Exploring the Fibonacci Sequence's Application in Network Load Balancing

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Abstract

This paper explores the application of the Fibonacci sequence in the context of network load balancing, specifically through the Fibonacci Multipath Load Balancing (FMLB) protocol. We delve into how the inherent properties of the Fibonacci sequence and the golden ratio provide an innovative approach to managing network congestion, enhancing packet delivery ratios, and optimizing end-to-end delay in Mobile Ad Hoc Networks (MANETs).

1 Introduction

The Fibonacci sequence, a series of numbers where each number is the sum of the two preceding ones, manifests across various facets of nature and mathematics. This paper examines a novel application of this sequence in network load balancing, particularly within the realm of MANETs, through the FMLB protocol.

2 Background

2.1 The Fibonacci Sequence and Golden Ratio

- Definition and properties of the Fibonacci sequence.

- The golden ratio and its relationship to the Fibonacci sequence.

2.2 Network Load Balancing and MANETs

- Overview of network load balancing: objectives and challenges.

- Introduction to Mobile Ad Hoc Networks (MANETs) and their characteristics.

3 FMLB Protocol

3.1 Overview

Discussion on how FMLB leverages the Fibonacci sequence for load balancing in MANETs.

3.2 Operation

Detailed explanation of FMLB's operation, including path discovery and packet distribution according to Fibonacci weights.

3.3 Benefits

Analysis of how FMLB improves upon traditional load balancing approaches in terms of packet delivery ratio and delay minimization.

4 Case Study and Results

Presentation of a case study or simulation results demonstrating FMLB's performance in comparison to other protocols.

5 Conclusion

Summarization of FMLB's advantages in network load balancing, its implications for future network design, and potential areas for further research.