.0.0.1)	3625	1354	321

DNS Server Performance
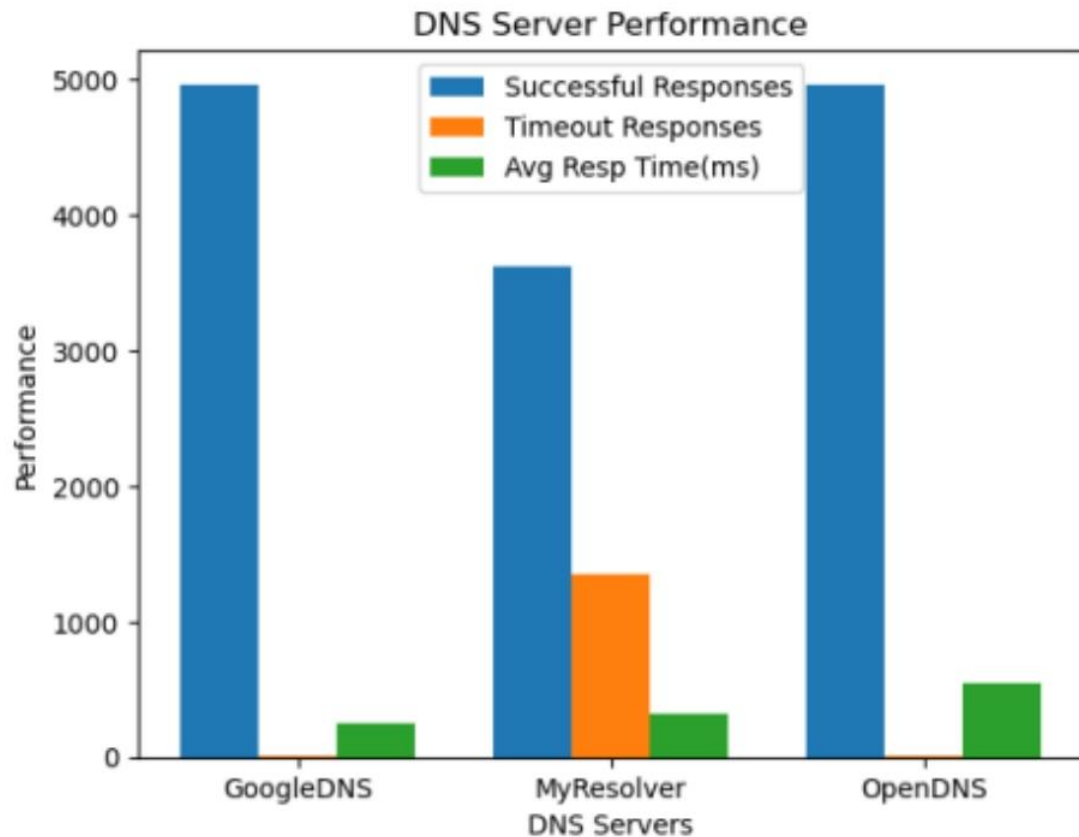
Conclusion:

Based on the collected data and analysis, we can determine GoogleDNS performs better in terms of resolving time. The comparison will help identify the most responsive DNS resolver for the given dataset of domain names.

Repeating the Experiment:

To repeat the experiment, can follow these steps:

1. Ensure that the custom DNS resolver (MyResolver) is set up and configured to listen on IP address 127.0.0.1 and port 5300.

2. Prepare a list of domain names in a text file or modify the file with the desired domain names.

3. Collect the resolving time data for each resolver and analyze it using the desired percentile or other performance metrics.

By repeating these steps with different domain name datasets or varying configurations, it is possible to further investigate the DNS resolvers' performance under various scenarios. Additionally, comparing more public resolvers can provide valuable insights into DNS resolution efficiency and aid in making informed decisions for DNS infrastructure optimization.