World Engineering & Applied Sciences Journal 7 (4): 212-219, 2016
ISSN 2079-2204

DOI: 10.5829/idosi.weasj.2016.212.219

Mitigating Link Failures and Implementing Security Mechanism in Multipath Flows for Data Plane Resources

[1]*M. Ramya and* [2]*V. Ramesh*

[1]Department of Computer Science and Engineering,
Kalasalingam Institute of Technology, India
[2]Department of Computer Science and Engineering,
Kalasalingam Institute of Technology, Krishnan Koil, India

Abstract: The transmission of a traffic flows with a certain bandwidth demand over a single network path is either not possible or not cost-effective. In these cases, it is veritably periodic usable to improve focus the network's bandwidth appliance by breaking the traffic flow upon multiple qualified paths. Using multiple paths for the equivalent traffic flow increases the certainty of the network, it absorbs deluxe forwarding resources from the network nodes and also it overcomes link failure provide security. In this paper, we illustrate several problems related to splitting a traffic flow over multiple paths while minimizing the absorption of forwarding resources mitigates failures and implementing security.

Key words: RMO (Routing with minimum overhead · DMO (Decomposition with minimum overhead) · MPC (Multiple Routing Configuration) · OSPF (Open Shortest Path

INTRODUCTION

In networks group of interconnected computers and peripherals that is capable of sharing software and hardware resources between many resources based upon traffic flow. The traffic flow splits into multiple traffic sub flows, using information in the packet header at IP/MAC addresses in the UDP/TCP. Multiple paths provide less expensive and possible services. Networks can connect with other networks and contain sub networks. Set of technologies that connect computer allows communication and collaboration between users. Use these traffic sub flows are generated by different applications, or even by different hosts, it is attainable to route each of them over a different network path. Using multiple paths for a traffic flow is useful when routing over a single path is impossible or too expensive.

The capability to recover from failures has always been a main design goal on the Internet. IP networks are intrinsically booming since IGP routing protocols like OSPF are designed to demand the forwarding information based on the changed topology after a failure. This reconvergence believe full distribution of the recent link case to all routers in the network domain. When the new state information is distributed, every router individually calculates new valid routing tables. This network wide IP reconvergence is a time consuming action and a link or node failure is typically followed by a period of routing instability. During this action, packets may be dropped due to invalid routes. This phenomenon has been studied in twain IGP and BGP context and has an adverse result on real time applications. Overcome error implements security using several ways. Using this approach in multipath provides results.

Related Works: Banner R. And Orda A [1] Developed multipath routing scheme should limit the number of paths per destination, the end-to-end delay of each path and the delay variance (delay-jitter) between different paths that ship traffic towards the same destination. This paper provides the first comprehensive study that establishes practical multipath routing strategies with provable performance guarantees, in terms of load balancing and congestion minimization using RMP(Restricted Multipath), RDJM(Restricted delay jitter multipath). Both techniques provides multipath services.

Corresponding Author: M. Ramya, Department of Computer Science and Engineering,
Kalasalingam Institute of Technology, India.

Hartman T, Hassidim A, Kaplan H [2] Produced the problem of decomposing a flow into a small number of multi paths Many practically deployed flow algorithms produce the amount as a decide of cost associated with the network links. However, to actually deploy a flow in a network we often need to present it as a set of paths between the source and destination nodes. Using Fraction Method provide multipath.

Greenhalgh A, Wischik D [3] the latest large-scale data centers offer higher aggregate transmission and robustness by creating multiple paths in the basis of the network. The latest large-scale data centers offer higher aggregate bandwidth and robustness aside creating multiple paths in the core of the network. To utilize this bandwidth requires different flows take different paths, which poses an objection. In short, a single-path transport seems ill-suited to such networks. Proposed using Multipath TCP as a replacement for TCP in such data centers, as it can effectively and seamlessly adoption available bandwidth, giving improved throughput and better fairness on many topologies. Using ECMP (Equal Cost Multipath) provides multipath.

Lee S, Yu Y, Nelakuditi S, Zhang Z and Chuah C [4] Proposed novel proactive intra-domain routing access – Failure Insensitive Routing (FIR) for ensuring high service availability and reliability without changing the current destination-based forwarding paradigm. There are two key ideas that under the proposed accession: interface-specific forwarding and provincial rerouting. These ideas enable us to infer link failures based on packets' arrival (the interfaces they are coming from), pre-compute interface-specific forwarding tables ("alternative" paths) in a distributed appearance and trigger local rerouting without relying on network-wide link-state advertisements. The proposed approach can effectively knob transient link failures that are most frequent in today's networks. It enhances failure elasticity and routing stability by suppressing the advertisement of transient breakdown and locally rerouting packets during the suppression stage.

Theoretical Analysis

Project Scope: The scope of this project provides multi path and develops multiple routing configuration approach for recovering from link failures in networks with proactive backup calculation and implements security. The highlight of the developed approach is that recovery of link failures.

Problem Statement: In existing system no prior work deals with minimizing the number of nodes traversed by paths that satisfy a given traffic demand. Moreover, no prior work deals with the decomposition of a given network flow while minimizing the number of nodes traversed by paths.

Proposed System: The aim of this project is provides multipath services and mitigates link failure implement security mechanism. In this paper provides multipath services in two ways. Such RMO (Routing with Minimum Overhead) and DMO (Decomposition with Minimum Overhead).Overcome Link Failures using Multiple Routing Configuration Approach [5, 6].

RMO (Routing With Minimum Overhead): It gives traffic demand. Problem can be solved between simplest paths. Minimize the number of nodes Routing with minimum overhead is given and the problem is to find a set of simplest paths between the source and destination nodes accomplished which the bandwidth demand can be delivered while minimizing the number of paths or the number of nodes they traverse. Using two algorithms provides multipath.

Scaling Algorithm: Assigns each node in the network. Choose sender and receiver of the network. Uses the maximum Length path flow procedure. Transforms data to sender to receiver. Steps of scaling algorithm given below

Step 1: Scale the capacities
Step 2: Find a network flow whose value is not larger than $[B/\alpha]$in the scaled network.
Step 3: Find any decomposition of into paths. Let the resulting set of paths be $P=p_{1..}p_k$, where path carries a single-path flow of f_i.
Step 4: Use every path p_i?P to bear a single-path flow of in the original graph.

DMO(Decomposition with Minimum Overhead): It supplies traffic demand and bandwidth demand. It can be break into a set of simplest paths. Minimize the number of nodes and the can be provide multipath. Network flow that satisfies the bandwidth demand between source and destination nodes. This network flow predetermined according to some bandwidth efficiency criterion, such as bandwidth cost and the problem is to break it into a set of simplest paths between the source and destination nodes although minimizing the number of paths or the number of nodes traverse. The diagrammatical representation of DMO is given below this diagram represents decomposition of flow and optimization of flows in multipath routing strategies. Using Greedy algorithm provides multipath [7].

Greedy Algorithm: Assigns each node in the network. Select sender and receiver node in the network. Choose path in the network. Send data to sender and receiver. Steps of greedy algorithm is given below:

Step 1: B°_B , f° _f.
Step 2: Repeat until B^i=0

Choose the path that can provide the largest portion of from the source to the destination. This can be begin using the extended Dijkstra algorithm.

Step 3: Return.

Multiple Routing Configuration Approach: Our MRC access is threefold. First, we create a set of backup configurations, so that every network component is excluded from packet forwarding current one configuration. Second, for each configuration, a standard routing algorithm like OSPF is used to compute configuration specific shortest paths and create forwarding tables in each router, based on the configurations. The adoption of a standard routing algorithm guarantees loop-free forwarding within one configuration. Finally, we design a for-warding accord that takes advantage of the backup configurations to provide fast recovery from a component failure.

Simulation System Design
Architectural Diagram:

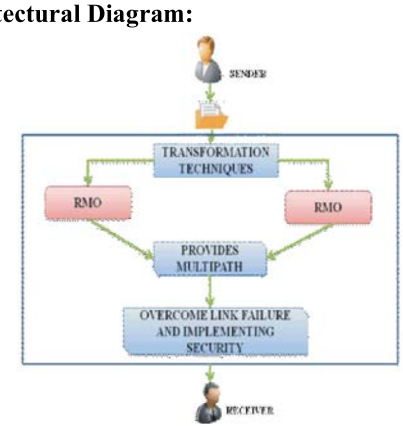

Fig. 4.1: Architectural Diagram

Architecture design representation of multipath routing strategies. Sender transfer files to destination the transformation techniques of multipath flows classified into two types.RMO and DMO.Based upon those techniques provides multipath and also recovers the failure.

RESULTS

As in the case of provides multi path and overcomes failures. Its overcomes single link failures and dual link failures.

Screen Shots: Software testing is probe conducted to provide stakeholders with information about the quality of the product or service below test. Software testing also provides an objective, independent view of the software to allow the business to acknowledge and understand the risks of software implementation. Test techniques include, but are not limited to, the action of executing a program or application with the decide of finding software bugs.

Nodes Desktop:

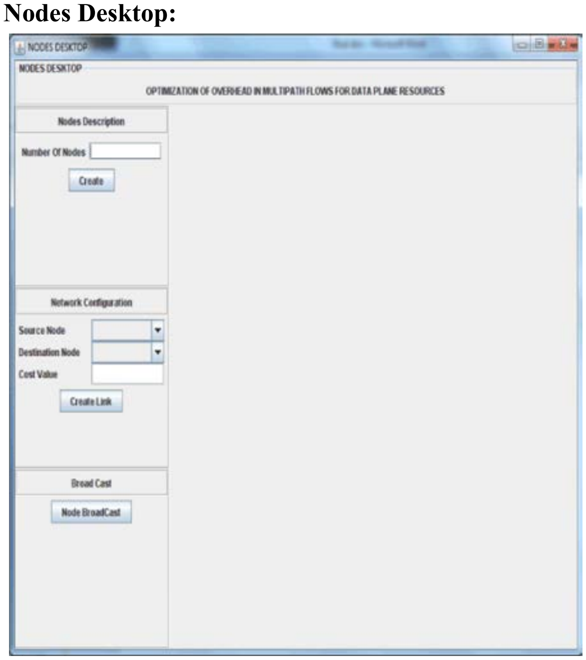

Fig. 5.1.1: Nodes Desktop

Here it is nodes desktop form. In this form represent nodes desktop, nodes configuration and broadcast. In nodes desktop represents number of nodes formation, nodes configuration represents sender and client information. Last nodes broad cast represents broadcast services.

Nodes Generation:

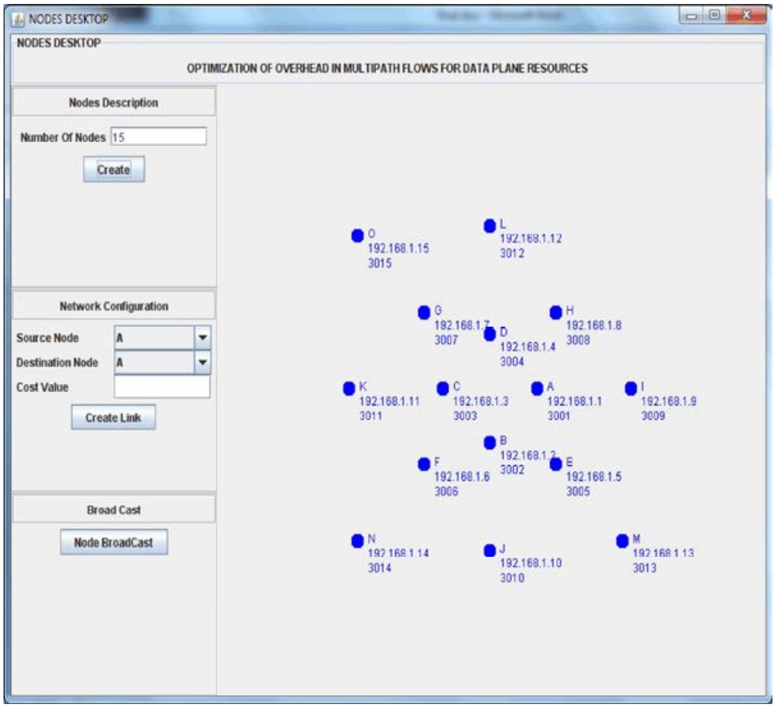

Fig. 5.1.2: Nodes Generation

Here this is the nodes generation. In nodes generation represents number of nodes in the network. And also its generate network.

Link Generation And Cost Value Representation:

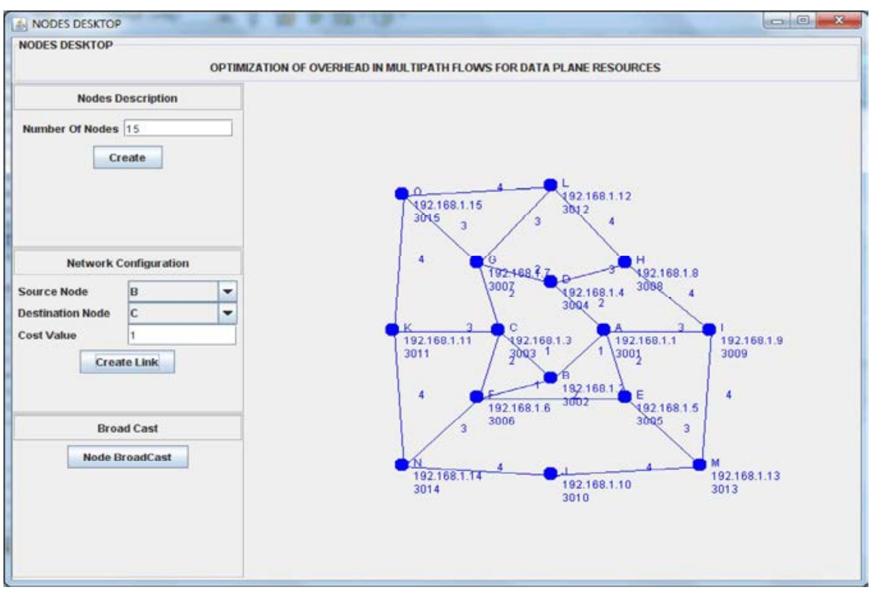

Fig. 5.1.3: Link Generation and Cost value representation

Here this is the link generation and cost value representation of network. In cost value represents connectivity between number two nodes in network. Each node assign between cost value.

Router Configuration:

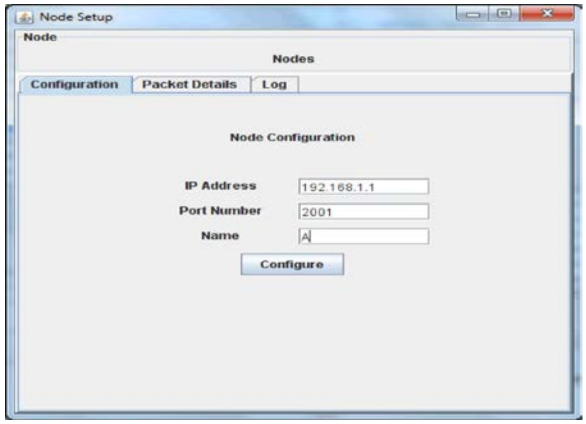

Fig. 5.1.4: Router Configuration

Here this is the router configuration. In router configuration represents number nodes connects between each and individual nodes in network. Router configuration represents between ip address and port number. And also its epresents configuration, packet details and logs.

Data Transformation:

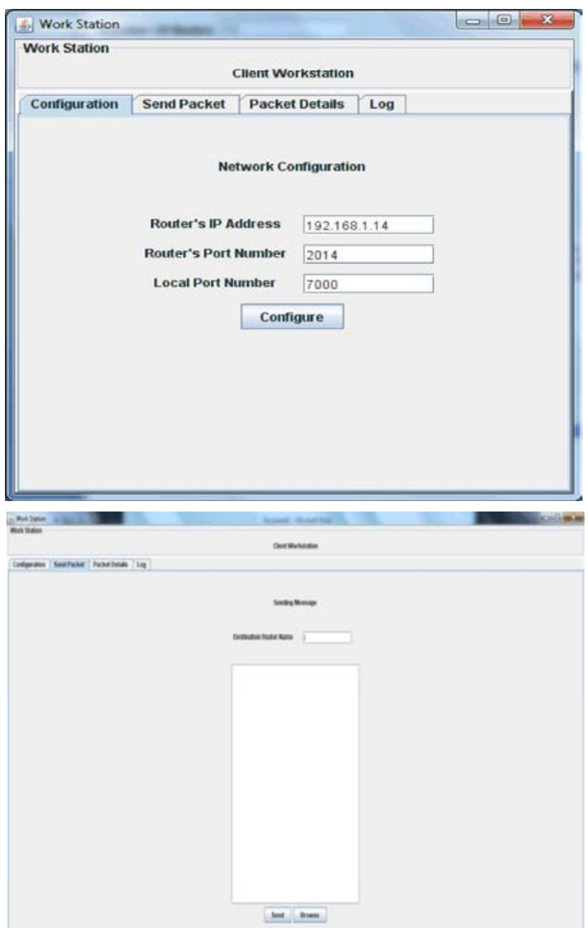

Fig. 5.1.5: Data Transformation

Here this is the data transformation representation in network. It can represent transformation of messages.

Multipath Technique Representation:

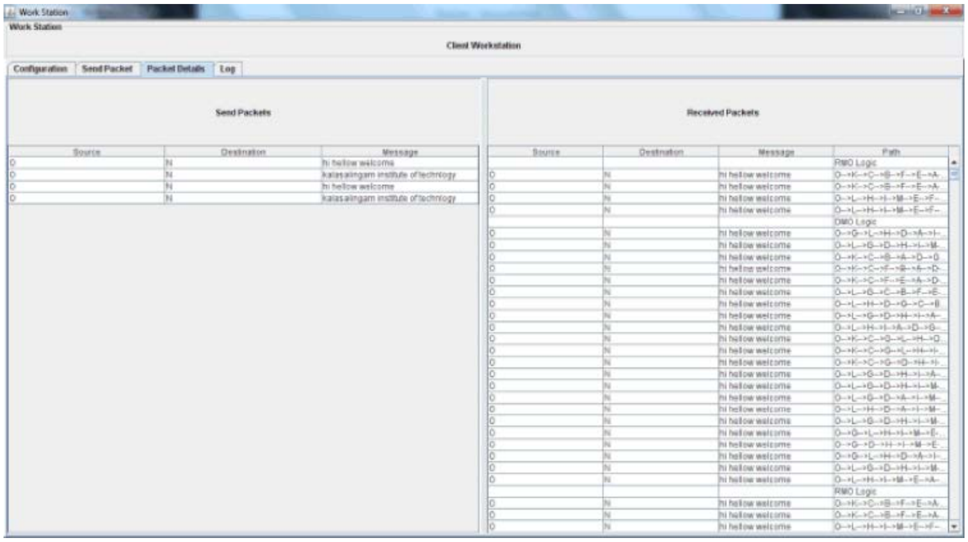

Fig. 5.1.6: Multipath Technique Representation

Here this the multipath technique representation. In this form represents RMO, DMO and shortest path services in network.

Link Failure Representation:

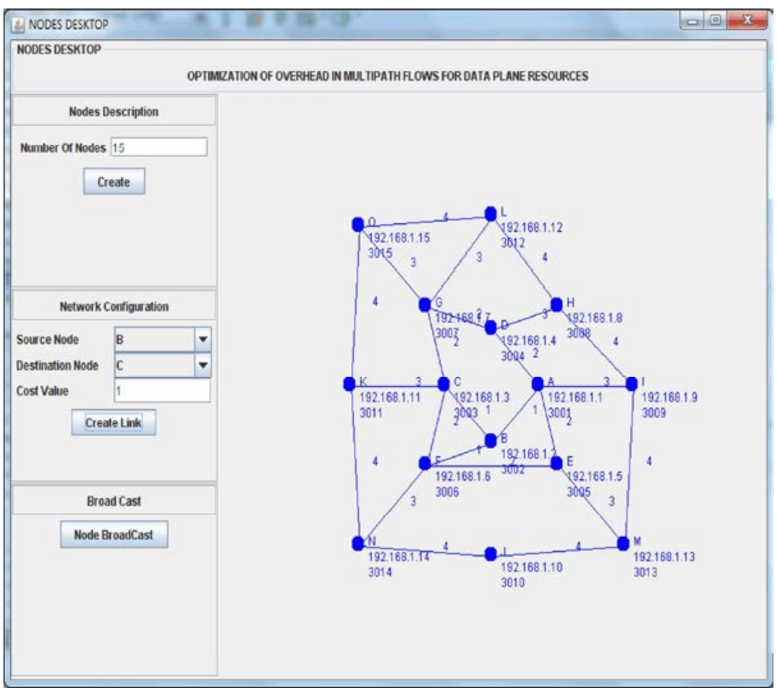

Fig. 5.1.7: Link Failure Representation

Here this is the link failure representation. Using MPC procedure overcome link failure.

Performance Evaluation: In this paper produces performance evaluation based upon following tables.

Table 5.3: Problem tackles

Problem	Minimum Bound	Approximation ratio
DMO(p)	-	$O(\log(B/b))$
DMO(n)	-	$O(\log(B/b))$
RMO(p)	3/2	$O\left(\frac{B}{opt.\alpha}\right)$
RMO(n)	3/2-€	$O\left(\frac{B}{\alpha}\right)$

In this table, B denotes the bandwidth demand, b denotes the quantum of the edge capacities, *opt* denotes the value of the optimal solution and α is a tuning parameter.

Theorem 1: The approximation ratio of $O(\log(B/b))$ is given below:

$f^{i}(p_i) > f^{i}(p_j^*)$

f denotes network flow, p denotes path and p_j* denotes optimal solution.

$$opt.fi(pi) \geq \sum_{j=1}^{OPT} fi(p_j^*) \geq \frac{Bi}{b}$$

Opt.fi denotes optimal network flow. Based upon this formula provides DMO multipath.

Theorem 2: The Approximation ratio of $O\left(\frac{B}{\alpha}\right)$ is given below $\Sigma_i\, w\, i = B$

W denotes width of flow and B represents bandwidth.

$$c(e) \geq \sum_{e \in Pi} wi$$

C denotes capacity.w denotes width. Based upon this formula provides RMO multiapath.

Simulation Area:

Table 5.3.1: Simulation Area

Range	Area
X axis	698m
Y axis	641m

Here this is the simulation area of network formation. In X axis represents height and Y axis represents Width.

Bandwidth Calculation:

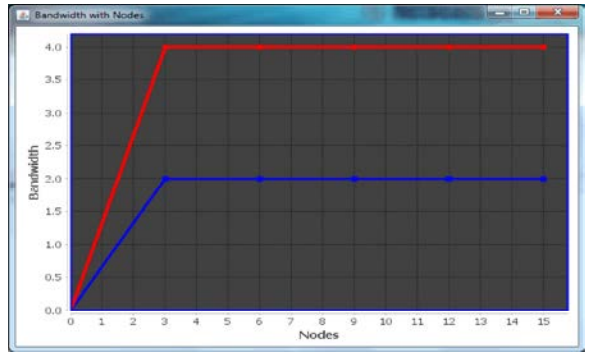

Fig. 5.3.1: Bandwidth Calculation

In this performance analysis provides forwarding result calculation. It can be based upon two techniques. Finally its provides results.

Cost Value Calculation:

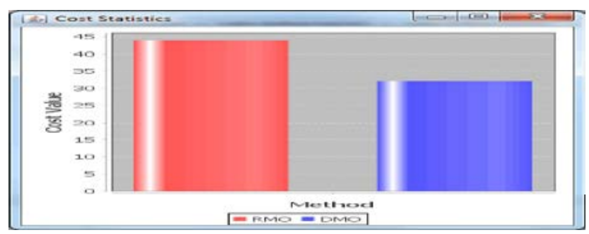

Fig. 5.3.2:Cost value

Table 5.3.2: Cost value table

Method	Cost Value
RMO	32
DMO	43

Here this is cost value representation. Its represents amount of total cost value.

CONCLUSION

In spite of improve the band width demand and traffic demand in RMO and DMO techniques. Propsed efficient practical heuristics for RMO produced multi path and proposed efficient practical heuristics for DMO produced multipath. Both techniques used to wired and wireless network. Finally both provide overhead services and also overcome link failures.

Future Work: The Enhancement of this project includes creation of more number of nodes and links and also simulate recovery scheme for different types of wired networks in order to achieve better performance.

REFERENCES

1. Banner, R. and An Orda, 2014. Efficient multipath-routing schemes for congestion minimization, Technion Israel Institute of Technology, Haifa, Israel, Tech. Rep.
2. Hartman, T., A. Hassidim and H. Kaplan, 2012. How-to split a flow? In Proc. IEEE INFOCOM, pp: 828-836.
3. Handley, M., A. Greenhalgh and D. Wishek, 2011. Improving datacenter performance and robustness with multipath TCP, in Proc.
4. Lee, S., Y. Yu, S. Nelakuditi and Z.L. Zhang, 2004. Proactive vs. reactive approaches to failure resilient routing, in Proc. IEEE INFOCOM, 1: 176-186.
5. Chauvet, F., P. Chretienne and P. Mahey, 2008. Simple bounds and greedy algorithms for decomposing a flow into minimal paths, Eur. J. Oper. Res., 185(3): 1390-1401.
6. Chen, Y., Y. Sun and X. Shen, 2009. Achieving maximum throughput with a minimum number of label switched paths in MPLS Proc. Networks, in ICCCN.
7. Nakibly Gabi, Reuven Cohen and Liran Katzir, 2015. Optimizing Data Plane Resources for Multipath Flows, Technion Israel Institute of Technology, Halfa, Isreal, Tech Rep.