A Steady Routing Structure for Flawless Traffic Flow Over the Network

[1]M.Sneha priya, [1]PG Student
Department of Computer Science and Engineering,
[1]PG Student, Department of CSE,Parisutham Institute Of Technology And Science,
Thanjavur, India

***Abstract*—This paper proposes a QoS routing framework for real- time mission-critical and life crucial communication like tele- engineering and telesurgery. Such communications ar time period and seamless, and demand the exhausting timeliness guarantees on message delivery lag-time and recovery delays encountered owing to the network part failure. Success of the fulfillment of those 2 needs depends upon the performance of routing. Routing framework projected here may be divided into 2 parts: 1) active channel routing; 2) backup channel routing. Active channel routing theme projected here is in a position to pick out QoS path with minimum network components. Backup routing is an energetic path's phase based mostly local-recovery theme. A network resource reservation based mostly proactive routing / rerouting has been adopted thus on deliver the goods a higher service continuity. Backup routing theme, identifies the weakest link or set of links of primary path. Routing methodology projected during this paper is in a position to optimize resource utilization and ensures the continuity of seamless flow with optimum performance over the pc network.**

Keywords - Service Continuity, Quality-of-Service (QoS) Routing, Reliability, Recovery, Seamless Flow.

I. INTRODUCTION.

In its beginning, computer communication was based on datagram store-and-forward IP technology. This technology is unable to handle the delay-sensitive applications. However, with the emergence of high speed networking and advancement in switching and routing technology, network is becoming more and more competent in handling the real-time traffic such as tele-surgery, tele-engineering, medical image processing, audio and video conferencing involving digital continuous media [9,14]. Most of the real-time mission-critical applications demand the seamless traffic flow. Therefore, requirement guarantees on the timeliness in terms of message delivery and failure recovery delay are important [10]. In this paper attempt has been made to obtain these timeliness guarantees through a resource reservation based schemes both for active path and backup path. Active path is the channel through which traffic must flow seamlessly if the path is not having any failure. Backup paths are the channels which reroute the traffic from the active path at the time of its node or link failure [8]. Dependability of the real-time communication can be achieved through the trading-off the various parameters of the path or channel; such as reliability, throughput, capacity or bandwidth, end-to-end delay and jitter. ReI iabil ity is indicative of expected time to survive. Hence, it provides necessary data for the planning of backup path. remainder of the parameters i.e. throughput, capacity, end-to-end delay and interference ar associated with the transmission performance. responsibility and timeliness each ar essential style thought for the continuity ofreal-time mission-critical (RTMC) communication. to meet the timeliness demand, this paper adopt following policies:

1.choice ofmuIti-constrained QoS active path.
2.Reserving the spare resources for backup path.
3.step-down of knowledge loss and recovery time, just in case offail ure.

Each one of those steps involves the routing schemes and sign for satisfactory operation and performance [8]. Recovery timeliness guarantee issue is said to correct|the right|the correct} allocation of spare resources and proper sign mechanism for the recovery cycle [10,8]. This paper ensures the element accessibility through spare resource reservation.The problem of the network resources allocation for the continuity oftraffic flow is corresponding to finding the end-to-end QoS path. This downside has been wide mentioned within the literature [1,16,10,11]. There ar numerous algorithms to pick AN optimum multi-constrained path. Timeliness performance for the trail to be used throughout the traditional operation will be achieved through the allocation of links with high information measure and minimum node delays and process delays [11,13]. However, traditional traffic will be discontinuous at any time on prevalence of failure and/or congestion of any link. Therefore, there ought to be a meeting of dependable recovery mechanism to keep up the continuity in spite of the element failures or congestion. Another contribution of this paper is that the introduction of the convergence of multi-constraints (capacity, delay, reliability) into one weight that simplifies the computation ofQoS path.

II.REQUIREMENTS OF THE CONTINUITY

Quality of service continuity in period of time mission-critical application is relying upon numerous parameters [8], those may be divided into 3 categories:
Category-I: Those parameters that ar chargeable for the transmission performance, these are: capability or information measure, throughput, delay (transmission,

queuing delay etc.), noise (delay variation).
Category-2: Those parameters that ar chargeable for the dependableness performance, these are: failure (MTTF), maintainability or mean solar time to repair(MTTR),availability=(MTTF/ (MTTF+MTTR), frequency of failure throughout the requiredamount.
Category-3: Those parameters that ar answerable for the recovery performance, these are: recovery time, availableness of spare resources, backup resources, backup resource allocation theme, and fault mechanism.

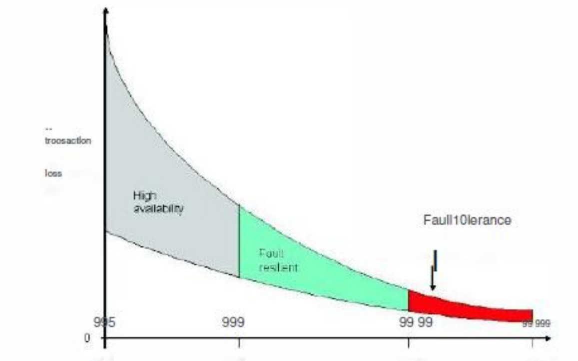


Fig. I. Transaction Loss vs. Communication Channel Availability

First network demand for the service continuity is that the institution of end-to-end path incorporating some or all the parameters mentioned in category-I. Second network demand for the continuity is that the provision of maintenance to deal with the failures. All types of maintenance action need bound time to bring back the operation of the system. this point is liable for the service handiness of the pc network. per the expression of handiness, no system is 100% out there. However, with the employment of quick recovery mechanism like self-healing techniques and automatic protection change (APS) etc., network will absorb the failures. It suggests that one will replace the MTTR by the MTR (mean time to recovery) i.e. MTR (:: 0), will build the communicating just about 100% out there. It ought to be noted spare resources ought to be reserved beforehand so as to form the recovery operation faster; otherwise with facilitate of unreserved resources recovery are slower. Therefore, this paper proposes the resource reservation theme for the mission vital applications.
Another necessary demand for the service continuity of communication is expounded to the loss of transactions occurred throughout the recovery amount[5]. this will be simply understood with the assistance of a curve shown in Fig.I[IO]. during this curve channel handiness has been divided into 3 classes per the vary of handiness in proportion i.e. high handiness (99.5-99.9), fault resilient (99.9-99.99) and fault-tolerance (99.99-99.999). annually down time for every class is eight hour, fifty three minutes and eight minutes severally.

III RESOURCE RESERVATION SCHEME FOR CONTINUITY

Fig.2 shows the requirement of spare resources for the service continuity between terminals s-t. Network resources area unit routers, switches, server and interconnecting links etc. Network resources area unit reserved thus on deliver the goods the QoS delivery of real-time data[4]. Separate resource reservation theme has been adopted for each the first channel and backup channels. it's been adopted that that usually traffic travels on the first channel and it's rerouted on the backup path just in case of the failure of primary channel. just in case of the node / link failure, renairrate is verv hiQ:h.

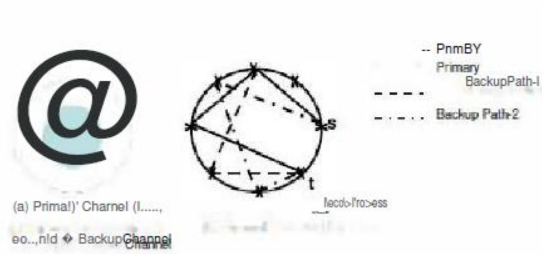


Fig.2. Primary and Backup Channel for Continuity

Establishment of End-to-End Dedicated Channel:
Primary channel is AN end-to-end QoS path that ought to have such characteristics that the majority of the traffic follows the first path. It ought to have spare information measure and minimum process delays thus on minimize the message delivery delay on this path[1]. For fulfilling the onerous timeliness needs, we've got thought of the 2 constraints: delay and capability. each of those ar having useful relationship. we've got thought of responsibility of link united constraint thus on defend the physically weak links. On the idea of various heuristics following optimized ways could also be defined:

Minimum delay path: Optim ized Path wherever path price is finish-to- end delay [6].
Most Reliable Path: Optimum path having most responsibility [17,6].
Best-Performing Path: wherever all the performance constraints ar to be optim ized [15].

Problem of building the first or backup channel is that the downside of reserving the network resources for a multi constraints path. Multiconstraints optimum path downside are mentioned in [14]. All of those strategies, initial of all fmd the possible ways then optimize these ways for the value of path. Our approach reduces the process efforts of this 2 steps approach and proposes a replacement simplified method of multi constraints path choice. One will apply the Dijkstra's based mostly algorithmic program for locating the shortest path with some modifications[4].

IV.DEVELOPMENT OF PATH SELECTION ALGORITHM

Concept of Constraints Convergence Technique (CCT): A network are often shapely by a graph G(V,E), wherever V is ready of nodes andE is that the set of interconnecting links. every link (u, v) E E is followed by the 2 nodes u and v. Routing relies on the selection of parts for the end-to-end path. downside of deciding a QoS path is same as fmding the finish-to- end multi-constraint optimum path [18,20]. There could also be a quite large number of constraints those could have an effect on performance of time period communication however solely 3 vital constraints as advised in [7, 15] are thought-about for path computation. These are often classified into 3 categories: delay, information measure or capability, dependableness.

Let (J be the information to be transmitted via a position (u,v). every link (u,v) is allotted by 3 weights wk(u,v): wl(u,v)= c(u,v), capability is that the bottleneck parameter, w2(u,v)= d(u,v), delay is associate degree additive parameter, and w3(u,v)= r(u,v), responsibleness is that the increasing parameter. The minimum coordinated universal time needed to transmit (J units of knowledge from node 'u' to node 'v' via a position (u, v).

With the help of equations (1), (2) and (3), we can formulated following relationship for three constraints capacity, delay and reliability for a link (u,v) that is transmitting (J unit of data:

One can easiIy understand from (1)-(4) that multiplication of all w(u,v) correctly represent the cost of path. On multiplication ofthis weight for all series links of a path P(vl ,v2, ..., vk):

One can apply Dijkstra's like algorithm [2] for fmding maximum cost given by equation (5).

Taking the natural logarithm of equation:

w(u, v)=r (u,v).exp(-T (u, v)) this can be modified as follows :

W (u, v) = -In w(u, v)

Expanding this function:

W (u, v) = -In r (u, v) + T (u, v) (6)

Now apply path selection algorithm with this link weight.

V.ALGORITHM

Algorithm maintains 2 sets of vertices S and letter of the alphabet. Set S contains all vertices that the worth d[v] is already the price of the least weight path and set letter of the alphabet contains all different vertices. Initially ,S is empty, letter of the alphabet is similar to N, and in every the first step vertex is moved from letter of the alphabet to S[5]. This vertex is chosen because the vertex with lowest price of d[u]. once a vertex u is touched to S,ALGORITHM]ATH relaxes each outgoing edge(u ,v).

```
ALGORITHM_PATH
function BPP(G,w,s)
for each vertex v in N
    d[v] := infinity
    previous[v] := undefined
    d[s] := 0
    S := { s }
    Q := N - {s}
While Q is not an empty set
    u := Extract Min(Q)
    S := S union {u}
    Q := Q - {u}
for each edge (u,v) outgoing
    from u
    if d[v] > d[u] + W(u,v)
    d[v] := d[u] + W(u,v)
    previous[v]:=u
    End_while
    End_BPP
```

A.Implementation of ALGORITHM_PATH:

Computer network, shown in Fig.3 [15], has been used for illustration of ALGORITHM PATH.

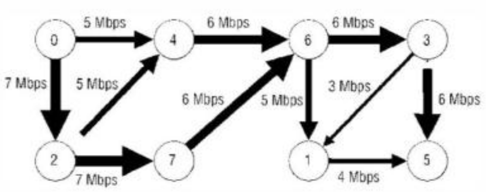


Fig. 3. Network used for Finding Channel Path

For 100 units of flow ALGORITHM_PATH computes path (0,4,6,1,5) as active channel.

B.Improvements on ALGORITHM_PATH:

a)Capacity Computation:Capacity is mainly chargeable for the QoS of the information transfer path. For a period of time seamless transmission, capability shouldn't be below the required Iimit to

provide the guarantee for message transfer lag-time.Hence ,neglect such links from the configuration then run the ALGORITHM PATH for the changed topology. This method has been as referred to as the topology pruning.

TABLE I

Link(u,v)	r(u,v)	d(u,v)
(0, 2)	0.7	0.80
(0, 4)	0.7	0.50
(1, 5)	0.7	0.95
(2, 4)	0.8	1.00
(2, 7)	0.9	1.50
(3, 1)	0.8	0.70
(3, 5)	0.7	0.76
(4, 6)	0.6	0.80
(6, 1)	0.9	0.85
(6, 3)	0.7	0.75
(7, 6)	0.8	0.90

b)Scaling the Constraint Parameters for the Dominance: in expression (6) two components might not be comparable therefore we are able to face that one parameter could become a lot of dominating. To
solve this downside we've got introduced the scaling factors C one and C2.
For finding the QoS path with the order of preference of the parameters r,c,d. Equation (7) and (8) can be modified by adjusting the value of Cl,C2 and C .

VI.REROUTING SCHEME

In case of the failure of primary channel, real-time-missioncritical application demands the quick recovery of traffic therefore on maintain the seamless transmission. Therefore, protection based recovery theme has been adopted as compared to the restoration based mostly. Backup recovery channel is also utterly partly [12] disjoint to the active channel. In case of disjoint methods routing, one path is functioning because the active path and remaining methods area unit operating as backup methods and at the time of failure, whole traffic from the active path is rerouted on the backup path that doesn't share any element with the active path[7]. A disjoint path protection theme will increase the survivability of communication [11]. However, at the time of traffic switchover whole info contained in active channel is totally lost [3] that will have an effect on the performance of communication. Another reasons of discouraging the disjoint path protection theme area unit its resource unskillfulness and slow recovery action [8]. just in case of native protection ,only faulty portion of the active path is rerouted.
To overcome the drawbacks of disjoint protection scheme, a segment based protection scheme [3,14] has been shown in Fig4.

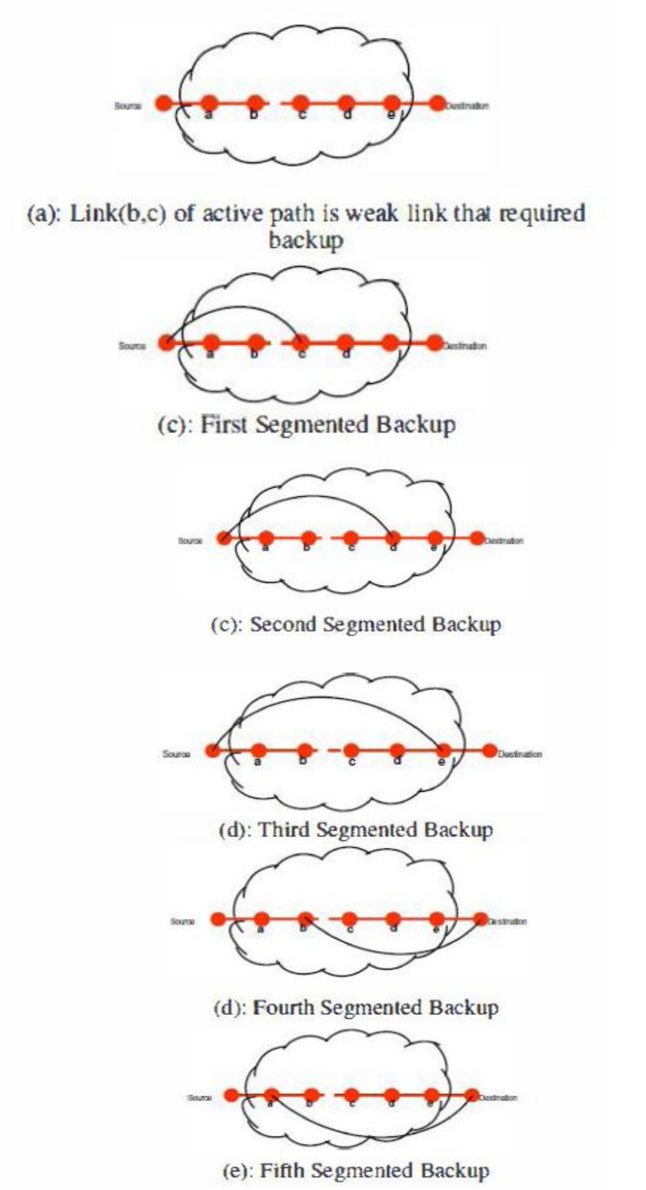
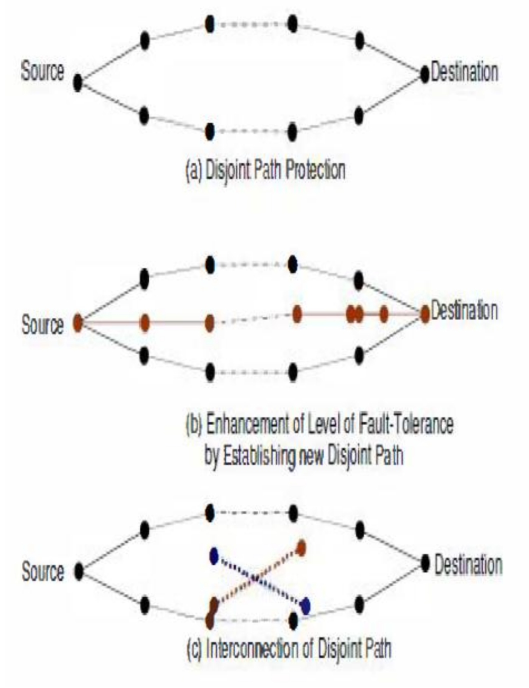


Fig. 4. Various Connections Arrangements Showing the Segmented Protection

Although end-to-end protection theme like disjoint path protection don't seem to be found a lot of appropriate for the survivability of communication[13]. Therefore, this paper proposes Associate in Nursing interconnecting theme for rising the fault tolerance and timeliness. This theme has been illustrated in Fig.5. it's clear from the illustration in FigA&5 that interconnections of disjoint paths improve the performance of recovery by changing a global protection theme into the native theme. Now-a-days when over one service suppliers square measure out there, one can involve over one service suppliers for the continuity of critical communication like telesurgery. Interconnection



VII CONCLUSION

This paper proposes a computationally easier approach for the dependable seamless communication over the pc network. 1st salient feature of this theme is that the convergence of 3 link weights (capacity, delay, and reliability) .This convergence of 3 link weights (capacity, delay, and reliability). This convergence makes alter the tactic of finding QoS path. Second, it searches a QoS active path that has minimum variety of parts[9]. If variety of parts in the primary path will increase, the quantity of backup parts also will increase. Third feature is rerouting theme is targeted on the active path. Therefore, this paper proposes associate economical framework for the seamless flow over the pc network.

REFERENCES

[1] A. Chakrabarti and G. Manimaran, "Reliability Constrained Routing in QoS Networks" , IEEE/ACM Trans. Networking, voI. 14, no. 3,June 2005,pp 662·675.

[2] Cormen,T. H., C. E. Leiserson, R. L. Ri vest, and C. Stien, Introduction to Algorithms, Prantice·Hall of India Pvt. Ltd.,

[3] D. Xu, Y. Chen, Y. Xiong and C. Qiao, "On the Complexity of and Algorithms for Finding the Shortest Path with a Disjoint Counterpart", IEEE/ACM Trans. Networking, Vol. 14, No.1, Feb. 2006, ppI47-15S.

[4] F.Kuiper,T.Korkmaz and M. Krunz," An Overview of Constraint-Based Path Selection Algorithms for QoS Routing",IEEE Communication Magazine, Dec. 2002, pp 50· 55.

[5] F.Kuiper,T. Korkmaz, M. Krunz and P. Van Mieghem, "Performance Evaluation of Constraint-Basesd Path Selection Algorithms", IEEE Network, Sep./Oct. , 2004, pp2-23

[6] G. Xue, "End-to-End Data Paths: Quickest or Most Reliable?", IEEE Communications Letters, Vol. 2, No.6, pp. 156-15S, 1995.

[7]lD. McCABE, Network analysis, architecture and design, 2ndedition, Morgan Kaufmann Publication, 2003.

[8] lVasseur, M. Pickavet, P. Demeester, Network Recovery· Protection and Restoration of Optical, SONET·SDH, IP and MPLS, Morgan Kaufinann Publishers, N. Delhi,2005.

[9] K. P. Gummadi, M. l Pradeep and C. Siva Ram Murthi, "An Efficient Primary-Segmented Backup Scheme for Dependable Real-Time Communication in Multihop Networks" , IEEE/ACM Trans. Networking, Vol. 11, No.1, Feb. 2003, pp SI-94

[10]M. Liotine, Mission·Crritical Network Planning, Artech House, Inc., London, 2003.

[II] M. Pioro and D. Medhi, Routing, Flow, and Capacity Design in Communication and Computer Network, Morgan Kaufinann Publishers, N. Delhi,2005.

[12] N. Taft·Plotkin, B. Bellur and R. Ogier, "Quality of Service Routing Using Maximally Disjoint Paths" , IWQoS '99: Seventh International Workshop on Quality of Service.

[13] P. Stavroulakis, Reliability, Survivability and Quality of Large Scale Telecommunication System, John Wiley and Sons, Ltd.,U.K., 2003.

[14] Ranjit G. and C. Siva Ram Murthi, "A Multiple Segmented Backups Scheme for Dependable Real-Time Communication In Multihop Networks" , Proceedings of Parallel and Distributed Proce ssing Symposium,2003.