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Numbering Exchange Protocol (NEP) Specification draft-omar-nep-00

Status of this Memo

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Abstract

This document specifies Numbering Exchange Protocol (NEP).

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1. Introduction

- Numbering Exchange Protocol (NEP) is an Interior Gateway Protocol (IGP) that delivers IP packets between routers in the same Autonomous System (AS).

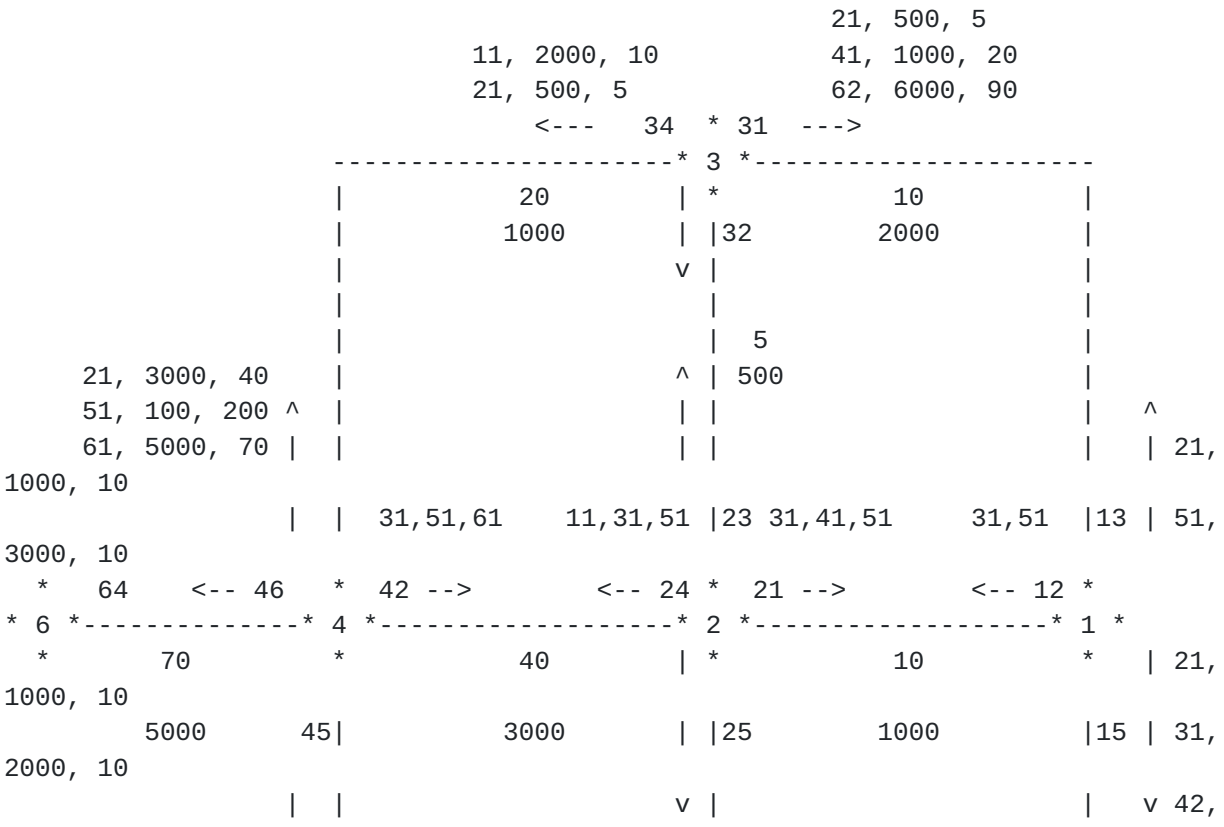
- NEP chooses its best path based on a composite metric of:

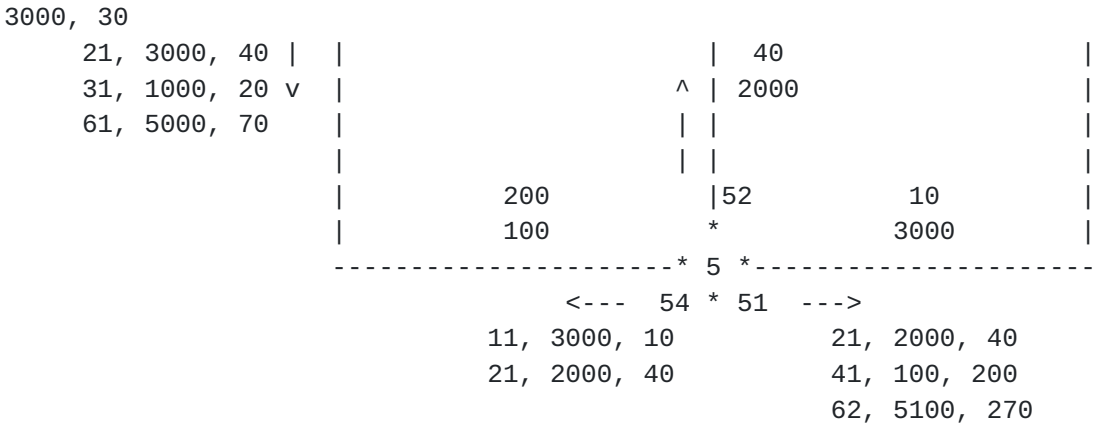
  a. Highest total bandwidth (for faster transmission).
  b. Number of hops (for less processing).
  c. Lowest total delay (for faster delivery).

- NEP uses a numbering method between routers that provides a fast topology exchange and learning process.

2. Numbering Exchange Protocol (NEP)

- The following figure shows 6 interconnected routers within an AS as follows:





- Each link has two numeric values:

  Upper value represents the link delay.
  Lower value represents the link bandwidth.

- Each router interface has a number called CUIN assigned to it and is a combination of the local and remote NEP routers' ULRNs as follows:

  xy

  Where x represents the local NEP router ULRN.
  y represents the remote neighbor NEP Router ULRN.

- Each NEP router advertises the topology information as follows:

  rh, b, d

  Where r represents the NEP router ULRN.
  h represents the number of hops to reach that ULRN.
  b represents the link bandwidth.
  d represents the link delay.

- Each router within an Autonomous System (AS) must be configured with a unique number called Unique Local Router Number (ULRN).

* Unique Local Router Number (ULRN): 8-bit decimal number that uniquely identifies a router within an AS.

- Each router advertises its ULRN first to its neighboring NEP router.

- Each router assigns the interface connected to the neighboring NEP router with a composite number called Composite Unique Interface Number (CUIN).

* Composite Unique Interface Number (CUIN): 16-bit decimal number that uniquely identifies a router interface within an AS.

- Each router advertises all the interconnected ULRNs, total bandwidth, number of hops, and total delay to the neighboring NEP router.

- Each NEP router calculates the best path to each ULRN using the following values:

  a. Total bandwidth.
  b. Number of hops.
  c. Total delay.

- The best NEP path from the NEP router to every ULRN from the collected advertised information has the following:

  a. Highest total bandwidth.
  b. Lowest number of hops that corresponds to the highest total bandwidth.
  c. Lowest total delay.

- The NEP metric is calculated using the following formula:

$$\text{Metric} = \frac{\text{(Total-BW * Total-Delay)}}{\text{No. of Hops}}$$

- The best metric has the lowest value.

- Each NEP router sends an Echo message of each of its interface to the neighboring
  NEP router, the time taken by the message to be sent and received over the link
  divided by 2 determines the link delay.

- The Echo message is sent by every NEP router every 10 seconds (by default).

- The link delay value is updated every 10 seconds on every advertised message that
  contains the 3 values that can be used to determine the best path from the NEP router
  to every ULRN.

Security Considerations

Acknowledgments

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References

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