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Dynamic P2P Streaming Using Delaunay Edges

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Abstract
Commercial P2P streaming servers like Zattoo, Joost are some Content Delivery Networks (CDN) based on P2P network architecture that acts viable alternatives to client-server(broadcast systems) architectures such as YouTube. Visual and audio feeds via cable, satellite systems are evolving to IPTV and P2PTV based systems. Data delivery is better in broadcast based systems when content is a static feed. But as the user volume for dynamic content increases, internet scale search and data delivery using p2p systems beats any broadcast based systems. This is essentially the driving force behind P2P Streaming Services. P2P streaming systems are usually classified as either tree-oriented push or mesh-oriented swarming and Zatto happens to be a hybrid implementation. Previously, for performance improvement Zattoo implemented a receiver-based peer-division multiplexing engine involving repeater nodes to deliver live streaming content on a p2p network was developed. This hybrid approach causes resource drain with performance and scalability issues. Such an implementation can be handled by commercial systems like Zattoo but considering medium, small scale streaming systems we propose to use P2PStreaming services governed by Delauny Triangulation protocol. The paper presents an algorithm to build each peer with Delaunay links incrementally based on random peer information returned from P2P network querying or accessing the same content signifying a live feed. This algorithm is then optimized by considering the Euclidean distance between peers to speed up the overlay convergence thus improving content loading delays at same time supporting many other peers. A practical implementation of the proposed system validates our claim.

Index Terms: Delaunay triangulation, Cool Streaming, multicasting, random peers, P2P network querying, peer-to-peer technology.

I. INTRODUCTION

Due to lack of video streaming in earlier technologies we introduce the IPTV Network for sending information to more no. of clients using single server file sharing. IPTV is a system through which television services are delivered using Internet Protocol suite packet switched network such as Internet, but this is a centralized system for file sharing. Due to this issue we introduce the P2P Network for file sharing

P2P Network has the following properties:

- The end-to-end delay between the source and receiver to be excessive because they have number of intermediate receivers for file sharing.
- Efficient use of network resources but resource is small due to size limitation of the resource, it is very important to increase the scalability of the system with large system process.

It is a type of decentralized and distributed network architecture in which every node act as a both supplier and consumer for file sharing. In Peer to Peer network tasks are shared among multiple interconnected peers which may take a position of their resources directly available to the other network Peer to Peer network can be implemented on some of the overlay networks on the top of the physical network topology where nodes are overlay from the subnet of the nodes in the physical network. Overlays are used for indexing and peer discovery and make the P2P system independent from the physical network topology.

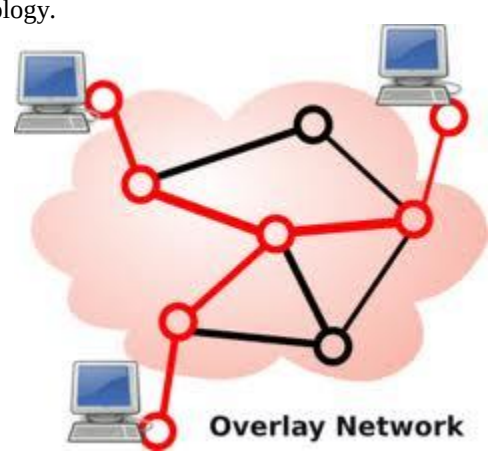

Figure 1: Overlay Peer to Peer Network.

We are sending information from server resources to various clients using peer to peer overlay network. Preceding this information we will send the relevant file sharing using same resources. For that purpose we are using P2P TV, it will be used for only conventional networks, i.e it is only supported for traditional approach in P2P TV networks. It will not be supported by commercial file sharing in P2P networks.

In this region we are introducing Zattoo P2P network. Zattoo P2P sharing is the main solution for Commercial network file sharing as compared to conventional network. In this paper we will introduce Delaunay Triangulation Protocol governed by the P2P networks. We are arranging all the peers with equivalent file sharing with same time. By using our proposed work we will increase the performance of the file sharing system in between the peers.

II. RELATED WORK

The general, approach for self organized applications into logical overlay network and transfer data along with the edges of overlay network is based on unicast services. In peer to peer networks we are providing three types of distributed services, they are tree based push schemas, mesh based push schemas and distributed based file sharing schemas. In general we are using Zattoo like systems like PPLive, PPStream, Sop Cast, TV Ants, and UUSee from China, and Joost, Livestation, Octoshape, and RawFlow another networks are present in the sequence of file sharing process.

Figure 2: Zattoo Network architecture in live streaming.

Zattoo has increased the streaming quality of its android app recently and can now provide much better and stable streams including HD quality for our Android users. Our proposed technique is unique that are able to collect network core data from a large production system with registered users knowledge. We are increasing the performance of the streaming with single resource in server. For this purpose we are introducing Delaunay triangulation protocol version for equal sharing in peer to peer network. A Delaunay triangulation, for a set of points in plane can be arranged in the triangulation DT(p).It will maximize the minimum angles of all the angles of triangle.

III. EXISTING SYSTEM

P2PTV based live streaming services offered by Commercial peer-to-peer systems like Zattoo act as alternatives to conventional viewing On 5 August 2008, Zattoo asked its Spanish users for a €2.40 charge by SMS in order to continue with the service during August and September. In March 2009, Zattoo removed its services from Belgium in an attempt to keep its costs down. Offers decent Performance at higher costs. For performance improvement in systems like Zattoo a receiver-based, peer-division multiplexing engine involving repeater nodes to deliver live streaming content on a p2p network was developed. But repeater nodes implementation is a huge drain on financial resources and can only be handled by commercial systems like Zattoo. P2P systems are usually classified as either tree-based push or mesh-based swarming. In tree-based push schemes, peers organize themselves into multiple distribution trees. In mesh-based swarming, peers form a randomly connected mesh, and content is swarmed via dynamically constructed directed acyclic paths. Zattoo is an hybrid implementation of the above to systems. Such an implementation can only be handled by commercial systems like Zattoo but this approach happens to be a resource drain especially considering small and medium scale systems.

IV. PROPSED SYSTEM

Earlier technologies are not sufficient for free live P2P streaming because those technologies are not cost effective. Extending this approach to live free P2P Streaming systems at reduced costs and achieving optimal performance is required. So we propose an algorithm to build each peer with Delaunay links then they send same information to our networks. Our proposed algorithm is optimized by using the Euclidean distance between peers to speed up the overlay virtual streaming. This approach reduces content loading delays supporting other peers present in the network using Delaunay Triangulation, assurance sending information at the same time. Delaunay triangulation is most attractive for triangulation due to its special feature that circumscribed circle of triangle must not contain other points than the points of the original triangle.

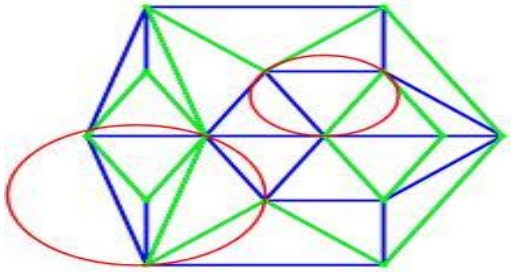

Figure 3: Delaunay Triangulation Overlay Network Architecture.

As shown in fig 3 we will describe the following things.

1. Same equivalent time sharing presented in the connection between each peers.
2. Increase the performance of the overlay network in P2P streaming.

By using polygons in Delaunay triangulation, it gives a nice set of triangles to the other objects and

also helps us to find out the Euclidance distance between each node present in the network.

V. DELAUNAY TRIANGULATION PROTOCOL

Delaunay triangulations have been exploited recently to implementing systems provided efficient routing and broadcasting. In this paper we propose to extend Delaunay with distributed algorithm for incremental construction of P2P networks. Distributed algorithm follows Edge Flipping procedure with distribution of peers. Our solution is based on the definition of a distributed version of the classic Edge Flipping incremental algorithm whose original version is exploited by centralized algorithms to build Delaunay overlays. The centralized Edge Flipping algorithm assumes total knowledge regarding the nodes in the network. Our proposed Delaunay triangulation protocol is able to compute Delaunay neighborhood for each node. Edge Flipping is a centralized algorithm for the construction of a Delaunay triangulation based on the idea of inserting sites, randomly one at a time, and updating the triangulation with each new addition.

```
INPUT:  n be the edge corresponding to the
edge to be inserted
if (n==NeighborTest(n))
{
 then
ADD n to the Local View
p = lat(n)
s = lan(n)
LocalEdgeFlipping(ap,n)
LocalEdgeFlipping(as,n)
}
```

Algorithm 1: Insertion of New Node Procedure.

Above algorithm shows the insertion of new node in to P2P networks. This insertion can be done based on their longitude and latitude values present in the network according to the services provided by the network. This insertion checks Local edge connection present in the network using the following process.

```
Input: nm, the edge to be checked n the new edge
created
if  (NeighborTest (nm) != Neighbor)
{
 then
DELETE w from the Local View
Let nwx be the triangle adjacent to nwnnew
LocalEdgeFlipping(nm,n)
}
```

Algorithm 2: Local edge Flipping process in the P2P networks.

In this process we are calculating neighbor test for new connection to network for accessing services.

```
Input: nm the edge to be checked Let x and y be the
other vertices of the triangles sharing nm
if (InCircle(a,b,x,y) <= 0 or InCircle(a,b,x,y) <=0)
{
then
return false
else
return true
}
```

Algorithm 3: Neighbor Test Generation in P2P network.

Every entering node is verified for establishing connection with other nodes or server present in the network. If one neighbor was found in the circle presented in the network then new node can be added to the network according their longitude and latitude values. The above three algorithms can be followed in an iterative process for each node to add into the network.

VI. EXPERIMENTAL RESULTS

In computational geometry well known topics conclude with set of points presented in the finite elements for modeling shape representation terrain modeling volume rendering and computer vision. Increasing the research in Delaunay triangulation, time Complexity is the main aspect present in file sharing. Uniform distribution takes more time for other networks present in the P2P networks. As mentioned in the above theory we consider each node longitude and latitude values according to the network. After entering into network then we will find out the Euclidian distance between nodes present in the network as follows:

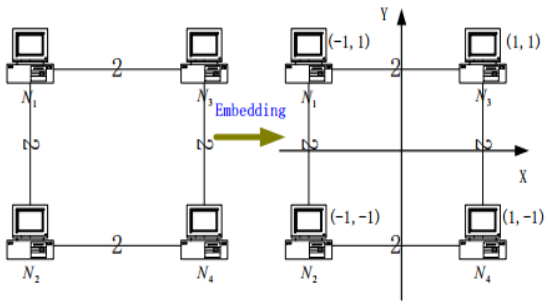

Figure 4: Embedding nodes in network with Euclidian space between nodes.

The basic idea is to ask each node to maintain z co-ordinate characterizing their locations in network so that distance between two nodes can be predicted by evaluating a distance function nodes co-ordinate (Longitude and latitude) values. Euclidian distance d_p with each element present in the internet coordinate system.

Then Euclidian distance is calculated as follows:

$$\mathbf{d}_p(d_{N_i}, d_{N_j}) = \left(\sum_{k=1}^{m} |d_{N_{ik}} - d_{N_{jk}}|^p \right)^{\frac{1}{p}}$$

Where d_{Ni} and d_{Nj} are the distance vector that every element it is the distance from i to each node present in the network. We define that Euclidean distance between dp is the network distance measured by the i^{th} node to j^{th} node.

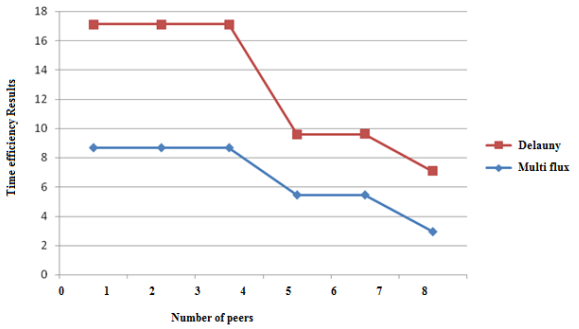

Figure 5: Comparison results of live streaming with multi fluxing and Delaunay Triangulation Protocol with Euclidean distance calculation.

Comparison results between our existing multiplex live streaming process and our proposed work delaunay triangulation with Euclidean distance between each node present in the peer to peer to network. Those results are calculated by the above mentioned equation for Euclidean space between every node present in the network.

VII. CONCLUSION

P2P systems are usually classified as either tree-based push or mesh-based swarming. In tree-based push schemes, peers organize themselves into multiple distribution trees. In mesh-based swarming, peers form a randomly connected mesh, and content is swarmed via dynamically constructed directed acyclic paths. Zattoo is an hybrid implementation of the above to systems. Such an implementation can only be handled by commercial systems like Zattoo but this approach happens to be a resource drain especially considering small and medium scale systems. In this paper we propose an algorithm to build each peer with Delaunay links incrementally by including random peers returned from P2P network querying or accessing the same content. The algorithm is then optimized by considering the Euclidean distance between peers to speed up the overlay convergence. This approach reduces content loading delays significantly at the same time supporting many other peers thus attaining performance and scalability parameters.

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